Cisco Nexus 9000 Series FPGA/EPLD Upgrade Release Notes, Release 9.3(8), 9.3(9), 9.3(10)

This document lists the current and past versions of EPLD images and describes how to update them for use with the Cisco Nexus 9000 Series switches.

This document also covers later releases. If a newer Cisco Nexus 9000 Series FPGA/EPLD Upgrade Release Notes document isn't available, then these are the latest numbers available for upgrade.

The following table lists the changes to this document.

Date	Description
August 6, 2021	Release 9.3(8) became available.

Contents

Introduction

The Cisco Nexus 9000 Series NX-OS mode switches contain several programmable logical devices (PLDs) that provide hardware functionalities in all modules. Cisco provides electronic programmable logic device (EPLD) image upgrades to enhance hardware functionality or to resolve known issues. PLDs include electronic programmable logic devices (EPLDs), field programmable gate arrays (FPGAs), and complex programmable logic devices (CPLDs), but they do not include ASICs. In this document, the term EPLD is used for FPGA and CPLDs.

The advantage of having EPLDs for some module functions is that when you need to upgrade those functions, you just upgrade their software images instead of replacing their hardware.

NOTE: EPLD image upgrades for a line card disrupt the traffic going through the module because the module must power down briefly during the upgrade. The system performs EPLD upgrades on one module at a time, so at any one time the upgrade disrupts only the traffic going through one module.

Cisco provides the latest EPLD images with each release. Typically, these images are the same as provided in earlier releases but occasionally some of these images are updated. These EPLD image updates are not mandatory unless otherwise specified. The EPLD image upgrades are independent from the Cisco In Service Software Upgrade (ISSU) process, which upgrades the system image with no impact on the network environment.

When Cisco makes an EPLD image upgrade available, these release notes announce their availability, and you can download the EPLD images from https://software.cisco.com/download/navigator.html.

When to Upgrade EPLDs

When new EPLD images are available, the upgrades are always recommended if your network environment allows for a maintenance period in which some level of traffic disruption is acceptable. If such a disruption is not acceptable, then consider postponing the upgrade until a better time.

NOTE: The EPLD upgrade operation is a disruptive operation. Execute this operation only at a programmed maintenance time. The system ISSU upgrade is a nondisruptive upgrade.

NOTE: Do not perform an EPLD upgrade during an ISSU system upgrade.

NOTE: EPLD version is backward compatible.

Switch Requirements

The Cisco Nexus 9000 Series switch must be running the Cisco NX-OS operating system

You must be able to access the switch through a console, SSH, or Telnet (required for setting up a switch running in NX-OS mode).

You must have administrator privileges to work with the Cisco Nexus 9000 Series switch.

EPLD Upgrades Available for NX-OS Mode Releases 9.3(5) through 9.3(8-10)

Each EPLD image that you can download from Software Download page, is a bundle of EPLD upgrades. To see the recent updated EPLD versions for the Cisco Nexus 9200, 9300, 9300-EX, 9300-FX, and 9500 platforms, see the following tables.

NOTE: All updates to an image are shown in boldface. If more than one release is shown for a column, the boldface applies to the first release listed for the column.

NOTE: The 9.3(8) release of EPLD, addresses the Secure Boot Hardware Tampering vulnerability for the Nexus 3K and Nexus 9000 Series switches. Please refer to Security Advisory.

Please review the advisory for affected HW-PIDs (see below table) for more details on how to apply the patch. The 9.3(8) release epld requires a specific sequence of upgrade.

Vulnerable Products addressed in Security Advisory (cisco-sa-20190513-secureboot)

Nexus 9000 Series Switches

PID	Fixed IO FPGA Version
N9K-C93180YC-EX	0x15
N9K-C93108TC-EX	0x15
N9K-C93180LC-EX	0x20
N9K-C93180YC-FX	0x20

N9K-C93108TC-FX	0x20
N9K-C9348GC-FXP	0x10
N9K-C92300YC	0x20
N9K-C93240YC-FX2	0x10
N9K-C9336C-FX2	0x10
N9K-C9364C	0x6
N9K-C9332C	0x10
N9K-C92160YC-X	0x19
N9K-C9272Q	0x17
N9K-C92304QC	0x12
N9K-C9236C	0x17
N9K-C9232C	0x8
N9K-SUP-A+	0x14
N9K-SUP-B+	0x14
N9K-C93120TX	0x13
N9K-SUP-B	0x30
N9K-SUP-A	0x30

Nexus 3000 Series Switches

N3K-C36180YC-R	0x8
N3K-C3636C-R	0x8
N3K-3232C	0x12
N3K-C3264Q-S	0x12
N3K-C31108PC-V	0x6
N3K-C3164Q-40GE	0x13
N3K-C31108TC-V	0x6
N3K-C3132C-Z	0x20
N3K-C3264C-E	0x6

NOTE: N3K-C36180YC-R and N3K-C3636C-R, CPU FPGA will have the fix, so look for CPU FPGA instead of IO.

Cisco Secure Boot Hardware Tampering Vulnerability - Remediation Steps

The following section details updating your EPLD version for affected switches listed in:
https://tools.cisco.com/security/center/content/CiscoSecurityAdvisory/cisco-sa-20190513-secureboot

Nexus 9000 Modular chassis with dual supervisor:

IMPORTANT NOTE:
It is required to update both Golden and Primary regions of FPGA to address this particular vulnerability. It is by design,

that we don't allow updating both primary and golden at the same time (to avoid programming errors, that may cause switch to not boot, hence only one region is allowed to be programmed per reload).

Please do not attempt to upgrade Golden region of FPGA once it is on a fixed version.

1. Copy the EPLD image to bootflash (e.g. used n9000-epld.9.3.8.img).
2. If you have dual supervisor, determine which is the standby Supervisor by doing 'show module' and start upgrading it first. On the N9K, Only supervisors need upgrade for this vulnerability. LC/FM/SC cards are not affected.
3. Assuming standby supervisor is slot 28. Update the Primary FPGA region of standby supervisor.

```
install epld bootflash:n9000-epld.9.3.8.img module 28
```

Expected result: Switch will update primary EPLD of standby supervisor and will reload the standby supervisor module automatically. Please don't interrupt, power cycle or reload when EPLD update is happening. Once standby is booted, it will again come up as standby supervisor. A 'show version module 28 epld' will continue to show old version.

```
switch# show mod | grep SUP
27   0    Supervisor Module              N9K-SUP-A          active *
28   0    Supervisor Module              N9K-SUP-A          ha-standby
27   9.3(0.416)           1.0    SUP1
28   9.3(0.416)           0.3011 SUP2

switch# show version module 28 epld
EPLD Device                 Version
---------------------------------------
IO FPGA                     0x27
```

This is expected, as the switch would have booted from Golden FPGA which is still not updated. You can verify this from syslog which would say:

```
%CARDCLIENT-5-MOD_BOOT_GOLDEN: Module 28 IOFPGA booted from Golden
```

4. Update the Golden (also called backup) FPGA region of the standby supervisor.

```
install epld bootflash:n9000-epld.9.3.8.img module 28 golden

Module 28 : IO FPGA [Programming      ] : 100.00% (     64 of      64 total sectors)
Module 28 EPLD upgrade is successful.
Module       Type  Upgrade-Result
------  ------------------  --------------
   28        SUP        Success
```

Expected result: Switch will update the golden EPLD of standby supervisor and will reload the standby supervisor module automatically. Please don't interrupt, power cycle or reload when EPLD update is happening. Once standby is booted, it will again come up as ha-standby supervisor.
Once this is done, when you check 'show version module 28 epld' you will see FPGA version that is >= to the fixed version for the standby supervisor. Your switch has the fixed version for standby supervisor.

```
switch# show version module 28 epld


EPLD Device                 Version
---------------------------------------
IO FPGA                     0x30
```

Repeat Step 3 and 4, for the active supervisor. At the end of Step 3, supervisor in slot 27 will reload and hence now will become standby supervisor. The active supervisor will be Supervisor in slot 28.

(considering SUP 27 is active to begin with, for the above activity, such as steps 3 and 4, commands would have 27 in place of 28.)

Log below shows what happens when epld upgrade happens for active supervisor.

```
Module 27 : IO FPGA [Programming] : 100.00% (     64 of      64 sectors)
Module 27 EPLD upgrade is successful.
Module       Type  Upgrade-Result
------ ------------------ --------------
   27       SUP        Success


EPLDs upgraded. Performing switchover.
```

Once the supervisor in Slot 27 becomes ha-standby complete step 4 for Slot 27, and it will again boot and become ha-standby. Both the supervisors now have the vulnerability fixed version of FPGA.

At the end of the upgrades, switch should boot with primary for both SUPs, logs below

```
switch# show logging log | grep -i fpga | grep -i 27
2019 Jul 10 07:55:04 switch %CARDCLIENT-5-MOD_BOOT_PRIMARY: Module 27 IOFPGA booted from Primary
switch# show logging log | grep -i fpga | grep -i 28
2019 Jul 10 07:58:01 switch %CARDCLIENT-5-MOD_BOOT_PRIMARY: Module 28 IOFPGA booted from Primary
```

Nexus 9000 Modular chassis with single supervisor:

IMPORTANT NOTE:
It is required to update both Golden and Primary regions of FPGA to address this particular vulnerability. It is by design, that we don't allow updating both primary and golden at the same time (to avoid programming errors, that may cause switch to not boot, hence only one region is allowed to be programmed per reload).

Please do not attempt to upgrade Golden region of FPGA once it is on a fixed version.

1.Copy the EPLD image to bootflash (e.g. used n9000-epld.9.3.8.img).

2.Assuming the supervisor is in Slot27. Update the Primary FPGA region.

```
install epld bootflash:n9000-epld.9.3.8.img module 27
```

Expected result: Switch will update primary EPLD of the supervisor and will reload the switch automatically. Please don't interrupt, power cycle or reload when EPLD update is happening. Once the supervisor is booted, the 'show version module 27 epld' will continue to show old version

```
Switch#show version module 27 epld
------------------------------------------------------------------
Name               InstanceNum         Version       Date
------------------------------------------------------------------
```

```
IO FPGA                 0          0x27      20160111
BIOS version              v08.35(08/31/2018)
Alternate BIOS version        v08.32(10/18/2016)
```

This is expected, as the switch would have booted from Golden FPGA which is still not updated. You can verify this from sys-log which would say:

%CARDCLIENT-5-MOD_BOOT_GOLDEN: Module 27 IOFPGA booted from Golden

3. Since in this case there is only one supervisor, update the Golden (also called backup) FPGA region.

install epld bootflash:n9000-epld.9.3.8.img module 27 golden

```
Module 27 : IO FPGA [Programming     ] : 100.00% (     64 of      64 total sectors)
Module 27 EPLD upgrade is successful.
Module       Type  Upgrade-Result
------ ------------------ --------------
   27        SUP        Success
```

Expected result: Switch will update the golden EPLD of the supervisor and will reload the switch automatically. Please don't interrupt, power cycle or reload when EPLD update is happening.
Once this is done, when you check 'show version module 27 epld' you will see FPGA version that is >= to the fixed version for the supervisor. Your supervisor has the vulnerability fixed version of FPGA.

```
SWITCH# show version module 27 epld
----------------------------------------------------------------------
Name               InstanceNum         Version       Date
----------------------------------------------------------------------
IO FPGA                 0          0x30      20190625
BIOS version              v08.35(08/31/2018)
Alternate BIOS version        v08.32(10/18/2016)
```

At the end of the upgrades, switch should boot with primary for the SUP, log below

```
switch# show logging log | grep -i fpga | grep -i 27
2019 Jul 10 07:55:04 switch %CARDCLIENT-5-MOD_BOOT_PRIMARY: Module 27 IOFPGA booted from Primary
```

IMPORTANT NOTE:
If you attempt to upgrade the Golden region of the FPGA once it is on the fixed version, the system will not automatically allow you to upgrade the Golden region of SUP, and will provide the following prompt:

```
switch# install epld bootflash:n9000-epld.9.2.5.img module all golden
Digital signature verification is successful
Compatibility check:
Module       Type        Upgradable       Impact   Reason
------ ---------------- ----------   ----------  ------
   22          FM          Yes      disruptive   Module Upgradable
   24          FM          Yes      disruptive   Module Upgradable
   27         SUP           No           none   Golden Not Upgradable
   28         SUP           No           none   Golden Not Upgradable
   29          SC          Yes      disruptive   Module Upgradable
   30          SC          Yes      disruptive   Module Upgradable
```

```
Retrieving EPLD versions.... Please wait.
Images will be upgraded according to following table:
Module  Type   EPLD          Running-Version   New-Version  Upg-Required
------  ----  ------------    ---------------  ----------- ------------
   22    FM  IO FPGA             0x19       0x19         Yes
   24    FM  IO FPGA             0x19       0x19         Yes
   29    SC  IO FPGA             0x17       0x20         Yes
   30    SC  IO FPGA             0x17       0x20         Yes
Module 27 (EPLD ver 0x29) Golden upgrade not supported
Module 28 (EPLD ver 0x30) Golden upgrade not supported
The above modules require upgrade.
Since both System Controller modules need an upgrade,a chassis reload will happen at the end of the upgrade.
Do you want to continue (y/n) ?  [n] y
```

Nexus 9000 and Nexus 3000 TOR:

IMPORTANT NOTE:
It is required to update both Golden and Primary regions of FPGA to address this particular vulnerability. It is by design, that we don't allow updating both primary and golden at the same time (to avoid programming errors, that may cause switch to not boot, hence only one region is allowed to be programmed per reload).

Please do not attempt to upgrade Golden region of FPGA once it is on a fixed version.

1. Copy the EPLD image to bootflash (e.g. used n9000-epld.9.3.8.img).
2. Update the Primary FPGA region.

```
install epld bootflash:n9000-epld.9.3.8.img module 1
```

Expected result: Switch will update EPLD and will reload automatically. Please don't interrupt, power cycle or reload when EPLD update is happening. Switch would boot up with golden FPGA, 'show version module 1 epld' would show the old Fpga version for IO, due to this. This is expected.

```
show version module 1 epld
-----------------------------------------------------------------
Name               InstanceNum        Version      Date
-----------------------------------------------------------------
IO FPGA                 0           0x06      20180920
MI FPGA                 0           0x01      20170609
BIOS version             v01.14(06/15/2019)
Alternate BIOS version       v01.12(07/25/2018)
```

You can verify this from syslog which would say:

```
%CARDCLIENT-5-MOD_BOOT_GOLDEN: Module 1 IOFPGA booted from Golden
%CARDCLIENT-2-FPGA_BOOT_GOLDEN: IOFPGA booted from Golden
```

3. Update the Golden (also called backup) FPGA region.

```
install epld bootflash:n9000-epld.9.3.8.img module 1 golden
```

Expected result: Switch will update EPLD and will reload automatically. Please don't interrupt, power cycle or reload when EPLD update is happening.

Once this is done, when you check 'show version module 1 epld' you will see FPGA version that is >= to the fixed version.

```
show version module 1 epld
----------------------------------------------------------------
Name                 InstanceNum         Version       Date
----------------------------------------------------------------
IO FPGA                    0              0x07      20180920
MI FPGA                    0              0x01       20170609
BIOS version                v01.14(06/15/2019)
Alternate BIOS version          v01.12(07/25/2018)
```

After uprade is complete, switch should boot up with primary, shown logs below

```
show logging log | grep -i fpga
2019 Jul  9 19:46:11 Deervalley4 %CARDCLIENT-2-FPGA_BOOT_PRIMARY: IOFPGA booted from Primary
2019 Jul  9 19:46:11 Deervalley4 %CARDCLIENT-2-FPGA_BOOT_PRIMARY: MIFPGA booted from Primary
2019 Jul  9 19:46:11 Deervalley4 %CARDCLIENT-5-MOD_BOOT_PRIMARY: Module 1 IOFPGA booted from Primary
2019 Jul  9 19:46:11 Deervalley4 %CARDCLIENT-5-MOD_BOOT_PRIMARY: Module 1 MIFPGA booted from Primary
```

NOTE: For N3K-C36180YC-R and N3K-C3636C-R, CPU FPGA will have the fix, so look for CPU FPGA instead of IO.

Available EPLD Images for the Cisco Nexus 9200, 9300, 9300-EX, and 9300-FX Platform Switches

Switch or Uplink Module	EPLD Device	Release 9.3(5)	Release 9.3(6)	Release 9.3(7)	Release 9.3(8-10)
Cisco Nexus 92160YC-X (N9K-C92160YC-X)	IOFPGA	0x19 (0.025)	0x19 (0.025)	0x19 (0.025)	0x19 (0.025)
	MIFPGA	0x5 (0.005)	0x5 (0.005)	0x5 (0.005)	0x5 (0.005)
Cisco Nexus 92300YC (N9K-C92300YC)	IOFPGA	0x22 (0.034)	0x22 (0.034)	0x22 (0.034)	0x22 (0.034)
	MIFPGA0	0x7 (0.007)	0x7 (0.007)	0x7 (0.007)	0x7 (0.007)
	MIFPGA1	0x2 (0.002)	0x2 (0.002)	0x2 (0.002)	0x2 (0.002)
Cisco Nexus 92304QC (N9K-C92304QC)	IOFPGA	0x12 (0.018)	0x12 (0.018)	0x12 (0.018)	0x12 (0.018)
	MIFPGA0	0x1 (0.001)	0x1 (0.001)	0x1 (0.001)	0x1 (0.001)
	MIFPGA1	0x1 (0.001)	0x1 (0.001)	0x1 (0.001)	0x1 (0.001)
Cisco Nexus 9232C (N9K-C9232C)	IOFPGA	0x8 (0.008)	0x8 (0.008)	0x8 (0.008)	0x8 (0.008)
	MIFPGA	0x2 (0.002)	0x2 (0.002)	0x2 (0.002)	0x2 (0.002)
Cisco Nexus 92348GC-X (N9K-C92348GC-X)	IOFPGA	0x10 (0.016)	0x14 (0.020)	0x14 (0.020)	0x14 (0.020)

Switch or Uplink Module	EPLD Device	Release 9.3(5)	Release 9.3(6)	Release 9.3(7)	Release 9.3(8-10)
Cisco Nexus 9236C (N9K-C9236C)	IOFPGA	0x17 (0.023)	0x17 (0.023)	0x17 (0.023)	0x17 (0.023)
	MIFPGA	0x9 (0.009)	0x9 (0.009)	0x9 (0.009)	0x9 (0.009)
Cisco Nexus 9272Q (N9K-C9272Q)	IOFPGA	0x17 (0.023)	0x17 (0.023)	0x17 (0.023)	0x17 (0.023)
	MIFPGA0	0x4 (0.004)	0x4 (0.004)	0x4 (0.004)	0x4 (0.004)
	MIFPGA1	0x7 (0.007)	0x7 (0.007)	0x7 (0.007)	0x7 (0.007)
Cisco Nexus 93108TC-EX (N9K-C93108TC-EX)	IOFPGA	0x15 (0.021)	0x15 (0.021)	0x15 (0.021)	0x15 (0.021)
	MIFPGA	0x2 (0.002)	0x2 (0.002)	0x2 (0.002)	0x2 (0.002)
Cisco Nexus 93108TC-FX (N9K-C93108TC-FX)	IOFPGA	0x22 (0.034)	0x22 (0.034)	0x22 (0.034)	0x22 (0.034)
	MIFPGA	0x3 (0.003)	0x3 (0.003)	0x3 (0.003)	0x3 (0.003)
Cisco Nexus 93108TC-FX3P (N9K-C93108TC-FX3P)	IOFPGA	0x8 (0.008)	0x8 (0.008)	0x8 (0.008)	0x8 (0.008)
	MIFPGA	0x9 (0.009)	0x9 (0.009)	0x9 (0.009)	0x9 (0.009)
Cisco Nexus 93120TX (N9K-C93120TX)	IOFPGA	0x13 (0.019)	0x13 (0.019)	0x13 (0.019)	0x13 (0.019)
	MIFPGA1	0x10 (0.016)	0x10 (0.016)	0x10 (0.016)	0x10 (0.016)
	MIFPGA2	0x9 (0.009)	0x9 (0.009)	0x9 (0.009)	0x9 (0.009)
Cisco Nexus 93128TX (N9K-C93128TX)	IOFPGA	0x11 (0.017)	0x11 (0.017)	0x11 (0.017)	0x11 (0.017)
	MIFPGA	0x9 (0.009)	0x9 (0.009)	0x9 (0.009)	0x9 (0.009)
Cisco Nexus 9316D-GX (N9K-C9316D-GX)	IOFPGA	0x15 (0.021)	0x15 (0.021)	0x15 (0.021)	0x15 (0.021)
	MIFPGA	0x6 (0.006)	0x6 (0.006)	0x6 (0.006)	0x6 (0.006)
Cisco Nexus 93180LC-EX (N9K-C93180LC-EX)	IOFPGA	0x22 (0.034)	0x22 (0.034)	0x22 (0.034)	0x22 (0.034)
	MIFPGA	0x15 (0.021)	0x15 (0.021)	0x15 (0.021)	0x15 (0.021)
Cisco Nexus 93180YC-FX3S (N9K-C93180YC-FX3S)	IOFPGA	0x12 (0.018)	0x12 (0.018)	0x12 (0.018)	0x12 (0.018)
	MIFPGA	0x15 (0.021)	0x15 (0.021)	0x15 (0.021)	0x15 (0.021)
Cisco Nexus 93180YC-FX3 (N9K-C93180YC-FX3)	IOFPGA	N/A	N/A	N/A	0x12 (0.018)
	MIFPGA	N/A	N/A	N/A	0x16 (0.022)
Cisco Nexus 93180YC-EX (N9K-C93180YC-EX)	IOFPGA	0x15 (0.021)	0x15 (0.021)	0x15 (0.021)	0x15 (0.021)
	MIFPGA	0x4 (0.004)	0x4 (0.004)	0x4 (0.004)	0x4 (0.004)
Cisco Nexus 93180YC-FX	IOFPGA	0x22 (0.034)	0x22 (0.034)	0x22 (0.034)	0x22 (0.034)

Switch or Uplink Module	EPLD Device	Release 9.3(5)	Release 9.3(6)	Release 9.3(7)	Release 9.3(8-10)
(N9K-C93180YC-FX)	MIFPGA	0x10 (0.016)	0x10 (0.016)	0x10 (0.016)	0x10 (0.016)
Cisco Nexus 93180YC2-FX (N9K-C93180YC2-FX)	IOFPGA	0x22 (0.034)	0x22 (0.034)	0x22 (0.034)	0x22 (0.034)
	MIFPGA	0x3 (0.003)	0x3 (0.003)	0x3 (0.003)	0x3 (0.003)
Cisco Nexus 93216TC-FX2 (N9K-C93216TC-FX2)	IOFPGA	0x16 (0.022)	0x16 (0.022)	0x16 (0.022)	0x16 (0.022)
	MIFPGA0	0x5 (0.005)	0x5 (0.005)	0x5 (0.005)	0x5 (0.005)
	MIFPGA1	0x5 (0.005)	0x5 (0.005)	0x5 (0.005)	0x5 (0.005)
Cisco Nexus 93240YC-FX2 (N9K-C93240YC-FX2)	IOFPGA	0x11 (0.017)	0x12 (0.018)	0x13 (0.019)	0x13 (0.019)
	MIFPGA1	0x12 (0.018)	0x12 (0.018)	0x12 (0.018)	0x12 (0.018)
	MIFPGA2	0x8 (0.008)	0x8 (0.008)	0x8 (0.008)	0x8 (0.008)
Cisco Nexus 9332C (N9K-C9332C)	IOFPGA	0x11 (0.017)	0x12 (0.018)	0x13 (0.019)	0x13 (0.019)
	MIFPGA	0x3 (0.003)	0x3 (0.003)	0x3 (0.003)	0x3 (0.003)
Cisco Nexus 9332PQ (N9K-C9332PQ)	IOFPGA	0x12 (0.018)	0x12 (0.018)	0x12 (0.018)	0x12 (0.018)
	MIFPGA	0x17 (0.023)	0x17 (0.023)	0x17 (0.023)	0x17 (0.023)
Cisco Nexus 9336C-FX2 (N9K-C9336C-FX2)	IOFPGA	0x11 (0.017)	0x12 (0.018)	0x13 (0.019)	0x13 (0.019)
	MIFPGA	0x5 (0.005)	0x5 (0.005)	0x5 (0.005)	0x5 (0.005)
Cisco Nexus 93360YC-FX2 (N9K-C93360YC-FX2)	IOFPGA	0x16 (0.022)	0x16 (0.022)	0x16 (0.022)	0x16 (0.022)
	MIFPGA0	0x4 (0.004)	0x4 (0.004)	0x4 (0.004)	0x4 (0.004)
	MIFPGA1	0x3 (0.003)	0x3 (0.003)	0x3 (0.003)	0x3 (0.003)
Cisco Nexus 9348GC-FXP (N9K-C9348GC-FXP)	IOFPGA	0x10 (0.016)	0x10 (0.016)	0x10 (0.016)	0x10 (0.016)
	MIFPGA	0x10 (0.016)	0x10 (0.016)	0x10 (0.016)	0x10 (0.016)
Cisco Nexus 9348GC-FXP (N9K-C9348GC2-FXP)	IOFPGA	0x10 (0.016)	0x10 (0.016)	0x10 (0.016)	0x10 (0.016)
	MIFPGA	0x3 (0.003)	0x3 (0.003)	0x3 (0.003)	0x3 (0.003)
Cisco Nexus 93600CD-GX (N9K-C93600CD-GX)	IOFPGA	0x15 (0.021)	0x15 (0.021)	0x15 (0.021)	0x15 (0.021)
	MIFPGA	0x9 (0.009)	0x9 (0.009)	0x9 (0.009)	0x9 (0.009)
Cisco Nexus 9364C (N9K-C9364C)	IOFPGA	0x7 (0.007)	0x7 (0.007)	0x7 (0.007)	0x7 (0.007)
	MIFPGA0	0x11 (0.017)	0x11 (0.017)	0x11 (0.017)	0x11 (0.017)
	MIFPGA1	0x4 (0.004)	0x4 (0.004)	0x4 (0.004)	0x4 (0.004)
Cisco Nexus 9364C-GX	IOFPGA	0x6 (0.006)	0x6 (0.006)	0x6 (0.006)	0x6 (0.006)

Switch or Uplink Module	EPLD Device	Release 9.3(5)	Release 9.3(6)	Release 9.3(7)	Release 9.3(8-10)
(N9K-C9364C-GX)	MIFPGA0	0x5 (0.005)	0x5 (0.005)	0x5 (0.005)	0x5 (0.005)
	MIFPGA1	0x4 (0.004)	0x4 (0.004)	0x4 (0.004)	0x4 (0.004)
Cisco Nexus 9372PX (N9K-C9372PX)	IOFPGA	0x8 (0.008)	0x8 (0.008)	0x8 (0.008)	0x8 (0.008)
	MIFPGA	0x15 (0.021)	0x15 (0.021)	0x15 (0.021)	0x15 (0.021)
Cisco Nexus 9372PX-E (N9K-C9372PX-E)	IOFPGA	0x8 (0.008)	0x8 (0.008)	0x8 (0.008)	0x8 (0.008)
	MIFPGA	0x15 (0.021)	0x15 (0.021)	0x15 (0.021)	0x15 (0.021)
Cisco Nexus 9372TX (N9K-C9372TX)	IOFPGA	0x6 (0.006)	0x6 (0.006)	0x6 (0.006)	0x6 (0.006)
	MIFPGA	0x15 (0.021)	0x15 (0.021)	0x15 (0.021)	0x15 (0.021)
Cisco Nexus 9372TX-E (N9K-C9372TX-E)	IOFPGA	0x6 (0.006)	0x6 (0.006)	0x6 (0.006)	0x6 (0.006)
	MIFPGA	0x3 (0.003)	0x3 (0.003)	0x3 (0.003)	0x3 (0.003)
Cisco Nexus 9396PX (N9K-C9396PX)	IOFPGA	0x16 (0.022)	0x16 (0.022)	0x16 (0.022)	0x16 (0.022)
	MIFPGA	0x15 (0.021)	0x15 (0.021)	0x15 (0.021)	0x15 (0.021)
Cisco Nexus 9396TX (N9K-C9396TX)	IOFPGA	0x9 (0.009)	0x9 (0.009)	0x9 (0.009)	0x9 (0.009)
4-port 100-Gigabit optical uplink module (N9K-M4PC-CFP2)	MIFPGA	0x11 (0.017)	0x11 (0.017)	0x11 (0.017)	0x11 (0.017)
6-port 40-Gigabit optical uplink module (N9K-M6PQ or N9K-M6PQ-E)	MIFPGA	0x10 (0.016)	0x10 (0.016)	0x10 (0.016)	0x10 (0.016)
12-port optical uplink module (N9K-M12PQ)	MIFPGA	0x20 (0.032)	0x20 (0.032)	0x20 (0.032)	0x20 (0.032)

[1] Not available in this release.

Available EPLD Images for the Cisco Nexus 9500 Platform Switches

Component	EPLD Device	Release 9.3(5)	Release 9.3(6)	Release 9.3(7)	Release 9.3(8-10)
Supervisor A (N9K-SUP-A)	IOFPGA	0x31 (0.049)	0x31 (0.049)	0x31 (0.049)	0x31 (0.049)
Supervisor A+ (N9K-SUP-A+)	IOFPGA	0x15 (0.021)	0x15 (0.021)	0x15 (0.021)	0x15 (0.021)
Supervisor B (N9K-SUP-B)	IOFPGA	0x30 (0.049)	0x30 (0.049)	0x30 (0.049)	0x30 (0.049)
Supervisor B+ (N9K-SUP-B+)	IOFPGA	0x15 (0.021)	0x15 (0.021)	0x15 (0.021)	0x15 (0.021)
System Controller (N9K-SC-A)	IOFPGA	0x20 (0.032)	0x20 (0.032)	0x20 (0.032)	0x20 (0.032)
8-port 100-Gigabit CFP2 line card (N9K-X9408)	IOFPGA	0x5 (0.005)	0x5 (0.005)	0x5 (0.005)	0x5 (0.005)
	MIFPGA	0x9 (0.009)	0x9 (0.009)	0x9 (0.009)	0x9 (0.009)
32-port 100-Gigabit QSFP28 line card (N9K-X9432C-S)	IOFPGA	0x14 (0.020)	0x14 (0.020)	0x14 (0.020)	0x14 (0.020)
	MIFPGA	0x4 (0.004)	0x4 (0.004)	0x4 (0.004)	0x4 (0.004)
32-port 40-Gigabit QSFP+ line card (N9K-X9432PQ)	IOFPGA	0x16 (0.022)	0x16 (0.022)	0x16 (0.022)	0x16 (0.022)
	MIFPGA	0x13 (0.019)	0x13 (0.019)	0x13 (0.019)	0x13 (0.019)
32-port 100-Gigabit QSFP28 line card (N9K-X9732C-EX) (for –E fabric modules)	IOFPGA	0x13 (0.019)	0x13 (0.019)	0x13 (0.019)	0x13 (0.019)
	MIFPGA	0x9 (0.009)	0x9 (0.009)	0x9 (0.009)	0x9 (0.009)
32-port 100-Gigabit QSFP28 line card (N9K-X9732C-EXM) (for –E fabric modules)	IOFPGA	0x11 (0.017)	0x11 (0.017)	0x11 (0.017)	0x11 (0.017)
	MIFPGA	0x5 (0.005)	0x5 (0.005)	0x5 (0.005)	0x5 (0.005)
36-port 100-Gigabit QSFP28 line card (N9K-X9732C-FX)	IOFPGA	0x7 (0.007)	0x7 (0.007)	0x7 (0.007)	0x7 (0.007)
	MIFPGA	0x2 (0.002)	0x2 (0.002)	0x2 (0.002)	0x2 (0.002)
36-port 40-Gigabit QSFP+ line card (N9K-X9636PQ)	IOFPGA	0x19 (0.025)	0x19 (0.025)	0x19 (0.025)	0x19 (0.025)
	MIFPGA	0x13 (0.019)	0x13 (0.019)	0x13 (0.019)	0x13 (0.019)
36-port 40-Gigabit QSFP+ line card (N9K-X9536PQ)	IOFPGA	0x11 (0.017)	0x11 (0.017)	0x11 (0.017)	0x11 (0.017)
	MIFPGA	0x7 (0.007)	0x7 (0.007)	0x7 (0.007)	0x7 (0.007)
36-port 100-Gigabit QSFP28 line card (N9K-X9736C-EX)	IOFPGA	0x13 (0.019)	0x13 (0.019)	0x13 (0.019)	0x13 (0.019)
	MIFPGA	0x9 (0.009)	0x9 (0.009)	0x9 (0.009)	0x9 (0.009)
36-port 100-Gigabit QSFP28 line card (N9K-X9736C-FX)	IOFPGA	0x7 (0.007)	0x7 (0.007)	0x7 (0.007)	0x7 (0.007)
	MIFPGA	0x7 (0.007)	0x7 (0.007)	0x7 (0.007)	0x7 (0.007)
48-port 1-/10-Gigabit SFP+ and 4-port 40-Gigabit QSFP+ line card (N9K-X9464PX)	IOFPGA	0x11 (0.017)	0x11 (0.017)	0x11 (0.017)	0x11 (0.017)
	MIFPGA	0x10 (0.016)	0x10 (0.016)	0x10 (0.016)	0x10 (0.016)
48-port 1/10GBASE-T and 4-port	IOFPGA	0x9 (0.009)	0x9 (0.009)	0x9 (0.009)	0x9 (0.009)

Component	EPLD Device	Release 9.3(5)	Release 9.3(6)	Release 9.3(7)	Release 9.3(8-10)
40-Gigabit QSFP+ line card (N9K-X9464TX)	MIFPGA	0x8 (0.008)	0x8 (0.008)	0x8 (0.008)	0x8 (0.008)
48-port 1/10GBASE-T and 4-port 40-Gigabit QSFP+ line card (N9K-X9464TX2)	IOFPGA	0x9 (0.009)	0x9 (0.009)	0x9 (0.009)	0x9 (0.009)
	MIFPGA	0x3 (0.003)	0x3 (0.003)	0x3 (0.003)	0x3 (0.003)
48-port 1/10GBASE-T and 4-port 40-Gigabit QSFP+ line card (N9K-X9564TX)	IOFPGA	0x10 (0.016)	0x10 (0.016)	0x10 (0.016)	0x10 (0.016)
	MIFPGA	0x8 (0.008)	0x8 (0.008)	0x8 (0.008)	0x8 (0.008)
48-port 1-/10-Gigabit SFP+ and 4-port 40-Gigabit QSFP+ line card (N9K-X9564PX)	IOFPGA	0x14 (0.020)	0x14 (0.020)	0x14 (0.020)	0x14 (0.020)
	MIFPGA	0x10 (0.016)	0x10 (0.016)	0x10 (0.016)	0x10 (0.016)
48-port 1-/10-/25-Gigabit SFP28 and 4-port 40-/100-Gigabit QSFP28 line card (N9K-X97160YC-EX)	IOFPGA	0x12 (0.018)	0x12 (0.018)	0x12 (0.018)	0x12 (0.018)
	MIFPGA	0x5 (0.005)	0x5 (0.005)	0x5 (0.005)	0x5 (0.005)
48-port 10-Gigabit SFP+ and 4-port 100-Gigabit QSFP28 line card (N9K-X9788TC-FX)	IOFPGA	0x4 (0.004)	0x4 (0.004)	0x4 (0.004)	0x4 (0.004)
	MIFPGA	0x6 (0.006)	0x6 (0.006)	0x6 (0.006)	0x6 (0.006)
48-port 10-Gigabit SFP+ and 4-port 100-Gigabit QSFP28 line card (N9K-X9788TC2-FX)	IOFPGA	0x6 (0.006)	0x6 (0.006)	0x6 (0.006)	0x6 (0.006)
	MIFPGA	0x3 (0.003)	0x3 (0.003)	0x3 (0.003)	0x3 (0.003)
Fabric module for Cisco Nexus 9504 40-Gigabit line cards (N9K-C9504-FM)	IOFPGA	0x19 (0.025)	0x19 (0.025)	0x19 (0.025)	0x19 (0.025)
Fabric module for Cisco Nexus 9504 100-Gigabit –EX line (N9K-C9504-FM-E)	IOFPGA	0x15 (0.021)	0x15 (0.021)	0x15 (0.021)	0x15 (0.021)
Fabric module for Cisco Nexus 9504 100-Gigabit –S line cards (N9K-C9504-FM-S)	IOFPGA	0x11 (0.017)	0x11 (0.017)	0x11 (0.017)	0x11 (0.017)
Fabric module for Cisco Nexus 9508 40-Gigabit line cards (N9K-C9508-FM)	IOFPGA	0x19 (0.025)	0x19 (0.025)	0x19 (0.025)	0x19 (0.025)
Fabric module for Cisco Nexus 9508 100-Gigabit –EX line cards (N9K-C9508-FM-E)	IOFPGA	0x14 (0.020)	0x14 (0.020)	0x14 (0.020)	0x14 (0.020)
Fabric module for Cisco Nexus 9508 100-Gigabit –EX line (N9K-C9508-FM-E2)	IOFPGA	0x9 (0.009)	0x9 (0.009)	0x9 (0.009)	0x9 (0.009)
Fabric module for Cisco Nexus 9508 100-Gigabit –S line (N9K-C9508-FM-S)	IOFPGA	0x11 (0.017)	0x11 (0.017)	0x11 (0.017)	0x11 (0.017)
Fabric module for Cisco Nexus 9516 40-Gigabit line cards (N9K-C9516-FM)	IOFPGA	0x13 (0.019)	0x13 (0.019)	0x13 (0.019)	0x13 (0.019)

Component	EPLD Device	Release 9.3(5)	Release 9.3(6)	Release 9.3(7)	Release 9.3(8-10)
Fabric module for Cisco Nexus 9516 100-Gigabit –EX line cards (N9K-C9516-FM-E)	IOFPGA	0x8 (0.008)	0x8 (0.008)	0x8 (0.008)	0x8 (0.008)
	MIFPGA	0x8 (0.008)	0x8 (0.008)	0x8 (0.008)	0x8 (0.008)
Fabric module for Cisco Nexus 9516 100-Gigabit -EX and -FX line cards (N9K-C9516-FM-E2)	MIFPGA	0x11 (0.011)	0x11 (0.011)	0x11 (0.011)	0x11 (0.011)
	IOFPGA	0x8 (0.008)	0x8 (0.008)	0x8 (0.008)	0x8 (0.008)

[2] Not available in this release.

Available EPLD Images for the Cisco Nexus 9500 Platform Switches with R Line Cards

Component	EPLD Device	Release 9.3(5)	Release 9.3(6)	Release 9.3(7)	Release 9.3(8-10)
36-port 100-Gigabit QSFP28 line card (N9K-X9636C-RX)	IOFPGA	0x18 (0.024)	0x18 (0.024)	0x18 (0.024)	0x18 (0.024)
	MIFPGA	0x3 (0.003)	0x3 (0.003)	0x3 (0.003)	0x3 (0.003)
36-port 100-Gigabit QSFP28 line card (N9K-X9636C-R)	IOFPGA	0x12 (0.018)	0x12 (0.018)	0x12 (0.018)	0x12 (0.018)
	MIFPGA	0x9 (0.009)	0x9 (0.009)	0x9 (0.009)	0x9 (0.009)
36-port 40-Gigabit QSF+ line card (N9K-X9636Q-R)	IOFPGA	0x19 (0.025)	0x19 (0.025)	0x19 (0.025)	0x19 (0.025)
	MIFPGA	0x3 (0.003)	0x3 (0.003)	0x3 (0.003)	0x3 (0.003)
52-port 100-Gigabit –R line cards (N9K-X96136YC-R)	IOFPGA	0xD	0xD	0xD	0xD
	MIFPGA	0xF	0xF	0xF	0xF
	DBFPGA	0xE	0xE	0xE	0xE
Fabric module for Cisco Nexus 9504 100-Gigabit –R line cards (N9K-C9504-FM-R)	IOFPGA	0x7 (0.007)	0x7 (0.007)	0x7 (0.007)	0x7 (0.007)
Fabric module for Cisco Nexus 9508 100-Gigabit –R line cards (N9K-C9508-FM-R)	IOFPGA	0x10 (0.016)	0x10 (0.016)	0x10 (0.016)	0x10 (0.016)

[3] Not available in this release.

Determining Whether to Upgrade EPLD Images

EPLD image number, you can skip the upgrade.

- To determine the EPLD upgrades needed for a Cisco Nexus 9000 Series switch, use the show install impact epld bootflash: command on that switch and indicate the n9000-epld.9.3.8 image. In the following example, the MIFPGA, and IOFPGA EPLD images do not need to be upgraded.

```
switch# show install all impact epld n9000-epld.9.3.8.img
Retrieving EPLD versions.... Please wait.
Images will be upgraded according to following table:
```

```
Module  Type   EPLD             Running-Version   New-Version  Upg-Required
------  ----  -------------      ---------------   -----------  ------------
     1    LC  MI FPGA                   0x0f        0x0f             No
     1    LC  IO FPGA                   0x0d        0x0d             No
     1    LC  DB FPGA                   0x0e        0x0e             No
    21    FM  IO FPGA                   0x07        0x07             No
    27   SUP  IO FPGA                   0x15        0x15             No
    28   SUP  IO FPGA                   0x15        0x15             No
    29    SC  IO FPGA                   0x20        0x20             No
    30    SC  IO FPGA                   0x20        0x20             No
Compatibility check:
Module        Type         Upgradable        Impact   Reason
-----------------------------------------------------
     1             LC           Yes       disruptive   Module Upgradable
    21            SUP           Yes       disruptive   Module Upgradable
    27            SUP           Yes       disruptive   Module Upgradable
    28            SUP           Yes       disruptive   Module Upgradable
    29             SC           Yes       disruptive   Module Upgradable
    30             SC           Yes       disruptive   Module Upgradable
```

Downloading the EPLD Images

Before you can prepare the EPLD images for installation, you must download them to the FTP or management server.

1. From a browser, go to https://software.cisco.com/download/navigator.html.

   The browser displays the Cisco website.

2. Choose Switches.

   A list of switch types displays on the right.

3. Select Data Center Switches.

   The right side lists the Data Center Switch product series.

4. Select Cisco Nexus 9000.

   The right side lists the switches in the series that you selected.

5. Select the switch that you are updating EPLD images for.

   The Downloads page opens and lists what you can download for the switch that you selected.

6. Select NX-OS EPLD Updates.

   The Download Software page lists the available EPLD images for the switch.

7. If you see a new EPLD image for the NX-OS software installed on the switch, click the Download button.

   CAUTION: When you are trying to upgrade EPLD, it is recommended to use the same version of EPLD as that of installed software. However, if the installed version of EPLD is already later than the software you are installing, NX-OS software does not allow for the downgrading of the EPLD. Newer EPLD is compatible with older NX-OS software.

8 Click the link for the file.

The Downloads page displays a Download button and lists information for the file.

9 Click Download.

The Supporting Documents page opens to display the rules for downloading the software.

10 Read the rules and click Agree.

A File Download dialog box opens to ask if you want to open or save the images file.

11 Click Save.

The Save As dialog box appears.

12 Indicate where to save the file and click Save.

The file saves to the location that you specified.

Installation Guidelines

To upgrade the EPLD images using CLI commands, follow these guidelines:

- Before you upgrade any EPLD images, be sure that you have updated the Cisco NX-OS operating system to the level required for the images. Also be sure that you have an EPLD image file.

CAUTION: When you are trying to upgrade EPLD, it is recommended to use the same version of EPLD as that of installed software. However, if the installed version of EPLD is already later than the software you are installing, it is not required to downgrade the EPLD.

- You can execute an upgrade from the active supervisor module only. This upgrade is for one or all of the modules as follows:
  - You can upgrade a module individually.
  - You can upgrade all modules sequentially.
  - You can update the images for online modules only.
- On a Cisco Nexus 9500 platform switch that has two supervisor modules, upgrade the EPLDs for the standby supervisor and then switch the active supervisor to the standby mode to upgrade its EPLDs. The supervisor switchover is not disruptive to traffic on Cisco Nexus 9500 platform switches. On a switch that has only one supervisor module, you can upgrade the active supervisor, but this will disrupt its operations during the upgrade.
- If you interrupt an upgrade, you must reapply the upgrade to the module that was being upgraded during the interruption.
- The upgrade process disrupts traffic on the targeted module.
- Do not insert or remove any modules while an EPLD upgrade is in progress.

1 Copy the EPLD image file to bootflash.

2 To determine if you need to upgrade the BIOS for the image, use the show install all impact command and see the Upgrade Required (Upg-Required) field for the BIOS row in the command output.

3 If you do not need to upgrade the BIOS, set the boot variable using the boot nxos bootflash:n9000-dk9.9.3.8.bin command.

4 Enter the copy running-config startup-config command to set the startup boot variables to the NX-OS image.

5 If you need to upgrade the BIOS, enter the install all nxos bootflash:n9000-dk9.9.3.8.bin command.

6 Enter the install epld bootflash:n9000-epld.9.3.8.img module all command.

The switch automatically reboots.

Upgrading the EPLD Images

CAUTION: When you are trying to upgrade EPLD, it is recommended to use the same version of EPLD as that of installed software. However, if the installed version of EPLD is already later than the software you are installing, it is not required to downgrade the EPLD.

Verifying the EPLD Upgrades

To verify the EPLD upgrades for a switch or its modules, use the show version module *slot-number* epld command as follows:

- To verify updates for a module on a modular switch (Cisco Nexus 9500 platform switches), indicate the chassis slot number for *slot-number.*
  `switch# show version module 22 epld`
- To verify updates for a top-of-rack switch (Cisco Nexus 9200, 9300, and 9300-EX platforms), use 1 for *slot-number*.
  `switch# show version module 1 epld`

Displaying the Status of EPLD Upgrades

To display the status of EPLD upgrades on the switch, use the show install epld status command.

Limitations

When EPLDs are upgraded, the following guidelines and observations apply:

- If a module is not online, you cannot upgrade its EPLD images.
- If there are two supervisors that are installed in the switch (Cisco Nexus 9504, 9508, and 9516 switches only), you can either upgrade only the standby or upgrade all modules (including both supervisor modules) by using the following commands:

- install epld bootflash: *image module standby-supervisor-slot-number* (upgrades only the standby supervisor module)

NOTE: After you use this command, you can switchover the active and standby supervisor modules and then upgrade the other supervisor.

- install epld bootflash: *image module* all (upgrades all of the modules)

- If there is only one supervisor that are installed in the switch, your upgrading or downgrading of EPLD images is disruptive.

Related Documentation

The entire Cisco NX-OS 9000 Series documentation set.

Release Notes

The entire Cisco NX-OS 9000 Series release notes set.

Documentation Feedback

To provide technical feedback on this document, or to report an error or omission, please send your comments to nexus9k-docfeedback@cisco.com. We appreciate your feedback.

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