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Tips and Tricks With Network Install Manager

AIX systems administrators use NIM as a central point of management for installation and maintenance. Here's how to use NIM for migrating mksysb images to new levels.



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Network Install Manager (NIM) has been around for a long time and is used extensively by systems administrators on AIX as a central point of management for installation and maintenance. It can be used for LPARs, standalone servers and to install and maintain VIO servers. NIM makes management far simpler and allows the deployment of consistent images out to systems being supported. Effectively you can create a golden image and then clone it to other LPARs to ensure that the installations are well tested.

With NIM you can do a completely fresh install of AIX, install from a mksysb, apply maintenance such as a technology level (TL) or service pack (SP) or add bundles of products. You can also install multiple LPARs at the same time and

installations can be done as a push (NIM server kicks them off) or as a pull (client LPAR requests install). Installation from a DVD is much slower – it can take 8 hours to install and fully customize an LPAR. Compare this to using NIM, which only takes 15 to 20 minutes.

NIM Master

Any NIM environment requires a master LPAR. This LPAR should be set up with dedicated storage and a dedicated network adapter. The purpose of the LPAR is to install and recover LPARs so it makes no sense for it to be dependent on a VIO server. Typically, this LPAR needs around 4GB memory and .5 of a core with 2 VPs. It may need more if you regularly do mass installs or updates.

The NIM master needs to be installed at the highest level of AIX possible. This will allow you to maintain LPARs at the same level or lower. It typically has a separate volume group (I call it nimvg) of at least 500GB that is used to store the NIM resources.

Installing the NIM Master

Install the NIM LPAR at the highest AIX level including TL and SP. Create a scalable volume group called nimvg to hold resources Create a JFS2 filesystem called /nim in the nimvg volumegroup Be sure to install the following filesets:

```
bos.sysmgt.nim.master
  bos.sysmgt.nim.spot
  bos.sysmgt.nim.client
NIM also requires that the following filesets are installed:
  bos.net.tcp.server
  bos.net.nfs.server
```

Now put the AIX DVD in the CD drive or use loopmount to mount the iso image so you can start to set up the resources. In my case I have a filesystem called /software and I use loopmount and smitty bffcreate to copy the DVDs into directories that I install from. I have separate directories for the TLs and SPs.

To setup NIM you run the following on the NIM master

```
nim_master_setup -B -a device=/dev/cd0 -a file_system=/nim -a volume_group=nimvg
```

This will create the SPOT and lpp_source resources along with some other basic resources into /nim. The default resources created in an AIX 7.2.1.2 NIM master are (use lsrim to check):

```

master          machines      master
boot            resources    boot
nim_script      resources    nim_script
master_net      networks     ent
master_net_conf resources    resolv_conf
7200-01bid_ow   resources    bosinst_data
721lpp_res      resources    lpp_source
721spot_res     resources    spot
basic_res_grp   groups       res_group

```

At this point you can start to add resources to your NIM master. The basic structure of /nim is:

```

/nim           Base directory
/nim/lpp_source lpp_source directories
/nim/images    mksysb images get put here
/nim/spot      spot directories
/nim/bosinst_data bosinst.data files
/nim/resolv_conf resolv.conf files

```

I also add

```

/nim/mksysb      Converted mksysb images
/nim/installp_bundle Install bundles such as host attach kits, etc

```

At this point you can add machine resources (these are the LPARs). To add a machine you need to ensure its network name is resolvable (either DNS or add to /etc/hosts on the NIM master).

You will also need to check that the NIM master is enabled for bootp and tftp in /etc/inetd.conf.

Things you can do with NIM

The obvious things are installations and updates but there is also some very cool integration with Alternate disk install. As an example, you can take a mksysb of an LPAR, then use nimadm to upgrade that mksysb to a new version of the operating system. You can then either copy it to the client LPAR and use alternate disk install to restore it to a separate disk or you can network boot from the client to the NIM master and restore the upgraded mksysb (to the prod disk or to a separate disk). Below we got through the steps to setup some basic NIM resources so that you can take advantage of some of these options.

The first steps include setting up the lpp_source and spot needed for the installs or migrations that are planned – in this case I am using 7.2.1.2. The lpp_source and spot for 7.2.1.2 are created ahead of time using commands like:

```
nim -o define -t lpp_source -a server=master
-a source=/software/aix72/aix72-base -a packages=all -a location=/nim/lpp_source/lpp7212 lpp7212
The above sets up the lpp_source
```

I then add some additional software: openssh and openssl upgrades. I copy the filesets needed into /software/addons and run `inutoc . nim -o update -a packages=all -a source=/software/addons lpp7212`

Since the aix72-base above was created from the base DVD I then need to apply AIX 7.1 tl01 sp2 from the directory I copied it into. `nim -o update -a packages=all -a source=/software/aix72/aix72tl01sp2 lpp7212`

You can now use the `showres` command to check for filesets:

```
nim -o showres lpp7212 | grep bos.net
nim -o showres lpp7212 | grep bos.alt.disk
```

And then check the LPP is OK:

```
nim -o check lpp7212
```

Now you need to create the SPOT from the LPP:

```
nim -o define -t spot -a server=master -a source=lpp7212 -a location=/nim/spot/spot7212 spot7212
nim -o check spot7212
```

You may need to customize the spot to ensure that the alternate disk install images went on:

```
nim -o cust -a filesets=bos.alt_disk_install.boot_images -a lpp_source=lpp7212 spot7212
nim -o showres spot7212 | grep -i bos.alt
```

Using Alternate disk install with NIM

This is an incredible useful way to work with NIM when you need to upgrade an LPAR and don't have a DVD available. You can take a mksysb of the LPAR and then copy it into /nim/images on the NIM master and create a mksysb resource that points to it. In this case our base mksysb is at 7.1 and is called `mksysb_may2317`. We want to migrate it to AIX 7.2.1.2 and will call the resulting mksysb resource `mksysb72_may2317`.

First make sure you have the alternate disk install filesets are installed on the master:

```
bos.alt_disk_install.boot_images
bos.alt_disk_install.rte 7.2.1.1 COMMITTED Alternate Disk Installation
bos.alt_disk_install.rte 7.2.1.1 COMMITTED Alternate Disk Installation
```

The client will also need the `bos.alt_disk_install.rte` fileset.

Now you can use `nimadm` to migrate the `mksysb`.

```
nimadm -T mksysb-may2317 -O /nim/mksysb/mksysb72-may2317 -s spot7212 -l lpp7212 -j nimvg -Y -N
```

This takes about 20 minutes and creates the migrated `mksysb` image. You can then use NIM to set up an `bos_inst mksysb` restore to the client or you can use alternate disk install as follows, provided there is a spare disk on the client LPAR: Copy the new `mksysb` image to the client LPAR or to an NFS resource the client LPAR has access to—in this case I copied it to `/backups` which is an NFS filesystem

On the client LPAR I had a spare

```
hdisk - hdisk5
alt_disk_mksysb -m /backups/mksysb72-may2317 -d hdisk5 -k
```

When it is complete it will set the bootlist to boot from `hdisk5`. If you don't plan to do that immediately I suggest you set the bootlist back to the production `rootvg` and change it later when you are ready to boot the new image.

NIM Clones

NIM can also be used to clone a running system. As an example I can clone my current boot disk to `hdisk5` as follows:

```
alt_disk_copy -d hdisk5
bosboot -a -d hdisk5
bootlist -m normal hdisk5
```

Useful NIM Commands to Know

```
alt_disk_copy
alt_disk_install
alt_disk_mksysb
alt_rootvg_op
nimadm
```

Once you have installed using alternate disk install the `hdisk` you install to will show as `altinst_rootvg` and the filesystems

on it will be unavailable. If you need to make changes you can wake up the volume group as follows (on our hdisk5 install):

```
alt_disk_install -W hdisk5
```

This causes all the filesystems to be mounted but prefixed with /alt_inst

Summary

There are many other uses for NIM. In this article, I wanted to illustrate using NIM for migrating mksysb images to new levels. NIM can also be used with VIO servers and is a great time saving application for systems administrators.

About the author

Jaqui Lynch has over 38 years of experience working with a projects and Oses across vendor platforms, including IBM Z, UNIX systems and more.

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