Configuring SD Swap Drive

Overview

An SD card can be used instead of the internal flash memory of a switch to update or restore configuration settings. In addition, the SD card can be used to boot the switch. You can also copy Cisco IOS software and switch configuration settings from a PC or from the switch to the SD card, and then use the SD card to copy this software and settings to other switches.

When an SD card is formatted on the switch, the card is formatted with the Disk Operating System Filing System (DosFs), a platform-independent industry-standard file system that is supported on various Cisco switches and routers.

The switch does not support third-party SD cards or SD High Capacity (SDHC) cards. Attempting to operate the switch with a nonsupported card causes the following message to be displayed:

```
WARNING: Non-IT SD flash detected.
Use of this card during normal operation can impact and
severely degrade performance of the system.
Please use supported SD flash cards only.
```

If the write-protect switch on the SD card is in the lock position, the switch can read data on the card and boot from the card, but updates and files cannot be written to the card.

Inserting and Removing the Flash Memory (SD) Card

To insert an SD card into a switch, make sure that the card is oriented properly, and press it into the SD card slot on the switch until the card is seated. To remove the card, press it to release it, and then pull it out of the slot.

The SD card is hot-swappable, but it should not be removed from the switch during the boot process or while sdflash write is in progress.

When an SD card is inserted, a syslog message similar to the following is logged:

```
Mar 30 01:38:51.965: %FLASH-6-DEVICE_INSERTED: Flash device inserted
```

When an SD card is removed, a syslog message similar to the following is logged:

```
Mar 30 01:39:12.467: %FLASH-1-DEVICE_REMOVED: Flash device removed
```

Boot Loader Operation

The following boot loader commands can be executed on an SD card:

- **boot**—Load and boot an executable Cisco IOS image

- **cat**—Concatenate (type) a file or files

- **copy**—Copy a file

- **delete**—Delete a file of files

- **dir**—List files in directories

- **fsck**—Check file system consistency

- **format**—Format a file system

- **mkdir**—Create directories

- **more**—Concatenate (display) file

- **rename**—Rename a file

- **rmdir**—Delete empty directories

- **sd_init**—Initialize SD flash file systems

The switch can be booted from its internal flash memory or from an SD card. The SD card takes precedence over internal flash memory. If an SD card is installed in the switch, the switch attempts to boot in the following order:

1. From the Cisco IOS image that is specified in the SD card system boot path.

2. From the first Cisco IOS image in the SD card.

3. From the Cisco IOS image that is specified in the internal flash memory system boot path.

4. From the first Cisco IOS image in the internal flash.

Cisco IOS XE Operation

You can insert or remove an SD card while Cisco IOS is running. If you insert a supported Cisco SD card while Cisco IOS is running, the switch validates the Cisco-embedded string in the Product Name (PNM) field and displays the product number and the flash capacity of the SD card. If you remove an SD card while Cisco IOS is running, the switch displays a warning message to alert you that the SD card has been removed.

If syslog is enabled, the system also sends a message when the SD card is inserted or removed.

When an SD card is installed in a switch, the following Cisco IOS commands operate as described:

- **write** command—Saves the running configuration. If the system boots from an SD card and you run a **write** command, the system saves the running configuration to the SD card if the card is still installed. If the SD card has been removed, the system saves the running configuration to the internal flash memory and displays this message:

```
WARNING: The SD flash is not present.
The running-config is saved to the on-board flash.

NOTE: This warning message is displayed only once.
```

  If the system boots from the internal flash memory and you then insert an SD card and run the **write** command, the system saves the running configuration to the internal flash memory.

- **boot** command—Lets you change the system boot parameters.

  If the system boots from an SD card and you run a **boot** command, the following behavior applies:

  - If the SD card is installed and the system boot path or configuration file path points to the SD card, the system boot path or configuration file path is saved to the SD card.

  - If the SD card is installed and the system boot path or configuration file path points to the internal flash memory, the system boot path or configuration file path is saved to the internal flash memory.

  - If the SD card has been removed and the system boot path or configuration file path points to the SD card, the system boot path or configuration file path is not saved and the following message is displayed:

    ```
    WARNING: The BOOT/config file path points to the SD flash card and the SD flash
    card is not present.
    The environment variable(s) is not saved.

    NOTE: This warning message is displayed only once.
    ```

  If the system boots from the internal flash memory and you then insert an SD card and run the **boot** command, the following behaviors occur:

  - If the system boot path or configuration file path points to the internal flash memory, the system boot path or configuration file path is saved to the internal flash memory.

  - If the system boot path or configuration file path points to the SD card, the system boot path or configuration file path is saved to the SD card and the following message is displayed:

    ```
    :WARNING: The BOOT/config file path points to the SD flash card.
    The environment variable(s) is saved onto the SD flash card.

    NOTE: This warning message is displayed only once.
    ```

  - If the SD card has been removed and the system boot path or configuration file path points to the SD card, the system boot path or configuration file path is not saved and the following message is displayed:

    ```
    WARNING: The BOOT/config file path points to the SD flash card and the SD flash
    card is not present.
    The environment variable(s) is not saved.

    NOTE: This warning message is displayed only once.
    ```

- **sync** command—Copies the Cisco IOS image directory (which includes the Cisco IOS image file, FPGA image files, Device Manager files, and Profinet/CIP configuration files), the config.text Cisco IOS configuration file, the vlan.dat VLAN configuration file, and Cisco IOS boot parameters from the internal

flash memory to the SD card or from the SD card to the internal flash memory. This command verifies that the Cisco IOS image is appropriate for the switch model and that enough destination flash memory is present, and aborts the sync process if a potential problem is detected. The **sync** command obtains the source Cisco IOS image directory path and source Cisco IOS configuration file path from the Cisco IOS boot parameters on the source flash device that is specified in the **sync** command. By default, this command overwrites the destination Cisco IOS image directory and Cisco IOS configuration files. The option to save old files can be used to override this default behavior. If the running configuration has not been saved and you run the **sync** command, the switch provides the option for you to save the running configuration before the command is run.

The **sync** command options are:

- Switch# **sync flash: sdflash:**—Synchronizes the Cisco IOS image directory, configuration files, and boot parameters from internal flash memory to the SD card.

- Switch# **sync sdflash: flash:**—Synchronizes the Cisco IOS image directory, configuration files, and boot parameters from the SD card to internal flash memory.

- Switch# **sync flash: sdflash: ios-image-name** —Synchronizes the boot Cisco IOS image from Flash to SDFlash.

- Switch# **sync sdflash: flash: ios-image-name** —Synchronizes the Cisco IOS image from SDFlash to Flash.

- Switch# **sync sdflash: flash: skip [config|env-variable|ios-image]** —Synchronizes either the Cisco IOS configuration, the environment variables, or the Cisco IOS image directory from the SD card to internal flash memory.

Formatting the SD Card to Load Cisco IOx

If you plan to run Cisco IOx applications on the switch, an SD card needs to be formatted in EXT4 format.

If you plan to run both Cisco IOS XE and Cisco IOx applications, use the **partition sdflash** command to create both FAT32 and EXT4 partitions on the SD card:

- The first partition is the FAT32 partition for Cisco IOS XE, and must be a minimum of 1 GB.

- The second partition is the EXT4 partition for Cisco IOx, and must be a minimum of 2.5 GB.

Note When the image is loaded from sdflash, formatting of the SD card is not allowed. You must first copy the image to flash and then boot from flash. After this, you can partition the SD card.

Step 1 To create the Cisco IOx partition, enter the following command:

```
partition sdflash <create iox partition [size (MB or percentage)]>
```

After executing this command, the SD card is split into two partitions.

- If the SD card size is 4 GB or greater and no size is specified:

- Partition 1 (FAT32) is reduced to 34 percent of the total SD card size and mounted to /flash11.

     • Partition 2 (EXT4) is 66 percent of the total SD card size and mounted to /flash12.

   • If SD card size is less than 4 GB:

     • Specify the partition space so that there is at least 1 GB for the Cisco IOS XE partition and a minimum of 2.5 GB for the Cisco IOx partition.

     If the partition space is inadequate, a warning is displayed and the partitioning is not applied.

Caution   When the **partition sdflash** command is used, any data present before upgrading to 17.5.1 is lost.

Step 2   To dedicate the entire SD flash to Cisco IOx or Cisco IOS XE, enter the following command:

```
format sdflash <filesystem format>
```

This command deletes all the existing partitions and replaces them with a single partition of the specified filesystem format:

   • FAT2 — Cisco IOS XE

   • EXT4— Cisco IOx

Note   Standard SD card formatting is FAT32.