Troubleshooting Cisco Catalyst 5500 Multiswitch Routers Signaling

Two Cisco Catalyst 5500 Multiswitch Routers (MSRs) are used in fault-tolerant Cisco telephony solutions. Both MSRs are active. Virtual local area networks (VLANs) are set up within these MSRs. The MSR VLANs are used by system components to route message traffic to other system components. The Catalyst 5500 is equipped with an interswitch link (ISL), which connects the active MSR to the standby MSR.

Normally, al least two Cisco Signaling Link Terminals (SLTs) are connected to each MSR for redundancy. SS7 call messages travel from the Cisco SLTs through the MSR VLANs and on to the Cisco Media Gateway Controllers (MGCs). MSR VLANs can also be used to link the Cisco MGCs to the Media Gateways (MGWs).

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MSR VLANs

VLANs are configured within each MS, and help to simplify MSR management. All intrasystem-MSR Ethernet message traffic is partitioned and routed over VLANs according to component origination and destination. Route Switch Modules (RSM) within the MSRs control the routing of inter-VLAN message traffic. The active MSR VLAN configuration is exactly the same as that of the standby MSR VLANs.

For example, VLANs within the active MSR can provide paths to ports of the following components:

- VLAN 1 (black) provides a path to ports on modules one and two of the Supervisor Engine.
- VLAN 2 (green) provides a path to a port on each of the four Cisco SLTs and the two Cisco MGCs.
- VLAN 3 (blue) provides a path to ports on the Cisco Media Gateways (MGWs).
- VLAN 4 (red) provides a path to ports on each of the two Cisco MGCs.

Command Line Interface

Access to the Command Line Interface (CLI) can be gained either locally through a console terminal connected to an EIA/TIA-232 port or remotely through a Telnet session. Telnet session access requires a previously set IP address for the switch. Telnet sessions are automatically disconnected after remaining idle for a configurable time period.

There are two modes of operation—normal and privileged—both password protected. Normal-mode commands are used for everyday system monitoring. Privileged commands are used for system configuration and basic troubleshooting.

After you log in successfully, the system automatically enters normal mode, which gives you access to normal-mode commands only. You can enter privileged mode by entering the enable command followed by a second password. Privileged mode is indicated by the appearance of the word "enable" immediately after the system prompt. To return to normal mode, enter the disable command at the prompt.

Commands entered from the CLI can apply to the entire system or to a specific module, port, or virtual local area network (VLAN). Catalyst 5500 modules (module slots), ports, and VLANs are numbered starting with 1. The supervisor module is module 1, residing in the top slot. If you are using a Catalyst 5500 with a redundant supervisor engine, the supervisor modules reside in slots 1 and 2. On each module, port 1 is the leftmost port.

To reference a specific port on a specific module, the command syntax is mod_num/port_num. For example, 3/1 denotes module 3, port 1. In some commands, such as set trunk, set cam, and set VLAN commands, you can enter lists of ports and VLANs. Designate ports by entering the module and port number pairs, separated by commas. To specify a range of ports, use a dash (-) between the module number and port number pairs. Dashes take precedence over commas.

The following examples show several ways of designating ports:

Example 1: `2/1,2/3 denotes module 2, port 1 and module 2, port 3`
Example 2: `2/1-12 denotes module 2, ports 1 through 12`
Example 3: `2/1-2/12 is the same as Example 2`

Each VLAN is designated by a single number. You specify lists of VLANs in the same way that you do for ports. Individual VLANs are separated by commas (,); ranges are separated by dashes (-). In the following example, VLAN numbers 1 through 10 and VLAN 1000 are specified:

```
1-10,1000
```

Some commands require a Media Access Control (MAC) address, IP address, or IP alias, which must be designated in a standard format. The MAC address format must be six hexadecimal numbers separated by hyphens, as shown in this example:

```
00-00-0c-24-d2-fe
```

The IP address format is 32 bits, written as four octets separated by periods (dotted decimal format) that are made up of a network section, an optional subnet section, and a host section, as shown in this example:

```
126.2.54.1
```

If the IP alias table is configured, you can use IP aliases in place of the dotted decimal IP address. This is true for most commands that use an IP address, except commands that define the IP address or IP alias. For more information about the set interface and set IP alias commands, refer to the *Catalyst 5000 Series Command Reference*.

Command Line Interface Local Access

To obtain local access to the CLI, complete the following steps:

Step 1 At the Console> prompt, press **Return** (or **Enter**).

Step 2 At the Enter Password: prompt, enter the system password. The Console> prompt appears indicating that you have successfully accessed the CLI in normal operation mode.

Step 3 Enter the necessary commands to complete the required task.

Step 4 Enter **quit** and press **Return** (or **Enter**) to exit the session.

Command Line Interface Remote Access

To obtain remote access to the CLI, complete the following steps:

Step 1 From the remote host, enter the Telnet command and designate the name or IP address of the switch you wish to access (Telnet hostname | IP address).

Step 2 At the Enter Password: prompt, enter the password for the CLI. There is no default password (just press **Return** or **Enter**) unless a password was previously established using the set password command.

Step 3 Enter the necessary commands to complete the required task.

Step 4 Enter quit and press **Return** (or **Enter**) to exit the Telnet session.

Troubleshooting MSR Virtual Pathways and ISLs

Use of a recommended protocol analyzer (locally or remotely) equipped with a recommended Packet Internet Groper (PING) utility program to perform Ethernet echo response tests should identify MSR hardware, VLAN, and ISL connectivity problems. Echo is used to detect if another host is active on the network. The sender initializes the identifier and sequence number (which is used if multiple echo requests are sent), adds some data to the data field, and sends the ICMP echo to the destination host. The ICMP header code field is zero. The recipient changes the type to Echo Reply and returns the datagram to the sender. This mechanism is used to determine if a destination host is reachable.

To use the PING command, complete the following steps:

Step 1 Log in to the CLI and enter the command:

```
Console> show port status
```

A response, similar to the following, is displayed:

```
Port  Name               Status     Vlan       Level  Duplex Speed Type
----- ------------------ ---------- ---------- ------ ------ ----- ------------
 1/1                     connected  523        normal   half   100 100BaseTX
 1/2                     notconnect 1          normal   half   100 100BaseTX
 2/1                     connected  trunk      normal   half   400 Route Switch
 3/1                     notconnect trunk      normal   full   155 OC3 MMF ATM
 5/1                     notconnect 1          normal   half   100 FDDI
 5/2                     notconnect 1          normal   half   100 FDDI
```

Step 2 Enter the CLI command **Show VLAN**.

```
Console> (enable) show vlan 998
```

A response, similar to the following, is displayed:

```
VLAN Name                             Status    IfIndex Mod/Ports, Vlans
---- -------------------------------- --------- ------- ------------------------

998  VLAN0998                         active    357


VLAN Type  SAID       MTU   Parent RingNo BrdgNo Stp  BrdgMode Trans1 Trans2
---- ----- ---------- ----- ------ ------ ------ ---- -------- ------ ------
998  trcrf 100998     4472  999    0xff   -      -    srb      0      0


VLAN AREHops STEHops Backup CRF
---- ------- ------- ----------
998  10      10      off
```

Step 3 Enter (for ISLs) the command **Show Trunk**.

```
Console> (enable) show trunk
```

A response, similar to the following, is displayed:

```
Port      Mode         Encapsulation  Status        Native vlan
--------  -----------  -------------  ------------  -----------
 2/1      desirable    dot1q          trunking      1
 2/2      desirable    dot1q          trunking      1

Port      Vlans allowed on trunk
--------  ----------------------------------------------------
 2/1      1-1005
 2/2      1-1005

Port      Vlans allowed and active in management domain
--------  ----------------------------------------------------
 2/1      1,10,20,30,40,50,60
 2/2      1,10,20,30,40,50,60

Port      Vlans in spanning tree forwarding state and not pruned
--------  ----------------------------------------------------
 2/1      1,10,20,30,40,50,60
 2/2      1,10,20,30,40,50,60
```

Step 4 Use a PING utility program to echo response test the desired ports, VLANs, and ISLs.

Step 5 Go to Chapter 7, "Maintaining the Cisco Catalyst 5500 Multiswitch Router," and check the MSR equipment status. Replace suspected hardware, then return to Step 1 to verify MSR operation.