



Performing Extended Fast Software Upgrade

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Prerequisites for Extended Fast Software Upgrade

- The Extended Fast Software Upgrade feature is supported starting with Cisco IOS XE Amsterdam 17.3.2a. Ensure that the software version that is installed on your switch is Cisco IOS XE Amsterdam 17.3.2a or later before you start the upgrade process.
- You must disable manual boot using the **no boot manual** command.

Restrictions for Extended Fast Software Upgrade

The following restrictions are applicable to both standalone and stacked switch:

- This feature is supported only if the switch is running in install mode.
- This feature is not supported on a switch that is configured with Spanning Tree Protocol (STP) only. The switch must additionally be configured with either Rapid Spanning Tree Protocol (RSTP) or Multiple Spanning Tree Protocol (MSTP).
- For a root device, Extended Fast Software Upgrade feature is not supported if any of the device ports in forwarding state are connected to a STP peer (A device with STP configured and directly connected to root device).
- For a device, with STP configured and not defined as a root device, Extended Fast Software Upgrade feature is supported only if the number of device ports in the forwarding state connected to a STP peer is less or equal to 1.

- Application hosting may not restart automatically after performing Extended Fast Software Upgrade. You may need to disable and re-enable Cisco IOx, configure application hosting, and install, activate and start an application again.

The following restrictions are applicable for a stacked switch:

- This feature is not supported if the stacked switch is configured in the partial-ring state.
- This feature is not supported on a stacked switch that is configured with Bidirectional Forwarding Detection (BFD).
- This feature is not supported on a stacked switch that is configured with MACsec Key Agreement (MKA).
- This feature is not supported on a stacked switch that is configured with Cisco TrustSec.
- Configured UniDirectional Link Detection (UDLD) message intervals are ignored during traffic downtime. The intervals are restored to the configured values after Extended Fast Software Upgrade is completed.

Information About Extended Fast Software Upgrade

Extended Fast Software Upgrade reduces the traffic downtime during software reload or upgrade operations. Compared to Fast Software Upgrade, the traffic downtime is reduced to less than 30 seconds, depending on the switch configuration. Extended Fast Software Upgrade uses graceful restart capability (also known as Cisco NSF) to ensure that switch configurations, such as certain routing protocols, remain unaffected during a software upgrade or reload.



Note Extended Fast Software Upgrade works on access layer switches only.

Perpetual Power over Ethernet (PoE), if configured, continues to provide uninterrupted power to the connected devices during software reload or upgrade.

Protocols Supported with Extended Fast Software Upgrade

The following protocols are supported with Extended Fast Software Upgrade feature:



Note For all protocols other than the following, the traffic downtime will be longer than 30 seconds:

- BGP (IPv4 and IPv6 address families)
- Flexible NetFlow
- IEEE 802.1X Port-Based Authentication
- Intermediate System-to-Intermediate System (IS-IS)
- Internet Group Management Protocol (IGMP) snooping
- Layer 2 Switching

- Link Aggregation Control Protocol (LACP)
- MAC authentication bypass
- Multicast Listener Discovery (MLD) snooping
- Open Shortest Path First (OSPF) or OSPFv2 or OSPFv3
- Per VLAN Spanning Tree (PVST)
- QoS
- Static Port-channels (Mode on)
- STP with RSTP or MSTP
- UDLD
- Virtual routing and forwarding (VRF)
- Web authentication

How to Perform Extended Fast Software Upgrade on a Standalone Switch

The following sections provide configuration information on how to perform Extended Fast Software Upgrade on a standalone switch.

Upgrading the Software on a Standalone Switch

To upgrade the software on a standalone switch, perform the following procedure:

Before you begin

- Use the **show graceful-reload** command in privileged EXEC mode to ensure that all the routing protocols are in **UP** status.
- Use the **install remove inactive** command in privileged EXEC mode to free the disk space for the new software, if necessary.

Procedure

| | Command or Action | Purpose |
|---------------|--|--|
| Step 1 | enable Example: Device> enable | Enables privileged EXEC mode. Enter your password, if prompted. |
| Step 2 | install add file <i>image</i> activate reloadfast commit Example: | Upgrades the switch with the new software image. |

| | Command or Action | Purpose |
|--|--|---|
| | Device# <code>install add file bootflash: cat9k_iosxe.17.03.02.SPA.bin activate reloadfast commit</code> | The <i>image</i> keyword includes the location of the file (TFTP, HTTP, flash drives) and the image name. |

Upgrading the Software on a Standalone Switch Configured with IPv6

To upgrade the software on a standalone switch, perform the following procedure:

Before you begin

- Use the **show graceful-reload** command in privileged EXEC mode to ensure that all the routing protocols are in **UP** status.
- Use the **install remove inactive** command in privileged EXEC mode to free the disk space for the new software, if necessary.

Procedure

| | Command or Action | Purpose |
|---------------|--|---|
| Step 1 | enable Example: Device> <code>enable</code> | Enables privileged EXEC mode. Enter your password, if prompted. |
| Step 2 | configure terminal Example: Device# <code>configure terminal</code> | Enters global configuration mode. |
| Step 3 | ipv6 nd reachable-time <i>seconds</i> Example: Device(config)# <code>ipv6 nd reachable-time 3600000</code> | Sets the time limit for a remote IPv6 node to be considered reachable after a reachability confirmation event has occurred. |
| Step 4 | end Example: Device(config)# <code>end</code> | Returns to privileged EXEC mode. |
| Step 5 | write memory Example: Device# <code>write memory</code> | Saves the configuration on the switch. |
| Step 6 | install add file <i>image</i> activate reloadfast commit Example: Device# <code>install add file bootflash: cat9k_iosxe.17.03.02.SPA.bin activate reloadfast commit</code> | Upgrades the switch with the new software image. The <i>image</i> keyword includes the location of the file (TFTP, HTTP, flash drives) and the image name. |

Upgrading the Software on a Standalone Switch Configured with IPv6 MLD

To upgrade the software on a standalone switch configured with IPv6 MLD, perform the following procedure:

Before you begin

- Use the **show graceful-reload** command in privileged EXEC mode to ensure that all the routing protocols are in **UP** status.
- Use the **install remove inactive** command in privileged EXEC mode to free the disk space for the new software, if necessary.

Procedure

| | Command or Action | Purpose |
|---------------|--|---|
| Step 1 | enable Example: Device> enable | Enables privileged EXEC mode. Enter your password, if prompted. |
| Step 2 | configure terminal Example: Device# configure terminal | Enters global configuration mode. |
| Step 3 | ipv6 mld snooping Example: Device(config)# ipv6 mld snooping | Enables IPv6 MLD snooping. |
| Step 4 | end Example: Device(config)# end | Returns to privileged EXEC mode. |
| Step 5 | write memory Example: Device# write memory | Saves the configuration on the switch. |
| Step 6 | install add file <i>image</i> activate reloadfast commit Example: Device# install add file bootflash: cat9k_iosxe.17.03.02.SPA.bin activate reloadfast commit | Upgrades the switch with the new software image. The <i>image</i> keyword includes the location of the file (TFTP, HTTP, flash drives) and the image name. |

Upgrading the Software on a Standalone Switch Configured with BGP

To upgrade the software on a standalone switch configured with BGP, perform the following procedure:

Before you begin

- Use the **show graceful-reload** command in privileged EXEC mode to ensure that all the routing protocols are in **UP** status.
- Use the **install remove inactive** command in privileged EXEC mode to free the disk space for the new software, if necessary.

Procedure

| | Command or Action | Purpose |
|---------------|---|---|
| Step 1 | enable Example: Device> enable | Enables privileged EXEC mode. Enter your password, if prompted. |
| Step 2 | configure terminal Example: Device# configure terminal | Enters global configuration mode. |
| Step 3 | router bgp <i>autonomous-system-number</i> Example: Device(config)# router bgp 65000 | Enters BGP router configuration mode. |
| Step 4 | bgp graceful-restart Example: Device(config-router)# bgp graceful-restart | Enables NSF awareness on a switch. By default, NSF awareness is disabled. |
| Step 5 | end Example: Device(config-router)# end | Returns to privileged EXEC mode. |
| Step 6 | write memory Example: Device# write memory | Saves the configuration on the switch. |
| Step 7 | install add file <i>image</i> activate reloadfast commit Example: Device# install add file bootflash: cat9k_iosxe.17.03.02.SPA.bin activate reloadfast commit | Upgrades the switch with the new software image. The <i>image</i> keyword includes the location of the file (TFTP, HTTP, flash drives) and the image name. |

Upgrading the Software on a Standalone Switch Configured with OSPFv3

To upgrade the software on a standalone switch configured with OSPFv3, perform the following procedure:

Before you begin

- Use the **show graceful-reload** command in privileged EXEC mode to ensure that all the routing protocols are in **UP** status.
- Use the **install remove inactive** command in privileged EXEC mode to free the disk space for the new software, if necessary.

Procedure

| | Command or Action | Purpose |
|---------------|---|---|
| Step 1 | enable Example: Device> enable | Enables privileged EXEC mode. Enter your password, if prompted. |
| Step 2 | configure terminal Example: Device# configure terminal | Enters global configuration mode. |
| Step 3 | ipv6 nd reachable-time seconds Example: Device(config)# ipv6 nd reachable-time 3600000 | Sets the time limit for a remote IPv6 node to be considered reachable after a reachability confirmation event has occurred. |
| Step 4 | snmp ifmib ifindex persist Example: Device(config)# snmp ifmib ifindex persist | Enables SNMP ifIndex persistence globally. |
| Step 5 | router ospfv3 process-id Example: Device(config)# router ospfv3 1 | Enters OSPFv3 router configuration mode. |
| Step 6 | router-id ip-address Example: Device(config-router)# router-id 192.0.2.5 | Sets a fixed router ID for the OSPFv3 instance. |
| Step 7 | interface-id snmp-if-index Example: Device(config-router)# interface-id snmp-if-index | Enables SNMP ifIndex persistence on the specified interface. |
| Step 8 | end Example: Device(config-router)# end | Returns to privileged EXEC mode. |

| | Command or Action | Purpose |
|----------------|--|---|
| Step 9 | write memory Example: Device# <code>write memory</code> | Saves the configuration on the switch. |
| Step 10 | install add file <i>image</i> activate reloadfast commit Example: Device# <code>install add file bootflash: cat9k_iosxe.17.03.02.SPA.bin activate reloadfast commit</code> | Upgrades the switch with the new software image. The <i>image</i> keyword includes the location of the file (TFTP, HTTP, flash drives) and the image name. |

Reloading Software on a Standalone Switch

To reload software on a standalone switch, perform the following procedure.

Before you begin

Use the **show graceful-reload** command in privileged EXEC mode to ensure that all the routing protocols are in UP status.

Procedure

| | Command or Action | Purpose |
|---------------|---|--|
| Step 1 | enable Example: Device> <code>enable</code> | Enables privileged EXEC mode. Enter your password, if prompted. |
| Step 2 | reload fast Example: Device# <code>reload fast</code> | Reloads the switch without software upgrade. |

Reloading Software on a Standalone Switch Configured with BGP

To reload software on a standalone switch configured with BGP, perform the following procedure.

Before you begin

Use the **show graceful-reload** command in privileged EXEC mode to ensure that all the routing protocols are in UP status.

Procedure

| | Command or Action | Purpose |
|---------------|-------------------|-------------------------------|
| Step 1 | enable | Enables privileged EXEC mode. |

| | Command or Action | Purpose |
|---------------|---|---|
| | Example: Device> enable | Enter your password, if prompted. |
| Step 2 | configure terminal Example: Device# configure terminal | Enters global configuration mode. |
| Step 3 | router bgp <i>autonomous-system-number</i> Example: Device(config)# router bgp 65000 | Enters BGP router configuration mode. |
| Step 4 | bgp graceful-restart Example: Device(config-router)# bgp graceful-restart | Enables NSF awareness on the switch. By default, NSF awareness is disabled. |
| Step 5 | end Example: Device(config-router)# end | Returns to privileged EXEC mode. |
| Step 6 | write memory Example: Device# write memory | Saves the configuration on the switch. |
| Step 7 | reload fast Example: Device# reload fast | Reloads the switch without software upgrade. |

Reloading Software on a Standalone Switch Configured with OSPFv3

To reload software on a standalone switch configured with OSPv3, perform the following procedure.

Before you begin

Use the **show graceful-reload** command in privileged EXEC mode to ensure that all the routing protocols are in **UP** status.

Procedure

| | Command or Action | Purpose |
|---------------|---|--|
| Step 1 | enable Example: Device> enable | Enables privileged EXEC mode. Enter your password, if prompted. |

| | Command or Action | Purpose |
|----------------|--|---|
| Step 2 | configure terminal Example: Device# configure terminal | Enters global configuration mode. |
| Step 3 | ipv6 nd reachable-time seconds Example: Device (config)# ipv6 nd reachable-time 3600000 | Sets the time limit for a remote IPv6 node to be considered reachable after a reachability confirmation event has occurred. |
| Step 4 | snmp ifmib ifindex persist Example: Device (config)# snmp ifmib ifindex persist | Globally enables SNMP ifIndex persistence. |
| Step 5 | router ospfv3 process-id Example: Device (config)# router ospfv3 1 | Enters OSPFv3 router configuration mode. |
| Step 6 | router-id ip-address Example: Device (config-router)# router-id 192.0.2.5 | Sets a fixed router ID for the OSPFv3 instance. |
| Step 7 | interface-id snmp-if-index Example: Device (config-router)# interface-id snmp-if-index | Enables SNMP ifIndex persistence on the specified interface. |
| Step 8 | end Example: Device (config-router)# end | Returns to privileged EXEC mode. |
| Step 9 | write memory Example: Device# write memory | Saves the configuration on the switch. |
| Step 10 | reload fast Example: Device# reload fast | Reloads the switch without software upgrade. |

How to Perform Extended Fast Software Upgrade on a Stacked Switch

The following sections provide configuration information on how to perform Extended Fast Software Upgrade on a stacked switch.

Upgrading the Software on a Stacked Switch

To upgrade the software on a stacked switch, perform the following procedure:

Before you begin

Use the **install remove inactive** command in privileged EXEC mode to free the disk space for the new software, if necessary.

Procedure

| | Command or Action | Purpose |
|---------------|---|--|
| Step 1 | enable Example: Device> enable | Enables privileged EXEC mode. Enter your password, if prompted. |
| Step 2 | install add file image activate reloadfast commit Example: Device# install add file bootflash: cat9k_iosxe.17.03.02.SPA.bin activate reloadfast commit | The following processes happen: <ol style="list-style-type: none"> Upgrades the image on the active, standby, and member switches. Restarts the standby and member switches. Restarts the active switch and switch changeover occurs. The standby switch becomes the new active switch and the active switch becomes the standby switch. The <i>image</i> keyword includes the location of the file (TFTP, HTTP, flash drives) and the image name. |

Upgrading the Software on a Stacked Switch Configured with BGP

To upgrade the software on a stacked switch configured with BGP, perform the following procedure:

Before you begin

- Use the **show graceful-reload** command in privileged EXEC mode to ensure that all the routing protocols are in **UP** status.
- Use the **install remove inactive** command in privileged EXEC mode to free the disk space for the new software, if necessary.

Procedure

| | Command or Action | Purpose |
|---------------|---|---|
| Step 1 | enable Example: Device> enable | Enables privileged EXEC mode. Enter your password, if prompted. |
| Step 2 | configure terminal Example: Device# configure terminal | Enters global configuration mode. |
| Step 3 | router bgp <i>autonomous-system-number</i> Example: Device(config)# router bgp 65000 | Enters BGP router configuration mode. |
| Step 4 | bgp graceful-restart all Example: Device(config-router)# bgp graceful-restart | Enables NSF awareness on a switch. By default, NSF awareness is disabled. |
| Step 5 | end Example: Device(config-router)# end | Returns to privileged EXEC mode. |
| Step 6 | write memory Example: Device# write memory | Saves the configuration on the switch. |
| Step 7 | install add file <i>image</i> activate reloadfast commit Example: Device# install add file bootflash: cat9k_iosxe.17.03.02.SPA.bin activate reloadfast commit | Upgrades the switch with the new software image. The <i>image</i> keyword includes the location of the file (TFTP, HTTP, flash drives) and the image name. |

Upgrading the Software on a Stacked Switch Configured with IS-IS

To upgrade the software on a stacked switch configured with IS-IS, perform the following procedure:

Before you begin

Use the **install remove inactive** command in privileged EXEC mode to free the disk space for the new software, if necessary.

Procedure

| | Command or Action | Purpose |
|---------------|---|--|
| Step 1 | enable Example: Device> enable | Enables privileged EXEC mode. Enter your password, if prompted. |
| Step 2 | configure terminal Example: Device# configure terminal | Enters global configuration mode. |
| Step 3 | router isis area-tag Example: Device(config)# router isis tag1 | Enables the IS-IS routing protocol to specify an IS-IS process, and places the switch in router configuration mode. |
| Step 4 | nsf {cisco ietf} Example: Device(config-router)# nsf cisco OR Device(config-router)# nsf ietf | Enables NSF operation for IS-IS. <ul style="list-style-type: none"> • ietf: Enables IS-IS in homogeneous network where adjacencies with networking switches supporting IETF draft-based restartability is guaranteed. • cisco: Runs IS-IS in heterogeneous networks that might not have adjacencies with NSF-aware networking switches. |
| Step 5 | end Example: Device(config-router)# end | Returns to privileged EXEC mode. |
| Step 6 | write memory Example: Device# write memory | Saves the configuration on the switch. |
| Step 7 | install add file image activate reloadfast commit Example: Device# install add file bootflash: cat9k_iosxe.17.03.02.SPA.bin activate reloadfast commit | Upgrades the switch with the new software image. The <i>image</i> keyword includes the location of the file (TFTP, HTTP, flash drives) and the image name. |

Reloading Software on a Stacked Switch

To reload software on a stacked switch, perform the following procedure.

Procedure

| | Command or Action | Purpose |
|---------------|---|--|
| Step 1 | enable Example: Device> enable | Enables privileged EXEC mode. Enter your password, if prompted. |
| Step 2 | reload fast Example: Device# reload fast | The following processes happen: <ol style="list-style-type: none"> a. Reloads the standby and member switches. b. Reloads the active switch and switch changeover occurs. The standby switch becomes the new active switch and the active switch becomes the new standby switch. |

Reloading Software on a Stacked Switch Configured with BGP

To reload software on a stacked switch configured with BGP, perform the following procedure.

Before you begin

Use the **show graceful-reload** command in privileged EXEC mode to ensure that all the routing protocols are in **UP** status.

Procedure

| | Command or Action | Purpose |
|---------------|---|--|
| Step 1 | enable Example: Device> enable | Enables privileged EXEC mode. Enter your password, if prompted. |
| Step 2 | configure terminal Example: Device# configure terminal | Enters global configuration mode. |
| Step 3 | router bgp <i>autonomous-system-number</i> Example: Device(config)# router bgp 65000 | Enters BGP router configuration mode. |
| Step 4 | bgp graceful-restart all Example: Device(config-router)# bgp graceful-restart all | Enables NSF awareness on all switches in the stack. By default, NSF awareness is disabled. |

| | Command or Action | Purpose |
|---------------|---|--|
| Step 5 | end Example: Device(config-router)# end | Returns to privileged EXEC mode. |
| Step 6 | write memory Example: Device# write memory | Saves the configuration on the switch. |
| Step 7 | reload fast Example: Device# reload fast | Reloads the switch without software upgrade. |

Reloading Software on a Stacked Switch Configured with IS-IS

To reload software on a stacked switch configured with IS-IS, perform the following procedure.

Procedure

| | Command or Action | Purpose |
|---------------|---|---|
| Step 1 | enable Example: Device> enable | Enables privileged EXEC mode. Enter your password, if prompted. |
| Step 2 | configure terminal Example: Device# configure terminal | Enters global configuration mode. |
| Step 3 | router isis area-tag Example: Device(config)# router isis tag1 | Enables the IS-IS routing protocol to specify an IS-IS process, and places the switch in router configuration mode. |
| Step 4 | nsf {cisco ietf} Example: Device(config-router)# nsf cisco OR Device(config-router)# nsf ietf | Enables NSF operation for IS-IS. <ul style="list-style-type: none"> • ietf: Enables IS-IS in homogeneous network where adjacencies with networking switches supporting IETF draft-based restartability is guaranteed. • cisco: Runs IS-IS in heterogeneous networks that might not have adjacencies with NSF-aware networking switches. |
| Step 5 | end Example: Device(config-router)# end | Returns to privileged EXEC mode. |

| | Command or Action | Purpose |
|---------------|---|--|
| Step 6 | write memory Example: Device# <code>write memory</code> | Saves the configuration on the switch. |
| Step 7 | reload fast Example: Device# <code>reload fast</code> | Reloads the switch without software upgrade. |

Verifying Software Upgrade or Reload

Use the following commands in privileged EXEC mode to verify the software upgrade or reload is successful.

Table 1: Commands to Verify the Software Upgrade or Reload

| Command | Purpose |
|---------------------------------------|--|
| <code>show version</code> | Displays the hardware and software information for a device. |
| <code>show log in FAST</code> | Displays whether software upgrade or reload using Extended Fast Software Upgrade is completed. |
| <code>show install summary</code> | Displays information about an active package. |
| <code>show install log</code> | Displays information about installation requests. |
| <code>show version running</code> | Displays information about the files that are currently running. |
| <code>show version in reason</code> | Displays the reason for the last reload. |

Additional References

Related Documents

| Related Topic | Document Title |
|------------------------------------|--|
| Information on routing protocols | See the <i>IP Routing Configuration Guide of the Software Configuration Guide (Catalyst 9300 Switches)</i> |
| Information on STP, PVST, and UDLD | See the <i>Layer 2 Configuration Guide of the Software Configuration Guide (Catalyst 9300 Switches)</i> |
| Information on Perpetual PoE | See the <i>Network Powered Lighting Configuration Guide of the Software Configuration Guide (Catalyst 9300 Switches)</i> |

Feature History for Extended Fast Software Upgrade

This table provides release and related information for features explained in this module.

These features are available on all releases subsequent to the one they were introduced in, unless noted otherwise.

| Release | Feature | Feature Information |
|--------------------------------|--------------------------------|--|
| Cisco IOS XE Amsterdam 17.3.2a | Extended Fast Software Upgrade | Extended Fast Software Upgrade reduces the traffic downtime during software reload or upgrade operations. Support for this feature was introduced on the 9300 and 9300L switch models of the Cisco Catalyst 9300 Series Switches. |

