



## Configuring Bridges

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This chapter describes how to configure bridging for the ML-Series card. For more information about the Cisco IOS commands used in this chapter, refer to the *Cisco IOS Command Reference* publication.

This chapter includes the following major sections:

- [Understanding Bridging, page 6-1](#)
- [Configuring Bridging, page 6-2](#)
- [Monitoring and Verifying Bridging, page 6-3](#)



### Caution

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Cisco Inter-Switch Link (ISL) and Cisco Dynamic Trunking Protocol (DTP) are not supported by the ML-Series cards, but the ML-Series broadcast forwards these formats. Using ISL or DTP on connecting devices is not recommended. Some Cisco devices attempt to use ISL or DTP by default.

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## Understanding Bridging

The ML-Series card supports transparent bridging for Fast Ethernet, Gigabit Ethernet and POS ports. It supports a maximum of 255 active bridge groups. Transparent bridging combines the speed and protocol transparency of a spanning-tree bridge, along with the functionality, reliability, and security of a router.

To configure bridging, you must perform the following tasks in the modes indicated:

- In global configuration mode:
  - Enable bridging of IP packets.
  - Select the type of Spanning Tree Protocol (STP) (optional).
- In interface configuration mode:
  - Determine which interfaces belong to the same bridge group.

The ML-Series card bridges all nonrouted traffic among the network interfaces comprising the bridge group. If spanning tree is enabled, the interfaces became part of the same spanning tree. Interfaces not participating in a bridge group cannot forward bridged traffic.

If the destination address of the packet is known in the bridge table, the packet is forwarded on a single interface in the bridge group. If the packet's destination is unknown in the bridge table, the packet is flooded on all forwarding interfaces in the bridge group. The bridge places source addresses in the bridge table as it learns them during the process of bridging.

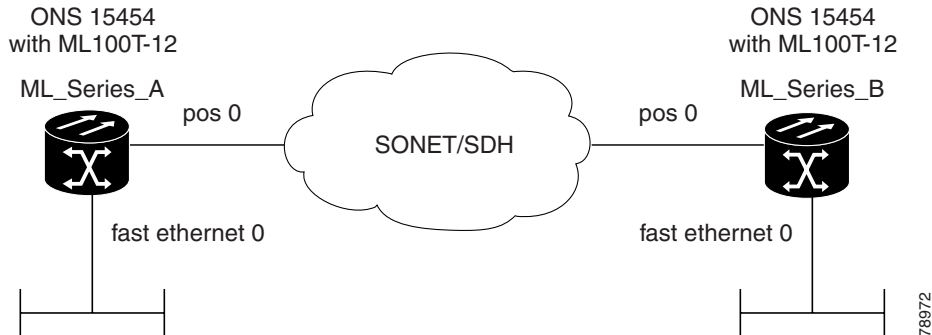
Spanning tree is not mandatory for an ML-Series card bridge group. But if it is configured, a separate spanning-tree process runs for each configured bridge group. A bridge group establishes a spanning tree based on the bridge protocol data units (BPDUs) it receives on only its member interfaces. The ML-Series card has a 255 active bridge group maximum.

## Configuring Bridging

Use the following steps to configure bridging:

	Command	Purpose
Step 1	Router(config)# <b>no ip routing</b>	Enables bridging of IP packets. This command needs to be executed once per card, not once per bridge-group. This step is not done for integrated routing and bridging (IRB).
Step 2	Router(config)# <b>bridge</b> <i>bridge-group-number</i> [ <b>protocol</b> { <i>drpri-rstp</i>   <i>rstp</i>   <i>ieee</i> }]	Assigns a bridge group number and defines the appropriate spanning-tree type:  bridge-group-number can range from 1 to 4096.  <i>drpri-rstp</i> is the protocol used to interconnect dual RPR to protect from node failur.  <i>rstp</i> is the IEEE 802.1W Rapid Spanning Tree.  <i>ieee</i> is the IEEE 802.1D Spanning Tree Protocol.  <b>Note</b> Spanning tree is not mandatory for an ML-Series card bridge group. But configuring spanning tree blocks network loops.
Step 3	Router(config)# <b>bridge</b> <i>bridge-group-number</i> <b>priority</b> <i>number</i>	(Optional) Assigns a specific priority to the bridge, to assist in the spanning-tree root definition. Lowering the priority of a bridge makes it more likely the bridge is selected as the root.
Step 4	Router(config)# <b>interface</b> <i>type</i> <i>number</i>	Enters interface configuration mode to configure the interface of the ML-Series card.
Step 5	Router(config-if)# <b>bridge-group</b> <i>bridge-group-number</i>	Assigns a network interface to a bridge group.
Step 6	Router(config-if)# <b>no shutdown</b>	Changes the shutdown state to up and enables the interface.
Step 7	Router(config-if)# <b>end</b>	Returns to privileged EXEC mode.
Step 8	Router# <b>copy running-config</b> <b>startup-config</b>	(Optional) Saves your entries in the configuration file.

Figure 6-1 shows a bridging example. Example 6-1 shows the code used to configure ML-Series A. Example 6-2 shows the code used to configure ML-Series B.

**Figure 6-1 Bridging Example****Example 6-1 Router A Configuration**

```
bridge 1 protocol ieee
!
!
interface FastEthernet0
 no ip address
 bridge-group 1
!
interface POS0
 no ip address
 crc 32
 bridge-group 1
 pos flag c2 1
```

**Example 6-2 Router B Configuration**

```
bridge 1 protocol ieee
!
!
interface FastEthernet0
 no ip address
 bridge-group 1
!
interface POS0
 no ip address
 crc 32
 bridge-group 1
 pos flag c2 1
```

## Monitoring and Verifying Bridging

After you have set up the ML-Series card for bridging, you can monitor and verify its operation by performing the following procedure in privileged EXEC mode:

	Command	Purpose
Step 1	Router# <b>clear bridge</b> <i>bridge-group-number</i>	Removes any learned entries from the forwarding database of a particular bridge group, clears the transmit, and receives counts for any statically configured forwarding entries.
Step 2	Router# <b>show bridge</b> { <i>bridge-group-number</i>   <i>interface-address</i> }	Displays classes of entries in the bridge forwarding database.
Step 3	Router# <b>show bridge verbose</b>	Displays detailed information about configured bridge groups.
Step 4	ML_Series# <b>show spanning-tree</b> [ <i>bridge-group-number</i> ] [ <b>brief</b> ]	Displays detailed information about spanning tree. <i>bridge-group-number</i> restricts the spanning tree information to specific bridge groups. brief displays summary information about spanning tree.

Example 6-3 shows an example of the monitoring and verifying bridging.

### Example 6-3 Monitoring and Verifying Bridging

```

ML-Series# show bridge

Total of 300 station blocks, 298 free
Codes: P - permanent, S - self

Bridge Group 1:

Maximum dynamic entries allowed: 1000
Current dynamic entry count: 2

      Address      Action  Interface
0000.0001.6000  forward FastEthernet0
0000.0001.6100  forward POS0

ML-Series# show bridge verbose

Total of 300 station blocks, 298 free
Codes: P - permanent, S - self

Maximum dynamic entries allowed: 1000
Current dynamic entry count: 2

BG Hash      Address      Action  Interface      VC   Age   RX count  TX co
unt
  1 60/0     0000.0001.6000 forward FastEthernet0   -
  1 61/0     0000.0001.6100 forward POS0      -

Flood ports
FastEthernet0
POS0

ML-Series# show spanning-tree brief

Bridge group 1
Spanning tree enabled protocol ieee
Root ID      Priority    32769
Address      0005.9a39.6634
This bridge is the root

```

```

Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec

Bridge ID Priority 32769 (priority 32768 sys-id-ext 1)
Address 0005.9a39.6634
Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
Aging Time 300

Interface      Role Sts Cost      Prio.Nbr Type
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Fa0            Desg FWD 19        128.3   P2p
PO0            Desg FWD 9         128.20  P2p
    
```

