



Unit 13

Backup and Restore



Unit objectives

After completing this unit, you should be able to:

- Identify issues which have to be considered when deciding which backup policies to implement:
 - Media to be used
 - Frequency of the backup
 - Type of backup
- List the different backup methods supported through SMIT and on the command line
- Create a customized installable system image backup
- Execute other useful commands to manipulate the backed up data on the media

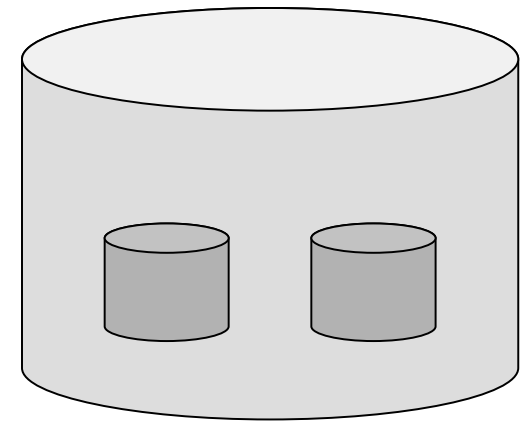
Why backup?

- Data is very important:
 - Expensive to re-create
 - Can it be re-created?
- Disaster recovery:
 - Hardware failure
 - Damage due to installation/repair
 - Accidental deletion
- Transfer of data between systems
- Reorganizing file systems
- Defragmentation to improve performance
- System image for installation
- Checkpoint (before and after upgrade)
- Long term archive

Types of backup

Three types of backup:

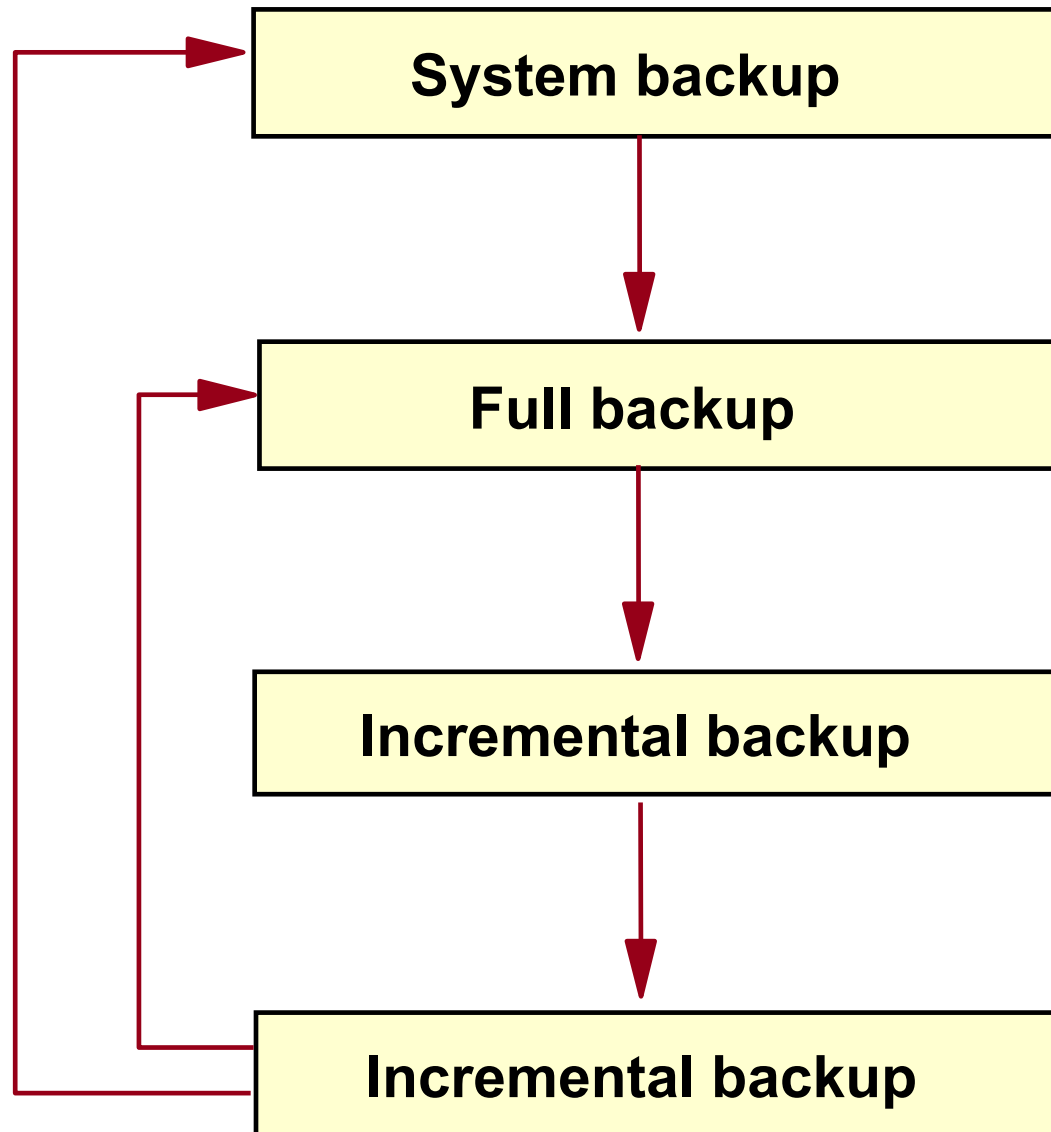
- **System**
 - Records image backup of the operating system
- **Full**
 - Preserves all user data and configuration files
- **Incremental**
 - Records changes since previous backups
 - Must be used carefully
 - Very quick



rootvg

Backup strategy

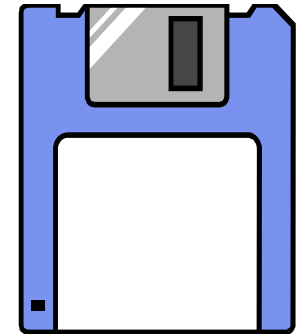
Backup all data that changes!



Backup devices - diskette

/dev/fd0 - Built in 3 1/2-inch diskette drive

/dev/fd1 - Second diskette drive

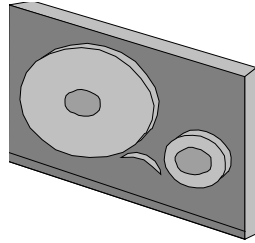


Drive

	3 1/2-inch (1.44)	3 1/2-inch (2.88)
/dev/fd0	720 KB	720 KB
/dev/fd1	1.44 MB	2.88 MB
/dev/fd0.9	720 KB	720 KB
/dev/fd0.18	1.44 MB	1.44 MB
/dev/fd0.36	-	2.88 MB

Backup devices - tape

- 4 mm DAT
- 8 mm

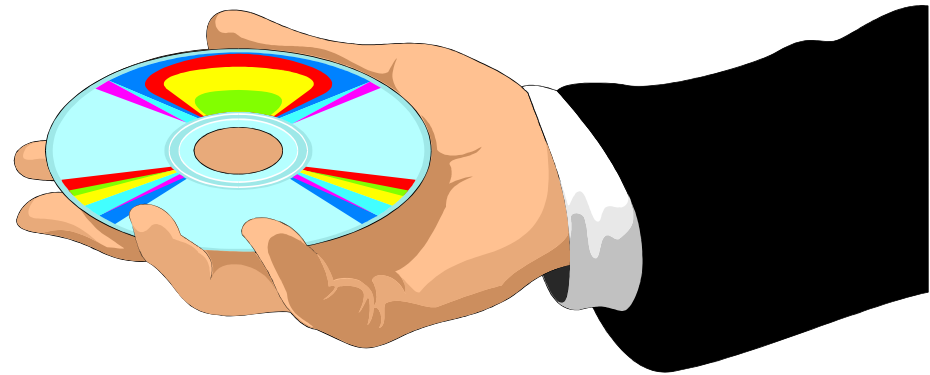


- 1/2 - inch
- DLT
- VXA
- QIC

	Low Capacity	Retension on Open	Rewind on Close
/dev/rmtx	no	no	yes
/dev/rmtx.1	no	no	no
/dev/rmtx.2	no	yes	yes
/dev/rmtx.3	no	yes	no
/dev/rmtx.4	yes	no	yes
/dev/rmtx.5	yes	no	no
/dev/rmtx.6	yes	yes	yes
/dev/rmtx.7	yes	yes	no

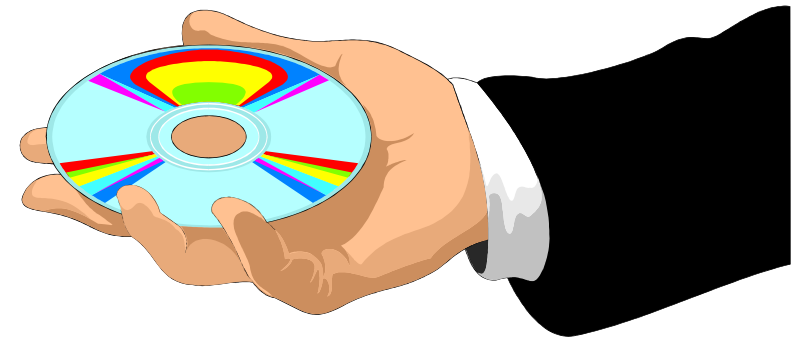
Backup device - read/write optical drive

- Use with CD-ROM file system for read only operations
- Use with journal file systems for read/write operation
- For CD:
 - OEM CD-RW drive
 - Third-party CD burn software
(AIX Toolbox for Linux Applications)
- For DVD:
 - Need 7210 DVD-RAM drive
 - No additional software needed for UDF format



Backup device – 7210 external DVD-RAM drive

- Writes DVD-RAM media
- Reads DVD media in 2.6 GB, 4.7 GB, 5.2 GB, and 9.4 GB
- Supports CD-ROM media in Modes 1 or 2, XA, and CDDA and audio formats
- Reads multi-session disks, CD-R, CD-ROM, and CD-RW disks
- Loading tray accommodates 8 cm and 12 cm media
- SCSI attachable



SMIT backup menus

System Storage Management (Physical and Logical)

Logical Volume Manager
File Systems
Files and Directories
System Backup Manager

File Systems

Back Up a File System
Restore a File System
List Contents of a Backup

Files and Directories

Back Up a File or Directory
Restore a File or Directory
List Contents of a Backup

System Backup Manager

Back Up the System
Preview Information about a Backup
Verify the Readability of a Backup
View the Backup Log
List Information about Filesets in a System Image
List Files in a System Image
Restore Files in a System Image

Logical Volume Manager

Volume Groups

Volume Groups

Back Up a Volume Group
Remake a Volume Group
List Files in a Volume Group Backup
Restore Files in a Volume Group Backup

Back Up the System

Back Up This System to Tape/File
Back Up This System to CD
Back Up This System to DVD

Back Up a Volume Group

Back Up a Volume Group to Tape/File
Back Up a Volume Group to CD
Back Up a Volume Group to DVD

rootvg backup process - mksysb

- Backs up **rootvg** only
- Unmounted file systems are not backed up
- Bootable tape is created in **backup** format
- Provides facilities for a non-interactive installation
- Saves system-created paging space definitions
- Saves logical volume policies
- There should be minimal user and application activity

/image.data file for rootvg

image data:

IMAGE_TYPE= bff
DATE_TIME= Fri Nov 29 10:23:36 NPT 2007
UNAME_INFO= AIX ibm150 2 5 00428DFB4C00
PRODUCT_TAPE= no
USERVG_LIST=
PLATFORM= chrp
OSLEVEL= 6.1.0.0
CPU_ID= 00428DFB4C00

logical_volume_policy:

SHRINK= no
EXACT_FIT= no

ils_data:

LANG= en_US

#Command used for vg_data, /usr/sbin/lsvg

vg_data:

VGNAME= rootvg
PPSIZE= 16
VARYON= yes
VG_SOURCE_DISK_LIST= hdisk0
BIGVG= no
TFACTOR= 1

#Command used for source disk data: /usr/sbin/bootinfo

source_disk_data: **(stanza is repeated for each disk in rootvg)**

PVID=(physical volume id)
LOCATION=(disk location)
SIZE_MB=(size of disk in megabytes)
HDISKNAME=(disk name)

#Command used for lv_data; /usr/sbin/lslv

lv_data: **(stanza for each logical volume in rootvg)**

fs_data: **(stanza for each MOUNTED filesystem in rootvg)**

/bosinst.data file for rootvg

control_flow:

```
CONSOLE = Default
INSTALL_METHOD = overwrite
PROMPT = yes
EXISTING_SYSTEM_OVERWRITE = yes
INSTALL_X_IF_ADAPTER = yes
RUN_STARTUP = yes
RM_INST_ROOTS = no
ERROR_EXIT =
CUSTOMIZATION_FILE =
TCB = no
INSTALL_TYPE =
BUNDLES =
RECOVER_DEVICES = Default
BOSINST_DEBUG = no
ACCEPT_LICENSES =
DESKTOP = CDE
INSTALL_DEVICES_AND_UPDATES = yes
IMPORT_USER_VGS =
ENABLE_64BIT_KERNEL = no
CREATE_JFS2_FS = no
ALL_DEVICES_KERNELS = yes
(some bundles ....)
```

target_disk_data:

```
LOCATION =
SIZE_MB =
HDISKNAME =
```

locale:

```
BOSINST_LANG =
CULTURAL_CONVENTION =
MESSAGES =
KEYBOARD =
```

rootvg - Back Up the System

```
# smit sysbackup
```

Back Up the System

Move cursor to desired item and press Enter.

Back Up This System to Tape/File

Back Up This System to CD

Create a Generic Backup CD or DVD

Back Up This System to DVD

F1=Help

F2=Refresh

F3=Cancel

F8=Image

F9=Shell

F10=Exit

Enter=Do

rootvg - Back Up This System to Tape/File

```
# smit mksysb
```

Back Up This System to Tape/File

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

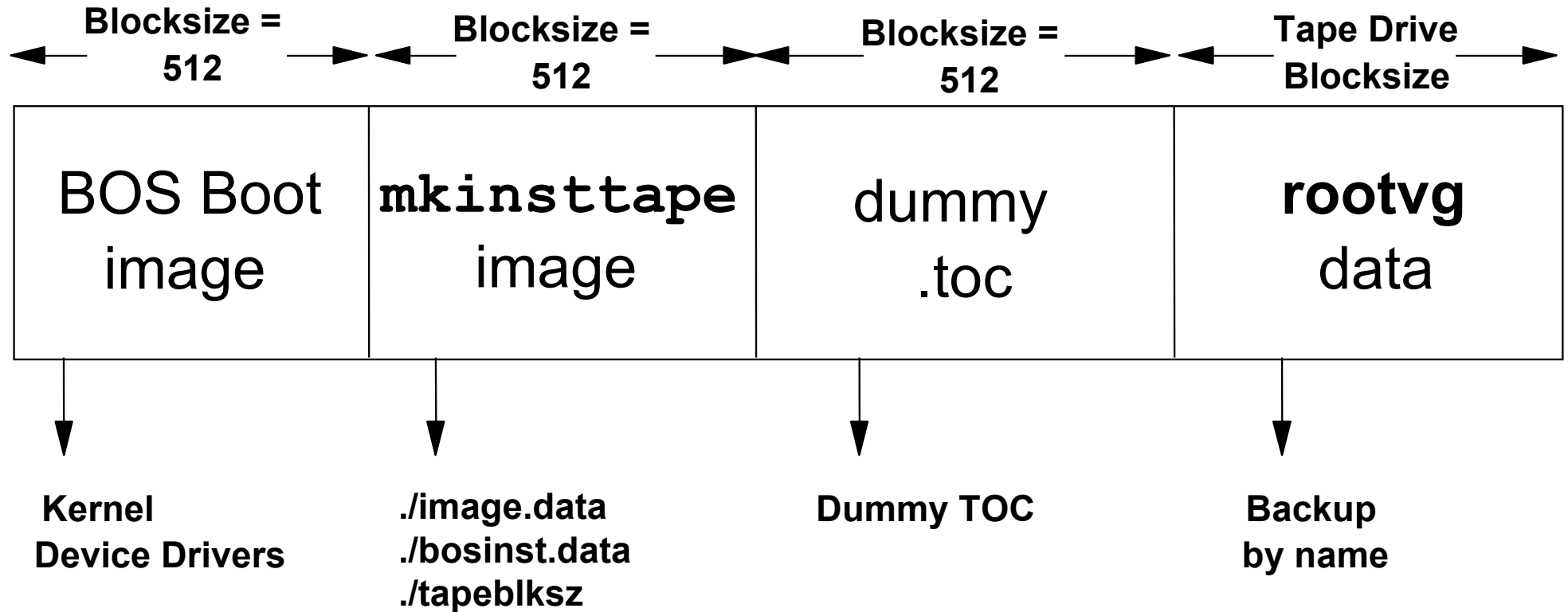
[Entry Fields]

WARNING: Execution of the mksysb command will
result in the loss of all material
previously stored on the selected
output medium. This command backs
up only rootvg volume group.

* Backup DEVICE or FILE	[]	+/
Create MAP files?	no	+
EXCLUDE files?	no	+
List files as they are backed up?	no	+
Verify readability if tape device?	no	+
Generate new /image.data file?	yes	+
EXPAND /tmp if needed?	no	+
Disable software packing of backup?	no	+
Backup extended attributes?	yes	+
Number of BLOCKS to write in a single output (Leave blank to use a system default	[]	#
Location of existing mksysb image	[]	/
File system to use for temporary work space (If blank, /tmp will be used.)	[]	/
Backup encrypted files?	yes	+
Back up DMAPI filesystem files?	yes	+

[BOTTOM]

mksysb image



Back Up a Volume Group

smit vgbackup

Back Up a Volume Group

Move cursor to desired item and press Enter.

Back Up a Volume Group to Tape/File

Back Up a Volume Group to CD

Back Up a Volume Group to DVD

F1=Help

F2=Refresh

F3=Cancel

F8=Image

F9=Shell

F10=Exit

Enter=Do

Back Up a Volume Group to Tape/File

```
# smit savevg
```

Back Up a Volume Group to Tape/File

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

[Entry Fields]

WARNING: Execution of the savevg command will
result in the loss of all material
previously stored on the selected
output medium.

* Backup DEVICE or FILE	[]	+/
* VOLUME GROUP to back up	[]	+
List files as they are backed up?	no	+
Generate new vg.data file?	yes	+
Create MAP files?	no	+
EXCLUDE files?	no	+
EXPAND /tmp if needed?	no	+
Disable software packing of backup?	no	+
Backup extended attributes?	yes	+
Number of BLOCKS to write in a single output (Leave blank to use a system default)	[]	#
Verify readability if tape device	no	+
Backup Volume Group information files only?	no	+
Backup encrypted files?	yes	+
Back up DMAPI filesystem files?	yes	+

[BOTTOM]

Restoring a mksysb (1 of 2)

- Boot the system in install/maintenance mode:

Welcome to Base Operating System Installation and Maintenance

- | | | |
|----|---|---|
| | 1 | Start Install Now With Default Settings |
| | 2 | Change/Show Installation Settings and Install |
| >> | 3 | Start Maintenance Mode for System Recovery |
| | 4 | Configure Network Disks (iSCSI) |



Maintenance

- | | | |
|----|---|---------------------------------------|
| | 1 | Access A Root Volume Group |
| | 2 | Copy a System Dump to Removable Media |
| | 3 | Access Advanced Maintenance Functions |
| | 4 | Erase Disks |
| >> | 6 | Install from a System Backup |



Choose Tape Drive

- | | | Tape Drive | Path Name |
|----|---|-------------------|-----------|
| >> | 1 | tape/scsi/4mm/2GB | /dev/rmt0 |

Restoring a mksysb (2 of 2)

Welcome to Base Operating System Installation and Maintenance

Type the number of your choice and press Enter. Choice is indicated by >>.

	1	Start Install Now With Default Settings
>>	2	Change/Show Installation Settings and Install
	3	Start Maintenance Mode for System Recovery
	4	Configure Network Disks (iSCSI)

System Backup Installation and Settings

Type the number of your choice and press Enter.

1	Disk(s) where you want to install	hdisk0
2	Use Maps	No
3	Shrink Filesystems	No
0	Install with the settings listed above	

Remake/Restore a non-rootvg volume group

smit restvg

Remake a Volume Group

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

	[Entry Fields]	
* Restore DEVICE or FILE	[/dev/rmt0]	+/
SHRINK the filesystems?	no	+
Recreate logical volumes and filesystems only	no	+
PHYSICAL VOLUME names	[]	+
(Leave blank to use the PHYSICAL VOLUMES listed in the vgname.data file in the backup image)		
Use existing MAP files?	yes	+
Physical partition SIZE in megabytes	[]	+ #
(Leave blank to have the SIZE determined based on disk size)		
Number of BLOCKS to read in a single input	[]	#
(Leave blank to use a system default)		
Alternate vg.data file	[]	/
(Leave blank to use vg.data stored in backup image)		

F1=Help

F2=Refresh

F3=Cancel

F4=List

F5=Reset

F6=Command

F7=Edit

F8=Image

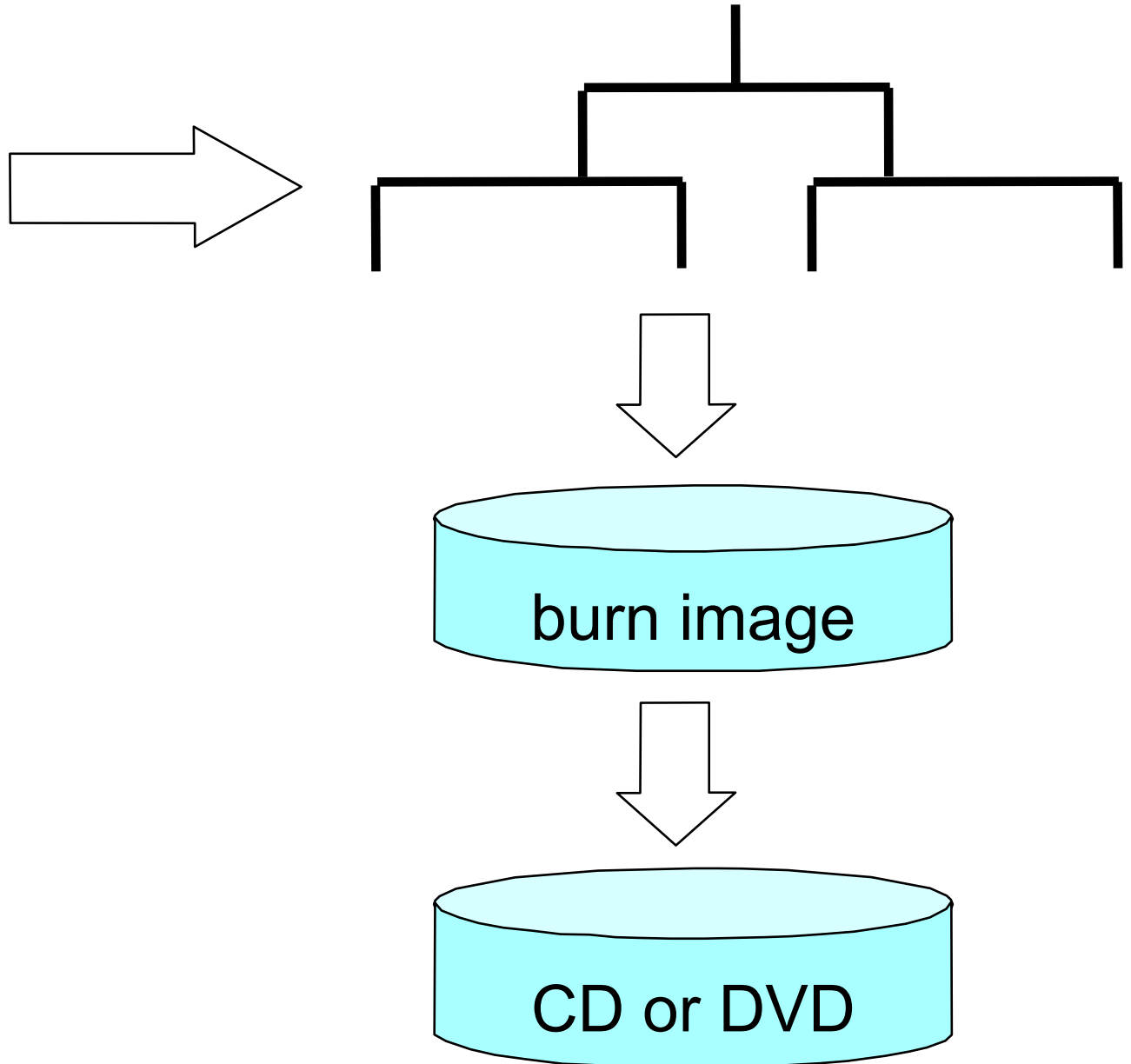
F9=Shell

F10=Exit

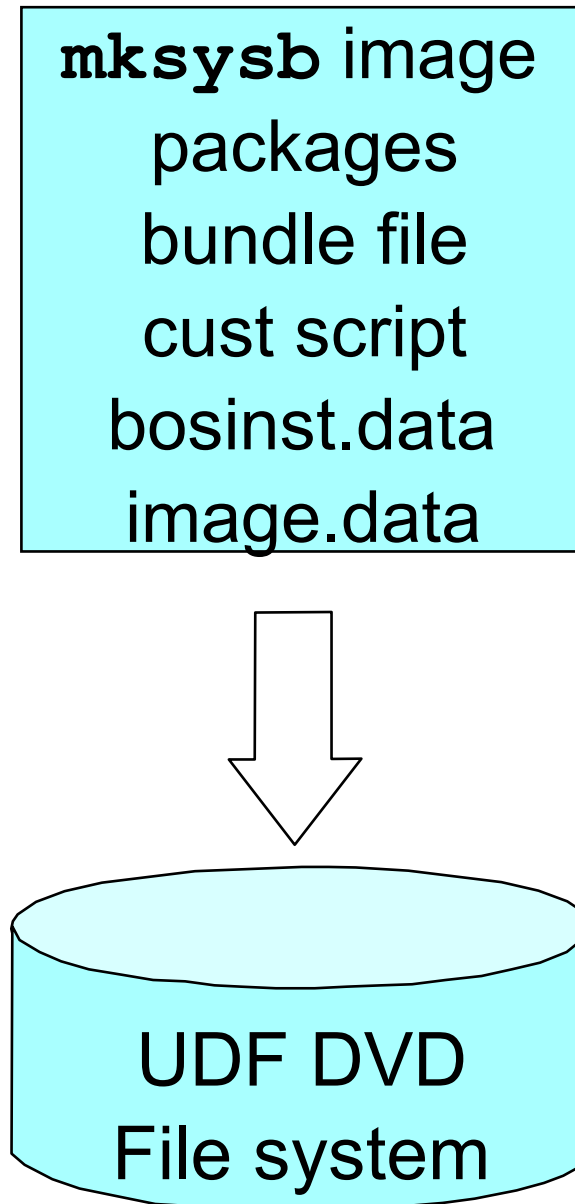
Enter=Do

mksysb - ISO9660 burn image

mksysb image
packages
bundle file
cust script
bosinst.data
image.data



mksysb - UDF DVD



rootvg - Back Up This System to CD (ISO9660)

```
# smit mkcd
```

Back Up This System to CD

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

	[Entry Fields]	
CD-R Device	[]	+
mkysyb creation options:		
Create map files?	no	+
Exclude files?	no	+
Disable software packing of backup?	no	+
Backup extended attributes?	yes	+
File system to store mkysyb image	[]	/
File system to store CD file structure	[]	/
File system to store final CD images	[]	/
If file systems are being created:		
Volume Group for created file systems	[rootvg]	+
Advanced Customization Options:		
Do you want the CD to be bootable?	yes	+
Remove final images after creating CD?	yes	+
Create the CD now?	yes	+
Install bundle file	[]	/
File with list of packages to copy to CD	[]	/
Location of packages to copy to CD	[]	+/
Customization script	[]	/
User supplied bosinst.data file	[]	/
Debug output?	no	+
User supplied image.data file	[]	/
Backup encrypted files?	yes	
Back up DMAPI filesystem files?	Yes	

[BOTTOM]

rootvg - Back Up This System to ISO9660 DVD

smit mkdvd -> Select 1 ISO9660 (CD format)

Back Up This System to ISO9660 DVD

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

	[Entry Fields]	
DVD-R or DVD-RAM Device	[]	+
mkysyb creation options:		
Create map files?	no	+
Exclude files?	no	+
Disable software packing of backup?	no	+
Backup extended attributes?	yes	+
File system to store mkysyb image	[]	/
File system to store DVD file structure	[]	/
File system to store final DVD images	[]	/
If file systems are being created:		
Volume Group for created file systems	[rootvg]	+
Advanced Customization Options:		
Do you want the DVD to be bootable?	yes	+
Remove final images after creating DVD?	yes	+
Create the DVD now?	yes	+
Install bundle file	[]	/
File with list of packages to copy to DVD	[]	/
Location of packages to copy to DVD	[]	+/
Customization script	[]	/
User supplied bosinst.data file	[]	/
Debug output?	no	+
User supplied image.data file	[]	/
Backup encrypted files?	yes	+
Back up DMAPI filesystem files?	yes	+

[BOTTOM]

rootvg - Back Up This System to UDF DVD

`smit mkdvd` -> Select 2 UDF (Universal Disk Format)

Back Up This System to UDF DVD

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

[Entry Fields]

DVD-RAM Device	[]	+
mkysyb creation options:		
Create map files?	no	+
Exclude files?	no	+
Disable software packing of backup?	no	+
Backup extended attributes?	yes	+
File system to store mkysyb image	[]	/
(If blank, the file system will be created for you.)		
If file system is being created:		
Volume Group for created file system	[rootvg]	+
Advanced Customization Options:		
Do you want the DVD to be bootable?	yes	+
Install bundle file	[]	/
File with list of packages to copy to DVD	[]	/
Location of packages to copy to DVD	[]	+/
Customization script	[]	/
User supplied bosinst.data file	[]	/
Debug output?	no	+
User supplied image.data file	[]	/
Backup encrypted files?	Yes	+
Back up DMAPI filesystem files?	yes	+

[BOTTOM]

Back Up a Volume Group to CD

smit savevgcd

Back Up a Volume Group to CD

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

	[Entry Fields]	
CD-R Device	[]	+
* Volume Group to back up	[]	+
savevg creation options:		
Create map files?	no	+
Exclude files?	no	+
Disable software packing of backup?	no	+
Backup extended attributes?	yes	+
File system to store savevg image	[]	/
File system to store CD file structure	[]	/
File system to store final CD images	[]	/
If file systems are being created:		
Volume Group for created file systems	[rootvg]	+
Advanced Customization Options:		
Remove final images after creating CD?	yes	+
Create the CD now?	yes	+
Debug output?	no	+
Backup Volume Group information files only?	no	+
Backup encrypted files?	Yes	+
Back up DMAPI filesystem files?	yes	+
[BOTTOM]		

F1=Help
F5=Reset
F9=Shell

F2=Refresh
F6=Command
F10=Exit

F3=Cancel
F7=Edit
Enter=Do

F4=List
F8=Image

Back Up a Volume Group to ISO9660 DVD

smit savevgdvd

Back Up a Volume Group to ISO9660 DVD

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

[Entry Fields]

DVD-R or DVD-RAM Device	[]	+
* Volume Group to back up	[]	+
savevg creation options:		
Create map files?	no	+
Exclude files?	no	+
Disable software packing of backup?	no	+
Backup extended attributes?	yes	+
File system to store savevg image	[]	/
File system to store DVD file structure	[]	/
File system to store final DVD images	[]	/
If file systems are being created:		
Volume Group for created file systems	[rootvg]	+
Advanced Customization Options:		
Remove final images after creating DVD?	yes	+
Create the DVD now?	yes	+
Debug output?	no	+
Backup encrypted files?	yes	+
Back up DMAPI filesystem files?	yes	+

[BOTTOM]

F1=Help
F5=Reset
F9=Shell

F2=Refresh
F6=Command
F10=Exit

F3=Cancel
F7=Edit
Enter=Do

F4=List
F8=Image

Back Up a Volume Group to UDF DVD

smit savevgdvd

Back Up a Volume Group to ISO9660 DVD

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

[Entry Fields]

DVD-RAM Device	[]	+
* Volume Group to back up	[]	+
savevg creation options:		
Create map files?	no	+
Exclude files?	no	+
Disable software packing of backup?	no	+
Backup extended attributes?	yes	+
File system to store savevg image (If blank, the file system will be created for you.)	[]	/
If file systems are being created:		
Volume Group for created file systems	[rootvg]	+
Advanced Customization Options:		
Debug output?	no	+
Backup Volume Group information files only?	no	+
Backup encrypted files?	yes	+
Back up DMAPI filesystem files?	yes	+

[BOTTOM]

F1=Help
F5=Reset
F9=Shell

F2=Refresh
F6=Command
F10=Exit

F3=Cancel
F7=Edit
Enter=Do

F4=List
F8=Image

Exercise 13: Using backup and restore (part 1)

- 
- A whiteboard on a stand with a list item.
- Part 1 - Using SMIT to backup a non-rootvg volume group

Back up by filename

```
backup -i [-q] [-v] [-p] [-U] [-Z] [-f device]
```

- q Media is ready
- v Verbose - display filenames during backup
- p Pack files which are less than 2 GB
- U Specifies to backup any ACLs
- Z Backs up the Encrypted File System (EFS)

Filenames are read from standard input

Back up by filename examples

- Example 1: Read input from a file

```
# cat listfile  
/home/roy/file1  
/home/roy/file2  
/home/roy/file3  
# backup -iqvf /dev/rmt0 < listfile
```

- Example 2: Use **find** to generate list

```
# find /home/roy | backup -iqvf /dev/rmt0  
# cd /home/roy  
# find . | backup -iqvf /dev/rmt0
```

Relative versus full filenames will impact location of files on recovery!

Backup a File or Directory

```
# smit backupfile
```

Backup a File or Directory

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

	[Entry Fields]	
This option will perform a backup by name.		
* Backup DEVICE	[/dev/fd0]	+/
* FILE or DIRECTORY to backup	[.]	
Current working DIRECTORY	[]	/
Backup LOCAL files only?	yes	+
VERBOSE output?	no	+
PACK files?	no	+
Backup extended attributes?	yes	+
Back up EFS Attributes?	Yes	+

F1=Help
F5=Reset
F9=Shell

F2=Refresh
F6=Command
F10=Exit

F3=Cancel
F7=Edit
Enter=Do

F4=List
F8=Image

Back up a file system by inode

Syntax:

```
backup [-u] [-level] [-f device] filesystem
```

- Levels provide incremental backups:
 - 0 Full file system back up
 - 1,-2, etc Backup changes since *level* -1
 - u Updates **/etc/dumpdates**
(**/etc/dumpdates** contains a backup history)

```
# backup -u -1 -f /dev/rmt0 /home
```

Incremental backup example

Sun	Mon	Tue	Wed	Thur	Fri	Sat
					¹ level 0	²
³	⁴ level 6	⁵ level 6	⁶ level 6	⁷ level 6	⁸ level 3	⁹
¹⁰	¹¹ level 6	¹² level 6	¹³ level 6	¹⁴ level 6	¹⁵ level 0	¹⁶
¹⁷	¹⁸ level 6	¹⁹ level 6	²⁰ level 6	²¹ level 6	²² level 3	²³
²⁴	²⁵ level 6	²⁶ level 6	²⁷ level 6	²⁸ level 6	²⁹ level 0	³⁰
³¹						

Back up a file system by inode using SMIT

```
# smit backfilesys
```

Backup a Filesystem

Type or select values in entry fields.

Press Enter AFTER making all desired changes.

	[Entry Fields]	
This option will perform a backup by inode.		
* FILESYSTEM to backup	[]	+/
* Backup DEVICE	[/dev/fd0]	+/
Backup LEVEL (0 for a full backup)	[0]	#
RECORD backup in /etc/dumpdates?	no	+
* Backup extended attributes?	yes	+
* Backup EFS attributes?	yes	+

F1=Help

F2=Refresh

F3=Cancel

F4=List

F5=Reset

F6=Command

F7=Edit

F8=Image

F9=Shell

F10=Exit

Enter=Do

restore command (1 of 2)

- List files on media (verify the backup):

```
restore -T [-q] [-v] [-f device]
```

```
# restore -Tvf /dev/rmt0
```

- Restore individual files:

```
restore -x [-q] [-v] [-f device] [file1 file2 ..]
```

```
# restore -xvf /dev/rmt0/home/mike/manual/chap1
```

- Restore complete file system:

```
restore -r [-q] [-v] [-f device]
```

Restore backups in order, that is, -0 then -1 and so forth

```
# restore -rqvf /dev/rmt0
```

restore command (2 of 2)

- Restores the file attributes without restoring the file contents:

```
restore -Pstring [-q] [-v] [-f device] [file1 file2 ...]
```

string can be:

- A Restore all attributes
- a Restore only the permissions of the file
- o Restore only the ownership of the file
- t Restore only the timestamp of the file
- c Restore only the ACL attributes of the file

- To restore only the permissions of the file **/etc/passwd** from the archive:

```
# restore -Pa -vf /dev/rmt0 ./etc/passwd
```

- To display only the permissions of the file **/etc/passwd** on the archive:

```
# restore -Ta -vf /dev/rmt0 ./etc/passwd
```

Restore a File or Directory

smit restfile

Restore a File or Directory

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

	[Entry Fields]	
* Restore DEVICE	[/dev/fd0]	+/
* Target DIRECTORY	[.]	/
FILE or DIRECTORY to restore	[]	
(Leave blank to restore entire archive.)		
VERBOSE output?	no	+
Number of BLOCKS to read in a single input operation	[]	#
Restore Extended Attributes?	yes	+

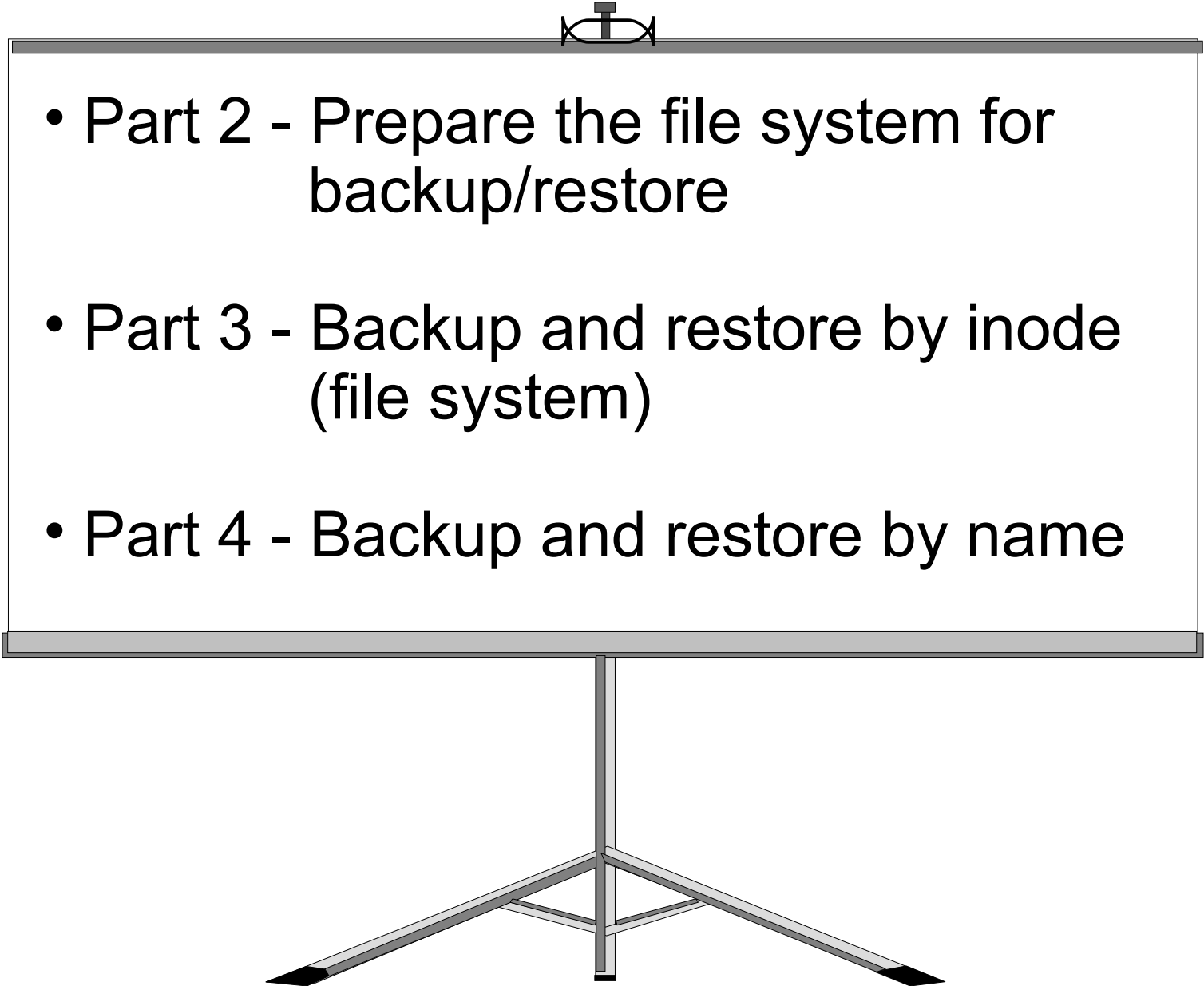
F1=Help
F5=Reset
F9=Shell

F2=Refresh
F6=Command
F10=Exit

F3=Cancel
F7=Edit
Enter=Do

F4=List
F8=Image

Exercise 13: Using backup and restore (parts 2, 3 and 4)

- 
- Part 2 - Prepare the file system for backup/restore
 - Part 3 - Backup and restore by inode (file system)
 - Part 4 - Backup and restore by name

Other UNIX backup commands

- **tar** (tape archive)
 - Widely available
 - Good for transfer of data between platforms
- **cpio** (copy input to output)
 - Widely available
 - Difficulties can occur with many symbolic links
- **dd** (device to device)
 - Makes backup copies that are an exact image
 - Can also be used for conversions
 - For example: can convert ASCII to EBCDIC

The tar command

- Generate a **tar** backup:

```
# tar -cvf /dev/rmt0.3 /home
```

- Restore a file from a **tar** image:

```
# tar -xvf /dev/rmt0 /home/team01/mydir
```

- List (verify) content of a **tar** file:

```
# tar -tvf /dev/rmt0
```

The `cpio` command

- Generate a `cpio` backup:

```
# find /home | cpio -ov> /dev/rmt0
```

- Restore from a `cpio` image:

```
# cpio -idv </dev/rmt0
```

- List (verify) the contents of a `cpio` image:

```
# cpio -itv < /dev/rmt0
```

The dd command

- The **dd** command converts and copies files
- To copy a file to diskette

```
# dd if=/etc/inittab of=/dev/rfd0
```

- To convert a file from ASCII to EBCDIC

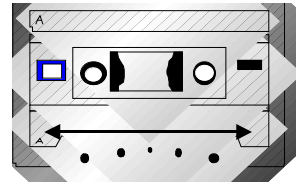
```
# dd if=text.ascii of=text.ebcdic conv=ebcdic
```

- To convert data to uppercase characters

```
# cat lcase.data | dd conv=ucase
```

Controlling the tape

tctl	rewind	Rewinds a tape
	fsf	Fast forwards a tape
	offline	Ejects a tape
	rewoffl	Rewinds and ejects a tape



```
# tctl -f /dev/rmt0 rewind
# tctl -f /dev/rmt0.1 fsf 3
# tctl -f /dev/rmt0 rewoffl
```

restore -s

```
# restore -s 4 -xvf /dev/rmt0.1 ./etc/inittab
```

Good practices

- Verify your backups
- Check the tape device
- Keep old backups
- Offsite secure storage
- Label tape
- Test recovery procedures before you have to!



Checkpoint

1. What is the difference between the following two commands?
a) `find /home/fred | backup -ivf /dev/rmt0`
b) `cd /home/fred; find . | backup -ivf /dev/rmt0`

- On a `mksysb` tape, if you entered `tctl rewind` and then `tctl -f/dev/rmt0.1 fsf 3`, which element on the tape could you look at?

- Which command could you use to restore these files?

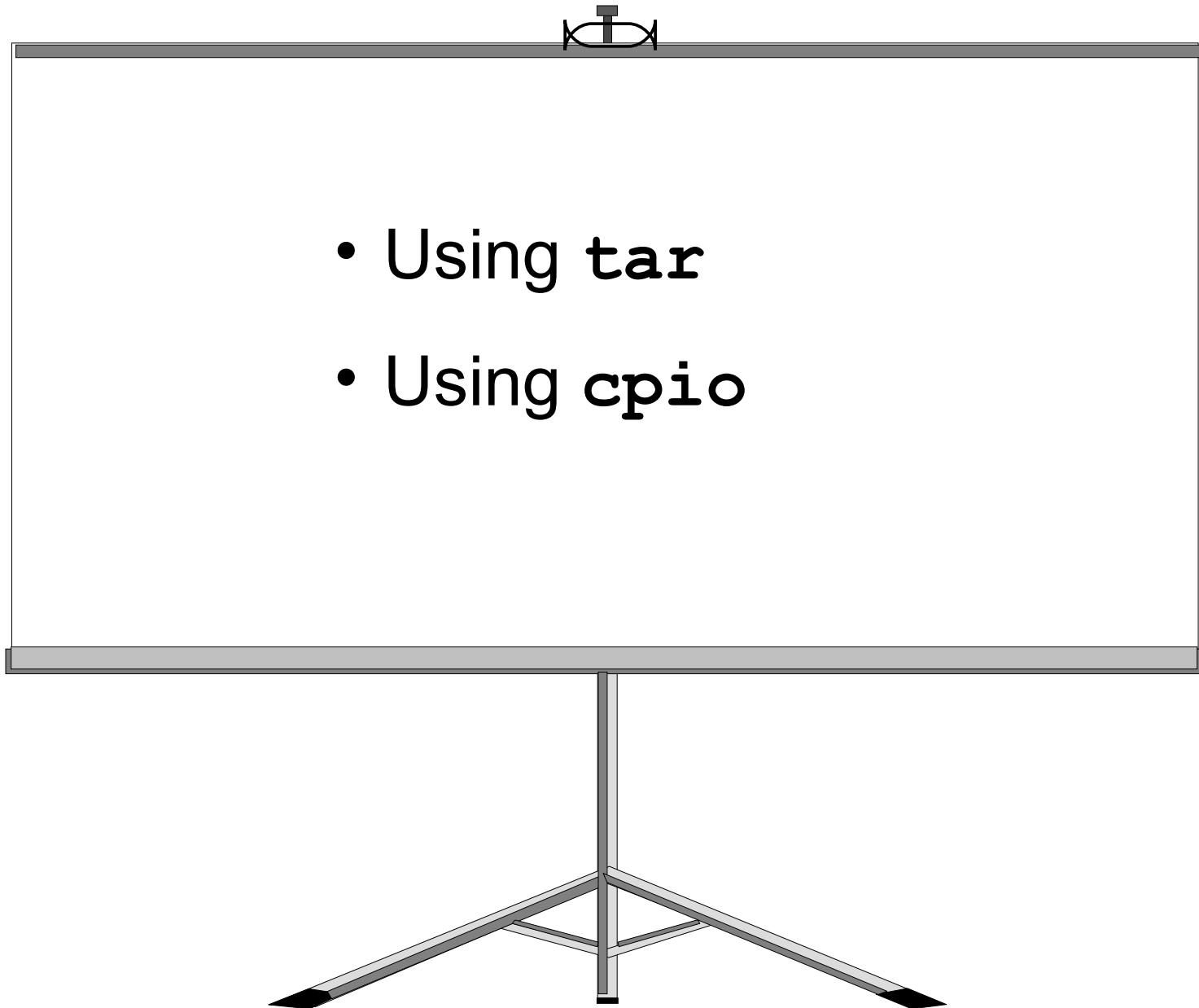
6. True or False? `smit mksysb` backs up all file systems, provided they are mounted. _____

Checkpoint solutions

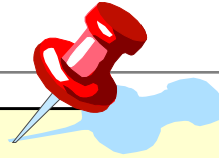
1. What is the difference between the following two commands?
 - a) `find /home/fred | backup -ivf /dev/rmt0`
 - b) `cd /home/fred; find . | backup -ivf /dev/rmt0`

(a) backs up the files using the full path names, whereas
(b) backs up the file names using the relative path names.
So (b)'s files can be restored into any directory.
- On a `mksysb` tape, if you entered `tctl rewind` and then `tctl -f/dev/rmt0.1 fsf 3`, which element on the tape could you look at?
You would be at the start of the backed up images of the files, having skipped over the boot portion of the tape.
- Which command could you use to restore these files? The files were backed up using the `backup` command so you would have to use the `restore` command.
6. True or **False**? `smit mksysb` backs up all file systems, provided they are mounted. `mksysb` only backs up `rootvg` file systems. To back up other volume groups, you must use the `savevg` command.

Exercise 14: (optional) Using tar and cpio



Unit summary



- In order to perform successful backups, consideration must be given to the frequency of the backup, the media to be used and the type of backup.
- Backups can be initiated on a single file, a file system or an entire volume group, all of which are supported through SMIT.
- By modifying the **bosinst.data** and the **image.data** files, a customized system image backup can be created.
- There are many other UNIX backup commands which can be used, however their limitations must be fully understood. The commands include: **tar**, **cpio** and **dd**.
- Other useful commands also exist to manipulate the data on the backup media such as **tctl**.