



# INFERENCE SERVER

RN-08995-001 \_v18.04 | October 2018

## Release Notes



# TABLE OF CONTENTS

Chapter 1. Inference Server Overview.....	1
Chapter 2. Pulling A Container.....	2
Chapter 3. Running The Inference Server.....	3
Chapter 4. Inference Server Release 18.04 Beta.....	5

# Chapter 1.

## INFERENCE SERVER OVERVIEW

The NVIDIA Inference Server™ provides a cloud inferencing solution optimized for NVIDIA GPUs. The server provides an inference service via an HTTP endpoint, allowing remote clients to request inferencing for any model that is being managed by the server.

The Inference Server itself is included in the Inference Server container. External to the container, there are additional C++ and Python client libraries, and additional documentation at [GitHub: Inference Server](#).

This document describes the key features, software enhancements and improvements, any known issues, and how to run this container.

## Chapter 2.

# PULLING A CONTAINER

You can access NVIDIA's GPU accelerated containers for all three products, the NVIDIA DGX-1™, NVIDIA DGX Station™, and the NVIDIA® GPU Cloud™ (NGC). If you own a DGX-1 or DGX Station then you should use the NVIDIA® DGX™ container registry at <https://compute.nvidia.com>. This is a web interface to the Docker hub, **nvcr.io** (NVIDIA DGX container registry). You can pull the containers from there and you can also push containers there into your own account in the registry.

If you are accessing the NVIDIA containers from the NVIDIA® GPU Cloud™ (NGC) container registry via a cloud services provide such as Amazon® Web Services™ (AWS), then you should use NGC container registry at <https://ngc.nvidia.com>. This is also a web interface to the same Docker repository as for the DGX-1 and DGX Station. After you create an account, the commands to pull containers are the same as if you had a DGX-1 in your own data center. However, currently, you cannot save any containers to the NGC container registry. Instead you have to save the containers to your own Docker repository that is either on-premise or in the Cloud.



The containers are exactly the same, whether you pull them from the NVIDIA DGX container registry or the NGC container registry.

Before you can pull a container from the NGC container registry, you must have Docker and nvidia-docker installed as explained in [Preparing to use NVIDIA Containers Getting Started Guide](#). You must also have access and logged into the NGC container registry as explained in the [NGC Getting Started Guide](#).

For step-by-step instructions, see [Container User Guide](#).

# Chapter 3.

## RUNNING THE INFERENCE SERVER

Before running the Inference Server, you must first set up a model store containing the models that the server will make available for inferencing. The [Inference Server User Guide - Model Store](#), describes how to create a model store. For this example, assume the model store is created on the host system directory `/path/to/model/store`. The following command will launch the Inference Server using that model store.

```
$ nvidia-docker run --rm --shm-size=1g --ulimit memlock=-1 --ulimit stack=67108864 -p8000:8000 --mount type=bind,source=/path/to/model/store,target=/tmp/models <container> /opt/inference_server/bin/inference_server --model_base_path=/tmp/models
```

Where `<container>` is the name of the docker container that was pulled from the NVIDIA DGX or NGC container registry as described in [Pulling A Container](#).

The `nvidia-docker --mount` option maps `/path/to/model/store` on the host into the container at `/tmp/models`, and the `--model_base_path` option to the inference server is used to point to `/tmp/models` as the model store.

The Inference Server listens on port 8000 and the above command uses the `-p` flag to map container port 8000 to host port 8000. A different host port can be used by modifying the `-p` flag, for example `-p9000:8000` will cause the Inference Server to be available on host port 9000.

The `--shm-size` and `--ulimit` flags are recommended to improve Inference Server performance. For `--shm-size` the minimum recommended size is 1g but larger sizes may be necessary depending on the number and size of models being served.

After starting, the Inference Server will log initialization information to the console. Initialization is complete and the server is ready to accept requests after the console shows the following:

```
Starting server listening on :8000
```

Additionally, C++ and Python client libraries and examples are available at [GitHub: Inference Server](#). These libraries and examples demonstrate how to communicate with the Inference Server container from a C++ or Python application.

# Chapter 4.

## INFERENCE SERVER RELEASE 18.04 BETA

The NVIDIA container image of the Inference Server, release 18.04, is available as a beta release.

### Contents of the Inference Server

This container image contains the Inference Server executable in `/opt/inference_server`.

The container also includes the following:

- ▶ Ubuntu 16.04 including Python 2.7 environment
- ▶ NVIDIA CUDA 9.0.176 (see Errata section and 2.1) including CUDA<sup>®</sup> Basic Linear Algebra Subroutines library<sup>™</sup> (cuBLAS) 9.0.333 (see section 2.3.1)
- ▶ NVIDIA CUDA<sup>®</sup> Deep Neural Network library<sup>™</sup> (cuDNN) 7.1.1
- ▶ NCCL 2.1.15 (optimized for NVLink<sup>™</sup>)

### Driver Requirements

Release 18.04 is based on CUDA 9, which requires NVIDIA Driver release 384.xx.

### Key Features and Enhancements

This Inference Server release includes the following key features and enhancements.

- ▶ This is the 0.1 Beta release of the Inference Server container.
- ▶ Multiple model support. The Inference Server can manage any number and mix of models (limited by system disk and memory resources). Supports TensorRT and TensorFlow GraphDef model formats.
- ▶ Multi-GPU support. The server can distribute inferencing across all system GPUs.
- ▶ Multi-tenancy support. Multiple models (or multiple instances of the same model) can run simultaneously on the same GPU.
- ▶ Batching support.

- ▶ Latest version of NCCL 2.1.15
- ▶ Ubuntu 16.04 with March 2018 updates

### **Known Issues**

This is a beta release of the Inference Server. All features are expected to be available, however, some aspects of functionality and performance will likely be limited compared to a non-beta release.



## Notice

THE INFORMATION IN THIS GUIDE AND ALL OTHER INFORMATION CONTAINED IN NVIDIA DOCUMENTATION REFERENCED IN THIS GUIDE IS PROVIDED “AS IS.” NVIDIA MAKES NO WARRANTIES, EXPRESSED, IMPLIED, STATUTORY, OR OTHERWISE WITH RESPECT TO THE INFORMATION FOR THE PRODUCT, AND EXPRESSLY DISCLAIMS ALL IMPLIED WARRANTIES OF NONINFRINGEMENT, MERCHANTABILITY, AND FITNESS FOR A PARTICULAR PURPOSE. Notwithstanding any damages that customer might incur for any reason whatsoever, NVIDIA’s aggregate and cumulative liability towards customer for the product described in this guide shall be limited in accordance with the NVIDIA terms and conditions of sale for the product.

THE NVIDIA PRODUCT DESCRIBED IN THIS GUIDE IS NOT FAULT TOLERANT AND IS NOT DESIGNED, MANUFACTURED OR INTENDED FOR USE IN CONNECTION WITH THE DESIGN, CONSTRUCTION, MAINTENANCE, AND/OR OPERATION OF ANY SYSTEM WHERE THE USE OR A FAILURE OF SUCH SYSTEM COULD RESULT IN A SITUATION THAT THREATENS THE SAFETY OF HUMAN LIFE OR SEVERE PHYSICAL HARM OR PROPERTY DAMAGE (INCLUDING, FOR EXAMPLE, USE IN CONNECTION WITH ANY NUCLEAR, AVIONICS, LIFE SUPPORT OR OTHER LIFE CRITICAL APPLICATION). NVIDIA EXPRESSLY DISCLAIMS ANY EXPRESS OR IMPLIED WARRANTY OF FITNESS FOR SUCH HIGH RISK USES. NVIDIA SHALL NOT BE LIABLE TO CUSTOMER OR ANY THIRD PARTY, IN WHOLE OR IN PART, FOR ANY CLAIMS OR DAMAGES ARISING FROM SUCH HIGH RISK USES.

NVIDIA makes no representation or warranty that the product described in this guide will be suitable for any specified use without further testing or modification. Testing of all parameters of each product is not necessarily performed by NVIDIA. It is customer’s sole responsibility to ensure the product is suitable and fit for the application planned by customer and to do the necessary testing for the application in order to avoid a default of the application or the product. Weaknesses in customer’s product designs may affect the quality and reliability of the NVIDIA product and may result in additional or different conditions and/or requirements beyond those contained in this guide. NVIDIA does not accept any liability related to any default, damage, costs or problem which may be based on or attributable to: (i) the use of the NVIDIA product in any manner that is contrary to this guide, or (ii) customer product designs.

Other than the right for customer to use the information in this guide with the product, no other license, either expressed or implied, is hereby granted by NVIDIA under this guide. Reproduction of information in this guide is permissible only if reproduction is approved by NVIDIA in writing, is reproduced without alteration, and is accompanied by all associated conditions, limitations, and notices.

## Trademarks

NVIDIA, the NVIDIA logo, and cuBLAS, CUDA, cuDNN, cuFFT, cuSPARSE, DIGITS, DGX, DGX-1, DGX Station, GRID, Jetson, Kepler, NVIDIA GPU Cloud, Maxwell, NCCL, NVLink, Pascal, Tegra, TensorRT, Tesla and Volta are trademarks and/or registered trademarks of NVIDIA Corporation in the United States and other countries. Other company and product names may be trademarks of the respective companies with which they are associated.

## Copyright

© 2018 NVIDIA Corporation. All rights reserved.

[www.nvidia.com](http://www.nvidia.com)

