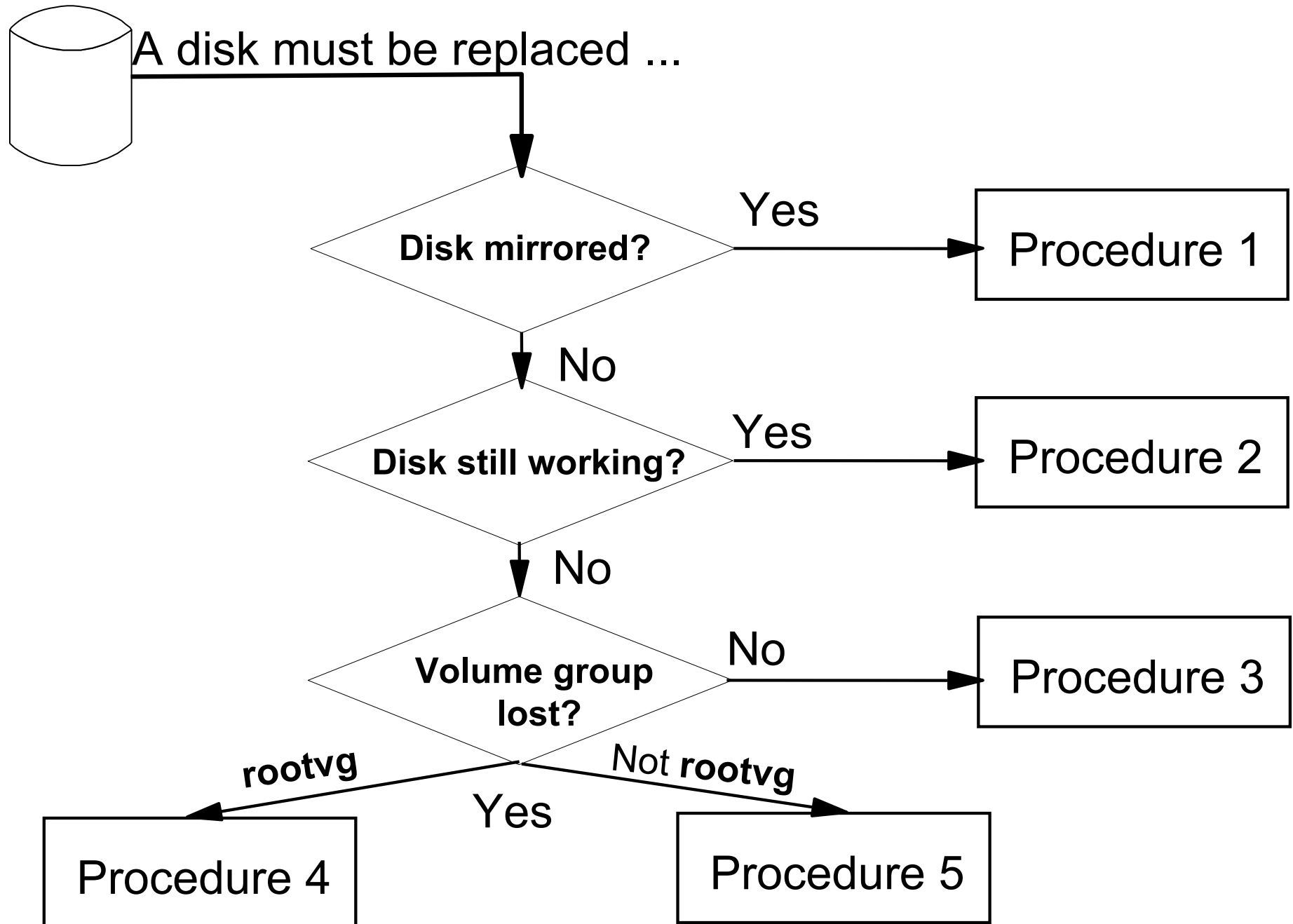# Disk Management Procedures

Unit Objectives

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

Disk Replacement: Starting Point

A disk must be replaced ...

Disk mirrored? — Yes → Procedure 1

No

Disk still working? — Yes → Procedure 2

No

Volume group lost? — No → Procedure 3

rootvg / Not **rootvg** — Yes

Procedure 4

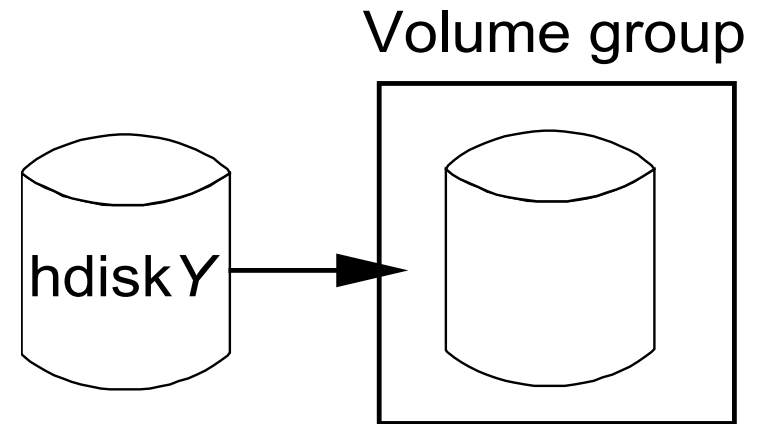Procedure 5

Procedure 1: Disk Mirrored

1. Remove all copies from disk:
   # **unmirrorvg *vg_name* hdisk*X***

4. Remove disk from volume group:
   # **reducevg *vg_name* hdisk*X***

7. Remove disk from ODM:
   # **rmdev -l hdisk*X* -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* hdisk*Y***

16. Create new copies:
    # **mirrorvg *vg_name* hdisk*Y***
   # **syncvg *vg_name***
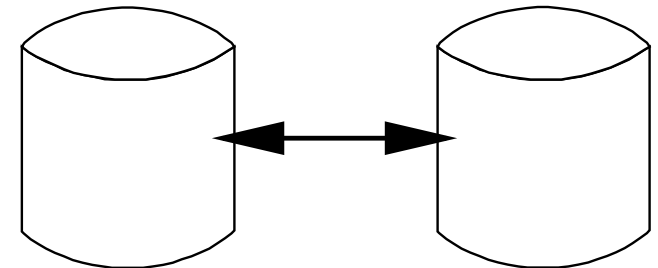
Mirrored

Procedure 2: Disk Still Working

1. Connect new disk to system.

3. Add new disk to volume group:
   # **extendvg *vg_name* hdisk*Y***

6. Migrate old disk to new disk: (*)
   # **migratepv hdisk*X* hdisk*Y***

9. Remove old disk from volume group:
   # **reducevg *vg_name* hdisk*X***

12. Remove old disk from ODM:
   # **rmdev -l hdisk*X* -d**

Volume group

hdisk*Y* →

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

Procedure 2: Special Steps for rootvg

rootvg

hdiskY

1…

2…
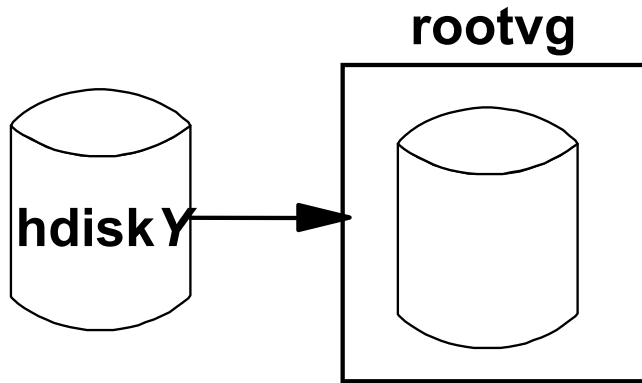
1. Connect new disk to system

3. Add new disk to volume group

5. ☐

7. Remove old disk from volume group

9. Remove old disk from ODM

- Disk contains **hd5**?
  ```
  # migratepv -l hd5 hdiskX hdiskY
  # bosboot -ad /dev/hdiskY
  # chpv -c hdiskX
  # bootlist -m normal hdiskY
  ```

  Migrate old disk to new disk:
  ```
  # migratepv hdiskX hdiskY
  ```

4…

5…

Procedure 3: Disk in Missing or Removed State

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

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 hdiskY**

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

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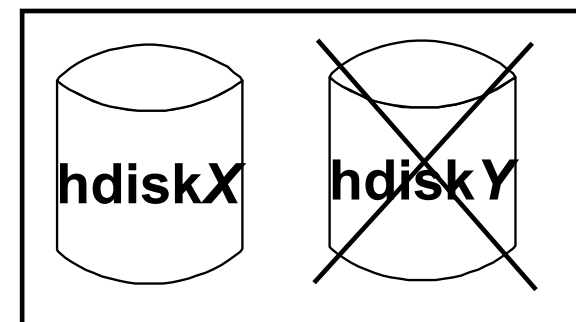   # **extendvg vg_name hdiskZ**

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   hdiskY

lspv hdiskY
...
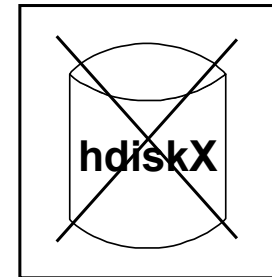PV STATE: removed

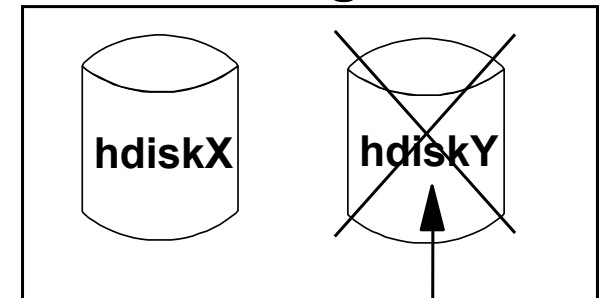# **lspv hdiskY**
...
PV STATE: missing

Procedure 4: Total rootvg Failure

rootvg

2. Replace bad disk

4. Boot in maintenance mode

6. Restore from a `mksysb` tape

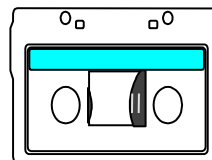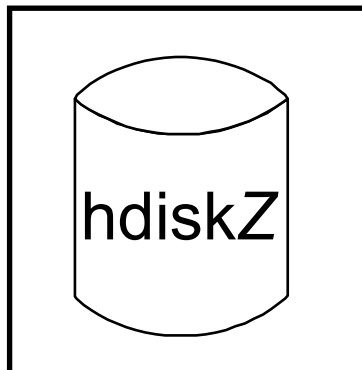8. Import each volume group into the new ODM (`importvg`) if needed

hdiskX

rootvg

hdiskX   hdiskY

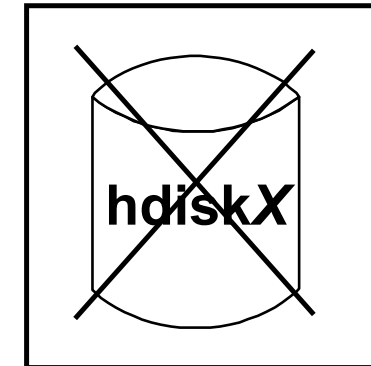Contains OS logical volumes

datavg

hdiskZ

`mksysb`

Procedure 5: Total non-rootvg Failure

datavg

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
   ```

9. Connect new disk.

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
   ```

hdisk**X**

Tape

hdisk**Y**

Frequent Disk Replacement Errors (1 of 4)

rootvg

hdisk*Y* → hdisk*X*

rootvg - Migration
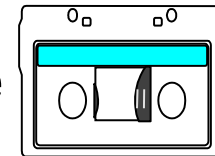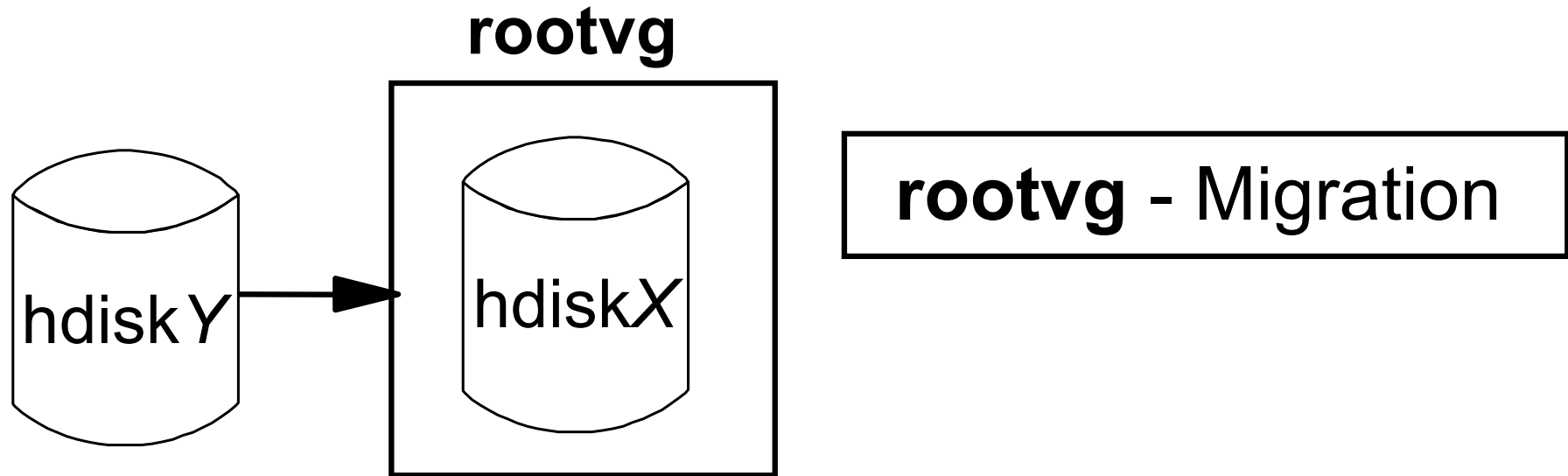
Boot problems after migration:

- 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)

datavg

PVID:
...221...

hdisk4

PVID:
...555...

hdisk5

VGDA:

...

physical:
...221...
...555...

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

`rmdev -l hdisk5 -d`

ODM:
```
CuAt:
name = "hdisk4"
attribute = "pvid"
value = "...221..."
...
CuAt:
name = "hdisk5"
attribute = "pvid"
value = "...555..."
...
```

Frequent Disk Replacement Errors (3 of 4)

datavg

PVID:
...221...

hdisk4

VGDA:

...

physical:
...221...
...555...

!!!

rmdev -l hdisk5 -d

Fix:

reducevg datavg ...555...

Use PVID instead of disk name

ODM:

CuAt:
name = "hdisk4"
attribute = "pvid"
value = "...221..."
...

Frequent Disk Replacement Errors (4 of 4)

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

ODM failure !

Analyze failure !

- Typo in command ?

- Analyze the ID of the device:
  Which PV or LV causes problems?

ODM problem in **rootvg**?

No → Export and import volume group

Yes → **rvgrecover**

Exporting a Volume Group

moon

hdisk9

lv10
lv11
loglv01

myvg

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:
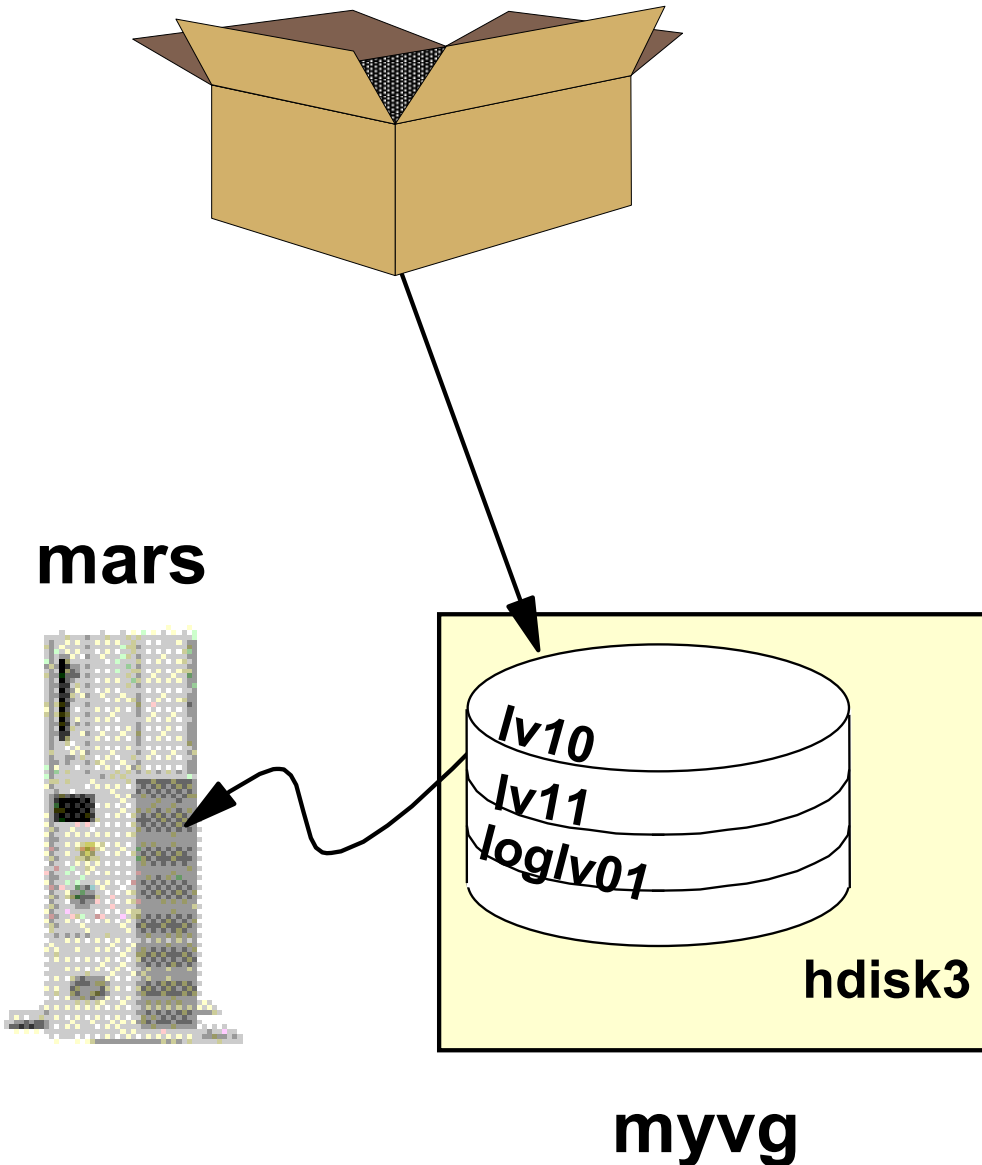   ```
   # varyoffvg myvg
   ```

10. Export volume group:
    ```
    # exportvg myvg
    ```

The complete volume group is removed from the ODM.

# Importing a Volume Group

**mars**

**myvg**

*lv10*
*lv11*
*loglv01*

**hdisk3**

To import a volume group:

3. Configure the disk(s).

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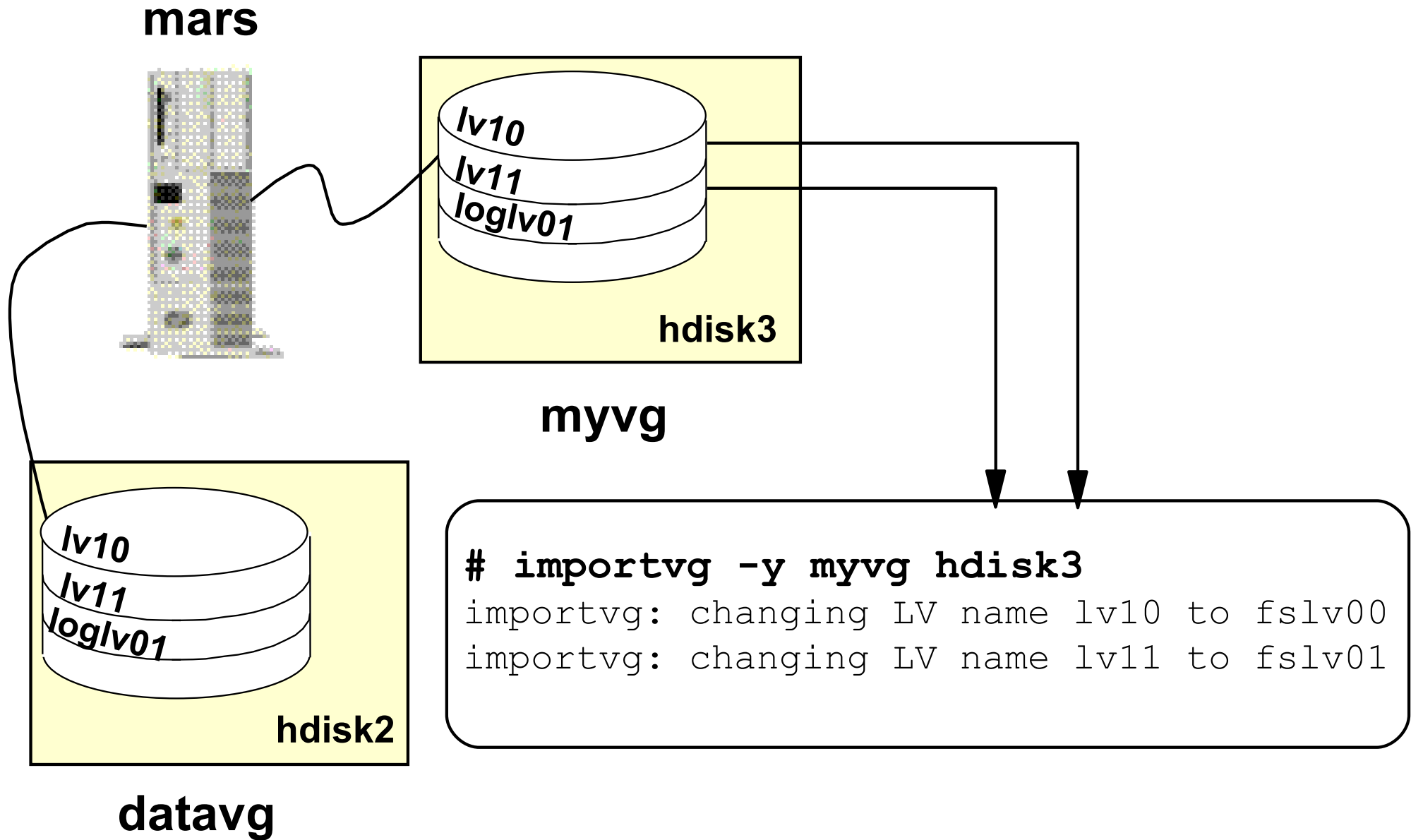   ```
   # importvg -y myvg hdisk3
   ```

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

mars

hdisk3

lv10
lv11
loglv01

myvg

lv10
lv11
loglv01

hdisk2

datavg

```
# importvg -y myvg hdisk3
importvg: changing LV name lv10 to fslv00
importvg: changing LV name lv11 to fslv01
```

`importvg` can also accept the PVID in place of the hdisk name

`importvg` and Existing File Systems (1 of 2)

/dev/lv10:	**/home/sarah**
/dev/lv11:	**/home/michael**
/dev/loglv00:	log device

/dev/lv23:	**/home/peter**
/dev/lv24:	**/home/michael**
/dev/loglv01:	log device

```
# 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
```

```
# 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
```

```
/dev/lv10:          /home/sarah
/dev/lv11:          /home/michael

/dev/loglv00:       log device

datavg
```

```
/dev/lv23:          /home/peter
/dev/lv24:          /home/michael

/dev/loglv01:       log device
hdisk3 (myvg)
```
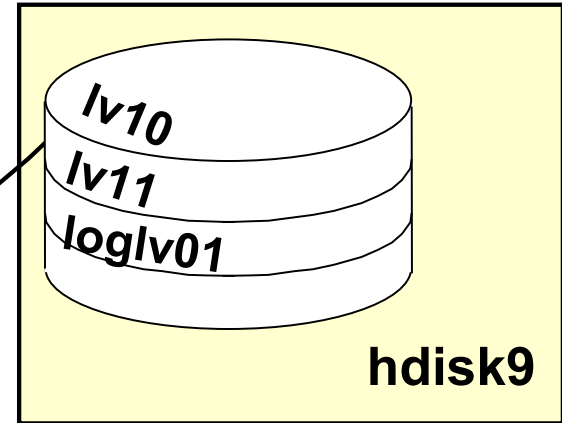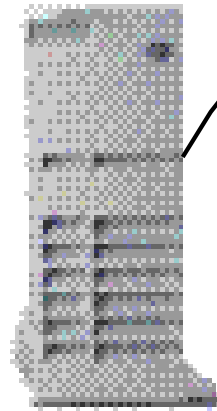
```
# mount   /home/michael
# mount   /home/michael_moon  ───────▶  Mount point must exist!
```

moon

No `exportvg` !!!

lv10
lv11
loglv01

hdisk9

myvg

mars
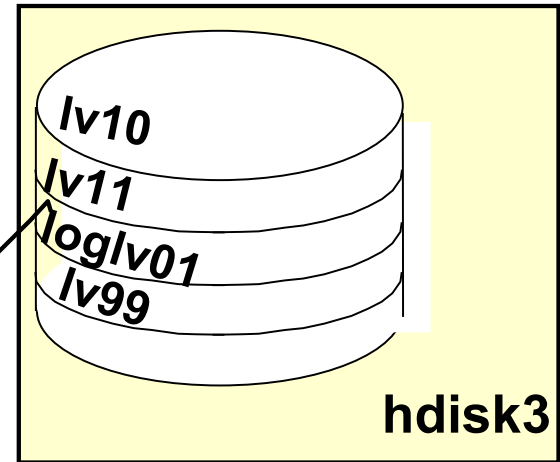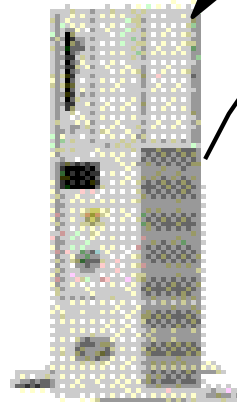
```
# importvg -y myvg hdisk3
# mklv lv99 myvg
```

lv10
lv11
loglv01
lv99

hdisk3

myvg

moon

hdisk9

lv10
lv11
loglv01
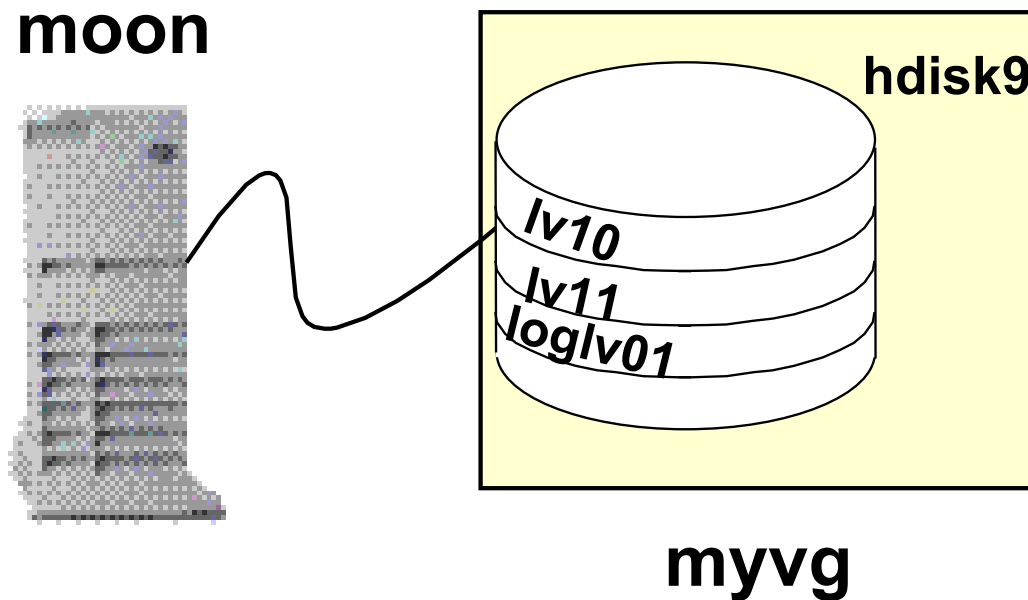
myvg

"Learn about possible changes!"

```
#  importvg -L myvg hdisk9
#  varyonvg myvg

==>  importvg -L  fails if a name clash is detected
```

Checkpoint

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?

   _____

   _____

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?

   _____

   _____

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?

   _____

   _____

Checkpoint Solutions

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`.
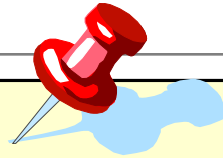   Use Procedure 1 for mirrored disks.

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)
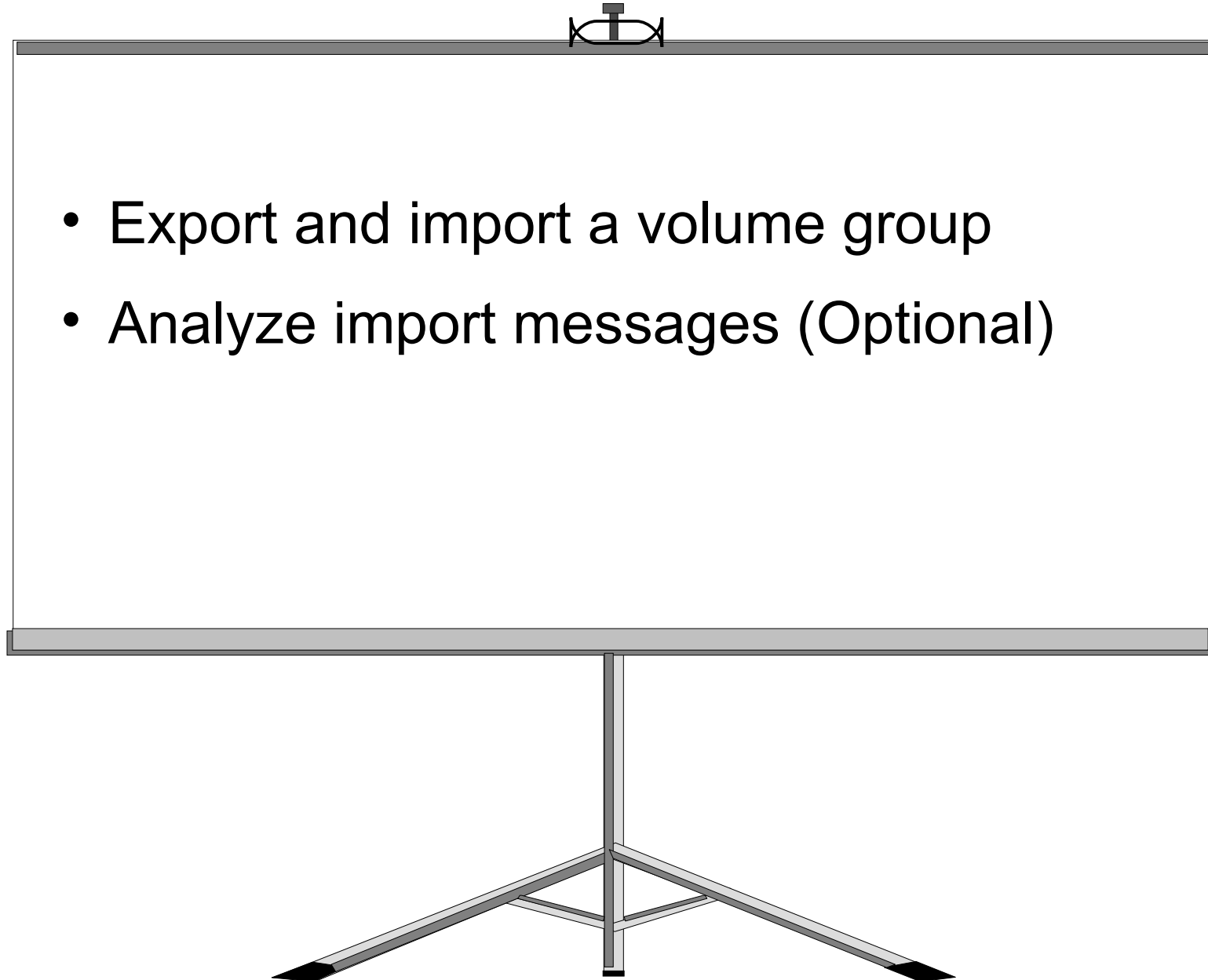
Unit Summary

- 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