Application Note

Ethernet Ring Protection Switching Configuration Guide

Released

August 2020

Contents

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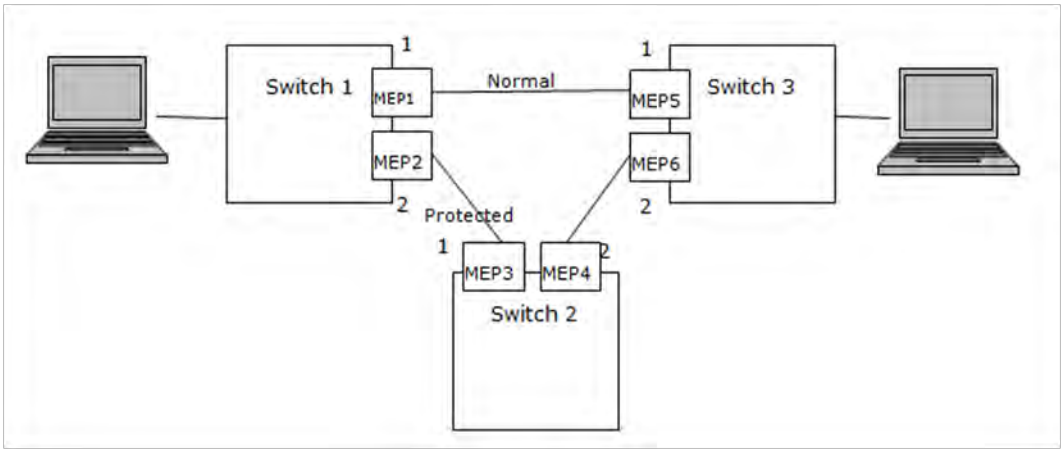
1 Revision History

Issue	Issue Date	Details of Change
1.1	August 2020	Revision 1.1 was published.
		.

2 Ethernet Ring Protection Switching Configuration

This document shows how to configure the Ethernet Ring Protection Switching (ERPS) for Extreme Copper Inc. switches using the WebGUI and ICLI commands. The following figure shows the simple three switch network constructed to demonstrate these features.

Figure 1 • Ethernet Ring Protection Switching (ERPS) Model



3 Configuring ERPS from the ICLI

The following sections describe how to configure from the ICLI.

3.1 Initial Switch Configuration

The following commands disable Spanning Tree Protocol (STP) and LLDP and enable C-Port on Port 1 and 2 of all switches.

```
#Configure port 1-2
interface GigabitEthernet 1/1-2
 #set C-Port
 switchport hybrid port-type c-port
 switchport mode hybrid
 #disable LLDP
 no lldp receive
 no lldp transmit
 #disable Spanning Tree Protocol
 no spanning-tree
```

3.2 Configuring Maintenance Entity Point (MEP) and ERPS on Switch 1 (RPL Owner)

The following commands configure MEP and ERPS on switch 1 (RPL owner).

```
#create mep 1 on port 1
mep 1 down domain port flow 1 level 0 interface GigabitEthernet 1/1
#set vlan for MEP traffic
mep 1 vid 3001
#set id of peer mep
mep 1 peer-mep-id 5
#enable ccm, default is 1FPS
mep 1 cc 0
#enable RAPS
mep 1 aps 0 raps
mep 2 down domain port flow 2 level 0 interface GigabitEthernet 1/2
mep 2 mep-id 2
mep 2 vid 3001
mep 2 peer-mep-id 3
mep 2 cc 0
mep 2 aps 0 raps
#create erps on port 1 and port 2
erps 1 major port0 interface GigabitEthernet 1/1 port1 interface GigabitEthernet 1/2
#set MEP ID for the corresponding port
erps 1 mep port0 sf 1 aps 1 port1 sf 2 aps 2
#set to RPL owner
erps 1 rpl owner port1\
#set protected VLAN
erps 1 vlan 1
```

3.3 Configuring MEP and ERPS on Switch 2 (RPL Neighbor)

The following commands configure MEP and ERPS on switch 2 (RPL neighbor).

```
mep 1 down domain port flow 1 level 0 interface GigabitEthernet 1/1
mep 1 mep-id 3
mep 1 vid 3001
mep 1 peer-mep-id 2
mep 1 cc 0
mep 1 aps 0 raps
mep 2 down domain port flow 2 level 0 interface GigabitEthernet 1/2
mep 2 mep-id 4
mep 2 vid 3001
mep 2 peer-mep-id 6
mep 2 cc 0
mep 2 aps 0 raps
erps 1 major port0 interface GigabitEthernet 1/1 port1 interface GigabitEthernet 1/2
erps 1 mep port0 sf 1 aps 1 port1 sf 2 aps 2
#set to RPL neighbour
```

```
erps 1 rpl neighbor port0
erps 1 vlan 1
```

3.4 Configuring MEP and ERPS on Switch 3

The following commands configure MEP and ERPS on switch 3.

```
mep 1 down domain port flow 1 level 0 interface GigabitEthernet 1/1
mep 1 mep-id 5
mep 1 vid 3001
mep 1 peer-mep-id 1
mep 1 cc 0
mep 1 aps 0 raps
mep 2 down domain port flow 2 level 0 interface GigabitEthernet 1/2
mep 2 mep-id 6
mep 2 vid 3001
mep 2 peer-mep-id 4
mep 2 cc 0
mep 2 aps 0 raps
erps 1 major port0 interface GigabitEthernet 1/1 port1 interface GigabitEthernet 1/2
erps 1 mep port0 sf 1 aps 1 port1 sf 2 aps 2
erps 1 vlan 1
```

Note:
To set the CCM rate to 100 FPS or 300 FPS on the TES7000 and TES6000-10, the peer MAC address must be known, or first set it to the lower rate, until the peer MAC address is learned and then change it to a higher rate.

```
mep 1 peer-mep-id <peer mep id> mac <peer mac address>
mep 1 cc 0 fr300s
```

The ERPS status can be checked with the `show erps` command.

4 Configuring ERPS Examples

The following sections provide examples for the various configurations of ERPS.

4.1 Initial Switch Configuration

Use the following steps to configure the ERPS features.

> **Note:**
> Connect switch 1 to switch 2 and switch 1 to switch 3. Do not connect switch 2 to switch 3 to avoid creating a loop. The web client is connected to switch 1.

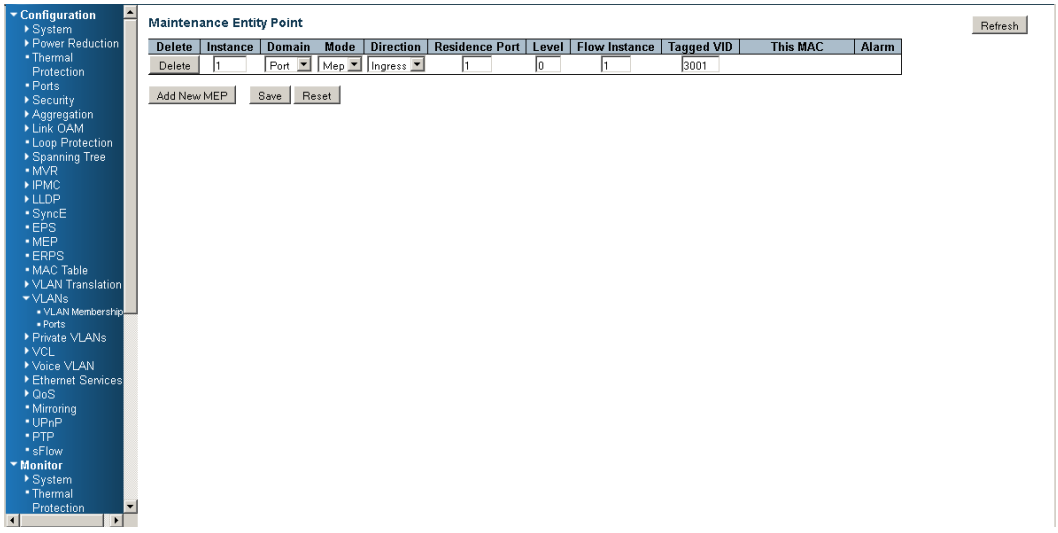
1. Restore the default settings for all three switches.
2. Disable the DHCP client and set the proper static IP for each switch. In this example, switch 1 is 192.0.2.1, switch 2 is 192.0.2.2, and switch 3 is 192.0.2.3.
3. Disable spanning tree on all the switches to avoid conflict with ERPS (spanning tree is enabled by default).
4. Enable VLAN tag aware on all three switches. In the VLAN configuration page, set the port mode to Hybrid port and the port type to C-Port on port 1 and port 2 for each of the three switches.

4.2 Creating an MEP on Switch 1

Use the following steps to create an MEP on switch 1.

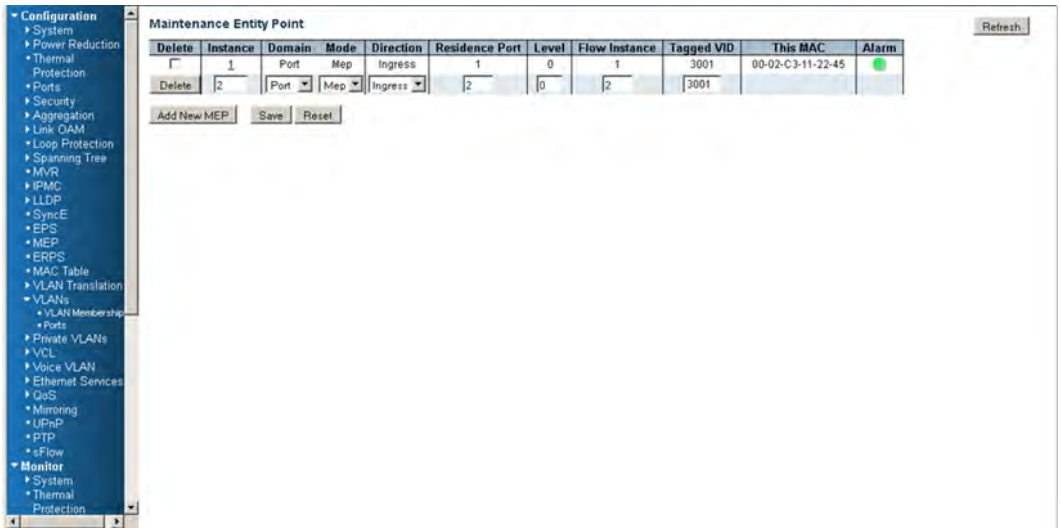
1. On switch 1, add a new MEP on port 1 by clicking **MEP**. Configure the MEP as shown in the following illustration, and click **Add New MEP**.

Figure 2 • Switch 1 Port 1 MEP Configuration



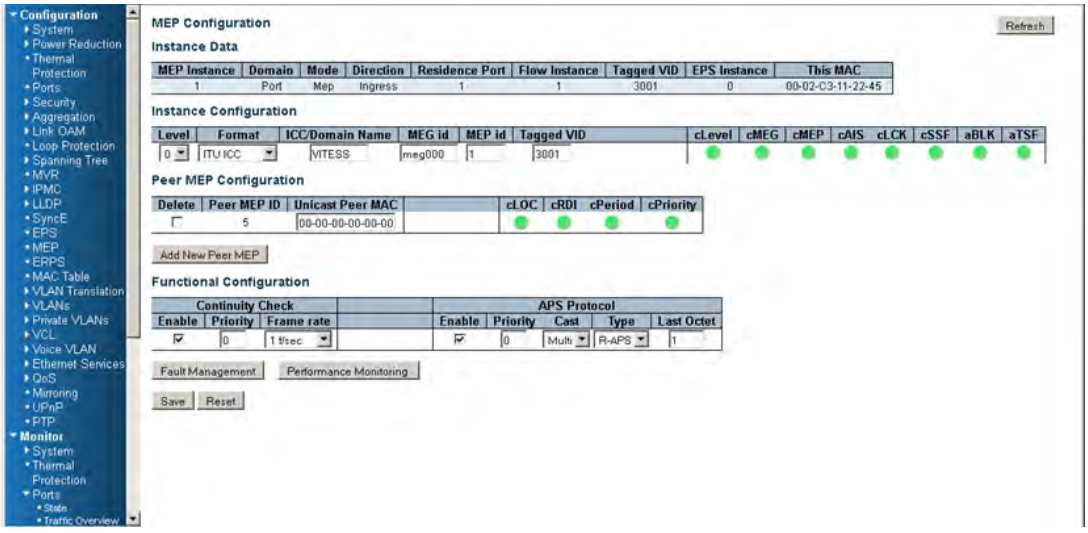
2. Add a new MEP on port 2 of switch 1 configured as shown in the following illustration, and click **Add New MEP**.

Figure 3 • Switch 1 Port 2 MEP Configuration



3. To edit MEP 1, under **MEP Instance** in the **Instance Data** table, click **1**, configure the page as shown in the following illustration, and click **Save**.

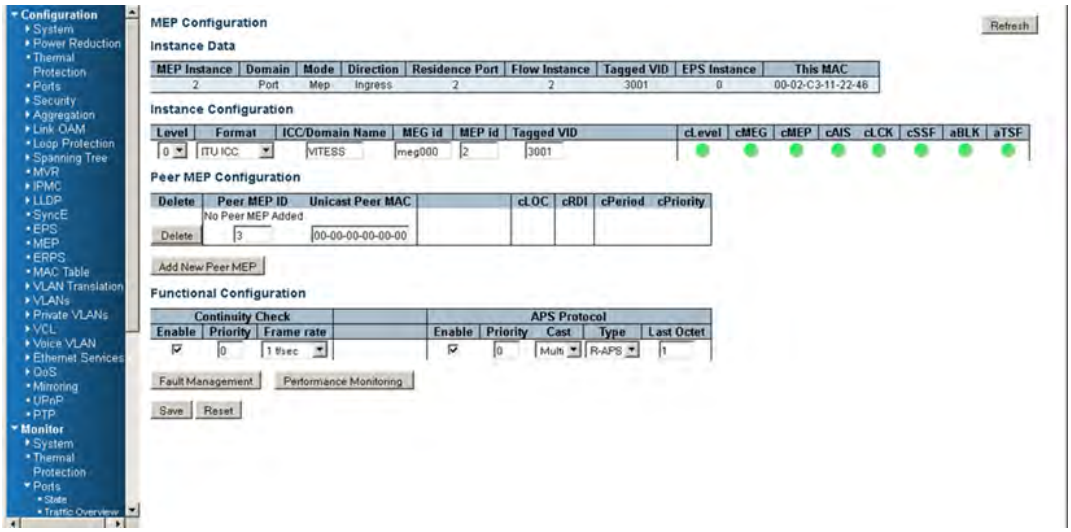
Figure 4 • Switch 1 MEP 1 Configuration



The Unicast Peer MAC can remain empty because it will be learned by receiving the CCM from the peer side. Before it is learned on the TES7000 and TES6000-10, the CCM frame rate cannot be changed to above 100 ps. If known, enter the peer MAC address manually.

4. To edit MEP 2, under **MEP Instance** in the **Instance Data** table, click **2**, configure the MEP as shown in the following illustration, and click **Save**.

Figure 5 • Switch 1 MEP 2 Configuration

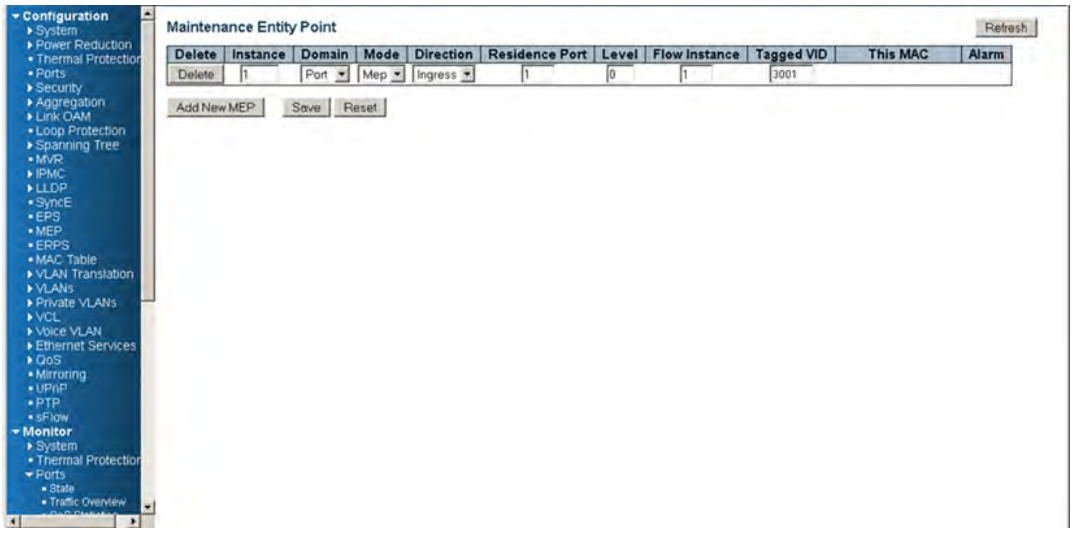


4.3 Configuring Switch 2

Use the following steps to configure switch 2.

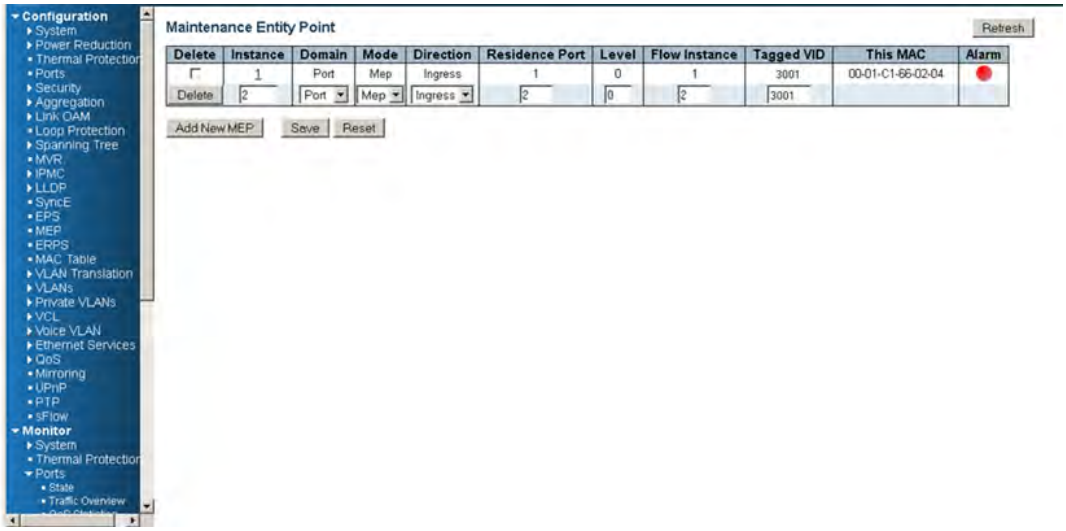
1. Add a new MEP on port 1 of switch 2.

Figure 6 • Switch 2 Port 1 MEP Configuration



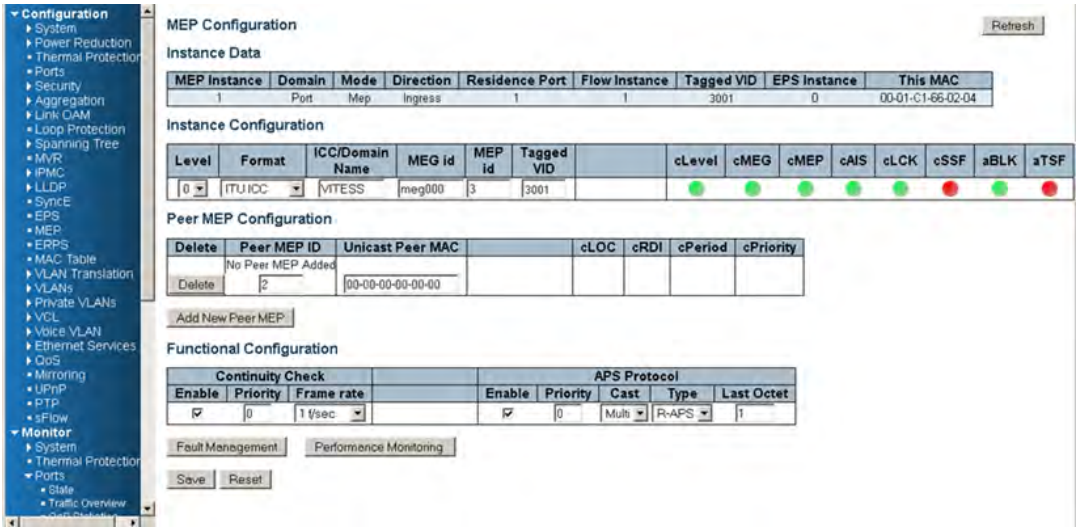
2. Add a new MEP on port 2 of switch 2 configured as shown in the following illustration, and click **Add New MEP**.

Figure 7 • Switch 2 Port 2 MEP Configuration



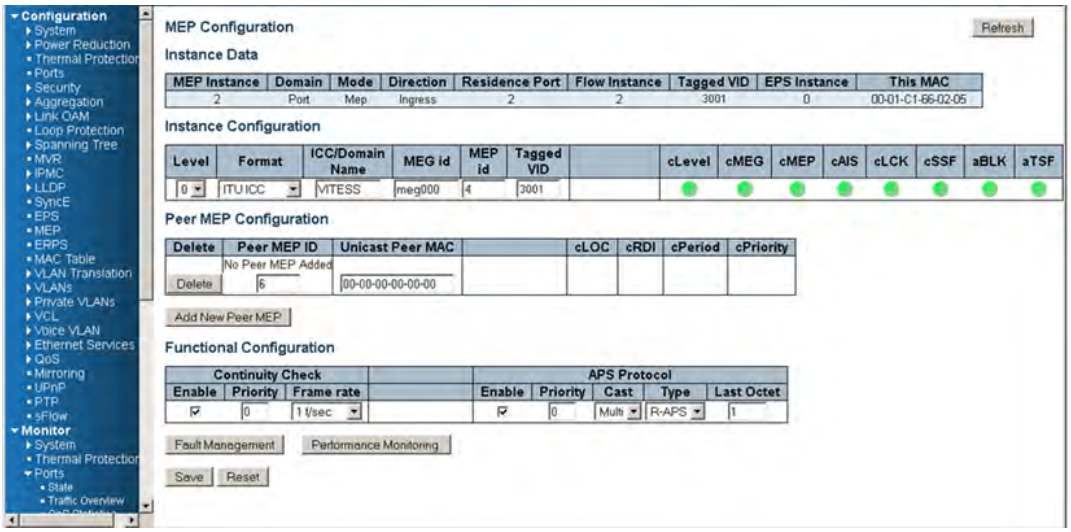
3. Edit MEP1 of switch 2 by clicking **1** under Instance of the MEP table. Configure the MEP as shown in the following illustration, and click **Save**.

Figure 8 • Switch 2 MEP 1 Configuration



4. Edit MEP 2 of switch 2 by clicking **2** under Instance of the MEP table. Configure the MEP as shown in the following illustration, and click **Save**.

Figure 9 • Switch 2 MEP 2 Configuration

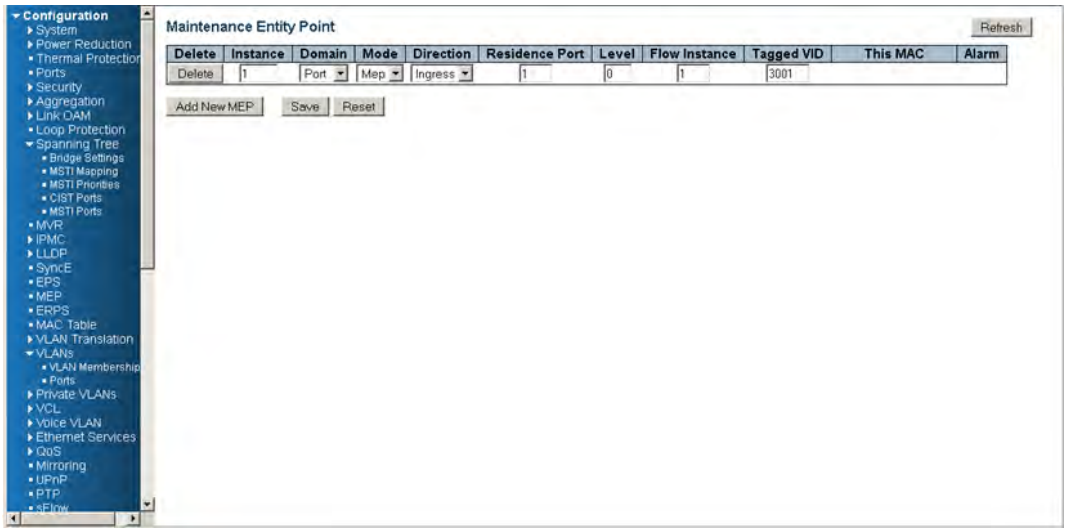


4.4 Configuring Switch 3

Use the following steps to configure switch 3.

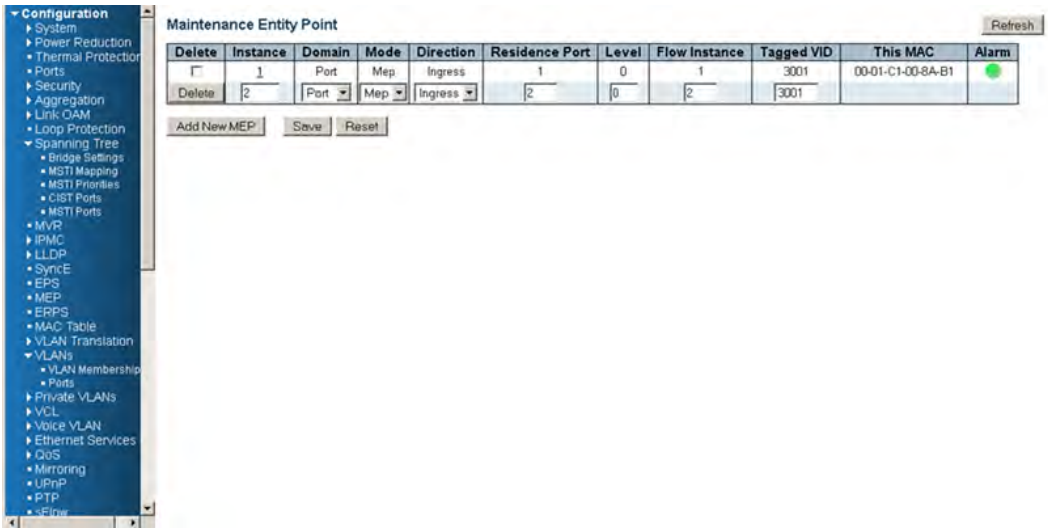
1. Add a new MEP on port 1 of switch 3.

Figure 10 • Switch 3 Port 1 MEP Configuration



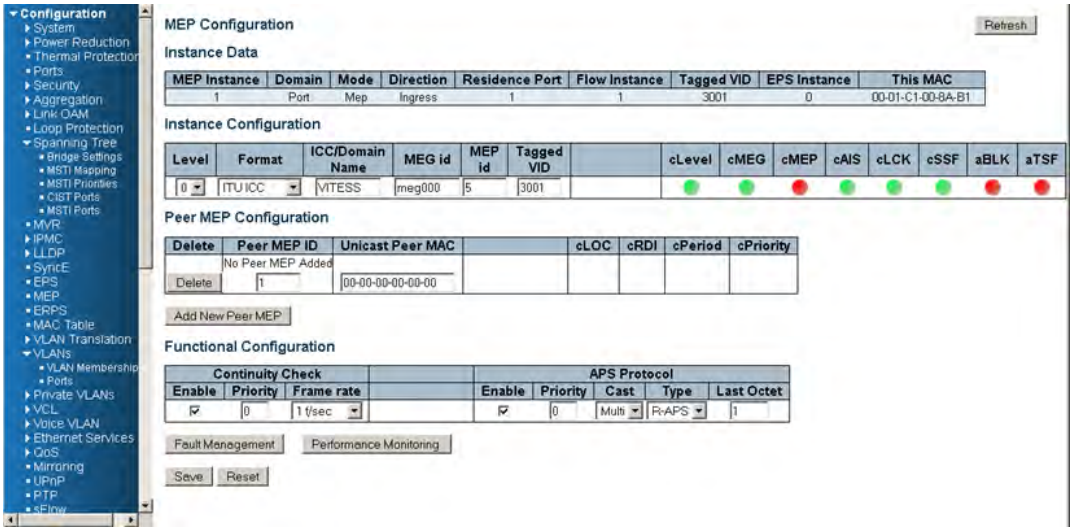
2. Add a new MEP on port 2 of switch 3.

Figure 11 • Switch 3 Port 2 MEP Configuration



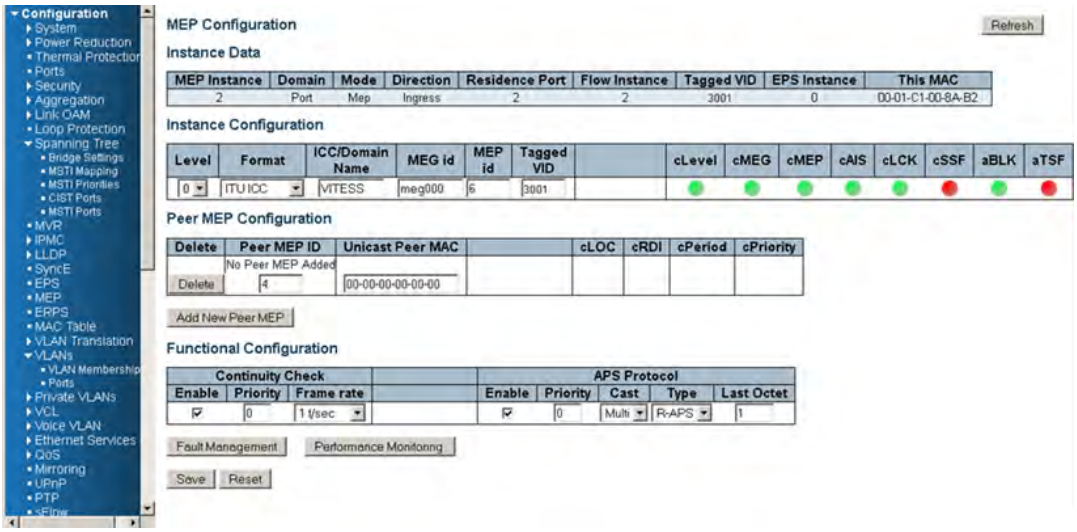
3. Edit MEP1 of switch 3 by clicking **1** under Instance of the MEP table. Configure the MEP as shown in the following illustration, and click **Save**.

Figure 12 • Switch 3 MEP 1 Configuration



4. Edit MEP 2 of switch 3 by clicking **2** under Instance of the MEP table. Configure the MEP as shown in the following illustration, and click **Save**.

Figure 13 • Switch 3 MEP 2 Configuration

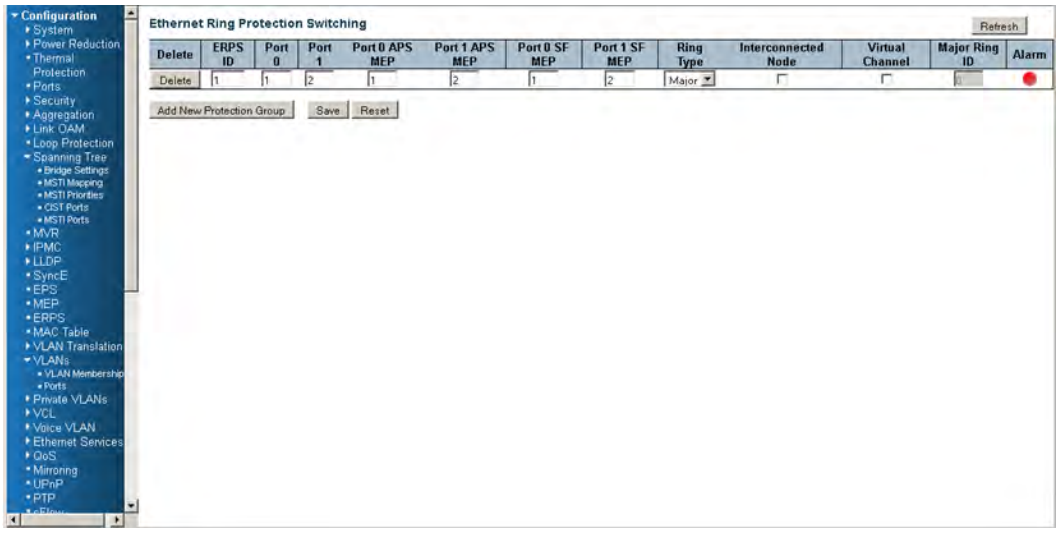


4.5 Configuring ERPS on Switch 1

Use the following steps to configure ERPS on switch 1.

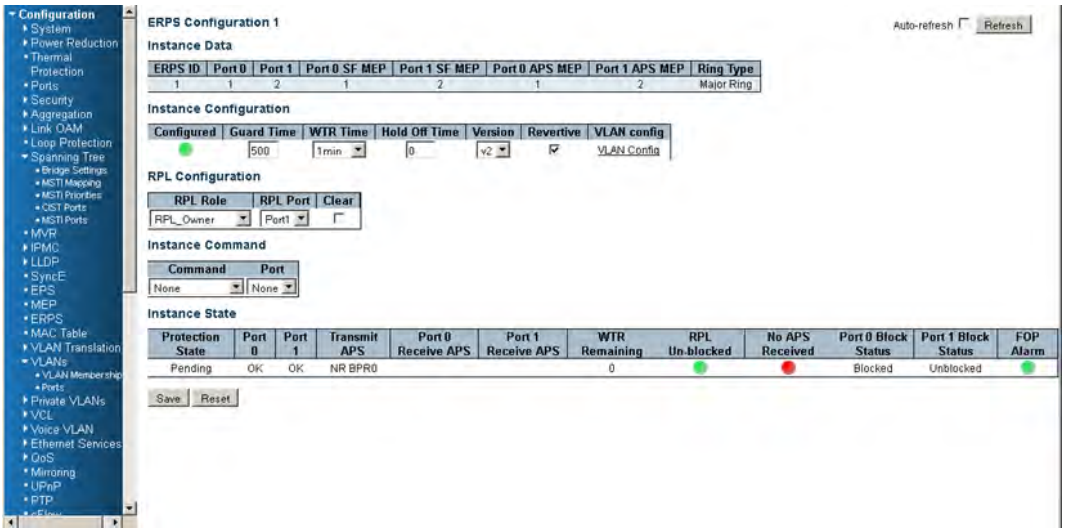
1. On switch 1, click **ERPS**, the **Ethernet Ring Protection Switching** page opens. Add the Ring Protection Link (RPL) owner as shown, and click **Add New Protection Group**.

   Figure 14 • Add New Protection Group (Switch 1) Configuration



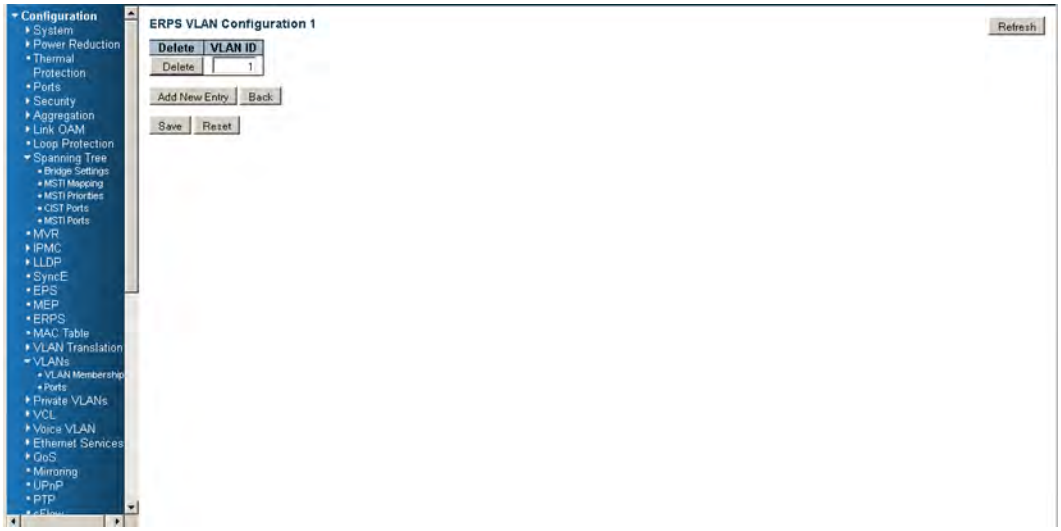
2. Edit ERPS1 by clicking **1**. Set up the configuration as shown in the following illustration, and click **Save**.

Figure 15 • ERPS 1 (Switch 1) Configuration



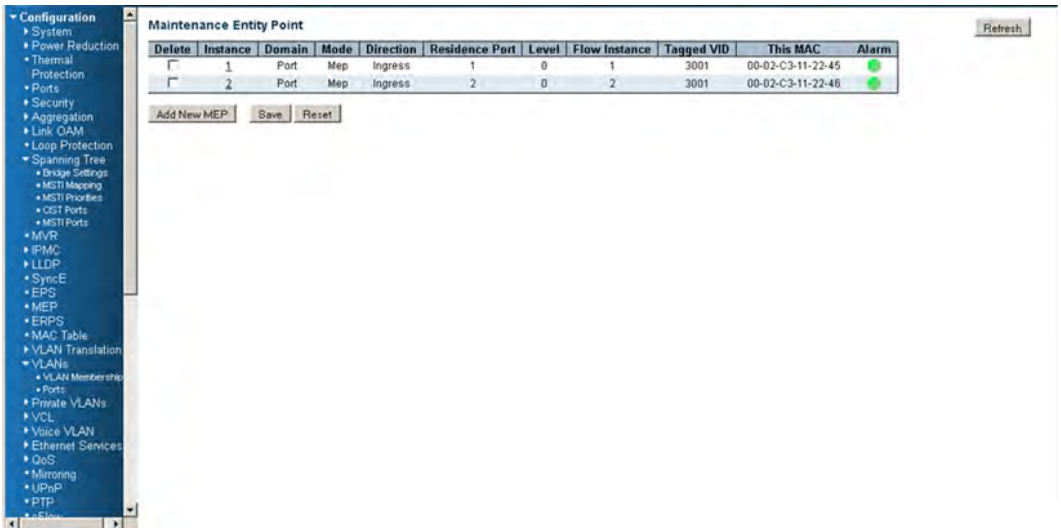
3. Click **VLAN Config** to edit the protected VLAN.

Figure 16 • Protected VLAN (Switch 1) Configuration



4. After clicking **Save**, remember to connect switch 2 and switch 3. The user can not access switch 2 from switch 1 because the RPL is disconnected.
5. Check the MEP table on switch 1, switch 2, and switch 3. Alarms should show green.

Figure 17 • MEP Status

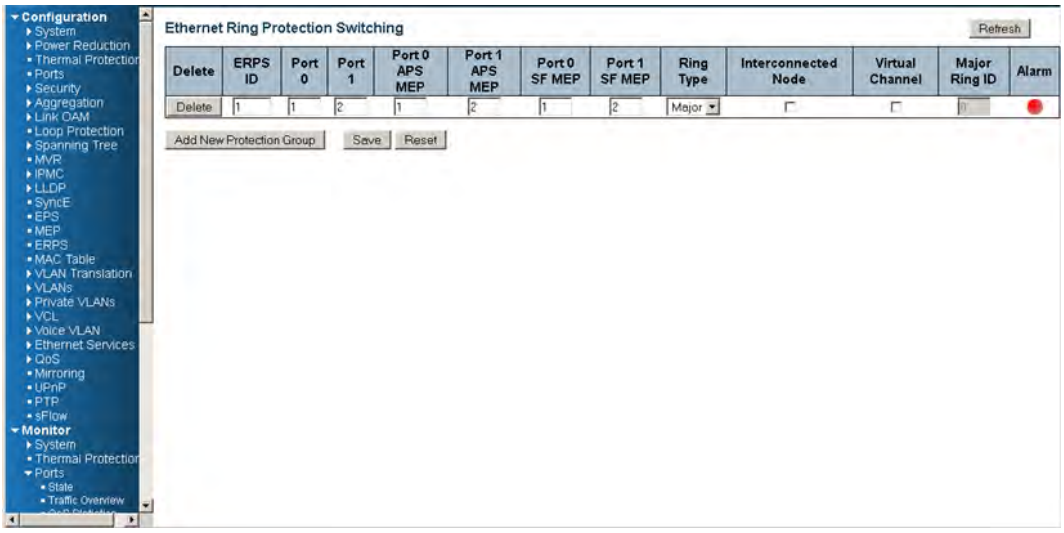


4.6 Configuring ERPS on Switch 2, the RPL Neighbor

Use the following steps to configure ERPS on switch 2.

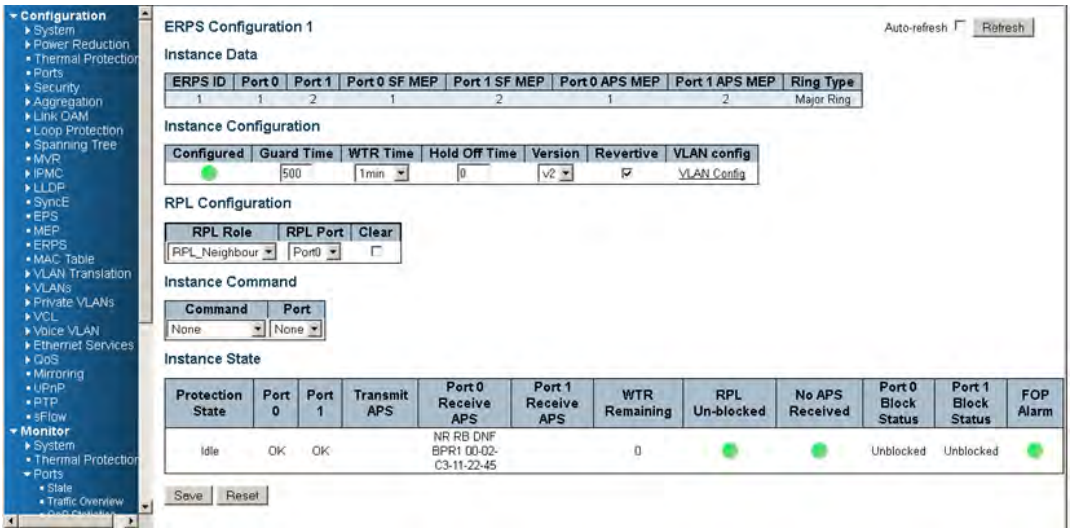
1. On switch 2, click **ERPS** and then click **Add New Protection Group**.

Figure 18 • Add New Protection Group (Switch 2) Configuration



2. Edit ERPS1 by clicking **1**. Configure the device as shown in the following illustration, and click **Save**.

Figure 19 • ERPS 1 (Switch 2) Configuration



3. Click **VLAN Config** to edit the protected VLAN.

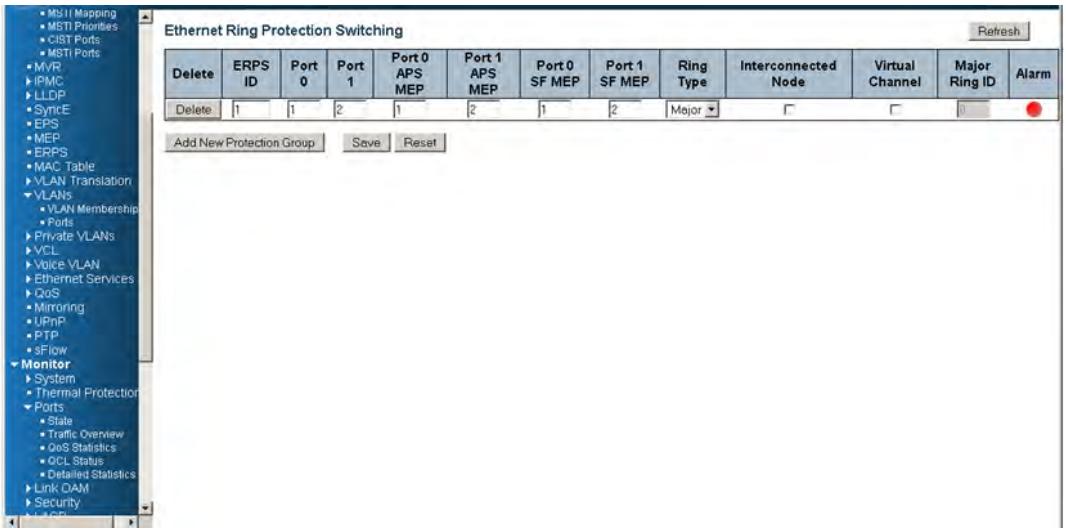
Figure 20 • Protected VLAN (Switch 2) Configuration

4.7 Configuring ERPS on Switch 3

Use the following steps to configure ERPS on switch 3.

1. On switch 3, click **ERPS** and then click **Add New Protection Group**.

Figure 21 • Add New Protection Group (Switch 3) Configuration



2. Edit ERPS1 by clicking **1**. No action is required on switch 3. Keep the RPL owner at none.
3. Click **VLAN Config** to edit the protected VLAN.

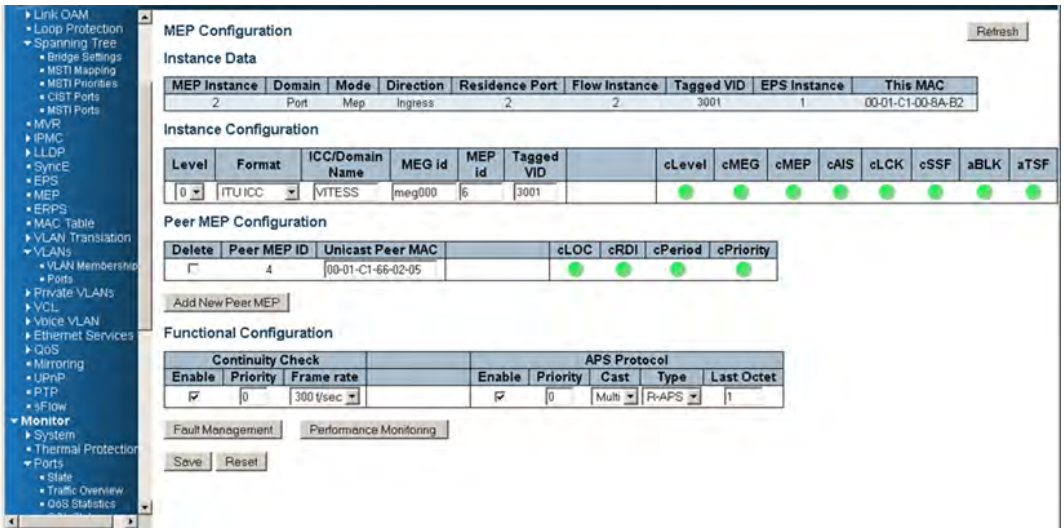
Figure 22 • Protected VLAN (Switch 3) Configuration

4.8 Verifying ERPS

Use the following steps to verify the configuration of the ERPS.

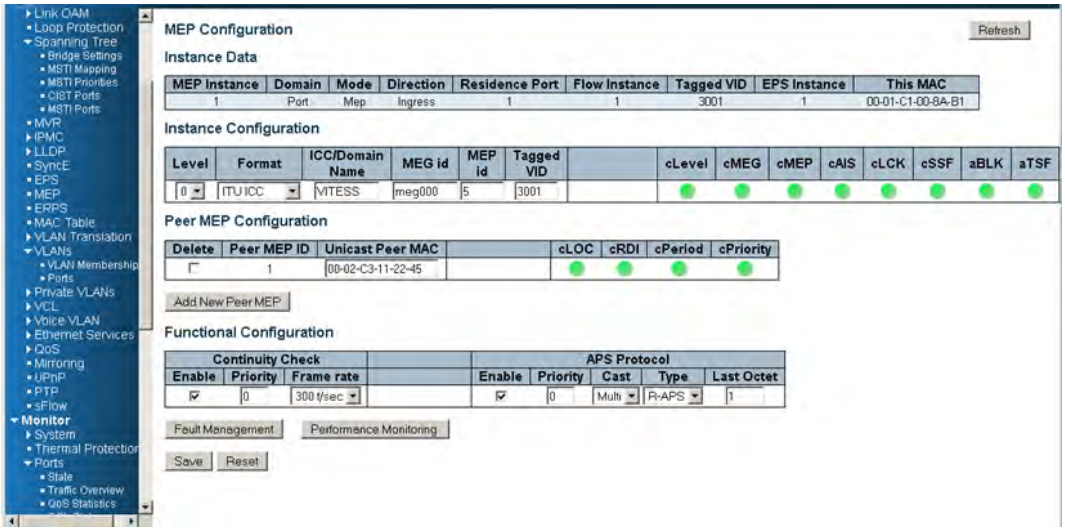
1. Change the CCM rate starting from switch 3. Click on **MEP** > **2** and then use the frame rate pull down to select 300 f/sec.

Figure 23 • Edit MEP 2 CCM Rate (Switch 3)



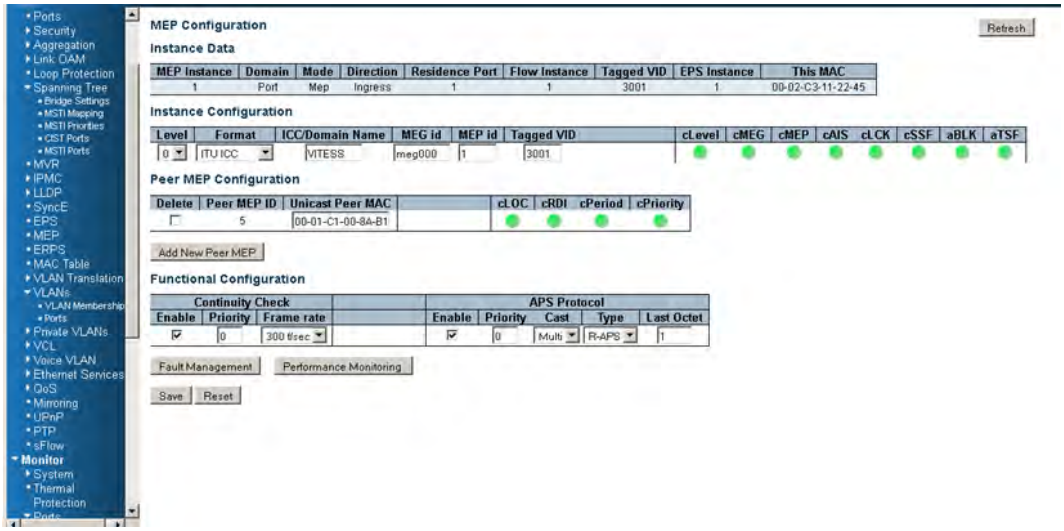
2. Change the CCM rate for MEP 1.

Figure 24 • Edit MEP 1 CCM Rate (Switch 3)



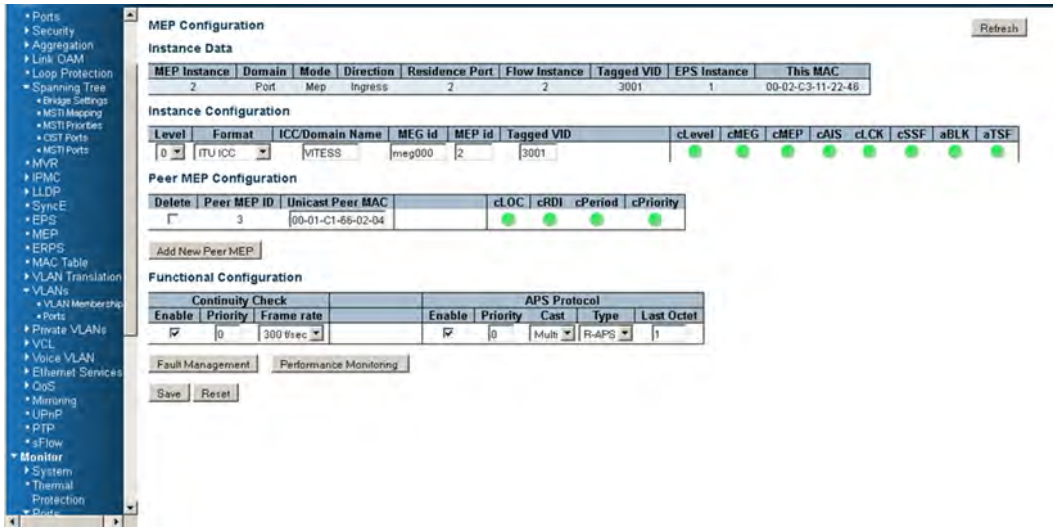
3. Change the CCM rate on switch 1. Click on **MEP** > **1** and then use the frame rate pull down to select 300 f/sec.

Figure 25 • Edit MEP 1 CCM Rate (Switch 1)



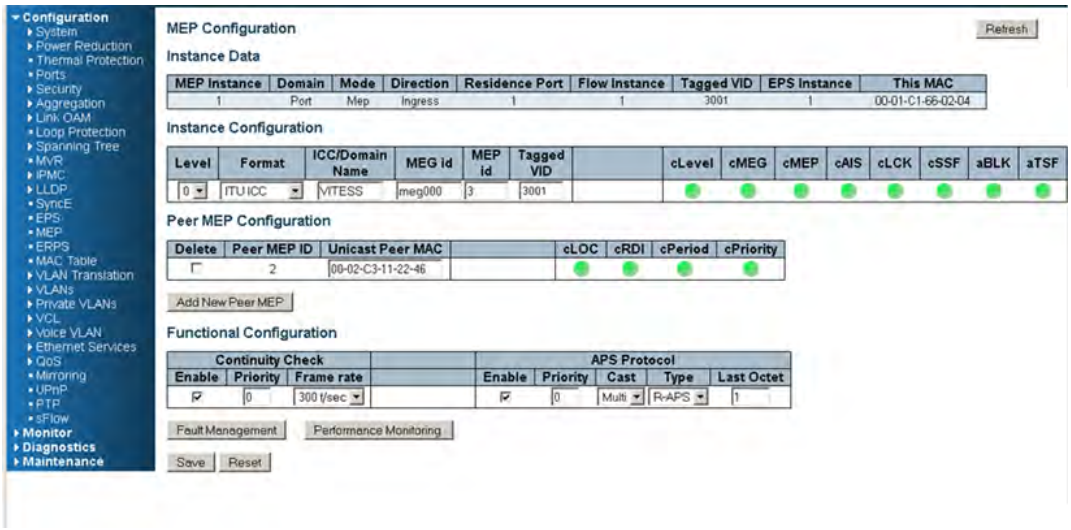
4. Change the CCM rate for MEP 2.

Figure 26 • Edit MEP 2 CCM Rate (Switch 1)



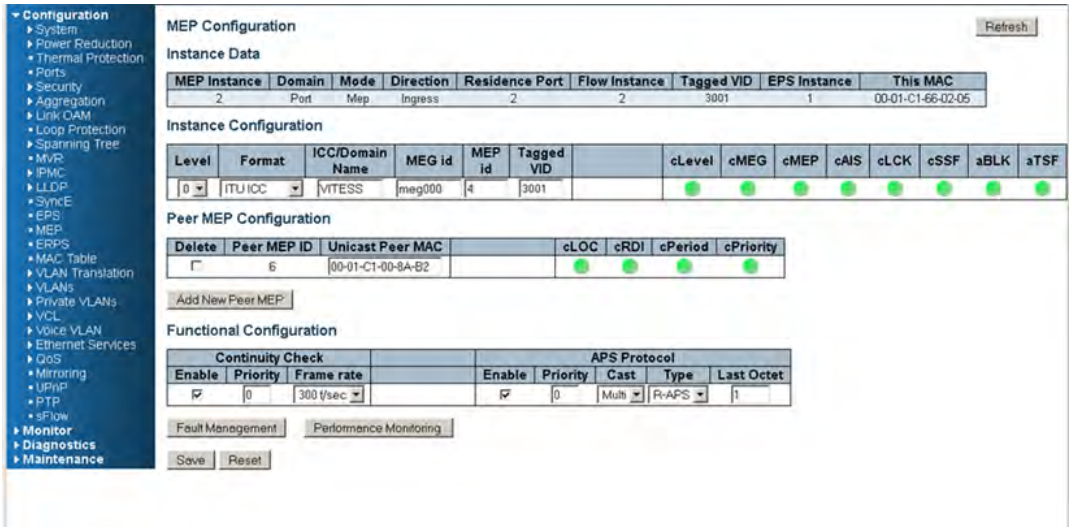
5. Change the CCM rate on switch 2. Click on **MEP** > **1** and then use the frame rate pull down to select 300 f/sec.

Figure 27 • Edit MEP 1 CCM Rate (Switch 2)



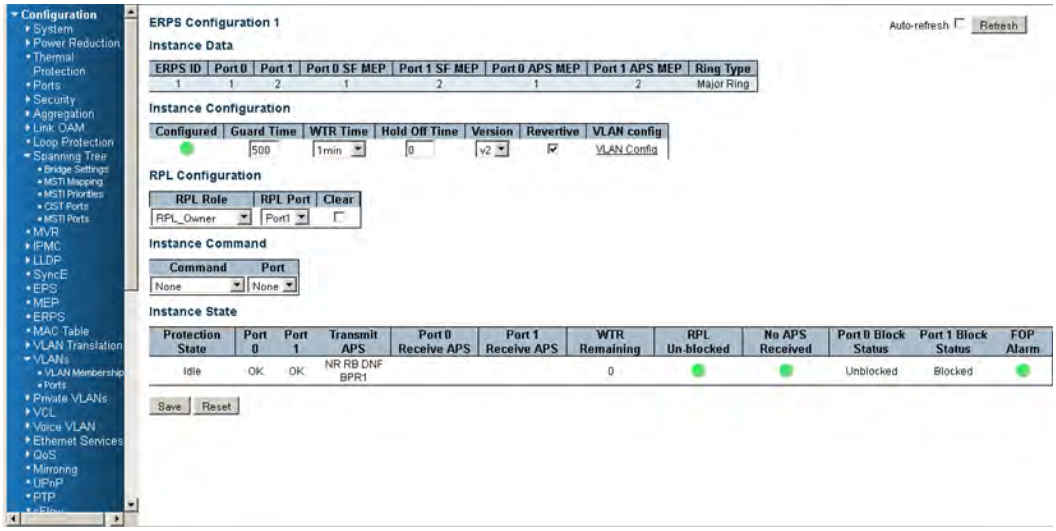
6. Change the CCM rate for MEP 2.

Figure 28 • Edit MEP 2 CCM Rate (Switch 2)



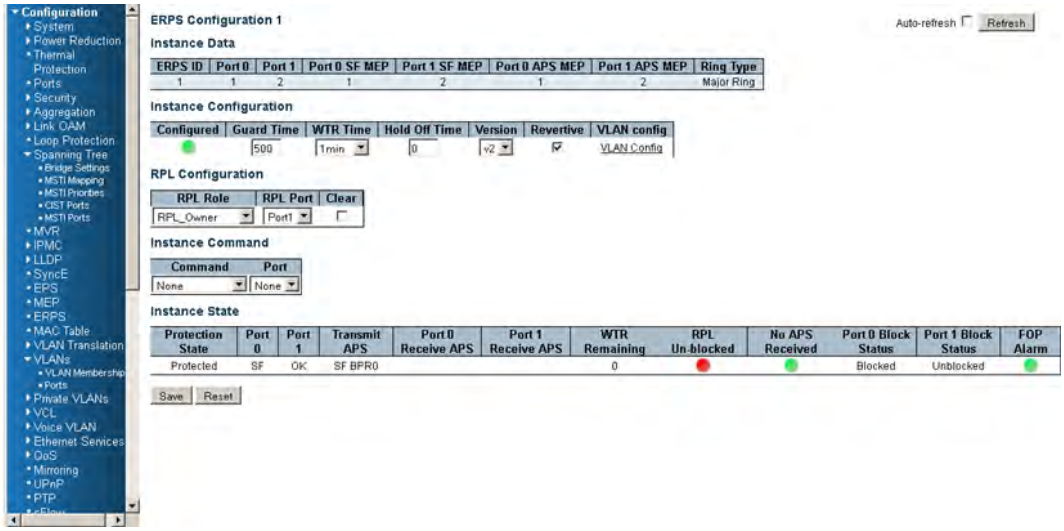
7. On Switch 1, click **ERPS** to check ERPS status to ensure the normal link status.

Figure 29 • Switch 1 ERPS Status



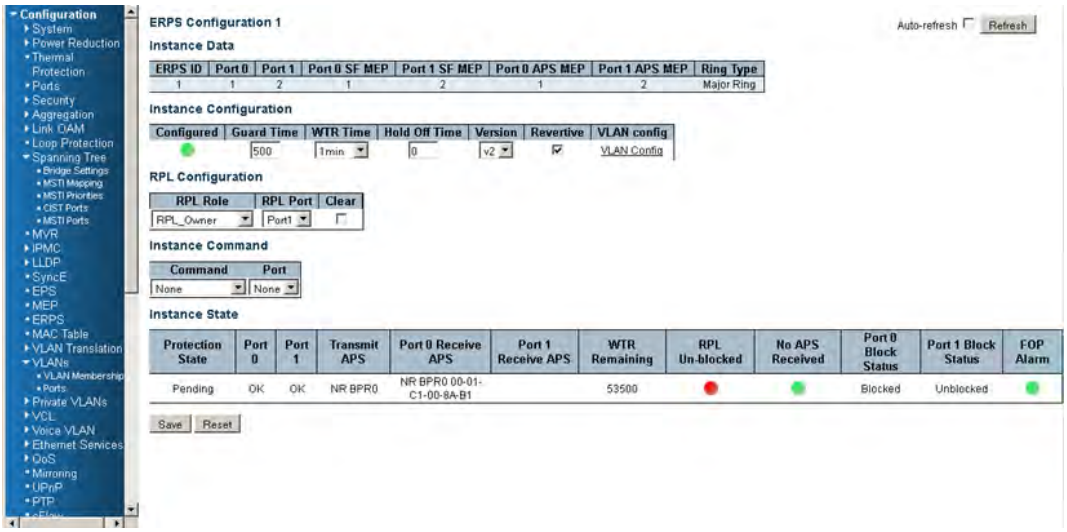
8. Disconnect the normal link for switch 1 and switch 3.

Figure 30 • Disconnect Normal Link



9. Restore the normal link for switch 1 and switch 3 to display the protection state as **Pending**.

Figure 31 • Restore Normal Link



10. After WTR timeout, Click **Refresh**. **Protection State** should be shown as **Idle**.

Figure 32 • Refresh ERPS Status