



NVIDIA DGX H100 User Guide

NVIDIA Corporation

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The *NVIDIA DGX H100 System User Guide* is also available as a [PDF](#).

Chapter 1. Introduction to the NVIDIA DGX H100 System

The NVIDIA DGX H100 System is the universal system purpose-built for all AI infrastructure and workloads, from analytics to training to inference. The system is built on eight NVIDIA H100 Tensor Core GPUs.



1.1. Hardware Overview

1.1.1. DGX H100 Component Descriptions

The NVIDIA DGX H100 640GB system includes the following components.

Table 1: Table 1. Component Description

Component	Description
GPU	8 x NVIDIA H100 GPUs that provide 640 GB total GPU memory
CPU	2 x Intel Xeon 8480C PCIe Gen5 CPUs with 56 cores each 2.0/2.9/3.8 GHz (base/all core turbo/Max turbo)
NVSwitch	4 x 4th generation NVLinks that provide 900 GB/s GPU-to-GPU bandwidth
Storage (OS)	2 x 1.92 TB NVMe M.2 SSD (ea) in RAID 1 array
Storage (Data Cache)	8 x 3.84 TB NVMe U.2 SED (ea) in RAID 0 array
Network (Cluster) card	4 x OSFP ports for 8 x NVIDIA® ConnectX®-7 Single Port Infini-Band Cards Each card provides the following speeds: <ul style="list-style-type: none"> ▶ InfiniBand (default): Up to 400Gbps ▶ Ethernet: 400GbE, 200GbE, 100GbE, 50GbE, 40GbE, 25GbE, and 10GbE
Network (storage and in-band management) card	2 x NVIDIA® ConnectX®-7 Dual Port Ethernet Cards Each card provides the following speeds: <ul style="list-style-type: none"> ▶ Ethernet (default): 400GbE, 200GbE, 100GbE, 50GbE, 40GbE, 25GbE, and 10GbE ▶ InfiniBand: Up to 400Gbps
System memory (DIMM)	2 TB using 32 x DIMMs
BMC (out-of-band system management)	1 GbE RJ45 interface Supports Redfish, IPMI, SNMP, KVM, and Web user interface
System management interfaces (optional)	Dual port 100GbE in slot 3 and 10 GbE RJ45 interface
Power supply	6 x 3.3 kW

1.1.2. Mechanical Specifications

Table 2: Table 2. Mechanical Specifications

Feature	Description
Form Factor	8U Rackmount
Height	14" (356 mm)
Width	19" (482.3 mm) max
Depth	35.3" (897.1 mm) max
System Weight	287.6 lbs (130.45 kg) max

1.1.3. Power Specifications

The DGX H100 system contains six power supplies with balanced distribution of the power load.

Table 3: Table 3. Power Specifications

Input		Specification for Each Power Supply
200-240 volts AC	10.2 kW max.	3300 W @ 200-240 V, 16 A, 50-60 Hz

1.1.3.1 Support for PSU Redundancy and Continuous Operation

The system includes six power supply units (PSU) configured for 4+2 redundancy.

Refer to the following additional considerations:

- ▶ If a PSU fails, troubleshoot the cause and replace the failed PSU immediately.
- ▶ To replace faulty PSUs, ensure that the system is idle or shut down the system before installing operational PSUs.
- ▶ If three PSUs lose power as a result of a data center issue or power distribution unit failure, the system continues to function, but at a reduced performance level.
- ▶ If only three PSUs have power, shut down the system before replacing an operational PSU.
- ▶ The system only boots if at least three PSUs are operational. If fewer than three PSUs are operational, only the BMC is available.
- ▶ Do not operate the system with PSUs depopulated.

1.1.4. DGX H100 Locking Power Cord Specification

The DGX H100 is shipped with a set of six (6) locking power cords which have been qualified for use with the DGX H100 to ensure regulatory compliance.

Warning: To avoid electric shock or fire, only use the NVIDIA-provided power cords to connect power to the DGX H100. For more details, refer to [Electrical Precautions](#).

Important: Do not use the provided cables with any other product or for any other purpose.

Power Cord Specification

Power Cord Feature	Specification
Electrical	250VAC, 20A
Plug Standard	C19/C20
Dimension	1200mm length
Compliance	Cord: UL62, IEC60227 Connector/Plug: IEC60320-1

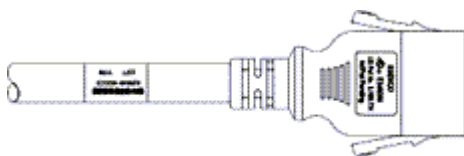
1.1.5. Using the Locking Power Cords

This section provides information about how to use the locking power cords.

Locking and Unlocking the PDU Side

Power Distribution Unit side

- ▶ To INSERT, push the cable into the PDU socket.
- ▶ To REMOVE, press the clips together and pull the cord out of the socket.



Locking/Unlocking the PSU Side (Cords with Twist-Lock Mechanism)

Power Supply (System) side - Twist locking

- ▶ To INSERT or REMOVE make sure the cable is UNLOCKED and push/ pull into/out of the socket.



To UNLOCK the power cord, twist the gray locking ring to the unlocked (indicator will show an unlocked padlock)



To LOCK the power cord, twist the gray locking ring to the locked position (indicator should show a locked padlock)

1.1.6. Environmental Specifications

Here are the environmental specifications for your DGX H100 system.

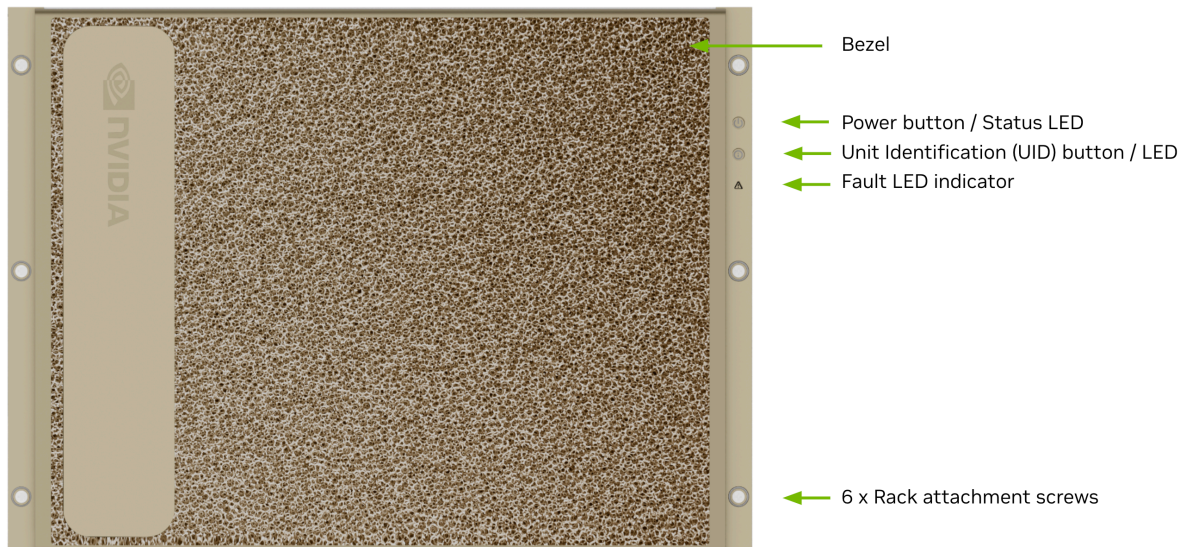
Feature	Specification
Operating Temperature	5° C to 30° C (41° F to 86° F)
Relative Humidity	20% to 80% non-condensing
Airflow	1 105 CFM Front-to-Back @ 80% fan PWM
Heat Output	38,557 BTU/hr

1.1.7. Front Panel Connections and Controls

This section provides information about the front panel, connections, and controls of the DGX H100 system.

1.1.7.1 With a Bezel

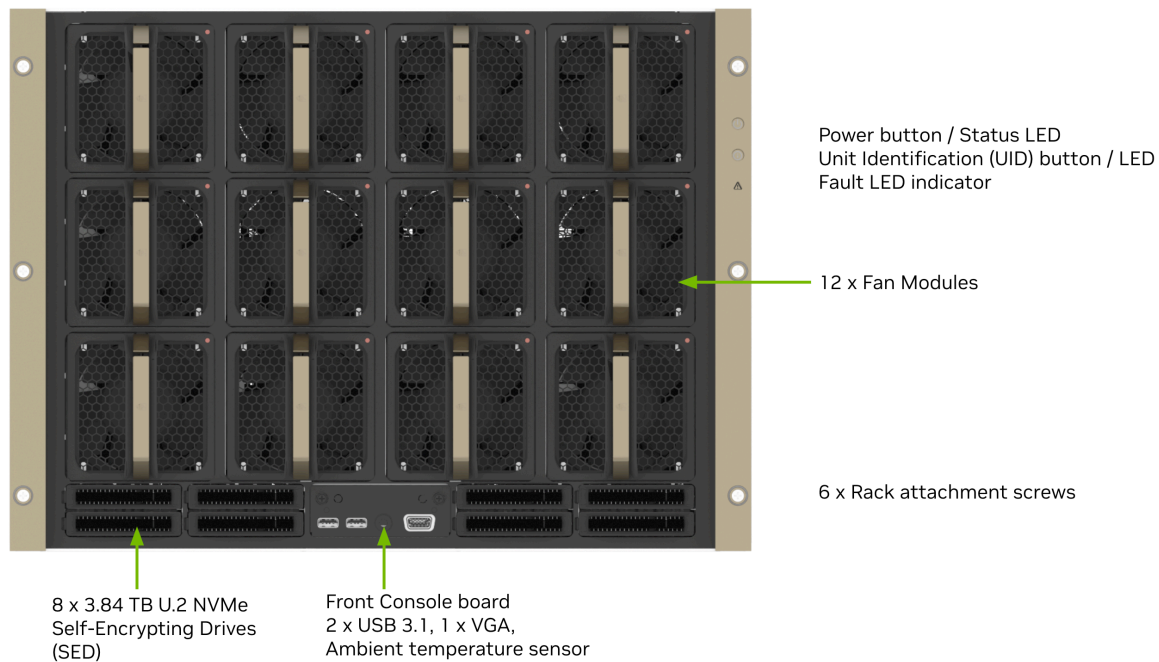
Here is an image of the DGX H100 system with a bezel.



Control	Description
Power Button	Press to turn the DGX H100 system On or Off. <ul style="list-style-type: none"> ▶ Green flashing (1 Hz): Standby (BMC booted) ▶ Green flashing (4 Hz): POST in progress ▶ Green solid On: Power On
ID Button	Press to have the blue LED turn On or blink (configurable through the BMC) as an identifier during servicing. Also causes an LED on the back of the unit to flash as an identifier during servicing.
Fault LED	Amber On: System or component faulted

1.1.7.2 With the Bezel Removed

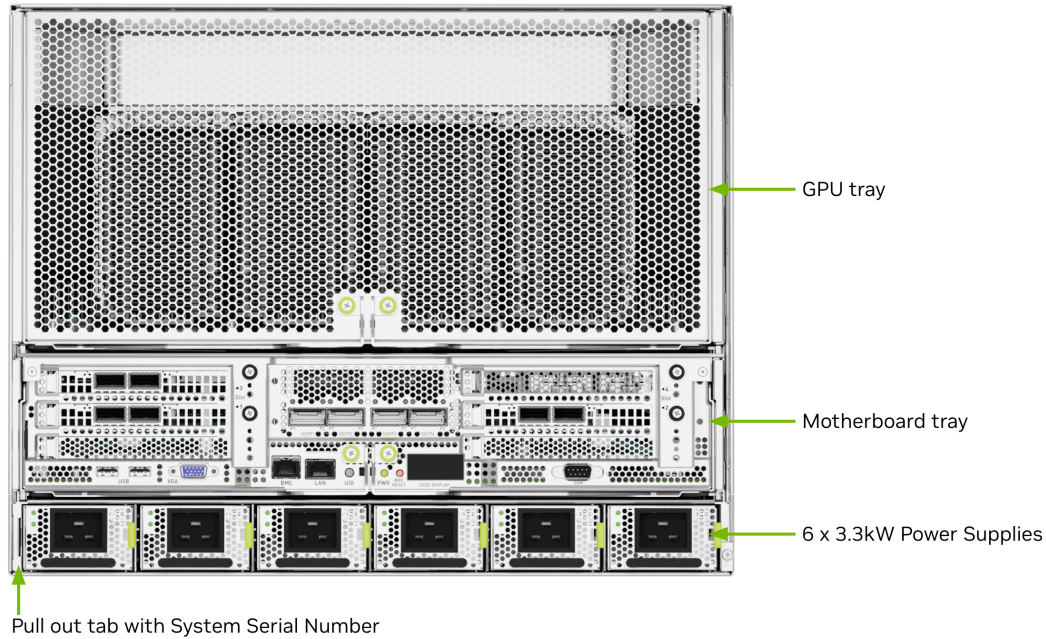
Here is an image of the DGX H100 system without a bezel.



Important: Refer to the section *First Boot Setup* for instructions on how to properly turn the system on or off.

1.1.8. Rear Panel Modules

Here is an image that shows the rear panel modules on DGX H100.



1.1.9. Motherboard Connections and Controls

Here is an image that shows the motherboard connections and controls in a DGX H100 system.

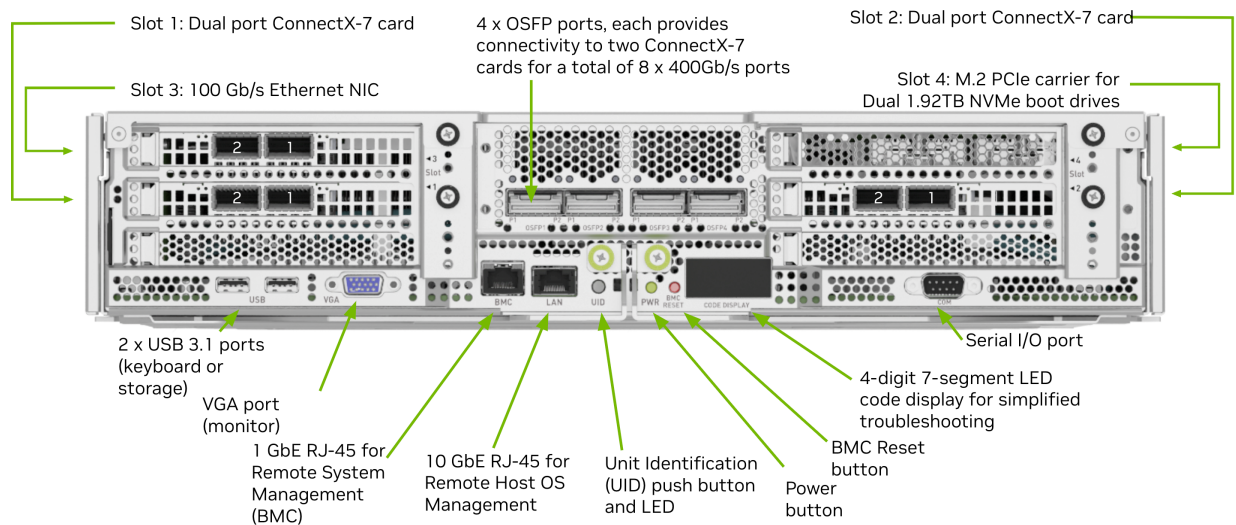


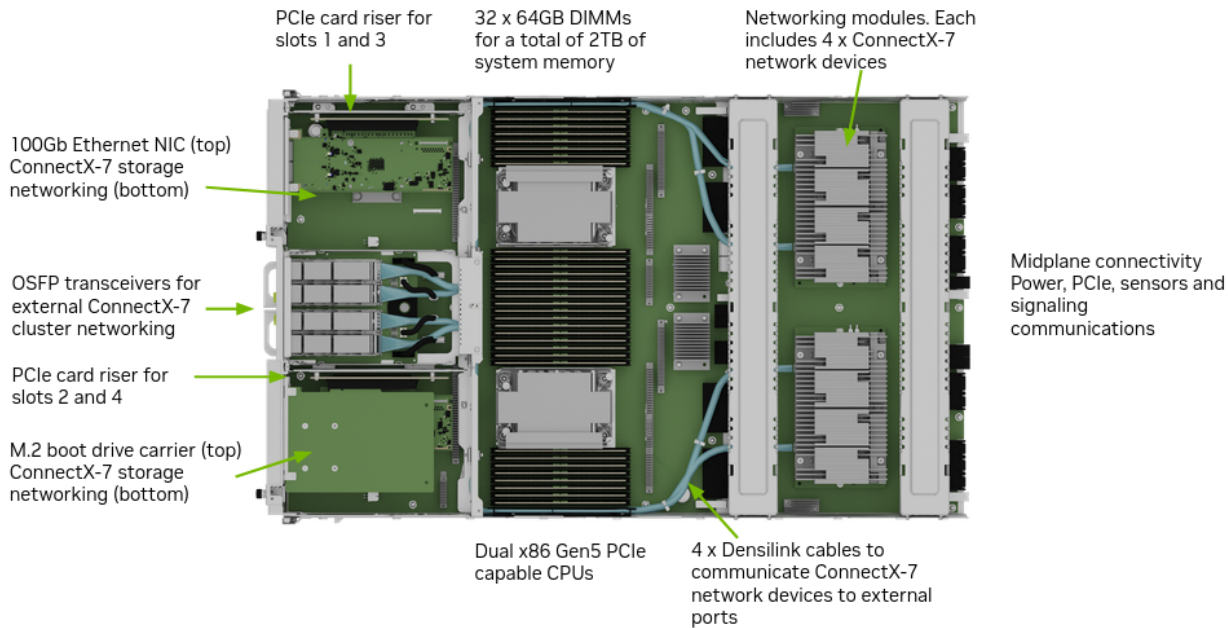
Table 4: Table 4. Motherboard Controls

Control	Description
Power Button	Press to turn the system On or Off.
ID LED Button	Blinks when ID button is pressed from the front of the unit as an aid in identifying the unit needing servicing.
BMC Reset button	Press to manually reset the BMC.

See [Network Connections, Cables, and Adaptors](#) for details on the network connections.

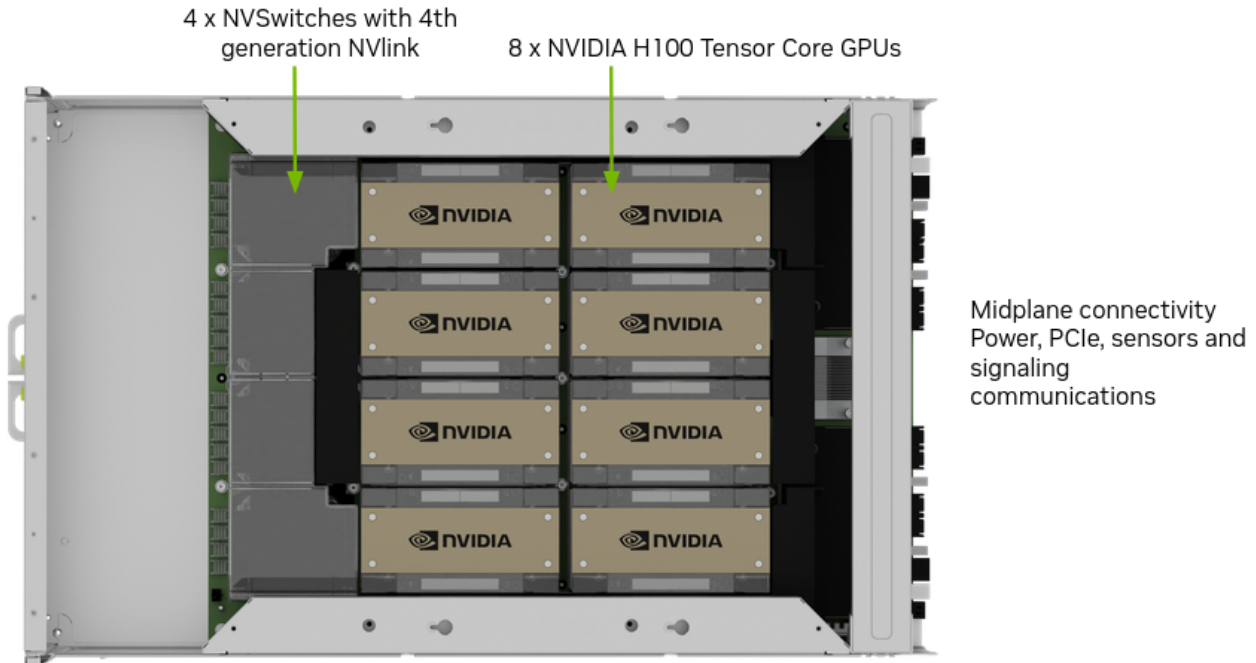
1.1.10. Motherboard Tray Components

Here is an image that shows the motherboard tray components in DGX H100.



1.1.11. GPU Tray Components

Here is an image of the GPU tray components in a DGX H100 system.



1.2. Network Connections, Cables, and Adaptors

This section provides information about network connections, cables, and adaptors.

1.2.1. Network Ports

Here is an image that shows the network ports on a DGX H100 system.

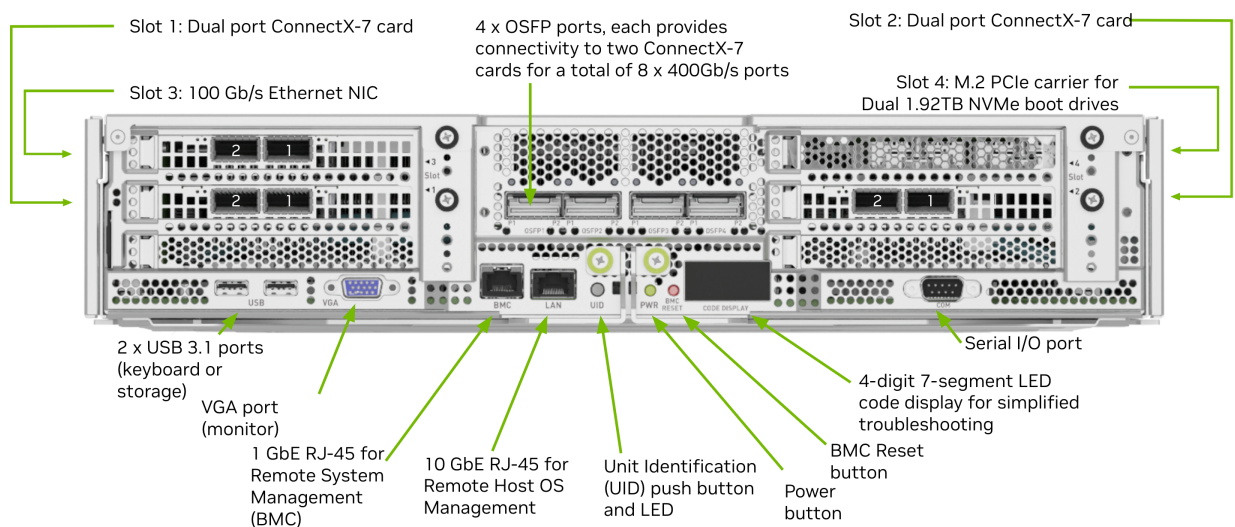
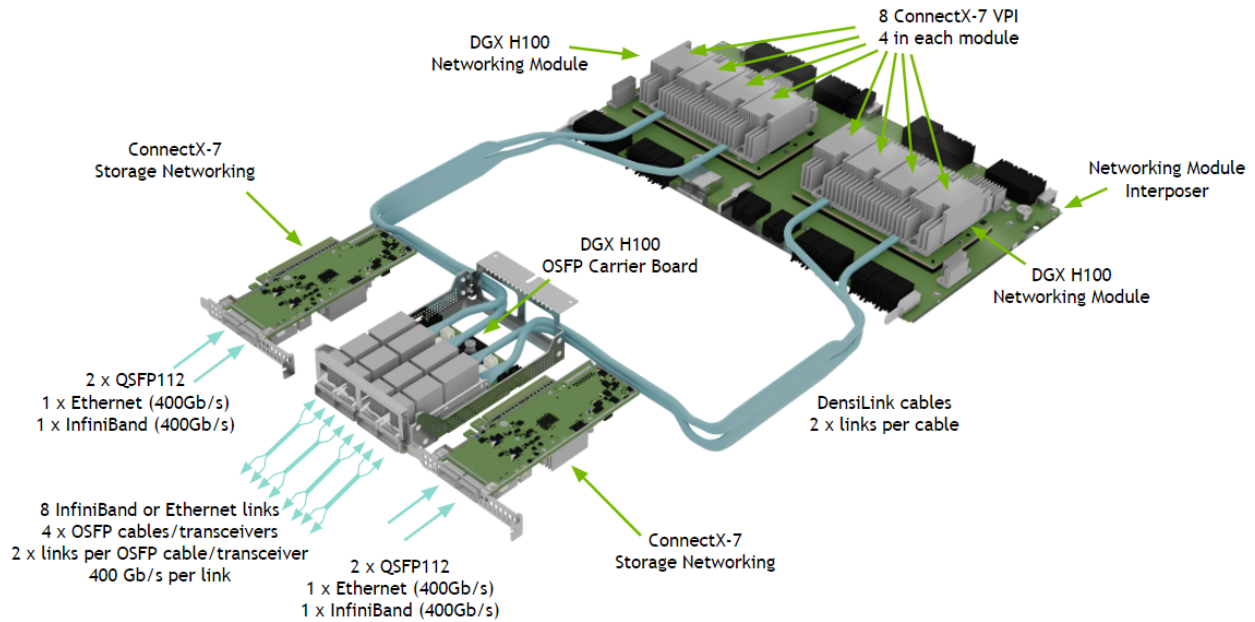


Table 5: Table 5. Network Port Mapping

		Port Designation		
Port	PCI Bus	Default	Optional	RDMA
OSFP1P1	dc:00.0	ibp220s0	enp220s0np0	mlx5_11
OSFP1P2	9a:00.0	ibp154s0	enp154s0np0	mlx5_6
OSFP2P1	ce:00.0	ibp206s0	enp206s0np0	mlx5_10
OSFP2P2	c0:00.0	ibp192s0	enp192s0np0	mlx5_9
OSFP3P1	4f:00.0	ibp79s0	enp79s0np0	mlx5_4
OSFP3P2	40:00.0	ibp64s0	enp64s0np0	mlx5_3
OSFP4P1	5e:00.0	ibp94s0	enp94s0np0	mlx5_5
OSFP4P2	18:00.0	ibp24s0	enp24s0np0	mlx5_0
Slot1 P1	aa:00.0	ibp170s0f0	enp170s0f0np0	mlx5_7
Slot1 P2	aa:00.1	enp170s0f1np1	ibp170s0f1np1	mlx5_8
Slot2 P1	29:00.0	ibp41s0f0	enp41s0f0np0	mlx5_1
Slot2 P2	29:00.1	enp41s0f1np1	ibp41s0f1np1	mlx5_2
Slot3 P1	82:00.0	ens6f0	N/A	irdma0
Slot3 P2	82:00.1	ens6f1	N/A	irdma1
On-board	0b:00.0	eno3	N/A	

1.2.2. Compute and Storage Networking



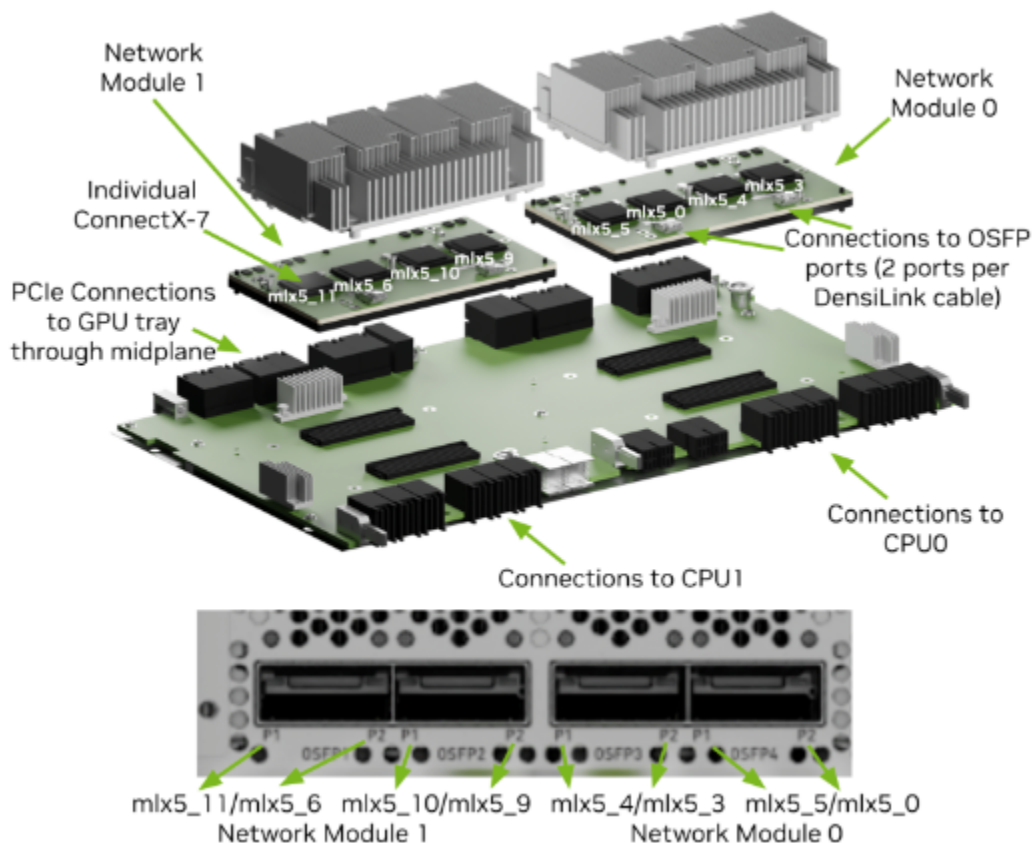
1.2.3. Network Modules

- New form factor for aggregate PCIe network devices
- Consolidates four ConnectX-7 networking cards into a single device
- Two networking modules are installed on interposer board
- Interposer board connects to CPUs on one end and to GPU tray on the other
- DensiLink cables are used to go directly from ConnectX-7 networking cards to OSFP connectors at the back of the system

Each DensiLink cable has two ports, one from each ConnectX-7 card

Table 6: Table 6. Network Modules

Port	ConnectX Device	Network Module/CPU	GPU	Default	RDMA
OSFP1P1	CX0	1	7	ibp220s0	mlx5_11
OSFP1P2	CX1	1	4	ibp154s0	mlx5_6
OSFP2P1	CX2	1	6	ibp206s0	mlx5_10
OSFP2P2	CX3	1	5	ibp192s0	mlx5_9
OSFP3P1	CX2	0	2	ibp79s0	mlx5_4
OSFP3P2	CX3	0	1	ibp64s0	mlx5_3
OSFP4P1	CX0	0	3	ibp94s0	mlx5_5
OSFP4P2	CX1	0	0	ibp24s0	mlx5_0



1.2.4. BMC Port LEDs

The BCM RJ-45 port has two LEDs.

The LED on the left indicates the speed. Solid green indicates the speed is 100M. Solid amber indicates the speed is 1G.

The LED on the right is green and flashes to indicate activity.

1.2.5. Supported Network Cables and Adaptors

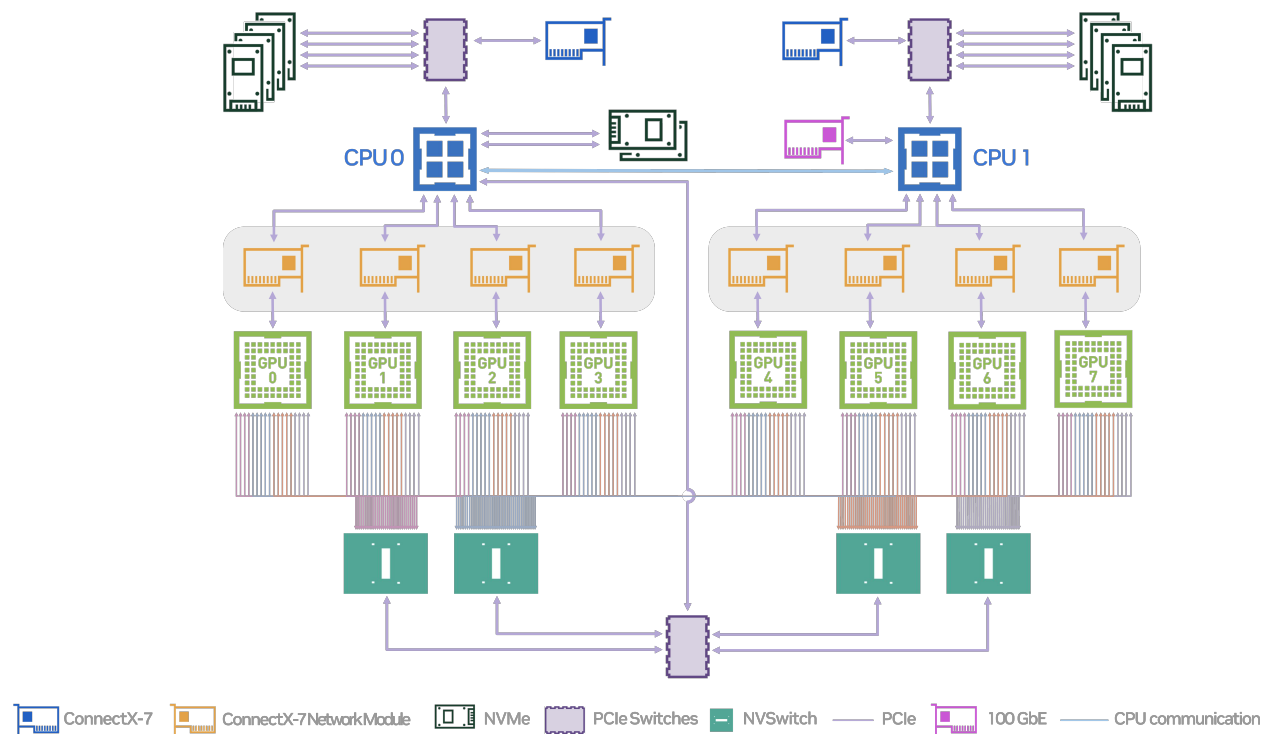
The DGX H100 system is not shipped with network cables or adaptors. You will need to purchase supported cables or adaptors for your network.

The ConnectX-7 firmware determines which cables and adaptors are supported. For a list of cables and adaptors compatible with the NVIDIA ConnectX cards installed in the DGX H100 system,

1. Visit the [NVIDIA Adapter Firmware Release](#) page.
2. Click the ConnectX model and select the corresponding firmware included in the DGX H100 system.
3. From the left **Topics** pane, select the Validated and Supported Cables and Switches topic.

1.3. DGX H100 System Topology

The following figure shows the DGX H100 system topology.



1.4. DGX OS Software

The DGX H100 system comes pre-installed with a DGX software stack incorporating the following components:

- ▶ An Ubuntu server distribution with supporting packages.
- ▶ The following system management and monitoring software:
 - ▶ NVIDIA System Management (NVSM)

Provides active health monitoring and system alerts for NVIDIA DGX nodes in a data center. It also provides simple commands for checking the health of the DGX H100 system from the command line.
 - ▶ Data Center GPU Management (DCGM)

This software enables node-wide administration of GPUs and can be used for cluster and data-center level management.
- ▶ DGX H100 system support packages.
- ▶ The NVIDIA GPU driver
- ▶ Docker Engine
- ▶ NVIDIA Container Toolkit

- ▶ NVIDIA Networking OpenFabrics Enterprise Distribution for Linux (MOFED)
- ▶ NVIDIA Networking Software Tools (MST)
- ▶ cachefilesd (daemon for managing cache data storage)

1.5. Customer Support

Contact NVIDIA Enterprise Support for assistance in reporting, troubleshooting, or diagnosing problems with your DGX H100 system. Also contact NVIDIA Enterprise Support for assistance in moving the DGX H100 system.

- ▶ For contracted Enterprise Support questions, you can send an email to enterprisesupport@nvidia.com.
- ▶ For additional details about how to obtain support, go to [NVIDIA Enterprise Support](#).

Our support team can help collect appropriate information about your issue and involve internal resources as needed.

Chapter 2. Connecting to the DGX H100

2.1. Connecting to the Console

Connect to the DGX H100 console using either a direct connection or a remote connection through the BMC.

Important: Connect directly to the DGX H100 console if the DGX H100 system is connected to a 172.17.xx.xx subnet.

DGX OS Server software installs Docker Engine which uses the 172.17.xx.xx subnet by default for Docker containers. If the DGX H100 system is on the same subnet, you will not be able to establish a network connection to the DGX H100 system.

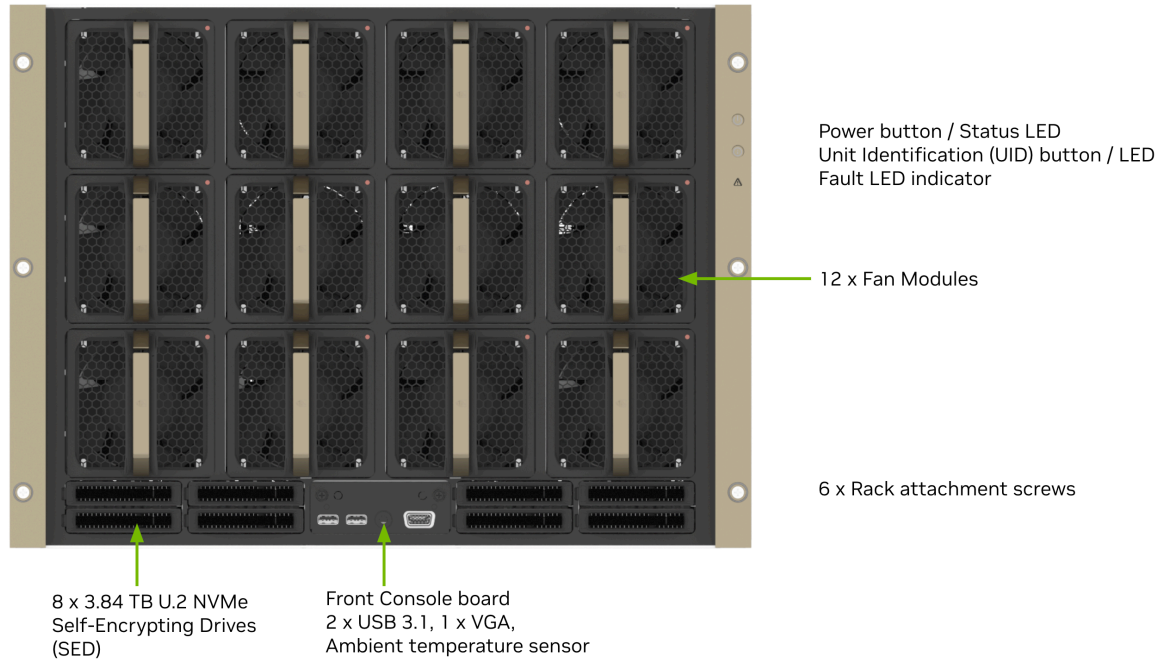
Refer to [Configuring Docker IP Addresses](#) in the *NVIDIA DGX OS 6 User Guide* for instructions on how to change the default Docker network settings.

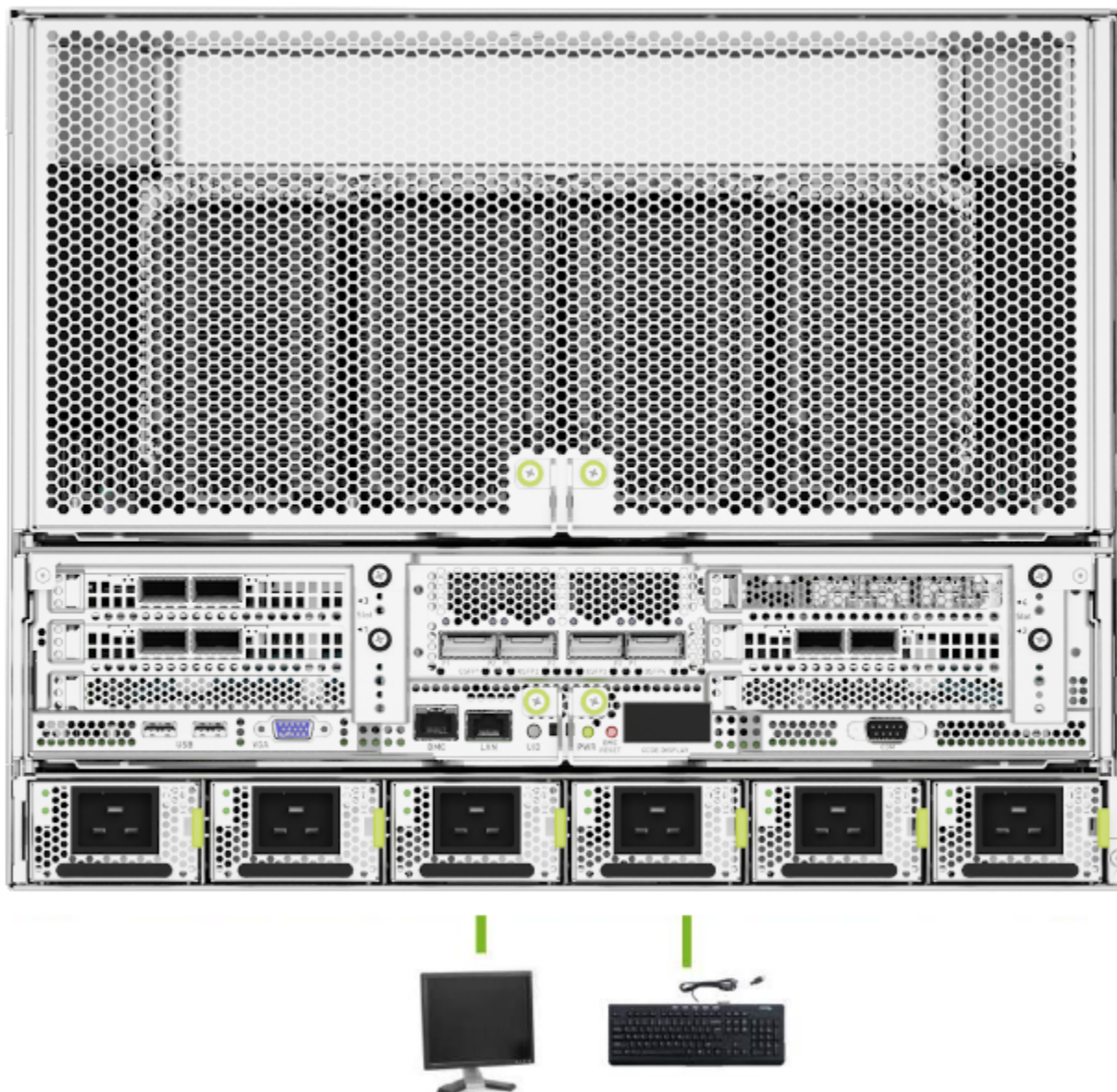
2.1.1. Direct Connection

At the front or the back of the system, you can connect a display to the VGA connector and a keyboard to any of the USB ports.

The system provides video to one of the two VGA ports at a time. Simultaneous video output is not supported. If you connect to both VGA ports, the VGA port on the rear has precedence.

Note: The display resolution must be 1440x900 or lower.





2.1.2. Remote Connection through the BMC

Here is some information about how you can remotely connect to DGX H100 through the BMC.

NVIDIA recommends that customers follow best security practices for BMC management (IPMI port). These include, but are not limited to, such measures as:

- ▶ Restricting the DGX H100 IPMI port to an isolated, dedicated management network.
- ▶ Using a separate, firewalled subnet.
- ▶ Configuring a separate VLAN for BMC traffic if a dedicated network is not available.

This method requires that you have the BMC login credentials. These credentials depend on the following conditions:

Before the First Boot Setup

Caution: You perform the First Boot Setup to change the default credentials before connecting the BMC to an unsecured network.

- ▶ The default credentials are:
 - ▶ Username: admin
 - ▶ Password: admin

Caution: When you create a BMC admin user, we strongly recommend that you change the default password for this user - DO NOT use the default password.

After the First Boot Setup

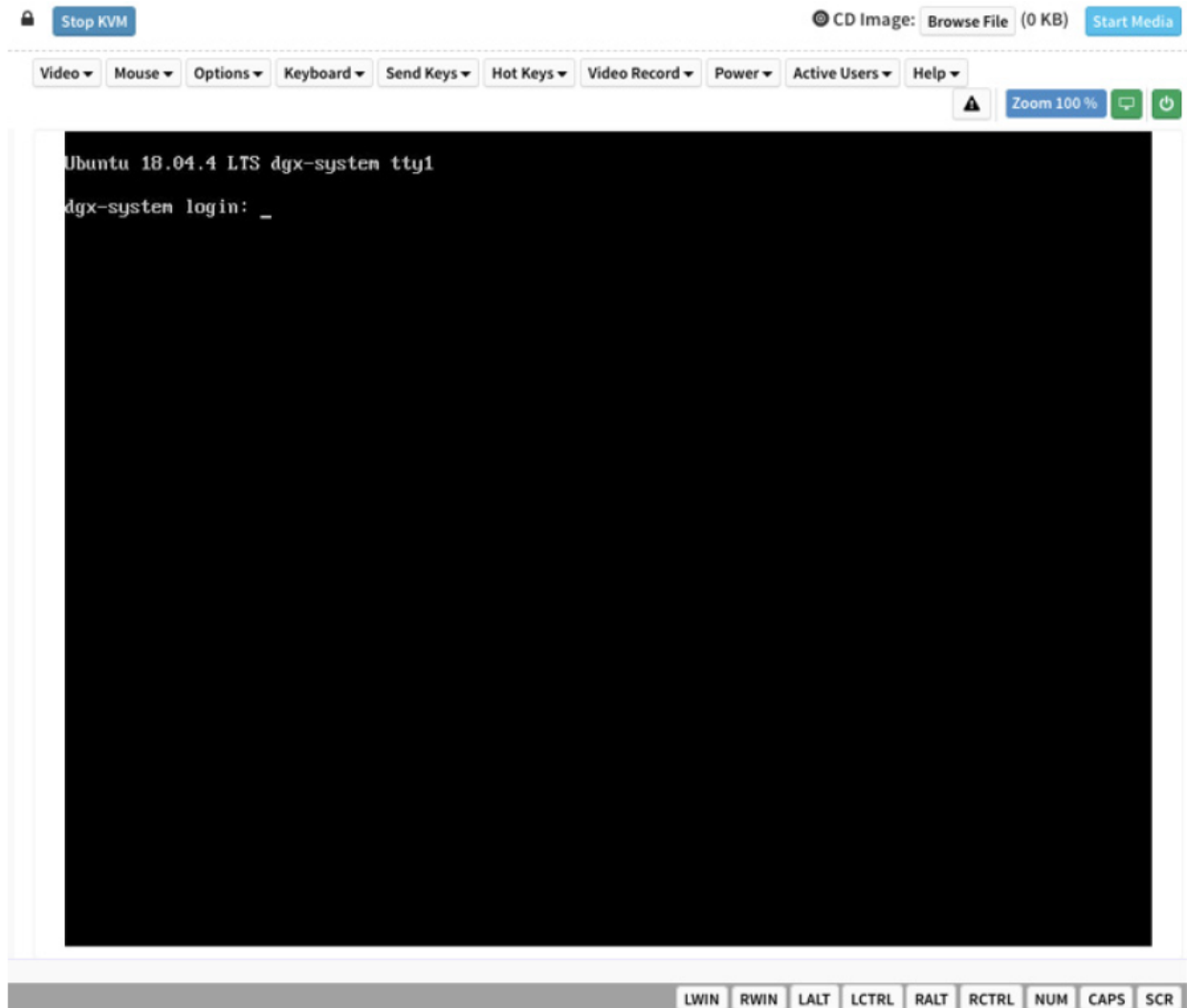
During the first-boot procedure, you were prompted to configure an administrator username and password and a password for the BMC. The BMC username is the same as the administrator username:

- ▶ Username: <administrator-username>
 - ▶ Password: <bmc-password>
1. Make sure you have connected the BMC port on the DGX H100 system to your LAN.
 2. Open a browser within your LAN and go to `https://<bmc-ip-address>/`
Make sure popups are allowed for the BMC address.
 3. Log in.
 4. From the navigation menu, click **Remote Control**.

The **Remote Control** page enables you to open a virtual Keyboard/Video/Mouse (KVM) on the DGX H100 system, as if you were using a physical monitor and keyboard connected to the front of the system.

5. Click Launch KVM.

The DGX H100 console appears in your browser.



2.2. SSH Connection to the OS

After the system has been configured, you can also establish an SSH connection to the DGX H100 OS through the network port. Refer to [Network Ports](#) to identify the port to use.

Chapter 3. First Boot Setup

This section provides information about the set up process after you first boot the DGX H100 system. While NVIDIA partner network personnel or NVIDIA field service engineers will install the DGX H100 system at the site and perform the first boot setup, the first boot setup instructions are provided here for reference and to support any reimaging of the server.

3.1. System Setup

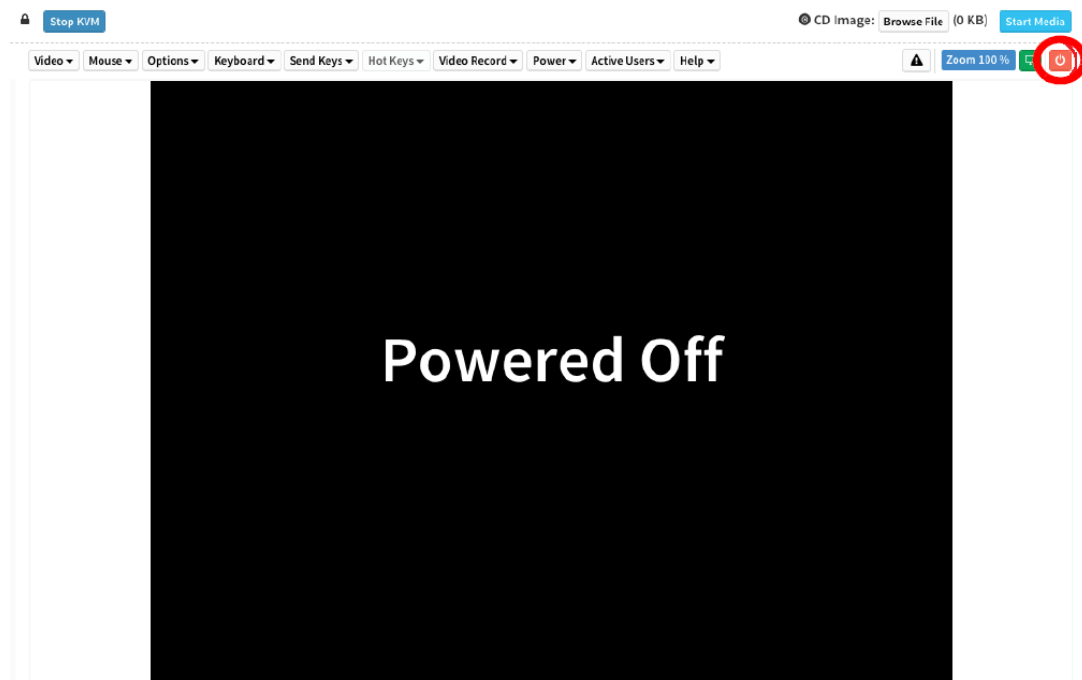
These instructions describe the setup process that occurs the first time the DGX H100 system is powered on after delivery or after the server is re-imaged.

Be prepared to accept all End User License Agreements (EULAs) and to set up your username and password. To preview the EULA, visit <https://www.nvidia.com/en-us/data-center/dgx-systems/support/> and click the DGX EULA link.

1. Connect to the DGX H100 console as explained in *Connecting to the Console*.
2. Power on the DGX H100 system in one of the following ways:
 - ▶ Using the physical power button.



► Using the Remote BMC



3. Refer to [First Boot Process for DGX Servers](#) in the *NVIDIA DGX OS 6 User Guide* for information about the following topics:

- Optionally encrypt the root file system.

- ▶ Use the first boot wizard to set the language, locale, country, and so on.
- ▶ Create an administrative user account for the system, BMC, and Grub boot loader.
- ▶ Configure the primary network interface.

3.2. Post Setup Tasks

This section explains recommended tasks to perform after the initial system first-boot setup.

Note: RAID 1 rebuild can temporarily affect system performance.

When the system is booted after restoring the image and running the first-boot setup, software RAID begins the process of rebuilding the RAID 1 array, which creates a mirror of (or resynchronizing) the drive containing the software. System performance can be affected during the RAID 1 rebuild process. The process can take an hour to complete.

During this time, running the `nvsm show health` command reports a warning that the RAID volume is re-syncing.

You can monitor status of the RAID 1 rebuild process by running the `sudo nvsm show volumes` command, and then view the output under `/systems/localhost/storage/volumes/md0/rebuild`.

3.2.1. Obtaining Software Updates

To ensure that you are running the latest version of DGX OS, you might need to update the software.

Updating the software ensures that your DGX H100 system contains important updates, including security updates. The Ubuntu Security Notice site, <https://usn.ubuntu.com/>, lists known common vulnerabilities and exposures (CVEs), including those that can be resolved by updating the DGX OS software.

Refer to [Upgrading](#) in the *NVIDIA DGX OS 6 User Guide* for information about updating the operating system.

3.2.2. Enabling the SRP Daemon

The NVIDIA networking drivers provide the SRP daemon software. The daemon is disabled by default. Enabling the daemon is required if you want to use RDMA over Infiniband. You can enable the daemon by running the following commands:

```
sudo systemctl enable srp_daemon.service
sudo systemctl enable srptools.service
```

Chapter 4. Quickstart and Basic Operation

This chapter provides basic requirements and instructions for using the DGX H100 system, including how to perform a preliminary health check and how to prepare for running containers. Go to the [DGX documentation](#) for additional product documentation.

4.1. Installation and Configuration

Before you install DGX H100, ensure you have given all relevant site information to your Installation Partner.

Important: Your DGX H100 System must be installed by NVIDIA partner network personnel or NVIDIA field service engineers. If not performed accordingly, your hardware warranty will be voided.

4.2. Registration

To obtain support for your DGX H100, follow the instructions for registration in the Entitlement Certification email that was sent as part of the purchase.

Registration allows you to access the NVIDIA Enterprise Support Portal, obtain technical support, get software updates, and set up an NGC for DGX systems account. If you did not receive the information, open a case with the NVIDIA Enterprise Support Team at <https://www.nvidia.com/en-us/support/enterprise/>.

To obtain support for your DGX H100 system, follow the instructions for registration in the Entitlement Certification email that was sent as part of the purchase.

Registration allows you to access the NVIDIA Enterprise Support Portal, obtain technical support, get software updates, and set up an NGC for DGX systems account. If you did not receive the information, open a case with the NVIDIA Enterprise Support Team at <https://www.nvidia.com/en-us/support/enterprise/>.

Refer to [Customer Support](#) for contact information.

4.3. Obtaining an NGC Account

NVIDIA NGC provides access to GPU-optimized software for deep learning, machine learning, and high-performance computing (HPC). An NGC account grants you access to these tools and gives you the ability to set up a private registry to manage your customized software.

If you are the organization administrator for your DGX system purchase, work with NVIDIA Enterprise Support to set up an NGC enterprise account. Refer to the [NGC Private Registry User Guide](#) for more information about getting an NGC enterprise account.

4.4. Turning DGX H100 On and Off

DGX H100 is a complex system, integrating a large number of cutting-edge components with specific startup and shutdown sequences. Observe the following startup and shutdown instructions.

4.4.1. Startup Considerations

To keep your DGX H100 running smoothly, allow up to a minute of idle time after reaching the login prompt. This ensures that all components can complete their initialization.

4.4.2. Shutdown Considerations

When shutting down DGX H100, always initiate the shutdown from the operating system, momentary press of the power button, or by using Graceful Shutdown from the BMC, and wait until the system enters a powered-off state before performing any maintenance.

Warning: Risk of Danger - Removing power cables or using Power Distribution Units (PDUs) to shut off the system while the Operating System is running may cause damage to sensitive components in the DGX H100 server.

4.5. Verifying Functionality - Quick Health Check

NVIDIA provides customers a diagnostics and management tool called NVIDIA System Management, or NVSM. The `nvsm` command can be used to determine the system's health, identify component issues and alerts, or run a stress test to make sure all components are in working order while under load. The use of Docker is key to getting the most performance out of the system since NVIDIA has optimized containers for all the major frameworks and workloads used on DGX systems.

The following are the steps for performing a health check on the DGX H100 System, and verifying the Docker and NVIDIA driver installation.

1. Establish an SSH connection to the DGX H100 System.

2. Run a basic system check.

```
sudo nvsm show health
```

3. Verify that the output summary shows that all checks are Healthy and that the overall system status is Healthy.
4. Verify that Docker is installed by viewing the installed Docker version.

```
sudo docker --version
```

On success, the command returns the version as `Docker version xx.yy.zz`, where the actual version may differ depending on the specific release of the DGX OS Server software.

5. Verify connection to the NVIDIA repository and that the NVIDIA Driver is installed.

```
sudo docker run --gpus all --rm nvcr.io/nvidia/cuda:12.1.1-base-ubuntu22.04
↳ nvidia-smi
```

The preceding command pulls the `nvidia/cuda` container image layer by layer, then runs the `nvidia-smi` command.

When complete, the output shows the NVIDIA Driver version and a description of each installed GPU.

For more information, refer to [Containers For Deep Learning Frameworks User Guide](#).

4.6. Running the Pre-flight Test

Instructions for running the DGX stress test.

NVIDIA recommends running the pre-flight stress test before putting a system into a production environment or after servicing. You can specify running the test on the GPUs, CPU, memory, and storage, and also specify the duration of the tests.

To run the tests, use NVSM.

Syntax

```
sudo nvsm stress-test [--usage] [--force] [--no-prompt] [<test>...] [DURATION]
```

For help on running the test, issue the following.

```
sudo nvsm stress-test --usage
```

Recommended Command

The following command runs the test on all supported components (GPU, CPU, memory, and storage), and takes approximately 20 minutes.

```
sudo nvsm stress-test --force
```

4.7. Running NGC Containers with GPU Support

To obtain the best performance when running NGC containers on DGX H100 systems, the following methods of providing GPU support for Docker containers are available:

- ▶ Native GPU support (included in Docker 20.10.18 and later)

The method implemented in your system depends on the DGX OS version installed.

DGX OS Releases	Method Included
6.0	<ul style="list-style-type: none">▶ Native GPU support▶ NVIDIA Container Runtime for Docker (deprecated - availability to be removed in a future DGX OS release)

Each method is invoked by using specific Docker commands, described as follows.

4.7.1. Using Native GPU Support

Use `docker run --gpus` to run GPU-enabled containers.

- ▶ Example using all GPUs

```
sudo docker run --gpus all ...
```

- ▶ Example using two GPUs

```
sudo docker run --gpus 2 ...
```

- ▶ Examples using specific GPUs

```
sudo docker run --gpus '"device=1,2"' ...  
sudo docker run --gpus '"device=UUID-ABCDEF,1"' ...
```


4.7.2. Using the NVIDIA Container Runtime for Docker

If you need to use `nvidia-docker2`, install it using `sudo apt install nvidia-docker2`, then run:

```
sudo systemctl restart docker
```

The DGX OS also includes the NVIDIA Container Runtime for Docker (`nvidia-docker2`) which lets you run GPU-accelerated containers in one of the following ways:

- Use `docker run` and specify `runtime=nvidia`.

```
docker run --runtime=nvidia ...
```

- Use `nvidia-docker run`.

```
nvidia-docker run ...
```

The `nvidia-docker2` package provides backward compatibility with the previous `nvidia-docker` package, so you can run GPU-accelerated containers using this command and the new runtime will be used.

- Use `docker run` with `nvidia` as the default runtime.

You can set `nvidia` as the default runtime, for example, by adding the following line to the `/etc/docker/daemon.json` configuration file as the first entry.

```
"default-runtime": "nvidia",
```

Here is an example of how the added line appears in the JSON file. Do not remove any pre-existing content when making this change.

```
{
  "default-runtime": "nvidia",
  "runtimes": {
    "nvidia": {
      "path": "/usr/bin/nvidia-container-runtime",
      "args": []
    }
  }
}
```

You can then use `docker run` to run GPU-accelerated containers.

```
docker run ...
```

Caution: If you build Docker images while `nvidia` is set as the default runtime, make sure the build scripts executed by the Dockerfile specify the GPU architectures that the container will need. Failure to do so might result in the container being optimized only for the GPU architecture on which it was built. Instructions for specifying the GPU architecture depend on the application and are beyond the scope of this document. Consult the specific application build process.

For more information, refer to the [NVIDIA DGX OS 6 User Guide](#).

4.8. Managing CPU Mitigations

DGX OS Server includes security updates to mitigate CPU speculative side-channel vulnerabilities. These mitigations can decrease the performance of deep learning and machine learning workloads.

If your installation of DGX systems incorporates other measures to mitigate these vulnerabilities, such as measures at the cluster level, you can disable the CPU mitigations for individual DGX nodes and thereby increase performance. This capability is available starting with DGX OS Server release 4.4.0.

4.8.1. Determining the CPU Mitigation State of the DGX System

If you do not know whether CPU mitigations are enabled or disabled, issue the following.

```
cat /sys/devices/system/cpu/vulnerabilities/*
```

- CPU mitigations are enabled if the output consists of multiple lines prefixed with **Mitigation:**.

Example

```
KVM: Mitigation: Split huge pages
Mitigation: PTE Inversion; VMX: conditional cache flushes, SMT vulnerable
Mitigation: Clear CPU buffers; SMT vulnerable
Mitigation: PTI
Mitigation: Speculative Store Bypass disabled via prctl and seccomp
Mitigation: usercopy/swapgs barriers and __user pointer sanitization
Mitigation: Full generic retpoline, IBPB: conditional, IBRS_FW, STIBP: conditional,
↳ RSB filling
Mitigation: Clear CPU buffers; SMT vulnerable
```

- CPU mitigations are disabled if the output consists of multiple lines prefixed with **Vulnerable**.

Example

```
KVM: Vulnerable
Mitigation: PTE Inversion; VMX: vulnerable
Vulnerable; SMT vulnerable
Vulnerable
Vulnerable
Vulnerable: __user pointer sanitization and usercopy barriers only; no swapgs barriers
Vulnerable, IBPB: disabled, STIBP: disabled
Vulnerable
```

4.8.2. Disabling CPU Mitigations

Caution: Performing the following instructions will disable the CPU mitigations provided by the DGX OS Server software.

1. Install the nv-mitigations-off package.

```
sudo apt install nv-mitigations-off -y
```

2. Reboot the system.
3. Verify CPU mitigations are disabled.

```
cat /sys/devices/system/cpu/vulnerabilities/*
```

The output should include several Vulnerable lines. See [Determining the CPU Mitigation State of the DGX System](#) for example output.

4.8.3. Re-enabling CPU Mitigations

1. Remove the nv-mitigations-off package.

```
sudo apt purge nv-mitigations-off
```

2. Reboot the system.
3. Verify CPU mitigations are enabled.

```
cat /sys/devices/system/cpu/vulnerabilities/*
```

The output should include several Mitigations lines. See [Determining the CPU Mitigation State of the DGX System](#) for example output.

Chapter 5. SBIOS Settings

The NVIDIA DGX H100 system comes with a system BIOS with optimized settings for the DGX system. There might be situations where the settings need to be changed, such as changes in the boot order, changes to enable PXE booting, or changes in the BMC network settings.

Instructions for these use cases are provided in this section.

Important: Do not change settings in the SBIOS other than those described in this or other DGX H100 user documents. Contact NVIDIA Enterprise Services **before** making other changes.

5.1. Accessing the SBIOS Setup

Here is information about how you can access the SBIOS setup.

1. Access the DGX H100 console, either from a locally connected keyboard and mouse or through the BMC remote console.
2. Reboot the DGX H100.
3. When presented with the SBIOS version screen, press the Del or F2 key to enter the BIOS Setup Utility.



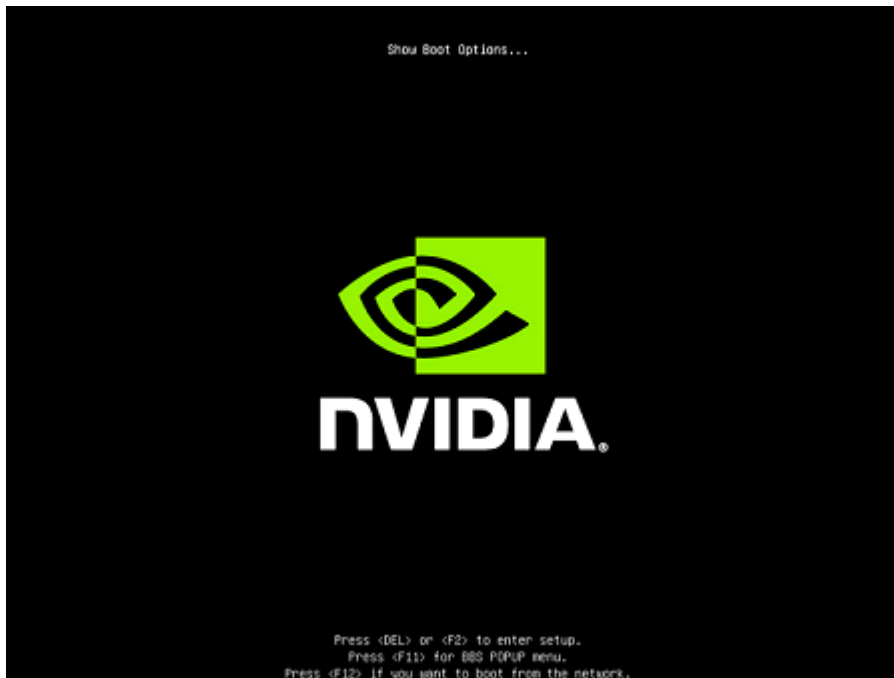
Here are some occasions where it might be necessary to reconfigure settings in the SBIOS:

- ▶ Configuring a BMC Static IP Address Using the System BIOS
- ▶ Enabling the TPM and Preventing the BIOS from Sending Block SID Requests
- ▶ Clearing the TPM

5.2. Configuring the Boot Order

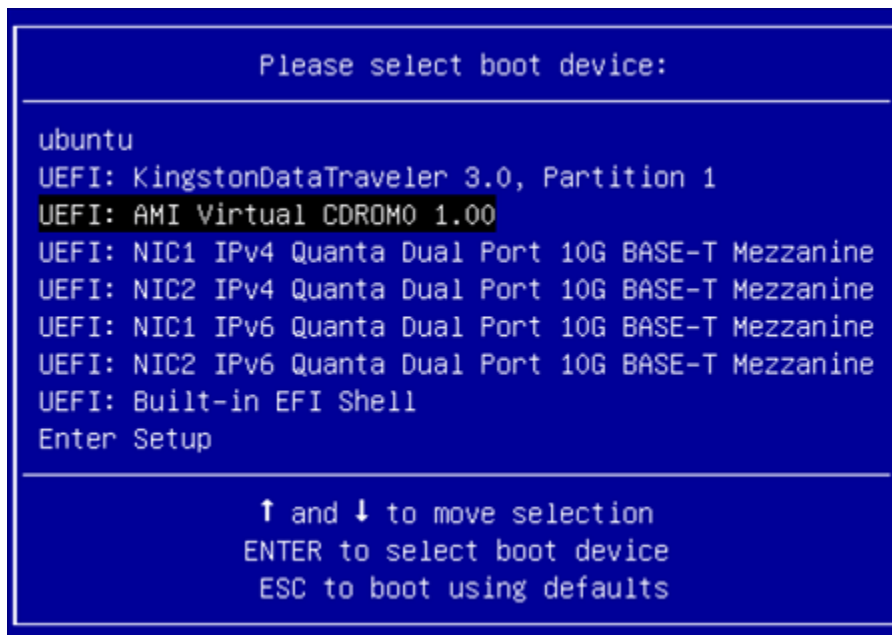
The following instructions describe how to set the boot order at boot time. You can also set the boot order from the SBIOS setup > Boot screen.

1. Access the DGX H100 console, either from a locally connected keyboard and mouse or through the BMC remote console.
2. Reboot the DGX H100.
3. Press the F11 key at the NVIDIA splash screen.



4. Select the boot device.

The following figure shows virtual media selected.



5.3. Configuring the Local Terminal

There are two ways to access the BIOS setup screen:

- ▶ A direct-attached keyboard and monitor
- ▶ Serial-over-LAN (SOL) using IPMI tools

To use the SOL connection, you might need to configure your terminal application.

5.3.1. Linux

1. Set the locale and language for your terminal:

```
sudo localectl set-locale LANG=en_US.UTF-8
```

2. Set the locale for the current session:

```
export LANG=en_US.UTF-8
```

3. Type `xterm` to launch the terminal with the set locale.

5.3.2. Windows and MacOS

- ▶ Configure your terminal application for `en_US.UTF-8` support.

5.4. Power on or Reboot the System

1. Reboot the system using one of the following methods:
 - ▶ Connect to the BMC web interface and click **power on/reboot**.
 - ▶ From an operating system command line, run `sudo reboot`.

2. Connect to the DGX H100 SOL console:

```
ipmitool -I lanplus -H <ip-address> -U admin -P dgxluna.admin sol activate
```

3. Press the Del or F2 key when the system is booting.

The system confirms your choice and shows the BIOS configuration screen.

Chapter 6. Using the Baseboard Management Controller (BMC)

The NVIDIA DGX H100 system comes with a baseboard management controller (BMC) for monitoring and controlling various hardware devices on the system. It monitors system sensors and other parameters.

6.1. Connecting to the BMC

Here are the steps to connect to the BMC on a DGX H100 system.

Before you begin, ensure that you connected the BMC network interface controller port on the DGX system to your LAN.

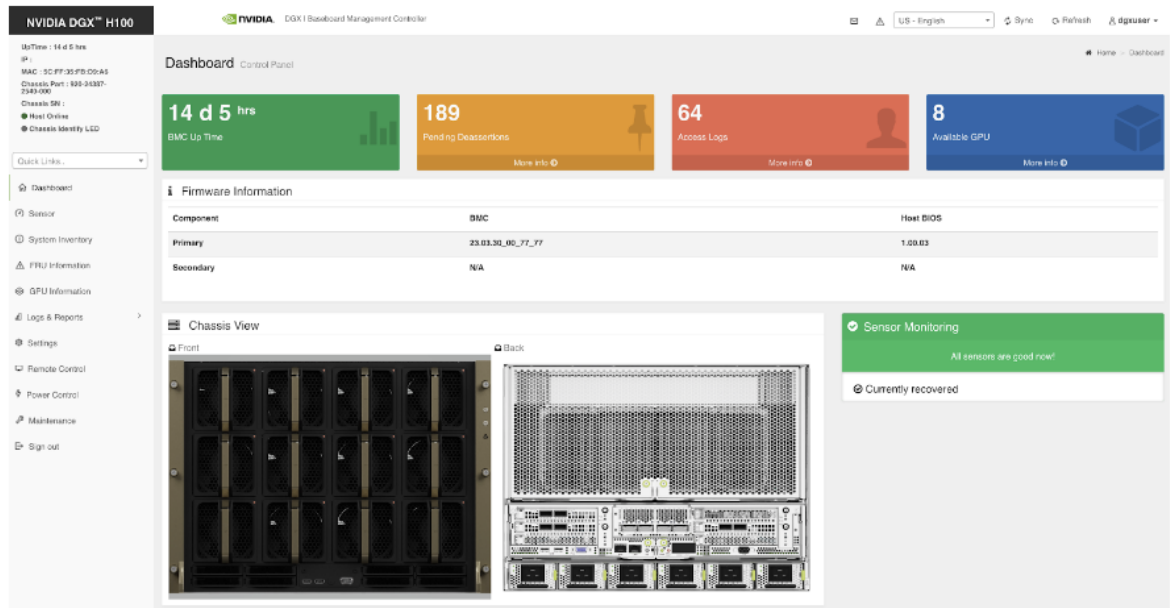
1. Open a browser within your LAN and enter the IP address of the BMC in the location.

The BMC is supported on the following browsers:

- ▶ Internet Explorer 11 and later
- ▶ Firefox 29.0 (64-bit) and later
- ▶ Google Chrome 70.0.3538.67 (64-bit) and later

2. Log in.

The BMC dashboard opens.



6.2. Overview of BMC Controls

The left-side navigation menu bar on the BMC main page contains the primary controls.

NVIDIA DGX™ H100

UpTime : 1 d 7 hrs

IP :

MAC : 5C:FF:35:

Chassis Part : 675-24387-0000-DVT

Chassis SN : 1234567890123

● Host Online

● Chassis Identify LED

Quick Links.. ▾












-  Dashboard
-  Sensor
-  System Inventory
-  FRU Information
-  GPU Information
-  Logs & Reports >
-  Settings
-  Remote Control
-  Power Control
-  Maintenance
-  Sign out

Table 1: Table 8. BMC Main Controls

Control	Description
Quick Links	Provides quick access to several tasks.
Dashboard	Displays the overall information about the status of the device.
Sensor	Provides status and readings for system sensors, such as SSD, PSUs, voltages, CPU temperatures, DIMM temperatures, and fan speeds.
System Inventory	Displays inventory information of system modules.
FRU Information	System, Processor, Memory Controller, Base-Board, Power, Thermal, PCIE Device, PCIE Function, and Storage.
GPU Information	Provides basic information on all the GPUs in the systems, including GUID, VBIOS version, In-foROM version, and number of retired pages for each GPU.
Logs and Reports	View, and if applicable, download and erase, the IPMI event log, and System, Audit, Video, and POST Code logs.
Settings	Configure the following settings: Captured BSOD, External User Services, KVM Mouse Setting, Log Settings, Media Redirection Settings, Network Settings, PAM Order Settings, Platform Event Filter, Services, SMTP Settings, SSL Settings, System Firewall, User Management, and Video Recording
Remote Control	Opens the KVM Launch page to remotely access the DGX H100 console.
Power Control	Perform the following power actions: Power On, Power Off, Power Cycle, Hard Reset, and ACP/Shutdown
Chassis ID LED Control	“Virtual LED” is a button to toggle the UID LED on/off: <ul style="list-style-type: none"> ▶ Off ▶ Solid on ▶ Blinking on (select from five (5) to 255 second blink interval). This is activated by the “Chassis Identify LED” option above the “Quick Links” drop down.
Maintenance	Perform the following maintenance tasks: Backup Configuration, Firmware Image Location, Firmware Update, Preserve Configuration, Restore Configuration, Restore Factory Defaults, and System Administrator
Sign out	Sign out of the BMC web UI.

6.3. Open Ports

Ensure that the ports listed in the following table are open and available on your firewall to the DGX H100 System.

Table 2: Open Ports

Port	Protocol	Function
443	HTTPS	Web User Interface
80	HTTPS	Redfish service root
443	Redfish	Redfish https with auth
623	RMCP+	IPMI
7582	KVM	Secure (SSL) KVM redirection
1900	UPNP	UPNP discovery
50000	UPNP	UPNP discovery
427	SLPD	Service Locator
123	NTP	Network Time Protocol
161	SNMP	SNMP incoming UDP requests
199	SNMP	SNMP incoming SMUX PDUs
546	DHCPv6	DHCPv6 messages
5124	CD Media redirection	CD media redirection secure (SSL) connections

6.4. Configuring a Static IP Address for the BMC

This section explains how to set a static IP address for the BMC. You will need to do this if your network does not support DHCP.

Use one of the methods described in the following sections:

- *Configuring a BMC Static IP Address Using ipmitool*
- *Configuring a BMC Static IP Address by Using the System BIOS*

6.4.1. Configuring a BMC Static Address by Using ipmitool

This section describes how to set a static IP address for the BMC from the Ubuntu command line.

Note: If you cannot access the DGX H100 System remotely, connect a display (1440x900 or lower resolution) and keyboard directly to the DGX H100 system.

To view the current settings, enter the following command.

```
$ sudo ipmitool lan print 1
```

1. Set the IP address source to static.

```
$ sudo ipmitool lan set 1 ipsrc static
```

2. Set the appropriate address information.

- ▶ To set the IP address (Station IP address in the BIOS settings), enter the following and replace the italicized text with your information.

```
$ sudo ipmitool lan set 1 ipaddr <my-ip-address>
```

- ▶ To set the subnet mask, enter the following and replace the italicized text with your information.

```
$ sudo ipmitool lan set 1 netmask <my-netmask-address>
```

- ▶ To set the default gateway IP (Router IP address in the BIOS settings), enter the following and replace the italicized text with your information.

```
$ sudo ipmitool lan set 1 defgw ipaddr <my-default-gateway-ip-address>
```

6.4.2. Configuring a BMC Static IP Address by Using the System BIOS

This section describes how to set a static IP address for the BMC when you cannot access the DGX H100 System remotely, and this process involves setting the BMC IP address during system boot.

1. Connect a keyboard and display (1440 x 900 maximum resolution) to the DGX H100 System and turn on the DGX H100 System.
2. When you see the SBIOS version screen, press **Del** or **F2** to enter the **BIOS Setup Utility** screen.
3. On the **BIOS Setup Utility** screen, navigate to the **Server Mgmt** tab on the top menu. Scroll to **BMC network configuration** and press **Enter**.
4. Scroll to **Configuration Address Source** and press **Enter**. On the **Configuration Address Source** dialog, select **Static** and then press **Enter**.
5. Set the addresses for the Station IP address, Subnet mask, and Router IP address as needed by performing the following steps for each:
 1. Scroll to the specific item and press **Enter**.
 2. Enter the appropriate information at the dialog, and then press **Enter**.
6. When you finish making all your changes, press **F10** to save and exit.

6.5. Changing the BMC Login Credentials

6.5.1. User Name and Password Requirements

Refer to the following requirements for the user name:

- ▶ a string of 1 to 16 alphanumeric characters
- ▶ must start with an alphabetical character
- ▶ case-sensitive
- ▶ special characters - (hyphen), _ (underscore), and @ (at sign) are allowed

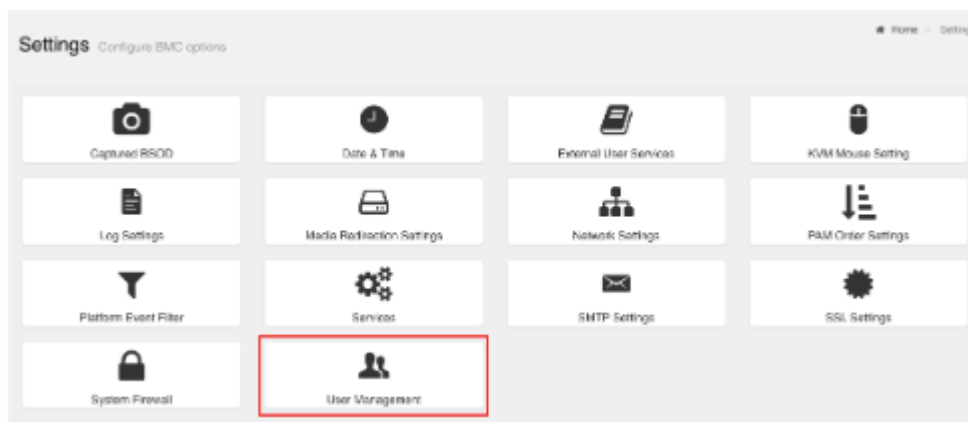
Refer to the following requirements for the password:

- ▶ a string up to 20 characters
- ▶ case-sensitive
- ▶ special characters that must be preceded by a \ (backslash) character: ! " & ' () ; < > ` | } ~ \
- ▶ special characters that do not require any special consideration: # \$ % * + , - . / : = ? @ [] ^ _ {

6.5.2. Procedure

To change your credentials or add or remove users, perform the following steps:

1. Select **Settings** from the left-side navigation menu.
2. Select the **User Management** card.



3. Click the help icon (?) for information about configuring users and creating a password.
4. Log out and then log in with the new credentials.

6.6. Using the Remote Console

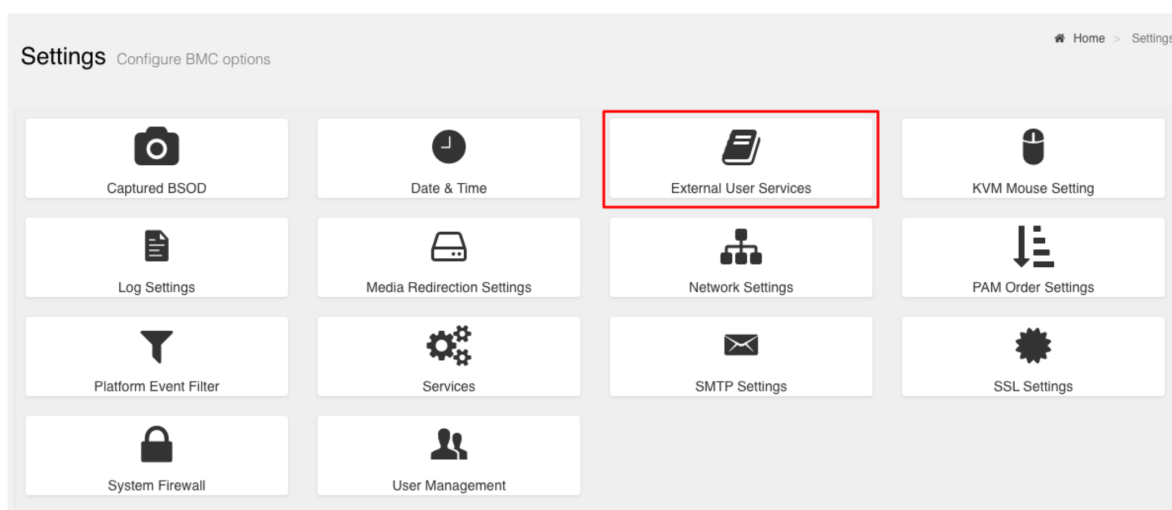
To use the remote console, perform the following steps:

1. Click **Remote Control** from the left-side navigation menu.
2. Click **Launch KVM** to start the remote KVM and access the DGX system console.

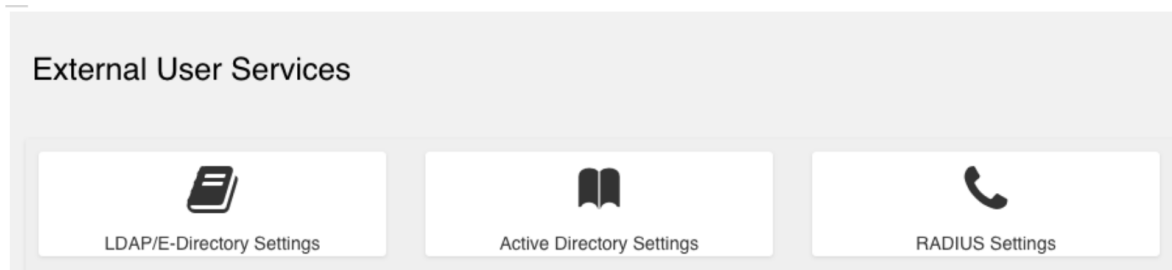
6.7. Setting Up Active Directory, LDAP, or E-Directory

To set up Active Directory, LDAP, or E-Directory, perform the following steps:

1. From the side navigation menu, click **Settings** > **External User Services**.

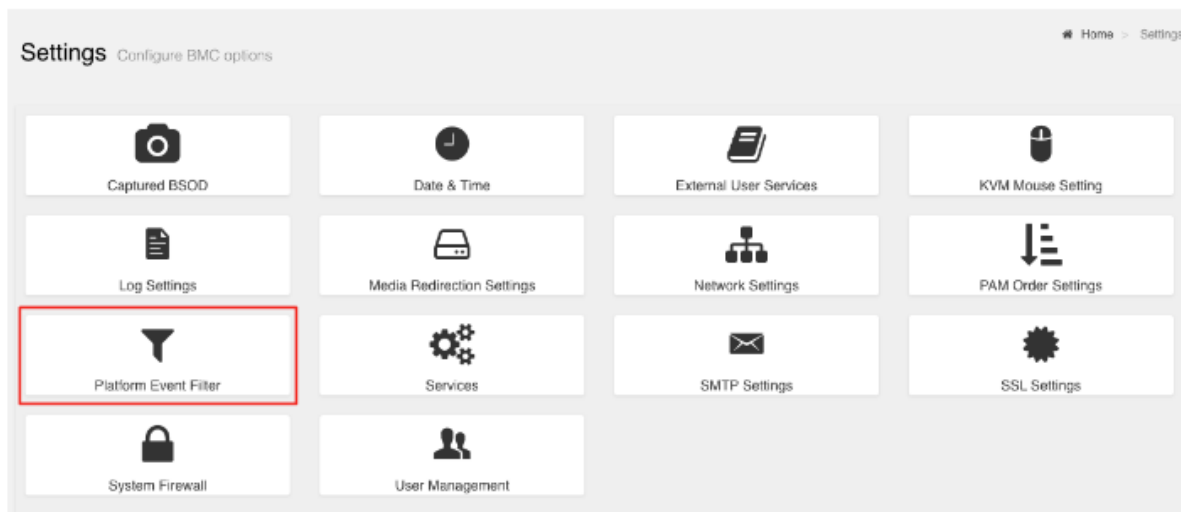


2. Click **Active Directory Settings** or **LDAP/E-Directory Settings** and follow the instructions.



6.8. Configuring Platform Event Filters

From the side navigation menu, click **Settings** and then click **Platform Event Filters**.



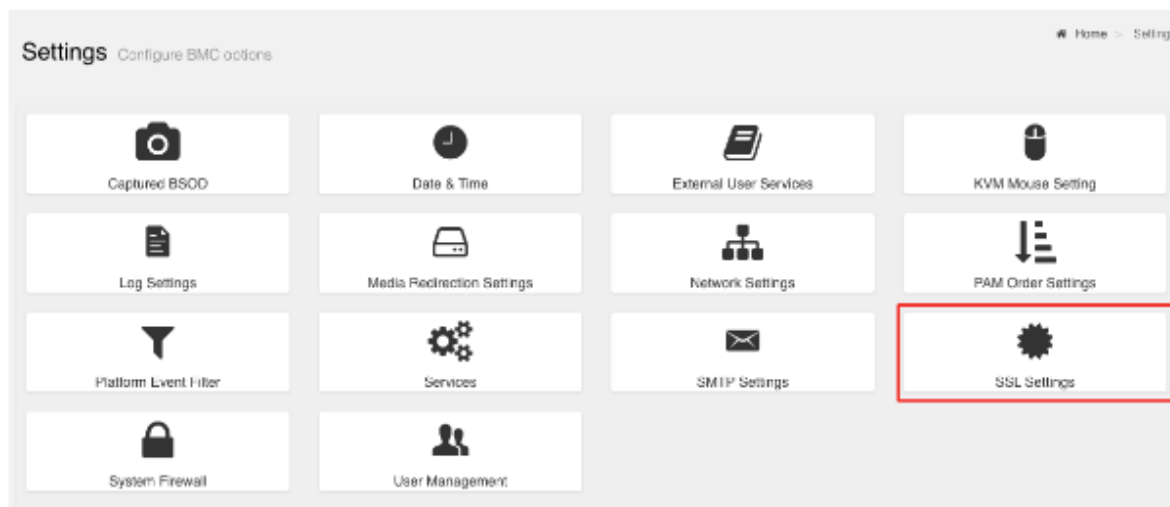
The Event Filters page shows all configured event filters and available slots. You can modify or add new event filter entry on this page.

- ▶ To view available configured and unconfigured slots, click **All** in the upper-left corner of the page.
- ▶ To view available configured slots, click **Configured** in the upper-left corner of the page.
- ▶ To view available unconfigured slots, click **UnConfigured** in the upper-left corner of the page.
- ▶ To delete an event filter from the list, click the **x** icon.

6.9. Uploading or Generating SSL Certificates

You can set up a new certificate by generating a (self-signed) SSL or by uploading an SSL (for example, to use a Trusted CA-signed certificate).

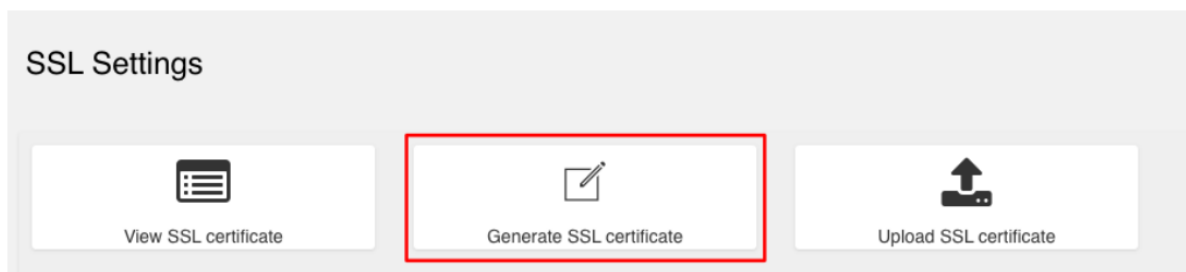
From the side navigation menu, click **Settings** > **SSL Settings**.



Refer to the following sections for more information.

6.9.1. Viewing the SSL Certificate

To view the SSL certificate, on the SSL Setting page, click **View SSL Certificate**.



The View SSL Certificate page displays the following basic information about the uploaded SSL certificate:

- ▶ Certificate Version, Serial Number, Algorithm, and Public Key
- ▶ Issuer information
- ▶ Valid Date range
- ▶ Issued to information

6.9.2. Generating the SSL Certificate

Here is some information about generating an SSL certificate.

1. From the SSL Setting page, click **Generate SSL Certificate**.
2. Enter the information as described in the following table.

Table 3: Table 9. SSL Certificate

Items	Description and Requirements
Common Name (CN)	The common name for which the certificate is to be generated. <ul style="list-style-type: none"> ▶ Maximum length of 64 alphanumeric characters. ▶ Special characters '#' and '\$' are not allowed.
Organization (O)	The name of the organization for which the certificate is generated. <ul style="list-style-type: none"> ▶ Maximum length of 64 alphanumeric characters. ▶ Special characters '#' and '\$' are not allowed.
Organization Unit (OU)	Overall organization section unit name for which the certificate is generated. <ul style="list-style-type: none"> ▶ Maximum length of 64 alphanumeric characters. ▶ Special characters '#' and '\$' are not allowed.
City or Locality (L)	City or Locality of the organization (mandatory) <ul style="list-style-type: none"> ▶ Maximum length of 64 alphanumeric characters. ▶ Special characters '#' and '\$' are not allowed.
State or Province (ST)	State or Province of the organization (mandatory) <ul style="list-style-type: none"> ▶ Maximum length of 64 alphanumeric characters. ▶ Special characters '#' and '\$' are not allowed.
Country (C)	Country code of the organization. <ul style="list-style-type: none"> ▶ Only two characters are allowed. ▶ Special characters are not allowed.
Email Address	Email address of the organization (mandatory)
Valid for	Enter a range from 1 to 3650 (days)
Key Length	Enter 4096.

3. To generate the new certificate, click **Save**.

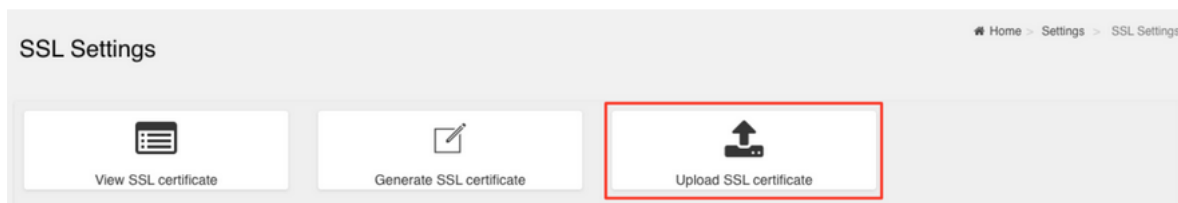
6.9.3. Uploading the SSL Certificate

In BMC, you can upload your SSL certificate.

Make sure the certificate and key meet the following requirements:

- ▶ SSL certificates and keys must both use the .pem file extension.
- ▶ Private keys must not be encrypted.
- ▶ SSL certificates and keys must each be less than 3584 bits in size.
- ▶ SSL certificates must be current (not expired).

1. On the SSL Setting page, click **Upload SSL Certificate**.



2. Click the **New Certificate** folder icon, browse to locate the appropriate file, and select it.
3. Click the **New Private Key** folder icon, browse and locate the appropriate file, and select it.
4. Click **Save**.

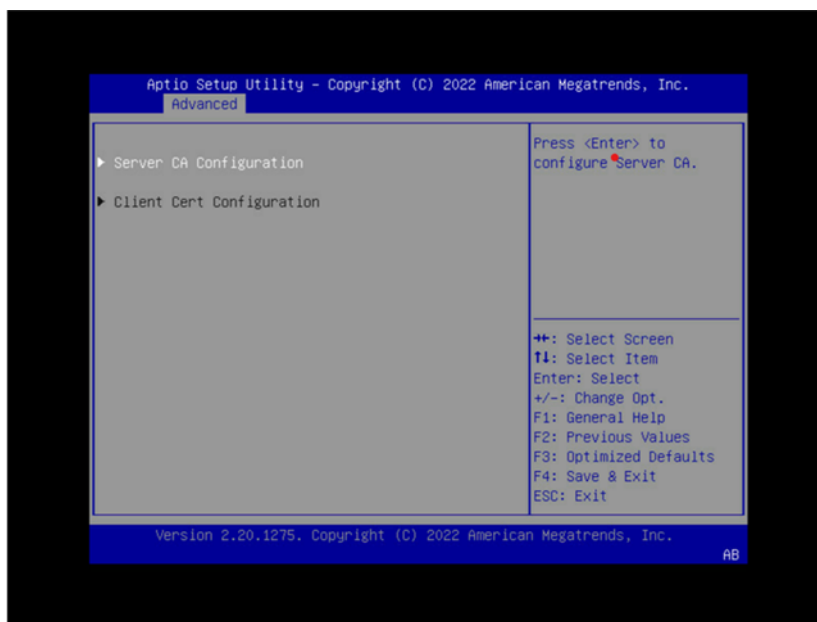
6.9.4. Updating the SBIOS Certificate

The CA Certificate for the trusted CA that was used to sign the SSL certificate must be uploaded to allow the SBIOS to authenticate the certificate.

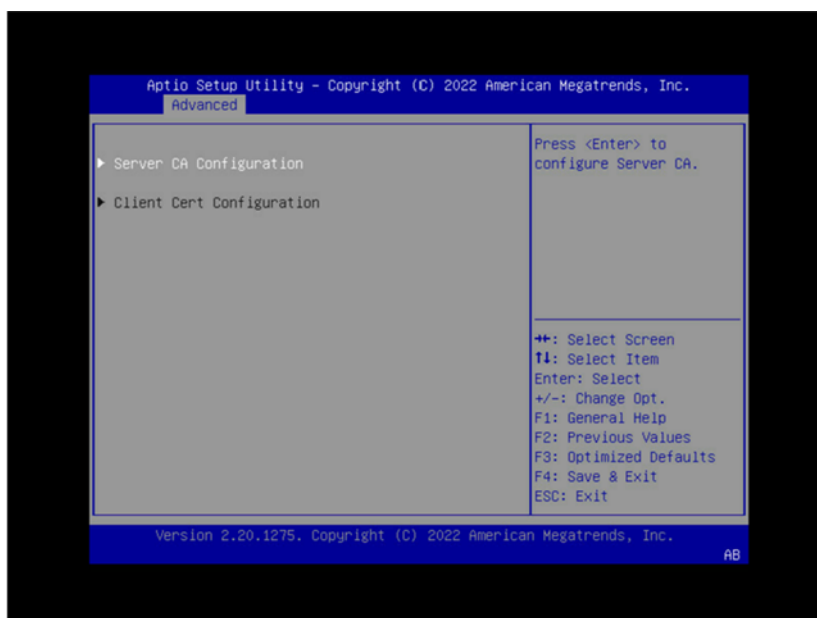
1. Obtain the CA certificate from the signing authority that was used to sign the SSL certificate.
2. Copy the CA certificate onto a USB thumb drive or to /boot/efi on the operating system.
3. Access a console from a locally connected keyboard and mouse or through the BMC remote console.
4. Reboot the server.
5. To enter BIOS setup menu, when prompted, press DEL.

Note: you may need to be logged in with admin privileges.

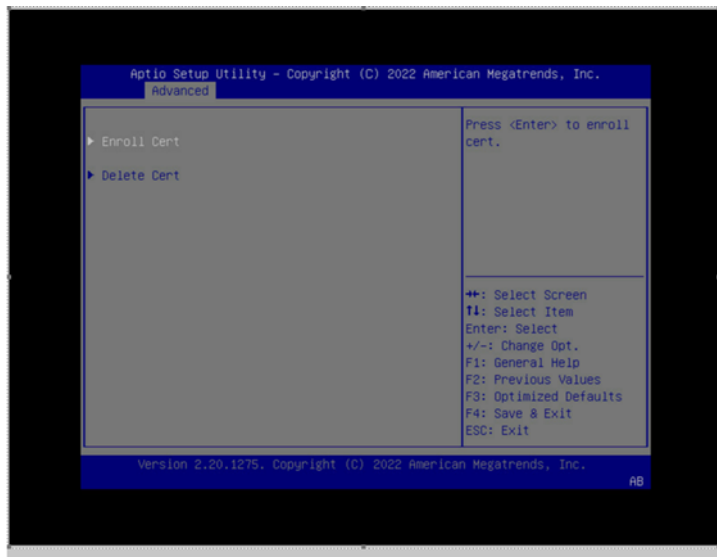
6. In the BIOS setup menu on the **Advanced** tab, select **Tls Auth Config**.



7. Select **Server CA Configuration**.



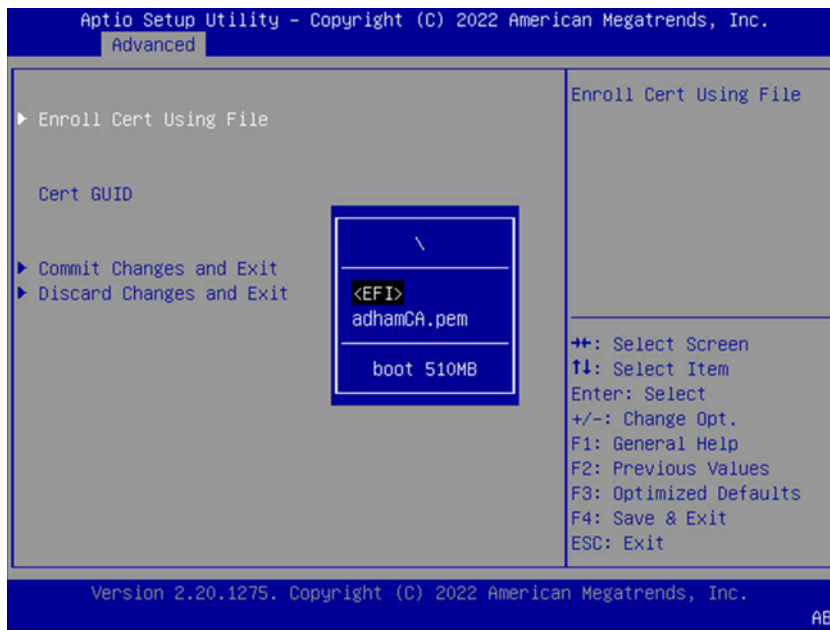
8. Select **Enroll Cert**.



9. Select **Enroll Cert Using File**.
10. Select the device where you stored the certificate.



11. Navigate the file structure and select the certificate.



Chapter 7. Security

This section provides information about security measures in the DGX H100 system.

7.1. User Security Measures

The NVIDIA DGX H100 system is a specialized server designed to be deployed in a data center. It must be configured to protect the hardware from unauthorized access and unapproved use. The DGX H100 system is designed with a dedicated BMC Management Port and multiple Ethernet network ports.

When you install the DGX H100 system in the data center, follow best practices as established by your organization to protect against unauthorized access.

7.1.1. Securing the BMC Port

NVIDIA recommends that you connect the BMC port in the DGX H100 system to a dedicated management network with firewall protection.

If remote access to the BMC is required, such as for a system hosted at a co-location provider, it should be accessed through a secure method that provides isolation from the internet, such as through a VPN server.

7.2. System Security Measures

This section provides information about the security measures that have been incorporated in an NVIDIA DGX H100 system.

7.2.1. Secure Flash of DGX H100 Firmware

Secure Flash is implemented for the DGX H100 to prevent unsigned and unverified firmware images from being flashed onto the system.

7.2.2. Encryption

Here is some information about encrypting the DGX H100 firmware.

The firmware encryption algorithm is AES-CBC.

- ▶ The firmware encryption key strength is 128 bits or higher.
- ▶ Each firmware class uses a unique encryption key.
- ▶ Firmware decryption is performed either by the same agent that performs signature check or a more trusted agent in the same COT.

7.2.3. NVIDIA System Manager Security

For information about security in NVIDIA System Management, refer to [NVSM documentation page](#).

7.3. Secure Data Deletion

This section explains how to securely delete data from the DGX H100 system SSDs to permanently destroy all the data that was stored there.

This process performs a more secure SSD data deletion than merely deleting files or reformatting the SSDs.

7.3.1. Prerequisites

You need to prepare a bootable installation medium that contains the current DGX OS Server ISO image.

Refer to [Reimaging](#) in the *NVIDIA DGX OS 6 User Guide* for information on the following topics:

- ▶ Obtaining the DGX OS ISO Image
- ▶ Booting the DGX OS ISO Image

7.3.2. Procedure

Here are the instructions to securely delete data from the DGX H100 system SSDs.

1. Boot the system from the ISO image, either remotely or from a bootable USB key.
2. At the GRUB menu, select:
 - (For DGX OS 6): **Rescue a broken system** and configure the locale and network information.
3. When prompted to select a root file system, select **Do not use a root file system** and then select **Execute a shell in the installer environment**.
4. Log in.
5. Run the following command to identify the devices available in the system:

```
nvme list
```

If the `nvme-cli` package is not installed, then install the CLI as follows and then run `nvme list`.

```
dpkg -i /usr/lib/live/mount/rootfs/filesystem.squashfs/curtin/repo/<nvme-cli-  
↪package.deb>
```

6. Perform a secure erase:

```
nvme format -s1 <device-path>
```

where `<device-path>` is the specific storage node as listed in the previous step. For example, `/dev/nvme0n1`.

Chapter 8. Redfish APIs Support

The DGX System firmware supports Redfish APIs. Redfish is DMTF's standard set of APIs for managing and monitoring a platform. By default, Redfish support is enabled in the DGX H100 BMC and the BIOS. By using the Redfish interface, administrator-privileged users can browse physical resources at the chassis and system level through the REST API interface. Redfish provides information that is categorized under a specific resource endpoint and Redfish clients can use the end points by using following HTTP methods:

- ▶ GET
- ▶ POST
- ▶ PATCH
- ▶ PUT
- ▶ DELETE

Not all endpoints support all these operations. Refer to the Redfish JSON Schema for more information about the operations. The Redfish server follows the [DSP0266 1.7.0 Specification and Redfish Schema 2019.1](#) documentation. Redfish URIs are accessed by using basic authentication and implementation, so that IPMI users with required privilege can access the Redfish URIs.

8.1. Supported Redfish Features

Here is some information about the Redfish features that are supported in DGX H100.

The following features are supported:

- ▶ Manage user accounts, privileges, and roles
- ▶ Manager Sessions
- ▶ BMC configuration
- ▶ BIOS configuration
- ▶ BIOS boot order management
- ▶ Get PCIe device and functions inventory
- ▶ Get storage Inventory
- ▶ Get system component information and health (PSU, FAN, CPU, DIMM, and so on)
- ▶ Get sensor information (Thermal/Power/Cooling)
- ▶ BMC configuration change/BMC reset

- ▶ System/Chassis power operations
- ▶ Get health event log/advanced system event log
- ▶ Logging Service, which provides critical/informational severity events
- ▶ Event Services (SSE)

Refer to the following documentation for more information:

- ▶ [DMTF Redfish specification](#)
- ▶ [DSP0266 1.7.0 specification](#)
- ▶ [Redfish Schema 2019.1](#) announcement from DMTF

8.2. Connectivity Between the Host and BMC

You can configure internal network connectivity between the host and the BMC rather than using external network connectivity and routing traffic outside the host.

To configure internal network connectivity, you must configure an interface on the 169.254.0.0/255.255.0.0 network. The interface can then send and receive Redfish API traffic between the host and the BMC. The BMC is preconfigured to use the 169.254.0.17 IP address.

Run an `ifconfig` command like the following example to configure connectivity:

```
sudo ifconfig enx9638a3b292ec 169.254.0.18 netmask 255.255.0.0
```

Replace the network interface name and IP address in the preceding example according to your needs.

After you configure the network interface, you can use commands such as `curl` and `nvfwupd` with the 169.254.0.17 IP address to connect to the BMC and use the Redfish API.

The following example command shows the firmware versions:

```
nvfwupd -t ip=169.254.0.17 username=<bmc-user> password=<password> show_version
```

8.3. Redfish Examples

8.3.1. BMC Manager

- ▶ Accounts

The following `curl` command changes the password for the admin user.

```
curl -k -u <bmc-user>:<password> --request PATCH 'https://<bmc-ip-address>
↪ /redfish/v1/AccountService/Accounts/1' --header 'If-Match: *' --header
↪ 'Content-Type: application/json' --data-raw '{"Enabled" : true,
↪ "Password" : "DGXuser12345678!", "UserName" : "admin", "RoleId" :
↪ "Administrator", "Locked" : false}'
```

- ▶ Reset BMC

The following `curl` command forces a reset of the DGX H100 BMC.

```
curl -k -u <bmc-user>:<password> --request POST --location 'https://<bmc-
↪ip-address>/redfish/v1/Managers/BMC/Actions/Manager.Reset' --header
↪'Content-Type: application/json' --data '{"ResetType": "ForceRestart"}
↪'
```

► Reset BMC to factory defaults

The following curl command resets the BMC to factory defaults.

```
curl -k -u <bmc-user>:<password> --request POST --location 'https://<bmc-
↪ip-address>/redfish/v1/Managers/BMC/Actions/Manager.ResetToDefaults' --
↪header 'Content-Type: application/json' --data '{"ResetType": "ResetAll
↪"}'
```

8.3.2. Firmware Update

► Firmware inventory

```
curl -k -u <bmc-user>:<password> --request GET 'https://<bmc-ip-address>/
↪redfish/v1/UpdateService/FirmwareInventory'
```

Example Output

```
{
  "@odata.context": "/redfish/v1/$metadata#SoftwareInventoryCollection.
↪SoftwareInventoryCollection",
  "@odata.etag": "\"1683226281\"",
  "@odata.id": "/redfish/v1/UpdateService/FirmwareInventory",
  "@odata.type": "#SoftwareInventoryCollection.
↪SoftwareInventoryCollection",
  "Description": "Collection of Firmware Inventory resources available
↪to the UpdateService",
  "Members": [
    {
      "@odata.id": "/redfish/v1/UpdateService/FirmwareInventory/
↪CPLDMB_0"
    },
    {
      "@odata.id": "/redfish/v1/UpdateService/FirmwareInventory/
↪CPLDMID_0"
    },
    // ...
  ],
  "Members@odata.count": 66,
  "Name": "Firmware Inventory Collection",
  "Oem": {
    "Ami": {
      "FirmwareInventory": [
        {
          "DataSourceUri": "/redfish/v1/UpdateService/
↪FirmwareInventory/CPLDMB_0",
          "Name": "CPLDMB_0",
          "Version": "0.2.1.6"
        },
        {

```

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```

        "DataSourceUri": "/redfish/v1/UpdateService/
↪FirmwareInventory/CPLDMID_0",
        "Name": "CPLDMID_0",
        "Version": "0.2.0.7"
    },
    // ...
]
}
}
}

```

► Update GPU tray components

To update the GPU tray components in your DGX H100 system, you need to specify HGX_0 as the target regardless of the GPU tray component that you want to update.

```

echo "{\"Targets\":[\"/redfish/v1/UpdateService/FirmwareInventory/HGX_0\
↪\"]}" > parameters.json
curl -k -u <bmc-user>:<password> -H 'Expect:' --location --request POST
↪https://<bmc-ip-address>/redfish/v1/UpdateService/upload -F
↪'UpdateParameters=@parameters.json;type=application/json' -F
↪UpdateFile=@<fw_bundle>

```

Make sure to specify the nvfw_DGX-HGX-H100x8_0002_XXXXXX.x.x_prod-signed.fwpkg firmware file.

► Update motherboard tray components

To update the motherboard tray components, you need to specify the component name as a target in a JSON file. The following example updates the host BMC:

```

echo "{\"Targets\":[\"/redfish/v1/UpdateService/FirmwareInventory/HostBMC_
↪0\"]}" > parameters.json
curl -k -u <bmc-user>:<password> -H 'Expect:' --location --request POST
↪https://<bmc-ip-address>/redfish/v1/UpdateService/upload -F
↪'UpdateParameters=@parameters.json;type=application/json' -F
↪UpdateFile=@<fw_bundle>

```

The following targets are available:

- HostBMC_0 — This is the DGX H100 BMC.
- HostBIOS_0 — This is the DGX H100 BIOS.
- ER0T_BMC_0 — This is the external root of trust for the host BMC.
- ER0T_BIOS_0 — This is the external root of trust for the host BIOS.
- CPLDMID_0 — This is the midplane CPLD.
- CPLDMB_0 — This is the CPU tray CPLD.
- PSU_0 to PSU_5 — These are the PSUs.
- PCIESwitch_0 and PCIESwitch_1 — These are the Gen5 PCIe switches on the CPU tray.
- PCIERetimer_0 and PCIERetimer_1 — These are the PCIe retimers on the CPU tray.

To update a target, change the path `/redfish/v1/UpdateService/FirmwareInventory/HostBMC_0` in the preceding example. For example, for CPU tray CPLD, specify `/redfish/v1/UpdateService/FirmwareInventory/CPLDMB_0`.

Make sure to specify the `nvfw_DGX-HGX-H100x8_0002_xxxxxx.x.x_prod-signed.fwpkg` firmware file.

► Forced Update

The DGX H100 system components firmware is only updated if the incoming firmware version is newer than the existing version. To override this behavior and flash the component anyway, specify the `ForceUpdate` field and set it to `true`.

```
curl -k -u <bmc-user>:<password> --request PATCH 'https://<bmc-ip-address>
↪/redfish/v1/UpdateService' --header 'If-Match: *' --header 'Content-
↪Type: application/json' --data-raw '{"HttpPushUriOptions" : {
↪"ForceUpdate": true}}'
```

On success, the command returns a 204 HTTP status code. If you attempt to set the flag to the currently set value, the command returns a 400 HTTP status code.

To get the value of the `ForceUpdate` parameter:

```
curl -k -u <bmc-user>:<password> --request GET 'https://<bmc-ip-address>/
↪redfish/v1/UpdateService'
```

► Firmware Update Activation

To activate the firmware update, refer to [Firmware Update Activation](#) in the *NVIDIA DGX H100 Firmware Update Guide* for more information.

8.3.3. BIOS Settings

► Supported BIOS attributes

1. Get a list of all the attributes your particular BIOS supports:

```
curl -k -u <bmc-user>:<password> --location --request GET 'https://<bmc-ip-
↪address>/redfish/v1/Registries'
```

One of the Registries in the list is your BIOS attribute registry. The format is `BiosAttributeRegistry<version><version>`. For example, for BIOS 0.1.6, the registry is `BiosAttributeRegistry106.1.0.6`.

2. Get the URI of the BIOS registry:

```
curl -k -u <bmc-user>:<password> --location --request GET 'https://<bmc-ip-
↪address>/redfish/v1/Registries/BiosAttributeRegistry106.0.1.6/'
```

The response includes the location of the JSON file that describes all the BIOS attributes. Under `Location`, the `Uri` is specified. For example, `Uri: "/redfish/v1/Registries/BiosAttributeRegistry106.1.0.6"`.

3. Get the JSON file with the registry of all your BIOS attributes:

```
curl -k -u <bmc-user>:<password> --location --request GET 'https://<bmc-ip-
↪address>/redfish/v1/Registries/BiosAttributeRegistry106.en-US.1.0.6.json' --
↪output BiosAttributeRegistry106.en-US.1.0.6.json
```

Each attribute name has a default value, display name, help text, a read-only indicator, and an indicator of whether a reset is required to take effect.

To get the current value of all your attributes from the BIOS:

```
curl -k -u <bmc-user>:<password> --location --request GET 'https://<bmc-ip-address>/redfish/v1/Systems/DGX/Bios/SD'
```

Match the attribute name with the value in the registry for a description.

To change an attribute, PATCH the SD URI and specify the attribute name with the new value. Also, you can change more than one attribute at one time. For example, the following PATCH request specifies how the system responds when the SEL log is full:

```
curl -k -u <bmc-user>:<password> --location --request PATCH 'https://<bmc-ip-address>/redfish/v1/Systems/DGX/Bios/SD' -H 'Content-Type: application/json' -H 'If-Match:*' --data-raw '{"Attributes" : {"IPMI002": "IPMI002DoNothing", "IPMI201": "IPMI201Donotloganymore"}}'
```

8.3.4. Modifying the Boot Order on DGX H100 Using Redfish

To modify the boot order on DGX H100 using Redfish APIs, follow the steps described in this procedure.

1. Read the current boot order.

From any system in the same network as the BMC, run the following `curl` command to get the current boot order:

```
$ curl -k -u <BMC username>:<BMC password> https://<BMC_IP_address>/redfish/v1/Systems/DGX/SD -H "content-type:application/json" -X GET -s | jq .Boot.BootOrder
```

```
[
  "Boot0000",
  "Boot000F",
  "Boot0004",
  "Boot0005",
  "Boot0006",
  "Boot0007",
  "Boot0008",
  "Boot0009",
  "Boot000A",
  "Boot0010"
]
```

2. Identify the available boot devices.

To show more information about the boot devices in step 1, such as `Boot0000`, `Boot000F`, and `Boot0004`, run the following command:

```
$ curl -k -u <BMC username>:<BMC password> https://<BMC_IP_address>/redfish/v1/Systems/DGX/BootOptions/00{0,1}{0,4,5,6,7,8,9,A,F} -H "content-type:application/json" -X GET -s | jq | grep -e "UefiDevicePath\|Name"
```

```

"@odata.etag": "\"1696896625\"",
"DisplayName": "DGX OS",
"Name": "Boot0000",
"UefiDevicePath": "HD(1,GPT,159C2E52-2329-40AC-9103-6C28DC1528B8,0x800,0x100000)/\
↳ \EFI\UBUNTU\SHIMX64.EFI"
"@odata.etag": "\"1696896625\"",
"DisplayName": "UEFI: PXE IPv4 Intel(R) Ethernet Controller X550",
"Name": "Boot0004",
"UefiDevicePath": "PciRoot(0x0)/Pci(0x10,0x0)/Pci(0x0,0x0)/MAC(5CFF35FBDA09,0x1)/
↳ IPv4(0.0.0.0,0x0,DHCP,0.0.0.0,0.0.0.0,0.0.0.0)"
"@odata.etag": "\"1696896625\"",
"DisplayName": "UEFI: PXE IPv4 Nvidia Network Adapter - B8:3F:D2:E7:B1:6C",
"Name": "Boot0005",
"UefiDevicePath": "PciRoot(0x20)/Pci(0x1,0x0)/Pci(0x0,0x0)/Pci(0x0,0x0)/Pci(0x0,
↳ 0x0)/Pci(0x0,0x0)/Pci(0x0,0x0)/MAC(B83FD2E7B16C,0x1)/IPv4(0.0.0.0,0x0,DHCP,0.0.
↳ 0.0,0.0.0.0,0.0.0.0)"
"@odata.etag": "\"1696896625\"",
"DisplayName": "UEFI: PXE IPv4 Nvidia Network Adapter - B8:3F:D2:E7:B1:6D",
"Name": "Boot0006",
"UefiDevicePath": "PciRoot(0x20)/Pci(0x1,0x0)/Pci(0x0,0x0)/Pci(0x0,0x0)/Pci(0x0,
↳ 0x0)/Pci(0x0,0x0)/Pci(0x0,0x1)/MAC(B83FD2E7B16D,0x1)/IPv4(0.0.0.0,0x0,DHCP,0.0.
↳ 0.0,0.0.0.0,0.0.0.0)"
"@odata.etag": "\"1696896625\"",
"DisplayName": "UEFI: PXE IPv4 Nvidia Network Adapter - B8:3F:D2:E7:B0:9C",
"Name": "Boot0007",
"UefiDevicePath": "PciRoot(0x120)/Pci(0x1,0x0)/Pci(0x0,0x0)/Pci(0x0,0x0)/Pci(0x0,
↳ 0x0)/Pci(0x0,0x0)/Pci(0x0,0x0)/MAC(B83FD2E7B09C,0x1)/IPv4(0.0.0.0,0x0,DHCP,0.0.
↳ 0.0,0.0.0.0,0.0.0.0)"
"@odata.etag": "\"1696896625\"",
"DisplayName": "UEFI: PXE IPv4 Nvidia Network Adapter - B8:3F:D2:E7:B0:9D",
"Name": "Boot0008",
"UefiDevicePath": "PciRoot(0x120)/Pci(0x1,0x0)/Pci(0x0,0x0)/Pci(0x0,0x0)/Pci(0x0,
↳ 0x0)/Pci(0x0,0x0)/Pci(0x0,0x1)/MAC(B83FD2E7B09D,0x1)/IPv4(0.0.0.0,0x0,DHCP,0.0.
↳ 0.0,0.0.0.0,0.0.0.0)"
"@odata.etag": "\"1696896625\"",
"DisplayName": "UEFI: PXE IPv4 Intel(R) Ethernet Network Adapter E810-C-Q2",
"Name": "Boot0009",
"UefiDevicePath": "PciRoot(0x160)/Pci(0x5,0x0)/Pci(0x0,0x0)/MAC(6CFE543D8F48,0x1)/
↳ IPv4(0.0.0.0,0x0,DHCP,0.0.0.0,0.0.0.0,0.0.0.0)"
"@odata.etag": "\"1696896625\"",
"DisplayName": "UEFI: PXE IPv4 Intel(R) Ethernet Network Adapter E810-C-Q2",
"Name": "Boot000A",
"UefiDevicePath": "PciRoot(0x160)/Pci(0x5,0x0)/Pci(0x0,0x1)/MAC(6CFE543D8F49,0x1)/
↳ IPv4(0.0.0.0,0x0,DHCP,0.0.0.0,0.0.0.0,0.0.0.0)"
"@odata.etag": "\"1696896625\"",
"DisplayName": "ubuntu",
"Name": "Boot000F",
"UefiDevicePath": "HD(1,GPT,1E0EFF2A-2BF3-4DC6-8757-4075B1E5343D,0x800,0x100000)/\
↳ \EFI\UBUNTU\SHIMX64.EFI"
"@odata.etag": "\"1696896625\"",
"DisplayName": "UEFI: PXE IPv4 American Megatrends Inc.",
"Name": "Boot0010",
"UefiDevicePath": "PciRoot(0x0)/Pci(0x14,0x0)/USB(0xA,0x0)/USB(0x2,0x1)/
↳ MAC(4E2A712C2451,0x0)/IPv4(0.0.0.0,0x0,DHCP,0.0.0.0,0.0.0.0,0.0.0.0)"

```

Where

- The `DisplayName` string is the name of the drive or network adapter.

- ▶ The Name string is the boot device name.
- ▶ The MAC(<address>, 0x1) value for the UefiDevicePath string is the corresponding MAC address.
- ▶ The @odata.etag string is the etag number.

Identify the following information from the JSON output for the next step:

- ▶ The name of the device to be the boot device.
- ▶ The etag number to compose the header.

3. Update the boot order.

The following command uses the PATCH method to modify the BootOrder settings, specifying the etag number and boot device names from step 2. The command generates a new order list for BootOrder, which affects the next boot of the system.

```
$ curl -k -u <BMC username>:<BMC password> https://<BMC_IP_address>/redfish/v1/
↪Systems/DGX/SD -H "content-type:application/json" -H 'if-None-Match: "@odata.
↪etag": "1697483651"' --data '{"Boot":{"BootOrder": ["Boot0004", "Boot0000",
↪"Boot0005", "Boot0006", "Boot0007", "Boot0008", "Boot0009", "Boot000A",
↪"Boot000F", "Boot0010"]}}' -X PATCH
```

4. Confirm the boot order.

Repeat the command in step 1 to ensure the BootOrder settings are as expected. Note that the Boot0004 boot device is now at the top and the system will boot from the on-board RJ-45 network interface.

```
$ curl -k -u <BMC username>:<BMC password> https://<BMC_IP_address>/redfish/v1/
↪Systems/DGX/SD -H "content-type:application/json" -X GET -s | jq .Boot.BootOrder
```

```
[
  "Boot0004",
  "Boot0000",
  "Boot0005",
  "Boot0006",
  "Boot0007",
  "Boot0008",
  "Boot0009",
  "Boot000A",
  "Boot000F",
  "Boot0010"
]
```

Upon reboot, the system should attempt to boot from the network using the correct network interface:

```
>>Checking Media Presence.....
>>Media Present.....
>>Start PXE over IPv4 on MAC: 5C-FF-35-FB-DA-09.
```

This boot order change will remain until the next boot order update, which can be done by resetting the SBIOS or running this procedure again.

8.3.5. Telemetry

► GPU tray sensors

```
curl -k -u <bmc-user>:<password> --location --request GET 'https://<bmc-  
↪ip-address>/redfish/v1/TelemetryService/MetricReportDefinitions/HGX_  
↪PlatformEnvironmentMetrics_0'
```

► DGX platform sensors

```
curl -k -u <bmc-user>:<password> --location --request GET 'https://<bmc-  
↪ip-address>/redfish/v1/Chassis/DGX/Sensors'
```

The endpoint returns 75 members at a time. To page through the results, use the URI in the Members@odata.nextLink field. For example, /redfish/v1/Chassis/DGX/Sensors?\$skip=75.

8.3.6. Chassis

► Chassis Restart (IPMI chassis power cycle)

```
curl -k -u <bmc-user>:<password> --request POST --location 'https://<bmc-  
↪ip-address>/redfish/v1/Systems/DGX/Actions/ComputerSystem.Reset' --  
↪header 'Content-Type: application/json' --data '{"ResetType":  
↪"ForceRestart"}'
```

► Chassis Start (IPMI chassis power on)

```
curl -k -u <bmc-user>:<password> --request POST --location 'https://<bmc-  
↪ip-address>/redfish/v1/Systems/DGX/Actions/ComputerSystem.Reset' --  
↪header 'Content-Type: application/json' --data '{"ResetType": "On"}'
```

► Chassis Off (IPMI chassis power off)

```
curl -k -u <bmc-user>:<password> --request POST --location 'https://<bmc-  
↪ip-address>/redfish/v1/Systems/DGX/Actions/ComputerSystem.Reset' --  
↪header 'Content-Type: application/json' --data '{"ResetType":  
↪"ForceOff"}'
```

► Chassis Off Gracefully (IPMI chassis soft)

```
curl -k -u <bmc-user>:<password> --request POST --location 'https://<bmc-  
↪ip-address>/redfish/v1/Systems/DGX/Actions/ComputerSystem.Reset' --  
↪header 'Content-Type: application/json' --data '{"ResetType":  
↪"GracefulShutdown"}'
```

8.3.7. SEL Logs

To view all the SEL entries using redfish:

```
curl -k -u <bmc-user>:<password> --location --request GET 'https://<bmc-ip-address>/redfish/v1/Managers/BMC/LogServices/SEL/Entries'
```

The endpoint returns 75 members at a time. To page through the results, use the URI in the `Members@odata.nextLink` field. For example, `/redfish/v1/Managers/BMC/LogServices/SEL/Entries?$skip=75`.

8.3.8. Virtual Image

1. Make sure Virtual Media is enabled:

```
curl -k -u <bmc-user>:<password> --request POST --location 'https://<bmc-ip-address>/redfish/v1/Managers/BMC/Actions/Oem/AMIVirtualMedia.EnableRMedia' --data-raw '{"RMediaState": "Enable"}'
```

2. Mount the media:

```
curl -k -u <bmc-user>:<password> --request POST --location 'https://{bmc-ip-address}/redfish/v1/Managers/Self/VirtualMedia/CD_1/Actions/VirtualMedia.InsertMedia' --data-raw '{"Image": "//<serverip>/home/nvidia/images/ubuntu-20.04.2-live-server-amd64.iso", "TransferProtocolType": "NFS"}'
```

8.3.9. Collect BMC Debug Data

1. Create a request for BMC to start collecting debug data:

```
curl -k -u <bmc-user>:<password> --request POST --location 'https://<bmc-ip-address>/redfish/v1/Managers/BMC/LogServices/DiagnosticLog/Actions/LogService.CollectDiagnosticData' -H 'Content-Type: application/json' --data-raw '{"DiagnosticDataType": "OEM"}'
```

Example Output

```
{
  "@odata.context": "/redfish/v1/$metadata#Task.Task",
  "@odata.id": "/redfish/v1/TaskService/Tasks/1",
  "@odata.type": "#Task.v1_4_2.Task",
  "Description": "Task for Manager CollectDiagnosticData",
  "Id": "1",
  "Name": "Manager CollectDiagnosticData",
  "TaskState": "New"
}
```

2. Monitor the task returned until it completes. Change task number as appropriate:

```
curl -k -u <bmc-user>:<password> --request GET 'https://<bmc-ip-address>/redfish/v1/TaskService/Tasks/1'
```

3. After the task stats reports Complete, download the attachments:

```
curl -k -u <bmc-user>:<password> --request GET 'https://<bmc-ip-address>/redfish/v1/Managers/BMC/LogServices/DiagnosticLog/Entries/All/Attachment' --output  
↳ debugBMC.tgz
```

8.3.10. Clear BIOS and Reset to Factory Defaults

To clear the BIOS and reset the system to factory defaults:

```
echo "{\"Targets\":[\"/redfish/v1/UpdateService/FirmwareInventory/HostBIOS_0\"]}" >  
↳ parameters.json  
curl -k -u <bmc-user>:<password> -H 'Expect:' --location --request POST https://<bmc-  
↳ ip-address>/redfish/v1/UpdateService/Actions/Oem/NvidiaUpdateService.ClearNVRAM -F  
↳ 'UpdateParameters=@parameters.json;type=application/json'
```

Chapter 9. Safety

This section provides information about how to safely use the DGX H100 system.

9.1. Safety Information

To reduce the risk of bodily injury, electrical shock, fire, and equipment damage, read this document and observe all warnings and precautions in this guide before installing or maintaining your server product.

In the event of a conflict between the information in this document and information provided with the product or on the website for a particular product, the product documentation takes precedence.

Your server should be integrated and serviced only by technically qualified persons.

You must adhere to the guidelines in this guide and the assembly instructions in your server manuals to ensure and maintain compliance with existing product certifications and approvals. Use only the described, regulated components specified in this guide. Use of other products or components will void the UL Listing and other regulatory approvals of the product and may result in noncompliance with product regulations in the region(s) in which the product is sold.

9.2. Safety Warnings and Cautions

To avoid personal injury or property damage, before you begin installing the product, read, observe, and adhere to all of the following safety instructions and information.

The following safety symbols may be used throughout the documentation and may be marked on the product and the product packaging.

- ▶ **CAUTION:** Indicates the presence of a hazard that may cause minor personal injury or property damage if the CAUTION is ignored.
- ▶ **WARNING:** Indicates the presence of a hazard that may result in serious personal injury if the WARNING is ignored.

Indicates potential hazard if indicated information is ignored.



Indicates shock hazards that result in serious injury or death if safety instructions are not followed.



Indicates hot components or surfaces



Indicates do not touch fan blades, may result in injury.



Shock hazard: The product might be equipped with multiple power cords. - To remove all hazardous voltages, disconnect all power cords. - High leakage current ground (earth) connection to the Power Supply is essential before connecting the supply.



Recycle the battery.



The rail racks are designed to carry only the weight of the server system. Do not use rail-mounted equipment as a workspace. Do not place additional load onto any rail-mounted equipment.

9.3. Intended Application Uses

This product was evaluated as Information Technology Equipment (ITE), which may be installed in offices, schools, computer rooms, and similar commercial type locations.

The suitability of this product for other product categories and environments (such as medical, industrial, residential, alarm systems, and test equipment), other than an ITE application, may require further evaluation.

9.4. Site Selection

Choose a site that is:

- ▶ Clean, dry, and free of airborne particles (other than normal room dust).
- ▶ Well-ventilated and away from sources of heat including direct sunlight and radiators.
- ▶ Away from sources of vibration or physical shock.

- ▶ In regions that are susceptible to electrical storms, we recommend you plug your system into a surge suppressor and disconnect telecommunication lines to your modem during an electrical storm.
- ▶ Provided with a properly grounded wall outlet.
- ▶ Provided with sufficient space to access the power supply cord(s), because they serve as the product's main power disconnect.

9.5. Equipment Handling Practices

To reduce the risk of personal injury or equipment damage, do the following:

- ▶ Conform to local occupational health and safety requirements when moving and lifting equipment.
- ▶ Use mechanical assistance or other suitable assistance when moving and lifting equipment.

9.6. Electrical Precautions

9.6.1. Power and Electrical Warnings

Caution: The power button, indicated by the stand-by power marking, DOES NOT completely turn off the system AC power; standby power is active whenever the system is plugged in. To remove power from system, you must unplug the AC power cord from the wall outlet. Make sure all AC power cords are unplugged before you open the chassis, or add or remove any non hot-plug components.

Do not attempt to modify or use an AC power cord if it is not the exact type required. A separate AC cord is required for each system power supply.

Some power supplies in servers use Neutral Pole Fusing. To avoid risk of shock use caution when working with power supplies that use Neutral Pole Fusing.

The power supply in this product contains no user-serviceable parts. Do not open the power supply. Hazardous voltage, current and energy levels are present inside the power supply. Return to manufacturer for servicing.

When replacing a hot-plug power supply, unplug the power cord to the power supply being replaced before removing it from the server.

To avoid risk of electric shock, turn off the server and disconnect the power cords, telecommunications systems, networks, and modems attached to the server before opening it.

9.6.2. Power Cord Warnings

Caution: To avoid electrical shock or fire, check the power cord(s) that will be used with the product as follows:

- ▶ Do not attempt to modify or use the AC power cord(s) if they are not the exact type required to fit into the grounded electrical outlets.
- ▶ The power cord(s) must meet the following criteria:
 - ▶ The power cord must have an electrical rating that is greater than that of the electrical current rating marked on the product.
 - ▶ The power cord must have safety ground pin or contact that is suitable for the electrical outlet.
 - ▶ The power supply cord(s) is/ are the main disconnect device to AC power. The socket outlet(s) must be near the equipment and readily accessible for disconnection.
 - ▶ The power supply cord(s) must be plugged into socket-outlet(s) that is /are provided with a suitable earth ground.

9.7. System Access Warnings

To avoid personal injury or property damage, the following safety instructions apply whenever accessing the inside of the product:

- ▶ Turn off all peripheral devices connected to this product.
- ▶ Turn off the system by pressing the power button to off.
- ▶ Disconnect the AC power by unplugging all AC power cords from the system or wall outlet.
- ▶ Disconnect all cables and telecommunication lines that are connected to the system.
- ▶ Retain all screws or other fasteners when removing access cover(s). Upon completion of accessing inside the product, refasten access cover with original screws or fasteners.
- ▶ Do not access the inside of the power supply. There are no serviceable parts in the power supply.
- ▶ Return to manufacturer for servicing.
- ▶ Power down the server and disconnect all power cords before adding or replacing any non hot-plug component.
- ▶ When replacing a hot-plug power supply, unplug the power cord to the power supply being replaced before removing the power supply from the server.

Caution: If the server has been running, any installed processor(s) and heat sink(s) may be hot. Unless you are adding or removing a hot-plug component, allow the system to cool before opening the covers. To avoid the possibility of coming into contact with hot component(s) during a hot-plug installation, be careful when removing or installing the hot-plug component(s).

Caution: To avoid injury do not contact moving fan blades. Your system is supplied with a guard over the fan, do not operate the system without the fan guard in place.

9.8. Rack Mount Warnings

The following installation guidelines are required by UL to maintain safety compliance when installing your system into a rack.

The equipment rack must be anchored to an unmovable support to prevent it from tipping when a server or piece of equipment is extended from it. The equipment rack must be installed according to the rack manufacturer's instructions.

Install equipment in the rack from the bottom up with the heaviest equipment at the bottom of the rack.

Extend only one piece of equipment from the rack at a time.

You are responsible for installing a main power disconnect for the entire rack unit. This main disconnect must be readily accessible, and it must be labeled as controlling power to the entire unit, not just to the server(s).

To avoid risk of potential electric shock, a proper safety ground must be implemented for the rack and each piece of equipment installed in it.

Elevated Operating Ambient- If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient. Therefore, consideration should be given to installing the equipment in an environment compatible with the maximum ambient temperature (T_{ma}) specified by the manufacturer.

Reduced Air Flow -Installation of the equipment in a rack should be such that the amount of air flow required for safe operation of the equipment is not compromised.

Mechanical Loading- Mounting of the equipment in the rack should be such that a hazardous condition is not achieved due to uneven mechanical loading.

Circuit Overloading- Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of the circuits might have on overcurrent protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.

Reliable Earthing- Reliable earthing of rack-mounted equipment should be maintained.

Particular attention should be given to supply connections other than direct connections to the branch circuit (for example, the use of power strips).

9.9. Electrostatic Discharge

Caution: ESD can damage drives, boards, and other parts. We recommend that you perform all procedures at an ESD workstation. If one is not available, provide some ESD protection by wearing an antistatic wrist strap attached to chassis ground (any unpainted metal surface) on your server when handling parts.

Always handle boards carefully. They can be extremely sensitive to ESD. Hold boards only by their edges. After removing a board from its protective wrapper or from the server, place the board component side up on a grounded, static free surface. Use a conductive foam pad if available but not the board wrapper. Do not slide board over any surface.

9.10. Other Hazards

9.10.1. CALIFORNIA DEPARTMENT OF TOXIC SUBSTANCES CONTROL

Perchlorate Material - special handling may apply. See www.dtsc.ca.gov/perchlorate.

Perchlorate Material: Lithium battery (CR2032) contains perchlorate. Please follow instructions for disposal.

9.10.2. NICKEL



NVIDIA Bezel. The bezel's decorative metal foam contains some nickel. The metal foam is not intended for direct and prolonged skin contact. Please use the handles to remove, attach or carry the bezel. While nickel exposure is unlikely to be a problem, you should be aware of the possibility in case you are susceptible to nickel-related reactions.

9.10.3. Battery Replacement

Caution: There is the danger of explosion if the battery is incorrectly replaced. When replacing the battery, use only the battery recommended by the equipment manufacturer.

Dispose of batteries according to local ordinances and regulations. Do not attempt to recharge a battery.

Do not attempt to disassemble, puncture, or otherwise damage a battery.

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9.10.4. Cooling and Airflow

Caution: Carefully route cables as directed to minimize airflow blockage and cooling problems. For proper cooling and airflow, operate the system only with the chassis covers installed.

Operating the system without the covers in place can damage system parts. To install the covers:

- ▶ Check first to make sure you have not left loose tools or parts inside the system.
- ▶ Check that cables, add-in cards, and other components are properly installed.
- ▶ Attach the covers to the chassis according to the product instructions.

The equipment is intended for installation only in a Server Room/ Computer Room where both these conditions apply:

- ▶ Access can only be gained by SERVICE PERSONS or by USERS who have been instructed about the reasons for the restrictions applied to the location and about any precautions that shall be taken.
- ▶ Access is through the use of a TOOL or lock and key, or other means of security, and is controlled by the authority responsible for the location.

Chapter 10. Compliance

The NVIDIA DGX H100 Server is compliant with the regulations listed in this section.

10.1. United States

Federal Communications Commission (FCC) FCC Marking (Class A)

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including any interference that may cause undesired operation of the device.

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

California Department of Toxic Substances Control: Perchlorate Material - special handling may apply. See www.dtsc.ca.gov/perchlorate.

10.2. United States/Canada

TÜV Rheinland of North America is accredited as a Nationally Recognized Testing Laboratory (NRTL), by OSHA (The Occupational Safety and Health Administration) in the United States, and as a Product Certification Body by SCC (Standards Council of Canada) in Canada. Refer to <https://www.tuv.com/usa/en/ctuvus-certification.html>

cTUVus Mark



10.3. Canada

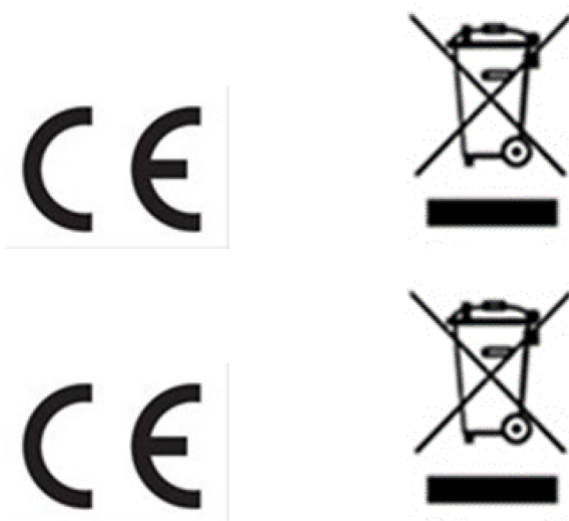
Innovation, Science and Economic Development Canada (ISED) CAN ICES-3(A)/NMB-3(A)

The Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulation.

Cet appareil numérique de la class A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

10.4. CE

European Conformity; Conformité Européenne (CE)



This is a Class A product. In a domestic environment this product may cause radio frequency interference in which case the user may be required to take adequate measures.

This device bears the CE mark in accordance with Directive 2014/53/EU. This device complies with the following Directives:

- ▶ EMC Directive A, I.T.E Equipment.
- ▶ Low Voltage Directive for electrical safety.
- ▶ RoHS Directive for hazardous substances.
- ▶ Energy-related Products Directive (ErP).

The full text of EU declaration of conformity is available at the following URL: <http://www.nvidia.com/support>

A copy of the Declaration of Conformity to the essential requirements may be obtained directly from NVIDIA GmbH (Bavaria Towers – Blue Tower, Einsteinstrasse 172, D-81677 Munich, Germany).

10.5. Australia and New Zealand

Australian Communications and Media Authority



This product meets the applicable EMC requirements for Class A, I.T.E equipment.

10.6. Brazil

INMETRO



10.7. Japan

Voluntary Control Council for Interference (VCCI)



この装置は、クラスA機器です。この装置を住宅環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

VCCI — A



この装置は、クラスA機器です。この装置を住宅環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

VCCI - A

This is a Class A product.

In a domestic environment this product may cause radio interference, in which case the user may be required to take corrective actions. VCCI-A.

2008年、日本における製品含有表示方法、JISC0950が公示されました。製造事業者は、2006年7月1日以降に販売される電気・電子機器の特定化学物質の含有に付きまして情報提供を義務付けられました。製品の部材表示に付きましては、以下をご覧ください。¶

A Japanese regulatory requirement, defined by specification JIS-C-0950, 2008, mandates that manufacturers provide Material Content Declarations for certain categories of electronic products offered for sale after July 1, 2006.¶

To view the JIS-C-0950 material declaration for this product, visit¶

Japan RoHS Material Content Declaration

日本工業規格JIS-C¶ 0950:2008により、2006年7月1日以降に販売される特定分野の電気および電子機器について、製造者による含有物質の表示が義務付けられます。¶ 機器名称：リノバ¶						
主な分類¶	特定化学物質記号¶					
	Pb¶	Hg¶	Cd¶	Cr(VI)¶	PBB¶	PBDE¶
筐体¶	除外項目¶	0¶	0¶	0¶	0¶	0¶
プリント基板¶	除外項目¶	0¶	0¶	0¶	0¶	0¶
プロセッサー¶	除外項目¶	0¶	0¶	0¶	0¶	0¶
マザーボード¶	除外項目¶	0¶	0¶	0¶	0¶	0¶
電源¶	除外項目¶	0¶	0¶	0¶	0¶	0¶
システムメモリ¶	除外項目¶	0¶	0¶	0¶	0¶	0¶
ハードディスクドライブ¶	除外項目¶	0¶	0¶	0¶	0¶	0¶
機械部品（ファン、ヒートシンク、ベゼル、）¶	除外項目¶	0¶	0¶	0¶	0¶	0¶
ケーブル/コネクタ¶	除外項目¶	0¶	0¶	0¶	0¶	0¶
はんだ付け材料¶	0¶	0¶	0¶	0¶	0¶	0¶
フラックス、クリームはんだ、ラベル、その他消耗品¶	0¶	0¶	0¶	0¶	0¶	0¶
注：¶ 1. 「0」は、特定化学物質の含有率が日本工業規格 JIS-C-0950:2008に記載されている含有率基準値より低いことを示します。¶ 2. 「除外項目」は、特定化学物質が含有マークの除外項目に該当するため、特定化学物質について、日本工業規格 JIS-C-0950:2008に基づく含有マークの表示が不要であることを示します。¶ ¶ 3. 「0.1wt%超」または「0.01wt%超」は、特定化学物質の含有率が日本工業規格JIS-C-0950:2008に記載されている含有率基準値を超えていることを示します。□						

A Japanese regulatory requirement, defined by specification JIS C 0950: 2008, mandates that manufacturers provide Material Content Declarations for certain categories of electronic products offered for sale after July 1, 2006.

Product Model Numbers: P3687 Server

Major Classification	Symbols of Specified Chemical Substance					
	Pb	Hg	Cd	Cr(VI)	PBB	PBDE
Chassis	Exempt	0	0	0	0	0
PCA	Exempt	0	0	0	0	0
Processor	Exempt	0	0	0	0	0
Motherboard	Exempt	0	0	0	0	0
Power supply	Exempt	0	0	0	0	0

System memory	Exempt	0	0	0	0	0
Hard drive	Exempt	0	0	0	0	0
Mechanical parts (fan, heat sink, bezel...)	Exempt	0	0	0	0	0
Cables/Connectors	Exempt	0	0	0	0	0
Soldering material	0	0	0	0	0	0
Flux, Solder Paste, label and other consumable materials	0	0	0	0	0	0

Notes:

- "0" indicates that the level of the specified chemical substance is less than the threshold level specified in the standard, JIS C 0950:2008.
- "Exempt" indicates that the specified chemical substance is exempt from marking and it is not required to display the marking for that specified chemical substance per the standard, JIS C 0950: 2008.
- "Exceeding 0.1wt%" or "Exceeding 0.01wt%" is entered in the table if the level of the specified chemical substance exceeds the threshold level specified in the standard, JIS C 0950: 2008.

10.8. South Korea

Korean Agency for Technology and Standards (KATS)



R-R-WT1-P3687

A급 기기 (업무용 방송통신기자재)	이 기기는 업무용(A급) 전자파적합기기로서 판매자 또는 사용자는 이 점을 주의하시기 바라며, 가정외의 지역에서 사용하는 것을 목적으로 합니다.
------------------------	---

Class A Equipment (Industrial Broadcasting & Communication Equipment). This equipment Industrial (Class A) electromagnetic wave suitability equipment and seller or user should take notice of it, and this equipment is to be used in the places except for home.

Korea RoHS Material Content Declaration

확인 및 평가 양식은 제품에 포함 된 유해 물질의 허용 기준의 준수에 관한			
문 준비	상호:	엔비디아홀딩스 리미티드(영입소)	법인등록번호: 110181-0036373
	대표자성명	카렌테레사번즈	사업자등록번호: 120-84-06711
	주소	서울특별시 강남구 영동대로 511, 2101호 (삼성동,	
제품 내용			
제품의 종류	해당없음	제품명(규격)	해당없음
세부모델명(번호)	해당없음	제품출시일	해당없음
제품의 종류	해당없음	제조, 수입업자	엔비디아
엔비디아의 그래픽 카드제품은 전기 전자제품 및 자동차의 자원순환에 관한 법률 시행령 제 11조 제 1항에 의거한 법 시행령규칙 제 3조에따른 유해물질 함유 기준을 확인 및 평가한 결과, 이를 준수하였음을 공표합니다.			
구비서류 : 없음			
작성방법			
① 제품의 종류는 "전기 전자제품 및 자동차의 자원순환에 관한 법률 시행령" 제 8조 제 1항 및 제 2항에 따른 품목별로 구분하여 기재합니다.			
② 전기 전자 제품의 경우 모델명 (번호), 자동차의 경우, 제품관리번호를 기재합니다.			
③ 해당제품의 제조업자 또는 수입업자를 기재합니다.			

Confirmation and Evaluation Form Concerning the Adherence to Acceptable Standards of Hazardous Materials Contained in Products				
Statement Prepared by	Company Name:	Nvidia HongKong Holding Ltd.Korea branch	Corporate Identification Number:	110181-0036373
	Name of Company Representative:	Karen Theresa Burns	Business Registration Number:	120-84-06711
	Address	2788 San Tomas Expressway, Santa Clara, CA 95051		
Product Information				
Product Category:	N/A	Name of Product:	N/A	
Detailed Product Model Name (Number)	N/A	Date of first market release:	N/A	
Weight of Product:	N/A	Manufacturer and/or Importer:	NVIDIA Corporation	
This for is publicly certify That NVIDIA Company has undergone the confirmation and evaluation procedures for the acceptable amounts of hazardous materials contained in graphic card according to the regulations stipulated in Article 3 of the 'Status on the Recycling of Electrical and Electronic Products, and Automobiles' and that company has graphic card adhered to the Enforcement Regulations of Article 11, Item 1 of the statute.				
Attachment: None				
★ Preparing the Form				
① Please indicate the product category according to the categories listed in Article 8, Items 1and 2 of the ' Enforcement Ordinance of the Statute on the Recycling of Electrical, Electronic and Automobile Materials'				
② For electrical and electronic products, please indicate the Model Name (and number). For automobiles, please indicate the Vehicle Identification Number.				
③ Please indicate the name of manufacturer and/or importer of the product.				

10.9. China

China Compulsory Certificate

No certification is needed for China. The NVIDIA DGX H100 is a server with power consumption greater than 1.3 kW.

China RoHS Material Content Declaration



产品中有毒物质的名称及含量

The Table of Hazardous Substances and their Content

根据中国《电器电子产品有害物质限制使用管理办法》

as required by China's Management Methods for Restricted of Hazardous Substances Used in Electrical and Electronic Products

部件名称 Parts	有害物质 Hazardous Substances					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr(VI))	多溴联苯 (PBB)	多溴联苯醚 (PBDE)
机箱 Chassis	X	0	0	0	0	0
印刷电路部件 PCA	X	0	0	0	0	0
处理器 Processor	X	0	0	0	0	0
主板 Motherboard	X	0	0	0	0	0
电源设备 Power supply	X	0	0	0	0	0
存储设备 System memory	X	0	0	0	0	0
硬盘驱动器 Hard drive	X	0	0	0	0	0
机械部件 (风扇、散热器、面板等) Mechanical parts (fan, heat sink, bezel...)	X	0	0	0	0	0
线材/连接器 Cables/Connectors	X	0	0	0	0	0

焊接金属 Soldering material	0	0	0	0	0	0
助焊剂, 锡膏, 标签及其他耗材 Flux, Solder Paste, label and other consumable materials	0	0	0	0	0	0
<p>本表格依据SJ/T 11364-2014 的规定编制 The table according to SJ/T 11364-2014</p> <p>0 : 表示该有害物质在该部件所有均质材料中的含量均在GB/T 26572-2011 标准规定的限量要求以下。 0: Indicates that this hazardous substance contained in all of the homogeneous materials for this part is below the limit requirement in GB/T 26572-2011.</p> <p>X : 表示该有害物质至少在该部件的某一均质材料中的含量超出GB/T 26572-2011 标准规定的限量要求。 X: Indicates that this hazardous substance contained in at least one of the homogeneous materials used for this part is above the limit requirement in GB/T 26572-2011.</p> <p>此表中所有名称中含“X”的部件均符合欧盟 RoHS 立法。 All parts named in this table with an “X” are in compliance with the European Union’s RoHS Legislation.</p> <p>Note: The referenced Environmental Protection Use Period Marking was determined according to normal operating use conditions of the product such as temperature and humidity.</p>						

10.10. Taiwan

Bureau of Standards, Metrology & Inspection (BSMI)



警告使用者:
此為甲類資訊技術設備, 於居住環境中使用時, 可能會造成射頻擾動, 在此種情況下, 使用者會被要求採取某些適當的對策

報驗義務人:

香港商輝達香港控股有限公司台灣分公司 · 統一編號: 80022300

臺北市內湖區基湖路8號.

Taiwan RoHS Material Content Declaration

限制物質含有物標記聲明書 Declaration of the presence condition of the Restricted Substances Marking						
設備名稱: DGX 伺服器 Equipment Name: DGX Server						
單元 Parts	限制物質及其化學符號 Restricted substances and its chemical symbols					
	鉛 (Pb)	汞 (Hg)	鎘 (Cd)	六價鉻 (Cr(VI))	多環芳烴 (PAH)	多溴二苯醚 (PBDE)
機殼 Chassis	-	0	0	0	0	0
印刷電路板 PCA	-	0	0	0	0	0
處理器 Processor	-	0	0	0	0	0
主機板 Motherboard	-	0	0	0	0	0
電源設備 Power supply	-	0	0	0	0	0
記憶體 System memory	-	0	0	0	0	0
硬碟機 Hard drive	-	0	0	0	0	0
機械零件 (風扇、散熱器、齒輪等) Mechanical parts (fan, heat sink, bead...)	-	0	0	0	0	0
線材/連接器 Cables/Connectors	-	0	0	0	0	0
焊錫金屬 Soldering material	0	0	0	0	0	0
助焊劑、黏帶、膠帶及其他消耗材料 Flux, Solder Paste, label and other consumable materials	0	0	0	0	0	0

備註 1: 0: 表示該限制物質含量百分比低於豁免標準。
Note 1: 0: Indicates that the percentage content of the restricted substance does not exceed the percentage of reference value of presence.
備註 2: -: 表示該限制物質符合豁免標準。
Note 2: -: Indicates that the restricted substance corresponds to the exemption.
此表中所有名稱中含“-”的部件均符合歐盟 RoHS 立法。
All parts named in this table with an “-” are in compliance with the European Union's RoHS Legislation.
註: 此份聲明書係根據全球標準化測試方法在正常運作溫度及濕度條件下。
Note: The referenced Environmental Protection Use (EPU) Marking was determined according to normal operating use conditions of the product such as temperature and humidity.

10.11. Russia/Kazakhstan/Belarus

Customs Union Technical Regulations (CU TR)



This device complies with the technical regulations of the Customs Union (CU TR)

ТЕХНИЧЕСКИЙ РЕГЛАМЕНТ ТАМОЖЕННОГО СОЮЗА О безопасности низковольтного оборудования (ТР ТС 004/2011)

ТЕХНИЧЕСКИЙ РЕГЛАМЕНТ ТАМОЖЕННОГО СОЮЗА Электромагнитная совместимость технических средств (ТР ТС 020/2011)

Технический регламент Евразийского экономического союза “Об ограничении применения опасных веществ в изделиях электротехники и радиоэлектроники” (ТР ЕАЭС 037/2016)

Federal Agency of communication (FAC)

This device complies with the rules set forth by Federal Agency of Communications and the Ministry of Communications and Mass Media.

Federal Security Service notification has been filed.

10.12. Israel

SII

ודא שלמות ותקינות כבל החשמל והתקע אין להכניס או להוציא את התקע מרשת החשמל בידיים רטובות . אין לפתוח את המכשיר , במקרה של בעיה כלשהי יש לפנות למעבדת השירות הקרובה. יש להרחיק את המכשיר מנזלים . במקרה של ריח מוזר, רעשים שמקורם במכשיר , יש לנתקו מיידית מרשת החשמל ולפנות למעבדת שירות המכשיר מיועד לשימוש בתוך המבנה , ולא לשימוש חיצוני ולא לשימוש בסביבה לחה. אין לחתוך, לשבור, ולעקם את הכבל החשמל. אין להניח חפצים על הכבל החשמל או להניח לו להתחמם יתר על המידה , שכן עלול לגרום לנזק, דליקה או התחשמלות . יש להקפיד לחזק את התקן הניתוק במצב תפעולי מוכן לשימוש. אזהרה: אין להחליף את כבל הזינה בתחליפים לא מקוריים, חיבור לקוי עלול לגרום להתחשמלות המשתמש. בשימוש על כבל מאריך יש לוודא תקינות מוליך הארקה שבכבל .

10.13. India

Bureau of India Standards (BIS)



Authenticity may be verified by visiting the Bureau of Indian Standards website at <http://www.bis.gov.in>.

India RoHS Compliance Statement

This product, as well as its related consumables and spares, complies with the reduction in hazardous substances provisions of the “India E-waste (Management and Handling) Rule 2016”. It does not contain lead, mercury, hexavalent chromium, polybrominated biphenyls or polybrominated diphenyl ethers in concentrations exceeding 0.1 weight % and 0.01 weight % for cadmium, except for where allowed pursuant to the exemptions set in Schedule 2 of the Rule.

10.14. South Africa

South African Bureau of Standards (SABS)

This device complies with the following SABS Standards:

SANS 2332: 2017/CISPR 32:2015 SANS 2335:2018/ CISPR 35:2016

National Regulator of Compulsory Specification (NRCS)

This device complies with following standard under VC 8055:

SANS IEC 60950-1

10.15. Great Britain (England, Wales, and Scotland)

UK Conformity Assessed



This device complies with the following Regulations:

- ▶ SI 2016/1091: Electromagnetic Compatibility (EMC)
- ▶ SI 2016/1101: The Low Voltage Electrical Equipment (Safety)
- ▶ SI 2012/3032: The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment (As Amended)

A copy of the Declaration of Conformity to the essential requirements may be obtained directly from NVIDIA Ltd. (100 Brook Drive, 3rd Floor Green Park, Reading RG2 6UJ, United Kingdom)

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