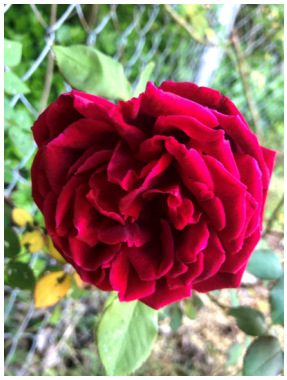

NIM 201

Power Virtual User Group 1/22/2025

jaqui@circle4.com or jaquilynch@gmail.com

http://www.circle4.com/ptechu/nim201-jan222025.pdf

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Agenda

- Migrations and NIMADM
- Backups
- Using File Backed Optical (FBO) to enhance NIM functionality.
- VIOS and NIM
- Hints and tips
- Useful Commands

- Adventures with NIMADM
  - https://techchannel.com/systems-management/nimadm-aix-v7-2-to-v7-3/
- Article from 2019 on Using NIM with VIO Servers
  - http://www.circle4.com/jaqui/eserver/usingnimwithVIO-sep2019.pdf

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1. Introduction
Cool NIM things you can do

- Install and maintain systems
- Backup and restore AIX LPARs and VIO servers
- Update LPARs and VIO servers
- Alternate disk – install, copy, clone
- Migrations
- Alternate Masters

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MIGRATIONS AND NIMADM
And Working with MKSYSBs

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Migrations and Updates

Migration

Changes version or release

Update

Preserves version and release
Basically changes a TL or SP

Both migrations and updates can use alternate copies of rootvg if there is an unused disk available

After changes, boot from altinst_rootvg and test

Migrate or update NIM Master first
Then update LPP_SOURCE and SPOT or create new ones

Use nimadm for migrations, to install a down level mksysb and then migrate it or to install a new golden image

Use nim_alt_clone with update_all to update a TL or SP
With multibos the standby copy of AIX can be on the same physical disk as the current rootvg

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Image_data

- Template is /usr/lpp/bosinst/image.template
- Copy and modify
- Specify things like
  - logical volume policy
  - SHRINK=no
  - EXACT_FIT=no
  - lv_data: (an lv_data stanza for each logical volume in rootvg)
    - COPIES= 1 (or 2, 3 to mirror. make sure you have enough target disk stanzas in the bosinst_data resource)
    - LPs= nn (the number of logical partitions)
    - PP= nn (if mirroring, this is an exact 2x or 3x of LPs)
- If you don't specify an image_data resource, NIM will use the file embedded in the mksysb image.
- Typical use of a "side" image.data file is when mksysb is mirrored, but the new install is to be nonmirrored, or vice-versa.
- Now set up the mksysb resource to use for the restore

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Setup mksysb as a resource

smitty nim
Perform nim administrative tasks
Manage resources
Define a resource

Select mksysb resource and then fill in the following fields
name = mksysb_aix7340
server = master
location = /nim/images/aix7340-golden.mksysb

OR

nim -o define -t mksysb -a server=master -a location=/nim/images/ aix7340-golden.mksysb mksysb_ aix7340

For VIO:
Grab the VIO 4.1.2.0 mksysb image off the Flash ISO downloaded from ESS

loopmount -i /software/powervm41/Virtual_IO_Server_Base_Install_4.1.2.0_Flash_122025_LCD8292404.iso -o "-V udfs -o ro" -m /cdrom

cp /cdrom/usr/sys/inst.images/mksysb_image /nim/images/mksysb_vio4120_2025

nim -o define -t mksysb -a server=master -a location=/nim/images/mksysb_vio4120_2025 mksysb_vio4120_2025

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Setup a client to restore from a mksysb

- Make sure aix2 (client) is in /etc/hosts or in DNS and that the name can be resolved
- Create the client (aix2) machine to nim as a machine object
- The first step is to define aix2 as a client machine
- smitty nim, perform NIM administrative tasks, manage machines, Define a machine
- Put in the hostname (i.e. aix2) as it is in /etc/hosts or DNS
- Select correct network type (usually ent)
- Select 64 as kernel, nimsh as shell, N/A as network i/face
- lsnim | grep aix2 check it is there
- Now create an image_data if you need one

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Tell NIM to use the AIX 7.3.4.0 mksysb for aix2 machine

smitty nim_bosinst
- Select aix2
- install source = mksysb_aix73tl4sp0_2025
- select mksysb and spot as resources (also select the lpp)
- Select yes to accept licenses
- Select no to initiate now

Initiate now = no means this is a pull resource and must be initiated at the client

nim -o allocate -a spot=spot_73tl4sp0-254-a lpp_source=lpp_73tl4sp0-2541 -a mksysb= mksysb_aix73tl4sp0_2025 aix2
OR
nim -o allocate -a lpp_source=lpp_73tl4sp0-254 -a spot=spot_73tl4sp0-254 -a mksysb= mksysb_aix73tl4sp0_2025 -a bosinst_data=bosinst72 -a installp_bundle=netapphak60 aix2

nim -o bos_inst -a source=mksysb -a accept_licenses=yes -a boot_client=no -a installp_flags='-agX' aix2

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smitty nim_bosinst

Install the Base Operating System on Standalone Clients
Type or select values in entry fields.
Press Enter AFTER making all desired changes.

[TOP]	[Entry Fields]
* Installation Target	aix01
* Installation TYPE	mksysb
* SPOT	spot_73tl4sp0-2546
LPP_SOURCE	[lpp_73tl4sp0-2546] +
MKSYSB	aixnim-mksysb
BOSINST_DATA to use during installation	[] +
IMAGE_DATA to use during installation	[] +
RESOLV_CONF to use for network configuration	[] +
Customization SCRIPT to run after installation	[] +
Customization FB Script to run at first reboot	[] +
ACCEPT new license agreements?	[yes] +
Remain NIM client after install?	[yes] +
PRESERVE NIM definitions for resources on this target?	[yes] +
FORCE PUSH the installation?	[no] +
Initiate reboot and installation now?	[no] +
-OR-	
Set bootlist for installation at the next reboot	[no] +

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Checks

- showmount –e

```
/nim/images/mksysb_aix73tl4sp0_2025                          aix2
/nim/lpp_source/lpp_73tl04sp0-2546                  aix2
/nim/spot/spot_72tl01sp2/spot_73tl4sp0-2546/usr     aix2
```

- # cat /etc/bootptab

aix2:bf=/tftpboot/gandalf:ip=10.152.10.124:ht=ethernet:sa=10.152.10.203:sm=255.255.255.0:

- ls -al /tftpboot | grep vios | sort

```
-rw-r--r--   1 root     system          512 Jan 06 16:56 spotvios4120.iplrecord.ent
-rw-r--r--   1 root     system          512 Jul 29 15:54 spotvios41110.iplrecord.ent
-rw-r--r--   1 root     system     31457280 Jan 06 16:56 spotvios4120.chrp.64.ent
-rw-r--r--   1 root     system     31457280 Jul 29 15:54 spotvios41110.chrp.64.ent
```

- You should see iplrecord, .ent and .info files for the server plus the spot and lpp

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mksysb Resources

#lsnim -l | grep mksysb

```
# lsnim -l | grep mksysb
 serves             = mksysb_vio4120_2025

mksysb_vio4120_2025:
   type           = mksysb
   location       = /nim/images/mksysb_vio4120_2025
   mksysb_source = mksysb_vio4120_2025

# ls -l /nim/images | grep 4120
-r--r--r--    1 root     system   2442393600 Dec 19 17:19 mksysb_vio4120_2025
```

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Check VIOS mksysb definition

#lsnim -l mksysb_vio4120_2025

```
mksysb_vio4120_2025:
  class        = resources
  type         = mksysb
  creation_date  = Tue Jan 6 16:53:10 2026
  Rstate       = ready for use
  prev_state    = unavailable for use
  location     = /nim/images/mksysb_vio4120_2025
  version      = 7
  release      = 3
  mod          = 4
  oslevel_r    = 7300-04
  oslevel_s    = 7300-04-00-2546
  alloc_count   = 0
  server       = master
  extracted_spot = spotvios4120
```

Check the image is there:

 # ls -l /nim/images/mksysb_vio4120_2025

```
-r--r--r--    1 root     system   2442393600 Dec 19 17:19 mksysb_vio4120_2025
```

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Start the install from the client (pull method)

- Boot client into SMS mode either from the HMC or the server

Select 2 for setup remote IPL
- Select 1 for first ethernet
- Select 1 for IPV4
- Select 1 for bootp
- Select 1 for IP parameters
  - 1 - client – 10.0.1.5 — Use the client IP here
  - 2 - server - 10.0.1.9 — Use the NIM server IP here
  - 3 - Gateway - 10.0.1.1 — You may need to leave this as 0.0.0.0
  - 4 - Subnet - 255.255.255.0
- Esc
- Select 2 for adapter config
  - 2 spanning tree - ensure it is disabled (this can speed things up)
  - ESC
  - 3 - protocol - set it to standard
  - ESC and ESC
  - 3 Ping test then 1 to execute ping test

If the ping test is successful return to main menu
Select 5 - boot options
- 1 select boot device
- 6 select network
- 1 bootp
- 1 select first ethernet or whichever ethernet is the correct one
- 2 normal mode boot
- 1 yes I want to exit

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Next steps

- LPAR/Server should boot, and you should see tftp start up
- After around 30,000 to 70,000 packets the console prompt should appear
- Sometimes it goes through the tftp process twice

    - F1 and enter for console
    - 1 for english during install
    - An error message that "all LVs are being created exactly as they were but the disks are not the same" may appear. Unless there is a reason not to, go ahead and:
    - Choose 1 to continue with install
    - 2 Check install settings
    -
    - Make sure that only 1 disk is chosen here and that it is the correct one for rootvg:
    - Choose hdisk0
    - Use maps for installation – I tend to choose no
    - Check that importvgs defaults to n
    - 0 to continue with choices

- Note make sure the mksysb you are using is not of a mirrored system – if it is mirrored then you will need to provide 2 disks to restore to or use a side image.data file
- After the system reboots you can import volume groups, remirror rootvg and perform further tailoring

- If this is a netapp then you may have to take all except one path away as the mpio drivers are not part of the boot image

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Continuing on

- After the reboot the install should start
- Monitor using lsnim –l lparname
- This will show you how far it has gone
- Or you can monitor reference codes on the HMC

- You can also ssh to the HMC and use vtmenu to get a console on the LPAR so you can watch it boot

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nim –o update

1. To add all the filesets on /dev/cd0 to lpp_source1, enter the following command:
   nim -o update -a packages=all -a source=/dev/cd0 lpp_source1

2. To add the bos.games 7.1.0.0 and bos.terminfo filesets to lpp_source1, enter the following command:
   nim -o update -a packages="bos.games 7.1.0.0 bos.terminfo" -a source=/dev/cd0 lpp_source1

3. To remove bos.games from lpp_source1, enter the following command:
   nim -o update -a rm_images=yes -a packages="bos.games" lpp_source1

4. To recover the missing SIMAGES for lpp_source1 from the AIX Installation CD, enter the following command:
   nim -o update -a recover=yes -a source=/dev/cd0 lpp_source1

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nimadm

nimadm (Network Install Manager Alternate Disk Migration) command
Utility that allows the system administrator to:

Create a copy of rootvg to a free disk (or disks) and simultaneously migrate it to a new version or release level of AIX.

Using a copy of rootvg, create a new NIM mksysb resource that has been migrated to a new version or release level of AIX.

Using a NIM mksysb resource, create a new NIM mksysb resource that has been migrated to a new version or release level of AIX.
nimadm -T xxmksysb-apr2417 -O /nim/mksysb/xxmksysb-may0417 -s spot7212 -l lpp_tl01sp1 -j nimvg -Y -N

Using a NIM mksysb resource, restore to a free disk (or disks) and simultaneously migrate to a new version or release level of AIX.

Once upgraded mksysb is there, you can either boot from it over the network or copy it to the client and use alt disk install to restore the mksysb to the alt disk.

man nimadm provide man page entries

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nimadm

Make sure bos.alt_disk_install.rte is installed into your spot or you will get error messages
Also make sure there are no errors in /etc/inittab or /etc/inetd.conf

To update the NIM client, from 7300-03-00-2446 to 7300-03-01-2520 on hdisk1 if rootvg elsewhere:
nimadm -j nimadmvg -c aix7331 -s spotAIX73TL3SP1 -l AIX73TL3SP1 -d hdisk1 -Y -A –U

The flags indicate the following:
-c client's name
-T specifies the existing AIX 6.1 NIM mksysb resource.
-O specifies the output location for the migrated mksysb resource.
-s indicates the AIX 7.1 NIM SPOT resource for the migration.
-l indicates the AIX 7.1 NIM lpp_source resource for the migration.
-j identifies the volume group that will be used on the NIM master to create file systems.
-Y Agrees to required software license agreements for software to be installed.
-N specifies the name of the new AIX 7.1 NIM mksysb resource to be created after migration.
-A Adds a timestamp at the start of each phase
-d hdisk1 tells it to do the upgrade to an alternate disk (hdisk1)
-U performs an AIX TL or SP update by using the specified LPP and SPOT (as of NIM server at AIX 7.3.3)

For alternate disk migration:
nimadm -l lpp_source -c NIMClient -s SPOT -d TargetDisks [-a PreMigrationScript] [-b installp_bundle] [-z PostMigrationScript] [-e exclude_files] [-i image_data] [-j VGname] [-m NFSMountOptions] [-o bosinst_data] [-P Phase] [-j VGname] [-Y] [-F] [-D] [-E] [-V] [{ -B | -r }]

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nimadm – Verify update

Once nimadm is complete hdisk1 would now be at the updated level
You can confirm this as follows:

oslevel –s
This will show the current rootvg oslevel

lspv
Shows hdisk1 as altinst_rootvg

Wakeup the altinst_rootvg
alt_rootvg_op -W -d hdisk1

Chroot to the updated disk

chroot /alt_inst /alt_inst/bin/ksh oslevel -s
Should show
7300-03-01-2520

Put altinst_rootvg back to sleep
alt_rootvg_op -S -d hdisk1

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nimadm – Verify update

In this case I did a live update after taking a clone so the alternate disk should be at the old level

```
#lspv | grep root
hdisk3          00c47b307f5f4996                    rootvg          active
hdisk0          00c47b30cba20b09                    altinst_rootvg

#alt_rootvg_op -W -d hdisk0
Waking up altinst_rootvg volume group ...
```

df should now show a number of /alt_inst directories mounted

```
#chroot /alt_inst /alt_inst/bin/ksh oslevel -s
7300-03-01-2520

alt_rootvg_op -S -d hdisk0

#oslevel -s
7300-04-00-2546
```

The oslevel on the altinst_rootvg is 7.3.3.1 which is the level prior to the upgrade I just did
The current system is 7.3.4.0

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NIM Cloning

Clone rootvg to another disk – can use this for VIO servers as well as regular LPARs

alt_disk_copy –V –B –d hdisk2 (if you add –B flag it does not set the bootlist but I still set it anyway)
bosboot –a –d hdisk2
bootlist –m normal –o Check what bootlist is now
bootlist –m normal hdisk2
bootlist –m normal -o

IBM uses this for their v3 and v4 VIO server upgrades under the covers

Update within the same version/release (i.e update a TL or SP)
Build the lpp_source at the desired level with simages-yes
Update NIM master from this lpp_source and reboot master
On client
- unmirror rootvg and cleanup (chpv –c and reducevg)
- bosboot –a and bootlist –m

Master
- smitty nim_alt_clone
- Specify target client and target disks
- Set FIXES to install to “update_all”
- Point to lpp_source from above and accept licenses

The clone and update will take place on altinst_rootvg while still running on rootvg
Boot from altinst_rootvg and test
Either reboot from old rootvg or make this the production one
If you don’t plan to reboot immediately then ensure the bootlist is set to the original rootvg hdisk

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MULTIBOS

Creates, updates, and manages multiple versions of the Base Operating System (BOS) on a rootvg.

The multibos command allows the root level administrator to create multiple instances of AIX(R) on the same rootvg.

The multibos setup operation creates a standby Base Operating System (BOS) that boots from a distinct boot logical volume (BLV).

This creates two bootable sets of BOS on a given rootvg and the administrator can boot from either instance of BOS by specifying the respective BLV as an argument to the bootlist command or using system firmware boot operations.

Two bootable instances of BOS can be simultaneously maintained.

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Alternate Disk Install

- https://www.ibm.com/docs/en/aix/7.1.0?topic=alt-disk-install-command
- https://www.ibm.com/docs/en/aix/7.3.0?topic=aix-cloning-rootvg-using-alternate-disk-installation

- Make sure you have a spare hard disk or LUN
- Install bos.alt_disk_install.rte and update it
- Create a bundle to install to the new disk and any custom scripts
  - Or take a of the system to a file
- Clone rootvg using smitty alt_clone or alt_disk_copy
- lspv now shows a disk as rootvg and one as altinst_rootvg
- Check your bootlist as the alt disk install process changes it
  - bootlist –m normal –o
- Correct the bootlist back to normal until you are ready
- Now you can use smitty, software installation, alternate Disk Installation to do the upgrades to the new hard drive
- When happy with the upgrade you update the bootlist and reboot on the new image
- If having problems with nimadm you can create the migrated mksysb then copy it to the client and use alternate disk install to restore the mksysb on a separate disk

- **NOTE if the LPAR being updated has efixes (shown by emgr –P) then you will need to run a pre script to remove them or nimadm will fail**

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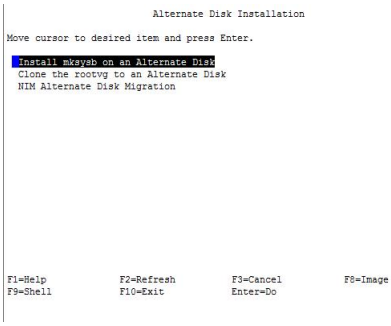
Alt Disk Install from mksysb

Commands to look at:
alt_disk_copy
alt_disk_install
alt_disk_mksysb
alt_rootvg_op




```
#
# lspv
hdisk0          00f6934c642af030                    rootvg          active
hdisk1          none                                None
# lsdev -Ccdisk
hdisk0 Available  Virtual SCSI Disk Drive
hdisk1 Available  Virtual SCSI Disk Drive
#
# lslpp -l | grep bos.alt
  bos.alt_disk_install.boot_images
  bos.alt_disk_install.rte   7.3.4.0  COMMITTED  Alternate Disk Installation
  bos.alt_disk_install.rte   7.3.4.0  COMMITTED  Alternate Disk Installation
```

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Alt Disk Install from mksysb

```
                        Install mksysb on an Alternate Disk

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

                                                      [Entry Fields]
* Target Machine / Group to Install                  []
* Target Disk(s) to install                          []
* MKSYSB image                                       []
  Phase to execute                                    all
  IMAGE_DATA resource                                []
  Customization SCRIPT resource                      []
  Set bootlist to boot from this disk
  on next reboot                                      yes
  Reboot when complete?                               no
  Verbose output?                                     no
  Debug output?                                       no
  RESOLV_CONF                                        []
  Remain NIM client after install?                    yes
```

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Alt Disk from mksysb

```
                                COMMAND STATUS

Command: running       stdout: yes           stderr: no

Before command completion, additional instructions may appear below.

[MORE...6]
Restoring /image.data from mksysb image.
Checking disk sizes.
Creating cloned rootvg volume group and associated logical volumes.
Creating logical volume alt_hd5.
Creating logical volume alt_hd6.
Creating logical volume alt_hd8.
Creating logical volume alt_hd4.
Creating logical volume alt_hd2.
Creating logical volume alt_hd9var.
Creating logical volume alt_hd3.
Creating logical volume alt_hd1.
Creating logical volume alt_hd10opt.
Creating logical volume alt_hd11admin.
Creating logical volume alt_lg_dumplv.
[BOTTOM]
```

Plus many more as it restores from the mksysb image

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Alt Disk from mksysb

Now we see:

```
# lspv
hdisk0      00f6934c642af030              rootvg        active
hdisk1      00f6934c75816830              altinst_rootvg  active

# bootlist -m normal -o
hdisk0 blv=hd5 pathid=0
```

Phase 1	Creates the **altinst_rootvg** volume group, the **alt_** "logical volumes", the **/alt_inst** file systems, and restores the mksysb or rootvg data.
Phase 2	Runs any specified customization script, installs updates, new filesets, fixes or bundles (cloning only), copies a **resolv.conf** file if specified, and copies files over to remain a NIM client if specified.
Phase 3	Unmounts the **/alt_inst** file systems, renames the file systems and logical volumes, removes the **alt_ logical** volumes, names ODM and varies off the altinst_rootvg. It sets the bootlist and reboots if specified.

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Alt Disk from mksysb

```
# lspv -l hdisk0
hdisk0:
LV NAME       LPs   PPs   DISTRIBUTION      MOUNT POINT
hd8           1     1     00..00..01..00..00   N/A
hd6           64    64    00..64..00..00..00   N/A
hd2           80    80    00..00..80..00..00   /usr
hd4           10    10    00..00..10..00..00   /
hd3           48    48    00..00..48..00..00   /tmp
hd9var        12    12    00..00..12..00..00   /var
hd10opt       32    32    00..32..00..00..00   /opt
hd1           4     4     00..00..04..00..00   /home
hd5           1     1     01..00..00..00..00   N/A
lg_dumplv2    16    16    00..16..00..00..00   N/A
fslv00        80    80    80..00..00..00..00   /usr/local
fslv01        16    16    00..16..00..00..00   /usr/local/logs
lg_dumplv     16    16    00..16..00..00..00   N/A
livedump      4     4     00..04..00..00..00   /var/adm/ras/livedump
hd11admin     4     4     00..00..04..00..00   /admin
```

```
# lspv -l hdisk1
hdisk1:
LV NAME          LPs   PPs   DISTRIBUTION      MOUNT POINT
alt_hd10opt      32    32    00..32..00..00..00   /alt_inst/opt
alt_hd1          4     4     00..00..04..00..00   /alt_inst/home
alt_hd3          48    48    00..00..48..00..00   /alt_inst/tmp
alt_hd9var       12    12    00..00..12..00..00   /alt_inst/var
alt_hd2          80    80    00..00..80..00..00   /alt_inst/usr
alt_hd4          10    10    00..00..10..00..00   /alt_inst
alt_hd8          1     1     00..00..01..00..00   N/A
alt_hd6          64    64    00..64..00..00..00   N/A
alt_hd5          1     1     01..00..00..00..00   N/A
alt_lg_dumplv    16    16    00..16..00..00..00   N/A
alt_hd11admin    4     4     00..00..04..00..00   /alt_inst/admin
alt_lg_dumplv2   16    16    00..16..00..00..00   N/A
alt_fslv01       16    16    00..16..00..00..00   /alt_inst/usr/local/logs
alt_fslv00       80    80    80..00..00..00..00   /alt_inst/usr/local
alt_livedump     4     4     00..04..00..00..00
/alt_inst/var/adm/ras/livedump
```

You can display the above during the mksysb clone
At the end the alt_inst filesystems are all unmounted and altinst_rootvg is varied offline

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Alt Disk from mksysb

You can wake up the altinst_rootvg to mount the filesystems and put it back to sleep:

```
# alt_disk_install -W hdisk1
+-----------------------------------------------------------------------------+
ATTENTION: calling new module /usr/sbin/alt_rootvg_op. Please see the
alt_rootvg_op man page and documentation for more details.
Executing command: /usr/sbin/alt_rootvg_op -W -d hdisk1
+-----------------------------------------------------------------------------+
Waking up altinst_rootvg volume group ...
```

Replacement command to wake the disk is:
alt_rootvg_op –W –d hdisk1

Replacement command to put the disk back to sleep is:
alt_rootvg_op –S –d hdisk1

```
# lspv
hdisk0          00f6934c642af030                    rootvg          active
hdisk1          00f6934c75816830                    altinst_rootvg  active
```

Once it is awake you can copy files that you may need

Back to sleep

```
# alt_disk_install -S hdisk1
+-----------------------------------------------------------------------------+
ATTENTION: calling new module /usr/sbin/alt_rootvg_op. Please see the
alt_rootvg_op man page and documentation for more details.
Executing command: /usr/sbin/alt_rootvg_op -S hdisk1
+-----------------------------------------------------------------------------+
Putting volume group altinst_rootvg to sleep ...
forced unmount of /alt_inst/var/adm/ras/livedump
forced unmount of /alt_inst/var/adm/ras/livedump
forced unmount of /alt_inst/var
forced unmount of /alt_inst/var
forced unmount of /alt_inst/usr/local/logs
forced unmount of /alt_inst/usr/local/logs
forced unmount of /alt_inst/usr/local
forced unmount of /alt_inst/usr/local
forced unmount of /alt_inst/usr
forced unmount of /alt_inst/usr
forced unmount of /alt_inst/tmp
forced unmount of /alt_inst/tmp
forced unmount of /alt_inst/opt
forced unmount of /alt_inst/opt
forced unmount of /alt_inst/home
forced unmount of /alt_inst/home
forced unmount of /alt_inst/admin
forced unmount of /alt_inst/admin
forced unmount of /alt_inst
forced unmount of /alt_inst
Fixing LV control blocks...
Fixing file system superblocks...
```

```
# lspv
hdisk0          00f6934c642af030                    rootvg          active
hdisk1          00f6934c75816830                    altinst_rootvg
```

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Alt Disk from mksysb

```
# df -g
Filesystem    GB blocks      Free %Used    Iused %Iused Mounted on
/dev/hd4         2.25      2.12   6%     9740     2% /
/dev/hd2        10.25      5.49  47%    91948     7% /usr
/dev/hd9var      2.00      1.15  43%     2059     1% /var
/dev/hd3         5.00      4.15  17%     1299     1% /tmp
/dev/hd1        40.00     39.98   1%      112     1% /home
/dev/hd11admin   1.00      1.00   1%        5     1% /admin
/proc               -         -    -        -     - /proc
/dev/hd10opt     5.00      3.20  37%    23881     4% /opt
/dev/livedump    0.25      0.25   1%        4     1% /var/adm/ras/livedump
/dev/lvlocal    50.00     49.98   1%       56     1% /usr/local
/dev/lvlocallogs 2.00      1.99   1%       26     1% /usr/local/logs
/dev/lvtftpboot 10.00      9.63   4%       30     1% /tftpboot
/dev/lvnim     100.00      5.00  96%   209038    13% /nim
/dev/lvbackups 350.00    126.27  64%       98     1% /backups
/dev/lvsoftware 445.00    41.25  91%    38111     1% /software
/ahafs              -         -    -       35     1% /aha
/dev/alt_hd4     2.25      2.16   5%     7995     2% /alt_inst
/dev/alt_hd11admin 1.00    1.00   1%        5     1% /alt_inst/admin
/dev/alt_hd1    40.00     39.98   1%      112     1% /alt_inst/home
/dev/alt_hd10opt 5.00      3.21  36%    23829     4% /alt_inst/opt
/dev/alt_lvtftpboot 10.00  9.69   4%       26     1% /alt_inst/tftpboot
/dev/alt_hd3     5.00      4.15  17%     1284     1% /alt_inst/tmp
/dev/alt_hd2    10.25      5.84  44%    86892     6% /alt_inst/usr
/dev/alt_lvlocal 50.00     49.98   1%       56     1% /alt_inst/usr/local
/dev/alt_lvlocallogs 2.00  1.99   1%       26     1%
/alt_inst/usr/local/logs
/dev/alt_hd9var  2.00      1.12  44%     1967     1% /alt_inst/var
/dev/alt_livedump 0.25     0.25   1%        4     1%
/alt_inst/var/adm/ras/livedump
```

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Quick alt_disk_copy with upgrade Example

alt_disk_copy -d hdisk1 -F 7330-01_AIX_ML -l /updates

The above copies the current 7330-01 rootvg to hdisk1
It applies the updates from /updates to bring the cloned rootvg to 7330-01
It also sets the bootlist to boot from hdisk1

Allows you to copy the running system and apply maintenance in one step
After reboot the old rootvg will be named old_rootvg
Use alt_rootvg_op to remove it later
Use bootlist to go back if needs be

OR
alt_disk_copy –d hdisk2 or alt_disk_copy –V –B –d hdisk2
Above just copies rootvg across to hdisk2
https://www.ibm.com/docs/en/aix/7.3.0?topic=alt-disk-copy-command
http://www-01.ibm.com/support/docview.wss?uid=isg3T1012273

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Migrating a 7.2 mksysb to a 7.3 mksysb for future use

Take a mksysb on the client to be updated
Copy it to /nim/images and add it as a resource

ls -l /nim/images/aix7251-golden.mksysb

ls -l /nim/images/aix7251-golden.mksysb
-rw-r--r-- 1 root system 10692556800 Jan 07 14:15 /nim/images/aix7251-golden.mksysb

nim -o define -t mksysb -a server=master -a location=/nim/images/aix7251-golden.mksysb mksysb_aix7251

lsnim | grep mksysb
mksysb_aix7251 resources mksysb

Check the mksysb
listvgbackup -f'/nim/images/aix7251-golden.mksysb' | grep rc.tcpip
listvgbackup -f'/nim/images/aix7251-golden.mksysb' | grep inetd.conf

Convert the mksysb to 7.3
nimadm -s spot_73tl4sp0-2546 -l lpp_73tl4sp0-2546 -j nimvg -Y -T mksysb_aix7251 -O /nim/mksysb/aix7340-golden.mksysb 6 -N -V mksysb_aix7340

Initializing the NIM master.
Verifying alt_disk_migration eligibility.
Initializing log: /var/adm/ras/alt_mig/mksysb_aix7251_alt_mig.log
Starting Alternate Disk Migration.
.....

ls -l /nim/images/aix7340-golden.mksysb
lsnim | grep mksysb_7340

Convert the mksysb to 7.3
nimadm -T aix7251-golden.mksysb -O /nim/mksysb/aix7340-golden.mksysb -s spot_73tl4sp0-2546 -l lpp_73tl4sp0-2546 -j nimvg -Y -N

Phase 3 takes a while then 808 fixes get applied to the new mksysb – total of 12 phases

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Migrating a 7.2 mksysb to a 7.3 mksysb

Check the converted mksysb
listvgbackup -f'/nim/mksysb/aix7340-golden.mksysb' | grep rc.tcpip
listvgbackup -f'/nim/mksysb/aix7340-golden.mksysb' | grep inetd.conf
listvgbackup -f'/nim/mksysb/aix7340-golden.mksysb' | grep -I netapp
lsnim –l mksysb_aix7340

If all good on master then copy it to the client:
cp /nim/mksysb/aix7340-golden.mksysb /backups
And on client install in this case to hdisk1:
alt_disk_mksysb -m /backups/aix7340-golden.mksysb -d hdisk1 –k

NOTE: Ensure your /etc/inetd.conf and /etc/inittab are pristine. We had a bug where a line in inetd.conf went over 2 lines and it caused the resulting converted mksysb to drop over 2000 filesets
If not rebooting migrated image immediately then make sure to set the bootlist to the original rootvg

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Checks

For some reason it called the migrated mksysb mksysb_aix7251_mig_73

```
# lsnim -l mksysb_aix7251_mig_73
mksysb_aix7251_mig_73:
  class        = resources
  type         = mksysb
  comments     = Created by nimadm on Wed Jan 7 15:40:37 EST 2026
  creation_date = Wed Jan 7 15:40:39 2026
  Rstate       = ready for use
  prev_state   = unavailable for use
  location     = /nim/mksysb/aix7340-golden.mksysb
  version      = 7
  release      = 3
  mod          = 4
  oslevel_r    = 7300-00
  oslevel_s    = 7300-00-01-2148
  alloc_count  = 0
  server       = master
```

Above should say AIX 7.3.4.0 so some filesets are missing which I will check once I boot from the mksysb

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emgr_check_ifixes -D [-d aixlevel:fw | -c NIM_clients] [-P path]

Item	Description
-D	Downloads the available interim fixes.
>|-d *aixlevel:fw*|<	Specifies the AIX level and firmware level of the system.
>|-c *NIM_clients*|<	Specifies the names of the NIM client.
-P *path*	Specifies the path to download the interim fix. The default path is /tmp/ifix_$PID.

Examples

1. To check the availability of the security interim fixes for the current operating system level, enter the following command:

```
emgr_check_ifixes
```

2. To check the availability of the security interim fixes for the current operating system level and to download the interim fixes in a batch mode, enter the following command:

```
emgr_check_ifixes -D -P /tmp
```

3. >|To check the availability of the security interim fixes for the particular AIX and firmware level, enter the following command:

```
emgr_check_ifixes -d 7300-01-01-2246:VL950_090
```

|<

4. >|To check the availability of the security interim fixes for the NIM clients, enter the following command from the NIM server, by using a comma or a space to separate client names:

```
emgr_check_ifixes -c "nim_client1 nim_client2"
```

```
emgr_check_ifixes -c "nim_client,nim_client2"
```

https://techchannel.com/systems-management/using-emgr-check-ifixes-aix-7-3/

https://www.ibm.com/docs/en/aix/7.3.0?topic=e-emgr-check-ifixes-command

https://developer.ibm.com/tutorials/awb-identify-download-and-install-the-security-interim-fixes/

https://www.ibm.com/docs/en/aix/7.3.0?topic=e-emgr-command

https://www.ibm.com/docs/en/aix/7.3.0?topic=e-emgr-sec-patch-command

https://www.ibm.com/docs/en/aix/7.3.0?topic=e-emgr-sec-command

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Example

Define machine to nim (in this case client is called sandbox)
If get errors saying it is not a nim client then:
On the LPAR

```
ps -ef | grep nim
stopsrc -s nimsh
mv /etc/niminfo /etc/niminfo-old
niminit -a master=nimsrvr -a name=sandbox
```

```
sandbox# niminit -a master=nimsrvr -a name=sandbox
0513-077 Subsystem has been changed.
0513-059 The nimsh Subsystem has been started. Subsystem
PID is 9044292.

nimsrvr # lsnim -l sandbox
sandbox:
  class        = machines
  type         = standalone
  connect      = nimsh
  platform     = chrp
  netboot_kernel = 64
  if1          = master_net sandbox 0
  cable_type1    = N/A
  Cstate       = ready for a NIM operation
  prev_state     = ready for a NIM operation
  Mstate       = currently running
  cpuid        = 00FBF7034C00
```

```
sandbox# cat /etc/niminfo
#---------------- Network Install Manager ---------------
# warning - this file contains NIM configuration information
#       and should only be updated by NIM
export NIM_NAME=sandbox
export NIM_HOSTNAME=sandbox
export NIM_CONFIGURATION=standalone
export NIM_MASTER_HOSTNAME=nimsrvr
export NIM_SSL_STATUS=disabled
export NIM_MASTER_PORT=1058
export NIM_REGISTRATION_PORT=1059
export NIM_SHELL="nimsh"
export NIM_MASTERID=00CCD1614B00
export NIM_FIPS_MODE=0
export NIM_BOS_IMAGE=/SPOT/usr/sys/inst.images/installp/ppc/bos
export NIM_BOS_FORMAT=rte
export NIM_HOSTS=" 127.0.0.1:loopback:localhost  10.1.1.179:sandbox
10.1.1.112:nimsrvr "
export NIM_MOUNTS=""
export ROUTES=" default:0:10.1.1.1 "
```

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Example

```
nimsrvr # emgr_check_ifixes -D -c sandbox -P /tmp/ifixes

                          sandbox
================================================================
============
Gathering system information
+------------------------------------------------------------------------+
p0.mtm=9040-MR9
p0.fw=VM950_175
p0.parnm=sandbox
p0.os=aix
p0.aix=7200-05-08-2420

+------------------------------------------------------------------------+
Checking interim fixes on the system ...
+------------------------------------------------------------------------+
ID  STATE LABEL     INSTALL TIME     UPDATED BY ABSTRACT
=== ===== ========== ================ ==========
=====================================
1   S   IJ52366s8a 03/25/25 18:34:36         IJ52366 POTENTIAL SECURITY ISSUE
2   S   IJ52533m8a 03/25/25 18:34:55          IJ52533 POTENTIAL SECURITY ISSUE
3   S   IJ51639s8a 03/25/25 18:42:43         IFIX for IJ51639
4   S   IJ55344s9a 11/06/25 11:47:35         KRB5_TRACE security issue
5   S   IJ55266m9a 11/06/25 11:50:26          IJ55266 - POTENTIAL SECURITY ISSUE
6   S   IJ55665sAa 11/06/25 11:51:01         IJ55665 POTENTIAL SECURITY ISSUE
7   S   IJ55968mAa 11/18/25 09:42:18          IJ55968 NIM CLIENT SECURITY FIX
8   S   301610sa   12/20/25 19:01:52         ifix for openssl CVEs

Searching for AIX security fixes ...
+------------------------------------------------------------------------+
Recommended ifixes, please wait..parsing
================================================================
====================
INFO: Server has self-signed certificate in certificate chain
IJ53757 AIX is vulnerable to arbitrary command execution (CVE-2024-
56346 CVE-2024-56347)
https://aix.software.ibm.com/aix/efixes/security/nim_fix.tar

Downloading 1 of 1 ...
Downloading fix:
https://aix.software.ibm.com/aix/efixes/security/nim_fix.tar
+------------------------------------------------------------------------+
Performing certificate verification ...
OpenSSL success!
Interim fix nim_fix.tar has been downloaded to /tmp/ifixes_sandbox
directory.
+------------------------------------------------------------------------+

nimsrvr # ls -al /tmp/ifixes_sandbox
total 23160
drwxr-xr-x   2 root    system        4096 Jan 13 13:19 .
drwxrwxrwt  45 bin     bin          53248 Jan 13 13:19 ..
-rw-r--r--   1 root    system        8702 Jan 13 13:19 adv_file
-rw-r--r--   1 root    system         256 Jan 13 13:19 adv_file.sig
-rw-r--r--   1 root    system    11776000 Jan 13 13:19 nim_fix.tar
```

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BACKUPS

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Backup Tips

- /nim is a separate filesystem
- I take client LPAR mksysbs to a separate filesystem that is an NFS directory exported from my NIM server - /usr/local/backups
- When I want to use a mksysb image I copy it to /nim/images and create it as a mksysb resource
- This avoids issues around the way NIM exports mksysb images
- As an example
  - If NIM exports a mksysb image only the file is exported to NFS clients
  - However, if someone is taking a mksysb to that same directory the whole parent directory is exported
  - This will cause NFS errors, so it is best to keep them separate
  - OR you can use the environment variable that will cause NIM to use subdirectories to separate mksysb images

    NIM_MKSYSB_SUBDIRS=yes

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Backing up and restoring NIM

- Save the following NIM files on the master

- /etc/niminfo
- /etc/objrepos/nim_attr
- /etc/objrepos/nim_attr.vc
- /etc/objrepos/nim_object
- /etc/objrepos/nim_object.vc

- You can restore the NIM database and activate the NIM master using SMIT or the command line.

- Restore the files saved in backing up the NIM database.

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Recovering /etc/niminfo

- /etc/niminfo is required on master and running NIM clients to run NIM operations and commands

- You can rebuild it on the master:

nimconfig -rTo

- You can rebuild it from a running NIM client:

niminit -a master_port= PortNumber -a master= MasterHostName -a name= ClientMachineObjectName

- Check /etc/inittab to see if NIM is starting on master:

#grep nim /etc/inittab
nim:2:wait:/usr/bin/startsrc -g nim >/dev/console 2>&1

On the client you should see nimsh running

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/etc/niminfo on the Master

#cat /etc/niminfo

```
# nimconfig
export NIM_NAME=master
export NIM_CONFIGURATION=master
export NIM_MASTER_PORT=1058
export NIM_REGISTRATION_PORT=1059
export NIM_MASTER_HOSTNAME=nim01
export NIM_SSL_STATUS=disabled
```

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/etc/niminfo on the client

#cat /etc/niminfo

```
export NIM_NAME=aix01
export NIM_HOSTNAME=aix01
export NIM_CONFIGURATION=standalone
export NIM_MASTER_HOSTNAME=nim01
export NIM_MASTER_PORT=1058
export NIM_REGISTRATION_PORT=1059
export NIM_SHELL="nimsh"
export NIM_MASTERID=00C47B304B00
export NIM_FIPS_MODE=0
export NIM_LICENSE_ACCEPT=yes
export RC_CONFIG=rc.bos_inst
export NIM_BOSINST_RECOVER="/../SPOT/usr/lpp/bos.sysmgt/nim/methods/c_bosinst_env -a hostname=aix01"
export SPOT=nim01:/nim/spot/spot_72tl5sp4-2220/usr
export NIM_CUSTOM="/../SPOT/usr/lpp/bos.sysmgt/nim/methods/c_script -a
location=nim01:/export/nim/scripts/aix01.script"
export NIM_BOS_IMAGE=/NIM_BOS_IMAGE
export NIM_BOS_FORMAT=mksysb
export NIM_HOSTS=" 127.0.0.1:loopback:localhost  10.192.194.13:aix01  10.192.194.19:nim01 "
export NIM_MOUNTS=" nim01:/nim/lpp_source/lpp_72tl5sp4-2220:/SPOT/usr/sys/inst.images:dir
nim01:/nim/images/aix7254-withpbisandsamba.mksysb:/NIM_BOS_IMAGE:file "
export ROUTES=" default:0:10.192.130.1 "
export NIM_SSL_STATUS=disabled
```

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Useful NIM commands

- Recover missing simages if needs be:
- nim -o update -a recover=yes -a source=/software/aix73/aix73tl4sp0-2546-base lpp_aix73tl4sp0

- ALLOCATIONS
- nim -o deallocate -a spot=spot_73tl4sp0-2546 -a lpp_source=lpp_73tl4sp0-2546 -a mksysb=mksysb_ 73tl4sp0-2546 aix01
- nim -o allocate -a spot=spot_73tl4sp0-2546 -a lpp_source=lpp_73tl4sp0-2546 -a mksysb=mksysb_ 73tl4sp0-2546 aix01

- nim -o bos_inst -a source=mksysb -a accept_licenses=yes -a boot_client=no -a installp_flags='-agX' aix01

- OTHER
- To add the bos.games 7.3.0.0 and bos.terminfo filesets to lpp_source1, type:
- nim -o update -a packages="bos.games 7.3.0.0 bos.terminfo" -a source=/dev/cd0 lpp_source1
- To remove bos.games from lpp_source1, type:
- nim -o update -a rm_images=yes -a packages="bos.games" lpp_source1

- alt_rootvg_op
- https://www.ibm.com/support/knowledgecenter/en/ssw_aix_71/com.ibm.aix.cmds1/alt_rootvg_op.htm

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Backout

- If you have a machine enabled for install, and need to back out...
  - nim -o reset –a force=yes <nimclienthostname>
  - nim -Fo deallocate –a subclass=all <nimclienthostname>

- May need to do this after an LPM move so cpuid reflects new system
  - nim -o change -a cpuid="" <nimclienthostname>

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FILE BACKED OPTICAL (FBO)

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Using VIO Optical Library

- File backed Virtual SCSI (file backed optical)
- Came with VIOS 1.5 FP 10.1
- Can even use it to store backups
- Add disk into a new volume group (violibvg)
- Using IVM (HMC uses command line)
  - Connect to the VIO server partition (https://viosname)
  - Click on View/modify virtual storage
  - At the panel select the tab for optical devices
  - Create library and give it a size (I used 40gb) and choose violibvg
    - Creates /var/vio/VMLibrary as a filesystem and mounts it
  - Upload the iso formatted DVDs or CDs to /var/vio/VMLibrary
  - You can now allocate those iso files to LPARs to boot from or use, as if they were on a direct attached CD or DVD
- Useful URLs
  - http://www.redbooks.ibm.com/redbooks/pdfs/sg247940.pdf
    - Section 3.5.4 covers this
  - http://www.ibm.com/developerworks/wikis/display/virtualization/IVM
  - http://www.ibm.com/developerworks/wikis/download/attachments/51773454/IVM_FAQ.pdf?version=1
  - Movie from IBM on this = http://www.ibm.com/developerworks/wikis/download/attachments/53871873/IVM_optical.wmv

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FBO Line Commands on VIOS

Virtual Media Commands

chrep	chvopt
loadopt	lsrep
lsvopt	mkrep
mkvopt	rmrep
rmvopt	unloadopt

help <command>

```
loadopt -disk rhel96serverppc -vtd vtopt0

mkvdev -fbo -vadapter vhost0
             vtopt0 Available

lsrep
Size(mb) Free(mb) Parent Pool       Parent Size     Parent Free
  204800   204256 fbovg              1087488         677888

Name                        File Size Optical       Access
Rhel96serverppc.iso              3561      None            rw

$ df -g | grep -i vio
/dev/VMLibrary    200.00    199.47   1%      4     1% /var/vio/VMLibrary
```

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VIOS AND NIM

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VIOS and NIM

- Use of NIM to back up, install, and update the VIOS is supported.
- **Note**: For install, always create the SPOT resource directly from the VIOS **mksysb** image. Do NOT update the SPOT from an LPP_SOURCE.
- Use of NIM to update the VIOS is supported as follows:
Ensure that the NIM Master is at the appropriate level to support the VIOS image.
- https://www.ibm.com/support/pages/node/6561917
- On the NIM Master, use the operation **updateios** to update the VIOS Server.
- "**nim –o updateios –a lpp_source=lpp_source1 ... ...**"
- On the NIM Master, use the operation **alt_disk_install** to update an alternate disk copy of the VIOS Server.
- "**nim –o alt_disk_install –a source=rootvg –a disk=target_disk –a fix_bundle=(Value) ... ...**"
- If NIM is not used to update the VIOS, only the **updateios** or the **alt_root_vg** command from the padmin shell can be used to update the VIOS.
- You must use upgradevios to upgrade from 2.2.6.32 to v3.1 or from v3 to v4 of the VIO server

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VIOS and NIM – Set up resources

- http://www-01.ibm.com/support/docview.wss?uid=isg3T1011386
- Add VIOS partition as a machine resource
- Need to extract the mksysb image from VIO install ISO - I use the flash ISO as there is only one mksysb image to deal with
- mkdir /cdrom
- loopmount -i /software/powervm41/Virtual_IO_Server_Base_Install_4.1.2.0_Flash_122025_LCD8292404.iso -o "-V udfs -o ro" -m /cdrom
- cp /cdrom/usr/sys/inst.images/mksysb_image /software/powervm41/mksysb_vio4120_2025
- cp -R /cdrom/* /software/powervm41/powervm4120-base
- Copy the bosinst.data from the DVD and create a viosbosinst resource
- umount /cdrom
- cp /software/powervm41/mksysb_vio4120_2025 /nim/images
- Copy the image into the images directory
- It is now there as:
  - /nim/images/ mksysb_vio4120_2025
- Create the mksysb resource
  - nim -o define -t mksysb -a server=master -a location=/nim/images/ mksysb_vio4120_2025 mksysb_vio4120_2025
- Create the spot from the mksysb image
  - nim -o define -t spot -a server=master -a location=/nim/spot -a source= mksysb_vio4120_2025 spot_vios4120
- Check the images
  - lsnim -l mksysb_vio4120_2025
  - nim -o check spotvios4120
  - lsnim -l spotvios4120
- You can now use these resources to do a bos_inst install of the VIO using the mksysb and spot
- **NOTE – there are only mksysb and spot resources for a VIO – there is no LPP. NEVER use a normal AIX resource for a VIO**

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VIOS and NIM – Check resources

```
# lsnim -l mksysb_vio4120_2025
mksysb_vio4120_2025:
  class         = resources
  type          = mksysb
  creation_date  = Tue Jan 6 16:53:10 2026
  Rstate        = ready for use
  prev_state     = unavailable for use
  location      = /nim/images/mksysb_vio4120_2025
  version       = 7
  release       = 3
  mod           = 4
  oslevel_r     = 7300-04
  oslevel_s     = 7300-04-00-2546
  alloc_count    = 0
  server        = master
  extracted_spot = spotvios4120
```

Reports the underlying O/S level, not ioslevel
ioslevel 4.1.2.0 is AIX 7300-04-00-2546
https://www.ibm.com/support/pages/node/6561917

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VIOS and NIM – Check resources

```
# lsnim -l spotvios4120
spotvios4120:
  class         = resources
  type          = spot
  plat_defined  = chrp
  arch          = power
  Rstate        = ready for use
  prev_state    = verification is being performed
  location      = /nim/spot/spotvios4120/usr
  version       = 7
  release       = 3
  mod           = 4
  oslevel_r     = 7300-04
  oslevel_s     = 7300-04-00-2546
  alloc_count   = 0
  server        = master
  if_supported  = chrp.64 ent
  Rstate_result = success
  mksysb_source = mksysb_vio4120_2025
  date_updated  = Tue Jan 6 16:56:07 2026
```

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Examples from man page - nim –o updateios

1 To install fixes or to update VIOS with the vioserver1 NIM object name to the latest maintenance level, enter the following command:

nim -o updateios -a lpp_source=lpp_source1 -a preview=no vioserver1

The updates are stored in lpp_source and lpp_source1 files. Note: The updateios operation runs a preview during installation. Running the updateios operation from NIM runs a preview unless the preview flag is set to no. During the installation, you must run a preview when you use the updateios operation with updatios_flags=-install. With the preview, you can check whether the preview installation is running accurately before you proceed with the VIOS update.

2 To reject fixes for a VIOS with the vioserver1 NIM object name, enter the following command:

nim -o updateios -a updateios_flags=-reject vioserver1

3 To clean up partially installed updates for a VIOS with the vioserver1 NIM object name, enter the following command:

nim -o updateios -a updateios_flags=-cleanup vioserver1

4 To commit updates for a VIOS with the vioserver1 NIM object name, enter the following command:

nim -o updateios -a updateios_flags=-commit vioserver1

5 To remove a specific update such as update1 for a VIOS with the vioserver1 NIM object name, enter the following command:

nim -o updateios -a updateios_flags=-remove-a filesets="update1" vioserver1

6 To remove updates for a VIOS with the vioserver1 NIM object name by using an installp_bundle bundle1, where bundle1 contains the updates to be removed, enter the following command:

nim -o updateios -a updateios_flags=remove -a installp_bundle=bundle1 vioserver1

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NIM viosupgrade

- The viosupgrade command on NIM is different to the one on the VIO server
- https://www.ibm.com/docs/en/aix/7.3.0?topic=v-viosupgrade-command
- Use to perform bosinst upgrade
- Use to perform altdisk upgrade
- viosupgrade –q –n hostname to check
  - Backups up the virtual and logical configuration data
  - Performs a new and complete VIOS installation from the VIOS image
  - Restores the virtual and logical configuration
  - Can specify bosinst (current disk) or altdisk
- VIOS to be upgraded must be at least 2.2.6.30 (2.2.6.32 if SSPs)
  - 2.2.6.32 is where I start all my VIOS to 3.1 upgrades
  - Use for v2 to v3 or v3 to v4 upgrades

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Examples from man page on NIM – man viosupgrade

Purpose

Performs the operations of backing up the virtual and logical configuration data, installing the specified image, and restoring the virtual and logical configuration data of the Virtual I/O Server (VIOS).

To perform the bosinst type of upgrade operation, use the following syntax:

viosupgrade -t bosinst -n hostname -m ios_mksysbname
-p spotname {-a RootVGCloneddisk: ... | -r RootVGInstallDisk: ...| -s}
[-b BackupFileResource][-c][-e resources: ...] [-F skipclusterstate] [-v]

To perform the altdisk type of upgrade operation, use the following syntax:

viosupgrade -t altdisk -n hostname -m ios_mksysbname
-a RootVGInstallDisk: ... [-b BackupFileResource] [-c] [-e
resources: ...] [-F skipclusterstate] [-v]

To perform a bosinst or altdisk type of upgrade operation across multiple nodes, use the following syntax:

viosupgrade -t {bosinst | altdisk} -f filename [-v]

To check the status of the triggered upgrade operation, use the following syntax:

viosupgrade -q { [-n hostname | -f filename] }

To create the ios_mksysb image file from the International Organization for Standardization (ISO) image files, use the following syntax:

viosupgrade -I ISOImage1:ISOImage2 -w directoryPath
-x iosmksysbResourceName [-y spotResourceName]

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Backing up VIOS (nim_resources.tar)

- Use viosbr to backup user defined virtual resources on the VIO
- Make sure to save that backup in rootvg
  - viosbr –backup –file /tmp/viosbkup-oct0925
    Backup of this node (vio1) successful
- Automatic daily Backup
  - viosbr -backup -file p11vio1 -frequency daily -numfiles 7
- You can also use viosbr to list, view or restore
  viosbr –view -list
  viosbr –view –file /tmp/viosbkup-oct0925.tar.gz
- Mount NFS filesystem to backup to (in my case /backups)
- mkdir /backups/viosa
- Then as padmin run backupios which automatically calls savevgstruct:
- **backupios** **-file** {*File name*} [**-mksysb**] [**-nopak**] [**-nosvg**] [**-nomedialib**]
- backupios –file /backups/viosa
- The above creates a nim_resources.tar package in that directory and it can be used to clone or restore VIO servers using installios (NIMOL) from the HMC
- The nim_resources.tar file contains all the necessary resources to restore the Virtual I/O Server, including the mksysb image, the bosinst.data file, the network boot image, and SPOT resource.
- The NFS export should allow root access to the Virtual I/O Server, otherwise the backup will fail with permission errors.
- If nim installios is not working check that apar IY85192 is installed to enable it
- https://www.ibm.com/docs/en/power10?topic=commands-viosbr-command

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VIO Server Backup Script to put in crontab

```
#! /bin/sh
#
machine=`uname -n`
mount /usr/local/backups
mkdir /usr/local/backups/$machine
umount /var/vio/VMLibrary
su - padmin -c "ioscli backupios -file /usr/local/backups/$machine -nomedialib"
su - padmin -c "ioscli backupios -file /usr/local/backups/vio-mksysbs/$machine.mksysb -nomedialib -mksysb"
mount /var/vio/VMLibrary
#
exit 0
```

NOTES
The above can be put in root's crontab to run regularly
Don't forget to set up an NFS mount to the VIO from your NIM or NFS server
Do not allow ANY NFS mount to mount automatically at boot in case the NIM or NFS server is down at the time of boot
Also, regularly grab an HMCScanner report
https://www.ibm.com/support/pages/hmc-scanner-power-server-config-and-performance-stats
https://www.ibm.com/support/pages/system/files/inline-files/hmcScanner-0.11.56.zip
NOTE hmcscanner 0.11.56 is required for POWER11

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Using NIM with VIOS mksysb

Again we run the viosbr to backup the virtual resources
Then:
backupios –file /backups/viosmksysb-oct0225.mksysb –mksysb -nomedialib
When the **-mksysb** flag is used, the NIMOL resources are not saved in the image.

To restore from this image first copy the image to /nim/images
Define the mksysb as a nim object
nim -o define -t mksysb -a server=master –a location=/nim/images/ viosmksysb-oct0225.mksysb viosmksysb
Now define a spot
nim -o define -t spot -a server=master -a location=/nim/spot -a source=viosmksysb spotvios
Then smitty bos_inst and select a mksysb restore along with the mksysb and spot resources created above
Open a vterm (I use vtmenu from the HMC) to the vios
Activate the partition in SMS mode
Set up the remote_ipl parameters
Do the ping test
Select boot options and boot from the network from the NIM server
Reply to prompts in the vtmenu console

https://www.ibm.com/docs/en/power8/9119-MHE?topic=commands-backupios-command

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Manual backupios backup

This creates the nim_resources.tar, not the mksysb image

$ backupios -file /usr/local/backups/viosa -nomedialib

Creating information file for volume group fbovg.
Creating list of files to back up.
Backing up 15 files.....

15 of 15 files (100%)
0512-038 savevg: Backup Completed Successfully.
Backup in progress. This command can take a considerable amount of time
to complete, please be patient...
$

ls -l vio2
total 8472824
-rw-r--r-- 1 root staff 4337367040 Jan 01 01:34 nim_resources.tar

du -sg vio2
4.04 vio2
But I saw it get as big as 40GB during the process

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Restore from nim_resources.tar

If you plan to use NIM to restore to a specific disk, then you will need to follow this procedure:

Extract the bosinst.data from the nim_resources.tar
tar -xvf nim_resources.tar ./bosinst.data
The following is an example of the target_disk_data stanza of the bosinst.data generated by backupios.
target_disk_data:
LOCATION =
SIZE_MB =
HDISKNAME =
Fill the value of HDISKNAME with the name of the disk to which you want to restore to
Put back the modified bosinst.data in the nim_resources.tar image
tar -uvf nim_resources.tar ./bosinst.data

All other parts of the nim_resources.tar image must remain unchanged.

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Restore from nim_resources.tar

Once bosinst.data is changed (if needed)
run the *installios* command without any flag from the HMC command line.

Select the Managed System where you want to restore your Virtual I/O Server from the objects of type "managed system" found by installios command.
Select the VIOS Partition where you want to restore your system from the objects of type "virtual I/O server partition" found
Select the Profile from the objects of type "profile" found.
Enter the source of the installation images [/dev/cdrom]: *server:/exported_dir*
Enter the client's intended IP address: <*IP address of the VIOS*>
Enter the client's intended subnet mask: <*subnet of the VIOS*>
Enter the client's gateway: <*default gateway of the VIOS*>
Enter the client's speed [100]: <*network speed*>
Enter the client's duplex [full]: <*network duplex*>
Would you like to configure the client's network after the installation [yes]/no?
Select the Ethernet Adapter used for the installation from the objects of type "ethernet adapters" found.

When the restoration is finished, open a virtual terminal connection (for example, using telnet) to the Virtual I/O Server that you restored.

Don't forget to use your viosbr to restore your virtual devices as needed.

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Cloning disks to install

After installing vio1, if you have all the disks in vio1 you can take a clone to build vio2
If your server has a split backplane or NVMe disks then you can make a clone
It is best to do this before adding the network and fiber adapters as it makes the cleanup much easier

Make sure the 4 disks are split (2 and 2) across the backplane or are NVMe
vio1 is using hdisk0 and hdisk1, hdisk2 and 3 are on the other adapter and will be used for vio2
Put all the disks into vio1 (both adapters) in the profile
Install vio1 on hdisk0 – from NIM, DVD, HMC …..

Now clone it to hdisk2

```
alt_disk_copy –V –B –d hdisk2
```

http://www-01.ibm.com/support/docview.wss?uid=isg3T1012273

https://www.ibm.com/docs/en/aix/7.3.0?topic=alt-disk-copy-command

Useful flags are –B and –O
-B tells it NOT to change the bootlist which it does automatically otherwise
-O Performs a device reset on the target **altinst_rootvg**. This causes the alternate disk install to not retain any user-defined device configurations. This flag is useful if the target disk or disks become the rootvg of a different system

Remove vio2 hdisks from vio1, Shutdown vio1
Remove vio2 resources from vio1 profile
Leave vio1 down

Activate vio2
Remove any disks, adapters, networks etc that show as defined on vio2
Now cleanup vio2 (see next slide)

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Cleaning up after cloning vio

If you do not cleanup you will experience weird RMC issues

Cleanup vio2:
stopsrc -g rsct_rm; stopsrc -g rsct
Clear Nodeid
chdev -l cluster0 -a node_uuid=00000000-0000-0000-0000-000000000000
OR
/usr/bin/odmdelete -o CuAt -q 'attribute=node_uuid'

Generate new nodeid
/usr/sbin/rsct/bin/mknodeid -f

lsattr -El cluster0
/usr/sbin/rsct/bin/lsnodeid
/usr/sbin/rsct/install/bin/recfgct

lspartition -dlpar
lssrc -g rsct_rm; lssrc –g rsct
You may have to start ctcas – startsrc –s ctcas

Cleanup old vio1 resources (next slide)

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Cleaning up after cloning vio

CLEANUP on VIO2
rmdev all devices showing as defined (fcs, ent, hdisk, etc)
rmdev -dp hdisk0
rmdev -dl hdisk0
rmdev -dp pdisk0
rmdev -dl pdisk0
rmdev -dp sissas0
rmdev -dl sissas0
rmdev -dp pci0
rmdev -dp pci1
rmdev -dp pci2
rmdev -dp pci3
rmdev -dp pci4
rmdev -dl pci0
rmdev -dl pci1
rmdev -dl pci2
rmdev -dl pci3
rmdev -dl pci4
If ethernet adapters were in vio1 when cloned then you may need to remove all those as well

Once vio2 is cleaned up reboot it
Then activate vio1

Clean up vio1 removing any extra hdisks, pdisks, pci, sissas1, etc that now show as defined. Also remove the adapter definitions for them.
Reboot vio1 to ensure changes are good

alt_disk_copy -O

Performs a device reset on the target **altinst_rootvg**. This causes the alternate disk install to not retain any user-defined device configurations. This flag is useful if the target disk or disks become the rootvg of a different system (such as in the case of logical partitioning or system disk swap).

The above flag on the copy helps avoid much of the cleanup

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HINTS AND TIPS

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Pre-install Notes

- Aggregation and installs and restores
  - You cannot install a VIO server from the HMC or from NIM if the network is aggregated
  - Network installs are only supported over an access port connection
  - This applies to installing any LPAR that has physical network ports that are aggregated
  - One solution is a separate admin network on a single port that is used for installs
- Installing onto SAN disks
  - The SAN team may need you to light up the adapters so they can do their zoning and mapping
- Lighting up WWPNs for a VIO or LPAR for zoning and mapping
  - On the HMC go to the profile (action, profiles, manage profile then selct the profile)
    Then virtual adapters
    Check all the virtual fibre adapters (called client fibre channel)
    Then actions, advanced, login/logout fibre
    Click on login to log them all in or logout to logout any not being used
  - https://www.ibm.com/support/pages/how-initiate-loginlogout-operation-virtual-fibre-channel-client-adapters-hmc
  - Troubleshooting NIM LED Hangs
  - https://www.ibm.com/support/pages/troubleshooting-nim-led-hangs

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MPIO

- IBM is now recommending using the AIXPCM rather than SDDPCM. They have a new MPIO best practices document at:
  - https://developer.ibm.com/articles/au-aix-mpio/
  - https://www.ibm.com/support/pages/ibm-aix-mpio-best-practices-and-considerations
- There is a good description of AIXPCM here:
  - https://www.ibm.com/docs/en/aix/7.3.0?topic=management-multiple-path-io
- Migration notes
  - https://www.ibm.com/support/pages/how-migrate-sddpcm-aixpcm
- Article on MPIO resiliency and problem determination
  - https://developer.ibm.com/articles/au-aix-multipath-io-mpio/

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Uninstalling NIM

- nim –o unconfig master
- installp –u bos.sysmgt.nim.master
- Note: the NIM master must be unconfigured before you can uninstall the master fileset

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NIM and NFS exports

- Never export your /nim filesystem using NFS – NIM will do this when it needs to
- By default NIM creates an entry in /etc/exports granting both client mount access and root access for root users
- If you have numerous clients and need to exceed 32767 characters in the exports file

nim –o change –a restrict_nfs_exports=no master

https://www.ibm.com/support/knowledgecenter/en/ssw_aix_72/com.ibm.aix.install/addl_mstr_mgmt_tasks_incr_hosts.htm

The above change causes NIM to only grant root access to target hosts

Still have to obey NFS limitation of 256 hostnames in a root exports file entry

You can change this back easily by reissuing the command changing no to yes

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Suppressing output

- Use show_progress=no to suppress progress messages
- nim -o cust -a show_progress=no -a lpp_source=images1 \ -a fixes=update_all Standalone1

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Alternate NIM Master

Assumes there is already a NIM master
Install bos.sysmgt.nim.master fileset
Then smitty niminit_altmstr
Use smitty nim_altmstr fast path to synchronize the alternate master with the master or:

On master

nim –o sync altmastername
Or nim –o sync –a replicate=yes altmastername
Above causes it to replicate masters resources to the Alt.
You can add reset_clients=yes to also rebuild the NIM clients list in/etc/niminfo to be aware of the alternate master
You may need to add –F (-Fo sync) to overwrite existing NIM database

You can use niminit command if you prefer

```
# niminit -a is_alternate=yes -a master=mastername -a pif_name=en0 -a cable_type1=N/A -a platform=chrp -a
name=altmastername
```

Then go to the master and register the alternate:

```
# niminit -a is_alternate=yes -a master=altmastername -a pif_name=en0 -a cable_type1=N/A -a platform=chrp -a
name=mastername
```

To takeover from the master

On the alternate: nim –o takeover mastername (can add –a async=yes or no – default is yes)

To remove an alternate master (from the master)

nim –o remove altmastername

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Problems

- Step 1 – bootp makes initial communication and talks to client
- Step 2 – after successful bootp tftp is used for transfer of boot image.
- U0608 – usually a bootp or tftp problem
- **Bootp Issues**
  - Ensure bootp is active in /etc/inetd.conf
    - lssrc –ls inetd
  - Ensure /etc/bootptab entries are correct
  - Check GW setting on the NIM machine definition as well as on the SMS boot setting
  - Check all IP addresses specified
  - To run bootpd in debug mode:
    1. Comment out the bootps entry from the /etc/inetd.conf file on the server.
    2. Stop all running bootpd processes (ps -ef | grep bootp –> kill -9 ..)
    3. Restart inetd using the refresh -s inetd command.
    4. Start bootpd from the command line, using the /usr/sbin/bootpd -s -d -d -d command (output will be on the screen)
- **Tftpd Issues**
  - Check /etc/tftpboot to make sure .info files are there for the machine
  - cat /etc/tftpaccess.ctl make sure /tftpboot is allowed
  - lssrc –ls tftpd make sure it is active
  - To run tftpd in debug mode – add –v to startup in /etc/inetd.conf and entries will go to SYSLOG at the info level
- Make sure firewall (if there is one) is allowing bootp and tftpd between the NIM server and the client

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USEFUL COMMANDS

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Useful commands

- lsnim
- lsnim –l lparname
- nim -o reset –a force=yes clientnode
- nim -Fo deallocate –a subclass=all clientnode
- nim -o change -a cpuid="" clientnode
- bootlist -m normal –o (check bootlist)
- arp and ping
- oslevel –s
- Instfix
- showmount –e
- ls –al /tftpboot
- lsnim –c machines | resources | networks
- lsnim –t spot | lpp_source | mksysb | standalone …….
- lsnim –O resource - shows valid actions
  - i.e. lsnim –O lpp7221
- nim –o check resource (i.e. spot, lpp, etc)
  - nim –o check lpp7221
- nim –o lslpp clientlpar LPAR must be up
  - nim –o lslpp aix2

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NIM Useful Commands

- nim_master_setup –B –a device=/dev/cd0 -a file_system=/nim -a volume_group=nimvg
- lslpp -l | grep bos.sysmgt.nim
- Create an LPPsource
  - nim -o define -t lpp_source -a server=master -a location=/nim/lpp_source/lpp_73tl4sp0-2546 -a source=/software/aix73/aix73tl4sp0-2546-base lpp_73tl4sp0-254
  - nim -o update -a packages=all -a source=/software/flrtfixes/javasshssl-jan062026 lpp_73tl4sp0-2546
  - nim -o showres -a filesets=rpm.rte lpp_73tl4sp0-2546
  - nim -o update -a packages=all -a source=/software/flrtfixes/openssl_fix45 lpp_73tl4sp0-2546
  - nim -o check lpp_73tl4sp0-2546
  - lsnim -l lpp_73tl4sp0-2546
- Create SPOT
  - nim -o define -t spot -a server=master -a location=/nim/spot -a source=lpp_73tl4sp0-2546 spot_73tl4sp0-2546
  - nim -o showres spot_73tl4sp0-2546 | grep -i bos.alt
  - nim -o cust -a filesets=bos.alt_disk_install.boot_images -a lpp_source=lpp_73tl4sp0-2546 spot_73tl4sp0-2546
  - nim -o check spot_73tl4sp0-2546
  - lsnim -l spot_73tl4sp0-2546

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Useful commands on master

```
# lsnim -o mksysb_vio4120_2025
mksysb_vio4120_2025:
  showres = show contents of a resource

# lsnim -O mksysb_vio4120_2025
mksysb_vio4120_2025:
  remove  = remove an object
  define  = define an object
  change  = change an object's attributes
  showres = show contents of a resource
```

```
# lsnim -l mksysb_vio4120_2025
mksysb_vio4120_2025:
  class         = resources
  type          = mksysb
  creation_date  = Tue Jan 6 16:53:10 2026
  Rstate        = ready for use
  prev_state    = unavailable for use
  location      = /nim/images/mksysb_vio4120_2025
  version       = 7
  release       = 3
  mod           = 4
  oslevel_r     = 7300-04
  oslevel_s     = 7300-04-00-2546
  alloc_count   = 0
  server        = master
  extracted_spot = spotvios4120
```

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Useful commands on master - niminfo

```
# ls -l /etc/niminfo
-rw-r--r--    1 root     system          198 Jan 06 15:58 /etc/niminfo


#cat /etc/niminfo

# nimconfig
export NIM_NAME=master
export NIM_CONFIGURATION=master
export NIM_MASTER_PORT=1058
export NIM_REGISTRATION_PORT=1059
export NIM_MASTER_HOSTNAME=aix1nim
export NIM_SSL_STATUS=disabled
```

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Useful commands on master

 # ls -l /etc/objrepos/nim*

```
-rw-rw-r--    1 root     system        32768 Jan 07 15:47 /etc/objrepos/nim_attr
-rw-rw-r--    1 root     system        20480 Jan 07 15:47 /etc/objrepos/nim_attr.vc
-rw-rw-r--    1 root     system         8192 Jan 07 15:40 /etc/objrepos/nim_object
-rw-rw-r--    1 root     system         4096 Jan 07 15:40 /etc/objrepos/nim_object.vc
-r-xr-x---    1 root     system        28672 Jan 06 16:16 /etc/objrepos/nim_pdattr
-r-xr-x---    1 root     system        28672 Jan 06 16:16 /etc/objrepos/nim_pdattr.vc
```

/var/adm/ras is where default logs for NIM go

 # ls -l /var/adm/ras/nim*

```
-rw-r--r--    1 root     system       352734 Mar 29 2021  /var/adm/ras/nim.setup
-rw-r--r--    1 root     system       131072 Jan 07 15:47 /var/adm/ras/nimlog
-rw-r-----    1 root     system         1252 Jan 06 15:58 /var/adm/ras/nimsh.log
```

/var/adm/ras/nimsh.log nimsh log – check connection issues here
/var/adm/ras/nimlog general NIM log
alog -f /var/adm/ras/nimlog -o
Above shows failed NIM operations

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Nim Commands

- nim –o operation –a attribute=value …. Targetname(s)
- cust
  - Install filesets or updates on clients or SPOT resources
- sync
  - Sync NIM database with an alternate master
- fix_query
  - Check fix status on a client
- maint
  - Uninstall filesets and commit or reject updates on a client or SPOT
- maint_boot
  - Boot client into maintenance mode
- reboot
  - Reboot a NIM client
- lppchk
  - Verify software installed correctly
- lppmgr
  - Helps manage base install images and update images in an lpp_source
- activate or deactivate
  - Start or stop a managed system
- showlog
  - List software installed on a client or SPOT
- update
  - Update the lpp_source by adding or removing packages
- updateios
  - Update and customize the VIO server
- alt_disk_install
  - Install to an alternate disk to current rootvg
- bos_inst
  - Install AIX on a client
- change
  - Modify NIM object attributes
- check
  - Verify usability of a NIM resource or machine
- chwpar
  - Change characteristics of a WPAR
- allocate or deallocate
  - Allocate or deallocate resources to a client
- define
  - Create networks, machines or resources
- diag
  - Netboot client into diagnostic mode
- remove
  - Remove objects from the NIM environment
- reset
  - Reset the state of a client or resource
- takeover
  - Allow alternate_master to take control
- unconfig
  - Unconfigure the NIM environment
- showres
- lslpp

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QUESTIONS?

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NIM Specific Useful Links

- NIMADM COMMAND
  - https://www.ibm.com/docs/en/aix/7.3.0?topic=n-nimadm-command
- USING NIMADM
  - https://www.ibm.com/support/pages/using-nim-alternate-disk-migration-nimadm
- Using EZNIM
  - https://www.ibm.com/docs/en/aix/7.3.0?topic=management-using-eznim
- SG24-7296 – NIM from A-Z in AIX 5L Redbook – 30 May 2007
  - http://www.redbooks.ibm.com/redbooks/pdfs/sg247296.pdf
- Simplifying with NIM – article from IBM Systems Magazine 2006
  - http://www.circle4.com/jaqui/eserver/aixtra-FebMar06-SimplifyingwithNIM.pdf
- NIM Concepts
  - https://www.ibm.com/docs/en/aix/7.3.0?topic=management-nim-concepts
- Backing up the NIM Database
  - https://www.ibm.com/docs/en/aix/7.3.0?topic=nim-backing-up-database
- AIX NIM Configuration Pages
  - https://www.ibm.com/docs/en/aix/7.3.0?topic=nim-configuring-master-creating-basic-installation-resources
- Nim Tips
  - https://www.ibm.com/docs/en/aix/7.3.0?topic=nim-managing-master
- **Using NIM Operations (all the subcommands)**
  - https://www.ibm.com/docs/en/aix/7.3.0?topic=management-using-nim-operations
- NIM Basics
  - https://aixexpert.wordpress.com/nim/nim-basics/

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Useful Links

- Using NIM Alternate Disk Migration (NIMADM)
  - https://www.ibm.com/support/pages/using-nim-alternate-disk-migration-nimadm
- Migrating to AIX 7.2 with nimadm
  - https://community.ibm.com/community/user/blogs/chris-gibson1/2022/01/13/migrating-to-aix-72-with-nimadm
- AIX 7.3 TL3 SP1 and "rcmd" errors
  - http://gibsonnet.net/blog/cgaix/html/7300-03-01-2520_rcmd_issue.html
- Migrating to AIX 7.2 with Minimal Downtime (PDF)
  - https://ibm.ent.box.com/s/qo1avzwply1vv3mxpynnxnfvpp0qmqod
- Migrating to AIX 7.2 with Minimal Downtime (Video)
  - https://www.youtube.com/watch?v=wNYXAX5kz_8
- Jaqui Lynch Articles
  - http://www.circle4.com/jaqui/eserver.html
  - https://techchannel.com/contributor/jaqui-lynch/
- Jaqui's Movie Replays
  - http://www.circle4.com/movies
- IBM US Virtual User Group
  - https://www.ibm.com/support/pages/node/1120377
- Power Systems UK User Group – no longer updated
  - https://www.ibm.com/support/pages/node/1110195

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