DGX A100 System Firmware Update Container

Release Notes

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Chapter 1. DGX A100 System FW Update Container Overview

The NVIDIA DGX™ A100 System Firmware Update container is the preferred method for updating firmware on DGX A100 system. It provides an easy method for updating the firmware to the latest released versions, and uses the standard method for running Docker containers.

This document describes firmware components that can be updated, any known issues, and how to run this container.

Features

- Automates firmware (FW) update for DGX A100 system firmware, such as the system BIOS and BMC.
- Provides flexibility to update individual or all FW components
- Embeds the following
  - Qualified FW binaries for supported components
  - Flash update utilities and supporting dependencies
  - Manifest file which lists
    - Target platform and firmware version numbers
    - Sequence in which FW update should be applied
    - "On-Error" policy for every FW component
- Supports interactive and non-interactive firmware update

Chapter 2. Using the DGX A100 FW Update Utility

The NVIDIA DGX A100 System Firmware Update utility is provided in a tarball and also as a .run file. Copy the files to the DGX A100 system, then update the firmware using one of the following three methods:

- **NVSM** provides convenient commands to update the firmware using the firmware update container
- **Using Docker** to run the firmware update container
- **Using the .run file** which is a self-extracting package embedding the firmware update container tarball

Note: Fan speeds may increase while updating the BMC firmware. This is a normal part of the BMC firmware update process.

Requirements

Refer to the **Highlights and Changes** in the specific release for the DGX OS and EL7/EL8 versions supported by the firmware update container.

The firmware update container requires that the following modules are installed on the system.

- `nvidia_vgpu_vfio`
- `nvidia-uvm`
- `nvidia-drm`
- `nvidia-modeset`
- `nv_peer_mem`
- `nvidia_peermem`
- `nvidia`
- `i2c_nvidia_gpu`
- `ipmi_devintf`
- `ipmi_ssif`
- `acpi_ipmi`

- `ipmi_si`
- `ipmi_msghandler`

These modules are installed as part of the standard DGX OS, EL7, or EL8 installation. The container may fail if any of these modules are not installed. Be sure to follow the provided instructions when installing or upgrading DGX OS, EL7, or EL8.

CAUTION: Observe the following before running the firmware update container:

- Do not log into the BMC dashboard UI while a firmware update is in progress.
- Stop all unnecessary system activities before attempting to update firmware.
- Stop all GPU activity, including accessing nvidia-smi, as this can prevent the VBIOS from updating.
- When issuing `update_fw all`, stop the following services if they are launched from Docker through the `docker run` command:
  - `dcgm-exporter`
  - `nvidia-dcgm`
  - `nvidia-fabricmanager`
  - `nvidia-persistenced`
  - `xorg-setup`
  - `lightdm`
  - `nvsm-core`
  - `kubelet`

  The container will attempt to stop these services automatically, but will be unable to stop any that are launched from Docker.
- Do not add additional loads on the system (such as user jobs, diagnostics, or monitoring services) while an update is in progress. A high workload can disrupt the firmware update process and result in an unusable component.
- When initiating an update, the update software assists in determining the activity state of the DGX system and provides a warning if it detects that activity levels are above a predetermined threshold. If the warning is encountered, you are strongly advised to take action to reduce the workload before proceeding with the update.

2.1. Using NVSM

The NVIDIA DGX A100 system software includes Docker software required to run the container.

1. Copy the tarball to a location on the DGX system.

2. From the directory where you copied the tarball, enter the following command to load the container image.
```
$ sudo docker load -i nvfw-dgxa100_22.12.1_221208.tar.gz
```
3. To verify that the container image is loaded, enter the following.
```
$ sudo docker images

REPOSITORY    TAG
nvfw-dgxa100  22.12.1
```
4. Using NVSM interactive mode, enter the firmware update module.
```
$ sudo nvsm
nvsm-> cd systems/localhost/firmware/install
```
5. Set the flags corresponding to the action you want to take.
```
$ nvsm(/system/localhost/firmware/install)-> set Flags=<option>
```
See the Command and Argument Summary section below for the list of common flags.
6. Set the container image to run.
```
$ nvsm(/system/localhost/firmware/install)-> set DockerImageRef=nvfw-dgxa100:22.12.1
```
7. Run the command.
```
$ nvsm(/system/localhost/firmware/install)-> start
```

2.2. Using `docker run`

The NVIDIA DGX A100 system software includes Docker software required to run the container.

1. Copy the tarball to a location on the DGX system.
2. From the directory where you copied the tarball, enter the following command to load the container image.
```
$ sudo docker load -i nvfw-dgxa100_22.12.1_221208.tar.gz
```
3. To verify that the container image is loaded, enter the following.
```
$ sudo docker images

REPOSITORY    TAG
nvfw-dgxa100  22.12.1
```
4. Use the following syntax to run the container image.
```
$ sudo docker run --rm --privileged -ti -v /:/hostfs nvfw-dgxa100:22.12.1
 <command> <[arg1] [arg2] ... [argn]
```

See the Command and Argument List section below for the list of common commands and arguments.

Note: If you do not have the tarball file, but you do have the .run file, you can extract the tarball from the .run file by issuing the following:
```
sudo nvfw-dgxa100_22.12.1_221208.run -x
```

2.3. Using the .run File

The update container is also available as a .run file. The .run file uses the Docker software if it is installed on the system, but can also be run without Docker installed.

1. After obtaining the .run file, make the file executable.
```
$ chmod +x nvfw-dgxa100_22.12.1_221208.run
```
2. Use the following syntax to run the container image.
```
$ sudo ./nvfw-dgxa100_22.12.1_221208.run <command> <[arg1] [arg2] ... [argn]
```

See the Command and Argument Summary section below for the list of common commands and arguments.

2.4. Command and Argument List

The following are common commands and arguments.

- Show the manifest
```
show_fw_manifest
```
  - NVSM Example: `$ nvsm(/system/localhost/firmware/install)-> set Flags=show_fw_manifest`
  - Docker Run Example:`$ sudo docker run --rm --privileged -ti -v /:/hostfs nvfw-dgxa100:22.12.1 show_fw_manifest`
  - .run File Example: `$ sudo ./nvfw-dgxa100_22.12.1_221208.run show_fw_manifest`
- Show version information
```
show_version
```
  - NVSM Example: `$ nvsm(/system/localhost/firmware/install)-> set Flags=show_version`
  - Docker Run Example:`$ sudo docker run --rm --privileged -ti -v /:/hostfs nvfw-dgxa100:22.12.1 show_version`
  - .run File Example: `$ sudo ./nvfw-dgxa100_22.12.1_221208.run show_version`
- Check the onboard firmware against the manifest and update all down-level firmware.
```
update_fw all
```
  - NVSM Example: `$ nvsm(/system/localhost/firmware/install)-> set Flags=update_fw\ all`

    For NVSM, an escape is needed before blank spaces when setting the flags.
  - Docker Run Example:`$ sudo docker run --rm --privileged -ti -v /:/hostfs nvfw-dgxa100:22.12.1 update_fw all`
  - .run File Example: `$ sudo ./nvfw-dgxa100_22.12.1_221208.run update_fw all`
- Check the specified onboard firmware against the manifest and update if down-level.

```
update_fw [fw]
```

Where `[fw]` corresponds to the specific firmware as listed in the manifest. Multiple components can be listed within the same command. The following are examples of updating the BMC and SBIOS.

- NVSM Example: `$ nvsm(/system/localhost/firmware/install)-> set Flags=update_fw\ BMC\ SBIOS`

  For NVSM, an escape is needed before blank spaces when setting the flags.
- Docker Run Example:`$ sudo docker run --rm --privileged -ti -v /:/hostfs nvfw-dgxa100:22.12.1 update_fw BMC SBIOS`
- .run File Example: `$ sudo ./nvfw-dgxa100_22.12.1_221208.run update_fw BMC SBIOS`

- Run the DGX A100 firmware update in non-interactive mode.

```
set_flags auto=1
```

List of Arguments

```
Update flags:
   Updates all, a specified combination, or an individual firmware component
   if the image currently on the device is prior to the available version.
   syntax:
      update_fw  < firmware_components >
      update_fw < component [ -f | --force ] [ component options ] >

Update flag Definitions :
   --force  For single component updates. Bypass the checks and upgrade regardless
 of the version.
   all      Update firmware on all components. Cannot be used with the '--force'
 flag.
            syntax: update_fw all

   SBIOS    Update the System BIOS firmware.
            syntax: update_fw SBIOS [ -a | --active]
                                    [ -i | --inactive]

   BMC      Update the firmware on all, or a specified Baseboard Management
            Controller.

            syntax: update_fw BMC [ -i | --inactive]
                                  [ -b | --bmc-access-path <BMC
 IP:login_id:password> ]
                                  [ -m | --intermediate-fw ]
                                  [ -t | --target-bmc <target BMC> ]
            where:
               --bmc-access-path <val>   Non-default access parameters to the BMC

   SSD      Update firmware on all, or a specified Solid State Drive.
            syntax: update_fw SSD [ -s | --select-ssd <SSD target> ]
            where:
               --select-ssd <target>  Name of the specific drive to update

   PSU      Update the firmware on all, or a specified Power Supply
            syntax: update_fw PSU [ -s | --select-psu <PSU number> ] [ -S | --
select-slot <PSU slot> }
            where:
               --select-psu <target>  Name of the specific PSU to update.
               --select-slot <slot>   Name of the specific PSU slot to update

   VBIOS    Update the Video BIOS firmware on all detected GPUs.
            It is not currently possible to update individual GPU devices.
            syntax: update_fw VBIOS
```

```
FPGA     Update firmware on the FPGA devices on lower and upper GPU trays.
         syntax: update_fw FPGA

SWITCH   Update firmware on one, specific set, or all switch devices.
         syntax: update_fw SWITCH [ -s | --select-switch <switch-model[:BDF]> ]

CEC      Update firmware on one or multiple CEC
         syntax: update_fw CEC [ -s | --select-cec [ MB_CEC | Delta_CEC ]

CPLD     Update MB CPLD / MID CPLD firmware
         syntax: update_fw CPLD [ -s | --select-cpld [ MB_CPLD | MID_CPLD ]
```

2.5. Troubleshooting Update Issues

Missing Software Modules

The container may fail if any of these modules are not installed on the system.

- nvidia_vgpu_vfio
- nvidia-uvm
- nvidia-drm
- nvidia-modeset
- nv_peer_mem
- nvidia_peermem
- nvidia
- i2c_nvidia_gpu
- ipmi_devintf
- ipmi_ssif
- acpi_ipmi
- ipmi_si
- ipmi_msghandler

The following are examples of error messages:

- ```
  Firmware update not started
  Following service(s)/process(es) are holding onto the resource about
  to be upgraded. These need to be manually stopped for firmware update to occur.
  If xorg is holding the resources, try to stop it by 'sudo systemctl stop <display
   manager>,'
  where the <display manager> can be acquired by 'cat /etc/X11/default-display-
  manager':
  process nvidia-persiste(pid 7554)
  ● session-1.scope - Session 1 of user swqa
  Loaded: loaded (/run/systemd/system/session-1.scope; static; vendor preset:
   disabled)
  Transient: yes
    Drop-In: /run/systemd/system/session-1.scope.d
        └─50-After-systemd-logind\x2eservice.conf, 50-After-systemd-user-sessions
  \x2eservice.conf, 50-Description.conf, 50-SendSIGHUP.conf, 50-Slice.conf, 50-
  TasksMax.conf
    Active: active (running) since Wed 2021-11-17 00:36:22 EST; 1min 49s ago
  ```
  ```

```
  CGroup: /user.slice/user-1000.slice/session-1.scope
```

- `modprobe: FATAL: Module nvidia not found in directory /lib/modules/5.4.0-80-generic`

To recover, perform an update of the DGX OS (refer to the DGX OS User Guide for instructions), then retry the firmware update.

Chapter 3. Using the DGX A100 Firmware Update ISO

This section describes how to use the DGX A100 firmware update ISO to efficiently update the firmware in a large fleet of DGX A100 systems.

3.1. About the Firmware Update Menu

Once the system boots up to the firmware update ISO, it sets up the environment and launches a firmware update menu. The menu can be used in the following three different modes:

- **Interactive**

  This displays a text-based UI with the following choices of actions to take:

  - **Start the firmware update container**

    This runs the firmware update container using the `update_fw all` option.

  - **Start the firmware update container with custom options**

    This runs the firmware update container using custom arguments that you enter into a text box. Separate multiple arguments by a space. Example

    ```
    update_fw BMC -f
    ```

    See List of Arguments for available arguments.

  - **Set up connection for automation and Exit**

    This sets up an SSH connection (default user name is `fwui` and default password is `fw_update`) so you can run automation scripts from a different system. For example, this lets you use Ansible automation.

  - **Exit**

- **Non-interactive**

  This reads the argument from kernel parameter (`/proc/cmdline`) and then runs the firmware update container automatically. See section "Updating the Firmware Automatically" in Booting to the Firmware Update ISO from a USB Flash Drive

- **Automation**

This sets up an SSH connection. The default user name is `fwui` and default password is `fw_update`. From there you can use automation scripts (for example, Ansible) to perform the firmware update.

3.2. Booting to the Firmware Update ISO from a USB Flash Drive

This section describes how to boot to the DGX A100 firmware update ISO from a USB flash drive.

Basic Process

Download the ISO image and create a bootable USB drive that contains the ISO image.

Important: Do not use the virtual media from the BMC as the BMC will be reset during the update.

Updating the Firmware Automatically

To set up the firmware to update automatically when the system boots up,

1. Edit the GRUB menu parameters within the ISO at BOOT/GRUB/GRUB.CGF as follows.

   Set `fwuc-mode=noninteractive`.

   Set the following parameters as needed.

   - `fwuc-update_args=<arg1>,<arg2> ...`
   - `fwuc-extra_args=<extra-arg1> ...`

   See List of Arguments for available arguments.

   The following example boots the firmware update ISO in non-interactive mode and then updates the SBIOS without first checking the installed version, then reboots the system after the update.

   ```
   menuentry "Start Firmware Update Environment (Non-interactive)" {
       linux /vmlinuz boot=live console=tty0 apparmor=0 elevator=noop nvme-
   core.multipath=n nouveau.modeset=0 boot-live-env start-systemd-networkd fwuc-
   mode=noninteractive fwuc-update_args=update_fw,SBIOS,-f fwuc-extra_args=reboot-
   after-update
       initrd /initrd
   }
   ```

2. Create a bootable USB drive that contains the updated ISO.
3. Boot to the USB drive.
4. If the NVMe drive firmware, the FPGA, or the CEC1712 (Delta_CEC) was updated, then perform a DC power cycle by issuing the following.

   ```
   $ sudo ipmitool -I lanplus -H ${BMC_IP} -U ${BMC_USER} -P ${BMC_PW} chassis power
    cycle
   ```

3.3. Booting to the Firmware Update ISO by PXE Boot

This section describes how to PXE boot to the DGX A100 firmware update ISO.

1. Refer to the information in Setting Up DGX OS 5.0 for PXE Boot for guidance on setting up the DGX A100 to PXE boot.
2. Download the ISO image and then mount it.

```
$ sudo mount -o loop ~/DGXA100_FWUI-22.12.1-2022-12-09-01-25-20.iso /mnt
```

3. Copy the `filesystem.squashfs, initrd`, and `vmlinuz` files to the http directory.

```
$ sudo mkdir -p /local/http/firmware-update/
$ sudo cp /mnt/live/filesystem.squashfs /local/http/firmware-update/
$ sudo cp /mnt/{initrd,vmlinuz} /local/http/firmware-update/
$ umount /mnt
```

   The new `/local/http` folder structure should look like this:

```
/local/http/
├── dgxbaseos-5.x.y
│   ├── base_os_5.x.y.iso
│   ├── initrd
│   └── vmlinuz
└── firmware-update
    ├── filesystem.squashfs
    ├── initrd
    └── vmlinuz
```

4. Edit the `/local/syslinux/efi64/pxelinux.cfg/default` file to add the following menu option content for the Firmware Update OS.

```
label Firmware Update Container
    menu label Firmware Update Container
    kernel http://${SERVER_IP}/firmware-update/vmlinuz
    initrd http://${SERVER_IP}/firmware-update/initrd
    append vga=788 initrd=initrd boot=live console=tty0 console=ttyS1,115200n8
 apparmor=0 elevator=noop nvme-core.multipath=nouveau.modeset=0 boot-
live-env start-systemd-networkd fetch=http://${SERVER_IP}/firmware-update/
filesystem.squashfs
```

> **Important:** If the system is booting from the LAN port connection (`enp226s0`), connections to slot 4 (`enp225s0f0` and `enp225s0f1`) must be on the same domain as the LAN port. If they are not on the same domain, then add `live-netdev=enp226s0` to the `append` line.
>
> **Example**:
>
> ```
> append vga=788 initrd=initrd boot=live console=tty0 apparmor=0 live-
> netdev=enp226s0 elevator=noop nvme-core.multipath=n nouveau.modeset=0
>  boot-live-env start-systemd-networkd fetch=http://${SERVER_IP}/
> filesystem.squashfs
> ```

5. (Optional) To set up the boot configuration to run the container automatically when booting, edit the following parameters at `pxelinux.cfg/default`:

   Set `fwuc-mode=noninteractive`.

Set the following parameters as needed.

- `fwuc-update_args=<arg1>,<arg2> ...`
- `fwuc-extra_args=<extra-arg1> ...`

See List of Arguments for available arguments.

The following example boots the package in non-interactive mode and updates the SBIOS without first checking the installed version, then reboots the system after the update.

```
append vga=788 initrd=initrd boot=live console=tty0 apparmor=0 elevator=noop
 nvme-core.multipath=n nouveau.modeset=0 fwuc-mode=noninteractive fwuc-
update_args=update_fw,SBIOS,-f fwuc-extra_args=reboot-after-updateboot-live-env
 start-systemd-networkd fetch=http://${SERVER_IP}/filesystem.squashfs
```

6. Change permissions on `/local`.

```
$ sudo chmod 755 -R /local
```

7. PXE boot by restarting the system using `ipmitool`.

```
$ ipmitool -I lanplus -H <DGX-BMC-IP> -U <username> -P <password> chassis bootdev
 pxe options=efiboot
$ ipmitool -I lanplus -H <DGX-BMC-IP> -U <username> -P <password> chassis power
 reset
```

When the system PXE menu comes up, choose the Firmware Update Container option. The firmware is updated automatically once the system has booted. If not set to update automatically, then follow the instructions to update the firmware.

8. If the NVMe drive firmware, the FPGA, or the CEC1712 (Delta_CEC) was updated, then perform a DC power cycle by issuing the following.

```
$ sudo ipmitool -I lanplus -H ${BMC_IP} -U ${BMC_USER} -P ${BMC_PW} chassis power
 cycle
```

Chapter 4. DGX A100 System Firmware Update Container Version 22.12.1

The DGX Firmware Update container version **22.12.1** is available.

- Package name: nvfw-dgxa100_22.12.1_221208.tar.gz
- Run file name: nvfw-dgxa100_22.12.1_221208.run
- Image name: nvfw-dgxa100:22.12.1
- ISO image: DGXA100_FWUI-22.12.1-2022-12-09-01-25-20.iso
- PXE netboot: pxeboot-DGXA100_FWUI-22.12.1.tgz

Highlights and Changes in this Release

This release is supported with the following DGX OS software:

DGX OS 5.4 or later.

Important: This firmware update container does NOT support DGX OS 4.99.xx. To use the container on DGX A100 servers, update to DGX OS 5.1 or later.

- EL7-22.08 or later (See "Special Instructions for Red Hat Enterprise Linux 7" in the DGX A100 System Firmware Container Release Notes) EL8-21.08 Update 1 or later.
- EL8-22.08 or later

Fixed BMC issues

- Improved SNMP trap handling and updated SNMP MIB with additional description for better trap information.
- Handled a rare NTP server configuration settings issue from BMC WebUI.
- The BMC update includes software security enhancements. See the NVIDIA Security Bulletin DGX - December 2022 for details.
- Improvements In Redfish

- Addressed a redfish URI timeout issue by appropriately handling the session authentication mechanism.
- Addressed a rare redfish URI connection failure issue by appropriately handling the Redfish session authentication mechanism.
- Fixed Redfish' chassis power state inconsistencies.
- Fixed redfish to fetch accurate values of thermal and power sensors states and readings.
- Revised redfish chassis to identify LED status reporting issue.
- Reduced frequency of UPNP (Universal Plug and Play) SSDP (Simple Service Discovery Protocol) advertisements from BMC

- Fixed SBIOS Issues
  - Fixed issues relating to redfish reporting of PCIe device types and speeds.
  - Removed unimplemented setup menu options for User Defaults and Boot NumLock State.
  - Updated AGESA to version 1.0.0.E.
  - The SBIOS update includes software security enhancements. See the NVIDIA Security Bulletin DGX - December 2022 for details.
- Added Support
  - Added M.2 Micron 7400 Gen4 drive.
- Known Issues
  - For more information, see Known Issues.

Contents of the DGX A100 System Firmware Container

This container includes the firmware binaries and update utilities for the firmware listed in the following table.

- If you are updating from 21.11.4 the total update time is *approximately* **sixty-eight (68) minutes**.
- If you are updating from 22.5.5 the total update time is *approximately* **sixty-one (61) minutes**.

Component	Version	Key Changes	Update time from 21.11.4	Update Time from 22.5.5
BMC (via CEC)	**00.19.07**	Refer to DGX A100 BMC Changes	32	31
SBIOS	**1.18**	See SBIOS changes section	6	6

Broadcom 88096 PCIe switch board	0.2.0	No change	0	0
BMC CEC SPI (MB_CEC)	3.28	No change	0	0
PEX88064 Retimer	3.1.0	No change	1	0
PEX88080 Retimer (U225)	3.1.0	No change	1	0
PEX88080 Retimer (U666)	**4.1.0**	New update	1	1
NVSwitch BIOS	92.10.18.00.01	No change	0	0
VBIOS (A100 PG506 SKU200 (40GB))/VBIOS (A100 40GB)	**92.00.45.00.03**	No change	0	0
VBIOS (A100 PG506 SKU210 (80GB))/VBIOS (A100 80GB)	92.00.9E.00.01	New update	2	2
VBIOS (A800 PG506 SKU215 (80GB))	**92.00.A4.00.01**	New support	2	2
VBIOS (A100 PG510 SKU200 (40GB))	92.00.81.00.01	New support	2	2
VBIOS (A100 PG510 SKU210 (80GB))	92.00.9E.00.03	New support	2	2
VBIOS (A800 PG510 SKU215 (80GB))	**92.00.A4.00.05**	New support	2	2
VBIOS (A100 SystemB 80GB)	92.00.81.00.06	No change	0	0
U.2 NVMe (Samsung)	EPK9CB5Q	No change	0	0
U.2 NVMe (Kioxia)	105	No change	0	0
M.2 NVMe (Samsung version 1)	EDA7602Q	No change	0	0
M.2 NVMe (Samsung version 2)	GDC7302Q	No change	1	0
M.2 Micron 7400 Gen4	**E1MU238V**	New support	1	1
FPGA (GPU sled)	**4.02**	New update	20	20
CEC1712 SPI (GPU sled)	4	No change	3	0
PSU (Delta rev04)	Primary 1.7/ Secondary 1.7/ Community 1.7	No change	0	0

PSU (Delta rev03)	Primary 1.6/ Secondary 1.6/ Community 1.7	No change	0	0
PSU (Delta rev02)	Primary 1.6/ Secondary 1.6/ Community 1.7	No change	0	0
PSU (LiteOn)	908	No change	0	0

Updating Components with Secondary Images

Some firmware components provide a secondary image as backup. The following is the policy when updating those components:

- **SBIOS**: The two images are referred to as active and inactive, where the active is the currently running image and the inactive is the backup image.

  When using `update_fw all`, the update container updates both active and inactive images.

- **BMC**: The two images are referred to as active and inactive, where the active is the currently running image and the inactive is the backup image.

  The update container can only update the inactive image, and will update it only if the *active* image needs to be updated. After the update is completed, the updated inactive image becomes the active image. Because the active image is now updated, subsequent `update_fw all` commands will not update the inactive image. To update the inactive image in this case, use `update_fw BMC --inactive`. Since the container does not support updating the active image directly, commands such as `update_fw BMC -a -f` will not work.

DO NOT UPDATE DGX A100 CPLD FIRMWARE UNLESS INSTRUCTED

When updating DGX A100 firmware using the Firmware Update Container, do not update the CPLD firmware unless the DGX A100 system is being upgraded from 320GB to 640GB.

The current DGX A100 Firmware Update Container will not automatically update the CPLD firmware (for example, when running `update_fw all`). It is possible to update the CPLD firmware using "`update_fw CPLD`"; however, it is strongly recommended that the CPLD firmware not be updated manually unless specifically instructed by NVIDIA Enterprise Support (or email enterprisesupport@nvidia.com). If the DGX A100 is upgraded from 320GB to 640GB, the CPLD firmware update should be performed as instructed.

4.1. Special Instructions for Red Hat Enterprise Linux 7

This section describes the actions that must be taken before updating firmware on DGX A100 systems installed with Red Hat Enterprise Linux. There are two options for meeting these requirements.

Option 1: Update to EL7-22.05

Refer to the DGX Software for Red Hat Enterprise Linux 7 Release Notes for more information.

Important: Updating the DGX software for Red Hat Enterprise Linux will update the Red Hat Enterprise Linux installation to 7.9 or later. If you do not want to update your Red Hat Enterprise Linux 7 installation, then choose Option 2.

Option 2: Install mpt3sas 31.101.01.00-0

These instructions apply if:

- You do not want to update your Red Hat Enterprise Linux installation, and
- Your system is currently installed with Red Hat Enterprise Linux 7.7 or later.

Note: If your system is installed with Red Hat Enterprise Linux 7.6 or earlier, contact NVIDIA Enterprise Support for assistance.

1. Perform this step if your system is no longer pointing to the NVIDIA DGX software repository.
   a). On Red Hat Enterprise Linux, run the following commands to enable additional repositories required by the DGX software.

```
sudo subscription-manager repos --enable=rhel-7-server-extras-rpms
sudo subscription-manager repos --enable=rhel-7-server-optional-rpms
```

   b). Run the following command to install the DGX software installation package and enable the NVIDIA DGX software repository.

ATTENTION: By running these commands you are confirming that you have read and agree to be bound by the DGX Software License Agreement. You are also confirming that you understand that any pre-release software and materials available that you elect to install in a DGX may not be fully functional, may contain errors or design flaws, and may have reduced or different security, privacy, availability, and reliability standards relative to commercial versions of NVIDIA software and materials, and that you use pre-release versions at your risk.

```
yum install -y \
https://international.download.nvidia.com/dgx/repos/rhel-files/dgx-repo-setup-20.03-1.el7.x86_64.rpm
```

2. Install `mpt3sas` 31.101.01.00-0.
   ```
   sudo yum install mpt3sas-dkms
   ```
3. Load the `mpt3sas` driver into the Red Hat Enterprise Linux kernel.
   ```
   sudo modprobe mpt3sas
   ```
   You can verify the correct `mpt3sas` version is installed by issuing the following.
   ```
   yum list installed
   ```

4.2. Instructions for Updating Firmware

This section provides a simple way to update the firmware on the system using the firmware update container.
The commands use the .run file, but you can also use any method described in Using the DGX A100 FW Update Utility.

CAUTION:

- Do not log into the BMC dashboard UI while a firmware update is in progress.
- Stop all unnecessary system activities before attempting to update firmware.
- Stop all GPU activity, including accessing nvidia-smi, as this can prevent the VBIOS from updating.
- When issuing `update_fw all`, stop the following services if they are launched from Docker through the `docker run` command:
  - `dcgm-exporter`
  - `nvidia-dcgm`
  - `nvidia-fabricmanager`
  - `nvidia-persistenced`
  - `xorg-setup`
  - `lightdm`
  - `nvsm-core`
  - `kubelet`

  The container will attempt to stop these services automatically, but will be unable to stop any that are launched from Docker.
- Do not add additional loads on the system (such as user jobs, diagnostics, or monitoring services) while an update is in progress. A high workload can disrupt the firmware update process and result in an unusable component.
- When initiating an update, the update software assists in determining the activity state of the DGX system and provides a warning if it detects that activity levels are above a predetermined threshold. If the warning is encountered, you are strongly advised to take action to reduce the workload before proceeding with the update.

1. Check if updates are needed by checking the installed versions.

   ```
   $ sudo ./nvfw-dgxa100_22.12.1_221208.run show_version
   ```

   - If there is "no" in any up-to-date column for updatable firmware, then continue with the next step.
   - If all up-to-date column entries are "yes", then no updates are needed and no further action is necessary.

2. Perform the update for all firmware supported by the container.

   ```
   $ sudo ./nvfw-dgxa100_22.12.1_221208.run update_fw all
   ```

   Depending on the firmware that is updated, you may be prompted to either reboot the system or power cycle the system.

   - If you are prompted to reboot, issue

     ```
     $ sudo reboot
     ```

   - If you are prompted to power cycle, you can issue the following two commands (there is no output with the first command).

     ```
     $ sudo ipmitool raw 0x3c 0x04
     $ sudo ipmitool chassis power cycle
     ```

3. After rebooting or power cycling the system, you may need to perform another `update_fw all` to update other firmware.

   - Either repeat Step 1 to check if updates are needed and then perform Step 2 if needed, or
   - Repeat Step 2 just in case updates are needed.

   If you perform another `update_fw all`, you may be prompted again to either reboot the system or power cycle the system.

   See DGX A100 Firmware Update Process for more information about the update process.

You can verify the update by issuing the following.

```
$ sudo ./nvfw-dgxa100_22.12.1_221208.run show_version
```

Example output for a DGX A100 640GB system:

```
  CEC
============
                                          Onboard Version   Manifest       up-to-
date
MB_CEC(enabled)                           3.28              3.28
 yes
Delta_CEC(enabled)                        4.00              4.00
 yes

 BMC DGX
=========
Image Id              Status         Location      Onboard Version   Manifest  up-
to-date
0:Active   Boot       Online         Local         00.17.07          00.19.07
 yes
1:Inactive Updatable                 Local         00.17.07          00.19.07
 yes

 SBIOS
=======
Image Id                          Onboard Version   Manifest        up-to-date
0:Active   Boot Updatable         1.18              1.18               yes
1:Inactive Updatable              1.18              1.18               yes
```

```
  Switches
============
PCI Bus#                        Model           Onboard Version   Manifest        FUB
 Updated?  up-to-date
DGX - 0000:91:00.0(U261)        88064_Retimer   3.1.0             3.1.0
 N/A        yes
DGX - 0000:88:00.0(U260)        88064_Retimer   3.1.0             3.1.0
 N/A        yes
DGX - 0000:4f:00.0(U262)        88064_Retimer   3.1.0             3.1.0
 N/A        yes
DGX - 0000:48:00.0(U225)        88080_Retimer   3.1.0             3.1.0
 N/A        yes


DGX - 0000:01:00.0(U1)          PEX88096        2.0               2.0
 N/A        yes
DGX - 0000:81:00.0(U3)          PEX88096        2.0               2.0
 N/A        yes
DGX - 0000:b1:00.0(U4)          PEX88096        2.0               2.0
 N/A        yes
DGX - 0000:41:00.0(U2)          PEX88096        2.0               2.0
 N/A        yes


DGX - 0000:c4:00.0              LR10            92.10.18.00.01    92.10.18.00.01
 N/A        yes
DGX - 0000:c5:00.0              LR10            92.10.18.00.01    92.10.18.00.01
 N/A        yes
DGX - 0000:c6:00.0              LR10            92.10.18.00.01    92.10.18.00.01
 N/A        yes
DGX - 0000:c7:00.0              LR10            92.10.18.00.01    92.10.18.00.01
 N/A        yes
DGX - 0000:c8:00.0              LR10            92.10.18.00.01    92.10.18.00.01
 N/A        yes
DGX - 0000:c9:00.0              LR10            92.10.18.00.01    92.10.18.00.01
 N/A        yes



 Mass Storage
==============
Drive Name/Slot          Model Number          Onboard Version   Manifest        up-
to-date
nvme0n1          Samsung MZWLJ3T8HBLS-00007  EPK9CB5Q          EPK9CB5Q
 yes
nvme1n1          Samsung MZWLJ3T8HBLS-00007  EPK9CB5Q          EPK9CB5Q
 yes
nvme2n1          Samsung MZ1LB1T9HALS-00007  EDA7602Q          EDA7602Q
 yes
nvme3n1          Samsung MZ1LB1T9HALS-00007  EDA7602Q          EDA7602Q
 yes
nvme4n1          Samsung MZWLJ3T8HBLS-00007  EPK9CB5Q          EPK9CB5Q
 yes
nvme5n1          Samsung MZWLJ3T8HBLS-00007  EPK9CB5Q          EPK9CB5Q
 yes
nvme6n1          Samsung MZWLJ3T8HBLS-00007  EPK9CB5Q          EPK9CB5Q
 yes
nvme7n1          Samsung MZWLJ3T8HBLS-00007  EPK9CB5Q          EPK9CB5Q
 yes
nvme8n1          Samsung MZWLJ3T8HBLS-00007  EPK9CB5Q          EPK9CB5Q
 yes
nvme9n1          Samsung MZWLJ3T8HBLS-00007  EPK9CB5Q          EPK9CB5Q
 yes

 Video BIOS
============
```

```
Bus            Model            Onboard Version   Manifest         FUB Updated?  up-
to-date
0000:07:00.0   A100-SXM4-80GB   92.00.45.00.05    92.00.45.00.05         yes
 yes
0000:0f:00.0   A100-SXM4-80GB   92.00.45.00.05    92.00.45.00.05         yes
 yes
0000:47:00.0   A100-SXM4-80GB   92.00.45.00.05    92.00.45.00.05         yes
 yes
0000:4e:00.0   A100-SXM4-80GB   92.00.45.00.05    92.00.45.00.05         yes
 yes
0000:87:00.0   A100-SXM4-80GB   92.00.45.00.05    92.00.45.00.05         yes
 yes
0000:90:00.0   A100-SXM4-80GB   92.00.45.00.05    92.00.45.00.05         yes
 yes
0000:b7:00.0   A100-SXM4-80GB   92.00.45.00.05    92.00.45.00.05         yes
 yes
0000:bd:00.0   A100-SXM4-80GB   92.00.45.00.05    92.00.45.00.05         yes
 yes


Power Supply
==============
ID                        Vendor Model        MFR ID              Revision  Status
 Onboard Version     Manifest       up-to-date
PSU 0: Communication      Delta ECD16010092   Delta               03        ok
 01.07               01.07             yes
PSU 0: Secondary          Delta ECD16010092   Delta               03        ok
 01.06               01.06             yes
PSU 0: Primary            Delta ECD16010092   Delta               03        ok
 01.06               01.06             yes
PSU 1: Communication      Delta ECD16010092   Delta               03        ok
 01.07               01.07             yes
PSU 1: Secondary          Delta ECD16010092   Delta               03        ok
 01.06               01.06             yes
PSU 1: Primary            Delta ECD16010092   Delta               03        ok
 01.06               01.06             yes
PSU 2: Communication      Delta ECD16010092   Delta               03        ok
 01.07               01.07             yes
PSU 2: Secondary          Delta ECD16010092   Delta               03        ok
 01.06               01.06             yes
PSU 2: Primary            Delta ECD16010092   Delta               03        ok
 01.06               01.06             yes
PSU 3: Communication      Delta ECD16010092   Delta               03        ok
 01.07               01.07             yes
PSU 3: Secondary          Delta ECD16010092   Delta               03        ok
 01.06               01.06             yes
PSU 3: Primary            Delta ECD16010092   Delta               03        ok
 01.06               01.06             yes
PSU 4: Communication      Delta ECD16010092   Delta               03        ok
 01.07               01.07             yes
PSU 4: Secondary          Delta ECD16010092   Delta               03        ok
 01.06               01.06             yes
PSU 4: Primary            Delta ECD16010092   Delta               03        ok
 01.06               01.06             yes
PSU 5: Communication      Delta ECD16010092   Delta               03        ok
 01.07               01.07             yes
PSU 5: Secondary          Delta ECD16010092   Delta               03        ok
 01.06               01.06             yes
PSU 5: Primary            Delta ECD16010092   Delta               03        ok
 01.06               01.06             yes


  CPLD
=============
                                          Onboard Version   Manifest       up-to-
date
```

```
MB_CPLD                                         1.05              1.05
 yes
MID_CPLD                                        1.03              1.03
 yes

* CPLD won't be updated by default (`update_fw all`), use `update_fw CPLD` if it's
 needed

FPGA
========
Onboard version     Manifest  up-to-date
03.0e               03.0e        yes
```

4.3. Known Issues

4.3.1. VBIOS cannot update due to running service processes

Issue

VBIOS update fails on *Red Hat Enterprise Linux 9* due to system service/process caching the resource to be upgraded.

Explanation

The following services (system processes) must be stopped manually for the firmware update to start:

- process nvidia-persistenced(pid 5372)
- process nv-hostengine(pid 2723)
- process cache_mgr_event(pid 5276)
- process cache_mgr_main(pid 5278)
- process dcgm_ipc(pid 5279)

If `xorg` is holding the resources, try to stop it by running

```
$ sudo systemctl stop <display manager>
```

where the (display manager) can be acquired by

```
$ cat /etc/X11/default-display-manager
```

4.3.2. [BCM users only] Firmware Update Completes with Error on Base Command Manager

Issue

When attempting to update the new -0R4 CPU Trays, a failure occurs during the update process where FWUC fails to list services:

Failure messages may include:

- Failed to install DGX 88064_Retimer dev 91 3.1.o
- Unable to unload NVIDIA drivers. The following process(es)/service(s) need to be stopped in order for switch firmware update to occur:
- `<blank>`

Workaround

1. Run:
   ```
   $ scontrol update NodeName=hostname State=drain Reason="FW update"
   ```
2. Wait for jobs on the host to complete and the status of node shows drained.

   NOTE: if the output for the following command returns draining implies the node has jobs running and not ready; only proceed to step 2 only if the node status returns drained.
   ```
   $ si$ sinfo --state=drained | grep hostname
   ```
3. Stop `slurmd` service on compute node
   ```
   $ ansible -i /opt/provisioning/inventory/ --become -m shell -a  'systemctl stop
    slurmd.service ' 'hostname'
   ```
4. Post firmware update: if host has been rebooted after firmware update, change host state to resume:
   ```
   $ scontrol update NodeName=hostname state=resume
   ```

Chapter 5. DGX A100 System Firmware Update Container Version 22.5.5

The DGX Firmware Update container version **22.5.5** is available.

- Package name:`nvfw-dgxa100_22.5.5_220518.tar.gz`
- Run file name: `nvfw-dgxa100_22.5.5_220518.run`
- Image name: `nvfw-dgxa100:22.5.5`
- ISO image: `DGXA100_FWUI-22.5.5-2022-05-19-00-23-59.iso`
- PXE netboot: `pxeboot-DGXA100_FWUI-22.5.5.tgz`

Highlights and Changes in this Release

- This release is supported with the following DGX OS software:
  - DGX OS 5.1 or later.

    Important: This firmware update container does not support DGX OS 4.99.xx. To use the container on DGX A100 servers, update to DGX OS 5.1 or later.
  - EL7-21.10 or later (See Special Instructions for Red Hat Enterprise Linux 7)
  - EL8-21.08 Update 1 or later
- Fixed BMC issues
  - Fixed an issue so that certain sensors are now displaying in the BMC Web UI.
  - Fixed the graceful handling of system power loss, which prevents the BMC Flash file system consistency issue and improves recovery.
  - Fixed issues that caused the BMC usage to dramatically increase, which resulted in a POST failure with error code 91 or B4.

    This fix also improves the error handling in the Redfish interface.
  - Fixed the BMC Web UI security settings and page refresh during full screen mode.
  - Fixed BMC SEL Event page, which was causing an error in certain SEL record parsing.

  - Fixed an issue where the Power/Status LED was flashing continuously after the server was rebooted, and the Power/Status LED stayed on after the server was powered off.
- Added Redfish API support.
  - For more information, see Redfish API support in the DGX A100 User Guide.
  - For a list of known issues, see Known Issues.
- Fixed SBIOS issues
  - Fixed two issues that were causing boot order settings to not be saved to the BMC if applied out-of-band, causing settings to be lost after a subsequent firmware update.
  - Added interactive countdown messages during boot, to display the Setup Prompt Timeout configurable through the **Boot** > **Setup Prompt Timeout** configuration menu.
  - Added reporting of AGESA Version in SMBIOS.
  - Updated AGESA to version 1.0.0.D.

Contents of the DGX A100 System Firmware Container

This container includes the firmware binaries and update utilities for the firmware listed in the following table.

- If you are updating from 21.11.4 to 22.5.5, the total update time is approximately **1 hour and 3 minutes**.
- If you are updating from 21.03.6 or earlier to 22.5.5, the total update time is approximately **2 hours and 51 minutes**.

The update time for each component is provided in the following table.

Component	Version	Key Changes	Update Time from 21.03.6 or earlier	Update Time from 21.11.4
BMC (via CEC)	**00.17.07**	Refer to DGX A100 BMC Changes for the list of changes.	31 minutes	31 minutes
SBIOS	**1.13**	Refer to DGX A100 SBIOS Changes for the list of changes.	6 minutes	6 minutes
Broadcom 88096 PCIe switch board	0.2.0	No change	1 minute	0 minute
BMC CEC SPI (`MB_CEC`)	3.28	No change	7 minutes	0 minutes
PEX88064 Retimer	3.1.0	New support	1 minute	1 minutes
PEX88080 Retimer	3.1.0	New support	1 minute	1 minutes
NvSwitch BIOS	92.10.18.00.01	No change	2 minutes	0 minutes

Component	Version	Key Changes	Update Time from 21.03.6 or earlier	Update Time from 21.11.4
VBIOS (A100 40GB)	92.00.45.00.03	Added security protection to the I2C interface.	2 minutes	0 minutes
VBIOS (A100 80GB)	92.00.45.00.05	Added security protection to the I2C interface.		
VBIOS (A100 SystemB 80GB)	**92.00.81.00.06**	New support	N/A	
U.2 NVMe (Samsung)	EPK9CB5Q	Refer to DGX A100 U.2 NVMe Changes for the list of changes.	5 minutes	0 minutes
U.2 NVMe (Kioxia)	105	No change		
M.2 NVMe (Samsung version 1)	EDA7602Q	No change	0 minutes	0 minutes
M.2 NVMe (Samsung version 2)	**GDC7302Q**	New support		
FPGA (GPU sled)	**3.0e**	New support	22 minutes	21 minutes
CEC1712 SPI (GPU sled)	4.0	New support	3 minutes	3 minutes
PSU (Delta rev04)	Primary 1.7/ Secondary 1.7/ Community 1.7	New support	0 minutes	0 minutes
PSU (Delta rev03)	Primary 1.6/ Secondary 1.6/ Community 1.7	No change	90 minutes	
PSU (Delta rev02)	Primary 1.6/ Secondary 1.6/ Community 1.7	No change		
PSU (LiteOn)	**908**	No change	0 minutes	

Updating Components with Secondary Images

Some firmware components provide a secondary image as backup. The following is the policy when updating those components:

- **SBIOS**: The two images are referred to as active and inactive, where the active is the currently running image and the inactive is the backup image.

When using `update_fw all`, the update container updates both active and inactive images.

- **BMC**: The two images are referred to as active and inactive, where the active is the currently running image and the inactive is the backup image.

  The update container can only update the inactive image, and will update it only if the *active* image needs to be updated. After the update is completed, the updated inactive image becomes the active image. Because the active image is now updated, subsequent `update_fw all` commands will not update the inactive image. To update the inactive image in this case, use `update_fw BMC --inactive`. Since the container does not support updating the active image directly, commands such as `update_fw BMC -a -f` will not work.

DO NOT UPDATE DGX A100 CPLD FIRMWARE UNLESS INSTRUCTED

When updating DGX A100 firmware using the Firmware Update Container, do not update the CPLD firmware unless the DGX A100 system is being upgraded from 320GB to 640GB.

The current DGX A100 Firmware Update Container will not automatically update the CPLD firmware (for example, when running `update_fw all`). It is possible to update the CPLD firmware using "`update_fw CPLD`"; however, it is strongly recommended that the CPLD firmware not be updated manually unless specifically instructed by NVIDIA Enterprise Support (or email enterprisesupport@nvidia.com). If the DGX A100 is upgraded from 320GB to 640GB, the CPLD firmware update should be performed as instructed.

5.1. Special Instructions for Red Hat Enterprise Linux 7

This section describes the actions that must be taken before updating firmware on DGX A100 systems installed with Red Hat Enterprise Linux. There are two options for meeting these requirements.

Option 1: Update to EL7-22.05

Refer to the DGX Software for Red Hat Enterprise Linux 7 Release Notes for more information.

Important: Updating the DGX software for Red Hat Enterprise Linux will update the Red Hat Enterprise Linux installation to 7.9 or later. If you do not want to update your Red Hat Enterprise Linux 7 installation, then choose Option 2.

Option 2: Install mpt3sas 31.101.01.00-0

These instructions apply if:

- You do not want to update your Red Hat Enterprise Linux installation, and
- Your system is currently installed with Red Hat Enterprise Linux 7.7 or later.

Note: If your system is installed with Red Hat Enterprise Linux 7.6 or earlier, contact NVIDIA Enterprise Support for assistance.

1. Perform this step if your system is no longer pointing to the NVIDIA DGX software repository.
   a). On Red Hat Enterprise Linux, run the following commands to enable additional repositories required by the DGX software.
   ```
   $ sudo subscription-manager repos --enable=rhel-7-server-extras-rpms
   $ sudo subscription-manager repos --enable=rhel-7-server-optional-rpms
   ```
   b). Run the following command to install the DGX software installation package and enable the NVIDIA DGX software repository.

   ATTENTION: By running these commands you are confirming that you have read and agree to be bound by the DGX Software License Agreement. You are also confirming that you understand that any pre-release software and materials available that you elect to install in a DGX may not be fully functional, may contain errors or design flaws, and may have reduced or different security, privacy, availability, and reliability standards relative to commercial versions of NVIDIA software and materials, and that you use pre-release versions at your risk.

   ```
   $ yum install -y \
   https://international.download.nvidia.com/dgx/repos/rhel-files/dgx-repo-setup-20.03-1.el7.x86_64.rpm
   ```
2. Install `mpt3sas` 31.101.01.00-0.
   ```
   $ sudo yum install mpt3sas-dkms
   ```
3. Load the `mpt3sas` driver into the Red Hat Enterprise Linux kernel.
   ```
   $ sudo modprobe mpt3sas
   ```
   You can verify the correct `mpt3sas` version is installed by issuing the following.
   ```
   $ yum list installed
   ```

5.2. Instructions for Updating Firmware

This section provides a simple way to update the firmware on the system using the firmware update container.
The commands use the .run file, but you can also use any method described in Using the DGX A100 FW Update Utility.

CAUTION:

- Do not log into the BMC dashboard UI while a firmware update is in progress.
- Stop all unnecessary system activities before attempting to update firmware.
- Stop all GPU activity, including accessing nvidia-smi, as this can prevent the VBIOS from updating.

- When issuing `update_fw all`, stop the following services if they are launched from Docker through the `docker run` command:
  - `dcgm-exporter`
  - `nvidia-dcgm`
  - `nvidia-fabricmanager`
  - `nvidia-persistenced`
  - `xorg-setup`
  - `lightdm`
  - `nvsm-core`
  - `kubelet`

  The container will attempt to stop these services automatically, but will be unable to stop any that are launched from Docker.
- Do not add additional loads on the system (such as user jobs, diagnostics, or monitoring services) while an update is in progress. A high workload can disrupt the firmware update process and result in an unusable component.
- When initiating an update, the update software assists in determining the activity state of the DGX system and provides a warning if it detects that activity levels are above a predetermined threshold. If the warning is encountered, you are strongly advised to take action to reduce the workload before proceeding with the update.

1. Check if updates are needed by checking the installed versions.

   ```
   $ sudo ./nvfw-dgxa100_22.5.5_220518.run show_version
   ```

   - If there is "no" in any up-to-date column for updatable firmware, then continue with the next step.
   - If all up-to-date column entries are "yes", then no updates are needed and no further action is necessary.
2. Perform the update for all firmware supported by the container.

   ```
   $ sudo ./nvfw-dgxa100_22.5.5_220518.run update_fw all
   ```

   Depending on the firmware that is updated, you may be prompted to either reboot the system or power cycle the system.

   - If you are prompted to reboot, issue

     ```
     $ sudo reboot
     ```
   - If you are prompted to power cycle, you can issue the following two commands (there is no output with the first command).

     ```
     $ sudo ipmitool raw 0x3c 0x04
     $ sudo ipmitool chassis power cycle
     ```
3. After rebooting or power cycling the system, you may need to perform another `update_fw all` to update other firmware.

   - Either repeat Step 1 to check if updates are needed and then perform Step 2 if needed, or
   - Repeat Step 2 just in case updates are needed.

If you perform another `update_fw all`, you may be prompted again to either reboot the system or power cycle the system.

See DGX A100 Firmware Update Process for more information about the update process.

You can verify the update by issuing the following.

```
$ sudo ./nvfw-dgxa100_22.5.5_220518.run show_version
```

Example output for a DGX A100 640GB system

```
  CEC
============
                                        Onboard Version   Manifest       up-to-
date
MB_CEC(enabled)                         3.28              3.28
 yes
Delta_CEC(enabled)                      4.00              4.00
 yes

 BMC DGX
=========
Image Id              Status         Location      Onboard Version   Manifest  up-
to-date
0:Active   Boot       Online         Local         00.17.07          00.17.07
 yes
1:Inactive Updatable                 Local         00.17.07          00.17.07
 yes

 SBIOS
=======
Image Id                          Onboard Version   Manifest        up-to-date
0:Active   Boot Updatable         1.13              1.13               yes
1:Inactive Updatable              1.13              1.13               yes

  Switches
============
PCI Bus#                      Model          Onboard Version   Manifest        FUB
 Updated?  up-to-date
DGX - 0000:91:00.0(U261)      88064_Retimer  3.1.0             3.1.0
 N/A        yes
DGX - 0000:88:00.0(U260)      88064_Retimer  3.1.0             3.1.0
 N/A        yes
DGX - 0000:4f:00.0(U262)      88064_Retimer  3.1.0             3.1.0
 N/A        yes
DGX - 0000:48:00.0(U225)      88080_Retimer  3.1.0             3.1.0
 N/A        yes


DGX - 0000:01:00.0(U1)        PEX88096       2.0               2.0
 N/A        yes
DGX - 0000:81:00.0(U3)        PEX88096       2.0               2.0
 N/A        yes
DGX - 0000:b1:00.0(U4)        PEX88096       2.0               2.0
 N/A        yes
DGX - 0000:41:00.0(U2)        PEX88096       2.0               2.0
 N/A        yes


DGX - 0000:c4:00.0            LR10           92.10.18.00.01    92.10.18.00.01
 N/A        yes
DGX - 0000:c5:00.0            LR10           92.10.18.00.01    92.10.18.00.01
 N/A        yes
DGX - 0000:c6:00.0            LR10           92.10.18.00.01    92.10.18.00.01
 N/A        yes
```

```
DGX - 0000:c7:00.0            LR10            92.10.18.00.01    92.10.18.00.01
 N/A        yes
DGX - 0000:c8:00.0            LR10            92.10.18.00.01    92.10.18.00.01
 N/A        yes
DGX - 0000:c9:00.0            LR10            92.10.18.00.01    92.10.18.00.01
 N/A        yes



 Mass Storage
==============
Drive Name/Slot         Model Number         Onboard Version   Manifest        up-
to-date
nvme0n1          Samsung MZWLJ3T8HBLS-00007  EPK9CB5Q          EPK9CB5Q
 yes
nvme1n1          Samsung MZWLJ3T8HBLS-00007  EPK9CB5Q          EPK9CB5Q
 yes
nvme2n1          Samsung MZ1LB1T9HALS-00007  EDA7602Q          EDA7602Q
 yes
nvme3n1          Samsung MZ1LB1T9HALS-00007  EDA7602Q          EDA7602Q
 yes
nvme4n1          Samsung MZWLJ3T8HBLS-00007  EPK9CB5Q          EPK9CB5Q
 yes
nvme5n1          Samsung MZWLJ3T8HBLS-00007  EPK9CB5Q          EPK9CB5Q
 yes
nvme6n1          Samsung MZWLJ3T8HBLS-00007  EPK9CB5Q          EPK9CB5Q
 yes
nvme7n1          Samsung MZWLJ3T8HBLS-00007  EPK9CB5Q          EPK9CB5Q
 yes
nvme8n1          Samsung MZWLJ3T8HBLS-00007  EPK9CB5Q          EPK9CB5Q
 yes
nvme9n1          Samsung MZWLJ3T8HBLS-00007  EPK9CB5Q          EPK9CB5Q
 yes

 Video BIOS
============
Bus             Model            Onboard Version   Manifest         FUB Updated?  up-
to-date
0000:07:00.0   A100-SXM4-80GB   92.00.45.00.05    92.00.45.00.05         yes
 yes
0000:0f:00.0   A100-SXM4-80GB   92.00.45.00.05    92.00.45.00.05         yes
 yes
0000:47:00.0   A100-SXM4-80GB   92.00.45.00.05    92.00.45.00.05         yes
 yes
0000:4e:00.0   A100-SXM4-80GB   92.00.45.00.05    92.00.45.00.05         yes
 yes
0000:87:00.0   A100-SXM4-80GB   92.00.45.00.05    92.00.45.00.05         yes
 yes
0000:90:00.0   A100-SXM4-80GB   92.00.45.00.05    92.00.45.00.05         yes
 yes
0000:b7:00.0   A100-SXM4-80GB   92.00.45.00.05    92.00.45.00.05         yes
 yes
0000:bd:00.0   A100-SXM4-80GB   92.00.45.00.05    92.00.45.00.05         yes
 yes


Power Supply
==============
ID                       Vendor Model        MFR ID              Revision  Status
 Onboard Version     Manifest       up-to-date
PSU 0: Communication     Delta ECD16010092   Delta               03        ok
 01.07               01.07             yes
PSU 0: Secondary         Delta ECD16010092   Delta               03        ok
 01.06               01.06             yes
PSU 0: Primary           Delta ECD16010092   Delta               03        ok
 01.06               01.06             yes
```

```
PSU 1: Communication     Delta ECD16010092   Delta                03        ok
 01.07                01.07             yes
PSU 1: Secondary         Delta ECD16010092   Delta                03        ok
 01.06                01.06             yes
PSU 1: Primary           Delta ECD16010092   Delta                03        ok
 01.06                01.06             yes
PSU 2: Communication     Delta ECD16010092   Delta                03        ok
 01.07                01.07             yes
PSU 2: Secondary         Delta ECD16010092   Delta                03        ok
 01.06                01.06             yes
PSU 2: Primary           Delta ECD16010092   Delta                03        ok
 01.06                01.06             yes
PSU 3: Communication     Delta ECD16010092   Delta                03        ok
 01.07                01.07             yes
PSU 3: Secondary         Delta ECD16010092   Delta                03        ok
 01.06                01.06             yes
PSU 3: Primary           Delta ECD16010092   Delta                03        ok
 01.06                01.06             yes
PSU 4: Communication     Delta ECD16010092   Delta                03        ok
 01.07                01.07             yes
PSU 4: Secondary         Delta ECD16010092   Delta                03        ok
 01.06                01.06             yes
PSU 4: Primary           Delta ECD16010092   Delta                03        ok
 01.06                01.06             yes
PSU 5: Communication     Delta ECD16010092   Delta                03        ok
 01.07                01.07             yes
PSU 5: Secondary         Delta ECD16010092   Delta                03        ok
 01.06                01.06             yes
PSU 5: Primary           Delta ECD16010092   Delta                03        ok
 01.06                01.06             yes


  CPLD
============
                                         Onboard Version   Manifest       up-to-
date
MB_CPLD                                  1.05              1.05
 yes
MID_CPLD                                 1.03              1.03
 yes

* CPLD won't be updated by default (`update_fw all`), use `update_fw CPLD` if it's
 needed

FPGA
========
Onboard version     Manifest  up-to-date
03.0e               03.0e        yes
```

5.3. Known Issues

5.3.1. Chassis Power State Remains On

Issue

When the system completes a `GracefulShutdown` and is queried by using Redfish, the Chassis Power State remains `On`, but the system power status will be correctly reported by using IPMI and in the BMC Web UI.

Explanation

The system can be powered on by using the IPMI command or by using BMC Web UI.

5.3.2. Incorrect Thermal and Voltage Sensor and Fan RPM Values are Displayed

Issue

Some thermal and voltage sensors and FAN RPMs might show incorrect (Zero reading) values when retrieved by using the Redfish APIs.

Explanation

This issue is currently under investigation.

5.3.3. Processor Power Limit and Power Metrics are Not Supported

Issue

Some thermal sensor reading and FAN RPMs might show incorrect (a zero reading) value when they are retrieved through the Redfish API.

Explanation

This issue is currently under investigation.

5.3.4. IndicatorLED Status Might Display an Incorrect State

Issue

The IndicatorLED status in Redfish might display an incorrect state for the system and disk resources.

Explanation

This issue is currently under investigation.

5.3.5. Unable to Update BMC Firmware

Issue

To run Firmware Update Container Version 22.5.5, you must use `MB_CEC` version 3.28.

Explanation

If you are using an `MB_CEC` version that is earlier than 3.28, you must first update to firmware update container version 21.03.6 or later.

5.3.6. Firmware Update Container Unable to Recover PSU with Corrupted Firmware

Issue

The firmware update container cannot recover the PSU firmware when the container cannot determine the hardware revision of the PSU.

Explanation

To recover a PSU that is revision 00-03, use firmware update container version 21.11.4.

5.3.7. Setting Up Active Directory Settings Might Fail with "Invalid Domain Name" Error

Issue

After logging into the BMC dashboard UI and setting up and enabling Active Directory Authentication, an "Invalid Domain Name" error may occur.

Explanation

If you encounter this error, set up the DNS manually as follows:

1. Login to the BMC UI dashboard.
2. Navigate to Settings > Network Settings > DNS Configuration > "Domain Name Server Setting"
3. Find "Domain Name Server Setting" and change "**Automatic**" to "**Manual**".
4. Replace "DNS Server 1" IP to "`8.8.8.8`" (the IP is dns.google)
5. Click **Save** and accept the alert to restart the BMC network.

5.3.8. NVSM Incorrectly Reports the Delta PSU Part Number Instead of the Model Numbers

Issue

When issuing `show_version` or `show_fw_manifest`, the number associated with the Delta PSU is the part number instead of the model number.

Explanation

This will be resolved in a future release.

5.3.9. BMC KVM Screen May Show "No Signal" Under Certain Conditions

Issue

When attempting to view the DGX A100 console from the BMC Web UI KVM, the screen might show `No Signal` if you cold reset the BMC and reboot the server. This is due to a rare condition between BMC and the SBIOS.

For example, the issue might occur after performing the following:

1. Issue the command to cold reset the BMC.
   ```
   $ sudo ipmitool mc reset cold
   ```
2. Wait about 30 seconds and issue the command to reboot the system.
   ```
   $ sudo reboot
   ```

Explanation

You can recover the system by issuing a hard reset from the Web UI.

5.3.10. SBIOS "Bootup NumLock State" not Enforced

Issue

When turning NumLock to OFF after setting "**Boot NumLock State**" to ON from the SBIOS setup menu, NumLock remains off after rebooting the server. Similarly, when turning NumLock to ON after setting "**Boot NumLock State**" to OFF from the SBIOS setup menu, NumLock remains on after rebooting the server.

Explanation

This feature is currently not implemented in the DGX A100 SBIOS.

5.3.11. NVSM Fails to Run the FWUC `show_version` Command

Issue

This is an issue with NGC access without entering an email address for authentication

Explanation

To resolve this issue, upgrade to NVSM version 20.09.37 and later.

5.3.12. NVSM Exits With an Error Message When Updating Firmware by Using NVSM

Issue

When the firmware update container uses NVSM to update the firmware, after a few minutes, NVSM exits with the following message:

```
('Connection broken: IncompleteRead(0 bytes read)', IncompleteRead(0 bytes read)).
```

In the `nvidia-fw.log`, the update process continues in the background until it has completed.

Explanation

The system can be powered on by using the IPMI command or by using BMC Web UI.

5.3.13. After an FPGA Update, BMC Sel Log Shows Sensor-Related Errors

Issue

After a firmware update, the BMC sel log might show sensor-related errors.

Explanation

These errors can be safely ignored. To resolve this issue, upgrade to DGX OS 5.3 and later.

5.3.14. After a Firmware Update, Only the Delta Manifest Version Displays

Issue

After a firmware update, the Delta PSU version and the Delta manifest version should be displayed, but only the Delta manifest version appears.

Explanation

This issue will be fixed in a future release.

5.3.15. PSUs Sometimes Display an Error after an Update

Issue

When you run `show_version`, you might see `ERR:retries` in the container output and components might be listed as `not-supported`.

Explanation

To see the correct firmware versions and component status, run `show_version` again.

5.3.16. Force FPGA Update Sometimes Fails

Issue

When you force-update FPGA firmware, the update might fail, and the `Auto updates are not allowed on a busy system` message is displayed.

Explanation

This issue will be fixed in a future release.

5.3.17. Updating to Firmware Container Version 22.5.5 Fails for SSDs

Issue

The firmware container version 22.5.5 fails to update SSDs on systems where NVMe multipathing is enabled.

Explanation

If the container fails to update a device that has `c<number>`, for example `nvme0c0n1`, in its name. This is because the device was a multipath device.

Disabling multipathing depends on the type of multipathing and the way it was enabled. As a result, you can update each SSD individually without disabling multipathing by running the following command:

```
update_fw SSD --select-ssd <ssd_name>
```

For example, here is a system with the following devices in `show` version:

```
Mass Storage
==============
Drive Name/Slot          Model Number          Onboard Version   Manifest         up-
to-date
nvme0n1           Samsung MZWLJ3T8HBLS-00007  EPK9CB5Q          EPK9CB5Q
 yes
nvme1n1           Samsung MZ1LB1T9HALS-00007  EDA7602Q          EDA7602Q
 yes
nvme2n1           Samsung MZ1LB1T9HALS-00007  EDA7602Q          EDA7602Q
 yes
```

To update `nvme0n1`, run the following command:

```
update_fw SSD --select-ssd nvme0n1
```

Chapter 6. DGX A100 System Firmware Update Container Version 21.11.4

The DGX Firmware Update container version 21.11.4 is available.

- Package name:`nvfw-dgxa100_21.11.4_211111.tar.gz`
- Run file name: `nvfw-dgxa100_21.11.4_211111.run`
- Image name: `nvfw-dgxa100:21.11.4`
- ISO image: `DGXA100_FWUI-21.11.4-2021-11-12-09-20-53.iso`
- PXE netboot: `pxeboot-DGXA100-FWUI-21.11.4.tgz`

Highlights and Changes in this Release

- This release is supported with the following DGX OS software -
  - DGX OS 5.0.1 or later

    Important: This firmware update container does not support DGX OS 4.99.xx. To use the container on DGX A100 servers, update to DGX OS 5.0.1 or later.
  - EL7-21.04 or later (See Special Instructions for Red Hat Enterprise Linux 7)
  - EL8-20.11 or later
- Fixed BMC issues
  - Fixed incorrect temperatures reported for sensors on the NVIDIA Networking ConnectX-6 single-port and dual-port VPI cards.
  - Fixed BMC user data (username, password, privileges) getting lost after BMC upgrade.
  - Added ability to set the BMC to local time instead of the default UTC.
  - Added authentication capabilities to the BMC RESTful API.
  - Added new capabilities to identify firmware update in the System Event Log (SEL) on the BMC.

  - Fixed the bug to ensure that the BMC will boot to the latest version updated on the system.
- Fixed SBIOS issues
  - Added Memory correctable ECC Error leaky bucket, preventing unnecessary replacement of working system DIMMs.
  - Fixed PXE boot configuration not persisting, helpful for multiple DGX A100 nodes.
  - Fixed inability to enter SBIOS Admin/User password from the Serial over LAN console.
- Fixed U.2 NVMe driver issues
  - Improved write performance while performing drive wear-leveling.
- Addressed the needs of security-conscious customers who no longer support Python 2.7 by using Python 3 in the NVIDIA containerless .run file.
- IPMITool: "`ipmitool -I lan`" is no longer supported. Instead, use "`ipmitool -I lanplus`".

Contents of the DGX A100 System Firmware Container

This container includes the firmware binaries and update utilities for the firmware listed in the following table.

- If updating from 21.05.7 or 21.03.6, the total update time is approximately 44 minutes.
- If updating from 20.12.3.3 or earlier, the total update time is approximately 3 hours and 22 minutes.

The update time for each component is provided in the following table.

Component	Version	Key Changes	Update Time from 20.12.3.3 or earlier	Update Time from 21.05.7 or 21.03.6
BMC (via CEC)	**00.16.09**	Refer to DGX A100 BMC Changes for the list of changes.	32 minutes	32 minutes
SBIOS	**1.09**	Refer to DGX A100 SBIOS Changes for the list of changes.	5 minutes	5 minutes
Broadcom 88096 PCIe switch board	0.2.0	No change	1 minute	0 minute
BMC CEC SPI	v3.28	No change	22 minutes	0 minutes
PEX88064 Retimer	1.2f	No change	1 minute	0 minutes
PEX88080 Retimer	1.2f	No change	1 minute	0 minutes
NvSwitch BIOS	92.10.18.00.01	No change	2 minutes	0 minutes

Component	Version	Key Changes	Update Time from 20.12.3.3 or earlier	Update Time from 21.05.7 or 21.03.6
VBIOS (A100 40GB)	**92.00.45.00.03**	Added security protection to the I2C interface.	7 minutes	3 minutes
VBIOS (A100 80GB)	**92.00.45.00.05**	Added security protection to the I2C interface.		
U.2 NVMe (Samsung)	**EPK9CB5Q**	Refer to DGX A100 U.2 NVMe Changes for the list of changes.	4 minutes	4 minutes
U.2 NVMe (Kioxia)	0105	No change		
M.2 NVMe (Samsung version 1)	EDA7602Q	No change	4 minutes	0 minutes
M.2 NVMe (Samsung version 2)	**GDC7202Q**	New support		
FPGA (GPU sled)	2.A5	No change	22 minutes	0 minutes
CEC1712 SPI (GPU sled)	3.9	No change	3 minutes	0 minutes
PSU (Delta)	Primary 1.6/ Secondary 1.6/ Community 1.7	No change	90 minutes	0 minutes
PSU (LiteOn)	**v0908**	New support		

BMC 00.16.12 on Newer CPU Motherboards

Newer CPU motherboards are manufactured and shipped with BMC version 00.16.12. This BMC version provides an updated PCIe setting that is required by the newer (-004) motherboards. Do not attempt to downgrade the BMC on these motherboards using the firmware update container.

Updating Components with Secondary Images

Some firmware components provide a secondary image as backup. The following is the policy when updating those components:

- **SBIOS**: The two images are referred to as active and inactive, where the active is the currently running image and the inactive is the backup image. When using `update_fw all`, the update container updates both active and inactive images.

- **BMC**: The two images are referred to as active and inactive, where the active is the currently running image and the inactive is the backup image. The update container can only update the inactive image, and will update it only if the *active* image needs to be updated. After the update is completed, the updated inactive image becomes the active image. Because the active image is now updated, subsequent `update_fw all` commands will not update the inactive image. To update the inactive image in this case, use `update_fw BMC --inactive`. Since the container does not support updating the active image directly, commands such as `update_fw BMC -a -f` will not work.

Updating the PSU FW

- If the PSU update fails due to a failure in the PSU recovery, power cycle the PSU and then perform the PSU update again. The following are some methods for power cycling the PSU:
  - Remove power from the failed PSU by turning off the rack PDU output to that PSU and then turning it back on after a few moments. (If necessary, run the container using the `show_version` option to determine which PSU is reported as "`not-ok`").
  - Physically disconnect power to the PSU by disconnecting one end of the PSU power cord and then reconnect after a few moments. (If necessary, run the container using the `show_version` option to determine which PSU is reported as "`not-ok`").
  - AC power cycle the server.

```
$ sudo ipmitool raw 0x3c 0x04
$ sudo ipmitool chassis power cycle
```

DO NOT UPDATE DGX A100 CPLD FIRMWARE UNLESS INSTRUCTED

When updating DGX A100 firmware using the Firmware Update Container, do not update the CPLD firmware unless the DGX A100 system is being upgraded from 320GB to 640GB.

The current DGX A100 Firmware Update Container will not automatically update the CPLD firmware (for example, when running `update_fw all`). It is possible to update the CPLD firmware using "`update_fw CPLD`"; however, it is strongly recommended that the CPLD firmware not be updated manually unless specifically instructed by NVIDIA Enterprise Support (or email enterprisesupport@nvidia.com). If the DGX A100 is upgraded from 320GB to 640GB, the CPLD firmware update should be performed as instructed.

6.1. Special Instructions for Red Hat Enterprise Linux 7

This section describes the actions that must be taken before updating firmware on DGX A100 systems installed with Red Hat Enterprise Linux. There are two options for meeting these requirements.

Option 1: Update to EL7-21.01 or later

Refer to the DGX Software for Red Hat Enterprise Linux 7 Release Notes for more information.

Important: Updating the DGX software for Red Hat Enterprise Linux will update the Red Hat Enterprise Linux installation to 7.9 or later. If you do not want to update your Red Hat Enterprise Linux 7 installation, then choose Option 2.

Option 2: Install mpt3sas 31.101.01.00-0

These instructions apply if

- You do not want to update your Red Hat Enterprise Linux installation, and
- Your system is currently installed with Red Hat Enterprise Linux 7.7 or later.

Note: If your system is installed with Red Hat Enterprise Linux 7.6 or earlier, contact NVIDIA Enterprise Support for assistance.

1. Perform this step if your system is no longer pointing to the NVIDIA DGX software repository.
   a). On Red Hat Enterprise Linux, run the following commands to enable additional repositories required by the DGX software.
   ```
   sudo subscription-manager repos --enable=rhel-7-server-extras-rpms
   sudo subscription-manager repos --enable=rhel-7-server-optional-rpms
   ```
   b). Run the following command to install the DGX software installation package and enable the NVIDIA DGX software repository.

   ATTENTION: By running these commands you are confirming that you have read and agree to be bound by the DGX Software License Agreement. You are also confirming that you understand that any pre-release software and materials available that you elect to install in a DGX may not be fully functional, may contain errors or design flaws, and may have reduced or different security, privacy, availability, and reliability standards relative to commercial versions of NVIDIA software and materials, and that you use pre-release versions at your risk.

   ```
   yum install -y \
   https://international.download.nvidia.com/dgx/repos/rhel-files/dgx-repo-setup-20.03-1.el7.x86_64.rpm
   ```
2. Install `mpt3sas` 31.101.01.00-0.
   ```
   sudo yum install mpt3sas-dkms
   ```
3. Load the `mpt3sas` driver into the Red Hat Enterprise Linux kernel.
   ```
   sudo modprobe mpt3sas
   ```
   You can verify the correct `mpt3sas` version is installed by issuing the following.
   ```
   yum list installed
   ```

6.2. Instructions for Updating Firmware

This section provides a simple way to update the firmware on the system using the firmware update container. The commands use the .run file, but you can also use any method described in Using the DGX A100 FW Update Utility.

CAUTION:

- Do not log into the BMC dashboard UI while a firmware update is in progress.
- Stop all unnecessary system activities before attempting to update firmware.
- Stop all GPU activity, including accessing nvidia-smi, as this can prevent the VBIOS from updating.
- When issuing `update_fw all`, stop the following services if they are launched from Docker through the `docker run` command:
  - `dcgm-exporter`
  - `nvidia-dcgm`
  - `nvidia-fabricmanager`
  - `nvidia-persistenced`
  - `xorg-setup`
  - `lightdm`
  - `nvsm-core`
  - `kubelet`

  The container will attempt to stop these services automatically, but will be unable to stop any that are launched from Docker.
- Do not add additional loads on the system (such as user jobs, diagnostics, or monitoring services) while an update is in progress. A high workload can disrupt the firmware update process and result in an unusable component.
- When initiating an update, the update software assists in determining the activity state of the DGX system and provides a warning if it detects that activity levels are above a predetermined threshold. If the warning is encountered, you are strongly advised to take action to reduce the workload before proceeding with the update.

1. Check if updates are needed by checking the installed versions.

   ```
   $ sudo ./nvfw-dgxa100:21.11.4_211111.run show_version
   ```

   - If there is "no" in any up-to-date column for updatable firmware, then continue with the next step.
   - If all up-to-date column entries are "yes", then no updates are needed and no further action is necessary.
2. Perform the update for all firmware supported by the container.

```
$ sudo ./nvfw-dgxa100:21.11.4_211111.run update_fw all
```

Depending on the firmware that is updated, you may be prompted to either reboot the system or power cycle the system.

- If you are prompted to reboot, issue

  ```
  $ sudo reboot
  ```

- If you are prompted to power cycle, you can issue the following two commands (there is no output with the first command).

  ```
  $ sudo ipmitool raw 0x3c 0x04
  $ sudo ipmitool chassis power cycle
  ```

3. After rebooting or power cycling the system, you may need to perform another `update_fw all` to update other firmware.

   - Either repeat Step 1 to check if updates are needed and then perform Step 2 if needed, or
   - Repeat Step 2 just in case updates are needed.

   If you perform another `update_fw all`, you may be prompted again to either reboot the system or power cycle the system.

   See DGX A100 Firmware Update Process for more information about the update process.

You can verify the update by issuing the following.

```
$ sudo ./nvfw-dgxa100:21.11.4_211111.run show_version
```

Example output for a DGX A100 320GB system

```
 CEC
============
                                        Onboard Version   Manifest  up-to-date
MB_CEC(enabled)                          3.28              3.28         yes
Delta_CEC(enabled)                       3.09              3.09         yes

 BMC DGX
=========
Image Id              Status    Location    Onboard Version   Manifest  up_to_date
0:Active   Boot       Online    Local       00.16.09          00.16.09     yes
1:Inactive Updatable            Local       00.16.09          00.16.09     yes

 SBIOS
=======
Image Id                                    Onboard Version   Manifest    up_to_date
0:Inactive Updatable                        1.09              1.09          yes
1:Active   Boot Updatable                   1.09              1.09          yes

  Switches
============
PCI Bus#                  Model      Onboard Version Manifest FUB Updated? up-to-
date
DGX - 0000:91:00.0(U261)  88064_Retimer  1.2.0        1.2.0      N/A         yes
DGX - 0000:88:00.0(U260)  88064_Retimer  1.2.0        1.2.0      N/A         yes
DGX - 0000:4f:00.0(U262)  88064_Retimer  1.2.0        1.2.0      N/A         yes
DGX - 0000:48:00.0(U225)  88080_Retimer  1.2.0        1.2.0      N/A         yes


DGX - 0000:01:00.0(U1)    PEX88096       2.0          2.0        N/A         yes
DGX - 0000:b1:00.0(U4)    PEX88096       2.0          2.0        N/A         yes
DGX - 0000:41:00.0(U2)    PEX88096       2.0          2.0        N/A         yes
DGX - 0000:81:00.0(U3)    PEX88096       2.0          2.0        N/A         yes
```

```
DGX - 0000:c4:00.0        LR10    92.10.18.00.01  92.10.18.00.01  N/A      yes
DGX - 0000:c5:00.0        LR10    92.10.18.00.01  92.10.18.00.01  N/A      yes
DGX - 0000:c8:00.0        LR10    92.10.18.00.01  92.10.18.00.01  N/A      yes
DGX - 0000:c6:00.0        LR10    92.10.18.00.01  92.10.18.00.01  N/A      yes
DGX - 0000:c9:00.0        LR10    92.10.18.00.01  92.10.18.00.01  N/A      yes
DGX - 0000:c7:00.0        LR10    92.10.18.00.01  92.10.18.00.01  N/A      yes



 Mass Storage
==============
Drive Name/Slot         Model Number        Onboard Version   Manifest   up-to-date
nvme0n1          Samsung MZWLJ3T8HBLS-00007  EPK9CB5Q          EPK9CB5Q     yes
nvme1n1          Samsung MZ1LB1T9HALS-00007  EDA7602Q          EDA7602Q     yes
nvme2n1          Samsung MZ1LB1T9HALS-00007  EDA7602Q          EDA7602Q     yes
nvme3n1          Samsung MZWLJ3T8HBLS-00007  EPK9CB5Q          EPK9CB5Q     yes
nvme4n1          Samsung MZWLJ3T8HBLS-00007  EPK9CB5Q          EPK9CB5Q     yes
nvme5n1          Samsung MZWLJ3T8HBLS-00007  EPK9CB5Q          EPK9CB5Q     yes

 Video BIOS
============
Bus             Model            Onboard Version   Manifest     FUB Updated? up-to-
date
0000:07:00.0   A100-SXM4-40GB   92.00.45.00.03   92.00.45.00.03  yes         yes
0000:0f:00.0   A100-SXM4-40GB   92.00.45.00.03   92.00.45.00.03  yes         yes
0000:47:00.0   A100-SXM4-40GB   92.00.45.00.03   92.00.45.00.03  yes         yes
0000:4e:00.0   A100-SXM4-40GB   92.00.45.00.03   92.00.45.00.03  yes         yes
0000:87:00.0   A100-SXM4-40GB   92.00.45.00.03   92.00.45.00.03  yes         yes
0000:90:00.0   A100-SXM4-40GB   92.00.45.00.03   92.00.45.00.03  yes         yes
0000:b7:00.0   A100-SXM4-40GB   92.00.45.00.03   92.00.45.00.03  yes         yes
0000:bd:00.0   A100-SXM4-40GB   92.00.45.00.03   92.00.45.00.03  yes         yes


FPGA
========
Onboard version     Manifest  up-to-date
02.a5               02.a5        yes

Power Supply
==============
                                                        Onboard
ID                  Vendor Model        MFR ID  Status   Version   Manifest  up-to-
date
PSU 0: Primary      Delta ECD16010092   Delta     ok       01.06     01.06       yes
PSU 0: Secondary    Delta ECD16010092   Delta     ok       01.06     01.06       yes
PSU 0: Community    Delta ECD16010092   Delta     ok       01.07     01.07       yes
PSU 1: Primary      Delta ECD16010092   Delta     ok       01.06     01.06       yes
PSU 1: Secondary    Delta ECD16010092   Delta     ok       01.06     01.06       yes
PSU 1: Community    Delta ECD16010092   Delta     ok       01.07     01.07       yes
PSU 2: Primary      Delta ECD16010092   Delta     ok       01.06     01.06       yes
PSU 2: Secondary    Delta ECD16010092   Delta     ok       01.06     01.06       yes
PSU 2: Community    Delta ECD16010092   Delta     ok       01.07     01.07       yes
PSU 3: Primary      Delta ECD16010092   Delta     ok       01.06     01.06       yes
PSU 3: Secondary    Delta ECD16010092   Delta     ok       01.06     01.06       yes
PSU 3: Community    Delta ECD16010092   Delta     ok       01.07     01.07       yes
PSU 4: Primary      Delta ECD16010092   Delta     ok       01.06     01.06       yes
PSU 4: Secondary    Delta ECD16010092   Delta     ok       01.06     01.06       yes
PSU 4: Community    Delta ECD16010092   Delta     ok       01.07     01.07       yes
PSU 5: Primary      Delta ECD16010092   Delta     ok       01.06     01.06       yes
PSU 5: Secondary    Delta ECD16010092   Delta     ok       01.06     01.06       yes
PSU 5: Community    Delta ECD16010092   Delta     ok       01.07     01.07       yes

  CPLD
=============
                                    Onboard Version   Manifest       up-to-date
MID_CPLD                            1.03              1.03              yes
MB_CPLD                             1.03              1.03              yes
```

```
* CPLD won't be updated by default (`update_fw all`), use `update_fw CPLD` if it's
 needed
```

6.3. Known Issues

6.3.1. BMC Incorrectly Reports CPU Motherboard Overvoltage

Issue

The BMC incorrectly reports that the sensors for 3.3V and 5V_STBY on the CPU motherboard exceed the non-critical thresholds. The assertion is reported in the SEL logs.

Explanation

This is an issue with the BMC where it is not interpreting the sensor information properly. The SEL gets filled with voltage messages but otherwise there is no functional impact. The values reported in the SEL confirm that the threshold has not been exceeded.

6.3.2. TEMP_IO0_IB0_P0 Reading not Reported in BMC "Disabled Sensors" List

Issue

The `TEMP_IO0_IB0_P0` sensor does not appear in the BMC web UI when it is disabled.

Explanation

This is an issue with the BMC web UI and will be resolved in the future release. You can issue `ipmitool sensor` or `ipmitool sdr list` to see information on disabled sensors.

6.3.3. nvipmitool Reports PCIe Correctable Errors as "Asserted"

Issue

The `nvipmitool` includes an Asserted text when reporting PCIe correctable errors without further explanation.

Explanation

"`Asserted`" just means that correctable errors were found in the test.

6.3.4. KVM "Power On Server" Option is Grayed Out

Issue

If the system is powered off, you may not be able to "power on" the system using the BMC KVM ("Power On Server" option is grayed out).

Explanation

To work around, log in to the BMC Web UI, then navigate to the Power Control dialog and select "**Power On**".

6.3.5. BMC Web UI Performance Drop

Issue

Several BMC web UI tasks - such as BMC login, getting SEL lists, or getting SDR lists - may be slower to complete compared to previous BMC versions.

Explanation

NVIDIA is investigating this issue.

6.3.6. SOL Cannot be Activated for a Newly Created User Account

Issue

After created a new user account, attempts to activate SOL for that account fail.

Explanation

NVIDIA is investigating the issue. To work around, enable the SOL payload for the new user.

Example:

```
$ sudo ipmitool sol payload enable 1 5
```

Then retry activating SOL again.

6.3.7. Unable to Set Static IPv6 Address Using BMC Web UI

Issue

1. From the BMC web UI, navigate to **Settings -> Network -> Network IP Settings**.

2. Deselect **Enable IPv6 DHCP** and input an IPv6 Address and Subnet Prefix length, then click **Save**.

The changes are not made.

Explanation

To work around, set the IPv6 address using the command line.

6.3.8. The BMC KVM May Stop Accepting Keyboard Input on the OS Command Line

Issue

When this occurs, the terminal will hang or not accepting any key strokes. After continuing to press keys, an error message appears indicating the HID queue is getting full.

Explanation

This may occur if the USB service is not enabled. To resolve, enable USB in the kernel and try again. The following is an example on Red Hat Enterprise Linux:

1. Remove "`nousb`" from `/boot/efi/EFI/redhat/grub.cfg`.
2. Configure grub using `grub2-mkconfig -o /boot/efi/EFI/redhat/grub.cfg`.
3. Reboot.
4. Verify USB is enabled by using the command "`lsscsi -H | grep usb-storage`".
5. Try KVM console.

6.3.9. BMC Kernel Panic Upon Power Cycle then BMC Reset Sequence

Issue

BMC kernel panic may occur when performing the following:

1. Issue '`ipmitool chassis power cycle`'.
2. Wait several seconds.
3. Issue '`impitool mc reset cold`'

Explanation

This is a timing issue that results in the loss of IRQ 8, resulting in the kernel panic. The BMC will continue to reboot until it is successful.

6.3.10. REDUNDANCY_PSU Sensor May Report 0x0a80 for Sensor Status

Issue

The REDUNDANCY_PSU sensor status of 0x0a80 indicates that redundancy is lost.

Explanation

NVIDIA is investigating this issue. The reported sensor status is misleading but has no functional impact.

6.3.11. SBIOS "Bootup NumLock State" not Enforced

Issue

When turning NumLock to OFF after setting "**Boot NumLock State**" to ON from the SBIOS setup menu, NumLock remains off after rebooting the server. Similarly, when turning NumLock to ON after setting "**Boot NumLock State**" to OFF from the SBIOS setup menu, NumLock remains on after rebooting the server.

Explanation

This feature is currently not implemented in the DGX A100 SBIOS.

6.3.12. Updating only Active or Inactive SBIOS Can Cause Internal Compatibility Issues

Issue

If you use the `-a` (active image only) or `-i` (inactive image only) option when updating the SBIOS, the fail-safe flag may get set and not removed upon reboot.

Explanation

When updating the SBIOS, both active and inactive SBIOS images must be updated. Do not use the `-a` or `-i` option. Instead, let the firmware update container automatically update both active and inactive images by using either "`update_fw all`" or "`update_fw SBIOS`".

6.3.13. IPMITool "Persistent" Flag Does not Work

Issue

The ipmitool persistent flag does not take effect when using the standard command format; for example,

```
ipmitool chassis bootdev options=persistent, efiboot
```

The persistent flag does work when part of the raw command.

Explanation

This is an issue with IPMITool. To use the persistent flag, use in conjunction with a raw command.

Example: The following raw command corresponds to the example command in the issue description:

```
ipmitool raw 01 05 e0 04 00 00 00
```

"`e0`" specifies PXE boot with EFI.

6.3.14. User is Logged Out of the BMC Web UI After Powering On the System

Issue

To reproduce the issue:

1. AC power cycle the system.
2. Log into the BMC web UI and then power on the system, such as through the BMC KVM.

The user is logged out of the BMC web UI.

Explanation

This behavior is the result of the BMC erroneously concluding that the BMC was idle for too long. The AC power cycle resets the BMC RTC to the default value (1999). After powering on the system, the current time is compared to the BMC RTC value and the difference exceeds the timeout value. This is a limitation in the DGX A100 BMC.

6.3.15. SBIOS Versions Might not be Reported After BMC Cold Reboot

Issue

After performing a BMC cold boot, the SBIOS versions (both primary and secondary) are reported as "0" either in the BMC web UI or on the command line.

Explanation

To work around, perform the following.

1. Reboot
2. Verify that the active SBIOS version is populated:
```
$ sudo ipmitool raw 0x3c 0x24 ($ sudo ipmitool raw 0x3c 0x22)
```
3. Switch to the inactive SBIOS.
```
$ sudo ipmitool raw 0x3c 0x23 $(($(sudo ipmitool raw 0x3c 0x22)^1))
```
4. Reboot again.
5. Verify that both active and inactive SBIOS versions are populated.
```
$ sudo ipmitool raw 0x3c 0x24 0 && sudo ipmitool raw 0x3c 0x24 1
```

6.3.16. NVSM Incorrectly Reports the Delta PSU Part Number Instead of the Model Numbers

Issue

When issuing `show_version` or `show_fw_manifest`, the number associated with the Delta PSU is the part number instead of the model number.

Explanation

This will be resolved in a future release.

6.3.17. BMC KVM Screen May Show "No Signal" Under Certain Conditions

Issue

When attempting to view the DGX A100 console from the BMC Web UI KVM, the screen may show "No Signal" if you cold reset the BMC and then reboot the server.

For example, the issue might occur after performing the following.

1. Issue the command to cold reset the BMC.

```
$ sudo ipmitool mc reset cold
```

2. Wait about 30 seconds, then issue the command to reboot the system.

```
$ sudo reboot
```

Explanation

This is due to a rare race condition between BMC and the SBIOS, and will be resolved in a future update.

6.3.18. "Power On Server" Option in KVM is Grayed Out

Issue

If the system is powered off, you may not be able to "power on" the system using the BMC KVM ("Power On Server" option is grayed out).

Explanation

To work around, log in to the BMC Web UI, then navigate to the Power Control dialog and select "**Power On**".

6.3.19. BMC SEL Log May Show a Negative Value for Sensor "TEMP_MB_AD_CARD" During AC/DC/Warm reboot

Issue

After any kind of reboot (AC/DC/warm reboot), the BMC SEL log may show a negative value for "`Temperature TEMP_MB_AD_CARD0`".

Explanation

This issue will be resolved in a future release.

6.3.20. Setting Up Active Directory Settings May Fail with "Invalid Domain Name" Error

Issue

After logging into the BMC dashboard UI and setting up and enabling Active Directory Authentication, an "Invalid Domain Name" error may occur.

Explanation

If you encounter this error, set up the DNS manually as follows:

1. Login to the BMC UI dashboard.
2. Navigate to Settings > Network Settings > DNS Configuration > "Domain Name Server Setting"
3. Find "Domain Name Server Setting" and change "**Automatic**" to "**Manual**".
4. Replace "DNS Server 1" IP to "`8.8.8.8`" (the IP is dns.google)
5. Click **Save** and accept the alert to restart the BMC network.

6.3.21. Systems Won't PXE Boot After BMC and CEC FW Update

Issue

After updating the BMC and CEC firmware, the system may fail to PXE boot.

Explanation

If you encounter this issue, perform a factory reset of the BMC and reconfigure usernames and passwords.

Using the BMC web UI

1. Navigate to **Maintenance** > **Preserve Configuration**, then clear all check boxes and click **Save**.
2. Navigate to **Maintenance** > **Restore Factory Defaults**, then click **Save**.

Using the IPMITool OEM Commands

1. Specify "do not preserve configuration".
   ```
   sudo ipmitool raw 0x32 0xba 0x00 0x00
   ```
2. Restore defaults.
   ```
   sudo ipmitool raw 0x32 0x66
   ```

6.3.22. BMC UI May not be Accessible from Mac OS

Issue

When attempting to connect to the DGX A100 BMC from a system with Mac OS, a "Your connection is not private" message appears that prevents access to the BMC.

Explanation

Starting with version 0.13.6, the BMC provides a self-signed certificate which Mac OS flags in the browser. Most browsers will let you either accept the risk and continue, or add the certificate to the keychain and continue. The Chrome and Opera browsers, however, do not provide these options and so Mac OS users will not be able to access the BMC from the Chrome or Opera browser.

To access the DGX A100 BMC, Mac OS users can use Safari or Firefox, which provide an access path.

6.3.23. Unable to Launch BMC Dashboard under Pre-84.01 Firefox

Issue

After updating the BMC, attempts to access the BMC dashboard using Firefox versions earlier than 84.01 fail with a "Secure Connection Fail" message.

Explanation

To work around, update Firefox to version 84.01 or later.

6.3.24. The system starts the POST process several times during boot after updating the SBIOS.

Issue

After updating the SBIOS and rebooting the system, the NVIDIA splash screen appears and disappears several times before boot is completed.

Explanation

After updating the SBIOS, several component states are cleared and the system may reboot automatically 3-4 times to reset all the components. This is expected behavior.

6.3.25. Restoring BMC Default Affects Power LED

Issue

After restoring the factory default settings using the BMC,

- The Power/Status LED flashes continuously after the rebooting the server.
- The Power/Status LED stays on after powering off the server.

Explanation

NVIDIA is investigating this issue. There is no functional impact.

6.3.26. The "Relative Mouse Mode" Option is grayed out in the KVM Menu

Issue

In the BMC Remote KVM, the Mouse > Relative Mouse Mode option is grayed out and unavailable.

Explanation

To work around, enable Relative Mouse Mode from the BMC web UI as follows:

Navigate to **Settings > KVM Mouse Setting,** then select "**Relative Positioning (Linux)**" from the Mouse Mode Configuration dialog and click **Save**.

Chapter 7. DGX A100 System Firmware Update Container Version 21.05.7

The DGX Firmware Update container version 21.05.7 is available.

- Package name:`nvfw-dgxa100_21.05.7_210519.tar.gz`
- Run file name: `nvfw-dgxa100_21.05.7_210519.run`
- Image name: `nvfw-dgxa100:21.05.7`
- ISO image: `DGXA100_FWUI-21.05.7-2021-05-19-07-26-16.iso`
- PXE netboot: `pxeboot-dgxa100-21.05.7.tgz`

Highlights and Changes in this Release

- This release is supported with the following DGX OS software -
  - DGX OS 5.0 or later

    Important: This firmware update container does not support DGX OS 4.99.xx. To use the container on DGX A100 servers, update to DGX OS 5.0 or later.
  - EL7-21.01 or later (See Special Instructions for Red Hat Enterprise Linux)
  - EL8-20.11 or later
- Eliminated the need for the workaround when updating the CEC 1712 SPI from 3.5 to 3.9.
- Fixed 0W reporting issue with Delta PSU.

Contents of the DGX A100 System Firmware Container

This container includes the firmware binaries and update utilities for the firmware listed in the following table. The update time for each component is provided for reference. Total update time if all components are updated is approximately 2 hours and 20 minutes.

Component	Version	Key Changes	Update Time
BMC (via CEC)	**00.14.17**	See DGX A100 BMC Changes	25 minutes
SBIOS	**0.34**	No change	7 minutes
Broadcom 88096 PCIe switch board	**0.2.0**	No change	8 minutes
BMC CEC SPI	**v3.28**	No change	8 minutes
PEX88064 Retimer	**1.2f**	No change	7 minutes
PEX88080 Retimer	**1.2f**	No change	7 minutes
NvSwitch BIOS	**92.10.18.00.01**	No change	8 minutes
VBIOS (A100 40GB)	**92.00.36.00.04**	No change	7 minutes
VBIOS (A100 80GB)	**92.00.36.00.01**	No change	
U.2 NVMe (Samsung)	**EPK99B5Q**	No change	6 minutes
U.2 NVMe (Kioxia)	**0105**	No change	
M.2 NVMe (Samsung)	**EDA7602Q**	No change	3 minutes
FPGA (GPU sled)	**2.A5**	No change	40 minutes
CEC1712 SPI (GPU sled)	**3.9**	No change	7 minutes
PSU (Delta)	Primary **1.6**/ Secondary **1.6**/ Community **1.7**	Added to container	90 minutes

Updating Components with Secondary Images

Some firmware components provide a secondary image as backup. The following is the policy when updating those components:

- **SBIOS**: The two images are referred to as active and inactive, where the active is the currently running image and the inactive is the backup image. When using `update_fw all`, the update container updates both active and inactive images.
- **BMC**: The two images are referred to as active and inactive, where the active is the currently running image and the inactive is the backup image. The update container can only update the inactive image, and will update it only if the *active* image needs to be updated. After the update is completed, the updated inactive image becomes the active image. Because the active image is now updated, subsequent `update_fw all` commands will not update the inactive image. To update the inactive image in this case, use `update_fw BMC --inactive`.

Updating the PSU FW

If one of the PSU firmware slots (primary, secondary, or community) is corrupted, updating the PSU firmware will fail if attempts are made to update other slots.

- If you know the slot that is corrupted, then update that slot as follows (where <psu> is 0, 1, 2, 3, 4, or 5; <Slot> is Primary, Secondary, or Community);

```
$ sudo ./nvfw-dgxa100_21.05.7_210519.run update_fw PSU -s <psu> -S <Slot> -f
```

- If you do not know which slot is corrupted, then use the SKIP_FAIL flag to update all three slots.

```
$ sudo ./nvfw-dgxa100_21.05.7_210519.run set_flags SKIP_FAIL=1 update_fw PSU -s
 <psu> -f
```

  The FWUC may display a message about the PSU update failing in the non-corrupted slots, but the PSU should actually be recovered because the corrupted slot is successfully updated.

DO NOT UPDATE DGX A100 CPLD FIRMWARE UNLESS INSTRUCTED

When updating DGX A100 firmware using the Firmware Update Container, do not update the CPLD firmware unless the DGX A100 system is being upgraded from 320GB to 640GB.

The current DGX A100 Firmware Update Container will not automatically update the CPLD firmware (for example, when running `update_fw all`). It is possible to update the CPLD firmware using "`update_fw CPLD`"; however, it is strongly recommended that the CPLD firmware not be updated manually unless specifically instructed by NVIDIA Enterprise Support (or email enterprisesupport@nvidia.com). If the DGX A100 is upgraded from 320GB to 640GB, the CPLD firmware update should be performed as instructed.

7.1. Special Instructions for Red Hat Enterprise Linux

This section describes the actions that must be taken before updating firmware on DGX A100 systems installed with Red Hat Enterprise Linux. There are two options for meeting these requirements.

Option 1: Update to EL7-21.01 or later

Refer to the DGX Software for Red Hat Enterprise Linux 7 Release Notes for more information.

Important: Updating the DGX software for Red Hat Enterprise Linux will update the Red Hat Enterprise Linux installation to 7.9 or later. If you do not want to update your Red Hat Enterprise Linux 7 installation, then choose Option 2.

Option 2: Install mpt3sas 31.101.01.00-0

These instructions apply if

- You do not want to update your Red Hat Enterprise Linux installation, and
- Your system is currently installed with Red Hat Enterprise Linux 7.7 or later.

  If your system is installed with Red Hat Enterprise Linux 7.6 or earlier, contact NVIDIA Enterprise Support for assistance.

1. Perform this step if your system is no longer pointing to the NVIDIA DGX software repository.
   a). On Red Hat Enterprise Linux, run the following commands to enable additional repositories required by the DGX software.
   ```
   sudo subscription-manager repos --enable=rhel-7-server-extras-rpms
   sudo subscription-manager repos --enable=rhel-7-server-optional-rpms
   ```
   b). Run the following command to install the DGX software installation package and enable the NVIDIA DGX software repository.

   > **ATTENTION:** By running these commands you are confirming that you have read and agree to be bound by the DGX Software License Agreement. You are also confirming that you understand that any pre-release software and materials available that you elect to install in a DGX may not be fully functional, may contain errors or design flaws, and may have reduced or different security, privacy, availability, and reliability standards relative to commercial versions of NVIDIA software and materials, and that you use pre-release versions at your risk.

   ```
   yum install -y \
   https://international.download.nvidia.com/dgx/repos/rhel-files/dgx-repo-setup-20.03-1.el7.x86_64.rpm
   ```
2. Install `mpt3sas` 31.101.01.00-0.
   ```
   sudo yum install mpt3sas-dkms
   ```
3. Load the `mpt3sas` driver into the Red Hat Enterprise Linux kernel.
   ```
   sudo modprobe mpt3sas
   ```
   You can verify the correct `mpt3sas` version is installed by issuing the following.
   ```
   yum list installed
   ```

7.2. Instructions for Updating Firmware

This section provides a simple way to update the firmware on the system using the firmware update container. It includes instructions for performing a transitional update for systems that require it. The commands use the .run file, but you can also use any method described in Using the DGX A100 FW Update Utility.

> **CAUTION:**
>
> - Stop all unnecessary system activities before attempting to update firmware.

- Stop all GPU activity, including accessing nvidia-smi, as this can prevent the VBIOS from updating.
- Do not add additional loads on the system (such as user jobs, diagnostics, or monitoring services) while an update is in progress. A high workload can disrupt the firmware update process and result in an unusable component.
- When initiating an update, the update software assists in determining the activity state of the DGX system and provides a warning if it detects that activity levels are above a predetermined threshold. If the warning is encountered, you are strongly advised to take action to reduce the workload before proceeding with the update.

1. Check if updates are needed by checking the installed versions.
   ```
   $ sudo ./nvfw-dgxa100:21.05.7_210519.run show_version
   ```
   - If there is "no" in any up-to-date column for updatable firmware, then continue with the next step.
   - If all up-to-date column entries are "yes", then no updates are needed and no further action is necessary.
2. Perform the update for all firmware supported by the container.
   ```
   $ sudo ./nvfw-dgxa100:21.05.7_210519.run update_fw all
   ```
   Depending on the firmware that is updated, you may be prompted to either reboot the system or power cycle the system.
   - If you are prompted to reboot, issue
     ```
     $ sudo reboot
     ```
   - If you are prompted to power cycle, you can issue the following two commands (there is no output with the first command).
     ```
     $ sudo ipmitool raw 0x3c 0x04
     $ sudo ipmitool chassis power cycle
     ```
3. After rebooting or power cycling the system, you may need to perform another `update_fw all` to update other firmware.
   - Either repeat Step 1 to check if updates are needed and then perform Step 2 if needed, or
   - Repeat Step 2 just in case updates are needed.

   If you perform another `update_fw all`, you may be prompted again to either reboot the system or power cycle the system.

   See DGX A100 Firmware Update Process for more information about the update process.

You can verify the update by issuing the following.

```
$ sudo ./nvfw-dgxa100:21.05.7_210519.run show_version
```

Example output for a DGX A100 320GB system

```
 CEC
============
                                        Onboard Version   Manifest  up-to-date
MB_CEC(enabled)                          3.28              3.28         yes
Delta_CEC(enabled)                       3.09              3.09         yes

 BMC DGX
```

```
=========
Image Id              Status    Location    Onboard Version   Manifest  up_to_date
0:Active   Boot       Online    Local       00.14.17          00.14.17     yes
1:Inactive Updatable            Local       00.14.17          00.14.17     yes

 SBIOS
=======
Image Id                                    Onboard Version   Manifest    up_to_date
0:Inactive Updatable                        0.34              0.34          yes
1:Active   Boot Updatable                   0.34              0.34          yes

  Switches
============
PCI Bus#                  Model      Onboard Version Manifest FUB Updated? up-to-
date
DGX - 0000:91:00.0(U261)  88064_Retimer  1.2.0        1.2.0      N/A         yes
DGX - 0000:88:00.0(U260)  88064_Retimer  1.2.0        1.2.0      N/A         yes
DGX - 0000:4f:00.0(U262)  88064_Retimer  1.2.0        1.2.0      N/A         yes
DGX - 0000:48:00.0(U225)  88080_Retimer  1.2.0        1.2.0      N/A         yes


DGX - 0000:01:00.0(U1)    PEX88096       2.0          2.0       N/A          yes
DGX - 0000:b1:00.0(U4)    PEX88096       2.0          2.0       N/A          yes
DGX - 0000:41:00.0(U2)    PEX88096       2.0          2.0       N/A          yes
DGX - 0000:81:00.0(U3)    PEX88096       2.0          2.0       N/A          yes


DGX - 0000:c4:00.0        LR10    92.10.18.00.01  92.10.18.00.01  yes      yes
DGX - 0000:c5:00.0        LR10    92.10.18.00.01  92.10.18.00.01  yes      yes
DGX - 0000:c8:00.0        LR10    92.10.18.00.01  92.10.18.00.01  yes      yes
DGX - 0000:c6:00.0        LR10    92.10.18.00.01  92.10.18.00.01  yes      yes
DGX - 0000:c9:00.0        LR10    92.10.18.00.01  92.10.18.00.01  yes      yes
DGX - 0000:c7:00.0        LR10    92.10.18.00.01  92.10.18.00.01  yes      yes



 Mass Storage
==============
Drive Name/Slot         Model Number        Onboard Version   Manifest   up-to-date
nvme0n1          Samsung MZWLJ3T8HBLS-00007  EPK99B5Q         EPK99B5Q     yes
nvme1n1          Samsung MZ1LB1T9HALS-00007  EDA7602Q         EDA7602Q     yes
nvme2n1          Samsung MZ1LB1T9HALS-00007  EDA7602Q         EDA7602Q     yes
nvme3n1          Samsung MZWLJ3T8HBLS-00007  EPK99B5Q         EPK99B5Q     yes
nvme4n1          Samsung MZWLJ3T8HBLS-00007  EPK99B5Q         EPK99B5Q     yes
nvme5n1          Samsung MZWLJ3T8HBLS-00007  EPK99B5Q         EPK99B5Q     yes

 Video BIOS
============
Bus            Model            Onboard Version   Manifest     FUB Updated? up-to-
date
0000:07:00.0   A100-SXM4-40GB   92.00.36.00.04   92.00.36.00.04  yes        yes
0000:0f:00.0   A100-SXM4-40GB   92.00.36.00.04   92.00.36.00.04  yes        yes
0000:47:00.0   A100-SXM4-40GB   92.00.36.00.04   92.00.36.00.04  yes        yes
0000:4e:00.0   A100-SXM4-40GB   92.00.36.00.04   92.00.36.00.04  yes        yes
0000:87:00.0   A100-SXM4-40GB   92.00.36.00.04   92.00.36.00.04  yes        yes
0000:90:00.0   A100-SXM4-40GB   92.00.36.00.04   92.00.36.00.04  yes        yes
0000:b7:00.0   A100-SXM4-40GB   92.00.36.00.04   92.00.36.00.04  yes        yes
0000:bd:00.0   A100-SXM4-40GB   92.00.36.00.04   92.00.36.00.04  yes        yes


FPGA
========
Onboard version     Manifest  up-to-date
02.a5               02.a5        yes

Power Supply
==============
```

```
                                                             Onboard
ID                    Vendor Model        MFR ID  Status   Version    Manifest  up-to-
date
PSU 0: Primary        Delta ECD16010092   Delta     ok       01.06      01.06      yes
PSU 0: Secondary      Delta ECD16010092   Delta     ok       01.06      01.06      yes
PSU 0: Community      Delta ECD16010092   Delta     ok       01.07      01.07      yes
PSU 1: Primary        Delta ECD16010092   Delta     ok       01.06      01.06      yes
PSU 1: Secondary      Delta ECD16010092   Delta     ok       01.06      01.06      yes
PSU 1: Community      Delta ECD16010092   Delta     ok       01.07      01.07      yes
PSU 2: Primary        Delta ECD16010092   Delta     ok       01.06      01.06      yes
PSU 2: Secondary      Delta ECD16010092   Delta     ok       01.06      01.06      yes
PSU 2: Community      Delta ECD16010092   Delta     ok       01.07      01.07      yes
PSU 3: Primary        Delta ECD16010092   Delta     ok       01.06      01.06      yes
PSU 3: Secondary      Delta ECD16010092   Delta     ok       01.06      01.06      yes
PSU 3: Community      Delta ECD16010092   Delta     ok       01.07      01.07      yes
PSU 4: Primary        Delta ECD16010092   Delta     ok       01.06      01.06      yes
PSU 4: Secondary      Delta ECD16010092   Delta     ok       01.06      01.06      yes
PSU 4: Community      Delta ECD16010092   Delta     ok       01.07      01.07      yes
PSU 5: Primary        Delta ECD16010092   Delta     ok       01.06      01.06      yes
PSU 5: Secondary      Delta ECD16010092   Delta     ok       01.06      01.06      yes
PSU 5: Community      Delta ECD16010092   Delta     ok       01.07      01.07      yes

  CPLD
============
                                         Onboard Version   Manifest       up-to-date
MID_CPLD                                 1.03              1.03                yes
MB_CPLD                                  1.03              1.03                yes

* CPLD won't be updated by default (`update_fw all`), use `update_fw CPLD` if it's
 needed
```

7.3. Known Issues

7.3.1. BMC UI May not be Accessible from Mac OS

Issue

When attempting to connect to the DGX A100 BMC from a system with Mac OS, a "Your connection is not private" message appears that prevents access to the BMC.

Explanation

Starting with version 0.13.6, the BMC provides a self-signed certificate which Mac OS flags in the browser. Most browsers will let you either accept the risk and continue, or add the certificate to the keychain and continue. The Chrome and Opera browsers, however, do not provide these options and so Mac OS users will not be able to access the BMC from the Chrome or Opera browser.

To access the DGX A100 BMC, Mac OS users can use Safari or Firefox, which provide an access path.

7.3.2. Boot Order in the SBIOS Reverts to the Default

Issue

After updating the SBIOS, any changes in the boot order that you have made are not preserved and the boot order specified in the SBIOS reverts to the following.

```
Boot Option #1  [Hard Disk]
Boot Option #2  [NVME]
Boot Option #3  [USB CD/DVD]
Boot Option #4  [USB Hard Disk]
Boot Option #5  [USB Key]
Boot Option #6  [Network]
```

Explanation

You will need to prepare for the change when restarting the system, and then enter the SBIOS setup to edit the boot order as needed.

7.3.3. Unable to Launch BMC Dashboard under Pre-84.01 Firefox

Issue

After updating the BMC, attempts to access the BMC dashboard using Firefox versions earlier than 84.01 fail with a "Secure Connection Fail" message.

Explanation

To work around, update Firefox to version 84.01 or later.

7.3.4. The system starts the POST process several times during boot after updating the SBIOS.

Issue

After updating the SBIOS and rebooting the system, the NVIDIA splash screen appears and disappears several times before boot is completed.

Explanation

After updating the SBIOS, several component states are cleared and the system may reboot automatically 3-4 times to reset all the components. This is expected behavior.

Chapter 8. DGX A100 System Firmware Update Container Version 21.03.6

The DGX Firmware Update container version 21.03.6 is available.

- Package name:`nvfw-dgxa100_21.03.6_210321.tar.gz`
- Run file name: `nvfw-dgxa100_21.03.6_210321.run`
- Image name: `nvfw-dgxa100:21.03.6`
- ISO image: `DGXA100_FWUI-21.03.6-2021-03-23-22-03-47.iso`
- PXE netboot: `pxeboot-dgxa100-21.03.6.tgz`

Highlights and Changes in this Release

- This release is supported with the following DGX OS software -
  - DGX OS 4.99.11
  - DGX OS 5.0 or later
  - EL7-21.01 or later (See Special Instructions for Red Hat Enterprise Linux)
  - EL8-20.11 or later
- Added ISO and netboot package for efficiently updating multiple systems.
- Added code to prevent use of hardware that is being updated, such as NVIDIA GPUs.

Contents of the DGX A100 System Firmware Container

This container includes the firmware binaries and update utilities for the firmware listed in the following table. The update time for each component is provided for reference. Total update time if all components are updated is approximately 2 hours and 20 minutes.

Component	Version	Key Changes	Update Time
BMC (via CEC)	**00.14.16**	See DGX A100 BMC Changes	25 minutes
SBIOS	**0.34**	See DGX A100 SBIOS Changes	7 minutes

Component	Version	Key Changes	Update Time
Broadcom 88096 PCIe switch board	**0.2.0**	See DGX A100 Broadcom 88096 PCIe Switchboard Changes	8 minutes
BMC CEC SPI	**v3.28**	See DGX A100 BMC CEC Changes	8 minutes
PEX88064 Retimer	**1.2f**	See DGX A100 Broadcom 880xx Retimer Changes	7 minutes
PEX88080 Retimer	**1.2f**	See DGX A100 Broadcom 880xx Retimer Changes	7 minutes
NvSwitch BIOS	**92.10.18.00.01**	See DGX A100 BMC Changes	8 minutes
VBIOS (A100 40GB)	**92.00.36.00.04**	See A100 VBIOS Changes	7 minutes
VBIOS (A100 80GB)	**92.00.36.00.01**	No change	
U.2 NVMe (Samsung)	**EPK99B5Q**	No change	6 minutes
U.2 NVMe (Kioxia)	**0105**	Added to the container	
M.2 NVMe (Samsung)	**EDA7602Q**	Added to the container	3 minutes
FPGA (GPU sled)	**2.A5**	See DGX A100 FPGA Release Notes	40 minutes
CEC1712 SPI (GPU sled)	**3.9**	See DGX A100 BMC CEC SPI Changes	7 minutes

Updating Components with Secondary Images

Some firmware components provide a secondary image as backup. The following is the policy when updating those components:

- **SBIOS**: The two images are referred to as active and inactive, where the active is the currently running image and the inactive is the backup image. When using `update_fw all`, the update container updates both active and inactive images.
- **BMC**: The two images are referred to as active and inactive, where the active is the currently running image and the inactive is the backup image. The update container can only update the inactive image, and will update it only if the *active* image needs to be updated. After the update is completed, the updated inactive image becomes the active image. Because the active image is now updated, subsequent `update_fw all` commands will not update the inactive image. To update the inactive image in this case, use `update_fw BMC --inactive`.

Updating the CEC 1712 (Delta-CEC)

The firmware update container may fail to update the Delta_CEC. To work around, perform the following.

1. `sudo ./nvfw-dgxa100_21.03.6_210321.run update_fw CEC -s Delta_CEC -m`
2. `sudo ipmitool chassis power cycle`

3. `sudo ./nvfw-dgxa100_21.03.6_210321.run update_fw all`

DO NOT UPDATE DGX A100 CPLD FIRMWARE UNLESS INSTRUCTED

When updating DGX A100 firmware using the Firmware Update Container, do not update the CPLD firmware unless the DGX A100 system is being upgraded from 320GB to 640GB.

The current DGX A100 Firmware Update Container will not automatically update the CPLD firmware (for example, when running `update_fw all`). It is possible to update the CPLD firmware using "`update_fw CPLD`"; however, it is strongly recommended that the CPLD firmware not be updated manually unless specifically instructed by NVIDIA Enterprise Support (or email enterprisesupport@nvidia.com). If the DGX A100 is upgraded from 320GB to 640GB, the CPLD firmware update should be performed as instructed.

8.1. Special Instructions for Red Hat Enterprise Linux

This section describes the actions that must be taken before updating firmware on DGX A100 systems installed with Red Hat Enterprise Linux. There are two options for meeting these requirements.

Option 1: Update to EL7-21.01 or later

Refer to the DGX Software for Red Hat Enterprise Linux 7 Release Notes for more information.

Important: Updating the DGX software for Red Hat Enterprise Linux will update the Red Hat Enterprise Linux installation to 7.9 or later. If you do not want to update your Red Hat Enterprise Linux 7 installation, then choose Option 2.

Option 2: Install mpt3sas 31.101.01.00-0

These instructions apply if

- You do not want to update your Red Hat Enterprise Linux installation, and
- Your system is currently installed with Red Hat Enterprise Linux 7.7 or later.

  If your system is installed with Red Hat Enterprise Linux 7.6 or earlier, contact NVIDIA Enterprise Support for assistance.

1. Perform this step if your system is no longer pointing to the NVIDIA DGX software repository.
   a). On Red Hat Enterprise Linux, run the following commands to enable additional repositories required by the DGX software.

```
sudo subscription-manager repos --enable=rhel-7-server-extras-rpms
sudo subscription-manager repos --enable=rhel-7-server-optional-rpms
```

b). Run the following command to install the DGX software installation package and enable the NVIDIA DGX software repository.

> **ATTENTION:** By running these commands you are confirming that you have read and agree to be bound by the DGX Software License Agreement. You are also confirming that you understand that any pre-release software and materials available that you elect to install in a DGX may not be fully functional, may contain errors or design flaws, and may have reduced or different security, privacy, availability, and reliability standards relative to commercial versions of NVIDIA software and materials, and that you use pre-release versions at your risk.

```
yum install -y \
https://international.download.nvidia.com/dgx/repos/rhel-files/dgx-repo-setup-20.03-1.el7.x86_64.rpm
```

2. Install `mpt3sas` 31.101.01.00-0.

```
sudo yum install mpt3sas-dkms
```

3. Load the `mpt3sas` driver into the Red Hat Enterprise Linux kernel.

```
sudo modprobe mpt3sas
```

You can verify the correct `mpt3sas` version is installed by issuing the following.

```
yum list installed
```

8.2. Instructions for Updating Firmware

This section provides a simple way to update the firmware on the system using the firmware update container. It includes instructions for performing a transitional update for systems that require it. The commands use the .run file, but you can also use any method described in Using the DGX A100 FW Update Utility.

> **CAUTION:**
>
> - Stop all unnecessary system activities before attempting to update firmware.
> - Stop all GPU activity, including accessing nvidia-smi, as this can prevent the VBIOS from updating.
> - Do not add additional loads on the system (such as user jobs, diagnostics, or monitoring services) while an update is in progress. A high workload can disrupt the firmware update process and result in an unusable component.
> - When initiating an update, the update software assists in determining the activity state of the DGX system and provides a warning if it detects that activity levels are above a predetermined threshold. If the warning is encountered, you are strongly advised to take action to reduce the workload before proceeding with the update.

1. Check if updates are needed by checking the installed versions.

```
$ sudo ./nvfw-dgxa100:21.03.6_210321.run show_version
```

   - If there is "no" in any up-to-date column for updatable firmware, then continue with the next step.

- If all up-to-date column entries are "yes", then no updates are needed and no further action is necessary.

2. Perform the update for all firmware supported by the container.

```
$ sudo ./nvfw-dgxa100:21.03.6_210321.run update_fw all
```

Depending on the firmware that is updated, you may be prompted to either reboot the system or power cycle the system.

- If you are prompted to reboot, issue

```
$ sudo reboot
```

- If you are prompted to power cycle, you can issue the following two commands (there is no output with the first command).

```
$ sudo ipmitool raw 0x3c 0x04
$ sudo ipmitool chassis power cycle
```

3. After rebooting or power cycling the system, you may need to perform another `update_fw all` to update other firmware.

- Either repeat Step 1 to check if updates are needed and then perform Step 2 if needed, or
- Repeat Step 2 just in case updates are needed.

If you perform another `update_fw all`, you may be prompted again to either reboot the system or power cycle the system.

See DGX A100 Firmware Update Process for more information about the update process.

You can verify the update by issuing the following.

```
$ sudo ./nvfw-dgxa100:21.03.6_210321.run show_version
```

Example output for a DGX A100 320GB system

```
 CEC
============
                                        Onboard Version   Manifest  up-to-date
MB_CEC(enabled)                          3.28              3.28         yes
Delta_CEC(enabled)                       3.09              3.09         yes

 BMC DGX
=========
Image Id              Status    Location    Onboard Version   Manifest  up_to_date
0:Active   Boot       Online    Local       00.14.16          00.14.16     yes
1:Inactive Updatable            Local       00.14.16          00.14.16     yes

 SBIOS
=======
Image Id                                    Onboard Version   Manifest    up_to_date
0:Inactive Updatable                        0.34              0.34          yes
1:Active   Boot Updatable                   0.34              0.34          yes

  Switches
============
PCI Bus#                  Model      Onboard Version Manifest FUB Updated? up-to-
date
DGX - 0000:91:00.0(U261)  88064_Retimer  1.2f        1.2f      N/A         yes
DGX - 0000:88:00.0(U260)  88064_Retimer  1.2f        1.2f      N/A         yes
DGX - 0000:4f:00.0(U262)  88064_Retimer  1.2f        1.2f      N/A         yes
DGX - 0000:48:00.0(U225)  88080_Retimer  1.2f        1.2f      N/A         yes


DGX - 0000:01:00.0(U1)    PEX88096       2.0         2.0       N/A         yes
```

```
DGX - 0000:b1:00.0(U4)     PEX88096        2.0          2.0        N/A          yes
DGX - 0000:41:00.0(U2)     PEX88096        2.0          2.0        N/A          yes
DGX - 0000:81:00.0(U3)     PEX88096        2.0          2.0        N/A          yes


DGX - 0000:c4:00.0         LR10     92.10.18.00.01  92.10.18.00.01  yes       yes
DGX - 0000:c5:00.0         LR10     92.10.18.00.01  92.10.18.00.01  yes       yes
DGX - 0000:c8:00.0         LR10     92.10.18.00.01  92.10.18.00.01  yes       yes
DGX - 0000:c6:00.0         LR10     92.10.18.00.01  92.10.18.00.01  yes       yes
DGX - 0000:c9:00.0         LR10     92.10.18.00.01  92.10.18.00.01  yes       yes
DGX - 0000:c7:00.0         LR10     92.10.18.00.01  92.10.18.00.01  yes       yes



 Mass Storage
==============
Drive Name/Slot          Model Number         Onboard Version   Manifest   up-to-date
nvme0n1           Samsung MZWLJ3T8HBLS-00007  EPK99B5Q          EPK99B5Q     yes
nvme1n1           Samsung MZ1LB1T9HALS-00007  EDA7202Q          EDA7202Q     yes
nvme2n1           Samsung MZ1LB1T9HALS-00007  EDA7202Q          EDA7202Q     yes
nvme3n1           Samsung MZWLJ3T8HBLS-00007  EPK99B5Q          EPK99B5Q     yes
nvme4n1           Samsung MZWLJ3T8HBLS-00007  EPK99B5Q          EPK99B5Q     yes
nvme5n1           Samsung MZWLJ3T8HBLS-00007  EPK99B5Q          EPK99B5Q     yes

 Video BIOS
============
Bus             Model            Onboard Version   Manifest     FUB Updated? up-to-
date
0000:07:00.0    A100-SXM4-40GB   92.00.36.00.04    92.00.36.00.04  yes        yes
0000:0f:00.0    A100-SXM4-40GB   92.00.36.00.04    92.00.36.00.04  yes        yes
0000:47:00.0    A100-SXM4-40GB   92.00.36.00.04    92.00.36.00.04  yes        yes
0000:4e:00.0    A100-SXM4-40GB   92.00.36.00.04    92.00.36.00.04  yes        yes
0000:87:00.0    A100-SXM4-40GB   92.00.36.00.04    92.00.36.00.04  yes        yes
0000:90:00.0    A100-SXM4-40GB   92.00.36.00.04    92.00.36.00.04  yes        yes
0000:b7:00.0    A100-SXM4-40GB   92.00.36.00.04    92.00.36.00.04  yes        yes
0000:bd:00.0    A100-SXM4-40GB   92.00.36.00.04    92.00.36.00.04  yes        yes


FPGA
========
Onboard version     Manifest  up-to-date
02.A5               02.A5        yes


  CPLD
=============
                                        Onboard Version   Manifest       up-to-date
MID_CPLD                                1.05              1.05              yes
MB_CPLD                                 1.05              1.05              yes

* CPLD won't be updated by default (`update_fw all`), use `update_fw CPLD` if it's
 needed
```

8.3. Known Issues

8.3.1. BMC UI May not be Accessible from Mac OS

Issue

When attempting to connect to the DGX A100 BMC from a system with Mac OS, a "Your connection is not private" message appears that prevents access to the BMC.

Explanation

Starting with version 0.13.6, the BMC provides a self-signed certificate which Mac OS flags in the browser. Most browsers will let you either accept the risk and continue, or add the certificate to the keychain and continue. The Chrome and Opera browsers, however, do not provide these options and so Mac OS users will not be able to access the BMC from the Chrome or Opera browser.

To access the DGX A100 BMC, Mac OS users can use Safari or Firefox, which provide an access path.

8.3.2. Boot Order in the SBIOS Reverts to the Default

Issue

After updating the SBIOS, any changes in the boot order that you have made are not preserved and the boot order specified in the SBIOS reverts to the following.

```
Boot Option #1  [Hard Disk]
Boot Option #2  [NVME]
Boot Option #3  [USB CD/DVD]
Boot Option #4  [USB Hard Disk]
Boot Option #5  [USB Key]
Boot Option #6  [Network]
```

Explanation

You will need to prepare for the change when restarting the system, and then enter the SBIOS setup to edit the boot order as needed.

8.3.3. Unable to Launch BMC Dashboard under Pre-84.01 Firefox

Issue

After updating the BMC, attempts to access the BMC dashboard using Firefox versions earlier than 84.01 fail with a "Secure Connection Fail" message.

Explanation

To work around, update Firefox to version 84.01 or later.

8.3.4. The system starts the POST process several times during boot after updating the SBIOS.

Issue

After updating the SBIOS and rebooting the system, the NVIDIA splash screen appears and disappears several times before boot is completed.

Explanation

After updating the SBIOS, several component states are cleared and the system may reboot automatically 3-4 times to reset all the components. This is expected behavior.

Chapter 9. DGX A100 System Firmware Update Container Version 20.12.3.3

The DGX Firmware Update container version 20.12.3.3 is available.

- Package name:`nvfw-dgxa100_20.12.3.3_210205.tar.gz`
- Run file name: `nvfw-dgxa100_20.12.3.3_210205.run`
- Image name: `nvfw-dgxa100:20.12.3.3`

Highlights and Changes in this Release

- This release is supported with the following DGX OS software -
  - DGX OS 4.99.11
  - DGX OS 5.0 or later
  - EL7-21.01 or later (See Special Instructions for Red Hat Enterprise Linux)
  - EL8-20.11 or later
- Fixed the mishandling of correctable PCIe errors.

Contents of the DGX A100 System Firmware Container

This container includes the firmware binaries and update utilities for the firmware listed in the following table. The update time for each component is provided for reference. Total update time if all components are updated is approximately 2 hours and 20 minutes.

Component	Version	Key Changes	Update Time
BMC (via CEC)	**00.13.16**	No change	25 minutes
SBIOS	**0.33**	See DGX A100 SBIOS Changes	7 minutes
Broadcom 88096 PCIe switch board	**0.1.8**	No change	8 minutes
BMC CEC SPI	**v3.25**	No change	8 minutes

Component	Version	Key Changes	Update Time
PEX88064 Retimer	**0.F.0**	No change	7 minutes
PEX88080 Retimer	**0.F.0**	No change	7 minutes
NvSwitch BIOS	**92.10.14.00.01**	No change	8 minutes
VBIOS (A100 40GB)	**92.00.19.00.10**	No change	7 minutes
VBIOS (A100 80GB)	**92.00.36.00.01**	No change	
U.2 NVMe (Samsung)	**EPK99B5Q**	No change	6 minutes
FPGA (GPU sled)	**2.9c**	No change	40 minutes
CEC1712 SPI (GPU sled)	**3.5**	No change	7 minutes

Updating Components with Secondary Images

Some firmware components provide a secondary image as backup. The following is the policy when updating those components:

- **SBIOS**: The two images are referred to as active and inactive, where the active is the currently running image and the inactive is the backup image. When using `update_fw all`, the update container updates both active and inactive images.
- **BMC**: The two images are referred to as active and inactive, where the active is the currently running image and the inactive is the backup image. The update container can only update the inactive image, and will update it only if the *active* image needs to be updated. After the update is completed, the updated inactive image becomes the active image. Because the active image is now updated, subsequent `update_fw all` commands will not update the inactive image. To update the inactive image in this case, use `update_fw BMC --inactive --force`.

9.1. Special Instructions for Red Hat Enterprise Linux

This section describes the actions that must be taken before updating firmware on DGX A100 systems installed with Red Hat Enterprise Linux. There are two options for meeting these requirements.

Option 1: Update to EL7-21.01 or later

Refer to the DGX Software for Red Hat Enterprise Linux 7 Release Notes for more information.

Important: Updating the DGX software for Red Hat Enterprise Linux will update the Red Hat Enterprise Linux installation to 7.9 or later. If you do not want to update your Red Hat Enterprise Linux 7 installation, then choose Option 2.

Option 2: Install mpt3sas 31.101.01.00-0

These instructions apply if

- You do not want to update your Red Hat Enterprise Linux installation, and
- Your system is currently installed with Red Hat Enterprise Linux 7.7 or later.

  If your system is installed with Red Hat Enterprise Linux 7.6 or earlier, contact NVIDIA Enterprise Support for assistance.

1. Perform this step if your system is no longer pointing to the NVIDIA DGX software repository.
   a). On Red Hat Enterprise Linux, run the following commands to enable additional repositories required by the DGX software.
   ```
   sudo subscription-manager repos --enable=rhel-7-server-extras-rpms
   sudo subscription-manager repos --enable=rhel-7-server-optional-rpms
   ```
   b). Run the following command to install the DGX software installation package and enable the NVIDIA DGX software repository.

   ATTENTION: By running these commands you are confirming that you have read and agree to be bound by the DGX Software License Agreement. You are also confirming that you understand that any pre-release software and materials available that you elect to install in a DGX may not be fully functional, may contain errors or design flaws, and may have reduced or different security, privacy, availability, and reliability standards relative to commercial versions of NVIDIA software and materials, and that you use pre-release versions at your risk.

   ```
   yum install -y \
   https://international.download.nvidia.com/dgx/repos/rhel-files/dgx-repo-setup-20.03-1.el7.x86_64.rpm
   ```
2. Install `mpt3sas` 31.101.01.00-0.
   ```
   sudo yum install mpt3sas-dkms
   ```
3. Load the `mpt3sas` driver into the Red Hat Enterprise Linux kernel.
   ```
   sudo modprobe mpt3sas
   ```
   You can verify the correct `mpt3sas` version is installed by issuing the following.
   ```
   yum list installed
   ```

9.2. Instructions for Updating Firmware

This section provides a simple way to update the firmware on the system using the firmware update container. It includes instructions for performing a transitional update for systems that require it. The commands use the .run file, but you can also use any method described in Using the DGX A100 FW Update Utility.

CAUTION:

- Stop all unnecessary system activities before attempting to update firmware.
- Stop all GPU activity, including accessing nvidia-smi, as this can prevent the VBIOS from updating.
- Do not add additional loads on the system (such as user jobs, diagnostics, or monitoring services) while an update is in progress. A high workload can disrupt the firmware update process and result in an unusable component.
- When initiating an update, the update software assists in determining the activity state of the DGX system and provides a warning if it detects that activity levels are above a predetermined threshold. If the warning is encountered, you are strongly advised to take action to reduce the workload before proceeding with the update.

1. Check if updates are needed by checking the installed versions.

```
$ sudo ./nvfw-dgxa100_20.12.3.3_210205.run show_version
```

   - If there is "no" in any up-to-date column for updatable firmware, then continue with the next step.
   - If all up-to-date column entries are "yes", then no updates are needed and no further action is necessary.

2. Perform the update for all firmware supported by the container.

```
$ sudo ./nvfw-dgxa100_20.12.3.3_210205.run update_fw all
```

   Depending on the firmware that is updated, you may be prompted to either reboot the system or power cycle the system.

   - If you are prompted to reboot, issue

```
$ sudo reboot
```

   - If you are prompted to power cycle, you can issue the following two commands (there is no output with the first command).

```
$ sudo ipmitool raw 0x3c 0x04
$ sudo ipmitool chassis power cycle
```

3. After rebooting or power cycling the system, you may need to perform another `update_fw all` to update other firmware.

   - Either repeat Step 1 to check if updates are needed and then perform Step 2 if needed, or
   - Repeat Step 2 just in case updates are needed.

   If you perform another `update_fw all`, you may be prompted again to either reboot the system or power cycle the system.

   See DGX A100 Firmware Update Process for more information about the update process.

You can verify the update by issuing the following.

```
$ sudo ./nvfw-dgxa100_20.12.3.3_210205.run show_version
```

Example output for a DGX A100 320GB system

```
 CEC
=============
                                          Onboard Version   Manifest       up-to-
date
MB_CEC(enabled)                           3.25              3.25
 yes
Delta_CEC(enabled)                        3.05              3.05
 yes

 BMC DGX
=========
Image Id              Status         Location      Onboard Version   Manifest
 up_to_date
0:Active   Boot       Online         Local         00.13.16          00.13.16
 yes
1:Inactive Updatable                 Local         00.13.16          00.13.16
 yes

 SBIOS
=======
Image Id                           Onboard Version   Manifest        up_to_date
0:Inactive Updatable               0.33              0.33               yes
1:Active   Boot Updatable          0.33              0.33               yes

  Switches
=============
PCI Bus#                      Model          Onboard Version   Manifest        FUB
 Updated?  up-to-date
DGX - 0000:91:00.0(U261)      88064_Retimer  0.F.0             0.F.0
 N/A        yes
DGX - 0000:88:00.0(U260)      88064_Retimer  0.F.0             0.F.0
 N/A        yes
DGX - 0000:4f:00.0(U262)      88064_Retimer  0.F.0             0.F.0
 N/A        yes
DGX - 0000:48:00.0(U225)      88080_Retimer  0.F.0             0.F.0
 N/A        yes


DGX - 0000:01:00.0(U1)        PEX88096       1.8               1.8
 N/A        yes
DGX - 0000:b1:00.0(U4)        PEX88096       1.8               1.8
 N/A        yes
DGX - 0000:41:00.0(U2)        PEX88096       1.8               1.8
 N/A        yes
DGX - 0000:81:00.0(U3)        PEX88096       1.8               1.8
 N/A        yes


DGX - 0000:c4:00.0            LR10           92.10.14.00.01    92.10.14.00.01
 yes        yes
DGX - 0000:c5:00.0            LR10           92.10.14.00.01    92.10.14.00.01
 yes        yes
DGX - 0000:c8:00.0            LR10           92.10.14.00.01    92.10.14.00.01
 yes        yes
DGX - 0000:c6:00.0            LR10           92.10.14.00.01    92.10.14.00.01
 yes        yes
DGX - 0000:c9:00.0            LR10           92.10.14.00.01    92.10.14.00.01
 yes        yes
DGX - 0000:c7:00.0            LR10           92.10.14.00.01    92.10.14.00.01
 yes        yes
```

```
 Mass Storage
==============
Drive Name/Slot          Model Number          Onboard Version   Manifest        up-
to-date
nvme0n1           Samsung MZWLJ3T8HBLS-00007  EPK99B5Q          EPK99B5Q
 yes
nvme1n1           Samsung MZ1LB1T9HALS-00007  EDA7202Q          EDA7202Q
 yes
nvme2n1           Samsung MZ1LB1T9HALS-00007  EDA7202Q          EDA7202Q
 yes
nvme3n1           Samsung MZWLJ3T8HBLS-00007  EPK99B5Q          EPK99B5Q
 yes
nvme4n1           Samsung MZWLJ3T8HBLS-00007  EPK99B5Q          EPK99B5Q
 yes
nvme5n1           Samsung MZWLJ3T8HBLS-00007  EPK99B5Q          EPK99B5Q
 yes

 Video BIOS
============
Bus             Model            Onboard Version   Manifest         FUB Updated?  up-
to-date
0000:07:00.0    A100-SXM4-40GB   92.00.19.00.10    92.00.19.00.10         yes
 yes
0000:0f:00.0    A100-SXM4-40GB   92.00.19.00.10    92.00.19.00.10         yes
 yes
0000:47:00.0    A100-SXM4-40GB   92.00.19.00.10    92.00.19.00.10         yes
 yes
0000:4e:00.0    A100-SXM4-40GB   92.00.19.00.10    92.00.19.00.10         yes
 yes
0000:87:00.0    A100-SXM4-40GB   92.00.19.00.10    92.00.19.00.10         yes
 yes
0000:90:00.0    A100-SXM4-40GB   92.00.19.00.10    92.00.19.00.10         yes
 yes
0000:b7:00.0    A100-SXM4-40GB   92.00.19.00.10    92.00.19.00.10         yes
 yes
0000:bd:00.0    A100-SXM4-40GB   92.00.19.00.10    92.00.19.00.10         yes
 yes


FPGA
========
Onboard version     Manifest  up-to-date
02.9c               02.9c        yes


  CPLD
============
                                          Onboard Version   Manifest       up-to-
date
MID_CPLD                                  1.03              1.03
 yes
MB_CPLD                                   1.03              1.03
 yes

* CPLD won't be updated by default (`update_fw all`), use `update_fw CPLD` if it's
 needed
```

9.3. Known Issues

9.3.1. BMC UI May not be Accessible from Mac OS

Issue

When attempting to connect to the DGX A100 BMC from a system with Mac OS, a "Your connection is not private" message appears that prevents access to the BMC.

Explanation

Starting with version 0.13.6, the BMC provides a self-signed certificate which Mac OS flags in the browser. Most browsers will let you either accept the risk and continue, or add the certificate to the keychain and continue. The Chrome and Opera browsers, however, do not provide these options and so Mac OS users will not be able to access the BMC from the Chrome or Opera browser.

To access the DGX A100 BMC, Mac OS users can use Safari or Firefox, which provide an access path.

9.3.2. Update Timeout Reported for Motherboard CEC

Issue

The update progress output reports "`Update_timeout`" for the motherboard CEC (MB_CEC) when using the .run file without Docker installed.

Example

```
+-----------------------------------------------------------------------------+
|+---------------------------------------------------------------------------+|
||                    !!!!! Firmware Update In Progress !!!!!                ||
||                         Status: reflash BMC firmware                      ||
|+---------------------------------------------------------------------------+|
|                                 Onboard         Manifest          Update Status  |
|MB_CEC                           3.05            3.25              Update timeout |
```

Explanation

This message can be ignored provided that the MB_CEC update is successful.

Example success message:

```
Success:
  Installed firmware 3.25 on MB_CEC
```

9.3.3. Boot Order in the SBIOS Reverts to the Default

Issue

After updating the SBIOS, any changes in the boot order that you have made are not preserved and the boot order specified in the SBIOS reverts to the following.

```
Boot Option #1  [Hard Disk]
Boot Option #2  [NVME]
Boot Option #3  [USB CD/DVD]
Boot Option #4  [USB Hard Disk]
Boot Option #5  [USB Key]
Boot Option #6  [Network]
```

Explanation

You will need to prepare for the change when restarting the system, and then enter the SBIOS setup to edit the boot order as needed.

Chapter 10. DGX A100 System Firmware Update Container Version 20.12.3

The DGX Firmware Update container version 20.12.3 is available.

- Package name:`nvfw-dgxa100_20.12.3_201209.tar.gz`
- Run file name: `nvfw-dgxa100_20.12.3_201209.run`
- Image name: `nvfw-dgxa100:20.12.3`

Highlights and Changes in this Release

- This release is supported with the following DGX OS software -
  - DGX OS 4.99.11
  - DGX OS 5.0 or later
- Fixed an issue where running the container generated an overly large log file.

Contents of the DGX A100 System Firmware Container

This container includes the firmware binaries and update utilities for the firmware listed in the following table. The update time for each component is provided for reference. Total update time if all components are updated is approximately 2 hours and 20 minutes.

Component	Version	Key Changes	Update Time
BMC (via CEC)	**00.13.16**	No change	25 minutes
SBIOS	**0.30**	No change	7 minutes
Broadcom 88096 PCIe switch board	**0.1.8**	No change	8 minutes
BMC CEC SPI	**v3.25**	No change	8 minutes
PEX88064 Retimer	**0.F.0**	No change	7 minutes
PEX88080 Retimer	**0.F.0**	No change	7 minutes

Component	Version	Key Changes	Update Time
NvSwitch BIOS	**92.10.14.00.01**	No change	8 minutes
VBIOS (A100 40GB)	**92.00.19.00.10**	No change	7 minutes
VBIOS (A100 80GB)	**92.00.36.00.01**	No change	
U.2 NVMe (Samsung)	**EPK99B5Q**	No change	6 minutes
FPGA (GPU sled)	**2.9c**	No change	40 minutes
CEC1712 SPI (GPU sled)	**3.5**	No change	7 minutes

Updating Components with Secondary Images

Some firmware components provide a secondary image as backup. The following is the policy when updating those components:

- **SBIOS**: The two images are referred to as active and inactive, where the active is the currently running image and the inactive is the backup image. When using `update_fw all`, the update container updates both active and inactive images.
- **BMC**: The two images are referred to as active and inactive, where the active is the currently running image and the inactive is the backup image. The update container can only update the inactive image, and will update it only if the *active* image needs to be updated. After the update is completed, the updated inactive image becomes the active image. Because the active image is now updated, subsequent `update_fw all` commands will not update the inactive image. To update the inactive image in this case, use `update_fw BMC --inactive --force`.

10.1. Instructions for Updating Firmware

This section provides a simple way to update the firmware on the system using the firmware update container. It includes instructions for performing a transitional update for systems that require it. The commands use the .run file, but you can also use any method described in Using the DGX A100 FW Update Utility.

CAUTION:

- Stop all unnecessary system activities before attempting to update firmware.
- Stop all GPU activity, including accessing nvidia-smi, as this can prevent the VBIOS from updating.
- Do not add additional loads on the system (such as user jobs, diagnostics, or monitoring services) while an update is in progress. A high workload can disrupt the firmware update process and result in an unusable component.

- When initiating an update, the update software assists in determining the activity state of the DGX system and provides a warning if it detects that activity levels are above a predetermined threshold. If the warning is encountered, you are strongly advised to take action to reduce the workload before proceeding with the update.

1. Check if updates are needed by checking the installed versions.
   ```
   $ sudo nvfw-dgxa100_20.12.3_201209.run show_version
   ```
   - If there is "no" in any up-to-date column for updatable firmware, then continue with the next step.
   - If all up-to-date column entries are "yes", then no updates are needed and no further action is necessary.
2. Perform the update for all firmware supported by the container.
   ```
   $ sudo nvfw-dgxa100_20.12.3_201209.run update_fw all
   ```
   Depending on the firmware that is updated, you may be prompted to either reboot the system or power cycle the system.
   - If you are prompted to reboot, issue
     ```
     $ sudo reboot
     ```
   - If you are prompted to power cycle, you can issue the following two commands (there is no output with the first command).
     ```
     $ sudo ipmitool raw 0x3c 0x04
     $ sudo ipmitool chassis power cycle
     ```
3. After rebooting or power cycling the system, you may need to perform another `update_fw all` to update other firmware.
   - Either repeat Step 1 to check if updates are needed and then perform Step 2 if needed, or
   - Repeat Step 2 just in case updates are needed.

   If you perform another `update_fw all`, you may be prompted again to either reboot the system or power cycle the system.

   See DGX A100 Firmware Update Process for more information about the update process.

You can verify the update by issuing the following.

```
$ sudo nvfw-dgxa100_20.12.3_201209.run show_version
```

Example output for a DGX A100 320GB system

```
 BMC DGX
=========
Image Id             Status  Location  Onboard Version  Manifest   up_to_date
0:Active   Boot      Online   Local     00.13.16        00.13.16         yes
1:Inactive Updatable          Local     00.13.16        00.13.16         yes

  CEC
=============
                                Onboard Version   Manifest    up-to-date
MB_CEC(enabled)                  3.25              3.25              yes


 SBIOS
=======
Image Id                   Method    Onboard Version   Manifest    up_to_date
```

```
0:Inactive Updatabl        afulnx     0.30              0.30              yes
1:Active   Boot                       0.30              0.30              yes

 Video BIOS
============
Bus             Model                Onboard Version    Manifest    up-to-date
0000:07:00.0    A100-SXM4-40GB       92.00.19.00.10     92.00.19.00.10    yes
0000:0f:00.0    A100-SXM4-40GB       92.00.19.00.10     92.00.19.00.10    yes
0000:47:00.0    A100-SXM4-40GB       92.00.19.00.10     92.00.19.00.10    yes
0000:4e:00.0    A100-SXM4-40GB       92.00.19.00.10     92.00.19.00.10    yes
0000:87:00.0    A100-SXM4-40GB       92.00.19.00.10     92.00.19.00.10    yes
0000:90:00.0    A100-SXM4-40GB       92.00.19.00.10     92.00.19.00.10    yes
0000:b7:00.0    A100-SXM4-40GB       92.00.19.00.10     92.00.19.00.10    yes
0000:bd:00.0    A100-SXM4-40GB       92.00.19.00.10     92.00.19.00.10    yes

  Switches
============
PCI Bus#                    Model       Onboard Version   Manifest     up-to-date
DGX - 0000:91:00.0(U261)    88064_Retimer  0.F.0          0.F.0            yes
DGX - 0000:88:00.0(U260)    88064_Retimer  0.F.0          0.F.0            yes
DGX - 0000:4f:00.0(U262)    88064_Retimer  0.F.0          0.F.0            yes

DGX - 0000:48:00.0(U225)    88080_Retimer  0.F.0          0.F.0            yes

DGX - 0000:c4:00.0          LR10         92.10.14.00.01    92.10.14.00.01     yes
DGX - 0000:c5:00.0          LR10         92.10.14.00.01    92.10.14.00.01     yes
DGX - 0000:c2:00.0          LR10         92.10.14.00.01    92.10.14.00.01     yes
DGX - 0000:c6:00.0          LR10         92.10.14.00.01    92.10.14.00.01     yes
DGX - 0000:c3:00.0          LR10         92.10.14.00.01    92.10.14.00.01     yes
DGX - 0000:c7:00.0          LR10         92.10.14.00.01    92.10.14.00.01     yes

DGX - 0000:01:00.0(U1)      PEX88096        1.8               1.8             yes
DGX - 0000:81:00.0(U3)      PEX88096        1.8               1.8             yes
DGX - 0000:41:00.0(U2)      PEX88096        1.8               1.8             yes
DGX - 0000:b1:00.0(U4)      PEX88096        1.8               1.8             yes
```

10.2. Known Issues

10.2.1. BMC UI May not be Accessible from Mac OS

Issue

When attempting to connect to the DGX A100 BMC from a system with Mac OS, a "Your connection is not private" message appears that prevents access to the BMC.

Explanation

Starting with version 0.13.6, the BMC provides a self-signed certificate which Mac OS flags in the browser. Most browsers will let you either accept the risk and continue, or add the certificate to the keychain and continue. The Chrome and Opera browsers, however, do not provide these options and so Mac OS users will not be able to access the BMC from the Chrome or Opera browser.

To access the DGX A100 BMC, Mac OS users can use Safari or Firefox, which provide an access path.

10.2.2. Update Timeout Reported for Motherboard CEC

Issue

The update progress output reports "`Update_timeout`" for the motherboard CEC (MB_CEC) when using the .run file without Docker installed.

Example

```
+-----------------------------------------------------------------------------+
|+---------------------------------------------------------------------------+|
||                    !!!!! Firmware Update In Progress !!!!!                ||
||                         Status: reflash BMC firmware                      ||
|+---------------------------------------------------------------------------+|
|                                 Onboard         Manifest          Update Status  |
|MB_CEC                           3.05            3.25              Update timeout |
```

Explanation

This message can be ignored provided that the MB_CEC update is successful.

Example success message:

```
Success:
  Installed firmware 3.25 on MB_CEC
```

10.2.3. Boot Order in the SBIOS Reverts to the Default

Issue

After updating the SBIOS, any changes in the boot order that you have made are not preserved and the boot order specified in the SBIOS reverts to the following.

```
Boot Option #1  [Hard Disk]
Boot Option #2  [NVME]
Boot Option #3  [USB CD/DVD]
Boot Option #4  [USB Hard Disk]
Boot Option #5  [USB Key]
Boot Option #6  [Network]
```

Explanation

You will need to prepare for the change when restarting the system, and then enter the SBIOS setup to edit the boot order as needed.

Chapter 11. DGX A100 System Firmware Update Container Version 20.11.3

The DGX Firmware Update container version 20.11.3 is available.

- Package name:`nvfw-dgxa100_20.11.3_201124.tar.gz`
- Run file name: `nvfw-dgxa100_20.11.3_201124.run`
- Image name: `nvfw-dgxa100:20.11.3`

Highlights and Changes in this Release

- This release is supported with the following DGX OS software -
  - DGX OS 4.99.11
  - DGX OS 5.0 or later
- Includes firmware updates to resolve PCIe advanced error reporting (AER) issues.
- The BMC update includes software security enhancements.

  See the NVIDIA Security Bulletin 5010 for details.
- Changed the policy for updating the active/inactive BMC images. See **Updating Components with Secondary Images**.
- Removed the need to manually stop certain services before updating on DGX OS 5.0.
- See DGX A100 System Firmware Changes for the list of changes in individual components.

Contents of the DGX A100 System Firmware Container

This container includes the firmware binaries and update utilities for the firmware listed in the following table. The update time for each component is provided for reference. Total update time if all components are updated is approximately 2 hours and 20 minutes.

Component	Version	Key Changes	Update Time
BMC (via CEC)	**00.13.16**	The BMC update includes software security enhancements. See the NVIDIA Security Bulletin 5010 for details.	25 minutes
SBIOS	**0.30**	See SBIOS Release Notes	7 minutes
Broadcom 88096 PCIe switch board	**0.1.8**	Updated preset values to address PCIe advanced error reporting (AER) issues.	8 minutes
BMC CEC SPI	**v3.25**	Improved BMC update time and reliability.	8 minutes
PEX88064 Retimer	**0.F.0**	Improved error handling of downstream switches.	7 minutes
PEX88080 Retimer	**0.F.0**	Improved error handling of downstream switches.	7 minutes
NvSwitch BIOS	**92.10.14.00.01**	Added support for a new out-of-band SMBPBI query to retrieve FUB revocation status.	8 minutes
VBIOS (A100 40GB)	**92.00.19.00.10**	Improved VBIOS compatibility.	7 minutes
VBIOS (A100 80GB)	**92.00.36.00.01**	New addition to the container.	
U.2 NVMe (Samsung)	**EPK99B5Q**	Enabled Relaxed Ordering.	6 minutes
FPGA (GPU sled)	**2.9c**	Added to the container. Implements miscellaneous bug fixes.	40 minutes
CEC1712 SPI (GPU sled)	**3.5**	Added to the container. Improved update time and reliability.	7 minutes

Updating Components with Secondary Images

Some firmware components provide a secondary image as backup. The following is the policy when updating those components:

- **SBIOS**: The two images are referred to as active and inactive, where the active is the currently running image and the inactive is the backup image. When using `update_fw all`, the update container updates both active and inactive images.
- **BMC**: The two images are referred to as active and inactive, where the active is the currently running image and the inactive is the backup image. The update container can only update the inactive image, and will update it only if the *active* image needs to be updated. After the update is completed, the updated inactive image becomes the active image. Because the active image is now updated, subsequent `update_fw all` commands will not update the inactive image. To update the inactive image in this case, use `update_fw BMC --inactive --force`.

11.1. Instructions for Updating Firmware

This section provides a simple way to update the firmware on the system using the firmware update container. It includes instructions for performing a transitional update for systems that require it. The commands use the .run file, but you can also use any method described in Using the DGX A100 FW Update Utility.

CAUTION: Stop all unnecessary system activities before attempting to update firmware, and do not add additional loads on the system (such as Kubernetes jobs or other user jobs or diagnostics) while an update is in progress. A high GPU workload can disrupt the firmware update process and result in an unusable component.

1. Check if updates are needed by checking the installed versions.

   ```
   $ sudo nvfw-dgxa100_20.11.3_201124.run show_version
   ```

   - If there is "no" in any up-to-date column for updatable firmware, then continue with the next step.
   - If all up-to-date column entries are "yes", then no updates are needed and no further action is necessary.

2. Perform the update for all firmware supported by the container.

   ```
   $ sudo nvfw-dgxa100_20.11.3_201124.run update_fw all
   ```

   Depending on the firmware that is updated, you may be prompted to either reboot the system or power cycle the system.

   - If you are prompted to reboot, issue

     ```
     $ sudo reboot
     ```

   - If you are prompted to power cycle, you can issue the following two commands (there is no output with the first command).

     ```
     $ sudo ipmitool raw 0x3c 0x04
     $ sudo ipmitool chassis power cycle
     ```

3. After rebooting or power cycling the system, you may need to perform another `update_fw all` to update other firmware.

   - Either repeat Step 1 to check if updates are needed and then perform Step 2 if needed, or
   - Repeat Step 2 just in case updates are needed.

   If you perform another `update_fw all`, you may be prompted again to either reboot the system or power cycle the system.

   See DGX A100 Firmware Update Process for more information about the update process.

4. Rename the firmware update log file (the update generates `/var/log/nvidia-fw.log` which you should rename).

   Example:

   ```
   $ sudo mv /var/log/nvidia-fw.log /var/log/nvidia-fw-large.log
   ```

   Refer to Firmware Update Log File Size Impacts nvsm dump health for more information.

You can verify the update by issuing the following.

```
$ sudo nvfw-dgxa100_20.11.3_201124.run show_version
```

Example output for a DGX A100 320GB system

```
 BMC DGX
=========
Image Id             Status  Location  Onboard Version  Manifest   up_to_date
0:Active   Boot      Online   Local     00.13.16        00.13.16         yes
1:Inactive Updatable          Local     00.13.16        00.13.16         yes

  CEC
============
                                  Onboard Version   Manifest    up-to-date
MB_CEC(enabled)                    3.25              3.25              yes


 SBIOS
=======
Image Id                   Method    Onboard Version   Manifest    up_to_date
0:Inactive Updatabl        afulnx     0.30              0.30              yes
1:Active   Boot                       0.30              0.30              yes

 Video BIOS
============
Bus             Model                Onboard Version    Manifest    up-to-date
0000:07:00.0    A100-SXM4-40GB       92.00.19.00.10     92.00.19.00.10    yes
0000:0f:00.0    A100-SXM4-40GB       92.00.19.00.10     92.00.19.00.10    yes
0000:47:00.0    A100-SXM4-40GB       92.00.19.00.10     92.00.19.00.10    yes
0000:4e:00.0    A100-SXM4-40GB       92.00.19.00.10     92.00.19.00.10    yes
0000:87:00.0    A100-SXM4-40GB       92.00.19.00.10     92.00.19.00.10    yes
0000:90:00.0    A100-SXM4-40GB       92.00.19.00.10     92.00.19.00.10    yes
0000:b7:00.0    A100-SXM4-40GB       92.00.19.00.10     92.00.19.00.10    yes
0000:bd:00.0    A100-SXM4-40GB       92.00.19.00.10     92.00.19.00.10    yes

  Switches
============
PCI Bus#                    Model       Onboard Version   Manifest     up-to-date
DGX - 0000:91:00.0(U261)  88064_Retimer  0.F.0             0.F.0            yes
DGX - 0000:88:00.0(U260)  88064_Retimer  0.F.0             0.F.0            yes
DGX - 0000:4f:00.0(U262)  88064_Retimer  0.F.0             0.F.0            yes

DGX - 0000:48:00.0(U225)  88080_Retimer  0.F.0             0.F.0            yes

DGX - 0000:c4:00.0        LR10        92.10.14.00.01    92.10.14.00.01     yes
DGX - 0000:c5:00.0        LR10        92.10.14.00.01    92.10.14.00.01     yes
DGX - 0000:c2:00.0        LR10        92.10.14.00.01    92.10.14.00.01     yes
DGX - 0000:c6:00.0        LR10        92.10.14.00.01    92.10.14.00.01     yes
DGX - 0000:c3:00.0        LR10        92.10.14.00.01    92.10.14.00.01     yes
DGX - 0000:c7:00.0        LR10        92.10.14.00.01    92.10.14.00.01     yes

DGX - 0000:01:00.0(U1)    PEX88096        1.8               1.8            yes
DGX - 0000:81:00.0(U3)    PEX88096        1.8               1.8            yes
DGX - 0000:41:00.0(U2)    PEX88096        1.8               1.8            yes
DGX - 0000:b1:00.0(U4)    PEX88096        1.8               1.8            yes
```

11.2. Known Issues

11.2.1. Firmware Update Log File Size Impacts `nvsm dump health`

Issue

After running the container, the generated log file (`/var/log/nvidia-fw.log`) can grow to up to tens of gigabytes in size, depending on the firmware that gets updated. If, at a later time, you run `nvsm dump health`, the command might time out and fail if the file size is too large.

Explanation

To avoid problems running `nvsm dump health`, rename the generated firmware update log file after updating the firmware.

Example:

```
$ sudo mv /var/log/nvidia-fw.log /var/log/nvidia-fw-large.log
```

11.2.2. BMC UI May not be Accessible from Mac OS

Issue

When attempting to connect to the DGX A100 BMC from a system with Mac OS, a "Your connection is not private" message appears that prevents access to the BMC.

Explanation

Starting with version 0.13.6, the BMC provides a self-signed certificate which Mac OS flags in the browser. Most browsers will let you either accept the risk and continue, or add the certificate to the keychain and continue. The Chrome and Opera browsers, however, do not provide these options and so Mac OS users will not be able to access the BMC from the Chrome or Opera browser.

To access the DGX A100 BMC, Mac OS users can use Safari or Firefox, which provide an access path.

11.2.3. Update Timeout Reported for Motherboard CEC

Issue

The update progress output reports "`Update_timeout`" for the motherboard CEC (MB_CEC) when using the .run file without Docker installed.

Example

```
+-----------------------------------------------------------------------------+
|+---------------------------------------------------------------------------+|
||                   !!!!! Firmware Update In Progress !!!!!                 ||
||                        Status: reflash BMC firmware                       ||
|+---------------------------------------------------------------------------+|
|                                Onboard         Manifest          Update Status  |
|MB_CEC                          3.05            3.25              Update timeout |
```

Explanation

This message can be ignored provided that the MB_CEC update is successful.

Example success message:

```
Success:
  Installed firmware 3.25 on MB_CEC
```

11.2.4. Boot Order in the SBIOS Reverts to the Default

Issue

After updating the SBIOS, any changes in the boot order that you have made are not preserved and the boot order specified in the SBIOS reverts to the following.

```
Boot Option #1  [Hard Disk]
Boot Option #2  [NVME]
Boot Option #3  [USB CD/DVD]
Boot Option #4  [USB Hard Disk]
Boot Option #5  [USB Key]
Boot Option #6  [Network]
```

Explanation

You will need to prepare for the change when restarting the system, and then enter the SBIOS setup to edit the boot order as needed.

Chapter 12. DGX A100 System Firmware Update Container Version 20.05.12.3

The DGX Firmware Update container version 20.05.12.3 is available.

- Package name:`nvfw-dgxa100_20.05.12.3_200716.tar.gz`
- Run file name: `nvfw-dgxa100_20.05.12.3_200716.run`
- Image name: `nvfw-dgxa100:20.05.12.3`

Highlights and Changes in this Release

- This release is supported with the following DGX OS software -
  - DGX OS 4.99.9 or later
  - DGX OS 5.0.x

    Before using the container to update firmware on DGX OS 5.0.x or later, first stop certain NVIDIA services. See Updating Firmware on DGX Systems Installed with DGX OS Release 5.0 or Later.
- Fixed an issue where the DGX A100 fans would run at high speed when the optional dual-port network card was not installed.

Contents of the DGX A100 System Firmware Container

This container includes the firmware binaries and update utilities for the firmware listed in the following table.

Component	Version	Key Changes	Update Time
BMC (via CEC)	00.12.06	Fixed high fan speed bug.	31 minutes
SBIOS	0.25	No change	7 minutes
Broadcom 88096 PCIe switch board	1.3	No change	8 minutes

Component	Version	Key Changes	Update Time
BMC CEC SPI	v3.05	No change	8 minutes
PEX88064 Retimer	0.13.0	No change	7 minutes
PEX88080 Retimer	0.13.0	No change	7 minutes
NvSwitch BIOS	92.10.12.00.01	No change	8 minutes
VBIOS	92.00.19.00.01	No change	7 minutes

Updating Components with Secondary Images

Some firmware components provide a secondary image as backup. The following is the policy when updating those components:

- **SBIOS**: The two images are referred to as active and inactive, where the active is the currently running image and the inactive is the backup image. The update container can only update the inactive image. After reboot, the updated image becomes the active image. You can perform the update again to update the current inactive image so that both images are updated.
- **BMC**: The two images are referred to as active and inactive, where the active is the currently running image and the inactive is the backup image. The update container can only update the inactive image. After the update is completed, the updated image becomes the active image. You can perform the update again to update the current inactive image so that both images are updated.

12.1. Updating Firmware on DGX Systems Installed with DGX OS Release 5.0 or Later

You need to stop certain NVIDIA services before using the container to update firmware on systems installed with DGX OS 5.0.x or later

- If you run the container using either the `docker run` or `.run` file method, then stop services first by issuing the following.

```
$ sudo systemctl stop nvsm dcgm nvidia-fabricmanager nvidia-persistenced.service
```

- If you run the container using NVSM CLI, then stop services first by issuing the following (does not include stopping nvsm).

```
$ sudo systemctl stop dcgm nvidia-fabricmanager nvidia-persistenced.service
```

12.2. Instructions for Updating Firmware

This section provides a simple way to update the firmware on the system using the firmware update container. It includes instructions for performing a transitional update for systems that require it. The commands use the .run file, but you can also use any method described in Using the DGX A100 FW Update Utility.

CAUTION: Stop all unnecessary system activities before attempting to update firmware, and do not add additional loads on the system (such as Kubernetes jobs or other user jobs or diagnostics) while an update is in progress. A high GPU workload can disrupt the firmware update process and result in an unusable component.

1. Perform a transitional update if needed.

   Depending on the BMC and MB_CEC versions on the system, you may need to perform a transitional update before updating the BMC and SBIOS to the latest versions.

   a). Check if the transitional update is needed.

   ```
   $ sudo nvfw-dgxa100_20.05.12.3_200716.run run_script --command "fw_transition.py
    show_version"
   ```

   The following message appears if a transition update is needed.

   ```
   BMC/MB_CEC firmware needs update to Active/Inactive, secure boot mode
   This is a one-time update required for DGXA100. All future updates require BMC
    in this mode
   ```

   - If the one-time update is required, continue with the next step to perform the transitional update.
   - If the one-time update is not required, then skip to step 2.

   b). Refer to Updating Firmware on DGX Systems Installed with DGX OS Release 5.0 or Laterto see if services need to be stopped and how to do it.

   c). Perform the transitional update.

   ```
   $ sudo nvfw-dgxa100_20.05.12.3_200716.run run_script --command "fw_transition.py
    update_fw"
   $ sudo reboot
   ```

   d). Verify that BMC (both images) and the MB_CEC are up to date.

   ```
   $ sudo nvfw-dgxa100_20.05.12.3_200716.run run_script --command "fw_transition.py
    show_version"
   ```

2. Check if other updates are needed by checking the installed versions.

   ```
   $ sudo nvfw-dgxa100_20.05.12.3_200716.run show_version
   ```

   - If there is "no" in any up-to-date column for updatable firmware, then continue with the next step.
   - If all up-to-date column entries are "yes", then no updates are needed and no further action is necessary.

3. Perform the final update for all firmware supported by the container and reboot the system.

   a). Refer to Updating Firmware on DGX Systems Installed with DGX OS Release 5.0 or Laterto see if services need to be stopped and how to do it.

   b). Perform the update.

   ```
   $ sudo nvfw-dgxa100_20.05.12.3_200716.run update_fw all
   ```

```
$ sudo reboot
```

Note: The `update_fw all` command updates the inactive BMC and SBIOS images only. After rebooting the system, the updated images become "active". You can then update the inactive images using `nvfw-dgxa100_20.05.12.3_200716.run update_fw [BMC] [SBIOS]` as needed.

You can verify the update by issuing the following.

```
$ sudo nvfw-dgxa100_20.05.12.3_200716.run show_version
```

Expected output.

```
 BMC DGX
=========
Image Id             Status  Location  Onboard Version  Manifest   up_to_date
0:Active   Boot      Online   Local     00.12.06        00.12.06         yes
1:Inactive Updatable          Local     00.12.06        00.12.06         yes

  CEC
============
                                    Onboard Version   Manifest    up-to-date
MB_CEC(enabled)                      3.05              3.05              yes


 SBIOS
=======
Image Id                   Method    Onboard Version   Manifest    up_to_date
0:Inactive Updatabl        afulnx     0.25              0.25              yes
1:Active   Boot                       0.25              0.25              yes

 Video BIOS
============
Bus            Model                Onboard Version    Manifest    up-to-date
0000:07:00.0   A100-SXM4-40GB       92.00.19.00.01     92.00.19.00.01    yes
0000:0f:00.0   A100-SXM4-40GB       92.00.19.00.01     92.00.19.00.01    yes
0000:47:00.0   A100-SXM4-40GB       92.00.19.00.01     92.00.19.00.01    yes
0000:4e:00.0   A100-SXM4-40GB       92.00.19.00.01     92.00.19.00.01    yes
0000:87:00.0   A100-SXM4-40GB       92.00.19.00.01     92.00.19.00.01    yes
0000:90:00.0   A100-SXM4-40GB       92.00.19.00.01     92.00.19.00.01    yes
0000:b7:00.0   A100-SXM4-40GB       92.00.19.00.01     92.00.19.00.01    yes
0000:bd:00.0   A100-SXM4-40GB       92.00.19.00.01     92.00.19.00.01    yes

  Switches
============
PCI Bus#                   Model       Onboard Version   Manifest     up-to-date
DGX - 0000:91:00.0(U261)   88064_Retimer  0.13.0          0.13.0            yes
DGX - 0000:88:00.0(U260)   88064_Retimer  0.13.0          0.13.0            yes
DGX - 0000:4f:00.0(U262)   88064_Retimer  0.13.0          0.13.0            yes

DGX - 0000:48:00.0(U225)   88080_Retimer  0.13.0          0.13.0            yes

DGX - 0000:c4:00.0         LR10         92.10.12.00.01    92.10.12.00.01    yes
DGX - 0000:c5:00.0         LR10         92.10.12.00.01    92.10.12.00.01    yes
DGX - 0000:c2:00.0         LR10         92.10.12.00.01    92.10.12.00.01    yes
DGX - 0000:c6:00.0         LR10         92.10.12.00.01    92.10.12.00.01    yes
DGX - 0000:c3:00.0         LR10         92.10.12.00.01    92.10.12.00.01    yes
DGX - 0000:c7:00.0         LR10         92.10.12.00.01    92.10.12.00.01    yes

DGX - 0000:01:00.0(U1)     PEX88096        1.3               1.3            yes
DGX - 0000:81:00.0(U3)     PEX88096        1.3               1.3            yes
DGX - 0000:41:00.0(U2)     PEX88096        1.3               1.3            yes
DGX - 0000:b1:00.0(U4)     PEX88096        1.3               1.3            yes
```

Chapter 13. DGX A100 System Firmware Update Container Version 20.05.12.2

The DGX Firmware Update container version 20.05.12.2 is available.

- Package name:`nvfw-dgxa100_20.05.12.2_200630.tar.gz`
- Run file name: `nvfw-dgxa100_20.05.12.2_200630.run`
- Image name: `nvfw-dgxa100:20.05.12.2`

Highlights and Changes in this Release

- This release is supported with the following DGX OS software -
  - DGX OS 4.99.9 or later
- Restored ability to view hidden options in the SBIOS setup screens.

Contents of the DGX A100 System Firmware Container

This container includes the firmware binaries and update utilities for the firmware listed in the following table.

Component	Version	Key Changes	Update Time
BMC (via CEC)	00.12.05	No change.	31 minutes
SBIOS	0.25	▶ Restored Hidden Options	7 minutes
Broadcom 88096 PCIe switch board	1.3	No change	8 minutes
BMC CEC SPI	v3.05	No change	8 minutes
PEX88064 Retimer	0.13.0	No change	7 minutes
PEX88080 Retimer	0.13.0	No change	7 minutes
NvSwitch BIOS	92.10.12.00.01	No change	8 minutes

Component	Version	Key Changes	Update Time
VBIOS	92.00.19.00.01	No change	7 minutes

Updating Components with Secondary Images

Some firmware components provide a secondary image as backup. The following is the policy when updating those components:

- **SBIOS**: The two images are referred to as active and inactive, where the active is the currently running image and the inactive is the backup image. The update container can only update the inactive image. After reboot, the updated image becomes the active image. You can perform the update again to update the current inactive image so that both images are updated.
- **BMC**: The two images are referred to as active and inactive, where the active is the currently running image and the inactive is the backup image. The update container can only update the inactive image. After the update is completed, the updated image becomes the active image. You can perform the update again to update the current inactive image so that both images are updated.

13.1. Instructions for Updating Firmware

This section provides a simple way to update the firmware on the system using the firmware update container. It includes instructions for performing a transitional update for systems that require it. The commands use the .run file, but you can also use the container image directly.

1. Perform a transitional update if needed.

   Depending on the BMC and MB_CEC versions on the system, you may need to perform a transitional update before updating the BMC and SBIOS to the latest versions.

   a). Check if the transitional update is needed.

   ```
   $ sudo nvfw-dgxa100_20.05.12.2_200630.run run_script --command "fw_transition.py
    show_version"
   ```

   The following message appears if a transition update is needed.

   ```
   BMC/MB_CEC firmware needs update to Active/Inactive, secure boot mode
   This is a one-time update required for DGXA100. All future updates require BMC
    in this mode
   ```

   - If the one-time update is required, continue with the next step to perform the transitional update.
   - If the one-time update is not required, then skip to step 2.

   b). Perform the transitional update.

   ```
   $ sudo nvfw-dgxa100_20.05.12.2_200630.run run_script --command "fw_transition.py
    update_fw"
   $ sudo reboot
   ```

   c). Verify that BMC (both images) and the MB_CEC are up to date.

```
$ sudo nvfw-dgxa100_20.05.12.2_200630.run run_script --command "fw_transition.py
 show_version"
```

2. Check if other updates are needed.

```
$ sudo nvfw-dgxa100_20.05.12.2_200630.run show_version
```

   - If there is "no" in any up-to-date column for updatable firmware, then continue with the next step.
   - If all up-to-date column entries are "yes", then no updates are needed and no further action is necessary.

3. Perform the final update for all firmware supported by the container and reboot the system.

```
$ sudo nvfw-dgxa100_20.05.12.2_200630.run update_fw all

$ sudo reboot
```

Note: The `update_fw all` command updates the inactive BMC and SBIOS images only. After rebooting the system, the updated images become "active". You can then update the inactive images using `nvfw-dgxa100_20.05.12.2_200630.run update_fw [BMC] [SBIOS] --inactive` as needed.

You can verify the update by issuing the following.

```
$ sudo nvfw-dgxa100_20.05.12.2_200630.run show_version
```

Expected output.

```
 BMC DGX
=========
Image Id             Status  Location  Onboard Version  Manifest   up_to_date
0:Active   Boot      Online   Local     00.12.05        00.12.05         yes
1:Inactive Updatable          Local     00.12.05        00.12.05         yes

  CEC
============
                                 Onboard Version   Manifest    up-to-date
MB_CEC(enabled)                   3.05              3.05              yes


 SBIOS
=======
Image Id                  Method    Onboard Version   Manifest    up_to_date
0:Inactive Updatabl       afulnx     0.25              0.25             yes
1:Active   Boot                      0.25              0.25             yes

 Video BIOS
============
Bus            Model                Onboard Version    Manifest    up-to-date
0000:07:00.0   A100-SXM4-40GB       92.00.19.00.01     92.00.19.00.01    yes
0000:0f:00.0   A100-SXM4-40GB       92.00.19.00.01     92.00.19.00.01    yes
0000:47:00.0   A100-SXM4-40GB       92.00.19.00.01     92.00.19.00.01    yes
0000:4e:00.0   A100-SXM4-40GB       92.00.19.00.01     92.00.19.00.01    yes
0000:87:00.0   A100-SXM4-40GB       92.00.19.00.01     92.00.19.00.01    yes
0000:90:00.0   A100-SXM4-40GB       92.00.19.00.01     92.00.19.00.01    yes
0000:b7:00.0   A100-SXM4-40GB       92.00.19.00.01     92.00.19.00.01    yes
0000:bd:00.0   A100-SXM4-40GB       92.00.19.00.01     92.00.19.00.01    yes

  Switches
============
PCI Bus#                   Model       Onboard Version   Manifest     up-to-date
DGX - 0000:91:00.0(U261)   88064_Retimer  0.13.0          0.13.0            yes
DGX - 0000:88:00.0(U260)   88064_Retimer  0.13.0          0.13.0            yes
```

```
DGX - 0000:4f:00.0(U262)  88064_Retimer  0.13.0          0.13.0            yes

DGX - 0000:48:00.0(U225)  88080_Retimer  0.13.0          0.13.0            yes

DGX - 0000:c4:00.0        LR10        92.10.12.00.01    92.10.12.00.01    yes
DGX - 0000:c5:00.0        LR10        92.10.12.00.01    92.10.12.00.01    yes
DGX - 0000:c2:00.0        LR10        92.10.12.00.01    92.10.12.00.01    yes
DGX - 0000:c6:00.0        LR10        92.10.12.00.01    92.10.12.00.01    yes
DGX - 0000:c3:00.0        LR10        92.10.12.00.01    92.10.12.00.01    yes
DGX - 0000:c7:00.0        LR10        92.10.12.00.01    92.10.12.00.01    yes

DGX - 0000:01:00.0(U1)    PEX88096        1.3               1.3           yes
DGX - 0000:81:00.0(U3)    PEX88096        1.3               1.3           yes
DGX - 0000:41:00.0(U2)    PEX88096        1.3               1.3           yes
DGX - 0000:b1:00.0(U4)    PEX88096        1.3               1.3           yes
```

Chapter 14. DGX A100 System Firmware Update Container Version 20.05.12

The DGX Firmware Update container version 20.05.12 is available.

- Package name:`nvfw-dgxa100_20.05.12_200603.tar.gz`
- Run file name: `nvfw-dgxa100_20.05.12_200603.run`
- Image name: `nvfw-dgxa100:20.05.12`

Highlights and Changes in this Release

- This release is supported with the following DGX OS software -
  - DGX OS 4.99.8 or later
- Enabled BMC Secure Flash
- Enabled PCI-Compliant DPC and AER error propagation
- Implemented critical VBIOS fixes

Contents of the DGX A100 System Firmware Container

This container includes the firmware binaries and update utilities for the firmware listed in the following table.

Component	Version	Key Changes	Update Time
BMC (via CEC)	00.12.05	Added to container. - BMC now recognizes the level of CEC installed, and enforces Secure Flash if the CEC supports it. - Removed the ability to update the BMC via the UI.	31 minutes

Component	Version	Key Changes	Update Time
		▶ Added micro-controller assist (MCA) SEL, downloadable from the UI. ▶ Added Logs & Reports > Debug Log > Download Debug log control to BMC UI.	
SBIOS	0.23	Added to container ▶ Removed Hidden Options and made TPM Configuration options visible ▶ Fixed NVSM Show Health Errors related to DIMMs and DIMM population ▶ Fixed system getting stuck at POST after enabling and then disabling drive encryption	7 minutes
Broadcom 88096 PCIe switch board	1.3	Added to container ▶ Disabled hot-plug and hot-plug surprise capability	8 minutes
BMC CEC SPI	v3.05	Added to container	8 minutes
PEX88064 Retimer	0.13.0	Updated	7 minutes
PEX88080 Retimer	0.13.0	Updated	7 minutes
NvSwitch BIOS	92.10.12.00.01	No change	8 minutes
VBIOS	92.00.19.00.01	Updated ▶ Fixed Xid 64 (Row Remapper Error)	7 minutes

Updating Components with Secondary Images

Some firmware components provide a secondary image as backup. The following is the policy when updating those components:

- **SBIOS**: The two images are referred to as active and inactive, where the active is the currently running image and the inactive is the backup image. The update container can only update the inactive image. After reboot, the updated image becomes the active image. You can perform the update again to update the current inactive image so that both images are updated.
- **BMC**: The two images are referred to as active and inactive, where the active is the currently running image and the inactive is the backup image. The update container can only update the inactive image. After the update is completed, the updated image becomes the active image. You can perform the update again to update the current inactive image so that both images are updated.

14.1. Instructions for Updating Firmware

This section provides a simple way to update the firmware on the system using the firmware update container. It includes instructions for performing a transitional update for systems that require it. The commands use the .run file, but you can also use the container image directly.

1. Perform a transitional update if needed.

   Depending on the BMC and MB_CEC versions on the system, you may need to perform a transitional update before updating the BMC and SBIOS to the latest versions.

   a). Check if the transitional update is needed.

   ```
   $ sudo nvfw-dgxa100_20.05.12_2006003.run run_script --command "fw_transition.py
    show_version"
   ```

   The following message appears if a transition update is needed.

   ```
   BMC/MB_CEC firmware needs update to Active/Inactive, secure boot mode
   This is a one-time update required for DGXA100. All future updates require BMC
    in this mode
   ```

   - If the one-time update is required, continue with the next step to perform the transitional update.
   - If the one-time update is not required, then skip to step 2.

   b). Perform the transitional update.

   ```
   $ sudo nvfw-dgxa100_20.05.12_2006003.run run_script --command "fw_transition.py
    update_fw"
   $ sudo reboot
   ```

   c). Verify that BMC (both images) and the MB_CEC are up to date.

   ```
   $ sudo nvfw-dgxa100_20.05.12_2006003.run run_script --command "fw_transition.py
    show_version"
   ```

2. Check if other updates are needed.

   ```
   $ sudo nvfw-dgxa100_20.05.12_2006003.run show_version
   ```

   - If there is "no" in any up-to-date column for updatable firmware, then continue with the next step.
   - If all up-to-date column entries are "yes", then no updates are needed and no further action is necessary.

3. Perform the final update for all firmware supported by the container and reboot the system.

   ```
   $ sudo nvfw-dgxa100_20.05.12_2006003.run update_fw all

   $ sudo reboot
   ```

Note: The `update_fw all` command updates the inactive BMC and SBIOS images only. After rebooting the system, the updated images become "active". You can then update the inactive images using `nvfw-dgxa100_20.05.12_2006003.run update_fw [BMC] [SBIOS] --inactive` as needed.

You can verify the update by issuing the following.

```
$ sudo nvfw-dgxa100_20.05.12_2006003.run show_version
```

Expected output.

```
 BMC DGX
=========
Image Id             Status  Location  Onboard Version  Manifest   up_to_date
0:Active   Boot      Online   Local     00.12.05        00.12.05         yes
1:Inactive Updatable          Local     00.12.05        00.12.05         yes

  CEC
=============
                                  Onboard Version   Manifest    up-to-date
MB_CEC(enabled)                    3.05              3.05              yes


 SBIOS
=======
Image Id                   Method    Onboard Version   Manifest    up_to_date
0:Inactive Updatabl        afulnx     0.24              0.24              yes
1:Active   Boot                       0.24              0.24              yes

 Video BIOS
============
Bus             Model                Onboard Version    Manifest    up-to-date
0000:07:00.0    A100-SXM4-40GB       92.00.19.00.01     92.00.19.00.01    yes
0000:0f:00.0    A100-SXM4-40GB       92.00.19.00.01     92.00.19.00.01    yes
0000:47:00.0    A100-SXM4-40GB       92.00.19.00.01     92.00.19.00.01    yes
0000:4e:00.0    A100-SXM4-40GB       92.00.19.00.01     92.00.19.00.01    yes
0000:87:00.0    A100-SXM4-40GB       92.00.19.00.01     92.00.19.00.01    yes
0000:90:00.0    A100-SXM4-40GB       92.00.19.00.01     92.00.19.00.01    yes
0000:b7:00.0    A100-SXM4-40GB       92.00.19.00.01     92.00.19.00.01    yes
0000:bd:00.0    A100-SXM4-40GB       92.00.19.00.01     92.00.19.00.01    yes

  Switches
============
PCI Bus#                    Model       Onboard Version   Manifest     up-to-date
DGX - 0000:91:00.0(U261)  88064_Retimer  0.13.0           0.13.0            yes
DGX - 0000:88:00.0(U260)  88064_Retimer  0.13.0           0.13.0            yes
DGX - 0000:4f:00.0(U262)  88064_Retimer  0.13.0           0.13.0            yes

DGX - 0000:48:00.0(U225)  88080_Retimer  0.13.0           0.13.0            yes

DGX - 0000:c4:00.0        LR10         92.10.12.00.01    92.10.12.00.01    yes
DGX - 0000:c5:00.0        LR10         92.10.12.00.01    92.10.12.00.01    yes
DGX - 0000:c2:00.0        LR10         92.10.12.00.01    92.10.12.00.01    yes
DGX - 0000:c6:00.0        LR10         92.10.12.00.01    92.10.12.00.01    yes
DGX - 0000:c3:00.0        LR10         92.10.12.00.01    92.10.12.00.01    yes
DGX - 0000:c7:00.0        LR10         92.10.12.00.01    92.10.12.00.01    yes

DGX - 0000:01:00.0(U1)    PEX88096        1.3               1.3            yes
DGX - 0000:81:00.0(U3)    PEX88096        1.3               1.3            yes
DGX - 0000:41:00.0(U2)    PEX88096        1.3               1.3            yes
DGX - 0000:b1:00.0(U4)    PEX88096        1.3               1.3            yes
```

Chapter 15. DGX A100 Firmware Changes

This chapter contains the list of changes for the following DGX A100 firmware components.

15.1. DGX A100 BMC Changes

Changes in 00.19.07

- Added a new version of GPU baseboard support.
- Improved SNMP trap handling and updated SNMP MIB with additional description for better trap information.
- Handled a rare NTP server configuration settings issue from BMC WebUI.
- The BMC update includes software security enhancements. See the NVIDIA Security Bulletin DGX - December 2022 for details.

Changes in 00.18.03

- Added a new version of GPU baseboard support.

Changes in 00.17.07

- Fixed an issue so that certain sensors are now displayed in the BMC Web UI.
- Fixed the graceful handling of system power loss, which prevents the BMC Flash file system consistency issue and improves recovery.
- Fixed issues that caused the BMC usage to dramatically increase, which resulted in a POST failure with error code 91 or B4.
- Improves Redfish interface error handling.
- Fixed the BMC Web UI security settings and page refresh during full screen mode.
- Fixed BMC SEL Event page, which was causing an error in certain SEL record parsing.
- Fixed an issue where the Power/Status LED was flashing continuously after the server was rebooted, and the Power/Status LED stayed on after the server was powered off.

Changes in 00.16.09

- Fixed incorrect temperatures reported for sensors on the NVIDIA Networking ConnectX-6 single-port and dual-port VPI cards.
- Fixed a bug to ensure that the BMC will boot to the latest version updated on the system.
- Fixed SEL log not showing the correct BMC or SBIOS version after an update.
- Added ability to set the BMC to local time instead of default UTC.
- Added ability to sync local time to NTP servers. (enable NTP time sync).
- Removed unnecessary SEL log messages pointing to high CPU power consumption.
- Fixed "/" character not allowed in BMC web UI LDAP Role Group settings.
- Added authentication capabilities to the RESTful API.
- Added new capabilities to identify firmware updates in the System Event Log (SEL) via "NVIDIA-firmware" event.

  Adds SEL information for BMC (end), BIOS, CPLD, and PSU.

Changes in 00.14.17

- Added support for second source SPI ROM.

Changes in 00.14.16

- Fixed an issue where a cold boot might put the BMC in a non-bootable state.
- Fixed BMC update failing with "Error flashing Inactive image 2: rc = 0x-9" ,
- Fixed occasionally needing to log into the BMC WebUI twice.
- Fixed the BMC dashboard system event filter not working.
- Added ability to monitor Mellanox card transceiver temperatures and increase fan speeds.
- Fixed inability to update the BMC after unexpected interruption.
- Fixed missing memory, NIC and storage drive information.

Changes in 00.13.16

- The BMC update includes software security enhancements.

  See the NVIDIA Security Bulletin 5010 for details.

Changes in 00.13.04

- Resolved increased fan speed that occurred when optional components are not installed, even when the system is idle.

15.2. DGX A100 SBIOS Changes

Changes in 1.18

- Added a new version of GPU baseboard support.
- Fixed issues relating to redfish reporting of PCIe device types and speeds.
- Removed unimplemented setup menu options for User Defaults and Boot NumLock State.

  Updated AGESA to version 1.0.0.E

  The SBIOS update includes software security enhancements. See the NVIDIA Security Bulletin DGX - December 2022 for details.

Changes in 1.13

- Fixed two issues that were causing boot order settings to not be saved to the BMC if applied out-of-band, causing settings to be lost after a subsequent firmware update.
- Added interactive countdown messages during boot, to display the Setup Prompt Timeout configurable through the **Boot** > **Setup Prompt Timeout** configuration menu.
- Added reporting of AGESA Version in SMBIOS.
- Updated AGESA to version 1.0.0.D.

Changes in 1.09

- Fixed an issue where changes in the boot order are not preserved after updating the SBIOS.
- Fixed inability to enter the SBIOS Admin/User password from the Serial Over LAN (SOL) console.
- Fixed PXE boot configuration not persisting; helpful for multiple DGX A100 nodes.
- Added Memory correctable ECC Error leaky bucket; prevents unnecessary replacement of working system DIMMs.
- Fixed SBIOS Setup > Main page showing incorrect Admin/User Access level.

Changes in 0.34

- Removed warning message that occurred when the system contained DIMMs from different vendors.

Changes in 0.33

- Fixed mishandling of correctable PCIe errors.

Changes in 0.30

- Added support for HTTP boot.
- Updated DSP/USP preset values to address PCIe advanced error reporting (AER) issues.

- Changed the following default settings.
  - Determinism Control > [Manual]
  - Determinism Slider > [Power]
  - cTDP Control > [Manual]
  - cTDP > [240]
  - Package Power Limit Control > [Manual]
  - Package Power Limit > [240]
  - DF Cstates > [Disabled]

15.3. DGX A100 U.2 NVMe Changes

Changes in EPK9CB5Q

- Fixed drive going into read-only mode if there is a sudden power cycle while performing live firmware update.
- Improved write performance while performing drive wear-leveling; shortens wear-leveling process time.
- Fixed drive going into failed mode when a high number of uncorrectable ECC errors occurred.

15.4. DGX A100 Broadcom 88096 PCIe Switchboard Changes

Changes in 0.2.0

- Fixed the incorrect setting of the switch's Upstream Port Number as Port 0.

Changes in 1.8

- Implemented tuning to address PCIe advanced error reporting (AER) issues.

Changes in 1.3

- Disabled hot-plug and hot-plug surprise capability.

15.5. DGX A100 Broadcom 880xx Retimer Changes

Release notes for the DGX A100 Broadcom 88080 and 88064 retimers.

Changes in 1.2f

- Fixed an issue that caused NVQual to hang while loading the MODS driver.

Changes in 0.F.0

- Improved error handling of downstream switches.

  This change modifies the PCIe topology and mapping. Refer to the DGX A100 User Guide for PCIe mapping details.

Changes in 0.13.0

- Fixed DPC Notification behavior for Firmware First Platform.

15.6. A100 VBIOS Changes

Changes in 92.00.45.00.03/05

- Added security protection to the I2C interface.

Changes in 92.00.36.00.04

- Fixed an issue allocating the BAR1 size across resets.
- Fixed MIG capability not being reported correctly if the driver is not loaded; for example, if accessed out-of-band.

Changes in 92.00.19.00.10

- Expanded support for potential alternate HBM sources.

Changes in 92.00.19.00.01

- Fixed Xid 64 (Row Remapper Error)

15.7. DGX A100 BMC CEC Changes

Changes in 3.28

- Fixed the update progress output reporting "`Update_timeout`" for the motherboard CEC (MB_CEC) when using the .run file without Docker installed.
- Fixed the user's configuration getting lost if the BMC updated failed.

15.8. DGX A100 BMC CEC SPI Changes

Changes in 01.05.12

- Added LDAPS (secure LDAP) support.
- Resolved network connection getting lost when connected to virtual media.
- Resolved an issue where occasionally the BMC UI would stop responding.

Changes in 01.05.10

- Fixed an issue with BMC 01.05.07 that potentially affected SBIOS stability.
- Fixed BMC configuration settings not getting applied to both primary and secondary images.
- Fixed corrupted primary BMC failing to recover when primary and secondary images are different versions.
- Fixed issue recovering corrupted firmware on Delta PSU.
- Fixed BMC web UI reporting BIOS information incorrectly.
- Fixed BMC Web UI reporting backup BMC version incorrectly.
- Fixed cryptic BMC entries.
- Added BMC capture logs from CPLD/FPGA during power on.
- Added IPMI OEM command to GET and SET which image the SBIOS is pointing to (Change the PIN).
- Fixed MaxP/MaxQ System unable to boot after BMC-initiated shutdown with four or more PSU failures.
- Fixed SEL logs to indicate that a bad fan (or fan speed of zero) may have caused the system to shut down due to GPU overtemp.
- Fixed how the BMC responds when it cannot read a temperature sensor.
- Fixed the IPMI log event decoding through ipmitool to show the same events as the GUI.
- Fixed the BMC to provide more meaningful and useful SEL logs.

- Fixed the GPU sensor name on baseboard 2 to match the service label.
- Changed the naming of U.2 SSDs from "NVME" to "U.2".-
- Resolved BMC SNMP community string limitations.

Changes in 01.04.03

- Fixed BMC Update Timeout issue.
- Fixed BMC configuration backup/restore function not working properly.
- Fixed system not shutting down when all fans in Fan Zone 2 or 3 are not detected.
- Fixed system fans all running at 80% after hot-unplugging/hot-plugging a PSU.
- Fixed system fans running at 80% after hot-plugging an NVMe drive.
- Fixed system shutting down after hot-unplugging one of the fans.
- Fixed system unable to boot after updating BMC image while one BMC module is removed.
- Fixed incorrect SEL timestamp after executing ipmi mc reset cold.
- Fixed missing firmware information in the BMC dashboard. Information is available on the Maintenance->Firmware Information page.
- Fixed missing DIMM information in the BMC dashboard.
- Fixed blinking amber-colored power LED.
- Fixed BMC update freeze while updating using Yafuflash.
- Fixed issues responding to 3.3V/5V/12V sensors.
- Fixed incorrect responses to GPU temperature assertion - Fan Zone 1 goes to 80% and DIMM temperature reports 'device disabled'.
- The BMC now saves CPU MCA registers when it detects a fatal MCA error.

Changes in 01.00.01

- Fixed BMC update via dashboard erroneously preserving the configuration.
- Fixed Network Link Configuration and Network IP Settings pages on the BMC dashboard to reflect changes only when saved.
- Added dual FPGA image container update support.
- Added PSU firmware container update support.
- Enhanced SMBPBI support for GPU sensors, thermal polling and FAN control to avoid anomalous sensor reading for GPU sensors and corresponding thermal actions.
- Added support for FPGA update of Image #1 to the BMC dashboard.
- Added VLAN support to the BMC dashboard.

15.9. DGX A100 BMC Changes

Changes in 01.05.12

- Added LDAPS (secure LDAP) support.
- Resolved network connection getting lost when connected to virtual media.
- Resolved an issue where occasionally the BMC UI would stop responding.

Changes in 01.05.10

- Fixed an issue with BMC 01.05.07 that potentially affected SBIOS stability.
- Fixed BMC configuration settings not getting applied to both primary and secondary images.
- Fixed corrupted primary BMC failing to recover when primary and secondary images are different versions.
- Fixed issue recovering corrupted firmware on Delta PSU.
- Fixed BMC web UI reporting BIOS information incorrectly.
- Fixed BMC Web UI reporting backup BMC version incorrectly.
- Fixed cryptic BMC entries.
- Added BMC capture logs from CPLD/FPGA during power on.
- Added IPMI OEM command to GET and SET which image the SBIOS is pointing to (Change the PIN).
- Fixed MaxP/MaxQ System unable to boot after BMC-initiated shutdown with four or more PSU failures.
- Fixed SEL logs to indicate that a bad fan (or fan speed of zero) may have caused the system to shut down due to GPU overtemp.
- Fixed how the BMC responds when it cannot read a temperature sensor.
- Fixed the IPMI log event decoding through ipmitool to show the same events as the GUI.
- Fixed the BMC to provide more meaningful and useful SEL logs.
- Fixed the GPU sensor name on baseboard 2 to match the service label.
- Changed the naming of U.2 SSDs from "NVME" to "U.2".-
- Resolved BMC SNMP community string limitations.

Changes in 01.04.03

- Fixed BMC Update Timeout issue.
- Fixed BMC configuration backup/restore function not working properly.
- Fixed system not shutting down when all fans in Fan Zone 2 or 3 are not detected.

- Fixed system fans all running at 80% after hot-unplugging/hot-plugging a PSU.
- Fixed system fans running at 80% after hot-plugging an NVMe drive.
- Fixed system shutting down after hot-unplugging one of the fans.
- Fixed system unable to boot after updating BMC image while one BMC module is removed.
- Fixed incorrect SEL timestamp after executing ipmi mc reset cold.
- Fixed missing firmware information in the BMC dashboard. Information is available on the Maintenance->Firmware Information page.
- Fixed missing DIMM information in the BMC dashboard.
- Fixed blinking amber-colored power LED.
- Fixed BMC update freeze while updating using Yafuflash.
- Fixed issues responding to 3.3V/5V/12V sensors.
- Fixed incorrect responses to GPU temperature assertion - Fan Zone 1 goes to 80% and DIMM temperature reports 'device disabled'.
- The BMC now saves CPU MCA registers when it detects a fatal MCA error.

Changes in 01.00.01

- Fixed BMC update via dashboard erroneously preserving the configuration.
- Fixed Network Link Configuration and Network IP Settings pages on the BMC dashboard to reflect changes only when saved.
- Added dual FPGA image container update support.
- Added PSU firmware container update support.
- Enhanced SMBPBI support for GPU sensors, thermal polling and FAN control to avoid anomalous sensor reading for GPU sensors and corresponding thermal actions.
- Added support for FPGA update of Image #1 to the BMC dashboard.
- Added VLAN support to the BMC dashboard.

15.10. DGX A100 FPGA Release Notes

Features

- Changes in 03.14
  - FPGA (GPU sled)3.0e: this version of FPGA fixes a GPU Tray failing to power ON during system power cycle (LLC failures will be reported in SEL logs. System fails to boot or comes up with no GPUs). The new versions of FPGA and CEC (GB sled) address this issue and we recommend every customer upgrade these components.
- Changes in 01.05.07

- Fixed BMC configuration settings not getting applied to both primary and secondary images.
- Fixed corrupted primary BMC failing to recover when primary and secondary images are different versions.
- Fixed issue recovering corrupted firmware on Delta PSU.
- Fixed BMC web UI reporting BIOS information incorrectly.
- Fixed BMC Web UI reporting backup BMC version incorrectly.
- Fixed cryptic BMC entries.
- Added BMC capture logs from CPLD/FPGA during power on.
- Added IPMI OEM command to GET and SET which image the SBIOS is pointing to (Change the PIN).
- Fixed MaxP/MaxQ System unable to boot after BMC-initiated shutdown with four or more PSU failures.
- Fixed SEL logs to indicate that a bad fan (or fan speed of zero) may have caused the system to shut down due to GPU overtemp.
- Fixed how the BMC responds when it cannot read a temperature sensor.
- Fixed the IPMI log event decoding through ipmitool to show the same events as the GUI.
- Fixed the BMC to provide more meaningful and useful SEL logs.
- Fixed the GPU sensor name on baseboard 2 to match the service label.
- Changed the naming of U.2 SSDs from "NVME" to "U.2".
- BMC SNMP Support on DGX-2

- Changes in 01.04.03
  - Fixed BMC Update Timeout issue.
  - Fixed BMC configuration backup/restore function not working properly.
  - Fixed system not shutting down when all fans in Fan Zone 2 or 3 are not detected.
  - Fixed system fans all running at 80% after hot-unplugging/hot-plugging a PSU.
  - Fixed system fans running at 80% after hot-plugging an NVMe drive.
  - Fixed system shutting down after hot-unplugging one of the fans.
  - Fixed system unable to boot after updating BMC image while one BMC module is removed.
  - Fixed incorrect SEL timestamp after executing ipmi mc reset cold.
  - Fixed missing firmware information in the BMC dashboard. Information is available on the Maintenance->Firmware Information page.
  - Fixed missing DIMM information in the BMC dashboard.
  - Fixed blinking amber-colored power LED.
  - Fixed BMC update freeze while updating using Yafuflash.

- Fixed issues responding to 3.3V/5V/12V sensors.
- Fixed incorrect responses to GPU temperature assertion - Fan Zone 1 goes to 80% and DIMM temperature reports 'device disabled'.
- The BMC now saves CPU MCA registers when it detects a fatal MCA error.

- Changes in 01.00.01
  - Fixed BMC update via dashboard erroneously preserving the configuration.
  - Fixed Network Link Configuration and Network IP Settings pages on the BMC dashboard to reflect changes only when saved.
  - Added dual FPGA image container update support.
  - Added PSU firmware container update support.
  - Enhanced SMBPBI support for GPU sensors, thermal polling and FAN control to avoid anomalous sensor reading for GPU sensors and corresponding thermal actions.
  - Added support for FPGA update of Image #1 to the BMC dashboard.
  - Added VLAN support to the BMC dashboard.

15.11. DGX A100 Delta PSU Release Notes

Changes in 1.6/1.6/1.7

- Fixed 0W reporting issue.

Appendix A. DGX A100 Firmware Update Process

This chapter provides an overview of the firmware update process when issuing `update_fw all`.

The following table shows the order in which the updates are performed, and whether a reboot or power cycle is required to complete the update. The table assumes that all firmware needs to be updated, and corresponds to the following sequence:

1. Issue `update_fw all`.
2. Power cycle the system.
3. Issue `update_fw all`.
4. Power cycle the system.
5. Issue `update_fw all`.

Table 1. Firmware Updated Upon Initial `update_fw all`

Update Order	Component	Reboot or Power Cycle Required
1	BMC-CEC	None
2	BMC	None
3	SBIOS	Reboot
4	Switch PEX88080/PEX88064	Reboot
5	Switch PEX88096 (U1~U3)	Reboot
6	NVMe	DC Power Cycle
7	GPU VBIOS and FUB	Reboot
8	CEC1712 SPI	DC Power Cycle

Table 2. Firmware Updated Upon Second `update_fw all`

Update Order	Component	Reboot or Power Cycle Required
1	Switch PEX88096 (U4)	Reboot
2	FPGA	DC Power Cycle

Table 3. Firmware Updated Upon Third `update_fw all`

Update Order	Component	Reboot or Power Cycle Required
1	NVSwitch	Reboot

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