

Tru64 UNIX Best Practice

Adding a Single-Spindle SCSI Disk

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Product Version: Tru64 UNIX Version 5.1A or higher

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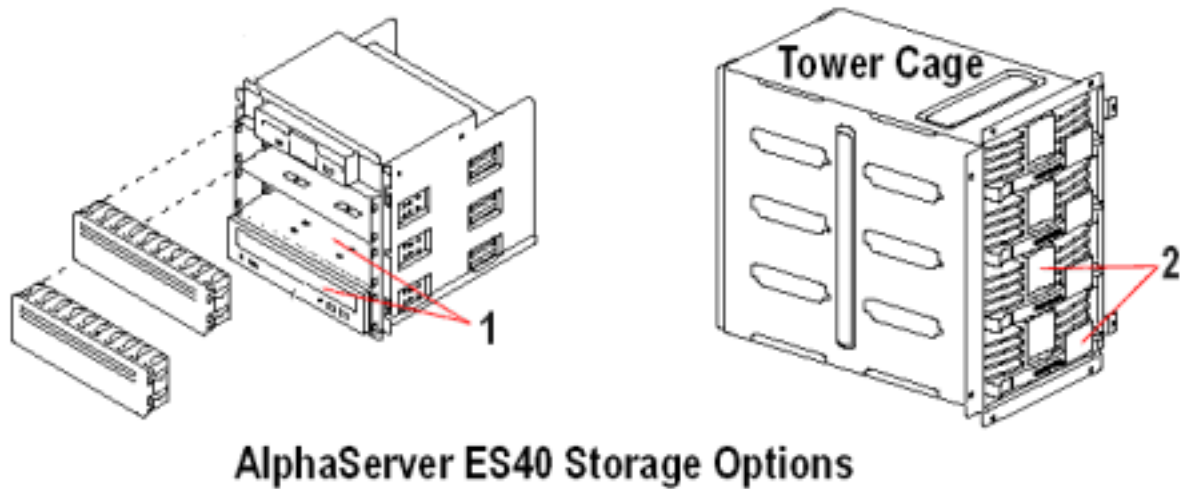
Adding a Single-Spindle SCSI Disk

This Best Practice describes how to add a single-spindle SCSI disk to a system while the operating system is running. Such disks are mounted in a carrier that you insert into a slot in the system box or into bays in an attached expansion enclosure. They might be referred to as hot-pluggable or hot-swappable disks.

This Best Practice does not apply to situations where you must shut down the system to install disk in an internal bay within the CPU cabinet. Such installations involve the removal of power and bus connectors and you cannot do this while the operating system is running. Also, this best practice does not apply to hot-pluggable disks in RAID arrays, such as the HSG and HSZ-series of storage array. You must use RAID array management software to perform such tasks.

Figure 1 represents a typical implementation of hot-swappable devices in an AlphaServer ES40 server. The storage options in the internal bays (1) are usually devices that you cannot hot-swap. You can only hot-swap the disk drives that are located in the tower cage (2).

Figure 1: Hot-Swap (Single-Spinde) Disks in an AlphaServer ES40 Cage



See the Tru64 UNIX Best Practices Web Page for more information about Best Practices documentation.

Is This Best Practice Right for You?

Not all Best Practices apply to all configurations, so you must be sure that it is appropriate for your system and circumstances. To use this Best Practice, you must meet the requirements described in the following table:

Requirement	Description
Operating System	This procedure applies to single systems (not clusters) running Tru64 UNIX Version 5.1A (and higher) operating system software.
A Full and Recent Backup	If you are adding a disk to expand storage capacity, you might need a full backup of all file sets that are on the current disk volume.

Requirement	Description
System Configuration	This procedure applies to all single-system configurations that provide hot-swappable disk slots. You must use a disk that is a supported option for the target system. This procedure is not guaranteed to work for devices that are not listed as a supported option for your processor.
Impact on Availability	Adding or exchanging a disk typically has no immediate impact on system availability. If you are replacing an existing disk that is in use, you must back up, recreate, and eventually restore the file systems on the disk. The duration of these tasks depends on the size of the disk and the speed of the recovery media. Advise users that the file system might be unavailable for an hour or more.
Privileges	You must be superuser (root user) with physical access to the system's storage array.

If your system does not meet these requirements, see *Alternative Practices*.

Before You Begin

Before you apply the Best Practice for adding a single-spindle SCSI disk, you must understand some background information and perform some preliminary tasks.

Device management utilities and device naming conventions in Tru64 UNIX Version 5.0 differ from preceding versions of the operating system. In previous versions, device names were assigned based on the physical location of the drive, according to the SCSI bus address. In Version 5.0 and higher, device names are assigned logically and stored in a database. They have no relationship to the bus address of the device. For a complete description of the device naming changes, see the *System Administration* guide for your version of the operating system.

A device is known to the system and the user by a variety of names, or identifiers. The typical device name for a disk is `disk1`, based on its device

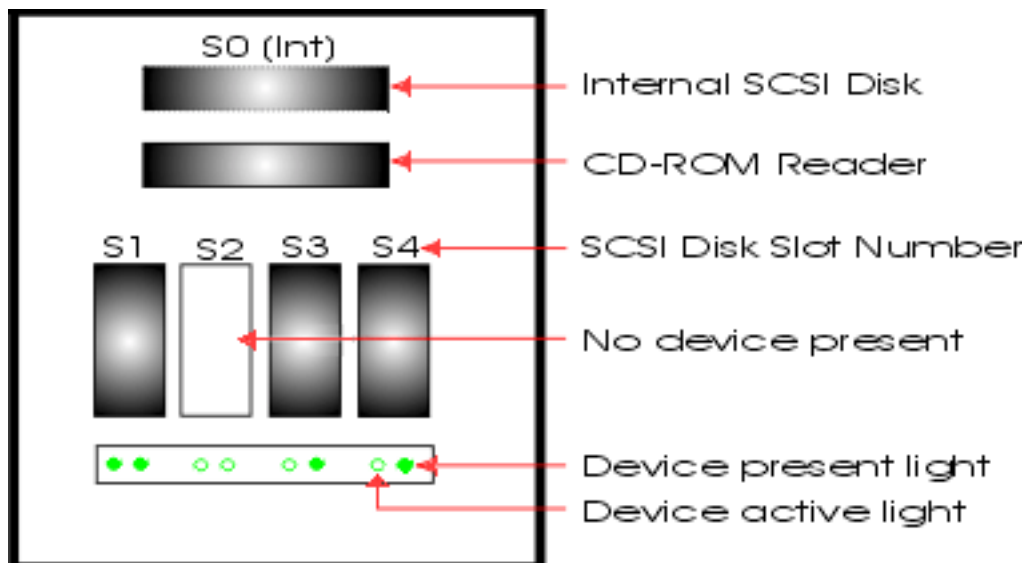
special file name `/dev/disk/dsk1c`. All SCSI devices also have other system wide identification numbers, such as a device identifier (DID or DEVICEID) and a hardware identifier (HWID). The operating system automatically assigns a unique set of identifiers to a SCSI device when you change the hardware configuration.

Physical Disk Layout

The scenario described in this Best Practice is based on an AlphaServer 800-series system, but the principles apply to all systems with integrated storage. Physical disk replacement might differ for your system and you should consult the owner's manual.

In the example described in this Best Practice, the administrator is adding a new disk in the integrated SCSI storage bay slots of an AlphaServer 800 system, which supports disks that you can hot-swap. The new disk is inserted into an empty slot. The slots are numbered S1 through S4. Slot S2 is currently empty. *Figure 2* shows the disk layout.

Figure 2: Physical Disk Layout in an AlphaServer 800 System



Gathering Information and Resources

Depending on how your system is set up, the following items and preparation might be necessary:

- A replacement disk drive that must be a supported option. Consult the online specifications information about supported options at the *Quickspecs* web site.

Note

You must ensure that the disk is a supported model of the correct SCSI mode and is compatible with your SCSI bus adapter. The disk must be installed in a hot-pluggable disk carrier that is compatible with your system storage cage. You cannot interchange SCSI disks unless they are supported for your particular configuration. If in doubt, contact your local Compaq technical support office.

- The procedure instructions are typical for newer processors. If your system is older, you might need to consult its owner's manual.
- A review of the command syntax.

If you are unfamiliar with UNIX command syntax, see `hwmgr(8)` for your version of the operating system for more information on using the `hwmgr` command.

- Start the monitoring utility.

If it is not already configured, start the Event Manager (EVM) viewer and ensure that it is configured to display events of priority 300 and greater:

```
# sysman event_viewer
```

You can use the event viewer to verify hardware events generated by the procedure. You must refresh the event viewer to view current events.

Applying the Best Practice

Before you add a disk, be sure to follow the recommendations in *Before You Begin*. In the following procedure, always proceed to the next step unless you are redirected.

1. Use the `hwmgr` command to display information about all existing SCSI devices:

```
# hwmgr show scsi
      SCSI                DEVICE DEVICE  DRIVER NUM  DEVICE FIRST
HWID: DEVICEID HOSTNAME TYPE    SUBTYPE OWNER  PATH FILE  VALID PATH
```

```

-----
31:  0      cymric  disk  none  2      1      dsk0   [0/0/0]
32:  1      cymric  disk  none  2      1      dsk1   [0/1/0]
36:  5      cymric  disk  none  0      1      dsk4   [0/11/0]
45:  4      cymric  disk  none  0      1      dsk3   [0/3/0]
46:  3      cymric  cdrom none  0      1      cdrom1 [0/4/0]

```

See *Device Identifiers* for an explanation of the data fields.

2. Insert the new disk into the empty slot. The device present light (if available) should glow continuously to indicate that the device is correctly inserted and has power.
3. If you have only a small number (1–16) of SCSI devices on your system, follow this step. Otherwise, go to step *Step 5*. (See *Command Options for scan* for an explanation of the alternate commands.)

Enter the following command to register the new disk and assign system wide identifiers to it:

```
# hwmgr scan scsi
hwmgr: Scan request successfully initiated
```

4. Repeat the following command until you observe that the new device is detected and added to the system:

```
# hwmgr show scsi
```

5. In *Step 6*, you use a component scan instead of a SCSI scan to register the new disk. Enter the following command so that you can detect completion of the scan:

```
# evmwatch -A &
```

See *The evmwatch Command* for an explanation of this command.

6. If you have a large number (16–256) of SCSI devices on your system, follow this step. Otherwise, use the command specified in *Step 4*. (See *Command Options for scan* for an explanation of why you use alternate scan commands.)

Enter the following command to register the new disk and assign system-wide identifiers to it:

```
# hwmgr scan scsi
hwmgr: Scan request successfully initiated
A hardware component has been registered (HWID=N)
```

Wait for the scan to complete by watching for the following EVM event message:

```
A SCSI scan has just completed
```

The preceding message is output by the `evmwatch -A` process that you started in *Step 5*.

7. Enter the following command to display information about the new disk:

```
# hwmgr show scsi
      SCSI
HWID: DEVICEID  HOSTNAME  DEVICE  DEVICE  DRIVER  NUM  DEVICE  FIRST
      :          :          :      :      :      :      :      :
-----
31:    0      cymric   disk   none   2      1      dsk0   [0/0/0]
32:    1      cymric   disk   none   2      1      dsk1   [0/1/0]
36:    5      cymric   disk   none   0      1      dsk4   [0/11/0]
45:    4      cymric   disk   none   0      1      dsk3   [0/3/0]
46:    3      cymric   cdrom  none   0      1      cdrom1 [0/4/0]
48:    2      cymric   disk   none   0      1      dsk9   [0/5/0]
```

Compared to the output in *Step 1*, you can see that the new disk is now listed as device `dsk9`, HWID 48. The SCSI DEVICEID column shows its device identifier as 2.

The procedure is complete. You can now create file systems on the new disk and mount it for general use.

Troubleshooting

Step 7 of the procedure confirms that the disk is correctly added to the system and is available for use. If the procedure fails completely, the disk is either not visible in the output from the `show scsi` command option or some of its data fields are blank.

If you determine that the Best Practice was not successful, use the following table to identify and solve problems:

Problem	Possible Solutions
The disk does not appear in the output from the <code>show scsi</code> command option.	Verify that the disk is supported and is functional. Repeat the procedure, ensuring that the disk is installed correctly.

Problem	Possible Solutions
There is no VALID PATH for the disk.	Use the <code>delete scsi</code> option with the <code>hwmgrr</code> command to remove any record of the device from the database. Repeat the procedure, ensuring that the disk is installed correctly.
	Verify that the SCSI bus is functioning correctly and is accessible. You might need to use commands at the console level, other <code>hwmgrr</code> command options, or utilities such as the <code>scu</code> command.
There is no DEVICE file for the disk.	Use the <code>dsfmgr</code> command to create a device special file.

Alternative Practices

This Best Practice is the recommended method for adding a single-spindle SCSI disk, provided your system meets the requirements described in *Is This Best Practice Right for You?*.

Other methods of adding a disk depend on the requirements for the disk and its physical location. For example, adding an internal fixed disk or a device that you cannot hot-swap requires a system shutdown. Some disks do not support dynamic recognition and must be manually added to the system configuration. See the *System Administration* guide for your version of the operating system for more information.

SCSI tape devices might require additional steps and are documented in a separate best practice that is currently in development. When adding tape devices, see the *System Administration* guide and `dsfmgr(8)` for your version of the operating system.

Supplementary Information

The following supplementary information is not essential to performing the procedure but is placed here so that you can better understand the steps and command options used in the procedure.

Device Identifiers

The output from the `show scsi` command option provides the following information:

- **HWID** – The hardware identifier, an integer assigned to the device by the system at system startup time. When entering `hwmgrr` commands, you identify the hardware identifier by using the `-id` argument.
- **SCSI DEVICEID (device identifier)** – An integer based on the SCSI address of the device. When entering `hwmgrr` commands, you identify this number by using the `-did` argument.
- **FIRST VALID PATH** – The SCSI bus, target, and logical unit number (LUN) that represent a data path to the device. The absence of a valid path indicates a possible I/O problem with the device.

Command Options for scan

The `scan scsi` command option is asynchronous and does not signal when the scan is complete. The only way you can determine when a newly-added device is recognized is to repeat the `show scsi` command until you see the new device. On systems that have a small number of SCSI devices, the device is detected and added quickly.

The `scan component` command posts an EVM event which indicates when the scan is complete. On systems that have a large number of SCSI devices, a scan can take many minutes. It is therefore more economical of your time to use the `evmwatch` command to watch for the scan completion.

The evmwatch Command

You run the `evmwatch -A` command as a background task to watch for the end of the component scan. Alternatively, use the EVM Viewer or open a new terminal window to run the `evmwatch` command so that its output does not interfere with your other command input.

In the suggested format (when using the C shell) this command creates two processes that you can identify as follows:

```
# ps -agx | grep evm
857 pts/1 I + 0:00.02 evmwatch -A
858 pts/1 I + 0:00.02 /usr/bin/evmshow
```

Kill these processes when you have completed the procedure. Otherwise, they continue to display other EVM events to your terminal.

Comments and Questions

We value your comments and questions on the information in this document. Please mail your comments to us at this address:

`best_practices@zk3.dec.com`

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