M2 SATA Module

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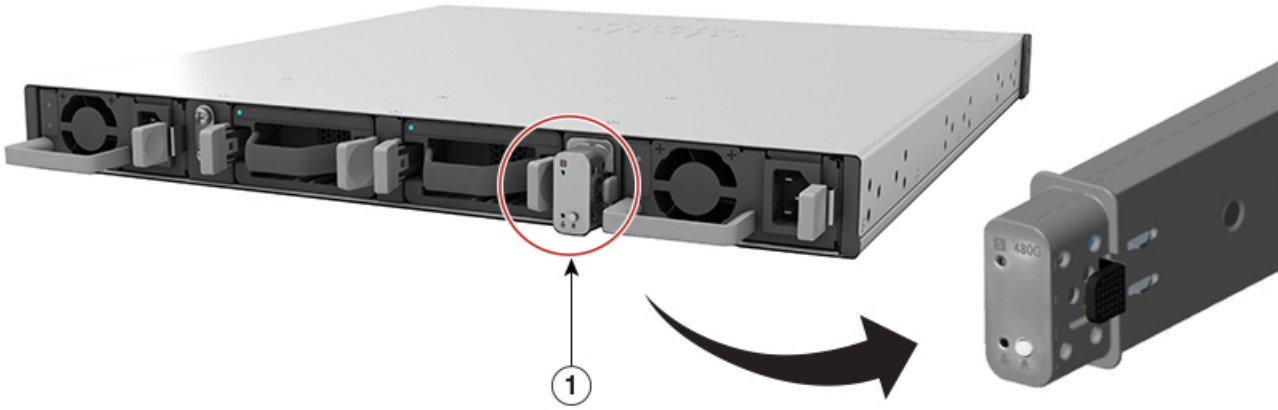
M2 SATA Module on Cisco Catalyst 9500 Series High Performance Switches

To support the storage needs on the switch, the Cisco Catalyst 9500 Series High Performance Switches support pluggable Serial Advanced Technology Attachment (SATA) Solid State Drive (SSD) module. The SATA SSD module slot is located on the rear panel of the switch.

The SATA module is a Field Replaceable Unit (FRU). A hot-swap button on the rear panel of the switch initiates the removal of the SATA module. For more information on inserting and removing the SSD SATA module, refer the *Cisco Catalyst 9500 Series Switch Installation Guide*.

The SSD module storage capacity ranges are 240GB, 480GB and 960GB. SATA SSD mainly provides storage for application hosting. Applications can be hosted on Kernel Virtual Machines (KVM), Linux containers or Docket Containers. SATA SSD module can also be used to store software generated packet captures and trace logs.

Figure 1: SATA Module on the Rear Panel



File System and Storage on M2 SATA

The default file system format of SATA is EXT4. However, SATA supports all extended file systems-EXT2, EXT3 and EXT4.

The SATA device has the following characteristics:

- Files stored on the M2 SATA partition are compatible with files stored on other devices.
- You can copy, or, store files between M2 SATA and other types of devices such as USB, eUSB, flash, and other IOS-XE file-system or storage.
- You can also read, write, delete, and format the SATA device.

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You can check the type of current file system using the **show disk0: filesys** command:

```
Switch#show disk0: filesys
Filesystem: disk0
Filesystem Path: /vol/disk0
Filesystem Type: ext3
Mounted: Read/Write
```

Limitations of M2 SATA

- Non-EXT based file systems are not supported on M2 SATA.
- You cannot use M2 SATA to boot images from rommon.
- You cannot upgrade the firmware on the M2 SATA drive.
- M2 SATA is supported only on C9500-24Y-4C, C9500-48Y-4C, C9500-32QC, and C9500-32C models of the Cisco Catalyst 9500 Series Switches.

Self-Monitoring, Analysis and Reporting Technology System (S.M.A.R.T.) Health Monitoring

Cisco Catalyst IOS XE Release 16.9.1 gives you the ability to monitor the health of the device through CLIs. You can monitor internal hot-spots, flash wear-outs, and hardware failure of the SATA device and alert your users about a SATA failure. These users can then backup data and obtain a new SATA device.

A linux deamon smartd starts when the SATA is inserted into the Switch. By default, the polling interval is set to 2 days for offline test, 6 days for short test and 14 days for long test. The warnings and error messages are saved in /crashinfo/tracelogs/smart_errors.log and are also sent to the IOSd console.

The S.M.A.R.T. feature and smartd daemon are enabled by default when the SATA device is detected by the switch.

Note If the SATA is not detected after insertion, check the existing file system on the device. If it is not EXT based, SATA will not be detected. In that case, change the filesystem to EXT and reinsert the SATA.

The following CLI shows the logs from the smartd daemon:

```
Switch# more crashinfo:tracelogs/smart_errors.log
%IOSXEBOOT-4-SMART_LOG: (local/local): Mon Jan 4 00:13:10 Universal 2016
INFO: Starting SMART deamon
```

You can monitor the overall health of the device through the following CLI:

```
Switch# more flash:smart_overall_health.log
smartctl 6.4 2015-06-04 r4109 [x86_64-linux-4.4.131] (local build)
Copyright (C) 2002-15, Bruce Allen, Christian Franke, www.smartmontools.org

=== START OF READ SMART DATA SECTION ===
SMART overall-health self-assessment test result: PASSED
```

Accessing File System on M2 SATA

The mounted file system from the SATA flash card is accessed at disk0:. Use the **show file systems** command to view the details of each type of available filesystem.

Copying files to and from bootflash: or usbflash0: is supported.

Formatting the M2 SATA Flash Disk

To format a new Flash Disk, use the **format disk0:** command.

The format command recursively deletes all files on the device. This command fails if any file is open during its execution.

```
Switch#format disk0: ? <cr> <cr>
       ext2    ext2 filesystem type
       ext3    ext3 filesystem type
       ext4    ext4 filesystem type
```

```
      secure  Securely format the file system
<cr> <cr>

Switch# format disk0:
Format operation may take a while. Continue? [confirm]
Format operation will destroy all data in "disk0:". Continue? [confirm] Format of disk0:
complete
```

Operations on the SATA Module

The following are some of the operations that you can perform on the SATA:

Command	Description
dir *filesystem*	Displays the directories on the specified file system.
copy *source-file destination-url*	Copies files from specified source to a specified destination.
delete	Deletes a specified file
format	Formats the filesystem on the disk.
show disk0:	Displays the content and details of disk0:
show file information *file-url*	Displays information about a specific file.
show file systems	Displays the available file system on your device.
show inventory	Displays the details of the existing modules on the switch.

Following are sample outputs of the operations:

```
Switch# dir disk0:
Directory of disk0:/
        11  drwx            16384  May 11 2018 16:06:14 +00:00  lost+found
        10747905  drwx             4096  May 25 2018 13:03:43 +00:00  test
        236154740736 bytes total (224072925184 bytes free)
```

Copy a file from the disk0: to USB

```
Switch# copy disk0:test.txt usbflash0:
Destination filename [test.txt]?
Copy in progress...C
17866 bytes copied in 0.096 secs (186104 bytes/sec)
```

```
Switch# dir usbflash0:
Directory of usbflash0:/
   12  -rw-         33554432  Jul 28 2017 10:12:58 +00:00  nvram_config
   11  drwx            16384  Jul 28 2017 10:09:46 +00:00  lost+found
   13  -rw-            17866  Aug 11 2017 09:52:16 +00:00  test.txt
189628416 bytes total (145387520 bytes free)
```

Delete the file test.txt from disk0:

```
Switch# delete disk0:test.txt
Delete filename [test.txt]?
Delete disk0:/test.txt? [confirm]
```

```
Switch# dir disk0:
Directory of disk0:/
No files in directory
118148280320 bytes total (112084135936 bytes free)
```

Copy file test.txt from USB to disk0:

```
Switch# copy usbflash0:test.txt disk0:
Destination filename [test.txt]?
Copy in progress...C
17866 bytes copied in 0.058 secs (308034 bytes/sec)

Switch# dir disk0:
Directory of disk0:/
   11  -rw-           17866  Aug 11 2017 09:53:03 +00:00  test.txt
118148280320 bytes total (112084115456 bytes free)
```

Format the disk

To format the ext4 filesystem, use the following command:

```
Switch#format disk0:ext4
```

Show commands

```
Switch# show disk0:
-#- --length-- ---------date/time---------- path
  2      17866 Aug 11 2017 09:54:06.0000000000 +00:00 test.txt
112084115456 bytes available (62513152 bytes used)

Switch# show file information disk0:test.txt
disk0:test.txt:
  type is image (elf64) []
  file size is 448 bytes, run size is 448 bytes
Foreign image, entry point 0x400610

Switch# show file systems
File Systems:

              Size(b)       Free(b)      Type  Flags  Prefixes
-
             -
*  11250098176    9694093312      disk     rw   bootflash: flash:
    1651314688    1232220160      disk     rw   crashinfo:
  118148280320  112084115456      disk     rw   disk0:
     189628416     145387520      disk     rw   usbflash0:
    7763918848    7696850944      disk     ro   webui:
             -             -    opaque     rw   null:
             -             -    opaque     ro   tar:
             -             -   network     rw   tftp:
      33554432      33532852     nvram     rw   nvram:
             -             -    opaque     wo   syslog:
             -             -   network     rw   rcp:
             -             -   network     rw   http:
             -             -   network     rw   ftp:
             -             -   network     rw   scp:
             -             -   network     rw   https:
             -             -    opaque     ro   cns:

Switch#show disk0: filesys
    Filesystem: disk0
    Filesystem Path: /vol/disk0
    Filesystem Type: ext4
    Mounted: Read/Write

Switch#show inventory
NAME: "Power Supply Module 1", DESCR: "Cisco Catalyst 9500 Series 650W AC Power Supply"
```

```
PID: C9K-PWR-650WAC-R , VID: V00 , SN: DCI2136201N
NAME: "Fan Tray 0", DESCR: "Cisco Catalyst 9500 Series Fan Tray"
PID: C9K-T1-FANTRAY , VID: , SN:
NAME: "Fan Tray 1", DESCR: "Cisco Catalyst 9500 Series Fan Tray"
PID: C9K-T1-FANTRAY , VID: , SN:
NAME: "Slot 1 Supervisor", DESCR: "Cisco Catalyst 9500 Series Router"
PID: C9500-32QC , VID: V00 , SN: CAT2148L16K
NAME: "SATA disk", DESCR: "disk0 Drive"
PID: C9K-F1-SSD-960G , VID: V00 , SN: CAT2148L0D2
```

Feature History and Information for M2 SATA Module

The following table provides release information about the feature or features described in this module. This table lists only the software release that introduced support for a given feature in a given software release train. Unless noted otherwise, subsequent releases of that software release train also support that feature.

Feature Name	Release	Feature Information
M2 SATA Module	Cisco IOS XE Fuji 16.9.1	The M2 SATA card addresses the storage needs of a device. It a a small form factor card and connector. For more information refer the *Hardware Installion Guide* for the device. Support for this feature was introduced on the C9500-32C, C9500-32QC, C9500-48Y4C, and C9500-24Y4C models of the Cisco Catalyst 9500 Series Switches.