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Chapter 1.
NVIDIA DEEP LEARNING AMI OVERVIEW

NVIDIA makes available on the Amazon Web Service (AWS) platform a customized Amazon Machine Instance (AMI) optimized for the latest generations of NVIDIA GPUs - NVIDIA Volta™ GPUs and NVIDIA Turing GPUs. Running NVIDIA® GPU Cloud containers on AWS instances with NVIDIA Volta or NVIDIA Turing GPUs provides optimum performance of NGC containers for deep learning, machine learning, and HPC workloads.

See the NGC AWS Setup Guide for instructions on setting up and using the AMI, including instructions on using the following features:

- Automated login to the NGC container registry.
- Elastic Block Storage (EBS) mounting.
Chapter 2.  
VERSION 20.03.1

Image Name
- NGC AMI: NVIDIA Deep Learning AMI 20.03.1
- TensorFlow from NVIDIA AMI: NVIDIA Deep Learning tensorflow AMI 20.03.1
- PyTorch from NVIDIA AMI: NVIDIA Deep Learning pytorch AMI 20.03.1

Contents of the NVIDIA Deep Learning AMI
- Ubuntu Server: 18.04 LTS
- NVIDIA Driver: 440.64.01
- Docker Engine: 19.03.6
- NVIDIA Container Toolkit v1.0.5-1
  Includes new command to run containers: `docker run --gpus all <container>`
- PyTorch container (PyTorch from NVIDIA image): `nvcr.io/nvidia/pytorch:20.02-py3`

Key Changes
- Updated Docker Engine to 19.03.6
- Updated NVIDIA Driver to 440.64.01

2.1. Known Issues
2.1.1. Installing GPU drivers on the VM via a CUDA Install Succeeds Erroneously

**Issue**

Attempting to install CUDA on the VM will succeed, resulting in a potential conflict with the NVIDIA GPU driver included in the VM image.

**Explanation**

The configuration file to prevent driver installs is not working. This will be resolved in a later release of the VM image.
Chapter 3.
VERSION 19.11.3

Image Name

‣ NGC AMI: NVIDIA Deep Learning AMI 19.11.3
‣ TensorFlow from NVIDIA AMI: NVIDIA Deep Learning tensorflow AMI 19.11.3
‣ PyTorch from NVIDIA AMI: NVIDIA Deep Learning pytorch AMI 19.11.3

Contents of the NVIDIA Deep Learning AMI

‣ Ubuntu Server: 18.04 LTS
‣ NVIDIA Driver: 440.33.01
‣ Docker CE: 19.03.4-ce
‣ NVIDIA Container Toolkit v1.0.5-1

  Includes new command to run containers: \texttt{docker run --gpus all <container>}

‣ TensorFlow container (TensorFlow from NVIDIA image): \texttt{nvcr.io/nvidia/tensorflow:19.10-py3}
‣ PyTorch container (PyTorch from NVIDIA image): \texttt{nvcr.io/nvidia/pytorch:19.10-py3}

Key Changes

‣ Updated Docker-CE to 19.03.4
‣ Updated NVIDIA Driver to 440.33.01

3.1. Known Issues
3.1.1. Installing GPU drivers on the VM via a CUDA Install Succeeds Erroneously

**Issue**

Attempting to install CUDA on the VM will succeed, resulting in a potential conflict with the NVIDIA GPU driver included in the VM image.

**Explanation**

The configuration file to prevent driver installs is not working. This will be resolved in a later release of the VM image.
Chapter 4.
VERSION 19.10.2

Image Name

- NGC AMI: NVIDIA Deep Learning AMI 19.10.2
- TensorFlow from NVIDIA AMI: NVIDIA Deep Learning tensorflow AMI 19.10.2
- PyTorch from NVIDIA AMI: NVIDIA Deep Learning pytorch AMI 19.10.2

Contents of the NVIDIA Deep Learning AMI

- Ubuntu Server: 18.04 LTS
- NVIDIA Driver: 418.87.00
- Docker CE: 19.03.2-ce
- NVIDIA Container Toolkit v1.0.5-1
- PyTorch container (PyTorch from NVIDIA image): nvcr.io/nvidia/pytorch:19.09-py3

Key Changes

- Updated Docker-CE to 19.03.2
- Replaced the NVIDIA Container Runtime for Docker with the NVIDIA Container Toolkit
  Includes new command to run containers: `docker run --gpus all <container>`

4.1. Known Issues
4.1.1. Installing GPU drivers on the VM via a CUDA Install Succeeds Erroneously

**Issue**

Attempting to install CUDA on the VM will succeed, resulting in a potential conflict with the NVIDIA GPU driver included in the VM image.

**Explanation**

The configuration file to prevent driver installs is not working. This will be resolved in a later release of the VM image.
Chapter 5.
VERSION 19.08.0

Image Name
- NGC AMI: NVIDIA Deep Learning AMI 19.08.0
- TensorFlow from NVIDIA AMI: NVIDIA Deep Learning tensorflow AMI 19.08.0
- PyTorch from NVIDIA AMI: NVIDIA Deep Learning pytorch AMI 19.08.0

Contents of the NVIDIA Deep Learning AMI
- Ubuntu Server: 18.04 LTS
- NVIDIA Driver: 418.87
- Docker CE: 18.09.8-ce
- NVIDIA Container Runtime for Docker: (nvidia-docker2) v2.1.0-1
- TensorFlow container (TensorFlow from NVIDIA image): nvcr.io/nvidia/tensorflow:19.06-py3
- PyTorch container (PyTorch from NVIDIA image): nvcr.io/nvidia/pytorch:19.06-py3

Key Changes
- Updated NVIDIA Driver to version 418.87
- Updated Docker-CE to 18.09.8
- Updated NVIDIA Container Runtime for Docker to v2.1.0-1

5.1. Known Issues
5.1.1. Installing GPU drivers on the VM via a CUDA Install Succeeds Erroneously

Issue

Attempting to install CUDA on the VM will succeed, resulting in a potential conflict with the NVIDIA GPU driver included in the VM image.

Explanation

The configuration file to prevent driver installs is not working. This will be resolved in a later release of the VM image.
Chapter 6.
VERSION 19.07.0

Image Name

- NGC Image: NVIDIA Deep Learning AMI 19.07.0
- TensorFlow from NVIDIA Image: NVIDIA Deep Learning tensorflow AMI 19.07.0
- PyTorch from NVIDIA Image: NVIDIA Deep Learning pytorch AMI 19.07.0

Contents of the NVIDIA Deep Learning AMI

- Ubuntu Server: 18.04 LTS
- NVIDIA Driver: 418.67
- Docker CE: 18.09.7-ce
- NVIDIA Container Runtime for Docker: (nvidia-docker2) v2.0.3
- TensorFlow container (TensorFlow from NVIDIA image): nvcr.io/nvidia/tensorflow:19.06-py3
- PyTorch container (PyTorch from NVIDIA image): nvcr.io/nvidia/pytorch:19.06-py3

Key Changes

- Incorporates updated Ubuntu kernel to address a security update.
- Updated Docker-CE to 18.09.7: Incorporates security update.
- Incorporates cloud-init fix to allow updating older images to the latest kernel without user prompts.

6.1. Known Issues
6.1.1. Installing GPU drivers on the VM via a CUDA Install Succeeds Erroneously

Issue

Attempting to install CUDA on the VM will succeed, resulting in a potential conflict with the NVIDIA GPU driver included in the VM image.

Explanation

The configuration file to prevent driver installs is not working. This will be resolved in a later release of the VM image.
Chapter 7.
VERSION 19.05.1

Image Name

- NGC Image: NVIDIA Driver 418.67 NVIDIA Deep Learning AMI
- TensorFlow from NVIDIA Image: NVIDIA Driver 418.67 NVIDIA Deep Learning tensorflow AMI
- PyTorch from NVIDIA Image: NVIDIA Driver 418.67 NVIDIA Deep Learning pytorch AMI

Contents of the NVIDIA Deep Learning AMI

- Ubuntu Server: 18.04 LTS
- NVIDIA Driver: 418.67
- Docker CE: 18.09.4-ce
- NVIDIA Container Runtime for Docker: (nvidia-docker2) v2.0.3
- PyTorch container (PyTorch from NVIDIA image): nvcr.io/nvidia/pytorch:19.04-py3

Key Changes

19.05.1

- Incorporates updated OS kernel to address a security update. Refer to https://wiki.ubuntu.com/SecurityTeam/KnowledgeBase/MDS.

19.05.0

- Initial release of PyTorch from NVIDIA and TensorFlow from NVIDIA images
- Updated the NVIDIA Driver to 418.67
- Updated Docker to 18.09.4-ce
7.1. Known Issues

7.1.1. Installing GPU drivers on the VM via a CUDA Install Succeeds Erroneously

Issue

Attempting to install CUDA on the VM will succeed, resulting in a potential conflict with the NVIDIA GPU driver included in the VM image.

Explanation

The configuration file to prevent driver installs is not working. This will be resolved in a later release of the VM image.
Chapter 8.
VERSION 19.03.0

Image Name
NVIDIA Volta Deep Learning AMI 19.03.0

Contents of the NVIDIA Volta Deep Learning AMI
- Ubuntu Server: 18.04 LTS
- NVIDIA Driver: 418.40.04
- Docker CE: 18.09.2-ce
- NVIDIA Container Runtime for Docker: (nvidia-docker2) v2.0.3

Key Changes
- Updated the NVIDIA Driver to 418.40.04
- Updated Docker to 18.09.2-ce

Known Issues
There are no known issues in this release.
Chapter 9.
VERSION 19.02.0

Image Name
NVIDIA Volta Deep Learning AMI 19.02.0

Contents of the NVIDIA Volta Deep Learning AMI

‣ Ubuntu Server: 18.04 LTS
‣ NVIDIA Driver: 410.104
‣ Docker CE: 18.09.1-ce
‣ NVIDIA Container Runtime for Docker: (nvidia-docker2) v2.0.3

Key Changes
‣ Updated the NVIDIA Driver to 410.104
‣ Updated Docker to 18.09.1-ce

Known Issues
There are no known issues in this release.
Chapter 10.
VERSION 19.01.0

Image Name
NVIDIA Volta Deep Learning AMI 19.01.0

Contents of the NVIDIA Volta Deep Learning AMI

▶ Ubuntu Server: 18.04 LTS
▶ NVIDIA Driver: 410.79
▶ Docker CE: 18.06.1
▶ NVIDIA Container Runtime for Docker: (nvidia-docker2) v2.0.3

Key Changes

▶ Updated the Ubuntu Server to 18.04 LTS.

Known Issues

There are no known issues in this release.
Chapter 11.
VERSION 18.11.1

Image Name
NVIDIA Volta Deep Learning AMI 18.11.1

Contents of the NVIDIA Volta Deep Learning AMI
- Ubuntu Server: 16.04 LTS
- NVIDIA Driver: 410.79
- Docker CE: 18.06.1
- NVIDIA Container Runtime for Docker: (nvidia-docker2) v2.0.3

Key Changes
- Updated the NVIDIA driver to 410.79.

Known Issues
There are no known issues in this release.
Chapter 12.  
VERSION 18.09.1

**Image Name**
NVIDIA Volta Deep Learning AMI 18.09.1

**Contents of the NVIDIA Volta Deep Learning AMI**
- Ubuntu Server: 16.04 LTS
- NVIDIA Driver: 410.48
- Docker CE: 18.06.1
- NVIDIA Container Runtime for Docker: (nvidia-docker2) v2.0.3

**Key Changes**
- Updated the NVIDIA driver to 410.48.
- Updated Docker CE to 18.06.1

**Known Issues**
There are no known issues in this release.
Chapter 13.  
VERSION 18.08.0

**Image Name**
NVIDIA Volta Deep Learning AMI 18.08.0

**Contents of the NVIDIA Volta Deep Learning AMI**
- Ubuntu Server: 16.04 LTS
- NVIDIA Driver: 396.44
- Docker CE: 18.06-ce
- NVIDIA Container Runtime for Docker: (nvidia-docker2) v2.0.3

**Key Changes**
- Updated the NVIDIA driver to 396.44.
- Updated Docker CE to 18.06

**Known Issues**
There are no known issues in this release.
Chapter 14.
VERSION 18.07.0

Image Name
NVIDIA Volta Deep Learning AMI 18.07.0

Contents of the NVIDIA Volta Deep Learning AMI
- Ubuntu Server: 16.04 LTS
- NVIDIA Driver: 396.37
- Docker CE: 18.03.1-ce
- NVIDIA Container Runtime for Docker: (nvidia-docker2) v2.0.3

Key Changes
- Updated the NVIDIA driver to 396.37.

Known Issues
There are no known issues in this release.
Chapter 15.  
VERSION 18.06.0

Image Name
NVIDIA Volta Deep Learning AMI 18.06.0

Contents of the NVIDIA Volta Deep Learning AMI
- Ubuntu Server: 16.04 LTS
- NVIDIA Driver: 396.26
- Docker CE: 18.03.1-ce
- NVIDIA Container Runtime for Docker: (nvidia-docker2) v2.0.3

Key Changes
- Updated the NVIDIA driver to 396.26.

Known Issues
There are no known issues in this release.
Chapter 16.
VERSION 18.05.0

Contents of the NVIDIA Volta Deep Learning AMI

- Ubuntu Server: 16.04 LTS
- NVIDIA Driver: 384.125
- Docker CE: 18.03.1-ce
- NVIDIA Container Runtime for Docker: (nvidia-docker2) v2.0.3

Key Changes

- Includes Ubuntu 16.04 security updates
- Updated Docker CE to version 18.03.1-ce

Known Issues

There are no known issues in this release.
Chapter 17.
VERSION 18.04.0

Contents of the NVIDIA Volta Deep Learning AMI

- Ubuntu: 16.04 LTS
- NVIDIA Driver: 384.125
- Docker CE: 18.03.0-ce
- NVIDIA Container Runtime for Docker: (nvidia-docker2) v2.0.3

Key Changes

- Updated the NVIDIA Driver to version 384.125
- Updated Docker CE to version 18.03.0-ce

Known Issues

There are no known issues in this release.
Chapter 18.
VERSION 18.03.0

Contents of the NVIDIA Volta Deep Learning AMI

- Ubuntu: 16.04 LTS
- NVIDIA Driver: 384.111
- Docker CE: 17.12.1-ce
- NVIDIA Container Runtime for Docker: (nvidia-docker2) v2.0.3

Key Features and Enhancements

- Installs available Ubuntu updates at boot.
- Updated the NVIDIA Driver to version 384.111
- Updated Docker CE to version 17.12.0-ce
- Updated the NVIDIA Container Runtime for Docker (nvidia-docker2) to v2.0.3

Known Issues

There are no known issues in this release.
Chapter 19.
VERSION 18.01.0

Contents of the NVIDIA Volta Deep Learning AMI

NVIDIA is providing updates to help mitigate the Intel CPU security issues and maintain compatibility with recent Linux updates for these security issues.

- Ubuntu: 16.04 LTS
- NVIDIA Driver: 384.111
- Docker CE: 17.12.0-ce
- NVIDIA Container Runtime for Docker (nvidia-docker v2.0)

For details on the vulnerability, refer to Security Bulletin 4611 for more information. To see NVIDIA security bulletins, subscribe to security bulletin notifications, or learn more about NVIDIA’s product security management process, go to NVIDIA Product Security.

Key Features and Enhancements

- Installs available Ubuntu updates at boot.
- Updated the NVIDIA Driver to version 384.111
- Updated Docker CE to version 17.12.0-ce
- Updated to the NVIDIA Container Runtime for Docker (nvidia-docker2 v2.0)

Known Issues

There are no known issues in this release.
Chapter 20.
VERSION 17.10.1

Contents of the NVIDIA Volta Deep Learning AMI

‣ Ubuntu: 16.04.3
‣ NVIDIA Driver: 384.81
‣ Docker CE: 17.09.0-ce
‣ Docker Engine Utility for NVIDIA GPUs: 1.0.1

Key Features and Enhancements

‣ Installs available Ubuntu updates at boot.
‣ Provided a new MNIST example script with correct container image tags.
  ‣ Removed the mnist_tensorflow.sh and mnist_pytorch.sh scripts.
  ‣ Added the mnist_example.sh script.

Known Issues

There are no known issues in this release.
Chapter 21.
VERSION 17.10.0

Contents of the NVIDIA Volta Deep Learning AMI

- Ubuntu : 16.04.3
- NVIDIA Driver : 384.81
- Docker CE : 17.09.0-ce
- Docker Engine Utility for NVIDIA GPUs : 1.0.1

Key Features and Enhancements

- Installs available Ubuntu updates at boot.

Known Issues

- Container Tags in Example Scripts are Incorrect
  
  **Description**
  
  Two example scripts are provided as part of the AMI to show how to run NGC Deep Learning containers. These scripts are in the Ubuntu home directory, named mnist_pytorch.sh and mnist_tensorflow.sh. These scripts reference container tags 17.09 instead of 17.10.
  
  **Workaround**
  
  Edit 17.09 to 17.10 in both scripts before running them. This issue will be fixed at the next release of the NVIDIA Volta Deep Learning AMI.
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