

# Release Notes

for the CN4093 10Gb Converged Scalable Switch

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# **Release Notes**

These release notes provide the latest information regarding IBM Networking OS 7.5 (N/OS) for the CN4093 10Gb Converged Scalable Switch (referred to as CN4093 throughout this document).

This supplement modifies and extends the following Networking OS documentation for use with N/OS 7.5:

- IBM Networking OS Application Guide for the CN4093 10Gb Converged Scalable Switch
- IBM Networking OS Command Reference for the CN4093 10Gb Converged Scalable Switch
- IBM Networking OS ISCLI Reference for the CN4093 10Gb Converged Scalable Switch
- IBM Networking OS BBI Quick Guide for the CN4093 10Gb Converged Scalable Switch
- CN4093 10Gb Converged Scalable Switch User's Guide

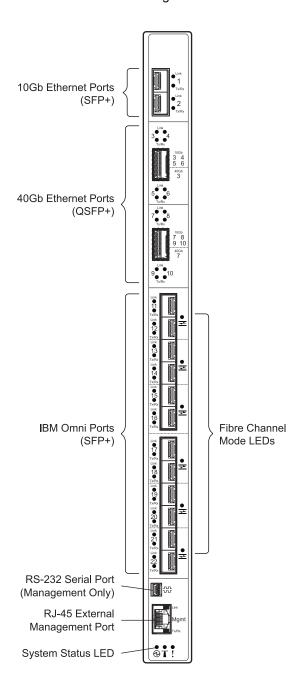
The publications listed above are available at the following address: http://publib.boulder.ibm.com/infocenter/flexsys/information/index.jsp

Please keep these release notes with your product manuals.

# Hardware Support

N/OS 7.5 software is supported on the CN4093 10Gb Converged Scalable Switch for the IBM Flex System. The CN4093 10Gb Converged Scalable Switch (CN4093), shown in Figure 1, is a high performance network switch that features high-capacity Ethernet and Fibre Channel ports, and provides tight integration with the IBM Flex System chassis management module.

Figure 1. CN4093 10Gb Converged Scalable Switch Faceplate



The CN4093 has the following port capacities:

- Forty-two 10Gb internal ports (maximum)
- Two 10Gb SFP+ ports
- Two high-capacity QSFP+ ports
- Twelve IBM Omni Ports (SFP+) which can be configured (in pairs) to operate in 10Gb Ethernet mode or 4/8Gb Fibre Channel mode
- One 1Gb RJ-45 external management port
- One 1Gb internal management port
- One mini-USB serial port

The CN4093 SFP+ ports accept any SFP+ Direct Attach Cable (DAC) that complies to the MSA specification for the appropriate protocol and port speeds. However, for the most current list of compatible port transceivers and cables, see the appropriate product part number documentation.

# **Updating the Switch Software Image**

The switch software image is the executable code running on the CN4093. 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 CN4093, go to the following website:

http://www.ibm.com/systems/support

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

>> # /info/sys/gen

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 using the menu-based CLI, the ISCLI, or the BBI, see "Loading New Software to Your Switch" on page 6.

**ATTENTION:** Although the typical upgrade process is all that is necessary in most cases, upgrading from (or reverting to) some versions of N/OS requires special steps prior to or after the software installation process. Please be sure to follow all applicable instructions in the following sections to ensure that your switch continues to operate as expected after installing new software.



#### **CAUTION:**

N/OS 7.5 is the earliest version of software supported by the CN4093 10Gb Converged Scalable Switch. Do not use any prior versions with this device.

# Loading New Software to Your Switch

The CN4093 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 Software 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 one of the following procedures to download the new software to your switch. You can use the menu-based CLI, the ISCLI, or the BBI to download and activate new software.

# Loading Software via the Menu-Based CLI

1. Enter the following Boot Options command:

```
>> # /boot/gtimg
```

2. Enter the name of the switch software to be replaced:

```
Enter name of switch software image to be replaced
["image1"/"image2"/"boot"]: <image>
```

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

```
Enter hostname or IP address of SFTP/FTP/TFTP server: < hostname \ or \ IP \ address>
```

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

```
Enter name of file on SFTP/FTP/TFTP server: <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 (usually /tftpboot).

5. Enter your username for the server, if applicable.

```
Enter username for SFTP/FTP server or hit return for
TFTP server: {<username>/<Enter>}
```

If entering an SFTP or FTP server username, you will also be prompted for the password. The system then prompts you to confirm your request. Once confirmed, the software will load into the switch.

6. If software is loaded into a different image than the one most recently booted, the system will prompt you whether you wish to run the new image at next boot. Otherwise, you can enter the following command at the Boot Options# prompt:

```
Boot Options# image
```

The system then informs you of which software image (image1 or image2) is currently set to be loaded at the next reset, and prompts you to enter a new choice:

```
Currently set to use switch software "image1" on next reset. Specify new image to use on next reset ["image1"/"image2"]:
```

Specify the image that contains the newly loaded software.

7. Reboot the switch to run the new software:

Boot Options# reset

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

# Loading Software via the ISCLI

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

Router# 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 or FTP server, enter the appropriate username and password.
- 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:

Router# configure terminal
Router(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:

Router(config)# reload

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

### **Loading Software via BBI**

You can use the Browser-Based Interface to load software onto the CN4093. The software image to load can reside in one of the following locations:

- SFTP server
- FTP server
- TFTP server
- Local computer

After you log onto the BBI, perform the following steps to load a software image:

- 1. Click the Configure context tab in the toolbar.
- In the Navigation Window, select System > Config/Image Control.
   The Switch Image and Configuration Management page appears.
- 3. If you are loading software from your computer (HTTP client), skip this step and go to the next. Otherwise, if you are loading software from a SFTP, FTP, or TFTP server, enter the server's information in the FTP/SFTP/TFTP Settings section.
- 4. In the Image Settings section, select the image version you want to replace (Image for Transfer).
  - If you are loading software from a SFTP, FTP, or TFTP server, enter the file name and click **Get Image**.
  - If you are loading software from your computer, click Browse.
     In the File Upload Dialog, select the file and click OK. Then click Download via Browser.

Once the image has loaded, the page refreshes to show the new software.

# **Supplemental Information**

This section provides additional information about configuring and operating the CN4093 and N/OS.

# 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.

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

- To change the booting image, press 1 and follow the screen prompts.
- To change the configuration block, press 2, and follow the screen prompts.
- To perform a software image recovery, press 3 and follow the screen prompts.
- To perform an Xmodem download (boot image only), press 4 and follow the screen prompts.
- To exit the Boot Management menu, press 6. 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.
- Open a terminal emulator program that supports Xmodem download (for example, HyperTerminal, CRT, PuTTY) and select the following serial port characteristics:

Speed: 9600 bps

Data Bits: 8Stop Bits: 1Parity: NoneFlow Control: None

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 **3** 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
R) Reboot
E) Exit

- 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 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.

```
Installing image as image1...
Image1 updated successfully
Please select one of the following options:

T) Configure networking and tftp download an image
X) Use xmodem 1K to serial download an image
R) Reboot
E) Exit
```

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 >.
- 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 6.8.3_0S.img 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.

```
Installing image as image1...
Image1 updated successfully
Please select one of the following options:

T) Configure networking and tftp download an image
X) Use xmodem 1K to serial download an image
R) Reboot
E) Exit
```

- 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 a Failed Boot Image**

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

- 1. Connect a PC to the serial port of the switch.
- Open a terminal emulator program that supports Xmodem download (for example, HyperTerminal, CRT, PuTTY) and select the following serial port characteristics:

Speed: 9600 bps

Data Bits: 8Stop Bits: 1Parity: NoneFlow 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 **4** for **Xmodem 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 \langle {\rm ENTER} \rangle 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:

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.

# **Chassis Management Module**

The switch management port IP address can only be configured via the CMM web interface. The switch-based configuration interfaces (such as the menu-based CLI, ISCLI, BBI, etc.) cannot be used for this purpose.

When configuring the IP interface, which is dedicated to the internal management port (IF128, MGT1), you cannot use a subnet that is already configured on any other enabled interface (IF1-127). This results in IF128 being disabled and an IP configuration of all zeros displayed on the CMM user interface. The CMM event log will indicate that a "Duplicate route" was detected.

For example, consider that the interface dedicated to the external management port (EXTM, IF127) is configured or enabled to the following IP address and mask:

```
Interface information:
127: IP4 192.168.71.120 255.255.255.0
```

The switch will reject an attempt made from the CMM CLI to configure the internal management port (MGT1, IF128) to the following IP address and mask:

```
system: switch[1]> ifconfig -i 192.168.71.130 -s 255.255.255.0
```

In this scenario, the switch rejects the attempt by disabling any current configuration on IF128, and responds to the CMM with an IP address, mask, and gateway that contains all zeros.

On the CMM CLI, the resulting condition appears as follows:

```
system: switch[1] > i fconfig
Ethernet ScSE
Enabled
-c static
-i 0.0.0.0
-s 0.0.0.0
-g 0.0.0.0
system: mm[1] > displaylog
1 I IOMod_01 04/03/12 08:02:49 (i omodule01) Duplicate route detected to I/O module i omodule01.
2 I IOMod_01 04/03/12 08:02:49 (i omodule01) I/O module 1 IP address was changed to 0.0.0.0.
```

### **VLAGs**

For optimal VLAG operation, adhere to the following configuration recommendations:

- The ISL should include enough ports to accommodate the peer-to-peer traffic.
- Any port-related configuration, such as applied ACLs, should be the same for all
  ports included in the same VLAG, across both peer switches.
- Configure VLAG health checking as shown in the Application Guide.

# **External Port Link Negotiation**

Autonegotiation settings for each external switch port should be the same as those of the devices being connected. In a valid configuration, both ends of a port link are set with autonegotiation on, or both ends are set to specific speed and link properties with autonegotiation disabled.

# **Port Mirroring Tags BPDU Packets**

When you perform port mirroring, Spanning Tree BPDU packets are VLAN tagged at the monitoring port. This is standard behavior of port mirroring on the CN4093. All mirrored egress traffic is tagged.

### QSFP+

After you upgrade switch software and reset the switch, you must reconfigure the QSFP+ port mode. Use the following command:

```
>> # /boot/qsfp40g/add <3,7>
```

### Secure Management Network

The following CN4093 attributes are reserved to provide secure management access to and from the chassis management module:

- MGT port (MGT1)
- VLAN 4095
- IP interface 126 (IPv6), 128 (IPv4)
- Gateway 4
- STG 128

For more information about remotely managing the CN4093 through the external ports, see "Accessing the Switch" in the *IBM Networking OS 7.5 Application Guide*.

**Note:** The external uplink ports (EXT*x*) cannot be members of management VLANs.

# Secure Shell (SSH)

Because SSH key generation is CPU intensive, the CN4093 attempts to avoid unnecessary key generation. The process generates three server keys:

- 1. One key is generated to replace the current server key, if used.
- 2. A second key is generated as a spare, in case the current server key is used and the specified interval expires.
- 3. A third key is generated for use at the next reboot.

Therefore, if you never login via SSH, you will only see two key generation events. You may see all three events directly following a reboot. If you want to witness the key generation after the specified interval has expired, then you must login via SSH at least once during each expiration interval.

# **Spanning Tree Configuration Tips**

To ensure proper operation with switches that use Cisco Per VLAN Spanning Tree (PVST+), you must do one of the following:

- Create a separate Spanning Tree Group for each VLAN.
- Manually add all associated VLANs into a single Spanning Tree Group.

When using Layer 2 Trunk Failover, disable Spanning Tree Protocol on external ports.

# **Syslog Configuration Tip**

The *facility* parameter traditionally is used to correlate services (such as IP, CLI, etc.) to messages. This is done to distinguish between the different services that are running in the network/device. However, for the CN4093, there is a single configured facility value (0-7) used on all messages. By configuring a unique facility value for each switch, a single SYSLOG server can distinguish between the various CN4093s in the network. Refer to "System Host Log Configuration" in the *Command Reference*.

### **Trunk Group Configuration Tips**

Please be aware of the following information when you configure trunk groups:

- Always configure trunk groups first, on both ends, before you physically connect the links.
- Configure all ports in a trunk group to the same speed (you cannot aggregate 1Gb ports with 10GBASE-SFP+ ports).
- Configure all ports in a trunk group with the same duplex.
- Configure all ports in a trunk group with the same flowcontrol.

# vCenter Synchronization

When applying distributed VM group configuration changes, the switch will attempt to synchronize settings with the VMware vCenter for virtualization management. If the vCenter is unavailable, an error message will be displayed on the switch. Be sure to evaluate all error message and take the appropriate actions to ensure the expected changes are properly applied. If corrective actions are not taken, synchronization may remain incomplete when connection with the vCenter is restored.

Solution: When the switch connection with the vCenter is restored, use the following operational command to force synchronization:

>> # /oper/virt/vmware/scan

# **VRRP Configuration**

Although the Virtual Router Redundancy Protocol (VRRP) standard permits up to 255 virtual router instances, the N/OS 7.5 implementation only allows up to 128 virtual router instances (corresponding to the number of supported IP interfaces). Each virtual router instance can be assigned a unique Virtual Router ID (VRID) between 1 and 255.

### **Known Issues**

This section describes known issues for N/OS 7.5 on the CN4093 10Gb Converged Scalable Switch.

# **Boot Configuration Block**

In the CLI, the boot configuration command (/boot/conf <block>) examines only the initial character of the block option. Invalid block strings (those other than active, backup, or factory) that use a valid first character (a, b, or f) will be interpreted as the matching valid string. (ID: 42422)

### **Chassis Management Module (CMM)**

NTP configuration can only be saved via the CMM web interface. NTP
configuration using the switch-based configuration interfaces (such as the
menu-based CLI, ISCLI, BBI, etc.) will be overridden by the CMM whenever the
switch or CMM are restarted. (ID: 60460)

### **FCoE**

- Only the ISCLI and BBI are supported for configuring the FCoE and Fibre Channel features.
- In N/OS 7.5, the CN4093 supports up to 175 simultaneous FCoE sessions.
   When this capacity is reached, traffic for additional sessions is dropped, though some host servers and uplink devices may consider all sessions fully established. (ID: 60337, 64842)
- When using FCoE to connect the switch to a Cisco Nexus 5000 (as the external FCF), the DCBX PFC willing flag must be enabled. (ID: 65043)

### **Fibre Channel**

 Only the ISCLI and BBI are supported for configuring the FCoE and Fibre Channel features.

### **Hotlinks**

 Prior to enabling hotlinks, Spanning-Tree should be globally disabled using the following command (ID: 47917):

CN 4093(config)# spanning-tree mode dis

### **IPsec**

IPsec does not support virtual links. (ID: 48914)

# **ISCLI Configuration Scripts**

When using the ISCLI, configuration commands are applied to the active switch configuration immediately upon execution. As a result, when using the ISCLI to load a configuration script containing a long list of processor-intensive commands (such as static route definitions), switch response to other management functions (such as Telnet access for additional management sessions) may be slow or even time-out while the switch individually applies each scripted command. (ID 31787)

Solution: The CLI may be used as an alternative to the ISCLI. Because CLI commands are not fully processed until the CLI  $\mathtt{apply}$  command is given, the equivalent configuration script can be loaded in its entirety and then applied as a whole without undue impact on other management sessions.

### **LACP**

- If a static trunk on a CN4093 is connected to another CN4093 with LACP configured (but no active LACP trunk), the /info/12/trunk command might erroneously report the static trunk as forwarding.
- If you configure LACP (active/passive) on one port, also configure LACP on the partner switch, at the end of the link. If you connect LACP with a static trunk, there will be no connectivity on that link.
- Since LACP trunks use LACPDU packet to maintain trunking with the partner, there is a possibility for those packets to be dropped from an extremely busy trunk. If this happens, some links in the LACP trunk might be removed, then aggregated back to the trunk if an LACPDU is received. To avoid this unstable LACP trunk link, you can add more links to the trunk to increase the bandwidth, or use regular static trunk if there are no more links available.
- Under some conditions, setting the LACP timeout value on partner switches to "short" may cause LACP links to flap in and out of service. If this situation occurs, set the LACP timeout value to "long." (ID: 63405, 64518)

#### **OSPF**

- Some changes to OSPF configuration (such as creating a new area or changing an area's type) may result in OSPF state reconvergence. (ID: 46445, 48483)
- OSPFv3 over IPsec
  - This combination can only be configured only on a per-interface basis.
     Configuration based on virtual links is not currently supported.
  - The current implementation for OSPFv3 allows the use of only one protocol (AH or ESP) at any given time. AH and ESP cannot be applied together.

### **Ports and Transceivers**

- Under repeated and rapid removal and reinsertion a port transceiver, it is
  possible that the resulting port state may not be represented accurately within
  the switch. (ID 32412)
  - Solution: Once you have removed a transceiver from a switch port, wait five seconds before reinserting any transceiver into the same port. This allows the port to stabilize, and promotes accurate port state information within the switch.
- When the link speed for an external connection is forced (i.e. no Auto-Negotiation) to 100 Mbps and then changed to 10 Mbps, if the external device is changed first, the external device may erroneously report the link as DOWN even after the switch is changed to 10 Mbps.

Solution: At the external device, disconnect and reconnect the cable.

Interoperability with Older Hubs

The command-line interface might display link up and link down messages continuously for an external port that is connected to certain older hub models configured for 100 Mbps half-duplex. The display might show link up erroneously. This behavior has been observed when connecting the GbESM with the following devices:

- NETGEAR FE104 100 hub
- SBS 1000Base-T NIC
- 3Com Linkbuilder FMS100 Hub 3C250 TX/I
- 3Com SuperStack II 100TX 3C250C-TX-24/12
- Nortel Baystack 204 Hub
- If the CN4093 is connected to an application switch which requires a link speed of 100 Mbps half-duplex, then enable auto negotiation on the CN4093 port with port speed=any, mode=any, fctl=both, and auto=on.
- Egress packets contribute to statistics on IBM Omni Ports even when link is down or transceivers are not present. (ID: 62639)
- In Ethernet mode (the default), IBM Omni Ports may take longer than dedicated Ethernet ports to reflect changes in port link status. As a result, some traffic loss can be expected while the port transitions to a down state. Also, when using protocols sensitive to link timing (VRRP, OSPF, BGP, LACP, VLAG, IGMP, etc.) it is not recommended to use low- or sub-second timer values. (ID: 64746)

### QSFP+

 The QSFP+ ports do not auto-negotiate. The desired speed must be configured to match on both ends of the connection, and the switch reset for changes to take effect. (ID: 46340)

### SLP

 When using multi-value attributes that contain a list of comma-separated values, the service reply will match if it contains one or more of the values. It is not required that all values match. (ID: 60086)

# **Virtual Link Aggregation Groups**

- All switches participating in a VLAG must run the same version of N/OS software.
- Dynamically changing the Spanning Tree Group of a VLAG-enabled port is not allowed. When Spanning Tree Protocol is enabled, you cannot add VLAG-enabled ports to new VLANs created in the switch without first globally disabling VLAG. (ID: 57336)