NVIDIA DRIVE OS 6.0 TensorRT 8.3.0 API Reference

NVIDIA DRIVE OS 6.0.2

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TensorRT API Reference

8.3.0

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Table 1 Revision history

Date	Summary of change
November 2, 2021	Initial draft
November 9 - December 22, 2021	Review
January 3, 2021	Approval review

Contents

Chapter 1

Standard and Safe

This document covers both the standard TensorRT release and the safe TensorRT release. Interfaces supported in the safe runtime are exclusively defined in the following interface files:

See the *NVIDIA DRIVE OS 6.0 Safety Developer Guide* for more details on the Standard/Safe split. The safety runtime is designed to support automotive Safety Integrity Level B (ASIL-B) for safety flows. Applications using the safety runtime must follow the *NVIDIA DRIVE OS 6.0 Safety Manual*. The safety runtime makes use of CUDA® and is designed to work with applications using CUDA.

Chapter 2

TensorRT

This is the API documentation for the NVIDIA TensorRT library. It provides information on individual functions, classes and methods. Use the index on the left to navigate the documentation.

Please see the accompanying user guide and samples for higher-level information and general advice on using TensorRT.

Chapter 3

Deprecated List

Member nvcaffeparser1::createCaffeParser () noexcept

ICaffeParser will be removed in TensorRT 9.0. Plan to migrate your workflow to use nvonnxparser::IParser for deployment.

Member nvcaffeparser1::IBinaryProtoBlob::destroy () noexcept=0

Deprecated interface will be removed in TensorRT 10.0.

Member nvcaffeparser1::ICaffeParser::destroy () noexcept=0

Deprecated interface will be removed in TensorRT 10.0.

Member nvinfer1::IAlgorithm::getAlgorithmIOInfo (int32_t index) const noexcept

Use IAlgorithm::getAlgorithmIOInfoByIndex instead. Deprecated in TensorRT 8.0

Member nvinfer1::IBuilder::buildEngineWithConfig (INetworkDefinition &network, IBuilderConfig &config) noexcept

Use IBuilder::buildSerializedNetwork. Deprecated in TensorRT 8.0

Member nvinfer1::IBuilder::destroy () noexcept

Use `delete` instead. Deprecated in TensorRT 8.0

Member nvinfer1::IBuilderConfig::destroy () noexcept

Use `delete` instead. Deprecated in TensorRT 8.0

Member nvinfer1::IBuilderConfig::getMaxWorkspaceSize () const noexcept

Use IBuilderConfig::getMemoryPoolLimit with MemoryPoolType::kWORKSPACE. Deprecated in TensorRT 8.3

Member nvinfer1::IBuilderConfig::setMaxWorkspaceSize (std::size_t workspaceSize) noexcept

Use IBuilderConfig::setMemoryPoolLimit with MemoryPoolType::kWORKSPACE. Deprecated in TensorRT 8.3

Member nvinfer1::IConvolutionLayer::getDilation () const noexcept

Superseded by getDilationNd. Deprecated prior to TensorRT 8.0 and will be removed in 9.0

Member nvinfer1::IConvolutionLayer::getKernelSize () const noexcept

Superseded by getKernelSizeNd. Deprecated prior to TensorRT 8.0 and will be removed in 9.0

Member nvinfer1::IConvolutionLayer::getPadding () const noexcept

Superseded by getPaddingNd. Deprecated prior to TensorRT 8.0 and will be removed in 9.0

Member nvinfer1::IConvolutionLayer::getStride () const noexcept

Superseded by getStrideNd. Deprecated prior to TensorRT 8.0 and will be removed in 9.0

Member nvinfer1::IConvolutionLayer::setDilation (DimsHW dilation) noexcept

Superseded by setDilationNd. Deprecated prior to TensorRT 8.0 and will be removed in 9.0

Member nvinfer1::IConvolutionLayer::setKernelSize (DimsHW kernelSize) noexcept

Superseded by setKernelSizeNd. Deprecated prior to TensorRT 8.0 and will be removed in 9.0

Member nvinfer1::IConvolutionLayer::setPadding (DimsHW padding) noexcept

Superseded by setPaddingNd. Deprecated prior to TensorRT 8.0 and will be removed in 9.0

Member nvinfer1::IConvolutionLayer::setStride (DimsHW stride) noexcept

Superseded by setStrideNd. Deprecated prior to TensorRT 8.0 and will be removed in 9.0

Member nvinfer1::ICudaEngine::destroy () noexcept

Deprecated interface will be removed in TensorRT 10.0.

Member nvinfer1::IDeconvolutionLayer::getKernelSize () const noexcept

Superseded by getKernelSizeNd. Deprecated prior to TensorRT 8.0 and will be removed in 9.0

Member nvinfer1::IDeconvolutionLayer::getPadding () const noexcept

Superseded by getPaddingNd. Deprecated prior to TensorRT 8.0 and will be removed in 9.0

Member nvinfer1::IDeconvolutionLayer::getStride () const noexcept

Superseded by getStrideNd. Deprecated prior to TensorRT 8.0 and will be removed in 9.0

Member nvinfer1::IDeconvolutionLayer::setKernelSize (DimsHW kernelSize) noexcept

Superseded by setKernelSizeNd. Deprecated prior to TensorRT 8.0 and will be removed in 9.0

Member nvinfer1::IDeconvolutionLayer::setPadding (DimsHW padding) noexcept

Superseded by setPaddingNd. Deprecated prior to TensorRT 8.0 and will be removed in 9.0

Member nvinfer1::IDeconvolutionLayer::setStride (DimsHW stride) noexcept

Superseded by setStrideNd. Deprecated prior to TensorRT 8.0 and will be removed in 9.0

Member nvinfer1::IExecutionContext::destroy () noexcept

Deprecated interface will be removed in TensorRT 10.0.

Member nvinfer1::IExecutionContext::setOptimizationProfile (int32_t profileIndex) noexcept

This API is superseded by setOptimizationProfileAsync and will be removed in TensorRT 9.0.

Member nvinfer1::IGpuAllocator::free (void *const memory) noexcept=0

Superseded by deallocate and will be removed in TensorRT 10.0.

Member nvinfer1::IHostMemory::destroy () noexcept

Deprecated interface will be removed in TensorRT 10.0.

Member nvinfer1::INetworkDefinition::addConvolution (ITensor &input, int32_t nbOutputMaps, DimsHW kernelSize, Weights kernelWeights, Weights biasWeights) noexcept

Superseded by addConvolutionNd. Deprecated prior to TensorRT 8.0 and will be removed in 9.0

Member nvinfer1::INetworkDefinition::addDeconvolution (ITensor &input, int32_t nbOutputMaps, DimsHW kernelSize, Weights kernelWeights, Weights biasWeights) noexcept

Superseded by addDeconvolutionNd. Deprecated prior to TensorRT 8.0 and will be removed in 9.0

Member nvinfer1::INetworkDefinition::addPadding (ITensor &input, DimsHW prePadding, DimsHW post↩ Padding) noexcept

Superseded by addPaddingNd. Deprecated prior to TensorRT 8.0 and will be removed in 9.0

Member nvinfer1::INetworkDefinition::addPaddingNd (ITensor &input, Dims prePadding, Dims postPadding) noexcept

Superseded by addSlice. Deprecated in TensorRT 8.0

Member nvinfer1::INetworkDefinition::addPooling (ITensor &input, PoolingType type, DimsHW windowSize) noexcept

Superseded by addPoolingNd. Deprecated prior to TensorRT 8.0 and will be removed in 9.0

Member nvinfer1::INetworkDefinition::addRNNv2 (ITensor &input, int32_t layerCount, int32_t hiddenSize, int32_t maxSeqLen, RNNOperation op) noexcept

Superseded by INetworkDefinition::addLoop. Deprecated prior to TensorRT 8.0 and will be removed in 9.0

Member nvinfer1::INetworkDefinition::destroy () noexcept

Use `delete` instead. Deprecated in TensorRT 8.0

Member nvinfer1::INetworkDefinition::hasExplicitPrecision () const noexcept

Deprecated in TensorRT 8.0

Member nvinfer1::IPaddingLayer::getPostPadding () const noexcept

Superseded by getPostPaddingNd. Deprecated prior to TensorRT 8.0 and will be removed in 9.0

Member nvinfer1::IPaddingLayer::getPrePadding () const noexcept

Superseded by getPrePaddingNd. Deprecated prior to TensorRT 8.0 and will be removed in 9.0

Member nvinfer1::IPaddingLayer::setPostPadding (DimsHW padding) noexcept

Superseded by setPostPaddingNd. Deprecated prior to TensorRT 8.0 and will be removed in 9.0

Member nvinfer1::IPaddingLayer::setPrePadding (DimsHW padding) noexcept

Superseded by setPrePaddingNd. Deprecated prior to TensorRT 8.0 and will be removed in 9.0

Member nvinfer1::IPoolingLayer::getPadding () const noexcept

Superseded by getPaddingNd. Deprecated prior to TensorRT 8.0 and will be removed in 9.0

Member nvinfer1::IPoolingLayer::getStride () const noexcept

Superseded by getStrideNd. Deprecated prior to TensorRT 8.0 and will be removed in 9.0

Member nvinfer1::IPoolingLayer::getWindowSize () const noexcept

Superseded by getWindowSizeNd. Deprecated prior to TensorRT 8.0 and will be removed in 9.0

Member nvinfer1::IPoolingLayer::setPadding (DimsHW padding) noexcept

Superseded by setPaddingNd. Deprecated prior to TensorRT 8.0 and will be removed in 9.0

Member nvinfer1::IPoolingLayer::setStride (DimsHW stride) noexcept

Superseded by setStrideNd. Deprecated prior to TensorRT 8.0 and will be removed in 9.0

Member nvinfer1::IPoolingLayer::setWindowSize (DimsHW windowSize) noexcept

Superseded by setWindowSizeNd. Deprecated prior to TensorRT 8.0 and will be removed in 9.0

Member nvinfer1::IRefitter::destroy () noexcept

Deprecated interface will be removed in TensorRT 10.0.

Member nvinfer1::IResizeLayer::getAlignCorners () const noexcept

Superseded by IResizeLayer::getCoordinateTransformation(). Deprecated in TensorRT 8.0

Member nvinfer1::IResizeLayer::setAlignCorners (bool alignCorners) noexcept

Superseded by IResizeLayer::setCoordinateTransformation(). Deprecated in TensorRT 8.0

Class nvinfer1::IRNNv2Layer

Use INetworkDefinition::addLoop instead. Deprecated prior to TensorRT 8.0 and will be removed in 9.0

Member nvinfer1::IRuntime::deserializeCudaEngine (const void *blob, std::size_t size, IPluginFactory *pluginFactory) noexcept

Deprecated interface will be removed in TensorRT 10.0.

Member nvinfer1::IRuntime::destroy () noexcept

Deprecated interface will be removed in TensorRT 10.0.

Member nvinfer1::kSTRICT_TYPES

Deprecated in TensorRT 8.2

Member nvonnxparser::IOnnxConfig::destroy () noexcept=0

Deprecated interface will be removed in TensorRT 10.0.

Member nvuffparser::createUffParser () noexcept

IUffParser will be removed in TensorRT 9.0. Plan to migrate your workflow to use nvonnxparser::IParser for deployment.

Member nvuffparser::IUffParser::destroy () noexcept=0

Deprecated interface will be removed in TensorRT 10.0.

Chapter 4

Namespace Index

4.1 Namespace List

Here is a list of all namespaces with brief descriptions:

Chapter 5

Hierarchical Index

5.1 Class Hierarchy

This inheritance list is sorted roughly, but not completely, alphabetically:

Chapter 6

Class Index

6.1 Class List

Here are the classes, structs, unions and interfaces with brief descriptions:

Chapter 7

File Index

7.1 File List

Here is a list of all files with brief descriptions:

Chapter 8

Namespace Documentation

8.1 nvcaffeparser1 Namespace Reference

The TensorRT Caffe parser API namespace.

Classes

- class IBinaryProtoBlob

  Object used to store and query data extracted from a binaryproto file using the ICaffeParser.
- class IBlobNameToTensor

  Object used to store and query Tensors after they have been extracted from a Caffe model using the ICaffeParser.
- class ICaffeParser

  Class used for parsing Caffe models.
- class IPluginFactoryV2

  Plugin factory used to configure plugins.

Functions

- ICaffeParser * createCaffeParser () noexcept

  Creates a ICaffeParser object.
- void shutdownProtobufLibrary () noexcept

  Shuts down protocol buffers library.

8.1.1 Detailed Description

The TensorRT Caffe parser API namespace.

8.1.2 Function Documentation

8.1.2.1 createCaffeParser()

```
ICaffeParser * nvcaffeparser1::createCaffeParser ( )  [noexcept]
```

Creates a ICaffeParser object.

Returns

A pointer to the ICaffeParser object is returned.

See also

nvcaffeparser1::ICaffeParser

Deprecated ICaffeParser will be removed in TensorRT 9.0. Plan to migrate your workflow to use nvonnxparser::IParser for deployment.

8.1.2.2 shutdownProtobufLibrary()

```
void nvcaffeparser1::shutdownProtobufLibrary ( )  [noexcept]
```

Shuts down protocol buffers library.

Note

No part of the protocol buffers library can be used after this function is called.

8.2 nvinfer1 Namespace Reference

The TensorRT API version 1 namespace.

Namespaces

- namespace consistency
- namespace impl
- namespace plugin
- namespace safe

  The safety subset of TensorRT's API version 1 namespace.
- namespace utils

Classes

- class Dims2

  Descriptor for two-dimensional data.
- class Dims3

  Descriptor for three-dimensional data.
- class Dims32
- class Dims4

  Descriptor for four-dimensional data.
- class DimsExprs
- class DimsHW

  Descriptor for two-dimensional spatial data.
- class DynamicPluginTensorDesc
- class IActivationLayer

  An Activation layer in a network definition.
- class IAlgorithm

  Describes a variation of execution of a layer. An algorithm is represented by IAlgorithmVariant and the IAlgorithmIOInfo for each of its inputs and outputs. An algorithm can be selected or reproduced using AlgorithmSelector::select↩ Algorithms().".
- class IAlgorithmContext

  Describes the context and requirements, that could be fulfilled by one or more instances of IAlgorithm.
- class IAlgorithmIOInfo

  Carries information about input or output of the algorithm. IAlgorithmIOInfo for all the input and output along with IAlgorithmVariant denotes the variation of algorithm and can be used to select or reproduce an algorithm using IAlgorithmSelector::selectAlgorithms().
- class IAlgorithmSelector

  Interface implemented by application for selecting and reporting algorithms of a layer provided by the builder.
- class IAlgorithmVariant

  provides a unique 128-bit identifier, which along with the input and output information denotes the variation of algorithm and can be used to select or reproduce an algorithm, using IAlgorithmSelector::selectAlgorithms()
- class IAssertionLayer

  An assertion layer in a network.
- class IBuilder

  Builds an engine from a network definition.
- class IBuilderConfig

  Holds properties for configuring a builder to produce an engine.
- class IConcatenationLayer

  A concatenation layer in a network definition.
- class IConditionLayer
- class IConstantLayer

  Layer that represents a constant value.
- class IConvolutionLayer

  A convolution layer in a network definition.
- class ICudaEngine

  An engine for executing inference on a built network, with functionally unsafe features.
- class IDeconvolutionLayer

  A deconvolution layer in a network definition.
- class IDequantizeLayer

  A Dequantize layer in a network definition.

- class IDimensionExpr
- class IEinsumLayer

  An Einsum layer in a network.
- class IElementWiseLayer

  A elementwise layer in a network definition.
- class IEngineInspector

  An engine inspector which prints out the layer information of an engine or an execution context.
- class IErrorRecorder

  Reference counted application-implemented error reporting interface for TensorRT objects.
- class IExecutionContext

  Context for executing inference using an engine, with functionally unsafe features.
- class IExprBuilder
- class IFillLayer

  Generate an output tensor with specified mode.
- class IFullyConnectedLayer

  A fully connected layer in a network definition. This layer expects an input tensor of three or more non-batch dimensions. The input is automatically reshaped into an `MxV` *tensor* `X`*, where* `V` *is a product of the last three dimensions and* `M` *is a product of the remaining dimensions (where the product over 0 dimensions is defined as 1). For example:*
- class IGatherLayer

  A Gather layer in a network definition. Supports several kinds of gathering.
- class IGpuAllocator

  Application-implemented class for controlling allocation on the GPU.
- class IHostMemory

  Class to handle library allocated memory that is accessible to the user.
- class IIdentityLayer

  A layer that represents the identity function.
- class IIfConditional
- class IIfConditionalBoundaryLayer
- class IIfConditionalInputLayer
- class IIfConditionalOutputLayer
- class IInt8Calibrator

  Application-implemented interface for calibration.
- class IInt8EntropyCalibrator
- class IInt8EntropyCalibrator2
- class IInt8LegacyCalibrator
- class IInt8MinMaxCalibrator
- class IIteratorLayer
- class ILayer

  Base class for all layer classes in a network definition.
- class ILogger

  Application-implemented logging interface for the builder, refitter and runtime.
- class ILoop
- class ILoopBoundaryLayer
- class ILoopOutputLayer
- class ILRNLayer

  A LRN layer in a network definition.
- class IMatrixMultiplyLayer

  Layer that represents a Matrix Multiplication.

- class INetworkDefinition

  A network definition for input to the builder.
- class INoCopy

  Forward declaration of IEngineInspector for use by other interfaces.
- class IOptimizationProfile

  Optimization profile for dynamic input dimensions and shape tensors.
- class IPaddingLayer

  Layer that represents a padding operation.
- class IParametricReLULayer

  Layer that represents a parametric ReLU operation.
- class IPluginCreator

  Plugin creator class for user implemented layers.
- class IPluginRegistry

  Single registration point for all plugins in an application. It is used to find plugin implementations during engine deserialization. Internally, the plugin registry is considered to be a singleton so all plugins in an application are part of the same global registry. Note that the plugin registry is only supported for plugins of type IPluginV2 and should also have a corresponding IPluginCreator implementation.
- class IPluginV2

  Plugin class for user-implemented layers.
- class IPluginV2DynamicExt
- class IPluginV2Ext

  Plugin class for user-implemented layers.
- class IPluginV2IOExt

  Plugin class for user-implemented layers.
- class IPluginV2Layer

  Layer type for pluginV2.
- class IPoolingLayer

  A Pooling layer in a network definition.
- class IProfiler

  Application-implemented interface for profiling.
- class IQuantizeLayer

  A Quantize layer in a network definition.
- class IRaggedSoftMaxLayer

  A RaggedSoftmax layer in a network definition.
- class IRecurrenceLayer
- class IReduceLayer

  Layer that represents a reduction operator across Shape, Int32, Float, Half, and Int8 tensors.
- class IRefitter

  Updates weights in an engine.
- class IResizeLayer

  A resize layer in a network definition.
- class IRNNv2Layer

  An RNN layer in a network definition, version 2.
- class IRuntime

  Allows a serialized functionally unsafe engine to be deserialized.
- class IScaleLayer

  A Scale layer in a network definition.
- class IScatterLayer

A scatter layer in a network definition. Supports several kinds of scattering.

- class ISelectLayer
- class IShapeLayer

  Layer type for getting shape of a tensor.
- class IShuffleLayer

  Layer type for shuffling data.
- class ISliceLayer

  Slices an input tensor into an output tensor based on the offset and strides.
- class ISoftMaxLayer

  A Softmax layer in a network definition.
- class ITensor

  A tensor in a network definition.
- class ITimingCache

  Class to handle tactic timing info collected from builder.
- class ITopKLayer

  Layer that represents a TopK reduction.
- class ITripLimitLayer
- class IUnaryLayer

  Layer that represents an unary operation.
- struct Permutation
- class PluginField

  Structure containing plugin attribute field names and associated data This information can be parsed to decode necessary plugin metadata.
- struct PluginFieldCollection

  Plugin field collection struct.
- class PluginRegistrar

  Register the plugin creator to the registry The static registry object will be instantiated when the plugin library is loaded. This static object will register all creators available in the library to the registry.
- struct PluginTensorDesc

  Fields that a plugin might see for an input or output.
- class Weights

  An array of weights used as a layer parameter.

Typedefs

- using TensorFormats = uint32_t

  It is capable of representing one or more TensorFormat by binary OR operations, e.g., 1U << TensorFormat::kCHW4 | 1U << TensorFormat::kCHW32.
- using QuantizationFlags = uint32_t

  Represents one or more QuantizationFlag values using binary OR operations.
- using BuilderFlags = uint32_t

  Represents one or more QuantizationFlag values using binary OR operations, e.g., 1U << BuilderFlag::kFP16 | 1U << BuilderFlag::kDEBUG.
- using NetworkDefinitionCreationFlags = uint32_t

  Represents one or more NetworkDefinitionCreationFlag flags using binary OR operations. e.g., 1U << NetworkDefinitionCreationFlag::kEXPLICIT_BATCH.
- using TacticSources = uint32_t

  Represents a collection of one or more TacticSource values combine using bitwise-OR operations.

- using char_t = char

  char_t is the type used by TensorRT to represent all valid characters.
- using AsciiChar = char_t

  AsciiChar is the type used by TensorRT to represent valid ASCII characters.
- using Dims = Dims32
- using PluginFormat = TensorFormat

  PluginFormat is reserved for backward compatibility.
- using AllocatorFlags = uint32_t

Enumerations

- enum class LayerType : int32_t {
  kCONVOLUTION = 0 , kFULLY_CONNECTED = 1 , kACTIVATION = 2 , kPOOLING = 3 ,
  kLRN = 4 , kSCALE = 5 , kSOFTMAX = 6 , kDECONVOLUTION = 7 ,
  kCONCATENATION = 8 , kELEMENTWISE = 9 , kPLUGIN = 10 , kUNARY = 11 ,
  kPADDING = 12 , kSHUFFLE = 13 , kREDUCE = 14 , kTOPK = 15 ,
  kGATHER = 16 , kMATRIX_MULTIPLY = 17 , kRAGGED_SOFTMAX = 18 , kCONSTANT = 19 ,
  kRNN_V2 = 20 , kIDENTITY = 21 , kPLUGIN_V2 = 22 , kSLICE = 23 ,
  kSHAPE = 24 , kPARAMETRIC_RELU = 25 , kRESIZE = 26 , kTRIP_LIMIT = 27 ,
  kRECURRENCE = 28 , kITERATOR = 29 , kLOOP_OUTPUT = 30 , kSELECT = 31 ,
  kFILL = 32 , kQUANTIZE = 33 , kDEQUANTIZE = 34 , kCONDITION = 35 ,
  kCONDITIONAL_INPUT = 36 , kCONDITIONAL_OUTPUT = 37 , kSCATTER = 38 , kEINSUM = 39 ,
  kASSERTION = 40 }

  The type values of layer classes.
- enum class ActivationType : int32_t {
  kRELU = 0 , kSIGMOID = 1 , kTANH = 2 , kLEAKY_RELU = 3 ,
  kELU = 4 , kSELU = 5 , kSOFTSIGN = 6 , kSOFTPLUS = 7 ,
  kCLIP = 8 , kHARD_SIGMOID = 9 , kSCALED_TANH = 10 , kTHRESHOLDED_RELU = 11 }

  Enumerates the types of activation to perform in an activation layer.
- enum class PaddingMode : int32_t {
  kEXPLICIT_ROUND_DOWN = 0 , kEXPLICIT_ROUND_UP = 1 , kSAME_UPPER = 2 , kSAME_LOWER = 3 ,
  kCAFFE_ROUND_DOWN = 4 , kCAFFE_ROUND_UP = 5 }

  Enumerates the modes of padding to perform in convolution, deconvolution and pooling layer, padding mode takes precedence if setPaddingMode() and setPrePadding() are also used.
- enum class PoolingType : int32_t { kMAX = 0 , kAVERAGE = 1 , kMAX_AVERAGE_BLEND = 2 }

  The type of pooling to perform in a pooling layer.
- enum class ScaleMode : int32_t { kUNIFORM = 0 , kCHANNEL = 1 , kELEMENTWISE = 2 }

  Controls how shift, scale and power are applied in a Scale layer.
- enum class ElementWiseOperation : int32_t {
  kSUM = 0 , kPROD = 1 , kMAX = 2 , kMIN = 3 ,
  kSUB = 4 , kDIV = 5 , kPOW = 6 , kFLOOR_DIV = 7 ,
  kAND = 8 , kOR = 9 , kXOR = 10 , kEQUAL = 11 ,
  kGREATER = 12 , kLESS = 13 }

  Enumerates the binary operations that may be performed by an ElementWise layer.
- enum class GatherMode : int32_t { kDEFAULT = 0 , kELEMENT = 1 , kND = 2 }

  Control form of IGatherLayer.
- enum class RNNOperation : int32_t { kRELU = 0 , kTANH = 1 , kLSTM = 2 , kGRU = 3 }

  Enumerates the RNN operations that may be performed by an RNN layer.

- enum class RNNDirection : int32_t { kUNIDIRECTION = 0 , kBIDIRECTION = 1 }

  Enumerates the RNN direction that may be performed by an RNN layer.
- enum class RNNInputMode : int32_t { kLINEAR = 0 , kSKIP = 1 }

  Enumerates the RNN input modes that may occur with an RNN layer.
- enum class RNNGateType : int32_t {
  kINPUT = 0 , kOUTPUT = 1 , kFORGET = 2 , kUPDATE = 3 ,
  kRESET = 4 , kCELL = 5 , kHIDDEN = 6 }

  Identifies an individual gate within an RNN cell.
- enum class UnaryOperation : int32_t {
  kEXP = 0 , kLOG = 1 , kSQRT = 2 , kRECIP = 3 ,
  kABS = 4 , kNEG = 5 , kSIN = 6 , kCOS = 7 ,
  kTAN = 8 , kSINH = 9 , kCOSH = 10 , kASIN = 11 ,
  kACOS = 12 , kATAN = 13 , kASINH = 14 , kACOSH = 15 ,
  kATANH = 16 , kCEIL = 17 , kFLOOR = 18 , kERF = 19 ,
  kNOT = 20 , kSIGN = 21 , kROUND = 22 }

  Enumerates the unary operations that may be performed by a Unary layer.
- enum class ReduceOperation : int32_t {
  kSUM = 0 , kPROD = 1 , kMAX = 2 , kMIN = 3 ,
  kAVG = 4 }

  Enumerates the reduce operations that may be performed by a Reduce layer.
- enum class SliceMode : int32_t {
  kDEFAULT = 0 , kWRAP = 1 , kCLAMP = 2 , kFILL = 3 ,
  kREFLECT = 4 }

  Controls how ISliceLayer handles out of bounds coordinates.
- enum class TopKOperation : int32_t { kMAX = 0 , kMIN = 1 }

  Enumerates the operations that may be performed by a TopK layer.
- enum class MatrixOperation : int32_t { kNONE , kTRANSPOSE , kVECTOR }

  Enumerates the operations that may be performed on a tensor by IMatrixMultiplyLayer before multiplication.
- enum class ResizeMode : int32_t { kNEAREST = 0 , kLINEAR = 1 }

  Enumerates various modes of resize in the resize layer. Resize mode set using setResizeMode().
- enum class ResizeCoordinateTransformation : int32_t { kALIGN_CORNERS = 0 , kASYMMETRIC = 1 , kHALF_PIXEL = 2 }

  The resize coordinate transformation function.
- enum class ResizeSelector : int32_t { kFORMULA = 0 , kUPPER = 1 }

  The coordinate selector when resize to single pixel output.
- enum class ResizeRoundMode : int32_t { kHALF_UP = 0 , kHALF_DOWN = 1 , kFLOOR = 2 , kCEIL = 3 }

  The rounding mode for nearest neighbor resize.
- enum class LoopOutput : int32_t { kLAST_VALUE = 0 , kCONCATENATE = 1 , kREVERSE = 2 }

  Enum that describes kinds of loop outputs.
- enum class TripLimit : int32_t { kCOUNT = 0 , kWHILE = 1 }

  Enum that describes kinds of trip limits.
- enum class FillOperation : int32_t { kLINSPACE = 0 , kRANDOM_UNIFORM = 1 }

  Enumerates the tensor fill operations that may performed by a fill layer.
- enum class ScatterMode : int32_t { kELEMENT = 0 , kND = 1 }

  Control form of IScatterLayer.
- enum class CalibrationAlgoType : int32_t { kLEGACY_CALIBRATION = 0 , kENTROPY_CALIBRATION = 1 , kENTROPY_CALIBRATION_2 = 2 , kMINMAX_CALIBRATION = 3 }

  Version of calibration algorithm to use.
- enum class QuantizationFlag : int32_t { kCALIBRATE_BEFORE_FUSION = 0 }

List of valid flags for quantizing the network to int8.

- enum class BuilderFlag : int32_t {
  kFP16 = 0 , kINT8 = 1 , kDEBUG = 2 , kGPU_FALLBACK = 3 ,
  kSTRICT_TYPES = 4 , kREFIT = 5 , kDISABLE_TIMING_CACHE = 6 , kTF32 = 7 ,
  kSPARSE_WEIGHTS = 8 , kSAFETY_SCOPE = 9 , kOBEY_PRECISION_CONSTRAINTS = 10 ,
  kPREFER_PRECISION_CONSTRAINTS = 11 ,
  kDIRECT_IO = 12 , kREJECT_EMPTY_ALGORITHMS = 13 }

  List of valid modes that the builder can enable when creating an engine from a network definition.
- enum class MemoryPoolType : int32_t { kWORKSPACE = 0 , kDLA_MANAGED_SRAM = 1 , kDLA_LOCAL_DRAM = 2 , kDLA_GLOBAL_DRAM = 3 }

  The type for memory pools used by TensorRT.
- enum class NetworkDefinitionCreationFlag : int32_t { kEXPLICIT_BATCH = 0 , kEXPLICIT_PRECISION = 1 }

  List of immutable network properties expressed at network creation time. NetworkDefinitionCreationFlag is used with createNetworkV2 to specify immutable properties of the network. The createNetwork() function always had an implicit batch dimension being specified by the maxBatchSize builder parameter. createNetworkV2 with kDEFAULT flag mimics that behaviour.
- enum class EngineCapability : int32_t {
  kSTANDARD = 0 , kDEFAULT = kSTANDARD , kSAFETY = 1 , kSAFE_GPU = kSAFETY ,
  kDLA_STANDALONE = 2 , kSAFE_DLA = kDLA_STANDALONE }

  List of supported engine capability flows.
- enum class DimensionOperation : int32_t {
  kSUM = 0 , kPROD = 1 , kMAX = 2 , kMIN = 3 ,
  kSUB = 4 , kEQUAL = 5 , kLESS = 6 , kFLOOR_DIV = 7 ,
  kCEIL_DIV = 8 }

  An operation on two IDimensionExpr, which represent integer expressions used in dimension computations.
- enum class TensorLocation : int32_t { kDEVICE = 0 , kHOST = 1 }

  The location for tensor data storage, device or host.
- enum class WeightsRole : int32_t {
  kKERNEL = 0 , kBIAS = 1 , kSHIFT = 2 , kSCALE = 3 ,
  kCONSTANT = 4 , kANY = 5 }

  How a layer uses particular Weights.
- enum class DeviceType : int32_t { kGPU , kDLA }

  The device that this layer/network will execute on.
- enum class OptProfileSelector : int32_t { kMIN = 0 , kOPT = 1 , kMAX = 2 }

  When setting or querying optimization profile parameters (such as shape tensor inputs or dynamic dimensions), select whether we are interested in the minimum, optimum, or maximum values for these parameters. The minimum and maximum specify the permitted range that is supported at runtime, while the optimum value is used for the kernel selection. This should be the "typical" value that is expected to occur at runtime.
- enum class TacticSource : int32_t { kCUBLAS = 0 , kCUBLAS_LT = 1 , kCUDNN = 2 }

  List of tactic sources for TensorRT.
- enum class ProfilingVerbosity : int32_t {
  kLAYER_NAMES_ONLY = 0 , kNONE = 1 , kDETAILED = 2 , kDEFAULT = kLAYER_NAMES_ONLY ,
  kVERBOSE = kDETAILED }

  List of verbosity levels of layer information exposed in NVTX annotations and in IEngineInspector.
- enum class LayerInformationFormat : int32_t { kONELINE = 0 , kJSON = 1 }

  The format in which the IEngineInspector prints the layer information.
- enum class DataType : int32_t {
  kFLOAT = 0 , kHALF = 1 , kINT8 = 2 , kINT32 = 3 ,
  kBOOL = 4 }

  The type of weights and tensors.

- enum class TensorFormat : int32_t {
  kLINEAR = 0 , kCHW2 = 1 , kHWC8 = 2 , kCHW4 = 3 ,
  kCHW16 = 4 , kCHW32 = 5 , kDHWC8 = 6 , kCDHW32 = 7 ,
  kHWC = 8 , kDLA_LINEAR = 9 , kDLA_HWC4 = 10 , kHWC16 = 11 }

  Format of the input/output tensors.
- enum class PluginVersion : uint8_t { kV2 = 0 , kV2_EXT = 1 , kV2_IOEXT = 2 , kV2_DYNAMICEXT = 3 }
- enum class PluginFieldType : int32_t {
  kFLOAT16 = 0 , kFLOAT32 = 1 , kFLOAT64 = 2 , kINT8 = 3 ,
  kINT16 = 4 , kINT32 = 5 , kCHAR = 6 , kDIMS = 7 ,
  kUNKNOWN = 8 }
- enum class AllocatorFlag : int32_t { kRESIZABLE = 0 }
- enum class ErrorCode : int32_t {
  kSUCCESS = 0 , kUNSPECIFIED_ERROR = 1 , kINTERNAL_ERROR = 2 , kINVALID_ARGUMENT = 3 ,
  kINVALID_CONFIG = 4 , kFAILED_ALLOCATION = 5 , kFAILED_INITIALIZATION = 6 , kFAILED_EXECUTION
  = 7 ,
  kFAILED_COMPUTATION = 8 , kINVALID_STATE = 9 , kUNSUPPORTED_STATE = 10 }

  Error codes that can be returned by TensorRT during execution.

Functions

- template<> constexpr int32_t EnumMax< LayerType > () noexcept
- template<> constexpr int32_t EnumMax< ScaleMode > () noexcept
- template<> constexpr int32_t EnumMax< GatherMode > () noexcept
- template<> constexpr int32_t EnumMax< RNNOperation > () noexcept
- template<> constexpr int32_t EnumMax< RNNDirection > () noexcept
- template<> constexpr int32_t EnumMax< RNNInputMode > () noexcept
- template<> constexpr int32_t EnumMax< RNNGateType > () noexcept
- template<> constexpr int32_t EnumMax< UnaryOperation > () noexcept
- template<> constexpr int32_t EnumMax< ReduceOperation > () noexcept
- template<> constexpr int32_t EnumMax< SliceMode > () noexcept
- template<> constexpr int32_t EnumMax< TopKOperation > () noexcept
- template<> constexpr int32_t EnumMax< MatrixOperation > () noexcept
- template<> constexpr int32_t EnumMax< LoopOutput > () noexcept
- template<> constexpr int32_t EnumMax< TripLimit > () noexcept
- template<> constexpr int32_t EnumMax< FillOperation > () noexcept
- template<> constexpr int32_t EnumMax< ScatterMode > () noexcept
- template<> constexpr int32_t EnumMax< CalibrationAlgoType > () noexcept
- template<> constexpr int32_t EnumMax< QuantizationFlag > () noexcept
- template<> constexpr int32_t EnumMax< BuilderFlag > () noexcept
- template<> constexpr int32_t EnumMax< MemoryPoolType > () noexcept
- template<> constexpr int32_t EnumMax< NetworkDefinitionCreationFlag > () noexcept
- nvinfer1::IPluginRegistry * getBuilderPluginRegistry (nvinfer1::EngineCapability capability) noexcept

  Return the plugin registry for the given capability or nullptr if no registry exists.
- template<> constexpr int32_t EnumMax< DimensionOperation > () noexcept

  Maximum number of elements in DimensionOperation enum.
- template<> constexpr int32_t EnumMax< WeightsRole > () noexcept

  Maximum number of elements in WeightsRole enum.
- template<> constexpr int32_t EnumMax< DeviceType > () noexcept

  Maximum number of elements in DeviceType enum.

- template<> constexpr int32_t EnumMax< OptProfileSelector > () noexcept
- template<> constexpr int32_t EnumMax< TacticSource > () noexcept

  Maximum number of tactic sources in TacticSource enum.
- template<> constexpr int32_t EnumMax< ProfilingVerbosity > () noexcept

  Maximum number of profile verbosity levels in ProfilingVerbosity enum.
- template<> constexpr int32_t EnumMax< LayerInformationFormat > () noexcept
- template<typename T >
  constexpr int32_t EnumMax () noexcept

  Maximum number of elements in an enumeration type.

8.2.1 Detailed Description

The TensorRT API version 1 namespace.

8.2.2 Typedef Documentation

8.2.2.1 AllocatorFlags

```
using nvinfer1::AllocatorFlags = typedef uint32_t
```

8.2.2.2 AsciiChar

```
using nvinfer1::AsciiChar = typedef char_t
```

AsciiChar is the type used by TensorRT to represent valid ASCII characters.

8.2.2.3 BuilderFlags

```
using nvinfer1::BuilderFlags = typedef uint32_t
```

Represents one or more QuantizationFlag values using binary OR operations, e.g., 1U << BuilderFlag::kFP16 | 1U << BuilderFlag::kDEBUG.

See also

IBuilderConfig::getFlags(), ITensor::setFlags(),

8.2.2.4 char_t

```
using nvinfer1::char_t = typedef char
```

char_t is the type used by TensorRT to represent all valid characters.

8.2.2.5 Dims

```
using nvinfer1::Dims = typedef Dims32
```

Alias for Dims32.

Warning

: This alias might change in the future.

8.2.2.6 NetworkDefinitionCreationFlags

```
using nvinfer1::NetworkDefinitionCreationFlags = typedef uint32_t
```

Represents one or more NetworkDefinitionCreationFlag flags using binary OR operations. e.g., 1U << NetworkDefinitionCreationFlag::kEXPLICIT_BATCH.

See also

IBuilder::createNetworkV2

8.2.2.7 PluginFormat

```
using nvinfer1::PluginFormat = typedef TensorFormat
```

PluginFormat is reserved for backward compatibility.

See also

IPluginV2::supportsFormat()

8.2.2.8 QuantizationFlags

```
using nvinfer1::QuantizationFlags = typedef uint32_t
```

Represents one or more QuantizationFlag values using binary OR operations.

See also

IBuilderConfig::getQuantizationFlags(), IBuilderConfig::setQuantizationFlags()

8.2.2.9 TacticSources

```
using nvinfer1::TacticSources = typedef uint32_t
```

Represents a collection of one or more TacticSource values combine using bitwise-OR operations.

See also

IBuilderConfig::setTacticSources(), IBuilderConfig::getTacticSources()

8.2.2.10 TensorFormats

```
using nvinfer1::TensorFormats = typedef uint32_t
```

It is capable of representing one or more TensorFormat by binary OR operations, e.g., 1U << TensorFormat::kCHW4 | 1U << TensorFormat::kCHW32.

See also

ITensor::getAllowedFormats(), ITensor::setAllowedFormats(),

8.2.3 Enumeration Type Documentation

8.2.3.1 ActivationType

```
enum class nvinfer1::ActivationType : int32_t [strong]
```

Enumerates the types of activation to perform in an activation layer.

Enumerator

kRELU	Rectified linear activation.
kSIGMOID	Sigmoid activation.
kTANH	TanH activation.
kLEAKY_RELU	LeakyRelu activation: x>=0 ? x : alpha ∗ x.
kELU	Elu activation: x>=0 ? x : alpha ∗ (exp(x) - 1).
kSELU	Selu activation: x>0 ? beta ∗ x : beta ∗ (alpha∗exp(x) - alpha)
kSOFTSIGN	Softsign activation: x / (1+|x|)
kSOFTPLUS	Parametric softplus activation: alpha∗log(exp(beta∗x)+1)
kCLIP	Clip activation: max(alpha, min(beta, x))
kHARD_SIGMOID	Hard sigmoid activation: max(0, min(1, alpha∗x+beta))
kSCALED_TANH	Scaled tanh activation: alpha∗tanh(beta∗x)
kTHRESHOLDED_RELU	Thresholded ReLU activation: x>alpha ? x : 0.

8.2.3.2 AllocatorFlag

`enum class nvinfer1::AllocatorFlag : int32_t [strong]`

Enumerator

kRESIZABLE	TensorRT may call realloc() on this allocation.

8.2.3.3 BuilderFlag

`enum class nvinfer1::BuilderFlag : int32_t [strong]`

List of valid modes that the builder can enable when creating an engine from a network definition.

See also

IBuilderConfig::setFlag(), IBuilderConfig::getFlag()

Enumerator

kFP16	Enable FP16 layer selection, with FP32 fallback.
kINT8	Enable Int8 layer selection, with FP32 fallback with FP16 fallback if kFP16 also specified.
kDEBUG	Enable debugging of layers via synchronizing after every layer.

Enumerator

kGPU_FALLBACK	Enable layers marked to execute on GPU if layer cannot execute on DLA.
kSTRICT_TYPES	Legacy flag with effect similar to setting all of these three flags: • kPREFER_PRECISION_CONSTRAINTS • kDIRECT_IO • kREJECT_EMPTY_ALGORITHMS except that if the direct I/O requirement cannot be met and kDIRECT_IO was not explicitly set, instead of the build failing, the build falls back as if kDIRECT_IO was not set. **Deprecated** Deprecated in TensorRT 8.2
kREFIT	Enable building a refittable engine.
kDISABLE_TIMING_CACHE	Disable reuse of timing information across identical layers.
kTF32	Allow (but not require) computations on tensors of type DataType::kFLOAT to use TF32. TF32 computes inner products by rounding the inputs to 10-bit mantissas before multiplying, but accumulates the sum using 23-bit mantissas. Enabled by default.
kSPARSE_WEIGHTS	Allow the builder to examine weights and use optimized functions when weights have suitable sparsity.
kSAFETY_SCOPE	Change the allowed parameters in the EngineCapability::kSTANDARD flow to match the restrictions that EngineCapability::kSAFETY check against for DeviceType::kGPU and EngineCapability::kDLA_STANDALONE check against the DeviceType::kDLA case. This flag is forced to true if EngineCapability::kSAFETY at build time if it is unset. This flag is only supported in NVIDIA Drive(R) products.
kOBEY_PRECISION_CONSTRAINTS	Require that layers execute in specified precisions. Build fails otherwise.
kPREFER_PRECISION_CONSTRAINTS	Prefer that layers execute in specified precisions. Fall back (with warning) to another precision if build would otherwise fail.
kDIRECT_IO	Require that no reformats be inserted between a layer and a network I/O tensor for which ITensor::setAllowedFormats was called. Build fails if a reformat is required for functional correctness.
kREJECT_EMPTY_ALGORITHMS	Fail if IAlgorithmSelector::selectAlgorithms returns an empty set of algorithms.

8.2.3.4 CalibrationAlgoType

`enum class nvinfer1::CalibrationAlgoType : int32_t [strong]`

Version of calibration algorithm to use.

enum CalibrationAlgoType

Enumerator

kLEGACY_CALIBRATION	
kENTROPY_CALIBRATION	
kENTROPY_↩ CALIBRATION_2	
kMINMAX_CALIBRATION	

8.2.3.5 DataType

`enum class nvinfer1::DataType : int32_t [strong]`

The type of weights and tensors.

Enumerator

kFLOAT	32-bit floating point format.
kHALF	IEEE 16-bit floating-point format.
kINT8	8-bit integer representing a quantized floating-point value.
kINT32	Signed 32-bit integer format.
kBOOL	8-bit boolean. 0 = false, 1 = true, other values undefined.

8.2.3.6 DeviceType

`enum class nvinfer1::DeviceType : int32_t [strong]`

The device that this layer/network will execute on.

Enumerator

kGPU	GPU Device.
kDLA	DLA Core.

8.2.3.7 DimensionOperation

`enum class nvinfer1::DimensionOperation : int32_t [strong]`

An operation on two IDimensionExpr, which represent integer expressions used in dimension computations.

For example, given two IDimensionExpr x and y and an IExprBuilder& eb, eb.operation(DimensionOperation::kSUM, x, y) creates a representation of x+y.

See also

IDimensionExpr, IExprBuilder

Enumerator

kSUM	Sum of the two operands.
kPROD	Product of the two operands.
kMAX	Maximum of the two operands.
kMIN	Minimum of the two operands.
kSUB	Substract the second element from the first.
kEQUAL	1 if operands are equal, 0 otherwise.
kLESS	1 if first operand is less than second operand, 0 otherwise.
kFLOOR_DIV	Floor division of the first element by the second.
kCEIL_DIV	Division rounding up.

8.2.3.8 ElementWiseOperation

```
enum class nvinfer1::ElementWiseOperation : int32_t [strong]
```

Enumerates the binary operations that may be performed by an ElementWise layer.

See also

IElementWiseLayer

Enumerator

kSUM	Sum of the two elements.
kPROD	Product of the two elements.
kMAX	Maximum of the two elements.
kMIN	Minimum of the two elements.
kSUB	Substract the second element from the first.
kDIV	Divide the first element by the second.
kPOW	The first element to the power of the second element.
kFLOOR_DIV	Floor division of the first element by the second.
kAND	Logical AND of two elements.
kOR	Logical OR of two elements.
kXOR	Logical XOR of two elements.
kEQUAL	Check if two elements are equal.
kGREATER	Check if element in first tensor is greater than corresponding element in second tensor.
kLESS	Check if element in first tensor is less than corresponding element in second tensor.

8.2.3.9 EngineCapability

```
enum class nvinfer1::EngineCapability : int32_t [strong]
```

List of supported engine capability flows.

The EngineCapability determines the restrictions of a network during build time and what runtime it targets. When BuilderFlag::kSAFETY_SCOPE is not set (by default), EngineCapability::kSTANDARD does not provide any restrictions on functionality and the resulting serialized engine can be executed with TensorRT's standard runtime APIs in the nvinfer1 namespace. EngineCapability::kSAFETY provides a restricted subset of network operations that are safety certified and the resulting serialized engine can be executed with TensorRT's safe runtime APIs in the nvinfer1::safe namespace. EngineCapability::kDLA_STANDALONE provides a restricted subset of network operations that are DLA compatible and the resulting serialized engine can be executed using standalone DLA runtime APIs. See sample↩ Nvmedia for an example of integrating NvMediaDLA APIs with TensorRT APIs.

Enumerator

kSTANDARD	Standard: TensorRT flow without targeting the safety runtime. This flow supports both DeviceType::kGPU and DeviceType::kDLA.
kDEFAULT	
kSAFETY	Safety: TensorRT flow with restrictions targeting the safety runtime. See safety documentation for list of supported layers and formats. This flow supports only DeviceType::kGPU. This flag is only supported in NVIDIA Drive(R) products.
kSAFE_GPU	
kDLA_STANDALONE	DLA Standalone: TensorRT flow with restrictions targeting external, to TensorRT, DLA runtimes. See DLA documentation for list of supported layers and formats. This flow supports only DeviceType::kDLA.
kSAFE_DLA	

8.2.3.10 ErrorCode

```
enum class nvinfer1::ErrorCode : int32_t [strong]
```

Error codes that can be returned by TensorRT during execution.

Enumerator

kSUCCESS	Execution completed successfully.
kUNSPECIFIED_ERROR	An error that does not fall into any other category. This error is included for forward compatibility.
kINTERNAL_ERROR	A non-recoverable TensorRT error occurred. TensorRT is in an invalid internal state when this error is emitted and any further calls to TensorRT will result in undefined behavior.

Enumerator

kINVALID_ARGUMENT	An argument passed to the function is invalid in isolation. This is a violation of the API contract.
kINVALID_CONFIG	An error occurred when comparing the state of an argument relative to other arguments. For example, the dimensions for concat differ between two tensors outside of the channel dimension. This error is triggered when an argument is correct in isolation, but not relative to other arguments. This is to help to distinguish from the simple errors from the more complex errors. This is a violation of the API contract.
kFAILED_ALLOCATION	An error occurred when performing an allocation of memory on the host or the device. A memory allocation error is normally fatal, but in the case where the application provided its own memory allocation routine, it is possible to increase the pool of available memory and resume execution.
kFAILED_INITIALIZATION	One, or more, of the components that TensorRT relies on did not initialize correctly. This is a system setup issue.
kFAILED_EXECUTION	An error occurred during execution that caused TensorRT to end prematurely, either an asynchronous error or other execution errors reported by CUDA/DLA. In a dynamic system, the data can be thrown away and the next frame can be processed or execution can be retried. This is either an execution error or a memory error.
kFAILED_COMPUTATION	An error occurred during execution that caused the data to become corrupted, but execution finished. Examples of this error are NaN squashing or integer overflow. In a dynamic system, the data can be thrown away and the next frame can be processed or execution can be retried. This is either a data corruption error, an input error, or a range error. This is not used in safety but may be used in standard.
kINVALID_STATE	TensorRT was put into a bad state by incorrect sequence of function calls. An example of an invalid state is specifying a layer to be DLA only without GPU fallback, and that layer is not supported by DLA. This can occur in situations where a service is optimistically executing networks for multiple different configurations without checking proper error configurations, and instead throwing away bad configurations caught by TensorRT. This is a violation of the API contract, but can be recoverable. Example of a recovery: GPU fallback is disabled and conv layer with large filter(63x63) is specified to run on DLA. This will fail due to DLA not supporting the large kernel size. This can be recovered by either turning on GPU fallback or setting the layer to run on the GPU.
kUNSUPPORTED_STATE	An error occurred due to the network not being supported on the device due to constraints of the hardware or system. An example is running a unsafe layer in a safety certified context, or a resource requirement for the current network is greater than the capabilities of the target device. The network is otherwise correct, but the network and hardware combination is problematic. This can be recoverable. Examples: • Scratch space requests larger than available device memory and can be recovered by increasing allowed workspace size. • Tensor size exceeds the maximum element count and can be recovered by reducing the maximum batch size.

8.2.3.11 FillOperation

```
enum class nvinfer1::FillOperation : int32_t [strong]
```

Enumerates the tensor fill operations that may performed by a fill layer.

See also

IFillLayer

Enumerator

kLINSPACE	Generate evenly spaced numbers over a specified interval.
kRANDOM_UNIFORM	Generate a tensor with random values drawn from a uniform distribution.

8.2.3.12 GatherMode

```
enum class nvinfer1::GatherMode : int32_t [strong]
```

Control form of IGatherLayer.

See also

IGatherLayer

Enumerator

kDEFAULT	Similar to ONNX Gather.
kELEMENT	Similar to ONNX GatherElements.
kND	Similar to ONNX GatherND.

8.2.3.13 LayerInformationFormat

```
enum class nvinfer1::LayerInformationFormat : int32_t [strong]
```

The format in which the IEngineInspector prints the layer information.

See also

IEngineInspector::getLayerInformation(), IEngineInspector::getEngineInformation()

Enumerator

kONELINE	Print layer information in one line per layer.
kJSON	Print layer information in JSON format.

8.2.3.14 LayerType

```
enum class nvinfer1::LayerType : int32_t [strong]
```

The type values of layer classes.

See also

ILayer::getType()

Enumerator

kCONVOLUTION	Convolution layer.
kFULLY_CONNECTED	Fully connected layer.
kACTIVATION	Activation layer.
kPOOLING	Pooling layer.
kLRN	LRN layer.
kSCALE	Scale layer.
kSOFTMAX	SoftMax layer.
kDECONVOLUTION	Deconvolution layer.
kCONCATENATION	Concatenation layer.
kELEMENTWISE	Elementwise layer.
kPLUGIN	Plugin layer.
kUNARY	UnaryOp operation Layer.
kPADDING	Padding layer.
kSHUFFLE	Shuffle layer.
kREDUCE	Reduce layer.
kTOPK	TopK layer.
kGATHER	Gather layer.
kMATRIX_MULTIPLY	Matrix multiply layer.
kRAGGED_SOFTMAX	Ragged softmax layer.
kCONSTANT	Constant layer.
kRNN_V2	RNNv2 layer.
kIDENTITY	Identity layer.
kPLUGIN_V2	PluginV2 layer.
kSLICE	Slice layer.
kSHAPE	Shape layer.

Enumerator

kPARAMETRIC_RELU	Parametric ReLU layer.
kRESIZE	Resize Layer.
kTRIP_LIMIT	Loop Trip limit layer.
kRECURRENCE	Loop Recurrence layer.
kITERATOR	Loop Iterator layer.
kLOOP_OUTPUT	Loop output layer.
kSELECT	Select layer.
kFILL	Fill layer.
kQUANTIZE	Quantize layer.
kDEQUANTIZE	Dequantize layer.
kCONDITION	Condition layer.
kCONDITIONAL_INPUT	Conditional Input layer.
kCONDITIONAL_OUTPUT	Conditional Output layer.
kSCATTER	Scatter layer.
kEINSUM	Einsum layer.
kASSERTION	Assertion layer.

8.2.3.15 LoopOutput

`enum class nvinfer1::LoopOutput : int32_t [strong]`

Enum that describes kinds of loop outputs.

Enumerator

kLAST_VALUE	Output value is value of tensor for last iteration.
kCONCATENATE	Output value is concatenation of values of tensor for each iteration, in forward order.
kREVERSE	Output value is concatenation of values of tensor for each iteration, in reverse order.

8.2.3.16 MatrixOperation

`enum class nvinfer1::MatrixOperation : int32_t [strong]`

Enumerates the operations that may be performed on a tensor by IMatrixMultiplyLayer before multiplication.

Enumerator

kNONE	Treat x as a matrix if it has two dimensions, or as a collection of matrices if x has more than two dimensions, where the last two dimensions are the matrix dimensions. x must have at least two dimensions.
kTRANSPOSE	Like kNONE, but transpose the matrix dimensions.
kVECTOR	Treat x as a vector if it has one dimension, or as a collection of vectors if x has more than one dimension. x must have at least one dimension. The first input tensor with dimensions [M,K] used with MatrixOperation::kVECTOR is equivalent to a tensor with dimensions [M, 1, K] with MatrixOperation::kNONE, i.e. is treated as M row vectors of length K. If MatrixOperation::kTRANSPOSE is specified, then the dimensions are [M, K, 1]. The second input tensor with dimensions [M,K] used with MatrixOperation::kVECTOR is equivalent to a tensor with dimensions [M, K, 1] with MatrixOperation::kNONE, i.e. is treated as M column vectors of length K. If MatrixOperation::kTRANSPOSE is specified, then the dimensions are [M, 1, K].

8.2.3.17 MemoryPoolType

```
enum class nvinfer1::MemoryPoolType : int32_t [strong]
```

The type for memory pools used by TensorRT.

See also

IBuilderConfig::setMemoryPoolLimit, IBuilderConfig::getMemoryPoolLimit

Enumerator

kWORKSPACE	kWORKSPACE is used by TensorRT to store intermediate buffers within an operation. This is equivalent to the deprecated IBuilderConfig::setMaxWorkspace size and overrides that value. This defaults to max device memory. Set to a smaller value to restrict tactics that use over the threshold en masse. For more targeted removal of tactics use the IAlgorithmSelector interface.
kDLA_MANAGED_SRAM	kDLA_MANAGED_SRAM is a fast software managed RAM used by DLA to communicate within a layer. The size of this pool must be at least 4 KiB and must be a power of 2. This defaults to 1 MiB. Orin has capacity of 1 MiB per core, and Xavier shares 4 MiB across all of its accelerator cores.
kDLA_LOCAL_DRAM	kDLA_LOCAL_DRAM is host RAM used by DLA to share intermediate tensor data across operations. The size of this pool must be at least 4 KiB and must be a power of 2. This defaults to 1 GiB.
kDLA_GLOBAL_DRAM	kDLA_GLOBAL_DRAM is host RAM used by DLA to store weights and metadata for execution. The size of this pool must be at least 4 KiB and must be a power of 2. This defaults to 512 MiB.

8.2.3.18 NetworkDefinitionCreationFlag

```
enum class nvinfer1::NetworkDefinitionCreationFlag : int32_t [strong]
```

List of immutable network properties expressed at network creation time. NetworkDefinitionCreationFlag is used with createNetworkV2 to specify immutable properties of the network. The createNetwork() function always had an implicit batch dimension being specified by the maxBatchSize builder parameter. createNetworkV2 with kDEFAULT flag mimics that behaviour.

See also

IBuilder::createNetworkV2

Enumerator

kEXPLICIT_BATCH	Mark the network to be an explicit batch network. Dynamic shape support requires that the kEXPLICIT_BATCH flag is set. With dynamic shapes, any of the input dimensions can vary at run-time, and there are no implicit dimensions in the network specification. This is specified by using the wildcard dimension value -1.
kEXPLICIT_PRECISION	Setting the network to be an explicit precision network has the following implications: 1) Precision of all input tensors to the network have to be specified with ITensor::setType() function 2) Precision of all layer output tensors in the network have to be specified using ILayer::setOutputType() function 3) The builder will not quantize the weights of any layer including those running in lower precision(INT8). It will simply cast the weights into the required precision. 4) Dynamic ranges must not be provided to run the network in int8 mode. Dynamic ranges of each tensor in the explicit precision network is [-127,127]. 5) Quantizing and dequantizing activation values between higher (FP32) and lower (INT8) precision will be performed using explicit Scale layers with input/output precision set appropriately.

8.2.3.19 OptProfileSelector

```
enum class nvinfer1::OptProfileSelector : int32_t [strong]
```

When setting or querying optimization profile parameters (such as shape tensor inputs or dynamic dimensions), select whether we are interested in the minimum, optimum, or maximum values for these parameters. The minimum and maximum specify the permitted range that is supported at runtime, while the optimum value is used for the kernel selection. This should be the ”typical” value that is expected to occur at runtime.

See also

IOptimizationProfile::setDimensions(), IOptimizationProfile::setShapeValues()

Enumerator

kMIN	This is used to set or get the minimum permitted value for dynamic dimensions etc.
kOPT	This is used to set or get the value that is used in the optimization (kernel selection).
kMAX	This is used to set or get the maximum permitted value for dynamic dimensions etc.

8.2.3.20 PaddingMode

```
enum class nvinfer1::PaddingMode :  int32_t  [strong]
```

Enumerates the modes of padding to perform in convolution, deconvolution and pooling layer, padding mode takes precedence if setPaddingMode() and setPrePadding() are also used.

There are three padding styles, EXPLICIT, SAME, and CAFFE, with each style having two variants. The EXPLICIT and CAFFE styles determine if the final sampling location is used or not. The SAME style determine if the asymmetry in the padding is on the pre or post padding.

```
Shorthand:
    I = dimensions of input image.
    B = prePadding, before the image data. For deconvolution, prePadding is set before output.
    A = postPadding, after the image data. For deconvolution, postPadding is set after output.
    P = delta between input and output
    S = stride
    F = filter
    O = output
    D = dilation
    M = I + B + A ; The image data plus any padding
    DK = 1 + D * (F - 1)
```

Formulas for Convolution:

- EXPLICIT_ROUND_DOWN:
  ```
  O = floor((M - DK) / S) + 1
  ```
- CAFFE_ROUND_DOWN:
  ```
  O = floor((I + B * 2 - DK) / S) + 1
  ```
- EXPLICIT_ROUND_UP:
  ```
  O = ceil((M - DK) / S) + 1
  ```
- CAFFE_ROUND_UP:
  ```
  O = ceil((I + B * 2 - DK) / S) + 1
  ```
- SAME_UPPER:
  ```
  O = ceil(I / S)
  P = floor((I - 1) / S) * S + DK - I;
  B = floor(P / 2)
  A = P - B
  ```
- SAME_LOWER:
  ```
  O = ceil(I / S)
  P = floor((I - 1) / S) * S + DK - I;
  A = floor(P / 2)
  B = P - A
  ```

Formulas for Deconvolution:

- EXPLICIT_ROUND_DOWN:
- CAFFE_ROUND_DOWN:
- EXPLICIT_ROUND_UP:
- CAFFE_ROUND_UP:
  ```
  O = (I - 1) * S + DK - (B + A)
  ```

- SAME_UPPER:
```
O = min(I * S, (I - 1) * S + DK)
P = max(DK - S, 0)
B = floor(P / 2)
A = P - B
```

- SAME_LOWER:
```
O = min(I * S, (I - 1) * S + DK)
P = max(DK - S, 0)
A = floor(P / 2)
B = P - A
```

Formulas for Pooling:

- EXPLICIT_ROUND_DOWN:
```
O = floor((M - F) / S) + 1
```

- EXPLICIT_ROUND_UP:
```
O = ceil((M - F) / S) + 1
```

- SAME_UPPER:
```
O = ceil(I / S)
P = floor((I - 1) / S) * S + F - I;
B = floor(P / 2)
A = P - B
```

- SAME_LOWER:
```
O = ceil(I / S)
P = floor((I - 1) / S) * S + F - I;
A = floor(P / 2)
B = P - A
```

- CAFFE_ROUND_DOWN:
```
EXPLICIT_ROUND_DOWN - ((EXPLICIT_ROUND_DOWN - 1) * S >= I + B)
```

- CAFFE_ROUND_UP:
```
EXPLICIT_ROUND_UP - ((EXPLICIT_ROUND_UP - 1) * S >= I + B)
```

Pooling Example 1:
```
Given I = {6, 6}, B = {3, 3}, A = {2, 2}, S = {2, 2}, F = {3, 3}. What is O?
(B, A can be calculated for SAME_UPPER and SAME_LOWER mode)
```

- EXPLICIT_ROUND_DOWN:
```
Computation:
    M = {6, 6} + {3, 3} + {2, 2} ==> {11, 11}
    O ==> floor((M - F) / S) + 1
      ==> floor(({11, 11} - {3, 3}) / {2, 2}) + {1, 1}
      ==> floor({8, 8} / {2, 2}) + {1, 1}
      ==> {5, 5}
```

- EXPLICIT_ROUND_UP:
```
Computation:
    M = {6, 6} + {3, 3} + {2, 2} ==> {11, 11}
    O ==> ceil((M - F) / S) + 1
      ==> ceil(({11, 11} - {3, 3}) / {2, 2}) + {1, 1}
      ==> ceil({8, 8} / {2, 2}) + {1, 1}
      ==> {5, 5}
```

  The sample points are $\{0, 2, 4, 6, 8\}$ in each dimension.

- SAME_UPPER:
```
Computation:
    I = {6, 6}
    S = {2, 2}
    O = ceil(I / S) = {3, 3}
    P = floor((I - 1) / S) * S + F - I
        ==> floor(({6, 6} - {1, 1}) / {2, 2}) * {2, 2} + {3, 3} - {6, 6}
        ==> {4, 4} + {3, 3} - {6, 6}
        ==> {1, 1}
    B = floor({1, 1} / {2, 2})
        ==> {0, 0}
    A = {1, 1} - {0, 0}
        ==> {1, 1}
```

- SAME_LOWER:

```
Computation:
    I = {6, 6}
    S = {2, 2}
    O = ceil(I / S) = {3, 3}
    P = floor((I - 1) / S) * S + F - I
      ==> {1, 1}
    A = floor({1, 1} / {2, 2})
      ==> {0, 0}
    B = {1, 1} - {0, 0}
      ==> {1, 1}
```

The sample pointers are {0, 2, 4} in each dimension. SAMPLE_UPPER has {O0, O1, O2, pad} in output in each dimension. SAMPLE_LOWER has {pad, O0, O1, O2} in output in each dimension.

Pooling Example 2:

```
Given I = {6, 6}, B = {3, 3}, A = {3, 3}, S = {2, 2}, F = {3, 3}. What is O?
```

- CAFFE_ROUND_DOWN:

```
Computation:
    M = {6, 6} + {3, 3} + {3, 3} ==> {12, 12}
    EXPLICIT_ROUND_DOWN ==> floor((M - F) / S) + 1
                        ==> floor(({12, 12} - {3, 3}) / {2, 2}) + {1, 1}
                        ==> {5, 5}
    DIFF = (((EXPLICIT_ROUND_DOWN - 1) * S >= I + B) ? {1, 1} : {0, 0})
      ==> (({5, 5} - {1, 1}) * {2, 2} >= {6, 6} + {3, 3} ? {1, 1} : {0,0}
      ==> {0, 0}
    O ==> EXPLICIT_ROUND_DOWN - DIFF
      ==> {5, 5} - {0, 0}
      ==> {5, 5}
```

- CAFFE_ROUND_UP:

```
Computation:
    M = {6, 6} + {3, 3} + {3, 3} ==> {12, 12}
    EXPLICIT_ROUND_UP ==> ceil((M - F) / S) + 1
                      ==> ceil(({12, 12} - {3, 3}) / {2, 2}) + {1, 1}
                      ==> {6, 6}
    DIFF = (((EXPLICIT_ROUND_UP - 1) * S >= I + B) ? {1, 1} : {0, 0})
      ==> (({6, 6} - {1, 1}) * {2, 2} >= {6, 6} + {3, 3} ? {1, 1} : {0,0}
      ==> {1, 1}
    O ==> EXPLICIT_ROUND_UP - DIFF
      ==> {6, 6} - {1, 1}
      ==> {5, 5}
```

The sample points are {0, 2, 4, 6, 8} in each dimension.
CAFFE_ROUND_DOWN and CAFFE_ROUND_UP have two restrictions each on usage with pooling operations. This will cause getDimensions to return an empty dimension and also to reject the network at validation time.
For more information on original reference code, see https://github.com/BVLC/caffe/blob/master/src/caffe/lay
_layer.cpp

- Restriction 1:

```
CAFFE_ROUND_DOWN: B >= F is an error if (B - S) < F
CAFFE_ROUND_UP: (B + S) >= (F + 1) is an error if B < (F + 1)
```

- Restriction 2:

```
CAFFE_ROUND_DOWN: (B - S) >= F is an error if B >= F
CAFFE_ROUND_UP: B >= (F + 1) is an error if (B + S) >= (F + 1)
```

Enumerator

kEXPLICIT_ROUND_DOWN	Use explicit padding, rounding output size down.
kEXPLICIT_ROUND_UP	Use explicit padding, rounding output size up.
kSAME_UPPER	Use SAME padding, with prePadding <= postPadding.
kSAME_LOWER	Use SAME padding, with prePadding >= postPadding.
kCAFFE_ROUND_DOWN	Use CAFFE padding, rounding output size down, uses prePadding value.
kCAFFE_ROUND_UP	Use CAFFE padding, rounding output size up, uses prePadding value.

8.2.3.21 PluginFieldType

`enum class nvinfer1::PluginFieldType : int32_t [strong]`

Enumerator

kFLOAT16	FP16 field type.
kFLOAT32	FP32 field type.
kFLOAT64	FP64 field type.
kINT8	INT8 field type.
kINT16	INT16 field type.
kINT32	INT32 field type.
kCHAR	char field type.
kDIMS	nvinfer1::Dims field type.
kUNKNOWN	Unknown field type.

8.2.3.22 PluginVersion

`enum class nvinfer1::PluginVersion : uint8_t [strong]`

Enumerator

kV2	IPluginV2.
kV2_EXT	IPluginV2Ext.
kV2_IOEXT	IPluginV2IOExt.
kV2_DYNAMICEXT	IPluginV2DynamicExt.

8.2.3.23 PoolingType

`enum class nvinfer1::PoolingType : int32_t [strong]`

The type of pooling to perform in a pooling layer.

Enumerator

kMAX	
kAVERAGE	
kMAX_AVERAGE_BLEND	

8.2.3.24 ProfilingVerbosity

```
enum class nvinfer1::ProfilingVerbosity : int32_t [strong]
```

List of verbosity levels of layer information exposed in NVTX annotations and in IEngineInspector.

See also

IBuilderConfig::setProfilingVerbosity(), IBuilderConfig::getProfilingVerbosity(), IEngineInspector

Enumerator

kLAYER_NAMES_ONLY	Print only the layer names. This is the default setting.
kNONE	Do not print any layer information.
kDETAILED	Print detailed layer information including layer names and layer parameters.
kDEFAULT	
kVERBOSE	

8.2.3.25 QuantizationFlag

```
enum class nvinfer1::QuantizationFlag : int32_t [strong]
```

List of valid flags for quantizing the network to int8.

See also

IBuilderConfig::setQuantizationFlag(), IBuilderConfig::getQuantizationFlag()

Enumerator

kCALIBRATE_BEFORE_FUSION	Run int8 calibration pass before layer fusion. Only valid for IInt8LegacyCalibrator and IInt8EntropyCalibrator. The builder always runs the int8 calibration pass before layer fusion for IInt8MinMaxCalibrator and IInt8EntropyCalibrator2. Disabled by default.

8.2.3.26 ReduceOperation

```
enum class nvinfer1::ReduceOperation : int32_t [strong]
```

Enumerates the reduce operations that may be performed by a Reduce layer.

The table shows the result of reducing across an empty volume of a given type.

Operation	kFLOAT and kHALF	kINT32	kINT8
kSUM	0	0	0
kPROD	1	1	1
kMAX	negative infinity	INT_MIN	-128
kMIN	positive infinity	INT_MAX	127
kAVG	NaN	0	-128

The current version of TensorRT usually performs reduction for kINT8 via kFLOAT or kHALF. The kINT8 values show the quantized representations of the floating-point values.

Enumerator

kSUM	
kPROD	
kMAX	
kMIN	
kAVG	

8.2.3.27 ResizeCoordinateTransformation

```
enum class nvinfer1::ResizeCoordinateTransformation : int32_t [strong]
```

The resize coordinate transformation function.

See also

IResizeLayer::setCoordinateTransformation()

Enumerator

kALIGN_CORNERS	Think of each value in the tensor as a unit volume, and the coordinate is a point inside this volume. The coordinate point is drawn as a star `(*)` in the below diagram, and multiple values range has a length. Define `x_origin` as the coordinate of axis x in the input tensor, `x_resized` as the coordinate of axis x in the output tensor, `length_origin` as length of the input tensor in axis x, and `length_resize` as length of the output tensor in axis x.
	`kALIGN_CORNERS` transforms the coordinates to these locations:
	`|<----------length---------->|`
	`|  0  |  1  |  2  |  3  |`
	`*  *  *  *`
	`x_origin = x_resized * (length_origin - 1) / (length_resize - 1)`

Enumerator

kASYMMETRIC	kASYMMETRIC transforms the coordinates to these locations: `|<--------------length---------------------->|` `| 0	1	2	3 |` `* * * *` `x_origin = x_resized * (length_origin / length_resize)`
kHALF_PIXEL	kHALF_PIXEL transforms the coordinates to these locations: `|<--------------length---------------------->|` `| 0	1	2	3 |` `* * * *` `x_origin = (x_resized + 0.5) * (length_origin / length_resize) - 0.5`

8.2.3.28 ResizeMode

`enum class nvinfer1::ResizeMode : int32_t [strong]`

Enumerates various modes of resize in the resize layer. Resize mode set using setResizeMode().

Enumerator

kNEAREST	ND (0 < N <= 8) nearest neighbor resizing.
kLINEAR	Can handle linear (1D), bilinear (2D), and trilinear (3D) resizing.

8.2.3.29 ResizeRoundMode

`enum class nvinfer1::ResizeRoundMode : int32_t [strong]`

The rounding mode for nearest neighbor resize.

See also

IResizeLayer::setNearestRounding()

Enumerator

kHALF_UP	Round half up.
kHALF_DOWN	Round half down.
kFLOOR	Round to floor.
kCEIL	Round to ceil.

8.2.3.30 ResizeSelector

`enum class nvinfer1::ResizeSelector : int32_t [strong]`

The coordinate selector when resize to single pixel output.

See also

IResizeLayer::setSelectorForSinglePixel()

Enumerator

kFORMULA	Use formula to map the original index.
kUPPER	Select the upper left pixel.

8.2.3.31 RNNDirection

`enum class nvinfer1::RNNDirection : int32_t [strong]`

Enumerates the RNN direction that may be performed by an RNN layer.

See also

IRNNv2Layer

Enumerator

kUNIDIRECTION	Network iterations from first input to last input.
kBIDIRECTION	Network iterates from first to last and vice versa and outputs concatenated.

8.2.3.32 RNNGateType

`enum class nvinfer1::RNNGateType : int32_t [strong]`

Identifies an individual gate within an RNN cell.

See also

RNNOperation

Enumerator

kINPUT	Input gate (i).
kOUTPUT	Output gate (o).
kFORGET	Forget gate (f).
kUPDATE	Update gate (z).
kRESET	Reset gate (r).
kCELL	Cell gate (c).
kHIDDEN	Hidden gate (h).

8.2.3.33 RNNInputMode

`enum class nvinfer1::RNNInputMode : int32_t [strong]`

Enumerates the RNN input modes that may occur with an RNN layer.

If the RNN is configured with RNNInputMode::kLINEAR, then for each gate `g` in the first layer of the RNN, the input vector `X[t]` (length `E`) is left-multiplied by the gate's corresponding weight matrix `W[g]` (dimensions `HxE`) as usual, before being used to compute the gate output as described by RNNOperation.

If the RNN is configured with RNNInputMode::kSKIP, then this initial matrix multiplication is "skipped" and `W[g]` is conceptually an identity matrix. In this case, the input vector `X[t]` must have length `H` (the size of the hidden state).

See also

IRNNv2Layer

Enumerator

kLINEAR	Perform the normal matrix multiplication in the first recurrent layer.
kSKIP	No operation is performed on the first recurrent layer.

8.2.3.34 RNNOperation

`enum class nvinfer1::RNNOperation : int32_t [strong]`

Enumerates the RNN operations that may be performed by an RNN layer.

Equation definitions

The equations below have the following naming convention:

```
t := current time step
i := input gate
o := output gate
f := forget gate
z := update gate
r := reset gate
c := cell gate
h := hidden gate
g[t] denotes the output of gate g at timestep t, e.g.
f[t] is the output of the forget gate f.
X[t] := input tensor for timestep t
C[t] := cell state for timestep t
H[t] := hidden state for timestep t
W[g] := W (input) parameter weight matrix for gate g
R[g] := U (recurrent) parameter weight matrix for gate g
Wb[g] := W (input) parameter bias vector for gate g
Rb[g] := U (recurrent) parameter bias vector for gate g
Unless otherwise specified, all operations apply pointwise
to elements of each operand tensor.
ReLU(X) := max(X, 0)
tanh(X) := hyperbolic tangent of X
sigmoid(X) := 1 / (1 + exp(-X))
exp(X) := e^X
A.B denotes matrix multiplication of A and B.
A*B denotes pointwise multiplication of A and B.
```

Equations

Depending on the value of RNNOperation chosen, each sub-layer of the RNN layer will perform one of the following operations:

```
::kRELU
  H[t] := ReLU(W[i].X[t] + R[i].H[t-1] + Wb[i] + Rb[i])
::kTANH
  H[t] := tanh(W[i].X[t] + R[i].H[t-1] + Wb[i] + Rb[i])
::kLSTM
  i[t] := sigmoid(W[i].X[t] + R[i].H[t-1] + Wb[i] + Rb[i])
  f[t] := sigmoid(W[f].X[t] + R[f].H[t-1] + Wb[f] + Rb[f])
  o[t] := sigmoid(W[o].X[t] + R[o].H[t-1] + Wb[o] + Rb[o])
  c[t] :=    tanh(W[c].X[t] + R[c].H[t-1] + Wb[c] + Rb[c])
  C[t] := f[t]*C[t-1] + i[t]*c[t]
  H[t] := o[t]*tanh(C[t])
::kGRU
  z[t] := sigmoid(W[z].X[t] + R[z].H[t-1] + Wb[z] + Rb[z])
  r[t] := sigmoid(W[r].X[t] + R[r].H[t-1] + Wb[r] + Rb[r])
  h[t] := tanh(W[h].X[t] + r[t]*(R[h].H[t-1] + Rb[h]) + Wb[h])
  H[t] := (1 - z[t])*h[t] + z[t]*H[t-1]
```

See also

IRNNv2Layer

Enumerator

kRELU	Single gate RNN w/ ReLU activation function.
kTANH	Single gate RNN w/ TANH activation function.
kLSTM	Four-gate LSTM network w/o peephole connections.
kGRU	Three-gate network consisting of Gated Recurrent Units.

8.2.3.35 ScaleMode

```
enum class nvinfer1::ScaleMode :  int32_t  [strong]
```

Controls how shift, scale and power are applied in a Scale layer.

See also

IScaleLayer

Enumerator

kUNIFORM	Identical coefficients across all elements of the tensor.
kCHANNEL	Per-channel coefficients.
kELEMENTWISE	Elementwise coefficients.

8.2.3.36 ScatterMode

`enum class nvinfer1::ScatterMode : int32_t [strong]`

Control form of IScatterLayer.

See also

IScatterLayer

Enumerator

kELEMENT	Similar to ONNX ScatterElements.
kND	Similar to ONNX ScatterND.

8.2.3.37 SliceMode

`enum class nvinfer1::SliceMode : int32_t [strong]`

Controls how ISliceLayer handles out of bounds coordinates.

See also

ISliceLayer

Enumerator

kDEFAULT	Fail with error when the coordinates are out of bounds. This is the default.
kWRAP	Coordinates wrap around periodically.
kCLAMP	Out of bounds indices are clamped to bounds.
kFILL	Use fill input value when coordinates are out of bounds.
kREFLECT	Coordinates reflect. The axis of reflection is the middle of the perimeter pixel and the reflections are repeated indefinitely within the padded regions. Repeats values for a single pixel and throws error for zero pixels.

8.2.3.38 TacticSource

```
enum class nvinfer1::TacticSource : int32_t [strong]
```

List of tactic sources for TensorRT.

See also

TacticSources, IBuilderConfig::setTacticSources(), IBuilderConfig::getTacticSources()

Enumerator

kCUBLAS	cuBLAS tactics. Note Disabling kCUBLAS will cause the cublas handle passed to plugins in attachToContext to be null.
kCUBLAS_LT	cuBLAS LT tactics
kCUDNN	cuDNN tactics

8.2.3.39 TensorFormat

```
enum class nvinfer1::TensorFormat : int32_t [strong]
```

Format of the input/output tensors.

This enum is extended to be used by both plugins and reformat-free network I/O tensors.

See also

IPluginV2::supportsFormat(), safe::ICudaEngine::getBindingFormat()

For more information about data formats, see the topic "Data Format Description" located in the TensorRT Developer Guide.

Enumerator

kLINEAR	Row major linear format. For a tensor with dimensions {N, C, H, W} or {numbers, channels, columns, rows}, the dimensional index corresponds to {3, 2, 1, 0} and thus the order is W minor. For DLA usage, the tensor sizes are limited to C,H,W in the range [1,8192].

Enumerator

kCHW2	Two wide channel vectorized row major format. This format is bound to FP16. It is only available for dimensions >= 3. For a tensor with dimensions {N, C, H, W}, the memory layout is equivalent to a C array with dimensions [N][(C+1)/2][H][W][2], with the tensor coordinates (n, c, h, w) mapping to array subscript [n][c/2][h][w][c%2].
kHWC8	Eight channel format where C is padded to a multiple of 8. This format is bound to FP16. It is only available for dimensions >= 3. For a tensor with dimensions {N, C, H, W}, the memory layout is equivalent to the array with dimensions [N][H][W][(C+7)/8∗8], with the tensor coordinates (n, c, h, w) mapping to array subscript [n][h][w][c].
kCHW4	Four wide channel vectorized row major format. This format is bound to INT8 or FP16. It is only available for dimensions >= 3. For INT8, the C dimension must be a build-time constant. For a tensor with dimensions {N, C, H, W}, the memory layout is equivalent to a C array with dimensions [N][(C+3)/4][H][W][4], with the tensor coordinates (n, c, h, w) mapping to array subscript [n][c/4][h][w][c%4]. Deprecated usage: If running on the DLA, this format can be used for acceleration with the caveat that C must be equal or lesser than 4. If used as DLA input and the build option kGPU_FALLBACK is not specified, it needs to meet line stride requirement of DLA format. Column stride in bytes should be a multiple of 32 on Xavier and 64 on Orin.
kCHW16	Sixteen wide channel vectorized row major format. This format is bound to FP16. It is only available for dimensions >= 3. For a tensor with dimensions {N, C, H, W}, the memory layout is equivalent to a C array with dimensions [N][(C+15)/16][H][W][16], with the tensor coordinates (n, c, h, w) mapping to array subscript [n][c/16][h][w][c%16]. For DLA usage, this format maps to the native image format for FP16, and the tensor sizes are limited to C,H,W in the range [1,8192].
kCHW32	Thirty-two wide channel vectorized row major format. This format is only available for dimensions >= 3. For a tensor with dimensions {N, C, H, W}, the memory layout is equivalent to a C array with dimensions [N][(C+31)/32][H][W][32], with the tensor coordinates (n, c, h, w) mapping to array subscript [n][c/32][h][w][c%32]. For DLA usage, this format maps to the native image format for INT8, and the tensor sizes are limited to C,H,W in the range [1,8192].
kDHWC8	Eight channel format where C is padded to a multiple of 8. This format is bound to FP16, and it is only available for dimensions >= 4. For a tensor with dimensions {N, C, D, H, W}, the memory layout is equivalent to an array with dimensions [N][D][H][W][(C+7)/8∗8], with the tensor coordinates (n, c, d, h, w) mapping to array subscript [n][d][h][w][c].
kCDHW32	Thirty-two wide channel vectorized row major format. This format is bound to FP16 and INT8 and is only available for dimensions >= 4. For a tensor with dimensions {N, C, D, H, W}, the memory layout is equivalent to a C array with dimensions [N][(C+31)/32][D][H][W][32], with the tensor coordinates (n, c, d, h, w) mapping to array subscript [n][c/32][d][h][w][c%32].
kHWC	Non-vectorized channel-last format. This format is bound to FP32 and is only available for dimensions >= 3.
kDLA_LINEAR	DLA planar format. For a tensor with dimension {N, C, H, W}, the W axis always has unit stride. The stride for stepping along the H axis is rounded up to 64 bytes. The memory layout is equivalent to a C array with dimensions [N][C][H][roundUp(W, 64/elementSize)] where elementSize is 2 for FP16 and 1 for Int8, with the tensor coordinates (n, c, h, w) mapping to array subscript [n][c][h][w].

Enumerator

kDLA_HWC4	DLA image format. For a tensor with dimension {N, C, H, W} the C axis always has unit stride. The stride for stepping along the H axis is rounded up to 32 bytes on Xavier and 64 bytes on Orin. C can only be 1, 3 or 4. If C == 1, it will map to grayscale format. If C == 3 or C == 4, it will map to color image format. And if C == 3, the stride for stepping along the W axis needs to be padded to 4 in elements. When C is {1, 3, 4}, then C' is {1, 4, 4} respectively, the memory layout is equivalent to a C array with dimensions [N][H][roundUp(W, 32/C'/elementSize)][C'] where elementSize is 2 for FP16 and 1 for Int8. The tensor coordinates (n, c, h, w) mapping to array subscript [n][h][w][c].
kHWC16	Sixteen channel format where C is padded to a multiple of 16. This format is bound to FP16. It is only available for dimensions >= 3. For a tensor with dimensions {N, C, H, W}, the memory layout is equivalent to the array with dimensions [N][H][W][(C+15)/16*16], with the tensor coordinates (n, c, h, w) mapping to array subscript [n][h][w][c].

8.2.3.40 TensorLocation

`enum class nvinfer1::TensorLocation : int32_t [strong]`

The location for tensor data storage, device or host.

Enumerator

kDEVICE	Data stored on device.
kHOST	Data stored on host.

8.2.3.41 TopKOperation

`enum class nvinfer1::TopKOperation : int32_t [strong]`

Enumerates the operations that may be performed by a TopK layer.

Enumerator

kMAX	Maximum of the elements.
kMIN	Minimum of the elements.

8.2.3.42 TripLimit

```
enum class nvinfer1::TripLimit : int32_t [strong]
```

Enum that describes kinds of trip limits.

Enumerator

kCOUNT	Tensor is scalar of type kINT32 that contains the trip count.
kWHILE	Tensor is a scalar of type kBOOL. Loop terminates when value is false.

8.2.3.43 UnaryOperation

```
enum class nvinfer1::UnaryOperation : int32_t [strong]
```

Enumerates the unary operations that may be performed by a Unary layer.

See also

IUnaryLayer

Enumerator

kEXP	Exponentiation.
kLOG	Log (base e).
kSQRT	Square root.
kRECIP	Reciprocal.
kABS	Absolute value.
kNEG	Negation.
kSIN	Sine.
kCOS	Cosine.
kTAN	Tangent.
kSINH	Hyperbolic sine.
kCOSH	Hyperbolic cosine.
kASIN	Inverse sine.
kACOS	Inverse cosine.
kATAN	Inverse tangent.
kASINH	Inverse hyperbolic sine.
kACOSH	Inverse hyperbolic cosine.
kATANH	Inverse hyperbolic tangent.
kCEIL	Ceiling.
kFLOOR	Floor.
kERF	Gauss error function.
kNOT	Logical NOT.
kSIGN	Sign. If input > 0, output 1; if input < 0, output -1; if input == 0, output 0.
kROUND	Round to nearest even for float datatype.

8.2.3.44 WeightsRole

```
enum class nvinfer1::WeightsRole :  int32_t  [strong]
```

How a layer uses particular Weights.

The power weights of an IScaleLayer are omitted. Refitting those is not supported.

Enumerator

kKERNEL	kernel for IConvolutionLayer, IDeconvolutionLayer, or IFullyConnectedLayer
kBIAS	bias for IConvolutionLayer, IDeconvolutionLayer, or IFullyConnectedLayer
kSHIFT	shift part of IScaleLayer
kSCALE	scale part of IScaleLayer
kCONSTANT	weights for IConstantLayer
kANY	Any other weights role.

8.2.4 Function Documentation

8.2.4.1 EnumMax()

```
template<typename T >
constexpr int32_t nvinfer1::EnumMax ( )  [constexpr], [noexcept]
```

Maximum number of elements in an enumeration type.

8.2.4.2 EnumMax< BuilderFlag >()

```
template<>
constexpr int32_t nvinfer1::EnumMax< BuilderFlag > ( )  [inline], [constexpr], [noexcept]
```

Maximum number of builder flags in BuilderFlag enum.

See also

BuilderFlag

8.2.4.3 EnumMax< CalibrationAlgoType >()

```
template<>
constexpr int32_t nvinfer1::EnumMax< CalibrationAlgoType > ( )  [inline], [constexpr], [noexcept]
```

Maximum number of elements in CalibrationAlgoType enum.

See also

DataType

8.2.4.4 EnumMax< DeviceType >()

```
template<>
constexpr int32_t nvinfer1::EnumMax< DeviceType > ( )  [inline], [constexpr], [noexcept]
```

Maximum number of elements in DeviceType enum.

See also

DeviceType

8.2.4.5 EnumMax< DimensionOperation >()

```
template<>
constexpr int32_t nvinfer1::EnumMax< DimensionOperation > ( )  [inline], [constexpr], [noexcept]
```

Maximum number of elements in DimensionOperation enum.

See also

DimensionOperation

8.2.4.6 EnumMax< FillOperation >()

```
template<>
constexpr int32_t nvinfer1::EnumMax< FillOperation > ( )  [inline], [constexpr], [noexcept]
```

Maximum number of elements in FillOperation enum.

See also

FillOperation

8.2.4.7 EnumMax< GatherMode >()

```
template<>
constexpr int32_t nvinfer1::EnumMax< GatherMode > ( )  [inline], [constexpr], [noexcept]
```

Maximum number of elements in GatherMode enum.

See also

GatherMode

8.2.4.8 EnumMax< LayerInformationFormat >()

```
template<>
constexpr int32_t nvinfer1::EnumMax< LayerInformationFormat > ( )  [inline], [constexpr], [noexcept]
```

Maximum number of layer information formats in LayerInformationFormat enum.

See also

LayerInformationFormat

8.2.4.9 EnumMax< LayerType >()

```
template<>
constexpr int32_t nvinfer1::EnumMax< LayerType > ( )  [inline], [constexpr], [noexcept]
```

Maximum number of elements in LayerType enum.

See also

LayerType

8.2.4.10 EnumMax< LoopOutput >()

```
template<>
constexpr int32_t nvinfer1::EnumMax< LoopOutput > ( )  [inline], [constexpr], [noexcept]
```

Maximum number of elements in LoopOutput enum.

See also

DataType

8.2.4.11 EnumMax< MatrixOperation >()

```
template<>
constexpr int32_t nvinfer1::EnumMax< MatrixOperation > ( )  [inline], [constexpr], [noexcept]
```

Maximum number of elements in MatrixOperation enum.

See also

DataType

8.2.4.12 EnumMax< MemoryPoolType >()

```
template<>
constexpr int32_t nvinfer1::EnumMax< MemoryPoolType > ( )  [inline], [constexpr], [noexcept]
```

Maximum number of memory pool types in the MemoryPoolType enum.

See also

MemoryPoolType

8.2.4.13 EnumMax< NetworkDefinitionCreationFlag >()

```
template<>
constexpr int32_t nvinfer1::EnumMax< NetworkDefinitionCreationFlag > ( )  [inline], [constexpr],
[noexcept]
```

Maximum number of elements in NetworkDefinitionCreationFlag enum.

See also

NetworkDefinitionCreationFlag

8.2.4.14 EnumMax< OptProfileSelector >()

```
template<>
constexpr int32_t nvinfer1::EnumMax< OptProfileSelector > ( )  [inline], [constexpr], [noexcept]
```

8.2.4.15 EnumMax< ProfilingVerbosity >()

```
template<>
constexpr int32_t nvinfer1::EnumMax< ProfilingVerbosity > ( )  [inline], [constexpr], [noexcept]
```

Maximum number of profile verbosity levels in ProfilingVerbosity enum.

See also

ProfilingVerbosity

8.2.4.16 EnumMax< QuantizationFlag >()

```
template<>
constexpr int32_t nvinfer1::EnumMax< QuantizationFlag > ( )  [inline], [constexpr], [noexcept]
```

Maximum number of quantization flags in QuantizationFlag enum.

See also

QuantizationFlag

8.2.4.17 EnumMax< ReduceOperation >()

```
template<>
constexpr int32_t nvinfer1::EnumMax< ReduceOperation > ( )  [inline], [constexpr], [noexcept]
```

Maximum number of elements in ReduceOperation enum.

See also

ReduceOperation

8.2.4.18 EnumMax< RNNDirection >()

```
template<>
constexpr int32_t nvinfer1::EnumMax< RNNDirection > ( )  [inline], [constexpr], [noexcept]
```

Maximum number of elements in RNNDirection enum.

See also

RNNDirection

8.2.4.19 EnumMax< RNNGateType >()

```
template<>
constexpr int32_t nvinfer1::EnumMax< RNNGateType > ( )  [inline], [constexpr], [noexcept]
```

Maximum number of elements in RNNGateType enum.

See also

RNNGateType

8.2.4.20 EnumMax< RNNInputMode >()

```
template<>
constexpr int32_t nvinfer1::EnumMax< RNNInputMode > ( )  [inline], [constexpr], [noexcept]
```

Maximum number of elements in RNNInputMode enum.

See also

RNNInputMode

8.2.4.21 EnumMax< RNNOperation >()

```
template<>
constexpr int32_t nvinfer1::EnumMax< RNNOperation > ( )  [inline], [constexpr], [noexcept]
```

Maximum number of elements in RNNOperation enum.

See also

RNNOperation

8.2.4.22 EnumMax< ScaleMode >()

```
template<>
constexpr int32_t nvinfer1::EnumMax< ScaleMode > ( )  [inline], [constexpr], [noexcept]
```

Maximum number of elements in ScaleMode enum.

See also

ScaleMode

8.2.4.23 EnumMax< ScatterMode >()

```
template<>
constexpr int32_t nvinfer1::EnumMax< ScatterMode > ( )  [inline], [constexpr], [noexcept]
```

Maximum number of elements in ScatterMode enum.

See also

ScatterMode

8.2.4.24 EnumMax< SliceMode >()

```
template<>
constexpr int32_t nvinfer1::EnumMax< SliceMode > ( )  [inline], [constexpr], [noexcept]
```

Maximum number of elements in SliceMode enum.

See also

SliceMode

8.2.4.25 EnumMax< TacticSource >()

```
template<>
constexpr int32_t nvinfer1::EnumMax< TacticSource > ( )  [inline], [constexpr], [noexcept]
```

Maximum number of tactic sources in TacticSource enum.

See also

TacticSource

8.2.4.26 EnumMax< TopKOperation >()

```
template<>
constexpr int32_t nvinfer1::EnumMax< TopKOperation > ( )  [inline], [constexpr], [noexcept]
```

Maximum number of elements in TopKOperation enum.

See also

TopKOperation

8.2.4.27 EnumMax< TripLimit >()

```
template<>
constexpr int32_t nvinfer1::EnumMax< TripLimit > ( )  [inline], [constexpr], [noexcept]
```

Maximum number of elements in TripLimit enum.

See also

DataType

8.2.4.28 EnumMax< UnaryOperation >()

```
template<>
constexpr int32_t nvinfer1::EnumMax< UnaryOperation > ( )  [inline], [constexpr], [noexcept]
```

Maximum number of elements in UnaryOperation enum.

See also

UnaryOperation

8.2.4.29 EnumMax< WeightsRole >()

```
template<>
constexpr int32_t nvinfer1::EnumMax< WeightsRole > ( )  [inline], [constexpr], [noexcept]
```

Maximum number of elements in WeightsRole enum.

See also

WeightsRole

8.2.4.30 getBuilderPluginRegistry()

```
nvinfer1::IPluginRegistry * nvinfer1::getBuilderPluginRegistry (
            nvinfer1::EngineCapability capability )  [noexcept]
```

Return the plugin registry for the given capability or nullptr if no registry exists.

Engine capabilities EngineCapability::kSTANDARD and EngineCapability::kSAFETY have distinct plugin registries. Use IPluginRegistry::registerCreator from the registry to register plugins. Plugins registered in a registry associated with a specific engine capability are only available when building engines with that engine capability.

There is no plugin registry for EngineCapability::kDLA_STANDALONE.

8.3 nvinfer1::consistency Namespace Reference

Classes

- class IConsistencyChecker

  Validates a serialized engine blob.
- class IPluginChecker

  Consistency Checker plugin class for user implemented Plugins.

8.4 nvinfer1::impl Namespace Reference

Classes

- struct EnumMaxImpl

  Declaration of EnumMaxImpl struct to store maximum number of elements in an enumeration type.
- struct EnumMaxImpl< ActivationType >
- struct EnumMaxImpl< AllocatorFlag >

  Maximum number of elements in AllocatorFlag enum.
- struct EnumMaxImpl< DataType >

  Maximum number of elements in DataType enum.
- struct EnumMaxImpl< ElementWiseOperation >
- struct EnumMaxImpl< EngineCapability >

  Maximum number of elements in EngineCapability enum.
- struct EnumMaxImpl< ErrorCode >

  Maximum number of elements in ErrorCode enum.
- struct EnumMaxImpl< ILogger::Severity >

  Maximum number of elements in ILogger::Severity enum.
- struct EnumMaxImpl< PaddingMode >
- struct EnumMaxImpl< PoolingType >
- struct EnumMaxImpl< ResizeCoordinateTransformation >
- struct EnumMaxImpl< ResizeMode >
- struct EnumMaxImpl< ResizeRoundMode >
- struct EnumMaxImpl< ResizeSelector >
- struct EnumMaxImpl< TensorFormat >

  Maximum number of elements in TensorFormat enum.
- struct EnumMaxImpl< TensorLocation >

  Maximum number of elements in TensorLocation enum.

8.5 nvinfer1::plugin Namespace Reference

Classes

- struct DetectionOutputParameters

  The DetectionOutput plugin layer generates the detection output based on location and confidence predictions by doing non maximum suppression. This plugin first decodes the bounding boxes based on the anchors generated. It then performs non_max_suppression on the decoded bounding boxes. DetectionOutputParameters defines a set of parameters for creating the DetectionOutput plugin layer. It contains:
- struct GridAnchorParameters

  The Anchor Generator plugin layer generates the prior boxes of designated sizes and aspect ratios across all dimensions (H x W). GridAnchorParameters defines a set of parameters for creating the plugin layer for all feature maps. It contains:
- struct NMSParameters

  The NMSParameters are used by the BatchedNMSPlugin for performing the non_max_suppression operation over boxes for object detection networks.
- struct PriorBoxParameters

  The PriorBox plugin layer generates the prior boxes of designated sizes and aspect ratios across all dimensions (H x W). PriorBoxParameters defines a set of parameters for creating the PriorBox plugin layer. It contains:
- struct Quadruple

  The Permute plugin layer permutes the input tensor by changing the memory order of the data. Quadruple defines a structure that contains an array of 4 integers. They can represent the permute orders or the strides in each dimension.
- struct RegionParameters

  The Region plugin layer performs region proposal calculation: generate 5 bounding boxes per cell (for yolo9000, generate 3 bounding boxes per cell). For each box, calculating its probablities of objects detections from 80 pre-defined classifications (yolo9000 has 9418 pre-defined classifications, and these 9418 items are organized as work-tree structure). RegionParameters defines a set of parameters for creating the Region plugin layer.
- struct RPROIParams

  RPROIParams is used to create the RPROIPlugin instance. It contains:
- struct softmaxTree

  When performing yolo9000, softmaxTree is helping to do softmax on confidence scores, for element to get the precise classification through word-tree structured classification definition.

Enumerations

- enum class CodeTypeSSD : int32_t { CORNER = 0 , CENTER_SIZE = 1 , CORNER_SIZE = 2 , TF_CENTER = 3 }

  The type of encoding used for decoding the bounding boxes and loc_data.

8.5.1 Enumeration Type Documentation

8.5.1.1 CodeTypeSSD

```
enum class nvinfer1::plugin::CodeTypeSSD :  int32_t  [strong]
```

The type of encoding used for decoding the bounding boxes and loc_data.

Enumerator

CORNER	Use box corners.
CENTER_SIZE	Use box centers and size.
CORNER_SIZE	Use box centers and size.
TF_CENTER	Use box centers and size but flip x and y coordinates.

8.6 nvinfer1::safe Namespace Reference

The safety subset of TensorRT's API version 1 namespace.

Classes

- struct FloatingPointErrorInformation

  Space to record information about floating point runtime errors.
- class ICudaEngine

  A functionally safe engine for executing inference on a built network.
- class IExecutionContext

  Functionally safe context for executing inference using an engine.
- class IRuntime

  Allows a serialized functionally safe engine to be deserialized.
- class PluginRegistrar

  Register the plugin creator to the registry The static registry object will be instantiated when the plugin library is loaded. This static object will register all creators available in the library to the registry.

Functions

- IRuntime * createInferRuntime (ILogger &logger) noexcept

  Create an instance of an safe::IRuntime class.
- nvinfer1::IPluginRegistry * getSafePluginRegistry () noexcept

  Return the safe plugin registry.

8.6.1 Detailed Description

The safety subset of TensorRT's API version 1 namespace.

8.6.2 Function Documentation

8.6.2.1 createInferRuntime()

```
IRuntime * nvinfer1::safe::createInferRuntime (
            ILogger & logger )  [noexcept]
```

Create an instance of an safe::IRuntime class.

This class is the logging class for the runtime.

Usage considerations

- Allowed context for the API call
  - Thread-safe: Yes

8.6.2.2 getSafePluginRegistry()

```
nvinfer1::IPluginRegistry * nvinfer1::safe::getSafePluginRegistry ( )  [noexcept]
```

Return the safe plugin registry.

Usage considerations

- Allowed context for the API call
  - Thread-safe: Yes

8.7 nvinfer1::utils Namespace Reference

Functions

- TRT_DEPRECATED bool reshapeWeights (const Weights &input, int32_t const *shape, int32_t const *shape↩ Order, void *data, int32_t nbDims) noexcept

  Reformat the input weights of the given shape based on the new order of dimensions.
- TRT_DEPRECATED bool reorderSubBuffers (void *input, int32_t const *order, int32_t num, int32_t size) noexcept

  Takes an input stream and re-orders `num` *chunks of the data given the* `size` *and* `order`*.*
- TRT_DEPRECATED bool transposeSubBuffers (void *input, DataType type, int32_t num, int32_t height, int32↩ _t width) noexcept

  Transpose `num` *sub-buffers of* `height * width`*.*

8.7.1 Function Documentation

8.7.1.1 reorderSubBuffers()

```
TRT_DEPRECATED bool nvinfer1::utils::reorderSubBuffers (
            void * input,
            int32_t const * order,
            int32_t num,
            int32_t size )  [noexcept]
```

Takes an input stream and re-orders `num` chunks of the data given the `size` and `order`.

Parameters

input	The input data to re-order.
order	The new order of the data sub-buffers.
num	The number of data sub-buffers to re-order.
size	The size of each data sub-buffer in bytes.

In some frameworks, the ordering of the sub-buffers within a dimension is different than the way that TensorRT expects them. TensorRT expects the gate/bias sub-buffers for LSTM's to be in fico order. TensorFlow however formats the sub-buffers in icfo order. This helper function solves this in a generic fashion.

Example usage output of reshapeWeights above: int32_t indir[1]{1, 0} int32_t stride = W∗H; for (int32_t x = 0, y = N∗C; x < y; ++x) reorderSubBuffers(out + x ∗ stride, indir, H, W);

Input Matrix{2, 3, 2, 3}: { 0 2 4}, { 1 3 5} <– {0, 0, ∗, ∗} {12 14 16}, {13 15 17} <– {0, 1, ∗, ∗} {24 26 28}, {25 27 29} <– {0, 2, ∗, ∗} { 6 8 10}, { 7 9 11} <– {1, 0, ∗, ∗} {18 20 22}, {19 21 23} <– {1, 1, ∗, ∗} {30 32 34}, {31 33 35} <– {1, 2, ∗, ∗}

Output Matrix{2, 3, 2, 3}: { 1 3 5}, { 0 2 4} <– {0, 0, ∗, ∗} {13 15 17}, {12 14 16} <– {0, 1, ∗, ∗} {25 27 29}, {24 26 28} <– {0, 2, ∗, ∗} { 7 9 11}, { 6 8 10} <– {1, 0, ∗, ∗} {19 21 23}, {18 20 22} <– {1, 1, ∗, ∗} {31 33 35}, {30 32 34} <– {1, 2, ∗, ∗}

Returns

True on success, false on failure.

See also

reshapeWeights()

Warning

This file will be removed in TensorRT 10.0.

8.7.1.2 reshapeWeights()

```
TRT_DEPRECATED bool nvinfer1::utils::reshapeWeights (
            const Weights & input,
            int32_t const * shape,
            int32_t const * shapeOrder,
            void * data,
            int32_t nbDims )  [noexcept]
```

Reformat the input weights of the given shape based on the new order of dimensions.

Parameters

input	The input weights to reshape.
shape	The shape of the weights.
shapeOrder	The order of the dimensions to process for the output.
data	The location where the output data is placed.
nbDims	The number of dimensions to process.

Take the weights specified by `input` with the dimensions specified by `shape` and re-order the weights based on the new dimensions specified by `shapeOrder`. The size of each dimension and the input data is not modified. The output volume pointed to by `data` must be the same as he `input` volume.

Example usage: float *out = new float[N*C*H*W]; Weights input{DataType::kFLOAT, {0 ... N*C*H*W-1}, N*C*H*W size}; int32_t order[4]{1, 0, 3, 2}; int32_t shape[4]{C, N, W, H}; reshapeWeights(input, shape, order, out, 4); Weights reshaped{input.type, out, input.count};

Input Matrix{3, 2, 3, 2}: { 0 1}, { 2 3}, { 4 5} <– {0, 0, *, *} { 6 7}, { 8 9}, {10 11} <– {0, 1, *, *} {12 13}, {14 15}, {16 17} <– {1, 0, *, *} {18 19}, {20 21}, {22 23} <– {1, 1, *, *} {24 25}, {26 27}, {28 29} <– {2, 0, *, *} {30 31}, {32 33}, {34 35} <– {2, 1, *, *}

Output Matrix{2, 3, 2, 3}: { 0 2 4}, { 1 3 5} <– {0, 0, *, *} {12 14 16}, {13 15 17} <– {0, 1, *, *} {24 26 28}, {25 27 29} <– {0, 2, *, *} { 6 8 10}, { 7 9 11} <– {1, 0, *, *} {18 20 22}, {19 21 23} <– {1, 1, *, *} {30 32 34}, {31 33 35} <– {1, 2, *, *}

Returns

True on success, false on failure.

Warning

This file will be removed in TensorRT 10.0.

8.7.1.3 transposeSubBuffers()

```
TRT_DEPRECATED bool nvinfer1::utils::transposeSubBuffers (
            void * input,
            DataType type,
            int32_t num,
            int32_t height,
            int32_t width )  [noexcept]
```

Transpose `num` sub-buffers of `height * width`.

Parameters

input	The input data to transpose.
type	The type of the data to transpose.
num	The number of data sub-buffers to transpose.
height	The size of the height dimension to transpose.
width	The size of the width dimension to transpose.

Returns

True on success, false on failure.

Warning

This file will be removed in TensorRT 10.0.

8.8 nvonnxparser Namespace Reference

The TensorRT ONNX parser API namespace.

Classes

- class IOnnxConfig

  Configuration Manager Class.
- class IParser

  an object for parsing ONNX models into a TensorRT network definition
- class IParserError

  an object containing information about an error

Enumerations

- enum class ErrorCode : int {
  kSUCCESS = 0 , kINTERNAL_ERROR = 1 , kMEM_ALLOC_FAILED = 2 , kMODEL_DESERIALIZE_FAILED = 3 ,
  kINVALID_VALUE = 4 , kINVALID_GRAPH = 5 , kINVALID_NODE = 6 , kUNSUPPORTED_GRAPH = 7 ,
  kUNSUPPORTED_NODE = 8 }

  the type of parser error

Functions

- IOnnxConfig * createONNXConfig ()
- template<typename T >
  int32_t EnumMax ()
- template<> int32_t EnumMax< ErrorCode > ()

8.8.1 Detailed Description

The TensorRT ONNX parser API namespace.

8.8.2 Enumeration Type Documentation

8.8.2.1 ErrorCode

```
enum class nvonnxparser::ErrorCode :  int  [strong]
```

the type of parser error

Enumerator

kSUCCESS	
kINTERNAL_ERROR	
kMEM_ALLOC_FAILED	
kMODEL_DESERIALIZE_FAILED	
kINVALID_VALUE	
kINVALID_GRAPH	
kINVALID_NODE	
kUNSUPPORTED_GRAPH	
kUNSUPPORTED_NODE	

8.8.3 Function Documentation

8.8.3.1 createONNXConfig()

```
IOnnxConfig * nvonnxparser::createONNXConfig ( )
```

8.8.3.2 EnumMax()

```
template<typename T >
int32_t nvonnxparser::EnumMax ( )  [inline]
```

8.8.3.3 EnumMax< ErrorCode >()

```
template<>
int32_t nvonnxparser::EnumMax< ErrorCode > ( )  [inline]
```

8.9 nvuffparser Namespace Reference

The TensorRT UFF parser API namespace.

Classes

- struct FieldCollection
- class FieldMap

  An array of field params used as a layer parameter for plugin layers.
- class IUffParser

  Class used for parsing models described using the UFF format.

Enumerations

- enum class UffInputOrder : int32_t { kNCHW = 0 , kNHWC = 1 , kNC = 2 }

  The different possible supported input order.
- enum class FieldType : int32_t {
  kFLOAT = 0 , kINT32 = 1 , kCHAR = 2 , kDIMS = 4 ,
  kDATATYPE = 5 , kUNKNOWN = 6 }

  The possible field types for custom layer.

Functions

- IUffParser * createUffParser () noexcept

  Creates a IUffParser object.
- void shutdownProtobufLibrary (void) noexcept

  Shuts down protocol buffers library.

8.9.1 Detailed Description

The TensorRT UFF parser API namespace.

8.9.2 Enumeration Type Documentation

8.9.2.1 FieldType

```
enum class nvuffparser::FieldType :  int32_t  [strong]
```

The possible field types for custom layer.

Enumerator

kFLOAT	FP32 field type.
kINT32	INT32 field type.
kCHAR	char field type. String for length>1.
kDIMS	nvinfer1::Dims field type.
kDATATYPE	nvinfer1::DataType field type.
kUNKNOWN	

8.9.2.2 UffInputOrder

```
enum class nvuffparser::UffInputOrder :  int32_t  [strong]
```

The different possible supported input order.

Enumerator

kNCHW	NCHW order.
kNHWC	NHWC order.
kNC	NC order.

8.9.3 Function Documentation

8.9.3.1 createUffParser()

```
IUffParser * nvuffparser::createUffParser ( )  [noexcept]
```

Creates a IUffParser object.

Returns

A pointer to the IUffParser object is returned.

See also

nvuffparser::IUffParser

Deprecated IUffParser will be removed in TensorRT 9.0. Plan to migrate your workflow to use nvonnxparser::IParser for deployment.

8.9.3.2 shutdownProtobufLibrary()

```
void nvuffparser::shutdownProtobufLibrary (
             void  )  [noexcept]
```

Shuts down protocol buffers library.

Note

No part of the protocol buffers library can be used after this function is called.

Chapter 9

Class Documentation

9.1 nvinfer1::plugin::DetectionOutputParameters Struct Reference

The DetectionOutput plugin layer generates the detection output based on location and confidence predictions by doing non maximum suppression. This plugin first decodes the bounding boxes based on the anchors generated. It then performs non_max_suppression on the decoded bounding boxes. DetectionOutputParameters defines a set of parameters for creating the DetectionOutput plugin layer. It contains:

`#include <NvInferPluginUtils.h>`

Public Attributes

- bool shareLocation
- bool varianceEncodedInTarget
- int32_t backgroundLabelId
- int32_t numClasses
- int32_t topK
- int32_t keepTopK
- float confidenceThreshold
- float nmsThreshold
- CodeTypeSSD codeType
- int32_t inputOrder [3]
- bool confSigmoid
- bool isNormalized
- bool isBatchAgnostic {true}

9.1.1 Detailed Description

The DetectionOutput plugin layer generates the detection output based on location and confidence predictions by doing non maximum suppression. This plugin first decodes the bounding boxes based on the anchors generated. It then performs non_max_suppression on the decoded bounding boxes. DetectionOutputParameters defines a set of parameters for creating the DetectionOutput plugin layer. It contains:

Parameters

shareLocation	If true, bounding box are shared among different classes.
varianceEncodedInTarget	If true, variance is encoded in target. Otherwise we need to adjust the predicted offset accordingly.
backgroundLabelId	Background label ID. If there is no background class, set it as -1.
numClasses	Number of classes to be predicted.
topK	Number of boxes per image with top confidence scores that are fed into the NMS algorithm.
keepTopK	Number of total bounding boxes to be kept per image after NMS step.
confidenceThreshold	Only consider detections whose confidences are larger than a threshold.
nmsThreshold	Threshold to be used in NMS.
codeType	Type of coding method for bbox.
inputOrder	Specifies the order of inputs {loc_data, conf_data, priorbox_data}.
confSigmoid	Set to true to calculate sigmoid of confidence scores.
isNormalized	Set to true if bounding box data is normalized by the network.
isBatchAgnostic	Defaults to true. Set to false if prior boxes are unique per batch

9.1.2 Member Data Documentation

9.1.2.1 backgroundLabelId

```
int32_t nvinfer1::plugin::DetectionOutputParameters::backgroundLabelId
```

9.1.2.2 codeType

```
CodeTypeSSD nvinfer1::plugin::DetectionOutputParameters::codeType
```

9.1.2.3 confidenceThreshold

```
float nvinfer1::plugin::DetectionOutputParameters::confidenceThreshold
```

9.1.2.4 confSigmoid

```
bool nvinfer1::plugin::DetectionOutputParameters::confSigmoid
```

9.1.2.5 inputOrder

```
int32_t nvinfer1::plugin::DetectionOutputParameters::inputOrder[3]
```

9.1.2.6 isBatchAgnostic

```
bool nvinfer1::plugin::DetectionOutputParameters::isBatchAgnostic {true}
```

9.1.2.7 isNormalized

```
bool nvinfer1::plugin::DetectionOutputParameters::isNormalized
```

9.1.2.8 keepTopK

```
int32_t nvinfer1::plugin::DetectionOutputParameters::keepTopK
```

9.1.2.9 nmsThreshold

```
float nvinfer1::plugin::DetectionOutputParameters::nmsThreshold
```

9.1.2.10 numClasses

```
int32_t nvinfer1::plugin::DetectionOutputParameters::numClasses
```

9.1.2.11 shareLocation

```
bool nvinfer1::plugin::DetectionOutputParameters::shareLocation
```

9.1.2.12 topK

```
int32_t nvinfer1::plugin::DetectionOutputParameters::topK
```

9.1.2.13 varianceEncodedInTarget

```
bool nvinfer1::plugin::DetectionOutputParameters::varianceEncodedInTarget
```

The documentation for this struct was generated from the following file:

- NvInferPluginUtils.h

9.2 Dims Class Reference

Structure to define the dimensions of a tensor.

```
#include <NvInferRuntimeCommon.h>
```

9.2.1 Detailed Description

Structure to define the dimensions of a tensor.

TensorRT can also return an invalid dims structure. This structure is represented by nbDims == -1 and d[i] == 0 for all d.

TensorRT can also return an "unknown rank" dims structure. This structure is represented by nbDims == -1 and d[i] == -1 for all d.

The documentation for this class was generated from the following file:

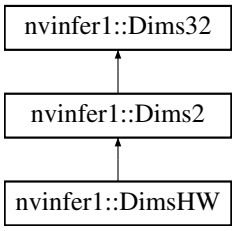
- NvInferRuntimeCommon.h

9.3 nvinfer1::Dims2 Class Reference

Descriptor for two-dimensional data.

`#include <NvInferLegacyDims.h>`

Inheritance diagram for nvinfer1::Dims2:



Public Member Functions

- Dims2 ()
  Construct an empty Dims2 object.
- Dims2 (int32_t d0, int32_t d1)
  Construct a Dims2 from 2 elements.

Additional Inherited Members

9.3.1 Detailed Description

Descriptor for two-dimensional data.

9.3.2 Constructor & Destructor Documentation

9.3.2.1 Dims2() [1/2]

```
nvinfer1::Dims2::Dims2 ( )  [inline]
```

Construct an empty Dims2 object.

9.3.2.2 Dims2() [2/2]

```
nvinfer1::Dims2::Dims2 (
            int32_t d0,
            int32_t d1 )  [inline]
```

Construct a Dims2 from 2 elements.

Parameters

d0	The first element.
d1	The second element.

The documentation for this class was generated from the following file:

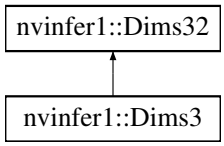
- NvInferLegacyDims.h

9.4 nvinfer1::Dims3 Class Reference

Descriptor for three-dimensional data.

`#include <NvInferLegacyDims.h>`

Inheritance diagram for nvinfer1::Dims3:



Public Member Functions

- Dims3 ()

  Construct an empty Dims3 object.
- Dims3 (int32_t d0, int32_t d1, int32_t d2)

  Construct a Dims3 from 3 elements.

Additional Inherited Members

9.4.1 Detailed Description

Descriptor for three-dimensional data.

9.4.2 Constructor & Destructor Documentation

9.4.2.1 Dims3() [1/2]

```
nvinfer1::Dims3::Dims3 ( )  [inline]
```

Construct an empty Dims3 object.

9.4.2.2 Dims3() [2/2]

```
nvinfer1::Dims3::Dims3 (
            int32_t d0,
            int32_t d1,
            int32_t d2 )  [inline]
```

Construct a Dims3 from 3 elements.

Parameters

d0	The first element.
d1	The second element.
d2	The third element.

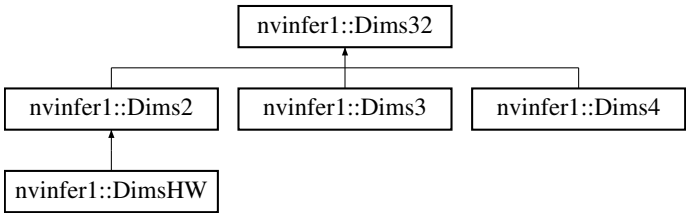
The documentation for this class was generated from the following file:

- NvInferLegacyDims.h

9.5 nvinfer1::Dims32 Class Reference

```
#include <NvInferRuntimeCommon.h>
```

Inheritance diagram for nvinfer1::Dims32:



Public Attributes

- int32_t nbDims

  The rank (number of dimensions).
- int32_t d [MAX_DIMS]

  The extent of each dimension.

Static Public Attributes

- static constexpr int32_t MAX_DIMS {8}

  The maximum rank (number of dimensions) supported for a tensor.

9.5.1 Member Data Documentation

9.5.1.1 d

`int32_t nvinfer1::Dims32::d[MAX_DIMS]`

The extent of each dimension.

9.5.1.2 MAX_DIMS

`constexpr int32_t nvinfer1::Dims32::MAX_DIMS {8} [static], [constexpr]`

The maximum rank (number of dimensions) supported for a tensor.

9.5.1.3 nbDims

`int32_t nvinfer1::Dims32::nbDims`

The rank (number of dimensions).

The documentation for this class was generated from the following file:

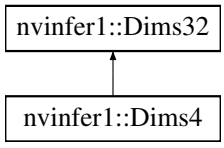
- NvInferRuntimeCommon.h

9.6 nvinfer1::Dims4 Class Reference

Descriptor for four-dimensional data.

`#include <NvInferLegacyDims.h>`

Inheritance diagram for nvinfer1::Dims4:



Public Member Functions

- Dims4 ()

  Construct an empty Dims4 object.
- Dims4 (int32_t d0, int32_t d1, int32_t d2, int32_t d3)

  Construct a Dims4 from 4 elements.

Additional Inherited Members

9.6.1 Detailed Description

Descriptor for four-dimensional data.

9.6.2 Constructor & Destructor Documentation

9.6.2.1 Dims4() [1/2]

```
nvinfer1::Dims4::Dims4 ( )  [inline]
```

Construct an empty Dims4 object.

9.6.2.2 Dims4() [2/2]

```
nvinfer1::Dims4::Dims4 (
            int32_t d0,
            int32_t d1,
            int32_t d2,
            int32_t d3 )  [inline]
```

Construct a Dims4 from 4 elements.

Parameters

d0	The first element.
d1	The second element.
d2	The third element.
d3	The fourth element.

The documentation for this class was generated from the following file:

- NvInferLegacyDims.h

9.7 nvinfer1::DimsExprs Class Reference

`#include <NvInferRuntime.h>`

Public Attributes

- int32_t nbDims

  The number of dimensions.
- const IDimensionExpr * d [Dims::MAX_DIMS]

  The extent of each dimension.

9.7.1 Detailed Description

Analog of class Dims with expressions instead of constants for the dimensions.

9.7.2 Member Data Documentation

9.7.2.1 d

`const IDimensionExpr* nvinfer1::DimsExprs::d[Dims::MAX_DIMS]`

The extent of each dimension.

9.7.2.2 nbDims

`int32_t nvinfer1::DimsExprs::nbDims`

The number of dimensions.

The documentation for this class was generated from the following file:

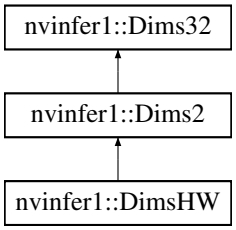
- NvInferRuntime.h

9.8 nvinfer1::DimsHW Class Reference

Descriptor for two-dimensional spatial data.

`#include <NvInferLegacyDims.h>`

Inheritance diagram for nvinfer1::DimsHW:



Public Member Functions

- DimsHW ()

  Construct an empty DimsHW object.
- DimsHW (int32_t height, int32_t width)

  Construct a DimsHW given height and width.
- int32_t & h ()

  Get the height.
- int32_t h () const

  Get the height.
- int32_t & w ()

  Get the width.
- int32_t w () const

  Get the width.

Additional Inherited Members

9.8.1 Detailed Description

Descriptor for two-dimensional spatial data.

9.8.2 Constructor & Destructor Documentation

9.8.2.1 DimsHW() [1/2]

```
nvinfer1::DimsHW::DimsHW ( )  [inline]
```

Construct an empty DimsHW object.

9.8.2.2 DimsHW() [2/2]

```
nvinfer1::DimsHW::DimsHW (
            int32_t height,
            int32_t width )  [inline]
```

Construct a DimsHW given height and width.

Parameters

height	the height of the data
width	the width of the data

9.8.3 Member Function Documentation

9.8.3.1 h() [1/2]

```
int32_t & nvinfer1::DimsHW::h ( )  [inline]
```

Get the height.

Returns

The height.

9.8.3.2 h() [2/2]

```
int32_t nvinfer1::DimsHW::h ( ) const  [inline]
```

Get the height.

Returns

The height.

9.8.3.3 w() [1/2]

```
int32_t & nvinfer1::DimsHW::w ( )  [inline]
```

Get the width.

Returns

The width.

9.8.3.4 w() [2/2]

```
int32_t nvinfer1::DimsHW::w ( ) const  [inline]
```

Get the width.

Returns

The width.

The documentation for this class was generated from the following file:

- NvInferLegacyDims.h

9.9 nvinfer1::DynamicPluginTensorDesc Class Reference

```
#include <NvInferRuntime.h>
```

Public Attributes

- PluginTensorDesc desc

  Information required to interpret a pointer to tensor data, except that desc.dims has -1 in place of any runtime dimension.
- Dims min

  Lower bounds on tensor's dimensions.
- Dims max

  Upper bounds on tensor's dimensions.

9.9.1 Detailed Description

Summarizes tensors that a plugin might see for an input or output.

9.9.2 Member Data Documentation

9.9.2.1 desc

`PluginTensorDesc nvinfer1::DynamicPluginTensorDesc::desc`

Information required to interpret a pointer to tensor data, except that desc.dims has -1 in place of any runtime dimension.

9.9.2.2 max

`Dims nvinfer1::DynamicPluginTensorDesc::max`

Upper bounds on tensor's dimensions.

9.9.2.3 min

`Dims nvinfer1::DynamicPluginTensorDesc::min`

Lower bounds on tensor's dimensions.

The documentation for this class was generated from the following file:

- NvInferRuntime.h

9.10 nvinfer1::impl::EnumMaxImpl< T > Struct Template Reference

Declaration of EnumMaxImpl struct to store maximum number of elements in an enumeration type.

9.10.1 Detailed Description

template<typename T>
struct nvinfer1::impl::EnumMaxImpl< T >

Declaration of EnumMaxImpl struct to store maximum number of elements in an enumeration type.

The documentation for this struct was generated from the following file:

- NvInferRuntimeCommon.h

9.11 nvinfer1::impl::EnumMaxImpl< ActivationType > Struct Reference

`#include <NvInfer.h>`

Static Public Attributes

- static constexpr int32_t kVALUE = 12

9.11.1 Detailed Description

Maximum number of elements in ActivationType enum.

See also

ActivationType

9.11.2 Member Data Documentation

9.11.2.1 kVALUE

`constexpr int32_t nvinfer1::impl::EnumMaxImpl< ActivationType >::kVALUE = 12 [static], [constexpr]`

The documentation for this struct was generated from the following file:

- NvInfer.h

9.12 nvinfer1::impl::EnumMaxImpl< AllocatorFlag > Struct Reference

Maximum number of elements in AllocatorFlag enum.

`#include <NvInferRuntimeCommon.h>`

Static Public Attributes

- static constexpr int32_t kVALUE = 1

  maximum number of elements in AllocatorFlag enum

9.12.1 Detailed Description

Maximum number of elements in AllocatorFlag enum.

See also

AllocatorFlag

9.12.2 Member Data Documentation

9.12.2.1 kVALUE

```
constexpr int32_t nvinfer1::impl::EnumMaxImpl< AllocatorFlag >::kVALUE = 1  [static], [constexpr]
```

maximum number of elements in AllocatorFlag enum

The documentation for this struct was generated from the following file:

- NvInferRuntimeCommon.h

9.13 nvinfer1::impl::EnumMaxImpl< DataType > Struct Reference

Maximum number of elements in DataType enum.

`#include <NvInferRuntimeCommon.h>`

Static Public Attributes

- static constexpr int32_t kVALUE = 5

9.13.1 Detailed Description

Maximum number of elements in DataType enum.

See also

DataType

9.13.2 Member Data Documentation

9.13.2.1 kVALUE

```
constexpr int32_t nvinfer1::impl::EnumMaxImpl< DataType >::kVALUE = 5  [static], [constexpr]
```

The documentation for this struct was generated from the following file:

- NvInferRuntimeCommon.h

9.14 nvinfer1::impl::EnumMaxImpl< ElementWiseOperation > Struct Reference

`#include <NvInfer.h>`

Static Public Attributes

- static constexpr int32_t kVALUE = 14

9.14.1 Detailed Description

Maximum number of elements in ElementWiseOperation enum.

See also

ElementWiseOperation

9.14.2 Member Data Documentation

9.14.2.1 kVALUE

```
constexpr int32_t nvinfer1::impl::EnumMaxImpl< ElementWiseOperation >::kVALUE = 14  [static],
[constexpr]
```

The documentation for this struct was generated from the following file:

- NvInfer.h

9.15 nvinfer1::impl::EnumMaxImpl< EngineCapability > Struct Reference

Maximum number of elements in EngineCapability enum.

`#include <NvInferRuntime.h>`

Static Public Attributes

- static constexpr int32_t kVALUE = 3

9.15.1 Detailed Description

Maximum number of elements in EngineCapability enum.

See also

EngineCapability

9.15.2 Member Data Documentation

9.15.2.1 kVALUE

`constexpr int32_t nvinfer1::impl::EnumMaxImpl< EngineCapability >::kVALUE = 3 [static], [constexpr]`

The documentation for this struct was generated from the following file:

- NvInferRuntime.h

9.16 nvinfer1::impl::EnumMaxImpl< ErrorCode > Struct Reference

Maximum number of elements in ErrorCode enum.

`#include <NvInferRuntimeCommon.h>`

Static Public Attributes

- static constexpr int32_t kVALUE = 11

  Declaration of kVALUE.

9.16.1 Detailed Description

Maximum number of elements in ErrorCode enum.

See also

ErrorCode

9.16.2 Member Data Documentation

9.16.2.1 kVALUE

```
constexpr int32_t nvinfer1::impl::EnumMaxImpl< ErrorCode >::kVALUE = 11  [static], [constexpr]
```

Declaration of kVALUE.

The documentation for this struct was generated from the following file:

- NvInferRuntimeCommon.h

9.17 nvinfer1::impl::EnumMaxImpl< ILogger::Severity > Struct Reference

Maximum number of elements in ILogger::Severity enum.

```
#include <NvInferRuntimeCommon.h>
```

Static Public Attributes

- static constexpr int32_t kVALUE = 5

  Declaration of kVALUE that represents maximum number of elements in ILogger::Severity enum.

9.17.1 Detailed Description

Maximum number of elements in ILogger::Severity enum.

See also

ILogger::Severity

9.17.2 Member Data Documentation

9.17.2.1 kVALUE

```
constexpr int32_t nvinfer1::impl::EnumMaxImpl< ILogger::Severity >::kVALUE = 5  [static], [constexpr]
```

Declaration of kVALUE that represents maximum number of elements in ILogger::Severity enum.

The documentation for this struct was generated from the following file:

- NvInferRuntimeCommon.h

9.18 nvinfer1::impl::EnumMaxImpl< PaddingMode > Struct Reference

```
#include <NvInfer.h>
```

Static Public Attributes

- static constexpr int32_t kVALUE = 6

9.18.1 Detailed Description

Maximum number of elements in PaddingMode enum.

See also

PaddingMode

9.18.2 Member Data Documentation

9.18.2.1 kVALUE

```
constexpr int32_t nvinfer1::impl::EnumMaxImpl< PaddingMode >::kVALUE = 6  [static], [constexpr]
```

The documentation for this struct was generated from the following file:

- NvInfer.h

9.19 nvinfer1::impl::EnumMaxImpl< PoolingType > Struct Reference

`#include <NvInfer.h>`

Static Public Attributes

- static constexpr int32_t kVALUE = 3

9.19.1 Detailed Description

Maximum number of elements in PoolingType enum.

See also

PoolingType

9.19.2 Member Data Documentation

9.19.2.1 kVALUE

`constexpr int32_t nvinfer1::impl::EnumMaxImpl< PoolingType >::kVALUE = 3 [static], [constexpr]`

The documentation for this struct was generated from the following file:

- NvInfer.h

9.20 nvinfer1::impl::EnumMaxImpl< ResizeCoordinateTransformation > Struct Reference

`#include <NvInfer.h>`

Static Public Attributes

- static constexpr int32_t kVALUE = 3

9.20.1 Detailed Description

Maximum number of elements in ResizeCoordinateTransformation enum.

See also

ResizeCoordinateTransformation

9.20.2 Member Data Documentation

9.20.2.1 kVALUE

```
constexpr int32_t nvinfer1::impl::EnumMaxImpl< ResizeCoordinateTransformation >::kVALUE = 3  [static],
[constexpr]
```

The documentation for this struct was generated from the following file:

- NvInfer.h

9.21 nvinfer1::impl::EnumMaxImpl< ResizeMode > Struct Reference

```
#include <NvInfer.h>
```

Static Public Attributes

- static constexpr int32_t kVALUE = 2

9.21.1 Detailed Description

Maximum number of elements in ResizeMode enum.

See also

ResizeMode

9.21.2 Member Data Documentation

9.21.2.1 kVALUE

```
constexpr int32_t nvinfer1::impl::EnumMaxImpl< ResizeMode >::kVALUE = 2  [static], [constexpr]
```

The documentation for this struct was generated from the following file:

- NvInfer.h

9.22 nvinfer1::impl::EnumMaxImpl< ResizeRoundMode > Struct Reference

```
#include <NvInfer.h>
```

Static Public Attributes

- static constexpr int32_t kVALUE = 4

9.22.1 Detailed Description

Maximum number of elements in ResizeRoundMode enum.

See also

ResizeRoundMode

9.22.2 Member Data Documentation

9.22.2.1 kVALUE

```
constexpr int32_t nvinfer1::impl::EnumMaxImpl< ResizeRoundMode >::kVALUE = 4  [static], [constexpr]
```

The documentation for this struct was generated from the following file:

- NvInfer.h

9.23 nvinfer1::impl::EnumMaxImpl< ResizeSelector > Struct Reference

```
#include <NvInfer.h>
```

Static Public Attributes

- static constexpr int32_t kVALUE = 2

9.23.1 Detailed Description

Maximum number of elements in ResizeSelector enum.

See also

ResizeSelector

9.23.2 Member Data Documentation

9.23.2.1 kVALUE

```
constexpr int32_t nvinfer1::impl::EnumMaxImpl< ResizeSelector >::kVALUE = 2  [static], [constexpr]
```

The documentation for this struct was generated from the following file:

- NvInfer.h

9.24 nvinfer1::impl::EnumMaxImpl< TensorFormat > Struct Reference

Maximum number of elements in TensorFormat enum.

```
#include <NvInferRuntimeCommon.h>
```

Static Public Attributes

- static constexpr int32_t kVALUE = 12

  Declaration of kVALUE that represents maximum number of elements in TensorFormat enum.

9.24.1 Detailed Description

Maximum number of elements in TensorFormat enum.

See also

TensorFormat

9.24.2 Member Data Documentation

9.24.2.1 kVALUE

```
constexpr int32_t nvinfer1::impl::EnumMaxImpl< TensorFormat >::kVALUE = 12  [static], [constexpr]
```

Declaration of kVALUE that represents maximum number of elements in TensorFormat enum.

The documentation for this struct was generated from the following file:

- NvInferRuntimeCommon.h

9.25 nvinfer1::impl::EnumMaxImpl< TensorLocation > Struct Reference

Maximum number of elements in TensorLocation enum.

```
#include <NvInferRuntime.h>
```

Static Public Attributes

- static constexpr int32_t kVALUE = 2

9.25.1 Detailed Description

Maximum number of elements in TensorLocation enum.

See also

TensorLocation

9.25.2 Member Data Documentation

9.25.2.1 kVALUE

```
constexpr int32_t nvinfer1::impl::EnumMaxImpl< TensorLocation >::kVALUE = 2  [static], [constexpr]
```

The documentation for this struct was generated from the following file:

- NvInferRuntime.h

9.26 nvuffparser::FieldCollection Struct Reference

`#include <NvUffParser.h>`

Public Attributes

- int32_t nbFields
- const FieldMap * fields

9.26.1 Member Data Documentation

9.26.1.1 fields

`const FieldMap* nvuffparser::FieldCollection::fields`

9.26.1.2 nbFields

`int32_t nvuffparser::FieldCollection::nbFields`

The documentation for this struct was generated from the following file:

- NvUffParser.h

9.27 nvuffparser::FieldMap Class Reference

An array of field params used as a layer parameter for plugin layers.

`#include <NvUffParser.h>`

Public Member Functions

- FieldMap (const char *name, const void *data, const FieldType type, int32_t length=1)

Public Attributes

- const char * name
- const void * data
- FieldType type = FieldType::kUNKNOWN
- int32_t length = 1

9.27.1 Detailed Description

An array of field params used as a layer parameter for plugin layers.

The node fields are passed by the parser to the API through the plugin constructor. The implementation of the plugin should parse the contents of the fieldMap as part of the plugin constructor

9.27.2 Constructor & Destructor Documentation

9.27.2.1 FieldMap()

```
nvuffparser::FieldMap::FieldMap (
            const char * name,
            const void * data,
            const FieldType type,
            int32_t length = 1 )
```

9.27.3 Member Data Documentation

9.27.3.1 data

```
const void* nvuffparser::FieldMap::data
```

9.27.3.2 length

```
int32_t nvuffparser::FieldMap::length = 1
```

9.27.3.3 name

```
const char* nvuffparser::FieldMap::name
```

9.27.3.4 type

```
FieldType nvuffparser::FieldMap::type = FieldType::kUNKNOWN
```

The documentation for this class was generated from the following file:

- NvUffParser.h

9.28 nvinfer1::safe::FloatingPointErrorInformation Struct Reference

Space to record information about floating point runtime errors.

```
#include <NvInferSafeRuntime.h>
```

Public Attributes

- int32_t nbNanErrors

  Total count of errors relating to NAN values (0 if none)
- int32_t nbInfErrors

  Total count of errors relating to INF values (0 if none)

9.28.1 Detailed Description

Space to record information about floating point runtime errors.

NAN errors occur when NAN values are stored in an INT8 quantized datatype. INF errors occur when +-INF values are stored in an INT8 quantized datatype.

9.28.2 Member Data Documentation

9.28.2.1 nbInfErrors

```
int32_t nvinfer1::safe::FloatingPointErrorInformation::nbInfErrors
```

Total count of errors relating to INF values (0 if none)

9.28.2.2 nbNanErrors

```
int32_t nvinfer1::safe::FloatingPointErrorInformation::nbNanErrors
```

Total count of errors relating to NAN values (0 if none)

The documentation for this struct was generated from the following file:

- NvInferSafeRuntime.h

9.29 nvinfer1::plugin::GridAnchorParameters Struct Reference

The Anchor Generator plugin layer generates the prior boxes of designated sizes and aspect ratios across all dimensions (H x W). GridAnchorParameters defines a set of parameters for creating the plugin layer for all feature maps. It contains:

```
#include <NvInferPluginUtils.h>
```

Public Attributes

- float minSize
- float maxSize
- float * aspectRatios
- int32_t numAspectRatios
- int32_t H
- int32_t W
- float variance [4]

9.29.1 Detailed Description

The Anchor Generator plugin layer generates the prior boxes of designated sizes and aspect ratios across all dimensions (H x W). GridAnchorParameters defines a set of parameters for creating the plugin layer for all feature maps. It contains:

Parameters

minScale	Scale of anchors corresponding to finest resolution.
maxScale	Scale of anchors corresponding to coarsest resolution.
aspectRatios	List of aspect ratios to place on each grid point.
numAspectRatios	Number of elements in aspectRatios.
H	Height of feature map to generate anchors for.
W	Width of feature map to generate anchors for.
variance	Variance for adjusting the prior boxes.

9.29.2 Member Data Documentation

9.29.2.1 aspectRatios

```
float* nvinfer1::plugin::GridAnchorParameters::aspectRatios
```

9.29.2.2 H

```
int32_t nvinfer1::plugin::GridAnchorParameters::H
```

9.29.2.3 maxSize

```
float nvinfer1::plugin::GridAnchorParameters::maxSize
```

9.29.2.4 minSize

```
float nvinfer1::plugin::GridAnchorParameters::minSize
```

9.29.2.5 numAspectRatios

```
int32_t nvinfer1::plugin::GridAnchorParameters::numAspectRatios
```

9.29.2.6 variance

```
float nvinfer1::plugin::GridAnchorParameters::variance[4]
```

9.29.2.7 W

```
int32_t nvinfer1::plugin::GridAnchorParameters::W
```

The documentation for this struct was generated from the following file:

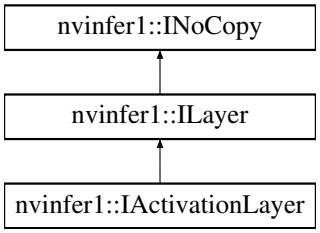
- NvInferPluginUtils.h

9.30 nvinfer1::IActivationLayer Class Reference

An Activation layer in a network definition.

```
#include <NvInfer.h>
```

Inheritance diagram for nvinfer1::IActivationLayer:



Public Member Functions

- void setActivationType (ActivationType type) noexcept

  Set the type of activation to be performed.
- ActivationType getActivationType () const noexcept

  Get the type of activation to be performed.
- void setAlpha (float alpha) noexcept

  Set the alpha parameter (must be finite).
- void setBeta (float beta) noexcept

  Set the beta parameter (must be finite).
- float getAlpha () const noexcept

  Get the alpha parameter.
- float getBeta () const noexcept

  Get the beta parameter.

Protected Member Functions

- virtual ~IActivationLayer () noexcept=default

Protected Attributes

- apiv::VActivationLayer * mImpl

9.30.1 Detailed Description

An Activation layer in a network definition.

This layer applies a per-element activation function to its input.

The output has the same shape as the input.

Warning

Do not inherit from this class, as doing so will break forward-compatibility of the API and ABI.

9.30.2 Constructor & Destructor Documentation

9.30.2.1 ~IActivationLayer()

```
virtual nvinfer1::IActivationLayer::~IActivationLayer ( )  [protected], [virtual], [default],
[noexcept]
```

9.30.3 Member Function Documentation

9.30.3.1 getActivationType()

```
ActivationType nvinfer1::IActivationLayer::getActivationType ( ) const  [inline], [noexcept]
```

Get the type of activation to be performed.

See also

setActivationType(), ActivationType

9.30.3.2 getAlpha()

```
float nvinfer1::IActivationLayer::getAlpha ( ) const  [inline], [noexcept]
```

Get the alpha parameter.

See also

getBeta(), setAlpha()

9.30.3.3 getBeta()

```
float nvinfer1::IActivationLayer::getBeta ( ) const  [inline], [noexcept]
```

Get the beta parameter.

See also

getAlpha(), setBeta()

9.30.3.4 setActivationType()

```
void nvinfer1::IActivationLayer::setActivationType (
            ActivationType type )  [inline], [noexcept]
```

Set the type of activation to be performed.

On the DLA, the valid activation types are kRELU, kSIGMOID, kTANH, and kCLIP.

See also

getActivationType(), ActivationType

9.30.3.5 setAlpha()

```
void nvinfer1::IActivationLayer::setAlpha (
             float alpha )  [inline], [noexcept]
```

Set the alpha parameter (must be finite).

This parameter is used by the following activations: LeakyRelu, Elu, Selu, Softplus, Clip, HardSigmoid, ScaledTanh, ThresholdedRelu.

It is ignored by the other activations.

See also

getAlpha(), setBeta()

9.30.3.6 setBeta()

```
void nvinfer1::IActivationLayer::setBeta (
             float beta )  [inline], [noexcept]
```

Set the beta parameter (must be finite).

This parameter is used by the following activations: Selu, Softplus, Clip, HardSigmoid, ScaledTanh.

It is ignored by the other activations.

See also

getBeta(), setAlpha()

9.30.4 Member Data Documentation

9.30.4.1 mImpl

```
apiv::VActivationLayer* nvinfer1::IActivationLayer::mImpl  [protected]
```

The documentation for this class was generated from the following file:

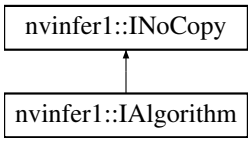
- NvInfer.h

9.31 nvinfer1::IAlgorithm Class Reference

Describes a variation of execution of a layer. An algorithm is represented by IAlgorithmVariant and the IAlgorithmIOInfo for each of its inputs and outputs. An algorithm can be selected or reproduced using Algorithm↩ Selector::selectAlgorithms().".

`#include <NvInfer.h>`

Inheritance diagram for nvinfer1::IAlgorithm:



Public Member Functions

- TRT_DEPRECATED const IAlgorithmIOInfo & getAlgorithmIOInfo (int32_t index) const noexcept

  Returns the format of an Algorithm input or output. Algorithm inputs are incrementally numbered first, followed by algorithm outputs.
- const IAlgorithmVariant & getAlgorithmVariant () const noexcept

  Returns the algorithm variant.
- float getTimingMSec () const noexcept

  The time in milliseconds to execute the algorithm.
- std::size_t getWorkspaceSize () const noexcept

  The size of the GPU temporary memory in bytes which the algorithm uses at execution time.
- const IAlgorithmIOInfo * getAlgorithmIOInfoByIndex (int32_t index) const noexcept

  Returns the format of an Algorithm input or output. Algorithm inputs are incrementally numbered first, followed by algorithm outputs.

Protected Member Functions

- virtual ~IAlgorithm () noexcept=default

Protected Attributes

- apiv::VAlgorithm * mImpl

9.31.1 Detailed Description

Describes a variation of execution of a layer. An algorithm is represented by IAlgorithmVariant and the IAlgorithmIOInfo for each of its inputs and outputs. An algorithm can be selected or reproduced using Algorithm↩ Selector::selectAlgorithms().".

See also

IAlgorithmIOInfo, IAlgorithmVariant, IAlgorithmSelector::selectAlgorithms()

Warning

Do not inherit from this class, as doing so will break forward-compatibility of the API and ABI.

9.31.2 Constructor & Destructor Documentation

9.31.2.1 ~IAlgorithm()

```
virtual nvinfer1::IAlgorithm::~IAlgorithm ( )  [protected], [virtual], [default], [noexcept]
```

9.31.3 Member Function Documentation

9.31.3.1 getAlgorithmIOInfo()

```
TRT_DEPRECATED const IAlgorithmIOInfo & nvinfer1::IAlgorithm::getAlgorithmIOInfo (
            int32_t index ) const  [inline], [noexcept]
```

Returns the format of an Algorithm input or output. Algorithm inputs are incrementally numbered first, followed by algorithm outputs.

Parameters

index	Index of the input or output of the algorithm. Incremental numbers assigned to indices of inputs and the outputs.

Returns

a reference to IAlgorithmIOInfo specified by index or the first algorithm if index is out of range.

Deprecated Use IAlgorithm::getAlgorithmIOInfoByIndex instead. Deprecated in TensorRT 8.0

9.31.3.2 getAlgorithmIOInfoByIndex()

```
const IAlgorithmIOInfo * nvinfer1::IAlgorithm::getAlgorithmIOInfoByIndex (
            int32_t index ) const  [inline], [noexcept]
```

Returns the format of an Algorithm input or output. Algorithm inputs are incrementally numbered first, followed by algorithm outputs.

Parameters

index	Index of the input or output of the algorithm. Incremental numbers assigned to indices of inputs and the outputs.

Returns

a pointer to a IAlgorithmIOInfo interface or nullptr if index is out of range.

9.31.3.3 getAlgorithmVariant()

```
const IAlgorithmVariant & nvinfer1::IAlgorithm::getAlgorithmVariant ( ) const  [inline], [noexcept]
```

Returns the algorithm variant.

9.31.3.4 getTimingMSec()

```
float nvinfer1::IAlgorithm::getTimingMSec ( ) const  [inline], [noexcept]
```

The time in milliseconds to execute the algorithm.

9.31.3.5 getWorkspaceSize()

```
std::size_t nvinfer1::IAlgorithm::getWorkspaceSize ( ) const  [inline], [noexcept]
```

The size of the GPU temporary memory in bytes which the algorithm uses at execution time.

9.31.4 Member Data Documentation

9.31.4.1 mImpl

```
apiv::VAlgorithm* nvinfer1::IAlgorithm::mImpl  [protected]
```

The documentation for this class was generated from the following file:

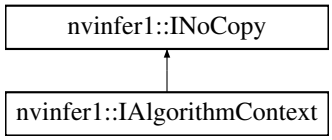
- NvInfer.h

9.32 nvinfer1::IAlgorithmContext Class Reference

Describes the context and requirements, that could be fulfilled by one or more instances of IAlgorithm.

`#include <NvInfer.h>`

Inheritance diagram for nvinfer1::IAlgorithmContext:



Public Member Functions

- const char * getName () const noexcept

  Return name of the algorithm node. This is a unique identifier for the IAlgorithmContext.
- Dims getDimensions (int32_t index, OptProfileSelector select) const noexcept

  Get the minimum / optimum / maximum dimensions for input or output tensor.
- int32_t getNbInputs () const noexcept

  Return number of inputs of the algorithm.
- int32_t getNbOutputs () const noexcept

  Return number of outputs of the algorithm.

Protected Member Functions

- virtual ~IAlgorithmContext () noexcept=default

Protected Attributes

- apiv::VAlgorithmContext * mImpl

9.32.1 Detailed Description

Describes the context and requirements, that could be fulfilled by one or more instances of IAlgorithm.

See also

IAlgorithm

Warning

Do not inherit from this class, as doing so will break forward-compatibility of the API and ABI.

9.32.2 Constructor & Destructor Documentation

9.32.2.1 ~IAlgorithmContext()

```
virtual nvinfer1::IAlgorithmContext::~IAlgorithmContext ( )  [protected], [virtual], [default],
[noexcept]
```

9.32.3 Member Function Documentation

9.32.3.1 getDimensions()

```
Dims nvinfer1::IAlgorithmContext::getDimensions (
            int32_t index,
            OptProfileSelector select ) const  [inline], [noexcept]
```

Get the minimum / optimum / maximum dimensions for input or output tensor.

Parameters

index	Index of the input or output of the algorithm. Incremental numbers assigned to indices of inputs and the outputs.
select	Which of the minimum, optimum, or maximum dimensions to be queried.

9.32.3.2 getName()

```
const char * nvinfer1::IAlgorithmContext::getName ( ) const  [inline], [noexcept]
```

Return name of the algorithm node. This is a unique identifier for the IAlgorithmContext.

9.32.3.3 getNbInputs()

```
int32_t nvinfer1::IAlgorithmContext::getNbInputs ( ) const  [inline], [noexcept]
```

Return number of inputs of the algorithm.

9.32.3.4 getNbOutputs()

```
int32_t nvinfer1::IAlgorithmContext::getNbOutputs ( ) const  [inline], [noexcept]
```

Return number of outputs of the algorithm.

9.32.4 Member Data Documentation

9.32.4.1 mImpl

```
apiv::VAlgorithmContext* nvinfer1::IAlgorithmContext::mImpl  [protected]
```

The documentation for this class was generated from the following file:

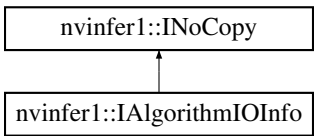
- NvInfer.h

9.33 nvinfer1::IAlgorithmIOInfo Class Reference

Carries information about input or output of the algorithm. IAlgorithmIOInfo for all the input and output along with IAlgorithmVariant denotes the variation of algorithm and can be used to select or reproduce an algorithm using IAlgorithmSelector::selectAlgorithms().

```
#include <NvInfer.h>
```

Inheritance diagram for nvinfer1::IAlgorithmIOInfo:



Public Member Functions

- TensorFormat getTensorFormat () const noexcept

  Return TensorFormat of the input/output of algorithm.
- DataType getDataType () const noexcept

  Return DataType of the input/output of algorithm.
- Dims getStrides () const noexcept

  Return strides of the input/output tensor of algorithm.

Protected Member Functions

- virtual ~IAlgorithmIOInfo () noexcept=default

Protected Attributes

- apiv::VAlgorithmIOInfo * mImpl

9.33.1 Detailed Description

Carries information about input or output of the algorithm. IAlgorithmIOInfo for all the input and output along with IAlgorithmVariant denotes the variation of algorithm and can be used to select or reproduce an algorithm using IAlgorithmSelector::selectAlgorithms().

See also

IAlgorithmVariant, IAlgorithm, IAlgorithmSelector::selectAlgorithms()

Warning

Do not inherit from this class, as doing so will break forward-compatibility of the API and ABI.

9.33.2 Constructor & Destructor Documentation

9.33.2.1 ~IAlgorithmIOInfo()

```
virtual nvinfer1::IAlgorithmIOInfo::~IAlgorithmIOInfo ( )  [protected], [virtual], [default],
[noexcept]
```

9.33.3 Member Function Documentation

9.33.3.1 getDataType()

```
DataType nvinfer1::IAlgorithmIOInfo::getDataType ( ) const  [inline], [noexcept]
```

Return DataType of the input/output of algorithm.

9.33.3.2 getStrides()

```
Dims nvinfer1::IAlgorithmIOInfo::getStrides ( ) const  [inline], [noexcept]
```

Return strides of the input/output tensor of algorithm.

9.33.3.3 getTensorFormat()

```
TensorFormat nvinfer1::IAlgorithmIOInfo::getTensorFormat ( ) const  [inline], [noexcept]
```

Return TensorFormat of the input/output of algorithm.

9.33.4 Member Data Documentation

9.33.4.1 mImpl

```
apiv::VAlgorithmIOInfo* nvinfer1::IAlgorithmIOInfo::mImpl  [protected]
```

The documentation for this class was generated from the following file:

- NvInfer.h

9.34 nvinfer1::IAlgorithmSelector Class Reference

Interface implemented by application for selecting and reporting algorithms of a layer provided by the builder.

```
#include <NvInfer.h>
```

Public Member Functions

- virtual int32_t selectAlgorithms (const IAlgorithmContext &context, const IAlgorithm ∗const ∗choices, int32_t nbChoices, int32_t ∗selection) noexcept=0

  Select Algorithms for a layer from the given list of algorithm choices.
- virtual void reportAlgorithms (const IAlgorithmContext ∗const ∗algoContexts, const IAlgorithm ∗const ∗algo↩ Choices, int32_t nbAlgorithms) noexcept=0

  Called by TensorRT to report choices it made.
- virtual ∼IAlgorithmSelector () noexcept=default

9.34.1 Detailed Description

Interface implemented by application for selecting and reporting algorithms of a layer provided by the builder.

Note

A layer in context of algorithm selection may be different from ILayer in INetworkDefiniton. For example, an algorithm might be implementing a conglomeration of multiple ILayers in INetworkDefinition.

9.34.2 Constructor & Destructor Documentation

9.34.2.1 ~IAlgorithmSelector()

```
virtual nvinfer1::IAlgorithmSelector::~IAlgorithmSelector ( )  [virtual], [default], [noexcept]
```

9.34.3 Member Function Documentation

9.34.3.1 reportAlgorithms()

```
virtual void nvinfer1::IAlgorithmSelector::reportAlgorithms (
            const IAlgorithmContext *const * algoContexts,
            const IAlgorithm *const * algoChoices,
            int32_t nbAlgorithms )  [pure virtual], [noexcept]
```

Called by TensorRT to report choices it made.

Note

For a given optimization profile, this call comes after all calls to selectAlgorithms. algoChoices[i] is the choice that TensorRT made for algoContexts[i], for i in [0, nbAlgorithms-1]

Parameters

algoContexts	The list of all algorithm contexts.
algoChoices	The list of algorithm choices made by TensorRT
nbAlgorithms	The size of algoContexts as well as algoChoices.

9.34.3.2 selectAlgorithms()

```
virtual int32_t nvinfer1::IAlgorithmSelector::selectAlgorithms (
            const IAlgorithmContext & context,
            const IAlgorithm *const * choices,
            int32_t nbChoices,
            int32_t * selection )  [pure virtual], [noexcept]
```

Select Algorithms for a layer from the given list of algorithm choices.

Returns

The number of choices selected from [0, nbChoices-1].

Parameters

context	The context for which the algorithm choices are valid.
choices	The list of algorithm choices to select for implementation of this layer.
nbChoices	Number of algorithm choices.
selection	The user writes indices of selected choices in to selection buffer which is of size nbChoices.

Note

TensorRT uses its default algorithm selection to choose from the list provided. If return value is 0, TensorRT's default algorithm selection is used unless BuilderFlag::kREJECT_EMPTY_ALGORITHMS (or the deprecated BuilderFlag::kSTRICT_TYPES) is set. The list of choices is valid only for this specific algorithm context.

The documentation for this class was generated from the following file:

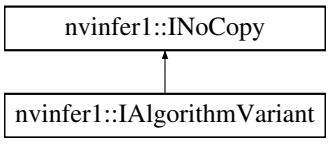
- NvInfer.h

9.35 nvinfer1::IAlgorithmVariant Class Reference

provides a unique 128-bit identifier, which along with the input and output information denotes the variation of algorithm and can be used to select or reproduce an algorithm, using IAlgorithmSelector::selectAlgorithms()

```
#include <NvInfer.h>
```

Inheritance diagram for nvinfer1::IAlgorithmVariant:



Public Member Functions

- int64_t getImplementation () const noexcept

  Return implementation of the algorithm.
- int64_t getTactic () const noexcept

  Return tactic of the algorithm.

Protected Member Functions

- virtual ~IAlgorithmVariant () noexcept=default

Protected Attributes

- apiv::VAlgorithmVariant * mImpl

9.35.1 Detailed Description

provides a unique 128-bit identifier, which along with the input and output information denotes the variation of algorithm and can be used to select or reproduce an algorithm, using IAlgorithmSelector::selectAlgorithms()

See also

IAlgorithmIOInfo, IAlgorithm, IAlgorithmSelector::selectAlgorithms()

Note

A single implementation can have multiple tactics.

Warning

Do not inherit from this class, as doing so will break forward-compatibility of the API and ABI.

9.35.2 Constructor & Destructor Documentation

9.35.2.1 ~IAlgorithmVariant()

```
virtual nvinfer1::IAlgorithmVariant::~IAlgorithmVariant ( )  [protected], [virtual], [default],
[noexcept]
```

9.35.3 Member Function Documentation

9.35.3.1 getImplementation()

```
int64_t nvinfer1::IAlgorithmVariant::getImplementation ( ) const  [inline], [noexcept]
```

Return implementation of the algorithm.

9.35.3.2 getTactic()

```
int64_t nvinfer1::IAlgorithmVariant::getTactic ( ) const  [inline], [noexcept]
```

Return tactic of the algorithm.

9.35.4 Member Data Documentation

9.35.4.1 mImpl

```
apiv::VAlgorithmVariant* nvinfer1::IAlgorithmVariant::mImpl  [protected]
```

The documentation for this class was generated from the following file:

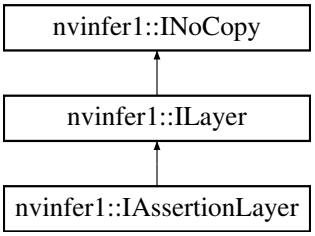
- NvInfer.h

9.36 nvinfer1::IAssertionLayer Class Reference

An assertion layer in a network.

```
#include <NvInfer.h>
```

Inheritance diagram for nvinfer1::IAssertionLayer:



Public Member Functions

- void setMessage (const char *message) noexcept

  Set the message to print if the assertion fails.
- const char * getMessage () const noexcept

  Return the assertion message.

Protected Member Functions

- virtual ~IAssertionLayer () noexcept=default

Protected Attributes

- apiv::VAssertionLayer * mImpl

9.36.1 Detailed Description

An assertion layer in a network.

The layer has a single input and no output. The input must be a boolean shape tensor. If any element of the input is provably false at build time, the network is rejected. If any element of the input is false at runtime for the supplied runtime dimensions, an error occurs, much the same as if any other runtime error (e.g. using IShuffleLayer to change the volume of a tensor) is handled.

Asserting equality of input dimensions may help the optimizer.

Warning

Do not inherit from this class, as doing so will break forward-compatibility of the API and ABI.

9.36.2 Constructor & Destructor Documentation

9.36.2.1 ~IAssertionLayer()

```
virtual nvinfer1::IAssertionLayer::~IAssertionLayer ( )  [protected], [virtual], [default], [noexcept]
```

9.36.3 Member Function Documentation

9.36.3.1 getMessage()

```
const char * nvinfer1::IAssertionLayer::getMessage ( ) const  [inline], [noexcept]
```

Return the assertion message.

See also

setMessage()

9.36.3.2 setMessage()

```
void nvinfer1::IAssertionLayer::setMessage (
            const char * message )  [inline], [noexcept]
```

Set the message to print if the assertion fails.

The name is used in error diagnostics. This method copies the message string.

See also

getMessage()

9.36.4 Member Data Documentation

9.36.4.1 mImpl

```
apiv::VAssertionLayer* nvinfer1::IAssertionLayer::mImpl  [protected]
```

The documentation for this class was generated from the following file:

- NvInfer.h

9.37 nvcaffeparser1::IBinaryProtoBlob Class Reference

Object used to store and query data extracted from a binaryproto file using the ICaffeParser.

```
#include <NvCaffeParser.h>
```

Public Member Functions

- virtual const void * getData () noexcept=0
- virtual nvinfer1::Dims4 getDimensions () noexcept=0
- virtual nvinfer1::DataType getDataType () noexcept=0
- virtual TRT_DEPRECATED void destroy () noexcept=0
- virtual ~IBinaryProtoBlob () noexcept=default

9.37.1 Detailed Description

Object used to store and query data extracted from a binaryproto file using the ICaffeParser.

See also

nvcaffeparser1::ICaffeParser

Warning

Do not inherit from this class, as doing so will break forward-compatibility of the API and ABI.

9.37.2 Constructor & Destructor Documentation

9.37.2.1 ~IBinaryProtoBlob()

```
virtual nvcaffeparser1::IBinaryProtoBlob::~IBinaryProtoBlob ( )  [virtual], [default], [noexcept]
```

9.37.3 Member Function Documentation

9.37.3.1 destroy()

```
virtual TRT_DEPRECATED void nvcaffeparser1::IBinaryProtoBlob::destroy ( )  [pure virtual], [noexcept]
```

Deprecated Deprecated interface will be removed in TensorRT 10.0.

Warning

Calling destroy on a managed pointer will result in a double-free error.

9.37.3.2 getData()

```
virtual const void * nvcaffeparser1::IBinaryProtoBlob::getData ( )  [pure virtual], [noexcept]
```

9.37.3.3 getDataType()

```
virtual nvinfer1::DataType nvcaffeparser1::IBinaryProtoBlob::getDataType ( )  [pure virtual],
[noexcept]
```

9.37.3.4 getDimensions()

```
virtual nvinfer1::Dims4 nvcaffeparser1::IBinaryProtoBlob::getDimensions ( )  [pure virtual], [noexcept]
```

The documentation for this class was generated from the following file:

- NvCaffeParser.h

9.38 nvcaffeparser1::IBlobNameToTensor Class Reference

Object used to store and query Tensors after they have been extracted from a Caffe model using the ICaffeParser.

```
#include <NvCaffeParser.h>
```

Public Member Functions

- virtual nvinfer1::ITensor * find (const char *name) const noexcept=0

  Given a blob name, returns a pointer to a ITensor object.

Protected Member Functions

- virtual ~IBlobNameToTensor ()

9.38.1 Detailed Description

Object used to store and query Tensors after they have been extracted from a Caffe model using the ICaffeParser.

Note

The lifetime of IBlobNameToTensor is the same as the lifetime of its parent ICaffeParser.

See also

nvcaffeparser1::ICaffeParser

Warning

Do not inherit from this class, as doing so will break forward-compatibility of the API and ABI.

9.38.2 Constructor & Destructor Documentation

9.38.2.1 ~IBlobNameToTensor()

```
virtual nvcaffeparser1::IBlobNameToTensor::~IBlobNameToTensor ( )  [inline], [protected], [virtual]
```

9.38.3 Member Function Documentation

9.38.3.1 find()

```
virtual nvinfer1::ITensor * nvcaffeparser1::IBlobNameToTensor::find (
            const char * name ) const  [pure virtual], [noexcept]
```

Given a blob name, returns a pointer to a ITensor object.

Parameters

name	Caffe blob name for which the user wants the corresponding ITensor.

Returns

ITensor* corresponding to the queried name. If no such ITensor exists, then nullptr is returned.

The documentation for this class was generated from the following file:

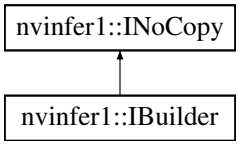
- NvCaffeParser.h

9.39 nvinfer1::IBuilder Class Reference

Builds an engine from a network definition.

```
#include <NvInfer.h>
```

Inheritance diagram for nvinfer1::IBuilder:



Public Member Functions

- virtual ~IBuilder () noexcept=default
- void setMaxBatchSize (int32_t batchSize) noexcept

  Set the maximum batch size.
- int32_t getMaxBatchSize () const noexcept

  Get the maximum batch size.
- bool platformHasFastFp16 () const noexcept

  Determine whether the platform has fast native fp16.
- bool platformHasFastInt8 () const noexcept

  Determine whether the platform has fast native int8.
- TRT_DEPRECATED void destroy () noexcept

  Destroy this object.
- int32_t getMaxDLABatchSize () const noexcept

  Get the maximum batch size DLA can support. For any tensor the total volume of index dimensions combined(dimensions other than CHW) with the requested batch size should not exceed the value returned by this function.
- int32_t getNbDLACores () const noexcept

  Return the number of DLA engines available to this builder.
- void setGpuAllocator (IGpuAllocator *allocator) noexcept

  Set the GPU allocator.
- nvinfer1::IBuilderConfig * createBuilderConfig () noexcept

  Create a builder configuration object.
- TRT_DEPRECATED nvinfer1::ICudaEngine * buildEngineWithConfig (INetworkDefinition &network, IBuilderConfig &config) noexcept

  Builds an engine for the given INetworkDefinition and given IBuilderConfig.
- nvinfer1::INetworkDefinition * createNetworkV2 (NetworkDefinitionCreationFlags flags) noexcept

  Create a network definition object.
- nvinfer1::IOptimizationProfile * createOptimizationProfile () noexcept

  Create a new optimization profile.
- void setErrorRecorder (IErrorRecorder *recorder) noexcept

  Set the ErrorRecorder for this interface.
- IErrorRecorder * getErrorRecorder () const noexcept

  get the ErrorRecorder assigned to this interface.
- void reset () noexcept

  Resets the builder state to default values.
- bool platformHasTf32 () const noexcept

  Determine whether the platform has TF32 support.
- nvinfer1::IHostMemory * buildSerializedNetwork (INetworkDefinition &network, IBuilderConfig &config) noexcept

Builds and serializes a network for the given INetworkDefinition and IBuilderConfig.

- bool isNetworkSupported (INetworkDefinition const &network, IBuilderConfig const &config) const noexcept

  Checks that a network is within the scope of the IBuilderConfig settings.
- ILogger * getLogger () const noexcept

  get the logger with which the builder was created

Protected Attributes

- apiv::VBuilder * mImpl

Additional Inherited Members

9.39.1 Detailed Description

Builds an engine from a network definition.

Warning

Do not inherit from this class, as doing so will break forward-compatibility of the API and ABI.

9.39.2 Constructor & Destructor Documentation

9.39.2.1 ~IBuilder()

```
virtual nvinfer1::IBuilder::~IBuilder ( )  [virtual], [default], [noexcept]
```

9.39.3 Member Function Documentation

9.39.3.1 buildEngineWithConfig()

```
TRT_DEPRECATED nvinfer1::ICudaEngine * nvinfer1::IBuilder::buildEngineWithConfig (
            INetworkDefinition & network,
            IBuilderConfig & config )  [inline], [noexcept]
```

Builds an engine for the given INetworkDefinition and given IBuilderConfig.

It enables the builder to build multiple engines based on the same network definition, but with different builder configurations.

Note

This function will synchronize the cuda stream returned by `config.getProfileStream()` before returning.

Deprecated Use IBuilder::buildSerializedNetwork. Deprecated in TensorRT 8.0

9.39.3.2 buildSerializedNetwork()

```
nvinfer1::IHostMemory * nvinfer1::IBuilder::buildSerializedNetwork (
            INetworkDefinition & network,
            IBuilderConfig & config )  [inline], [noexcept]
```

Builds and serializes a network for the given INetworkDefinition and IBuilderConfig.

This function allows building and serialization of a network without creating an engine.

Parameters

network	Network definition.
config	Builder configuration.

Returns

A pointer to a IHostMemory object that contains a serialized network.

Note

This function will synchronize the cuda stream returned by `config.getProfileStream()` before returning.

See also

INetworkDefinition, IBuilderConfig, IHostMemory

9.39.3.3 createBuilderConfig()

```
nvinfer1::IBuilderConfig * nvinfer1::IBuilder::createBuilderConfig ( )  [inline], [noexcept]
```

Create a builder configuration object.

See also

IBuilderConfig

9.39.3.4 createNetworkV2()

```
nvinfer1::INetworkDefinition * nvinfer1::IBuilder::createNetworkV2 (
            NetworkDefinitionCreationFlags flags )  [inline], [noexcept]
```

Create a network definition object.

Creates a network definition object with immutable properties specified using the flags parameter. Providing the k↩ DEFAULT flag as parameter mimics the behaviour of createNetwork(). CreateNetworkV2 supports dynamic shapes and explicit batch dimensions when used with NetworkDefinitionCreationFlag::kEXPLICIT_BATCH flag.

Parameters

flags	Bitset of NetworkDefinitionCreationFlags specifying network properties combined with bitwise OR. e.g., 1U << NetworkDefinitionCreationFlag::kEXPLICIT_BATCH

See also

INetworkDefinition, NetworkDefinitionCreationFlags

9.39.3.5 createOptimizationProfile()

```
nvinfer1::IOptimizationProfile * nvinfer1::IBuilder::createOptimizationProfile ( )  [inline],
[noexcept]
```

Create a new optimization profile.

If the network has any dynamic input tensors, the appropriate calls to setDimensions() must be made. Likewise, if there are any shape input tensors, the appropriate calls to setShapeValues() are required. The builder retains ownership of the created optimization profile and returns a raw pointer, i.e. the users must not attempt to delete the returned pointer.

See also

IOptimizationProfile

9.39.3.6 destroy()

```
TRT_DEPRECATED void nvinfer1::IBuilder::destroy ( )  [inline], [noexcept]
```

Destroy this object.

Deprecated Use `delete` instead. Deprecated in TensorRT 8.0

Warning

Calling destroy on a managed pointer will result in a double-free error.

9.39.3.7 getErrorRecorder()

```
IErrorRecorder * nvinfer1::IBuilder::getErrorRecorder ( ) const  [inline], [noexcept]
```

get the ErrorRecorder assigned to this interface.

Retrieves the assigned error recorder object for the given class. A nullptr will be returned if setErrorRecorder has not been called.

Returns

A pointer to the IErrorRecorder object that has been registered.

See also

setErrorRecorder()

9.39.3.8 getLogger()

```
ILogger * nvinfer1::IBuilder::getLogger ( ) const  [inline], [noexcept]
```

get the logger with which the builder was created

Returns

the logger

9.39.3.9 getMaxBatchSize()

```
int32_t nvinfer1::IBuilder::getMaxBatchSize ( ) const  [inline], [noexcept]
```

Get the maximum batch size.

Returns

The maximum batch size.

See also

setMaxBatchSize()
getMaxDLABatchSize()

9.39.3.10 getMaxDLABatchSize()

```
int32_t nvinfer1::IBuilder::getMaxDLABatchSize ( ) const  [inline], [noexcept]
```

Get the maximum batch size DLA can support. For any tensor the total volume of index dimensions combined(dimensions other than CHW) with the requested batch size should not exceed the value returned by this function.

Warning

getMaxDLABatchSize does not work with dynamic shapes.

9.39.3.11 getNbDLACores()

```
int32_t nvinfer1::IBuilder::getNbDLACores ( ) const  [inline], [noexcept]
```

Return the number of DLA engines available to this builder.

9.39.3.12 isNetworkSupported()

```
bool nvinfer1::IBuilder::isNetworkSupported (
            INetworkDefinition const & network,
            IBuilderConfig const & config ) const  [inline], [noexcept]
```

Checks that a network is within the scope of the IBuilderConfig settings.

Parameters

network	The network definition to check for configuration compliance.
config	The configuration of the builder to use when checking `network`.

Given an INetworkDefinition, `network`, and an IBuilderConfig, `config`, check if the network falls within the constraints of the builder configuration based on the EngineCapability, BuilderFlag, and DeviceType. If the network is within the constraints, then the function returns true, and false if a violation occurs. This function reports the conditions that are violated to the registered ErrorRecorder.

Returns

True if network is within the scope of the restrictions specified by the builder config, false otherwise.

Note

This function will synchronize the cuda stream returned by `config.getProfileStream()` before returning.

This function is only supported in NVIDIA Drive(R) products.

9.39.3.13 platformHasFastFp16()

```
bool nvinfer1::IBuilder::platformHasFastFp16 ( ) const  [inline], [noexcept]
```

Determine whether the platform has fast native fp16.

9.39.3.14 platformHasFastInt8()

```
bool nvinfer1::IBuilder::platformHasFastInt8 ( ) const  [inline], [noexcept]
```

Determine whether the platform has fast native int8.

9.39.3.15 platformHasTf32()

```
bool nvinfer1::IBuilder::platformHasTf32 ( ) const  [inline], [noexcept]
```

Determine whether the platform has TF32 support.

9.39.3.16 reset()

```
void nvinfer1::IBuilder::reset ( )  [inline], [noexcept]
```

Resets the builder state to default values.

9.39.3.17 setErrorRecorder()

```
void nvinfer1::IBuilder::setErrorRecorder (
            IErrorRecorder * recorder )  [inline], [noexcept]
```

Set the ErrorRecorder for this interface.

Assigns the ErrorRecorder to this interface. The ErrorRecorder will track all errors during execution. This function will call incRefCount of the registered ErrorRecorder at least once. Setting recorder to nullptr unregisters the recorder with the interface, resulting in a call to decRefCount if a recorder has been registered.

If an error recorder is not set, messages will be sent to the global log stream.

Parameters

recorder	The error recorder to register with this interface.

See also

getErrorRecorder()

9.39.3.18 setGpuAllocator()

```
void nvinfer1::IBuilder::setGpuAllocator (
            IGpuAllocator * allocator )  [inline], [noexcept]
```

Set the GPU allocator.

Parameters

allocator	Set the GPU allocator to be used by the builder. All GPU memory acquired will use this allocator. If NULL is passed, the default allocator will be used.

Default: uses cudaMalloc/cudaFree.

Note

This allocator will be passed to any engines created via the builder; thus the lifetime of the allocator must span the lifetime of those engines as well as that of the builder. If nullptr is passed, the default allocator will be used.

9.39.3.19 setMaxBatchSize()

```
void nvinfer1::IBuilder::setMaxBatchSize (
            int32_t batchSize )  [inline], [noexcept]
```

Set the maximum batch size.

Parameters

batchSize	The maximum batch size which can be used at execution time, and also the batch size for which the engine will be optimized.

See also

getMaxBatchSize()

9.39.4 Member Data Documentation

9.39.4.1 mImpl

```
apiv::VBuilder* nvinfer1::IBuilder::mImpl  [protected]
```

The documentation for this class was generated from the following file:

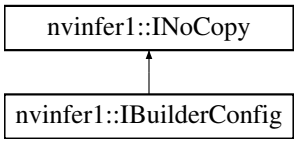
- NvInfer.h

9.40 nvinfer1::IBuilderConfig Class Reference

Holds properties for configuring a builder to produce an engine.

`#include <NvInfer.h>`

Inheritance diagram for nvinfer1::IBuilderConfig:



Public Member Functions

- virtual ~IBuilderConfig () noexcept=default
- virtual void setMinTimingIterations (int32_t minTiming) noexcept

  Set the number of minimization iterations used when timing layers.
- virtual int32_t getMinTimingIterations () const noexcept

  Query the number of minimization iterations.
- virtual void setAvgTimingIterations (int32_t avgTiming) noexcept

  Set the number of averaging iterations used when timing layers.
- int32_t getAvgTimingIterations () const noexcept

  Query the number of averaging iterations.
- void setEngineCapability (EngineCapability capability) noexcept

  Configure the builder to target specified EngineCapability flow.
- EngineCapability getEngineCapability () const noexcept

  Query EngineCapability flow configured for the builder.
- void setInt8Calibrator (IInt8Calibrator *calibrator) noexcept

  Set Int8 Calibration interface.
- IInt8Calibrator * getInt8Calibrator () const noexcept

  Get Int8 Calibration interface.
- TRT_DEPRECATED void setMaxWorkspaceSize (std::size_t workspaceSize) noexcept

  Set the maximum workspace size.
- TRT_DEPRECATED std::size_t getMaxWorkspaceSize () const noexcept

  Get the maximum workspace size.
- void setFlags (BuilderFlags builderFlags) noexcept

  Set the build mode flags to turn on builder options for this network.
- BuilderFlags getFlags () const noexcept

  Get the build mode flags for this builder config. Defaults to 0.
- void clearFlag (BuilderFlag builderFlag) noexcept

  clear a single build mode flag.
- void setFlag (BuilderFlag builderFlag) noexcept

  Set a single build mode flag.
- bool getFlag (BuilderFlag builderFlag) const noexcept

  Returns true if the build mode flag is set.

- void setDeviceType (const ILayer *layer, DeviceType deviceType) noexcept

  Set the device that this layer must execute on.
- DeviceType getDeviceType (const ILayer *layer) const noexcept

  Get the device that this layer executes on.
- bool isDeviceTypeSet (const ILayer *layer) const noexcept

  whether the DeviceType has been explicitly set for this layer
- void resetDeviceType (const ILayer *layer) noexcept

  reset the DeviceType for this layer
- bool canRunOnDLA (const ILayer *layer) const noexcept

  Checks if a layer can run on DLA.
- void setDLACore (int32_t dlaCore) noexcept

  Sets the DLA core used by the network.
- int32_t getDLACore () const noexcept

  Get the DLA core that the engine executes on.
- void setDefaultDeviceType (DeviceType deviceType) noexcept

  Sets the default DeviceType to be used by the builder. It ensures that all the layers that can run on this device will run on it, unless setDeviceType is used to override the default DeviceType for a layer.
- DeviceType getDefaultDeviceType () const noexcept

  Get the default DeviceType which was set by setDefaultDeviceType.
- void reset () noexcept

  Resets the builder configuration to defaults.
- TRT_DEPRECATED void destroy () noexcept

  Delete this IBuilderConfig.
- void setProfileStream (const cudaStream_t stream) noexcept

  Set the cuda stream that is used to profile this network.
- cudaStream_t getProfileStream () const noexcept

  Get the cuda stream that is used to profile this network.
- int32_t addOptimizationProfile (const IOptimizationProfile *profile) noexcept

  Add an optimization profile.
- int32_t getNbOptimizationProfiles () const noexcept

  Get number of optimization profiles.
- void setProfilingVerbosity (ProfilingVerbosity verbosity) noexcept

  Set verbosity level of layer information exposed in NVTX annotations and IEngineInspector.
- ProfilingVerbosity getProfilingVerbosity () const noexcept

  Get verbosity level of layer information exposed in NVTX annotations and IEngineInspector.
- void setAlgorithmSelector (IAlgorithmSelector *selector) noexcept

  Set Algorithm Selector.
- IAlgorithmSelector * getAlgorithmSelector () const noexcept

  Get Algorithm Selector.
- bool setCalibrationProfile (const IOptimizationProfile *profile) noexcept

  Add a calibration profile.
- const IOptimizationProfile * getCalibrationProfile () noexcept

  Get the current calibration profile.
- void setQuantizationFlags (QuantizationFlags flags) noexcept

  Set the quantization flags.
- QuantizationFlags getQuantizationFlags () const noexcept

  Get the quantization flags.

- void clearQuantizationFlag (QuantizationFlag flag) noexcept

  clear a quantization flag.
- void setQuantizationFlag (QuantizationFlag flag) noexcept

  Set a single quantization flag.
- bool getQuantizationFlag (QuantizationFlag flag) const noexcept

  Returns true if the quantization flag is set.
- bool setTacticSources (TacticSources tacticSources) noexcept

  Set tactic sources.
- TacticSources getTacticSources () const noexcept

  Get tactic sources.
- nvinfer1::ITimingCache * createTimingCache (const void *blob, std::size_t size) const noexcept

  Create timing cache.
- bool setTimingCache (const ITimingCache &cache, bool ignoreMismatch) noexcept

  Attach a timing cache to IBuilderConfig.
- const nvinfer1::ITimingCache * getTimingCache () const noexcept

  Get the pointer to the timing cache from current IBuilderConfig.
- void setMemoryPoolLimit (MemoryPoolType pool, std::size_t poolSize) noexcept

  Set the memory size for the memory pool.
- std::size_t getMemoryPoolLimit (MemoryPoolType pool) const noexcept

  Get the memory size limit of the memory pool.

Protected Attributes

- apiv::VBuilderConfig * mImpl

Additional Inherited Members

9.40.1 Detailed Description

Holds properties for configuring a builder to produce an engine.

See also

BuilderFlags

9.40.2 Constructor & Destructor Documentation

9.40.2.1 ~IBuilderConfig()

```
virtual nvinfer1::IBuilderConfig::~IBuilderConfig ( )  [virtual], [default], [noexcept]
```

9.40.3 Member Function Documentation

9.40.3.1 addOptimizationProfile()

```
int32_t nvinfer1::IBuilderConfig::addOptimizationProfile (
            const IOptimizationProfile * profile )  [inline], [noexcept]
```

Add an optimization profile.

This function must be called at least once if the network has dynamic or shape input tensors. This function may be called at most once when building a refittable engine, as more than a single optimization profile are not supported for refittable engines.

Parameters

profile	The new optimization profile, which must satisfy profile->isValid() == true

Returns

The index of the optimization profile (starting from 0) if the input is valid, or -1 if the input is not valid.

9.40.3.2 canRunOnDLA()

```
bool nvinfer1::IBuilderConfig::canRunOnDLA (
            const ILayer * layer ) const  [inline], [noexcept]
```

Checks if a layer can run on DLA.

Returns

status true if the layer can on DLA else returns false.

9.40.3.3 clearFlag()

```
void nvinfer1::IBuilderConfig::clearFlag (
            BuilderFlag builderFlag )  [inline], [noexcept]
```

clear a single build mode flag.

clears the builder mode flag from the enabled flags.

See also

setFlags()

9.40.3.4 clearQuantizationFlag()

```
void nvinfer1::IBuilderConfig::clearQuantizationFlag (
            QuantizationFlag flag )  [inline], [noexcept]
```

clear a quantization flag.

Clears the quantization flag from the enabled quantization flags.

See also

setQuantizationFlags()

9.40.3.5 createTimingCache()

```
nvinfer1::ITimingCache * nvinfer1::IBuilderConfig::createTimingCache (
            const void * blob,
            std::size_t size ) const  [inline], [noexcept]
```

Create timing cache.

Create ITimingCache instance from serialized raw data. The created timing cache doesn't belong to a specific IBuilderConfig. It can be shared by multiple builder instances. Call setTimingCache() before launching a builder to attach cache to builder instance.

Parameters

blob	A pointer to the raw data that contains serialized timing cache
size	The size in bytes of the serialized timing cache. Size 0 means create a new cache from scratch

See also

setTimingCache

Returns

the pointer to ITimingCache created

9.40.3.6 destroy()

```
TRT_DEPRECATED void nvinfer1::IBuilderConfig::destroy ( )  [inline], [noexcept]
```

Delete this IBuilderConfig.

De-allocates any internally allocated memory.

Deprecated Use `delete` instead. Deprecated in TensorRT 8.0

Warning

Calling destroy on a managed pointer will result in a double-free error.

9.40.3.7 getAlgorithmSelector()

```
IAlgorithmSelector * nvinfer1::IBuilderConfig::getAlgorithmSelector ( ) const  [inline], [noexcept]
```

Get Algorithm Selector.

9.40.3.8 getAvgTimingIterations()

```
int32_t nvinfer1::IBuilderConfig::getAvgTimingIterations ( ) const  [inline], [noexcept]
```

Query the number of averaging iterations.

By default the number of averaging iterations is 1.

See also

setAvgTimingIterations()

9.40.3.9 getCalibrationProfile()

```
const IOptimizationProfile * nvinfer1::IBuilderConfig::getCalibrationProfile ( )  [inline], [noexcept]
```

Get the current calibration profile.

Returns

A pointer to the current calibration profile or nullptr if calibration profile is unset.

9.40.3.10 getDefaultDeviceType()

```
DeviceType nvinfer1::IBuilderConfig::getDefaultDeviceType ( ) const  [inline], [noexcept]
```

Get the default DeviceType which was set by setDefaultDeviceType.

By default it returns DeviceType::kGPU.

9.40.3.11 getDeviceType()

```
DeviceType nvinfer1::IBuilderConfig::getDeviceType (
            const ILayer * layer ) const  [inline], [noexcept]
```

Get the device that this layer executes on.

Returns

Returns DeviceType of the layer.

9.40.3.12 getDLACore()

```
int32_t nvinfer1::IBuilderConfig::getDLACore ( ) const  [inline], [noexcept]
```

Get the DLA core that the engine executes on.

Returns

If setDLACore is called, returns DLA core from 0 to N-1, else returns 0.

Warning

Starting with TensorRT 8, the default value will be -1 if the DLA is not specified or unused.

9.40.3.13 getEngineCapability()

```
EngineCapability nvinfer1::IBuilderConfig::getEngineCapability ( ) const  [inline], [noexcept]
```

Query EngineCapability flow configured for the builder.

By default it returns EngineCapability::kSTANDARD.

See also

setEngineCapability()

9.40.3.14 getFlag()

```
bool nvinfer1::IBuilderConfig::getFlag (
            BuilderFlag builderFlag ) const  [inline], [noexcept]
```

Returns true if the build mode flag is set.

See also

getFlags()

Returns

True if flag is set, false if unset.

9.40.3.15 getFlags()

```
BuilderFlags nvinfer1::IBuilderConfig::getFlags ( ) const  [inline], [noexcept]
```

Get the build mode flags for this builder config. Defaults to 0.

Returns

The build options as a bitmask.

See also

setFlags()

9.40.3.16 getInt8Calibrator()

```
IInt8Calibrator * nvinfer1::IBuilderConfig::getInt8Calibrator ( ) const  [inline], [noexcept]
```

Get Int8 Calibration interface.

9.40.3.17 getMaxWorkspaceSize()

```
TRT_DEPRECATED std::size_t nvinfer1::IBuilderConfig::getMaxWorkspaceSize ( ) const  [inline], [noexcept]
```

Get the maximum workspace size.

By default the workspace size is the size of total global memory in the device.

Returns

The maximum workspace size.

See also

setMaxWorkspaceSize()

Deprecated Use IBuilderConfig::getMemoryPoolLimit with MemoryPoolType::kWORKSPACE. Deprecated in TensorRT 8.3

9.40.3.18 getMemoryPoolLimit()

```
std::size_t nvinfer1::IBuilderConfig::getMemoryPoolLimit (
            MemoryPoolType pool ) const  [inline], [noexcept]
```

Get the memory size limit of the memory pool.

Retrieve the memory size limit of the corresponding pool in bytes. If setMemoryPoolLimit for the pool has not been called, this returns the default value used by TensorRT. This default value is not necessarily the maximum possible value for that configuration.

Parameters

pool	The memory pool to get the limit for.

Returns

The size of the memory limit, in bytes, for the corresponding pool.

See also

setMemoryPoolLimit

9.40.3.19 getMinTimingIterations()

```
virtual int32_t nvinfer1::IBuilderConfig::getMinTimingIterations ( ) const  [inline], [virtual],
[noexcept]
```

Query the number of minimization iterations.

By default the minimum number of iterations is 2.

See also

setMinTimingIterations()

9.40.3.20 getNbOptimizationProfiles()

```
int32_t nvinfer1::IBuilderConfig::getNbOptimizationProfiles ( ) const  [inline], [noexcept]
```

Get number of optimization profiles.

This is one higher than the index of the last optimization profile that has be defined (or zero, if none has been defined yet).

Returns

The number of the optimization profiles.

9.40.3.21 getProfileStream()

```
cudaStream_t nvinfer1::IBuilderConfig::getProfileStream ( ) const  [inline], [noexcept]
```

Get the cuda stream that is used to profile this network.

Returns

The cuda stream set by setProfileStream, nullptr if setProfileStream has not been called.

See also

setProfileStream()

9.40.3.22 getProfilingVerbosity()

```
ProfilingVerbosity nvinfer1::IBuilderConfig::getProfilingVerbosity ( ) const  [inline], [noexcept]
```

Get verbosity level of layer information exposed in NVTX annotations and IEngineInspector.

Get the current setting of verbosity level of layer information exposed in NVTX annotations and IEngineInspector. Default value is ProfilingVerbosity::kDEFAULT.

See also

ProfilingVerbosity, setProfilingVerbosity(), IEngineInspector

9.40.3.23 getQuantizationFlag()

```
bool nvinfer1::IBuilderConfig::getQuantizationFlag (
            QuantizationFlag flag ) const  [inline], [noexcept]
```

Returns true if the quantization flag is set.

See also

getQuantizationFlags()

Returns

True if quantization flag is set, false if unset.

9.40.3.24 getQuantizationFlags()

```
QuantizationFlags nvinfer1::IBuilderConfig::getQuantizationFlags ( ) const  [inline], [noexcept]
```

Get the quantization flags.

Returns

The quantization flags as a bitmask.

See also

setQuantizationFlag()

9.40.3.25 getTacticSources()

```
TacticSources nvinfer1::IBuilderConfig::getTacticSources ( ) const  [inline], [noexcept]
```

Get tactic sources.

Get the tactic sources currently set in the engine build configuration.

See also

setTacticSources

Returns

tactic sources

9.40.3.26 getTimingCache()

```
const nvinfer1::ITimingCache * nvinfer1::IBuilderConfig::getTimingCache ( ) const  [inline], [noexcept]
```

Get the pointer to the timing cache from current IBuilderConfig.

Returns

pointer to the timing cache used in current IBuilderConfig

9.40.3.27 isDeviceTypeSet()

```
bool nvinfer1::IBuilderConfig::isDeviceTypeSet (
            const ILayer * layer ) const  [inline], [noexcept]
```

whether the DeviceType has been explicitly set for this layer

Returns

true if device type is not default

See also

setDeviceType() getDeviceType() resetDeviceType()

9.40.3.28 reset()

```
void nvinfer1::IBuilderConfig::reset ( )  [inline], [noexcept]
```

Resets the builder configuration to defaults.

Useful for initializing a builder config object to its original state.

9.40.3.29 resetDeviceType()

```
void nvinfer1::IBuilderConfig::resetDeviceType (
            const ILayer * layer )  [inline], [noexcept]
```

reset the DeviceType for this layer

See also

setDeviceType() getDeviceType() isDeviceTypeSet()

9.40.3.30 setAlgorithmSelector()

```
void nvinfer1::IBuilderConfig::setAlgorithmSelector (
            IAlgorithmSelector * selector )  [inline], [noexcept]
```

Set Algorithm Selector.

Parameters

selector	The algorithm selector to be set in the build config.

9.40.3.31 setAvgTimingIterations()

```
virtual void nvinfer1::IBuilderConfig::setAvgTimingIterations (
            int32_t avgTiming )  [inline], [virtual], [noexcept]
```

Set the number of averaging iterations used when timing layers.

When timing layers, the builder minimizes over a set of average times for layer execution. This parameter controls the number of iterations used in averaging.

See also

getAvgTimingIterations()

9.40.3.32 setCalibrationProfile()

```
bool nvinfer1::IBuilderConfig::setCalibrationProfile (
            const IOptimizationProfile * profile )  [inline], [noexcept]
```

Add a calibration profile.

Calibration optimization profile must be set if int8 calibration is used to set scales for a network with runtime dimensions.

Parameters

profile	The new calibration profile, which must satisfy profile->isValid() == true or be nullptr. MIN and MAX values will be overwritten by kOPT.

Returns

True if the calibration profile was set correctly.

9.40.3.33 setDefaultDeviceType()

```
void nvinfer1::IBuilderConfig::setDefaultDeviceType (
            DeviceType deviceType )  [inline], [noexcept]
```

Sets the default DeviceType to be used by the builder. It ensures that all the layers that can run on this device will run on it, unless setDeviceType is used to override the default DeviceType for a layer.

See also

getDefaultDeviceType()

9.40.3.34 setDeviceType()

```
void nvinfer1::IBuilderConfig::setDeviceType (
            const ILayer * layer,
            DeviceType deviceType )  [inline], [noexcept]
```

Set the device that this layer must execute on.

Parameters

deviceType	that this layer must execute on. If DeviceType is not set or is reset, TensorRT will use the default DeviceType set in the builder.

Note

The device type for a layer must be compatible with the safety flow (if specified). For example a layer cannot be marked for DLA execution while the builder is configured for kSAFE_GPU.

See also

getDeviceType()

9.40.3.35 setDLACore()

```
void nvinfer1::IBuilderConfig::setDLACore (
            int32_t dlaCore )  [inline], [noexcept]
```

Sets the DLA core used by the network.

Parameters

dlaCore	The DLA core to execute the engine on (0 to N-1). Default value is 0.

It can be used to specify which DLA core to use via indexing, if multiple DLA cores are available.

See also

IRuntime::setDLACore() getDLACore()

Warning

Starting with TensorRT 8, the default value will be -1 if the DLA is not specified or unused.

9.40.3.36 setEngineCapability()

```
void nvinfer1::IBuilderConfig::setEngineCapability (
            EngineCapability capability )  [inline], [noexcept]
```

Configure the builder to target specified EngineCapability flow.

The flow means a sequence of API calls that allow an application to set up a runtime, engine, and execution context in order to run inference.

The supported flows are specified in the EngineCapability enum.

9.40.3.37 setFlag()

```
void nvinfer1::IBuilderConfig::setFlag (
            BuilderFlag builderFlag )  [inline], [noexcept]
```

Set a single build mode flag.

Add the input builder mode flag to the already enabled flags.

See also

setFlags()

9.40.3.38 setFlags()

```
void nvinfer1::IBuilderConfig::setFlags (
            BuilderFlags builderFlags )  [inline], [noexcept]
```

Set the build mode flags to turn on builder options for this network.

The flags are listed in the BuilderFlags enum. The flags set configuration options to build the network.

Parameters

builderFlags	The build option for an engine.

Note

This function will override the previous set flags, rather than bitwise ORing the new flag.

See also

getFlags()

9.40.3.39 setInt8Calibrator()

```
void nvinfer1::IBuilderConfig::setInt8Calibrator (
            IInt8Calibrator * calibrator )  [inline], [noexcept]
```

Set Int8 Calibration interface.

The calibrator is to minimize the information loss during the INT8 quantization process.

9.40.3.40 setMaxWorkspaceSize()

```
TRT_DEPRECATED void nvinfer1::IBuilderConfig::setMaxWorkspaceSize (
            std::size_t workspaceSize )  [inline], [noexcept]
```

Set the maximum workspace size.

Parameters

workspaceSize	The maximum GPU temporary memory which the engine can use at execution time.

See also

getMaxWorkspaceSize()

Deprecated Use IBuilderConfig::setMemoryPoolLimit with MemoryPoolType::kWORKSPACE. Deprecated in TensorRT 8.3

9.40.3.41 setMemoryPoolLimit()

```
void nvinfer1::IBuilderConfig::setMemoryPoolLimit (
            MemoryPoolType pool,
            std::size_t poolSize )  [inline], [noexcept]
```

Set the memory size for the memory pool.

TensorRT layers access different memory pools depending on the operation. This function sets in the IBuilderConfig the size limit, specified by `poolSize`, for the corresponding memory pool, specified by `pool`. TensorRT will build a plan file that is constrained by these limits or report which constraint caused the failure.

If the size of the pool, specified by `poolSize`, fails to meet the size requirements for the pool, this function does nothing and emits the recoverable error, ErrorCode::kINVALID_ARGUMENT, to the registered IErrorRecorder.

If the size of the pool is larger than the maximum possible value for the configuration, this function does nothing and emits ErrorCode::kUNSUPPORTED_STATE.

If the pool does not exist on the requested device type when building the network, a warning is emitted to the logger, and the memory pool value is ignored.

Refer to MemoryPoolType to see the size requirements for each pool.

Parameters

pool	The memory pool to limit the available memory for.
poolSize	The size of the pool in bytes.

See also

getMemoryPoolLimit, MemoryPoolType

9.40.3.42 setMinTimingIterations()

```
virtual void nvinfer1::IBuilderConfig::setMinTimingIterations (
            int32_t minTiming )  [inline], [virtual], [noexcept]
```

Set the number of minimization iterations used when timing layers.

When timing layers, the builder minimizes over a set of average times for layer execution. This parameter controls the number of iterations used in minimization. The builder may sometimes run layers for more iterations to improve timing accuracy if this parameter is set to a small value and the runtime of the layer is short.

See also

getMinTimingIterations()

9.40.3.43 setProfileStream()

```
void nvinfer1::IBuilderConfig::setProfileStream (
            const cudaStream_t stream )  [inline], [noexcept]
```

Set the cuda stream that is used to profile this network.

Parameters

stream	The cuda stream used for profiling by the builder.

See also

getProfileStream()

9.40.3.44 setProfilingVerbosity()

```
void nvinfer1::IBuilderConfig::setProfilingVerbosity (
            ProfilingVerbosity verbosity )  [inline], [noexcept]
```

Set verbosity level of layer information exposed in NVTX annotations and IEngineInspector.

Control how much layer information will be exposed in NVTX annotations and IEngineInspector.

See also

ProfilingVerbosity, getProfilingVerbosity(), IEngineInspector

9.40.3.45 setQuantizationFlag()

```
void nvinfer1::IBuilderConfig::setQuantizationFlag (
            QuantizationFlag flag )  [inline], [noexcept]
```

Set a single quantization flag.

Add the input quantization flag to the already enabled quantization flags.

See also

setQuantizationFlags()

9.40.3.46 setQuantizationFlags()

```
void nvinfer1::IBuilderConfig::setQuantizationFlags (
            QuantizationFlags flags )  [inline], [noexcept]
```

Set the quantization flags.

The flags are listed in the QuantizationFlag enum. The flags set configuration options to quantize the network in int8.

Parameters

flags	The quantization flags.

Note

This function will override the previous set flags, rather than bitwise ORing the new flag.

See also

getQuantizationFlags()

9.40.3.47 setTacticSources()

```
bool nvinfer1::IBuilderConfig::setTacticSources (
            TacticSources tacticSources )  [inline], [noexcept]
```

Set tactic sources.

This bitset controls which tactic sources TensorRT is allowed to use for tactic selection.

By default, kCUBLAS and kCUDNN are always enabled. kCUBLAS_LT is enabled for x86 platforms as well as non-x86 platforms when CUDA >= 11.0.

Multiple tactic sources may be combined with a bitwise OR operation. For example, to enable cublas and cublasLt as tactic sources, use a value of:

1U << static_cast<uint32_t>(TacticSource::kCUBLAS) | 1U << static_cast<uint32_t>(TacticSource::kCUBLAS↩_LT)

See also

getTacticSources

Returns

true if the tactic sources in the build configuration were updated. The tactic sources in the build configuration will not be updated if the provided value is invalid.

9.40.3.48 setTimingCache()

```
bool nvinfer1::IBuilderConfig::setTimingCache (
            const ITimingCache & cache,
            bool ignoreMismatch )  [inline], [noexcept]
```

Attach a timing cache to IBuilderConfig.

The timing cache has verification header to make sure the provided cache can be used in current environment. A failure will be reported if the CUDA device property in the provided cache is different from current environment. ignoreMismatch = true skips strict verification and allows loading cache created from a different device.

The cache must not be destroyed until after the engine is built.

Parameters

cache	the timing cache to be used
ignoreMismatch	whether or not allow using a cache that contains different CUDA device property

Returns

true if set successfully, false otherwise

Warning

Using cache generated from devices with different CUDA device properties may lead to functional/performance bugs.

9.40.4 Member Data Documentation

9.40.4.1 mImpl

```
apiv::VBuilderConfig* nvinfer1::IBuilderConfig::mImpl  [protected]
```

The documentation for this class was generated from the following file:

- NvInfer.h

9.41 nvcaffeparser1::ICaffeParser Class Reference

Class used for parsing Caffe models.

`#include <NvCaffeParser.h>`

Public Member Functions

- virtual const IBlobNameToTensor * parse (const char *deploy, const char *model, nvinfer1::INetworkDefinition &network, nvinfer1::DataType weightType) noexcept=0

  Parse a prototxt file and a binaryproto Caffe model to extract network definition and weights associated with the network, respectively.
- virtual const IBlobNameToTensor * parseBuffers (const uint8_t *deployBuffer, std::size_t deployLength, const uint8_t *modelBuffer, std::size_t modelLength, nvinfer1::INetworkDefinition &network, nvinfer1::DataType weightType) noexcept=0

  Parse a deploy prototxt and a binaryproto Caffe model from memory buffers to extract network definition and weights associated with the network, respectively.
- virtual IBinaryProtoBlob * parseBinaryProto (const char *fileName) noexcept=0

  Parse and extract data stored in binaryproto file.
- virtual void setProtobufBufferSize (size_t size) noexcept=0

  Set buffer size for the parsing and storage of the learned model.
- virtual TRT_DEPRECATED void destroy () noexcept=0

  Destroy this ICaffeParser object.
- virtual void setPluginFactoryV2 (IPluginFactoryV2 *factory) noexcept=0

  Set the IPluginFactoryV2 used to create the user defined pluginV2 objects.
- virtual void setPluginNamespace (const char *libNamespace) noexcept=0

  Set the namespace used to lookup and create plugins in the network.
- virtual ~ICaffeParser () noexcept=default
- virtual void setErrorRecorder (nvinfer1::IErrorRecorder *recorder) noexcept=0

  Set the ErrorRecorder for this interface.
- virtual nvinfer1::IErrorRecorder * getErrorRecorder () const noexcept=0

  get the ErrorRecorder assigned to this interface.

9.41.1 Detailed Description

Class used for parsing Caffe models.

Allows users to export models trained using Caffe to TRT.

Warning

Do not inherit from this class, as doing so will break forward-compatibility of the API and ABI.

9.41.2 Constructor & Destructor Documentation

9.41.2.1 ~ICaffeParser()

```
virtual nvcaffeparser1::ICaffeParser::~ICaffeParser ( )  [virtual], [default], [noexcept]
```

9.41.3 Member Function Documentation

9.41.3.1 destroy()

```
virtual TRT_DEPRECATED void nvcaffeparser1::ICaffeParser::destroy ( )  [pure virtual], [noexcept]
```

Destroy this ICaffeParser object.

Deprecated Deprecated interface will be removed in TensorRT 10.0.

Warning

Calling destroy on a managed pointer will result in a double-free error.

9.41.3.2 getErrorRecorder()

```
virtual nvinfer1::IErrorRecorder * nvcaffeparser1::ICaffeParser::getErrorRecorder ( ) const  [pure
virtual], [noexcept]
```

get the ErrorRecorder assigned to this interface.

Retrieves the assigned error recorder object for the given class. A nullptr will be returned if setErrorRecorder has not been called.

Returns

A pointer to the IErrorRecorder object that has been registered.

See also

setErrorRecorder()

9.41.3.3 parse()

```
virtual const IBlobNameToTensor * nvcaffeparser1::ICaffeParser::parse (
            const char * deploy,
            const char * model,
            nvinfer1::INetworkDefinition & network,
            nvinfer1::DataType weightType )  [pure virtual], [noexcept]
```

Parse a prototxt file and a binaryproto Caffe model to extract network definition and weights associated with the network, respectively.

Parameters

deploy	The plain text, prototxt file used to define the network definition.
model	The binaryproto Caffe model that contains the weights associated with the network.
network	Network in which the CaffeParser will fill the layers.
weightType	The type to which the weights will transformed.

Returns

A pointer to an IBlobNameToTensor object that contains the extracted data.

See also

nvcaffeparser1::IBlobNameToTensor

9.41.3.4 parseBinaryProto()

```
virtual IBinaryProtoBlob * nvcaffeparser1::ICaffeParser::parseBinaryProto (
            const char * fileName )  [pure virtual], [noexcept]
```

Parse and extract data stored in binaryproto file.

The binaryproto file contains data stored in a binary blob. parseBinaryProto() converts it to an IBinaryProtoBlob object which gives the user access to the data and meta-data about data.

Parameters

fileName	Path to file containing binary proto.

Returns

A pointer to an IBinaryProtoBlob object that contains the extracted data.

See also

nvcaffeparser1::IBinaryProtoBlob

9.41.3.5 parseBuffers()

```
virtual const IBlobNameToTensor * nvcaffeparser1::ICaffeParser::parseBuffers (
            const uint8_t * deployBuffer,
            std::size_t deployLength,
            const uint8_t * modelBuffer,
            std::size_t modelLength,
            nvinfer1::INetworkDefinition & network,
            nvinfer1::DataType weightType )  [pure virtual], [noexcept]
```

Parse a deploy prototxt and a binaryproto Caffe model from memory buffers to extract network definition and weights associated with the network, respectively.

Parameters

deployBuffer	The plain text deploy prototxt used to define the network definition.
deployLength	The length of the deploy buffer.
modelBuffer	The binaryproto Caffe memory buffer that contains the weights associated with the network.
modelLength	The length of the model buffer.
network	Network in which the CaffeParser will fill the layers.
weightType	The type to which the weights will transformed.

Returns

A pointer to an IBlobNameToTensor object that contains the extracted data.

See also

nvcaffeparser1::IBlobNameToTensor

9.41.3.6 setErrorRecorder()

```
virtual void nvcaffeparser1::ICaffeParser::setErrorRecorder (
            nvinfer1::IErrorRecorder * recorder )  [pure virtual], [noexcept]
```

Set the ErrorRecorder for this interface.

Assigns the ErrorRecorder to this interface. The ErrorRecorder will track all errors during execution. This function will call incRefCount of the registered ErrorRecorder at least once. Setting recorder to nullptr unregisters the recorder with the interface, resulting in a call to decRefCount if a recorder has been registered.

If an error recorder is not set, messages will be sent to the global log stream.

Parameters

recorder	The error recorder to register with this interface.

See also

getErrorRecorder()

9.41.3.7 setPluginFactoryV2()

```
virtual void nvcaffeparser1::ICaffeParser::setPluginFactoryV2 (
            IPluginFactoryV2 * factory )  [pure virtual], [noexcept]
```

Set the IPluginFactoryV2 used to create the user defined pluginV2 objects.

Parameters

factory	Pointer to an instance of the user implementation of IPluginFactoryV2.

9.41.3.8 setPluginNamespace()

```
virtual void nvcaffeparser1::ICaffeParser::setPluginNamespace (
            const char * libNamespace )  [pure virtual], [noexcept]
```

Set the namespace used to lookup and create plugins in the network.

9.41.3.9 setProtobufBufferSize()

```
virtual void nvcaffeparser1::ICaffeParser::setProtobufBufferSize (
            size_t size )  [pure virtual], [noexcept]
```

Set buffer size for the parsing and storage of the learned model.

Parameters

size	The size of the buffer specified as the number of bytes.

Note

Default size is 2^30 bytes.

The documentation for this class was generated from the following file:

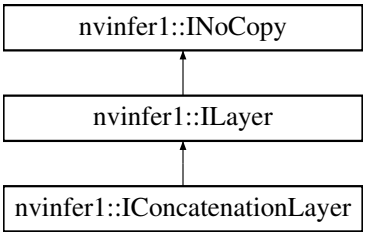
- NvCaffeParser.h

9.42 nvinfer1::IConcatenationLayer Class Reference

A concatenation layer in a network definition.

```
#include <NvInfer.h>
```

Inheritance diagram for nvinfer1::IConcatenationLayer:



Public Member Functions

- void setAxis (int32_t axis) noexcept

  Set the axis along which concatenation occurs.
- int32_t getAxis () const noexcept

  Get the axis along which concatenation occurs.

Protected Member Functions

- virtual ~IConcatenationLayer () noexcept=default

Protected Attributes

- apiv::VConcatenationLayer * mImpl

9.42.1 Detailed Description

A concatenation layer in a network definition.

The output dimension along the concatenation axis is the sum of the corresponding input dimensions. Every other output dimension is the same as the corresponding dimension of the inputs.

Warning

All tensors must have the same dimensions except along the concatenation axis.

Do not inherit from this class, as doing so will break forward-compatibility of the API and ABI.

9.42.2 Constructor & Destructor Documentation

9.42.2.1 ~IConcatenationLayer()

```
virtual nvinfer1::IConcatenationLayer::~IConcatenationLayer ( )  [protected], [virtual], [default],
[noexcept]
```

9.42.3 Member Function Documentation

9.42.3.1 getAxis()

```
int32_t nvinfer1::IConcatenationLayer::getAxis ( ) const  [inline], [noexcept]
```

Get the axis along which concatenation occurs.

See also

setAxis()

9.42.3.2 setAxis()

```
void nvinfer1::IConcatenationLayer::setAxis (
            int32_t axis )  [inline], [noexcept]
```

Set the axis along which concatenation occurs.

0 is the major axis (excluding the batch dimension). The default is the number of non-batch axes in the tensor minus three (e.g. for an NCHW input it would be 0), or 0 if there are fewer than 3 non-batch axes.

When running this layer on the DLA, only concat across the Channel axis is valid.

Parameters

axis	The axis along which concatenation occurs.

9.42.4 Member Data Documentation

9.42.4.1 mImpl

```
apiv::VConcatenationLayer* nvinfer1::IConcatenationLayer::mImpl  [protected]
```

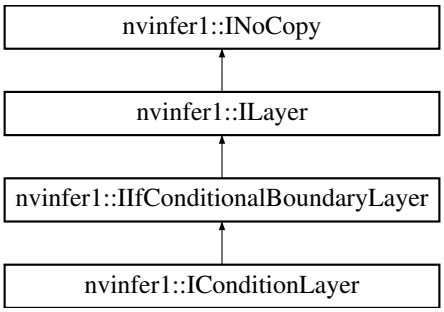
The documentation for this class was generated from the following file:

- NvInfer.h

9.43 nvinfer1::IConditionLayer Class Reference

`#include <NvInfer.h>`

Inheritance diagram for nvinfer1::IConditionLayer:



Protected Member Functions

- virtual ~IConditionLayer () noexcept=default

Protected Attributes

- apiv::VConditionLayer * mImpl

Additional Inherited Members

9.43.1 Detailed Description

This layer represents a condition input to an IIfConditional.

9.43.2 Constructor & Destructor Documentation

9.43.2.1 ~IConditionLayer()

`virtual nvinfer1::IConditionLayer::~IConditionLayer ( )  [protected], [virtual], [default], [noexcept]`

9.43.3 Member Data Documentation

9.43.3.1 mImpl

```
apiv::VConditionLayer* nvinfer1::IConditionLayer::mImpl  [protected]
```

The documentation for this class was generated from the following file:

- NvInfer.h

9.44 nvinfer1::consistency::IConsistencyChecker Class Reference

Validates a serialized engine blob.

```
#include <NvInferConsistency.h>
```

Public Member Functions

- bool validate () const noexcept

  Check that a blob that was input to createConsistencyChecker method represents a valid engine.
- virtual ~IConsistencyChecker ()=default

  De-allocates any internally allocated memory.

Protected Member Functions

- IConsistencyChecker ()=default
- IConsistencyChecker (const IConsistencyChecker &other)=delete
- IConsistencyChecker & operator= (const IConsistencyChecker &other)=delete
- IConsistencyChecker (IConsistencyChecker &&other)=delete
- IConsistencyChecker & operator= (IConsistencyChecker &&other)=delete

Protected Attributes

- apiv::VConsistencyChecker * mImpl

9.44.1 Detailed Description

Validates a serialized engine blob.

Warning

Do not inherit from this class, as doing so will break forward-compatibility of the API and ABI.

9.44.2 Constructor & Destructor Documentation

9.44.2.1 ~IConsistencyChecker()

```
virtual nvinfer1::consistency::IConsistencyChecker::~IConsistencyChecker ( )  [virtual], [default]
```

De-allocates any internally allocated memory.

9.44.2.2 IConsistencyChecker() [1/3]

```
nvinfer1::consistency::IConsistencyChecker::IConsistencyChecker ( )  [protected], [default]
```

9.44.2.3 IConsistencyChecker() [2/3]

```
nvinfer1::consistency::IConsistencyChecker::IConsistencyChecker (
            const IConsistencyChecker & other )  [protected], [delete]
```

9.44.2.4 IConsistencyChecker() [3/3]

```
nvinfer1::consistency::IConsistencyChecker::IConsistencyChecker (
            IConsistencyChecker && other )  [protected], [delete]
```

9.44.3 Member Function Documentation

9.44.3.1 operator=() [1/2]

```
IConsistencyChecker & nvinfer1::consistency::IConsistencyChecker::operator= (
            const IConsistencyChecker & other )  [protected], [delete]
```

9.44.3.2 operator=() [2/2]

```
IConsistencyChecker & nvinfer1::consistency::IConsistencyChecker::operator= (
            IConsistencyChecker && other )  [protected], [delete]
```

9.44.3.3 validate()

```
bool nvinfer1::consistency::IConsistencyChecker::validate ( ) const  [inline], [noexcept]
```

Check that a blob that was input to createConsistencyChecker method represents a valid engine.

Returns

true if the original blob encoded an engine that belongs to valid engine domain with target capability EngineCapability::kSAFETY, false otherwise.

9.44.4 Member Data Documentation

9.44.4.1 mImpl

```
apiv::VConsistencyChecker* nvinfer1::consistency::IConsistencyChecker::mImpl  [protected]
```

The documentation for this class was generated from the following file:

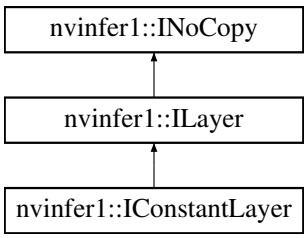
- NvInferConsistency.h

9.45 nvinfer1::IConstantLayer Class Reference

Layer that represents a constant value.

`#include <NvInfer.h>`

Inheritance diagram for nvinfer1::IConstantLayer:



Public Member Functions

- void setWeights (Weights weights) noexcept
  Set the weights for the layer.
- Weights getWeights () const noexcept
  Get the weights for the layer.
- void setDimensions (Dims dimensions) noexcept
  Set the dimensions for the layer.
- Dims getDimensions () const noexcept
  Get the dimensions for the layer.

Protected Member Functions

- virtual ~IConstantLayer () noexcept=default

Protected Attributes

- apiv::VConstantLayer * mImpl

9.45.1 Detailed Description

Layer that represents a constant value.

Note

This layer does not support boolean types.

Warning

Do not inherit from this class, as doing so will break forward-compatibility of the API and ABI.

9.45.2 Constructor & Destructor Documentation

9.45.2.1 ~IConstantLayer()

```
virtual nvinfer1::IConstantLayer::~IConstantLayer ( )  [protected], [virtual], [default], [noexcept]
```

9.45.3 Member Function Documentation

9.45.3.1 getDimensions()

```
Dims nvinfer1::IConstantLayer::getDimensions ( ) const  [inline], [noexcept]
```

Get the dimensions for the layer.

Returns

the dimensions for the layer

See also

getDimensions

9.45.3.2 getWeights()

```
Weights nvinfer1::IConstantLayer::getWeights ( ) const  [inline], [noexcept]
```

Get the weights for the layer.

See also

setWeights

9.45.3.3 setDimensions()

```
void nvinfer1::IConstantLayer::setDimensions (
            Dims dimensions )  [inline], [noexcept]
```

Set the dimensions for the layer.

Parameters

dimensions	The dimensions of the layer

See also

setDimensions

9.45.3.4 setWeights()

```
void nvinfer1::IConstantLayer::setWeights (
            Weights weights )  [inline], [noexcept]
```

Set the weights for the layer.

If weights.type is DataType::kINT32, the output is a tensor of 32-bit indices. Otherwise the output is a tensor of real values and the output type will be follow TensorRT's normal precision rules.

See also

getWeights()

9.45.4 Member Data Documentation

9.45.4.1 mImpl

```
apiv::VConstantLayer* nvinfer1::IConstantLayer::mImpl  [protected]
```

The documentation for this class was generated from the following file:

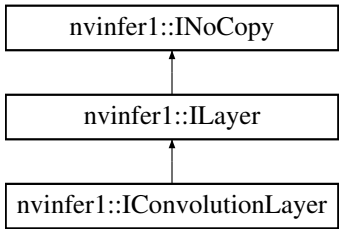
- NvInfer.h

9.46 nvinfer1::IConvolutionLayer Class Reference

A convolution layer in a network definition.

```
#include <NvInfer.h>
```

Inheritance diagram for nvinfer1::IConvolutionLayer:



Public Member Functions

- TRT_DEPRECATED void setKernelSize (DimsHW kernelSize) noexcept

  Set the HW kernel size of the convolution.
- TRT_DEPRECATED DimsHW getKernelSize () const noexcept

  Get the HW kernel size of the convolution.
- void setNbOutputMaps (int32_t nbOutputMaps) noexcept

  Set the number of output maps for the convolution.
- int32_t getNbOutputMaps () const noexcept

  Get the number of output maps for the convolution.
- TRT_DEPRECATED void setStride (DimsHW stride) noexcept

  Get the stride of the convolution.
- TRT_DEPRECATED DimsHW getStride () const noexcept

  Get the stride of the convolution.
- TRT_DEPRECATED void setPadding (DimsHW padding) noexcept

  Set the padding of the convolution.
- TRT_DEPRECATED DimsHW getPadding () const noexcept

  Get the padding of the convolution. If the padding is asymmetric, the pre-padding is returned.
- void setNbGroups (int32_t nbGroups) noexcept

  Set the number of groups for a convolution.
- int32_t getNbGroups () const noexcept

Get the number of groups of the convolution.

- void setKernelWeights (Weights weights) noexcept

  Set the kernel weights for the convolution.
- Weights getKernelWeights () const noexcept

  Get the kernel weights of the convolution.
- void setBiasWeights (Weights weights) noexcept

  Set the bias weights for the convolution.
- Weights getBiasWeights () const noexcept

  Get the bias weights for the convolution.
- TRT_DEPRECATED void setDilation (DimsHW dilation) noexcept

  Set the dilation for a convolution.
- TRT_DEPRECATED DimsHW getDilation () const noexcept

  Get the dilation for a convolution.
- void setPrePadding (Dims padding) noexcept

  Set the multi-dimension pre-padding of the convolution.
- Dims getPrePadding () const noexcept

  Get the pre-padding.
- void setPostPadding (Dims padding) noexcept

  Set the multi-dimension post-padding of the convolution.
- Dims getPostPadding () const noexcept

  Get the post-padding.
- void setPaddingMode (PaddingMode paddingMode) noexcept

  Set the padding mode.
- PaddingMode getPaddingMode () const noexcept

  Get the padding mode.
- void setKernelSizeNd (Dims kernelSize) noexcept

  Set the multi-dimension kernel size of the convolution.
- Dims getKernelSizeNd () const noexcept

  Get the multi-dimension kernel size of the convolution.
- void setStrideNd (Dims stride) noexcept

  Set the multi-dimension stride of the convolution.
- Dims getStrideNd () const noexcept

  Get the multi-dimension stride of the convolution.
- void setPaddingNd (Dims padding) noexcept

  Set the multi-dimension padding of the convolution.
- Dims getPaddingNd () const noexcept

  Get the multi-dimension padding of the convolution.
- void setDilationNd (Dims dilation) noexcept

  Set the multi-dimension dilation of the convolution.
- Dims getDilationNd () const noexcept

  Get the multi-dimension dilation of the convolution.
- void setInput (int32_t index, ITensor &tensor) noexcept

  Append or replace an input of this layer with a specific tensor.

Protected Member Functions

- virtual ~IConvolutionLayer () noexcept=default

Protected Attributes

- apiv::VConvolutionLayer * mImpl

9.46.1 Detailed Description

A convolution layer in a network definition.

This layer performs a correlation operation between 3-dimensional filter with a 4-dimensional tensor to produce another 4-dimensional tensor.

An optional bias argument is supported, which adds a per-channel constant to each value in the output.

Warning

Do not inherit from this class, as doing so will break forward-compatibility of the API and ABI.

9.46.2 Constructor & Destructor Documentation

9.46.2.1 ~IConvolutionLayer()

```
virtual nvinfer1::IConvolutionLayer::~IConvolutionLayer ( )  [protected], [virtual], [default],
[noexcept]
```

9.46.3 Member Function Documentation

9.46.3.1 getBiasWeights()

```
Weights nvinfer1::IConvolutionLayer::getBiasWeights ( ) const  [inline], [noexcept]
```

Get the bias weights for the convolution.

See also

setBiasWeights()

9.46.3.2 getDilation()

```
TRT_DEPRECATED DimsHW nvinfer1::IConvolutionLayer::getDilation ( ) const  [inline], [noexcept]
```

Get the dilation for a convolution.

See also

setDilation()

Deprecated Superseded by getDilationNd. Deprecated prior to TensorRT 8.0 and will be removed in 9.0

9.46.3.3 getDilationNd()

```
Dims nvinfer1::IConvolutionLayer::getDilationNd ( ) const  [inline], [noexcept]
```

Get the multi-dimension dilation of the convolution.

See also

setDilation()

9.46.3.4 getKernelSize()

```
TRT_DEPRECATED DimsHW nvinfer1::IConvolutionLayer::getKernelSize ( ) const  [inline], [noexcept]
```

Get the HW kernel size of the convolution.

See also

setKernelSize()

Deprecated Superseded by getKernelSizeNd. Deprecated prior to TensorRT 8.0 and will be removed in 9.0

9.46.3.5 getKernelSizeNd()

```
Dims nvinfer1::IConvolutionLayer::getKernelSizeNd ( ) const  [inline], [noexcept]
```

Get the multi-dimension kernel size of the convolution.

See also

setKernelSizeNd()

9.46.3.6 getKernelWeights()

```
Weights nvinfer1::IConvolutionLayer::getKernelWeights ( ) const  [inline], [noexcept]
```

Get the kernel weights of the convolution.

See also

setKernelWeights()

9.46.3.7 getNbGroups()

```
int32_t nvinfer1::IConvolutionLayer::getNbGroups ( ) const  [inline], [noexcept]
```

Get the number of groups of the convolution.

See also

setNbGroups()

9.46.3.8 getNbOutputMaps()

```
int32_t nvinfer1::IConvolutionLayer::getNbOutputMaps ( ) const  [inline], [noexcept]
```

Get the number of output maps for the convolution.

See also

setNbOutputMaps()

9.46.3.9 getPadding()

```
TRT_DEPRECATED DimsHW nvinfer1::IConvolutionLayer::getPadding ( ) const  [inline], [noexcept]
```

Get the padding of the convolution. If the padding is asymmetric, the pre-padding is returned.

See also

setPadding()

Deprecated Superseded by getPaddingNd. Deprecated prior to TensorRT 8.0 and will be removed in 9.0

9.46.3.10 getPaddingMode()

```
PaddingMode nvinfer1::IConvolutionLayer::getPaddingMode ( ) const  [inline], [noexcept]
```

Get the padding mode.

Default: kEXPLICIT_ROUND_DOWN

See also

setPaddingMode()

9.46.3.11 getPaddingNd()

```
Dims nvinfer1::IConvolutionLayer::getPaddingNd ( ) const  [inline], [noexcept]
```

Get the multi-dimension padding of the convolution.

If the padding is asymmetric, the pre-padding is returned.

See also

setPaddingNd()

9.46.3.12 getPostPadding()

```
Dims nvinfer1::IConvolutionLayer::getPostPadding ( ) const  [inline], [noexcept]
```

Get the post-padding.

See also

setPostPadding()

9.46.3.13 getPrePadding()

```
Dims nvinfer1::IConvolutionLayer::getPrePadding ( ) const  [inline], [noexcept]
```

Get the pre-padding.

See also

setPrePadding()

9.46.3.14 getStride()

```
TRT_DEPRECATED DimsHW nvinfer1::IConvolutionLayer::getStride ( ) const  [inline], [noexcept]
```

Get the stride of the convolution.

Deprecated Superseded by getStrideNd. Deprecated prior to TensorRT 8.0 and will be removed in 9.0

9.46.3.15 getStrideNd()

```
Dims nvinfer1::IConvolutionLayer::getStrideNd ( ) const  [inline], [noexcept]
```

Get the multi-dimension stride of the convolution.

See also

setStrideNd()

9.46.3.16 setBiasWeights()

```
void nvinfer1::IConvolutionLayer::setBiasWeights (
            Weights weights )  [inline], [noexcept]
```

Set the bias weights for the convolution.

Bias is optional. To omit bias, set the count value of the weights structure to zero.

The bias is applied per-channel, so the number of weights (if non-zero) must be equal to the number of output feature maps.

See also

getBiasWeights()

9.46.3.17 setDilation()

```
TRT_DEPRECATED void nvinfer1::IConvolutionLayer::setDilation (
            DimsHW dilation )  [inline], [noexcept]
```

Set the dilation for a convolution.

Default: (1,1)

If executing this layer on DLA, both height and width must be in the range [1,32].

See also

getDilation()

Deprecated Superseded by setDilationNd. Deprecated prior to TensorRT 8.0 and will be removed in 9.0

9.46.3.18 setDilationNd()

```
void nvinfer1::IConvolutionLayer::setDilationNd (
            Dims dilation )  [inline], [noexcept]
```

Set the multi-dimension dilation of the convolution.

Default: (1, 1, ..., 1)

If executing this layer on DLA, only support 2D padding, both height and width must be in the range [1,32].

See also

getDilation()

9.46.3.19 setInput()

```
void nvinfer1::ILayer::setInput (
            int32_t index,
            ITensor & tensor )  [inline], [noexcept]
```

Append or replace an input of this layer with a specific tensor.

Parameters

index	the index of the input to modify.
tensor	the new input tensor

Only index 0 (data input) is valid, unless explicit-quantization mode is enabled. In explicit-quantization mode, input with index 1 is the kernel-weights tensor, if present. The kernel-weights tensor must be a build-time constant (computable at build-time via constant-folding) and an output of a dequantize layer. If input index 1 is used then the kernel-weights parameter must be set to empty Weights.

See also

getKernelWeights(), setKernelWeights()

The indices are as follows:

- 0: The input activation tensor.
- 1: The kernel weights tensor (a constant tensor).

If this function is called with the value 1, then the function getNbInputs() changes from returning 1 to 2.

9.46.3.20 setKernelSize()

```
TRT_DEPRECATED void nvinfer1::IConvolutionLayer::setKernelSize (
            DimsHW kernelSize )  [inline], [noexcept]
```

Set the HW kernel size of the convolution.

If executing this layer on DLA, both height and width of kernel size must be in the range [1,32].

See also

getKernelSize()

Deprecated Superseded by setKernelSizeNd. Deprecated prior to TensorRT 8.0 and will be removed in 9.0

9.46.3.21 setKernelSizeNd()

```
void nvinfer1::IConvolutionLayer::setKernelSizeNd (
            Dims kernelSize )  [inline], [noexcept]
```

Set the multi-dimension kernel size of the convolution.

If executing this layer on DLA, only support 2D kernel size, both height and width of kernel size must be in the range [1,32].

See also

getKernelSizeNd()

9.46.3.22 setKernelWeights()

```
void nvinfer1::IConvolutionLayer::setKernelWeights (
            Weights weights )  [inline], [noexcept]
```

Set the kernel weights for the convolution.

The weights are specified as a contiguous array in `GKCRS` order, where `G` is the number of groups, `K` the number of output feature maps, `C` the number of input channels, and `R` and `S` are the height and width of the filter.

See also

getKernelWeights()

9.46.3.23 setNbGroups()

```
void nvinfer1::IConvolutionLayer::setNbGroups (
            int32_t nbGroups )  [inline], [noexcept]
```

Set the number of groups for a convolution.

The input tensor channels are divided into `nbGroups` groups, and a convolution is executed for each group, using a filter per group. The results of the group convolutions are concatenated to form the output.

Note

When using groups in int8 mode, the size of the groups (i.e. the channel count divided by the group count) must be a multiple of 4 for both input and output.

Default: 1

If executing this layer on DLA, the max number of groups is 8192.

See also

getNbGroups()

9.46.3.24 setNbOutputMaps()

```
void nvinfer1::IConvolutionLayer::setNbOutputMaps (
            int32_t nbOutputMaps )  [inline], [noexcept]
```

Set the number of output maps for the convolution.

If executing this layer on DLA, the number of output maps must be in the range [1,8192].

See also

getNbOutputMaps()

9.46.3.25 setPadding()

```
TRT_DEPRECATED void nvinfer1::IConvolutionLayer::setPadding (
            DimsHW padding )  [inline], [noexcept]
```

Set the padding of the convolution.

The input will be zero-padded by this number of elements in the height and width directions. Padding is symmetric.

Default: (0,0)

If executing this layer on DLA, both height and width of padding must be in the range [0,31], and the padding size must be less than the kernel size.

See also

getPadding()

Deprecated Superseded by setPaddingNd. Deprecated prior to TensorRT 8.0 and will be removed in 9.0

9.46.3.26 setPaddingMode()

```
void nvinfer1::IConvolutionLayer::setPaddingMode (
            PaddingMode paddingMode )  [inline], [noexcept]
```

Set the padding mode.

Padding mode takes precedence if both setPaddingMode and setPre/PostPadding are used.

Default: kEXPLICIT_ROUND_DOWN

See also

getPaddingMode()

9.46.3.27 setPaddingNd()

```
void nvinfer1::IConvolutionLayer::setPaddingNd (
            Dims padding )  [inline], [noexcept]
```

Set the multi-dimension padding of the convolution.

The input will be zero-padded by this number of elements in each dimension. Padding is symmetric.

Default: (0, 0, ..., 0)

If executing this layer on DLA, only support 2D padding, both height and width of padding must be in the range [0,31], and the padding must be less than the kernel size.

See also

getPaddingNd() setPadding() getPadding()

9.46.3.28 setPostPadding()

```
void nvinfer1::IConvolutionLayer::setPostPadding (
            Dims padding )  [inline], [noexcept]
```

Set the multi-dimension post-padding of the convolution.

The end of the input will be zero-padded by this number of elements in each dimension.

Default: (0, 0, ..., 0)

If executing this layer on DLA, only support 2D padding, both height and width of padding must be in the range [0,31], and the padding must be less than the kernel size.

See also

getPostPadding()

9.46.3.29 setPrePadding()

```
void nvinfer1::IConvolutionLayer::setPrePadding (
            Dims padding )  [inline], [noexcept]
```

Set the multi-dimension pre-padding of the convolution.

The start of the input will be zero-padded by this number of elements in each dimension.

Default: (0, 0, ..., 0)

If executing this layer on DLA, only support 2D padding, both height and width of padding must be in the range [0,31], and the padding must be less than the kernel size.

See also

getPrePadding()

9.46.3.30 setStride()

```
TRT_DEPRECATED void nvinfer1::IConvolutionLayer::setStride (
            DimsHW stride )  [inline], [noexcept]
```

Get the stride of the convolution.

Default: (1,1)

If executing this layer on DLA, both height and width of stride must be in the range [1,8].

See also

getStride()

Deprecated Superseded by setStrideNd. Deprecated prior to TensorRT 8.0 and will be removed in 9.0

9.46.3.31 setStrideNd()

```
void nvinfer1::IConvolutionLayer::setStrideNd (
            Dims stride )  [inline], [noexcept]
```

Set the multi-dimension stride of the convolution.

Default: (1, 1, ..., 1)

If executing this layer on DLA, only support 2D stride, both height and width of stride must be in the range [1,8].

See also

getStrideNd() setStride() getStride()

9.46.4 Member Data Documentation

9.46.4.1 mImpl

```
apiv::VConvolutionLayer* nvinfer1::IConvolutionLayer::mImpl  [protected]
```

The documentation for this class was generated from the following file:

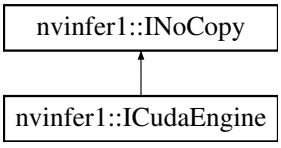
- NvInfer.h

9.47 nvinfer1::ICudaEngine Class Reference

An engine for executing inference on a built network, with functionally unsafe features.

```
#include <NvInferRuntime.h>
```

Inheritance diagram for nvinfer1::ICudaEngine:



Public Member Functions

- virtual ~ICudaEngine () noexcept=default
- int32_t getNbBindings () const noexcept

  Get the number of binding indices.
- int32_t getBindingIndex (const char *name) const noexcept

  Retrieve the binding index for a named tensor.
- const char * getBindingName (int32_t bindingIndex) const noexcept

  Retrieve the name corresponding to a binding index.
- bool bindingIsInput (int32_t bindingIndex) const noexcept

  Determine whether a binding is an input binding.
- Dims getBindingDimensions (int32_t bindingIndex) const noexcept

  Get the dimensions of a binding.
- DataType getBindingDataType (int32_t bindingIndex) const noexcept

  Determine the required data type for a buffer from its binding index.
- int32_t getMaxBatchSize () const noexcept

  Get the maximum batch size which can be used for inference.
- int32_t getNbLayers () const noexcept

  Get the number of layers in the network.
- IHostMemory * serialize () const noexcept

  Serialize the network to a stream.
- IExecutionContext * createExecutionContext () noexcept

  Create an execution context.
- TRT_DEPRECATED void destroy () noexcept

  Destroy this object;.
- TensorLocation getLocation (int32_t bindingIndex) const noexcept

  Get location of binding.
- IExecutionContext * createExecutionContextWithoutDeviceMemory () noexcept

  create an execution context without any device memory allocated
- size_t getDeviceMemorySize () const noexcept

  Return the amount of device memory required by an execution context.
- bool isRefittable () const noexcept

  Return true if an engine can be refit.
- int32_t getBindingBytesPerComponent (int32_t bindingIndex) const noexcept

  Return the number of bytes per component of an element.
- int32_t getBindingComponentsPerElement (int32_t bindingIndex) const noexcept

  Return the number of components included in one element.
- TensorFormat getBindingFormat (int32_t bindingIndex) const noexcept

  Return the binding format.
- const char * getBindingFormatDesc (int32_t bindingIndex) const noexcept

  Return the human readable description of the tensor format.
- int32_t getBindingVectorizedDim (int32_t bindingIndex) const noexcept

  Return the dimension index that the buffer is vectorized.
- const char * getName () const noexcept

  Returns the name of the network associated with the engine.
- int32_t getNbOptimizationProfiles () const noexcept

  Get the number of optimization profiles defined for this engine.

- Dims getProfileDimensions (int32_t bindingIndex, int32_t profileIndex, OptProfileSelector select) const noexcept

  Get the minimum / optimum / maximum dimensions for a particular binding under an optimization profile.
- const int32_t * getProfileShapeValues (int32_t profileIndex, int32_t inputIndex, OptProfileSelector select) const noexcept

  Get minimum / optimum / maximum values for an input shape binding under an optimization profile.
- bool isShapeBinding (int32_t bindingIndex) const noexcept

  True if tensor is required as input for shape calculations or output from them.
- bool isExecutionBinding (int32_t bindingIndex) const noexcept

  True if pointer to tensor data is required for execution phase, false if nullptr can be supplied.
- EngineCapability getEngineCapability () const noexcept

  Determine what execution capability this engine has.
- void setErrorRecorder (IErrorRecorder *recorder) noexcept

  Set the ErrorRecorder for this interface.
- IErrorRecorder * getErrorRecorder () const noexcept

  Get the ErrorRecorder assigned to this interface.
- bool hasImplicitBatchDimension () const noexcept

  Query whether the engine was built with an implicit batch dimension.
- TacticSources getTacticSources () const noexcept

  return the tactic sources required by this engine
- ProfilingVerbosity getProfilingVerbosity () const noexcept

  Return the ProfilingVerbosity the builder config was set to when the engine was built.
- IEngineInspector * createEngineInspector () const noexcept

  Create a new engine inspector which prints the layer information in an engine or an execution context.

Protected Attributes

- apiv::VCudaEngine * mImpl

Additional Inherited Members

9.47.1 Detailed Description

An engine for executing inference on a built network, with functionally unsafe features.

Warning

Do not inherit from this class, as doing so will break forward-compatibility of the API and ABI.

9.47.2 Constructor & Destructor Documentation

9.47.2.1 ~ICudaEngine()

```
virtual nvinfer1::ICudaEngine::~ICudaEngine ( )  [virtual], [default], [noexcept]
```

9.47.3 Member Function Documentation

9.47.3.1 bindingIsInput()

```
bool nvinfer1::ICudaEngine::bindingIsInput (
            int32_t bindingIndex ) const  [inline], [noexcept]
```

Determine whether a binding is an input binding.

Parameters

bindingIndex	The binding index.

Returns

True if the index corresponds to an input binding and the index is in range.

See also

getBindingIndex()

9.47.3.2 createEngineInspector()

```
IEngineInspector * nvinfer1::ICudaEngine::createEngineInspector ( ) const  [inline], [noexcept]
```

Create a new engine inspector which prints the layer information in an engine or an execution context.

See also

IEngineInspector.

9.47.3.3 createExecutionContext()

```
IExecutionContext * nvinfer1::ICudaEngine::createExecutionContext ( )  [inline], [noexcept]
```

Create an execution context.

If the engine supports dynamic shapes, each execution context in concurrent use must use a separate optimization profile. The first execution context created will call setOptimizationProfile(0) implicitly. For other execution contexts, setOptimizationProfile() must be called with unique profile index before calling execute or enqueue. If an error recorder has been set for the engine, it will also be passed to the execution context.

See also

IExecutionContext.

IExecutionContext::setOptimizationProfile()

9.47.3.4 createExecutionContextWithoutDeviceMemory()

```
IExecutionContext * nvinfer1::ICudaEngine::createExecutionContextWithoutDeviceMemory ( )  [inline],
[noexcept]
```

create an execution context without any device memory allocated

The memory for execution of this device context must be supplied by the application.

9.47.3.5 destroy()

```
TRT_DEPRECATED void nvinfer1::ICudaEngine::destroy ( )  [inline], [noexcept]
```

Destroy this object;.

Deprecated Deprecated interface will be removed in TensorRT 10.0.

Warning

Calling destroy on a managed pointer will result in a double-free error.

9.47.3.6 getBindingBytesPerComponent()

```
int32_t nvinfer1::ICudaEngine::getBindingBytesPerComponent (
            int32_t bindingIndex ) const  [inline], [noexcept]
```

Return the number of bytes per component of an element.

The vector component size is returned if getBindingVectorizedDim() != -1.

Parameters

bindingIndex	The binding Index.

See also

ICudaEngine::getBindingVectorizedDim()

9.47.3.7 getBindingComponentsPerElement()

```
int32_t nvinfer1::ICudaEngine::getBindingComponentsPerElement (
            int32_t bindingIndex ) const  [inline], [noexcept]
```

Return the number of components included in one element.

The number of elements in the vectors is returned if getBindingVectorizedDim() != -1.

Parameters

bindingIndex	The binding Index.

See also

ICudaEngine::getBindingVectorizedDim()

9.47.3.8 getBindingDataType()

```
DataType nvinfer1::ICudaEngine::getBindingDataType (
            int32_t bindingIndex ) const  [inline], [noexcept]
```

Determine the required data type for a buffer from its binding index.

Parameters

bindingIndex	The binding index.

Returns

The type of the data in the buffer.

See also

getBindingIndex()

9.47.3.9 getBindingDimensions()

```
Dims nvinfer1::ICudaEngine::getBindingDimensions (
            int32_t bindingIndex ) const  [inline], [noexcept]
```

Get the dimensions of a binding.

Parameters

bindingIndex	The binding index.

Returns

The dimensions of the binding if the index is in range, otherwise Dims(). Has -1 for any dimension that varies within the optimization profile.

For example, suppose an INetworkDefinition has an input with shape [-1,-1] that becomes a binding b in the engine. If the associated optimization profile specifies that b has minimum dimensions as [6,9] and maximum dimensions [7,9], getBindingDimensions(b) returns [-1,9], despite the second dimension being dynamic in the INetworkDefinition.

Because each optimization profile has separate bindings, the returned value can differ across profiles. Consider another binding b' for the same network input, but for another optimization profile. If that other profile specifies minimum dimensions [5,8] and maximum dimensions [5,9], getBindingDimensions(b') returns [5,-1].

See also

getBindingIndex()

9.47.3.10 getBindingFormat()

```
TensorFormat nvinfer1::ICudaEngine::getBindingFormat (
            int32_t bindingIndex ) const  [inline], [noexcept]
```

Return the binding format.

Parameters

bindingIndex	The binding Index.

9.47.3.11 getBindingFormatDesc()

```
const char * nvinfer1::ICudaEngine::getBindingFormatDesc (
            int32_t bindingIndex ) const  [inline], [noexcept]
```

Return the human readable description of the tensor format.

The description includes the order, vectorization, data type, strides, and etc. Examples are shown as follows: Example 1: kCHW + FP32 "Row major linear FP32 format" Example 2: kCHW2 + FP16 "Two wide channel vectorized row major FP16 format" Example 3: kHWC8 + FP16 + Line Stride = 32 "Channel major FP16 format where C % 8 == 0 and H Stride % 32 == 0"

Parameters

bindingIndex	The binding Index.

9.47.3.12 getBindingIndex()

```
int32_t nvinfer1::ICudaEngine::getBindingIndex (
            const char * name ) const  [inline], [noexcept]
```

Retrieve the binding index for a named tensor.

IExecutionContext::enqueue() and IExecutionContext::execute() require an array of buffers.

Engine bindings map from tensor names to indices in this array. Binding indices are assigned at engine build time, and take values in the range [0 ... n-1] where n is the total number of inputs and outputs.

To get the binding index of the name in an optimization profile with index k $>$ 0, mangle the name by appending " [profile k]", as described for method getBindingName().

Parameters

name	The tensor name.

Returns

The binding index for the named tensor, or -1 if the name is not found.

See also

getNbBindings() getBindingName()

9.47.3.13 getBindingName()

```
const char * nvinfer1::ICudaEngine::getBindingName (
            int32_t bindingIndex ) const  [inline], [noexcept]
```

Retrieve the name corresponding to a binding index.

This is the reverse mapping to that provided by getBindingIndex().

For optimization profiles with an index k > 0, the name is mangled by appending " [profile k]", with k written in decimal. For example, if the tensor in the INetworkDefinition had the name "foo", and bindingIndex refers to that tensor in the optimization profile with index 3, getBindingName returns "foo [profile 3]".

Parameters

bindingIndex	The binding index.

Returns

The name corresponding to the index, or nullptr if the index is out of range.

See also

getBindingIndex()

9.47.3.14 getBindingVectorizedDim()

```
int32_t nvinfer1::ICudaEngine::getBindingVectorizedDim (
            int32_t bindingIndex ) const  [inline], [noexcept]
```

Return the dimension index that the buffer is vectorized.

Specifically -1 is returned if scalars per vector is 1.

Parameters

bindingIndex	The binding Index.

9.47.3.15 getDeviceMemorySize()

```
size_t nvinfer1::ICudaEngine::getDeviceMemorySize ( ) const  [inline], [noexcept]
```

Return the amount of device memory required by an execution context.

See also

IExecutionContext::setDeviceMemory()

9.47.3.16 getEngineCapability()

```
EngineCapability nvinfer1::ICudaEngine::getEngineCapability ( ) const  [inline], [noexcept]
```

Determine what execution capability this engine has.

If the engine has EngineCapability::kSTANDARD, then all engine functionality is valid. If the engine has EngineCapability::kSAFETY, then only the functionality in safe engine is valid. If the engine has EngineCapability::kDLA_STANDALONE, then only serialize, destroy, and const-accessor functions are valid.

Returns

The EngineCapability flag that the engine was built for.

9.47.3.17 getErrorRecorder()

```
IErrorRecorder * nvinfer1::ICudaEngine::getErrorRecorder ( ) const  [inline], [noexcept]
```

Get the ErrorRecorder assigned to this interface.

Retrieves the assigned error recorder object for the given class. A nullptr will be returned if an error handler has not been set.

Returns

A pointer to the IErrorRecorder object that has been registered.

See also

setErrorRecorder()

9.47.3.18 getLocation()

```
TensorLocation nvinfer1::ICudaEngine::getLocation (
            int32_t bindingIndex ) const  [inline], [noexcept]
```

Get location of binding.

This lets you know whether the binding should be a pointer to device or host memory.

See also

ITensor::setLocation() ITensor::getLocation()

Parameters

bindingIndex	The binding index.

Returns

The location of the bound tensor with given index.

9.47.3.19 getMaxBatchSize()

```
int32_t nvinfer1::ICudaEngine::getMaxBatchSize ( ) const  [inline], [noexcept]
```

Get the maximum batch size which can be used for inference.

For an engine built from an INetworkDefinition without an implicit batch dimension, this will always return 1.

Returns

The maximum batch size for this engine.

9.47.3.20 getName()

```
const char * nvinfer1::ICudaEngine::getName ( ) const  [inline], [noexcept]
```

Returns the name of the network associated with the engine.

The name is set during network creation and is retrieved after building or deserialization.

See also

INetworkDefinition::setName(), INetworkDefinition::getName()

Returns

A null-terminated C-style string representing the name of the network.

9.47.3.21 getNbBindings()

```
int32_t nvinfer1::ICudaEngine::getNbBindings ( ) const  [inline], [noexcept]
```

Get the number of binding indices.

There are separate binding indices for each optimization profile. This method returns the total over all profiles. If the engine has been built for K profiles, the first getNbBindings() / K bindings are used by profile number 0, the following getNbBindings() / K bindings are used by profile number 1 etc.

See also

getBindingIndex();

9.47.3.22 getNbLayers()

```
int32_t nvinfer1::ICudaEngine::getNbLayers ( ) const  [inline], [noexcept]
```

Get the number of layers in the network.

The number of layers in the network is not necessarily the number in the original network definition, as layers may be combined or eliminated as the engine is optimized. This value can be useful when building per-layer tables, such as when aggregating profiling data over a number of executions.

Returns

The number of layers in the network.

9.47.3.23 getNbOptimizationProfiles()

```
int32_t nvinfer1::ICudaEngine::getNbOptimizationProfiles ( ) const  [inline], [noexcept]
```

Get the number of optimization profiles defined for this engine.

Returns

Number of optimization profiles. It is always at least 1.

See also

IExecutionContext::setOptimizationProfile()

9.47.3.24 getProfileDimensions()

```
Dims nvinfer1::ICudaEngine::getProfileDimensions (
            int32_t bindingIndex,
            int32_t profileIndex,
            OptProfileSelector select ) const  [inline], [noexcept]
```

Get the minimum / optimum / maximum dimensions for a particular binding under an optimization profile.

Parameters

bindingIndex	The binding index, which must belong to the given profile, or be between 0 and bindingsPerProfile-1 as described below.
profileIndex	The profile index, which must be between 0 and getNbOptimizationProfiles()-1.
select	Whether to query the minimum, optimum, or maximum dimensions for this binding.

Returns

The minimum / optimum / maximum dimensions for this binding in this profile. If the profileIndex or bindingIndex are invalid, return Dims with nbDims=-1.

For backwards compatibility with earlier versions of TensorRT, if the bindingIndex does not belong to the current optimization profile, but is between 0 and bindingsPerProfile-1, where bindingsPerProfile = getNbBindings()/getNbOptimizationProfiles, then a corrected bindingIndex is used instead, computed by:

```
profileIndex * bindingsPerProfile + bindingIndex % bindingsPerProfile
```

Otherwise the bindingIndex is considered invalid.

9.47.3.25 getProfileShapeValues()

```
const int32_t * nvinfer1::ICudaEngine::getProfileShapeValues (
            int32_t profileIndex,
            int32_t inputIndex,
            OptProfileSelector select ) const  [inline], [noexcept]
```

Get minimum / optimum / maximum values for an input shape binding under an optimization profile.

Parameters

profileIndex	The profile index (must be between 0 and getNbOptimizationProfiles()-1)
inputIndex	The input index (must be between 0 and getNbBindings() - 1)
select	Whether to query the minimum, optimum, or maximum shape values for this binding.

Returns

If the binding is an input shape binding, return a pointer to an array that has the same number of elements as the corresponding tensor, i.e. 1 if dims.nbDims == 0, or dims.d[0] if dims.nbDims == 1, where dims = getBindingDimensions(inputIndex). The array contains the elementwise minimum / optimum / maximum values for this shape binding under the profile. If either of the indices is out of range, or if the binding is not an input shape binding, return nullptr.

For backwards compatibility with earlier versions of TensorRT, a bindingIndex that does not belong to the profile is corrected as described for getProfileDimensions.

See also

ICudaEngine::getProfileDimensions

9.47.3.26 getProfilingVerbosity()

```
ProfilingVerbosity nvinfer1::ICudaEngine::getProfilingVerbosity ( ) const  [inline], [noexcept]
```

Return the ProfilingVerbosity the builder config was set to when the engine was built.

Returns

the profiling verbosity the builder config was set to when the engine was built.

See also

IBuilderConfig::setProfilingVerbosity()

9.47.3.27 getTacticSources()

```
TacticSources nvinfer1::ICudaEngine::getTacticSources ( ) const  [inline], [noexcept]
```

return the tactic sources required by this engine

See also

IBuilderConfig::setTacticSources()

9.47.3.28 hasImplicitBatchDimension()

```
bool nvinfer1::ICudaEngine::hasImplicitBatchDimension ( ) const  [inline], [noexcept]
```

Query whether the engine was built with an implicit batch dimension.

Returns

True if tensors have implicit batch dimension, false otherwise.

This is an engine-wide property. Either all tensors in the engine have an implicit batch dimension or none of them do.

hasImplicitBatchDimension() is true if and only if the INetworkDefinition from which this engine was built was created with createNetwork() or createNetworkV2() without NetworkDefinitionCreationFlag::kEXPLICIT_BATCH flag.

See also

createNetworkV2

9.47.3.29 isExecutionBinding()

```
bool nvinfer1::ICudaEngine::isExecutionBinding (
            int32_t bindingIndex ) const  [inline], [noexcept]
```

True if pointer to tensor data is required for execution phase, false if nullptr can be supplied.

For example, if a network uses an input tensor with binding i ONLY as the ”reshape dimensions” input of IShuffleLayer, then isExecutionBinding(i) is false, and a nullptr can be supplied for it when calling IExecutionContext::execute or IExecutionContext::enqueue.

See also

isShapeBinding()

9.47.3.30 isRefittable()

```
bool nvinfer1::ICudaEngine::isRefittable ( ) const  [inline], [noexcept]
```

Return true if an engine can be refit.

See also

nvinfer1::createInferRefitter()

9.47.3.31 isShapeBinding()

```
bool nvinfer1::ICudaEngine::isShapeBinding (
            int32_t bindingIndex ) const  [inline], [noexcept]
```

True if tensor is required as input for shape calculations or output from them.

TensorRT evaluates a network in two phases:

1. Compute shape information required to determine memory allocation requirements and validate that runtime sizes make sense.
2. Process tensors on the device.

Some tensors are required in phase 1. These tensors are called ”shape tensors”, and always have type Int32 and no more than one dimension. These tensors are not always shapes themselves, but might be used to calculate tensor shapes for phase 2.

isShapeBinding(i) returns true if the tensor is a required input or an output computed in phase 1. isExecutionBinding(i) returns true if the tensor is a required input or an output computed in phase 2.

For example, if a network uses an input tensor with binding i as an addend to an IElementWiseLayer that computes the ”reshape dimensions” for IShuffleLayer, then isShapeBinding(i) == true.

It's possible to have a tensor be required by both phases. For instance, a tensor can be used for the ”reshape dimensions” and as the indices for an IGatherLayer collecting floating-point data.

It's also possible to have a tensor be required by neither phase, but nonetheless shows up in the engine's inputs. For example, if an input tensor is used only as an input to IShapeLayer, only its shape matters and its values are irrelevant.

See also

isExecutionBinding()

9.47.3.32 serialize()

```
IHostMemory * nvinfer1::ICudaEngine::serialize ( ) const  [inline], [noexcept]
```

Serialize the network to a stream.

Returns

A IHostMemory object that contains the serialized engine.

The network may be deserialized with IRuntime::deserializeCudaEngine().

See also

IRuntime::deserializeCudaEngine()

9.47.3.33 setErrorRecorder()

```
void nvinfer1::ICudaEngine::setErrorRecorder (
            IErrorRecorder * recorder )  [inline], [noexcept]
```

Set the ErrorRecorder for this interface.

Assigns the ErrorRecorder to this interface. The ErrorRecorder will track all errors during execution. This function will call incRefCount of the registered ErrorRecorder at least once. Setting recorder to nullptr unregisters the recorder with the interface, resulting in a call to decRefCount if a recorder has been registered.

If an error recorder is not set, messages will be sent to the global log stream.

Parameters

recorder	The error recorder to register with this interface.

See also

getErrorRecorder()

9.47.4 Member Data Documentation

9.47.4.1 mImpl

```
apiv::VCudaEngine* nvinfer1::ICudaEngine::mImpl  [protected]
```

The documentation for this class was generated from the following file:

- NvInferRuntime.h

9.48 nvinfer1::safe::ICudaEngine Class Reference

A functionally safe engine for executing inference on a built network.

```
#include <NvInferSafeRuntime.h>
```

Public Member Functions

- virtual std::int32_t getNbBindings () const noexcept=0
  Get the number of binding indices.
- virtual std::int32_t getBindingIndex (AsciiChar const *const name) const noexcept=0
  Retrieve the binding index for a named tensor.
- virtual AsciiChar const * getBindingName (std::int32_t const bindingIndex) const noexcept=0
  Retrieve the name corresponding to a binding index.
- virtual bool bindingIsInput (std::int32_t const bindingIndex) const noexcept=0
  Determine whether a binding is an input binding.
- virtual Dims getBindingDimensions (std::int32_t const bindingIndex) const noexcept=0
  Get the dimensions of a binding.
- virtual DataType getBindingDataType (std::int32_t const bindingIndex) const noexcept=0
  Determine the required data type for a buffer from its binding index.
- virtual IExecutionContext * createExecutionContext () noexcept=0
  Create an execution context.
- virtual IExecutionContext * createExecutionContextWithoutDeviceMemory () noexcept=0
  Create an execution context without any device memory allocated.
- virtual size_t getDeviceMemorySize () const noexcept=0
  Return the amount of device memory required by an execution context.
- virtual std::int32_t getBindingBytesPerComponent (std::int32_t const bindingIndex) const noexcept=0
  Return the number of bytes per component of an element.

- virtual std::int32_t getBindingComponentsPerElement (std::int32_t const bindingIndex) const noexcept=0

  Return the number of components included in one element.
- virtual TensorFormat getBindingFormat (std::int32_t const bindingIndex) const noexcept=0

  Return the binding format.
- virtual std::int32_t getBindingVectorizedDim (std::int32_t const bindingIndex) const noexcept=0

  Return the dimension index that the buffer is vectorized.
- virtual AsciiChar const * getName () const noexcept=0

  Returns the name of the network associated with the engine.
- virtual void setErrorRecorder (IErrorRecorder *const recorder) noexcept=0

  Set the ErrorRecorder for this interface.
- virtual IErrorRecorder * getErrorRecorder () const noexcept=0

  Get the ErrorRecorder assigned to this interface.
- ICudaEngine ()=default
- virtual ~ICudaEngine () noexcept=default
- ICudaEngine (ICudaEngine const &)=delete
- ICudaEngine (ICudaEngine &&)=delete
- ICudaEngine & operator= (ICudaEngine const &) &=delete
- ICudaEngine & operator= (ICudaEngine &&) &=delete

9.48.1 Detailed Description

A functionally safe engine for executing inference on a built network.

Warning

Do not inherit from this class, as doing so will break forward-compatibility of the API and ABI.

9.48.2 Constructor & Destructor Documentation

9.48.2.1 ICudaEngine() [1/3]

```
nvinfer1::safe::ICudaEngine::ICudaEngine ( )  [default]
```

9.48.2.2 ~ICudaEngine()

```
virtual nvinfer1::safe::ICudaEngine::~ICudaEngine ( )  [virtual], [default], [noexcept]
```

9.48.2.3 ICudaEngine() [2/3]

```
nvinfer1::safe::ICudaEngine::ICudaEngine (
            ICudaEngine const &  )  [delete]
```

9.48.2.4 ICudaEngine() [3/3]

```
nvinfer1::safe::ICudaEngine::ICudaEngine (
            ICudaEngine &&  )  [delete]
```

9.48.3 Member Function Documentation

9.48.3.1 bindingIsInput()

```
virtual bool nvinfer1::safe::ICudaEngine::bindingIsInput (
            std::int32_t const bindingIndex ) const  [pure virtual], [noexcept]
```

Determine whether a binding is an input binding.

Parameters

bindingIndex	The binding index.

Returns

True if the index corresponds to an input binding and the index is in range.

See also

getBindingIndex()

Usage considerations

- Allowed context for the API call
  - Thread-safe: Yes

9.48.3.2 createExecutionContext()

```
virtual IExecutionContext * nvinfer1::safe::ICudaEngine::createExecutionContext ( )  [pure virtual],
[noexcept]
```

Create an execution context.

See also

safe::IExecutionContext.

Usage considerations

- Allowed context for the API call
  - Thread-safe: Yes; if createExecutionContext fails, users should treat this as a critical error and not perform any subsequent TensorRT operations apart from outputting the error logs.

9.48.3.3 createExecutionContextWithoutDeviceMemory()

```
virtual IExecutionContext * nvinfer1::safe::ICudaEngine::createExecutionContextWithoutDeviceMemory
( )  [pure virtual], [noexcept]
```

Create an execution context without any device memory allocated.

The memory for execution of this device context must be supplied by the application.

See also

getDeviceMemorySize() safe::IExecutionContext::setDeviceMemory()

Usage considerations

- Allowed context for the API call
  - Thread-safe: Yes; if createExecutionContext fails, users should treat this as a critical error and not perform any subsequent TensorRT operations apart from outputting the error logs.

9.48.3.4 getBindingBytesPerComponent()

```
virtual std::int32_t nvinfer1::safe::ICudaEngine::getBindingBytesPerComponent (
            std::int32_t const bindingIndex ) const  [pure virtual], [noexcept]
```

Return the number of bytes per component of an element.

The vector component size is returned if getBindingVectorizedDim() != -1.

Parameters

bindingIndex	The binding Index.

See also

safe::ICudaEngine::getBindingVectorizedDim()

Usage considerations

- Allowed context for the API call
  - Thread-safe: Yes

9.48.3.5 getBindingComponentsPerElement()

```
virtual std::int32_t nvinfer1::safe::ICudaEngine::getBindingComponentsPerElement (
            std::int32_t const bindingIndex ) const  [pure virtual], [noexcept]
```

Return the number of components included in one element.

The number of elements in the vectors is returned if getBindingVectorizedDim() != -1.

Parameters

bindingIndex	The binding Index.

See also

safe::ICudaEngine::getBindingVectorizedDim()

Usage considerations

- Allowed context for the API call
  - Thread-safe: Yes

9.48.3.6 getBindingDataType()

```
virtual DataType nvinfer1::safe::ICudaEngine::getBindingDataType (
            std::int32_t const bindingIndex ) const  [pure virtual], [noexcept]
```

Determine the required data type for a buffer from its binding index.

Parameters

bindingIndex	The binding index.

Returns

The type of the data in the buffer.

See also

getBindingIndex()

Usage considerations

- Allowed context for the API call
  - Thread-safe: Yes

9.48.3.7 getBindingDimensions()

```
virtual Dims nvinfer1::safe::ICudaEngine::getBindingDimensions (
            std::int32_t const bindingIndex ) const  [pure virtual], [noexcept]
```

Get the dimensions of a binding.

Parameters

bindingIndex	The binding index.

Returns

The dimensions of the binding if the index is in range, otherwise Dims()

See also

getBindingIndex()

Usage considerations

- Allowed context for the API call
  - Thread-safe: Yes

9.48.3.8 getBindingFormat()

```
virtual TensorFormat nvinfer1::safe::ICudaEngine::getBindingFormat (
            std::int32_t const bindingIndex ) const  [pure virtual], [noexcept]
```

Return the binding format.

Parameters

bindingIndex	The binding Index.

Usage considerations

- Allowed context for the API call
  - Thread-safe: Yes

9.48.3.9 getBindingIndex()

```
virtual std::int32_t nvinfer1::safe::ICudaEngine::getBindingIndex (
            AsciiChar const *const name ) const  [pure virtual], [noexcept]
```

Retrieve the binding index for a named tensor.

safe::IExecutionContext::enqueueV2() requires an array of buffers. Engine bindings map from tensor names to indices in this array. Binding indices are assigned at engine build time, and take values in the range [0 ... n-1] where n is the total number of inputs and outputs.

Warning

Strings passed to the runtime must be 1024 characters or less including NULL terminator and must be NULL terminated.

Parameters

name	The tensor name.

Returns

The binding index for the named tensor, or -1 if the name is not found.

See also

getNbBindings()

Usage considerations

- Allowed context for the API call
  - Thread-safe: Yes

9.48.3.10 getBindingName()

```
virtual AsciiChar const * nvinfer1::safe::ICudaEngine::getBindingName (
            std::int32_t const bindingIndex ) const  [pure virtual], [noexcept]
```

Retrieve the name corresponding to a binding index.

This is the reverse mapping to that provided by getBindingIndex().

Parameters

bindingIndex	The binding index.

Returns

The name corresponding to the index, or nullptr if the index is out of range.

See also

getBindingIndex()

Usage considerations

- Allowed context for the API call
  - Thread-safe: Yes

9.48.3.11 getBindingVectorizedDim()

```
virtual std::int32_t nvinfer1::safe::ICudaEngine::getBindingVectorizedDim (
            std::int32_t const bindingIndex ) const  [pure virtual], [noexcept]
```

Return the dimension index that the buffer is vectorized.

Specifically -1 is returned if scalars per vector is 1.

Parameters

bindingIndex	The binding Index.

Usage considerations

- Allowed context for the API call
  - Thread-safe: Yes

9.48.3.12 getDeviceMemorySize()

```
virtual size_t nvinfer1::safe::ICudaEngine::getDeviceMemorySize ( ) const  [pure virtual], [noexcept]
```

Return the amount of device memory required by an execution context.

See also

safe::IExecutionContext::setDeviceMemory()

Usage considerations

- Allowed context for the API call
  - Thread-safe: Yes

9.48.3.13 getErrorRecorder()

```
virtual IErrorRecorder * nvinfer1::safe::ICudaEngine::getErrorRecorder ( ) const  [pure virtual],
[noexcept]
```

Get the ErrorRecorder assigned to this interface.

Retrieves the assigned error recorder object for the given class. A nullptr will be returned if an error reporter has not been inherited from the IRuntime, and setErrorReporter() has not been called.

Returns

A pointer to the IErrorRecorder object that has been registered.

See also

setErrorRecorder()

Usage considerations

- Allowed context for the API call
  - Thread-safe: Yes

9.48.3.14 getName()

```
virtual AsciiChar const * nvinfer1::safe::ICudaEngine::getName ( ) const  [pure virtual], [noexcept]
```

Returns the name of the network associated with the engine.

The name is set during network creation and is retrieved after building or deserialization.

See also

INetworkDefinition::setName(), INetworkDefinition::getName()

Returns

A null-terminated C-style string representing the name of the network.

Usage considerations

- Allowed context for the API call
  - Thread-safe: Yes

9.48.3.15 getNbBindings()

```
virtual std::int32_t nvinfer1::safe::ICudaEngine::getNbBindings ( ) const  [pure virtual], [noexcept]
```

Get the number of binding indices.

See also

getBindingIndex()

Usage considerations

- Allowed context for the API call
  - Thread-safe: Yes

9.48.3.16 operator=() [1/2]

```
ICudaEngine & nvinfer1::safe::ICudaEngine::operator= (
            ICudaEngine &&  ) &  [delete]
```

9.48.3.17 operator=() [2/2]

```
ICudaEngine & nvinfer1::safe::ICudaEngine::operator= (
            ICudaEngine const &  ) &  [delete]
```

9.48.3.18 setErrorRecorder()

```
virtual void nvinfer1::safe::ICudaEngine::setErrorRecorder (
            IErrorRecorder *const recorder )  [pure virtual], [noexcept]
```

Set the ErrorRecorder for this interface.

Assigns the ErrorRecorder to this interface. The ErrorRecorder will track all errors during execution. This function will call incRefCount of the registered ErrorRecorder at least once. Setting recorder to nullptr unregisters the recorder with the interface, resulting in a call to decRefCount if a recorder has been registered.

Parameters

recorder	The error recorder to register with this interface.

See also

getErrorRecorder()

Usage considerations

- Allowed context for the API call
  - Thread-safe: No

The documentation for this class was generated from the following file:

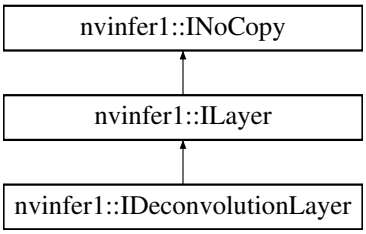
- NvInferSafeRuntime.h

9.49 nvinfer1::IDeconvolutionLayer Class Reference

A deconvolution layer in a network definition.

`#include <NvInfer.h>`

Inheritance diagram for nvinfer1::IDeconvolutionLayer:



Public Member Functions

- TRT_DEPRECATED void setKernelSize (DimsHW kernelSize) noexcept
  Set the HW kernel size of the convolution.
- TRT_DEPRECATED DimsHW getKernelSize () const noexcept
  Get the HW kernel size of the deconvolution.
- void setNbOutputMaps (int32_t nbOutputMaps) noexcept
  Set the number of output feature maps for the deconvolution.
- int32_t getNbOutputMaps () const noexcept
  Get the number of output feature maps for the deconvolution.
- TRT_DEPRECATED void setStride (DimsHW stride) noexcept
  Set the stride of the deconvolution.
- TRT_DEPRECATED DimsHW getStride () const noexcept
  Get the stride of the deconvolution.
- TRT_DEPRECATED void setPadding (DimsHW padding) noexcept
  Set the padding of the deconvolution.
- TRT_DEPRECATED DimsHW getPadding () const noexcept
  Get the padding of the deconvolution.
- void setNbGroups (int32_t nbGroups) noexcept
  Set the number of groups for a deconvolution.
- int32_t getNbGroups () const noexcept
  Get the number of groups for a deconvolution.
- void setKernelWeights (Weights weights) noexcept
  Set the kernel weights for the deconvolution.
- Weights getKernelWeights () const noexcept
  Get the kernel weights for the deconvolution.
- void setBiasWeights (Weights weights) noexcept
  Set the bias weights for the deconvolution.
- Weights getBiasWeights () const noexcept
  Get the bias weights for the deconvolution.
- void setPrePadding (Dims padding) noexcept

Set the multi-dimension pre-padding of the deconvolution.

- Dims getPrePadding () const noexcept

  Get the pre-padding.
- void setPostPadding (Dims padding) noexcept

  Set the multi-dimension post-padding of the deconvolution.
- Dims getPostPadding () const noexcept

  Get the padding.
- void setPaddingMode (PaddingMode paddingMode) noexcept

  Set the padding mode.
- PaddingMode getPaddingMode () const noexcept

  Get the padding mode.
- void setKernelSizeNd (Dims kernelSize) noexcept

  Set the multi-dimension kernel size of the deconvolution.
- Dims getKernelSizeNd () const noexcept

  Get the multi-dimension kernel size of the deconvolution.
- void setStrideNd (Dims stride) noexcept

  Set the multi-dimension stride of the deconvolution.
- Dims getStrideNd () const noexcept

  Get the multi-dimension stride of the deconvolution.
- void setPaddingNd (Dims padding) noexcept

  Set the multi-dimension padding of the deconvolution.
- Dims getPaddingNd () const noexcept

  Get the multi-dimension padding of the deconvolution.
- void setDilationNd (Dims dilation) noexcept

  Set the multi-dimension dilation of the deconvolution.
- Dims getDilationNd () const noexcept

  Get the multi-dimension dilation of the deconvolution.
- void setInput (int32_t index, ITensor &tensor) noexcept

  Append or replace an input of this layer with a specific tensor.

Protected Member Functions

- virtual ~IDeconvolutionLayer () noexcept=default

Protected Attributes

- apiv::VDeconvolutionLayer * mImpl

9.49.1 Detailed Description

A deconvolution layer in a network definition.

Warning

Do not inherit from this class, as doing so will break forward-compatibility of the API and ABI.

9.49.2 Constructor & Destructor Documentation

9.49.2.1 ~IDeconvolutionLayer()

```
virtual nvinfer1::IDeconvolutionLayer::~IDeconvolutionLayer ( )  [protected], [virtual], [default],
[noexcept]
```

9.49.3 Member Function Documentation

9.49.3.1 getBiasWeights()

```
Weights nvinfer1::IDeconvolutionLayer::getBiasWeights ( ) const  [inline], [noexcept]
```

Get the bias weights for the deconvolution.

See also

getBiasWeights()

9.49.3.2 getDilationNd()

```
Dims nvinfer1::IDeconvolutionLayer::getDilationNd ( ) const  [inline], [noexcept]
```

Get the multi-dimension dilation of the deconvolution.

See also

setDilationNd()

9.49.3.3 getKernelSize()

```
TRT_DEPRECATED DimsHW nvinfer1::IDeconvolutionLayer::getKernelSize ( ) const  [inline], [noexcept]
```

Get the HW kernel size of the deconvolution.

See also

setKernelSize()

Deprecated Superseded by getKernelSizeNd. Deprecated prior to TensorRT 8.0 and will be removed in 9.0

9.49.3.4 getKernelSizeNd()

```
Dims nvinfer1::IDeconvolutionLayer::getKernelSizeNd ( ) const  [inline], [noexcept]
```

Get the multi-dimension kernel size of the deconvolution.

See also

setKernelSizeNd()

9.49.3.5 getKernelWeights()

```
Weights nvinfer1::IDeconvolutionLayer::getKernelWeights ( ) const  [inline], [noexcept]
```

Get the kernel weights for the deconvolution.

See also

setNbGroups()

9.49.3.6 getNbGroups()

```
int32_t nvinfer1::IDeconvolutionLayer::getNbGroups ( ) const  [inline], [noexcept]
```

Get the number of groups for a deconvolution.

See also

setNbGroups()

9.49.3.7 getNbOutputMaps()

```
int32_t nvinfer1::IDeconvolutionLayer::getNbOutputMaps ( ) const  [inline], [noexcept]
```

Get the number of output feature maps for the deconvolution.

See also

setNbOutputMaps()

9.49.3.8 getPadding()

```
TRT_DEPRECATED DimsHW nvinfer1::IDeconvolutionLayer::getPadding ( ) const  [inline], [noexcept]
```

Get the padding of the deconvolution.

Default: (0, 0)

See also

setPadding()

Deprecated Superseded by getPaddingNd. Deprecated prior to TensorRT 8.0 and will be removed in 9.0

9.49.3.9 getPaddingMode()

```
PaddingMode nvinfer1::IDeconvolutionLayer::getPaddingMode ( ) const  [inline], [noexcept]
```

Get the padding mode.

Default: kEXPLICIT_ROUND_DOWN

See also

setPaddingMode()

9.49.3.10 getPaddingNd()

```
Dims nvinfer1::IDeconvolutionLayer::getPaddingNd ( ) const  [inline], [noexcept]
```

Get the multi-dimension padding of the deconvolution.

If the padding is asymmetric, the pre-padding is returned.

See also

setPaddingNd()

9.49.3.11 getPostPadding()

```
Dims nvinfer1::IDeconvolutionLayer::getPostPadding ( ) const  [inline], [noexcept]
```

Get the padding.

See also

setPostPadding()

9.49.3.12 getPrePadding()

```
Dims nvinfer1::IDeconvolutionLayer::getPrePadding ( ) const  [inline], [noexcept]
```

Get the pre-padding.

See also

setPrePadding()

9.49.3.13 getStride()

```
TRT_DEPRECATED DimsHW nvinfer1::IDeconvolutionLayer::getStride ( ) const  [inline], [noexcept]
```

Get the stride of the deconvolution.

Default: (1,1)

Deprecated Superseded by getStrideNd. Deprecated prior to TensorRT 8.0 and will be removed in 9.0

9.49.3.14 getStrideNd()

```
Dims nvinfer1::IDeconvolutionLayer::getStrideNd ( ) const  [inline], [noexcept]
```

Get the multi-dimension stride of the deconvolution.

See also

setStrideNd()

9.49.3.15 setBiasWeights()

```
void nvinfer1::IDeconvolutionLayer::setBiasWeights (
            Weights weights )  [inline], [noexcept]
```

Set the bias weights for the deconvolution.

Bias is optional. To omit bias, set the count value of the weights structure to zero.

The bias is applied per-feature-map, so the number of weights (if non-zero) must be equal to the number of output feature maps.

See also

getBiasWeights()

9.49.3.16 setDilationNd()

```
void nvinfer1::IDeconvolutionLayer::setDilationNd (
            Dims dilation )  [inline], [noexcept]
```

Set the multi-dimension dilation of the deconvolution.

Default: (1, 1, ..., 1)

See also

getDilationNd()

9.49.3.17 setInput()

```
void nvinfer1::ILayer::setInput (
            int32_t index,
            ITensor & tensor )  [inline], [noexcept]
```

Append or replace an input of this layer with a specific tensor.

Parameters

index	the index of the input to modify.
tensor	the new input tensor

Only index 0 (data input) is valid, unless explicit-quantization mode is enabled. In explicit-quantization mode, input with index 1 is the kernel-weights tensor, if present. The kernel-weights tensor must be a build-time constant (computable at build-time via constant-folding) and an output of a dequantize layer. If input index 1 is used then the kernel-weights parameter must be set to empty Weights.

See also

getKernelWeights(), setKernelWeights()

The indices are as follows:

- 0: The input activation tensor.
- 1: The kernel weights tensor (a constant tensor).

If this function is called with the value 1, then the function getNbInputs() changes from returning 1 to 2.

9.49.3.18 setKernelSize()

```
TRT_DEPRECATED void nvinfer1::IDeconvolutionLayer::setKernelSize (
            DimsHW kernelSize )  [inline], [noexcept]
```

Set the HW kernel size of the convolution.

If executing this layer on DLA, both height and width of kernel size must be in the range [1,32], or the combinations of [64, 96, 128] in one dimension and 1 in the other dimensions, i.e. [1x64] or [64x1] are valid, but not [64x64].

See also

getKernelSize()

Deprecated Superseded by setKernelSizeNd. Deprecated prior to TensorRT 8.0 and will be removed in 9.0

9.49.3.19 setKernelSizeNd()

```
void nvinfer1::IDeconvolutionLayer::setKernelSizeNd (
            Dims kernelSize )  [inline], [noexcept]
```

Set the multi-dimension kernel size of the deconvolution.

If executing this layer on DLA, there are ttwo restrictions: 1) Only 2D Kernel is supported. 2) Kernel height and width must be in the range [1,32] or the combinations of [64, 96, 128] in one dimension and 1 in the other dimensions, i.e. [1x64] or [64x1] are valid, but not [64x64].

See also

getKernelSizeNd() setKernelSize() getKernelSize()

9.49.3.20 setKernelWeights()

```
void nvinfer1::IDeconvolutionLayer::setKernelWeights (
            Weights weights )  [inline], [noexcept]
```

Set the kernel weights for the deconvolution.

The weights are specified as a contiguous array in `CKRS` order, where `C` the number of input channels, `K` the number of output feature maps, and `R` and `S` are the height and width of the filter.

See also

getWeights()

9.49.3.21 setNbGroups()

```
void nvinfer1::IDeconvolutionLayer::setNbGroups (
            int32_t nbGroups )  [inline], [noexcept]
```

Set the number of groups for a deconvolution.

The input tensor channels are divided into `nbGroups` groups, and a deconvolution is executed for each group, using a filter per group. The results of the group convolutions are concatenated to form the output.

If executing this layer on DLA, nbGroups must be one

Note

When using groups in int8 mode, the size of the groups (i.e. the channel count divided by the group count) must be a multiple of 4 for both input and output.

Default: 1

See also

getNbGroups()

9.49.3.22 setNbOutputMaps()

```
void nvinfer1::IDeconvolutionLayer::setNbOutputMaps (
            int32_t nbOutputMaps )  [inline], [noexcept]
```

Set the number of output feature maps for the deconvolution.

If executing this layer on DLA, the number of output maps must be in the range [1,8192].

See also

getNbOutputMaps()

9.49.3.23 setPadding()

```
TRT_DEPRECATED void nvinfer1::IDeconvolutionLayer::setPadding (
            DimsHW padding )  [inline], [noexcept]
```

Set the padding of the deconvolution.

The output will be trimmed by this number of elements on each side in the height and width directions. In other words, it resembles the inverse of a convolution layer with this padding size. Padding is symmetric, and negative padding is not supported.

Default: (0,0)

If executing this layer on DLA, both height and width of padding must be 0.

See also

getPadding()

Deprecated Superseded by setPaddingNd. Deprecated prior to TensorRT 8.0 and will be removed in 9.0

9.49.3.24 setPaddingMode()

```
void nvinfer1::IDeconvolutionLayer::setPaddingMode (
            PaddingMode paddingMode )  [inline], [noexcept]
```

Set the padding mode.

Padding mode takes precedence if both setPaddingMode and setPre/PostPadding are used.

Default: kEXPLICIT_ROUND_DOWN

See also

getPaddingMode()

9.49.3.25 setPaddingNd()

```
void nvinfer1::IDeconvolutionLayer::setPaddingNd (
            Dims padding )  [inline], [noexcept]
```

Set the multi-dimension padding of the deconvolution.

The output will be trimmed by this number of elements on both sides of every dimension. In other words, it resembles the inverse of a convolution layer with this padding size. Padding is symmetric, and negative padding is not supported.

Default: (0, 0, ..., 0)

If executing this layer on DLA, padding must be 0.

See also

getPaddingNd() setPadding() getPadding()

9.49.3.26 setPostPadding()

```
void nvinfer1::IDeconvolutionLayer::setPostPadding (
            Dims padding )  [inline], [noexcept]
```

Set the multi-dimension post-padding of the deconvolution.

The output will be trimmed by this number of elements on the end of every dimension. In other words, it resembles the inverse of a convolution layer with this padding size. Negative padding is not supported.

Default: (0, 0, ..., 0)

If executing this layer on DLA, padding must be 0.

See also

getPostPadding()

9.49.3.27 setPrePadding()

```
void nvinfer1::IDeconvolutionLayer::setPrePadding (
            Dims padding )  [inline], [noexcept]
```

Set the multi-dimension pre-padding of the deconvolution.

The output will be trimmed by this number of elements on the start of every dimension. In other words, it resembles the inverse of a convolution layer with this padding size. Negative padding is not supported.

Default: (0, 0, ..., 0)

If executing this layer on DLA, padding must be 0.

See also

getPrePadding()

9.49.3.28 setStride()

```
TRT_DEPRECATED void nvinfer1::IDeconvolutionLayer::setStride (
            DimsHW stride )  [inline], [noexcept]
```

Set the stride of the deconvolution.

If executing this layer on DLA, there is one restriction: 1) Stride height and width must be in the range [1,32] or the combinations of [64, 96, 128] in one dimension and 1 in the other dimensions, i.e. [1x64] or [64x1] are valid, but not [64x64].

See also

getStride()

Deprecated Superseded by setStrideNd. Deprecated prior to TensorRT 8.0 and will be removed in 9.0

9.49.3.29 setStrideNd()

```
void nvinfer1::IDeconvolutionLayer::setStrideNd (
            Dims stride )  [inline], [noexcept]
```

Set the multi-dimension stride of the deconvolution.

Default: (1, 1, ..., 1)

If executing this layer on DLA, there are two restrictions: 1) Only 2D Stride is supported. 2) Stride height and width must be in the range [1,32] or the combinations of [64, 96, 128] in one dimension and 1 in the other dimensions, i.e. [1x64] or [64x1] are valid, but not [64x64].

See also

getStrideNd() setStride() getStride()

9.49.4 Member Data Documentation

9.49.4.1 mImpl

```
apiv::VDeconvolutionLayer* nvinfer1::IDeconvolutionLayer::mImpl  [protected]
```

The documentation for this class was generated from the following file:

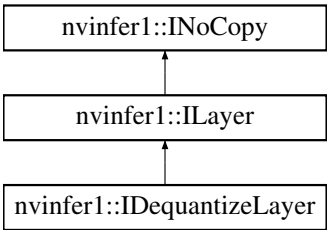
- NvInfer.h

9.50 nvinfer1::IDequantizeLayer Class Reference

A Dequantize layer in a network definition.

`#include <NvInfer.h>`

Inheritance diagram for nvinfer1::IDequantizeLayer:



Public Member Functions

- int32_t getAxis () const noexcept

  Get the quantization axis.
- void setAxis (int32_t axis) noexcept

  Set the quantization axis.

Protected Member Functions

- virtual ~IDequantizeLayer () noexcept=default

Protected Attributes

- apiv::VDequantizeLayer * mImpl

9.50.1 Detailed Description

A Dequantize layer in a network definition.

This layer accepts a signed 8-bit integer input tensor, and uses the configured scale and zeroPt inputs to dequantize the input according to: `output` = (`input` - `zeroPt`) * `scale`

The first input (index 0) is the tensor to be quantized. The second (index 1) and third (index 2) are the scale and zero point respectively. Each of `scale` and `zeroPt` must be either a scalar, or a 1D tensor.

The `zeroPt` tensor is optional, and if not set, will be assumed to be zero. Its data type must be DataType::kINT8. `zeroPt` must only contain zero-valued coefficients, because only symmetric quantization is supported. The `scale` value must be either a scalar for per-tensor quantization, or a 1D tensor for per-channel quantization. All `scale` coefficients must have positive values. The size of the 1-D `scale` tensor must match the size of the quantization axis. The size of the `scale` must match the size of the `zeroPt`.

The subgraph which terminates with the `scale` tensor must be a build-time constant. The same restrictions apply to the `zeroPt`. The output type, if constrained, must be constrained to DataType::kINT8. The input type, if constrained, must be constrained to DataType::kFLOAT (FP16 input is not supported). The output size is the same as the input size. The quantization axis is in reference to the input tensor's dimensions.

IDequantizeLayer only supports DataType::kINT8 precision and will default to this precision during instantiation. IDequantizeLayer only supports DataType::kFLOAT output.

As an example of the operation of this layer, imagine a 4D NCHW activation input which can be quantized using a single scale coefficient (referred to as per-tensor quantization): For each n in N: For each c in C: For each h in H: For each w in W: output[n,c,h,w] = (`input`[n,c,h,w] - `zeroPt`) * `scale`

Per-channel dequantization is supported only for input that is rooted at an IConstantLayer (i.e. weights). Activations cannot be quantized per-channel. As an example of per-channel operation, imagine a 4D KCRS weights input and K (dimension 0) as the quantization axis. The scale is an array of coefficients, which is the same size as the quantization axis. For each k in K: For each c in C: For each r in R: For each s in S: output[k,c,r,s] = (`input`[k,c,r,s] - `zeroPt`[k]) * `scale`[k]

Note

Only symmetric quantization is supported.

Currently the only allowed build-time constant `scale` and \zeroPt subgraphs are:

1. Constant -> Quantize
2. Constant -> Cast -> Quantize

Warning

Do not inherit from this class, as doing so will break forward-compatibility of the API and ABI.

9.50.2 Constructor & Destructor Documentation

9.50.2.1 ~IDequantizeLayer()

```
virtual nvinfer1::IDequantizeLayer::~IDequantizeLayer ( )  [protected], [virtual], [default],
[noexcept]
```

9.50.3 Member Function Documentation

9.50.3.1 getAxis()

```
int32_t nvinfer1::IDequantizeLayer::getAxis ( ) const  [inline], [noexcept]
```

Get the quantization axis.

Returns

axis parameter set by setAxis(). The return value is the index of the quantization axis in the input tensor's dimensions. A value of -1 indicates per-tensor quantization. The default value is -1.

9.50.3.2 setAxis()

```
void nvinfer1::IDequantizeLayer::setAxis (
            int32_t axis )  [inline], [noexcept]
```

Set the quantization axis.

Set the index of the quantization axis (with reference to the input tensor's dimensions). The axis must be a valid axis if the scale tensor has more than one coefficient. The axis value will be ignored if the scale tensor has exactly one coefficient (per-tensor quantization).

9.50.4 Member Data Documentation

9.50.4.1 mImpl

```
apiv::VDequantizeLayer* nvinfer1::IDequantizeLayer::mImpl  [protected]
```

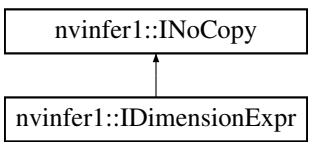
The documentation for this class was generated from the following file:

- NvInfer.h

9.51 nvinfer1::IDimensionExpr Class Reference

```
#include <NvInferRuntime.h>
```

Inheritance diagram for nvinfer1::IDimensionExpr:



Public Member Functions

- bool isConstant () const noexcept

  Return true if expression is a build-time constant.
- int32_t getConstantValue () const noexcept

Protected Member Functions

- virtual ~IDimensionExpr () noexcept=default

Protected Attributes

- apiv::VDimensionExpr * mImpl

9.51.1 Detailed Description

An IDimensionExpr represents an integer expression constructed from constants, input dimensions, and binary operations. These expressions are can be used in overrides of IPluginV2DynamicExt::getOutputDimensions to define output dimensions in terms of input dimensions.

Warning

Do not inherit from this class, as doing so will break forward-compatibility of the API and ABI.

See also

DimensionOperation, IPluginV2DynamicExt::getOutputDimensions

9.51.2 Constructor & Destructor Documentation

9.51.2.1 ~IDimensionExpr()

```
virtual nvinfer1::IDimensionExpr::~IDimensionExpr ( )  [protected], [virtual], [default], [noexcept]
```

9.51.3 Member Function Documentation

9.51.3.1 getConstantValue()

```
int32_t nvinfer1::IDimensionExpr::getConstantValue ( ) const  [inline], [noexcept]
```

If isConstant(), returns value of the constant. If !isConstant(), return std::numeric_limits<int32_t>::min().

9.51.3.2 isConstant()

```
bool nvinfer1::IDimensionExpr::isConstant ( ) const  [inline], [noexcept]
```

Return true if expression is a build-time constant.

9.51.4 Member Data Documentation

9.51.4.1 mImpl

```
apiv::VDimensionExpr* nvinfer1::IDimensionExpr::mImpl  [protected]
```

The documentation for this class was generated from the following file:

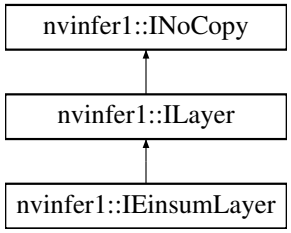
- NvInferRuntime.h

9.52 nvinfer1::IEinsumLayer Class Reference

An Einsum layer in a network.

```
#include <NvInfer.h>
```

Inheritance diagram for nvinfer1::IEinsumLayer:



Public Member Functions

- bool setEquation (const char *equation) noexcept

  Set the equation. The equation is a comma-separated list of subscript labels, where each label refers to a dimension of the corresponding tensor.
- const char * getEquation () const noexcept

  Return the equation.

Protected Member Functions

- virtual ~IEinsumLayer () noexcept=default

Protected Attributes

- apiv::VEinsumLayer * mImpl

9.52.1 Detailed Description

An Einsum layer in a network.

This layer implements a summation over the elements of the inputs along dimensions specified by the equation parameter, based on the Einstein summation convention. The layer can have one or more inputs of rank >= 0. All the inputs must be of same data type and that data type must be DataType::kFLOAT or DataType::kHALF. There is one output tensor of the same type as the input tensors. The shape of the output tensor is determined by the equation.

The equation specifies ASCII lower-case letters for each dimension in the inputs in the same order as the dimensions, separated by comma for each input. The dimensions labeled with the same subscript must match. Repeated subscript labels in one input take the diagonal. Repeating a label across multiple inputs means that those axes will be multiplied. Omitting a label from the output means values along those axes will be summed. In implicit mode, the indices which appear once in the expression will be part of the output in increasing alphabetical order. In explicit mode, the output can be controlled by specifying output subscript labels by adding an arrow ('->') followed by subscripts for the output. For example, "ij,jk->ik" is equivalent to "ij,jk". Ellipsis ('...') can be used in place of subscripts to broadcast the dimensions. See the TensorRT Developer Guide for more details on equation syntax.

Many common operations can be expressed using the Einsum equation. For example: Matrix Transpose: ij->ji Sum: ij-> Matrix-Matrix Multiplication: ik,kj->ij Dot Product: i,i-> Matrix-Vector Multiplication: ik,k->i Batch Matrix Multiplication: ijk,ikl->ijl Batch Diagonal: ...ii->...i

Note

TensorRT does not support ellipsis, diagonal operations or more than two inputs for Einsum.

Warning

Do not inherit from this class, as doing so will break forward-compatibility of the API and ABI.

9.52.2 Constructor & Destructor Documentation

9.52.2.1 ~IEinsumLayer()

```
virtual nvinfer1::IEinsumLayer::~IEinsumLayer ( )  [protected], [virtual], [default], [noexcept]
```

9.52.3 Member Function Documentation

9.52.3.1 getEquation()

```
const char * nvinfer1::IEinsumLayer::getEquation ( ) const  [inline], [noexcept]
```

Return the equation.

See also

setEquation()

9.52.3.2 setEquation()

```
bool nvinfer1::IEinsumLayer::setEquation (
            const char * equation )  [inline], [noexcept]
```

Set the equation. The equation is a comma-separated list of subscript labels, where each label refers to a dimension of the corresponding tensor.

Returns

true if the equation was syntactically valid and set successfully, false otherwise.

See also

setEquation()

9.52.4 Member Data Documentation

9.52.4.1 mImpl

```
apiv::VEinsumLayer* nvinfer1::IEinsumLayer::mImpl  [protected]
```

The documentation for this class was generated from the following file:

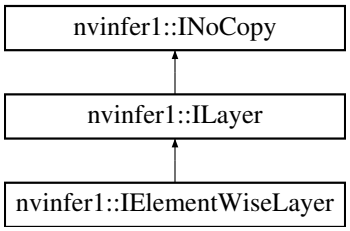
- NvInfer.h

9.53 nvinfer1::IElementWiseLayer Class Reference

A elementwise layer in a network definition.

`#include <NvInfer.h>`

Inheritance diagram for nvinfer1::IElementWiseLayer:



Public Member Functions

- void setOperation (ElementWiseOperation op) noexcept
  Set the binary operation for the layer.
- ElementWiseOperation getOperation () const noexcept
  Get the binary operation for the layer.

Protected Member Functions

- virtual ~IElementWiseLayer () noexcept=default

Protected Attributes

- apiv::VElementWiseLayer * mImpl

9.53.1 Detailed Description

A elementwise layer in a network definition.

This layer applies a per-element binary operation between corresponding elements of two tensors.

The input tensors must have the same rank. For each dimension, their lengths must match, or one of them must be one. In the latter case, the tensor is broadcast along that axis.

The output tensor has the same rank as the inputs. For each output dimension, its length is equal to the lengths of the corresponding input dimensions if they match, otherwise it is equal to the length that is not one.

Warning

When running this layer on the DLA with Int8 data type, the dynamic ranges of two input tensors shall be equal. If the dynamic ranges are generated using calibrator, the largest value shall be used.

Do not inherit from this class, as doing so will break forward-compatibility of the API and ABI.

9.53.2 Constructor & Destructor Documentation

9.53.2.1 ~IElementWiseLayer()

```
virtual nvinfer1::IElementWiseLayer::~IElementWiseLayer ( )  [protected], [virtual], [default],
[noexcept]
```

9.53.3 Member Function Documentation

9.53.3.1 getOperation()

```
ElementWiseOperation nvinfer1::IElementWiseLayer::getOperation ( ) const  [inline], [noexcept]
```

Get the binary operation for the layer.

See also

setOperation(), ElementWiseOperation

setBiasWeights()

9.53.3.2 setOperation()

```
void nvinfer1::IElementWiseLayer::setOperation (
            ElementWiseOperation op )  [inline], [noexcept]
```

Set the binary operation for the layer.

DLA supports only kSUM, kPROD, kMAX, kMIN, and kSUB.

See also

getOperation(), ElementWiseOperation

getBiasWeights()

9.53.4 Member Data Documentation

9.53.4.1 mImpl

```
apiv::VElementWiseLayer* nvinfer1::IElementWiseLayer::mImpl  [protected]
```

The documentation for this class was generated from the following file:

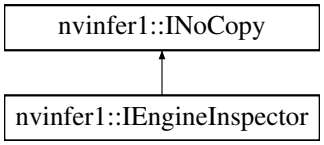
- NvInfer.h

9.54 nvinfer1::IEngineInspector Class Reference

An engine inspector which prints out the layer information of an engine or an execution context.

```
#include <NvInferRuntime.h>
```

Inheritance diagram for nvinfer1::IEngineInspector:



Public Member Functions

- virtual ~IEngineInspector () noexcept=default
- bool setExecutionContext (IExecutionContext const *context) noexcept

  Set an execution context as the inspection source.
- IExecutionContext const * getExecutionContext () const noexcept

  Get the context currently being inspected.
- AsciiChar const * getLayerInformation (int32_t layerIndex, LayerInformationFormat format) const noexcept

  Get a string describing the information about a specific layer in the current engine or the execution context.
- AsciiChar const * getEngineInformation (LayerInformationFormat format) const noexcept

  Get a string describing the information about all the layers in the current engine or the execution context.
- void setErrorRecorder (IErrorRecorder *recorder) noexcept

  Set the ErrorRecorder for this interface.
- IErrorRecorder * getErrorRecorder () const noexcept

  Get the ErrorRecorder assigned to this interface.

Protected Attributes

- apiv::VEngineInspector * mImpl

Additional Inherited Members

9.54.1 Detailed Description

An engine inspector which prints out the layer information of an engine or an execution context.

The amount of printed information depends on the profiling verbosity setting of the builder config when the engine is built:

- ProfilingVerbosity::kLAYER_NAMES_ONLY: only layer names will be printed.
- ProfilingVerbosity::kNONE: no layer information will be printed.
- ProfilingVerbosity::kDETAILED: layer names and layer parameters will be printed.

Warning

Do not inherit from this class, as doing so will break forward-compatibility of the API and ABI.

See also

ProfilingVerbosity, IEngineInspector

9.54.2 Constructor & Destructor Documentation

9.54.2.1 ~IEngineInspector()

```
virtual nvinfer1::IEngineInspector::~IEngineInspector ( )  [virtual], [default], [noexcept]
```

9.54.3 Member Function Documentation

9.54.3.1 getEngineInformation()

```
AsciiChar const * nvinfer1::IEngineInspector::getEngineInformation (
            LayerInformationFormat format ) const  [inline], [noexcept]
```

Get a string describing the information about all the layers in the current engine or the execution context.

Parameters

layerIndex	the index of the layer. It must lie in range [0, engine.getNbLayers()).
format	the format the layer information should be printed in.

Returns

A null-terminated C-style string describing the information about all the layers in the current engine or the execution context.

Warning

The content of the returned string may change when another execution context has been set, or when another getLayerInformation() or getEngineInformation() has been called.

In a multi-threaded environment, this function must be protected from other threads changing the inspection source. If the inspection source changes, the data that is being pointed to can change. Copy the string to another buffer before releasing the lock in order to guarantee consistency.

See also

LayerInformationFormat

9.54.3.2 getErrorRecorder()

```
IErrorRecorder * nvinfer1::IEngineInspector::getErrorRecorder ( ) const  [inline], [noexcept]
```

Get the ErrorRecorder assigned to this interface.

Retrieves the assigned error recorder object for the given class. A nullptr will be returned if an error handler has not been set.

Returns

A pointer to the IErrorRecorder object that has been registered.

See also

setErrorRecorder()

9.54.3.3 getExecutionContext()

```
IExecutionContext const * nvinfer1::IEngineInspector::getExecutionContext ( ) const  [inline],
[noexcept]
```

Get the context currently being inspected.

Returns

The pointer to the context currently being inspected.

See also

setExecutionContext()

9.54.3.4 getLayerInformation()

```
AsciiChar const * nvinfer1::IEngineInspector::getLayerInformation (
            int32_t layerIndex,
            LayerInformationFormat format ) const  [inline], [noexcept]
```

Get a string describing the information about a specific layer in the current engine or the execution context.

Parameters

layerIndex	the index of the layer. It must lie in range [0, engine.getNbLayers()).
format	the format the layer information should be printed in.

Returns

A null-terminated C-style string describing the information about a specific layer in the current engine or the execution context.

Warning

The content of the returned string may change when another execution context has been set, or when another getLayerInformation() or getEngineInformation() has been called.

In a multi-threaded environment, this function must be protected from other threads changing the inspection source. If the inspection source changes, the data that is being pointed to can change. Copy the string to another buffer before releasing the lock in order to guarantee consistency.

See also

LayerInformationFormat

9.54.3.5 setErrorRecorder()

```
void nvinfer1::IEngineInspector::setErrorRecorder (
            IErrorRecorder * recorder )  [inline], [noexcept]
```

Set the ErrorRecorder for this interface.

Assigns the ErrorRecorder to this interface. The ErrorRecorder will track all errors during execution. This function will call incRefCount of the registered ErrorRecorder at least once. Setting recorder to nullptr unregisters the recorder with the interface, resulting in a call to decRefCount if a recorder has been registered.

If an error recorder is not set, messages will be sent to the global log stream.

Parameters

recorder	The error recorder to register with this interface.

See also

getErrorRecorder()

9.54.3.6 setExecutionContext()

```
bool nvinfer1::IEngineInspector::setExecutionContext (
            IExecutionContext const * context )  [inline], [noexcept]
```

Set an execution context as the inspection source.

Setting the execution context and specifying all the input shapes allows the inspector to calculate concrete dimensions for any dynamic shapes and display their format information. Otherwise, values dependent on input shapes will be displayed as -1 and format information will not be shown.

Passing nullptr will remove any association with an execution context.

Returns

Whether the action succeeds.

9.54.4 Member Data Documentation

9.54.4.1 mImpl

```
apiv::VEngineInspector* nvinfer1::IEngineInspector::mImpl  [protected]
```

The documentation for this class was generated from the following file:

- NvInferRuntime.h

9.55 nvinfer1::IErrorRecorder Class Reference

Reference counted application-implemented error reporting interface for TensorRT objects.

```
#include <NvInferRuntimeCommon.h>
```

Public Types

- using ErrorDesc = char const *
- using RefCount = int32_t

Public Member Functions

- IErrorRecorder ()=default
- virtual ~IErrorRecorder () noexcept=default
- virtual int32_t getNbErrors () const noexcept=0

  Return the number of errors.
- virtual ErrorCode getErrorCode (int32_t errorIdx) const noexcept=0

  Returns the ErrorCode enumeration.
- virtual ErrorDesc getErrorDesc (int32_t errorIdx) const noexcept=0

  Returns a null-terminated C-style string description of the error.
- virtual bool hasOverflowed () const noexcept=0

  Determine if the error stack has overflowed.
- virtual void clear () noexcept=0

  Clear the error stack on the error recorder.
- virtual bool reportError (ErrorCode val, ErrorDesc desc) noexcept=0

  Report an error to the error recorder with the corresponding enum and description.
- virtual RefCount incRefCount () noexcept=0

  Increments the refcount for the current ErrorRecorder.
- virtual RefCount decRefCount () noexcept=0

  Decrements the refcount for the current ErrorRecorder.

Static Public Attributes

- static constexpr size_t kMAX_DESC_LENGTH {127U}

9.55.1 Detailed Description

Reference counted application-implemented error reporting interface for TensorRT objects.

The error reporting mechanism is a user defined object that interacts with the internal state of the object that it is assigned to in order to determine information about abnormalities in execution. The error recorder gets both an error enum that is more descriptive than pass/fail and also a string description that gives more detail on the exact failure modes. In the safety context, the error strings are all limited to 1024 characters in length.

The ErrorRecorder gets passed along to any class that is created from another class that has an ErrorRecorder assigned to it. For example, assigning an ErrorRecorder to an IBuilder allows all INetwork's, ILayer's, and ITensor's to use the same error recorder. For functions that have their own ErrorRecorder accessor functions. This allows registering a different error recorder or de-registering of the error recorder for that specific object.

The ErrorRecorder object implementation must be thread safe. All locking and synchronization is pushed to the interface implementation and TensorRT does not hold any synchronization primitives when accessing the interface functions.

The lifetime of the ErrorRecorder object must exceed the lifetime of all TensorRT objects that use it.

9.55.2 Member Typedef Documentation

9.55.2.1 ErrorDesc

```
using nvinfer1::IErrorRecorder::ErrorDesc = char const*
```

A typedef of a C-style string for reporting error descriptions.

9.55.2.2 RefCount

```
using nvinfer1::IErrorRecorder::RefCount = int32_t
```

A typedef of a 32bit integer for reference counting.

9.55.3 Constructor & Destructor Documentation

9.55.3.1 IErrorRecorder()

```
nvinfer1::IErrorRecorder::IErrorRecorder ( )  [default]
```

9.55.3.2 ~IErrorRecorder()

```
virtual nvinfer1::IErrorRecorder::~IErrorRecorder ( )  [virtual], [default], [noexcept]
```

9.55.4 Member Function Documentation

9.55.4.1 clear()

```
virtual void nvinfer1::IErrorRecorder::clear ( )  [pure virtual], [noexcept]
```

Clear the error stack on the error recorder.

Removes all the tracked errors by the error recorder. This function must guarantee that after this function is called, and as long as no error occurs, the next call to getNbErrors will return zero.

See also

getNbErrors

Usage considerations

- Allowed context for the API call
  - Thread-safe: Yes, this method is required to be thread-safe and may be called from multiple threads when multiple execution contexts are used during runtime.

9.55.4.2 decRefCount()

```
virtual RefCount nvinfer1::IErrorRecorder::decRefCount ( )  [pure virtual], [noexcept]
```

Decrements the refcount for the current ErrorRecorder.

Decrements the reference count for the object by one and returns the current value. This reference count allows the application to know that an object inside of TensorRT has taken a reference to the ErrorRecorder. TensorRT guarantees that every call to IErrorRecorder::decRefCount will be preceded by a call to IErrorRecorder::incRefCount. It is undefined behavior to destruct the ErrorRecorder when incRefCount has been called without a corresponding decRefCount.

Returns

The reference counted value after the decrement completes.

Usage considerations

- Allowed context for the API call
  - Thread-safe: Yes, this method is required to be thread-safe and may be called from multiple threads when multiple execution contexts are used during runtime.

9.55.4.3 getErrorCode()

```
virtual ErrorCode nvinfer1::IErrorRecorder::getErrorCode (
            int32_t errorIdx ) const  [pure virtual], [noexcept]
```

Returns the ErrorCode enumeration.

Parameters

errorIdx	A 32-bit integer that indexes into the error array.

The errorIdx specifies what error code from 0 to getNbErrors()-1 that the application wants to analyze and return the error code enum.

Returns

Returns the enum corresponding to errorIdx.

See also

getErrorDesc, ErrorCode

Usage considerations

- Allowed context for the API call
  - Thread-safe: Yes, this method is required to be thread-safe and may be called from multiple threads when multiple execution contexts are used during runtime.

9.55.4.4 getErrorDesc()

```
virtual ErrorDesc nvinfer1::IErrorRecorder::getErrorDesc (
            int32_t errorIdx ) const  [pure virtual], [noexcept]
```

Returns a null-terminated C-style string description of the error.

Parameters

errorIdx	A 32-bit integer that indexes into the error array.

For the error specified by the idx value, return the string description of the error. The error string is a null-terminated C-style string. In the safety context there is a constant length requirement to remove any dynamic memory allocations and the error message may be truncated. The format of the string is "<EnumAsStr> - <Description>".

Returns

Returns a string representation of the error along with a description of the error.

See also

getErrorCode

Usage considerations

- Allowed context for the API call
  - Thread-safe: Yes, this method is required to be thread-safe and may be called from multiple threads when multiple execution contexts are used during runtime.

9.55.4.5 getNbErrors()

```
virtual int32_t nvinfer1::IErrorRecorder::getNbErrors ( ) const  [pure virtual], [noexcept]
```

Return the number of errors.

Determines the number of errors that occurred between the current point in execution and the last time that the clear() was executed. Due to the possibility of asynchronous errors occuring, a TensorRT API can return correct results, but still register errors with the Error Recorder. The value of getNbErrors must monotonically increases until clear() is called.

Returns

Returns the number of errors detected, or 0 if there are no errors.

See also

clear

Usage considerations

- Allowed context for the API call
  - Thread-safe: Yes, this method is required to be thread-safe and may be called from multiple threads when multiple execution contexts are used during runtime.

9.55.4.6 hasOverflowed()

```
virtual bool nvinfer1::IErrorRecorder::hasOverflowed ( ) const  [pure virtual], [noexcept]
```

Determine if the error stack has overflowed.

In the case when the number of errors is large, this function is used to query if one or more errors have been dropped due to lack of storage capacity. This is especially important in the automotive safety case where the internal error handling mechanisms cannot allocate memory.

Returns

true if errors have been dropped due to overflowing the error stack.

Usage considerations

- Allowed context for the API call
  - Thread-safe: Yes, this method is required to be thread-safe and may be called from multiple threads when multiple execution contexts are used during runtime.

9.55.4.7 incRefCount()

```
virtual RefCount nvinfer1::IErrorRecorder::incRefCount ( )  [pure virtual], [noexcept]
```

Increments the refcount for the current ErrorRecorder.

Increments the reference count for the object by one and returns the current value. This reference count allows the application to know that an object inside of TensorRT has taken a reference to the ErrorRecorder. TensorRT guarantees that every call to IErrorRecorder::incRefCount will be paired with a call to IErrorRecorder::decRefCount when the reference is released. It is undefined behavior to destruct the ErrorRecorder when incRefCount has been called without a corresponding decRefCount.

Returns

The reference counted value after the increment completes.

Usage considerations

- Allowed context for the API call
  - Thread-safe: Yes, this method is required to be thread-safe and may be called from multiple threads when multiple execution contexts are used during runtime.

9.55.4.8 reportError()

```
virtual bool nvinfer1::IErrorRecorder::reportError (
            ErrorCode val,
            ErrorDesc desc )  [pure virtual], [noexcept]
```

Report an error to the error recorder with the corresponding enum and description.

Parameters

val	The error code enum that is being reported.
desc	The string description of the error.

Report an error to the user that has a given value and human readable description. The function returns false if processing can continue, which implies that the reported error is not fatal. This does not guarantee that processing continues, but provides a hint to TensorRT. The desc C-string data is only valid during the call to reportError and may be immediately deallocated by the caller when reportError returns. The implementation must not store the desc pointer in the ErrorRecorder object or otherwise access the data from desc after reportError returns.

Returns

True if the error is determined to be fatal and processing of the current function must end.

Usage considerations

- Allowed context for the API call
  - Thread-safe: Yes, this method is required to be thread-safe and may be called from multiple threads when multiple execution contexts are used during runtime.

9.55.5 Member Data Documentation

9.55.5.1 kMAX_DESC_LENGTH

```
constexpr size_t nvinfer1::IErrorRecorder::kMAX_DESC_LENGTH {127U}  [static], [constexpr]
```

The length limit for an error description, excluding the '\0' string terminator.

The documentation for this class was generated from the following file:

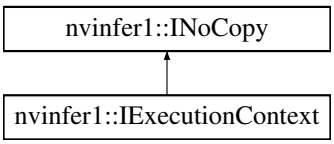
- NvInferRuntimeCommon.h

9.56 nvinfer1::IExecutionContext Class Reference

Context for executing inference using an engine, with functionally unsafe features.

```
#include <NvInferRuntime.h>
```

Inheritance diagram for nvinfer1::IExecutionContext:



Public Member Functions

- virtual ~IExecutionContext () noexcept=default
- bool execute (int32_t batchSize, void *const *bindings) noexcept

  Synchronously execute inference on a batch.
- bool enqueue (int32_t batchSize, void *const *bindings, cudaStream_t stream, cudaEvent_t *inputConsumed) noexcept

  Asynchronously execute inference on a batch.
- void setDebugSync (bool sync) noexcept

  Set the debug sync flag.
- bool getDebugSync () const noexcept

  Get the debug sync flag.
- void setProfiler (IProfiler *profiler) noexcept

  Set the profiler.
- IProfiler * getProfiler () const noexcept

  Get the profiler.
- const ICudaEngine & getEngine () const noexcept

  Get the associated engine.
- TRT_DEPRECATED void destroy () noexcept

  Destroy this object.
- void setName (const char *name) noexcept

  Set the name of the execution context.
- const char * getName () const noexcept

  Return the name of the execution context.
- void setDeviceMemory (void *memory) noexcept

  Set the device memory for use by this execution context.
- Dims getStrides (int32_t bindingIndex) const noexcept

  Return the strides of the buffer for the given binding.
- TRT_DEPRECATED bool setOptimizationProfile (int32_t profileIndex) noexcept

  Select an optimization profile for the current context.
- int32_t getOptimizationProfile () const noexcept

  Get the index of the currently selected optimization profile.
- bool setBindingDimensions (int32_t bindingIndex, Dims dimensions) noexcept

  Set the dynamic dimensions of a binding.
- Dims getBindingDimensions (int32_t bindingIndex) const noexcept

  Get the dynamic dimensions of a binding.
- bool setInputShapeBinding (int32_t bindingIndex, int32_t const *data) noexcept

  Set values of input tensor required by shape calculations.
- bool getShapeBinding (int32_t bindingIndex, int32_t *data) const noexcept

  Get values of an input tensor required for shape calculations or an output tensor produced by shape calculations.
- bool allInputDimensionsSpecified () const noexcept

  Whether all dynamic dimensions of input tensors have been specified.
- bool allInputShapesSpecified () const noexcept

  Whether all input shape bindings have been specified.
- void setErrorRecorder (IErrorRecorder *recorder) noexcept

  Set the ErrorRecorder for this interface.
- IErrorRecorder * getErrorRecorder () const noexcept

Get the ErrorRecorder assigned to this interface.

- bool executeV2 (void ∗const ∗bindings) noexcept

  Synchronously execute inference a network.
- bool enqueueV2 (void ∗const ∗bindings, cudaStream_t stream, cudaEvent_t ∗inputConsumed) noexcept

  Asynchronously execute inference.
- bool setOptimizationProfileAsync (int32_t profileIndex, cudaStream_t stream) noexcept

  Select an optimization profile for the current context with async semantics.
- void setEnqueueEmitsProfile (bool enqueueEmitsProfile) noexcept

  Set whether enqueue emits layer timing to the profiler.
- bool getEnqueueEmitsProfile () const noexcept

  Get the enqueueEmitsProfile state.
- bool reportToProfiler () const noexcept

  Calculate layer timing info for the current optimization profile in IExecutionContext and update the profiler after one iteration of inference launch.

Protected Attributes

- apiv::VExecutionContext ∗ mImpl

Additional Inherited Members

9.56.1 Detailed Description

Context for executing inference using an engine, with functionally unsafe features.

Multiple execution contexts may exist for one ICudaEngine instance, allowing the same engine to be used for the execution of multiple batches simultaneously. If the engine supports dynamic shapes, each execution context in concurrent use must use a separate optimization profile.

Warning

Do not inherit from this class, as doing so will break forward-compatibility of the API and ABI.

9.56.2 Constructor & Destructor Documentation

9.56.2.1 ~IExecutionContext()

```
virtual nvinfer1::IExecutionContext::~IExecutionContext ( )  [virtual], [default], [noexcept]
```

9.56.3 Member Function Documentation

9.56.3.1 allInputDimensionsSpecified()

```
bool nvinfer1::IExecutionContext::allInputDimensionsSpecified ( ) const  [inline], [noexcept]
```

Whether all dynamic dimensions of input tensors have been specified.

Returns

True if all dynamic dimensions of input tensors have been specified by calling setBindingDimensions().

Trivially true if network has no dynamically shaped input tensors.

See also

setBindingDimensions(bindingIndex,dimensions)

9.56.3.2 allInputShapesSpecified()

```
bool nvinfer1::IExecutionContext::allInputShapesSpecified ( ) const  [inline], [noexcept]
```

Whether all input shape bindings have been specified.

Returns

True if all input shape bindings have been specified by setInputShapeBinding().

Trivially true if network has no input shape bindings.

See also

isShapeBinding(bindingIndex)

9.56.3.3 destroy()

```
TRT_DEPRECATED void nvinfer1::IExecutionContext::destroy ( )  [inline], [noexcept]
```

Destroy this object.

Deprecated Deprecated interface will be removed in TensorRT 10.0.

Warning

Calling destroy on a managed pointer will result in a double-free error.

9.56.3.4 enqueue()

```
bool nvinfer1::IExecutionContext::enqueue (
            int32_t batchSize,
            void *const * bindings,
            cudaStream_t stream,
            cudaEvent_t * inputConsumed )  [inline], [noexcept]
```

Asynchronously execute inference on a batch.

This method requires an array of input and output buffers. The mapping from tensor names to indices can be queried using ICudaEngine::getBindingIndex()

Parameters

batchSize	The batch size. This is at most the value supplied when the engine was built.
bindings	An array of pointers to input and output buffers for the network.
stream	A cuda stream on which the inference kernels will be enqueued.
inputConsumed	An optional event which will be signaled when the input buffers can be refilled with new data.

Returns

True if the kernels were enqueued successfully.

See also

ICudaEngine::getBindingIndex() ICudaEngine::getMaxBatchSize()

Warning

Calling enqueue() in from the same IExecutionContext object with different CUDA streams concurrently results in undefined behavior. To perform inference concurrently in multiple streams, use one execution context per stream.

This function will trigger layer resource updates if hasImplicitBatchDimension() returns true and batchSize changes between subsequent calls, possibly resulting in performance bottlenecks.

9.56.3.5 enqueueV2()

```
bool nvinfer1::IExecutionContext::enqueueV2 (
            void *const * bindings,
            cudaStream_t stream,
            cudaEvent_t * inputConsumed )  [inline], [noexcept]
```

Asynchronously execute inference.

This method requires an array of input and output buffers. The mapping from tensor names to indices can be queried using ICudaEngine::getBindingIndex(). This method only works for execution contexts built with full dimension networks.

Parameters

bindings	An array of pointers to input and output buffers for the network.
stream	A cuda stream on which the inference kernels will be enqueued
inputConsumed	An optional event which will be signaled when the input buffers can be refilled with new data

Returns

True if the kernels were enqueued successfully.

See also

ICudaEngine::getBindingIndex() ICudaEngine::getMaxBatchSize()

Note

Calling enqueueV2() with a stream in CUDA graph capture mode has a known issue. If dynamic shapes are used, the first enqueueV2() call after a setInputShapeBinding() call will cause failure in stream capture due to resource allocation. Please call enqueueV2() once before capturing the graph.

Warning

Calling enqueueV2() in from the same IExecutionContext object with different CUDA streams concurrently results in undefined behavior. To perform inference concurrently in multiple streams, use one execution context per stream.

9.56.3.6 execute()

```
bool nvinfer1::IExecutionContext::execute (
            int32_t batchSize,
            void *const * bindings )  [inline], [noexcept]
```

Synchronously execute inference on a batch.

This method requires an array of input and output buffers. The mapping from tensor names to indices can be queried using ICudaEngine::getBindingIndex()

Parameters

batchSize	The batch size. This is at most the value supplied when the engine was built.
bindings	An array of pointers to input and output buffers for the network.

Returns

True if execution succeeded.

Warning

This function will trigger layer resource updates if hasImplicitBatchDimension() returns true and batchSize changes between subsequent calls, possibly resulting in performance bottlenecks.

See also

ICudaEngine::getBindingIndex() ICudaEngine::getMaxBatchSize()

9.56.3.7 executeV2()

```
bool nvinfer1::IExecutionContext::executeV2 (
            void *const * bindings )  [inline], [noexcept]
```

Synchronously execute inference a network.

This method requires an array of input and output buffers. The mapping from tensor names to indices can be queried using ICudaEngine::getBindingIndex(). This method only works for execution contexts built with full dimension networks.

Parameters

bindings	An array of pointers to input and output buffers for the network.

Returns

True if execution succeeded.

See also

ICudaEngine::getBindingIndex() ICudaEngine::getMaxBatchSize()

9.56.3.8 getBindingDimensions()

```
Dims nvinfer1::IExecutionContext::getBindingDimensions (
            int32_t bindingIndex ) const  [inline], [noexcept]
```

Get the dynamic dimensions of a binding.

If the engine was built with an implicit batch dimension, same as ICudaEngine::getBindingDimensions.

If setBindingDimensions() has been called on this binding (or if there are no dynamic dimensions), all dimensions will be positive. Otherwise, it is necessary to call setBindingDimensions() before enqueue() or execute() may be called.

If the bindingIndex is out of range, an invalid Dims with nbDims == -1 is returned. The same invalid Dims will be returned if the engine was not built with an implicit batch dimension and if the execution context is not currently associated with a valid optimization profile (i.e. if getOptimizationProfile() returns -1).

If ICudaEngine::bindingIsInput(bindingIndex) is false, then both allInputDimensionsSpecified() and allInputShapesSpecified() must be true before calling this method.

Returns

Currently selected binding dimensions

For backwards compatibility with earlier versions of TensorRT, a bindingIndex that does not belong to the current profile is corrected as described for ICudaEngine::getProfileDimensions.

See also

ICudaEngine::getProfileDimensions

9.56.3.9 getDebugSync()

```
bool nvinfer1::IExecutionContext::getDebugSync ( ) const  [inline], [noexcept]
```

Get the debug sync flag.

See also

setDebugSync()

9.56.3.10 getEngine()

```
const ICudaEngine & nvinfer1::IExecutionContext::getEngine ( ) const  [inline], [noexcept]
```

Get the associated engine.

See also

ICudaEngine

9.56.3.11 getEnqueueEmitsProfile()

```
bool nvinfer1::IExecutionContext::getEnqueueEmitsProfile ( ) const  [inline], [noexcept]
```

Get the enqueueEmitsProfile state.

Returns

The enqueueEmitsProfile state.

See also

IExecutionContext::setEnqueueEmitsProfile()

9.56.3.12 getErrorRecorder()

```
IErrorRecorder * nvinfer1::IExecutionContext::getErrorRecorder ( ) const  [inline], [noexcept]
```

Get the ErrorRecorder assigned to this interface.

Retrieves the assigned error recorder object for the given class. A nullptr will be returned if an error handler has not been set.

Returns

A pointer to the IErrorRecorder object that has been registered.

See also

setErrorRecorder()

9.56.3.13 getName()

```
const char * nvinfer1::IExecutionContext::getName ( ) const  [inline], [noexcept]
```

Return the name of the execution context.

See also

setName()

9.56.3.14 getOptimizationProfile()

```
int32_t nvinfer1::IExecutionContext::getOptimizationProfile ( ) const  [inline], [noexcept]
```

Get the index of the currently selected optimization profile.

If the profile index has not been set yet (implicitly to 0 for the first execution context to be created, or explicitly for all subsequent contexts), an invalid value of -1 will be returned and all calls to enqueue() or execute() will fail until a valid profile index has been set.

9.56.3.15 getProfiler()

```
IProfiler * nvinfer1::IExecutionContext::getProfiler ( ) const  [inline], [noexcept]
```

Get the profiler.

See also

IProfiler setProfiler()

9.56.3.16 getShapeBinding()

```
bool nvinfer1::IExecutionContext::getShapeBinding (
            int32_t bindingIndex,
            int32_t * data ) const  [inline], [noexcept]
```

Get values of an input tensor required for shape calculations or an output tensor produced by shape calculations.

Parameters

bindingIndex	index of an input or output tensor for which ICudaEngine::isShapeBinding(bindingIndex) is true.
data	pointer to where values will be written. The number of values written is the product of the dimensions returned by getBindingDimensions(bindingIndex).

If ICudaEngine::bindingIsInput(bindingIndex) is false, then both allInputDimensionsSpecified() and allInputShapesSpecified() must be true before calling this method. The method will also fail if no valid optimization profile has been set for the current execution context, i.e. if getOptimizationProfile() returns -1.

See also

isShapeBinding(bindingIndex)

9.56.3.17 getStrides()

```
Dims nvinfer1::IExecutionContext::getStrides (
            int32_t bindingIndex ) const  [inline], [noexcept]
```

Return the strides of the buffer for the given binding.

The strides are in units of elements, not components or bytes. For example, for TensorFormat::kHWC8, a stride of one spans 8 scalars.

Note that strides can be different for different execution contexts with dynamic shapes.

If the bindingIndex is invalid or there are dynamic dimensions that have not been set yet, returns Dims with Dims::nbDims = -1.

Parameters

bindingIndex	The binding index.

See also

getBindingComponentsPerElement

9.56.3.18 reportToProfiler()

```
bool nvinfer1::IExecutionContext::reportToProfiler ( ) const  [inline], [noexcept]
```

Calculate layer timing info for the current optimization profile in IExecutionContext and update the profiler after one iteration of inference launch.

If IExecutionContext::getEnqueueEmitsProfile() returns true, the enqueue function will calculate layer timing implicitly if a profiler is provided. There is no need to call this function.

If IExecutionContext::getEnqueueEmitsProfile() returns false, the enqueue function will record the CUDA event timers if a profiler is provided. But it will not perform the layer timing calculation. IExecutionContext::reportToProfiler() needs to be called explicitly to calculate layer timing for the previous inference launch.

In the CUDA graph launch scenario, it will record the same set of CUDA events as in regular enqueue functions if the graph is captured from an IExecutionContext with profiler enabled. This function needs to be called after graph launch to report the layer timing info to the profiler.

Warning

profiling CUDA graphs is only available from CUDA 11.1 onwards.

Returns

true if the call succeeded, else false (e.g. profiler not provided, in CUDA graph capture mode, etc.)

See also

IExecutionContext::setEnqueueEmitsProfile()

IExecutionContext::getEnqueueEmitsProfile()

9.56.3.19 setBindingDimensions()

```
bool nvinfer1::IExecutionContext::setBindingDimensions (
            int32_t bindingIndex,
            Dims dimensions )  [inline], [noexcept]
```

Set the dynamic dimensions of a binding.

Parameters

bindingIndex	index of an input tensor whose dimensions must be compatible with the network definition (i.e. only the wildcard dimension -1 can be replaced with a new dimension >= 0).
dimensions	specifies the dimensions of the input tensor. It must be in the valid range for the currently selected optimization profile, and the corresponding engine must not be safety-certified.

This method requires the engine to be built without an implicit batch dimension. This method will fail unless a valid optimization profile is defined for the current execution context (getOptimizationProfile() must not be -1).

For all dynamic non-output bindings (which have at least one wildcard dimension of -1), this method needs to be called before either enqueue() or execute() may be called. This can be checked using the method allInputDimensionsSpecified().

Warning

This function will trigger layer resource updates on the next call of enqueue[V2]()/execute[V2](), possibly resulting in performance bottlenecks, if the dimensions are different than the previous set dimensions.

Returns

false if an error occurs (e.g. bindingIndex is out of range for the currently selected optimization profile or binding dimension is inconsistent with min-max range of the optimization profile), else true. Note that the network can still be invalid for certain combinations of input shapes that lead to invalid output shapes. To confirm the correctness of the network input shapes, check whether the output binding has valid dimensions using getBindingDimensions() on the output bindingIndex.

See also

ICudaEngine::getBindingIndex

9.56.3.20 setDebugSync()

```
void nvinfer1::IExecutionContext::setDebugSync (
            bool sync )  [inline], [noexcept]
```

Set the debug sync flag.

If this flag is set to true, the engine will log the successful execution for each kernel during execute(). It has no effect when using enqueue().

See also

getDebugSync()

9.56.3.21 setDeviceMemory()

```
void nvinfer1::IExecutionContext::setDeviceMemory (
            void * memory )  [inline], [noexcept]
```

Set the device memory for use by this execution context.

The memory must be aligned with cuda memory alignment property (using cudaGetDeviceProperties()), and its size must be at least that returned by getDeviceMemorySize(). Setting memory to nullptr is acceptable if getDevice↩ MemorySize() returns 0. If using enqueue() to run the network, the memory is in use from the invocation of enqueue() until network execution is complete. If using execute(), it is in use until execute() returns. Releasing or otherwise using the memory for other purposes during this time will result in undefined behavior.

See also

ICudaEngine::getDeviceMemorySize() ICudaEngine::createExecutionContextWithoutDeviceMemory()

9.56.3.22 setEnqueueEmitsProfile()

```
void nvinfer1::IExecutionContext::setEnqueueEmitsProfile (
            bool enqueueEmitsProfile )  [inline], [noexcept]
```

Set whether enqueue emits layer timing to the profiler.

If set to true (default), enqueue is synchronous and does layer timing profiling implicitly if there is a profiler attached. If set to false, enqueue will be asynchronous if there is a profiler attached. An extra method reportToProfiler() needs to be called to obtain the profiling data and report to the profiler attached.

See also

IExecutionContext::getEnqueueEmitsProfile()

IExecutionContext::reportToProfiler()

9.56.3.23 setErrorRecorder()

```
void nvinfer1::IExecutionContext::setErrorRecorder (
            IErrorRecorder * recorder )  [inline], [noexcept]
```

Set the ErrorRecorder for this interface.

Assigns the ErrorRecorder to this interface. The ErrorRecorder will track all errors during execution. This function will call incRefCount of the registered ErrorRecorder at least once. Setting recorder to nullptr unregisters the recorder with the interface, resulting in a call to decRefCount if a recorder has been registered.

If an error recorder is not set, messages will be sent to the global log stream.

Parameters

recorder	The error recorder to register with this interface.

See also

getErrorRecorder()

9.56.3.24 setInputShapeBinding()

```
bool nvinfer1::IExecutionContext::setInputShapeBinding (
            int32_t bindingIndex,
            int32_t const * data )  [inline], [noexcept]
```

Set values of input tensor required by shape calculations.

Parameters

bindingIndex	index of an input tensor for which ICudaEngine::isShapeBinding(bindingIndex) and ICudaEngine::bindingIsInput(bindingIndex) are both true.
data	pointer to values of the input tensor. The number of values should be the product of the dimensions returned by getBindingDimensions(bindingIndex).

If ICudaEngine::isShapeBinding(bindingIndex) and ICudaEngine::bindingIsInput(bindingIndex) are both true, this method must be called before enqueue() or execute() may be called. This method will fail unless a valid optimization profile is defined for the current execution context (getOptimizationProfile() must not be -1).

Warning

This function will trigger layer resource updates on the next call of enqueue[V2]()/execute[V2](), possibly resulting in performance bottlenecks, if the shapes are different than the previous set shapes.

Returns

false if an error occurs (e.g. bindingIndex is out of range for the currently selected optimization profile or shape data is inconsistent with min-max range of the optimization profile), else true. Note that the network can still be invalid for certain combinations of input shapes that lead to invalid output shapes. To confirm the correctness of the network input shapes, check whether the output binding has valid dimensions using getBindingDimensions() on the output bindingIndex.

9.56.3.25 setName()

```
void nvinfer1::IExecutionContext::setName (
            const char * name )  [inline], [noexcept]
```

Set the name of the execution context.

This method copies the name string.

See also

getName()

9.56.3.26 setOptimizationProfile()

```
TRT_DEPRECATED bool nvinfer1::IExecutionContext::setOptimizationProfile (
            int32_t profileIndex )  [inline], [noexcept]
```

Select an optimization profile for the current context.

Parameters

profileIndex	Index of the profile. It must lie between 0 and getEngine().getNbOptimizationProfiles() - 1

The selected profile will be used in subsequent calls to execute() or enqueue().

When an optimization profile is switched via this API, TensorRT may enqueue GPU memory copy operations required to set up the new profile during the subsequent enqueue() operations. To avoid these calls during enqueue(), use setOptimizationProfileAsync() instead.

If the associated CUDA engine has dynamic inputs, this method must be called at least once with a unique profileIndex before calling execute or enqueue (i.e. the profile index may not be in use by another execution context that has not been destroyed yet). For the first execution context that is created for an engine, setOptimizationProfile(0) is called implicitly.

If the associated CUDA engine does not have inputs with dynamic shapes, this method need not be called, in which case the default profile index of 0 will be used (this is particularly the case for all safe engines).

setOptimizationProfile() must be called before calling setBindingDimensions() and setInputShapeBinding() for all dynamic input tensors or input shape tensors, which in turn must be called before either execute() or enqueue().

Warning

This function will trigger layer resource updates on the next call of enqueue[V2]()/execute[V2](), possibly resulting in performance bottlenecks.

Returns

true if the call succeeded, else false (e.g. input out of range)

Deprecated This API is superseded by setOptimizationProfileAsync and will be removed in TensorRT 9.0.

See also

ICudaEngine::getNbOptimizationProfiles() IExecutionContext::setOptimizationProfileAsync()

9.56.3.27 setOptimizationProfileAsync()

```
bool nvinfer1::IExecutionContext::setOptimizationProfileAsync (
            int32_t profileIndex,
            cudaStream_t stream )  [inline], [noexcept]
```

Select an optimization profile for the current context with async semantics.

Parameters

profileIndex	Index of the profile. The value must lie between 0 and getEngine().getNbOptimizationProfiles() - 1
stream	A cuda stream on which the cudaMemcpyAsyncs may be enqueued

When an optimization profile is switched via this API, TensorRT may require that data is copied via cudaMemcpy↩ Async. It is the application's responsibility to guarantee that synchronization between the profile sync stream and the enqueue stream occurs.

The selected profile will be used in subsequent calls to execute() or enqueue(). If the associated CUDA engine has inputs with dynamic shapes, the optimization profile must be set with a unique profileIndex before calling execute or enqueue. For the first execution context that is created for an engine, setOptimizationProfile(0) is called implicitly.

If the associated CUDA engine does not have inputs with dynamic shapes, this method need not be called, in which case the default profile index of 0 will be used.

setOptimizationProfileAsync() must be called before calling setBindingDimensions() and setInputShapeBinding() for all dynamic input tensors or input shape tensors, which in turn must be called before either execute() or enqueue().

Warning

This function will trigger layer resource updates on the next call of enqueue[V2]()/execute[V2](), possibly resulting in performance bottlenecks.

Not synchronizing the stream used at enqueue with the stream used to set optimization profile asynchronously using this API will result in undefined behavior.

Returns

true if the call succeeded, else false (e.g. input out of range)

See also

ICudaEngine::getNbOptimizationProfiles()

IExecutionContext::setOptimizationProfile()

9.56.3.28 setProfiler()

```
void nvinfer1::IExecutionContext::setProfiler (
            IProfiler * profiler )  [inline], [noexcept]
```

Set the profiler.

See also

IProfiler getProfiler()

9.56.4 Member Data Documentation

9.56.4.1 mImpl

```
apiv::VExecutionContext* nvinfer1::IExecutionContext::mImpl  [protected]
```

The documentation for this class was generated from the following file:

- NvInferRuntime.h

9.57 nvinfer1::safe::IExecutionContext Class Reference

Functionally safe context for executing inference using an engine.

```
#include <NvInferSafeRuntime.h>
```

Public Member Functions

- virtual const ICudaEngine & getEngine () const noexcept=0

  Get the associated engine.
- virtual void setName (AsciiChar const ∗const name) noexcept=0

  Set the name of the execution context.
- virtual AsciiChar const ∗ getName () const noexcept=0

  Return the name of the execution context.
- virtual void setDeviceMemory (void ∗const memory) noexcept=0

  Set the device memory for use by this execution context.
- virtual Dims getStrides (std::int32_t const bindingIndex) const noexcept=0

  Return the strides of the buffer for the given binding.
- virtual void setErrorRecorder (IErrorRecorder ∗const recorder) noexcept=0

  Set the ErrorRecorder for this interface.
- virtual IErrorRecorder ∗ getErrorRecorder () const noexcept=0

  get the ErrorRecorder assigned to this interface.
- virtual bool enqueueV2 (void ∗const ∗const bindings, cudaStream_t const stream, cudaEvent_t ∗const input↩ Consumed) noexcept=0

  Asynchronously execute inference on a batch.
- IExecutionContext ()=default
- virtual ∼IExecutionContext () noexcept=default
- IExecutionContext (IExecutionContext const &)=delete
- IExecutionContext (IExecutionContext &&)=delete
- IExecutionContext & operator= (IExecutionContext const &) &=delete
- IExecutionContext & operator= (IExecutionContext &&) &=delete
- virtual void setErrorBuffer (FloatingPointErrorInformation ∗const buffer) noexcept=0

  Set error buffer output for floating point errors.
- virtual FloatingPointErrorInformation ∗ getErrorBuffer () const noexcept=0

  Get error buffer output for floating point errors.

9.57.1 Detailed Description

Functionally safe context for executing inference using an engine.

Multiple safe execution contexts may exist for one safe::ICudaEngine instance, allowing the same engine to be used for the execution of multiple inputs simultaneously.

Warning

Do not call the APIs of the same IExecutionContext from multiple threads at any given time. Each concurrent execution must have its own instance of an IExecutionContext.

Do not inherit from this class, as doing so will break forward-compatibility of the API and ABI.

9.57.2 Constructor & Destructor Documentation

9.57.2.1 IExecutionContext() [1/3]

```
nvinfer1::safe::IExecutionContext::IExecutionContext ( )  [default]
```

9.57.2.2 ~IExecutionContext()

```
virtual nvinfer1::safe::IExecutionContext::~IExecutionContext ( )  [virtual], [default], [noexcept]
```

9.57.2.3 IExecutionContext() [2/3]

```
nvinfer1::safe::IExecutionContext::IExecutionContext (
            IExecutionContext const &  )  [delete]
```

9.57.2.4 IExecutionContext() [3/3]

```
nvinfer1::safe::IExecutionContext::IExecutionContext (
            IExecutionContext &&  )  [delete]
```

9.57.3 Member Function Documentation

9.57.3.1 enqueueV2()

```
virtual bool nvinfer1::safe::IExecutionContext::enqueueV2 (
            void *const *const bindings,
            cudaStream_t const stream,
            cudaEvent_t *const inputConsumed )  [pure virtual], [noexcept]
```

Asynchronously execute inference on a batch.

This method requires an array of input and output buffers. The mapping from tensor names to indices can be queried using safe::ICudaEngine::getBindingIndex(). This method only works for an execution context built from a network without an implicit batch dimension.

Parameters

bindings	An array of pointers to input and output buffers for the network.
stream	A cuda stream on which the inference kernels will be enqueued.
inputConsumed	An optional event which will be signaled when the input buffers can be refilled with new data.

Returns

True if the kernels were enqueued successfully.

See also

safe::ICudaEngine::getBindingIndex()

Usage considerations

- Allowed context for the API call
  - Thread-safe: No

9.57.3.2 getEngine()

```
virtual const ICudaEngine & nvinfer1::safe::IExecutionContext::getEngine ( ) const  [pure virtual],
[noexcept]
```

Get the associated engine.

See also

safe::ICudaEngine

Usage considerations

- Allowed context for the API call
  - Thread-safe: Yes

9.57.3.3 getErrorBuffer()

```
virtual FloatingPointErrorInformation * nvinfer1::safe::IExecutionContext::getErrorBuffer ( )
const  [pure virtual], [noexcept]
```

Get error buffer output for floating point errors.

Returns

Pointer to device memory to use as floating point error buffer or nullptr if not set.

See also

setErrorBuffer()

Usage considerations

- Allowed context for the API call
  - Thread-safe: Yes

9.57.3.4 getErrorRecorder()

```
virtual IErrorRecorder * nvinfer1::safe::IExecutionContext::getErrorRecorder ( ) const  [pure
virtual], [noexcept]
```

get the ErrorRecorder assigned to this interface.

Retrieves the assigned error recorder object for the given class. A default error recorder does not exist, so a nullptr will be returned if setErrorRecorder has not been called.

Returns

A pointer to the IErrorRecorder object that has been registered.

See also

setErrorRecorder()

Usage considerations

- Allowed context for the API call
  - Thread-safe: No

9.57.3.5 getName()

```
virtual AsciiChar const * nvinfer1::safe::IExecutionContext::getName ( ) const  [pure virtual],
[noexcept]
```

Return the name of the execution context.

See also

setName()

Usage considerations

- Allowed context for the API call
  - Thread-safe: No

9.57.3.6 getStrides()

```
virtual Dims nvinfer1::safe::IExecutionContext::getStrides (
            std::int32_t const bindingIndex ) const  [pure virtual], [noexcept]
```

Return the strides of the buffer for the given binding.

Parameters

bindingIndex	The binding index.

Usage considerations

- Allowed context for the API call
  - Thread-safe: Yes

9.57.3.7 operator=() [1/2]

```
IExecutionContext & nvinfer1::safe::IExecutionContext::operator= (
            IExecutionContext &&  ) &  [delete]
```

9.57.3.8 operator=() [2/2]

```
IExecutionContext & nvinfer1::safe::IExecutionContext::operator= (
            IExecutionContext const &  ) &  [delete]
```

9.57.3.9 setDeviceMemory()

```
virtual void nvinfer1::safe::IExecutionContext::setDeviceMemory (
            void *const memory )  [pure virtual], [noexcept]
```

Set the device memory for use by this execution context.

If using enqueueV2() to run the network, The memory is in use from the invocation of enqueueV2() until network execution is complete. Releasing or otherwise using the memory for other purposes during this time will result in undefined behavior.

Warning

Do not release or use for other purposes the memory set here during network execution.

See also

safe::ICudaEngine::getDeviceMemorySize() safe::ICudaEngine::createExecutionContextWithoutDeviceMemory()

Usage considerations

- Allowed context for the API call
  - Thread-safe: No

9.57.3.10 setErrorBuffer()

```
virtual void nvinfer1::safe::IExecutionContext::setErrorBuffer (
            FloatingPointErrorInformation *const buffer )  [pure virtual], [noexcept]
```

Set error buffer output for floating point errors.

The error buffer output must be allocated in device memory and will be used for subsequent calls to enqueueV2. Checking the contents of the error buffer after inference is the responsibility of the application. The pointer passed here must have alignment adequate for the FloatingPointErrorInformation struct.

Warning

Do not release or use the contents of the error buffer for any other purpose before synchronizing on the CUDA stream passed to enqueueV2.

Parameters

buffer	The device memory to use as floating point error buffer

See also

getErrorBuffer()

Usage considerations

- Allowed context for the API call
  - Thread-safe: No

9.57.3.11 setErrorRecorder()

```
virtual void nvinfer1::safe::IExecutionContext::setErrorRecorder (
            IErrorRecorder *const recorder )  [pure virtual], [noexcept]
```

Set the ErrorRecorder for this interface.

Assigns the ErrorRecorder to this interface. The ErrorRecorder will track all errors during execution. This function will call incRefCount of the registered ErrorRecorder at least once. Setting recorder to nullptr unregisters the recorder with the interface, resulting in a call to decRefCount if a recorder has been registered.

Parameters

recorder	The error recorder to register with this interface.

See also

getErrorRecorder()

Usage considerations

- Allowed context for the API call
  - Thread-safe: No

9.57.3.12 setName()

```
virtual void nvinfer1::safe::IExecutionContext::setName (
            AsciiChar const *const name )  [pure virtual], [noexcept]
```

Set the name of the execution context.

This method copies the name string.

Warning

Strings passed to the runtime must be 1024 characters or less including NULL terminator and must be NULL terminated.

See also

getName()

Usage considerations

- Allowed context for the API call
  - Thread-safe: No

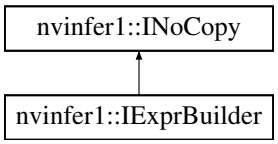
The documentation for this class was generated from the following file:

- NvInferSafeRuntime.h

9.58 nvinfer1::IExprBuilder Class Reference

`#include <NvInferRuntime.h>`

Inheritance diagram for nvinfer1::IExprBuilder:



Public Member Functions

- const IDimensionExpr * constant (int32_t value) noexcept

  Return pointer to IDimensionExp for given value.
- const IDimensionExpr * operation (DimensionOperation op, const IDimensionExpr &first, const IDimensionExpr &second) noexcept

Protected Member Functions

- virtual ~IExprBuilder () noexcept=default

Protected Attributes

- apiv::VExprBuilder * mImpl

9.58.1 Detailed Description

Object for constructing IDimensionExpr.

There is no public way to construct an IExprBuilder. It appears as an argument to method IPluginV2DynamicExt::getOutputDimensions() Overrides of that method can use that IExprBuilder argument to construct expressions that define output dimensions in terms of input dimensions.

Clients should assume that any values constructed by the IExprBuilder are destroyed after IPluginV2DynamicExt::getOutputDimensions(returns.

Warning

Do not inherit from this class, as doing so will break forward-compatibility of the API and ABI.

See also

IDimensionExpr

9.58.2 Constructor & Destructor Documentation

9.58.2.1 ~IExprBuilder()

```
virtual nvinfer1::IExprBuilder::~IExprBuilder ( )  [protected], [virtual], [default], [noexcept]
```

9.58.3 Member Function Documentation

9.58.3.1 constant()

```
const IDimensionExpr * nvinfer1::IExprBuilder::constant (
            int32_t value )  [inline], [noexcept]
```

Return pointer to IDimensionExp for given value.

9.58.3.2 operation()

```
const IDimensionExpr * nvinfer1::IExprBuilder::operation (
            DimensionOperation op,
            const IDimensionExpr & first,
            const IDimensionExpr & second )  [inline], [noexcept]
```

Return pointer to IDimensionExp that represents the given operation applied to first and second. Returns nullptr if op is not a valid DimensionOperation.

9.58.4 Member Data Documentation

9.58.4.1 mImpl

```
apiv::VExprBuilder* nvinfer1::IExprBuilder::mImpl  [protected]
```

The documentation for this class was generated from the following file:

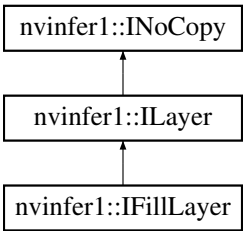
- NvInferRuntime.h

9.59 nvinfer1::IFillLayer Class Reference

Generate an output tensor with specified mode.

```
#include <NvInfer.h>
```

Inheritance diagram for nvinfer1::IFillLayer:



Public Member Functions

- void setDimensions (Dims dimensions) noexcept

  Set the output tensor's dimensions.
- Dims getDimensions () const noexcept

  Get the output tensor's dimensions.
- void setOperation (FillOperation op) noexcept

  Set the fill operation for the layer.
- FillOperation getOperation () const noexcept

  Get the fill operation for the layer.
- void setAlpha (double alpha) noexcept

  Set the alpha parameter.
- double getAlpha () const noexcept

  Get the value of alpha parameter.
- void setBeta (double beta) noexcept

  Set the beta parameter.
- double getBeta () const noexcept

  Get the value of beta parameter.
- void setInput (int32_t index, ITensor &tensor) noexcept

  replace an input of this layer with a specific tensor.

Protected Member Functions

- virtual ~IFillLayer () noexcept=default

Protected Attributes

- apiv::VFillLayer * mImpl

9.59.1 Detailed Description

Generate an output tensor with specified mode.

The fill layer has two variants, static and dynamic. Static fill specifies its parameters at layer creation time via Dims and the get/set accessor functions of the IFillLayer. Dynamic fill specifies one or more of its parameters as ITensors, by using ILayer::setTensor to add a corresponding input. The corresponding static parameter is used if an input is missing or null.

The shape of the output is specified by the parameter `Dimension`, or if non-null and present, the first input, which must be a 1D Int32 shape tensor. Thus an application can determine if the IFillLayer has a dynamic output shape based on whether it has a non-null first input.

Alpha and Beta are treated differently based on the Fill Operation specified. See details in IFillLayer::setAlpha(), IFillLayer::setBeta(), and IFillLayer::setInput().

A fill layer can produce a shape tensor if the following restrictions are met:

- The FillOperation is kLINSPACE.
- The output is a 1D Int32 tensor with length not exceeding 2*Dims::MAX_DIMS.
- There is at most one input, and if so, that input is input 0.
- If input 0 exists, the length of the output tensor must be computable by constant folding.

See also

FillOperation

Warning

Do not inherit from this class, as doing so will break forward-compatibility of the API and ABI.

9.59.2 Constructor & Destructor Documentation

9.59.2.1 ~IFillLayer()

```
virtual nvinfer1::IFillLayer::~IFillLayer ( )  [protected], [virtual], [default], [noexcept]
```

9.59.3 Member Function Documentation

9.59.3.1 getAlpha()

```
double nvinfer1::IFillLayer::getAlpha ( ) const  [inline], [noexcept]
```

Get the value of alpha parameter.

Returns

A double value of alpha.

If the second input is present and non-null, this function returns -1.0.

See also

setAlpha

9.59.3.2 getBeta()

```
double nvinfer1::IFillLayer::getBeta ( ) const  [inline], [noexcept]
```

Get the value of beta parameter.

Returns

A double value of beta.

If the third input is present and non-null, this function returns -1.0.

See also

setBeta

9.59.3.3 getDimensions()

```
Dims nvinfer1::IFillLayer::getDimensions ( ) const  [inline], [noexcept]
```

Get the output tensor's dimensions.

Returns

The output tensor's dimensions, or an invalid Dims structure.

If the first input is present and non-null, this function returns a Dims with nbDims = -1.

See also

setDimensions

9.59.3.4 getOperation()

```
FillOperation nvinfer1::IFillLayer::getOperation ( ) const  [inline], [noexcept]
```

Get the fill operation for the layer.

See also

setOperation(), FillOperation

9.59.3.5 setAlpha()

```
void nvinfer1::IFillLayer::setAlpha (
            double alpha )  [inline], [noexcept]
```

Set the alpha parameter.

Parameters

alpha	has different meanings for each operator:

Operation | Usage kLINSPACE | the start value, defaults to 0.0; kRANDOMUNIFORM | the minimum value, defaults to 0.0;

If a second input had been used to create this layer, that input is reset to null by this method.

See also

getAlpha

9.59.3.6 setBeta()

```
void nvinfer1::IFillLayer::setBeta (
            double beta )  [inline], [noexcept]
```

Set the beta parameter.

Parameters

beta	has different meanings for each operator:

Operation | Usage kLINSPACE | the delta value, defaults to 1.0; kRANDOMUNIFORM | the maximal value, defaults to 1.0;

If a third input had been used to create this layer, that input is reset to null by this method.

See also

getBeta

9.59.3.7 setDimensions()

```
void nvinfer1::IFillLayer::setDimensions (
            Dims dimensions )  [inline], [noexcept]
```

Set the output tensor's dimensions.

Parameters

dimensions	The output tensor's dimensions.

If the first input had been used to create this layer, that input is reset to null by this method.

See also

getDimensions

9.59.3.8 setInput()

```
void nvinfer1::ILayer::setInput (
             int32_t index,
             ITensor & tensor )  [inline], [noexcept]
```

replace an input of this layer with a specific tensor.

Parameters

index	the index of the input to set.
tensor	the new input tensor

Indices for kLINSPACE are described as:

- 0: Shape tensor, represents the output tensor's dimensions.
- 1: Start, a scalar, represents the start value.
- 2: Delta, a 1D tensor, length equals to shape tensor's nbDims, represents the delta value for each dimension.

Indices for kRANDOM_UNIFORM are described as:

- 0: Shape tensor, represents the output tensor's dimensions.
- 1: Minimum, a scalar, represents the minimum random value.
- 2: Maximum, a scalar, represents the maximal random value.

Using the corresponding setter resets the input to null.

If either inputs 1 or 2, is non-null, then both must be non-null and have the same data type.

If this function is called for an index greater or equal to getNbInputs(), then afterwards getNbInputs() returns index + 1, and any missing intervening inputs are set to null.

9.59.3.9 setOperation()

```
void nvinfer1::IFillLayer::setOperation (
            FillOperation op )  [inline], [noexcept]
```

Set the fill operation for the layer.

See also

getOperation(), FillOperation

9.59.4 Member Data Documentation

9.59.4.1 mImpl

```
apiv::VFillLayer* nvinfer1::IFillLayer::mImpl  [protected]
```

The documentation for this class was generated from the following file:

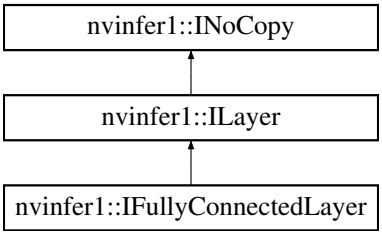
- NvInfer.h

9.60 nvinfer1::IFullyConnectedLayer Class Reference

A fully connected layer in a network definition. This layer expects an input tensor of three or more non-batch dimensions. The input is automatically reshaped into an `MxV` tensor `X`, where `V` is a product of the last three dimensions and `M` is a product of the remaining dimensions (where the product over 0 dimensions is defined as 1). For example:

```
#include <NvInfer.h>
```

Inheritance diagram for nvinfer1::IFullyConnectedLayer:



Public Member Functions

- void setNbOutputChannels (int32_t nbOutputs) noexcept

  Set the number of output channels `K` from the fully connected layer.
- int32_t getNbOutputChannels () const noexcept

  Get the number of output channels `K` from the fully connected layer.
- void setKernelWeights (Weights weights) noexcept

  Set the kernel weights, given as a `KxC` matrix in row-major order.
- Weights getKernelWeights () const noexcept

  Get the kernel weights.
- void setBiasWeights (Weights weights) noexcept

  Set the bias weights.
- Weights getBiasWeights () const noexcept

  Get the bias weights.
- void setInput (int32_t index, ITensor &tensor) noexcept

  Append or replace an input of this layer with a specific tensor.

Protected Member Functions

- virtual ~IFullyConnectedLayer () noexcept=default

Protected Attributes

- apiv::VFullyConnectedLayer * mImpl

9.60.1 Detailed Description

A fully connected layer in a network definition. This layer expects an input tensor of three or more non-batch dimensions. The input is automatically reshaped into an `MxV` tensor `X`, where `V` is a product of the last three dimensions and `M` is a product of the remaining dimensions (where the product over 0 dimensions is defined as 1). For example:

- If the input tensor has shape {`C, H, W`}, then the tensor is reshaped into {`1, C*H*W`}.
- If the input tensor has shape {`P, C, H, W`}, then the tensor is reshaped into {`P, C*H*W`}.

The layer then performs the following operation:

```
Y := matmul(X, W^T) + bias
```

Where `X` is the `MxV` tensor defined above, `W` is the `KxV` weight tensor of the layer, and `bias` is a row vector size `K` that is broadcasted to `MxK`. `K` is the number of output channels, and configurable via setNbOutputChannels(). If `bias` is not specified, it is implicitly `0`.

The `MxK` result `Y` is then reshaped such that the last three dimensions are {`K, 1, 1`} and the remaining dimensions match the dimensions of the input tensor. For example:

- If the input tensor has shape {`C, H, W`}, then the output tensor will have shape {`K, 1, 1`}.
- If the input tensor has shape {`P, C, H, W`}, then the output tensor will have shape {`P, K, 1, 1`}.

Warning

Do not inherit from this class, as doing so will break forward-compatibility of the API and ABI.

9.60.2 Constructor & Destructor Documentation

9.60.2.1 ~IFullyConnectedLayer()

```
virtual nvinfer1::IFullyConnectedLayer::~IFullyConnectedLayer ( )  [protected], [virtual], [default],
[noexcept]
```

9.60.3 Member Function Documentation

9.60.3.1 getBiasWeights()

```
Weights nvinfer1::IFullyConnectedLayer::getBiasWeights ( ) const  [inline], [noexcept]
```

Get the bias weights.

See also

setBiasWeightsWeights()

9.60.3.2 getKernelWeights()

```
Weights nvinfer1::IFullyConnectedLayer::getKernelWeights ( ) const  [inline], [noexcept]
```

Get the kernel weights.

See also

setKernelWeights()

9.60.3.3 getNbOutputChannels()

```
int32_t nvinfer1::IFullyConnectedLayer::getNbOutputChannels ( ) const  [inline], [noexcept]
```

Get the number of output channels `K` from the fully connected layer.

See also

setNbOutputChannels()

9.60.3.4 setBiasWeights()

```
void nvinfer1::IFullyConnectedLayer::setBiasWeights (
            Weights weights )  [inline], [noexcept]
```

Set the bias weights.

Bias is optional. To omit bias, set the count value in the weights structure to zero.

See also

getBiasWeightsWeights()

9.60.3.5 setInput()

```
void nvinfer1::ILayer::setInput (
            int32_t index,
            ITensor & tensor )  [inline], [noexcept]
```

Append or replace an input of this layer with a specific tensor.

Parameters

index	the index of the input to modify.
tensor	the new input tensor

Only index 0 (data input) is valid, unless explicit-quantization mode is enabled. In explicit-quantization mode, input with index 1 is the kernel-weights tensor, if present. The kernel-weights tensor must be a build-time constant (computable at build-time via constant-folding) and an output of a dequantize layer. If input index 1 is used then the kernel-weights parameter must be set to empty Weights.

See also

getKernelWeights(), setKernelWeights()

The indices are as follows:

- 0: The input activation tensor.
- 1: The kernel weights tensor (a constant tensor).

If this function is called with the value 1, then the function getNbInputs() changes from returning 1 to 2.

9.60.3.6 setKernelWeights()

```
void nvinfer1::IFullyConnectedLayer::setKernelWeights (
            Weights weights )  [inline], [noexcept]
```

Set the kernel weights, given as a `KxC` matrix in row-major order.

See also

getKernelWeights()

9.60.3.7 setNbOutputChannels()

```
void nvinfer1::IFullyConnectedLayer::setNbOutputChannels (
            int32_t nbOutputs )  [inline], [noexcept]
```

Set the number of output channels `K` from the fully connected layer.

If executing this layer on DLA, number of output channels must in the range [1,8192].

See also

getNbOutputChannels()

9.60.4 Member Data Documentation

9.60.4.1 mImpl

```
apiv::VFullyConnectedLayer* nvinfer1::IFullyConnectedLayer::mImpl  [protected]
```

The documentation for this class was generated from the following file:

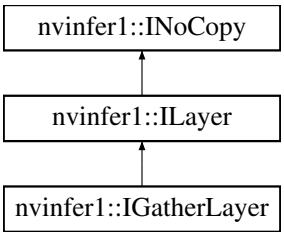
- NvInfer.h

9.61 nvinfer1::IGatherLayer Class Reference

A Gather layer in a network definition. Supports several kinds of gathering.

```
#include <NvInfer.h>
```

Inheritance diagram for nvinfer1::IGatherLayer:



Public Member Functions

- void setGatherAxis (int32_t axis) noexcept

  Set the axis used by GatherMode::kELEMENTS and GatherMode::kDEFAULT The axis must be less than the number of dimensions in the data input. The axis defaults to 0.
- int32_t getGatherAxis () const noexcept

  Get the axis to gather on.
- void setNbElementWiseDims (int32_t elementWiseDims) noexcept

  Set the number of leading dimensions of indices tensor to be handled elementwise. The gathering of indexing starts from the dimension of data[NbElementWiseDims:]. The NbElementWiseDims must be less than the Rank of the data input.
- int32_t getNbElementWiseDims () const noexcept

  Get the number of leading dimensions of indices tensor to be handled elementwise.
- void setMode (GatherMode mode) noexcept

  Set the gather mode.
- GatherMode getMode () const noexcept

  Get the gather mode.

Protected Member Functions

- virtual ~IGatherLayer () noexcept=default

Protected Attributes

- apiv::VGatherLayer * mImpl

9.61.1 Detailed Description

A Gather layer in a network definition. Supports several kinds of gathering.

The Gather layer has two input tensors, Data and Indices, and an output tensor Output. Additionally, there are three parameters: mode, nbElementwiseDims, and axis that control how the indices are interpreted.

- Data is a tensor of rank r >= 1 that stores the values to be gathered in Output.
- Indices is a tensor of rank q >= 1 that determines which locations in Data to gather.
  - GatherMode::kDEFAULT: q >= 1
  - GatherMode::kND: q >= 1 and the last dimension of Indices must be a build time constant.
  - GatherMode::kELEMENT: q = r
- Output stores the gathered results. Its rank s depends on the mode:
  - GatherMode::kDEFAULT: s = q + r - 1 - nbElementwiseDims
  - GatherMode::kND: s = q + r - indices.d[q-1] - 1 - nbElementwiseDims
  - GatherMode::kELEMENT: s = q = r. The output can be a shape tensor only if the mode is GatherMode::kDEFAULT.

The dimensions of the output likewise depends on the mode:

```
GatherMode::kDEFAULT:

    First nbElementwiseDims of output are computed by applying broadcast rules to
    first nbElementwiseDims of indices and data. Note that nbElementwiseDims <= 1.
    Rest of dimensions are computed by copying dimensions of Data, and replacing
    the dimension for axis gatherAxis with the dimensions of indices.

GatherMode::kND:
    If indices.d[q-1] = r - nbElementwiseDims
        output.d = [indices.d[0], ... , indices.d[q-2]]
    Else if indices.d[q-1] < r - nbElementWiseDims
        output.d = [indices.d[0], ... , indices.d[q-1], data.d[nbElementwiseDims + indices.d[q-1] + q],
        data.d[r-1]]
    Else
        This is build time error

GatherMode::kELEMENT:
    The output dimensions match the dimensions of the indices tensor.
```

The types of Data and Output must be the same, and Indices shall be DataType::kINT32.

How the elements of Data are gathered depends on the mode:

```
GatherMode::kDEFAULT:
    Each index in indices is used to index Data along axis gatherAxis.

GatherMode::kND:
    Indices is a rank q integer tensor, best thought of as a rank (q-1) tensor of
    indices into data, where each element defines a slice of data
    The operation can be formulated as output[i_1, ..., i_{q-1}] = data[indices[i_1, ..., i_{q-1}]]

GatherMode::kELEMENT:

    Here "axis" denotes the result of getGatherAxis().
    For each element X of indices:
        Let J denote a sequence for the subscripts of X
        Let K = sequence J with element [axis] replaced by X
        output[J] = data[K]
```

The handling of nbElementWiseDims depends on the mode:

- GatherMode::kDEFAULT: nbElementWiseDims <= 1. Broadcast is supported across the elementwise dimension if present.
- GatherMode::kND: 0 <= nbElementWiseDims < rank(Data)-1. Broadcast is not supported across the elementwise dimensions.
- GatherMode::kELEMENT: nbElementWiseDims = 0

Notes:

- For modes GatherMode::kND and GatherMode::kELEMENT, the first nbElementWiseDims dimensions of data and index must be equal. If not, an error will be reported at build time or run time.
- Only mode GatherMode::kDEFAULT supports an implicit batch dimensions or broadcast on the elementwise dimensions.
- If an axis of Data has dynamic length, using a negative index for it has undefined behavior.
- No DLA support
- Zero will be stored for OOB access

Warning

Do not inherit from this class, as doing so will break forward-compatibility of the API and ABI.

9.61.2 Constructor & Destructor Documentation

9.61.2.1 ~IGatherLayer()

```
virtual nvinfer1::IGatherLayer::~IGatherLayer ( )  [protected], [virtual], [default], [noexcept]
```

9.61.3 Member Function Documentation

9.61.3.1 getGatherAxis()

```
int32_t nvinfer1::IGatherLayer::getGatherAxis ( ) const  [inline], [noexcept]
```

Get the axis to gather on.

Warning

Undefined behavior when used with GatherMode::kND.

See also

setGatherAxis()

9.61.3.2 getMode()

```
GatherMode nvinfer1::IGatherLayer::getMode ( ) const  [inline], [noexcept]
```

Get the gather mode.

See also

setMode()

9.61.3.3 getNbElementWiseDims()

```
int32_t nvinfer1::IGatherLayer::getNbElementWiseDims ( ) const  [inline], [noexcept]
```

Get the number of leading dimensions of indices tensor to be handled elementwise.

See also

setNbElementWiseDims()

9.61.3.4 setGatherAxis()

```
void nvinfer1::IGatherLayer::setGatherAxis (
            int32_t axis )  [inline], [noexcept]
```

Set the axis used by GatherMode::kELEMENTS and GatherMode::kDEFAULT The axis must be less than the number of dimensions in the data input. The axis defaults to 0.

Warning

Undefined behavior when used with GatherMode::kND.

See also

getGatherAxis()

9.61.3.5 setMode()

```
void nvinfer1::IGatherLayer::setMode (
            GatherMode mode )  [inline], [noexcept]
```

Set the gather mode.

See also

getMode()

9.61.3.6 setNbElementWiseDims()

```
void nvinfer1::IGatherLayer::setNbElementWiseDims (
            int32_t elementWiseDims )  [inline], [noexcept]
```

Set the number of leading dimensions of indices tensor to be handled elementwise. The gathering of indexing starts from the dimension of data[NbElementWiseDims:]. The NbElementWiseDims must be less than the Rank of the data input.

Parameters

elementWiseDims	number of dims to be handled as elementwise.

Default: 0

The value of nbElementWiseDims and GatherMode are checked during network validation:

GatherMode::kDEFAULT: nbElementWiseDims must be 0 if there is an implicit batch dimension. It can be 0 or 1 if there is not an implicit batch dimension. GatherMode::kND: nbElementWiseDims can be between 0 and one less than rank(data). GatherMode::kELEMENT: nbElementWiseDims must be 0

See also

getNbElementWiseDims()

9.61.4 Member Data Documentation

9.61.4.1 mImpl

```
apiv::VGatherLayer* nvinfer1::IGatherLayer::mImpl  [protected]
```

The documentation for this class was generated from the following file:

- NvInfer.h

9.62 nvinfer1::IGpuAllocator Class Reference

Application-implemented class for controlling allocation on the GPU.

```
#include <NvInferRuntimeCommon.h>
```

Public Member Functions

- virtual void * allocate (uint64_t const size, uint64_t const alignment, AllocatorFlags const flags) noexcept=0
- virtual TRT_DEPRECATED void free (void *const memory) noexcept=0
- virtual ~IGpuAllocator ()=default
- IGpuAllocator ()=default
- virtual void * reallocate (void *, uint64_t, uint64_t) noexcept
- virtual bool deallocate (void *const memory) noexcept

9.62.1 Detailed Description

Application-implemented class for controlling allocation on the GPU.

9.62.2 Constructor & Destructor Documentation

9.62.2.1 ~IGpuAllocator()

```
virtual nvinfer1::IGpuAllocator::~IGpuAllocator ( )  [virtual], [default]
```

Destructor declared virtual as general good practice for a class with virtual methods. TensorRT never calls the destructor for an IGpuAllocator defined by the application.

9.62.2.2 IGpuAllocator()

```
nvinfer1::IGpuAllocator::IGpuAllocator ( )  [default]
```

9.62.3 Member Function Documentation

9.62.3.1 allocate()

```
virtual void * nvinfer1::IGpuAllocator::allocate (
            uint64_t const size,
            uint64_t const alignment,
            AllocatorFlags const flags )  [pure virtual], [noexcept]
```

A thread-safe callback implemented by the application to handle acquisition of GPU memory.

Parameters

size	The size of the memory required.
alignment	The required alignment of memory. Alignment will be zero or a power of 2 not exceeding the alignment guaranteed by cudaMalloc. Thus this allocator can be safely implemented with cudaMalloc/cudaFree. An alignment value of zero indicates any alignment is acceptable.
flags	Reserved for future use. In the current release, 0 will be passed.

If an allocation request of size 0 is made, nullptr should be returned.

If an allocation request cannot be satisfied, nullptr should be returned.

Note

The implementation must guarantee thread safety for concurrent allocate/free/reallocate/deallocate requests.

Usage considerations

- Allowed context for the API call
  - Thread-safe: Yes, this method is required to be thread-safe and may be called from multiple threads.

9.62.3.2 deallocate()

```
virtual bool nvinfer1::IGpuAllocator::deallocate (
            void *const memory )  [inline], [virtual], [noexcept]
```

A thread-safe callback implemented by the application to handle release of GPU memory.

TensorRT may pass a nullptr to this function if it was previously returned by allocate().

Parameters

memory	The acquired memory.

Returns

True if the acquired memory is released successfully.

Note

The implementation must guarantee thread safety for concurrent allocate/free/reallocate/deallocate requests.

If user-implemented free() might hit an error condition, the user should override deallocate() as the primary implementation and override free() to call deallocate() for backwards compatibility.

See also

free()

Usage considerations

- Allowed context for the API call
  - Thread-safe: Yes, this method is required to be thread-safe and may be called from multiple threads.

9.62.3.3 free()

```
virtual TRT_DEPRECATED void nvinfer1::IGpuAllocator::free (
            void *const memory )  [pure virtual], [noexcept]
```

A thread-safe callback implemented by the application to handle release of GPU memory.

TensorRT may pass a nullptr to this function if it was previously returned by allocate().

Parameters

memory	The acquired memory.

Note

The implementation must guarantee thread safety for concurrent allocate/free/reallocate/deallocate requests.

See also

deallocate()

Deprecated Superseded by deallocate and will be removed in TensorRT 10.0.

Usage considerations

- Allowed context for the API call
  - Thread-safe: Yes, this method is required to be thread-safe and may be called from multiple threads.

9.62.3.4 reallocate()

```
virtual void * nvinfer1::IGpuAllocator::reallocate (
            void * ,
            uint64_t ,
            uint64_t  )  [inline], [virtual], [noexcept]
```

A thread-safe callback implemented by the application to resize an existing allocation.

Only allocations which were allocated with AllocatorFlag::kRESIZABLE will be resized.

Options are one of:

- resize in place leaving min(oldSize, newSize) bytes unchanged and return the original address
- move min(oldSize, newSize) bytes to a new location of sufficient size and return its address
- return nullptr, to indicate that the request could not be fulfilled.

If nullptr is returned, TensorRT will assume that resize() is not implemented, and that the allocation at baseAddr is still valid.

This method is made available for use cases where delegating the resize strategy to the application provides an opportunity to improve memory management. One possible implementation is to allocate a large virtual device buffer and progressively commit physical memory with cuMemMap. CU_MEM_ALLOC_GRANULARITY_RECOMMENDED is suggested in this case.

TensorRT may call realloc to increase the buffer by relatively small amounts.

Parameters

baseAddr	the address of the original allocation.
alignment	The alignment used by the original allocation.
newSize	The new memory size required.

Returns

the address of the reallocated memory

Note

The implementation must guarantee thread safety for concurrent allocate/free/reallocate/deallocate requests.

Usage considerations

- Allowed context for the API call
  - Thread-safe: Yes, this method is required to be thread-safe and may be called from multiple threads.

The documentation for this class was generated from the following file:

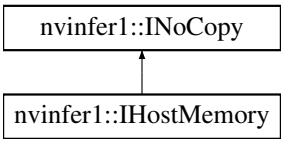
- NvInferRuntimeCommon.h

9.63 nvinfer1::IHostMemory Class Reference

Class to handle library allocated memory that is accessible to the user.

`#include <NvInferRuntime.h>`

Inheritance diagram for nvinfer1::IHostMemory:



Public Member Functions

- virtual ~IHostMemory () noexcept=default
- void * data () const noexcept

  A pointer to the raw data that is owned by the library.
- std::size_t size () const noexcept

  The size in bytes of the data that was allocated.
- DataType type () const noexcept

  The type of the memory that was allocated.
- TRT_DEPRECATED void destroy () noexcept

Protected Attributes

- apiv::VHostMemory * mImpl

Additional Inherited Members

9.63.1 Detailed Description

Class to handle library allocated memory that is accessible to the user.

The memory allocated via the host memory object is owned by the library and will be de-allocated when the destroy method is called.

Warning

Do not inherit from this class, as doing so will break forward-compatibility of the API and ABI.

9.63.2 Constructor & Destructor Documentation

9.63.2.1 ~IHostMemory()

```
virtual nvinfer1::IHostMemory::~IHostMemory ( )  [virtual], [default], [noexcept]
```

9.63.3 Member Function Documentation

9.63.3.1 data()

```
void * nvinfer1::IHostMemory::data ( ) const  [inline], [noexcept]
```

A pointer to the raw data that is owned by the library.

9.63.3.2 destroy()

```
TRT_DEPRECATED void nvinfer1::IHostMemory::destroy ( )  [inline], [noexcept]
```

Destroy the allocated memory.

Deprecated Deprecated interface will be removed in TensorRT 10.0.

Warning

Calling destroy on a managed pointer will result in a double-free error.

9.63.3.3 size()

```
std::size_t nvinfer1::IHostMemory::size ( ) const  [inline], [noexcept]
```

The size in bytes of the data that was allocated.

9.63.3.4 type()

```
DataType nvinfer1::IHostMemory::type ( ) const  [inline], [noexcept]
```

The type of the memory that was allocated.

9.63.4 Member Data Documentation

9.63.4.1 mImpl

```
apiv::VHostMemory* nvinfer1::IHostMemory::mImpl  [protected]
```

The documentation for this class was generated from the following file:

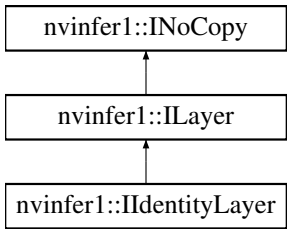
- NvInferRuntime.h

9.64 nvinfer1::IIdentityLayer Class Reference

A layer that represents the identity function.

`#include <NvInfer.h>`

Inheritance diagram for nvinfer1::IIdentityLayer:



Protected Member Functions

- virtual ~IIdentityLayer () noexcept=default

Protected Attributes

- apiv::VIdentityLayer * mImpl

Additional Inherited Members

9.64.1 Detailed Description

A layer that represents the identity function.

If the input and/or output tensor types are explicitly specified, it can be used to convert from one type to another. Other than conversion between the same type (kFLOAT -> kFLOAT for example), the only valid conversions are:

```
(kFLOAT | kHALF | kINT32 | kBOOL) -> (kFLOAT | kHALF | kINT32)
```

Warning

Do not inherit from this class, as doing so will break forward-compatibility of the API and ABI.

9.64.2 Constructor & Destructor Documentation

9.64.2.1 ~IIdentityLayer()

```
virtual nvinfer1::IIdentityLayer::~IIdentityLayer ( )  [protected], [virtual], [default], [noexcept]
```

9.64.3 Member Data Documentation

9.64.3.1 mImpl

```
apiv::VIdentityLayer* nvinfer1::IIdentityLayer::mImpl  [protected]
```

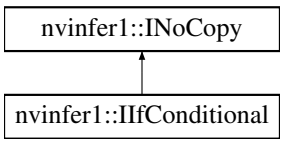
The documentation for this class was generated from the following file:

- NvInfer.h

9.65 nvinfer1::IIfConditional Class Reference

`#include <NvInfer.h>`

Inheritance diagram for nvinfer1::IIfConditional:



Public Member Functions

- IConditionLayer * setCondition (ITensor &condition) noexcept

  Set the condition tensor for this If-Conditional construct.
- IIfConditionalOutputLayer * addOutput (ITensor &trueSubgraphOutput, ITensor &falseSubgraphOutput) noexcept

  Add an If-conditional output.
- IIfConditionalInputLayer * addInput (ITensor &input) noexcept

  Add an If-conditional input.
- void setName (const char *name) noexcept

  Set the name of the conditional.
- const char * getName () const noexcept

  Return the name of the conditional.

Protected Member Functions

- virtual ~IIfConditional () noexcept=default

Protected Attributes

- apiv::VIfConditional * mImpl

9.65.1 Detailed Description

Helper for constructing conditionally-executed subgraphs.

An If-conditional conditionally executes part of the network according to the following pseudo-code:

If condition is true then: output = trueSubgraph(trueInputs); Else output = falseSubgraph(falseInputs); Emit output

Condition is a 0D boolean tensor (representing a scalar). trueSubgraph represents a network subgraph that is executed when condition is evaluated to True. falseSubgraph represents a network subgraph that is executed when condition is evaluated to False.

The following constraints apply to If-conditionals:

- Both the trueSubgraph and falseSubgraph must be defined.
- The number of output tensors in both subgraphs is the same.
- The type and shape of each output tensor from true/false subgraphs are the same.

9.65.2 Constructor & Destructor Documentation

9.65.2.1 ~IIfConditional()

```
virtual nvinfer1::IIfConditional::~IIfConditional ( )  [protected], [virtual], [default], [noexcept]
```

9.65.3 Member Function Documentation

9.65.3.1 addInput()

```
IIfConditionalInputLayer * nvinfer1::IIfConditional::addInput (
            ITensor & input )  [inline], [noexcept]
```

Add an If-conditional input.

Parameters

input	An input to the conditional that can be used by either or both of the conditional's subgraphs.

See also

IIfConditionalInputLayer

9.65.3.2 addOutput()

```
IIfConditionalOutputLayer * nvinfer1::IIfConditional::addOutput (
            ITensor & trueSubgraphOutput,
            ITensor & falseSubgraphOutput )  [inline], [noexcept]
```

Add an If-conditional output.

Parameters

trueSubgraphOutput	The output of the subgraph executed when the conditional evaluates to true.
falseSubgraphOutput	The output of the subgraph executed when the conditional evaluates to false.

Each output layer of an IIfConditional represents a single output of either the true-subgraph or the false-subgraph of an IIfConditional, depending on which subgraph was executed.

See also

IIfConditionalOutputLayer

9.65.3.3 getName()

```
const char * nvinfer1::IIfConditional::getName ( ) const  [inline], [noexcept]
```

Return the name of the conditional.

See also

setName()

9.65.3.4 setCondition()

```
IConditionLayer * nvinfer1::IIfConditional::setCondition (
            ITensor & condition )  [inline], [noexcept]
```

Set the condition tensor for this If-Conditional construct.

Parameters

condition	The condition tensor that will determine which subgraph to execute.

`condition` tensor must be a 0D data tensor (scalar) with type DataType::kBOOL.

See also

IConditionLayer

9.65.3.5 setName()

```
void nvinfer1::IIfConditional::setName (
            const char * name )  [inline], [noexcept]
```

Set the name of the conditional.

The name is used in error diagnostics. This method copies the name string.

See also

getName()

9.65.4 Member Data Documentation

9.65.4.1 mImpl

```
apiv::VIfConditional* nvinfer1::IIfConditional::mImpl  [protected]
```

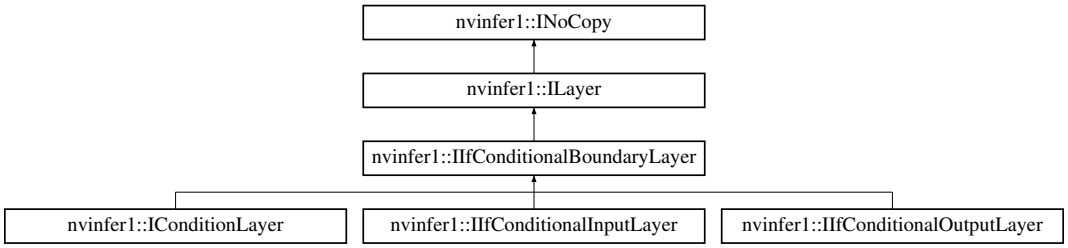
The documentation for this class was generated from the following file:

- NvInfer.h

9.66 nvinfer1::IIfConditionalBoundaryLayer Class Reference

```
#include <NvInfer.h>
```

Inheritance diagram for nvinfer1::IIfConditionalBoundaryLayer:



Public Member Functions

- IIfConditional * getConditional () const noexcept

  Return pointer to the IIfConditional associated with this boundary layer.

Protected Member Functions

- virtual ~IIfConditionalBoundaryLayer () noexcept=default

Protected Attributes

- apiv::VConditionalBoundaryLayer * mBoundary

9.66.1 Detailed Description

This is a base class for Conditional boundary layers.

Boundary layers are used to demarcate the boundaries of Conditionals.

9.66.2 Constructor & Destructor Documentation

9.66.2.1 ~IIfConditionalBoundaryLayer()

```
virtual nvinfer1::IIfConditionalBoundaryLayer::~IIfConditionalBoundaryLayer ( )  [protected],
[virtual], [default], [noexcept]
```

9.66.3 Member Function Documentation

9.66.3.1 getConditional()

```
IIfConditional * nvinfer1::IIfConditionalBoundaryLayer::getConditional ( ) const  [inline], [noexcept]
```

Return pointer to the IIfConditional associated with this boundary layer.

9.66.4 Member Data Documentation

9.66.4.1 mBoundary

```
apiv::VConditionalBoundaryLayer* nvinfer1::IIfConditionalBoundaryLayer::mBoundary  [protected]
```

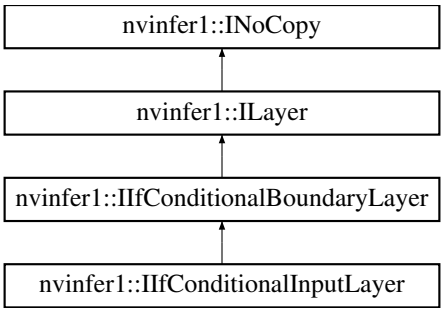
The documentation for this class was generated from the following file:

- NvInfer.h

9.67 nvinfer1::IIfConditionalInputLayer Class Reference

`#include <NvInfer.h>`

Inheritance diagram for nvinfer1::IIfConditionalInputLayer:



Protected Member Functions

- virtual ~IIfConditionalInputLayer () noexcept=default

Protected Attributes

- apiv::VConditionalInputLayer * mImpl

Additional Inherited Members

9.67.1 Detailed Description

This layer represents an input to an IIfConditional.

9.67.2 Constructor & Destructor Documentation

9.67.2.1 ~IIfConditionalInputLayer()

`virtual nvinfer1::IIfConditionalInputLayer::~IIfConditionalInputLayer ( ) [protected], [virtual], [default], [noexcept]`

9.67.3 Member Data Documentation

9.67.3.1 mImpl

```
apiv::VConditionalInputLayer* nvinfer1::IIfConditionalInputLayer::mImpl  [protected]
```

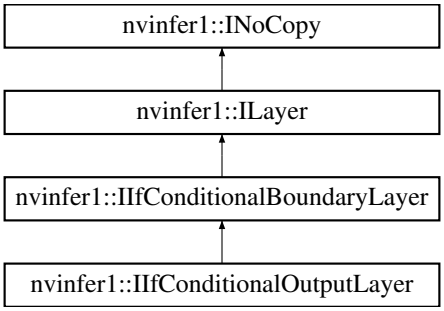
The documentation for this class was generated from the following file:

- NvInfer.h

9.68 nvinfer1::IIfConditionalOutputLayer Class Reference

`#include <NvInfer.h>`

Inheritance diagram for nvinfer1::IIfConditionalOutputLayer:



Protected Member Functions

- virtual ~IIfConditionalOutputLayer () noexcept=default

Protected Attributes

- apiv::VConditionalOutputLayer * mImpl

Additional Inherited Members

9.68.1 Detailed Description

This layer represents an output of an IIfConditional.

An IIfConditionalOutputLayer has exactly one output.

9.68.2 Constructor & Destructor Documentation

9.68.2.1 ~IIfConditionalOutputLayer()

```
virtual nvinfer1::IIfConditionalOutputLayer::~IIfConditionalOutputLayer ( )  [protected], [virtual],
[default], [noexcept]
```

9.68.3 Member Data Documentation

9.68.3.1 mImpl

```
apiv::VConditionalOutputLayer* nvinfer1::IIfConditionalOutputLayer::mImpl  [protected]
```

The documentation for this class was generated from the following file:

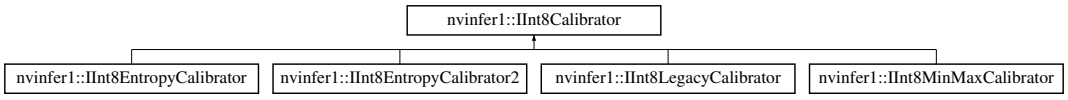
- NvInfer.h

9.69 nvinfer1::IInt8Calibrator Class Reference

Application-implemented interface for calibration.

```
#include <NvInfer.h>
```

Inheritance diagram for nvinfer1::IInt8Calibrator:



Public Member Functions

- virtual int32_t getBatchSize () const noexcept=0

  Get the batch size used for calibration batches.
- virtual bool getBatch (void ∗bindings[ ], const char ∗names[ ], int32_t nbBindings) noexcept=0

  Get a batch of input for calibration.
- virtual const void ∗ readCalibrationCache (std::size_t &length) noexcept=0

  Load a calibration cache.
- virtual void writeCalibrationCache (const void ∗ptr, std::size_t length) noexcept=0

  Save a calibration cache.
- virtual CalibrationAlgoType getAlgorithm () noexcept=0

  Get the algorithm used by this calibrator.
- virtual ~IInt8Calibrator () noexcept=default

9.69.1 Detailed Description

Application-implemented interface for calibration.

Calibration is a step performed by the builder when deciding suitable scale factors for 8-bit inference.

It must also provide a method for retrieving representative images which the calibration process can use to examine the distribution of activations. It may optionally implement a method for caching the calibration result for reuse on subsequent runs.

9.69.2 Constructor & Destructor Documentation

9.69.2.1 ~IInt8Calibrator()

```
virtual nvinfer1::IInt8Calibrator::~IInt8Calibrator ( )  [virtual], [default], [noexcept]
```

9.69.3 Member Function Documentation

9.69.3.1 getAlgorithm()

```
virtual CalibrationAlgoType nvinfer1::IInt8Calibrator::getAlgorithm ( )  [pure virtual], [noexcept]
```

Get the algorithm used by this calibrator.

Returns

The algorithm used by the calibrator.

Implemented in nvinfer1::IInt8EntropyCalibrator, nvinfer1::IInt8EntropyCalibrator2, nvinfer1::IInt8MinMaxCalibrator, and nvinfer1::IInt8LegacyCalibrator.

9.69.3.2 getBatch()

```
virtual bool nvinfer1::IInt8Calibrator::getBatch (
            void * bindings[],
            const char * names[],
            int32_t nbBindings )  [pure virtual], [noexcept]
```

Get a batch of input for calibration.

The batch size of the input must match the batch size returned by getBatchSize().

Parameters

bindings	An array of pointers to device memory that must be updated to point to device memory containing each network input data.
names	The names of the network input for each pointer in the binding array.
nbBindings	The number of pointers in the bindings array.

Returns

False if there are no more batches for calibration.

See also

getBatchSize()

9.69.3.3 getBatchSize()

```
virtual int32_t nvinfer1::IInt8Calibrator::getBatchSize ( ) const  [pure virtual], [noexcept]
```

Get the batch size used for calibration batches.

Returns

The batch size.

9.69.3.4 readCalibrationCache()

```
virtual const void * nvinfer1::IInt8Calibrator::readCalibrationCache (
            std::size_t & length )  [pure virtual], [noexcept]
```

Load a calibration cache.

Calibration is potentially expensive, so it can be useful to generate the calibration data once, then use it on subsequent builds of the network. The cache includes the regression cutoff and quantile values used to generate it, and will not be used if these do not batch the settings of the current calibrator. However, the network should also be recalibrated if its structure changes, or the input data set changes, and it is the responsibility of the application to ensure this.

Parameters

length	The length of the cached data, that should be set by the called function. If there is no data, this should be zero.

Returns

A pointer to the cache, or nullptr if there is no data.

9.69.3.5 writeCalibrationCache()

```
virtual void nvinfer1::IInt8Calibrator::writeCalibrationCache (
            const void * ptr,
            std::size_t length )  [pure virtual], [noexcept]
```

Save a calibration cache.

Parameters

ptr	A pointer to the data to cache.
length	The length in bytes of the data to cache.

See also

readCalibrationCache()

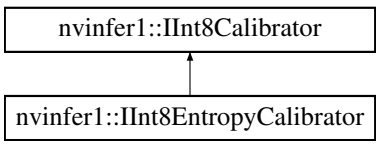
The documentation for this class was generated from the following file:

- NvInfer.h

9.70 nvinfer1::IInt8EntropyCalibrator Class Reference

`#include <NvInfer.h>`

Inheritance diagram for nvinfer1::IInt8EntropyCalibrator:



Public Member Functions

- CalibrationAlgoType getAlgorithm () noexcept override
- virtual ~IInt8EntropyCalibrator () noexcept=default

9.70.1 Detailed Description

Entropy calibrator. This is the Legacy Entropy calibrator. It is less complicated than the legacy calibrator and produces better results.

9.70.2 Constructor & Destructor Documentation

9.70.2.1 ~IInt8EntropyCalibrator()

```
virtual nvinfer1::IInt8EntropyCalibrator::~IInt8EntropyCalibrator ( )  [virtual], [default], [noexcept]
```

9.70.3 Member Function Documentation

9.70.3.1 getAlgorithm()

```
CalibrationAlgoType nvinfer1::IInt8EntropyCalibrator::getAlgorithm ( )  [inline], [override],
[virtual], [noexcept]
```

Signal that this is the entropy calibrator.

Implements nvinfer1::IInt8Calibrator.

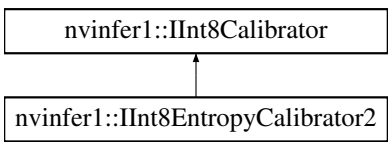
The documentation for this class was generated from the following file:

- NvInfer.h

9.71 nvinfer1::IInt8EntropyCalibrator2 Class Reference

```
#include <NvInfer.h>
```

Inheritance diagram for nvinfer1::IInt8EntropyCalibrator2:



Public Member Functions

- CalibrationAlgoType getAlgorithm () noexcept override
- virtual ~IInt8EntropyCalibrator2 () noexcept=default

9.71.1 Detailed Description

Entropy calibrator 2. This is the preferred calibrator. This is the required calibrator for DLA, as it supports per activation tensor scaling.

9.71.2 Constructor & Destructor Documentation

9.71.2.1 ~IInt8EntropyCalibrator2()

```
virtual nvinfer1::IInt8EntropyCalibrator2::~IInt8EntropyCalibrator2 ( )  [virtual], [default],
[noexcept]
```

9.71.3 Member Function Documentation

9.71.3.1 getAlgorithm()

```
CalibrationAlgoType nvinfer1::IInt8EntropyCalibrator2::getAlgorithm ( )  [inline], [override],
[virtual], [noexcept]
```

Signal that this is the entropy calibrator 2.

Implements nvinfer1::IInt8Calibrator.

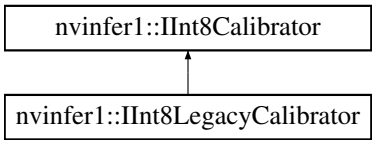
The documentation for this class was generated from the following file:

- NvInfer.h

9.72 nvinfer1::IInt8LegacyCalibrator Class Reference

```
#include <NvInfer.h>
```

Inheritance diagram for nvinfer1::IInt8LegacyCalibrator:



Public Member Functions

- CalibrationAlgoType getAlgorithm () noexcept override
- virtual double getQuantile () const noexcept=0

  The quantile (between 0 and 1) that will be used to select the region maximum when the quantile method is in use.
- virtual double getRegressionCutoff () const noexcept=0

  The fraction (between 0 and 1) of the maximum used to define the regression cutoff when using regression to determine the region maximum.
- virtual const void * readHistogramCache (std::size_t &length) noexcept=0

  Load a histogram.
- virtual void writeHistogramCache (const void *ptr, std::size_t length) noexcept=0

  Save a histogram cache.
- virtual ~IInt8LegacyCalibrator () noexcept=default

9.72.1 Detailed Description

Legacy calibrator left for backward compatibility with TensorRT 2.0. This calibrator requires user parameterization, and is provided as a fallback option if the other calibrators yield poor results.

9.72.2 Constructor & Destructor Documentation

9.72.2.1 ~IInt8LegacyCalibrator()

```
virtual nvinfer1::IInt8LegacyCalibrator::~IInt8LegacyCalibrator ( )  [virtual], [default], [noexcept]
```

9.72.3 Member Function Documentation

9.72.3.1 getAlgorithm()

```
CalibrationAlgoType nvinfer1::IInt8LegacyCalibrator::getAlgorithm ( )  [inline], [override], [virtual],
[noexcept]
```

Signal that this is the legacy calibrator.

Implements nvinfer1::IInt8Calibrator.

9.72.3.2 getQuantile()

```
virtual double nvinfer1::IInt8LegacyCalibrator::getQuantile ( ) const  [pure virtual], [noexcept]
```

The quantile (between 0 and 1) that will be used to select the region maximum when the quantile method is in use.

See the user guide for more details on how the quantile is used.

9.72.3.3 getRegressionCutoff()

```
virtual double nvinfer1::IInt8LegacyCalibrator::getRegressionCutoff ( ) const  [pure virtual],
[noexcept]
```

The fraction (between 0 and 1) of the maximum used to define the regression cutoff when using regression to determine the region maximum.

See the user guide for more details on how the regression cutoff is used

9.72.3.4 readHistogramCache()

```
virtual const void * nvinfer1::IInt8LegacyCalibrator::readHistogramCache (
            std::size_t & length )  [pure virtual], [noexcept]
```

Load a histogram.

Histogram generation is potentially expensive, so it can be useful to generate the histograms once, then use them when exploring the space of calibrations. The histograms should be regenerated if the network structure changes, or the input data set changes, and it is the responsibility of the application to ensure this.

Parameters

length	The length of the cached data, that should be set by the called function. If there is no data, this should be zero.

Returns

A pointer to the cache, or nullptr if there is no data.

9.72.3.5 writeHistogramCache()

```
virtual void nvinfer1::IInt8LegacyCalibrator::writeHistogramCache (
            const void * ptr,
            std::size_t length )  [pure virtual], [noexcept]
```

Save a histogram cache.

Parameters

ptr	A pointer to the data to cache.
length	The length in bytes of the data to cache.

See also

readHistogramCache()

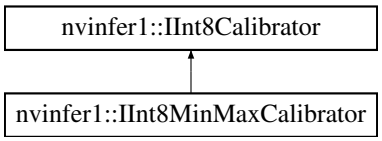
The documentation for this class was generated from the following file:

- NvInfer.h

9.73 nvinfer1::IInt8MinMaxCalibrator Class Reference

`#include <NvInfer.h>`

Inheritance diagram for nvinfer1::IInt8MinMaxCalibrator:



Public Member Functions

- CalibrationAlgoType getAlgorithm () noexcept override
- virtual ~IInt8MinMaxCalibrator () noexcept=default

9.73.1 Detailed Description

MinMax Calibrator. It supports per activation tensor scaling.

9.73.2 Constructor & Destructor Documentation

9.73.2.1 ~IInt8MinMaxCalibrator()

`virtual nvinfer1::IInt8MinMaxCalibrator::~IInt8MinMaxCalibrator ( ) [virtual], [default], [noexcept]`

9.73.3 Member Function Documentation

9.73.3.1 getAlgorithm()

```
CalibrationAlgoType nvinfer1::IInt8MinMaxCalibrator::getAlgorithm ( )  [inline], [override], [virtual],
[noexcept]
```

Signal that this is the MinMax Calibrator.

Implements nvinfer1::IInt8Calibrator.

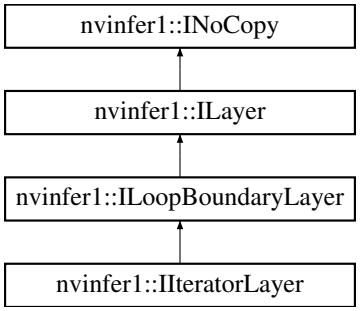
The documentation for this class was generated from the following file:

- NvInfer.h

9.74 nvinfer1::IIteratorLayer Class Reference

```
#include <NvInfer.h>
```

Inheritance diagram for nvinfer1::IIteratorLayer:



Public Member Functions

- void setAxis (int32_t axis) noexcept

  Set axis to iterate over.
- int32_t getAxis () const noexcept

  Get axis being iterated over.
- void setReverse (bool reverse) noexcept
- bool getReverse () const noexcept

  True if and only if reversing input.

Protected Member Functions

- virtual ~IIteratorLayer () noexcept=default

Protected Attributes

- apiv::VIteratorLayer * mImpl

9.74.1 Constructor & Destructor Documentation

9.74.1.1 ~IIteratorLayer()

```
virtual nvinfer1::IIteratorLayer::~IIteratorLayer ( )  [protected], [virtual], [default], [noexcept]
```

9.74.2 Member Function Documentation

9.74.2.1 getAxis()

```
int32_t nvinfer1::IIteratorLayer::getAxis ( ) const  [inline], [noexcept]
```

Get axis being iterated over.

9.74.2.2 getReverse()

```
bool nvinfer1::IIteratorLayer::getReverse ( ) const  [inline], [noexcept]
```

True if and only if reversing input.

9.74.2.3 setAxis()

```
void nvinfer1::IIteratorLayer::setAxis (
            int32_t axis )  [inline], [noexcept]
```

Set axis to iterate over.

9.74.2.4 setReverse()

```
void nvinfer1::IIteratorLayer::setReverse (
            bool reverse )  [inline], [noexcept]
```

For reverse=false, the layer is equivalent to addGather(tensor, I, 0) where I is a scalar tensor containing the loop iteration number. For reverse=true, the layer is equivalent to addGather(tensor, M-1-I, 0) where M is the trip count computed from TripLimits of kind kCOUNT. The default is reverse=false.

9.74.3 Member Data Documentation

9.74.3.1 mImpl

```
apiv::VIteratorLayer* nvinfer1::IIteratorLayer::mImpl  [protected]
```

The documentation for this class was generated from the following file:

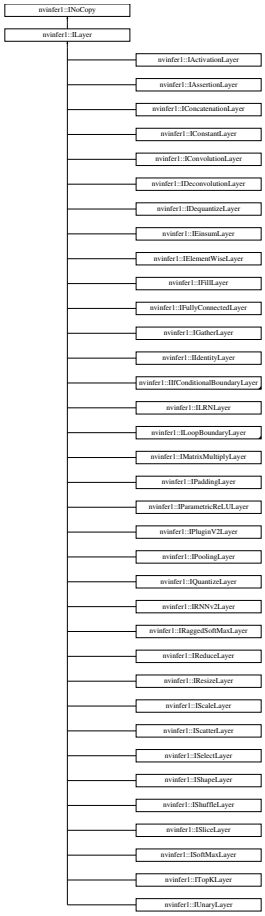
- NvInfer.h

9.75 nvinfer1::ILayer Class Reference

Base class for all layer classes in a network definition.

```
#include <NvInfer.h>
```

Inheritance diagram for nvinfer1::ILayer:



Public Member Functions

- LayerType getType () const noexcept

  Return the type of a layer.
- void setName (const char ∗name) noexcept

  Set the name of a layer.
- const char ∗ getName () const noexcept

  Return the name of a layer.
- int32_t getNbInputs () const noexcept

  Get the number of inputs of a layer.
- ITensor ∗ getInput (int32_t index) const noexcept

  Get the layer input corresponding to the given index.
- int32_t getNbOutputs () const noexcept

  Get the number of outputs of a layer.
- ITensor ∗ getOutput (int32_t index) const noexcept

  Get the layer output corresponding to the given index.
- void setInput (int32_t index, ITensor &tensor) noexcept

  Replace an input of this layer with a specific tensor.
- void setPrecision (DataType dataType) noexcept

  Set the computational precision of this layer.

- DataType getPrecision () const noexcept
  get the computational precision of this layer
- bool precisionIsSet () const noexcept
  whether the computational precision has been set for this layer
- void resetPrecision () noexcept
  reset the computational precision for this layer
- void setOutputType (int32_t index, DataType dataType) noexcept
  Set the output type of this layer.
- DataType getOutputType (int32_t index) const noexcept
  get the output type of this layer
- bool outputTypeIsSet (int32_t index) const noexcept
  whether the output type has been set for this layer
- void resetOutputType (int32_t index) noexcept
  reset the output type for this layer

Protected Member Functions

- virtual ~ILayer () noexcept=default

Protected Attributes

- apiv::VLayer * mLayer

9.75.1 Detailed Description

Base class for all layer classes in a network definition.

Warning

Do not inherit from this class, as doing so will break forward-compatibility of the API and ABI.

9.75.2 Constructor & Destructor Documentation

9.75.2.1 ~ILayer()

```
virtual nvinfer1::ILayer::~ILayer ( )  [protected], [virtual], [default], [noexcept]
```

9.75.3 Member Function Documentation

9.75.3.1 getInput()

```
ITensor * nvinfer1::ILayer::getInput (
            int32_t index ) const  [inline], [noexcept]
```

Get the layer input corresponding to the given index.

Parameters

index	The index of the input tensor.

Returns

The input tensor, or nullptr if the index is out of range or the tensor is optional (ISliceLayer and IRNNv2Layer).

9.75.3.2 getName()

```
const char * nvinfer1::ILayer::getName ( ) const  [inline], [noexcept]
```

Return the name of a layer.

See also

setName()

9.75.3.3 getNbInputs()

```
int32_t nvinfer1::ILayer::getNbInputs ( ) const  [inline], [noexcept]
```

Get the number of inputs of a layer.

9.75.3.4 getNbOutputs()

```
int32_t nvinfer1::ILayer::getNbOutputs ( ) const  [inline], [noexcept]
```

Get the number of outputs of a layer.

9.75.3.5 getOutput()

```
ITensor * nvinfer1::ILayer::getOutput (
            int32_t index ) const  [inline], [noexcept]
```

Get the layer output corresponding to the given index.

Returns

The indexed output tensor, or nullptr if the index is out of range or the tensor is optional (IRNNv2Layer).

9.75.3.6 getOutputType()

```
DataType nvinfer1::ILayer::getOutputType (
            int32_t index ) const  [inline], [noexcept]
```

get the output type of this layer

Parameters

index	the index of the output

Returns

the output precision. If no precision has been set, DataType::kFLOAT will be returned, unless the output type is inherently DataType::kINT32.

See also

getOutputType() outputTypeIsSet() resetOutputType()

9.75.3.7 getPrecision()

```
DataType nvinfer1::ILayer::getPrecision ( ) const  [inline], [noexcept]
```

get the computational precision of this layer

Returns

the computational precision

See also

setPrecision() precisionIsSet() resetPrecision()

9.75.3.8 getType()

```
LayerType nvinfer1::ILayer::getType ( ) const  [inline], [noexcept]
```

Return the type of a layer.

See also

LayerType

9.75.3.9 outputTypeIsSet()

```
bool nvinfer1::ILayer::outputTypeIsSet (
            int32_t index ) const  [inline], [noexcept]
```

whether the output type has been set for this layer

Parameters

index	the index of the output

Returns

whether the output type has been explicitly set

See also

setOutputType() getOutputType() resetOutputType()

9.75.3.10 precisionIsSet()

```
bool nvinfer1::ILayer::precisionIsSet ( ) const  [inline], [noexcept]
```

whether the computational precision has been set for this layer

Returns

whether the computational precision has been explicitly set

See also

setPrecision() getPrecision() resetPrecision()

9.75.3.11 resetOutputType()

```
void nvinfer1::ILayer::resetOutputType (
             int32_t index )  [inline], [noexcept]
```

reset the output type for this layer

Parameters

index	the index of the output

See also

setOutputType() getOutputType() outputTypeIsSet()

9.75.3.12 resetPrecision()

```
void nvinfer1::ILayer::resetPrecision ( )  [inline], [noexcept]
```

reset the computational precision for this layer

See also

setPrecision() getPrecision() precisionIsSet()

9.75.3.13 setInput()

```
void nvinfer1::ILayer::setInput (
             int32_t index,
             ITensor & tensor )  [inline], [noexcept]
```

Replace an input of this layer with a specific tensor.

Parameters

index	the index of the input to modify.
tensor	the new input tensor

Except for IFillLayer, ILoopOutputLayer, IResizeLayer, IShuffleLayer, and ISliceLayer, this method cannot change the number of inputs to a layer. The index argument must be less than the value of getNbInputs().

See comments for overloads of setInput() for layers with special behavior.

9.75.3.14 setName()

```
void nvinfer1::ILayer::setName (
             const char * name )  [inline], [noexcept]
```

Set the name of a layer.

This method copies the name string.

See also

getName()

9.75.3.15 setOutputType()

```
void nvinfer1::ILayer::setOutputType (
            int32_t index,
            DataType dataType )  [inline], [noexcept]
```

Set the output type of this layer.

Setting the output type constrains TensorRT to choose implementations which generate output data with the given type. If it is not set, TensorRT will select output type based on layer computational precision. TensorRT could still choose non-conforming output type based on fastest implementation. To force choosing the requested output type, set exactly one of the following flags, which differ in what happens if no such implementation exists:

- BuilderFlag::kOBEY_PRECISION_CONSTRAINTS - build fails with an error message.
- BuilderFlag::kPREFER_PRECISION_CONSTRAINTS - TensorRT falls back to an implementation with a non-conforming output type.

In case layer precision is not specified, or falling back, the output type depends on the chosen implementation, based on performance considerations and the flags specified to the builder.

This method cannot be used to set the data type of the second output tensor of the TopK layer. The data type of the second output tensor of the topK layer is always Int32. Also the output type of all layers that are shape operations must be DataType::kINT32, and all attempts to set the output type to some other data type will be ignored except for issuing an error message.

Note that the layer output type is generally not identical to the data type of the output tensor, as TensorRT may insert implicit reformatting operations to convert the former to the latter. Calling layer->setOutputType(i, type) has no effect on the data type of the i-th output tensor of layer, and users need to call layer->getOutput(i)->setType(type) to change the tensor data type. This is particularly relevant if the tensor is marked as a network output, since only setType() [but not setOutputType()] will affect the data representation in the corresponding output binding.

Parameters

index	the index of the output to set
dataType	the type of the output

See also

getOutputType() outputTypeIsSet() resetOutputType()

9.75.3.16 setPrecision()

```
void nvinfer1::ILayer::setPrecision (
            DataType dataType )  [inline], [noexcept]
```

Set the computational precision of this layer.

Setting the precision allows TensorRT to choose an implementation which run at this computational precision. Layer input type would also get inferred from layer computational precision. TensorRT could still choose a non-conforming fastest implementation that ignores the requested precision. To force choosing an implementation with the requested precision, set exactly one of the following flags, which differ in what happens if no such implementation exists:

- BuilderFlag::kOBEY_PRECISION_CONSTRAINTS - build fails with an error message.
- BuilderFlag::kPREFER_PRECISION_CONSTRAINTS - TensorRT falls back to an implementation without the requested precision.

If precision is not set, or falling back, TensorRT will select the layer computational precision and layer input type based on global performance considerations and the flags specified to the builder.

Parameters

dataType	the computational precision.

See also

getPrecision() precisionIsSet() resetPrecision()

9.75.4 Member Data Documentation

9.75.4.1 mLayer

```
apiv::VLayer* nvinfer1::ILayer::mLayer  [protected]
```

The documentation for this class was generated from the following file:

- NvInfer.h

9.76 nvinfer1::ILogger Class Reference

Application-implemented logging interface for the builder, refitter and runtime.

```
#include <NvInferRuntimeCommon.h>
```

Public Types

- enum class Severity : int32_t {
  kINTERNAL_ERROR = 0 , kERROR = 1 , kWARNING = 2 , kINFO = 3 ,
  kVERBOSE = 4 }

Public Member Functions

- virtual void log (Severity severity, AsciiChar const *msg) noexcept=0
- ILogger ()=default
- virtual ~ILogger ()=default

9.76.1 Detailed Description

Application-implemented logging interface for the builder, refitter and runtime.

The logger used to create an instance of IBuilder, IRuntime or IRefitter is used for all objects created through that interface. The logger should be valid until all objects created are released.

9.76.2 Member Enumeration Documentation

9.76.2.1 Severity

```
enum class nvinfer1::ILogger::Severity :  int32_t  [strong]
```

The severity corresponding to a log message.

Enumerator

kINTERNAL_ERROR	An internal error has occurred. Execution is unrecoverable.
kERROR	An application error has occurred.
kWARNING	An application error has been discovered, but TensorRT has recovered or fallen back to a default.
kINFO	Informational messages with instructional information.
kVERBOSE	Verbose messages with debugging information.

9.76.3 Constructor & Destructor Documentation

9.76.3.1 ILogger()

```
nvinfer1::ILogger::ILogger ( )  [default]
```

9.76.3.2 ~ILogger()

```
virtual nvinfer1::ILogger::~ILogger ( )  [virtual], [default]
```

9.76.4 Member Function Documentation

9.76.4.1 log()

```
virtual void nvinfer1::ILogger::log (
            Severity severity,
            AsciiChar const * msg )  [pure virtual], [noexcept]
```

A callback implemented by the application to handle logging messages;

Parameters

severity	The severity of the message.
msg	A null-terminated log message.

Usage considerations

- Allowed context for the API call
  - Thread-safe: No, this method is not required to be thread-safe and will not be called from multiple threads.

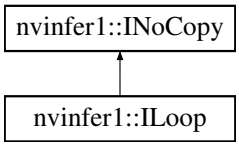
The documentation for this class was generated from the following file:

- NvInferRuntimeCommon.h

9.77 nvinfer1::ILoop Class Reference

```
#include <NvInfer.h>
```

Inheritance diagram for nvinfer1::ILoop:



Public Member Functions

- IRecurrenceLayer * addRecurrence (ITensor &initialValue) noexcept

  Create a recurrence layer for this loop with initialValue as its first input.
- ITripLimitLayer * addTripLimit (ITensor &tensor, TripLimit limit) noexcept

  Add a trip-count limiter, based on the given tensor.
- IIteratorLayer * addIterator (ITensor &tensor, int32_t axis=0, bool reverse=false) noexcept

  Return layer that subscripts tensor by loop iteration.
- ILoopOutputLayer * addLoopOutput (ITensor &tensor, LoopOutput outputKind, int32_t axis=0) noexcept

  Make an output for this loop, based on the given tensor.
- void setName (const char *name) noexcept

  Set the name of the loop.
- const char * getName () const noexcept

  Return the name of the loop.

Protected Member Functions

- virtual ~ILoop () noexcept=default

Protected Attributes

- apiv::VLoop * mImpl

9.77.1 Detailed Description

Helper for creating a recurrent subgraph.

An ILoop cannot be added to an INetworkDefinition where hasImplicitBatchDimensions() returns true.

9.77.2 Constructor & Destructor Documentation

9.77.2.1 ~ILoop()

```
virtual nvinfer1::ILoop::~ILoop ( )  [protected], [virtual], [default], [noexcept]
```

9.77.3 Member Function Documentation

9.77.3.1 addIterator()

```
IIteratorLayer * nvinfer1::ILoop::addIterator (
            ITensor & tensor,
            int32_t axis = 0,
            bool reverse = false )  [inline], [noexcept]
```

Return layer that subscripts tensor by loop iteration.

For reverse=false, this is equivalent to addGather(tensor, I, 0) where I is a scalar tensor containing the loop iteration number. For reverse=true, this is equivalent to addGather(tensor, M-1-I, 0) where M is the trip count computed from TripLimits of kind kCOUNT.

9.77.3.2 addLoopOutput()

```
ILoopOutputLayer * nvinfer1::ILoop::addLoopOutput (
            ITensor & tensor,
            LoopOutput outputKind,
            int32_t axis = 0 )  [inline], [noexcept]
```

Make an output for this loop, based on the given tensor.

axis is the axis for concatenation (if using outputKind of kCONCATENATE or kREVERSE).

If outputKind is kCONCATENATE or kREVERSE, a second input specifying the concatenation dimension must be added via method ILoopOutputLayer::setInput.

9.77.3.3 addRecurrence()

```
IRecurrenceLayer * nvinfer1::ILoop::addRecurrence (
            ITensor & initialValue )  [inline], [noexcept]
```

Create a recurrence layer for this loop with initialValue as its first input.

IRecurrenceLayer requires exactly two inputs. The 2nd input must be added, via method IRecurrenceLayer::set↩ Input(1,...) before an Engine can be built.

9.77.3.4 addTripLimit()

```
ITripLimitLayer * nvinfer1::ILoop::addTripLimit (
            ITensor & tensor,
            TripLimit limit )  [inline], [noexcept]
```

Add a trip-count limiter, based on the given tensor.

There may be at most one kCOUNT and one kWHILE limiter for a loop. When both trip limits exist, the loop exits when the count is reached or condition is falsified. It is an error to not add at least one trip limiter.

For kCOUNT, the input tensor must be available before the loop starts.

For kWHILE, the input tensor must be the output of a subgraph that contains only layers that are not ITripLimitLayer, IIteratorLayer or ILoopOutputLayer. Any IRecurrenceLayers in the subgraph must belong to the same loop as the ITripLimitLayer. A trivial example of this rule is that the input to the kWHILE is the output of an IRecurrenceLayer for the same loop.

9.77.3.5 getName()

```
const char * nvinfer1::ILoop::getName ( ) const  [inline], [noexcept]
```

Return the name of the loop.

See also

setName()

9.77.3.6 setName()

```
void nvinfer1::ILoop::setName (
            const char * name )  [inline], [noexcept]
```

Set the name of the loop.

The name is used in error diagnostics. This method copies the name string.

See also

getName()

9.77.4 Member Data Documentation

9.77.4.1 mImpl

```
apiv::VLoop* nvinfer1::ILoop::mImpl  [protected]
```

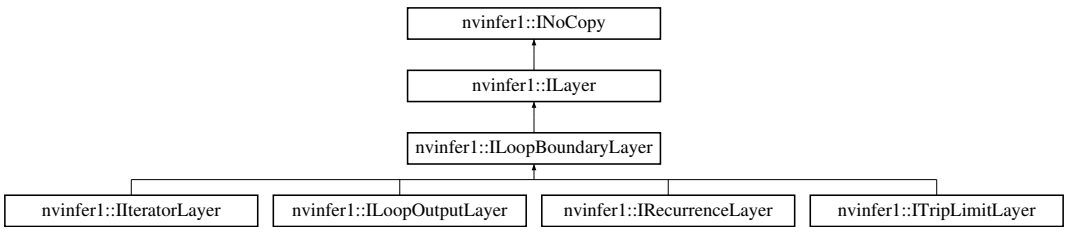
The documentation for this class was generated from the following file:

- NvInfer.h

9.78 nvinfer1::ILoopBoundaryLayer Class Reference

```
#include <NvInfer.h>
```

Inheritance diagram for nvinfer1::ILoopBoundaryLayer:



Public Member Functions

- ILoop * getLoop () const noexcept

  Return pointer to ILoop associated with this boundary layer.

Protected Member Functions

- virtual ~ILoopBoundaryLayer () noexcept=default

Protected Attributes

- apiv::VLoopBoundaryLayer * mBoundary

9.78.1 Constructor & Destructor Documentation

9.78.1.1 ~ILoopBoundaryLayer()

```
virtual nvinfer1::ILoopBoundaryLayer::~ILoopBoundaryLayer ( )  [protected], [virtual], [default],
[noexcept]
```

9.78.2 Member Function Documentation

9.78.2.1 getLoop()

```
ILoop * nvinfer1::ILoopBoundaryLayer::getLoop ( ) const  [inline], [noexcept]
```

Return pointer to ILoop associated with this boundary layer.

9.78.3 Member Data Documentation

9.78.3.1 mBoundary

```
apiv::VLoopBoundaryLayer* nvinfer1::ILoopBoundaryLayer::mBoundary  [protected]
```

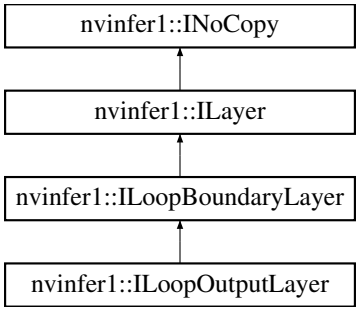
The documentation for this class was generated from the following file:

- NvInfer.h

9.79 nvinfer1::ILoopOutputLayer Class Reference

`#include <NvInfer.h>`

Inheritance diagram for nvinfer1::ILoopOutputLayer:



Public Member Functions

- LoopOutput getLoopOutput () const noexcept
- void setAxis (int32_t axis) noexcept

  Set where to insert the contenation axis. Ignored if getLoopOutput() is kLAST_VALUE.
- int32_t getAxis () const noexcept

  Get axis being concatenated over.
- void setInput (int32_t index, ITensor &tensor) noexcept

  Append or replace an input of this layer with a specific tensor.

Protected Member Functions

- virtual ~ILoopOutputLayer () noexcept=default

Protected Attributes

- apiv::VLoopOutputLayer * mImpl

9.79.1 Detailed Description

An ILoopOutputLayer is the sole way to get output from a loop.

The first input tensor must be defined inside the loop; the output tensor is outside the loop. The second input tensor, if present, must be defined outside the loop.

If getLoopOutput() is kLAST_VALUE, a single input must be provided, and that input must from a IRecurrenceLayer in the same loop.

If getLoopOutput() is kCONCATENATE or kREVERSE, a second input must be provided. The second input must be a scalar “shape tensor”, defined before the loop commences, that specifies the concatenation length of the output.

The output tensor has j more dimensions than the input tensor, where j == 0 if getLoopOutput() is kLAST_VALUE j == 1 if getLoopOutput() is kCONCATENATE or kREVERSE.

9.79.2 Constructor & Destructor Documentation

9.79.2.1 ~ILoopOutputLayer()

```
virtual nvinfer1::ILoopOutputLayer::~ILoopOutputLayer ( )  [protected], [virtual], [default],
[noexcept]
```

9.79.3 Member Function Documentation

9.79.3.1 getAxis()

```
int32_t nvinfer1::ILoopOutputLayer::getAxis ( ) const  [inline], [noexcept]
```

Get axis being concatenated over.

9.79.3.2 getLoopOutput()

```
LoopOutput nvinfer1::ILoopOutputLayer::getLoopOutput ( ) const  [inline], [noexcept]
```

9.79.3.3 setAxis()

```
void nvinfer1::ILoopOutputLayer::setAxis (
            int32_t axis )  [inline], [noexcept]
```

Set where to insert the contenation axis. Ignored if getLoopOutput() is kLAST_VALUE.

For example, if the input tensor has dimensions [b,c,d], and getLoopOutput() is kCONCATENATE, the output has four dimensions. Let a be the value of the second input. setAxis(0) causes the output to have dimensions [a,b,c,d]. setAxis(1) causes the output to have dimensions [b,a,c,d]. setAxis(2) causes the output to have dimensions [b,c,a,d]. setAxis(3) causes the output to have dimensions [b,c,d,a]. Default is axis is 0.

9.79.3.4 setInput()

```
void nvinfer1::ILayer::setInput (
            int32_t index,
            ITensor & tensor )  [inline], [noexcept]
```

Append or replace an input of this layer with a specific tensor.

Parameters

index	the index of the input to modify.
tensor	the new input tensor Sets the input tensor for the given index. The index must be 0 for a kLAST_VALUE loop output layer. Loop output layer is converted to a kCONCATENATE or kREVERSE loop output layer by calling setInput with an index 1. A kCONCATENATE or kREVERSE loop output layer cannot be converted back to a kLAST_VALUE loop output layer.

For a kCONCATENATE or kREVERSE loop output layer, the values 0 and 1 are valid. The indices in the k↩ CONCATENATE or kREVERSE cases are as follows:

- 0: Contribution to the output tensor. The contribution must come from inside the loop.
- 1: The concatenation length scalar value, must come from outside the loop, as a 0D Int32 shape tensor.

If this function is called with the value 1, then the function getNbInputs() changes from returning 1 to 2.

9.79.4 Member Data Documentation

9.79.4.1 mImpl

```
apiv::VLoopOutputLayer* nvinfer1::ILoopOutputLayer::mImpl  [protected]
```

The documentation for this class was generated from the following file:

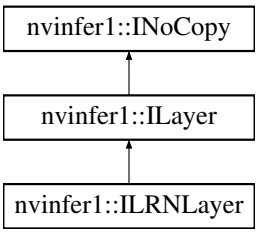
- NvInfer.h

9.80 nvinfer1::ILRNLayer Class Reference

A LRN layer in a network definition.

```
#include <NvInfer.h>
```

Inheritance diagram for nvinfer1::ILRNLayer:



Public Member Functions

- void setWindowSize (int32_t windowSize) noexcept

  Set the LRN window size.
- int32_t getWindowSize () const noexcept

  Get the LRN window size.
- void setAlpha (float alpha) noexcept

  Set the LRN alpha value.
- float getAlpha () const noexcept

  Get the LRN alpha value.
- void setBeta (float beta) noexcept

  Set the LRN beta value.
- float getBeta () const noexcept

  Get the LRN beta value.
- void setK (float k) noexcept

  Set the LRN K value.
- float getK () const noexcept

  Get the LRN K value.

Protected Member Functions

- virtual ~ILRNLayer () noexcept=default

Protected Attributes

- apiv::VLRNLayer * mImpl

9.80.1 Detailed Description

A LRN layer in a network definition.

The output size is the same as the input size.

Warning

Do not inherit from this class, as doing so will break forward-compatibility of the API and ABI.

9.80.2 Constructor & Destructor Documentation

9.80.2.1 ~ILRNLayer()

```
virtual nvinfer1::ILRNLayer::~ILRNLayer ( )  [protected], [virtual], [default], [noexcept]
```

9.80.3 Member Function Documentation

9.80.3.1 getAlpha()

```
float nvinfer1::ILRNLayer::getAlpha ( ) const  [inline], [noexcept]
```

Get the LRN alpha value.

See also

setAlpha()

9.80.3.2 getBeta()

```
float nvinfer1::ILRNLayer::getBeta ( ) const  [inline], [noexcept]
```

Get the LRN beta value.

See also

setBeta()

9.80.3.3 getK()

```
float nvinfer1::ILRNLayer::getK ( ) const  [inline], [noexcept]
```

Get the LRN K value.

See also

setK()

9.80.3.4 getWindowSize()

```
int32_t nvinfer1::ILRNLayer::getWindowSize ( ) const  [inline], [noexcept]
```

Get the LRN window size.

See also

getWindowStride()

9.80.3.5 setAlpha()

```
void nvinfer1::ILRNLayer::setAlpha (
            float alpha )  [inline], [noexcept]
```

Set the LRN alpha value.

The valid range is [-1e20, 1e20].

See also

getAlpha()

9.80.3.6 setBeta()

```
void nvinfer1::ILRNLayer::setBeta (
            float beta )  [inline], [noexcept]
```

Set the LRN beta value.

The valid range is [0.01, 1e5f].

See also

getBeta()

9.80.3.7 setK()

```
void nvinfer1::ILRNLayer::setK (
            float k )  [inline], [noexcept]
```

Set the LRN K value.

The valid range is [1e-5, 1e10].

See also

getK()

9.80.3.8 setWindowSize()

```
void nvinfer1::ILRNLayer::setWindowSize (
            int32_t windowSize )  [inline], [noexcept]
```

Set the LRN window size.

The window size must be odd and in the range of [1, 15].

If executing this layer on the DLA, only values in the set, [3, 5, 7, 9], are valid.

See also

setWindowStride()

9.80.4 Member Data Documentation

9.80.4.1 mImpl

```
apiv::VLRNLayer* nvinfer1::ILRNLayer::mImpl  [protected]
```

The documentation for this class was generated from the following file:

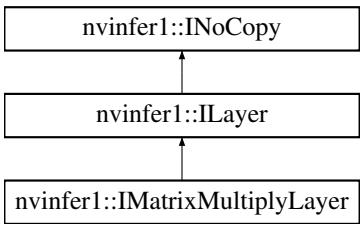
- NvInfer.h

9.81 nvinfer1::IMatrixMultiplyLayer Class Reference

Layer that represents a Matrix Multiplication.

`#include <NvInfer.h>`

Inheritance diagram for nvinfer1::IMatrixMultiplyLayer:



Public Member Functions

- void setOperation (int32_t index, MatrixOperation op) noexcept

  Set the operation for an input tensor.
- MatrixOperation getOperation (int32_t index) const noexcept

  Get the operation for an input tensor.

Protected Member Functions

- virtual ~IMatrixMultiplyLayer () noexcept=default

Protected Attributes

- apiv::VMatrixMultiplyLayer * mImpl

9.81.1 Detailed Description

Layer that represents a Matrix Multiplication.

Let A be op(getInput(0)) and B be op(getInput(1)) where op(x) denotes the corresponding MatrixOperation.

When A and B are matrices or vectors, computes the inner product A * B:

```
matrix * matrix -> matrix
matrix * vector -> vector
vector * matrix -> vector
vector * vector -> scalar
```

Inputs of higher rank are treated as collections of matrices or vectors. The output will be a corresponding collection of matrices, vectors, or scalars.

For a dimension that is not one of the matrix or vector dimensions: If the dimension is 1 for one of the tensors but not the other tensor, the former tensor is broadcast along that dimension to match the dimension of the latter tensor. The number of these extra dimensions for A and B must match.

Warning

Do not inherit from this class, as doing so will break forward-compatibility of the API and ABI.

9.81.2 Constructor & Destructor Documentation

9.81.2.1 ~IMatrixMultiplyLayer()

```
virtual nvinfer1::IMatrixMultiplyLayer::~IMatrixMultiplyLayer ( )  [protected], [virtual], [default],
[noexcept]
```

9.81.3 Member Function Documentation

9.81.3.1 getOperation()

```
MatrixOperation nvinfer1::IMatrixMultiplyLayer::getOperation (
            int32_t index ) const  [inline], [noexcept]
```

Get the operation for an input tensor.

Parameters

index	Input tensor number (0 or 1).

See also

setOperation()

9.81.3.2 setOperation()

```
void nvinfer1::IMatrixMultiplyLayer::setOperation (
            int32_t index,
            MatrixOperation op )  [inline], [noexcept]
```

Set the operation for an input tensor.

Parameters

index	Input tensor number (0 or 1).
op	New operation.

See also

getOperation()

9.81.4 Member Data Documentation

9.81.4.1 mImpl

```
apiv::VMatrixMultiplyLayer* nvinfer1::IMatrixMultiplyLayer::mImpl  [protected]
```

The documentation for this class was generated from the following file:

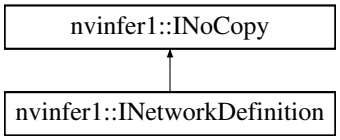
- NvInfer.h

9.82 nvinfer1::INetworkDefinition Class Reference

A network definition for input to the builder.

```
#include <NvInfer.h>
```

Inheritance diagram for nvinfer1::INetworkDefinition:



Public Member Functions

- virtual ~INetworkDefinition () noexcept=default
- ITensor * addInput (const char *name, DataType type, Dims dimensions) noexcept

  Add an input tensor to the network.
- void markOutput (ITensor &tensor) noexcept

  Mark a tensor as a network output.
- TRT_DEPRECATED IConvolutionLayer * addConvolution (ITensor &input, int32_t nbOutputMaps, DimsHW kernelSize, Weights kernelWeights, Weights biasWeights) noexcept

  Add a convolution layer to the network.
- IFullyConnectedLayer * addFullyConnected (ITensor &input, int32_t nbOutputs, Weights kernelWeights, Weights biasWeights) noexcept

  Add a fully connected layer to the network.
- IActivationLayer * addActivation (ITensor &input, ActivationType type) noexcept

  Add an activation layer to the network.
- TRT_DEPRECATED IPoolingLayer * addPooling (ITensor &input, PoolingType type, DimsHW windowSize) noexcept

  Add a pooling layer to the network.
- ILRNLayer * addLRN (ITensor &input, int32_t window, float alpha, float beta, float k) noexcept

  Add a LRN layer to the network.
- IScaleLayer * addScale (ITensor &input, ScaleMode mode, Weights shift, Weights scale, Weights power) noexcept

  Add a Scale layer to the network.
- ISoftMaxLayer * addSoftMax (ITensor &input) noexcept

  Add a SoftMax layer to the network.
- IConcatenationLayer * addConcatenation (ITensor *const *inputs, int32_t nbInputs) noexcept

  Add a concatenation layer to the network.
- TRT_DEPRECATED IDeconvolutionLayer * addDeconvolution (ITensor &input, int32_t nbOutputMaps, DimsHW kernelSize, Weights kernelWeights, Weights biasWeights) noexcept

  Add a deconvolution layer to the network.
- IElementWiseLayer * addElementWise (ITensor &input1, ITensor &input2, ElementWiseOperation op) noexcept

  Add an elementwise layer to the network.
- IUnaryLayer * addUnary (ITensor &input, UnaryOperation operation) noexcept

  Add a unary layer to the network.
- TRT_DEPRECATED IPaddingLayer * addPadding (ITensor &input, DimsHW prePadding, DimsHW post↩ Padding) noexcept

  Add a padding layer to the network.
- IShuffleLayer * addShuffle (ITensor &input) noexcept

  Add a shuffle layer to the network.
- int32_t getNbLayers () const noexcept

  Get the number of layers in the network.
- ILayer * getLayer (int32_t index) const noexcept

  Get the layer specified by the given index.
- int32_t getNbInputs () const noexcept

  Get the number of inputs in the network.
- ITensor * getInput (int32_t index) const noexcept

  Get the input tensor specified by the given index.

- int32_t getNbOutputs () const noexcept

  Get the number of outputs in the network.
- ITensor * getOutput (int32_t index) const noexcept

  Get the output tensor specified by the given index.
- TRT_DEPRECATED void destroy () noexcept

  Destroy this INetworkDefinition object.
- IReduceLayer * addReduce (ITensor &input, ReduceOperation operation, uint32_t reduceAxes, bool keep↩ Dimensions) noexcept

  Add a reduce layer to the network.
- ITopKLayer * addTopK (ITensor &input, TopKOperation op, int32_t k, uint32_t reduceAxes) noexcept

  Add a TopK layer to the network.
- IGatherLayer * addGather (ITensor &data, ITensor &indices, int32_t axis) noexcept

  Add gather with mode GatherMode::kDEFAULT and specified axis and nbElementWiseDims=0.
- IGatherLayer * addGatherV2 (ITensor &data, ITensor &indices, GatherMode mode)

  Add gather with specified mode, axis=0 and nbElementWiseDims=0.
- IRaggedSoftMaxLayer * addRaggedSoftMax (ITensor &input, ITensor &bounds) noexcept

  Add a RaggedSoftMax layer to the network.
- IMatrixMultiplyLayer * addMatrixMultiply (ITensor &input0, MatrixOperation op0, ITensor &input1, MatrixOperation op1) noexcept

  Add a MatrixMultiply layer to the network.
- IConstantLayer * addConstant (Dims dimensions, Weights weights) noexcept

  Add a constant layer to the network.
- TRT_DEPRECATED IRNNv2Layer * addRNNv2 (ITensor &input, int32_t layerCount, int32_t hiddenSize, int32_t maxSeqLen, RNNOperation op) noexcept

  Add an `layerCount` deep RNN layer to the network with `hiddenSize` internal states that can take a batch with fixed or variable sequence lengths.
- IIdentityLayer * addIdentity (ITensor &input) noexcept

  Add an identity layer.
- void removeTensor (ITensor &tensor) noexcept

  remove a tensor from the network definition.
- void unmarkOutput (ITensor &tensor) noexcept

  unmark a tensor as a network output.
- IPluginV2Layer * addPluginV2 (ITensor *const *inputs, int32_t nbInputs, IPluginV2 &plugin) noexcept

  Add a plugin layer to the network using the IPluginV2 interface.
- ISliceLayer * addSlice (ITensor &input, Dims start, Dims size, Dims stride) noexcept

  Add a slice layer to the network.
- void setName (const char *name) noexcept

  Sets the name of the network.
- const char * getName () const noexcept

  Returns the name associated with the network.
- IShapeLayer * addShape (ITensor &input) noexcept

  Add a shape layer to the network.
- bool hasImplicitBatchDimension () const noexcept

  Query whether the network was created with an implicit batch dimension.
- bool markOutputForShapes (ITensor &tensor) noexcept

  Enable tensor's value to be computed by IExecutionContext::getShapeBinding.
- bool unmarkOutputForShapes (ITensor &tensor) noexcept

  Undo markOutputForShapes.

- IParametricReLULayer * addParametricReLU (ITensor &input, ITensor &slope) noexcept

  Add a parametric ReLU layer to the network.
- IConvolutionLayer * addConvolutionNd (ITensor &input, int32_t nbOutputMaps, Dims kernelSize, Weights kernelWeights, Weights biasWeights) noexcept

  Add a multi-dimension convolution layer to the network.
- IPoolingLayer * addPoolingNd (ITensor &input, PoolingType type, Dims windowSize) noexcept

  Add a multi-dimension pooling layer to the network.
- IDeconvolutionLayer * addDeconvolutionNd (ITensor &input, int32_t nbOutputMaps, Dims kernelSize, Weights kernelWeights, Weights biasWeights) noexcept

  Add a multi-dimension deconvolution layer to the network.
- IScaleLayer * addScaleNd (ITensor &input, ScaleMode mode, Weights shift, Weights scale, Weights power, int32_t channelAxis) noexcept

  Add a multi-dimension scale layer to the network.
- IResizeLayer * addResize (ITensor &input) noexcept

  Add a resize layer to the network.
- TRT_DEPRECATED bool hasExplicitPrecision () const noexcept

  True if network is an explicit precision network.
- ILoop * addLoop () noexcept

  Add a loop to the network.
- ISelectLayer * addSelect (ITensor &condition, ITensor &thenInput, ITensor &elseInput) noexcept

  Add a select layer to the network.
- IAssertionLayer * addAssertion (ITensor &condition, const char *message) noexcept

  Add an assertion layer to the network.
- IFillLayer * addFill (Dims dimensions, FillOperation op) noexcept

  Add a fill layer to the network.
- TRT_DEPRECATED IPaddingLayer * addPaddingNd (ITensor &input, Dims prePadding, Dims postPadding) noexcept

  Add a padding layer to the network. Only 2D padding is currently supported.
- bool setWeightsName (Weights weights, const char *name) noexcept

  Associate a name with all current uses of the given weights.
- void setErrorRecorder (IErrorRecorder *recorder) noexcept

  Set the ErrorRecorder for this interface.
- IErrorRecorder * getErrorRecorder () const noexcept

  get the ErrorRecorder assigned to this interface.
- IDequantizeLayer * addDequantize (ITensor &input, ITensor &scale) noexcept

  Add a dequantization layer to the network.
- IScatterLayer * addScatter (ITensor &data, ITensor &indices, ITensor &updates, ScatterMode mode) noexcept

  Add a Scatter layer to the network with specified mode and axis=0.
- IQuantizeLayer * addQuantize (ITensor &input, ITensor &scale) noexcept

  Add a quantization layer to the network.
- IIfConditional * addIfConditional () noexcept

  Add an If-conditional layer to the network.
- IEinsumLayer * addEinsum (ITensor *const *inputs, int32_t nbInputs, const char *equation) noexcept

  Add an Einsum layer to the network.

Protected Attributes

- apiv::VNetworkDefinition * mImpl

Additional Inherited Members

9.82.1 Detailed Description

A network definition for input to the builder.

A network definition defines the structure of the network, and combined with a IBuilderConfig, is built into an engine using an IBuilder. An INetworkDefinition can either have an implicit batch dimensions, specified at runtime, or all dimensions explicit, full dims mode, in the network definition. When a network has been created using createNetwork(), only implicit batch size mode is supported. The function hasImplicitBatchDimension() is used to query the mode of the network.

A network with implicit batch dimensions returns the dimensions of a layer without the implicit dimension, and instead the batch is specified at execute/enqueue time. If the network has all dimensions specified, then the first dimension follows elementwise broadcast rules: if it is 1 for some inputs and is some value N for all other inputs, then the first dimension of each output is N, and the inputs with 1 for the first dimension are broadcast. Having divergent batch sizes across inputs to a layer is not supported.

Warning

Do not inherit from this class, as doing so will break forward-compatibility of the API and ABI.

9.82.2 Constructor & Destructor Documentation

9.82.2.1 ~INetworkDefinition()

```
virtual nvinfer1::INetworkDefinition::~INetworkDefinition ( )  [virtual], [default], [noexcept]
```

9.82.3 Member Function Documentation

9.82.3.1 addActivation()

```
IActivationLayer * nvinfer1::INetworkDefinition::addActivation (
            ITensor & input,
            ActivationType type )  [inline], [noexcept]
```

Add an activation layer to the network.

Parameters

input	The input tensor to the layer.
type	The type of activation function to apply.

Note that the setAlpha() and setBeta() methods must be used on the output for activations that require these parameters.

See also

IActivationLayer ActivationType

Warning

Int32 tensors are not valid input tensors.

Returns

The new activation layer, or nullptr if it could not be created.

9.82.3.2 addAssertion()

```
IAssertionLayer * nvinfer1::INetworkDefinition::addAssertion (
            ITensor & condition,
            const char * message )  [inline], [noexcept]
```

Add an assertion layer to the network.

Parameters

condition	The input tensor to the layer.
message	A message to print if the assertion fails.

See also

IAssertionLayer

Returns

The new assertion layer, or nullptr if it could not be created.

The input tensor must be a boolean shape tensor.

9.82.3.3 addConcatenation()

```
IConcatenationLayer * nvinfer1::INetworkDefinition::addConcatenation (
            ITensor *const * inputs,
            int32_t nbInputs )  [inline], [noexcept]
```

Add a concatenation layer to the network.

Parameters

inputs	The input tensors to the layer.
nbInputs	The number of input tensors.

See also

IConcatenationLayer

Returns

The new concatenation layer, or nullptr if it could not be created.

Warning

All tensors must have the same dimensions except along the concatenation axis.

9.82.3.4 addConstant()

```
IConstantLayer * nvinfer1::INetworkDefinition::addConstant (
            Dims dimensions,
            Weights weights )  [inline], [noexcept]
```

Add a constant layer to the network.

Parameters

dimensions	The dimensions of the constant.
weights	The constant value, represented as weights.

See also

IConstantLayer

Returns

The new constant layer, or nullptr if it could not be created.

If weights.type is DataType::kINT32, the output is a tensor of 32-bit indices. Otherwise the output is a tensor of real values and the output type will be follow TensorRT's normal precision rules.

If tensors in the network have an implicit batch dimension, the constant is broadcast over that dimension.

If a wildcard dimension is used, the volume of the runtime dimensions must equal the number of weights specified.

9.82.3.5 addConvolution()

```
TRT_DEPRECATED IConvolutionLayer * nvinfer1::INetworkDefinition::addConvolution (
            ITensor & input,
            int32_t nbOutputMaps,
            DimsHW kernelSize,
            Weights kernelWeights,
            Weights biasWeights )  [inline], [noexcept]
```

Add a convolution layer to the network.

Parameters

input	The input tensor to the convolution.
nbOutputMaps	The number of output feature maps for the convolution.
kernelSize	The HW-dimensions of the convolution kernel.
kernelWeights	The kernel weights for the convolution.
biasWeights	The bias weights for the convolution. Weights{} represents no bias.

See also

IConvolutionLayer

Warning

It is an error to specify a wildcard value for the 'C' dimension of the input tensor.

Int32 tensors are not valid input tensors.

Returns

The new convolution layer, or nullptr if it could not be created.

Deprecated Superseded by addConvolutionNd. Deprecated prior to TensorRT 8.0 and will be removed in 9.0

9.82.3.6 addConvolutionNd()

```
IConvolutionLayer * nvinfer1::INetworkDefinition::addConvolutionNd (
            ITensor & input,
            int32_t nbOutputMaps,
            Dims kernelSize,
            Weights kernelWeights,
            Weights biasWeights )  [inline], [noexcept]
```

Add a multi-dimension convolution layer to the network.

Parameters

input	The input tensor to the convolution.
nbOutputMaps	The number of output feature maps for the convolution.
kernelSize	The multi-dimensions of the convolution kernel.
kernelWeights	The kernel weights for the convolution.
biasWeights	The bias weights for the convolution. Weights{} represents no bias.

See also

IConvolutionLayer

Warning

It is an error to specify a wildcard value for the 'C' dimension of the input tensor.

Int32 tensors are not valid input tensors.

Only 2D or 3D convolution is supported.

Returns

The new convolution layer, or nullptr if it could not be created.

9.82.3.7 addDeconvolution()

```
TRT_DEPRECATED IDeconvolutionLayer * nvinfer1::INetworkDefinition::addDeconvolution (
            ITensor & input,
            int32_t nbOutputMaps,
            DimsHW kernelSize,
            Weights kernelWeights,
            Weights biasWeights )  [inline], [noexcept]
```

Add a deconvolution layer to the network.

Parameters

input	The input tensor to the layer.
nbOutputMaps	The number of output feature maps.
kernelSize	The HW-dimensions of the deconvolution kernel.
kernelWeights	The kernel weights for the deconvolution.
biasWeights	The bias weights for the deconvolution. Weights{} represents no bias.

See also

IDeconvolutionLayer

Warning

It is an error to specify a wildcard value for the 'C' dimension of the input tensor.

Int32 tensors are not valid input tensors.

Returns

The new deconvolution layer, or nullptr if it could not be created.

Deprecated Superseded by addDeconvolutionNd. Deprecated prior to TensorRT 8.0 and will be removed in 9.0

9.82.3.8 addDeconvolutionNd()

```
IDeconvolutionLayer * nvinfer1::INetworkDefinition::addDeconvolutionNd (
            ITensor & input,
            int32_t nbOutputMaps,
            Dims kernelSize,
            Weights kernelWeights,
            Weights biasWeights )  [inline], [noexcept]
```

Add a multi-dimension deconvolution layer to the network.

Parameters

input	The input tensor to the layer.
nbOutputMaps	The number of output feature maps.
kernelSize	The multi-dimensions of the deconvolution kernel.
kernelWeights	The kernel weights for the deconvolution.
biasWeights	The bias weights for the deconvolution. Weights{} represents no bias.

See also

IDeconvolutionLayer

Warning

It is an error to specify a wildcard value for the 'C' dimension of the input tensor.

Int32 tensors are not valid input tensors.

Only 2D or 3D deconvolution is supported.

Returns

The new deconvolution layer, or nullptr if it could not be created.

9.82.3.9 addDequantize()

```
IDequantizeLayer * nvinfer1::INetworkDefinition::addDequantize (
            ITensor & input,
            ITensor & scale )  [inline], [noexcept]
```

Add a dequantization layer to the network.

Parameters

input	The input tensor to be quantized.
scale	A tensor with the scale value.

See also

IDequantizeLayer

`input` tensor data type must be DataType::kFLOAT. `scale` tensor data type must be DataType::kFLOAT. The subgraph which terminates with the `scale` tensor must be a build-time constant.

Returns

The new quantization layer, or nullptr if it could not be created.

9.82.3.10 addEinsum()

```
IEinsumLayer * nvinfer1::INetworkDefinition::addEinsum (
            ITensor *const * inputs,
            int32_t nbInputs,
            const char * equation )  [inline], [noexcept]
```

Add an Einsum layer to the network.

Parameters

inputs	The input tensors to the layer.
nbInputs	The number of input tensors.
equation	The equation of the layer

See also

IEinsumLayer

Returns

The new Einsum layer, or nullptr if it could not be created.

9.82.3.11 addElementWise()

```
IElementWiseLayer * nvinfer1::INetworkDefinition::addElementWise (
            ITensor & input1,
            ITensor & input2,
            ElementWiseOperation op ) [inline], [noexcept]
```

Add an elementwise layer to the network.

Parameters

input1	The first input tensor to the layer.
input2	The second input tensor to the layer.
op	The binary operation that the layer applies.

The input tensors must have the same rank. For each dimension, their lengths must match, or one of them must be one. In the latter case, the tensor is broadcast along that axis.

The output tensor has the same rank as the inputs. For each dimension, its length is the maximum of the lengths of the corresponding input dimension.

See also

IElementWiseLayer

Warning

For shape tensors, ElementWiseOperation::kPOW is not a valid op.

Returns

The new elementwise layer, or nullptr if it could not be created.

9.82.3.12 addFill()

```
IFillLayer * nvinfer1::INetworkDefinition::addFill (
             Dims dimensions,
             FillOperation op )  [inline], [noexcept]
```

Add a fill layer to the network.

Parameters

dimensions	The output tensor dimensions.
op	The fill operation that the layer applies.

Warning

For FillOperation::kLINSPACE, dimensions.nbDims must be 1.

The network must not have an implicit batch dimension.

See also

IFillLayer

Returns

The new fill layer, or nullptr if it could not be created.

9.82.3.13 addFullyConnected()

```
IFullyConnectedLayer * nvinfer1::INetworkDefinition::addFullyConnected (
            ITensor & input,
            int32_t nbOutputs,
            Weights kernelWeights,
            Weights biasWeights )  [inline], [noexcept]
```

Add a fully connected layer to the network.

Parameters

input	The input tensor to the layer.
nbOutputs	The number of outputs of the layer.
kernelWeights	The kernel weights for the fully connected layer.
biasWeights	The bias weights for the fully connected layer. Weights{} represents no bias.

See also

IFullyConnectedLayer

Warning

It is an error to specify a wildcard value for the 'C' dimension of the input tensor.

Int32 tensors are not valid input tensors.

Returns

The new fully connected layer, or nullptr if it could not be created.

9.82.3.14 addGather()

```
IGatherLayer * nvinfer1::INetworkDefinition::addGather (
            ITensor & data,
            ITensor & indices,
            int32_t axis )  [inline], [noexcept]
```

Add gather with mode GatherMode::kDEFAULT and specified axis and nbElementWiseDims=0.

Parameters

data	The tensor to gather values from.
indices	The tensor to get indices from to populate the output tensor.
axis	The axis in the data tensor to gather on.

See also

IGatherLayer

Returns

The new gather layer, or nullptr if it could not be created.

9.82.3.15 addGatherV2()

```
IGatherLayer * nvinfer1::INetworkDefinition::addGatherV2 (
            ITensor & data,
            ITensor & indices,
            GatherMode mode )  [inline]
```

Add gather with specified mode, axis=0 and nbElementWiseDims=0.

Parameters

data	The tensor to gather values from.
indices	The tensor to get indices from to populate the output tensor.
mode	The gather mode.

See also

IGatherLayer

Returns

The new gather layer, or nullptr if it could not be created.

9.82.3.16 addIdentity()

```
IIdentityLayer * nvinfer1::INetworkDefinition::addIdentity (
            ITensor & input )  [inline], [noexcept]
```

Add an identity layer.

Parameters

input	The input tensor to the layer.

See also

IIdentityLayer

Returns

The new identity layer, or nullptr if it could not be created.

9.82.3.17 addIfConditional()

```
IIfConditional * nvinfer1::INetworkDefinition::addIfConditional ( )  [inline], [noexcept]
```

Add an If-conditional layer to the network.

An IIfConditional provides a way to conditionally execute parts of the network.

See also

IIfConditional

Returns

The new conditional layer, or nullptr if network has an implicit batch dimension or this version of TensorRT does not support conditional execution.

9.82.3.18 addInput()

```
ITensor * nvinfer1::INetworkDefinition::addInput (
            const char * name,
            DataType type,
            Dims dimensions )  [inline], [noexcept]
```

Add an input tensor to the network.

The name of the input tensor is used to find the index into the buffer array for an engine built from the network. The volume must be less than 2^31 elements.

For networks with an implicit batch dimension, this volume includes the batch dimension with its length set to the maximum batch size. For networks with all explicit dimensions and with wildcard dimensions, the volume is based on the maxima specified by an IOptimizationProfile.Dimensions are normally non-negative integers. The exception is that in networks with all explicit dimensions, -1 can be used as a wildcard for a dimension to be specified at runtime. Input tensors with such a wildcard must have a corresponding entry in the IOptimizationProfiles indicating the permitted extrema, and the input dimensions must be set by IExecutionContext::setBindingDimensions. Different IExecutionContext instances can have different dimensions. Wildcard dimensions are only supported for EngineCapability::kSTANDARD. They are not supported in safety contexts. DLA does not support Wildcard dimensions.

Tensor dimensions are specified independent of format. For example, if a tensor is formatted in "NHWC" or a vectorized format, the dimensions are still specified in the order{N, C, H, W}. For 2D images with a channel dimension, the last three dimensions are always {C,H,W}. For 3D images with a channel dimension, the last four dimensions are always {C,D,H,W}.

Parameters

name	The name of the tensor.
type	The type of the data held in the tensor.
dimensions	The dimensions of the tensor.

Warning

It is an error to specify a wildcard value on a dimension that is determined by trained parameters.

If run on DLA with explicit dimensions, only leading dimension can be a wildcard. And provided profile must have same minimum, optimum, and maximum dimensions.

See also

ITensor

Returns

The new tensor or nullptr if there is an error.

9.82.3.19 addLoop()

```
ILoop * nvinfer1::INetworkDefinition::addLoop ( )  [inline], [noexcept]
```

Add a loop to the network.

An ILoop provides a way to specify a recurrent subgraph.

Returns

Pointer to ILoop that can be used to add loop boundary layers for the loop, or nullptr if network has an implicit batch dimension or this version of TensorRT does not support loops.

The network must not have an implicit batch dimension.

9.82.3.20 addLRN()

```
ILRNLayer * nvinfer1::INetworkDefinition::addLRN (
            ITensor & input,
            int32_t window,
            float alpha,
            float beta,
            float k )  [inline], [noexcept]
```

Add a LRN layer to the network.

Parameters

input	The input tensor to the layer.
window	The size of the window.
alpha	The alpha value for the LRN computation.
beta	The beta value for the LRN computation.
k	The k value for the LRN computation.

See also

ILRNLayer

Warning

Int32 tensors are not valid input tensors.

Returns

The new LRN layer, or nullptr if it could not be created.

9.82.3.21 addMatrixMultiply()

```
IMatrixMultiplyLayer * nvinfer1::INetworkDefinition::addMatrixMultiply (
            ITensor & input0,
            MatrixOperation op0,
            ITensor & input1,
            MatrixOperation op1 )  [inline], [noexcept]
```

Add a MatrixMultiply layer to the network.

Parameters

input0	The first input tensor (commonly A).
op0	The operation to apply to input0.
input1	The second input tensor (commonly B).
op1	The operation to apply to input1.

See also

IMatrixMultiplyLayer

Warning

Int32 tensors are not valid input tensors.

Returns

The new matrix multiply layer, or nullptr if it could not be created.

9.82.3.22 addPadding()

```
TRT_DEPRECATED IPaddingLayer * nvinfer1::INetworkDefinition::addPadding (
            ITensor & input,
            DimsHW prePadding,
            DimsHW postPadding )  [inline], [noexcept]
```

Add a padding layer to the network.

Parameters

input	The input tensor to the layer.
prePadding	The padding to apply to the start of the tensor.
postPadding	The padding to apply to the end of the tensor.

See also

IPaddingLayer

Returns

The new padding layer, or nullptr if it could not be created.

Deprecated Superseded by addPaddingNd. Deprecated prior to TensorRT 8.0 and will be removed in 9.0

9.82.3.23 addPaddingNd()

```
TRT_DEPRECATED IPaddingLayer * nvinfer1::INetworkDefinition::addPaddingNd (
            ITensor & input,
            Dims prePadding,
            Dims postPadding )  [inline], [noexcept]
```

Add a padding layer to the network. Only 2D padding is currently supported.

Parameters

input	The input tensor to the layer.
prePadding	The padding to apply to the start of the tensor.
postPadding	The padding to apply to the end of the tensor.

See also

IPaddingLayer

Returns

The new padding layer, or nullptr if it could not be created.

Deprecated Superseded by addSlice. Deprecated in TensorRT 8.0

9.82.3.24 addParametricReLU()

```
IParametricReLULayer * nvinfer1::INetworkDefinition::addParametricReLU (
            ITensor & input,
            ITensor & slope )  [inline], [noexcept]
```

Add a parametric ReLU layer to the network.

Parameters

input	The input tensor to the layer.
slope	The slope tensor to the layer. This tensor should be unidirectionally broadcastable to the input tensor.

See also

IParametricReLULayer

Warning

Int32 tensors are not valid input tensors.

Returns

The new parametric ReLU layer, or nullptr if it could not be created.

9.82.3.25 addPluginV2()

```
IPluginV2Layer * nvinfer1::INetworkDefinition::addPluginV2 (
            ITensor *const * inputs,
            int32_t nbInputs,
            IPluginV2 & plugin )  [inline], [noexcept]
```

Add a plugin layer to the network using the IPluginV2 interface.

Parameters

inputs	The input tensors to the layer.
nbInputs	The number of input tensors.
plugin	The layer plugin.

See also

IPluginV2Layer

Warning

Dimension wildcard are only supported with IPluginV2DynamicExt or IPluginV2IOExt plugins.

Int32 tensors are not valid input tensors.

Returns

The new plugin layer, or nullptr if it could not be created.

9.82.3.26 addPooling()

```
TRT_DEPRECATED IPoolingLayer * nvinfer1::INetworkDefinition::addPooling (
            ITensor & input,
            PoolingType type,
            DimsHW windowSize )  [inline], [noexcept]
```

Add a pooling layer to the network.

Parameters

input	The input tensor to the layer.
type	The type of pooling to apply.
windowSize	The size of the pooling window.

See also

IPoolingLayer PoolingType

Warning

Int32 tensors are not valid input tensors.

Returns

The new pooling layer, or nullptr if it could not be created.

Deprecated Superseded by addPoolingNd. Deprecated prior to TensorRT 8.0 and will be removed in 9.0

9.82.3.27 addPoolingNd()

```
IPoolingLayer * nvinfer1::INetworkDefinition::addPoolingNd (
            ITensor & input,
            PoolingType type,
            Dims windowSize )  [inline], [noexcept]
```

Add a multi-dimension pooling layer to the network.

Parameters

input	The input tensor to the layer.
type	The type of pooling to apply.
windowSize	The size of the pooling window.

See also

IPoolingLayer PoolingType

Warning

Int32 tensors are not valid input tensors.

Only 2D or 3D pooling is supported.

Returns

The new pooling layer, or nullptr if it could not be created.

9.82.3.28 addQuantize()

```
IQuantizeLayer * nvinfer1::INetworkDefinition::addQuantize (
            ITensor & input,
            ITensor & scale )  [inline], [noexcept]
```

Add a quantization layer to the network.

Parameters

input	The input tensor to be quantized.
scale	A tensor with the scale value.

See also

IQuantizeLayer

`input` tensor data type must be DataType::kFLOAT. `scale` tensor data type must be DataType::kFLOAT. The subgraph which terminates with the `scale` tensor must be a build-time constant.

Returns

The new quantization layer, or nullptr if it could not be created.

9.82.3.29 addRaggedSoftMax()

```
IRaggedSoftMaxLayer * nvinfer1::INetworkDefinition::addRaggedSoftMax (
            ITensor & input,
            ITensor & bounds ) [inline], [noexcept]
```

Add a RaggedSoftMax layer to the network.

Parameters

input	The ZxS input tensor.
bounds	The Zx1 bounds tensor.

See also

IRaggedSoftMaxLayer

Warning

The bounds tensor cannot have the last dimension be the wildcard character.

Int32 tensors are not valid input tensors.

Returns

The new RaggedSoftMax layer, or nullptr if it could not be created.

9.82.3.30 addReduce()

```
IReduceLayer * nvinfer1::INetworkDefinition::addReduce (
            ITensor & input,
            ReduceOperation operation,
            uint32_t reduceAxes,
            bool keepDimensions )  [inline], [noexcept]
```

Add a reduce layer to the network.

Parameters

input	The input tensor to the layer.
operation	The reduction operation to perform.
reduceAxes	The reduction dimensions. The bit in position i of bitmask reduceAxes corresponds to explicit dimension i if result. E.g., the least significant bit corresponds to the first explicit dimension and the next to least significant bit corresponds to the second explicit dimension.
keepDimensions	The boolean that specifies whether or not to keep the reduced dimensions in the output of the layer.

The reduce layer works by performing an operation specified by `operation` to reduce the tensor `input` across the axes specified by `reduceAxes`.

See also

IReduceLayer

Warning

If output is a shape tensor, ReduceOperation::kAVG is unsupported.

Returns

The new reduce layer, or nullptr if it could not be created.

9.82.3.31 addResize()

```
IResizeLayer * nvinfer1::INetworkDefinition::addResize (
            ITensor & input )  [inline], [noexcept]
```

Add a resize layer to the network.

Parameters

input	The input tensor to the layer.

See also

IResizeLayer

Warning

Int32 tensors are not valid input tensors.

Returns

The new resize layer, or nullptr if it could not be created.

9.82.3.32 addRNNv2()

```
TRT_DEPRECATED IRNNv2Layer * nvinfer1::INetworkDefinition::addRNNv2 (
            ITensor & input,
            int32_t layerCount,
            int32_t hiddenSize,
            int32_t maxSeqLen,
            RNNOperation op )  [inline], [noexcept]
```

Add an `layerCount` deep RNN layer to the network with `hiddenSize` internal states that can take a batch with fixed or variable sequence lengths.

Parameters

input	The input tensor to the layer (see below).
layerCount	The number of layers in the RNN.
hiddenSize	Size of the internal hidden state for each layer.
maxSeqLen	Maximum sequence length for the input.
op	The type of RNN to execute.

By default, the layer is configured with RNNDirection::kUNIDIRECTION and RNNInputMode::kLINEAR. To change these settings, use IRNNv2Layer::setDirection() and IRNNv2Layer::setInputMode().

Weights and biases for the added layer should be set using IRNNv2Layer::setWeightsForGate() and IRNNv2Layer::setBiasForGate() prior to building an engine using this network.

The input tensors must be of the type DataType::kFLOAT or DataType::kHALF. The layout of the weights is row major and must be the same datatype as the input tensor. `weights` contain 8 matrices and `bias` contains 8 vectors.

See IRNNv2Layer::setWeightsForGate() and IRNNv2Layer::setBiasForGate() for details on the required input format for `weights` and `bias`.

The `input` ITensor should contain zero or more index dimensions {`N1, ..., Np`}, followed by two dimensions, defined as follows:

- S_max is the maximum allowed sequence length (number of RNN iterations)
- E specifies the embedding length (unless ::kSKIP is set, in which case it should match getHiddenSize()).

By default, all sequences in the input are assumed to be size maxSeqLen. To provide explicit sequence lengths for each input sequence in the batch, use IRNNv2Layer::setSequenceLengths().

The RNN layer outputs up to three tensors.

The first output tensor is the output of the final RNN layer across all timesteps, with dimensions {N1, ..., Np, S_max, H}:

- N1..Np are the index dimensions specified by the input tensor
- S_max is the maximum allowed sequence length (number of RNN iterations)
- H is an output hidden state (equal to getHiddenSize() or 2x getHiddenSize())

The second tensor is the final hidden state of the RNN across all layers, and if the RNN is an LSTM (i.e. getOperation() is ::kLSTM), then the third tensor is the final cell state of the RNN across all layers. Both the second and third output tensors have dimensions {N1, ..., Np, L, H}:

- N1..Np are the index dimensions specified by the input tensor
- L is the number of layers in the RNN, equal to getLayerCount() if getDirection is ::kUNIDIRECTION, and 2x getLayerCount() if getDirection is ::kBIDIRECTION. In the bi-directional case, layer l's final forward hidden state is stored in L = 2*l, and final backward hidden state is stored in L= 2*l + 1.
- H is the hidden state for each layer, equal to getHiddenSize().

See also

IRNNv2Layer

Deprecated Superseded by INetworkDefinition::addLoop. Deprecated prior to TensorRT 8.0 and will be removed in 9.0

Warning

RNN inputs do not support wildcard dimensions or explicit batch size networks.

Int32 tensors are not valid input tensors, only for sequence lengths.

Returns

The new RNN layer, or nullptr if it could not be created.

9.82.3.33 addScale()

```
IScaleLayer * nvinfer1::INetworkDefinition::addScale (
            ITensor & input,
            ScaleMode mode,
            Weights shift,
            Weights scale,
            Weights power )  [inline], [noexcept]
```

Add a Scale layer to the network.

Parameters

input	The input tensor to the layer. This tensor is required to have a minimum of 3 dimensions in implicit batch mode and a minimum of 4 dimensions in explicit batch mode.
mode	The scaling mode.
shift	The shift value.
scale	The scale value.
power	The power value.

If the weights are available, then the size of weights are dependent on the ScaleMode. For ::kUNIFORM, the number of weights equals 1. For ::kCHANNEL, the number of weights equals the channel dimension. For ::kELEMENTWISE, the number of weights equals the product of the last three dimensions of the input.

See also

addScaleNd

IScaleLayer

Warning

Int32 tensors are not valid input tensors.

Returns

The new Scale layer, or nullptr if it could not be created.

9.82.3.34 addScaleNd()

```
IScaleLayer * nvinfer1::INetworkDefinition::addScaleNd (
            ITensor & input,
            ScaleMode mode,
            Weights shift,
            Weights scale,
            Weights power,
            int32_t channelAxis )  [inline], [noexcept]
```

Add a multi-dimension scale layer to the network.

Parameters

input	The input tensor to the layer.
mode	The scaling mode.
shift	The shift value.
scale	The scale value.
power	The power value.
channelAxis	The channel axis.

If the weights are available, then the size of weights are dependent on the ScaleMode. For ::kUNIFORM, the number of weights equals 1. For ::kCHANNEL, the number of weights equals the channel dimension. For ::kELEMENTWISE, the number of weights equals the product of all input dimensions at channelAxis and beyond.

For example, if the inputs dimensions are [A,B,C,D,E,F], and channelAxis=2: For ::kUNIFORM, the number of weights is equal to 1. For ::kCHANNEL, the number of weights is C. For ::kELEMENTWISE, the number of weights is C∗D∗E∗F.

channelAxis can also be set explicitly using setChannelAxis().

See also

IScaleLayer

setChannelAxis()

Warning

Int32 tensors are not valid input tensors.

Only 2D or 3D scale is supported.

Returns

The new Scale layer, or nullptr if it could not be created.

9.82.3.35 addScatter()

```
IScatterLayer * nvinfer1::INetworkDefinition::addScatter (
            ITensor & data,
            ITensor & indices,
            ITensor & updates,
            ScatterMode mode )  [inline], [noexcept]
```

Add a Scatter layer to the network with specified mode and axis=0.

Parameters

input	The input tensor to be updated with additional values.
indices	indices of the elements to be updated.
updates	values to be used for updates.

See also

IScatterLayer

`input` tensor data type must be DataType::kFLOAT. `indices` tensor data type must be DataType::kINT32. `updates` tensor data type must be DataType::kFLOAT.

Returns

The new Scatter layer, or nullptr if it could not be created.

9.82.3.36 addSelect()

```
ISelectLayer * nvinfer1::INetworkDefinition::addSelect (
            ITensor & condition,
            ITensor & thenInput,
            ITensor & elseInput )  [inline], [noexcept]
```

Add a select layer to the network.

Parameters

condition	The condition tensor to the layer. Must have type DataType::kBOOL.
thenInput	The ”then” input tensor to the layer.
elseInput	The ”else” input tensor to the layer.

All three input tensors must have the same rank, and along each axis must have the same length or a length of one. If the length is one, the tensor is broadcast along that axis. The output tensor has the dimensions of the inputs AFTER the broadcast rule is applied. For example, given:

dimensions of condition: [1,1,5,9] dimensions of thenInput: [1,1,5,9] dimensions of elseInput: [1,3,1,9]

the output dimensions are [1,3,5,9], and the output contents are defined by:

```
output[0,i,j,k] = condition[0,0,j,k] ? thenInput[0,0,j,k] : elseInput[0,i,0,k]
```

The output dimensions are not necessarily the max of the input dimensions if any input is an empty tensor. For example, if in the preceding example, 5 is changed to 0:

dimensions of condition: [1,1,0,9] dimensions of thenInput: [1,1,0,9] dimensions of elseInput: [1,3,1,9]

then the output dimensions are [1,3,0,9].

The network must not have an implicit batch dimension.

See also

ISelectLayer

Returns

The new select layer, or nullptr if it could not be created.

9.82.3.37 addShape()

```
IShapeLayer * nvinfer1::INetworkDefinition::addShape (
            ITensor & input )  [inline], [noexcept]
```

Add a shape layer to the network.

Parameters

input	The input tensor to the layer.

See also

IShapeLayer

Warning

addShape is only supported when hasImplicitBatchDimensions is false.

input to addShape cannot contain wildcard dimension values.

Returns

The new shape layer, or nullptr if it could not be created.

9.82.3.38 addShuffle()

```
IShuffleLayer * nvinfer1::INetworkDefinition::addShuffle (
            ITensor & input )  [inline], [noexcept]
```

Add a shuffle layer to the network.

Parameters

input	The input tensor to the layer.

See also

IShuffleLayer

Returns

The new shuffle layer, or nullptr if it could not be created.

9.82.3.39 addSlice()

```
ISliceLayer * nvinfer1::INetworkDefinition::addSlice (
            ITensor & input,
```

```
            Dims start,
            Dims size,
            Dims stride )  [inline], [noexcept]
```

Add a slice layer to the network.

Parameters

input	The input tensor to the layer.
start	The start offset
size	The output dimension
stride	The slicing stride

Positive, negative, zero stride values, and combinations of them in different dimensions are allowed.

See also

ISliceLayer

Returns

The new slice layer, or nullptr if it could not be created.

9.82.3.40 addSoftMax()

```
ISoftMaxLayer * nvinfer1::INetworkDefinition::addSoftMax (
            ITensor & input )  [inline], [noexcept]
```

Add a SoftMax layer to the network.

See also

ISoftMaxLayer

Warning

Int32 tensors are not valid input tensors.

Returns

The new SoftMax layer, or nullptr if it could not be created.

9.82.3.41 addTopK()

```
ITopKLayer * nvinfer1::INetworkDefinition::addTopK (
            ITensor & input,
            TopKOperation op,
            int32_t k,
            uint32_t reduceAxes )  [inline], [noexcept]
```

Add a TopK layer to the network.

The TopK layer has two outputs of the same dimensions. The first contains data values, the second contains index positions for the values. Output values are sorted, largest first for operation kMAX and smallest first for operation kMIN.

Currently only values of K up to 1024 are supported.

Parameters

input	The input tensor to the layer.
op	Operation to perform.
k	Number of elements to keep.
reduceAxes	The reduction dimensions. The bit in position i of bitmask reduceAxes corresponds to explicit dimension i of the result. E.g., the least significant bit corresponds to the first explicit dimension and the next to least significant bit corresponds to the second explicit dimension.

Currently reduceAxes must specify exactly one dimension, and it must be one of the last four dimensions.

See also

ITopKLayer

Warning

Int32 tensors are not valid input tensors.

Returns

The new TopK layer, or nullptr if it could not be created.

9.82.3.42 addUnary()

```
IUnaryLayer * nvinfer1::INetworkDefinition::addUnary (
            ITensor & input,
            UnaryOperation operation )  [inline], [noexcept]
```

Add a unary layer to the network.

Parameters

input	The input tensor to the layer.
operation	The operation to apply.

See also

IUnaryLayer

Warning

Int32 tensors are only valid for kSIGN.

Bool tensors are only valid for kNOT.

Shape tensors are not supported as outputs.

Returns

The new unary layer, or nullptr if it could not be created

9.82.3.43 destroy()

```
TRT_DEPRECATED void nvinfer1::INetworkDefinition::destroy ( )  [inline], [noexcept]
```

Destroy this INetworkDefinition object.

Deprecated Use `delete` instead. Deprecated in TensorRT 8.0

Warning

Calling destroy on a managed pointer will result in a double-free error.

9.82.3.44 getErrorRecorder()

```
IErrorRecorder * nvinfer1::INetworkDefinition::getErrorRecorder ( ) const  [inline], [noexcept]
```

get the ErrorRecorder assigned to this interface.

Retrieves the assigned error recorder object for the given class. A nullptr will be returned if setErrorRecorder has not been called.

Returns

A pointer to the IErrorRecorder object that has been registered.

See also

setErrorRecorder()

9.82.3.45 getInput()

```
ITensor * nvinfer1::INetworkDefinition::getInput (
            int32_t index ) const  [inline], [noexcept]
```

Get the input tensor specified by the given index.

Parameters

index	The index of the input tensor.

Returns

The input tensor, or nullptr if the index is out of range.

Note

adding inputs invalidates indexing here

See also

getNbInputs()

9.82.3.46 getLayer()

```
ILayer * nvinfer1::INetworkDefinition::getLayer (
            int32_t index ) const  [inline], [noexcept]
```

Get the layer specified by the given index.

Parameters

index	The index of the layer.

Returns

The layer, or nullptr if the index is out of range.

See also

getNbLayers()

9.82.3.47 getName()

```
const char * nvinfer1::INetworkDefinition::getName ( ) const  [inline], [noexcept]
```

Returns the name associated with the network.

The memory pointed to by getName() is owned by the INetworkDefinition object.

See also

INetworkDefinition::setName()

Returns

A null-terminated C-style string representing the name of the network.

9.82.3.48 getNbInputs()

```
int32_t nvinfer1::INetworkDefinition::getNbInputs ( ) const  [inline], [noexcept]
```

Get the number of inputs in the network.

Returns

The number of inputs in the network.

See also

getInput()

9.82.3.49 getNbLayers()

```
int32_t nvinfer1::INetworkDefinition::getNbLayers ( ) const  [inline], [noexcept]
```

Get the number of layers in the network.

Returns

The number of layers in the network.

See also

getLayer()

9.82.3.50 getNbOutputs()

```
int32_t nvinfer1::INetworkDefinition::getNbOutputs ( ) const  [inline], [noexcept]
```

Get the number of outputs in the network.

The outputs include those marked by markOutput or markOutputForShapes.

Returns

The number of outputs in the network.

See also

getOutput()

9.82.3.51 getOutput()

```
ITensor * nvinfer1::INetworkDefinition::getOutput (
            int32_t index ) const  [inline], [noexcept]
```

Get the output tensor specified by the given index.

Parameters

index	The index of the output tensor.

Returns

The output tensor, or nullptr if the index is out of range.

Note

adding inputs invalidates indexing here

See also

getNbOutputs()

9.82.3.52 hasExplicitPrecision()

```
TRT_DEPRECATED bool nvinfer1::INetworkDefinition::hasExplicitPrecision ( ) const  [inline], [noexcept]
```

True if network is an explicit precision network.

Deprecated Deprecated in TensorRT 8.0

hasExplicitPrecision() is true if and only if this INetworkDefinition was created with createNetworkV2() with NetworkDefinitionCreationFlag::kEXPLICIT_PRECISION set.

See also

createNetworkV2

Returns

True if network has explicit precision, false otherwise.

9.82.3.53 hasImplicitBatchDimension()

```
bool nvinfer1::INetworkDefinition::hasImplicitBatchDimension ( ) const  [inline], [noexcept]
```

Query whether the network was created with an implicit batch dimension.

Returns

True if tensors have implicit batch dimension, false otherwise.

This is a network-wide property. Either all tensors in the network have an implicit batch dimension or none of them do.

hasImplicitBatchDimension() is true if and only if this INetworkDefinition was created with createNetwork() or createNetworkV2() without NetworkDefinitionCreationFlag::kEXPLICIT_BATCH flag.

See also

createNetworkV2

9.82.3.54 markOutput()

```
void nvinfer1::INetworkDefinition::markOutput (
            ITensor & tensor )  [inline], [noexcept]
```

Mark a tensor as a network output.

Parameters

tensor	The tensor to mark as an output tensor.

Warning

It is an error to mark a network input as an output.

It is an error to mark a tensor inside an ILoop or an IIfConditional as an output.

9.82.3.55 markOutputForShapes()

```
bool nvinfer1::INetworkDefinition::markOutputForShapes (
            ITensor & tensor ) [inline], [noexcept]
```

Enable tensor's value to be computed by IExecutionContext::getShapeBinding.

Returns

True if successful, false if tensor is already marked as an output.

The tensor must be of type DataType::kINT32 and have no more than one dimension.

Warning

The tensor must have dimensions that can be determined to be constants at build time.

It is an error to mark a network input as a shape output.

See also

isShapeBinding(), getShapeBinding()

9.82.3.56 removeTensor()

```
void nvinfer1::INetworkDefinition::removeTensor (
            ITensor & tensor ) [inline], [noexcept]
```

remove a tensor from the network definition.

Parameters

tensor	the tensor to remove

It is illegal to remove a tensor that is the input or output of a layer. if this method is called with such a tensor, a warning will be emitted on the log and the call will be ignored. Its intended use is to remove detached tensors after e.g. concatenating two networks with Layer::setInput().

9.82.3.57 setErrorRecorder()

```
void nvinfer1::INetworkDefinition::setErrorRecorder (
            IErrorRecorder * recorder )  [inline], [noexcept]
```

Set the ErrorRecorder for this interface.

Assigns the ErrorRecorder to this interface. The ErrorRecorder will track all errors during execution. This function will call incRefCount of the registered ErrorRecorder at least once. Setting recorder to nullptr unregisters the recorder with the interface, resulting in a call to decRefCount if a recorder has been registered.

If an error recorder is not set, messages will be sent to the global log stream.

Parameters

recorder	The error recorder to register with this interface.

See also

getErrorRecorder()

9.82.3.58 setName()

```
void nvinfer1::INetworkDefinition::setName (
            const char * name )  [inline], [noexcept]
```

Sets the name of the network.

Parameters

name	The name to assign to this network.

Set the name of the network so that it can be associated with a built engine. The `name` must be a null-terminated C-style string. TensorRT makes no use of this string except storing it as part of the engine so that it may be retrieved at runtime. A name unique to the builder will be generated by default.

This method copies the name string.

See also

INetworkDefinition::getName(), ISafeCudaEngine::getName()

Returns

none

9.82.3.59 setWeightsName()

```
bool nvinfer1::INetworkDefinition::setWeightsName (
            Weights weights,
            const char * name )  [inline], [noexcept]
```

Associate a name with all current uses of the given weights.

The name must be set after the Weights are used in the network. Lookup is associative. The name applies to all Weights with matching type, value pointer, and count. If Weights with a matching value pointer, but different type or count exists in the network, an error message is issued, the name is rejected, and return false. If the name has already been used for other weights, return false. A nullptr causes the weights to become unnamed, i.e. clears any previous name.

Parameters

weights	The weights to be named.
name	The name to associate with the weights.

Returns

true on success.

9.82.3.60 unmarkOutput()

```
void nvinfer1::INetworkDefinition::unmarkOutput (
            ITensor & tensor )  [inline], [noexcept]
```

unmark a tensor as a network output.

Parameters

tensor	The tensor to unmark as an output tensor.

see markOutput()

9.82.3.61 unmarkOutputForShapes()

```
bool nvinfer1::INetworkDefinition::unmarkOutputForShapes (
            ITensor & tensor )  [inline], [noexcept]
```

Undo markOutputForShapes.

Warning

inputs to addShape cannot contain wildcard dimension values.

Returns

True if successful, false if tensor is not marked as an output.

9.82.4 Member Data Documentation

9.82.4.1 mImpl

```
apiv::VNetworkDefinition* nvinfer1::INetworkDefinition::mImpl  [protected]
```

The documentation for this class was generated from the following file:

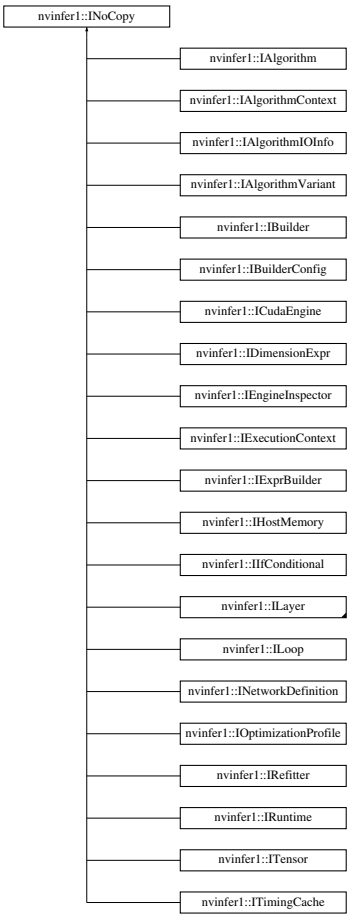
- NvInfer.h

9.83 nvinfer1::INoCopy Class Reference

Forward declaration of IEngineInspector for use by other interfaces.

```
#include <NvInferRuntime.h>
```

Inheritance diagram for nvinfer1::INoCopy:



Protected Member Functions

- INoCopy ()=default
- virtual ~INoCopy ()=default
- INoCopy (const INoCopy &other)=delete
- INoCopy & operator= (const INoCopy &other)=delete
- INoCopy (INoCopy &&other)=delete
- INoCopy & operator= (INoCopy &&other)=delete

9.83.1 Detailed Description

Forward declaration of IEngineInspector for use by other interfaces.

Base class for all TensorRT interfaces that are implemented by the TensorRT libraries

Objects of such classes are not movable or copyable, and should only be manipulated via pointers.

9.83.2 Constructor & Destructor Documentation

9.83.2.1 INoCopy() [1/3]

```
nvinfer1::INoCopy::INoCopy ( )  [protected], [default]
```

9.83.2.2 ~INoCopy()

```
virtual nvinfer1::INoCopy::~INoCopy ( )  [protected], [virtual], [default]
```

9.83.2.3 INoCopy() [2/3]

```
nvinfer1::INoCopy::INoCopy (
            const INoCopy & other )  [protected], [delete]
```

9.83.2.4 INoCopy() [3/3]

```
nvinfer1::INoCopy::INoCopy (
            INoCopy && other )  [protected], [delete]
```

9.83.3 Member Function Documentation

9.83.3.1 operator=() [1/2]

```
INoCopy & nvinfer1::INoCopy::operator= (
            const INoCopy & other )  [protected], [delete]
```

9.83.3.2 operator=() [2/2]

```
INoCopy & nvinfer1::INoCopy::operator= (
            INoCopy && other )  [protected], [delete]
```

The documentation for this class was generated from the following file:

- NvInferRuntime.h

9.84 nvonnxparser::IOnnxConfig Class Reference

Configuration Manager Class.

`#include <NvOnnxConfig.h>`

Public Types

- typedef int32_t Verbosity
  Defines Verbosity level.

Public Member Functions

- virtual ~IOnnxConfig () noexcept=default
- virtual void setModelDtype (const nvinfer1::DataType) noexcept=0
  Set the Model Data Type.
- virtual nvinfer1::DataType getModelDtype () const noexcept=0
  Get the Model Data Type.
- virtual const char * getModelFileName () const noexcept=0
  Get the Model FileName.
- virtual void setModelFileName (const char *onnxFilename) noexcept=0
  Set the Model File Name.
- virtual Verbosity getVerbosityLevel () const noexcept=0
  Get the Verbosity Level.
- virtual void addVerbosity () noexcept=0
  Increase the Verbosity Level.
- virtual void reduceVerbosity () noexcept=0
  Reduce the Verbosity Level.
- virtual void setVerbosityLevel (Verbosity) noexcept=0
  Set to specific verbosity Level.
- virtual const char * getTextFileName () const noexcept=0
  Returns the File Name of the Network Description as a Text File.
- virtual void setTextFileName (const char *textFileName) noexcept=0
  Set the File Name of the Network Description as a Text File.
- virtual const char * getFullTextFileName () const noexcept=0
  Get the File Name of the Network Description as a Text File, including the weights.
- virtual void setFullTextFileName (const char *fullTextFileName) noexcept=0
  Set the File Name of the Network Description as a Text File, including the weights.
- virtual bool getPrintLayerInfo () const noexcept=0
  Get whether the layer information will be printed.
- virtual void setPrintLayerInfo (bool) noexcept=0
  Set whether the layer information will be printed.
- virtual TRT_DEPRECATED void destroy () noexcept=0
  Destroy IOnnxConfig object.

9.84.1 Detailed Description

Configuration Manager Class.

9.84.2 Member Typedef Documentation

9.84.2.1 Verbosity

`nvonnxparser::IOnnxConfig::Verbosity`

Defines Verbosity level.

9.84.3 Constructor & Destructor Documentation

9.84.3.1 ~IOnnxConfig()

```
virtual nvonnxparser::IOnnxConfig::~IOnnxConfig ( )  [virtual], [default], [noexcept]
```

9.84.4 Member Function Documentation

9.84.4.1 addVerbosity()

```
virtual void nvonnxparser::IOnnxConfig::addVerbosity ( )  [pure virtual], [noexcept]
```

Increase the Verbosity Level.

Returns

The Verbosity Level.

See also

reduceVerbosity(), setVerbosity(Verbosity)

9.84.4.2 destroy()

```
virtual TRT_DEPRECATED void nvonnxparser::IOnnxConfig::destroy ( )  [pure virtual], [noexcept]
```

Destroy IOnnxConfig object.

Deprecated Deprecated interface will be removed in TensorRT 10.0.

Warning

Calling destroy on a managed pointer will result in a double-free error.

9.84.4.3 getFullTextFileName()

```
virtual const char * nvonnxparser::IOnnxConfig::getFullTextFileName ( ) const  [pure virtual],
[noexcept]
```

Get the File Name of the Network Description as a Text File, including the weights.

Returns

Return the name of the file containing the network description converted to a plain text, used for debugging purposes.

See also

setFullTextFilename()

9.84.4.4 getModelDtype()

```
virtual nvinfer1::DataType nvonnxparser::IOnnxConfig::getModelDtype ( ) const  [pure virtual],
[noexcept]
```

Get the Model Data Type.

Returns

DataType nvinfer1::DataType

See also

setModelDtype() and #DataType

9.84.4.5 getModelFileName()

```
virtual const char * nvonnxparser::IOnnxConfig::getModelFileName ( ) const  [pure virtual], [noexcept]
```

Get the Model FileName.

Returns

Return the Model Filename, as a null-terminated C-style string.

See also

setModelFileName()

9.84.4.6 getPrintLayerInfo()

```
virtual bool nvonnxparser::IOnnxConfig::getPrintLayerInfo ( ) const  [pure virtual], [noexcept]
```

Get whether the layer information will be printed.

Returns

Returns whether the layer information will be printed.

See also

setPrintLayerInfo()

9.84.4.7 getTextFileName()

```
virtual const char * nvonnxparser::IOnnxConfig::getTextFileName ( ) const  [pure virtual], [noexcept]
```

Returns the File Name of the Network Description as a Text File.

Returns

Return the name of the file containing the network description converted to a plain text, used for debugging purposes.

See also

setTextFilename()

9.84.4.8 getVerbosityLevel()

```
virtual Verbosity nvonnxparser::IOnnxConfig::getVerbosityLevel ( ) const  [pure virtual], [noexcept]
```

Get the Verbosity Level.

Returns

The Verbosity Level.

See also

addVerbosity(), reduceVerbosity()

9.84.4.9 reduceVerbosity()

```
virtual void nvonnxparser::IOnnxConfig::reduceVerbosity ( )  [pure virtual], [noexcept]
```

Reduce the Verbosity Level.

See also

addVerbosity(), setVerbosity(Verbosity)

9.84.4.10 setFullTextFileName()

```
virtual void nvonnxparser::IOnnxConfig::setFullTextFileName (
            const char * fullTextFileName )  [pure virtual], [noexcept]
```

Set the File Name of the Network Description as a Text File, including the weights.

This API allows setting a file name for the network description in plain text, equivalent of the ONNX protobuf.

This method copies the name string.

Parameters

fullTextFileName	Name of the file.

See also

getFullTextFilename()

9.84.4.11 setModelDtype()

```
virtual void nvonnxparser::IOnnxConfig::setModelDtype (
            const nvinfer1::DataType  )  [pure virtual], [noexcept]
```

Set the Model Data Type.

Sets the Model DataType, one of the following: float -d 32 (default), half precision -d 16, and int8 -d 8 data types.

See also

getModelDtype()

9.84.4.12 setModelFileName()

```
virtual void nvonnxparser::IOnnxConfig::setModelFileName (
            const char * onnxFilename )  [pure virtual], [noexcept]
```

Set the Model File Name.

The Model File name contains the Network Description in ONNX pb format.

This method copies the name string.

Parameters

onnxFilename	The name.

See also

getModelFileName()

9.84.4.13 setPrintLayerInfo()

```
virtual void nvonnxparser::IOnnxConfig::setPrintLayerInfo (
            bool  )  [pure virtual], [noexcept]
```

Set whether the layer information will be printed.

See also

getPrintLayerInfo()

9.84.4.14 setTextFileName()

```
virtual void nvonnxparser::IOnnxConfig::setTextFileName (
            const char * textFileName )  [pure virtual], [noexcept]
```

Set the File Name of the Network Description as a Text File.

This API allows setting a file name for the network description in plain text, equivalent of the ONNX protobuf.

This method copies the name string.

Parameters

textFileName	Name of the file.

See also

getTextFilename()

9.84.4.15 setVerbosityLevel()

```
virtual void nvonnxparser::IOnnxConfig::setVerbosityLevel (
            Verbosity  )  [pure virtual], [noexcept]
```

Set to specific verbosity Level.

See also

addVerbosity(), reduceVerbosity()

The documentation for this class was generated from the following file:

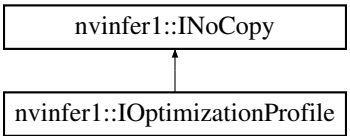
- NvOnnxConfig.h

9.85 nvinfer1::IOptimizationProfile Class Reference

Optimization profile for dynamic input dimensions and shape tensors.

`#include <NvInferRuntime.h>`

Inheritance diagram for nvinfer1::IOptimizationProfile:



Public Member Functions

- bool setDimensions (const char ∗inputName, OptProfileSelector select, Dims dims) noexcept

  Set the minimum / optimum / maximum dimensions for a dynamic input tensor.
- Dims getDimensions (const char ∗inputName, OptProfileSelector select) const noexcept

  Get the minimum / optimum / maximum dimensions for a dynamic input tensor.
- bool setShapeValues (const char ∗inputName, OptProfileSelector select, const int32_t ∗values, int32_t nbValues) noexcept

  Set the minimum / optimum / maximum values for an input shape tensor.
- int32_t getNbShapeValues (const char ∗inputName) const noexcept

  Get the number of values for an input shape tensor.
- int32_t const ∗ getShapeValues (const char ∗inputName, OptProfileSelector select) const noexcept

  Get the minimum / optimum / maximum values for an input shape tensor.
- bool setExtraMemoryTarget (float target) noexcept

  Set a target for extra GPU memory that may be used by this profile.
- float getExtraMemoryTarget () const noexcept

  Get the extra memory target that has been defined for this profile.
- bool isValid () const noexcept

  Check whether the optimization profile can be passed to an IBuilderConfig object.

Protected Member Functions

- virtual ∼IOptimizationProfile () noexcept=default

Protected Attributes

- apiv::VOptimizationProfile ∗ mImpl

9.85.1 Detailed Description

Optimization profile for dynamic input dimensions and shape tensors.

When building an ICudaEngine from an INetworkDefinition that has dynamically resizable inputs (at least one input tensor has one or more of its dimensions specified as -1) or shape input tensors, users need to specify at least one optimization profile. Optimization profiles are numbered 0, 1, ... The first optimization profile that has been defined (with index 0) will be used by the ICudaEngine whenever no optimization profile has been selected explicitly. If none of the inputs are dynamic, the default optimization profile will be generated automatically unless it is explicitly provided by the user (this is possible but not required in this case). If more than a single optimization profile is defined, users may set a target how much additional weight space should be maximally allocated to each additional profile (as a fraction of the maximum, unconstrained memory).

Users set optimum input tensor dimensions, as well as minimum and maximum input tensor dimensions. The builder selects the kernels that result in the lowest runtime for the optimum input tensor dimensions, and are valid for all input tensor sizes in the valid range between minimum and maximum dimensions. A runtime error will be raised if the input tensor dimensions fall outside the valid range for this profile. Likewise, users provide minimum, optimum, and maximum values for all shape tensor input values.

See also

IBuilderConfig::addOptimizationProfile()

9.85.2 Constructor & Destructor Documentation

9.85.2.1 ~IOptimizationProfile()

```
virtual nvinfer1::IOptimizationProfile::~IOptimizationProfile ( )  [protected], [virtual], [default],
[noexcept]
```

9.85.3 Member Function Documentation

9.85.3.1 getDimensions()

```
Dims nvinfer1::IOptimizationProfile::getDimensions (
            const char * inputName,
            OptProfileSelector select ) const  [inline], [noexcept]
```

Get the minimum / optimum / maximum dimensions for a dynamic input tensor.

If the dimensions have not been previously set via setDimensions(), return an invalid Dims with nbDims == -1.

9.85.3.2 getExtraMemoryTarget()

```
float nvinfer1::IOptimizationProfile::getExtraMemoryTarget ( ) const  [inline], [noexcept]
```

Get the extra memory target that has been defined for this profile.

9.85.3.3 getNbShapeValues()

```
int32_t nvinfer1::IOptimizationProfile::getNbShapeValues (
            const char * inputName ) const  [inline], [noexcept]
```

Get the number of values for an input shape tensor.

This will return the number of shape values if setShapeValues() has been called before for this input tensor. Otherwise, return -1.

9.85.3.4 getShapeValues()

```
int32_t const * nvinfer1::IOptimizationProfile::getShapeValues (
            const char * inputName,
            OptProfileSelector select ) const  [inline], [noexcept]
```

Get the minimum / optimum / maximum values for an input shape tensor.

If the shape values have not been set previously with setShapeValues(), this returns nullptr.

9.85.3.5 isValid()

```
bool nvinfer1::IOptimizationProfile::isValid ( ) const  [inline], [noexcept]
```

Check whether the optimization profile can be passed to an IBuilderConfig object.

This function performs partial validation, by e.g. checking that whenever one of the minimum, optimum, or maximum dimensions of a tensor have been set, the others have also been set and have the same rank, as well as checking that the optimum dimensions are always as least as large as the minimum dimensions, and that the maximum dimensions are at least as large as the optimum dimensions. Some validation steps require knowledge of the network definition and are deferred to engine build time.

Returns

true if the optimization profile is valid and may be passed to an IBuilderConfig, else false

9.85.3.6 setDimensions()

```
bool nvinfer1::IOptimizationProfile::setDimensions (
            const char * inputName,
            OptProfileSelector select,
            Dims dims ) [inline], [noexcept]
```

Set the minimum / optimum / maximum dimensions for a dynamic input tensor.

This function must be called three times (for the minimum, optimum, and maximum) for any network input tensor that has dynamic dimensions. If minDims, optDims, and maxDims are the minimum, optimum, and maximum dimensions, and networkDims are the dimensions for this input tensor that are provided to the INetworkDefinition object, then the following conditions must all hold:

(1) minDims.nbDims == optDims.nbDims == maxDims.nbDims == networkDims.nbDims (2) 0 <= minDims.d[i] <= optDims.d[i] <= maxDims.d[i] for i = 0, ..., networkDims.nbDims-1 (3) if networkDims.d[i] != -1, then minDims.d[i] == optDims.d[i] == maxDims.d[i] == networkDims.d[i]

This function may (but need not be) called for an input tensor that does not have dynamic dimensions. In this case, the third argument must always equal networkDims.

Parameters

inputName	The input tensor name
select	Whether to set the minimum, optimum, or maximum dimensions
dims	The minimum, optimum, or maximum dimensions for this input tensor

Returns

false if an inconsistency was detected (e.g. the rank does not match another dimension that was previously set for the same input), true if no inconsistency was detected. Note that inputs can be validated only partially; a full validation is performed at engine build time.

Warning

If run on DLA, minimum, optimum, and maximum dimensions must to be the same.

9.85.3.7 setExtraMemoryTarget()

```
bool nvinfer1::IOptimizationProfile::setExtraMemoryTarget (
            float target ) [inline], [noexcept]
```

Set a target for extra GPU memory that may be used by this profile.

Parameters

target	Additional memory that the builder should aim to maximally allocate for this profile, as a fraction of the memory it would use if the user did not impose any constraints on memory. This unconstrained case is the default; it corresponds to target == 1.0. If target == 0.0, the builder aims to create the new optimization profile without allocating any additional weight memory. Valid inputs lie between 0.0 and 1.0. This parameter is only a hint, and TensorRT does not guarantee that the target will be reached. This parameter is ignored for the first (default) optimization profile that is defined.

Returns

true if the input is in the valid range (between 0 and 1 inclusive), else false

9.85.3.8 setShapeValues()

```
bool nvinfer1::IOptimizationProfile::setShapeValues (
            const char * inputName,
            OptProfileSelector select,
            const int32_t * values,
            int32_t nbValues )  [inline], [noexcept]
```

Set the minimum / optimum / maximum values for an input shape tensor.

This function must be called three times for every input tensor t that is a shape tensor (t.isShape() == true). This implies that the datatype of t is DataType::kINT32, the rank is either 0 or 1, and the dimensions of t are fixed at network definition time. This function must not be called for any input tensor that is not a shape tensor.

Each time this function is called for the same input tensor, the same nbValues must be supplied (either 1 if the tensor rank is 0, or dims.d[0] if the rank is 1). Furthermore, if minVals, optVals, maxVals are the minimum, optimum, and maximum values, it must be true that minVals[i] <= optVals[i] <= maxVals[i] for i = 0, ..., nbValues - 1. Execution of the network must be valid for the optVals.

Shape tensors are tensors that contribute to shape calculations in some way, and can contain any int32_t values appropriate for the network. Examples:

- A shape tensor used as the second input to IShuffleLayer can contain a -1 wildcard. The corresponding minVal[i] should be -1.
- A shape tensor used as the stride input to ISliceLayer can contain any valid strides. The values could be positive, negative, or zero.
- A shape tensor subtracted from zero to compute the size input of an ISliceLayer can contain any non-positive values that yield a valid slice operation.

Tightening the minVals and maxVals bounds to cover only values that are necessary may help optimization.

Parameters

inputName	The input tensor name
select	Whether to set the minimum, optimum, or maximum input values.
values	An array of length nbValues containing the minimum, optimum, or maximum shape tensor elements.
nbValues	The length of the value array, which must equal the number of shape tensor elements (>= 1)

Returns

false if an inconsistency was detected (e.g. nbValues does not match a previous call for the same tensor), else true. As for setDimensions(), a full validation can only be performed at engine build time.

Warning

If run on DLA, minimum, optimum, and maximum shape values must to be the same.

9.85.4 Member Data Documentation

9.85.4.1 mImpl

```
apiv::VOptimizationProfile* nvinfer1::IOptimizationProfile::mImpl  [protected]
```

The documentation for this class was generated from the following file:

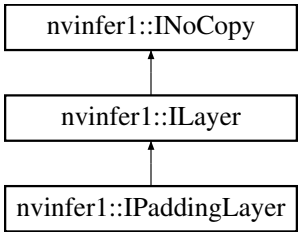
- NvInferRuntime.h

9.86 nvinfer1::IPaddingLayer Class Reference

Layer that represents a padding operation.

```
#include <NvInfer.h>
```

Inheritance diagram for nvinfer1::IPaddingLayer:



Public Member Functions

- TRT_DEPRECATED void setPrePadding (DimsHW padding) noexcept

  Set the padding that is applied at the start of the tensor.
- TRT_DEPRECATED DimsHW getPrePadding () const noexcept

  Get the padding that is applied at the start of the tensor.
- TRT_DEPRECATED void setPostPadding (DimsHW padding) noexcept

  Set the padding that is applied at the end of the tensor.
- TRT_DEPRECATED DimsHW getPostPadding () const noexcept

  Get the padding that is applied at the end of the tensor.
- void setPrePaddingNd (Dims padding) noexcept

  Set the padding that is applied at the start of the tensor.
- Dims getPrePaddingNd () const noexcept

  Get the padding that is applied at the start of the tensor.
- void setPostPaddingNd (Dims padding) noexcept

  Set the padding that is applied at the end of the tensor.
- Dims getPostPaddingNd () const noexcept

  Get the padding that is applied at the end of the tensor.

Protected Member Functions

- virtual ~IPaddingLayer () noexcept=default

Protected Attributes

- apiv::VPaddingLayer * mImpl

9.86.1 Detailed Description

Layer that represents a padding operation.

The padding layer adds zero-padding at the start and end of the input tensor. It only supports padding along the two innermost dimensions. Applying negative padding results in cropping of the input.

Warning

Do not inherit from this class, as doing so will break forward-compatibility of the API and ABI.

9.86.2 Constructor & Destructor Documentation

9.86.2.1 ~IPaddingLayer()

```
virtual nvinfer1::IPaddingLayer::~IPaddingLayer ( )  [protected], [virtual], [default], [noexcept]
```

9.86.3 Member Function Documentation

9.86.3.1 getPostPadding()

```
TRT_DEPRECATED DimsHW nvinfer1::IPaddingLayer::getPostPadding ( ) const  [inline], [noexcept]
```

Get the padding that is applied at the end of the tensor.

See also

setPostPadding

Deprecated Superseded by getPostPaddingNd. Deprecated prior to TensorRT 8.0 and will be removed in 9.0

9.86.3.2 getPostPaddingNd()

```
Dims nvinfer1::IPaddingLayer::getPostPaddingNd ( ) const  [inline], [noexcept]
```

Get the padding that is applied at the end of the tensor.

Warning

Only 2 dimensional padding is currently supported.

See also

setPostPaddingNd

9.86.3.3 getPrePadding()

```
TRT_DEPRECATED DimsHW nvinfer1::IPaddingLayer::getPrePadding ( ) const  [inline], [noexcept]
```

Get the padding that is applied at the start of the tensor.

See also

setPrePadding

Deprecated Superseded by getPrePaddingNd. Deprecated prior to TensorRT 8.0 and will be removed in 9.0

9.86.3.4 getPrePaddingNd()

```
Dims nvinfer1::IPaddingLayer::getPrePaddingNd ( ) const  [inline], [noexcept]
```

Get the padding that is applied at the start of the tensor.

Warning

Only 2 dimensional padding is currently supported.

See also

setPrePaddingNd

9.86.3.5 setPostPadding()

```
TRT_DEPRECATED void nvinfer1::IPaddingLayer::setPostPadding (
            DimsHW padding )  [inline], [noexcept]
```

Set the padding that is applied at the end of the tensor.

Negative padding results in trimming the edge by the specified amount

See also

getPostPadding

Deprecated Superseded by setPostPaddingNd. Deprecated prior to TensorRT 8.0 and will be removed in 9.0

9.86.3.6 setPostPaddingNd()

```
void nvinfer1::IPaddingLayer::setPostPaddingNd (
            Dims padding )  [inline], [noexcept]
```

Set the padding that is applied at the end of the tensor.

Negative padding results in trimming the edge by the specified amount

Warning

Only 2 dimensional padding is currently supported.

See also

getPostPaddingNd

9.86.3.7 setPrePadding()

```
TRT_DEPRECATED void nvinfer1::IPaddingLayer::setPrePadding (
            DimsHW padding )  [inline], [noexcept]
```

Set the padding that is applied at the start of the tensor.

Negative padding results in trimming the edge by the specified amount

See also

getPrePadding

Deprecated Superseded by setPrePaddingNd. Deprecated prior to TensorRT 8.0 and will be removed in 9.0

9.86.3.8 setPrePaddingNd()

```
void nvinfer1::IPaddingLayer::setPrePaddingNd (
            Dims padding )  [inline], [noexcept]
```

Set the padding that is applied at the start of the tensor.

Negative padding results in trimming the edge by the specified amount.

Warning

Only 2 dimensional padding is currently supported.

See also

getPrePaddingNd

9.86.4 Member Data Documentation

9.86.4.1 mImpl

```
apiv::VPaddingLayer* nvinfer1::IPaddingLayer::mImpl  [protected]
```

The documentation for this class was generated from the following file:

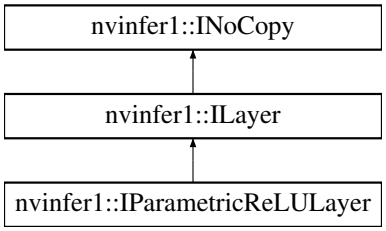
- NvInfer.h

9.87 nvinfer1::IParametricReLULayer Class Reference

Layer that represents a parametric ReLU operation.

`#include <NvInfer.h>`

Inheritance diagram for nvinfer1::IParametricReLULayer:



Protected Member Functions

- virtual ~IParametricReLULayer () noexcept=default

Protected Attributes

- apiv::VParametricReLULayer * mImpl

Additional Inherited Members

9.87.1 Detailed Description

Layer that represents a parametric ReLU operation.

When running this layer on DLA, the slopes input must be a build-time constant.

Warning

Do not inherit from this class, as doing so will break forward-compatibility of the API and ABI.

9.87.2 Constructor & Destructor Documentation

9.87.2.1 ~IParametricReLULayer()

`virtual nvinfer1::IParametricReLULayer::~IParametricReLULayer ( ) [protected], [virtual], [default], [noexcept]`

9.87.3 Member Data Documentation

9.87.3.1 mImpl

```
apiv::VParametricReLULayer* nvinfer1::IParametricReLULayer::mImpl  [protected]
```

The documentation for this class was generated from the following file:

- NvInfer.h

9.88 nvonnxparser::IParser Class Reference

an object for parsing ONNX models into a TensorRT network definition

```
#include <NvOnnxParser.h>
```

Public Member Functions

- virtual bool parse (void const *serialized_onnx_model, size_t serialized_onnx_model_size, const char *model_path=nullptr)=0

  Parse a serialized ONNX model into the TensorRT network. This method has very limited diagnostics. If parsing the serialized model fails for any reason (e.g. unsupported IR version, unsupported opset, etc.) it the user responsibility to intercept and report the error. To obtain a better diagnostic, use the parseFromFile method below.
- virtual bool parseFromFile (const char *onnxModelFile, int verbosity)=0

  Parse an onnx model file, which can be a binary protobuf or a text onnx model calls parse method inside.
- virtual bool supportsModel (void const *serialized_onnx_model, size_t serialized_onnx_model_size, SubGraphCollection_t &sub_graph_collection, const char *model_path=nullptr)=0

  Check whether TensorRT supports a particular ONNX model.
- virtual bool parseWithWeightDescriptors (void const *serialized_onnx_model, size_t serialized_onnx_model_size)=0

  Parse a serialized ONNX model into the TensorRT network with consideration of user provided weights.
- virtual bool supportsOperator (const char *op_name) const =0

  Returns whether the specified operator may be supported by the parser.
- virtual TRT_DEPRECATED void destroy ()=0

  destroy this object
- virtual int getNbErrors () const =0

  Get the number of errors that occurred during prior calls to `parse`.
- virtual IParserError const * getError (int index) const =0

  Get an error that occurred during prior calls to `parse`.
- virtual void clearErrors ()=0

  Clear errors from prior calls to `parse`.
- virtual ~IParser () noexcept=default

9.88.1 Detailed Description

an object for parsing ONNX models into a TensorRT network definition

9.88.2 Constructor & Destructor Documentation

9.88.2.1 ~IParser()

```
virtual nvonnxparser::IParser::~IParser ( )  [virtual], [default], [noexcept]
```

9.88.3 Member Function Documentation

9.88.3.1 clearErrors()

```
virtual void nvonnxparser::IParser::clearErrors ( )  [pure virtual]
```

Clear errors from prior calls to `parse`.

See also

getNbErrors() getError() IParserError

9.88.3.2 destroy()

```
virtual TRT_DEPRECATED void nvonnxparser::IParser::destroy ( )  [pure virtual]
```

destroy this object

Warning

deprecated and planned on being removed in TensorRT 10.0

9.88.3.3 getError()

```
virtual IParserError const * nvonnxparser::IParser::getError (
            int index ) const  [pure virtual]
```

Get an error that occurred during prior calls to `parse`.

See also

getNbErrors() clearErrors() IParserError

9.88.3.4 getNbErrors()

```
virtual int nvonnxparser::IParser::getNbErrors ( ) const  [pure virtual]
```

Get the number of errors that occurred during prior calls to `parse`.

See also

getError() clearErrors() IParserError

9.88.3.5 parse()

```
virtual bool nvonnxparser::IParser::parse (
            void const * serialized_onnx_model,
            size_t serialized_onnx_model_size,
            const char * model_path = nullptr )  [pure virtual]
```

Parse a serialized ONNX model into the TensorRT network. This method has very limited diagnostics. If parsing the serialized model fails for any reason (e.g. unsupported IR version, unsupported opset, etc.) it the user responsibility to intercept and report the error. To obtain a better diagnostic, use the parseFromFile method below.

Parameters

serialized_onnx_model	Pointer to the serialized ONNX model
serialized_onnx_model_size	Size of the serialized ONNX model in bytes
model_path	Absolute path to the model file for loading external weights if required

Returns

true if the model was parsed successfully

See also

getNbErrors() getError()

9.88.3.6 parseFromFile()

```
virtual bool nvonnxparser::IParser::parseFromFile (
            const char * onnxModelFile,
            int verbosity )  [pure virtual]
```

Parse an onnx model file, which can be a binary protobuf or a text onnx model calls parse method inside.

Parameters

File	name
Verbosity	Level

Returns

true if the model was parsed successfully

9.88.3.7 parseWithWeightDescriptors()

```
virtual bool nvonnxparser::IParser::parseWithWeightDescriptors (
            void const * serialized_onnx_model,
            size_t serialized_onnx_model_size )  [pure virtual]
```

Parse a serialized ONNX model into the TensorRT network with consideration of user provided weights.

Parameters

serialized_onnx_model	Pointer to the serialized ONNX model
serialized_onnx_model_size	Size of the serialized ONNX model in bytes

Returns

true if the model was parsed successfully

See also

getNbErrors() getError()

9.88.3.8 supportsModel()

```
virtual bool nvonnxparser::IParser::supportsModel (
            void const * serialized_onnx_model,
            size_t serialized_onnx_model_size,
            SubGraphCollection_t & sub_graph_collection,
            const char * model_path = nullptr )  [pure virtual]
```

Check whether TensorRT supports a particular ONNX model.

Parameters

serialized_onnx_model	Pointer to the serialized ONNX model
serialized_onnx_model_size	Size of the serialized ONNX model in bytes
sub_graph_collection	Container to hold supported subgraphs
model_path	Absolute path to the model file for loading external weights if required

Returns

true if the model is supported

9.88.3.9 supportsOperator()

```
virtual bool nvonnxparser::IParser::supportsOperator (
            const char * op_name ) const  [pure virtual]
```

Returns whether the specified operator may be supported by the parser.

Note that a result of true does not guarantee that the operator will be supported in all cases (i.e., this function may return false-positives).

Parameters

op_name	The name of the ONNX operator to check for support

The documentation for this class was generated from the following file:

- NvOnnxParser.h

9.89 nvonnxparser::IParserError Class Reference

an object containing information about an error

`#include <NvOnnxParser.h>`

Public Member Functions

- virtual ErrorCode code () const =0

  the error code
- virtual const char * desc () const =0

  description of the error
- virtual const char * file () const =0

  source file in which the error occurred
- virtual int line () const =0

  source line at which the error occurred
- virtual const char * func () const =0

  source function in which the error occurred
- virtual int node () const =0

  index of the ONNX model node in which the error occurred

Protected Member Functions

- virtual ~IParserError ()

9.89.1 Detailed Description

an object containing information about an error

9.89.2 Constructor & Destructor Documentation

9.89.2.1 ~IParserError()

```
virtual nvonnxparser::IParserError::~IParserError ( )  [inline], [protected], [virtual]
```

9.89.3 Member Function Documentation

9.89.3.1 code()

```
virtual ErrorCode nvonnxparser::IParserError::code ( ) const  [pure virtual]
```

the error code

9.89.3.2 desc()

```
virtual const char * nvonnxparser::IParserError::desc ( ) const  [pure virtual]
```

description of the error

9.89.3.3 file()

```
virtual const char * nvonnxparser::IParserError::file ( ) const  [pure virtual]
```

source file in which the error occurred

9.89.3.4 func()

```
virtual const char * nvonnxparser::IParserError::func ( ) const  [pure virtual]
```

source function in which the error occurred

9.89.3.5 line()

```
virtual int nvonnxparser::IParserError::line ( ) const  [pure virtual]
```

source line at which the error occurred

9.89.3.6 node()

```
virtual int nvonnxparser::IParserError::node ( ) const  [pure virtual]
```

index of the ONNX model node in which the error occurred

The documentation for this class was generated from the following file:

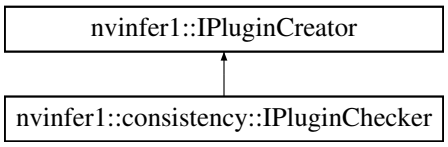
- NvOnnxParser.h

9.90 nvinfer1::consistency::IPluginChecker Class Reference

Consistency Checker plugin class for user implemented Plugins.

`#include <NvInferConsistency.h>`

Inheritance diagram for nvinfer1::consistency::IPluginChecker:



Public Member Functions

- virtual bool validate (const char *name, const void *serialData, size_t serialLength, const PluginTensorDesc *in, size_t nbInputs, const PluginTensorDesc *out, size_t nbOutputs, int64_t workspaceSize) const noexcept=0

  Called during IConsistencyChecker::validate. Allows users to provide custom validation of serialized Plugin data. Returns boolean that indicates whether or not the Plugin passed validation.
- IPluginChecker ()=default
- virtual ~IPluginChecker () override=default

Protected Member Functions

- IPluginChecker (IPluginChecker const &)=default
- IPluginChecker (IPluginChecker &&)=default
- IPluginChecker & operator= (IPluginChecker const &) &=default
- IPluginChecker & operator= (IPluginChecker &&) &=default

9.90.1 Detailed Description

Consistency Checker plugin class for user implemented Plugins.

Plugins are a mechanism for applications to implement custom layers. It provides a mechanism to register Consistency plugins and look up the Plugin Registry during validate.

Supported IPlugin inferfaces are limited to IPluginV2IOExt only.

9.90.2 Constructor & Destructor Documentation

9.90.2.1 IPluginChecker() [1/3]

```
nvinfer1::consistency::IPluginChecker::IPluginChecker ( )  [default]
```

9.90.2.2 ~IPluginChecker()

```
virtual nvinfer1::consistency::IPluginChecker::~IPluginChecker ( )  [override], [virtual], [default]
```

9.90.2.3 IPluginChecker() [2/3]

```
nvinfer1::consistency::IPluginChecker::IPluginChecker (
            IPluginChecker const &  )  [protected], [default]
```

9.90.2.4 IPluginChecker() [3/3]

```
nvinfer1::consistency::IPluginChecker::IPluginChecker (
            IPluginChecker &&  )  [protected], [default]
```

9.90.3 Member Function Documentation

9.90.3.1 operator=() [1/2]

```
IPluginChecker & nvinfer1::consistency::IPluginChecker::operator= (
            IPluginChecker &&  ) &  [protected], [default]
```

9.90.3.2 operator=() [2/2]

```
IPluginChecker & nvinfer1::consistency::IPluginChecker::operator= (
            IPluginChecker const &  ) &  [protected], [default]
```

9.90.3.3 validate()

```
virtual bool nvinfer1::consistency::IPluginChecker::validate (
            const char * name,
            const void * serialData,
            size_t serialLength,
            const PluginTensorDesc * in,
            size_t nbInputs,
            const PluginTensorDesc * out,
            size_t nbOutputs,
            int64_t workspaceSize ) const  [pure virtual], [noexcept]
```

Called during IConsistencyChecker::validate. Allows users to provide custom validation of serialized Plugin data. Returns boolean that indicates whether or not the Plugin passed validation.

Parameters

name	The plugin name
serialData	The memory that holds the plugin serialized data.
serialLength	The size of the plugin serialized data.
in	The input tensors attributes.
nbInputs	The number of input tensors.
out	The output tensors attributes.
nbOutputs	The number of output tensors.
workspaceSize	The size of workspace provided during enqueue.

The documentation for this class was generated from the following file:

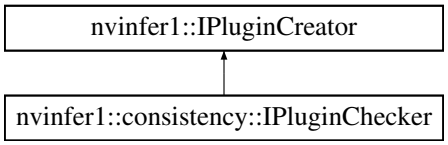
- NvInferConsistency.h

9.91 nvinfer1::IPluginCreator Class Reference

Plugin creator class for user implemented layers.

```
#include <NvInferRuntimeCommon.h>
```

Inheritance diagram for nvinfer1::IPluginCreator:



Public Member Functions

- virtual int32_t getTensorRTVersion () const noexcept

  Return the version of the API the plugin creator was compiled with.
- virtual AsciiChar const * getPluginName () const noexcept=0

  Return the plugin name.
- virtual AsciiChar const * getPluginVersion () const noexcept=0

  Return the plugin version.
- virtual PluginFieldCollection const * getFieldNames () noexcept=0

  Return a list of fields that needs to be passed to createPlugin.
- virtual IPluginV2 * createPlugin (AsciiChar const *name, PluginFieldCollection const *fc) noexcept=0

  Return a plugin object. Return nullptr in case of error.
- virtual IPluginV2 * deserializePlugin (AsciiChar const *name, void const *serialData, size_t serialLength) noexcept=0

  Called during deserialization of plugin layer. Return a plugin object.
- virtual void setPluginNamespace (AsciiChar const *pluginNamespace) noexcept=0

  Set the namespace of the plugin creator based on the plugin library it belongs to. This can be set while registering the plugin creator.
- virtual AsciiChar const * getPluginNamespace () const noexcept=0

  Return the namespace of the plugin creator object.
- IPluginCreator ()=default
- virtual ~IPluginCreator ()=default

9.91.1 Detailed Description

Plugin creator class for user implemented layers.

See also

IPlugin and IPluginFactory

9.91.2 Constructor & Destructor Documentation

9.91.2.1 IPluginCreator()

```
nvinfer1::IPluginCreator::IPluginCreator ( )  [default]
```

9.91.2.2 ~IPluginCreator()

```
virtual nvinfer1::IPluginCreator::~IPluginCreator ( )  [virtual], [default]
```

9.91.3 Member Function Documentation

9.91.3.1 createPlugin()

```
virtual IPluginV2 * nvinfer1::IPluginCreator::createPlugin (
            AsciiChar const * name,
            PluginFieldCollection const * fc )  [pure virtual], [noexcept]
```

Return a plugin object. Return nullptr in case of error.

Usage considerations

- Allowed context for the API call
  - Thread-safe: Yes, this method is required to be thread-safe and may be called from multiple threads when building networks on multiple devices sharing the same plugin or when deserializing multiple engines concurrently sharing plugins.

9.91.3.2 deserializePlugin()

```
virtual IPluginV2 * nvinfer1::IPluginCreator::deserializePlugin (
            AsciiChar const * name,
            void const * serialData,
            size_t serialLength )  [pure virtual], [noexcept]
```

Called during deserialization of plugin layer. Return a plugin object.

Usage considerations

- Allowed context for the API call
  - Thread-safe: Yes, this method is required to be thread-safe and may be called from multiple threads when building networks on multiple devices sharing the same plugin or when deserializing multiple engines concurrently sharing plugins.

9.91.3.3 getFieldNames()

```
virtual PluginFieldCollection const * nvinfer1::IPluginCreator::getFieldNames ( )  [pure virtual],
[noexcept]
```

Return a list of fields that needs to be passed to createPlugin.

See also

PluginFieldCollection

Usage considerations

- Allowed context for the API call
  - Thread-safe: Yes, this method is required to be thread-safe and may be called from multiple threads when building networks on multiple devices sharing the same plugin or when deserializing multiple engines concurrently sharing plugins.

9.91.3.4 getPluginName()

```
virtual AsciiChar const * nvinfer1::IPluginCreator::getPluginName ( ) const  [pure virtual], [noexcept]
```

Return the plugin name.

Warning

The string returned must be 1024 bytes or less including the NULL terminator and must be NULL terminated.

Usage considerations

- Allowed context for the API call
  - Thread-safe: Yes, this method is required to be thread-safe and may be called from multiple threads when building networks on multiple devices sharing the same plugin or when deserializing multiple engines concurrently sharing plugins.

9.91.3.5 getPluginNamespace()

```
virtual AsciiChar const * nvinfer1::IPluginCreator::getPluginNamespace ( ) const  [pure virtual],
[noexcept]
```

Return the namespace of the plugin creator object.

Warning

The string returned must be 1024 bytes or less including the NULL terminator and must be NULL terminated.

Usage considerations

- Allowed context for the API call
  - Thread-safe: Yes, this method is required to be thread-safe and may be called from multiple threads when building networks on multiple devices sharing the same plugin or when deserializing multiple engines concurrently sharing plugins.

9.91.3.6 getPluginVersion()

```
virtual AsciiChar const * nvinfer1::IPluginCreator::getPluginVersion ( ) const  [pure virtual],
[noexcept]
```

Return the plugin version.

Warning

The string returned must be 1024 bytes or less including the NULL terminator and must be NULL terminated.

Usage considerations

- Allowed context for the API call
  - Thread-safe: Yes, this method is required to be thread-safe and may be called from multiple threads when building networks on multiple devices sharing the same plugin or when deserializing multiple engines concurrently sharing plugins.

9.91.3.7 getTensorRTVersion()

```
virtual int32_t nvinfer1::IPluginCreator::getTensorRTVersion ( ) const  [inline], [virtual], [noexcept]
```

Return the version of the API the plugin creator was compiled with.

Usage considerations

- Allowed context for the API call
  - Thread-safe: Yes, the implementation provided here is safe to call from any thread.

9.91.3.8 setPluginNamespace()

```
virtual void nvinfer1::IPluginCreator::setPluginNamespace (
            AsciiChar const * pluginNamespace )  [pure virtual], [noexcept]
```

Set the namespace of the plugin creator based on the plugin library it belongs to. This can be set while registering the plugin creator.

See also

IPluginRegistry::registerCreator()

Usage considerations

- Allowed context for the API call
  - Thread-safe: Yes, this method is required to be thread-safe and may be called from multiple threads when building networks on multiple devices sharing the same plugin or when deserializing multiple engines concurrently sharing plugins.

The documentation for this class was generated from the following file:

- NvInferRuntimeCommon.h

9.92 nvcaffeparser1::IPluginFactoryV2 Class Reference

Plugin factory used to configure plugins.

`#include <NvCaffeParser.h>`

Public Member Functions

- virtual bool isPluginV2 (const char ∗layerName) noexcept=0

  A user implemented function that determines if a layer configuration is provided by an IPluginV2.
- virtual nvinfer1::IPluginV2 ∗ createPlugin (const char ∗layerName, const nvinfer1::Weights ∗weights, int32_t nbWeights, const char ∗libNamespace="") noexcept=0

  Creates a plugin.
- virtual ∼IPluginFactoryV2 () noexcept=default

9.92.1 Detailed Description

Plugin factory used to configure plugins.

9.92.2 Constructor & Destructor Documentation

9.92.2.1 ~IPluginFactoryV2()

```
virtual nvcaffeparser1::IPluginFactoryV2::~IPluginFactoryV2 ( )  [virtual], [default], [noexcept]
```

9.92.3 Member Function Documentation

9.92.3.1 createPlugin()

```
virtual nvinfer1::IPluginV2 * nvcaffeparser1::IPluginFactoryV2::createPlugin (
            const char * layerName,
            const nvinfer1::Weights * weights,
            int32_t nbWeights,
            const char * libNamespace = "" )  [pure virtual], [noexcept]
```

Creates a plugin.

Parameters

layerName	Name of layer associated with the plugin.
weights	Weights used for the layer.
nbWeights	Number of weights.
libNamespace	Library Namespace associated with the plugin object

9.92.3.2 isPluginV2()

```
virtual bool nvcaffeparser1::IPluginFactoryV2::isPluginV2 (
            const char * layerName )  [pure virtual], [noexcept]
```

A user implemented function that determines if a layer configuration is provided by an IPluginV2.

Parameters

layerName	Name of the layer which the user wishes to validate.

The documentation for this class was generated from the following file:

- NvCaffeParser.h

9.93 nvinfer1::IPluginRegistry Class Reference

Single registration point for all plugins in an application. It is used to find plugin implementations during engine deserialization. Internally, the plugin registry is considered to be a singleton so all plugins in an application are part of the same global registry. Note that the plugin registry is only supported for plugins of type IPluginV2 and should also have a corresponding IPluginCreator implementation.

`#include <NvInferRuntimeCommon.h>`

Public Member Functions

- virtual bool registerCreator (IPluginCreator &creator, AsciiChar const ∗const pluginNamespace) noexcept=0

  Register a plugin creator. Returns false if one with same type is already registered.
- virtual IPluginCreator ∗const ∗ getPluginCreatorList (int32_t ∗const numCreators) const noexcept=0

  Return all the registered plugin creators and the number of registered plugin creators. Returns nullptr if none found.
- virtual IPluginCreator ∗ getPluginCreator (AsciiChar const ∗const pluginName, AsciiChar const ∗const pluginVersion, AsciiChar const ∗const pluginNamespace="") noexcept=0

  Return plugin creator based on plugin name, version, and namespace associated with plugin during network creation.
- virtual void setErrorRecorder (IErrorRecorder ∗const recorder) noexcept=0

  Set the ErrorRecorder for this interface.
- virtual IErrorRecorder ∗ getErrorRecorder () const noexcept=0

  Set the ErrorRecorder assigned to this interface.
- virtual bool deregisterCreator (IPluginCreator const &creator) noexcept=0

  Deregister a previously registered plugin creator.

Protected Member Functions

- virtual ∼IPluginRegistry () noexcept=default

9.93.1 Detailed Description

Single registration point for all plugins in an application. It is used to find plugin implementations during engine deserialization. Internally, the plugin registry is considered to be a singleton so all plugins in an application are part of the same global registry. Note that the plugin registry is only supported for plugins of type IPluginV2 and should also have a corresponding IPluginCreator implementation.

See also

IPluginV2 and IPluginCreator

Warning

Do not inherit from this class, as doing so will break forward-compatibility of the API and ABI.

In the automotive safety context, be sure to call IPluginRegistry::setErrorRecorder() to register an error recorder with the registry before using other methods in the registry.

9.93.2 Constructor & Destructor Documentation

9.93.2.1 ~IPluginRegistry()

```
virtual nvinfer1::IPluginRegistry::~IPluginRegistry ( )  [protected], [virtual], [default], [noexcept]
```

9.93.3 Member Function Documentation

9.93.3.1 deregisterCreator()

```
virtual bool nvinfer1::IPluginRegistry::deregisterCreator (
            IPluginCreator const & creator )  [pure virtual], [noexcept]
```

Deregister a previously registered plugin creator.

Since there may be a desire to limit the number of plugins, this function provides a mechanism for removing plugin creators registered in TensorRT. The plugin creator that is specified by `creator` is removed from TensorRT and no longer tracked.

Returns

True if the plugin creator was deregistered, false if it was not found in the registry or otherwise could not be deregistered.

Usage considerations

- Allowed context for the API call
  - Thread-safe: Yes

9.93.3.2 getErrorRecorder()

```
virtual IErrorRecorder * nvinfer1::IPluginRegistry::getErrorRecorder ( ) const  [pure virtual],
[noexcept]
```

Set the ErrorRecorder assigned to this interface.

Retrieves the assigned error recorder object for the given class. A default error recorder does not exist, so a nullptr will be returned if setErrorRecorder has not been called, or an ErrorRecorder has not been inherited.

Returns

A pointer to the IErrorRecorder object that has been registered.

See also

setErrorRecorder()

Usage considerations

- Allowed context for the API call
  - Thread-safe: Yes

9.93.3.3 getPluginCreator()

```
virtual IPluginCreator * nvinfer1::IPluginRegistry::getPluginCreator (
            AsciiChar const *const pluginName,
            AsciiChar const *const pluginVersion,
            AsciiChar const *const pluginNamespace = "" )  [pure virtual], [noexcept]
```

Return plugin creator based on plugin name, version, and namespace associated with plugin during network creation.

Warning

The strings pluginName, pluginVersion, and pluginNamespace must be 1024 bytes or less including the NULL terminator and must be NULL terminated.

Usage considerations

- Allowed context for the API call
  - Thread-safe: Yes

9.93.3.4 getPluginCreatorList()

```
virtual IPluginCreator *const * nvinfer1::IPluginRegistry::getPluginCreatorList (
            int32_t *const numCreators ) const  [pure virtual], [noexcept]
```

Return all the registered plugin creators and the number of registered plugin creators. Returns nullptr if none found.

Usage considerations

- Allowed context for the API call
  - Thread-safe: No

9.93.3.5 registerCreator()

```
virtual bool nvinfer1::IPluginRegistry::registerCreator (
            IPluginCreator & creator,
            AsciiChar const *const pluginNamespace )  [pure virtual], [noexcept]
```

Register a plugin creator. Returns false if one with same type is already registered.

Warning

The string pluginNamespace must be 1024 bytes or less including the NULL terminator and must be NULL terminated.

Usage considerations

- Allowed context for the API call
  - Thread-safe: Yes; calls to this method will be synchronized by a mutex.

9.93.3.6 setErrorRecorder()

```
virtual void nvinfer1::IPluginRegistry::setErrorRecorder (
            IErrorRecorder *const recorder )  [pure virtual], [noexcept]
```

Set the ErrorRecorder for this interface.

Assigns the ErrorRecorder to this interface. The ErrorRecorder will track all errors during execution. This function will call incRefCount of the registered ErrorRecorder at least once. Setting recorder to nullptr unregisters the recorder with the interface, resulting in a call to decRefCount if a recorder has been registered.

Parameters

recorder	The error recorder to register with this interface.

See also

getErrorRecorder()

Usage considerations

- Allowed context for the API call
  - Thread-safe: No

The documentation for this class was generated from the following file:

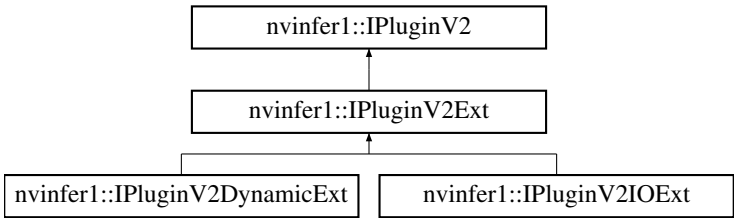
- NvInferRuntimeCommon.h

9.94 nvinfer1::IPluginV2 Class Reference

Plugin class for user-implemented layers.

`#include <NvInferRuntimeCommon.h>`

Inheritance diagram for nvinfer1::IPluginV2:



Public Member Functions

- virtual int32_t getTensorRTVersion () const noexcept

  Return the API version with which this plugin was built.
- virtual AsciiChar const * getPluginType () const noexcept=0

  Return the plugin type. Should match the plugin name returned by the corresponding plugin creator.
- virtual AsciiChar const * getPluginVersion () const noexcept=0

  Return the plugin version. Should match the plugin version returned by the corresponding plugin creator.
- virtual int32_t getNbOutputs () const noexcept=0

  Get the number of outputs from the layer.

- virtual Dims getOutputDimensions (int32_t index, Dims const *inputs, int32_t nbInputDims) noexcept=0

  Get the dimension of an output tensor.
- virtual bool supportsFormat (DataType type, PluginFormat format) const noexcept=0

  Check format support.
- virtual void configureWithFormat (Dims const *inputDims, int32_t nbInputs, Dims const *outputDims, int32_t nbOutputs, DataType type, PluginFormat format, int32_t maxBatchSize) noexcept=0

  Configure the layer.
- virtual int32_t initialize () noexcept=0

  Initialize the layer for execution. This is called when the engine is created.
- virtual void terminate () noexcept=0

  Release resources acquired during plugin layer initialization. This is called when the engine is destroyed.
- virtual size_t getWorkspaceSize (int32_t maxBatchSize) const noexcept=0

  Find the workspace size required by the layer.
- virtual int32_t enqueue (int32_t batchSize, void const *const *inputs, void *const *outputs, void *workspace, cudaStream_t stream) noexcept=0

  Execute the layer.
- virtual size_t getSerializationSize () const noexcept=0

  Find the size of the serialization buffer required.
- virtual void serialize (void *buffer) const noexcept=0

  Serialize the layer.
- virtual void destroy () noexcept=0

  Destroy the plugin object. This will be called when the network, builder or engine is destroyed.
- virtual IPluginV2 * clone () const noexcept=0

  Clone the plugin object. This copies over internal plugin parameters and returns a new plugin object with these parameters.
- virtual void setPluginNamespace (AsciiChar const *pluginNamespace) noexcept=0

  Set the namespace that this plugin object belongs to. Ideally, all plugin objects from the same plugin library should have the same namespace.
- virtual AsciiChar const * getPluginNamespace () const noexcept=0

  Return the namespace of the plugin object.

9.94.1 Detailed Description

Plugin class for user-implemented layers.

Plugins are a mechanism for applications to implement custom layers. When combined with IPluginCreator it provides a mechanism to register plugins and look up the Plugin Registry during de-serialization.

See also

IPluginCreator

IPluginRegistry

9.94.2 Member Function Documentation

9.94.2.1 clone()

```
virtual IPluginV2 * nvinfer1::IPluginV2::clone ( ) const  [pure virtual], [noexcept]
```

Clone the plugin object. This copies over internal plugin parameters and returns a new plugin object with these parameters.

The TensorRT runtime calls clone() to clone the plugin when an execution context is created for an engine, after the engine has been created. The runtime does not call initialize() on the cloned plugin, so the cloned plugin should be created in an initialized state.

Usage considerations

- Allowed context for the API call
  - Thread-safe: Yes, this method is required to be thread-safe and may be called from multiple threads when building networks on multiple devices sharing the same plugin or when creating multiple execution contexts.

Implemented in nvinfer1::IPluginV2DynamicExt, and nvinfer1::IPluginV2Ext.

9.94.2.2 configureWithFormat()

```
virtual void nvinfer1::IPluginV2::configureWithFormat (
             Dims const * inputDims,
             int32_t nbInputs,
             Dims const * outputDims,
             int32_t nbOutputs,
             DataType type,
             PluginFormat format,
             int32_t maxBatchSize )  [pure virtual], [noexcept]
```

Configure the layer.

This function is called by the builder prior to initialize(). It provides an opportunity for the layer to make algorithm choices on the basis of its weights, dimensions, and maximum batch size.

Parameters

inputDims	The input tensor dimensions.
nbInputs	The number of inputs.
outputDims	The output tensor dimensions.
nbOutputs	The number of outputs.
type	The data type selected for the engine.
format	The format selected for the engine.
maxBatchSize	The maximum batch size.

The dimensions passed here do not include the outermost batch size (i.e. for 2-D image networks, they will be 3-dimensional CHW dimensions).

Warning

for the format field, the values PluginFormat::kCHW4, PluginFormat::kCHW16, and PluginFormat::kCHW32 will not be passed in, this is to keep backward compatibility with TensorRT 5.x series. Use PluginV2IOExt or PluginV2DynamicExt for other PluginFormats.

DataType:kBOOL not supported.

See also

clone()

Usage considerations

- Allowed context for the API call
  - Thread-safe: Yes, this method is required to be thread-safe and may be called from multiple threads when building networks on multiple devices sharing the same plugin. However, TensorRT will not call this method from two threads simultaneously on a given clone of a plugin.

Implemented in nvinfer1::IPluginV2Ext.

9.94.2.3 destroy()

```
virtual void nvinfer1::IPluginV2::destroy ( )  [pure virtual], [noexcept]
```

Destroy the plugin object. This will be called when the network, builder or engine is destroyed.

Usage considerations

- Allowed context for the API call
  - Thread-safe: Yes, this method is required to be thread-safe and may be called from multiple threads when building networks on multiple devices sharing the same plugin.

9.94.2.4 enqueue()

```
virtual int32_t nvinfer1::IPluginV2::enqueue (
            int32_t batchSize,
            void const *const * inputs,
            void *const * outputs,
            void * workspace,
            cudaStream_t stream )  [pure virtual], [noexcept]
```

Execute the layer.

Parameters

batchSize	The number of inputs in the batch.
inputs	The memory for the input tensors.
outputs	The memory for the output tensors.
workspace	Workspace for execution.
stream	The stream in which to execute the kernels.

Returns

0 for success, else non-zero (which will cause engine termination).

Usage considerations

- Allowed context for the API call
  - Thread-safe: Yes, this method is required to be thread-safe and may be called from multiple threads when multiple execution contexts are used during runtime.

9.94.2.5 getNbOutputs()

```
virtual int32_t nvinfer1::IPluginV2::getNbOutputs ( ) const  [pure virtual], [noexcept]
```

Get the number of outputs from the layer.

Returns

The number of outputs.

This function is called by the implementations of INetworkDefinition and IBuilder. In particular, it is called prior to any call to initialize().

Usage considerations

- Allowed context for the API call
  - Thread-safe: Yes, this method is required to be thread-safe and may be called from multiple threads when building networks on multiple devices sharing the same plugin.

9.94.2.6 getOutputDimensions()

```
virtual Dims nvinfer1::IPluginV2::getOutputDimensions (
            int32_t index,
            Dims const * inputs,
            int32_t nbInputDims )  [pure virtual], [noexcept]
```

Get the dimension of an output tensor.

Parameters

index	The index of the output tensor.
inputs	The input tensors.
nbInputDims	The number of input tensors.

This function is called by the implementations of INetworkDefinition and IBuilder. In particular, it is called prior to any call to initialize().

Usage considerations

- Allowed context for the API call
  - Thread-safe: Yes, this method is required to be thread-safe and may be called from multiple threads when building networks on multiple devices sharing the same plugin.

9.94.2.7 getPluginNamespace()

```
virtual AsciiChar const * nvinfer1::IPluginV2::getPluginNamespace ( ) const  [pure virtual], [noexcept]
```

Return the namespace of the plugin object.

Usage considerations

- Allowed context for the API call
  - Thread-safe: Yes, this method is required to be thread-safe and may be called from multiple threads when building networks on multiple devices sharing the same plugin.

9.94.2.8 getPluginType()

```
virtual AsciiChar const * nvinfer1::IPluginV2::getPluginType ( ) const  [pure virtual], [noexcept]
```

Return the plugin type. Should match the plugin name returned by the corresponding plugin creator.

See also

IPluginCreator::getPluginName()

Warning

The string returned must be 1024 bytes or less including the NULL terminator and must be NULL terminated.

Usage considerations

- Allowed context for the API call
  - Thread-safe: Yes, this method is required to be thread-safe and may be called from multiple threads when building networks on multiple devices sharing the same plugin.

9.94.2.9 getPluginVersion()

```
virtual AsciiChar const * nvinfer1::IPluginV2::getPluginVersion ( ) const  [pure virtual], [noexcept]
```

Return the plugin version. Should match the plugin version returned by the corresponding plugin creator.

See also

IPluginCreator::getPluginVersion()

Warning

The string returned must be 1024 bytes or less including the NULL terminator and must be NULL terminated.

Usage considerations

- Allowed context for the API call
  - Thread-safe: Yes, this method is required to be thread-safe and may be called from multiple threads when building networks on multiple devices sharing the same plugin.

9.94.2.10 getSerializationSize()

```
virtual size_t nvinfer1::IPluginV2::getSerializationSize ( ) const  [pure virtual], [noexcept]
```

Find the size of the serialization buffer required.

Returns

The size of the serialization buffer.

Usage considerations

- Allowed context for the API call
  - Thread-safe: Yes, this method is required to be thread-safe and may be called from multiple threads when building networks on multiple devices sharing the same plugin.

9.94.2.11 getTensorRTVersion()

```
virtual int32_t nvinfer1::IPluginV2::getTensorRTVersion ( ) const  [inline], [virtual], [noexcept]
```

Return the API version with which this plugin was built.

Do not override this method as it is used by the TensorRT library to maintain backwards-compatibility with plugins.

Usage considerations

- Allowed context for the API call
  - Thread-safe: Yes, the implementation provided here is safe to call from any thread.

Reimplemented in nvinfer1::IPluginV2DynamicExt, nvinfer1::IPluginV2Ext, and nvinfer1::IPluginV2IOExt.

9.94.2.12 getWorkspaceSize()

```
virtual size_t nvinfer1::IPluginV2::getWorkspaceSize (
            int32_t maxBatchSize ) const  [pure virtual], [noexcept]
```

Find the workspace size required by the layer.

This function is called during engine startup, after initialize(). The workspace size returned should be sufficient for any batch size up to the maximum.

Returns

The workspace size.

Usage considerations

- Allowed context for the API call
  - Thread-safe: Yes, this method is required to be thread-safe and may be called from multiple threads when building networks on multiple devices sharing the same plugin. However, TensorRT will not call this method from two threads simultaneously on a given clone of a plugin.

9.94.2.13 initialize()

```
virtual int32_t nvinfer1::IPluginV2::initialize ( )  [pure virtual], [noexcept]
```

Initialize the layer for execution. This is called when the engine is created.

Returns

0 for success, else non-zero (which will cause engine termination).

Usage considerations

- Allowed context for the API call
  - Thread-safe: Yes, this method is required to be thread-safe and may be called from multiple threads when building networks on multiple devices sharing the same plugin or when using multiple execution contexts using this plugin.

9.94.2.14 serialize()

```
virtual void nvinfer1::IPluginV2::serialize (
            void * buffer ) const  [pure virtual], [noexcept]
```

Serialize the layer.

Parameters

buffer	A pointer to a buffer to serialize data. Size of buffer must be equal to value returned by getSerializationSize.

See also

getSerializationSize()

Usage considerations

- Allowed context for the API call
  - Thread-safe: Yes, this method is required to be thread-safe and may be called from multiple threads when building networks on multiple devices sharing the same plugin.

9.94.2.15 setPluginNamespace()

```
virtual void nvinfer1::IPluginV2::setPluginNamespace (
            AsciiChar const * pluginNamespace )  [pure virtual], [noexcept]
```

Set the namespace that this plugin object belongs to. Ideally, all plugin objects from the same plugin library should have the same namespace.

Parameters

pluginNamespace	The namespace for the plugin object.

Warning

The string pluginNamespace must be 1024 bytes or less including the NULL terminator and must be NULL terminated.

Usage considerations

- Allowed context for the API call
  - Thread-safe: Yes, this method is required to be thread-safe and may be called from multiple threads when building networks on multiple devices sharing the same plugin.

9.94.2.16 supportsFormat()

```
virtual bool nvinfer1::IPluginV2::supportsFormat (
            DataType type,
            PluginFormat format ) const  [pure virtual], [noexcept]
```

Check format support.

Parameters

type	DataType requested.
format	PluginFormat requested.

Returns

true if the plugin supports the type-format combination.

This function is called by the implementations of INetworkDefinition, IBuilder, and safe::ICudaEngine/ICudaEngine. In particular, it is called when creating an engine and when deserializing an engine.

Warning

for the format field, the values PluginFormat::kCHW4, PluginFormat::kCHW16, and PluginFormat::kCHW32 will not be passed in, this is to keep backward compatibility with TensorRT 5.x series. Use PluginV2IOExt or PluginV2DynamicExt for other PluginFormats.

DataType:kBOOL not supported.

Usage considerations

- Allowed context for the API call
  - Thread-safe: Yes, this method is required to be thread-safe and may be called from multiple threads when building networks on multiple devices sharing the same plugin.

9.94.2.17 terminate()

```
virtual void nvinfer1::IPluginV2::terminate ( )  [pure virtual], [noexcept]
```

Release resources acquired during plugin layer initialization. This is called when the engine is destroyed.

See also

initialize()

Usage considerations

- Allowed context for the API call
  - Thread-safe: Yes, this method is required to be thread-safe and may be called from multiple threads when building networks on multiple devices sharing the same plugin or when using multiple execution contexts using this plugin. However, TensorRT will not call this method from two threads simultaneously on a given clone of a plugin.

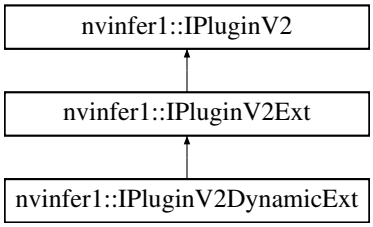
The documentation for this class was generated from the following file:

- NvInferRuntimeCommon.h

9.95 nvinfer1::IPluginV2DynamicExt Class Reference

`#include <NvInferRuntime.h>`

Inheritance diagram for nvinfer1::IPluginV2DynamicExt:



Public Member Functions

- IPluginV2DynamicExt ∗ clone () const noexcept override=0

  Clone the plugin object. This copies over internal plugin parameters as well and returns a new plugin object with these parameters. If the source plugin is pre-configured with configurePlugin(), the returned object should also be pre-configured. The returned object should allow attachToContext() with a new execution context. Cloned plugin objects can share the same per-engine immutable resource (e.g. weights) with the source object (e.g. via ref-counting) to avoid duplication.
- virtual DimsExprs getOutputDimensions (int32_t outputIndex, const DimsExprs ∗inputs, int32_t nbInputs, IExprBuilder &exprBuilder) noexcept=0

  Get expressions for computing dimensions of an output tensor from dimensions of the input tensors.
- virtual bool supportsFormatCombination (int32_t pos, const PluginTensorDesc ∗inOut, int32_t nbInputs, int32_t nbOutputs) noexcept=0

  Return true if plugin supports the format and datatype for the input/output indexed by pos.
- virtual void configurePlugin (const DynamicPluginTensorDesc ∗in, int32_t nbInputs, const DynamicPluginTensorDesc ∗out, int32_t nbOutputs) noexcept=0

  Configure the plugin.
- virtual size_t getWorkspaceSize (const PluginTensorDesc ∗inputs, int32_t nbInputs, const PluginTensorDesc ∗outputs, int32_t nbOutputs) const noexcept=0

  Find the workspace size required by the layer.
- virtual int32_t enqueue (const PluginTensorDesc ∗inputDesc, const PluginTensorDesc ∗outputDesc, const void ∗const ∗inputs, void ∗const ∗outputs, void ∗workspace, cudaStream_t stream) noexcept=0

  Execute the layer.

Static Public Attributes

- static constexpr int32_t kFORMAT_COMBINATION_LIMIT = 100

Protected Member Functions

- int32_t getTensorRTVersion () const noexcept override

  Return the API version with which this plugin was built. The upper byte reserved by TensorRT and is used to differentiate this from IPluginV2.
- virtual ~IPluginV2DynamicExt () noexcept

9.95.1 Detailed Description

Similar to IPluginV2Ext, but with support for dynamic shapes.

Clients should override the public methods, including the following inherited methods:

```
virtual int32_t getNbOutputs() const noexcept = 0;
virtual nvinfer1::DataType getOutputDataType(int32_t index, const nvinfer1::DataType* inputTypes,
    int32_t nbInputs) const noexcept = 0;
virtual size_t getSerializationSize() const noexcept = 0;
virtual void serialize(void* buffer) const noexcept = 0; virtual void destroy() noexcept = 0;
virtual void setPluginNamespace(const char* pluginNamespace) noexcept = 0;
virtual const char* getPluginNamespace() const noexcept = 0;
```

For getOutputDataType, the inputTypes will always be DataType::kFLOAT or DataType::kINT32, and the returned type is canonicalized to DataType::kFLOAT if it is DataType::kHALF or DataType:kINT8. Details about the floating-point precision are elicited later by method supportsFormatCombination.

9.95.2 Constructor & Destructor Documentation

9.95.2.1 ~IPluginV2DynamicExt()

```
virtual nvinfer1::IPluginV2DynamicExt::~IPluginV2DynamicExt ( )  [inline], [protected], [virtual],
[noexcept]
```

9.95.3 Member Function Documentation

9.95.3.1 clone()

```
IPluginV2DynamicExt * nvinfer1::IPluginV2DynamicExt::clone ( ) const  [override], [pure virtual],
[noexcept]
```

Clone the plugin object. This copies over internal plugin parameters as well and returns a new plugin object with these parameters. If the source plugin is pre-configured with configurePlugin(), the returned object should also be pre-configured. The returned object should allow attachToContext() with a new execution context. Cloned plugin objects can share the same per-engine immutable resource (e.g. weights) with the source object (e.g. via ref-counting) to avoid duplication.

Usage considerations

- Allowed context for the API call
  - Thread-safe: Yes, this method is required to be thread-safe and may be called from multiple threads when building networks on multiple devices sharing the same plugin.

Implements nvinfer1::IPluginV2Ext.

9.95.3.2 configurePlugin()

```
virtual void nvinfer1::IPluginV2DynamicExt::configurePlugin (
            const DynamicPluginTensorDesc * in,
            int32_t nbInputs,
            const DynamicPluginTensorDesc * out,
            int32_t nbOutputs )  [pure virtual], [noexcept]
```

Configure the plugin.

configurePlugin() can be called multiple times in both the build and execution phases. The build phase happens before initialize() is called and only occurs during creation of an engine by IBuilder. The execution phase happens after initialize() is called and occurs during both creation of an engine by IBuilder and execution of an engine by IExecutionContext.

Build phase: IPluginV2DynamicExt->configurePlugin is called when a plugin is being prepared for profiling but not for any specific input size. This provides an opportunity for the plugin to make algorithmic choices on the basis of input and output formats, along with the bound of possible dimensions. The min and max value of the DynamicPluginTensorDesc correspond to the kMIN and kMAX value of the current profile that the plugin is being profiled for, with the desc.dims field corresponding to the dimensions of plugin specified at network creation. Wildcard dimensions will exist during this phase in the desc.dims field.

Execution phase: IPluginV2DynamicExt->configurePlugin is called when a plugin is being prepared for executing the plugin for a specific dimensions. This provides an opportunity for the plugin to change algorithmic choices based on the explicit input dimensions stored in desc.dims field.

- IBuilder will call this function once per profile, with desc.dims resolved to the values specified by the kOPT field of the current profile. Wildcard dimensions will not exist during this phase.
- IExecutionContext will call this during the next subsequent instance enqueue[V2]() or execute[V2]() if:
  - The batch size is changed from previous call of execute()/enqueue() if hasImplicitBatchDimension() returns true.
  - The optimization profile is changed via setOptimizationProfile() or setOptimizationProfileAsync().
  - An input shape binding is changed via setInputShapeBinding().
  - An input execution binding is changed via setBindingDimensions().

> **Warning**
>
> The execution phase is timing critical during IExecutionContext but is not part of the timing loop when called from IBuilder. Performance bottlenecks of configurePlugin won't show up during engine building but will be visible during execution after calling functions that trigger layer resource updates.

Parameters

in	The input tensors attributes that are used for configuration.
nbInputs	Number of input tensors.
out	The output tensors attributes that are used for configuration.
nbOutputs	Number of output tensors.

9.95.3.3 enqueue()

```
virtual int32_t nvinfer1::IPluginV2DynamicExt::enqueue (
            const PluginTensorDesc * inputDesc,
            const PluginTensorDesc * outputDesc,
            const void *const * inputs,
            void *const * outputs,
            void * workspace,
            cudaStream_t stream )  [pure virtual], [noexcept]
```

Execute the layer.

Parameters

inputDesc	how to interpret the memory for the input tensors.
outputDesc	how to interpret the memory for the output tensors.
inputs	The memory for the input tensors.
outputs	The memory for the output tensors.
workspace	Workspace for execution.
stream	The stream in which to execute the kernels.

Returns

0 for success, else non-zero (which will cause engine termination).

9.95.3.4 getOutputDimensions()

```
virtual DimsExprs nvinfer1::IPluginV2DynamicExt::getOutputDimensions (
            int32_t outputIndex,
            const DimsExprs * inputs,
            int32_t nbInputs,
            IExprBuilder & exprBuilder )  [pure virtual], [noexcept]
```

Get expressions for computing dimensions of an output tensor from dimensions of the input tensors.

Parameters

outputIndex	The index of the output tensor
inputs	Expressions for dimensions of the input tensors
nbInputs	The number of input tensors
exprBuilder	Object for generating new expressions

This function is called by the implementations of IBuilder during analysis of the network.

Example #1: A plugin has a single output that transposes the last two dimensions of the plugin's single input. The body of the override of getOutputDimensions can be:

```
DimsExprs output(inputs[0]);
std::swap(output.d[output.nbDims-1], output.d[output.nbDims-2]);
return output;
```

Example #2: A plugin concatenates its two inputs along the first dimension. The body of the override of getOutput↩ Dimensions can be:

```
DimsExprs output(inputs[0]);
output.d[0] = exprBuilder.operation(DimensionOperation::kSUM, *inputs[0].d[0], *inputs[1].d[0]);
return output;
```

9.95.3.5 getTensorRTVersion()

```
int32_t nvinfer1::IPluginV2DynamicExt::getTensorRTVersion ( ) const  [inline], [override], [protected],
[virtual], [noexcept]
```

Return the API version with which this plugin was built. The upper byte reserved by TensorRT and is used to differentiate this from IPluginV2.

Do not override this method as it is used by the TensorRT library to maintain backwards-compatibility with plugins.

Reimplemented from nvinfer1::IPluginV2.

9.95.3.6 getWorkspaceSize()

```
virtual size_t nvinfer1::IPluginV2DynamicExt::getWorkspaceSize (
            const PluginTensorDesc * inputs,
            int32_t nbInputs,
            const PluginTensorDesc * outputs,
            int32_t nbOutputs ) const  [pure virtual], [noexcept]
```

Find the workspace size required by the layer.

This function is called after the plugin is configured, and possibly during execution. The result should be a sufficient workspace size to deal with inputs and outputs of the given size or any smaller problem.

Returns

The workspace size.

9.95.3.7 supportsFormatCombination()

```
virtual bool nvinfer1::IPluginV2DynamicExt::supportsFormatCombination (
            int32_t pos,
            const PluginTensorDesc * inOut,
            int32_t nbInputs,
            int32_t nbOutputs )  [pure virtual], [noexcept]
```

Return true if plugin supports the format and datatype for the input/output indexed by pos.

For this method inputs are numbered 0..(nbInputs-1) and outputs are numbered nbInputs..(nbInputs+nbOutputs-1). Using this numbering, pos is an index into InOut, where 0 <= pos < nbInputs+nbOutputs-1.

TensorRT invokes this method to ask if the input/output indexed by pos supports the format/datatype specified by inOut[pos].format and inOut[pos].type. The override should return true if that format/datatype at inOut[pos] are supported by the plugin. If support is conditional on other input/output formats/datatypes, the plugin can make its result conditional on the formats/datatypes in inOut[0..pos-1], which will be set to values that the plugin supports. The override should not inspect inOut[pos+1..nbInputs+nbOutputs-1], which will have invalid values. In other words, the decision for pos must be based on inOut[0..pos] only.

Some examples:

- A definition for a plugin that supports only FP16 NCHW:

  ```
  return inOut.format[pos] == TensorFormat::kLINEAR && inOut.type[pos] == DataType::kHALF;
  ```

- A definition for a plugin that supports only FP16 NCHW for its two inputs, and FP32 NCHW for its single output:

  ```
  return inOut.format[pos] == TensorFormat::kLINEAR && (inOut.type[pos] == pos < 2 ?  DataType::kHALF :
  DataType::kFLOAT);
  ```

- A definition for a "polymorphic" plugin with two inputs and one output that supports any format or type, but the inputs and output must have the same format and type:

  ```
  return pos == 0 || (inOut.format[pos] == inOut.format[0] && inOut.type[pos] == inOut.type[0]);
  ```

  Warning: TensorRT will stop asking for formats once it finds kFORMAT_COMBINATION_LIMIT on combinations.

9.95.4 Member Data Documentation

9.95.4.1 kFORMAT_COMBINATION_LIMIT

```
constexpr int32_t nvinfer1::IPluginV2DynamicExt::kFORMAT_COMBINATION_LIMIT = 100  [static], [constexpr]
```

Limit on number of format combinations accepted.

The documentation for this class was generated from the following file:

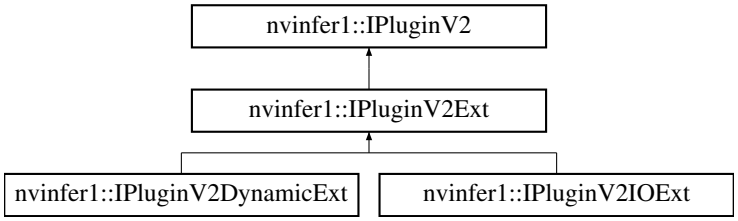
- NvInferRuntime.h

9.96 nvinfer1::IPluginV2Ext Class Reference

Plugin class for user-implemented layers.

`#include <NvInferRuntimeCommon.h>`

Inheritance diagram for nvinfer1::IPluginV2Ext:



Public Member Functions

- virtual nvinfer1::DataType getOutputDataType (int32_t index, nvinfer1::DataType const *inputTypes, int32_t nbInputs) const noexcept=0

  Return the DataType of the plugin output at the requested index.
- virtual bool isOutputBroadcastAcrossBatch (int32_t outputIndex, bool const *inputIsBroadcasted, int32_t nbInputs) const noexcept=0

  Return true if output tensor is broadcast across a batch.
- virtual bool canBroadcastInputAcrossBatch (int32_t inputIndex) const noexcept=0

  Return true if plugin can use input that is broadcast across batch without replication.
- virtual void configurePlugin (Dims const *inputDims, int32_t nbInputs, Dims const *outputDims, int32_t nbOutputs, DataType const *inputTypes, DataType const *outputTypes, bool const *inputIsBroadcast, bool const *outputIsBroadcast, PluginFormat floatFormat, int32_t maxBatchSize) noexcept=0

  Configure the layer with input and output data types.
- IPluginV2Ext ()=default
- ~IPluginV2Ext () override=default
- virtual void attachToContext (cudnnContext *, cublasContext *, IGpuAllocator *) noexcept

  Attach the plugin object to an execution context and grant the plugin the access to some context resource.
- virtual void detachFromContext () noexcept

  Detach the plugin object from its execution context.
- IPluginV2Ext * clone () const noexcept override=0

  Clone the plugin object. This copies over internal plugin parameters as well and returns a new plugin object with these parameters. If the source plugin is pre-configured with configurePlugin(), the returned object should also be pre-configured. The returned object should allow attachToContext() with a new execution context. Cloned plugin objects can share the same per-engine immutable resource (e.g. weights) with the source object (e.g. via ref-counting) to avoid duplication.

Protected Member Functions

- int32_t getTensorRTVersion () const noexcept override

  Return the API version with which this plugin was built. The upper byte reserved by TensorRT and is used to differentiate this from IPluginV2.
- void configureWithFormat (Dims const *, int32_t, Dims const *, int32_t, DataType, PluginFormat, int32_t) noexcept override

  Derived classes should not implement this. In a C++11 API it would be override final.

9.96.1 Detailed Description

Plugin class for user-implemented layers.

Plugins are a mechanism for applications to implement custom layers. This interface provides additional capabilities to the IPluginV2 interface by supporting different output data types and broadcast across batch.

See also

IPluginV2

9.96.2 Constructor & Destructor Documentation

9.96.2.1 IPluginV2Ext()

```
nvinfer1::IPluginV2Ext::IPluginV2Ext ( )  [default]
```

9.96.2.2 ~IPluginV2Ext()

```
nvinfer1::IPluginV2Ext::~IPluginV2Ext ( )  [override], [default]
```

9.96.3 Member Function Documentation

9.96.3.1 attachToContext()

```
virtual void nvinfer1::IPluginV2Ext::attachToContext (
            cudnnContext * ,
            cublasContext * ,
            IGpuAllocator *  )  [inline], [virtual], [noexcept]
```

Attach the plugin object to an execution context and grant the plugin the access to some context resource.

Parameters

cudnn	The CUDNN context handle of the execution context
cublas	The cublas context handle of the execution context
allocator	The allocator used by the execution context

This function is called automatically for each plugin when a new execution context is created. If the context was created without resources, this method is not called until the resources are assigned. It is also called if new resources are assigned to the context.

If the plugin needs per-context resource, it can be allocated here. The plugin can also get context-owned CUDNN and CUBLAS context here.

Note

In the automotive safety context, the CUDNN and CUBLAS parameters will be nullptr because CUDNN and CUBLAS is not used by the safe runtime.

Usage considerations

- Allowed context for the API call
  - Thread-safe: Yes, this method is required to be thread-safe and may be called from multiple threads when building networks on multiple devices sharing the same plugin.

9.96.3.2 canBroadcastInputAcrossBatch()

```
virtual bool nvinfer1::IPluginV2Ext::canBroadcastInputAcrossBatch (
            int32_t inputIndex ) const  [pure virtual], [noexcept]
```

Return true if plugin can use input that is broadcast across batch without replication.

Parameters

inputIndex	Index of input that could be broadcast.

For each input whose tensor is semantically broadcast across a batch, TensorRT calls this method before calling configurePlugin. If canBroadcastInputAcrossBatch returns true, TensorRT will not replicate the input tensor; i.e., there will be a single copy that the plugin should share across the batch. If it returns false, TensorRT will replicate the input tensor so that it appears like a non-broadcasted tensor.

This method is called only for inputs that can be broadcast.

Usage considerations

- Allowed context for the API call
  - Thread-safe: Yes, this method is required to be thread-safe and may be called from multiple threads when building networks on multiple devices sharing the same plugin.

9.96.3.3 clone()

```
IPluginV2Ext * nvinfer1::IPluginV2Ext::clone ( ) const  [override], [pure virtual], [noexcept]
```

Clone the plugin object. This copies over internal plugin parameters as well and returns a new plugin object with these parameters. If the source plugin is pre-configured with configurePlugin(), the returned object should also be pre-configured. The returned object should allow attachToContext() with a new execution context. Cloned plugin objects can share the same per-engine immutable resource (e.g. weights) with the source object (e.g. via ref-counting) to avoid duplication.

Usage considerations

- Allowed context for the API call
  - Thread-safe: Yes, this method is required to be thread-safe and may be called from multiple threads when building networks on multiple devices sharing the same plugin.

Implements nvinfer1::IPluginV2.

Implemented in nvinfer1::IPluginV2DynamicExt.

9.96.3.4 configurePlugin()

```
virtual void nvinfer1::IPluginV2Ext::configurePlugin (
             Dims const * inputDims,
             int32_t nbInputs,
             Dims const * outputDims,
             int32_t nbOutputs,
             DataType const * inputTypes,
             DataType const * outputTypes,
             bool const * inputIsBroadcast,
             bool const * outputIsBroadcast,
             PluginFormat floatFormat,
             int32_t maxBatchSize )  [pure virtual], [noexcept]
```

Configure the layer with input and output data types.

This function is called by the builder prior to initialize(). It provides an opportunity for the layer to make algorithm choices on the basis of its weights, dimensions, data types and maximum batch size.

Parameters

inputDims	The input tensor dimensions.
nbInputs	The number of inputs.
outputDims	The output tensor dimensions.
nbOutputs	The number of outputs.
inputTypes	The data types selected for the plugin inputs.
outputTypes	The data types selected for the plugin outputs.
inputIsBroadcast	True for each input that the plugin must broadcast across the batch.
outputIsBroadcast	True for each output that TensorRT will broadcast across the batch.
floatFormat	The format selected for the engine for the floating point inputs/outputs.

The dimensions passed here do not include the outermost batch size (i.e. for 2-D image networks, they will be 3-dimensional CHW dimensions). When inputIsBroadcast or outputIsBroadcast is true, the outermost batch size for that input or output should be treated as if it is one. inputIsBroadcast[i] is true only if the input is semantically broadcast across the batch and canBroadcastInputAcrossBatch(i) returned true. outputIsBroadcast[i] is true only if isOutput↩ BroadcastAcrossBatch(i) returns true.

Warning

for the floatFormat field, the values PluginFormat::kCHW4, PluginFormat::kCHW16, and PluginFormat↩ ::kCHW32 will not be passed in, this is to keep backward compatibility with TensorRT 5.x series. Use PluginV2IOExt or PluginV2DynamicExt for other PluginFormats.

Usage considerations

- Allowed context for the API call
  - Thread-safe: Yes, this method is required to be thread-safe and may be called from multiple threads when building networks on multiple devices sharing the same plugin. However, TensorRT will not call this method from two threads simultaneously on a given clone of a plugin.

9.96.3.5 configureWithFormat()

```
void nvinfer1::IPluginV2Ext::configureWithFormat (
            Dims const * ,
            int32_t ,
            Dims const * ,
            int32_t ,
            DataType ,
            PluginFormat ,
            int32_t  )  [inline], [override], [protected], [virtual], [noexcept]
```

Derived classes should not implement this. In a C++11 API it would be override final.

Implements nvinfer1::IPluginV2.

9.96.3.6 detachFromContext()

```
virtual void nvinfer1::IPluginV2Ext::detachFromContext ( )  [inline], [virtual], [noexcept]
```

Detach the plugin object from its execution context.

This function is called automatically for each plugin when a execution context is destroyed or the context resources are unassigned from the context.

If the plugin owns per-context resource, it can be released here.

Usage considerations

- Allowed context for the API call
  - Thread-safe: Yes, this method is required to be thread-safe and may be called from multiple threads when building networks on multiple devices sharing the same plugin.

9.96.3.7 getOutputDataType()

```
virtual nvinfer1::DataType nvinfer1::IPluginV2Ext::getOutputDataType (
            int32_t index,
            nvinfer1::DataType const * inputTypes,
            int32_t nbInputs ) const  [pure virtual], [noexcept]
```

Return the DataType of the plugin output at the requested index.

The default behavior should be to return the type of the first input, or DataType::kFLOAT if the layer has no inputs. The returned data type must have a format that is supported by the plugin.

See also

supportsFormat()

Warning

DataType:kBOOL not supported.

Usage considerations

- Allowed context for the API call
  - Thread-safe: Yes, this method is required to be thread-safe and may be called from multiple threads when building networks on multiple devices sharing the same plugin.

9.96.3.8 getTensorRTVersion()

```
int32_t nvinfer1::IPluginV2Ext::getTensorRTVersion ( ) const  [inline], [override], [protected],
[virtual], [noexcept]
```

Return the API version with which this plugin was built. The upper byte reserved by TensorRT and is used to differentiate this from IPluginV2.

Do not override this method as it is used by the TensorRT library to maintain backwards-compatibility with plugins.

Usage considerations

- Allowed context for the API call
  - Thread-safe: Yes, the implementation provided here is safe to call from any thread.

Reimplemented from nvinfer1::IPluginV2.

Reimplemented in nvinfer1::IPluginV2IOExt.

9.96.3.9 isOutputBroadcastAcrossBatch()

```
virtual bool nvinfer1::IPluginV2Ext::isOutputBroadcastAcrossBatch (
            int32_t outputIndex,
            bool const * inputIsBroadcasted,
            int32_t nbInputs ) const  [pure virtual], [noexcept]
```

Return true if output tensor is broadcast across a batch.

Parameters

outputIndex	The index of the output
inputIsBroadcasted	The ith element is true if the tensor for the ith input is broadcast across a batch.
nbInputs	The number of inputs

The values in inputIsBroadcasted refer to broadcasting at the semantic level, i.e. are unaffected by whether method canBroadcastInputAcrossBatch requests physical replication of the values.

Usage considerations

- Allowed context for the API call
  - Thread-safe: Yes, this method is required to be thread-safe and may be called from multiple threads when building networks on multiple devices sharing the same plugin.

The documentation for this class was generated from the following file:

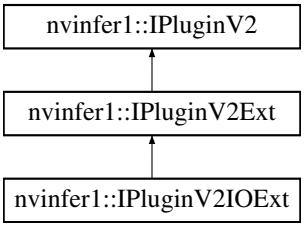
- NvInferRuntimeCommon.h

9.97 nvinfer1::IPluginV2IOExt Class Reference

Plugin class for user-implemented layers.

`#include <NvInferRuntimeCommon.h>`

Inheritance diagram for nvinfer1::IPluginV2IOExt:



Public Member Functions

- virtual void configurePlugin (PluginTensorDesc const ∗in, int32_t nbInput, PluginTensorDesc const ∗out, int32↩ _t nbOutput) noexcept=0

  Configure the layer.
- virtual bool supportsFormatCombination (int32_t pos, PluginTensorDesc const ∗inOut, int32_t nbInputs, int32_t nbOutputs) const noexcept=0

  Return true if plugin supports the format and datatype for the input/output indexed by pos.

Protected Member Functions

- int32_t getTensorRTVersion () const noexcept override

  Return the API version with which this plugin was built. The upper byte is reserved by TensorRT and is used to differentiate this from IPluginV2 and IPluginV2Ext.

9.97.1 Detailed Description

Plugin class for user-implemented layers.

Plugins are a mechanism for applications to implement custom layers. This interface provides additional capabilities to the IPluginV2Ext interface by extending different I/O data types and tensor formats.

See also

IPluginV2Ext

9.97.2 Member Function Documentation

9.97.2.1 configurePlugin()

```
virtual void nvinfer1::IPluginV2IOExt::configurePlugin (
            PluginTensorDesc const * in,
            int32_t nbInput,
            PluginTensorDesc const * out,
            int32_t nbOutput )  [pure virtual], [noexcept]
```

Configure the layer.

This function is called by the builder prior to initialize(). It provides an opportunity for the layer to make algorithm choices on the basis of I/O PluginTensorDesc and the maximum batch size.

Parameters

in	The input tensors attributes that are used for configuration.
nbInput	Number of input tensors.
out	The output tensors attributes that are used for configuration.
nbOutput	Number of output tensors.

Usage considerations

- Allowed context for the API call

- Thread-safe: Yes, this method is required to be thread-safe and may be called from multiple threads when building networks on multiple devices sharing the same plugin. However, TensorRT will not call this method from two threads simultaneously on a given clone of a plugin.

9.97.2.2 getTensorRTVersion()

```
int32_t nvinfer1::IPluginV2IOExt::getTensorRTVersion ( ) const  [inline], [override], [protected],
[virtual], [noexcept]
```

Return the API version with which this plugin was built. The upper byte is reserved by TensorRT and is used to differentiate this from IPluginV2 and IPluginV2Ext.

Do not override this method as it is used by the TensorRT library to maintain backwards-compatibility with plugins.

Usage considerations

- Allowed context for the API call
  - Thread-safe: Yes, the implementation provided here is safe to call from any thread.

Reimplemented from nvinfer1::IPluginV2Ext.

9.97.2.3 supportsFormatCombination()

```
virtual bool nvinfer1::IPluginV2IOExt::supportsFormatCombination (
            int32_t pos,
            PluginTensorDesc const * inOut,
            int32_t nbInputs,
            int32_t nbOutputs ) const  [pure virtual], [noexcept]
```

Return true if plugin supports the format and datatype for the input/output indexed by pos.

For this method inputs are numbered 0..(nbInputs-1) and outputs are numbered nbInputs..(nbInputs+nbOutputs-1). Using this numbering, pos is an index into InOut, where 0 <= pos < nbInputs+nbOutputs-1.

TensorRT invokes this method to ask if the input/output indexed by pos supports the format/datatype specified by inOut[pos].format and inOut[pos].type. The override should return true if that format/datatype at inOut[pos] are supported by the plugin. If support is conditional on other input/output formats/datatypes, the plugin can make its result conditional on the formats/datatypes in inOut[0..pos-1], which will be set to values that the plugin supports. The override should not inspect inOut[pos+1..nbInputs+nbOutputs-1], which will have invalid values. In other words, the decision for pos must be based on inOut[0..pos] only.

Some examples:

- A definition for a plugin that supports only FP16 NCHW:

```
return inOut.format[pos] == TensorFormat::kLINEAR && inOut.type[pos] == DataType::kHALF;
```

- A definition for a plugin that supports only FP16 NCHW for its two inputs, and FP32 NCHW for its single output:

```
return inOut.format[pos] == TensorFormat::kLINEAR &&
       (inOut.type[pos] == pos < 2 ?  DataType::kHALF : DataType::kFLOAT);
```

- A definition for a "polymorphic" plugin with two inputs and one output that supports any format or type, but the inputs and output must have the same format and type:

```
return pos == 0 || (inOut.format[pos] == inOut.format[0] && inOut.type[pos] == inOut.type[0]);
```

  Warning: TensorRT will stop asking for formats once it finds kFORMAT_COMBINATION_LIMIT on combinations.

Usage considerations

- Allowed context for the API call
  - Thread-safe: Yes, this method is required to be thread-safe and may be called from multiple threads when building networks on multiple devices sharing the same plugin.

The documentation for this class was generated from the following file:

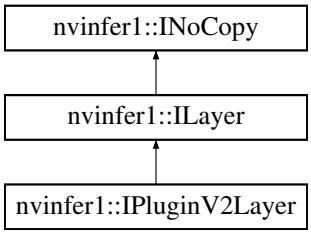
- NvInferRuntimeCommon.h

9.98 nvinfer1::IPluginV2Layer Class Reference

Layer type for pluginV2.

`#include <NvInfer.h>`

Inheritance diagram for nvinfer1::IPluginV2Layer:



Public Member Functions

- IPluginV2 & getPlugin () noexcept

  Get the plugin for the layer.

Protected Member Functions

- virtual ~IPluginV2Layer () noexcept=default

Protected Attributes

- apiv::VPluginV2Layer * mImpl

9.98.1 Detailed Description

Layer type for pluginV2.

See also

IPluginV2

Warning

Do not inherit from this class, as doing so will break forward-compatibility of the API and ABI.

9.98.2 Constructor & Destructor Documentation

9.98.2.1 ~IPluginV2Layer()

```
virtual nvinfer1::IPluginV2Layer::~IPluginV2Layer ( )  [protected], [virtual], [default], [noexcept]
```

9.98.3 Member Function Documentation

9.98.3.1 getPlugin()

```
IPluginV2 & nvinfer1::IPluginV2Layer::getPlugin ( )  [inline], [noexcept]
```

Get the plugin for the layer.

See also

IPluginV2

9.98.4 Member Data Documentation

9.98.4.1 mImpl

```
apiv::VPluginV2Layer* nvinfer1::IPluginV2Layer::mImpl  [protected]
```

The documentation for this class was generated from the following file:

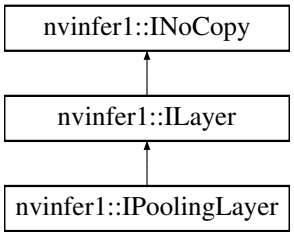
- NvInfer.h

9.99 nvinfer1::IPoolingLayer Class Reference

A Pooling layer in a network definition.

```
#include <NvInfer.h>
```

Inheritance diagram for nvinfer1::IPoolingLayer:



Public Member Functions

- void setPoolingType (PoolingType type) noexcept

  Set the type of activation to be performed.
- PoolingType getPoolingType () const noexcept

  Get the type of activation to be performed.
- TRT_DEPRECATED void setWindowSize (DimsHW windowSize) noexcept

  Set the window size for pooling.
- TRT_DEPRECATED DimsHW getWindowSize () const noexcept

  Get the window size for pooling.
- TRT_DEPRECATED void setStride (DimsHW stride) noexcept

  Set the stride for pooling.
- TRT_DEPRECATED DimsHW getStride () const noexcept

  Get the stride for pooling.
- TRT_DEPRECATED void setPadding (DimsHW padding) noexcept

  Set the padding for pooling.

- TRT_DEPRECATED DimsHW getPadding () const noexcept

  Get the padding for pooling.
- void setBlendFactor (float blendFactor) noexcept

  Set the blending factor for the max_average_blend mode: max_average_blendPool = (1-blendFactor)∗maxPool + blendFactor∗avgPool blendFactor is a user value in [0,1] with the default value of 0.0 This value only applies for the kMAX_AVERAGE_BLEND mode.
- float getBlendFactor () const noexcept

  Get the blending factor for the max_average_blend mode: max_average_blendPool = (1-blendFactor)∗maxPool + blendFactor∗avgPool blendFactor is a user value in [0,1] with the default value of 0.0 In modes other than kMAX_AVERAGE_BLEND, blendFactor is ignored.
- void setAverageCountExcludesPadding (bool exclusive) noexcept

  Set whether average pooling uses as a denominator the overlap area between the window and the unpadded input. If this is not set, the denominator is the overlap between the pooling window and the padded input.
- bool getAverageCountExcludesPadding () const noexcept

  Get whether average pooling uses as a denominator the overlap area between the window and the unpadded input.
- void setPrePadding (Dims padding) noexcept

  Set the multi-dimension pre-padding for pooling.
- Dims getPrePadding () const noexcept

  Get the pre-padding.
- void setPostPadding (Dims padding) noexcept

  Set the multi-dimension post-padding for pooling.
- Dims getPostPadding () const noexcept

  Get the padding.
- void setPaddingMode (PaddingMode paddingMode) noexcept

  Set the padding mode.
- PaddingMode getPaddingMode () const noexcept

  Get the padding mode.
- void setWindowSizeNd (Dims windowSize) noexcept

  Set the multi-dimension window size for pooling.
- Dims getWindowSizeNd () const noexcept

  Get the multi-dimension window size for pooling.
- void setStrideNd (Dims stride) noexcept

  Set the multi-dimension stride for pooling.
- Dims getStrideNd () const noexcept

  Get the multi-dimension stride for pooling.
- void setPaddingNd (Dims padding) noexcept

  Set the multi-dimension padding for pooling.
- Dims getPaddingNd () const noexcept

  Get the multi-dimension padding for pooling.

Protected Member Functions

- virtual ~IPoolingLayer () noexcept=default

Protected Attributes

- apiv::VPoolingLayer ∗ mImpl

9.99.1 Detailed Description

A Pooling layer in a network definition.

The layer applies a reduction operation within a window over the input.

Warning

When running pooling layer with DeviceType::kDLA in Int8 mode, the dynamic ranges for input and output tensors must be equal.

Do not inherit from this class, as doing so will break forward-compatibility of the API and ABI.

9.99.2 Constructor & Destructor Documentation

9.99.2.1 ~IPoolingLayer()

```
virtual nvinfer1::IPoolingLayer::~IPoolingLayer ( )  [protected], [virtual], [default], [noexcept]
```

9.99.3 Member Function Documentation

9.99.3.1 getAverageCountExcludesPadding()

```
bool nvinfer1::IPoolingLayer::getAverageCountExcludesPadding ( ) const  [inline], [noexcept]
```

Get whether average pooling uses as a denominator the overlap area between the window and the unpadded input.

See also

setAverageCountExcludesPadding()

9.99.3.2 getBlendFactor()

```
float nvinfer1::IPoolingLayer::getBlendFactor ( ) const  [inline], [noexcept]
```

Get the blending factor for the max_average_blend mode: max_average_blendPool = (1-blendFactor)∗maxPool + blendFactor∗avgPool blendFactor is a user value in [0,1] with the default value of 0.0 In modes other than kMAX_↩ AVERAGE_BLEND, blendFactor is ignored.

See also

setBlendFactor()

9.99.3.3 getPadding()

```
TRT_DEPRECATED DimsHW nvinfer1::IPoolingLayer::getPadding ( ) const  [inline], [noexcept]
```

Get the padding for pooling.

Default: 0

See also

setPadding()

Deprecated Superseded by getPaddingNd. Deprecated prior to TensorRT 8.0 and will be removed in 9.0

9.99.3.4 getPaddingMode()

```
PaddingMode nvinfer1::IPoolingLayer::getPaddingMode ( ) const  [inline], [noexcept]
```

Get the padding mode.

Default: kEXPLICIT_ROUND_DOWN

See also

setPaddingMode()

9.99.3.5 getPaddingNd()

```
Dims nvinfer1::IPoolingLayer::getPaddingNd ( ) const  [inline], [noexcept]
```

Get the multi-dimension padding for pooling.

If the padding is asymmetric, the pre-padding is returned.

See also

setPaddingNd()

9.99.3.6 getPoolingType()

```
PoolingType nvinfer1::IPoolingLayer::getPoolingType ( ) const  [inline], [noexcept]
```

Get the type of activation to be performed.

See also

setPoolingType(), PoolingType

9.99.3.7 getPostPadding()

```
Dims nvinfer1::IPoolingLayer::getPostPadding ( ) const  [inline], [noexcept]
```

Get the padding.

See also

setPostPadding()

9.99.3.8 getPrePadding()

```
Dims nvinfer1::IPoolingLayer::getPrePadding ( ) const  [inline], [noexcept]
```

Get the pre-padding.

See also

setPrePadding()

9.99.3.9 getStride()

```
TRT_DEPRECATED DimsHW nvinfer1::IPoolingLayer::getStride ( ) const  [inline], [noexcept]
```

Get the stride for pooling.

See also

setStride()

Deprecated Superseded by getStrideNd. Deprecated prior to TensorRT 8.0 and will be removed in 9.0

9.99.3.10 getStrideNd()

```
Dims nvinfer1::IPoolingLayer::getStrideNd ( ) const  [inline], [noexcept]
```

Get the multi-dimension stride for pooling.

See also

setStrideNd()

9.99.3.11 getWindowSize()

```
TRT_DEPRECATED DimsHW nvinfer1::IPoolingLayer::getWindowSize ( ) const  [inline], [noexcept]
```

Get the window size for pooling.

See also

setWindowSize()

Deprecated Superseded by getWindowSizeNd. Deprecated prior to TensorRT 8.0 and will be removed in 9.0

9.99.3.12 getWindowSizeNd()

```
Dims nvinfer1::IPoolingLayer::getWindowSizeNd ( ) const  [inline], [noexcept]
```

Get the multi-dimension window size for pooling.

See also

setWindowSizeNd()

9.99.3.13 setAverageCountExcludesPadding()

```
void nvinfer1::IPoolingLayer::setAverageCountExcludesPadding (
            bool exclusive )  [inline], [noexcept]
```

Set whether average pooling uses as a denominator the overlap area between the window and the unpadded input. If this is not set, the denominator is the overlap between the pooling window and the padded input.

Default: true

Note

On Xavier, DLA supports only inclusive padding and this must be explicitly set to false.

See also

getAverageCountExcludesPadding()

9.99.3.14 setBlendFactor()

```
void nvinfer1::IPoolingLayer::setBlendFactor (
            float blendFactor )  [inline], [noexcept]
```

Set the blending factor for the max_average_blend mode: max_average_blendPool = (1-blendFactor)∗maxPool + blendFactor∗avgPool blendFactor is a user value in [0,1] with the default value of 0.0 This value only applies for the kMAX_AVERAGE_BLEND mode.

Since DLA does not support kMAX_AVERAGE_BLEND, blendFactor is ignored on the DLA.

See also

getBlendFactor()

9.99.3.15 setPadding()

```
TRT_DEPRECATED void nvinfer1::IPoolingLayer::setPadding (
            DimsHW padding )  [inline], [noexcept]
```

Set the padding for pooling.

Default: 0

If executing this layer on DLA, both height and width of padding must be in the range [0,7].

See also

getPadding()

Deprecated Superseded by setPaddingNd. Deprecated prior to TensorRT 8.0 and will be removed in 9.0

9.99.3.16 setPaddingMode()

```
void nvinfer1::IPoolingLayer::setPaddingMode (
            PaddingMode paddingMode )  [inline], [noexcept]
```

Set the padding mode.

Padding mode takes precedence if both setPaddingMode and setPre/PostPadding are used.

Default: kEXPLICIT_ROUND_DOWN

See also

getPaddingMode()

9.99.3.17 setPaddingNd()

```
void nvinfer1::IPoolingLayer::setPaddingNd (
            Dims padding )  [inline], [noexcept]
```

Set the multi-dimension padding for pooling.

The input will be padded by this number of elements in each dimension. Padding is symmetric. Padding value depends on pooling type, -inf is used for max pooling and zero padding for average pooling.

Default: (0, 0, ..., 0)

If executing this layer on DLA, only support 2D padding, both height and width of padding must be in the range [0,7].

See also

getPaddingNd() setPadding() getPadding()

9.99.3.18 setPoolingType()

```
void nvinfer1::IPoolingLayer::setPoolingType (
            PoolingType type )  [inline], [noexcept]
```

Set the type of activation to be performed.

DLA only supports kMAX and kAVERAGE pooling types.

See also

getPoolingType(), PoolingType

9.99.3.19 setPostPadding()

```
void nvinfer1::IPoolingLayer::setPostPadding (
            Dims padding )  [inline], [noexcept]
```

Set the multi-dimension post-padding for pooling.

The end of the input will be padded by this number of elements in each dimension. Padding value depends on pooling type, -inf is used for max pooling and zero padding for average pooling.

Default: (0, 0, ..., 0)

If executing this layer on DLA, only support 2D padding, both height and width of padding must be in the range [0,7].

See also

getPostPadding()

9.99.3.20 setPrePadding()

```
void nvinfer1::IPoolingLayer::setPrePadding (
            Dims padding )  [inline], [noexcept]
```

Set the multi-dimension pre-padding for pooling.

The start of the input will be padded by this number of elements in each dimension. Padding value depends on pooling type, -inf is used for max pooling and zero padding for average pooling.

Default: (0, 0, ..., 0)

If executing this layer on DLA, only support 2D padding, both height and width of padding must be in the range [0,7].

See also

getPrePadding()

9.99.3.21 setStride()

```
TRT_DEPRECATED void nvinfer1::IPoolingLayer::setStride (
            DimsHW stride )  [inline], [noexcept]
```

Set the stride for pooling.

Default: 1

If executing this layer on DLA, both height and width of stride must be in the range [1,16].

See also

getStride()

Deprecated Superseded by setStrideNd. Deprecated prior to TensorRT 8.0 and will be removed in 9.0

9.99.3.22 setStrideNd()

```
void nvinfer1::IPoolingLayer::setStrideNd (
            Dims stride )  [inline], [noexcept]
```

Set the multi-dimension stride for pooling.

Default: (1, 1, ..., 1)

If executing this layer on DLA, only support 2D stride, both height and width of stride must be in the range [1,16].

See also

getStrideNd() setStride() getStride()

9.99.3.23 setWindowSize()

```
TRT_DEPRECATED void nvinfer1::IPoolingLayer::setWindowSize (
            DimsHW windowSize )  [inline], [noexcept]
```

Set the window size for pooling.

If executing this layer on DLA, both height and width of window size must be in the range [1,8].

See also

getWindowSize()

Deprecated Superseded by setWindowSizeNd. Deprecated prior to TensorRT 8.0 and will be removed in 9.0

9.99.3.24 setWindowSizeNd()

```
void nvinfer1::IPoolingLayer::setWindowSizeNd (
            Dims windowSize )  [inline], [noexcept]
```

Set the multi-dimension window size for pooling.

If executing this layer on DLA, only support 2D window size, both height and width of window size must be in the range [1,8].

See also

getWindowSizeNd() setWindowSize() getWindowSize()

9.99.4 Member Data Documentation

9.99.4.1 mImpl

```
apiv::VPoolingLayer* nvinfer1::IPoolingLayer::mImpl  [protected]
```

The documentation for this class was generated from the following file:

- NvInfer.h

9.100 nvinfer1::IProfiler Class Reference

Application-implemented interface for profiling.

`#include <NvInferRuntime.h>`

Public Member Functions

- virtual void reportLayerTime (const char ∗layerName, float ms) noexcept=0

  Layer time reporting callback.
- virtual ∼IProfiler () noexcept

9.100.1 Detailed Description

Application-implemented interface for profiling.

When this class is added to an execution context, the profiler will be called once per layer for each invocation of execute(). Note that enqueue() does not currently support profiling.

The profiler will only be called after execution is complete. It has a small impact on execution time.

9.100.2 Constructor & Destructor Documentation

9.100.2.1 ∼IProfiler()

```
virtual nvinfer1::IProfiler::∼IProfiler ( )  [inline], [virtual], [noexcept]
```

9.100.3 Member Function Documentation

9.100.3.1 reportLayerTime()

```
virtual void nvinfer1::IProfiler::reportLayerTime (
            const char * layerName,
            float ms )  [pure virtual], [noexcept]
```

Layer time reporting callback.

Parameters

layerName	The name of the layer, set when constructing the network definition.
ms	The time in milliseconds to execute the layer.

The documentation for this class was generated from the following file:

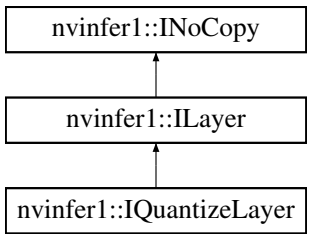
- NvInferRuntime.h

9.101 nvinfer1::IQuantizeLayer Class Reference

A Quantize layer in a network definition.

`#include <NvInfer.h>`

Inheritance diagram for nvinfer1::IQuantizeLayer:



Public Member Functions

- int32_t getAxis () const noexcept

  Get the quantization axis.
- void setAxis (int32_t axis) noexcept

  Set the quantization axis.

Protected Member Functions

- virtual ~IQuantizeLayer () noexcept=default

Protected Attributes

- apiv::VQuantizeLayer * mImpl

9.101.1 Detailed Description

A Quantize layer in a network definition.

This layer accepts a floating-point data input tensor, and uses the scale and zeroPt inputs to quantize the data to an 8-bit signed integer according to: `output` = clamp(round(`input` / `scale`) + `zeroPt`)

Rounding type is rounding-to-nearest ties-to-even (https://en.wikipedia.org/wiki/Rounding#Round_half_to_even). Clamping is in the range [-128, 127].

The first input (index 0) is the tensor to be quantized. The second (index 1) and third (index 2) are the scale and zero point respectively. Each of `scale` and `zeroPt` must be either a scalar, or a 1D tensor.

The `zeroPt` tensor is optional, and if not set, will be assumed to be zero. Its data type must be DataType::kINT8. `zeroPt` must only contain zero-valued coefficients, because only symmetric quantization is supported. The `scale` value must be either a scalar for per-tensor quantization, or a 1D tensor for per-channel quantization. All `scale` coefficients must have positive values. The size of the 1-D `scale` tensor must match the size of the quantization axis. The size of the `scale` must match the size of the `zeroPt`.

The subgraph which terminates with the `scale` tensor must be a build-time constant. The same restrictions apply to the `zeroPt`. The output type, if constrained, must be constrained to DataType::kINT8. The input type, if constrained, must be constrained to DataType::kFLOAT (FP16 input is not supported). The output size is the same as the input size. The quantization axis is in reference to the input tensor's dimensions.

IQuantizeLayer only supports DataType::kFLOAT precision and will default to this precision during instantiation. IQuantizeLayer only supports DataType::kINT8 output.

As an example of the operation of this layer, imagine a 4D NCHW activation input which can be quantized using a single scale coefficient (referred to as per-tensor quantization): For each n in N: For each c in C: For each h in H: For each w in W: output[n,c,h,w] = clamp(round(`input`[n,c,h,w] / `scale`) + `zeroPt`)

Per-channel quantization is supported only for weight inputs. Thus, Activations cannot be quantized per-channel. As an example of per-channel operation, imagine a 4D KCRS weights input and K (dimension 0) as the quantization axis. The scale is an array of coefficients, and must have the same size as the quantization axis. For each k in K: For each c in C: For each r in R: For each s in S: output[k,c,r,s] = clamp(round(`input`[k,c,r,s] / `scale`[k]) + `zeroPt`[k])

Note

Only symmetric quantization is supported.

Currently the only allowed build-time constant `scale` and \zeroPt subgraphs are:

1. Constant -> Quantize
2. Constant -> Cast -> Quantize

Warning

Do not inherit from this class, as doing so will break forward-compatibility of the API and ABI.

9.101.2 Constructor & Destructor Documentation

9.101.2.1 ~IQuantizeLayer()

```
virtual nvinfer1::IQuantizeLayer::~IQuantizeLayer ( )  [protected], [virtual], [default], [noexcept]
```

9.101.3 Member Function Documentation

9.101.3.1 getAxis()

```
int32_t nvinfer1::IQuantizeLayer::getAxis ( ) const  [inline], [noexcept]
```

Get the quantization axis.

Returns

axis parameter set by setAxis(). The return value is the index of the quantization axis in the input tensor's dimensions. A value of -1 indicates per-tensor quantization. The default value is -1.

9.101.3.2 setAxis()

```
void nvinfer1::IQuantizeLayer::setAxis (
            int32_t axis )  [inline], [noexcept]
```

Set the quantization axis.

Set the index of the quantization axis (with reference to the input tensor's dimensions). The axis must be a valid axis if the scale tensor has more than one coefficient. The axis value will be ignored if the scale tensor has exactly one coefficient (per-tensor quantization).

9.101.4 Member Data Documentation

9.101.4.1 mImpl

```
apiv::VQuantizeLayer* nvinfer1::IQuantizeLayer::mImpl  [protected]
```

The documentation for this class was generated from the following file:

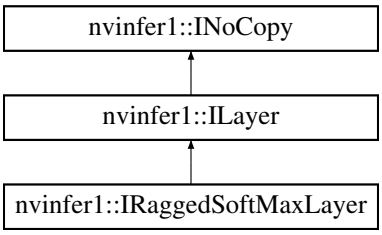
- NvInfer.h

9.102 nvinfer1::IRaggedSoftMaxLayer Class Reference

A RaggedSoftmax layer in a network definition.

`#include <NvInfer.h>`

Inheritance diagram for nvinfer1::IRaggedSoftMaxLayer:



Protected Member Functions

- virtual ~IRaggedSoftMaxLayer () noexcept=default

Protected Attributes

- apiv::VRaggedSoftMaxLayer * mImpl

Additional Inherited Members

9.102.1 Detailed Description

A RaggedSoftmax layer in a network definition.

This layer takes a ZxS input tensor and an additional Zx1 bounds tensor holding the lengths of the Z sequences.

This layer computes a softmax across each of the Z sequences.

The output tensor is of the same size as the input tensor.

Warning

Do not inherit from this class, as doing so will break forward-compatibility of the API and ABI.

9.102.2 Constructor & Destructor Documentation

9.102.2.1 ~IRaggedSoftMaxLayer()

```
virtual nvinfer1::IRaggedSoftMaxLayer::~IRaggedSoftMaxLayer ( )  [protected], [virtual], [default],
[noexcept]
```

9.102.3 Member Data Documentation

9.102.3.1 mImpl

```
apiv::VRaggedSoftMaxLayer* nvinfer1::IRaggedSoftMaxLayer::mImpl  [protected]
```

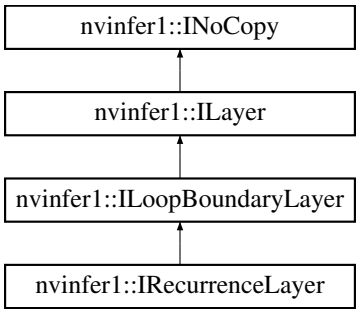
The documentation for this class was generated from the following file:

- NvInfer.h

9.103 nvinfer1::IRecurrenceLayer Class Reference

```
#include <NvInfer.h>
```

Inheritance diagram for nvinfer1::IRecurrenceLayer:



Public Member Functions

- void setInput (int32_t index, ITensor &tensor) noexcept

  Append or replace an input of this layer with a specific tensor.

Protected Member Functions

- virtual ~IRecurrenceLayer () noexcept=default

Protected Attributes

- apiv::VRecurrenceLayer * mImpl

9.103.1 Constructor & Destructor Documentation

9.103.1.1 ~IRecurrenceLayer()

```
virtual nvinfer1::IRecurrenceLayer::~IRecurrenceLayer ( )  [protected], [virtual], [default],
[noexcept]
```

9.103.2 Member Function Documentation

9.103.2.1 setInput()

```
void nvinfer1::ILayer::setInput (
             int32_t index,
             ITensor & tensor )  [inline], [noexcept]
```

Append or replace an input of this layer with a specific tensor.

Parameters

index	the index of the input to modify.
tensor	the new input tensor Sets the input tensor for the given index.

For a recurrence layer, the values 0 and 1 are valid. The indices are as follows:

- 0: The initial value of the output tensor. The value must come from outside the loop.
- 1: The next value of the output tensor. The value usually comes from inside the loop, and must have the same dimensions as input 0.

If this function is called with the value 1, then the function getNbInputs() changes from returning 1 to 2.

9.103.3 Member Data Documentation

9.103.3.1 mImpl

```
apiv::VRecurrenceLayer* nvinfer1::IRecurrenceLayer::mImpl  [protected]
```

The documentation for this class was generated from the following file:

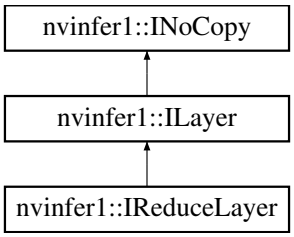
- NvInfer.h

9.104 nvinfer1::IReduceLayer Class Reference

Layer that represents a reduction operator across Shape, Int32, Float, Half, and Int8 tensors.

`#include <NvInfer.h>`

Inheritance diagram for nvinfer1::IReduceLayer:



Public Member Functions

- void setOperation (ReduceOperation op) noexcept
  Set the reduce operation for the layer.
- ReduceOperation getOperation () const noexcept
  Get the reduce operation for the layer.
- void setReduceAxes (uint32_t reduceAxes) noexcept
  Set the axes over which to reduce.
- uint32_t getReduceAxes () const noexcept
  Get the axes over which to reduce for the layer.
- void setKeepDimensions (bool keepDimensions) noexcept
  Set the boolean that specifies whether or not to keep the reduced dimensions for the layer.
- bool getKeepDimensions () const noexcept
  Get the boolean that specifies whether or not to keep the reduced dimensions for the layer.

Protected Member Functions

- virtual ~IReduceLayer () noexcept=default

Protected Attributes

- apiv::VReduceLayer * mImpl

9.104.1 Detailed Description

Layer that represents a reduction operator across Shape, Int32, Float, Half, and Int8 tensors.

Warning

Do not inherit from this class, as doing so will break forward-compatibility of the API and ABI.

9.104.2 Constructor & Destructor Documentation

9.104.2.1 ~IReduceLayer()

```
virtual nvinfer1::IReduceLayer::~IReduceLayer ( )  [protected], [virtual], [default], [noexcept]
```

9.104.3 Member Function Documentation

9.104.3.1 getKeepDimensions()

```
bool nvinfer1::IReduceLayer::getKeepDimensions ( ) const  [inline], [noexcept]
```

Get the boolean that specifies whether or not to keep the reduced dimensions for the layer.

See also

setKeepDimensions

9.104.3.2 getOperation()

```
ReduceOperation nvinfer1::IReduceLayer::getOperation ( ) const  [inline], [noexcept]
```

Get the reduce operation for the layer.

See also

setOperation(), ReduceOperation

9.104.3.3 getReduceAxes()

```
uint32_t nvinfer1::IReduceLayer::getReduceAxes ( ) const  [inline], [noexcept]
```

Get the axes over which to reduce for the layer.

See also

setReduceAxes

9.104.3.4 setKeepDimensions()

```
void nvinfer1::IReduceLayer::setKeepDimensions (
            bool keepDimensions )  [inline], [noexcept]
```

Set the boolean that specifies whether or not to keep the reduced dimensions for the layer.

See also

getKeepDimensions

9.104.3.5 setOperation()

```
void nvinfer1::IReduceLayer::setOperation (
            ReduceOperation op )  [inline], [noexcept]
```

Set the reduce operation for the layer.

See also

getOperation(), ReduceOperation

9.104.3.6 setReduceAxes()

```
void nvinfer1::IReduceLayer::setReduceAxes (
            uint32_t reduceAxes )  [inline], [noexcept]
```

Set the axes over which to reduce.

See also

getReduceAxes

9.104.4 Member Data Documentation

9.104.4.1 mImpl

```
apiv::VReduceLayer* nvinfer1::IReduceLayer::mImpl  [protected]
```

The documentation for this class was generated from the following file:

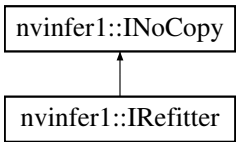
- NvInfer.h

9.105 nvinfer1::IRefitter Class Reference

Updates weights in an engine.

```
#include <NvInferRuntime.h>
```

Inheritance diagram for nvinfer1::IRefitter:



Public Member Functions

- virtual ~IRefitter () noexcept=default
- bool setWeights (const char *layerName, WeightsRole role, Weights weights) noexcept

  Specify new weights for a layer of given name. Returns true on success, or false if new weights are rejected. Possible reasons for rejection are:
- bool refitCudaEngine () noexcept

  Updates associated engine. Return true if successful.
- int32_t getMissing (int32_t size, const char **layerNames, WeightsRole *roles) noexcept

  Get description of missing weights.
- int32_t getAll (int32_t size, const char **layerNames, WeightsRole *roles) noexcept

  Get description of all weights that could be refit.
- TRT_DEPRECATED void destroy () noexcept
- bool setDynamicRange (const char *tensorName, float min, float max) noexcept
- float getDynamicRangeMin (const char *tensorName) const noexcept

  Get minimum of dynamic range.
- float getDynamicRangeMax (const char *tensorName) const noexcept

  Get maximum of dynamic range.
- int32_t getTensorsWithDynamicRange (int32_t size, const char **tensorNames) const noexcept

Get names of all tensors that have refittable dynamic ranges.

- void setErrorRecorder (IErrorRecorder *recorder) noexcept

  Set the ErrorRecorder for this interface.
- IErrorRecorder * getErrorRecorder () const noexcept

  Get the ErrorRecorder assigned to this interface.
- bool setNamedWeights (const char *name, Weights weights) noexcept

  Specify new weights of given name.
- int32_t getMissingWeights (int32_t size, const char **weightsNames) noexcept

  Get names of missing weights.
- int32_t getAllWeights (int32_t size, const char **weightsNames) noexcept

  Get names of all weights that could be refit.
- ILogger * getLogger () const noexcept

  get the logger with which the refitter was created

Protected Attributes

- apiv::VRefitter * mImpl

Additional Inherited Members

9.105.1 Detailed Description

Updates weights in an engine.

Warning

Do not inherit from this class, as doing so will break forward-compatibility of the API and ABI.

9.105.2 Constructor & Destructor Documentation

9.105.2.1 ~IRefitter()

```
virtual nvinfer1::IRefitter::~IRefitter ( )  [virtual], [default], [noexcept]
```

9.105.3 Member Function Documentation

9.105.3.1 destroy()

```
TRT_DEPRECATED void nvinfer1::IRefitter::destroy ( )  [inline], [noexcept]
```

Deprecated Deprecated interface will be removed in TensorRT 10.0.

Warning

Calling destroy on a managed pointer will result in a double-free error.

9.105.3.2 getAll()

```
int32_t nvinfer1::IRefitter::getAll (
            int32_t size,
            const char ** layerNames,
            WeightsRole * roles )  [inline], [noexcept]
```

Get description of all weights that could be refit.

Parameters

size	The number of items that can be safely written to a non-null layerNames or roles.
layerNames	Where to write the layer names.
roles	Where to write the weights roles.

Returns

The number of Weights that could be refit.

If layerNames!=nullptr, each written pointer points to a string owned by the engine being refit, and becomes invalid when the engine is destroyed.

9.105.3.3 getAllWeights()

```
int32_t nvinfer1::IRefitter::getAllWeights (
            int32_t size,
            const char ** weightsNames )  [inline], [noexcept]
```

Get names of all weights that could be refit.

Parameters

size	The number of weights names that can be safely written to.
weightsNames	The names of the weights to be updated, or nullptr for unnamed weights.

Returns

The number of Weights that could be refit.

If layerNames!=nullptr, each written pointer points to a string owned by the engine being refit, and becomes invalid when the engine is destroyed.

9.105.3.4 getDynamicRangeMax()

```
float nvinfer1::IRefitter::getDynamicRangeMax (
            const char * tensorName ) const  [inline], [noexcept]
```

Get maximum of dynamic range.

Returns

Maximum of dynamic range.

If the dynamic range was never set, returns the maximum computed during calibration.

9.105.3.5 getDynamicRangeMin()

```
float nvinfer1::IRefitter::getDynamicRangeMin (
            const char * tensorName ) const  [inline], [noexcept]
```

Get minimum of dynamic range.

Returns

Minimum of dynamic range.

If the dynamic range was never set, returns the minimum computed during calibration.

9.105.3.6 getErrorRecorder()

```
IErrorRecorder * nvinfer1::IRefitter::getErrorRecorder ( ) const  [inline], [noexcept]
```

Get the ErrorRecorder assigned to this interface.

Retrieves the assigned error recorder object for the given class. A nullptr will be returned if an error handler has not been set.

Returns

A pointer to the IErrorRecorder object that has been registered.

See also

setErrorRecorder()

9.105.3.7 getLogger()

```
ILogger * nvinfer1::IRefitter::getLogger ( ) const  [inline], [noexcept]
```

get the logger with which the refitter was created

Returns

the logger

9.105.3.8 getMissing()

```
int32_t nvinfer1::IRefitter::getMissing (
            int32_t size,
            const char ** layerNames,
            WeightsRole * roles )  [inline], [noexcept]
```

Get description of missing weights.

For example, if some Weights have been set, but the engine was optimized in a way that combines weights, any unsupplied Weights in the combination are considered missing.

Parameters

size	The number of items that can be safely written to a non-null layerNames or roles.
layerNames	Where to write the layer names.
roles	Where to write the weights roles.

Returns

The number of missing Weights.

If layerNames!=nullptr, each written pointer points to a string owned by the engine being refit, and becomes invalid when the engine is destroyed.

9.105.3.9 getMissingWeights()

```
int32_t nvinfer1::IRefitter::getMissingWeights (
            int32_t size,
            const char ** weightsNames )  [inline], [noexcept]
```

Get names of missing weights.

For example, if some Weights have been set, but the engine was optimized in a way that combines weights, any unsupplied Weights in the combination are considered missing.

Parameters

size	The number of weights names that can be safely written to.
weightsNames	The names of the weights to be updated, or nullptr for unnamed weights.

Returns

The number of missing Weights.

If layerNames!=nullptr, each written pointer points to a string owned by the engine being refit, and becomes invalid when the engine is destroyed.

9.105.3.10 getTensorsWithDynamicRange()

```
int32_t nvinfer1::IRefitter::getTensorsWithDynamicRange (
            int32_t size,
            const char ** tensorNames ) const  [inline], [noexcept]
```

Get names of all tensors that have refittable dynamic ranges.

Parameters

size	The number of items that can be safely written to a non-null tensorNames.
tensorNames	Where to write the layer names.

Returns

The number of Weights that could be refit.

If tensorNames!=nullptr, each written pointer points to a string owned by the engine being refit, and becomes invalid when the engine is destroyed.

9.105.3.11 refitCudaEngine()

```
bool nvinfer1::IRefitter::refitCudaEngine ( )  [inline], [noexcept]
```

Updates associated engine. Return true if successful.

Failure occurs if getMissing() != 0 before the call.

The behavior is undefined if the engine has pending enqueued work.

Extant IExecutionContexts associated with the engine should not be used afterwards. Instead, create new IExecution↩ Contexts after refitting.

9.105.3.12 setDynamicRange()

```
bool nvinfer1::IRefitter::setDynamicRange (
            const char * tensorName,
            float min,
            float max )  [inline], [noexcept]
```

Update dynamic range for a tensor.

Parameters

tensorName	The name of an ITensor in the network.
min	The minimum of the dynamic range for the tensor.
max	The maximum of the dynamic range for the tensor.

Returns

True if successful; false otherwise.

Returns false if there is no Int8 engine tensor derived from a network tensor of that name. If successful, then getMissing may report that some weights need to be supplied.

9.105.3.13 setErrorRecorder()

```
void nvinfer1::IRefitter::setErrorRecorder (
            IErrorRecorder * recorder )  [inline], [noexcept]
```

Set the ErrorRecorder for this interface.

Assigns the ErrorRecorder to this interface. The ErrorRecorder will track all errors during execution. This function will call incRefCount of the registered ErrorRecorder at least once. Setting recorder to nullptr unregisters the recorder with the interface, resulting in a call to decRefCount if a recorder has been registered.

If an error recorder is not set, messages will be sent to the global log stream.

Parameters

recorder	The error recorder to register with this interface.

See also

getErrorRecorder()

9.105.3.14 setNamedWeights()

```
bool nvinfer1::IRefitter::setNamedWeights (
            const char * name,
            Weights weights )  [inline], [noexcept]
```

Specify new weights of given name.

Parameters

name	The name of the weights to be refit.
weights	The new weights to associate with the name.

Returns true on success, or false if new weights are rejected. Possible reasons for rejection are:

- The name of weights is nullptr or does not correspond to any refittable weights.
- The number of weights is inconsistent with the original specification.

Modifying the weights before method refitCudaEngine() completes will result in undefined behavior.

9.105.3.15 setWeights()

```
bool nvinfer1::IRefitter::setWeights (
            const char * layerName,
            WeightsRole role,
            Weights weights )  [inline], [noexcept]
```

Specify new weights for a layer of given name. Returns true on success, or false if new weights are rejected. Possible reasons for rejection are:

- There is no such layer by that name.
- The layer does not have weights with the specified role.
- The number of weights is inconsistent with the layer's original specification.

Modifying the weights before method refit() completes will result in undefined behavior.

9.105.4 Member Data Documentation

9.105.4.1 mImpl

```
apiv::VRefitter* nvinfer1::IRefitter::mImpl  [protected]
```

The documentation for this class was generated from the following file:

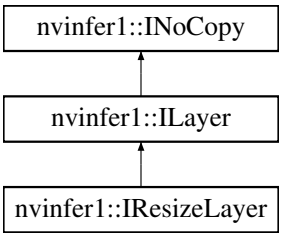
- NvInferRuntime.h

9.106 nvinfer1::IResizeLayer Class Reference

A resize layer in a network definition.

```
#include <NvInfer.h>
```

Inheritance diagram for nvinfer1::IResizeLayer:



Public Member Functions

- void setOutputDimensions (Dims dimensions) noexcept

  Set the output dimensions.
- Dims getOutputDimensions () const noexcept

  Get the output dimensions.
- void setScales (const float *scales, int32_t nbScales) noexcept

  Set the resize scales.
- int32_t getScales (int32_t size, float *scales) const noexcept

  Copies resize scales to scales[0, ..., nbScales-1], where nbScales is the number of scales that were set.
- void setResizeMode (ResizeMode resizeMode) noexcept

  Set resize mode for an input tensor.
- ResizeMode getResizeMode () const noexcept

  Get resize mode for an input tensor.
- TRT_DEPRECATED void setAlignCorners (bool alignCorners) noexcept

  Set whether to align corners while resizing.
- TRT_DEPRECATED bool getAlignCorners () const noexcept

  True if align corners has been set.
- void setCoordinateTransformation (ResizeCoordinateTransformation coordTransform) noexcept

  Set coordinate transformation function.
- ResizeCoordinateTransformation getCoordinateTransformation () const noexcept

Get coordinate transformation function.

- void setSelectorForSinglePixel (ResizeSelector selector) noexcept

  Set coordinate selector function when resized to single pixel.
- ResizeSelector getSelectorForSinglePixel () const noexcept

  Get the coordinate selector function when resized to single pixel.
- void setNearestRounding (ResizeRoundMode value) noexcept

  Set rounding mode for nearest neighbor resize.
- ResizeRoundMode getNearestRounding () const noexcept

  Get rounding mode for nearest neighbor resize.
- void setInput (int32_t index, ITensor &tensor) noexcept

  Append or replace an input of this layer with a specific tensor.

Protected Member Functions

- virtual ~IResizeLayer () noexcept=default

Protected Attributes

- apiv::VResizeLayer * mImpl

9.106.1 Detailed Description

A resize layer in a network definition.

Resize layer can be used for resizing a N-D tensor.

Resize layer currently supports the following configurations:

- ResizeMode::kNEAREST - resizes innermost `m` dimensions of N-D, where 0 < m <= min(8, N) and N > 0
- ResizeMode::kLINEAR - resizes innermost `m` dimensions of N-D, where 0 < m <= min(3, N) and N > 0

Default resize mode is ResizeMode::kNEAREST.

The coordinates in the output tensor are mapped to coordinates in the input tensor using a function set by calling setCoordinateTransformation(). The default for all ResizeMode settings (nearest, linear, bilinear, etc.) is ResizeCoordinateTransformation::kASYMMETRIC.

The resize layer provides two ways to resize tensor dimensions.

- Set output dimensions directly. It can be done for static as well as dynamic resize layer. Static resize layer requires output dimensions to be known at build-time. Dynamic resize layer requires output dimensions to be set as one of the input tensors.
- Set scales for resize. Each output dimension is calculated as floor(input dimension * scale). Only static resize layer allows setting scales where the scales are known at build-time.

If executing this layer on DLA, the following combinations of parameters are supported:

- In kNEAREST mode:
  - (ResizeCoordinateTransformation::kASYMMETRIC, ResizeSelector::kFORMULA, ResizeRoundMode::kFLOOR)
  - (ResizeCoordinateTransformation::kHALF_PIXEL, ResizeSelector::kFORMULA, ResizeRoundMode::kHALF_DOWN)
  - (ResizeCoordinateTransformation::kHALF_PIXEL, ResizeSelector::kFORMULA, ResizeRoundMode::kHALF_UP)
- In kLINEAR mode:
  - (ResizeCoordinateTransformation::kHALF_PIXEL, ResizeSelector::kFORMULA)
  - (ResizeCoordinateTransformation::kHALF_PIXEL, ResizeSelector::kUPPER)

Warning

Do not inherit from this class, as doing so will break forward-compatibility of the API and ABI.

9.106.2 Constructor & Destructor Documentation

9.106.2.1 ~IResizeLayer()

```
virtual nvinfer1::IResizeLayer::~IResizeLayer ( )  [protected], [virtual], [default], [noexcept]
```

9.106.3 Member Function Documentation

9.106.3.1 getAlignCorners()

```
TRT_DEPRECATED bool nvinfer1::IResizeLayer::getAlignCorners ( ) const  [inline], [noexcept]
```

True if align corners has been set.

Returns

True if align corners has been set, false otherwise.

Deprecated Superseded by IResizeLayer::getCoordinateTransformation(). Deprecated in TensorRT 8.0

9.106.3.2 getCoordinateTransformation()

```
ResizeCoordinateTransformation nvinfer1::IResizeLayer::getCoordinateTransformation ( ) const  [inline], [noexcept]
```

Get coordinate transformation function.

Returns

The coordinate transformation function.

9.106.3.3 getNearestRounding()

```
ResizeRoundMode nvinfer1::IResizeLayer::getNearestRounding ( ) const  [inline], [noexcept]
```

Get rounding mode for nearest neighbor resize.

Returns

The rounding mode.

9.106.3.4 getOutputDimensions()

```
Dims nvinfer1::IResizeLayer::getOutputDimensions ( ) const  [inline], [noexcept]
```

Get the output dimensions.

Returns

The output dimensions.

9.106.3.5 getResizeMode()

```
ResizeMode nvinfer1::IResizeLayer::getResizeMode ( ) const  [inline], [noexcept]
```

Get resize mode for an input tensor.

Returns

The resize mode.

9.106.3.6 getScales()

```
int32_t nvinfer1::IResizeLayer::getScales (
            int32_t size,
            float * scales ) const  [inline], [noexcept]
```

Copies resize scales to scales[0, ..., nbScales-1], where nbScales is the number of scales that were set.

Parameters

size	The number of scales to get. If size != nbScales, no scales will be copied.
scales	Pointer to where to copy the scales. Scales will be copied only if size == nbScales and scales != nullptr.

In case the size is not known consider using size = 0 and scales = nullptr. This method will return the number of resize scales.

Returns

The number of resize scales i.e. nbScales if scales were set. Return -1 in case no scales were set or resize layer is used in dynamic mode.

9.106.3.7 getSelectorForSinglePixel()

```
ResizeSelector nvinfer1::IResizeLayer::getSelectorForSinglePixel ( ) const  [inline], [noexcept]
```

Get the coordinate selector function when resized to single pixel.

Returns

The selector function.

9.106.3.8 setAlignCorners()

```
TRT_DEPRECATED void nvinfer1::IResizeLayer::setAlignCorners (
            bool alignCorners )  [inline], [noexcept]
```

Set whether to align corners while resizing.

If true, the centers of the 4 corner pixels of both input and output tensors are aligned i.e. preserves the values of corner pixels.

Default: false.

Deprecated Superseded by IResizeLayer::setCoordinateTransformation(). Deprecated in TensorRT 8.0

9.106.3.9 setCoordinateTransformation()

```
void nvinfer1::IResizeLayer::setCoordinateTransformation (
            ResizeCoordinateTransformation coordTransform )  [inline], [noexcept]
```

Set coordinate transformation function.

The function maps a coordinate in the output tensor to a coordinate in the input tensor.

Default function is ResizeCoordinateTransformation::kASYMMETRIC.

See also

ResizeCoordinateTransformation

9.106.3.10 setInput()

```
void nvinfer1::ILayer::setInput (
            int32_t index,
            ITensor & tensor )  [inline], [noexcept]
```

Append or replace an input of this layer with a specific tensor.

Parameters

index	the index of the input to modify.
tensor	the new input tensor.

Sets the input tensor for the given index. The index must be 0 for a static resize layer. A static resize layer is converted to a dynamic resize layer by calling setInput with an index 1. A dynamic resize layer cannot be converted back to a static resize layer.

For a dynamic resize layer, the values 0 and 1 are valid. The indices in the dynamic case are as follows:

- 0: Data or Shape tensor to be resized.
- 1: The output dimensions, as a 1D Int32 shape tensor.

If this function is called with the value 1, then the function getNbInputs() changes from returning 1 to 2.

9.106.3.11 setNearestRounding()

```
void nvinfer1::IResizeLayer::setNearestRounding (
            ResizeRoundMode value )  [inline], [noexcept]
```

Set rounding mode for nearest neighbor resize.

This value is used for nearest neighbor interpolation rounding. It is applied after coordinate transformation.

Default is kFLOOR.

See also

ResizeRoundMode

9.106.3.12 setOutputDimensions()

```
void nvinfer1::IResizeLayer::setOutputDimensions (
            Dims dimensions )  [inline], [noexcept]
```

Set the output dimensions.

Parameters

dimensions	The output dimensions. Number of output dimensions must be the same as the number of input dimensions.

If executing this layer on DLA, setOutputDimensions() is not supported.

If there is a second input, i.e. resize layer is dynamic, calling setOutputDimensions() is an error and does not update the dimensions.

Output dimensions can be specified directly, or via scale factors relative to input dimensions. Scales for resize can be provided using setScales().

See also

setScales

getOutputDimensions

9.106.3.13 setResizeMode()

```
void nvinfer1::IResizeLayer::setResizeMode (
            ResizeMode resizeMode )  [inline], [noexcept]
```

Set resize mode for an input tensor.

Supported resize modes are Nearest Neighbor and Linear.

See also

ResizeMode

9.106.3.14 setScales()

```
void nvinfer1::IResizeLayer::setScales (
            const float * scales,
            int32_t nbScales )  [inline], [noexcept]
```

Set the resize scales.

Parameters

scales	An array of resize scales.
nbScales	Number of scales. Number of scales must be equal to the number of input dimensions.

If executing this layer on DLA, there are three restrictions: 1) nbScales has to be exactly 4. 2) the first two elements in scales need to be exactly 1 (for unchanged batch and channel dimensions). 3) The last two elements in scales, representing the scale values along height and width dimensions, respectively, need to be integer values in the range of [1, 32] for kNEAREST mode and [1, 4] for kLINEAR. Example of DLA-supported scales: {1, 1, 2, 2}.

If there is a second input, i.e. resize layer is dynamic, calling setScales() is an error and does not update the scales.

Output dimensions are calculated as follows: outputDims[i] = floor(inputDims[i] ∗ scales[i])

Output dimensions can be specified directly, or via scale factors relative to input dimensions. Output dimensions can be provided directly using setOutputDimensions().

See also

setOutputDimensions

getScales

9.106.3.15 setSelectorForSinglePixel()

```
void nvinfer1::IResizeLayer::setSelectorForSinglePixel (
            ResizeSelector selector )  [inline], [noexcept]
```

Set coordinate selector function when resized to single pixel.

When resize to single pixel image, use this function to decide how to map the coordinate in the original image.

Default is ResizeSelector::kFORMULA.

See also

ResizeSelector

9.106.4 Member Data Documentation

9.106.4.1 mImpl

```
apiv::VResizeLayer* nvinfer1::IResizeLayer::mImpl  [protected]
```

The documentation for this class was generated from the following file:

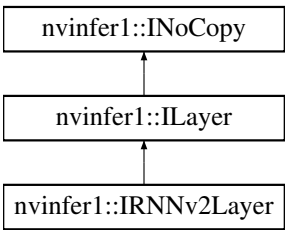
- NvInfer.h

9.107 nvinfer1::IRNNv2Layer Class Reference

An RNN layer in a network definition, version 2.

`#include <NvInfer.h>`

Inheritance diagram for nvinfer1::IRNNv2Layer:



Public Member Functions

- int32_t getLayerCount () const noexcept

  Get the layer count of the RNN.
- int32_t getHiddenSize () const noexcept

  Get the hidden size of the RNN.
- int32_t getMaxSeqLength () const noexcept

  Get the maximum sequence length of the RNN.
- int32_t getDataLength () const noexcept

  Get the maximum data length of the RNN.
- void setSequenceLengths (ITensor &seqLengths) noexcept

  Specify individual sequence lengths in the batch with the ITensor pointed to by `seqLengths`.
- ITensor * getSequenceLengths () const noexcept

  Get the sequence lengths specified for the RNN.
- void setOperation (RNNOperation op) noexcept

  Set the operation of the RNN layer.
- RNNOperation getOperation () const noexcept

  Get the operation of the RNN layer.
- void setInputMode (RNNInputMode op) noexcept

  Set the input mode of the RNN layer.
- RNNInputMode getInputMode () const noexcept

  Get the input mode of the RNN layer.
- void setDirection (RNNDirection op) noexcept

  Set the direction of the RNN layer.
- RNNDirection getDirection () const noexcept

  Get the direction of the RNN layer.
- void setWeightsForGate (int32_t layerIndex, RNNGateType gate, bool isW, Weights weights) noexcept

  Set the weight parameters for an individual gate in the RNN.
- Weights getWeightsForGate (int32_t layerIndex, RNNGateType gate, bool isW) const noexcept

  Get the weight parameters for an individual gate in the RNN.
- void setBiasForGate (int32_t layerIndex, RNNGateType gate, bool isW, Weights bias) noexcept

Set the bias parameters for an individual gate in the RNN.

- Weights getBiasForGate (int32_t layerIndex, RNNGateType gate, bool isW) const noexcept

  Get the bias parameters for an individual gate in the RNN.

- void setHiddenState (ITensor &hidden) noexcept

  Set the initial hidden state of the RNN with the provided `hidden` *ITensor.*

- ITensor * getHiddenState () const noexcept

  Get the initial hidden state of the RNN.

- void setCellState (ITensor &cell) noexcept

  Set the initial cell state of the LSTM with the provided `cell` *ITensor.*

- ITensor * getCellState () const noexcept

  Get the initial cell state of the RNN.

Protected Member Functions

- virtual ~IRNNv2Layer () noexcept=default

Protected Attributes

- apiv::VRNNv2Layer * mImpl

9.107.1 Detailed Description

An RNN layer in a network definition, version 2.

This layer supersedes IRNNLayer.

Deprecated Use INetworkDefinition::addLoop instead. Deprecated prior to TensorRT 8.0 and will be removed in 9.0

Warning

Do not inherit from this class, as doing so will break forward-compatibility of the API and ABI.

9.107.2 Constructor & Destructor Documentation

9.107.2.1 ~IRNNv2Layer()

```
virtual nvinfer1::IRNNv2Layer::~IRNNv2Layer ( )  [protected], [virtual], [default], [noexcept]
```

9.107.3 Member Function Documentation

9.107.3.1 getBiasForGate()

```
Weights nvinfer1::IRNNv2Layer::getBiasForGate (
            int32_t layerIndex,
            RNNGateType gate,
            bool isW ) const  [inline], [noexcept]
```

Get the bias parameters for an individual gate in the RNN.

See also

setBiasForGate()

9.107.3.2 getCellState()

```
ITensor * nvinfer1::IRNNv2Layer::getCellState ( ) const  [inline], [noexcept]
```

Get the initial cell state of the RNN.

See also

setCellState()

9.107.3.3 getDataLength()

```
int32_t nvinfer1::IRNNv2Layer::getDataLength ( ) const  [inline], [noexcept]
```

Get the maximum data length of the RNN.

9.107.3.4 getDirection()

```
RNNDirection nvinfer1::IRNNv2Layer::getDirection ( ) const  [inline], [noexcept]
```

Get the direction of the RNN layer.

See also

setDirection(), RNNDirection

9.107.3.5 getHiddenSize()

```
int32_t nvinfer1::IRNNv2Layer::getHiddenSize ( ) const  [inline], [noexcept]
```

Get the hidden size of the RNN.

9.107.3.6 getHiddenState()

```
ITensor * nvinfer1::IRNNv2Layer::getHiddenState ( ) const  [inline], [noexcept]
```

Get the initial hidden state of the RNN.

See also

setHiddenState()

9.107.3.7 getInputMode()

```
RNNInputMode nvinfer1::IRNNv2Layer::getInputMode ( ) const  [inline], [noexcept]
```

Get the input mode of the RNN layer.

See also

setInputMode(), RNNInputMode

9.107.3.8 getLayerCount()

```
int32_t nvinfer1::IRNNv2Layer::getLayerCount ( ) const  [inline], [noexcept]
```

Get the layer count of the RNN.

9.107.3.9 getMaxSeqLength()

```
int32_t nvinfer1::IRNNv2Layer::getMaxSeqLength ( ) const  [inline], [noexcept]
```

Get the maximum sequence length of the RNN.

9.107.3.10 getOperation()

```
RNNOperation nvinfer1::IRNNv2Layer::getOperation ( ) const  [inline], [noexcept]
```

Get the operation of the RNN layer.

See also

setOperation(), RNNOperation

9.107.3.11 getSequenceLengths()

```
ITensor * nvinfer1::IRNNv2Layer::getSequenceLengths ( ) const  [inline], [noexcept]
```

Get the sequence lengths specified for the RNN.

Returns

nullptr if no sequence lengths were specified, the sequence length data otherwise.

See also

setSequenceLengths()

9.107.3.12 getWeightsForGate()

```
Weights nvinfer1::IRNNv2Layer::getWeightsForGate (
            int32_t layerIndex,
            RNNGateType gate,
            bool isW ) const  [inline], [noexcept]
```

Get the weight parameters for an individual gate in the RNN.

See also

setWeightsForGate()

9.107.3.13 setBiasForGate()

```
void nvinfer1::IRNNv2Layer::setBiasForGate (
            int32_t layerIndex,
            RNNGateType gate,
            bool isW,
            Weights bias )  [inline], [noexcept]
```

Set the bias parameters for an individual gate in the RNN.

The DataType for this structure must be ::kFLOAT or ::kHALF, and must be the same datatype as the input tensor.

Each bias vector has a fixed size, getHiddenSize().

Parameters

layerIndex	The index of the layer that contains this gate. See the section Order of weight matrices in IRNNLayer::setWeights() for a description of the layer index.
gate	The name of the gate within the RNN layer. The gate name must correspond to one of the gates used by this layer's RNNOperation.
isW	True if the bias parameters are for the input bias Wb[g] and false if they are for the recurrent input bias Rb[g]. See RNNOperation for equations showing how these bias vectors are used in the RNN gate.
bias	The weight structure holding the bias parameters, which should be an array of size getHiddenSize().

9.107.3.14 setCellState()

```
void nvinfer1::IRNNv2Layer::setCellState (
             ITensor & cell )  [inline], [noexcept]
```

Set the initial cell state of the LSTM with the provided `cell` ITensor.

The `cell` ITensor should have the dimensions {`N1, ..., Np, L, H`}, where:

- `N1..Np` are the index dimensions specified by the input tensor
- `L` is the number of layers in the RNN, equal to getLayerCount() if getDirection is ::kUNIDIRECTION, and 2x getLayerCount() if getDirection is ::kBIDIRECTION. In the bi-directional case, layer `l`'s final forward hidden state is stored in `L = 2*l`, and final backward hidden state is stored in `L= 2*l + 1`.
- `H` is the hidden state for each layer, equal to getHiddenSize().

It is an error to call setCellState() on an RNN layer that is not configured with RNNOperation::kLSTM.

9.107.3.15 setDirection()

```
void nvinfer1::IRNNv2Layer::setDirection (
             RNNDirection op )  [inline], [noexcept]
```

Set the direction of the RNN layer.

The direction determines if the RNN is run as a unidirectional(left to right) or bidirectional(left to right and right to left). In the ::kBIDIRECTION case the output is concatenated together, resulting in output size of 2x getHiddenSize().

See also

getDirection(), RNNDirection

9.107.3.16 setHiddenState()

```
void nvinfer1::IRNNv2Layer::setHiddenState (
            ITensor & hidden )  [inline], [noexcept]
```

Set the initial hidden state of the RNN with the provided `hidden` ITensor.

The `hidden` ITensor should have the dimensions {`N1, ..., Np, L, H`}, where:

- `N1..Np` are the index dimensions specified by the input tensor
- `L` is the number of layers in the RNN, equal to getLayerCount() if getDirection is ::kUNIDIRECTION, and 2x getLayerCount() if getDirection is ::kBIDIRECTION. In the bi-directional case, layer `l`'s final forward hidden state is stored in `L = 2*l`, and final backward hidden state is stored in `L= 2*l + 1`.
- `H` is the hidden state for each layer, equal to getHiddenSize().

9.107.3.17 setInputMode()

```
void nvinfer1::IRNNv2Layer::setInputMode (
            RNNInputMode op )  [inline], [noexcept]
```

Set the input mode of the RNN layer.

See also

getInputMode(), RNNInputMode

9.107.3.18 setOperation()

```
void nvinfer1::IRNNv2Layer::setOperation (
            RNNOperation op )  [inline], [noexcept]
```

Set the operation of the RNN layer.

See also

getOperation(), RNNOperation

9.107.3.19 setSequenceLengths()

```
void nvinfer1::IRNNv2Layer::setSequenceLengths (
             ITensor & seqLengths )  [inline], [noexcept]
```

Specify individual sequence lengths in the batch with the ITensor pointed to by `seqLengths`.

The `seqLengths` ITensor should be a {N1, ..., Np} tensor, where N1..Np are the index dimensions of the input tensor to the RNN.

If this is not specified, then the RNN layer assumes all sequences are size getMaxSeqLength().

All sequence lengths in `seqLengths` should be in the range [1, getMaxSeqLength()]. Zero-length sequences are not supported.

This tensor must be of type DataType::kINT32.

9.107.3.20 setWeightsForGate()

```
void nvinfer1::IRNNv2Layer::setWeightsForGate (
             int32_t layerIndex,
             RNNGateType gate,
             bool isW,
             Weights weights )  [inline], [noexcept]
```

Set the weight parameters for an individual gate in the RNN.

The DataType for this structure must be ::kFLOAT or ::kHALF, and must be the same datatype as the input tensor.

Each parameter matrix is row-major in memory, and has the following dimensions:

```
 Let K := { ::kUNIDIRECTION => 1
          { ::kBIDIRECTION => 2
     l := layer index (as described above)
     H := getHiddenSize()
     E := getDataLength() (the embedding length)
     isW := true if the matrix is an input (W) matrix, and false if
            the matrix is a recurrent input (R) matrix.
if isW:
   if l < K and ::kSKIP:
      (numRows, numCols) := (0, 0) # input matrix is skipped
   elif l < K and ::kLINEAR:
      (numRows, numCols) := (H, E) # input matrix acts on input data size E
   elif l >= K:
      (numRows, numCols) := (H, K * H) # input matrix acts on previous hidden state
else: # not isW
   (numRows, numCols) := (H, H)
```

In other words, the input weights of the first layer of the RNN (if not skipped) transform a `getDataLength()`-size column vector into a `getHiddenSize()`-size column vector. The input weights of subsequent layers transform a `K*getHiddenSize()`-size column vector into a `getHiddenSize()`-size column vector. `K=2` in the bidirectional case to account for the full hidden state being the concatenation of the forward and backward RNN hidden states.

The recurrent weight matrices for all layers all have shape `(H, H)`, both in the unidirectional and bidirectional cases. (In the bidirectional case, each recurrent weight matrix for the (forward or backward) RNN cell operates on the previous (forward or backward) RNN cell's hidden state, which is size `H`).

Parameters

layerIndex	The index of the layer that contains this gate. See the section
gate	The name of the gate within the RNN layer. The gate name must correspond to one of the gates used by this layer's RNNOperation.
isW	True if the weight parameters are for the input matrix W[g] and false if they are for the recurrent input matrix R[g]. See RNNOperation for equations showing how these matrices are used in the RNN gate.
weights	The weight structure holding the weight parameters, which are stored as a row-major 2D matrix. See the layout of elements within a weight matrix in IRNNLayer::setWeights() for documentation on the expected dimensions of this matrix.

9.107.4 Member Data Documentation

9.107.4.1 mImpl

```
apiv::VRNNv2Layer* nvinfer1::IRNNv2Layer::mImpl  [protected]
```

The documentation for this class was generated from the following file:

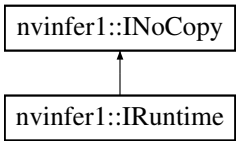
- NvInfer.h

9.108 nvinfer1::IRuntime Class Reference

Allows a serialized functionally unsafe engine to be deserialized.

```
#include <NvInferRuntime.h>
```

Inheritance diagram for nvinfer1::IRuntime:



Public Member Functions

- virtual ~IRuntime () noexcept=default
- TRT_DEPRECATED nvinfer1::ICudaEngine * deserializeCudaEngine (const void *blob, std::size_t size, IPluginFactory *pluginFactory) noexcept

  Deserialize an engine from a stream.
- void setDLACore (int32_t dlaCore) noexcept

  Set the DLA core that the deserialized engine must execute on.
- int32_t getDLACore () const noexcept

  Get the DLA core that the engine executes on.
- int32_t getNbDLACores () const noexcept

  Returns number of DLA hardware cores accessible.
- TRT_DEPRECATED void destroy () noexcept

  Destroy this object.
- void setGpuAllocator (IGpuAllocator *allocator) noexcept

  Set the GPU allocator.
- void setErrorRecorder (IErrorRecorder *recorder) noexcept

  Set the ErrorRecorder for this interface.
- IErrorRecorder * getErrorRecorder () const noexcept

  get the ErrorRecorder assigned to this interface.
- ICudaEngine * deserializeCudaEngine (const void *blob, std::size_t size) noexcept

  Deserialize an engine from a stream.
- ILogger * getLogger () const noexcept

  get the logger with which the runtime was created

Protected Attributes

- apiv::VRuntime * mImpl

Additional Inherited Members

9.108.1 Detailed Description

Allows a serialized functionally unsafe engine to be deserialized.

Warning

Do not inherit from this class, as doing so will break forward-compatibility of the API and ABI.

9.108.2 Constructor & Destructor Documentation

9.108.2.1 ~IRuntime()

```
virtual nvinfer1::IRuntime::~IRuntime ( )  [virtual], [default], [noexcept]
```

9.108.3 Member Function Documentation

9.108.3.1 deserializeCudaEngine() [1/2]

```
ICudaEngine * nvinfer1::IRuntime::deserializeCudaEngine (
            const void * blob,
            std::size_t size )  [inline], [noexcept]
```

Deserialize an engine from a stream.

If an error recorder has been set for the runtime, it will also be passed to the engine.

Parameters

blob	The memory that holds the serialized engine.
size	The size of the memory.

Returns

The engine, or nullptr if it could not be deserialized.

9.108.3.2 deserializeCudaEngine() [2/2]

```
TRT_DEPRECATED nvinfer1::ICudaEngine * nvinfer1::IRuntime::deserializeCudaEngine (
            const void * blob,
            std::size_t size,
            IPluginFactory * pluginFactory )  [inline], [noexcept]
```

Deserialize an engine from a stream.

If an error recorder has been set for the runtime, it will also be passed to the engine.

Parameters

blob	The memory that holds the serialized engine.
size	The size of the memory in bytes.
pluginFactory	The plugin factory, if any plugins are used by the network, otherwise nullptr.

Returns

The engine, or nullptr if it could not be deserialized.

Deprecated Deprecated interface will be removed in TensorRT 10.0.

Warning

IPluginFactory is no longer supported, therefore pluginFactory must be a nullptr.

9.108.3.3 destroy()

```
TRT_DEPRECATED void nvinfer1::IRuntime::destroy ( )  [inline], [noexcept]
```

Destroy this object.

Deprecated Deprecated interface will be removed in TensorRT 10.0.

Warning

Calling destroy on a managed pointer will result in a double-free error.

9.108.3.4 getDLACore()

```
int32_t nvinfer1::IRuntime::getDLACore ( ) const  [inline], [noexcept]
```

Get the DLA core that the engine executes on.

Returns

If setDLACore is called, returns DLA core from 0 to N-1, else returns 0.

Warning

Starting with TensorRT 8, the default value will be -1 if the DLA is not specified or unused.

9.108.3.5 getErrorRecorder()

```
IErrorRecorder * nvinfer1::IRuntime::getErrorRecorder ( ) const  [inline], [noexcept]
```

get the ErrorRecorder assigned to this interface.

Retrieves the assigned error recorder object for the given class. A nullptr will be returned if an error handler has not been set.

Returns

A pointer to the IErrorRecorder object that has been registered.

See also

setErrorRecorder()

9.108.3.6 getLogger()

```
ILogger * nvinfer1::IRuntime::getLogger ( ) const  [inline], [noexcept]
```

get the logger with which the runtime was created

Returns

the logger

9.108.3.7 getNbDLACores()

```
int32_t nvinfer1::IRuntime::getNbDLACores ( ) const  [inline], [noexcept]
```

Returns number of DLA hardware cores accessible.

9.108.3.8 setDLACore()

```
void nvinfer1::IRuntime::setDLACore (
            int32_t dlaCore )  [inline], [noexcept]
```

Set the DLA core that the deserialized engine must execute on.

Parameters

dlaCore	The DLA core to execute the engine on (0 to N-1, where N is the maximum number of DLA's present on the device). Default value is 0.

See also

getDLACore()

Warning

Starting with TensorRT 8, the default value will be -1 if the DLA is not specified or unused.

9.108.3.9 setErrorRecorder()

```
void nvinfer1::IRuntime::setErrorRecorder (
            IErrorRecorder * recorder )  [inline], [noexcept]
```

Set the ErrorRecorder for this interface.

Assigns the ErrorRecorder to this interface. The ErrorRecorder will track all errors during execution. This function will call incRefCount of the registered ErrorRecorder at least once. Setting recorder to nullptr unregisters the recorder with the interface, resulting in a call to decRefCount if a recorder has been registered.

If an error recorder is not set, messages will be sent to the global log stream.

Parameters

recorder	The error recorder to register with this interface.

See also

getErrorRecorder()

9.108.3.10 setGpuAllocator()

```
void nvinfer1::IRuntime::setGpuAllocator (
            IGpuAllocator * allocator )  [inline], [noexcept]
```

Set the GPU allocator.

Parameters

allocator	Set the GPU allocator to be used by the runtime. All GPU memory acquired will use this allocator. If NULL is passed, the default allocator will be used.

Default: uses cudaMalloc/cudaFree.

If nullptr is passed, the default allocator will be used.

9.108.4 Member Data Documentation

9.108.4.1 mImpl

```
apiv::VRuntime* nvinfer1::IRuntime::mImpl  [protected]
```

The documentation for this class was generated from the following file:

- NvInferRuntime.h

9.109 nvinfer1::safe::IRuntime Class Reference

Allows a serialized functionally safe engine to be deserialized.

```
#include <NvInferSafeRuntime.h>
```

Public Member Functions

- virtual ICudaEngine * deserializeCudaEngine (void const *const blob, std::size_t const size) noexcept=0
  Deserialize an engine from a stream.
- virtual void setGpuAllocator (IGpuAllocator *const allocator) noexcept=0
  Set the GPU allocator.
- virtual void setErrorRecorder (IErrorRecorder *const recorder) noexcept=0
  Set the ErrorRecorder for this interface.
- virtual IErrorRecorder * getErrorRecorder () const noexcept=0
  Get the ErrorRecorder assigned to this interface.
- IRuntime ()=default
- virtual ~IRuntime () noexcept=default
- IRuntime (IRuntime const &)=delete
- IRuntime (IRuntime &&)=delete
- IRuntime & operator= (IRuntime const &) &=delete
- IRuntime & operator= (IRuntime &&) &=delete

9.109.1 Detailed Description

Allows a serialized functionally safe engine to be deserialized.

Warning

In the safety runtime the application is required to set the error reporter for correct error handling.

See also

setErrorRecorder()

Warning

Do not inherit from this class, as doing so will break forward-compatibility of the API and ABI.

9.109.2 Constructor & Destructor Documentation

9.109.2.1 IRuntime() [1/3]

```
nvinfer1::safe::IRuntime::IRuntime ( )  [default]
```

9.109.2.2 ~IRuntime()

```
virtual nvinfer1::safe::IRuntime::~IRuntime ( )  [virtual], [default], [noexcept]
```

9.109.2.3 IRuntime() [2/3]

```
nvinfer1::safe::IRuntime::IRuntime (
            IRuntime const &  )  [delete]
```

9.109.2.4 IRuntime() [3/3]

```
nvinfer1::safe::IRuntime::IRuntime (
            IRuntime &&  )  [delete]
```

9.109.3 Member Function Documentation

9.109.3.1 deserializeCudaEngine()

```
virtual ICudaEngine * nvinfer1::safe::IRuntime::deserializeCudaEngine (
            void const *const blob,
            std::size_t const size )  [pure virtual], [noexcept]
```

Deserialize an engine from a stream.

If the serialized engine requires plugins the plugin creator must be registered by calling IPluginRegistry::registerCreator() before calling deserializeCudaEngine(). Every plugin creator registered must have a unique combination of namespace, plugin name, and version.

Parameters

blob	The memory that holds the serialized engine.
size	The size of the memory in bytes.

Returns

The engine, or nullptr if it could not be deserialized.

See also

IPluginRegistry::registerCreator()

Usage considerations

- Allowed context for the API call
  - Thread-safe: Yes, if called from different instances of safe::IRuntime. Calling deserializeCudaEngine of the same safety runtime from multiple threads is not guaranteed to be thread safe.

9.109.3.2 getErrorRecorder()

```
virtual IErrorRecorder * nvinfer1::safe::IRuntime::getErrorRecorder ( ) const  [pure virtual],
[noexcept]
```

Get the ErrorRecorder assigned to this interface.

Retrieves the assigned error recorder object for the given class. A default error recorder does not exist, so a nullptr will be returned if setErrorRecorder has not been called.

Returns

A pointer to the IErrorRecorder object that has been registered.

See also

setErrorRecorder()

Usage considerations

- Allowed context for the API call
  - Thread-safe: Yes

9.109.3.3 operator=() [1/2]

```
IRuntime & nvinfer1::safe::IRuntime::operator= (
            IRuntime &&  ) &  [delete]
```

9.109.3.4 operator=() [2/2]

```
IRuntime & nvinfer1::safe::IRuntime::operator= (
            IRuntime const &  ) &  [delete]
```

9.109.3.5 setErrorRecorder()

```
virtual void nvinfer1::safe::IRuntime::setErrorRecorder (
            IErrorRecorder *const recorder )  [pure virtual], [noexcept]
```

Set the ErrorRecorder for this interface.

Assigns the ErrorRecorder to this interface. The ErrorRecorder will track all errors during execution. This function will call incRefCount of the registered ErrorRecorder at least once. Setting recorder to nullptr unregisters the recorder with the interface, resulting in a call to decRefCount if a recorder has been registered.

Parameters

recorder	The error recorder to register with this interface.

See also

getErrorRecorder()

Usage considerations

- Allowed context for the API call
  - Thread-safe: No

9.109.3.6 setGpuAllocator()

```
virtual void nvinfer1::safe::IRuntime::setGpuAllocator (
            IGpuAllocator *const allocator )  [pure virtual], [noexcept]
```

Set the GPU allocator.

Parameters

allocator	Set the GPU allocator to be used by the runtime. All GPU memory acquired will use this allocator. If NULL is passed, the default allocator will be used.

Default: uses cudaMalloc/cudaFree.

If nullptr is passed, the default allocator will be used.

Usage considerations

- Allowed context for the API call
  - Thread-safe: No

The documentation for this class was generated from the following file:

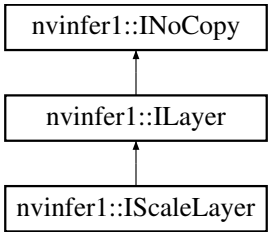
- NvInferSafeRuntime.h

9.110 nvinfer1::IScaleLayer Class Reference

A Scale layer in a network definition.

`#include <NvInfer.h>`

Inheritance diagram for nvinfer1::IScaleLayer:



Public Member Functions

- void setMode (ScaleMode mode) noexcept

  Set the scale mode.
- ScaleMode getMode () const noexcept

  Get the scale mode.
- void setShift (Weights shift) noexcept

  Set the shift value.
- Weights getShift () const noexcept

  Get the shift value.
- void setScale (Weights scale) noexcept

  Set the scale value.
- Weights getScale () const noexcept

  Get the scale value.
- void setPower (Weights power) noexcept

  Set the power value.
- Weights getPower () const noexcept

  Get the power value.
- int32_t getChannelAxis () const noexcept

  Get the channel axis.
- void setChannelAxis (int32_t channelAxis) noexcept

  Set the channel axis.

Protected Member Functions

- virtual ~IScaleLayer () noexcept=default

Protected Attributes

- apiv::VScaleLayer * mImpl

9.110.1 Detailed Description

A Scale layer in a network definition.

This layer applies a per-element computation to its input:

`output = (input* scale + shift)^ power`

The coefficients can be applied on a per-tensor, per-channel, or per-element basis.

Note

If the number of weights is 0, then a default value is used for shift, power, and scale. The default shift is 0, the default power is 1, and the default scale is 1.

The output size is the same as the input size.

Note

The input tensor for this layer is required to have a minimum of 3 dimensions in implicit batch mode and a minimum of 4 dimensions in explicit batch mode.

A scale layer may be used as an INT8 quantization node in a graph, if the output is constrained to INT8 and the input to FP32. Quantization rounds ties to even, and clamps to [-128, 127].

See also

ScaleMode

Warning

Do not inherit from this class, as doing so will break forward-compatibility of the API and ABI.

9.110.2 Constructor & Destructor Documentation

9.110.2.1 ~IScaleLayer()

```
virtual nvinfer1::IScaleLayer::~IScaleLayer ( )  [protected], [virtual], [default], [noexcept]
```

9.110.3 Member Function Documentation

9.110.3.1 getChannelAxis()

```
int32_t nvinfer1::IScaleLayer::getChannelAxis ( ) const  [inline], [noexcept]
```

Get the channel axis.

Returns

channelAxis parameter passed to addScaleNd() or set by setChannelAxis()

The value is the index of the channel axis in the input tensor's dimensions. Scaling happens along the channel axis when ScaleMode::kCHANNEL is enabled.

See also

addScaleNd()

9.110.3.2 getMode()

```
ScaleMode nvinfer1::IScaleLayer::getMode ( ) const  [inline], [noexcept]
```

Get the scale mode.

See also

setMode()

9.110.3.3 getPower()

```
Weights nvinfer1::IScaleLayer::getPower ( ) const  [inline], [noexcept]
```

Get the power value.

See also

setPower()

9.110.3.4 getScale()

```
Weights nvinfer1::IScaleLayer::getScale ( ) const  [inline], [noexcept]
```

Get the scale value.

See also

setScale()

9.110.3.5 getShift()

```
Weights nvinfer1::IScaleLayer::getShift ( ) const  [inline], [noexcept]
```

Get the shift value.

See also

setShift()

9.110.3.6 setChannelAxis()

```
void nvinfer1::IScaleLayer::setChannelAxis (
            int32_t channelAxis )  [inline], [noexcept]
```

Set the channel axis.

The value is the index of the channel axis in the input tensor's dimensions.

For ScaleMode::kCHANNEL, there can be distinct scale, shift, and power weights for each channel coordinate. For ScaleMode::kELEMENTWISE, there can be distinct scale, shift, and power weights for each combination of coordinates from the channel axis and axes after it.

For example, suppose the input tensor has dimensions [10,20,30,40] and the channel axis is 1. Let [n,c,h,w] denote an input coordinate. For ScaleMode::kCHANNEL, the scale, shift, and power weights are indexed by c. For ScaleMode::kELEMENTWISE, the scale, shift, and power weights are indexed by [c,h,w].

See also

addScaleNd()

9.110.3.7 setMode()

```
void nvinfer1::IScaleLayer::setMode (
            ScaleMode mode )  [inline], [noexcept]
```

Set the scale mode.

See also

getMode()

9.110.3.8 setPower()

```
void nvinfer1::IScaleLayer::setPower (
            Weights power )  [inline], [noexcept]
```

Set the power value.

See also

getPower()

9.110.3.9 setScale()

```
void nvinfer1::IScaleLayer::setScale (
             Weights scale )  [inline], [noexcept]
```

Set the scale value.

See also

getScale()

9.110.3.10 setShift()

```
void nvinfer1::IScaleLayer::setShift (
             Weights shift )  [inline], [noexcept]
```

Set the shift value.

See also

getShift()

9.110.4 Member Data Documentation

9.110.4.1 mImpl

```
apiv::VScaleLayer* nvinfer1::IScaleLayer::mImpl  [protected]
```

The documentation for this class was generated from the following file:

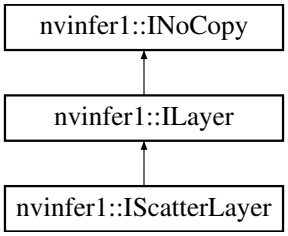
- NvInfer.h

9.111 nvinfer1::IScatterLayer Class Reference

A scatter layer in a network definition. Supports several kinds of scattering.

`#include <NvInfer.h>`

Inheritance diagram for nvinfer1::IScatterLayer:



Public Member Functions

- void setMode (ScatterMode mode) noexcept

  Set the scatter mode.
- ScatterMode getMode () const noexcept

  Get the scatter mode.
- void setAxis (int32_t axis) noexcept

  Set the axis used by ScatterMode::kELEMENTS.
- int32_t getAxis () const noexcept

  Get the axis.

Protected Member Functions

- virtual ~IScatterLayer () noexcept=default

Protected Attributes

- apiv::VScatterLayer * mImpl

9.111.1 Detailed Description

A scatter layer in a network definition. Supports several kinds of scattering.

The Scatter layer has three input tensors: Data, Indices, and Updates, one output tensor Output, and a scatter mode. When kELEMENT mode is used an optional axis parameter is available.

- Data is a tensor of rank r >= 1 that stores the values to be duplicated in Output.
- Indices is a tensor of rank q that determines which locations in Output to write new values to. Constraints on the rank of q depend on the mode: ScatterMode::kND: q >= 1 ScatterMode::kELEMENT: q must be the same as r
- Updates is atensor of rank s >=1 that provides the data to write to Output specified by its corresponding location in Index. Constraints the rank of Updates depend on the mode: ScatterMode::kND: s = r + q - shape(Indices)[-1] - 1 Scattermode::kELEMENT: s = q = r
- Output is a tensor with the same dimensions as Data that stores the resulting values of the transformation. It must not be a shape tensor. The types of Data, Update, and Output shall be the same, and Indices shall be DataType::kINT32.

The output is computed by copying the data, and then updating elements of it based on indices. How Indices are interpreted depends upon the ScatterMode.

ScatterMode::kND

```
The indices are interpreted as a tensor of rank q-1 of indexing tuples.
The axis parameter is ignored.

Given that data dims are {d_0,...,d_{r-1}} and indices dims are {i_0,...,i_{q-1}},
define k = indices[q-1], it follows that updates dims are {i_0,...,i_{q-2},d_k,...,d_{r-1}}
The updating can be computed by:
    foreach slice in indices[i_0,...i_{q-2}]
        output[indices[slice]] = updates[slice]
```

ScatterMode::kELEMENT

```
Here "axis" denotes the result of getAxis().

For each element X of indices:
    Let J denote a sequence for the subscripts of X
    Let K = sequence J with element [axis] replaced by X
    output[K] = updates[J]

For example, if indices has dimensions [N,C,H,W] and axis is 2, then the updates happen as:

    for n in [0,n)
        for c in [0,n)
            for h in [0,n)
                for w in [0,n)
                    output[n,c,indices[n,c,h,w],w] = updates[n,c,h,w]]
```

Writes to the same output element cause undefined behavior.

Warning

Do not inherit from this class, as doing so will break forward-compatibility of the API and ABI.

9.111.2 Constructor & Destructor Documentation

9.111.2.1 ~IScatterLayer()

```
virtual nvinfer1::IScatterLayer::~IScatterLayer ( )  [protected], [virtual], [default], [noexcept]
```

9.111.3 Member Function Documentation

9.111.3.1 getAxis()

```
int32_t nvinfer1::IScatterLayer::getAxis ( ) const  [inline], [noexcept]
```

Get the axis.

9.111.3.2 getMode()

```
ScatterMode nvinfer1::IScatterLayer::getMode ( ) const  [inline], [noexcept]
```

Get the scatter mode.

See also

setMode()

9.111.3.3 setAxis()

```
void nvinfer1::IScatterLayer::setAxis (
            int32_t axis )  [inline], [noexcept]
```

Set the axis used by ScatterMode::kELEMENTS.

The axis defaults to 0.

9.111.3.4 setMode()

```
void nvinfer1::IScatterLayer::setMode (
            ScatterMode mode )  [inline], [noexcept]
```

Set the scatter mode.

See also

getMode()

9.111.4 Member Data Documentation

9.111.4.1 mImpl

```
apiv::VScatterLayer* nvinfer1::IScatterLayer::mImpl  [protected]
```

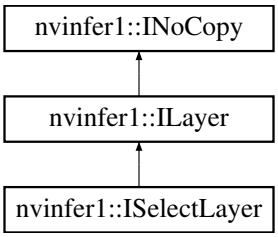
The documentation for this class was generated from the following file:

- NvInfer.h

9.112 nvinfer1::ISelectLayer Class Reference

`#include <NvInfer.h>`

Inheritance diagram for nvinfer1::ISelectLayer:



Protected Member Functions

- virtual ~ISelectLayer () noexcept=default

Protected Attributes

- apiv::VSelectLayer * mImpl

Additional Inherited Members

9.112.1 Detailed Description

Warning

Do not inherit from this class, as doing so will break forward-compatibility of the API and ABI.

9.112.2 Constructor & Destructor Documentation

9.112.2.1 ~ISelectLayer()

`virtual nvinfer1::ISelectLayer::~ISelectLayer ( )  [protected], [virtual], [default], [noexcept]`

9.112.3 Member Data Documentation

9.112.3.1 mImpl

```
apiv::VSelectLayer* nvinfer1::ISelectLayer::mImpl  [protected]
```

The documentation for this class was generated from the following file:

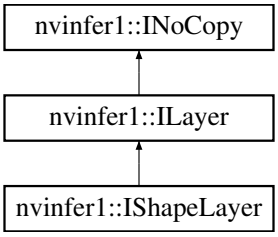
- NvInfer.h

9.113 nvinfer1::IShapeLayer Class Reference

Layer type for getting shape of a tensor.

`#include <NvInfer.h>`

Inheritance diagram for nvinfer1::IShapeLayer:



Protected Member Functions

- virtual ~IShapeLayer () noexcept=default

Protected Attributes

- apiv::VShapeLayer * mImpl

Additional Inherited Members

9.113.1 Detailed Description

Layer type for getting shape of a tensor.

This layer sets the output to a one-dimensional tensor with the dimensions of the input tensor.

For example, if the input is a four-dimensional tensor (of any type) with dimensions [2,3,5,7], the output tensor is a one-dimensional Int32 tensor of length 4 containing the sequence 2, 3, 5, 7.

Warning

Do not inherit from this class, as doing so will break forward-compatibility of the API and ABI.

9.113.2 Constructor & Destructor Documentation

9.113.2.1 ~IShapeLayer()

```
virtual nvinfer1::IShapeLayer::~IShapeLayer ( )  [protected], [virtual], [default], [noexcept]
```

9.113.3 Member Data Documentation

9.113.3.1 mImpl

```
apiv::VShapeLayer* nvinfer1::IShapeLayer::mImpl  [protected]
```

The documentation for this class was generated from the following file:

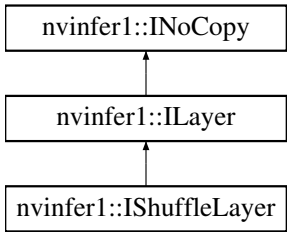
- NvInfer.h

9.114 nvinfer1::IShuffleLayer Class Reference

Layer type for shuffling data.

```
#include <NvInfer.h>
```

Inheritance diagram for nvinfer1::IShuffleLayer:



Public Member Functions

- void setFirstTranspose (Permutation permutation) noexcept

  Set the permutation applied by the first transpose operation.
- Permutation getFirstTranspose () const noexcept

  Get the permutation applied by the first transpose operation.
- void setReshapeDimensions (Dims dimensions) noexcept

  Set the reshaped dimensions.
- Dims getReshapeDimensions () const noexcept

  Get the reshaped dimensions.
- void setSecondTranspose (Permutation permutation) noexcept

  Set the permutation applied by the second transpose operation.
- Permutation getSecondTranspose () const noexcept

  Get the permutation applied by the second transpose operation.
- void setZeroIsPlaceholder (bool zeroIsPlaceholder) noexcept

  Set meaning of 0 in reshape dimensions.
- bool getZeroIsPlaceholder () const noexcept

  Get meaning of 0 in reshape dimensions.
- void setInput (int32_t index, ITensor &tensor) noexcept

  Append or replace an input of this layer with a specific tensor.

Protected Member Functions

- virtual ~IShuffleLayer () noexcept=default

Protected Attributes

- apiv::VShuffleLayer * mImpl

9.114.1 Detailed Description

Layer type for shuffling data.

This layer shuffles data by applying in sequence: a transpose operation, a reshape operation and a second transpose operation. The dimension types of the output are those of the reshape dimension.

The layer has an optional second input. If present, it must be a 1D Int32 shape tensor, and the reshape dimensions are taken from it.

Warning

Do not inherit from this class, as doing so will break forward-compatibility of the API and ABI.

9.114.2 Constructor & Destructor Documentation

9.114.2.1 ~IShuffleLayer()

```
virtual nvinfer1::IShuffleLayer::~IShuffleLayer ( )  [protected], [virtual], [default], [noexcept]
```

9.114.3 Member Function Documentation

9.114.3.1 getFirstTranspose()

```
Permutation nvinfer1::IShuffleLayer::getFirstTranspose ( ) const  [inline], [noexcept]
```

Get the permutation applied by the first transpose operation.

Returns

The dimension permutation applied before the reshape.

See also

setFirstTranspose

9.114.3.2 getReshapeDimensions()

```
Dims nvinfer1::IShuffleLayer::getReshapeDimensions ( ) const  [inline], [noexcept]
```

Get the reshaped dimensions.

Returns

The reshaped dimensions.

If a second input is present and non-null, or setReshapeDimensions has not yet been called, this function returns Dims with nbDims == -1.

9.114.3.3 getSecondTranspose()

```
Permutation nvinfer1::IShuffleLayer::getSecondTranspose ( ) const  [inline], [noexcept]
```

Get the permutation applied by the second transpose operation.

Returns

The dimension permutation applied after the reshape.

See also

setSecondTranspose

9.114.3.4 getZeroIsPlaceholder()

```
bool nvinfer1::IShuffleLayer::getZeroIsPlaceholder ( ) const  [inline], [noexcept]
```

Get meaning of 0 in reshape dimensions.

Returns

true if 0 is placeholder for corresponding input dimension, false if 0 denotes a zero-length dimension.

See also

setZeroIsPlaceholder

9.114.3.5 setFirstTranspose()

```
void nvinfer1::IShuffleLayer::setFirstTranspose (
            Permutation permutation )  [inline], [noexcept]
```

Set the permutation applied by the first transpose operation.

Parameters

permutation	The dimension permutation applied before the reshape.

The default is the identity permutation.

See also

getFirstTranspose

9.114.3.6 setInput()

```
void nvinfer1::ILayer::setInput (
            int32_t index,
            ITensor & tensor )  [inline], [noexcept]
```

Append or replace an input of this layer with a specific tensor.

Parameters

index	the index of the input to modify.
tensor	the new input tensor Sets the input tensor for the given index. The index must be 0 for a static shuffle layer. A static shuffle layer is converted to a dynamic shuffle layer by calling setInput with an index 1. A dynamic shuffle layer cannot be converted back to a static shuffle layer.

For a dynamic shuffle layer, the values 0 and 1 are valid. The indices in the dynamic case are as follows:

- 0: Data or Shape tensor to be shuffled.
- 1: The dimensions for the reshape operation, as a 1D Int32 shape tensor.

If this function is called with the value 1, then the function getNbInputs() changes from returning 1 to 2.

The reshape dimensions are treated identically to how they are treated if set statically via setReshapeDimensions. In particular, a -1 is treated as a wildcard even if dynamically supplied at runtime, and a 0 is treated as a placeholder if getZeroIsPlaceholder() = true, which is the default. If the placeholder interpretation of 0 is unwanted because the runtime dimension should be 0 when the reshape dimension is 0, be sure to call setZeroIsPlacholder(false) on the IShuffleLayer.

See also

setReshapeDimensions.

9.114.3.7 setReshapeDimensions()

```
void nvinfer1::IShuffleLayer::setReshapeDimensions (
            Dims dimensions ) [inline], [noexcept]
```

Set the reshaped dimensions.

Parameters

dimensions	The reshaped dimensions.

Two special values can be used as dimensions.

Value 0 copies the corresponding dimension from input. This special value can be used more than once in the dimensions. If number of reshape dimensions is less than input, 0s are resolved by aligning the most significant dimensions of input.

Value -1 infers that particular dimension by looking at input and rest of the reshape dimensions. Note that only a maximum of one dimension is permitted to be specified as -1.

The product of the new dimensions must be equal to the product of the old.

If a second input had been used to create this layer, that input is reset to null by this method.

9.114.3.8 setSecondTranspose()

```
void nvinfer1::IShuffleLayer::setSecondTranspose (
            Permutation permutation )  [inline], [noexcept]
```

Set the permutation applied by the second transpose operation.

Parameters

permutation	The dimension permutation applied after the reshape.

The default is the identity permutation.

The permutation is applied as outputDimensionIndex = permutation.order[inputDimensionIndex], so to permute from CHW order to HWC order, the required permutation is [1, 2, 0].

See also

getSecondTranspose

9.114.3.9 setZeroIsPlaceholder()

```
void nvinfer1::IShuffleLayer::setZeroIsPlaceholder (
            bool zeroIsPlaceholder )  [inline], [noexcept]
```

Set meaning of 0 in reshape dimensions.

If true, then a 0 in the reshape dimensions denotes copying the corresponding dimension from the first input tensor. If false, then a 0 in the reshape dimensions denotes a zero-length dimension.

Default: true

See also

getZeroIsPlaceholder();

9.114.4 Member Data Documentation

9.114.4.1 mImpl

```
apiv::VShuffleLayer* nvinfer1::IShuffleLayer::mImpl  [protected]
```

The documentation for this class was generated from the following file:

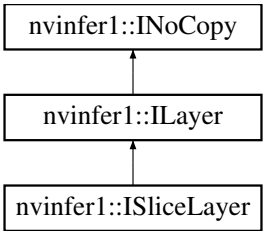
- NvInfer.h

9.115 nvinfer1::ISliceLayer Class Reference

Slices an input tensor into an output tensor based on the offset and strides.

`#include <NvInfer.h>`

Inheritance diagram for nvinfer1::ISliceLayer:



Public Member Functions

- void setStart (Dims start) noexcept

  Set the start offset that the slice layer uses to create the output slice.
- Dims getStart () const noexcept

  Get the start offset for the slice layer.
- void setSize (Dims size) noexcept

  Set the dimensions of the output slice.
- Dims getSize () const noexcept

  Get dimensions of the output slice.
- void setStride (Dims stride) noexcept

  Set the stride for computing the output slice data.
- Dims getStride () const noexcept

  Get the stride for the output slice.
- void setMode (SliceMode mode) noexcept

  Set the slice mode.
- SliceMode getMode () const noexcept

  Get the slice mode.
- void setInput (int32_t index, ITensor &tensor) noexcept

  Append or replace an input of this layer with a specific tensor.

Protected Member Functions

- virtual ~ISliceLayer () noexcept=default

Protected Attributes

- apiv::VSliceLayer * mImpl

9.115.1 Detailed Description

Slices an input tensor into an output tensor based on the offset and strides.

The slice layer has two variants, static and dynamic. Static slice specifies the start, size, and stride dimensions at layer creation time via Dims and can use the get/set accessor functions of the ISliceLayer. Dynamic slice specifies one or more of start, size or stride as ITensors, by using ILayer::setTensor to add a second, third, or fourth input respectively. The corresponding Dims are used if an input is missing or null.

An application can determine if the ISliceLayer has a dynamic output shape based on whether the size input (third input) is present and non-null.

The slice layer selects for each dimension a start location from within the input tensor, and copies elements to the output tensor using the specified stride across the input tensor. Start, size, and stride tensors must be 1D Int32 shape tensors if not specified via Dims.

A slice layer can produce a shape tensor if the following conditions are met:

- start, size, and stride are build time constants, either as static Dims, or computable by constant folding.
- The number of elements in the output tensor does not exceed 2∗Dims::MAX_DIMS.

For example using slice on a tensor: input = {{0, 2, 4}, {1, 3, 5}} start = {1, 0} size = {1, 2} stride = {1, 2} output = {{1, 5}}

When the sliceMode is kCLAMP or kREFLECT, for each input dimension, if its size is 0 then the corresponding output dimension must be 0 too.

Warning

Do not inherit from this class, as doing so will break forward-compatibility of the API and ABI.

9.115.2 Constructor & Destructor Documentation

9.115.2.1 ~ISliceLayer()

```
virtual nvinfer1::ISliceLayer::~ISliceLayer ( )  [protected], [virtual], [default], [noexcept]
```

9.115.3 Member Function Documentation

9.115.3.1 getMode()

```
SliceMode nvinfer1::ISliceLayer::getMode ( ) const  [inline], [noexcept]
```

Get the slice mode.

See also

setMode()

9.115.3.2 getSize()

```
Dims nvinfer1::ISliceLayer::getSize ( ) const  [inline], [noexcept]
```

Get dimensions of the output slice.

Returns

The output dimension, or an invalid Dims structure.

If the third input is present and non-null, this function returns a Dims with nbDims = -1.

See also

setSize

9.115.3.3 getStart()

```
Dims nvinfer1::ISliceLayer::getStart ( ) const  [inline], [noexcept]
```

Get the start offset for the slice layer.

Returns

The start offset, or an invalid Dims structure.

If the second input is present and non-null, this function returns a Dims with nbDims = -1.

See also

setStart

9.115.3.4 getStride()

```
Dims nvinfer1::ISliceLayer::getStride ( ) const  [inline], [noexcept]
```

Get the stride for the output slice.

Returns

The slicing stride, or an invalid Dims structure.

If the fourth input is present and non-null, this function returns a Dims with nbDims = -1.

See also

setStride

9.115.3.5 setInput()

```
void nvinfer1::ILayer::setInput (
             int32_t index,
             ITensor & tensor )  [inline], [noexcept]
```

Append or replace an input of this layer with a specific tensor.

Parameters

index	the index of the input to modify.
tensor	the new input tensor

For a slice layer, the values 0-4 are valid. The indices are as follows:

- 0: Data or Shape tensor to be sliced.
- 1: The start tensor to begin slicing, as a 1D Int32 shape tensor.
- 2: The size tensor of the resulting slice, as a 1D Int32 shape tensor.
- 3: The stride of the slicing operation, as a 1D Int32 shape tensor.
- 4: Value for the kFILL slice mode. The fill value data type should have the same data phylum as input data type. And this input is disallowed for other modes.

Using the corresponding setter resets the input to null.

If this function is called with a value greater than 0, then the function getNbInputs() changes from returning 1 to index + 1.

9.115.3.6 setMode()

```
void nvinfer1::ISliceLayer::setMode (
            SliceMode mode )  [inline], [noexcept]
```

Set the slice mode.

See also

getMode()

9.115.3.7 setSize()

```
void nvinfer1::ISliceLayer::setSize (
            Dims size )  [inline], [noexcept]
```

Set the dimensions of the output slice.

Parameters

size	The dimensions of the output slice.

If a third input had been used to create this layer, that input is reset to null by this method.

See also

getSize

9.115.3.8 setStart()

```
void nvinfer1::ISliceLayer::setStart (
            Dims start )  [inline], [noexcept]
```

Set the start offset that the slice layer uses to create the output slice.

Parameters

start	The start offset to read data from the input tensor.

If a second input had been used to create this layer, that input is reset to null by this method.

See also

getStart

9.115.3.9 setStride()

```
void nvinfer1::ISliceLayer::setStride (
            Dims stride )  [inline], [noexcept]
```

Set the stride for computing the output slice data.

Parameters

stride	The dimensions of the stride to compute the values to store in the output slice.

If a fourth input had been used to create this layer, that input is reset to null by this method.

See also

getStride

9.115.4 Member Data Documentation

9.115.4.1 mImpl

```
apiv::VSliceLayer* nvinfer1::ISliceLayer::mImpl  [protected]
```

The documentation for this class was generated from the following file:

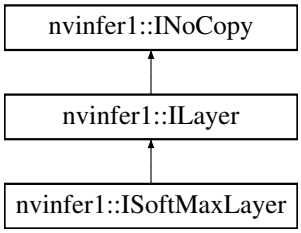
- NvInfer.h

9.116 nvinfer1::ISoftMaxLayer Class Reference

A Softmax layer in a network definition.

```
#include <NvInfer.h>
```

Inheritance diagram for nvinfer1::ISoftMaxLayer:



Public Member Functions

- void setAxes (uint32_t axes) noexcept

  Set the axis along which softmax is computed. Currently, only one axis can be set.
- uint32_t getAxes () const noexcept

  Get the axis along which softmax occurs.

Protected Member Functions

- virtual ~ISoftMaxLayer () noexcept=default

Protected Attributes

- apiv::VSoftMaxLayer * mImpl

9.116.1 Detailed Description

A Softmax layer in a network definition.

This layer applies a per-channel softmax to its input.

The output size is the same as the input size.

On Xavier, this layer is not supported on DLA. On Orin and later, when running this layer on DLA, the volume of non-axis, non-batch dimensions cannot exceed 1024 and the batch dimension must be 1. Furthermore, unless the layer precision is explicitly set to INT8, the layer will either use FP16 mode or fall back to GPU if FP16 mode is disabled.

Warning

Do not inherit from this class, as doing so will break forward-compatibility of the API and ABI.

9.116.2 Constructor & Destructor Documentation

9.116.2.1 ~ISoftMaxLayer()

```
virtual nvinfer1::ISoftMaxLayer::~ISoftMaxLayer ( )  [protected], [virtual], [default], [noexcept]
```

9.116.3 Member Function Documentation

9.116.3.1 getAxes()

```
uint32_t nvinfer1::ISoftMaxLayer::getAxes ( ) const  [inline], [noexcept]
```

Get the axis along which softmax occurs.

See also

setAxes()

9.116.3.2 setAxes()

```
void nvinfer1::ISoftMaxLayer::setAxes (
             uint32_t axes )  [inline], [noexcept]
```

Set the axis along which softmax is computed. Currently, only one axis can be set.

The axis is specified by setting the bit corresponding to the axis to 1. For example, consider an NCHW tensor as input (three non-batch dimensions).

In implicit mode : Bit 0 corresponds to the C dimension boolean. Bit 1 corresponds to the H dimension boolean. Bit 2 corresponds to the W dimension boolean. By default, softmax is performed on the axis which is the number of axes minus three. It is 0 if there are fewer than 3 non-batch axes. For example, if the input is NCHW, the default axis is C. If the input is NHW, then the default axis is H.

In explicit mode : Bit 0 corresponds to the N dimension boolean. Bit 1 corresponds to the C dimension boolean. Bit 2 corresponds to the H dimension boolean. Bit 3 corresponds to the W dimension boolean. By default, softmax is performed on the axis which is the number of axes minus three. It is 0 if there are fewer than 3 axes. For example, if the input is NCHW, the default axis is C. If the input is NHW, then the default axis is N.

For example, to perform softmax on axis R of a NPQRCHW input, set bit 2 with implicit batch mode, set bit 3 with explicit batch mode.

When running this layer on DLA, the axis must be a non-batch dimension.

Parameters

axes	The axis along which softmax is computed. Here axes is a bitmap. For example, when doing softmax along axis 0, bit 0 is set to 1, axes = 1 << axis = 1.

9.116.4 Member Data Documentation

9.116.4.1 mImpl

```
apiv::VSoftMaxLayer* nvinfer1::ISoftMaxLayer::mImpl  [protected]
```

The documentation for this class was generated from the following file:

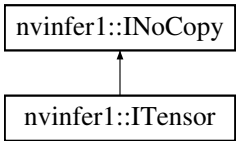
- NvInfer.h

9.117 nvinfer1::ITensor Class Reference

A tensor in a network definition.

```
#include <NvInfer.h>
```

Inheritance diagram for nvinfer1::ITensor:



Public Member Functions

- void setName (const char *name) noexcept
  Set the tensor name.
- const char * getName () const noexcept
  Get the tensor name.
- void setDimensions (Dims dimensions) noexcept
  Set the dimensions of a tensor.
- Dims getDimensions () const noexcept
  Get the dimensions of a tensor.
- void setType (DataType type) noexcept
  Set the data type of a tensor.
- DataType getType () const noexcept
  Get the data type of a tensor.
- bool setDynamicRange (float min, float max) noexcept
  Set dynamic range for the tensor.
- bool isNetworkInput () const noexcept
  Whether the tensor is a network input.
- bool isNetworkOutput () const noexcept
  Whether the tensor is a network output.
- void setBroadcastAcrossBatch (bool broadcastAcrossBatch) noexcept
  Set whether to enable broadcast of tensor across the batch.
- bool getBroadcastAcrossBatch () const noexcept

Check if tensor is broadcast across the batch.

- TensorLocation getLocation () const noexcept

  Get the storage location of a tensor.

- void setLocation (TensorLocation location) noexcept

  Set the storage location of a tensor.

- bool dynamicRangeIsSet () const noexcept

  Query whether dynamic range is set.

- void resetDynamicRange () noexcept

  Undo effect of setDynamicRange.

- float getDynamicRangeMin () const noexcept

  Get minimum of dynamic range.

- float getDynamicRangeMax () const noexcept

  Get maximum of dynamic range.

- void setAllowedFormats (TensorFormats formats) noexcept

  Set allowed formats for this tensor. By default all formats are allowed. Shape tensors (for which isShapeTensor() returns true) may only have row major linear format.

- TensorFormats getAllowedFormats () const noexcept

  Get a bitmask of TensorFormat values that the tensor supports. For a shape tensor, only row major linear format is allowed.

- bool isShapeTensor () const noexcept

  Whether the tensor is a shape tensor.

- bool isExecutionTensor () const noexcept

  Whether the tensor is an execution tensor.

Protected Member Functions

- virtual ~ITensor () noexcept=default

Protected Attributes

- apiv::VTensor * mImpl

9.117.1 Detailed Description

A tensor in a network definition.

To remove a tensor from a network definition, use INetworkDefinition::removeTensor().

When using the DLA, the cumulative size of all Tensors that are not marked as Network Input or Output tensors, must be less than 1GB in size to fit into a single subgraph. If the build option kGPU_FALLBACK is specified, then multiple subgraphs can be created, with each subgraph limited to less than 1GB of internal tensors data.

Warning

The volume of the tensor must be less than 2^31 elements.

Do not inherit from this class, as doing so will break forward-compatibility of the API and ABI.

9.117.2 Constructor & Destructor Documentation

9.117.2.1 ~ITensor()

```
virtual nvinfer1::ITensor::~ITensor ( )  [protected], [virtual], [default], [noexcept]
```

9.117.3 Member Function Documentation

9.117.3.1 dynamicRangeIsSet()

```
bool nvinfer1::ITensor::dynamicRangeIsSet ( ) const  [inline], [noexcept]
```

Query whether dynamic range is set.

Returns

True if dynamic range is set, false otherwise.

9.117.3.2 getAllowedFormats()

```
TensorFormats nvinfer1::ITensor::getAllowedFormats ( ) const  [inline], [noexcept]
```

Get a bitmask of TensorFormat values that the tensor supports. For a shape tensor, only row major linear format is allowed.

Returns

The value specified by setAllowedFormats or all possible formats.

See also

ITensor::setAllowedFormats()

9.117.3.3 getBroadcastAcrossBatch()

```
bool nvinfer1::ITensor::getBroadcastAcrossBatch ( ) const  [inline], [noexcept]
```

Check if tensor is broadcast across the batch.

When a tensor is broadcast across a batch, it has the same value for every member in the batch. Memory is only allocated once for the single member. If the network is in explicit batch mode, this function returns true if the leading dimension is 1.

Returns

True if tensor is broadcast across the batch, false otherwise.

See also

setBroadcastAcrossBatch()

9.117.3.4 getDimensions()

```
Dims nvinfer1::ITensor::getDimensions ( ) const  [inline], [noexcept]
```

Get the dimensions of a tensor.

Returns

The dimensions of the tensor.

Warning

getDimensions() returns a -1 for dimensions that are derived from a wildcard dimension.

See also

setDimensions()

9.117.3.5 getDynamicRangeMax()

```
float nvinfer1::ITensor::getDynamicRangeMax ( ) const  [inline], [noexcept]
```

Get maximum of dynamic range.

Returns

Maximum of dynamic range, or quiet NaN if range was not set.

9.117.3.6 getDynamicRangeMin()

```
float nvinfer1::ITensor::getDynamicRangeMin ( ) const  [inline], [noexcept]
```

Get minimum of dynamic range.

Returns

Minimum of dynamic range, or quiet NaN if range was not set.

9.117.3.7 getLocation()

```
TensorLocation nvinfer1::ITensor::getLocation ( ) const  [inline], [noexcept]
```

Get the storage location of a tensor.

Returns

The location of tensor data.

See also

setLocation()

9.117.3.8 getName()

```
const char * nvinfer1::ITensor::getName ( ) const  [inline], [noexcept]
```

Get the tensor name.

Returns

The name as a null-terminated C-style string.

See also

setName()

9.117.3.9 getType()

```
DataType nvinfer1::ITensor::getType ( ) const  [inline], [noexcept]
```

Get the data type of a tensor.

Returns

The data type of the tensor.

See also

setType()

9.117.3.10 isExecutionTensor()

```
bool nvinfer1::ITensor::isExecutionTensor ( ) const  [inline], [noexcept]
```

Whether the tensor is an execution tensor.

Tensors are usually execution tensors. The exceptions are tensors used solely for shape calculations or whose contents not needed to compute the outputs.

The result of isExecutionTensor() is reliable only when network construction is complete. For example, if a partially built network has no path from a tensor to a network output, isExecutionTensor() returns false. Completing the path would cause it to become true.

If a tensor is an execution tensor and becomes an engine input or output, then ICudaEngine::isExecutionBinding will be true for that tensor.

A tensor with isShapeTensor() == false and isExecutionTensor() == false can still show up as an input to the engine if its dimensions are required. In that case, only its dimensions need to be set at runtime and a nullptr can be passed instead of a pointer to its contents.

9.117.3.11 isNetworkInput()

```
bool nvinfer1::ITensor::isNetworkInput ( ) const  [inline], [noexcept]
```

Whether the tensor is a network input.

9.117.3.12 isNetworkOutput()

```
bool nvinfer1::ITensor::isNetworkOutput ( ) const  [inline], [noexcept]
```

Whether the tensor is a network output.

9.117.3.13 isShapeTensor()

```
bool nvinfer1::ITensor::isShapeTensor ( ) const  [inline], [noexcept]
```

Whether the tensor is a shape tensor.

A shape tensor is a tensor that is related to shape calculations. It must be 0D or 1D, have type Int32 or Bool, and its shape must be determinable at build time. Furthermore, it must be needed as a shape tensor, either marked as a network shape output via markOutputForShapes(), or as an input that is required to be a shape tensor, such as the second input to IShuffleLayer. Some layers are ”polymorphic” in this respect. For example, the inputs to IElementWiseLayer must be shape tensors if the output is a shape tensor.

The TensorRT Developer Guide give the formal rules for what tensors are shape tensors.

The result of isShapeTensor() is reliable only when network construction is complete. For example, if a partially built network sums two tensors T1 and T2 to create tensor T3, and none are yet needed as shape tensors, isShapeTensor() returns false for all three tensors. Setting the second input of IShuffleLayer to be T3 would cause all three tensors to be shape tensors, because IShuffleLayer requires that its second optional input be a shape tensor, and IElementWiseLayer is ”polymorphic”.

If a tensor is a shape tensor and becomes an engine input or output, then ICudaEngine::isShapeBinding will be true for that tensor.

It is possible for a tensor to be both a shape tensor and an execution tensor.

Returns

True if tensor is a shape tensor, false otherwise.

See also

INetworkDefinition::markOutputForShapes(), ICudaEngine::isShapeBinding()

9.117.3.14 resetDynamicRange()

```
void nvinfer1::ITensor::resetDynamicRange ( )  [inline], [noexcept]
```

Undo effect of setDynamicRange.

9.117.3.15 setAllowedFormats()

```
void nvinfer1::ITensor::setAllowedFormats (
            TensorFormats formats )  [inline], [noexcept]
```

Set allowed formats for this tensor. By default all formats are allowed. Shape tensors (for which isShapeTensor() returns true) may only have row major linear format.

When running network on DLA and the build option kGPU_FALLBACK is not specified, if DLA format(kCHW4 with Int8, kCHW4 with FP16, kCHW16 with FP16, kCHW32 with Int8) is set, the input format is treated as native DLA format with line stride requirement. Input/output binding with these format should have correct layout during inference.

Parameters

formats	A bitmask of TensorFormat values that are supported for this tensor.

See also

ITensor::getAllowedFormats()

TensorFormats

9.117.3.16 setBroadcastAcrossBatch()

```
void nvinfer1::ITensor::setBroadcastAcrossBatch (
            bool broadcastAcrossBatch )  [inline], [noexcept]
```

Set whether to enable broadcast of tensor across the batch.

When a tensor is broadcast across a batch, it has the same value for every member in the batch. Memory is only allocated once for the single member.

This method is only valid for network input tensors, since the flags of layer output tensors are inferred based on layer inputs and parameters. If this state is modified for a tensor in the network, the states of all dependent tensors will be recomputed. If the tensor is for an explicit batch network, then this function does nothing.

Warning

The broadcast flag is ignored when using explicit batch network mode.

Parameters

broadcastAcrossBatch	Whether to enable broadcast of tensor across the batch.

See also

getBroadcastAcrossBatch()

9.117.3.17 setDimensions()

```
void nvinfer1::ITensor::setDimensions (
            Dims dimensions )  [inline], [noexcept]
```

Set the dimensions of a tensor.

For a network input, the dimensions are assigned by the application. For a network output, the dimensions are computed based on the layer parameters and the inputs to the layer. If a tensor size or a parameter is modified in the network, the dimensions of all dependent tensors will be recomputed.

This call is only legal for network input tensors, since the dimensions of layer output tensors are inferred based on layer inputs and parameters. The volume must be less than 2^31 elements.

Parameters

dimensions	The dimensions of the tensor.

See also

getDimensions()

9.117.3.18 setDynamicRange()

```
bool nvinfer1::ITensor::setDynamicRange (
            float min,
            float max )  [inline], [noexcept]
```

Set dynamic range for the tensor.

Currently, only symmetric ranges are supported. Therefore, the larger of the absolute values of the provided bounds is used.

Returns

Whether the dynamic range was set successfully.

Requires that min and max be finite, and min <= max.

9.117.3.19 setLocation()

```
void nvinfer1::ITensor::setLocation (
            TensorLocation location )  [inline], [noexcept]
```

Set the storage location of a tensor.

Parameters

location	the location of tensor data

Only network input tensors for storing sequence lengths for RNNv2 are supported. Using host storage for layers that do not support it will generate errors at build time.

See also

getLocation()

9.117.3.20 setName()

```
void nvinfer1::ITensor::setName (
            const char * name )  [inline], [noexcept]
```

Set the tensor name.

For a network input, the name is assigned by the application. For tensors which are layer outputs, a default name is assigned consisting of the layer name followed by the index of the output in brackets.

This method copies the name string.

Parameters

name	The name.

See also

getName()

9.117.3.21 setType()

```
void nvinfer1::ITensor::setType (
            DataType type )  [inline], [noexcept]
```

Set the data type of a tensor.

Parameters

type	The data type of the tensor.

The type is unchanged if the tensor is not a network input tensor, or marked as an output tensor or shape output tensor.

See also

getType()

9.117.4 Member Data Documentation

9.117.4.1 mImpl

```
apiv::VTensor* nvinfer1::ITensor::mImpl  [protected]
```

The documentation for this class was generated from the following file:

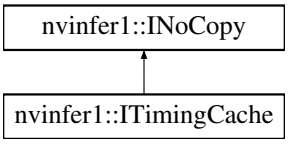
- NvInfer.h

9.118 nvinfer1::ITimingCache Class Reference

Class to handle tactic timing info collected from builder.

```
#include <NvInfer.h>
```

Inheritance diagram for nvinfer1::ITimingCache:



Public Member Functions

- virtual ~ITimingCache () noexcept=default
- nvinfer1::IHostMemory * serialize () const noexcept

  Serialize a timing cache to IHostMemory object.
- bool combine (const ITimingCache &inputCache, bool ignoreMismatch) noexcept

  Combine input timing cache into local instance.
- bool reset () noexcept

  Empty the timing cache.

Protected Attributes

- apiv::VTimingCache * mImpl

Additional Inherited Members

9.118.1 Detailed Description

Class to handle tactic timing info collected from builder.

The timing cache is created or initialized by IBuilderConfig. It can be shared across builder instances to accelerate the builder wallclock time.

See also

IBuilderConfig

9.118.2 Constructor & Destructor Documentation

9.118.2.1 ~ITimingCache()

```
virtual nvinfer1::ITimingCache::~ITimingCache ( )  [virtual], [default], [noexcept]
```

9.118.3 Member Function Documentation

9.118.3.1 combine()

```
bool nvinfer1::ITimingCache::combine (
            const ITimingCache & inputCache,
            bool ignoreMismatch )  [inline], [noexcept]
```

Combine input timing cache into local instance.

This function allows combining entries in the input timing cache to local cache object.

Parameters

inputCache	The input timing cache.
ignoreMismatch	Whether or not to allow cache verification header mismatch.

Returns

True if combined successfully, false otherwise.

Append entries in input cache to local cache. Conflicting entries will be skipped The input cache must be generated by a TensorRT build of exact same version, otherwise combine will be skipped and return false. ignoreMismatch must be set to true if combining a timing cache created from a different device.

Warning

Combining caches generated from devices with different device properties may lead to functional/performance bugs!

9.118.3.2 reset()

```
bool nvinfer1::ITimingCache::reset ( )  [inline], [noexcept]
```

Empty the timing cache.

Returns

True if reset successfully, false otherwise.

9.118.3.3 serialize()

```
nvinfer1::IHostMemory * nvinfer1::ITimingCache::serialize ( ) const  [inline], [noexcept]
```

Serialize a timing cache to IHostMemory object.

This function allows serialization of current timing cache.

Returns

A pointer to a IHostMemory object that contains a serialized timing cache.

See also

IHostMemory

9.118.4 Member Data Documentation

9.118.4.1 mImpl

```
apiv::VTimingCache* nvinfer1::ITimingCache::mImpl  [protected]
```

The documentation for this class was generated from the following file:

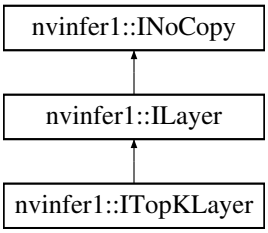
- NvInfer.h

9.119 nvinfer1::ITopKLayer Class Reference

Layer that represents a TopK reduction.

`#include <NvInfer.h>`

Inheritance diagram for nvinfer1::ITopKLayer:



Public Member Functions

- void setOperation (TopKOperation op) noexcept
  Set the operation for the layer.
- TopKOperation getOperation () const noexcept
  Get the operation for the layer.
- void setK (int32_t k) noexcept
  Set the k value for the layer.
- int32_t getK () const noexcept
  Get the k value for the layer.
- void setReduceAxes (uint32_t reduceAxes) noexcept
  Set which axes to reduce for the layer.
- uint32_t getReduceAxes () const noexcept
  Get the axes to reduce for the layer.

Protected Member Functions

- virtual ~ITopKLayer () noexcept=default

Protected Attributes

- apiv::VTopKLayer * mImpl

9.119.1 Detailed Description

Layer that represents a TopK reduction.

Warning

Do not inherit from this class, as doing so will break forward-compatibility of the API and ABI.

9.119.2 Constructor & Destructor Documentation

9.119.2.1 ~ITopKLayer()

```
virtual nvinfer1::ITopKLayer::~ITopKLayer ( )  [protected], [virtual], [default], [noexcept]
```

9.119.3 Member Function Documentation

9.119.3.1 getK()

```
int32_t nvinfer1::ITopKLayer::getK ( ) const  [inline], [noexcept]
```

Get the k value for the layer.

See also

setK()

9.119.3.2 getOperation()

```
TopKOperation nvinfer1::ITopKLayer::getOperation ( ) const  [inline], [noexcept]
```

Get the operation for the layer.

See also

setOperation(), TopKOperation

9.119.3.3 getReduceAxes()

```
uint32_t nvinfer1::ITopKLayer::getReduceAxes ( ) const  [inline], [noexcept]
```

Get the axes to reduce for the layer.

See also

setReduceAxes()

9.119.3.4 setK()

```
void nvinfer1::ITopKLayer::setK (
            int32_t k )  [inline], [noexcept]
```

Set the k value for the layer.

Currently only values up to 3840 are supported.

See also

getK()

9.119.3.5 setOperation()

```
void nvinfer1::ITopKLayer::setOperation (
            TopKOperation op )  [inline], [noexcept]
```

Set the operation for the layer.

See also

getOperation(), TopKOperation

9.119.3.6 setReduceAxes()

```
void nvinfer1::ITopKLayer::setReduceAxes (
            uint32_t reduceAxes )  [inline], [noexcept]
```

Set which axes to reduce for the layer.

See also

getReduceAxes()

9.119.4 Member Data Documentation

9.119.4.1 mImpl

```
apiv::VTopKLayer* nvinfer1::ITopKLayer::mImpl  [protected]
```

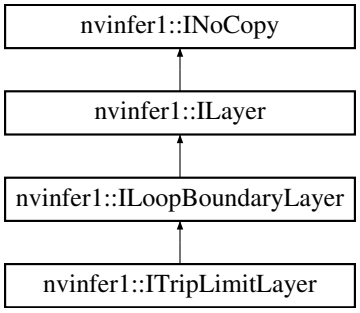
The documentation for this class was generated from the following file:

- NvInfer.h

9.120 nvinfer1::ITripLimitLayer Class Reference

```
#include <NvInfer.h>
```

Inheritance diagram for nvinfer1::ITripLimitLayer:



Public Member Functions

- TripLimit getTripLimit () const noexcept

Protected Member Functions

- virtual ~ITripLimitLayer () noexcept=default

Protected Attributes

- apiv::VTripLimitLayer * mImpl

9.120.1 Constructor & Destructor Documentation

9.120.1.1 ~ITripLimitLayer()

```
virtual nvinfer1::ITripLimitLayer::~ITripLimitLayer ( )  [protected], [virtual], [default], [noexcept]
```

9.120.2 Member Function Documentation

9.120.2.1 getTripLimit()

```
TripLimit nvinfer1::ITripLimitLayer::getTripLimit ( ) const  [inline], [noexcept]
```

9.120.3 Member Data Documentation

9.120.3.1 mImpl

```
apiv::VTripLimitLayer* nvinfer1::ITripLimitLayer::mImpl  [protected]
```

The documentation for this class was generated from the following file:

- NvInfer.h

9.121 nvuffparser::IUffParser Class Reference

Class used for parsing models described using the UFF format.

```
#include <NvUffParser.h>
```

Public Member Functions

- virtual bool registerInput (const char ∗inputName, nvinfer1::Dims inputDims, UffInputOrder inputOrder) noexcept=0

  Register an input name of a UFF network with the associated Dimensions.
- virtual bool registerOutput (const char ∗outputName) noexcept=0

  Register an output name of a UFF network.
- virtual bool parse (const char ∗file, nvinfer1::INetworkDefinition &network, nvinfer1::DataType weights↩Type=nvinfer1::DataType::kFLOAT) noexcept=0

  Parse a UFF file.
- virtual bool parseBuffer (const char ∗buffer, std::size_t size, nvinfer1::INetworkDefinition &network, nvinfer1::DataType weightsType=nvinfer1::DataType::kFLOAT) noexcept=0

  Parse a UFF buffer, useful if the file already live in memory.
- virtual TRT_DEPRECATED void destroy () noexcept=0
- virtual int32_t getUffRequiredVersionMajor () noexcept=0

  Return Version Major of the UFF.
- virtual int32_t getUffRequiredVersionMinor () noexcept=0

  Return Version Minor of the UFF.
- virtual int32_t getUffRequiredVersionPatch () noexcept=0

  Return Patch Version of the UFF.
- virtual void setPluginNamespace (const char ∗libNamespace) noexcept=0

  Set the namespace used to lookup and create plugins in the network.
- virtual ~IUffParser () noexcept=default
- virtual void setErrorRecorder (nvinfer1::IErrorRecorder ∗recorder) noexcept=0

  Set the ErrorRecorder for this interface.
- virtual nvinfer1::IErrorRecorder ∗ getErrorRecorder () const noexcept=0

  get the ErrorRecorder assigned to this interface.

9.121.1 Detailed Description

Class used for parsing models described using the UFF format.

Warning

Do not inherit from this class, as doing so will break forward-compatibility of the API and ABI.

9.121.2 Constructor & Destructor Documentation

9.121.2.1 ~IUffParser()

```
virtual nvuffparser::IUffParser::~IUffParser ( )  [virtual], [default], [noexcept]
```

9.121.3 Member Function Documentation

9.121.3.1 destroy()

```
virtual TRT_DEPRECATED void nvuffparser::IUffParser::destroy ( )  [pure virtual], [noexcept]
```

Deprecated Deprecated interface will be removed in TensorRT 10.0.

9.121.3.2 getErrorRecorder()

```
virtual nvinfer1::IErrorRecorder * nvuffparser::IUffParser::getErrorRecorder ( ) const  [pure
virtual], [noexcept]
```

get the ErrorRecorder assigned to this interface.

Retrieves the assigned error recorder object for the given class. A nullptr will be returned if setErrorRecorder has not been called.

Returns

A pointer to the IErrorRecorder object that has been registered.

See also

setErrorRecorder()

9.121.3.3 getUffRequiredVersionMajor()

```
virtual int32_t nvuffparser::IUffParser::getUffRequiredVersionMajor ( )  [pure virtual], [noexcept]
```

Return Version Major of the UFF.

9.121.3.4 getUffRequiredVersionMinor()

```
virtual int32_t nvuffparser::IUffParser::getUffRequiredVersionMinor ( )  [pure virtual], [noexcept]
```

Return Version Minor of the UFF.

9.121.3.5 getUffRequiredVersionPatch()

```
virtual int32_t nvuffparser::IUffParser::getUffRequiredVersionPatch ( )  [pure virtual], [noexcept]
```

Return Patch Version of the UFF.

9.121.3.6 parse()

```
virtual bool nvuffparser::IUffParser::parse (
            const char * file,
            nvinfer1::INetworkDefinition & network,
            nvinfer1::DataType weightsType = nvinfer1::DataType::kFLOAT )  [pure virtual], [noexcept]
```

Parse a UFF file.

Parameters

file	File name of the UFF file.
network	Network in which the UFFParser will fill the layers.
weightsType	The type on which the weights will transformed in.

9.121.3.7 parseBuffer()

```
virtual bool nvuffparser::IUffParser::parseBuffer (
            const char * buffer,
            std::size_t size,
            nvinfer1::INetworkDefinition & network,
            nvinfer1::DataType weightsType = nvinfer1::DataType::kFLOAT )  [pure virtual], [noexcept]
```

Parse a UFF buffer, useful if the file already live in memory.

Parameters

buffer	Buffer of the UFF file.
size	Size of buffer of the UFF file.
network	Network in which the UFFParser will fill the layers.
weightsType	The type on which the weights will transformed in.

9.121.3.8 registerInput()

```
virtual bool nvuffparser::IUffParser::registerInput (
            const char * inputName,
            nvinfer1::Dims inputDims,
            UffInputOrder inputOrder )  [pure virtual], [noexcept]
```

Register an input name of a UFF network with the associated Dimensions.

Parameters

inputName	Input name.
inputDims	Input dimensions.
inputOrder	Input order on which the framework input was originally.

9.121.3.9 registerOutput()

```
virtual bool nvuffparser::IUffParser::registerOutput (
            const char * outputName )  [pure virtual], [noexcept]
```

Register an output name of a UFF network.

Parameters

outputName	Output name.

9.121.3.10 setErrorRecorder()

```
virtual void nvuffparser::IUffParser::setErrorRecorder (
            nvinfer1::IErrorRecorder * recorder )  [pure virtual], [noexcept]
```

Set the ErrorRecorder for this interface.

Assigns the ErrorRecorder to this interface. The ErrorRecorder will track all errors during execution. This function will call incRefCount of the registered ErrorRecorder at least once. Setting recorder to nullptr unregisters the recorder with the interface, resulting in a call to decRefCount if a recorder has been registered.

If an error recorder is not set, messages will be sent to the global log stream.

Parameters

recorder	The error recorder to register with this interface.

See also

getErrorRecorder()

9.121.3.11 setPluginNamespace()

```
virtual void nvuffparser::IUffParser::setPluginNamespace (
            const char * libNamespace )  [pure virtual], [noexcept]
```

Set the namespace used to lookup and create plugins in the network.

The documentation for this class was generated from the following file:

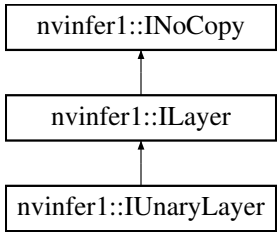
- NvUffParser.h

9.122 nvinfer1::IUnaryLayer Class Reference

Layer that represents an unary operation.

`#include <NvInfer.h>`

Inheritance diagram for nvinfer1::IUnaryLayer:



Public Member Functions

- void setOperation (UnaryOperation op) noexcept
  Set the unary operation for the layer.
- UnaryOperation getOperation () const noexcept
  Get the unary operation for the layer.

Protected Member Functions

- virtual ~IUnaryLayer () noexcept=default

Protected Attributes

- apiv::VUnaryLayer * mImpl

9.122.1 Detailed Description

Layer that represents an unary operation.

Warning

Do not inherit from this class, as doing so will break forward-compatibility of the API and ABI.

9.122.2 Constructor & Destructor Documentation

9.122.2.1 ~IUnaryLayer()

```
virtual nvinfer1::IUnaryLayer::~IUnaryLayer ( )  [protected], [virtual], [default], [noexcept]
```

9.122.3 Member Function Documentation

9.122.3.1 getOperation()

```
UnaryOperation nvinfer1::IUnaryLayer::getOperation ( ) const  [inline], [noexcept]
```

Get the unary operation for the layer.

See also

setOperation(), UnaryOperation

9.122.3.2 setOperation()

```
void nvinfer1::IUnaryLayer::setOperation (
            UnaryOperation op )  [inline], [noexcept]
```

Set the unary operation for the layer.

When running this layer on DLA, only UnaryOperation::kABS is supported.

See also

getOperation(), UnaryOperation

9.122.4 Member Data Documentation

9.122.4.1 mImpl

```
apiv::VUnaryLayer* nvinfer1::IUnaryLayer::mImpl  [protected]
```

The documentation for this class was generated from the following file:

- NvInfer.h

9.123 nvinfer1::plugin::NMSParameters Struct Reference

The NMSParameters are used by the BatchedNMSPlugin for performing the non_max_suppression operation over boxes for object detection networks.

```
#include <NvInferPluginUtils.h>
```

Public Attributes

- bool shareLocation
- int32_t backgroundLabelId
- int32_t numClasses
- int32_t topK
- int32_t keepTopK
- float scoreThreshold
- float iouThreshold
- bool isNormalized

9.123.1 Detailed Description

The NMSParameters are used by the BatchedNMSPlugin for performing the non_max_suppression operation over boxes for object detection networks.

Parameters

shareLocation	If set to true, the boxes inputs are shared across all classes. If set to false, the boxes input should account for per class box data.
backgroundLabelId	Label ID for the background class. If there is no background class, set it as -1
numClasses	Number of classes in the network.
topK	Number of bounding boxes to be fed into the NMS step.
keepTopK	Number of total bounding boxes to be kept per image after NMS step. Should be less than or equal to the topK value.
scoreThreshold	Scalar threshold for score (low scoring boxes are removed).
iouThreshold	scalar threshold for IOU (new boxes that have high IOU overlap with previously selected boxes are removed).
isNormalized	Set to false, if the box coordinates are not normalized, i.e. not in the range [0,1]. Defaults to false.

9.123.2 Member Data Documentation

9.123.2.1 backgroundLabelId

```
int32_t nvinfer1::plugin::NMSParameters::backgroundLabelId
```

9.123.2.2 iouThreshold

```
float nvinfer1::plugin::NMSParameters::iouThreshold
```

9.123.2.3 isNormalized

```
bool nvinfer1::plugin::NMSParameters::isNormalized
```

9.123.2.4 keepTopK

```
int32_t nvinfer1::plugin::NMSParameters::keepTopK
```

9.123.2.5 numClasses

```
int32_t nvinfer1::plugin::NMSParameters::numClasses
```

9.123.2.6 scoreThreshold

```
float nvinfer1::plugin::NMSParameters::scoreThreshold
```

9.123.2.7 shareLocation

```
bool nvinfer1::plugin::NMSParameters::shareLocation
```

9.123.2.8 topK

```
int32_t nvinfer1::plugin::NMSParameters::topK
```

The documentation for this struct was generated from the following file:

- NvInferPluginUtils.h

9.124 nvinfer1::Permutation Struct Reference

```
#include <NvInfer.h>
```

Public Attributes

- int32_t order [Dims::MAX_DIMS]

9.124.1 Member Data Documentation

9.124.1.1 order

```
int32_t nvinfer1::Permutation::order[Dims::MAX_DIMS]
```

The elements of the permutation. The permutation is applied as outputDimensionIndex = permutation.order[input↩ DimensionIndex], so to permute from CHW order to HWC order, the required permutation is [1, 2, 0], and to permute from HWC to CHW, the required permutation is [2, 0, 1].

The documentation for this struct was generated from the following file:

- NvInfer.h

9.125 nvinfer1::PluginField Class Reference

Structure containing plugin attribute field names and associated data This information can be parsed to decode necessary plugin metadata.

`#include <NvInferRuntimeCommon.h>`

Public Member Functions

- PluginField (AsciiChar const *const name_=nullptr, void const *const data_=nullptr, PluginFieldType const type_=PluginFieldType::kUNKNOWN, int32_t const length_=0) noexcept

Public Attributes

- AsciiChar const * name

  Plugin field attribute name.
- void const * data

  Plugin field attribute data.
- PluginFieldType type

  Plugin field attribute type.
- int32_t length

  Number of data entries in the Plugin attribute.

9.125.1 Detailed Description

Structure containing plugin attribute field names and associated data This information can be parsed to decode necessary plugin metadata.

9.125.2 Constructor & Destructor Documentation

9.125.2.1 PluginField()

```
nvinfer1::PluginField::PluginField (
            AsciiChar const *const name_ = nullptr,
            void const *const data_ = nullptr,
            PluginFieldType const type_ = PluginFieldType::kUNKNOWN,
            int32_t const length_ = 0 )  [inline], [noexcept]
```

9.125.3 Member Data Documentation

9.125.3.1 data

```
void const* nvinfer1::PluginField::data
```

Plugin field attribute data.

9.125.3.2 length

```
int32_t nvinfer1::PluginField::length
```

Number of data entries in the Plugin attribute.

9.125.3.3 name

```
AsciiChar const* nvinfer1::PluginField::name
```

Plugin field attribute name.

9.125.3.4 type

```
PluginFieldType nvinfer1::PluginField::type
```

Plugin field attribute type.

See also

PluginFieldType

The documentation for this class was generated from the following file:

- NvInferRuntimeCommon.h

9.126 nvinfer1::PluginFieldCollection Struct Reference

Plugin field collection struct.

```
#include <NvInferRuntimeCommon.h>
```

Public Attributes

- int32_t nbFields
  Number of PluginField entries.
- PluginField const * fields
  Pointer to PluginField entries.

9.126.1 Detailed Description

Plugin field collection struct.

9.126.2 Member Data Documentation

9.126.2.1 fields

```
PluginField const* nvinfer1::PluginFieldCollection::fields
```

Pointer to PluginField entries.

9.126.2.2 nbFields

```
int32_t nvinfer1::PluginFieldCollection::nbFields
```

Number of PluginField entries.

The documentation for this struct was generated from the following file:

- NvInferRuntimeCommon.h

9.127 nvinfer1::PluginRegistrar< T > Class Template Reference

Register the plugin creator to the registry The static registry object will be instantiated when the plugin library is loaded. This static object will register all creators available in the library to the registry.

```
#include <NvInferRuntime.h>
```

Public Member Functions

- PluginRegistrar ()

9.127.1 Detailed Description

template<typename T>
class nvinfer1::PluginRegistrar< T >

Register the plugin creator to the registry The static registry object will be instantiated when the plugin library is loaded. This static object will register all creators available in the library to the registry.

Warning

Statically registering plugins should be avoided in the automotive safety context as the application developer should first register an error recorder with the plugin registry via IPluginRegistry::setErrorRecorder() before using IPluginRegistry::registerCreator() or other methods.

9.127.2 Constructor & Destructor Documentation

9.127.2.1 PluginRegistrar()

```
template<typename T >
nvinfer1::PluginRegistrar< T >::PluginRegistrar ( )  [inline]
```

The documentation for this class was generated from the following file:

- NvInferRuntime.h

9.128 nvinfer1::safe::PluginRegistrar< T > Class Template Reference

Register the plugin creator to the registry The static registry object will be instantiated when the plugin library is loaded. This static object will register all creators available in the library to the registry.

```
#include <NvInferSafeRuntime.h>
```

Public Member Functions

- PluginRegistrar ()

9.128.1 Detailed Description

template<typename T>
class nvinfer1::safe::PluginRegistrar< T >

Register the plugin creator to the registry The static registry object will be instantiated when the plugin library is loaded. This static object will register all creators available in the library to the registry.

Warning

Statically registering plugins should be avoided in the automotive safety context as the application developer should first register an error recorder with the plugin registry via IPluginRegistry::setErrorRecorder() before using IPluginRegistry::registerCreator() or other methods.

9.128.2 Constructor & Destructor Documentation

9.128.2.1 PluginRegistrar()

```
template<typename T >
nvinfer1::safe::PluginRegistrar< T >::PluginRegistrar ( )  [inline]
```

The documentation for this class was generated from the following file:

- NvInferSafeRuntime.h

9.129 nvinfer1::PluginTensorDesc Struct Reference

Fields that a plugin might see for an input or output.

```
#include <NvInferRuntimeCommon.h>
```

Public Attributes

- Dims dims
  Dimensions.
- DataType type
- TensorFormat format
  Tensor format.
- float scale
  Scale for INT8 data type.

9.129.1 Detailed Description

Fields that a plugin might see for an input or output.

Scale is only valid when data type is DataType::kINT8. TensorRT will set the value to -1.0f if it is invalid.

See also

IPluginV2IOExt::supportsFormatCombination

IPluginV2IOExt::configurePlugin

9.129.2 Member Data Documentation

9.129.2.1 dims

```
Dims nvinfer1::PluginTensorDesc::dims
```

Dimensions.

9.129.2.2 format

```
TensorFormat nvinfer1::PluginTensorDesc::format
```

Tensor format.

9.129.2.3 scale

```
float nvinfer1::PluginTensorDesc::scale
```

Scale for INT8 data type.

9.129.2.4 type

```
DataType nvinfer1::PluginTensorDesc::type
```

Warning

DataType:kBOOL not supported.

The documentation for this struct was generated from the following file:

- NvInferRuntimeCommon.h

9.130 PluginVersion Struct Reference

Definition of plugin versions.

```
#include <NvInferRuntimeCommon.h>
```

9.130.1 Detailed Description

Definition of plugin versions.

Tag for plug-in versions. Used in upper byte of getTensorRTVersion().

The documentation for this struct was generated from the following file:

- NvInferRuntimeCommon.h

9.131 nvinfer1::plugin::PriorBoxParameters Struct Reference

The PriorBox plugin layer generates the prior boxes of designated sizes and aspect ratios across all dimensions (H x W). PriorBoxParameters defines a set of parameters for creating the PriorBox plugin layer. It contains:

```
#include <NvInferPluginUtils.h>
```

Public Attributes

- float * minSize
- float * maxSize
- float * aspectRatios
- int32_t numMinSize
- int32_t numMaxSize
- int32_t numAspectRatios
- bool flip
- bool clip
- float variance [4]
- int32_t imgH
- int32_t imgW
- float stepH
- float stepW
- float offset

9.131.1 Detailed Description

The PriorBox plugin layer generates the prior boxes of designated sizes and aspect ratios across all dimensions (H x W). PriorBoxParameters defines a set of parameters for creating the PriorBox plugin layer. It contains:

Parameters

minSize	Minimum box size in pixels. Can not be nullptr.
maxSize	Maximum box size in pixels. Can be nullptr.
aspectRatios	Aspect ratios of the boxes. Can be nullptr.
numMinSize	Number of elements in minSize. Must be larger than 0.
numMaxSize	Number of elements in maxSize. Can be 0 or same as numMinSize.

Parameters

numAspectRatios	Number of elements in aspectRatios. Can be 0.
flip	If true, will flip each aspect ratio. For example, if there is an aspect ratio ”r”, the aspect ratio ”1.0/r” will be generated as well.
clip	If true, will clip the prior so that it is within [0,1].
variance	Variance for adjusting the prior boxes.
imgH	Image height. If 0, then the H dimension of the data tensor will be used.
imgW	Image width. If 0, then the W dimension of the data tensor will be used.
stepH	Step in H. If 0, then (float)imgH/h will be used where h is the H dimension of the 1st input tensor.
stepW	Step in W. If 0, then (float)imgW/w will be used where w is the W dimension of the 1st input tensor.
offset	Offset to the top left corner of each cell.

9.131.2 Member Data Documentation

9.131.2.1 aspectRatios

```
float * nvinfer1::plugin::PriorBoxParameters::aspectRatios
```

9.131.2.2 clip

```
bool nvinfer1::plugin::PriorBoxParameters::clip
```

9.131.2.3 flip

```
bool nvinfer1::plugin::PriorBoxParameters::flip
```

9.131.2.4 imgH

```
int32_t nvinfer1::plugin::PriorBoxParameters::imgH
```

9.131.2.5 imgW

```
int32_t nvinfer1::plugin::PriorBoxParameters::imgW
```

9.131.2.6 maxSize

```
float * nvinfer1::plugin::PriorBoxParameters::maxSize
```

9.131.2.7 minSize

```
float* nvinfer1::plugin::PriorBoxParameters::minSize
```

9.131.2.8 numAspectRatios

```
int32_t nvinfer1::plugin::PriorBoxParameters::numAspectRatios
```

9.131.2.9 numMaxSize

```
int32_t nvinfer1::plugin::PriorBoxParameters::numMaxSize
```

9.131.2.10 numMinSize

```
int32_t nvinfer1::plugin::PriorBoxParameters::numMinSize
```

9.131.2.11 offset

```
float nvinfer1::plugin::PriorBoxParameters::offset
```

9.131.2.12 stepH

```
float nvinfer1::plugin::PriorBoxParameters::stepH
```

9.131.2.13 stepW

```
float nvinfer1::plugin::PriorBoxParameters::stepW
```

9.131.2.14 variance

```
float nvinfer1::plugin::PriorBoxParameters::variance[4]
```

The documentation for this struct was generated from the following file:

- NvInferPluginUtils.h

9.132 nvinfer1::plugin::Quadruple Struct Reference

The Permute plugin layer permutes the input tensor by changing the memory order of the data. Quadruple defines a structure that contains an array of 4 integers. They can represent the permute orders or the strides in each dimension.

```
#include <NvInferPluginUtils.h>
```

Public Attributes

- int32_t data [4]

9.132.1 Detailed Description

The Permute plugin layer permutes the input tensor by changing the memory order of the data. Quadruple defines a structure that contains an array of 4 integers. They can represent the permute orders or the strides in each dimension.

9.132.2 Member Data Documentation

9.132.2.1 data

```
int32_t nvinfer1::plugin::Quadruple::data[4]
```

The documentation for this struct was generated from the following file:

- NvInferPluginUtils.h

9.133 nvinfer1::plugin::RegionParameters Struct Reference

The Region plugin layer performs region proposal calculation: generate 5 bounding boxes per cell (for yolo9000, generate 3 bounding boxes per cell). For each box, calculating its probablities of objects detections from 80 pre-defined classifications (yolo9000 has 9418 pre-defined classifications, and these 9418 items are organized as work-tree structure). RegionParameters defines a set of parameters for creating the Region plugin layer.

```
#include <NvInferPluginUtils.h>
```

Public Attributes

- int32_t num
- int32_t coords
- int32_t classes
- softmaxTree * smTree

9.133.1 Detailed Description

The Region plugin layer performs region proposal calculation: generate 5 bounding boxes per cell (for yolo9000, generate 3 bounding boxes per cell). For each box, calculating its probablities of objects detections from 80 pre-defined classifications (yolo9000 has 9418 pre-defined classifications, and these 9418 items are organized as work-tree structure). RegionParameters defines a set of parameters for creating the Region plugin layer.

Parameters

num	Number of predicted bounding box for each grid cell.
coords	Number of coordinates for a bounding box.
classes	Number of classifications to be predicted.
smTree	Helping structure to do softmax on confidence scores.

9.133.2 Member Data Documentation

9.133.2.1 classes

```
int32_t nvinfer1::plugin::RegionParameters::classes
```

9.133.2.2 coords

```
int32_t nvinfer1::plugin::RegionParameters::coords
```

9.133.2.3 num

```
int32_t nvinfer1::plugin::RegionParameters::num
```

9.133.2.4 smTree

```
softmaxTree* nvinfer1::plugin::RegionParameters::smTree
```

The documentation for this struct was generated from the following file:

- NvInferPluginUtils.h

9.134 nvinfer1::plugin::RPROIParams Struct Reference

RPROIParams is used to create the RPROIPlugin instance. It contains:

```
#include <NvInferPluginUtils.h>
```

Public Attributes

- int32_t poolingH
- int32_t poolingW
- int32_t featureStride
- int32_t preNmsTop
- int32_t nmsMaxOut
- int32_t anchorsRatioCount
- int32_t anchorsScaleCount
- float iouThreshold
- float minBoxSize
- float spatialScale

9.134.1 Detailed Description

RPROIParams is used to create the RPROIPlugin instance. It contains:

Parameters

poolingH	Height of the output in pixels after ROI pooling on feature map.
poolingW	Width of the output in pixels after ROI pooling on feature map.
featureStride	Feature stride; ratio of input image size to feature map size. Assuming that max pooling layers in the neural network use square filters.
preNmsTop	Number of proposals to keep before applying NMS.
nmsMaxOut	Number of remaining proposals after applying NMS.
anchorsRatioCount	Number of anchor box ratios.
anchorsScaleCount	Number of anchor box scales.
iouThreshold	IoU (Intersection over Union) threshold used for the NMS step.
minBoxSize	Minimum allowed bounding box size before scaling, used for anchor box calculation.
spatialScale	Spatial scale between the input image and the last feature map.

9.134.2 Member Data Documentation

9.134.2.1 anchorsRatioCount

```
int32_t nvinfer1::plugin::RPROIParams::anchorsRatioCount
```

9.134.2.2 anchorsScaleCount

```
int32_t nvinfer1::plugin::RPROIParams::anchorsScaleCount
```

9.134.2.3 featureStride

```
int32_t nvinfer1::plugin::RPROIParams::featureStride
```

9.134.2.4 iouThreshold

```
float nvinfer1::plugin::RPROIParams::iouThreshold
```

9.134.2.5 minBoxSize

```
float nvinfer1::plugin::RPROIParams::minBoxSize
```

9.134.2.6 nmsMaxOut

```
int32_t nvinfer1::plugin::RPROIParams::nmsMaxOut
```

9.134.2.7 poolingH

```
int32_t nvinfer1::plugin::RPROIParams::poolingH
```

9.134.2.8 poolingW

```
int32_t nvinfer1::plugin::RPROIParams::poolingW
```

9.134.2.9 preNmsTop

```
int32_t nvinfer1::plugin::RPROIParams::preNmsTop
```

9.134.2.10 spatialScale

```
float nvinfer1::plugin::RPROIParams::spatialScale
```

The documentation for this struct was generated from the following file:

- NvInferPluginUtils.h

9.135 nvinfer1::plugin::softmaxTree Struct Reference

When performing yolo9000, softmaxTree is helping to do softmax on confidence scores, for element to get the precise classification through word-tree structured classification definition.

```
#include <NvInferPluginUtils.h>
```

Public Attributes

- int32_t * leaf
- int32_t n
- int32_t * parent
- int32_t * child
- int32_t * group
- char ** name
- int32_t groups
- int32_t * groupSize
- int32_t * groupOffset

9.135.1 Detailed Description

When performing yolo9000, softmaxTree is helping to do softmax on confidence scores, for element to get the precise classification through word-tree structured classification definition.

9.135.2 Member Data Documentation

9.135.2.1 child

```
int32_t* nvinfer1::plugin::softmaxTree::child
```

9.135.2.2 group

```
int32_t* nvinfer1::plugin::softmaxTree::group
```

9.135.2.3 groupOffset

```
int32_t* nvinfer1::plugin::softmaxTree::groupOffset
```

9.135.2.4 groups

```
int32_t nvinfer1::plugin::softmaxTree::groups
```

9.135.2.5 groupSize

```
int32_t* nvinfer1::plugin::softmaxTree::groupSize
```

9.135.2.6 leaf

```
int32_t* nvinfer1::plugin::softmaxTree::leaf
```

9.135.2.7 n

```
int32_t nvinfer1::plugin::softmaxTree::n
```

9.135.2.8 name

```
char** nvinfer1::plugin::softmaxTree::name
```

9.135.2.9 parent

```
int32_t* nvinfer1::plugin::softmaxTree::parent
```

The documentation for this struct was generated from the following file:

- NvInferPluginUtils.h

9.136 nvinfer1::Weights Class Reference

An array of weights used as a layer parameter.

```
#include <NvInferRuntime.h>
```

Public Attributes

- DataType type

  The type of the weights.
- const void * values

  The weight values, in a contiguous array.
- int64_t count

  The number of weights in the array.

9.136.1 Detailed Description

An array of weights used as a layer parameter.

When using the DLA, the cumulative size of all Weights used in a network must be less than 512MB in size. If the build option kGPU_FALLBACK is specified, then multiple DLA sub-networks may be generated from the single original network.

The weights are held by reference until the engine has been built. Therefore the data referenced by `values` field should be preserved until the build is complete.

The term "empty weights" refers to Weights with weight coefficients (`count` == 0 and `values` == nullptr).

9.136.2 Member Data Documentation

9.136.2.1 count

```
int64_t nvinfer1::Weights::count
```

The number of weights in the array.

9.136.2.2 type

```
DataType nvinfer1::Weights::type
```

The type of the weights.

9.136.2.3 values

```
const void* nvinfer1::Weights::values
```

The weight values, in a contiguous array.

The documentation for this class was generated from the following file:

- NvInferRuntime.h

Chapter 10

File Documentation

10.1 NvCaffeParser.h File Reference

```
#include "NvInfer.h"
```

Classes

- class nvcaffeparser1::IBlobNameToTensor

  Object used to store and query Tensors after they have been extracted from a Caffe model using the ICaffeParser.
- class nvcaffeparser1::IBinaryProtoBlob

  Object used to store and query data extracted from a binaryproto file using the ICaffeParser.
- class nvcaffeparser1::IPluginFactoryV2

  Plugin factory used to configure plugins.
- class nvcaffeparser1::ICaffeParser

  Class used for parsing Caffe models.

Namespaces

- namespace nvcaffeparser1

  The TensorRT Caffe parser API namespace.

Functions

- ICaffeParser * nvcaffeparser1::createCaffeParser () noexcept

  Creates a ICaffeParser object.
- void nvcaffeparser1::shutdownProtobufLibrary () noexcept

  Shuts down protocol buffers library.

10.1.1 Detailed Description

This is the API for the Caffe Parser

10.2 NvCaffeParser.h

Go to the documentation of this file.

```
1 /*
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3  *
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43  *
44  * Any use of the Licensed Deliverables in individual and commercial
45  * software must include, in the user documentation and internal
46  * comments to the code, the above Disclaimer and U.S. Government End
47  * Users Notice.
48  */
49
50 #ifndef NV_CAFFE_PARSER_H
51 #define NV_CAFFE_PARSER_H
52
53 #include "NvInfer.h"
54
60
66 namespace nvcaffeparser1
67 {
68
80 class IBlobNameToTensor
81 {
82 public:
89     virtual nvinfer1::ITensor* find(const char* name) const noexcept = 0;
90
91 protected:
92     virtual ~IBlobNameToTensor() {}
93 };
```

```
94
104 class IBinaryProtoBlob
105 {
106 public:
107     virtual const void* getData() noexcept = 0;
108     virtual nvinfer1::Dims4 getDimensions() noexcept = 0;
109     virtual nvinfer1::DataType getDataType() noexcept = 0;
115     TRT_DEPRECATED virtual void destroy() noexcept = 0;
116     virtual ~IBinaryProtoBlob() noexcept = default;
117 };
118
124 class IPluginFactoryV2
125 {
126 public:
132     virtual bool isPluginV2(const char* layerName) noexcept = 0;
133
142     virtual nvinfer1::IPluginV2* createPlugin(const char* layerName, const nvinfer1::Weights* weights,
143         int32_t nbWeights, const char* libNamespace = "") noexcept
144         = 0;
145
146     virtual ~IPluginFactoryV2() noexcept = default;
147 };
157 class ICaffeParser
158 {
159 public:
173     virtual const IBlobNameToTensor* parse(const char* deploy, const char* model,
        nvinfer1::INetworkDefinition& network,
174         nvinfer1::DataType weightType) noexcept
175         = 0;
176
192     virtual const IBlobNameToTensor* parseBuffers(const uint8_t* deployBuffer, std::size_t deployLength,
193         const uint8_t* modelBuffer, std::size_t modelLength, nvinfer1::INetworkDefinition& network,
194         nvinfer1::DataType weightType) noexcept
195         = 0;
196
209     virtual IBinaryProtoBlob* parseBinaryProto(const char* fileName) noexcept = 0;
210
218     virtual void setProtobufBufferSize(size_t size) noexcept = 0;
219
227     TRT_DEPRECATED virtual void destroy() noexcept = 0;
228
234     virtual void setPluginFactoryV2(IPluginFactoryV2* factory) noexcept = 0;
235
239     virtual void setPluginNamespace(const char* libNamespace) noexcept = 0;
240
241     virtual ~ICaffeParser() noexcept = default;
242
243 public:
258     virtual void setErrorRecorder(nvinfer1::IErrorRecorder* recorder) noexcept = 0;
259
270     virtual nvinfer1::IErrorRecorder* getErrorRecorder() const noexcept = 0;
271 };
272
283 TENSORRTAPI ICaffeParser* createCaffeParser() noexcept;
284
290 TENSORRTAPI void shutdownProtobufLibrary() noexcept;
291 } // namespace nvcaffeparser1
292
297 extern "C" TENSORRTAPI void* createNvCaffeParser_INTERNAL() noexcept;
298 #endif
```

10.3 NvInfer.h File Reference

```
#include "NvInferLegacyDims.h"
#include "NvInferRuntime.h"
```

Classes

- struct nvinfer1::impl::EnumMaxImpl< ActivationType >

- class nvinfer1::ITensor

  A tensor in a network definition.
- class nvinfer1::ILayer

  Base class for all layer classes in a network definition.
- struct nvinfer1::impl::EnumMaxImpl< PaddingMode >
- class nvinfer1::IConvolutionLayer

  A convolution layer in a network definition.
- class nvinfer1::IFullyConnectedLayer

  A fully connected layer in a network definition. This layer expects an input tensor of three or more non-batch dimensions. The input is automatically reshaped into an `MxV` tensor `X`, where `V` is a product of the last three dimensions and `M` is a product of the remaining dimensions (where the product over 0 dimensions is defined as 1). For example:
- class nvinfer1::IActivationLayer

  An Activation layer in a network definition.
- struct nvinfer1::impl::EnumMaxImpl< PoolingType >
- class nvinfer1::IPoolingLayer

  A Pooling layer in a network definition.
- class nvinfer1::ILRNLayer

  A LRN layer in a network definition.
- class nvinfer1::IScaleLayer

  A Scale layer in a network definition.
- class nvinfer1::ISoftMaxLayer

  A Softmax layer in a network definition.
- class nvinfer1::IConcatenationLayer

  A concatenation layer in a network definition.
- class nvinfer1::IDeconvolutionLayer

  A deconvolution layer in a network definition.
- struct nvinfer1::impl::EnumMaxImpl< ElementWiseOperation >
- class nvinfer1::IElementWiseLayer

  A elementwise layer in a network definition.
- class nvinfer1::IGatherLayer

  A Gather layer in a network definition. Supports several kinds of gathering.
- class nvinfer1::IRNNv2Layer

  An RNN layer in a network definition, version 2.
- class nvinfer1::IPluginV2Layer

  Layer type for pluginV2.
- class nvinfer1::IUnaryLayer

  Layer that represents an unary operation.
- class nvinfer1::IReduceLayer

  Layer that represents a reduction operator across Shape, Int32, Float, Half, and Int8 tensors.
- class nvinfer1::IPaddingLayer

  Layer that represents a padding operation.
- struct nvinfer1::Permutation
- class nvinfer1::IShuffleLayer

  Layer type for shuffling data.
- class nvinfer1::ISliceLayer

  Slices an input tensor into an output tensor based on the offset and strides.
- class nvinfer1::IShapeLayer

  Layer type for getting shape of a tensor.

- class nvinfer1::ITopKLayer

  Layer that represents a TopK reduction.
- class nvinfer1::IMatrixMultiplyLayer

  Layer that represents a Matrix Multiplication.
- class nvinfer1::IRaggedSoftMaxLayer

  A RaggedSoftmax layer in a network definition.
- class nvinfer1::IIdentityLayer

  A layer that represents the identity function.
- class nvinfer1::IConstantLayer

  Layer that represents a constant value.
- class nvinfer1::IParametricReLULayer

  Layer that represents a parametric ReLU operation.
- struct nvinfer1::impl::EnumMaxImpl< ResizeMode >
- struct nvinfer1::impl::EnumMaxImpl< ResizeCoordinateTransformation >
- struct nvinfer1::impl::EnumMaxImpl< ResizeSelector >
- struct nvinfer1::impl::EnumMaxImpl< ResizeRoundMode >
- class nvinfer1::IResizeLayer

  A resize layer in a network definition.
- class nvinfer1::ILoopBoundaryLayer
- class nvinfer1::IIfConditionalBoundaryLayer
- class nvinfer1::IConditionLayer
- class nvinfer1::IIfConditionalOutputLayer
- class nvinfer1::IIfConditionalInputLayer
- class nvinfer1::IIfConditional
- class nvinfer1::IRecurrenceLayer
- class nvinfer1::ILoopOutputLayer
- class nvinfer1::ITripLimitLayer
- class nvinfer1::IIteratorLayer
- class nvinfer1::ILoop
- class nvinfer1::ISelectLayer
- class nvinfer1::IAssertionLayer

  An assertion layer in a network.
- class nvinfer1::IFillLayer

  Generate an output tensor with specified mode.
- class nvinfer1::IQuantizeLayer

  A Quantize layer in a network definition.
- class nvinfer1::IDequantizeLayer

  A Dequantize layer in a network definition.
- class nvinfer1::IEinsumLayer

  An Einsum layer in a network.
- class nvinfer1::IScatterLayer

  A scatter layer in a network definition. Supports several kinds of scattering.
- class nvinfer1::INetworkDefinition

  A network definition for input to the builder.
- class nvinfer1::IInt8Calibrator

  Application-implemented interface for calibration.
- class nvinfer1::IInt8EntropyCalibrator
- class nvinfer1::IInt8EntropyCalibrator2

- class nvinfer1::IInt8MinMaxCalibrator
- class nvinfer1::IInt8LegacyCalibrator
- class nvinfer1::IAlgorithmIOInfo

  Carries information about input or output of the algorithm. IAlgorithmIOInfo for all the input and output along with IAlgorithmVariant denotes the variation of algorithm and can be used to select or reproduce an algorithm using IAlgorithmSelector::selectAlgorithms().
- class nvinfer1::IAlgorithmVariant

  provides a unique 128-bit identifier, which along with the input and output information denotes the variation of algorithm and can be used to select or reproduce an algorithm, using IAlgorithmSelector::selectAlgorithms()
- class nvinfer1::IAlgorithmContext

  Describes the context and requirements, that could be fulfilled by one or more instances of IAlgorithm.
- class nvinfer1::IAlgorithm

  Describes a variation of execution of a layer. An algorithm is represented by IAlgorithmVariant and the IAlgorithmIOInfo for each of its inputs and outputs. An algorithm can be selected or reproduced using AlgorithmSelector::select↩ Algorithms().".
- class nvinfer1::IAlgorithmSelector

  Interface implemented by application for selecting and reporting algorithms of a layer provided by the builder.
- class nvinfer1::ITimingCache

  Class to handle tactic timing info collected from builder.
- class nvinfer1::IBuilderConfig

  Holds properties for configuring a builder to produce an engine.
- class nvinfer1::IBuilder

  Builds an engine from a network definition.

Namespaces

- namespace nvinfer1

  The TensorRT API version 1 namespace.
- namespace nvinfer1::impl

Typedefs

- using nvinfer1::TensorFormats = uint32_t

  It is capable of representing one or more TensorFormat by binary OR operations, e.g., 1U << TensorFormat::kCHW4 | 1U << TensorFormat::kCHW32.
- using nvinfer1::QuantizationFlags = uint32_t

  Represents one or more QuantizationFlag values using binary OR operations.
- using nvinfer1::BuilderFlags = uint32_t

  Represents one or more QuantizationFlag values using binary OR operations, e.g., 1U << BuilderFlag::kFP16 | 1U << BuilderFlag::kDEBUG.
- using nvinfer1::NetworkDefinitionCreationFlags = uint32_t

  Represents one or more NetworkDefinitionCreationFlag flags using binary OR operations. e.g., 1U << NetworkDefinitionCreationFlag::kEXPLICIT_BATCH.

Enumerations

- enum class nvinfer1::LayerType : int32_t {
  nvinfer1::kCONVOLUTION = 0 , nvinfer1::kFULLY_CONNECTED = 1 , nvinfer1::kACTIVATION = 2 ,
  nvinfer1::kPOOLING = 3 ,
  nvinfer1::kLRN = 4 , nvinfer1::kSCALE = 5 , nvinfer1::kSOFTMAX = 6 , nvinfer1::kDECONVOLUTION = 7
  ,
  nvinfer1::kCONCATENATION = 8 , nvinfer1::kELEMENTWISE = 9 , nvinfer1::kPLUGIN = 10 ,
  nvinfer1::kUNARY = 11 ,
  nvinfer1::kPADDING = 12 , nvinfer1::kSHUFFLE = 13 , nvinfer1::kREDUCE = 14 , nvinfer1::kTOPK = 15 ,
  nvinfer1::kGATHER = 16 , nvinfer1::kMATRIX_MULTIPLY = 17 , nvinfer1::kRAGGED_SOFTMAX = 18 ,
  nvinfer1::kCONSTANT = 19 ,
  nvinfer1::kRNN_V2 = 20 , nvinfer1::kIDENTITY = 21 , nvinfer1::kPLUGIN_V2 = 22 , nvinfer1::kSLICE = 23 ,
  nvinfer1::kSHAPE = 24 , nvinfer1::kPARAMETRIC_RELU = 25 , nvinfer1::kRESIZE = 26 , nvinfer1::kTRIP_LIMIT
  = 27 ,
  nvinfer1::kRECURRENCE = 28 , nvinfer1::kITERATOR = 29 , nvinfer1::kLOOP_OUTPUT = 30 ,
  nvinfer1::kSELECT = 31 ,
  nvinfer1::kFILL = 32 , nvinfer1::kQUANTIZE = 33 , nvinfer1::kDEQUANTIZE = 34 , nvinfer1::kCONDITION
  = 35 ,
  nvinfer1::kCONDITIONAL_INPUT = 36 , nvinfer1::kCONDITIONAL_OUTPUT = 37 , nvinfer1::kSCATTER
  = 38 , nvinfer1::kEINSUM = 39 ,
  nvinfer1::kASSERTION = 40 }

  The type values of layer classes.
- enum class nvinfer1::ActivationType : int32_t {
  nvinfer1::kRELU = 0 , nvinfer1::kSIGMOID = 1 , nvinfer1::kTANH = 2 , nvinfer1::kLEAKY_RELU = 3 ,
  nvinfer1::kELU = 4 , nvinfer1::kSELU = 5 , nvinfer1::kSOFTSIGN = 6 , nvinfer1::kSOFTPLUS = 7 ,
  nvinfer1::kCLIP = 8 , nvinfer1::kHARD_SIGMOID = 9 , nvinfer1::kSCALED_TANH = 10 , nvinfer1::kTHRESHOLDED_RELU
  = 11 }

  Enumerates the types of activation to perform in an activation layer.
- enum class nvinfer1::PaddingMode : int32_t {
  nvinfer1::kEXPLICIT_ROUND_DOWN = 0 , nvinfer1::kEXPLICIT_ROUND_UP = 1 , nvinfer1::kSAME_UPPER
  = 2 , nvinfer1::kSAME_LOWER = 3 ,
  nvinfer1::kCAFFE_ROUND_DOWN = 4 , nvinfer1::kCAFFE_ROUND_UP = 5 }

  Enumerates the modes of padding to perform in convolution, deconvolution and pooling layer, padding mode takes precedence if setPaddingMode() and setPrePadding() are also used.
- enum class nvinfer1::PoolingType : int32_t { nvinfer1::kMAX = 0 , nvinfer1::kAVERAGE = 1 ,
  nvinfer1::kMAX_AVERAGE_BLEND = 2 }

  The type of pooling to perform in a pooling layer.
- enum class nvinfer1::ScaleMode : int32_t { nvinfer1::kUNIFORM = 0 , nvinfer1::kCHANNEL = 1 ,
  nvinfer1::kELEMENTWISE = 2 }

  Controls how shift, scale and power are applied in a Scale layer.
- enum class nvinfer1::ElementWiseOperation : int32_t {
  nvinfer1::kSUM = 0 , nvinfer1::kPROD = 1 , nvinfer1::kMAX = 2 , nvinfer1::kMIN = 3 ,
  nvinfer1::kSUB = 4 , nvinfer1::kDIV = 5 , nvinfer1::kPOW = 6 , nvinfer1::kFLOOR_DIV = 7 ,
  nvinfer1::kAND = 8 , nvinfer1::kOR = 9 , nvinfer1::kXOR = 10 , nvinfer1::kEQUAL = 11 ,
  nvinfer1::kGREATER = 12 , nvinfer1::kLESS = 13 }

  Enumerates the binary operations that may be performed by an ElementWise layer.
- enum class nvinfer1::GatherMode : int32_t { nvinfer1::kDEFAULT = 0 , nvinfer1::kELEMENT = 1 ,
  nvinfer1::kND = 2 }

  Control form of IGatherLayer.
- enum class nvinfer1::RNNOperation : int32_t { nvinfer1::kRELU = 0 , nvinfer1::kTANH = 1 , nvinfer1::kLSTM
  = 2 , nvinfer1::kGRU = 3 }

Enumerates the RNN operations that may be performed by an RNN layer.

- enum class nvinfer1::RNNDirection : int32_t { nvinfer1::kUNIDIRECTION = 0 , nvinfer1::kBIDIRECTION = 1 }

  Enumerates the RNN direction that may be performed by an RNN layer.
- enum class nvinfer1::RNNInputMode : int32_t { nvinfer1::kLINEAR = 0 , nvinfer1::kSKIP = 1 }

  Enumerates the RNN input modes that may occur with an RNN layer.
- enum class nvinfer1::RNNGateType : int32_t { nvinfer1::kINPUT = 0 , nvinfer1::kOUTPUT = 1 , nvinfer1::kFORGET = 2 , nvinfer1::kUPDATE = 3 , nvinfer1::kRESET = 4 , nvinfer1::kCELL = 5 , nvinfer1::kHIDDEN = 6 }

  Identifies an individual gate within an RNN cell.
- enum class nvinfer1::UnaryOperation : int32_t { nvinfer1::kEXP = 0 , nvinfer1::kLOG = 1 , nvinfer1::kSQRT = 2 , nvinfer1::kRECIP = 3 , nvinfer1::kABS = 4 , nvinfer1::kNEG = 5 , nvinfer1::kSIN = 6 , nvinfer1::kCOS = 7 , nvinfer1::kTAN = 8 , nvinfer1::kSINH = 9 , nvinfer1::kCOSH = 10 , nvinfer1::kASIN = 11 , nvinfer1::kACOS = 12 , nvinfer1::kATAN = 13 , nvinfer1::kASINH = 14 , nvinfer1::kACOSH = 15 , nvinfer1::kATANH = 16 , nvinfer1::kCEIL = 17 , nvinfer1::kFLOOR = 18 , nvinfer1::kERF = 19 , nvinfer1::kNOT = 20 , nvinfer1::kSIGN = 21 , nvinfer1::kROUND = 22 }

  Enumerates the unary operations that may be performed by a Unary layer.
- enum class nvinfer1::ReduceOperation : int32_t { nvinfer1::kSUM = 0 , nvinfer1::kPROD = 1 , nvinfer1::kMAX = 2 , nvinfer1::kMIN = 3 , nvinfer1::kAVG = 4 }

  Enumerates the reduce operations that may be performed by a Reduce layer.
- enum class nvinfer1::SliceMode : int32_t { nvinfer1::kDEFAULT = 0 , nvinfer1::kWRAP = 1 , nvinfer1::kCLAMP = 2 , nvinfer1::kFILL = 3 , nvinfer1::kREFLECT = 4 }

  Controls how ISliceLayer handles out of bounds coordinates.
- enum class nvinfer1::TopKOperation : int32_t { nvinfer1::kMAX = 0 , nvinfer1::kMIN = 1 }

  Enumerates the operations that may be performed by a TopK layer.
- enum class nvinfer1::MatrixOperation : int32_t { nvinfer1::kNONE , nvinfer1::kTRANSPOSE , nvinfer1::kVECTOR }

  Enumerates the operations that may be performed on a tensor by IMatrixMultiplyLayer before multiplication.
- enum class nvinfer1::ResizeMode : int32_t { nvinfer1::kNEAREST = 0 , nvinfer1::kLINEAR = 1 }

  Enumerates various modes of resize in the resize layer. Resize mode set using setResizeMode().
- enum class nvinfer1::ResizeCoordinateTransformation : int32_t { nvinfer1::kALIGN_CORNERS = 0 , nvinfer1::kASYMMETRIC = 1 , nvinfer1::kHALF_PIXEL = 2 }

  The resize coordinate transformation function.
- enum class nvinfer1::ResizeSelector : int32_t { nvinfer1::kFORMULA = 0 , nvinfer1::kUPPER = 1 }

  The coordinate selector when resize to single pixel output.
- enum class nvinfer1::ResizeRoundMode : int32_t { nvinfer1::kHALF_UP = 0 , nvinfer1::kHALF_DOWN = 1 , nvinfer1::kFLOOR = 2 , nvinfer1::kCEIL = 3 }

  The rounding mode for nearest neighbor resize.
- enum class nvinfer1::LoopOutput : int32_t { nvinfer1::kLAST_VALUE = 0 , nvinfer1::kCONCATENATE = 1 , nvinfer1::kREVERSE = 2 }

  Enum that describes kinds of loop outputs.
- enum class nvinfer1::TripLimit : int32_t { nvinfer1::kCOUNT = 0 , nvinfer1::kWHILE = 1 }

  Enum that describes kinds of trip limits.
- enum class nvinfer1::FillOperation : int32_t { nvinfer1::kLINSPACE = 0 , nvinfer1::kRANDOM_UNIFORM = 1 }

  Enumerates the tensor fill operations that may performed by a fill layer.

- enum class nvinfer1::ScatterMode : int32_t { nvinfer1::kELEMENT = 0 , nvinfer1::kND = 1 }

  Control form of IScatterLayer.
- enum class nvinfer1::CalibrationAlgoType : int32_t { nvinfer1::kLEGACY_CALIBRATION = 0 , nvinfer1::kENTROPY_CALIBRATION = 1 , nvinfer1::kENTROPY_CALIBRATION_2 = 2 , nvinfer1::kMINMAX_CALIBRATIC = 3 }

  Version of calibration algorithm to use.
- enum class nvinfer1::QuantizationFlag : int32_t { nvinfer1::kCALIBRATE_BEFORE_FUSION = 0 }

  List of valid flags for quantizing the network to int8.
- enum class nvinfer1::BuilderFlag : int32_t { nvinfer1::kFP16 = 0 , nvinfer1::kINT8 = 1 , nvinfer1::kDEBUG = 2 , nvinfer1::kGPU_FALLBACK = 3 , nvinfer1::kSTRICT_TYPES = 4 , nvinfer1::kREFIT = 5 , nvinfer1::kDISABLE_TIMING_CACHE = 6 , nvinfer1::kTF32 = 7 , nvinfer1::kSPARSE_WEIGHTS = 8 , nvinfer1::kSAFETY_SCOPE = 9 , nvinfer1::kOBEY_PRECISION_CONSTRAINTS = 10 , nvinfer1::kPREFER_PRECISION_CONSTRAINTS = 11 , nvinfer1::kDIRECT_IO = 12 , nvinfer1::kREJECT_EMPTY_ALGORITHMS = 13 }

  List of valid modes that the builder can enable when creating an engine from a network definition.
- enum class nvinfer1::MemoryPoolType : int32_t { nvinfer1::kWORKSPACE = 0 , nvinfer1::kDLA_MANAGED_SRAM = 1 , nvinfer1::kDLA_LOCAL_DRAM = 2 , nvinfer1::kDLA_GLOBAL_DRAM = 3 }

  The type for memory pools used by TensorRT.
- enum class nvinfer1::NetworkDefinitionCreationFlag : int32_t { nvinfer1::kEXPLICIT_BATCH = 0 , nvinfer1::kEXPLICIT_PRECISION = 1 }

  List of immutable network properties expressed at network creation time. NetworkDefinitionCreationFlag is used with createNetworkV2 to specify immutable properties of the network. The createNetwork() function always had an implicit batch dimension being specified by the maxBatchSize builder parameter. createNetworkV2 with kDEFAULT flag mimics that behaviour.

Functions

- template<> constexpr int32_t nvinfer1::EnumMax< LayerType > () noexcept
- template<> constexpr int32_t nvinfer1::EnumMax< ScaleMode > () noexcept
- template<> constexpr int32_t nvinfer1::EnumMax< GatherMode > () noexcept
- template<> constexpr int32_t nvinfer1::EnumMax< RNNOperation > () noexcept
- template<> constexpr int32_t nvinfer1::EnumMax< RNNDirection > () noexcept
- template<> constexpr int32_t nvinfer1::EnumMax< RNNInputMode > () noexcept
- template<> constexpr int32_t nvinfer1::EnumMax< RNNGateType > () noexcept
- template<> constexpr int32_t nvinfer1::EnumMax< UnaryOperation > () noexcept
- template<> constexpr int32_t nvinfer1::EnumMax< ReduceOperation > () noexcept
- template<> constexpr int32_t nvinfer1::EnumMax< SliceMode > () noexcept
- template<> constexpr int32_t nvinfer1::EnumMax< TopKOperation > () noexcept
- template<> constexpr int32_t nvinfer1::EnumMax< MatrixOperation > () noexcept
- template<> constexpr int32_t nvinfer1::EnumMax< LoopOutput > () noexcept
- template<> constexpr int32_t nvinfer1::EnumMax< TripLimit > () noexcept
- template<> constexpr int32_t nvinfer1::EnumMax< FillOperation > () noexcept
- template<> constexpr int32_t nvinfer1::EnumMax< ScatterMode > () noexcept
- template<> constexpr int32_t nvinfer1::EnumMax< CalibrationAlgoType > () noexcept
- template<> constexpr int32_t nvinfer1::EnumMax< QuantizationFlag > () noexcept
- template<> constexpr int32_t nvinfer1::EnumMax< BuilderFlag > () noexcept
- template<> constexpr int32_t nvinfer1::EnumMax< MemoryPoolType > () noexcept
- template<> constexpr int32_t nvinfer1::EnumMax< NetworkDefinitionCreationFlag > () noexcept
- nvinfer1::IPluginRegistry * nvinfer1::getBuilderPluginRegistry (nvinfer1::EngineCapability capability) noexcept

  Return the plugin registry for the given capability or nullptr if no registry exists.

10.3.1 Detailed Description

TensorRT Versioning follows Semantic Versioning Guidelines specified here: https://semver.org/

This is the top-level API file for TensorRT.

10.4 NvInfer.h

Go to the documentation of this file.

```
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47  * Users Notice.
48  */
49
50 #ifndef NV_INFER_H
51 #define NV_INFER_H
52
53 #include "NvInferLegacyDims.h"
54 #include "NvInferRuntime.h"
55
64 //
67
73
79 namespace nvinfer1
80 {
81
89 enum class LayerType : int32_t
90 {
```

```
91      kCONVOLUTION = 0,
92      kFULLY_CONNECTED = 1,
93      kACTIVATION = 2,
94      kPOOLING = 3,
95      kLRN = 4,
96      kSCALE = 5,
97      kSOFTMAX = 6,
98      kDECONVOLUTION = 7,
99      kCONCATENATION = 8,
100      kELEMENTWISE = 9,
101      kPLUGIN = 10,
102      kUNARY = 11,
103      kPADDING = 12,
104      kSHUFFLE = 13,
105      kREDUCE = 14,
106      kTOPK = 15,
107      kGATHER = 16,
108      kMATRIX_MULTIPLY = 17,
109      kRAGGED_SOFTMAX = 18,
110      kCONSTANT = 19,
111      kRNN_V2 = 20,
112      kIDENTITY = 21,
113      kPLUGIN_V2 = 22,
114      kSLICE = 23,
115      kSHAPE = 24,
116      kPARAMETRIC_RELU = 25,
117      kRESIZE = 26,
118      kTRIP_LIMIT = 27,
119      kRECURRENCE = 28,
120      kITERATOR = 29,
121      kLOOP_OUTPUT = 30,
122      kSELECT = 31,
123      kFILL = 32,
124      kQUANTIZE = 33,
125      kDEQUANTIZE = 34,
126      kCONDITION = 35,
127      kCONDITIONAL_INPUT = 36,
128      kCONDITIONAL_OUTPUT = 37,
129      kSCATTER = 38,
130      kEINSUM = 39,
131      kASSERTION = 40,
132  };
133
139  template <>
140  constexpr inline int32_t EnumMax<LayerType>() noexcept
141  {
142      return 41;
143  }
144
151  using TensorFormats = uint32_t;
152
158  enum class ActivationType : int32_t
159  {
160      kRELU = 0,
161      kSIGMOID = 1,
162      kTANH = 2,
163      kLEAKY_RELU = 3,
164      kELU = 4,
165      kSELU = 5,
166      kSOFTSIGN = 6,
167      kSOFTPLUS = 7,
168      kCLIP = 8,
169      kHARD_SIGMOID = 9,
170      kSCALED_TANH = 10,
171      kTHRESHOLDED_RELU = 11
172  };
173
174  namespace impl
175  {
181  template <>
182  struct EnumMaxImpl<ActivationType>
183  {
184      static constexpr int32_t kVALUE = 12;
185  };
186  } // namespace impl
187
203  class ITensor : public INoCopy
204  {
205  public:
218      void setName(const char* name) noexcept
219      {
```

```
220         mImpl->setName(name);
221     }
222
230     const char* getName() const noexcept
231     {
232         return mImpl->getName();
233     }
234
249     void setDimensions(Dims dimensions) noexcept
250     {
251         mImpl->setDimensions(dimensions);
252     }
253
262     Dims getDimensions() const noexcept
263     {
264         return mImpl->getDimensions();
265     }
266
277     void setType(DataType type) noexcept
278     {
279         mImpl->setType(type);
280     }
281
289     DataType getType() const noexcept
290     {
291         return mImpl->getType();
292     }
293
304     bool setDynamicRange(float min, float max) noexcept
305     {
306         return mImpl->setDynamicRange(min, max);
307     }
308
312     bool isNetworkInput() const noexcept
313     {
314         return mImpl->isNetworkInput();
315     }
316
320     bool isNetworkOutput() const noexcept
321     {
322         return mImpl->isNetworkOutput();
323     }
324
342     void setBroadcastAcrossBatch(bool broadcastAcrossBatch) noexcept
343     {
344         mImpl->setBroadcastAcrossBatch(broadcastAcrossBatch);
345     }
346
358     bool getBroadcastAcrossBatch() const noexcept
359     {
360         return mImpl->getBroadcastAcrossBatch();
361     }
362
368     TensorLocation getLocation() const noexcept
369     {
370         return mImpl->getLocation();
371     }
372
383     void setLocation(TensorLocation location) noexcept
384     {
385         mImpl->setLocation(location);
386     }
387
393     bool dynamicRangeIsSet() const noexcept
394     {
395         return mImpl->dynamicRangeIsSet();
396     }
397
401     void resetDynamicRange() noexcept
402     {
403         mImpl->resetDynamicRange();
404     }
405
411     float getDynamicRangeMin() const noexcept
412     {
413         return mImpl->getDynamicRangeMin();
414     }
415
421     float getDynamicRangeMax() const noexcept
422     {
423         return mImpl->getDynamicRangeMax();
```

```
424     }
425
440     void setAllowedFormats(TensorFormats formats) noexcept
441     {
442         mImpl->setAllowedFormats(formats);
443     }
444
453     TensorFormats getAllowedFormats() const noexcept
454     {
455         return mImpl->getAllowedFormats();
456     }
457
487     bool isShapeTensor() const noexcept
488     {
489         return mImpl->isShapeTensor();
490     }
491
510     bool isExecutionTensor() const noexcept
511     {
512         return mImpl->isExecutionTensor();
513     }
514
515 protected:
516     apiv::VTensor* mImpl;
517     virtual ~ITensor() noexcept = default;
518 };
519
527 class ILayer : public INoCopy
528 {
529 public:
535     LayerType getType() const noexcept
536     {
537         return mLayer->getType();
538     }
539
547     void setName(const char* name) noexcept
548     {
549         mLayer->setName(name);
550     }
551
555
558     const char* getName() const noexcept
559     {
560         return mLayer->getName();
561     }
562
566     int32_t getNbInputs() const noexcept
567     {
568         return mLayer->getNbInputs();
569     }
570
579     ITensor* getInput(int32_t index) const noexcept
580     {
581         return mLayer->getInput(index);
582     }
583
587     int32_t getNbOutputs() const noexcept
588     {
589         return mLayer->getNbOutputs();
590     }
591
598     ITensor* getOutput(int32_t index) const noexcept
599     {
600         return mLayer->getOutput(index);
601     }
602
615     void setInput(int32_t index, ITensor& tensor) noexcept
616     {
617         return mLayer->setInput(index, tensor);
618     }
619
641     void setPrecision(DataType dataType) noexcept
642     {
643         mLayer->setPrecision(dataType);
644     }
645
653     DataType getPrecision() const noexcept
654     {
655         return mLayer->getPrecision();
656     }
657
```

```
665     bool precisionIsSet() const noexcept
666     {
667         return mLayer->precisionIsSet();
668     }
669
675     void resetPrecision() noexcept
676     {
677         mLayer->resetPrecision();
678     }
679
713     void setOutputType(int32_t index, DataType dataType) noexcept
714     {
715         mLayer->setOutputType(index, dataType);
716     }
717
727     DataType getOutputType(int32_t index) const noexcept
728     {
729         return mLayer->getOutputType(index);
730     }
731
740     bool outputTypeIsSet(int32_t index) const noexcept
741     {
742         return mLayer->outputTypeIsSet(index);
743     }
744
752     void resetOutputType(int32_t index) noexcept
753     {
754         return mLayer->resetOutputType(index);
755     }
756
757 protected:
758     virtual ~ILayer() noexcept = default;
759     apiv::VLayer* mLayer;
760 };
761
984 enum class PaddingMode : int32_t
985 {
986     kEXPLICIT_ROUND_DOWN = 0,
987     kEXPLICIT_ROUND_UP = 1,
988     kSAME_UPPER = 2,
989     kSAME_LOWER = 3,
990     kCAFFE_ROUND_DOWN = 4,
991     kCAFFE_ROUND_UP = 5
992 };
993
994 namespace impl
995 {
1001 template <>
1002 struct EnumMaxImpl<PaddingMode>
1003 {
1004     static constexpr int32_t kVALUE = 6;
1005 };
1006 } // namespace impl
1007
1020 class IConvolutionLayer : public ILayer
1021 {
1022 public:
1032     TRT_DEPRECATED void setKernelSize(DimsHW kernelSize) noexcept
1033     {
1034         mImpl->setKernelSize(kernelSize);
1035     }
1036
1044     TRT_DEPRECATED DimsHW getKernelSize() const noexcept
1045     {
1046         return mImpl->getKernelSize();
1047     }
1048
1056     void setNbOutputMaps(int32_t nbOutputMaps) noexcept
1057     {
1058         mImpl->setNbOutputMaps(nbOutputMaps);
1059     }
1060
1066     int32_t getNbOutputMaps() const noexcept
1067     {
1068         return mImpl->getNbOutputMaps();
1069     }
1070
1082     TRT_DEPRECATED void setStride(DimsHW stride) noexcept
1083     {
1084         mImpl->setStride(stride);
1085     }
```

```
1086
1092     TRT_DEPRECATED DimsHW getStride() const noexcept
1093     {
1094         return mImpl->getStride();
1095     }
1096
1112     TRT_DEPRECATED void setPadding(DimsHW padding) noexcept
1113     {
1114         return mImpl->setPadding(padding);
1115     }
1116
1124     TRT_DEPRECATED DimsHW getPadding() const noexcept
1125     {
1126         return mImpl->getPadding();
1127     }
1128
1144     void setNbGroups(int32_t nbGroups) noexcept
1145     {
1146         mImpl->setNbGroups(nbGroups);
1147     }
1148
1154     int32_t getNbGroups() const noexcept
1155     {
1156         return mImpl->getNbGroups();
1157     }
1158
1168     void setKernelWeights(Weights weights) noexcept
1169     {
1170         mImpl->setKernelWeights(weights);
1171     }
1172
1178     Weights getKernelWeights() const noexcept
1179     {
1180         return mImpl->getKernelWeights();
1181     }
1182
1193     void setBiasWeights(Weights weights) noexcept
1194     {
1195         mImpl->setBiasWeights(weights);
1196     }
1197
1203     Weights getBiasWeights() const noexcept
1204     {
1205         return mImpl->getBiasWeights();
1206     }
1207
1219     TRT_DEPRECATED void setDilation(DimsHW dilation) noexcept
1220     {
1221         return mImpl->setDilation(dilation);
1222     }
1223
1231     TRT_DEPRECATED DimsHW getDilation() const noexcept
1232     {
1233         return mImpl->getDilation();
1234     }
1235
1248     void setPrePadding(Dims padding) noexcept
1249     {
1250         mImpl->setPrePadding(padding);
1251     }
1252
1258     Dims getPrePadding() const noexcept
1259     {
1260         return mImpl->getPrePadding();
1261     }
1262
1275     void setPostPadding(Dims padding) noexcept
1276     {
1277         mImpl->setPostPadding(padding);
1278     }
1279
1285     Dims getPostPadding() const noexcept
1286     {
1287         return mImpl->getPostPadding();
1288     }
1289
1299     void setPaddingMode(PaddingMode paddingMode) noexcept
1300     {
1301         mImpl->setPaddingMode(paddingMode);
1302     }
1303
```

```
1311     PaddingMode getPaddingMode() const noexcept
1312     {
1313         return mImpl->getPaddingMode();
1314     }
1315
1324     void setKernelSizeNd(Dims kernelSize) noexcept
1325     {
1326         mImpl->setKernelSizeNd(kernelSize);
1327     }
1328
1334     Dims getKernelSizeNd() const noexcept
1335     {
1336         return mImpl->getKernelSizeNd();
1337     }
1338
1349     void setStrideNd(Dims stride) noexcept
1350     {
1351         mImpl->setStrideNd(stride);
1352     }
1353
1359     Dims getStrideNd() const noexcept
1360     {
1361         return mImpl->getStrideNd();
1362     }
1363
1377     void setPaddingNd(Dims padding) noexcept
1378     {
1379         mImpl->setPaddingNd(padding);
1380     }
1381
1389     Dims getPaddingNd() const noexcept
1390     {
1391         return mImpl->getPaddingNd();
1392     }
1393
1403     void setDilationNd(Dims dilation) noexcept
1404     {
1405         mImpl->setDilationNd(dilation);
1406     }
1407
1413     Dims getDilationNd() const noexcept
1414     {
1415         return mImpl->getDilationNd();
1416     }
1417
1439     using ILayer::setInput;
1440
1441 protected:
1442     virtual ~IConvolutionLayer() noexcept = default;
1443     apiv::VConvolutionLayer* mImpl;
1444 };
1445
1475 class IFullyConnectedLayer : public ILayer
1476 {
1477 public:
1485     void setNbOutputChannels(int32_t nbOutputs) noexcept
1486     {
1487         mImpl->setNbOutputChannels(nbOutputs);
1488     }
1489
1495     int32_t getNbOutputChannels() const noexcept
1496     {
1497         return mImpl->getNbOutputChannels();
1498     }
1499
1505     void setKernelWeights(Weights weights) noexcept
1506     {
1507         mImpl->setKernelWeights(weights);
1508     }
1509
1515     Weights getKernelWeights() const noexcept
1516     {
1517         return mImpl->getKernelWeights();
1518     }
1519
1527     void setBiasWeights(Weights weights) noexcept
1528     {
1529         mImpl->setBiasWeights(weights);
1530     }
1531
1537     Weights getBiasWeights() const noexcept
```

```
1538     {
1539         return mImpl->getBiasWeights();
1540     }
1541
1563     using ILayer::setInput;
1564
1565 protected:
1566     virtual ~IFullyConnectedLayer() noexcept = default;
1567     apiv::VFullyConnectedLayer* mImpl;
1568 };
1569
1581 class IActivationLayer : public ILayer
1582 {
1583 public:
1591     void setActivationType(ActivationType type) noexcept
1592     {
1593         mImpl->setActivationType(type);
1594     }
1595
1601     ActivationType getActivationType() const noexcept
1602     {
1603         return mImpl->getActivationType();
1604     }
1605
1616     void setAlpha(float alpha) noexcept
1617     {
1618         mImpl->setAlpha(alpha);
1619     }
1620
1630     void setBeta(float beta) noexcept
1631     {
1632         mImpl->setBeta(beta);
1633     }
1634
1639     float getAlpha() const noexcept
1640     {
1641         return mImpl->getAlpha();
1642     }
1643
1648     float getBeta() const noexcept
1649     {
1650         return mImpl->getBeta();
1651     }
1652
1653 protected:
1654     virtual ~IActivationLayer() noexcept = default;
1655     apiv::VActivationLayer* mImpl;
1656 };
1657
1663 enum class PoolingType : int32_t
1664 {
1665     kMAX = 0,               // Maximum over elements
1666     kAVERAGE = 1,           // Average over elements. If the tensor is padded, the count includes the
      padding
1667     kMAX_AVERAGE_BLEND = 2 // Blending between max and average pooling: (1-blendFactor)*maxPool +
      blendFactor*avgPool
1668 };
1669
1670 namespace impl
1671 {
1677 template <>
1678 struct EnumMaxImpl<PoolingType>
1679 {
1680     static constexpr int32_t kVALUE = 3;
1681 };
1682 } // namespace impl
1683
1695 class IPoolingLayer : public ILayer
1696 {
1697 public:
1705     void setPoolingType(PoolingType type) noexcept
1706     {
1707         mImpl->setPoolingType(type);
1708     }
1709
1715     PoolingType getPoolingType() const noexcept
1716     {
1717         return mImpl->getPoolingType();
1718     }
1719
1729     TRT_DEPRECATED void setWindowSize(DimsHW windowSize) noexcept
```

```
1730     {
1731         mImpl->setWindowSize(windowSize);
1732     }
1733
1741     TRT_DEPRECATED DimsHW getWindowSize() const noexcept
1742     {
1743         return mImpl->getWindowSize();
1744     }
1745
1757     TRT_DEPRECATED void setStride(DimsHW stride) noexcept
1758     {
1759         mImpl->setStride(stride);
1760     }
1761
1769     TRT_DEPRECATED DimsHW getStride() const noexcept
1770     {
1771         return mImpl->getStride();
1772     }
1773
1785     TRT_DEPRECATED void setPadding(DimsHW padding) noexcept
1786     {
1787         mImpl->setPadding(padding);
1788     }
1789
1799     TRT_DEPRECATED DimsHW getPadding() const noexcept
1800     {
1801         return mImpl->getPadding();
1802     }
1803
1814     void setBlendFactor(float blendFactor) noexcept
1815     {
1816         mImpl->setBlendFactor(blendFactor);
1817     }
1818
1827     float getBlendFactor() const noexcept
1828     {
1829         return mImpl->getBlendFactor();
1830     }
1831
1844     void setAverageCountExcludesPadding(bool exclusive) noexcept
1845     {
1846         mImpl->setAverageCountExcludesPadding(exclusive);
1847     }
1848
1855     bool getAverageCountExcludesPadding() const noexcept
1856     {
1857         return mImpl->getAverageCountExcludesPadding();
1858     }
1859
1873     void setPrePadding(Dims padding) noexcept
1874     {
1875         mImpl->setPrePadding(padding);
1876     }
1877
1883     Dims getPrePadding() const noexcept
1884     {
1885         return mImpl->getPrePadding();
1886     }
1887
1901     void setPostPadding(Dims padding) noexcept
1902     {
1903         mImpl->setPostPadding(padding);
1904     }
1905
1911     Dims getPostPadding() const noexcept
1912     {
1913         return mImpl->getPostPadding();
1914     }
1915
1924     void setPaddingMode(PaddingMode paddingMode) noexcept
1925     {
1926         mImpl->setPaddingMode(paddingMode);
1927     }
1928
1935     PaddingMode getPaddingMode() const noexcept
1936     {
1937         return mImpl->getPaddingMode();
1938     }
1939
1948     void setWindowSizeNd(Dims windowSize) noexcept
1949     {
```

```
1950         mImpl->setWindowSizeNd(windowSize);
1951     }
1952
1958     Dims getWindowSizeNd() const noexcept
1959     {
1960         return mImpl->getWindowSizeNd();
1961     }
1962
1973     void setStrideNd(Dims stride) noexcept
1974     {
1975         mImpl->setStrideNd(stride);
1976     }
1977
1983     Dims getStrideNd() const noexcept
1984     {
1985         return mImpl->getStrideNd();
1986     }
1987
2002     void setPaddingNd(Dims padding) noexcept
2003     {
2004         mImpl->setPaddingNd(padding);
2005     }
2006
2014     Dims getPaddingNd() const noexcept
2015     {
2016         return mImpl->getPaddingNd();
2017     }
2018
2019 protected:
2020     virtual ~IPoolingLayer() noexcept = default;
2021     apiv::VPoolingLayer* mImpl;
2022 };
2023
2033 class ILRNLayer : public ILayer
2034 {
2035 public:
2045     void setWindowSize(int32_t windowSize) noexcept
2046     {
2047         mImpl->setWindowSize(windowSize);
2048     }
2049
2055     int32_t getWindowSize() const noexcept
2056     {
2057         return mImpl->getWindowSize();
2058     }
2059
2066     void setAlpha(float alpha) noexcept
2067     {
2068         mImpl->setAlpha(alpha);
2069     }
2070
2076     float getAlpha() const noexcept
2077     {
2078         return mImpl->getAlpha();
2079     }
2080
2087     void setBeta(float beta) noexcept
2088     {
2089         mImpl->setBeta(beta);
2090     }
2091
2097     float getBeta() const noexcept
2098     {
2099         return mImpl->getBeta();
2100     }
2101
2108     void setK(float k) noexcept
2109     {
2110         mImpl->setK(k);
2111     }
2112
2118     float getK() const noexcept
2119     {
2120         return mImpl->getK();
2121     }
2122
2123 protected:
2124     virtual ~ILRNLayer() noexcept = default;
2125     apiv::VLRNLayer* mImpl;
2126 };
2127
```

```
2133 enum class ScaleMode : int32_t
2134 {
2135     kUNIFORM = 0,
2136     kCHANNEL = 1,
2137     kELEMENTWISE = 2
2138 };
2139
2145 template <>
2146 constexpr inline int32_t EnumMax<ScaleMode>() noexcept
2147 {
2148     return 3;
2149 }
2150
2177 class IScaleLayer : public ILayer
2178 {
2179 public:
2185     void setMode(ScaleMode mode) noexcept
2186     {
2187         mImpl->setMode(mode);
2188     }
2189
2195     ScaleMode getMode() const noexcept
2196     {
2197         return mImpl->getMode();
2198     }
2199
2205     void setShift(Weights shift) noexcept
2206     {
2207         mImpl->setShift(shift);
2208     }
2209
2215     Weights getShift() const noexcept
2216     {
2217         return mImpl->getShift();
2218     }
2219
2225     void setScale(Weights scale) noexcept
2226     {
2227         mImpl->setScale(scale);
2228     }
2229
2235     Weights getScale() const noexcept
2236     {
2237         return mImpl->getScale();
2238     }
2239
2245     void setPower(Weights power) noexcept
2246     {
2247         mImpl->setPower(power);
2248     }
2249
2255     Weights getPower() const noexcept
2256     {
2257         return mImpl->getPower();
2258     }
2259
2270     int32_t getChannelAxis() const noexcept
2271     {
2272         return mImpl->getChannelAxis();
2273     }
2274
2291     void setChannelAxis(int32_t channelAxis) noexcept
2292     {
2293         mImpl->setChannelAxis(channelAxis);
2294     }
2295
2296 protected:
2297     virtual ~IScaleLayer() noexcept = default;
2298     apiv::VScaleLayer* mImpl;
2299 };
2300
2317 class ISoftMaxLayer : public ILayer
2318 {
2319 public:
2352     void setAxes(uint32_t axes) noexcept
2353     {
2354         mImpl->setAxes(axes);
2355     }
2356
2362     uint32_t getAxes() const noexcept
2363     {
```

```
2364         return mImpl->getAxes();
2365     }
2366
2367 protected:
2368     virtual ~ISoftMaxLayer() noexcept = default;
2369     apiv::VSoftMaxLayer* mImpl;
2370 };
2371
2384 class IConcatenationLayer : public ILayer
2385 {
2386 public:
2397     void setAxis(int32_t axis) noexcept
2398     {
2399         mImpl->setAxis(axis);
2400     }
2401
2407     int32_t getAxis() const noexcept
2408     {
2409         return mImpl->getAxis();
2410     }
2411
2412 protected:
2413     virtual ~IConcatenationLayer() noexcept = default;
2414     apiv::VConcatenationLayer* mImpl;
2415 };
2416
2424 class IDeconvolutionLayer : public ILayer
2425 {
2426 public:
2438     TRT_DEPRECATED void setKernelSize(DimsHW kernelSize) noexcept
2439     {
2440         mImpl->setKernelSize(kernelSize);
2441     }
2442
2450     TRT_DEPRECATED DimsHW getKernelSize() const noexcept
2451     {
2452         return mImpl->getKernelSize();
2453     }
2454
2462     void setNbOutputMaps(int32_t nbOutputMaps) noexcept
2463     {
2464         mImpl->setNbOutputMaps(nbOutputMaps);
2465     }
2466
2472     int32_t getNbOutputMaps() const noexcept
2473     {
2474         return mImpl->getNbOutputMaps();
2475     }
2476
2488     TRT_DEPRECATED void setStride(DimsHW stride) noexcept
2489     {
2490         mImpl->setStride(stride);
2491     }
2492
2500     TRT_DEPRECATED DimsHW getStride() const noexcept
2501     {
2502         return mImpl->getStride();
2503     }
2504
2520     TRT_DEPRECATED void setPadding(DimsHW padding) noexcept
2521     {
2522         mImpl->setPadding(padding);
2523     }
2524
2534     TRT_DEPRECATED DimsHW getPadding() const noexcept
2535     {
2536         return mImpl->getPadding();
2537     }
2538
2554     void setNbGroups(int32_t nbGroups) noexcept
2555     {
2556         mImpl->setNbGroups(nbGroups);
2557     }
2558
2564     int32_t getNbGroups() const noexcept
2565     {
2566         return mImpl->getNbGroups();
2567     }
2568
2578     void setKernelWeights(Weights weights) noexcept
2579     {
```

```
2580         mImpl->setKernelWeights(weights);
2581     }
2582
2588     Weights getKernelWeights() const noexcept
2589     {
2590         return mImpl->getKernelWeights();
2591     }
2592
2603     void setBiasWeights(Weights weights) noexcept
2604     {
2605         mImpl->setBiasWeights(weights);
2606     }
2607
2613     Weights getBiasWeights() const noexcept
2614     {
2615         return mImpl->getBiasWeights();
2616     }
2617
2631     void setPrePadding(Dims padding) noexcept
2632     {
2633         mImpl->setPrePadding(padding);
2634     }
2635
2641     Dims getPrePadding() const noexcept
2642     {
2643         return mImpl->getPrePadding();
2644     }
2645
2659     void setPostPadding(Dims padding) noexcept
2660     {
2661         mImpl->setPostPadding(padding);
2662     }
2663
2669     Dims getPostPadding() const noexcept
2670     {
2671         return mImpl->getPostPadding();
2672     }
2673
2683     void setPaddingMode(PaddingMode paddingMode) noexcept
2684     {
2685         mImpl->setPaddingMode(paddingMode);
2686     }
2687
2695     PaddingMode getPaddingMode() const noexcept
2696     {
2697         return mImpl->getPaddingMode();
2698     }
2699
2710     void setKernelSizeNd(Dims kernelSize) noexcept
2711     {
2712         mImpl->setKernelSizeNd(kernelSize);
2713     }
2714
2720     Dims getKernelSizeNd() const noexcept
2721     {
2722         return mImpl->getKernelSizeNd();
2723     }
2724
2737     void setStrideNd(Dims stride) noexcept
2738     {
2739         mImpl->setStrideNd(stride);
2740     }
2741
2747     Dims getStrideNd() const noexcept
2748     {
2749         return mImpl->getStrideNd();
2750     }
2751
2765     void setPaddingNd(Dims padding) noexcept
2766     {
2767         mImpl->setPaddingNd(padding);
2768     }
2769
2777     Dims getPaddingNd() const noexcept
2778     {
2779         return mImpl->getPaddingNd();
2780     }
2781
2803     using ILayer::setInput;
2804
2811     void setDilationNd(Dims dilation) noexcept
```

```
2812     {
2813         mImpl->setDilationNd(dilation);
2814     }
2815
2821     Dims getDilationNd() const noexcept
2822     {
2823         return mImpl->getDilationNd();
2824     }
2825
2826 protected:
2827     virtual ~IDeconvolutionLayer() noexcept = default;
2828     apiv::VDeconvolutionLayer* mImpl;
2829 };
2830
2838 enum class ElementWiseOperation : int32_t
2839 {
2840     kSUM = 0,
2841     kPROD = 1,
2842     kMAX = 2,
2843     kMIN = 3,
2844     kSUB = 4,
2845     kDIV = 5,
2846     kPOW = 6,
2847     kFLOOR_DIV = 7,
2848     kAND = 8,
2849     kOR = 9,
2850     kXOR = 10,
2851     kEQUAL = 11,
2852     kGREATER = 12,
2853     kLESS = 13
2854 };
2855
2856 namespace impl
2857 {
2863 template <>
2864 struct EnumMaxImpl<ElementWiseOperation>
2865 {
2866     static constexpr int32_t kVALUE = 14;
2867 };
2868 } // namespace impl
2869
2889 class IElementWiseLayer : public ILayer
2890 {
2891 public:
2901     void setOperation(ElementWiseOperation op) noexcept
2902     {
2903         return mImpl->setOperation(op);
2904     }
2905
2913     ElementWiseOperation getOperation() const noexcept
2914     {
2915         return mImpl->getOperation();
2916     }
2917
2918 protected:
2919     apiv::VElementWiseLayer* mImpl;
2920     virtual ~IElementWiseLayer() noexcept = default;
2921 };
2922
2928 enum class GatherMode : int32_t
2929 {
2930     kDEFAULT = 0,
2931     kELEMENT = 1,
2932     kND = 2
2933 };
2934
2940 template <>
2941 constexpr inline int32_t EnumMax<GatherMode>() noexcept
2942 {
2943     return 3;
2944 }
2945
3024 class IGatherLayer : public ILayer
3025 {
3026 public:
3036     void setGatherAxis(int32_t axis) noexcept
3037     {
3038         mImpl->setGatherAxis(axis);
3039     }
3040
3047     int32_t getGatherAxis() const noexcept
```

```
3048     {
3049         return mImpl->getGatherAxis();
3050     }
3051
3068     void setNbElementWiseDims(int32_t elementWiseDims) noexcept
3069     {
3070         mImpl->setNbElementWiseDims(elementWiseDims);
3071     }
3072
3078     int32_t getNbElementWiseDims() const noexcept
3079     {
3080         return mImpl->getNbElementWiseDims();
3081     }
3082
3088     void setMode(GatherMode mode) noexcept
3089     {
3090         mImpl->setMode(mode);
3091     }
3092
3098     GatherMode getMode() const noexcept
3099     {
3100         return mImpl->getMode();
3101     }
3102
3103 protected:
3104     apiv::VGatherLayer* mImpl;
3105     virtual ~IGatherLayer() noexcept = default;
3106 };
3107
3187 enum class RNNOperation : int32_t
3188 {
3189     kRELU = 0,
3190     kTANH = 1,
3191     kLSTM = 2,
3192     kGRU = 3
3193 };
3194
3200 template <>
3201 constexpr inline int32_t EnumMax<RNNOperation>() noexcept
3202 {
3203     return 4;
3204 }
3205
3213 enum class RNNDirection : int32_t
3214 {
3215     kUNIDIRECTION = 0,
3216     kBIDIRECTION = 1
3217 };
3218
3224 template <>
3225 constexpr inline int32_t EnumMax<RNNDirection>() noexcept
3226 {
3227     return 2;
3228 }
3229
3245 enum class RNNInputMode : int32_t
3246 {
3247     kLINEAR = 0,
3248     kSKIP = 1
3249 };
3250
3256 template <>
3257 constexpr inline int32_t EnumMax<RNNInputMode>() noexcept
3258 {
3259     return 2;
3260 }
3261
3269 enum class RNNGateType : int32_t
3270 {
3271     kINPUT = 0,
3272     kOUTPUT = 1,
3273     kFORGET = 2,
3274     kUPDATE = 3,
3275     kRESET = 4,
3276     kCELL = 5,
3277     kHIDDEN = 6
3278 };
3279
3285 template <>
3286 constexpr inline int32_t EnumMax<RNNGateType>() noexcept
3287 {
```

```
3288     return 7;
3289 }
3290
3302 class TRT_DEPRECATED IRNNv2Layer : public ILayer
3303 {
3304 public:
3305     int32_t getLayerCount() const noexcept
3306     {
3307         return mImpl->getLayerCount();
3308     }
3309     int32_t getHiddenSize() const noexcept
3310     {
3311         return mImpl->getHiddenSize();
3312     }
3313     int32_t getMaxSeqLength() const noexcept
3314     {
3315         return mImpl->getMaxSeqLength();
3316     }
3317     int32_t getDataLength() const noexcept
3318     {
3319         return mImpl->getDataLength();
3320     }
3321
3336     void setSequenceLengths(ITensor& seqLengths) noexcept
3337     {
3338         return mImpl->setSequenceLengths(seqLengths);
3339     }
3340
3348     ITensor* getSequenceLengths() const noexcept
3349     {
3350         return mImpl->getSequenceLengths();
3351     }
3352
3358     void setOperation(RNNOperation op) noexcept
3359     {
3360         mImpl->setOperation(op);
3361     }
3362
3368     RNNOperation getOperation() const noexcept
3369     {
3370         return mImpl->getOperation();
3371     }
3372
3378     void setInputMode(RNNInputMode op) noexcept
3379     {
3380         mImpl->setInputMode(op);
3381     }
3382
3388     RNNInputMode getInputMode() const noexcept
3389     {
3390         return mImpl->getInputMode();
3391     }
3392
3403     void setDirection(RNNDirection op) noexcept
3404     {
3405         mImpl->setDirection(op);
3406     }
3407
3413     RNNDirection getDirection() const noexcept
3414     {
3415         return mImpl->getDirection();
3416     }
3417
3472     void setWeightsForGate(int32_t layerIndex, RNNGateType gate, bool isW, Weights weights) noexcept
3473     {
3474         mImpl->setWeightsForGate(layerIndex, gate, isW, weights);
3475     }
3476
3482     Weights getWeightsForGate(int32_t layerIndex, RNNGateType gate, bool isW) const noexcept
3483     {
3484         return mImpl->getWeightsForGate(layerIndex, gate, isW);
3485     }
3486
3507     void setBiasForGate(int32_t layerIndex, RNNGateType gate, bool isW, Weights bias) noexcept
3508     {
3509         mImpl->setBiasForGate(layerIndex, gate, isW, bias);
3510     }
3511
3517     Weights getBiasForGate(int32_t layerIndex, RNNGateType gate, bool isW) const noexcept
3518     {
3519         return mImpl->getBiasForGate(layerIndex, gate, isW);
```

```
3520     }
3521
3534     void setHiddenState(ITensor& hidden) noexcept
3535     {
3536         mImpl->setHiddenState(hidden);
3537     }
3538
3544     ITensor* getHiddenState() const noexcept
3545     {
3546         return mImpl->getHiddenState();
3547     }
3548
3563     void setCellState(ITensor& cell) noexcept
3564     {
3565         mImpl->setCellState(cell);
3566     }
3567
3573     ITensor* getCellState() const noexcept
3574     {
3575         return mImpl->getCellState();
3576     }
3577
3578 protected:
3579     apiv::VRNNv2Layer* mImpl;
3580     virtual ~IRNNv2Layer() noexcept = default;
3581 };
3582
3592 class IPluginV2Layer : public ILayer
3593 {
3594 public:
3600     IPluginV2& getPlugin() noexcept
3601     {
3602         return mImpl->getPlugin();
3603     }
3604
3605 protected:
3606     apiv::VPluginV2Layer* mImpl;
3607     virtual ~IPluginV2Layer() noexcept = default;
3608 };
3609
3617 enum class UnaryOperation : int32_t
3618 {
3619     kEXP = 0,
3620     kLOG = 1,
3621     kSQRT = 2,
3622     kRECIP = 3,
3623     kABS = 4,
3624     kNEG = 5,
3625     kSIN = 6,
3626     kCOS = 7,
3627     kTAN = 8,
3628     kSINH = 9,
3629     kCOSH = 10,
3630     kASIN = 11,
3631     kACOS = 12,
3632     kATAN = 13,
3633     kASINH = 14,
3634     kACOSH = 15,
3635     kATANH = 16,
3636     kCEIL = 17,
3637     kFLOOR = 18,
3638     kERF = 19,
3639     kNOT = 20,
3640     kSIGN = 21,
3641     kROUND = 22
3642 };
3643
3649 template <>
3650 constexpr inline int32_t EnumMax<UnaryOperation>() noexcept
3651 {
3652     return 23;
3653 }
3654
3662 class IUnaryLayer : public ILayer
3663 {
3664 public:
3672     void setOperation(UnaryOperation op) noexcept
3673     {
3674         mImpl->setOperation(op);
3675     }
3676
```

```
3682     UnaryOperation getOperation() const noexcept
3683     {
3684         return mImpl->getOperation();
3685     }
3686
3687 protected:
3688     apiv::VUnaryLayer* mImpl;
3689     virtual ~IUnaryLayer() noexcept = default;
3690 };
3691
3710 enum class ReduceOperation : int32_t
3711 {
3712     kSUM = 0,
3713     kPROD = 1,
3714     kMAX = 2,
3715     kMIN = 3,
3716     kAVG = 4
3717 };
3718
3724 template <>
3725 constexpr inline int32_t EnumMax<ReduceOperation>() noexcept
3726 {
3727     return 5;
3728 }
3729
3737 class IReduceLayer : public ILayer
3738 {
3739 public:
3745     void setOperation(ReduceOperation op) noexcept
3746     {
3747         mImpl->setOperation(op);
3748     }
3749
3755     ReduceOperation getOperation() const noexcept
3756     {
3757         return mImpl->getOperation();
3758     }
3759
3765     void setReduceAxes(uint32_t reduceAxes) noexcept
3766     {
3767         mImpl->setReduceAxes(reduceAxes);
3768     }
3769
3775     uint32_t getReduceAxes() const noexcept
3776     {
3777         return mImpl->getReduceAxes();
3778     }
3779
3785     void setKeepDimensions(bool keepDimensions) noexcept
3786     {
3787         mImpl->setKeepDimensions(keepDimensions);
3788     }
3789
3795     bool getKeepDimensions() const noexcept
3796     {
3797         return mImpl->getKeepDimensions();
3798     }
3799
3800 protected:
3801     apiv::VReduceLayer* mImpl;
3802     virtual ~IReduceLayer() noexcept = default;
3803 };
3804
3815 class IPaddingLayer : public ILayer
3816 {
3817 public:
3827     TRT_DEPRECATED void setPrePadding(DimsHW padding) noexcept
3828     {
3829         mImpl->setPrePadding(padding);
3830     }
3831
3839     TRT_DEPRECATED DimsHW getPrePadding() const noexcept
3840     {
3841         return mImpl->getPrePadding();
3842     }
3843
3853     TRT_DEPRECATED void setPostPadding(DimsHW padding) noexcept
3854     {
3855         mImpl->setPostPadding(padding);
3856     }
3857
```

```
3865     TRT_DEPRECATED DimsHW getPostPadding() const noexcept
3866     {
3867         return mImpl->getPostPadding();
3868     }
3869
3879     void setPrePaddingNd(Dims padding) noexcept
3880     {
3881         mImpl->setPrePaddingNd(padding);
3882     }
3883
3891     Dims getPrePaddingNd() const noexcept
3892     {
3893         return mImpl->getPrePaddingNd();
3894     }
3895
3905     void setPostPaddingNd(Dims padding) noexcept
3906     {
3907         mImpl->setPostPaddingNd(padding);
3908     }
3909
3917     Dims getPostPaddingNd() const noexcept
3918     {
3919         return mImpl->getPostPaddingNd();
3920     }
3921
3922 protected:
3923     apiv::VPaddingLayer* mImpl;
3924     virtual ~IPaddingLayer() noexcept = default;
3925 };
3926
3927 struct Permutation
3928 {
3935     int32_t order[Dims::MAX_DIMS];
3936 };
3937
3950 class IShuffleLayer : public ILayer
3951 {
3952 public:
3962     void setFirstTranspose(Permutation permutation) noexcept
3963     {
3964         mImpl->setFirstTranspose(permutation);
3965     }
3966
3974     Permutation getFirstTranspose() const noexcept
3975     {
3976         return mImpl->getFirstTranspose();
3977     }
3978
3999     void setReshapeDimensions(Dims dimensions) noexcept
4000     {
4001         mImpl->setReshapeDimensions(dimensions);
4002     }
4003
4012     Dims getReshapeDimensions() const noexcept
4013     {
4014         return mImpl->getReshapeDimensions();
4015     }
4016
4022     //
4045     using ILayer::setInput;
4046
4059     void setSecondTranspose(Permutation permutation) noexcept
4060     {
4061         mImpl->setSecondTranspose(permutation);
4062     }
4063
4071     Permutation getSecondTranspose() const noexcept
4072     {
4073         return mImpl->getSecondTranspose();
4074     }
4075
4087     void setZeroIsPlaceholder(bool zeroIsPlaceholder) noexcept
4088     {
4089         return mImpl->setZeroIsPlaceholder(zeroIsPlaceholder);
4090     }
4091
4100     bool getZeroIsPlaceholder() const noexcept
4101     {
4102         return mImpl->getZeroIsPlaceholder();
4103     }
4104
```

```
4105 protected:
4106     apiv::VShuffleLayer* mImpl;
4107     virtual ~IShuffleLayer() noexcept = default;
4108 };
4109
4115 enum class SliceMode : int32_t
4116 {
4117     kDEFAULT = 0,
4118     kWRAP = 1,
4119     kCLAMP = 2,
4120     kFILL = 3,
4121     kREFLECT = 4,
4124 };
4125
4131 template <>
4132 constexpr inline int32_t EnumMax<SliceMode>() noexcept
4133 {
4134     return 5;
4135 }
4136
4170 class ISliceLayer : public ILayer
4171 {
4172 public:
4182     void setStart(Dims start) noexcept
4183     {
4184         mImpl->setStart(start);
4185     }
4186
4197     Dims getStart() const noexcept
4198     {
4199         return mImpl->getStart();
4200     }
4201
4211     void setSize(Dims size) noexcept
4212     {
4213         return mImpl->setSize(size);
4214     }
4215
4226     Dims getSize() const noexcept
4227     {
4228         return mImpl->getSize();
4229     }
4230
4240     void setStride(Dims stride) noexcept
4241     {
4242         mImpl->setStride(stride);
4243     }
4244
4255     Dims getStride() const noexcept
4256     {
4257         return mImpl->getStride();
4258     }
4259
4265     void setMode(SliceMode mode) noexcept
4266     {
4267         mImpl->setMode(mode);
4268     }
4269
4275     SliceMode getMode() const noexcept
4276     {
4277         return mImpl->getMode();
4278     }
4279
4301     using ILayer::setInput;
4302
4303 protected:
4304     apiv::VSliceLayer* mImpl;
4305     virtual ~ISliceLayer() noexcept = default;
4306 };
4307
4320 class IShapeLayer : public ILayer
4321 {
4322 protected:
4323     apiv::VShapeLayer* mImpl;
4324     virtual ~IShapeLayer() noexcept = default;
4325 };
4326
4332 enum class TopKOperation : int32_t
4333 {
4334     kMAX = 0,
4335     kMIN = 1,
```

```
4336 };
4337
4343 template <>
4344 constexpr inline int32_t EnumMax<TopKOperation>() noexcept
4345 {
4346     return 2;
4347 }
4348
4356 class ITopKLayer : public ILayer
4357 {
4358 public:
4364     void setOperation(TopKOperation op) noexcept
4365     {
4366         mImpl->setOperation(op);
4367     }
4368
4374     TopKOperation getOperation() const noexcept
4375     {
4376         return mImpl->getOperation();
4377     }
4378
4386     void setK(int32_t k) noexcept
4387     {
4388         mImpl->setK(k);
4389     }
4390
4396     int32_t getK() const noexcept
4397     {
4398         return mImpl->getK();
4399     }
4400
4406     void setReduceAxes(uint32_t reduceAxes) noexcept
4407     {
4408         mImpl->setReduceAxes(reduceAxes);
4409     }
4410
4416     uint32_t getReduceAxes() const noexcept
4417     {
4418         return mImpl->getReduceAxes();
4419     }
4420
4421 protected:
4422     apiv::VTopKLayer* mImpl;
4423     virtual ~ITopKLayer() noexcept = default;
4424 };
4425
4432 enum class MatrixOperation : int32_t
4433 {
4437     kNONE,
4438
4440     kTRANSPOSE,
4441
4451     kVECTOR
4452 };
4453
4459 template <>
4460 constexpr inline int32_t EnumMax<MatrixOperation>() noexcept
4461 {
4462     return 3;
4463 }
4464
4490 class IMatrixMultiplyLayer : public ILayer
4491 {
4492 public:
4499     void setOperation(int32_t index, MatrixOperation op) noexcept
4500     {
4501         mImpl->setOperation(index, op);
4502     }
4503
4511     MatrixOperation getOperation(int32_t index) const noexcept
4512     {
4513         return mImpl->getOperation(index);
4514     }
4515
4516 protected:
4517     apiv::VMatrixMultiplyLayer* mImpl;
4518     virtual ~IMatrixMultiplyLayer() noexcept = default;
4519 };
4520
4535 class IRaggedSoftMaxLayer : public ILayer
4536 {
```

```
4537 protected:
4538     apiv::VRaggedSoftMaxLayer* mImpl;
4539     virtual ~IRaggedSoftMaxLayer() noexcept = default;
4540 };
4541
4554 class IIdentityLayer : public ILayer
4555 {
4556 protected:
4557     apiv::VIdentityLayer* mImpl;
4558     virtual ~IIdentityLayer() noexcept = default;
4559 };
4560
4569 class IConstantLayer : public ILayer
4570 {
4571 public:
4581     void setWeights(Weights weights) noexcept
4582     {
4583         mImpl->setWeights(weights);
4584     }
4585
4591     Weights getWeights() const noexcept
4592     {
4593         return mImpl->getWeights();
4594     }
4595
4603     void setDimensions(Dims dimensions) noexcept
4604     {
4605         mImpl->setDimensions(dimensions);
4606     }
4607
4615     Dims getDimensions() const noexcept
4616     {
4617         return mImpl->getDimensions();
4618     }
4619
4620 protected:
4621     apiv::VConstantLayer* mImpl;
4622     virtual ~IConstantLayer() noexcept = default;
4623 };
4624
4634 class IParametricReLULayer : public ILayer
4635 {
4636 protected:
4637     apiv::VParametricReLULayer* mImpl;
4638     virtual ~IParametricReLULayer() noexcept = default;
4639 };
4640
4646 enum class ResizeMode : int32_t
4647 {
4648     kNEAREST = 0,
4649     kLINEAR = 1
4650 };
4651
4652 namespace impl
4653 {
4659 template <>
4660 struct EnumMaxImpl<ResizeMode>
4661 {
4662     static constexpr int32_t kVALUE = 2;
4663 };
4664 } // namespace impl
4665
4673 enum class ResizeCoordinateTransformation : int32_t
4674 {
4689     kALIGN_CORNERS = 0,
4690
4699     kASYMMETRIC = 1,
4700
4709     kHALF_PIXEL = 2,
4710 };
4711
4712 namespace impl
4713 {
4719 template <>
4720 struct EnumMaxImpl<ResizeCoordinateTransformation>
4721 {
4722     static constexpr int32_t kVALUE = 3;
4723 };
4724 } // namespace impl
4725
4733 enum class ResizeSelector : int32_t
```

```
4734 {
4736     kFORMULA = 0,
4737
4739     kUPPER = 1,
4740 };
4741
4742 namespace impl
4743 {
4749 template <>
4750 struct EnumMaxImpl<ResizeSelector>
4751 {
4752     static constexpr int32_t kVALUE = 2;
4753 };
4754 } // namespace impl
4755
4763 enum class ResizeRoundMode : int32_t
4764 {
4766     kHALF_UP = 0,
4767
4769     kHALF_DOWN = 1,
4770
4772     kFLOOR = 2,
4773
4775     kCEIL = 3,
4776 };
4777
4778 namespace impl
4779 {
4785 template <>
4786 struct EnumMaxImpl<ResizeRoundMode>
4787 {
4788     static constexpr int32_t kVALUE = 4;
4789 };
4790 } // namespace impl
4791
4828 class IResizeLayer : public ILayer
4829 {
4830 public:
4849     void setOutputDimensions(Dims dimensions) noexcept
4850     {
4851         return mImpl->setOutputDimensions(dimensions);
4852     }
4853
4859     Dims getOutputDimensions() const noexcept
4860     {
4861         return mImpl->getOutputDimensions();
4862     }
4863
4889     void setScales(const float* scales, int32_t nbScales) noexcept
4890     {
4891         mImpl->setScales(scales, nbScales);
4892     }
4893
4908     int32_t getScales(int32_t size, float* scales) const noexcept
4909     {
4910         return mImpl->getScales(size, scales);
4911     }
4912
4920     void setResizeMode(ResizeMode resizeMode) noexcept
4921     {
4922         mImpl->setResizeMode(resizeMode);
4923     }
4924
4930     ResizeMode getResizeMode() const noexcept
4931     {
4932         return mImpl->getResizeMode();
4933     }
4934
4946     TRT_DEPRECATED void setAlignCorners(bool alignCorners) noexcept
4947     {
4948         mImpl->setAlignCorners(alignCorners);
4949     }
4950
4958     TRT_DEPRECATED bool getAlignCorners() const noexcept
4959     {
4960         return mImpl->getAlignCorners();
4961     }
4962
4982     using ILayer::setInput;
4983
4993     void setCoordinateTransformation(ResizeCoordinateTransformation coordTransform) noexcept
```

```
4994     {
4995         mImpl->setCoordinateTransformation(coordTransform);
4996     }
4997
5003     ResizeCoordinateTransformation getCoordinateTransformation() const noexcept
5004     {
5005         return mImpl->getCoordinateTransformation();
5006     }
5007
5018     void setSelectorForSinglePixel(ResizeSelector selector) noexcept
5019     {
5020         mImpl->setSelectorForSinglePixel(selector);
5021     }
5022
5028     ResizeSelector getSelectorForSinglePixel() const noexcept
5029     {
5030         return mImpl->getSelectorForSinglePixel();
5031     }
5032
5042     void setNearestRounding(ResizeRoundMode value) noexcept
5043     {
5044         mImpl->setNearestRounding(value);
5045     }
5046
5052     ResizeRoundMode getNearestRounding() const noexcept
5053     {
5054         return mImpl->getNearestRounding();
5055     }
5056
5057 protected:
5058     virtual ~IResizeLayer() noexcept = default;
5059     apiv::VResizeLayer* mImpl;
5060 };
5061
5063 enum class LoopOutput : int32_t
5064 {
5066     kLAST_VALUE = 0,
5067
5069     kCONCATENATE = 1,
5070
5072     kREVERSE = 2
5073 };
5074
5080 template <>
5081 constexpr inline int32_t EnumMax<LoopOutput>() noexcept
5082 {
5083     return 3;
5084 }
5085
5087 enum class TripLimit : int32_t
5088 {
5089
5090     kCOUNT = 0,
5091     kWHILE = 1
5092 };
5093
5099 template <>
5100 constexpr inline int32_t EnumMax<TripLimit>() noexcept
5101 {
5102     return 2;
5103 }
5104
5105 class ILoop;
5106
5107 class ILoopBoundaryLayer : public ILayer
5108 {
5109 public:
5111     ILoop* getLoop() const noexcept
5112     {
5113         return mBoundary->getLoop();
5114     }
5115
5116 protected:
5117     virtual ~ILoopBoundaryLayer() noexcept = default;
5118     apiv::VLoopBoundaryLayer* mBoundary;
5119 };
5120
5126 class IIfConditionalBoundaryLayer : public ILayer
5127 {
5128 public:
5130     IIfConditional* getConditional() const noexcept
```

```
5131     {
5132         return mBoundary->getConditional();
5133     }
5134
5135 protected:
5136     virtual ~IIfConditionalBoundaryLayer() noexcept = default;
5137     apiv::VConditionalBoundaryLayer* mBoundary;
5138 };
5139
5143 class IConditionLayer : public IIfConditionalBoundaryLayer
5144 {
5145 public:
5146 protected:
5147     virtual ~IConditionLayer() noexcept = default;
5148     apiv::VConditionLayer* mImpl;
5149 };
5150
5156 class IIfConditionalOutputLayer : public IIfConditionalBoundaryLayer
5157 {
5158 public:
5159 protected:
5160     virtual ~IIfConditionalOutputLayer() noexcept = default;
5161     apiv::VConditionalOutputLayer* mImpl;
5162 };
5163
5167 class IIfConditionalInputLayer : public IIfConditionalBoundaryLayer
5168 {
5169 public:
5170 protected:
5171     virtual ~IIfConditionalInputLayer() noexcept = default;
5172     apiv::VConditionalInputLayer* mImpl;
5173 };
5174
5196 class IIfConditional : public INoCopy
5197 {
5198 public:
5208     IConditionLayer* setCondition(ITensor& condition) noexcept
5209     {
5210         return mImpl->setCondition(condition);
5211     }
5212
5224     IIfConditionalOutputLayer* addOutput(ITensor& trueSubgraphOutput, ITensor& falseSubgraphOutput)
      noexcept
5225     {
5226         return mImpl->addOutput(trueSubgraphOutput, falseSubgraphOutput);
5227     }
5228
5236     IIfConditionalInputLayer* addInput(ITensor& input) noexcept
5237     {
5238         return mImpl->addInput(input);
5239     }
5240
5249     void setName(const char* name) noexcept
5250     {
5251         mImpl->setName(name);
5252     }
5253
5259     const char* getName() const noexcept
5260     {
5261         return mImpl->getName();
5262     }
5263
5264 protected:
5265     virtual ~IIfConditional() noexcept = default;
5266     apiv::VIfConditional* mImpl;
5267 };
5268
5269
5270 class IRecurrenceLayer : public ILoopBoundaryLayer
5271 {
5272 public:
5278     //
5291     using ILayer::setInput;
5292
5293 protected:
5294     virtual ~IRecurrenceLayer() noexcept = default;
5295     apiv::VRecurrenceLayer* mImpl;
5296 };
5297
5315 class ILoopOutputLayer : public ILoopBoundaryLayer
5316 {
```

```
5317 public:
5318     LoopOutput getLoopOutput() const noexcept
5319     {
5320         return mImpl->getLoopOutput();
5321     }
5322
5335     void setAxis(int32_t axis) noexcept
5336     {
5337         mImpl->setAxis(axis);
5338     }
5339
5341     int32_t getAxis() const noexcept
5342     {
5343         return mImpl->getAxis();
5344     }
5345
5351     //
5366     using ILayer::setInput;
5367
5368 protected:
5369     virtual ~ILoopOutputLayer() noexcept = default;
5370     apiv::VLoopOutputLayer* mImpl;
5371 };
5372
5373 class ITripLimitLayer : public ILoopBoundaryLayer
5374 {
5375 public:
5376     TripLimit getTripLimit() const noexcept
5377     {
5378         return mImpl->getTripLimit();
5379     }
5380
5381 protected:
5382     virtual ~ITripLimitLayer() noexcept = default;
5383     apiv::VTripLimitLayer* mImpl;
5384 };
5385
5386 class IIteratorLayer : public ILoopBoundaryLayer
5387 {
5388 public:
5390     void setAxis(int32_t axis) noexcept
5391     {
5392         mImpl->setAxis(axis);
5393     }
5394
5396     int32_t getAxis() const noexcept
5397     {
5398         return mImpl->getAxis();
5399     }
5400
5406     void setReverse(bool reverse) noexcept
5407     {
5408         mImpl->setReverse(reverse);
5409     }
5410
5412     bool getReverse() const noexcept
5413     {
5414         return mImpl->getReverse();
5415     }
5416
5417 protected:
5418     virtual ~IIteratorLayer() noexcept = default;
5419     apiv::VIteratorLayer* mImpl;
5420 };
5421
5427 class ILoop : public INoCopy
5428 {
5429 public:
5436     IRecurrenceLayer* addRecurrence(ITensor& initialValue) noexcept
5437     {
5438         return mImpl->addRecurrence(initialValue);
5439     }
5440
5457     ITripLimitLayer* addTripLimit(ITensor& tensor, TripLimit limit) noexcept
5458     {
5459         return mImpl->addTripLimit(tensor, limit);
5460     }
5461
5470     IIteratorLayer* addIterator(ITensor& tensor, int32_t axis = 0, bool reverse = false) noexcept
5471     {
5472         return mImpl->addIterator(tensor, axis, reverse);
```

```
5473     }
5474
5482     ILoopOutputLayer* addLoopOutput(ITensor& tensor, LoopOutput outputKind, int32_t axis = 0) noexcept
5483     {
5484         return mImpl->addLoopOutput(tensor, outputKind, axis);
5485     }
5486
5495     void setName(const char* name) noexcept
5496     {
5497         mImpl->setName(name);
5498     }
5499
5505     const char* getName() const noexcept
5506     {
5507         return mImpl->getName();
5508     }
5509
5510 protected:
5511     virtual ~ILoop() noexcept = default;
5512     apiv::VLoop* mImpl;
5513 };
5514
5518 class ISelectLayer : public ILayer
5519 {
5520 protected:
5521     virtual ~ISelectLayer() noexcept = default;
5522     apiv::VSelectLayer* mImpl;
5523 };
5524
5539 class IAssertionLayer : public ILayer
5540 {
5541 public:
5550     void setMessage(const char* message) noexcept
5551     {
5552         mImpl->setMessage(message);
5553     }
5554
5560     const char* getMessage() const noexcept
5561     {
5562         return mImpl->getMessage();
5563     }
5564
5565 protected:
5566     virtual ~IAssertionLayer() noexcept = default;
5567
5568     apiv::VAssertionLayer* mImpl;
5569 };
5570
5578 enum class FillOperation : int32_t
5579 {
5580     kLINSPACE = 0,
5581     kRANDOM_UNIFORM = 1
5582 };
5583
5589 template <>
5590 constexpr inline int32_t EnumMax<FillOperation>() noexcept
5591 {
5592     return 2;
5593 }
5594
5620 class IFillLayer : public ILayer
5621 {
5622 public:
5631     //
5632     void setDimensions(Dims dimensions) noexcept
5633     {
5634         mImpl->setDimensions(dimensions);
5635     }
5636
5647     Dims getDimensions() const noexcept
5648     {
5649         return mImpl->getDimensions();
5650     }
5651
5657     void setOperation(FillOperation op) noexcept
5658     {
5659         mImpl->setOperation(op);
5660     }
5661
5667     FillOperation getOperation() const noexcept
5668     {
```

```
5669         return mImpl->getOperation();
5670     }
5671
5684     //
5685     void setAlpha(double alpha) noexcept
5686     {
5687         mImpl->setAlpha(alpha);
5688     }
5689
5700     double getAlpha() const noexcept
5701     {
5702         return mImpl->getAlpha();
5703     }
5704
5718     void setBeta(double beta) noexcept
5719     {
5720         mImpl->setBeta(beta);
5721     }
5722
5733     double getBeta() const noexcept
5734     {
5735         return mImpl->getBeta();
5736     }
5737
5764     using ILayer::setInput;
5765
5766 protected:
5767     virtual ~IFillLayer() noexcept = default;
5768     apiv::VFillLayer* mImpl;
5769 };
5770
5828 class IQuantizeLayer : public ILayer
5829 {
5830 public:
5839     int32_t getAxis() const noexcept
5840     {
5841         return mImpl->getAxis();
5842     }
5850     void setAxis(int32_t axis) noexcept
5851     {
5852         mImpl->setAxis(axis);
5853     }
5854
5855 protected:
5856     virtual ~IQuantizeLayer() noexcept = default;
5857     apiv::VQuantizeLayer* mImpl;
5858 };
5859
5915 class IDequantizeLayer : public ILayer
5916 {
5917 public:
5926     int32_t getAxis() const noexcept
5927     {
5928         return mImpl->getAxis();
5929     }
5937     void setAxis(int32_t axis) noexcept
5938     {
5939         mImpl->setAxis(axis);
5940     }
5941
5942 protected:
5943     virtual ~IDequantizeLayer() noexcept = default;
5944     apiv::VDequantizeLayer* mImpl;
5945 };
5946
5983 class IEinsumLayer : public ILayer
5984 {
5985 public:
5995     bool setEquation(const char* equation) noexcept
5996     {
5997         return mImpl->setEquation(equation);
5998     }
5999
6005     const char* getEquation() const noexcept
6006     {
6007         return mImpl->getEquation();
6008     }
6009
6010 protected:
6011     virtual ~IEinsumLayer() noexcept = default;
6012     apiv::VEinsumLayer* mImpl;
```

```
6013 };
6014
6020 enum class ScatterMode : int32_t
6021 {
6022     kELEMENT = 0,
6023     kND = 1,
6024 };
6025
6031 template <>
6032 constexpr inline int32_t EnumMax<ScatterMode>() noexcept
6033 {
6034     return 2;
6035 }
6036
6093 class IScatterLayer : public ILayer
6094 {
6095 public:
6101     void setMode(ScatterMode mode) noexcept
6102     {
6103         mImpl->setMode(mode);
6104     }
6105
6111     ScatterMode getMode() const noexcept
6112     {
6113         return mImpl->getMode();
6114     }
6115
6121     void setAxis(int32_t axis) noexcept
6122     {
6123         mImpl->setAxis(axis);
6124     }
6125
6129     int32_t getAxis() const noexcept
6130     {
6131         return mImpl->getAxis();
6132     }
6133
6134 protected:
6135     apiv::VScatterLayer* mImpl;
6136     virtual ~IScatterLayer() noexcept = default;
6137 }; // class IScatterLayer
6138
6158 class INetworkDefinition : public INoCopy
6159 {
6160 public:
6161     virtual ~INetworkDefinition() noexcept = default;
6162
6198     ITensor* addInput(const char* name, DataType type, Dims dimensions) noexcept
6199     {
6200         return mImpl->addInput(name, type, dimensions);
6201     }
6202
6212     void markOutput(ITensor& tensor) noexcept
6213     {
6214         mImpl->markOutput(tensor);
6215     }
6216
6235     TRT_DEPRECATED IConvolutionLayer* addConvolution(
6236         ITensor& input, int32_t nbOutputMaps, DimsHW kernelSize, Weights kernelWeights, Weights
      biasWeights) noexcept
6237     {
6238         return mImpl->addConvolution(input, nbOutputMaps, kernelSize, kernelWeights, biasWeights);
6239     }
6240
6256     IFullyConnectedLayer* addFullyConnected(
6257         ITensor& input, int32_t nbOutputs, Weights kernelWeights, Weights biasWeights) noexcept
6258     {
6259         return mImpl->addFullyConnected(input, nbOutputs, kernelWeights, biasWeights);
6260     }
6261
6276     IActivationLayer* addActivation(ITensor& input, ActivationType type) noexcept
6277     {
6278         return mImpl->addActivation(input, type);
6279     }
6280
6295     TRT_DEPRECATED IPoolingLayer* addPooling(ITensor& input, PoolingType type, DimsHW windowSize) noexcept
6296     {
6297         return mImpl->addPooling(input, type, windowSize);
6298     }
6299
6314     ILRNLayer* addLRN(ITensor& input, int32_t window, float alpha, float beta, float k) noexcept
```

```
6315     {
6316         return mImpl->addLRN(input, window, alpha, beta, k);
6317     }
6318
6341     IScaleLayer* addScale(ITensor& input, ScaleMode mode, Weights shift, Weights scale, Weights power)
       noexcept
6342     {
6343         return mImpl->addScale(input, mode, shift, scale, power);
6344     }
6345
6354     ISoftMaxLayer* addSoftMax(ITensor& input) noexcept
6355     {
6356         return mImpl->addSoftMax(input);
6357     }
6358
6371     IConcatenationLayer* addConcatenation(ITensor* const* inputs, int32_t nbInputs) noexcept
6372     {
6373         return mImpl->addConcatenation(inputs, nbInputs);
6374     }
6375
6394     TRT_DEPRECATED IDeconvolutionLayer* addDeconvolution(
6395         ITensor& input, int32_t nbOutputMaps, DimsHW kernelSize, Weights kernelWeights, Weights
       biasWeights) noexcept
6396     {
6397         return mImpl->addDeconvolution(input, nbOutputMaps, kernelSize, kernelWeights, biasWeights);
6398     }
6399
6420     IElementWiseLayer* addElementWise(ITensor& input1, ITensor& input2, ElementWiseOperation op) noexcept
6421     {
6422         return mImpl->addElementWise(input1, input2, op);
6423     }
6424
6440     IUnaryLayer* addUnary(ITensor& input, UnaryOperation operation) noexcept
6441     {
6442         return mImpl->addUnary(input, operation);
6443     }
6444
6457     TRT_DEPRECATED IPaddingLayer* addPadding(ITensor& input, DimsHW prePadding, DimsHW postPadding)
       noexcept
6458     {
6459         return mImpl->addPadding(input, prePadding, postPadding);
6460     }
6461
6471     IShuffleLayer* addShuffle(ITensor& input) noexcept
6472     {
6473         return mImpl->addShuffle(input);
6474     }
6475
6483     int32_t getNbLayers() const noexcept
6484     {
6485         return mImpl->getNbLayers();
6486     }
6487
6497     ILayer* getLayer(int32_t index) const noexcept
6498     {
6499         return mImpl->getLayer(index);
6500     }
6501
6509     int32_t getNbInputs() const noexcept
6510     {
6511         return mImpl->getNbInputs();
6512     }
6513
6525     ITensor* getInput(int32_t index) const noexcept
6526     {
6527         return mImpl->getInput(index);
6528     }
6529
6539     int32_t getNbOutputs() const noexcept
6540     {
6541         return mImpl->getNbOutputs();
6542     }
6543
6555     ITensor* getOutput(int32_t index) const noexcept
6556     {
6557         return mImpl->getOutput(index);
6558     }
6559
6567     TRT_DEPRECATED void destroy() noexcept
6568     {
6569         delete this;
```

```
6570     }
6571
6595     IReduceLayer* addReduce(
6596         ITensor& input, ReduceOperation operation, uint32_t reduceAxes, bool keepDimensions) noexcept
6597     {
6598         return mImpl->addReduce(input, operation, reduceAxes, keepDimensions);
6599     }
6600
6629     ITopKLayer* addTopK(ITensor& input, TopKOperation op, int32_t k, uint32_t reduceAxes) noexcept
6630     {
6631         return mImpl->addTopK(input, op, k, reduceAxes);
6632     }
6633
6645     IGatherLayer* addGather(ITensor& data, ITensor& indices, int32_t axis) noexcept
6646     {
6647         return mImpl->addGather(data, indices, axis);
6648     }
6649
6661     IGatherLayer* addGatherV2(ITensor& data, ITensor& indices, GatherMode mode)
6662     {
6663         return mImpl->addGatherV2(data, indices, mode);
6664     }
6665
6679     IRaggedSoftMaxLayer* addRaggedSoftMax(ITensor& input, ITensor& bounds) noexcept
6680     {
6681         return mImpl->addRaggedSoftMax(input, bounds);
6682     }
6683
6698     IMatrixMultiplyLayer* addMatrixMultiply(
6699         ITensor& input0, MatrixOperation op0, ITensor& input1, MatrixOperation op1) noexcept
6700     {
6701         return mImpl->addMatrixMultiply(input0, op0, input1, op1);
6702     }
6703
6724     IConstantLayer* addConstant(Dims dimensions, Weights weights) noexcept
6725     {
6726         return mImpl->addConstant(dimensions, weights);
6727     }
6728
6793     TRT_DEPRECATED IRNNv2Layer* addRNNv2(
6794         ITensor& input, int32_t layerCount, int32_t hiddenSize, int32_t maxSeqLen, RNNOperation op) noexcept
6795     {
6796         return mImpl->addRNNv2(input, layerCount, hiddenSize, maxSeqLen, op);
6797     }
6798
6808     IIdentityLayer* addIdentity(ITensor& input) noexcept
6809     {
6810         return mImpl->addIdentity(input);
6811     }
6812
6823     void removeTensor(ITensor& tensor) noexcept
6824     {
6825         mImpl->removeTensor(tensor);
6826     }
6827
6835     void unmarkOutput(ITensor& tensor) noexcept
6836     {
6837         mImpl->unmarkOutput(tensor);
6838     }
6839
6854     IPluginV2Layer* addPluginV2(ITensor* const* inputs, int32_t nbInputs, IPluginV2& plugin) noexcept
6855     {
6856         return mImpl->addPluginV2(inputs, nbInputs, plugin);
6857     }
6858
6873     ISliceLayer* addSlice(ITensor& input, Dims start, Dims size, Dims stride) noexcept
6874     {
6875         return mImpl->addSlice(input, start, size, stride);
6876     }
6877
6895     void setName(const char* name) noexcept
6896     {
6897         mImpl->setName(name);
6898     }
6899
6909     const char* getName() const noexcept
6910     {
6911         return mImpl->getName();
6912     }
6913
6927     IShapeLayer* addShape(ITensor& input) noexcept
```

```
6928     {
6929         return mImpl->addShape(input);
6930     }
6931
6946     bool hasImplicitBatchDimension() const noexcept
6947     {
6948         return mImpl->hasImplicitBatchDimension();
6949     }
6950
6964     bool markOutputForShapes(ITensor& tensor) noexcept
6965     {
6966         return mImpl->markOutputForShapes(tensor);
6967     }
6968
6976     bool unmarkOutputForShapes(ITensor& tensor) noexcept
6977     {
6978         return mImpl->unmarkOutputForShapes(tensor);
6979     }
6980
6994     IParametricReLULayer* addParametricReLU(ITensor& input, ITensor& slope) noexcept
6995     {
6996         return mImpl->addParametricReLU(input, slope);
6997     }
6998
7016     IConvolutionLayer* addConvolutionNd(
7017         ITensor& input, int32_t nbOutputMaps, Dims kernelSize, Weights kernelWeights, Weights biasWeights)
     noexcept
7018     {
7019         return mImpl->addConvolutionNd(input, nbOutputMaps, kernelSize, kernelWeights, biasWeights);
7020     }
7021
7036     IPoolingLayer* addPoolingNd(ITensor& input, PoolingType type, Dims windowSize) noexcept
7037     {
7038         return mImpl->addPoolingNd(input, type, windowSize);
7039     }
7040
7055     //
7058     IDeconvolutionLayer* addDeconvolutionNd(
7059         ITensor& input, int32_t nbOutputMaps, Dims kernelSize, Weights kernelWeights, Weights biasWeights)
     noexcept
7060     {
7061         return mImpl->addDeconvolutionNd(input, nbOutputMaps, kernelSize, kernelWeights, biasWeights);
7062     }
7063
7094     IScaleLayer* addScaleNd(
7095         ITensor& input, ScaleMode mode, Weights shift, Weights scale, Weights power, int32_t channelAxis)
     noexcept
7096     {
7097         return mImpl->addScaleNd(input, mode, shift, scale, power, channelAxis);
7098     }
7099
7110     IResizeLayer* addResize(ITensor& input) noexcept
7111     {
7112         return mImpl->addResize(input);
7113     }
7114
7127     TRT_DEPRECATED bool hasExplicitPrecision() const noexcept
7128     {
7129         return mImpl->hasExplicitPrecision();
7130     }
7131
7143     ILoop* addLoop() noexcept
7144     {
7145         return mImpl->addLoop();
7146     }
7147
7181     ISelectLayer* addSelect(ITensor& condition, ITensor& thenInput, ITensor& elseInput) noexcept
7182     {
7183         return mImpl->addSelect(condition, thenInput, elseInput);
7184     }
7185
7198     IAssertionLayer* addAssertion(ITensor& condition, const char* message) noexcept
7199     {
7200         return mImpl->addAssertion(condition, message);
7201     }
7202
7216     IFillLayer* addFill(Dims dimensions, FillOperation op) noexcept
7217     {
7218         return mImpl->addFill(dimensions, op);
7219     }
7220
```

```
7233     TRT_DEPRECATED IPaddingLayer* addPaddingNd(ITensor& input, Dims prePadding, Dims postPadding) noexcept
7234     {
7235         return mImpl->addPaddingNd(input, prePadding, postPadding);
7236     }
7237
7253     bool setWeightsName(Weights weights, const char* name) noexcept
7254     {
7255         return mImpl->setWeightsName(weights, name);
7256     }
7257
7269     //
7272     void setErrorRecorder(IErrorRecorder* recorder) noexcept
7273     {
7274         mImpl->setErrorRecorder(recorder);
7275     }
7276
7287     IErrorRecorder* getErrorRecorder() const noexcept
7288     {
7289         return mImpl->getErrorRecorder();
7290     }
7291
7306     IDequantizeLayer* addDequantize(ITensor& input, ITensor& scale) noexcept
7307     {
7308         return mImpl->addDequantize(input, scale);
7309     }
7310
7326     IScatterLayer* addScatter(ITensor& data, ITensor& indices, ITensor& updates, ScatterMode mode) noexcept
7327     {
7328         return mImpl->addScatter(data, indices, updates, mode);
7329     }
7330
7345     IQuantizeLayer* addQuantize(ITensor& input, ITensor& scale) noexcept
7346     {
7347         return mImpl->addQuantize(input, scale);
7348     }
7349
7360     IIfConditional* addIfConditional() noexcept
7361     {
7362         return mImpl->addIfConditional();
7363     }
7364
7374     IEinsumLayer* addEinsum(ITensor* const* inputs, int32_t nbInputs, const char* equation) noexcept
7375     {
7376         return mImpl->addEinsum(inputs, nbInputs, equation);
7377     }
7378
7379 protected:
7380     apiv::VNetworkDefinition* mImpl;
7381 };
7382
7388 enum class CalibrationAlgoType : int32_t
7389 {
7390     kLEGACY_CALIBRATION = 0,
7391     kENTROPY_CALIBRATION = 1,
7392     kENTROPY_CALIBRATION_2 = 2,
7393     kMINMAX_CALIBRATION = 3,
7394 };
7395
7401 template <>
7402 constexpr inline int32_t EnumMax<CalibrationAlgoType>() noexcept
7403 {
7404     return 4;
7405 }
7406
7418 class IInt8Calibrator
7419 {
7420 public:
7426     virtual int32_t getBatchSize() const noexcept = 0;
7427
7441     virtual bool getBatch(void* bindings[], const char* names[], int32_t nbBindings) noexcept = 0;
7442
7457     virtual const void* readCalibrationCache(std::size_t& length) noexcept = 0;
7458
7467     virtual void writeCalibrationCache(const void* ptr, std::size_t length) noexcept = 0;
7468
7474     virtual CalibrationAlgoType getAlgorithm() noexcept = 0;
7475
7476     virtual ~IInt8Calibrator() noexcept = default;
7477 };
7478
7483 class IInt8EntropyCalibrator : public IInt8Calibrator
```

```
7484 {
7485 public:
7489     CalibrationAlgoType getAlgorithm() noexcept override
7490     {
7491         return CalibrationAlgoType::kENTROPY_CALIBRATION;
7492     }
7493
7494     virtual ~IInt8EntropyCalibrator() noexcept = default;
7495 };
7496
7501 class IInt8EntropyCalibrator2 : public IInt8Calibrator
7502 {
7503 public:
7507     CalibrationAlgoType getAlgorithm() noexcept override
7508     {
7509         return CalibrationAlgoType::kENTROPY_CALIBRATION_2;
7510     }
7511
7512     virtual ~IInt8EntropyCalibrator2() noexcept = default;
7513 };
7514
7518 class IInt8MinMaxCalibrator : public IInt8Calibrator
7519 {
7520 public:
7524     CalibrationAlgoType getAlgorithm() noexcept override
7525     {
7526         return CalibrationAlgoType::kMINMAX_CALIBRATION;
7527     }
7528
7529     virtual ~IInt8MinMaxCalibrator() noexcept = default;
7530 };
7531
7536 class IInt8LegacyCalibrator : public IInt8Calibrator
7537 {
7538 public:
7542     CalibrationAlgoType getAlgorithm() noexcept override
7543     {
7544         return CalibrationAlgoType::kLEGACY_CALIBRATION;
7545     }
7546
7553     virtual double getQuantile() const noexcept = 0;
7554
7561     virtual double getRegressionCutoff() const noexcept = 0;
7562
7575     virtual const void* readHistogramCache(std::size_t& length) noexcept = 0;
7576
7585     virtual void writeHistogramCache(const void* ptr, std::size_t length) noexcept = 0;
7586
7587     virtual ~IInt8LegacyCalibrator() noexcept = default;
7588 };
7589
7600 class IAlgorithmIOInfo : public INoCopy
7601 {
7602 public:
7606     TensorFormat getTensorFormat() const noexcept
7607     {
7608         return mImpl->getTensorFormat();
7609     }
7610
7614     DataType getDataType() const noexcept
7615     {
7616         return mImpl->getDataType();
7617     }
7618
7622     Dims getStrides() const noexcept
7623     {
7624         return mImpl->getStrides();
7625     }
7626
7627 protected:
7628     virtual ~IAlgorithmIOInfo() noexcept = default;
7629     apiv::VAlgorithmIOInfo* mImpl;
7630 };
7631
7643 class IAlgorithmVariant : public INoCopy
7644 {
7645 public:
7649     int64_t getImplementation() const noexcept
7650     {
7651         return mImpl->getImplementation();
7652     }
```

```
7653
7657     int64_t getTactic() const noexcept
7658     {
7659         return mImpl->getTactic();
7660     }
7661
7662 protected:
7663     virtual ~IAlgorithmVariant() noexcept = default;
7664     apiv::VAlgorithmVariant* mImpl;
7665 };
7666
7675 class IAlgorithmContext : public INoCopy
7676 {
7677 public:
7682     const char* getName() const noexcept
7683     {
7684         return mImpl->getName();
7685     }
7686
7693     Dims getDimensions(int32_t index, OptProfileSelector select) const noexcept
7694     {
7695         return mImpl->getDimensions(index, select);
7696     }
7697
7701     int32_t getNbInputs() const noexcept
7702     {
7703         return mImpl->getNbInputs();
7704     }
7705
7709     int32_t getNbOutputs() const noexcept
7710     {
7711         return mImpl->getNbOutputs();
7712     }
7713
7714 protected:
7715     virtual ~IAlgorithmContext() noexcept = default;
7716     apiv::VAlgorithmContext* mImpl;
7717 };
7718
7728 class IAlgorithm : public INoCopy
7729 {
7730 public:
7741     TRT_DEPRECATED const IAlgorithmIOInfo& getAlgorithmIOInfo(int32_t index) const noexcept
7742     {
7743         return mImpl->getAlgorithmIOInfo(index);
7744     }
7745
7749     const IAlgorithmVariant& getAlgorithmVariant() const noexcept
7750     {
7751         return mImpl->getAlgorithmVariant();
7752     }
7753
7757     float getTimingMSec() const noexcept
7758     {
7759         return mImpl->getTimingMSec();
7760     }
7761
7765     std::size_t getWorkspaceSize() const noexcept
7766     {
7767         return mImpl->getWorkspaceSize();
7768     }
7769
7778     const IAlgorithmIOInfo* getAlgorithmIOInfoByIndex(int32_t index) const noexcept
7779     {
7780         return mImpl->getAlgorithmIOInfoByIndex(index);
7781     }
7782
7783 protected:
7784     virtual ~IAlgorithm() noexcept = default;
7785     apiv::VAlgorithm* mImpl;
7786 }; // IAlgorithm
7787
7796 class IAlgorithmSelector
7797 {
7798 public:
7813     virtual int32_t selectAlgorithms(const IAlgorithmContext& context, const IAlgorithm* const* choices,
7814         int32_t nbChoices, int32_t* selection) noexcept
7815         = 0;
7826     virtual void reportAlgorithms(const IAlgorithmContext* const* algoContexts, const IAlgorithm* const*
    algoChoices,
7827         int32_t nbAlgorithms) noexcept
```

```
7828         = 0;
7829
7830     virtual ~IAlgorithmSelector() noexcept = default;
7831 };
7832
7839 using QuantizationFlags = uint32_t;
7840
7848 enum class QuantizationFlag : int32_t
7849 {
7853     kCALIBRATE_BEFORE_FUSION = 0
7854 };
7855
7861 template <>
7862 constexpr inline int32_t EnumMax<QuantizationFlag>() noexcept
7863 {
7864     return 1;
7865 }
7866
7873 using BuilderFlags = uint32_t;
7874
7882 enum class BuilderFlag : int32_t
7883 {
7884     kFP16 = 0,
7885     kINT8 = 1,
7886     kDEBUG = 2,
7887     kGPU_FALLBACK = 3,
7888
7898     kSTRICT_TYPES TRT_DEPRECATED_ENUM = 4,
7899
7900     kREFIT = 5,
7901     kDISABLE_TIMING_CACHE = 6,
7902
7906     kTF32 = 7,
7907
7909     kSPARSE_WEIGHTS = 8,
7910
7917     kSAFETY_SCOPE = 9,
7918
7920     kOBEY_PRECISION_CONSTRAINTS = 10,
7921
7924     kPREFER_PRECISION_CONSTRAINTS = 11,
7925
7929     kDIRECT_IO = 12,
7930
7932     kREJECT_EMPTY_ALGORITHMS = 13
7933 };
7934
7940 template <>
7941 constexpr inline int32_t EnumMax<BuilderFlag>() noexcept
7942 {
7943     return 14;
7944 }
7945
7956 class ITimingCache : public INoCopy
7957 {
7958 public:
7959     virtual ~ITimingCache() noexcept = default;
7960
7970     nvinfer1::IHostMemory* serialize() const noexcept
7971     {
7972         return mImpl->serialize();
7973     }
7974
7994     bool combine(const ITimingCache& inputCache, bool ignoreMismatch) noexcept
7995     {
7996         return mImpl->combine(inputCache, ignoreMismatch);
7997     }
7998
8004     bool reset() noexcept
8005     {
8006         return mImpl->reset();
8007     }
8008
8009 protected:
8010     apiv::VTimingCache* mImpl;
8011 };
8012
8020 enum class MemoryPoolType : int32_t
8021 {
8029     kWORKSPACE = 0,
8030
```

```
8037     kDLA_MANAGED_SRAM = 1,
8038
8044     kDLA_LOCAL_DRAM = 2,
8045
8051     kDLA_GLOBAL_DRAM = 3,
8052 };
8053
8059 template <>
8060 constexpr inline int32_t EnumMax<MemoryPoolType>() noexcept
8061 {
8062     return 4;
8063 }
8064
8072 class IBuilderConfig : public INoCopy
8073 {
8074 public:
8075     virtual ~IBuilderConfig() noexcept = default;
8076
8087     virtual void setMinTimingIterations(int32_t minTiming) noexcept
8088     {
8089         mImpl->setMinTimingIterations(minTiming);
8090     }
8091
8099     virtual int32_t getMinTimingIterations() const noexcept
8100     {
8101         return mImpl->getMinTimingIterations();
8102     }
8103
8112     virtual void setAvgTimingIterations(int32_t avgTiming) noexcept
8113     {
8114         mImpl->setAvgTimingIterations(avgTiming);
8115     }
8116
8124     int32_t getAvgTimingIterations() const noexcept
8125     {
8126         return mImpl->getAvgTimingIterations();
8127     }
8128
8137     void setEngineCapability(EngineCapability capability) noexcept
8138     {
8139         mImpl->setEngineCapability(capability);
8140     }
8141
8149     EngineCapability getEngineCapability() const noexcept
8150     {
8151         return mImpl->getEngineCapability();
8152     }
8153
8159     void setInt8Calibrator(IInt8Calibrator* calibrator) noexcept
8160     {
8161         mImpl->setInt8Calibrator(calibrator);
8162     }
8163
8167     IInt8Calibrator* getInt8Calibrator() const noexcept
8168     {
8169         return mImpl->getInt8Calibrator();
8170     }
8171
8182     TRT_DEPRECATED void setMaxWorkspaceSize(std::size_t workspaceSize) noexcept
8183     {
8184         mImpl->setMaxWorkspaceSize(workspaceSize);
8185     }
8186
8199     TRT_DEPRECATED std::size_t getMaxWorkspaceSize() const noexcept
8200     {
8201         return mImpl->getMaxWorkspaceSize();
8202     }
8203
8216     void setFlags(BuilderFlags builderFlags) noexcept
8217     {
8218         mImpl->setFlags(builderFlags);
8219     }
8220
8228     BuilderFlags getFlags() const noexcept
8229     {
8230         return mImpl->getFlags();
8231     }
8232
8240     void clearFlag(BuilderFlag builderFlag) noexcept
8241     {
8242         mImpl->clearFlag(builderFlag);
```

```
8243     }
8244
8252     void setFlag(BuilderFlag builderFlag) noexcept
8253     {
8254         mImpl->setFlag(builderFlag);
8255     }
8256
8264     bool getFlag(BuilderFlag builderFlag) const noexcept
8265     {
8266         return mImpl->getFlag(builderFlag);
8267     }
8268
8279     void setDeviceType(const ILayer* layer, DeviceType deviceType) noexcept
8280     {
8281         mImpl->setDeviceType(layer, deviceType);
8282     }
8283
8288     DeviceType getDeviceType(const ILayer* layer) const noexcept
8289     {
8290         return mImpl->getDeviceType(layer);
8291     }
8292
8298     bool isDeviceTypeSet(const ILayer* layer) const noexcept
8299     {
8300         return mImpl->isDeviceTypeSet(layer);
8301     }
8302
8308     void resetDeviceType(const ILayer* layer) noexcept
8309     {
8310         mImpl->resetDeviceType(layer);
8311     }
8312
8317     bool canRunOnDLA(const ILayer* layer) const noexcept
8318     {
8319         return mImpl->canRunOnDLA(layer);
8320     }
8321
8332     void setDLACore(int32_t dlaCore) noexcept
8333     {
8334         mImpl->setDLACore(dlaCore);
8335     }
8336
8343     int32_t getDLACore() const noexcept
8344     {
8345         return mImpl->getDLACore();
8346     }
8347
8353     void setDefaultDeviceType(DeviceType deviceType) noexcept
8354     {
8355         mImpl->setDefaultDeviceType(deviceType);
8356     }
8357
8363     DeviceType getDefaultDeviceType() const noexcept
8364     {
8365         return mImpl->getDefaultDeviceType();
8366     }
8367
8373     void reset() noexcept
8374     {
8375         mImpl->reset();
8376     }
8377
8387     TRT_DEPRECATED void destroy() noexcept
8388     {
8389         delete this;
8390     }
8391
8399     void setProfileStream(const cudaStream_t stream) noexcept
8400     {
8401         return mImpl->setProfileStream(stream);
8402     }
8403
8411     cudaStream_t getProfileStream() const noexcept
8412     {
8413         return mImpl->getProfileStream();
8414     }
8415
8427     int32_t addOptimizationProfile(const IOptimizationProfile* profile) noexcept
8428     {
8429         return mImpl->addOptimizationProfile(profile);
8430     }
```

```
8431
8440     int32_t getNbOptimizationProfiles() const noexcept
8441     {
8442         return mImpl->getNbOptimizationProfiles();
8443     }
8444
8452     void setProfilingVerbosity(ProfilingVerbosity verbosity) noexcept
8453     {
8454         mImpl->setProfilingVerbosity(verbosity);
8455     }
8456
8465     ProfilingVerbosity getProfilingVerbosity() const noexcept
8466     {
8467         return mImpl->getProfilingVerbosity();
8468     }
8469
8474     void setAlgorithmSelector(IAlgorithmSelector* selector) noexcept
8475     {
8476         mImpl->setAlgorithmSelector(selector);
8477     }
8478
8482     IAlgorithmSelector* getAlgorithmSelector() const noexcept
8483     {
8484         return mImpl->getAlgorithmSelector();
8485     }
8486
8497     bool setCalibrationProfile(const IOptimizationProfile* profile) noexcept
8498     {
8499         return mImpl->setCalibrationProfile(profile);
8500     }
8501
8507     const IOptimizationProfile* getCalibrationProfile() noexcept
8508     {
8509         return mImpl->getCalibrationProfile();
8510     }
8511
8524     void setQuantizationFlags(QuantizationFlags flags) noexcept
8525     {
8526         mImpl->setQuantizationFlags(flags);
8527     }
8528
8536     QuantizationFlags getQuantizationFlags() const noexcept
8537     {
8538         return mImpl->getQuantizationFlags();
8539     }
8540
8548     void clearQuantizationFlag(QuantizationFlag flag) noexcept
8549     {
8550         mImpl->clearQuantizationFlag(flag);
8551     }
8552
8560     void setQuantizationFlag(QuantizationFlag flag) noexcept
8561     {
8562         mImpl->setQuantizationFlag(flag);
8563     }
8564
8572     bool getQuantizationFlag(QuantizationFlag flag) const noexcept
8573     {
8574         return mImpl->getQuantizationFlag(flag);
8575     }
8576
8597     bool setTacticSources(TacticSources tacticSources) noexcept
8598     {
8599         return mImpl->setTacticSources(tacticSources);
8600     }
8601
8612     TacticSources getTacticSources() const noexcept
8613     {
8614         return mImpl->getTacticSources();
8615     }
8616
8631     nvinfer1::ITimingCache* createTimingCache(const void* blob, std::size_t size) const noexcept
8632     {
8633         return mImpl->createTimingCache(blob, size);
8634     }
8635
8654     bool setTimingCache(const ITimingCache& cache, bool ignoreMismatch) noexcept
8655     {
8656         return mImpl->setTimingCache(cache, ignoreMismatch);
8657     }
8658
```

```
8664     const nvinfer1::ITimingCache* getTimingCache() const noexcept
8665     {
8666         return mImpl->getTimingCache();
8667     }
8668
8696     void setMemoryPoolLimit(MemoryPoolType pool, std::size_t poolSize) noexcept
8697     {
8698         mImpl->setMemoryPoolLimit(pool, poolSize);
8699     }
8700
8715     std::size_t getMemoryPoolLimit(MemoryPoolType pool) const noexcept
8716     {
8717         return mImpl->getMemoryPoolLimit(pool);
8718     }
8719
8720 protected:
8721     apiv::VBuilderConfig* mImpl;
8722 };
8723
8730 using NetworkDefinitionCreationFlags = uint32_t;
8731
8741 enum class NetworkDefinitionCreationFlag : int32_t
8742 {
8747     kEXPLICIT_BATCH = 0,
8748
8761     kEXPLICIT_PRECISION TRT_DEPRECATED_ENUM = 1,
8762 };
8763
8769 template <>
8770 constexpr inline int32_t EnumMax<NetworkDefinitionCreationFlag>() noexcept
8771 {
8772     return 2;
8773 }
8774
8782 class IBuilder : public INoCopy
8783 {
8784 public:
8785     virtual ~IBuilder() noexcept = default;
8786
8795     void setMaxBatchSize(int32_t batchSize) noexcept
8796     {
8797         mImpl->setMaxBatchSize(batchSize);
8798     }
8799
8808     int32_t getMaxBatchSize() const noexcept
8809     {
8810         return mImpl->getMaxBatchSize();
8811     }
8812
8816     bool platformHasFastFp16() const noexcept
8817     {
8818         return mImpl->platformHasFastFp16();
8819     }
8820
8824     bool platformHasFastInt8() const noexcept
8825     {
8826         return mImpl->platformHasFastInt8();
8827     }
8828
8836     TRT_DEPRECATED void destroy() noexcept
8837     {
8838         delete this;
8839     }
8840
8848     int32_t getMaxDLABatchSize() const noexcept
8849     {
8850         return mImpl->getMaxDLABatchSize();
8851     }
8852
8856     int32_t getNbDLACores() const noexcept
8857     {
8858         return mImpl->getNbDLACores();
8859     }
8860
8872     void setGpuAllocator(IGpuAllocator* allocator) noexcept
8873     {
8874         mImpl->setGpuAllocator(allocator);
8875     }
8876
8882     nvinfer1::IBuilderConfig* createBuilderConfig() noexcept
8883     {
```

```
8884         return mImpl->createBuilderConfig();
8885     }
8886
8897     TRT_DEPRECATED nvinfer1::ICudaEngine* buildEngineWithConfig(
8898         INetworkDefinition& network, IBuilderConfig& config) noexcept
8899     {
8900         return mImpl->buildEngineWithConfig(network, config);
8901     }
8902
8914     nvinfer1::INetworkDefinition* createNetworkV2(NetworkDefinitionCreationFlags flags) noexcept
8915     {
8916         return mImpl->createNetworkV2(flags);
8917     }
8918
8928     nvinfer1::IOptimizationProfile* createOptimizationProfile() noexcept
8929     {
8930         return mImpl->createOptimizationProfile();
8931     }
8932
8944     //
8947     void setErrorRecorder(IErrorRecorder* recorder) noexcept
8948     {
8949         mImpl->setErrorRecorder(recorder);
8950     }
8951
8962     IErrorRecorder* getErrorRecorder() const noexcept
8963     {
8964         return mImpl->getErrorRecorder();
8965     }
8966
8970     void reset() noexcept
8971     {
8972         mImpl->reset();
8973     }
8974
8978     bool platformHasTf32() const noexcept
8979     {
8980         return mImpl->platformHasTf32();
8981     }
8982
8997     nvinfer1::IHostMemory* buildSerializedNetwork(INetworkDefinition& network, IBuilderConfig& config)
    noexcept
8998     {
8999         return mImpl->buildSerializedNetwork(network, config);
9000     }
9001
9021     bool isNetworkSupported(INetworkDefinition const& network, IBuilderConfig const& config) const noexcept
9022     {
9023         return mImpl->isNetworkSupported(network, config);
9024     }
9025
9031     ILogger* getLogger() const noexcept
9032     {
9033         return mImpl->getLogger();
9034     }
9035
9036 protected:
9037     apiv::VBuilder* mImpl;
9038 };
9039
9040 } // namespace nvinfer1
9041
9046 extern "C" TENSORRTAPI void* createInferBuilder_INTERNAL(void* logger, int32_t version) noexcept;
9047
9048 namespace nvinfer1
9049 {
9050 namespace
9051 {
9052
9060 inline IBuilder* createInferBuilder(ILogger& logger) noexcept
9061 {
9062     return static_cast<IBuilder*>(createInferBuilder_INTERNAL(&logger, NV_TENSORRT_VERSION));
9063 }
9064
9065 } // namespace
9066
9077 extern "C" TENSORRTAPI nvinfer1::IPluginRegistry* getBuilderPluginRegistry(
9078     nvinfer1::EngineCapability capability) noexcept;
9079
9080 } // namespace nvinfer1
9081
```

```
9082 #endif // NV_INFER_H
```

10.5 NvInferConsistency.h File Reference

```
#include "NvInferConsistencyImpl.h"
#include "NvInferRuntimeCommon.h"
```

Classes

- class nvinfer1::consistency::IConsistencyChecker

  Validates a serialized engine blob.
- class nvinfer1::consistency::IPluginChecker

  Consistency Checker plugin class for user implemented Plugins.

Namespaces

- namespace nvinfer1

  The TensorRT API version 1 namespace.
- namespace nvinfer1::consistency

Functions

- void * createConsistencyChecker_INTERNAL (void *logger, const void *blob, size_t size, int32_t version)

  Internal C entry point for creating IConsistencyChecker.

10.5.1 Function Documentation

10.5.1.1 createConsistencyChecker_INTERNAL()

```
void * createConsistencyChecker_INTERNAL (
            void * logger,
            const void * blob,
            size_t size,
            int32_t version )
```

Internal C entry point for creating IConsistencyChecker.

10.6 NvInferConsistency.h

Go to the documentation of this file.

```
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47  * Users Notice.
48  */
49
50 #ifndef NV_INFER_CONSISTENCY_H
51 #define NV_INFER_CONSISTENCY_H
52
53 #include "NvInferConsistencyImpl.h"
54 #include "NvInferRuntimeCommon.h"
55
56
59
60 namespace nvinfer1
61 {
62
63 namespace consistency
64 {
65
73 class IConsistencyChecker
74 {
75 public:
78     //
82     bool validate() const noexcept
83     {
84         return mImpl->validate();
85     }
86
90     virtual ~IConsistencyChecker() = default;
91
92 protected:
93     apiv::VConsistencyChecker* mImpl;
94     IConsistencyChecker() = default;
```

```
95     IConsistencyChecker(const IConsistencyChecker& other) = delete;
96     IConsistencyChecker& operator=(const IConsistencyChecker& other) = delete;
97     IConsistencyChecker(IConsistencyChecker&& other) = delete;
98     IConsistencyChecker& operator=(IConsistencyChecker&& other) = delete;
99 };
100
112 class IPluginChecker : public IPluginCreator
113 {
114 public:
129     virtual bool validate(const char* name, const void* serialData, size_t serialLength, const
        PluginTensorDesc* in,
130         size_t nbInputs, const PluginTensorDesc* out, size_t nbOutputs, int64_t workspaceSize) const noexcept
131         = 0;
132
133     IPluginChecker() = default;
134     virtual ~IPluginChecker() override = default;
135
136 protected:
137     IPluginChecker(IPluginChecker const&) = default;
138     IPluginChecker(IPluginChecker&&) = default;
139     IPluginChecker& operator=(IPluginChecker const&) & = default;
140     IPluginChecker& operator=(IPluginChecker&&) & = default;
141 };
142
143 } // namespace consistency
144
145 } // namespace nvinfer1
146
147 extern "C" TENSORRTAPI void* createConsistencyChecker_INTERNAL(void* logger, const void* blob, size_t size,
148     int32_t version);
149
150 namespace nvinfer1
151 {
152
153 namespace consistency
154 {
162 namespace // anonymous
163 {
164
165 inline IConsistencyChecker* createConsistencyChecker(ILogger& logger, const void* blob, size_t size)
166 {
167     return static_cast<IConsistencyChecker*>(
168         createConsistencyChecker_INTERNAL(&logger, blob, size, NV_TENSORRT_VERSION));
169 }
170
171 } // namespace
172
173 } // namespace consistency
174
175 } // namespace nvinfer1
176
177 #endif // NV_INFER_CONSISTENCY_H
```

10.7 NvInferLegacyDims.h File Reference

`#include "NvInferRuntimeCommon.h"`

Classes

- class nvinfer1::Dims2

  Descriptor for two-dimensional data.
- class nvinfer1::DimsHW

  Descriptor for two-dimensional spatial data.
- class nvinfer1::Dims3

  Descriptor for three-dimensional data.
- class nvinfer1::Dims4

  Descriptor for four-dimensional data.

Namespaces

- namespace nvinfer1

  The TensorRT API version 1 namespace.

10.7.1 Detailed Description

This file contains declarations of legacy dimensions types which use channel semantics in their names, and declarations on which those types rely.

10.8 NvInferLegacyDims.h

Go to the documentation of this file.

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48  */
49
50 #ifndef NV_INFER_LEGACY_DIMS_H
51 #define NV_INFER_LEGACY_DIMS_H
52
53 #include "NvInferRuntimeCommon.h"
54
61
```

```
67 namespace nvinfer1
68 {
73 class Dims2 : public Dims
74 {
75 public:
79     Dims2()
80         : Dims{2, {}}
81     {
82     }
83
90     Dims2(int32_t d0, int32_t d1)
91         : Dims{2, {d0, d1}}
92     {
93     }
94 };
95
100 class DimsHW : public Dims2
101 {
102 public:
106     DimsHW()
107         : Dims2()
108     {
109     }
110
117     DimsHW(int32_t height, int32_t width)
118         : Dims2(height, width)
119     {
120     }
121
127     int32_t& h()
128     {
129         return d[0];
130     }
131
137     int32_t h() const
138     {
139         return d[0];
140     }
141
147     int32_t& w()
148     {
149         return d[1];
150     }
151
157     int32_t w() const
158     {
159         return d[1];
160     }
161 };
162
167 class Dims3 : public Dims
168 {
169 public:
173     Dims3()
174         : Dims{3, {}}
175     {
176     }
177
185     Dims3(int32_t d0, int32_t d1, int32_t d2)
186         : Dims{3, {d0, d1, d2}}
187     {
188     }
189 };
190
195 class Dims4 : public Dims
196 {
197 public:
201     Dims4()
202         : Dims{4, {}}
203     {
204     }
205
214     Dims4(int32_t d0, int32_t d1, int32_t d2, int32_t d3)
215         : Dims{4, {d0, d1, d2, d3}}
216     {
217     }
218 };
219
220 } // namespace nvinfer1
221
222 #endif // NV_INFER_LEGCY_DIMS_H
```

10.9 NvInferPlugin.h File Reference

```
#include "NvInfer.h"
#include "NvInferPluginUtils.h"
```

Functions

- nvinfer1::IPluginV2 * createRPNROIPlugin (int32_t featureStride, int32_t preNmsTop, int32_t nmsMax↩ Out, float iouThreshold, float minBoxSize, float spatialScale, nvinfer1::DimsHW pooling, nvinfer1::Weights anchorRatios, nvinfer1::Weights anchorScales)

  Create a plugin layer that fuses the RPN and ROI pooling using user-defined parameters. Registered plugin type "↩ RPROI_TRT". Registered plugin version "1".
- nvinfer1::IPluginV2 * createNormalizePlugin (const nvinfer1::Weights *scales, bool acrossSpatial, bool channelShared, float eps)

  The Normalize plugin layer normalizes the input to have L2 norm of 1 with scale learnable. Registered plugin type "Normalize_TRT". Registered plugin version "1".
- nvinfer1::IPluginV2 * createPriorBoxPlugin (nvinfer1::plugin::PriorBoxParameters param)

  The PriorBox plugin layer generates the prior boxes of designated sizes and aspect ratios across all dimensions (H x W). PriorBoxParameters defines a set of parameters for creating the PriorBox plugin layer. Registered plugin type "PriorBox_TRT". Registered plugin version "1".
- nvinfer1::IPluginV2 * createAnchorGeneratorPlugin (nvinfer1::plugin::GridAnchorParameters *param, int32_t numLayers)

  The Grid Anchor Generator plugin layer generates the prior boxes of designated sizes and aspect ratios across all dimensions (H x W) for all feature maps. GridAnchorParameters defines a set of parameters for creating the Grid↩ AnchorGenerator plugin layer. Registered plugin type "GridAnchor_TRT". Registered plugin version "1".
- nvinfer1::IPluginV2 * createNMSPlugin (nvinfer1::plugin::DetectionOutputParameters param)

  The DetectionOutput plugin layer generates the detection output based on location and confidence predictions by doing non maximum suppression. DetectionOutputParameters defines a set of parameters for creating the DetectionOutput plugin layer. Registered plugin type "NMS_TRT". Registered plugin version "1".
- nvinfer1::IPluginV2 * createReorgPlugin (int32_t stride)

  *The Reorg plugin reshapes input of shape CxHxW into a (C*stride*stride)x(H/stride)x(W/stride) shape, used in YOLOv2. It does that by taking 1 x stride x stride slices from tensor and flattening them into (stride x stride) x 1 x 1 shape. Registered plugin type "Reorg_TRT". Registered plugin version "1".*
- nvinfer1::IPluginV2 * createRegionPlugin (nvinfer1::plugin::RegionParameters params)

  The Region plugin layer performs region proposal calculation: generate 5 bounding boxes per cell (for yolo9000, generate 3 bounding boxes per cell). For each box, calculating its probablities of objects detections from 80 pre-defined classifications (yolo9000 has 9416 pre-defined classifications, and these 9416 items are organized as work-tree structure). RegionParameters defines a set of parameters for creating the Region plugin layer. Registered plugin type "Region_TRT". Registered plugin version "1".
- nvinfer1::IPluginV2 * createBatchedNMSPlugin (nvinfer1::plugin::NMSParameters param)

  The BatchedNMS Plugin performs non_max_suppression on the input boxes, per batch, across all classes. It greedily selects a subset of bounding boxes in descending order of score. Prunes away boxes that have a high intersection-over-union (IOU) overlap with previously selected boxes. Bounding boxes are supplied as [y1, x1, y2, x2], where (y1, x1) and (y2, x2) are the coordinates of any diagonal pair of box corners and the coordinates can be provided as normalized (i.e., lying in the interval [0, 1]) or absolute. The plugin expects two inputs. Input0 is expected to be 4-D float boxes tensor of shape [batch_size, num_boxes, q, 4], where q can be either 1 (if shareLocation is true) or num_classes. Input1 is expected to be a 3-D float scores tensor of shape [batch_size, num_boxes, num_classes] representing a single score corresponding to each box. The plugin returns four outputs. num_detections : A [batch_size] int32 tensor indicating the number of valid detections per batch item. Can be less than keepTopK. Only the top num_detections[i] entries in nmsed_boxes[i], nmsed↩ _scores[i] and nmsed_classes[i] are valid. nmsed_boxes : A [batch_size, max_detections, 4] float32 tensor containing the co-ordinates of non-max suppressed boxes. nmsed_scores : A [batch_size, max_detections] float32 tensor containing the scores for the boxes. nmsed_classes : A [batch_size, max_detections] float32 tensor containing the classes for the boxes.

- nvinfer1::IPluginV2 * createSplitPlugin (int32_t axis, int32_t *output_lengths, int32_t noutput)

  The Split Plugin performs a split operation on the input tensor. It splits the input tensor into several output tensors, each of a length corresponding to output_lengths. The split occurs along the axis specified by axis.
- nvinfer1::IPluginV2 * createInstanceNormalizationPlugin (float epsilon, nvinfer1::Weights scale_weights, nvinfer1::Weights bias_weights)

  *The Instance Normalization Plugin computes the instance normalization of an input tensor. The instance normalization is calculated as found in the paper https://arxiv.org/abs/1607.08022. The calculation is y = scale * (x - mean) / sqrt(variance + epsilon) + bias where mean and variance are computed per instance per channel.*
- bool initLibNvInferPlugins (void *logger, const char *libNamespace)

  Initialize and register all the existing TensorRT plugins to the Plugin Registry with an optional namespace. The plugin library author should ensure that this function name is unique to the library. This function should be called once before accessing the Plugin Registry.

10.9.1 Detailed Description

This is the API for the Nvidia provided TensorRT plugins.

10.9.2 Function Documentation

10.9.2.1 createAnchorGeneratorPlugin()

```
nvinfer1::IPluginV2 * createAnchorGeneratorPlugin (
            nvinfer1::plugin::GridAnchorParameters * param,
            int32_t numLayers )
```

The Grid Anchor Generator plugin layer generates the prior boxes of designated sizes and aspect ratios across all dimensions (H x W) for all feature maps. GridAnchorParameters defines a set of parameters for creating the Grid↩ AnchorGenerator plugin layer. Registered plugin type "GridAnchor_TRT". Registered plugin version "1".

10.9.2.2 createBatchedNMSPlugin()

```
nvinfer1::IPluginV2 * createBatchedNMSPlugin (
            nvinfer1::plugin::NMSParameters param )
```

The BatchedNMS Plugin performs non_max_suppression on the input boxes, per batch, across all classes. It greedily selects a subset of bounding boxes in descending order of score. Prunes away boxes that have a high intersection-over-union (IOU) overlap with previously selected boxes. Bounding boxes are supplied as [y1, x1, y2, x2], where (y1, x1) and (y2, x2) are the coordinates of any diagonal pair of box corners and the coordinates can be provided as normalized (i.e., lying in the interval [0, 1]) or absolute. The plugin expects two inputs. Input0 is expected to be 4-D float boxes tensor of shape [batch_size, num_boxes, q, 4], where q can be either 1 (if shareLocation is true) or num_classes. Input1 is expected to be a 3-D float scores tensor of shape [batch_size, num_boxes, num_classes] representing a single score corresponding to each box. The plugin returns four outputs. num_detections : A [batch_size] int32 tensor indicating the number of valid detections per batch item. Can be less than keepTopK. Only the top num_detections[i] entries

in nmsed_boxes[i], nmsed_scores[i] and nmsed_classes[i] are valid. nmsed_boxes : A [batch_size, max_detections, 4] float32 tensor containing the co-ordinates of non-max suppressed boxes. nmsed_scores : A [batch_size, max_↩ detections] float32 tensor containing the scores for the boxes. nmsed_classes : A [batch_size, max_detections] float32 tensor containing the classes for the boxes.

Registered plugin type "BatchedNMS_TRT". Registered plugin version "1".

The batched NMS plugin can require a lot of workspace due to intermediate buffer usage. To get the estimated workspace size for the plugin for a batch size, use the API `plugin->getWorkspaceSize(batchSize)`.

10.9.2.3 createInstanceNormalizationPlugin()

```
nvinfer1::IPluginV2 * createInstanceNormalizationPlugin (
            float epsilon,
            nvinfer1::Weights scale_weights,
            nvinfer1::Weights bias_weights )
```

The Instance Normalization Plugin computes the instance normalization of an input tensor. The instance normalization is calculated as found in the paper https://arxiv.org/abs/1607.08022. The calculation is y = scale ∗ (x - mean) / sqrt(variance + epsilon) + bias where mean and variance are computed per instance per channel.

Parameters

epsilon	The epsilon value to use to avoid division by zero.
scale_weights	The input 1-dimensional scale weights of size C to scale.
bias_weights	The input 1-dimensional bias weights of size C to offset.

10.9.2.4 createNMSPlugin()

```
nvinfer1::IPluginV2 * createNMSPlugin (
            nvinfer1::plugin::DetectionOutputParameters param )
```

The DetectionOutput plugin layer generates the detection output based on location and confidence predictions by doing non maximum suppression. DetectionOutputParameters defines a set of parameters for creating the DetectionOutput plugin layer. Registered plugin type "NMS_TRT". Registered plugin version "1".

10.9.2.5 createNormalizePlugin()

```
nvinfer1::IPluginV2 * createNormalizePlugin (
            const nvinfer1::Weights * scales,
            bool acrossSpatial,
            bool channelShared,
            float eps )
```

The Normalize plugin layer normalizes the input to have L2 norm of 1 with scale learnable. Registered plugin type "Normalize_TRT". Registered plugin version "1".

Parameters

scales	Scale weights that are applied to the output tensor.
acrossSpatial	Whether to compute the norm over adjacent channels (acrossSpatial is true) or nearby spatial locations (within channel in which case acrossSpatial is false).
channelShared	Whether the scale weight(s) is shared across channels.
eps	Epsilon for not dividing by zero.

10.9.2.6 createPriorBoxPlugin()

```
nvinfer1::IPluginV2 * createPriorBoxPlugin (
            nvinfer1::plugin::PriorBoxParameters param )
```

The PriorBox plugin layer generates the prior boxes of designated sizes and aspect ratios across all dimensions (H x W). PriorBoxParameters defines a set of parameters for creating the PriorBox plugin layer. Registered plugin type "PriorBox_TRT". Registered plugin version "1".

10.9.2.7 createRegionPlugin()

```
nvinfer1::IPluginV2 * createRegionPlugin (
            nvinfer1::plugin::RegionParameters params )
```

The Region plugin layer performs region proposal calculation: generate 5 bounding boxes per cell (for yolo9000, generate 3 bounding boxes per cell). For each box, calculating its probablities of objects detections from 80 pre-defined classifications (yolo9000 has 9416 pre-defined classifications, and these 9416 items are organized as work-tree structure). RegionParameters defines a set of parameters for creating the Region plugin layer. Registered plugin type "Region_TRT". Registered plugin version "1".

10.9.2.8 createReorgPlugin()

```
nvinfer1::IPluginV2 * createReorgPlugin (
            int32_t stride )
```

The Reorg plugin reshapes input of shape CxHxW into a (C∗stride∗stride)x(H/stride)x(W/stride) shape, used in YOLOv2. It does that by taking 1 x stride x stride slices from tensor and flattening them into (stride x stride) x 1 x 1 shape. Registered plugin type "Reorg_TRT". Registered plugin version "1".

Parameters

stride	Strides in H and W, it should divide both H and W. Also stride ∗ stride should be less than or equal to C.

10.9.2.9 createRPNROIPlugin()

```
nvinfer1::IPluginV2 * createRPNROIPlugin (
            int32_t featureStride,
            int32_t preNmsTop,
            int32_t nmsMaxOut,
            float iouThreshold,
            float minBoxSize,
            float spatialScale,
            nvinfer1::DimsHW pooling,
            nvinfer1::Weights anchorRatios,
            nvinfer1::Weights anchorScales )
```

Create a plugin layer that fuses the RPN and ROI pooling using user-defined parameters. Registered plugin type "RPROI_TRT". Registered plugin version "1".

Parameters

featureStride	Feature stride.
preNmsTop	Number of proposals to keep before applying NMS.
nmsMaxOut	Number of remaining proposals after applying NMS.
iouThreshold	IoU threshold.
minBoxSize	Minimum allowed bounding box size before scaling.
spatialScale	Spatial scale between the input image and the last feature map.
pooling	Spatial dimensions of pooled ROIs.
anchorRatios	Aspect ratios for generating anchor windows.
anchorScales	Scales for generating anchor windows.

Returns

Returns a FasterRCNN fused RPN+ROI pooling plugin. Returns nullptr on invalid inputs.

10.9.2.10 createSplitPlugin()

```
nvinfer1::IPluginV2 * createSplitPlugin (
            int32_t axis,
            int32_t * output_lengths,
            int32_t noutput )
```

The Split Plugin performs a split operation on the input tensor. It splits the input tensor into several output tensors, each of a length corresponding to output_lengths. The split occurs along the axis specified by axis.

Parameters

axis	The axis to split on.
output_lengths	The lengths of the output tensors.
noutput	The number of output tensors.

10.9.2.11 initLibNvInferPlugins()

```
bool initLibNvInferPlugins (
             void * logger,
             const char * libNamespace )
```

Initialize and register all the existing TensorRT plugins to the Plugin Registry with an optional namespace. The plugin library author should ensure that this function name is unique to the library. This function should be called once before accessing the Plugin Registry.

Parameters

logger	Logger object to print plugin registration information
libNamespace	Namespace used to register all the plugins in this library

10.10 NvInferPlugin.h

Go to the documentation of this file.

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48  */
49
50 #ifndef NV_INFER_PLUGIN_H
51 #define NV_INFER_PLUGIN_H
52
53 #include "NvInfer.h"
54 #include "NvInferPluginUtils.h"
60
61 extern "C"
62 {
78     TENSORRTAPI nvinfer1::IPluginV2* createRPNROIPlugin(int32_t featureStride, int32_t preNmsTop, int32_t
      nmsMaxOut,
79         float iouThreshold, float minBoxSize, float spatialScale, nvinfer1::DimsHW pooling,
80         nvinfer1::Weights anchorRatios, nvinfer1::Weights anchorScales);
81
91     TENSORRTAPI nvinfer1::IPluginV2* createNormalizePlugin(
92         const nvinfer1::Weights* scales, bool acrossSpatial, bool channelShared, float eps);
93
99     TENSORRTAPI nvinfer1::IPluginV2* createPriorBoxPlugin(nvinfer1::plugin::PriorBoxParameters param);
100
107     TENSORRTAPI nvinfer1::IPluginV2* createAnchorGeneratorPlugin(
108         nvinfer1::plugin::GridAnchorParameters* param, int32_t numLayers);
109
115     TENSORRTAPI nvinfer1::IPluginV2* createNMSPlugin(nvinfer1::plugin::DetectionOutputParameters param);
116
123     TENSORRTAPI nvinfer1::IPluginV2* createReorgPlugin(int32_t stride);
124
132     TENSORRTAPI nvinfer1::IPluginV2* createRegionPlugin(nvinfer1::plugin::RegionParameters params);
133
163     TENSORRTAPI nvinfer1::IPluginV2* createBatchedNMSPlugin(nvinfer1::plugin::NMSParameters param);
164
173     TENSORRTAPI nvinfer1::IPluginV2* createSplitPlugin(int32_t axis, int32_t* output_lengths, int32_t
      noutput);
174
184     TENSORRTAPI nvinfer1::IPluginV2* createInstanceNormalizationPlugin(
185         float epsilon, nvinfer1::Weights scale_weights, nvinfer1::Weights bias_weights);
186
194     TENSORRTAPI bool initLibNvInferPlugins(void* logger, const char* libNamespace);
195
196 } // extern "C"
197
198 #endif // NV_INFER_PLUGIN_H
```

10.11 NvInferPluginUtils.h File Reference

```
#include "NvInferRuntimeCommon.h"
```

Classes

- struct nvinfer1::plugin::Quadruple

  The Permute plugin layer permutes the input tensor by changing the memory order of the data. Quadruple defines a structure that contains an array of 4 integers. They can represent the permute orders or the strides in each dimension.

- struct nvinfer1::plugin::PriorBoxParameters

  The PriorBox plugin layer generates the prior boxes of designated sizes and aspect ratios across all dimensions (H x W). PriorBoxParameters defines a set of parameters for creating the PriorBox plugin layer. It contains:

- struct nvinfer1::plugin::RPROIParams

  RPROIParams is used to create the RPROIPlugin instance. It contains:

- struct nvinfer1::plugin::GridAnchorParameters

  The Anchor Generator plugin layer generates the prior boxes of designated sizes and aspect ratios across all dimensions (H x W). GridAnchorParameters defines a set of parameters for creating the plugin layer for all feature maps. It contains:

- struct nvinfer1::plugin::DetectionOutputParameters

  The DetectionOutput plugin layer generates the detection output based on location and confidence predictions by doing non maximum suppression. This plugin first decodes the bounding boxes based on the anchors generated. It then performs non_max_suppression on the decoded bounding boxes. DetectionOutputParameters defines a set of parameters for creating the DetectionOutput plugin layer. It contains:

- struct nvinfer1::plugin::softmaxTree

  When performing yolo9000, softmaxTree is helping to do softmax on confidence scores, for element to get the precise classification through word-tree structured classification definition.

- struct nvinfer1::plugin::RegionParameters

  The Region plugin layer performs region proposal calculation: generate 5 bounding boxes per cell (for yolo9000, generate 3 bounding boxes per cell). For each box, calculating its probablities of objects detections from 80 pre-defined classifications (yolo9000 has 9418 pre-defined classifications, and these 9418 items are organized as work-tree structure). RegionParameters defines a set of parameters for creating the Region plugin layer.

- struct nvinfer1::plugin::NMSParameters

  The NMSParameters are used by the BatchedNMSPlugin for performing the non_max_suppression operation over boxes for object detection networks.

Namespaces

- namespace nvinfer1

  The TensorRT API version 1 namespace.

- namespace nvinfer1::plugin

Enumerations

- enum class nvinfer1::plugin::CodeTypeSSD : int32_t { nvinfer1::plugin::CORNER = 0 , nvinfer1::plugin::CENTER_SIZE = 1 , nvinfer1::plugin::CORNER_SIZE = 2 , nvinfer1::plugin::TF_CENTER = 3 }

  The type of encoding used for decoding the bounding boxes and loc_data.

10.11.1 Detailed Description

This is the API for the Nvidia provided TensorRT plugin utilities. It lists all the parameters utilized by the TensorRT plugins.

10.12 NvInferPluginUtils.h

Go to the documentation of this file.

```
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48  */
49
50 #ifndef NV_INFER_PLUGIN_UTILS_H
51 #define NV_INFER_PLUGIN_UTILS_H
52
53 #include "NvInferRuntimeCommon.h"
54
61
62 namespace nvinfer1
63 {
64 namespace plugin
65 {
66
72 typedef struct
73 {
74     int32_t data[4];
75 } Quadruple;
76
97 struct PriorBoxParameters
98 {
99     float *minSize, *maxSize, *aspectRatios;
100     int32_t numMinSize, numMaxSize, numAspectRatios;
101     bool flip;
102     bool clip;
103     float variance[4];
104     int32_t imgH, imgW;
105     float stepH, stepW;
106     float offset;
107 };
```

```
108
124 struct RPROIParams
125 {
126     int32_t poolingH;
127     int32_t poolingW;
128     int32_t featureStride;
129     int32_t preNmsTop;
130     int32_t nmsMaxOut;
131     int32_t anchorsRatioCount;
132     int32_t anchorsScaleCount;
133     float iouThreshold;
134     float minBoxSize;
135     float spatialScale;
136 };
137
138
151 struct GridAnchorParameters
152 {
153     float minSize, maxSize;
154     float* aspectRatios;
155     int32_t numAspectRatios, H, W;
156     float variance[4];
157 };
158
163 enum class CodeTypeSSD : int32_t
164 {
165     CORNER = 0,
166     CENTER_SIZE = 1,
167     CORNER_SIZE = 2,
168     TF_CENTER = 3
169 };
170
190 struct DetectionOutputParameters
191 {
192     bool shareLocation, varianceEncodedInTarget;
193     int32_t backgroundLabelId, numClasses, topK, keepTopK;
194     float confidenceThreshold, nmsThreshold;
195     CodeTypeSSD codeType;
196     int32_t inputOrder[3];
197     bool confSigmoid;
198     bool isNormalized;
199     bool isBatchAgnostic{true};
200 };
201
205 struct softmaxTree
206 {
207     int32_t* leaf;
208     int32_t n;
209     int32_t* parent;
210     int32_t* child;
211     int32_t* group;
212     char** name;
213
214     int32_t groups;
215     int32_t* groupSize;
216     int32_t* groupOffset;
217 };
218
229 struct RegionParameters
230 {
231     int32_t num;
232     int32_t coords;
233     int32_t classes;
234     softmaxTree* smTree;
235 };
236
253
254 struct NMSParameters
255 {
256     bool shareLocation;
257     int32_t backgroundLabelId, numClasses, topK, keepTopK;
258     float scoreThreshold, iouThreshold;
259     bool isNormalized;
260 };
261
262 } // namespace plugin
263 } // namespace nvinfer1
264
265 #endif // NV_INFER_PLUGIN_UTILS_H
```

10.13 NvInferRuntime.h File Reference

```
#include "NvInferImpl.h"
#include "NvInferRuntimeCommon.h"
```

Classes

- class nvinfer1::INoCopy

  Forward declaration of IEngineInspector for use by other interfaces.
- struct nvinfer1::impl::EnumMaxImpl< EngineCapability >

  Maximum number of elements in EngineCapability enum.
- class nvinfer1::Weights

  An array of weights used as a layer parameter.
- class nvinfer1::IHostMemory

  Class to handle library allocated memory that is accessible to the user.
- struct nvinfer1::impl::EnumMaxImpl< TensorLocation >

  Maximum number of elements in TensorLocation enum.
- class nvinfer1::IDimensionExpr
- class nvinfer1::IExprBuilder
- class nvinfer1::DimsExprs
- class nvinfer1::DynamicPluginTensorDesc
- class nvinfer1::IPluginV2DynamicExt
- class nvinfer1::IProfiler

  Application-implemented interface for profiling.
- class nvinfer1::IRuntime

  Allows a serialized functionally unsafe engine to be deserialized.
- class nvinfer1::IRefitter

  Updates weights in an engine.
- class nvinfer1::IOptimizationProfile

  Optimization profile for dynamic input dimensions and shape tensors.
- class nvinfer1::ICudaEngine

  An engine for executing inference on a built network, with functionally unsafe features.
- class nvinfer1::IExecutionContext

  Context for executing inference using an engine, with functionally unsafe features.
- class nvinfer1::IEngineInspector

  An engine inspector which prints out the layer information of an engine or an execution context.
- class nvinfer1::PluginRegistrar< T >

  Register the plugin creator to the registry The static registry object will be instantiated when the plugin library is loaded. This static object will register all creators available in the library to the registry.

Namespaces

- namespace nvinfer1

  The TensorRT API version 1 namespace.
- namespace nvinfer1::impl

Macros

- #define REGISTER_TENSORRT_PLUGIN(name) static nvinfer1::PluginRegistrar<name> plugin↩ Registrar##name {}

Typedefs

- using nvinfer1::TacticSources = uint32_t

  Represents a collection of one or more TacticSource values combine using bitwise-OR operations.

Enumerations

- enum class nvinfer1::EngineCapability : int32_t { nvinfer1::kSTANDARD = 0 , nvinfer1::kDEFAULT = kSTANDARD , nvinfer1::kSAFETY = 1 , nvinfer1::kSAFE_GPU = kSAFETY , nvinfer1::kDLA_STANDALONE = 2 , nvinfer1::kSAFE_DLA = kDLA_STANDALONE }

  List of supported engine capability flows.
- enum class nvinfer1::DimensionOperation : int32_t { nvinfer1::kSUM = 0 , nvinfer1::kPROD = 1 , nvinfer1::kMAX = 2 , nvinfer1::kMIN = 3 , nvinfer1::kSUB = 4 , nvinfer1::kEQUAL = 5 , nvinfer1::kLESS = 6 , nvinfer1::kFLOOR_DIV = 7 , nvinfer1::kCEIL_DIV = 8 }

  An operation on two IDimensionExpr, which represent integer expressions used in dimension computations.
- enum class nvinfer1::TensorLocation : int32_t { nvinfer1::kDEVICE = 0 , nvinfer1::kHOST = 1 }

  The location for tensor data storage, device or host.
- enum class nvinfer1::WeightsRole : int32_t { nvinfer1::kKERNEL = 0 , nvinfer1::kBIAS = 1 , nvinfer1::kSHIFT = 2 , nvinfer1::kSCALE = 3 , nvinfer1::kCONSTANT = 4 , nvinfer1::kANY = 5 }

  How a layer uses particular Weights.
- enum class nvinfer1::DeviceType : int32_t { nvinfer1::kGPU , nvinfer1::kDLA }

  The device that this layer/network will execute on.
- enum class nvinfer1::OptProfileSelector : int32_t { nvinfer1::kMIN = 0 , nvinfer1::kOPT = 1 , nvinfer1::kMAX = 2 }

  When setting or querying optimization profile parameters (such as shape tensor inputs or dynamic dimensions), select whether we are interested in the minimum, optimum, or maximum values for these parameters. The minimum and maximum specify the permitted range that is supported at runtime, while the optimum value is used for the kernel selection. This should be the "typical" value that is expected to occur at runtime.
- enum class nvinfer1::TacticSource : int32_t { nvinfer1::kCUBLAS = 0 , nvinfer1::kCUBLAS_LT = 1 , nvinfer1::kCUDNN = 2 }

  List of tactic sources for TensorRT.
- enum class nvinfer1::ProfilingVerbosity : int32_t { nvinfer1::kLAYER_NAMES_ONLY = 0 , nvinfer1::kNONE = 1 , nvinfer1::kDETAILED = 2 , nvinfer1::kDEFAULT = kLAYER_NAMES_ONLY , nvinfer1::kVERBOSE = kDETAILED }

  List of verbosity levels of layer information exposed in NVTX annotations and in IEngineInspector.
- enum class nvinfer1::LayerInformationFormat : int32_t { nvinfer1::kONELINE = 0 , nvinfer1::kJSON = 1 }

  The format in which the IEngineInspector prints the layer information.

Functions

- template<> constexpr int32_t nvinfer1::EnumMax< DimensionOperation > () noexcept

  Maximum number of elements in DimensionOperation enum.
- template<> constexpr int32_t nvinfer1::EnumMax< WeightsRole > () noexcept

  Maximum number of elements in WeightsRole enum.
- template<> constexpr int32_t nvinfer1::EnumMax< DeviceType > () noexcept

  Maximum number of elements in DeviceType enum.
- template<> constexpr int32_t nvinfer1::EnumMax< OptProfileSelector > () noexcept
- template<> constexpr int32_t nvinfer1::EnumMax< TacticSource > () noexcept

  Maximum number of tactic sources in TacticSource enum.
- template<> constexpr int32_t nvinfer1::EnumMax< ProfilingVerbosity > () noexcept

  Maximum number of profile verbosity levels in ProfilingVerbosity enum.
- template<> constexpr int32_t nvinfer1::EnumMax< LayerInformationFormat > () noexcept
- nvinfer1::IPluginRegistry * getPluginRegistry () noexcept

  Return the plugin registry.
- nvinfer1::ILogger * getLogger () noexcept

  Return the logger object.

10.13.1 Detailed Description

This is the top-level API file for TensorRT extended runtime library.

10.13.2 Macro Definition Documentation

10.13.2.1 REGISTER_TENSORRT_PLUGIN

```
#define REGISTER_TENSORRT_PLUGIN(
              name )  static nvinfer1::PluginRegistrar<name> pluginRegistrar##name {}
```

10.13.3 Function Documentation

10.13.3.1 getLogger()

```
nvinfer1::ILogger * getLogger ( )  [noexcept]
```

Return the logger object.

Note

the global logger is used only by standalone functions which have no associated builder, runtime or refitter.

10.13.3.2 getPluginRegistry()

```
nvinfer1::IPluginRegistry * getPluginRegistry ( )  [noexcept]
```

Return the plugin registry.

10.14 NvInferRuntime.h

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```
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48  */
49
50 #ifndef NV_INFER_RUNTIME_H
51 #define NV_INFER_RUNTIME_H
52
58
59 #include "NvInferImpl.h"
60 #include "NvInferRuntimeCommon.h"
61
62 namespace nvinfer1
63 {
64
65 class IExecutionContext;
66 class ICudaEngine;
67 class IPluginFactory;
68 class IEngineInspector;
```

```
69
78
79 class INoCopy
80 {
81 protected:
82     INoCopy() = default;
83     virtual ~INoCopy() = default;
84     INoCopy(const INoCopy& other) = delete;
85     INoCopy& operator=(const INoCopy& other) = delete;
86     INoCopy(INoCopy&& other) = delete;
87     INoCopy& operator=(INoCopy&& other) = delete;
88 };
89
104
105 enum class EngineCapability : int32_t
106 {
111     kSTANDARD = 0,
112     kDEFAULT TRT_DEPRECATED_ENUM = kSTANDARD,
113
120     kSAFETY = 1,
121     kSAFE_GPU TRT_DEPRECATED_ENUM = kSAFETY,
122
128     kDLA_STANDALONE = 2,
129     kSAFE_DLA TRT_DEPRECATED_ENUM = kDLA_STANDALONE,
130 };
131
132 namespace impl
133 {
135 template <>
136 struct EnumMaxImpl<EngineCapability>
137 {
138     static constexpr int32_t kVALUE = 3;
139 };
140 } // namespace impl
141
156 class Weights
157 {
158 public:
159     DataType type;
160     const void* values;
161     int64_t count;
162 };
163
174 class IHostMemory : public INoCopy
175 {
176 public:
177     virtual ~IHostMemory() noexcept = default;
178
180     void* data() const noexcept
181     {
182         return mImpl->data();
183     }
184
186     std::size_t size() const noexcept
187     {
188         return mImpl->size();
189     }
190
192     DataType type() const noexcept
193     {
194         return mImpl->type();
195     }
203     TRT_DEPRECATED void destroy() noexcept
204     {
205         delete this;
206     }
207
208 protected:
209     apiv::VHostMemory* mImpl;
210 };
211
222 enum class DimensionOperation : int32_t
223 {
224     kSUM = 0,
225     kPROD = 1,
226     kMAX = 2,
227     kMIN = 3,
228     kSUB = 4,
229     kEQUAL = 5,
230     kLESS = 6,
231     kFLOOR_DIV = 7,
```

```
232     kCEIL_DIV = 8
233 };
234
236 template <>
237 constexpr inline int32_t EnumMax<DimensionOperation>() noexcept
238 {
239     return 9;
240 }
241
246 enum class TensorLocation : int32_t
247 {
248     kDEVICE = 0,
249     kHOST = 1,
250 };
251
252 namespace impl
253 {
255 template <>
256 struct EnumMaxImpl<TensorLocation>
257 {
258     static constexpr int32_t kVALUE = 2;
259 };
260 } // namespace impl
261
274 class IDimensionExpr : public INoCopy
275 {
276 public:
278     bool isConstant() const noexcept
279     {
280         return mImpl->isConstant();
281     }
282
285     int32_t getConstantValue() const noexcept
286     {
287         return mImpl->getConstantValue();
288     }
289
290 protected:
291     apiv::VDimensionExpr* mImpl;
292     virtual ~IDimensionExpr() noexcept = default;
293 };
294
312 class IExprBuilder : public INoCopy
313 {
314 public:
316     const IDimensionExpr* constant(int32_t value) noexcept
317     {
318         return mImpl->constant(value);
319     }
320
323     const IDimensionExpr* operation(
324         DimensionOperation op, const IDimensionExpr& first, const IDimensionExpr& second) noexcept
325     {
326         return mImpl->operation(op, first, second);
327     }
328
329 protected:
330     apiv::VExprBuilder* mImpl;
331     virtual ~IExprBuilder() noexcept = default;
332 };
333
339 class DimsExprs
340 {
341 public:
342     int32_t nbDims;
343     const IDimensionExpr* d[Dims::MAX_DIMS];
344 };
345
351 struct DynamicPluginTensorDesc
352 {
354     PluginTensorDesc desc;
355
357     Dims min;
358
360     Dims max;
361 };
362
382 class IPluginV2DynamicExt : public nvinfer1::IPluginV2Ext
383 {
384 public:
385     IPluginV2DynamicExt* clone() const noexcept override = 0;
```

```
386
411     virtual DimsExprs getOutputDimensions(
412         int32_t outputIndex, const DimsExprs* inputs, int32_t nbInputs, IExprBuilder& exprBuilder) noexcept
413         = 0;
414
418     static constexpr int32_t kFORMAT_COMBINATION_LIMIT = 100;
419
452     virtual bool supportsFormatCombination(
453         int32_t pos, const PluginTensorDesc* inOut, int32_t nbInputs, int32_t nbOutputs) noexcept
454         = 0;
455
494     virtual void configurePlugin(const DynamicPluginTensorDesc* in, int32_t nbInputs,
495         const DynamicPluginTensorDesc* out, int32_t nbOutputs) noexcept
496         = 0;
497
507     virtual size_t getWorkspaceSize(const PluginTensorDesc* inputs, int32_t nbInputs, const PluginTensorDesc*
    outputs,
508         int32_t nbOutputs) const noexcept
509         = 0;
510
523     virtual int32_t enqueue(const PluginTensorDesc* inputDesc, const PluginTensorDesc* outputDesc,
524         const void* const* inputs, void* const* outputs, void* workspace, cudaStream_t stream) noexcept
525         = 0;
526
527 protected:
535     int32_t getTensorRTVersion() const noexcept override
536     {
537         return (static_cast<int32_t>(PluginVersion::kV2_DYNAMICEXT) << 24 | (NV_TENSORRT_VERSION & 0xFFFFFF));
538     }
539
540     virtual ~IPluginV2DynamicExt() noexcept {}
541
542 private:
543     // Following are obsolete base class methods, and must not be implemented or used.
544
545     void configurePlugin(Dims const*, int32_t, Dims const*, int32_t, DataType const*, DataType const*, bool
    const*,
546         bool const*, PluginFormat, int32_t) noexcept override final
547     {
548     }
549
550     bool supportsFormat(DataType, PluginFormat) const noexcept override final
551     {
552         return false;
553     }
554
555     Dims getOutputDimensions(int32_t, Dims const*, int32_t) noexcept override final
556     {
557         return Dims{-1, {}};
558     }
559
560     bool isOutputBroadcastAcrossBatch(int32_t, bool const*, int32_t) const noexcept override final
561     {
562         return false;
563     }
564
565     bool canBroadcastInputAcrossBatch(int32_t) const noexcept override final
566     {
567         return true;
568     }
569
570     size_t getWorkspaceSize(int32_t) const noexcept override final
571     {
572         return 0;
573     }
574
575     int32_t enqueue(int32_t, const void* const*, void* const*, void*, cudaStream_t) noexcept override final
576     {
577         return 1;
578     }
579 };
580
591 class IProfiler
592 {
593 public:
600     virtual void reportLayerTime(const char* layerName, float ms) noexcept = 0;
601
602     virtual ~IProfiler() noexcept {}
603 };
604
611 enum class WeightsRole : int32_t
```

```
612 {
613     kKERNEL = 0,
614     kBIAS = 1,
615     kSHIFT = 2,
616     kSCALE = 3,
617     kCONSTANT = 4,
618     kANY = 5,
619 };
620
622 template <>
623 constexpr inline int32_t EnumMax<WeightsRole>() noexcept
624 {
625     return 6;
626 }
627
633 enum class DeviceType : int32_t
634 {
635     kGPU,
636     kDLA,
637 };
638
640 template <>
641 constexpr inline int32_t EnumMax<DeviceType>() noexcept
642 {
643     return 2;
644 }
645
653 class IRuntime : public INoCopy
654 {
655 public:
656     virtual ~IRuntime() noexcept = default;
657
673     TRT_DEPRECATED nvinfer1::ICudaEngine* deserializeCudaEngine(
674         const void* blob, std::size_t size, IPluginFactory* pluginFactory) noexcept
675     {
676         return mImpl->deserializeCudaEngine(blob, size, nullptr);
677     }
678
686     void setDLACore(int32_t dlaCore) noexcept
687     {
688         mImpl->setDLACore(dlaCore);
689     }
690
697     int32_t getDLACore() const noexcept
698     {
699         return mImpl->getDLACore();
700     }
701
705     int32_t getNbDLACores() const noexcept
706     {
707         return mImpl->getNbDLACores();
708     }
709
717     TRT_DEPRECATED void destroy() noexcept
718     {
719         delete this;
720     }
721
731     void setGpuAllocator(IGpuAllocator* allocator) noexcept
732     {
733         mImpl->setGpuAllocator(allocator);
734     }
735
747     //
750     void setErrorRecorder(IErrorRecorder* recorder) noexcept
751     {
752         mImpl->setErrorRecorder(recorder);
753     }
754
765     IErrorRecorder* getErrorRecorder() const noexcept
766     {
767         return mImpl->getErrorRecorder();
768     }
769
780     ICudaEngine* deserializeCudaEngine(const void* blob, std::size_t size) noexcept
781     {
782         return mImpl->deserializeCudaEngine(blob, size, nullptr);
783     }
784
790     ILogger* getLogger() const noexcept
791     {
```

```
792         return mImpl->getLogger();
793     }
794
795 protected:
796     apiv::VRuntime* mImpl;
797 };
798
806 class IRefitter : public INoCopy
807 {
808 public:
809     virtual ~IRefitter() noexcept = default;
810
821     bool setWeights(const char* layerName, WeightsRole role, Weights weights) noexcept
822     {
823         return mImpl->setWeights(layerName, role, weights);
824     }
825
836     bool refitCudaEngine() noexcept
837     {
838         return mImpl->refitCudaEngine();
839     }
840
857     int32_t getMissing(int32_t size, const char** layerNames, WeightsRole* roles) noexcept
858     {
859         return mImpl->getMissing(size, layerNames, roles);
860     }
861
874     int32_t getAll(int32_t size, const char** layerNames, WeightsRole* roles) noexcept
875     {
876         return mImpl->getAll(size, layerNames, roles);
877     }
878
884     TRT_DEPRECATED void destroy() noexcept
885     {
886         delete this;
887     }
888
901     bool setDynamicRange(const char* tensorName, float min, float max) noexcept
902     {
903         return mImpl->setDynamicRange(tensorName, min, max);
904     }
905
913     float getDynamicRangeMin(const char* tensorName) const noexcept
914     {
915         return mImpl->getDynamicRangeMin(tensorName);
916     }
917
925     float getDynamicRangeMax(const char* tensorName) const noexcept
926     {
927         return mImpl->getDynamicRangeMax(tensorName);
928     }
929
941     int32_t getTensorsWithDynamicRange(int32_t size, const char** tensorNames) const noexcept
942     {
943         return mImpl->getTensorsWithDynamicRange(size, tensorNames);
944     }
945
957     //
960     void setErrorRecorder(IErrorRecorder* recorder) noexcept
961     {
962         mImpl->setErrorRecorder(recorder);
963     }
964
975     IErrorRecorder* getErrorRecorder() const noexcept
976     {
977         return mImpl->getErrorRecorder();
978     }
979
993     bool setNamedWeights(const char* name, Weights weights) noexcept
994     {
995         return mImpl->setNamedWeights(name, weights);
996     }
997
1013     int32_t getMissingWeights(int32_t size, const char** weightsNames) noexcept
1014     {
1015         return mImpl->getMissingWeights(size, weightsNames);
1016     }
1017
1029     int32_t getAllWeights(int32_t size, const char** weightsNames) noexcept
1030     {
1031         return mImpl->getAllWeights(size, weightsNames);
```

```
1032     }
1033
1039     ILogger* getLogger() const noexcept
1040     {
1041         return mImpl->getLogger();
1042     }
1043
1044 protected:
1045     apiv::VRefitter* mImpl;
1046 };
1047
1058 enum class OptProfileSelector : int32_t
1059 {
1060     kMIN = 0,
1061     kOPT = 1,
1062     kMAX = 2
1063 };
1064
1066 template <>
1067 constexpr inline int32_t EnumMax<OptProfileSelector>() noexcept
1068 {
1069     return 3;
1070 }
1071
1094 class IOptimizationProfile : public INoCopy
1095 {
1096 public:
1122     bool setDimensions(const char* inputName, OptProfileSelector select, Dims dims) noexcept
1123     {
1124         return mImpl->setDimensions(inputName, select, dims);
1125     }
1126
1132     Dims getDimensions(const char* inputName, OptProfileSelector select) const noexcept
1133     {
1134         return mImpl->getDimensions(inputName, select);
1135     }
1136
1175     bool setShapeValues(
1176         const char* inputName, OptProfileSelector select, const int32_t* values, int32_t nbValues) noexcept
1177     {
1178         return mImpl->setShapeValues(inputName, select, values, nbValues);
1179     }
1180
1187     int32_t getNbShapeValues(const char* inputName) const noexcept
1188     {
1189         return mImpl->getNbShapeValues(inputName);
1190     }
1191
1197     int32_t const* getShapeValues(const char* inputName, OptProfileSelector select) const noexcept
1198     {
1199         return mImpl->getShapeValues(inputName, select);
1200     }
1201
1215     bool setExtraMemoryTarget(float target) noexcept
1216     {
1217         return mImpl->setExtraMemoryTarget(target);
1218     }
1219
1223     float getExtraMemoryTarget() const noexcept
1224     {
1225         return mImpl->getExtraMemoryTarget();
1226     }
1227
1239     bool isValid() const noexcept
1240     {
1241         return mImpl->isValid();
1242     }
1243
1244 protected:
1245     apiv::VOptimizationProfile* mImpl;
1246     virtual ~IOptimizationProfile() noexcept = default;
1247 };
1248
1256 enum class TacticSource : int32_t
1257 {
1259     kCUBLAS = 0,
1260     kCUBLAS_LT = 1,
1261     kCUDNN = 2
1262 };
1263
1264 template <>
```

```
1265 constexpr inline int32_t EnumMax<TacticSource>() noexcept
1266 {
1267     return 3;
1268 }
1269
1276 using TacticSources = uint32_t;
1277
1287 enum class ProfilingVerbosity : int32_t
1288 {
1289     kLAYER_NAMES_ONLY = 0,
1290     kNONE = 1,
1291     kDETAILED = 2,
1292     kDEFAULT TRT_DEPRECATED_ENUM = kLAYER_NAMES_ONLY,
1293     kVERBOSE TRT_DEPRECATED_ENUM = kDETAILED
1294 };
1295
1297 template <>
1298 constexpr inline int32_t EnumMax<ProfilingVerbosity>() noexcept
1299 {
1300     return 3;
1301 }
1302
1310 class ICudaEngine : public INoCopy
1311 {
1312 public:
1313     virtual ~ICudaEngine() noexcept = default;
1314
1325     int32_t getNbBindings() const noexcept
1326     {
1327         return mImpl->getNbBindings();
1328     }
1329
1347     int32_t getBindingIndex(const char* name) const noexcept
1348     {
1349         return mImpl->getBindingIndex(name);
1350     }
1351
1367     const char* getBindingName(int32_t bindingIndex) const noexcept
1368     {
1369         return mImpl->getBindingName(bindingIndex);
1370     }
1371
1380     bool bindingIsInput(int32_t bindingIndex) const noexcept
1381     {
1382         return mImpl->bindingIsInput(bindingIndex);
1383     }
1384
1405     Dims getBindingDimensions(int32_t bindingIndex) const noexcept
1406     {
1407         return mImpl->getBindingDimensions(bindingIndex);
1408     }
1409
1418     DataType getBindingDataType(int32_t bindingIndex) const noexcept
1419     {
1420         return mImpl->getBindingDataType(bindingIndex);
1421     }
1422
1430     int32_t getMaxBatchSize() const noexcept
1431     {
1432         return mImpl->getMaxBatchSize();
1433     }
1434
1444     int32_t getNbLayers() const noexcept
1445     {
1446         return mImpl->getNbLayers();
1447     }
1448
1458     IHostMemory* serialize() const noexcept
1459     {
1460         return mImpl->serialize();
1461     }
1462
1474     IExecutionContext* createExecutionContext() noexcept
1475     {
1476         return mImpl->createExecutionContext();
1477     }
1478
1486     TRT_DEPRECATED void destroy() noexcept
1487     {
1488         delete this;
1489     }
```

```
1490
1501     TensorLocation getLocation(int32_t bindingIndex) const noexcept
1502     {
1503         return mImpl->getLocation(bindingIndex);
1504     }
1505
1510     IExecutionContext* createExecutionContextWithoutDeviceMemory() noexcept
1511     {
1512         return mImpl->createExecutionContextWithoutDeviceMemory();
1513     }
1514
1520     size_t getDeviceMemorySize() const noexcept
1521     {
1522         return mImpl->getDeviceMemorySize();
1523     }
1524
1530     bool isRefittable() const noexcept
1531     {
1532         return mImpl->isRefittable();
1533     }
1534
1544     int32_t getBindingBytesPerComponent(int32_t bindingIndex) const noexcept
1545     {
1546         return mImpl->getBindingBytesPerComponent(bindingIndex);
1547     }
1548
1558     int32_t getBindingComponentsPerElement(int32_t bindingIndex) const noexcept
1559     {
1560         return mImpl->getBindingComponentsPerElement(bindingIndex);
1561     }
1562
1568     TensorFormat getBindingFormat(int32_t bindingIndex) const noexcept
1569     {
1570         return mImpl->getBindingFormat(bindingIndex);
1571     }
1572
1587     const char* getBindingFormatDesc(int32_t bindingIndex) const noexcept
1588     {
1589         return mImpl->getBindingFormatDesc(bindingIndex);
1590     }
1591
1599     int32_t getBindingVectorizedDim(int32_t bindingIndex) const noexcept
1600     {
1601         return mImpl->getBindingVectorizedDim(bindingIndex);
1602     }
1603
1614     const char* getName() const noexcept
1615     {
1616         return mImpl->getName();
1617     }
1618
1625     int32_t getNbOptimizationProfiles() const noexcept
1626     {
1627         return mImpl->getNbOptimizationProfiles();
1628     }
1629
1652     Dims getProfileDimensions(int32_t bindingIndex, int32_t profileIndex, OptProfileSelector select) const
    noexcept
1653     {
1654         return mImpl->getProfileDimensions(bindingIndex, profileIndex, select);
1655     }
1656
1678     const int32_t* getProfileShapeValues(int32_t profileIndex, int32_t inputIndex, OptProfileSelector
    select) const
1679         noexcept
1680     {
1681         return mImpl->getProfileShapeValues(profileIndex, inputIndex, select);
1682     }
1683
1715     bool isShapeBinding(int32_t bindingIndex) const noexcept
1716     {
1717         return mImpl->isShapeBinding(bindingIndex);
1718     }
1719
1729     bool isExecutionBinding(int32_t bindingIndex) const noexcept
1730     {
1731         return mImpl->isExecutionBinding(bindingIndex);
1732     }
1733
1744     EngineCapability getEngineCapability() const noexcept
1745     {
```

```
1746         return mImpl->getEngineCapability();
1747     }
1748
1759     //
1762     void setErrorRecorder(IErrorRecorder* recorder) noexcept
1763     {
1764         return mImpl->setErrorRecorder(recorder);
1765     }
1766
1777     IErrorRecorder* getErrorRecorder() const noexcept
1778     {
1779         return mImpl->getErrorRecorder();
1780     }
1781
1796     bool hasImplicitBatchDimension() const noexcept
1797     {
1798         return mImpl->hasImplicitBatchDimension();
1799     }
1800
1805     TacticSources getTacticSources() const noexcept
1806     {
1807         return mImpl->getTacticSources();
1808     }
1809
1816     ProfilingVerbosity getProfilingVerbosity() const noexcept
1817     {
1818         return mImpl->getProfilingVerbosity();
1819     }
1820
1826     IEngineInspector* createEngineInspector() const noexcept
1827     {
1828         return mImpl->createEngineInspector();
1829     }
1830
1831 protected:
1832     apiv::VCudaEngine* mImpl;
1833 };
1834
1845 class IExecutionContext : public INoCopy
1846 {
1847 public:
1848     virtual ~IExecutionContext() noexcept = default;
1849
1867     bool execute(int32_t batchSize, void* const* bindings) noexcept
1868     {
1869         return mImpl->execute(batchSize, bindings);
1870     }
1871
1896     bool enqueue(int32_t batchSize, void* const* bindings, cudaStream_t stream, cudaEvent_t* inputConsumed)
      noexcept
1897     {
1898         return mImpl->enqueue(batchSize, bindings, stream, inputConsumed);
1899     }
1900
1909     void setDebugSync(bool sync) noexcept
1910     {
1911         mImpl->setDebugSync(sync);
1912     }
1913
1919     bool getDebugSync() const noexcept
1920     {
1921         return mImpl->getDebugSync();
1922     }
1923
1929     void setProfiler(IProfiler* profiler) noexcept
1930     {
1931         mImpl->setProfiler(profiler);
1932     }
1933
1939     IProfiler* getProfiler() const noexcept
1940     {
1941         return mImpl->getProfiler();
1942     }
1943
1949     const ICudaEngine& getEngine() const noexcept
1950     {
1951         return mImpl->getEngine();
1952     }
1953
1961     TRT_DEPRECATED void destroy() noexcept
1962     {
```

```
1963         delete this;
1964     }
1965
1973     void setName(const char* name) noexcept
1974     {
1975         mImpl->setName(name);
1976     }
1977
1983     const char* getName() const noexcept
1984     {
1985         return mImpl->getName();
1986     }
1987
1999     void setDeviceMemory(void* memory) noexcept
2000     {
2001         mImpl->setDeviceMemory(memory);
2002     }
2003
2020     Dims getStrides(int32_t bindingIndex) const noexcept
2021     {
2022         return mImpl->getStrides(bindingIndex);
2023     }
2024
2025 public:
2061     TRT_DEPRECATED
2062     bool setOptimizationProfile(int32_t profileIndex) noexcept
2063     {
2064         return mImpl->setOptimizationProfile(profileIndex);
2065     }
2066
2074     int32_t getOptimizationProfile() const noexcept
2075     {
2076         return mImpl->getOptimizationProfile();
2077     }
2078
2111     bool setBindingDimensions(int32_t bindingIndex, Dims dimensions) noexcept
2112     {
2113         return mImpl->setBindingDimensions(bindingIndex, dimensions);
2114     }
2115
2141     Dims getBindingDimensions(int32_t bindingIndex) const noexcept
2142     {
2143         return mImpl->getBindingDimensions(bindingIndex);
2144     }
2145
2171     bool setInputShapeBinding(int32_t bindingIndex, int32_t const* data) noexcept
2172     {
2173         return mImpl->setInputShapeBinding(bindingIndex, data);
2174     }
2175
2193     bool getShapeBinding(int32_t bindingIndex, int32_t* data) const noexcept
2194     {
2195         return mImpl->getShapeBinding(bindingIndex, data);
2196     }
2197
2208     bool allInputDimensionsSpecified() const noexcept
2209     {
2210         return mImpl->allInputDimensionsSpecified();
2211     }
2212
2222     bool allInputShapesSpecified() const noexcept
2223
2224     {
2225         return mImpl->allInputShapesSpecified();
2226     }
2227
2239     //
2242     void setErrorRecorder(IErrorRecorder* recorder) noexcept
2243     {
2244         mImpl->setErrorRecorder(recorder);
2245     }
2246
2257     IErrorRecorder* getErrorRecorder() const noexcept
2258     {
2259         return mImpl->getErrorRecorder();
2260     }
2261
2274     bool executeV2(void* const* bindings) noexcept
2275     {
2276         return mImpl->executeV2(bindings);
2277     }
```

```
2278
2302     bool enqueueV2(void* const* bindings, cudaStream_t stream, cudaEvent_t* inputConsumed) noexcept
2303     {
2304         return mImpl->enqueueV2(bindings, stream, inputConsumed);
2305     }
2306
2350     bool setOptimizationProfileAsync(int32_t profileIndex, cudaStream_t stream) noexcept
2351     {
2352         return mImpl->setOptimizationProfileAsync(profileIndex, stream);
2353     }
2354
2365     void setEnqueueEmitsProfile(bool enqueueEmitsProfile) noexcept
2366     {
2367         mImpl->setEnqueueEmitsProfile(enqueueEmitsProfile);
2368     }
2369
2376     bool getEnqueueEmitsProfile() const noexcept
2377     {
2378         return mImpl->getEnqueueEmitsProfile();
2379     }
2380
2403     bool reportToProfiler() const noexcept
2404     {
2405         return mImpl->reportToProfiler();
2406     }
2407
2408 protected:
2409     apiv::VExecutionContext* mImpl;
2410 }; // class IExecutionContext
2411
2419 enum class LayerInformationFormat : int32_t
2420 {
2421     kONELINE = 0,
2422     kJSON = 1,
2423 };
2424
2427 template <>
2428 constexpr inline int32_t EnumMax<LayerInformationFormat>() noexcept
2429 {
2430     return 2;
2431 }
2432
2448 class IEngineInspector : public INoCopy
2449 {
2450 public:
2451     virtual ~IEngineInspector() noexcept = default;
2452
2465     bool setExecutionContext(IExecutionContext const* context) noexcept
2466     {
2467         return mImpl->setExecutionContext(context);
2468     }
2469
2477     IExecutionContext const* getExecutionContext() const noexcept
2478     {
2479         return mImpl->getExecutionContext();
2480     }
2481
2502     AsciiChar const* getLayerInformation(int32_t layerIndex, LayerInformationFormat format) const noexcept
2503     {
2504         return mImpl->getLayerInformation(layerIndex, format);
2505     }
2506
2527     AsciiChar const* getEngineInformation(LayerInformationFormat format) const noexcept
2528     {
2529         return mImpl->getEngineInformation(format);
2530     }
2531
2543     //
2546     void setErrorRecorder(IErrorRecorder* recorder) noexcept
2547     {
2548         mImpl->setErrorRecorder(recorder);
2549     }
2550
2561     IErrorRecorder* getErrorRecorder() const noexcept
2562     {
2563         return mImpl->getErrorRecorder();
2564     }
2565
2566 protected:
2567     apiv::VEngineInspector* mImpl;
2568 }; // class IEngineInspector
```

```
2569
2570 } // namespace nvinfer1
2571
2576 extern "C" TENSORRTAPI void* createInferRuntime_INTERNAL(void* logger, int32_t version) noexcept;
2577
2582 extern "C" TENSORRTAPI void* createInferRefitter_INTERNAL(void* engine, void* logger, int32_t version)
       noexcept;
2583
2587 extern "C" TENSORRTAPI nvinfer1::IPluginRegistry* getPluginRegistry() noexcept;
2588
2594 extern "C" TENSORRTAPI nvinfer1::ILogger* getLogger() noexcept;
2595
2596 namespace nvinfer1
2597 {
2598 namespace // unnamed namespace avoids linkage surprises when linking objects built with different versions
       of this
2599           // header.
2600 {
2606 inline IRuntime* createInferRuntime(ILogger& logger) noexcept
2607 {
2608     return static_cast<IRuntime*>(createInferRuntime_INTERNAL(&logger, NV_TENSORRT_VERSION));
2609 }
2610
2616 inline IRefitter* createInferRefitter(ICudaEngine& engine, ILogger& logger) noexcept
2617 {
2618     return static_cast<IRefitter*>(createInferRefitter_INTERNAL(&engine, &logger, NV_TENSORRT_VERSION));
2619 }
2620
2621 } // namespace
2622
2634 template <typename T>
2635 class PluginRegistrar
2636 {
2637 public:
2638     PluginRegistrar()
2639     {
2640         getPluginRegistry()->registerCreator(instance, "");
2641     }
2642
2643 private:
2645     T instance{};
2646 };
2647
2648 } // namespace nvinfer1
2649
2650 #define REGISTER_TENSORRT_PLUGIN(name)
                \
2651     static nvinfer1::PluginRegistrar<name> pluginRegistrar##name {}
2652 #endif // NV_INFER_RUNTIME_H
```

10.15 NvInferRuntimeCommon.h File Reference

```
#include "NvInferVersion.h"
#include <cstddef>
#include <cstdint>
#include <cuda_runtime_api.h>
```

Classes

- struct nvinfer1::impl::EnumMaxImpl< DataType >

  Maximum number of elements in DataType enum.
- class nvinfer1::Dims32
- struct nvinfer1::impl::EnumMaxImpl< TensorFormat >

  Maximum number of elements in TensorFormat enum.
- struct nvinfer1::PluginTensorDesc

Fields that a plugin might see for an input or output.

- class nvinfer1::IPluginV2

  Plugin class for user-implemented layers.
- class nvinfer1::IPluginV2Ext

  Plugin class for user-implemented layers.
- class nvinfer1::IPluginV2IOExt

  Plugin class for user-implemented layers.
- class nvinfer1::PluginField

  Structure containing plugin attribute field names and associated data This information can be parsed to decode necessary plugin metadata.
- struct nvinfer1::PluginFieldCollection

  Plugin field collection struct.
- class nvinfer1::IPluginCreator

  Plugin creator class for user implemented layers.
- class nvinfer1::IPluginRegistry

  Single registration point for all plugins in an application. It is used to find plugin implementations during engine deserialization. Internally, the plugin registry is considered to be a singleton so all plugins in an application are part of the same global registry. Note that the plugin registry is only supported for plugins of type IPluginV2 and should also have a corresponding IPluginCreator implementation.
- struct nvinfer1::impl::EnumMaxImpl< AllocatorFlag >

  Maximum number of elements in AllocatorFlag enum.
- class nvinfer1::IGpuAllocator

  Application-implemented class for controlling allocation on the GPU.
- class nvinfer1::ILogger

  Application-implemented logging interface for the builder, refitter and runtime.
- struct nvinfer1::impl::EnumMaxImpl< ILogger::Severity >

  Maximum number of elements in ILogger::Severity enum.
- struct nvinfer1::impl::EnumMaxImpl< ErrorCode >

  Maximum number of elements in ErrorCode enum.
- class nvinfer1::IErrorRecorder

  Reference counted application-implemented error reporting interface for TensorRT objects.

Namespaces

- namespace nvinfer1

  The TensorRT API version 1 namespace.
- namespace nvinfer1::impl

Macros

- #define TRT_DEPRECATED __attribute__((deprecated))

  < Items that are marked as deprecated will be removed in a future release.
- #define TRT_DEPRECATED_ENUM
- #define TRT_DEPRECATED_API __attribute__((deprecated, visibility("default")))

  Defines which symbols are exported.
- #define TENSORRTAPI
- #define TRTNOEXCEPT
- #define NV_TENSORRT_VERSION nvinfer1::kNV_TENSORRT_VERSION_IMPL

Typedefs

- using nvinfer1::char_t = char

  char_t is the type used by TensorRT to represent all valid characters.
- using nvinfer1::AsciiChar = char_t

  AsciiChar is the type used by TensorRT to represent valid ASCII characters.
- using nvinfer1::Dims = Dims32
- using nvinfer1::PluginFormat = TensorFormat

  PluginFormat is reserved for backward compatibility.
- using nvinfer1::AllocatorFlags = uint32_t

Enumerations

- enum class nvinfer1::DataType : int32_t { nvinfer1::kFLOAT = 0 , nvinfer1::kHALF = 1 , nvinfer1::kINT8 = 2 , nvinfer1::kINT32 = 3 , nvinfer1::kBOOL = 4 }

  The type of weights and tensors.
- enum class nvinfer1::TensorFormat : int32_t { nvinfer1::kLINEAR = 0 , nvinfer1::kCHW2 = 1 , nvinfer1::kHWC8 = 2 , nvinfer1::kCHW4 = 3 , nvinfer1::kCHW16 = 4 , nvinfer1::kCHW32 = 5 , nvinfer1::kDHWC8 = 6 , nvinfer1::kCDHW32 = 7 , nvinfer1::kHWC = 8 , nvinfer1::kDLA_LINEAR = 9 , nvinfer1::kDLA_HWC4 = 10 , nvinfer1::kHWC16 = 11 }

  Format of the input/output tensors.
- enum class nvinfer1::PluginVersion : uint8_t { nvinfer1::kV2 = 0 , nvinfer1::kV2_EXT = 1 , nvinfer1::kV2_IOEXT = 2 , nvinfer1::kV2_DYNAMICEXT = 3 }
- enum class nvinfer1::PluginFieldType : int32_t { nvinfer1::kFLOAT16 = 0 , nvinfer1::kFLOAT32 = 1 , nvinfer1::kFLOAT64 = 2 , nvinfer1::kINT8 = 3 , nvinfer1::kINT16 = 4 , nvinfer1::kINT32 = 5 , nvinfer1::kCHAR = 6 , nvinfer1::kDIMS = 7 , nvinfer1::kUNKNOWN = 8 }
- enum class nvinfer1::AllocatorFlag : int32_t { nvinfer1::kRESIZABLE = 0 }
- enum class nvinfer1::ErrorCode : int32_t { nvinfer1::kSUCCESS = 0 , nvinfer1::kUNSPECIFIED_ERROR = 1 , nvinfer1::kINTERNAL_ERROR = 2 , nvinfer1::kINVALID_ARGUMENT = 3 , nvinfer1::kINVALID_CONFIG = 4 , nvinfer1::kFAILED_ALLOCATION = 5 , nvinfer1::kFAILED_INITIALIZATION = 6 , nvinfer1::kFAILED_EXECUTION = 7 , nvinfer1::kFAILED_COMPUTATION = 8 , nvinfer1::kINVALID_STATE = 9 , nvinfer1::kUNSUPPORTED_STATE = 10 }

  Error codes that can be returned by TensorRT during execution.

Functions

- template<typename T >
  constexpr int32_t nvinfer1::EnumMax () noexcept

  Maximum number of elements in an enumeration type.
- int32_t getInferLibVersion () noexcept

  Return the library version number.

10.15.1 Detailed Description

This is the top-level API file for TensorRT core runtime library.

10.15.2 Macro Definition Documentation

10.15.2.1 NV_TENSORRT_VERSION

```
#define NV_TENSORRT_VERSION nvinfer1::kNV_TENSORRT_VERSION_IMPL
```

10.15.2.2 TENSORRTAPI

```
#define TENSORRTAPI
```

10.15.2.3 TRT_DEPRECATED

```
#define TRT_DEPRECATED __attribute__((deprecated))
```

< Items that are marked as deprecated will be removed in a future release.

10.15.2.4 TRT_DEPRECATED_API

```
#define TRT_DEPRECATED_API __attribute__((deprecated, visibility("default")))
```

Defines which symbols are exported.

10.15.2.5 TRT_DEPRECATED_ENUM

```
#define TRT_DEPRECATED_ENUM
```

10.15.2.6 TRTNOEXCEPT

```
#define TRTNOEXCEPT
```

10.15.3 Function Documentation

10.15.3.1 getInferLibVersion()

```
int32_t getInferLibVersion ( )  [noexcept]
```

Return the library version number.

The format is as for TENSORRT_VERSION: (TENSORRT_MAJOR * 1000) + (TENSORRT_MINOR * 100) + TENSOR_PATCH.

10.16 NvInferRuntimeCommon.h

Go to the documentation of this file.

```
51 #define NV_INFER_RUNTIME_COMMON_H
52
53 #include "NvInferVersion.h"
54 #include <cstddef>
55 #include <cstdint>
56 #include <cuda_runtime_api.h>
57
59 #if __cplusplus >= 201402L
60 #define TRT_DEPRECATED [[deprecated]]
61 #if __GNUC__ < 6
62 #define TRT_DEPRECATED_ENUM
63 #else
64 #define TRT_DEPRECATED_ENUM TRT_DEPRECATED
65 #endif
66 #ifdef _MSC_VER
67 #define TRT_DEPRECATED_API __declspec(dllexport)
68 #else
69 #define TRT_DEPRECATED_API [[deprecated]] __attribute__((visibility("default")))
70 #endif
71 #else
72 #ifdef _MSC_VER
73 #define TRT_DEPRECATED
74 #define TRT_DEPRECATED_ENUM
75 #define TRT_DEPRECATED_API __declspec(dllexport)
76 #else
77 #define TRT_DEPRECATED __attribute__((deprecated))
78 #define TRT_DEPRECATED_ENUM
79 #define TRT_DEPRECATED_API __attribute__((deprecated, visibility("default")))
80 #endif
81 #endif
82
84 #ifdef TENSORRT_BUILD_LIB
85 #ifdef _MSC_VER
86 #define TENSORRTAPI __declspec(dllexport)
87 #else
88 #define TENSORRTAPI __attribute__((visibility("default")))
89 #endif
90 #else
91 #define TENSORRTAPI
92 #endif
93 #define TRTNOEXCEPT
99
100 // forward declare some CUDA types to avoid an include dependency
101
102 extern "C"
103 {
105     struct cublasContext;
107     struct cudnnContext;
108 }
109
110 #define NV_TENSORRT_VERSION nvinfer1::kNV_TENSORRT_VERSION_IMPL
116 namespace nvinfer1
117 {
118
119 static constexpr int32_t kNV_TENSORRT_VERSION_IMPL
120     = (NV_TENSORRT_MAJOR * 1000) + (NV_TENSORRT_MINOR * 100) + NV_TENSORRT_PATCH; // major, minor, patch
121
123 using char_t = char;
125 using AsciiChar = char_t;
126
128 class IErrorRecorder;
130 class IGpuAllocator;
131
132 namespace impl
133 {
135 template <typename T>
136 struct EnumMaxImpl;
137 } // namespace impl
138
140 template <typename T>
141 constexpr int32_t EnumMax() noexcept
142 {
143     return impl::EnumMaxImpl<T>::kVALUE;
144 }
145
150 enum class DataType : int32_t
151 {
153     kFLOAT = 0,
154
156     kHALF = 1,
157
```

```
159     kINT8 = 2,
160
162     kINT32 = 3,
163
165     kBOOL = 4
166 };
167
168 namespace impl
169 {
171 template <>
172 struct EnumMaxImpl<DataType>
173 {
174     // Declaration of kVALUE that represents maximum number of elements in DataType enum
175     static constexpr int32_t kVALUE = 5;
176 };
177 } // namespace impl
178
189 class Dims32
190 {
191 public:
193     static constexpr int32_t MAX_DIMS{8};
195     int32_t nbDims;
197     int32_t d[MAX_DIMS];
198 };
199
205 using Dims = Dims32;
206
220 enum class TensorFormat : int32_t
221 {
229     kLINEAR = 0,
230
237     kCHW2 = 1,
238
245     kHWC8 = 2,
246
262     kCHW4 = 3,
263
274     kCHW16 = 4,
275
285     kCHW32 = 5,
286
293     kDHWC8 = 6,
294
301     kCDHW32 = 7,
302
305     kHWC = 8,
306
315     kDLA_LINEAR = 9,
316
329     kDLA_HWC4 = 10,
330
337     kHWC16 = 11
338 };
339
345 using PluginFormat = TensorFormat;
346
347 namespace impl
348 {
350 template <>
351 struct EnumMaxImpl<TensorFormat>
352 {
354     // coverity[autosar_cpp14_m0_1_4_violation] Approved RFD: https://jirasw.nvidia.com/browse/TID-489
355     static constexpr int32_t kVALUE = 12;
356 };
357 } // namespace impl
358
369 struct PluginTensorDesc
370 {
372     Dims dims;
374     DataType type;
376     TensorFormat format;
378     float scale;
379 };
380
387 enum class PluginVersion : uint8_t
388 {
390     kV2 = 0,
392     kV2_EXT = 1,
394     kV2_IOEXT = 2,
396     kV2_DYNAMICEXT = 3,
397 };
```

```
398
410 class IPluginV2
411 {
412 public:
423     virtual int32_t getTensorRTVersion() const noexcept
424     {
425         return NV_TENSORRT_VERSION;
426     }
427
440     virtual AsciiChar const* getPluginType() const noexcept = 0;
441
454     virtual AsciiChar const* getPluginVersion() const noexcept = 0;
455
469     virtual int32_t getNbOutputs() const noexcept = 0;
470
486     virtual Dims getOutputDimensions(int32_t index, Dims const* inputs, int32_t nbInputDims) noexcept = 0;
487
510     virtual bool supportsFormat(DataType type, PluginFormat format) const noexcept = 0;
511
543     virtual void configureWithFormat(Dims const* inputDims, int32_t nbInputs, Dims const* outputDims, int32_t
    nbOutputs,
544         DataType type, PluginFormat format, int32_t maxBatchSize) noexcept
545         = 0;
546
558     virtual int32_t initialize() noexcept = 0;
559
572     virtual void terminate() noexcept = 0;
573
588     virtual size_t getWorkspaceSize(int32_t maxBatchSize) const noexcept = 0;
589
606     virtual int32_t enqueue(int32_t batchSize, void const* const* inputs, void* const* outputs, void*
    workspace,
607         cudaStream_t stream) noexcept
608         = 0;
609
620     virtual size_t getSerializationSize() const noexcept = 0;
621
635     virtual void serialize(void* buffer) const noexcept = 0;
636
645     virtual void destroy() noexcept = 0;
646
661     virtual IPluginV2* clone() const noexcept = 0;
662
677     virtual void setPluginNamespace(AsciiChar const* pluginNamespace) noexcept = 0;
678
687     virtual AsciiChar const* getPluginNamespace() const noexcept = 0;
688
689     // @cond SuppressDoxyWarnings
690     IPluginV2() = default;
691     virtual ~IPluginV2() noexcept = default;
692 // @endcond
693
694 protected:
695 // @cond SuppressDoxyWarnings
696     IPluginV2(IPluginV2 const&) = default;
697     IPluginV2(IPluginV2&&) = default;
698     IPluginV2& operator=(IPluginV2 const&) & = default;
699     IPluginV2& operator=(IPluginV2&&) & = default;
700 // @endcond
701 };
702
713 class IPluginV2Ext : public IPluginV2
714 {
715 public:
731     virtual nvinfer1::DataType getOutputDataType(
732         int32_t index, nvinfer1::DataType const* inputTypes, int32_t nbInputs) const noexcept
733         = 0;
734
750     virtual bool isOutputBroadcastAcrossBatch(
751         int32_t outputIndex, bool const* inputIsBroadcasted, int32_t nbInputs) const noexcept
752         = 0;
753
772     virtual bool canBroadcastInputAcrossBatch(int32_t inputIndex) const noexcept = 0;
773
808     virtual void configurePlugin(Dims const* inputDims, int32_t nbInputs, Dims const* outputDims, int32_t
    nbOutputs,
809         DataType const* inputTypes, DataType const* outputTypes, bool const* inputIsBroadcast,
810         bool const* outputIsBroadcast, PluginFormat floatFormat, int32_t maxBatchSize) noexcept
811         = 0;
812
813     IPluginV2Ext() = default;
```

```
814     ~IPluginV2Ext() override = default;
815
839     virtual void attachToContext(
840         cudnnContext* /*cudnn*/, cublasContext* /*cublas*/, IGpuAllocator* /*allocator*/) noexcept
841     {
842     }
843
857     virtual void detachFromContext() noexcept {}
858
871     IPluginV2Ext* clone() const noexcept override = 0;
872
873 protected:
874     // @cond SuppressDoxyWarnings
875     IPluginV2Ext(IPluginV2Ext const&) = default;
876     IPluginV2Ext(IPluginV2Ext&&) = default;
877     IPluginV2Ext& operator=(IPluginV2Ext const&) & = default;
878     IPluginV2Ext& operator=(IPluginV2Ext&&) & = default;
879 // @endcond
880
892     int32_t getTensorRTVersion() const noexcept override
893     {
894         return static_cast<int32_t>((static_cast<uint32_t>(PluginVersion::kV2_EXT) << 24U)
895             | (static_cast<uint32_t>(NV_TENSORRT_VERSION) & 0xFFFFFFU));
896     }
897
901     void configureWithFormat(Dims const* /*inputDims*/, int32_t /*nbInputs*/, Dims const* /*outputDims*/,
902         int32_t /*nbOutputs*/, DataType /*type*/, PluginFormat /*format*/, int32_t /*maxBatchSize*/) noexcept
    override
903     {
904     }
905 };
906
916 class IPluginV2IOExt : public IPluginV2Ext
917 {
918 public:
936     virtual void configurePlugin(
937         PluginTensorDesc const* in, int32_t nbInput, PluginTensorDesc const* out, int32_t nbOutput) noexcept
938         = 0;
939
977     virtual bool supportsFormatCombination(
978         int32_t pos, PluginTensorDesc const* inOut, int32_t nbInputs, int32_t nbOutputs) const noexcept
979         = 0;
980
981     // @cond SuppressDoxyWarnings
982     IPluginV2IOExt() = default;
983     ~IPluginV2IOExt() override = default;
984 // @endcond
985
986 protected:
987 // @cond SuppressDoxyWarnings
988     IPluginV2IOExt(IPluginV2IOExt const&) = default;
989     IPluginV2IOExt(IPluginV2IOExt&&) = default;
990     IPluginV2IOExt& operator=(IPluginV2IOExt const&) & = default;
991     IPluginV2IOExt& operator=(IPluginV2IOExt&&) & = default;
992 // @endcond
993
1005     int32_t getTensorRTVersion() const noexcept override
1006     {
1007         return static_cast<int32_t>((static_cast<uint32_t>(PluginVersion::kV2_IOEXT) << 24U)
1008             | (static_cast<uint32_t>(NV_TENSORRT_VERSION) & 0xFFFFFFU));
1009     }
1010
1011 private:
1012     // Following are obsolete base class methods, and must not be implemented or used.
1013
1014     void configurePlugin(Dims const*, int32_t, Dims const*, int32_t, DataType const*, DataType const*, bool
    const*,
1015         bool const*, PluginFormat, int32_t) noexcept final
1016     {
1017     }
1018
1019     bool supportsFormat(DataType, PluginFormat) const noexcept final
1020     {
1021         return false;
1022     }
1023 };
1024
1029
1030 enum class PluginFieldType : int32_t
1031 {
1033     kFLOAT16 = 0,
```

```
1035     kFLOAT32 = 1,
1037     kFLOAT64 = 2,
1039     kINT8 = 3,
1041     kINT16 = 4,
1043     kINT32 = 5,
1045     kCHAR = 6,
1047     kDIMS = 7,
1049     kUNKNOWN = 8
1050 };
1051
1059 class PluginField
1060 {
1061 public:
1065     AsciiChar const* name;
1069     void const* data;
1074     PluginFieldType type;
1078     int32_t length;
1079
1080     PluginField(AsciiChar const* const name_ = nullptr, void const* const data_ = nullptr,
1081         PluginFieldType const type_ = PluginFieldType::kUNKNOWN, int32_t const length_ = 0) noexcept
1082         : name(name_)
1083         , data(data_)
1084         , type(type_)
1085         , length(length_)
1086     {
1087     }
1088 };
1089
1091 struct PluginFieldCollection
1092 {
1094     int32_t nbFields;
1096     PluginField const* fields;
1097 };
1098
1106
1107 class IPluginCreator
1108 {
1109 public:
1117     virtual int32_t getTensorRTVersion() const noexcept
1118     {
1119         return NV_TENSORRT_VERSION;
1120     }
1121
1134     virtual AsciiChar const* getPluginName() const noexcept = 0;
1135
1148     virtual AsciiChar const* getPluginVersion() const noexcept = 0;
1149
1160     virtual PluginFieldCollection const* getFieldNames() noexcept = 0;
1161
1171     virtual IPluginV2* createPlugin(AsciiChar const* name, PluginFieldCollection const* fc) noexcept = 0;
1172
1182     virtual IPluginV2* deserializePlugin(AsciiChar const* name, void const* serialData, size_t
     serialLength) noexcept
1183         = 0;
1184
1197     virtual void setPluginNamespace(AsciiChar const* pluginNamespace) noexcept = 0;
1198
1211     virtual AsciiChar const* getPluginNamespace() const noexcept = 0;
1212
1213     IPluginCreator() = default;
1214     virtual ~IPluginCreator() = default;
1215
1216 protected:
1217 // @cond SuppressDoxyWarnings
1218     IPluginCreator(IPluginCreator const&) = default;
1219     IPluginCreator(IPluginCreator&&) = default;
1220     IPluginCreator& operator=(IPluginCreator const&) & = default;
1221     IPluginCreator& operator=(IPluginCreator&&) & = default;
1222 // @endcond
1223 };
1224
1242
1243 class IPluginRegistry
1244 {
1245 public:
1257     virtual bool registerCreator(IPluginCreator& creator, AsciiChar const* const pluginNamespace) noexcept
     = 0;
1258
1267     virtual IPluginCreator* const* getPluginCreatorList(int32_t* const numCreators) const noexcept = 0;
1268
1280     virtual IPluginCreator* getPluginCreator(AsciiChar const* const pluginName, AsciiChar const* const
```

```
    pluginVersion,
1281        AsciiChar const* const pluginNamespace = "") noexcept
1282        = 0;
1283
1284    // @cond SuppressDoxyWarnings
1285    IPluginRegistry() = default;
1286    IPluginRegistry(IPluginRegistry const&) = delete;
1287    IPluginRegistry(IPluginRegistry&&) = delete;
1288    IPluginRegistry& operator=(IPluginRegistry const&) & = delete;
1289    IPluginRegistry& operator=(IPluginRegistry&&) & = delete;
1290 // @endcond
1291
1292 protected:
1293    virtual ~IPluginRegistry() noexcept = default;
1294
1295 public:
1305    //
1312    virtual void setErrorRecorder(IErrorRecorder* const recorder) noexcept = 0;
1313
1329    virtual IErrorRecorder* getErrorRecorder() const noexcept = 0;
1330
1346    virtual bool deregisterCreator(IPluginCreator const& creator) noexcept = 0;
1347 };
1348
1349 enum class AllocatorFlag : int32_t
1350 {
1351    kRESIZABLE = 0,
1352 };
1353
1354 namespace impl
1355 {
1357 template <>
1358 struct EnumMaxImpl<AllocatorFlag>
1359 {
1360    static constexpr int32_t kVALUE = 1;
1361 };
1362 } // namespace impl
1363
1364 using AllocatorFlags = uint32_t;
1365
1371 class IGpuAllocator
1372 {
1373 public:
1395    virtual void* allocate(uint64_t const size, uint64_t const alignment, AllocatorFlags const flags)
    noexcept = 0;
1396
1415    TRT_DEPRECATED virtual void free(void* const memory) noexcept = 0;
1416
1421    virtual ~IGpuAllocator() = default;
1422    IGpuAllocator() = default;
1423
1457    virtual void* reallocate(void* /*baseAddr*/, uint64_t /*alignment*/, uint64_t /*newSize*/) noexcept
1458    {
1459        return nullptr;
1460    }
1461
1482    virtual bool deallocate(void* const memory) noexcept
1483    {
1484        this->free(memory);
1485        return true;
1486    }
1487
1488 protected:
1489 // @cond SuppressDoxyWarnings
1490    IGpuAllocator(IGpuAllocator const&) = default;
1491    IGpuAllocator(IGpuAllocator&&) = default;
1492    IGpuAllocator& operator=(IGpuAllocator const&) & = default;
1493    IGpuAllocator& operator=(IGpuAllocator&&) & = default;
1494 // @endcond
1495 };
1496
1505 class ILogger
1506 {
1507 public:
1513    enum class Severity : int32_t
1514    {
1516        kINTERNAL_ERROR = 0,
1518        kERROR = 1,
1520        kWARNING = 2,
1522        kINFO = 3,
1524        kVERBOSE = 4,
```

```
1525     };
1526
1537     virtual void log(Severity severity, AsciiChar const* msg) noexcept = 0;
1538
1539     ILogger() = default;
1540     virtual ~ILogger() = default;
1541
1542 protected:
1543 // @cond SuppressDoxyWarnings
1544     ILogger(ILogger const&) = default;
1545     ILogger(ILogger&&) = default;
1546     ILogger& operator=(ILogger const&) & = default;
1547     ILogger& operator=(ILogger&&) & = default;
1548 // @endcond
1549 };
1550
1551 namespace impl
1552 {
1554 template <>
1555 struct EnumMaxImpl<ILogger::Severity>
1556 {
1558     static constexpr int32_t kVALUE = 5;
1559 };
1560 } // namespace impl
1561
1567 enum class ErrorCode : int32_t
1568 {
1572     kSUCCESS = 0,
1573
1577     kUNSPECIFIED_ERROR = 1,
1578
1583     kINTERNAL_ERROR = 2,
1584
1589     kINVALID_ARGUMENT = 3,
1590
1598     kINVALID_CONFIG = 4,
1599
1605     kFAILED_ALLOCATION = 5,
1606
1611     kFAILED_INITIALIZATION = 6,
1612
1619     kFAILED_EXECUTION = 7,
1620
1628     kFAILED_COMPUTATION = 8,
1629
1642     kINVALID_STATE = 9,
1643
1654     kUNSUPPORTED_STATE = 10,
1655
1656 };
1657
1658 namespace impl
1659 {
1661 template <>
1662 struct EnumMaxImpl<ErrorCode>
1663 {
1665     static constexpr int32_t kVALUE = 11;
1666 };
1667 } // namespace impl
1668
1692 class IErrorRecorder
1693 {
1694 public:
1698     using ErrorDesc = char const*;
1699
1703     // coverity[autosar_cpp14_m0_1_4_violation] Approved RFD: https://jirasw.nvidia.com/browse/TID-489
1704     static constexpr size_t kMAX_DESC_LENGTH{127U};
1705
1709     using RefCount = int32_t;
1710
1711     IErrorRecorder() = default;
1712     virtual ~IErrorRecorder() noexcept = default;
1713
1714     // Public API used to retrieve information from the error recorder.
1715
1734     virtual int32_t getNbErrors() const noexcept = 0;
1735
1753     virtual ErrorCode getErrorCode(int32_t errorIdx) const noexcept = 0;
1754
1774     virtual ErrorDesc getErrorDesc(int32_t errorIdx) const noexcept = 0;
1775
```

```
1790     virtual bool hasOverflowed() const noexcept = 0;
1791
1806     virtual void clear() noexcept = 0;
1807
1808     // API used by TensorRT to report Error information to the application.
1809
1830     virtual bool reportError(ErrorCode val, ErrorDesc desc) noexcept = 0;
1831
1848     virtual RefCount incRefCount() noexcept = 0;
1849
1866     virtual RefCount decRefCount() noexcept = 0;
1867
1868 protected:
1869     // @cond SuppressDoxyWarnings
1870     IErrorRecorder(IErrorRecorder const&) = default;
1871     IErrorRecorder(IErrorRecorder&&) = default;
1872     IErrorRecorder& operator=(IErrorRecorder const&) & = default;
1873     IErrorRecorder& operator=(IErrorRecorder&&) & = default;
1874     // @endcond
1875 }; // class IErrorRecorder
1876 } // namespace nvinfer1
1877
1883 extern "C" TENSORRTAPI int32_t getInferLibVersion() noexcept;
1884
1885 #endif // NV_INFER_RUNTIME_COMMON_H
```

10.17 NvInferSafeRuntime.h File Reference

```
#include "NvInferRuntimeCommon.h"
#include <cstddef>
#include <cstdint>
```

Classes

- class nvinfer1::safe::IRuntime

  Allows a serialized functionally safe engine to be deserialized.
- class nvinfer1::safe::ICudaEngine

  A functionally safe engine for executing inference on a built network.
- struct nvinfer1::safe::FloatingPointErrorInformation

  Space to record information about floating point runtime errors.
- class nvinfer1::safe::IExecutionContext

  Functionally safe context for executing inference using an engine.
- class nvinfer1::safe::PluginRegistrar< T >

  Register the plugin creator to the registry The static registry object will be instantiated when the plugin library is loaded. This static object will register all creators available in the library to the registry.

Namespaces

- namespace nvinfer1

  The TensorRT API version 1 namespace.
- namespace nvinfer1::safe

  The safety subset of TensorRT's API version 1 namespace.

Macros

- #define REGISTER_SAFE_TENSORRT_PLUGIN(name) static nvinfer1::safe::PluginRegistrar<name> pluginRegistrar##name {}

Functions

- IRuntime * nvinfer1::safe::createInferRuntime (ILogger &logger) noexcept

  Create an instance of an safe::IRuntime class.
- nvinfer1::IPluginRegistry * nvinfer1::safe::getSafePluginRegistry () noexcept

  Return the safe plugin registry.

10.17.1 Detailed Description

The functionality in this file is only supported in NVIDIA Drive(R) products.

10.17.2 Macro Definition Documentation

10.17.2.1 REGISTER_SAFE_TENSORRT_PLUGIN

```
#define REGISTER_SAFE_TENSORRT_PLUGIN(
              name )  static nvinfer1::safe::PluginRegistrar<name> pluginRegistrar##name {}
```

10.18 NvInferSafeRuntime.h

Go to the documentation of this file.

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48  */
49
50 #ifndef NV_INFER_SAFE_RUNTIME_H
51 #define NV_INFER_SAFE_RUNTIME_H
52
53 #include "NvInferRuntimeCommon.h"
54 #include <cstddef>
55 #include <cstdint>
56
61
67 namespace nvinfer1
68 {
74 namespace safe
75 {
77 class ICudaEngine;
79 class IExecutionContext;
80
91 class IRuntime
92 {
93 public:
113     virtual ICudaEngine* deserializeCudaEngine(void const* const blob, std::size_t const size) noexcept = 0;
114
128     virtual void setGpuAllocator(IGpuAllocator* const allocator) noexcept = 0;
129
139     //
146     virtual void setErrorRecorder(IErrorRecorder* const recorder) noexcept = 0;
147
162     virtual IErrorRecorder* getErrorRecorder() const noexcept = 0;
163
164     IRuntime() = default;
165     virtual ~IRuntime() noexcept = default;
166     IRuntime(IRuntime const&) = delete;
167     IRuntime(IRuntime&&) = delete;
168     IRuntime& operator=(IRuntime const&) & = delete;
169     IRuntime& operator=(IRuntime&&) & = delete;
170 };
171
179 class ICudaEngine
180 {
181 public:
191     virtual std::int32_t getNbBindings() const noexcept = 0;
192
213     virtual std::int32_t getBindingIndex(AsciiChar const* const name) const noexcept = 0;
214
229     virtual AsciiChar const* getBindingName(std::int32_t const bindingIndex) const noexcept = 0;
230
243     virtual bool bindingIsInput(std::int32_t const bindingIndex) const noexcept = 0;
244
257     virtual Dims getBindingDimensions(std::int32_t const bindingIndex) const noexcept = 0;
258
271     virtual DataType getBindingDataType(std::int32_t const bindingIndex) const noexcept = 0;
272
284     virtual IExecutionContext* createExecutionContext() noexcept = 0;
285
299     virtual IExecutionContext* createExecutionContextWithoutDeviceMemory() noexcept = 0;
300
310     virtual size_t getDeviceMemorySize() const noexcept = 0;
311
325     virtual std::int32_t getBindingBytesPerComponent(std::int32_t const bindingIndex) const noexcept = 0;
```

```
326
340     virtual std::int32_t getBindingComponentsPerElement(std::int32_t const bindingIndex) const noexcept = 0;
341
351     virtual TensorFormat getBindingFormat(std::int32_t const bindingIndex) const noexcept = 0;
352
364     virtual std::int32_t getBindingVectorizedDim(std::int32_t const bindingIndex) const noexcept = 0;
365
380     virtual AsciiChar const* getName() const noexcept = 0;
381
391     //
398     virtual void setErrorRecorder(IErrorRecorder* const recorder) noexcept = 0;
399
415     virtual IErrorRecorder* getErrorRecorder() const noexcept = 0;
416
417     ICudaEngine() = default;
418     virtual ~ICudaEngine() noexcept = default;
419     ICudaEngine(ICudaEngine const&) = delete;
420     ICudaEngine(ICudaEngine&&) = delete;
421     ICudaEngine& operator=(ICudaEngine const&) & = delete;
422     ICudaEngine& operator=(ICudaEngine&&) & = delete;
423 };
424
431 struct FloatingPointErrorInformation
432 {
434     int32_t nbNanErrors;
436     int32_t nbInfErrors;
437 };
438
452 class IExecutionContext
453 {
454 public:
464     virtual const ICudaEngine& getEngine() const noexcept = 0;
465
480     virtual void setName(AsciiChar const* const name) noexcept = 0;
481
491     virtual AsciiChar const* getName() const noexcept = 0;
492
508     virtual void setDeviceMemory(void* const memory) noexcept = 0;
509
519     virtual Dims getStrides(std::int32_t const bindingIndex) const noexcept = 0;
520
530     //
537     virtual void setErrorRecorder(IErrorRecorder* const recorder) noexcept = 0;
538
553     virtual IErrorRecorder* getErrorRecorder() const noexcept = 0;
554
574     virtual bool enqueueV2(
575         void* const* const bindings, cudaStream_t const stream, cudaEvent_t* const inputConsumed) noexcept
576         = 0;
577
578     IExecutionContext() = default;
579     virtual ~IExecutionContext() noexcept = default;
580     IExecutionContext(IExecutionContext const&) = delete;
581     IExecutionContext(IExecutionContext&&) = delete;
582     IExecutionContext& operator=(IExecutionContext const&) & = delete;
583     IExecutionContext& operator=(IExecutionContext&&) & = delete;
584
604     virtual void setErrorBuffer(FloatingPointErrorInformation* const buffer) noexcept = 0;
605
617     virtual FloatingPointErrorInformation* getErrorBuffer() const noexcept = 0;
618 };
619
629 IRuntime* createInferRuntime(ILogger& logger) noexcept;
630
638 extern "C" TENSORRTAPI nvinfer1::IPluginRegistry* getSafePluginRegistry() noexcept;
639
651 template <typename T>
652 class PluginRegistrar
653 {
654 public:
655     PluginRegistrar()
656     {
657         getSafePluginRegistry()->registerCreator(instance, "");
658     }
659
660 private:
662     T instance{};
663 };
664
665 } // namespace safe
666
```

```
667 } // namespace nvinfer1
668
669 #define REGISTER_SAFE_TENSORRT_PLUGIN(name)
                \
670     static nvinfer1::safe::PluginRegistrar<name> pluginRegistrar##name {}
671 #endif // NV_INFER_SAFE_RUNTIME_H
```

10.19 NvInferVersion.h File Reference

Macros

- #define NV_TENSORRT_MAJOR 8

  TensorRT major version.
- #define NV_TENSORRT_MINOR 3

  TensorRT minor version.
- #define NV_TENSORRT_PATCH 0

  TensorRT patch version.
- #define NV_TENSORRT_BUILD 11

  TensorRT build number.
- #define NV_TENSORRT_SONAME_MAJOR 8

  Shared object library major version number.
- #define NV_TENSORRT_SONAME_MINOR 3

  Shared object library minor version number.
- #define NV_TENSORRT_SONAME_PATCH 0

  Shared object library patch version number.

10.19.1 Detailed Description

Defines the TensorRT version

10.19.2 Macro Definition Documentation

10.19.2.1 NV_TENSORRT_BUILD

```
#define NV_TENSORRT_BUILD 11
```

TensorRT build number.

10.19.2.2 NV_TENSORRT_MAJOR

```
#define NV_TENSORRT_MAJOR 8
```

TensorRT major version.

10.19.2.3 NV_TENSORRT_MINOR

```
#define NV_TENSORRT_MINOR 3
```

TensorRT minor version.

10.19.2.4 NV_TENSORRT_PATCH

```
#define NV_TENSORRT_PATCH 0
```

TensorRT patch version.

10.19.2.5 NV_TENSORRT_SONAME_MAJOR

```
#define NV_TENSORRT_SONAME_MAJOR 8
```

Shared object library major version number.

10.19.2.6 NV_TENSORRT_SONAME_MINOR

```
#define NV_TENSORRT_SONAME_MINOR 3
```

Shared object library minor version number.

10.19.2.7 NV_TENSORRT_SONAME_PATCH

```
#define NV_TENSORRT_SONAME_PATCH 0
```

Shared object library patch version number.

10.20 NvInferVersion.h

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48  */
49
55
56 #ifndef NV_INFER_VERSION_H
57 #define NV_INFER_VERSION_H
58
59 #define NV_TENSORRT_MAJOR 8
60 #define NV_TENSORRT_MINOR 3
61 #define NV_TENSORRT_PATCH 0
62 #define NV_TENSORRT_BUILD 11
63
64 #define NV_TENSORRT_SONAME_MAJOR 8
65 #define NV_TENSORRT_SONAME_MINOR 3
66 #define NV_TENSORRT_SONAME_PATCH 0
67
68 #endif // NV_INFER_VERSION_H
```

10.21 NvOnnxConfig.h File Reference

```
#include "NvInfer.h"
```

Classes

- class nvonnxparser::IOnnxConfig

  Configuration Manager Class.

Namespaces

- namespace nvonnxparser

  The TensorRT ONNX parser API namespace.

Functions

- IOnnxConfig * nvonnxparser::createONNXConfig ()

10.21.1 Detailed Description

This is the API file for the Configuration Manager for ONNX Parser for Nvidia TensorRT.

10.22 NvOnnxConfig.h

Go to the documentation of this file.

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48  */
49
50 #ifndef NV_OnnxConfig_H
51 #define NV_OnnxConfig_H
52
53 #include "NvInfer.h"
54
55 namespace nvonnxparser
56 {
57
67
73
78 class IOnnxConfig
79 {
80 public:
81     virtual ~IOnnxConfig() noexcept = default;
86     typedef int32_t Verbosity;
87
96     virtual void setModelDtype(const nvinfer1::DataType) noexcept = 0;
97
105     virtual nvinfer1::DataType getModelDtype() const noexcept = 0;
106
114     virtual const char* getModelFileName() const noexcept = 0;
115
127     virtual void setModelFileName(const char* onnxFilename) noexcept = 0;
128
136     virtual Verbosity getVerbosityLevel() const noexcept = 0;
137
145     virtual void addVerbosity() noexcept = 0;
146
152     virtual void reduceVerbosity() noexcept = 0;
153
159     virtual void setVerbosityLevel(Verbosity) noexcept = 0;
160
169     virtual const char* getTextFileName() const noexcept = 0;
170
182     virtual void setTextFileName(const char* textFileName) noexcept = 0;
183
192     virtual const char* getFullTextFileName() const noexcept = 0;
193
205     virtual void setFullTextFileName(const char* fullTextFileName) noexcept = 0;
206
214     virtual bool getPrintLayerInfo() const noexcept = 0;
215
221     virtual void setPrintLayerInfo(bool) noexcept = 0;
222
230     TRT_DEPRECATED virtual void destroy() noexcept = 0;
231
232 }; // class IOnnxConfig
233
234 TENSORRTAPI IOnnxConfig* createONNXConfig();
235
236 } // namespace nvonnxparser
237
238 #endif
```

10.23 NvUffParser.h File Reference

`#include "NvInfer.h"`

Classes

- class nvuffparser::FieldMap

An array of field params used as a layer parameter for plugin layers.

- struct nvuffparser::FieldCollection
- class nvuffparser::IUffParser

  Class used for parsing models described using the UFF format.

Namespaces

- namespace nvuffparser

  The TensorRT UFF parser API namespace.

Macros

- #define UFF_REQUIRED_VERSION_MAJOR 0
- #define UFF_REQUIRED_VERSION_MINOR 6
- #define UFF_REQUIRED_VERSION_PATCH 9

Enumerations

- enum class nvuffparser::UffInputOrder : int32_t { nvuffparser::kNCHW = 0 , nvuffparser::kNHWC = 1 , nvuffparser::kNC = 2 }

  The different possible supported input order.
- enum class nvuffparser::FieldType : int32_t { nvuffparser::kFLOAT = 0 , nvuffparser::kINT32 = 1 , nvuffparser::kCHAR = 2 , nvuffparser::kDIMS = 4 , nvuffparser::kDATATYPE = 5 , nvuffparser::kUNKNOWN = 6 }

  The possible field types for custom layer.

Functions

- IUffParser * nvuffparser::createUffParser () noexcept

  Creates a IUffParser object.
- void nvuffparser::shutdownProtobufLibrary (void) noexcept

  Shuts down protocol buffers library.

10.23.1 Detailed Description

This is the API for the UFF Parser

10.23.2 Macro Definition Documentation

10.23.2.1 UFF_REQUIRED_VERSION_MAJOR

```
#define UFF_REQUIRED_VERSION_MAJOR 0
```

10.23.2.2 UFF_REQUIRED_VERSION_MINOR

```
#define UFF_REQUIRED_VERSION_MINOR 6
```

10.23.2.3 UFF_REQUIRED_VERSION_PATCH

```
#define UFF_REQUIRED_VERSION_PATCH 9
```

10.24 NvUffParser.h

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```

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48  */
49
50 #ifndef NV_UFF_PARSER_H
51 #define NV_UFF_PARSER_H
52
53 #include "NvInfer.h"
54
60
61 // Current supported Universal Framework Format (UFF) version for the parser.
62 #define UFF_REQUIRED_VERSION_MAJOR 0
63 #define UFF_REQUIRED_VERSION_MINOR 6
64 #define UFF_REQUIRED_VERSION_PATCH 9
65
71 namespace nvuffparser
72 {
73
78 enum class UffInputOrder : int32_t
79 {
80     kNCHW = 0,
81     kNHWC = 1,
82     kNC = 2
83 };
84
89
90 enum class FieldType : int32_t
91 {
92     kFLOAT = 0,
93     kINT32 = 1,
94     kCHAR = 2,
95     kDIMS = 4,
96     kDATATYPE = 5,
97     kUNKNOWN = 6
98 };
99
109 class TENSORRTAPI FieldMap
110 {
111 public:
112     const char* name;
113     const void* data;
114     FieldType type = FieldType::kUNKNOWN;
115     int32_t length = 1;
116
117     FieldMap(const char* name, const void* data, const FieldType type, int32_t length = 1);
118 };
119
120 struct FieldCollection
121 {
122     int32_t nbFields;
123     const FieldMap* fields;
124 };
125
133 class IUffParser
134 {
135 public:
143     virtual bool registerInput(const char* inputName, nvinfer1::Dims inputDims, UffInputOrder inputOrder)
      noexcept = 0;
144
150     virtual bool registerOutput(const char* outputName) noexcept = 0;
151
159     virtual bool parse(const char* file, nvinfer1::INetworkDefinition& network,
160         nvinfer1::DataType weightsType = nvinfer1::DataType::kFLOAT) noexcept
161         = 0;
162
171     virtual bool parseBuffer(const char* buffer, std::size_t size, nvinfer1::INetworkDefinition& network,
172         nvinfer1::DataType weightsType = nvinfer1::DataType::kFLOAT) noexcept
173         = 0;
174
178     TRT_DEPRECATED virtual void destroy() noexcept = 0;
179
183     virtual int32_t getUffRequiredVersionMajor() noexcept = 0;
184
188     virtual int32_t getUffRequiredVersionMinor() noexcept = 0;
189
193     virtual int32_t getUffRequiredVersionPatch() noexcept = 0;
194
198     virtual void setPluginNamespace(const char* libNamespace) noexcept = 0;
199
```

```
200     virtual ~IUffParser() noexcept = default;
201
202 public:
214     //
217     virtual void setErrorRecorder(nvinfer1::IErrorRecorder* recorder) noexcept = 0;
218
229     virtual nvinfer1::IErrorRecorder* getErrorRecorder() const noexcept = 0;
230 };
231
242 TENSORRTAPI IUffParser* createUffParser() noexcept;
243
249 TENSORRTAPI void shutdownProtobufLibrary(void) noexcept;
250
251 } // namespace nvuffparser
252
257 extern "C" TENSORRTAPI void* createNvUffParser_INTERNAL() noexcept;
258
259 #endif /* !NV_UFF_PARSER_H */
```

10.25 NvUtils.h File Reference

`#include "NvInfer.h"`

Namespaces

- namespace nvinfer1

  The TensorRT API version 1 namespace.
- namespace nvinfer1::utils

Functions

- TRT_DEPRECATED bool nvinfer1::utils::reshapeWeights (const Weights &input, int32_t const *shape, int32_t const *shapeOrder, void *data, int32_t nbDims) noexcept

  Reformat the input weights of the given shape based on the new order of dimensions.
- TRT_DEPRECATED bool nvinfer1::utils::reorderSubBuffers (void *input, int32_t const *order, int32_t num, int32_t size) noexcept

  Takes an input stream and re-orders `num` chunks of the data given the `size` and `order`.
- TRT_DEPRECATED bool nvinfer1::utils::transposeSubBuffers (void *input, DataType type, int32_t num, int32_t height, int32_t width) noexcept

  Transpose `num` sub-buffers of `height * width`.

10.25.1 Detailed Description

This file includes various utility functions

10.26 NvUtils.h

Go to the documentation of this file.

```
1 /*
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3  *
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47  * Users Notice.
48  */
49
50 #ifndef NV_UTILS_H
51 #define NV_UTILS_H
52
53 #include "NvInfer.h"
54
60
61 namespace nvinfer1
62 {
63 namespace utils
64 {
65
110 TRT_DEPRECATED TENSORRTAPI bool reshapeWeights(
111     const Weights& input, int32_t const* shape, int32_t const* shapeOrder, void* data, int32_t nbDims)
      noexcept;
112
156 TRT_DEPRECATED TENSORRTAPI bool reorderSubBuffers(
157     void* input, int32_t const* order, int32_t num, int32_t size) noexcept;
158
172 TRT_DEPRECATED TENSORRTAPI bool transposeSubBuffers(
173     void* input, DataType type, int32_t num, int32_t height, int32_t width) noexcept;
174
175 } // namespace utils
176 } // namespace nvinfer1
177 #endif // NV_UTILS_H
```

10.27 NvOnnxParser.h File Reference

```
#include "NvInfer.h"
#include <stddef.h>
#include <vector>
```

Classes

- class nvonnxparser::IParserError

  an object containing information about an error
- class nvonnxparser::IParser

  an object for parsing ONNX models into a TensorRT network definition

Namespaces

- namespace nvonnxparser

  The TensorRT ONNX parser API namespace.

Macros

- #define NV_ONNX_PARSER_MAJOR 0
- #define NV_ONNX_PARSER_MINOR 1
- #define NV_ONNX_PARSER_PATCH 0

Typedefs

- typedef std::pair< std::vector< size_t >, bool > SubGraph_t

  The data structure containing the parsing capability of a set of nodes in an ONNX graph.
- typedef std::vector< SubGraph_t > SubGraphCollection_t

  The data structure containing all SubGraph_t partitioned out of an ONNX graph.

Enumerations

- enum class nvonnxparser::ErrorCode : int { nvonnxparser::kSUCCESS = 0 , nvonnxparser::kINTERNAL_ERROR = 1 , nvonnxparser::kMEM_ALLOC_FAILED = 2 , nvonnxparser::kMODEL_DESERIALIZE_FAILED = 3 , nvonnxparser::kINVALID_VALUE = 4 , nvonnxparser::kINVALID_GRAPH = 5 , nvonnxparser::kINVALID_NODE = 6 , nvonnxparser::kUNSUPPORTED_GRAPH = 7 , nvonnxparser::kUNSUPPORTED_NODE = 8 }

  the type of parser error

Functions

- template<typename T >
  int32_t nvonnxparser::EnumMax ()
- template<> int32_t nvonnxparser::EnumMax< ErrorCode > ()
- TENSORRTAPI void * createNvOnnxParser_INTERNAL (void *network, void *logger, int version)
- TENSORRTAPI int getNvOnnxParserVersion ()

10.27.1 Detailed Description

This is the API for the ONNX Parser

10.27.2 Macro Definition Documentation

10.27.2.1 NV_ONNX_PARSER_MAJOR

```
#define NV_ONNX_PARSER_MAJOR 0
```

10.27.2.2 NV_ONNX_PARSER_MINOR

```
#define NV_ONNX_PARSER_MINOR 1
```

10.27.2.3 NV_ONNX_PARSER_PATCH

```
#define NV_ONNX_PARSER_PATCH 0
```

10.27.3 Typedef Documentation

10.27.3.1 SubGraph_t

```
SubGraph_t
```

The data structure containing the parsing capability of a set of nodes in an ONNX graph.

10.27.3.2 SubGraphCollection_t

SubGraphCollection_t

The data structure containing all SubGraph_t partitioned out of an ONNX graph.

10.27.4 Function Documentation

10.27.4.1 createNvOnnxParser_INTERNAL()

```
TENSORRTAPI void * createNvOnnxParser_INTERNAL (
            void * network,
            void * logger,
            int version )
```

10.27.4.2 getNvOnnxParserVersion()

```
TENSORRTAPI int getNvOnnxParserVersion ( )
```

10.28 NvOnnxParser.h

Go to the documentation of this file.

```
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18 * LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING
19 * FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER
20 * DEALINGS IN THE SOFTWARE.
21 */
22
23 #ifndef NV_ONNX_PARSER_H
24 #define NV_ONNX_PARSER_H
25
26 #include "NvInfer.h"
27 #include <stddef.h>
28 #include <vector>
29
35
```

```
36 #define NV_ONNX_PARSER_MAJOR 0
37 #define NV_ONNX_PARSER_MINOR 1
38 #define NV_ONNX_PARSER_PATCH 0
39
40 static const int NV_ONNX_PARSER_VERSION = ((NV_ONNX_PARSER_MAJOR * 10000) + (NV_ONNX_PARSER_MINOR * 100) +
       NV_ONNX_PARSER_PATCH);
41
47 typedef std::pair<std::vector<size_t>, bool> SubGraph_t;
48
54 typedef std::vector<SubGraph_t> SubGraphCollection_t;
55
61 namespace nvonnxparser
62 {
63
64 template <typename T>
65 inline int32_t EnumMax();
66
71 enum class ErrorCode : int
72 {
73     kSUCCESS = 0,
74     kINTERNAL_ERROR = 1,
75     kMEM_ALLOC_FAILED = 2,
76     kMODEL_DESERIALIZE_FAILED = 3,
77     kINVALID_VALUE = 4,
78     kINVALID_GRAPH = 5,
79     kINVALID_NODE = 6,
80     kUNSUPPORTED_GRAPH = 7,
81     kUNSUPPORTED_NODE = 8
82 };
83
84 template <>
85 inline int32_t EnumMax<ErrorCode>()
86 {
87     return 9;
88 }
89
94 class IParserError
95 {
96 public:
99     virtual ErrorCode code() const = 0;
102     virtual const char* desc() const = 0;
105     virtual const char* file() const = 0;
108     virtual int line() const = 0;
111     virtual const char* func() const = 0;
114     virtual int node() const = 0;
115
116 protected:
117     virtual ~IParserError() {}
118 };
119
124 class IParser
125 {
126 public:
140     virtual bool parse(void const* serialized_onnx_model,
141                        size_t serialized_onnx_model_size,
142                        const char* model_path = nullptr)
143         = 0;
144
154     virtual bool parseFromFile(const char* onnxModelFile, int verbosity) = 0;
155
165     virtual bool supportsModel(void const* serialized_onnx_model,
166                                size_t serialized_onnx_model_size,
167                                SubGraphCollection_t& sub_graph_collection,
168                                const char* model_path = nullptr)
169         = 0;
170
180     virtual bool parseWithWeightDescriptors(
181         void const* serialized_onnx_model, size_t serialized_onnx_model_size)
182         = 0;
183
192     virtual bool supportsOperator(const char* op_name) const = 0;
197     TRT_DEPRECATED virtual void destroy() = 0;
203     virtual int getNbErrors() const = 0;
208     virtual IParserError const* getError(int index) const = 0;
213     virtual void clearErrors() = 0;
214
215     virtual ~IParser() noexcept = default;
216 };
217
218 } // namespace nvonnxparser
219
```

```
220 extern "C" TENSORRTAPI void* createNvOnnxParser_INTERNAL(void* network, void* logger, int version);
221 extern "C" TENSORRTAPI int getNvOnnxParserVersion();
222
223 namespace nvonnxparser
224 {
225
226 namespace
227 {
228
242 inline IParser* createParser(nvinfer1::INetworkDefinition& network, nvinfer1::ILogger& logger)
243 {
244     return static_cast<IParser*>(createNvOnnxParser_INTERNAL(&network, &logger, NV_ONNX_PARSER_VERSION));
245 }
246
247 } // namespace
248
249 } // namespace nvonnxparser
250
251 #endif // NV_ONNX_PARSER_H
```

Index

NVIDIA TensorRT Standard Python API Documentation

Release 8.3.0

NVIDIA

Jan 21, 2022

TENSORRT PYTHON API REFERENCE

CHAPTER

ONE

GETTING STARTED WITH TENSORRT

1.1 Installation

For installation instructions, please refer to https://docs.nvidia.com/deeplearning/sdk/tensorrt-install-guide/index.html

1.2 Samples

For information about samples, please refer to https://docs.nvidia.com/deeplearning/sdk/tensorrt-developer-guide/index.html#python_samples_section

1.3 Installing PyCUDA

Although not required by the TensorRT Python API, PyCUDA is used in several samples. For installation instructions, please refer to https://wiki.tiker.net/PyCuda/Installation

CHAPTER

TWO

CORE CONCEPTS

2.1 TensorRT Workflow

The general TensorRT workflow consists of 3 steps:

1. Populate a *tensorrt.INetworkDefinition* either with a parser or by using the TensorRT Network API (see *tensorrt.INetworkDefinition* for more details). The *tensorrt.Builder* can be used to generate an empty *tensorrt.INetworkDefinition*.
2. Use the *tensorrt.Builder* to build a *tensorrt.ICudaEngine* using the populated *tensorrt.INetworkDefinition*.
3. Create a *tensorrt.IExecutionContext* from the *tensorrt.ICudaEngine* and use it to perform optimized inference.

2.2 Classes Overview

2.2.1 Logger

Most other TensorRT classes use a logger to report errors, warnings and informative messages. TensorRT provides a basic *tensorrt.Logger* implementation, but you can write your own implementation by deriving from *tensorrt.ILogger* for more advanced functionality.

2.2.2 Parsers

Parsers are used to populate a *tensorrt.INetworkDefinition* from a model trained in a Deep Learning framework.

2.2.3 Network

The *tensorrt.INetworkDefinition* represents a computational graph. In order to populate the network, TensorRT provides a suite of parsers for a variety of Deep Learning frameworks. It is also possible to populate the network manually using the Network API.

2.2.4 Builder

The *tensorrt.Builder* is used to build a *tensorrt.ICudaEngine*. In order to do so, it must be provided a populated *tensorrt.INetworkDefinition*.

2.2.5 Engine and Context

The *tensorrt.ICudaEngine* is the output of the TensorRT optimizer. It is used to generate a *tensorrt.IExecutionContext* that can perform inference.

CHAPTER

THREE

FOUNDATIONAL TYPES

3.1 DataType

tensorrt.**DataType**
Represents data types.

itemsize int The size in bytes of this *DataType*.

Members:

FLOAT : Represents a 32-bit floating point number.

HALF : Represents a 16-bit floating point number.

INT8 : Represents an 8-bit integer.

INT32 : Represents a 32-bit integer.

BOOL : Represents a boolean.

TensorRT also exposes some short-hand, NumPy-style `DataType` aliases that can be used across the library:

Type	Alias
tensorrt.DataType.FLOAT	tensorrt.float32
tensorrt.DataType.HALF	tensorrt.float16
tensorrt.DataType.INT32	tensorrt.int32
tensorrt.DataType.INT8	tensorrt.int8
tensorrt.DataType.BOOL	tensorrt.bool

tensorrt.**nptype**(*trt_type*)
Returns the numpy-equivalent of a TensorRT *DataType*.

Parameters **trt_type** – The TensorRT data type to convert.

Returns The equivalent numpy type.

3.2 Weights

`tensorrt.`**`WeightsRole`**

How a layer uses particular Weights. The power weights of an IScaleLayer are omitted. Refitting those is not supported.

Members:

KERNEL : Kernel for *IConvolutionLayer* , *IDeconvolutionLayer* , or *IFullyConnectedLayer* .

BIAS : Bias for *IConvolutionLayer* , *IDeconvolutionLayer* , or *IFullyConnectedLayer* .

SHIFT : Shift part of *IScaleLayer* .

SCALE : Scale part of *IScaleLayer* .

CONSTANT : Weights for *IConstantLayer* .

ANY : Any other weights role.

class `tensorrt.`**`Weights`**(**args*, ***kwargs*)

An array of weights used as a layer parameter. The weights are held by reference until the engine has been built - deep copies are not made automatically.

Variables

- **dtype** – *DataType* The type of the weights.
- **size** – `int` The number of weights in the array.
- **nbytes** – `int` Total bytes consumed by the elements of the weights buffer.

Overloaded function.

1. __init__(self: tensorrt.tensorrt.Weights, type: tensorrt.tensorrt.DataType = <DataType.FLOAT: 0>) -> None

   Initializes an empty (0-length) Weights object with the specified type.

   type A type to initialize the weights with. Default: `tensorrt.float32`

2. __init__(self: tensorrt.tensorrt.Weights, a: numpy.ndarray) -> None

   a A numpy array whose values to use. No deep copies are made.

numpy(*self: tensorrt.tensorrt.Weights*) → numpy.ndarray

Create a numpy array using the underlying buffer of this weights object.

Returns A new numpy array that holds a reference to this weight object's buffer - no deep copy is made.

3.3 Dims

3.3.1 Volume

tensorrt.**volume**(*iterable*)

Computes the volume of an iterable.

Parameters **iterable** – Any python iterable, including a *Dims* object.

Returns The volume of the iterable. This will return 1 for empty iterables, as a scalar has an empty shape and the volume of a tensor with empty shape is 1.

3.3.2 Dims

class tensorrt.**Dims**(**args*, ***kwargs*)

Structure to define the dimensions of a tensor. *Dims* and all derived classes behave like Python `tuple` s. Furthermore, the TensorRT API can implicitly convert Python iterables to *Dims* objects, so `tuple` or `list` can be used in place of this class.

Overloaded function.

1. __init__(self: tensorrt.tensorrt.Dims) -> None
2. __init__(self: tensorrt.tensorrt.Dims, shape: List[int]) -> None

property MAX_DIMS

The maximum number of dimensions supported by *Dims*.

3.3.3 Dims2

class tensorrt.**Dims2**(**args*, ***kwargs*)

Structure to define 2D shape.

Overloaded function.

1. __init__(self: tensorrt.tensorrt.Dims2) -> None
2. __init__(self: tensorrt.tensorrt.Dims2, dim0: int, dim1: int) -> None
3. __init__(self: tensorrt.tensorrt.Dims2, shape: List[int]) -> None

3.3.4 DimsHW

class tensorrt.**DimsHW**(**args*, ***kwargs*)

Structure to define 2D shape with height and width.

Variables

- **h** – `int` The first dimension (height).
- **w** – `int` The second dimension (width).

Overloaded function.

1. __init__(self: tensorrt.tensorrt.DimsHW) -> None
2. __init__(self: tensorrt.tensorrt.DimsHW, h: int, w: int) -> None
3. __init__(self: tensorrt.tensorrt.DimsHW, shape: List[int]) -> None

3.3.5 Dims3

class tensorrt.**Dims3**(**args*, ***kwargs*)
Structure to define 3D shape.

Overloaded function.

1. __init__(self: tensorrt.tensorrt.Dims3) -> None
2. __init__(self: tensorrt.tensorrt.Dims3, dim0: int, dim1: int, dim2: int) -> None
3. __init__(self: tensorrt.tensorrt.Dims3, shape: List[int]) -> None

3.3.6 Dims4

class tensorrt.**Dims4**(**args*, ***kwargs*)
Structure to define 4D tensor.

Overloaded function.

1. __init__(self: tensorrt.tensorrt.Dims4) -> None
2. __init__(self: tensorrt.tensorrt.Dims4, dim0: int, dim1: int, dim2: int, dim3: int) -> None
3. __init__(self: tensorrt.tensorrt.Dims4, shape: List[int]) -> None

3.4 IHostMemory

class tensorrt.**IHostMemory**
Handles library allocated memory that is accessible to the user.

The memory allocated via the host memory object is owned by the library and will be de-allocated when object is destroyed.

This class exposes a buffer interface using Python's buffer protocol.

Variables

- **dtype** – *DataType* The data type of this buffer.
- **nbytes** – int Total bytes consumed by the elements of the buffer.

__del__(*self: tensorrt.tensorrt.IHostMemory*) → None

__exit__(*exc_type*, *exc_value*, *traceback*)
Context managers are deprecated and have no effect. Objects are automatically freed when the reference count reaches 0.

__init__()
Initialize self. See help(type(self)) for accurate signature.

CHAPTER

FOUR

CORE

4.1 Logger

class tensorrt.**ILogger**(*self: tensorrt.tensorrt.ILogger*) → None

Abstract base Logger class for the *Builder*, *ICudaEngine* and *Runtime*.

To implement a custom logger, ensure that you explicitly instantiate the base class in __init__() :

```
class MyLogger(trt.ILogger):
    def __init__(self):
        trt.ILogger.__init__(self)

    def log(self, severity, msg):
        ... # Your implementation here
```

Parameters **min_severity** – The initial minimum severity of this Logger.

Variables **min_severity** – Logger.Severity This minimum required severity of messages for the logger to log them.

The logger used to create an instance of IBuilder, IRuntime or IRefitter is used for all objects created through that interface. The logger should be valid until all objects created are released.

class Severity(*self: tensorrt.tensorrt.ILogger.Severity*, *value: int*) → None

Indicates the severity of a message. The values in this enum are also accessible in the *ILogger* directly. For example, tensorrt.ILogger.INFO corresponds to tensorrt.ILogger.Severity.INFO.

Members:

INTERNAL_ERROR : Represents an internal error. Execution is unrecoverable.

ERROR : Represents an application error.

WARNING : Represents an application error that TensorRT has recovered from or fallen back to a default.

INFO : Represents informational messages.

VERBOSE : Verbose messages with debugging information.

property name

log(*self: tensorrt.tensorrt.ILogger*, *severity: nvinfer1::ILogger::Severity*, *msg: str*) → None

Logs a message to *stderr* . This function must be overriden by a derived class.

Parameters

- **severity** – The severity of the message.
- **msg** – The log message.

class tensorrt.**Logger**(*self: tensorrt.tensorrt.Logger*, *min_severity: tensorrt.tensorrt.ILogger.Severity* = <*Severity.WARNING: 2*>) → None

Logger for the *Builder*, *ICudaEngine* and *Runtime* .

Parameters **min_severity** – The initial minimum severity of this Logger.

Variables **min_severity** – `Logger.Severity` This minimum required severity of messages for the logger to log them.

log(*self: tensorrt.tensorrt.Logger*, *severity: tensorrt.tensorrt.ILogger.Severity*, *msg: str*) → None

Logs a message to *stderr* .

Parameters

- **severity** – The severity of the message.
- **msg** – The log message.

4.2 Profiler

class tensorrt.**IProfiler**(*self: tensorrt.tensorrt.IProfiler*) → None

Abstract base Profiler class.

To implement a custom profiler, ensure that you explicitly instantiate the base class in `__init__()` :

```
class MyProfiler(trt.IProfiler):
    def __init__(self):
        trt.IProfiler.__init__(self)

    def report_layer_time(self, layer_name, ms):
        ... # Your implementation here
```

When this class is added to an *IExecutionContext*, the profiler will be called once per layer for each invocation of *IExecutionContext.execute()* . Note that *IExecutionContext.execute_async()* does not currently support profiling.

The profiler will only be called after execution is complete. It has a small impact on execution time.

report_layer_time(*self: tensorrt.tensorrt.IProfiler*, *layer_name: str*, *ms: float*) → None

Reports time in milliseconds for each layer. This function must be overriden a derived class.

Parameters

- **layer_name** – The name of the layer, set when constructing the *INetworkDefinition* .
- **ms** – The time in milliseconds to execute the layer.

class tensorrt.**Profiler**(*self: tensorrt.tensorrt.Profiler*) → None

When this class is added to an *IExecutionContext*, the profiler will be called once per layer for each invocation of *IExecutionContext.execute()* . Note that *IExecutionContext.execute_async()* does not currently support profiling.

The profiler will only be called after execution is complete. It has a small impact on execution time.

report_layer_time(*self: tensorrt.tensorrt.Profiler*, *layer_name: str*, *ms: float*) → None

Prints time in milliseconds for each layer to stdout.

Parameters

- **layer_name** – The name of the layer, set when constructing the *INetworkDefinition*.
- **ms** – The time in milliseconds to execute the layer.

4.3 IOptimizationProfile

class tensorrt.**IOptimizationProfile**

Optimization profile for dynamic input dimensions and shape tensors.

When building an *ICudaEngine* from an *INetworkDefinition* that has dynamically resizable inputs (at least one input tensor has one or more of its dimensions specified as -1) or shape input tensors, users need to specify at least one optimization profile. Optimization profiles are numbered 0, 1, ...

The first optimization profile that has been defined (with index 0) will be used by the *ICudaEngine* whenever no optimization profile has been selected explicitly. If none of the inputs are dynamic, the default optimization profile will be generated automatically unless it is explicitly provided by the user (this is possible but not required in this case). If more than a single optimization profile is defined, users may set a target how much additional weight space should be maximally allocated to each additional profile (as a fraction of the maximum, unconstrained memory).

Users set optimum input tensor dimensions, as well as minimum and maximum input tensor dimensions. The builder selects the kernels that result in the lowest runtime for the optimum input tensor dimensions, and are valid for all input tensor sizes in the valid range between minimum and maximum dimensions. A runtime error will be raised if the input tensor dimensions fall outside the valid range for this profile. Likewise, users provide minimum, optimum, and maximum values for all shape tensor input values.

IOptimizationProfile implements `__nonzero__()` and `__bool__()` such that evaluating a profile as a `bool` (e.g. `if profile:`) will check whether the optimization profile can be passed to an IBuilderConfig object. This will perform partial validation, by e.g. checking that the maximum dimensions are at least as large as the optimum dimensions, and that the optimum dimensions are always as least as large as the minimum dimensions. Some validation steps require knowledge of the network definition and are deferred to engine build time.

Variables **extra_memory_target** – Additional memory that the builder should aim to maximally allocate for this profile, as a fraction of the memory it would use if the user did not impose any constraints on memory. This unconstrained case is the default; it corresponds to `extra_memory_target` == 1.0. If `extra_memory_target` == 0.0, the builder aims to create the new optimization profile without allocating any additional weight memory. Valid inputs lie between 0.0 and 1.0. This parameter is only a hint, and TensorRT does not guarantee that the `extra_memory_target` will be reached. This parameter is ignored for the first (default) optimization profile that is defined.

get_shape(*self: tensorrt.tensorrt.IOptimizationProfile*, *input: str*) → List[tensorrt.tensorrt.Dims]

Get the minimum/optimum/maximum dimensions for a dynamic input tensor. If the dimensions have not been previously set via *set_shape()*, return an invalid *Dims* with a length of -1.

Returns A `List[Dims]` of length 3, containing the minimum, optimum, and maximum shapes, in that order. If the shapes have not been set yet, an empty list is returned.

get_shape_input(*self: tensorrt.tensorrt.IOptimizationProfile*, *input: str*) → List[List[int]]

Get the minimum/optimum/maximum values for a shape input tensor.

Returns A `List[List[int]]` of length 3, containing the minimum, optimum, and maximum values, in that order. If the values have not been set yet, an empty list is returned.

set_shape(*self: tensorrt.tensorrt.IOptimizationProfile*, *input: str*, *min: tensorrt.tensorrt.Dims*, *opt: tensorrt.tensorrt.Dims*, *max: tensorrt.tensorrt.Dims*) → None

Set the minimum/optimum/maximum dimensions for a dynamic input tensor.

This function must be called for any network input tensor that has dynamic dimensions. If `min`, `opt`, and `max` are the minimum, optimum, and maximum dimensions, and `real_shape` is the shape for this input tensor provided to the *INetworkDefinition* ,then the following conditions must hold:

(1) `len(min) == len(opt) == len(max) == len(real_shape)`

(2) 1 <= `min[i]` <= `opt[i]` <= `max[i]` for all `i`

(3) if `real_shape[i]` != -1, then `min[i] == opt[i] == max[i] == real_shape[i]`

This function may (but need not be) called for an input tensor that does not have dynamic dimensions. In this case, all shapes must equal `real_shape`.

Parameters

- **input** – The name of the input tensor.
- **min** – The minimum dimensions for this input tensor.
- **opt** – The optimum dimensions for this input tensor.
- **max** – The maximum dimensions for this input tensor.

Raises `ValueError` if an inconsistency was detected. Note that inputs can be validated only partially; a full validation is performed at engine build time.

set_shape_input(*self: tensorrt.tensorrt.IOptimizationProfile, input: str, min: List[int], opt: List[int], max: List[int]*) → None

Set the minimum/optimum/maximum values for a shape input tensor.

This function must be called for every input tensor `t` that is a shape tensor (`t.is_shape == True`). This implies that the datatype of `t` is `int32`, the rank is either 0 or 1, and the dimensions of `t` are fixed at network definition time. This function must NOT be called for any input tensor that is not a shape tensor.

If `min`, `opt`, and `max` are the minimum, optimum, and maximum values, it must be true that `min[i]` <= `opt[i]` <= `max[i]` for all `i`.

Parameters

- **input** – The name of the input tensor.
- **min** – The minimum values for this shape tensor.
- **opt** – The optimum values for this shape tensor.
- **max** – The maximum values for this shape tensor.

Raises `ValueError` if an inconsistency was detected. Note that inputs can be validated only partially; a full validation is performed at engine build time.

4.4 IBuilderConfig

tensorrt.**QuantizationFlag**
List of valid flags for quantizing the network to int8.

Members:

CALIBRATE_BEFORE_FUSION : Run int8 calibration pass before layer fusion. Only valid for IInt8LegacyCalibrator and IInt8EntropyCalibrator. We always run int8 calibration pass before layer fusion for IInt8MinMaxCalibrator and IInt8EntropyCalibrator2. Disabled by default.

tensorrt.**DeviceType**
Device types that TensorRT can execute on

Members:

GPU : GPU device

DLA : DLA core

tensorrt.**ProfilingVerbosity**
Profiling verbosity in NVTX annotations and the engine inspector

Members:

LAYER_NAMES_ONLY : Print only the layer names. This is the default setting.

DETAILED : Print detailed layer information including layer names and layer parameters.

NONE : Do not print any layer information.

DEFAULT : DEPRECATED. Same as LAYER_NAMES_ONLY.

VERBOSE : DEPRECATED. Same as DETAILED.

tensorrt.**TacticSource**
Tactic sources that can provide tactics for TensorRT.

Members:

CUBLAS : Enables cuBLAS tactics. **NOTE:** Disabling this value will cause the cublas handle passed to plugins in attachToContext to be null.

CUBLAS_LT : Enables cuBLAS LT tactics

CUDNN : Enables cuDNN tactics

tensorrt.**EngineCapability**

List of supported engine capability flows. The EngineCapability determines the restrictions of a network during build time and what runtime it targets. When BuilderFlag::kSAFETY_SCOPE is not set (by default), EngineCapability.STANDARD does not provide any restrictions on functionality and the resulting serialized engine can be executed with TensorRT's standard runtime APIs in the nvinfer1 namespace. EngineCapability.SAFETY provides a restricted subset of network operations that are safety certified and the resulting serialized engine can be executed with TensorRT's safe runtime APIs in the *nvinfer1::safe* namespace. EngineCapability.DLA_STANDALONE provides a restricted subset of network operations that are DLA compatible and the resulting serialized engine can be executed using standalone DLA runtime APIs. See sampleNvmedia for an example of integrating NvMediaDLA APIs with TensorRT APIs.

Members:

DEFAULT : Deprecated: Unrestricted: TensorRT mode without any restrictions using TensorRT nvinfer1 APIs.

SAFE_GPU : Deprecated: Safety-restricted: TensorRT mode for GPU devices using TensorRT safety APIs. See safety documentation for list of supported layers and formats.

SAFE_DLA : Deprecated: DLA-restricted: TensorRT mode for DLA devices using NvMediaDLA APIs. Only FP16 and Int8 modes are supported.

STANDARD : Standard: TensorRT flow without targeting the standard runtime. This flow supports both DeviceType::kGPU and DeviceType::kDLA.

SAFETY : Safety: TensorRT flow with restrictions targeting the safety runtime. See safety documentation for list of supported layers and formats. This flow supports only DeviceType::kGPU.

DLA_STANDALONE : DLA Standalone: TensorRT flow with restrictions targeting external, to TensorRT, DLA runtimes. See DLA documentation for list of supported layers and formats. This flow supports only DeviceType::kDLA.

tensorrt.**BuilderFlag**

Valid modes that the builder can enable when creating an engine from a network definition.

Members:

FP16 : Enable FP16 layer selection

INT8 : Enable Int8 layer selection

DEBUG : Enable debugging of layers via synchronizing after every layer

GPU_FALLBACK : Enable layers marked to execute on GPU if layer cannot execute on DLA

STRICT_TYPES : Deprecated: Enables strict type constraints. Equivalent to setting PREFER_PRECISION_CONSTRAINTS, DIRECT_IO, and REJECT_EMPTY_ALGORITHMS.

REFIT : Enable building a refittable engine

DISABLE_TIMING_CACHE : Disable reuse of timing information across identical layers.

TF32 : Allow (but not require) computations on tensors of type DataType.FLOAT to use TF32. TF32 computes inner products by rounding the inputs to 10-bit mantissas before multiplying, but accumulates the sum using 23-bit mantissas. Enabled by default.

SPARSE_WEIGHTS : Allow the builder to examine weights and use optimized functions when weights have suitable sparsity.

SAFETY_SCOPE : Change the allowed parameters in the EngineCapability.STANDARD flow to match the restrictions that EngineCapability.SAFETY check against for DeviceType.GPU and EngineCapability.DLA_STANDALONE check against the DeviceType.DLA case. This flag is forced to true if EngineCapability.SAFETY at build time if it is unset.

OBEY_PRECISION_CONSTRAINTS : Require that layers execute in specified precisions. Build fails otherwise.

PREFER_PRECISION_CONSTRAINTS : Prefer that layers execute in specified precisions. Fall back (with warning) to another precision if build would otherwise fail.

DIRECT_IO : Require that no reformats be inserted between a layer and a network I/O tensor for which ITensor.allowed_formats was set. Build fails if a reformat is required for functional correctness.

REJECT_EMPTY_ALGORITHMS : Fail if IAlgorithmSelector.select_algorithms returns an empty set of algorithms.

class tensorrt.**IBuilderConfig**

Variables

- **min_timing_iterations** – int The number of minimization iterations used when timing layers. When timing layers, the builder minimizes over a set of average times for layer execution. This parameter controls the number of iterations used in minimization.
- **avg_timing_iterations** – int The number of averaging iterations used when timing layers. When timing layers, the builder minimizes over a set of average times for layer execution. This parameter controls the number of iterations used in averaging.
- **int8_calibrator** – *IInt8Calibrator* Int8 Calibration interface. The calibrator is to minimize the information loss during the INT8 quantization process.
- **max_workspace_size** – int Deprecated: The maximum workspace size. The maximum GPU temporary memory which the engine can use at execution time.
- **flags** – int The build mode flags to turn on builder options for this network. The flags are listed in the BuilderFlags enum. The flags set configuration options to build the network. This should be in integer consisting of one or more *BuilderFlag* s, combined via binary OR. For example, `1 << BuilderFlag.FP16 | 1 << BuilderFlag.DEBUG`.
- **profile_stream** – int The handle for the CUDA stream that is used to profile this network.
- **num_optimization_profiles** – int The number of optimization profiles.
- **default_device_type** – *tensorrt.DeviceType* The default DeviceType to be used by the Builder.
- **DLA_core** – int The DLA core that the engine executes on. Must be between 0 and N-1 where N is the number of available DLA cores.
- **profiling_verbosity** – Profiling verbosity in NVTX annotations.
- **engine_capability** – The desired engine capability. See *EngineCapability* for details.

__del__(*self: tensorrt.tensorrt.IBuilderConfig*) → None

__exit__(*exc_type*, *exc_value*, *traceback*)
Context managers are deprecated and have no effect. Objects are automatically freed when the reference count reaches 0.

__init__()
Initialize self. See help(type(self)) for accurate signature.

add_optimization_profile(*self: tensorrt.tensorrt.IBuilderConfig*, *profile: tensorrt.tensorrt.IOptimizationProfile*) → int
Add an optimization profile.

This function must be called at least once if the network has dynamic or shape input tensors.

Parameters **profile** – The new optimization profile, which must satisfy `bool(profile) == True`

Returns The index of the optimization profile (starting from 0) if the input is valid, or -1 if the input is not valid.

can_run_on_DLA(*self: tensorrt.tensorrt.IBuilderConfig*, *layer: tensorrt.tensorrt.ILayer*) → bool
Check if the layer can run on DLA.

Parameters **layer** – The layer to check

Returns A *bool* indicating whether the layer can run on DLA

clear_flag(*self: tensorrt.tensorrt.IBuilderConfig*, *flag: tensorrt.tensorrt.BuilderFlag*) → None
Clears the builder mode flag from the enabled flags.

Parameters **flag** – The flag to clear.

clear_quantization_flag(*self: tensorrt.tensorrt.IBuilderConfig*, *flag: tensorrt.tensorrt.QuantizationFlag*) → None
Clears the quantization flag from the enabled quantization flags.

Parameters **flag** – The flag to clear.

create_timing_cache(*self: tensorrt.tensorrt.IBuilderConfig*, *serialized_timing_cache: buffer*) → tensorrt.tensorrt.ITimingCache
Create timing cache

Create *ITimingCache* instance from serialized raw data. The created timing cache doesn't belong to a specific builder config. It can be shared by multiple builder instances

Parameters **serialized_timing_cache** – The serialized timing cache. If an empty cache is provided (i.e. `b""`), a new cache will be created.

Returns The created *ITimingCache* object.

get_calibration_profile(*self: tensorrt.tensorrt.IBuilderConfig*) → tensorrt.tensorrt.IOptimizationProfile
Get the current calibration profile.

Returns The current calibration profile or nullptr if calibrartion profile is unset.

get_device_type(*self: tensorrt.tensorrt.IBuilderConfig*, *layer: tensorrt.tensorrt.ILayer*) → tensorrt.tensorrt.DeviceType
Get the device that the layer executes on.

Parameters **layer** – The layer to get the DeviceType for

Returns The DeviceType of the layer

get_flag(*self: tensorrt.tensorrt.IBuilderConfig*, *flag: tensorrt.tensorrt.BuilderFlag*) → bool
Check if a build mode flag is set.

Parameters **flag** – The flag to check.

Returns A *bool* indicating whether the flag is set.

get_memory_pool_limit(*self: tensorrt.tensorrt.IBuilderConfig*, *pool: tensorrt.tensorrt.MemoryPoolType*) → int
Retrieve the memory size limit of the corresponding pool in bytes. If *set_memory_pool_limit()* for the pool has not been called, this returns the default value used by TensorRT. This default value is not necessarily the maximum possible value for that configuration.

Parameters **pool** – The memory pool to get the limit for.

Returns The size of the memory limit, in bytes, for the corresponding pool.

get_quantization_flag(*self: tensorrt.tensorrt.IBuilderConfig*, *flag: tensorrt.tensorrt.QuantizationFlag*) → bool
Check if a quantization flag is set.

Parameters **flag** – The flag to check.

Returns A *bool* indicating whether the flag is set.

get_tactic_sources(*self: tensorrt.tensorrt.IBuilderConfig*) → int
Get the tactic sources currently set in the engine build configuration.

get_timing_cache(*self: tensorrt.tensorrt.IBuilderConfig*) → tensorrt.tensorrt.ITimingCache
Get the timing cache from current IBuilderConfig

Returns The timing cache used in current IBuilderConfig, or *None* if no timing cache is set.

is_device_type_set(*self: tensorrt.tensorrt.IBuilderConfig*, *layer: tensorrt.tensorrt.ILayer*) → bool

Check if the DeviceType for a layer is explicitly set.

Parameters **layer** – The layer to check for DeviceType

Returns True if DeviceType is not default, False otherwise

reset(*self: tensorrt.tensorrt.IBuilderConfig*) → None

Resets the builder configuration to defaults. When initializing a builder config object, we can call this function.

reset_device_type(*self: tensorrt.tensorrt.IBuilderConfig*, *layer: tensorrt.tensorrt.ILayer*) → None

Reset the DeviceType for the given layer.

Parameters **layer** – The layer to reset the DeviceType for

set_calibration_profile(*self: tensorrt.tensorrt.IBuilderConfig*, *profile: tensorrt.tensorrt.IOptimizationProfile*) → bool

Set a calibration profile.

Calibration optimization profile must be set if int8 calibration is used to set scales for a network with runtime dimensions.

Parameters **profile** – The new calibration profile, which must satisfy `bool(profile) == True` or be nullptr. MIN and MAX values will be overwritten by kOPT.

Returns True if the calibration profile was set correctly.

set_device_type(*self: tensorrt.tensorrt.IBuilderConfig*, *layer: tensorrt.tensorrt.ILayer*, *device_type: tensorrt.tensorrt.DeviceType*) → None

Set the device that this layer must execute on. If DeviceType is not set or is reset, TensorRT will use the default DeviceType set in the builder.

The DeviceType for a layer must be compatible with the safety flow (if specified). For example a layer cannot be marked for DLA execution while the builder is configured for kSAFE_GPU.

Parameters

- **layer** – The layer to set the DeviceType of
- **device_type** – The DeviceType the layer must execute on

set_flag(*self: tensorrt.tensorrt.IBuilderConfig*, *flag: tensorrt.tensorrt.BuilderFlag*) → None

Add the input builder mode flag to the already enabled flags.

Parameters **flag** – The flag to set.

set_memory_pool_limit(*self: tensorrt.tensorrt.IBuilderConfig*, *pool: tensorrt.tensorrt.MemoryPoolType*, *pool_size: int*) → None

Set the memory size for the memory pool.

TensorRT layers access different memory pools depending on the operation. This function sets in the *IBuilderConfig* the size limit, specified by pool_size, for the corresponding memory pool, specified by pool. TensorRT will build a plan file that is constrained by these limits or report which constraint caused the failure.

If the size of the pool, specified by pool_size, fails to meet the size requirements for the pool, this function does nothing and emits the recoverable error, ErrorCode.INVALID_ARGUMENT, to the registered *IErrorRecorder*.

If the size of the pool is larger than the maximum possible value for the configuration, this function does nothing and emits ErrorCode.UNSUPPORTED_STATE.

If the pool does not exist on the requested device type when building the network, a warning is emitted to the logger, and the memory pool value is ignored.

Refer to MemoryPoolType to see the size requirements for each pool.

Parameters

- **pool** – The memory pool to limit the available memory for.
- **pool_size** – The size of the pool in bytes.

set_quantization_flag(*self: tensorrt.tensorrt.IBuilderConfig*, *flag: tensorrt.tensorrt.QuantizationFlag*) → None

Add the input quantization flag to the already enabled quantization flags.

Parameters **flag** – The flag to set.

set_tactic_sources(*self: tensorrt.tensorrt.IBuilderConfig*, *tactic_sources: int*) → bool

Set tactic sources.

This bitset controls which tactic sources TensorRT is allowed to use for tactic selection. By default, kCUBLAS and kCUDNN are always enabled, and kCUBLAS_LT is enabled for x86 platforms as well as non-x86 platforms when CUDA >= 11.0

Multiple tactic sources may be combined with a bitwise OR operation. For example, to enable cublas and cublasLt as tactic sources, use a value of: `1 << int(trt.TacticSource.CUBLAS) | 1 << int(trt.TacticSource.CUBLAS_LT)`

Parameters **tactic_sources** – The tactic sources to set

Returns A *bool* indicating whether the tactic sources in the build configuration were updated. The tactic sources in the build configuration will not be updated if the provided value is invalid.

set_timing_cache(*self: tensorrt.tensorrt.IBuilderConfig*, *cache: tensorrt.tensorrt.ITimingCache*, *ignore_mismatch: bool*) → bool

Attach a timing cache to IBuilderConfig

The timing cache has verification header to make sure the provided cache can be used in current environment. A failure will be reported if the CUDA device property in the provided cache is different from current environment. `bool(ignore_mismatch) == True` skips strict verification and allows loading cache created from a different device. The cache must not be destroyed until after the engine is built.

Parameters

- **cache** – The timing cache to be used
- **ignore_mismatch** – Whether or not allow using a cache that contains different CUDA device property

Returns A *BOOL* indicating whether the operation is done successfully.

4.5 Builder

4.5.1 NetworkDefinitionCreationFlag

tensorrt.**NetworkDefinitionCreationFlag**

List of immutable network properties expressed at network creation time. For example, to enable explicit batch mode, pass a value of `1 << int(NetworkDefinitionCreationFlag.EXPLICIT_BATCH)` to `create_network()`

Members:

EXPLICIT_BATCH : Specify that the network should be created with an explicit batch dimension.

EXPLICIT_PRECISION : Specify that the network contains explicit quantization and dequantization scale layers.

4.5.2 Builder

class tensorrt.**Builder**(*self: tensorrt.tensorrt.Builder*, *logger: tensorrt.tensorrt.ILogger*) → None

Builds an *ICudaEngine* from a *INetworkDefinition*.

Variables

- **max_batch_size** – int The maximum batch size which can be used at execution time, and also the batch size for which the *ICudaEngine* will be optimized.
- **platform_has_tf32** – bool Whether the platform has tf32 support.
- **platform_has_fast_fp16** – bool Whether the platform has fast native fp16.
- **platform_has_fast_int8** – bool Whether the platform has fast native int8.
- **max_DLA_batch_size** – int The maximum batch size DLA can support. For any tensor the total volume of index dimensions combined(dimensions other than CHW) with the requested batch size should not exceed the value returned by this function.
- **num_DLA_cores** – int The number of DLA engines available to this builder.
- **error_recorder** – *IErrorRecorder* Application-implemented error reporting interface for TensorRT objects.
- **gpu_allocator** – *IGpuAllocator* The GPU allocator to be used by the *Builder*. All GPU memory acquired will use this allocator. If set to None, the default allocator will be used.
- **logger** – *ILogger* The logger provided when creating the refitter.

Parameters **logger** – The logger to use.

__del__(*self: tensorrt.tensorrt.Builder*) → None

__exit__(*exc_type*, *exc_value*, *traceback*)

Context managers are deprecated and have no effect. Objects are automatically freed when the reference count reaches 0.

__init__(*self: tensorrt.tensorrt.Builder*, *logger: tensorrt.tensorrt.ILogger*) → None

Parameters **logger** – The logger to use.

build_engine(*self: tensorrt.tensorrt.Builder*, *network: tensorrt.tensorrt.INetworkDefinition*, *config: tensorrt.tensorrt.IBuilderConfig*) → tensorrt.tensorrt.ICudaEngine

Builds an engine for the given *INetworkDefinition* and *IBuilderConfig*.

This enables the builder to build multiple engines based on the same network definition, but with different builder configurations.

Parameters

- **network** – The TensorRT *INetworkDefinition*.
- **config** – The TensorRT *IBuilderConfig*.

Returns A new *ICudaEngine*.

build_serialized_network(*self: tensorrt.tensorrt.Builder*, *network: tensorrt.tensorrt.INetworkDefinition*, *config: tensorrt.tensorrt.IBuilderConfig*) → tensorrt.tensorrt.IHostMemory

Builds and serializes a network for the given *INetworkDefinition* and *IBuilderConfig*.

This function allows building and serialization of a network without creating an engine.

Parameters

- **network** – Network definition.
- **config** – Builder configuration.

Returns A pointer to a *IHostMemory* object that contains a serialized network.

create_builder_config(*self: tensorrt.tensorrt.Builder*) → tensorrt.tensorrt.IBuilderConfig

Create a builder configuration object.

See *IBuilderConfig*

create_network(*self: tensorrt.tensorrt.Builder*, *flags: int = 0*) → tensorrt.tensorrt.INetworkDefinition

Create a *INetworkDefinition* object.

Parameters **flags** – *NetworkDefinitionCreationFlag* s combined using bitwise OR. Default value is 0. This mimics the behavior of create_network() in TensorRT 5.1.

Returns An empty TensorRT *INetworkDefinition*.

create_optimization_profile(*self: tensorrt.tensorrt.Builder*) → tensorrt.tensorrt.IOptimizationProfile

Create a new optimization profile.

If the network has any dynamic input tensors, the appropriate calls to *IOptimizationProfile.set_shape()* must be made. Likewise, if there are any shape input tensors, the appropriate calls to *IOptimizationProfile.set_shape_input()* are required.

See *IOptimizationProfile*

is_network_supported(*self: tensorrt.tensorrt.Builder*, *network: tensorrt.tensorrt.INetworkDefinition*, *config: tensorrt.tensorrt.IBuilderConfig*) → bool

Checks that a network is within the scope of the *IBuilderConfig* settings.

Parameters

- **network** – The network definition to check for configuration compliance.
- **config** – The configuration of the builder to use when checking the network.

Given an *INetworkDefinition* and an *IBuilderConfig*, check if the network falls within the constraints of the builder configuration based on the *EngineCapability*, *BuilderFlag*, and *DeviceType*.

Returns `True` if network is within the scope of the restrictions specified by the builder config, `False` otherwise. This function reports the conditions that are violated to the registered `ErrorRecorder`.

NOTE: This function will synchronize the cuda stream returned by `config.profile_stream` before returning.

reset(*self: tensorrt.tensorrt.Builder*) → None

Resets the builder state to default values.

4.6 ICudaEngine

class tensorrt.**ICudaEngine**

An *ICudaEngine* for executing inference on a built network.

The engine can be indexed with [] . When indexed in this way with an integer, it will return the corresponding binding name. When indexed with a string, it will return the corresponding binding index.

Variables

- **num_bindings** – int The number of binding indices.
- **max_batch_size** – int The maximum batch size which can be used for inference. For an engine built from an *INetworkDefinition* without an implicit batch dimension, this will always be 1 .
- **has_implicit_batch_dimension** – bool Whether the engine was built with an implicit batch dimension.. This is an engine-wide property. Either all tensors in the engine have an implicit batch dimension or none of them do. This is True if and only if the *INetworkDefinition* from which this engine was built was created with the NetworkDefinitionCreationFlag.EXPLICIT_BATCH flag.
- **num_layers** – int The number of layers in the network. The number of layers in the network is not necessarily the number in the original *INetworkDefinition*, as layers may be combined or eliminated as the *ICudaEngine* is optimized. This value can be useful when building per-layer tables, such as when aggregating profiling data over a number of executions.
- **max_workspace_size** – int The amount of workspace the *ICudaEngine* uses. The workspace size will be no greater than the value provided to the *Builder* when the *ICudaEngine* was built, and will typically be smaller. Workspace will be allocated for each *IExecutionContext* .
- **device_memory_size** – int The amount of device memory required by an *IExecutionContext* .
- **refittable** – bool Whether the engine can be refit.
- ***name*** – str The name of the network associated with the engine. The name is set during network creation and is retrieved after building or deserialization.
- **num_optimization_profiles** – int The number of optimization profiles defined for this engine. This is always at least 1.
- **error_recorder** – *IErrorRecorder* Application-implemented error reporting interface for TensorRT objects.
- **engine_capability** – *EngineCapability* The engine capability. See *EngineCapability* for details.
- **tactic_sources** – int The tactic sources required by this engine.
- **profiling_verbosity** – The profiling verbosity the builder config was set to when the engine was built.

__del__(*self: tensorrt.tensorrt.ICudaEngine*) → None

__exit__(*exc_type*, *exc_value*, *traceback*)

Context managers are deprecated and have no effect. Objects are automatically freed when the reference count reaches 0.

__getitem__(**args*, ***kwargs*)
Overloaded function.

1. __getitem__(self: tensorrt.tensorrt.ICudaEngine, arg0: str) -> int

2. __getitem__(self: tensorrt.tensorrt.ICudaEngine, arg0: int) -> str

__init__()
Initialize self. See help(type(self)) for accurate signature.

__len__(*self: tensorrt.tensorrt.ICudaEngine*) → int

binding_is_input(**args*, ***kwargs*)
Overloaded function.

1. binding_is_input(self: tensorrt.tensorrt.ICudaEngine, index: int) -> bool

   Determine whether a binding is an input binding.

   index The binding index.

   returns True if the index corresponds to an input binding and the index is in range.

2. binding_is_input(self: tensorrt.tensorrt.ICudaEngine, name: str) -> bool

   Determine whether a binding is an input binding.

   name The name of the tensor corresponding to an engine binding.

   returns True if the index corresponds to an input binding and the index is in range.

create_engine_inspector(*self: tensorrt.tensorrt.ICudaEngine*) → nvinfer1::IEngineInspector
Create an `IEngineInspector` which prints out the layer information of an engine or an execution context.

Returns The `IEngineInspector`.

create_execution_context(*self: tensorrt.tensorrt.ICudaEngine*) → tensorrt.tensorrt.IExecutionContext
Create an *IExecutionContext*.

Returns The newly created *IExecutionContext*.

create_execution_context_without_device_memory(*self: tensorrt.tensorrt.ICudaEngine*) → tensorrt.tensorrt.IExecutionContext
Create an *IExecutionContext* without any device memory allocated The memory for execution of this device context must be supplied by the application.

Returns An *IExecutionContext* without device memory allocated.

get_binding_bytes_per_component(*self: tensorrt.tensorrt.ICudaEngine*, *index: int*) → int
Return the number of bytes per component of an element. The vector component size is returned if *get_binding_vectorized_dim()* != -1.

Parameters **index** – The binding index.

get_binding_components_per_element(*self: tensorrt.tensorrt.ICudaEngine*, *index: int*) → int
Return the number of components included in one element.

The number of elements in the vectors is returned if *get_binding_vectorized_dim()* != -1.

Parameters **index** – The binding index.

get_binding_dtype(**args*, ***kwargs*)
Overloaded function.

1. get_binding_dtype(self: tensorrt.tensorrt.ICudaEngine, index: int) -> tensorrt.tensorrt.DataType

   Determine the required data type for a buffer from its binding index.

   index The binding index.

   Returns The type of data in the buffer.

2. get_binding_dtype(self: tensorrt.tensorrt.ICudaEngine, name: str) -> tensorrt.tensorrt.DataType

   Determine the required data type for a buffer from its binding index.

   name The name of the tensor corresponding to an engine binding.

   Returns The type of data in the buffer.

get_binding_format(*self: tensorrt.tensorrt.ICudaEngine*, *index: int*) → tensorrt.tensorrt.TensorFormat
Return the binding format.

Parameters **index** – The binding index.

get_binding_format_desc(*self: tensorrt.tensorrt.ICudaEngine*, *index: int*) → str
Return the human readable description of the tensor format.

The description includes the order, vectorization, data type, strides, etc. For example:

Example 1: kCHW + FP32
"Row major linear FP32 format"
Example 2: kCHW2 + FP16
"Two wide channel vectorized row major FP16 format"
Example 3: kHWC8 + FP16 + Line Stride = 32
"Channel major FP16 format where C % 8 == 0 and H Stride % 32 == 0"

Parameters **index** – The binding index.

get_binding_index(*self: tensorrt.tensorrt.ICudaEngine*, *name: str*) → int
Retrieve the binding index for a named tensor.

You can also use engine's *__getitem__()* with `engine[name]`. When invoked with a `str` , this will return the corresponding binding index.

IExecutionContext.execute_async() and *IExecutionContext.execute()* require an array of buffers. Engine bindings map from tensor names to indices in this array. Binding indices are assigned at *ICudaEngine* build time, and take values in the range [0 ... n-1] where n is the total number of inputs and outputs.

Parameters **name** – The tensor name.

Returns The binding index for the named tensor, or -1 if the name is not found.

get_binding_name(*self: tensorrt.tensorrt.ICudaEngine*, *index: int*) → str
Retrieve the name corresponding to a binding index.

You can also use engine's *__getitem__()* with `engine[index]`. When invoked with an `int` , this will return the corresponding binding name.

This is the reverse mapping to that provided by *get_binding_index()* .

Parameters **index** – The binding index.

Returns The name corresponding to the binding index.

get_binding_shape(**args*, ***kwargs*)
Overloaded function.

1. get_binding_shape(self: tensorrt.tensorrt.ICudaEngine, index: int) -> tensorrt.tensorrt.Dims

   Get the shape of a binding.

   index The binding index.

   Returns The shape of the binding if the index is in range, otherwise Dims()

2. get_binding_shape(self: tensorrt.tensorrt.ICudaEngine, name: str) -> tensorrt.tensorrt.Dims

   Get the shape of a binding.

   name The name of the tensor corresponding to an engine binding.

   Returns The shape of the binding if the tensor is present, otherwise Dims()

get_binding_vectorized_dim(*self: tensorrt.tensorrt.ICudaEngine*, *index: int*) → int
Return the dimension index that the buffer is vectorized.

Specifically -1 is returned if scalars per vector is 1.

Parameters **index** – The binding index.

get_location(**args*, ***kwargs*)
Overloaded function.

1. get_location(self: tensorrt.tensorrt.ICudaEngine, index: int) -> tensorrt.tensorrt.TensorLocation

   Get location of binding. This lets you know whether the binding should be a pointer to device or host memory.

   index The binding index.

   returns The location of the bound tensor with given index.

2. get_location(self: tensorrt.tensorrt.ICudaEngine, name: str) -> tensorrt.tensorrt.TensorLocation

   Get location of binding. This lets you know whether the binding should be a pointer to device or host memory.

   name The name of the tensor corresponding to an engine binding.

   returns The location of the bound tensor with given index.

get_profile_shape(**args*, ***kwargs*)
Overloaded function.

1. get_profile_shape(self: tensorrt.tensorrt.ICudaEngine, profile_index: int, binding: int) -> List[tensorrt.tensorrt.Dims]

   Get the minimum/optimum/maximum dimensions for a particular binding under an optimization profile.

   arg profile_index The index of the profile.

   arg binding The binding index or name.

   returns A `List[Dims]` of length 3, containing the minimum, optimum, and maximum shapes, in that order.

2. get_profile_shape(self: tensorrt.tensorrt.ICudaEngine, profile_index: int, binding: str) -> List[tensorrt.tensorrt.Dims]

   Get the minimum/optimum/maximum dimensions for a particular binding under an optimization profile.

   arg profile_index The index of the profile.

   arg binding The binding index or name.

   returns A `List[Dims]` of length 3, containing the minimum, optimum, and maximum shapes, in that order.

get_profile_shape_input(**args*, ***kwargs*)

Overloaded function.

1. get_profile_shape_input(self: tensorrt.tensorrt.ICudaEngine, profile_index: int, binding: int) -> List[List[int]]

   Get minimum/optimum/maximum values for an input shape binding under an optimization profile. If the specified binding is not an input shape binding, an exception is raised.

   arg profile_index The index of the profile.

   arg binding The binding index or name.

   returns A `List[List[int]]` of length 3, containing the minimum, optimum, and maximum values, in that order. If the values have not been set yet, an empty list is returned.

2. get_profile_shape_input(self: tensorrt.tensorrt.ICudaEngine, profile_index: int, binding: str) -> List[List[int]]

   Get minimum/optimum/maximum values for an input shape binding under an optimization profile. If the specified binding is not an input shape binding, an exception is raised.

   arg profile_index The index of the profile.

   arg binding The binding index or name.

   returns A `List[List[int]]` of length 3, containing the minimum, optimum, and maximum values, in that order. If the values have not been set yet, an empty list is returned.

is_execution_binding(*self: tensorrt.tensorrt.ICudaEngine*, *binding: int*) → bool

Returns `True` if tensor is required for execution phase, false otherwise.

For example, if a network uses an input tensor with binding i ONLY as the reshape dimensions for an *IShuffleLayer* , then `is_execution_binding(i) == False`, and a binding of *0* can be supplied for it when calling *IExecutionContext.execute()* or *IExecutionContext.execute_async()* .

Parameters **binding** – The binding index.

is_shape_binding(*self: tensorrt.tensorrt.ICudaEngine*, *binding: int*) → bool

Returns `True` if tensor is required as input for shape calculations or output from them.

TensorRT evaluates a network in two phases:

1. Compute shape information required to determine memory allocation requirements and validate that runtime sizes make sense.
2. Process tensors on the device.

Some tensors are required in phase 1. These tensors are called "shape tensors", and always have type `tensorrt.int32` and no more than one dimension. These tensors are not always shapes themselves, but might be used to calculate tensor shapes for phase 2.

is_shape_binding() returns true if the tensor is a required input or an output computed in phase 1. *is_execution_binding()* returns true if the tensor is a required input or an output computed in phase 2.

For example, if a network uses an input tensor with binding `i` as an input to an IElementWiseLayer that computes the reshape dimensions for an *IShuffleLayer*, `is_shape_binding(i) == True`

It's possible to have a tensor be required by both phases. For instance, a tensor can be used as a shape in an *IShuffleLayer* and as the indices for an *IGatherLayer* collecting floating-point data.

It's also possible to have a tensor required by neither phase that shows up in the engine's inputs. For example, if an input tensor is used only as an input to an *IShapeLayer*, only its shape matters and its values are irrelevant.

Parameters **binding** – The binding index.

serialize(*self: tensorrt.tensorrt.ICudaEngine*) → tensorrt.tensorrt.IHostMemory
Serialize the engine to a stream.

Returns An *IHostMemory* object containing the serialized *ICudaEngine*.

4.7 IExecutionContext

class tensorrt.**IExecutionContext**
Context for executing inference using an *ICudaEngine*. Multiple *IExecutionContext* s may exist for one *ICudaEngine* instance, allowing the same *ICudaEngine* to be used for the execution of multiple batches simultaneously.

Variables

- **debug_sync** – `bool` The debug sync flag. If this flag is set to true, the *ICudaEngine* will log the successful execution for each kernel during execute(). It has no effect when using execute_async().
- **profiler** – *IProfiler* The profiler in use by this *IExecutionContext*.
- **engine** – *ICudaEngine* The associated *ICudaEngine*.
- ***name*** – `str` The name of the *IExecutionContext*.
- **device_memory** – `capsule` The device memory for use by this execution context. The memory must be aligned on a 256-byte boundary, and its size must be at least `engine.device_memory_size`. If using *execute_async()* to run the network, The memory is in use from the invocation of *execute_async()* until network execution is complete. If using *execute()*, it is in use until *execute()* returns. Releasing or otherwise using the memory for other purposes during this time will result in undefined behavior.
- **active_optimization_profile** – `int` The active optimization profile for the context. The selected profile will be used in subsequent calls to *execute()* or *execute_async()*. Profile 0 is selected by default. Changing this value will invalidate all dynamic bindings for the current execution context, so that they have to be set again using *set_binding_shape()* before calling either *execute()* or *execute_async()*.
- **all_binding_shapes_specified** – `bool` Whether all dynamic dimensions of input tensors have been specified by calling *set_binding_shape()*. Trivially true if network has no dynamically shaped input tensors.

- **all_shape_inputs_specified** – bool Whether values for all input shape tensors have been specified by calling *set_shape_input()* . Trivially true if network has no input shape bindings.
- **error_recorder** – *IErrorRecorder* Application-implemented error reporting interface for TensorRT objects.

Ival enqueue_emits_profile bool Whether enqueue emits layer timing to the profiler. The default value is True. If set to False, enqueue will be asynchronous if there is a profiler attached. An extra method IExecutionContext::report_to_profiler() needs to be called to obtain the profiling data and report to the profiler attached.

__del__(*self: tensorrt.tensorrt.IExecutionContext*) → None

__exit__(*exc_type*, *exc_value*, *traceback*)
Context managers are deprecated and have no effect. Objects are automatically freed when the reference count reaches 0.

__init__()
Initialize self. See help(type(self)) for accurate signature.

execute(*self: tensorrt.tensorrt.IExecutionContext, batch_size: int = 1, bindings: List[int]*) → bool
Synchronously execute inference on a batch. This method requires a array of input and output buffers. The mapping from tensor names to indices can be queried using *ICudaEngine.get_binding_index()* .

Parameters

- **batch_size** – The batch size. This is at most the value supplied when the *ICudaEngine* was built.
- **bindings** – A list of integers representing input and output buffer addresses for the network.

Returns True if execution succeeded.

execute_async(*self: tensorrt.tensorrt.IExecutionContext, batch_size: int = 1, bindings: List[int], stream_handle: int, input_consumed: capsule = None*) → bool
Asynchronously execute inference on a batch. This method requires a array of input and output buffers. The mapping from tensor names to indices can be queried using ICudaEngine::get_binding_index() .

Parameters

- **batch_size** – The batch size. This is at most the value supplied when the *ICudaEngine* was built.
- **bindings** – A list of integers representing input and output buffer addresses for the network.
- **stream_handle** – A handle for a CUDA stream on which the inference kernels will be executed.
- **input_consumed** – An optional event which will be signaled when the input buffers can be refilled with new data

Returns True if the kernels were executed successfully.

execute_async_v2(*self: tensorrt.tensorrt.IExecutionContext, bindings: List[int], stream_handle: int, input_consumed: capsule = None*) → bool
Asynchronously execute inference on a batch. This method requires a array of input and output buffers. The mapping from tensor names to indices can be queried using

ICudaEngine::get_binding_index() . This method only works for execution contexts built from networks with no implicit batch dimension.

Parameters

- **bindings** – A list of integers representing input and output buffer addresses for the network.
- **stream_handle** – A handle for a CUDA stream on which the inference kernels will be executed.
- **input_consumed** – An optional event which will be signaled when the input buffers can be refilled with new data

Returns True if the kernels were executed successfully.

execute_v2(*self: tensorrt.tensorrt.IExecutionContext, bindings: List[int]*) → bool

Synchronously execute inference on a batch. This method requires a array of input and output buffers. The mapping from tensor names to indices can be queried using *ICudaEngine.get_binding_index()* . This method only works for execution contexts built from networks with no implicit batch dimension.

Parameters **bindings** – A list of integers representing input and output buffer addresses for the network.

Returns True if execution succeeded.

get_binding_shape(*self: tensorrt.tensorrt.IExecutionContext*, *binding: int*) → tensorrt.tensorrt.Dims

Get the dynamic shape of a binding.

If *set_binding_shape()* has been called on this binding (or if there are no dynamic dimensions), all dimensions will be positive. Otherwise, it is necessary to call *set_binding_shape()* before *execute_async()* or *execute()* may be called.

If the binding is out of range, an invalid Dims with nbDims == -1 is returned.

If ICudaEngine.binding_is_input(binding) is False , then both all_binding_shapes_specified and all_shape_inputs_specified must be True before calling this method.

Parameters **binding** – The binding index.

Returns A *Dims* object representing the currently selected shape.

get_shape(*self: tensorrt.tensorrt.IExecutionContext*, *binding: int*) → List[int]

Get values of an input shape tensor required for shape calculations or an output tensor produced by shape calculations.

Parameters **binding** – The binding index of an input tensor for which ICudaEngine.is_shape_binding(binding) is true.

If ICudaEngine.binding_is_input(binding) == False, then both all_binding_shapes_specified and all_shape_inputs_specified must be True before calling this method.

Returns An iterable containing the values of the shape tensor.

get_strides(*self: tensorrt.tensorrt.IExecutionContext*, *binding: int*) → tensorrt.tensorrt.Dims

Return the strides of the buffer for the given binding.

Note that strides can be different for different execution contexts with dynamic shapes.

Parameters **binding** – The binding index.

report_to_profiler(*self: tensorrt.tensorrt.IExecutionContext*) → bool

Calculate layer timing info for the current optimization profile in IExecutionContext and update the profiler after one iteration of inference launch.

If the enqueue_emits_profiler flag was set to true, the enqueue function will calculate layer timing implicitly if a profiler is provided. There is no need to call this function. If the enqueue_emits_profiler flag was set to false, the enqueue function will record the CUDA event timers if a profiler is provided. But it will not perform the layer timing calculation. This function needs to be called explicitly to calculate layer timing for the previous inference launch.

In the CUDA graph launch scenario, it will record the same set of CUDA events as in regular enqueue functions if the graph is captured from an *IExecutionContext* with profiler enabled. This function needs to be called after graph launch to report the layer timing info to the profiler.

Profiling CUDA graphs is only available from CUDA 11.1 onwards.

Returns `True` if the call succeeded, else `False` (e.g. profiler not provided, in CUDA graph capture mode, etc.)

set_binding_shape(*self: tensorrt.tensorrt.IExecutionContext*, *binding: int*, *shape: tensorrt.tensorrt.Dims*) → bool

Set the dynamic shape of a binding.

Requires the engine to be built without an implicit batch dimension. The binding must be an input tensor, and all dimensions must be compatible with the network definition (i.e. only the wildcard dimension -1 can be replaced with a new dimension > 0). Furthermore, the dimensions must be in the valid range for the currently selected optimization profile.

For all dynamic non-output bindings (which have at least one wildcard dimension of -1), this method needs to be called after setting `active_optimization_profile` before either *execute_async()* or *execute()* may be called. When all input shapes have been specified, `all_binding_shapes_specified` is set to `True` .

Parameters

- **binding** – The binding index.
- **shape** – The shape to set.

Returns `False` if an error occurs (e.g. specified binding is out of range for the currently selected optimization profile or specified shape is inconsistent with min-max range of the optimization profile), else `True`.

Note that the network can still be invalid for certain combinations of input shapes that lead to invalid output shapes. To confirm the correctness of the network input shapes, check whether the output binding has valid shape using *get_binding_shape()* on the output binding.

set_optimization_profile_async(*self: tensorrt.tensorrt.IExecutionContext*, *profile_index: int*, *stream_handle: int*) → bool

Set the optimization profile with async semantics

Parameters

- **profile_index** – The index of the optimization profile
- **stream_handle** – cuda stream on which the work to switch optimization profile can be enqueued

When an optimization profile is switched via this API, TensorRT may require that data is copied via cudaMemcpyAsync. It is the application's responsibility to guarantee that synchronization between the profile sync stream and the enqueue stream occurs.

Returns `True` if the optimization profile was set successfully

set_shape_input (*self: tensorrt.tensorrt.IExecutionContext, binding: int, shape: List[int]*) → bool
Set values of an input shape tensor required by shape calculations.

Parameters

- **binding** – The binding index of an input tensor for which `ICudaEngine.is_shape_binding(binding)` and `ICudaEngine.binding_is_input(binding)` are both true.
- **shape** – An iterable containing the values of the input shape tensor. The number of values should be the product of the dimensions returned by `get_binding_shape(binding)`.

If `ICudaEngine.is_shape_binding(binding)` and `ICudaEngine.binding_is_input(binding)` are both true, this method must be called before *execute_async()* or *execute()* may be called. Additionally, this method must not be called if either `ICudaEngine.is_shape_binding(binding)` or `ICudaEngine.binding_is_input(binding)` are false.

Returns `False` if an error occurs (e.g. specified binding is out of range for the currently selected optimization profile or specified shape values are inconsistent with min-max range of the optimization profile), else `True`.

Note that the network can still be invalid for certain combinations of input shapes that lead to invalid output shapes. To confirm the correctness of the network input shapes, check whether the output binding has valid shape using *get_binding_shape()* on the output binding.

4.8 Runtime

class tensorrt.**Runtime** (*self: tensorrt.tensorrt.Runtime*, *logger: tensorrt.tensorrt.ILogger*) → None
Allows a serialized *ICudaEngine* to be deserialized.

Variables

- **error_recorder** – *IErrorRecorder* Application-implemented error reporting interface for TensorRT objects.
- **gpu_allocator** – *IGpuAllocator* The GPU allocator to be used by the *Runtime*. All GPU memory acquired will use this allocator. If set to None, the default allocator will be used (Default: cudaMalloc/cudaFree).
- **DLA_core** – `int` The DLA core that the engine executes on. Must be between 0 and N-1 where N is the number of available DLA cores.
- **num_DLA_cores** – `int` The number of DLA engines available to this builder.
- **logger** – *ILogger* The logger provided when creating the refitter.

Parameters **logger** – The logger to use.

__del__ (*self: tensorrt.tensorrt.Runtime*) → None

__exit__ (*exc_type*, *exc_value*, *traceback*)
Context managers are deprecated and have no effect. Objects are automatically freed when the reference count reaches 0.

__init__ (*self: tensorrt.tensorrt.Runtime*, *logger: tensorrt.tensorrt.ILogger*) → None

Parameters **logger** – The logger to use.

deserialize_cuda_engine(*self: tensorrt.tensorrt.Runtime*, *serialized_engine: buffer*) → tensorrt.tensorrt.ICudaEngine

Deserialize an *ICudaEngine* from a stream.

Parameters **serialized_engine** – The `buffer` that holds the serialized *ICudaEngine* .

Returns The *ICudaEngine*, or None if it could not be deserialized.

4.9 Refitter

class tensorrt.**Refitter**(*self: tensorrt.tensorrt.Refitter*, *engine: tensorrt.tensorrt.ICudaEngine*, *logger: tensorrt.tensorrt.ILogger*) → None

Updates weights in an *ICudaEngine* .

Variables

- **error_recorder** – *IErrorRecorder* Application-implemented error reporting interface for TensorRT objects.
- **logger** – *ILogger* The logger provided when creating the refitter.

Parameters

- **engine** – The engine to refit.
- **logger** – The logger to use.

__del__(*self: tensorrt.tensorrt.Refitter*) → None

__exit__(*exc_type*, *exc_value*, *traceback*)

Context managers are deprecated and have no effect. Objects are automatically freed when the reference count reaches 0.

__init__(*self: tensorrt.tensorrt.Refitter*, *engine: tensorrt.tensorrt.ICudaEngine*, *logger: tensorrt.tensorrt.ILogger*) → None

Parameters

- **engine** – The engine to refit.
- **logger** – The logger to use.

get_all(*self: tensorrt.tensorrt.Refitter*) → Tuple[List[str], List[tensorrt.tensorrt.WeightsRole]]

Get description of all weights that could be refitted.

Returns The names of layers with refittable weights, and the roles of those weights.

get_all_weights(*self: tensorrt.tensorrt.Refitter*) → List[str]

Get names of all weights that could be refitted.

Returns The names of refittable weights.

get_dynamic_range(*self: tensorrt.tensorrt.Refitter*, *tensor_name: str*) → tuple

Gets the dynamic range of a tensor. If the dynamic range was never set, returns the range computed during calibration.

Parameters **tensor_name** – The name of the tensor whose dynamic range to retrieve.

Returns `Tuple[float, float]` A tuple containing the [minimum, maximum] of the dynamic range.

get_missing(*self: tensorrt.tensorrt.Refitter*) → Tuple[List[str], List[tensorrt.tensorrt.WeightsRole]]
Get description of missing weights.

For example, if some Weights have been set, but the engine was optimized in a way that combines weights, any unsupplied Weights in the combination are considered missing.

Returns The names of layers with missing weights, and the roles of those weights.

get_missing_weights(*self: tensorrt.tensorrt.Refitter*) → List[str]
Get names of missing weights.

For example, if some Weights have been set, but the engine was optimized in a way that combines weights, any unsupplied Weights in the combination are considered missing.

Returns The names of missing weights, empty string for unnamed weights.

get_tensors_with_dynamic_range(*self: tensorrt.tensorrt.Refitter*) → List[str]
Get names of all tensors that have refittable dynamic ranges.

Returns The names of tensors with refittable dynamic ranges.

refit_cuda_engine(*self: tensorrt.tensorrt.Refitter*) → bool
Updates associated engine. Return `True` if successful.

Failure occurs if *get_missing()* != 0 before the call.

set_dynamic_range(*self: tensorrt.tensorrt.Refitter, tensor_name: str, range: List[float]*) → bool
Update dynamic range for a tensor.

Parameters

- **tensor_name** – The name of the tensor whose dynamic range to update.
- **range** – The new range.

Returns `True` if successful, `False` otherwise.

Returns false if there is no Int8 engine tensor derived from a network tensor of that name. If successful, then *get_missing()* may report that some weights need to be supplied.

set_named_weights(*self: tensorrt.tensorrt.Refitter*, *name: str*, *weights: tensorrt.tensorrt.Weights*) → bool
Specify new weights of given name. Possible reasons for rejection are:

- The name of weights is empty or does not correspond to any refittable weights.
- The number of weights is inconsistent with the original specification.

Modifying the weights before method refit_cuda_engine() completes will result in undefined behavior.

Parameters

- **name** – The name of the weights to be refitted.
- **weights** – The new weights to associate with the name.

Returns `True` on success, or `False` if new weights are rejected.

set_weights(*self: tensorrt.tensorrt.Refitter*, *layer_name: str*, *role: tensorrt.tensorrt.WeightsRole*, *weights: tensorrt.tensorrt.Weights*) → bool
Specify new weights for a layer of given name. Possible reasons for rejection are:

- There is no such layer by that name.
- The layer does not have weights with the specified role.
- The number of weights is inconsistent with the layer's original specification.

Modifying the weights before *refit_cuda_engine()* completes will result in undefined behavior.

Parameters

- **layer_name** – The name of the layer.
- **role** – The role of the weights. See *WeightsRole* for more information.
- **weights** – The weights to refit with.

Returns `True` on success, or `False` if new weights are rejected.

4.10 IErrorRecorder

`tensorrt.`**ErrorCodeTRT**

Error codes that can be returned by TensorRT during execution.

Members:

SUCCESS : Execution completed successfully.

UNSPECIFIED_ERROR : An error that does not fall into any other category. This error is included for forward compatibility.

INTERNAL_ERROR : A non-recoverable TensorRT error occurred.

INVALID_ARGUMENT : An argument passed to the function is invalid in isolation. This is a violation of the API contract.

INVALID_CONFIG : An error occurred when comparing the state of an argument relative to other arguments. For example, the dimensions for concat differ between two tensors outside of the channel dimension. This error is triggered when an argument is correct in isolation, but not relative to other arguments. This is to help to distinguish from the simple errors from the more complex errors. This is a violation of the API contract.

FAILED_ALLOCATION : An error occurred when performing an allocation of memory on the host or the device. A memory allocation error is normally fatal, but in the case where the application provided its own memory allocation routine, it is possible to increase the pool of available memory and resume execution.

FAILED_INITIALIZATION : One, or more, of the components that TensorRT relies on did not initialize correctly. This is a system setup issue.

FAILED_EXECUTION : An error occurred during execution that caused TensorRT to end prematurely, either an asynchronous error or other execution errors reported by CUDA/DLA. In a dynamic system, the data can be thrown away and the next frame can be processed or execution can be retried. This is either an execution error or a memory error.

FAILED_COMPUTATION : An error occurred during execution that caused the data to become corrupted, but execution finished. Examples of this error are NaN squashing or integer overflow. In a dynamic system, the data can be thrown away and the next frame can be processed or execution can be retried. This is either a data corruption error, an input error, or a range error.

INVALID_STATE : TensorRT was put into a bad state by incorrect sequence of function calls. An example of an invalid state is specifying a layer to be DLA only without GPU fallback, and that layer is not supported by DLA. This can occur in situations where a service is optimistically executing networks for multiple different configurations without checking proper error configurations, and instead throwing away bad configurations caught by TensorRT. This is a violation of the API contract, but can be recoverable.

Example of a recovery: GPU fallback is disabled and conv layer with large filter(63x63) is specified to run on DLA. This will fail due to DLA not supporting the large kernel size. This can be recovered by either turning on GPU fallback or setting the layer to run on the GPU.

UNSUPPORTED_STATE : An error occurred due to the network not being supported on the device due to constraints of the hardware or system. An example is running a unsafe layer in a safety certified context, or a resource requirement for the current network is greater than the capabilities of the target device. The network is otherwise correct, but the network and hardware combination is problematic. This can be recoverable. Examples: * Scratch space requests larger than available device memory and can be recovered by increasing allowed workspace size. * Tensor size exceeds the maximum element count and can be recovered by reducing the maximum batch size.

class tensorrt.**IErrorRecorder**(*self: tensorrt.tensorrt.IErrorRecorder*) → None

Reference counted application-implemented error reporting interface for TensorRT objects.

The error reporting mechanism is a user defined object that interacts with the internal state of the object that it is assigned to in order to determine information about abnormalities in execution. The error recorder gets both an error enum that is more descriptive than pass/fail and also a description that gives more detail on the exact failure modes. In the safety context, the error strings are all limited to 128 characters in length. The ErrorRecorder gets passed along to any class that is created from another class that has an ErrorRecorder assigned to it. For example, assigning an ErrorRecorder to an Builder allows all INetwork's, ILayer's, and ITensor's to use the same error recorder. For functions that have their own ErrorRecorder accessor functions. This allows registering a different error recorder or de-registering of the error recorder for that specific object.

The ErrorRecorder object implementation must be thread safe if the same ErrorRecorder is passed to different interface objects being executed in parallel in different threads. All locking and synchronization is pushed to the interface implementation and TensorRT does not hold any synchronization primitives when accessing the interface functions.

clear(*self: tensorrt.tensorrt.IErrorRecorder*) → None

Clear the error stack on the error recorder.

Removes all the tracked errors by the error recorder. This function must guarantee that after this function is called, and as long as no error occurs, *num_errors* will be zero.

get_error_code(*self: tensorrt.tensorrt.IErrorRecorder*, *arg0: int*) → tensorrt.tensorrt.ErrorCodeTRT

Returns the ErrorCode enumeration.

The error_idx specifies what error code from 0 to *num_errors*-1 that the application wants to analyze and return the error code enum.

Parameters **error_idx** – A 32bit integer that indexes into the error array.

Returns Returns the enum corresponding to error_idx.

get_error_desc(*self: tensorrt.tensorrt.IErrorRecorder*, *arg0: int*) → str

Returns description of the error.

For the error specified by the idx value, return description of the error. In the safety context there is a constant length requirement to remove any dynamic memory allocations and the error message may be truncated. The format of the error description is "<EnumAsStr> - <Description>".

Parameters **error_idx** – A 32bit integer that indexes into the error array.

Returns Returns description of the error.

has_overflowed(*self: tensorrt.tensorrt.IErrorRecorder*) → bool

Determine if the error stack has overflowed.

In the case when the number of errors is large, this function is used to query if one or more errors have been dropped due to lack of storage capacity. This is especially important in the automotive safety case where the internal error handling mechanisms cannot allocate memory.

Returns True if errors have been dropped due to overflowing the error stack.

num_errors(*self: tensorrt.tensorrt.IErrorRecorder*) → int
Return the number of errors

Determines the number of errors that occurred between the current point in execution and the last time that the clear() was executed. Due to the possibility of asynchronous errors occuring, a TensorRT API can return correct results, but still register errors with the Error Recorder. The value of getNbErrors must monotonically increases until clear() is called.

Returns Returns the number of errors detected, or 0 if there are no errors.

report_error(*self: tensorrt.tensorrt.IErrorRecorder*, *arg0: tensorrt.tensorrt.ErrorCodeTRT*, *arg1: str*) → bool
Clear the error stack on the error recorder.

Report an error to the user that has a given value and human readable description. The function returns false if processing can continue, which implies that the reported error is not fatal. This does not guarantee that processing continues, but provides a hint to TensorRT.

Parameters

- **val** – The error code enum that is being reported.
- **desc** – The description of the error.

Returns True if the error is determined to be fatal and processing of the current function must end.

4.11 ITimingCache

class tensorrt.**ITimingCache**
Class to handle tactic timing info collected from builder.

combine(*self: tensorrt.tensorrt.ITimingCache*, *input_cache: tensorrt.tensorrt.ITimingCache*, *ignore_mismatch: bool*) → bool
Combine input timing cache into local instance.

Append entries in input cache to local cache. Conflicting entries will be skipped. The input cache must be generated by a TensorRT build of exact same version, otherwise combine will be skipped and return false. `bool(ignore_mismatch) == True` if combining a timing cache created from a different device.

Parameters

- **input_cache** – The input timing cache
- **ignore_mismatch** – Whether or not to allow cache verification header mismatch

Returns A *bool* indicating whether the combine operation is done successfully.

reset(*self: tensorrt.tensorrt.ITimingCache*) → bool
Empty the timing cache

Returns A *bool* indicating whether the reset operation is done successfully.

serialize(*self: tensorrt.tensorrt.ITimingCache*) → tensorrt.tensorrt.IHostMemory
Serialize a timing cache to a *IHostMemory* object.

Returns An *IHostMemory* object that contains a serialized timing cache.

4.12 GPU Allocator

4.12.1 AllocatorFlag

tensorrt.**AllocatorFlag**

Members:

RESIZABLE : TensorRT may call realloc() on this allocation

4.12.2 IGpuAllocator

class tensorrt.**IGpuAllocator**(*self: tensorrt.tensorrt.IGpuAllocator*) → None

Application-implemented class for controlling allocation on the GPU.

__init__(*self: tensorrt.tensorrt.IGpuAllocator*) → None

allocate(*self: tensorrt.tensorrt.IGpuAllocator*, *size: int*, *alignment: int*, *flags: int*) → capsule

A callback implemented by the application to handle acquisition of GPU memory. If an allocation request of size 0 is made, `None` should be returned.

If an allocation request cannot be satisfied, `None` should be returned.

Parameters

- **size** – The size of the memory required.
- **alignment** – The required alignment of memory. Alignment will be zero or a power of 2 not exceeding the alignment guaranteed by cudaMalloc. Thus this allocator can be safely implemented with cudaMalloc/cudaFree. An alignment value of zero indicates any alignment is acceptable.
- **flags** – Allocation flags. See *AllocatorFlag*

Returns The address of the allocated memory

deallocate(*self: tensorrt.tensorrt.IGpuAllocator*, *memory: capsule*) → bool

A callback implemented by the application to handle release of GPU memory.

TensorRT may pass a 0 to this function if it was previously returned by `allocate()`.

Parameters **memory** – The memory address of the memory to release.

Returns True if the acquired memory is released successfully.

free(*self: tensorrt.tensorrt.IGpuAllocator*, *memory: capsule*) → None

A callback implemented by the application to handle release of GPU memory.

TensorRT may pass a 0 to this function if it was previously returned by `allocate()`.

Parameters **memory** – The memory address of the memory to release.

reallocate(*self: tensorrt.tensorrt.IGpuAllocator*, *address: capsule*, *alignment: int*, *new_size: int*) → capsule

A callback implemented by the application to resize an existing allocation.

Only allocations which were allocated with AllocatorFlag.RESIZABLE will be resized.

Options are one of: - resize in place leaving min(old_size, new_size) bytes unchanged and return the original address - move min(old_size, new_size) bytes to a new location of sufficient size and return its address - return nullptr, to indicate that the request could not be fulfilled.

If nullptr is returned, TensorRT will assume that resize() is not implemented, and that the allocation at address is still valid.

This method is made available for use cases where delegating the resize strategy to the application provides an opportunity to improve memory management. One possible implementation is to allocate a large virtual device buffer and progressively commit physical memory with cuMemMap. CU_MEM_ALLOC_GRANULARITY_RECOMMENDED is suggested in this case.

TensorRT may call realloc to increase the buffer by relatively small amounts.

Parameters

- **address** – the address of the original allocation.
- **alignment** – The alignment used by the original allocation.
- **new_size** – The new memory size required.

Returns The address of the reallocated memory

4.13 EngineInspector

class tensorrt.**EngineInspector**

An engine inspector which prints out the layer information of an engine or an execution context. The engine or the context must be set before get_layer_information() or get_engine_information() can be called.

The amount of printed information depends on the profiling verbosity setting of the builder config when the engine is built. By default, the profiling verbosity is set to ProfilingVerbosity.LAYER_NAMES_ONLY, and only layer names will be printed. If the profiling verbosity is set to ProfilingVerbosity.DETAILED, layer names and layer parameters will be printed. If the profiling verbosity is set to ProfilingVerbosity.NONE, no layer information will be printed.

Variables

- **engine** – *ICudaEngine* Set or get the engine currently being inspected.
- **context** – *IExecutionContext* Set or get context currently being inspected.
- **error_recorder** – *IErrorRecorder* Application-implemented error reporting interface for TensorRT objects.

__init__()

Initialize self. See help(type(self)) for accurate signature.

get_engine_information(*self: tensorrt.tensorrt.EngineInspector*, *format: tensorrt.tensorrt.LayerInformationFormat*) → str

Get a string describing the information about all the layers in the current engine or the execution context.

Parameters **format** – LayerInformationFormat The format the layer information should be printed in.

Returns A string describing the information about all the layers in the current engine or the execution context.

get_layer_information(*self: tensorrt.tensorrt.EngineInspector*, *layer_index: int*, *format: tensorrt.tensorrt.LayerInformationFormat*) → str

Get a string describing the information about a specific layer in the current engine or the execution context.

Parameters

- **layer_index** – The index of the layer. It must lie in [0, engine.num_layers].

- **format** – LayerInformationFormat The format the layer information should be printed in.

Returns A string describing the information about a specific layer in the current engine or the execution context.

CHAPTER

FIVE

NETWORK

5.1 INetworkDefinition

class tensorrt.**INetworkDefinition**

Represents a TensorRT Network from which the Builder can build an Engine

Variables

- **num_layers** – int The number of layers in the network.
- **num_inputs** – int The number of inputs of the network.
- **num_outputs** – int The number of outputs of the network.
- ***name*** – str The name of the network. This is used so that it can be associated with a built engine. The name must be at most 128 characters in length. TensorRT makes no use of this string except storing it as part of the engine so that it may be retrieved at runtime. A name unique to the builder will be generated by default.
- **has_implicit_batch_dimension** – bool Whether the network was created with an implicit batch dimension. This is a network-wide property. Either all tensors in the network have an implicit batch dimension or none of them do. This is True when the INetworkDefinition is created with default flags: `create_network()`. To specify explicit batch, set the flag: `create_network(flags=1 << int(tensorrt.NetworkDefinitionCreationFlag.EXPLICIT_BATCH))`.
- **has_explicit_precision** – bool True if and only if this *INetworkDefinition* was created with `NetworkDefinitionCreationFlag.EXPLICIT_PRECISION` set: `create_network(flags=(1 << int(NetworkDefinitionCreationFlag.EXPLICIT_PRECISION)))`.
- **error_recorder** – *IErrorRecorder* Application-implemented error reporting interface for TensorRT objects.

__del__(*self: tensorrt.tensorrt.INetworkDefinition*) → None

__exit__(*exc_type*, *exc_value*, *traceback*)

Context managers are deprecated and have no effect. Objects are automatically freed when the reference count reaches 0.

__getitem__(*self: tensorrt.tensorrt.INetworkDefinition*, *arg0: int*) → tensorrt.tensorrt.ILayer

__init__()

Initialize self. See help(type(self)) for accurate signature.

__len__(*self: tensorrt.tensorrt.INetworkDefinition*) → int

add_activation(*self: tensorrt.tensorrt.INetworkDefinition*, *input: tensorrt.tensorrt.ITensor*, *type: tensorrt.tensorrt.ActivationType*) → tensorrt.tensorrt.IActivationLayer

Add an activation layer to the network. See `IActivationLayer` for more information.

Parameters

- **input** – The input tensor to the layer.
- **type** – The type of activation function to apply.

Returns The new activation layer, or `None` if it could not be created.

add_assertion(*self: tensorrt.tensorrt.INetworkDefinition*, *condition: tensorrt.tensorrt.ITensor*, *message: str*) → tensorrt.tensorrt.IAssertionLayer

Add a assertion layer. See `IAssertionLayer` for more information.

Parameters

- **condition** – The condition tensor to the layer.
- **message** – The message to print if the assertion fails.

Returns The new assertion layer, or `None` if it could not be created.

add_concatenation(*self: tensorrt.tensorrt.INetworkDefinition,* *inputs: List[tensorrt.tensorrt.ITensor]*) → tensorrt.tensorrt.IConcatenationLayer

Add a concatenation layer to the network. Note that all tensors must have the same dimension except for the Channel dimension. See `IConcatenationLayer` for more information.

Parameters **inputs** – The input tensors to the layer.

Returns The new concatenation layer, or `None` if it could not be created.

add_constant(*self: tensorrt.tensorrt.INetworkDefinition*, *shape: tensorrt.tensorrt.Dims*, *weights: tensorrt.tensorrt.Weights*) → tensorrt.tensorrt.IConstantLayer

Add a constant layer to the network. See `IConstantLayer` for more information.

Parameters

- **shape** – The shape of the constant.
- **weights** – The constant value, represented as weights.

Returns The new constant layer, or `None` if it could not be created.

add_convolution(*self: tensorrt.tensorrt.INetworkDefinition*, *input: tensorrt.tensorrt.ITensor*, *num_output_maps: int*, *kernel_shape: tensorrt.tensorrt.DimsHW*, *kernel: tensorrt.tensorrt.Weights*, *bias: tensorrt.tensorrt.Weights = None*) → tensorrt.tensorrt.IConvolutionLayer

Add a 2D convolution layer to the network. See `IConvolutionLayer` for more information.

Parameters

- **input** – The input tensor to the convolution.
- **num_output_maps** – The number of output feature maps for the convolution.
- **kernel_shape** – The dimensions of the convolution kernel.
- **kernel** – The kernel weights for the convolution.
- **bias** – The optional bias weights for the convolution.

Returns The new convolution layer, or `None` if it could not be created.

add_convolution_nd(*self: tensorrt.tensorrt.INetworkDefinition*, *input: tensorrt.tensorrt.ITensor*, *num_output_maps: int*, *kernel_shape: tensorrt.tensorrt.Dims*, *kernel: tensorrt.tensorrt.Weights*, *bias: tensorrt.tensorrt.Weights = None*) → tensorrt.tensorrt.IConvolutionLayer

Add a multi-dimension convolution layer to the network. See *IConvolutionLayer* for more information.

Parameters

- **input** – The input tensor to the convolution.
- **num_output_maps** – The number of output feature maps for the convolution.
- **kernel_shape** – The dimensions of the convolution kernel.
- **kernel** – The kernel weights for the convolution.
- **bias** – The optional bias weights for the convolution.

Returns The new convolution layer, or `None` if it could not be created.

add_deconvolution(*self: tensorrt.tensorrt.INetworkDefinition*, *input: tensorrt.tensorrt.ITensor*, *num_output_maps: int*, *kernel_shape: tensorrt.tensorrt.DimsHW*, *kernel: tensorrt.tensorrt.Weights*, *bias: tensorrt.tensorrt.Weights = None*) → tensorrt.tensorrt.IDeconvolutionLayer

Add a 2D deconvolution layer to the network. See *IDeconvolutionLayer* for more information.

Parameters

- **input** – The input tensor to the layer.
- **num_output_maps** – The number of output feature maps.
- **kernel_shape** – The dimensions of the convolution kernel.
- **kernel** – The kernel weights for the convolution.
- **bias** – The optional bias weights for the convolution.

Returns The new deconvolution layer, or `None` if it could not be created.

add_deconvolution_nd(*self: tensorrt.tensorrt.INetworkDefinition*, *input: tensorrt.tensorrt.ITensor*, *num_output_maps: int*, *kernel_shape: tensorrt.tensorrt.Dims*, *kernel: tensorrt.tensorrt.Weights*, *bias: tensorrt.tensorrt.Weights = None*) → tensorrt.tensorrt.IDeconvolutionLayer

Add a multi-dimension deconvolution layer to the network. See *IDeconvolutionLayer* for more information.

Parameters

- **input** – The input tensor to the layer.
- **num_output_maps** – The number of output feature maps.
- **kernel_shape** – The dimensions of the convolution kernel.
- **kernel** – The kernel weights for the convolution.
- **bias** – The optional bias weights for the convolution.

Returns The new deconvolution layer, or `None` if it could not be created.

add_dequantize(*self: tensorrt.tensorrt.INetworkDefinition*, *input: tensorrt.tensorrt.ITensor*, *scale: tensorrt.tensorrt.ITensor*) → tensorrt.tensorrt.IDequantizeLayer

Add a dequantization layer to the network. See *IDequantizeLayer* for more information.

Parameters

- **input** – A tensor to quantize.
- **scale** – A tensor with the scale coefficients.

Returns The new dequantization layer, or None if it could not be created.

add_einsum(*self: tensorrt.tensorrt.INetworkDefinition, inputs: List[tensorrt.tensorrt.ITensor], equation: str*) → tensorrt.tensorrt.IEinsumLayer

Adds an Einsum layer to the network. See *IEinsumLayer* for more information.

Parameters

- **inputs** – The input tensors to the layer.
- **equation** – The Einsum equation of the layer.

Returns the new Einsum layer, or None if it could not be created.

add_elementwise(*self: tensorrt.tensorrt.INetworkDefinition*, *input1: tensorrt.tensorrt.ITensor*, *input2: tensorrt.tensorrt.ITensor*, *op: tensorrt.tensorrt.ElementWiseOperation*) → tensorrt.tensorrt.IElementWiseLayer

Add an elementwise layer to the network. See *IElementWiseLayer* for more information.

Parameters

- **input1** – The first input tensor to the layer.
- **input2** – The second input tensor to the layer.
- **op** – The binary operation that the layer applies.

The input tensors must have the same number of dimensions. For each dimension, their lengths must match, or one of them must be one. In the latter case, the tensor is broadcast along that axis.

The output tensor has the same number of dimensions as the inputs. For each dimension, its length is the maximum of the lengths of the corresponding input dimension.

Returns The new element-wise layer, or None if it could not be created.

add_fill(*self: tensorrt.tensorrt.INetworkDefinition*, *shape: tensorrt.tensorrt.Dims*, *op: tensorrt.tensorrt.FillOperation*) → tensorrt.tensorrt.IFillLayer

Add a fill layer. See *IFillLayer* for more information.

Parameters

- **dimensions** – The output tensor dimensions.
- **op** – The fill operation that the layer applies.

Returns The new fill layer, or None if it could not be created.

add_fully_connected(*self: tensorrt.tensorrt.INetworkDefinition*, *input: tensorrt.tensorrt.ITensor*, *num_outputs: int*, *kernel: tensorrt.tensorrt.Weights*, *bias: tensorrt.tensorrt.Weights = None*) → tensorrt.tensorrt.IFullyConnectedLayer

Add a fully connected layer to the network. See *IFullyConnectedLayer* for more information.

Parameters

- **input** – The input tensor to the layer.
- **num_outputs** – The number of outputs of the layer.
- **kernel** – The kernel weights for the convolution.
- **bias** – The optional bias weights for the convolution.

Returns The new fully connected layer, or None if it could not be created.

add_gather(*self: tensorrt.tensorrt.INetworkDefinition*, *input: tensorrt.tensorrt.ITensor*, *indices: tensorrt.tensorrt.ITensor*, *axis: int*) → tensorrt.tensorrt.IGatherLayer
Add a gather layer to the network. See *IGatherLayer* for more information.

Parameters

- **input** – The tensor to gather values from.
- **indices** – The tensor to get indices from to populate the output tensor.
- **axis** – The non-batch dimension axis in the data tensor to gather on.

Returns The new gather layer, or None if it could not be created.

add_gather_v2(*self: tensorrt.tensorrt.INetworkDefinition*, *input: tensorrt.tensorrt.ITensor*, *indices: tensorrt.tensorrt.ITensor*, *mode: tensorrt.tensorrt.GatherMode*) → tensorrt.tensorrt.IGatherLayer
Add a gather layer to the network. See *IGatherLayer* for more information.

Parameters

- **input** – The tensor to gather values from.
- **indices** – The tensor to get indices from to populate the output tensor.
- **mode** – The gather mode.

Returns The new gather layer, or None if it could not be created.

add_identity(*self: tensorrt.tensorrt.INetworkDefinition*, *input: tensorrt.tensorrt.ITensor*) → tensorrt.tensorrt.IIdentityLayer
Add an identity layer. See *IIdentityLayer* for more information.

Parameters **input** – The input tensor to the layer.

Returns The new identity layer, or None if it could not be created.

add_if_conditional(*self: tensorrt.tensorrt.INetworkDefinition*) → tensorrt.tensorrt.IIfConditional
Adds an if-conditional to the network, which provides a way to specify subgraphs that will be conditionally executed using lazy evaluation. See *IIfConditional* for more information.

Returns The new if-condtional, or None if it could not be created.

add_input(*self: tensorrt.tensorrt.INetworkDefinition*, *name: str*, *dtype: tensorrt.tensorrt.DataType*, *shape: tensorrt.tensorrt.Dims*) → tensorrt.tensorrt.ITensor
Adds an input to the network.

Parameters

- **name** – The name of the tensor.
- **dtype** – The data type of the tensor. Currently, tensorrt.int8 is not supported for inputs.
- **shape** – The dimensions of the tensor. The total volume must be less than 2^30 elements.

Returns The newly added Tensor.

add_loop(*self: tensorrt.tensorrt.INetworkDefinition*) → tensorrt.tensorrt.ILoop
Adds a loop to the network, which provides a way to specify a recurrent subgraph. See *ILoop* for more information.

Returns The new loop layer, or None if it could not be created.

add_lrn(*self: tensorrt.tensorrt.INetworkDefinition*, *input: tensorrt.tensorrt.ITensor*, *window: int*, *alpha: float*, *beta: float*, *k: float*) → tensorrt.tensorrt.ILRNLayer
Add a LRN layer to the network. See *ILRNLayer* for more information.

Parameters

- **input** – The input tensor to the layer.
- **window** – The size of the window.
- **alpha** – The alpha value for the LRN computation.
- **beta** – The beta value for the LRN computation.
- **k** – The k value for the LRN computation.

Returns The new LRN layer, or `None` if it could not be created.

add_matrix_multiply(*self: tensorrt.tensorrt.INetworkDefinition*, *input0: tensorrt.tensorrt.ITensor*, *op0: tensorrt.tensorrt.MatrixOperation*, *input1: tensorrt.tensorrt.ITensor*, *op1: tensorrt.tensorrt.MatrixOperation*) → tensorrt.tensorrt.IMatrixMultiplyLayer

Add a matrix multiply layer to the network. See *IMatrixMultiplyLayer* for more information.

Parameters

- **input0** – The first input tensor (commonly A).
- **op0** – Whether to treat input0 as matrices, transposed matrices, or vectors.
- **input1** – The second input tensor (commonly B).
- **op1** – Whether to treat input1 as matrices, transposed matrices, or vectors.

Returns The new matrix multiply layer, or `None` if it could not be created.

add_padding(*self: tensorrt.tensorrt.INetworkDefinition*, *input: tensorrt.tensorrt.ITensor*, *pre_padding: tensorrt.tensorrt.DimsHW*, *post_padding: tensorrt.tensorrt.DimsHW*) → tensorrt.tensorrt.IPaddingLayer

Add a 2D padding layer to the network. See *IPaddingLayer* for more information.

Parameters

- **input** – The input tensor to the layer.
- **pre_padding** – The padding to apply to the start of the tensor.
- **post_padding** – The padding to apply to the end of the tensor.

Returns The new padding layer, or `None` if it could not be created.

add_padding_nd(*self: tensorrt.tensorrt.INetworkDefinition*, *input: tensorrt.tensorrt.ITensor*, *pre_padding: tensorrt.tensorrt.Dims*, *post_padding: tensorrt.tensorrt.Dims*) → tensorrt.tensorrt.IPaddingLayer

Add a multi-dimensional padding layer to the network. See *IPaddingLayer* for more information.

Parameters

- **input** – The input tensor to the layer.
- **pre_padding** – The padding to apply to the start of the tensor.
- **post_padding** – The padding to apply to the end of the tensor.

Returns The new padding layer, or `None` if it could not be created.

add_parametric_relu(*self: tensorrt.tensorrt.INetworkDefinition*, *input: tensorrt.tensorrt.ITensor*, *slopes: tensorrt.tensorrt.ITensor*) → tensorrt.tensorrt.IParametricReLULayer

Add a parametric ReLU layer. See *IParametricReLULayer* for more information.

Parameters

- **input** – The input tensor to the layer.

- **slopes** – The slopes tensor (input elements are multiplied with the slopes where the input is negative).

Returns The new parametric ReLU layer, or `None` if it could not be created.

add_plugin_v2(*self: tensorrt.tensorrt.INetworkDefinition, inputs: List[tensorrt.tensorrt.ITensor], plugin: tensorrt.tensorrt.IPluginV2*) → tensorrt.tensorrt.IPluginV2Layer

Add a plugin layer to the network using an `IPluginV2` interface. See `IPluginV2` for more information.

Parameters

- **inputs** – The input tensors to the layer.
- **plugin** – The layer plugin.

Returns The new plugin layer, or `None` if it could not be created.

add_pooling(*self: tensorrt.tensorrt.INetworkDefinition*, *input: tensorrt.tensorrt.ITensor*, *type: tensorrt.tensorrt.PoolingType*, *window_size: tensorrt.tensorrt.DimsHW*) → tensorrt.tensorrt.IPoolingLayer

Add a 2D pooling layer to the network. See *IPoolingLayer* for more information.

Parameters

- **input** – The input tensor to the layer.
- **type** – The type of pooling to apply.
- **window_size** – The size of the pooling window.

Returns The new pooling layer, or `None` if it could not be created.

add_pooling_nd(*self: tensorrt.tensorrt.INetworkDefinition*, *input: tensorrt.tensorrt.ITensor*, *type: tensorrt.tensorrt.PoolingType*, *window_size: tensorrt.tensorrt.Dims*) → tensorrt.tensorrt.IPoolingLayer

Add a multi-dimension pooling layer to the network. See *IPoolingLayer* for more information.

Parameters

- **input** – The input tensor to the layer.
- **type** – The type of pooling to apply.
- **window_size** – The size of the pooling window.

Returns The new pooling layer, or `None` if it could not be created.

add_quantize(*self: tensorrt.tensorrt.INetworkDefinition*, *input: tensorrt.tensorrt.ITensor*, *scale: tensorrt.tensorrt.ITensor*) → tensorrt.tensorrt.IQuantizeLayer

Add a quantization layer to the network. See *IQuantizeLayer* for more information.

Parameters

- **input** – A tensor to quantize.
- **scale** – A tensor with the scale coefficients.

Returns The new quantization layer, or `None` if it could not be created.

add_ragged_softmax(*self: tensorrt.tensorrt.INetworkDefinition*, *input: tensorrt.tensorrt.ITensor*, *bounds: tensorrt.tensorrt.ITensor*) → tensorrt.tensorrt.IRaggedSoftMaxLayer

Add a ragged softmax layer to the network. See *IRaggedSoftMaxLayer* for more information.

Parameters

- **input** – The ZxS input tensor.

- **bounds** – The Zx1 bounds tensor.

Returns The new ragged softmax layer, or `None` if it could not be created.

add_reduce(*self: tensorrt.tensorrt.INetworkDefinition*, *input: tensorrt.tensorrt.ITensor*, *op: tensorrt.tensorrt.ReduceOperation*, *axes: int*, *keep_dims: bool*) → tensorrt.tensorrt.IReduceLayer

Add a reduce layer to the network. See *IReduceLayer* for more information.

Parameters

- **input** – The input tensor to the layer.
- **op** – The reduction operation to perform.
- **axes** – The reduction dimensions. The bit in position i of bitmask axes corresponds to explicit dimension i of the result. E.g., the least significant bit corresponds to the first explicit dimension and the next to least significant bit corresponds to the second explicit dimension.
- **keep_dims** – The boolean that specifies whether or not to keep the reduced dimensions in the output of the layer.

Returns The new reduce layer, or `None` if it could not be created.

add_resize(*self: tensorrt.tensorrt.INetworkDefinition*, *input: tensorrt.tensorrt.ITensor*) → tensorrt.tensorrt.IResizeLayer

Add a resize layer. See *IResizeLayer* for more information.

Parameters **input** – The input tensor to the layer.

Returns The new resize layer, or `None` if it could not be created.

add_rnn_v2(*self: tensorrt.tensorrt.INetworkDefinition*, *input: tensorrt.tensorrt.ITensor*, *layer_count: int*, *hidden_size: int*, *max_seq_length: int*, *op: tensorrt.tensorrt.RNNOperation*) → tensorrt.tensorrt.IRNNv2Layer

Add an RNNv2 layer to the network. See *IRNNv2Layer* for more information.

Add an `layer_count` deep RNN layer to the network with `hidden_size` internal states that can take a batch with fixed or variable sequence lengths.

Parameters

- **input** – The input tensor to the layer (see below).
- **layer_count** – The number of layers in the RNN.
- **hidden_size** – Size of the internal hidden state for each layer.
- **max_seq_length** – Maximum sequence length for the input.
- **op** – The type of RNN to execute.

By default, the layer is configured with `RNNDirection.UNIDIRECTION` and `RNNInputMode.LINEAR` . To change these settings, set `IRNNv2Layer.direction` and `IRNNv2Layer.input_mode` .

Weights and biases for the added layer should be set using *IRNNv2Layer.set_weights_for_gate()* and *IRNNv2Layer.set_bias_for_gate()* prior to building an engine using this network.

The input tensors must be of the type `float32` or `float16` . The layout of the weights is row major and must be the same datatype as the input tensor. `weights` contain 8 matrices and `bias` contains 8 vectors.

See *IRNNv2Layer.set_weights_for_gate()* and *IRNNv2Layer.set_bias_for_gate()* for details on the required input format for `weights` and `bias` .

The `input` ITensor should contain zero or more index dimensions *{N1, ..., Np}*, followed by two dimensions, defined as follows:

S_max is the maximum allowed sequence length (number of RNN iterations)
E specifies the embedding length (unless `RNNInputMode.SKIP` is set, in which case it should match `IRNNv2Layer.hidden_size`).

By default, all sequences in the input are assumed to be size `max_seq_length` . To provide explicit sequence lengths for each input sequence in the batch, set `IRNNv2Layer.seq_lengths` .

The RNN layer outputs up to three tensors.

The first output tensor is the output of the final RNN layer across all timesteps, with dimensions *{N1, ..., Np, S_max, H}*:

N1..Np are the index dimensions specified by the input tensor
S_max is the maximum allowed sequence length (number of RNN iterations)
H is an output hidden state (equal to `IRNNv2Layer.hidden_size` or 2x `IRNNv2Layer.hidden_size`)

The second tensor is the final hidden state of the RNN across all layers, and if the RNN is an LSTM (i.e. `IRNNv2Layer.op` is `RNNOperation.LSTM`), then the third tensor is the final cell state of the RNN across all layers. Both the second and third output tensors have dimensions *{N1, ..., Np, L, H}*:

N1..Np are the index dimensions specified by the input tensor
L is the number of layers in the RNN, equal to `IRNNv2Layer.num_layers`
H is the hidden state for each layer, equal to `IRNNv2Layer.hidden_size` if getDirection is `RNNDirection.UNIDIRECTION`, and 2x `IRNNv2Layer.hidden_size` otherwise.

Returns The new RNNv2 layer, or `None` if it could not be created.

add_scale(*self: tensorrt.tensorrt.INetworkDefinition*, *input: tensorrt.tensorrt.ITensor*, *mode: tensorrt.tensorrt.ScaleMode*, *shift: tensorrt.tensorrt.Weights = None*, *scale: tensorrt.tensorrt.Weights = None*, *power: tensorrt.tensorrt.Weights = None*) → tensorrt.tensorrt.IScaleLayer

Add a scale layer to the network. See *IScaleLayer* for more information.

Parameters

- **input** – The input tensor to the layer. This tensor is required to have a minimum of 3 dimensions.
- **mode** – The scaling mode.
- **shift** – The shift value.
- **scale** – The scale value.
- **power** – The power value.

If the weights are available, then the size of weights are dependent on the ScaleMode. For UNIFORM, the number of weights is equal to 1. For CHANNEL, the number of weights is equal to the channel dimension. For ELEMENTWISE, the number of weights is equal to the volume of the input.

Returns The new scale layer, or `None` if it could not be created.

add_scale_nd(*self: tensorrt.tensorrt.INetworkDefinition*, *input: tensorrt.tensorrt.ITensor*, *mode: tensorrt.tensorrt.ScaleMode*, *shift: tensorrt.tensorrt.Weights = None*, *scale: tensorrt.tensorrt.Weights = None*, *power: tensorrt.tensorrt.Weights = None*, *channel_axis: int*) → tensorrt.tensorrt.IScaleLayer

Add a multi-dimension scale layer to the network. See *IScaleLayer* for more information.

Parameters

- **input** – The input tensor to the layer. This tensor is required to have a minimum of 3 dimensions.
- **mode** – The scaling mode.
- **shift** – The shift value.
- **scale** – The scale value.
- **power** – The power value.
- **channel_axis** – The channel dimension axis.

If the weights are available, then the size of weights are dependent on the ScaleMode. For UNIFORM, the number of weights is equal to 1. For CHANNEL, the number of weights is equal to the channel dimension. For ELEMENTWISE, the number of weights is equal to the volume of the input.

Returns The new scale layer, or `None` if it could not be created.

add_scatter(*self: tensorrt.tensorrt.INetworkDefinition*, *data: tensorrt.tensorrt.ITensor*, *indices: tensorrt.tensorrt.ITensor*, *updates: tensorrt.tensorrt.ITensor*, *mode: tensorrt.tensorrt.ScatterMode*) → tensorrt.tensorrt.IScatterLayer

Add a scatter layer to the network. See *IScatterLayer* for more information.

Parameters

- **data** – The tensor to get default values from.
- **indices** – The tensor to get indices from to populate the output tensor.
- **updates** – The tensor to get values from to populate the output tensor.
- **mode** – operation mode see IScatterLayer for more info

Returns The new Scatter layer, or `None` if it could not be created.

add_select(*self: tensorrt.tensorrt.INetworkDefinition*, *condition: tensorrt.tensorrt.ITensor*, *then_input: tensorrt.tensorrt.ITensor*, *else_input: tensorrt.tensorrt.ITensor*) → tensorrt.tensorrt.ISelectLayer

Add a select layer. See *ISelectLayer* for more information.

Parameters

- **condition** – The condition tensor to the layer.
- **then_input** – The then input tensor to the layer.
- **else_input** – The else input tensor to the layer.

Returns The new select layer, or `None` if it could not be created.

add_shape(*self: tensorrt.tensorrt.INetworkDefinition*, *input: tensorrt.tensorrt.ITensor*) → tensorrt.tensorrt.IShapeLayer
Add a shape layer to the network. See *IShapeLayer* for more information.

Parameters **input** – The input tensor to the layer.

Returns The new shape layer, or None if it could not be created.

add_shuffle(*self: tensorrt.tensorrt.INetworkDefinition*, *input: tensorrt.tensorrt.ITensor*) → tensorrt.tensorrt.IShuffleLayer
Add a shuffle layer to the network. See *IShuffleLayer* for more information.

Parameters **input** – The input tensor to the layer.

Returns The new shuffle layer, or None if it could not be created.

add_slice(*self: tensorrt.tensorrt.INetworkDefinition*, *input: tensorrt.tensorrt.ITensor*, *start: tensorrt.tensorrt.Dims*, *shape: tensorrt.tensorrt.Dims*, *stride: tensorrt.tensorrt.Dims*) → tensorrt.tensorrt.ISliceLayer
Add a slice layer to the network. See *ISliceLayer* for more information.

Parameters

- **input** – The input tensor to the layer.
- **start** – The start offset.
- **shape** – The output shape.
- **stride** – The slicing stride. Positive, negative, zero stride values, and combinations of them in different dimensions are allowed.

Returns The new slice layer, or None if it could not be created.

add_softmax(*self: tensorrt.tensorrt.INetworkDefinition*, *input: tensorrt.tensorrt.ITensor*) → tensorrt.tensorrt.ISoftMaxLayer
Add a softmax layer to the network. See *ISoftMaxLayer* for more information.

Parameters **input** – The input tensor to the layer.

Returns The new softmax layer, or None if it could not be created.

add_topk(*self: tensorrt.tensorrt.INetworkDefinition*, *input: tensorrt.tensorrt.ITensor*, *op: tensorrt.tensorrt.TopKOperation*, *k: int*, *axes: int*) → tensorrt.tensorrt.ITopKLayer
Add a TopK layer to the network. See *ITopKLayer* for more information.

The TopK layer has two outputs of the same dimensions. The first contains data values, the second contains index positions for the values. Output values are sorted, largest first for operation TopKOperation.MAX and smallest first for operation TopKOperation.MIN.

Currently only values of K up to 1024 are supported.

Parameters

- **input** – The input tensor to the layer.
- **op** – Operation to perform.
- **k** – Number of elements to keep.
- **axes** – The reduction dimensions. The bit in position i of bitmask axes corresponds to explicit dimension i of the result. E.g., the least significant bit corresponds to the first explicit dimension and the next to least significant bit corresponds to the second explicit dimension. Currently axes must specify exactly one dimension, and it must be one of the last four dimensions.

Returns The new TopK layer, or None if it could not be created.

add_unary(*self: tensorrt.tensorrt.INetworkDefinition*, *input: tensorrt.tensorrt.ITensor*, *op: tensorrt.tensorrt.UnaryOperation*) → tensorrt.tensorrt.IUnaryLayer
Add a unary layer to the network. See `IUnaryLayer` for more information.

Parameters

- **input** – The input tensor to the layer.
- **op** – The operation to apply.

Returns The new unary layer, or `None` if it could not be created.

get_input(*self: tensorrt.tensorrt.INetworkDefinition*, *index: int*) → tensorrt.tensorrt.ITensor
Get the input tensor specified by the given index.

Parameters **index** – The index of the input tensor.

Returns The tensor, or `None` if it is out of range.

get_layer(*self: tensorrt.tensorrt.INetworkDefinition*, *index: int*) → tensorrt.tensorrt.ILayer
Get the layer specified by the given index.

Parameters **index** – The index of the layer.

Returns The layer, or `None` if it is out of range.

get_output(*self: tensorrt.tensorrt.INetworkDefinition*, *index: int*) → tensorrt.tensorrt.ITensor
Get the output tensor specified by the given index.

Parameters **index** – The index of the output tensor.

Returns The tensor, or `None` if it is out of range.

mark_output(*self: tensorrt.tensorrt.INetworkDefinition*, *tensor: tensorrt.tensorrt.ITensor*) → None
Mark a tensor as an output.

Parameters **tensor** – The tensor to mark.

mark_output_for_shapes(*self: tensorrt.tensorrt.INetworkDefinition*, *tensor: tensorrt.tensorrt.ITensor*) → bool
Enable tensor's value to be computed by `IExecutionContext.get_shape_binding()`.

Parameters **tensor** – The tensor to unmark as an output tensor. The tensor must be of type `tensorrt.int32` and have no more than one dimension.

Returns `True` if successful, `False` if tensor is already marked as an output.

remove_tensor(*self: tensorrt.tensorrt.INetworkDefinition*, *tensor: tensorrt.tensorrt.ITensor*) → None
Remove a tensor from the network.

Parameters **tensor** – The tensor to remove

It is illegal to remove a tensor that is the input or output of a layer. if this method is called with such a tensor, a warning will be emitted on the log and the call will be ignored.

set_weights_name(*self: tensorrt.tensorrt.INetworkDefinition*, *weights: tensorrt.tensorrt.Weights*, *name: str*) → bool
Associate a name with all current uses of the given weights.

The name must be set after the Weights are used in the network. Lookup is associative. The name applies to all Weights with matching type, value pointer, and count. If Weights with a matching value pointer, but different type or count exists in the network, an error message is issued, the name is rejected, and return false. If the name has already been used for other weights, return false. None causes the weights to become unnamed, i.e. clears any previous name.

Parameters

- **weights** – The weights to be named.
- **name** – The name to associate with the weights.

Returns true on success.

unmark_output(*self: tensorrt.tensorrt.INetworkDefinition*, *tensor: tensorrt.tensorrt.ITensor*) → None

Unmark a tensor as a network output.

Parameters **tensor** – The tensor to unmark as an output tensor.

unmark_output_for_shapes(*self: tensorrt.tensorrt.INetworkDefinition*, *tensor: tensorrt.tensorrt.ITensor*) → bool

Undo *mark_output_for_shapes()* .

Parameters **tensor** – The tensor to unmark as an output tensor.

Returns `True` if successful, `False` if tensor is not marked as an output.

5.2 Layer Base Classes

5.2.1 ITensor

tensorrt.**TensorLocation**

The physical location of the data.

Members:

DEVICE : Data is stored on the device.

HOST : Data is stored on the device.

tensorrt.**TensorFormat**

Format of the input/output tensors.

This enum is extended to be used by both plugins and reformat-free network I/O tensors.

For more information about data formats, see the topic "Data Format Description" located in the TensorRT Developer Guide (https://docs.nvidia.com/deeplearning/sdk/tensorrt-developer-guide/index.html).

Members:

LINEAR : Row major linear format.

For a tensor with dimensions {N, C, H, W}, the W axis always has unit stride, and the stride of every other axis is at least the the product of of the next dimension times the next stride. the strides are the same as for a C array with dimensions [N][C][H][W].

CHW2 : Two wide channel vectorized row major format.

This format is bound to FP16. It is only available for dimensions >= 3.

For a tensor with dimensions {N, C, H, W}, the memory layout is equivalent to a C array with dimensions [N][(C+1)/2][H][W][2], with the tensor coordinates (n, c, h, w) mapping to array subscript [n][c/2][h][w][c%2].

HWC8 : Eight channel format where C is padded to a multiple of 8.

This format is bound to FP16. It is only available for dimensions >= 3.

For a tensor with dimensions {N, C, H, W}, the memory layout is equivalent to the array with dimensions [N][H][W][(C+7)/8*8], with the tensor coordinates (n, c, h, w) mapping to array subscript [n][h][w][c].

CHW4 : Four wide channel vectorized row major format. This format is bound to INT8. It is only available for dimensions >= 3.

For a tensor with dimensions {N, C, H, W}, the memory layout is equivalent to a C array with dimensions [N][(C+3)/4][H][W][4], with the tensor coordinates (n, c, h, w) mapping to array subscript [n][c/4][h][w][c%4].

CHW16 : Sixteen wide channel vectorized row major format.

This format is bound to FP16. It is only available for dimensions >= 3.

For a tensor with dimensions {N, C, H, W}, the memory layout is equivalent to a C array with dimensions [N][(C+15)/16][H][W][16], with the tensor coordinates (n, c, h, w) mapping to array subscript [n][c/16][h][w][c%16].

CHW32 : Thirty-two wide channel vectorized row major format.

This format is only available for dimensions >= 3.

For a tensor with dimensions {N, C, H, W}, the memory layout is equivalent to a C array with dimensions [N][(C+31)/32][H][W][32], with the tensor coordinates (n, c, h, w) mapping to array subscript [n][c/32][h][w][c%32].

DHWC8 : Eight channel format where C is padded to a multiple of 8.

This format is bound to FP16, and it is only available for dimensions >= 4.

For a tensor with dimensions {N, C, D, H, W}, the memory layout is equivalent to an array with dimensions [N][D][H][W][(C+7)/8*8], with the tensor coordinates (n, c, d, h, w) mapping to array subscript [n][d][h][w][c].

CDHW32 : Thirty-two wide channel vectorized row major format with 3 spatial dimensions.

This format is bound to FP16 and INT8. It is only available for dimensions >= 4.

For a tensor with dimensions {N, C, D, H, W}, the memory layout is equivalent to a C array with dimensions [N][(C+31)/32][D][H][W][32], with the tensor coordinates (n, d, c, h, w) mapping to array subscript [n][c/32][d][h][w][c%32].

HWC : Non-vectorized channel-last format. This format is bound to FP32 and is only available for dimensions >= 3.

DLA_LINEAR : DLA planar format. Row major format. The stride for stepping along the H axis is rounded up to 64 bytes.

This format is bound to FP16/Int8 and is only available for dimensions >= 3.

For a tensor with dimensions {N, C, H, W}, the memory layout is equivalent to a C array with dimensions [N][C][H][roundUp(W, 64/elementSize)] where elementSize is 2 for FP16 and 1 for Int8, with the tensor coordinates (n, c, h, w) mapping to array subscript [n][c][h][w].

DLA_HWC4 : DLA image format. channel-last format. C can only be 1, 3, 4. If C == 3 it will be rounded to 4. The stride for stepping along the H axis is rounded up to 32 bytes.

This format is bound to FP16/Int8 and is only available for dimensions >= 3.

For a tensor with dimensions {N, C, H, W}, with C' is 1, 4, 4 when C is 1, 3, 4 respectively, the memory layout is equivalent to a C array with dimensions [N][H][roundUp(W, 32/C'/elementSize)][C'] where elementSize is 2 for FP16 and 1 for Int8, C' is the rounded C. The tensor coordinates (n, c, h, w) maps to array subscript [n][h][w][c].

HWC16 : Sixteen channel format where C is padded to a multiple of 16. This format is bound to FP16. It is only available for dimensions >= 3.

For a tensor with dimensions {N, C, H, W}, the memory layout is equivalent to the array with dimensions [N][H][W][(C+15)/16*16], with the tensor coordinates (n, c, h, w) mapping to array subscript [n][h][w][c].

class tensorrt.**ITensor**

A tensor in an *INetworkDefinition*.

Variables

- ***name*** – `str` The tensor name. For a network input, the name is assigned by the application. For tensors which are layer outputs, a default name is assigned consisting of the layer name followed by the index of the output in brackets.
- **shape** – *Dims* The shape of a tensor. For a network input the shape is assigned by the application. For a network output it is computed based on the layer parameters and the inputs to the layer. If a tensor size or a parameter is modified in the network, the shape of all dependent tensors will be recomputed. This call is only legal for network input tensors, since the shape of layer output tensors are inferred based on layer inputs and parameters.
- **dtype** – *DataType* The data type of a tensor. The type is unchanged if the type is invalid for the given tensor.
- **broadcast_across_batch** – `bool` Whether to enable broadcast of tensor across the batch. When a tensor is broadcast across a batch, it has the same value for every member in the batch. Memory is only allocated once for the single member. This method is only valid for network input tensors, since the flags of layer output tensors are inferred based on layer inputs and parameters. If this state is modified for a tensor in the network, the states of all dependent tensors will be recomputed.
- **location** – *TensorLocation* The storage location of a tensor.
- **is_network_input** – `bool` Whether the tensor is a network input.
- **is_network_output** – `bool` Whether the tensor is a network output.
- **dynamic_range** – `Tuple[float, float]` A tuple containing the [minimum, maximum] of the dynamic range, or `None` if the range was not set.
- **is_shape** – `bool` Whether the tensor is a shape tensor.
- **allowed_formats** – `int` The allowed set of TensorFormat candidates. This should be an integer consisting of one or more *TensorFormat* s, combined via bitwise OR after bit shifting. For example, `1 << int(TensorFormats.CHW4) | 1 << int(TensorFormat.CHW32)`.

reset_dynamic_range(*self: tensorrt.tensorrt.ITensor*) → None

Undo the effect of setting the dynamic range.

set_dynamic_range(*self: tensorrt.tensorrt.ITensor*, *min: float*, *max: float*) → bool

Set dynamic range for the tensor. NOTE: It is suggested to use `tensor.dynamic_range = (min, max)` instead.

Parameters

- **min** – Minimum of the dynamic range.
- **max** – Maximum of the dyanmic range.

Returns true if succeed in setting range. Otherwise false.

5.2.2 ILayer

tensorrt.**LayerType**

Type of Layer

Members:

CONVOLUTION : Convolution layer

FULLY_CONNECTED : Fully connected layer

ACTIVATION : Activation layer

POOLING : Pooling layer

LRN : LRN layer

SCALE : Scale layer

SOFTMAX : Softmax layer

DECONVOLUTION : Deconvolution layer

CONCATENATION : Concatenation layer

ELEMENTWISE : Elementwise layer

PLUGIN : Plugin layer

UNARY : Unary layer

PADDING : Padding layer

SHUFFLE : Shuffle layer

REDUCE : Reduce layer

TOPK : TopK layer

GATHER : Gather layer

MATRIX_MULTIPLY : Matrix multiply layer

RAGGED_SOFTMAX : Ragged softmax layer

CONSTANT : Constant layer

RNN_V2 : RNNv2 layer

IDENTITY : Identity layer

PLUGIN_V2 : PluginV2 layer

SLICE : Slice layer

SHAPE : Shape layer

PARAMETRIC_RELU : Parametric ReLU layer

RESIZE : Resize layer

TRIP_LIMIT : Loop Trip limit layer

RECURRENCE : Loop Recurrence layer

ITERATOR : Loop Iterator layer

LOOP_OUTPUT : Loop output layer

SELECT : Select layer

ASSERTION : Assertion layer

FILL : Fill layer

QUANTIZE : Quantize layer

DEQUANTIZE : Dequantize layer

CONDITION : If-conditional Condition layer

CONDITIONAL_INPUT : If-conditional input layer

CONDITIONAL_OUTPUT : If-conditional output layer

SCATTER : Scatter layer

EINSUM : Einsum layer

class tensorrt.**ILayer**

Base class for all layer classes in an *INetworkDefinition*.

Variables

- ***name*** – str The name of the layer.
- **type** – *LayerType* The type of the layer.
- **num_inputs** – int The number of inputs of the layer.
- **num_outputs** – int The number of outputs of the layer.
- **precision** – *DataType* The computation precision.
- **precision_is_set** – bool Whether the precision is set or not.

get_input(*self: tensorrt.tensorrt.ILayer*, *index: int*) → tensorrt.tensorrt.ITensor

Get the layer input corresponding to the given index.

Parameters **index** – The index of the input tensor.

Returns The input tensor, or None if the index is out of range.

get_output(*self: tensorrt.tensorrt.ILayer*, *index: int*) → tensorrt.tensorrt.ITensor

Get the layer output corresponding to the given index.

Parameters **index** – The index of the output tensor.

Returns The output tensor, or None if the index is out of range.

get_output_type(*self: tensorrt.tensorrt.ILayer*, *index: int*) → tensorrt.tensorrt.DataType

Get the output type of the layer.

Parameters **index** – The index of the output tensor.

Returns The output precision. Default : DataType.FLOAT.

output_type_is_set(*self: tensorrt.tensorrt.ILayer*, *index: int*) → bool

Whether the output type has been set for this layer.

Parameters **index** – The index of the output.

Returns Whether the output type has been explicitly set.

reset_output_type(*self: tensorrt.tensorrt.ILayer*, *index: int*) → None

Reset output type of this layer.

Parameters **index** – The index of the output.

reset_precision (*self: tensorrt.tensorrt.ILayer*) → None
Reset the computation precision of the layer.

set_input (*self: tensorrt.tensorrt.ILayer*, *index: int*, *tensor: tensorrt.tensorrt.ITensor*) → None
Set the layer input corresponding to the given index.

Parameters

- **index** – The index of the input tensor.
- **tensor** – The input tensor.

set_output_type (*self: tensorrt.tensorrt.ILayer*, *index: int*, *dtype: tensorrt.tensorrt.DataType*) → None
Constraint layer to generate output data with given type. Note that this method cannot be used to set the data type of the second output tensor of the topK layer. The data type of the second output tensor of the topK layer is always Int32.

Parameters

- **index** – The index of the output tensor to set the type.
- **dtype** – DataType of the output.

5.3 Layers

5.3.1 PaddingMode

tensorrt.**PaddingMode**

Enumerates types of padding available in convolution, deconvolution and pooling layers. Padding mode takes precedence if both `padding_mode` and `pre_padding` are set.

EXPLICIT* corresponds to explicit padding.

SAME* implicitly calculates padding such that the output dimensions are the same as the input dimensions. For convolution and pooling, output dimensions are determined by ceil(input dimensions, stride).

CAFFE* corresponds to symmetric padding.

Members:

EXPLICIT_ROUND_DOWN : Use explicit padding, rounding the output size down

EXPLICIT_ROUND_UP : Use explicit padding, rounding the output size up

SAME_UPPER : Use SAME padding, with `pre_padding` <= `post_padding`

SAME_LOWER : Use SAME padding, with `pre_padding` >= `post_padding`

CAFFE_ROUND_DOWN : Use CAFFE padding, rounding the output size down

CAFFE_ROUND_UP : Use CAFFE padding, rounding the output size up

5.3.2 IConvolutionLayer

class tensorrt.**IConvolutionLayer**

A convolution layer in an *INetworkDefinition*.

This layer performs a correlation operation between 3-dimensional filter with a 4-dimensional tensor to produce another 4-dimensional tensor.

An optional bias argument is supported, which adds a per-channel constant to each value in the output.

Variables

- **kernel_size** – *DimsHW* The HW kernel size of the convolution.
- **num_output_maps** – int The number of output maps for the convolution.
- **stride** – *DimsHW* The stride of the convolution. Default: (1, 1)
- **padding** – *DimsHW* The padding of the convolution. The input will be zero-padded by this number of elements in the height and width directions. If the padding is asymmetric, this value corresponds to the pre-padding. Default: (0, 0)
- **pre_padding** – *DimsHW* The pre-padding. The start of input will be zero-padded by this number of elements in the height and width directions. Default: (0, 0)
- **post_padding** – *DimsHW* The post-padding. The end of input will be zero-padded by this number of elements in the height and width directions. Default: (0, 0)
- **padding_mode** – *PaddingMode* The padding mode. Padding mode takes precedence if both IConvolutionLayer.padding_mode and either IConvolutionLayer.pre_padding or IConvolutionLayer.post_padding are set.
- **num_groups** – int The number of groups for a convolution. The input tensor channels are divided into this many groups, and a convolution is executed for each group, using a filter per group. The results of the group convolutions are concatenated to form the output. **Note** When using groups in int8 mode, the size of the groups (i.e. the channel count divided by the group count) must be a multiple of 4 for both input and output. Default: 1.
- **kernel** – *Weights* The kernel weights for the convolution. The weights are specified as a contiguous array in *GKCRS* order, where *G* is the number of groups, *K* the number of output feature maps, *C* the number of input channels, and *R* and *S* are the height and width of the filter.
- **bias** – *Weights* The bias weights for the convolution. Bias is optional. To omit bias, set this to an empty *Weights* object. The bias is applied per-channel, so the number of weights (if non-zero) must be equal to the number of output feature maps.
- **dilation** – *DimsHW* The dilation for a convolution. Default: (1, 1)
- **kernel_size_nd** – *Dims* The multi-dimension kernel size of the convolution.
- **stride_nd** – *Dims* The multi-dimension stride of the convolution. Default: (1, . . . , 1)
- **padding_nd** – *Dims* The multi-dimension padding of the convolution. The input will be zero-padded by this number of elements in each dimension. If the padding is asymmetric, this value corresponds to the pre-padding. Default: (0, . . . , 0)
- **dilation_nd** – *Dims* The multi-dimension dilation for the convolution. Default: (1, . . . , 1)

5.3.3 IFullyConnectedLayer

class tensorrt.**IFullyConnectedLayer**

A fully connected layer in an *INetworkDefinition*.

This layer expects an input tensor of three or more non-batch dimensions. The input is automatically reshaped into an *MxV* tensor *X*, where *V* is a product of the last three dimensions and *M* is a product of the remaining dimensions (where the product over 0 dimensions is defined as 1). For example:

- If the input tensor has shape *{C, H, W}*, then the tensor is reshaped into *{1, C*H*W}* .
- If the input tensor has shape *{P, C, H, W}*, then the tensor is reshaped into *{P, C*H*W}* .

The layer then performs:

$Y := matmul(X, W^T) + bias$

Where *X* is the *MxV* tensor defined above, *W* is the *KxV* weight tensor of the layer, and *bias* is a row vector size *K* that is broadcasted to *MxK* . *K* is the number of output channels, and configurable via IFullyConnectedLayer.num_output_channels . If *bias* is not specified, it is implicitly *0* .

The *MxK* result *Y* is then reshaped such that the last three dimensions are *{K, 1, 1}* and the remaining dimensions match the dimensions of the input tensor. For example:

- If the input tensor has shape *{C, H, W}*, then the output tensor will have shape *{K, 1, 1}* .
- If the input tensor has shape *{P, C, H, W}*, then the output tensor will have shape *{P, K, 1, 1}* .

Variables

- **num_output_channels** – int The number of output channels *K* from the fully connected layer.
- **kernel** – *Weights* The kernel weights, given as a *KxC* matrix in row-major order.
- **bias** – *Weights* The bias weights. Bias is optional. To omit bias, set this to an empty *Weights* object.

5.3.4 IActivationLayer

tensorrt.**ActivationType**

The type of activation to perform.

Members:

RELU : Rectified Linear activation

SIGMOID : Sigmoid activation

TANH : Hyperbolic Tangent activation

LEAKY_RELU : Leaky Relu activation: f(x) = x if x >= 0, f(x) = alpha * x if x < 0

ELU : Elu activation: f(x) = x if x >= 0, f(x) = alpha * (exp(x) - 1) if x < 0

SELU : Selu activation: f(x) = beta * x if x > 0, f(x) = beta * (alpha * exp(x) - alpha) if x <= 0

SOFTSIGN : Softsign activation: f(x) = x / (1 + abs(x))

SOFTPLUS : Softplus activation: f(x) = alpha * log(exp(beta * x) + 1)

CLIP : Clip activation: f(x) = max(alpha, min(beta, x))

HARD_SIGMOID : Hard sigmoid activation: f(x) = max(0, min(1, alpha * x + beta))

SCALED_TANH : Scaled Tanh activation: f(x) = alpha * tanh(beta * x)

THRESHOLDED_RELU : Thresholded Relu activation: f(x) = x if x > alpha, f(x) = 0 if x <= alpha

class tensorrt.**IActivationLayer**

An Activation layer in an *INetworkDefinition*. This layer applies a per-element activation function to its input. The output has the same shape as the input.

Variables

- **type** – *ActivationType* The type of activation to be performed.
- **alpha** – float The alpha parameter that is used by some parametric activations (LEAKY_RELU, ELU, SELU, SOFTPLUS, CLIP, HARD_SIGMOID, SCALED_TANH). Other activations ignore this parameter.
- **beta** – float The beta parameter that is used by some parametric activations (SELU, SOFTPLUS, CLIP, HARD_SIGMOID, SCALED_TANH). Other activations ignore this parameter.

5.3.5 IPoolingLayer

tensorrt.**PoolingType**

The type of pooling to perform in a pooling layer.

Members:

MAX : Maximum over elements

AVERAGE : Average over elements. If the tensor is padded, the count includes the padding

MAX_AVERAGE_BLEND : Blending between the max pooling and average pooling: *(1-blendFactor)*maxPool + blendFactor*avgPool*

class tensorrt.**IPoolingLayer**

A Pooling layer in an *INetworkDefinition*. The layer applies a reduction operation within a window over the input.

Variables

- **type** – *PoolingType* The type of pooling to be performed.
- **window_size** – *DimsHW* The window size for pooling.
- **stride** – *DimsHW* The stride for pooling. Default: (1, 1)
- **padding** – *DimsHW* The padding for pooling. Default: (0, 0)
- **pre_padding** – *DimsHW* The pre-padding. The start of input will be zero-padded by this number of elements in the height and width directions. Default: (0, 0)
- **post_padding** – *DimsHW* The post-padding. The end of input will be zero-padded by this number of elements in the height and width directions. Default: (0, 0)
- **padding_mode** – *PaddingMode* The padding mode. Padding mode takes precedence if both IPoolingLayer.padding_mode and either IPoolingLayer.pre_padding or IPoolingLayer.post_padding are set.
- **blend_factor** – float The blending factor for the max_average_blend mode: $max_average_blendPool = (1 - blendFactor) * maxPool + blendFactor * avgPool$. blend_factor is a user value in [0,1] with the default value of 0.0. This value only applies for the PoolingType.MAX_AVERAGE_BLEND mode.

- **average_count_excludes_padding** – bool Whether average pooling uses as a denominator the overlap area between the window and the unpadded input. If this is not set, the denominator is the overlap between the pooling window and the padded input. Default: True
- **window_size_nd** – *Dims* The multi-dimension window size for pooling.
- **stride_nd** – *Dims* The multi-dimension stride for pooling. Default: (1, . . . , 1)
- **padding_nd** – *Dims* The multi-dimension padding for pooling. Default: (0, . . . , 0)

5.3.6 ILRNLayer

class tensorrt.**ILRNLayer**

A LRN layer in an *INetworkDefinition* . The output size is the same as the input size.

Variables

- **window_size** – int The LRN window size. The window size must be odd and in the range of [1, 15].
- **alpha** – float The LRN alpha value. The valid range is [-1e20, 1e20].
- **beta** – float The LRN beta value. The valid range is [0.01, 1e5f].
- **k** – float The LRN K value. The valid range is [1e-5, 1e10].

5.3.7 IScaleLayer

tensorrt.**ScaleMode**

Controls how scale is applied in a Scale layer.

Members:

UNIFORM : Identical coefficients across all elements of the tensor.

CHANNEL : Per-channel coefficients. The channel dimension is assumed to be the third to last dimension.

ELEMENTWISE : Elementwise coefficients.

class tensorrt.**IScaleLayer**

A Scale layer in an *INetworkDefinition* .

This layer applies a per-element computation to its input:

$output = (input * scale + shift)^{p}ower$

The coefficients can be applied on a per-tensor, per-channel, or per-element basis.

Note If the number of weights is 0, then a default value is used for shift, power, and scale. The default shift is 0, the default power is 1, and the default scale is 1.

The output size is the same as the input size.

Note The input tensor for this layer is required to have a minimum of 3 dimensions.

Variables

- **mode** – *ScaleMode* The scale mode.
- **shift** – *Weights* The shift value.
- **scale** – *Weights* The scale value.

- **power** – *Weights* The power value.
- **channel_axis** – int The channel axis.

5.3.8 ISoftMaxLayer

class tensorrt.**ISoftMaxLayer**

A Softmax layer in an *INetworkDefinition*.

This layer applies a per-channel softmax to its input.

The output size is the same as the input size.

Variables **axes** – int The axis along which softmax is computed. Currently, only one axis can be set.

The axis is specified by setting the bit corresponding to the axis to 1, as a bit mask.
For example, consider an NCHW tensor as input (three non-batch dimensions).

In implicit mode :
Bit 0 corresponds to the C dimension boolean.
Bit 1 corresponds to the H dimension boolean.
Bit 2 corresponds to the W dimension boolean.

By default, softmax is performed on the axis which is the number of axes minus three. It is 0 if there are fewer than 3 non-batch axes. For example, if the input is NCHW, the default axis is C. If the input is NHW, then the default axis is H.

In explicit mode :
Bit 0 corresponds to the N dimension boolean.
Bit 1 corresponds to the C dimension boolean.
Bit 2 corresponds to the H dimension boolean.
Bit 3 corresponds to the W dimension boolean.
By default, softmax is performed on the axis which is the number of axes minus three. It is 0 if there are fewer than 3 axes. For example, if the input is NCHW, the default axis is C. If the input is NHW, then the default axis is N.

For example, to perform softmax on axis R of a NPQRCHW input, set bit 2 with implicit batch mode, set bit 3 with explicit batch mode.

5.3.9 IConcatenationLayer

class tensorrt.**IConcatenationLayer**
A concatenation layer in an *INetworkDefinition*.

The output channel size is the sum of the channel sizes of the inputs. The other output sizes are the same as the other input sizes, which must all match.

Variables **axis** – int The axis along which concatenation occurs. 0 is the major axis (excluding the batch dimension). The default is the number of non-batch axes in the tensor minus three (e.g. for an NCHW input it would be 0), or 0 if there are fewer than 3 non-batch axes.

5.3.10 IDeconvolutionLayer

class tensorrt.**IDeconvolutionLayer**
A deconvolution layer in an *INetworkDefinition*.

Variables

- **kernel_size** – *DimsHW* The HW kernel size of the convolution.
- **num_output_maps** – int The number of output feature maps for the deconvolution.
- **stride** – *DimsHW* The stride of the deconvolution. Default: (1, 1)
- **padding** – *DimsHW* The padding of the deconvolution. The input will be zero-padded by this number of elements in the height and width directions. Padding is symmetric. Default: (0, 0)
- **pre_padding** – *DimsHW* The pre-padding. The start of input will be zero-padded by this number of elements in the height and width directions. Default: (0, 0)
- **post_padding** – *DimsHW* The post-padding. The end of input will be zero-padded by this number of elements in the height and width directions. Default: (0, 0)
- **padding_mode** – *PaddingMode* The padding mode. Padding mode takes precedence if both IDeconvolutionLayer.padding_mode and either IDeconvolutionLayer.pre_padding or IDeconvolutionLayer.post_padding are set.
- **num_groups** – int The number of groups for a deconvolution. The input tensor channels are divided into this many groups, and a deconvolution is executed for each group, using a filter per group. The results of the group convolutions are concatenated to form the output. **Note** When using groups in int8 mode, the size of the groups (i.e. the channel count divided by the group count) must be a multiple of 4 for both input and output. Default: 1
- **kernel** – *Weights* The kernel weights for the deconvolution. The weights are specified as a contiguous array in *CKRS* order, where *C* the number of input channels, *K* the number of output feature maps, and *R* and *S* are the height and width of the filter.
- **bias** – *Weights* The bias weights for the deconvolution. Bias is optional. To omit bias, set this to an empty *Weights* object. The bias is applied per-feature-map, so the number of weights (if non-zero) must be equal to the number of output feature maps.
- **kernel_size_nd** – *Dims* The multi-dimension kernel size of the convolution.
- **stride_nd** – *Dims* The multi-dimension stride of the deconvolution. Default: (1, . . . , 1)
- **padding_nd** – *Dims* The multi-dimension padding of the deconvolution. The input will be zero-padded by this number of elements in each dimension. Padding is symmetric. Default: (0, . . . , 0)

5.3.11 IElementWiseLayer

tensorrt.**ElementWiseOperation**
The binary operations that may be performed by an ElementWise layer.

Members:

SUM : Sum of the two elements

PROD : Product of the two elements

MAX : Max of the two elements

MIN : Min of the two elements

SUB : Subtract the second element from the first

DIV : Divide the first element by the second

POW : The first element to the power of the second element

FLOOR_DIV : Floor division of the first element by the second

AND : Logical AND of two elements

OR : Logical OR of two elements

XOR : Logical XOR of two elements

EQUAL : Check if two elements are equal

GREATER : Check if element in first tensor is greater than corresponding element in second tensor

LESS : Check if element in first tensor is less than corresponding element in second tensor

class tensorrt.**IElementWiseLayer**
A elementwise layer in an *INetworkDefinition*.

This layer applies a per-element binary operation between corresponding elements of two tensors.

The input dimensions of the two input tensors must be equal, and the output tensor is the same size as each input.

Variables **op** – *ElementWiseOperation* The binary operation for the layer.

5.3.12 IGatherLayer

class tensorrt.**IGatherLayer**
A gather layer in an *INetworkDefinition*.

Variables

- **axis** – int The non-batch dimension axis to gather on. The axis must be less than the number of non-batch dimensions in the data input.
- **num_elementwise_dims** – int The number of leading dimensions of indices tensor to be handled elementwise. For *GatherMode::kDEFAULT*, it must be 0 if there is an implicit batch dimension. It can be 0 or 1 if there is not an implicit batch dimension. For *GatherMode::kND*, it can be between 0 and one less than rank(data). For *GatherMode::kELEMENT*, it must be 0.
- **mode** – GatherMode The gather mode.

5.3.13 RNN Layers

tensorrt.**RNNOperation**

The RNN operations that may be performed by an RNN layer.

Equation definitions

In the equations below, we use the following naming convention:

t := current time step
i := input gate
o := output gate
f := forget gate
z := update gate
r := reset gate
c := cell gate
h := hidden gate

g[t] denotes the output of gate g at timestep *t*, e.g.`f[t]` is the output of the forget gate *f* .
X[t] := input tensor for timestep *t*
C[t] := cell state for timestep *t*
H[t] := hidden state for timestep *t*

W[g] := *W* (input) parameter weight matrix for gate *g*
R[g] := *U* (recurrent) parameter weight matrix for gate *g*
Wb[g] := *W* (input) parameter bias vector for gate *g*
Rb[g] := *U* (recurrent) parameter bias vector for gate *g*

Unless otherwise specified, all operations apply pointwise to elements of each operand tensor.

ReLU(X) := *max(X, 0)*
tanh(X) := hyperbolic tangent of *X*
sigmoid(X) := *1 / (1 + exp(-X))*
exp(X) := *e^X*
A.B denotes matrix multiplication of *A* and *B* .
*A*B* denotes pointwise multiplication of *A* and *B* .

Equations

Depending on the value of RNNOperation chosen, each sub-layer of the RNN layer will perform one of the following operations:

RELU

$H[t] := ReLU(W[i].X[t] + R[i].H[t-1] + Wb[i] + Rb[i])$

TANH

$H[t] := tanh(W[i].X[t] + R[i].H[t-1] + Wb[i] + Rb[i])$

LSTM

$$i[t] := sigmoid(W[i].X[t] + R[i].H[t-1] + Wb[i] + Rb[i])$$
$$f[t] := sigmoid(W[f].X[t] + R[f].H[t-1] + Wb[f] + Rb[f])$$
$$o[t] := sigmoid(W[o].X[t] + R[o].H[t-1] + Wb[o] + Rb[o])$$
$$c[t] := tanh(W[c].X[t] + R[c].H[t-1] + Wb[c] + Rb[c])$$

$$C[t] := f[t] * C[t-1] + i[t] * c[t]$$
$$H[t] := o[t] * tanh(C[t])$$

GRU

$$z[t] := sigmoid(W[z].X[t] + R[z].H[t-1] + Wb[z] + Rb[z])$$
$$r[t] := sigmoid(W[r].X[t] + R[r].H[t-1] + Wb[r] + Rb[r])$$
$$h[t] := tanh(W[h].X[t] + r[t] * (R[h].H[t-1] + Rb[h]) + Wb[h])$$
$$H[t] := (1 - z[t]) * h[t] + z[t] * H[t-1]$$

Members:

RELU : Single gate RNN w/ ReLU activation

TANH : Single gate RNN w/ TANH activation

LSTM : Four-gate LSTM network w/o peephole connections

GRU : Three-gate network consisting of Gated Recurrent Units

`tensorrt.`**`RNNDirection`**

The RNN direction that may be performed by an RNN layer.

Members:

UNIDIRECTION : Network iterates from first input to last input

BIDIRECTION : Network iterates from first to last (and vice versa) and outputs concatenated

`tensorrt.`**`RNNInputMode`**

The RNN input modes that may occur with an RNN layer.

If the RNN is configured with `RNNInputMode.LINEAR` , then for each gate *g* in the first layer of the RNN, the input vector *X[t]* (length *E*) is left-multiplied by the gate's corresponding weight matrix *W[g]* (dimensions *HxE*) as usual, before being used to compute the gate output as described by *`RNNOperation`* .

If the RNN is configured with `RNNInputMode.SKIP` , then this initial matrix multiplication is "skipped" and *W[g]* is conceptually an identity matrix. In this case, the input vector *X[t]* must have length *H* (the size of the hidden state).

Members:

LINEAR : Perform the normal matrix multiplication in the first recurrent layer

SKIP : No operation is performed on the first recurrent layer

5.3.13.1 IRNNv2Layer

tensorrt.**RNNGateType**

The RNN input modes that may occur with an RNN layer.

If the RNN is configured with `RNNInputMode.LINEAR`, then for each gate *g* in the first layer of the RNN, the input vector *X[t]* (length *E*) is left-multiplied by the gate's corresponding weight matrix *W[g]* (dimensions *HxE*) as usual, before being used to compute the gate output as described by *RNNOperation*.

If the RNN is configured with `RNNInputMode.SKIP`, then this initial matrix multiplication is "skipped" and *W[g]* is conceptually an identity matrix. In this case, the input vector *X[t]* must have length *H* (the size of the hidden state).

Members:

INPUT : Input Gate

OUTPUT : Output Gate

FORGET : Forget Gate

UPDATE : Update Gate

RESET : Reset Gate

CELL : Cell Gate

HIDDEN : Hidden Gate

class tensorrt.**IRNNv2Layer**

An RNN layer in an *INetworkDefinition*, version 2

Variables

- **num_layers** – `int` The layer count of the RNN.
- **hidden_size** – `int` The hidden size of the RNN.
- **max_seq_length** – `int` The maximum sequence length of the RNN
- **data_length** – `int` The length of the data being processed by the RNN for use in computing other values.
- **seq_lengths** – *ITensor* Individual sequence lengths in the batch with the *ITensor* provided. The `seq_lengths` *ITensor* should be a {N1, ..., Np} tensor, where N1..Np are the index dimensions of the input tensor to the RNN. If `seq_lengths` is not specified, then the RNN layer assumes all sequences are size `max_seq_length`. All sequence lengths in `seq_lengths` should be in the range [1, `max_seq_length`]. Zero-length sequences are not supported. This tensor must be of type int32.
- **op** – *RNNOperation* The operation of the RNN layer.
- **input_mode** – `int` The input mode of the RNN layer.
- **direction** – `int` The direction of the RNN layer.
- **hidden_state** – *ITensor* the initial hidden state of the RNN with the provided `hidden_state` *ITensor*. The `hidden_state` *ITensor* should have the dimensions *{N1, ..., Np, L, H}*, where: *N1..Np* are the index dimensions specified by the input tensor *L* is the number of layers in the RNN, equal to `num_layers` *H* is the hidden state for each layer, equal to `hidden_size` if `direction` is `RNNDirection.UNIDIRECTION`, and 2x `hidden_size` otherwise.

- **cell_state** – *ITensor* The initial cell state of the LSTM with the provided `cell_state` *ITensor*. The `cell_state` *ITensor* should have the dimensions *{N1, ..., Np, L, H}*, where: *N1..Np* are the index dimensions specified by the input tensor *L* is the number of layers in the RNN, equal to `num_layers` *H* is the hidden state for each layer, equal to `hidden_size` if `direction` is `RNNDirection.UNIDIRECTION`, and 2x `hidden_size` otherwise. It is an error to set this on an RNN layer that is not configured with `RNNOperation.LSTM`.

get_bias_for_gate(*self: tensorrt.tensorrt.IRNNv2Layer*, *layer_index: int*, *gate: tensorrt.tensorrt.RNNGateType*, *is_w: bool*) → numpy.ndarray

Get the bias parameters for an individual gate in the RNN.

Parameters

- **layer_index** – The index of the layer that contains this gate.
- **gate** – The name of the gate within the RNN layer.
- **is_w** – True if the bias parameters are for the input bias Wb[g] and false if they are for the recurrent input bias Rb[g].

Returns The bias parameters.

get_weights_for_gate(*self: tensorrt.tensorrt.IRNNv2Layer*, *layer_index: int*, *gate: tensorrt.tensorrt.RNNGateType*, *is_w: bool*) → numpy.ndarray

Get the weight parameters for an individual gate in the RNN.

Parameters

- **layer_index** – The index of the layer that contains this gate.
- **gate** – The name of the gate within the RNN layer.
- **is_w** – True if the weight parameters are for the input matrix W[g] and false if they are for the recurrent input matrix R[g].

Returns The weight parameters.

set_bias_for_gate(*self: tensorrt.tensorrt.IRNNv2Layer*, *layer_index: int*, *gate: tensorrt.tensorrt.RNNGateType*, *is_w: bool*, *bias: tensorrt.tensorrt.Weights*) → None

Set the bias parameters for an individual gate in the RNN.

Parameters

- **layer_index** – The index of the layer that contains this gate.
- **gate** – The name of the gate within the RNN layer. The gate name must correspond to one of the gates used by this layer's *RNNOperation*.
- **is_w** – True if the bias parameters are for the input bias Wb[g] and false if they are for the recurrent input bias Rb[g]. See *RNNOperation* for equations showing how these bias vectors are used in the RNN gate.
- **bias** – The weight structure holding the bias parameters, which should be an array of size `hidden_size`.

set_weights_for_gate(*self: tensorrt.tensorrt.IRNNv2Layer*, *layer_index: int*, *gate: tensorrt.tensorrt.RNNGateType*, *is_w: bool*, *weights: tensorrt.tensorrt.Weights*) → None

Set the weight parameters for an individual gate in the RNN.

Parameters

- **layer_index** – The index of the layer that contains this gate.

- **gate** – The name of the gate within the RNN layer. The gate name must correspond to one of the gates used by this layer's *RNNOperation*.
- **is_w** – True if the weight parameters are for the input matrix W[g] and false if they are for the recurrent input matrix R[g]. See *RNNOperation* for equations showing how these matrices are used in the RNN gate.
- **weights** – The weight structure holding the weight parameters, which are stored as a row-major 2D matrix. For more information, see IRNNv2Layer::setWeights().

5.3.14 IPluginV2Layer

class tensorrt.**IPluginV2Layer**

A plugin layer in an *INetworkDefinition*.

Variables **plugin** – IPluginV2 The plugin for the layer.

5.3.15 IUnaryLayer

tensorrt.**UnaryOperation**

The unary operations that may be performed by a Unary layer.

Members:

EXP : Exponentiation

LOG : Log (base e)

SQRT : Square root

RECIP : Reciprocal

ABS : Absolute value

NEG : Negation

SIN : Sine

COS : Cosine

TAN : Tangent

SINH : Hyperbolic sine

COSH : Hyperbolic cosine

ASIN : Inverse sine

ACOS : Inverse cosine

ATAN : Inverse tangent

ASINH : Inverse hyperbolic sine

ACOSH : Inverse hyperbolic cosine

ATANH : Inverse hyperbolic tangent

CEIL : Ceiling

FLOOR : Floor

ERF : Gauss error function

NOT : Not

SIGN : Sign. If input > 0, output 1; if input < 0, output -1; if input == 0, output 0.

ROUND : Round to nearest even for float datatype.

class tensorrt.**IUnaryLayer**
A unary layer in an *INetworkDefinition*.

Variables **op** – *UnaryOperation* The unary operation for the layer. When running this layer on DLA, only `UnaryOperation.ABS` is supported.

5.3.16 IReduceLayer

tensorrt.**ReduceOperation**
The reduce operations that may be performed by a Reduce layer

Members:

SUM :

PROD :

MAX :

MIN :

AVG :

class tensorrt.**IReduceLayer**
A reduce layer in an *INetworkDefinition*.

Variables

- **op** – *ReduceOperation* The reduce operation for the layer.
- **axes** – `int` The axes over which to reduce.
- **keep_dims** – `bool` Specifies whether or not to keep the reduced dimensions for the layer.

5.3.17 IPaddingLayer

class tensorrt.**IPaddingLayer**
A padding layer in an *INetworkDefinition*.

Variables

- **pre_padding** – *DimsHW* The padding that is applied at the start of the tensor. Negative padding results in trimming the edge by the specified amount.
- **post_padding** – *DimsHW* The padding that is applied at the end of the tensor. Negative padding results in trimming the edge by the specified amount
- **pre_padding_nd** – *Dims* The padding that is applied at the start of the tensor. Negative padding results in trimming the edge by the specified amount. Only 2 dimensions currently supported.
- **post_padding_nd** – *Dims* The padding that is applied at the end of the tensor. Negative padding results in trimming the edge by the specified amount. Only 2 dimensions currently supported.

5.3.18 IParametricReLULayer

class tensorrt.**IParametricReLULayer**

A parametric ReLU layer in an *INetworkDefinition*.

This layer applies a parametric ReLU activation to an input tensor (first input), with slopes taken from a slopes tensor (second input). This can be viewed as a leaky ReLU operation where the negative slope differs from element to element (and can in fact be learned).

The slopes tensor must be unidirectional broadcastable to the input tensor: the rank of the two tensors must be the same, and all dimensions of the slopes tensor must either equal the input tensor or be 1. The output tensor has the same shape as the input tensor.

5.3.19 ISelectLayer

class tensorrt.**ISelectLayer**

A select layer in an *INetworkDefinition*.

This layer implements an element-wise ternary conditional operation. Wherever `condition` is `True`, elements are taken from the first input, and wherever `condition` is `False`, elements are taken from the second input.

5.3.20 IShuffleLayer

class tensorrt.**Permutation**(**args*, ***kwargs*)

The elements of the permutation. The permutation is applied as outputDimensionIndex = permutation[inputDimensionIndex], so to permute from CHW order to HWC order, the required permutation is [1, 2, 0], and to permute from HWC to CHW, the required permutation is [2, 0, 1].

It supports iteration and indexing and is implicitly convertible to/from Python iterables (like `tuple` or `list`). Therefore, you can use those classes in place of *Permutation*.

Overloaded function.

1. __init__(self: tensorrt.tensorrt.Permutation) -> None
2. __init__(self: tensorrt.tensorrt.Permutation, arg0: List[int]) -> None

class tensorrt.**IShuffleLayer**

A shuffle layer in an *INetworkDefinition*.

This class shuffles data by applying in sequence: a transpose operation, a reshape operation and a second transpose operation. The dimension types of the output are those of the reshape dimension.

Variables

- **first_transpose** – *Permutation* The permutation applied by the first transpose operation. Default: Identity Permutation
- **reshape_dims** – *Dims* The reshaped dimensions. Two special values can be used as dimensions. Value 0 copies the corresponding dimension from input. This special value can be used more than once in the dimensions. If number of reshape dimensions is less than input, 0s are resolved by aligning the most significant dimensions of input. Value -1 infers that particular dimension by looking at input and rest of the reshape dimensions. Note that only a maximum of one dimension is permitted to be specified as -1. The product of the new dimensions must be equal to the product of the old.
- **second_transpose** – *Permutation* The permutation applied by the second transpose operation. Default: Identity Permutation

- **zero_is_placeholder** – bool The meaning of 0 in reshape dimensions. If true, then a 0 in the reshape dimensions denotes copying the corresponding dimension from the first input tensor. If false, then a 0 in the reshape dimensions denotes a zero-length dimension.

set_input(*self: tensorrt.tensorrt.IShuffleLayer*, *index: int*, *tensor: tensorrt.tensorrt.ITensor*) → None
Sets the input tensor for the given index. The index must be 0 for a static shuffle layer. A static shuffle layer is converted to a dynamic shuffle layer by calling *set_input()* with an index 1. A dynamic shuffle layer cannot be converted back to a static shuffle layer.

For a dynamic shuffle layer, the values 0 and 1 are valid. The indices in the dynamic case are as follows:

Index	Description
0	Data or Shape tensor to be shuffled.
1	The dimensions for the reshape operation, as a 1D Int32 shape tensor.

If this function is called with a value 1, then num_inputs changes from 1 to 2.

Parameters

- **index** – The index of the input tensor.
- **tensor** – The input tensor.

5.3.21 ISliceLayer

class tensorrt.**ISliceLayer**
A slice layer in an *INetworkDefinition*.

Variables

- **start** – *Dims* The start offset.
- **shape** – *Dims* The output dimensions.
- **stride** – *Dims* The slicing stride.
- **mode** – SliceMode Controls how ISliceLayer handles out of bounds coordinates.

set_input(*self: tensorrt.tensorrt.ISliceLayer*, *index: int*, *tensor: tensorrt.tensorrt.ITensor*) → None
Sets the input tensor for the given index. The index must be 0 or 4 for a static slice layer. A static slice layer is converted to a dynamic slice layer by calling *set_input()* with an index between 1 and 3. A dynamic slice layer cannot be converted back to a static slice layer.

The indices are as follows:

Index	Description
0	Data or Shape tensor to be sliced.
1	The start tensor to begin slicing, N-dimensional for Data, and 1-D for Shape.
2	The size tensor of the resulting slice, N-dimensional for Data, and 1-D for Shape.
3	The stride of the slicing operation, N-dimensional for Data, and 1-D for Shape.
4	Value for the kFILL slice mode. Disallowed for other modes.

If this function is called with a value greater than 0, then num_inputs changes from 1 to index + 1.

Parameters

- **index** – The index of the input tensor.
- **tensor** – The input tensor.

5.3.22 IShapeLayer

class tensorrt.**IShapeLayer**

A shape layer in an *INetworkDefinition*. Used for getting the shape of a tensor. This class sets the output to a one-dimensional tensor with the dimensions of the input tensor.

For example, if the input is a four-dimensional tensor (of any type) with dimensions [2,3,5,7], the output tensor is a one-dimensional Int32 tensor of length 4 containing the sequence 2, 3, 5, 7.

5.3.23 ITopKLayer

tensorrt.**TopKOperation**

The operations that may be performed by a TopK layer

Members:

MAX : Maximum of the elements

MIN : Minimum of the elements

class tensorrt.**ITopKLayer**

A TopK layer in an *INetworkDefinition*.

Variables

- **op** – *TopKOperation* The operation for the layer.
- **k** – *TopKOperation* the k value for the layer. Currently only values up to 25 are supported.
- **axes** – *TopKOperation* The axes along which to reduce.

5.3.24 IMatrixMultiplyLayer

tensorrt.**MatrixOperation**

The matrix operations that may be performed by a Matrix layer

Members:

NONE :

TRANSPOSE : Transpose each matrix

VECTOR : Treat operand as collection of vectors

class tensorrt.**IMatrixMultiplyLayer**

A matrix multiply layer in an *INetworkDefinition*.

Let A be op(getInput(0)) and B be op(getInput(1)) where op(x) denotes the corresponding MatrixOperation.

When A and B are matrices or vectors, computes the inner product A * B:

matrix * matrix -> matrix
matrix * vector -> vector
vector * matrix -> vector
vector * vector -> scalar

Inputs of higher rank are treated as collections of matrices or vectors. The output will be a corresponding collection of matrices, vectors, or scalars.

Variables

- **op0** – *MatrixOperation* How to treat the first input.
- **op1** – *MatrixOperation* How to treat the second input.

5.3.25 IRaggedSoftMaxLayer

class tensorrt.**IRaggedSoftMaxLayer**

A ragged softmax layer in an *INetworkDefinition*.

This layer takes a ZxS input tensor and an additional Zx1 bounds tensor holding the lengths of the Z sequences.

This layer computes a softmax across each of the Z sequences.

The output tensor is of the same size as the input tensor.

5.3.26 IIdentityLayer

class tensorrt.**IIdentityLayer**

A layer that represents the identity function.

If tensor precision is explicitly specified, it can be used to transform from one precision to another.

5.3.27 IConstantLayer

class tensorrt.**IConstantLayer**

A constant layer in an *INetworkDefinition*.

Note: This layer does not support boolean types.

Variables

- **weights** – *Weights* The weights for the layer.
- **shape** – *Dims* The shape of the layer.

5.3.28 IResizeLayer

tensorrt.**ResizeMode**

Various modes of resize in the resize layer.

Members:

NEAREST : 1D, 2D, and 3D nearest neighbor resizing.

LINEAR : Can handle linear, bilinear, trilinear resizing.

class tensorrt.**IResizeLayer**

A resize layer in an *INetworkDefinition*.

Resize layer can be used for resizing a N-D tensor.

Resize layer currently supports the following configurations:

- ResizeMode.NEAREST - resizes innermost *m* dimensions of N-D, where 0 < m <= min(3, N) and N > 0.

- ResizeMode.LINEAR - resizes innermost *m* dimensions of N-D, where 0 < m <= min(3, N) and N > 0.

Default resize mode is ResizeMode.NEAREST.

Resize layer provides two ways to resize tensor dimensions:

- **Set output dimensions directly. It can be done for static as well as dynamic resize layer.** Static resize layer requires output dimensions to be known at build-time. Dynamic resize layer requires output dimensions to be set as one of the input tensors.
- **Set scales for resize. Each output dimension is calculated as floor(input dimension * scale).** Only static resize layer allows setting scales where the scales are known at build-time.

If executing this layer on DLA, the following combinations of parameters are supported:

- In NEAREST mode:
  - (ResizeCoordinateTransformation.ASYMMETRIC, ResizeSelector.FORMULA, ResizeRoundMode.FLOOR)
  - (ResizeCoordinateTransformation.HALF_PIXEL, ResizeSelector.FORMULA, ResizeRoundMode.HALF_DOWN)
  - (ResizeCoordinateTransformation.HALF_PIXEL, ResizeSelector.FORMULA, ResizeRoundMode.HALF_UP)
- In LINEAR mode:
  - (ResizeCoordinateTransformation.HALF_PIXEL, ResizeSelector.FORMULA)
  - (ResizeCoordinateTransformation.HALF_PIXEL, ResizeSelector.UPPER)

Variables

- **shape** – *Dims* The output dimensions. Must to equal to input dimensions size.
- **scales** – `List[float]` List of resize scales. If executing this layer on DLA, there are three restrictions: 1. `len(scales)` has to be exactly 4. 2. The first two elements in scales need to be exactly 1 (for unchanged batch and channel dimensions). 3. The last two elements in scales, representing the scale values along height and width dimensions, respectively, need to be integer values in the range of [1, 32] for NEAREST mode and [1, 4] for LINEAR. Example of DLA-supported scales: [1, 1, 2, 2].
- **resize_mode** – *ResizeMode* Resize mode can be Linear or Nearest.
- **coordinate_transformation** – `ResizeCoordinateTransformationDoc` Supported resize coordinate transformation modes are ALIGN_CORNERS, ASYMMETRIC and HALF_PIXEL.
- **selector_for_single_pixel** – `ResizeSelector` Supported resize selector modes are FORMULA and UPPER.
- **nearest_rounding** – `ResizeRoundMode` Supported resize Round modes are HALF_UP, HALF_DOWN, FLOOR and CEIL.

set_input (*self: tensorrt.tensorrt.IResizeLayer*, *index: int*, *tensor: tensorrt.tensorrt.ITensor*) → None
Sets the input tensor for the given index.

If index == 1 and num_inputs == 1, and there is no implicit batch dimension, in which case num_inputs changes to 2. Once such additional input is set, resize layer works in dynamic mode. When index == 1 and num_inputs == 1, the output dimensions are used from the input tensor, overriding the dimensions supplied by *shape*.

Parameters

- **index** – The index of the input tensor.
- **tensor** – The input tensor.

5.3.29 ILoop

class tensorrt.**ILoop**

Helper for creating a recurrent subgraph.

Variables ***name*** – The name of the loop. The name is used in error diagnostics.

add_iterator(*self: tensorrt.tensorrt.ILoop*, *tensor: tensorrt.tensorrt.ITensor*, *axis: int = 0*, *reverse: bool = False*) → tensorrt.tensorrt.IIteratorLayer

Return layer that subscripts tensor by loop iteration.

For reverse=false, this is equivalent to add_gather(tensor, I, 0) where I is a scalar tensor containing the loop iteration number. For reverse=true, this is equivalent to add_gather(tensor, M-1-I, 0) where M is the trip count computed from TripLimits of kind COUNT.

Parameters

- **tensor** – The tensor to iterate over.
- **axis** – The axis along which to iterate.
- **reverse** – Whether to iterate in the reverse direction.

Returns The *IIteratorLayer* , or None if it could not be created.

add_loop_output(*self: tensorrt.tensorrt.ILoop*, *tensor: tensorrt.tensorrt.ITensor*, *kind: tensorrt.tensorrt.LoopOutput*, *axis: int = 0*) → tensorrt.tensorrt.ILoopOutputLayer

Make an output for this loop, based on the given tensor.

If kind is CONCATENATE or REVERSE, a second input specifying the concatenation dimension must be added via method *ILoopOutputLayer.set_input()* .

Parameters

- **kind** – The kind of loop output. See *LoopOutput*
- **axis** – The axis for concatenation (if using kind of CONCATENATE or REVERSE).

Returns The added *ILoopOutputLayer* , or None if it could not be created.

add_recurrence(*self: tensorrt.tensorrt.ILoop*, *initial_value: tensorrt.tensorrt.ITensor*) → tensorrt.tensorrt.IRecurrenceLayer

Create a recurrence layer for this loop with initial_value as its first input.

Parameters **initial_value** – The initial value of the recurrence layer.

Returns The added *IRecurrenceLayer* , or None if it could not be created.

add_trip_limit(*self: tensorrt.tensorrt.ILoop*, *tensor: tensorrt.tensorrt.ITensor*, *kind: tensorrt.tensorrt.TripLimit*) → tensorrt.tensorrt.ITripLimitLayer

Add a trip-count limiter, based on the given tensor.

There may be at most one COUNT and one WHILE limiter for a loop. When both trip limits exist, the loop exits when the count is reached or condition is falsified. It is an error to not add at least one trip limiter.

For WHILE, the input tensor must be the output of a subgraph that contains only layers that are not *ITripLimitLayer* , *IIteratorLayer* or *ILoopOutputLayer* . Any *IRecurrenceLayer* s in the subgraph must belong to the same loop as the *ITripLimitLayer* . A trivial example of this rule is that the input to the WHILE is the output of an *IRecurrenceLayer* for the same loop.

Parameters

- **tensor** – The input tensor. Must be available before the loop starts.
- **kind** – The kind of trip limit. See *TripLimit*

Returns The added *ITripLimitLayer* , or None if it could not be created.

5.3.29.1 ILoopBoundaryLayer

class tensorrt.**ILoopBoundaryLayer**

Variables **loop** – *ILoop* associated with this boundary layer.

5.3.29.1.1 ITripLimitLayer

tensorrt.**TripLimit**

Describes kinds of trip limits.

Members:

COUNT : Tensor is scalar of type kINT32 that contains the trip count.

WHILE : Tensor is a scalar of type BOOL. Loop terminates when value is false.

class tensorrt.**ITripLimitLayer**

Variables **kind** – The kind of trip limit. See *TripLimit*

5.3.29.1.2 IRecurrenceLayer

class tensorrt.**IRecurrenceLayer**

set_input(*self: tensorrt.tensorrt.IRecurrenceLayer*, *index: int*, *tensor: tensorrt.tensorrt.ITensor*) → None

Set the first or second input. If index==1 and the number of inputs is one, the input is appended. The first input specifies the initial output value, and must come from outside the loop. The second input specifies the next output value, and must come from inside the loop. The two inputs must have the same dimensions.

Parameters

- **index** – The index of the input to set.
- **tensor** – The input tensor.

5.3.29.1.3 IIteratorLayer

class tensorrt.**IIteratorLayer**

Variables

- **axis** – The axis to iterate over
- **reverse** – For reverse=false, the layer is equivalent to add_gather(tensor, I, 0) where I is a scalar tensor containing the loop iteration number. For reverse=true, the layer is equivalent to add_gather(tensor, M-1-I, 0) where M is the trip count computed from TripLimits of kind COUNT. The default is reverse=false.

5.3.29.1.4 ILoopOutputLayer

tensorrt.**LoopOutput**
Describes kinds of loop outputs.

Members:

LAST_VALUE : Output value is value of tensor for last iteration.

CONCATENATE : Output value is concatenation of values of tensor for each iteration, in forward order.

REVERSE : Output value is concatenation of values of tensor for each iteration, in reverse order.

class tensorrt.**ILoopOutputLayer**
An *ILoopOutputLayer* is the sole way to get output from a loop.

The first input tensor must be defined inside the loop; the output tensor is outside the loop. The second input tensor, if present, must be defined outside the loop.

If `kind` is `LAST_VALUE`, a single input must be provided.

If `kind` is `CONCATENATE` or `REVERSE`, a second input must be provided. The second input must be a scalar "shape tensor", defined before the loop commences, that specifies the concatenation length of the output.

The output tensor has j more dimensions than the input tensor, where j == 0 if `kind` is `LAST_VALUE` j == 1 if `kind` is `CONCATENATE` or `REVERSE`.

Variables

- **axis** – The contenation axis. Ignored if `kind` is `LAST_VALUE`. For example, if the input tensor has dimensions [b,c,d], and `kind` is `CONCATENATE`, the output has four dimensions. Let a be the value of the second input. axis=0 causes the output to have dimensions [a,b,c,d]. axis=1 causes the output to have dimensions [b,a,c,d]. axis=2 causes the output to have dimensions [b,c,a,d]. axis=3 causes the output to have dimensions [b,c,d,a]. Default is axis is 0.
- **kind** – The kind of loop output. See *LoopOutput*

set_input(*self: tensorrt.tensorrt.ILoopOutputLayer*, *index: int*, *tensor: tensorrt.tensorrt.ITensor*) → None
Like *ILayer.set_input()*, but additionally works if index==1, `num_inputs`==1, in which case :attr:`num_inputs` changes to 2.

5.3.30 IFillLayer

tensorrt.**FillOperation**
The tensor fill operations that may performed by an Fill layer.

Members:

LINSPACE : Generate evenly spaced numbers over a specified interval

RANDOM_UNIFORM : Generate a tensor with random values drawn from a uniform distribution

class tensorrt.**IFillLayer**
A fill layer in an *INetworkDefinition* .

set_input(*self: tensorrt.tensorrt.IFillLayer*, *index: int*, *tensor: tensorrt.tensorrt.ITensor*) → None
replace an input of this layer with a specific tensor.

Index	Description for kLINSPACE
0	Shape tensor, represents the output tensor's dimensions.
1	Start, a scalar, represents the start value.
2	Delta, a 1D tensor, length equals to shape tensor's nbDims, represents the delta value for each dimension.

Index	Description for kRANDOM_UNIFORM
0	Shape tensor, represents the output tensor's dimensions.
1	Minimum, a scalar, represents the minimum random value.
2	Maximum, a scalar, represents the maximal random value.

Parameters

- **index** – the index of the input to modify.
- **tensor** – the input tensor.

5.3.31 IQuantizeLayer

class tensorrt.**IQuantizeLayer**

A Quantize layer in an *INetworkDefinition*.

This layer accepts a floating-point data input tensor, and uses the scale and zeroPt inputs to

quantize the data to an 8-bit signed integer according to:

$output = clamp(round(input/scale) + zeroPt)$

Rounding type is rounding-to-nearest ties-to-even (https://en.wikipedia.org/wiki/Rounding#Round_half_to_even).

Clamping is in the range [-128, 127].

The first input (index 0) is the tensor to be quantized. The second (index 1) and third (index 2) are the scale and zero point respectively. Each of scale and zeroPt must be either a scalar, or a 1D tensor.

The zeroPt tensor is optional, and if not set, will be assumed to be zero. Its data type must be tensorrt.int8. zeroPt must only contain zero-valued coefficients, because only symmetric quantization is supported. The scale value must be either a scalar for per-tensor quantization, or a 1D tensor for per-axis quantization. The size of the 1-D scale tensor must match the size of the quantization axis. The size of the scale must match the size of the zeroPt.

The subgraph which terminates with the scale tensor must be a build-time constant. The same restrictions apply to the zeroPt. The output type, if constrained, must be constrained to tensorrt.int8. The input type, if constrained, must be constrained to tensorrt.float32 (FP16 input is not supported). The output size is the same as the input size.

IQuantizeLayer only supports tensorrt.float32 precision and will default to this precision during instantiation. IQuantizeLayer only supports tensorrt.int8 output.

Variables **axis** – int The axis along which quantization occurs. The quantization axis is in reference to the input tensor's dimensions.

5.3.32 IDequantizeLayer

class tensorrt.**IDequantizeLayer**

A Dequantize layer in an *INetworkDefinition*.

This layer accepts a signed 8-bit integer input tensor, and uses the configured scale and zeroPt inputs to dequantize the input according to: $output = (input - zeroPt) * scale$

The first input (index 0) is the tensor to be quantized. The second (index 1) and third (index 2) are the scale and zero point respectively. Each of scale and zeroPt must be either a scalar, or a 1D tensor.

The zeroPt tensor is optional, and if not set, will be assumed to be zero. Its data type must be tensorrt.int8. zeroPt must only contain zero-valued coefficients, because only symmetric quantization is supported. The scale value must be either a scalar for per-tensor quantization, or a 1D tensor for per-axis quantization. The size of the 1-D scale tensor must match the size of the quantization axis. The size of the scale must match the size of the zeroPt.

The subgraph which terminates with the scale tensor must be a build-time constant. The same restrictions apply to the zeroPt. The output type, if constrained, must be constrained to tensorrt.int8. The input type, if constrained, must be constrained to tensorrt.float32 (FP16 input is not supported). The output size is the same as the input size.

IDequantizeLayer only supports tensorrt.int8 precision and will default to this precision during instantiation. IDequantizeLayer only supports tensorrt.float32 output.

Variables **axis** – `int` The axis along which dequantization occurs. The dequantization axis is in reference to the input tensor's dimensions.

5.3.33 IScatterLayer

class tensorrt.**IScatterLayer**

A Scatter layer as in *INetworkDefinition*. :ivar axis: axis to scatter on when using Scatter Element mode (ignored in ND mode) :ivar mode: `ScatterMode` The operation mode of the scatter.

5.3.34 IIfConditional

class tensorrt.**IIfConditional**

Helper for constructing conditionally-executed subgraphs.

An If-conditional conditionally executes (lazy evaluation) part of the network according to the following pseudo-code:

```
If condition is true Then:
    output = trueSubgraph(trueInputs);
Else:
    output = falseSubgraph(falseInputs);
Emit output
```

Condition is a 0D boolean tensor (representing a scalar). trueSubgraph represents a network subgraph that is executed when condition is evaluated to True. falseSubgraph represents a network subgraph that is executed when condition is evaluated to False.

The following constraints apply to If-conditionals: - Both the trueSubgraph and falseSubgraph must be defined. - The number of output tensors in both subgraphs is the same. - The type and shape of each output tensor from true/false subgraphs are the same.

add_input(*self: tensorrt.tensorrt.IIfConditional*, *input: tensorrt.tensorrt.ITensor*) → tensorrt.tensorrt.IIfConditionalInputLayer

Make an input for this if-conditional, based on the given tensor.

Parameters **input** – An input to the conditional that can be used by either or both of the conditional's subgraphs.

add_output(*self: tensorrt.tensorrt.IIfConditional*, *true_subgraph_output: tensorrt.tensorrt.ITensor*, *false_subgraph_output: tensorrt.tensorrt.ITensor*) → tensorrt.tensorrt.IIfConditionalOutputLayer

Make an output for this if-conditional, based on the given tensors.

Each output layer of the if-conditional represents a single output of either the true-subgraph or the false-subgraph of the if-conditional, depending on which subgraph was executed.

Parameters

- **true_subgraph_output** – The output of the subgraph executed when this conditional's condition input evaluates to true.
- **false_subgraph_output** – The output of the subgraph executed when this conditional's condition input evaluates to false.

Returns The *IIfConditionalOutputLayer*, or `None` if it could not be created.

set_condition(*self: tensorrt.tensorrt.IIfConditional*, *condition: tensorrt.tensorrt.ITensor*) → tensorrt.tensorrt.IConditionLayer

Set the condition tensor for this If-Conditional construct.

The `condition` tensor must be a 0D data tensor (scalar) with type DataType::kBOOL.

Parameters **condition** – The condition tensor that will determine which subgraph to execute.

Returns The *IConditionLayer*, or `None` if it could not be created.

5.3.35 IConditionLayer

class tensorrt.**IConditionLayer**

Describes the boolean condition of an if-conditional.

5.3.36 IIfConditionalOutputLayer

class tensorrt.**IIfConditionalOutputLayer**

Describes kinds of if-conditional outputs.

5.3.37 IIfConditionalInputLayer

class tensorrt.**IIfConditionalInputLayer**

Describes kinds of if-conditional inputs.

5.3.38 IEinsumLayer

class tensorrt.**IEinsumLayer**

An Einsum layer in an *INetworkDefinition*.

This layer implements a summation over the elements of the inputs along dimensions specified by the equation parameter, based on the Einstein summation convention. The layer can have one or more inputs of rank >= 0. All the inputs must be of same data type. This layer supports all TensorRT data types except trt.bool. There is one output tensor of the same type as the input tensors. The shape of output tensor is determined by the equation.

The equation specifies ASCII lower-case letters for each dimension in the inputs in the same order as the dimensions, separated by comma for each input. The dimensions labeled with the same subscript must match or be broadcastable. Repeated subscript labels in one input take the diagonal. Repeating a label across multiple inputs means that those axes will be multiplied. Omitting a label from the output means values along those axes will be summed. In implicit mode, the indices which appear once in the expression will be part of the output in increasing alphabetical order. In explicit mode, the output can be controlled by specifying output subscript labels by adding an arrow ('->') followed by subscripts for the output. For example, "ij,jk->ik" is equivalent to "ij,jk". Ellipsis ('...') can be used in place of subscripts to broadcast the dimensions. See the TensorRT Developer Guide for more details on equation syntax.

Many common operations can be expressed using the Einsum equation. For example: Matrix Transpose: ij->ji Sum: ij-> Matrix-Matrix Multiplication: ik,kj->ij Dot Product: i,i-> Matrix-Vector Multiplication: ik,k->i Batch Matrix Multiplication: ijk,ikl->ijl Batch Diagonal: ...ii->...i

Note that TensorRT does not support ellipsis or diagonal operations.

Variables **equation** – str The Einsum equation of the layer. The equation is a comma-separated list of subscript labels, where each label refers to a dimension of the corresponding tensor.

5.3.39 IAssertionLayer

class tensorrt.**IAssertionLayer**

An assertion layer in an *INetworkDefinition*.

This layer implements assertions. The input must be a boolean shape tensor. If any element of it is `False`, a build-time or run-time error occurs. Asserting equality of input dimensions may help the optimizer.

Variables **message** – string Message to print if the assertion fails.

CHAPTER

SIX

PLUGIN

6.1 IPluginCreator

tensorrt.**PluginFieldType**
The possible field types for custom layer.

Members:

FLOAT16

FLOAT32

FLOAT64

INT8

INT16

INT32

CHAR

DIMS

UNKNOWN

class tensorrt.**PluginField**(**args*, ***kwargs*)
Contains plugin attribute field names and associated data. This information can be parsed to decode necessary plugin metadata

Variables

- ***name*** – str Plugin field attribute name.
- **data** – buffer Plugin field attribute data.
- **type** – *PluginFieldType* Plugin field attribute type.
- **size** – int Number of data entries in the Plugin attribute.

Overloaded function.

1. __init__(self: tensorrt.tensorrt.PluginField, name: tensorrt.tensorrt.FallbackString = '') -> None
2. __init__(self: tensorrt.tensorrt.PluginField, name: tensorrt.tensorrt.FallbackString, data: buffer, type: tensorrt.tensorrt.PluginFieldType = <PluginFieldType.UNKNOWN: 8>) -> None

class tensorrt.**PluginFieldCollection**(**args*, ***kwargs*)
Overloaded function.

1. __init__(self: tensorrt.tensorrt.PluginFieldCollection) -> None

2. __init__(self: tensorrt.tensorrt.PluginFieldCollection, arg0: tensorrt.tensorrt.PluginFieldCollection) -> None

Copy constructor

3. __init__(self: tensorrt.tensorrt.PluginFieldCollection, arg0: Iterable) -> None

append(*self: tensorrt.tensorrt.PluginFieldCollection*, *x: nvinfer1::PluginField*) → None
Add an item to the end of the list

clear(*self: tensorrt.tensorrt.PluginFieldCollection*) → None
Clear the contents

extend(**args*, ***kwargs*)
Overloaded function.

1. extend(self: tensorrt.tensorrt.PluginFieldCollection, L: tensorrt.tensorrt.PluginFieldCollection) -> None

Extend the list by appending all the items in the given list

2. extend(self: tensorrt.tensorrt.PluginFieldCollection, L: Iterable) -> None

Extend the list by appending all the items in the given list

insert(*self: tensorrt.tensorrt.PluginFieldCollection*, *i: int*, *x: nvinfer1::PluginField*) → None
Insert an item at a given position.

pop(**args*, ***kwargs*)
Overloaded function.

1. pop(self: tensorrt.tensorrt.PluginFieldCollection) -> nvinfer1::PluginField

Remove and return the last item

2. pop(self: tensorrt.tensorrt.PluginFieldCollection, i: int) -> nvinfer1::PluginField

Remove and return the item at index `i`

class tensorrt.**IPluginCreator**
Plugin creator class for user implemented layers

Variables

- **tensorrt_version** – `int` Number of *PluginField* entries.
- ***name*** – `str` Plugin name.
- **plugin_version** – `str` Plugin version.
- **field_names** – `list` List of fields that needs to be passed to *create_plugin()* .
- **plugin_namespace** – `str` The namespace of the plugin creator based on the plugin library it belongs to. This can be set while registering the plugin creator.

create_plugin(*self: tensorrt.tensorrt.IPluginCreator*, *name: str*, *field_collection: tensorrt.tensorrt.PluginFieldCollection_*) → tensorrt.tensorrt.IPluginV2
Creates a new plugin.

Parameters

- **name** – The name of the plugin.
- **field_collection** – The *PluginFieldCollection* for this plugin.

Returns `IPluginV2` or `None` on failure.

deserialize_plugin(*self: tensorrt.tensorrt.IPluginCreator*, *name: str*, *serialized_plugin: buffer*) → tensorrt.tensorrt.IPluginV2

Creates a plugin object from a serialized plugin.

Parameters

- **name** – Name of the plugin.
- **serialized_plugin** – A buffer containing a serialized plugin.

Returns A new `IPluginV2`

6.2 IPluginRegistry

class tensorrt.**IPluginRegistry**

Registers plugin creators.

Variables

- **plugin_creator_list** – All the registered plugin creators.
- **error_recorder** – *IErrorRecorder* Application-implemented error reporting interface for TensorRT objects.

deregister_creator(*self: tensorrt.tensorrt.IPluginRegistry*, *creator: tensorrt.tensorrt.IPluginCreator*) → bool

Deregister a previously registered plugin creator.

Since there may be a desire to limit the number of plugins, this function provides a mechanism for removing plugin creators registered in TensorRT. The plugin creator that is specified by `creator` is removed from TensorRT and no longer tracked.

Parameters **creator** – The IPluginCreator instance.

Returns `True` if the plugin creator was deregistered, `False` if it was not found in the registry or otherwise could not be deregistered.

get_plugin_creator(*self: tensorrt.tensorrt.IPluginRegistry*, *type: str*, *version: str*, *plugin_namespace: str = ''*) → tensorrt.tensorrt.IPluginCreator

Return plugin creator based on type and version

Parameters

- **type** – The type of the plugin.
- **version** – The version of the plugin.
- **plugin_namespace** – The namespace of the plugin.

Returns An *IPluginCreator* .

register_creator(*self: tensorrt.tensorrt.IPluginRegistry*, *creator: tensorrt.tensorrt.IPluginCreator*, *plugin_namespace: str = ''*) → bool

Register a plugin creator.

Parameters

- **creator** – The IPluginCreator instance.
- **plugin_namespace** – The namespace of the plugin creator.

Returns False if one with the same type is already registered.

tensorrt.**get_plugin_registry**() → tensorrt.tensorrt.IPluginRegistry
Return the plugin registry for standard runtime

tensorrt.**init_libnvinfer_plugins**(*logger: capsule*, *namespace: str*) → bool
Initialize and register all the existing TensorRT plugins to the *IPluginRegistry* with an optional namespace. The plugin library author should ensure that this function name is unique to the library. This function should be called once before accessing the Plugin Registry.

Parameters

- **logger** – Logger to print plugin registration information.
- **namespace** – Namespace used to register all the plugins in this library.

CHAPTER

SEVEN

INT8

7.1 IInt8Calibrator

tensorrt.**CalibrationAlgoType**
Version of calibration algorithm to use.

Members:

LEGACY_CALIBRATION

ENTROPY_CALIBRATION

ENTROPY_CALIBRATION_2

MINMAX_CALIBRATION

class tensorrt.**IInt8Calibrator**(*self: tensorrt.tensorrt.IInt8Calibrator*) → None
Application-implemented interface for calibration. Calibration is a step performed by the builder when deciding suitable scale factors for 8-bit inference. It must also provide a method for retrieving representative images which the calibration process can use to examine the distribution of activations. It may optionally implement a method for caching the calibration result for reuse on subsequent runs.

To implement a custom calibrator, ensure that you explicitly instantiate the base class in `__init__()`:

```
class MyCalibrator(trt.IInt8Calibrator):
    def __init__(self):
        trt.IInt8Calibrator.__init__(self)
```

Variables

- **batch_size** – int The batch size used for calibration batches.
- **algorithm** – *CalibrationAlgoType* The algorithm used by this calibrator.

get_algorithm(*self: tensorrt.tensorrt.IInt8Calibrator*) → tensorrt.tensorrt.CalibrationAlgoType
Get the algorithm used by this calibrator.

Returns The algorithm used by this calibrator.

get_batch(*self: tensorrt.tensorrt.IInt8Calibrator, names: List[str]*) → List[int]
Get a batch of input for calibration. The batch size of the input must match the batch size returned by *get_batch_size()*.

A possible implementation may look like this:

```
def get_batch(names):
    try:
        # Assume self.batches is a generator that provides batch data.
        data = next(self.batches)
        # Assume that self.device_input is a device buffer allocated by the␣
↪constructor.
        cuda.memcpy_htod(self.device_input, data)
        return [int(self.device_input)]
    except StopIteration:
        # When we're out of batches, we return either [] or None.
        # This signals to TensorRT that there is no calibration data␣
↪remaining.
        return None
```

Parameters **names** – The names of the network inputs for each object in the bindings array.

Returns A `list` of device memory pointers set to the memory containing each network input data, or an empty `list` if there are no more batches for calibration. You can allocate these device buffers with pycuda, for example, and then cast them to `int` to retrieve the pointer.

get_batch_size(*self: tensorrt.tensorrt.IInt8Calibrator*) → int

Get the batch size used for calibration batches.

Returns The batch size.

read_calibration_cache(*self: tensorrt.tensorrt.IInt8Calibrator*) → buffer

Load a calibration cache.

Calibration is potentially expensive, so it can be useful to generate the calibration data once, then use it on subsequent builds of the network. The cache includes the regression cutoff and quantile values used to generate it, and will not be used if these do not match the settings of the current calibrator. However, the network should also be recalibrated if its structure changes, or the input data set changes, and it is the responsibility of the application to ensure this.

Reading a cache is just like reading any other file in Python. For example, one possible implementation is:

```
def read_calibration_cache(self):
    # If there is a cache, use it instead of calibrating again. Otherwise,␣
↪implicitly return None.
    if os.path.exists(self.cache_file):
        with open(self.cache_file, "rb") as f:
            return f.read()
```

Returns A cache object or None if there is no data.

write_calibration_cache(*self: tensorrt.tensorrt.IInt8Calibrator*, *cache: buffer*) → None

Save a calibration cache.

Writing a cache is just like writing any other buffer in Python. For example, one possible implementation is:

```
def write_calibration_cache(self, cache):
    with open(self.cache_file, "wb") as f:
        f.write(cache)
```

Parameters **cache** – The calibration cache to write.

7.2 IInt8LegacyCalibrator

class tensorrt.**IInt8LegacyCalibrator**(*self: tensorrt.tensorrt.IInt8LegacyCalibrator*) → None

Extends the *IInt8Calibrator* class. This calibrator requires user parameterization, and is provided as a fallback option if the other calibrators yield poor results.

To implement a custom calibrator, ensure that you explicitly instantiate the base class in `__init__()`:

```
class MyCalibrator(trt.IInt8LegacyCalibrator):
    def __init__(self):
        trt.IInt8LegacyCalibrator.__init__(self)
```

Variables

- **quantile** – `float` The quantile (between 0 and 1) that will be used to select the region maximum when the quantile method is in use. See the user guide for more details on how the quantile is used.
- **regression_cutoff** – `float` The fraction (between 0 and 1) of the maximum used to define the regression cutoff when using regression to determine the region maximum. See the user guide for more details on how the regression cutoff is used

get_algorithm(*self: tensorrt.tensorrt.IInt8LegacyCalibrator*) → tensorrt.tensorrt.CalibrationAlgoType

Signals that this is the legacy calibrator.

Returns `CalibrationAlgoType.LEGACY_CALIBRATION`

get_batch(*self: tensorrt.tensorrt.IInt8LegacyCalibrator, names: List[str]*) → List[int]

Get a batch of input for calibration. The batch size of the input must match the batch size returned by *get_batch_size()*.

A possible implementation may look like this:

```
def get_batch(names):
    try:
        # Assume self.batches is a generator that provides batch data.
        data = next(self.batches)
        # Assume that self.device_input is a device buffer allocated by the␣
↪constructor.
        cuda.memcpy_htod(self.device_input, data)
        return [int(self.device_input)]
    except StopIteration:
        # When we're out of batches, we return either [] or None.
        # This signals to TensorRT that there is no calibration data␣
↪remaining.
        return None
```

Parameters **names** – The names of the network inputs for each object in the bindings array.

Returns A `list` of device memory pointers set to the memory containing each network input data, or an empty `list` if there are no more batches for calibration. You can allocate these device buffers with pycuda, for example, and then cast them to `int` to retrieve the pointer.

get_batch_size(*self: tensorrt.tensorrt.IInt8LegacyCalibrator*) → int

Get the batch size used for calibration batches.

Returns The batch size.

read_calibration_cache(*self: tensorrt.tensorrt.IInt8LegacyCalibrator*) → buffer
Load a calibration cache.

Calibration is potentially expensive, so it can be useful to generate the calibration data once, then use it on subsequent builds of the network. The cache includes the regression cutoff and quantile values used to generate it, and will not be used if these do not match the settings of the current calibrator. However, the network should also be recalibrated if its structure changes, or the input data set changes, and it is the responsibility of the application to ensure this.

Reading a cache is just like reading any other file in Python. For example, one possible implementation is:

```
def read_calibration_cache(self):
    # If there is a cache, use it instead of calibrating again. Otherwise,␣
↪implicitly return None.
    if os.path.exists(self.cache_file):
        with open(self.cache_file, "rb") as f:
            return f.read()
```

Returns A cache object or None if there is no data.

write_calibration_cache(*self: tensorrt.tensorrt.IInt8LegacyCalibrator*, *cache: buffer*) → None
Save a calibration cache.

Writing a cache is just like writing any other buffer in Python. For example, one possible implementation is:

```
def write_calibration_cache(self, cache):
    with open(self.cache_file, "wb") as f:
        f.write(cache)
```

Parameters **cache** – The calibration cache to write.

7.3 IInt8EntropyCalibrator

class tensorrt.**IInt8EntropyCalibrator**(*self: tensorrt.tensorrt.IInt8EntropyCalibrator*) → None
Extends the *IInt8Calibrator* class.

To implement a custom calibrator, ensure that you explicitly instantiate the base class in `__init__()`:

```
class MyCalibrator(trt.IInt8EntropyCalibrator):
    def __init__(self):
        trt.IInt8EntropyCalibrator.__init__(self)
```

This is the Legacy Entropy calibrator. It is less complicated than the legacy calibrator and produces better results.

get_algorithm(*self: tensorrt.tensorrt.IInt8EntropyCalibrator*) → tensorrt.tensorrt.CalibrationAlgoType
Signals that this is the entropy calibrator.

Returns `CalibrationAlgoType.ENTROPY_CALIBRATION`

get_batch(*self: tensorrt.tensorrt.IInt8EntropyCalibrator*, *names: List[str]*) → List[int]
Get a batch of input for calibration. The batch size of the input must match the batch size returned by *get_batch_size()*.

A possible implementation may look like this:

```
def get_batch(names):
    try:
        # Assume self.batches is a generator that provides batch data.
        data = next(self.batches)
        # Assume that self.device_input is a device buffer allocated by the␣
↪constructor.
        cuda.memcpy_htod(self.device_input, data)
        return [int(self.device_input)]
    except StopIteration:
        # When we're out of batches, we return either [] or None.
        # This signals to TensorRT that there is no calibration data␣
↪remaining.
        return None
```

Parameters **names** – The names of the network inputs for each object in the bindings array.

Returns A `list` of device memory pointers set to the memory containing each network input data, or an empty `list` if there are no more batches for calibration. You can allocate these device buffers with pycuda, for example, and then cast them to `int` to retrieve the pointer.

get_batch_size(*self: tensorrt.tensorrt.IInt8EntropyCalibrator*) → int
Get the batch size used for calibration batches.

Returns The batch size.

read_calibration_cache(*self: tensorrt.tensorrt.IInt8EntropyCalibrator*) → buffer
Load a calibration cache.

Calibration is potentially expensive, so it can be useful to generate the calibration data once, then use it on subsequent builds of the network. The cache includes the regression cutoff and quantile values used to generate it, and will not be used if these do not match the settings of the current calibrator. However, the network should also be recalibrated if its structure changes, or the input data set changes, and it is the responsibility of the application to ensure this.

Reading a cache is just like reading any other file in Python. For example, one possible implementation is:

```
def read_calibration_cache(self):
    # If there is a cache, use it instead of calibrating again. Otherwise,␣
↪implicitly return None.
    if os.path.exists(self.cache_file):
        with open(self.cache_file, "rb") as f:
            return f.read()
```

Returns A cache object or None if there is no data.

write_calibration_cache(*self: tensorrt.tensorrt.IInt8EntropyCalibrator*, *cache: buffer*) → None
Save a calibration cache.

Writing a cache is just like writing any other buffer in Python. For example, one possible implementation is:

```
def write_calibration_cache(self, cache):
    with open(self.cache_file, "wb") as f:
        f.write(cache)
```

Parameters **cache** – The calibration cache to write.

7.4 IInt8EntropyCalibrator2

class tensorrt.**IInt8EntropyCalibrator2**(*self: tensorrt.tensorrt.IInt8EntropyCalibrator2*) → None

Extends the *IInt8Calibrator* class.

To implement a custom calibrator, ensure that you explicitly instantiate the base class in `__init__()`:

```
class MyCalibrator(trt.IInt8EntropyCalibrator2):
    def __init__(self):
        trt.IInt8EntropyCalibrator2.__init__(self)
```

This is the preferred calibrator. This is the required calibrator for DLA, as it supports per activation tensor scaling.

get_algorithm(*self: tensorrt.tensorrt.IInt8EntropyCalibrator2*) → tensorrt.tensorrt.CalibrationAlgoType

Signals that this is the entropy calibrator 2.

Returns `CalibrationAlgoType.ENTROPY_CALIBRATION_2`

get_batch(*self: tensorrt.tensorrt.IInt8EntropyCalibrator2, names: List[str]*) → List[int]

Get a batch of input for calibration. The batch size of the input must match the batch size returned by *get_batch_size()*.

A possible implementation may look like this:

```
def get_batch(names):
    try:
        # Assume self.batches is a generator that provides batch data.
        data = next(self.batches)
        # Assume that self.device_input is a device buffer allocated by the␣
↪constructor.
        cuda.memcpy_htod(self.device_input, data)
        return [int(self.device_input)]
    except StopIteration:
        # When we're out of batches, we return either [] or None.
        # This signals to TensorRT that there is no calibration data␣
↪remaining.
        return None
```

Parameters **names** – The names of the network inputs for each object in the bindings array.

Returns A `list` of device memory pointers set to the memory containing each network input data, or an empty `list` if there are no more batches for calibration. You can allocate these device buffers with pycuda, for example, and then cast them to `int` to retrieve the pointer.

get_batch_size(*self: tensorrt.tensorrt.IInt8EntropyCalibrator2*) → int

Get the batch size used for calibration batches.

Returns The batch size.

read_calibration_cache(*self: tensorrt.tensorrt.IInt8EntropyCalibrator2*) → buffer

Load a calibration cache.

Calibration is potentially expensive, so it can be useful to generate the calibration data once, then use it on subsequent builds of the network. The cache includes the regression cutoff and quantile values used to generate it, and will not be used if these do not match the settings of the current calibrator. However, the network should also be recalibrated if its structure changes, or the input data set changes, and it is the responsibility of the application to ensure this.

Reading a cache is just like reading any other file in Python. For example, one possible implementation is:

```
def read_calibration_cache(self):
    # If there is a cache, use it instead of calibrating again. Otherwise,␣
↪implicitly return None.
    if os.path.exists(self.cache_file):
        with open(self.cache_file, "rb") as f:
            return f.read()
```

Returns A cache object or None if there is no data.

write_calibration_cache(*self: tensorrt.tensorrt.IInt8EntropyCalibrator2*, *cache: buffer*) → None

Save a calibration cache.

Writing a cache is just like writing any other buffer in Python. For example, one possible implementation is:

```
def write_calibration_cache(self, cache):
    with open(self.cache_file, "wb") as f:
        f.write(cache)
```

Parameters **cache** – The calibration cache to write.

7.5 IInt8MinMaxCalibrator

class tensorrt.**IInt8MinMaxCalibrator**(*self: tensorrt.tensorrt.IInt8MinMaxCalibrator*) → None

Extends the *IInt8Calibrator* class.

To implement a custom calibrator, ensure that you explicitly instantiate the base class in `__init__()`:

```
class MyCalibrator(trt.IInt8MinMaxCalibrator):
    def __init__(self):
        trt.IInt8MinMaxCalibrator.__init__(self)
```

This is the preferred calibrator for NLP tasks for all backends. It supports per activation tensor scaling.

get_algorithm(*self: tensorrt.tensorrt.IInt8MinMaxCalibrator*) → tensorrt.tensorrt.CalibrationAlgoType

Signals that this is the minmax calibrator.

Returns `CalibrationAlgoType.MINMAX_CALIBRATION`

get_batch(*self: tensorrt.tensorrt.IInt8MinMaxCalibrator, names: List[str]*) → List[int]

Get a batch of input for calibration. The batch size of the input must match the batch size returned by *get_batch_size()*.

A possible implementation may look like this:

```
def get_batch(names):
    try:
        # Assume self.batches is a generator that provides batch data.
        data = next(self.batches)
        # Assume that self.device_input is a device buffer allocated by the␣
↪constructor.
        cuda.memcpy_htod(self.device_input, data)
```

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```
        return [int(self.device_input)]
    except StopIteration:
        # When we're out of batches, we return either [] or None.
        # This signals to TensorRT that there is no calibration data␣
↪remaining.
        return None
```

Parameters **names** – The names of the network inputs for each object in the bindings array.

Returns A `list` of device memory pointers set to the memory containing each network input data, or an empty `list` if there are no more batches for calibration. You can allocate these device buffers with pycuda, for example, and then cast them to `int` to retrieve the pointer.

get_batch_size(*self: tensorrt.tensorrt.IInt8MinMaxCalibrator*) → int

Get the batch size used for calibration batches.

Returns The batch size.

read_calibration_cache(*self: tensorrt.tensorrt.IInt8MinMaxCalibrator*) → buffer

Load a calibration cache.

Calibration is potentially expensive, so it can be useful to generate the calibration data once, then use it on subsequent builds of the network. The cache includes the regression cutoff and quantile values used to generate it, and will not be used if these do not match the settings of the current calibrator. However, the network should also be recalibrated if its structure changes, or the input data set changes, and it is the responsibility of the application to ensure this.

Reading a cache is just like reading any other file in Python. For example, one possible implementation is:

```
def read_calibration_cache(self):
    # If there is a cache, use it instead of calibrating again. Otherwise,␣
↪implicitly return None.
    if os.path.exists(self.cache_file):
        with open(self.cache_file, "rb") as f:
            return f.read()
```

Returns A cache object or None if there is no data.

write_calibration_cache(*self: tensorrt.tensorrt.IInt8MinMaxCalibrator*, *cache: buffer*) → None

Save a calibration cache.

Writing a cache is just like writing any other buffer in Python. For example, one possible implementation is:

```
def write_calibration_cache(self, cache):
    with open(self.cache_file, "wb") as f:
        f.write(cache)
```

Parameters **cache** – The calibration cache to write.

CHAPTER

EIGHT

ALGORITHM SELECTOR

class tensorrt.**IAlgorithmIOInfo**

This class carries information about input or output of the algorithm. IAlgorithmIOInfo for all the input and output along with IAlgorithmVariant denotes the variation of algorithm and can be used to select or reproduce an algorithm using IAlgorithmSelector.select_algorithms().

Variables

- **tensor_format** – *TensorFormat* TensorFormat of the input/output of algorithm.
- **dtype** – *DataType* DataType of the input/output of algorithm.
- **strides** – *Dims* strides of the input/output tensor of algorithm.

__init__()

Initialize self. See help(type(self)) for accurate signature.

class tensorrt.**IAlgorithmVariant**

provides a unique 128-bit identifier, which along with the input and output information denotes the variation of algorithm and can be used to select or reproduce an algorithm, using IAlgorithmSelector.select_algorithms() see IAlgorithmIOInfo, IAlgorithm, IAlgorithmSelector.select_algorithms() note A single implementation can have multiple tactics.

Variables

- **implementation** – int implementation of the algorithm.
- **tactic** – int tactic of the algorithm.

__init__()

Initialize self. See help(type(self)) for accurate signature.

class tensorrt.**IAlgorithmContext**

Describes the context and requirements, that could be fulfilled by one or more instances of IAlgorithm. see IAlgorithm

Variables

- ***name*** – str name of the algorithm node.
- **num_inputs** – int number of inputs of the algorithm.
- **num_outputs** – int number of outputs of the algorithm.

__init__()

Initialize self. See help(type(self)) for accurate signature.

get_shape(*self: tensorrt.tensorrt.IAlgorithmContext*, *index: int*) → List[tensorrt.tensorrt.Dims]

Get the minimum / optimum / maximum dimensions for a dynamic input tensor.

Parameters **index** – Index of the input or output of the algorithm. Incremental numbers assigned to indices of inputs and the outputs.

Returns A *List[Dims]* of length 3, containing the minimum, optimum, and maximum shapes, in that order. If the shapes have not been set yet, an empty list is returned.`

class tensorrt.**IAlgorithm**

Application-implemented interface for selecting and reporting the tactic selection of a layer. Tactic Selection is a step performed by the builder for deciding best algorithms for a layer.

Variables

- **algorithm_variant** – `IAlgorithmVariant&` the algorithm variant.
- **timing_msec** – `float` The time in milliseconds to execute the algorithm.
- **workspace_size** – `int` The size of the GPU temporary memory in bytes which the algorithm uses at execution time.

__init__()
Initialize self. See help(type(self)) for accurate signature.

get_algorithm_io_info(*self: tensorrt.tensorrt.IAlgorithm*, *index: int*) → tensorrt.tensorrt.IAlgorithmIOInfo
A single call for both inputs and outputs. Incremental numbers assigned to indices of inputs and the outputs.

Parameters **index** – Index of the input or output of the algorithm. Incremental numbers assigned to indices of inputs and the outputs.

Returns A `IAlgorithmIOInfo&`

class tensorrt.**IAlgorithmSelector**(*self: tensorrt.tensorrt.IAlgorithmSelector*) → None
Interface implemented by application for selecting and reporting algorithms of a layer provided by the builder. note A layer in context of algorithm selection may be different from ILayer in INetworkDefiniton. For example, an algorithm might be implementing a conglomeration of multiple ILayers in INetworkDefinition.

To implement a custom algorithm selector, ensure that you explicitly instantiate the base class in *__init__()* :

```
class MyAlgoSelector(trt.IAlgorithmSelector):
    def __init__(self):
        trt.IAlgorithmSelector.__init__(self)
```

__init__(*self: tensorrt.tensorrt.IAlgorithmSelector*) → None

report_algorithms(*self: tensorrt.tensorrt.IAlgorithmSelector*, *contexts: List[tensorrt.tensorrt.IAlgorithmContext]*, *choices: List[tensorrt.tensorrt.IAlgorithm]*) → None
Called by TensorRT to report choices it made.

Note: For a given optimization profile, this call comes after all calls to select_algorithms. choices[i] is the choice that TensorRT made for algoContexts[i], for i in [0, num_algorithms-1]

For example, a possible implementation may look like this:

```
def report_algorithms(self, contexts, choices):
    # Prints the time of the chosen algorithm by TRT from the
    # selection list passed in by select_algorithms
    for choice in choices:
        print(choice.timing_msec)
```

Parameters

- **contexts** – The list of all algorithm contexts.
- **choices** – The list of algorithm choices made by TensorRT corresponding to each context.

select_algorithms(*self: tensorrt.tensorrt.IAlgorithmSelector, context: tensorrt.tensorrt.IAlgorithmContext, choices: List[tensorrt.tensorrt.IAlgorithm]*) → List[int]

Select Algorithms for a layer from the given list of algorithm choices.

Note: TRT uses its default algorithm selection to choose from the list returned by the user. If the returned list is empty, TRT's default algorithm selection is used unless strict type constraints are set. The list of choices is valid only for this specific algorithm context.

For example, the simplest implementation looks like this:

```
def select_algorithms(self, context, choices):
    assert len(choices) > 0
    return list(range(len(choices)))
```

Parameters

- **context** – The context for which the algorithm choices are valid.
- **choices** – The list of algorithm choices to select for implementation of this layer.

Returns A `List[int]` indicating the indices from the choices vector that TensorRT should choose from.

CHAPTER

NINE

UFF PARSER

tensorrt.**UffInputOrder**
The different possible supported input orders.

Members:

NCHW

NHWC

NC

class tensorrt.**UffParser**(*self: tensorrt.tensorrt.UffParser*) → None
This class is used for parsing models described using the UFF format.

Variables

- **uff_required_version_major** – int Version Major of the UFF.
- **uff_required_version_minor** – int Version Minor of the UFF.
- **uff_required_version_patch** – int Version Patch of the UFF.
- **plugin_namespace** – str The namespace used to lookup and create plugins in the network.
- **error_recorder** – *IErrorRecorder* Application-implemented error reporting interface for TensorRT objects.

__del__(*self: tensorrt.tensorrt.UffParser*) → None

__exit__(*exc_type*, *exc_value*, *traceback*)
Context managers are deprecated and have no effect. Objects are automatically freed when the reference count reaches 0.

__init__(*self: tensorrt.tensorrt.UffParser*) → None

parse(*self: tensorrt.tensorrt.UffParser*, *file: str*, *network: tensorrt.tensorrt.INetworkDefinition*, *weights_type: tensorrt.tensorrt.DataType = <DataType.FLOAT: 0>*) → bool
Parse a UFF file.

Parameters

- **file** – File name of the UFF file.
- **network** – Network in which the *UffParser* will fill the layers.
- **weights_type** – The type on which the weights will be transformed in.

Returns True if the UFF file is parsed without error.

parse_buffer(*self: tensorrt.tensorrt.UffParser*, *buffer: buffer*, *network: tensorrt.tensorrt.INetworkDefinition*, *weights_type: tensorrt.tensorrt.DataType = <DataType.FLOAT: 0>*) → bool

Parse a UFF buffer - useful if the file is already live in memory.

Parameters

- **buffer** – The UFF buffer.
- **network** – Network in which the UFFParser will fill the layers.
- **weights_type** – The type on which the weights will be transformed in.

Returns True if the UFF buffer is parsed without error.

register_input(*self: tensorrt.tensorrt.UffParser*, *name: str*, *shape: tensorrt.tensorrt.Dims*, *order: tensorrt.tensorrt.UffInputOrder = <UffInputOrder.NCHW: 0>*) → bool

Register an input name of a UFF network with the associated Dimensions.

Parameters

- **name** – Input name.
- **shape** – Input shape.
- **order** – Input order on which the framework input was originally.

Returns True if the name registers without error.

register_output(*self: tensorrt.tensorrt.UffParser*, *name: str*) → bool

Register an output name of a UFF network.

Parameters **output_name** – Output name.

Returns True if the name registers without error.

9.1 Fields

tensorrt.**FieldType**

The possible field types for the custom layer.

Members:

FLOAT

INT32

CHAR

DIMS

DATATYPE

UNKNOWN

class tensorrt.**FieldMap**(*self: tensorrt.tensorrt.FieldMap*, *name: str*, *data: capsule*, *type: tensorrt.tensorrt.FieldType*, *length: int = 1*) → None

This is a class containing an array of field params used as a layer parameter for plugin layers. The node fields are passed by the parser to the API through the plugin constructor. The implementation of the plugin should parse the contents of the *FieldMap* as part of the plugin constructor.

Variables

- ***name*** – str field param

- **data** – capsule field param
- **type** – *FieldType* field param
- **length** – int field param

class tensorrt.**FieldCollection**

This class contains an array of *FieldMap* s.

Variables

- **num_fields** – int The number of *FieldMap* s.
- **fields** – capsule The array of *FieldMap* s.

CHAPTER

TEN

CAFFE PARSER

class tensorrt.**IBlobNameToTensor**

This class is used to store and query *ITensor* s after they have been extracted from a Caffe model using the *CaffeParser* .

find(*self: tensorrt.tensorrt.IBlobNameToTensor*, *name: str*) → tensorrt.tensorrt.ITensor

Given a blob name, this function returns an *ITensor* object.

Parameters **name** – Caffe blob name for which the user wants the corresponding *ITensor* .

Returns A *ITensor* object corresponding to the queried name. If no such *ITensor* exists, then an empty object is returned.

class tensorrt.**CaffeParser**(*self: tensorrt.tensorrt.CaffeParser*) → None

This class is used for parsing Caffe models. It allows users to export models trained using Caffe to TRT.

Variables

- **plugin_factory_v2** – *ICaffePluginFactoryV2* The ICaffePluginFactory used to create the user defined plugins.
- **plugin_namespace** – str The namespace used to lookup and create plugins in the network.
- **protobuf_buffer_size** – int The buffer size for the parsing and storage of the learned model.
- **error_recorder** – *IErrorRecorder* Application-implemented error reporting interface for TensorRT objects.

__del__(*self: tensorrt.tensorrt.CaffeParser*) → None

__exit__(*exc_type*, *exc_value*, *traceback*)

Context managers are deprecated and have no effect. Objects are automatically freed when the reference count reaches 0.

__init__(*self: tensorrt.tensorrt.CaffeParser*) → None

parse(*self: tensorrt.tensorrt.CaffeParser*, *deploy: str*, *model: str*, *network: tensorrt.tensorrt.INetworkDefinition*, *dtype: tensorrt.tensorrt.DataType*) → tensorrt.tensorrt.IBlobNameToTensor

Parse a prototxt file and a binaryproto Caffe model to extract network definition and weights associated with the network, respectively.

Parameters

- **deploy** – The plain text, prototxt file used to define the network definition.
- **model** – The binaryproto Caffe model that contains the weights associated with the network.

- **network** – Network in which the CaffeParser will fill the layers.
- **dtype** – The type to which the weights will be transformed.

Returns An *IBlobNameToTensor* object that contains the extracted data.

parse_binary_proto(*self: tensorrt.tensorrt.CaffeParser*, *filename: str*) → numpy.ndarray
Parse and extract data stored in binaryproto file. The binaryproto file contains data stored in a binary blob. *parse_binary_proto()* converts it to an `numpy.ndarray` object.

Parameters **filename** – Path to file containing binary proto.

Returns `numpy.ndarray` An array that contains the extracted data.

parse_buffer(*self: tensorrt.tensorrt.CaffeParser*, *deploy_buffer: buffer*, *model_buffer: buffer*, *network: tensorrt.tensorrt.INetworkDefinition*, *dtype: tensorrt.tensorrt.DataType*) → tensorrt.tensorrt.IBlobNameToTensor
Parse a prototxt file and a binaryproto Caffe model to extract network definition and weights associated with the network, respectively.

Parameters

- **deploy_buffer** – The memory buffer containing the plain text deploy prototxt used to define the network definition.
- **model_buffer** – The binaryproto Caffe memory buffer that contains the weights associated with the network.
- **network** – Network in which the CaffeParser will fill the layers.
- **dtype** – The type to which the weights will be transformed.

Returns An *IBlobNameToTensor* object that contains the extracted data.

`tensorrt.`**shutdown_protobuf_library**`()` → None
Shuts down protocol buffers library.

10.1 Plugins

class `tensorrt.`**ICaffePluginFactoryV2**
Plugin factory used to configure plugins.

create_plugin(*self: tensorrt.tensorrt.ICaffePluginFactoryV2*, *layer_name: str*, *weights: std::vector<nvinfer1::Weights, std::allocator<nvinfer1::Weights> >*) → tensorrt.tensorrt.IPluginV2
Creates a plugin.

arg layer_name Name of layer associated with the plugin.

arg weights Weights used for the layer.

Returns The newly created `IPluginV2` .

is_plugin_v2(*self: tensorrt.tensorrt.ICaffePluginFactoryV2*, *layer_name: str*) → bool
A user implemented function that determines if a layer configuration is provided by an `IPluginV2` .

Parameters **layer_name** – Name of the layer which the user wishes to validate.

Returns True if the the layer configuration is provided by an `IPluginV2` .

CHAPTER

ELEVEN

ONNX PARSER

class tensorrt.**OnnxParser**(*self: tensorrt.tensorrt.OnnxParser*, *network: tensorrt.tensorrt.INetworkDefinition*, *logger: tensorrt.tensorrt.ILogger*) → None

This class is used for parsing ONNX models into a TensorRT network definition

Variables ***num_errors*** – int The number of errors that occurred during prior calls to *parse()*

Parameters

- **network** – The network definition to which the parser will write.
- **logger** – The logger to use.

__del__(*self: tensorrt.tensorrt.OnnxParser*) → None

__exit__(*exc_type*, *exc_value*, *traceback*)

Context managers are deprecated and have no effect. Objects are automatically freed when the reference count reaches 0.

__init__(*self: tensorrt.tensorrt.OnnxParser*, *network: tensorrt.tensorrt.INetworkDefinition*, *logger: tensorrt.tensorrt.ILogger*) → None

Parameters

- **network** – The network definition to which the parser will write.
- **logger** – The logger to use.

clear_errors(*self: tensorrt.tensorrt.OnnxParser*) → None

Clear errors from prior calls to *parse()*

get_error(*self: tensorrt.tensorrt.OnnxParser*, *index: int*) → nvonnxparser::IParserError

Get an error that occurred during prior calls to *parse()*

Parameters **index** – Index of the error

parse(*self: tensorrt.tensorrt.OnnxParser*, *model: buffer*, *path: str = None*) → bool

Parse a serialized ONNX model into the TensorRT network.

Parameters

- **model** – The serialized ONNX model.
- **path** – The path to the model file. Only required if the model has externally stored weights.

Returns true if the model was parsed successfully

parse_from_file(*self: tensorrt.tensorrt.OnnxParser*, *model: str*) → bool

Parse an ONNX model from file into a TensorRT network.

Parameters **model** – The path to an ONNX model.

Returns true if the model was parsed successfully

parse_with_weight_descriptors(*self: tensorrt.tensorrt.OnnxParser*, *model: buffer*) → bool
Parse a serialized ONNX model into the TensorRT network with consideration of user provided weights.

Parameters **model** – The serialized ONNX model.

Returns true if the model was parsed successfully

supports_model(*self: tensorrt.tensorrt.OnnxParser*, *model: buffer*, *path: str = None*) → Tuple[bool, tensorrt.tensorrt.SubGraphCollection]
Check whether TensorRT supports a particular ONNX model.

Parameters

- **model** – The serialized ONNX model.
- **path** – The path to the model file. Only required if the model has externally stored weights.

Returns Tuple[bool, List[Tuple[NodeIndices, bool]]] The first element of the tuple indicates whether the model is supported. The second indicates subgraphs (by node index) in the model and whether they are supported.

supports_operator(*self: tensorrt.tensorrt.OnnxParser*, *op_name: str*) → bool
Returns whether the specified operator may be supported by the parser. Note that a result of true does not guarantee that the operator will be supported in all cases (i.e., this function may return false-positives).

Parameters **op_name** – The name of the ONNX operator to check for support

tensorrt.**ErrorCode**
The type of parser error

Members:

SUCCESS

INTERNAL_ERROR

MEM_ALLOC_FAILED

MODEL_DESERIALIZE_FAILED

INVALID_VALUE

INVALID_GRAPH

INVALID_NODE

UNSUPPORTED_GRAPH

UNSUPPORTED_NODE

class tensorrt.**ParserError**

code(*self: tensorrt.tensorrt.ParserError*) → tensorrt.tensorrt.ErrorCode

Returns The error code

desc(*self: tensorrt.tensorrt.ParserError*) → str

Returns Description of the error

file(*self: tensorrt.tensorrt.ParserError*) → str

Returns Source file in which the error occurred

func (*self: tensorrt.tensorrt.ParserError*) → str

Returns Source function in which the error occurred

line (*self: tensorrt.tensorrt.ParserError*) → int

Returns Source line at which the error occurred

node (*self: tensorrt.tensorrt.ParserError*) → int

Returns Index of the Onnx model node in which the error occurred

CHAPTER

TWELVE

UFF CONVERTER

The `uff` package contains a set of utilites to convert trained models from various frameworks to a common format.

12.1 Conversion Tools

12.1.1 Tensorflow Modelstream to UFF

`uff.`**`from_tensorflow`**(*graphdef*, *output_nodes=[]*, *preprocessor=None*, ***kwargs*)

Converts a TensorFlow GraphDef to a UFF model.

Parameters

- **`graphdef`** (*`tensorflow.GraphDef`*) – The TensorFlow graph to convert.
- **`output_nodes`** (*`list(str)`*) – The names of the outputs of the graph. If not provided, graphsurgeon is used to automatically deduce output nodes.
- **`output_filename`** (*`str`*) – The UFF file to write.
- **`preprocessor`** (*`str`*) – The path to a preprocessing script that will be executed before the converter. This script should define a `preprocess` function which accepts a graphsurgeon DynamicGraph and modifies it in place.
- **`write_preprocessed`** (*`bool`*) – If set to True, the converter will write out the preprocessed graph as well as a TensorBoard visualization. Must be used in conjunction with output_filename.
- **`text`** (*`bool`*) – If set to True, the converter will also write out a human readable UFF file. Must be used in conjunction with output_filename.
- **`quiet`** (*`bool`*) – If set to True, suppresses informational messages. Errors may still be printed.
- **`debug_mode`** (*`bool`*) – If set to True, the converter prints verbose debug messages.
- **`return_graph_info`** (*`bool`*) – If set to True, this function returns the graph input and output nodes in addition to the serialized UFF graph.

Returns

serialized UFF MetaGraph (str)

OR, if return_graph_info is set to True,

serialized UFF MetaGraph (str), graph inputs (list(tensorflow.NodeDef)), graph outputs (list(tensorflow.NodeDef))

12.1.2 Tensorflow Frozen Protobuf Model to UFF

uff.**from_tensorflow_frozen_model**(*frozen_file*, *output_nodes=[]*, *preprocessor=None*, ***kwargs*)

Converts a TensorFlow frozen graph to a UFF model.

Parameters

- **frozen_file** (*str*) – The path to the frozen TensorFlow graph to convert.
- **output_nodes** (*list(str)*) – The names of the outputs of the graph. If not provided, graphsurgeon is used to automatically deduce output nodes.
- **output_filename** (*str*) – The UFF file to write.
- **preprocessor** (*str*) – The path to a preprocessing script that will be executed before the converter. This script should define a `preprocess` function which accepts a graphsurgeon DynamicGraph and modifies it in place.
- **write_preprocessed** (*bool*) – If set to True, the converter will write out the preprocessed graph as well as a TensorBoard visualization. Must be used in conjunction with output_filename.
- **text** (*bool*) – If set to True, the converter will also write out a human readable UFF file. Must be used in conjunction with output_filename.
- **quiet** (*bool*) – If set to True, suppresses informational messages. Errors may still be printed.
- **debug_mode** (*bool*) – If set to True, the converter prints verbose debug messages.
- **return_graph_info** (*bool*) – If set to True, this function returns the graph input and output nodes in addition to the serialized UFF graph.

Returns

serialized UFF MetaGraph (str)

OR, if return_graph_info is set to True,

serialized UFF MetaGraph (str), graph inputs (list(tensorflow.NodeDef)), graph outputs (list(tensorflow.NodeDef))

CHAPTER

THIRTEEN

UFF OPERATORS

All shapes include batch dimension, unless otherwise specified.

13.1 Input

An input to the network. Expects a CHW shape.

13.1.1 Supported Datatypes

float32, float16, int32, int8

13.2 Identity

Identity layer.

13.2.1 Inputs

Input0 [Tensor or Constant] Input0 to the identity. Must be float32.

13.2.2 Supported Datatypes

float32

13.3 Const

A constant in the network. Should not include batch dimension.

13.3.1 Supported Datatypes

float32, float16, int32, int8

13.4 Conv

A convolution operation.

13.4.1 Inputs

Input0 [Tensor] The input to the convolution. Must be 4 dimensional. Automatically transposed to NCHW.

Kernel [Constant] The kernel weights for the convolution. Must be 4 dimensional. Automatically transposed to NCHW.

13.4.2 Attributes

dilation [List[int]] The HW dilations.

strides [List[int]] The HW strides.

padding [List[int]] The HW padding. Asymmetric padding is unsupported.

13.4.3 Supported Datatypes

float32, float16, int32, int8

13.5 ConvTranspose

A transposed convolution, also known as deconvolution.

13.5.1 Inputs

Input0 [Tensor] The input to the transposed convolution. Must be 4 dimensional. Automatically transposed to NCHW.

Kernel [Constant] The kernel weights for the transposed convolution. Must be 4 dimensional. Automatically transposed to NCHW.

Shape [Constant] The HW dimensions of the output.

13.5.2 Attributes

strides [List[int]] The HW strides.

padding [List[int]] The HW padding. Asymmetric padding is unsupported.

13.5.3 Supported Datatypes

float32, float16, int32, int8

13.6 Pool

A pooling layer.

13.6.1 Inputs

Input0 [Tensor] The input to the pooling layer. Must be 4 dimensional.

13.6.2 Attributes

func [Enum[max, avg]] The type of pooling to apply.

kernel [List[int]] The HW shape of the kernel.

strides [List[int]] The HW strides.

padding [List[int]] The HW padding.

13.6.3 Supported Datatypes

float32, float16, int32, int8

13.7 FullyConnected

A fully connected layer.

13.7.1 Inputs

Input0 [Tensor] The input to the fully connected layer. Must be at least 4 dimensional. Automatically transposed to -NC-.

Weights [Constant] The weights for the fully connected layer. Must be 3 dimensional. Automatically transposed to CHW, where C is the number of output channels.

13.7.2 Supported Datatypes

float32, float16, int32, int8

13.8 LRN

An LRN layer.

13.8.1 Inputs

Input0 [Tensor] The input to the LRN. Must be at least 4 dimensional.

13.8.2 Attributes

window_size [int] The window size.

alpha [double] The LRN alpha value.

beta [double] The LRN beta value.

k [double] The LRN k value.

13.8.3 Supported Datatypes

float32, float16, int32, int8

13.9 Binary

A binary layer.

13.9.1 Inputs

Input0 [Tensor or Constant] The first input to the binary layer.

Input1 [Tensor or Constant] The second input to the binary layer.

If either input is a constant, then at least one of the inputs must be 4 dimensional.

13.9.2 Attributes

func [Enum[min, max, mul, sub, div, add, pow]] The type of operation to perform.

13.9.3 Supported Datatypes

float32, float16, int32, int8

13.10 Unary

A unary layer.

13.10.1 Inputs

Input0 [Tensor or Constant] The input to the unary layer.

The output of a unary layer with a Constant input is treated as a Constant, and therefore will not work with layers expecting a Tensor input.

13.10.2 Attributes

func [Enum[neg, exp, log, abs, sqrt, rsqrt, square, sin, cos, tan, sinh, cosh, asin, acos, atan, asinh, acosh, atanh, ceil, floor]]
The type of operation to perform.

13.10.3 Supported Datatypes

float32, float16, int32, int8

13.11 Reshape

A reshape layer. NOTE: this layer destroys order information. Therefore, subsequent layers will cease to automatically transpose their inputs to the correct format.

13.11.1 Inputs

Input0 [Tensor or Constant] The input to the reshape layer.

Shape [Constant] The desired shape. If the shape has fewer than 3 non-batch dimensions, 1s are inserted in the least significant dimensions. For example, if the shape specified is [1, 300, 5], it will be treated as [1, 300, 5, 1] instead. - -1 specifies that the dimension should be automatically deduced - this can only be used at most once in any given shape. - 0 specifies that the dimension should be copied from the input.

The output of a reshape layer with a Constant input is treated as a Constant, and therefore will not work with layers expecting a Tensor input.

13.11.2 Supported Datatypes

float32, float16, int32, int8

13.12 ExpandDims

An unsqueeze layer. NOTE: this layer destroys order information. Therefore, subsequent layers will cease to automatically transpose their inputs to the correct format.

13.12.1 Inputs

Input0 [Tensor] The input to unsqueeze.

If the resulting output has fewer than 3 non-batch dimensions, it is unsqueezed further with additional 1s inserted in the least significant dimensions. For example, with an input of shape [1, 300], and axis of 1, the shape of the output will be [1, 300, 1, 1] rather than [1, 300, 1].

13.12.2 Attributes

axis [int] The axis on which to unsqueeze, excluding batch dimension. For example, unsqueezing an NCHW tensor with an axis of 0 will result in a N1CHW tensor.

13.12.3 Supported Datatypes

float32, float16, int32, int8

13.13 ArgMax

An argmax layer.

13.13.1 Inputs

Input0 [Tensor] The input to the argmax layer.

13.13.2 Attributes

axis [int] The axis on which to perform the argmax, with 0 corresponding to the batch dimension. The specified dimension is removed. For example, performing argmax on an input of shape [1, 300, 150], with an axis of 1 would result in an output of shape [1, 150]. NOTE: argmax on the batch dimension is not supported.

13.13.3 Supported Datatypes

float32, float16, int32, int8

13.14 ArgMin

An argmin layer.

13.14.1 Inputs

Input0 [Tensor] The input to the argmin layer.

13.14.2 Attributes

axis [int] The axis on which to perform the argmin, with 0 corresponding to the batch dimension. The specified dimension is removed. For example, performing argmin on an input of shape [1, 300, 150], with an axis of 1 would result in an output of shape [1, 150]. NOTE: argmin on the batch dimension is not supported.

13.14.3 Supported Datatypes

float32, float16, int32, int8

13.15 Transpose

A transpose layer. A no-op in the network, this layer only modifies the UFF parser's internal order information. Therefore, when followed by any layer that destroys order information, the transpose will not be performed.

13.15.1 Inputs

Input0 [Tensor] The input to the transpose layer.

13.15.2 Attributes

permutation [int] The permutation to perform. Must be 4 dimensional.

13.15.3 Supported Datatypes

float32, float16, int32, int8

13.16 Reduce

A reduce layer. NOTE: this layer destroys order information. Therefore, subsequent layers will cease to automatically transpose their inputs to the correct format.

13.16.1 Inputs

Input0 [Tensor or Constant] The input to the reduce layer.

The output of a reduce layer with a Constant input is treated as a Constant, and therefore will not work with layers expecting a Tensor input.

13.16.2 Attributes

func [Enum[sum, prod, max, min, mean]] The reduction operation to perform.

axes [List[int]] The axes on which to reduce, with 0 corresponding to the batch dimension. Reduction on the batch dimension is unsupported.

keepdims [bool] Whether to keep the dimensions which were reduced. NOTE: The UFF parser ignored this value, and always keeps dimensions.

13.16.3 Supported Datatypes

float32, float16, int32, int8

13.17 Concat

A concatenation layer.

13.17.1 Inputs

Inputs (variadic) [List[Tensor]] The tensors to concatenate. All inputs are transposed to the same format as the first input. Inputs must be at least 4 dimensional.

13.17.2 Attributes

axis [int] The axis on which to perform the concatenation, with 0 corresponding to the batch dimension. Concatenating on the batch dimension is unsupported.

13.17.3 Supported Datatypes

float32, float16, int32, int8

13.18 MarkOutput

The output of the network.

13.18.1 Inputs

Inputs (variadic) [List[Tensor]] The inputs to this layer. Automatically transposed to the same order as the outputs of the original TensorFlow network.

13.18.2 Supported Datatypes

float32, float16, int32, int8

13.19 Activation

An activation layer.

13.19.1 Inputs

Input0 [Tensor] The input to the activation.

13.19.2 Attributes

func [Enum[relu, relu6, sigmoid, tanh, elu, selu, softsign, softplus]] The operation to perform.

13.19.3 Supported Datatypes

float32, float16, int32, int8

13.20 Softmax

A softmax layer.

13.20.1 Inputs

Input0 [Tensor] The input to the softmax.

13.20.2 Attributes

axis [int] The axis on which to perform the reduction. NOTE: This value is ignored by the UFF parser.

13.20.3 Supported Datatypes

float32, float16, int32, int8

13.21 BatchNorm

A batchnorm layer.

13.21.1 Inputs

Input0 [Tensor] The input to the batchnorm. Must be 4 dimensional.

Gamma [Constant] The gamma values.

Beta [Constant] The beta values.

Mean [Constant] The mean values.

Variance [Constant] The variance values.

13.21.2 Attributes

epsilon [double] The epsilon value.

13.21.3 Supported Datatypes

float32, float16, int32, int8

13.22 Shape

A shape layer. Returns the shape of its input. NOTE: the output of this layer is a Constant, and therefore will not work with layers expecting a Tensor input.

13.22.1 Inputs

Input0 [Tensor] The input to the shape layer.

13.22.2 Supported Datatypes

float32, float16, int32, int8

13.23 StridedSlice

A strided slice layer.

13.23.1 Inputs

Input0 [Tensor or Constant] The input to the strided slice.

Begin [Constant] The indices at which to begin slicing.

End [Constant] The indices at which to end slicing.

Strides [Constant] Strides to use when slicing.

13.23.2 Attributes

begin_mask [int] See TensorFlow stridedSlice documentation.

end_mask [int] See TensorFlow stridedSlice documentation.

shrink_axis_mask [int] See TensorFlow stridedSlice documentation. This value is ignored unless the input is a constant.

13.23.3 Supported Datatypes

float32, float16, int32, int8

13.24 Stack

A stack layer. NOTE: the output of this layer is a Constant, and therefore will not work with layers expecting a Tensor input.

13.24.1 Inputs

Inputs (variadic) [List[Constant]] The inputs to the stack layer.

13.24.2 Attributes

axis [int] The axis on which to stack. NOTE: this value is ignored by the UFF parser.

13.24.3 Supported Datatypes

float32, float16, int32, int8

13.25 Squeeze

Not implemented

13.26 Flatten

A flatten layer. A no-op in the UFF parser.

13.26.1 Inputs

Input0 [Tensor] The tensor to flatten.

13.26.2 Supported Datatypes

float32, float16, int32, int8

13.27 Pad

A padding layer.

13.27.1 Inputs

Input0 [Tensor or Constant] The input to pad. The input is automatically transposed if padding is applied to non-HW dimensions.

Padding [Constant] The padding to apply. Padding is supported on 2 dimensions at most.

The output of a padding layer with a Constant input is treated as a Constant, and therefore will not work with layers expecting a Tensor input.

13.27.2 Supported Datatypes

float32, float16, int32, int8

13.28 Gather

A gather layer.

13.28.1 Inputs

Input0 [Tensor or Constant] The input to the gather layer. If the input is constant, it is assumed to be of shape NC11.

Indices [Tensor or Constant] The indices to gather along. These are assumed to be on the first non-batch dimension.

13.28.2 Supported Datatypes

float32, float16, int32, int8

13.29 GatherV2

A gatherV2 layer.

13.29.1 Inputs

Input0 [Tensor or Constant] The input to the gather layer. If the input is constant, it is assumed to be of shape NC11.

Indices [Tensor or Constant] The indices to gather along.

13.29.2 Attributes

axis [int] The axis along which to gather, excluding batch dimension.

13.29.3 Supported Datatypes

float32, float16, int32, int8

CHAPTER

FOURTEEN

GRAPH SURGEON

`graphsurgeon` allows you to transform TensorFlow graphs. Its capabilities are broadly divided into two categories: search and manipulation. Search functions allow you to find nodes in a TensorFlow graph. Manipulation functions allow you to modify, add, or remove nodes.

14.1 Node Creation

Allow you to create free standing TensorFlow nodes, which can be used as stand-ins for plugins.

`graphsurgeon.`**`create_node`**(*name*, *op=None*, *trt_plugin=False*, ***kwargs*)

Creates a free-standing TensorFlow NodeDef with the specified properties.

Parameters

- **`name`** (*`str`*) – The name of the node.
- **`op`** (*`str`*) – The node's operation.

Keyword Arguments

- **`dtype`** (*`tensorflow.DType`*) – TensorFlow dtype.
- **`shape`** (*`tuple(int)`*) – Iterable container (usually a tuple) describing the shape of a tensor.
- **`inputs`** (*`list(tensorflow.NodeDef) or str`*) – Iterable container (usually a tuple) of input nodes or input node names. Supports mixed-type lists.
- **`**kwargs`** (*`AttrName=Value`*) – Any additional fields that should be present in the node. Currently supports int, float, bool, list(int), list(float), str and NumPy arrays. NumPy arrays will be inserted into the "value" attribute of the node - this can be useful for creating constant nodes equivalent to those created by tensorflow.constant.

Returns tensorflow.NodeDef

`graphsurgeon.`**`create_plugin_node`**(*name*, *op=None*, ***kwargs*)

Creates a free-standing TensorFlow NodeDef with the specified properties. This is similar to *create_node*,

Parameters

- **`name`** (*`str`*) – The name of the node.
- **`op`** (*`str`*) – The node's operation.
- **`dtype`** (*`tensorflow.DType`*) – TensorFlow dtype.
- **`shape`** (*`tuple(int)`*) – Iterable container (usually a tuple) describing the shape of a tensor.

- **inputs** (*list(tensorflow.NodeDef) or str*) – Iterable container (usually a tuple) of input nodes or input node names. Supports mixed-type lists.
- ****kwargs** (*AttrName=Value*) – Any additional fields that should be present in the node. Currently supports int, float, bool, list(int), list(float) and str.

Returns tensorflow.NodeDef

14.2 Static Graph

class graphsurgeon.**StaticGraph**(*graphdef=None*)

Acts as a thin wrapper for a read-only TensorFlow GraphDef. Supports indexing based on node name/index as well as iteration over nodes using Python's `for node in static_graph` syntax.

Parameters **graphdef** (*tensorflow.GraphDef/tensorflow.Graph OR graphsurgeon.StaticGraph/graphsurgeon.DynamicGraph OR str*) – A TensorFlow GraphDef/Graph or a StaticGraph from which to construct this graph, or a string containing a path to a frozen model.

node_outputs

A mapping of node names to their respective output nodes.

Type dict(str, list(tensorflow.NodeDef))

node_map

A mapping of node names to their corresponding nodes.

Type dict(str, tensorflow.NodeDef)

graph_outputs

A list of likely outputs of the graph.

Type list(tensorflow.NodeDef)

graph_inputs

A list of likely inputs of the graph.

Type list(tensorflow.NodeDef)

as_graph_def()

Returns this StaticGraph's internal TensorFlow GraphDef.

Parameters **None** –

Returns tensorflow.GraphDef

find_node_chains_by_op(*chain*)

Finds groups of nodes in this graph that match the specified sequence of ops. Returns a list of matching chains of nodes, with ordering preserved.

Parameters **chain** (*list(str)*) – The sequence of ops to look for. Should be ordered with the input of the chain as the first element, and the output as the last.

Returns list(list(tensorflow.NodeDef))

find_node_inputs(*node*)

Finds input nodes of a given node.

Parameters **node** (*tensorflow.NodeDef*) – The node in which to perform the search.

Returns list(tensorflow.NodeDef)

find_node_inputs_by_name(*node*, *name*)
Finds input nodes of a given node based on their names.

Parameters

- **node** (*tensorflow.NodeDef*) – The node in which to perform the search.
- **name** (*str OR list(str)*) – The name to look for. Also accepts iterable containers (preferably a list) to search for multiple names in a single pass. Supports regular expressions.

Returns list(tensorflow.NodeDef)

find_node_inputs_by_op(*node*, *op*)
Finds input nodes of a given node based on their ops.

Parameters

- **node** (*tensorflow.NodeDef*) – The node in which to perform the search.
- **op** (*str OR list(str)*) – The op to look for. Also accepts iterable containers (preferably a list) to search for multiple op in a single pass.

Returns list(tensorflow.NodeDef)

find_nodes_by_name(*name*)
Finds nodes in this graph based on their names.

Parameters **name** (*str OR list(str)*) – The name to look for. Also accepts iterable containers (preferably a list) to search for multiple names in a single pass of the graph. Supports regular expressions.

Returns list(tensorflow.NodeDef)

find_nodes_by_op(*op*)
Finds nodes in this graph based on their ops.

Parameters **op** (*str OR set(str)*) – The op to look for. Also accepts iterable containers (preferably hashsets) to search for multiple ops in a single pass of the graph.

Returns list(tensorflow.NodeDef)

find_nodes_by_path(*path*)
Finds nodes in this graph based on their full paths. This will only match exact paths.

Parameters **path** (*str OR list(str)*) – The path to look for. Also accepts iterable containers (preferably a list) to search for multiple paths in a single pass of the graph. Supports regular expressions.

Returns list(tensorflow.NodeDef)

read(*filename*)
Reads a frozen protobuf file into this StaticGraph.

Parameters **filename** (*str*) – Name of the protobuf file.

Returns None

write(*filename*)
Writes the StaticGraph's internal TensorFlow GraphDef into a frozen protobuf file.

Parameters **filename** (*str*) – Name of the protobuf file to write.

Returns None

write_tensorboard(*logdir*)
Writes the StaticGraph's internal TensorFlow GraphDef into the specified directory, which can then be visualized in TensorBoard.

Parameters **logdir** (*str*) – Name of the directory to write.

Returns None

Raises

- **Warning** – Passing a *GraphDef* to the SummaryWriter is deprecated. Pass a *Graph* object instead, such as *sess.graph*.
- **This is a known warning, but currently there is no alternative, since TensorFlow will not be able to convert invalid GraphDefs back to Graphs.** –

14.3 Dynamic Graph (Inherits from StaticGraph)

class graphsurgeon.**DynamicGraph**(*graphdef=None*)
A sub-class of StaticGraph that can search and modify a TensorFlow GraphDef.

Parameters **graphdef** (*tensorflow.GraphDef/tensorflow.Graph OR graphsurgeon.StaticGraph/graphsurgeon.DynamicGraph OR str*) – A TensorFlow GraphDef/Graph or a StaticGraph/DynamicGraph from which to construct this graph, or a string containing the path to a frozen model.

append(*node*)
Appends a node to this graph.

Parameters **node** (*tensorflow.NodeDef*) – TensorFlow NodeDef to add to the graph.

Returns None

collapse_namespaces(*namespace_map*, *exclude_nodes=[]*, *unique_inputs=True*)
Collapses nodes in namespaces to single nodes specified by the user, except where those nodes are marked for exclusion.

Parameters

- **namespace_map** (*dict(str, tensorflow.NodeDef)*) – A dictionary specifying namespaces and their corresponding plugin nodes. These plugin nodes are typically used to specify attributes of the custom plugin, while inputs and outputs are automatically deduced. Multiple namespaces can be collapsed into a single plugin node, and nested namespaces are collapsed into plugin nodes outside their parent namespaces.
- **exclude_nodes** (*list(tensorflow.NodeDef)*) – Iterable container (usually a list) of nodes which should NOT be collapsed. These nodes will be present in the final graph as either inputs or outputs of the plugin nodes.
- **unique_inputs** (*bool*) – Whether inputs to the collapsed node should be unique. If this is false, plugin nodes may have duplicate inputs.

Returns None

extend(*node_list*)
Extends this graph's nodes based on the provided list.

Parameters **node_list** (*list(tensorflow.NodeDef)*) – List of TensorFlow NodeDefs to add to the graph.

Returns None

forward_inputs(*nodes*)

Removes nodes from this graph. Recursively forwards inputs, such that paths in the graph are preserved.

Warning: Nodes with control inputs are not removed, so as not to break the structure of the graph. If you need to forward these, remove their control inputs first.

Parameters **nodes** (*list(tensorflow.NodeDef)*) – Iterable container (usually a list) of nodes which should be removed and whose inputs forwarded.

Returns None

remove(*nodes*, *remove_exclusive_dependencies=False*)

Removes nodes from this graph. Does not forward inputs, so paths in the graph could be broken.

Parameters

- **nodes** (*list(tensorflow.NodeDef)*) – Iterable container (usually a list) of nodes which should be removed.
- **remove_exclusive_dependencies** (*bool*) – Whether to also remove dependencies exclusive to the nodes about to be removed. When set to True, all exclusive dependencies will be removed recursively, and the number of hanging nodes in the graph will remain constant. Defaults to False.

Returns None

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