



# SUPPORT MATRIX FOR TENSORRT

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## Support Guide



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# Chapter 1.

## FEATURES FOR PLATFORMS AND SOFTWARE

Table 1 List of supported features per platform.

	Linux x86-64	Windows x64	Linux ppc64le	Linux AArch64	QNX AArch64
<u>Supported CUDA versions</u>	<ul style="list-style-type: none"> <li>▶ <a href="#">10.2</a></li> <li>▶ <a href="#">10.1</a></li> <li>▶ <a href="#">10.0</a></li> <li>▶ <a href="#">9.0</a></li> </ul>	<ul style="list-style-type: none"> <li>▶ <a href="#">10.1</a></li> <li>▶ <a href="#">10.0</a></li> <li>▶ <a href="#">9.0</a></li> </ul>	<ul style="list-style-type: none"> <li>▶ <a href="#">10.2</a></li> <li>▶ <a href="#">10.1</a></li> </ul>	<ul style="list-style-type: none"> <li>▶ <a href="#">10.2</a></li> <li>▶ <a href="#">10.0</a></li> </ul>	<a href="#">10.2</a>
<u>Supported cuDNN versions</u>	<a href="#">7.6.5</a>	<a href="#">7.6.5</a>	<a href="#">7.6.5</a>	<a href="#">7.6.5</a>	<a href="#">7.6.5</a>
TensorRT Python API	Yes	No	Yes	Yes <sup>1</sup>	No
NvUffParser	Yes	Yes	Yes	Yes	Yes
NvOnnxParser	Yes	Yes	Yes	Yes	Yes



Serialized engines are not portable across platforms or TensorRT versions.

<sup>1</sup> Python is not supported on automotive platforms.

# Chapter 2.

## LAYERS AND FEATURES

Table 2 List of supported features per TensorRT layer.

Layer	Dimensions of input tensor	Dimensions of output tensor	Does the operation apply to only the innermost 3 dimensions?	Supports broadcast (see Note 1)	Supports broadcast across batch (see Note 2)
<a href="#">IActivationLayer</a>	0-7 dimensions	0-7 dimensions	No	No	No
<a href="#">IConcatenationLayer</a>	1-7 dimensions	1-7 dimensions	No	No	No
<a href="#">IConstantLayer</a>	0-7 dimensions	0-7 dimensions	No	No	Always
<a href="#">IConvolutionLayer &gt; 2D Convolution</a>	3 or more dimensions	3 or more dimensions	Yes	No	No
<a href="#">IConvolutionLayer &gt; 3D Convolution</a>	4 or more dimensions	4 or more dimensions	No	No	No
<a href="#">IDeconvolutionLayer &gt; 2D Deconvolution</a>	3 or more dimensions	3 or more dimensions	Yes	No	No
<a href="#">IDeconvolutionLayer &gt; 3D Deconvolution</a>	4 or more dimensions	4 or more dimensions	No	No	No
<a href="#">IElementWiseLayer</a>	0-7 dimensions	0-7 dimensions	No	Yes	Yes

Layer	Dimensions of input tensor	Dimensions of output tensor	Does the operation apply to only the innermost 3 dimensions?	Supports broadcast (see Note 1)	Supports broadcast across batch (see Note 2)
<a href="#">IFullyConnectedLayer</a>	3 or more dimensions	3 or more dimensions	Yes	No	No
<a href="#">IGatherLayer</a>	<ul style="list-style-type: none"> <li>▶ Input1: 1-7 dimensions</li> <li>▶ Input2: 0-7 dimensions</li> </ul>	0-7 dimensions	No	No	Yes
<a href="#">IIdentityLayer</a>	0-7 dimensions	0-7 dimensions	No	No	No
<a href="#">ILRNLayer</a>	3 or more dimensions	3 or more dimensions	Yes	No	No
<a href="#">IMatrixMultiplyLayer</a>	2 or more dimensions	2 or more dimensions	No	Yes	Yes
<a href="#">IPaddingLayer</a>	3 or more dimensions	3 or more dimensions	Yes	No	No
<a href="#">IPluginLayer</a>	User defined	User defined	User defined	User defined	User defined
<a href="#">IPluginV2Layer</a>	User defined	User defined	User defined	User defined	User defined
<a href="#">IPoolingLayer &gt; 2D Pooling</a>	3 or more dimensions	3 or more dimensions	Yes	Yes	Yes
<a href="#">IPoolingLayer &gt; 3D Pooling</a>	4 or more dimensions	4 or more dimensions	No	Yes	Yes
<a href="#">IRaggedSoftMaxLayer</a>	<ul style="list-style-type: none"> <li>▶ Input: 2 dimensions</li> <li>▶ Bounds: 2 dimensions</li> </ul>	2 or more dimensions	No	No	Yes
<a href="#">IReduceLayer</a>	1-7 dimensions	0-7 dimensions	No	No	No
<a href="#">IResizeLayer</a>	1-7 dimensions	1-7 dimensions	No	No	No
<a href="#">IRNNLayer</a>	3 dimensions	3 dimensions	No	No	No

Layer	Dimensions of input tensor	Dimensions of output tensor	Does the operation apply to only the innermost 3 dimensions?	Supports broadcast (see Note 1)	Supports broadcast across batch (see Note 2)
<a href="#">IRNNv2Layer</a>	<ul style="list-style-type: none"> <li>▶ Data/Hidden/Cell: 2 or more dimensions</li> <li>▶ SeqLen: 0 or more dimensions</li> </ul>	Data/Hidden/Cell: 2 or more dimensions	No	No	No
<a href="#">IScaleLayer</a>	3 or more dimensions	3 or more dimensions	Yes	No	No
<a href="#">IShapeLayer</a>	1 or more dimensions	1 dimension	No	No	No
<a href="#">IShuffleLayer</a>	0-7 dimensions	0-7 dimensions	No	No	No
<a href="#">ISliceLayer</a>	1-7 dimensions	1-7 dimensions	No	No	Yes
<a href="#">ISoftMaxLayer</a>	1-7 dimensions	1-7 dimensions	No	No	Yes
<a href="#">ITopKLayer</a>	1-7 dimensions	<ul style="list-style-type: none"> <li>▶ Output1: 1-7 dimensions</li> <li>▶ Output2: 1-7 dimensions</li> </ul>	Yes	No	Yes
<a href="#">IUnaryLayer</a>	0-7 dimensions	0-7 dimensions	No	No	No



1. Indicates support for broadcast in this layer. This layer allows its two input tensors to be of dimensions [1, 5, 4, 3] and [1, 5, 1, 1], and its output out be [1, 5, 4, 3]. Note: The second input tensor has been broadcast in the innermost 2 dimensions.
2. Indicates support for broadcast across the batch dimension.

For more information about each of the TensorRT layers, see [TensorRT Layers](#).

# Chapter 3.

## LAYERS AND PRECISION

The following table lists the TensorRT layers and the precision modes that each layer supports. It also lists the ability of the layer to run on Deep Learning Accelerator (DLA). For more information about additional constraints, see [DLA Supported Layers](#).

For more information about each of the TensorRT layers, see [TensorRT Layers](#). To view a list of the specific attributes that are supported by each layer, refer to the [TensorRT API documentation](#).

Table 3 List of supported precision mode per TensorRT layer.

Layer	FP32	FP16	INT8	INT32	DLA FP16	DLA INT8
<a href="#">IActivationLayer</a>	Yes	Yes	Yes	No	Yes <sup>2</sup>	Yes <sup>3</sup>
<a href="#">IConcatenationLayer</a>	Yes	Yes	Yes	Yes	Yes <sup>4</sup>	Yes <sup>3</sup>
<a href="#">IConstantLayer</a>	Yes	Yes	Yes	Yes	No	No
<a href="#">IConvolutionLayer &gt; 2D Convolution</a>	Yes	Yes	Yes	No	Yes	Yes <sup>5</sup>
<a href="#">IConvolutionLayer &gt; 3D Convolution</a>	Yes	Yes	No	No	No	No
<a href="#">IDeconvolutionLayer &gt; 2D Deconvolution</a>	Yes	Yes	Yes	No	Yes	Yes <sup>6</sup>

<sup>2</sup> Partial support. Yes for ReLU, sigmoid and TanH activation types only.

<sup>3</sup> Partial support. Yes for ReLU activation type only.

<sup>4</sup> Partial support. Yes for concatenation across C dimension only.

<sup>5</sup> Partial support. Yes for ungrouped convolutions and No for grouped.

<sup>6</sup> Partial support. Yes for ungrouped deconvolutions and No for grouped.

Layer	FP32	FP16	INT8	INT32	DLA FP16	DLA INT8
<a href="#">IDeconvolutionLayer &gt; 3D Deconvolution</a>	Yes	Yes	No	No	No	No
<a href="#">IElementwiseLayer</a>	Yes	Yes	No	Yes	Yes <sup>7</sup>	Yes <sup>8</sup>
<a href="#">IFullyConnectedLayer</a>	Yes	Yes	Yes	No	Yes	Yes
<a href="#">IGatherLayer</a>	Yes	Yes	No	Yes	No	No
<a href="#">IIdentityLayer</a>	Yes	Yes	Yes	Yes	No	No
<a href="#">IPluginV2Layer</a>	Yes	Yes	Yes	No	No	No
<a href="#">ILRNLayer</a>	Yes	Yes	Yes	No	Yes	No
<a href="#">IMatrixMultiplyLayer</a>	Yes	Yes	No	No	No	No
<a href="#">IPaddingLayer</a>	Yes	Yes	Yes	No	No	No
<a href="#">IPluginLayer</a>	Yes	Yes	No	No	No	No
<a href="#">IPoolingLayer &gt; 2D Pooling</a>	Yes	Yes	Yes	No	Yes <sup>9</sup>	Yes <sup>8</sup>
<a href="#">IPoolingLayer &gt; 3D Pooling</a>	Yes	Yes	No	No	No	No
<a href="#">IRaggedSoftMaxLayer</a>	Yes	No	No	No	No	No
<a href="#">IReduceLayer</a>	Yes	Yes	No	No	No	No
<a href="#">IResizeLayer</a>	Yes	Yes	No	No	No	No
<a href="#">IRNNLayer</a>	Yes	Yes	No	No	No	No
<a href="#">IRNNv2Layer</a>	Yes	Yes	No	No	No	No
<a href="#">IScaleLayer</a>	Yes	Yes	Yes	No	Yes <sup>10</sup>	Yes <sup>9</sup>
<a href="#">IShapeLayer</a> <sup>11</sup>	Yes	Yes	Yes	Yes	No	No
<a href="#">IShuffleLayer</a>	Yes	Yes	Yes	Yes	No	No
<a href="#">ISliceLayer</a>	Yes	Yes	No <sup>12</sup>	Yes	No	No
<a href="#">ISoftMaxLayer</a>	Yes	Yes	No	No	No	No

<sup>7</sup> Partial support. Yes for **sum**, **sub**, **prod**, **min** and **max** elementwise operations only.

<sup>8</sup> Partial support. Yes for **sum** elementwise operation only.

<sup>9</sup> Partial support. Yes for **max** and average pooling type only.

<sup>10</sup> Partial support. DLA does not support power on scale layer.

<sup>11</sup> Output is always INT32.

<sup>12</sup> Partial support. Yes for unstrided Slice and No for strided.



Layer	FP32	FP16	INT8	INT32	DLA FP16	DLA INT8
<a href="#">ITopKLayer</a>	Yes	Yes	No	No	No	No
<a href="#">UnaryLayer</a>	Yes	Yes	No	No	No	No



DLA with FP16/INT8 precision with some restrictions on layer parameters.

# Chapter 4.

## HARDWARE AND PRECISION

The following table lists NVIDIA hardware and which precision modes each hardware supports. It also lists availability of Deep Learning Accelerator (DLA) on these hardware. TensorRT supports all NVIDIA hardware with capability SM 3.0 or higher.

Table 4 List of supported precision mode per hardware.

<a href="#">CUDA Compute Capability</a>	Example Device	FP32	FP16	INT8	FP16 Tensor Cores	INT8 Tensor Cores	DLA
7.5	Tesla T4	Yes	Yes	Yes	Yes	Yes	No
7.2	Jetson AGX Xavier	Yes	Yes	Yes	Yes	Yes	Yes
7.0	Tesla V100	Yes	Yes	Yes	Yes	No	No
6.2	Jetson TX2	Yes	Yes	No	No	No	No
6.1	Tesla P4	Yes	No	Yes	No	No	No
6.0	Tesla P100	Yes	Yes	No	No	No	No
5.3	Jetson TX1	Yes	Yes	No	No	No	No
5.2	Tesla M4	Yes	No	No	No	No	No
5.0	Quadro K2200	Yes	No	No	No	No	No
3.7	Tesla K80	Yes	No	No	No	No	No
3.5	Tesla K40	Yes	No	No	No	No	No
3.0	Tesla K10	Yes	No	No	No	No	No

# Chapter 5.

## SOFTWARE VERSIONS PER PLATFORM

Table 5 List of supported platforms per software version.

	Compiler version	Python version
Ubuntu 14.04 x86-64	<a href="#">gcc 4.8.4</a>	2.7, 3.4
Ubuntu 16.04 x86-64	<a href="#">gcc 5.4.0</a>	2.7, 3.5
Ubuntu 18.04 x86-64	<a href="#">gcc 7.4.0</a>	2.7, 3.6
CentOS 7.5 x86-64	<a href="#">gcc 4.8.5</a>	2.7, 3.6
Windows 10 x64	<b>CUDA 10.0, 10.1</b> <a href="#">MSVC 2017u5</a> <b>CUDA 9.0</b> <a href="#">MSVC 2017u3</a>	
Ubuntu 18.04 ppc64le	<a href="#">gcc 7.4.0</a>	2.7, 3.6
CentOS 7.5 ppc64le	<a href="#">gcc 4.8.5</a>	2.7, 3.6
Ubuntu 18.04 AArch64	<ul style="list-style-type: none"> <li>▶ Jetson: <a href="#">gcc 7.4.0</a></li> <li>▶ Automotive: <a href="#">gcc 7.3.1</a></li> </ul>	2.7, 3.6
QNX AArch64	<a href="#">gcc 5.4.0</a>	

# Chapter 6.

## SUPPORTED OPS

The following lists describe the operations that are supported in a Caffe or TensorFlow framework and in the ONNX TensorRT parser:

### Caffe

These are the operations that are supported in a Caffe framework:

- ▶ **BatchNormalization**
- ▶ **BNLL**
- ▶ **Clip**<sup>13</sup>
- ▶ **Concatenation**
- ▶ **Convolution**
- ▶ **Crop**
- ▶ **Deconvolution**
- ▶ **Dropout**
- ▶ **ElementWise**
- ▶ **ELU**
- ▶ **InnerProduct**
- ▶ **Input**
- ▶ **LeakyReLU**
- ▶ **LRN**
- ▶ **Permute**
- ▶ **Pooling**
- ▶ **Power**
- ▶ **Reduction**
- ▶ **ReLU, TanH, and Sigmoid**
- ▶ **Reshape**

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<sup>13</sup> When using the `Clip` operation, Caffe users must serialize their layers using `ditcaffe.pb.h` instead of `caffe.pb.h` in order to import the layer into TensorRT.

- ▶ **SoftMax**
- ▶ **Scale**

## TensorFlow

These are the operations that are supported in a TensorFlow framework:

- ▶ **Add, Sub, Mul, Div, Minimum and Maximum**
- ▶ **ArgMax**
- ▶ **ArgMin**
- ▶ **AvgPool**
- ▶ **BiasAdd**
- ▶ **Clip**
- ▶ **ConcatV2**
- ▶ **Const**
- ▶ **Conv2D**
- ▶ **ConvTranspose2D**
- ▶ **DepthwiseConv2dNative**
- ▶ **Elu**
- ▶ **ExpandDims**
- ▶ **FusedBatchNorm**
- ▶ **Identity**
- ▶ **LeakyReLU**
- ▶ **MaxPool**
- ▶ **Mean**
- ▶ **Negative, Abs, Sqrt, Recip, Rsqrt, Pow, Exp and Log**
- ▶ **Pad** is supported if followed by one of these TensorFlow layers: **Conv2D**, **DepthwiseConv2dNative**, **MaxPool**, and **AvgPool**.
- ▶ **Placeholder**
- ▶ **ReLU, TanH, and Sigmoid**
- ▶ **Relu6**
- ▶ **Reshape**
- ▶ **ResizeBilinear, ResizeNearestNeighbor**
- ▶ **Sin, Cos, Tan, Asin, Acos, Atan, Sinh, Cosh, Asinh, Acosh, Atanh, Ceil and Floor**
- ▶ **Selu**
- ▶ **Slice**
- ▶ **SoftMax**



If the input to a TensorFlow `SoftMax` op is not `NHWC`, TensorFlow will automatically insert a transpose layer with a non-constant permutation, causing

the UFF converter to fail. It is therefore advisable to manually transpose `SoftMax` inputs to `NHWC` using a constant permutation.

- ▶ `Softplus`
- ▶ `Softsign`
- ▶ `Transpose`

## ONNX

Since the ONNX parser is an open source project, the most up-to-date information regarding the supported operations can be found in [GitHub: ONNX TensorRT](#).

These are the operations that are supported in the ONNX framework:

- ▶ `Abs`
- ▶ `Add`
- ▶ `ArgMax`
- ▶ `ArgMin`
- ▶ `AveragePool`
- ▶ `BatchNormalization`
- ▶ `Cast`
- ▶ `Ceil`
- ▶ `Clip`
- ▶ `Concat`
- ▶ `Constant`
- ▶ `Conv`
- ▶ `ConvTranspose`
- ▶ `DepthToSpace`
- ▶ `Div`
- ▶ `Dropout`
- ▶ `Elu`
- ▶ `Exp`
- ▶ `Flatten`
- ▶ `Floor`
- ▶ `Gather`
- ▶ `Gemm`
- ▶ `GlobalAveragePool`
- ▶ `GlobalMaxPool`
- ▶ `HardSigmoid`
- ▶ `Identity`
- ▶ `ImageScaler`
- ▶ `InstanceNormalization`
- ▶ `LRN`

- ▶ LeakyRelU
- ▶ Log
- ▶ LogSoftmax
- ▶ MatMul
- ▶ Max
- ▶ MaxPool
- ▶ Mean
- ▶ Min
- ▶ Mul
- ▶ Neg
- ▶ Pad
- ▶ ParametricSoftplus
- ▶ Pow
- ▶ Reciprocal
- ▶ ReduceL1
- ▶ ReduceL2
- ▶ ReduceLogSum
- ▶ ReduceLogSumExp
- ▶ ReduceMax
- ▶ ReduceMean
- ▶ ReduceMin
- ▶ ReduceProd
- ▶ ReduceSum
- ▶ ReduceSumSquare
- ▶ Relu
- ▶ Reshape
- ▶ Resize
- ▶ ScaledTanh
- ▶ Selu
- ▶ Shape
- ▶ Sigmoid
- ▶ Sin, Cos, Tan, Asin, Acos, Atan, Sinh, Cosh, Asinh, Acosh, and Atanh
- ▶ Size
- ▶ Slice
- ▶ Softmax
- ▶ Softplus
- ▶ Softsign
- ▶ SpaceToDepth
- ▶ Split

- ▶ **Squeeze**
- ▶ **Sub**
- ▶ **Sum**
- ▶ **Tanh**
- ▶ **ThresholdedRelu**
- ▶ **TopK**
- ▶ **Transpose**
- ▶ **Unsqueeze**
- ▶ **Upsample**



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