C H A P T E R **5**

Configuring Bridging

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:

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Caution Cisco Inter-Switch Link (ISL) and Cisco Dynamic Trunking Protocol (DTP) are not supported by the ML-Series, 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.

Understanding Bridging

The ML-Series card can be configured to serve as an IP router and a bridge. Cisco IOS software supports transparent bridging for Fast Ethernet, Gigabit Ethernet, and POS. Cisco IOS software functionality combines the advantages of a spanning-tree bridge and a router. This combination provides 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.
- In interface configuration mode:
  - Determine which interfaces belong to the same bridge group.

    These interfaces become part of the same spanning tree, allowing the ML-Series card to bridge all nonrouted traffic among the network interfaces comprising the bridge group. Interfaces not participating in a bridge group cannot forward bridged traffic.
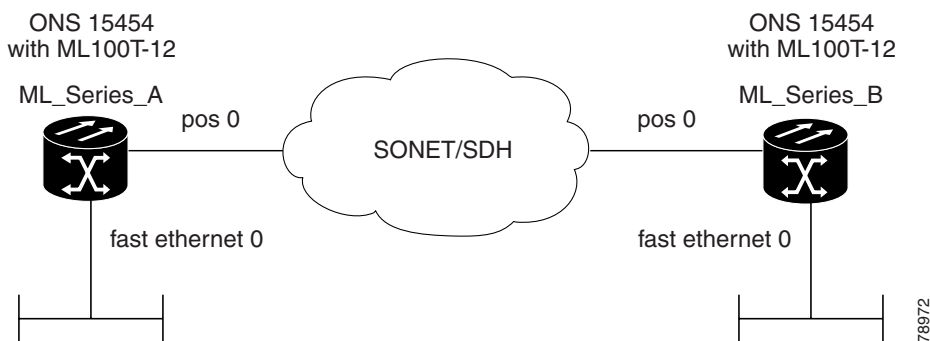
    If the destination address of the packet is known in the bridge table, the packet is forwarded on a single interface in the bridge group. If the packet's destination is unknown in the bridge table, the packet is flooded on all forwarding interfaces in the bridge group. The bridge places source addresses in the bridge table as it learns them during the process of bridging.

A separate spanning-tree process runs for each configured bridge group. Each bridge group participates in a separate spanning tree. A bridge group establishes a spanning tree based on the bridge protocol data units (BPDUs) it receives on only its member interfaces.

Configuring Bridging

	Command	Purpose
Step 1	Router(config)# **no ip routing**	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)# **bridge** *bridge-group-number* **protocol {rstp	ieee}**	Assigns a bridge group number and defines the appropriate spanning-tree type: either IEEE 802.1D Spanning Tree Protocol or IEEE 802.1W Rapid Spanning Tree.
Step 3	Router(config)# **bridge** *bridge-group-number* **priority** *number*	(Optional) Assigns a specific priority to the bridge, to assist in the spanning-tree root definition. The lower the priority, the more likely the bridge is selected as the root.
Step 4	Router(config)# **interface** *interface type interface number*	Enters interface configuration mode to configure the interface of the ML-Series card.
Step 5	Router(config-if)# **bridge-group** *bridge-group-number*	Assigns a network interface to a bridge group.
Step 6	Router(config-if)# **no shutdown**	Changes the shutdown state to up and enables the interface.
Step 7	Router(config-if)# **end**	Returns to privileged EXEC mode.
Step 8	Router# **copy running-config startup-config**	(Optional) Saves your entries in the configuration file.

Example 5-1   Bridging Example

Example 5-2   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 5-3   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# **clear bridge** *bridge-group-number*	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# **show bridge** *bridge-group-number* | *interface-address*	Displays classes of entries in the bridge forwarding database.
Step 3	Router# **show bridge verbose**	Displays detailed information about configured bridge groups.
Step 4	Router# **show spanning-tree**	Displays the spanning tree topology known to the ML-Series card.

Example 5-4   Monitoring and Verifying Bridging

```
Router# 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
```

```
Router# 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

Router# show spanning-tree

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
---------------- ---- --- --------- -------- --------------------------------
Fa0              Desg FWD 19         128.3    P2p
PO0              Desg FWD 9          128.20   P2p
```