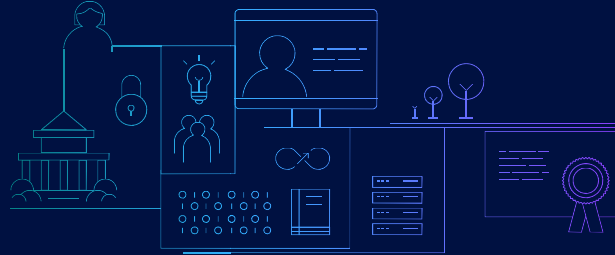


IBM TechU

NIM 201

A204234

—
Jaqui Lynch
Flagship Solutions Group
jlynch@flagshipsg.net



IBM TechU 2021



1

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>

2

2

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

3

3

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.sysmgt.nim.master
 - bos.sysmgt.nim.spot
 - bos.sysmgt.nim.client
- Also ensure the following filesets are installed
 - bos.net.tcp.server
 - bos.net.nfs.server
- Use lspp to check they are there

4

4

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
```

5

5

NIM on my 7.2 system

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

```
lspp -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
```

6

6

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

7

7

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

8

8

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_72t104sp2 lpp_72t104sp2
```

Update LPPsource with fixes and additional packages

```
nim -o update -a packages=all -a source=/software/addons lpp_72t104sp2
```

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

```
nim -o update -a packages=all -a source=/software/javasshssl-sep012020 lpp_72t104sp2
```

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/aix72t104sp2-2028 lpp_72t104sp2
```

Above updates the LPP to AIX 7.2 t104 sp2 – 7200-04-02-2028

```
nim -o check lpp_72t104sp2
```

Create the SPOT

```
nim -o define -t spot -a server=master -a source=lpp_72t104sp2 -a location=/nim/spot/spot_72t1040sp2 spot_72t104sp2
```

```
nim -o check spot_72t104sp2
```

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_72t104sp2 spot_72t104sp2
```

You may need to use smitty to install bos.alt_disk_install.boot_images and bos.alt_disk_install.rte into the SPOT

9

9

List resources

```
aixlnim:~/> ls -l | grep -i 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
mksysb_vios31125    resources           mksysb
spot_vios31125      resources           spot
lpp_72t105sp1       resources           lpp_source
spot_72t105sp1      resources           spot
mksysb_vios312_10   resources           mksysb
spotvios312_10      resources           spot
lpp_72t15sp2        resources           lpp_source
spot_72t15sp2       resources           spot
mksysb_vios31221    resources           mksysb
spotvios312_21      resources           spot
```

10

10

List other items

```

aix1nim:/> lsnim | grep -i machine
master          machines      master
aix2            machines     standalone
aix3            machines     standalone
aix4            machines     standalone
gpfs1           machines     standalone
qpfs2           machines     standalone

aix1nim:/> lsnim | grep -i group
basic_res_grp   groups        res_group
aix1nim:/> lsnim | grep -i 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
mksysb_vios31125    resources    mksysb
mksysb_vios312_10   resources    mksysb
mksysb_vios31221    resources    mksysb

```

11

11

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

```

12

12

NIM Resources 1/3

```

aixlnim:> 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 2020  lpp_72t104sp2
drwxr-xr-x  5 root    system    256 Nov 18 2020  lpp_72t105sp1
drwxr-xr-x  5 root    system    256 Aug 03 16:39 lpp_72t15sp2
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 2020  lppaix7242
aixlnim:> 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 2020  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 2020  spot_72t104sp2
drwxr-xr-x  3 bin     bin      256 Nov 18 2020  spot_72t105sp1
drwxr-xr-x  3 bin     bin      256 Aug 03 16:41 spot_72t15sp2
drwxr-xr-x  3 bin     bin      256 Dec 08 2016  spot_res
drwxrwxr-x  3 root    system   256 Sep 16 2020  spot_vios31125
drwxrwxr-x  3 root    system   256 Aug 22 2019  spotvios31021
drwxrwxr-x  3 root    system   256 Jun 03 2020  spotvios31121
drwxrwxr-x  3 root    system   256 Nov 18 2020  spotvios312_10
drwxrwxr-x  3 root    system   256 Aug 03 17:04 spotvios312_21

```

13

13

NIM Resources 2/3

```

aixlnim:> ls -l /nim/images
total 260915160
-rw-r--r--  1 root    system    2880051200 Dec 08 2016  aixlnim.mksysb
-rw-r--r--  1 root    system    8764401336 Oct 24 2017  aix7212.mksysb
-rw-r--r--  1 root    system    1973163040 Jun 03 2020  aix7242-golden.mksysb
-rw-r-----  1 root    system    3624806400 Jun 03 2020  mksysb_vios31121
-r--r--r--  1 root    system    3624908800 Nov 18 2020  mksysb_vios312_10
-rw-r--r--  1 root    system    3614668800 Aug 03 17:04  vio31221-mksysb_image
-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
-rw-r-----  1 root    system    3624960000 Sep 16 2020  vios31125-flash-mksysb_image
aixlnim:> 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
hdisk10     00f95d3a1eb09156      nimvg      active
aixlnim:> lsvg -l nimvg
nimvg:
LV NAME      TYPE      LPs      PPs      PVs      LV STATE      MOUNT POINT
lvnim       jfs2      454      454      4        open/syncd    /nim
lvbackups   jfs2      380      380      2        open/syncd    /backups
lvsoftware  jfs2      600      600      4        open/syncd    /software
loglv01     jfs2log   1         1         1        open/syncd    N/A
lvtftpboot  jfs2      8         8         1        open/syncd    /tftpboot

```

14

14

NIM Resources 3/3

```

aix1nim:/> lsvg -l nimvg
nimvg:
LV NAME          TYPE      LPs      PPs      PVs      LV STATE      MOUNT POINT
lvnim            jfs2     454      454      4        open/syncd    /nim
lvbackups        jfs2     380      380      2        open/syncd    /backups
lvsoftware       jfs2     600      600      4        open/syncd    /software
loglv01          jfs2log  1         1         1        open/syncd    N/A
lvtftpboot       jfs2     8         8         1        open/syncd    /tftpboot
aix1nim:/> lsvg nimvg
VOLUME GROUP:    nimvg                VG IDENTIFIER:    00f95d3a00004c0000000158d5107f55
VG STATE:        active              PP SIZE:          1024 megabyte(s)
VG PERMISSION:   read/write          TOTAL PPs:        1592 (1630208 megabytes)
MAX LVs:         256                FREE PPs:         149 (152576 megabytes)
LVs:             5                   USED PPs:         1443 (1477632 megabytes)
OPEN LVs:        5                   QUORUM:           5 (Enabled)
TOTAL PVs:       8                   VG DESCRIPTORS:   8
STALE PVs:       0                   STALE PPs:        0
ACTIVE PVs:      8                   AUTO ON:          yes
MAX PPs per VG: 32768          MAX PVs:          1024
LTG size (Dynamic): 512 kilobyte(s)  AUTO SYNC:        no
HOT SPARE:       no                   BB POLICY:        relocatable
MIRROR POOL STRICT: off          INFINITE RETRY:   no
PV RESTRICTION: none              CRITICAL VG:      no
DISK BLOCK SIZE: 512              CRITICAL PVs:     no
FS SYNC OPTION:  no
ENCRYPTION:      no

```

15

15

List resources 1/2

```

aix1nim:/> lsnim -l aix2
aix2:
class          = machines
type           = standalone
connect        = nimsh
platform       = chrp
netboot_kernel = 64
if1            I = master_net aix2 0
cable_type1    = N/A
Cstate         = ready for a NIM operation
prev_state     = currently running
Mstate         = not running
cpuid          = 00F95D3A4C00
Cstate_result  = reset

aix1nim:/> lsnim -l lpp_72t15sp2
lpp_72t15sp2:
class          I = resources
type           = lpp_source
arch           = power
Rstate         = ready for use
prev_state     = verification is being performed
location       = /nim/lpp_source/lpp_72t15sp2
simages        = yes
alloc_count    = 0
server         = master

aix1nim:/> lsnim -l spot_72t15sp2
spot_72t15sp2:
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_72t15sp2/usr
version        = 7
release        = 2
mod            = 5
oslevel_r      = 7200-05
oslevel_s      = 7200-05-02-2114
alloc_count    = 0
server         = master
if_supported   = chrp.64 ent
Rstate_result  = success

```

16

16

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

19

19

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

20

20

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

21

21

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
```

22

22

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
```

23

23

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
```

24

24

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_72t101sp1	
LPP_SOURCE	[pp_72t101sp1]	+
MKSYSB	mksysb_aix72t101sp1	
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?	[no]	+
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?	[yes]	+
-OR-		
Set bootlist for installation at the next reboot?	[no]	+

25

25

Tell NIM to use the mksysb for this machine

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

```
lsnim -l aix2
```

```
aix1nim: /> 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     = currently running
Mstate         = not running
cpuid          = 00F95D3A4C00
Cstate_result  = reset
```

26

26

Checks

- `showmount -e`

```
/nim/images/aix7212.mkysyb          aix2
/nim/lpp_source/lpp_72tl01sp2      aix2
/nim/spot/spot_72tl01sp2/spot_72tl01sp2/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`

```
aixlnim: /> ls -al /tftpboot | grep vios
-rw-r--r-- 1 root system 31457280 Sep 16 2020 spot_vios31125.chrp.64.ent
-rw-r--r-- 1 root system 512 Sep 16 2020 spot_vios31125.iplrecord.ent
-rw-r--r-- 1 root system 30408704 Aug 22 2019 spotvios31021.chrp.64.ent
-rw-r--r-- 1 root system 512 Aug 22 2019 spotvios31021.iplrecord.ent
-rw-r--r-- 1 root system 31457280 Jun 03 2020 spotvios31121.chrp.64.ent
-rw-r--r-- 1 root system 512 Jun 03 2020 spotvios31121.iplrecord.ent
-rw-r--r-- 1 root system 31457280 Nov 18 2020 spotvios312_10.chrp.64.ent
-rw-r--r-- 1 root system 512 Nov 18 2020 spotvios312_10.iplrecord.ent
-rw-r--r-- 1 root system 31457280 Aug 03 17:07 spotvios312_21.chrp.64.ent
-rw-r--r-- 1 root system 512 Aug 03 17:07 spotvios312_21.iplrecord.ent
```

27

27

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 mkysyb=mkysyb_71tl01sp1 b740nl1`
- `nim -o allocate -a spot=spot_71tl01sp1 -a lpp_source=lpp_71tl01sp1 -a mkysyb=mkysyb_71tl01sp1 b740nl1`
- `nim -o bos_inst -a source=mkysyb -a accept_licenses=yes -a boot_client=no -a installp_flags='-agX' b740nl1`
- 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

28

28

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>`

29

29

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>

30

30

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
- 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/>

31

31

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

```

32

32

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 importvg 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

33

33

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

34

34

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
- lnstfix
- 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

35

35

Useful commands on master

```

aixlnim: /> lsnim -O mksysb_vios31221
mksysb_vios31221:
  remove = remove an object
  define  = define an object
  change  = change an object's attributes
  showres = show contents of a resource
aixlnim: /> lsnim -l mksysb_vios31221
mksysb_vios31221:
  class          = resources
  type           = mksysb
  creation_date  = Tue Aug 3 17:04:37 2021
  Rstate         = ready for use I
  prev_state     = unavailable for use
  location       = /nim/images/vio31221-mksysb_image
  version        = 7
  release        = 2
  mod            = 5
  oslevel_r      = 7200-05
  oslevel_s      = 7200-05-02-2114
  alloc_count    = 0
  server         = master
  extracted_spot = spotvios312_21

```

36

36

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
```

37

37

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
```

38

38

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.

39

39

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`

40

40

/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_72tl01sp1/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_72tl01sp1:/SPOT/usr/sys/inst.images:dir
aix1nim:/nim/images/aix1nim.mksysb:/NIM_BOS_IMAGE:file "
export ROUTES=" default:0:10.1.2.2 "

```

41

41

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

42

42

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

43

43

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

44

44

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 install_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 } ]
```

45

45

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
bootlist -m normal hdisk2
bootlist -m normal -o
```

Check what bootlist is now)

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

46

46

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.

47

47

Alternate Disk Install

- 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

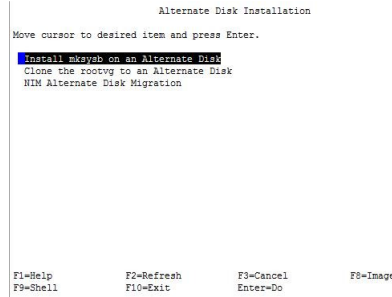
48

48

Alt Disk from mksysb

Commands to look at:

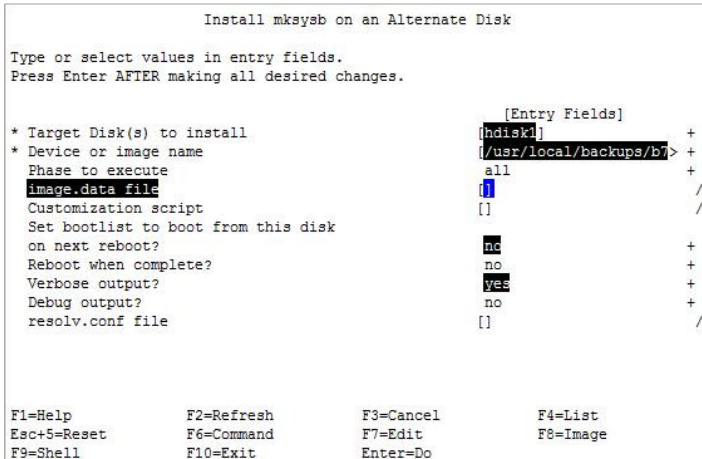
- alt_disk_copy
- alt_disk_install
- alt_disk_mksysb
- alt_rootvg_op



```
#
# 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
```

49

Alt Disk from mksysb



50

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

51

51

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.

52

52

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 altinst_rootvg is varied offline and these (the alt ones) are all unmounted

53

53

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
```

54

54

Alt Disk from mksysb

```
# df -g
Filesystem  GB blocks  Free %Used  lused %lused 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/fs1v00 5.00     4.93 2%    231 1% /usr/local
/dev/fs1v01 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_fs1v00 5.00    4.93 2%    230 1% /alt_inst/usr/local
/dev/alt_fs1v01 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
```

55

55

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

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

56

56

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

57

57

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.

58

58

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

59

59

VIOS and NIM – Check resources

```

aixlnim:/> lsnim -l mksysb_vios31221
mksysb_vios31221:
  class           = resources
  type            = mksysb
  creation_date   = Tue Aug 3 17:04:37 2021
  Rstate         = ready for use
  prev_state      = unavailable for use
  location        = /nim/images/vio31221-mksysb_image
  version         = 7
  release         = 2
  mod             = 5
  oslevel_r      = 7200-05
  oslevel_s      = 7200-05-02-2114
  alloc_count     = 0
  server         = master
  extracted_spot  = spotvios312_21

```

60

60

VIOS and NIM – Check resources

```
aixlnim: /> lsnim -l spotvios312_21
spotvios312_21:
  class      = resources
  type       = spot
  plat_defined = chrp
  arch       = power
  Rstate     = ready for use
  prev_state = verification is being performed
  location   = /nim/spot/spotvios312_21/usr
  version    = 7
  release    = 2
  mod        = 5
  oslevel_r  = 7200-05
  oslevel_s  = 7200-05-02-2114
  alloc_count = 0
  server     = master
  if_supported = chrp.64 ent
  Rstate_result = success
  mksysb_source = mksysb_vios31221
```

61

61

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

62

62

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 3rd 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>

63

63

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.

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

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

```

64

64

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_commands/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

65

65

Examples from man page on NIM – man viosupgrade

viosupgrade command

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).

Syntax

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: ...] [-v]
```

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

```
viosupgrade -t altdisk -n hostname -m ios mksysbname
-a RootVGInstallDisk: ... [-bBackupFileResource] [-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] }
```

66

66

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

67

67

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/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)

68

68

```
$ 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
```

69

69

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.

70

70

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.

71

71

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

72

72

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

73

73

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

74

74

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`

75

75

Alternate NIM Master

Assumes there is already a NIM master

Install `bos.sysmgt.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
```

76

76

Problems

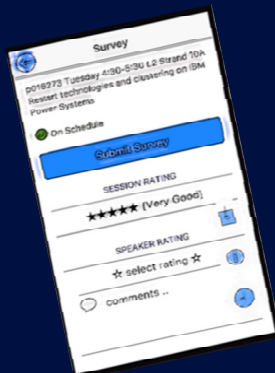
- Step 1 – bootp makes initial communication and talks to client
- Step 2 – after successful bootp tftp is used for transfer of boot image.
- U0608 – usually a bootp or tftp problem
- **Bootp Issues**
 - Ensure bootp is active in /etc/inetd.conf
 - `lssrc -ls inetd`
 - Ensure /etc/bootptab entries are 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

77

77

Thank you

- Jaqui Lynch
- jlynch@flagshipsg.net
- jaqui@circle4.com
- Also check out:
- <http://www.circle4.com/movies/>
- Copy of presentation at:
- <http://www.circle4.com/ptechu/nim201-oct2021.pdf>



Please complete the session evaluation!

78

78

Backup Slides



79

79

Nim Commands

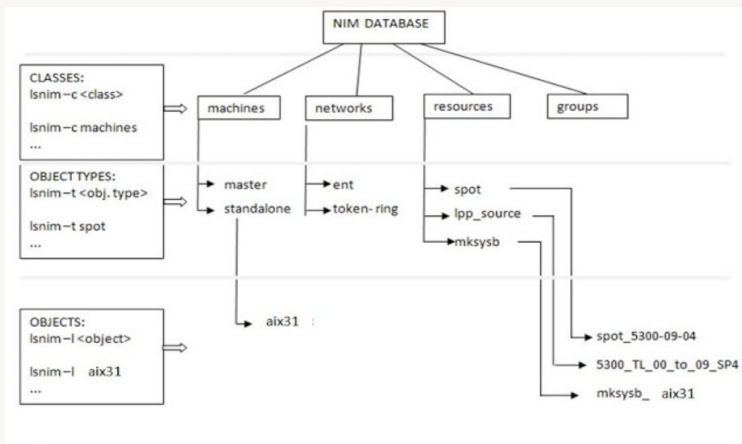
- `nim -o operation -a attribute=value Targetname(s)`
- `cust`
 - Install filesets or updates on clients or SPOT resources
- `sync`
 - Sync NIM database with an alternate master
- `fix_query`
 - Check fix status on a client
- `maint`
 - Uninstall filesets and commit or reject updates on a client or SPOT
- `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`

80

80

NIM Layout

machines: shows the machines in NIM (master, clients)
networks: shows what type of network (topology: ent, Token-Ring...) can be used
resources: shows resource types: mksysb, spot ...



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>

81

81

NIM Resources

- Machines
 - These are the clients
- lpp_source
 - The lpp_source (Licensed Program Product source) directory contains the images that AIX uses to load software. These are typically the BFF (backup file format) images that exist on the AIX installation CDs or DVD. Each OS version should have its own lpp_source. Additionally these should be separated into 32-bit and 64-bit lpp_source sets.
- SPOT
 - The SPOT (Shared Product Object Tree) is a directory that is created from the lpp_source. The SPOT is used in a similar fashion to the boot images and installation scripts on the Base installation CD volume 1 for AIX. It may be necessary to create multiple SPOTs depending on the maintenance levels and versions that need to be supported.
- mksysb
 - The NIM master can use lpp_source to install an instance or it can install the instance from a mksysb of either that instance or another one. Once the mksysb is restored a script can be run automatically to customize the instance .

82

82

NIM Specific Useful Links

- Using EZNIM
 - 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
- 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
- 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
- AIX v6.1 NIM Pages
 - 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
- **Using NIM Operations (all the subcommands)**
 - 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
- NIM Basics
 - <https://aixexpert.wordpress.com/nim/nim-basics/>

83

83

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
- 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
- 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>

84

84

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

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)

85

85

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/l/nodeid`

`/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)

86

86

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

87

87