Cisco Nexus 9000 Series NX-OS Mode Switch FPGA/EPLD Upgrade Release Notes, Release 10.5(3)

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Note: Beginning with Release 10.5(3), Cisco provides a **single image** for NXOS and EPLD images. There will no longer be separate images. Instead, the EPLD image is bundled with all NXOS images and so the image sizes are correspondingly larger.

Here's the link to the Cisco Nexus 9000 Series NX-OS Software Upgrade and Downgrade Guide, Release 10.5(x).

Starting with Release 10.5(3), these three 64-bit images are supported:

- The 64-bit Cisco NX-OS image file name with **nxos64-cs** as the prefix (for example, **nxos64-cs.10.5.3.F.bin**) is supported on all Cisco Nexus 9000 series switches except Cisco Nexus 9500 -R and -R2 switches and line cards and Nexus 9800 switches.
- The 64-bit Cisco NXOS image file name with **nxos64-s1** as the prefix (for example, **nxos64-s1.10.5.3.bin**) is mandatory on Nexus 9800 switches and N9364E-SG2 switches and is supported from Cisco NXOS Release 10.5(3)F.
- The 64-bit Cisco NXOS image file name with **nxos64-msll** as the prefix (for example**, nxos64-msll.10.5.3.F.bin**) is supported on Cisco Nexus 9000 Series -R and -R2 modular switches.

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 new Cisco Nexus 9000 Series FPGA/EPLD Upgrade Release Notes document isn't available, that means that these are the latest available numbers for upgrade.

This table lists the changes to this document.

Table 1. Changes to this Document

Date	Description
April 22, 2025	Release 10.5(3) became available.
June 23, 2025	Added N9K-C93108TC-FX3H switch to Table 2.

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.

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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 choosing an EPLD version for upgrade, ensure you have already installed the corresponding NXOS software version first. It is generally not supported to upgrade to a newer EPLD image built for a future version of NXOS while running on an older NXOS version, unless explicitly supported as per the specific EPLD Release Notes. NXOS and EPLD images are labeled for their related version to avoid any unsupported upgrades.

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: The EPLD version is backward compatible. The NXOS software can be downgraded for the switch and the EPLD version does not have to be downgraded to match the older NXOS version.

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 10.4(1) through 10.5(3)

Each EPLD image that you can download from Software Download page is a bundle of EPLD upgrades packaged into a single EPLD image file. Beginning with NXOS Release 10.5(3), this EPLD image file is bundled with NXOS images. There will no longer be separate images. To see the available EPLD versions for the Nexus 9000 standalone and module switches on this release, see the 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: This release of EPLD addresses the Secure Boot Hardware Tampering vulnerability for Nexus 9000 Series switches. Please refer to this Security Advisory for more information - https://www.cisco.com/c/en/us/support/docs/csa/cisco-sa-20190513-secureboot.html.

Table 2. Available EPLD Images for the Cisco Nexus 9200, 9300, 9300-EX, and 9300-FX Platform Switches

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Switch or Uplink Module	EPLD Device	Release 10.4(1)	Release 10.4(2)	Release 10.4(3)	Release 10.4(4)	Release 10.5(1)	Release 10.5(2)	Release 10.5(3)
Cisco Nexus 92348GC-X (N9K-C92348GC-X)	IOFPGA	0x15 (0.021)	0x15 (0.021)	0x15 (0.021)	0x15 (0.021)	0x15 (0.021)	0x15 (0.021)	0x15 (0.021)
Cisco Nexus 93108TC-EX (N9K-C93108TC-EX)	IOFPGA	0x15 (0.021)	0x15 (0.021)	0x15 (0.021)	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)	0x2 (0.002)	0x2 (0.002)	0x2 (0.002)
Cisco Nexus 93108TC-FX (N9K-C93108TC-FX)	IOFPGA	0x23 (0.035)	0x23 (0.035)	0x23 (0.035)	0x23 (0.035)	0x23 (0.035)	0x23 (0.035)	0x23 (0.035)
	MIFPGA	0x3 (0.003)	0x3 (0.003)	0x3 (0.003)	0x3 (0.003)	0x3 (0.003)	0x3 (0.003)	0x3 (0.003)
Cisco Nexus 93108TC2-FX (N9K-C93108TC2-FX)	IOFPGA	0x22 (0.034)	0x22 (0.034)	0x22 (0.034)	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)	0x3 (0.003)	0x3 (0.003)	0x3 (0.003)
Cisco Nexus 93108TC-FX3 (N9K-C93108TC-FX3)	IOFPGA	N/A	0x16 (0.022)	0x16 (0.022)	**0x19 (0.025)**	0x19 (0.025)	0x19 (0.025)	0x20 (0.032)
	MIFPGA	N/A	0x12 (0.018)	0x12 (0.018)	**0x15 (0.021)**	0x15 (0.021)	0x15 (0.021)	0x15 (0.021)
Cisco Nexus 93108TC-FX3H (N9K-C93108TC-FX3H)	IOFPGA	0x8 (0.008)	0x8 (0.008)	0x8 (0.008)	0x8 x(0.008)	0x8 (0.008)	0x8 (0.008)	0x8 (0.008)
	MIFPGA	0x10 (0.016)	**0x11 (0.017)**	0x11 (0.017)	0x11 (0.017)	0x11 (0.017)	0x11 (0.017)	0x11 (0.017)
Cisco Nexus 93108TC-FX3P (N9K-C93108TC-FX3P)	IOFPGA	0x8 (0.008)	0x8 (0.008)	0x8 (0.008)	0x8 x(0.008)	0x8 (0.008)	0x8 (0.008)	0x8 (0.008)
	MIFPGA	0x10 (0.016)	**0x11 (0.017)**	0x11 (0.017)	0x11 (0.017)	0x11 (0.017)	0x11 (0.017)	0x11 (0.017)
Cisco Nexus 9316D-GX (N9K-C9316D-GX)	IOFPGA	0x18 (0.024)	0x18 (0.024)	0x18 (0.024)	0x18 (0.024)	0x18 (0.024)	0x18 (0.024)	0x18 (0.024)
	MIFPGA	0x6 (0.006)	0x6 (0.006)	0x6 (0.006)	0x6 (0.006)	0x6 (0.006)	0x6 (0.006)	0x6 (0.006)
Cisco Nexus 93180YC-FX3 (N9K-C93180YC-FX3)	IOFPGA	0x13 (0.019)	0x13 (0.019)	0x13 (0.019)	0x13 (0.019)	0x13 (0.019)	0x13 (0.019)	0x13 (0.019)
	MIFPGA	0x18 (0.024)	0x18 (0.024)	0x18 (0.024)	**0x20 (0.032)**	0x20 (0.032)	0x20 (0.032)	0x20 (0.032)
Cisco Nexus 93180YC-FX3S	IOFPGA	0x13 (0.019)	0x13 (0.019)	0x13 (0.019)	0x13 (0.019)	0x13 (0.019)	0x13 (0.019)	0x13 (0.019)

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Switch or Uplink Module	EPLD Device	Release 10.4(1)	Release 10.4(2)	Release 10.4(3)	Release 10.4(4)	Release 10.5(1)	Release 10.5(2)	Release 10.5(3)
(N9K-C93180YC-FX3S)	MIFPGA	0x17 (0.023)	0x17 (0.023)	0x17 (0.023)	**0x19 (0.025)**	0x19 (0.025)	0x19 (0.025)	0x19 (0.025)
Cisco Nexus 93180YC-FX3H (N9K-C93180YC-FX3H)	IOFPGA	0x12 (0.018)	0x12 (0.018)	0x12 (0.018)	0x12 (0.018)	0x12 (0.018)	0x13 (0.019)	0x13 (0.019)
	MIFPGA	0x18 (0.024)	0x18 (0.024)	0x18 (0.024)	0x18 (0.024)	0x18 (0.024)	0x20 (0.032)	0x20 (0.032)
Cisco Nexus 93180YC-EX (N9K-C93180YC-EX)	IOFPGA	0x15 (0.021)	0x15 (0.021)	0x15 (0.021)	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)	0x4 (0.004)	0x4 (0.004)	0x4 (0.004)
Cisco Nexus 93180YC-FX (N9K-C93180YC-FX)	IOFPGA	0x23 (0.035)	0x23 (0.035)	0x23 (0.035)	0x23 (0.035)	0x23 (0.035)	0x23 (0.035)	0x23 (0.035)
	MIFPGA	0x10 (0.016)	0x10 (0.016)	0x10 (0.016)	0x10 (0.016)	0x10 (0.016)	0x10 (0.016)	0x10 (0.016)
Cisco Nexus 93216TC-FX2 (N9K-C93216TC-FX2)	IOFPGA	0x16 (0.022)	0x16 (0.022)	0x16 (0.022)	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)	0x5 (0.005)	0x5 (0.005)	0x5 (0.005)
	MIFPGA1	0x5 (0.005)	0x5 (0.005)	0x5 (0.005)	0x5 (0.005)	0x5 (0.005)	0x5 (0.005)	0x5 (0.005)
Cisco Nexus 93240YC-FX2 (N9K-C93240YC-FX2)	IOFPGA	0x17 (0.023)	0x17 (0.023)	0x18 (0.023)	0x18 (0.023)	0x18 (0.023)	0x18 (0.023)	0x18 (0.023)
	MIFPGA1	0x8 (0.007)	0x8 (0.007)	0x8 (0.007)	0x8 (0.007)	0x8 (0.007)	0x8 (0.007)	0x8 (0.007)
	MIFPGA2	0x12 (0.018)	0x12 (0.018)	0x12 (0.018)	0x12 (0.018)	0x12 (0.018)	0x12 (0.018)	0x12 (0.018)
Cisco Nexus 9332C (N9K-C9332C)	IOFPGA	0x17 (0.023)	0x17 (0.023)	**0x18 (0.024)**	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)	0x3 (0.003)	0x3 (0.003)	0x3 (0.003)
Cisco Nexus 9332D-GX2B (N9K-C9332D-GX2B)	IOFPGA	0x13 (0.019)	0x13 (0.019)	0x13 (0.019)	0x13 (0.019)	0x13 (0.019)	0x13 (0.019)	0x14 (0.020)
	MIFPGA	0x14 (0.020)	0x14 (0.020)	**0x15 (0.021)**	0x16 (0.022)	0x16 (0.022)	0x16 (0.022)	0x16 (0.022)
Cisco Nexus 9332D-H2R (N9K-C9332D-H2R)	IOFPGA	0x15 (0.021)	0x15 (0.021)	0x15 (0.021)	**0x20 (0.032)**	0x15 (0.021)	0x20 (0.032)	0x20 (0.32)
	MIFPGA	0x9 (0.009)	0x9 (0.009)	0x9 (0.009)	**0x12 (0.018)**	0x9 (0.009)	0x12 (0.018)	0x13 (0.019)

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Switch or Uplink Module	EPLD Device	Release 10.4(1)	Release 10.4(2)	Release 10.4(3)	Release 10.4(4)	Release 10.5(1)	Release 10.5(2)	Release 10.5(3)
	BIOS	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Cisco Nexus 9336C-FX2 (N9K-C9336C-FX2)	IOFPGA	0x17 (0.023)	0x17 (0.023)	**0x18 (0.024)**	0x18 (0.024)	0x18 (0.024)	0x18 (0.024)	0x18 (0.024)
	MIFPGA	0x5 (0.005)	0x5 (0.005)	0x5 (0.005)	0x5 (0.005)	0x5 (0.005)	0x5 (0.005)	0x5 (0.005)
Cisco Nexus 9336C-FX2-E (N9K-C9336C-FX2-E)	IOFPGA	0x13 (0.019)	0x13 (0.019)	0x13 (0.019)	0x13 (0.019)	0x14 (0.020)	0x14 (0.020)	0x14 (0.020)
	MIFPGA	0x5 (0.005)	0x5 (0.005)	0x5 (0.005)	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)	0x16 (0.022)	0x16 (0.022)	0x16 (0.022)
	MIFPGA0	0x4 (0.004)	0x4 (0.004)	0x4 (0.004)	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)	0x3 (0.003)	0x3 (0.003)	0x3 (0.003)
Cisco Nexus 9348GC-FXP (N9K-C9348GC-FXP)	IOFPGA	0x14 (0.020)	0x14 (0.020)	0x14 (0.020)	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)	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)	0x10 (0.016)	0x10 (0.016)	0x10 (0.016)
	MIFPGA	0x3 (0.003)	0x3 (0.003)	0x3 (0.003)	0x3 (0.003)	0x3 (0.003)	0x3 (0.003)	0x3 (0.003)
Cisco Nexus 93600CD-GX (N9K-C93600CD-GX)	IOFPGA	0x18 (0.024)	0x18 (0.024)	0x18 (0.024)	0x18 (0.024)	0x18 (0.024)	0x18 (0.024)	0x18 (0.024)
	MIFPGA	0x9 (0.009)	0x9 (0.009)	0x9 (0.009)	0x9 (0.009)	0x9 (0.009)	0x9 (0.009)	0x9 (0.009)
Cisco Nexus 9348GC-FX3 (N9K-C9348GC-FX3)	IOFPGA	0x20 (0.032)	0x20 (0.032)	0x20 (0.032)	0x20 (0.032)	0x20 (0.032)	0x20 (0.032)	0x20 (0.032)
	MIFPGA	0x7 (0.007)	0x08	0x08	0x08	0x08	0x08	0x08
	BIOS	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Cisco Nexus 9348GC-FX3PH (N9K-C9348GC-FX3PH)	IOFPGA	0x20 (0.032)	0x20 (0.032)	0x20 (0.032)	0x20 (0.032)	0x20 (0.032)	0x20 (0.032)	0x20 (0.032)
	MIFPGA	0x7 (0.007)	0x7 (0.007)	0x7 (0.007)	0x7 (0.007)	0x7 (0.007)	0x7 (0.007)	0x7 (0.007)
	BIOS	1.04	1.04	1.04	1.04	1.04	1.04	1.04

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Switch or Uplink Module	EPLD Device	Release 10.4(1)	Release 10.4(2)	Release 10.4(3)	Release 10.4(4)	Release 10.5(1)	Release 10.5(2)	Release 10.5(3)
Cisco Nexus 9364C (N9K-C9364C)	IOFPGA	0x7 (0.007)	0x7 (0.007)	0x7 (0.007)	0x7 (0.007)	0x7 (0.007)	0x7 (0.007)	0x7 (0.007)
	IOFPGA		0x7 (0.007)	0x7 (0.007)	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)	0x11 (0.017)	0x11 (0.017)	0x11 (0.017)
Cisco Nexus 9364C-H1 (N9K-C9364C-H1)	IOFPGA	N/A	N/A	**0x11**	0x11	0x11	0x12	0x12
	MIFPGA	N/A	N/A	**0x15**	0x16	0x16	0x16	0x16
	BIOS	N/A	N/A	**1.03**	1.03	1.03	1.03	1.03
Cisco Nexus 9364C-GX (N9K-C9364C-GX)	IOFPGA	0x6 (0.006)	0x6 (0.006)	0x6 (0.006)	0x6 (0.006)	0x6 (0.006)	0x6 (0.006)	0x6 (0.006)
	MIFPGA0	0x5 (0.005)	0x5 (0.005)	0x5 (0.005)	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)	0x4 (0.004)	0x4 (0.004)	0x4 (0.004)
Cisco Nexus 9364D-GX2A (N9K-C9364D-GX2A)	IOFPGA	0x15 (0.021)	0x15 (0.021)	0x15 (0.021)	0x15 (0.021)	0x15 (0.021)	0x15 (0.021)	0x15 (0.021)
	MIFPGA0	0x23 (0.035)	0x23 (0.035)	0x23 (0.035)	0x23 (0.035)	0x23 (0.035)	0x23 (0.035)	0x23 (0.035)
	MIFPGA1	0x14 (0.020)	0x14 (0.020)	0x14 (0.020)	0x14 (0.020)	0x14 (0.020)	0x14 (0.020)	0x14 (0.020)
Cisco Nexus 9348D-GX2A (N9K-C9348D-GX2A)	IOFPGA	0x16 (0.022)	0x16 (0.022)	0x16 (0.022)	0x16 (0.022)	0x16 (0.022)	0x16 (0.022)	0x16 (0.022)
	MIFPGA0	0x10 (0.016)	0x10 (0.016)	0x10 (0.016)	0x10 (0.016)	0x10 (0.016)	0x10 (0.016)	0x10 (0.016)
	MIFPGA1	0x7 (0.007)	0x7 (0.007)	0x7 (0.007)	0x7 (0.007)	0x7 (0.007)	0x7 (0.007)	0x7 (0.007)
Cisco Nexus 93400LD-H1 (N9K-C93400LD-H1)	MIFPGA	N/A	0x11 (0.017)	0x11 (0.017)	0x11 (0.017)	0x11 (0.017)	0x12 (0.018)	0x12 (0.018)
	IOFPGA	N/A	0x12 (0.018)	0x12 (0.018)	0x12 (0.018)	0x12 (0.018)	0x13 (0.019)	0x13 (0.019)
Cisco Nexus 9324C-SE1U (N9324C-SE1U)	MIFPGA	N/A	N/A	N/A	N/A	N/A	N/A	0x18 (0.024)
	IOFPGA	N/A	N/A	N/A	N/A	N/A	N/A	0x09 (0.09)
	MIFPGA	N/A	N/A	N/A	N/A	N/A	N/A	0x010008

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Switch or Uplink Module	EPLD Device	Release 10.4(1)	Release 10.4(2)	Release 10.4(3)	Release 10.4(4)	Release 10.5(1)	Release 10.5(2)	Release 10.5(3)
Cisco Nexus 9364E-SG2 (N9364E-SG2-O)	IOFPGA	N/A	N/A	N/A	N/A	N/A	N/A	0x010007
	TAM FPGA	N/A	N/A	N/A	N/A	N/A	N/A	0x7000c
	FB FPGA	N/A	N/A	N/A	N/A	N/A	N/A	0x1000d
Cisco Nexus 9364E-SG2 (N9364E-SG2-Q)	MIFPGA	N/A	N/A	N/A	N/A	N/A	N/A	0x010008
	IOFPGA	N/A	N/A	N/A	N/A	N/A	N/A	0x010007
	TAM FPGA	N/A	N/A	N/A	N/A	N/A	N/A	0x7000c
	FB FPGA	N/A	N/A	N/A	N/A	N/A	N/A	0x1000d

Table 3. Available EPLD Images for the Cisco Nexus 9400 Switches

Component	EPLD Device	Release 10.4(1)	Release 10.4(2)	Release 10.4(3)	Release 10.4(4)	Release 10.5(1)	Release 10.5(2)	Release 10.5(3)
Cisco Nexus 9408 (N9K-C9408)	IOFPGA	0x29 (0.041)	0x29 (0.041)	0x29 (0.041)	0x29 (0.041)	0x29 (0.041)	0x29 (0.041)	0x29 (0.041)
	MIFPGA	0x18 (0.024)	0x18 (0.024)	0x18 (0.024)	0x18 (0.024)	0x18 (0.024)	0x20 (0.032)	0x20 (0.032)
22 Port (N9K-X9400-22L)	IOFPGA	0x07 (0.007)	0x07 (0.007)	0x07 (0.007)	**0x08 (0.008)**	0x08 (0.008)	0x20 (0.032)	0x20 (0.032)
16 Port LEM (N9K-X9400-16W)	IOFPGA	0x15 (0.021)	0x15 (0.021)	0x15 (0.021)	**0x16 (0.022)**	0x16 (0.022)	0x16 (0.022)	0x16 (0.022)
8 Port LEM (N9K-X9400-8D)	IOFPGA	0x15 (0.021)	0x15 (0.021)	0x15 (0.021)	0x16 (0.022)	0x16 (0.022)	0x16 (0.022)	0x16 (0.022)

Table 4. Available EPLD Images for the Cisco Nexus 9500 Platform Switches

Component	EPLD Device	Release 10.4(1)	Release 10.4(2)	Release 10.4(3)	Release 10.4(4)	Release 10.5(1)	Release 10.5(2)	Release 10.5(3)
Supervisor A (N9K-SUP-A)	IOFPGA	0x32 (0.050)	0x32 (0.050)	0x32 (0.050)	0x32 (0.050)	0x32 (0.050)	0x32 (0.050)	0x32 (0.050)
Supervisor A+ (N9K-SUP-A+)	IOFPGA	0x18 (0.024)	0x18 (0.024)	0x18 (0.024)	0x18 (0.024)	0x18 (0.024)	0x18 (0.024)	0x18 (0.024)
Supervisor B (N9K-SUP-B)	IOFPGA	0x30 (0.049)	0x30 (0.049)	0x30 (0.049)	0x30 (0.049)	0x30 (0.049)	0x30 (0.049)	0x30 (0.049)
Supervisor B+ (N9K-SUP-B+)	IOFPGA	0x18 (0.024)	0x18 (0.024)	0x18 (0.024)	0x18 (0.024)	0x18 (0.024)	0x18 (0.024)	0x18 (0.024)

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Component	EPLD Device	Release 10.4(1)	Release 10.4(2)	Release 10.4(3)	Release 10.4(4)	Release 10.5(1)	Release 10.5(2)	Release 10.5(3)
System Controller (N9K-SC-A)	IOFPGA	0x23 (0.035)	0x23 (0.035)	0x23 (0.035)	0x23 (0.035)	0x23 (0.035)	0x23 (0.035)	0x23 (0.035)
32-port 100-Gigabit QSFP28 line card (N9K-X9432C-S)	IOFPGA	0x14 (0.020)	0x14 (0.020)	0x14 (0.020)	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)	0x4 (0.004)	0x4 (0.004)	0x4 (0.004)
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)	0x13 (0.019)	0x13 (0.019)	0x13 (0.019)
	MIFPGA	0x9 (0.009)	0x9 (0.009)	0x9 (0.009)	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)	0x11 (0.017)	0x11 (0.017)	0x11 (0.017)
	MIFPGA	0x5 (0.005)	0x5 (0.005)	0x5 (0.005)	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)	0x7 (0.007)	0x7 (0.007)	0x7 (0.007)
	MIFPGA	0x2 (0.002)	0x2 (0.002)	0x2 (0.002)	0x2 (0.002)	0x2 (0.002)	0x2 (0.002)	0x2 (0.002)
16-port 400-Gigabit QSFP-DD line card (N9K-X9716D-GX)	IOFPGA	0x9 (0.009)	0x9 (0.009)	0x9 (0.009)	0x9 (0.009)	0x9 (0.009)	0x9 (0.009)	0x9 (0.009)
	MIFPGA	0x11 (0.017)	0x11 (0.017)	0x11 (0.017)	0x11 (0.017)	0x11 (0.017)	0x11 (0.017)	0x11 (0.017)
36-port 100-Gigabit QSFP28 line card (N9K-X9736C-EX)	IOFPGA	0x14 (0.020)	0x14 (0.020)	0x14 (0.020)	0x14 (0.020)	0x14 (0.020)	0x14 (0.020)	0x14 (0.020)
	MIFPGA	0x9 (0.009)	0x9 (0.009)	0x9 (0.009)	0x9 (0.009)	0x9 (0.009)	0x9 (0.009)	0x9 (0.009)
36-port 100-Gigabit QSFP28 line card (N9K-X9736C-FX)	IOFPGA	0x12 (0.018)	0x12 (0.018)	0x12 (0.018)	0x12 (0.018)	0x12 (0.018)	0x12 (0.018)	0x12 (0.018)
	MIFPGA	0x7 (0.007)	0x7 (0.007)	0x7 (0.007)	0x7 (0.007)	0x7 (0.007)	0x7 (0.007)	0x7 (0.007)
36-port 100-Gigabit QSFP28 line card (N9K-X9736C-FX3)	IOFPGA	N/A	N/A	N/A	N/A	N/A	0x5 (0.005)	0x5 (0.005)
	MIFPGA	N/A	N/A	N/A	N/A	N/A	0x5 (0.005)	0x5 (0.005)
48-port 1/10GBASE-T and	IOFPGA	0x9 (0.009)	0x9 (0.009)	0x9 (0.009)	0x15 (0.021)	0x9 (0.009)	0x9 (0.009)	0x9 (0.009)

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Component	EPLD Device	Release 10.4(1)	Release 10.4(2)	Release 10.4(3)	Release 10.4(4)	Release 10.5(1)	Release 10.5(2)	Release 10.5(3)
4-port 40-Gigabit QSFP+ line card (N9K-X9464TX)	MIFPGA	0x8 (0.008)	0x8 (0.008)	0x8 (0.008)	0x5 (0.005)	0x8 (0.008)	0x8 (0.008)	0x8 (0.008)
48-port 1-/10-/25-Gigabit SFP28 and 4-port 40-/100-Gigabit QSFP28 line card (N9K-X97160YC-EX)	IOFPGA	0x15 (0.021)	0x15 (0.021)	0x15 (0.021)	0x7 (0.007)	0x15 (0.021)	0x15 (0.021)	0x15 (0.021)
	MIFPGA	0x5 (0.005)	0x5 (0.005)	0x5 (0.005)	0x6 (0.006)	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	0x7 (0.007)	0x7 (0.007)	0x7 (0.007)	0x6 (0.006)	0x7 (0.007)	0x7 (0.007)	0x7 (0.007)
	MIFPGA	0x6 (0.006)	0x6 (0.006)	0x6 (0.006)	0x3 (0.003)	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)	0x18 (0.024)	0x6 (0.006)	0x6 (0.006)	0x6 (0.006)
	MIFPGA	0x3 (0.003)	0x3 (0.003)	0x3 (0.003)	0x11 (0.017)	0x3 (0.003)	0x3 (0.003)	0x3 (0.003)
Fabric module for Cisco Nexus 9504 100-Gigabit -EX line (N9K-C9504-FM-E)	IOFPGA	0x18 (0.024)	0x18 (0.024)	0x18 (0.024)	0x14 (0.020)	0x18 (0.024)	0x18 (0.024)	0x18 (0.024)
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)	0x12 (0.018)	0x11 (0.017)	0x11 (0.017)	0x11 (0.017)
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)	0x11 (0.017)	0x14 (0.020)	0x14 (0.020)	0x14 (0.020)
Fabric module for Cisco Nexus 9508 100-Gigabit -EX line (N9K-C9508-FM-E2)	IOFPGA	0x12 (0.018)	0x12 (0.018)	0x12 (0.018)	0x11 (0.011)	0x12 (0.018)	0x12 (0.018)	0x12 (0.018)
Fabric module for Cisco Nexus 9508 100-Gigabit -S line (N9K-C9508-FM-S)	IOFPGA	0x11 (0.017)	0x11 (0.017)	0x11 (0.017)	0x8 (0.008)	0x11 (0.017)	0x11 (0.017)	0x11 (0.017)

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Component	EPLD Device	Release 10.4(1)	Release 10.4(2)	Release 10.4(3)	Release 10.4(4)	Release 10.5(1)	Release 10.5(2)	Release 10.5(3)
Fabric module for Cisco Nexus 9516 100-Gigabit -EX and -FX line cards (N9K-C9516-FM-E2)	MIFPGA	0x11 (0.017)	0x11 (0.017)	0x11 (0.017)	0x32 (0.050)	0x11 (0.017)	0x11 (0.017)	0x11 (0.017)
	IOFPGA	0x8 (0.008)	0x8 (0.008)	0x8 (0.008)	0x18 (0.024)	0x8 (0.008)	0x8 (0.008)	0x8 (0.008)

Table 5. Available EPLD Images for the Cisco Nexus 9500 Switches with R Line Card

Component	EPLD Device	Release 10.4(1)	Release 10.4(2)	Release 10.4(3)	Release 10.4(4)	Release 10.5(1)	Release 10.5(2)	Release 10.5(3)
36-port 100-Gigabit QSFP28 line card (N9K-X9636C-RX)	IOFPGA	0x18 (0.024)	0x18 (0.024)	0x18 (0.024)	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)	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)	0x12 (0.018)	0x12 (0.018)	0x12 (0.018)
	MIFPGA	0x9 (0.009)	0x9 (0.009)	0x9 (0.009)	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)	0x19 (0.025)	0x19 (0.025)	0x19 (0.025)
	MIFPGA	0x3 (0.003)	0x3 (0.003)	0x3 (0.003)	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	0xD	0xD	0xD
	MIFPGA	0xF	0xF	0xF	0xF	0xF	0xF	0xF
	DBFPGA	0xE	0xE	0xE	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)	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)	0x10 (0.016)	0x10 (0.016)	0x10 (0.016)

Table 6. Available EPLD Images for the Cisco Nexus 9800 Platform Switches

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Component	EPLD Device	Release 10.4(1)	Release 10.4(2)	Release 10.4(3)	Release 10.4(4)	Release 10.5(1)	Release 10.5(2)	Release 10.5(3)
N9K-C9800-SUP-A	TMFPGA	0x010006	0x010006	0x010006	0x010006	0x010006	0x010006	0x010006
	IOFPGA	0x010020	0x010020	0x010020	0x010020	0x010020	0x010020	0x010020
N9K-X9836DM-A	IOFPGA	(1.36)	(1.36)	**(1.48)**	(1.48)	(1.48)	(1.48)	(1.51)
	MIFPGA	0x1000d	0x1000e	0x1000e	0x1000e	0x1000e	0x1000e	0x10013
N9K-X98900CD-A	IOFPGA	0x0005b	0x0005b	0x0005b	**0x00061**	0x00061	0x00061	0x00061
	MIFPGA	0x1000a	0x1000c	0x1000c	0x1000c	0x1000c	0x1000c	0x1000c
N9K-C9804-FM-A	MIFPGA	0x10002	0x10002	0x10002	0x10002	0x10002	0x10002	0x10006
N9K-C9808-FM-A	MIFPGA	0x10002	0x10002	0x10002	0x10002	0x10002	0x10002	0x10006

Determining Whether to Upgrade EPLD Images

If the current EPLD image number for a card is greater than or matches the version expected for your current NXOS software version, you can skip the upgrade.

- To determine the EPLD upgrades needed for a Cisco Nexus 9000 Series switch running 10.5(3) software, use the **show install impact epld bootflash:<image-name>** command on that switch, where the image-name given is **nxos64-cs.10.5.3.F.bin** or **nxos64-msll.10.5.3.F.bin** or **nxos64-s1.10.5.3.F.bin**. First, copy this file to the bootflash to proceed. In this example, the MIFPGA and IOFPGA EPLD images do not need to be upgraded.

Note: The CLI content in this document is only an example. The CLI output might change depending on the hardware/software.

switch# **show install all impact epld nxos64-cs.10.5.3.F.bin**

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	0x16	0x16	No
1	SUP	IO FPGA	0x12	0x12	No
27	SUP	MI FPGA	0x16	0x16	No
27	SUP	IO FPGA	0x12	0x12	No

Compatibility check:

Module	Type	Upgradable	Impact	Reason

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27	SUP	Yes	disruptive	Module Upgradable

switch#

EPLD Upgrade Using Install EPLD Command

To install the EPLD upgrades needed for a Cisco Nexus 9000 Series switch running 10.5(3) software, use the **install epld bootflash:<image-name> module all** command on that switch. Where the image-name given is **nxos64-cs.10.5.3.F.bin** or **nxos64-msll.10.5.3.F.bin** or **nxos64-s1.10.5.3.F.bin**. First, copy this file to the bootflash to proceed. In this example, the MIFPGA and IOFPGA EPLD images need to be upgraded.

Note: The CLI content in this document is only an example. The CLI output might change depending on the hardware/software.

switch# **install epld bootflash:nxos64-cs.10.5.3.F.bin module all**

Compatibility check:

Module	Type	Upgradable	Impact	Reason
27	SUP	Yes	disruptive	Module Upgradable

Retrieving EPLD versions.... Please wait.

Images will be upgraded according to the following table:

Module	Type	EPLD	Running-Version	New-Version	Upg-Required
27	SUP	MI FPGA	0x16	0x20	Yes
27	SUP	IO FPGA	0x12	0x13	Yes

The above modules require upgrade. EPLD Upgrade may result in multiple modules going offline. The switch will be reloaded at the end of the upgrade.

Do you want to continue (y/n) ? [n] y

Proceeding to upgrade Modules.

Starting Module 27 EPLD Upgrade

Module 27 : MI FPGA [Programming] : 100.00% (128 of 128 sectors)

Module 27 : IO FPGA [Programming] : 100.00% (64 of 64 sectors)

Module 27 EPLD upgrade is successful...

Module	Type	Upgrade-Result
27	SUP	Success

Module 27 EPLD upgrade is successful.

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```
Module          Type            Upgrade-Result
------          ----            --------------
    27          SUP               Success

Reseting Active SUP (Module 27) FPGAs.  Please wait...
Reload in 10 seconds.....
switch#
```

EPLD Upgrade During Install All

Until NX-OS Release 10.5(2)F, ISSU supports EPLD upgrades using the **install all nxos** <*image-name*> **epld** <*epld-image*> command during disruptive system (NX-OS) upgrade.

While upgrading from pre-10.5(3)F releases to 10.5(3)F and later, first upgrade to 10.5(3) NX-OS using the **install all** <*nxos-image*> command. Then, after the NX-OS upgrade is complete, upgrade EPLD using the **install epld** command.

Beginning with NX-OS Release 10.5(3)F, EPLD upgrade takes place during an ISSU system upgrade. To avoid EPLD upgrade, use the **skip-epld** option. Do not use the **epld** <*epld-image*> option as the EPLD image is bundled with the NX-OS images and a separate EPLD image is no longer provided.

```
switch# install all nxos bootflash:nxos64-cs.10.5.3.F.bin
Installer will perform compatibility check first. Please wait.
Installer is forced disruptive
Verifying image bootflash:/nxos64-cs.10.5.3.F.bin for boot variable " nxos" .
[########################] 100% -- SUCCESS
Verifying EPLD/FPGA image //bootflash/nxos64-cs.10.5.3.F.bin.
[########################] 100% -- SUCCESS
Verifying image type.
[########################] 100% -- SUCCESS
Preparing " nxos"  version info using image bootflash:/nxos64-cs.10.5.3.F.bin.
[########################] 100% -- SUCCESS
Preparing " bios"  version info using image bootflash:/nxos64-cs.10.5.3.F.bin.
[########################] 100% -- SUCCESS
Performing module support checks.
[########################] 100% -- SUCCESS
Notifying services about system upgrade.
```

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[########################] 100% -- SUCCESS

Compatibility check is done:

Module	bootable	Impact	Install-type	Reason
1	yes	disruptive	reset	default upgrade is not hitless
27	yes	disruptive	none	default upgrade is not hitless

Images will be upgraded according to the following table:

Module	Image	Running-Version(pri:alt)	New-Version	Upg-Required
1	lcn9k	10.5(3)	10.5(3)	no
27	nxos	10.5(3)	10.5(3)	no
27	bios	v01.08(12/04/2024):v01.07(01/27/2024)	v01.08(12/04/2024)	no

FPGA microcode will be upgraded according to the following table:

Module	Type	EPLD	Running-Version	New-Version	Upg-Required
27	SUP	MI FPGA	0x10	0x13	Yes
27	SUP	IO FPGA	0x18	0x20	Yes

EPLD Upgrade may result in multiple modules going offline.

Switch will be reloaded for disruptive upgrade.

Do you want to continue with the installation (y/n) ? [n] y

Install is in progress, please wait.

Setting boot variables.

[########################] 100% -- SUCCESS

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Performing configuration copy.

[####################] 100% -- SUCCESS

Module 1: Refreshing compact flash and upgrading bios/loader/bootrom.

Warning: please do not remove or power off the module at this time.

[####################] 100% -- SUCCESS

Module 27: Refreshing compact flash and upgrading bios/loader/bootrom.

Warning: please do not remove or power off the module at this time.

[####################] 100% -- SUCCESS

EPLD/FPGA upgrade can take up to 8 minutes.

Performing EPLD/FPGA upgrade .

[####################] 100% -- SUCCESS

Install has been successful.

switch#

EPLD upgrades are disruptive. For non-disruptive NXOS system upgrade, use the **install all nxos <image-name> non-disruptive** command. This command will upgrade and load a new NXOS version and program the EPLD. However, explicit power cycle or reload of the switch is required for the new EPLD image to take effect.

To upgrade only NXOS, you can use the **skip-epld** option. Use this command: **install all nxos <image-name> skip-epld**

For additional information about ISSU, please see the Cisco Nexus 9000 Series NX-OS Software Upgrade and Downgrade Guide.

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, apply these guidelines and observations:

- 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 these commands:

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

- If there is only one supervisor installed in the switch, the upgrade or downgrade of the EPLD images is disruptive.

Cisco Secure Boot Hardware Tampering Vulnerability

This section details updating your EPLD version for affected switches listed in the link below. The table provides the PIDs exposed to the issue, as well as the fixed IO FPGA version for each PID, for validation purposes.

Secure Boot Hardware Tampering Vulnerability advisory:
https://sec.cloudapps.cisco.com/security/center/content/CiscoSecurityAdvisory/cisco-sa-20190513-secureboot

Vulnerable Products

These are the vulnerable products addressed in the Secure Boot Tampering Security Advisory (cisco-sa-20190513-secureboot).

Table 7. Nexus 9000 Series Switches affected by the Secure Boot Hardware Tampering Vulnerability

PID	Fixed IO FPGA Version
N9K-C93180YC-EX	0x15
N9K-C93108TC-EX	0x15
N9K-C93180YC-FX	0x20
N9K-C93108TC-FX	0x20
N9K-C9348GC-FXP	0x10
N9K-C93240YC-FX2	0x10
N9K-C9336C-FX2	0x10
N9K-C9364C	0x6
N9K-C9332C	0x10
N9K-C93180YC-FX	0x20
N9K-C9232C	0x8
N9K-SUP-A+	0x14

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PID	Fixed IO FPGA Version
N9K-SUP-B+	0x14
N9K-SUP-B	0x30
N9K-SUP-A	0x30

Cisco Secure Boot Hardware Tampering Vulnerability - Remediation Steps

Nexus 9000 Modular chassis with dual supervisor

Note: **Requirement–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, so only one region is allowed to be programmed per reload).

Note: Beginning with Release 10.5(3), Cisco provides a **single image** for NXOS and EPLD images. There will no longer be separate images. Instead, the EPLD image is bundled with all NXOS images and so the image sizes are correspondingly larger.

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

1. Copy the EPLD image to bootflash (e.g., this document will use the nxos64-cs.10.5.3.F.bin image).
2. If you have dual supervisors, determine which is the standby supervisor by doing **'show module'** to verify the status of the supervisors, and start upgrading the standby first. On the Nexus 9500, only supervisors need to be upgraded to address this vulnerability. Line cards/fabric modules/system controllers are not affected.
3. Assuming the standby supervisor is slot 28, update the Primary FPGA region of the standby supervisor.

install epld bootflash: nxos64-cs.10.5.3.F.bin module 28

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

Note: The CLI sequence used in this document is just an example. Your CLI sequence can be confirmed directly on the switch.

switch# show mod | grep SUP

27 0 Supervisor Module N9K-SUP-A active *

28 0 Supervisor Module N9K-SUP-A ha-standby <<< standby supervisor

27 10.3(5) 1.0 SUP1

28 10.3(5) 0.3011 SUP2

switch# show version module 28 epld

EPLD Device Version

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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 the 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: nxos64-cs.10.5.3.F.bin 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 the 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 the standby supervisor.

Once this is done, check **show version module 28 epld** to confirm the FPGA version is greater than or equal 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 Steps 3 and 4 for the active supervisor. At the end of Step 3, the supervisor in slot 27 will reload and so now will become the standby supervisor. The active supervisor will be the supervisor in slot 28.

For the situation where the active supervisor is in the other slot, considering SUP 27 is active to begin with, for the above activity, such as Steps 3 and 4, commands would have swapped 27 in place of 28.

Log below shows what happens when the EPLD upgrade happens for the 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.

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

At the end of the upgrades, the switch should boot with the primary EPLD image for both SUPs, as seen in the 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

Note: Requirement–Update both Golden and Primary regions of FPGA to address this 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, so 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 NXOS image to bootflash (e.g., this document will use the nxos64-cs.10.5.3.F.bin image).
2. Assuming the supervisor is in slot 27, update the Primary FPGA region.

install epld bootflash: nxos64-cs.10.5.3.F.bin module 27

Expected result: Switch will update the 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 command **show version module 27 epld** will continue to show the old version.

Note: The CLI sequence used in this document is just an example. Your CLI sequence can be confirmed directly on the switch.

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 the Golden FPGA which is still not updated. You can verify this from the syslog which would say:

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

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

install epld bootflash: nxos64-cs.10.5.3.F.bin module 27 golden

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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: The switch will update the golden EPLD of the supervisor and will reload the switch automatically. Please don't interrupt, power cycle, or reload the device while the EPLD update is in progress.

Once this is done, when you check the command **show version module 27 epld** to confirm that the FPGA version is greater than or equal to the fixed version for the supervisor. Your supervisor now 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, the switch should boot with the primary EPLD for the supervisor. The log to check is seen 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 the supervisor and will provide the prompt seen below:

switch# install epld bootflash: nxos64-cs.10.5.3.F.bin module all golden

Digital signature verification is successful

Compatibility check:

Module Type Upgradable Impact Reason

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```
  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 this 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 TOR (standalone chassis) switch

Note: It is required to update both the Golden and Primary regions of the FPGA to address this 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 lead to switch boot failure), so only one FPGA 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., this document will use the nxos64-cs.10.5.3.F.bin image).
2. Update the Primary FPGA region.

install epld bootflash: nxos64-cs.10.5.3.F.bin module all

Expected result: The switch will update the EPLD and will reload automatically. Please don't interrupt, power cycle, or reload the switch while the EPLD update is in progress. The switch will boot up with the golden FPGA. The command **show version module 1 epld** will show the old IO FPGA version at this time. This is expected.

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Note: The CLI sequence used in this document is just an example. Your CLI sequence can be confirmed directly on the switch.

Switch# 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: nxos64-cs.10.5.3.F.bin module all golden

Expected result: The switch will update the EPLD image and will reload automatically. Please don't interrupt, power cycle, or further reload the switch when the EPLD update is in progress.

Once this is done, when you check **show version module 1 epld**, you will see an FPGA version that is greater than or equal to the fixed version.

Switch# 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 the upgrade is complete, the switch should boot up with the primary EPLD image as shown in the logs below:

Switch# 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

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2019 Jul 9 19:46:11 switch %CARDCLIENT-5-MOD_BOOT_PRIMARY: Module 1 MIFPGA booted from Primary

Related Documentation

The entire Cisco NX-OS 9000 Series documentation set.

Release Notes

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

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