rif

To enter static source-route information into the Routing Information Field (RIF) cache, use the **rif** command in global configuration mode. To remove an entry from the cache, use the **no** form of this command.

rif *mac-address rif-string* {*interface-name* | **ring-group** *ring*}

no rif *mac-address rif-string* {*interface-name* | **ring-group** *ring*}

Syntax Description

mac-address	12-digit hexadecimal string written as a dotted triple of four-digit hexadecimal numbers; for example, 0010.0a00.20a6.
rif-string	Series of 4-digit hexadecimal numbers separated by a period (.). This RIF string is inserted into the packets sent to the specified MAC address.
interface-name	Interface name (for example, tokenring 0) that indicates the origin of the RIF.
ring-group	Specifies the origin of the RIF is a ring group.
ring	Ring group number that indicates the origin of the RIF. This ring group number must match the number you have specified with the **source-bridge ring-group** command. The valid range is from 1 to 4095.

Usage Guidelines

If a Token Ring host does not support the use of IEEE 802.2 TEST or XID datagrams as explorer packets, you may need to add static information to the RIF cache of the router.

Command Default

No static source-route information is entered.

Command Modes

Global configuration

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines

You must specify either an interface name or a ring group number to indicate the origin of the RIF. You specify an interface name (for example, tokenring 0) with the *interface-name* argument, and you specify a ring group number with the **ring-group** *ring* keyword and argument. The ring group number must match the number you specified with the **source-bridge ring-group** command. Ring groups are explained in the "Configuring Source-Route Bridging" chapter of the *Bridging and IBM Networking Configuration Guide*.

Using the command **rif** *mac-address* without any other arguments puts an entry into the RIF cache indicating that packets for this MAC address should not have RIF information.

Do not configure a static RIF with any of the *all rings* type codes. Doing so causes traffic for the configured host to appear on more than one ring and leads to unnecessary congestion.

Note Input to the **source-bridge** interface configuration command is in decimal format. RIF displays and input are in hexadecimal format, and IBM source-route bridges use hexadecimal for input. It is essential that bridge and ring numbers are consistent for proper network operation. This means you must explicitly declare the numbers to be hexadecimal by preceding the number with 0x, or you must convert IBM hexadecimal numbers to a decimal equivalent when entering them. For example, IBM hexadecimal bridge number 10 would be entered as hexadecimal number 0x10 or decimal number 16 in the configuration commands. In the displays, these commands always will be in decimal.

Examples

The following example configuration sets up a static RIF:

```
! insert entry with MAC address 1000.5A12.3456 and RIF of
! 0630.0081.0090 into RIF cache
rif 1000.5A12.3456 0630.0081.0090 tokenring 0
```

Related Commands

Command	Description
multiring	Enables collection and use of RIF information.
source-bridge ring-group	Defines or removes a ring group from the configuration.

rif timeout

To determine the number of minutes an inactive Routing Information Field (RIF) entry is kept, use the **rif timeout** command in global configuration mode. To restore the default, use the **no** form of this command.

rif timeout *minutes*

no rif timeout

Syntax Description

minutes	Number of minutes an inactive RIF entry is kept. The value must be greater than 0. Default is 15 minutes.

Defaults

15 minutes

Command Modes

Global configuration

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines

A RIF entry is cached based on the MAC address and the interface.

RIF information is maintained in a cache whose entries are aged. A RIF entry can be aged out even if there is active traffic, but the traffic is fast or autonomously switched. Until a RIF entry is removed from the cache, no new information is accepted for that RIF entry.

A RIF entry is refreshed only if a RIF field of an incoming frame is identical to the RIF information of the RIF entry in the cache.

Examples

The following example changes the timeout period to 5 minutes:

```
rif timeout 5
```

Related Commands

Command	Description
clear rif-cache	Clears the entire RIF cache.
rif validate-enable	Enables RIF validation for entries learned on an interface (Token Ring or FDDI).
show rif	Displays the current contents of the RIF cache.

rif validate-age

To define the validation time when the Cisco IOS software is acting as a proxy for NetBIOS NAME_QUERY packet or for explorer frames, use the **rif validate-age** command in global configuration mode.

rif validate-age *seconds*

no rif validate-age *seconds*

Syntax Description

seconds	Interval, in seconds, at which a proxy is sent. The valid range is any number greater than 0. Default is 2 seconds.

Defaults

2 seconds

Command Modes

Global configuration

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines

If the timer expires before the response is received, the Routing Information Field (RIF) entry or the NetBIOS cache entry is marked as invalid and is flushed from the cache table when another explorer or NAME_QUERY packet is received.

Examples

The following example specifies the interval at which a proxy is sent to be 3 seconds:

```
rif validate-age 3
```

Related Commands

Command	Description
rif	Enters static source-route information into the RIF cache.
rif timeout	Determines the number of minutes an inactive RIF entry is kept.

rif validate-enable

To enable Routing Information Field (RIF) validation for entries learned on an interface (Token Ring or Fiber Distributed Data Interface [FDDI]), use the **rif validate-enable** command in global configuration mode. To disable the specification, use the **no** form of this command.

rif validate-enable

no rif validate-enable

Syntax Description

This command has no arguments or keywords.

Defaults

RIF validation is enabled.

Command Modes

Global configuration

Command History

Release	Modification
11.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines

A RIF validation algorithm is used for the following cases:

- To decrease convergence time to a new source-route path when an intermediate bridge goes down.
- To keep a valid RIF entry in a RIF cache even if a RIF entry is not refreshed either because traffic is fast or autonomously switched, or because there is no traffic.

A directed IEEE TEST command is sent to the destination MAC address. If a response received in the time specified by the **rif validate-age** command, the entry is refreshed and is considered valid. Otherwise, the entry is removed from the cache. To prevent sending too many TEST commands, any entry that has been refreshed in fewer than 70 seconds is considered valid.

Validation is triggered as follows:

- When a RIF entry is found in the cache.
- When a RIF field of an incoming frame and the RIF information of the RIF entry is not identical. If, as the result of validation, the entry is removed from the cache, the RIF field of the next incoming frame with the same MAC address is cached.
- When the RIF entry is not refreshed for the time specified in the **rif timeout** command.

Note If the RIF entry has been in the RIF cache for 6 hours, and has not been refreshed for the time specified in the **rif timeout** command, the entry is removed unconditionally from the cache.

Note The **rif validate-enable** commands have no effect on remote entries learned over RSRB.

Examples

The following example enables RIF validation:

```
rif validate-enable
```

Related Commands

Command	Description
rif timeout	Determines the number of minutes an inactive RIF entry is kept.
rif validate-age	Defines the validation time when the Cisco IOS software is acting as a proxy for NetBIOS NAME_QUERY packet or for explorer frames.
rif validate-enable-age	Enables RIF validation for stations on a source-route bridge network that do not respond to an IEEE TEST command.
rif validate-enable-route-cache	Enables synchronization of the RIF cache with the protocol route cache.

rif validate-enable-age

To enable Routing Information Field (RIF) validation for stations on a source-route bridge network that do not respond to an IEEE TEST command, use the **rif validate-enable-age** command in global configuration mode. To disable the specification, use the **no** form of this command.

rif validate-enable-age

no rif validate-enable-age

Syntax Description

This command has no arguments or keywords.

Defaults

RIF validation is enabled.

Command Modes

Global configuration

Command History

Release	Modification
11.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines

You must first issue the **rif validate-enable** command.

When this command is enabled, a RIF entry is not removed from the cache even if it becomes invalid. If the entry is refreshed, it becomes valid again.

If a RIF field of an incoming frame and the RIF information of the invalid RIF entry are not identical, the old RIF information is replaced by the new information.

Note The **rif validate-enable** commands have no effect on remote entries learned over remote source-route bridging (RSRB).

Examples

The following example enables RIF validation:

```
rif validate-enable-age
```

Related Commands

Command	Description
rif validate-enable	Enables RIF validation for entries learned on an interface (Token Ring or FDDI).

rif validate-enable-route-cache

To enable synchronization of the Routing Information Field (RIF) cache with the protocol route cache, use the **rif validate-enable-route-cache** command in global configuration mode. To disable the specification, use the **no** form of this command.

rif validate-enable-route-cache

no rif validate-enable-route-cache

Syntax Description

This command has no arguments or keywords.

Defaults

Disabled

Command Modes

Global configuration

Command History

Release	Modification
11.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines

When a RIF entry is removed from the RIF cache, or the RIF information in the RIF entry is changed, the protocol route caches are synchronized with the RIF cache.

Note The **rif validate-enable** commands have no effect on remote entries learned over remote source-route bridging (RSRB).

Examples

The following example synchronizes the RIF cache with the protocol route cache:

```
rif validate-enable-route-cache
```

Related Commands

Command	Description
rif validate-enable	Enables RIF validation for entries learned on an interface (Token Ring or FDDI).

show access-expression

To display the defined input and output access list expressions, use the **show access-expression** command in privileged EXEC mode.

show access-expression [**begin** | **include** | **exclude**]

Syntax Description

begin	(Optional) Begin with the access list expression that matches.
include	(Optional) Include access list expressions that match.
exclude	(Optional) Exclude access list expressions that match.

Defaults

Displays all input and output access list expressions.

Command Modes

Privileged EXEC

Command History

Release	Modification
11.3	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Examples

The following is sample output from the **show access-expression** command:

```
Router# show access-expression
Router# interface TokenRing0/0:
        Input:(dmac(701) | ~lsap(202))
```

See the **access-expression** command for a description of the access expressions.

Related Commands

Command	Description
access-expression	Defines an access expression.

show bridge

To display classes of entries in the bridge forwarding database, use the **show bridge** command in privileged EXEC mode.

show bridge [*bridge-group*] [*interface*] [*address* [*mask*]] [**verbose**]

Syntax Description

bridge-group	(Optional) Number that specifies a particular spanning tree.
interface	(Optional) Specific interface, such as Ethernet 0.
address	(Optional) 48-bit canonical (Ethernet ordered) MAC address. This may be entered with an optional mask of bits to be ignored in the address, which is specified with the *mask* argument.
mask	(Optional) Bits to be ignored in the address. You must specify the *address* argument if you want to specify a mask.
verbose	(Optional) Displays additional detail, including any Frame Relay data-link connection identifier (DLCI) associated with a station address.

Command Modes

Privileged EXEC

Command History

Release	Modification
10.0	This command was introduced.
11.0	The **verbose** keyword was added.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines

This command first appeared in Cisco IOS Release 10.0. The **verbose** keyword first appeared in Cisco IOS Release 11.0.

The following are possible variations of the **show bridge** command:

```
show bridge ethernet 0
show bridge 0000.0c00.0000 0000.00FF.FFFF
show bridge 0000.0c00.0e1a
show bridge
show bridge verbose
```

In the sample output, the first command would display all entries for hosts reachable via Ethernet interface 0, the second command would display all entries with the vendor code of 0000.0c00.0000, and the third command would display the entry for address 0000.0c00.0e1a. In the fourth command, all entries in the forwarding database would be displayed. The fifth command provides additional detail. In all five lines, the bridge group number has been omitted.

Examples

The following is sample output from the **show bridge** command. The second display is output from the **show bridge** command with the **verbose** argument.

```
Router# show bridge

Total of 300 station blocks, 280 free
Codes: P - permanent, S - self

Bridge Group 32:Bridge Group 32:

    Address       Action   Interface       Age   RX count   TX count
0180.c200.0000   receive       -            S           0          0
ffff.ffff.ffff   receive       -            S           0          0
0900.2b01.0001   receive       -            S           0          0
0300.0c00.0001   receive       -            S           0          0
0000.0c05.1000   forward   Ethernet0/1      4           1          0
0000.0c04.4b5b   receive       -            S           0          0
0000.0c04.4b5e   receive       -            S           0          0
0000.0c04.4b5d   receive       -            S           0          0
0000.0c04.4b5c   receive       -            S           0          0
0000.0c05.4a62   forward   Ethernet0/1      4           1          0
aa00.0400.2108   forward   Ethernet0/1      0          42          0
0000.0c12.b888   forward   Ethernet0/2      4           1          0
0000.0c12.b886   forward   Ethernet0/1      4           1          0
aa00.0400.4d09   forward   Ethernet0/1      4           1          0
0000.0c06.fb9a   forward   Ethernet0/1      4           1          0
0000.0c04.b039   forward   Ethernet0/1      4           1          0

Router# show bridge verbose

Total of 300 station blocks, 287 free
Codes: P - permanent, S - self

BG Hash      Address      Action Interface     DLCI   Age RX count   TX count
32 00/0   0180.c200.0000 receive      -           -     S           0          0
32 00/1   ffff.ffff.ffff receive      -           -     S           0          0
32 01/0   0900.2b01.0001 receive      -           -     S           0          0
32 01/1   0300.0c00.0001 receive      -           -     S           0          0
32 10/0   0000.0c04.4b5b receive      -           -     S           0          0
32 15/0   0000.0c04.4b5e receive      -           -     S           0          0
32 16/0   0000.0c04.4b5d receive      -           -     S           0          0
32 17/0   0000.0c04.4b5c receive      -           -     S           0          0
32 29/0   aa00.0400.2108 forward  Ethernet0/1     -     0          48          0
32 30/0   0000.0c12.b888 forward  Ethernet0/2     -     0           1          0
32 A4/0   0800.2002.ff5b forward  Ethernet0/1     -     0           6          0
32 E2/0   aa00.0400.e90b forward  Ethernet0/1     -     0          65          0
32 F2/0   0000.0c04.b042 forward  Ethernet0/2     -     3           2          0
```

Table 14 describes the significant fields shown in the display.

Table 14 show bridge Field Descriptions

Field	Description
Total of 300 station blocks	Total number of forwarding database elements in the system. The memory to hold bridge entries is allocated in blocks of memory sufficient to hold 300 individual entries. When the number of free entries falls below 25, another block of memory sufficient to hold another 300 entries is allocated. Therefore, the size of the bridge forwarding database is limited to the amount of free memory in the router.
295 free	Number in the free list of forwarding database elements in the system. The total number of forwarding elements is expanded dynamically, as needed.
BG	Bridging group to which the address belongs.
Hash	Hash key/relative position in the keyed list.
Address	Canonical (Ethernet ordered) MAC address.
Action	Action to be taken when that address is looked up; choices are to discard or forward the datagram.
Interface	Interface, if any, on which that address was seen.
Age	Number of minutes since a frame was received from or sent to that address. The letter “P” indicates a permanent entry. The letter “S” indicates the system as recorded by the router. On the modular systems, this is typically the broadcast address and the router’s own hardware address; on the IGS, this field will also include certain multicast addresses.
RX count	Number of frames received from that address.
TX count	Number of frames forwarded to that address.

show bridge circuit-group

To display the interfaces configured in each circuit group and show whether they are currently participating in load distribution, use the **show bridge circuit-group** command in user EXEC or privileged EXEC mode.

show bridge [*bridge-group*] **circuit-group** [*circuit-group*] [*src-mac-address*] [*dst-mac-address*]

Syntax Description

bridge-group	(Optional) Number that specifies a particular bridge group.
circuit-group	(Optional) Number that specifies a particular circuit group.
src-mac-address	(Optional) 48-bit canonical (Ethernet ordered) source MAC address.
dst-mac-address	(Optional) 48-bit canonical (Ethernet ordered) destination MAC address.

Command Modes

User EXEC
Privileged EXEC

Command History

Release	Modification
10.3	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Examples

The following is sample output from various **show bridge circuit-group** command strings:

```
Router# show bridge circuit-group

Bridge group 1 Circuit group 1:
    Interface Serial0 : inserted, learning, forwarding
    Interface Serial3 : inserted, learning, forwarding
Bridge group 1 Circuit group 2:
    Interface Serial2 : inserted, learning, forwarding

Router# show bridge 1 circuit-group 1

Bridge group 1 Circuit group 1:
    Interface Serial0 : inserted, learning, forwarding
    Interface Serial3 : inserted, learning, forwarding

Router# show bridge 1 circuit-group 2

Bridge group 1 Circuit group 2:
    Interface Serial2 : inserted, learning, forwarding

Router# show bridge 1 circuit-group 1 0000.6502.23EA 0000.1234.4567

Output circuit group interface is Serial3
```

```
Router# show bridge 1 circuit-group 1 0000.6502.23EA

%Destination MAC address required

Router# show bridge 1 circuit-group 1

Bridge group 1 Circuit group 1:
    Transmission pause interval is 250ms
    Output interface selection is source-based
    Interface Serial0 : inserted, learning, forwarding
    Interface Serial3 : inserted, learning, forwarding
    Interface Serial2 is unavailable

Router# show bridge 1 circuit-group 1 0000.6502.23EA 0000.1234.4567

%Please enter source MAC address only
```

Table 15 describes the significant fields shown in the display.

Table 15 show bridge circuit-group Field Descriptions

Field	Description
inserted	Indicates whether this interface is included or not included in circuit-group operation. If the interface is administratively down, or if line protocol is not up, the interface is not included in the circuit-group operation.
learning	Indicates whether this interface is in Spanning Tree Protocol (IEEE or Digital) learning or not learning state.
forwarding	Indicates whether this port is in Spanning Tree Protocol (IEEE or Digital) forwarding or not forwarding state.

show bridge group

To display the status of each bridge group, use the **show bridge group** command in privileged EXEC mode.

show bridge group [**verbose**]

Syntax Description

verbose	(Optional) Displays detailed information.

Command Modes

Privileged EXEC

Command History

Release	Modification
10.3	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Examples

The following is sample output from the **show bridge group** command:

```
Router# show bridge group

Bridge Group 1 is running the DEC compatible Spanning Tree Protocol

   Port 7 (ATM0.1 LANE Ethernet) of bridge group 1 is down
   Port 4 (TokenRing0) of bridge group 1 is forwarding
```

"Forwarding" and "down" indicate the port state as determined by the spanning-tree algorithm or via configuration.

The following examples are for bridge group 30 and bridge group 40 of a PA-12E/2FE port adapter in slot 3:

```
Router# show bridge group

Bridge Group 30 is running the IEEE compatible Spanning Tree Protocol
   Port 19 (Fast Ethernet3/0) of bridge group 30 is forwarding
   Port 20 (Fast Ethernet3/1) of bridge group 30 is forwarding
   Port 21 (Ethernet3/2) of bridge group 30 is forwarding
   Port 22 (Ethernet3/3) of bridge group 30 is forwarding
   Port 23 (Ethernet3/4) of bridge group 30 is forwarding
   Port 24 (Ethernet3/5) of bridge group 30 is forwarding
   Port 25 (Ethernet3/6) of bridge group 30 is forwarding

Bridge Group 40 is running the IEEE compatible Spanning Tree Protocol

   Port 26 (Ethernet3/7) of bridge group 40 is down
   Port 27 (Ethernet3/8) of bridge group 40 is down
   Port 28 (Ethernet3/9) of bridge group 40 is down
   Port 29 (Ethernet3/10) of bridge group 40 is down
```

```
Port 30 (Ethernet3/11) of bridge group 40 is down
Port 31 (Ethernet3/12) of bridge group 40 is down
Port 32 (Ethernet3/13) of bridge group 40 is down
```

show bridge multicast

To display transparent bridging multicast state information, use the **show bridge multicast** command in user EXEC or privileged EXEC mode.

show bridge [*bridge-group*] **multicast** [**router-ports** | **groups**] [*group-address*]

Syntax Description

bridge-group	(Optional) Bridge group number specified in the **bridge protocol** command.
router-ports	(Optional) Display information for multicast router ports.
groups	(Optional) Display information for multicast groups.
group-address	(Optional) Multicast IP address associated with a specific multicast group.

Command Modes

User EXEC
Privileged EXEC

Command History

Release	Modification
11.2	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Examples

The following is sample output from the **show bridge multicast** command:

```
Router# show bridge multicast

 Multicast router ports for bridge group 1:

  2 multicast router ports
   Fddi2/0         R
   Ethernet0/4     R

 Multicast groups for bridge group 1:

  235.145.145.223            RX count     TX count
   Fddi2/0         R                0            2
   Ethernet0/4     R                0            3
   Ethernet0/3     G                1            0

  235.5.5.5                  RX count     TX count
   Fddi2/0         R                0            2
   Ethernet0/4     R                0            3
   Ethernet0/3     G                1            0

  235.4.4.4                  RX count     TX count
   Fddi2/0         R                0            2
   Ethernet0/4     R                0            3
   Ethernet0/3     G                1            0
```

Table 16 describes the significant fields shown in the display.

Table 16 show bridge multicast Field Descriptions

Field	Description
Multicast router ports for…	List of the multicast router ports by bridge group. Within the bridge group cluster, the display lists the number of multicast router ports and then lists the ports by interface.
Multicast groups for…	List of the multicast groups by bridge group. Within each multicast group, identified by a unique address, the display lists each port by interface name and indicates whether that port is a group member (“G”), a multicast router port (“R”), or both. The receive (RX) and transmit (TX) counts show the number of multicast packets that have been constrained to the multicast group by the bridge.

show bridge vlan

To display virtual LAN subinterfaces, use the **show bridge vlan** command in privileged EXEC mode.

show bridge vlan

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

Command History

Release	Modification
10.3	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Examples

The following is sample output from the **show bridge vlan** command:

```
Router# show bridge vlan

Bridge Group: 50

Virtual LAN Trunking Interface(s):  vLAN Protocol:     vLAN ID:  State

Fddi2/0.1000                        IEEE 802.10        1000      forwarding
Fast Ethernet4/0.500                 Inter Switch Link  500       listening

Virtual LAN Native Interface(s):    State

Ethernet0/1                         forwarding
Serial1/1                           down
```

Table 17 describes the fields shown in the display.

Table 17 show bridge vlan Field Descriptions

Field	Description
Bridge Group	Bridge group to which these interfaces belong.
Virtual LAN Trunking Interface(s)	VLAN interface.
vLAN Protocol)	IEEE 802.10 or Cisco Inter-Switch Link (ISL) encapsulation.
vLAN ID	VLAN identifier that maintains VLAN identities between switches.

Table 17 show bridge vlan Field Descriptions (continued)

Field	Description
State	Spanning-tree port state of the interface.
Virtual LAN Native Interface(s):	Interfaces whose transparently bridged traffic will be propagated only to other LAN segments within the same virtual LAN.

show controllers token (IBM)

To display information about memory management, error counters, and the board itself, use the **show controllers token** command in privileged EXEC mode.

show controllers token

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines

Depending on the board being used, the output from the **show controllers token** command can vary. The **show controllers token** command also displays proprietary information. Thus, the information that the **show controllers token** command displays is of primary use to Cisco Systems technical personnel. Information that is useful to users can be obtained with the **show interfaces tokenring** command, described later.

Examples

The following is sample output from the **show controllers token** command of a CSC-IR or CSC-2R card:

```
Router# show controllers token

TR Unit 0 is board 0 - ring 0

 state 3, dev blk: 0x1D2EBC, mailbox: 0x2100010, sca: 0x2010000
   current address: 0000.3080.6f40, burned in address: 0000.3080.6f40
   current TX ptr: 0xBA8, current RX ptr: 0x800

   Last Ring Status: none

 Stats: soft:0/0, hard:0/0, sig loss:0/0
        tx beacon: 0/0, wire fault 0/0, recovery: 0/0
        only station: 0/0, remote removal: 0/0
   Bridge: local 3330, bnum 1, target 3583
     max_hops 7, target idb: 0x0, not local
   Interface failures: 0 -- Bkgnd Ints: 0
   TX shorts 0, TX giants 0

   Monitor state: (active)
     flags 0xC0, state 0x0, test 0x0, code 0x0, reason 0x0
 f/w ver: 1.0, chip f/w: '000000.ME31100', [bridge capable]
```

```
     SMT form of this command s: 1.01 kernel, 4.02 fastmac
     ring mode: F00, internal enables: SRB REM RPS CRS/NetMgr
     internal functional: 0000011A (0000011A), group: 00000000 (00000000)
     if_state: 1, ints: 0/0, ghosts: 0/0, bad_states: 0/0
     t2m fifo purges: 0/0
     t2m fifo current: 0, t2m fifo max: 0/0, proto_errs: 0/0
     ring: 3330, bridge num: 1, target: 3583, max hops: 7

Packet counts:
       receive total: 298/6197, small: 298/6197, large 0/0
               runts: 0/0, giants: 0/0
               local: 298/6197, bridged: 0/0, promis: 0/0
             bad rif: 0/0, multiframe: 0/0
       ring num mismatch 0/0, spanning violations 0
       transmit total: 1/25, small: 1/25, large 0/0
                runts: 0/0, giants: 0/0, errors 0/0
bad fs: 0/0, bad ac: 0
congested: 0/0, not present: 0/0
     Unexpected interrupts: 0/0, last unexp. int: 0

     Internal controller counts:
    line errors:  0/0, internal errors: 0/0
    burst errors: 0/0, ari/fci errors:  0/0
    abort errors: 0/0, lost frame: 0/0
    copy errors:  0/0, rcvr congestion: 0/0
    token errors: 0/0, frequency errors: 0/0
    dma bus errors: -/-, dma parity errors: -/-
     Internal controller smt state:
    Adapter MAC:     0000.3080.6f40, Physical drop:     00000000
    NAUN Address:    0000.a6e0.11a6, NAUN drop:         00000000
    Last source:     0000.a6e0.11a6, Last poll:         0000.3080.6f40
    Last MVID:       0006,           Last attn code:    0006
    Txmit priority:  0006,           Auth Class:        7FFF
    Monitor Error:   0000,           Interface Errors:  FFFF
    Correlator:      0000,           Soft Error Timer:  00C8
    Local Ring:      0000,           Ring Status:       0000
    Beacon rcv type: 0000,           Beacon txmit type: 0000
    Beacon type:     0000,           Beacon NAUN:       0000.a6e0.11a6
```

Table 18, Part 1 describes the fields shown in the first line of sample output.

Table 18, Part 1 show controllers token Field Descriptions

Field	Description
TR Unit 0	Unit number assigned to the Token Ring interface associated with this output.
is board 0	Board number assigned to the Token Ring controller board associated with this interface.
ring 0	Number of the Token Ring associated with this board.

In the following line, state 3 indicates the state of the board. The rest of this output line displays memory mapping that is of primary use to Cisco engineers.

```
state 3, dev blk: 0x1D2EBC, mailbox: 0x2100010, sca: 0x2010000
```

The following line also appears in **show interface token** output as the address and burned-in address (bia), respectively:

```
current address: 0000.3080.6f40, burned in address: 0000.3080.6f40
```

The following line displays buffer management pointers that change by board:

```
current TX ptr: 0xBA8, current RX ptr: 0x800
```

The following line indicates the ring status from the controller chipset. This information is used by LAN Network Manager:

```
Last Ring Status: none
```

The following line displays Token Ring statistics. See the Token Ring specification for more information:

```
Stats: soft:0/0, hard:0/0, sig loss:0/0
        tx beacon: 0/0, wire fault 0/0, recovery: 0/0
        only station: 0/0, remote removal: 0/0
```

The following line indicates that Token Ring communication has been enabled on the interface. If this line of output appears, the message "Source Route Bridge capable" should appear in the **show interfaces tokenring** display.

```
Bridge: local 3330, bnum 1, target 3583
```

Table 18, Part 2 describes the fields shown in the following line of sample output:

```
max_hops 7, target idb: 0x0, not local
```

Table 18, Part 2 show controllers token Field Descriptions

Field	Description
max_hops 7	Maximum number of bridges.
target idb: 0x0	Destination interface definition.
not local	Interface has been defined as a remote bridge.

The following line is specific to the hardware:

```
Interface failures: 0 -- Bkgnd Ints: 0
```

In the following line, transmit (TX) shorts are the number of packets the interface sends that are discarded because they are smaller than the medium's minimum packet size. TX giants are the number of packets the interface sends that are discarded because they exceed the medium's maximum packet size.

```
TX shorts 0, TX giants 0
```

The following line indicates the state of the controller. Possible values are active, failure, inactive, and reset.

```
Monitor state: (active)
```

The following line displays detailed information relating to the monitor state shown in the previous line of output. This information relates to the firmware on the controller. This information is relevant to Cisco engineers only if the monitor state is something other than active.

```
flags 0xC0, state 0x0, test 0x0, code 0x0, reason 0x0
```

Table 18, Part 3 describes the fields in the following line of output:

```
f/w ver: 1.0 expr 0, chip f/w: '000000.ME31100', [bridge capable]
```

Table 18, Part 3 show controllers token Field Descriptions

Field	Description
f/w ver: 1.0	Version of Cisco firmware on the board.
chip f/w: '000000.ME31100'	Firmware on the chipset.
[bridge capable]	Interface has not been configured for bridging, but it has that capability.

The following line displays the version numbers for the kernel and the accelerator microcode of the Madge firmware on the board; this firmware is the Logical Link Control (LLC) interface to the chipset:

```
SMT form of this command s: 1.01 kernel, 4.02 fastmac
```

The following line displays LAN Network Manager information that relates to ring status:

```
ring mode: F00, internal enables: SRB REM RPS CRS/NetMgr
```

The following line corresponds to the functional address and the group address shown in **show interfaces tokenring** output:

```
internal functional: 0000011A (0000011A), group: 00000000 (00000000)
```

The following line displays interface board state information that is proprietary:

```
if_state: 1, ints: 0/0, ghosts: 0/0, bad_states: 0/0
```

The following lines display information that is proprietary. Our engineers use this information for debugging purposes:

```
t2m fifo purges: 0/0
t2m fifo current: 0, t2m fifo max: 0/0, proto_errs: 0/0
```

Each of the fields in the following line maps to a field in the **show source bridge** display, as follows: ring maps to srn; bridge num maps to bn; target maps to trn; and max hops maps to max:

```
ring: 3330, bridge num: 1, target: 3583, max hops: 7
```

In the following lines of output, the number preceding the slash (/) indicates the count since the value was last displayed; the number following the slash (/) indicates the count since the system was last booted:

```
Packet counts:
       receive total: 298/6197, small: 298/6197, large 0/0
```

In the following line, the number preceding the slash (/) indicates the count since the value was last displayed; the number following the slash (/) indicates the count since the system was last booted. The runts and giants values that appear here correspond to the runts and giants values that appear in **show interfaces tokenring** output:

```
runts: 0/0, giants: 0/0
```

The following lines are receiver-specific information that Cisco engineers can use for debugging purposes:

```
local: 298/6197, bridged: 0/0, promis: 0/0
bad rif: 0/0, multiframe: 0/0
ring num mismatch 0/0, spanning violations 0
transmit total: 1/25, small: 1/25, large 0/0
runts: 0/0, giants: 0/0, errors 0/0
```

The following lines include very specific statistics that are not relevant in most cases, but exist for historical purposes. In particular, the internal errors, burst errors, ari/fci, abort errors, copy errors, frequency errors, dma bus errors, and dma parity errors fields are not relevant.

```
Internal controller counts:
 line errors: 0/0, internal errors: 0/0
 burst errors: 0/0, ari/fci errors: 0/0
 abort errors: 0/0, lost frame: 0/0
 copy errors: 0/0, rcvr congestion: 0/0
 token errors: 0/0, frequency errors: 0/0
 dma bus errors: -/-, dma parity errors: -/-
```

The following lines are low-level Token Ring interface statistics relating to the state and status of the Token Ring with respect to all other Token Rings on the line:

```
Internal controller smt state:
 Adapter MAC:     0000.3080.6f40, Physical drop:     00000000
 NAUN Address:    0000.a6e0.11a6, NAUN drop:         00000000
 Last source:     0000.a6e0.11a6, Last poll:         0000.3080.6f40
 Last MVID:       0006,           Last attn code:    0006
 Txmit priority:  0006,           Auth Class:        7FFF
 Monitor Error:   0000,           Interface Errors:  FFFF
 Correlator:      0000,           Soft Error Timer:  00C8
 Local Ring:      0000,           Ring Status:       0000
 Beacon rcv type: 0000,           Beacon txmit type: 0000
```

show drip

To display the status of the duplicate ring protocol (DRiP) database for a router or Route Switch Module (RSM), use the **show drip** command in privileged EXEC mode.

show drip

Syntax Descriptions

This command has no arguments or keywords.

Defaults

No default behavior or values.

Command Modes

Privileged EXEC

Command History

Release	Modification
11.3(4)T	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Examples

The following is sample output from the **show drip** command:

```
Router# show drip

DRIP Database for Mgmt Domain Fast Ethernet4/0
---------------------------------------------
Mac Address 0010-A6AE-B440
Vlan     100    Status    30 : l-active, l-config,

Mac Address 0010-2F72-C800
Vlan      20    Status    0C : r-active, r-config,
Vlan    1003    Status    0C : r-active, r-config,

Statistics:
Advertisements received            126
Advertisements processed           1
Advertisements transmitted         131
Last revision transmitted          0x84
Last changed revision transmitted  0x2
```

Related Commands

Command	Description
clear drip counters	Clears DRiP counters.
interface vlan	Configures a Token Ring or Ethernet interface on the RSM.
show vlans	Displays virtual LAN subinterfaces.

show interfaces crb

To display the configuration for each interface that has been configured for routing or bridging, use the **show interfaces crb** command in privileged EXEC mode.

show interfaces crb

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

Command History

Release	Modification
11.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Examples

The following is sample output from the **show interfaces crb** command:

```
Router# show interfaces crb

Ethernet0/0

Routed protocols on Ethernet0/0:
appletalk decnet ip novell

Ethernet0/1

Routed protocols on Ethernet0/1:
appletalk  decnet  ip  novell

Ethernet0/2

Routed protocols on Ethernet0/2:
appletalk  ip

Bridged protocols on Ethernet0/2:
clns  decnet  vines  apollo
novell  xns

Software MAC address filter on Ethernet0/2
Hash Len   Address         Matches   Act   Type
0x00: 0    ffff.ffff.ffff  0         RCV   Physical broadcast
0x00: 1    ffff.ffff.ffff  0         RCV   Appletalk zone
0x2A: 0    0900.2b01.0001  0         RCV   DEC spanning tree
0x49: 0    0000.0c36.7a45  0         RCV   Interface MAC address
0xc0: 0    0100.0ccc.cccc  20        RCV   CDP
0xc2: 0    0180.c200.0000  0         RCV   IEEE spanning tree
0xF8: 0    0900.07ff.ffff  0         RCV   Appletalk broadcast
```

```
Ethernet0/3

Routed protocols on Ethernet0/3:
appletalk  ip

Bridged protocols on Ethernet0/3:
clns  decnet  vines  apollo
novell  xns

Software MAC address filter on Ethernet0/3
Hash Len   Address         Matches   Act   Type
0x00: 0    ffff.ffff.ffff  0         RCV   Physical broadcast
0x00: 1    ffff.ffff.ffff  0         RCV   Appletalk zone
0x2A: 0    0900.2b01.0001  0         RCV   DEC spanning tree
0x49: 0    0000.0c36.7a45  0         RCV   Interface MAC address
0xc0: 0    0100.0ccc.cccc  48        RCV   CDP
0xc2: 0    0180.c200.0000  0         RCV   IEEE spanning tree
0xF8: 0    0900.07ff.ffff  0         RCV   Appletalk broadcast
```

Table 19 describes the significant fields shown in the display.

Table 19 show interfaces crb Field Descriptions

Field	Description
Routed protocols on…	List of the routed protocols configured for the specified interface.
Bridged protocols on…	List of the bridged protocols configured for the specified interface.
Software MAC address filter on…	Table of software MAC address filter information for the specified interface.
Hash	Hash key/relative position in the keyed list for this MAC-address entry.
Len	Length of this entry to the beginning element of this hash chain.
Address	Canonical (Ethernet ordered) MAC address.
Matches	Number of received packets matched to this MAC address.
Act	Action to be taken when that address is looked up; choices are to receive or discard the packet.
Type	MAC address type.

show interfaces irb

To display the configuration for each interface that has been configured for integrated routing or bridging, use the **show interfaces irb** command in privileged EXEC mode.

show interfaces {**ethernet** | **fastethernet**} [*interface* | *slot*/*port*] **irb**

Syntax Description

ethernet	Specify Ethernet interface.
fastethernet	Specify Fast Ethernet interface.
interface	(Optional) Specific interface, such as Ethernet 0.
slot/*port*	(Optional) Specific slot and port, such as Fast Ethernet 3/0.

Command Modes

Privileged EXEC

Command History

Release	Modification
11.2	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Examples

The following is sample output from the **show interfaces irb** command:

```
Router# show interfaces ethernet 2 irb

Ethernet 2

Routed protocols on Ethernet 2:
appletalk ip

Bridged protocols on Ethernet 2:
appletalk   clns   decnet   vines
apollo      ipx    xns

Software MAC address filter on Ethernet 2
Hash Len  Address         Matches  Act   Type
0x00: 0   ffff.ffff.ffff  4886     RCV   Physical broadcast
0x1F: 0   0060.3e2b.a221  7521     RCV   Appletalk zone
0x1F: 1   0060.3e2b.a221  0        RCV   Bridge-group Virtual Interface
0x2A: 0   0900.2b01.0001  0        RCV   DEC spanning tree
0x05: 0   0900.0700.00a2  0        RCV   Appletalk zone
0xC2: 0   0180.c200.0000  0        RCV   IEEE spanning tree
0xF8: 0   0900.07ff.ffff  2110     RCV   Appletalk broadcast
```

The following example shows that IP is configured for the first PA-12E/2FE interface of the port adapter in slot 3:

```
Router# show interfaces fastethernet 3/0 irb

Fast Ethernet3/0
```

```
Routed protocols on Fast Ethernet3/0:
 ip

Bridged protocols on Fast Ethernet3/0:
 appletalk  clns       decnet     ip
 vines      apollo     ipx        xns

Software MAC address filter on Ethernet3/0
 Hash Len    Address      Matches  Act      Type
 0x00:  0 ffff.ffff.ffff         0 RCV Physical broadcast
 0x2A:  0 0900.2b01.0001         0 RCV DEC spanning tree
 0xC2:  0 0180.c200.0000         0 RCV IEEE spanning tree
 0xC7:  0 00e0.f7a4.5130         0 RCV Interface MAC address
 0xC7:  1 00e0.f7a4.5130         0 RCV Bridge-group Virtual Interface
```

Table 20 describes the significant fields shown in the displays.

Table 20 show interfaces irb Field Descriptions

Field	Description
Routed protocols on…	List of the routed protocols configured for the specified interface.
Bridged protocols on…	List of the bridged protocols configured for the specified interface.
Software MAC address filter on…	Table of software MAC address filter information for the specified interface.
Hash	Hash key/relative position in the keyed list for this MAC-address entry.
Len	Length of this entry to the beginning element of this hash chain.
Address	Canonical (Ethernet ordered) MAC address.
Matches	Number of received packets matched to this MAC address.
Act	Action to be taken when that address is looked up; choices are to receive or discard the packet.
Type	MAC address type.

show interfaces tokenring (IBM)

To display information about the Token Ring interface and the state of source-route bridging (SRB), use the **show interfaces tokenring** command in privileged EXEC mode.

show interfaces tokenring [*number*]

Syntax Description

number	(Optional) Interface number. If you do not provide a value, the command will display statistics for all Token Ring interfaces.

Command Modes

Privileged EXEC

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Examples

The following is sample output from the **show interfaces tokenring** command:

```
Router# show interfaces tokenring

TokenRing 0 is up, line protocol is up
Hardware is 16/4 Token Ring, address is 5500.2000.dc27 (bia 0000.3000.072b)
   Internet address is  10.136.230.203, subnet mask is 255.255.255.0
   MTU 8136 bytes, BW 16000 Kb, DLY 630 usec, rely 255/255, load 1/255
   Encapsulation SNAP, loopback not set, keepalive set (10 sec)
   ARP type: SNAP, ARP Timeout 4:00:00
   Ring speed: 16 Mbps
   Single ring node, Source Route Bridge capable
   Group Address: 0x00000000, Functional Address: 0x60840000
   Last input 0:00:01, output 0:00:01, output hang never
   Output queue 0/40, 0 drops; input queue 0/75, 0 drops
   Five minute input rate 0 bits/sec, 0 packets/sec
   Five minute output rate 0 bits/sec, 0 packets/sec
   16339 packets input, 1496515 bytes, 0 no buffer
        Received 9895 broadcasts, 0 runts, 0 giants
        0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
     32648 packets output, 9738303 bytes, 0 underruns
0 output errors, 0 collisions, 2 interface resets, 0 restarts
     5 transitions
```

Table 21 describes the significant fields shown in the display.

Table 21 show interfaces tokenring Field Descriptions

Field	Description
Token Ring is up	Interface is currently active and inserted into ring (up) or inactive and not inserted (down).
Token Ring is Reset	Hardware error has occurred. This is not in the sample output; it is informational only.
Token Ring is Initializing	Hardware is up, in the process of inserting the ring. This is not in the sample output; it is informational only.
Token Ring is Administratively Down	Hardware has been taken down by an administrator. This is not in the sample output; it is informational only. "Disabled" indicates the Cisco IOS software has received over 5000 errors in a keepalive interval, which is 10 seconds by default.
line protocol is up	Indicates whether the software processes that handle the line protocol believe the interface is usable (that is, whether keepalives are successful).
Hardware	Specifies the hardware type. "Hardware is ciscoBus Token Ring" indicates that the board is a CSC-C2CTR board. "Hardware is 16/4 Token Ring" indicates that the board is a CSC-1R, CSC-2R, or a CSC-R16M board. Also shows the address of the interface.
Internet address	Lists the Internet address followed by the subnet mask.
MTU	Maximum transmission unit of the interface.
BW	Bandwidth of the interface in kilobits per second.
DLY	Delay of the interface in microseconds.
rely	Reliability of the interface as a fraction of 255 (255/255 is 100 percent reliability), calculated as an exponential average over 5 minutes.
load	Load on the interface as a fraction of 255 (255/255 is completely saturated), calculated as an exponential average over 5 minutes.
Encapsulation	Encapsulation method assigned to interface.
loopback	Indicates whether loopback is set.
keepalive	Indicates whether keepalives are set.
ARP type	Type of Address Resolution Protocol assigned.
Ring speed	Speed of Token Ring—4 or 16 Mbps.
Single ring node	Indicates whether a node is enabled to collect and use source RIF for routable Token Ring protocols.
Group Address	Interface's group address, if any. The group address is a multicast address; any number of interfaces on the ring may share the same group address. Each interface may have at most one group address.
Functional Address	Bit-significant group address. Each "on" bit represents a function performed by the station.

Table 21 show interfaces tokenring Field Descriptions (continued)

Field	Description
Last input	Number of hours, minutes, and seconds since the last packet was received by an interface. Useful for knowing when a dead interface failed.
output hang	Number of hours, minutes, and seconds (or never) since the interface was last reset because the data took too long to send. When the number of hours in any of the "last" fields exceeds 24 hours, the number of days and hours is printed. If that field overflows, asterisks are printed.
Output queue, drops input queue, drops	Number of packets in output and input queues. Each number is followed by a slash, the maximum size of the queue, and the number of packets dropped due to a full queue.
Five minute input rate, Five minute output rate	Average number of bits and packets sent per second in the last 5 minutes.
packets input	Total number of error-free packets received by the system.
broadcasts	Total number of broadcast or multicast packets received by the interface.
runts	Number of packets that are discarded because they are smaller than the medium's minimum packet size.
giants	Number of packets that are discarded because they exceed the medium's maximum packet size.
CRC	Cyclic redundancy check (CRC) generated by the originating LAN station or far-end device does not match the checksum calculated from the data received. On a LAN, this usually indicates noise or problems sending data on the LAN interface or the LAN bus itself. A high number of CRCs is usually the result of a station sending bad data.
frame	Number of packets received incorrectly having a CRC error and a noninteger number of octets.
overrun	Number of times the serial receiver hardware was unable to hand received data to a hardware buffer because the input rate exceeded the receiver's ability to handle the data.
ignored	Number of received packets ignored by the interface because the interface hardware ran low on internal buffers. These buffers are different than the system buffers mentioned previously in the buffer description. Broadcast storms and bursts of noise can cause the ignored count to be increased.
packets output	Total number of messages sent by the system.
bytes	Total number of bytes, including data and MAC encapsulation, sent by the system.
underruns	Number of times that the far-end sender has been running faster than the near-end router's receiver can handle. This may never be reported on some interfaces.

Table 21 show interfaces tokenring Field Descriptions (continued)

Field	Description
output errors	Sum of all errors that prevented the final sending of datagrams out of the interface being examined. Note that this may not balance with the sum of the enumerated output errors, because some datagrams may have more than one error, and others may have errors that do not fall into any of the specifically tabulated categories.
collisions	Because a Token Ring cannot have collisions, this statistic is nonzero only if an unusual event occurred when frames were being queued or dequeued by the system software.
interface resets	Number of times an interface has been reset. The interface may be reset by the administrator or automatically when an internal error occurs.
restarts	Should always be zero for Token Ring interfaces.
transitions	Number of times the ring made a transition from up to down, or vice versa. A large number of transitions indicates a problem with the ring or the interface.

show lnm bridge

Note Effective with Cisco IOS Release 12.3(4)T, the **show lnm bridge** command is not available in Cisco IOS 12.3T software.

To display all currently configured bridges and all parameters that are related to the bridge as a whole, not to one of its interfaces, use the **show lnm bridge** command in privileged EXEC mode.

show lnm bridge

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

Command History

Release	Modification
10.0	This command was introduced.
12.3(4)T	This command was removed.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Examples

The following is sample output from the **show lnm bridge** command:

```
Router# show lnm bridge

Bridge 001-2-003, Ports 0000.3000.abc4, 0000.0028.abcd
Active Links: 0000.0000.0000 0000.0000.0000 0000.0000.0000 0000.0000.0000
Notification: 0 min, Threshold 00.10%
```

Table 22 describes the significant fields shown in the display.

Table 22 show lnm bridge Field Descriptions

Field	Description
Bridge 001-2-003	Ring and bridge numbers of this bridge.
Ports 0000.3000.abc4....	MAC addresses of the two interfaces of this bridge.
Active Links:	Any LAN Network Manager (LNM) stations that are connected to this bridge. An entry preceded by an asterisk is the controlling LNM.
Notification: 0 min	Current counter notification interval in minutes.
Threshold 00.10%	Current loss threshold (in percent) that will trigger a message to the LNM.

show lnm config

Note Effective with Cisco IOS Release 12.3(4)T, the **show lnm config** command is not available in Cisco IOS 12.3T software.

To display the logical configuration of all bridges configured in a router, use the **show lnm config** command in privileged EXEC mode. This information is needed to configure an LAN Network Manager (LNM) Management Station to communicate with a router. This is especially important when the router is configured as a multiport bridge, thus employing the concept of a virtual ring.

show lnm config

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

Command History

Release	Modification
10.0	This command was introduced.
12.3(4)T	This command was removed.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Examples

The following is sample output from the **show lnm config** command for a simple two-port bridge:

```
Router# show lnm config

Bridge(s) currently configured:

           From     ring 001, address 0000.3000.abc4
           Across bridge 002
           To       ring 003, address 0000.0028.abcd
```

The following is sample output from the **show lnm config** command for a multiport bridge:

```
Router# show lnm config

Bridge(s) currently configured:

           From     ring 001, address 0000.0028.abc4
           Across bridge 001
           To       ring 008, address 4000.0028.abcd

           From     ring 002, address 0000.3000.abc4
           Across bridge 002
           To       ring 008, address 4000.3000.abcd
```

```
From     ring 003, address 0000.3000.5735
Across bridge 003
To       ring 008, address 4000.3000.5735
```

Table 23 describes the significant fields shown in the display.

Table 23 show lnm config Field Descriptions

Field	Description
From ring 001	Ring number of the first interface in the two-port bridge.
address 0000.3000.abc4	MAC address of the first interface in the two-port bridge.
Across bridge 002	Bridge number assigned to this bridge.
To ring 003	Ring number of the second interface in the two-port bridge.
address 0000.0028.abcd	MAC address of the second interface in the two-port bridge.

show lnm interface

Note Effective with Cisco IOS Release 12.3(4)T, the **show lnm interface** command is not available in Cisco IOS 12.3T software.

To display all LAN Network Manager (LNM)-related information about a specific interface or all interfaces, use the **show lnm interface** command in privileged EXEC mode.

show lnm interface [*type number*]

Syntax Description

type	(Optional) Interface type.
number	(Optional) Interface number.

Defaults

The *type* argument is not specified, information about all interface types is displayed.
If *number* is not specified, information about all interface numbers is displayed.

Command Modes

Privileged EXEC

Command History

Release	Modification
10.0	This command was introduced.
12.3(4)T	This command was removed.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines

This command is for all types of interfaces, including Token Ring interfaces. If you want information specific to Token Ring, use the **show lnm ring** command.

Examples

The following is sample output from the **show lnm interface** command:

```
Router# show lnm interface

 nonisolating error counts
interface  ring   Active Monitor  SET   dec   lost   cong.  fc    freq.token
TokenRing1 0001*  1000.5a98.23a0  00200 00001 00000  00000  00000 0000000002

Notification flags: FE00, Ring Intensive: FFFF, Auto Intensive: FFFF
Active Servers: LRM LBS REM RPS CRS
Last NNIN:   never, from 0000.0000.0000.
Last Claim:  never, from 0000.0000.0000.
Last Purge:  never, from 0000.0000.0000.
Last Beacon: never, 'none' from 0000.0000.0000.
```

```
Last MonErr: never, 'none' from 0000.0000.0000.

                isolating error counts
station         int ring   loc.   weight line   inter  burst  ac    abort
1000.5a98.23a0  T1  0001   0000   00 - N00000   00000  00000  00000 00000
1000.5a98.239e  T1  0001   0000   00 - N00000   00000  00000  00000 00000
1000.5a6f.bc15  T1  0001   0000   00 - N00000   00000  00000  00000 00000
0000.3000.abc4  T1  0001   0000   00 - N00000   00000  00000  00000 00000
1000.5a98.239f  T1  0001   0000   00 - N00000   00000  00000  00000 00000
```

Table 24 describes the significant fields shown in the display. See the **show lnm station** command for a description of the fields that follow after the "isolating error counts" line in the sample output.

Table 24 show lnm interface Field Descriptions

Field	Description
interface	Interface about which information was requested.
ring	Number assigned to that Token Ring. An asterisk following the ring number indicates that stations with nonzero error counters are present on that ring.
Active Monitor	Address of the station that is providing "Active Monitor" functions to the ring. The description of this server can be found in the *IBM Token Ring Architecture Reference Manual.*
SET	Current soft error reporting time for the ring in units of tens of milliseconds.
dec	Rate at which the various counters of nonisolating errors are being decreased. This number is in errors per 30 seconds.
lost, cong., fc, freq.token	Current values of the five nonisolating error counters specified in the 802.5 specification. These are Lost Frame errors, Receiver Congestion errors, FC errors, Frequency errors, and Token errors.
Notification flags:	Representation of which types of ring errors are being reported to LNM. The description of this number can be found in the *IBM Token Ring Architecture Reference Manual.*
Ring Intensive:	Representation of which specific ring error messages are being reported to LNM when in the "Ring Intensive" reporting mode. The description of this number can be found in the *IBM Token Ring Architecture Reference Manual.*
Auto Intensive:	Representation of which specific ring error messages are being reported to LNM when in the "Auto Intensive" reporting mode. The description of this number can be found in the *IBM Token Ring Architecture Reference Manual.*

Table 24 show lnm interface Field Descriptions (continued)

Field	Description
Active Servers:	A list of which servers are active on this Token Ring. The acronyms and their meanings are as follows: • CRS—Configuration Report Server • LRM—LAN Reporting Manager • LBS—LAN Bridge Server • REM—Ring Error Monitor • RPS—Ring Parameter Server The description of these servers can be found in the *IBM Token Ring Architecture Reference Manual*.
Last NNIN:	Time since the last "Neighbor Notification Incomplete" frame was received, and the station that sent this message.
Last Claim:	Time since the last "Claim Token" frame was received, and the station that sent this message.
Last Purge:	Time since the last "Purge Ring" frame was received, and the station that sent this message.
Last Beacon:	Time since the last "Beacon" frame was received, the type of the last beacon frame, and the station that sent this message.
Last Mon Err:	Time since the last "Report Active Monitor Error" frame was received, the type of the last monitor error frame, and the station that sent this message.

Related Commands

Command	Description
show lnm ring	Displays all LNM information about a specific Token Ring or all Token Rings.
show lnm station	Displays LNM-related information about a specific station or all known stations on all rings.

show lnm ring

Note Effective with Cisco IOS Release 12.3(4)T, the **show lnm ring** command is not available in Cisco IOS 12.3T software.

To display all LAN Network Manager (LNM) information about a specific Token Ring or all Token Rings, use the **show lnm ring** command in privileged EXEC mode.

show lnm ring [*ring-number*]

Syntax Description

ring-number	(Optional) Number of a specific Token Ring. It can be a value in the range from 1 to 4095.

Defaults

If the *ring-number* argument is not specified, information about all Token Rings is displayed.

Command Modes

Privileged EXEC

Command History

Release	Modification
10.0	This command was introduced.
12.3(4)T	This command was removed.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines

If a specific interface is requested, it also displays a list of all active stations on that interface.

The output of this command is the same as the output of the **show lnm interface** command. See the **show lnm interface** and **show lnm station** commands for sample output and a description of the fields. The same information can be obtained by using the **show lnm interface** command, but instead of specifying an interface number, you specify a ring number as an argument.

Related Commands

Command	Description
show lnm interface	Displays all LNM-related information about a specific interface or all interfaces.
show lnm station	Displays LNM-related information about a specific station or all known stations on all rings.

show lnm station

Note Effective with Cisco IOS Release 12.3(4)T, the **show lnm station** command is not available in Cisco IOS 12.3T software.

To display LAN Network Manager (LNM)-related information about a specific station or all known stations on all rings, use the **show lnm station** command in privileged EXEC mode

show lnm station [*address*]

Syntax Description

address	(Optional) Address of a specific LNM station.

Command Modes

Privileged EXEC

Command History

Release	Modification
11.0	This command was introduced.
12.3(4)T	This command was removed.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines

If a specific station is requested, it also displays a detailed list of that station's current MAC-level parameters.

Examples

The following is sample output from the **show lnm station** command when a particular address has been specified:

```
Router# show lnm station 1000.5a6f.bc15

                                          isolating error counts
    station      int  ring  loc.   weight   line  inter burst   ac  abort
1000.5a6f.bc15    T1  0001  0000   00 - N   00000 00000 00000 00000 00000

Unique ID:  0000.0000.0000          NAUN: 0000.3000.abc4
Functional: C000.0000.0000         Group: C000.0000.0000
Physical Location:   00000        Enabled Classes:  0000
Allowed Priority:    00000        Address Modifier: 0000
Product ID:     00000000.00000000.00000000.00000000.0000
Ucode Level:    00000000.00000000.0000
Station Status: 00000000.0000
Last transmit status: 00
```

Table 25 describes the significant fields shown in the display.

Table 25 show lnm station Field Descriptions

Field	Description
station	MAC address of the given station on the Token Ring.
int	Interface used to reach the given station.
ring	Number of the Token Ring where the given station is located.
loc.	Physical location number of the given station.
weight	Weighted accumulation of the errors of the given station, and of its nearest active upstream neighbor (NAUN). The three possible letters and their meanings are as follows:[1] • N—not in a reported error condition. • P—in a "preweight" error condition. • W—in a "preweight" error condition.
isolating error counts	Current values of the five isolating error counters specified in the 802.5 specification. These are Line errors, Internal errors, Burst errors, AC errors, and Abort errors.
Values below this point will be zero unless the LNM has previously requested this information.	
Unique ID:	Uniquely assigned value for this station.
NAUN:	MAC address of this station's "upstream" neighbor.
Functional:	MAC-level functional address currently in use by this station.
Group:	MAC-level group address currently in use by this station.
Physical Location:	Number assigned to this station as its "Physical Location" identifier.
Enabled Classes:	Functional classes that the station is allowed to send.
Allowed Priority:	Maximum access priority that the station may use when sending onto the Token Ring.
Address Modifier:	Reserved field.
Product ID:	Encoded 18-byte string used to identify what hardware and software combination is running on this station.
Ucode Level:	10-byte extended binary coded decimal interchange code (EBCDIC) string indicating the microcode level of the station.
Station Status:	Implementation-dependent vector that is not specified anywhere.
Last transmit status:	Contains the strip status of the last "Report Transmit Forward" MAC frame forwarded by this interface.

1. The description of these error conditions can be found in the *IBM Architecture Reference Manual*.

show netbios-cache

To display a list of NetBIOS cache entries, use the **show netbios-cache** command in privileged EXEC mode.

show netbios-cache

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Examples

The following is sample output from the **show netbios-cache** command:

```
Router# show netbios-cache

  HW Addr          Name            How       Idle      NetBIOS Packet Savings
1000.5a89.449a     IC6W06_B        TR1       6         0
1000.5a8b.14e5     IC_9Q07A        TR1       2         0
1000.5a25.1b12     IC9Q19_A        TR1       7         0
1000.5a25.1b12     IC9Q19_A        TR1       10        0
1000.5a8c.7bb1     BKELSA1         TR1       4         0
1000.5a8b.6c7c     ICELSB1         TR1       -         0
1000.5a31.df39     ICASC_01        TR1       -         0
1000.5ada.47af     BKELSA2         TR1       10        0
1000.5a8f.018a     ICELSC1         TR1       1         0
```

Table 26 describes the significant fields shown in the display.

Table 26 show netbios-cache Field Descriptions

Field	Description
HW Addr	MAC address mapped to the NetBIOS name in this entry.
Name	NetBIOS name mapped to the MAC address in this entry.
How	Interface through which this information was learned.
Idle	Period of time (in seconds) since this entry was last accessed. A hyphen in this column indicates it is a static entry in the NetBIOS name cache.
NetBIOS Packet Savings	Number of packets to which local replies were made (thus preventing sending of these packets over the network).

Related Commands

Command	Description
netbios name-cache	Defines a static NetBIOS name cache entry, tying the server with the name netbios-name to the mac-address, and specifying that the server is accessible either locally through the interface-name specified, or remotely through the ring-group group-number specified.
netbios name-cache timeout	Enables NetBIOS name caching and sets the time that entries can remain in the NetBIOS name cache.

show pxf cpu statistics

To display parallel express forwarding (PXF) central processing unit (CPU) statistics for a configured router, use the **show pxf cpu statistics** command in privilege EXEC mode.

show pxf cpu statistics [**crtp** | **diversion** | **drop** | **ip** | **mlp** | **qos** | **spd**]

Syntax Description

crtp	(Optional) IP header compression statistics.
diversion	(Optional) Packets that need to be bridged, as well as control packets such as Spanning Tree Protocol (STP) and Virtual Router Redundancy Protocol (VRRP), that are not processed by PXF and are diverted to a route processor (RP).
drop	(Optional) Packets that are dropped by the PXF.
ip	(Optional) IP statistics.
mlp	(Optional) Multilink PPP (MLP) statistics.
qos	(Optional) Quality of Service (QoS) statistics.
spd	(Optional) Multicast Selective Packet Discard (SPD) statistics.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.2	This command was introduced.
12.3(14)T	This command was enhanced to include counters for Integrated Routing and Bridging (IRB) functionality.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Examples

The following is sample output from the **show pxf cpu statistics** command for diversion statistics:

```
Router# show pxf cpu statistics diversion

Diversion Cause Stats:
 local     = 31
 dest      = 0
 option    = 0
 protocol  = 0
 encap     = 0
 oam f5    = 149
 oam f4    = 0
 atm ilmi  = 0
 comp      = 0
 ip_sanity = 0
 ip_bcast  = 0
 ip_dest   = 0
 fib_punt  = 0
```

```
 mtu       = 0
 arp       = 1
 rarp      = 0
 icmp      = 0
 divert    = 0
 no_group  = 0
 direct    = 0
 local_mem = 0
 p2p_prune = 0
 assert    = 0
 dat_prune = 0
 join_spt  = 0
 null_out  = 0
 igmp      = 0
 register  = 0
 no_fast   = 0
 ipc_resp  = 0
 keepalive = 0
 min_mtu   = 0
 icmp_frag = 0
 icmp_bad  = 0
 mpls_ttl  = 0
 tfib      = 0
 multicast = 0
 clns_isis = 0
 ppp_cntrl = 0
 tun_norte = 0
 tun_nofrg = 0
 ctcp_in   = 0
 vsi_sig   = 8
 mvpn_tfrg = 0
 cdp       = 0

!IRB counters

 smf_msmtch= 0
 irb_stp   = 0
 brdg_ip   = 0
 no_rt_ip  = 0
 multi_mac = 0
```

Related Commands

Command	Description
debug pxf tbridge	Displays debugging output of the PXF transparent bridging.
show pxf cpu subblock	Displays PXF CPU for a bridged subinterface.
show pxf cpu tbridge	Displays PXF CPU statistics for transparent bridging.

show pxf cpu subblock

To display parallel express forwarding (PXF) central processing unit (CPU) statistics for a bridged subinterface (encapsulation type), use the **show pxf cpu subblock** command in privileged EXEC mode.

show pxf cpu subblock *interface-name*

Syntax Description

interface-name	Name of the interface.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.2	This command was introduced.
12.3(14)T	This command was enhanced to display more information for all subblocks.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Examples

The following is sample output from the **show pxf cpu subblock** command, which shows the bridge-group virtual interface software MAC-address filtering (SMF) table:

```
Router# show pxf cpu subblock switch1.100

Switch1.100 is up

 ICB = C001, LinkId = 3, interface PXF, enabled
 IOS encapsulation type 33 ATM

!BVI encapsulation denoted by the type.

 ICB: Index: 49155 Min mtu: 4 Max mtu: 4486 Encapsulation Type:8
 VCCI maptable location = 0x8340A800
 VCCImap entry: vcci: 0x5   u0 : 0x64   Max mtu : 4486
             Min mtu : 0x4   vc_type_flags: 0x20
 VCCI 0x5        seg channel id 0x1A5
    icmp ipaddress 10.4.4.1          timestamp 0
    feature_data: flags 0x0000 fib_index 0x0
 col_5_cicb.flags : 0x00
```

Related Commands

Command	Description
debug pxf tbridge	Displays debugging output of the PXF transparent bridging.
show pxf cpu statistics	Displays PXF CPU statistics for a configured router.
show pxf cpu tbridge	Displays PXF CPU statistics for transparent bridging.

show pxf cpu tbridge

To display parallel express forwarding (PXF) central processing unit (CPU) statistics for transparent bridging, use the **show pxf cpu tbridge** command in privileged EXEC mode.

show pxf cpu tbridge

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.3(14)T	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Examples

The following is sample output from the **show pxf cpu tbridge** command, which shows the bridge-group virtual interface software MAC-address filtering (SMF) table:

```
Router# show pxf cpu tbridge

Bridge-group Virtual Interface SMF table ========================================

SMF Entry    Mac Address     SMF MATCH     BVI Flags
     1      0000.0000.0000            0      0x0
     2      0000.0000.0000            0      0x0
     3      0000.0000.0000            0      0x0
     4      0000.0000.0000            0      0x0
     5      0000.0000.0000            0      0x0
     6      0000.0000.0000            0      0x0
     7      0000.0000.0000            0      0x0
     8      0000.0000.0000            0      0x0
     9      0000.0000.0000            0      0x0

!Entry for BVI 10.

    10      0000.0c09.6504            0      0x1

!Bridged packets.

    11      0000.0000.0000            0      0x0001
    12      0000.0000.0000            0      0x0
    13      0000.0000.0000            0      0x0
    14      0000.0000.0000            0      0x0
    15      0000.0000.0000            0      0x0
    16      0000.0000.0000            0      0x0
    17      0000.0000.0000            0      0x0

!Routed packets.
```

```
    18      0000.0000.0000          0       0x0100
    19      0000.0000.0000          0       0x0
    20      0000.0000.0000          0       0x0
.
.
```

Related Commands

Command	Description
debug pxf tbridge	Displays debugging output of the PXF transparent bridging.
show pxf cpu statistics	Displays PXF CPU statistics for a configured router.
show pxf cpu subblock	Displays PXF CPU statistics for a bridged subinterface.

show rif

To display the current contents of the Routing Information Field (RIF) cache, use the **show rif** command in privileged EXEC mode.

show rif

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Examples

The following is sample output from the **show rif** command:

```
Router# show rif

Codes: * interface, - static, + remote
Hardware Addr  How   Idle (min)  Routing Information Field
5C02.0001.4322 rg5           -   0630.0053.00B0
5A00.0000.2333 TR0           3   08B0.0101.2201.0FF0
5B01.0000.4444 -             -   -
0000.1403.4800 TR1           0   -
0000.2805.4C00 TR0           *   -
0000.2807.4C00 TR1           *   -
0000.28A8.4800 TR0           0   -
0077.2201.0001 rg5          10   0830.0052.2201.0FF0
```

In the display, entries marked with an asterisk (*) are the router's interface addresses. Entries marked with a dash (-) are static entries. Entries with a number denote cached entries. If the RIF timeout is set to something other than the default of 15 minutes, the timeout is displayed at the top of the display. Table 27 describes the significant fields shown in the display.

Table 27 show rif Field Descriptions

Field	Description
Hardware Addr	Lists the MAC-level addresses.
How	Describes how the RIF has been learned. Values are ring group (rg) or interface (TR).
Idle (min)	Indicates how long, in minutes, since the last response was received directly from this node.
Routing Information Field	Lists the RIF.

Related Commands

Command	Description
multiring	Enables collection and use of RIF information.

show source-bridge

To display the current source bridge configuration and miscellaneous statistics, use the **show source-bridge** command in privileged EXEC mode.

show source-bridge [**interface**]

Syntax Description

interface	(Optional) Displays the current source bridge configuration over all interfaces and a summary of all packets sent and received over each interface, not just the number of packets forwarded through the bridge.

Command Modes

Privileged EXEC

Command History

Release	Modification
10.0	This command was introduced.
12.2	The **interface** keyword was added.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Examples

The following is sample output from the **show source-bridge** command:

```
Router# show source-bridge

Local Interfaces:                            receive     transmit
             srn bn  trn r p s n  max hops     cnt         cnt        drops
TR0            5  1   10 *   *          7    39:1002     23:62923

Ring Group 10:
  This peer: TCP 10.136.92.92
   Maximum output TCP queue length, per peer: 100
  Peers:                 state   lv  pkts_rx  pkts_tx  expl_gn    drops TCP
   TCP  10.136.92.92     -       2       0        0          0     0    0
   TCP  10.136.93.93     open    2*     18       18          3     0    0
Rings:
   bn: 1 rn: 5    local  ma: 4000.3080.844b TokenRing0            fwd: 18
   bn: 1 rn: 2   remote  ma: 4000.3080.8473 TCP  10.136.93.93     fwd: 36

Explorers: ------- input -------             ------- output -------
       spanning  all-rings     total      spanning  all-rings     total
  TR0         0          3         3             3          5         8
```

The following is sample output from the **show source-bridge** command when Token Ring LAN emulation (LANE) is configured.

```
Router# show source-bridge
```

```
Local Interfaces:                                receive     transmit
             srn bn  trn r p s n  max hops     cnt         cnt        drops
AT2/0.1     2048  5  256 *   f    7  7  7     5073        5072         0
To3/0/0        1  1  256 *   f    7  7  7     4719        4720         0

Global RSRB Parameters:
 TCP Queue Length maximum: 100

Ring Group 256:
  No TCP peername set, TCP transport disabled
   Maximum output TCP queue length, per peer: 100
  Rings:
   bn: 5  rn: 2048 local  ma: 4000.0ca0.5b40 ATM2/0.1              fwd: 5181
   bn: 1  rn: 1    local  ma: 4000.3005.da06 TokenRing3/0/0        fwd: 5180

Explorers: ------- input -------             ------- output -------
         spanning  all-rings     total      spanning  all-rings     total
AT2/0.1         9           1        10            10           0        10
To3/0/0        10           0        10             9           1        10

  Local: fastswitched 20        flushed 0         max Bps 38400

         rings      inputs         bursts         throttles     output drops
       To3/0/0          10              0                 0                0
```

The following is sample output from the **show source-bridge** command with the **interface** keyword specified:

```
Router# show source-bridge interface

                                          v p s n r                    Packets
 Interface  St  MAC-Address    srn bn  trn r x p b c IP-Address         In    Out

 To0/0      up 0000.300a.7c06    1  1 2009 *   b   F 10.2.0.9        63836 75413
 To0/1      up 0000.300a.7c86    2  1 2009 *   b   F 10.1.0.9        75423 63835
 To0/2      up 0000.300a.7c46 1001  1 2009 *   b   F                  5845  5845
```

Table 28 describes the significant fields shown in the displays.

Table 28 show source-bridge Field Descriptions

Field	Description
Local Interfaces:	Description of local interfaces.
srn	Ring number of this Token Ring.
bn	Bridge number of this router for this ring.
trn	Group in which the interface is configured. Can be the target ring number or virtual ring group.
r	Ring group is assigned. An asterisk (*) in this field indicates that a ring group has been assigned for this interface.
p	Interface can respond with proxy explorers. An asterisk (*) in this field indicates that the interface can respond to proxy explorers.
s	Spanning-tree explorers enabled on the interface. An asterisk (*) indicates that this interface will forward spanning-tree explorers.

Table 28 show source-bridge Field Descriptions (continued)

Field	Description
n	Interface has NetBIOS name caching enabled. An asterisk (*) in this field indicates that the interface has NetBIOS name caching enabled.
max hops	Maximum number of hops.
receive cnt	Bytes received on the interface for source bridging.
transmit cnt	Bytes sent on the interface for source bridging.
drops	Number of dropped packets.
Ring Group *n*:	The number of the ring group.
This peer:	Address and address type of this peer.
Maximum output TCP queue length, per peer:	Maximum number of packets queued on this peer before the Cisco IOS software starts dropping packets.
Peers:	Addresses and address types of the ring group peers.
state	Current state of the peer, open or closed. A hyphen indicates this router.
lv	Indicates local acknowledgment.
pkts_rx	Number of packets received.
pkts_tx	Number of packets sent.
expl_gn	Explorers generated.
drops	Number of packets dropped.
TCP	Lists the current TCP backup queue length.
Rings:	Describes the ring groups. Information displayed is the bridge groups, ring groups, whether each group is local or remote, the MAC address, the network address or interface type, and the number of packets forwarded. A type shown as “locvrt” indicates a local virtual ring used by SDLLC or SR/TLB; a type shown as “remvrt” indicates a remote virtual ring used by SDLC Logical Link Control (SDLLC) or source-route translational bridging (SR/TLB).
Explorers:	This section describes the explorer packets that the Cisco IOS software has sent and received.
input	Explorers received by Cisco IOS software.
output	Explorers generated by Cisco IOS software.
TR0	Interface on which explorers were received.
spanning	Spanning-tree explorers.
all-rings	All-rings explored.
total	Summation of spanning and all-rings.
fastswitched	Number of fast-switched packets.
flushed	Number of flushed packets.
max Bps	Maximum bytes per second.
rings	Interface for the particular ring.
inputs	Number of inputs.
bursts	Number of bursts.

Table 28 show source-bridge Field Descriptions (continued)

Field	Description
throttles	Number of throttles.
output drops	Number of output drops.

show span

To display the spanning-tree topology known to the router, use the **show span** command in user EXEC or privileged EXEC mode.

show span

Syntax Description

This command has no arguments or keywords.

Command Modes

User EXEC
Privileged EXEC

Command History

Release	Modification
10.3	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Examples

The following is sample output from the **show span** command:

```
Router# show span

Bridge Group 1 is executing the IBM compatible Spanning Tree Protocol
  Bridge Identifier has priority 32768, address 0000.0c0c.f68b
  Configured hello time 2, max age 6, forward delay 4
  Current root has priority 32768, address 0000.0c0c.f573
  Root port is 001A (TokenRing0/0), cost of root path is 16
  Topology change flag not set, detected flag not set
  Times:  hold 1, topology change 30, notification 30
          hello 2, max age 6, forward delay 4, aging 300
  Timers: hello 0, topology change 0, notification 0
Port 001A (TokenRing0/0) of bridge group 1 is forwarding. Path cost 16
   Designated root has priority 32768, address 0000.0c0c.f573
   Designated bridge has priority 32768, address 0000.0c0c.f573
   Designated port is 001B, path cost 0, peer 0
   Timers: message age 1, forward delay 0, hold 0
Port 002A (TokenRing0/1) of bridge group 1 is blocking. Path cost 16
   Designated root has priority 32768, address 0000.0c0c.f573
   Designated bridge has priority 32768, address 0000.0c0c.f573
   Designated port is 002B, path cost 0, peer 0
   Timers: message age 0, forward delay 0, hold 0
Port 064A (spanRSRB) of bridge group 1 is disabled. Path cost 250
   Designated root has priority 32768, address 0000.0c0c.f573
   Designated bridge has priority 32768, address 0000.0c0c.f68b
   Designated port is 064A, path cost 16, peer 0
   Timers: message age 0, forward delay 0, hold 0
```

A port (spanRSRB) is created with each virtual ring group. The port will be disabled until one or more peers go into open state in the ring group.

show spanning-tree

To display spanning-tree information for the specified spanning-tree instances, use the **show spanning-tree** command in privileged EXEC mode.

Cisco 2600, 3660, and 3845 Series Switches

show spanning-tree [*bridge-group*] [**active | backbonefast | blockedports | bridge | brief | inconsistentports | interface** *interface-type interface-number*| **root | summary** [**totals**] | **uplinkfast | vlan** *vlan-id*]

Cisco 6500/6000 Catalyst Series Switches and Cisco 7600 Series Routers

show spanning-tree [*bridge-group* | **active | backbonefast | bridge** [*id*] | **detail | inconsistentports | interface** *interface-type interface-number* [**portfast** [**edge**]] | **mst** [*list* | **configuration** [**digest**]] | **root | summary** [**totals**] | **uplinkfast | vlan** *vlan-id* | **port-channel** *number* | **pathcost** *method*]

Syntax Description

bridge-group	(Optional) Specifies the bridge group number. The range is 1 to 255.
active	(Optional) Displays spanning-tree information on active interfaces only.
backbonefast	(Optional) Displays spanning-tree BackboneFast status.
blockedports	(Optional) Displays blocked port information.
bridge	(Optional) Displays status and configuration of this switch.
brief	(Optional) Specifies a brief summary of interface information.
configuration [**digest**]	(Optional) Displays the multiple spanning-tree current region configuration.
inconsistentports	(Optional) Displays information about inconsistent ports.
interface *interface-type interface-number*	(Optional) Specifies the type and number of the interface. Enter each interface designator, using a space to separate it from the one before and the one after. Ranges are not supported. Valid interfaces include physical ports and virtual LANs (VLANs). See the "Usage Guidelines" for valid values.
list	(Optional) Specifies a multiple spanning-tree instance list.
mst	(Optional) Specifies multiple spanning-tree.
portfast [**edge**]	(Optional) Displays spanning-tree PortFast edge interface operational status. Beginning with Cisco IOS Release 12.2(33)SXI, the **edge** keyword is required. In earlier releases, the **edge** keyword is not used.
root	(Optional) Displays root-switch status and configuration.
summary	(Optional) Specifies a summary of port states.
totals	(Optional) Displays the total lines of the spanning-tree state section.
uplinkfast	(Optional) Displays spanning-tree UplinkFast status.
vlan *vlan-id*	(Optional) Specifies the VLAN ID. The range is 1 to 1005. Beginning with Cisco IOS Release 12.4(15)T, the valid VLAN ID range is from 1 to 4094. If the *vlan-id* value is omitted, the command applies to the spanning-tree instance for all VLANs.

id	(Optional) Identifies the spanning tree bridge.
detail	(Optional) Shows status and configuration details.
port-channel *number*	(Optional) Identifies the Ethernet channel associated with the interfaces.
pathcost *method*	(Optional) Displays the default path-cost calculation method that is used. See the "Usage Guidelines" section for the valid values.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
12.0(1)T	This command was introduced.
12.0(5.2)WC(1)	This command was integrated into Cisco IOS Release 12.0(5.2)WC(1).
12.1(6)EA2	This command was integrated into Cisco IOS Release 12.1(6)EA2. The following keywords and arguments were added: *bridge-group*, **active**, **backbonefast**, **blockedports**, **bridge**, **inconsistentports**, **pathcost** *method*, **root**, **totals**, and **uplinkfast**.
12.2(14)SX	Support for this command was introduced on the Supervisor Engine 720.
12.2(15)ZJ	The syntax added in Cisco IOS Release 12.1(6)EA2 was implemented on the Cisco 2600 series, Cisco 3600 series, and Cisco 3700 series routers.
12.2(17d)SXB	Support for this command on the Supervisor Engine 2 was extended to Cisco IOS Release 12.2(17d)SXB.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.3(4)T	The platform support and syntax added in Cisco IOS Release 12.2(15)ZJ was integrated into Cisco IOS Release 12.3(4)T.
12.4(15)T	This command was modified to extend the range of valid VLAN IDs to 1–4094 for specified platforms.
12.2(33)SXI	This command was modified to require the **edge** keyword after **portfast**. The command output was modified to show the status of Bridge Assurance and PVST Simulation.

Usage Guidelines

The keywords and arguments that are available with the **show spanning-tree** command vary depending on the platform you are using and the network modules that are installed and operational.

Cisco 2600, 3660, and 3845 Series Switches

The valid values for **interface** *interface-type* are:

- **fastethernet**—Specifies a Fast Ethernet IEEE 802.3 interface.
- **port-channel**—Specifies an Ethernet channel of interfaces.

Cisco 6500/6000 Catalyst Switches and 7600 Series Routers

The **port-channel** *number* values from 257 to 282 are supported on the Content Switching Module (CSM) and the Firewal Services Module (FWSM) only.

The *interface-number* argument designates the module and port number. Valid values for *interface-number* depend on the specified interface type and the chassis and module that are used. For example, if you specify a Gigabit Ethernet interface and have a 48-port 10/100BASE-T Ethernet module that is installed in a 13-slot chassis, valid values for the module number are from 2 to 13 and valid values for the port number are from 1 to 48.

When checking spanning tree-active states and you have a large number of VLANs, you can enter the **show spanning-tree summary total** command. You can display the total number of VLANs without having to scroll through the list of VLANs.

The valid values for **interface** *interface-type* are:

- **fastethernet**—Specifies a Fast Ethernet IEEE 802.3 interface.
- **port-channel**—Specifies an Ethernet channel of interfaces.
- **atm**—Specifies an Asynchronous Transfer Mode (ATM) interface.
- **gigabitethernet**—Specifies a Gigabit Ethernet IEEE 802.3z interface.
- **multilink**—Specifies a multilink-group interface.
- **serial**—Specifies a serial interface.
- **vlan**—Specifies a catalyst VLAN interface.

The valid values for keyword **pathcoast** *method* are:

- **append**—Appends the redirected output to a URL (supporting the append operation).
- **begin**—Begins with the matching line.
- **exclude**—Excludes matching lines.
- **include**—Includes matching lines.
- **redirect**—Redirects output to a URL.
- **tee**—Copies output to a URL.

When you run the **show spanning-tree** command for a VLAN or an interface the switch router will display the different port states for the VLAN or interface. The valid spanning-tree port states are listening, learning, forwarding, blocking, disabled, and loopback. See Table 29 for definitions of the port states:

Table 29 show spanning-tree vlan Command Port States

Field	Definition
LIS	Listening is when the port spanning tree initially starts to listen for BPDU packets for the root bridge.
LRN	Learning is when the port sets the proposal bit on the BPDU packets it sends out
FWD	Forwarding is when the port is sending and listening to BPDU packets and forwarding traffic.
BLK	Blocked is when the port is still sending and listening to BPDU packets but is not forwarding traffic.
DIS	Disabled is when the port is not sending or listening to BPDU packets and is not forwarding traffic.
LBK	Loopback is when the port recieves its own BPDU packet back.

Examples

Cisco 2600, 3660, and 3845 Series Switches

The following example shows that bridge group 1 is running the VLAN Bridge Spanning Tree Protocol:

```
Router# show spanning-tree 1

Bridge group 1 is executing the VLAN Bridge compatible Spanning Tree Protocol
Bridge Identifier has priority 32768, address 0000.0c37.b055
Configured hello time 2, max age 30, forward delay 20
We are the root of the spanning tree
Port Number size is 10 bits
Topology change flag not set, detected flag not set
Times: hold 1, topology change 35, notification 2
      hello 2, max age 30, forward delay 20
Timers: hello 0, topology change 0, notification 0
  bridge aging time 300

Port 8 (Ethernet1) of Bridge group 1 is forwarding
   Port path cost 100, Port priority 128
   Designated root has priority 32768, address 0000.0c37.b055
   Designated bridge has priority 32768, address 0000.0c37.b055
   Designated port is 8, path cost 0
   Timers: message age 0, forward delay 0, hold 0
   BPDU: sent 184, received 0
```

The following is sample output from the **show spanning-tree summary** command:

```
Router# show spanning-tree summary

UplinkFast is disabled

Name                 Blocking Listening Learning Forwarding STP Active
-------------------- -------- --------- -------- ---------- ----------
VLAN1                23       0         0        1          24
-------------------- -------- --------- -------- ---------- ----------
              1 VLAN 23       0         0        1          24
```

Table 30 describes the significant fields shown in the display.

Table 30 show spanning-tree summary Field Descriptions

Field	Description
UplinkFast	Indicates whether the spanning-tree UplinkFast feature is enabled or disabled.
Name	Name of VLAN.
Blocking	Number of ports in the VLAN in a blocking state.
Listening	Number of ports in a listening state.
Learning	Number of ports in a learning state.
Forwarding	Number of ports in a forwarding state.
STP Active	Number of ports using the Spanning-Tree Protocol.

The following is sample output from the **show spanning-tree brief** command:

```
Router# show spanning-tree brief

VLAN1
  Spanning tree enabled protocol IEEE
  ROOT ID     Priority 32768
              Address 0030.7172.66c4
              Hello Time   2 sec  Max Age 20 sec  Forward Delay 15 sec
VLAN1
  Spanning tree enabled protocol IEEE
  ROOT ID     Priority 32768
              Address 0030.7172.66c4
Port                            Designated
Name     Port ID Prio Cost Sts  Cost  Bridge ID      Port ID
-------- ------- ---- ---- ---  ----  -------------- -------
Fa0/11   128.17  128  100  BLK  38    0404.0400.0001 128.17
Fa0/12   128.18  128  100  BLK  38    0404.0400.0001 128.18
Fa0/13   128.19  128  100  BLK  38    0404.0400.0001 128.19
Fa0/14   128.20  128  100  BLK  38    0404.0400.0001 128.20
Fa0/15   128.21  128  100  BLK  38    0404.0400.0001 128.21
Fa0/16   128.22  128  100  BLK  38    0404.0400.0001 128.22
Fa0/17   128.23  128  100  BLK  38    0404.0400.0001 128.23
Fa0/18   128.24  128  100  BLK  38    0404.0400.0001 128.24
Fa0/19   128.25  128  100  BLK  38    0404.0400.0001 128.25
Fa0/20   128.26  128  100  BLK  38    0404.0400.0001 128.26
Fa0/21   128.27  128  100  BLK  38    0404.0400.0001 128.27

Port                            Designated
Name     Port ID Prio Cost Sts  Cost  Bridge ID      Port ID
-------- ------- ---- ---- ---  ----  -------------- -------
Fa0/22   128.28  128  100  BLK  38    0404.0400.0001 128.28
Fa0/23   128.29  128  100  BLK  38    0404.0400.0001 128.29
Fa0/24   128.30  128  100  BLK  38    0404.0400.0001 128.30 Hello Time   2 sec  Max Age 20
sec  Forward Delay 15 sec
```

Table 31 describes the significant fields shown in the display.

Table 31 show spanning-tree brief Field Descriptions

Field	Description
VLAN1	VLAN for which spanning-tree information is shown.
Spanning tree enabled protocol	Type of spanning tree (IEEE, IBM, CISCO).
ROOT ID	Indicates the root bridge.
Priority	Priority indicator.
Address	MAC address of the port.
Hello Time	Amount of time, in seconds, that the bridge sends bridge protocol data units (BPDUs).
Max Age	Amount of time, in seconds, that a BPDU packet should be considered valid.
Forward Delay	Amount of time, in seconds, that the port spends in listening or learning mode.
Port Name	Interface type and number of the port.
Port ID	Identifier of the named port.
Prio	Priority associated with the port.

Table 31 show spanning-tree brief Field Descriptions (continued)

Field	Description
Cost	Cost associated with the port.
Sts	Status of the port.
Designated Cost	Designated cost for the path.
Designated Bridge ID	Bridge identifier of the bridge assumed to be the designated bridge for the LAN associated with the port.

The following is sample output from the **show spanning-tree vlan 1** command:

```
Router# show spanning-tree vlan 1

Spanning tree 1 is executing the IEEE compatible Spanning Tree protocol
  Bridge Identifier has priority 32768, address 00e0.1eb2.ddc0
  Configured hello time 2, max age 20, forward delay 15
  Current root has priority 32768, address 0010.0b3f.ac80
  Root port is 5, cost of root path is 10
  Topology change flag not set, detected flag not set, changes 1
  Times:  hold 1, topology change 35, notification 2
          hello 2, max age 20, forward delay 15
  Timers: hello 0, topology change 0, notification 0

Interface Fa0/1  in Spanning tree 1 is down
   Port path cost 100, Port priority 128
   Designated root has priority 32768, address 0010.0b3f.ac80
Designated bridge has priority 32768, address 00e0.1eb2.ddc0
   Designated port is 1, path cost 10
   Timers: message age 0, forward delay 0, hold 0
   BPDU: sent 0, received 0
```

Table 32 describes the significant fields shown in the display.

Table 32 show spanning-tree vlan Field Descriptions

Field	Description
Spanning tree	Type of spanning tree (IEEE, IBM, CISCO).
Bridge Identifier	Part of the bridge identifier and taken as the most significant part for bridge ID comparisons.
address	Bridge MAC address.
Root port	Identifier of the root port.
Topology change	Flags and timers associated with topology changes.

The following is sample output from the **show spanning-tree interface fastethernet0/3** command:

```
Router# show spanning-tree interface fastethernet0/3

Interface Fa0/3 (port 3) in Spanning tree 1 is down
   Port path cost 100, Port priority 128
   Designated root has priority 6000, address 0090.2bba.7a40
   Designated bridge has priority 32768, address 00e0.1e9f.4abf
   Designated port is 3, path cost 410
   Timers: message age 0, forward delay 0, hold 0
   BPDU: sent 0, received 0
```

Cisco 6500/6000 Series Catalyst Switches and 7600 Series Routers

This example shows how to display a summary of interface information:

```
Router# show spanning-tree

VLAN0001
  Spanning tree enabled protocol ieee
  Root ID    Priority    4097
             Address     0004.9b78.0800
             This bridge is the root
             Hello Time   2 sec  Max Age 20 sec  Forward Delay 15 sec

  Bridge ID  Priority    4097   (priority 4096 sys-id-ext 1)
             Address     0004.9b78.0800
             Hello Time   2 sec  Max Age 20 sec  Forward Delay 15 sec
             Aging Time 15

Interface        Port ID                     Designated                Port ID
Name             Prio.Nbr      Cost Sts      Cost Bridge ID            Prio.Nbr
---------------- -------- --------- --- --------- -------------------- --------
Gi2/1            128.65           4 LIS         0  4097 0004.9b78.0800 128.65
Gi2/2            128.66           4 LIS         0  4097 0004.9b78.0800 128.66
Fa4/3            128.195         19 LIS         0  4097 0004.9b78.0800 128.195
Fa4/4            128.196         19 BLK         0  4097 0004.9b78.0800 128.195

Router#
```

Table 33 describes the fields that are shown in the example.

Table 33 show spanning-tree Command Output Fields

Field	Definition
Port ID Prio.Nbr	Port ID and priority number.
Cost	Port cost.
Sts	Status information.

This example shows how to display information about the spanning tree on active interfaces only:

```
Router# show spanning-tree active

UplinkFast is disabled
BackboneFast is disabled

 VLAN1 is executing the ieee compatible Spanning Tree protocol
  Bridge Identifier has priority 32768, address 0050.3e8d.6401
  Configured hello time 2, max age 20, forward delay 15
  Current root has priority 16384, address 0060.704c.7000
  Root port is 265 (FastEthernet5/9), cost of root path is 38
  Topology change flag not set, detected flag not set
  Number of topology changes 0 last change occurred 18:13:54 ago
  Times:  hold 1, topology change 24, notification 2
          hello 2, max age 14, forward delay 10
  Timers: hello 0, topology change 0, notification 0

Router#
```

This example shows how to display the status of spanning-tree BackboneFast:

```
Router# show spanning-tree backbonefast

BackboneFast is enabled

BackboneFast statistics
-----------------------
Number of transition via backboneFast (all VLANs) : 0
Number of inferior BPDUs received (all VLANs)     : 0
Number of RLQ request PDUs received (all VLANs)   : 0
Number of RLQ response PDUs received (all VLANs)  : 0
Number of RLQ request PDUs sent (all VLANs)       : 0
Number of RLQ response PDUs sent (all VLANs)      : 0
Router#
```

This example shows how to display information about the spanning tree for this bridge only:

```
Router# show spanning-tree bridge

VLAN1
  Bridge ID  Priority    32768
             Address     0050.3e8d.6401
             Hello Time   2 sec  Max Age 20 sec  Forward Delay 15 sec
.
Router#
```

This example shows how to display detailed information about the interface:

```
Router# show spanning-tree detail

VLAN1 is executing the ieee compatible Spanning Tree protocol
Bridge Identifier has priority 4096, address 00d0.00b8.1401
Configured hello time 2, max age 20, forward delay 15
We are the root of the spanning tree
Topology change flag not set, detected flag not set
Number of topology changes 9 last change occurred 02:41:34 ago
from FastEthernet4/21
Times: hold 1, topology change 35, notification 2
hello 2, max age 20, forward delay 15
Timers: hello 1, topology change 0, notification 0, aging 300


Port 213 (FastEthernet4/21) of VLAN1 is forwarding
Port path cost 19, Port priority 128, Port Identifier 128.213.
Designated root has priority 4096, address 00d0.00b8.1401
Designated bridge has priority 4096, address 00d0.00b8.1401
Designated port id is 128.213, designated path cost 0
Timers: message age 0, forward delay 0, hold 0
Number of transitions to forwarding state: 1
BPDU: sent 4845, received 1
Router#
```

This example shows how to display information about the spanning tree for a specific interface:

```
Router# show spanning-tree interface fastethernet 5/9

Interface Fa0/10 (port 23) in Spanning tree 1 is ROOT-INCONSISTENT
Port path cost 100, Port priority 128
Designated root has priority 8192, address 0090.0c71.a400
Designated bridge has priority 32768, address 00e0.1e9f.8940
```

This example shows how to display information about the spanning tree for a specific bridge group:

```
Router# show spanning-tree 1

UplinkFast is disabled
 BackboneFast is disabled

  Bridge group 1 is executing the ieee compatible Spanning Tree protocol
   Bridge Identifier has priority 32768, address 00d0.d39c.004d
   Configured hello time 2, max age 20, forward delay 15
   Current root has priority 32768, address 00d0.d39b.fddd
   Root port is 7 (FastEthernet2/2), cost of root path is 19
   Topology change flag set, detected flag not set
   Number of topology changes 3 last change occurred 00:00:01 ago
           from FastEthernet2/2
   Times:  hold 1, topology change 35, notification 2
           hello 2, max age 20, forward delay 15
   Timers: hello 0, topology change 0, notification 0  bridge aging time 15

Port 2 (Ethernet0/1/0) of Bridge group 1 is down

    Port path cost 100, Port priority 128
    Designated root has priority 32768, address 0050.0bab.1808
    Designated bridge has priority 32768, address 0050.0bab.1808
    Designated port is 2, path cost 0
    Timers: message age 0, forward delay 0, hold 0
    BPDU: sent 0, received 0
Router#
```

This example shows how to display a summary of port states:

```
Router# show spanning-tree summary

Root bridge for: Bridge group 1, VLAN0001, VLAN0004-VLAN1005
 VLAN1013-VLAN1499, VLAN2001-VLAN4094
EtherChannel misconfiguration guard is enabled
Extended system ID is enabled
Portfast is enabled by default
PortFast BPDU Guard is disabled by default
Portfast BPDU Filter is disabled by default
Loopguard is disabled by default
UplinkFast is disabled
BackboneFast is disabled
Pathcost method used is long
Name                   Blocking Listening Learning Forwarding STP Active
---------------------- -------- --------- -------- ---------- ----------
1 bridge               0        0         0        1          1
3584 vlans 3584 0 0 7168 10752


Blocking Listening Learning Forwarding STP Active
---------------------- -------- --------- -------- ---------- ----------
Total                  3584     0         0        7169       10753
Router#
```

This example shows how to display the total lines of the spanning-tree state section:

```
Router#  show spanning-tree summary total
Root bridge for:Bridge group 10, VLAN1, VLAN6, VLAN1000.
Extended system ID is enabled.
PortFast BPDU Guard is disabled
EtherChannel misconfiguration guard is enabled
UplinkFast is disabled
BackboneFast is disabled
```

```
Default pathcost method used is long

Name                 Blocking Listening Learning Forwarding STP Active
-------------------- -------- --------- -------- ---------- ----------
           105 VLANs 3433     0         0        105        3538

BackboneFast statistics
-----------------------
Number of transition via backboneFast (all VLANs) :0
Number of inferior BPDUs received (all VLANs)     :0
Number of RLQ request PDUs received (all VLANs)   :0
Number of RLQ response PDUs received (all VLANs)  :0
Number of RLQ request PDUs sent (all VLANs)       :0
Number of RLQ response PDUs sent (all VLANs)      :0
Router#
```

This example shows how to display information about the spanning tree for a specific VLAN:

```
Router# show spanning-tree vlan 200
VLAN0200
 Spanning tree enabled protocol ieee
 Root ID Priority 32768
    Address 00d0.00b8.14c8
    This bridge is the root
    Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
 Bridge ID Priority 32768
    Address 00d0.00b8.14c8
    Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
    Aging Time 300
Interface Role Sts Cost Prio.Nbr Status
---------------- ---- --- --------- -------- --------------------------------
Fa4/4 Desg FWD 200000 128.196 P2p
Fa4/5 Back BLK 200000 128.197 P2p
Router#
```

Table 34 describes the fields that are shown in the example.

Table 34 show spanning-tree vlan Command Output Fields

Field	Definition
Role	Current 802.1w role; valid values are Boun (boundary), Desg (designated), Root, Altn (alternate), and Back (backup).
Sts	Spanning-tree states; valid values are BKN* (broken)[1], BLK (blocking), DWN (down), LTN (listening), LBK (loopback), LRN (learning), and FWD (forwarding).
Cost	Port cost.

Table 34 show spanning-tree vlan Command Output Fields (continued)

Field	Definition
Prio.Nbr	Port ID that consists of the port priority and the port number.
Status	Status information; valid values are as follows: • P2p/Shr—The interface is considered as a point-to-point (resp. shared) interface by the spanning tree. • Edge—PortFast has been configured (either globally using the **default** command or directly on the interface) and no BPDU has been received. • *ROOT_Inc, *LOOP_Inc, *PVID_Inc and *TYPE_Inc—The port is in a broken state (BKN*) for an inconsistency. The port would be (respectively) Root inconsistent, Loopguard inconsistent, PVID inconsistent, or Type inconsistent. • Bound(type)—When in MST mode, identifies the boundary ports and specifies the type of the neighbor (STP, RSTP, or PVST). • Peer(STP)—When in PVRST rapid-pvst mode, identifies the port connected to a previous version of the 802.1D bridge.

1. For information on the *, see the definition for the Status field.

This example shows how to determine if any ports are in the root-inconsistent state:

```
Router#  show spanning-tree inconsistentports

Name                 Interface            Inconsistency
-------------------- -------------------- ------------------
 VLAN1               FastEthernet3/1      Root Inconsistent

Number of inconsistent ports (segments) in the system :1
Router#
```

Related Commands

Command	Description
spanning-tree backbonefast	Enables BackboneFast on all Ethernet VLANs.
spanning-tree cost	Sets the path cost of the interface for STP calculations.
spanning-tree guard	Enables or disables the guard mode.
spanning-tree pathcost method	Sets the default path-cost calculation method.
spanning-tree portfast (interface configuration mode)	Enables PortFast mode.
spanning-tree portfast bpdufilter default	Enables BPDU filtering by default on all PortFast ports.
spanning-tree portfast bpduguard default	Enables BPDU guard by default on all PortFast ports.
spanning-tree port-priority	Sets an interface priority when two bridges vie for position as the root bridge.
spanning-tree uplinkfast	Enables UplinkFast.
spanning-tree vlan	Enables the Spanning Tree Protocol (STP) on a VLAN.

show spantree

To display spanning-tree information for a virtual LAN (VLAN) or port, use the **show spantree** command in privileged EXEC mode.

show spantree [*vlan*] [**active**]

show spantree *mod/port*

Syntax Description

vlan	(Optional) Number of the VLAN; valid values are from 1 to 1001 and from 1025 to 4094.
active	(Optional) Displays only the active ports.
mod/port	Number of the module and the port on the module. The slash mark is required.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.0(7)XE	This command was introduced on the Catalyst 6000 series switches.
12.2(2)XT	This command was implemented on the Cisco 2600 series, Cisco 3600 series, and Cisco 3700 series routers.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T on the Cisco 2600 series, Cisco 3600 series, and Cisco 3700 series routers.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines

If you do not specify the VLAN number, VLAN 1 is displayed.

If you are in Multiple Instances of Spanning Tree (MISTP) mode, instance information is not displayed.

The maximum length of the channel port list is 47. The space in the Port(s) column might not be enough to display the entire list in one line. If this is the case, the port list is split into multiple lines. For example, in the following display, ports 6/5-8, 6/13, 6/15, 6/17, 6/19 are channeling:

```
.
.
.
Port(s)                  Vlan Port-State    Cost      Prio Portfast Channel_id
------------------------ ---- ------------- --------- ---- -------- ----------
6/5-8,6/13,6/15,6/17,6/1 1    not-connected 2684354   32   disabled 0

9
.
.
.
```

The Link Aggregation Control Protocol (LACP) for channels does not support half-duplex links. If a port is in active/passive mode and becomes half duplex, the port is suspended (and a syslog message is generated).

The port is shown as "connected" if you use the **show port** command and as "not connected" if you use the **show spantree** command. This discrepancy occurs because the port is physically connected but never joined the active spanning-tree topology. To get the port to join the active spanning- tree topology, either set the duplex to full or set the channel mode to off for that port.

Examples

The following example shows how to display the active spanning tree port configuration for VLAN 1 while in Per VLAN Spanning Tree (PVST+ mode):

```
Router# (enable) show spantree 1 active

VLAN 1
Spanning tree mode          PVST+
Spanning tree type          ieee
Spanning tree enabled

Designated Root             00-60-70-4c-70-00
Designated Root Priority    16384
Designated Root Cost        19
Designated Root Port        2/3
Root Max Age   14 sec   Hello Time 2  sec   Forward Delay 10 sec

Bridge ID MAC ADDR          00-d0-00-4c-18-00
Bridge ID Priority          32768
Bridge Max Age 20 sec   Hello Time 2  sec   Forward Delay 15 sec

Port                     Vlan Port-State    Cost      Prio Portfast Channel_id
------------------------ ---- ------------- --------- ---- -------- ----------
 2/3                     1    forwarding           19   32 disabled 0
 2/12                    1    forwarding           19   32 disabled 0
```

The following example shows how to display the active spanning-tree port configuration for VLAN 1 (while in MISTP mode):

```
Router# (enable) show spantree 1 active

VLAN 1
Spanning tree mode          MISTP
Spanning tree type          ieee
Spanning tree enabled
VLAN mapped to MISTP Instance: 1
Port                     Vlan Port-State    Cost      Prio Portfast Channel_id
------------------------ ---- ------------- --------- ---- -------- ----------
 2/3                     1    forwarding       200000   32 disabled 0
 2/12                    1    forwarding       200000   32 disabled 0
```

Table 35 describes the significant fields shown in the displays.

Table 35 show spantree Field Descriptions

Field	Description
VLAN	VLAN for which the spanning-tree information is shown.
Spanning tree mode	Indicates the current mode that spanning tree is operating in: • PVST—Per VLAN Spanning Tree • MSTP—Multiple Spanning Tree Protocol
Spanning tree type	Indicates the current Spanning Tree Protocol type: • IEEE—IEEE Spanning Tree • DEC—Digital Equipment Corporation Spanning Tree
Spanning tree enabled	Indicates whether Spanning Tree Protocol is enabled or disabled.
Designated Root	MAC address of the designated spanning-tree root bridge.
Designated Root Priority	Priority of the designated root bridge.
Designated Root Cost	Total path cost to reach the root.
Designated Root Port	Port through which the root bridge can be reached. (Shown only on nonroot bridges.)
Root Max Age	Amount of time a bridge packet data unit (BPDU) packet should be considered valid.
Hello Time	Number of times the root bridge sends BPDUs.
Forward Delay	Amount of time the port spends in listening or learning mode.
Port	Port number.
Vlan	VLAN to which the port belongs.
Port-State	Spanning tree port state (disabled, inactive, not-connected, blocking, listening, learning, forwarding, bridging, or type-pvid-inconsistent).
Cost	Cost associated with the port.
Prio	Priority associated with the port.
Portfast	Status of whether the port is configured to use the PortFast feature.
Channel_id	Channel ID number.

Related Commands

Command	Description
show spantree backbonefast	Displays whether the spanning-tree BackboneFast Convergence feature is enabled.
show spantree blockedports	Displays only the blocked ports on a per-VLAN or per-instance basis.
show spantree portvlancost	Shows the path cost for the VLANs or extended-range VLANs.
show spantree statistics	Shows spanning tree statistical information
show spantree summary	Displays a summary of spanning-tree information.
show spantree uplinkfast	Shows the UplinkFast feature settings.

show subscriber-policy

To display the details of a subscriber policy, use the **show subscriber-policy** command in user EXEC or privileged EXEC mode.

show subscriber-policy *range*

Syntax Description

range	Range of subscriber policy numbers (range 1 to 100).

Command Modes

User EXEC
Privileged EXEC

Command History

Release	Modification
11.3	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Examples

The following is sample output from the **show subscriber-policy** command:

```
Router# show subscriber-policy 1

ARP: Permit
Broadcast: Deny
Multicast: Permit
Unknown: Deny
STP: Disable
CDP: Disable
```

Related Commands

Command	Description
bridge protocol	Defines the type of Spanning Tree Protocol.
bridge subscriber-policy	Binds a bridge group with a subscriber policy.
show bridge	Displays classes of entries in the bridge forwarding database.
subscriber-policy	Defines or modifies the forward and filter decisions of the subscriber policy.

source-bridge trcrf-vlan

To attach a VLAN to the Route Switch Module (RSM)'s virtual ring when source-route bridging, use the **source-bridge trcrf-vlan** command in interface configuration mode. To disable the attachment of a VLAN to the RSM's virtual ring, use the **no** form of this command.

source-bridge trcrf-vlan *vlanid* **ring-group** *ringnum*

Syntax Description

vlanid	VLAN ID number.
ring-group *ringnum*	Pseudoring number that corresponds to the virtual ring number for the interface.

Defaults

No default behavior or values

Command Modes

Interface configuration

Command History

Release	Modification
11.3(4)T	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines

Use the **source-bridge ring-group** command to create a virtual ring for source-route bridging (SRB) between Token Ring Bridge Relay Function (TrBRF) VLANs. Use the **source-bridge trcrf-vlan** command to assign a Token Ring Concentrator Relay Function (TrCRF) VLAN ID to the virtual ring.

In SRB and source-route translational bridging (SR/TLB), define a unique TrCRF VLAN ID that corresponds to the virtual ring on the RSM for each TrBRF. Although the VLAN ID for the TrCRF is unique for each TrBRF, the ring number will be the same.

If IP or IPX routing source routing (SR) frames is required on a TrBRF interface configured for SRB, you must also define a pseudoring for this interface with the **multiring trcrf-vlan** command. In this case, the VLAN ID used for the TrCRF that corresponds to the virtual ring can be the same as the one used for the pseudoring. If the VLAN IDs are different, the virtual ring and pseudoring numbers must be different.

Examples

The following example shows both SRB and IP routing for SR frames:

```
source-bridge ring-group 100
interface Token Ring3/1
 source-bridge 10 1 100
 source-bridge spanning
!
```

```
interface vlan999 type trbrf
 source-bridge trcrf-vlan 400 ring-group 100
 source-bridge spanning
 multiring all
 multiring trcrf-vlan 400 ring-group 100
```

Note that the ring number must be the same for the **source-bridge ring-group**, **source-bridge**, and **source-bridge trcrf-vlan** commands. In this example, the ring number of the pseudoring also matches the virtual ring number.

Related Commands

Command	Description
multiring trcrf-vlan	Creates pseudoring on the RSM and terminates the RIF when routing IP or IPX source-routed traffic on Token Ring VLAN (TrBRF) interfaces.
show source-bridge	Displays the current source bridge configuration and miscellaneous statistics.
source-bridge	Configure an interface for SRB.
source-bridge ring-group	Defines or removes a ring group from the configuration.

spanning-tree portfast (interface mode)

To enable PortFast on a specific interface, use the **spanning-tree portfast** command in interface configuration mode. To disable PortFast, use the **no** form of this command.

spanning-tree portfast {**disable** | **trunk**}

no spanning-tree portfast

Syntax Description

disable	Disables PortFast on the interface.
trunk	Enables PortFast on the interface when it is in trunk mode.

Command Default

Portfast on an interface defaults to the state of portfast on the device.

Command Modes

Interface configuration (config-if)

Command History

Release	Modification
12.1E	This command was introduced.
12.2(14)SX	This command was implemented on the Supervisor Engine 720.
12.2(17d)SXB	Support for the Supervisor Engine 2 was integrated into Cisco IOS Release 12.2(17d)SXB.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines

Use this command only with interfaces that connect to end stations; otherwise, an accidental data-packet loop could form that disrupts operations of both the Cisco 7600 series router and the network.

An interface with PortFast mode enabled moves directly to the spanning-tree forwarding state when linkup occurs. No waiting for the standard forward-time delay is required.

The **spanning-tree portfast** command has four states:

- **spanning-tree portfast**—Enables PortFast unconditionally on the given port.
- **spanning-tree portfast disable**—Explicitly disables PortFast for the given port. The configuration line displays in the running configuration because it is not the default.
- **spanning-tree portfast trunk**—Allows you to configure PortFast on trunk ports. When you enter this command, the port is configured for PortFast even in the access mode.
- **no spanning-tree portfast**—Implicitly enables PortFast if you define the **spanning-tree portfast default** command in global configuration mode and if the port is not a trunk port. If you do not configure PortFast globally, the **no spanning-tree portfast** command is equivalent to the **spanning-tree portfast disable** command.

The **no spanning-tree portfast** command does not disable PortFast if the **spanning-tree portfast default** command is enabled.

Examples

The following example shows how to enable PortFast on an interface:

```
Router(config-if)# spanning-tree portfast
```

Related Commands

Command	Description
show spanning-tree	Displays information about the spanning-tree state.
spanning-tree portfast default	Enables PortFast by default on all access ports.