

Lenovo RackSwitch G8296

# Release Notes

For Enterprise Network Operating System 8.4

**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 Enterprise Network Operating System 8.4 for the Lenovo RackSwitch G8296 (referred to as G8296 throughout this document).

This supplement modifies and extends the following Enterprise NOS documentation for use with NOS 8.4:

- *Lenovo RackSwitch G8296 Application Guide for Lenovo Enterprise Network Operating System 8.4*
- *Lenovo RackSwitch G8296 Command Reference for Lenovo Enterprise Network Operating System 8.4*
- *Lenovo RackSwitch G8296 Installation Guide*

The publications listed here 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.

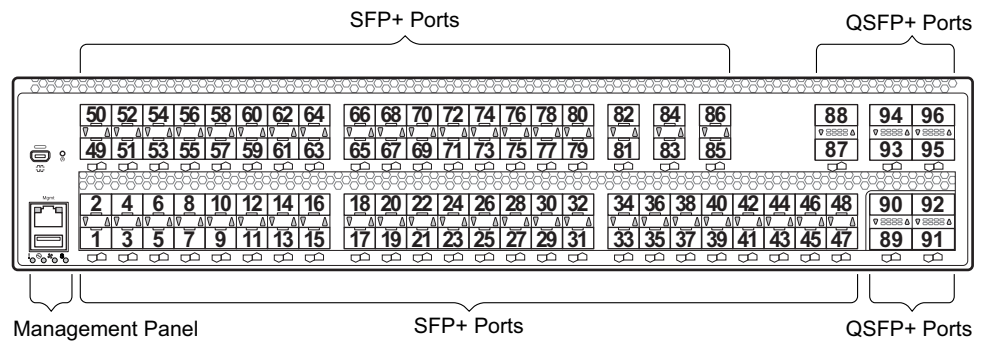
# Hardware Support

Enterprise NOS 8.4 software is supported on the G8296, a high performance Layer 2-3 network switch

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 can optionally be used as four 10 GbE SFP+ ports

**Figure 1.** RackSwitch G8296 front panel



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## Updating the Switch Software Image

The switch software image is the executable code running on the G8296. A version of the image comes pre-installed on the device. As new versions of the image are released, you can upgrade the software running on your switch. To get the latest version of software supported for your G8296, go to the following website:

<http://www.support.lenovo.com/>

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

```
RS 8296> show version
```

The typical upgrade process for the software image consists of the following steps:

- Load a new software image and boot image onto an SFTP, FTP, or TFTP server on your network.
- Transfer the new images to your switch.
- Specify the new software image as the one which will be loaded into switch memory the next time a switch reset occurs.
- Reset the switch.

For instructions on the typical upgrade process, see [“Loading New Software to Your Switch”](#) on page 6.

## Loading New Software to Your Switch

The G8296 can store up to two different switch software images (called `image1` and `image2`) as well as special boot software (called `boot`). When you load new software, you must specify where it should be placed: either into `image1`, `image2` or `boot`.

For example, if your active image is currently loaded into `image1`, you would probably load the new image software into `image2`. This lets you test the new software and reload the original active image (stored in `image1`), if needed.

**Attention:** When you upgrade the switch software image, always load the new boot image and the new software image before you reset the switch. If you do not load a new boot image, your switch might not boot properly (To recover, see [“Recovering from a Failed OS Image Upgrade” on page 10](#)).

To load a new software image to your switch, you will need the following:

- The image and boot software loaded on an SFTP, FTP, or TFTP server on your network.

**Note:** Be sure to download both the new boot file and the new image file.

- The hostname or IP address of the SFTP, FTP, or TFTP server.

**Note:** The DNS parameters must be configured if specifying hostnames.

- The name of the new software image or boot file.

When the software requirements are met, use the following procedures to download the new software to your switch.

1. In Privileged EXEC mode, enter the following command:

```
RS 8296# copy {sftp|tftp|ftp} {image1|image2|boot-image}
```

2. Enter the hostname or IP address of the SFTP, FTP or TFTP server.

```
Address or name of remote host: <name or IP address>
```

3. Enter the name of the new software file on the server.

```
Source file name: <filename>
```

The exact form of the name will vary by server. However, the file location is normally relative to the SFTP, FTP or TFTP directory (for example, `tftpboot`).

4. If required by the SFTP, FTP or TFTP server, enter the appropriate username and password.
5. The switch will prompt you to confirm your request.

Once confirmed, the software will begin loading into the switch.

6. When loading is complete, use the following commands to enter Global Configuration mode to select which software image (`image1` or `image2`) you want to run in switch memory for the next reboot:

```
RS 8296# configure terminal  
RS 8296(config)# boot image {image1|image2}
```

The system will then verify which image is set to be loaded at the next reset:

```
Next boot will use switch software image1 instead of image2.
```

7. Reboot the switch to run the new software:

```
RS 8296(config)# reload
```

The system prompts you to confirm your request. Once confirmed, the switch will reboot to use the new software.

**Note:** If you select “No” when asked to confirm the reload, any changes made to the configuration since the last reboot will be lost.

## Updating vLAG Switches with Lenovo Network Enterprise OS 8.x

Following are the steps for updating the software and boot images for switches configured with vLAG:

1. Save the configuration on both switches using the following command:

```
RS 8296# copy running-config startup-config
```

2. Use FTP, STFP, or TFTP to copy the new Networking OS and boot images onto both vLAG switches. For more details, see [“Loading New Software to Your Switch” on page 6](#).
3. Shutdown all ports except the ISL ports and the health check port on the primary switch (Switch 1).  
**Note:** Do not save this configuration.
4. Reload Switch 1. Switch 2 will assume the vLAG primary role. Once Switch 1 has rebooted, Switch 1 will take the vLAG secondary role.
5. Shutdown all ports except the ISL ports and the health check port on Switch 2.  
**Note:** Do not save this configuration.
6. Reload Switch 2. Switch 1 will assume the vLAG primary role. Once Switch 2 has rebooted, make sure that Switch 1 is now the vLAG primary switch and Switch 2 is now the vLAG secondary switch.
7. Verify the all the vLAG clients have converged using the following command:

```
RS 8296> show vlag information
```



---

## Supplemental Information

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

### 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 the System ...
Memory Test .....
.
.
Boot Management Menu
  I - Change booting image
  C - Change configuration block
  R - Boot in recovery mode (tftp and xmodem download of images to
recover switch)
  Q - Reboot
  E - Exit
Please choose your menu option:
```

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

- To change the booting image, press **I** and follow the screen prompts.
- To change the configuration block, press **C**, and follow the screen prompts.
- To perform a TFTP/Xmodem download, press **R** 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 OS Image Upgrade

The Boot Management menu allows you to perform fundamental device management operations, such as selecting which software image will be loaded, resetting the G8296 to factory defaults or recovering from a failed image download.

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

1. Connect a PC to the serial port of the switch.
2. Open a terminal emulator program that supports XModem Download (for example, HyperTerminal, SecureCRT, or PuTTY) and select the following serial port characteristics:
  - Speed: 9,600 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 the System ...
Memory Test .....
.
.
Boot Management Menu
  I - Change booting image
  C - Change configuration block
  R - Boot in recovery mode (tftp and xmodem download of images to
recover switch)
  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)
  R) Reboot
  E) Exit

Option?:
```

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

5. **Xmodem download:** When you see the following message, change the Serial Port characteristics to 115,200 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. You will see a display similar to the following:

```
... Waiting for the <Enter> key to be hit before the download can
start...
CC
```

- b. When you see the following message, change the Serial Port characteristics to 9,600 bps:

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

- c. When you see the following prompt, press **<Enter>** to start installing the image. If the file is a software image, enter the image number:

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

The image install will begin. After the procedure is complete, the Recovery Mode menu will be re-displayed.

```
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)
  R) Reboot
  E) Exit

Option?:
```

Continue to [Step 7](#).

6. **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>**. 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 G8296-8.4.1.0_OS.imgs from TFTP server 10.10.98.100
```

b. If the file is a software image, you will be prompted to enter an image number:

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

The following message is displayed when the image download is complete:

```
Image2 updated succeeded
Updating install log. File G8296-8.4.1.0_OS.imgs installed from
10.10.98.100 at 15:29:30 on 12-3-2015
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)
    R) Reboot
    E) Exit

Option?:
```

Continue to [Step 7](#).

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.

## Recovering from a Failed Boot Image Upgrade

Use the following procedure to recover from a failed boot image upgrade.

1. Connect a PC to the serial port of the switch.
2. Open a terminal emulator program that supports Xmodem download (such as HyperTerminal, CRT, or PuTTY) and select the following serial port characteristics:
  - Speed: 9600 bps
  - Data Bits: 8
  - Stop Bits: 1
  - Parity: None
  - Flow Control: None
3. Boot the switch and access the Boot Management menu by pressing **<Shift B>** while the Memory Test is in progress and the dots are being displayed.
4. Select **R** to boot in recovery mode. Then choose option **X** (Xmodem serial download). You will see the following display:

```
Perform xmodem download
To download an image use 1K Xmodem at 115200 bps.
```

5. 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. You will see a display similar to the following:

```
Extracting images ... Do *NOT* power cycle the switch.
**** RAMDISK ****
UnProtected
38 sectors
Erasing Flash...
..... done
Erased 38 sectors
Writing to Flash... 9... 8... 7... 6... 5... 4... 3... 2... 1... done
Protected 38 sectors
**** KERNEL ****
UnProtected
24 sectors
Erasing Flash...
..... done
Erased 24 sectors
Writing to Flash... 9... 8... 7... 6... 5... 4... 3... 2... 1...
```

- 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.

Boot image recovery is complete.

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## New and Updated Features

Enterprise NOS 8.4 for the G8296 has been updated to include several new features, summarized in the following sections. For more detailed information about configuring G8296 features and capabilities, refer to the complete Enterprise NOS 8.4 documentation as listed on [page 3](#).

### NSX Gateway for vSphere

NSX is a VMware virtualized network platform that offers the operational model of a virtual machine over a network. Virtual networks function in a similar way to virtual machines for computers. NSX builds virtual networks inside software, providing a full set of networking services, such as logical switching, routing, firewall, load balancing, VPN, quality of service (QoS), and monitoring.

The integration of NSX and Lenovo switches offers the following benefits to deploying network virtualization within software defined cloud networking:

- Virtual and physical workloads can be connected upon demand on a common logical segment regardless of hypervisor, IP subnet, or physical location.
- Holistic views of the virtual and physical topology increase operational efficiency.
- Network virtualization with NSX does not require IP multicast to learn or forward broadcast, unknown unicast, or multicast packets.
- A single point of management and control (NSX API) can be used for configuring logical networks across hypervisors and physical access switches.

**Note:** Lenovo is actively working with VMware to complete the certification for NSX Gateway for vSphere. NSX Gateway for vSphere support is available in this release while VMware certification is pending. Lenovo will fully support the NSX Gateway for vSphere implementation throughout the certification process. Please work with the controller vendor on issues related to the controller.

### Dynamic ARP Inspection

This is a security feature that enables the device to intercept and examine all ARP request and response packets in a subnet and discard those packets with invalid IP to MAC address bindings. This capability protects the network from some man-in-the-middle attacks.

### UFP Support for Eight VNICs Per Port with Emulex CNAs

Added support for 8 vNICs per port for the UFP feature when working with Emulex Rackserver CNAs.

### UFP Support for Four VNICs Per Port with QLogic NICs

Four vNIC per port UFP support is available with QLogic NICs. For details about QLogic NICs that support UFP with Lenovo Rackswitches and the required Firmware and Driver version that needs to be installed on the NICs, see QLogic documentation.

## TACACS+ Two Level Authentication

When TACACS+ is used to control switch access and the CLI Enable Mode is configured to require a password, a second authentication for the Enable command will be required.

## Easy Connect

This feature is designed to simplify switch configuration by applying pre-defined configuration modes. Once launched, the user is prompted to input certain parameters (such as hostname, netmask, server and uplink ports, and vLAG information) and this feature will automatically custom configure the switch.

## Support for 256 PVRST Instances

The number of STP groups supported in the PVRST protocol has been increased to 256. For optimal performance, it is recommended that you stay within a maximum of 14 interfaces or aggregated links (including vLAGs) with 4K MAC table entries when deploying 256 STP groups.

## Security Feature Support

This feature supports Secure I/O Module (SIOM) framework by managing security policies based on the IOM mode (Secure/Legacy). A secure version of LDAP using startTLS and LDAPS is supported. Cryptographic Provisioning is also supported.

## No Terminal Prompting

This feature implements a new CLI command "**[no] terminal dont-ask**" to turn off prompting for all CLI commands that would ask for user confirmation to proceed. This command will disable CLI confirmation prompts for the current session only.

## BGP Prepend AS Path

This feature allows a route-map to specify up to 32 AS numbers to prepend to a matched route. Prepending an AS path allows the switch to add its own AS number multiple times to the outbound routes to influence the BGP route selection of routers in other AS. With this feature, the switch can influence the BGP route selection so one path is preferred over another.

This is especially useful when customers are dual homed to two different Internet Service Providers (ISPs) and they want to have a primary path to one ISP and use the other ISP as a backup path.

## Increase MAX ARP Entries to 16K

The number of ARP entries supported is now 16K.

## Display ARP Entries for MGMT VLAN 4095

This enhancement extends the display of ARP table to include the ARP entries learned on the dedicated management port.



## **UFP+PVLAN with PVLAN Trunk and Promiscuous Port Support**

UFP has been enhanced to support Full Private VLAN Trunk and Promiscuous mode on a UFP port.

## **Certificate Signing Request (CSR)**

This feature enhances the certificate management capabilities on the switch by incorporating the ability to generate a Certificate Signed Request which can be submitted to an external Certificate Authority (CA) for obtaining a signed certificate. The capability to support CSR and process the CA signed certificate thereof is made available from multiple user interfaces including BBI, SNMP, and CLI.

## **Password Encryption**

This feature enables all passwords in the switch to be encrypted using industry-standard encryption methods.

## **ACL Redirect to Trunk Support**

This feature enables the switch to steer traffic based on a combination of a physical port and Layer 2-4 protocol header fields.

## **vLAG Peer Gateway**

This feature enables a vLAG switch to act as an active gateway for packets that are addressed to the router MAC address of the vLAG peer.

## **On Box Scripting (OBS) Enhancements**

The OBS feature has been enhanced with monitoring of additional VRRP, BGP, LACP, and IGMP events.

## **OpenFlow with LACP Support**

OpenFlow 1.3.1 has been enhanced with support for LACP with Static Trunk ID.

## **SNMPv1 Default Community String Removal**

This feature removes the default read/write community string for SNMP v1/2c from the factory default configuration.

## **Default UserID with Default Password That Must Be Reset at First Login**

This feature adds a default user "USERID" at UID 1 with default password "PASSWORD" and prompts for a change of the default password at first login.

## Two-Tier vLAG (4xVRRP w/vLAG)

VRRP can work as Full Active-Active or Half Active-Active under a two tier vLAG topology. Full Active-Active means both two tier vLAGs can route L3 traffic for the related VRRP domain. Half Active-Active means vLAGs will do L2/L3 forwarding for the related VRRP domain based on the local and peer VRRP role.

## DHCP Snooping

DHCP Snooping acts like a firewall between untrusted hosts and DHCP servers. It provides security by filtering untrusted DHCP packets and by building/maintaining a DHCP Snooping binding table.

## Configurable Syslog Port

This feature adds support for a configurable syslog host server port for both primary and secondary syslog host servers.

## STP Debugging Enhancement

The STP display has been enhanced to display the current and previous STP STG root information.

## IGMP Reports Over the Current 3K Limit Must Be Forwarded to the Mrouter

IGMP reports over the current 3K limit will be forwarded to an Mrouter. If no Mrouter exists, such IGMP reports will be discarded. IGMPv2 leaves for groups not known by the switch will also be forwarded to the multicast router.

## SLP IPv6 Support

SLP has been enhanced with support for IPv6.

## Restructuring of the Proprietary MIB File

The proprietary MIB (GbTOR-G8296.mib) now imports a common MIB file (Lenovo-SMI-MIB.mib). This new MIB file is included in the firmware packages along with the other MIB files supported by the device. When loading the proprietary MIB file into a MIB browser or SNMP management application, make sure this new common MIB file is loaded first. This restructuring was necessary to improve MIB consistency across Lenovo Data Center switches and servers.

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## Known Issues

This section describes known issues for Enterprise NOS 8.4 on the Lenovo RackSwitch G8296.

**Note:** Please review the Change History documentation posted with the Switch Firmware to check if any of these issues have been fixed in the latest release.

### FCoE

- When you download a configuration file with more than 12 Fibre Channel Forwarder VLANs that differ from those in the running configuration, a “configdownload:fcf error” occurs. (ID: LV304109)
- When the area size is set to 4096, maximum number of logins allowed per switch across all VLANs remains at 2048, and the maximum number of logins allowed in a VLAN remains at 2048. (ID: LV300846)

**Note:** This issue is specific to FCoE Forwarder only, not FIP Snooping.

### On-Box Scripting

A python exception is thrown when checking help (“modules”) in the switch python shell. The supported modules are those from the python 2.6.8 distribution except for bsddb, curses, idlelib, lib-tk, and xml. (ID: LV299048, LV299106).

### OpenFlow

- Static FDB flows are stored as ACL flows. (ID: XB262456)
- Using a port.mod message to change the OFPPC\_NO\_FLOOD bit does not reprogram the already installed flows. (ID: XB259385)
- When you configure a port to use OpenFlow, spanning tree protocol is automatically disabled on that port. (ID: XB266710)

### QBG

If a VLAN is created statically and set to disabled using the VLAN configuration command shutdown, this will not influence QBG behavior on that VLAN. The user configuration is kept in the running configuration. (ID: XB295275)

### SLP

Abbreviated IPv6 addresses are not supported in Service Location Protocol (SLP) strings. All IPv6 addresses used in SLP request strings must be extended. For example, the SLP request:

```
slptool findattr  
service:io-device.Lenovo:management-module://2001::1
```

will not work. Instead, you must use the extended form of the IPv6 address:

```
slptool findattr  
service:io-device.Lenovo:management-module://2001:0000:0000:  
0000:0000:0001
```

## Spanning Tree

To make spanning-tree edge work in VLAG scenario with port flapping, flap both VLAG ports in primary and secondary. In this case, spanning-tree will treat them as link down/up, not local down or remote up.

Reload is different from flapping ports; the spanning-tree state machine will run from initial state and directly set edge to the ports, this is the normal process for all the ports, not for VLAG only. The ports become edge if no BPDU is received after system boot up. (ID: LV308106)

## Virtual Aggregation Link Groups (vLAG)

Traffic is lost when you disconnect and reconnect the ISL ports in a VLAG setup with Routing Information Protocol (RIP). Upon reconnection, the Content Addressable Memory (CAM) table does not synchronize. (ID: LV302019)