05-Commands for Anti-ring Protocol

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1.Commands for MSTP

abort

Command	abort
parameter	-
default	-
Mode	MSTP Region Mode
Usage Guide	This command is to quit MSTP region mode without saving the current configuration. The previous MSTP region configuration is valid.
Example	Quit MSTP region mode without saving the current configuration. Switch(Config-Mstp-Region)#abort Switch(config)#

exit

Command	**exit**
parameter	-
default	-
Mode	MSTP Region Mode
Usage Guide	This command is to quit MSTP region mode with saving the current configuration.
Example	Quit MSTP region mode with saving the current configuration. Switch(Config-Mstp-Region)#exit Switch(config)#

instance vlan

Command	**instance <*instance-id*> vlan <*vlan-list*>** **no instance <*instance-id*> [vlan <*vlan-list*>]**	
parameter	***instance-id***	sets the instance number. The valid range is from 0 to 64
	vlan-list	sets consecutive or non-consecutive VLAN numbers. "-" refers to consecutive numbers, and ";" refers to non-consecutive numbers
default	Before creating any Instances, there is only the instance 0, and VLAN 1~4094 all belong to the instance 0.	

Mode	MSTP Region Mode
Usage Guide	This command sets the mappings between VLANs and instances. Only if all the mapping relationships and other attributes are same, the switches are considered in the same MSTP region. Before setting any instances, all the VLANs belong to the instance 0. MSTP can support maximum 64 MSTIs (except for CISTs). CIST can be treated as MSTI 0. All the other instances are considered as instance 1 to 64.
Example	Map VLAN1-10 and VLAN 100-110 to Instance 1. Switch(config)#spanning-tree mst configuration Switch(Config-Mstp-Region)#instance 1 vlan 1-10;100-110

Name

Command	**name <*name*>** **no name**

parameter		
	name	is the MSTP region name. The length of the name should be less than 32 characters

default	Default MSTP region name is the MAC address of this bridge.
Mode	MSTP Region Mode
Usage Guide	This command is to set MSTP region name. The bridges with same MSTP region name and same other attributes are considered in the same MSTP region.
Example	Set MSTP region name to mstp-test. Switch(config)#spanning-tree mst configuration Switch(Config-Mstp-Region)#name mstp-test

revision-level

Command	**revision-level <*level*>** **no revision-level**

parameter		
	level	is revision level. The valid range is from 0 to 65535

default	The default revision level is 0.
Mode	MSTP Region Mode
Usage Guide	This command is to set revision level for MSTP configuration. The bridges with same MSTP

	revision level and same other attributes are considered in the same MSTP region.
Example	Set revision level to 2000. Switch(config)#spanning-tree mst configuration Switch(Config-Mstp-Region)# revision-level 2000

spanning-tree

Command	**spanning-tree** **no spanning-tree**
parameter	-
default	MSTP is not enabled by default.
Mode	Global Mode and Port Mode
Usage Guide	If the MSTP is enabled in global mode, the MSTP is enabled in all the ports except for the ports which are set to disable the MSTP explicitly
Example	Enable the MSTP in global mode, and disable the MSTP in the interface1/0/2. Switch(config)#spanning-tree Switch(config)#interface ethernet 1/0/2 Switch(Config-If-Ethernet1/0/2)#no spanning-tree

spanning-tree cost

Command	**spanning-tree cost <*cost*>** **no spanning-tree cost**	
parameter	***cost***	sets path cost. The valid range is from 1 to 200,000,000.
default	By default, the port cost is relevant to the port bandwidth.	

For the aggregation ports, the default costs are as below:	Default Path Cost	Suggested Range
10Mbps	2000000	2000000-20000000
100Mbps	200000	200000-2000000
1GMbps	20000	20000-200000

For the aggregation ports, the default costs are as below:

Port Type	Allowed Number Of Aggregation Ports	Default Port Cost
10Mbps	N	2000000/N
100Mbps	N	200000/N
1GMbps	N	20000/N

Mode Port Mode

Usage Guide By setting the port cost, users can control the cost from the current port to the root bridge in order to control the elections of port and the designated port of the instance.

Example On the port1/0/2, set the port cost is 3000000.
Switch(Config-If-Ethernet1/0/2)#spanning-tree cost 3000000

spanning-tree digest-snooping

Command **spanning-tree digest-snooping**
no spanning-tree digest-snooping

parameter -

default Don't use the authentication string of partner port.

Mode Port Mode

Usage Guide According to MSTP protocol, the region authentication string is generated by MD5 algorithm with public authentication key, intstance ID, VLAN ID. Some manufactory don't use the public authentication key, this causes the incompatibility. After the command is executed the port can use the authentication string of partner port, realize compatibility with these manufactories equipment.
Because the authentication string is related to instance ID and VLAN ID, the command may cause recognizing the equipment that with different instance and VLAN relation as in the same region. Before the command is executed, make sure that instance and VLAN relation is accord for all the equipment. If there are more than one equipment connected, all the connected ports should execute this command.

Example	Configure the authentication string of partner port. Switch(config)#interface ethernet 1/0/2 Switch(Config-If-Ethernet1/0/2)#spanning-tree digest-snooping Switch(Config-If-Ethernet1/0/2)#

spanning-tree format

Command	**spanning-tree format {standard | privacy | auto}** **no spanning-tree format**

parameter

standard	The packet format provided by IEEE
privacy	Privacy packet format, which is compatible with CISCO equipments.
auto	Auto identified packet format, which is determined by checking the format of the received packets.

default	Auto Packet Format.
Mode	Port Mode
Usage Guide	As the CISCO has adopted the packet format different with the one provided by IEEE, while many companies also adopted the CISCO format to be CISCO compatible, we have to provide support to both formats. The standard format is originally the one provided by IEEE, and the privacy packet format is CISCO compatible. In case we are not sure about which the packet format is on partner, the AUTO configuration will be preferred so to identify the format by the packets they sent. The AUTO packet format is set by default in the concern of better compatibility with previous products and the leading companies. The packet format will be privacy format before receiving the partner packet when configured to AUTO. When the format is not AUTO and the received packet format from the partner does not match the configured format, we set the state of the port which receives the unmatched packet to DISCARDING to prevent both sides consider themselves the root which leads to circuits. When the AUTO format is set, and over one equipment which is not compatible with each other are connected on the port (e.g. a equipment running through a HUB or Transparent Transmission BPDU is connected with several equipments running MSTP), the format alter counts will be recorded and the port will be disabled at certain count threshold. The port can only be re-enabled by the administrator.
Example	Configure port message format as the message format of IEEE. Switch(config)#interface ethernet 1/0/2 Switch(Config-If-Ethernet1/0/2)#spanning-tree format standard Switch(Config-If-Ethernet1/0/2)#

spanning-tree forward-time

Command	**spanning-tree forward-time <*time*>** **no spanning-tree forward-time**
parameter	***time*** is forward delay time in seconds. The valid range is from 4 to 30
default	The forward delay time is 15 seconds by default
Mode	Global Mode
Usage Guide	When the network topology changes, the status of the port is changed from blocking to forwarding. This delay is called the forward delay. The forward delay is co working with hello time and max age. The parameters should meet the following conditions. Otherwise, the MSTP may work incorrectly。 2 * (Bridge_Forward_Delay - 1.0 seconds) >= Bridge_Max_Age Bridge_Max_Age >= 2 * (Bridge_Hello_Time + 1.0 seconds)
Example	In global mode, set MSTP forward delay time to 20 seconds. Switch(config)#spanning-tree forward-time 20

spanning-tree hello-time

Command	**spanning-tree hello-time <*time*>** **no spanning-tree hello-time**
parameter	***time*** is Hello time in seconds. The valid range is from 1 to 10
default	Hello Time is 2 seconds by default
Mode	Global Mode
Usage Guide	This command is used to set the interval bpdu switch sending, command "no spanning-tree hello-time" restore default configuration.Hello time is the interval that the switch sends BPDUs. Hello time is co working with forward delay and max age. The parameters should meet the following conditions. Otherwise, the MSTP may work incorrectly. 2 * (Bridge_Forward_Delay - 1.0 seconds) >= Bridge_Max_Age Bridge_Max_Age >= 2 * (Bridge_Hello_Time + 1.0 seconds)
Example	Set MSTP hello time to 5 seconds in global mode. Switch(config)#spanning-tree hello-time 5

spanning-tree link-type p2p

Command	**spanning-tree link-type p2p {auto | force-true | force-false}** **no spanning-tree link-type**

parameter		
	auto	sets auto-negotiation
	force-true	forces the link as point-to-point type
	force-false	forces the link as non point-to-point type.

default	The link type is auto by default; The MSTP detects the link type automatically.
Mode	Port Mode
Usage Guide	For configuring port link types, command "no spanning-tree link-type" restore default configuration.When the port is full-duplex, MSTP sets the port link type as point-to-point; When the port is half-duplex, MSTP sets the port link type as shared.
Example	Force the port 1/0/7-8 as point-to-point type. Switch(config)#interface ethernet 1/0/7-8 Switch(Config-Port-Range)#spanning-tree link-type p2p force-true

spanning-tree maxage

Command	**spanning-tree maxage <*time*>** **no spanning-tree maxage**

parameter		
	time	is max aging time in seconds. The valid range is from 6 to 40.

default	The max age is 20 seconds by default.
Mode	Global Mode
Usage Guide	this command is used to configure bpdu maximum aging time, command "no spanning-tree maxage" restore default configuration.The lifetime of BPDU is called max age time. The max age is co working with hello time and forward delay. The parameters should meet the following conditions. Otherwise, the MSTP may work incorrectly. 2 * (Bridge_Forward_Delay - 1.0 seconds) >= Bridge_Max_Age Bridge_Max_Age >= 2 * (Bridge_Hello_Time + 1.0 seconds)
Example	In global mode, set max age time to 25 seconds. Switch(config)#spanning-tree maxage 25

spanning-tree max-hop

Command	**spanning-tree max-hop <*hop-count*>** **no spanning-tree max-hop**
parameter	***hop-count*** sets maximum hops. The valid range is from 1 to 40
default	The max hop is 20 by default.
Mode	Global Mode
Usage Guide	This command is used to set BPDU maximum number of hops, and the command "**no spanning-tree max-hop**" is used to restore the default configuration.The MSTP uses max-age to count BPDU lifetime. In addition, MSTP also uses max-hop to count BPDU lifetime. The max-hop is degressive in the network. The BPDU has the max value when it initiates from MSTI root bridge. Once the BPDU is received, the value of the max-hop is reduced by 1. When a port receives the BPDU with max-hop as 0, it drops this BPDU and sets itself as designated port to send the BPDU.
Example	Set max hop to 32. Switch(config)#spanning-tree max-hop 32

spanning-tree mcheck

Command	**spanning-tree mcheck**
parameter	-
default	The port is in the MSTP mode by default
Mode	Port Mode
Usage Guide	If a network which is attached to the current port is running IEEE 802.1D STP, the port converts itself to run in STP mode. The command is used to force the port to run in the MSTP mode. But once the port receives STP messages, it changes to work in the STP mode again. This command can only be used when the switch is running in IEEE802.1s MSTP mode. If the switch is running in IEEE802.1D STP mode, this command is invalid.
Example	Force the port 1/0/2 to run in the MSTP mode. Switch(Config-If-Ethernet1/0/2)#spanning-tree mcheck

spanning-tree mode

Command	**spanning-tree mode {mstp | stp | rstp}** **no spanning-tree mode**

parameter	**mstp**	sets the switch in IEEE802.1s MSTP mode
	stp	sets the switch in IEEE802.1D STP mode
	rstp	sets the switch in IEEE802.1D RSTP mode

default The switch is in the MSTP mode by default

Mode Global Mode

Usage Guide This command is used to configure the spanning tree mode and the command "**no spanning-tree mode**" is used to restore the default mode.When the switch is in IEEE802.1D STP mode, it only sends standard IEEE802.1D BPDU and TCN BPDU. It drops any MSTP BPDUs.

Example Set the switch in the STP mode.
Switch(config)#spanning-tree mode stp

spanning-tree mst configuration

Command **spanning-tree mst configuration**
no spanning-tree mst configuration

parameter -

default -

Mode Global Mode

Usage Guide Whether the switch is in the MSTP region mode or not, users can enter the MSTP mode, configure the attributes, and save the configuration. When the switch is running in the MSTP mode, the system will generate the MST configuration identifier according to the MSTP configuration. Only if the switches with the same MST configuration identifier are considered as in the same MSTP region.

Example Enter MSTP region mode.
Switch(config)#spanning-tree mst configuration
Switch(Config-Mstp-Region)#

panning-tree mst cost

Command **spanning-tree mst <*instance-id*> cost <*cost*>**
no spanning-tree mst <instance-id> cost

parameter	***instance-id***	sets the instance ID. The valid range is 0-64

cost

sets path cost, different cost formats have different ranges. For the default dot1t mode the valid range is 1-200,000,000, and for dot1d is 1-65535.

default

By default, the port cost is relevant to the port bandwidth.

Port Type	Default Path Cost	Suggested Range
10Mbps	2000000	2000000-20000000
100Mbps	200000	200000-2000000
1GMbps	20000	20000-200000

For the aggregation ports, the default costs are as below:

Port Type	Allowed Number Of Aggregation Ports	Default Port Cost
10Mbps	N	2000000/N
100Mbps	N	200000/N
1GMbps	N	20000/N

Port Speed	Port Type	Port Cost	
		802.1D-2008	802.1T
0		65535	200000000
10Mbps	Half- duplex Full- duplex aggregation link with 2 ports aggregation link with 3 ports aggregation link with 4 ports	100 99 95 95 95	2,000,000 1,999,999 1,000,000 666,666 500,000
100Mbps	Half- duplex Full- duplex aggregation link with 2 ports aggregation link with 3 ports	19 18 15 15 15	200,000 199,999 100,000 66,666 50,000

	aggregation link with 4 ports		
1000Mbps	Full- duplex aggregation link with 2 ports aggregation link with 3 ports aggregation link with 4 ports	4 3 3 3	20,000 10,000 6,666 5,000

Mode	Port Mode
Usage Guide	By setting the port cost, users can control the cost from the current port to the root bridge in order to control the elections of root port and the designated port of the instance.
Example	On the port1/0/2, set the MSTP port cost in the instance 2 to 3000000. Switch(Config-If-Ethernet1/0/2)#spanning-tree mst 2 cost 3000000

spanning-tree cost-format

Command	**spanning-tree cost-format {dot1d | dot1t}**
	-
default	count path-cost with dot1t format.
Mode	Global mode.
Usage Guide	There are two formats about cost value: they are dot1d marked on IEEE802.1d-2008 and dot1t marked on IEEE802.1t, but path-cost ranges of them are different, dot1d range from 1 to 65535, and dot1t range from 1 to 200,000,000.
Example	Set the cost format in global mode. Switch(config)#spanning-tree cost-format dot1d

spanning-tree mst loopguard

Command	**spanning-tree [mst <instance-id>] loopguard**

	no spanning-tree [mst <instance-id>] loopguard
parameter	**instance-id** MSTP instance ID.
default	Disable loopguard function
Mode	Port Mode
Usage Guide	The command can avoid root port or alternate port to be changed as designated port due to invalid unilateralism link. When the receiving timer is time, the configured port with loopguard is set as block state.
Example	Configure port 1/0/2 as loopguard mode for instance 0. Switch(Config)#interface ethernet 1/0/2 Switch(Config-Ethernet-1/0/2)#spanning-tree mst 0 loopguard Switch(Config-Ethernet-1/0/2)#

spanning-tree mst port-priority

Command	**spanning-tree mst <*instance-id*> port-priority <*port-priority*>** **no spanning-tree mst <*instance-id*> port-priority**
parameter	***instance-id*** sets the instance ID. The valid range is from 0 to 64
	port-priority sets port priority. The valid range is from 0 to 240. The value should be the multiples of 16, such as 0, 16, 32…240.
default	The default port priority is 128
Mode	Port Mode
Usage Guide	By setting the port priority, users can control the port ID of the instance in order to control the root port and designated port of the instance. The lower the value of the port priority is, the higher the priority is.
Example	Set the port priority as 32 on the port 1/0/2 for the instance 1. Switch(config)#interface ethernet 1/0/2 Switch(Config-If-Ethernet1/0/2)#spanning-tree mst 1 port-priority 32

spanning-tree mst priority

Command	**spanning-tree mst <*instance-id*> priority <*bridge-priority*>**

	no spanning-tree mst <*instance-id*> priority

parameter		
	instance-id	sets instance ID. The valid range is from 0 to 64;
	port-priority	sets the switch priority. The valid range is from 0 to 61440. The value should be the multiples of 4096, such as 0, 4096, 8192…61440

default	The default bridge priority is 32768
Mode	Global Mode
Usage Guide	By setting the bridge priority, users can change the bridge ID for the specified instance. And the bridge ID can influence the elections of root bridge and designated port for the specified instance.
Example	Set the priority for Instance 2 to 4096. Switch(config)#spanning-tree mst 2 priority 4096

spanning-tree mst rootguard

Command	**spanning-tree [mst <*instance-id*>] rootguard** **no spanning-tree [mst <*instance-id*>] rootguard**

parameter		
	instance-id	MSTP instance ID

default	Disable rootguard function
Mode	Port Mode
Usage Guide	The command is used in Port Mode, if the port is configured to be a rootguand port, it is forbidden to be a MSTP root port. If superior BPDU packet is received from a rootguard port, MSTP did not recalculate spanning-tree, and just set the status of the port to be root_inconsistent (blocked).If no superior BPDU packet is received from a blocked rootguard port, the port status will restore to be forwarding. The rootguard function can maintain a relative stable spanning-tree topology when a new switch is added to the network.
Example	Enable rootguard function for port 1/0/2 in instance 0. Switch(config)#interface ethernet 1/0/2 Switch(Config-If-Ethernet1/0/2)#spanning-tree mst 0 rootguard Switch(Config-If-Ethernet1/0/2)#

spanning-tree portfast

Command	**spanning-tree portfast [bpdufilter | bpduguard] [recovery <30-3600>]**

	no spanning-tree portfast

parameter		
	bpdufilter	configure the border port mode as BPDU filter
	bpduguard	configure the border port mode as BPDU guard
	recovery	configure the border port can be recovered automatically after implement bpduguard violation operation
	<30-3600>	the recovery time, do not recover it by default

default	All the ports are non-boundary ports by default when enabling MSTP
Mode	Port Mode
Usage Guide	Set the current port as boundary port, and BPDU filter. BPDU guard as specified mode or default mode; the command “no spanning-tree portfast” sets the current port as non-boundary port. When a port is set to be a boundary port, the port converts its status from discarding to forwarding without bearing forward delay. Once the boundary port receives the BPDU, the port becomes a non-boundary port.
Example	Configure the border port mode as BPDU guard, the recovery time as 60s. Switch(config)#interface ethernet 1/0/2 Switch(Config-If-Ethernet1/0/2)#spanning-tree portfast bpduguard recovery 60 Switch(Config-If-Ethernet1/0/2)#

spanning-tree port-priority

Command	**spanning-tree port-priority <*port-priority*>** **no spanning-tree port-priority**

parameter		
	port-priority	sets port priority. The valid range is from 0 to 240. The value should be the multiples of 16, such as 0, 16, 32, 48…240

default	The default port priority is 32768
Mode	Port Mode
Usage Guide	By setting the port priority to designated port. The lower the value of the port priority is, the higher the priority is.
Example	Set the port priority as 4096 on the port 1. Switch(Config-If-Ethernet1/0/1)#spanning-tree port-priority 4096

spanning-tree priority

Command	**spanning-tree priority <*bridge-priority*>** **no spanning-tree priority**
parameter	***bridge-priority*** is the priority of the bridging switch. Its value should be round times of 4096 between 0 and 61440, such as 0, 4096, 8192… 61440.
default	Default priority is 32768
Mode	Global Mode
Usage Guide	The bridge ID can be altered by changing the priority of the switch. Further, the priority information can also be used for voting of the root bridge and the specified ports. The bridge priority value of the switch is smaller, however the priority is higher.
Example	Configure the priority is 4096. Switch(config)#spanning-tree priority 4096

spanning-tree rootguard

Command	**spanning-tree rootguard** **no spanning-tree rootguard**
parameter	-
default	Port is non-root port
Mode	Port Mode
Usage Guide	The command is used in Port Mode, if the port is configured to be a rootguand port, it is forbidden to be a MSTP root port. If superior BPDU packet is received from a rootguard port, MSTP did not recalculate spanning-tree, and just set the status of the port to be root_inconsistent (blocked). If no superior BPDU packet is received from a blocked rootguard port, the port status will restore to be forwarding. The rootguard function can maintain a relative stable spanning-tree topology when a new switch is added to the network.
Example	Set the port 1 is root port. Switch(Config-If-Ethernet1/0/1)#spanning-tree rootguard

spanning-tree tcflush (Global mode)

Command	**spanning-tree tcflush {enable| disable| protect}** **no spanning-tree tcflush**

parameter	**enable**	The spanning-tree flush once the topology changes.
	disable	The spanning tree don't flush when the topology changes.
	protect	the spanning-tree flush not more than one time every ten seconds.

default	Enable
Mode	Global mode
Usage Guide	Configure the spanning-tree flush mode once the topology changes. "**no spanning-tree tcflush**" restores to default setting. According to MSTP, when topology changes, the port that send change message clears MAC/ARP table (FLUSH). In fact it is not needed for some network environment to do FLUSH with every topology change. At the same time, as a method to avoid network assault, we allow the network administrator to configure FLUSH mode by the command.
Example	Configure the spanning-tree flush mode once the topology changes is not flush to TC. Switch(config)#spanning-tree tcflush disable Switch(config)#

spanning-tree tcflush (Port mode)

Command	**spanning-tree tcflush {enable| disable| protect}** **no spanning-tree tcflush**	
parameter	**enable**	The spanning-tree flush once the topology changes
	disable	The spanning tree don't flush when the topology changes
	protect	the spanning-tree flush not more than one time every ten seconds
default	Default enable mode	
Mode	Port Mode	
Usage Guide	Configure the spanning-tree flush mode for port once the topology changes. "**no spanning-tree tcflush**" restores to default setting.	

	According to MSTP, when topology changes, the port that send change message clears MAC/ARP table (FLUSH). In fact it is not needed for some network environment to do FLUSH with every topology change. At the same time, as a method to avoid network assault, we allow the network administrator to configure FLUSH mode by the command.
Example	Configure the spanning-tree flush mode once the topology change is not flush to TC. Switch(config)#spanning-tree tcflush disable

spanning-tree transmit-hold-count

Command	**spanning-tree transmit-hold-count <*tx-hold-count-value*>** **no spanning-tree transmit-hold-count**
parameter	***tx-hold-count-value*** ranging from 1 to 255, the default value is 10
default	10
Mode	Global Mode
Usage Guide	Set the max number for sending BPDU within the Hello Time interval to control BPDU flow. The variable is used to whole MST bridge.
Example	Set the max transmit-hold-count as 20. Switch(config)#spanning-tree transmit-hold-count 20

show mst-pending

Command	**show mst-pending**
parameter	-
default	-
Mode	Admin Mode
Usage Guide	In the MSTP region mode, display the configuration of the current MSTP region such as MSTP name, revision, VLAN and instance mapping.
Example	Display the configuration of the current MSTP region. Switch(config)#spanning-tree mst configuration Switch(Config-Mstp-Region)#show mst-pending Name switch Revision 0 Instance Vlans Mapped -------------------------------- 00 1-29, 31-39, 41-4093 03 30

04 40
05 4094

Switch(Config-Mstp-Region)#

show spanning-tree

Command	**show spanning-tree [mst [<*instance-id*>]] [interface <*interface-list*>] [detail]**

parameter

instance-id	sets interface list
interface-list	sets the instance ID. The valid range is from 0 to 64
detail	sets the detailed spanning-tree information

default	-
Mode	Admin and Configuration Mode
Usage Guide	This command can display the MSTP information of the instances in the current bridge.

Example

Display the bridge MSTP.

```
Switch#sh spanning-tree
************************************ Process 0
************************************
                        -- MSTP Bridge Config Info --

Standard        :    IEEE 802.1s
Bridge MAC      :    00:1f:ce:10:b0:1b
Bridge Times :    Max Age 20, Hello Time 2, Forward Delay 15
Force Version:    3

############################ Instance 0 ############################
Self Bridge Id      : 32768.00:1f:ce:10:b0:1b
Root Id                 : this switch
Ext.RootPathCost : 0
Region Root Id      : this switch
Int.RootPathCost : 0
Root Port ID         : 0
Current port list in Instance 0:
Ethernet1/0/12 Ethernet1/0/20 (Total 2)

     PortName          ID         ExtRPC      IntRPC    State Role        DsgBridge
DsgPort
-------------- -------- --------- --------- ---    ---- ------------------ --------
Ethernet1/0/12 128.012               0              0 FWD    DSGN 32768.001fce10b01b
128.012
Ethernet1/0/20 128.020               0              0 FWD    DSGN 32768.001fce10b01b
128.020
```

Display information	describe
MSTP Bridge Config Info	
Standard	STP version
Bridge MAC	Bridge MAC address
Bridge Times	Max Age, Hello Time and Forward Delay of the bridge
Force Version	Version of STP
Instance 0	
Self Bridge Id	The priority and the MAC address of the current bridge for the current instance
Root Id	The priority and the MAC address of the root bridge for the current instance
Ext.RootPathCost	Total cost from the current bridge to the root of the entire network
Int.RootPathCost	Cost from the current bridge to the region root of the current instance
Root Port ID	Root port of the current instance on the current bridge
Current port list in Instance 0	
PortName	Port name
ID	Port priority and port index
ExtRPC	Port cost to the root of the entire network
IntRPC	Cost from the current port to the region root of the current instance
State Role	Port status of current instance
DsgBridge	Upward designated bridge of the current port in the current instance
DsgPort	Upward designated port of the current port in the current instance

show spanning-tree mst config

Command	**show spanning-tree mst config**
parameter	-
default	-
Mode	Admin Mode
Usage Guide	In the Admin mode, this command can show the parameters of the MSTP configuration such as MSTP name, revision, VLAN and instance mapping.
Example	Display the configuration of the MSTP on the switch. Switch#show spanning-tree mst config Name Revision 0 Instance Vlans Mapped

	----------
	00 1-4094
	----------

spanning-tree process

Command	**spanning-tree process <process-id>** **no spanning-tree process <process-id>**
parameter	**process-id** the range is 1-31
default	-
Mode	Global Mode
Usage Guide	Create the new mstp process. Multiple mstp processes can be configured on one device and each process is standalone. The process 0 exists only as default.
Example	Create the new mstp process 1. Switch(config)#spanning-tree process 1

spanning-tree tc-notify process0

Command	**spanning-tree tc-notify process0** **no spanning-tree tc-notify process0**
parameter	-
default	-
Mode	mstp process mode
Usage Guide	When there is a change in mstp process N, the device will receive the tc packet, at the same time, the process N will notify tc to the instance in mstp process 0 on the shared link. It makes the process 0 refresh the table entry for ensuring the traffic not to break off.
Example	Configure to notify TC of process 1 to process 0. Switch(Config-Mstp-Process-1)#spanning-tree tc-notify process0

spanning-tree binding-process

Command	**spanning-tree binding-process <process-id>** **no spanning-tree binding-process <process-id>**
parameter	**process-id** the range is 1-31.

default	All the ports belong to process 0
Mode	Port Mode
Usage Guide	Configure the port to join the appointed mstp process N. The port will enter into process N from the process 0. This command is mutually exclusive to the shared port configuration command (link-share).
Example	Add the Ethernet1/0/2 into process 1. Switch(Config-If-Ethernet1/0/2)#spanning-tree binding-process 1

spanning-tree binding-process link-share

Command	**spanning-tree binding-process < process-id > link-share** **no spanning-tree binding-process < process-id > link-share**

parameter		
	process-id	the range is 1-31

default	The port is only in the mstp calculating of process 0
Mode	Port Mode
Usage Guide	Configure the port belong to the shared port of process N. Except for process 0, the configured port can be in the mstp calculating of multiple processes, but the port status can be only configured by process 0. This command can be configured for more than once.
Example	Configure the Ethernet1/0/2 as the shared port of process 1 and 0. Switch(Config-If-Ethernet1/0/2)#spanning-tree binding-process 1 link-share

2.ERPS Configuration

ethernet tcn-propagation erps to {erps | stp}

Command	**ethernet tcn-propagation erps to {erps | stp}** **no ethernet tcn-propagation erps to**

parameter		
	erps	topology changing sends the R-APS event packets to notify the connection ring of this device
	stp	topology changing sends the stp packets to notify the stp topology connected to this device

default	ERPS ring topology changing only takes effect in this ring but does not send the notification packets
Mode	Global Mode
Usage Guide	Configure the topology changing transmission notification method supported by this device as the appointed method. The ERPS ring instance detects the changing, it will send the notification packets. If configured erps method, it will send the R-APS event packets to other ERPS rings; if configured stp method, it will send the stp packets outward.
Example	Configure to send R-APS event notification to the interconnection ring after the topology changing. Switch(config)#ethernet tcn-propagation erps to erps Configure to send STP notification to the interconnection ring after the topology changing. Switch(config)#ethernet tcn-propagation erps to stp Delete the topology changing transmission notification method. Switch(config)#no ethernet tcn-propagation erps to

erps-ring <ring-name>

Command	**erps-ring** < ***ring-name*** > **no erps-ring** < ***ring-name*** >	
parameter	***ring-name***	the ERPS ring name created. The maximum character number is 64 and it is made up with letters, numbers and the underlines. The first and last character cannot be the underline
default	Do not configure any ERPS ring.	
Mode	Global Mode	
Usage Guide	Create a ERPS ring and enter ERPS ring configuration mode. enter ERPS ring configuration mode if the ERPS ring already exists. no command delete ERPS ring.	
Example	Create the ERPS ring of ring1 Switch(config)#erps-ring 1 Switch(config-erps-ring)# Delete the EPRS ring of ring1 Switch(config)#no erps-ring 1	

version {v1 | v2}

Command	**version {v1 | v2}** **no version**

parameter	**v1**	means to support v1 which is released in 2008-06 and the amendment (2009-04)
	v2	means to support v2 which is released in 2010-03 and the amendment (2010-06)

default **V2**

Mode ERPS Ring Configuration Mode

Usage Guide This command is used to configure the supporting version of the ERPS loop, no the command is restored to the default state of the v2.
If configured ERPS ring to support v1, this ring will not support multi-instance. ERPS ring instance does not support the management commands of MS, FS, etc. and the non-revertive switch is not effective. It only support revertive switch.
If configured ERPS ring to support v1, the instance of this ring will deal with the ERPS packets according to the v1 format. Package the R-APS packets and resolve the fields according to v1 format. The fields defined by v2 will not be dealt.

Example Configure the ERPS ring of ring1 to support v1
Switch(config)#erps-ring ring1
Switch(config-erps-ring)#version v1
Delete v1 supported by the ERPS ring of ring1
Switch(config)#erps-ring ring1
Switch(config-erps-ring)#no version

open-ring

Command **open-ring**
no open-ring

parameter -

default Default Configuration ERPS Subrings

Mode ERPS Ring Configuration Mode

Usage Guide If the ERPS ring instance has been configured on the ring, there will be the message of "**Cann't config open-ring on ERPS ring whitch has ERPS instance, please delete ERPS instance firstly!**" Otherwise, enter into the next step. Configure this ERPS ring type as sub ring.

Example Configure the ERPS ring of ring1 as sub ring of open type.
Switch(config)#erps-ring 1
Switch(config-erps-ring)#open-ring
Delete the configuration of the sub ring of open type.
Switch(config)#erps-ring 1
Switch(config-erps-ring)#no open-ring

raps-virtual-channel {with | without}

Command	**raps-virtual-channel {with | without}**

parameter		
	with	the R-APS virtual channel is existed in this ERPS ring
	without	the R-APS virtual channel is not existed in this ERPS ring

default	The R-APS virtual channel is not existed in ERPS ring
Mode	ERPS Ring Configuration Mode
Usage Guide	Configure if there is the R-APS virtual channel in ERPS ring according to the configuration. Inputting: Success or error. If there is not R-APS virtual channel on the ERPS ring, the R-APS channel of all the instances of ERPS ring will be unblocked forever and it only blocks the data channel; otherwise, the R-APS channel and the data channel will be blocked at the same time.
Example	Configure that there is R-APS virtual channel in the ERPS sub ring of ring1. Switch(config)#erps-ring ring1 Switch(config-erps-ring)#raps-virtual-channel with

erps-ring <ring-name> port0 [port1-none]

Command	**erps-ring <ring-name> port0 [port1]** **no erps-ring <ring-name> port0**

parameter		
	ring-name	ERPS ring name, the maximum string is 64, and it is made up with letters, numbers and underlines; the first and last characters cannot be underlines
	port1-none	there is only the port0 on this ERPS ring node, no port1 and it is the interconnection node

default	Do not configure port0 on ERPS ring
Mode	Port Mode
Usage Guide	this command is used to configure the port as the port of the specified ERPS ring. If this ERPS ring is not open-ring type, the port1-none cannot be configured. Check if the ERPS ring configuration is integral; if it is integral, check if the ERPS instance configuration is integral; if it is integral, activate the instance as active and run the protocol.
Example	Configure e 1/0/1 as the port0 of ERPS ring1 Switch(config)#interface ethernet 1/0/1

	Switch(config-if-ethernet1/0/1)#erps-ring ring1 port0 Delete the e 1/0/1 as port0 of ERPS ring1 Switch(config)#interface ethernet 1/0/1 Switch(config-if-ethernet1/0/1)#no erps-ring ring1 port0

erps-ring <ring-name> port1

Command	**erps-ring <ring-name> port1** **no erps-ring <ring-name> port1**	
parameter	**ring-name**	ERPS ring name, the maximum string is 64, and it is made up with letters, numbers and underlines; the first and last characters cannot be underlines
default	Do not configure port1 on ERPS ring	
Mode	Port Mode	
Usage Guide	This command is used to configure the port as the port of the specified ERPS ring.Check if the ERPS ring configuration is integral; if it is integral, check if the ERPS instances configuration is integral; if it is integral, activate the instance as active and run the protocol.	
Example	Configure e 1/0/1 as the port1 of ERPS ring1 Switch(config)#interface ethernet 1/0/1 Switch(config-if-ethernet1/0/1)#erps-ring ring1 port1 Delete the e 1/0/1 as the port1 of ERPS ring1 Switch(config)#interface ethernet 1/0/1 Switch(config-if-ethernet1/0/1)#no erps-ring ring1 port1	

failure-detect {cc | physical-link-or-cc} domain <domain-name> service {< ma-name > | number < ma-num > | pvlan < vlan-id >} mep <mep-id> rmep<rmep-id>

Command	**{port0 | port1} failure-detect {cc | physical-link-or-cc} domain <domain-name> service {< ma-name > | number < ma-num > | pvlan < vlan-id >} mep <mep-id> rmep<rmep-id>** **no {port0 | port1} failure-detect**	
parameter	**{port0 | port1}**	parameter selection. Port0 means the fault detection type of port0. Port1 means the fault detection type ofport1
	{cc|physical-link-or-cc	parameter selection. cc means that the ERPS ring port detection

	}	is cc report fault. physical-link-or-cc means that the ERPS ring port detection is cc report fault and physical link fault.
	<domain-name>	the cfm domain name of ERPS ring port detection
	< ma-name >	the service name that cfm belongs to of ERPS ring port detection.
	<mep-id>	the local mep id that cfm monitored of ERPS ring port detection
	<rmep-id>	the remote mep id that cfm monitored of ERPS ring port detection

default ERPS ring port only detects the physical link fault as default

Mode ERPS Ring Configuration Mode

Usage Guide Configure the fault detection type of ERPS ring ports. If it is detected as cc type, the maintenance domain, maintenance set that cc belongs to and the monitoring link (it is conditioned with (mep-id, rmep-id)) should be appointed. The premise of this configuration is that the corresponding ring port has been joined into ERPS ring. The no command deletes the fault detection type of ERPS ring ports.
Configure the fault detection type of ERPS ring ports as the appointed type. If the type is cc, save the configured md, ma, mep and rmep information to use for matching after receiving the cfm fault notification.

Example Configure the detection type of ERPS ring1 port0as cc.
Switch(config)#erps-ring 1
Switch(config-erps-ring)#port0 failure-defect cc domain domain1 service serivice1 mep 1 rmep 2
Delete this configuration.
Switch(config)#erps-ring 1
Switch(config-erps-ring)#no port0 failure-defect

erps-instance <instance-id>

Command **erps-instance <instance-id>**
no erps-instance <instance-id>

parameter	**instance-id**	id of ERPS ring, the range is 1 to 48

default Do not configure any ERPS ring instance

Mode ERPS Ring Configuration Mode

Usage Guide Create the ERPS ring instance and enter into the ERPS ring instance configuration Mode.
If the ERPS ring supports v1, there will be the message of “Doesn't support multiple ERPS instance capability on the ring running version 1!” when configured more than one ERPS instance.

Example	Configure the ERPS ring instance 1 on ERPS ring1. Switch(config)#erps-ring 1 Switch(config-erps-ring)#erps-instance 1 Switch(config-erps-ring-inst-1)# Delete the ERPS ring instance 1 on ERPS ring1. Switch(config)#erps-ring 1 Switch(config-erps-ring)#no erps-instance 1

description

Command	**description <instance-name>** **no description <instance-name>**

parameter	**instance-name**	ERPS instance name, the maximum string is 64, and it is made up with letters, numbers and underlines; the first and last characters cannot be underlines. The no command deletes the ERPS instance name.

default	Do not configure the ERPS instance name as default
Mode	ERPS Instance Configuration Mode
Usage Guide	Configure the description string for the ERPS instance.
Example	Configure the ERPS instance1 name on ring1 as instance1. Switch(config)#erps-ring ring1 Switch(config-erps-ring)#erps-instance 1 Switch(config-erps-ring-inst-1)# description instance1 Delete this name of instance1. Switch(config)#erps-ring ring1 Switch(config-erps-ring)#erps-instance 1 Switch(config-erps-ring-inst-1)# no description

ring-id <ring-id>

Command	**ring-id <ring-id>** **no ring-id <ring-id>**

parameter	**ring-id**	ERPS ring id and the range is 1 to 64

default	The MAC address is 01-19-A7-00-00-01 as default
Mode	ERPS Instance Configuration Mode.

Usage Guide	Configure the last byte of R-APS packets destination MAC address sent by ERPS ring node to carry ring-id. If ERPS ring supports v1, ring-id only can be configured as 1. The no command configures it not to carry the ring-id, it means that the MAC is 01-19-A7-00-00-01.
Example	Configure the last byte of R-APS packets destination MAC address sent by ERPS ring1 instance2 to carry the ring-id 2. Switch(config)#erps-ring 1 Switch(config-erps-ring)#erps-instance 2 Switch(config-erps-ring-inst-2)#ring-id 2 Configure the last byte of R-APS packets destination MAC address sent by ERPS ring1 instance2 not to carry the ring-id, it means the destination MAC is 01-19-A7-00-00-01. Switch(config)#erps-ring 1 Switch(config-erps-ring)#erps-instance 2 Switch(config-erps-ring-inst-2)#no ring-id

rpl {port0 | port1} {owner | neighbour}

Command	**rpl {port0 | port1} {owner | neighbour}** **no rpl {port0 | port1}**

parameter		
	{port0 | port1}	ERPS ring member ports
	{owner | neighbour}	**Owner：** RPL owner **Neighbour：** RPL owner

default	None, it is the ordinary transmission node type.
Mode	ERPS Instance Configuration Mode
Usage Guide	Configure the member port of ERPS ring instance as RPL owner or RPL neighbour, the RPL node roles of different instances on the same ERPS ring cannot be configured on the same member port. The no command configures the member port of ERPS ring instance as the ordinary transmission port member.
Example	Configure the port0 of ERPS ring1 instance1 as RPL owner node. Switch(config)#erps-ring 1 Switch(config-erps-ring)#erps-instance 1 Switch(config-erps-ring-inst-1)# rpl port0 owner

non-revertive

Command	**non-revertive** **no non-revertive**

parameter	-
default	ERPS ring instance supports the revertive as default
Mode	ERPS Instance Configuration Mode
Usage Guide	Configure the ERPS ring instance as non-revertive. If this ERPS ring supports v1, this command is null and cannot be configured. The no command configures the ERPS ring instance as revertive. If this ERPS ring supports v1, this command is null. This command can be configured only on the RPL owner node of the sub ring.
Example	Configure the ERPS ring1 instance1 to support the non-revertive. Switch(config)#erps-ring 1 Switch(config-erps-ring)#erps-instance 1 Switch(config-erps-ring-inst-1)#non-revertive

guard-timer <guard-times>

Command	**guard-timer <guard-times>** **no guard-timer**

parameter	**guard-times**	the interval is 10ms and the range is 10ms to 200ms

default	10ms
Mode	ERPS Instance Configuration Mode
Usage Guide	Configure the Guard timer. The guard timer is used for the Ethernet node to avoid the error handling and the close loop according to the outdated R-APS packets. In the starting time of the timer, any R-APS packets received (the R-APS packets that the Request/State=”1110” are except) will be dropped. The no command configures the guard timer as the default value.
Example	Configure the guard timer of ERPS ring1 instance1 as 1s. Switch(config)#erps-ring 1 Switch(config-erps-ring)#erps-instance 1 Switch(config-erps-ring-inst-1)guard-timer 100

holdoff-timer < holdoff-times>

Command	**holdoff –timer <holdoff-times>** **no holdoff -timer**

parameter	**holdoff-times**	the interval is 1s and the range is 0 to 10s

default	0s
Mode	ERPS Instance Configuration Mode

Usage Guide	This command is used to configure the delay timer, and the default configuration is restored in the form of No
Example	Configure the Holdoff timer of ERPS ring1 instance1 as 5s. Switch(config)#erps-ring ring1 Switch(config-erps-ring)#erps-instance 1 Switch(config-erps-ring-inst-1)#holdoff –timer 5

wtr-timer <wtr-times>

Command	**wtr-timer <wtr-times>** **no wtr-timer**

parameter	**wtr-times**	the interval is 1min and the range is from 1 to 12min

default	1min
Mode	ERPS Instance Configuration Mode
Usage Guide	Configure the WTR timer. WTR timer is used to avoid the frequent protection switching of RPL owner node because of the periodic (intermittent) default. When RPL owner port received the default recovery packets, after some time, and then check if the default still existed on the other nodes and prevent blocking RPL owner port immediately to cause the chokepoint shocking. The no command configures the WTR timer as the default.
Example	Configure the WTR timer of ERPS ring1 instance1 as 10min. Switch(config)#erps-ring 1 Switch(config-erps-ring)#erps-instance 1 Switch(config-erps-ring-inst-1)#wtr-timer 10

protected-instance

Command	**protected-instance <instance-list>** **no protected-instance <instance-list>**

parameter	**instance-list**	the MSTP instance list protected by ERPS ring instance, such as i, j-k. The number of the instances in the list is not limited.

default	ERPS ring instance does not protect any MSTP instance
Mode	ERPS Instance Configuration Mode
Usage Guide	Configure the protection instance of ERPS ring instance. ERPS ring instance can protect all the MSTP instances. The same instance cannot be quoted by multiple ERPS ring instances under the same topology. Under the same ERPS ring instance, run this command more than once to protect instance, the result will be accumulated. The no command deletes the

	protection instance of ERPS ring instance.
Example	Configure the protection instance of ERPS ring1 instance1 as instance 2. Switch(config)#erps-ring ring1 Switch(config-erps-ring)#erps-instance 1 Switch(config-erps-ring-inst-1)#protected-instance 2

raps-mel <level-value>

Command	**raps-mel <level-value>** **no raps-mel**
parameter	**level-value** the level value of APS packets, range is from 0 to 7
default	Level is 7
Mode	ERPS Instance Configuration Mode
Usage Guide	Configure the level of R-APS channel of ERPS ring instance as the appointed level. If configured successfully, the mel field of the R-APS packet sent by this ERPS ring instance will be added as the appointed level and only the R-APS packets with the level that is larger than or same as the appointed level can be allowed passing by, or notify the error. The no command configures the level as the default of 7. The MEL field in the protocol packets is used to detect if the current packet can pass by.
Example	Configure the level of R-APS channel of ERPS ring1 instance1 as 5. Switch(config)#erps-ring ring1 Switch(config-erps-ring)#erps-instance 1 Switch(config-erps-ring-inst-1)raps-mel 5

control-vlan <vlan-id>

Command	**control-vlan <vlan-id>** **no control-vlan**
parameter	**vlan-id** vlan id of R-APS packets, range is from 2 to 4094
default	Do not configure any control vlan
Mode	ERPS Instance Configuration Mode
Usage Guide	Configure the control vlan of R-APS packets of R-APS channel. In the ERPS ring instance, this vlan is only used to transmit ERPS protocol packets but not to forward the user business packets. It improves the ERPS protocol security. User makes sure the configuration

	uniqueness. This vlan is as the vlan tag when sending R-APS packets. The protection VLAN configuration of all the nodes in the instance must be identical. The no command deletes the control vlan.
Example	Configure the control vlan of ERPS ring1 instance1 as vlan10. Switch(config)#erps-ring ring1 Switch(config-erps-ring)#erps-instance 1 Switch(config-erps-ring-inst-1)control-vlan 10

forced-switch {port0 | port1}

Command	**forced-switch {port0 | port1}**

parameter		
	port0	means to run the forced switch configuration on port0 of the ring node
	port1	means to run the forced switch configuration on port1 of the ring node

default	No forced switch in ERPS ring instance
Mode	ERPS Instance Configuration Mode
Usage Guide	Run the forced switch on the port of ERPS ring node. Two or more forced switch are allowed existing at the same time in one ERPS ring instance. But only one forced switch command can be existed on one ring node. User should avoid using multiple forced switch in ERPS ring instance to cause the ERPS ring instance splitting. If the forced switch is on the current highest priority, block the data channel and R-APS channel of this ERPS ring instance on the appointed member port (port0 or port1), and unblock the other member port of this ring node; If this instance configuration is not integral, it is on the status of unactive, there will be the message of "The request is rejected because the ERP instance in unactive state!" otherwise, enter into the next step;
Example	Run the forced switch configuration on the port0 of ERPS ring1 instance1. Switch(config)#erps-ring ring1 Switch(config-erps-ring)#erps-instance 1 Switch(config-erps-ring-inst-1)#force-switch port0

manual-switch {port0 | port1}

Command	**manual-switch {port0 | port1}**

parameter		
	port0	means to run the manual switch configuration on port0 of the ring node
	port1	means to run the manual switch configuration on port1 of the ring node

default	No manual switch in ERPS ring instance

Mode	ERPS Instance Configuration Mode
Usage Guide	Run the manual switch on the port of ERPS ring node. Only one manual switch is allowed existing in one ERPS ring instance, and the premise is that there is no SF fault or FS command in ERPS ring instance. If this instance configuration is not integral, it is on the status of unactive, there will be the message of "The request is rejected because the ERP instance in unactive state!" otherwise, enter into the next step;
Example	Run the manual switch configuration on the port0 of ERPS ring1 instance1. Switch(config)#erps-ring ring1 Switch(config-erps-ring)#erps-instance 1 Switch(config-erps-ring-inst-1)#manual-switch port0

clear command

Command	**clear command**
parameter	-
default	No clear command in ERPS ring instance.
Mode	ERPS Instance Configuration Mode
Usage Guide	Run the clear command to the member port of ERPS ring node, it can clear the management command of the local activity: forced switch command and manual switch command; it can be also used to trigger the link switch under the revertive mode before WTR or WTB is time out; and trigger the link to switch from the standby link RPL back to the intrinsic link under the non-revertive mode after the fault recovery. If the forced or manual switch command has existed on the node of this ring instance, clear the switch command and keep the block status of the data channel and R-APS channel of the blocked member ports. And send the P-APS (NR) packets on the two member ports stably and steadily until received R-APS (NR, RB) packets and known the RPL is blocked. Or the higher level request happens on the ring (such as SF); If the local forced or manual switch has existed on the node of this ring instance, clear the command and then receive the R-APS (NR) packets whose node ID is larger than the local node ID. Unblock all the ring ports without SF fault and stop sending the R-APS (NR) packets on the two member ports.
Example	Run clear configuration on ERPS ring1 instance1. Switch(config)#erps-ring ring1 Switch(config-erps-ring)#erps-instance 1 Switch(config-erps-ring-inst-1)#clear command

show erps ring {<ring-name> | brief}

Command	**show erps ring {<ring-name> | brief}**

parameter		
	ring-name	ERPS ring name
	brief	Show the ERPS ring main information

default	-
Mode	Admin Mode
Usage Guide	Read the ERPS ring information.
Example	show all the ERPS rings information. Switch#show erps ring brief ethernet tcn-propagation erps to none. Ring-Name Ring-topo Port0 Port1 Version Inst-Coun t ---------- ---------- -- ring1 major-ring - - V2 0

show erps instance [ring <ring-name> [instance <instance-id>]]

Command	**show erps instance [ring <ring-name> [instance <instance-id>]]**

parameter		
	ring-name	ERPS ring name
	instance-id	ID of ERPS ring instance, range is from 1 to 48. If it is not appointed, show all the ERPS ring instances information.

default	-
Mode	Admin Mode
Usage Guide	Show the ERPS ring instance information.
Example	Show all the ERPS ring instances information. Switch#show erps instance ERPS Ring: 1 Instance: 1 Description: - Protected Instance: - Revertive mode: revertive R-APS MEL: 7 R-APS Virtual-Channel: with Control Vlan: -

Ring ID: 1
Guard Timer(10ms): 50
Holdoff Timer(seconds): 0
WTR Timer(min): 5

Port Role Port-Status

Port0 common blocked
Port1 common blocked

Display content	analyze
Description	ERPS ring instance name
Protected Instance	MSTP instance protected by ERPS ring instance
Revertive mode	ERPS ring link mode: revertive, non-revertive
R-APS MEL	Level of R-APS channel, package R-APS packets
R-APS Virtual-Channel	If the ERPS ring is the sub ring, the R-APS virtual channel of the inherited ring: with, without
Ring ID	The ring-id number carried by the packets sent by ERPS ring instance, range is from 1 to 64.
Contral Vlan	R-APS channel vlan, package R-APS packet of tag
WTR_Timer	Wait to Restore timer, range is from 1 to 12min
Guard_Timer	Guard timer, range is from 10ms to 2s
Holdoff_Timer	Holdoff timer, range is from 0 to 10
Port	ERPS ring port information: port0, port1
Role	ERPS ring node roles: RPL Owner, RPL neighbor, Common
Port-Status	Blocked: port is in block status forwarding: port is in forwarding status

show erps status [ring <ring-name> [instance <instance-id>]]

Command	**show erps status [ring <ring-name> [instance <instance-id>]]**

parameter	**ring-name**	ERPS ring name
	instance-id	ID of ERPS ring instance, range is from 1 to 48. If it is not appointed, show all the ERPS ring instances status information.

default	-
Mode	Admin Mode

Usage Guide

Show the status information of ERPS ring instance.

Example

Show all the ERPS ring instances status information.

```
Switch#show erps status
ERPS ring: 1 instance: 1 status:
Active: 0
Node State: -
Time last topology change:Jan 00 00:00:00 1900
--------------------------------------------------------------------------------
Port        Interface        Port-Status        Signal-Status        R-APS-NodeId
BPR
--------------------------------------------------------------------------------
Port0       -                -                  -                    -
-
Port1       -                -                  -                    -
-

ERPS ring: 1 instance: 2 status:
Active: 0
Node State: -
Time last topology change:Jan 00 00:00:00 1900
--------------------------------------------------------------------------------
Port        Interface        Port-Status        Signal-Status        R-APS-NodeId
BPR
--------------------------------------------------------------------------------
Port0       -                -                  -                    -
-
Port1       -                -                  -                    -
-
```

Display content	analyze
Active	Current active status of ERPS ring instance: 1, 0
Node State	Current status of ERPS ring instance: Idle, Protection, Forced-switch, Manual-switch, Pending
Time last topology change	Topology switching last time
Port-Status	Blocked: the port is in block status Forwarding: the port is in forwarding status
Signal-Status	ERPS ring port fault status: Non-failed: no fault Failed: fault happened
R-APS-NodeId	The node ID information is the last bit of the MAC address
BPR	The block link information carried by the receiving last R-APS saved by ERPS ring port, it is port0 or port1 which was blocked.

show erps statistics [ring <ring-name> [instance <instance-id>]]

Command	**show erps statistics [ring <ring-name> [instance <instance-id>]]**

parameter	**ring-name**	ERPS ring name
	instance-id	ID of ERPS ring instance, range is from 1 to 48. If it is not appointed, show the statistic information of all the ERPS ring instances of this device.

default	-
Mode	Admin Mode
Usage Guide	Show the statistic information of ERPS ring instance.
Example	Show the statistic information of ERPS ring instance.

```
Switch#show erps statistics
Statistics for ERPS ring: 1 instance 1:
R-APS      Port0(Tx/Rx)              Port1(Tx/Rx)
------------------------------------------------------------
NR:        0          /0             0          /0
NR,RB:     0          /0             0          /0
SF:        0          /0             0          /0
MS:        0          /0             0          /0
FS:        0          /0             0          /0
EVENT:     0          /0             0          /0
------------------------------------------------------------
TOTAL:     0          /0             0          /0

Statistics for ERPS ring: 1 instance 2:
R-APS      Port0(Tx/Rx)              Port1(Tx/Rx)
------------------------------------------------------------
NR:        0          /0             0          /0
NR,RB:     0          /0             0          /0
SF:        0          /0             0          /0
MS:        0          /0             0          /0
FS:        0          /0             0          /0
EVENT:     0          /0             0          /0
------------------------------------------------------------
TOTAL:     0          /0             0          /0
```

clear erps statistics [ring <ring-name> [instance <instance-id>]]

Command	**clear erps statistics [ring <ring-name> [instance <instance-id>]]**

parameter	**ring-name**	ERPS ring name
	instance-id	ID of ERPS ring instance, range is from 1 to 48. If it is not appointed, clear the statistic information of all the ERPS ring

	instances of this device
default	-
Mode	Admin Mode
Usage Guide	Clear the statistic information of ERPS.
Example	Clear the statistic information of ERPS ring1 instance1. Switch#clear erps statistics ring 1 instance 1