

Linksys Stackable Switches

How to Build Stacks and Understand Their Operation

This document describes how to stack Linksys switches and covers advanced stacking information, as well as troubleshooting and maintenance procedures for stacked switches. It contains the following sections:

- Switch Operation Modes
- Building Automatically-Configured Stacks
- Building Manually-Configured Stacks
- Understanding Stack Resiliency
- Understanding Advanced Stacking
- Configuring Units and Ports
- Troubleshooting and Maintenance

Switch Operation Modes

A switch may operate in one of two modes: stack or standalone. Either mode is selected by the user during software boot or in the web interface's System Information page. The new mode takes effect after the unit is reset. The factory default is stack mode.

Standalone Mode

A switch operating in standalone mode runs as an independent, single unit. All ports of a standalone switch operate as normal Ethernet links. A standalone switch does not participate in a stack even if physically connected to a stack.

Stack Mode

A switch operating in stack mode is not an independent unit, but a member of an organized group of switches known as a stack. A stack consists of one Stack Master control switch, one Master Backup switch and up to six Stack Member switches.

In some cases, a unit in stack mode that is not connected to any other units may operate as a "stack-of-one."

Note: Two ports of each unit in a stack mode (ports 12 and 24 on GE units, and ports G1 and G2 on FE units) are reserved for stacking links, and cannot be used for regular network connections.

Stacking allows you to build a switch with many more ports than would be available in a single unit. The stack is managed by one of the units (called the Stack Master) and all of the other units serve as ports only.

You can build stacks by building a new stack from a group of switches, or adding new units to an existing stack. Stacks can be automatically or manually configured.

Building Automatically-Configured Stacks

Building a New Stack

The easiest way to build a stack is to use a group of switches, each of which is in factory default mode:

Note: If the units to be used in building the new stack have been used previously, we recommend that you reset them to the factory default by holding the reset button for at least 10 seconds before using them.

1. Connect the units physically through the stacking ports, using standard Ethernet cables.
2. Power the units on. After a short interval the stack becomes operational, with one of the units selected as the Stack Master. The unit selected as Stack Master is indicated by a lit green "MST" LED on its front panel. If a serial console connection is desired, the serial cable should be connected to the console port of the unit serving as the Stack Master.

Adding Units to a Running Stack

1. Reset the units that will be added by restoring them to the factory default mode.
2. Connect the units physically to the stack.
3. Power the units on. After a short interval, they will become members of the stack.

Building Manually-Configured Stacks

You can manually configure stacks, including choosing a specific unit as the Stack Master. You must assign a unique Unit ID (from 1 to 8) to each stack member.

Building a New Stack

1. Reset all relevant units to by restoring them to the factory default mode.
2. Connect the units physically through the stacking ports, using standard Ethernet cables.
3. Assign each unit its desired number, making sure no duplicates exist, and reset the stack.

Adding Units to a Running Stack

1. Reset the units to be added by restoring them to the factory default mode.
2. Connect the units physically to the stack.

3. Power the units on. After a short interval, they will become stack members, but will have automatically-assigned Unit IDs. Assign each such unit its desired Unit ID (using the Stack Management Interface through the console port, by Telnet, or by using the graphical user interface (GUI)).
4. Reset the units to make this assignment permanent.

Note: We recommend that if you manually assign a Unit ID to one unit, you manually assign Unit IDs to all units. Using a mix of both system-assigned and manually-assigned IDs in your network can impact system performance.

The unit that is assigned the Unit ID 1 is the Stack Master, and its front panel “MST” LED lights green. The unit assigned the Unit ID 2 is the Backup Master.

Understanding Stack Resiliency

Stacks can be configured in ring or chain topologies. We recommend configuring the stack in ring topology, due to the high resiliency in case of unit failure or stacking links failure.

Additionally, if a redundant power supply is present, we recommend connecting the Stack Master and Backup Master units to the redundant power supply.

Understanding Advanced Stacking

To understand advanced stacking, you must understand Unit IDs and how they are allocated, and the stack unit startup process.

Unit IDs

Each unit in a stack has an assigned unique Unit ID number. The following sections describe the Unit IDs and their characteristics.

Stack Master

The unit assigned the Unit ID number 1 serves as the Stack Master. All other units are stack members. The Stack Master provides a single point of control, configuration and management for the entire stack, and stores the configuration for all stack members. (Members do not store any configuration information.)

Stack Backup Master

The unit assigned the Unit ID number 2 is a special stack member that serves as the stack Backup Master. A stack Backup Master assumes the role of Stack Master for the remaining stack members if the stack Master fails or is disconnected.

The Stack Master stores a copy of the active configuration on the Backup Master. This copy is used only if the Backup Master assumes the role of Stack Master.

Note: Only the configuration file is copied. Any dynamically-filled tables (for example, learned addresses) are not copied from the Stack Master to the Backup Master. If the Backup Master assumes the role of Stack Master, it builds its own dynamic tables.

Stack Members

The units assigned the Unit IDs 3 through 8 are called stack members. A stack member operates only as a member of the stack under the direction of an operational Stack Master (or a Backup Master that has assumed the Stack Master role). Stack members are not directly manageable and configurable, and must be managed through the Stack Master. They do not contain any meaningful configuration information, including their own configuration. If an operational Stack Master is not present and reachable, these units are not functional.

Master-Enabled Units

Units that are assigned a Unit ID number of 1 or 2 are called master-enabled units. Only master-enabled units participate in the Master Election process (see below) when they are initialized, are inserted into a new stack, or lose connectivity with the existing Stack Master. Only master-enabled units participate in the Master Election process and can become the Stack Master or Backup Master. (Units that are assigned a Unit ID of 3 through 8 can only become a Stack Master or a Backup Master if they are manually configured by the system administrator or if they are reset to the factory default mode.)

Unit ID Allocation

Units are shipped from the factory without an assigned Unit ID, and must be assigned a unique Unit ID before they can operate as part of a stack. Unit ID numbers are assigned to units in one of two ways:

- Unit ID numbers are assigned by the system administrator, and can be changed only manually by the system administrator.
- Unit ID numbers are allocated to a stack member unit by the Stack Master during system initialization.

A unit that was assigned a Unit ID will usually keep this number even after it is rebooted. The Stack Master may reallocate Unit IDs during system initialization to resolve duplicate Unit ID conflicts (see below). Manually assigned Unit IDs cannot be changed by the Stack Master, even if there is a conflict.

Unit ID assignment or change takes effect only during system initialization and does not take place during system runtime. Units of a stack do not have to be numbered in sequence, and can be interconnected as long as each unit has a unique ID and at least one unit of the stack serves as Stack Master.

Stack Unit Startup Process

When a unit in stack mode is initialized (powered up or rebooted), it goes through the following process:

1. The Master Discovery and Master Election processes.
2. Unit ID allocation by the Stack Master (including duplicate Unit ID conflict resolution).
3. Unit and port configuration by the Stack Master.

Master Discovery Process

When a unit in stack mode initializes, its behavior depends on its Unit ID (if one is configured):

- If the unit does not have a current Unit ID (that is, the unit is in factory default mode) and if there is a Stack Master, the unit is allocated a Unit ID number from the Stack Master. If there is no Stack Master, then the unit participates in the Master Election process, and may be chosen as the new Stack Master or Backup Master.
- If the unit's current Unit ID is 1 or 2 (that was previously allocated, even if used in a different stack), then the unit participates in the Master Election process.
- If the unit has a current Unit ID (that was previously allocated, even if used in a different stack), the unit tries to act according to its Unit ID number in the new stack. For example, if the unit's current Unit ID is 3 through 8, it will try to connect to the running Stack Master, and will not proceed to the next stage until contact with the Stack Master is made. These units will not participate in the Master Election process, and if no Stack Master is present, the units are effectively shut down.

The Stack Master and all other stack units carry out a continuous process of Master Discovery by frequently exchanging stack control messages. This allows units to know if another unit fails or becomes unreachable.

Master Election Process

When units in stacking mode initialize, one of the units is elected as the Stack Master. If a unit in the stack was set to "Force Master" by the system administrator, that unit is elected as the Stack Master. Only master-enabled stack units (for example, those with the Unit ID of 1 or 2) can be configured as "Force Master."

If the stack contains units whose unique Unit ID is 1 or 2, then one of these two units will be the Stack Master. It does not matter if the Unit ID was originally assigned automatically or manually. These units are called master-enabled units. If there is only one master-enabled unit, it will be elected as the Stack Master (even if its Unit ID is 2).

If there are two master-enabled units, the two units decide which of them is the Master by checking which one has been running for a longer time (in intervals of 10 minutes). The unit that has been running for the longer time will be the Stack Master. If they have been running for the same amount of time, the unit with the Unit ID of 1 will be the Stack Master. If both units have been running for the same amount of time and both units have the same Unit ID, the unit with a lower MAC (hardware) address will be selected as the Stack Master.

If the stack contains one or more units without a current Unit ID (the units are in factory default mode), then one of these units will be the Stack Master. The unit selected to be the Stack Master is the one running for the longest time (in intervals of 10 minutes), or, if all units are running for the same amount of time, the one with the lowest MAC (hardware) address.

The Master Election process ensures that the stack has a Stack Master. The Stack Master has the Unit ID of 1 and the Backup Master, if it exists, has the Unit ID of 2. Alternatively, the Stack Master has the Unit ID of 2 and the Backup Master, if it exists, has the unit ID of 1.

If a master-enabled unit is added to a stack and powered on, when it comes up it invokes the Master Election process, even though the rest of the stack already has an elected master. Because the unit is new, it loses the election and joins as a stack member or Backup Master.

Unit ID Allocation and Duplicate Unit ID Conflict Resolution

After a Stack Master is elected, it allocates Unit IDs to units that do not have a currently assigned Unit ID (units that are in factory default mode). The Stack Master also attempts to resolve all cases of units with duplicate Unit IDs. The Stack Master changes the Unit IDs of units that have a duplicate current Unit ID, provided that there are available, unused Unit IDs. In a merged stack, if the Stack Master unit remains as the Stack Master, units that were in its group will keep their unit IDs. Members of other groups are renumbered.

If the conflict occurs after the units reboot, the conflict is resolved as follows:

- If both duplicate units are in auto (self ordering) mode, then the unit ID with the lower MAC (hardware) address will keep its unit ID. The other unit is assigned a new unit ID.
- If one of the duplicates is in auto (self ordering) mode, and the other unit is in manual mode, then the manual mode unit will keep its ID and the other is assigned a new unit ID.
- If both duplicate units are in manual mode, then both of them are shut down.

If the Stack Master is able to allocate a unique Unit ID to each unit, then all units can operate as a stack. If the Stack Master is unable to allocate a Unit ID to a unit, that unit is effectively shut down and will not participate in the stack. For example, units with a conflicting manually-set Unit ID number are shut down because the Stack Master cannot override the system administrator's assignment and resolve the conflict.

If there are more units than the maximum number allowed in a stack, and the incoming units are already in factory default mode (they do not have unit ID assigned), then a Stack Master is elected following the Master Discovery and Master Election processes. All other units remain shut down.

Occasionally, due to a race condition during the boot process, some of the units might be connected and join the stack. If the incoming units already have a unit ID, then none of them will join the stack and all are left in shutdown mode because there is no way for the Stack Master to determine their Unit ID preference.

Note: If a unit is shut down, its stacking links are inactive. If the stacking units are connected in a chain topology, the shutdown of one unit breaks the chain and can cause other units to be shut down if they have no active link to the Stack Master unit.

Configuring Units and Ports

After the Master Discovery and Master Election processes, each unit in the stack has a unique Unit ID, one of the units is the Stack Master, and one of the units may serve as the Backup Master. The Stack Master then configures each of the member units and its ports according to the configuration file present on the Stack Master. If the stack has a Backup Master, the configuration file is copied to the Backup Master.

After all the units and ports are configured, the stack enters normal operational mode. If a change is made to the system configuration, the change is stored by the Stack Master and is copied to the Backup Master if one exists.

You can use the command-line interface (CLI) or GUI to configure the stack units.

Setting the Unit's Operational Mode

Use the GUI to set the unit's operational mode to standalone or stack. This configuration takes effect after the next reboot. (See Figure 1.)

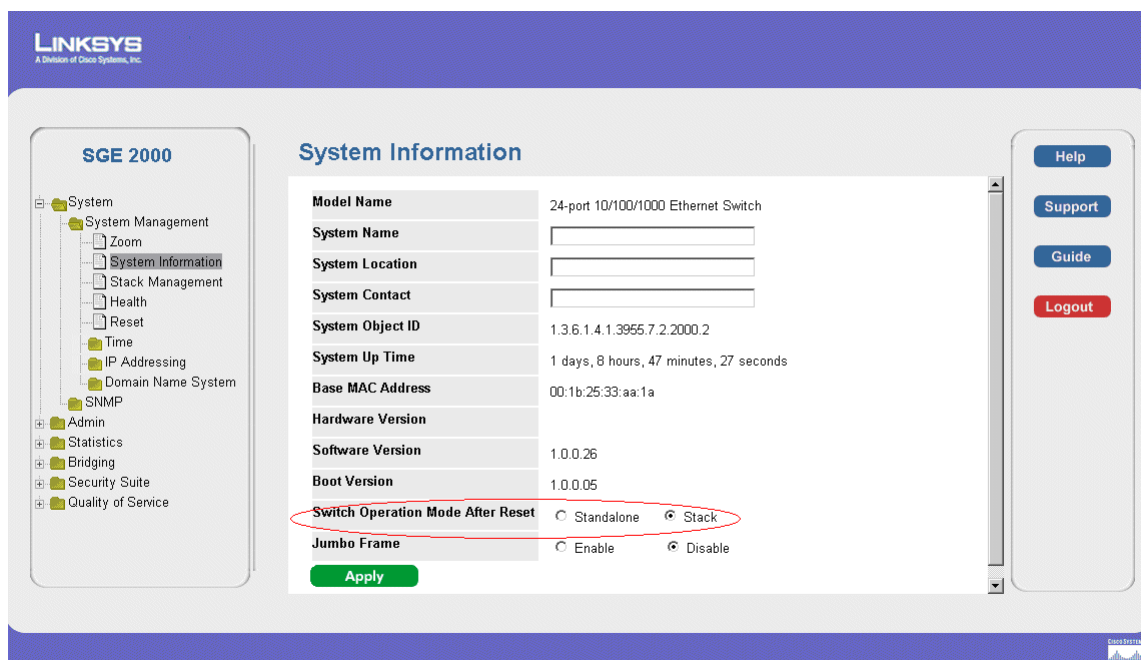


Figure 1

Configuring a Unit as the Stack Master

Use the GUI to force a unit to be the stack Master after the next reset. (See Figure 2.)

Configuring the Unit ID

Use the GUI to assign a static Unit ID or allow the unit to be renumbered. (See Figure 2.)

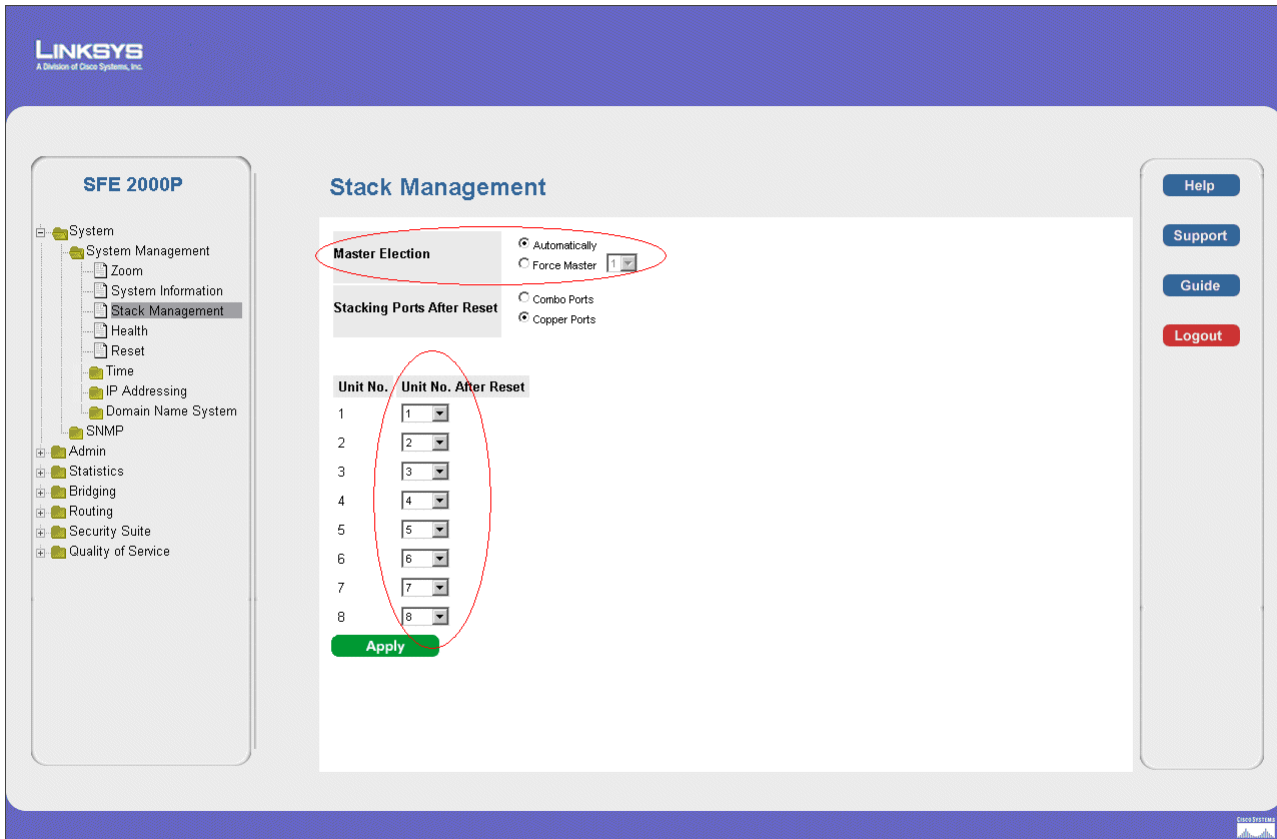


Figure 2

Resetting the Unit to Factory Default Mode

To reset the unit to the factory default settings, press the front panel RESET button (see Figure 3.) The unit is set to Stack mode with a Unit ID of 0.

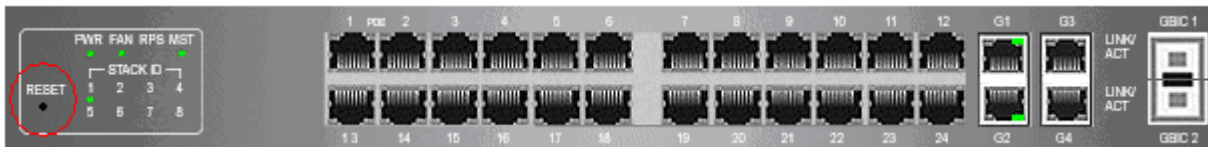


Figure 3

Understanding LED Indicators

Each unit contains a Master LED indicator and eight unit LEDs. The LED status definitions are shown in the table below.

LED	Mode	Color	Description
Master	Solid	Green	The switch is the Stack Master..
	Off	N/A	The switch is not the Stack Master or the switch is not stacked.
ID <i>n</i>	Solid	Green	The switch is Unit ID <i>n</i> .
	Off	N/A	The switch is not Unit ID <i>n</i> or the switch is not stacked.
All ports	Solid	Red	The switch is powered on, but not operational.

Troubleshooting and Maintenance

Replacing a Failed Member Stack Unit in an Operational Stack

If a unit that is not the Stack Master fails in an operational stack, the Stack Master discovers that the unit is no longer responding during the Master Discovery process. The Stack Master directs all other stack members to route unit-to-unit traffic around the failed unit using the ring topology of the stacking connections. Concurrently, the Stack Master notifies the system administrator of the failure by sending SYSLOG messages and SNMP traps.

Because all traffic has been routed around the failed unit, when it is disconnected from the stack, the stack continues to run as long as all other stacking connections are left intact.

When a new unit is inserted in the stack and powered on, the following occurs:

1. The incoming unit, which is in stack mode, performs the Master Discovery process, and may participate in the Master Election process.
 - If the incoming unit has a Unit ID of 1 or 2 (it is a master-enabled unit) it initiates the Master Election process. However, because the running Stack Master has a longer runtime, the current Stack Master retains its position and the incoming unit does not become the new Stack Master.
 - If the incoming unit has a Unit ID of 3 through 8, it attempts to become a member unit of the stack, subject to control by the already running Stack Master, and the Master Election process does not occur.
2. The Stack Master performs Unit ID allocation and the conflict resolution process.
 - If the incoming unit did not have an assigned Unit ID (that is, it is in factory default mode), it is assigned the lowest available Unit ID by the Stack Master. We recommend that you use the automatically-assigned unit ID mode because it provides better resiliency to the stack.
 - If the incoming unit already has an assigned Unit ID, and that Unit ID is unused in the current stack, the incoming unit keeps its assigned Unit ID and the Stack Master applies any configuration relevant to that Unit ID to the incoming unit.

- If the incoming unit already has an assigned Unit ID, and that Unit ID conflicts with a unit ID in the current stack, the Stack Master allocates a new Unit ID to the incoming unit, giving it the lowest available Unit ID. However, if the incoming unit has a manually assigned Unit ID, the Stack Master cannot change it. If the incoming unit cannot be assigned an available Unit ID, then it is shut down and is not joined to the stack.
3. The Stack Master performs unit and port configuration for the incoming unit.
 - Any configuration information that is relevant to the number assigned to the incoming unit is applied by the Stack Master. For example, if the incoming unit is assigned the same Unit ID of the unit it replaced, then when possible, it receives the same configuration as the failed unit.
 - If the incoming unit is identical to the replaced unit, the entire configuration of the replaced unit is applied to the incoming unit and the stack returns to the state it was in before unit failure.

If the incoming unit is not identical to the unit that failed, the Stack Master applies the configuration in the following manner:

- If a 24-port unit replaces a failed 48-port unit, the ports of the incoming unit are configured according to the configuration of the first 24 ports of the failed unit.

Note: The configuration of all 48 ports of the failed unit is kept in memory, even though the first 24 are currently applied. If, in the future, a 48 port unit is inserted and assigned the same Unit ID, it is configured the same as the original failed 48-port unit.

- If a 48-port unit replaces a 24-port unit, then the first 24 ports of the incoming unit are configured according to configuration of the ports of the failed unit. The remaining ports of the incoming are configured according to the default settings.
- If the units have uplink ports, then the first uplink port of the incoming unit is configured according to the configuration of the first uplink port of the failed unit.

Replacing a Failed Stack Master Unit in an Operational Stack

When the Stack Master unit fails, the stack Backup Master, using the Master Discovery process, discovers that the Stack Master unit no longer responds. The Backup Master takes over as the Stack Master. The Backup Master (now the Stack Master) directs all other stack members to route unit-to-unit traffic around the failed unit using the ring topology of the stacking connections. Concurrently, the Backup Master notifies the system administrator of the failure by sending SYSLOG messages and SNMP traps.

Because all traffic has been routed around the failed unit, when it is disconnected from the stack, the stack continues to run as long as all other stacking connections are left intact.

When a new unit is inserted in the stack and powered on, the following occurs:

1. The incoming unit, which is in stack mode, performs the Master Discovery process, and may participate in the Master Election process.
 - If the incoming unit has a Unit ID of 1 or 2 (it is a master-enabled unit) it initiates the Master Election process. However, because the running stack Backup Master has a longer runtime (if it has been running for more than 10 minutes) it remains the Stack Master and the incoming unit does not become the new Stack Master. This can cause an incoming unit with a Unit ID of 1 to serve as the stack Backup Master, while the current unit with the Unit ID of 2 remains the active Stack Master.

2. The Stack Master performs Unit ID allocation and the conflict resolution process.
 - If the incoming unit did not have an assigned Unit ID (that is, it is in factory default mode), it is assigned the lowest available Unit ID by the Stack Master. We recommend that you use the automatically-assigned unit ID mode because it provides better resiliency to the stack.
 - If the incoming unit already has an assigned Unit ID, and that Unit ID is unused in the current stack, the incoming unit keeps its assigned Unit ID and the Stack Master applies any configuration relevant to that Unit ID to the incoming unit.
 - If the incoming unit already has an assigned Unit ID, and that Unit ID conflicts with a unit ID in the current stack, the Stack Master allocates a new Unit ID to the incoming unit, giving it the lowest available Unit ID. However, if the incoming unit has a manually assigned Unit ID, the Stack Master cannot change it. If the incoming unit cannot be assigned an available Unit ID, then it is shut down and is not joined to the stack.
3. The Stack Master performs unit and port configuration for the incoming unit.
 - Any configuration information that is relevant to the number assigned to the incoming unit is applied by the Stack Master. For example, if the incoming unit is assigned the same Unit ID of the unit it replaced, then when possible, it receives the same configuration as the failed unit.
 - If the incoming unit is identical to the replaced unit, the entire configuration of the replaced unit is applied to the incoming unit and the stack returns to the state it was in before unit failure.

Splitting a Stack

A working stack can be split into two groups, either by failure of a stacking link connecting two units in the stack, or by a failed unit in a chain topology that causes disconnection between two units in the stack. In this case, each group is considered as an independent running stack configuration. For each group, there are three scenarios.

The Stack Master and Backup Master Units Remain in a Group

In this scenario, the Stack Master routes around the missing units. The Master Discovery, Master Election and Unit ID Allocation & Duplicate Unit ID Conflict Resolution processes occur with the following results:

- Any configuration information contained in the Stack Master that is relevant to the units which remained in the split group remains unchanged.
- Topology information (the information for each unit on how to send traffic to any other unit in the stack) managed by the Stack Master includes only units that are reachable (connected) following the split.
- The split stack continues to work as it previously did, but with fewer units.
- No unit ID changes are performed in each of the split stacks.
- The Stack Master notifies the system administrator of the removed units and ports that belong to the unreachable units by sending SYSLOG messages and SNMP traps. They are reported as “not present.”

The Stack Master or the Backup Master Unit Remains in a Group

If the Stack Master unit remains in the group, the scenario described in “Replacing a Failed Member Stack Unit in an Operational Stack” applies. If the Backup Master unit remains in the group, the scenario described in “Replacing a Failed Stack Master Unit in an Operational Stack” applies.

Note: If the stack is split in two groups, one with the Stack Master and one with the Backup Master, both groups will function.

The Master Discovery, Master Election and Unit ID Allocation & Duplicate Unit ID Conflict Resolution processes occur with the following results:

- If the Stack Master unit remains in the split stack, the Stack Master discovers (using the Master Discovery process) that the Master Backup unit no longer responds. The Stack Master notifies the system administrator (using SYSLOG messages and SNMP traps) of the removed units and ports that belong to the unreachable units and they are reported as “not present.”
- If the Backup Master unit remains in the split stack, the Backup Master determines this as a case of Stack Master failure and takes over and manages the remaining units as a stack while keeping its previous Unit ID number. Because the Backup Master was not acting as a master prior to the split, it initiates a topology database and ports learning process. Traffic might be halted for a short period of time until synchronization (unit and port configuration) is completed. New units discovered by the Backup Master notify the system administrator (using SYSLOG messages and SNMP traps).
- The partial stacks both continue to work as they did previously, but with fewer units.
- No unit ID changes are performed in each of the partial stacks.
- If each part of the stack has a Stack Master (for example, one contains the original Stack Master, and one contains the Backup Master), and are operating as two separate stacks, both Stack Masters contain the same configuration and use the same IP address.

Warning: If both Stack Masters use the same IP Address, problems can occur on the network, because users cannot connect to one of the stacks through its IP address.

Neither the Stack Master Unit or the Backup Master Unit Remains in the Group

This scenario is the same as that of a failed Stack Master where no Backup Master is available. The following concepts apply:

- Units whose ID numbers are 3 through 8 in this part of the original stack will not renumber themselves, and will remain shut down until a master-enabled unit is connected and begins to operate as the Stack Master. The Master Discovery process discovers that the Stack Master has failed.
- In this group, the units lose connection with the Stack Master. Since they began as a running stack and none of them are in factory default mode, renumbering does not occur, and even a reset of the units will not affect unit ID assignment, because units can be renumbered only by a Stack Master.
- No unit ID changes are performed in each one of the two groups.

Important: None of the units in either group will renumber themselves.

Merging Two Stacks

To merge two working stacks and create one stack, first decide if you will merge the stacks while the incoming units are powered off during insertion, or if both stacks will be running when merged.

If the incoming units are powered off, follow the procedures described in “Building a New Stack” in the “Building Automatically-Configured Stacks” or “Building Manually-Configured Stacks” sections. Repeat the process for each unit inserted into the stack.

If both stacks to be merged are running (for example, you are connecting the stacking cables of two stacks), the following occurs:

- If each of the joined stacks has a Stack Master unit, both Stack Master units perform the Master Discovery process and participate in the Master Election process. One of the Stack Master units is selected as the Stack Master unit for the merged stack. The criteria for choosing the Stack Master are as follows:
 - Force Master: If Force Master is enabled, the unit that is configured as the forced unit is selected as the Stack Master.
 - System Up Time: Up time is measured by quantities of 10-minute intervals. If the number of 10 minute intervals is higher for one of the units, this unit is selected as the Stack Master.
 - Lowest Unit ID: If both units have the same up time (measured in intervals of 10 minutes), the unit with the lowest unit ID is selected as the Stack Master.
 - Lowest MAC: If both Master unit ID numbers are equal, the unit with the Lower MAC address is chosen as the Stack Master.

The Stack Master unit that loses its “mastership” in the Master Election process is renumbered if the unit ID was dynamically allocated. The new Stack Master allocates it a new number and configures it as a stack member or a Backup Master. It will be shut down if the unit ID was manually allocated. We recommend that the administrator configure the unit to receive an auto-assigned Unit ID before reconnecting it to the stack.

Note: There will never be two units with the same Unit ID at the end of the merge.

When two stacks are combined, all of the configuration information for one of the stacks is lost. Only the surviving Stack Master (after the discovery and election processes are complete) maintains its configuration information.

We recommend that when combining two stacks, you reset the switches in one stack to factory default mode and then add the switches as described in “Adding Units to a Running Stack” in the “Building Automatically-Configured Stacks” section.

- If one of the merged stacks had neither a Stack Master unit nor a Backup Master unit, then units belonging to this group are inserted into the stack as described in “Replacing a Failed Member Stack Unit in an Operational Stack.” The Master either connects the running units to the stack using the current Unit ID numbers or renumbers them.

Note: Any time two stacks are combined into one stack, there is no way to maintain the configuration for both sets of switches. All dynamic information of the units that belong to the portion of the stack that was not re-elected to be the Stack Master is released.

Understanding Stacking Cable Failure

If the stacking connection cables fail and cause a stack split, the scenario described in “Merging Two Stacks” applies. This occurs only if the stack uses a chain topology. Single stacking cable failure will not cause a stack split if a ring topology is used.

Inserting Too Many Units into a Stack

If you try to insert too many units into a stack, when all units (existing and newly inserted) are powered on at the same time, the following occurs:

1. A Stack Master is elected following the Master Discovery and Master Election processes.
2. All other units are shut down.

Note: Occasionally, due to a race condition during the boot process, some of the units might be connected and join the stack.

When a running group of units is added to an existing stack and each one of the stack groups has an elected Stack Master, and the total of existing units and inserted units exceeds the maximum allowed number of units (8) in a stack:

- The Master Detection and Master Election processes determine the Stack Master out of one of the two combined stacking groups.
- When switches are added to a running stack, the Unit ID Allocation and Duplicate ID conflict resolution processes detect an error if too many switches are present in the stack, and no changes are made to units that originally belonged to the group managed by the newly-elected Stack Master. The original switches retain their ID assignments and configurations. The units that originally belonged to the group managed by the Stack Master that lost its “mastership” are shut down.

Inserting a Standalone Unit into a Running Stack

If a unit is in standalone mode, it will not participate in the Master Discovery process (it will not look for a Stack Master and will not respond to master queries). As a result, it will not join the stack but will continue to run as a standalone unit. The ports that are connected to the other units’ stacking links will not pass any traffic, and the Stack Master will consider them as failed stacking links and route all traffic around them.