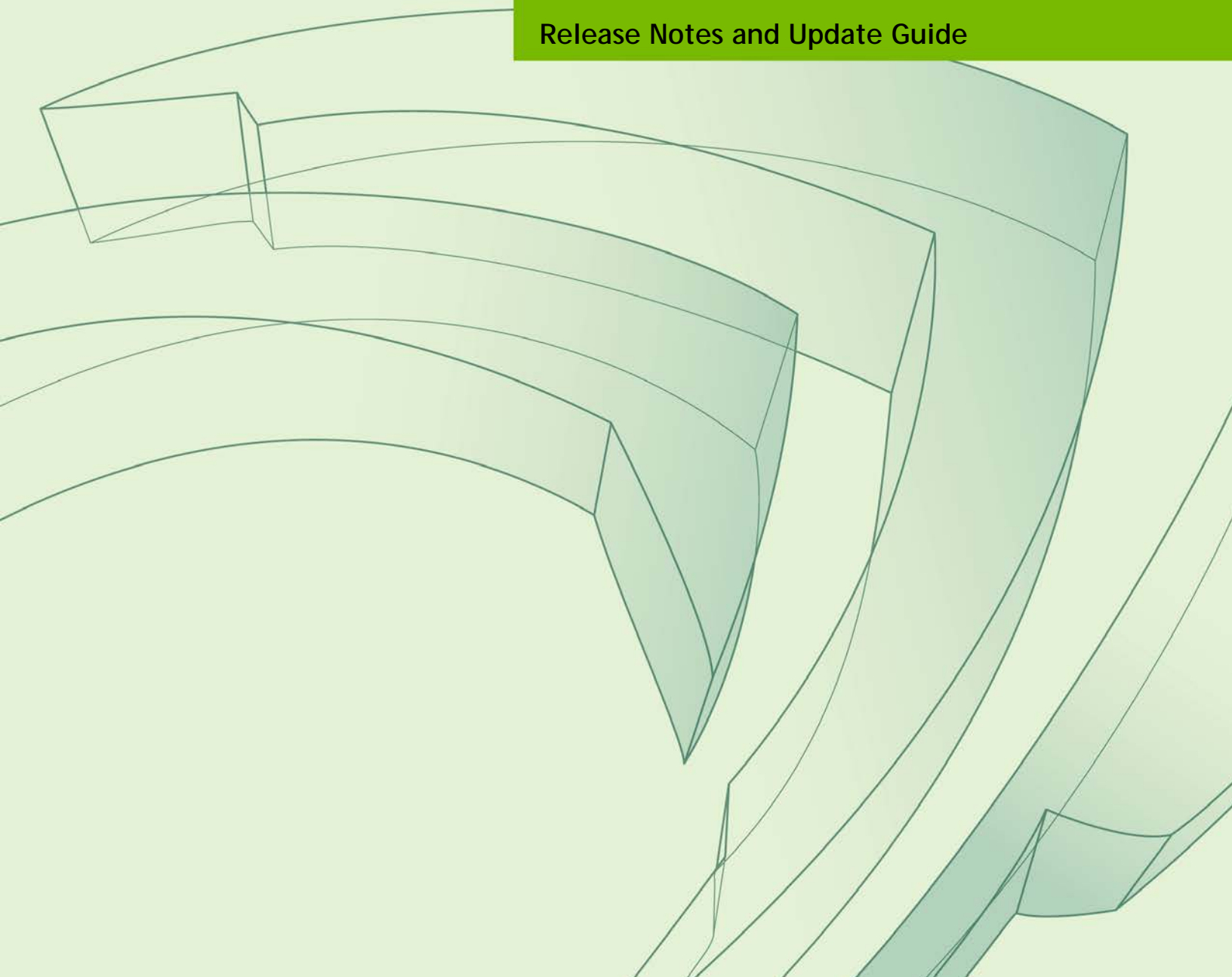# NVIDIA DGX OS SERVER VERSION 3.1.4

Release Notes and Update Guide

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NVIDIA DGX OS SERVER RELEASE NOTES FOR VERSION 3.1.4

This document describes version 3.1.4 of the NVIDIA® DGX™ OS Server Release 3.1 software and update package.

This software update is provided "over the network", and requires an internet connection and ability to access the NVIDIA public repository using the *apt-get* command. See the chapter Updating to Version 3.1.4 for instructions on performing the update.

If your DGX-1 is not connected to a network with internet access, refer to the DGX-1 User Guide for instructions on how to install the software on air-gapped systems.

UPDATE ADVISEMENT

▸ DGX OS Server software

  NVIDIA recommends updating the DGX OS Server software on their DGX-1 systems from version 1.x or 2.x to version 3.1.4. See the Highlights section for details of version 3.1.4.

▸ NVIDIA Docker Containers

In conjunction with DGX OS Server v3.1.4, customers should update their NVIDIA Docker containers to the latest container release[1].

▶ Ubuntu Security Updates

Customers are responsible for keeping the DGX-1 up to date with the latest Ubuntu security updates using the 'apt-get upgrade' procedure. See the Ubuntu Wiki Upgrades web page for more information.

ABOUT RELEASE 3.1

The following are the primary features of the DGX OS Server Release 3.1:

▶ Supports DGX-1 using NVIDIA Pascal as well as Volta GPUs.

▶ Ubuntu 16.04 LTS

- Initialization daemon changed from **Upstart** to **systemd**.
- Updated network interface naming policy.

  Policy now uses predictable names, rather than the native naming scheme used in previous releases. The first and second Ethernet interfaces, enumerated as em1 and em2 in previous releases, will now enumerate as enp1s0f0 and enp1s0f1 respectively.

▶ NVIDIA GPU Driver Release 384

- Supports the NVIDIA Tesla™ V100 GPUs.
- Supports CUDA 9.0

▶ CUDA drivers and diagnostic packages updated to Release 384

▶ Mellanox drivers updated to 4.0.

▶ Docker CE and the Docker Engine Utility for NVIDIA GPUs (nvidia-docker) are pre-installed, and the docker daemon automatically launched.

---

[1] See the *NVIDIA Deep Learning Frameworks* documentation website (http://docs.nvidia.com/deeplearning/dgx/index.htm) for information on the latest container releases as well as instructions for how to access them.

HIGHLIGHTS AND CHANGES SINCE VERSION 3.1.2

- ▶ NVIDIA GPU Driver Version 384.111
- ▶ CUDA drivers and diagnostic packages updated to version 384.111.
- ▶ New name `nvsysinfo` for the command to collect troubleshooting information
- ▶ Removal of the Docker CE startup option **`--disable-legacy-registry=false`** from the Docker CE service configuration file `docker-override.conf`

  This option is removed for compatibility with Docker CE 17.12 and later, which does not support interacting with registries that use API version v1.

KNOWN ISSUES

- Software Power Cap Not Reported Correctly by nvidia-smi
- GPUs Cannot be Reset While the System is Running
- Apparmor Profile May not Work with Some Containers

Software Power Cap Not Reported Correctly by nvidia-smi

Issue

On DGX-1 systems with Pascal GPUs, nvidia-smi does not report Software Power Cap as "Active" when clocks are throttled by power draw.

Workaround

This issue is with nvidia-smi reporting and not with the actual functionality. This will be fixed in a future release.

GPUs Cannot be Reset While the System is Running

Issue

You will not be able to reset the GPUs while the system is running.

Workaround

If an issue occurs which causes the GPUs to hang or if they need to be reset, you must reboot the system.

Apparmor Profile May not Work with Some Containers

Issue

Apparmor is enabled in this version of the DGX OS Server, with Docker generating a default profile. The default profile may or may not work with your containers.

Workaround

If there is a conflict with your containers, then either

- Disable Apparmor, or
- Provide a custom Apparmor profile and include it in the docker run command.

DGX OS SERVER SOFTWARE CONTENT

The following table provides version information for software included in the DGX OS Server update.

Component	Version	Notes
DGX OS Server	3.1.4	Software versions included in this DGX OS Server update package
GPU Driver	384.111	
Ubuntu	16.04 LTS	
nvidia-docker	1.0.1	
Docker CE		The release of Docker CE installed on your DGX-1 is the release that is available from Docker's stable repository when you update your DGX OS Server software over the network.

VERSION REFERENCE

The following table shows the firmware and BIOS versions for the DGX-1 hardware at the time of this release.

Component	Version	Notes
DGX-1 BMC	3.20.30	Released versions for DGX-1 hardware (Pascal) at the time of this software release. Information provided for reference purposes.
DGX-1 SBIOS	S2W_3A04	
DGX-1 VBIOS	86.00.41.00.05	
DGX-1 BMC	3.20.30	Released versions for DGX-1 hardware (Volta) at the time of this software release. Information provided for reference purposes.
DGX-1 SBIOS	S2W_3A04	
DGX-1 VBIOS	88.00.18.00.01	

UPDATING TO VERSION 3.1.4

These instructions explain how to update the DGX-1 software through an internet connection to the NVIDIA public repository. The process updates a DGX-1 system image to the latest QA'd versions of the entire DGX-1 software stack, including the drivers. Perform the updates using commands on the DGX-1 console.

> 💬 CAUTION: These instructions update all software for which updates are available from your configured software sources, including applications that you installed yourself. If you want to prevent an application from being updated, you can instruct the Ubuntu package manager to keep the current version. For more information, see Introduction to Holding Packages on the Ubuntu Community Help Wiki.

UPDATE PATH INSTRUCTIONS

The update instructions depend on the software version currently installed on the DGX-1. Follow the instructions corresponding to your current DGX-1 software.

Updating from Version 1.x
   a) Update from Version 1.x to 2.x

   b) Update from 2.x to 3.1.4

Updating from Version 2.x
Follow instructions at Updating from 2.x to 3.1.4.

Updating from Version 3.1.x
Follow instructions at Updating from 3.1.x to 3.1.4.

CONNECTING TO THE DGX-1 CONSOLE

Connect to the DGX-1 console using either a direct connection or a remote connection through the BMC.

> 💬 **NOTE**: SSH can be used to perform the update. However, if the Ethernet port is configured for DHCP, there is the potential that the IP address can change after the DGX-1 is rebooted during the update, resulting in loss of connection. If this happens, connect using either a direct connection or through the BMC to continue the update process.
>
> 💬 **WARNING: Connect directly to the DGX-1 Console if the DGX-1 is connected to a 172.17.xx.xx subnet.**
>
> DGX OS Server software version 3.1.4 installs Docker CE which uses the 172.17.xx.xx subnet by default for Docker containers. If the DGX-1 system is on the same subnet, you will not be able to establish a network connection to the DGX-1.
>
> Refer to the DGX-1 User Guide for instructions on how to change the default Docker network settings after performing the update.

Direct Connection

1. Connect a display to the VGA connector and a keyboard to any one of the USB ports.
2. Power on the DGX-1.

Remote Connection through the BMC

This method requires that you have the BMC login credentials.

1. Make sure you have connected the IPMI port on the DGX-1 to your LAN.
2. Open a Java-enabled browser within your LAN and go to http://<IPMI IP Address>/.

   Use Firefox or Internet Explorer. Google Chrome is not officially supported by the BMC.

   Make sure popups are allowed for the BMC address.
3. Log in.

   If the administrator has not manually created a password, then the username that was created during the initial DGX-1 setup is used for both the BMC username and BMC password.
4. From the top menu, click **Remote Control** and then select **Console Redirection**.
5. Click **Java Console** to open the popup window.
6. If necessary, power on the DGX-1 using the power button icon on the upper right corner of the BMC window.

UPDATING FROM 1.X TO 2.X

These instructions serve as the first phase of the update to DGX OS Server software version 3.1.4 from version 1.x. If you plan to use version 2.x without updating further, then refer to the Release Notes for version 2.x for the proper instructions.

See the section Connecting to the DGX-1 Console for guidance on connecting to the console to perform the update

Update Instructions

1. Verify that networking is enabled so that you can access the DGX-1 public repository.

   For example:

   ```
   $ ping www.google.com
   ```

   You may require alternate methods of verifying, if your network is not configured for ping.

2. Run the package manager.

   ```
   $ sudo apt-get update
   ```

3. Install CURL, if not already installed.

   ```
   $ sudo apt-get install curl
   ```

4. Verify that the DGX-1 public repository is configured.

   ```
   $ dpkg -l dgx1-repo-ubuntu1404
   ```

   Expected output:

   ```
   ii dgx1-repo-ubuntu1404 1.1-1 amd64 dgx1 repository configuration
   files
   ```

   If this output appears, then proceed directly to step 5.

   If the dgx1-repo-ubuntu1404 package is not present, then install the package manually as follows:

   a) Download the debian repo using *wget*.

   ```
   $ sudo wget
   http://international.download.nvidia.com/dgx1/repos/pool/multiverse/
   d/dgx1-repo/dgx1-repo-ubuntu1404_1.1-1_amd64.deb -O /tmp/dgx1-repo-
   ubuntu1404_1.1-1_amd64.deb
   ```

b) Install the package.

```
$ sudo dpkg -i /tmp/dgx1-repo-ubuntu1404_1.1-1_amd64.deb
```

c) Verify that the package installed.

```
$ dpkg -l dgx1-repo-ubuntu1404
```

Expected output:

```
ii dgx1-repo-ubuntu1404 1.1-1 amd64 dgx1 repository configuration
files
```

5. Get the new package list.

```
$ sudo apt-get update
```

6. Install the update script.

```
$ sudo apt-get -y --force-yes install dgx1-ota-update
```

7. Run the update script.

The script automatically performs several steps:

- Removes packages (nvidia-361, ar-mgr, isert-dkms, etc).
- Installs the update meta package (dgx1-ota-update-meta).
- Reboots the DGX-1 upon completion.

To run the script, enter the following:

```
$  sudo /usr/bin/dgx1-ota-update.sh
```

Enter y at the prompt:

```
Upgrade NVIDIA DGX1 from 1.0.x to 2.1.2? (y/NO)—:y
```

- You may be presented with a configuration choice such as the following:

```
Setting up dgx-limits (1.0-1) ...

Configuration file '/etc/security/limits.d/dgx1- limits.conf'

==> File on system created by you or by a script.
==> File also in package provided by package maintainer.
   What would you like to do about it ? Your options are:
    Y or I    : install the package maintainer's version
    N or O    : keep your currently-installed version
        D     : show the differences between the versions
        Z     : start a shell to examine the situation

The default action is to keep your current version.
```

```
*** dgx1-limits.conf (Y/I/N/O/D/Z) [default=N] ?
```

Press **Y** to all such messages to "install the package maintainer's version".

- If you see the following message:

```
A new version of configuration file /etc/default/grub is available, but
the version installed currently has been locally modified.
What do you want to do about modified configuration file
grub?
  install the package maintainer's version
  keep the local version currently installed
  show the differences between the versions
  show a side-by-side difference between the versions
  show a 3-way difference between available versions
  do a 3-way merge between available versions
  start a new shell to examine the situation
```

Select **install the package maintainer's version**.

- You may see the following error message during DKMS configuration for the nv_peer_mem module while running the script:

```
DKMS: install completed.
modprobe: ERROR: could not insert 'nv_peer_mem': Exec format error
```

The update to version 3.1.4 will remedy this error.

8. When completed, press y at the prompt to reboot the system.

```
Reboot now to finalize 2.1.2?  (y/NO) : y
```

9. Wait for the system to come back up, then confirm that the Linux kernel version is 4.4.0-104 or later.

```
$ uname -a
```

Expected output:

```
Linux jws-1 4.4.0-104-generic #116~14.04.1-Ubuntu SMP Mon Aug 14
16:07:05 UTC 2017 x86_64 x86_64 x86_64 GNU/Linux
```

10. Confirm GPU driver version is 384.111.

```
$ nvidia-smi
```

Expected output (first line)

```
NVIDIA-SMI 384.111   Driver Version: 384.111
```

Recovering from an Interrupted Update

If the script is interrupted during the update, such as from a loss of power or loss of network connection, you can attempt to recover as follows:

1. Restore power or restore the network connection, whichever caused the interruption.
    - If the system encounters a kernel panic after you restore power and reboot the DGX-1, you will not be able to perform the over-the-network update. You will need to re-image the DGX-1 with the latest image (see the DGX-1 User Guide for instructions) and then perform the network update.
    - If you are successfully returned to the Linux command line, continue the following steps.
1. Reset the script.

```
$ sudo dpkg --configure –a
```

2. Continue following the instructions from step 7 in the Updating from Version 1.x update instructions.

UPDATING FROM 2.X TO 3.1.4

See the section <u>Connecting to the DGX-1 Console</u> for guidance on connecting to the console to perform the update.

Update Instructions

1. Verify that networking is enabled so that you can access the DGX-1 public repository.

   For example:

   ```
   $ ping www.google.com
   ```

   You may require alternate methods of verifying, if your network is not configured for ping.

2. Run the package manager.

   ```
   $ sudo apt-get update
   ```

3. Install any updates.

   ```
   $ sudo apt-get upgrade -y
   ```

4. Install dgx-release-upgrade.

   ```
   $ sudo apt-get install -y dgx-release-upgrade
   ```

5. Begin the update process.

   ```
   $ sudo dgx-release-upgrade
   ```

6. At the prompt to confirm starting the upgrade, press **Y** to begin.

   ```
   Do you want to start the upgrade?
   ...

   Installing the upgrade can take several hours. Once the download has
   finished, the process cannot be canceled.

   Continue [yN]  Details [d]
   ```

7. At the prompt whether to restart services during the package upgrades without asking, select **Yes**.

   ```
   Restart services during package upgrades without
   asking?     <Yes>                        <No>
   ```

8. After starting the update process, respond to the presented options as follows:

- Select "**keep the local version currently installed"** if there is a new grub package and you see the following text:

```
A new version of configuration file /etc/default/grub is available,
but the version installed currently has been locally modified.

What do you want to do about modified configuration file grub?
      Install the package maintainer's version
      keep the local version currently installed ← Select
      show the differences between the versions
      show a side-by-side difference between the versions
      show a 3-way difference between available versions
      do a 3-way merge between available versions
      start a new shell to examine the situation
```

The local version contains the changes that have been made on the DGX-1.

- Press **Y** if prompted about InfiniBand configuration choices.

```
Configuration file
'./usr/src/mlnx-ofed-kernel-4.0/ofed_scripts/ib_ipoib.conf'

 ==> File on system created by you or by a script.
 ==> File also in package provided by package maintainer.

  What would you like to do about it ?  Your options are:
   Y or I  : install the package maintainer's version
   N or O  : keep your currently-installed version
     D      : show the differences between the versions
     Z      : start a shell to examine the situation

The default action is to keep your current version.
*** ib_ipoib.conf (Y/I/N/O/D/Z) [default=N] ?
```

- Press **Y** if prompted about docker.list configuration choices.

```
Configuration file '/etc/apt/sources.list.d/docker.list'

 ==> File on system created by you or by a script.
 ==> File also in package provided by package maintainer.

   What would you like to do about it ?  Your options are:
    Y or I  : install the package maintainer's version
    N or O  : keep your currently-installed version
      D      : show the differences between the versions
      Z      : start a shell to examine the situation

 The default action is to keep your current version.
*** docker.list (Y/I/N/O/D/Z) [default=N] ?
```

9. Press **Y** to proceed with the final reboot.

```
Restart required

To finish the upgrade, a restart is required. Upon the next boot,
the system will continue to install several packages in the
background.

*** This can take another ~7 minutes to complete. DO NOT shutdown or
reboot the system during this period ***.

If you select 'y' the system will be restarted.
Continue [yN]
```

After this reboot, the update process will take several minutes to perform some final installation steps.

10. Confirm the Linux kernel version.

```
$ uname -a
```

Expected output: (or later version)

```
Linux jws-1 4.4.0-104-generic #116~16.04.1-Ubuntu SMP Mon Aug 14
16:07:05 UTC 2017 x86_64 x86_64 x86_64 GNU/Linux
```

11. Confirm the CUDA driver version.

```
$ nvidia-smi
```

Expected output, first line

```
NVIDIA-SMI 384.111          Driver Version: 384.111
```

Verifying the nvidia-peer-memory Module

1. Make sure the nvidia-peer-memory module is installed.

```
$ lsmod | grep nv_peer_mem
```

Expected output:

```
nv_peer_mem       16384  0
nvidia            11911168  30 nv_peer_mem,nvidia_modeset,nvidia_uvm
ib_core           143360  13
rdma_cm,ib_cm,ib_sa,iw_cm,nv_peer_mem,mlx4_ib,mlx5_ib,ib_mad,ib_ucm
,ib_umad,ib_uverbs,rdma_ucm,ib_ipoib
```

- If the expected output appears, then no further action is needed.

- If there is no output, then continue the steps to install the nvidia-peer-memory module.

2. Install the module.

```
$ sudo apt-get install --reinstall mlnx-ofed-kernel-dkms nvidia-
peer-memory-dkms
```

Expected output:

```
DKMS: install completed.
Processing triggers for initramfs-tools (0.103ubuntu4.2) ...
update-initramfs: Generating /boot/initrd.img-4.4.0-64-generic
```

3. Add the module to the Linux kernel.

```
$ sudo modprobe nv_peer_mem
```

There is no expected output for this command.

4. Repeat step 1 to verify that the nvidia-peer-memory module is installed.

Recovering from an Interrupted Update

If the script is interrupted during the update, such as from a loss of power or loss of network connection, restore power or restore the network connection, whichever caused the interruption.

▶ If you have *not* rebooted the system and are successfully returned to the Linux command line, restart the update by entering the following, replacing * with the actual string of characters that identify the directory where the tarball was extracted:

```
$ cd /tmp/ubuntu-release-upgrade-*/
$ sudo ./xenial
```

▶ If you rebooted the system and are successfully returned to the Linux command line, you will need to download and extract the tarball manually.

```
$ sudo apt-get install -y wget
$ wget
http://international.download.nvidia.com/dgx/repos/release_updates/xe
nial.tar.gz
$ tar -zxvf xenial.tar.gz -C <extract_path>
```

Then restart the failed update:

```
$ cd <extracted_path>
$ sudo ./xenial
```

▶ If the system encounters a kernel panic after you restore power and reboot the DGX-1, you will not be able to perform the over-the-network update. You will need to re-image the DGX-1 with the latest image (see the <u>DGX-1 User Guide</u> for instructions) and then perform the network update.

UPDATING FROM 3.1.X TO 3.1.4

See the section <u>Connecting to the DGX-1 Console</u> for guidance on connecting to the console to perform the update.

> 💬 CAUTION: These instructions update all software for which updates are available from your configured software sources, including applications that you installed yourself. If you want to prevent an application from being updated, you can instruct the Ubuntu package manager to keep the current version. For more information, see <u>Introduction to Holding Packages</u> on the Ubuntu Community Help Wiki.

Update Instructions

1. Run the package manager.

   ```
   $ sudo apt update
   ```

2. Review the packages that will be updated.

   ```
   $ sudo apt full-upgrade -s
   ```

3. Upgrade to version 3.1.4.

   ```
   $ sudo apt full-upgrade
   ```

   Answer any questions that appear.

   Most questions require a Yes or No response. When asked to select the grub configuration to use, select the current one on the system.

   Other questions will depend on what other packages were installed before the update and how those packages interact with the update.

4. Reboot the system.

Verifying the nvidia-peer-memory Module

1. Make sure the nvidia-peer-memory module is installed.

   ```
   $ lsmod | grep nv_peer_mem
   ```

   Expected output:

   ```
   nv_peer_mem        16384  0
   nvidia             11911168  30 nv_peer_mem,nvidia_modeset,nvidia_uvm
   ib_core            143360  13
   rdma_cm,ib_cm,ib_sa,iw_cm,nv_peer_mem,mlx4_ib,mlx5_ib,ib_mad,ib_ucm
   ,ib_umad,ib_uverbs,rdma_ucm,ib_ipoib
   ```

   - If the expected output appears, then no further action is needed.

   - If there is no output, then continue the steps to install the nvidia-peer-memory module.

2. Install the module.

   ```
   $ sudo apt-get install --reinstall mlnx-ofed-kernel-dkms nvidia-peer-memory-dkms
   ```

   Expected output:

   ```
   DKMS: install completed.
   Processing triggers for initramfs-tools (0.103ubuntu4.2) ...
   update-initramfs: Generating /boot/initrd.img-4.4.0-64-generic
   ```

3. Add the module to the Linux kernel.

   ```
   $ sudo modprobe nv_peer_mem
   ```

   There is no expected output for this command.

4. Repeat step 1 to verify that the nvidia-peer-memory module is installed.

Recovering from an Interrupted or Failed Update

If the script is interrupted during the update, such as from a loss of power or loss of network connection, then restore power or restore the network connection, whichever caused the interruption.

▶ If the system encounters a kernel panic after you restore power and reboot the DGX-1, you will not be able to perform the over-the-network update. You will need to re-image the DGX-1 with the latest image (see the DGX-1 User Guide for instructions) and then perform the network update.

▶ If you are successfully returned to the Linux command line, continue following the instructions from step 2 in the Updating from Version 3.1.x to 3.1.4 update instructions.

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