MLAG Configuration Guide

Release 1.0

Super Micro Intelligent Switch
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Contents

1 Introduction

This document describes the Multi-Chassis Link Aggregation (MLAG) feature supported in Supermicro Layer 2 / Layer 3 switch products.

The availability of MLAG feature depends on the switch model. The currently supported switch model is XEM-002.

2 Overview

Typically, data centers provide redundancy by means of oversubscription by connecting switches and servers to dual aggregation switches. In such cases, spanning Tree Protocol (STP) prevents network loops by blocking half of the links to the aggregation switches. However this reduces available bandwidth by 50%.

Multi-Chassis Link Aggregation (MLAG) feature allow users to logically aggregate ports across two switches. This provides increased bandwidth and redundancy.

There can be multiple MLAG interfaces between two switches. The maximum number of MLAG interfaces is limited by the maximum number of LAGs supported in the switch models. Similar to the LAG, MLAG also supports up to 8 member ports.

The two switches that logically aggregate are called MLAG peer switches and communicate through an interface called an Inter peer link (IPL). The IPL is primarily used to exchange MLAG control information between peer switches, however it also carries data traffic for devices that are attached to only one of the MLAG peer.

3 Terminology

The following terms are used throughout this document and are defined here for clarification:

IPL – Inter Peer Link: The link connecting between two MLAG peer switches is referred as Inter Peer Link (IPL). This link should be configured as a LACP port channel. It can have many member ports as supported by the switch model.
Peer Switch: The two switches that form a single logical port channel interface is referred as peer switches. The peer switches are connected through IPL interface. For example, in the topology diagrams shown in “Topologies” section, the switches “Switch A” and “Switch B” are peer switches.
MLAG Port Channel: The link connecting MLAG peers to MLAG partner switches. MLAG port channel interfaces should be created on both the peer switches with the same port channel number.

Partner Device: The device connected to both the peer switches using a LACP aggregation link is referred as partner device. For example, in the topology diagrams shown in “Topologies” section, the switch “Switch C” and “Servers” are partner devices for MLAG switches.
Single Homed Device: The device connected to only one of the peer switch. This connection could be a regular single physical link connection or through a port channel interface.

4 How to configure MLAG in Supermicro switches

Here is a step by step procedure to configure MLAG in Supermicro switches.

Step 1: Create a port-channel interface (Static or LACP) on each MLAG peer.

Step 2: (Optional) Create a port-channel interface as an IPL port on each MLAG peer for carrying the MLAG control traffic.

Step 3: Making sure both MLAG peers has identical configurations to pass MLAG consistency check.

In order to ensure correct network behavior, Supermicro MLAG feature will conduct configuration consistency check on both MLAG peer and the peer connection will not be established if any incompatible configurations are identified during the configuration consistency check.

Below lists configuration parameters that are taken into account for configuration check:

Parameter Name	Value
Spanning Tree Protocol mode	The spanning-tree must be enabled for the IPL port with the following settings: BPDU Guard: Disabled BPDU Filter: Disabled Loop Guard: Disabled Port Fast: Disabled Port Priority must be the same on both peer Path cost must be the same on both peer
Interface Type	The IPL port must be configured as a switch port. Router port is not acceptable.
VLAN	The IPL port must be configured as a VLAN trunk port.

Step 4: Configuring MLAG Portal Address.

The MLAG Portal Address is a text string configured as a unique MAC address. MLAG switches use this MLAG Portal Address to identify their peers.

MLAG Portal Address must be configured as same in both the peer switches. If this condition does not meet, the peer connection will not be established. Follow the steps below to configure MLAG Portal Address.

Step	Command	Description
Step 1	configure terminal	Enters the configuration mode
Step 2	interface port-channel 2	Enters the port-channel configuration mode
Step 3	mlag portal-address <aa:aa:aa:aa:aa:aa>	Configuring the MLAG Portal Address <aa:aa:aa:aa:aa:aa> - Specify any unique MAC address to be used as the MLAG Portal Address
Step 4	**e**nd	Exit the configuration mode.
Step 5	show mlag detail	Displays the MLAG configuration details

Step 5: Configuring MLAG Portal Priority.
MLAG switches use this MLAG Portal Priority for LACP exchanges with partner devices. MLAG Portal Priority must be configured as same in both the peer switches. If this condition does not meet, the peer connection will not be established.

Follow the steps below to configure MLAG System Priority.

Step	Command	Description
Step 1	configure terminal	Enters the configuration mode
Step 2	interface port-channel 2	Enters the port-channel configuration mode
Step 3	mlag portal-priority <0-65535>	Configuring the MLAG Portal Priority
Step 4	**e**nd	Exit the configuration mode.
Step 5	show mlag detail	Displays the MLAG configuration details

Step 6: Configuring MLAG System Number.
Each logical MLAG system can have up to two physical MLAG peers. MLAG switches use unique Portal System Number (1 ~ 3) to identify MLAG peer in each logical MLAG system. If this condition does not meet, the peer connection will not be established.

Follow the steps below to configure MLAG Portal System Number.

Step	Command	Description
Step 1	configure terminal	Enters the configuration mode
Step 2	interface port-channel 2	Enters the port-channel configuration mode
Step 3	mlag portal-system-number <1-3>	Configuring the MLAG Portal System Number
Step 4	**e**nd	Exit the configuration mode.
Step 5	show mlag detail	Displays the MLAG configuration details

Step 7: Configuring MLAG IPL Interface.
The link connecting between two MLAG peer switches is referred as Inter Peer Link (IPL). This link should be configured as a LACP port channel or a regular network interface. It can have many member ports as supported by the switch model.

Follow the steps below to configure IPL Interface.

Step	Command	Description
Step 1	configure terminal	Enters the configuration mode
Step 2	interface port-channel 2	Enters the port-channel configuration mode
Step 3	mlag IPP <ifXtype> <ifnum>	Configuring the MLAG IPL interface. For example: mlag IPP extreme-ethernet 0/1 or mlag IPP port-channel 1
Step 4	**e**nd	Exit the configuration mode.
Step 5	show mlag detail	Displays the MLAG configuration details

5 MLAG Sample Configuration

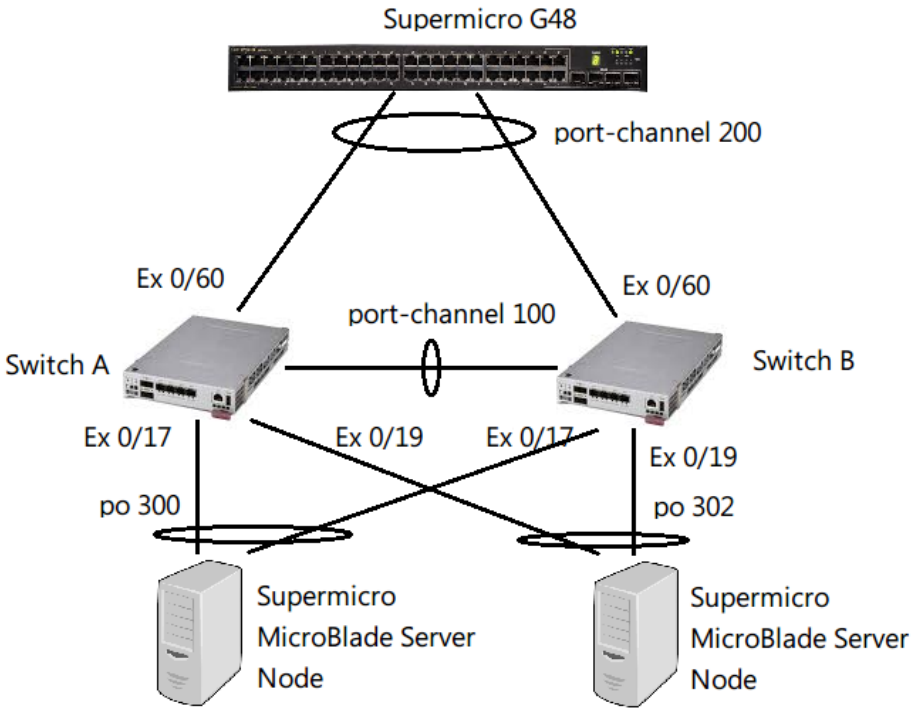

Figure 5-1 MLAG Sample Configuration Topology

5.1 Switch A configurations:

Step 1: Configuring MLAG port-channel interface

```
SMIS(Config)# interface port-channel 200
SMIS(Config-if)# no shutdown
SMIS(Config-if)# exit
SMIS(Config)# interface extreme-ethernet 0/60
SMIS(Config-if)# channel-group 200 mode active
SMIS(Config)# exit
SMIS(Config)# interface port-channel 300
SMIS(Config-if)# no shutdown
SMIS(Config-if)# exit
SMIS(Config)# interface extreme-ethernet 0/17
SMIS(Config-if)# channel-group 300 mode on
SMIS(Config)# exit
SMIS(Config)# interface port-channel 302
SMIS(Config-if)# no shutdown
SMIS(Config-if)# exit
SMIS(Config)# interface extreme-ethernet 0/19
SMIS(Config-if)# channel-group 302 mode on
SMIS(Config)# exit
```

Step 2: Configuring port-channel for MLAG IPL interface

```
SMIS(Config)# interface port-channel 100
SMIS(Config-if)# no shutdown
SMIS(Config-if)# switchport mode trunk
SMIS(Config-if)# exit
```

```
SMIS(Config)# interface extreme-ethernet 0/57
SMIS(Config-if)# channel-group 100 mode active
SMIS(Config)# exit
```

Step 3: Configuring MLAG Portal Address/Portal Priority/Portal System Number

```
SMIS(Config)# interface port-channel 200
SMIS(Config-if)# mlag portal-address 00:11:22:33:44:55 portal-priority
128 portal-system-number 1
SMIS(Config-if)# exit
SMIS(Config)# interface port-channel 300
SMIS(Config-if)# mlag portal-address 00:00:00:00:00:01 portal-priority
128 portal-system-number 1
SMIS(Config-if)# exit
SMIS(Config)# interface port-channel 302
SMIS(Config-if)# mlag portal-address 00:00:00:00:00:03 portal-priority
128 portal-system-number 1
SMIS(Config-if)# exit
```

Step 4: Configuring MLAG IPL port

```
SMIS(Config)# interface port-channel 200
SMIS(Config-if)# mlag IPP port-channel 100
SMIS(Config-if)# exit
SMIS(Config)# interface port-channel 300
SMIS(Config-if)# mlag IPP port-channel 100
SMIS(Config-if)# exit
SMIS(Config)# interface port-channel 302
SMIS(Config-if)# mlag IPP port-channel 100
SMIS(Config-if)# exit
```

Step 5: Show MLAG Status

```
MLAG Configuration : Channel Group 200
-----------------------------------------------------
Portal State                          : Initialization State
Configuration Check Result            : No inconsistency found
Portal Role                           : PRIMARY
Portal System Address                 : 00:11:22:33:44:55
Portal System Priority                : 128
Portal System Number                  : 1
Intra-Portal-Port                     : port-channel 100
Three Portal System                   : 0
Aggregator Address                    : 0c:c4:7a:1a:44:3e
Aggregator Priority                   : 32768


MLAG Configuration : Channel Group 300
-----------------------------------------------------
Portal State                          : Initialization State
Configuration Check Result            : No inconsistency found
Portal Role                           : PRIMARY
Portal System Address                 : 00:00:00:00:00:01
Portal System Priority                : 128
Portal System Number                  : 1
```

```
Intra-Portal-Port                       : port-channel 100
Three Portal System                     : 0
Aggregator Address                      : 0c:c4:7a:1a:44:3e
Aggregator Priority                     : 32768


MLAG Configuration : Channel Group 302
-------------------------------------------------------
Portal State                            : Initialization State
Configuration Check Result              : No inconsistency found
Portal Role                             : PRIMARY
Portal System Address                   : 00:00:00:00:00:03
Portal System Priority                  : 128
Portal System Number                    : 1
Intra-Portal-Port                       : port-channel 100
Three Portal System                     : 0
Aggregator Address                      : 0c:c4:7a:1a:44:3e
Aggregator Priority                     : 32768
```

5.2 Switch B configurations:

Step 1: Configuring MLAG port-channel interface

```
SMIS(Config)# interface port-channel 200
SMIS(Config-if)# no shutdown
SMIS(Config-if)# exit
SMIS(Config)# interface extreme-ethernet 0/60
SMIS(Config-if)# channel-group 200 mode active
SMIS(Config)# exit
SMIS(Config)# interface port-channel 300
SMIS(Config-if)# no shutdown
SMIS(Config-if)# exit
SMIS(Config)# interface extreme-ethernet 0/17
SMIS(Config-if)# channel-group 300 mode on
SMIS(Config)# exit
SMIS(Config)# interface port-channel 302
SMIS(Config-if)# no shutdown
SMIS(Config-if)# exit
SMIS(Config)# interface extreme-ethernet 0/19
SMIS(Config-if)# channel-group 302 mode on
SMIS(Config)# exit
```

Step 2: Configuring port-channel for MLAG IPL interface

```
SMIS(Config)# interface port-channel 100
SMIS(Config-if)# no shutdown
SMIS(Config-if)# switchport mode trunk
SMIS(Config-if)# exit
SMIS(Config)# interface extreme-ethernet 0/57
SMIS(Config-if)# channel-group 100 mode active
SMIS(Config)# exit
```

Step 3: Configuring MLAG Portal Address/Portal Priority/Portal System Number

```
SMIS(Config)# interface port-channel 200
SMIS(Config-if)# mlag portal-address 00:11:22:33:44:55 portal-priority
128 portal-system-number 2
SMIS(Config-if)# exit
SMIS(Config)# interface port-channel 300
SMIS(Config-if)# mlag portal-address 00:00:00:00:00:01 portal-priority
128 portal-system-number 2
SMIS(Config-if)# exit
SMIS(Config)# interface port-channel 302
SMIS(Config-if)# mlag portal-address 00:00:00:00:00:03 portal-priority
128 portal-system-number 2
SMIS(Config-if)# exit
```

Step 4: Configuring MLAG IPL port

```
SMIS(Config)# interface port-channel 200
SMIS(Config-if)# mlag IPP port-channel 100
SMIS(Config-if)# exit
SMIS(Config)# interface port-channel 300
SMIS(Config-if)# mlag IPP port-channel 100
SMIS(Config-if)# exit
SMIS(Config)# interface port-channel 302
SMIS(Config-if)# mlag IPP port-channel 100
SMIS(Config-if)# exit
```

Step 5: Show MLAG Status

```
MLAG Configuration : Channel Group 200
------------------------------------------------------
Portal State                          : Initialization State
Configuration Check Result            : No inconsistency found
Portal Role                           : PRIMARY
Portal System Address                 : 00:11:22:33:44:55
Portal System Priority                : 128
Portal System Number                  : 2
Intra-Portal-Port                     : port-channel 100
Three Portal System                   : 0
Aggregator Address                    : 0c:c4:7a:1a:44:3e
Aggregator Priority                   : 32768


MLAG Configuration : Channel Group 300
------------------------------------------------------
Portal State                          : Initialization State
Configuration Check Result            : No inconsistency found
Portal Role                           : PRIMARY
Portal System Address                 : 00:00:00:00:00:01
Portal System Priority                : 128
Portal System Number                  : 2
Intra-Portal-Port                     : port-channel 100
Three Portal System                   : 0
Aggregator Address                    : 0c:c4:7a:1a:44:3e
Aggregator Priority                   : 32768
```

```
MLAG Configuration : Channel Group 302
-------------------------------------------------------
Portal State                          : Initialization State
Configuration Check Result            : No inconsistency found
Portal Role                           : PRIMARY
Portal System Address                 : 00:00:00:00:00:03
Portal System Priority                : 128
Portal System Number                  : 2
Intra-Portal-Port                     : port-channel 100
Three Portal System                   : 0
Aggregator Address                    : 0c:c4:7a:1a:44:3e
Aggregator Priority                   : 32768
```

5.3 MLAG Status:

Switch A)

```
SMIS# show mlag detail

MLAG Configuration : Channel Group 200
-------------------------------------------------------
Portal State                          : Normal State
Configuration Check Result            : No inconsistency found
Portal Role                           : SECONDARY
Portal System Address                 : 00:11:22:33:44:55
Portal System Priority                : 128
Portal System Number                  : 1
Intra-Portal-Port                     : port-channel 100
Three Portal System                   : 0
Aggregator Address                    : 0c:c4:7a:1a:43:a8
Aggregator Priority                   : 32768
Active ports ifIndex                  : 60

Neighbor Portal System Address        : 00:11:22:33:44:55
Neighbor Portal System Priority       : 128
Neighbor Portal System Number         : 2
Neighbor Portal Three Portal System   : 0
Neighbor Portal Aggregator Address    : 0c:c4:7a:1a:44:3e
Neighbor Portal Aggregator Priority   : 32768
Neighbor Portal Partner Aggregator Key : 200
Active ports ifIndex                  : 60


MLAG Configuration : Channel Group 300
-------------------------------------------------------
Portal State                          : Normal State
Configuration Check Result            : No inconsistency found
Portal Role                           : SECONDARY
Portal System Address                 : 00:00:00:00:00:01
Portal System Priority                : 128
Portal System Number                  : 1
Intra-Portal-Port                     : port-channel 100
Three Portal System                   : 0
```

```
Aggregator Address                     : 0c:c4:7a:1a:43:a8
Aggregator Priority                    : 32768
Active ports ifIndex                   : 17

Neighbor Portal System Address         : 00:00:00:00:00:01
Neighbor Portal System Priority        : 128
Neighbor Portal System Number          : 2
Neighbor Portal Three Portal System    : 0
Neighbor Portal Aggregator Address     : 0c:c4:7a:1a:44:3e
Neighbor Portal Aggregator Priority    : 32768
Neighbor Portal Partner Aggregator Key : 0
Active ports ifIndex                   : 17


MLAG Configuration : Channel Group 302
-------------------------------------------------------
Portal State                           : Normal State
Configuration Check Result             : No inconsistency found
Portal Role                            : SECONDARY
Portal System Address                  : 00:00:00:00:00:03
Portal System Priority                 : 128
Portal System Number                   : 1
Intra-Portal-Port                      : port-channel 100
Three Portal System                    : 0
Aggregator Address                     : 0c:c4:7a:1a:43:a8
Aggregator Priority                    : 32768
Active ports ifIndex                   : 19

Neighbor Portal System Address         : 00:00:00:00:00:03
Neighbor Portal System Priority        : 128
Neighbor Portal System Number          : 2
Neighbor Portal Three Portal System    : 0
Neighbor Portal Aggregator Address     : 0c:c4:7a:1a:44:3e
Neighbor Portal Aggregator Priority    : 32768
Neighbor Portal Partner Aggregator Key : 0
Active ports ifIndex                   : 19
```

Switch B)

```
SMIS# show mlag detail

MLAG Configuration : Channel Group 200
-------------------------------------------------------
Portal State                           : Normal State
Configuration Check Result             : No inconsistency found
Portal Role                            : PRIMARY
Portal System Address                  : 00:11:22:33:44:55
Portal System Priority                 : 128
Portal System Number                   : 2
Intra-Portal-Port                      : port-channel 100
Three Portal System                    : 0
Aggregator Address                     : 0c:c4:7a:1a:44:3e
Aggregator Priority                    : 32768
```

```
Active ports ifIndex                    : 60

Neighbor Portal System Address          : 00:11:22:33:44:55
Neighbor Portal System Priority         : 128
Neighbor Portal System Number           : 1
Neighbor Portal Three Portal System     : 0
Neighbor Portal Aggregator Address      : 0c:c4:7a:1a:43:a8
Neighbor Portal Aggregator Priority     : 32768
Neighbor Portal Partner Aggregator Key  : 200
Active ports ifIndex                    : 60


MLAG Configuration : Channel Group 300
-------------------------------------------------------
Portal State                            : Normal State
Configuration Check Result              : No inconsistency found
Portal Role                             : PRIMARY
Portal System Address                   : 00:00:00:00:00:01
Portal System Priority                  : 128
Portal System Number                    : 2
Intra-Portal-Port                       : port-channel 100
Three Portal System                     : 0
Aggregator Address                      : 0c:c4:7a:1a:44:3e
Aggregator Priority                     : 32768
Active ports ifIndex                    : 17

Neighbor Portal System Address          : 00:00:00:00:00:01
Neighbor Portal System Priority         : 128
Neighbor Portal System Number           : 1
Neighbor Portal Three Portal System     : 0
Neighbor Portal Aggregator Address      : 0c:c4:7a:1a:43:a8
Neighbor Portal Aggregator Priority     : 32768
Neighbor Portal Partner Aggregator Key  : 0
Active ports ifIndex                    : 17


MLAG Configuration : Channel Group 302
-------------------------------------------------------
Portal State                            : Normal State
Configuration Check Result              : No inconsistency found
Portal Role                             : PRIMARY
Portal System Address                   : 00:00:00:00:00:03
Portal System Priority                  : 128
Portal System Number                    : 2
Intra-Portal-Port                       : port-channel 100
Three Portal System                     : 0
Aggregator Address                      : 0c:c4:7a:1a:44:3e
Aggregator Priority                     : 32768
Active ports ifIndex                    : 19

Neighbor Portal System Address          : 00:00:00:00:00:03
Neighbor Portal System Priority         : 128
Neighbor Portal System Number           : 1
Neighbor Portal Three Portal System     : 0
```

```
Neighbor Portal Aggregator Address     : 0c:c4:7a:1a:43:a8
Neighbor Portal Aggregator Priority    : 32768
Neighbor Portal Partner Aggregator Key : 0
Active ports ifIndex                   : 19
```