



# Managing Controller Stacks

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## Finding Feature Information

Your software release may not support all the features documented in this module. For the latest feature information and caveats, see the release notes for your platform and software release.

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.

## Pre-requisites for Configuring Controller Stack

You must ensure the following before stacking controllers:

- Ensure that the controllers are connected using the stack cable. For more details on stack cables used, see the Information on Controller stack section.
- Only one controller other than the active unit is available to be stacked.
- Identify which controller needs to be in active and standby state based on your priorities.
- You must verify that the controllers in the stack run on Cisco IOS Software release 3.3 and later.
- You must verify that the licenses of the controllers in the stack; for more details, see the Cisco 5700 Series Wireless Controller Installation Guide.

- Verify the license used by the controllers in the stack. Ideally, the active controller must possess a valid license and the standby controller can either possess a valid license or a HA SKU license. For more details on controller licenses, see the hardware guide-

## Restrictions for Configuring Controller Stack

You must ensure that the controllers in the stack are configured with the same Cisco IOS Software Release version and licenses.

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## Information on Controller Stack

A controller stack can have one stacking-capable controller connected through their StackWise-480 ports; which implies that the stack has two members- an active and a standby controller. The stack members work together as a unified system using the StackWise-480 technology. If the active controller becomes unavailable, the standby controller assumes the role of the active switch, and continues to keep the stack operational.

The active controller contains the saved and running configuration files for the controller stack. The configuration files include the system-level settings for the controller stack and the interface-level settings for the stack member. The stack member has a current copy of all these files for back-up purposes. The controllers in the stack use Cisco StackWise-480 technology which provides a robust distributed forwarding architecture through each stack member switch and a unified, fully centralized control and management plane to simplify operation in a large-scale network design.

In the stack, all configuration in the active unit is synced to the standby unit once the standby unit changes its state from member to the hot standby state. Thus, all the start-up configuration available in the unit prior to synchronization is lost. If you would need the start-up configuration of the standby unit again, you must save the startup configuration of the unit in secondary memory- Flash memory to reuse the configurations later.

You must use the following Cisco StackWise-480 and Cisco StackPower cables to connect the units in the stack.

Stack Cable	Description
STACK-T1-50CM	Cisco StackWise-480 50cm stacking cable spare
STACK-T1-1M	Cisco StackWise-480 1m stacking cable spare
STACK-T1-3M	Cisco StackWise-480 3m stacking cable spare
CAB-SPWR-30CM	Cisco Catalyst 3850 StackPower cable 30cm spare
CAB-SPWR-150CM	Cisco Catalyst 3850 StackPower cable 150cm spare

In the stack, all configuration in the active unit is synced to the standby unit once the standby unit changes its state from member to the hot standby state. Thus, all the start-up configuration available in the unit prior to

synchronization is lost. If you would need the start-up configuration of the standby unit again, you must save the startup configuration of the unit in secondary memory- Flash memory to reuse the configurations later.

When you use the controller stack, all the six controller ports of both the controllers are combined hence providing an availability of 12 ports for usage. The bandwidth of a controller port is a 10 gig ethernet port; however on combination of 12 ports the controller, a throughput of 60 Gbps is only available for use. These ports can be combined to form an Etherchannel, a flex link, or a Link Aggregation Group (LAG).

## Configuring Controller Stack

### SUMMARY STEPS

1. Connect two controllers that are up and running using the stack cable.
2. Power up and perform a boot on both controllers simultaneously or power and boot one controller.
3. Configure Etherchannel or LAG on the units. The deployment type of Etherchannel, LAG, and LACP is based on your network design.
4. Execute the command **show etherchannel summary** to view status of the configured Etherchannel.
5. Configure LACP .
6. Execute the commands defined for displaying stack information on the console of the active controller to verify that the redundancy high availability pair exists.

### DETAILED STEPS

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|---------------|---|
| <b>Step 1</b> | Connect two controllers that are up and running using the stack cable.  |
| <b>Step 2</b> | Power up and perform a boot on both controllers simultaneously or power and boot one controller. The controllers boot up successfully, and forms a high availability pair.  |
| <b>Step 3</b> | Configure Etherchannel or LAG on the units. The deployment type of Etherchannel, LAG, and LACP is based on your network design.   |
| <b>Step 4</b> | Execute the command <b>show etherchannel summary</b> to view status of the configured Etherchannel. On successful configuration, all the specified ports will be bundled in a single channel and listed in the command output of <b>show etherchannel summary</b> . |
| <b>Step 5</b> | Configure LACP .  |
| <b>Step 6</b> | Execute the commands defined for displaying stack information on the console of the active controller to verify that the redundancy high availability pair exists.  |
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## Switch Stack Membership

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

## Stack Member Numbers

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

Stack members in the same switch stack cannot have the same stack member number. Every stack member, including a standalone switch, 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* EXEC 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 SWITCH\_NUMBER environment variable.

If the number is being used by another member in the stack, the switch 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* EXEC command on a provisioned switch. If you do, the command is rejected.

- If you move a stack member to a different switch 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 switch selects the lowest available number in the stack.
- If you merge switch stacks, the switches that join the switch stack of a new select the lowest available numbers in the stack.

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

## Stack Member Priority Values

A higher priority value for a stack member increases the probability of it being elected 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 switch that you prefer to be the . This ensures that the switch is reelected as the if a reelection occurs.

To change the priority value for a stack member, use the **switch** *stack-member-number* **priority** *new* *priority-value* EXEC command.

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

## Election and Reelection

All stack members are eligible to be the active switch or the standby switch. If the active switch becomes unavailable, the standby switch becomes the active switch.

An active switch retains its role unless one of these events occurs:

- The switch stack is reset.
- The active switch is removed from the switch stack.
- The active switch is reset or powered off.
- The active switch fails.
- The switch stack membership is increased by adding powered-on standalone switches or switch stacks.

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

- 1 The switch that is currently the .
- 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 . This ensures that the switch is reelected as if a reelection occurs.

- 3 The switch with the shortest start-up time.
- 4 The switch with the lowest MAC address.

**Note**

The factors for electing or reelecting a new standby switch are same as those for the active switch election or reelection, and are applied to all participating switches except the active switch.

After election, the new active switch becomes available after a few seconds. In the meantime, the switch stack uses the forwarding tables in memory to minimize network disruption. The physical interfaces on the other available stack members are not affected during a new active switch election and reset.

When the previous active switch becomes available, it *does not* resume its role as the active switch.

If you power on or reset an entire switch stack, some stack members *might not* participate in the active switch election. Stack members that are powered on within the same 2-minute timeframe participate in the active switch election and have a chance to become the active switch. Stack members that are powered on after the 120-second timeframe do not participate in this initial election and become stack members. For powering considerations that affect active-switch elections, see the switch hardware installation guide.

As described in the hardware installation guide, you can use the ACTV LED on the switch to see if the switch is the active switch.

## Enabling Persistent MAC Address

This procedure is optional.

**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 MAC address elsewhere in the same domain could result in lost traffic.

**SUMMARY STEPS**

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

**DETAILED STEPS**

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	<b>configure terminal</b>  <b>Example:</b> Controller# <b>configure terminal</b>	Enters global configuration mode.
<b>Step 2</b>	<b>stack-mac persistent timer [0   <i>time-value</i>]</b>  <b>Example:</b> Controller(config)# <b>stack-mac persistent timer 7</b>	<p>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.</p> <p>You can configure the time period as 0 to 60 minutes.</p> <ul style="list-style-type: none"> <li>• 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.</li> <li>• Enter <b>0</b> to continue using the MAC address of the current stack master indefinitely. The stack MAC address of the previous stack master is used until you enter the <b>no stack-mac persistent timer</b> command, which immediately changes the stack MAC address to that of the current stack master.</li> <li>• Enter a <i>time-value</i> 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 <b>no stack-mac persistent timer</b> command.</li> </ul> <p><b>Note</b> If you enter the <b>no stack-mac persistent timer</b> command after a new stack master takes over, before the time expires, the switch stack moves to the current stack master MAC address.</p>

	Command or Action	Purpose
<b>Step 3</b>	<b>end</b>  <b>Example:</b> Controller(config)# <b>end</b>	Returns to privileged EXEC mode.
<b>Step 4</b>	<b>copy running-config startup-config</b>  <b>Example:</b> Controller# <b>copy running-config startup-config</b>	(Optional) Saves your entries in the configuration file.

## Assigning a Stack Member Number

This optional task is available only from the .

### SUMMARY STEPS

1. **switch** *current-stack-member-number* **renumber** *new-stack-member-number*
2. **reload slot** *stack-member-number*

### DETAILED STEPS

	Command or Action	Purpose
<b>Step 1</b>	<b>switch</b> <i>current-stack-member-number</i> <b>renumber</b> <i>new-stack-member-number</i>  <b>Example:</b> Controller# <b>switch 3 renumber 4</b>	Specifies the current stack member number and the new member number for the stack member. The range is 1 to 2.  You can display the current stack member number by using the <b>show switch</b> user EXEC command.
<b>Step 2</b>	<b>reload slot</b> <i>stack-member-number</i>  <b>Example:</b> Controller# <b>reload slot 4</b>	Resets the stack member.

## Setting the Stack Member Priority Value

This optional task is available only from the .

**SUMMARY STEPS**

1. `switch stack-member-number priority new-priority-number`
2. `reload slot stack-member-number`

**DETAILED STEPS**

	Command or Action	Purpose
<b>Step 1</b>	<p><code>switch stack-member-number priority new-priority-number</code></p> <p><b>Example:</b> Controller# <code>switch 3 priority 2</code></p>	<p>You can display the current priority value by using the <b>show switch</b> user EXEC command.</p> <p>The new priority value takes effect immediately but does not affect the current . The new priority value helps determine which stack member is elected as the new when the current or switch stack resets.</p>
<b>Step 2</b>	<p><code>reload slot stack-member-number</code></p> <p><b>Example:</b> Controller# <code>reload slot 3</code></p>	<p>Specifies the stack member number and the new priority for the stack member. The stack member number range is 1 to 9. The priority value range is 1 to 15.</p> <p>You can display the current priority value by using the <b>show switch</b> user EXEC command.</p> <p>The new priority value takes effect immediately but does not affect the current active switch. The new priority value helps determine which stack member is elected as the new active switch when the current active switch or switch stack resets.</p>

**Displaying Incompatible Switches in the Switch Stack****SUMMARY STEPS**

1. `show switch`

**DETAILED STEPS**

	Command or Action	Purpose
<b>Step 1</b>	<p><code>show switch</code></p> <p><b>Example:</b> Controller# <code>show switch</code></p>	<p>Displays any incompatible switches in the switch stack (indicated by a 'Current State' of 'V-Mismatch'). The V-Mismatch state identifies the switches with incompatible software. The output displays Lic-Mismatch for switches that are not running the same license level as the .</p> <p>For information about managing license levels, see the <i>System Management Configuration Guide (Catalyst 3850 Switches)</i> and <i>System Management Configuration Guide (Cisco WLC 5700 Series)</i> .</p>

# Upgrading an Incompatible Switch in the Switch Stack

## SUMMARY STEPS

1. software auto-upgrade
2. copy running-config startup-config

## DETAILED STEPS

	Command or Action	Purpose
<b>Step 1</b>	<b>software auto-upgrade</b>  <b>Example:</b> Controller# <code>software auto-upgrade</code>	Upgrades incompatible switches in the switch stack, or changes switches in bundle mode to installed mode.
<b>Step 2</b>	<b>copy running-config startup-config</b>  <b>Example:</b> Controller# <code>copy running-config startup-config</code>	(Optional) Saves your entries in the configuration file.

