Managing Switch 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.

Prerequisites for Switch Stacks

All stack members must run the same Cisco IOS software image to ensure compatibility among stack members. For switch stack hardware considerations, see the Catalyst 2960-X Switch Hardware Installation Guide.

Restrictions for Switch Stacks

The following are restrictions for your switch stack configuration:
• Stacking is not supported on switches running the LAN Lite image. All switches in the stack must be running the LAN Base image.

• In a mixed stack of Catalyst 2960-X and Catalyst 2960-S switches, the number of supported stack members is reduced from eight to four.

• In a mixed stack of Catalyst 2960-X and Catalyst 2960-S switches, full stack bandwidth is reduced from 80 Gbps to 40 Gbps.

• In a mixed stack of Catalyst 2960-X and Catalyst 2960-S switches, stack convergence time is increased from milliseconds to 1 to 2 seconds.

**Note**

In a mixed stack configuration, there is limited support for some features. For more information about a specific feature, see the relevant Catalyst 2960-X configuration guide.

**Related Topics**

- Supported Features in a Switch Stack, on page 2
- Mixed Stack Membership, on page 4

**Information About Switch Stacks**

**Switch Stack Overview**

A switch stack is a set of up to eight stacking-capable switches connected through their stack ports. You can connect only one switch type in a stack, or you can connect a mix of Catalyst 2960-X and Catalyst 2960-S switches in the stack. The stack can have one of these configurations:

- **Homogeneous stack**—A Catalyst 2960-X stack with only Catalyst 2960-X switches as stack members. A homogenous stack can have up to 8 stack members.

- **Mixed stack**—A stack with a mix of Catalyst 2960-X and Catalyst 2960-S switches. A mixed stack can have up to 4 stack members, with either a Catalyst 2960-X or Catalyst 2960-S switch as the stack master.

The stack master controls the operation of the switch stack, and is the single point of stack-wide management. From the stack master, you configure:

- System-level (global) features that apply to all stack members
- Interface-level features for each stack member

The stack master contains the saved and running configuration files for the switch stack. The configuration files include the system-level settings for the switch stack and the interface-level settings for each stack member. Each stack member has a current copy of these files for back-up purposes.

**Supported Features in a Switch Stack**

The system-level features supported on the stack master are supported on the entire switch stack.
Related Topics

Restrictions for Switch Stacks, on page 1

Encryption Features

If the stack master is running the cryptographic universal software image (supports encryption), the encryption features are available on the switch stack.

FlexStack-Plus

The stack members use the Cisco FlexStack-Plus technology to work together as a unified system. Layer 2 protocols support the entire switch stack as a single entity in the network.

The FlexStack-Plus bandwidth for a single stack port is 20 Gbps. With FlexStack-Plus technology, up to eight members can be joined into a single stack. In a mixed stack of Catalyst 2960-X and Catalyst 2960-S switches, FlexStack-Plus reverts to FlexStack capabilities of 10 Gbps stack port bandwidth and a maximum of four members per stack.

Fast Stack Convergence

When a single link in a full ring stack becomes inoperable, there is a disruption in the forwarding of packets, and the stack moves to a half ring. In a homogenous stack of Catalyst 2960-X switches this disruption of traffic (or stack convergence time) takes milliseconds. In a mixed stack configuration, the stack takes 1 to 2 seconds to reconverge.

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

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

![Figure 1: Creating a Switch Stack from Two Standalone Switches](image)

**Figure 2: Adding a Standalone Switch to a Switch Stack**

![Figure 2: Adding a Standalone Switch to a Switch Stack](image)

**Mixed Stack Membership**

A mixed stack can have up to 4 stack members, with either a Catalyst 2960-X or Catalyst 2960-S switch as the stack master.

By default, Catalyst 2960-X switches operate at a port speed of 20 Gbps while 2960-S switches have a maximum port speed of 10 Gbps. In a mixed stack of Catalyst 2960-X and Catalyst 2960-S switches, the stack must operate at the port speed of the Catalyst 2960-S switch. Otherwise, the switches will not stack.
To set the port speed of the stack to 10 Gbps, use the `switch stack port-speed 10` global configuration command on a Catalyst 2960-X stack member before you add a Catalyst 2960-S switch to the stack, and then reload the stack.

**Related Topics**

- Restrictions for Switch Stacks, on page 1
- Setting the Stack Port Speed to 10 Gbps, on page 21

**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 configuration 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.

**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 (40 Gb/s). 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.

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.

For cabling and power considerations that affect switch stacks, see the *Catalyst 2960-X Switch Hardware Installation Guide*.

**Related Topics**

- Assigning a Stack Member Number, on page 19
- Switch Stack Configuration Scenarios, on page 28
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 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` global configuration 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` global configuration 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 stack master 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.

Related Topics

Assigning a Stack Member Number, on page 19
Switch Stack Configuration Scenarios, on page 28

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.
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.

To change the priority value for a stack member, use the `switch stack-member-number priority new priority-value` global configuration 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 the switch stack resets.

**Related Topics**
- Setting the Stack Member Priority Value, on page 20

**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.

**Persistent MAC Address on the Switch Stack**

You can use the persistent MAC address feature to set a time delay before the stack MAC address changes to the MAC address of the new stack master. When this feature is enabled, the stack MAC address changes in approximately 4 minutes. During this time, if the previous stack master rejoins the stack, the stack continues to use its MAC address as the stack MAC address, even if the switch is now a stack member and not a stack master. If the previous stack master does not rejoin the stack during this period, the switch stack takes the MAC address of the new stack master as the stack MAC address.

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

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

**Related Topics**
- Enabling Persistent MAC Address, on page 17
- Enabling Persistent MAC Address: Example, on page 30

**Stack Master Election and Reelection**

All stack members are eligible stack masters. If the stack master becomes unavailable, the remaining members elect a new stack master from among themselves.

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

The switch that has the configuration file.

The switch with the lowest MAC address.

A stack master retains its role unless one of these events occurs:

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

In the events marked by an asterisk (*), the current stack master might be reelected based on the listed factors.

When you power on or reset an entire switch stack, some stack members might not participate in the stack master election. Stack members that are powered on within the same 20-second time frame participate in the stack master election and have a chance to become the stack master. Stack members that are powered on after the 20-second time frame do not participate in this initial election and become stack members. All stack members participate in reelections. For all powering considerations that affect stack-master elections, see the “Switch Installation” chapter in the hardware installation guide.

The new stack master 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 stack master election and reset.

After a new stack master is elected and the previous stack master becomes available, the previous stack master does not resume its role as stack master.

For all powering considerations that affect stack-master elections, see the Catalyst 2960-X Switch Hardware Installation Guide.

Switch Stack Configuration Files

The stack master has the saved and running configuration files for the switch stack. All stack members periodically receive synchronized copies of the configuration files from the stack master. If the stack master becomes unavailable, any stack member assuming the role of stack master has the latest 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
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 switch joining a switch stack uses the system-level settings of that switch stack. If a switch is moved to a different switch stack, that switch loses its saved configuration file and uses the system-level configuration of the new switch stack.

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 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 switch. You do not need to reconfigure the interface settings. The replacement switch (referred to as the provisioned switch) must have the same stack member number as the failed switch.

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

Related Topics

Assigning a Stack Member Number, on page 19
Switch Stack Configuration Scenarios, on page 28

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. 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 (for example, as part of a VLAN), the switch stack accepts the configuration, and the information appears in the running configuration. The interface associated with the provisioned switch is not active, operates as if it is administratively shut down, and the no shutdown interface configuration command does not return it to active service. The interface associated with the provisioned switch does not appear in the display of the specific feature; for example, it does not appear in the show vlan user EXEC command output.

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.

**Related Topics**
- Removing Provisioned Switch Information, on page 23
- Provisioning a New Member for a Switch Stack, on page 22
- Provisioning a New Member for a Switch Stack: Example, on page 30

**Effects of Adding a Provisioned Switch to a Switch Stack**

When you add a provisioned switch 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 1: Results of Comparing the Provisioned Configuration with the Provisioned Switch**

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>The stack member numbers and the switch types match.</td>
<td>The switch stack applies the provisioned configuration to the provisioned switch and adds it to the stack.</td>
</tr>
<tr>
<td>The stack member numbers match but the switch types do not match.</td>
<td>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.</td>
</tr>
<tr>
<td>The stack member number is not found in the provisioned configuration.</td>
<td>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.</td>
</tr>
</tbody>
</table>
The switch stack applies the provisioned configuration to the provisioned switch and adds it to the stack.
The provisioned configuration is changed to reflect the new information.

The stack master assigns a new stack member number to the provisioned switch.
The stack member numbers and the switch types match:
1. If the new stack member number of the provisioned switch matches the stack member number in the provisioned configuration on the stack, and
2. If the switch type of the provisioned switch matches the switch type in the provisioned configuration on the stack.

The stack member numbers match, but the switch 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 switch type of the provisioned switch does not match the switch type in the provisioned configuration on the stack.

The stack member number of the provisioned switch is in conflict with an existing stack member.

The stack master assigns a new stack member number to the provisioned switch.
The stack member numbers and the switch types match:
1. If the new stack member number of the provisioned switch matches the stack member number in the provisioned configuration on the stack, and
2. If the switch type of the provisioned switch matches the switch type in the provisioned configuration on the stack.

The stack member numbers match, but the switch 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 switch type of the provisioned switch does not match the switch 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 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 switch type and the previously provisioned switch type, some commands are rejected, and some commands are accepted.
If the switch stack does not contain a provisioned configuration for a new switch, the switch 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 switch.

**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 switch, 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. You can display the stack protocol version by using the `show platform stack manager all` privileged EXEC command.

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 switch 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.

**Major Stack Protocol Version Number Incompatibility Among Stack-Capable Switches**

Switches with different major Cisco IOS software versions usually have different stack protocol versions. Switches 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**

Switches with the same major version number but with a different minor version number are considered partially compatible. When connected to a switch stack, a partially compatible switch enters version-mismatch (VM) mode and cannot join the stack as a fully functioning member. The software detects the mismatched software and tries to upgrade (or downgrade) the switch in VM mode with the switch stack image or with a tar file image from the switch stack flash memory. The software uses the automatic upgrade (auto-upgrade) and the automatic advise (auto-advise) features.
The port LEDs on switches in version-mismatch mode will also remain off. Pressing the Mode button does not change the LED mode.

**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 new switch, 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.

By default, auto-upgrade is enabled (the `boot auto-copy-sw` global configuration command is enabled). You can disable auto-upgrade by using the `no boot auto-copy-sw` global configuration command on the stack master. You can check the status of auto-upgrade by using the `show boot` privileged EXEC command and by checking the `Auto upgrade` line in the display.

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.

- Automatic extraction (auto-extract) occurs when the auto-upgrade process cannot find appropriate software in the stack to copy to the new switch. In that case, the auto-extract process searches all switches in the stack for the tar file needed to upgrade the switch stack or the new switch. The tar file can be in any flash file system in the switch stack or in the new switch. If a tar file suitable for the new switch is found on a stack member, the process extracts the file and automatically upgrades the new switch.

The auto-upgrade (auto-copy and auto-extract) processes start a few minutes after the mismatched software is detected.

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.

**Auto-Advise**

Automatic advise (auto-advise) occurs when the auto-upgrade process cannot find appropriate stack member software to copy to the new switch. This process tells you the command (`archive copy-sw` or `archive download-sw` privileged EXEC command) and the image name (tar filename) needed to manually upgrade the switch stack or the new switch. The recommended image can be the running switch stack image or a tar file in any flash file system in the switch stack (including the new switch). If an appropriate image is not found
in the stack flash file systems, the auto-advice process tells you to install new software on the switch stack. Auto-advice cannot be disabled, and there is no command to check its status.

Examples of Auto-Advise Messages

When you add a switch that has a different minor version number to the switch stack, the software displays messages in sequence (assuming that there are no other system messages generated by the switch).

This example shows that the switch stack detected a new switch that is running a different minor version number than the switch stack. Auto-copy starts, finds suitable software to copy from a stack member to the switch in VM mode, upgrades the switch in VM mode, and then reloads it:

```
*Mar 11 20:31:19.247:%STACKMGR-6-STACK_LINK_CHANGE:Stack Port 2 Switch 2 has changed to state UP
*Mar 11 20:31:23.232:%STACKMGR-6-SWITCH_ADDED_VM:Switch 1 has been ADDED to the stack (VERSION_MISMATCH)
*Mar 11 20:31:23.291:%STACKMGR-6-SWITCH_ADDED_VM:Switch 1 has been ADDED to the stack (VERSION_MISMATCH) (Stack 1-3)
*Mar 11 20:33:23.248:%IMAGEMGR-6-AUTO_COPY_SW_INITIATED:Auto-copy-software process initiated for switch number(s) 1
*Mar 11 20:36:15.038:%IMAGEMGR-6-AUTO_COPY_SW:Searching for stack member to act as software donor...
*Mar 11 20:36:15.038:%IMAGEMGR-6-AUTO_COPY_SW:Found donor (system #2) for member(s) 1
*Mar 11 20:36:15.038:%IMAGEMGR-6-AUTO_COPY_SW:System software to be uploaded:
*Mar 11 20:36:15.038:%IMAGEMGR-6-AUTO_COPY_SW:System Type: 0x00000000
*Mar 11 20:36:15.038:%IMAGEMGR-6-AUTO_COPY_SW:archiving c2960x-universalk9-mz.150-2.EX (directory)
*Mar 11 20:36:15.038:%IMAGEMGR-6-AUTO_COPY_SW:archiving c2960x-universalk9-mz.150-2.EX.bin (4945851 bytes)
*Mar 11 20:36:15.038:%IMAGEMGR-6-AUTO_COPY_SW:archiving c2960x-universalk9-mz.150-2.EX/info (450 bytes)
*Mar 11 20:36:15.038:%IMAGEMGR-6-AUTO_COPY_SW:examining image...
*Mar 11 20:36:15.038:%IMAGEMGR-6-AUTO_COPY_SW:extracting info (104 bytes)
*Mar 11 20:36:15.038:%IMAGEMGR-6-AUTO_COPY_SW:extracting info (104 bytes)
*Mar 11 20:36:15.038:%IMAGEMGR-6-AUTO_COPY_SW:Stacking Version Number:1.4
*Mar 11 20:36:15.038:%IMAGEMGR-6-AUTO_COPY_SW:Stacking Version Number:1.4
*Mar 11 20:36:15.038:%IMAGEMGR-6-AUTO_COPY_SW:Minimum Dram required:0x08000000
*Mar 11 20:36:15.038:%IMAGEMGR-6-AUTO_COPY_SW:Image Suffix:universalk9-mz.150-2.EX
*Mar 11 20:36:15.038:%IMAGEMGR-6-AUTO_COPY_SW:New software image installed in flash1:c2960x-universalk9-mz.150-2.EX
*Mar 11 20:36:15.038:%IMAGEMGR-6-AUTO_COPY_SW:Removing old
This example shows that the switch stack detected a new switch that is running a different minor version number than the switch stack. Auto-copy starts but cannot find software in the switch stack to copy to the VM-mode switch to make it compatible with the switch stack. The auto-advise process starts and recommends that you download a tar file from the network to the switch in VM mode:

```
*Mar 1 00:01:11.319:%STACKMGR-6-STACK_LINK_CHANGE:Stack Port 2 Switch 2 has changed to state UP
*Mar 1 00:01:15.547:%STACKMGR-6-SWITCH_ADDED_VM:Switch 1 has been ADDED to the stack (VERSION_MISMATCH)
stack_2#
```

Auto-advise and auto-copy identify which images are running by examining the info file and by searching the directory structure on the switch stack. If you download your image by using the `archive download-sw` privileged EXEC command instead of the `copy tftp: boot loader` command, the proper directory structure is not created. For more information about the info file, see the Catalyst 2960-X Switch Managing Cisco IOS Image Files Configuration Guide.

**SDM Template Mismatch in Switch Stacks**

The LAN Base default template is used with switches in a homogeneous stack, and the LAN Base routing template is used with switches in a mixed stack.

All stack members use the Switch Database Management (SDM) template configured on the stack master. When a new switch is added to a stack, the SDM configuration that is stored on the stack master overrides the template configured on an individual switch.

When you add a Catalyst 2960-S switch to a stack of Catalyst 2960-X switches running the LAN Base default template, the Catalyst 2960-S switch will go into SDM-mismatch mode. You must change the template of the switch stack to the LAN Base routing template.
You can use the `show switch` privileged EXEC command to see if any stack members are in SDM-mismatch mode.

Version-mismatch (VM) mode has priority over SDM-mismatch mode. If a VM-mode condition and an SDM-mismatch mode exist, the switch stack first attempts to resolve the VM-mode condition.

For more information about SDM templates, see the Catalyst 2960-X Switch System Management Configuration Guide.

### 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 switch basis.

**Note**

Use SNMP to manage network features across the stack that are defined by supported MIBs. The switch does not support MIBs to manage stacking-specific features such as stack membership and election.

### 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.

To debug a specific stack member, you can access it from the stack master by using the `session stack-member-number` privileged EXEC command. The stack member number is appended to the system prompt. For example, Switch-2# is the prompt in privileged EXEC mode for stack member 2, and the system prompt for the stack master is Switch. Only the `show` and `debug` commands are available in a CLI session to a specific stack member.

**Related Topics**

Accessing the CLI of a Specific Member, on page 25

### 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 switches that you remove from the switch stack.

### Connectivity to the Switch Stack Through Console Ports or Ethernet Management Ports

You can connect to the stack master by using one of these methods:
• You can connect a terminal or a PC to the stack master through the console port of one or more stack members.

• You can connect a PC to the stack master through the Ethernet management ports 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

Default Switch Stack Configuration

The following table shows the default switch stack configuration settings:

<table>
<thead>
<tr>
<th>Feature</th>
<th>Default Setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stack MAC address timer</td>
<td>Disabled.</td>
</tr>
<tr>
<td>Stack member number</td>
<td>1</td>
</tr>
<tr>
<td>Stack member priority value</td>
<td>1</td>
</tr>
<tr>
<td>Offline configuration</td>
<td>The switch stack is not provisioned.</td>
</tr>
<tr>
<td>Persistent MAC address</td>
<td>Disabled.</td>
</tr>
</tbody>
</table>

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 stack master 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

<table>
<thead>
<tr>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong> configure terminal</td>
<td>Enters global configuration mode.</td>
</tr>
<tr>
<td><strong>Example:</strong> Switch# configure terminal</td>
<td></td>
</tr>
<tr>
<td><strong>Step 2</strong> stack-mac persistent timer [0</td>
<td>time-value]</td>
</tr>
<tr>
<td><strong>Example:</strong> Switch(config)# stack-mac persistent timer 7</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• 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.</td>
</tr>
<tr>
<td></td>
<td>• Enter 0 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 <strong>no stack-mac persistent timer</strong> command, which immediately changes the stack MAC address to that of the current stack master.</td>
</tr>
<tr>
<td></td>
<td>• 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 <strong>no stack-mac persistent timer</strong> command.</td>
</tr>
<tr>
<td><strong>Note</strong> If you enter the <strong>no stack-mac persistent timer</strong> command after a new stack master takes over, before the time expires, the switch stack moves to the current stack master MAC address.</td>
<td></td>
</tr>
<tr>
<td><strong>Step 3</strong> end</td>
<td>Returns to privileged EXEC mode.</td>
</tr>
<tr>
<td><strong>Example:</strong> Switch(config)# end</td>
<td></td>
</tr>
<tr>
<td><strong>Step 4</strong> copy running-config startup-config</td>
<td>(Optional) Saves your entries in the configuration file.</td>
</tr>
</tbody>
</table>
Assigning a Stack Member Number

This optional task is available only from the stack master.

**SUMMARY STEPS**

1. `configure terminal`
2. `switch current-stack-member-number renumber new-stack-member-number`
3. `end`
4. `reload slot stack-member-number`
5. `copy running-config startup-config`

**DETAILED STEPS**

<table>
<thead>
<tr>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong> configure terminal</td>
<td>Enters global configuration mode.</td>
</tr>
<tr>
<td>Example:</td>
<td></td>
</tr>
<tr>
<td>Switch# configure terminal</td>
<td></td>
</tr>
<tr>
<td><strong>Step 2</strong> switch current-stack-member-number renumber new-stack-member-number</td>
<td>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 <code>show switch</code> user EXEC command.</td>
</tr>
<tr>
<td>Example:</td>
<td></td>
</tr>
<tr>
<td>Switch(config)# switch 3 renumber 4</td>
<td></td>
</tr>
<tr>
<td><strong>Step 3</strong> end</td>
<td>Returns to privileged EXEC mode.</td>
</tr>
<tr>
<td>Example:</td>
<td></td>
</tr>
<tr>
<td>Switch(config)# end</td>
<td></td>
</tr>
</tbody>
</table>
Setting the Stack Member Priority Value

This optional task is available only from the stack master.

**SUMMARY STEPS**

1. `configure terminal`
2. `switch stack-member-number priority new-priority-number`
3. `end`
4. `copy running-config startup-config`

**DETAILED STEPS**

<table>
<thead>
<tr>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong></td>
<td></td>
</tr>
<tr>
<td><code>configure terminal</code></td>
<td>Enters global configuration mode.</td>
</tr>
<tr>
<td>Example:</td>
<td></td>
</tr>
<tr>
<td><code>Switch# configure terminal</code></td>
<td></td>
</tr>
</tbody>
</table>
### Step 2

**Command or Action:**
```
switch stack-member-number priority new-priority-number
```

**Purpose:** 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.

**Example:**
```
Switch(config)# switch 3 priority 2
```

**Related Topics**

Stack Member Priority Values, on page 6

### Setting the Stack Port Speed to 10 Gbps

In a mixed stack of Catalyst 2960-X and 2960-S switches, you must set the stack port speed to 10 Gbps. This task is required in a mixed stack configuration and must be run on a Catalyst 2960-X switch in the switch stack before you add a 2960-S switch to the stack. Otherwise, the switches will not stack.

**SUMMARY STEPS**

1. configure terminal
2. switch stack port-speed 10
3. end
4. copy running-config startup-config
5. reload
DETAILED STEPS

<table>
<thead>
<tr>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong></td>
<td>configure terminal</td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td>Switch# configure terminal</td>
</tr>
<tr>
<td><strong>Step 2</strong></td>
<td>switch stack port-speed 10</td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td>Switch(config)# switch stack port-speed 10</td>
</tr>
<tr>
<td><strong>Step 3</strong></td>
<td>end</td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td>Switch(config)# end</td>
</tr>
<tr>
<td><strong>Step 4</strong></td>
<td>copy running-config startup-config</td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td>Switch# copy running-config startup-config</td>
</tr>
<tr>
<td><strong>Step 5</strong></td>
<td>reload</td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td>Switch# reload</td>
</tr>
</tbody>
</table>

Related Topics

Mixed Stack Membership, on page 4

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

<table>
<thead>
<tr>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong></td>
<td>Displays summary information about the switch stack.</td>
</tr>
<tr>
<td><code>show switch</code></td>
<td>Displays summary information about the switch stack.</td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td>Switch# <code>show switch</code></td>
</tr>
<tr>
<td><strong>Step 2</strong></td>
<td>Enters global configuration mode.</td>
</tr>
<tr>
<td><code>configure terminal</code></td>
<td>Enters global configuration mode.</td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td>Switch# <code>configure terminal</code></td>
</tr>
<tr>
<td><strong>Step 3</strong></td>
<td>Specifies the stack member number for the preconfigured switch. By default, no switches are provisioned.</td>
</tr>
<tr>
<td><code>switch stack-member-number provision type</code></td>
<td>Specifies the stack member number for the preconfigured switch. By default, no switches are provisioned.</td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td>Switch(config)# <code>switch 3 provision WS-xxxx</code></td>
</tr>
<tr>
<td><strong>Step 4</strong></td>
<td>Returns to privileged EXEC mode.</td>
</tr>
<tr>
<td><code>end</code></td>
<td>Returns to privileged EXEC mode.</td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td>Switch(config)# <code>end</code></td>
</tr>
<tr>
<td><strong>Step 5</strong></td>
<td>(Optional) Saves your entries in the configuration file.</td>
</tr>
<tr>
<td><code>copy running-config startup-config</code></td>
<td>(Optional) Saves your entries in the configuration file.</td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td>Switch# <code>copy running-config startup-config</code></td>
</tr>
</tbody>
</table>

**Related Topics**

- [Offline Configuration to Provision a Stack Member](#) , on page 9
- [Provisioning a New Member for a Switch Stack: Example](#) , on page 30

### 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

<table>
<thead>
<tr>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong></td>
<td><strong>configure terminal</strong>&lt;br&gt;Enlists global configuration mode. <strong>Example:</strong>&lt;br&gt;Switch# configure terminal</td>
</tr>
<tr>
<td><strong>Step 2</strong></td>
<td><strong>no switch stack-member-number provision</strong>&lt;br&gt;Removes the provisioning information for the specified member. <strong>Example:</strong>&lt;br&gt;Switch(config)# no switch 3 provision</td>
</tr>
<tr>
<td><strong>Step 3</strong></td>
<td><strong>end</strong>&lt;br&gt;Returns to privileged EXEC mode. <strong>Example:</strong>&lt;br&gt;Switch(config)# end</td>
</tr>
<tr>
<td><strong>Step 4</strong></td>
<td><strong>copy running-config startup-config</strong>&lt;br&gt;(Optional) Saves your entries in the configuration file. <strong>Example:</strong>&lt;br&gt;Switch# copy running-config startup-config</td>
</tr>
</tbody>
</table>

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 stack 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.

Related Topics

- Offline Configuration to Provision a Stack Member, on page 9
- Provisioning a New Member for a Switch Stack: Example, on page 30
Troubleshooting the Switch Stack

Accessing the CLI of a Specific Member

This optional task is for debugging purposes, and is available only from the stack master.

You can access all or specific members by using the `remote command {all | stack-member-number}` privileged EXEC command. The stack member number range is 1 to 8.

You can access specific members by using the `session stack-member-number` privileged EXEC command. The member number is appended to the system prompt. For example, the prompt for member 2 is Switch-2#, and system prompt for the stack master is Switch#. Enter `exit` to return to the CLI session on the stack master.

Only the `show` and `debug` commands are available on a specific member.

Related Topics

Connectivity to Specific Stack Members, on page 16

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

- All members are connected through the 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`
3. `copy running-config startup-config`

**DETAILED STEPS**

<table>
<thead>
<tr>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td><code>switch stack-member-number stack port port-number disable</code></td>
</tr>
<tr>
<td>Command or Action</td>
<td>Purpose</td>
</tr>
<tr>
<td>-------------------</td>
<td>---------</td>
</tr>
<tr>
<td>Example:</td>
<td></td>
</tr>
<tr>
<td>Switch# switch 2 stack port 1 disable</td>
<td>Reenables the stack port after the problem is resolved.</td>
</tr>
<tr>
<td>Step 2</td>
<td></td>
</tr>
<tr>
<td>switch stack-member-number stack port port-number enable</td>
<td>(Optional) Saves your entries in the configuration file.</td>
</tr>
<tr>
<td>Example:</td>
<td></td>
</tr>
<tr>
<td>Switch# switch 2 stack port 1 enable</td>
<td></td>
</tr>
<tr>
<td>Step 3</td>
<td></td>
</tr>
<tr>
<td>copy running-config startup-config</td>
<td></td>
</tr>
<tr>
<td>Example:</td>
<td></td>
</tr>
<tr>
<td>Switch# copy running-config startup-config</td>
<td></td>
</tr>
</tbody>
</table>

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.
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 Switch Stack

### Table 3: Commands for Displaying Stack Information

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>`show controller ethernet-controller stack port {1</td>
<td>2}`</td>
</tr>
<tr>
<td><code>show controller ethernet-controller fastethernet0</code></td>
<td>Displays information about the Ethernet management port, including the port status and the per-interface send and receive statistics read from the hardware.</td>
</tr>
<tr>
<td><code>show platform stack compatibility</code></td>
<td>Displays information about HULC feature compatibility.</td>
</tr>
<tr>
<td><code>show platform stack manager all</code></td>
<td>Displays all stack manager information, such as the stack protocol version.</td>
</tr>
<tr>
<td><code>show platform stack passive-links</code></td>
<td>Displays information about stack passive links.</td>
</tr>
<tr>
<td><code>show switch</code></td>
<td>Displays summary information about the stack, including the status of provisioned switches and switches in version-mismatch mode.</td>
</tr>
<tr>
<td><code>show switch stack-member-number</code></td>
<td>Displays information about a specific member.</td>
</tr>
<tr>
<td><code>show switch detail</code></td>
<td>Displays detailed information about the stack.</td>
</tr>
<tr>
<td><code>show switch neighbors</code></td>
<td>Displays the stack neighbors.</td>
</tr>
<tr>
<td><code>show switch stack-ports</code></td>
<td>Displays port information for the stack.</td>
</tr>
</tbody>
</table>
Configuration Examples for Switch Stacks

Switch Stack Configuration Scenarios

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

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stack master election specifically determined by existing stack masters</td>
<td>Connect two powered-on switch stacks through the stack ports. Only one of the two stack masters becomes the new stack master.</td>
</tr>
</tbody>
</table>
| Stack master election specifically determined by the stack member priority value | 1 Connect two switches through their stack 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

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stack member number conflict</td>
<td>Assuming that one stack member has a higher priority value than the other stack member:</td>
</tr>
<tr>
<td></td>
<td>1 Ensure that both stack members have the same stack member number. If necessary, use the <code>switch</code> command.</td>
</tr>
<tr>
<td></td>
<td><code>current-stack-member-number</code></td>
</tr>
<tr>
<td></td>
<td><code>renumber</code></td>
</tr>
<tr>
<td></td>
<td><code>new-stack-member-number</code></td>
</tr>
<tr>
<td></td>
<td>global configuration command.</td>
</tr>
<tr>
<td></td>
<td>2 Restart both stack members at the same time.</td>
</tr>
<tr>
<td></td>
<td>The stack member with the higher priority value retains its stack member number. The other stack member has a new stack member number.</td>
</tr>
<tr>
<td>Add a stack member</td>
<td>1 Power off the new switch.</td>
</tr>
<tr>
<td></td>
<td>2 Through their stack ports, connect the new switch to a powered-on switch stack.</td>
</tr>
<tr>
<td></td>
<td>3 Power on the new switch.</td>
</tr>
<tr>
<td></td>
<td>The stack master is retained. The new switch is added to the switch stack.</td>
</tr>
<tr>
<td>Stack master failure</td>
<td>Remove (or power off) the stack master.</td>
</tr>
<tr>
<td></td>
<td>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.</td>
</tr>
<tr>
<td>Add more than eight stack members</td>
<td>1 Through their stack ports, connect nine switches.</td>
</tr>
<tr>
<td></td>
<td>2 Power on all switches.</td>
</tr>
<tr>
<td></td>
<td>Two switches become stack masters. One stack master has eight stack members. The other stack master remains as a standalone switch.</td>
</tr>
<tr>
<td></td>
<td>Use the Mode button and port LEDs on the switches to identify which switches are stack masters and which switches belong to each stack master.</td>
</tr>
</tbody>
</table>

### Related Topics

- Assigning a Stack Member Number, on page 19
- Changes to Switch Stack Membership, on page 5
- Stack Member Numbers, on page 6
- Switch Stack Configuration Files, on page 8
Enabling Persistent MAC Address: 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
Switch# Role  Mac Address  Priority  Version  State
*1  Master 0016.4727.a900 1  P2B  Ready

Related Topics
- Enabling Persistent MAC Address, on page 17
- Persistent MAC Address on the Switch Stack, on page 7

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:

Switch(config)# switch 2 provision switch_PID
Switch(config)# end
Switch# show running-config | include switch 2
switch 2 provision switch_PID

Related Topics
- Removing Provisioned Switch Information, on page 23
- Provisioning a New Member for a Switch Stack, on page 22
- Offline Configuration to Provision a Stack Member, on page 9

Additional References for Switch Stacks

Related Documents

<table>
<thead>
<tr>
<th>Related Topic</th>
<th>Document Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cabling and powering on a switch stack.</td>
<td>Catalyst 2960-X Switch Hardware Installation Guide</td>
</tr>
</tbody>
</table>
Standards and RFCs

<table>
<thead>
<tr>
<th>Standard/RFC</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>—</td>
</tr>
</tbody>
</table>

MIBs

<table>
<thead>
<tr>
<th>MIB</th>
<th>MIBs Link</th>
</tr>
</thead>
<tbody>
<tr>
<td>All supported MIBs for this release.</td>
<td>To locate and download MIBs for selected platforms, Cisco IOS releases, and software images, use Cisco MIB Locator found at the following URL: <a href="http://www.cisco.com/go/mibs">http://www.cisco.com/go/mibs</a></td>
</tr>
</tbody>
</table>

Technical Assistance

<table>
<thead>
<tr>
<th>Description</th>
<th>Link</th>
</tr>
</thead>
<tbody>
<tr>
<td>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.</td>
<td><a href="http://www.cisco.com/support">http://www.cisco.com/support</a></td>
</tr>
</tbody>
</table>

Feature Information for Switch Stack Features

This table lists the features in this module and provides links to specific configuration information:

<table>
<thead>
<tr>
<th>Feature Name</th>
<th>Releases</th>
<th>Feature Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>FlexStack-Plus</td>
<td>Cisco IOS 15.0(2)EX</td>
<td>FlexStack-Plus is the name of the stacking technology used by the Catalyst 2960-X Series of fixed Ethernet switches.</td>
</tr>
<tr>
<td>Fast Stack Convergence</td>
<td>Cisco IOS 15.0(2)EX</td>
<td>In a homogenous stack, the stack convergence time is milliseconds.</td>
</tr>
<tr>
<td>20 Gbps Stack Port Speed</td>
<td>Cisco IOS 15.0(2)EX</td>
<td>In a homogenous stack, the bandwidth for a single stack port is 20 Gbps unlike Flexstack where the port bandwidth is 10 Gbps.</td>
</tr>
</tbody>
</table>