

Link Aggregation Group (LAG) Management and Settings on Sx500 Series Stackable Switches

Objective

Link Aggregation Group (LAG) multiply the bandwidth, increase port flexibility, and provide link redundancy between two devices. Link Aggregation Control Protocol (LACP) is a part of IEEE specification (802.3az) that can control the bundling of several physical ports together to form a single logical channel (LAG). Traffic load balancing over the active member ports of a LAG is managed by a hash-based distribution function that distributes unicast and multicast traffic based on Layer 2 or Layer 3 packet header information. LACP helps to form one single LAG by bundling many physical ports. It is also responsible for bandwidth multiplication, increase in port flexibility, and in providing redundancy on links between any 2 devices. Additionally this helps in changing the LAG speed, advertisement, flow control, and also protection which can be easily identified in LAG settings table.

This document shows you how to configure the load balancing algorithm, LAG management, and LAG settings on a switch.

Note: For instructions on how to configure LAG on a switch through the CLI (Command Line Interface), click [here](#).

Applicable Devices

- Sx500 Series Stackable Switches
- Sx350X Series Switches
- Sx550X Series Switches

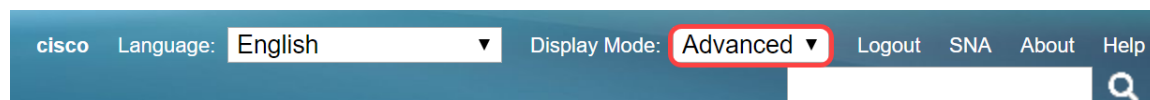
Software Version

- v2.3.5.63 (Sx350X & Sx550X)
- v1.4.9.4 (Sx500)

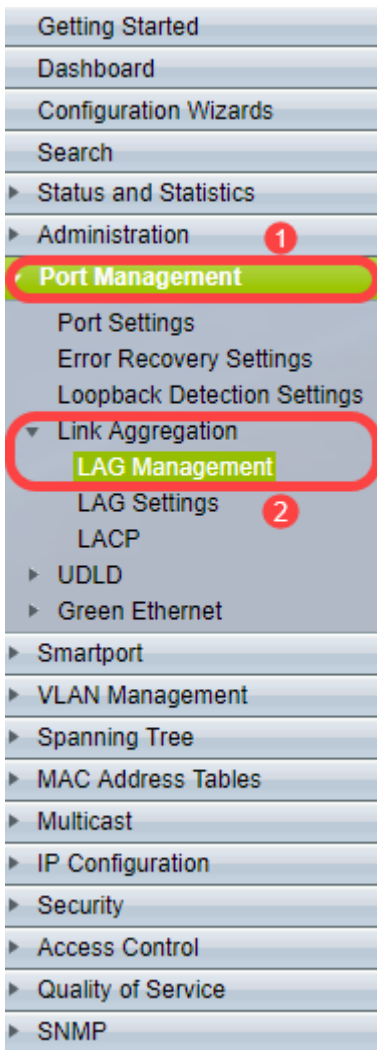
LAG Management Procedure

Configure Load Balance Algorithm

The steps in this document are performed under the advanced display mode using the SG550X-24. To change to the advanced display mode, go to the top right corner and select **Advanced** in the *Display Mode* drop-down list.

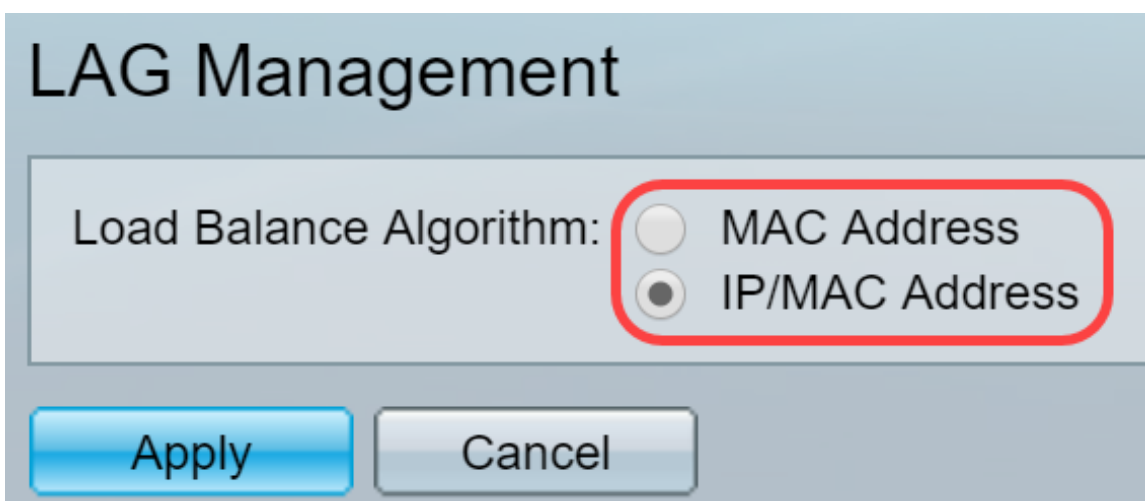


Step 1. Log in to the web configuration utility and choose **Port Management > Link Aggregation > LAG Management**. The *LAG Management* page opens:



Step 2. Click one of the following radio buttons for the *Load Balance Algorithm*. In this example, we will be configure IP/MAC address as our load balance algorithm.

- *MAC Address* - Performs load balancing based on source and destination MAC addresses on all the packets.
- *IP/MAC Address* - Performs load balancing by the source and destination IP addresses on IP packets, and by the source and destination MAC addresses on non-IP packets.



Step 3. Click the **Apply** button to apply the changes. The Running Configuration file is updated.

LAG Management

Success. To permanently save the configuration, go to the [File Operations](#) page or click the Save icon.

Load Balance Algorithm: MAC Address
 IP/MAC Address

Edit LAG Management

Step 1. To define member or candidate port in the *LAG Management Table* section, click the radio button for the LAG to be configured.

The descriptions of the fields in the *LAG Management Table* are:

- *LAG* - LAGs are shown in the column.
- *Name* - LAG name configured is shown in the column.
- *LACP* - Shows whether LACP is enabled or disabled to the particular LAG.
- *Link State* - Shows whether the LINK of the LAG is active or down.
- *Active Member* - Shows the member which are in the field and are active in the configured set.
- *Standby Member* - Shows the members which are configured to the LAG members which are on standby.

LAG Management Table						
	LAG	Name	LACP	Link State	Active Member	Standby Member
<input checked="" type="radio"/>	LAG 1			Link Not Present		
<input type="radio"/>	LAG 2			Link Not Present		
<input type="radio"/>	LAG 3			Link Not Present		
<input type="radio"/>	LAG 4			Link Not Present		
<input type="radio"/>	LAG 5			Link Not Present		

Step 2. Click **Edit...** to modify the LAG.

<input type="radio"/>	LAG 28			Link Not Present		
<input type="radio"/>	LAG 29			Link Not Present		
<input type="radio"/>	LAG 30			Link Not Present		
<input type="radio"/>	LAG 31			Link Not Present		
<input type="radio"/>	LAG 32			Link Not Present		

Step 3. (Optional) Choose the LAG number from the *LAG* drop-down list.

LAG: 1 ▼

LAG Name: (0/64 characters used)

LACP: Enable

Unit: 1 ▼

Port List:

- GE1
- GE2
- GE3
- GE4
- GE5
- GE6
- GE7
- GE8

LAG Members:

Apply Close

Step 4. Enter a name for the LAG in the *LAG Name* field.

LAG: 1 ▼

LAG Name: LAG1 (4/64 characters used)

LACP: Enable

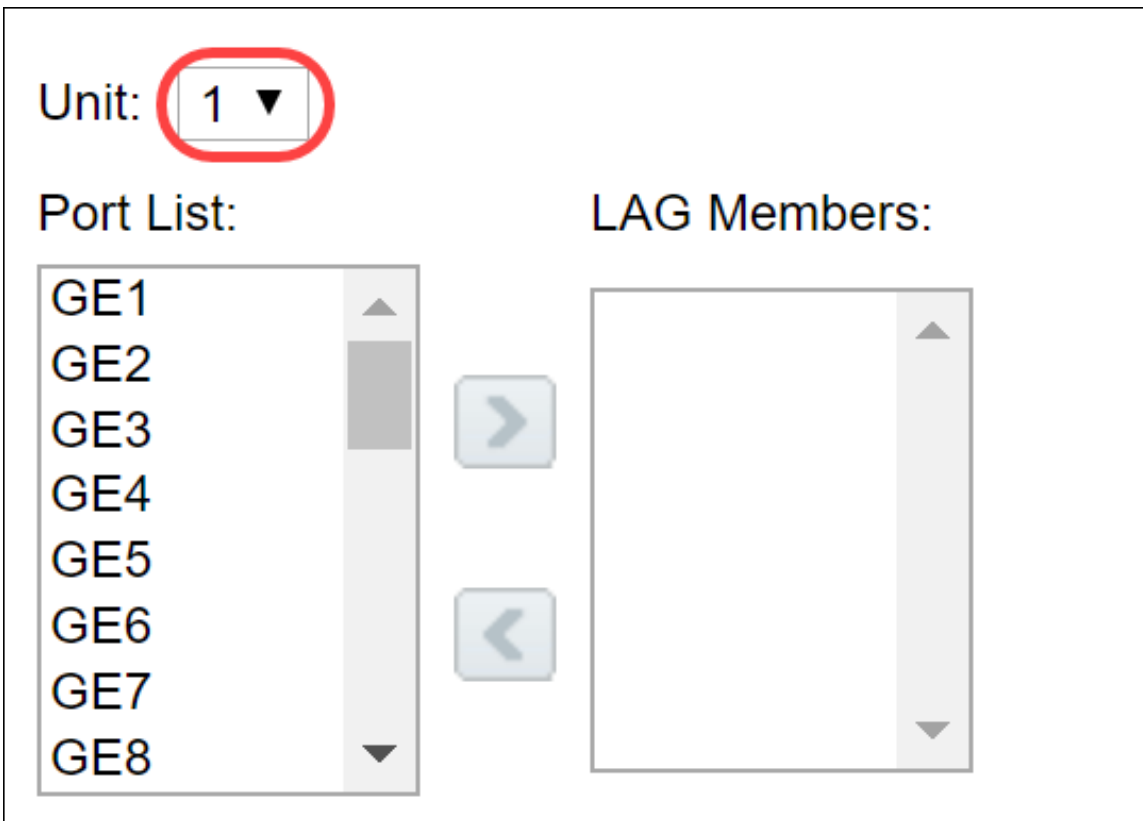
Step 5. Check **Enable** in the *LACP* field on the chosen LAG. This makes it a dynamic LAG. This field can only be enabled after moving a port to the LAG in the next field.

LAG: 1 ▼

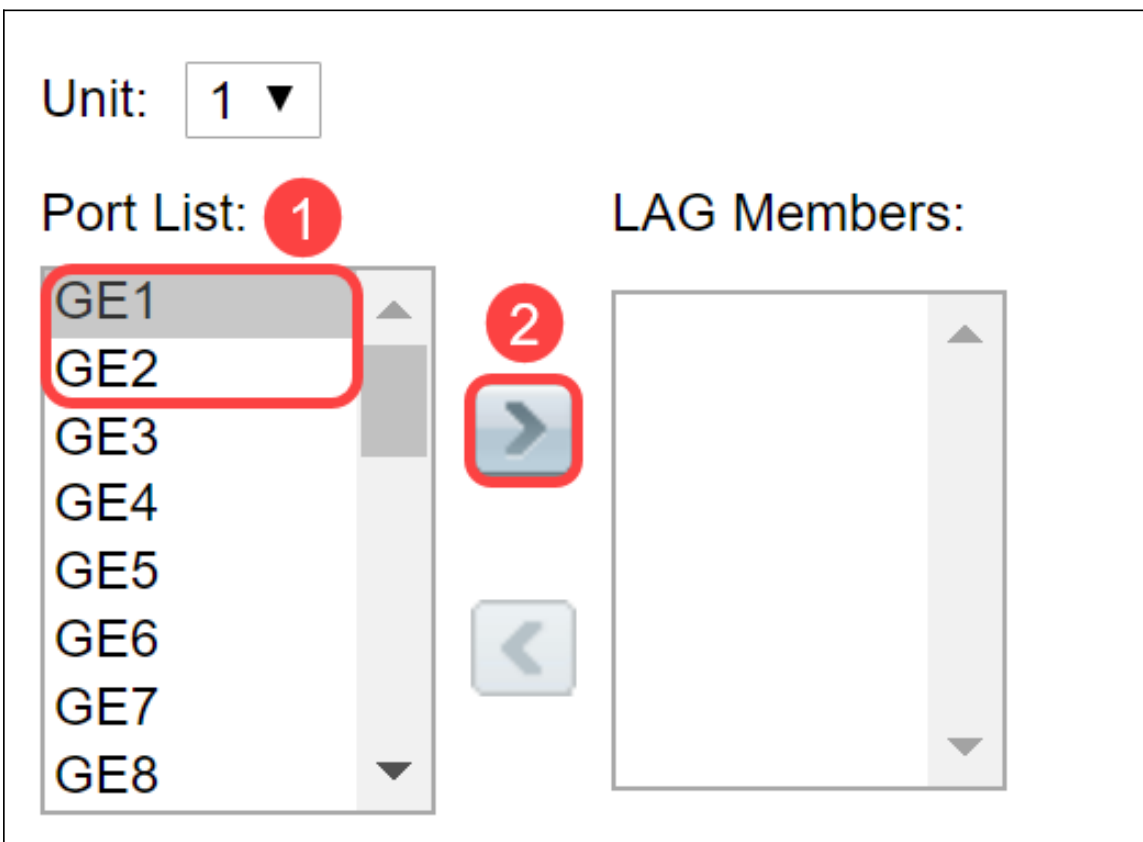
LAG Name: LAG1 (4/64 characters used)

LACP: Enable

Step 6. Choose the Unit of the switch from the *Unit* field which displays the stacking member for which LAG information is defined.



Step 7. Move the ports that are to be assigned to the LAG from the *Port List* to the *LAG Members* list. Up to eight ports per static LAG and 16 ports to a dynamic LAG can be assigned. The chosen Unit/Slot and the Port list are added to the LAG Members list. In this example, we will be selecting **GE1** and **GE2**.



Step 8. Click **Apply** to save the changes in the *Edit LAG Membership* page.

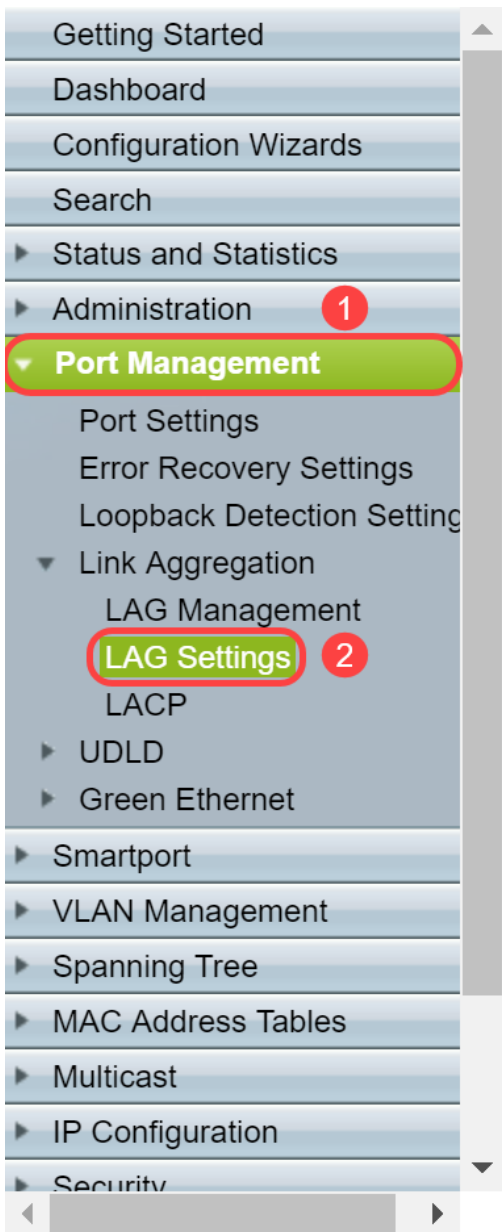
Note: LAG will also need to be configured on the other switch as well. If LAG is not configured on the other switch, then the *Link State* will be *Link Down* and the ports that you have configured will be in *Standby Member* field.

LAG Management Table						
	LAG	Name	LACP	Link State	Active Member	Standby Member
<input type="radio"/>	LAG 1	LAG1	Enabled	Link Up	GE1/1, GE1/2	
<input type="radio"/>	LAG 2			Link Not Present		
<input type="radio"/>	LAG 3			Link Not Present		
<input type="radio"/>	LAG 4			Link Not Present		
<input type="radio"/>	LAG 5			Link Not Present		
<input type="radio"/>	LAG 6			Link Not Present		
<input type="radio"/>	LAG 7			Link Not Present		
<input type="radio"/>	LAG 8			Link Not Present		
<input type="radio"/>	LAG 9			Link Not Present		
<input type="radio"/>	LAG 10			Link Not Present		
<input type="radio"/>	LAG 11			Link Not Present		
<input type="radio"/>	LAG 12			Link Not Present		
<input type="radio"/>	LAG 13			Link Not Present		

Configure LAG Settings

The following configuration procedure not only helps you to configure LAG but also to reactivate suspended LAG.

Step 1. Log in to the web configuration utility and choose **Port Management > Link Aggregation > LAG Settings**. The *LAG Settings* page opens:



Step 2. Click the LAG that needs to be modified.

LAG Settings

LAG Settings Table

	Entry No.	LAG	Description	Type	Status	Link Status	Time Range		Auto	Speed	Flow	Protection State
							SNMP Traps	Name				
<input checked="" type="radio"/>	1	LAG 1	LAG1	1000M	Up	Enabled			Enabled	1000M	Disabled	Unprotected
<input type="radio"/>	2	LAG 2				Enabled						Unprotected
<input type="radio"/>	3	LAG 3				Enabled						Unprotected
<input type="radio"/>	4	LAG 4				Enabled						Unprotected
<input type="radio"/>	5	LAG 5				Enabled						Unprotected

Step 3. Click **Edit** to modify that LAG.

<input type="radio"/>	29	LAG 29				Enabled						Unprotected
<input type="radio"/>	30	LAG 30				Enabled						Unprotected
<input type="radio"/>	31	LAG 31				Enabled						Unprotected
<input type="radio"/>	32	LAG 32				Enabled						Unprotected

Copy Settings... **Edit...**

Step 4. The *Edit LAG Settings* window appears. Choose the LAG ID number from the *LAG* drop-down list.

LAG:	1	LAG Type:	1000M-Eth
Description:	(4/64 characters used)		
Administrative Status:	Up	Operational Status:	Up
Link Status SNMP Traps:	Enable		
Time Range:	Enable		
Time Range Name:	Edit	Operational Time Range State:	N/A
Administrative Auto Negotiation:	Enable	Operational Auto Negotiation:	Enabled
Administrative Speed:	1000M	Operational LAG Speed:	1000M
Administrative Advertisement:	<input type="checkbox"/> Max. Capability <input type="checkbox"/> 1000 Full <input type="checkbox"/> 10 Full <input type="checkbox"/> 100 Full	Operational Advertisement:	Max. Capability
Administrative Flow Control:	<input type="radio"/> Enable <input checked="" type="radio"/> Disable <input type="radio"/> Auto Negotiation	Operational Flow Control:	Disabled
Protected LAG:	<input type="checkbox"/> Enable		

Step 5. In the *Description* field, enter the LAG name or a comment for identification. The *LAG Type* field will display the port type that comprises the LAG.

LAG:	1	LAG Type:	1000M-Eth
Description:	LAG1 (4/64 characters used)		
Administrative Status:	<input checked="" type="radio"/> Up <input type="radio"/> Down	Operational Status:	Up
Link Status SNMP Traps:	<input checked="" type="checkbox"/> Enable		
Time Range:	<input type="checkbox"/> Enable		
Time Range Name:	Edit	Operational Time Range State:	N/A

Step 6. Select the LAG to be administratively **Up** or **Down** in the *Administrative Status* field. The *Operational Status* field shows whether LAG is currently operating.

Administrative Status:	<input checked="" type="radio"/> Up <input type="radio"/> Down	Operational Status:	Up
Link Status SNMP Traps:	<input checked="" type="checkbox"/> Enable		
Time Range:	<input type="checkbox"/> Enable		
Time Range Name:	Edit	Operational Time Range State:	N/A

Step 7. Check the **Enable** checkbox in the *Link Status SNMP traps* field if you want to enable generation of SNMP traps notifying of changes to the link status of the ports in the LAG. Link status SNMP traps is enabled by default.

Administrative Status:	<input type="radio"/> Up <input checked="" type="radio"/> Down	Operational Status:	Up
Link Status SNMP Traps:	<input checked="" type="checkbox"/> Enable		
Time Range:	<input type="checkbox"/> Enable		
Time Range Name:	Edit	Operational Time Range State:	N/A

Step 8. (Optional) In the *Time Range* field, check the **Enable** checkbox to enable the time range during which the port is in up state. When the time range is not active, the port is in shutdown. If a

time range is configured, it is effective only when the port is administratively up. Time range is not enabled by default. In this example, we will be leaving time range disabled.

Note: This field may vary depending on the switch model you are using.

Administrative Status:	<input checked="" type="radio"/> Up <input type="radio"/> Down	Operational Status:	Up
Link Status SNMP Traps:	<input checked="" type="checkbox"/> Enable		
Time Range:	<input type="checkbox"/> Enable		
Time Range Name:	<input type="text"/> Edit	Operational Time Range State:	N/A

Step 9. (Optional) If *Time Range* was enabled in the previous step, select the profile that specifies the time range in the *Time Range Name* field. If a time range is not yet defined, click **Edit** to go to the *Time Range* page.

Note: Time range needs to be enabled in order to select a time range name.

Administrative Status:	<input checked="" type="radio"/> Up <input type="radio"/> Down	Operational Status:	Up
Link Status SNMP Traps:	<input checked="" type="checkbox"/> Enable		
Time Range:	<input type="checkbox"/> Enable		
Time Range Name:	<input type="text"/> Edit	Operational Time Range State:	N/A

Step 10. Check the **Enable** checkbox in the *Administrative Auto Negotiation* field to enable or disable auto-negotiation on the LAG. Auto-negotiation is a protocol between two link partners that enables a LAG to advertise its transmission speed and flow control to its partner (the Flow Control default is disabled). The *Operational Auto Negotiation* field displays the auto-negotiation settings.

Note: It is recommended to keep auto-negotiation enabled on both sides of an aggregate link, or disabled on both sides, while ensuring that link speeds are identical.

Administrative Auto Negotiation:	<input checked="" type="checkbox"/> Enable	Operational Auto Negotiation:	Enabled
Administrative Speed:	<input type="radio"/> 10M <input type="radio"/> 100M <input checked="" type="radio"/> 1000M	Operational LAG Speed:	1000M
Administrative Advertisement:	<input checked="" type="checkbox"/> Max. Capability <input type="checkbox"/> 1000 Full <input type="checkbox"/> 10 Full <input type="checkbox"/> 100 Full	Operational Advertisement:	Max. Capability
Administrative Flow Control:	<input type="radio"/> Enable <input checked="" type="radio"/> Disable <input type="radio"/> Auto Negotiation	Operational Flow Control:	Disabled
Protected LAG:	<input type="checkbox"/> Enable		

Step 11. (Optional) If *Administrative Auto Negotiation* is disabled in the previous step, select the *Administrative Speed*. The *Operational Lag Speed* displays the current speed at which the LAG is operating.

The available speeds are:

- 10M
- 100M
- 1000M

Note: The speed may vary depending on the model of your switch.

Administrative Auto Negotiation:	<input type="checkbox"/> Enable	Operational Auto Negotiation:	Enabled
Administrative Speed:	<input type="radio"/> 10M <input type="radio"/> 100M <input checked="" type="radio"/> 1000M	Operational LAG Speed:	1000M
Administrative Advertisement:	<input checked="" type="checkbox"/> Max. Capability <input type="checkbox"/> 1000 Full <input type="checkbox"/> 10 Full <input type="checkbox"/> 100 Full	Operational Advertisement:	Max. Capability
Administrative Flow Control:	<input type="radio"/> Enable <input checked="" type="radio"/> Disable <input type="radio"/> Auto Negotiation	Operational Flow Control:	Disabled
Protected LAG:	<input type="checkbox"/> Enable		

Step 12. In the *Administrative Advertisement* field, check the capabilities to be advertised by the LAG. The *Operational Advertisement* displays the administrative advertisement status. The LAG advertises its capabilities to its neighbor LAG to start the negotiation process. The possible values are:

- *Max Capability* - All LAG speeds and both duplex modes are available.
- *10 Full* - The LAG advertises a 10 Mbps speed and the mode is full duplex.
- *100 Full* - The LAG advertises a 100 Mbps speed and the mode is full duplex.
- *1000 Full* - The LAG advertises a 1000 Mbps speed and the mode is full duplex.

Administrative Auto Negotiation:	<input checked="" type="checkbox"/> Enable	Operational Auto Negotiation:	Enabled
Administrative Speed:	<input type="radio"/> 10M <input type="radio"/> 100M <input checked="" type="radio"/> 1000M	Operational LAG Speed:	1000M
Administrative Advertisement:	<input checked="" type="checkbox"/> Max. Capability <input type="checkbox"/> 1000 Full <input type="checkbox"/> 10 Full <input type="checkbox"/> 100 Full	Operational Advertisement:	Max. Capability
Administrative Flow Control:	<input type="radio"/> Enable <input checked="" type="radio"/> Disable <input type="radio"/> Auto Negotiation	Operational Flow Control:	Disabled
Protected LAG:	<input type="checkbox"/> Enable		

Step 13. Select one of the options in the *Administrative Flow Control* field. Flow control is a feature that allows the receiving device to send a signal to the sending device that it's congested. This tells the sending device to temporarily stop transmitting to help ease the congestion. The *Operational Flow Control* shows the current flow control setting. In this example, we will be enabling flow control.

The options are:

- *Enable*
- *Disable*
- *Auto Negotiation*

Administrative Auto Negotiation:	<input checked="" type="checkbox"/> Enable	Operational Auto Negotiation:	Enabled
Administrative Speed:	<input type="radio"/> 10M <input type="radio"/> 100M <input checked="" type="radio"/> 1000M	Operational LAG Speed:	1000M
Administrative Advertisement:	<input checked="" type="checkbox"/> Max. Capability <input type="checkbox"/> 1000 Full <input type="checkbox"/> 10 Full <input type="checkbox"/> 100 Full	Operational Advertisement:	Max. Capability
Administrative Flow Control:	<input checked="" type="radio"/> Enable <input type="radio"/> Disable <input type="radio"/> Auto Negotiation	Operational Flow Control:	Disabled
Protected LAG:	<input type="checkbox"/> Enable		

Step 14. Check the **Enable** checkbox in the *Protected LAG* to make the LAG a protected port for

Layer 2 isolation. In this example, we will enable protected LAG.

Administrative Auto Negotiation:	<input checked="" type="checkbox"/> Enable	Operational Auto Negotiation:	Enabled
Administrative Speed:	<input type="radio"/> 10M <input type="radio"/> 100M <input checked="" type="radio"/> 1000M	Operational LAG Speed:	1000M
Administrative Advertisement:	<input checked="" type="checkbox"/> Max. Capability <input type="checkbox"/> 1000 Full <input type="checkbox"/> 10 Full <input type="checkbox"/> 100 Full	Operational Advertisement:	Max. Capability
Administrative Flow Control:	<input checked="" type="radio"/> Enable <input type="radio"/> Disable <input type="radio"/> Auto Negotiation	Operational Flow Control:	Disabled
Protected LAG:	<input checked="" type="checkbox"/> Enable		

Step 15. Click **Apply**. The Running Configuration file is updated.

LAG: 1 LAG Type: 1000M-Eth

Description: LAG1 (4/64 characters used)

Administrative Status: Up Down Operational Status: Up

Link Status SNMP Traps: Enable

Time Range: Enable Operational Time Range State: N/A

Time Range Name: ▼ Edit

Administrative Auto Negotiation: Enable Operational Auto Negotiation: Enabled

Administrative Speed: 10M 100M 1000M Operational LAG Speed: 1000M

Administrative Advertisement: Max. Capability 1000 Full Operational Advertisement: Max. Capability

10 Full 100 Full

Administrative Flow Control: Enable Disable Operational Flow Control: Disabled

Auto Negotiation

Protected LAG: Enable

Apply Close

Note: The *LAG Setting Table* is updated with the modified configuration.

LAG Settings												
LAG Settings Table												
	Entry No.	LAG	Description	Type	Status	Link Status SNMP Traps	Time Range		Auto Negotiation	Speed	Flow Control	Protection State
							Name	State				
<input checked="" type="radio"/>	1	LAG 1	LAG1	1000M	Up	Enabled			Enabled	1000M	Enabled	Protected
<input type="radio"/>	2	LAG 2				Enabled						Unprotected
<input type="radio"/>	3	LAG 3				Enabled						Unprotected
<input type="radio"/>	4	LAG 4				Enabled						Unprotected
<input type="radio"/>	5	LAG 5				Enabled						Unprotected
<input type="radio"/>	6	LAG 6				Enabled						Unprotected

You have now learned the steps to configure the load balancing algorithm, LAG management, and LAG settings on a switch.