Arista switches support Multi-Chassis Link Aggregation (MLAG) to logically aggregate ports across two switches. For example, two 10-gigabit Ethernet ports, one each from two MLAG configured switches, can connect to two 10-gigabit ports on a host, switch, or network device to create a link that appears as a single 20-gigabit port. MLAG-configured ports provide Layer 2 multipathing, increased bandwidth, higher availability, and other improvements on traditional active-passive or Spanning Tree governed infrastructures.

The Multi-Chassis Link Aggregation chapter contains these sections:

- Section 13.1: MLAG Introduction
- Section 13.2: MLAG Conceptual Overview
- Section 13.3: MLAG Maintenance
- Section 13.4: Configuring MLAG
- Section 13.5: MLAG Implementation Example
- Section 13.6: MLAG Commands

### 13.1 MLAG Introduction

High availability data center topologies typically provide redundancy protection at the expense of oversubscription by connecting top-of-rack (TOR) switches and servers to dual aggregation switches. In these topologies, Spanning Tree Protocol prevents network loops by blocking half of the links to the aggregation switches. This reduces the available bandwidth by 50%.

Deploying MLAG removes oversubscription by configuring an MLAG link between two aggregation switches to create a single logical switching instance that utilizes all connections to the switches. Interfaces on both devices participate in a distributed port channel, enabling all active paths to carry data traffic while maintaining the integrity of the Spanning Tree topology.

MLAG provides these benefits:

- Aggregates multiple Ethernet ports across two switches.
- Provides higher bandwidth links as network traffic increases.
- Utilizes bandwidth more efficiently with fewer links blocked by STP.
- Connects to other switches and servers by static LAG or LACP without other proprietary protocols.
- Supports normal STP operation to prevent loops.
- Supports active-active Layer-2 redundancy.

**Note**

PTP (precision timing protocol) is not supported with MLAG.
Note

The global STP configuration is derived from the primary peer device while the secondary device parameters are ignored. When STP is disabled on the primary device, the secondary device will not contain any STP configuration information from the primary device. As a result, the secondary device will not be able to decide on the port roles or states, and will remain in the default state which is the discarding state. This is an expected behavior.
13.2 MLAG Conceptual Overview

13.2.1 MLAG Operation Process

A multi-chassis link aggregation group (MLAG) is a pair of links that terminate on two cooperating switches and appear as an ordinary link aggregation group (LAG). The cooperating switches are MLAG peer switches and communicate through an interface called a peer link. While the peer link’s primary purpose is exchanging MLAG control information between peer switches, it also carries data traffic from devices that are attached to only one MLAG peer and have no alternative path. An MLAG domain consists of the peer switches and the control links that connect the switches.

In Figure 13-1, Switch A and Switch B are peer switches in the MLAG domain and connect to each other through the peer link. Each peer switch uses the peer address to form and maintain the peer link.

The MLAG domain ID is a text string configured in each peer switch. MLAG switches use this string to identify their peers. The MLAG System ID (MSI) is the MLAG domain’s MAC address. The MSI is automatically derived when the MLAG forms and does not match the bridge MAC address of either peer. Each peer uses the MSI in STP and LACP PDUs.

The topology in Figure 13-1 contains four MLAGs: one MLAG connects each device to the MLAG domain. Each peer switch connects to the four servers through MLAG link interfaces.

In a conventional topology, with dually-attaching devices to multiple switches for redundancy, Spanning Tree Protocol (STP) blocks half of the switch-device links. In the MLAG topology, STP does not block any portion because it views the MLAG Domain as a single switch and each MLAG as a single port. The MLAG protocol facilitates the balancing of device traffic between the peer switches.

Figure 13-1: MLAG Domain Topology

When MLAG is disabled, peer switches revert to their independent state. MLAG is disabled by any of the following:
• MLAG configuration changes.
• The TCP connection breaks.
• The peer-link or local-interface goes down.
• A switch does not receive a response to a keep alive message from its peer within a specified period.

13.2.2 MLAG Interoperability with Other Features

The following sections describe MLAG interaction with other switch features.

13.2.2.1 VLANs

VLAN parameters must be configured identically on each peer for the LAGs comprising the peer link and MLAGs. These parameters include the switchport access VLAN, switchport mode, trunk-allowed VLANs, the trunk native VLAN, and switchport trunk groups. Configuration discrepancies may result in traffic loss in certain failure scenarios. Port-specific bridging configuration originates on the switch where the port is physically located.

13.2.2.2 LACP

Link Aggregation Control Protocol (LACP) should be used on all MLAG interfaces, including the peer-link. LACP control packets reference the MLAG system ID.

13.2.2.3 Static MAC Addresses

A static MAC address configured on an MLAG interface is automatically configured on the peer’s corresponding interface. Configuring static MAC addresses on both peers prevents undesired flooding if an MLAG peer relationship fails.

If the MLAG peering relationship is disabled, the static MAC previously learned from peer is removed.

13.2.2.4 STP

When implementing MLAG in a spanning tree network, spanning tree must be configured globally and on port-channels configured with an MLAG ID. Port specific spanning tree configuration comes from the switch where the port physically resides. This includes spanning-tree PortFast BPDU Guard and BPDU filter.

13.2.2.5 Port Mirroring

A port channel which is a member of an MLAG must not be used as the destination port for a port mirroring (port monitoring) session.
13.3 MLAG Maintenance

These sections describe tasks required for MLAG to operate on the switch:

- Section 13.3.1: Ensuring Control Plane ACL Compatibility
- Section 13.3.2: MLAG Availability through a Single Functional Peer
- Section 13.3.3: Upgrading MLAG Peers

13.3.1 Ensuring Control Plane ACL Compatibility

The control plane access control list (ACL) on any interface participating in the MLAG must be configured to allow only the peer link neighbor to generate MLAG control traffic. The required rules are included in the default control plane ACL for Ethernet ports.

Any custom control plane ACL applied to a participating port must include these three rules:

- `permit tcp any any eq mlag ttl eq 255`
- `permit udp any any eq mlag ttl eq 255`
- `permit tcp any eq mlag any ttl eq 255`

MLAG peers that function as routers must each have routing enabled.

13.3.2 MLAG Availability through a Single Functional Peer

MLAG high availability advantages are fully realized when all devices that connect to one MLAG switch also connect to the peer switch. A switch can continue supporting MLAG when its peer is offline if the STP agent is restartable. When one peer is offline, data traffic flows from the devices through the MLAG component link that connects to the functioning switch. When a switch is offline, its interfaces and ports do not appear in `show mlag` and `show spanning tree protocol` commands of the functioning peer.

To view the restartability status of the STP agent, use the `detail` option of the `show spanning-tree instance` command:

```
switch-1#show spanning-tree instance detail | grep agent
Stp agent restartable : True
```

STP agent restartability requires consistent configuration between the peers of STP, LACP, MLAG, and switchport parameters. Events triggering an STP state machine change may also briefly prevent the STP agent from being restartable.

13.3.2.1 Reload Delay

If an MLAG peer reboots, all ports except those in the peer-link port-channel remain in `errdisabled` state for a specified time, called the reload-delay period. This period allows all topology states to stabilize before the switch begins forwarding traffic. Each Arista switch defaults to the recommended reload-delay value, which varies by switch platform:

- **Fixed configuration switches**: 300 seconds
- **Trident II modular switches**: 900 seconds
  - 7304
  - 7308
  - 7316
  - 7300X series
- **Sand platform fixed configuration switches**: 600 seconds
  - 7280 series
• **Sand platform modular switches**: 1800 seconds
  - 7504
  - 7508
  - 7500E series
  - 7548S

In those cases where network topology requires additional time to stabilize or where a shorter delay can be tolerated, the reload-delay period can be configured using the `reload-delay mlag` command.

Severing the physical connection (cable) that establishes the peer-link between MLAG peers may result in a **split brain** state where each peer independently enters spanning tree state to prevent topology loops. Sessions established through one interface of a dual attached device may fail if its path is disrupted by the STP reconvergence, possibly resulting in temporarily lost connectivity. Sessions can be reestablished if permitted by the resulting topology.

### 13.3.3 Upgrading MLAG Peers

MLAG ISSU (In-Service Software Upgrade) upgrades EOS software on one MLAG peer with minimal traffic disruptions on active MLAG interfaces and without changing the network topology.

#### 13.3.3.1 Verifying Configuration Compatibility

A seamless EOS upgrade on an MLAG peer requires that the following features are configured consistently on each switch:

- VLANs
- Switchport configuration on port channel interfaces that are configured with an MLAG ID
- STP configuration (global)

#### 13.3.3.2 Version Compatibility

A switch running MLAG can be upgraded without disrupting MLAG traffic when the upgrade EOS version is compatible with the version on the peer switch. Refer to the Release Notes for a list of compatible EOS versions.

#### 13.3.3.3 Reload Warning Conditions

Entering an EOS reload command while MLAG is active generates warning messages if conditions that can result in packet loss during the upgrade are present. All warnings should be resolved before confirming the reload request. **Table 13-1** displays the reload conditions and a common resolution method for each condition.

<table>
<thead>
<tr>
<th>Reload Condition</th>
<th>Resolution Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compatibility check</td>
<td>Refer to the Release Notes to verify that the new version is compatible with the currently installed version</td>
</tr>
<tr>
<td>Active-partial MLAG warning</td>
<td>Bring up the remote port-channel. If the MLAG is not actively used, then this warning can be ignored.</td>
</tr>
<tr>
<td>STP is not restartable</td>
<td>Wait for STP to be restartable: typically 30 seconds, up to 120 seconds for a newly started STP agent. Refer to Section 13.3.2 for information on checking restartability.</td>
</tr>
</tbody>
</table>
Example

- The following `reload` command generates MLAG warning conditions that should be addressed before confirming the `proceed with reload` prompt.

  ```
  switch(config)#reload
  If you are performing an upgrade, and the Release Notes for the new version of EOS indicate that MLAG is not backwards-compatible with the currently installed version (4.9.2), the upgrade will result in packet loss.
  ```

  The following MLAGs are not in Active mode. Traffic to or from these ports will be lost during the upgrade process.

<table>
<thead>
<tr>
<th>mlag</th>
<th>desc</th>
<th>state</th>
<th>local</th>
<th>remote</th>
<th>status</th>
</tr>
</thead>
<tbody>
<tr>
<td>14</td>
<td>active-partial</td>
<td>Po14</td>
<td>Po14</td>
<td>up/down</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>active-partial</td>
<td>Po15</td>
<td>Po15</td>
<td>up/down</td>
<td></td>
</tr>
</tbody>
</table>

  Stp is not restartable. Topology changes will occur during the upgrade process.

  The configured reload delay of 100 seconds is below the default value of 300 seconds. A longer reload delay allows more time to rollback an unsuccessful upgrade due to incompatibility.

  The other MLAG peer has errdisabled interfaces. Traffic loss will occur during the upgrade process.

  Proceed with reload? [confirm]

13.3.3.4 Performing an MLAG ISSU Upgrade

The following procedure performs an MLAG ISSU upgrade:

**Step 1** Very configuration consistency on each peer (Section 13.3.3.1).

**Step 2** Verify version compatibility between the new and existing images (Section 13.3.3.2).

**Step 3** Configure `reload-delay mlag` (Section 13.3.2) if needed. Recommended delay period varies by switch type, and each switch defaults to its recommended delay period.

**Step 4** Install the new image onto one of the peers:

  a  Upload the new image to the switch.
  b  Set the boot path to the new image.
  c  Enter the `reload` command.

**Step 5** Resolve all reload warnings.

**Step 6** Confirm the reload.
Step 7  Wait for MLAG peers to renegotiate to the active state and reload-delay expiry on rebooted peer; until reload-delay period has expired, ports on the rebooted peer (except the peer-link) will be in `errdisabled` state with err-disabled reason being `mlag-issu`.

Avoid configuration changes on both peers until after this step.

Step 8  Repeat the upgrade process for the other peer.

When upgrading modular switches with dual supervisors, upgrade the standby supervisors first, then upgrade the active supervisors.
13.4 Configuring MLAG

These sections describe the basic MLAG configuration steps:

- Section 13.4.1: Configuring the MLAG Peers
- Section 13.4.2: Configuring MLAG Services

13.4.1 Configuring the MLAG Peers

Connecting two switches as MLAG peers requires the establishment of the peer link and an SVI that defines local and peer IP addresses on each switch.

The peer link is composed of a LAG between the switches. When all devices that connect to the MLAG domain are dually connected to the switches through an MLAG, a peer link of two Ethernet interfaces is sufficient to handle MLAG control data and provide N+1 redundancy. When the domain connects to devices through only one MLAG peer, the peer link may require additional Ethernet interfaces to manage data traffic.

Disruptions to peer link connectivity due to forwarding agent restarts may cause an extended MLAG outage. Forwarding agent restart event include some configuration changes, such as port speed change or UFT mode change). The following precautions can reduce the risk of losing peer-link connectivity:

- all switches: constructing peer-links from port-channels in preference to a single Ethernet interface.
- modular systems: peer-link port-channel members should span multiple line cards.
- multi-chip systems: peer-link port-channel member should span multiple chips.

Section 3.6 describes modular systems.

The steps that configure two switches as MLAG peers include:

- Configuring the Port Channels, VLAN Interfaces, and IP addresses
- Configure Peer Parameters
- Configuring MLAG Peer Gateway

13.4.1.1 Configuring the Port Channels, VLAN Interfaces, and IP addresses

The peer link is a normal port channel. The local address is the SVI that maps to the peer link port channel. The port channel and SVI must be configured on each peer switch. The port channel should be an active LACP port. The local and peer addresses must be located on the same IP address subnet. Autostate should be disabled on the SVI configured as the local interface.

Examples

- These commands create an active mode LACP port channel interface from two Ethernet interfaces and configure it as part of a trunk group on each switch.

  The `switchport mode trunk` command permits all VLANs on the interface by default, so all VLANs are permitted on port channel 10 in the following example. The configuration of a trunk group for a VLAN restricts only that specific VLAN to the associated ports: VLAN 4094 is only permitted on port channel 10, and not on any other ports on the switch. It is important to remember that all VLANs must be permitted between the peers on the peer link for correct operation.
Switch 1

```
switch1#config
switch1(config)#vlan 4094
switch1(config-vlan-4094)#trunk group mlpeer
switch1#config
switch1(config)#interface ethernet 1-2
switch1(config-if-eth1-2)#channel-group 10 mode active
switch1(config-if-eth1-2)#interface port-channel 10
switch1(config-if-po10)#switchport mode trunk
switch1(config-if-po10)#switchport trunk group mlpeer
switch1(config-if-po10)#exit
switch1(config)#
```

Switch 2

```
switch2#config
switch2(config)#vlan 4094
switch2(config-vlan-4094)#trunk group mlpeer
switch2(config-vlan-4094)#exit
switch2(config)#interface ethernet 1-2
switch2(config-if-eth1-2)#channel-group 10 mode active
switch2(config-if-eth1-2)#interface port-channel 10
switch2(config-if-po10)#switchport mode trunk
switch2(config-if-po10)#switchport trunk group mlpeer
switch2(config-if-po10)#exit
switch2(config)#
```

- These commands create an SVI for the local interface and associate it to the trunk group assigned to the peer link port channel.

The SVI creates a Layer 3 endpoint in the switch and enables MLAG processes to communicate via TCP. The IP address can be any unicast address that does not conflict with other SVIs. STP is disabled for the peer link VLAN 4094 to prevent any potential STP disruption of inter peer communications. Recall that the VLAN has been restricted to port-channel 10 by the earlier trunk group configuration thus preventing potential Layer 2 loop conditions within VLAN 4094.

Switch 1

```
switch1#config
switch1(config)#interface vlan 4094
switch1(config-if-vl4094)#ip address 10.0.0.1/30
switch1(config-if-vl4094)#no autostate
switch1(config-if-vl4094)#exit
switch1(config)#no spanning-tree vlan-id 4094
switch1(config)#
```

Switch 2

```
switch2#config
switch2(config)#interface vlan 4094
switch2(config-if-vl4094)#ip address 10.0.0.2/30
switch2(config-if-vl4094)#no autostate
switch2(config-if-vl4094)#exit
switch2(config)#no spanning-tree vlan-id 4094
switch2(config)#
```

13.4.1.2 Configure Peer Parameters

Peer connection parameters configure the connection between the MLAG peer switches. This section describes the following peer configuration parameters.

- **MLAG Configuration Mode**
MLAG Configuration Mode

Peer connection parameters are configured in MLAG-configuration mode. The `mlag configuration (global configuration)` command places the switch in MLAG configuration mode.

Example

- This command places the switch in MLAG configuration mode.

```
switch(config)#mlag configuration
switch(config-mlag)#
```

Local VLAN Interface

The local interface specifies the SVI upon which the switch sends MLAG control traffic. The local IP address is specified within the definition of the VLAN associated with the local interface. The Peer Address configures the control traffic destination on the peer switch.

The `local-interface` command specifies a VLAN interface as the peer link SVI.

Example

- This command configures VLAN 4094 as the local interface.

```
switch(config-mlag)#local-interface vlan 4094
switch(config-mlag)#
```

Peer Address

The peer address is the destination address on the peer switch for MLAG control traffic. If the peer IP address is unreachable, MLAG peering fails and both peer switches revert to their independent state.

The `peer-address` command specifies the peer address.

Example

- This command configures a peer address of 10.0.0.2.

```
switch(config-mlag)#peer-address 10.0.0.2
switch(config-mlag)#
```

Peer Link

An MLAG is formed by connecting two switches through an interface called a peer link. The peer link carries MLAG advertisements, keepalive messages, and data traffic between the switches. This information keeps the two switches working together as one. While interfaces comprising the peer links on each switch must be compatible, they need not use the same interface number. Ethernet and Port-channel interfaces can be configured as peer links.

The `peer-link` command specifies the interface the switch uses to communicates MLAG control traffic.
Example
- This command configures port-channel 10 as the peer link.
  ```
  switch(config-mlag)#peer-link port-channel 10
  switch(config-mlag)#
  ```

Domain ID
The MLAG domain ID is a unique identifier for an MLAG domain. The MLAG domain ID must be the identical on each switch to facilitate MLAG communication.

The `domain-id` command configures the MLAG domain ID.

Example
- This command configures `mlagDomain` as the domain ID:
  ```
  switch(config-mlag)#domain-id mlagDomain
  switch(config-mlag)#
  ```

Heartbeat Interval and Timeout
The heartbeat interval specifies the period between the transmission of successive keepalive messages. Each MLAG switch transmits keepalive messages and monitors message reception from its peer. The heartbeat timeout is reset when the switch receives a keepalive message. If the heartbeat timeout expires, the switch disables MLAG under the premise that the peer switch is not functioning.

The `heartbeat-interval (MLAG)` command configures the heartbeat interval between 1 and 30 seconds, with a default value of 2 seconds. The heartbeat timeout expiry is 30 seconds.

**Important!** On 7500 and 7500E Series Switches, Arista recommends setting the heartbeat interval to 10 seconds.

Example
- This command configures the heartbeat interval as 2.5 seconds (2500 ms).
  ```
  switch(config-mlag)#heartbeat-interval 2500
  switch(config-mlag)#
  ```

Reload Delay Period
The reload delay period specifies the interval that non-peer links are disabled after an MLAG peer reboots. This interval allows non-peer links to learn multicast and OSPF states and synchronize ARP caches before the ports start handling traffic. Each Arista switch defaults to the recommended reload-delay value, which varies by switch platform

- Fixed configuration switches: 300 seconds (five minutes)
- Trident II platform modular switches: 1200 seconds (twenty minutes)
- Sand platform fixed configuration switches (7280 series): 600 seconds (ten minutes)
- Sand platform modular switches: 1800 seconds (thirty minutes)

In those cases where network topology requires additional time to stabilize or where a shorter delay can be tolerated, the reload-delay period can be configured using the `reload-delay mlag` command.

Example
- This command configures the reload delay interval as 2.5 minutes (150 seconds).
  ```
  switch(config-mlag)#reload-delay 150
  switch(config-mlag)#
  ```
Chapter 13: Multi-Chassis Link Aggregation

Configuring MLAG

Shutdown

The **shutdown (MLAG)** command disables MLAG operations without disrupting the MLAG configuration. The **no mlag configuration** command (global configuration mode) disables MLAG and removes the MLAG configuration. The **no shutdown** command resumes MLAG activity.

**Examples**

- This command disables MLAG activity on the switch.
  ```
  switch(config-mlag)#shutdown
  switch(config-mlag)#
  ```

- This command resumes MLAG activity on the switch.
  ```
  switch(config-mlag)#no shutdown
  switch(config-mlag)#
  ```

13.4.1.3 Configuring MLAG Peer Gateway

In an MLAG setup, routing on a MLAG peer switch is possible using its own bridge system MAC, VARP MAC, or VRRP MAC. On a peer receiving an IP packet with destination MAC set to one of these MACs, a packet gets routed if its hardware has enough information to route the packet. Configuring sending traffic to a cached MAC involves routing the session table and MLAG peer traffic if packets are received with the MAC peer.

**Examples**

- This command enables the MLAG peer gateway.
  ```
  switch(config)#ip virtual-router mac-address mlag-peer
  switch(config)#
  ```

- This command disables the MLAG peer gateway.
  ```
  switch(config)#no ip virtual-router mac-address mlag-peer
  switch(config)#
  ```
13.4.1.4 Configuring Ingress Replication to LAGs

Hardware support for ingress replication to LAGs is enabled by default when the user configures ingress replication. When multicast traffic is sent over the LAG, the hardware uses its built-in algorithm, based on the L2/L3/L4 headers, to load balance traffic over ports in the LAG. When a port goes down in a LAG, the hardware quickly hashes the multicast traffic over the remaining ports in the LAG, resulting in fewer drops than software based LAG support.

Examples

- This command enables ingress replication.

  ```
  switch(config)#platform sand multicast replication default ingress
  switch(config)#
  ```

- This command configures the maximum members (within a range of 1 through 64) for ingress only replication in a multicast group.

  ```
  switch(config)#platform sand multicast replication ingress maximum 32
  switch(config)#
  ```

13.4.2 Configuring MLAG Services

An MLAG is a pair of links that originate on a network attached device and terminate on the two MLAG peer switches. The MLAG switches coordinate traffic to the device through a common `mlag (port-channel interface configuration)` command on the interfaces that connect to the device.

The MLAG ID differs from the MLAG domain ID. The MLAG domain ID is assigned globally per switch in MLAG configuration mode, and the same MLAG domain ID must be on both switches.

It is not recommended that MLAGs are used with static LAGs. Configure the downstream switch or router connected to the MLAG peers to negotiate a LAG with LACP. For Arista Networks switches, this is in respect to a configuration such as `channel-group group-number mode on`.

Port channels configured as an MLAG must have identical port channel numbers. Although the MLAG ID is a distinct parameter from the port channel number, best practices recommend assigning the MLAG ID to match the port channel number.

The following example does not follow this convention to emphasize the parameters that are distinct. The example in Section 13.5 follows the best practices convention.

Examples

- These Switch1 commands bundle Ethernet interfaces 3 and 4 in port channel 20, then associate that port channel with MLAG 12.

  ```
  switch1(config)#interface ethernet 3-4
  switch1(config-if-et3-4)#channel-group 20 mode active
  switch1(config-if-et3-4)#interface port-channel 20
  switch1(config-if-po20)#mlag 12
  switch1(config-if-po20)#exit
  switch1(config)#
  ```

- These Switch2 commands bundle Ethernet interfaces 9 and 10 in port channel 20, then associate that port channel with MLAG 12.

  ```
  switch2(config)#interface ethernet 9-10
  switch2(config-if-et9-10)#channel-group 20 mode active
  switch2(config-if-et9-10)#interface port-channel 20
  switch2(config-if-po20)#mlag 12
  switch2(config-if-po20)#exit
  switch2(config)#
  ```
These commands configure the port channels that attach to the MLAG on network attached device:

```
NAD(config)#interface ethernet 1-4
NAD(config-if-Et1-4)#channel-group 1 mode active
NAD(config-if-Et1-4)#exit
NAD(config)#
```

Figure 13-2 displays the result of the interface MLAG configuration.

Figure 13-2: MLAG Interface Configuration
13.5  MLAG Implementation Example

This example creates an MLAG Domain, then configures MLAG connections between the peer switches and four Network Attached Devices (NADs). The MLAG switches connect through a LAG and communicate with the NADs through MLAGs. Although the NADs can be any device that supports LACP LAGs, the devices in this example are Arista switches.

13.5.1  Topology

Figure 13-3 displays the MLAG topology. Switch 1 and Switch 2 are MLAG peers that logically represent a single Layer 2 switch. The peer link between the switches contains the following interfaces:

- Switch 1: Ethernet 47, Ethernet 48
- Switch 2: Ethernet 23, Ethernet 24

The example configures MLAGs from the MLAG Domain to four network attached devices (NAD-1, NAD-2, NAD-3, NAD-4).

13.5.2  Configuring the Peer Switch Connections

To configure the switches in the described topology, perform the tasks in these sections:

- Section 13.5.2.1: Configuring the Peer Switch Port Channels
- Section 13.5.2.2: Configuring the Peer Switch SVIs
- Section 13.5.2.3: Configuring the Peer Links

13.5.2.1  Configuring the Peer Switch Port Channels

These commands create the port channels the switches use to establish the peer link.
Chapter 13: Multi-Chassis Link Aggregation

13.5.2.2 Configuring the Peer Switch SVIs

For each peer switch, these commands create an SVI and associate it to the trunk group assigned to
the peer link port channel. STP is disabled on the VLAN.

These commands configure the SVI on Switch1

```
switch1(config)#vlan 4094
switch1(config-vlan-4094)#trunk group peertrunk
switch1(config-vlan-4094)#interface vlan 4094
switch1(config-if-vl4094)#ip address 172.17.0.1/30
switch1(config-if-vl4094)#no autostate
switch1(config-if-vl4094)#exit
switch1(config)#
```

These commands configure the SVI on Switch2

```
switch2(config)#vlan 4094
switch2(config-vlan-4094)#trunk group trunkpeer
switch2(config-vlan-4094)#interface vlan 4094
switch2(config-if-vl4094)#ip address 172.17.0.2/30
switch2(config-if-vl4094)#no autostate
switch2(config-if-vl4094)#exit
switch2(config)#
```

13.5.2.3 Configuring the Peer Links

These commands create the peer links on each MLAG switch.
These commands create peer links on Switch1

```conf
switch1(config)#mlag configuration
switch1(config-mlag)#local-interface vlan 4094
switch1(config-mlag)#peer-address 172.17.0.2
switch1(config-mlag)#peer-link port-channel 101
switch1(config-mlag)#domain-id mlag_01
switch1(config-mlag)#heartbeat-interval 2500
switch1(config-mlag)#reload-delay 150
switch1(config-mlag)#exit
switch2(config)#
```

These commands create peer links on Switch2

```conf
switch2(config)#mlag configuration
switch2(config-mlag)#local-interface vlan 4094
switch2(config-mlag)#peer-address 172.17.0.1
switch2(config-mlag)#peer-link port-channel 201
switch2(config-mlag)#domain-id mlag_01
switch2(config-mlag)#heartbeat-interval 2500
switch2(config-mlag)#reload-delay 150
switch2(config-mlag)#exit
switch2(config)#
```

13.5.3 Configuring Peer Switch MLAGs

These commands create the MLAGs that connect the MLAG domain to the network attached devices.

These commands configure MLAG 1 on Switch1

```conf
switch1(config)#interface ethernet 17-18
switch1(config-if-et17-18)#channel-group 1 mode active
switch1(config-if-et17-18)#interface port-channel 1
switch1(config-if-po1)#mlag 1
switch1(config-if-po1)#exit
switch1(config)#
```

These commands configure MLAG 1 on Switch2

```conf
switch2(config)#interface ethernet 1-2
switch2(config-if-et1-2)#channel-group 1 mode active
switch2(config-if-et1-2)#interface port-channel 1
switch2(config-if-po1)#mlag 1
switch2(config-if-po1)#exit
switch2(config)#
```

These commands configure MLAG 2 on Switch1

```conf
switch1(config)#interface ethernet 19-20
switch1(config-if-et19-20)#channel-group 2 mode active
switch1(config-if-et19-20)#interface port-channel 2
switch1(config-if-po2)#mlag 2
switch1(config-if-po2)#exit
switch1(config)#
```
These commands configure MLAG 2 on Switch2
switch2(config)#interface ethernet 3-4
switch2(config-if-et3-4)#channel-group 2 mode active
switch2(config-if-et3-4)#interface port-channel 2
switch2(config-if-po2)#mlag 2
switch2(config-if-po2)#exit
switch2(config)#

These commands configure MLAG 3 on Switch1
switch1(config)#interface ethernet 23
switch1(config-if-et23)#channel-group 3 mode active
switch1(config-if-et23)#interface port-channel 3
switch1(config-if-po3)#mlag 3
switch1(config-if-po3)#exit
switch1(config)#

These commands configure MLAG 3 on Switch2
switch2(config)#interface ethernet 7
switch2(config-if-et7)#channel-group 3 mode active
switch2(config-if-et7)#interface port-channel 3
switch2(config-if-po3)#exit
switch2(config)#

These commands configure MLAG 4 on Switch1
switch1(config)#interface ethernet 25
switch1(config-if-et25)#channel-group 4 mode active
switch1(config-if-et25)#interface port-channel 4
switch1(config-if-po4)#mlag 4
switch1(config-if-po4)#exit
switch1(config)#

These commands configure MLAG 4 on Switch2
switch2(config)#interface ethernet 9
switch2(config-if-et9)#channel-group 4 mode active
switch2(config-if-et9)#interface port-channel 4
switch2(config-if-po4)#mlag 4
switch2(config-if-po4)#exit
switch2(config)#

13.5.4 Configuring the Network Attached Devices

These commands create the LAGs on the Network Attached Devices that connect to the MLAG domain.

These commands configure the port channels on NAD-1
NAD-1(config)#interface ethernet 7-10
NAD-1(config-if-Et7-10)#channel-group 1 mode active
NAD-1(config-if-Et7-10)#exit
NAD-1(config)#
These commands configure the port channels on NAD-2

NAD-2(config)#interface ethernet 25-28
NAD-2(config-if-Et25-28)#channel-group 7 mode active
NAD-2(config-if-Et25-28)#exit
NAD-2(config)#

These commands configure the port channels on NAD-3

NAD-3(config)#interface ethernet 3-4
NAD-3(config-if-Et3-4)#channel-group 5 mode active
NAD-3(config-if-Et3-4)#exit
NAD-3(config)#

These commands configure the port channels on NAD-4

NAD-4(config)#interface ethernet 1-2
NAD-4(config-if-Et1-2)#channel-group 2 mode active
NAD-4(config-if-Et1-2)#exit
NAD-4(config)#
13.5.5 Verification

The following tasks verify the MLAG peer and connection configuration:

- Section 13.5.5.1: Verify the Peer Switch Connection
- Section 13.5.5.2: Verify the MLAGs
- Section 13.5.5.3: Verify Spanning Tree Protocol (STP)
- Section 13.5.5.4: Verify the MLAG Port Channel
- Section 13.5.5.5: Verify the VLAN Membership

13.5.5.1 Verify the Peer Switch Connection

To display the MLAG configuration and the MLAG status on Switch 1, use the `show mlag` command:

```
Switch1# show mlag
MLAG Configuration:
domain-id : mlag_01
local-interface : Vlan4094
peer-address : 172.17.0.2
peer-link : Port-Channel101

MLAG Status:
state : Active
peer-link status : Up
local-int status : Up
system-id : 02:1c:FF:00:15:38

MLAG Ports:
Disabled : 0
Configured : 0
Inactive : 0
Active-partial : 0
Active-full : 4
```

To display the MLAG configuration and the MLAG status on Switch 2, use the `show mlag` command:

```
Switch2# show mlag
MLAG Configuration:
domain-id : mlag_01
local-interface : Vlan4094
peer-address : 172.17.0.1
peer-link : Port-Channel102

MLAG Status:
state : Active
peer-link status : Up
local-int status : Up
system-id : 02:1c:FF:00:15:41

MLAG Ports:
Disabled : 0
Configured : 0
Inactive : 0
Active-partial : 0
Active-full : 4
```
13.5.5.2 Verify the MLAGs

The `show mlag interfaces` command displays MLAG connections between the MLAG switches and the Network Attached Devices.

- This `show mlag interfaces` command displays MLAG connections between the MLAG peer Switch 1 and the network attached devices:

  Switch1#`show mlag interfaces`

<table>
<thead>
<tr>
<th>mlag</th>
<th>desc</th>
<th>state</th>
<th>local</th>
<th>remote</th>
<th>status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>sw1.po1</td>
<td>active-full</td>
<td>Po1</td>
<td>Po1</td>
<td>up/up</td>
</tr>
<tr>
<td>2</td>
<td>sw1.po2</td>
<td>active-full</td>
<td>Po2</td>
<td>Po2</td>
<td>up/up</td>
</tr>
<tr>
<td>3</td>
<td>sw1.po3</td>
<td>active-full</td>
<td>Po3</td>
<td>Po3</td>
<td>up/up</td>
</tr>
<tr>
<td>4</td>
<td>sw1.po4</td>
<td>active-full</td>
<td>Po4</td>
<td>Po4</td>
<td>up/up</td>
</tr>
</tbody>
</table>

- The following `show mlag interfaces` command, with the `detail` option, displays MLAG connections between the MLAG peer Switch 1 and the network attached devices:

  Switch2#`show mlag interfaces detail`

<table>
<thead>
<tr>
<th>mlag</th>
<th>state</th>
<th>local</th>
<th>remote</th>
<th>oper</th>
<th>config</th>
<th>last change</th>
<th>changes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>active-full</td>
<td>Po1</td>
<td>Po1</td>
<td>up/up</td>
<td>ena/ena</td>
<td>6 days, 2:08:28 ago</td>
<td>5</td>
</tr>
<tr>
<td>2</td>
<td>active-full</td>
<td>Po2</td>
<td>Po2</td>
<td>up/up</td>
<td>ena/ena</td>
<td>6 days, 2:08:30 ago</td>
<td>5</td>
</tr>
<tr>
<td>3</td>
<td>active-full</td>
<td>Po3</td>
<td>Po3</td>
<td>up/up</td>
<td>ena/ena</td>
<td>6 days, 2:08:33 ago</td>
<td>5</td>
</tr>
<tr>
<td>4</td>
<td>active-full</td>
<td>Po4</td>
<td>Po4</td>
<td>up/up</td>
<td>ena/ena</td>
<td>6 days, 2:08:41 ago</td>
<td>5</td>
</tr>
</tbody>
</table>

13.5.5.3 Verify Spanning Tree Protocol (STP)

STP functions can be displayed from each peer switch. MLAG interfaces are displayed as a single entry. Configured interfaces on each switch that are not included in an MLAG are displayed. Local interfaces have the normal notation; remote interfaces are preceded by `P` or `Peer`.

**VLAN Output 1: Assume VLAN 3903 includes MLAG 1**

Switch1#`show spanning-tree vlan 3903`

Spanning tree instance for vlan 3903
VL3903

  Spanning tree enabled protocol rapid-pvst

  Root ID  Priority 36671
  Address  001c.730c.3009
  Cost  1999 (Ext) 0 (Int)
  Port  105 (Port-Channel5)
  Hello Time  2.000 sec Max Age 20 sec Forward Delay 15 sec

  Bridge ID  Priority 36671 (priority 32768 sys-id-ext 3903)
  Address  021c.7300.1319
  Hello Time  2.000 sec Max Age 20 sec Forward Delay 15 sec

  Interface  Role  State  Cost  Prio.Nbr  Type
  --------------  ------  -------  ------  --------  ----
  Po1  root  forwarding 1999  128.105  P2p

Switch1#

The output displays MLAG 1 under its local interface name (Po1). A peer interface is not displayed because spanning tree considers the local and remote Port Channels as a single MLAG interface.
VLAN Output 2: Assume VLAN 3908 does not include any MLAGs

Switch1# show spanning-tree vlan 3908
Spanning tree instance for vlan 3908
VL3908
  Spanning tree enabled protocol rapid-pvst
  Root ID Priority 36676
  Address 021c.7300.1319
  This bridge is the root

  Bridge ID Priority 36676 (priority 32768 sys-id-ext 3908)
  Address 021c.7300.1319
  Hello Time 2.000 sec Max Age 20 sec Forward Delay 15 sec

<table>
<thead>
<tr>
<th>Interface</th>
<th>Role</th>
<th>State</th>
<th>Cost</th>
<th>Prio.Nbr</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Et17</td>
<td>designated</td>
<td>forwarding</td>
<td>2000</td>
<td>128.217</td>
<td>P2p</td>
</tr>
<tr>
<td>Et18</td>
<td>designated</td>
<td>forwarding</td>
<td>2000</td>
<td>128.218</td>
<td>P2p</td>
</tr>
<tr>
<td>PEt17</td>
<td>designated</td>
<td>forwarding</td>
<td>2000</td>
<td>128.17</td>
<td>P2p</td>
</tr>
<tr>
<td>PEt18</td>
<td>designated</td>
<td>forwarding</td>
<td>2000</td>
<td>128.18</td>
<td>P2p</td>
</tr>
</tbody>
</table>

The output displays all interfaces from both switches. Each interface is explicitly displayed because they are individual units that STP must consider when selecting ports to block.

- Et17 and Et18 are located on the switch where the `show spanning-tree` command is issued.
- PEt17 and PEt18 are located on the remote switch from where the command was issued.

An identical command issued on the peer switch displays similar information.

Verify the MLAG does not create topology loops (show spanning-tree blocked)

Switch1# show spanning-tree blocked
Name Blocked Interfaces List
--------- -----------------------------------
Number of blocked ports (segments) in the system : 0
Switch1#

13.5.5.4 Verify the MLAG Port Channel

Issue the command `show port-channel` for channels 1-4 from Switch 1:

Switch1# show port-channel 1-4
Port Channel Port-Channel1:
  Active Ports: Ethernet17 Ethernet18 PeerEthernet1 PeerEthernet2
Port Channel Port-Channel2:
  Active Ports: Ethernet19 Ethernet20 Ethernet21 Ethernet22
                      PeerEthernet3 PeerEthernet4 PeerEthernet5 PeerEthernet6
Port Channel Port-Channel3:
  Active Ports: Ethernet23 Ethernet24 PeerEthernet7 PeerEthernet8
Port Channel Port-Channel4:
  Active Ports: Ethernet25 Ethernet26 PeerEthernet9 PeerEthernet10
Issue the command `show port-channel load-balance fields detailed` command for channel 1 from Switch 2:

```
Switch# show port-channel 1 detailed
Port Channel Port-Channel1:
Active Ports:

<table>
<thead>
<tr>
<th>Port</th>
<th>Time became active</th>
<th>Protocol</th>
<th>Mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethernet17</td>
<td>7/7/11 15:27:36</td>
<td>LACP</td>
<td>Active</td>
</tr>
<tr>
<td>Ethernet18</td>
<td>7/7/11 15:27:36</td>
<td>LACP</td>
<td>Active</td>
</tr>
<tr>
<td>PeerEthernet1</td>
<td>7/7/11 15:27:36</td>
<td>LACP</td>
<td>Active</td>
</tr>
<tr>
<td>PeerEthernet2</td>
<td>7/7/11 15:27:36</td>
<td>LACP</td>
<td>Active</td>
</tr>
</tbody>
</table>
```

### 13.5.5.5 Verify the VLAN Membership

The `show vlan` command displays VLAN member ports, including MLAG ports and ports on each peer not bundled in an MLAG.

```
Switch1# show vlan 3903, 3908

<table>
<thead>
<tr>
<th>VLAN</th>
<th>Name</th>
<th>Status</th>
<th>Ports</th>
</tr>
</thead>
<tbody>
<tr>
<td>3903</td>
<td>ar.mg.rn.172.17.254.16/29</td>
<td>active</td>
<td>Cpu, Po1</td>
</tr>
<tr>
<td>3908</td>
<td>po.ra.ar.mg.172.17.254.64/29</td>
<td>active</td>
<td>Cpu, Et17, Et18, PEt17, PEt18</td>
</tr>
</tbody>
</table>
```
13.6 MLAG Commands

MLAG and Port Channel Commands – Global Configuration Mode
- `mlag configuration (global configuration)`

Interface Configuration Commands – Interface Configuration Mode
- `mlag (port-channel interface configuration)`

MLAG Configuration Commands
- `domain-id`
- `heartbeat-interval (MLAG)`
- `local-interface`
- `peer-address`
- `peer-link`
- `reload-delay mlag`
- `reload-delay mode`
- `reload-delay non-mlag`
- `shutdown (MLAG)`

Display Commands
- `show mlag`
- `show mlag interfaces`
- `show mlag interfaces members`
- `show mlag interfaces states`
- `show mlag issu warnings`
domain-id

The `domain-id` command specifies a name for the multi-chassis link aggregation (MLAG) domain. The `no domain-id` and `default domain-id` commands remove the MLAG domain name by deleting the `domain-id` statement from `running-config`.

**Command Mode**
- MLAG Configuration

**Command Syntax**
- `domain-id identifier`
- `no domain-id`
- `default domain-id`

**Parameters**
- `identifier` alphanumeric string that names the MLAG domain.

**Examples**
- This command names the MLAG domain `mlag1`.
  ```
  switch(config)#mlag
  switch(config-mlag)#domain-id mlag1
  switch(config-mlag)#
  ```
**heartbeat-interval (MLAG)**

The **heartbeat-interval** command configures the interval at which heartbeat messages are issued in a multi-chassis link aggregation (MLAG) configuration.

The **no heartbeat-interval** and **default heartbeat-interval** commands revert the heartbeat interval to the default setting by removing the **heartbeat-interval** command from **running-config**.

**Command Mode**

- MLAG Configuration

**Command Syntax**

```
heartbeat-interval period
no heartbeat-interval
default heartbeat-interval
```

**Parameters**

- **period**  Interval duration (ms). Value ranges from 1000 through 30000 milliseconds. Default interval is 2000 milliseconds.

**Guidelines**

Heartbeat messages flow independently in both directions between the MLAG peers. If a peer stops receiving heartbeat messages within the expected time frame (30 seconds), the other peer can assume it no longer functions and without intervention or repair, the MLAG becomes disabled. Both switches revert to their independent state.

**Important!** On 7500 and 7500E Series Switches, Arista recommends setting the heartbeat interval to 10 seconds.

**Examples**

- This command configures the heartbeat interval to 15000 milliseconds:

  ```
switch(config)#mlag
switch(config-mlag)#heartbeat-interval 15000
switch(config-mlag)#
```
**local-interface**

The `local-interface` command assigns a VLAN interface for use in multi-chassis link aggregation (MLAG) configurations. The VLAN interface is used for both directions of communication between the MLAG peers.

The `no local-interface` and `default local-interface` commands delete the VLAN interface assignment by removing the `local-interface` command from `running-config`.

**Command Mode**

MLAG Configuration

**Command Syntax**

```
local-interface vlan vlan_number
no local-interface
default local-interface
```

**Parameters**

- `vlan_number` VLAN number, in the range from 1 through 4094.

**Guidelines**

When configuring the local interface, the VLAN interface must exist already. To configure a VLAN interface, issue the command `interface vlan`.

**Example**

- This command assigns VLAN 4094 as the local interface.

```
switch(config)#mlag
switch(config-mlag)#local-interface vlan 4094
switch(config-mlag)#
```
mlag (port-channel interface configuration)

The `mlag` command assigns an MLAG ID to a port-channel. MLAG peer switches form an MLAG when each switch configures the same MLAG ID to a port-channel interface. Only one MLAG ID can be assigned to an interface. An individual MLAG number cannot be assigned to more than one interface.

The `no mlag` and `default mlag` commands remove the MLAG ID assignment from the configuration mode interface by deleting the corresponding `mlag` command from `running-config`.

**Command Mode**

Interface-Port Channel Configuration

**Command Syntax**

```
mlag number
no mlag
default mlag
```

**Parameters**

- `number` Number used as MLAG ID. Value ranges from 1 to 2000.

**Example**

- These commands configures a port channel and assigns it MLAG 4.

```
switch(config)#interface ethernet 5-10
switch(config-if-Et5-10)#channel-group 1 mode active
switch(config-if-Et5-10)#interface port-channel 4
switch(config-if-Po4)#switchport trunk group group4
switch(config-if-Po4)#mlag 4
switch(config-if-Po4)#exit
switch(config)#
```
mlag configuration (global configuration)

The `mlag configuration` command enters MLAG configuration mode to configure multi-chassis link aggregation (MLAG) features. MLAG configuration mode is not a group change mode; `running-config` is changed immediately after commands are executed. The `exit` command does not affect the configuration.

The `no mlag configuration` and `default mlag configuration` commands remove all MLAG configuration commands from `running-config`.

The `exit` command returns the switch to global configuration mode.

**Command Mode**
- Global Configuration

**Command Syntax**
```
mlag [configuration]
no mlag configuration
default mlag configuration
```

`mlag` and `mlag configuration` are identical commands.

**Guidelines**
An MLAG is formed by connecting two switches through an interface called a peer link. The peer link carries control and data traffic between the switches, including advertisements and keepalive messages. This information coordinates the switches. Functioning peers are in the **active** state.

Each peer switch uses IP-level connectivity between their local addresses and the MLAG peer IP address to form and maintain the peer link.

**Commands Available in MLAG Configuration Mode**
- `domain-id`
- `heartbeat-interval (MLAG)`
- `local-interface`
- `peer-address`
- `peer-link`
- `reload-delay mlag`
- `shutdown (MLAG)`

**Example**
- These commands enter MLAG configuration mode and configure MLAG parameters:

  switch(config)#mlag
  switch(config-mlag)#local-interface vlan 4094
  switch(config-mlag)#peer-address 10.0.0.2
  switch(config-mlag)#peer-link port-channel 10
  switch(config-mlag)#domain-id mlagDomain
  switch(config-mlag)#heartbeat-interval 2500
  switch(config-mlag)#reload-delay 2000
  switch(config-mlag)#exit
  switch(config)#
peer-address

The peer-address command specifies the peer IPv4 address for a multi-chassis link aggregation (MLAG) domain. MLAG control traffic, including keepalive messages, is sent to the peer IPv4 address. If the peer IPv4 address is unreachable, then MLAG peering fails and both peer switches revert to their independent state.

The no peer-address and default peer-address commands remove the MLAG peer’s IPv4 address assignment by deleting the peer-address command from running-config.

Command Mode
MLAG Configuration

Command Syntax

peer-address  ipv4_addr
no peer-address
default peer-address

Parameters
•  ipv4_addr  MLAG peer IPv4 address.

Example
•  These commands configure the MLAG peer address.

switch(config)#mlag
switch(config-mlag)#peer-address 10.0.0.2
switch(config-mlag)#
peer-link

The **peer-link** command specifies the interface that connects multi-chassis link aggregation (MLAG) peers. To form an MLAG, two switches are connected through an interface called a peer link. The peer link carries control and data traffic between the two switches. Control traffic includes MLAG-related advertisements and keepalive messages. This information keeps the two switches working as one.

The **no peer-link** and **default peer-link** command remove the peer link by deleting the **peer-link** command from *running-config*.

**Command Mode**

- MLAG Configuration

**Command Syntax**

```plaintext
peer-link INT_NAME
no peer-link
default peer-link
```

**Parameters**

- **INT_NAME** denotes the interface type and number of the interface. Values include:
  - **ethernet e_num** Ethernet interface range specified by `e_num`.
  - **port-channel p_num** Channel group interface range specified by `p_num`.

**Example**

- These commands create a peer link.

  ```plaintext
  switch(config)#mlag configuration
  switch(config-mlag)#peer-link port-channel 10
  switch(config-mlag)
  ```
**reload-delay mlag**

The `reload-delay mlag` command configures the reload delay period for MLAG links. The command also specifies the reload delay period for non-MLAG links when the `reload-delay non-mlag` command is not configured.

Each Arista switch defaults to the recommended reload-delay value, which varies by switch platform:

- **Fixed configuration switches**: 300 seconds
- **Trident II modular switches**: 900 seconds
  - 7304
  - 7308
  - 7316
  - 7300X series
- **Sand platform fixed configuration switches**: 600 seconds
  - 7280 series
- **Sand platform modular switches**: 1800 seconds
  - 7504
  - 7508
  - 7500E series
  - 7548S

The `no reload-delay mlag` and `default reload-delay mlag` commands restore the default value by deleting the `reload-delay mlag` statement from `running-config`.

**Command Mode**

MLAG Configuration

**Command Syntax**

```
reload-delay [mlag] PERIOD
no reload-delay [mlag]
default reload-delay [mlag]
```

**Parameters**

- `PERIOD`  Period that non-peer links are disabled after an MLAG peer reboots. Options include:
  - `infinity`  link is not enabled after reboot.
  - `<0 to 86400>`  disabled link interval (seconds). Default varies by switch platform as described above.

**Guidelines**

The `reload-delay` and `reload-delay mlag` commands are equivalent.

**Example**

These commands configure the reload-delay interval to 15 minutes.

```
switch(config)#mlag configuration
switch(config-mlag)#reload-delay mlag 900
switch(config-mlag)#
```
**reload-delay mode**

The `reload-delay mode` command specifies the state of LACP LAG ports during the MLAG reload delay period. By default, MLAG ports remain in the errdisabled state during reload delay. This command configures MLAG ports to come up to standby mode before the expiration of the reload delay period.

The `no reload-delay mode` and `default reload-delay mode` commands restore the default behavior of MLAG ports by deleting the `reload-delay mode` statement from `running-config`. The default behavior is for the MLAG ports to remain in the errdisabled state until the expiration of the reload delay period.

**Command Mode**
MLAG Configuration

**Command Syntax**
- `reload-delay mode lacp standby`
- `no reload-delay mode`
- `default reload-delay mode`

**Related Commands**
- `reload-delay mlag` configures the MLAG reload delay period.

**Example**
- These commands configure the MLAG port to come up to standby state before the end of the reload delay period.

```
switch(config)#mlag configuration
switch(config-mlag)#reload-delay mode lacp standby
switch(config-mlag)#
```
**reload-delay non-mlag**

The `reload-delay non-mlag` command specifies the period that non-MLAG links are disabled after an MLAG peer reboots. This interval allows non peer links to learn multicast and OSPF states before the ports start handling traffic. The recommended minimum value required to ensure the forwarding hardware is initialized with the topology state depends on the switch platform:

- Fixed configuration switches: 300 seconds (five minutes)
- Sand platform fixed configuration switches (7280 series): 600 seconds (ten minutes)
- Modular switches: 1200 seconds (twenty minutes)

When the `reload-delay non-mlag` command is not configured, the `reload-delay mlag` command specifies the reload delay time for non-MLAG and MLAG links.

The `no reload-delay non-mlag` and `default reload-delay non-mlag` command restores the default behavior by deleting the `reload-delay non-mlag` statement from `running-config`.

**Command Mode**

MLAG Configuration

**Command Syntax**

```
reload-delay non-mlag PERIOD
no reload-delay non-mlag
default reload-delay non-mlag
```

**Parameters**

- **PERIOD**  Period that non-MLAG links are disabled after an MLAG peer reboots. Options include:
  - `infinity`  links are not enabled after reboot.
  - `<0 to 86400>`  disabled link interval (seconds). Values range from 0 to 86400 (24 hours).

**Example**

- These commands configure the reload-delay interval of non-MLAG links to 20 minutes.

```
switch(config)#mlag configuration
switch(config-mlag)#reload-delay non-mlag 1200
switch(config-mlag)#
```
show mlag

The `show mlag` command displays information about the multi-chassis link aggregation (MLAG) configuration on bridged Ethernet interfaces.

**Command Mode**

EXEC

**Command Syntax**

```
show mlag [INFO_LEVEL]
```

**Parameters**

- **INFO_LEVEL** specifies information displayed by command. Options include:
  - `<no parameter>` command displays MLAG configuration, status, and ports.
  - `detail` command displays MLAG configuration, status, ports, and detailed status.

**Example**

- This command displays output from the `show mlag` command:

```
switch>show mlag
MLAG Configuration:
domain-id         :         ar.mg.mlag
local-interface   :           Vlan3901
peer-address      :       172.17.254.2
peer-link         :      Port-Channel1

MLAG Status:
state             :             Active
peer-link status  :                 Up
local-int status  :                 Up
system-id         :  02:1c:73:00:13:19

MLAG Ports:
Disabled          :   0
Configured        :   0
Inactive          :   0
Active-partial    :   0
Active-full       :   5
switch>
```
show mlag interfaces

The `show mlag interfaces` command displays information about the multi-chassis link aggregation (MLAG) configuration on bridged Ethernet interfaces.

**Command Mode**

EXEC

**Command Syntax**

`show mlag interfaces [MLAGS] [INFO_LEVEL]`

**Parameters**

- **MLAGS** MLAG channels for which command displays data. Options include:
  - `<no parameter>` command displays data for all MLAGs.
  - `mlag_id` specifies MLAG for which command displays data. Value ranges from 1 to 2000.
- **INFO_LEVEL** specifies information displayed by command. Options include:
  - `<no parameter>` command displays basic MLAG interface parameters
  - `detail` command displays detailed MLAG interface parameters.

**Example**

- This command displays output from the `show mlag interfaces detail` command:

  ```
  switch>show mlag interfaces detail
  mlag state local remote oper config last change changes
  4 active-full Po4 Po4 up/up ena/ena 6 days, 1:19:26 ago 5
  5 active-full Po5 Po5 up/up ena/ena 6 days, 1:19:24 ago 5
  6 active-full Po6 Po6 up/up ena/ena 6 days, 1:19:23 ago 5
  7 active-full Po7 Po7 up/up ena/ena 6 days, 1:19:23 ago 5
  ```
show mlag interfaces members

The `show mlag interfaces members` command displays information about the multi-chassis link aggregation (MLAG) members on bridged Ethernet interfaces.

**Command Mode**

EXEC

**Command Syntax**

`show mlag interfaces members`

**Example**

- This command displays the MLAG interface members.

```
switch#show mlag interface members
Mlag4 is Port-Channel4
  Active Ports: Ethernet3 PeerEthernet3
Mlag5 is Port-Channel5
  Active Ports: Ethernet14
Mlag7 is Port-Channel7
  Active Ports: Ethernet5 PeerEthernet5
Mlag8 is Port-Channel8
  Active Ports: Ethernet10 PeerEthernet10
Mlag9 is Port-Channel9
  Active Ports: Ethernet15 Ethernet21 PeerEthernet19 PeerEthernet20
Mlag10 is Port-Channel10
  Active Ports: Ethernet19 Ethernet20 PeerEthernet21 PeerEthernet22
switch#
```
show mlag interfaces states

The `show mlag interfaces states` command displays information about the multi-chassis link aggregation (MLAG) states on bridged Ethernet interfaces.

**Command Mode**

EXEC

**Command Syntax**

```
show mlag interfaces [MLAGS] states [STATE_NAMES] [INFO_LEVEL]
```

**Parameters**

- **MLAGS**  MLAG channels for which command displays data. Options include:
  - `<no parameter>` command displays data for all MLAGs.
  - `mlag_id` specifies MLAG for which command displays data. Value ranges from 1 to 2000.
- **STATE_NAMES**  MLAG channels for which command displays data. Parameter may specify more than one name, which can be listed in any order. Valid state names include:
  - `active-full` includes active-full interfaces.
  - `active-partial` includes active-partial interfaces.
  - `configured` includes configured interfaces.
  - `disabled` includes disabled interfaces.
  - `inactive` includes inactive interfaces.
- **INFO_LEVEL**  specifies information displayed by command. Options include:
  - `<no parameter>` command displays basic MLAG interface parameters
  - `detail` command displays detailed MLAG interface state parameters.

**Example**

- This command displays the MLAG interface states that are active-full.

```
switch# show mlag interfaces states active-full

mlag desc                       state     local     remote         status
-------- -------------------- --------------- --------- ---------- ------------
    4  b.po1                active-full       Po4        Po4          up/up
    7  ar.mg.au.po1         active-full       Po7        Po7          up/up
    8  co.po1               active-full       Po8        Po8          up/up
    9  k.po5                active-full       Po9        Po9          up/up
   10  ar.mg.pt.ir.po10     active-full      Po10       Po10          up/up

switch#
```
show mlag issu warnings

The **show mlag issu warnings** command displays a warning message regarding the backward-compatibility of this feature before you upgrade.

**Command Mode**

EXEC

**Command Syntax**

```
show mlag issu warnings
```

**Example**

- This command displays the MLAG backward-compatibility warning message. Refer to the latest version of the release notes for additional information before you upgrade.

```
switch##show mlag issu warnings
```

If you are performing an upgrade, and the Release Notes for the new version of EOS indicate that MLAG is not backwards-compatible with the currently installed version, the upgrade will result in packet loss.

```
Stp is not restartable. Topology changes will occur during the upgrade process.
```

```
switch#
```
shutdown (MLAG)

The `shutdown` command disables MLAG on the switch without modifying the MLAG configuration.

The `no shutdown` and `default shutdown` commands re-enable MLAG by removing the `shutdown` command from `running-config`.

**Command Mode**
- MLAG Configuration

**Command Syntax**

```
shutdown
no shutdown
default shutdown
```

**Example**

- These commands disable MLAG on the switch.

```
switch(config)#mlag configuration
switch(config-mlag)#shutdown
switch(config-mlag)#
```