Managing System Hardware

This chapter provides details on monitoring the health of the switch. It includes the following sections:

Displaying Switch Hardware Inventory

Use the **show hardware** command to display switch hardware inventory details. See Example 7-1.

Example 7-1 Displays the Hardware Information

```
switch# show hardware
Cisco Storage Area Networking Operating System Software
SAN-OS Version 1.0(2a) Interim 1.0(0.271)
TAC Support: http://www.cisco.com/tac
Copyright (c) 1986-2002 by cisco Systems, Inc.
Compiled 11/10/2002 10:00:00

BIOS:   v0.0.0(10/10/02)
Kickstart: 1.0(2a)
System image file is

172.22.91.115 uptime is 0 day(s) 22 hour(s) 38 minute(s) 4 second(s)
Last reset at 837757 usecs after Thu Jan 17 23:28:42 1980
    Reason: Reset Requested by CLI command reload
    Service:
    Version: 1.0(2a)

This supervisor carries Pentium processor with 1930140 kB of memory
Intel(R) Pentium(R) III CPU at family with 512 KB L2 Cache
Rev: Family  6, Model  11 stepping  1

512K bytes of non-volatile memory.
1000944 blocks of internal bootflash (block size 512b)

-------------------------------
Chassis has 9 slots for Modules
-------------------------------

Module in slot 1 is empty

Module in slot 2 is ok
  Module type is "1/2 Gbps FC Module"
  3 submodules are present
  RAM size is 0 (kb)
  Model number is DS-X9032
  H/W version is 0.3
  Part Number is 73-8153-03
  Part Revision is 01
  Manufacture Date is Year 0 Week 0
  Serial number is jab06280ae0
  CLEI code is 0

Module in slot 3 is empty

Module in slot 4 is empty

Module in slot 5 is empty

Module in slot 6 is ok
  Module type is "Supervisor/Fabric-1"
  No submodules are present
  Model number is DS-X9530-SF1-K9
  H/W version is 0.0
  Part Number is 73-7523-06
  Part Revision is
  Manufacture Date is Year 0 Week 0
```

```
  Serial number is
  CLEI code is

Module in slot 7 is empty

Module in slot 8 is empty

Module in slot 9 is empty

---------------------------------------
Chassis has 2 Slots for Power Supplies
---------------------------------------

PS in slot A is ok
  Power supply type is "1153.32W 110v AC"
  Model number is DS-CAC-2500W
  H/W version is 1.0
  Part Number is 341-0061-01
  Part Revision is A0
  Manufacture Date is Year 0 Week 0
  Serial number is ART0620008H
  CLEI code is

PS in slot B is empty

----------------------------------
Chassis has one slot for Fan Module
----------------------------------

  Fan module is ok
  Model number is WS-9SLOT-FAN
  H/W version is 0.0
  Part Number is 800-22342-01
  Part Revision is
  Manufacture Date is Year 0 Week 0
  Serial number is
  CLEI code is
```

Note To display and configure modules, see Chapter 6, “Managing Modules.”

Displaying Power Usage Information

Use the **show environment power** command to display the actual power usage information for the entire switch. In response to this command power supply capacity and consumption information is displayed for each module. See Example 7-2.

Note In a Cisco MDS 9500 Series switch, power usage is reserved for both supervisors regardless of whether or not only one supervisor is present.

Example 7-2 Displays Power Management Information

```
switch# show environment power

-----------------------------------------------------
PS  Model                Power     Power       Status
                         (Watts)   (Amp @42V)
-----------------------------------------------------
1   DS-CAC-2500W         1153.32   27.46       ok
2   WS-CAC-2500W         1153.32   27.46       ok


Mod Model                Power     Power       Power     Power       Status
                         Requested Requested   Allocated Allocated
                         (Watts)   (Amp @42V)  (Watts)   (Amp @42V)
--- -------------------  -------   ----------  --------- ----------  ----------
1    DS-X9032            199.92    4.76        199.92    4.76        powered-up
4    DS-X9032            199.92    4.76        199.92    4.76        powered-up
5    DS-X9530-SF1-K9     126.00    3.00        126.00    3.00        powered-up
6    DS-X9530-SF1-K9     126.00    3.00        126.00    3.00        powered-up
9    DS-X9016            220.08    5.24        220.08    5.24        powered-up


Power Usage Summary:
--------------------
Power Supply redundancy mode:                   redundant

Total Power Capacity                            1153.32  W

Power reserved for Supervisor(s)[-]          252.00  W
Power reserved for Fan Module(s) [-]         0.00    W
Power currently used by Modules[-]           619.92  W

                                                -------
Total Power Available                           281.40   W
                                                -------
```

Configuring Power Supplies

Switches in the MDS 9000 Family have two redundant power supply slots. The power supplies can be configured in either **redundant** or **combined** mode.

- **redundant—**Uses the capacity of one power supply only. This is the default mode. In case of power supply failure, the entire switch has sufficient power available in the system.
- **combined—**Uses the combined capacity of both power supplies. In case of power supply failure, the entire switch can be shut down (depends on the power used) causing traffic disruption. This mode is seldom used, except in cases where the switch has two low power supply capacities but a higher power usage.

Note The chassis in the Cisco MDS 9000 Family uses 1200Watts when powered at 110 volts, and 2500Watts when powered at 220 volts.

To configure the power supply mode, follow these steps:

	Command	Purpose
Step 1	`switch# config t`	Enters configuration mode.
Step 2	`switch(config)# power redundancy-mode combined` `switch(config)#`	Configures combined power supply mode.
	`switch(config)# power redundancy-mode redundant` `switch(config)#`	Reverts to the redundant (default) power supply mode.

Power Supply Guidelines

Note Use the **show environment power** command to determine currently configured power supplies.

Be sure to follow these guidelines when configuring power supplies:

1. When power supplies with different capacities are installed in the switch, the total power available differs based on the configured mode:

- In **redundant** mode, the total power is the lesser of the two power supply capacities.
  For example, if you have the following usage figures configured:

  Power supply 1 = 2500Watts
  Additional Power supply 2 = not used
  Current usage = 2000Watts
  Current capacity = 2500Watts

  Then the following three scenarios differ as specified (see Table 7-1):

  a. **Scenario 1:** If 1800Watts is added to power supply 2, then power supply 2 is shut down.
     Reason: 1800Watts is less than the usage of 2000Watts.

  b. **Scenario 2:** If 2200Watts is added to power supply 2, then the current capacity increases to 2200Watts.
     Reason: 2200Watts is the lesser of the two power supplies.

c. **Scenario 3:** If 3000Watts is added to power supply 2, then the current capacity value remains at 2500Watts.
Reason: 2500Watts is the lesser of the two power supplies.

Table 7-1 Redundant Mode Power Supply Scenarios

Scenario	Power Supply 1 (W)[1]	Current Usage (W)	Insertion of Power Supply 2 (W)	New Capacity (W)	Action Taken by Switch
1	2500	2000	1800	2500	Power supply 2 is shut down.
2	2500	2000	2200	2200	Capacity becomes 2200Watts.
3	2500	2000	3300	2500	Capacity remains the same.

1. W = Watts

- In **combined** mode, the total power is twice the lesser of the two power supply capacities.

  For example, if you have the following usage figures configured:

  Power supply 1 = 2500Watts
  Additional Power supply 2 = not used
  Current Usage = 2000Watts
  Current capacity = 2500Watts

  Then, the following three scenarios differ as specified (see Table 7-2):

  a. **Scenario 1:** If 1800Watts is added to power supply 2, then the capacity increases to 3600Watts.
  Reason: 3600Watts is twice the minimum (1800Watts).

  b. **Scenario 2:** If 2200Watts is added to power supply 2, then the current capacity increases to 4400Watts.
  Reason:4400Watts is twice the minimum (2200Watts).

  c. **Scenario 3:** If 3000Watts is added to power supply 2, then the current capacity increases to 5000Watts.
  Reason: 5000Watts is twice the minimum (2500Watts).

Table 7-2 Combined Mode Power Supply Scenarios

Scenario	Power Supply 1 (W)[1]	Current Usage (W)	Insertion of Power Supply 2 (W)	New Capacity (W)	Action Taken by Switch
1	2500	2000	1800	3600	Power is never shut down. The new capacity is changed.
2	2500	2000	2200	4400	
3	2500	2000	3300	5000	

1. W = Watts

2. When you change the configuration from **combined** to **redundant** mode and the system detects a power supply that has a capacity lower than the current usage, the power supply is shut down. If both power supplies have a lower capacity than the current system usage, the configuration is not allowed. Various configuration scenarios are displayed and summarized in Table 7-3.

   a. **Scenario 1:** You have the following usage figures configured:

      Power supply 1 = 2500Watts
      Additional Power supply 2 = 1800Watts
      Current Usage = 2000Watts
      Current mode = **combined** mode (so current capacity is 3600Watts)

      You decide to change the switch to **redundant** mode. Then power supply 2 is shut down.

      Reason: 1800Watts is the lesser of the two power supplies and it is less than the system usage.

   b. **Scenario 2:** You have the following usage figures configured:

      Power supply 1 = 2500Watts
      Additional Power supply 2 = 2200Watts
      Current Usage = 2000Watts
      Current mode = **combined** mode (so current capacity is 4400Watts).

      You decide to change the switch to **redundant** mode. Then the current capacity decreases to 2200Watts.

      Reason: 2200Watts is the lesser of the two power supplies.

   c. **Scenario 3:** You have the following usage figures configured:

      Power supply 1 = 2500Watts
      Additional Power supply 2 = 1800Watts
      Current Usage = 3000Watts
      Current mode = **combined** mode (so current capacity is 3600Watts).

      You decide to change the switch to **redundant** mode. Then the current capacity decreases to 2500Watts and the configuration is rejected.

      Reason: 2500Watts is less than the system usage (3000Watts).

Table 7-3 Combined Mode Power Supply Scenarios

Scenario	Power Supply 1 (W)[1]	Current Mode	Current Usage (W)	Power Supply 2 (W)	New Mode	New Capacity (W)	Action Taken by Switch
1	2500	**combined**	2000	1800	**N/A**	3600	Existing configuration.
	2500	**N/A**	2000	1800	**redundant**	2500	Power supply 2 is shut down
2	2500	**combined**	2000	2200	**N/A**	4400	Existing configuration.
	2500	**N/A**	2000	2200	**redundant**	2200	The new capacity is changed.
3	2500	**combined**	3000	1800	**N/A**	3600	Existing configuration.
	2500	**N/A**	3000	1800	**redundant**	N/A	Rejected, so the mode reverts to **combined** mode.

1. W = Watts

Displaying Module Temperature

Use the **show environment temperature** command to display temperature sensors for each module. Example 7-3.

Each module (switching and supervisor) has four sensors: 1 (outlet sensor), 2 (intake sensor), 3 (onboard sensor), and 4 (onboard sensor). Each sensor has two thresholds (in Celsius): minor and major.

Note A threshold value of -127 indicates that no thresholds are configured or applicable.

- minor threshold—When a minor threshold is exceeded, a minor alarm occurs and the following action is taken for all four sensors:
  - Syslog messages are displayed
  - Call Home alerts are sent (if configured)
  - SNMP notifications are sent (if configured)
- major threshold—When a major threshold is exceeded, a major alarm occurs and the following action is taken as follows:
  - For sensors 1, 3, and 4 (outlet and onboard sensors):

    Syslog messages are displayed

    Call Home alerts are sent (if configured)

    SNMP notifications are sent (if configured)
  - For sensor 2 (intake sensor):

    If the threshold is exceeded in a switching module, the module is shut down

    If the threshold is exceeded in a supervisor module with HA-standby or standby present, the supervisor module is shut down

    If the standby supervisor is not present, the entire switch is shut down.

Note Switch shut down only happens after a two -minute interval. During this interval the software monitors the temperature every five (5) seconds and continuously sends syslog messages as configured. If the required action is not taken (for example, a new fan module inserted to decrease temperature) and if the temperature does not come down, the system is shut down at the end of two minutes.

Example 7-3 Displays Temperature Information

```
switch# show environment temperature
-----------------------------------------------------------------
Module   Sensor   MajorThresh   MinorThres   CurTemp     Status
                  (Celsius)     (Celsius)    (Celsius)
-----------------------------------------------------------------
1        1        75            60           42          ok
1        2        65            50           28          ok
1        3        -127          -127         58          ok
1        4        -127          -127         46          ok

4        1        75            60           35          ok
4        2        65            50           27          ok
4        3        -127          -127         52          ok
4        4        -127          -127         35          ok
```

Monitoring Fan Modules

Use the **show environment fan** command to display the fan status for each fan module. See Example 7-4.

Example 7-4 Displays Chassis Fan Information

```
switch# show environment fan
-----------------------------------------------------
FAN             Model                Hw         Status
-----------------------------------------------------
Chassis         WS-9SLOT-FAN         0.0        ok
PS-1            --                   --         ok
PS-2            --                   --         ok
```

The fan status is continuously monitored. In case of a fan module failure, the following action is taken:

- Syslog messages are displayed.
- Call Home alerts are sent (if configured).
- SNMP notifications are sent (if configured).

Caution A fan failure could lead to temperature alarms if not corrected immediately.

Monitoring Clock Modules

Use the **show environment clock** command to display the clock status for the chassis. See Example 7-5.

Example 7-5 Displays Chassis Clock Information

```
switch# show environment clock
-------------------------------------------------------
Clock           Model             Hw         Status
-------------------------------------------------------
A               Clock Module      1.0        ok/active
B              Clock Module       1.0        ok/standby
```

Each switch has two clock modules: Clock A (default) and Clock B.

If Clock A fails, the entire switch is reset (shut down and restarted). When the switch is restarted, Clock B automatically takes over.

Clock modules cannot be configured. If Clock A is available during any reboot, the switch uses Clock A, otherwise it uses Clock B.

If both modules fail, the switch shuts down.

Displaying Environment Information

Use the **show environment** command to display all environment-related switch information.

Example 7-6 Displays All Environment Information

```
switch# show environment
Clock:
-------------------------------------------------------
Clock           Model                Hw         Status
-------------------------------------------------------
A               Clock Module         1.0        ok/active
B               Clock Module         1.0        ok/standby

Fan:
-----------------------------------------------------
FAN             Model                Hw         Status
-----------------------------------------------------
Chassis         DS-2SLOT-FAN         0.0        ok
PS-1            --                   --         ok
PS-2            --                   --         absent

Temperature:
----------------------------------------------------------------
Module   Sensor   MajorThresh   MinorThres   CurTemp     Status
                  (Celsius)     (Celsius)    (Celsius)
----------------------------------------------------------------
1        1        75            60           32          ok
1        2        65            50           32          ok
1        3        -127          -127         43          ok
1        4        -127          -127         39          ok

Power Supply:
-----------------------------------------------------
PS  Model                Power     Power       Status
                         (Watts)   (Amp @42V)
-----------------------------------------------------
1   PWR-950-AC           919.38    21.89       ok
2                        --        --          absent

Mod Model                Power     Power       Power     Power       Status
                         Requested Requested   Allocated Allocated
                         (Watts)   (Amp @42V)  (Watts)   (Amp @42V)
--- -------------------  -------   ----------  --------- ----------  ----------
1    DS-X9216-K9-SUP     220.08    5.24        220.08    5.24        powered-up

Power Usage Summary:
--------------------
Power Supply redundancy mode:                   redundant

Total Power Capacity                            919.38   W

Power reserved for Supervisor(s)[-]             220.08   W
Power reserved for Fan Module(s)[-]             0.00     W
Power currently used by Modules[-]              0.00     W

                                                -------
Total Power Available                           699.30   W
                                                -------
```