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# Installing and Upgrading to AIX 6.1

April | May 2008 | by [Jaqui Lynch](#)

In my article “[Systems Management From Scratch](#),” in the December 2007 issue of this magazine, I went through the steps to install an AIX\* 5.3 LPAR from scratch. This article provides an update that covers what’s different about installing AIX 6.1 from scratch and also covers what’s involved in upgrading from AIX v5.3 to AIX v6.1. This is a fairly basic primer and should be tweaked to accommodate your company’s standards.

This article assumes that the Hardware Management Console (HMC) is already set up if an HMC is in use, or that the hardware is set up with a dedicated monitor if this is a standalone system. It also assumes that we’re installing AIX 6.1, since the command syntax listed is for 6.1.

## Installing AIX 6.1 From Scratch

Follow the steps from the aforementioned article on installing AIX 5.3 until you have created the `syslog.conf` file and have set up logging. You’ll probably need to make `/usr` and `/opt` a little bigger for 6.1 than it is for 5.3. This is where the install starts to be a little different.

The steps left to follow now include setting tunables, cleaning out files and general cleanup activities as well as installing any additional software.

The first step is to create the tunables file. This differs in AIX 6.1 because some of the tunables are now restricted tunables and can only be set using the `-F` flag. Additionally, they require a console response before they’re accepted:

```
vi /etc/tunables/rc.tune
```

Contents are:

```
/usr/sbin/no -p -o rfc1323=1
/usr/sbin/no -p -o sb_max=1310720
/usr/sbin/no -p -o tcp_sendspace=262144
/usr/sbin/no -p -o tcp_recvspace=262144
/usr/sbin/no -p -o udp_sendspace=65536
/usr/sbin/no -p -o udp_recvspace=655360
/usr/sbin/nfso -p -o nfs_rfc1323=1
```

Note we no longer set `minperm` and so forth as they’re now restricted and are set to the following defaults:

```
minperm = 3%
maxperm and maxclient = 90%
lru_file_repage = 0

chmod u+x /etc/tunables/rc.tune
```

Run it:

```
- /etc/tunables/rc.tune
```

You'll need to manually set the following as they're now restricted:

```
ioo -p -F -o j2_nBufferPerPageDevice=1024
ioo -p -F -o numfsbufs=2048
ioo -p -F -o pv_min_pbuf=1024
```

Check `/etc/tunables/nextboot` to ensure they were added.

You can now follow the instructions to cleanup files (`inetd.conf`, etc), change the `motd` and banners, etc. This includes setting up Network Time Protocol (NTP) and adding `rc.local`.

Add third-party software such as `gcc`, `nmon`, `sudo`, `lsof`, TCP wrappers, OpenSSL and OpenSSH. These all go into `/usr/local`. In 6.1 some of these don't compile so you'll need to use the Linux\* toolkit CD that came with your install set. The first thing to install is `nmon`; I use `nmon12` on my regular LPARs and `nmon11e` on my virtual I/O servers. This is an easy install as you basically download the code and unzip it into `/usr/local/bin`. Make sure `/usr/local/bin` is in the default path and everyone who needs it will have access.

I installed the following from the Linux toolkit: `Bison-1.875`; `bzip2-1.0.2`; `Flex 2.5.4a`; `Freetype-1.3.1`; `gcc-4.0.0` and `gcc-4.0.0C++`; `gettext-0.10.40`; `Less-382`; `libgcc-4.0.0`; `libpcap 0.8.3`; `libstdC++`; `libstdC++-devel`; `sudo 1.6.7p5`; and `zlib 1.2.3`.

If you're not using the IBM\* C compiler (`cc`), then once Gnu Compiler Collection (`gcc`) is installed you can set up a soft link to `gcc` so that the `cc` command will work:

```
cd /usr/local/bin
ln -s gcc cc
```

This yields a fully functioning `gcc` compiler and the libraries necessary to perform compiles. It also provides the `sudo` utility so that you can force users to log in as themselves and get enhanced access. The `less` command is similar to the `more` command except it lets you page forward and backward.

To take advantage of the new security features and Java\* 6, many filesets need to be installed from the expansion pack. I normally install the following: `Java 6`; `bos.crypto.*`; `clirc.*` (which is required for new Encrypting File System, or EFS); `des`; `lsof 4.7`; `modcrypt`; `OpenSSH`; `OpenSSL`; `rsct.crypt*`; and `sysmgmt.websm.security-us`.

If you want TCP wrappers you can install the `netsec.options`—I prefer to install TCP wrappers manually so I have all of the flags I want. At this point you should apply any service packs so that the install is current.

You can now install TCP wrappers by downloading the file from [ftp://ftp.porcupine.org/pub/security/tcp\\_wrappers\\_7.6-ipv6.4.tar.gz](ftp://ftp.porcupine.org/pub/security/tcp_wrappers_7.6-ipv6.4.tar.gz). After unzipping it you vi

the Makefile and set the following:

```
/AIX - uncomment REAL_DAEMON_DIR line
Uncomment STYLE=-DPROCESS_OPTIONS
Change FACILITY=LOG_MAIL to LOG_DAEMON
Check SEVERITY is LOG_INFO
Uncomment IPV6=-DHAVE-IPV6
```

Then run “make aix” and copy the tcpd binary to /usr/local/bin. Copy the tcpd.h file to /usr/local/include. (I also copy the man pages to /usr/local/man.) You’ll need to code a /etc/hosts.allow and a /etc/hosts.deny file as these provide the rules for the wrappers.

The last step is to update /etc/inetd.conf as follows:

```
ftp stream tcp6 nowait root
/usr/local/bin/tcpd /usr/sbin/ftpd -l ftpd
telnet stream tcp6 nowait root
/usr/local/bin/tcpd /usr/sbin/telnetd telnetd -a
```

Make sure you stay logged on now until you perform a successful test with “refresh -s inetd.” Now try to log on from a legitimate address. Messages should show up in the log pointed to by daemon.info in /etc/syslog.conf.

At this point you can follow the steps to mirror rootvg and create the dump data sets. After a reboot the system should be ready to allow you to try some of the new features in AIX v6.1 such as workload partitions (WPARs), the new EFS, etc.

### Upgrading to AIX 6.1 From 5.3

The migration upgrade from 5.3 to 6.1 is a fairly smooth upgrade, but there are a few little gotchas of which it pays to be aware. Once you’ve completed the migration upgrade and exited install assistant, there are some things you need to address. First, you’ll probably need to increase the size of / to accommodate the extra filesets you’ll need to install later. Secondly, there’s a line in /etc.inittab that needs to be removed: /usr/sni/aix53/rc.ml.

The next step is to install the extra filesets from the AIX 6.1 CDs. I had to add bos.compat, bos.mls, some of the message sets and sysmgt.pconsole (needed for WPARs). You’ll then need to install the service packs.

The following were completely replaced and will need re-editing:

```
/etc/inetd.conf
/etc/inittab
/etc/motd
/usr/dt/config/Xservers
```

The common-sense approach is to check all of the files you tailored after your initial installation of 5.3 and make sure they weren’t replaced by this upgrade. If they were, then you’ll have to edit them again. Note that the tunables come across as coded in 5.3. You should check /etc/nextboot and remove any of the restricted tunables so that you pick up the correct defaults. At this point you’ll need to add back in TCP wrappers as they were removed. I recommend following the steps above to install the extra filesets from the Linux toolkit and from the expansion CD and then recompile and reinstall TCP wrappers.

Last, you should also be aware that asynchronous I/O (AIO) servers are now set up using the `ioo` command, not using `minservers` and `maxservers` as before. The new tunables are `aio_minreqs`, `aio_minservers`, `aio_maxservers` and `aio_server_inactivity` for the LEGACY AIO subsystem; and `posix_aio_minreqs`, `posix_aio_minservers`, `posix_aio_maxservers` and `posix_aio_server_inactivity` for the POSIX AIO subsystem.

## The Next Step

AIX 6.1 contains many improvements and seems to be a very clean and tidy install. It seems to perform better than 5.3. I've already run a couple of benchmarks with 5.3 and 6.1 and it looks like AIX 6.1 offers some performance enhancements, so I strongly encourage you to start your migrations soon.

The upgrade is very straightforward although you'll need to tweak a few things after the upgrade is complete. Remember to run `mksysb` before and after. If you're using the AIX Network Installation Manager (NIM), then you'll need to upgrade your NIM server first so that it can be used to install and upgrade the LPARs.

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