

# TechU

## NIM 201

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## Agenda

- Introduction
- NIM Setup
- Working with mksysbs
- Useful Commands
- nimadm
- VIOS and NIM
- Hints and tips

- Article from 2019 on Using NIM with VIO Servers
  - <https://ibmsystemsmag.com/Power-Systems/09/2019/Using-NIM-with-VIO-Servers>

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## 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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## NIM Server Setup

- Must be at highest level of AIX that you plan to support
- **Should use dedicated resources for Disk and Network**
  - Affects ability to restore images if depends on VIO
  - Same applies to TSM server
  - Do not combine NIM and TSM on same LPAR
    - Makes upgrades difficult
- Plan for memory (2-4GB is plenty) and core (.5 of a core with 2 VPs)
- Create scalable VG - nimvg on disk to hold NIM resources
  - Do not put NIM resources into rootvg
- Create /nim filesystem in nimvg (JFS2)
- I also create a separate filesystem called /backups for mksysb images
- Install filesets and any updates from TLs for them
  - bos.sysmgmt.nim.master
  - bos.sysmgmt.nim.spot
  - bos.sysmgmt.nim.client
- Also ensure the following filesets are installed
  - bos.net.tcp.server
  - bos.net.nfs.server
- Use lspp to check they are there

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## More Setup

- Note – NIM does not like dot in resource names so use \_
- Put AIX DVD in the DVD drive or replace /dev/cd0 below with the directory you have the BFFs from the DVD loaded up to
- Setup NIM
 

```
nim_master_setup -B -a device=/dev/cd0 -a file_system=/nim -a volume_group=nimvg
Creates /tftpboot
Will not take a mksysb of the NIM server
Creates SPOT and lpp_source resources in /nim
```

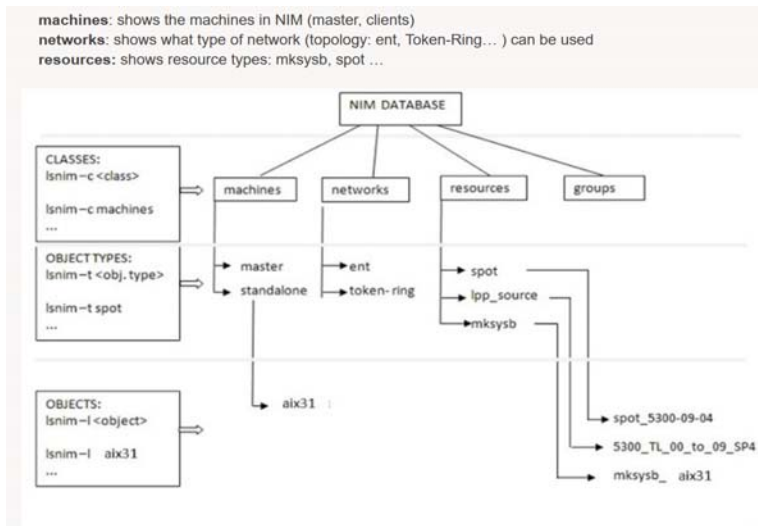
Directory Structure:

```
/nim
/nim/lpp_source
/nim/images
/nim/spot
/nim/bosinst_data
/nim/resolv_conf
I use /nim/mksysb for migrating mksysb images
```

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## NIM Layout



From: <https://aix4admins.blogspot.com/2011/05/nim-database-nim-database-is-stored-in.html>  
Also look at: <https://aix4admins.blogspot.com/2013/07/bootpd-this-is-initial-communication.html>

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## NIM on my 7.2 system

```
oslevel -s (on NIM Master)
7200-04-02-2028
```

```
lsipp -l | grep bos.sysmgt.nim
```

```
 bos.sysmgt.nim.client 7.2.4.1 COMMITTED Network Install Manager -
 bos.sysmgt.nim.master 7.2.4.1 COMMITTED Network Install Manager -
 bos.sysmgt.nim.spot 7.2.4.1 COMMITTED Network Install Manager - SPOT
 bos.sysmgt.nim.client 7.2.4.1 COMMITTED Network Install Manager -
```

```
# df -g /nim
```

```
Filesystem GB blocks Free %Used lused %lused Mounted on
/dev/lvnm 451.00 118.65 74% 250870 1% /nim
```

```
# ls -al /nim
```

```
drwxr-xr-x 12 root system 4096 Oct 02 2019 .
drwxr-xr-x 30 root system 4096 Sep 01 18:44 ..
drwxr-xr-x 2 root system 256 Mar 27 2019 aix72-isos
drwxr-xr-x 2 root system 256 Aug 22 2019 bosinst_data
drwxr-xr-x 2 root system 4096 Jun 03 16:14 images
drwxr-xr-x 10 root system 256 Jun 03 10:57 lpp_source
drwxr-xr-x 2 root system 256 Oct 24 2017 mksysb
drwxr-xr-x 2 root system 256 Dec 08 2016 resolv_conf
drwxr-xr-x 12 root system 4096 Jun 03 16:15 spot
```

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## Check network setup

```
# cat /etc/hosts
```

```
192.168.2.71 vio1
192.168.2.72 vio2
192.168.2.73 aix1nim
192.168.2.74 aix2
192.168.2.75 aix3
192.168.2.76 aix4
```

```
# cat /etc/inetd.conf
```

```
##
## service socket protocol wait/ user server server program
## name type nowait program arguments
##
bootps dgram udp wait root /usr/sbin/bootpd bootpd/etc/bootptab
tftp dgram udp6 SRC nobody /usr/sbin/tftpd tftpd -n
```

Note – I quite often keep these commented out and only uncomment when I am using NIM

### Do not TCP wrap these

For security reasons you can comment them out and just uncomment and refresh –s inetd when you want to use them

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## Check network setup

### cat /etc/services | grep bootps

```
bootps      67/udp     # Bootstrap Protocol Server
bootps      67/tcp     # Bootstrap Protocol Server
```

### cat /etc/services | grep bootpc

```
bootpc      68/tcp     # Bootstrap Protocol Client
bootpc      68/udp     # Bootstrap Protocol Client
```

### cat /etc/services | grep tftp

```
tftp        69/udp     # Trivial File Transfer
tftp        69/tcp     # Trivial File Transfer
```

Above checks required services are defined

Make sure firewalls and routers allow these protocols to pass though

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## Create LPP and SPOT

Download base DVDs as ISO images and use smitty bffcreate to create a source directory containing the images  
Download the latest service pack and save the images into a directory

Create an LPPsource

```
nim -o define -t lpp_source -a server=master -a source=/software/aix72/aix72-base -a packages=all -a location=/nim/lpp_source/lpp_72tl04sp2 lpp_72tl04sp2
```

Update LPPsource with fixes and additional packages

```
nim -o update -a packages=all -a source=/software/addons lpp_72tl04sp2
```

Above installs any addons you may need – I have none right now

```
nim -o update -a packages=all -a source=/software/javashssl-sep012020 lpp_72tl04sp2
```

Above updates ssh and ssl and java to more secure versions

Sep2020 Java6, Java7, Java8

OpenSSH 8.1.102.2100 and openssl 1.0.2.2100

```
nim -o update -a packages=all -a source=/software/aix72/aix72tl04sp2-2028 lpp_72tl04sp2
```

Above updates the LPP to AIX 7.2 tl04 sp2 – 7200-04-02-2028

```
nim -o check lpp_72tl04sp2
```

Create the SPOT

```
nim -o define -t spot -a server=master -a source=lpp_72tl04sp2 -a location=/nim/spot/spot_72tl040sp2 spot_72tl04sp2
```

```
nim -o check spot_72tl04sp2
```

May need to add bos.alt\_disk\_install.boot.images

```
nim -o cust -a filesets=bos.alt_disk_install.boot_images -a lpp_source=lpp_72tl04sp2 spot_72tl04sp2
```

You may need to use smitty to install bos.alt\_disk\_install.boot\_images and bos.alt\_disk\_install.rte into the SPOT

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## List resources

```

aixlnim:/software> lsnim | grep resource
boot                resources          boot
nim_script          resources          nim_script
master_net_conf     resources          resolv_conf
7200-01bid_ow       resources          bosinst_data
lpp_res             resources          lpp_source
spot_res            resources          spot
lpp_72t101sp1      resources          lpp_source
spot_72t101sp1     resources          spot
mksysb_aix72t101sp1 resources          mksysb
lpp_72t101sp2      resources          lpp_source
spot_72t101sp2     resources          spot
mksysb_aix7212     resources          mksysb
lpp7221            resources          lpp_source
spot7221           resources          spot
lpp7232            resources          lpp_source
spot7232           resources          spot
mksysb_vios310     resources          mksysb
mksysb_vios31021   resources          mksysb
viobosinstdata     resources          bosinst_data
spotvios31021      resources          spot
lpp_72t103sp3      resources          lpp_source
spot_72t103sp3     resources          spot
lpp7241            resources          lpp_source
spot7241           resources          spot
lpp7242            resources          lpp_source
spot7242           resources          spot
mksysb_aix7242     resources          mksysb
mksysb_vios31121   resources          mksysb
spotvios31121      resources          spot
lpp_72t104sp2      resources          lpp_source
spot_72t104sp2     resources          spot

```

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## List other items

```

aixlnim:/software> lsnim | grep machines
master              machines          master
aix2                machines          standalone
aix3                machines          standalone
aix4                machines          standalone
gpfs1              machines          standalone
gpfs2              machines          standalone
gtsoftware         machines          standalone
aixtest            machines          standalone
aixtest1           machines          standalone
aixlnim:/software> lsnim | grep group
basic_res_grp      groups            res_group
aixlnim:/software> lsnim | grep mksysb
mksysb_aix72t101sp1 resources          mksysb
mksysb_aix7212     resources          mksysb
mksysb_vios310     resources          mksysb
mksysb_vios31021   resources          mksysb
mksysb_aix7242     resources          mksysb
mksysb_vios31121   resources          mksysb

```

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## Show resources

**nim -o showres lpp\_72t104sp2 | grep bos.suma**

```
bos.suma      7.2.0.0      I N usr,root
bos.suma      7.2.3.15      S N usr,root
```

**nim -o showres lpp\_72t104sp2 | grep -i bos.alt**

```
bos.alt_disk_install.boot_images 7.2.0.0      I N usr
bos.alt_disk_install.boot_images 7.2.4.2      S N usr
bos.alt_disk_install.boot_images 7.2.4.6      S N usr
bos.alt_disk_install.rte 7.2.0.0      I N usr,root
bos.alt_disk_install.rte 7.2.4.0      S N usr,root
```

**nim -o showres lpp\_72t104sp2 | grep -i Java**

Lists all the Java levels

You can do the same for ssh and ssl to check the updates are in the LPP

**nim -o showres spot\_72t104sp2 | grep -i bos.alt**

```
bos.alt_disk_install.boot_images
bos.alt_disk_install.rte 7.2.4.1 A F Alternate Disk Installation
```

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## NIM Resources 1/3

```
aixnim:/software> ls -l /nim/lpp_source
total 0
drwxr-xr-x 6 root system 256 Nov 21 2019 lpp7241
drwxr-xr-x 5 root system 256 Dec 08 2016 lpp_72t101sp1
drwxr-xr-x 6 root system 256 Oct 09 2017 lpp_72t101sp2
drwxr-xr-x 5 root system 256 Aug 22 2019 lpp_72t103sp3
drwxr-xr-x 6 root system 256 Sep 16 12:20 lpp_72t104sp2
drwxr-xr-x 5 root system 256 Dec 08 2016 lpp_res
drwxr-xr-x 5 root system 256 Jan 29 2018 lppaix7221
drwxr-xr-x 6 root system 256 Nov 26 2018 lppaix7232
drwxr-xr-x 5 root system 256 Jun 03 11:10 lppaix7242
```

```
aixnim:/software> ls -l /nim/spot
total 0
drwxr-xr-x 3 bin bin 256 Jan 29 2018 spot7221
drwxr-xr-x 3 bin bin 256 Nov 26 2018 spot7232
drwxr-xr-x 3 root system 256 Nov 21 2019 spot7241
drwxr-xr-x 3 bin bin 256 Jun 03 11:12 spot7242
drwxr-xr-x 3 bin bin 256 Dec 08 2016 spot_72t101sp1
drwxr-xr-x 3 root system 256 Oct 09 2017 spot_72t101sp2
drwxr-xr-x 3 root system 256 Sep 11 2019 spot_72t103sp3
drwxr-xr-x 3 root system 256 Sep 16 12:39 spot_72t1040sp2
drwxr-xr-x 3 bin bin 256 Dec 08 2016 spot_res
drwxrwxr-x 3 root system 256 Aug 22 2019 spotvios31021
drwxrwxr-x 3 root system 256 Jun 03 16:15 spotvios31121
```

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## NIM Resources 2/3

```

aixlnim:/software> ls -l /nim/images
total 239695336
-rw-r--r-- 1 root    system  2880051200 Dec  8 2016  aixlnim.mksysb
-rw-r--r-- 1 root    system  8764401336 Oct 24 2017  aix7212.mksysb
-rw-r--r-- 1 root    system  1973163040 Jun  3 14:14  aix7242-golden.mksysb
-rw-r----- 1 root    system  3624806400 Jun  3 16:14  mksysb_vios31121
-rw-r--r-- 1 root    system  80544460800 Nov 27 2018  vios1-nov2718.mksysb
-rw-r--r-- 1 root    system  17578393600 Nov 27 2018  vios2-nov2718.mksysb
-rw-r----- 1 root    system  3561932800 Aug 22 2019  vios31021-flash-mksysb_image
-rw-r--r-- 1 root    system  3796787200 Nov 26 2018  vios310 mksysb

aixlnim:/software> lspv | grep nimvg
hdisk4      00f95d3a41e947c1          nimvg      active
hdisk3      00f95d3a41e94766          nimvg      active
hdisk5      00f95d3a41e946b1          nimvg      active
hdisk6      00f95d3a41e9470b          nimvg      active
hdisk7      00f95d3ab718f6af          nimvg      active
hdisk8      00f95d3ab7190772          nimvg      active
hdisk9      00f95d3a1587460f          nimvg      active

aixlnim:/software> df -g /nim
Filesystem      GB blocks      Free %Used      Iused %Used Mounted on
/dev/lvnmim     452.00         103.15    78%    286736      2% /nim

aixlnim:/software> lsvg -l nimvg
nimvg:
LV NAME          TYPE      LPs      PPs      PVs      LV STATE      MOUNT POINT
lvnmim           jfs2      452      452      3        open/syncd    /nim
lvbackups        jfs2      380      380      2        open/syncd    /backups
lvsoftware       jfs2      500      500      3        open/syncd    /software
loglv01          jfs2log   1         1         1        open/syncd    N/A
lvtftpboot       jfs2      8         8         1        open/syncd    /tftpboot

```

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## NIM Resources 3/3

```

aixlnim:/software> lsvg nimvg
VOLUME GROUP:      nimvg
VG STATE:          active
VG PERMISSION:     read/write
MAX LVs:           256
LVs:               5
OPEN LVs:          5
TOTAL PVs:         7
STALE PVs:         0
ACTIVE PVs:        7
MAX PPs per VG:    32768
LTG size (Dynamic): 512 kilobyte(s)
HOT SPARE:         no
MIRROR POOL STRICT: off
PV RESTRICTION:    none
DISK BLOCK SIZE:   512
FS SYNC OPTION:    no
VG IDENTIFIER:     00f95d3a00004c0000000158d5107f55
PP SIZE:           1024 megabyte(s)
TOTAL PPs:         1393 (1426432 megabytes)
FREE PPs:          52 (53248 megabytes)
USED PPs:          1341 (1373184 megabytes)
QUORUM:            4 (Enabled)
VG DESCRIPTORS:    7
STALE PPs:         0
AUTO ON:           yes
MAX PVs:           1024
AUTO SYNC:         no
BB POLICY:         relocatable
INFINITE RETRY:    no
CRITICAL VG:       no
CRITICAL PVs:      no

aixlnim:/software> lsvg -l nimvg
nimvg:
LV NAME          TYPE      LPs      PPs      PVs      LV STATE      MOUNT POINT
lvnmim           jfs2      452      452      3        open/syncd    /nim
lvbackups        jfs2      380      380      2        open/syncd    /backups
lvsoftware       jfs2      500      500      3        open/syncd    /software
loglv01          jfs2log   1         1         1        open/syncd    N/A
lvtftpboot       jfs2      8         8         1        open/syncd    /tftpboot

```

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## List resources 1/2

```
# lsnim -l aix2
```

```
aix2:
class      = machines
type       = standalone
connect    = nimsh
platform   = chrp
netboot_kernel = 64
if1        = master_net aix2 0
cable_type1 = N/A
Cstate     = ready for a NIM operation
prev_state = not running
Mstate     = currently running
cpuid      = 00F95D3A4C00
Cstate_result = success
```

```
aixlnim:/software> lsnim -l lpp_72t104sp2
lpp_72t104sp2:
class      = resources
type       = lpp_source
arch       = power
Rstate     = ready for use
prev_state = verification is being performed
location   = /nim/lpp_source/lpp_72t104sp2
simages    = yes
alloc_count = 0
server     = master
```

```
aixlnim:/software> lsnim -l spot_72t104sp2
spot_72t104sp2:
class      = resources
type       = spot
plat_defined = chrp
arch       = power
bos_license = yes
Rstate     = ready for use
prev_state = verification is being performed
location   = /nim/spot/spot_72t104sp2/spot_72t104sp2/usr
version    = 7
release    = 2
mod        = 4
oslevel_r  = 7200-04
oslevel_s  = 7200-04-02-2028
alloc_count = 0
server     = master
if_supported = chrp.64 ent
Rstate_result = success
```

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## List resources 2/2

```
aixlnim:/> lsnim | grep vio
mksysb_vios310      resources      mksysb
mksysb_vios31021    resources      mksysb
viobosinstdata     resources      bosinst_data
spotvios31021      resources      spot
mksysb_vios31121    resources      mksysb
spotvios31121      resources      spot
mksysb_vios31125    resources      mksysb
spot_vios31125      resources      spot
aixlnim:/>
```

```
aixlnim:/> lsnim -l spot_vios31125
spot_vios31125:
class      = resources
type       = spot
plat_defined = chrp
arch       = power
Rstate     = ready for use
prev_state = verification is being performed
location   = /nim/spot/spot_vios31125/usr
version    = 7
release    = 2
mod        = 4
oslevel_r  = 7200-04
oslevel_s  = 7200-04-02-2028
alloc_count = 0
server     = master
if_supported = chrp.64 ent
Rstate_result = success
mksysb_source = mksysb_vios31125
```

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## Update resources – add a 7.2tl1sp1 resource

- Creates NIM resources for AIX 7.1 with tl01 sp1 applied
- Put update CD in, or change into fixes directory
- Update SPOT and lpp\_source
  - smitty nim
  - Perform nim administration tasks
  - Manage resources
  - Perform operations on resources
  - Select the SPOT
  - Select update\_all
  - Point it to the update CD or directory
- OR
  - `nim -o define -t lpp_source -a server=master -a location=/nim/lpp_source/lpp_71tl04sp1 -a source=/software/aixv7/aix71-base lpp_71tl01sp1`
- `nim -o update -a packages=all -a source=/software/aixv7/aixv7-tl01-sp1 lpp_71tl01sp1`
- `nim -o define -t spot -a server=master -a location=/nim/spot -a source=lpp_71tl01sp1 spot_71tl01sp1`
- `nim -o check spot_71tl01sp1`
- `nim -o check lpp_71tl01sp1`
- `nim -o reset -a force=yes aix2`

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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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## 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_aix7212
```

```
  server = master
```

```
  location = /nim/images/aix7212-golden.mksysb
```

```
OR
```

```
nim -o define -t mksysb -a server=master -a location=/nim/images/ aix7212-golden.mksysb mksysb_ aix7212
```

```
For VIO:
```

```
nim -o define -t mksysb -a server=master -a location=/nim/images/vios31125-flash-mksysb_image mksysb_vios31125
```

```
Grabbed the VIO 3.1.1.25 mksysb image off the Flash ISO downloaded from ESS
```

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## mksysb Resources

**#lsnim -l | grep mksysb**

```
aix1nim:/software/powervm31125-base> lsnim -l | grep mksysb
serves          = mksysb_aix7212
serves          = mksysb_aix7242
serves          = mksysb_vios31121
serves          = mksysb_vios31125
mksysb_aix7212:
type            = mksysb
location       = /nim/images/aix7212.mksysb
mksysb_aix7242:
type            = mksysb
location       = /nim/images/aix7242-golden.mksysb
mksysb_vios31121:
type            = mksysb
location       = /nim/images/mksysb_vios31121
mksysb_source  = mksysb_vios31121
mksysb_vios31125:
type            = mksysb
location       = /nim/images/vios31125-flash-mksysb_image
```

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## Check VIOS mksysb definition

**lsnim -l mksysb\_vios31125**

```
mksysb_vios31125:
class          = resources
type           = mksysb
creation_date  = Wed Sep 16 13:22:34 2020
Rstate        = ready for use
prev_state     = unavailable for use
location       = /nim/images/vios31125-flash-mksysb_image
version        = 7
release        = 2
mod            = 4
oslevel_r     = 7200-04
oslevel_s     = 7200-04-02-2028
alloc_count   = 0
server        = master
```

Check the image is there:

**# ls -l /nim/images/vios31125-flash-mksysb\_image**

```
-rw-r----- 1 root system 3624960000 Sep 16 13:20 /nim/images/vios31125-flash-mksysb_image
```

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## Tell NIM to use the AIX 7.2.1.2 mksysb for aix2 machine

```
smitty nim_bosinst
  Select aix2
  install source = mksysb_aix7212
  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=spot7221-a lpp_source=lpp7221 -a mksysb=mksysb_aix7212 aix2
OR
```

```
nim -o allocate -a lpp_source=lpp7221 -a spot=spot7221 -a mksysb=mksysb_aix7212 -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                  aix2
* Installation TYPE                    mksysb
* SPOT                                 spot 72t101sp2
LPP_SOURCE                             [lpp 72t101sp2]
MKSYSB                                  mksysb_aix7212

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        [no]

```

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## Tell NIM to use the mksysb for this machine

First go into smitty nim and allocate resources – then check:

lsnim -l aix2

```
aix2:
class      = machines
type       = standalone
connect    = nimsh
platform   = chrp
netboot_kernel = 64
ifl        = master_net aix2 0
cable_type1 = N/A
Cstate     = BOS installation has been enabled
prev_state = ready for a NIM operation
Mstate     = not running
boot       = boot
lpp_source = lpp_72t101sp2
mksysb     = mksysb_aix7212
spot       = spot_72t101sp2
cpuid      = 00F95D3A4C00
control    = master
```

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## Checks

- showmount -e
  - /nim/images/aix7212.mksysb aix2
  - /nim/lpp\_source/lpp\_72t101sp2 aix2
  - /nim/spot/spot\_72t101sp2/spot\_72t101sp2/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

```
total 219192
lrwxr-xr-x 3 root system 4096 Apr 27 16:04 .
lrwxr-xr-x 24 root system 4096 Apr 27 15:48 ..
lrwxr-xr-x 1 root system 14 Apr 27 16:04 192.168.2.74 -> /tftpboot/aix2
lrwxr-xr-x 1 root system 14 Apr 27 16:04 192.168.2.74:boot -> /tftpboot/aix2
lrwxr-xr-x 1 root system 19 Apr 27 16:04 192.168.2.74:info -> /tftpboot/aix2.info
lrwxr-xr-x 1 root system 24 Apr 27 16:04 192.168.2.74:iplrecord -> /tftpboot/aix2.iplrecord
lrwxr-xr-x 1 root system 36 Apr 27 16:04 aix2 -> /tftpboot/spot_72t101sp2.chrp.64.ent
lrwxr-xr-x 1 root system 1087 Apr 27 16:04 aix2.info
lrwxr-xr-x 1 root system 38 Apr 27 16:04 aix2.iplrecord -> /tftpboot/spot_72t101sp2.iplrecord.ent
lrwxr-xr-x 2 root system 256 Dec 06 2016 lost+found
lrwxr-xr-x 1 root system 29360128 Jan 29 08:48 spot7221.chrp.64.ent
lrwxr-xr-x 1 root system 512 Jan 29 08:48 spot7221.iplrecord.ent
lrwxr-xr-x 1 root system 28311552 Dec 08 2016 spot_72t101spl.chrp.64.ent
lrwxr-xr-x 1 root system 512 Dec 08 2016 spot_72t101spl.iplrecord.ent
lrwxr-xr-x 1 root system 28311552 Oct 09 2017 spot_72t101sp2.chrp.64.ent
lrwxr-xr-x 1 root system 512 Oct 09 2017 spot_72t101sp2.iplrecord.ent
lrwxr-xr-x 1 root system 26214400 Dec 08 2016 spot_rea.chrp.64.ent
lrwxr-xr-x 1 root system 512 Dec 08 2016 spot_rea.iplrecord.ent
```

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## Useful NIM commands

- Recover missing simages if needs be:
- `nim -o update -a recover=yes -a source=/software/aixv7/aix71-base lpp_71tl01sp1`
- ALLOCATIONS
- `nim -o deallocate -a spot=spot_71tl01sp1 -a lpp_source=lpp_71tl01sp1 -a mksysb=mksysb_71tl01sp1 b740n1`
- `nim -o allocate -a spot=spot_71tl01sp1 -a lpp_source=lpp_71tl01sp1 -a mksysb=mksysb_71tl01sp1 b740n1`
- `nim -o bos_inst -a source=mksysb -a accept_licenses=yes -a boot_client=no -a installp_flags='-agX' b740n1`
- OTHER
- To add the bos.games 5.2.0.0 and bos.terminfo filesets to lpp\_source1, type:
  - `nim -o update -a packages="bos.games 5.2.0.0 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](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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## 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 select 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
  - <http://www-01.ibm.com/support/docview.wss?uid=isg3T1024487>
- Troubleshooting NIM LED Hangs
  - <http://www-01.ibm.com/support/docview.wss?uid=isg3T1012561>

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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/>
- There is a good description of AIXPCM here:
- [https://www.ibm.com/support/knowledgecenter/en/ssw\\_aix\\_72/com.ibm.aix.osdevice/devmpio.htm](https://www.ibm.com/support/knowledgecenter/en/ssw_aix_72/com.ibm.aix.osdevice/devmpio.htm)
- Migration notes
- <http://www-01.ibm.com/support/docview.wss?uid=ssg1S1010646>
- Article on MPIO resiliency and problem determination
- <https://developer.ibm.com/articles/au-aix-multipath-io-mpio/>

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## Start the install from the client

- 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 50,000 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

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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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## 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 lspp clientlpar` LPAR must be up
  - `nim -o lspp aix2`

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## Useful commands on master

```

aixlnim:/nim/bosinst_data> lsnim -O mksysb_vios31125
mksysb_vios31125:
  remove = remove an object
  define  = define an object
  change  = change an object's attributes
  showres = show contents of a resource
aixlnim:/nim/bosinst_data> lsnim -l mksysb_vios31125
mksysb_vios31125:
  class      = resources
  type       = mksysb
  creation_date = Wed Sep 16 13:22:34 2020
  Rstate     = ready for use
  prev state = unavailable for use
  location   = /nim/images/vios31125-flash-mksysb_image
  version    = 7
  release    = 2
  mod        = 4
  oslevel_r  = 7200-04
  oslevel_s  = 7200-04-02-2028
  alloc count = 0
  server     = master

```

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## Useful commands on master - niminfo

```

#ls -l /etc/niminfo
-rw-r--r-- 1 root system 164 Dec 08 2016 /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

```

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## Useful commands on master

```
# ls -l /etc/objrepos/nim*
```

```
-rw-rw-r-- 1 root system 20480 Sep 16 13:22 /etc/objrepos/nim_attr
-rw-rw-r-- 1 root system 20480 Sep 16 13:22 /etc/objrepos/nim_attr.vc
-rw-rw-r-- 1 root system 4096 Sep 16 13:22 /etc/objrepos/nim_object
-rw-rw-r-- 1 root system 4096 Sep 16 13:22 /etc/objrepos/nim_object.vc
-r-xr-x--- 1 root system 28672 May 14 20:58 /etc/objrepos/nim_pdatr
-r-xr-x--- 1 root system 28672 May 14 20:58 /etc/objrepos/nim_pdatr.vc
```

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

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

```
-rw-r--r-- 1 root system 342272 Dec 08 2016 /var/adm/ras/nim.setup
-rw-r--r-- 1 root system 131072 Sep 16 13:22 /var/adm/ras/nimlog
```

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

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## /etc/niminfo on the client

```
aix2:> cat /etc/niminfo
#----- Network Install Manager -----
# warning - this file contains NIM configuration information
#   and should only be updated by NIM
export NIM_NAME=aix2
export NIM_HOSTNAME=aix2
export NIM_CONFIGURATION=standalone
export NIM_MASTER_HOSTNAME=aix1nim
export NIM_MASTER_PORT=1058
export NIM_REGISTRATION_PORT=1059
export NIM_SHELL="nimsh"
export NIM_MASTERID=00F95D3A4C00
export NIM_FIPS_MODE=0
export NIM_LICENSE_ACCEPT=yes
export RC_CONFIG=rc.bos_inst
export NIM_BOSINST_RECOVER="/../SPOT/usr/lpp/bos.sysmgmt/nim/methods/c_bosinst_env -a hostname=aix2"
export SPOT=aix1nim:/nim/spot/spot_72t01sp1/usr
export NIM_CUSTOM="/../SPOT/usr/lpp/bos.sysmgmt/nim/methods/c_script -a
location=aix1nim:/export/nim/scripts/aix2.script"
export NIM_BOS_IMAGE=/NIM_BOS_IMAGE
export NIM_BOS_FORMAT=mksysb
export NIM_HOSTS=" 127.0.0.1:loopback:localhost 10.1.2.236:aix2 10.1.2.13:aix1nim "
export NIM_MOUNTS=" aix1nim:/nim/lpp_source/lpp_72t01sp1:/SPOT/usr/sys/inst.images:dir
aix1nim:/nim/images/aix1nim.mksysb:/NIM_BOS_IMAGE:file "
export ROUTES=" default:0:10.1.2.2 "
```

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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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## Backup Tips

- /nim is a separate filesystem
- I take 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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## 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

```
# nimadm -T cg-aix61 -O /export/mksysb/cg-aix71 -s spotaix7tl0sp2 -l aix7tl0sp2 -j nimadmvg -Y -N cg-aix71
```

The flags indicate the following:

- 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.

You can add "-d hdisk3" to do the upgrade to an alternate disk (hdisk3)

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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## 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 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

- [http://pic.dhe.ibm.com/infocenter/aix/v7r1/topic/com.ibm.aix.install/doc/insgdrf/HT\\_insgdrf\\_altdiskinstall\\_clone.htm](http://pic.dhe.ibm.com/infocenter/aix/v7r1/topic/com.ibm.aix.install/doc/insgdrf/HT_insgdrf_altdiskinstall_clone.htm)
- 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 mksysb 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

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## Alt Disk 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
#
# lspp -l | grep bos.alt
bos.alt_disk_install.boot_images
bos.alt_disk_install.rte 7.1.4.30 COMMITTED Alternate Disk Installation
bos.alt_disk_install.rte 7.1.4.30 COMMITTED Alternate Disk Installation
```

```
Alternate Disk Installation
Move cursor to desired item and press Enter.
Install mksysb on Alternate Disk
Clone the rootvg to an Alternate Disk
NIM Alternate Disk Migration

F1=Help      F2=Refresh  F3=Cancel   F8=Image
F9=Shell     F10=Exit   Enter=Do
```

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## Alt Disk 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 Disk(s) to install      [hdisk1]          +
* Device or image name          [/usr/local/backups/b7] +
Phase to execute                all              +
image.data file                 [ ]            /
Customization script            [ ]            /
Set bootlist to boot from this disk
on next reboot?                 no             +
Reboot when complete?          yes            +
Verbose output?                 no             +
Debug output?                   no             +
resolv.conf file                [ ]            /

F1=Help      F2=Refresh      F3=Cancel      F4=List
Esc+5=Reset  F6=Command      F7=Edit       F8=Image
F9=Shell     F10=Exit        Enter=Do

```

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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 mkysyb

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 `mkysyb` 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 mkysyb

```
# 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 `mkysyb` clone  
At the end `altinst_rootvg` is varied offline and these (the alt ones) are all unmounted

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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   lused %used Mounted on
/dev/hd4    0.62      0.41 35%  10330 10%   /
/dev/hd2    5.00      2.37 53%  62100 11%  /usr
/dev/hd9var 0.75      0.47 38%  5785  5%   /var
/dev/hd3    3.00      3.00 1%   72  1%   /tmp
/dev/hd1    0.25      0.25 1%   11  1%   /home
/dev/hd11admin 0.25     0.25 1%   5  1%   /admin
/proc      -         -    -    -    -    /proc
/dev/hd10opt 2.00     1.41 30%  13901 5%   /opt
/dev/livedump 0.25     0.25 1%   4  1%   /var/adm/ras/livedump
/dev/fslv00 5.00     4.93 2%   231  1%   /usr/local
/dev/fslv01 1.00     0.98 2%   39  1%   /usr/local/logs

/dev/alt_hd4 0.62     0.53 1%   13  1%   /alt_inst
/dev/alt_hd11admin 0.25     0.25 1%   5  1%   /alt_inst/admin
/dev/alt_hd1 0.25     0.25 1%   11  1%   /alt_inst/home
/dev/alt_hd10opt 2.00     1.41 30%  13900 5%   /alt_inst/opt
/dev/alt_hd3 3.00     3.00 1%   61  1%   /alt_inst/tmp
/dev/alt_hd2 5.00     2.37 53%  62100 11%   /alt_inst/usr
/dev/alt_fslv00 5.00     4.93 2%   230  1%   /alt_inst/usr/local
/dev/alt_fslv01 1.00     0.98 2%   39  1%   /alt_inst/usr/local/logs
/dev/alt_hd9var 0.75     0.47 38%  5761  5%   /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 7100-01_AIX_ML -l /updates
```

The above copies the current 7100-00 rootvg to hdisk1  
It applies the updates from /updates to bring the cloned rootvg to 7100-01  
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/support/knowledgecenter/en/ssw\\_aix\\_71/com.ibm.aix.cmds1/alt\\_disk\\_copy.htm](https://www.ibm.com/support/knowledgecenter/en/ssw_aix_71/com.ibm.aix.cmds1/alt_disk_copy.htm)  
<http://www-01.ibm.com/support/docview.wss?uid=isg3T1012273>

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## Migrating a 7.1 mksysb to 7.2

Take a mksysb on the client to be updated

Copy it to /nim/images and add it as a resource

Check the mksysb

```
listvgbackup -f/nim/images/jlmksysb-may2317' | grep rc.tcpip
listvgbackup -f/nim/images/jlmksysb-may2317' | grep inetd.conf
```

Convert the mksysb to 7.2

```
nimadm -T jlmksysb-may2317 -O /nim/mksysb/jlmksysb72-may2317 -s spot7212 -l lpp7212 -j nimvg -Y -N
```

Check the converted mksysb

```
listvgbackup -f/nim/mksysb/jlmksysb72-may2317' | grep rc.tcpip
listvgbackup -f/nim/mksysb/jlmksysb72-may2317' | grep inetd.conf
```

If all good on master then copy it to the client:

```
cp /nim/mksysb/jlmksysb72-may2317 /usr/local/backups
```

And on client install in this case to hdisk11:

```
alt_disk_mksysb -m /backups/jlmksysb72-may2317 -d hdisk11 -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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## listvgbackup

```
listvgbackup -f'/nim/images/vios31125-flash-mksysb_image' | grep rc.tcpip
```

New volume on /nim/images/vios31125-flash-mksysb\_image:

Cluster size is 51200 bytes (100 blocks).

The volume number is 1.

The backup date is: Fri Jul 3 02:43:34 EDT 2020

Files are backed up by name.

The user is .

6978 ./usr/lpp/bos.net/inst\_root/etc/rc.tcpip

4065 ./usr/share/man/info/EN\_US/a\_doc\_lib/files/filesreference/rc.tcpip.html

7020 ./etc/rc.tcpip

The number of archived files is 79119.

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## VIOS and NIM – Set up resources

- Need to extract mksysb image from VIO install ISO - I use the flash ISO as there is only one mksysb image to deal with
- Copy the image into the images directory
- It is now there as:
  - /nim/images/vios31125-flash-mksysb\_image
- Create the mksysb resource
  - `nim -o define -t mksysb -a server=master -a location=/nim/images/vios31125-flash-mksysb_image mksysb_vios31125`
- Create the spot from the mksysb image
  - `nim -o define -t spot -a server=master -a location=/nim/spot -a source=mksysb_vios31125 spot_vios31125`
- Check the images

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## VIOS and NIM – Check resources

```

aixlnim:/nim/bosinst_data> lsnim -l mksysb_vios31125
mksysb_vios31125:
  class      = resources
  type       = mksysb
  creation_date = Wed Sep 16 13:22:34 2020
  Rstate     = ready for use
  prev_state = unavailable for use
  location   = /nim/images/vios31125-flash-mksysb_image
  version    = 7
  release    = 2
  mod        = 4
  oslevel_r  = 7200-04
  oslevel_s  = 7200-04-02-2028
  alloc_count = 0
  server     = master
  extracted spot = spot_vios31125

```

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## VIOS and NIM – Check resources

```

aixlnim:/nim/bosinst_data> lsnim -l spot_vios31125
spot_vios31125:
  class      = resources
  type       = spot
  plat_defined = chrp
  arch       = power
  Rstate     = ready for use
  prev_state = verification is being performed
  location   = /nim/spot/spot_vios31125/usr
  version    = 7
  release    = 2
  mod        = 4
  oslevel_r  = 7200-04
  oslevel_s  = 7200-04-02-2028
  alloc_count = 0
  server     = master
  if_supported = chrp.64 ent
  Rstate_result = success
  mksysb_source = mksysb_vios31125

```

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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.
- <http://www14.software.ibm.com/webapp/set2/sas/f/flrt/viostable.html>
- 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 of VIO

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## VIOS and NIM

- Add VIOS partition as a client
- Copy the VIOS mksysb image from the CD to your NIM master
  - On VIOS media there are 3 images now – the 3<sup>rd</sup> is on DVD 2
  - Copy all 3 images individually to a directory and then use cat to combine them
  - `cat /export/mksysb/vios/mksysb_image /export/mksysb/vios/mksysb_image2 /export/mksysb/vios/mksysb_image3 >/export/mksysb/nim_vios.mksysb`
- OR you can save yourself the grief and use the flash image which provides a single mksysb
- Define mksysb resource to NIM master
- Define spot on the NIM master
  - The source for the SPOT will be the combined mksysb
- Copy the bosinst.data from the DVD and create a viosbosinst resource
- You can now use **bos\_inst** to do a mksysb install once the partition profile is defined
- <http://www-01.ibm.com/support/docview.wss?uid=isg3T1011386>

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## Examples from man page - nim -o updateios

```

updateios
1  To install fixes or to update VIOS with the vioserver1 NIM object name to the latest maintenance level, type:

   nim -o updateios -a lpp_source=lpp_source1 -a preview=no vioserver1
   The updates are stored in lpp_source and lpp_source1 files.      I

   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 updateios_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, type:

   nim -o updateios -a updateios_flags=-reject vioserver1

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

   nim -o updateios -a updateios_flags=-cleanup vioserver1

4  To commit updates for a VIOS with the vioserver1 NIM object name, type:

   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, type:

   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 install_bundle bundle1, where
   bundle1 contains the updates to be removed, type:

   nim -o updateios -a updateios_flags=-remove -a install_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/support/knowledgecenter/en/ssw\\_aix\\_72/v\\_cmds/viosupgrade.html](https://www.ibm.com/support/knowledgecenter/en/ssw_aix_72/v_cmds/viosupgrade.html)
- 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

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## Examples from man page – man viosupgrade

```

viosupgrade command

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).

Syntax

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

viosupgrade -t bosinst hostname -m ios_mksysbname
-p spotname (-a RootVGCloneddisk: ... | -r RootVGInstallDisk: ...) -s)
[-b BackupFileResource] [-c] [-e resources: ...] [-v]

To perform the altdisk type of upgrade operation type the following command:

viosupgrade -t altdisk -n hostname -m ios_mksysbname
-a rootvgclonedisk [-b BackupFileResource] [-c] [-e
resources: ...] [-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] )

When the viosupgrade command is run, the following operations are performed in the background:
Backup
The virtual and logical configuration data is backed up to ensure that the VIOS partition can be recovered
after a new installation.
Installation
The VIOS partition is installed from the provided VIOS image.
Restore
The virtual and logical configuration data of the VIOS partition is restored.

```

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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-oct0917
    - Backup of this node (vio1) successful
  - You can also use viosbr to view or restore
    - viosbr -view -file /tmp/viosbkup-oct0917.tar.gz
  - <http://publib.boulder.ibm.com/infocenter/systems/scope/hw/topic/p7hcg/viosbr.htm>
- 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

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## VIO Server Backup Script to put in crontab

```
#!/bin/sh
#
machine=`uname -n`
mkdir /usr/local/backups/$machine
mount /usr/local/backups
umount /var/vio/VMLibrary
su - padmin -c "ioscli backupios -file /usr/local/backups/$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/sites/default/files/inline-files/\\$FILE/hmcScanner-0.11.42.zip](https://www.ibm.com/support/pages/sites/default/files/inline-files/$FILE/hmcScanner-0.11.42.zip)

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```
$ 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 -al viosa
```

```
total 44300704
```

```
drwxr-xr-x  2 root  staff   256 Oct 09 23:32 .
```

```
drwxr-xr-x  4 root  system 4096 Oct 09 22:42 ..
```

```
-rw-r--r--  1 root  staff 22678507520 Oct 09 23:32 nim_resources.tar
```

```
# du -sg viosa
```

```
21.12 viosa
```

```
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 from the nim\_resources.tar the bosinst.data

```
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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## Using NIM with VIOS mksysb

Again we run the viosbr to backup the virtual resources

Then:

```
backupios -file /backups/viosmksysb-oct0219.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-oct0219.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

IBM document on this at: [ftp://ftp.software.ibm.com/software/server/vios/docs/backupios\\_mod.pdf](ftp://ftp.software.ibm.com/software/server/vios/docs/backupios_mod.pdf)

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## Cloning disks

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 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

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)

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/support/knowledgecenter/en/ssw\\_aix\\_71/com.ibm.aix.cmds1/alt\\_disk\\_copy.htm](https://www.ibm.com/support/knowledgecenter/en/ssw_aix_71/com.ibm.aix.cmds1/alt_disk_copy.htm)

Useful flags are -B and -O

-B tells it NOT to change the bootlist which it does automatically otherwise

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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## Uninstalling NIM

- `nim -o unconfig master`
- `installp -u bos.sysmgmt.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](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.sysmgmt.nim.master` fileset

Then `smitty nimit 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 `nimit` command if you prefer

```
# nimit -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:

```
# nimit -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
    - `Issrc -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
  - `Issrc -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

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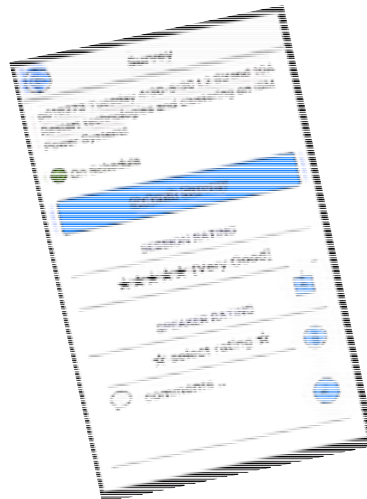
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## Thank you!

Jaqui Lynch

jlynch@flagshipsg.net

**Please complete the Session  
Evaluation!**



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## Thank you for your time



If you have questions please email me at:  
[jaqui@circle4.com](mailto:jaqui@circle4.com) or [jlynch@flagshipsg.net](mailto:jlynch@flagshipsg.net)

Also check out:  
<http://www.circle4.com/movies/>

Copy of presentation at:  
<http://www.circle4.com/ptechu/nim201-oct042020.pdf>

**And the Virtual User Group**  
<https://www.ibm.com/support/pages/node/1120377>

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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`
- `lspp`

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## NIM Specific Useful Links

- Using EZNIM
  - [https://www.ibm.com/support/knowledgecenter/en/ssw\\_aix\\_71/install/eznim.html](https://www.ibm.com/support/knowledgecenter/en/ssw_aix_71/install/eznim.html)
- SG24-7296 – NIM from A-Z in AIX 5L Redbook – 30 May 2007
  - <http://www.redbooks.ibm.com/redbooks/pdfs/sg247296.pdf>
- The Power of Network Install Manager
  - [http://www.ibm.com/developerworks/aix/library/au-nim/index.html?S\\_TACT=105AGX20](http://www.ibm.com/developerworks/aix/library/au-nim/index.html?S_TACT=105AGX20)
- Simplifying with NIM – article from IBM Systems Magazine 2006
  - <http://www.circle4.com/jaqui/eserver/aixtra-FebMar06-SimplifyingwithNIM.pdf>
- NIM Concepts
  - [http://publib.boulder.ibm.com/infocenter/aix/v6r1/topic/com.ibm.aix.install/doc/insgdrf/nim\\_concepts.htm](http://publib.boulder.ibm.com/infocenter/aix/v6r1/topic/com.ibm.aix.install/doc/insgdrf/nim_concepts.htm)
- Backing up the NIM Database
  - [http://publib.boulder.ibm.com/infocenter/aix/v6r1/topic/com.ibm.aix.install/doc/insgdrf/adv\\_config\\_backup\\_db\\_cmd\\_line.htm](http://publib.boulder.ibm.com/infocenter/aix/v6r1/topic/com.ibm.aix.install/doc/insgdrf/adv_config_backup_db_cmd_line.htm)
- AIX v6.1 NIM Pages
  - [http://publib.boulder.ibm.com/infocenter/aix/v6r1/topic/com.ibm.aix.install/doc/insgdrf/basic\\_config.htm](http://publib.boulder.ibm.com/infocenter/aix/v6r1/topic/com.ibm.aix.install/doc/insgdrf/basic_config.htm)
- Nim Tips
  - [https://www.ibm.com/support/knowledgecenter/en/ssw\\_aix\\_72/com.ibm.aix.install/nim\\_master\\_manage\\_tasks.htm](https://www.ibm.com/support/knowledgecenter/en/ssw_aix_72/com.ibm.aix.install/nim_master_manage_tasks.htm)
- **Using NIM Operations (all the subcommands)**
  - [https://www.ibm.com/support/knowledgecenter/en/ssw\\_aix\\_72/com.ibm.aix.install/concepts\\_operations.htm](https://www.ibm.com/support/knowledgecenter/en/ssw_aix_72/com.ibm.aix.install/concepts_operations.htm)
- Configuring NIM
  - [https://www.ibm.com/support/knowledgecenter/en/ssw\\_aix\\_72/com.ibm.aix.install/nim\\_basic.htm](https://www.ibm.com/support/knowledgecenter/en/ssw_aix_72/com.ibm.aix.install/nim_basic.htm)
- NIM Basics
  - <https://aixexpert.wordpress.com/nim/nim-basics/>

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## Useful Links

- Jaqui Lynch Articles
  - <http://www.circle4.com/jaqui/eserver.html>
  - <https://ibmsystemsmag.com/Authors/jaqui-lynch>
- Nigel Griffiths AIXpert Blog
  - <https://www.ibm.com/support/pages/aixpert-blog-nigel-griffiths-mrnmon>
- Nigel Griffiths Twitter – mr\_nmon
  - [https://twitter.com/mr\\_nmon](https://twitter.com/mr_nmon)
- Nigel Griffiths YouTube
  - <https://www.youtube.com/nigelargriffiths>
- Gareth Coates – Tricks of the POWER Masters
  - <https://www.ibm.com/support/pages/node/1116939>
- Gareth Coates Twitter – power\_gaz
  - [https://twitter.com/power\\_gaz](https://twitter.com/power_gaz)
- 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
  - <https://www.ibm.com/support/pages/node/1110195>

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