Disk Management Procedures
After completing this unit, you should be able to:

- Replace a disk under different circumstances
- Recover from a total volume group failure
- Rectify problems caused by incorrect actions that have been taken to change disks
- Export and import volume groups
A disk must be replaced ...

- Disk mirrored?
  - Yes → Procedure 1
  - No → Disk still working?
    - Yes → Procedure 2
    - No → Volume group lost?
      - rootvg → Procedure 4
      - Not rootvg → Procedure 5

- No → Volume group lost?
  - rootvg → Procedure 4
  - Not rootvg → Procedure 5

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Procedure 1: Disk Mirrored

1. Remove all copies from disk:
   # unmirrorvg vg_name hdiskX

4. Remove disk from volume group:
   # reducevg vg_name hdiskX

7. Remove disk from ODM:
   # rmdev -l hdiskX -d

10. Connect new disk to system
    May have to shut down if not hot-pluggable

13. Add new disk to volume group:
    # extendvg vg_name hdiskY

16. Create new copies:
    # mirrorvg vg_name hdiskY
    # syncvg vg_name
Procedure 2: Disk Still Working

1. Connect new disk to system.

3. Add new disk to volume group:
   ```
   # extendvg vg_name hdiskY
   ```

6. Migrate old disk to new disk: (*)
   ```
   # migratepv hdiskX hdiskY
   ```

9. Remove old disk from volume group:
   ```
   # reducevg vg_name hdiskX
   ```

12. Remove old disk from ODM:
    ```
    # rmdev -l hdiskX -d
    ```

(*) : Is the disk in rootvg?
See next visual for further considerations!
Procedure 2: Special Steps for rootvg

1. Connect new disk to system
2. ...
3. Add new disk to volume group
4. ...
5. Migrate old disk to new disk:
   - Disk contains **hd5**?
     ```
     # migratepv -l hd5 hdiskX hdiskY
     # bosboot -ad /dev/hdiskY
     # chpv -c hdiskX
     # bootlist -m normal hdiskY
     ```
6. ...
7. Remove old disk from volume group
8. ...
9. Remove old disk from ODM
   - 5…
Procedure 3: Disk in Missing or Removed State

1. Identify all LVs and file systems on failing disk:
   # lspv -l hdisk

4. Unmount all file systems on failing disk:
   # umount /dev/lv_name

7. Remove all file systems and LVs from failing disk:
   # smit rmfs  # rmlv lv_name

10. Remove disk from volume group:
    # reducevg vg_name hdisk

13. Remove disk from system:
    # rmdev -l hdisk -d

16. Add new disk to volume group:
    # extendvg vg_name hdisk

19. Re-create all LVs and file systems on new disk:
    # mklv -y lv_name  # smit crfs

22. Restore file systems from backup:
    # restore -rvqf /dev/rmt0

Volume group

hdiskX X hdiskY Y

PV STATE: removed

hdiskX X hdiskY Y

PV STATE: missing

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Procedure 4: Total rootvg Failure

2. Replace bad disk
4. Boot in maintenance mode
6. Restore from a mksysb tape
8. Import each volume group into the new ODM (importvg) if needed
Procedure 5: Total non-rootvg Failure

1. Export the volume group from the system:
   # exportvg vg_name

- Check /etc/filesystems.

- Remove bad disk from ODM and the system:
  # rmdev -l hdiskX -d


11. If volume group backup is available (savevg):
    # restvg -f /dev/rmt0 hdiskY

    - If no volume group backup is available: Re-create ...
      - Volume group (mkvg)
      - Logical volumes and file systems (mklv, crfs)

    Restore data from a backup:
    # restore -rqvf /dev/rmt0
Boot problems after migration:

- Firmware LED codes cycle or boots to SMS multiboot menu

Fix:

- Check bootlist (SMS menu)
- Check bootlist (bootlist)
- Re-create boot logical volume (bosboot)
**Frequent Disk Replacement Errors (2 of 4)**

`hdisk5` is removed from ODM and from the system, but not from the volume group:

```
# rmdev -l hdisk5 -d
```
Frequent Disk Replacement Errors (3 of 4)

Use PVID instead of disk name

```bash
# rmdev -l hdisk5 -d

Fix:

# reducevg datavg ...555...
```

**ODM:**

CuAt:
name = "hdisk4"
attribute = "pvid"
value = "...221...
..."
Frequent Disk Replacement Errors (4 of 4)

ODM failure!

Analyze failure!

ODM problem in rootvg?

Yes

No

rvgrecover

Export and import volume group

# lsvg -p datavg
unable to find device id ...
734... in device configuration database

• Typo in command?
• Analyze the ID of the device: Which PV or LV causes problems?
To export a volume group:

3. Unmount all file systems from the volume group:
   # umount /dev/lv10
   # umount /dev/lv11

7. Vary off the volume group:
   # varyoffvg myvg

10. Export volume group:
    # exportvg myvg

The complete volume group is removed from the ODM.
Importing a Volume Group

To import a volume group:

3. Configure the disk(s).

5. Import the volume group:
   # importvg -y myvg hdisk3

8. Mount the file systems:
   # mount /dev/lv10
   # mount /dev/lv11

The complete volume group is added to the ODM.
importvg and Existing Logical Volumes

importvg can also accept the PVID in place of the hdisk name.
# importvg -y myvg hdisk3

Warning: mount point /home/michael already exists in /etc/filesystems

# umount /home/michael
# mount -o log=/dev/loglv01 /dev/lv24 /home/michael
import vg and Existing File Systems (2 of 2)

# vi /etc/filesystems

/home/michael:
  dev   =   /dev/lv11
  vfs   =   jfs
  log   =   /dev/loglv00
  mount =   false
  options =   rw
  account =   false

/home/michael_moon:
  dev   =   /dev/lv24
  vfs   =   jfs
  log   =   /dev/loglv01
  mount =   false
  options =   rw
  account =   false

# mount   /home/michael
# mount   /home/michael_moon

Mount point must exist!
importvg -L (1 of 2)

No exportvg !!!

# importvg -y myvg hdisk3
# mklv lv99 myvg
importvg -L (2 of 2)

"Learn about possible changes!"

# importvg -L myvg hdisk9
# varyonvg myvg

==> importvg -L fails if a name clash is detected
1. Although everything seems to be working fine, you detect error log entries for disk **hdisk0** in your **rootvg**. The disk is not mirrored to another disk. You decide to replace this disk. Which procedure would you use to migrate this disk?

2. __________________________________________________________________________

3. __________________________________________________________________________

5. You detect an unrecoverable disk failure in volume group **datavg**. This volume group consists of two disks that are completely mirrored. Because of the disk failure you are not able to vary on **datavg**. How do you recover from this situation?

6. __________________________________________________________________________

7. __________________________________________________________________________

8. After disk replacement you recognize that a disk has been removed from the system but not from the volume group. How do you fix this problem?

9. __________________________________________________________________________

10. __________________________________________________________________________
1. Although everything seems to be working fine, you detect error log entries for disk **hdisk0** in your **rootvg**. The disk is not mirrored to another disk. You decide to replace this disk. Which procedure would you use to migrate this disk?

   **Procedure 2:** Disk still working. There are some additional steps necessary for **hd5** and the primary dump device **hd6**.

3. You detect an unrecoverable disk failure in volume group **datavg**. This volume group consists of two disks that are completely mirrored. Because of the disk failure you are not able to vary on **datavg**. How do you recover from this situation?

   **Forced varyon:** `varyonvg -f datavg`

   Use Procedure 1 for mirrored disks.

4. After disk replacement you recognize that a disk has been removed from the system but not from the volume group. How do you fix this problem?

   **Use PVID instead of disk name:** `reducevg vg_name PVID`
Exercise 7: Exporting and Importing Volume Groups

- Export and import a volume group
- Analyze import messages (Optional)
Different procedures are available that can be used to fix disk problems under any circumstance:

- Procedure 1: Mirrored disk
- Procedure 2: Disk still working (rootvg specials)
- Procedure 3: Total disk failure
- Procedure 4: Total rootvg failure
- Procedure 5: Total non-rootvg failure

exportvg and importvg can be used to easily transfer volume groups between systems.