

Lenovo RackSwitch G8296

# Release Notes

For Cloud Network Operating System 10.2

**Lenovo**<sup>TM</sup>

**Note:** Before using this information and the product it supports, read the general information in the *Safety information and Environmental Notices and User Guide* documents on the *Lenovo Documentation CD* and the *Warranty Information* document that comes with the product.

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## Release Notes

This release supplement provides the latest information regarding Lenovo Cloud Network OS 10.2 for the Lenovo RackSwitch G8296 (referred to as G8296 throughout this document).

This supplement modifies and extends the following Cloud NOS documentation for use with CNOS 10.2:

- *Lenovo Cloud Network OS 10.2 Application Guide*
- *Lenovo Cloud Network OS 10.2 ISCLI Reference*
- *Lenovo RackSwitch G8296 Installation Guide*

These publications are available from the following website:

<http://publib.boulder.ibm.com/infocenter/systemx/documentation/index.jsp>

Please keep these release notes with your product manuals.

**Note:** The Lenovo Cloud Network OS is based on the Embedded Linux Integration Environment (ELIE). To obtain open source code licenses, go to <https://github.com/lenovo/ELIE/tree/master/elic-1.7.1/licenses/>. For details on how to obtain open source code, please contact Lenovo Support.

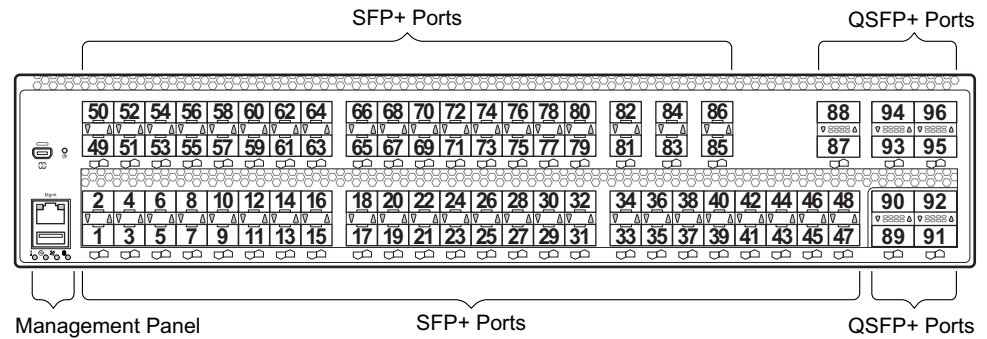
# Hardware Support

CNOS 10.2 software is supported on the G8296 high performance Layer 2-3 network switches.

The G8296 is a 2U rack-mountable aggregation switch. The G8296 uses a wire-speed, non-blocking switching fabric that provides simultaneous wire-speed transport of multiple packets at low latency on all ports.

- Eighty-six 10 Gigabit Ethernet (GbE) Small Form Pluggable Plus (SFP+) ports which also support legacy 1 GbE connections
- Ten 40 GbE Quad Small Form Pluggable Plus (QSFP+) ports, two of which (Ethernet 1/87 and Ethernet 1/88) can optionally be used as four 10 GbE SFP+ ports

**Figure 1.** G8296 front panel



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## Updating the Switch Software Image

The new Lenovo Cloud Network OS image can coexist on the switch with your legacy 8.x Lenovo NOS. When you install the 10.x image, the previous 8.x installation will be preserved in its original state and can be returned to by the steps outlined. The newly installed 10.x installation will start from a default configuration.

To download all necessary software images, go to the following website:

<http://support.lenovo.com>

Follow these directions to upgrade your switch software image from Lenovo NOS 8.x to Lenovo Network Cloud Operating System.

1. Make sure you are running Lenovo NOS 8.4.1.0 or later.

To determine the software version currently used on the switch, use the following switch command:

```
G8296# show version [brief]
```

If you are running a version of Lenovo ENOS earlier than 8.4.1.0, download and install a more recent version of the Lenovo NOS image before going to the next step.

2. From the 8.4.1 or later image, download the Cloud NOS image:

```
G8296# copy tftp image1 address <TFTP server address> filename <location on TFTP server relative to tftpboot location>/G8296-CNOS-10.2.1.0.imgs mgt-port
```

**Note:** CNOS consists of a single image to install that contains all components, including boot and operating system.

During the download, you are presented with the following message:

```
WARNING: This is the ONLY region with valid bootable image.
          If download fails, switch will not be able to boot.
          Please download into image2 to prevent potential fatal error!

Confirm overwriting the ONLY bootable image (y/n) ?
```

Enter y to continue.

```
Confirm overwriting the ONLY bootable image (y/n) ? y
Image download started to image1
File appears valid
Download in progress
.....
```

3. When the image is successfully downloaded, the switch will ask you to confirm the update:

```
Download Complete
Valid image detected.
Processing 10.x upgrade image - all data in /user will be lost,
including configuration
Confirm upgrade (y/n) ?
```

Enter y to continue.

```
Confirm upgrade (y/n) ? y
```

4. When the download has completed, reset the switch:

```
G8296# reload
Reset will use software "image1" and the active config block.
>> Note that this will RESTART the Spanning Tree,
>> which will likely cause an interruption in network service.
Confirm reload (y/n) ?
```

5. Enter y to continue the reload.
6. When the switch finishes rebooting, log in and verify the image to make sure it is the correct image running the correct version of the software:

```
G8296 login: admin
Password: <password>
Last login: Tue Dec 13 12:19:34 2016 from 10.42.1.100
<build note>

NOS version 10.2.1.0 LENOVO G8296, Wed Dec 14 15:01:20 PDT 2016

G8296# enable
G8296# display boot
Current ZTP State: Enable
Current FLASH software:
  active image: version 10.2.1.0, downloaded 08:56:56 UTC Wed Dec 7 2016
  standby image: version 10.2.1.0, downloaded 10:56:42 UTC Tue Dec 6
2016
  Uboot: version 10.2.1.0, downloaded 08:56:58 UTC Wed Dec 7 2016
  ONIE: version 10.2.1.0, downloaded 14:48:08 UTC Wed Dec 7 2016
Currently set to boot software active image
Current port mode: default mode
```

**Note:** If this is first time switching NOS versions the image version may appear as unknown. To fix this:

1. Reinstall the CNOS image again following standard image install methods:

```
G8296# cp tftp tftp:/<TFTP server address>/G8296-CNOS-10.2.1.0.imgs
system-image all vrf management
Confirm download operation? (y/n) [n] y
```

2. When prompted to change the active boot image to the standby image, enter **y** to confirm:

```
Boot loader now contains Software Version 10.2.1.0
Standby image now contains Software Version 10.2.1.0
Switch is currently set to boot active image.
Do you want to change that to the standby image? (y/n) [n] y
Switch is to be booted with standby image.
Currently profile is default, set to boot with default profile next time.
Current FLASH software:
  image1: version 10.2.1.0, downloaded 12:13:52 Mon Dec 5, 2016
  image2: version 10.2.1.0, downloaded 16:49:37 Wed Dec 7, 2016
  boot kernel: version 10.2.1.0
Currently scheduled reboot time: none
```

**Note:** Because both NOS version 8.x and CNOS 10.x use the same boot kernel, the 10.x version will be reflected in the boot kernel version displayed if you switch to NOS 8.x.

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## Reloading the ENOS Image

If you want to return to the legacy 8.x ENOS image, you must reinstall it:

1. Download the ENOS boot image to the switch and enter **y** to confirm the download operation.

```
G8296# cp tftp tftp://<tftp server IP>/G8296-8.4.1.0_Boot.imgs system-image
all vrf management
Confirm download operation? (y/n) [n] y
Download in progress
.....
Copy Success

Install image...This takes about 90 seconds. Please wait
Check image signature succeeded
Extracting image: 100%
Installing enOS RFS:
Updating flash: 100%
Extracting image: 100%
Installing enOS Kernel:
Updating flash: 100%
Extracting image: 100%
Installing enOS DFT:
Updating flash: 100%
Extracting image: 100%
Installing uboot:
Updating flash: 100%
Boot image installation succeeded.
OS image installation failed.
```

**Note:** You can ignore the OS image installation failed error message.

2. Download the ENOS system image to the switch and enter **y** to confirm the download operation:

```
G8296# cp tftp tftp://<tftp server IP>/G8296-8.4.1.0_OS.imgs system-image all
vrf management
Confirm download operation? (y/n) [n] y
Download in progress
.....
Copy Success
Install image...This takes about 90 seconds. Please wait
Check image signature succeeded
Extracting image: 100%
Installing E-NOS image to image1
Installing image to E-NOS image1: 100%
Boot image installation failed.
OS image installation succeeded.
```

3. Reboot the switch.

```
G8296# reload
```



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## Supplemental Information

This section provides additional information about configuring and operating the G8296 and CNOS.

### The Boot Management Menu

The Boot Management menu allows you to switch the software image, reset the switch to factory defaults, or to recover from a failed software download.

You can interrupt the boot process and enter the Boot Management menu from the serial console port. When the system displays Memory Test, press **<Shift B>**. The Boot Management menu appears.

```
Resetting at 10:55:49 Sun Apr 19, 2015...
Memory Test .....
Boot Management Menu
  I - Change booting image
  R - Boot in recovery mode (tftp and xmodem download of images to
recover switch)
  P - Password reset
  Q - Reboot
  E - Exit
Please choose your menu option: I
Current boot image is 1. Enter image to boot: 1 or 2: 2
Booting from image 2
```

The Boot Management menu allows you to perform the following actions:

- To change the booting image, press **I** and follow the screen prompts.
- To boot in recovery mode, press **R**.
- To reset the default user password, press **P** and follow the screen prompts.
- To reboot the switch, press **Q**. The booting process restarts
- To exit the Boot Management menu, press **E**. The booting process continues.

### *Recovering from a Failed Software Upgrade*

Use the following procedure to recover from a failed software upgrade.

1. Connect a PC to the serial port of the switch.
2. Open a terminal emulator program that supports TFTP (preferred) or Xmodem download (for example, HyperTerminal, SecureCRT, PuTTY). If using Xmodem, make sure the following settings are in effect:
  - Speed: 9600 bps
  - Data Bits: 8
  - Stop Bits: 1
  - Parity: None
  - Flow Control: None

3. To access the Boot Management menu, you must interrupt the boot process from the Console port. Boot the G8296, and when the system begins displaying Memory Test progress (a series of dots), press **<Shift B>**. The Boot Management menu will display:

```
Resetting at 10:55:49 Sun Dec 11, 2016..
Memory Test .....
Boot Management Menu
  I - Change booting image
  R - Boot in recovery mode (tftp and xmodem download of images to
recover switch)
  P - Password reset
  Q - Reboot
  E - Exit
Please choose your menu option:
```

4. Select **R** for **Boot in recovery mode**. You will see the following display:

```
Entering Rescue Mode.
Please select one of the following options:
  T) Configure networking and tftp download an image
  X) Use xmodem 1K to serial download an image
  P) Physical presence (low security mode)
  F) Filesystem check
  R) Reboot
  E) Exit

Option?:
```

- If you choose option **T** (TFTP download), go to step **5**.
- If you choose option **X** (Xmodem serial download), go to step **6**.

5. **TFTP download:** The switch prompts you to enter the following information:

```
Performing TFTP rescue. Please answer the following questions (enter 'q'
to quit):
IP addr   :
Server addr:
Netmask   :
Gateway   :
Image Filename:
```

- a. Enter the required information and press **<Enter>**.
- b. You will see a display similar to the following:

```
Host IP    : 10.10.98.110
Server IP  : 10.10.98.100
Netmask    : 255.255.255.0
Broadcast  : 10.10.98.255
Gateway    : 10.10.98.254
Installing image G8296-CNOS-10.2.1.0_OS.imgs from TFTP server
10.10.98.100
```

- c. When you see the following prompt, enter the image number where you want to install the new software and press **<Enter>**.

```
Install image as image 1 or 2 (hit return to just boot image): 1
```

- d. The following message is displayed when the image download is complete. Continue to step 7.

```
Entering Rescue Mode.
Please select one of the following options:
  T) Configure networking and tftp download an image
  X) Use xmodem 1K to serial download an image
  P) Physical presence (low security mode)
  F) Filesystem check
  R) Reboot
  E) Exit

Option?:
```

6. **Xmodem download:** When you see the following message, change the Serial Port characteristics to 115200 bps:

```
Change the baud rate to 115200 bps and hit the <ENTER> key before
initiating the download.
```

- a. Press **<Enter>** to set the system into download accept mode. When the readiness meter displays (a series of "C" characters), start XModem on your terminal emulator.
- b. When you see the following message, change the Serial Port characteristics to 9600 bps:

```
Change the baud rate back to 9600 bps, hit the <ESC> key.
```

- c. When you see the following prompt, enter the image number where you want to install the new software and press **<Enter>**.

```
Install image as image 1 or 2 (hit return to just boot image): 1
```

- d. The following message is displayed when the image download is complete. Continue to step 7.

```
Entering Rescue Mode.
Please select one of the following options:
    T) Configure networking and tftp download an image
    X) Use xmodem 1K to serial download an image
    P) Physical presence (low security mode)
    F) Filesystem check
    R) Reboot
    E) Exit

Option?:
```

7. Image recovery is complete. Perform one of the following steps:
- Press **r** to reboot the switch.
  - Press **e** to exit the Boot Management menu
  - Press the Escape key (**<Esc>**) to re-display the Boot Management menu.

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## New Features in This Release

This release of Lenovo Cloud Network OS contains the following significant fixes, enhancements, and other changes.

### Netboot ZTP

Zero-Touch Provisioning (ZTP) enables you to provision and configure a switch without user intervention.

When a switch with the ZTP feature enabled boots, it enters ZTP mode and locates a DHCP server and bootstraps itself with its interface IP address and gateway. The switch then obtains the IP address or URL of a TFTP server from which it downloads the necessary boot files and runs them.

### On-Box Scripting

#### *Uploading and Downloading Scripts*

The commands to upload and download scripts have been simplified. You no longer need a VRF name to upload or download a script.

#### *New Functions*

Functions were added to the on-box scripting Python library in the following areas:

- System Information
- Boot Information
- BGP
- DHCP
- DHCP Relay
- VLAG
- IGMP
- LLDP
- LAG

### Port and Aggregation Range Enhancement

You can now use spaces after the commas when specifying a range of ports or aggregations.

### Service Location Protocol

The switch now supports Service Location Protocol (SLP), a service discovery protocol that allows the switch to find services across the local network without the need for an initial configuration.

## Spanning Tree Protocol

The following STP features have been added to CNOS.

### *Rapid PVST+*

Rapid Per VLAN Spanning Tree Plus (Rapid PVST+) is now supported by CNOS. Rapid PVST uses a single STP instance per VLAN, enabling spanning trees to converge much faster than with 802.1D STP.

### *Loop Guard*

The loop guard feature performs additional checking to detect loops that might not be found using Spanning Tree. When a port is blocked by STP, if loop guard is enabled, the port will not erroneously transition to the forwarding state when the maximum age timer expires.

## System Logging (SYSLOG)

The following syslog features have been added to CNOS.

### *Logging Throttling - Duplicate Syslog Suppression*

With this feature, the first occurrence of an event is always logged immediately, but subsequent identical messages are suppressed for 30 seconds after the first event, then for 120 seconds, and for every 10 minutes. Instead, at the end of each of these time intervals, the next identical event triggers a “last message repeated N times” message and resets the count of duplicate messages.

### *VRF-Aware Logging*

Each remote syslog server configured on the switch can associate a Virtual Routing and Forwarding (VRF) table to be used to send customer syslog messages to the server. When contacting that syslog server, syslog messages are sent using the appropriate FIB (Forwarding Information Base) and are tagged with text that identifies the VRF table.

## Tag Ingress PVID

The Tag Ingress PVID provides tunneling support at the ingress port level using VLAN tag insertion. This consolidates the VLAN tunneling functionality required by multiple projects with a common feature that offers the greatest degree of flexibility and control in configuration and functionality.

## **vLAG**

The following enhancements have been made to vLAG support.

### ***IPv6 Health Checks***

CNOS now supports VLAG health checking under IPv6. You can now use an IPv6 address to manage the switch.

### ***vLAG with STP***

The switch supports the Spanning Tree Protocol (STP) running over individual vLAG instances. The switch supports both Rapid PVST+ and MSTP.

### ***vLAG with IGMP***

The switch supports vLAG with Internet Group Management Protocol (IGMP) versions 1, 2, and 3. IGMP works with IPv4 multicast routers to learn about the existence of host group members on their directly attached subnet.

### ***vLAG Peer Gateway***

The vLAG Peer Gateway allows a vLAG switch to function as the active gateway for traffic that is addressed to its vLAG peer. It enables the local forwarding of such packets between vLAG peers without using the inter-switch link (ISL). This optimizes the use of the ISL and avoids potential traffic loss.

### ***vLAG Consistency Check***

Two switches run vLAG simultaneously yet perform as one logical device. If there are any incompatible configuration differences between the two vLAG peers, this can lead to undesirable effects, such as traffic loss. The vLAG Configuration Consistency Check ensures that the network behaves correctly by using the vLAG synchronization mechanism to check the vLAG peer configurations for incompatibilities.

### ***vLAG with VRRP***

Using vLAG with VRRP enables a vLAG to operate as a Layer 3 gateway. Both primary and secondary switches can forward the Layer 3 traffic in the given virtual router instance independent of the VRRP state (Master or Backup). The vLAG with VRRP feature supports Passive (Half Active-Active) and Active (Full Active-Active) modes of operation.

### ***Two-Tier VRRP with vLAG***

The switch uses a Tier Identifier to separate different vLAG domains. This is helpful when configuring multiple vLAGs in a multi-tier network environment, because vLAG domains with differently configured tier IDs cannot be aggregated together.

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## Known Issues

This section describes known issues for CNOS 10.2 on the RackSwitch G8296.

### BGP

MD5 authentication is not always supported with BGP dynamic peers.

Workaround: Make sure the prefix length of the IPv4 dynamic peer with MD5 encryption is not shorter than 24 characters long and for IPv6 peers must not be less than 120 characters long. (ID: 45970)

### ECMP Routes

Recursive ECMP routes are not counted in ECMP route statistics. (ID: 43134)

### NRG

QSFP+ ports are set to 40G fixed (non auto-negotiate) mode. The link partner needs to meet the same requirements for the link to be fully functional. (ID: 52025)

### QoS

The ranges displayed for the following QoS parameters are not accurate:

- *Committed information rate;*
- *Peak information rate.*

The displayed range is 1bps - 1gbps, but the user can configure rates beyond the 1gbps upper limit using the kbps, mbps, and gbps options. (ID: 47847)

### Routed Ports

On the RackSwitch G8296, the maximum number of routed ports is 94.

### VLAG

- When VLAG Peer Gateway is enabled, IPv4 unicast packets cannot be exchanged between the Switch VLAN Interfaces (SVI) of VLAG Peer switches over ISL.
- VLAG Peer Gateway with IPv6 is not supported in this release. (ID: 62141, 70211)