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Introduction

This document covers the deployment of Netvisor ONE OS on Dell Open Networking switches, Edgecore switches, and Pluribus Freedom Series switches and also the process for readying for further configurations.

The main difference between Pluribus Freedom Series switches and Edgecore or Dell switches is on the day-0 software installation procedure. While the Freedom Series switches come with Netvisor ONE pre-loaded and pre-licensed, the Edgecore and the Dell switches require additional steps to install Netvisor ONE and apply the proper licenses. See the subsequent sections in this guide for details.

Additionally, for more detailed information on Netvisor ONE and the feature configurations, refer to other documents available on Pluribus Networks website.
Hardware Installation

Refer to the hardware installation guides of your platform of choice to complete the following hardware installation procedures:

1) Understanding Safety Considerations
2) Unpacking the Switch
3) Rack Mounting the Switch
4) Powering up the Switch

The steps described in this section prepare the hardware for Netvisor ONE installation.

Dell Hardware Installation

Refer to the hardware installation procedures for Dell Open Networking switches described in the Dell Platform Getting Started Guides.

Pluribus Networks Freedom Series Hardware Installation

Refer to the hardware installation guides here and follow the procedure mentioned in the document to complete the hardware installation.

Note: The serial port settings required to access the device via the console port are:

- Baud rate - 115200
- Data bits - 8
- Stop bits - 1
- Parity - n
Installing Netvisor ONE on Dell and Edgecore Switches

This section describes the procedure for installing Netvisor ONE on Edgecore and Dell Open Networking switches. For the installation procedure for Pluribus Freedom series switches, see the Upgrading Netvisor ONE Software for Freedom Series Switches.

The Open Network Install Environment (ONIE) is an open source initiative that defines an open install environment for bare metal network switches like Dell Open Networking and Edgecore. Download an ONIE compatible Netvisor ONE operating system image from Pluribus Networks Cloud (PNC) at cloud.pluribusnetworks.com.

However, before you download the Netvisor ONE image from PNC, you must retrieve the unique switch identifiers, which is required later to activate the switch license in PNC.

Obtaining the Switch Unique Identifiers for Dell Switches

For Dell switches, the unique identifier is represented by the Service Tag, which is a seven character identifier unique to the device.

When the network administrator connects to a Dell switch via console port for the first time (assuming that no other OS is already installed), the ONIE prompt is displayed. At the prompt type the command, onie-syseeprom and note down the Service Tag string as displayed below:

```
ONIE:/ # onie-syseeprom
TlvInfo Header:
   Id String:    TlvInfo
   Version:      1
   Total Length: 179

<table>
<thead>
<tr>
<th>TLV Name</th>
<th>Code</th>
<th>Len</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part Number</td>
<td>0x22</td>
<td>6</td>
<td>09H9MN</td>
</tr>
<tr>
<td>Serial Number</td>
<td>0x23</td>
<td>20</td>
<td>CN09H9MN2829875P0037</td>
</tr>
<tr>
<td>Base MAC Address</td>
<td>0x24</td>
<td>6</td>
<td>14:18:77:25:5A:B9</td>
</tr>
<tr>
<td>Manufacture Date</td>
<td>0x25</td>
<td>19</td>
<td>05/25/2017 08:02:43</td>
</tr>
<tr>
<td>Device Version</td>
<td>0x26</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Label Revision</td>
<td>0x27</td>
<td>3</td>
<td>A00</td>
</tr>
<tr>
<td>Platform Name</td>
<td>0x28</td>
<td>30</td>
<td>x86_64-dellemc_s4148f_c2338-r0</td>
</tr>
<tr>
<td>ONIE Version</td>
<td>0x29</td>
<td>10</td>
<td>3.33.1.1-4</td>
</tr>
<tr>
<td>MAC Addresses</td>
<td>0x2A</td>
<td>2</td>
<td>256</td>
</tr>
<tr>
<td>Manufacturer</td>
<td>0x2B</td>
<td>5</td>
<td>28298</td>
</tr>
<tr>
<td>Country Code</td>
<td>0x2C</td>
<td>2</td>
<td>CN</td>
</tr>
<tr>
<td>Vendor Name</td>
<td>0x2D</td>
<td>8</td>
<td>Dell EMC</td>
</tr>
<tr>
<td>Diag Version</td>
<td>0x2E</td>
<td>10</td>
<td>3.33.3.0-1</td>
</tr>
<tr>
<td>Service Tag</td>
<td>0x2F</td>
<td>7</td>
<td>5MP6XC2</td>
</tr>
<tr>
<td>Vendor Extension</td>
<td>0xFD</td>
<td>4</td>
<td>0x00 0x00 0x02 0xA2</td>
</tr>
<tr>
<td>Product Name</td>
<td>0x21</td>
<td>8</td>
<td>S4148-ON</td>
</tr>
<tr>
<td>CRC-32</td>
<td>0xFE</td>
<td>4</td>
<td>0xCF1D9FF</td>
</tr>
<tr>
<td>Checksum is valid.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
```
You can also find the service tag from the label of the packaging material as well. The service tag is also located on the device. See the examples (from the packaging label and the top cover of the device) in the figures below:

![Service Tag Location on the Packaging Label](image1)

*Figure - 1: Service Tag Location on the Packaging Label*

![Service Tag Location on the Device](image2)

*Figure - 2: Service Tag Location on the Device*
Obtaining the Switch Unique Identifiers for Edgecore Switches

For Edgecore switches, the unique identifier is represented by the Serial Number.

When the network administrator connects to an Edgecore switch via console for the first time (assuming that no other OS is already installed), the ONIE prompt is displayed.

At the prompt type the command, `onie-syseeprom` and note down the Serial Number string as displayed:

```
ONIE:/ # onie-syseeprom
TlvInfo Header:
   Id String:    TlvInfo
   Version:      1
   Total Length: 168

<table>
<thead>
<tr>
<th>TLV Name</th>
<th>Code</th>
<th>Len</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacture Date</td>
<td>0x25</td>
<td>19</td>
<td>06/30/2016 15:04:19</td>
</tr>
<tr>
<td>Diag Version</td>
<td>0x2E</td>
<td>7</td>
<td>2.0.1.5</td>
</tr>
<tr>
<td>Label Revision</td>
<td>0x27</td>
<td>4</td>
<td>R01J</td>
</tr>
<tr>
<td>Platform Name</td>
<td>0x28</td>
<td>27</td>
<td>x86_64-accton_as5712_54x-r0</td>
</tr>
<tr>
<td>ONIE Version</td>
<td>0x29</td>
<td>13</td>
<td>2015.11.00.05</td>
</tr>
<tr>
<td>Manufacturer</td>
<td>0x2B</td>
<td>6</td>
<td>Accton</td>
</tr>
<tr>
<td>Country Code</td>
<td>0x2C</td>
<td>2</td>
<td>TW</td>
</tr>
<tr>
<td>Base MAC Address</td>
<td>0x24</td>
<td>6</td>
<td>CC:37:AB:F5:37:74</td>
</tr>
<tr>
<td><strong>Serial Number</strong></td>
<td><strong>0x23</strong></td>
<td><strong>14</strong></td>
<td><strong>571254X1626007</strong></td>
</tr>
<tr>
<td>Part Number</td>
<td>0x22</td>
<td>13</td>
<td>FP1ZZ5654001A</td>
</tr>
<tr>
<td>Product Name</td>
<td>0x21</td>
<td>15</td>
<td>5812-54X-O-AC-F</td>
</tr>
<tr>
<td>MAC Addresses</td>
<td>0x2A</td>
<td>2</td>
<td>74</td>
</tr>
<tr>
<td>Vendor Name</td>
<td>0x2D</td>
<td>8</td>
<td>Edgecore</td>
</tr>
<tr>
<td>CRC-32</td>
<td>0xFE</td>
<td>4</td>
<td>0xCB35E235</td>
</tr>
</tbody>
</table>

Checksum is valid.
```
Downloading Netvisor ONE ONIE Image from Pluribus Networks Cloud

For a quick introduction on the services offered by Pluribus Networks Cloud (PNC), refer to the links:

- Getting started: [https://www.pluribusnetworks.com/get-started/](https://www.pluribusnetworks.com/get-started/)

Netvisor ONE supports multiple online and offline installation methods. However, this sections describes the offline installation method with the assumption that the switches are offline without access to the internet and PNC.

**Note:** For offline installation process, a USB drive is required to save both the Netvisor ONE software and the license files.

**Note:** It is mandatory to save the license files to the USB stick along with Netvisor ONE software. The installation process cannot be completed if you do have the license files.

To download and install Netvisor ONE:

1. Access the latest Netvisor ONE ONIE software from PNC: click **DOWNLOADS --> CURRENT** in the left-hand menu panel (see figure below). For ONIE images go to the **1ST TIME INSTALL** section of the page.

![Figure 3 - Pluribus Networks Cloud Software Download Page](image-url)
2. Download an image: click the **Download** button against the ONIE version that you would like to download (see figure 2) and save the image to the **USB stick root** folder:

**Note:** Ensure that the USB stick is of FAT32 format.

**Note:** Release notes are also available for download from the **Documentation** column. It is recommended that you download and review the release notes before you begin the ONIE installation process.

![Figure 4 - Pluribus Network Cloud Software Download - ONIE image](image-url)
3. Verify the MD5 checksum of the downloaded file against the MD5 checksum obtained from the cloud by hovering the mouse over the MD5:

![SOFTWARE]

**OPEN NETVISOR LINUX - 1ST TIME INSTALL**

This image is used for newly purchased or RMA'd products that do not have ONVL installed.

<table>
<thead>
<tr>
<th>Name</th>
<th>Version</th>
<th>Platform</th>
<th>Checksum</th>
<th>Documentation</th>
</tr>
</thead>
<tbody>
<tr>
<td>ONVL 5.1.1 ONIE GA</td>
<td>5.1.1-15300</td>
<td>ONVL</td>
<td>MD5</td>
<td>Download</td>
</tr>
<tr>
<td>ONVL 5.1.2 ONIE GA</td>
<td>5.1.2-15459</td>
<td>ONVL</td>
<td>d69fe863e1c51b340ac478e956d0f67</td>
<td>Download</td>
</tr>
<tr>
<td>ONVL 5.1.0 ONIE HF3</td>
<td>5.1.0-15027</td>
<td>ONVL</td>
<td>MD5</td>
<td>Download</td>
</tr>
<tr>
<td>ONVL 3.0.0 HF1 ONIE</td>
<td>3.0.0-12817</td>
<td>ONVL</td>
<td>MD5</td>
<td>Download</td>
</tr>
</tbody>
</table>

*Figure 5 - Pluribus Network Cloud Software Download - MD5 Checksum*
Activating a Switch from Pluribus Networks Cloud

To activate a switch,

1. Click the **ACTIVATIONS** option on the left-hand side menu panel as shown in the figure below:

![Figure 6 - Pluribus Network Cloud Software Activation Keys](image-url)

*Figure 6 - Pluribus Network Cloud Software Activation Keys*
2. Enter the Service Tag information if you are activating a Dell switch, or the Serial Number if you are activating an Edgecore switch, and click the Activate button (Figure 7):

![Figure 7 - Pluribus Network Cloud Software Activation Keys - Service Tag or Serial Number](image)

**Note:** You can activate multiple switches with single `onvl-activation-keys` file if the same license type is used, for example, all switches activated using ONVL-25G-PLEX-LIC can use same `onvl-activation-keys` file downloaded by clicking on ONVL-25G-PLEX-LIC’s ACTIVATION KEYS link.
3. Once the switch is activated, download the Activation Keys file and copy to the same USB stick root folder where you saved the Netvisor ONE ONIE image. To download the activation key(s) for the switch(es) activated using the same license type, click the button as shown in Figure below.

Figure 8 - Pluribus Network Cloud - Downloading Activation Keys
Downloading the Netvisor ONE ONIE Image from PNC (cont'd)

Offline Installation of Netvisor ONE ONIE Image and Switch Activation

Before you start the offline installation of Netvisor ONE ONIE image, ensure that:

- The switch is not connected to the Internet (if necessary, disconnect the management port).
- There is no previously installed Network OS on the switch.
- You are connected to the switch via console.

To install the offline image for Netvisor ONE ONIE:

1. Rename the Netvisor ONE ONIE image and Activation Keys file saved on the USB drive root folder:
   - Rename the file named `onie-installer-<version-number>` to `onie-installer`
   - Rename the Activation Keys file `onvl-activation-keys.dms` to `onvl-activation-keys`

2. Initiate the Netvisor ONE installation and switch activation process:

   Plug in the USB drive (having the two renamed files) into the switch and reboot it. The switch automatically detects the software image on the USB drive and starts the installation process.

**Note:** The switch reboots twice during the installation process and one more time after activation.
The progress of the installation can be monitored using the serial console:

 [...] 
Extracting stage1 image
./btrfs.initrd.img
./grub.cfg
./install.sh
./vmlinuz-4.2.0-27-generic
Provisioning fresh box
Netvisor Installer: platform: aquarius
Creating new Netvisor partition /dev/sda4 ...
Warning: The kernel is still using the old partition table.
The new table will be used at the next reboot.
The operation has completed successfully.
Error: /dev/sda4: unrecognised disk label
mke2fs 1.42.13 (17-May-2015)
Discarding device blocks: done
Creating filesystem with 7750353 4k blocks and 1937712 inodes
Filesystem UUID: 92cbbdd1-ffd8-4f91-ab89-e683b6258395
Superblock backups stored on blocks:
  32768, 98304, 163840, 229376, 294912, 819200, 884736, 1605632, 2654208
Allocating group tables: done
Writing inode tables: done
Creating journal (32768 blocks): done
Writing superblocks and filesystem accounting information: done

sed: /netvisor_mnt/etc/default/grub: No such file or directory
Installing for i386-pc platform.
Installation finished. No error reported.
Netvisor stage-1 installation Successful
Rebooting into stage-1 to complete stage-2 installation
ONIE: NOS install successful:
http://sandy.pluribusnetworks.com/artifactory/releases/nvOS/5.2.0-0A/onie-installer-5.2.0-5020015650
ONIE: Rebooting...
After the reboot, the switch comes up with Netvisor-stage1 as shown below:

```
GNU GRUB  version 2.02-beta2+e4a1fe391

*Netvisor-stage1
ONIE
```

At the completion of stage1, the switch prints the following messages and restarts again:

```
[...]
Setting up getty
Generating GRUB config
/init: line 393: can't create /netvisor-mnt/etc/mtab: nonexistent directory
Setting up netvisor initial config
Installing GRUB
mkdir: can't create directory '/netvisor-mnt/sys': File exists
mkdir: can't create directory '/netvisor-mnt/dev': File exists
mkdir: can't create directory '/netvisor-mnt/proc': File exists
mount: mounting none on /netvisor-mnt/dev/pts failed: No such file or directory
Installing for i386-pc platform.
Installation finished. No error reported.
Current default time zone: 'America/Los_Angeles'
Local time is now:      Sun Apr 19 15:33:23 PDT 2020.
Updating initramfs ...
update-initramfs: Generating /boot/initrd.img-4.15.0-36-generic
Resetting the grubenv file
Netvisor installation completed
```
Offline Installation - ONIE Image and Switch Activation (cont'd)

Rebalancing Btrfs block tree
[ 116.597985] BTRFS info (device sda4): relocating block group 6455033856 flags 5
[ 116.617053] BTRFS info (device sda4): relocating block group 5381292032 flags 5
[ 116.637495] BTRFS info (device sda4): relocating block group 4307550208 flags 5
[ 116.655937] BTRFS info (device sda4): relocating block group 3233808384 flags 5
[ 116.670648] BTRFS info (device sda4): relocating block group 2160066560 flags 5

Done, had to relocate 5 out of 9 chunks
Done, had to relocate 0 out of 4 chunks
umount: can't umount /netvisor-mnt/dev/pts: No such file or directory
mount: mounting UUID=92cbbdd1-ffd8-4f91-ab89-e68[ 117.656681] sd 4:0:0:0: [sda]
Synchronizing SCSI cache
3b6258395 on /netvisor_mnt failed: No such file [ 117.669433] reboot: Restarting system
or directory
se[ 117.673993] reboot: machine restart
Offline Installation - ONIE Image and Switch Activation (cont'd)

Next, the switch boots up, ready to be activated. Netvisor gets the license key from the USB drive and activates it at the end of this step:

```
GNU GRUB  version 2.02-beta2-36ubuntu3.18

*Netvisor-btrfs
ONIE
```

After Netvisor is installed successfully, the `onvl-activation-keys` file in the USB is auto-detected and the switch is activated.
Offline Installation - ONIE Image and Switch Activation (cont’d)

At the end of the activation process the switch reboots one last time:

The below messages are printed on the console after a successful activation:

```
[..]
AUTO-PROVISION: onvl-discover: onvl-activation-keys found: /dev/sdb1
AUTO-PROVISION: Extracting initial bundle.
AUTO-PROVISION: Decrypting signed bundle.
AUTO-PROVISION: Extracting signed bundle.
AUTO-PROVISION: Verifying package signature.
AUTO-PROVISION: Extracting packages.
AUTO-PROVISION: pkgs ready
AUTO-PROVISION: onvl-installer: checking for device installer - 8WWMX42/onvl-activation-keys...
AUTO-PROVISION: onvl-installer: executing device installer - 8WWMX42/onvlactivation-keys...
AUTO-PROVISION: [INSTALLED]
Running Acceptance Tests...
  test passed comment
  Total Memory: OK 7.78G
  Switch device: OK orion found
  [GREEN] switch successfully initialized.
  serial number: 1550ST9100083
  hostid: 900011c
  device id: 8WWMX42
  Reboot required.
```

After Netvisor ONE is installed and the switch is activated, wait for a while until the login prompt appears and then log into the console using the following credentials:

```
Username: network-admin  
Password: admin
```

Now, you are prompted to read and accept the EULA agreement and setup the switch parameters such as switch name, management IP, password, DNS IP etc.

Once these configurations are done, you can SSH into the switches using the username network-admin and the new password you set.
Upgrading Netvisor ONE Software for Freedom Series Switches

The Pluribus Freedom series switch always comes pre-loaded with Netvisor ONE software. However it is recommended to upgrade the Netvisor ONE software to the latest release, which can be obtained from Pluribus Networks Cloud (PNC).

For a quick introduction on the services offered by Pluribus Networks Cloud (PNC), refer to the following links:

- Getting started: https://www.pluribusnetworks.com/get-started/
- PN Cloud Overview video: https://www.pluribusnetworks.com/resources/pluribus-networks-cloud-overview/

Follow the steps described here to download and upgrade the Netvisor ONE software on Freedom series switches:

1) Access the latest Netvisor ONE software from PNC: click DOWNLOADS --> CURRENT in the left-hand menu panel (see Figure 9). For upgrade images scroll down to the OPEN NETVISOR LINUX - UPGRADES section on the page.

2) Click the Download button to download an image (see Figure):

![Figure 9 - Pluribus Network Cloud SoftwareUpgrades](image)

3) Verify the MD5 checksum of the downloaded file against the MD5 value posted on the cloud (by hovering over the MD5 label, as shown in Figure 9).
4) After the image is downloaded, apply the following procedure to upgrade the software on the Freedom series switch:

- Enable SFTP from the CLI using the command:
  
  ```
  (admin@netvisor) > admin-sftp-modify enable
  sftp password:
  confirm sftp password:
  ```

- Enable the shell access for the network-admin user using the command:
  
  ```
  (admin@netvisor) > role-modify name network-admin shell
  ```

- Go to the shell from the CLI by typing the command “shell” and going to the “sftp” folder:
  
  ```
  (admin@Spine) > shell
  admin@netvisor:~$ cd /sftp/import/
  ```

- To exit the shell, type `exit` so that the prompt goes back to the CLI

- Copy the file to the /sftp/import folder on the switch

- To upgrade the image, run the command:
  
  ```
  (admin@Spine) > software-upgrade package <upgrade-image-name>
  ```

- Check the status of the upgrade process using the command:
  
  ```
  (admin@Spine) > software-upgrade-status-show
  ```
  
  The switch reboots after the upgrade and comes back up with the new image.

- Verify the license on the switch by using the command:
  
  ```
  (admin@Spine) > software-license-show
  ```
Post Installation Configuration

After installation and activation is complete you can proceed to configure the switches for your network.

The Pluribus Data Center Interconnect Validated Design Guide provides a practical guide to create validated leaf-spine architectures.

The Pluribus Networks Netvisor ONE Configuration Guide provides an authoritative guide to the many features of Netvisor ONE. Basic knowledge of the management CLI is assumed; use the Configuration Guide to review CLI syntax and structure.

The overall procedure to configure Netvisor ONE based on the Validated Design Guide is as follows:

1) Review the topology and design considerations
   - Redundancy requirements
   - IP and VLAN scheme

2) Completing the initial switch setup
   - Setup wizard runs automatically upon first login (default login/password: pluribus/pluribus_password)
   - Set the timezone
   - Other management interface parameters may need to be configured
   - Review NTP server information to be used for time sync

3) Creating the ONVL Fabric
   - fabric-create command or fabric-join command
   - fabric-show command

For more details on configuring the Netvisor ONE features, see the Configuration Guide.
Submitting a Service Request

For Netvisor ONE software support, you can purchase optional support contracts from your partner, reseller, or Pluribus Networks.

Purchasing a support contract from a local partner is sometimes preferred due to geographical or language requirements.

Please contact your local partner to better understand the available service programs and pricing.

If you purchased a Pluribus FreedomCare maintenance agreement, you can contact Pluribus Networks directly for support requirements.
About Pluribus Networks

Pluribus Networks delivers an open, controllerless software-defined network fabric for modern data centers, multi-site data centers and distributed cloud edge environments.

The Linux-based Netvisor® ONE operating system and the Adaptive Cloud Fabric™ have been purpose-built to deliver radically simplified networking and comprehensive visibility along with white box economics by leveraging hardware from our partners Celestica, Dell EMC, and Edgecore, as well as Pluribus' own Freedom™ Series of switches.

The Adaptive Cloud Fabric provides a fully automated underlay and virtualized overlay with comprehensive visibility and brownfield interoperability and is optimized to deliver rich and highly secure per-tenant services across data center sites with simple operations having no single point of failure.

Further simplifying network operations is Pluribus UNUM™, an agile, multi-functional web management portal that provides a rich graphical user interface to manage the Adaptive Cloud Fabric. UNUM has two key modules - UNUM Fabric Manager for provisioning and management of the fabric and UNUM Insight Analytics to quickly examine billions of flows traversing the fabric to ensure quality and performance.

Pluribus is deployed in more than 275 customers worldwide, including the 4G and 5G mobile cores of more than 75 Tier 1 service providers delivering mission-critical traffic across the data center for hundreds of millions of connected devices. Pluribus is networking, simplified.

For additional information contact Pluribus Networks at info@pluribusnetworks.com, or visit www.pluribusnetworks.com.

Follow us on Twitter @pluribusnet or on LinkedIn at https://www.linkedin.com/company/pluribus-networks/.

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Document Version - June 2020