Managing Switch Stacks

Finding Feature Information

Your software release may not support all the features documented in this module. For the latest caveats and feature information, see Bug Search Tool and the release notes for your platform and software release. To find information about the features documented in this module, and to see a list of the releases in which each feature is supported, see the feature information table at the end of this module.

Use Cisco Feature Navigator to find information about platform support and Cisco software image support. To access Cisco Feature Navigator, go to http://www.cisco.com/go/cfn. An account on Cisco.com is not required.

Prerequisites for Switch Stacks

Restrictions for Switch Stacks

There are no restrictions with Horizontal Stacking on Catalyst 3560cx.

Information About Switch Stacks

Horizontal Stacking

The Catalyst 3560CX series switches supporting 10G SFP+ uplink ports and MGig ports can be part of horizontal stacking. We can use SFP+ with the optical cables and copper cables on the MGig ports to connect boxes placed at different location to form a stack, where the compact boxes are placed in different floors or buildings. We can form half-ring or full-ring based on need, and remaining uplink ports will continue to work as network ports.

When we convert a network port to stack port, it will continue to work as network port without any impact to current running configuration until next reload of switch. All current configurations of that particular network port will be lost after reload of switch once port comes up as Stack port.

When we convert a stack port back to network port it will continue to work as stack port until next reload of switch. After reload port comes up as network port with default configuration.

Note When uplink ports are working as stack ports, those particular uplink interfaces (ex: Te1/0/1) will not be listed in any show command or will not be available under any config command, unlike any other network port. They will be made available only after reload of the switch once ports are converted back to network.

Table 1: C3560CX Switches Supporting Horizontal Stacking

Product ID	Access Ports	Uplinks	Stackable Ports
WS-C3560CX-12PD-S	12 GE	2GE + 2SFP+	2 10G uplink
WS-C3560CX-8XPD-S	6 GE	2multigig + 2SFP+	1 multigig and 1 10G uplink, or 2 multigig, or 2 10G uplink

Switch Stack Membership

A switch stack has up to eight stack members connected through their stack ports. A switch stack always has one stack master.

A standalone device is a device stack with one stack member that also operates as the stack master. You can connect one standalone device to another to create a device stack containing two stack members, with one of them as the stack master. You can connect standalone devicees to an existing device stack to increase the stack membership.

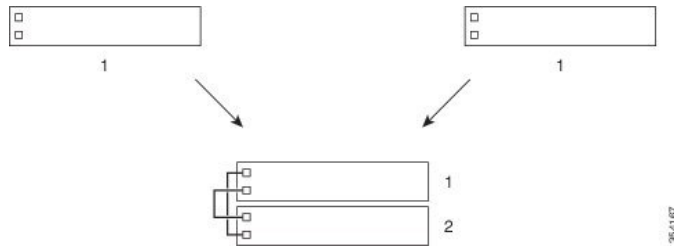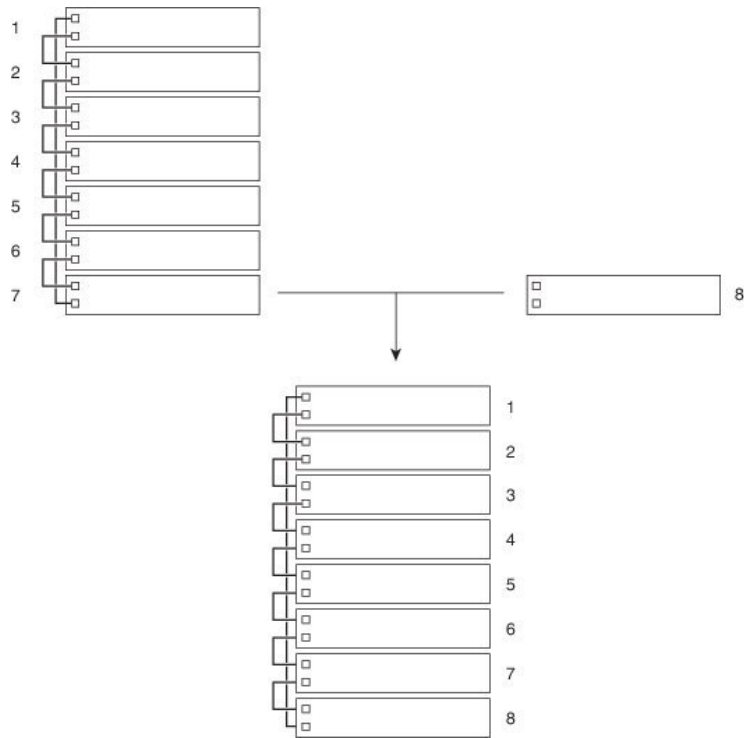*Figure 1: Creating a Switch Stack from Two Standalone Switches*

Figure 2: Adding a Standalone Switch to a Switch Stack

Changes to Switch Stack Membership

If you replace a stack member with an identical model, the new switch functions with exactly the same configuration as the replaced switch, assuming that the new switch (referred to as the provisioned switch) is using the same member number as the replaced switch.

The operation of the switch stack continues uninterrupted during membership changes unless you remove the stack master or you add powered-on standalone switches or switch stacks.

- Adding powered-on switches (merging) causes the stack masters of the merging switch stacks to elect a stack master from among themselves. The reelected stack master retains its role and configuration as do its stack members. All remaining switches, including the former stack masters, reload and join the switch stack as stack members. They change their stack member numbers to the lowest available numbers and use the stack configuration of the reelected stack master.

- Removing powered-on stack members causes the switch stack to divide (partition) into two or more switch stacks, each with the same configuration. This can cause:

- An IP address conflict in your network. If you want the switch stacks to remain separate, change the IP address or addresses of the newly created switch stacks.

- A MAC address conflict between two members in the stack. You can use the **stack-mac update force** command to resolve the conflict.

Note   Make sure that you power off the switches that you add to or remove from the switch stack.

After adding or removing stack members, make sure that the switch stack is operating at full bandwidth . Press the Mode button on a stack member until the Stack mode LED is on. The last two right port LEDs on all switches in the stack should be green. Depending on the switch model, the last two right ports are 10-Gigabit Ethernet ports or small form-factor pluggable (SFP) module ports (10/100/1000 ports). If one or both of these LEDs are not green on any of the switches, the stack is not operating at full bandwidth.

It may take upto 4 seconds for stack convergence when a new stack member is added to the existing switch stack.

If you remove powered-on members but do not want to partition the stack:

- Power off the switches in the newly created switch stacks.

- Reconnect them to the original switch stack through their stack ports.

- Power on the switches.

Stack Member Numbers

The stack member number (1 to 8) identifies each member in the switch stack. The member number also determines the interface-level configuration that a stack member uses. You can display the stack member number by using the **show switch** EXEC command.

A new, out-of-the-box (one that has not joined a stack or has not been manually assigned a stack member number) ships with a default stack member number of 1. When it joins a stack, its default stack member number changes to the lowest available member number in the stack.

Stack members in the same stack cannot have the same stack member number. Every stack member, including a standalone , retains its member number until you manually change the number or unless the number is already being used by another member in the stack.

- If you manually change the stack member number by using the **switch** *current-stack-member-number* **renumber** *new-stack-member-number* command, the new number goes into effect after that stack member resets (or after you use the **reload slot** *stack-member-number* privileged EXEC command) and only if that number is not already assigned to any other members in the stack. Another way to change the stack member number is by changing the _NUMBER environment variable.

  If the number is being used by another member in the stack, the selects the lowest available number in the stack.

  If you manually change the number of a stack member and no interface-level configuration is associated with that new member number, that stack member resets to its default configuration.

  You cannot use the **switch** *current-stack-member-number* **renumber** *new-stack-member-number* command on a provisioned . If you do, the command is rejected.

- If you move a stack member to a different stack, the stack member retains its number only if the number is not being used by another member in the stack. If it is being used, the selects the lowest available number in the stack.

- If you merge stacks, the that join the stack of a new stack master select the lowest available numbers in the stack.

As described in the hardware installation guide, you can use the port LEDs in Stack mode to visually determine the stack member number of each stack member.

In the **default** mode Stack LED will blink in green color only on the stack master. However, when we scroll the Mode button to **Stack** option - Stack LED will glow green on all the stack members.

When mode button is scrolled to **Stack** option, the switch number of each stack member will be displayed as LEDs on the first five ports of that switch. The switch number is displayed in binary format for all stack members. On the switch, the amber LED indicates value 0 and green LED indicates value 1.

Example for switch number 5 (Binary - 00101):

First five LEDs glow as follows on stack member with switch number 5.

- Port-1 : Amber

- Port-2 : Amber

- Port-3 : Green

- Port-4 : Amber

- Port-5 : Green

Similarly, the first five LEDs glow amber or green, depending on the switch number on all stack members.

Note
- If you connect a Horizontal stack port to a normal network port on other end, stack port transmission/reception will be disabled within 30 seconds if no SDP packets are received from the other end.

- Stack port will not go down but only transmission/reception will be disabled. The log message shown below will be displayed on the console. Once the peer end network port is converted to stack port, transmission/reception on this stack port will be enabled.

```
%STACKMGR-4-HSTACK_LINK_CONFIG: Verify peer stack port setting for hstack
 StackPort-1 switch 5 (hostname-switchnumber)
```

Stack Member Priority Values

A higher priority value for a stack member increases the probability of it being elected stack master and retaining its stack member number. The priority value can be 1 to 15. The default priority value is 1. You can display the stack member priority value by using the **show switch** EXEC command.

Note We recommend assigning the highest priority value to the device that you prefer to be the stack master. This ensures that the device is reelected as the stack master if a reelection occurs.

To change the priority value for a stack member, use the **switch** *stack-member-number* **priority** *new priority-value* command. For more information, see the "Setting the Stack Member Priority Value" section.

The new priority value takes effect immediately but does not affect the current stack master. The new priority value helps determine which stack member is elected as the new stack master when the current stack master or the switch stack resets.

Switch Stack Bridge ID and MAC Address

The MAC address of the stack master determines the stack MAC address.

When the stack initializes, the MAC address of the stack master determines the bridge ID that identifies the stack in the network.

If the stack master changes, the MAC address of the new stack master determines the new bridge ID and stack MAC address.

If the entire switch stack reloads, the switch stack uses the MAC address of the stack master.

Persistent MAC Address on the Switch Stack

You can also configure stack MAC persistency so that the stack MAC address never changes to the new stack master MAC address.

Stack Master Election and Reelection

The stack master is elected or reelected based on one of these factors and in the order listed:

1. The switch that is currently the stack master.

2. The switch with the highest stack member priority value.

Note We recommend assigning the highest priority value to the switch that you prefer to be the stack master. This ensures that the switch is reelected as stack master if a reelection occurs.

3. The switch with the lowest MAC address.

Switch Stack Configuration Files

The configuration files record these settings:

• System-level (global) configuration settings such as IP, STP, VLAN, and SNMP settings that apply to all stack members

• Stack member interface-specific configuration settings that are specific for each stack member

Note   The interface-specific settings of the stack master are saved if the stack master is replaced without saving the running configuration to the startup configuration.

A new, out-of-box device joining a switch stack uses the system-level settings of that switch stack. If a device is moved to a different switch stack before it is powered on, that device loses its saved configuration file and uses the system-level configuration of the new switch stack. If the device is powered on as a standalone device before it joins the new switch stack, the stack will reload. When the stack reloads, the new device may become the stack master, retain its configuration and overwrite the configuration files of the other stack members.

The interface-specific configuration of each stack member is associated with the stack member number. Stack members retain their numbers unless they are manually changed or they are already used by another member in the same switch stack. If the stack member number changes, the new number goes into effect after that stack member resets.

- If an interface-specific configuration does not exist for that member number, the stack member uses its default interface-specific configuration.

- If an interface-specific configuration exists for that member number, the stack member uses the interface-specific configuration associated with that member number.

If you replace a failed member with an identical model, the replacement member automatically uses the same interface-specific configuration as the failed device. You do not need to reconfigure the interface settings. The replacement device (referred to as the provisioned device) must have the same stack member number as the failed device.

You back up and restore the stack configuration in the same way as you would for a standalone device configuration.

Offline Configuration to Provision a Stack Member

You can use the offline configuration feature to *provision* (to supply a configuration to) a new switch before it joins the switch stack. You can configure the stack member number, the switch type, and the interfaces associated with a switch that is not currently part of the stack. The configuration that you create on the switch stack is called the *provisioned configuration*. The switch that is added to the switch stack and that receives this configuration is called the *provisioned switch*.

You manually create the provisioned configuration through the **switch** *stack-member-number* **provision** *type* global configuration command. You must change the *stack-member-number* on the provisioned switch before you add it to the stack, and it must match the stack member number that you created for the new switch on the switch stack. The switch type in the provisioned configuration must match the switch type of the newly added switch. The provisioned configuration is automatically created when a switch is added to a switch stack and when no provisioned configuration exists.

When you configure the interfaces associated with a provisioned switch, the switch stack accepts the configuration, and the information appears in the running configuration. However, as the switch is not active, any configuration on the interface is not operational and the interface associated with the provisioned switch does not appear in the display of the specific feature. For example, VLAN configuration information associated with a provisioned switch does not appear in the **show vlan** user EXEC command output on the switch stack.

The switch stack retains the provisioned configuration in the running configuration whether or not the provisioned switch is part of the stack. You can save the provisioned configuration to the startup configuration file by entering the **copy running-config startup-config** privileged EXEC command. The startup configuration

file ensures that the switch stack can reload and can use the saved information whether or not the provisioned switch is part of the switch stack.

Effects of Adding a Provisioned Switch to a Switch Stack

When you add a provisioned Device to the switch stack, the stack applies either the provisioned configuration or the default configuration. This table lists the events that occur when the switch stack compares the provisioned configuration with the provisioned switch.

Table 2: Results of Comparing the Provisioned Configuration with the Provisioned Switch

Scenario		Result
The stack member numbers and the Device types match.	1. If the stack member number of the provisioned switch matches the stack member number in the provisioned configuration on the stack, and 2. If the Device type of the provisioned switch matches the Device type in the provisioned configuration on the stack.	The switch stack applies the provisioned configuration to the provisioned switch and adds it to the stack.
The stack member numbers match but the Device types do not match.	1. If the stack member number of the provisioned switch matches the stack member number in the provisioned configuration on the stack, but 2. The Device type of the provisioned switch does not match the Device type in the provisioned configuration on the stack.	The switch stack applies the default configuration to the provisioned switch and adds it to the stack. The provisioned configuration is changed to reflect the new information.
The stack member number is not found in the provisioned configuration.		The switch stack applies the default configuration to the provisioned switch and adds it to the stack. The provisioned configuration is changed to reflect the new information.
The stack member number of the provisioned switch is not found in the provisioned configuration.		The switch stack applies the default configuration to the provisioned switch and adds it to the stack.

If you add a provisioned switch that is a different type than specified in the provisioned configuration to a powered-down switch stack and then apply power, the switch stack rejects the (now incorrect) **switch** *stack-member-number* **provision** *type* global configuration command in the startup configuration file. However, during stack initialization, the nondefault interface configuration information in the startup configuration file for the provisioned interfaces (potentially of the wrong type) is executed. Depending on the differences between

the actual Device type and the previously provisioned switch type, some commands are rejected, and some commands are accepted.

Note If the switch stack does not contain a provisioned configuration for a new Device, the Device joins the stack with the default interface configuration. The switch stack then adds to its running configuration with a **switch** *stack-member-number* **provision** *type* global configuration command that matches the new Device. For configuration information, see the *Provisioning a New Member for a Switch Stack* section.

Effects of Replacing a Provisioned Switch in a Switch Stack

When a provisioned switch in a switch stack fails, it is removed from the stack, and is replaced with another Device, the stack applies either the provisioned configuration or the default configuration to it. The events that occur when the switch stack compares the provisioned configuration with the provisioned switch are the same as those when you add a provisioned switch to a stack.

Effects of Removing a Provisioned Switch from a Switch Stack

If you remove a provisioned switch from the switch stack, the configuration associated with the removed stack member remains in the running configuration as provisioned information. To completely remove the configuration, use the **no switch** *stack-member-number* **provision** global configuration command.

Stack Protocol Version

Each software image includes a *stack protocol version*. The stack protocol version has a *major* version number and a *minor* version number (for example 1.4, where 1 is the major version number and 4 is the minor version number). Both version numbers determine the level of compatibility among the stack members.

The switches with the same Cisco IOS software version have the same stack protocol version. Such switches are fully compatible, and all features function properly across the switch stack. A device with the same Cisco IOS software version as the stack master can immediately join the switch stack.

If an incompatibility exists, the fully functional stack members generate a system message that describes the cause of the incompatibility on the specific stack members. The stack master sends the message to all stack members.

For more information, see the *Major Version Number Incompatibility Among Switches* procedure and the *Minor Version Number Incompatibility Among Switches* procedure.

Major Stack Protocol Version Number Incompatibility Among Stack-Capable Switches

Device with different major Cisco IOS software versions usually have different stack protocol versions. Device with different major version numbers are incompatible and cannot exist in the same switch stack.

Minor Stack Protocol Version Number Incompatibility Among Stack-Capable Switches

Auto-Upgrade

The purpose of the auto-upgrade feature is to allow a switch to be upgraded to a compatible software image, so that the switch can join the switch stack.

When a new switch attempts to join a switch stack, each stack member performs compatibility checks with itself and the new switch. Each stack member sends the results of the compatibility checks to the stack master, which uses the results to determine whether the switch can join the switch stack. If the software on the new switch is incompatible with the switch stack, the new switch enters version-mismatch (VM) mode.

If the auto-upgrade feature is enabled on the existing switch stack, the stack master automatically upgrades the new switch with the same software image running on a compatible stack member. Auto-upgrade starts a few minutes after the mismatched software is detected before starting.

Auto-upgrade includes an auto-copy process and an auto-extract process.

- Auto-copy automatically copies the software image running on any stack member to the new switch to automatically upgrade it. Auto-copy occurs if auto-upgrade is enabled, if there is enough flash memory in the new switch, and if the software image running on the switch stack is suitable for the new switch.

> **Note** A switch in VM mode might not run all released software. For example, new switch hardware is not recognized in earlier versions of software.

When the auto-upgrade process is complete, the new switch reloads and joins the stack as a fully functioning member. If you have both stack cables connected during the reload, network downtime does not occur because the switch stack operates on two rings.

Switch Stack Management Connectivity

You manage the switch stack and the stack member interfaces through the stack master. You can use the CLI, SNMP, and supported network management applications such as CiscoWorks. You cannot manage stack members on an individual Device basis.

Connectivity to Specific Stack Members

If you want to configure a specific stack member port, you must include the stack member number in the CLI command interface notation.

Connectivity to the Switch Stack Through an IP Address

The switch stack is managed through a single IP address. The IP address is a system-level setting and is not specific to the stack master or to any other stack member. You can still manage the stack through the same IP address even if you remove the stack master or any other stack member from the stack, provided there is IP connectivity.

> **Note** Stack members retain their IP addresses when you remove them from a switch stack. To avoid a conflict by having two devices with the same IP address in your network, change the IP addresses of any Device that you remove from the switch stack.

For related information about switch stack configurations, see the *Switch Stack Configuration Files section*.

Connectivity to the Switch Stack Through Console Ports

You can connect to the stack master by connecting a terminal or a PC to the stack master through the console port of one or more stack members.

Be careful when using multiple CLI sessions to the stack master. Commands that you enter in one session are not displayed in the other sessions. Therefore, it is possible that you might not be able to identify the session from which you entered a command.

We recommend using only one CLI session when managing the switch stack.

How to Configure a Switch Stack

Configuring a Network Port as Stack Port

You can configure both 10G network ports and multigig ports as stack ports or configure one port as stack port and retain another port as network port.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **switch** *switch-number* **hstack-port** *stack-port*
4. **end**
5. **show switch horizontal-stack-ports**
6. **copy running-config startup-config**
7. **reload**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** Switch> **enable**	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**configure terminal** **Example:** Switch# **configure terminal**	Enters global configuration mode.
Step 3	**switch** *switch-number* **hstack-port** *stack-port* **Example:** Switch(config)# **switch 1 hstack-port 1**	Configures the network port into a stack port . **Note** After configuration, restart the switch for network port to become a stack port.

	Command or Action	**Purpose**
	`TenGigabitEthernet 1/0/1`	
Step 4	**end** **Example:** `Switch(config)# end`	Returns to privileged EXEC mode.
Step 5	**show switch horizontal-stack-ports** **Example:** `Switch# show switch hstack-ports`	Verifies the operation status of network ports and stack ports.
Step 6	**copy running-config startup-config** **Example:** `Switch# copy running-config startup-config`	(Optional) Saves your entries in the configuration file.
Step 7	**reload** **Example:** `Switch# reload`	Reloads the configuration.

What to do next

To convert a stack port into a network port, run the **no switch** *switch-number* **hstack-port** *stack-port* command:

```
Switch(config)# no switch 1 hstack-port 1 TenGigabitEthernet 1/0/1
Switch# copy running-config startup-config
Switch# reload
```

Note After configuration, restart the switch to convert the stack port into a network port.

Note Stack port to network port conversion and vice versa cli is not nvgened. On write erase reload, the switch in stack mode will not be converted to standalone, and manual conversion of stack port to network port is required.

Enabling the Persistent MAC Address Feature

Note   When you enter the command to configure this feature, a warning message appears with the consequences of your configuration. You should use this feature cautiously. Using the old stack master MAC address elsewhere in the same domain could result in lost traffic.

Follow these steps to enable persistent MAC address:

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **stack-mac persistent timer** [**0** | *time-value*]
4. **end**
5. **copy running-config startup-config**

DETAILED STEPS

	Command or Action	**Purpose**
Step 1	**enable** **Example:** Switch> **enable**	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**configure terminal** **Example:** Switch# **configure terminal**	Enters global configuration mode.
Step 3	**stack-mac persistent timer** [**0**	*time-value*] **Example:** Switch(config)# **stack-mac persistent timer 7**	Enables a time delay after a stack-master change before the stack MAC address changes to that of the new stack master. If the previous stack master rejoins the stack during this period, the stack uses that MAC address as the stack MAC address. You can configure the time period as 0 to 60 minutes. • Enter the command with no value to set the default delay of approximately 4 minutes. We recommend that you always enter a value. If the command is entered without a value, the time delay appears in the running-config file with an explicit timer value of 4 minutes. • Enter **0** to continue using the MAC address of the current stack master indefinitely.

Command or Action	Purpose
	The stack MAC address of the previous stack master is used until you enter the **no stack-mac persistent timer** command, which immediately changes the stack MAC address to that of the current stack master.
	• Enter a *time-value* from 1 to 60 minutes to configure the time period before the stack MAC address changes to the new stack master.
	The stack MAC address of the previous stack master is used until the configured time period expires or until you enter the **no stack-mac persistent timer** command.
	Note If you enter the **no stack-mac persistent timer** command after a new stack master takes over, before the time expires, the switch stack moves to the current stack master MAC address.
Step 4 **end** **Example:** Switch(config)# **end**	Returns to privileged EXEC mode.
Step 5 **copy running-config startup-config** **Example:** Switch# **copy running-config startup-config**	(Optional) Saves your entries in the configuration file.

What to do next

Use the **no stack-mac persistent timer** global configuration command to disable the persistent MAC address feature.

Assigning a Stack Member Number

This optional task is available only from the stack master.

Follow these steps to assign a member number to a stack member:

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **switch** *current-stack-member-number* **renumber** *new-stack-member-number*
4. **end**
5. **reload slot** *stack-member-number*

6. **show switch**
7. **copy running-config startup-config**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** Switch> **enable**	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**configure terminal** **Example:** Switch# **configure terminal**	Enters global configuration mode.
Step 3	**switch** *current-stack-member-number* **renumber** *new-stack-member-number* **Example:** Switch(config)# **switch 3 renumber 4**	Specifies the current stack member number and the new stack member number for the stack member. The range is 1 to 8. You can display the current stack member number by using the **show switch** user EXEC command.
Step 4	**end** **Example:** Switch(config)# **end**	Returns to privileged EXEC mode.
Step 5	**reload slot** *stack-member-number* **Example:** Switch# **reload slot 4**	Resets the stack member.
Step 6	**show switch** **Example:** **show**Switch	Verify the stack member number.
Step 7	**copy running-config startup-config** **Example:** Switch# **copy running-config startup-config**	(Optional) Saves your entries in the configuration file.

Setting the Stack Member Priority Value

This optional task is available only from the stack master.

Follow these steps to assign a priority value to a stack member:

SUMMARY STEPS

1. **enable**
2. **switch** *stack-member-number* **priority** *new-priority-number*
3. **show switch** *stack-member-number*
4. **copy running-config startup-config**

DETAILED STEPS

	Command or Action	**Purpose**
Step 1	**enable** **Example:** Switch **enable**	Enables privileged EXEC mode. Enter your password if prompted.
Step 2	**switch** *stack-member-number* **priority** *new-priority-number* **Example:** Switch# **switch 3 priority 2**	Specifies the stack member number and the new priority for the stack member. The stack member number range is 1 to 8. The priority value range is 1 to 15. You can display the current priority value by using the **show switch** user EXEC command. The new priority value takes effect immediately but does not affect the current stack master. The new priority value helps determine which stack member is elected as the new stack master when the current stack master or switch stack resets.
Step 3	**show switch** *stack-member-number* **Example:** Switch# **show switch**	Verify the stack member priority value.
Step 4	**copy running-config startup-config** **Example:** Switch# **copy running-config startup-config**	(Optional) Saves your entries in the configuration file.

Provisioning a New Member for a Switch Stack

This optional task is available only from the stack master.

SUMMARY STEPS

1. **show switch**
2. **configure terminal**
3. **switch** *stack-member-number* **provision** *type*

4. end

5. copy running-config startup-config

DETAILED STEPS

	Command or Action	Purpose
Step 1	**show switch** **Example:** Switch# **show switch**	Displays summary information about the switch stack.
Step 2	**configure terminal** **Example:** Switch# **configure terminal**	Enters global configuration mode.
Step 3	**switch** *stack-member-number* **provision** *type* **Example:** Switch(config)# **switch 3 provision WS-xxxx**	Specifies the stack member number for the preconfigured switch. By default, no switches are provisioned. For *stack-member-number*, the range is 1 to 8. Specify a stack member number that is not already used in the switch stack. See Step 1. For *type*, enter the model number of a supported switch that is listed in the command-line help strings.
Step 4	**end** **Example:** Switch(config)# **end**	Returns to privileged EXEC mode.
Step 5	**copy running-config startup-config** **Example:** Switch# **copy running-config startup-config**	(Optional) Saves your entries in the configuration file.

Removing Provisioned Switch Information

Before you begin, you must remove the provisioned switch from the stack. This optional task is available only from the stack master.

SUMMARY STEPS

1. configure terminal

2. no switch *stack-member-number* provision

3. end

4. copy running-config startup-config

DETAILED STEPS

	Command or Action	**Purpose**
Step 1	**configure terminal** **Example:** Switch# **configure terminal**	Enters global configuration mode.
Step 2	**no switch** *stack-member-number* **provision** **Example:** Switch(config)# **no switch 3 provision**	Removes the provisioning information for the specified member.
Step 3	**end** **Example:** Switch(config)# **end**	Returns to privileged EXEC mode.
Step 4	**copy running-config startup-config** **Example:** Switch# **copy running-config startup-config**	(Optional) Saves your entries in the configuration file.

Example

If you are removing a provisioned switch in a stack with this configuration:

- The stack has four members
- Stack member 1 is the stack master
- Stack member 3 is a provisioned switch

and want to remove the provisioned information and to avoid receiving an error message, you can remove power from stack member 3, disconnect the cables between the stack member 3 and switches to which it is connected, reconnect the cables between the remaining stack members, and enter the **no switch** *stack-member-number* **provision** global configuration command.

Troubleshooting the Switch Stack

Temporarily Disabling a Stack Port

If a stack port is flapping and causing instability in the stack ring, to disable the port, enter the **switch** *stack-member-number* **stack port** *port-number* **disable** privileged EXEC command. To reenable the port, enter the **switch** *stack-member-number* **stack port** *port-number* **enable** command.

✎

Note   Be careful when using the **switch** *stack-member-number* **stack port** *port-number* **disable** command. When you disable the stack port, the stack operates at half bandwidth.

A stack is in the full-ring state when all members are connected through the stack ports and are in the ready state.

The stack is in the partial-ring state when the following occurs:

- All members are connected through their stack ports but some are not in the ready state.

- Some members are not connected through the stack ports.

SUMMARY STEPS

1. **switch** *stack-member-number* **stack port** *port-number* **disable**

2. **switch** *stack-member-number* **stack port** *port-number* **enable**

DETAILED STEPS

	Command or Action	**Purpose**
Step 1	**switch** *stack-member-number* **stack port** *port-number* **disable** **Example:** Switch# **switch 2 stack port 1 disable**	Disables the specified stack port.
Step 2	**switch** *stack-member-number* **stack port** *port-number* **enable** **Example:** Switch# **switch 2 stack port 1 enable**	Reenables the stack port.

When you disable a stack port and the stack is in the full-ring state, you can disable only one stack port. This message appears:

```
Enabling/disabling a stack port may cause undesired stack changes. Continue?[confirm]
```

When you disable a stack port and the stack is in the partial-ring state, you cannot disable the port. This message appears:

```
Disabling stack port not allowed with current stack configuration.
```

Reenabling a Stack Port While Another Member Starts

Stack Port 1 on Switch 1 is connected to Port 2 on Switch 4. If Port 1 is flapping, you can disable Port 1 with the **switch 1 stack port 1 disable** privileged EXEC command. While Port 1 on Switch 1 is disabled and Switch 1 is still powered on, follow these steps to reenable a stack port:

Step 1 Disconnect the stack cable between Port 1 on Switch 1 and Port 2 on Switch 4.

Step 2 Remove Switch 4 from the stack.

Step 3 Add a switch to replace Switch 4 and assign it switch-number 4.

Step 4 Reconnect the cable between Port 1 on Switch 1 and Port 2 on Switch 4 (the replacement switch).

Step 5 Reenable the link between the switches. Enter the **switch 1 stack port 1 enable** privileged EXEC command to enable Port 1 on Switch 1.

Step 6 Power on Switch 4.

⚠

Caution Powering on Switch 4 before enabling the Port 1 on Switch 1 might cause one of the switches to reload.

If Switch 4 is powered on first, you might need to enter the **switch 1 stack port 1 enable** and the **switch 4 stack port 2 enable** privileged EXEC commands to bring up the link.

Monitoring the Device Stack

Table 3: Commands for Displaying Stack Information

Command	Description
show switch	Displays summary information about the stack, including the status of provisioned switches and switches in version-mismatch mode.
show switch *stack-member-number*	Displays information about a specific member.
show switch detail	Displays detailed information about the stack.
show switch neighbors	Displays the stack neighbors.
show switch stack-ports	Displays port information for the stack.

Configuration Examples for Switch Stacks

Switch Stack Configuration Scenarios

Most of these switch stack configuration scenarios assume that at least two device are connected through their ports.

Table 4: Configuration Scenarios

Scenario		Result
Stack master election specifically determined by existing stack masters	Connect two powered-on switch stacks through the ports.	Only one of the two stack masters becomes the new stack master.
Stack master election specifically determined by the stack member priority value	1. Connect two switches through their ports. 2. Use the **switch** *stack-member-number* **priority** *new-priority-number* global configuration command to set one stack member with a higher member priority value. 3. Restart both stack members at the same time.	The stack member with the higher priority value is elected stack master.
Stack master election specifically determined by the configuration file	Assuming that both stack members have the same priority value: 1. Make sure that one stack member has a default configuration and that the other stack member has a saved (nondefault) configuration file. 2. Restart both stack members at the same time.	The stack member with the saved configuration file is elected stack master.
Stack master election specifically determined by the MAC address	Assuming that both stack members have the same priority value, configuration file, and feature set, restart both stack members at the same time.	The stack member with the lower MAC address is elected stack master.

Scenario		Result
Stack member number conflict	Assuming that one stack member has a higher priority value than the other stack member: 1. Ensure that both stack members have the same stack member number. If necessary, use the **switch** *current-stack-member-number* **renumber** *new-stack-member-number* global configuration command. 2. Restart both stack members at the same time.	The stack member with the higher priority value retains its stack member number. The other stack member has a new stack member number.
Add a stack member	1. Power off the new switch. 2. Through their ports, connect the new switch to a powered-on switch stack. 3. Power on the new switch.	The stack master is retained. The new switch is added to the switch stack.
Stack master failure	Remove (or power off) the stack master.	One of the remaining stack members becomes the new stack master. All other stack members in the stack remain as stack members and do not reboot.
Add more than eight stack members	1. Through their ports, connect nine device. 2. Power on all device.	Two device become stack masters. One stack master has eight stack members. The other stack master remains as a standalone device. Use the Mode button and port LEDs on the device to identify which device are stack masters and which device belong to each stack master.

Enabling the Persistent MAC Address Feature: Example

This example shows how to configure the persistent MAC address feature for a 7-minute time delay and to verify the configuration:

```
Switch(config)# stack-mac persistent timer 7
  WARNING: The stack continues to use the base MAC of the old Master
  WARNING: as the stack MAC after a master switchover until the MAC
  WARNING: persistency timer expires. During this time the Network
  WARNING: Administrators must make sure that the old stack-mac does
  WARNING: not appear elsewhere in this network domain. If it does,
  WARNING: user traffic may be blackholed.
  Switch(config)# end
  Switch# show switch
  Switch/Stack Mac Address : 0016.4727.a900
```

```
    Mac persistency wait time: 7 mins
                                          H/W    Current
    Switch#  Role   Mac Address     Priority Version State
    ------------------------------------------------------
    *1       Master 0016.4727.a900     1      P2B    Ready
```

Provisioning a New Member for a Switch Stack: Example

This example shows how to provision a switch with a stack member number of 2 for the switch stack. The **show running-config** command output shows the interfaces associated with the provisioned switch:

Configuring a Network Port into a Stack Port: Examples

The following example shows how to convert a network port to stack port.

```
Switch> enable
Switch#configure terminal
Switch(config)#switch 1 hstack-port 1 TenGigabitEthernet 1/0/1
Do you want to continue?[confirm]
New port setting will be effective after next reload


Switch(config)#switch 1 hstack-port 2 TenGigabitEthernet 1/0/2
Do you want to continue?[confirm]
New port setting will be effective after next reload
```

The following output example shows the status of the port before reload from network port to stack port.

```
Switch#show switch hstack-ports
 Horizontal stack port status :
 Te Ports   Stack Port   Operational Status   Next Reload Status   Media Type
 ---------  -----------  -------------------  -------------------  --------------
 Te1/0/1    1            N/W Port             Stack Port           Fiber
 Te1/0/2    2            N/W Port             Stack Port           Fiber
```

The following output example shows the status of the port after reload from network port to stack port.

```
Switch#show switch hstack-ports
 Horizontal stack port status :
 Te Ports   Stack Port   Operational Status   Next Reload Status   Media Type
 ---------  -----------  -------------------  -------------------  --------------
 Te1/0/1    1            Stack Port           Stack Port           Fiber
 Te1/0/2    2            Stack Port           Stack Port           Fiber
```

The following example shows how to convert a stack port back to network port.

```
Switch> enable
Switch#configure terminal
Switch(config)#no switch 1 hstack-port 1
Do you want to continue?[confirm]
New port setting will be effective after next reload
```

The following output example shows the status of the port before reload from stack port to network port.

```
Switch#show switch hstack-ports
 Horizontal stack port status :
 Te Ports   Stack Port   Operational Status   Next Reload Status   Media Type
 ---------  -----------  -------------------  -------------------  --------------
```

```
Te1/0/1      1            Stack Port          N/W Port            Fiber
Te1/0/2      2            Stack Port          Stack Port          Fiber
```

The following output example shows the status of the port after reload from stack port to network port.

```
Switch#show switch hstack-ports
 Horizontal stack port status :
 Te Ports   Stack Port   Operational Status   Next Reload Status   Media Type
 ---------  ------------ --------------------  -------------------  --------------
 Te1/0/1      1            N/W Port             N/W Port             Fiber
 Te1/0/2      2            Stack Port           Stack Port           Fiber
```

The following output example shows the status of the horizontal stack port.

```
Switch# show switch hstack-ports
 Horizontal stack port status :
 Te Ports   Stack Port   Operational Status   Next Reload Status   Media Type
 ---------  ------------ --------------------  -------------------  -------------
 Te1/0/1      1            Stack Port           Stack Port           Fiber
 Te1/0/2      2            Stack Port           Stack Port           Fiber
 Te2/0/1      1            Stack Port           Stack Port           Fiber
 Te2/0/2      2            Stack Port           Stack Port           Fiber
 Te3/0/1      1            Stack Port           Stack Port           Copper
 Te3/0/2      NA           N/W Port             N/W Port             Copper
 Te3/0/3      2            Stack Port           Stack Port           Fiber
 Te3/0/4      NA           N/W Port             N/W Port             Fiber
 Te4/0/1      NA           N/W Port             N/W Port             Copper
 Te4/0/2      1            Stack Port           Stack Port           Copper
 Te4/0/3      2            Stack Port           Stack Port           Fiber
 Te4/0/4      NA           N/W Port             N/W Port             Fiber
 Te5/0/1      1            Stack Port           Stack Port           Fiber
 Te5/0/2      2            Stack Port           Stack Port           Fiber
 Te6/0/1      1            Stack Port           Stack Port           Fiber
 Te6/0/2      2            Stack Port           Stack Port           Fiber
 Te7/0/1      1            Stack Port           Stack Port           Copper
 Te7/0/2      NA           N/W Port             N/W Port             Copper
 Te7/0/3      2            Stack Port           Stack Port           Fiber
 Te7/0/4      NA           N/W Port             N/W Port             Fiber
 Te8/0/1      NA           N/W Port             N/W Port             Copper
 Te8/0/2      1            Stack Port           Stack Port           Copper
 Te8/0/3      2            Stack Port           N/W Port             Fiber
 Te8/0/4      NA           N/W Port             N/W Port             Fiber
```

Additional References for Switch Stacks

Related Documents

Related Topic	Document Title
Cabling and powering on a switch stack.	

Error Message Decoder

Description	Link
To help you research and resolve system error messages in this release, use the Error Message Decoder tool.	https://www.cisco.com/cgi-bin/Support/Errordecoder/index.cgi

Standards and RFCs

Standard/RFC	Title
None	—

MIBs

MIB	MIBs Link
All the supported MIBs for this release.	To locate and download MIBs for selected platforms, Cisco IOS releases, and , use Cisco MIB Locator found at the following URL: http://www.cisco.com/go/mibs

Technical Assistance

Description	Link
The Cisco Support website provides extensive online resources, including documentation and tools for troubleshooting and resolving technical issues with Cisco products and technologies. To receive security and technical information about your products, you can subscribe to various services, such as the Product Alert Tool (accessed from Field Notices), the Cisco Technical Services Newsletter, and Really Simple Syndication (RSS) Feeds. Access to most tools on the Cisco Support website requires a Cisco.com user ID and password.	http://www.cisco.com/support