

Field Programmable Device (FPD) Upgrades on Cisco IOS XR

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Introduction

This document describes the Field Programmable Device (FPD) upgrade procedure and associated concerns.

Background Information

An FPD refers to any programmable hardware device on a router, which includes a Field Programmable Gate Array (FPGA) and Read Only Memory Monitor (ROMMON). Cisco IOS® XR routers use a number of FPDs that are crucial for the function of route processors, line cards, shared port adapters (SPAs), SPA Interface Processors (SIPs), and fan trays.

There are multiple types of FPDs for each type of card. The **admin show hw-module fpd location all** command provides information about each FPD.

```
RP/0/RP1/CPU0:router#admin show hw-module fpd location all
```

```
=====
Existing Field Programmable Devices
=====
HW Current SW Upg/
Location Card Type Version Type Subtype Inst Version Dng?
=====
0/0/SP 40G-MSC 0.3 lc rommonA 0 2.04* No
lc rommon 0 1.54 Yes
-----
0/0/CPU0 CRS1-SIP-800 0.2 lc fpga 0 5.00* No
lc rommonA 0 2.04* No
lc rommon 0 2.04 Yes
```

<snip>

The previous example shows that a Modular Services Card (MSC) on a Carrier Routing System (CRS) includes the ROMMON and ROMMONA FPDs. The **CRS1-SIP-800** in slot **0/0/CPU0** has

FPGA, ROMMON, and ROMMONA FPDs.

There are two different software components related to an FPD:

- Each FPD runs software that is stored in the internal memory. This internal memory can be reprogrammed (upgraded) in the field while the router runs, hence the name **Field Programmable Device**. When the FPD boots up, it reads its code from its internal memory, and runs it. An FPD runs the code from the internal memory and not from the boot disk of the router where Cisco IOS XR is stored.
- There is one FPD package in Cisco IOS XR that contains all of the FPD images for each FPD on the platform for that Cisco IOS XR version. That FPD package is stored on the boot disk along with the other Cisco IOS XR packages. The FPDs in the router run from images stored in each FPDs internal memory and not from the images inside the FPD package. The FPD images contained in the FPD package can be used in order to reprogram (upgrade) the images stored in the internal memory of the FPDs. The image from the FPD package is copied into the FPD internal memory in an FPD upgrade. The FPD uses this new FPD image in internal memory the next time it boots when the card is reloaded.

When to upgrade?

In each Cisco IOS XR version, there is a bundled FPD version for each type of FPD and for each router platform (CRS, Cisco Aggregation Services Router (ASR) 9000 Series, XR12000). The router hardware components with FPDs can be upgraded or downgraded in the field as needed in order to reduce incompatibilities between the Cisco IOS XR operating system and the FPDs. In some cases, FPD upgrades improve the functionality of these FPDs. The routers functionality in some cases can be compromised if it does not have up-to-date FPDs, because the new FPD version might contain a bug fix or a new required feature.

It is recommended that you keep the FPD versions stored in the internal FPD memory in sync with the FPD version contained in the Cisco IOS XR FPD package. At a minimum, keep the FPD versions stored in the internal FPD memory at or above the minimum version required by the Cisco IOS XR version.

Here are some circumstances which might lead to some outdated FPD versions:

- **A Cisco IOS XR upgrade.** The new Cisco IOS XR version might contain newer FPD versions in its FPD package, which means that the FPDs would have an outdated FPD version in their internal memory.
- **A Cisco IOS XR Software Maintenance Update (SMU) install.** A new version of an FPD might be delivered through a SMU in order to address a software defect in an FPD or in order to be compatible with the new Cisco IOS XR code that is delivered in the SMU. In this case, the FPD version in the internal memory of the FPD should be upgraded in order to obtain the fix contained in the SMU.
- **A Return Material Authorization (RMA).** When you receive a replacement part from an RMA depot, its FPDs might have been programmed with an older Cisco IOS XR version than the one that runs on the router. In this case, the FPDs of the new card should be upgraded

immediately after insertion. The new card might also contain newer FPD versions; in this case, there is usually no need to downgrade the FPD versions on the new card, since FPDs are backward compatible.

- When new cards are inserted into the router in the initial installation, all FPDs should be upgraded in order to match the FPD versions in the Cisco IOS XR FPD package.

How can I check if I need to upgrade an FPD?

The decision to upgrade one particular FPD is based on the FPD version contained in the FPD package and on the current FPD version installed in the internal memory of each FPD.

The **admin show fpd package** command can be used in order to display the FPD versions contained in the FPD package.

```
RP/0/RP1/CPU0:router#admin show fpd package
```

```
=====
Field Programmable Device Package
=====
```

Card Type	FPD Description	Type	Subtype	SW Version	Min Req SW Ver	Min Req HW Vers
<pre><snip> -----</pre>						
40G-MSC	ROMMONA swv2.07 asmp lc rommonA 2.07 2.01 0.0	ROMMONA	swv2.07 dsmp lc rommonA 2.07 2.01 0.0	ROMMONA	swv2.07 dsmp lc rommonA 2.07 2.01 0.0	ROMMONA swv2.07 sp lc rommonA 2.07 2.01 0.0
ROMMONA	swv2.07 dsmp lc rommon 2.07 2.07 0.0	ROMMONB	swv2.07 asmp lc rommon 2.07 2.07 0.0	ROMMONB	swv2.07 dsmp lc rommon 2.07 2.07 0.0	ROMMONB swv2.07 sp lc rommon 2.07 2.07 0.0
<pre>----- CRS1-</pre>						
SIP-800 JACKET	FPGA swv6.0 lc fpga1 6.00 5.00 0.0	FPGA	swv6.0 hmv80 lc fpga1 6.00 5.00 0.80			

```
-----
```

```
<snip>
```

The command indicates the bundled FPD version in the Cisco IOS XR FPD package for all types of cards on that routing platform. This is not the FPD version of the FPDs in each card, but rather the version that they would be upgraded to if the FPD image were copied from the Cisco IOS XR FPD package to the internal memory of the FPD. This command provides the latest FPD versions bundled in the Cisco IOS XR FPD package information. It cannot be used in order to determine whether an FPD upgrade is required on this router, because it does not check the FPD versions in each card.

On the CRS, there is a minimum version that allows you to keep the current FPD version without the need to run the latest version bundled into the XR FPD package.

The FPD version programmed in the internal memory of each FPD is displayed with the **admin show hw-module fpd location all** command.

```
RP/0/RP1/CPU0:router#admin show hw-module fpd location all
```

```
=====
Existing Field Programmable Devices
=====
HW Current SW Upg/
```

```

Location Card Type Version Type Subtype Inst Version Dng?
=====
0/0/SP 40G-MSC 0.3 lc rommonA 0 2.04* No
lc rommon 0 1.54 Yes
-----
0/0/CPU0 CRS1-SIP-800 0.2 lc fpga 0 5.00* No
lc rommonA 0 2.04* No
lc rommon 0 2.04 Yes
<snip>
-----

```

NOTES:

1. One or more FPD needs an upgrade or a downgrade. This can be accomplished using the "admin> upgrade hw-module fpd location " CLI.
2. * One or more FPD is running minimum software version supported. It can be upgraded using the "admin> upgrade hw-module fpd force location" CLI.

This command indicates which FPDs should be upgraded.

For each FPD found at each location, the command checks the **Current Version**, which is the FPD version stored in the internal FPD memory, and compares it with the bundled FPD version in the FPD package. It prints **Yes** if the FPD version in the internal memory is outdated and should be upgraded to the version contained in the FPD package.

If there is a * next to a version like for the **ROMMONA** of the **40G-MSC** in slot **0/0/SP**, that means that its version (**2.04**) does not have the latest version, but meets the minimum version requirement. The **admin show fpd package** command in the previous output shows that Version **2.0.1** is the minimum for the ROMMONA SWV2.07 SP FPD, so there is no need to upgrade it. Note that the **Upg/Dng?** column says **No**.

Here are some important points:

- The command prints **Yes** when the FPD has a later version than the one in the XR FPD package, but a downgrade is not required or recommended in that case because later FPD versions are backward compatible.
- Sometimes a later version exists in the FPD package, but for some reason, engineering has decided that this type of FPD should not be upgraded, so a **No** is printed. The FPD should not be upgraded in this case, and the **force** option should not be used in order to bypass this check when the last column says **No**.

Caution: Use of the **force** option has the potential to damage some cards. It should only be used at the direction of the a Cisco Technical Service Support Representative.

Upgrades

FPD Package

The Cisco IOS XR FPD package is required in order to be able to upgrade the FPDs on the router. Show commands succeed without the FPD package, but the **admin upgrade hw-module fpd** command fails without the FPD package. The FPD package is often referred to as the FPD Package Installation Envelope (PIE).

- The FPD package is an optional package that must be installed on top of the mini-package before the FPDs can be upgraded on these systems: CRS that runs any Cisco IOS XR

releaseCisco XR 12000 router that runs any Cisco IOS XR releaseASR 9000 that runs Release 3.9.0 or earlier

- On an ASR 9000 that runs Release 3.9.1 and later releases that are earlier than Release 4.3 (4.0, 4.1, and 4.2), the FPD package is bundled inside the mini-composite package. So, there is no need to install any optional package before you can upgrade the FPDs on the router. In Cisco IOS XR Releases 4.3.0 and later on the ASR 9000, the FPD package is no longer included in the mini-package.

Enter the **admin show install active summary** command in order to check if the FPD package is active. If the FPD PIE is not active, download the FPD PIE from Cisco Connection Online (CCO) and install it. The FPD package is inside the Cisco IOS-XR software tar bundle. You do not have to reload if you activate or deactivate the FPD PIE. The standard Cisco IOS XR commands should be used in order to install the FPD package:

- **admin install add** *<location of fpd pie on local disk or server>*
- **admin install activate** *<fpd package on disk0:>*
- **admin install commit**

Upgrade Methods

FPD upgrades can be performed with the manual or automatic FPD upgrade methods.

In order to perform a manual FPD upgrade, enter the **admin upgrade hw-module** command. This command is executed after you determine that an FPD should be upgraded with the **admin show hw-module fpd location all** command. Typically, FPDs must be upgraded after a card replacement or a software upgrade. The upgrade can be executed for all FPDs in the system or for specific FPDs or cards. After the **admin upgrade hw-module** command is executed, the FPDs still runs the old version and a manual reload of the cards where FPDs have been upgraded is required. This manual FPD upgrade typically results in two reloads in a Cisco IOS XR upgrade. The first reload is required in order to upgrade to the new Cisco IOS XR version, and then another reload of the cards is required after the FPD upgrade. This second reload is not necessary when you use the automatic FPD upgrade method described next. The manual FPD upgrade can be used when a new card with outdated FPDs is inserted in a chassis.

The automatic FPD upgrade method can be used in a software upgrade. When this feature is configured, the FPD upgrade happens automatically in a software upgrade in the **install activate** phase. Only one reload is required for the router to come back up running the new Cisco IOS XR version and the new FPD versions bundled in that Cisco IOS XR version. This is the recommended method for upgrades. This feature is available in Releases 3.8.3 and 3.9.1 and later on the CRS, and in Release 4.0.1 and later on the ASR 9000. The automatic FPD upgrade method is not recommended on the ASR 9000 for releases earlier than Release 4.2.3. The automatic FPD upgrade method should be used when possible in software upgrades.

Manual FPD Upgrade

Note: The FPD package must be installed before the upgrade can take place.

Use the **admin upgrade hw-module fpd** command in order to upgrade some specific FPDs or all FPDs that need an upgrade.

```

RP/0/RP1/CPU0:router(admin)#upgrade hw-module fpd ?
all All FPD
cpld1 CPLD FPD #1
cpld2 CPLD FPD #2
cpld3 CPLD FPD #3
cpld4 CPLD FPD #4
cpld5 CPLD FPD #5
cpld6 CPLD FPD #6
fabldr Fabric Downloader FPD
fpga All FPGA FPD
fpga1 FPGA FPD
fpga10 FPGA FPD #10
fpga11 FPGA FPD #11
fpga12 FPGA FPD #12
fpga13 FPGA FPD #13
fpga14 FPGA FPD #14
fpga2 FPGA FPD #2
fpga3 FPGA FPD #3
fpga4 FPGA FPD #4
fpga5 FPGA FPD #5
fpga6 FPGA FPD #6
fpga7 FPGA FPD #7
fpga8 FPGA FPD #8
fpga9 FPGA FPD #9
rommon Rommon FPD
rxpod Rx POD FPD
txpod Tx POD FPD
RP/0/RP1/CPU0:router(admin)#upgrade hw-module fpd all ?
force Skip version check and force an upgrade
location Specify a location
RP/0/RP1/CPU0:router(admin)#upgrade hw-module fpd all location ?
WORD Fully qualified location specification
all All locations
RP/0/RP1/CPU0:router(admin)#upgrade hw-module fpd all location

```

The user can decide to upgrade one specific FPD, such as **FPGA1**, or all FPDs. The user can also decide to upgrade the FPDs on one line card, such as location **0/3/CPU0**, or in all locations.

The command only upgrades FPDs for which there is a **Yes** in the **Upg/Dng?** column of the **admin show hw-module fpd location all** command. It is easiest to use the command with **admin upgrade hw-module fpd all location all** and allow the router to decide which FPDs to upgrade.

```

RP/0/RP1/CPU0:router(admin)#upgrade hw-module fpd all location all

```

```

***** UPGRADE WARNING MESSAGE: *****
* This upgrade operation has a maximum timeout of 160 minutes. *
* If you are executing the cmd for one specific location and *
* card in that location reloads or goes down for some reason *
* you can press CTRL-C to get back the RP's prompt. *
* If you are executing the cmd for _all_ locations and a node *
* reloads or is down please allow other nodes to finish the *
* upgrade process before pressing CTRL-C. *

% RELOAD REMINDER:
- The upgrade operation of the target module will not interrupt its normal
operation. However, for the changes to take effect, the target module
will need to be manually reloaded after the upgrade operation. This can
be accomplished with the use of "hw-module reload" command.
- If automatic reload operation is desired after the upgrade, please use
the "reload" option at the end of the upgrade command.
- The output of "show hw-module fpd location" command will not display
correct version information after the upgrade if the target module is

```

not reloaded.
NOTE:
Chassis CLI will not be accessible while upgrade is in progress.
Continue? [confirm]
This can take some time for a full chassis.
Ensure that system is not power cycled during the upgrades.
Please consult the documentation for more information.
Continue ? [no]: yes
RP/0/RP1/CPU0:Sep 6 17:53:28.119 : upgrade_fpd_cli[65832]:
%PLATFORM-UPGRADE_FPD-6-STATUS : FPD upgrade started.

FPD upgrade in progress on some hardware, reload/configuration change on those is not recommended as it might cause HW programming failure and result in RMA of the hardware.

Starting the upgrade/download of following FPD:
=====

Current Upg/Dng
Location Type Subtype Upg/Dng Version Version
0/0/SP lc rommon upg 1.54 2.07

RP/0/RP1/CPU0:Sep 6 17:53:28.342 : upgrade_fpd_cli[65832]:
%PLATFORM-UPGRADE_FPD-6-STATUS_LOC : Upgrade is going on:
FPD upgrade sent to location node0_0_SP
Starting the upgrade/download of following FPD:

=====

Current Upg/Dng
Location Type Subtype Upg/Dng Version Version
0/0/CPU0 lc rommon upg 2.04 2.07

RP/0/RP1/CPU0:Sep 6 17:53:28.393 : upgrade_fpd_cli[65832]:
%PLATFORM-UPGRADE_FPD-6-STATUS_LOC : Upgrade is going on:
FPD upgrade sent to location node0_0_CPU0
LC/0/0/CPU0:Sep 6 17:53:28.412 : lc_fpd_upgrade[237]:
%PLATFORM-UPGRADE_FPD-6-START : Starting to upgrade rommon subtype image from 2.04 to 2.07 for this card on location 0/0/CPU0

Starting the upgrade/download of following FPD:
=====

Current Upg/Dng
Location Type Subtype Upg/Dng Version Version
0/RP0/CPU0 lc rommon upg 1.54 2.07

RP/0/RP1/CPU0:Sep 6 17:53:28.426 : upgrade_fpd_cli[65832]:
%PLATFORM-UPGRADE_FPD-6-STATUS_LOC : Upgrade is going on:
FPD upgrade sent to location node0_RP0_CPU0
SP/0/0/SP:Sep 6 17:53:28.413 : lc_fpd_upgrade[132]:
%PLATFORM-UPGRADE_FPD-6-START : Starting to upgrade rommon subtype image from 1.54 to 2.07 for this card on location 0/0/SP
Starting the upgrade/download of following FPD:

=====

Current Upg/Dng
Location Type Subtype Upg/Dng Version Version
0/RP1/CPU0 lc rommon upg 1.54 2.07

snip
RP/0/RP1/CPU0:Sep 6 17:53:38.427 : upgrade_fpd_cli[65832]:
%PLATFORM-UPGRADE_FPD-6-STATUS_LOC : Upgrade is going on:
FPD upgrade completed for location node0_RP0_CPU0

```
RP/0/RP1/CPU0:Sep 6 17:53:40.989 : upgrade_fpd_cli[65832]:
%PLATFORM-UPGRADE_FPD-6-STATUS : FPD upgrade completed.
```

FPD upgrade has ended.

After the upgrade, the cards still run the same version:

```
RP/0/RP1/CPU0:router(admin)#show hw-module fpd location 0/RP0/CPU0
=====
Existing Field Programmable Devices
=====
HW Current SW Upg/
Location Card Type Version Type Subtype Inst Version Dng?
=====
0/RP0/CPU0 RP 0.1 lc rommonA 0 2.04* No
lc rommon 0 1.54 Yes
-----
NOTES:
1. One or more FPD needs an upgrade or a downgrade. This can be accomplished
using the "admin> upgrade hw-module fpd location " CLI.
2. * One or more FPD is running minimum software version supported.
It can be upgraded using the "admin> upgrade hw-module fpd force location" CLI.
```

Once the FPDs are upgraded, the cards with the upgraded FPDs must be reloaded:

- If a subset of cards have upgraded FPDs, then only reload those cards.
- If the two route processors were upgraded, complete these steps:
Reload the standby route processor with the **hw-module location 0/<standby rp slot>/CPU0 reload** command. Perform a switchover with the **redundancy switchover** command. Reload the new standby route processor with **hw-module location 0/<standby rp slot>/CPU0 reload** command.
- If all of the cards had FPD upgrades, schedule a maintenance so that the router does not carry production traffic, and then use the **admin reload location all** command in order to reload all the cards.
- If all of the cards have upgraded FPDs, minimize the traffic impact with these steps:
Reload the standby route processor. Perform a redundancy switchover. Reload the new standby route processor. Reload all of the line cards at one time or one-by-one in order to preserve redundant paths.

After the reload, the cards run the upgraded version:

```
=====
Existing Field Programmable Devices
=====
HW Current SW Upg/
Location Card Type Version Type Subtype Inst Version Dng?
=====
0/RP0/CPU0 RP 0.1 lc rommonA 0 2.04* No
lc rommon 0 2.07 No
-----
NOTES:
1. * One or more FPD is running minimum software version supported.
It can be upgraded using the "admin> upgrade hw-module fpd force location " CLI.
```

Automatic FPD Upgrade

Configure the **fpd auto-upgrade** administration configuration command on a CRS that runs Release 3.8.3, 3.9.1, or later or on an ASR 9000 that runs Release 4.2.3 or later in order to enable automatic FPD upgrades.

```
RP/0/RP1/CPU0:router(admin)#show running-config | i fpd
Building configuration...
fpd auto-upgrade
```

All FPDs that require an upgrade when a new Cisco IOS XR version is installed with the **admin install activate** command are updated if the **fpd auto-upgrade** command is configured in the administrator mode configuration, and the FPD package of the new version is also activated. All FPDs that require an upgrade due to a newer FPD version in the new Cisco IOS XR version are upgraded.

Messages similar to these display when the FPDs are automatically upgraded in the install activate phase:

- 90% complete: The operation can still be aborted (ctrl-c for options)

```
RP/0/RP0/CPU0:Sep 20 10:02:22.163 : firmware_manager[224]:
%PLATFORM-UPGRADE_FPD-6-STATUS : FPD upgrade started. FPD upgrade in progress on
some hardware, reload/configuration change on those is not recommended as it might
cause HW programming failure and result in RMA of the hardware. RP/0/RP0/CPU0:
Sep 20 10:02:22.442 : firmware_manager[224]: %PLATFORM-UPGRADE_FPD-6-STATUS_LOC :
Upgrade is going on: FPD upgrade sent to location node0_0_SP RP/0/RP0/CPU0:
Sep 20 10:02:22.484 : firmware_manager[224]: %PLATFORM-UPGRADE_FPD-6-STATUS_LOC :
Upgrade is going on: FPD upgrade sent to location node0_0_CPU0 Info: FPD Upgrade:
No fpd on location 0/RP0/CPU0 need upgrade at this time. Info: FPD Upgrade: No
fpd on location 0/RP1/CPU0 need upgrade at this time. / 16% complete: The operation
can still be aborted (ctrl-c for options)RP/0/RP0/CPU0:Sep 20 10:02:22.810 :
firmware_manager[224]: %PLATFORM-UPGRADE_FPD-6-STATUS_LOC : Upgrade is going on:
FPD upgrade sent to location node0_SM0_SP RP/0/RP0/CPU0:Sep 20 10:02:22.980 :
firmware_manager[224]: %PLATFORM-UPGRADE_FPD-6-STATUS_LOC : Upgrade is going on:
FPD upgrade sent to location node0_SM1_SP RP/0/RP0/CPU0:Sep 20 10:02:23.188 :
firmware_manager[224]: %PLATFORM-UPGRADE_FPD-6-STATUS_LOC : Upgrade is going on:
FPD upgrade sent to location node0_SM2_SP RP/0/RP0/CPU0:Sep 20 10:02:23.443 :
firmware_manager[224]: %PLATFORM-UPGRADE_FPD-6-STATUS_LOC : Upgrade is going on:
FPD upgrade sent to location node0_SM3_SP LC/0/0/CPU0:Sep 20 10:02:22.510 :
lc_fpd_upgrade[237]: %PLATFORM-UPGRADE_FPD-6-START : Starting to upgrade rommon
subtype image from 2.04 to 2.07 for this card on location 0/0/CPU0 LC/0/0/CPU0:
Sep 20 10:02:22.562 : upgrade_daemon[375]: Start Upgrade... LC/0/0/CPU0:Sep 20
10:02:22.564 : upgrade_daemon[375]: programming...with file
/net/node0_RP0_CPU0/disk0:/hfr-fpd-4.2.4/fpd/ucode/rommon-hfr-ppc7455-asmp-B.bin
LC/0/0/CPU0:Sep 20 10:02:22.577 : upgrade_daemon[375]: Verifying
/net/node0_RP0_CPU0/disk0: /hfr-fpd-4.2.4/fpd/ucode/rommon-hfr-ppc7455-asmp-B.bin:
SP/0/0/SP:Sep 20 10:02:22.497 : lc_fpd_upgrade[132]: %PLATFORM-UPGRADE_FPD-6-START :
Starting to upgrade rommon subtype image from 1.54 to 2.07 for this card on location
0/0/SP SP/0/0/SP: Sep 20 10:02:22.682 : upgrade_daemon[152]: Start Upgrade...
SP/0/0/SP: Sep 20 10:02:22.702 : upgrade_daemon[152]: programming...with file
/net/node0_RP0_CPU0/disk0:/hfr-fpd-4.2.4/fpd/ucode/rommon-hfr-ppc8255-sp-B.bin
SP/0/0/SP:Sep 20 10:02:22.807 : upgrade_daemon[152]: Verifying
/net/node0_RP0_CPU0/disk0:/hfr-fpd-4.2.4/fpd/ucode/rommon-hfr-ppc8255-sp-B.bin:
SP/0/0/SP: Sep 20 10:02:23.511 : upgrade_daemon[152]: Passed. SP/0/SM0/SP:Sep 20
10:02:22.898 : lc_fpd_upgrade[133]: %PLATFORM-UPGRADE_FPD-6-START : Starting to
upgrade rommon subtype image from 1.54 to 2.07 for this card on location 0/SM0/SP
LC/0/0/CPU0:Sep 20 10:02:24.063 : upgrade_daemon[375]: Passed. SP/0/SM0/SP:Sep 20
10:02:23.183 : upgrade_daemon[154]: Start Upgrade... SP/0/SM0/SP:Sep 20 10:02:23.203 :
upgrade_daemon[154]: programming...with file /net/node0_RP0_CPU0/disk0:
/hfr-fpd-4.2.4/fpd/ucode/rommon-hfr-ppc8255-sp-B.bin SP/0/SM0/SP:Sep 20 10:02:23.327 :
upgrade_daemon[154]: Verifying /net/node0_RP0_CPU0/disk0:/hfr-fpd-4.2.4/fpd/ucode/
```

rommon-hfr-ppc8255-sp-B.bin: SP/0/SM0/SP:Sep 20 10:02:23.706 : upgrade_daemon[154]:
Passed. SP/0/SM1/SP:Sep 20 10:02:23.081 : lc_fpd_upgrade[133]:
%PLATFORM-UPGRADE_FPD-6-START : Starting to upgrade rommon subtype image from 1.54
to 2.07 for this card on location 0/SM1/SP SP/0/SM1/SP:Sep 20 10:02:23.342 :
upgrade_daemon[154]: Start Upgrade... SP/0/SM1/SP:Sep 20 10:02:23.357 :
upgrade_daemon[154]: programming...with file /net/node0_RP0_CPU0/disk0:
/hfr-fpd-4.2.4/fpd/ucode/rommon-hfr-ppc8255-sp-B.bin SP/0/SM1/SP: Sep 20
10:02:23.516 : upgrade_daemon[154]: Verifying /net/node0_RP0_CPU0/disk0:
/hfr-fpd-4.2.4/fpd/ucode/rommon-hfr-ppc8255-sp-B.bin: SP/0/SM1/SP:Sep 20 10:02:23.764 :
upgrade_daemon[154]: Passed. SP/0/SM2/SP:Sep 20 10:02:23.273 : lc_fpd_upgrade[133]:
%PLATFORM-UPGRADE_FPD-6-START : Starting to upgrade rommon subtype image from 1.54
to 2.07 for this card on location 0/SM2/SP SP/0/SM2/SP:Sep 20 10:02:23.624 :
upgrade_daemon[154]: Start Upgrade... SP/0/SM2/SP:Sep 20 10:02:23.649 :
upgrade_daemon[154]: programming...with file /net/node0_RP0_CPU0/disk0:
/hfr-fpd-4.2.4/fpd/ucode/rommon-hfr-ppc8255-sp-B.bin SP/0/SM2/SP:Sep 20 10:02:23.778 :
upgrade_daemon[154]: Verifying /net/node0_RP0_CPU0/disk0:
/hfr-fpd-4.2.4/fpd/ucode/rommon-hfr-ppc8255-sp-B.bin: SP/0/SM2/SP:Sep 20 10:02:23.977 :
upgrade_daemon[154]: Passed. SP/0/SM3/SP:Sep 20 10:02:23.532 : lc_fpd_upgrade[133]:
%PLATFORM-UPGRADE_FPD-6-START : Starting to upgrade rommon subtype image from 1.54
to 2.07 for this card on location 0/SM3/SP SP/0/SM3/SP:Sep 20 10:02:23.777 :
upgrade_daemon[154]: Start Upgrade... SP/0/SM3/SP:Sep 20 10:02:23.787 : upgrade_daemon
[154]: programming...with file /net/node0_RP0_CPU0/disk0:/hfr-fpd-4.2.4
/fpd/ucode/rommon-hfr-ppc8255-sp-B.bin SP/0/SM3/SP:Sep 20 10:02:23.891 : upgrade_daemon
[154]: Verifying /net/node0_RP0_CPU0/disk0:/hfr-fpd-4.2.4/fpd/ucode/
rommon-hfr-ppc8255-sp-B.bin: SP/0/SM3/SP:Sep 20 10:02:24.090 : upgrade_daemon[154]:
Passed. - 16% complete: The operation can still be aborted (ctrl-c for options)
SP/0/SM1/SP:Sep 20 10:02:28.158 : upgrade_daemon[154]: Verifying ROMMON B:
SP/0/SM1/SP:Sep 20 10:02:28.204 : upgrade_daemon[154]: Passed. SP/0/SM1/SP:
Sep 20 10:02:28.209 : upgrade_daemon[154]: OK, ROMMON B is programmed successfully.
SP/0/SM1/SP:Sep 20 10:02:28.227 : lc_fpd_upgrade[133]: %PLATFORM-UPGRADE_FPD-6-PASSED :
Successfully upgrade rommon subtype image for this card on location 0/SM1/SP Info:
FPD Upgrade: Successfully upgraded rommon for Fabric QQS123 on location 0/SM1/SP from
1.54 to 2.07 \ 16% complete: The operation can still be aborted (ctrl-c for options)
RP/0/RP0/CPU0:Sep 20 10:02:28.237 : firmware_manager[224]:
%PLATFORM-UPGRADE_FPD-6-STATUS_LOC : Upgrade is going on: FPD upgrade completed for
location node0_SM1_SP | 16% complete: The operation can still be aborted (ctrl-c
for options)SP/0/SM2/SP:Sep 20 10:02:28.641 : upgrade_daemon[154]: Verifying ROMMON B:
SP/0/SM2/SP:Sep 20 10:02:28.686 : upgrade_daemon[154]: Passed. SP/0/SM2/SP:Sep 20
10:02:28.689 : upgrade_daemon[154]: OK, ROMMON B is programmed successfully. Info:
FPD Upgrade: Successfully upgraded rommon for Fabric QQS123 on location 0/SM2/SP from
1.54 to 2.07 / 16% complete: The operation can still be aborted (ctrl-c for options)
SP/0/SM2/SP:Sep 20 10:02:28.705 : lc_fpd_upgrade[133]: %PLATFORM-UPGRADE_FPD-6-PASSED :
Successfully upgrade rommon subtype image for this card on location 0/SM2/SP
RP/0/RP0/CPU0:Sep 20 10:02:28.714 : firmware_manager[224]:
%PLATFORM-UPGRADE_FPD-6-STATUS_LOC : Upgrade is going on: FPD upgrade completed for
location node0_SM2_SP SP/0/SM3/SP:Sep 20 10:02:28.763 : upgrade_daemon[154]: Verifying
ROMMON B: SP/0/SM3/SP:Sep 20 10:02:28.810 : upgrade_daemon[154]: Passed. SP/0/SM3/SP:
Sep 20 10:02:28.815 : upgrade_daemon[154]: OK, ROMMON B is programmed successfully.
SP/0/SM3/SP:Sep 20 10:02:28.830 : lc_fpd_upgrade[133]: %PLATFORM-UPGRADE_FPD-6-PASSED :
Successfully upgrade rommon subtype image for this card on location 0/SM3/SP Info:
FPD Upgrade: Successfully upgraded rommon for Fabric QQS123 on location 0/SM3/SP from
1.54 to 2.07 - 16% complete: The operation can still be aborted (ctrl-c for options)
RP/0/RP0/CPU0:Sep 20 10:02:28.839 : firmware_manager[224]:
%PLATFORM-UPGRADE_FPD-6-STATUS_LOC : Upgrade is going on: FPD upgrade completed for
location node0_SM3_SP SP/0/0/SP:Sep 20 10:02:28.964 : upgrade_daemon[152]: Verifying
ROMMON B: SP/0/0/SP:Sep 20 10:02:29.009 : upgrade_daemon[152]: Passed. SP/0/0/SP:
Sep 20 10:02:29.014 : upgrade_daemon[152]: OK, ROMMON B is programmed successfully.
Info: FPD Upgrade: Successfully upgraded rommon for 40G-MSB on location 0/0/SP from
1.54 to 2.07 \ 16% complete: The operation can still be aborted (ctrl-c for options)
SP/0/0/SP:Sep 20 10:02:29.040 : lc_fpd_upgrade[132]: %PLATFORM-UPGRADE_FPD-6-PASSED :
Successfully upgrade rommon subtype image for this card on location 0/0/SP
RP/0/RP0/CPU0:Sep 20 10:02:29.050 : firmware_manager[224]:
%PLATFORM-UPGRADE_FPD-6-STATUS_LOC : Upgrade is going on: FPD upgrade completed
for location node0_0_SP SP/0/SM0/SP:Sep 20 10:02:29.141 : upgrade_daemon[154]:

```
Verifying ROMMON B: SP/0/SM0/SP:Sep 20 10:02:29.187 : upgrade_daemon[154]: Passed.  
SP/0/SM0/SP:Sep 20 10:02:29.191 : upgrade_daemon[154]: OK, ROMMON B is programmed  
successfully. SP/0/SM0/SP:Sep 20 10:02:29.207 : lc_fpd_upgrade[133]:  
%PLATFORM-UPGRADE_FPD-6-PASSED : Successfully upgrade rommon subtype image for this  
card on location 0/SM0/SP Info: FPD Upgrade: Successfully upgraded rommon for Fabric  
QQS123 on location 0/SM0/SP from 1.54 to 2.07 | 16% complete: The operation can still  
be aborted (ctrl-c for options)RP/0/RP0/CPU0:Sep 20 10:02:29.222 : firmware_manager  
[224]: %PLATFORM-UPGRADE_FPD-6-STATUS_LOC : Upgrade is going on: FPD upgrade completed  
for location node0_SM0_SP / 16% complete: The operation can still be aborted  
(ctrl-c for options)LC/0/0/CPU0:Sep 20 10:02:31.602 : upgrade_daemon[375]: Verifying  
ROMMON B: LC/0/0/CPU0:Sep 20 10:02:31.700 : upgrade_daemon[375]: Passed. Info: FPD  
Upgrade: Successfully upgraded rommon for 40G-MSR on location 0/0/CPU0 from 2.04  
to 2.07 - 16% complete: The operation can still be aborted (ctrl-c for options)  
LC/0/0/CPU0:Sep 20 10:02:31.701 : upgrade_daemon[375]: OK, ROMMON B is programmed  
successfully. LC/0/0/CPU0:Sep 20 10:02:31.706 : lc_fpd_upgrade[237]:  
%PLATFORM-UPGRADE_FPD-6-PASSED : Successfully upgrade rommon subtype image for this  
card on location 0/0/CPU0 RP/0/RP0/CPU0:Sep 20 10:02:31.709 : firmware_manager[224]:  
%PLATFORM-UPGRADE_FPD-6-STATUS_LOC : Upgrade is going on: FPD upgrade completed for  
location node0_0_CPU0 RP/0/RP0/CPU0:Sep 20 10:02:33.452 : firmware_manager[224]:  
%PLATFORM-UPGRADE_FPD-6-STATUS : FPD upgrade completed. FPD upgrade has ended.
```

- 90% complete: The operation can still be aborted (ctrl-c for options)

The router then reloads with the new XR version and with the FPDs running the FPD version bundled in that FPD package. This eliminates the need to upgrade the FPDs after an the XR upgrade and perform a second reload.