



Multiple Spanning Tree Protocol Commands

For detailed information about MSTP concepts, configuration tasks, and examples, see the *Cisco ASR 9000 Series Aggregation Services Router L2VPN and Ethernet Services Configuration Guide*.

- [bridge-id](#), on page 3
- [bringup delay](#), on page 5
- [clear ethernet mvrp statistics](#), on page 6
- [cost](#), on page 7
- [debug ethernet mvrp packets](#), on page 9
- [debug ethernet mvrp protocol](#), on page 10
- [debug spanning-tree mst packet](#), on page 11
- [debug spanning-tree mst protocol-state](#), on page 13
- [debug spanning-tree mstag packet](#), on page 14
- [debug spanning-tree packet raw](#), on page 15
- [debug spanning-tree pvrst](#), on page 17
- [debug spanning-tree pvrstag packet](#), on page 18
- [debug spanning-tree pvstag packet](#), on page 20
- [debug spanning-tree repag packet](#), on page 21
- [edge-mode](#), on page 22
- [external-cost \(MSTAG/REPAG\)](#), on page 23
- [external-cost \(MSTP\)](#), on page 24
- [flush containment disable](#), on page 25
- [forward-delay](#), on page 26
- [forward-delay \(PVRST\)](#), on page 27
- [guard root](#), on page 28
- [guard topology-change](#), on page 29
- [hello-time \(Access Gateway\)](#), on page 30
- [hello-time \(MSTP\)](#), on page 32
- [instance \(MSTAG/REPAG\)](#), on page 33
- [instance \(MSTP\)](#), on page 34
- [instance cost](#), on page 35
- [instance port-priority](#), on page 36
- [interface \(MSTAG/REPAG\)](#), on page 37
- [interface \(MSTP\)](#), on page 39
- [interface \(PVRST\)](#), on page 40

- [interface \(PVSTAG/PVRSTAG\)](#), on page 41
- [interface \(MSTAG Uplink Tracking\)](#), on page 42
- [join-time](#), on page 44
- [leave-time](#), on page 45
- [leaveall-time](#), on page 46
- [link-type](#), on page 47
- [max age](#), on page 48
- [maximum \(PVRST\)](#), on page 50
- [maximum age](#), on page 51
- [maximum hops \(MSTP\)](#), on page 52
- [mvrp static](#), on page 53
- [name \(MSTAG/REPAG\)](#), on page 54
- [name \(MSTP\)](#), on page 55
- [periodic transmit](#), on page 56
- [port-id](#), on page 57
- [port-priority](#), on page 59
- [portfast](#), on page 61
- [preempt delay](#), on page 62
- [priority \(Access Gateway\)](#), on page 63
- [priority \(MSTP\)](#), on page 64
- [provider-bridge \(MSTAG/REPAG\)](#), on page 65
- [provider-bridge \(MSTP\)](#), on page 66
- [revision \(MSTAG/REPAG\)](#), on page 67
- [revision \(MSTP\)](#), on page 68
- [root-cost](#), on page 69
- [root-id](#), on page 71
- [root-priority](#), on page 73
- [show ethernet mvrp mad](#), on page 75
- [show ethernet mvrp statistics](#), on page 76
- [show ethernet mvrp status](#), on page 77
- [show l2vpn mstp port](#), on page 78
- [show l2vpn mstp vlan](#), on page 80
- [show spanning-tree mst](#), on page 81
- [show spanning-tree mst bpdu interface](#), on page 83
- [show spanning-tree mst configuration](#), on page 85
- [show spanning-tree mst errors](#), on page 86
- [show spanning-tree mst interface](#), on page 87
- [show spanning-tree mst topology-change flushes](#), on page 90
- [show spanning-tree mstag](#), on page 92
- [show spanning-tree mstag bpdu interface](#), on page 94
- [show spanning-tree mstag topology-change flushes](#), on page 95
- [show spanning-tree mstag tracked](#), on page 97
- [show spanning-tree pvrst](#), on page 98
- [show spanning-tree pvrstag](#), on page 101
- [show spanning-tree pvstag](#), on page 102
- [show spanning-tree repag](#), on page 104

- [show spanning-tree repag bpdu interface](#), on page 105
- [show spanning-tree repag topology-change flushes](#), on page 107
- [spanning-tree mst](#), on page 109
- [spanning-tree mstag](#), on page 110
- [spanning-tree pvrst](#), on page 111
- [spanning-tree pvrstag](#), on page 112
- [spanning-tree pvstag](#), on page 113
- [spanning-tree repag](#), on page 114
- [track](#), on page 115
- [transmit \(PVRST\)](#), on page 116
- [transmit hold-count](#), on page 117
- [vlan](#), on page 118
- [vlan \(PVRST\)](#), on page 119
- [vlan-ids \(MSTAG/REPAG\)](#), on page 120
- [vlan-id \(MSTP\)](#), on page 121

bridge-id

To set the bridge ID for this device for an Access Gateway instance, use the **bridge-id** command in MSTAG interface configuration, REPAG Interface configuration, PVSTAG VLAN configuration, or PVRSTAG VLAN configuration submode.

bridge-id *id* [**startup-value** *startup-id*]

Syntax Description	<p><i>id</i> MAC address of the switch. It can be any 48-bit value.</p> <p><i>startup-value</i> Specifies an alternate value to use when the interface first comes up, while the preempt delay timer is running.</p> <p><i>startup-id</i> Sets the startup bridge ID.</p>						
Command Default	For MSTAG/REPAG, the MAC address of the switch. For PVSTAG/PVRSTAG, the interface MAC address. If no startup value is specified, the normal value is used during startup.						
Command Modes	MSTAG interface configuration, REPAG Interface configuration, PVSTAG VLAN configuration, PVRSTAG VLAN configuration						
Command History	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 3.7.1</td> <td>This command was introduced.</td> </tr> <tr> <td>Release 4.0.0</td> <td>This command was supported in the PVSTAG VLAN configuration and PVRSTAG VLAN configuration submodes.</td> </tr> </tbody> </table>	Release	Modification	Release 3.7.1	This command was introduced.	Release 4.0.0	This command was supported in the PVSTAG VLAN configuration and PVRSTAG VLAN configuration submodes.
Release	Modification						
Release 3.7.1	This command was introduced.						
Release 4.0.0	This command was supported in the PVSTAG VLAN configuration and PVRSTAG VLAN configuration submodes.						
Usage Guidelines	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.						

bridge-id

When configuring access gateway, this command is used to modify the value of the bridge ID that is advertised in the STP BPDUs.

Task ID	Task ID	Operations
	interface (for MSTAG/REPAG)	read, write
	ethernet-services (for PVSTAG/PVRSTAG)	read, write

Examples

The following example shows how to set the bridge ID:

```
RP/0/RSP0/CPU0:router(config-mstag-if) # bridge-id 001c.0000.0011
```

Related Commands	Command	Description
	debug spanning-tree mstag packet, on page 14	Enables MSTAG packet debugging.
	debug spanning-tree pvrstag packet, on page 18	Enables packet debugging for sent and received PVRSTAG packets.
	debug spanning-tree pvstag packet, on page 20	Enables packet debugging for sent and received PVSTAG packets.
	debug spanning-tree repag packet, on page 21	Enables Resilient Ethernet Protocol (REP) Access Gateway debugging commands.
	interface (MSTAG/REPAG), on page 37	Enter the MSTAG interface configuration submode, and enables MSTAG for the specified port.
	interface (PVSTAG/PVRSTAG), on page 41	Enters PVST or PVRST Access Gateway Interface configuration submode and enables either PVSTAG or PVRSTAG for the specified port.
	spanning-tree mstag, on page 110	Enters the MST Access Gateway configuration submode.
	spanning-tree pvrstag, on page 112	Enters the Per VLAN Rapid Spanning Tree Access Gateway (PVRSTAG) configuration submode.
	spanning-tree pvstag, on page 113	Enters the Per VLAN Spanning Tree Access Gateway (PVSTAG) configuration submode.
	spanning-tree repag, on page 114	Enters the Resilient Ethernet Protocol Access Gateway (REPAG) configuration submode.
	show spanning-tree mstag, on page 92	Displays the values currently used for populating the BPDUs sent by all ports.
	show spanning-tree pvrstag, on page 101	Displays the values currently used for populating the BPDUs sent by all ports.
	show spanning-tree pvstag, on page 102	Displays the values currently used for populating the BPDUs sent by all ports.

Command	Description
show spanning-tree repag, on page 104	Displays the values currently used for populating the BPDUs sent by all ports.
vlan, on page 118	Enables a PVST or PVRST VLAN instance on the interface and enters PVSTAG or PVRSTAG VLAN configuration mode.

bringup delay

To configure a delay when an interface is first created before it is added to the MSTP topology, use the **bringup delay** command in the MSTP configuration mode.

```
bringup delay for interval {seconds | minutes | hours}
no bringup delay for interval {seconds | minutes | hours}
```

Syntax Description

interval Length of time to delay adding the interface to the MSTP topology.
seconds Specifies the delay in seconds.
minutes Specifies the delay in minutes.
hours Specifies the delay in hours.

Command Default

If no bringup delay is configured, interfaces are added to the MSTP topology as soon as they are created.

Command Modes

MSTP configuration

Command History

Release	Modification
Release 3.9.1	This command was introduced.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

This command is used to change the behaviour of MSTP when interfaces are first functional (for example, when a line card boots for the first time). By default, interfaces are added to the MSTP topology, and may be placed in the forwarding state, as soon as the system declares that the interfaces are functional. However, at this point the data plane may not be fully prepared to forward traffic on the interface. If a bringup delay is configured, MSTP keeps the interface in blocked state for the specified delay, and adds it to the MSTP topology only after the specified interval has occurred.

For information on configuring bringup delay, refer to the *Implementing Multiple Spanning Tree Protocol* module of the *Cisco ASR 9000 Series Aggregation Services Router L2VPN and Ethernet Services Configuration Guide*.

clear ethernet mvrp statistics

Task ID	Task ID	Operations
	interface	read, write

Examples

The following example shows how to configure the bringup delay:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)#spanning-tree mst A
RP/0/RSP0/CPU0:router(config-mstp)# bringup delay for 20 seconds
```

Related Commands	Command	Description
	debug spanning-tree mst packet, on page 11	Enables debugging for sent and received MSTP packets.
	debug spanning-tree mst protocol-state, on page 13	Enables debugging protocol-state changes such as port role or state changes, topology change notification.
	spanning-tree mst, on page 109	Enters the MSTP configuration submode
	show spanning-tree mst, on page 81	Displays the multiple spanning tree protocol status information.

clear ethernet mvrp statistics

To clear MVRP statistics for ethernet interfaces, use the **clear ethernet mvrp statistics** command in the EXEC mode.

```
clear ethernet mvrp statistics {interface type interface-path-id | location location | all}
```

Syntax Description	interface (Optional) Clears the MVRP statistics for the given interface. type Interface type. For more information, use the question mark (?) online help function. interface-path-id Physical interface or virtual interface. Note Use the show interfaces command to see a list of all interfaces currently configured on the router. For more information about the syntax for the router, use the question mark (?) online help function.
location	Clears MVRP statistics for interfaces in a particular location.
location	Specifies the fully qualified location.
all	Clears the MVRP statistics for all interfaces.

Command Default None

Command Modes	EXEC	
Command History	Release	Modification
	Release 3.9.1 This command was introduced.	
Usage Guidelines	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.	
Task ID	Task ID	Operations
	ethernet-services execute	
Examples	The following example shows how to configure the bringup delay:	
	<pre>RP/0/RSP0/CPU0:router# clear ethernet mvrp statistics all</pre>	
Related Commands	Command	Description
	mvrp static, on page 53	Enables Multiple VLAN Registration Protocol (MVRP) in static mode.
	show ethernet mvrp statistics, on page 76	Displays packet statistics per port.

COST

To set the internal path cost for a given instance on the current port, use the **cost** command in MSTAG interface instance or REPAG interface instance configuration submode.

cost *cost* [**startup-value** *startup-cost*]

Syntax Description	<i>cost</i> Port cost. Range is 1 to 200000000.
	startup-value Specifies an alternate value to use when the interface first comes up, while the preempt delay timer is running.
	startup-id Sets the startup internal path cost.
Command Default	If the startup value is not specified, it defaults to 200000000.
Command Modes	MSTAG interface instance configuration, REPAG Instance Configuration

cost

Command History	Release	Modification
	Release 3.7.1	This command was introduced.
Usage Guidelines		To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.
This command is used when configuring Access Gateway, to change the cost value that is advertised for this MSTI in the STP BPDUs.		
 Note MSTP cost for bundle interfaces is fixed to 10000 and does not depend on the number of interfaces and the speed of individual members.		
Task ID	Task ID	Operations
	interface	read, write
Examples		The following example shows how to set the port cost to 10000:
<pre>RP/0/RSP0/CPU0:router(config-mstag-if-inst)# cost 10000</pre>		
Related Commands	Command	Description
	debug spanning-tree mstag packet, on page 14	Enables MSTAG packet debugging.
	debug spanning-tree repag packet, on page 21	Enables Resilient Ethernet Protocol (REP) Access Gateway debugging commands.
	interface (MSTAG/REPAG), on page 37	Enter the MSTAG interface configuration submode, and enables MSTAG for the specified port.
	instance (MSTAG/REPAG), on page 33	Enters MSTAG Instance configuration mode or REPAG Instance configuration mode.
	spanning-tree mstag, on page 110	Enters the MST Access Gateway configuration submode.
	spanning-tree repag, on page 114	Enters the Resilient Ethernet Protocol Access Gateway (REPAG) configuration submode.
	show spanning-tree mstag, on page 92	Displays the values currently used for populating the BPDUs sent by all ports.
	show spanning-tree repag, on page 104	Displays the values currently used for populating the BPDUs sent by all ports.

debug ethernet mvrp packets

To enable debugging of sent and received MVRP packets, use the **debug ethernet mvrp packets** command in the EXEC mode. To disable debugging, use the **no** form of this command.

```
debug ethernet mvrp packets {brief | full | hexdump} [direction {received | sent}] [{interface interface-name | location node-id}]
no debug ethernet mvrp packets {brief | full | hexdump} [direction {received | sent}] [{interface interface-name | location node-id}]
```

Syntax Description	brief Enables brief debugging output. full Enables full debugging output. hexdump Enables full debugging output along with the raw contexts of the packet in hex. direction {Optional} Restricts output to a packet direction. received Indicates packets received. sent Indicates packets sent. interface <i>interface-name</i> {Optional} Filters by interface. Physical interface or a virtual interface. Note Use the show interfaces command to see a list of all possible interfaces currently configured on the router. For more information about the syntax for the router, use the question mark (?) online help function.
location <i>node-id</i>	{Optional} Indicates the location. The <i>node-id</i> argument is entered in the rack/slot/module notation.

Command Default	By default, debugging is enabled for both directions for all interfaces.
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Command Modes	EXEC
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Command History	Release	Modification
	4.0.1	This command was introduced.

Usage Guidelines	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.
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Task ID	Task ID	Operations
		ethernet-services read

debug ethernet mvrp protocol**Examples**

The following example shows how to enable debugging of brief MVRP packets:

```
RP/0/RSP0/CPU0:router#debug ethernet mvrp packets brief
Thu Oct 28 02:56:35.048 DST
```

The following example shows how to enable debugging of full MVRP packets on a specific location:

```
RP/0/RSP0/CPU0:router#debug ethernet mvrp packets full location 0/0/CPU0
Mon Nov 15 20:02:13.636 PST
```

The following example shows how to enable debugging of brief MVRP packets received at a specific interface:

```
RP/0/RSP0/CPU0:router#debug ethernet mvrp packets brief direction received interface
gigabitEthernet 0/0/0/1
Thu Nov 25 21:09:01.986 PST
```

Related Commands

Command	Description
debug ethernet mvrp protocol, on page 10	Enables MVRP protocol debugging on a specific interface, location or vlan.
mvrp static, on page 53	Enables Multiple VLAN Registration Protocol (MVRP) in static mode.
show ethernet mvrp mad, on page 75	Displays the current state of the Multiple Registration Protocol (MRP) Attribute Declaration (MAD) component on a port.
show ethernet mvrp statistics, on page 76	Displays packet statistics per port.
show ethernet mvrp status, on page 77	Displays a summary of the VIDs that are declared or registered.

debug ethernet mvrp protocol

To enable MVRP protocol debugging on a specific interface, location or vlan, use the **debug ethernet mvrp protocol** command in the EXEC mode. To disable debugging, use the **no** form of this command.

```
debug ethernet mvrp protocol [vlan vlan-id] [{interface interface-name | location node-id}]
no debug ethernet mvrp protocol [vlan vlan-id] [{interface interface-name | location node-id}]
```

Syntax Description

vlan <i>vlan-id</i>	{Optional} Specific vlan-id to filter on.
interface	{Optional} Filters by interface.
<i>interface-name</i>	Physical interface or a virtual interface.

Note Use the **show interfaces** command to see a list of all possible interfaces currently configured on the router.

For more information about the syntax for the router, use the question mark (?) online help function.

location <i>node-id</i>	(Optional) Indicates the location. The <i>node-id</i> argument is entered in the rack/slot/module notation.												
Command Default	By default, debug is enabled for all vlans, interfaces, and locations.												
Command Modes	EXEC												
Command History	<table border="1"> <thead> <tr> <th>Release</th><th>Modification</th></tr> </thead> <tbody> <tr> <td>4.0.1</td><td>This command was introduced.</td></tr> </tbody> </table>	Release	Modification	4.0.1	This command was introduced.								
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Usage Guidelines	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.												
Task ID	<table border="1"> <thead> <tr> <th>Task ID</th><th>Operations</th></tr> </thead> <tbody> <tr> <td>ethernet-services</td><td>read</td></tr> </tbody> </table>	Task ID	Operations	ethernet-services	read								
Task ID	Operations												
ethernet-services	read												
Examples	The following example shows how to debug an ethernet mvrp protocol:												
	<pre>RP/0/RSP0/CPU0:router#debug ethernet mvrp protocol Thu Oct 28 03:05:21.575 DST RP/0/RSP0/CPU0:router#debug ethernet mvrp protocol location 0/0/CPU0 Mon Nov 15 20:11:56.607 PST RP/0/RSP0/CPU0:router#debug ethernet mvrp protocol interface gigabitEthernet 0/0/0/1 Mon Nov 15 20:12:49.776 PST</pre>												
Related Commands	<table border="1"> <thead> <tr> <th>Command</th><th>Description</th></tr> </thead> <tbody> <tr> <td>debug ethernet mvrp packets, on page 9</td><td>Enables debugging of sent and received MVRP packets.</td></tr> <tr> <td>mvrp static, on page 53</td><td>Enables Multiple VLAN Registration Protocol (MVRP) in static mode.</td></tr> <tr> <td>show ethernet mvrp mad, on page 75</td><td>Displays the current state of the Multiple Registration Protocol (MRP) Attribute Declaration (MAD) component on a port.</td></tr> <tr> <td>show ethernet mvrp statistics, on page 76</td><td>Displays packet statistics per port.</td></tr> <tr> <td>show ethernet mvrp status, on page 77</td><td>Displays a summary of the VIDs that are declared or registered.</td></tr> </tbody> </table>	Command	Description	debug ethernet mvrp packets, on page 9	Enables debugging of sent and received MVRP packets.	mvrp static, on page 53	Enables Multiple VLAN Registration Protocol (MVRP) in static mode.	show ethernet mvrp mad, on page 75	Displays the current state of the Multiple Registration Protocol (MRP) Attribute Declaration (MAD) component on a port.	show ethernet mvrp statistics, on page 76	Displays packet statistics per port.	show ethernet mvrp status, on page 77	Displays a summary of the VIDs that are declared or registered.
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show ethernet mvrp mad, on page 75	Displays the current state of the Multiple Registration Protocol (MRP) Attribute Declaration (MAD) component on a port.												
show ethernet mvrp statistics, on page 76	Displays packet statistics per port.												
show ethernet mvrp status, on page 77	Displays a summary of the VIDs that are declared or registered.												

debug spanning-tree mst packet

To enable debugging for sent and received MSTP packets, use the **debug spanning-tree mst packet** command in the EXEC mode. To disable debugging, use the **no** form of this command.

debug spanning-tree mst packet

```
debug spanning-tree mst packet {brief | full} {sent | received} [interface interface-name]
no debug spanning-tree mst packet {brief | full} {sent | received} [interface interface-name]
```

Syntax Description	brief	Enables brief debugging output.
	full	Enables full debugging output.
	sent	Display packets being sent.
	received	Display packets being received.
	interface <i>interface-name</i>	{Optional} Filters by interface. Physical interface or a virtual interface.
	Note	Use the show interfaces command to see a list of all possible interfaces currently configured on the router.

For more information about the syntax for the router, use the question mark (?) online help function.

Command Default	If an interface is not specified, then debug is enabled for all interfaces.					
Command Modes	EXEC					
Command History	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 4.0.1</td> <td>This command was introduced.</td> </tr> </tbody> </table>		Release	Modification	Release 4.0.1	This command was introduced.
Release	Modification					
Release 4.0.1	This command was introduced.					
Usage Guidelines	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.					
Task ID	<table border="1"> <thead> <tr> <th>Task ID</th> <th>Operations</th> </tr> </thead> <tbody> <tr> <td>interface read</td> <td></td> </tr> </tbody> </table>		Task ID	Operations	interface read	
Task ID	Operations					
interface read						

Examples The following example shows how to enable brief debugging for received packets:

```
RP/0/RSP0/CPU0:router#debug spanning-tree mst packet brief received
Mon Nov 15 20:42:58.584 PST
```

The following example shows how to enable brief debugging for received packets at a specific location:

```
RP/0/RSP0/CPU0:router#debug spanning-tree mst packet brief received location 0/0/CPU0
Mon Nov 15 20:44:15.082 PST
```

The following example shows how to enable brief debugging for received packets on a specific interface:

```
RP/0/RSP0/CPU0:router#debug spanning-tree mst packet brief received interface gigabitEthernet
0/0/0/1
Mon Nov 15 20:45:40.047 PST
```

Related Commands	Command	Description
	debug spanning-tree mst protocol-state, on page 13	Enables debugging protocol-state changes such as port role or state changes, topology change notification.
	debug spanning-tree packet raw, on page 15	Enables debugging raw packet output for all received packets or sent packets.
	spanning-tree mst, on page 109	Enters the MSTP configuration submode
	show spanning-tree mst, on page 81	Displays the multiple spanning tree protocol status information.

debug spanning-tree mst protocol-state

To enable debugging protocol-state changes such as port role or state changes, topology change notification, use the **debug spanning-tree mst protocol-state** command in EXEC mode. To disable debugging, use the **no** form of this command.

```
debug spanning-tree mst protocol-state [instance instance-id] [interface interface-name]
no debug spanning-tree mst protocol-state [instance instance-id] [interface interface-name]
```

Syntax Description	instance <i>instance-id</i>	View debug for a specific MSTI.
	interface <i>interface-name</i>	View debug for a specific interface.

Command Default If no instance or interface is specified, debug is enabled for all instances and interfaces.

Command Modes EXEC

Command History	Release	Modification
	Release 4.0.1	This command was introduced.

Usage Guidelines To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID	Operations
	interface read

```
debug spanning-tree mstag packet
```

Examples

The following example shows how to enable protocol state debugging:

```
RP/0/RSP0/CPU0:router#debug spanning-tree mst protocol-state
Mon Nov 15 20:53:52.793 PST

RP/0/RSP0/CPU0:router#debug spanning-tree mst protocol-state interface gigabitEthernet
0/0/0/1
Mon Nov 15 20:54:57.310 PST

RP/0/RSP0/CPU0:router#debug spanning-tree mst protocol-state instance 4094
Mon Nov 15 20:59:35.860 PST
```

Related Commands

Command	Description
debug spanning-tree mst packet, on page 11	Enables debugging for sent and received MSTP packets.
spanning-tree mst, on page 109	Enters the MSTP configuration submode
show spanning-tree mst, on page 81	Displays the multiple spanning tree protocol status information.

debug spanning-tree mstag packet

To enable MSTAG packet debugging, use the **debug spanning-tree mstag packet** command in EXEC mode. To disable debugging, use the **no** form of this command.

```
debug spanning-tree mstag packet {brief | full} {sent | received} [interface interface-name]
no debug spanning-tree mstag packet {brief | full} {sent | received} [interface interface-name]
```

Syntax Description

brief	Enables brief debugging output.
full	Enables full debugging output.
received	Display packets being received.
sent	Display packets being sent.
interface <i>interface-name</i>	{Optional} Filters by interface. Physical interface or a virtual interface.

Note Use the **show interfaces** command to see a list of all possible interfaces currently configured on the router.

For more information about the syntax for the router, use the question mark (?) online help function.

Command Default

If the interface is not specified, the debug is enabled for all interfaces.

Command Modes

EXEC

Command History	Release	Modification
	Release 4.0.1	This command was introduced.
Usage Guidelines	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.	
Task ID	Task ID	Operations
		interface read
Examples	The following example shows how to enable MSTAG packet debugging:	
<pre>RP/0/RSP0/CPU0:router#debug spanning-tree mstag packet brief received Mon Nov 15 21:11:30.464 PST RP/0/RSP0/CPU0:router#debug spanning-tree mstag packet full sent interface gigabitEthernet 0/0/0/1 Mon Nov 15 21:12:23.391 PST</pre>		
Related Commands	Command	Description
	debug spanning-tree packet raw, on page 15	Enables debugging raw packet output for all received packets or sent packets.
	spanning-tree mstag, on page 110	Enters the MST Access Gateway configuration submode.
	show spanning-tree mstag, on page 92	Displays the values currently used for populating the BPDUs sent by all ports.

debug spanning-tree packet raw

To enable debugging raw packet output for all received packets or sent packets, use the **debug spanning-tree packet raw** command in EXEC mode. To disable debugging, use the **no** form of this command.

```
debug spanning-tree packet raw {sent | received} [interface interface-name]
no debug spanning-tree packet raw {sent | received} [interface interface-name]
```

Syntax Description	received	Display packets being received.
	sent	Display packets being sent.

debug spanning-tree packet raw

interface	{Optional} Filters by interface.
<i>interface-name</i>	Physical interface or a virtual interface.
Note	Use the show interfaces command to see a list of all possible interfaces currently configured on the router.

For more information about the syntax for the router, use the question mark (?) online help function.

Command Default If an interface is not specified, debug is enabled for all interfaces.

Command Modes EXEC

Release	Modification
----------------	---------------------

Release 4.0.1	This command was introduced.
---------------	------------------------------

Usage Guidelines To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

This command enables raw packet debug for all STP protocols: MSTP, MSTAG, REPAG, PVSTAG and PVRSTAG.

Task ID **Task ID Operations**

interface read

Examples The following example shows how to enable debugging raw packet output for packets received at a specific location:

```
RP/0/RSP0/CPU0:router#debug spanning-tree packet raw received location 0/0/CPU0
Mon Nov 15 21:16:42.570 PST
```

The following example shows how to enable debugging raw packet output for packets sent from a specific interface:

```
RP/0/RSP0/CPU0:router#debug spanning-tree packet raw sent interface gigabitEthernet 0/0/0/1
Mon Nov 15 21:17:43.303 PST
```

Related Commands

Command	Description
debug spanning-tree mst packet, on page 11	Enables debugging for sent and received MSTP packets.
debug spanning-tree mstag packet, on page 14	Enables MSTAG packet debugging.
debug spanning-tree pvrstag packet, on page 18	Enables packet debugging for sent and received PVRSTAG packets.

Command	Description
debug spanning-tree pvstag packet, on page 20	Enables packet debugging for sent and received PVSTAG packets.
debug spanning-tree repag packet, on page 21	Enables Resilient Ethernet Protocol (REP) Access Gateway debugging commands.
spanning-tree mst, on page 109	Enters the MSTP configuration submode
spanning-tree mstag, on page 110	Enters the MST Access Gateway configuration submode.
spanning-tree pvrstag, on page 112	Enters the Per VLAN Rapid Spanning Tree Access Gateway (PVRSTAG) configuration submode.
spanning-tree pvstag, on page 113	Enters the Per VLAN Spanning Tree Access Gateway (PVSTAG) configuration submode.
spanning-tree repag, on page 114	Enters the Resilient Ethernet Protocol Access Gateway (REPAG) configuration submode.

debug spanning-tree pvrst

To enable debugging protocol-state changes such as port role, state changes, and topology change notification, use the **debug spanning-tree pvrst** command in EXEC mode. To disable debugging, use the **no** form of this command.

```
debug spanning-tree pvrst {controller | io | packet | protocol-state}
no debug spanning-tree pvrst {controller | io | packet | protocol-state}
```

Syntax Description	controller Enables Spanning Tree Protocol (STP) controller debugging. io Enables PVRST IO debugging. packet Enables PVRST packets debugging. protocol-state Enables protocol state debugging.				
Command Default	None				
Command Modes	EXEC				
Command History	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 5.1</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 5.1	This command was introduced.
Release	Modification				
Release 5.1	This command was introduced.				
Usage Guidelines	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.				

debug spanning-tree pvrstag packet

Task ID	Task ID	Operations
	ethernet-services	read

Examples

This example shows how to enable protocol state debugging:

```
RP/0/RSP0/CPU0:router#debug spanning-tree pvrst protocol-state
RP/0/RSP0/CPU0:router#
debug spanning-tree pvrst protocol-state interface gigabitEthernet 0/0/0/1 vlan 400
RP/0/RSP0/CPU0:router#
```

This example shows a sample output for when **controller** keyword is used:

This example shows a sample output for when **io** keyword is used:

This example shows a sample output for when **packet** keyword is used:

This example shows a sample output for when **protocol-state** keyword is used:

Related Commands	Command	Description
	spanning-tree pvrst, on page 111	Enters the Per VLAN Rapid Spanning Tree (PVRST) configuration submode.
	show spanning-tree pvrst, on page 98	Displays the Per VLAN Rapid Spanning Tree (PVRST) status information.

debug spanning-tree pvrstag packet

To enable packet debugging for sent and received PVRSTAG packets, use the **debug spanning-tree pvrstag packet** command in EXEC mode. To disable debugging, use the **no** form of this command.

```
debug spanning-tree pvrstag packet {brief | full} {sent | received} [interface interface-name]
no debug spanning-tree pvrstag packet {brief | full} {sent | received} [interface interface-name]
```

Syntax Description	brief	Enables brief debugging output.
	full	Enables full debugging output.
	sent	Indicates packets sent.
	received	Indicates packets received.

interface	{Optional} Filters by interface.
<i>interface-name</i>	Physical interface or a virtual interface.
Note	Use the show interfaces command to see a list of all possible interfaces currently configured on the router.

For more information about the syntax for the router, use the question mark (?) online help function.

Command Default If an interface is not specified, then debug is enabled for all interfaces.

Command Modes EXEC

Release	Modification
----------------	---------------------

Release 4.0.1	This command was introduced.
---------------	------------------------------

Usage Guidelines To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID **Task ID** **Operations**

ethernet-services	debug
-------------------	-------

Examples The following example shows how to enable packet debugging for PVRSTAG packets received at a specific interface:

```
RP/0/RSP0/CPU0:router#debug spanning-tree pvrstag packet brief received interface
gigabitEthernet 0/0/0/1
Wed Nov 24 22:12:33.861 PST
```

The following example shows how to enable packet debugging for PVRSTAG packets sent from a specific interface:

```
RP/0/RSP0/CPU0:router#debug spanning-tree pvrstag packet brief sent interface gigabitEthernet
0/0/0/1
Wed Nov 24 22:15:12.893 PST
```

Related Commands	Command	Description
	show spanning-tree pvrstag, on page 101	Displays the values currently used for populating the BPDUs sent by all ports.
	spanning-tree pvrstag, on page 112	Enters the Per VLAN Rapid Spanning Tree Access Gateway (PVRSTAG) configuration submode.

debug spanning-tree pvstag packet

debug spanning-tree pvstag packet

To enable packet debugging for sent and received PVSTAG packets, use the **debug spanning-tree pvstag packet** command in EXEC mode. To disable debugging, use the **no** form of this command.

```
debug spanning-tree pvstag packet {brief|full} {sent|received} [interface interface-name]
no debug spanning-tree pvstag packet {brief|full} {sent|received} [interface interface-name]
```

Syntax Description	brief Enables brief debugging output. full Enables full debugging output. sent Indicates packets sent. received Indicates packets received. interface {Optional} Filters by interface. <i>interface-name</i> Physical interface or a virtual interface.				
	Note Use the show interfaces command to see a list of all possible interfaces currently configured on the router.				
	For more information about the syntax for the router, use the question mark (?) online help function.				
Command Default	If an interface is not specified, then debug is enabled for all interfaces.				
Command Modes	EXEC				
Command History	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 4.0.1</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 4.0.1	This command was introduced.
Release	Modification				
Release 4.0.1	This command was introduced.				
Usage Guidelines	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.				
Task ID	<table border="1"> <thead> <tr> <th>Task ID</th> <th>Operations</th> </tr> </thead> <tbody> <tr> <td>ethernet-services</td> <td>debug</td> </tr> </tbody> </table>	Task ID	Operations	ethernet-services	debug
Task ID	Operations				
ethernet-services	debug				

Examples The following example shows how to enable packet debugging for PVSTAG packets received at a specific interface:

```
RP/0/RSP0/CPU0:router#debug spanning-tree pvstag packet brief received interface
gigabitEthernet 0/0/0/1
Wed Nov 24 22:12:33.861 PST
```

The following example shows how to enable packet debugging for PVSTAG packets sent from a specific interface:

```
RP/0/RSP0/CPU0:router#debug spanning-tree pvstag packet brief sent interface gigabitEthernet
0/0/0/1
Wed Nov 24 22:15:12.893 PST
```

Related Commands	Command	Description
	show spanning-tree pvstag, on page 102	Displays the values currently used for populating the BPDUs sent by all ports.
	spanning-tree pvstag, on page 113	Enters the Per VLAN Spanning Tree Access Gateway (PVSTAG) configuration submode.

debug spanning-tree repag packet

To enable Resilient Ethernet Protocol (REP) Access Gateway debugging commands, use the **debug spanning-tree repag packet** command in the EXEC mode. To disable debugging, use the **no** form of this command.

```
debug spanning-tree repag packet {brief|full} {sent|received} [interface interface-name]
no debug spanning-tree repag packet {brief|full} {sent|received} [interface interface-name]
```

Syntax Description	brief	Enables brief debugging output.
	full	Enables full debugging output.
	received	Display packets being received.
	sent	Display packets being sent.
	interface <i>interface-name</i>	{Optional} Filters by interface. Physical interface or a virtual interface.
	Note	Use the show interfaces command to see a list of all possible interfaces currently configured on the router.
	For more information about the syntax for the router, use the question mark (?) online help function.	

Command Default If an interface is not specified, then debug is enabled for all interfaces.

Command Modes EXEC

Command History	Release	Modification
	4.0.1	This command was introduced.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID**Task ID Operations**

interface read

Examples

The following example shows how to enable brief debug for REP Access Gateway packets received at a specified interface.

```
RP/0/RSP0/CPU0:router#debug spanning-tree repag packet brief received interface
gigabitEthernet 0/0/0/1
Mon Nov 15 21:26:08.155 PST
```

The following example shows how to enable full debug for REP Access Gateway packets sent from a specific location:

```
RP/0/RSP0/CPU0:router#debug spanning-tree repag packet full sent location 0/0/CPU0
Mon Nov 15 21:27:10.674 PST
```

edge-mode

To enable MSTAG edge mode for Multiple Spanning Tree Instance (MSTI), use the **edge-mode** command in MSTAG instance configuration submode. Use the **no** form of this command to disable the MSTAG edge mode.

```
edge-mode
no edge-mode
```

Syntax Description

This command has no keywords or arguments.

Command Default

Disabled

Command Modes

MSTAG instance configuration mode

Command History

Release	Modification
4.1.0	This command was introduced.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID**Task ID Operation**

ethernet-services	read, write
-------------------	----------------

This example shows the output from the **edge-mode** command:

```
RP/0/RSP0/CPU0:router#configure
RP/0/RSP0/CPU0:router(config)#spanning-tree mstag A
RP/0/RSP0/CPU0:router(config-mstag)#interface GigabitEthernet 0/2/0/1.1
RP/0/RSP0/CPU0:router(config-mstag-if)#instance 100
RP/0/RSP0/CPU0:router(config-mstag-if-inst)#edge-mode
RP/0/RSP0/CPU0:router(config-mstag-if-inst)#

```

Related Commands	Command	Description
	spanning-tree mstag, on page 110	Enters the MST Access Gateway configuration submode.
	show spanning-tree mstag, on page 92	Displays the values currently used for populating the BPDUs sent by all ports.

external-cost (MSTAG/REPAG)

To set the external path cost on the current port, use the **external-cost** command in MSTAG interface or REPAG interface configuration submode.

external-cost *cost* [**startup-value** *startup-cost*]

Syntax Description	<i>cost</i>	Interface external path cost. Range is 1 to 200000000.				
	startup-value	Specifies an alternate value to use when the interface first comes up, while the preempt delay timer is running.				
	<i>startup-cost</i>	Sets the external path cost.				
Command Default	If no startup-value is configured, the startup value defaults to 200000000.					
Command Modes	MSTAG interface configuration, REPAG Interface Configuration					
Command History	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 3.9.0</td> <td>This command was introduced.</td> </tr> </tbody> </table>		Release	Modification	Release 3.9.0	This command was introduced.
Release	Modification					
Release 3.9.0	This command was introduced.					

Usage Guidelines To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

This command is used when configuring Access Gateway, to change the external cost that it advertised in STP BPDUs sent from this interface.

external-cost (MSTP)

Task ID	Task ID	Operations
	interface	read, write

Examples

The following example shows how to set the external cost to 10000:

```
RP/0/RSP0/CPU0:router(config-mstag-if) # external-cost 10000
```

Related Commands	Command	Description
	debug spanning-tree mstag packet, on page 14	Enables MSTAG packet debugging.
	debug spanning-tree repag packet, on page 21	Enables Resilient Ethernet Protocol (REP) Access Gateway debugging commands.
	interface (MSTAG/REPAG), on page 37	Enter the MSTAG interface configuration submode, and enables MSTAG for the specified port.
	spanning-tree mstag, on page 110	Enters the MST Access Gateway configuration submode.
	spanning-tree repag, on page 114	Enters the Resilient Ethernet Protocol Access Gateway (REPAG) configuration submode.
	show spanning-tree mstag, on page 92	Displays the values currently used for populating the BPDUs sent by all ports.
	show spanning-tree repag, on page 104	Displays the values currently used for populating the BPDUs sent by all ports.

external-cost (MSTP)

To set the external path cost on the current port, use the **external-cost** command in MSTP interface configuration submode.

external-cost *cost*

Syntax Description	<i>cost</i> Port cost. Range is 1 to 200000000.
---------------------------	---

Command Default	The default path cost depends on the speed of the link.
------------------------	---

Command Modes	MSTP interface configuration
----------------------	------------------------------

Command History	Release	Modification
	Release 3.7.1	This command was introduced.

Usage Guidelines	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.
-------------------------	---

Task ID	Task ID Operations
	interface read, write

Examples	The following example shows how to set the external cost to 10000:
-----------------	--

```
RP/0/RSP0/CPU0:router:router(config-mstp-if)# external-cost 10000
```

Related Commands	Command	Description
	debug spanning-tree mst packet, on page 11	Enables debugging for sent and received MSTP packets.
	debug spanning-tree mst protocol-state, on page 13	Enables debugging protocol-state changes such as port role or state changes, topology change notification.
	interface (MSTP), on page 39	Enters the MSTP interface configuration submode, and enables STP for the specified port.
	spanning-tree mst, on page 109	Enters the MSTP configuration submode
	show spanning-tree mst, on page 81	Displays the multiple spanning tree protocol status information.

flush containment disable

To disable the flush containment feature on a bridge, use the **flush containment disable** command in the MSTP configuration submode.

flush containment disable

Syntax Description	This command has no keywords or arguments.
---------------------------	--

Command Default	Flush containment feature is enabled.
------------------------	---------------------------------------

Command Modes	MSTP configuration
----------------------	--------------------

Command History	Release	Modification
-----------------	---------	--------------

Release 3.9.1	This command was introduced.
---------------	------------------------------

Usage Guidelines	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.
-------------------------	---

forward-delay

Flush containment is a Cisco feature that helps prevent unnecessary MAC flushes. Refer to the *Implementing Multiple Spanning Tree Protocol* module in the *Cisco ASR 9000 Series Aggregation Services Router L2VPN and Ethernet Services Configuration Guide*.

Task ID	Task ID	Operations
	interface	read, write

Examples

The following example shows how to disable the flush containment feature on a bridge:

```
RP/0/RSP0/CPU0:router(config-mstp) # flush containment disable
```

Related Commands	Command	Description
	debug spanning-tree mst packet, on page 11	Enables debugging for sent and received MSTP packets.
	debug spanning-tree mst protocol-state, on page 13	Enables debugging protocol-state changes such as port role or state changes, topology change notification.
	spanning-tree mst, on page 109	Enters the MSTP configuration submode
	show spanning-tree mst, on page 81	Displays the multiple spanning tree protocol status information.

forward-delay

To set the forward-delay parameter for the bridge, use the **forward-delay** command in MSTP configuration submode.

forward-delay seconds

Syntax Description	seconds Bridge forward delay time in seconds. Range is 4 to 30.				
Command Default	seconds: 15				
Command Modes	MSTP configuration				
Command History	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 3.7.1</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 3.7.1	This command was introduced.
Release	Modification				
Release 3.7.1	This command was introduced.				

Usage Guidelines To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID	Task ID	Operations
	interface	read, write

Examples

The following example shows how to set the forward-delay parameter for the bridge to 20:

```
RP/0/RSP0/CPU0:router(config-mstp) # forward-delay 20
```

Related Commands	Command	Description
	debug spanning-tree mst packet, on page 11	Enables debugging for sent and received MSTP packets.
	debug spanning-tree mst protocol-state, on page 13	Enables debugging protocol-state changes such as port role or state changes, topology change notification.
	spanning-tree mst, on page 109	Enters the MSTP configuration submode
	show spanning-tree mst, on page 81	Displays the multiple spanning tree protocol status information.

forward-delay (PVRST)

To set the forward-delay time for the bridge, use the **forward-delay** command in PVRST configuration submode. To undo the setting, use the **no** form of this command.

forward-delay *seconds*
no **forward-delay** *seconds*

Syntax Description	<i>seconds</i> Bridge forward delay time in seconds. The range is from 4 to 30.
---------------------------	---

Command Default	None
------------------------	------

Command Modes	PVRST configuration
----------------------	---------------------

Command History	Release	Modification
	5.1	This command was introduced.

Usage Guidelines	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.
-------------------------	---

guard root

Task ID	Task ID	Operations
	ethernet-services	read, write

Examples

This example shows how to set the forward-delay parameter for the bridge to 20:

```
RP/0/RSP0/CPU0:router(config)# spanning-tree pvrst st1
RP/0/RSP0/CPU0:router(config-pvrst)# forward-delay 20
```

Related Commands	Command	Description
	interface (PVRST), on page 40	Enables and configures Per VLAN Rapid Spanning Tree (PVRST) on an interface.
	maximum (PVRST), on page 50	Sets the maximum age for the bridge.
	transmit (PVRST), on page 116	Sets the transmit hold count performance parameter.
	vlan (PVRST), on page 119	Configures Per VLAN Rapid Spanning Tree (PVRST) on a VLAN.

guard root

To prevent a port from becoming the root port for the switch, use the **guard root** command in MSTP interface configuration submode.

guard root

Syntax Description This command has no keywords or arguments.

Command Default RootGuard is disabled.

Command Modes MSTP interface configuration

Command History	Release	Modification
	Release 3.7.1	This command was introduced.

Usage Guidelines To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

This command enables the Root Guard feature on the interface, by preventing the port from becoming a root port. This feature can be used to enforce the location of the root bridge within the MSTP network. For more information on guard root feature, refer to the *Implementing Multiple Spanning Tree Protocol* module in the *Cisco ASR 9000 Series Aggregation Services Router L2VPN and Ethernet Services Configuration Guide*.

Task ID	Task ID	Operations
	interface	read, write

Examples

The following example shows how to enable RootGuard on the port:

```
RP/0/RSP0/CPU0:router(config-mstp-if)# guard root
```

Related Commands	Command	Description
	debug spanning-tree mst packet, on page 11	Enables debugging for sent and received MSTP packets.
	debug spanning-tree mst protocol-state, on page 13	Enables debugging protocol-state changes such as port role or state changes, topology change notification.
	interface (MSTP), on page 39	Enters the MSTP interface configuration submode, and enables STP for the specified port.
	spanning-tree mst, on page 109	Enters the MSTP configuration submode
	show spanning-tree mst, on page 81	Displays the multiple spanning tree protocol status information.

guard topology-change

To enable topology change guard on the port, use the **guard topology-change** command in MSTP interface configuration submode.

guard topology-change

Syntax Description This command has no keywords or arguments.

Command Default TopologyChangeGuard is disabled.

Command Modes MSTP interface configuration

Command History

Release	Modification
Release 3.7.1	This command was introduced.

Usage Guidelines To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

This command enables topology change guard (also known as restricted TCN) on this interface. When this feature is enabled, topology changes originating at this interfaces, or received in BPDUs on this interface, are not propagated to the rest of the MSTP network. For more information on guard topology, refer to the

hello-time (Access Gateway)

Implementing Multiple Spanning Tree Protocol module in the Cisco ASR 9000 Series Aggregation Services Router L2VPN and Ethernet Services Configuration Guide.

Task ID	Task ID Operations												
	interface read, write												
Examples	The following example shows how to enable TopologyChangeGuard on the port:												
<pre>RP/0/RSP0/CPU0:router (config-mstp-if) # guard topology-change</pre>													
Related Commands	<table border="1"> <thead> <tr> <th>Command</th><th>Description</th></tr> </thead> <tbody> <tr> <td>debug spanning-tree mst packet, on page 11</td><td>Enables debugging for sent and received MSTP packets.</td></tr> <tr> <td>debug spanning-tree mst protocol-state, on page 13</td><td>Enables debugging protocol-state changes such as port role or state changes, topology change notification.</td></tr> <tr> <td>interface (MSTP), on page 39</td><td>Enters the MSTP interface configuration submode, and enables STP for the specified port.</td></tr> <tr> <td>spanning-tree mst, on page 109</td><td>Enters the MSTP configuration submode</td></tr> <tr> <td>show spanning-tree mst, on page 81</td><td>Displays the multiple spanning tree protocol status information.</td></tr> </tbody> </table>	Command	Description	debug spanning-tree mst packet, on page 11	Enables debugging for sent and received MSTP packets.	debug spanning-tree mst protocol-state, on page 13	Enables debugging protocol-state changes such as port role or state changes, topology change notification.	interface (MSTP), on page 39	Enters the MSTP interface configuration submode, and enables STP for the specified port.	spanning-tree mst, on page 109	Enters the MSTP configuration submode	show spanning-tree mst, on page 81	Displays the multiple spanning tree protocol status information.
Command	Description												
debug spanning-tree mst packet, on page 11	Enables debugging for sent and received MSTP packets.												
debug spanning-tree mst protocol-state, on page 13	Enables debugging protocol-state changes such as port role or state changes, topology change notification.												
interface (MSTP), on page 39	Enters the MSTP interface configuration submode, and enables STP for the specified port.												
spanning-tree mst, on page 109	Enters the MSTP configuration submode												
show spanning-tree mst, on page 81	Displays the multiple spanning tree protocol status information.												

hello-time (Access Gateway)

To configure the frequency of sending BPDUs on this interface, use the **hello-time** command in MSTAG interface configuration, REPAG Interface configuration, PVSTAG VLAN configuration, or PVRSTAG VLAN configuration submode.

hello-time seconds

Syntax Description	<i>seconds</i> Hello time in seconds. Range is 1 to 2.						
Command Default	<i>seconds: 2</i>						
Command Modes	MSTAG interface configuration, REPAG Interface configuration, PVSTAG VLAN configuration, PVRSTAG VLAN configuration						
Command History	<table border="1"> <thead> <tr> <th>Release</th><th>Modification</th></tr> </thead> <tbody> <tr> <td>Release 3.7.1</td><td>This command was introduced.</td></tr> <tr> <td>Release 4.0.0</td><td>This command was supported in the PVSTAG VLAN configuration and PVRSTAG VLAN configuration mode.</td></tr> </tbody> </table>	Release	Modification	Release 3.7.1	This command was introduced.	Release 4.0.0	This command was supported in the PVSTAG VLAN configuration and PVRSTAG VLAN configuration mode.
Release	Modification						
Release 3.7.1	This command was introduced.						
Release 4.0.0	This command was supported in the PVSTAG VLAN configuration and PVRSTAG VLAN configuration mode.						

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID

Task ID	Operations
interface (for MSTAG/REPAG)	read, write
ethernet-services (for PVSTAG/PVRSTAG)	read, write

Examples

The following example shows how to set the port hello time to 1:

```
RP/0/RSP0/CPU0:router(config-mstag-if)# hello-time 1
```

Related Commands

Command	Description
debug spanning-tree mstag packet, on page 14	Enables MSTAG packet debugging.
debug spanning-tree pvrstag packet, on page 18	Enables packet debugging for sent and received PVRSTAG packets.
debug spanning-tree pvstag packet, on page 20	Enables packet debugging for sent and received PVSTAG packets.
debug spanning-tree repag packet, on page 21	Enables Resilient Ethernet Protocol (REP) Access Gateway debugging commands.
interface (MSTAG/REPAG), on page 37	Enter the MSTAG interface configuration submode, and enables MSTAG for the specified port.
interface (PVSTAG/PVRSTAG), on page 41	Enters PVST or PVRST Access Gateway Interface configuration submode and enables either PVSTAG or PVRSTAG for the specified port.
spanning-tree mstag, on page 110	Enters the MST Access Gateway configuration submode.
spanning-tree pvrstag, on page 112	Enters the Per VLAN Rapid Spanning Tree Access Gateway (PVRSTAG) configuration submode.
spanning-tree pvstag, on page 113	Enters the Per VLAN Spanning Tree Access Gateway (PVSTAG) configuration submode.
spanning-tree repag, on page 114	Enters the Resilient Ethernet Protocol Access Gateway (REPAG) configuration submode.
show spanning-tree mstag, on page 92	Displays the values currently used for populating the BPUDUs sent by all ports.
show spanning-tree pvrstag, on page 101	Displays the values currently used for populating the BPUDUs sent by all ports.

hello-time (MSTP)

Command	Description
show spanning-tree pvstag, on page 102	Displays the values currently used for populating the BPDUs sent by all ports.
show spanning-tree repag, on page 104	Displays the values currently used for populating the BPDUs sent by all ports.
vlan, on page 118	Enables a PVST or PVRST VLAN instance on the interface and enters PVSTAG or PVRSTAG VLAN configuration mode.

hello-time (MSTP)

To set the port hello time, use the **hello-time** command in MSTP interface configuration submode.

hello-time seconds

Syntax Description	<i>seconds</i> Hello time in seconds. Range is 1 to 2.
---------------------------	--

Command Default	<i>seconds: 2</i>
------------------------	-------------------

Command Modes	MSTP interface configuration
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Command History	Release	Modification
	Release 3.7.1	This command was introduced.

Usage Guidelines	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.
-------------------------	---

Task ID	Task ID	Operations
	interface	read, write

Examples	The following example shows how to set the port hello time to 1:
-----------------	--

```
RP/0/RSP0/CPU0:router(config-mstp-if)# hello-time 1
```

Related Commands	Command	Description
	debug spanning-tree mst packet, on page 11	Enables debugging for sent and received MSTP packets.
	debug spanning-tree mst protocol-state, on page 13	Enables debugging protocol-state changes such as port role or state changes, topology change notification.

Command	Description
interface (MSTP), on page 39	Enters the MSTP interface configuration submode, and enables STP for the specified port.
spanning-tree mst, on page 109	Enters the MSTP configuration submode
show spanning-tree mst, on page 81	Displays the multiple spanning tree protocol status information.

instance (MSTAG/REPAG)

To enter MSTAG Instance configuration mode or REPAG Instance configuration mode, use the **instance** command in MSTAG Interface or REPAG Interface configuration mode respectively.

instance *id*

Syntax Description	<i>id</i> MSTI ID. Range is 0 to 4094.				
Command Default	None				
Command Modes	MST AG interface configuration, REPAG interface configuration				
Command History	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 3.7.1</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 3.7.1	This command was introduced.
Release	Modification				
Release 3.7.1	This command was introduced.				
Usage Guidelines	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.				
Note	 <p>An instance ID of 0 represents the IST for the region.</p>				
Task ID	<table border="1"> <thead> <tr> <th>Task ID</th> <th>Operations</th> </tr> </thead> <tbody> <tr> <td>interface</td> <td>read, write</td> </tr> </tbody> </table>	Task ID	Operations	interface	read, write
Task ID	Operations				
interface	read, write				
Examples	The following example shows how to enter MSTAG Instance configuration submode:				

instance (MSTP)

```
RP/0/RSP0/CPU0:router(config-mstag)# instance 101
RP/0/RSP0/CPU0:router(config-mstag-inst)#
```

Related Commands	Command	Description
	debug spanning-tree mstag packet, on page 14	Enables MSTAG packet debugging.
	debug spanning-tree repag packet, on page 21	Enables Resilient Ethernet Protocol (REP) Access Gateway debugging commands.
	interface (MSTAG/REPAG), on page 37	Enter the MSTAG interface configuration submode, and enables MSTAG for the specified port.
	spanning-tree mstag, on page 110	Enters the MST Access Gateway configuration submode.
	spanning-tree repag, on page 114	Enters the Resilient Ethernet Protocol Access Gateway (REPAG) configuration submode.
	show spanning-tree mstag, on page 92	Displays the values currently used for populating the BPDUs sent by all ports.
	show spanning-tree repag, on page 104	Displays the values currently used for populating the BPDUs sent by all ports.

instance (MSTP)

To enter the multiple spanning tree instance (MSTI) configuration submode, use the **instance** command in MSTP configuration submode.

instance *id*

Syntax Description	<i>id</i> MSTI ID. Range is 0 to 4094.
---------------------------	--

Command Default	None
------------------------	------

Command Modes	MSTP configuration
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Command History	Release	Modification
	Release 3.7.1	This command was introduced.

Usage Guidelines	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.
-------------------------	---

**Note**

An instance ID of 0 represents the CIST for the region.

Task ID**Task ID Operations**

interface read,
write

Examples

The following example shows how to enter the MSTI configuration submode:

```
RP/0/RSP0/CPU0:router(config-mstp)#
RP/0/RSP0/CPU0:router(config-mstp-inst)#
```

Related Commands

Command	Description
debug spanning-tree mst packet, on page 11	Enables debugging for sent and received MSTP packets.
debug spanning-tree mst protocol-state, on page 13	Enables debugging protocol-state changes such as port role or state changes, topology change notification.
priority (MSTP), on page 64	Sets the bridge priority for the current MSTI
show spanning-tree mst, on page 81	Displays the multiple spanning tree protocol status information.
spanning-tree mst, on page 109	Enters the MSTP configuration submode
vlan-id (MSTP), on page 121	Associates a set of VLAN IDs with the current MSTI.

instance cost

To set the internal path cost for a given instance on the current port, use the **instance cost** command in MSTP interface configuration submode.

instance id cost cost

Syntax Description

id MSTI ID. Range is 0 to 4094.

cost Port cost. Range is 1 to 200000000.

Command Default

The default path cost depends on the speed of the link.

Command Modes

MSTP interface configuration

instance port-priority

Command History	Release	Modification												
	Release 3.7.1	This command was introduced.												
Usage Guidelines	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.													
	 Note An instance ID of 0 represents the IST for the region.													
Task ID	Task ID Operations <table border="1"> <tr> <td>interface</td> <td>read, write</td> </tr> </table>		interface	read, write										
interface	read, write													
Examples	The following example shows how to set the port cost to 10000 for the instance ID 101:													
	<pre>RP/0/RSP0/CPU0:router(config-mstp-if)# instance 101 cost 10000</pre>													
Related Commands	<table border="1"> <thead> <tr> <th>Command</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>debug spanning-tree mst packet, on page 11</td> <td>Enables debugging for sent and received MSTP packets.</td> </tr> <tr> <td>debug spanning-tree mst protocol-state, on page 13</td> <td>Enables debugging protocol-state changes such as port role or state changes, topology change notification.</td> </tr> <tr> <td>interface (MSTP), on page 39</td> <td>Enters the MSTP interface configuration submode, and enables STP for the specified port.</td> </tr> <tr> <td>spanning-tree mst, on page 109</td> <td>Enters the MSTP configuration submode</td> </tr> <tr> <td>show spanning-tree mst, on page 81</td> <td>Displays the multiple spanning tree protocol status information.</td> </tr> </tbody> </table>		Command	Description	debug spanning-tree mst packet, on page 11	Enables debugging for sent and received MSTP packets.	debug spanning-tree mst protocol-state, on page 13	Enables debugging protocol-state changes such as port role or state changes, topology change notification.	interface (MSTP), on page 39	Enters the MSTP interface configuration submode, and enables STP for the specified port.	spanning-tree mst, on page 109	Enters the MSTP configuration submode	show spanning-tree mst, on page 81	Displays the multiple spanning tree protocol status information.
Command	Description													
debug spanning-tree mst packet, on page 11	Enables debugging for sent and received MSTP packets.													
debug spanning-tree mst protocol-state, on page 13	Enables debugging protocol-state changes such as port role or state changes, topology change notification.													
interface (MSTP), on page 39	Enters the MSTP interface configuration submode, and enables STP for the specified port.													
spanning-tree mst, on page 109	Enters the MSTP configuration submode													
show spanning-tree mst, on page 81	Displays the multiple spanning tree protocol status information.													

instance port-priority

To set the port priority performance parameter for the MSTI, use the **instance port-priority** command in MSTP interface configuration submode.

instance id port-priority priority

Syntax Description	<i>id</i>	MSTI ID. Range is 0 to 4094.
	<i>priority</i>	Port priority. Range is 0 to 240 in multiples of 16.

Command Default	<i>priority: 128</i>												
Command Modes	MSTP interface configuration												
Command History	<table border="1"> <thead> <tr> <th>Release</th><th>Modification</th></tr> </thead> <tbody> <tr> <td>Release 3.7.1</td><td>This command was introduced.</td></tr> </tbody> </table>	Release	Modification	Release 3.7.1	This command was introduced.								
Release	Modification												
Release 3.7.1	This command was introduced.												
Usage Guidelines	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.												
 Note	An instance ID of 0 represents the CIST for the region.												
Task ID	<table border="1"> <thead> <tr> <th>Task ID</th><th>Operations</th></tr> </thead> <tbody> <tr> <td>interface</td><td>read, write</td></tr> </tbody> </table>	Task ID	Operations	interface	read, write								
Task ID	Operations												
interface	read, write												
Examples	The following example shows how to set the port priority to 160 for the instance ID 101:												
<pre>RP/0/RSP0/CPU0:router(config-mstp-if)# instance 101 port-priority 160</pre>													
Related Commands	<table border="1"> <thead> <tr> <th>Command</th><th>Description</th></tr> </thead> <tbody> <tr> <td>debug spanning-tree mst packet, on page 11</td><td>Enables debugging for sent and received MSTP packets.</td></tr> <tr> <td>debug spanning-tree mst protocol-state, on page 13</td><td>Enables debugging protocol-state changes such as port role or state changes, topology change notification.</td></tr> <tr> <td>interface (MSTP), on page 39</td><td>Enters the MSTP interface configuration submode, and enables STP for the specified port.</td></tr> <tr> <td>spanning-tree mst, on page 109</td><td>Enters the MSTP configuration submode</td></tr> <tr> <td>show spanning-tree mst, on page 81</td><td>Displays the multiple spanning tree protocol status information.</td></tr> </tbody> </table>	Command	Description	debug spanning-tree mst packet, on page 11	Enables debugging for sent and received MSTP packets.	debug spanning-tree mst protocol-state, on page 13	Enables debugging protocol-state changes such as port role or state changes, topology change notification.	interface (MSTP), on page 39	Enters the MSTP interface configuration submode, and enables STP for the specified port.	spanning-tree mst, on page 109	Enters the MSTP configuration submode	show spanning-tree mst, on page 81	Displays the multiple spanning tree protocol status information.
Command	Description												
debug spanning-tree mst packet, on page 11	Enables debugging for sent and received MSTP packets.												
debug spanning-tree mst protocol-state, on page 13	Enables debugging protocol-state changes such as port role or state changes, topology change notification.												
interface (MSTP), on page 39	Enters the MSTP interface configuration submode, and enables STP for the specified port.												
spanning-tree mst, on page 109	Enters the MSTP configuration submode												
show spanning-tree mst, on page 81	Displays the multiple spanning tree protocol status information.												

interface (MSTAG/REPAG)

To enter the MSTAG interface configuration submode, and to enable MSTAG for the specified port, use the **interface** command in MSTAG configuration submode.

interface {Bundle-Ether | GigabitEthernet | TenGigE} *instance.subinterface*

Syntax Description	<i>instance.subinterface</i>	Physical interface instance, followed by the subinterface identifier. Naming notation is instance.subinterface, and a period between arguments is required as part of the notation.				
		<ul style="list-style-type: none"> • Replace the instance argument with the following physical interface instance. Naming notation is rack/slot/module/port and a slash between values is required as part of the notation. <ul style="list-style-type: none"> • rack—Chassis number of the rack. • slot—Physical slot number of the card. • module—Module number. A physical layer interface module (PLIM) is always 0. • port—Physical port number of the interface. • Replace the subinterface argument with the subinterface value. Range is from 0 through 4095. 				
Command Default	None					
Command Modes	MSTAG configuration, REPAG configuration					
Command History	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left; padding: 2px;">Release</th> <th style="text-align: left; padding: 2px;">Modification</th> </tr> </thead> <tbody> <tr> <td style="padding: 2px;">Release 3.7.1</td> <td style="padding: 2px;">This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 3.7.1	This command was introduced.	
Release	Modification					
Release 3.7.1	This command was introduced.					
Usage Guidelines	<p>To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.</p> <p>The specified subinterface must be configured to match untagged packets, i.e., it must be configured with encapsulation untagged. Only a single subinterface on any given port may be specified.</p> <p>A given port may only be enabled with one of MSTP, MSTAG, REPAG, PVSTAG or PVRSTAG.</p>					
Task ID	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left; padding: 2px;">Task ID</th> <th style="text-align: left; padding: 2px;">Operations</th> </tr> </thead> <tbody> <tr> <td style="padding: 2px;">interface</td> <td style="padding: 2px;">read, write</td> </tr> </tbody> </table>		Task ID	Operations	interface	read, write
Task ID	Operations					
interface	read, write					
Examples	The following example shows how to enter the MSTAG interface configuration submode:					

```
RP/0/RSP0/CPU0:router(config-mstag) # interface GigabitEthernet0/2/0/30.1
RP/0/RSP0/CPU0:router(config-mstag-if) #
```

Related Commands	Command	Description
	debug spanning-tree mstag packet, on page 14	Enables MSTAG packet debugging.
	debug spanning-tree repag packet, on page 21	Enables Resilient Ethernet Protocol (REP) Access Gateway debugging commands.
	spanning-tree mstag, on page 110	Enters the MST Access Gateway configuration submode.
	spanning-tree repag, on page 114	Enters the Resilient Ethernet Protocol Access Gateway (REPAG) configuration submode.
	show spanning-tree mstag, on page 92	Displays the values currently used for populating the BPDUs sent by all ports.
	show spanning-tree repag, on page 104	Displays the values currently used for populating the BPDUs sent by all ports.

interface (MSTP)

To enter the MSTP interface configuration submode, and to enable STP for the specified port, use the **interface** command in MSTP configuration submode.

interface {Bundle-Ether | GigabitEthernet | TenGigE} *instance*

Syntax Description	<i>instance</i> Forward interface in rack/slot-instance/port format.	
Command Default	None	
Command Modes	MSTP configuration	
Command History	Release	Modification
	Release 3.7.1	This command was introduced.
Usage Guidelines	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance. A given port may only be enabled with one of MSTP, MSTAG, REPAG, PVSTAG or PVRSTAG.	
Task ID	Task ID	Operations
	interface	read, write

Examples

The following example shows how to enter the MSTP interface configuration submode:

```
RP/0/RSP0/CPU0:router(config-mstp) # interface GigabitEthernet 0/0/0/1
RP/0/RSP0/CPU0:router(config-mstp-if) #
```

Related Commands	Command	Description
	debug spanning-tree mst packet, on page 11	Enables debugging for sent and received MSTP packets.
	debug spanning-tree mst protocol-state, on page 13	Enables debugging protocol-state changes such as port role or state changes, topology change notification.
	spanning-tree mst, on page 109	Enters the MSTP configuration submode
	show spanning-tree mst, on page 81	Displays the multiple spanning tree protocol status information.

interface (PVRST)

To enable and configure Per VLAN Rapid Spanning Tree (PVRST) on an interface, use the **interface** command in PVRST configuration mode. To disable PVRST, use the **no** form of this command.

```
interface {Bundle-Ether | FastEthernet | FortyGigE | GigabitEthernet | HundredGigE | TenGigE}[{guard | hello-time | link-type | portfast | vlan}]
no interface {Bundle-Ether | FastEthernet | FortyGigE | GigabitEthernet | HundredGigE | TenGigE}[{guard | hello-time | link-type | portfast | vlan}]
```

Syntax Description	Bundle-Ether Specifies Aggregated Ethernet interface.
	FastEthernet Specifies FastEthernet/IEEE 802.3 interface.
	FortyGigE Specifies FortyGigabitEthernet or IEEE 802.3 interface.
	GigabitEthernet Specifies GigabitEthernet or IEEE 802.3 interface.
	HundredGigE Specifies HundredGigabitEthernet or IEEE 802.3 interface.
	TenGigE Specifies TenGigabitEthernet or IEEE 802.3 interface.
	guard Specifies bridge guard features.
	hello-time Specifies Hello-Time interface.
	link-type Specifies the link type of an interface.
	portfast Specifies Portfast for an interface.
	vlan Specifies VLAN configuration for an interface.
Command Default	None

Command Modes	PVRST configuration											
Command History	Release	Modification										
	Release 5.1	This command was introduced.										
Usage Guidelines	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.											
Task ID	Task ID	Operations										
	ethernet-services	read, write										
Examples	This example shows how to enter the PVRST Interface configuration mode:											
	<pre>RP/0/RSP0/CPU0:router(config)# spanning-tree pvrst st1 RP/0/RSP0/CPU0:router(config-pvrst)# interface GigabitEthernet 0/0/0/1 RP/0/RSP0/CPU0:router(config-pvrst-if) #</pre>											
Related Commands	<table border="1"> <thead> <tr> <th>Command</th><th>Description</th></tr> </thead> <tbody> <tr> <td>forward-delay (PVRST), on page 27</td><td>Sets the forward-delay time for the bridge.</td></tr> <tr> <td>maximum (PVRST), on page 50</td><td>Sets the maximum age for the bridge.</td></tr> <tr> <td>transmit (PVRST), on page 116</td><td>Sets the transmit hold count performance parameter.</td></tr> <tr> <td>vlan (PVRST), on page 119</td><td>Configures Per VLAN Rapid Spanning Tree (PVRST) on a VLAN.</td></tr> </tbody> </table>		Command	Description	forward-delay (PVRST), on page 27	Sets the forward-delay time for the bridge.	maximum (PVRST), on page 50	Sets the maximum age for the bridge.	transmit (PVRST), on page 116	Sets the transmit hold count performance parameter.	vlan (PVRST), on page 119	Configures Per VLAN Rapid Spanning Tree (PVRST) on a VLAN.
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transmit (PVRST), on page 116	Sets the transmit hold count performance parameter.											
vlan (PVRST), on page 119	Configures Per VLAN Rapid Spanning Tree (PVRST) on a VLAN.											

interface (PVSTAG/PVRSTAG)

To enter PVST or PVRST Access Gateway Interface configuration submode and to enable either PVSTAG or PVRSTAG for the specified port, use the **interface** command in PVST and PVRST Access Gateway configuration submode.

interface {GigabitEthernet | TenGigE} instance

Syntax Description	<i>instance</i> Forward interface in rack/slot-instance/port format.
Command Default	None
Command Modes	PVSTAG and PVRSTAG configuration

interface (MSTAG Uplink Tracking)

Command History	Release	Modification
	Release 4.0.0	This command was introduced.
Usage Guidelines		
	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.	
	A given port may only be enabled with one of MSTP, MSTAG, REPAG, PVSTAG or PVRSTAG.	
Task ID	Task ID	Operations
	ethernet-services	read, write
Examples	The following example shows how to enter the PVST or PVRST Access Gateway Interface configuration submode:	
<pre>RP/0/RSP0/CPU0:router(config-pvstag)# interface GigabitEthernet 0/0/0/1 RP/0/RSP0/CPU0:router(config-pvstag-if) #</pre>		
Related Commands	Command	Description
	debug spanning-tree pvrstag packet, on page 18	Enables packet debugging for sent and received PVRSTAG packets.
	debug spanning-tree pvstag packet, on page 20	Enables packet debugging for sent and received PVSTAG packets.
	show spanning-tree pvrstag, on page 101	Displays the values currently used for populating the BPDUs sent by all ports.
	show spanning-tree pvstag, on page 102	Displays the values currently used for populating the BPDUs sent by all ports.
	spanning-tree pvrstag, on page 112	Enters the Per VLAN Rapid Spanning Tree Access Gateway (PVRSTAG) configuration submode.
	spanning-tree pvstag, on page 113	Enters the Per VLAN Spanning Tree Access Gateway (PVSTAG) configuration submode.
	vlan, on page 118	Enables a PVST or PVRST VLAN instance on the interface and enters PVSTAG or PVRSTAG VLAN configuration mode.

interface (MSTAG Uplink Tracking)

To enable MSTAG Uplink tracking for the specified port, use the **interface** command in the MSTAG Uplink tracking submode.

interface {Bundle-Ether | GigabitEthernet | TenGigE} *instance.subinterface*

Syntax Description	<p><i>instance.subinterface</i> Physical interface instance, optionally followed by the subinterface identifier. Naming notation is instance.subinterface, and a period between arguments is required as part of the notation.</p> <ul style="list-style-type: none"> • Replace the instance argument with the following physical interface instance. Naming notation is rack/slot/module/port and a slash between values is required as part of the notation. <ul style="list-style-type: none"> • rack—Chassis number of the rack. • slot—Physical slot number of the card. • module—Module number. A physical layer interface module (PLIM) is always 0. • port—Physical port number of the interface. • Replace the subinterface argument with the subinterface value. Range is from 0 through 4095. 				
Command Default	None				
Command Modes	MSTAG Uplink Tracking configuration submode				
Command History	<table border="1"> <thead> <tr> <th>Release</th><th>Modification</th></tr> </thead> <tbody> <tr> <td>Release 6.2.2</td><td>This command was introduced.</td></tr> </tbody> </table>	Release	Modification	Release 6.2.2	This command was introduced.
Release	Modification				
Release 6.2.2	This command was introduced.				
Usage Guidelines	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.				
Task ID	<table border="1"> <thead> <tr> <th>Task ID</th><th>Operations</th></tr> </thead> <tbody> <tr> <td>interface</td><td>read, write</td></tr> </tbody> </table>	Task ID	Operations	interface	read, write
Task ID	Operations				
interface	read, write				
Examples	The following example shows how to enter the MSTAG Uplink tracking interface configuration submode:				
	<pre>RP/0/RSP0/CPU0:router(config-mstag)# track RP/0/RSP0/CPU0:router(config-mstag-track)# interface GigabitEthernet0/2/0/30.1 RP/0/RSP0/CPU0:router(config-mstag-track)#</pre>				
Related Commands	<table border="1"> <thead> <tr> <th>Command</th><th>Description</th></tr> </thead> <tbody> <tr> <td>debug spanning-tree mstag packet, on page 14</td><td>Enables MSTAG packet debugging.</td></tr> </tbody> </table>	Command	Description	debug spanning-tree mstag packet, on page 14	Enables MSTAG packet debugging.
Command	Description				
debug spanning-tree mstag packet, on page 14	Enables MSTAG packet debugging.				

Command	Description
debug spanning-tree repag packet, on page 21	Enables Resilient Ethernet Protocol (REP) Access Gateway debugging commands.
spanning-tree mstag, on page 110	Enters the MST Access Gateway configuration submode.
spanning-tree repag, on page 114	Enters the Resilient Ethernet Protocol Access Gateway (REPAG) configuration submode.
show spanning-tree mstag, on page 92	Displays the values currently used for populating the BPDUs sent by all ports.
show spanning-tree repag, on page 104	Displays the values currently used for populating the BPDUs sent by all ports.

join-time

To set the join time for all active ports, use the **join-time** command in the MVRP configuration mode. To return to the default value, use the **no** form of this command.

join-time interval
no join-time interval

Syntax Description	<i>interval</i> Maximum time for the join timer parameter for all active ports. The range is from 100 to 1000. The default value is 200.				
Command Default	The default is 200 milliseconds.				
Command Modes	MVRP configuration				
Command History	<table> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 3.9.1</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 3.9.1	This command was introduced.
Release	Modification				
Release 3.9.1	This command was introduced.				
Usage Guidelines	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.				
Task ID	<table> <thead> <tr> <th>Task ID</th> <th>Operations</th> </tr> </thead> <tbody> <tr> <td>ethernet-services</td> <td>read, write</td> </tr> </tbody> </table>	Task ID	Operations	ethernet-services	read, write
Task ID	Operations				
ethernet-services	read, write				

Examples

The following example shows how to configure the join time for active ports:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# spanning-tree mst AA
```

```
RP/0/RSP0/CPU0:router(config-mstp) # mvrp static
RP/0/RSP0/CPU0:router(config-mvrv) # periodic transmit interval 5
RP/0/RSP0/CPU0:router(config-mvrv) # join-time 200
!
```

Related Commands	Command	Description
	debug ethernet mvrp packets, on page 9	Enables debugging of sent and received MVRP packets.
	debug ethernet mvrp protocol, on page 10	Enables MVRP protocol debugging on a specific interface, location or vlan.
	mvrp static, on page 53	Enables Multiple VLAN Registration Protocol (MVRP) in static mode.
	show ethernet mvrp mad, on page 75	Displays the current state of the Multiple Registration Protocol (MRP) Attribute Declaration (MAD) component on a port.
	show ethernet mvrp statistics, on page 76	Displays packet statistics per port.
	show ethernet mvrp status, on page 77	Displays a summary of the VIDs that are declared or registered.

leave-time

To set the leave time for all active ports, use the **leave-time** command in the MVRP configuration mode. To return to the default value, use the **no** form of this command.

```
leave-time interval
no leave-time interval
```

Syntax Description	<i>interval</i> Minimum time, in seconds, for the leaveall timer parameter for all active ports. The range is from 1 to 90 seconds .					
Command Default	The default is 30 seconds.					
Command Modes	MVRP configuration					
Command History	<table border="1"> <thead> <tr> <th>Release</th><th>Modification</th></tr> </thead> <tbody> <tr> <td>Release 3.9.1</td><td>This command was introduced.</td></tr> </tbody> </table>		Release	Modification	Release 3.9.1	This command was introduced.
Release	Modification					
Release 3.9.1	This command was introduced.					
Usage Guidelines	Task ID	Operations				
	ethernet-services	read, write				

leaveall-time**Examples**

The following example shows how to configure the join time for active ports:

```
RP/0/RSP0/CPU0:router# configuration
RP/0/RSP0/CPU0:router(config)# spanning-tree mst AA
RP/0/RSP0/CPU0:router(config-mstp)# mvrp static
RP/0/RSP0/CPU0:router(config-mvrp)# periodic transmit interval 5
RP/0/RSP0/CPU0:router(config-mvrp)# leave-time 30!
```

Related Commands	Command	Description
	debug ethernet mvrp packets, on page 9	Enables debugging of sent and received MVRP packets.
	debug ethernet mvrp protocol, on page 10	Enables MVRP protocol debugging on a specific interface, location or vlan.
	mvrp static, on page 53	Enables Multiple VLAN Registration Protocol (MVRP) in static mode.
	show ethernet mvrp mad, on page 75	Displays the current state of the Multiple Registration Protocol (MRP) Attribute Declaration (MAD) component on a port.
	show ethernet mvrp statistics, on page 76	Displays packet statistics per port.
	show ethernet mvrp status, on page 77	Displays a summary of the VIDs that are declared or registered.

leaveall-time

To set the leave all time for all active ports, use the **leaveall-time** command in the MVRP configuration mode. To return to the default value, use the **no** form of this command.

```
leaveall-time interval
no leaveall-time interval
```

Syntax Description	<i>interval</i> Minimum time, in seconds, for the leaveall timer parameter for all active ports. The range is from 5 to 30 seconds.				
Command Default	The default is 10 seconds.				
Command Modes	MVRP configuration				
Command History	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 3.9.1</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 3.9.1	This command was introduced.
Release	Modification				
Release 3.9.1	This command was introduced.				
Usage Guidelines	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.				

Task ID	Task ID	Operations
	ethernet-services	read, write

Examples

The following example shows how to configure the join time for active ports:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# spanning-tree mst AA
RP/0/RSP0/CPU0:router(config-mstp)# mvrp static
RP/0/RSP0/CPU0:router(config-mvrp)# periodic transmit interval 5
RP/0/RSP0/CPU0:router(config-mvrp)# leaveall-time 20
```

Related Commands	Command	Description
	debug ethernet mvrp packets, on page 9	Enables debugging of sent and received MVRP packets.
	debug ethernet mvrp protocol, on page 10	Enables MVRP protocol debugging on a specific interface, location or vlan.
	mvrp static, on page 53	Enables Multiple VLAN Registration Protocol (MVRP) in static mode.
	show ethernet mvrp mad, on page 75	Displays the current state of the Multiple Registration Protocol (MRP) Attribute Declaration (MAD) component on a port.
	show ethernet mvrp statistics, on page 76	Displays packet statistics per port.
	show ethernet mvrp status, on page 77	Displays a summary of the VIDs that are declared or registered.

link-type

To set the link type of the port to point-to-point or multipoint, use the **link-type** command in MSTP interface configuration submode.

link-type {point-to-point | multipoint}

Syntax Description	This command has no keywords or arguments.
---------------------------	--

Command Default	The default value is derived from the duplex setting for the link. A full-duplex link is considered point-to-point, and all others are considered multipoint.
------------------------	---

Command Modes	MSTP interface configuration
----------------------	------------------------------

Command History	Release	Modification
	Release 3.7.1	This command was introduced.

max age**Usage Guidelines**

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID**Task ID Operations**

interface read,
write

Examples

The following example shows how to set the link type of the port to point-to-point:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# spanning-tree mst A
RP/0/RSP0/CPU0:router(config-mstp)# interface GigabitEthernet 0/3/0/3
RP/0/RSP0/CPU0:router(config-mstp-if)# link-type point-to-point
```

Related Commands

Command	Description
debug spanning-tree mst packet, on page 11	Enables debugging for sent and received MSTP packets.
debug spanning-tree mst protocol-state, on page 13	Enables debugging protocol-state changes such as port role or state changes, topology change notification.
interface (MSTP), on page 39	Enters the MSTP interface configuration submode, and enables STP for the specified port.
spanning-tree mst, on page 109	Enters the MSTP configuration submode
show spanning-tree mst, on page 81	Displays the multiple spanning tree protocol status information.

max age

To set the maximum age for BPDUs sent on this interface, use the **max age** command in MSTAG interface configuration, REPAG interface configuration, PVSTAG VLAN configuration, or PVRSTAG VLAN configuration submode.

max age seconds

Syntax Description

seconds Maximum age time for the bridge in seconds. Range is 6 to 40.

Command Default

seconds: 20

Command Modes

MSTAG interface configuration, REPAG interface configuration, PVSTAG VLAN configuration, PVRSTAG VLAN configuration

Command History**Release Modification**

Release 3.7.1 This command was introduced.

Release	Modification
Release 4.0.0	This command was supported in the PVSTAG VLAN and PVRSTAG VLAN configuration modes.

Usage Guidelines To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID	Task ID	Operations
	ethernet-services (PVSTAG and PVRSTAG only)	read, write
	interface (MSTAG and REPAG only)	read, write

Examples The following example shows how to set the maximum age time for the bridge to 20:

```
RP/0/RSP0/CPU0:router(config-mstag-if)# max age 20
```

Related Commands	Command	Description
	debug spanning-tree mstag packet, on page 14	Enables MSTAG packet debugging.
	debug spanning-tree pvrstag packet, on page 18	Enables packet debugging for sent and received PVRSTAG packets.
	debug spanning-tree pvstag packet, on page 20	Enables packet debugging for sent and received PVSTAG packets.
	debug spanning-tree repag packet, on page 21	Enables Resilient Ethernet Protocol (REP) Access Gateway debugging commands.
	interface (MSTAG/REPAG), on page 37	Enter the MSTAG interface configuration submode, and enables MSTAG for the specified port.
	interface (PVSTAG/PVRSTAG), on page 41	Enters PVST or PVRST Access Gateway Interface configuration submode and enables either PVSTAG or PVRSTAG for the specified port.
	spanning-tree mstag, on page 110	Enters the MST Access Gateway configuration submode.
	spanning-tree pvrstag, on page 112	Enters the Per VLAN Rapid Spanning Tree Access Gateway (PVRSTAG) configuration submode.
	spanning-tree pvstag, on page 113	Enters the Per VLAN Spanning Tree Access Gateway (PVSTAG) configuration submode.
	spanning-tree repag, on page 114	Enters the Resilient Ethernet Protocol Access Gateway (REPAG) configuration submode.

maximum (PVRST)

Command	Description
show spanning-tree mstag, on page 92	Displays the values currently used for populating the BPDUs sent by all ports.
show spanning-tree pvrstag, on page 101	Displays the values currently used for populating the BPDUs sent by all ports.
show spanning-tree pvstag, on page 102	Displays the values currently used for populating the BPDUs sent by all ports.
show spanning-tree repag, on page 104	Displays the values currently used for populating the BPDUs sent by all ports.
vlan, on page 118	Enables a PVST or PVRST VLAN instance on the interface and enters PVSTAG or PVRSTAG VLAN configuration mode.

maximum (PVRST)

To set the maximum age for the bridge, use the **maximum** command in PVRST configuration submode. To undo the setting, use the **no** form of this command.

maximum age seconds
no maximum age seconds

Syntax Description	age	Specifies the age of the bridge.				
	seconds	Maximum age time for the bridge in seconds. The range is from 6 to 40.				
Command Default	None					
Command Modes	PVRST configuration					
Command History	<table border="1"> <thead> <tr> <th>Release</th><th>Modification</th></tr> </thead> <tbody> <tr> <td>Release 5.1</td><td>This command was introduced.</td></tr> </tbody> </table>		Release	Modification	Release 5.1	This command was introduced.
Release	Modification					
Release 5.1	This command was introduced.					
Usage Guidelines	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.					
Task ID	Task ID	Operations				
	ethernet-services	read, write				
Examples	This example shows how to set the maximum age time for the bridge to 40:					

```
RP/0/RSP0/CPU0:router(config)# spanning-tree pvrst st1
RP/0/RSP0/CPU0:router(config-pvrst)# maximum age 40
```

Related Commands	Command	Description
	forward-delay (PVRST), on page 27	Sets the forward-delay time for the bridge.
	interface (PVRST), on page 40	Enables and configures Per VLAN Rapid Spanning Tree (PVRST) on an interface.
	transmit (PVRST), on page 116	Sets the transmit hold count performance parameter.
	vlan (PVRST), on page 119	Configures Per VLAN Rapid Spanning Tree (PVRST) on a VLAN.

maximum age

To set the maximum age parameter for the bridge, use the **maximum age** command in MSTP configuration submode.

maximum age seconds

Syntax Description	<i>seconds</i> Maximum age time for the bridge in seconds. Range is 6 to 40.	
Command Default	<i>seconds</i> : 20	
Command Modes	MSTP configuration	
Command History	Release	Modification
	Release 3.7.1 This command was introduced.	
Usage Guidelines	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.	
Task ID	Task ID Operations	
	interface read, write	
Examples	The following example shows how to set the maximum age time for the bridge to 40:	

maximum hops (MSTP)

```
RP/0/RSP0/CPU0:router(config-mstp) # maximum age 40
```

Related Commands	Command	Description
	spanning-tree mst, on page 109	Enters the MSTP configuration submode

maximum hops (MSTP)

To set the maximum hops parameters for the bridge, use the **maximum hops** command in MSTP configuration submode.

maximum hops *hops*

Syntax Description	<i>hops</i> Maximum number of hops for the bridge in seconds. Range is 6 to 40.
---------------------------	---

Command Default	<i>hops</i> : 20
------------------------	------------------

Command Modes	MSTP configuration
----------------------	--------------------

Command History	Release	Modification
	Release 3.7.1	This command was introduced.

Usage Guidelines	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.
-------------------------	---

Task ID	Task ID Operations
	interface read, write

Examples	The following example shows how to set the maximum number of hops for the bridge to 30:
-----------------	---

```
RP/0/RSP0/CPU0:router(config-mstp) # max hops 30
```

Related Commands	Command	Description
	debug spanning-tree mst packet, on page 11	Enables debugging for sent and received MSTP packets.
	debug spanning-tree mst protocol-state, on page 13	Enables debugging protocol-state changes such as port role or state changes, topology change notification.
	spanning-tree mst, on page 109	Enters the MSTP configuration submode

Command	Description
show spanning-tree mst, on page 81	Displays the multiple spanning tree protocol status information.

mvrp static

To enable Multiple VLAN Registration Protocol (MVRP) in static mode and to enter the MVRP configuration submode, use the **mvrp static** command in the MSTP configuration mode. To return to the default setting, use the **no** form of this command.

mvrp static
no mvrp static

Syntax Description	This command has no keywords or arguments.									
Command Default	None									
Command Modes	MSTP configuration									
Command History	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 3.9.1</td> <td>This command was introduced.</td> </tr> </tbody> </table>		Release	Modification	Release 3.9.1	This command was introduced.				
Release	Modification									
Release 3.9.1	This command was introduced.									
Usage Guidelines	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.									
Task ID	<table border="1"> <thead> <tr> <th>Task ID</th> <th>Operations</th> </tr> </thead> <tbody> <tr> <td>ethernet-services</td> <td>read, write</td> </tr> </tbody> </table>		Task ID	Operations	ethernet-services	read, write				
Task ID	Operations									
ethernet-services	read, write									
Examples	The following example shows how to enable MVRP static mode:									
	<pre>RP/0/RSP0/CPU0:router# configure RP/0/RSP0/CPU0:router(config)# spanning-tree mst AA RP/0/RSP0/CPU0:router(config-mstp)# mvrp static RP/0/RSP0/CPU0:router(config-mvrp)# </pre>									
Related Commands	<table border="1"> <thead> <tr> <th>Command</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>debug ethernet mvrp packets, on page 9</td> <td>Enables debugging of sent and received MVRP packets.</td> </tr> <tr> <td>debug ethernet mvrp protocol, on page 10</td> <td>Enables MVRP protocol debugging on a specific interface, location or vlan.</td> </tr> <tr> <td>join-time, on page 44</td> <td>Sets the join time for all active ports.</td> </tr> </tbody> </table>		Command	Description	debug ethernet mvrp packets, on page 9	Enables debugging of sent and received MVRP packets.	debug ethernet mvrp protocol, on page 10	Enables MVRP protocol debugging on a specific interface, location or vlan.	join-time, on page 44	Sets the join time for all active ports.
Command	Description									
debug ethernet mvrp packets, on page 9	Enables debugging of sent and received MVRP packets.									
debug ethernet mvrp protocol, on page 10	Enables MVRP protocol debugging on a specific interface, location or vlan.									
join-time, on page 44	Sets the join time for all active ports.									

name (MSTAG/REPAG)

Command	Description
leave-time, on page 45	Sets the leave time for all active ports.
leaveall-time, on page 46	Sets the leave all time for all active ports.
periodic transmit, on page 56	Sends periodic Multiple VLAN Registration Protocol Data Unit (MVRPDU) on all active ports.
show ethernet mvrp mad, on page 75	Displays the current state of the Multiple Registration Protocol (MRP) Attribute Declaration (MAD) component on a port.
show ethernet mvrp statistics, on page 76	Displays packet statistics per port.
show ethernet mvrp status, on page 77	Displays a summary of the VIDs that are declared or registered.
spanning-tree mst, on page 109	Enters the MSTP configuration submode

name (MSTAG/REPAG)

To set the name of the MSTP region, use the **name** command in MSTAG interface configuration or REPAG interface configuration submode.

name *name*

Syntax Description	<i>name</i> String of a maximum of 32 characters conforming to the definition of SnmpAdminString in RFC 2271.				
Command Default	The MAC address of the switch, formatted as a text string using the hexadecimal representation specified in IEEE Std 802.				
Command Modes	MSTAG interface configuration, REPAG interface configuration				
Command History	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 3.7.1</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 3.7.1	This command was introduced.
Release	Modification				
Release 3.7.1	This command was introduced.				
Usage Guidelines	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.				
Task ID	<table border="1"> <thead> <tr> <th>Task ID</th> <th>Operations</th> </tr> </thead> <tbody> <tr> <td>interface</td> <td>read, write</td> </tr> </tbody> </table>	Task ID	Operations	interface	read, write
Task ID	Operations				
interface	read, write				
Examples	The following example shows how to set the name of the MSTP region to leo:				

```
RP/0/RSP0/CPU0:router(config-mstag-if)# name leo
```

Related Commands	Command	Description
	debug spanning-tree mstag packet, on page 14	Enables MSTAG packet debugging.
	debug spanning-tree repag packet, on page 21	Enables Resilient Ethernet Protocol (REP) Access Gateway debugging commands.
	interface (MSTAG/REPAG), on page 37	Enter the MSTAG interface configuration submode, and enables MSTAG for the specified port.
	spanning-tree mstag, on page 110	Enters the MST Access Gateway configuration submode.
	spanning-tree repag, on page 114	Enters the Resilient Ethernet Protocol Access Gateway (REPAG) configuration submode.
	show spanning-tree mstag, on page 92	Displays the values currently used for populating the BPDUs sent by all ports.
	show spanning-tree repag, on page 104	Displays the values currently used for populating the BPDUs sent by all ports.

name (MSTP)

To set the name of the MSTP region, use the **name** command in MSTP configuration submode.

name name

Syntax Description	<i>name</i> String of a maximum of 32 characters conforming to the definition of SnmpAdminString in RFC 2271.					
Command Default	The MAC address of the switch, formatted as a text string using the hexadecimal representation specified in IEEE Std 802.					
Command Modes	MSTP configuration					
Command History	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 3.7.1</td> <td>This command was introduced.</td> </tr> </tbody> </table>		Release	Modification	Release 3.7.1	This command was introduced.
Release	Modification					
Release 3.7.1	This command was introduced.					
Usage Guidelines	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.					

periodic transmit

Task ID	Task ID	Operations
	interface	read, write

Examples

The following example shows how to set the name of the MSTP region to m1:

```
RP/0/RSP0/CPU0:router(config-mstp) # name m1
```

Related Commands	Command	Description
	debug spanning-tree mst packet, on page 11	Enables debugging for sent and received MSTP packets.
	debug spanning-tree mst protocol-state, on page 13	Enables debugging protocol-state changes such as port role or state changes, topology change notification.
	spanning-tree mst, on page 109	Enters the MSTP configuration submode
	show spanning-tree mst, on page 81	Displays the multiple spanning tree protocol status information.

periodic transmit

To send periodic Multiple VLAN Registration Protocol Data Unit (MVRPDU) on all active ports, use the **periodic transmit** command in the MVRP configuration mode. To return to the default value, use the **no** form of this command.

```
periodic transmit [interval interval]
no periodic transmit [interval interval]
```

Syntax Description	interval <i>interval</i> Sends periodic MVRPDU on all active ports at specified time interval. The range is from 2 to 10 seconds.	
Command Default	The default is 3 seconds.	
Command Modes	MVRP configuration	
Command History	Release	Modification
	Release 3.9.1	This command was introduced.
Usage Guidelines	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.	

Sending periodic messages is not required when the state machines operate correctly. The periodic messages are intended purely to cope with a succession of lost new declaration MVRPDUs. In the absence of periodic messages, declarations are re-sent every 10 to 15 seconds in response to the LeaveAll timer expiring.

Task ID	Task ID	Operations
	ethernet-services	read, write

Examples

The following example shows how to enable MVRP static mode:

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# spanning-tree mst AA
RP/0/RSP0/CPU0:router(config-mstp)# mvrp static
RP/0/RSP0/CPU0:router(config-mvrvp)# periodic transmit interval 5
```

Related Commands	Command	Description
	debug ethernet mvrp packets, on page 9	Enables debugging of sent and received MVRP packets.
	debug ethernet mvrp protocol, on page 10	Enables MVRP protocol debugging on a specific interface, location or vlan.
	mvrp static, on page 53	Enables Multiple VLAN Registration Protocol (MVRP) in static mode.
	show ethernet mvrp mad, on page 75	Displays the current state of the Multiple Registration Protocol (MRP) Attribute Declaration (MAD) component on a port.
	show ethernet mvrp statistics, on page 76	Displays packet statistics per port.
	show ethernet mvrp status, on page 77	Displays a summary of the VIDs that are declared or registered.

port-id

To set the port ID for the current switch, use the **port-id** command in MSTAG interface configuration, REPAG interface configuration, PVSTAG VLAN configuration, or PVRSTAG VLAN configuration submode.

port-id *id* [**startup-value** *startup-id*]

Syntax Description	
<i>id</i>	Interface port ID. For MSTAG, REPAG and PVRSTAG the allowed range is between 1 to 4095. For PVSTAG the allowed range is between 1 to 255.
startup-value	Specifies an alternate value to use when the interface first comes up, while the preempt delay timer is running.
<i>startup-id</i>	Sets the startup port ID.

port-id

Command Default	If a startup value is not specified, it defaults to the normal value.						
Command Modes	MSTAG interface configuration, REPAG interface configuration, PVSTAG VLAN configuration, PVRSTAG VLAN configuration						
Command History	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 3.7.1</td> <td>This command was introduced.</td> </tr> <tr> <td>Release 4.0.0</td> <td>This command was supported in the PVSTAG VLAN and PVRSTAG VLAN configuration modes.</td> </tr> </tbody> </table>	Release	Modification	Release 3.7.1	This command was introduced.	Release 4.0.0	This command was supported in the PVSTAG VLAN and PVRSTAG VLAN configuration modes.
Release	Modification						
Release 3.7.1	This command was introduced.						
Release 4.0.0	This command was supported in the PVSTAG VLAN and PVRSTAG VLAN configuration modes.						
Usage Guidelines	<p>To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.</p> <p>This command is used when configuring Access Gateway, to set the value of the port ID advertised in BPDUs sent on this interface.</p>						

Task ID	Task ID	Operations
	ethernet-services (PVSTAG and PVRSTAG only)	read, write
	interface (MSTAG and REPAG only)	read, write

Examples

The following example shows how to set the port ID:

```
RP/0/RSP0/CPU0:router(config-mstag-if) # port-id 111
```

Related Commands	Command	Description
	debug spanning-tree mstag packet, on page 14	Enables MSTAG packet debugging.
	debug spanning-tree pvrstag packet, on page 18	Enables packet debugging for sent and received PVRSTAG packets.
	debug spanning-tree pvstag packet, on page 20	Enables packet debugging for sent and received PVSTAG packets.
	debug spanning-tree repag packet, on page 21	Enables Resilient Ethernet Protocol (REP) Access Gateway debugging commands.
	interface (MSTAG/REPAG), on page 37	Enter the MSTAG interface configuration submode, and enables MSTAG for the specified port.
	interface (PVSTAG/PVRSTAG), on page 41	Enters PVST or PVRST Access Gateway Interface configuration submode and enables either PVSTAG or PVRSTAG for the specified port.

Command	Description
instance (MSTAG/REPAG), on page 33	Enters MSTAG Instance configuration mode or REPAG Instance configuration mode.
spanning-tree mstag, on page 110	Enters the MST Access Gateway configuration submode.
spanning-tree pvrstag, on page 112	Enters the Per VLAN Rapid Spanning Tree Access Gateway (PVRSTAG) configuration submode.
spanning-tree pvstag, on page 113	Enters the Per VLAN Spanning Tree Access Gateway (PVSTAG) configuration submode.
spanning-tree repag, on page 114	Enters the Resilient Ethernet Protocol Access Gateway (REPAG) configuration submode.
show spanning-tree mstag, on page 92	Displays the values currently used for populating the BPDUs sent by all ports.
show spanning-tree pvrstag, on page 101	Displays the values currently used for populating the BPDUs sent by all ports.
show spanning-tree pvstag, on page 102	Displays the values currently used for populating the BPDUs sent by all ports.
show spanning-tree repag, on page 104	Displays the values currently used for populating the BPDUs sent by all ports.
vlan, on page 118	Enables a PVST or PVRST VLAN instance on the interface and enters PVSTAG or PVRSTAG VLAN configuration mode.

port-priority

To set the port priority performance parameter for the MSTI, use the **port-priority** command in MSTAG instance configuration, REPAG instance configuration, PVSTAG VLAN configuration, or PVRSTAG VLAN configuration submode.

port-priority *priority* [**startup-value** *startup-priority*]

Syntax Description	<p>priority Port priority. For MSTAG, REPAG and PVRSTAG, the range is between 0 to 40 in multiples of 16. For PVSTAG, the range is between 0 to 255.</p> <p>startup-value Specifies an alternate value to use when the interface first comes up, while the preempt delay timer is running.</p> <p><i>startup-priority</i> Sets the startup port priority.</p>
---------------------------	---

Command Default If no startup-value is configured, the normal value is used during startup.

Command Modes MSTAG instance configuration, REPAG instance configuration, PVSTAG VLAN configuration, PVRSTAG VLAN configuration

Command History **Release** **Modification**

Release 3.7.1 This command was introduced.

Release	Modification
Release 4.0.0	This command was supported in the PVSTAG VLAN and PVRSTAG VLAN configuration modes.

Usage Guidelines	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.
-------------------------	---

Task ID	Task ID	Operations
	ethernet-services (PVSTAG and PVRSTAG only)	read, write
	interface (MSTAG and REPAG only)	read, write

Examples	The following example shows how to set the port priority to 160:
-----------------	--

```
RP/0/RSP0/CPU0:router(config-mstag-if-inst)# port-priority 160
```

Related Commands	Command	Description
	debug spanning-tree mstag packet, on page 14	Enables MSTAG packet debugging.
	debug spanning-tree pvrstag packet, on page 18	Enables packet debugging for sent and received PVRSTAG packets.
	debug spanning-tree pvstag packet, on page 20	Enables packet debugging for sent and received PVSTAG packets.
	debug spanning-tree repag packet, on page 21	Enables Resilient Ethernet Protocol (REP) Access Gateway debugging commands.
	interface (MSTAG/REPAG), on page 37	Enter the MSTAG interface configuration submode, and enables MSTAG for the specified port.
	interface (PVSTAG/PVRSTAG), on page 41	Enters PVST or PVRST Access Gateway Interface configuration submode and enables either PVSTAG or PVRSTAG for the specified port.
	instance (MSTAG/REPAG), on page 33	Enters MSTAG Instance configuration mode or REPAG Instance configuration mode.
	spanning-tree mstag, on page 110	Enters the MST Access Gateway configuration submode.
	spanning-tree pvrstag, on page 112	Enters the Per VLAN Rapid Spanning Tree Access Gateway (PVRSTAG) configuration submode.
	spanning-tree pvstag, on page 113	Enters the Per VLAN Spanning Tree Access Gateway (PVSTAG) configuration submode.

Command	Description
spanning-tree repag, on page 114	Enters the Resilient Ethernet Protocol Access Gateway (REPAG) configuration submode.
show spanning-tree mstag, on page 92	Displays the values currently used for populating the BPDUs sent by all ports.
show spanning-tree pvrstag, on page 101	Displays the values currently used for populating the BPDUs sent by all ports.
show spanning-tree pvstag, on page 102	Displays the values currently used for populating the BPDUs sent by all ports.
show spanning-tree repag, on page 104	Displays the values currently used for populating the BPDUs sent by all ports.
vlan, on page 118	Enables a PVST or PVRST VLAN instance on the interface and enters PVSTAG or PVRSTAG VLAN configuration mode.

portfast

To enable Port Fast on the port, and optionally enable BPDU guard, use the **portfast** command in MSTP interface configuration submode.

portfast [bpduguard]

Syntax Description This command has no keywords or arguments.

Command Default PortFast is disabled.

Command Modes MSTP interface configuration

Command History	Release	Modification
Release 3.7.1	This command was introduced.	

Usage Guidelines You must disable and re-enable the port for Port Fast configuration to take effect. Use **shutdown** and **no shutdown** command (in interface configuration mode) to disable and re-enable the port.

This command enables the Port Fast feature (also known as edge port). When this is enabled, MSTP treats the port as an edge port, i.e., it keeps it in forwarding state and does not generate topology changes if the port goes down or comes up. It is not expected to receive MSTP BPDUs on an edge port. BPDU guard is a Cisco extension that causes the interface to be shut down using error-disable if an MSTP BPDU is received. For more information on Port Fast feature, refer to the *Implementing Multiple Spanning Tree Protocol* module in the *Cisco ASR 9000 Series Aggregation Services Router L2VPN and Ethernet Services Configuration Guide*.

Task ID	Task ID	Operations
---------	---------	------------

interface read,
write

preempt delay**Examples**

The following example shows how to enable PortFast and BPDU guard on the port:

```
RP/0/RSP0/CPU0:router(config-mstp-if)# portfast
RP/0/RSP0/CPU0:router(config-mstp-if)# portfast bpduguard
```

Related Commands	Command	Description
	debug spanning-tree mst packet, on page 11	Enables debugging for sent and received MSTP packets.
	debug spanning-tree mst protocol-state, on page 13	Enables debugging protocol-state changes such as port role or state changes, topology change notification.
	interface (MSTP), on page 39	Enters the MSTP interface configuration submode, and enables STP for the specified port.
	spanning-tree mst, on page 109	Enters the MSTP configuration submode
	show spanning-tree mst, on page 81	Displays the multiple spanning tree protocol status information.

preempt delay

To enable topology control and set the preempt delay on startup, use the **preempt delay** command in MSTAG, REPAG, PVSTAG or PVRSTAG configuration mode.

```
preempt delay {for time {seconds | minutes | hours} | until hh:mm:ss}
```

Syntax Description	for Specifies length of time to delay preempting for in seconds, minutes or hours. until Specifies time to delay preempting until the mentioned interval (24-hour hh:mm:ss).						
Command Default	Startup topology control is disabled.						
Command Modes	MSTAG configuration, REPAG configuration, PVSTAG configuration, PVRSTAG configuration						
Command History	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 3.7.1</td> <td>This command was introduced.</td> </tr> <tr> <td>Release 4.0.0</td> <td>This command was supported in the PVSTAG and PVRSTAG configuration modes.</td> </tr> </tbody> </table>	Release	Modification	Release 3.7.1	This command was introduced.	Release 4.0.0	This command was supported in the PVSTAG and PVRSTAG configuration modes.
Release	Modification						
Release 3.7.1	This command was introduced.						
Release 4.0.0	This command was supported in the PVSTAG and PVRSTAG configuration modes.						

Usage Guidelines To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

This command enables startup topology control for Access Gateway. By default, when an interface comes up, Access Gateway starts sending STP BPDUs immediately based on the configured values. This could cause the devices in the access network to immediately start directing traffic to this device. However, the data plane may not yet be ready to forward packets to the core or aggregation network. When a preempt delay is

configured, alternative values are sent in the BPDUs for the specified time. These alternative values must be configured using the **startup-value** option, and can be set so as to cause the access devices not to use this link unless it is the only one available.

For more information on preempt delay, refer to the *Implementing Multiple Spanning Tree Protocol* module in the *Cisco ASR 9000 Series Aggregation Services Router L2VPN and Ethernet Services Configuration Guide*.

Task ID	Task ID	Operations
	ethernet-services (PVSTAG and PVRSTAG only)	read, write
	interface (MSTAG and REPAG only)	read, write

Examples

The following example shows how to set the preempt delay for 20 seconds:

```
RP/0/RSP0/CPU0:router(config-mstag) # preempt delay for 20 seconds
```

Related Commands	Command	Description
	spanning-tree mstag, on page 110	Enters the MST Access Gateway configuration submode.
	spanning-tree pvrstag, on page 112	Enters the Per VLAN Rapid Spanning Tree Access Gateway (PVRSTAG) configuration submode.
	spanning-tree pvstag, on page 113	Enters the Per VLAN Spanning Tree Access Gateway (PVSTAG) configuration submode.
	spanning-tree repag, on page 114	Enters the Resilient Ethernet Protocol Access Gateway (REPAG) configuration submode.
	show spanning-tree mstag, on page 92	Displays the values currently used for populating the BPDUs sent by all ports.
	show spanning-tree pvrstag, on page 101	Displays the values currently used for populating the BPDUs sent by all ports.
	show spanning-tree pvstag, on page 102	Displays the values currently used for populating the BPDUs sent by all ports.
	show spanning-tree repag, on page 104	Displays the values currently used for populating the BPDUs sent by all ports.

priority (Access Gateway)

To set the bridge priority for the current MSTI or VLAN, use the **priority** command in the MSTAG, REPAG, PVSTAG or PVRSTAG instance configuration submodes.

priority *priority* [**startup-value** *startup-priority*]

priority (MSTP)

Syntax Description	<p>priority Specifies the bridge priority. For MSTAG, REPAG and PVRSTAG, the range is between 0 to 61440 in multiples of 4096. For PVSTAG, the range is between 0 to 65535.</p> <p>startup-value Sets an alternate value to use when the interface first comes up, while the preempt delay timer is running.</p> <p>startup-priority Specifies the startup priority.</p>						
Command Default	Default value is 32768. If the startup value is not specified while the standard value is, the startup value defaults to the standard value.						
Command Modes	MSTAG instance configuration, REPAG instance configuration, PVSTAG VLAN configuration, PVRSTAG VLAN configuration						
Command History	<table> <thead> <tr> <th>Release</th><th>Modification</th></tr> </thead> <tbody> <tr> <td>Release 3.7.1</td><td>This command was introduced.</td></tr> <tr> <td>Release 4.0.0</td><td>This command was supported in the PVSTAG and PVRSTAG configuration mode.</td></tr> </tbody> </table>	Release	Modification	Release 3.7.1	This command was introduced.	Release 4.0.0	This command was supported in the PVSTAG and PVRSTAG configuration mode.
Release	Modification						
Release 3.7.1	This command was introduced.						
Release 4.0.0	This command was supported in the PVSTAG and PVRSTAG configuration mode.						
Usage Guidelines	<p>To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.</p> <p>This command is used when configuring Access Gateway to set the bridge priority that is advertised for this MSTI or VLAN in the BPDUs sent from this interface.</p>						
Task ID	<table> <thead> <tr> <th>Task ID</th><th>Operations</th></tr> </thead> <tbody> <tr> <td>ethernet-services (PVSTAG and PVRSTAG only)</td><td>read, write</td></tr> <tr> <td>interface (MSTAG and REPAG only)</td><td>read, write</td></tr> </tbody> </table>	Task ID	Operations	ethernet-services (PVSTAG and PVRSTAG only)	read, write	interface (MSTAG and REPAG only)	read, write
Task ID	Operations						
ethernet-services (PVSTAG and PVRSTAG only)	read, write						
interface (MSTAG and REPAG only)	read, write						

Examples

The following example shows how to set the bridge priority for the current MSTI:

```
RP/0/RSP0/CPU0:router(config-mstag-if-inst)# priority 4096 startup-value 32768
```

Related Commands	Command	Description
	spanning-tree mstag, on page 110	Enters the MST Access Gateway configuration submode.

priority (MSTP)

To set the bridge priority for the current MSTI, use the **priority** command in MSTI configuration submode.

priority *priority*

Syntax Description	<i>priority</i> Bridge priority for the current MSTI. Range is 0 to 61440 in multiples of 4096.												
Command Default	<i>priority</i> : 32768												
Command Modes	MSTI configuration												
Command History	<table border="1"> <thead> <tr> <th>Release</th><th>Modification</th></tr> </thead> <tbody> <tr> <td>Release 3.7.1</td><td>This command was introduced.</td></tr> </tbody> </table>	Release	Modification	Release 3.7.1	This command was introduced.								
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Task ID	Operations												
interface	read, write												
Examples	The following example shows how to set the bridge priority to 8192 for the current MSTI: <pre>RP/0/RSP0/CPU0:router(config-mstp-inst)# priority 8192</pre>												
Related Commands	<table border="1"> <thead> <tr> <th>Command</th><th>Description</th></tr> </thead> <tbody> <tr> <td>debug spanning-tree mst packet, on page 11</td><td>Enables debugging for sent and received MSTP packets.</td></tr> <tr> <td>debug spanning-tree mst protocol-state, on page 13</td><td>Enables debugging protocol-state changes such as port role or state changes, topology change notification.</td></tr> <tr> <td>instance (MSTP), on page 34</td><td>Enters the multiple spanning tree instance (MSTI) configuration submode.</td></tr> <tr> <td>spanning-tree mst, on page 109</td><td>Enters the MSTP configuration submode</td></tr> <tr> <td>show spanning-tree mst, on page 81</td><td>Displays the multiple spanning tree protocol status information.</td></tr> </tbody> </table>	Command	Description	debug spanning-tree mst packet, on page 11	Enables debugging for sent and received MSTP packets.	debug spanning-tree mst protocol-state, on page 13	Enables debugging protocol-state changes such as port role or state changes, topology change notification.	instance (MSTP), on page 34	Enters the multiple spanning tree instance (MSTI) configuration submode.	spanning-tree mst, on page 109	Enters the MSTP configuration submode	show spanning-tree mst, on page 81	Displays the multiple spanning tree protocol status information.
Command	Description												
debug spanning-tree mst packet, on page 11	Enables debugging for sent and received MSTP packets.												
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spanning-tree mst, on page 109	Enters the MSTP configuration submode												
show spanning-tree mst, on page 81	Displays the multiple spanning tree protocol status information.												

provider-bridge (MSTAG/REPAG)

To place the current instance of the protocol in 802.1ad mode, use the **provider-bridge** command in MSTAG or REPAG interface configuration submode.

provider-bridge

Syntax Description	This command has no keywords or arguments.
---------------------------	--

provider-bridge (MSTP)

Command Default	The default value is FALSE.																
Command Modes	MSTAG interface configuration, REPAG interface configuration																
Command History	<table border="1"> <thead> <tr> <th>Release</th><th>Modification</th></tr> </thead> <tbody> <tr> <td>Release 3.7.1</td><td>This command was introduced.</td></tr> </tbody> </table>	Release	Modification	Release 3.7.1	This command was introduced.												
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Task ID	<table border="1"> <thead> <tr> <th>Task ID</th><th>Operations</th></tr> </thead> <tbody> <tr> <td>interface</td><td>read, write</td></tr> </tbody> </table>	Task ID	Operations	interface	read, write												
Task ID	Operations																
interface	read, write																
Examples	The following example shows how to use the provider-bridge command: <pre>RP/0/RSP0/CPU0:router (config-mstag-if) # provider-bridge</pre>																
Related Commands	<table border="1"> <thead> <tr> <th>Command</th><th>Description</th></tr> </thead> <tbody> <tr> <td>debug spanning-tree mstag packet, on page 14</td><td>Enables MSTAG packet debugging.</td></tr> <tr> <td>debug spanning-tree repag packet, on page 21</td><td>Enables Resilient Ethernet Protocol (REP) Access Gateway debugging commands.</td></tr> <tr> <td>interface (MSTAG/REPAG), on page 37</td><td>Enter the MSTAG interface configuration submode, and enables MSTAG for the specified port.</td></tr> <tr> <td>spanning-tree mstag, on page 110</td><td>Enters the MST Access Gateway configuration submode.</td></tr> <tr> <td>spanning-tree repag, on page 114</td><td>Enters the Resilient Ethernet Protocol Access Gateway (REPAG) configuration submode.</td></tr> <tr> <td>show spanning-tree mstag, on page 92</td><td>Displays the values currently used for populating the BPDUs sent by all ports.</td></tr> <tr> <td>show spanning-tree repag, on page 104</td><td>Displays the values currently used for populating the BPDUs sent by all ports.</td></tr> </tbody> </table>	Command	Description	debug spanning-tree mstag packet, on page 14	Enables MSTAG packet debugging.	debug spanning-tree repag packet, on page 21	Enables Resilient Ethernet Protocol (REP) Access Gateway debugging commands.	interface (MSTAG/REPAG), on page 37	Enter the MSTAG interface configuration submode, and enables MSTAG for the specified port.	spanning-tree mstag, on page 110	Enters the MST Access Gateway configuration submode.	spanning-tree repag, on page 114	Enters the Resilient Ethernet Protocol Access Gateway (REPAG) configuration submode.	show spanning-tree mstag, on page 92	Displays the values currently used for populating the BPDUs sent by all ports.	show spanning-tree repag, on page 104	Displays the values currently used for populating the BPDUs sent by all ports.
Command	Description																
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spanning-tree mstag, on page 110	Enters the MST Access Gateway configuration submode.																
spanning-tree repag, on page 114	Enters the Resilient Ethernet Protocol Access Gateway (REPAG) configuration submode.																
show spanning-tree mstag, on page 92	Displays the values currently used for populating the BPDUs sent by all ports.																
show spanning-tree repag, on page 104	Displays the values currently used for populating the BPDUs sent by all ports.																

provider-bridge (MSTP)

To place the current instance of the protocol in 802.1ad mode, use the **provider-bridge** command in MSTP configuration submode.

provider-bridge

Syntax Description	This command has no keywords or arguments.	
Command Default	The default value is FALSE.	
Command Modes	MSTP configuration	
Command History	Release	Modification
	Release 3.7.1 This command was introduced.	
Usage Guidelines	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.	
Task ID	Task ID	Operations
	interface read, write	
Examples	The following example shows how to use the provider-bridge command:	
<pre>RP/0/RSP0/CPU0:router (config-mstp) # provider-bridge</pre>		
Related Commands	Command	Description
	spanning-tree mst, on page 109	Enters the MSTP configuration submode

revision (MSTAG/REPAG)

To set the revision level in the BPDUs sent from this interface, use the **revision** command in MSTAG or REPAG interface configuration submode.

revision *revision-number*

Syntax Description	<i>revision-number</i> Revision level of the MSTP region. Range is 0 to 65535.	
Command Default	<i>revision-number</i> : 0	
Command Modes	MSTAG interface configuration, REPAG interface configuration	
Command History	Release	Modification
	Release 3.7.1 This command was introduced.	

revision (MSTP)

Usage Guidelines To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID	Task ID Operations
	interface read, write

Examples The following example shows how to set the revision level of the MSTP region to 1:

```
RP/0/RSP0/CPU0:router(config-mstag-if) # revision 1
```

Related Commands	Command	Description
	debug spanning-tree mstag packet, on page 14	Enables MSTAG packet debugging.
	debug spanning-tree repag packet, on page 21	Enables Resilient Ethernet Protocol (REP) Access Gateway debugging commands.
	interface (MSTAG/REPAG), on page 37	Enter the MSTAG interface configuration submode, and enables MSTAG for the specified port.
	spanning-tree mstag, on page 110	Enters the MST Access Gateway configuration submode.
	spanning-tree repag, on page 114	Enters the Resilient Ethernet Protocol Access Gateway (REPAG) configuration submode.
	show spanning-tree mstag, on page 92	Displays the values currently used for populating the BPDUs sent by all ports.
	show spanning-tree repag, on page 104	Displays the values currently used for populating the BPDUs sent by all ports.

revision (MSTP)

To set the revision level of the MSTP region, use the **revision** command in MSTP configuration submode.

revision *revision-number*

Syntax Description *revision-number* Revision level of the MSTP region. Range is 0 to 65535.

Command Default *revision-number: 0*

Command Modes MSTP configuration

Command History	Release	Modification
	Release 3.7.1	This command was introduced.
Usage Guidelines		
Task ID	Task ID	Operations
	interface	read, write
Examples	The following example shows how to set the revision level of the MSTP region to 10:	
	<pre>RP/0/RSP0/CPU0:router(config-mstp) # revision 10</pre>	
Related Commands	Command	Description
	debug spanning-tree mst packet, on page 11	Enables debugging for sent and received MSTP packets.
	debug spanning-tree mst protocol-state, on page 13	Enables debugging protocol-state changes such as port role or state changes, topology change notification.
	spanning-tree mst, on page 109	Enters the MSTP configuration submode
	show spanning-tree mst, on page 81	Displays the multiple spanning tree protocol status information.

root-cost

To set the root path cost to send in BPDUs from this interface, use the **root-cost** command in PVSTAG VLAN configuration or PVRSTAG VLAN configuration mode.

root-cost *cost* [**startup-value** *startup-cost*]

Syntax Description	cost	Sets the root path cost for the current port. The cost ranges between 0 to 4294967295.
	startup-value	Specifies an alternate value to use when the interface first comes up, while the preempt delay timer is running.
	startup-cost	Sets the startup cost.

Command Default The default is 0. If a cost is configured but no startup value is configured, the startup value defaults to the configured cost value. If no cost is configured, the startup value defaults to 1.

root-cost

Command Modes	PVSTAG VLAN configuration, PVRSTAG VLAN configuration	
Command History	Release	Modification
	Release 4.0.0	This command was introduced.
Usage Guidelines	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.	
Task ID	Task ID	Operations
	ethernet-services	read, write
Examples	The following example shows how to set the root path cost for the current port:	
	<pre>RP/0/RSP0/CPU0:router(config-pvrstag-if-vlan)# root-cost 1000000</pre>	
Related Commands	Command	Description
	debug spanning-tree pvrstag packet, on page 18	Enables packet debugging for sent and received PVRSTAG packets.
	debug spanning-tree pvstag packet, on page 20	Enables packet debugging for sent and received PVSTAG packets.
	interface (PVSTAG/PVRSTAG), on page 41	Enters PVST or PVRST Access Gateway Interface configuration submode and enables either PVSTAG or PVRSTAG for the specified port.
	show spanning-tree pvrstag, on page 101	Displays the values currently used for populating the BPDUs sent by all ports.
	show spanning-tree pvstag, on page 102	Displays the values currently used for populating the BPDUs sent by all ports.
	spanning-tree pvrstag, on page 112	Enters the Per VLAN Rapid Spanning Tree Access Gateway (PVRSTAG) configuration submode.
	spanning-tree pvstag, on page 113	Enters the Per VLAN Spanning Tree Access Gateway (PVSTAG) configuration submode.
	vlan, on page 118	Enables a PVST or PVRST VLAN instance on the interface and enters PVSTAG or PVRSTAG VLAN configuration mode.

root-id

To set the identifier of the root bridge for BPDUs sent from a port and an optional startup-value, use the **root-id** command in the MSTAG instance configuration, REPAG instance configuration, PVSTAG VLAN configuration and PVRSTAG VLAN configuration modes.

root-id id [startup-value startup-id]

Syntax Description

<i>id</i>	Sets the root bridge ID (MAC address) to set in the BPDUs.
startup-value	Specifies an alternate value to use when the interface first comes up, while the preempt delay timer is running.
<i>startup-id</i>	Sets the startup root ID.

Command Default

The MAC address of the region root switch. If the startup value is not specified while the standard value is, the startup value defaults to the standard value. For MSTAG and REPAG, the default is the bridge ID. For PVSTAG and PVRSTAG, the default is 0000.0000.0000.

Command Modes

MSTAG instance configuration, REPAG instance configuration, PVSTAG VLAN configuration, PVRSTAG VLAN configuration

Command History

Release	Modification
Release 3.7.1	This command was introduced.
Release 4.0.0	This command was supported in the PVSTAG VLAN and PVRSTAG VLAN configuration modes.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID

Task ID	Operations
ethernet-services (PVSTAG and PVRSTAG only)	read, write
interface (MSTAG and REPAG only)	read, write

Examples

The following example shows how to set the identifier of the root bridge for BPDUs:

root-id

```
RP/0/RSP0/CPU0:router(config-pvstag-if-vlan)#root-id 0000.0000.0000 startup-value
0000.0000.0001
```

Related Commands	Command	Description
	debug spanning-tree mstag packet, on page 14	Enables MSTAG packet debugging.
	debug spanning-tree pvrstag packet, on page 18	Enables packet debugging for sent and received PVRSTAG packets.
	debug spanning-tree pvstag packet, on page 20	Enables packet debugging for sent and received PVSTAG packets.
	debug spanning-tree repag packet, on page 21	Enables Resilient Ethernet Protocol (REP) Access Gateway debugging commands.
	interface (MSTAG/REPAG), on page 37	Enter the MSTAG interface configuration submode, and enables MSTAG for the specified port.
	interface (PVSTAG/PVRSTAG), on page 41	Enters PVST or PVRST Access Gateway Interface configuration submode and enables either PVSTAG or PVRSTAG for the specified port.
	instance (MSTAG/REPAG), on page 33	Enters MSTAG Instance configuration mode or REPAG Instance configuration mode.
	spanning-tree mstag, on page 110	Enters the MST Access Gateway configuration submode.
	spanning-tree pvrstag, on page 112	Enters the Per VLAN Rapid Spanning Tree Access Gateway (PVRSTAG) configuration submode.
	spanning-tree pvstag, on page 113	Enters the Per VLAN Spanning Tree Access Gateway (PVSTAG) configuration submode.
	spanning-tree repag, on page 114	Enters the Resilient Ethernet Protocol Access Gateway (REPAG) configuration submode.
	show spanning-tree mstag, on page 92	Displays the values currently used for populating the BPDUs sent by all ports.
	show spanning-tree pvrstag, on page 101	Displays the values currently used for populating the BPDUs sent by all ports.
	show spanning-tree pvstag, on page 102	Displays the values currently used for populating the BPDUs sent by all ports.
	show spanning-tree repag, on page 104	Displays the values currently used for populating the BPDUs sent by all ports.
	vlan, on page 118	Enables a PVST or PVRST VLAN instance on the interface and enters PVSTAG or PVRSTAG VLAN configuration mode.

root-priority

To set the root bridge priority sent in BPDUs for this interface for this MSTI or VLAN, and to set an optional startup value, use the **root-priority** command in the MSTAG instance configuration, REPAG instance configuration, PVSTAG VLAN configuration and PVRSTAG VLAN configuration modes.

root-priority *priority* [**startup-value** *startup-priority*]

Syntax Description	<p>priority Sets the root bridge priority to set in the BPDUs. For MSTAG, REPAG and PVRSTAG, the range is between 0 to 61440 in multiples of 4096. For PVSTAG, the range is between 0 to 65535.</p> <p>startup-value Specifies an alternate value to use when the interface first comes up, while the preempt delay timer is running.</p> <p><i>startup-priority</i> Sets the startup root priority.</p>						
Command Default	<p>Default value is 32768. If the startup value is not specified while the standard value is, the startup value defaults to the standard value.</p> <p>For MSTAG and REPAG, the default is 32768. For PVSTAG and PVRSTAG, the default is 0.</p>						
Command Modes	MSTAG instance configuration, REPAG instance configuration, PVSTAG VLAN configuration, PVRSTAG VLAN configuration						
Command History	<table border="1"> <thead> <tr> <th>Release</th><th>Modification</th></tr> </thead> <tbody> <tr> <td>Release 3.7.1</td><td>This command was introduced.</td></tr> <tr> <td>Release 4.0.0</td><td>This command was supported in the PVSTAG VLAN and PVRSTAG VLAN configuration modes.</td></tr> </tbody> </table>	Release	Modification	Release 3.7.1	This command was introduced.	Release 4.0.0	This command was supported in the PVSTAG VLAN and PVRSTAG VLAN configuration modes.
Release	Modification						
Release 3.7.1	This command was introduced.						
Release 4.0.0	This command was supported in the PVSTAG VLAN and PVRSTAG VLAN configuration modes.						
Usage Guidelines	<p>To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.</p>						
Task ID	<table border="1"> <thead> <tr> <th>Task ID</th><th>Operations</th></tr> </thead> <tbody> <tr> <td>ethernet-services (PVSTAG and PVRSTAG only)</td><td>read, write</td></tr> <tr> <td>interface (MSTAG and REPAG only)</td><td>read, write</td></tr> </tbody> </table>	Task ID	Operations	ethernet-services (PVSTAG and PVRSTAG only)	read, write	interface (MSTAG and REPAG only)	read, write
Task ID	Operations						
ethernet-services (PVSTAG and PVRSTAG only)	read, write						
interface (MSTAG and REPAG only)	read, write						
Examples	The following example shows how to set the root bridge priority for the current MSTI:						

```
RP/0/RSP0/CPU0:router(config-pvstag-if-vlan)# root-priority 4096 startup-value 8192
```

Related Commands	Command	Description
	debug spanning-tree mstag packet, on page 14	Enables MSTAG packet debugging.
	debug spanning-tree pvrstag packet, on page 18	Enables packet debugging for sent and received PVRSTAG packets.
	debug spanning-tree pvstag packet, on page 20	Enables packet debugging for sent and received PVSTAG packets.
	debug spanning-tree repag packet, on page 21	Enables Resilient Ethernet Protocol (REP) Access Gateway debugging commands.
	interface (MSTAG/REPAG), on page 37	Enter the MSTAG interface configuration submode, and enables MSTAG for the specified port.
	interface (PVSTAG/PVRSTAG), on page 41	Enters PVST or PVRST Access Gateway Interface configuration submode and enables either PVSTAG or PVRSTAG for the specified port.
	instance (MSTAG/REPAG), on page 33	Enters MSTAG Instance configuration mode or REPAG Instance configuration mode.
	spanning-tree mstag, on page 110	Enters the MST Access Gateway configuration submode.
	spanning-tree pvrstag, on page 112	Enters the Per VLAN Rapid Spanning Tree Access Gateway (PVRSTAG) configuration submode.
	spanning-tree pvstag, on page 113	Enters the Per VLAN Spanning Tree Access Gateway (PVSTAG) configuration submode.
	spanning-tree repag, on page 114	Enters the Resilient Ethernet Protocol Access Gateway (REPAG) configuration submode.
	show spanning-tree mstag, on page 92	Displays the values currently used for populating the BPDUs sent by all ports.
	show spanning-tree pvrstag, on page 101	Displays the values currently used for populating the BPDUs sent by all ports.
	show spanning-tree pvstag, on page 102	Displays the values currently used for populating the BPDUs sent by all ports.
	show spanning-tree repag, on page 104	Displays the values currently used for populating the BPDUs sent by all ports.
	vlan, on page 118	Enables a PVST or PVRST VLAN instance on the interface and enters PVSTAG or PVRSTAG VLAN configuration mode.

show ethernet mvrp mad

To display the current state of the Multiple Registration Protocol (MRP) Attribute Declaration (MAD) component on a port, for each active attribute value (VID), use the **show ethernet mvrp mad** command in EXEC mode.

show ethernet mvrp mad [brief] [interface *interface-name*] [vlan *vlan-id*]

Syntax Description	brief (Optional) Displays a brief view. interface (Optional) Displays the MVRP state for the given subinterface or base interface name. <i>interface-name</i> (Optional) Displays the interface name. vlan <i>vlan-id</i> (Optional) Displays information for a particular VLAN. The range is between 0 to 4094.				
Command Default	None				
Command Modes	EXEC				
Command History	<table border="1"> <thead> <tr> <th>Release</th><th>Modification</th></tr> </thead> <tbody> <tr> <td>Release 3.7.2</td><td>This command was introduced.</td></tr> </tbody> </table>	Release	Modification	Release 3.7.2	This command was introduced.
Release	Modification				
Release 3.7.2	This command was introduced.				
Usage Guidelines	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.				
Task ID	<table border="1"> <thead> <tr> <th>Task ID</th><th>Operations</th></tr> </thead> <tbody> <tr> <td>ethernet-services</td><td>read</td></tr> </tbody> </table>	Task ID	Operations	ethernet-services	read
Task ID	Operations				
ethernet-services	read				

Examples

The following sample output is from the **show ethernet mvrp mad** command:

```
RP/0/RSP0/CPU0:router# show ethernet mvrp mad interface GigabitEthernet 0/1/0/1
GigabitEthernet0/1/0/1
  Participant Type: Full; Point-to-Point: Yes
  Admin Control: Applicant Normal; Registrar Normal

  LeaveAll Passive (next in 5.92s); periodic disabled
  Leave in 25.70s; Join not running
  Last peer 0293.6926.9585; failed registrations: 0

  VID      Applicant          Registrar
  ----  -----  -----

```

show ethernet mvrp statistics

```

1 Very Anxious Observer Leaving
283 Quiet Passive Empty

```

Related Commands	Command	Description
	debug ethernet mvrp packets, on page 9	Enables debugging of sent and received MVRP packets.
	debug ethernet mvrp protocol, on page 10	Enables MVRP protocol debugging on a specific interface, location or vlan.
	mvrp static, on page 53	Enables Multiple VLAN Registration Protocol (MVRP) in static mode.
	show ethernet mvrp statistics, on page 76	Displays packet statistics per port.
	show ethernet mvrp status, on page 77	Displays a summary of the VIDs that are declared or registered.

show ethernet mvrp statistics

To display packet statistics per port, use the **show ethernet mvrp statistics** command in EXEC mode.

show ethernet mvrp statistics [interface *type* *interface-path-id*]

Syntax Description	interface (Optional) Displays the MVRP state for the given subinterface or base interface name.
	type (Optional) Interface type. For more information, use the question mark (?) online help function.
<i>interface-path-id</i> (Optional) Physical interface or virtual interface.	
	Note Use the show interfaces command to see a list of all interfaces currently configured on the router.

For more information about the syntax for the router, use the question mark (?) online help function.

Command Default	None				
Command Modes	EXEC				
Command History	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 3.7.2</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 3.7.2	This command was introduced.
Release	Modification				
Release 3.7.2	This command was introduced.				
Usage Guidelines	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.				

Task ID	Task ID	Operations
		ethernet-services read

Examples

The following sample output is from the **show ethernet mvrp statistics** command:

```
RP/0/RSP0/CPU0:router# show ethernet mvrp statistics interface GigabitEthernet 0/1/0/1
GigabitEthernet0/1/0/1
    MVRPDUs TX:      1245
    MVRPDUs RX:      7
    Dropped TX:      0
    Dropped RX:      42
    Invalid RX:      12
```

Related Commands	Command	Description
	debug ethernet mvrp packets, on page 9	Enables debugging of sent and received MVRP packets.
	debug ethernet mvrp protocol, on page 10	Enables MVRP protocol debugging on a specific interface, location or vlan.
	mvrp static, on page 53	Enables Multiple VLAN Registration Protocol (MVRP) in static mode.
	show ethernet mvrp mad, on page 75	Displays the current state of the Multiple Registration Protocol (MRP) Attribute Declaration (MAD) component on a port.
	show ethernet mvrp status, on page 77	Displays a summary of the VIDs that are declared or registered.

show ethernet mvrp status

To display a summary of the VIDs that are declared or registered, and to learn the origin of these declarations, use the **show ethernet mvrp status** command in EXEC mode.

show ethernet mvrp status [interface type interface-path-id]

Syntax Description	interface	(Optional) Displays the MVRP state for the given subinterface or base interface name.	
	type	(Optional) Interface type. For more information, use the question mark (?) online help function.	
	<i>interface-path-id</i> (Optional) Physical interface or virtual interface.		
	Note	Use the show interfaces command to see a list of all interfaces currently configured on the router.	
	For more information about the syntax for the router, use the question mark (?) online help function.		
Command Default	None		

show l2vpn mstp port

Command Modes	EXEC	
Command History	Release	Modification
	Release 3.7.2 This command was introduced.	
Usage Guidelines	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.	
Task ID	Task ID	Operations
	ethernet-services read	
Examples	The following sample output is from the show ethernet mvrp status command:	
	<pre>RP/0/RSP0/CPU0:router# show ethernet mvrp status interface GigabitEthernet 0/1/0/1 GigabitEthernet0/1/0/1 Staticly declared: 1-512,768,980-1034 Dynamically declared: 2048-3084 Registered: 1-512</pre>	
Related Commands	Command	Description
	debug ethernet mvrp packets, on page 9	Enables debugging of sent and received MVRP packets.
	debug ethernet mvrp protocol, on page 10	Enables MVRP protocol debugging on a specific interface, location or vlan.
	mvrp static, on page 53	Enables Multiple VLAN Registration Protocol (MVRP) in static mode.
	show ethernet mvrp mad, on page 75	Displays the current state of the Multiple Registration Protocol (MRP) Attribute Declaration (MAD) component on a port.
	show ethernet mvrp statistics, on page 76	Displays packet statistics per port.

show l2vpn mstp port

To display the internal MSTI number and number of ports for each VLAN, use the **show l2vpn mstp port** command in EXEC mode.

show l2vpn mstp port [interface type interface-path-id] [msti value]

Syntax Description	interface	(Optional) Displays the MSTP state for the given interface.
	type	Interface type. For more information, use the question mark (?) online help function.

interface-path-id Physical interface or virtual interface.

Note Use the **show interfaces** command to see a list of all interfaces currently configured on the router.

For more information about the syntax for the router, use the question mark (?) online help function.

msti value	(Optional) Displays the filter for Multiple Spanning Tree Instance (MSTI). The range is from 0 to 100.
-------------------	--

Command Default	None
------------------------	------

Command Modes	EXEC
----------------------	------

Command History	Release	Modification
------------------------	----------------	---------------------

Release 3.7.1	This command was introduced.
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Usage Guidelines	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.
-------------------------	---

Task ID	Task ID	Operations
	12vpn	read

Examples	The following sample output is from the show l2vpn mstp port command:
-----------------	--

```
RP/0/RSP0/CPU0:router# show l2vpn mstp port interface gigabitethernet 0/1/0/0 msti 5
```

Related Commands	Command	Description
	spanning-tree mst, on page 109	Enters the MSTP configuration submode
	spanning-tree mstag, on page 110	Enters the MST Access Gateway configuration submode.
	spanning-tree pvrstag, on page 112	Enters the Per VLAN Rapid Spanning Tree Access Gateway (PVRSTAG) configuration submode.
	spanning-tree pvstag, on page 113	Enters the Per VLAN Spanning Tree Access Gateway (PVSTAG) configuration submode.
	spanning-tree mst, on page 109	Enters the MSTP configuration submode
	spanning-tree mstag, on page 110	Enters the MST Access Gateway configuration submode.
	show l2vpn mstp vlan, on page 80	Displays the Multiple Spanning Tree Protocol (MSTP) state for the virtual local area network (VLAN) on a given interface.

show l2vpn mstp vlan

show l2vpn mstp vlan

To display the Multiple Spanning Tree Protocol (MSTP) state for the virtual local area network (VLAN) on a given interface, use the **show l2vpn mstp vlan** command in EXEC mode.

show l2vpn mstp vlan [interface type interface-path-id] [msti value] [vlan-id value]

Syntax Description	<p>interface (Optional) Displays the MSTP state for the given subinterface or base interface name.</p> <p>type (Optional) Interface type. For more information, use the question mark (?) online help function.</p> <p><i>interface-path-id</i> (Optional) Physical interface or virtual interface.</p> <p>Note Use the show interfaces command to see a list of all interfaces currently configured on the router.</p> <p>For more information about the syntax for the router, use the question mark (?) online help function.</p>				
msti value	(Optional) Displays the filter for Multiple Spanning Tree Instance (MSTI). The range is from 0 to 100.				
vlan-id value	(Optional) Displays the filter for the VLAN ID. The range is from 0 to 4294967295.				
Command Default	None				
Command Modes	EXEC				
Command History	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 3.7.2</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 3.7.2	This command was introduced.
Release	Modification				
Release 3.7.2	This command was introduced.				
Usage Guidelines	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.				
Task ID	<table border="1"> <thead> <tr> <th>Task ID</th> <th>Operations</th> </tr> </thead> <tbody> <tr> <td>l2vpn</td> <td>read</td> </tr> </tbody> </table>	Task ID	Operations	l2vpn	read
Task ID	Operations				
l2vpn	read				
Examples	The following sample output is from the show l2vpn mstp vlan command:				

```
RP/0/RSP0/CPU0:router# show l2vpn mstp vlan interface gigabitether net 0/1/0/0 msti 5 vlan-id
5
```

Related Commands	Command	Description
	spanning-tree mst, on page 109	Enters the MSTP configuration submode
	spanning-tree mstag, on page 110	Enters the MST Access Gateway configuration submode.
	spanning-tree pvrstag, on page 112	Enters the Per VLAN Rapid Spanning Tree Access Gateway (PVRSTAG) configuration submode.
	spanning-tree pvstag, on page 113	Enters the Per VLAN Spanning Tree Access Gateway (PVSTAG) configuration submode.
	spanning-tree mst, on page 109	Enters the MSTP configuration submode
	spanning-tree mstag, on page 110	Enters the MST Access Gateway configuration submode.
	show l2vpn mstp port, on page 78	Displays the internal MSTI number and number of ports for each VLAN.

show spanning-tree mst

To display the multiple spanning tree protocol status information, use the **show spanning-tree mst** command in EXEC mode.

```
show spanning-tree mst [protocol instance identifier [instance instance-id] [{blocked-ports | brief}]]
```

Syntax Description	protocol instance identifier String of a maximum of 25 characters that identifies the protocol instance.
	instance instance-id Forward interface in rack/slot-instance/port format.
	brief Displays a summary of MST information only.
	blocked-ports Displays MST information for blocked ports only.

Command Default	None
-----------------	------

Command Modes	EXEC
---------------	------

Command History	Release	Modification
	Release 3.7.1	This command was introduced.
	Release 3.9.1	The topology-change keyword was added.

Usage Guidelines	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.
------------------	---

show spanning-tree mst

Task ID	Task ID	Operations
		interface read

Examples

The following example shows the output from the **show spanning-tree mst** command, which produces an overview of the spanning tree protocol state:

```
RP/0/RSP0/CPU0:router# show spanning-tree mst a instance 0
Operating in Provider Bridge mode
MSTI 0 (CIST):
    VLANs Mapped: 1-100, 500-1000, 1017

    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

    Interface          Port ID          Designated          Port ID
    Name              Prio.Nbr  Cost  Role State  Cost Bridge ID  Prio.Nbr
    -----  -----  -----  -----  -----  -----
    GigabitEthernet0/1/2/1  128.65  20000  DSGN  FWD      0  4097 0004.9b78.0800 128.65
    GigabitEthernet0/1/2/2  128.66  20000  DSGN  FWD      0  4097 0004.9b78.0800 128.66
    ...

```

The following example shows the output from the **show spanning-tree mst** command when the **brief** and **blocked-ports** keywords are used:

```
RP/0/RSP0/CPU0:router# show spanning-tree mst a brief
MSTI 0 (CIST):
    VLAN IDs: 1-100, 500-1000, 1017
    This is the Root Bridge
MSTI 1:
    VLAN IDs: 101-499
    Root Port GigabitEthernet0/1/2/2 , Root Bridge ID 0002.9b78.0812
    ...
RP/0/RSP0/CPU0:router# show spanning-tree mst blocked-ports
MSTI 0 (CIST):
    Interface          Port ID          Designated          Port ID
    Name              Prio.Nbr  Cost  Role State  Cost Bridge ID  Prio.Nbr
    -----  -----  -----  -----  -----  -----
    GigabitEthernet0/0/4/4  128.196  200000  ALT  BLK      0  4097 0004.9b78.0800 128.195
    ...

```

Related Commands

Command	Description
debug spanning-tree mst packet, on page 11	Enables debugging for sent and received MSTP packets.
debug spanning-tree mst protocol-state, on page 13	Enables debugging protocol-state changes such as port role or state changes, topology change notification.

Command	Description
show l2vpn mstp port, on page 78	Displays the internal MSTI number and number of ports for each VLAN.
show l2vpn mstp vlan, on page 80	Displays the Multiple Spanning Tree Protocol (MSTP) state for the virtual local area network (VLAN) on a given interface.
show spanning-tree mst bpdu interface, on page 83	Displays the contents of MSTP BPDUs being sent and received on a particular interface.
show spanning-tree mst configuration, on page 85	Displays the VLAN ID to MSTI mapping table.
show spanning-tree mst errors, on page 86	Displays information about misconfiguration affecting MSTP.
show spanning-tree mst interface, on page 87	Displays detailed information on the interface state.
show spanning-tree mst topology-change flushes, on page 90	Displays details of the last topology change that occurred for each pair of port and instance.
spanning-tree mst, on page 109	Enters the MSTP configuration submode

show spanning-tree mst bpdu interface

To display the contents of MSTP BPDUs being sent and received on a particular interface, use the **show spanning-tree mst bpdu interface** command in the EXEC mode.

show spanning-tree mst protocol *instance identifier* bpdu interface *type interface-path-id* [direction {receive | transmit}**]**

Syntax Description	
protocol <i>instance identifier</i>	String of a maximum of 25 characters that identifies the protocol instance.
bpdu interface	Displays multiple spanning tree BPDUs.
type	Interface type. For more information, use the question mark (?) online help function.
interface-path-id	Physical interface or virtual interface.
direction	Displays per-interface MST BPDUs for a specific direction.
receive	Displays only the MST BPDUs received on this interface.
transmit	Displays only the MST BPDUs being transmitted for this interface.

For more information about the syntax for the router, use the question mark (?) online help function.

Note Use the **show interfaces** command to see a list of all interfaces currently configured on the router.

show spanning-tree mst bpdu interface

Command Default	None														
Command Modes	EXEC														
Command History	<table border="1"> <thead> <tr> <th>Release</th><th>Modification</th></tr> </thead> <tbody> <tr> <td>Release 3.7.1</td><td>This command was introduced.</td></tr> </tbody> </table>	Release	Modification	Release 3.7.1	This command was introduced.										
Release	Modification														
Release 3.7.1	This command was introduced.														
Usage Guidelines	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.														
Task ID	<table border="1"> <thead> <tr> <th>Task ID</th><th>Operations</th></tr> </thead> <tbody> <tr> <td>interface read</td><td></td></tr> </tbody> </table>	Task ID	Operations	interface read											
Task ID	Operations														
interface read															
Examples	<p>The following example shows the output from the show spanning-tree mst command, which produces details on the BPDUs being output and received on a given local interface:</p>  <hr/> <p>Note Several received packets can be stored in case of MSTP operating on a shared LAN.</p> <hr/> <pre>RP/0/RSP0/CPU0:router# show spanning-tree mst a bpdu interface GigabitEthernet0/1/2/2 direction transmit MSTI 0 (CIST): Root ID : 0004.9b78.0800 Path Cost : 83 Bridge ID : 0004.9b78.0800 Port ID : 12 Hello Time : 2</pre>														
Related Commands	<table border="1"> <thead> <tr> <th>Command</th><th>Description</th></tr> </thead> <tbody> <tr> <td>debug spanning-tree mst packet, on page 11</td><td>Enables debugging for sent and received MSTP packets.</td></tr> <tr> <td>debug spanning-tree mst protocol-state, on page 13</td><td>Enables debugging protocol-state changes such as port role or state changes, topology change notification.</td></tr> <tr> <td>show l2vpn mstp port, on page 78</td><td>Displays the internal MSTI number and number of ports for each VLAN.</td></tr> <tr> <td>show l2vpn mstp vlan, on page 80</td><td>Displays the Multiple Spanning Tree Protocol (MSTP) state for the virtual local area network (VLAN) on a given interface.</td></tr> <tr> <td>show spanning-tree mst, on page 81</td><td>Displays the multiple spanning tree protocol status information.</td></tr> <tr> <td>show spanning-tree mst configuration, on page 85</td><td>Displays the VLAN ID to MSTI mapping table.</td></tr> </tbody> </table>	Command	Description	debug spanning-tree mst packet, on page 11	Enables debugging for sent and received MSTP packets.	debug spanning-tree mst protocol-state, on page 13	Enables debugging protocol-state changes such as port role or state changes, topology change notification.	show l2vpn mstp port, on page 78	Displays the internal MSTI number and number of ports for each VLAN.	show l2vpn mstp vlan, on page 80	Displays the Multiple Spanning Tree Protocol (MSTP) state for the virtual local area network (VLAN) on a given interface.	show spanning-tree mst, on page 81	Displays the multiple spanning tree protocol status information.	show spanning-tree mst configuration, on page 85	Displays the VLAN ID to MSTI mapping table.
Command	Description														
debug spanning-tree mst packet, on page 11	Enables debugging for sent and received MSTP packets.														
debug spanning-tree mst protocol-state, on page 13	Enables debugging protocol-state changes such as port role or state changes, topology change notification.														
show l2vpn mstp port, on page 78	Displays the internal MSTI number and number of ports for each VLAN.														
show l2vpn mstp vlan, on page 80	Displays the Multiple Spanning Tree Protocol (MSTP) state for the virtual local area network (VLAN) on a given interface.														
show spanning-tree mst, on page 81	Displays the multiple spanning tree protocol status information.														
show spanning-tree mst configuration, on page 85	Displays the VLAN ID to MSTI mapping table.														

Command	Description
show spanning-tree mst errors, on page 86	Displays information about misconfiguration affecting MSTP.
show spanning-tree mst interface, on page 87	Displays detailed information on the interface state.
show spanning-tree mst topology-change flushes, on page 90	Displays details of the last topology change that occurred for each pair of port and instance.
spanning-tree mst, on page 109	Enters the MSTP configuration submode

show spanning-tree mst configuration

To display the VLAN ID to MSTI mapping table, use the **show spanning-tree mst configuration** command in the EXEC mode.

show spanning-tree mst protocol instance identifier configuration

Syntax Description	<i>protocol instance identifier</i> String of a maximum of 25 characters that identifies the protocol instance.
	configuration Displays a summary of MST related configuration.

Command Default	None
------------------------	------

Command Modes	EXEC
----------------------	------

Command History	Release	Modification
	Release 3.7.1	This command was introduced.

Usage Guidelines	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.
-------------------------	---

Task ID	Task ID	Operations
		interface read

Examples	The following example shows the output from the show spanning-tree mst command, which displays the VLAN ID to MSTI mapping table:
-----------------	--

```
RP/0/RSP0/CPU0:router# show spanning-tree mst a configuration
Name          leo
Revision      2702
Config Digest 9D-14-5C-26-7D-BE-9F-B5-D8-93-44-1B-E3-BA-08-CE
Instance      Vlans mapped
-----
```

show spanning-tree mst errors

```

0      1-9,11-19,21-29,31-39,41-4094
1      10,20,30,40
-----
```

Related Commands	Command	Description
	debug spanning-tree mst packet, on page 11	Enables debugging for sent and received MSTP packets.
	debug spanning-tree mst protocol-state, on page 13	Enables debugging protocol-state changes such as port role or state changes, topology change notification.
	show l2vpn mstp port, on page 78	Displays the internal MSTI number and number of ports for each VLAN.
	show l2vpn mstp vlan, on page 80	Displays the Multiple Spanning Tree Protocol (MSTP) state for the virtual local area network (VLAN) on a given interface.
	show spanning-tree mst, on page 81	Displays the multiple spanning tree protocol status information.
	show spanning-tree mst bpdu interface, on page 83	Displays the contents of MSTP BPDUs being sent and received on a particular interface.
	show spanning-tree mst errors, on page 86	Displays information about misconfiguration affecting MSTP.
	show spanning-tree mst interface, on page 87	Displays detailed information on the interface state.
	show spanning-tree mst topology-change flushes, on page 90	Displays details of the last topology change that occurred for each pair of port and instance.
	spanning-tree mst, on page 109	Enters the MSTP configuration submode

show spanning-tree mst errors

To display information about misconfiguration affecting MSTP, use the **show spanning-tree mst errors** in the EXEC mode.

show spanning-tree mst *protocol instance identifier* errors

Syntax Description	<i>protocol instance identifier</i> String of a maximum of 25 characters that identifies the protocol instance.				
	errors Displays configuration errors for MST.				
Command Default	None				
Command Modes	EXEC				
Command History	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 3.7.1</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 3.7.1	This command was introduced.
Release	Modification				
Release 3.7.1	This command was introduced.				

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID

Task ID	Operations
	interface read

Examples

The following example shows the output from the **show spanning-tree mst** command, which produces information about interfaces that are configured for MSTP but where MSTP is not operational. Primarily this shows information about interfaces which do not exist:

```
RP/0/RSP0/CPU0:router# show spanning-tree mst a errors
Interface          Error
-----
GigabitEthernet1/2/3/4  Interface does not exist.
```

Related Commands

Command	Description
debug spanning-tree mst packet, on page 11	Enables debugging for sent and received MSTP packets.
debug spanning-tree mst protocol-state, on page 13	Enables debugging protocol-state changes such as port role or state changes, topology change notification.
show l2vpn mstp port, on page 78	Displays the internal MSTI number and number of ports for each VLAN.
show l2vpn mstp vlan, on page 80	Displays the Multiple Spanning Tree Protocol (MSTP) state for the virtual local area network (VLAN) on a given interface.
show spanning-tree mst, on page 81	Displays the multiple spanning tree protocol status information.
show spanning-tree mst bpdu interface, on page 83	Displays the contents of MSTP BPDUs being sent and received on a particular interface.
show spanning-tree mst configuration, on page 85	Displays the VLAN ID to MSTI mapping table.
show spanning-tree mst interface, on page 87	Displays detailed information on the interface state.
show spanning-tree mst topology-change flushes, on page 90	Displays details of the last topology change that occurred for each pair of port and instance.
spanning-tree mst, on page 109	Enters the MSTP configuration submode

show spanning-tree mst interface

To display detailed information on the interface state, use the **show spanning-tree mst interface** command in EXEC mode.

show spanning-tree mst interface

show spanning-tree mst protocol instance identifier interface type interface-path-id [instance id]

Syntax Description

protocol instance identifier String of a maximum of 25 characters that identifies the protocol instance.

interface type Interface type. For more information, use the question mark (?) online help function.

interface-path-id Physical interface or virtual interface.

Note Use the **show interfaces** command to see a list of all interfaces currently configured on the router.

For more information about the syntax for the router, use the question mark (?) online help function.

instance id Forward interface in rack/slot/instance/port format.

Command Default

None

Command Modes

EXEC

Command History

Release	Modification
---------	--------------

Release 3.7.1 This command was introduced.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID

Task ID	Operations
---------	------------

interface read

Examples

The following example shows the output from the **show spanning-tree mst** command, which produces more detailed information regarding interface state than the standard command as described above:

```
RP/0/RSP0/CPU0:router# show spanning-tree mst a interface GigabitEthernet0/1/2/1 instance 3
GigabitEthernet0/1/2/1
Cost: 20000
link-type: point-to-point
hello-time 1
Portfast: no
BPDU Guard: no
Guard root: no
Guard topology change: no
BPDUs sent 492, received 3

MST 3:
Edge port:
```

```

Boundary : internal
Designated forwarding
Vlans mapped to MST 3: 1-2,4-2999,4000-4094
Port info port id 128.193 cost 200000
Designated root address 0050.3e66.d000 priority 8193 cost 20004
Designated bridge address 0002.172c.f400 priority 49152 port id 128.193
Timers: message expires in 0 sec, forward delay 0, forward transitions 1
Transitions to reach this state: 12

```

The output includes interface information about the interface which applies to all MSTIs:

- Cost
- link-type
- hello-time
- portfast (including whether BPDU guard is enabled)
- guard root
- guard topology change
- BPDUs sent, received.

It also includes information specific to each MSTI:

- Port ID, priority, cost
- BPDU information from root (bridge ID, cost, and priority)
- BPDU information being sent on this port (Bridge ID, cost, priority)
- State transitions to reach this state.
- Topology changes to reach this state.

Flush containment status for this MSTI.

Related Commands	Command	Description
	debug spanning-tree mst packet, on page 11	Enables debugging for sent and received MSTP packets.
	debug spanning-tree mst protocol-state, on page 13	Enables debugging protocol-state changes such as port role or state changes, topology change notification.
	show l2vpn mstp port, on page 78	Displays the internal MSTI number and number of ports for each VLAN.
	show l2vpn mstp vlan, on page 80	Displays the Multiple Spanning Tree Protocol (MSTP) state for the virtual local area network (VLAN) on a given interface.
	show spanning-tree mst, on page 81	Displays the multiple spanning tree protocol status information.
	show spanning-tree mst bpdu interface, on page 83	Displays the contents of MSTP BPDUs being sent and received on a particular interface.
	show spanning-tree mst configuration, on page 85	Displays the VLAN ID to MSTI mapping table.
	show spanning-tree mst errors, on page 86	Displays information about misconfiguration affecting MSTP.
	show spanning-tree mst topology-change flushes, on page 90	Displays details of the last topology change that occurred for each pair of port and instance.
	spanning-tree mst, on page 109	Enters the MSTP configuration submode

show spanning-tree mst topology-change flushes

show spanning-tree mst topology-change flushes

To display details of the last topology change that occurred for each pair of port and instance, as well as a count of the number of topology changes at each port, use the **show spanning-tree mst topology-change flushes** command in the EXEC mode.

```
show spanning-tree mst protocol instance identifier topology-change flushes [instance id]
[ {interface type interface-path-id | latest}]
```

Syntax Description

<i>protocol instance identifier</i>	String of a maximum of 25 characters that identifies the protocol instance.
topology-change	Displays topology change information.
flushes	Displays latest topology change flushes for each interface.
instance id	Instance for which information needs to be displayed.
interface type	Interface type. For more information, use the question mark (?) online help function.
<i>interface-path-id</i>	Physical interface or virtual interface.
	<p>Note Use the show interfaces command to see a list of all interfaces currently configured on the router.</p> <p>For more information about the syntax for the router, use the question mark (?) online help function.</p>
latest	Displays the most recent topology change for each instance.

Command Default

None

Command Modes

EXEC

Command History

Release	Modification
---------	--------------

Release 3.7.1 This command was introduced.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.



Note The latest filter displays only the most recent topology change for each instance. The output also displays information of the flush operation that takes place when the flush containment is active on an MSTI for a port.

Task ID	Task ID	Operations
	interface	read

Examples

The following example shows the output from the **show spanning-tree mst** command, which displays details on the MSTIs :

```
RP/0/RSP0/CPU0:router# show spanning-tree mst M topology-change flushes instance$  
MSTI 1:
```

Interface	Last TC	Reason	Count
Te0/0/0/1	04:16:05 Mar 16 2010	Role change: DSGN to ----	10
#			
#			

```
RP/0/RSP0/CPU0:router# show spanning-tree mst M topology-change flushes instance$  
MSTI 0 (CIST):
```

Interface	Last TC	Reason	Count
Te0/0/0/1	04:16:05 Mar 16 2010	Role change: DSGN to ----	10
#			
#			

Related Commands

Command	Description
debug spanning-tree mst packet, on page 11	Enables debugging for sent and received MSTP packets.
debug spanning-tree mst protocol-state, on page 13	Enables debugging protocol-state changes such as port role or state changes, topology change notification.
show l2vpn mstp port, on page 78	Displays the internal MSTI number and number of ports for each VLAN.
show l2vpn mstp vlan, on page 80	Displays the Multiple Spanning Tree Protocol (MSTP) state for the virtual local area network (VLAN) on a given interface.
show spanning-tree mst, on page 81	Displays the multiple spanning tree protocol status information.
show spanning-tree mst bpdu interface, on page 83	Displays the contents of MSTP BPDU being sent and received on a particular interface.
show spanning-tree mst configuration, on page 85	Displays the VLAN ID to MSTI mapping table.
show spanning-tree mst errors, on page 86	Displays information about misconfiguration affecting MSTP.
show spanning-tree mst interface, on page 87	Displays detailed information on the interface state.
spanning-tree mst, on page 109	Enters the MSTP configuration submode

show spanning-tree mstag

show spanning-tree mstag

To display the values currently used for populating the BPDU sent by all ports (with the specified feature enabled), use the **show spanning-tree mstag** in the EXEC mode.

show spanning-tree mstag protocol instance identifier

Syntax Description	<i>protocol instance identifier</i> String (a maximum of 25 characters) that identifies the protocol instance.	
Command Default	None	
Command Modes	EXEC	
Command History	Release	Modification
	Release 3.7.1	This command was introduced.
	Release 4.1.0	The show output of this command was modified to include information on the MSTAG Edge Mode feature.
	Release 6.2.2	The show output of this command was modified to include information on core connectivity status. If core connectivity is available, the device displays that the standard BPDU is sent, else it displays that the start-up BPDU is sent.
Usage Guidelines	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.	
Task ID	Task ID	Operations
	interface	read

Examples

This example shows the output from the **show spanning-tree mstag** command:

```
RP/0/RSP0/CPU0:router# show spanning-tree mstag A
GigabitEthernet0/0/0/1
  Preempt delay is disabled.
  Name:          6161:6161:6161
  Revision:      0
  Max Age:       20
  Provider Bridge: no
  Bridge ID:     6161.6161.6161
  Port ID:       1
  External Cost: 0
  Hello Time:    2
  Active:        no
  BPDUs sent:    0
  MSTI 0 (CIST):
    VLAN IDs:    1-9,32-39,41-4094
    Role:         Designated
    Bridge Priority: 32768
```

```

Port Priority: 128
Cost: 0
Root Bridge: 6161.6161.6161
Root Priority: 32768
Topology Changes: 123
MSTI 2
VLAN IDs: 10-31
Role: Designated
Bridge Priority: 32768
Port Priority: 128
Cost: 0
Root Bridge: 6161.6161.6161
Root Priority: 32768
Topology Changes: 123
MSTI 10
VLAN IDs: 40
Role: Root (Edge mode)
Bridge Priority: 32768
Port Priority: 128
Cost: 200000000
Root Bridge: 6161.6161.6161
Root Priority: 61440
Topology Changes: 0

RP/0/RSP0/CPU0:router# show spanning-tree mstag foo
GigabitEthernet0/0/0/0
Pre-empt delay is disabled. Core connectivity tracking is enabled
Sending startup BPDU as core connectivity is unavailable
Name: 029d:af84:4100
Revision: 0
Max Age: 20
Provider Bridge: no
Bridge ID: 029d.af84.4100
Port ID: 1
External Cost: 200000000
Hello Time: 2
Active: no
Packets sent: 184
Auto-configure edge: no
MSTI 0 (CIST):
VLAN IDs: 1-4094
Role: Designated
Bridge Priority: 32768
Port Priority: 128
Cost: 200000000
Root Bridge: 029d.af84.4100
Root Priority: 32768
Topology Changes: 0

```

Related Commands	Command	Description
	debug spanning-tree mstag packet, on page 14	Enables MSTAG packet debugging.
	show spanning-tree mstag bpdu interface, on page 94	Displays the content of the BPDUs being sent from this interface.
	show spanning-tree mstag topology-change flushes, on page 95	Displays details of the last topology change that occurred for each pair of port and instance.
	spanning-tree mstag, on page 110	Enters the MST Access Gateway configuration submode.

show spanning-tree mstag bpdu interface

show spanning-tree mstag bpdu interface

To view the content of the BPUDUs being sent from this interface, use the **show spanning-tree mstag bpdu interface** command in the EXEC mode.

show spanning-tree mstag protocol instance identifier bpdu interface type interface-path-id

Syntax Description	<p><i>protocol instance identifier</i> String of a maximum of 25 characters that identifies the protocol instance.</p> <p>bpdu interface Displays multiple spanning tree BPUDUs.</p> <p><i>type</i> Interface type. For more information, use the question mark (?) online help function.</p> <p><i>interface-path-id</i> Physical interface or virtual interface.</p>				
	<p>Note Use the show interfaces command to see a list of all interfaces currently configured on the router.</p> <p>For more information about the syntax for the router, use the question mark (?) online help function.</p>				
Command Default	None				
Command Modes	EXEC				
Command History	<table border="1"> <thead> <tr> <th>Release</th><th>Modification</th></tr> </thead> <tbody> <tr> <td>Release 3.7.1</td><td>This command was introduced.</td></tr> </tbody> </table>	Release	Modification	Release 3.7.1	This command was introduced.
Release	Modification				
Release 3.7.1	This command was introduced.				
Usage Guidelines	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.				
Task ID	<table border="1"> <thead> <tr> <th>Task ID</th><th>Operations</th></tr> </thead> <tbody> <tr> <td>interface</td><td>read</td></tr> </tbody> </table>	Task ID	Operations	interface	read
Task ID	Operations				
interface	read				
Examples	The following example shows the output from the show spanning-tree mstag bpdu interface command:				

```
RP/0/RSP0/CPU0:router#show spanning-tree mstag foo bpdu interface GigabitEthernet 0/0/0/0
Transmitted:
    MSTI 0 (CIST):
    ProtocolIdentifier: 0
    ProtocolVersionIdentifier: 3
    BPDUType: 2
```

```

CISTFlags: Top Change Ack 0
    Agreement      1
    Forwarding     1
    Learning       1
    Role           3
    Proposal        0
    Topology Change 0
CISTRootIdentifier: priority 8, MSTI 0, address 6969.6969.6969
CISTExternalPathCost: 0
CISTRegionalRootIdentifier: priority 8, MSTI 0, address 6969.6969.6969
CISTPortIdentifierPriority: 8
CISTPortIdentifierId: 1
MessageAge: 0
MaxAge: 20
HelloTime: 2
ForwardDelay: 15
Version1Length: 0
Version3Length: 80
FormatSelector: 0
Name: 6969:6969:6969
Revision: 0
MD5Digest: ac36177f 50283cd4 b83821d8 ab26de62
CISTInternalRootPathCost: 0
CISTBridgeIdentifier: priority 8, MSTI 0, address 6969.6969.6969
CISTRemainingHops: 20
    MSTI 1:
MSTIFlags: Master      0
    Agreement      1
    Forwarding     1
    Learning       1
    Role           3
    Proposal        0
    Topology Change 0
MSTIRegionalRootIdentifier: priority 8, MSTI 1, address 6969.6969.6969
MSTIInternalRootPathCost: 0
MSTIBridgePriority: 1
MSTIPortPriority: 8
MSTIRemainingHops: 20

```

Related Commands	Command	Description
	debug spanning-tree mstag packet, on page 14	Enables MSTAG packet debugging.
	show spanning-tree mstag, on page 92	Displays the values currently used for populating the BPDUs sent by all ports.
	show spanning-tree mstag topology-change flushes, on page 95	Displays details of the last topology change that occurred for each pair of port and instance.
	spanning-tree mstag, on page 110	Enters the MST Access Gateway configuration submode.

show spanning-tree mstag topology-change flushes

To display details of the last topology change that occurred for each pair of port and instance, as well as a count of the number of topology changes at each port, use the **show spanning-tree mstag topology-change flushes** command in the EXEC mode.

show spanning-tree mstag topology-change flushes



Note The latest filter displays only the most recent topology change for each instance. The output also displays information of the flush operation that takes place when the flush containment is active on an MSTI for a port.

show spanning-tree mstag protocol instance identifier topology-change flushes [instance id] [*interface type interface-path-id | latest*]

Syntax Description	<p><i>protocol instance identifier</i> String of a maximum of 25 characters that identifies the protocol instance.</p> <p>topology-change Displays topology change information.</p> <p>flushes Displays latest topology change flushes for each interface.</p> <p>instanceid Forward interface in rack/slot/instance/port format.</p> <p>interface type Interface type. For more information, use the question mark (?) online help function.</p>				
	<p><i>interface-path-id</i> Physical interface or virtual interface.</p> <p>Note Use the show interfaces command to see a list of all interfaces currently configured on the router.</p> <p>For more information about the syntax for the router, use the question mark (?) online help function.</p>				
	<p>latest Displays the most recent topology change for each instance.</p>				
Command Default	None				
Command Modes	EXEC				
Command History	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 3.7.1</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 3.7.1	This command was introduced.
Release	Modification				
Release 3.7.1	This command was introduced.				
Usage Guidelines	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.				
Task ID	<table border="1"> <thead> <tr> <th>Task ID</th> <th>Operations</th> </tr> </thead> <tbody> <tr> <td>interface read</td> <td></td> </tr> </tbody> </table>	Task ID	Operations	interface read	
Task ID	Operations				
interface read					

Examples The following example shows the output from the **show spanning-tree mstag topology-change flushes** command, which displays details on the MSTIs :

```
RP/0/RSP0/CPU0:router# show spanning-tree mstag b topology-change flushes
MSTAG Protocol Instance b
Interface      Last TC          Reason                                Count
-----          -----          -----
Gi0/0/0/1       18:03:24 2009-07-14 Gi0/0/0/1.10 egress TCN           65535
Gi0/0/0/2       21:05:04 2009-07-15 Gi0/0/2.1234567890 ingress TCN       2
```

Related Commands	Command	Description
	debug spanning-tree mstag packet, on page 14	Enables MSTAG packet debugging.
	show spanning-tree mstag, on page 92	Displays the values currently used for populating the BPDUs sent by all ports.
	show spanning-tree mstag bpdu interface, on page 94	Displays the content of the BPDUs being sent from this interface.
	spanning-tree mstag, on page 110	Enters the MST Access Gateway configuration submode.

show spanning-tree mstag tracked

To display the core connectivity tracking data, use the **show spanning-tree mstag tracked** command in the EXEC mode.

show spanning-tree mstag protocol instance identifier tracked

Syntax Description	<i>protocol instance identifier</i> String (a maximum of 25 characters) that identifies the protocol instance.					
	tracked Displays the core connectivity tracking data.					
Command Default	None					
Command Modes	EXEC					
Command History	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>6.2.2</td> <td>This command was introduced.</td> </tr> </tbody> </table>		Release	Modification	6.2.2	This command was introduced.
Release	Modification					
6.2.2	This command was introduced.					
Usage Guidelines	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.					
Task ID	<table border="1"> <thead> <tr> <th>Task ID</th> <th>Operations</th> </tr> </thead> <tbody> <tr> <td>interface</td> <td>read</td> </tr> </tbody> </table>		Task ID	Operations	interface	read
Task ID	Operations					
interface	read					

show spanning-tree pvrst

Examples

This example shows the output from the **show spanning-tree mstag foo tracked** command:

```
RP/0/RSP0/CPU0:router# show spanning-tree mstag foo tracked
Core Connectivity Available: True
Tracked Items: 1/2 up

Interface Name State
-----
GigabitEthernet0/0/0/3 Down
GigabitEthernet0/0/0/2 Up
-----
```

Related Commands

Command	Description
debug spanning-tree mstag packet, on page 14	Enables MSTAG packet debugging.
show spanning-tree mstag bpdu interface, on page 94	Displays the content of the BPDUs being sent from this interface.
show spanning-tree mstag topology-change flushes, on page 95	Displays details of the last topology change that occurred for each pair of port and instance.
spanning-tree mstag, on page 110	Enters the MST Access Gateway configuration submode.

show spanning-tree pvrst

To display the Per VLAN Rapid Spanning Tree (PVRST) status information, use the **show spanning-tree pvrst** command in EXEC mode.

```
show spanning-tree pvrst protocol instance identifier [{blocked-ports | bpdu | brief | errors | interface | topology-change | vlan}]
```

Syntax Description

<i>protocol instance identifier</i>	String of a maximum of 25 characters that identifies the protocol instance.
blocked-ports	Displays PVRST Bridge Protocol Data Unit (BPDU).
bpdu	Displays PVRST Bridge Protocol Data Unit (BPDU).
brief	Displays PVRST Bridge Protocol Data Unit (BPDU).
errors	Display configuration errors for PVRST.
interface	Displays PVRST information for every interface.
topology-change	Displays topology change information.

	vlan	Displays VLAN information.
Command Default	None	
Command Modes	EXEC	
Command History	Release	Modification
	Release 5.1	This command was introduced.
Usage Guidelines	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.	
Task ID	Task ID	Operations
	ethernet-services	read
Examples	This example shows the output from the show spanning-tree pvrst command, which produces an overview of the spanning tree protocol state:	
	<pre>RP/0/RSP0/CPU0:router# show spanning-tree pvrst MSTP Role: ROOT=Root, DSGN=Designated, ALT=Alternate, BKP=Backup State: FWD=Forwarding, LRN=Learning, BLK=Blocked VLAN 10: Root ID Priority 4096 Address 8cb6.4fe9.7b9e This bridge is the root Max Age 20 sec, Forward Delay 15 sec Bridge ID Priority 4096 (priority 4096 sys-id-ext 0) Address 8cb6.4fe9.7b9e Max Age 20 sec, Forward Delay 15 sec Transmit Hold count 6 Interface Port ID Role State Designated Port ID Pri.Nbr Cost Bridge ID Pri.Nbr ----- ----- Gi0/5/0/0 128.1 20000 DSGN FWD 4096 8cb6.4fe9.7b9e 128.1 Gi0/5/0/2 128.2 20000 DSGN FWD 4096 8cb6.4fe9.7b9e 128.2 VLAN 20: Root ID Priority 8192 Address c062.6bac.a07e Max Age 20 sec, Forward Delay 15 sec Bridge ID Priority 16384 (priority 16384 sys-id-ext 0)</pre>	

show spanning-tree pvrst

```

Address 8cb6.4fe9.7b9e
Max Age 20 sec, Forward Delay 15 sec
Transmit Hold count 6

Interface Port ID Role State Designated Port ID
Pri.Nbr Cost Bridge ID Pri.Nbr
-----
Gi0/5/0/0 128.1 20000 ROOT FWD 8192 c062.6bac.a07e 128.1
Gi0/5/0/2 128.2 20000 ALT BLK 8192 c062.6bac.a07e 128.2

```

This example shows the output from the **show spanning-tree pvrst** command when the **brief** and **blocked-ports** keywords are used:

```

RP/0/RSP0/CPU0:router# show spanning-tree pvrst st1 brief
VLAN 1 (native-vlan):
    This is the Root Bridge
VLAN 101:
    Root Port GigabitEthernet0/1/2/2 , Root Bridge ID 0002.9b78.0812
...
RP/0/RSP0/CPU0:router# show spanning-tree pvrst st1 blocked-ports
VLAN 1 (native-vlan):

Interface      Port ID      Role State Designated      Port ID
Pri.Nbr Cost      Bridge ID      Pri.Nbr
-----
Gi0/0/0/0      128.1      20000      ---- BLK      4097 0004.9b78.0800 128.195
...

```

This example shows the output for the **show spanning-tree pvrst** command when **interface** keyword is used:

```

RP/0/RSP0/CPU0:router#
show spanning-tree pvrst st1 interface GigabitEthernet 0/1/2/1 vlan 10
show spanning-tree pvrst MSTP interface gigabitEthernet 0/5/0/0 vlan 10
Gi0/5/0/0
Configured Cost: 20000
link-type: point-to-point
Configured hello-time: 2
Designated hello-time: 2
Portfast: no
BPDU Guard: no
Guard root: no

VLAN 10:
Edge port: no
designated, forwarding
Port info port id 128.1 cost 20000
Designated root address 8cb6.4fe9.7b9e priority 4096 cost 0
Designated bridge address 8cb6.4fe9.7b9e priority 4096 port id 128.1
Timers: message expires in 0 sec, forward delay 0
BPDUs sent 19433, received 19228
Transitions to reach this state: 2
Topology Changes: 1 total, last at 18:47:29 Jul 1 2013

```

This example shows the output for the **show spanning-tree pvrst** command when **errors** keyword is used:

```

RP/0/RSP0/CPU0:router# show spanning-tree pvrst st1 errors
Interface      Error

```

```
-----      -----
Gi/2/3/4      Interface does not exist.
```

This example shows the output for the **show spanning-tree pvrst** command when **bpdu** keyword is used:

```
RP/0/RSP0/CPU0:router#
show spanning-tree pvrst st1 bpdu interface GigabitEthernet 0/1/2/2 vlan 1 direction receive
Received: (0000.0000.000a)
VLAN 1 (native-VLAN):
  Root ID : 0004.9b78.0800
  Path Cost : 83
  Bridge ID : 0004.9b78.0800
  Port ID : 12
  Hello Time : 2
  ...
  ...
```

Related Commands	Command	Description
	debug spanning-tree pvrst, on page 17	Enables debugging protocol-state changes such as port role, state changes, and topology change notification.
	spanning-tree pvrst, on page 111	Enters the Per VLAN Rapid Spanning Tree (PVRST) configuration submode.

show spanning-tree pvrstag

To display the values currently used for populating the BPDUs sent by all ports (with the specified feature enabled), use the **show spanning-tree pvrstag** in the EXEC mode.

show spanning-tree pvrstag protocol instance identifier [interface type interface-path-id]

Syntax Description	protocol instance identifier	String of a maximum of 25 characters that identifies the protocol instance.
	interface type	Interface type. For more information, use the question mark (?) online help function.
	<i>interface-path-id</i>	Physical interface or virtual interface.
	Note	Use the show interfaces command to see a list of all interfaces currently configured on the router.
	For more information about the syntax for the router, use the question mark (?) online help function.	

Command Default	None
Command Modes	EXEC

show spanning-tree pvstag

Command History	Release	Modification
	Release 4.0.0	This command was introduced.
Usage Guidelines		
	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.	
Task ID	Task ID	Operations
		interface read
Examples	The following example shows the output from the show spanning-tree pvrstag command:	
<pre>RP/0/RSP0/CPU0:router# show spanning-tree pvrstag interface GigabitEthernet0/0/0/1 GigabitEthernet0/0/0/1 VLAN 10 Preempt delay is disabled. Sub-interface: GigabitEthernet0/0/0/1.20 (Up) Max Age: 20 Root Priority: 0 Root Bridge: 0000.0000.0000 Cost: 0 Bridge Priority: 32768 Bridge ID: 6161.6161.6161 Port Priority: 128 Port ID: 1 Hello Time: 2 Active: no BPDUs sent: 0 Topology Changes: 123 VLAN 20</pre>		
Related Commands	Command	Description
	debug spanning-tree pvrstag packet, on page 18	Enables packet debugging for sent and received PVRSTAG packets.
	spanning-tree pvrstag, on page 112	Enters the Per VLAN Rapid Spanning Tree Access Gateway (PVRSTAG) configuration submode.

show spanning-tree pvstag

To display the values currently used for populating the BPDUs sent by all ports (with the specified feature enabled), use the **show spanning-tree pvstag** in the EXEC mode.

show spanning-tree pvstag protocol instance identifier [interface type interface-path-id]

Syntax Description	protocol instance identifier String of a maximum of 25 characters that identifies the protocol instance.
--------------------	--

interface type	Interface type. For more information, use the question mark (?) online help function.				
interface-path-id	Physical interface or virtual interface. Note Use the show interfaces command to see a list of all interfaces currently configured on the router.				
	For more information about the syntax for the router, use the question mark (?) online help function.				
Command Default	None				
Command Modes	EXEC				
Command History	<table border="1"> <thead> <tr> <th>Release</th><th>Modification</th></tr> </thead> <tbody> <tr> <td>Release 4.0.0</td><td>This command was introduced.</td></tr> </tbody> </table>	Release	Modification	Release 4.0.0	This command was introduced.
Release	Modification				
Release 4.0.0	This command was introduced.				
Usage Guidelines	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.				
Task ID	<table border="1"> <thead> <tr> <th>Task ID</th><th>Operations</th></tr> </thead> <tbody> <tr> <td></td><td>interface read</td></tr> </tbody> </table>	Task ID	Operations		interface read
Task ID	Operations				
	interface read				

Examples

The following example shows the output from the **show spanning-tree pvstag** command:

```
RP/0/RSP0/CPU0:router# show spanning-tree pvstag interface GigabitEthernet0/0/0/1
GigabitEthernet0/0/0/1
VLAN 10
  Preempt delay is disabled.
  Sub-interface:  GigabitEthernet0/0/0/1.20 (Up)
  Max Age:      20
  Root Priority: 0
  Root Bridge:   0000.0000.0000
  Cost:          0
  Bridge Priority: 32768
  Bridge ID:    6161.6161.6161
  Port Priority: 128
  Port ID:      1
  Hello Time:   2
  Active:        no
  BPDUs sent:   0
  Topology Changes: 123
VLAN 20
```

show spanning-tree repag

show spanning-tree repag

To display the values currently used for populating the BPDUs sent by all ports (with the specified feature enabled), use the **show spanning-tree repag** in the EXEC mode.

show spanning-tree repag protocol instance identifier [interface type interface-path-id] [brief]

Syntax Description	<i>protocol instance identifier</i> String of a maximum of 25 characters that identifies the protocol instance.
interface type	Interface type. For more information, use the question mark (?) online help function.
<i>interface-path-id</i>	Physical interface or virtual interface.
	<p>Note Use the show interfaces command to see a list of all interfaces currently configured on the router.</p> <p>For more information about the syntax for the router, use the question mark (?) online help function.</p>

Command Default	None				
Command Modes	EXEC				
Command History	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 3.7.1</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 3.7.1	This command was introduced.
Release	Modification				
Release 3.7.1	This command was introduced.				

Usage Guidelines	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.
-------------------------	---

Task ID	<table border="1"> <thead> <tr> <th>Task ID</th><th>Operations</th></tr> </thead> <tbody> <tr> <td>interface read</td><td></td></tr> </tbody> </table>	Task ID	Operations	interface read	
Task ID	Operations				
interface read					

Examples	The following example shows the output from the show spanning-tree repag command:
-----------------	--

```
RP/0/RSP0/CPU0:router# show spanning-tree repag interface GigabitEthernet0/0/0/1
GigabitEthernet0/0/0/1
VLAN 10
Preempt delay is disabled.
Sub-interface:    GigabitEthernet0/0/0/1.20 (Up)
Max Age:          20
Root Priority:   0
Root Bridge:     0000.0000.0000
Cost:             0
Bridge Priority: 32768
```

```

Bridge ID:          6161.6161.6161
Port Priority:     128
Port ID:           1
Hello Time:        2
Active:            no
BPDUs sent:       0
Topology Changes: 123
VLAN 20

```

Related Commands	Command	Description
	debug spanning-tree repag packet, on page 21	Enables Resilient Ethernet Protocol (REP) Access Gateway debugging commands.
	show spanning-tree repag bpdu interface, on page 105	Displays BPDU information from root (bridge ID, cost, and priority) and the BPDU information being sent on the port.
	show spanning-tree repag topology-change flushes, on page 107	Displays details of the last topology change that occurred for each pair of port and instance.
	spanning-tree repag, on page 114	Enters the Resilient Ethernet Protocol Access Gateway (REPAG) configuration submode.

show spanning-tree repag bpdu interface

To display BPDU information from root (bridge ID, cost, and priority) and the BPDU information being sent on the port (Bridge ID, cost, priority) specific to an MSTI, use the **show spanning-tree repag bpdu interface** command in the EXEC mode.

show spanning-tree repag protocol instance identifier [bpdu interface type interface-path-id]

Syntax Description	<i>protocol instance identifier</i> String of a maximum of 25 characters that identifies the protocol instance.
bpdu interface	Displays multiple spanning tree BPDUs.
type	Interface type. For more information, use the question mark (?) online help function.
<i>interface-path-id</i>	Physical interface or virtual interface.
	Note Use the show interfaces command to see a list of all interfaces currently configured on the router.
	For more information about the syntax for the router, use the question mark (?) online help function.

Command Default None

Command Modes EXEC

show spanning-tree repag bpdu interface

Command History	Release	Modification
	Release 3.7.1	This command was introduced.
Usage Guidelines		
	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.	
Task ID	Task ID	Operations
		interface read

Examples

The following example shows the output from the **show spanning-tree repag** command, which produces details on the BPDUs being output and received on a given local interface:

```
RP/0/RSP0/CPU0:router#show spanning-tree mstag foo bpdu interface GigabitEthernet 0/0/0/0
Transmitted:
    MSTI 0 (CIST):
        ProtocolIdentifier: 0
        ProtocolVersionIdentifier: 3
        BPDUType: 2
        CISTFlags: Top Change Ack 0
                    Agreement 1
                    Forwarding 1
                    Learning 1
                    Role 3
                    Proposal 0
                    Topology Change 0
        CISTRootIdentifier: priority 8, MSTI 0, address 6969.6969.6969
        CISTExternalPathCost: 0
        CISTRegionalRootIdentifier: priority 8, MSTI 0, address 6969.6969.6969
        CISTPortIdentifierPriority: 8
        CISTPortIdentifierId: 1
        MessageAge: 0
        MaxAge: 20
        HelloTime: 2
        ForwardDelay: 15
        Version1Length: 0
        Version3Length: 80
        FormatSelector: 0
        Name: 6969:6969:6969
        Revision: 0
        MD5Digest: ac36177f 50283cd4 b83821d8 ab26de62
        CISTInternalRootPathCost: 0
        CISTBridgeIdentifier: priority 8, MSTI 0, address 6969.6969.6969
        CISTRemainingHops: 20
            MSTI 1:
                MSTIFlags: Master 0
                            Agreement 1
                            Forwarding 1
                            Learning 1
                            Role 3
                            Proposal 0
                            Topology Change 0
                MSTIRegionalRootIdentifier: priority 8, MSTI 1, address 6969.6969.6969
```

```
MSTIInternalRootPathCost: 0
MSTIBridgePriority: 1
MSTIPortPriority: 8
MSTIRemainingHops: 20
```

Related Commands	Command	Description
	debug spanning-tree repag packet, on page 21	Enables Resilient Ethernet Protocol (REP) Access Gateway debugging commands.
	show spanning-tree repag, on page 104	Displays the values currently used for populating the BPDUs sent by all ports.
	show spanning-tree repag topology-change flushes, on page 107	Displays details of the last topology change that occurred for each pair of port and instance.
	spanning-tree repag, on page 114	Enters the Resilient Ethernet Protocol Access Gateway (REPAG) configuration submode.

show spanning-tree repag topology-change flushes

To display details of the last topology change that occurred for each pair of port and instance, as well as a count of the number of topology changes at each port, use the **show spanning-tree repag topology-change flushes** command in the EXEC mode.


Note

The latest filter displays only the most recent topology change for each instance. The output also displays information of the flush operation that takes place when the flush containment is active on an MSTI for a port.

show spanning-tree repag protocol instance identifier topology-change flushes [instance id] [{interface type interface-path-id | latest}]

Syntax Description

protocol instance identifier String of a maximum of 25 characters that identifies the protocol instance.

topology-change Displays topology change information.

flushes Displays latest topology change flushes for each interface.

instanceid Forward interface in rack/slot-instance/port format.

interface type Interface type. For more information, use the question mark (?) online help function.

interface-path-id Physical interface or virtual interface.

Note Use the **show interfaces** command to see a list of all interfaces currently configured on the router.

For more information about the syntax for the router, use the question mark (?) online help function.

show spanning-tree repag topology-change flushes

latest	Displays the most recent topology change for each instance.										
Command Default	None										
Command Modes	EXEC										
Command History	<table border="1"> <thead> <tr> <th>Release</th><th>Modification</th></tr> </thead> <tbody> <tr> <td>Release 3.7.1</td><td>This command was introduced.</td></tr> </tbody> </table>	Release	Modification	Release 3.7.1	This command was introduced.						
Release	Modification										
Release 3.7.1	This command was introduced.										
Usage Guidelines	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.										
Task ID	<table border="1"> <thead> <tr> <th>Task ID</th><th>Operations</th></tr> </thead> <tbody> <tr> <td></td><td>interface read</td></tr> </tbody> </table>	Task ID	Operations		interface read						
Task ID	Operations										
	interface read										
Examples	The following example shows the output from the show spanning-tree repag topology-change flushes command, which displays details on the MSTIs :										
	<pre>RP/0/RSP0/CPU0:router#show spanning-tree repag b topology-change flushes MSTAG Protocol Instance b Interface Last TC Reason Count -----+-----+-----+-----+-----+-----+-----+-----+ Gi0/0/0/1 18:03:24 2009-07-14 Gi0/0/0/1.10 egress TCN 65535 Gi0/0/0/2 21:05:04 2009-07-15 Gi0/0/0/2.1234567890 ingress TCN 2</pre>										
Related Commands	<table border="1"> <thead> <tr> <th>Command</th><th>Description</th></tr> </thead> <tbody> <tr> <td>debug spanning-tree repag packet, on page 21</td><td>Enables Resilient Ethernet Protocol (REP) Access Gateway debugging commands.</td></tr> <tr> <td>show spanning-tree repag, on page 104</td><td>Displays the values currently used for populating the BPDU sent by all ports.</td></tr> <tr> <td>show spanning-tree repag bpdu interface, on page 105</td><td>Displays BPDU information from root (bridge ID, cost, and priority) and the BPDU information being sent on the port.</td></tr> <tr> <td>spanning-tree repag, on page 114</td><td>Enters the Resilient Ethernet Protocol Access Gateway (REPAG) configuration submode.</td></tr> </tbody> </table>	Command	Description	debug spanning-tree repag packet, on page 21	Enables Resilient Ethernet Protocol (REP) Access Gateway debugging commands.	show spanning-tree repag, on page 104	Displays the values currently used for populating the BPDU sent by all ports.	show spanning-tree repag bpdu interface, on page 105	Displays BPDU information from root (bridge ID, cost, and priority) and the BPDU information being sent on the port.	spanning-tree repag, on page 114	Enters the Resilient Ethernet Protocol Access Gateway (REPAG) configuration submode.
Command	Description										
debug spanning-tree repag packet, on page 21	Enables Resilient Ethernet Protocol (REP) Access Gateway debugging commands.										
show spanning-tree repag, on page 104	Displays the values currently used for populating the BPDU sent by all ports.										
show spanning-tree repag bpdu interface, on page 105	Displays BPDU information from root (bridge ID, cost, and priority) and the BPDU information being sent on the port.										
spanning-tree repag, on page 114	Enters the Resilient Ethernet Protocol Access Gateway (REPAG) configuration submode.										

spanning-tree mst

To enter the MSTP configuration submode, use the **spanning-tree mst** command in global configuration mode.

spanning-tree mst protocol instance identifier

Syntax Description	<i>protocol instance identifier</i> String of a maximum of 25 characters that identifies the protocol instance.
---------------------------	---

Command Default	None
------------------------	------

Command Modes	Global configuration
----------------------	----------------------

Command History	Release	Modification
	Release 3.7.1	This command was introduced.

Usage Guidelines	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.
-------------------------	---



Note

In MSTP configuration, only one protocol instance can be configured at a time.

Task ID	Task ID Operations
	interface read, write

Examples	The following example shows how to enter the MSTP configuration submode:
-----------------	--

```
RP/0/RSP0/CPU0:router(config)# spanning-tree mst a
RP/0/RSP0/CPU0:router(config-mstp) #
```

Related Commands	Command	Description
	debug spanning-tree mst packet, on page 11	Enables debugging for sent and received MSTP packets.
	debug spanning-tree mst protocol-state, on page 13	Enables debugging protocol-state changes such as port role or state changes, topology change notification.
	instance (MSTP), on page 34	Enters the multiple spanning tree instance (MSTI) configuration submode.

spanning-tree mstag

Command	Description
interface (MSTP), on page 39	Enters the MSTP interface configuration submode, and enables STP for the specified port.
mvrp static, on page 53	Enables Multiple VLAN Registration Protocol (MVRP) in static mode.
show spanning-tree mst, on page 81	Displays the multiple spanning tree protocol status information.

spanning-tree mstag

To enter the MST Access Gateway configuration submode, use the **spanning-tree mstag** command in global configuration mode.

spanning-tree mstag *protocol instance identifier*

Syntax Description	<i>protocol instance identifier</i> String of a maximum of 25 characters that identifies the protocol instance.				
Command Default	None				
Command Modes	Global configuration				
Command History	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 3.7.1</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 3.7.1	This command was introduced.
Release	Modification				
Release 3.7.1	This command was introduced.				
Usage Guidelines	<p>To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.</p> <p>Refer to the <i>Implementing Multiple Spanning Tree Protocol</i> module of the <i>Cisco ASR 9000 Series Aggregation Services Router L2VPN and Ethernet Services Configuration Guide</i> for more information.</p>				
Note	Unlike MSTP configuration, multiple MSTAG instances can be configured concurrently.				
Task ID	<table border="1"> <thead> <tr> <th>Task ID</th> <th>Operations</th> </tr> </thead> <tbody> <tr> <td>interface</td> <td>read, write</td> </tr> </tbody> </table>	Task ID	Operations	interface	read, write
Task ID	Operations				
interface	read, write				
Examples	The following example shows how to enter the MSTAG configuration submode.				

```
RP/0/RSP0/CPU0:router(config)# spanning-tree mstag a
RP/0/RSP0/CPU0:router(config-mstag) #
```

Related Commands	Command	Description
	debug spanning-tree mstag packet, on page 14	Enables MSTAG packet debugging.
	interface (MSTAG/REPAG), on page 37	Enter the MSTAG interface configuration submode, and enables MSTAG for the specified port.
	instance (MSTAG/REPAG), on page 33	Enters MSTAG Instance configuration mode or REPAG Instance configuration mode.
	show spanning-tree mstag, on page 92	Displays the values currently used for populating the BPDUs sent by all ports.

spanning-tree pvrst

To enter the Per VLAN Rapid Spanning Tree (PVRST) configuration submode, use the **spanning-tree pvrst** command in global configuration mode. To exit from the PVRST configuration mode, use the **no** form of this command.

spanning-tree pvrst protocol instance identifier
no spanning-tree pvrst protocol instance identifier

Syntax Description	<i>protocol instance identifier</i> String of a maximum of 25 characters that identifies the protocol instance.				
Command Default	None				
Command Modes	Global configuration				
Command History	<table border="1"> <thead> <tr> <th>Release</th><th>Modification</th></tr> </thead> <tbody> <tr> <td>Release 5.1</td><td>This command was introduced.</td></tr> </tbody> </table>	Release	Modification	Release 5.1	This command was introduced.
Release	Modification				
Release 5.1	This command was introduced.				
Usage Guidelines	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.				
Task ID	<table border="1"> <thead> <tr> <th>Task ID</th><th>Operations</th></tr> </thead> <tbody> <tr> <td>ethernet-services</td><td>read, write</td></tr> </tbody> </table>	Task ID	Operations	ethernet-services	read, write
Task ID	Operations				
ethernet-services	read, write				
Examples	This example shows how to enter the PVRST configuration submode:				

spanning-tree pvrstag

```
RP/0/RSP0/CPU0:router(config)# spanning-tree pvrst st1
RP/0/RSP0/CPU0:router(config-pvrst)#End
```

Related Commands	Command	Description
	forward-delay (PVRST), on page 27	Sets the forward-delay time for the bridge.
	interface (PVRST), on page 40	Enables and configures Per VLAN Rapid Spanning Tree (PVRST) on an interface.
	maximum (PVRST), on page 50	Sets the maximum age for the bridge.
	transmit (PVRST), on page 116	Sets the transmit hold count performance parameter.
	vlan (PVRST), on page 119	Configures Per VLAN Rapid Spanning Tree (PVRST) on a VLAN.

spanning-tree pvrstag

To enter the Per VLAN Rapid Spanning Tree Access Gateway (PVRSTAG) configuration submode, use the **spanning-tree pvrstag** command in global configuration mode.

spanning-tree pvrstag protocol instance identifier

Syntax Description	<i>protocol instance identifier</i> String of a maximum of 255 characters that identifies the protocol instance.					
Command Default	None					
Command Modes	Global configuration					
Command History	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 4.0.0</td> <td>This command was introduced.</td> </tr> </tbody> </table>		Release	Modification	Release 4.0.0	This command was introduced.
Release	Modification					
Release 4.0.0	This command was introduced.					
Usage Guidelines	Task ID	Operations				
	ethernet-services	read, write				
Examples	The following example shows how to enter the PVRSTAG configuration submode:					

```
RP/0/RSP0/CPU0:router(config)# spanning-tree pvrstag a
RP/0/RSP0/CPU0:router(config-pvrstag)#

```

Related Commands	Command	Description
	debug spanning-tree pvrstag packet, on page 18	Enables packet debugging for sent and received PVRSTAG packets.
	interface (PVSTAG/PVRSTAG), on page 41	Enters PVST or PVRST Access Gateway Interface configuration submode and enables either PVSTAG or PVRSTAG for the specified port.
	show spanning-tree pvrstag, on page 101	Displays the values currently used for populating the BPDUs sent by all ports.
	vlan, on page 118	Enables a PVST or PVRST VLAN instance on the interface and enters PVSTAG or PVRSTAG VLAN configuration mode.

spanning-tree pvstag

To enter the Per VLAN Spanning Tree Access Gateway (PVSTAG) configuration submode, use the **spanning-tree pvstag** command in global configuration mode.

spanning-tree pvstag protocol instance identifier

Syntax Description	<i>protocol instance identifier</i> String of a maximum of 255 characters that identifies the protocol instance.	
Command Default	None	
Command Modes	Global configuration	
Command History	Release	Modification
	4.0.0	This command was introduced.
Usage Guidelines	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance. Refer to the <i>Implementing Multiple Spanning Tree Protocol</i> module of the <i>Cisco ASR 9000 Series Aggregation Services Router L2VPN and Ethernet Services Configuration Guide</i> for more information.	
Task ID	Task ID	Operations
	ethernet-services	read, write

spanning-tree repag**Examples**

The following example shows how to enter the PVSTAG configuration mode:

```
RP/0/RSP0/CPU0:router(config)# spanning-tree pvstag a
RP/0/RSP0/CPU0:router(config-pvstag) #
```

Related Commands	Command	Description
	debug spanning-tree pvstag packet, on page 20	Enables packet debugging for sent and received PVSTAG packets.
	interface (PVSTAG/PVRSTAG), on page 41	Enters PVST or PVRST Access Gateway Interface configuration submode and enables either PVSTAG or PVRSTAG for the specified port.
	show spanning-tree pvstag, on page 102	Displays the values currently used for populating the BPDUs sent by all ports.
	vlan, on page 118	Enables a PVST or PVRST VLAN instance on the interface and enters PVSTAG or PVRSTAG VLAN configuration mode.

spanning-tree repag

To enter the Resilient Ethernet Protocol Access Gateway (REPAG) configuration submode, use the **spanning-tree repag** command in global configuration mode.

spanning-tree repag protocol instance identifier

Syntax Description	<i>protocol instance identifier</i> String of a maximum of 255 characters that identifies the protocol instance.				
Command Default	None				
Command Modes	Global configuration				
Command History	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 3.7.1</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 3.7.1	This command was introduced.
Release	Modification				
Release 3.7.1	This command was introduced.				

Usage Guidelines To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Refer to the *Implementing Multiple Spanning Tree Protocol* module of the *Cisco ASR 9000 Series Aggregation Services Router L2VPN and Ethernet Services Configuration Guide* for more information.

Task ID	Task ID	Operations
	interface	read, write

Examples

The following example shows how to enter the REPAG configuration mode:

```
RP/0/RSP0/CPU0:router(config)# spanning-tree repag a
RP/0/RSP0/CPU0:router(config-repag) #
```

Related Commands	Command	Description
	debug spanning-tree repag packet, on page 21	Enables Resilient Ethernet Protocol (REP) Access Gateway debugging commands.
	interface (MSTAG/REPAG), on page 37	Enter the MSTAG interface configuration submode, and enables MSTAG for the specified port.
	instance (MSTAG/REPAG), on page 33	Enters MSTAG Instance configuration mode or REPAG Instance configuration mode.
	show spanning-tree repag, on page 104	Displays the values currently used for populating the BPDUs sent by all ports.

track

To enter the MSTAG uplink tracking submode, use the **track** command in MST Access Gateway configuration submode.

track

Syntax Description	track Enters the MSTAG uplink tracking submode.				
Command Default	None				
Command Modes	MST Access Gateway configuration submode				
Command History	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 6.2.2</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 6.2.2	This command was introduced.
Release	Modification				
Release 6.2.2	This command was introduced.				

Usage Guidelines	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance. Refer to the <i>Implementing Multiple Spanning Tree Protocol</i> module of the <i>Cisco ASR 9000 Series Aggregation Services Router L2VPN and Ethernet Services Configuration Guide</i> for more information.
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transmit (PVRST)

Task ID	Task ID	Operations
	interface	read, write

Examples

The following example shows how to enter the MSTAG uplink tracking submode configuration submode.

```
RP/0/RSP0/CPU0:router(config-mstag) #track
RP/0/RSP0/CPU0:router(config-mstag-track) #
```

Related Commands	Command	Description
	interface (MSTAG Uplink Tracking), on page 42	
	spanning-tree mstag, on page 110	Enters the MST Access Gateway configuration submode.
	show spanning-tree mstag tracked, on page 97	Displays the core connectivity tracking data.
	show spanning-tree mstag, on page 92	Displays the values currently used for populating the BPDUs sent by all ports.

transmit (PVRST)

To set the transmit hold count performance parameter, use the **transmit** command in PVRST configuration submode. To undo the setting, use the **no** form of this command.

```
transmit hold-count count
no transmit hold-count count
```

Syntax Description	hold-count	Specifies the hold count performance parameter of the bridge.				
	<i>count</i>	Bridge transmit hold count. The range is from 1 to 10.				
Command Default	None					
Command Modes	PVRST configuration					
Command History	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 5.1</td> <td>This command was introduced.</td> </tr> </tbody> </table>		Release	Modification	Release 5.1	This command was introduced.
Release	Modification					
Release 5.1	This command was introduced.					

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID

Task ID	Operations
ethernet-services	read, write

Examples

This example shows how to set the bridge transmit hold-count parameter to 8:

```
RP/0/RSP0/CPU0:router(config)# spanning-tree pvrst st1
RP/0/RSP0/CPU0:router(config-pvrst)# transmit hold-count 8
```

Related Commands

Command	Description
forward-delay (PVRST), on page 27	Sets the forward-delay time for the bridge.
interface (PVRST), on page 40	Enables and configures Per VLAN Rapid Spanning Tree (PVRST) on an interface.
maximum (PVRST), on page 50	Sets the maximum age for the bridge.
vlan (PVRST), on page 119	Configures Per VLAN Rapid Spanning Tree (PVRST) on a VLAN.

transmit hold-count

To set the transmit hold count performance parameter, use the **transmit hold-count** command in MSTP configuration submode.

transmit hold-count *count*

Syntax Description

count Bridge transmit hold count. Range is 1 to 10.

Command Default

count: 6

Command Modes

MSTP configuration

Command History

Release	Modification
---------	--------------

Release 3.7.1 This command was introduced.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

vlan

Task ID	Task ID	Operations
	interface	read, write

Examples

The following example shows how to set the bridge transmit hold-count parameter to 8:

```
RP/0/RSP0/CPU0:router(config)# spanning-tree mst A
RP/0/RSP0/CPU0:router(config-mstp)# transmit hold-count 8
```

Related Commands	Command	Description
	debug spanning-tree mst packet, on page 11	Enables debugging for sent and received MSTP packets.
	debug spanning-tree mst protocol-state, on page 13	Enables debugging protocol-state changes such as port role or state changes, topology change notification.
	spanning-tree mst, on page 109	Enters the MSTP configuration submode
	show spanning-tree mst, on page 81	Displays the multiple spanning tree protocol status information.

vlan

To enable a PVST or PVRST VLAN instance on the interface and enter PVSTAG or PVRSTAG VLAN configuration mode, use the **vlan** command in PVSTAG or PVRSTAG configuration submode.

vlan *vlan-id*

Syntax Description	<i>vlan-id</i> Specifies the VLAN identifier. The range of the VLAN ID is between 1 to 4094.				
	<p>Note There is a limit of 200 VLANs per physical interface and 16000 VLANs across the system.</p>				
Command Default	None				
Command Modes	PVRSTAG interface configuration, PVSTAG interface configuration				
Command History	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 4.0.0</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 4.0.0	This command was introduced.
Release	Modification				
Release 4.0.0	This command was introduced.				
Usage Guidelines	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.				

Task ID	Task ID	Operations
	ethernet-services	read, write

Examples

The following example shows how to enable a VLAN in the PVSTAG configuration mode:

```
RP/0/RSP0/CPU0:router(config)# spanning-tree pvstag A
RP/0/RSP0/CPU0:router(config-pvstag)# interface GigabitEthernet 0/3/03
RP/0/RSP0/CPU0:router(config-pvstag-if)# vlan 100
RP/0/RSP0/CPU0:router(config-pvstag-if-vlan)#

```

Related Commands	Command	Description
	debug spanning-tree pvrstag packet, on page 18	Enables packet debugging for sent and received PVRSTAG packets.
	debug spanning-tree pvstag packet, on page 20	Enables packet debugging for sent and received PVSTAG packets.
	interface (PVSTAG/PVRSTAG), on page 41	Enters PVST or PVRST Access Gateway Interface configuration submode and enables either PVSTAG or PVRSTAG for the specified port.
	show spanning-tree pvrstag, on page 101	Displays the values currently used for populating the BPDUs sent by all ports.
	show spanning-tree pvstag, on page 102	Displays the values currently used for populating the BPDUs sent by all ports.
	spanning-tree pvrstag, on page 112	Enters the Per VLAN Rapid Spanning Tree Access Gateway (PVRSTAG) configuration submode.
	spanning-tree pvstag, on page 113	Enters the Per VLAN Spanning Tree Access Gateway (PVSTAG) configuration submode.

vlan (PVRST)

To configure Per VLAN Rapid Spanning Tree (PVRST) on a VLAN, use the **vlan** command in PVRST configuration submode. To undo the configuration , use the **no** form of this command.

```
vlan vlan-id priority bridge-priority
no vlan vlan-id priority bridge-priority
```

Syntax Description	vlan-id	VLAN ID. The range is from 1 to 4094.
	priority	Specifies the bridge priority.
	bridge-priority	Bridge priority. The value is a multiple of 4096.
Command Default	None	

vlan-ids (MSTAG/REPAG)

Command Modes	PVRST configuration	
Command History	Release	Modification
	Release 5.1 This command was introduced.	
Usage Guidelines	<p>To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.</p> <p>Bridge-priority must be multiples of 4096, and the valid range is 0 to 61440. Allowed values are: 0 4096 8192 12288 16384 20480 24576 28672 32768 36864 40960 45056 49152 53248 57344 61440.</p>	
Task ID	Task ID	Operations
	ethernet-services	read, write
Examples	<p>This example shows how to use the vlan-id command:</p> <pre>RP/0/RSP0/CPU0:router(config)# spanning-tree pvrst st1 RP/0/RSP0/CPU0:router(config-pvrst)# vlan 66 priority 4096</pre>	
Related Commands	Command	Description
	forward-delay (PVRST), on page 27	Sets the forward-delay time for the bridge.
	interface (PVRST), on page 40	Enables and configures Per VLAN Rapid Spanning Tree (PVRST) on an interface.
	maximum (PVRST), on page 50	Sets the maximum age for the bridge.
	transmit (PVRST), on page 116	Sets the transmit hold count performance parameter.

vlan-ids (MSTAG/REPAG)

To associate a set of VLAN IDs with the current MSTI, use the **vlan-id** command in MSTAG or REPAG instance configuration submode.

vlan-id *vlan-range* [*vlan-range*] [*vlan-range*] [*vlan-range*]

Syntax Description	<i>vlan-range</i> List of VLAN ranges in the form a-b, c, d, e-f, g etc.
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Command Default	None
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Command Modes	MSTAG Instance configuration mode, REPAG Instance configuration mode.
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Command History	Release	Modification
	Release 3.7.1	This command was introduced.
Usage Guidelines		
	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.	
Task ID	Task ID	Operations
	interface	read, write
Examples	The following example shows how to use the vlan-id command:	
	<pre>RP/0/RSP0/CPU0:router(config-mstag-inst)# vlan-id 2-1005</pre>	
Related Commands	Command	Description
	debug spanning-tree mstag packet, on page 14	Enables MSTAG packet debugging.
	debug spanning-tree repag packet, on page 21	Enables Resilient Ethernet Protocol (REP) Access Gateway debugging commands.
	interface (MSTAG/REPAG), on page 37	Enter the MSTAG interface configuration submode, and enables MSTAG for the specified port.
	instance (MSTAG/REPAG), on page 33	Enters MSTAG Instance configuration mode or REPAG Instance configuration mode.
	spanning-tree mstag, on page 110	Enters the MST Access Gateway configuration submode.
	spanning-tree repag, on page 114	Enters the Resilient Ethernet Protocol Access Gateway (REPAG) configuration submode.
	show spanning-tree mstag, on page 92	Displays the values currently used for populating the BPDUs sent by all ports.
	show spanning-tree repag, on page 104	Displays the values currently used for populating the BPDUs sent by all ports.

vlan-id (MSTP)

To associate a set of VLAN IDs with the current MSTI, use the **vlan-id** command in MSTI configuration submode.

vlan-id *vlan-range* [*vlan-range*] [*vlan-range*] [*vlan-range*]

vlan-id (MSTP)

Syntax Description	<i>vlan-range</i> List of VLAN ranges in the form a-b, c, d, e-f, g etc.												
Command Default	None												
Command Modes	MSTI configuration												
Command History	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 3.7.1</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 3.7.1	This command was introduced.								
Release	Modification												
Release 3.7.1	This command was introduced.												
Usage Guidelines	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.												
Task ID	<table border="1"> <thead> <tr> <th>Task ID</th> <th>Operations</th> </tr> </thead> <tbody> <tr> <td>interface</td> <td>read, write</td> </tr> </tbody> </table>	Task ID	Operations	interface	read, write								
Task ID	Operations												
interface	read, write												
Examples	The following example shows how to use the <code>vlan-id</code> command:												
	<pre>RP/0/RSP0/CPU0:router(config-mstp-inst)# vlan-id 2-1005</pre>												
Related Commands	<table border="1"> <thead> <tr> <th>Command</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>debug spanning-tree mst packet, on page 11</td> <td>Enables debugging for sent and received MSTP packets.</td> </tr> <tr> <td>debug spanning-tree mst protocol-state, on page 13</td> <td>Enables debugging protocol-state changes such as port role or state changes, topology change notification.</td> </tr> <tr> <td>instance (MSTP), on page 34</td> <td>Enters the multiple spanning tree instance (MSTI) configuration submode.</td> </tr> <tr> <td>spanning-tree mst, on page 109</td> <td>Enters the MSTP configuration submode</td> </tr> <tr> <td>show spanning-tree mst, on page 81</td> <td>Displays the multiple spanning tree protocol status information.</td> </tr> </tbody> </table>	Command	Description	debug spanning-tree mst packet, on page 11	Enables debugging for sent and received MSTP packets.	debug spanning-tree mst protocol-state, on page 13	Enables debugging protocol-state changes such as port role or state changes, topology change notification.	instance (MSTP), on page 34	Enters the multiple spanning tree instance (MSTI) configuration submode.	spanning-tree mst, on page 109	Enters the MSTP configuration submode	show spanning-tree mst, on page 81	Displays the multiple spanning tree protocol status information.
Command	Description												
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instance (MSTP), on page 34	Enters the multiple spanning tree instance (MSTI) configuration submode.												
spanning-tree mst, on page 109	Enters the MSTP configuration submode												
show spanning-tree mst, on page 81	Displays the multiple spanning tree protocol status information.												