Cisco Nexus 9000 Series FPGA/EPLD Upgrade Release Notes, Release 7.0(3)I7(9)

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.

The following table lists the changes to this document.

Date	Description
August 31, 2020	Release 7.0(3)I7(9) became available.

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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.

Deciding 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.

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

NOTE: EPLD version is backward compatible.

NOTE: If the NXOS image supports the digital signature feature and the EPLD image is not signed digitally, then the user needs to configure "no feature signature-verification", for the EPLD process to proceed.

Switch Requirements

The Cisco Nexus 9000 Series switch must be running the Cisco NX-OS operating system and include the following hardware:

- Supervisor modules (2)-–each with at least 800 MB of available bootflash memory (Cisco Nexus 9504, 9508, and 9516 switches)

- System controller modules (2) (Cisco Nexus 9504, 9508, and 9516 switches)

- Line cards (Cisco Nexus 9504, 9508, and 9516 switches)

  — Cisco Nexus 9504 switch (1 to 4 line cards)

  — Cisco Nexus 9508 switch (1 to 8 line cards)

- — Cisco Nexus 9516 switch (1 to 16 line cards)

- ■ Fabric modules (Cisco Nexus 9504, 9508, and 9516 switches)

  - — Fabric modules for 40-Gigabit line cards on a Cisco Nexus 9504, 9508, or 9516 switch (3-6 modules)

  - — Fabric modules for 100-Gigabit -E line cards on a Cisco Nexus 9504, 9508, or 9516 switch (4 modules)

  - — Fabric modules for 100-Gigabit -S line cards on a Cisco Nexus 9504 or 9508 switch (4 modules)

- ■ Fan modules

  - — Cisco Nexus 92304QC, 9272Q, and 93120TX switches (2 modules)

  - — Cisco Nexus 9336C-FX2, 9364C, 9396PX, 9396TX, and 93128TX switches (3 modules)

  - — Cisco Nexus 9236C, 92160YC-X, 92300YC, 9332PQ, 9372PX, 9372PX-E, 9372TX, 9372TX-E, 93108TC-EX, 93180LC-EX, and 92300YC switches (4 modules)

  - — Cisco Nexus 93240YC-FX2 switch (5 modules)

  - — Cisco Nexus 9504, 9508, and 9516 switches (3 fan trays)

- ■ Power supplies

  - — 500-W AC, 930-W DC, or 1200-W HVAC/HVDC power supplies (2 for the Cisco Nexus 93180LC-EX switches)

  - — 650-W AC, 930-W DC, or 1200-W HVAC/HVDC power supplies (2 for the Cisco Nexus 92160YC-X, 92304QC, 9236C, 93108TC-EX, 93180YC-EX, 9332PQ, 9372PX, 9372PX-E, 9372TX, 9372TX-E, 9396PX, and 9396TX switches

  - — 650-W AC or 1200-W HVAC/HVDC power supplies (2 for Cisco Nexus 92300YC switches)

  - — 930-W DC power supplies (2 for all Cisco Nexus 9200 and 9300 platform switches (except 92300YC and 9348GC-FXP switches)

  - — 11000W AC power supplies (2) for the Cisco Nexus 9336C and 93240YC switches

  - — 11000W DC power supplies (2) for the Cisco Nexus 9336C and 93240YC switches

  - — 11000W HVAC/HVDC power supplies (2) for the Cisco Nexus 9336C and 93240YC switches

  - — 1200-W AC power supplies (2) or 930-W DC power supplies (2) for the Cisco Nexus 9272Q, 93120TX, 93128TX, and 9364C switches

  - — 1200-W HVAC/HVDC power supplies (2) for all Cisco Nexus 9200 and 9300 platform switches (except the 9348GC-FXP switch)

  - — 3000-W AC power supplies or 3000-W Universal AC/DC or 3000-W DC power supplies for Cisco Nexus 9500 switches

    - Cisco Nexus 9504 switch (up to 4)

    - Cisco Nexus 9508 switch (up to 8)

    - Cisco Nexus 9516 switch (up to 10)

- ■ Uplink module (Cisco Nexus 93128TX, 9396PX, and 9396TX switches only)

4

— M4PC-CFP2

— M6PQ

— M6PQ-E

— M12PQ

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 7.0(3)I7(7) through 7.0(3)I7(10)

Each EPLD image that you can download from https://software.cisco.com/download/navigator.html is a bundle of EPLD upgrades. To see the recent updated EPLD versions for the Cisco Nexus 9200, 9300, 9300-EX, and 9300-FX platform switches, and the Cisco Nexus 9500 platform switches, 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 7.0(3)I7(9) release of EPLD, addresses the Secure Boot Hardware Tampering vulnerability for the Nexus 3K and Nexus 9000 Series switches. Please refer to Security Advisory at https://tools.cisco.com/security/center/content/CiscoSecurityAdvisory/cisco-sa-20190513-secureboot.

Please review the advisory for affected HW-PIDs (see below table) for more details on how to apply the patch. The 7.0(3)I7(9) release epld requires a specific sequence of upgrade.

Table 1. 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[1]	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. Please follow this link for N9K-C93180LC-EX

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.7.0.3.I7.9.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.7.0.3.I7.9.img module 28

Expected result: Switch will update primary EPLD of standby supervisor and will reload the standby supervisor module auto-matically. 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   7.0(3)I7(7)          1.0   SUP1
28   7.0(3)I7(7)          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 sys-log 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. 7.0.3.I7.9.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 be-come 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.7.0.3.I7.9.img).

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

install epld bootflash:n9000-epld.7.0.3.I7.9.img module 27

Expected result: Switch will update primary EPLD of the supervisor and will reload the switch automatically. Please don't in-terrupt, 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.7.0.3.I7.9.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

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 follow this link for N9K-C93180LC-EX

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.7.0.3.I7.9.img).
2. Update the Primary FPGA region.

   install epld bootflash:n9000-epld.7.0.3.I7.9.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.7.0.3.I7.9.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 switch %CARDCLIENT-2-FPGA_BOOT_PRIMARY: IOFPGA booted from Primary
2019 Jul  9 19:46:11 switch %CARDCLIENT-2-FPGA_BOOT_PRIMARY: MIFPGA booted from Primary
2019 Jul  9 19:46:11 switch %CARDCLIENT-5-MOD_BOOT_PRIMARY: Module 1 IOFPGA booted from Primary
2019 Jul  9 19:46:11 switch %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 7.0(3)I7(7)	Release 7.0(3)I7(8)	Release 7.0(3)I7(9)	Release 7.0(3)I7(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	**0x20(0.032)**	0x20(0.032)	0x20(0.032)	0x20(0.032)
	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 9236C	IOFPGA	**0x17 (0.023)**	0x17 (0.023)	0x17 (0.023)	0x17 (0.023)

Switch or Uplink Module	EPLD Device	Release 7.0(3)I7(7)	Release 7.0(3)I7(8)	Release 7.0(3)I7(9)	Release 7.0(3)I7(10)
(N9K-C9236C)	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	**0x20 (0.032)**	0x20 (0.032)	0x20 (0.032)	0x20 (0.032)
	MIFPGA	0x3 (0.003)	0x3 (0.003)	0x3 (0.003)	0x3 (0.003)
Cisco Nexus 93120TX (N9K-C93120TX)	IOFPGA	**0x13 (0.019)**	0x13 (0.019)	0x13 (0.019)	0x13 (0.019)
	MIFPGA1	**0x9 (0.009)**	0x9 (0.009)	0x9 (0.009)	0x9 (0.009)
	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 93180LC-EX (N9K-C93180LC-EX)	IOFPGA	0x17 (0.023)	**0x20 (0.032)**	0x20 (0.032)	0x20 (0.032)
	MIFPGA	0x15 (0.021)	0x15 (0.021)	0x15 (0.021)	0x15 (0.021)
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 (N9K-C93180YC-FX)	IOFPGA	**0x20 (0.032)**	0x20 (0.032)	0x20 (0.032)	0x20 (0.032)
	MIFPGA	0x10 (0.010)	0x10 (0.010)	0x10 (0.010)	0x10 (0.010)
Cisco Nexus 93240YC-FX2 (N9K-C93240YC-FX2)	IOFPGA	**0x10 (0.016)**	**0x11 (0.017)**	0x11 (0.017)	0x11 (0.017)
	MIFPGA1	**0x8 (0.008)**	**0x12 (0.018)**	0x12 (0.018)	0x12 (0.018)
	MIFPGA2	**0x12 (0.018)**	**0x8 (0.008)**	0x8 (0.008)	0x8 (0.008)
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	**0x10 (0.016)**	**0x11 (0.017)**	0x11 (0.017)	0x11 (0.017)
	MIFPGA	0x5 (0.005)	0x5 (0.005)	0x5 (0.005)	0x5 (0.005)
Cisco Nexus 9348GC-FXP (N9K-C9348GC-FXP)[3]	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 9364C (N9K-C9364C)	IOFPGA	**0x6 (0.006)**	0x6 (0.006)	0x6 (0.006)	0x6 (0.006)
	MIFPGA	**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 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)

[3] For N9K-C9348GC-FXP, EPLD should be upgraded to minimum 7.0(3)I7(5a) version. Please refer CSCvm94301 for further details.

Switch or Uplink Module	EPLD Device	Release 7.0(3)I7(7)	Release 7.0(3)I7(8)	Release 7.0(3)I7(9)	Release 7.0(3)I7(10)
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 mod-ule(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 7.0(3)I7(7)	Release 7.0(3)I7(8)	Release 7.0(3)I7(9)	Release 7.0(3)I7(10)
Supervisor A (N9K-SUP-A)	IOFPGA	**0x30 (0.049)**	0x30 (0.049)	0x30 (0.049)	0x30 (0.049)
Supervisor A+ (N9K-SUP-A+)	IOFPGA	**0x14 (0.020)**	0x14 (0.020)	0x14 (0.020)	0x14 (0.020)
Supervisor B (N9K-SUP-B)	IOFPGA	**0x30 (0.049)**	0x30 (0.049)	0x30 (0.049)	0x30 (0.049)
Supervisor B+ (N9K-SUP-B+)	IOFPGA	**0x14 (0.020)**	0x14 (0.020)	0x14 (0.020)	0x14 (0.020)
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)	IOFPGA	0x12 (0.018)	0x12 (0.018)	**0x13 (0.019)**	0x13 (0.019)
	MIFPGA	0x8 (0.008)	0x8 (0.008)	**0x9 (0.009)**	0x9 (0.009)
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)
32-port 100-Gigabit QSFP28 line card (N9K-X9732C-FX)	IOFPGA	0x5 (0.005)	0x5 (0.005)	**0x7 (0.007)**	0x7 (0.007)
	MIFPGA	0x1 (0.001)	0x1 (0.001)	**0x2 (0.002)**	0x2 (0.002)

Component	EPLD Device	Release 7.0(3)I7(7)	Release 7.0(3)I7(8)	Release 7.0(3)I7(9)	Release 7.0(3)I7(10)
36-port 100-Gigabit QSFP28 line card (N9K-X9736C-EX)	IOFPGA	0x12 (0.018)	0x12 (0.018)	**0x13 (0.019)**	0x13 (0.019)
	MIFPGA	0x8 (0.008)	0x8 (0.008)	**0x9 (0.009)**	0x9 (0.009)
36-port 100-Gigabit QSFP28 line card (N9K-X9736C-FX)	IOFPGA	0x6 (0.006)	0x6 (0.006)	**0x7 (0.007)**	0x7 (0.007)
	MIFPGA	0x6 (0.006)	0x6 (0.006)	**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 40-Gigabit QSFP+ line card (N9K-X9464TX)	IOFPGA	0x9 (0.009)	0x9 (0.009)	0x9 (0.009)	0x9 (0.009)
	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 (0.010)	0x10 (0.010)	0x10 (0.010)	0x10 (0.010)
	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	0x11 (0.017)	0x11 (0.017)	**0x12 (0.018)**	0x12 (0.018)
	MIFPGA	0x4 (0.004)	0x4 (0.004)	0x4 (0.004)	0x4 (0.004)
48-port 10-Gigabit SFP+ and 4-port 100-Gigabit QSFP28 line card (N9K-X9788TC-FX)	IOFPGA	0x3 (0.003)	0x3 (0.003)	**0x4 (0.004)**	0x4 (0.004)
	MIFPGA	0x5 (0.005)	0x5 (0.005)	**0x6 (0.006)**	0x6 (0.006)
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	0x14 (0.020)	0x14 (0.020)	**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	0x13 (0.019)	0x13 (0.019)	**0x14 (0.020)**	0x14 (0.020)
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)
Fabric module for Cisco Nexus 9516 100-Gigabit –EX line cards	IOFPGA	0x7 (0.007)	0x7 (0.007)	**0x8 (0.008)**	0x8 (0.008)

Component	EPLD Device	Release 7.0(3)I7(7)	Release 7.0(3)I7(8)	Release 7.0(3)I7(9)	Release 7.0(3)I7(10)
(N9K-C9516-FM-E)	MIFPGA	0x7 (0.007)	0x7 (0.007)	**0x8(0.008)**	0x8(0.008)
Fabric module for Cisco Nexus 9516 100-Gigabit –EX line cards (N9K-C9516-FM-E2)	IOFPGA	0x11 (0.017)	0x11 (0.017)	0x11 (0.017)	0x11 (0.017)
	MIFPGA	0x7(0.007)	0x7(0.007)	**0x8(0.008)**	0x8(0.008)

[2] Not available in this release.

Determining Whether to Upgrade EPLD Images

To determine which devices need upgraded EPLDs, use the show install impact epld bootflash: command for a device and indicate the latest EPLD image file (n9000-epld.7.0.3.I7.9.img). The output for this command indicates the current EPLD images, new EPLD images, and whether the upgrades would be disruptive to switch operations. If the currently installed EPLD version number is greater than the new EPLD image number, you can skip the upgrade.

■ To determine the EPLD upgrades needed for a Cisco Nexus 3000 Series switch, use the show install impact epld bootflash: command on that switch and indicate the n9000-epld.7.0.3.I7.9 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.7.0.3.I7.9.img
Compatibility check:
Module        Type            Upgradable      Impact    Reason
------ ----------------- ----------    ----------   ------
     1            SUP          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
------  ----   ------------      ---------------   -----------  ------------
     1   SUP   MI FPGA                 0x23          0x23            No
     1   SUP   IO FPGA                 0x06          0x06            No
     1   SUP   MI FPGA2                0x23          0x23            No
```

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 and be sure that you have an EPLD image file.

- 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.

Upgrading the EPLD Images

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:nxos.7.0.3.I7.9.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:nxos.7.0.3.I7.9.bin command.

6. Enter the install epld bootflash:n9000-epld.7.0.3.I7.9.img module all command. The switch automatically reboots.

7. Upon reload of the switch, enter the install epld bootflash:n9000-epld.7.0.3.I7.9.img module all golden command. The switch automatically initiates a reboot.

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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