

Creating, Checking, and Restoring an AIX System Image Backup (mksysb)

Although most sites generally make a successful AIX operating system (OS) backup by just running `mksysb /dev/rmt0`, few sites ensure the correct filesystem sizes to ensure a successful backup. Many do not crosscheck that their backup is viable.

The following will assist in ensuring a good-quality AIX backup that can be reliably used to restore the AIX operating system without undue disruption to **Ensemble/Cache/RPMS**.

Unless you have special instructions to utilize a customized `image.data` file (no sites are currently known to utilize this), you will want the AIX backup command to create a new image of the current state of the paging space, file systems, etc., prior to creating a backup. Additionally, you will want to ensure that the `/tmp` filesystem is large enough to accommodate backup or restoration of that image.

Finally, you want to consider if the system is utilizing part of the disk space in `rootvg` for backups (common when the disks assigned to the `rootvg` are over specified and are much larger than needed for the OS).

Creating

Presuming that the backup is to be run to the first tape drive, which would default to `/dev/rmt0`, the default form of the command that most sites should be running is:

```
mksysb -iX /dev/rmt0
```

This command presumes creating a new `image.data` file (**i**) to ensure consideration of the paging space, filesystems, etc., expands the `/tmp` filesystem if needed (**X**), and writes the backup to tape drive `rmt0`. There is also a flag (**V**) that can verify the ability to write the backup. This is not recommended as it falsely leads one to believe that the tape must be good.

You can invoke the System Management Interface Tool (SMIT) to assist in running the command as the following:

```
smitty mksysb
```

Note: Use “smitty” instead of “smit” to run ASCII mode in Xwindows environments.

```

Back Up This System to Tape/File or UDFS capable media

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                [/dev/rmt0]      +/
Create MAP files?                       no              +
EXCLUDE files?                           no              +
Exclude WPAR file systems?              no              +
Location of File System Exclusion List   []              /
List files as they are backed up?       no              +
Verify readability if tape device?     yes             +
Generate new /image.data file?         yes             +
EXPAND /tmp if needed?                  yes             +
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.)        []              /
Back up encrypted files?                 yes             +
Back up DMAPI filesystem files?         yes             +

Esc+1=Help      Esc+2=Refresh      Esc+3=Cancel      Esc+4=List
Esc+5=Reset     F6=Command       F7=Edit           F8=Image
F9=Shell        F10=Exit         Enter=Do
    
```

Figure 1: Back Up This System to Tape/File or UDFS capable media

This will result in a conclusion screen as shown in Figure 2.

```

                                COMMAND STATUS

Command: OK                stdout: yes                stderr: no

Before command completion, additional instructions may appear below.

[MORE...4]
bosboot: Boot image is 47104 512 byte blocks.
.

Creating list of files to back up.

Backing up 87784 files.....

87784 of 87784 files (100%)

Verifying readability...

New volume on /dev/rmt0.1:
Cluster size is 51200 bytes (100 blocks).
The volume number is 1.
The backup date is: Mon Feb 24 15:45:41 MST 2014
Files are backed up by name.
The user is root.
The number of archived files is 87784.

0512-038 mksysb: Backup Completed Successfully.

bosboot: Boot image is 47104 512 byte blocks.
█
[BOTTOM]

Esc+1=Help          Esc+2=Refresh      Esc+3=Cancel      F6=Command
F8=Image            F9=Shell           F10=Exit          /=Find
n=Find Next

```

Figure 2: Command Status

If a site is utilizing excess space in the rootvg to make online backups that they would not want restored in the event that AIX were restored (e.g., they would not want a month-old version of those backups), the full pathnames of the backups should be listed in `/etc/exclude.rootvg` with one line for each pathname, then run the command as follows:

```
mksysb -iXe /dev/rmt0
```

This will exclude (e) backing up the files listed in `/etc/exclude.rootvg`.

When the backup is complete, confirmation of the backup will display on your screen. Even if it says that it is a good backup, review of the tape may show it to be non-viable (e.g., old tapes that seem to be written but cannot be read back). Equally, error messages regarding files changing during the backup or vanishing may be fine. The operating system backup is intended to be run during a quiescent time for the OS, so running it during a production day can cause vanishing temporary files that really did not need to be backed up.

Checking

To test the viability of the backup, run the following:

```
restore -s4 -Tvqf/dev/rmt0.1
```

or

```
lsmksysb (defaults to rmt0)
```

This command will cause the tape to skip the boot and volume group recreation sections, then reread and display the names of all the files on the tape. This is a highly visual way to examine the ability of the command to skip the areas of the backup that are for rebuilding the volume group and filesystems, plus verify that the tape is readable by reading back the filenames. When this command concludes, that tape has been proven to be readable with the contents stored in the correct location to be considered a viable system image backup.

Should you receive an error that says that it could not back up a file for some reason and the read back fails by asking you to mount a second tape (even though it never requested one nor wrote to one during the backup), you likely have a packing error (a packing algorithm writes two bytes data per byte to conserve space). Should you see the following:

```
....  
....  
....  
  
a    2038    ./etc/corrals/secattr  
a    3532    ./etc/cronlog.conf  
a    1309    ./etc/csh.cshrc  
a    1373    ./etc/csh.login  
a    129     ./etc/ct_node_id  
cp: Requested a write of 131072 bytes, but wrote only 61440. Cannot copy  
./etc/daemon.info.log to a temporary location.  
An internal packing error occurred: incorrect size  
./etc/daemon.info.log will not be backed up.  
  
0512-005 mksysb: Backup Completed.  
The backup command completed with errors.  
The messages displayed on Standard Error contained additional
```

Then, run **mksysb** with the addition of the **p** flag to suppress packing:

```
# mksysb -iXp /dev/rmt0
```

That should clear the problem and result in a good, verifiable backup.

SMIT Check of Tapes

If you prefer utilizing the SMIT interface, you can run the following:

Note: SMIT will error on lengthy readbacks due to limited display space.

```
smitty lsmksysb
```

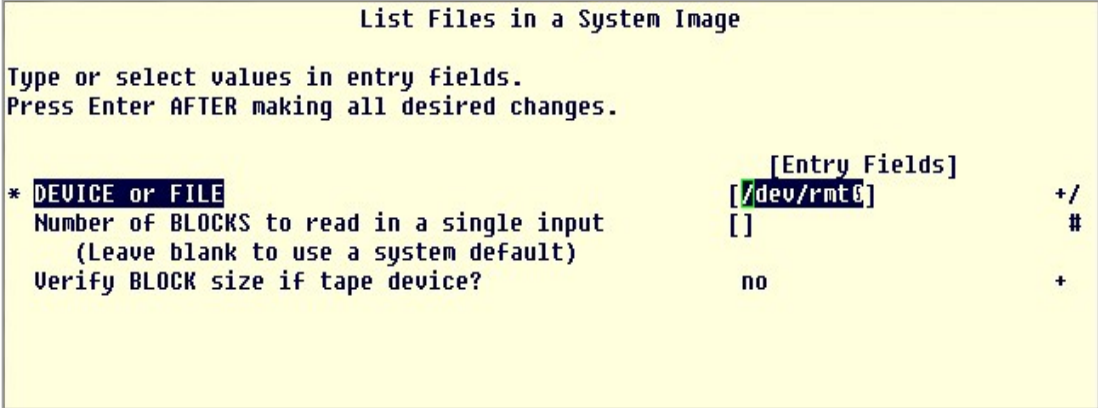


Figure 3: List of Files in a System Image

When concluded, your screen will look similar to the Figure 4 (your numbers will be different):

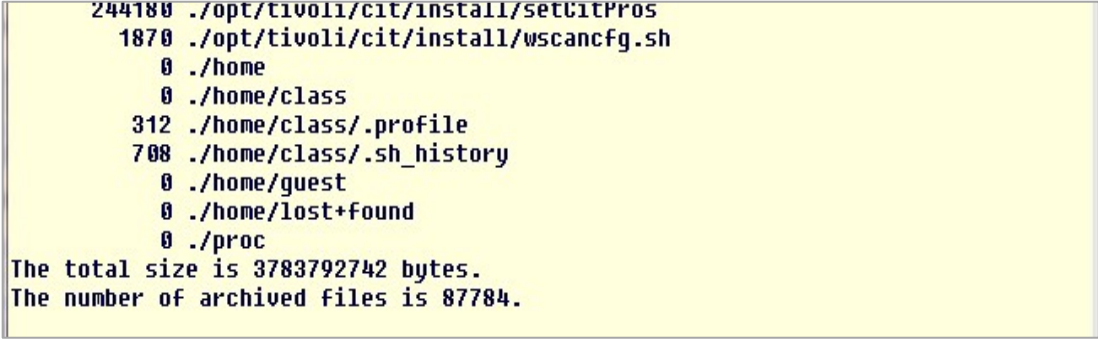


Figure 4: Total size and number of files

Restoring

To restore a system image backup, do the following:

1. Place the image backup in the drive.
2. Reset the bootlist from the command line as:

```
bootlist -m normal rmt0 hdisk0
```

- a. If AIX is unbootable, set the first boot device to **rmt0** in the SMS menus.
3. Reboot the system.
 - a. If at the command line, run:

```
shutdown -Fr,.
```

4. Answer the prompts as appropriate until the Installation screen.

```
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
88 Help ?
99 Previous Menu
>>> Choice [1]: 3
```

Figure 5: Installation and Maintenance menu

- a. Choose **3**, the **Start Maintenance Mode for System Recovery** option.
- b. Choose the **Install from a System Backup** option.
- c. Choose the drive containing the backup tape.
- d. The system reads the tape and begins the installation.

At the conclusion of the tape-read cycle, the system will reboot itself and will likely come up ready to run as previously. This is generally the case if the system backup is close to the running system. A system backup image should be made whenever a number of new users, printers, or other devices have been added to the system. It should always be made immediately prior to a system upgrade. It should definitely be done after a system upgrade upon confirmation of proper system function.