

OpenNMS on Debian Woody HOWTO

opennms.netstatz.com

v2.0 - 2004-03-20

This document has been created to help individuals and institutions deploy OpenNMS on Debian Woody, i386 based, servers. It was originally written as an administrative guide to clarify use of Debian specific commands and packages. Now, it has been extended to include the installation process as well as references to existing configuration and troubleshooting information. For information on the configuration files for discovery, polling and notification please read the HOWTOs posted at OpenNMS.org. This document attempts to overlap as little as possible with the existing OpenNMS HOWTOs and there are many links to the online FAQ and mailing-list archives. It is recommended that the HTML version is viewed in order that links to the online knowledge base can be used directly. This document can be used to help take a basic IDE/SCSI based system from cold iron to an operational OpenNMS solution with very little Debian-specific knowledge.

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1 About this Document

1.1 Revision History

0.1 - 2002-11-01 - Ian B. MacDonald - Initial Staging and Debian Operations Manual based on RPMs aliened to .debs

1.0 - 2003-01-28 - iMac - Initial Publication, ONMS v1.02-2

1.1 - 2003-04-03 - iMac- Updates, including DB purge, ONMS v1.11-1

1.2 - 2003-06-24 - iMac - Conversion to LinuxDOC SGML, FAQ and email, updates from Debian ONMS Downgrade HOWTO, ONMS v1.11-5woody

1.3 - 2003-06-25 - iMac - First public release on opennms.netstatz.com with minor layout changes and some additions

1.4 - 2003-07-14 - iMac - Used It on a box from cold iron. Some refinements, typo-repair and purging of quotes. Increased 1.7 (Woody distinction).

1.5 - 2003-10-15 - iMac - Second pubic release, new sources, new packages, new links to devices, troubleshooting mailing-list archives (*1.6 Now broken). Added vim, hdparm, snmp, GetOPT packages...

2.0 Draft a 2004-01-28 - iMac - Full 1.1.2 support, New mailing list includes, all new links (to match opennms.org changes), upgrade from 1.1.1-5 process, new supplemental utilities

2.0 Draft b 2004-03-11 - iMac - More 1.1.2 test implementations + Debian Woody R2

2.0 2004-03-20 - iMac - Finally a readable document that is useful and tested (grin)

1.2 Acknowledgements and Thanks

I would like to acknowledge the following individuals and groups for their valuable contributions that resulted in the creation of this document:

1. Tarus Balog for his commitment to OpenNMS from the ground up and positive guidance to anyone interested in using this great tool.
2. The OpenNMS team, Sortova Consulting Group and Oculan for their efforts. This includes Andreas Kerl, Ben Reed, Bill Ayres, Brian Weaver, David Miller, Derek Gillden, Eric Evans, Jacinta Remedios,

Jason Johns, Jim Doble, Jose Vicente, Nunez Zuleta, Larin Hennessy, Larry Karnowski, Marshall Christy, Michael Huot, Mike Davidson, Mike Johnson, Nick Wesselman, Oli M., Robert Berkowitz, Seth Leger, Shane O'Donnell, Sowmya Nataraj, Volker Seebode, Wrofl Courtney.

3. The many contributions to the OpenNMS mailing list from all across the globe.
4. Tony Simone and Eric Evans for Debianizing this great tool to the FHS standard.
5. Netstatz clients that use and promote OpenNMS with enthusiasm.
6. Dan Peachey for great feedback and notes on Debian.
7. Steve Moyer, Justin Hammond, Micheal baker and others who submitted code snippets via the mailing list.
8. Blast Internet, and their continued support of Tarus and the OpenNMS solution.
9. All the people I missed, particularly while distracted with other projects in the nine months prior to v2.0

The acknowledgement section is both difficult and important. Previous releases of this document left out many of the core OpenNMS contributors by name, even though I was communicating with them via the discuss mailing list. My apologies to the gang. Hopefully this release is a little more complete.

1.3 Copyright Information

This document is Copyright 2003 by Ian B. MacDonald. Permission is granted to copy, distribute and/or modify this document under the terms of the GNU Free Documentation License, Version 1.1 or any later version published by the Free Software Foundation; with no Invariant Sections, with no Front-Cover Texts, and with no Back-Cover Texts. A copy of the license is available at <http://www.gnu.org/copyleft/fdl.html> .

Copyright of documentation seems to be a standard. The goal of this section is to promote dissemination of this knowledge through as many channels as possible and also to be notified of any plans to redistribute the HOWTO so that I can keep people apprised of new versions.

If someones toes are being stepped on, let me know. Basically if someone is part of the OpenNMS.org team, I am going to tell them that they can do as they wish with this doc. Everybody else, let me know.

OpenNMS is a trademark of Sortova Consulting Group, Inc. OpenNMS is a registered trademark of Blast Internet Services Inc. OpenNMS is also referred to as ONMS in this document.

Netstatz is a trademark of Netstatz. To find out more visit <http://www.netstatz.com> <http://www.netstatz.com/> . Or track down my personal homepage.

From the Release Notes, the following copyrights are relevant to OpenNMS code and referenced documentation:

Copyright 2002-2004 Blast Internet Services, Inc. All rights reserved.

Copyright 2003 Tavve Software Company, Inc. All rights reserved.

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Copyright 2001 Microsoft Corporation
Copyright 2001 Netscape
Copyright 2001 Red Hat, Inc.
Copyright 1999-2001 ExoLab Group
Copyright 1999-2001 Apache Software Foundation
Copyright 1998-2001 The Mozilla Organization

1.4 How this document was created

This document was created using Lyx 1.3.2 and the LinuxDOC article (SGML) template. Every once in a while I clicked View->HTML and View->PDF and the rest was history. My desktop system at the time was a Sun Blade 100* running the Debian Sid GNU/Linux (Sparc) distribution. Anyone who would like to create documents easily, and uses Debian, should have a look at the following packages. (Or just apt-get install everything like I did.)

```
apt-get install docbook docbook-doc docbook-defguide docbook-dsssl docbook-dsssl-doc
docbook-utils docbook-xml docbook-xsl jade jadetex openjade ldp-docbook-dsssl
ldp-docbook-xsl linuxdoc-tools linuxdoc-tools-text linuxdoc-tools-info
linuxdoc-tools-latex sgml-data sgml-base sgmltools-lite sgmlspl sgmls-doc latex2html
latex2rtf gv html2text gnuhtml2latex imagemagick

apt-get install lyx
```

The only trick is to install lyx last, as debconf will help it run a `./configure` to build the `~/lyx` directory. If `~/lyx` already exists then lyx will not integrate with new SGML tools (i.e. will not automatically reconfigure). If `./lyx` does not exist on startup, it is automatically recreated. Thus one can always delete `~/lyx` to reconfigure lyx for use with new document template and publishing packages.

*The publishing computer was running Debian Sid(unstable) on a VIA/AMD i386 architecture box for >v1.4. It looked and worked exactly the same on big-endian and little-endian architecture. Props to the package maintainers that make Debian Sid fun and powerful on almost any file system architecture. As of v2.0, we now use Lyx 1.3.4 and have only been `apt-get upgrade`ing from the above package set. Debian PowerPC (Mac) users will probably find the same package set produces similar results.

1.5 Feedback and comments

Please send any feedback to Ian B. MacDonald imac@netstatz.com. I'm surprised someone didn't rant about the silly typos in some commands and URLs in early versions of this doc. Negative feedback is often the positive feedback, so hit me hard. I would like to enhance the readability and mood/tone of my documents and work towards a style that is consistent with the types of documents people enjoy and benefit from.

1.6 Why Debian Linux and this Document template?

Why use *Debian* <http://www.debian.org> ? One of the great things about Debian is superior package management. Debian stable is one of the most robust, secure and stable Linux distributions. Netstatz promotes and supports Debian and ONMS with enthusiasm, as they are best of breed tools in a changing open source world. In our experience deploying Linux solutions at Netstatz, Debian has proven to be the

easiest distribution to maintain and configure. Nothing is forever, and hopefully other distributions will begin to adapt the security, stability and ease of management that Debian has maintained for some time. There are now over 8710 packages in the Debian stable distribution.

Why use this Lyx/SGML format? LinuxDoc SGML is the closest to DocBook XML that requires nothing more than "apt-get install xxx" to create and maintain with Debian. When the Lyx template for DocBook XML is working via packages (or someone shows us what we are missing) we will use that. DocBook XML is the standard according to many authors of document processing HOWTOs at the *LDP* <http://linuxdoc.org>. LinuxDoc SGML meets the current requirements for submissions to the LDP and is the basis for many current HOWTOs.

1.7 Using Debian Woody vs. Debian Sid or Debian Sarge

Debian Woody (a.k.a *stable*), Debian Sarge (a.k.a *testing*) and Debian Sid (a.k.a *unstable*) are the three distributions maintained by the *Debian GNU/Linux* <http://debian.org> team. Debian *stable* uses only the very tried, tested and true versions of software. I like to think of it as *public_e-commerce* or *online_banking* *stable*. No new features other than security updates are added to the *stable* distribution once it has been released. This ensures the highest confidence level in package updates to the system.

In other distributions, new features often are included in package updates as their creators often maintain the packages independently of the goals of the operating system. Sometimes new features are desirable before they have reached a *tried_and_tested* state. For this reason, the *unstable* and *testing* distributions provide the newest versions of *stable* software, which often include dramatic improvements to the interface and functionality, and sometimes introduce new bugs. Desktop users who have previously been interested in the latest version of other operating systems will enjoy the cutting-edge appearance and functionality of the *unstable* distribution (My Gnome 2 desktop since fall 2002). To provide an example many people can relate with, at the time v1.4 of this document was written, the *unstable* and *testing* distributions contained Gnome 2 and Apache 2 whereas the *stable* distribution maintained Gnome 1.4 and Apache 1.3. At Netstanz, our public servers use Debian *stable/woody*. Other servers (private, backup and testing) run Debian *testing/sarge* or a *stable/woody* base with additional *testing/sarge* packages. Our private desktop machines run Debian *unstable* for the latest desktop experience.

This document is for Debian Woody (*stable*) users. The author's experience is that *unstable* users only require a mailing-list, or little knowledge in addition to a working Woody example to get *unstable* to work. To install from CDs, the recommended Debian ISO is v3.0r2 disk 5, a.k.a *bf2.4*, in order to start with an Ext3 or ReiserFS jouralling file system (prevents any file system corruption due to power failures). The Debian ISOs are found easily at *LinuxISO.org* <http://linuxiso.org> for anyone without *jigdo* <http://www.debian.org/CD/jigdo-cd/> access. Disk 1 (Non-US or US iso) is needed too as it contains the common Debian base packages, but be sure to boot the installation from disk 5 (*bf2.4*) in order to get a 2.4 Linux kernel.

Seasoned Debian users will prefer to install from a *Minimal CD* <http://www.debian.org/CD/netinst/>, a network image, or a set of floppies via the Internet. Don't try to mix versions of Debian CDs and floppies (i.e WoodyR0 disk1 and WoodyR2 disk5). This can sometimes cause installation problems as I discovered with a specific configuration on a device with Tulip NICs and a DAC960 RAID block device.

2 OpenNMS Package Sources

Currently version 1.1.2 of OpenNMS is extremely stable, and adds much improvement in reporting and monitoring capability to the 1.0.2 version of OpenNMS. For this reason version 1.1.2 has been selected as the default Debian Woody version for this document set.

2.1 Apt sources for OpenNMS on Woody

The following apt-source currently exists for OpenNMS (`/etc/apt/sources.list`). Please check the *OpenNMS.org downloads* <http://opennms.org/users/downloads/> web site for mirror sites.

```
deb http://debian.opennms.org/ debian/opennms stable
```

Like all GPL'd tools, the source code is also available using the `deb-src` line. To review the source code for the package, or experiment with contributions or source code modifications, add the following line to `/etc/apt/sources.list`.

```
deb-src http://debian.opennms.org/ debian/opennms stable
```

The source code will be placed in a directory named `opennms-1.1.2` that is created in the current directory when the following command is executed.

```
bash#apt-get source opennms
```

2.2 Notes from the package maintainers

2.2.1 1.0.2/1.1.1 Package Maintainer

The ONMS Debian packages have been heavily Debianized— i.e. they follow the majority of Debian conventions and policy. This means all the libraries are split into `libsomething` packages, the database schema and setup is in `opennms-db`, the server portion is in `opennms-server`, tomcat stuff in `opennms-webapp`, and the meta-package `opennms` depends on all of that to make a one-shot install easier. Directories follow Debian FHS conventions— `/usr/bin`, `/usr/lib`, `/usr/share/opennms`, `/etc/opennms`, etc.

In my next round of updates, I plan to start adding some Debconf pieces to prompt users for setup info, etc. This could make the install/upgrade experience much better, and even handle complete (other machine) separation of the database. Not sure about peeling off the webapp portion yet, or if that's even valuable. I don't have that sort of performance issue on my net, but I can imagine large networks where keeping the DB and GUI on separate boxes from the ONMS server/pollers would be a Good Thing (TM). :)

-Tony Simone

2.2.2 1.1.2 Package Maintainer

For OpenNMS 1.1.2, Eric Evans has stepped up as the Debian maintainer.

2.2.3 1.1.1 - Differences from the stock OpenNMS build

There are some notable differences between the OpenNMS Debian package and what's reported at <http://www.opennms.org> . Here is Tony Simone's quick summary:

1. Follows (as closely as possible) the FHS and Debian Policy. This means OpenNMS home is `/usr/share/opennms`, some jars in `/usr/share/java`, configs in `/etc/opennms`.
2. Tomcat4 in Debian lives on port 8180, not 8080.
3. Because of #2, one of the OpenNMS listener ports was moved to 8280 (this is for internal OpenNMS use, don't point a browser to it).

4. In Debian, the mail binary lives in `/usr/bin/mail`, not `/bin/mail`. The configs are updated to reflect this.
5. Default logging in `/etc/opennms/log4j.properties` has been scaled back to `INFO` level, and log rotation sizes were reduced. The defaults in the OpenNMS build were too noisy and large (just my opinion).
6. *Debian Unstable ONLY* - `librrd0` in Debian Sid has not been updated to use `libpng3` yet. I've built a new version against `libpng3` and put it on my server to take care of this. Otherwise, you end up busting a bunch of KDE and other stuff trying to install OpenNMS.

<![CDATA[**Note from the Author: Much has changed in Debian unstable, and as of v2.0 of this document]]>

3 Staging a Debian Woody Server

There are a number of methods of obtaining and installing Debian GNU/Linux. The Debian distribution CDs will be the installation medium used in this document. The installation steps provided here are boiled down, fairly assuming on operating system installation common practices and have been written by an individual familiar with the Debian installation system. For additional details on common staging issues and further explanation of the installation steps please refer to the *Official Debian en-i386 Installation Manual* <http://www.debian.org/releases/stable/i386/install.en.html#contents>. It is important to note that a network installation can be performed extremely quickly with very little media requirement. (One can deploy OpenNMS on Debian with six blank floppies and a network capable PC) Anyone interested in other methods such as direct installation via the Internet (sometimes faster) or Jigdo CD image creation (faster and more efficient than normal http/ftp downloading) should visit the *Getting Debian* <http://www.debian.org/distrib/> web site. Software RAID, VPN tunnels, SNMP ALG, QoS and the iptables firewall are not covered in this document, but may be desirable additions once the OpenNMS installation is complete. This section overlaps many existing documents but is included here to help shortcut the deployment of OpenNMS (obtain a workable system to learn on quickly while retaining interest) for anyone not familiar with Debian or Linux or as a quick reference for those familiar with the Debian installation process.

3.1 Operating System Installation Goals

- Minimal server footprint - avoid unnecessary packages to simplify management and minimize CPU overhead and disk footprint. Fewer *unknown* packages and daemons means less package entropy and greater security. The total running system with a handful of devices being monitored by OpenNMS and some additional networking tools is ~700MB for the system, 600MB of logs and data and 600MB of kernel compiling space. A safe estimate would be to have at least 4GB available to the system partitions, however the standard minimum disk size of 40GB (03/04) is more than sufficient.
- All data is to be wiped out. (No other operating systems or configured partitions that need to be preserved are present on the hard disks). Information regarding dual-boot systems and co-existence with Windows, Solaris or MacOS can be found in the *Official Debian Installation Manual* <http://www.debian.org/releases/stable/i386/ch-preparing.en.html#s-non-debian-partitioning>.
- Employ a journalling file system and a 2.4 Linux kernel. The 2.6 kernel is running on some of our servers and works fine with OpenNMS 1.1.2 Debian packages.
- Provide a simple iptables firewall implementation to protect the system. An example of a basic firewall we have created using the 8.7.5 (firewall builder) package is provided. QoS and strict but intelligent

iptables rule sets have many documents of their own. Refer to the 9 (further information) section for additional information.

3.2 Download and burn the CD images

The simplest method to obtain the Debian GNU/Linux CDs is via

LinuxISO.org <http://www.linuxiso.org> . Simply click on the Debian icon, and download the Disk 1 (Generic boot US or NON-US) and Disk 5 (bf2.4 boot). These CDs can be created using any popular cd-writing tool. Under Windows use Easy CD Creator, Sony CD Extreme, Nero Burning ROM or CDRWin or any other cd tool can be used to burn the disc (.iso) images. Linux users can use `cdrecord` to burn the CDs. If there is an IDE cd burner with buffer underrun protection running under the `ide-scsi` module as device 1,1,0 then the following Linux command should work to burn v3.0r2 Disk 5 (bf2.4) and v3.0r2 Disk 1. Linux 2.6 kernel users can specify the device directly (`/dev/hdd` is secondary slave) as the `ide-scsi` module is no longer required to access ide cd burners. The `cdrecord` package is required for this burning process.

3.2.1 Linux 2.4 Example

```
bash#cdrecord -v dev=1,0,0 speed=32 -data minbuf=50 -dao fs=16m ts=95k driveropts=burnfree /downloads/d
bash#cdrecord -v dev=1,0,0 speed=32 -data minbuf=50 -dao fs=16m ts=95k driveropts=burnfree /downloads/d
```

3.2.2 Linux 2.6 Example

```
bash#cdrecord -v dev=/dev/hdd speed=32 -data minbuf=50 -dao fs=16m ts=95k driveropts=burnfree /download
bash#cdrecord -v dev=/dev/hdd speed=32 -data minbuf=50 -dao fs=16m ts=95k driveropts=burnfree /download
```

3.3 Booting the Debian Installation CD-ROMs

To start the installation process, set the CD-ROM drive as the default boot device in the BIOS and power-on the computer with Debian GNU/Linux Disk 5 (a.k.a. bf2.4) inserted in the drive. A welcome screen will appear, simply press <Enter> at the boot: prompt to begin the installation process.

3.3.1 Choose The Language

The first blue screen will prompt for a default language and variant. English (en / United States) was used for this document. A Release Notes informational page will also be displayed in the language specified.

3.4 The GNU/Linux Installation Main Menu (10-20min)

The Debian GNU/Linux installation steps are listed vertically in this main installation screen. At the top of the main list, three steps are repeated and prefixed with `Next:`, `Alternate:` and `Alternate1:`. These top three steps represent the *suggested* next step as well as two *suggested* alternate steps in the installation process. The highlighted option (default) always represents the *suggested* next step and will lead towards a *Vanilla* installation. The user can navigate to alternative installation steps (from the entire list) or to go back and modify a previous installation step at any time. In certain circumstances performing installation steps too-far-out-of-order can produce unexpected results. A step-by-step procedure to a minimal Debian GNU/Linux installation is outlined below with the specific steps represented by the subheadings below.

3.4.1 Configure the Keyboard

Choose the default `querty/us` or an alternative if a non-standard type is required.

3.4.2 Partition the Hard Disk

This option will bring up the `cfdisk` interface. If there are some old Linux partitions, the installer will default to **Initialize and Activate a Swap Partition** in which case the user should navigate to **Partition a Hard Disk**. The following prompt will ask to **Select Disk Drive**. SCSI drives will appear as `/dev/sdX` and IDE drives will appear as `/dev/hdX`. Select the appropriate drive and continue with the partitioning process.

The hard disk used in this document is a 20GB IDE drive. It is the master drive on the primary IDE controller (`pm`) and as such appears as `hda`. Other IDE disks can appear as `hdb(ps)`, `hdc(sm)`, `hdd(ss)`, etc. SCSI disks would appear as `sda`, `sdb`, etc. The very simplest partition layout would have only two partitions; a swap partition and an operating system partition. Although this does work, it is recommended to partition the file system further in order to separate the different types and uses of files on the system.

If the disk is new or no partition table exists, the user will be asked to start with a zero table. Type `y` to continue with the new disk and a zero table.

Linux can operate on both primary and logical partitions. Logical partitions have been used here only out of preference and always begin numbering at 5. (i.e `hda5` is always the first logical partition on any IDE drive). For this example we have divided the IDE disk `hda` into the following partitions.

Name	Flags	Part Type	FS Type	Size
<code>hda5</code>	<code>Boot</code>	Logical	Linux	98.68*
<code>hda6</code>		Logical	Linux	4096.19
<code>hda7</code>		Logical	Linux	2048.10
<code>hda8</code>		Logical	Linux	13267.38
<code>hda9</code>		Logical	Linux swap	509.97

The mount points for each partition is planned to be as follows. In the following steps we will mount the swap partition and then assign each of the partitions to the appropriate mount point, beginning with the root partition (`hda6`)

Part.	Mount	Description
<code>hda5</code>	<code>/boot</code>	Kernel images for booting
<code>hda6</code>	<code>/</code>	Root file system containing system files, libraries and binaries.
<code>hda7</code>	<code>/home</code>	User home directories, user downloads and docs
<code>hda8</code>	<code>/var</code>	Variable data. All OpenNMS database entries, log files, cache, etc

Remember to change the partition FS Type for the swap partition to `Linux swap([Type] 82)`. The `boot` flag is optional with the LILO boot loader and only affects non-Linux partitions. If no boot partition is set, `cfdisk` will warn that DOS MBR partitions may have trouble booting. This warning has no impact on Linux systems. Once partitioning is complete, select `[Write] [Quit]` to exit. `cfdisk` will warn to reboot the system, however this message can be ignored as it is intended for users running `cfdisk` once the system has been fully installed.

3.4.3 Initialize and Activate a Swap Partition

In this document example `/dev/hda9` is automatically selected as it is the only partition with the [Type] set to `Linux swap`. Whatever partition is set to `Linux swap` (Type 82) will automatically be selected at this point in the installation.

3.4.4 Initialize a Linux Partition

When prompted for the file system type, select `Ext3` to enable the journalling file system. Choose the partition `/dev/hda6` (root partition) first. Next there will be a prompt to mount `/dev/hda6` as the root(/) partition.

3.4.5 Initialize a Linux Partition

Choose `/dev/hda5` and mount it to the `/boot` location, select `Ext3` as the file system.

3.4.6 Initialize a Linux Partition

Choose `/dev/hda7` and mount it to the `/home` location, select `Ext3` as the file system.

3.4.7 Initialize a Linux Partition

Choose `/dev/hda8` and mount it to the `/var` location, select `Ext3` as the file system.

3.4.8 Install Kernel Drivers and Modules

Select `cdrom` as the installation medium and insert Debian CD-ROM Disk 1 when prompted. When prompted, accept the default `Archive` path from the `list` of all likely directories on the CD-ROM.

3.4.9 Configure Device Driver Modules

This step allows specifies which kernel modules to load into the system. For OpenNMS we are interested in only network related modules in addition to the standard kernel. Sound cards, special input devices and support for other file systems can also be selected here. Users familiar with the Linux kernel will likely want to build their own custom kernel once the installation is complete. Some prefer the robustness, stability and blind upgradability of the kernel packages.

1. Network cards. The `bf2.4` kernel natively supports `RTL8139` network cards. For others, select them from the list of modules for network cards. Some common types (good types) are listed below:

```
/kernel/drivers/net/tulip:tulip - Tulip Based (DEC 2114X, Macronix MX98X)
/kernel/drivers/net:3c59x - Common 3COM (3c905X)
/kernel/drivers/net:tlan - Thunderlan (Older Compaqs)
/kernel/drivers/net:via-rhine - Many VIA motherboards
/kernel/drivers/net:eeepro100 - Intel 8255X chips (Newer Compaq/HP)
```

2. Other kernel extras. The `bf2.4` kernel natively supports `FAT` disks if they are needed.

```
/kernel/fs/smbfs:smbfs - Mount windows (SMB) file shares remotely
/kernel/drivers/md:raid1 - Software RAID Mirroring
/kernel/net/ipv4/netfilter:ip_contrack - For NAT capabilities
/kernel/net/ipv4/netfilter:ip_contrack_ftp - For passive FTP
/kernel/net/ipv4/netfilter:ip_nat_ftp - For FTP over NAT
/kernel/net/ipv4/netfilter:ip_nat_snmp_basic - For SNMP ALG NAT
/kernel/net/ipv4/netfilter:ip_tables - For firewall capabilities
/kernel/net/ipv4/netfilter:iptables_filter - For firewall capabilities
/kernel/net/ipv4/netfilter:ipt_REJECT - For firewall capabilities
/kernel/net/ipv4/netfilter:ipt_muiltport - For firewall capabilities
/kernel/net/ipv4/netfilter:ipt_state - For firewall capabilities
/kernel/net/ipv4/netfilter:iptables_mangle - For advanced nmap tool use
/kernel/net/ipv4/netfilter:ipt_LOG - For logging traffic
/kernel/net/ipv4/netfilter:ipt_unclean - For advanced nmap tool use
```

3.4.10 Configure the Network

Enter the hostname, ip address, netmask, domain name and DNS servers.

3.4.11 Install the Base System

Accept the current CD-ROM (Disk 1) as a package source.

3.4.12 Make the System Bootable

Set LILO to install into the MBR. For primary master IDE drives, this is `/dev/hda`. For SCSI systems with a single disk this is `/dev/sda`

3.4.13 Make a Boot Floppy(Optional)

This will create a boot floppy that understands where the root partition is located. i.e. if there is a problem booting the new Debian installation (other Boot Loaders, Dual-Boot scenarios) this will allow to boot the OS using a floppy initially that passes the boot over to the hard disk. This can also be used to boot other Linux systems with damaged boot loaders using the following `boot:` prompt command with the proper location of the root (`/`) partition.

```
boot:rescue root=/dev/hda6
```

3.4.14 Reboot the System

Remove all CD-ROMs and floppies.

3.5 Package Configuration

The system will restart with a welcome screen.

3.5.1 Time Zone Configuration

Hardware clock set to GMT (Default). Select the appropriate time zone.

3.5.2 Password setup

Enable MD5 and shadow(Default) passwords. Enter a root password, and setup a normal user account.

3.5.3 Debian System Configuration

Remove the PCMCIA (Default) packages.

Do not use a PPP connection (Default).

3.5.4 Apt Configuration

If the Debian CD was left in the drive it will automatically be added as an apt source, and there will be prompts for any additional cds. Additional cds can be added, however all packages can be downloaded from the Internet. Internet access is needed to install OpenNMS on Debian woody as the packages are not part of the official stable distribution. After adding cds (if this is preferred) add another apt source and select `http` as the method apt should use to access the Debian archive. Select the `non-US`, `non-free` and `contrib` package groups to make all Debian packages available (not necessarily installed).

Choose the country and mirror closest to the staging site. (also any proxy information if it is required). Add a second source if required. (Normally one is fine)

Use the security updates from security.debian.org when asked.

3.5.5 Debian System Configuration

When prompted to run `tasksel` select `<No>`.

When prompted to run `dselect` select `<No>`.

It is important to note that using `dselect` will introduce *suggested and recommended dependencies* that can lead to a level of package entropy that defeats the ease of management that `apt` provides.

At this point the required packages are queued for download, and the `pcmcia` packages will be removed. Accepting yes to the apt prompt `Do you want to continue?` will begin the download and configuration of any security updates.

3.5.6 Configuring Man-db

Have `man` and `mandb` setuid `man` for performance and dynamic updates.

The system will ask to erase the `.deb` (package files) for the programs installed. Accepting the default is fine, otherwise the installed packages are preserved locally in the `/var/cache/apt`.

3.5.7 Mail system configuration

Select option (1) if the system is capable of connecting to other mail servers directly using port 25. To pass outgoing mail thru another server select option (2). We will assume a direct Internet connection with no restrictions on port 25 use for the example in this documentation. Like all packages, the reconfiguration can

take place later if the settings are initially incorrect. The mail configuration questions are quite verbose, so the following are a typical series of answers.

- Q: 'visible' mail name? A: opennms.company.com
- Q: other system names? A: none
- Q: domains to relay for? A: none
- Q: networks to relay for? A: none
- Q: user account to funnel system mail to? A: active user account

That's it. Enjoy a minimal Debian server configuration. For ssh, just `apt-get install ssh`. Other utilities and common packages to consider for a system to compliment the OpenNMS server are listed in the 8 (Debian Network Tools) section.

4 Installing and Configuring OpenNMS on Debian Woody

This process includes all the currently known caveats associated with the ONMS 1.1.2 packages. All the installation operations should be performed as the `root` user. The `vi` editor is used by the author of this document. It is recommended to install 8.8.1 (`vim`) in order to use the `:syn` on command to enable syntax highlighting and reduce the chance of an error. Additionally 8.2.1 (`sshd`) should be installed for remote administration. Please do not use telnet.

4.1 Add OpenNMS sources and upgrade

1. Edit `/etc/apt/sources.list` to include the OpenNMS apt server. A typical `sources.list` file with the OpenNMS source as the last line might look similar to this:

```
deb http://debian.yorku.ca/debian/ stable main non-free contrib
deb http://non-us.debian.org/debian-non-US stable/non-US main contrib non-free
deb http://security.debian.org/ stable/updates main contrib non-free
deb http://debian.opennms.org/ debian/opennms stable
```

This particular `/etc/apt/sources.list` contains no `deb-src` lines (for downloading package source files) or `deb cdrom:` lines (for downloading packages from a distribution cdrom). These lines are often part of the default apt configuration, and are unnecessary when using the Internet as the package installation source (recommended) and are not planning on modifying and recompiling packages (development). The `deb cdrom:` lines can cause particular annoyance when they prompt to insert specific cds into the drive when attempting package installations. Details on obtaining the package source for OpenNMS can be found in the 2.1 (OpenNMS apt sources) section.

2. Update the known package lists:

```
bash#apt-get update
```

Look for output lines similar to the following to indicate a successful update of the OpenNMS sources:

```
Get:1 http://debian.opennms.org debian/opennms/stable Packages [4706B]
Get:2 http://debian.opennms.org debian/opennms/stable Release [92B]
```

If this action has already been performed, a re-execution of the command will indicate a successful match to the previously downloaded OpenNMS source list:

```
Hit http://debian.opennms.org debian/opennms/stable Packages
Hit http://debian.opennms.org debian/opennms/stable Release
```

A successful package list update will be followed by two lines of output with no error or warning messages:

```
Reading Package Lists... Done
Building Dependency Tree... Done
```

Any error output here must be dealt with before proceeding. Often this related to unavailable sources, or typos in the `/etc/apt/sources.list` file. Feel free to simply cut and past the above 1 (list) if problems occur here.

3. Upgrade the system to ensure the latest in security updates:

```
bash#apt-get upgrade
```

Next is a prompt to accept packages upgrades. Generally speaking, hit enter a few times here to bring a system up to the latest versions. For more information on the Debian apt package management system refer to the official *Debian apt HOWTO* <http://www.debian.org/doc/manuals/apt-howto/index.en.html>.

4.2 Install Sun J2SDK 1.4.0_02-1

1. Install the tomcat4 package building prerequisites (and the lynx web download tool).

```
bash#apt-get install java-common xlibs gcc bzip2 lynx make libstdc++2.9-glibc2.1 sun-jdk1.4-instal
```

Some of these packages may exist already, and several additional packages will be added to support dependencies.

2. Download the Java .bin file using the lynx web browser. Instructions are below for those new to the lynx interface.

```
bash#lynx http://java.sun.com/webapps/download/Display?BundleId=7016
```

The BundleId in the above URL is for J2SDK 1.4.0_02. Follow these instructions on this page.

- (a) On this initial page, accept the cookie (press Y), and navigate down the page using the pgdown and downarrow keys to the ACCEPT link at the bottom of the page and select the link using the *Enter* key.
 - (b) On the following page (download page) navigate using the pgdown and downarrow keys to the Download `j2sdk-1_4_0_02-linux-i586.bin` link and select it using the *Enter* key.
 - (c) Press D to download the binary file as an octet-stream. Once the download is complete, press Enter twice to save the binary file to disk with the default file name. Use q to exit.
3. Copy the downloaded Java .bin (from *Sun's J2SDK 1.4.0_02 Archive* http://java.sun.com/products/archive/j2se/1.4.0_02/index.html) into `/usr/src`.

```
bash#cp j2sdk-1_4_0_02-linux-i586.bin /usr/src
```

4. Build and install the Sun JDK, pressing enter at all prompts (the defaults in [] are fine including the `remove all files cleanup`).

```
bash#build-sun-jdk14
```

Without installing the xlibs packages, the Sun JDK will build with the following error messages, and maps will not work. Ensure that the xlibs dependency is met. Details on installing xlibs and reinstalling the Sun JDK are in the 7.4.8 (troubleshooting section).

```
dpkg-shlibdeps: warning: could not find path for libXp.so.6 dpkg-shlibdeps: warning: could not find path
```

4.3 Install OpenNMS 1.1.2-1woody

1. Install the OpenNMS package

```
bash#apt-get install opennms libgetopt-mixed-perl
```

The PostgreSQL installation will prompt for a default encoding. Accepting the default `SQL_ASCII` is fine. The OpenNMS databases are automatically created with `UNICODE` encoding. The `getopt-mixed-perl` package is optional and will allow a person to manually add interfaces to OpenNMS without modifying the configuration files, a.k.a. Generating a new suspect event. A transcript of the typical installation process is included in 10.4 (Appendix D).

4.3.1 opennms-db error on some systems

In certain circumstances the `opennms-db` package is unable to connect to the database. When this problem occurs there will be the output shown below.

```
- reading table definitions... OK
DBI->connect(dbname=template1) failed: could not connect to server:
No such file or directory at /usr/share/opennms-db/install.pl line 250
*** Unable to connect to the database!! ***
Be sure PostgreSQL is started and running correctly
before running this install script!
could not connect to server: No such file or directory
dpkg: error processing opennms-db (--configure):
subprocess post-installation script returned error exit status 255
```

In this situation, simply re-run the installation.

```
bash#apt-get install opennms
```

Note: This step completes the package installation process to satisfy apt, however it accomplishes proper execution of the installation script and is equivalent to running the following command to create the database structures and add the OpenNMS context to the `server.xml` file.

```
bash#/usr/share/opennms/bin/install.pl /etc/opennms/create.sql
```

The transcript of this installation process that includes the error output is included in 10.5 (Appendix E).

4.4 Post Installation Modifications for 1.1.2-1woody

These minor post-install modifications have been addressed in the discussion mailing list and should no longer be required in future releases of OpenNMS.

4.4.1 Disabling SMB Probes

In certain circumstances the polling for SMB connections will cause a timeout of the pollers and disable the OpenNMS server. To avoid this problem the `/etc/opennms/capsd-configuration.xml` must have a valid username, password and domain for all polled devices. If this cannot be completed reliably, disable this poller to avoid problems. If delays in rescanning occur with OpenNMS starting its pollers this could be the cause. More information is available *here* <http://lists.opennms.org/pipermail/discuss/2003-October/040188.html> .

4.4.2 Changing SSH Poller Plugin

The SSH poller is a modified version of the TCP poller that reduces the amount of logging on the polled sshd service. Unfortunately prolonged use of this plugin, which submits a version number, can cause the sshd service to spawn to its maximum processes, effectively causing a temporary DoS. The problem is resolved by stopping OpenNMS. To eliminate this problem completely modify the `/etc/opennms/capsd-configuration.xml` line

```
<protocol-plugin protocol="SSH" class-name="org.opennms.netmgt.capsd.SshPlugin" scan="on" user-defined=
```

to use the `TcpPlugin` by replacing the word `SshPlugin` as follows:

```
<protocol-plugin protocol="SSH" class-name="org.opennms.netmgt.capsd.TcpPlugin" scan="on" user-defined=
```

4.4.3 Change Tomcat4 Server.xml

The server.xml file is not properly modified by the Debian postinst scripts. As such the following OpenNMS context must be added to the server.xml file in order to log into OpenNMS. This can be accomplished by executing the following command:

```
bash#/usr/share/opennms/bin/install.pl -i /usr/share/opennms/etc/create.sql
```

This script is identical to the script executed during the package installation, except it is now invoked without the -t option allowing for modification of the Tomcat configuration. The following two lines of output indicate the change has occurred,

```
- checking Tomcat 4 for OpenNMS web UI... UPDATING:  
- adding OpenNMS web UI context to server.xml... DONE
```

4.4.4 Modify /etc/postgresql/postgresql.conf

Ensure the following parameters are set

```
tcpip_socket = true  
max_connections = 256  
shared_buffers = 1024
```

4.4.5 Configurations with < 384MB RAM

With 256MB of RAM the JAVA_HEAP_SIZE in /usr/share/opennms/bin/opennms.sh should be modified from 256 to 128 (megabytes).

4.4.6 Modify Tomcat4 Configuration

Currently OpenNMS has file permissions that require it to run itself and the tomcat4 service as root. To modify the tomcat4 configuration to do this, first stop the tomcat4 service.

```
bash#/etc/init.d/tomcat4 stop
```

To make the change edit the /etc/default/tomcat4 file to include TOMCAT4_USER="root".

If /etc/default/tomcat4 is modified before the tomcat4 service is stopped first or there may be 7.4.6 (problems logging into the OpenNMS console).

Once the above modifications have been committed, the Tomcat4 server will need to be restarted.

```
bash#/etc/init.d/tomcat4 start
```

4.5 OpenNMS Configuration HOWTOs

The OpenNMS configuration HOWTOs written by Tarus Balog are the bread and butter of understanding how to configure OpenNMS. Reading these documents is a must for anybody new to OpenNMS or revisiting their configuration. Of course Part 1 can be skipped, as it does not apply to Debian users. Please read these HOWTOs prior to using OpenNMS, and additionally review the online FAQ headings to gain familiarity

with the interface and types of information available there. Please read these documents before submitting questions to the mailing lists. The following summaries list some of the questions answered by each of Tarus' HOWTOs. *IF THE ANSWERS TO THESE QUESTIONS ARE NOT KNOWN, please read these HOWTOs.* They are available online at the *OpenNMS.org Documentation* [http://opennms.org/users/docs/](http://opennms.org/users/docs/page) page. Just read them, it does not take very long (i.e. they are a lot more concise than this HOWTO).

4.5.1 Release Notes

Please read the *OpenNMS 1.1.2 Release Notes* <http://www.opennms.org/users/docs/docs/html/release-1.1.2.html>

4.5.2 How-To Get Started with OpenNMS - Part 2 Discovery

Part 2 <http://www.opennms.org/users/docs/docs/html/part2.htm> describes the configuration files `/etc/opennms/discovery-configuration.xml`, `/etc/opennms/capsd-configuration.xml` and `/etc/opennms/snmp-config.xml`. It answers the following questions and much more:

What interfaces and/or networks do I want to monitor?

How aggressively do I want to discover these interfaces?

When do I probe for new interfaces and services on my network?

How do I discover a new node without restarting OpenNMS?

What services do I discover on each interface, and how often do I rediscover them?

What interfaces have which SNMP community strings and support what SNMP version?

4.5.3 How-To Get Started with OpenNMS - Part 3 Polling

Part 3 <http://www.opennms.org/users/docs/docs/html/part3.htm> describes the configuration file `/etc/opennms/poller-configuration.xml`. It answers the following questions and much more:

Which interfaces do I poll to determine what services are up or down?

How frequently do I poll each service and interface?

When do I ignore events due to maintenance windows?

How does the polling frequency change when a service is down?

4.5.4 How-To Get Started with OpenNMS - Part 4 SNMP Data Collection

Part 4 <http://www.opennms.org/users/docs/docs/html/part4.htm> describes the configuration files `/etc/opennms/snmp-config.xml`, `/etc/opennms/collectd-configuration.xml` and `/etc/opennms/datacollection-config.xml`. It answers the following questions and much more:

What interfaces have which SNMP community strings and support what SNMP version?

How many concurrent collection threads will occur?

Which interfaces belong to what collection package?

Which collection packages collect what service data (i.e. SNMP)?

What maximum size SNMP PDU will be collected?

Where will RRD files be stored?

What is the RRD file structure going to be?

What SNMP OIDs are in which collection groups?

Which collection groups are associated with which systems?

What SNMP system OID associates systems with actual interfaces?

How does OpenNMS know what data to collect from which SNMP agent?

4.5.5 How-To Get Started with OpenNMS - Part 5 Configuring Events

Part 5 <http://www.opennms.org/users/docs/docs/html/part5.htm> describes the configuration files `/etc/opennms/eventconf.xml`, `/etc/opennms/collectd-configuration.xml` and `/etc/opennms/datacollection-config.xml`. It answers the following questions and much more:

Where does OpenNMS listen for events?

How do I customize event messages?

How do I control what happens when an event arrives?

How do I suppress certain events, or keep them from entering the database?

What severity does each event have?

How are events like the movie *Spinal Tap*?

How do I customize event notification messages?

How do I extract SNMP Trap varbinds?

How do I browse the event database using `psql`?

A correction to Part 5 on *how the dest attribute works* <http://lists.opennms.org/pipermail/discuss/2003-May/027859.html> should be included soon.

4.5.6 Key Customized Performance Reports and Node Reports

There is a document on *KSC Reports* http://www.opennms.org/users/docs/docs/html/Key_SNMP_Customized.html that answers the following questions:

What is a KSC Performance Report?

What is a Node Report?

How do I make my own KSC report?

How do I add a graph to a report?

How do I modify a graph?

How do I view a report?

5 OpenNMS Administration

The OpenNMS server requires Postgres, Sun's J2SDK 1.4, and Apache Tomcat to run. The front-end and back-end operate independently, allowing a back-end (monitoring and database updating) restart without interruption to the front-end (HTML user interface and database querying). Conversely, the front-end can be disabled without stopping the back-end from monitoring. This is particularly useful when performing opennms package upgrades or making configuration changes. The Postgres database must be operational in

order for either the front-end user interface or the back-end monitoring to function. For more resources on the inner workings of OpenNMS check out the section near the end of this document, 9 (Further Information).

5.1 Server Startup and Shutdown

OpenNMS must be configured at this point. If the OpenNMS server is started without a proper configuration, ERROR and WARN will show up in your log files and things will be a general mess. Read the

HOWTOs <http://opennms.org/users/docs/> . Basic (very) configuration must have ip addresses in the appropriate include lines in `capsd-configuration.xml`, `discovery-configuration.xml`, `collectd-configuration.xml` and `poller-configuration.xml`. Ensure appropriate modifications to the packages in the `poller-configuration.xml` and `collectd-configuration.xml` to control polling and data collection from specific groups of devices. Ensure that community strings are entered properly in `snmp-config.xml`. For quick node name resolution (i.e. no DNS delays to affect processing of events or DNS queries to generate network traffic) modify the `/etc/hosts` file with appropriate device names. SNMP names will be used if devices are configured for SNMP properly.

The Postgres server must be running prior to starting the back-end (OpenNMS pollers) or the front-end (web interface). The startup order (automatic with system startup) is:

1. `bash#/etc/init.d/postgresql start` (Postgres)
2. `bash#/etc/init.d/tomcat4 start` (Web UI)
3. `bash#/etc/init.d/opennms start` (OpenNMS engine)

Shutdown is the reverse except with the `stop` directive, rather than `start` . It is important that Postgres starts first and is shutdown last. Of course this happens automatically with the init scripts on a complete system startup or shutdown. Except for database maintenance, the Postgres service should never require manual starting or stopping, even after configuration changes.

5.2 Enabling Maps

1. Stop the tomcat4 and opennms services

```
bash~/etc/init.d/tomcat4 stop
bash~/etc/init.d/opennms stop
```

2. Enable the feature in opennms

```
bash~#cp /etc/opennms/map.disable /etc/opennms/map.enable
```

3. In the default `/etc/default/tomcat4` uncomment the following `CATALINA_OPTS` line:

```
# Arguments to pass to the Java virtual machine (JVM)
# "-Djava.awt.headless=true" is automatically set if CATALINA_OPTS is empty
CATALINA_OPTS=""
```

4. Restart Tomcat4 and OpenNMS

```
bash~#/etc/init.d/tomcat4 start
bash~#/etc/init.d/opennms start
```

At the time of v1.5 of this document, Windows and Mac users could use the SVG maps if the the Adobe SVG plugin was installed. Windows users can get this plugin from *Adobe SVG Downloads* <http://www.adobe.com/support/downloads/main.html>. Linux users may have to wait for `libsvg2` to be fully integrated with Mozilla/Galeon/Safari, etc. The PNG format works exactly the same (in appearance). SVG is a standard maintained by the *w3c* <http://www.w3.org/>.

5.3 Database Maintenance

This section covers very basic operations on the ONMS Postgres database.

5.3.1 How to Perform a database Vacuum

If it is suspected that the database has gained entropy, this is a good idea.

1. Stop OpenNMS and Tomcat (Though it could probably work while ONMS is running).

```
bash~#/etc/init.d/tomcat4 stop
bash~#/etc/init.d/opennms stop
```

2. From the root user, become the Postgres user.

```
bash~#su - postgres
```

3. Perform a vacuum on the OpenNMS database.

```
bash~$/usr/lib/postgresql/bin/vacuumdb -v -f -d opennms
```

4. Restart OpenNMS and Tomcat.

```
bash~#/etc/init.d/opennms start
bash~#/etc/init.d/tomcat4 start
```

5.3.2 How to Purge and Recreate the OpenNMS Database

This process can be used to 'reset' the server's database while preserving the OpenNMS configuration data. A system admin that suspects that a problem or corruption in the database can use this process to clean out the entire Postgres database, and restart it using the current configuration. i.e. Current device nodes will be preserved, however events for those nodes will be purged. The RRD data will be preserved unless manually removed from `/usr/share/opennms/share/`.

1. Become the Postgres user from the root user.

```
bash~#su - postgres
```

2. Purge the OpenNMS database.

```
bash~$dropdb opennms
```

3. Become the root user again

```
bash~$exit
```

4. Recreate the OpenNMS database (as root user).

```
bash~#/usr/share/opennms/bin/install.pl -q /usr/share/opennms/etc/create.sql -l /usr/lib/postgresql
```

5.4 Backing Up and Restoring OpenNMS Configuration

Three backup files are created with this process. In our example they will be `062303_onms_sql.tar.gz`, `062303_onms_etc.tar.gz` and `062303_onms_rrd.tar.gz`. These files should be created at the same time to ensure that the rrd data, the SQL database and the configuration files match. It is necessary to capture the configuration and the databases at the same time in order to start an ONMS server with restored data.

5.4.1 Stop OpenNMS and Tomcat

(Not tested, though this may work while ONMS is running with only the web UI shutdown).

```
bash~#/etc/init.d/tomcat4 stop
```

```
bash~#/etc/init.d/opennms stop
```

5.4.2 Dump and Backup the OpenNMS SQL database

1. Shutdown Tomcat4

```
bash~#/etc/init.d/tomcat4 stop
```

2. Shutdown OpenNMS

```
bash~#/etc/init.d/opennms stop
```

3. Become the Postgres user

```
bash~#su - postgres
```

4. Perform a vacuum on the OpenNMS database.

```
bash~$/usr/lib/postgresql/bin/vacuumdb -v -f -d opennms
```

5. Dump all databases (This is OK for most users where OpenNMS is the only Postgres database)

```
bash~$pg_dumpall > 062303_onms_sql
```

6. Tar the dump

```
bash~$tar cvfz 062303_onms_sql.tar.gz 062303_onms_sql
```

7. Optionally move the tarball somewhere. A simple backup script could perform this task.

```
bash~$scp 062303_onms_sql.tar.gz backupuser@backupserver:
```

8. Optionally remove the dump files once they have been transferred

```
bash~$rm 062303_onms_sql*
```

9. Logout of the postgres user

```
bash~$exit
```

5.4.3 Backup the OpenNMS Configuration files

1. Tar up the configuration.

```
bash~#tar cvfzP 062303_onms_etc.tar.gz /etc/opennms/* -R
```

2. Optionally move it somewhere.

```
bash~#scp 062303_onms_etc.tar.gz backupuser@backupserver:
```

3. Optionally remove the tarball once it has been transferred.

```
bash~#rm 062303_onms_etc.tar.gz
```

5.4.4 Backup the OpenNMS RRD database files and reports

1. Tar up the configuration.

```
bash~#tar cvfzP 062303_onms_rrd.tar.gz /usr/share/opennms/share/* -R
```

2. Optionally move it somewhere.

```
bash~#scp 062303_onms_rrd.tar.gz backupuser@backupserver:
```

3. Optionally remove the tarball once it has been transferred.

```
bash~#rm 062303_onms_rrd.tar.gz
```

5.4.5 Restore a Previous OpenNMS Backup

1. Install Debian and OpenNMS if they are not already setup on the destination server.
2. From the new OpenNMS server transfer the backup files as root

```
bash~#scp backupuser@backupserver:062303* .
```

3. Become the database superuser from root

```
bash~#su - postgres
```

4. Purge the current (perhaps empty) OpenNMS database.

```
bash$dropdb opennms
```

5. Become the root user again

```
bash~$exit
```

6. Recreate the OpenNMS database (as root user).

```
bash~#/usr/share/opennms/bin/install.pl -q /usr/share/opennms/etc/create.sql -l /usr/lib/postgresql
```

7. Become the database superuser from root

```
bash~#su - postgres
```

8. Untar and restore the OpenNMS SQL database

```
bash~$tar xvfz /root/062303_onms_sql.tar.gz
```

```
bash~$psql -f 062303_onms_sql opennms
```

There will be some ERROR messages regarding structures that already exist, these can be safely ignored.

9. Become the root user again

```
bash~$exit
```

10. Untar the OpenNMS configuration

```
bash~#tar xvfzP 062303_onms_etc.tar.gz
```

11. Delete the RRD database files and reports that currently exist. (left over if this ONMS server had other uses)

```
bash~#rm /usr/share/opennms/share/* -rf
```

12. Restore the RRD database and report file backup

```
bash~#tar xvfzP 062303_onms_rrd.tar.gz
```

13. Remove the local backup tarballs (optional)

```
bash~#rm 062303*
```

Restart Tomcat4 and OpenNMS

1. Restart tomcat4

```
bash#/etc/init.d/tomcat4 start
```

2. Restart OpenNMS

```
bash#/etc/init.d/opennms start
```

5.5 OpenNMS Log Files

The ONMS system logs all activity to `/var/log/opennms`. Messages within the log files contain either FATAL, ERROR, WARN, INFO or DEBUG tags. The size and verbosity of the log files can be controlled by modifying `/etc/opennms/log4j.properties`. By default each file is set to INFO level (not as verbose as DEBUG) and will grow to 100MB. Each log file will "spawn" four times (i.e. 400MB total). All of these settings can be changed.

5.5.1 Viewing Error Messages

To view error messages that contain the ERROR tag, use the following command:

```
bash#grep "ERROR" /var/log/opennms/* | more
```

Replacing ERROR with another tag such as FATAL or WARN will display all log messages with that particular tag. Logs should contain no FATAL messages, minimal ERROR messages (ideally none), and possibly many WARN and INFO messages that should be at least be fully understood.

Related log messages will often share a common 'Pool-Fibre' as shown below. Time and Date can be used to correlate messages between different log files. Always try to determine the root cause, or initial error message as often the final error message is preceded by more meaningful log messages. Often related log messages are separated by other unimportant messages so creative use of `grep` and `|` is often required. Remember that there can be many situations that result in the same message. For help on troubleshooting messages please see the 7.4 (Log Troubleshooting) section.

5.5.2 A messages example

capsd.log

A device has other private interfaces that are not reachable by ONMS (but automatically detected and added to the interface table)

```
INFO [Capsd Rescan Pool-fiber1] FtpPlugin: FtpPlugin: Unable to test host 10.8.9.2, no route available
WARN [Capsd Rescan Pool-fiber1] IfCollector: IfCollector: No route to host 10.8.9.2, continuing protocol
INFO [Capsd Rescan Pool-fiber1] TcpPlugin: TcpPlugin: Could not connect to host 10.8.9.2, no route to host
```

5.5.3 Resetting the Log Files

Log files can grow very quickly making it difficult to find valuable information within. In order to minimize the effort required to troubleshoot problems, it is a good idea to backup the current logs and purge them before performing an OpenNMS restart. **DO NOT DELETE /var/log/*** as this will disable the Linux server. The procedure below outlines a typical restart scenario where the log files are backed up to the directory /root .

1. Stop OpenNMS

```
bash#/etc/init.d/opennms stop
```

2. Tar up the current log files

```
bash#tar cvfz /root/opennms_logs_061703.tar.gz /var/log/opennms/*
```

3. Reset the OpenNMS log directory

```
bash#rm -rf /var/log/opennms/*
```

4. Start OpenNMS

```
bash#/etc/init.d/opennms start
```

6 Further Configuration

6.1 Questions answered in the online FAQ

The *configuration FAQ* <http://faq.opennms.org/faq/fom-serve/cache/82.html> answered the following questions at the time this document was created.

How do I configure OpenNMS to collect performance data via SNMP?
How Do I Get OpenNMS to Collect Data from All SNMP Interfaces?
How Can I Change the Size of the RRD Files for Data Collection?
I Keep Running Out of Memory in Tomcat. How Do I Raise It?
How does SNMP Data Collection Work?
How to Create Custom Reports in OpenNMS
How to Speed Up the capsd Process
How to Integrate Snort + OpenNMS
What are the possible parameters in events and notifications?
What does the event mask mean?
What can I use in "filters" and "rules"?
How Do I Add Custom Notification Commands?
Are There Any Options I Can Use with the Java JDK?
How do I use the Alamin SMS Gateway with OpenNMS?
How do I purge old events from the database?
How Do I Configure OpenNMS/Tomcat to Use SSL?
How can I use OpenNMS to send pages?
How to add new traps descriptions on OpenNMS with mib2openms
Deleting Outages
How Do I Delete an Interface?
collectd-config - can you have multiple include-range and specific tags
How Do I Use mail.pl?

6.2 Custom Reports

Many of the custom report enhancements list here have already been integrated into current OpenNMS releases.

OpenNMS Custom SNMP graphics HOWTO <http://faq.opennms.org/faq/fom-serve/cache/109.html>

KSC Custom Reports <http://opennms.org/pipermail/discuss/2003-July/028401.html>

The first paragraph of the above email had improper formatting for online viewing and is quoted here:

Jason, The custom_view.jsp file includes the "includeNodeQueries" option when building a list of possible graphs. This should include all possible interface and node level queries for your device. I have no problems seeing node level prefab reports as selections on my KSC reports. I can create a page with just CPU utilization graphs for a group of important routers by just picking an interface from each of the desired router and selecting the appropriate prefab graph type. Can you see the node level reports for the interfaces in question in the other SNMP non-KSC performance reporting pages? If not, you may want to verify that this data is being collected for the device in question since this device may fall into a collection category that has no node level stats. If it doesn't, you will have to set up the proper collection OID info in datacollection-config.xml. If you want to create your own custom prefab reports for these OIDs then you can add the graph definition info to s nmp-graph.properties. Hope this helps. Dave

Key SNMP Customized (KSC) Performance Reports and Node Reports HOWTO http://opennms.org/users/docs/docs/html/Key_SNMP_Customized.html

Additional Net-SNMP parameters for data collection <http://lists.opennms.org/pipermail/discuss/2003-April/027566.html>

Setting up Net-SNMP Performance Reports <http://lists.opennms.org/pipermail/discuss/2003-April/027453.html>

Additional Net-SNMP parameters for data collection <http://lists.opennms.org/pipermail/discuss/>

2003-April/027566.html

Setting up Net-SNMP Performance Reports <http://lists.opennms.org/pipermail/discuss/2003-April/027453.html>

Converting Bytes to Bits in RRD Graphs <http://lists.opennms.org/pipermail/discuss/2003-September/040083.html>

Modifying the Scale of RRD Graphs <http://lists.opennms.org/pipermail/discuss/2003-October/040190.html>

Disabling Collection on Secondary Interfaces <http://lists.opennms.org/pipermail/discuss/2003-October/040176.html>

RRD graph line thickness is controlled from the `snmp-graph.properties`.

6.3 Integration with a Jabber server

Jabber integration

6.4 Configuring Thresholds

Unofficial Thresholds HOWTO <http://lists.opennms.org/pipermail/discuss/2003-March/026901.html>

6.5 Modifying the Notification Email Source

The `~/mailrc` for root controls how `/bin/mail` (the default mail command) sends its' mail. Check `man mail` for more information.

Alternative email script that allows FROM: <http://lists.opennms.org/pipermail/discuss/2002-November/036109.html>

6.6 Collecting SNMP Data on multiple Ports

As per Tarus,

Add a new service to the package in `collectd-configuration.xml`:

```
<service name="SNMP-NEW" interval="300000" user-defined="true" status="on">
  <parameter key="collection" value="default"/>
  <parameter key="port" value="[myport]"/>
  <parameter key="retry" value="3"/>
  <parameter key="timeout" value="3000"/>
</service>
```

and at the bottom:

```
<collector service="SNMP-NEW" class-name="org.opennms.netmgt.collectd.SnmpCollector"/>
```

The point is you can have more than one service in a collector package, just like in a poller package.

6.7 How to add Sound to Events

This is great if for situations where it is hard to keep eyes glued to the screen. First the proper sound drivers must be compiled into the kernel. This is not covered here, however the following output from `dmesg` shows the working Soundblaster Live 5.1 hardware on an ONMS server with a 2.4.21 kernel.

```
bash#cat /var/log/dmesg | more
<verb>
....
Creative EMU10K1 PCI Audio Driver, version 0.20, 11:26:04 May  6 2003
emu10k1: EMU10K1 rev 10 model 0x8065 found, IO at 0xece0-0xecff, IRQ 11
ac97_codec: AC97 Audio codec, id: 0x8384:0x7608 (SigmaTel STAC9708)
emu10k1: SBLive! 5.1 card detected
....
```

1. First install the `wavtools` <http://packages.debian.org/stable/net/wavtools> package. Wave files require less CPU overhead when played compared to other more compressed formats.

```
bash#apt-get install wavtools
```

2. Create a sounds directory in `/etc/opennms` and copy the `.wav` files there.

```
bash#mkdir /etc/opennms/sounds
bash#cp linkdown.wav /etc/opennms/sounds
```

3. Modify the event configuration file to play the sound and suppress all output. The following is an excerpt from the LinkDown trap that is sent from most switches when a device goes offline. The `<autoaction>` tag contains the command to play the sound.

```
<event>
<mask>
  <maskelement>
    <mename>generic</mename>
    <mevalue>2</mevalue>
  </maskelement>
</mask>
<uei>uei.opennms.org/generic/traps/SNMP_Link_Down</uei>
<event-label>OpenNMS-defined trap event: SNMP_Link_Down</event-label>
<descr> &lt;p>&gt;A linkDown trap signifies that the sending protocol entity recognizes a failure i
<logmsg dest='logndisplay'>
  Agent Interface Down (linkDown Trap) enterprise:%id% (%id%)
</logmsg>
<severity>Minor</severity>
<autoaction>/usr/bin/wavp /etc/opennms/sounds/linkdown.wav >/dev/null 2>1</autoaction>
</event>
```

6.8 Add Flashing lights and Text-to-Speech to OpenNMS

Wake up your NOC! <http://lists.opennms.org/pipermail/discuss/2003-December/040772.html>

6.9 How to further re-parent OpenNMS nodes in the maps

Reparenting Present from Steve Moyer <http://lists.opennms.org/pipermail/discuss/2003-September/029039.html>

6.10 How to add additional administrators

Edit `/etc/opennms/magic-users.properties` and add the new admin username to `role.admin.users`.

6.11 How to manually add a device OpenNMS while it is running

Execute the following command with the proper `<ip address>`:

```
/usr/share/opennms/bin/send-event.pl uei.opennms.org/internal/discovery/newSuspect -i <ip address>
```

To execute this command the *Getopt::Mixed package* <http://packages.debian.org/stable/interpreters/libgetopt-mixed-perl> must be installed. At the Debian command line enter:

```
bash#apt-get install libgetopt-mixed-perl
```

6.12 How to change Event Colors

Right now, edit `CateegoryUtil.java` (check out CVS) and rebuild OpenNMS. This should be an .XML option in future releases. This may be in 1.1.2.

6.13 How to modify console graphics

OpenNMS Look <http://lists.opennms.org/pipermail/discuss/2004-February/041337.html>

6.14 How to use an analog line and a modem for notifications

OpenNMS already has configurations to use *qpage* <http://www.qpage.org> . You can see them in `/etc/opennms/notificationCommands.xml`.

1. On the ONMS server configure a modem (the Conexant/Rockwell HCF chipset seems to have problems, old-style external USB modems work great)
2. Install *qpage* <http://packages.debian.org/stable/net/qpage>

```
bash#apt-get install qpage
```

3. Set up users in ONMS

4. Setup the users (with the same name) in `/etc/qpage.cf`.
5. On the qpage side, you need to configure the pager-ids and the service. The key here is that the number used to send alpha pages is not the pager number but a different number talking something called TAP. i.e. When you look for the number for Skytel, remember to look for the TAP number.

From the *FAQ* <http://faq.opennms.org/faq/fom-serve/cache/149.html> .

6.15 Configuring Notifications base on `%parm[#1]%` values

Configuring notifications based on `=%parm[#1]%` values <http://lists.opennms.org/pipermail/discuss/2003-June/038990.html>

Filtering notifications using Parm values and Rules <http://lists.opennms.org/pipermail/discuss/2004-January/041222.html>

6.16 Suppressing Traps from Specific Hosts

Supressing a specific trap from a specific host <http://lists.opennms.org/pipermail/discuss/2003-October/040179.html>

6.17 Mib2opennms Usage Notes

mib2opennms usage <http://lists.opennms.org/pipermail/discuss/2004-February/041371.html>

6.18 Specific Device Configurations

6.18.1 Monitoring FreeRadius Servers

The link below describes a method developed by Bill Ayres. The basic scheme is this. On the radius server, use `tcpd` (tcp wrapper) to deny a telnet connection from your OpenNMS box on some port. use the "twist" option to `tcpd` (see `man 5 hosts_options`) to run a script which tests the radius service, and returns an up or down banner to the client. The client is the OpenNMS telnet poller, looking for an "up" banner. If your radius server is not a unix box, not to worry. You can modify this scheme to run on a proxy unix system which could eventually be the same system that runs OpenNMS. It's just a little more work

Monitoring FreeRadious by Bill Ayres <http://lists.opennms.org/pipermail/discuss/2003-May/027818.html>

6.18.2 Monitoring Cisco Switches and Routers

For basic SNMP on almost any Cisco IOS device the following commands will work:

```
snmp-server community public RO
snmp-server ifindex persist
snmp-server enable traps
snmp-server host 10.1.1.1 public
```

In this example all traps are enabled with SNMP read-only community string set to `public`. The `ifindex persist` ensures that interface numbers do not change if hardware is added or removed. Things that depend

on interface numbers (like RRD graphs) can get confused when they change without this option. The last line is the OpenNMS server.

To add verbose interface labels to the ONMS trap notifications, add the following to the LinkDown notification to extract the varbinds:

```
Link Down on %parm[#2]% of %snmpghost%
```

On any interface (i.e. one connected to a guest Windows workstation), specify not to receive the SNMP message with the `no snmp trap link-status` directive shown below:

```
interface FastEthernet0/2
  switchport access vlan 200
  no ip address
  no snmp trap link-status
  spanning-tree portfast
```

If there are SNMP traps for syslog messages (`snmp-server enable traps syslog`) enabled but the repetition of Interface up/down messages is not wanted, simply add `no logging event link-status` to the above interface configuration.

Below is an SNMP configuration that has access-list security on the SNMP port, SNMP views restricting access to interfaces and telnet tty traps enabled. Not all IOS images support all these SNMP options. This was IOS 12.1 on an AS5300.

```
access-list 10 permit 192.168.66.0 0.0.0.255
access-list 10 deny any
snmp-server view nms enterprises included
snmp-server view nms ifEntry excluded
snmp-server view nms ifEntry.1.1 included
snmp-server view nms ifEntry.1.2 included
snmp-server view nms ifEntry.2.1 included
snmp-server view nms ifEntry.2.2 included
snmp-server view nms ifEntry.3.1 included
snmp-server view nms ifEntry.3.2 included
snmp-server view nms ifEntry.4.1 included
snmp-server view nms ifEntry.4.2 included
snmp-server view nms ifEntry.5.1 included
snmp-server view nms ifEntry.5.2 included
snmp-server view nms ifEntry.6.1 included
snmp-server view nms ifEntry.6.2 included
snmp-server view nms ifEntry.7.1 included
snmp-server view nms ifEntry.7.2 included
snmp-server view nms ifEntry.10.2 included
snmp-server view nms ifEntry.16.1 included
snmp-server view nms ifEntry.16.2 included
snmp-server community com$tr!ng view nms RO 10
snmp-server enable traps snmp authentication linkdown linkup coldstart warmstart
snmp-server enable traps calltracker
snmp-server enable traps tty
snmp-server enable traps modem-health
snmp-server enable traps ds0-busyout
```

```
snmp-server enable traps dsl-loopback
snmp-server enable traps hsrp
snmp-server enable traps config
snmp-server enable traps entity
snmp-server enable traps envmon
snmp-server enable traps aaa_server
snmp-server enable traps bgp
snmp-server enable traps pim neighbor-change rp-mapping-change invalid-pim-message
snmp-server enable traps ipmulticast
snmp-server enable traps msdp
snmp-server enable traps rsvp
snmp-server enable traps frame-relay
snmp-server enable traps frame-relay subif
snmp-server enable traps rtr
snmp-server enable traps syslog
snmp-server enable traps dlsw
snmp-server enable traps pppoe
snmp-server enable traps dsp card-status
snmp-server enable traps voice poor-qov
snmp-server enable traps dnis
snmp-server enable traps xgcp
snmp-server host 192.168.66.10 com$tr!ng
snmp-server host 192.168.66.11 com$tr!ng
```

SNMP views can be used to limit SNMP polls from trying to download huge interface tables or BGP routing tables (the latter not shown here). This router was used as a VOIP gateway and has the `no snmp-server enable traps isdn` to prevent a lot of unnecessary messages.

If there is a lot of telnet activity on a router, and the IOS supports this feature, use `no snmp-server enable traps tty` to disable the telnet traps. ONMS does not poll telnet by default, otherwise Cisco devices would send one of these to OpenNMS every five minutes. It is important to note that when a re-discover occurs (default every 24 hours) the telnet port will be polled and this trap will be sent to ONMS. The `<outage calendar>` tag is currently not supported in the `trapd-configuration.xml` file, so there is no way to block these re-discovery traps in the current ONMS v1.1.1. Use the `logmsg dest=suppress` in the `eventconf.xml` file to not display these traps in the event window.

There is a known bug in one of the older IOS versions that allows the SNMP engine to retain an IP address after it has been changed on an interface. The work around is to reload the Cisco device. None of the `show` commands reveal the IP address the SNMP engine accidently retains.

6.18.3 Monitoring Extreme Switches and Cisco VPN concentrators

Notes on varbinds with Extreme and Cisco devices <http://lists.opennms.org/pipermail/discuss/2003-May/027914.html>

6.18.4 Monitoring Netscreen Devices

Error detecting SNMP on Netscreen devices <http://lists.opennms.org/pipermail/install/2003-April/002553.html>

6.19 Using OpenNMS to monitor Scripts

Script based poller by Bill Ayers <http://opennms.org/pipermail/discuss/2003-June/039001.html>

7 Troubleshooting

There are a number of questions answered in the online FAQ in the *troubleshooting section* <http://faq.opennms.org/index.cgi?file=20>. A good process for determining problems is to stop OpenNMS, delete all the log files in `/var/log/opennms/` and restart OpenNMS. A command like `watch -d "ls -al"` allows one to monitor exactly what log files are changing while OpenNMS is restarting. Using `grep ERROR *` the log files can be searched for any containing ERROR. Tarus describes the process as:

Watch the output of the "watch" command. The log files should steadily grow. First eventd.log, then capsd and collectd (usually the largest), followed by poller and finally threshd. After threshd.log has some content, you should see rtc.log and then rtdatdata.log populate. When rtdatdata.log has data, "Calculating" should be gone. If it stops before then, do this in the logs directory: `grep FATAL *grep ERROR *` and look for anything suspicious.-T

7.1 Questions Answered in the Online FAQ

```
java.sql.SQLException: Sorry, too many clients already
".../[directory]" does not exist!
[chmod] /bin/chmod: too few arguments
Discovery and ICMP Service Monitor won't start...connection error.
An error occurred initializing the database connections: No suitable driver found
Category Not Found "Router" when starting the Web UI
I'm Installing the RPMs But It Still Can't Find DBI/DBD::Pg...
RTC Session Does Not exist
Web UI won't authenticate me even though I'm in the users.xml
I see a frightening number of Java processes/memory allocated to Java with ps or top
SNMP Data Not Collected on Linux machines
only packages with major numbers <= 3 are supported by this version of RPM
An error occurred initializing the event correlation manager: Connection refused.
I just upgraded to Red Hat 7.1, and java freezes, what gives?
ERROR: Java2 Virtual Machine Not Found.
error while loading shared libraries: libstdc++-libc6.1-1.so.2
assets table problem during install
ONC/RPC program not registered
PostgreSQL doesn't want to start/won't start automatically
Every thing's installed, but I get: HTTP Status 500 - No Context configured to process this request
jar_cacheXXXX.tmp files are filling up my /tmp
build.sh: line 189: 5672 General protect error $JAVA_HOME/bin/java ...
I get "can't parse argument 'RRA:AVERAGE:0.5:1:8928'"
What are the Steps for a Minimal OpenNMS installation?
I installed OpenNMS, and admin/admin Does Not Log Me On
Tomcat won't start, complains about JAVA_HOME
FATAL 1: IDENT authentication failed for user "postgres"
apt complains about zebra and gated in the lynx installer
OpenNMS Says My DNS Server is Down, When It Is Up
```

Why are some of my XML files all one line?

Why Don't My Linux Servers with the UCD SNMP Agent Show Up in Performance Reports?

opennms.sh status returns nothing, what's happening?!

Linux - OpenNMS stops working after about 1 hour or intermittent servlet crashes are seen in the Web GUI

RPM install hangs on RedHat 8.0

How Can I Best Test My XML Files?

Why Do I Get an Invalid ifIndex Error?

Getting around IDENT auth error during installation

How are node labels determined?

Logout/Re-login

I upgraded to 1.1.1 and now "Manage/Unmanage" does not work

Internal Server Errors

Why doesn't the dhcpd process ever start?

Why Are Availability Reports Never Generated?

OpenNMS.Rtcd problem

Why Doesn't the DHCP Service Start?

I can snmpwalk a device, but OpenNMS won't collect data on it, why?

New Installation: I can't login

Why Does My Windows DHCP Server Show as Down?

Why do KSC reports give me a "null parameters" error?

7.2 OpenNMS Console Display Problems

7.2.1 Categories not updating properly

7.2.2 *Bugzilla Bug 683 When SNMP is added to a device, categories do not update* http://bugzilla.opennms.org/cgi-bin/bugzilla/show_bug.cgi?id=683

It could also be this:

24hr avail did not get updated <http://lists.opennms.org/pipermail/discuss/2004-February/041570.html>

7.2.3 OpenNMS 'List All Nodes' displays after more than 5 minutes

A device may have many (hundreds or thousands) of interfaces due to VOIP dial peers. On Cisco devices (AS5300s) the SNMP process will timeout if the interface table is too long. SNMP views can be used to limit what SNMP interfaces are made available to ONMS. Limiting this information will allow ONMS to gather a complete (restricted to main interfaces) interface table. Other devices with hundreds of sub-interfaces may cause a similar problem.

7.2.4 Strange characters are appearing, even after refresh

If the GUI contains strange characters in menu items or response time graphs there is a chance of a corrupt Tomcat (Java Engine) cache. To clear the cache and restart the GUI perform the following steps:

1. Stop Tomcat

```
bash#/etc/init.d/tomcat4 stop
```

2. Clear the cache

```
bash#rm -rf /var/cache/tomcat4/*
```

3. Restart Tomcat

```
bash#/etc/init.d/tomcat4 start
```

7.2.5 Tomcat HTTP Status 500 Errors

Error Trying to Rescan a Node from WebGUI <http://lists.opennms.org/pipermail/install/2003-June/002779.html>

- `java.io.FileNotFoundException: /usr/share/OpenNMS/etc/users.xml (Permission denied)`
If there is a message related to (Permission denied) then Tomcat is probably running under the tomcat4 user. This error is telling you that the tomcat4 user cannot access the specified file (users.xml above) and you must manually change the permissions to resolve this problem.

```
bash#chown tomcat4 /usr/share/opennms/etc/users.xml
```

Running Tomcat as root will resolve the problem too.

- `org.apache.jasper.JasperException: You must set a DbConnectionFactory before requesting a database connection.` This error will occur when trying to run tomcat4 as user tomcat4 rather than the root user with the default install OpenNMS file permissions. Try changing setting TOMCAT4_USER="root" in /etc/default/tomcat4
- `javax.servlet.ServletException: Could not send event uei.opennms.org/nodes/deleteService` The OpenNMS server is probably not running. Restart the opennms service.
- `javax.servlet.ServletException: Servlet execution threw an exception` If this message appears while trying to view maps, the Sun JDK is probably built improperly. Install xlibs and rebuild the Sun JDK as shown 7.4.8 (here).
- Error selecting Home>Admin>Select SNMP Interfaces The non-IP interfaces may be set to null in the issnmpprimay/ipinterfaces column. SQL to fix this is *here* <http://lists.opennms.org/pipermail/discuss/2004-February/041457.html> .

7.3 Problems running other daemons

7.3.1 DHCP Conflicts

If there is a DHCP client running on the OpenNMS server, it will interfere with the starting of the OpenNMS poller. Disable the DHCP client by assigning a static IP address and restart the OpenNMS server to resolve the situation.

Dhcpd or dhcpcd processes do not start on the OpenNMS server <http://faq.opennms.org/index.cgi?file=20>

7.3.2 SSH Connections Refused

The ssh poller will sometimes cause the maximum number of ssh connections to be opened on a monitored server. As a result the server no longer accepts connections on the ssh port. To resolve this problem change the poller plugin from 'ssh' to 'tcp' in the `capsd-configuration.xml`. An SSH poller configured to avoid this SSH DoS situation looks like the following in `capsd-configuration.xml`. Prior to v1.1.3 this appeared as `SshPlugin` rather than `TcpPlugin`

```
<protocol-plugin protocol="SSH" class-name="org.opennms.netmgt.capsd.TcpPlugin" scan="on" user-defined=  
    <property key="banner" value="SSH"/>  
    <property key="port" value="22"/>  
    <property key="timeout" value="3000"/>  
    <property key="retry" value="3"/>  
</protocol-plugin>
```

7.3.3 SNMP Trap Daemon Conflict

If the SNMP trap daemon is running, it will conflict with OpenNMS. To disable it set `SNMPDRUN=no` in `/etc/default/snmpd`.

7.4 Log File Messages

7.4.1 Messages in `collectd.log`

- *Unable to schedule X.X.X.X for service SNMP; Unable to retrieve ifIndex for interface <http://faq.opennms.org/cgi-bin/fom?file=135>*
- *ERROR [CollectdScheduler-5 Pool-fiber1] SnmpCollector: collect: Error creating the SnmpSession to collect from X.X.X.X java.net.SocketException: Too many open files <http://opennms.org/pipermail/discuss/2003-June/039003.html>*
- *WARN [SnmpPortal-1] SnmpNodeCollector: snmpReceivedPDU: Failing varbind - name: IORawReceived oid: .1.3.6.1.4.1.2021.11.58 Hmmm.. not sure about this one yet.*
- *ERROR [CollectdScheduler-5 Pool-fiber2] CollectableService: run: An undeclared throwable was caught during SNMP collection for interface 192.168.78.10*
- *ERROR [CollectdScheduler-5 Pool-fiber1] > SnmpCollector: collect: Error creating the SnmpSession to collect from > 192.168.0.XX> java.net.SocketException: Too many open files This can have to do with open files, the Java HEAP size and/or corrupt RRD files as stated [here http://lists.opennms.org/pipermail/discuss/2003-June/039003.html](http://lists.opennms.org/pipermail/discuss/2003-June/039003.html)*

7.4.2 Messages in `capsd.log`

- *ERROR [Capsd Suspect Pool-fiber0] Poller: IO Exception during socket connection establishment with DHCP client daemon. <http://faq.opennms.org/faq/fom-serve/cache/171.html>*
- *INFO [Capsd Rescan Pool-fiber2] IfSnmpCollector: IfSnmpCollector: failed to collect System group for 192.168.34.3 ERROR [Capsd Rescan Pool-fiber2] RescanProcessor: setNodeLabelAndSmbInfo: failed to find primary interface... ERROR [Capsd Rescan Pool-fiber2] RescanProcessor: Error updating records java.lang.NullPointerException An SNMP View is restricting full SNMP access to a Cisco Devices. Also see the Cisco configuration notes.*

- INFO [Capsd Rescan Pool-fiber1] FtpPlugin: FtpPlugin: Unable to test host 10.8.9.2, no route available... WARN [Capsd Rescan Pool-fiber1] IfCollector: IfCollector: No route to host 10.8.9.2, continuing protocol scans. INFO [Capsd Rescan Pool-fiber1] TcpPlugin: TcpPlugin: Could not connect to host 10.8.9.2, no route to host A device has other private interfaces that are not reachable by ONMS (but automatically detected and added to ONMS)
- WARN [Capsd Rescan Pool-fiber2] HttpsPlugin: org.opennms.netmgt.capsd.HttpsPlugin: An undeclared I/O exception occurred contacting host 192.168.76.207
A Windows IIS server does not have a default page configured
- INFO [Capsd Rescan Pool-fiber2] SmtplibPlugin: SmtplibPlugin: received invalid result code from server 192.168.56.3 Qmail mail server, possibly restricted to only allow mail from specific sources other than ONMS
- WARN [SnmpTimer] SystemGroup: snmpTimeoutError: The session timed out communicating with the agent. INFO [Capsd Rescan Pool-fiber2] IfSnmpCollector: IfSnmpCollector: failed to collect ifTable for 192.168.92.2 INFO [Capsd Rescan Pool-fiber2] IfSnmpCollector: IfSnmpCollector: failed to collect ipAddrTable for 192.168.92.2 A device is powered down during a SNMP poll
- WARN [Capsd Rescan Pool-fiber0] SshPlugin: SshPlugin: An undeclared throwable exception was caught connecting to host X.X.X.X on port 22 The SshPlugin poller for OpenNMS 1.1.2 has some problems, it should be configured in `capsd-configuration.xml` as TcpPlugin.
- If "Testing SMB" followed by many "iterating over known nodes" messages appears in the log, then there is probably a SMB poller issue and SMB poller should be disabled in `capsd-configuration.xml`. Details on this can be found *here* <http://lists.opennms.org/pipermail/discuss/2003-October/040188.html>

7.4.3 Messages in manager.log

- ERROR [main] Manager: error invoking stop command java.net.ConnectException: Connection refused This error is harmless and always occurs, it likely has to do with the order in which services are stopped.

7.4.4 Messages in notifd.log

- * *ERROR [Thread-99] NotificationFactory: Error getting notice status: Backend start-up failed: FATAL 1: Sorry, too many clients already* <http://faq.opennms.org/faq/fom-serve/cache/23.html>

7.4.5 Messages in pollers.log

- ERROR [PollerScheduler-30 Pool-fiber5] IcmpMonitor: RRD database 'update' failed for 10.1.1.45, reason: illegal attempt to update using time 1054244371 when last update time is 1054244371 (minimum one second step)
- ERROR [PollerScheduler-30 Pool-fiber5] PollableService: poll: An undeclared throwable was caught polling interface 10.1.1.45

These is one reason why this could be happening posted here *RRD database 'update' failed* <http://lists.opennms.org/pipermail/discuss/2003-July/039026.html> . Another reason stated in a July1, 2003 posted by Tarus is as follows,

Okay, when OpenNMS writes an RRD for an interface, it uses the directoryname "ifDescr+MAC". On some machines, namely Compaq servers, it is possible for two interfaces to have the same ifDescr and MAC address. So what happens is that OpenNMS grabs the data for ifIndex=2, writes it, grabs the data for ifIndex=3, and attempts to write it to the same .rrdfile. Since RRD requires a minimum one second step, this second write fails. You know the problems with Layer 2 interfaces, so we really don't have a solution, except not to poll interfaces where this occurs.

-T

7.4.6 Errors in scriptd.log

- ERROR [main] org.apache.coyote.http11.Http11Protocol: Error initializing endpoint java.net.BindException: Address already in use:8180 This error will prevent anyone from logging in. If the TOMCAT_USER is modified while the tomcat4 server is running, the daemon will not shutdown properly (the only indication of this is a ps aux showing the processes running still). Stop OpenNMS and Tomcat4, ensure there are no Java processes remaining and restart the system. All will be fine.

7.4.7 Errors in threshd.log

- WARN [main] Threshd: scheduleInterface: Unable to schedule 192.168.76.203 for service SNMP, reason: Unable to retrieve ifIndex for interface 192.168.76.203 Invalid ifTable on some Fibre devices (IBM SanDataGateway, McData Sphereon 4500)

7.4.8 Errors in web.log

- WARN [main] WEB: [InitializerServletContextListener] Error subscribing to RTC POSTs This occurs when Tomcat connects to the Realtime Console (RTC) before OpenNMS is fully running. It eventually connects fine, so this message can be ignored.
- WARN [Thread-4] WEB: StandardWrapperValve[SVGTranscoder]: Servlet.service() for servlet SVGTranscoder threw exception This occurs when the SunJDK 1.4 package is built without the xlibs library installed. To fix this problem perform the following steps, pressing enter to accept all defaults. The package will be automatically reinstalled and maps will work properly

```
bash~#apt-get install xlibs
bash~#build-sun-jdk14
bash~#/etc/init.d/tomcat4 restart
```

7.5 Customization Problems

7.5.1 New trap definitions added to events.xml are categorized as unformatted.

How to add new trap descriptions on OpenNMS with mib2opennms <http://faq.opennms.org/faq/fom-serve/cache/150.html>

When you run mib2opennms, it usually does not set the value of "generic" to "6" and instead leaves it at "0". You almost always have to change that. When you get an unformatted trap event, it will list the enterprise id, the value for generic and the value for specific. Those three need to match the event in eventconf.xml for OpenNMS to not categorize your event as *unformatted*.

7.5.2 Device names are being displayed improperly.

DNS Resolution and OpenNMS <http://lists.opennms.org/pipermail/install/2003-April/002515.html>

7.6 Error in varbinds with Extreme and Cisco devices

<http://lists.opennms.org/pipermail/discuss/2003-May/027914.html>

7.7 Error detecting SNMP on some devices that support it

<http://lists.opennms.org/pipermail/install/2003-April/002553.html>

7.8 OpenNMS only partially resolving IPs

<http://lists.opennms.org/pipermail/discuss/2002-October/025140.html>

7.9 Error Trying to Rescan a Node from WebGUI

Try restarting the tomcat4 server if there have been configuration changes made, or the opennms service has been restarted recently.

<http://lists.opennms.org/pipermail/install/2003-June/002779.html>

Also, there may be a SMB poller issue. See *here* <http://lists.opennms.org/pipermail/discuss/2003-October/040188.html> for details.

8 Tools and Packages that compliment OpenNMS

This section describes some of the other packages that are available to compliment the OpenNMS system. This is where Debian's strengths become apparent.

8.1 OpenNMS Document Server

This is a straightforward procedure that first installs the documentation (stored in `/usr/share/doc/opennms`) and then installs and configures an Apache web server to allow access from any web browser enabled workstation. This documentation bundle does not include the HOWTOs, but does include Release Notes and developer documentation.

8.1.1 Install the OpenNMS Documentation

```
apt-get install opennms-doc
```

8.1.2 Install the Apache 1.3 web server

1. Install the apache server

```
apt-get install apache
```

2. Modify the apache configuration to display the Debian doc directory. The configuration will have to be modified in order to allow access from a particular private subnet. If the local subnet is 192.168.45.0/255.255.255.0 then add it to the following section in `/etc/apache/httpd.conf` as follows.

8.1.3 Original httpd.conf

```
# Allow access to local system documentation from localhost.
# (Debian Policy assumes /usr/share/doc is "/doc/", at least from the localhost.)
Alias /doc/ /usr/share/doc/

<Location /doc>
    order deny,allow
    deny from all
    allow from 127.0.0.0/255.0.0.0
    Options Indexes FollowSymLinks MultiViews
</Location>
```

8.1.4 Modified httpd.conf

```
# Allow access to local system documentation from localhost.
# (Debian Policy assumes /usr/share/doc is "/doc/", at least from the localhost.)
Alias /doc/ /usr/share/doc/

<Location /doc>
    order deny,allow
    deny from all
    allow from 127.0.0.0/255.0.0.0 192.168.45.0/255.255.255.0
    Options Indexes FollowSymLinks MultiViews
</Location>
```

3. Restart the Apache server

```
/etc/init.d/apache restart
```

The documentation can be found at the URL `http://<opennms_server_ip>/doc/`. A forbidden message indicates an improper configuration. No response indicates that the web server is not functioning or blocked by a firewall. Make sure that the local hostname is setup in `/etc/hosts` with the proper IP address. Apache configuration normally involves modifying a number of other parameters in the `httpd.conf`. The configuration file is commented, and the reader is encouraged to learn more about customizing the Apache web server.

8.2 Network connectivity tools

8.2.1 Secure shell client and daemon

```
apt-get install ssh
```

Administrators that run Windows on their desktop can use the freely available *Putty SSH Client* <http://www.chiark.greenend.org.uk/~sgtatham/putty/download.html> to connect to their OpenNMS server.

8.2.2 FTP server daemon

The proftpd package is secure and supports a variety of features for multi-user enterprise use.

```
apt-get install proftpd
```

8.3 Network diagnostic tools

8.3.1 Nmap security scanner

This tool allows probing devices for open ports (confirm OpenNMS probes) and identifies remote operating systems (using the `-O` switch). It is extremely configurable and has a full suite of port scanning options.

```
apt-get install nmap
```

8.3.2 tcpdump traffic analyzer

```
apt-get install tcpdump
```

8.3.3 mtr traceroute interface

```
apt-get install mtr-tiny
```

8.3.4 ntop traffic analyzer

This tool allows monitoring of network traffic flowing in and out of the OpenNMS server using a GUI web interface.

```
apt-get install ntop
```

8.4 Network security tools

8.4.1 iptables netfilter engine

These packages allows the creation of secure firewall and routing policies

```
apt-get install iptables iproute
```

8.4.2 portsentry port scanning blocker

```
apt-get install portsentry
```

8.4.3 chkrootkit root compromise checker

```
apt-get install chkrootkit
```

8.4.4 advanced intrusion detection engine

```
apt-get install aide
```

8.5 Database tools

8.5.1 phppgadmin

This is a nice GUI web interface to postgres databases. It can easily browse all the OpenNMS database tables.

```
apt-get install phppgadmin
```

8.6 System Resource Monitoring

8.6.1 Cacti

This tool allows monitoring of system resources with RRDtool. This tool allows someone to monitor system resources even when OpenNMS is not running, or when it is starting or stopping. It will require mysql-server to store its data by default, allowing someone to also stop and start PostgreSQL while still monitoring the system load.

```
apt-get install mysql-server
```

```
apt-get install cacti
```

- Note - The process graphs in Cacti will have a y-axis scale with a maximum of 100. OpenNMS has many more unique processes, and a server running Cacti to graph these processes should be modified from its defaults to show a maximum of 300. The scale does not affect the data recorded (i.e. if the data appears to be off-the-graph, simple adjust the scale and refresh).

8.7 Tools requiring an XServer

Tools here require some basic xlibraries to run, and require the remote user to have a local Xserver (Another box with an XServer running (i.e.Solaris or Linux desktop) or an XServer daemon (i.e.Exceed on Windows).

8.7.1 Mozilla web browser

```
apt-get install mozilla
```

8.7.2 MTR GUI traceroute

```
apt-get install mtr
```

8.7.3 Ethereal packet analyzer

```
apt-get install ethereal
```

8.7.4 Nessus security scanner

```
apt-get install nessus
```

8.7.5 Fwbuilder iptables GUI (like Checkpoint GUI)

```
apt-get install fwbuilder
```

8.7.6 mbrowse MIB browser

This tool is only available in the ["http://packages.debian.org/cgi-bin/search_packages.pl?keywords=mbrowse=names=1=all=all" name="testing"](http://packages.debian.org/cgi-bin/search_packages.pl?keywords=mbrowse=names=1=all=all) > distribution

```
apt-get install mbrowse
```

8.8 Other tools

8.8.1 vim

This enhanced version of vi allows syntax highlighting of XML files with a simple `:syn` on command.

```
apt-get install vim
```

9 Further Information

Hopefully everyone has visited the *OpenNMS website* <http://www.opennms.org> several times to view the Community information there.

9.1 About the OpenNMS Project

Check the *About the OpenNMS FAQ* <http://faq.opennms.org/faq/fom-serve/cache/80.html> regarding the OpenNMS project. The largest configuration is known to monitor *over 28,000 nodes* <http://lists.opennms.org/pipermail/discuss/2003-November/040544.html>.

9.2 Related Links

The OpenNMS *weblog* <http://blog.opennms.org> is one place to find recent community news.

For more information on OpenNMS Architecture check out this *IBM DeveloperWorks article featuring OpenNMS* <http://www-106.ibm.com/developerworks/library/j-jmx3/?n-j-12192>.

Sparc users may want to deploy Debian using TFTP/RARP/OpenBoot to perform a network installation. The official *Installing Debian on Sparc* <http://www.debian.org/releases/stable/sparc/ch-rescue-boot.en.html> document has details on this process. Currently this type of installation will have to be performed from source as Sparc binaries do not yet exist.

The *mailing lists* <http://www.opennms.org/users/discuss/> at OpenNMS.org are the heart of learning and discussion for new and advanced users. If there are any questions regarding ONMS on Debian or any other operating system that are not easily answered in the documentation, post them here. This is also a great way to become an active member of the OpenNMS community.

9.3 The following URLs are relevant to OpenNMS code or documentation:

XSLFO Spec, Oct 2000 <http://www.w3.org/TR/xsl/>

XSLFO Bible <http://www.ibiblio.org/xml/books/bible/updates/15.html>

XSL Info Site <http://www.xslinfo.com/>

XML Organization <http://www.xml.org/>

Docbook Organization <http://www.docbook.org/>

O'Reilly's DocBook: The Definitive Guide <http://www.oreilly.com/catalog/docbook/chapter/book/docbook.html>

apache.org <http://xml.apache.org/> - home of Xerces, XML4J etc

Sun <http://www.sun.com/> - home of JAVA

W3C Organization - home of XSLFO and XML

PostgreSQL <http://www.postgresql.org/> - home of PostgreSQL

Blast Internet Services <http://www.sortova.com/> - Commercial Services for OpenNMS

Netstatz <http://www.netstatz.com/> - Provider of Intelligent Linux Solutions, including solutions using OpenNMS with documents like this one.

10 Appendices

10.1 Appendix A - 1.1.2 Initial Package Listing

```
opennms:~# COLUMNS=132 dpkg -l
Desired=Unknown/Install/Remove/Purge/Hold
| Status=Not/Installed/Config-files/Unpacked/Failed-config/Half-installed
|/ Err?=(none)/Hold/Reinst-required/X=both-problems (Status,Err: uppercase=bad)
||/ Name                Version                Description
+++-----
```

	Name	Version	Description
ii	adduser	3.47	Add and remove users and groups
ii	apt	0.5.4	Advanced front-end for dpkg
ii	apt-utils	0.5.4	APT utility programs
ii	at	3.1.8-11	Delayed job execution and batch processing
rc	base-config	1.33.18	Debian base configuration package
ii	base-files	3.0.2	Debian base system miscellaneous files
ii	base-passwd	3.4.1	Debian Base System Password/Group Files
ii	bash	2.05a-11	The GNU Bourne Again SHell

ii	bsdmainutils	5.20020211-4.99	More utilities from FreeBSD.
ii	bsdutils	2.11n-4	Basic utilities from 4.4BSD-Lite.
ii	console-common	0.7.14	Basic infrastructure for text console confi
ii	cpio	2.4.2-39	GNU cpio -- a program to manage archives of
ii	cron	3.0p11-72	management of regular background processing
ii	debconf	1.0.32	Debian configuration management system
ii	debianutils	1.16	Miscellaneous utilities specific to Debian.
ii	dhcp-client	2.0p15-11	DHCP Client
ii	diff	2.7-29	File comparison utilities
ii	dpkg	1.9.21	Package maintenance system for Debian
ii	e2fsprogs	1.27-2	The EXT2 file system utilities and libraries
ii	ed	0.2-19	The classic unix line editor
ii	exim	3.35-1woody2	An MTA (Mail Transport Agent)
ii	fdutils	5.3-7	Linux floppy utilities
ii	fileutils	4.1-10	GNU file management utilities
ii	findutils	4.1.7-2	utilities for finding files--find, xargs, and
ii	gettext-base	0.10.40-5	GNU Internationalization utilities for the l
ii	grep	2.4.2-3	GNU grep, egrep and fgrep.
ii	groff-base	1.17.2-15.woody.1	GNU troff text-formatting system (base syste
ii	gzip	1.3.2-3woody1	The GNU compression utility.
ii	hostname	2.09	A utility to set/show the host name or doma
ii	ifupdown	0.6.4-4	High level tools to configure network inter
ii	info	4.1-2	Standalone GNU Info documentation browser
ii	ipchains	1.3.10-15	Network firewalling for Linux 2.2.x
ii	iptables	1.2.6a-5	IP packet filter administration tools for 2
ii	klogd	1.4.1-10	Kernel Logging Daemon
ii	libc6	2.2.5-11.5	GNU C Library: Shared libraries and Timezon
ii	libcap1	1.10-12	support for getting/setting POSIX.1e capabi
ii	libdb2	2.7.7.0-7	The Berkeley database routines (run-time fi
ii	libdb3	3.2.9-16	Berkeley v3 Database Libraries [runtime]
ii	libgdbmgl	1.7.3-27	GNU dbm database routines (runtime version)
ii	libident	0.22-2	simple RFC1413 client library - runtime
ii	libldap2	2.0.23-6.3	OpenLDAP libraries.
ii	liblockfile1	1.03	NFS-safe locking library, includes dotlockf
ii	libncurses5	5.2.20020112a-7	Shared libraries for terminal handling
ii	libnewt0	0.50.17-9.6	Not Erik's Windowing Toolkit - text mode wi
ii	libpam-modules	0.72-35	Pluggable Authentication Modules for PAM
ii	libpam-runtime	0.72-35	Runtime support for the PAM library
ii	libpam0g	0.72-35	Pluggable Authentication Modules library
ii	libpcap0	0.6.2-2	System interface for user-level packet capt
ii	libpcre3	3.4-1.1	Philip Hazel's Perl Compatible Regular Expr
ii	libpopt0	1.6.2-7	lib for parsing cmdline parameters
ii	libreadline4	4.2a-5	GNU readline and history libraries, run-tim
ii	libsasl7	1.5.27-3	Authentication abstraction library.
ii	libssl0.9.6	0.9.6c-2.woody.3	SSL shared libraries
ii	libstdc++2.10-glibc2.2	2.95.4-11woody1	The GNU stdc++ library
ii	libwrap0	7.6-9	Wietse Venema's TCP wrappers library
ii	lilo	22.2-3	LInux LOader - The Classic OS loader can lo
ii	login	20000902-12	System login tools
ii	logrotate	3.5.9-8	Log rotation utility

ii	mailx	8.1.2-0.20020411cvs-1	A simple mail user agent.
ii	makedev	2.3.1-58	Creates device files in /dev.
ii	man-db	2.3.20-18.woody.4	The on-line manual pager
ii	manpages	1.39-1.1	Man pages about using a Linux system.
ii	mawk	1.3.3-8	a pattern scanning and text processing language
ii	mbr	1.1.5-1	Master Boot Record for IBM-PC compatible computers
ii	modconf	0.2.43	Device Driver Configuration
ii	modutils	2.4.15-1	Linux module utilities.
ii	mount	2.11n-4	Tools for mounting and manipulating filesystems
ii	nano	1.0.6-2	free Pico clone with some new features
ii	ncurses-base	5.2.20020112a-7	Descriptions of common terminal types
ii	ncurses-bin	5.2.20020112a-7	Terminal-related programs and man pages
ii	net-tools	1.60-4	The NET-3 networking toolkit
ii	netbase	4.07	Basic TCP/IP networking system
ii	netkit-inetd	0.10-9	The Internet Superserver
ii	netkit-ping	0.10-9	The ping utility from netkit
ii	nvi	1.79-20	4.4BSD re-implementation of vi.
ii	passwd	20000902-12	Change and administer password and group data
ii	pciutils	2.1.9-4	Linux PCI Utilities (for 2.[1234].x kernels)
ii	perl	5.6.1-8.3	Larry Wall's Practical Extraction and Report
ii	perl-base	5.6.1-8.3	The Pathologically Eclectic Rubbish Lister.
ii	ppp	2.4.1.uus-4	Point-to-Point Protocol (PPP) daemon.
ii	pppconfig	2.0.14	A text menu based utility for configuring ppp
ii	pppoe	3.3-1.1	PPP over Ethernet driver
ii	pppoeconf	0.9.10.6	configures PPPoE/ADSL
ii	procps	2.0.7-8	The /proc file system utilities.
ii	psmisc	20.2-2.1	Utilities that use the proc filesystem
ii	sed	3.02-8	The GNU sed stream editor.
ii	setserial	2.17-24	Controls configuration of serial ports.
ii	shellutils	2.0.11-11	The GNU shell programming utilities.
ii	slang1	1.4.4-7.2	The S-Lang programming library - runtime version
ii	ssh	3.4p1-1.woody.3	Secure rlogin/rsh/rcp replacement (OpenSSH)
ii	sysklogd	1.4.1-10	System Logging Daemon
ii	syslinux	1.66-1	Bootloader for Linux/i386 using MS-DOS floppy
ii	sysvinit	2.84-2woody1	System-V like init.
ii	tar	1.13.25-2	GNU tar
ii	tasksel	1.18	Tool for selecting tasks for installation on
ii	tcpd	7.6-9	Wietse Venema's TCP wrapper utilities
ii	telnet	0.17-18	The telnet client.
ii	textutils	2.0-12	The GNU text file processing utilities.
ii	util-linux	2.11n-4	Miscellaneous system utilities.
ii	whiptail	0.50.17-9.6	Displays user-friendly dialog boxes from shell
ii	zlib1g	1.1.4-1	compression library - runtime

10.2 Appendix B - 1.1.1 Final Package Listing

In addition to the basics, my package listing includes some other tools such as nmap, ethereal, tools for building kernels, etc.

```

Desired=Unknown/Install/Remove/Purge/Hold
| Status=Not/Installed/Config-files/Unpacked/Failed-config/Half-installed
|/ Err?=(none)/Hold/Reinst-required/X=both-problems (Status,Err: uppercase=bad)
||/ Name                Version                Description
+++=====
ii  adduser                3.47                   Add and remove users and groups
ii  ant                    1.4.1-4                Java based build tool like make
ii  apt                    0.5.4                  Advanced front-end for dpkg
ii  apt-show-versions     0.03                   Lists available package versions with distribution
ii  apt-utils              0.5.4                  APT utility programs
ii  at                     3.1.8-11               Delayed job execution and batch processing
ii  base-config           1.33.18                Debian base configuration package
ii  base-files             3.0.2                  Debian base system miscellaneous files
ii  base-passwd           3.4.1                  Debian Base System Password/Group Files
ii  bash                  2.05a-11               The GNU Bourne Again SHell
ii  binutils               2.12.90.0.1-4          The GNU assembler, linker and binary utilities.
ii  bsdmainutils           5.20020211-4.99        More utilities from FreeBSD.
ii  bsdutils               2.11n-4                 Basic utilities from 4.4BSD-Lite.
ii  bzip2                  1.0.2-1                 A high-quality block-sorting file compressor - ut
ii  console-common         0.7.14                 Basic infrastructure for text console configurati
ii  console-data           1999.08.29-24          Keymaps, fonts, charset maps, fallback tables for
ii  console-tools          0.2.3-23.3             Linux console and font utilities.
ii  console-tools-libs     0.2.3-23.3             Shared libraries for Linux console and font manip
ii  cpio                   2.4.2-39                GNU cpio -- a program to manage archives of files
ii  cpp                    2.95.4-14              The GNU C preprocessor.
ii  cpp-2.95               2.95.4-11woody1        The GNU C preprocessor.
ii  cron                   3.0pl11-72              management of regular background processing
ii  debconf                1.0.32                  Debian configuration management system
ii  debconf-utils         1.0.32                  debconf utilities
ii  debhelper              4.0.2                   helper programs for debian/rules
ii  debianutils            1.16                    Miscellaneous utilities specific to Debian.
ii  dhcp-client            2.0pl15-11             DHCP Client
ii  diff                   2.7-29                  File comparison utilities
ii  dpkg                   1.9.21                  Package maintenance system for Debian
ii  dpkg-dev               1.9.21                  Package building tools for Debian
ii  e2fsprogs              1.27-2                  The EXT2 file system utilities and libraries.
ii  ed                     0.2-19                  The classic unix line editor
ii  ee                     1.4.2-4                 An "easy editor" for novices and compuphobics
ii  ethereal               0.9.4-1woody3           Network traffic analyzer
ii  ethereal-common        0.9.4-1woody3           Network traffic analyser (common files)
ii  exim                   3.35-1                  An MTA (Mail Transport Agent)
ii  fdutils                5.3-7                   Linux floppy utilities
ii  file                   3.37-3.1.woody.1        Determines file type using "magic" numbers
ii  fileutils              4.1-10                  GNU file management utilities
ii  findutils              4.1.7-2                  utilities for finding files--find, xargs, and loc
ii  ftp                    0.17-9                  The FTP client.
ii  gcc                    2.95.4-14              The GNU C compiler.
ii  gcc-2.95               2.95.4-11woody1        The GNU C compiler.
ii  gettext-base           0.10.40-5              GNU Internationalization utilities for the base s
ii  grep                   2.4.2-3                 GNU grep, egrep and fgrep.

```

ii	groff-base	1.17.2-15.woody.1	GNU troff text-formatting system (base system comp
ii	gzip	1.3.2-3	The GNU compression utility.
ii	hostname	2.09	A utility to set/show the host name or domain name
ii	html2text	1.3.0.1-1	An advanced HTML to text converter.
ii	ifupdown	0.6.4-4	High level tools to configure network interfaces
ii	info	4.1-2	Standalone GNU Info documentation browser
ii	ipchains	1.3.10-15	Network firewalling for Linux 2.2.x
ii	iproute	20010824-8	Professional tools to control the networking in L
ii	iptables	1.2.6a-5	IP packet filter administration tools for 2.4.4+ l
ii	j2sdk1.4	1.4.0-02.0	Java(TM) 2 Software Development Kit, Standard Edi
ii	java-common	0.14	Base of all Java packages
ii	klogd	1.4.1-10	Kernel Logging Daemon
ii	libbcel-java	5.0-1	analyze, create, and manipulate (binary) Java cla
ii	libbsf-java	2.2-1	Bean Scripting Framework
ii	libbz2-1.0	1.0.2-1	A high-quality block-sorting file compressor libr
ii	libc6	2.3.1-16	GNU C Library: Shared libraries and Timezone data
ii	libc6-dev	2.3.1-16	GNU C Library: Development Libraries and Header F
ii	libcap1	1.10-12	support for getting/setting POSIX.1e capabilities
ii	libcommons-beanutils-jav	1.6-2	utility for manipulating JavaBeans
ii	libcommons-collections-j	2.1-1	A set of abstract data type interfaces and implem
ii	libcommons-digester-java	1.1.1-1	A set of abstract data type interfaces and implem
ii	libcommons-logging-java	1.0.2-1	The common wrapper interface for several logging
ii	libcommons-modeler-java	1.0-2	A convenience library to use Java JMX(TM) technol
ii	libdb1-compat	2.1.3-7	The Berkeley database routines [glibc 2.0/2.1 comp
ii	libdb2	2.7.7.0-7	The Berkeley database routines (run-time files).
ii	libdb3	3.2.9-16	Berkeley v3 Database Libraries [runtime]
ii	libdbd-pg-perl	1.01-3	a PostgreSQL interface for Perl 5 using DBI.
ii	libdbi-perl	1.21-2	The Perl5 Database Interface by Tim Bunce
ii	libfreetype6	2.0.9-1	FreeType 2 font engine, shared library files.
ii	libgd-gif1	1.3-2	GD Graphics Library with gif support
ii	libgdbmgl	1.7.3-27	GNU dbm database routines (runtime version). [lib
ii	libglib1.2	1.2.10-4	The GLib library of C routines
ii	libgtk1.2	1.2.10-11	The GIMP Toolkit set of widgets for X
ii	libgtk1.2-common	1.2.10-11	Common files for the GTK+ library
ii	libicmp-jni	1.1.1-5woody	Java native libs for ICMP
ii	libident	0.22-2	simple RFC1413 client library - runtime
ii	libiplike-pgsql	1.1.1-5woody	IPLike stored procedure for Postgresql
ii	libldap2	2.0.23-6.3	OpenLDAP libraries.
ii	liblockfile1	1.03	NFS-safe locking library, includes dotlockfile pr
ii	liblog4j	1.2.7-0	Logging library for java.
ii	liblogkit-java	1.0.1-1	Lightweight and fast designed logging toolkit for
ii	libmx4j-java	1.1.1-1	An open source implementation of the JMX(TM) techn
ii	libncurses5	5.2.20020112a-7	Shared libraries for terminal handling
ii	libncurses5-dev	5.2.20020112a-7	Developer's libraries and docs for ncurses
ii	libnewt0	0.50.17-9.6	Not Erik's Windowing Toolkit - text mode windowin
ii	libopennms-java	1.1.1-5woody	The Open Network Management System base libs
ii	libpam-modules	0.72-35	Pluggable Authentication Modules for PAM
ii	libpam-runtime	0.72-35	Runtime support for the PAM library
ii	libpam0g	0.72-35	Pluggable Authentication Modules library
ii	libpcap0	0.6.2-2	System interface for user-level packet capture.

ii	libpcre3	3.4-1.1	Philip Hazel's Perl Compatible Regular Expression
ii	libpqsql2	7.2.1-2woody2	Shared library libpq.so.2 for PostgreSQL
ii	libpng2	1.0.12-3.woody.3	PNG library - runtime
ii	libpopt0	1.6.2-7	lib for parsing cmdline parameters
ii	libreadline4	4.2a-5	GNU readline and history libraries, run-time libr
ii	libregex-java	1.2.20010409-3	regular expression library for Java
ii	librrd0	1.0.35-2	Time-series data storage and display system (runt
ii	librrd0-jni	1.1.1-5woody	Java native libs for RRD
ii	libsasl7	1.5.27-3	Authentication abstraction library.
ii	libservlet2.3-java	4.0-3	Servlet 2.3 and JSP 1.2 Java classes and document
ii	libsnmp-base	5.0.7-1.1	NET SNMP (Simple Network Management Protocol) MIB
ii	libsnmp4.2	4.2.3-2	NET SNMP (Simple Network Management Protocol) Lib
ii	libsnmp5	5.0.7-1.1	NET SNMP (Simple Network Management Protocol) Lib
ii	libssl0.9.6	0.9.6c-2.woody.3	SSL shared libraries
ii	libssl0.9.7	0.9.7b-2	SSL shared libraries
ii	libstdc++2.10-glibc2.2	2.95.4-11woody1	The GNU stdc++ library
ii	libstdc++2.9-glibc2.1	2.91.66-4	The GNU stdc++ library (old egcs version)
ii	libtomcat4-java	4.1.18-1	Java Servlet engine -- core libraries
ii	libwrap0	7.6-9	Wietse Venema's TCP wrappers library
ii	libxalan-java	1.2.2-2	Java version of the Xalan XSLT processor.
ii	libxalan2-java	2.4.1-1	XSL Transformations (XSLT) processor in Java
ii	libxerces-java	1.4.3-1	Validating XML parser for Java
ii	libxerces2-java	2.0.1-1	Validating XML parser for Java
ii	lilo	22.2-3	LIlinux LOader - The Classic OS loader can load Lin
ii	login	20000902-12	System login tools
ii	logrotate	3.5.9-8	Log rotation utility
ii	lynx	2.8.4.1b-3.2	Text-mode WWW Browser
ii	mailx	8.1.2-0.20020411cvs-1	A simple mail user agent.
ii	make	3.79.1-14	The GNU version of the "make" utility.
ii	makedev	2.3.1-58	Creates device files in /dev.
ii	man-db	2.3.20-18	The on-line manual pager
ii	manpages	1.39-1.1	Man pages about using a Linux system.
ii	mawk	1.3.3-8	a pattern scanning and text processing language
ii	mbr	1.1.5-1	Master Boot Record for IBM-PC compatible computer
ii	mbrowse	0.3.1-2	a SNMP MIB browser
ii	metamail	2.7-45	An implementation of MIME.
ii	modconf	0.2.43	Device Driver Configuration
ii	modutils	2.4.15-1	Linux module utilities.
ii	mount	2.11n-4	Tools for mounting and manipulating filesystems.
ii	nano	1.0.6-2	free Pico clone with some new features
ii	ncftp	3.1.3-1	A user-friendly and well-featured FTP client.
ii	ncurses-base	5.2.20020112a-7	Descriptions of common terminal types
ii	ncurses-bin	5.2.20020112a-7	Terminal-related programs and man pages
ii	net-tools	1.60-4	The NET-3 networking toolkit
ii	netbase	4.07	Basic TCP/IP networking system
ii	netkit-inetd	0.10-9	The Internet Superserver
ii	netkit-ping	0.10-9	The ping utility from netkit
ii	nmap	2.54.31.BETA-1	The Network Mapper
ii	nvi	1.79-20	4.4BSD re-implementation of vi.
ii	opennms	1.1.1-5woody	The Open Network Management System

ii	opennms-common	1.1.1-5woody	The Open Network Management System core
ii	opennms-db	1.1.1-5woody	The Open Network Management System
ii	opennms-server	1.1.1-5woody	The Open Network Management System
ii	opennms-webapp	1.1.1-5woody	The Open Network Management System web application
ii	passwd	20000902-12	Change and administer password and group data.
ii	patch	2.5.4-11	Apply a diff file to an original
ii	pciutils	2.1.9-4	Linux PCI Utilities (for 2.[1234].x kernels)
ii	perl	5.6.1-8.2	Larry Wall's Practical Extraction and Report Language
ii	perl-base	5.6.1-8.2	The Pathologically Eclectic Rubbish Lister.
ii	perl-modules	5.6.1-8.2	Core Perl modules.
ii	postgresql	7.2.1-2woody2	Object-relational SQL database, descended from PostgreSQL
ii	postgresql-client	7.2.1-2woody2	Front-end programs for PostgreSQL
ii	procps	2.0.7-8	The /proc file system utilities.
ii	psmisc	20.2-2.1	Utilities that use the proc filesystem
ii	python	2.1.3-3.2	An interactive object-oriented scripting language
ii	python2.1	2.1.3-3.2	An interactive object-oriented scripting language
ii	qpage	3.3final-3	SNPP client, or SNPP-to-TAP/IXO gateway
ii	rrdtool	1.0.35-2	Time-series data storage and display system (program)
ii	sed	3.02-8	The GNU sed stream editor.
ii	setserial	2.17-24	Controls configuration of serial ports.
ii	shellutils	2.0.11-11	The GNU shell programming utilities.
ii	slang1	1.4.4-7.2	The S-Lang programming library - runtime version.
ii	snmp	5.0.7-1.1	NET SNMP (Simple Network Management Protocol) Application
ii	ssh	3.4p1-1	Secure rlogin/rsh/rcp replacement (OpenSSH)
ii	strace	4.4-1.2	A system call tracer.
ii	sun-jdk1.4-installer	1.4.0-02.0	Installer for Sun Developer Kit for Linux, Java(TM)
ii	sysklogd	1.4.1-10	System Logging Daemon
ii	syslinux	1.66-1	Bootloader for Linux/i386 using MS-DOS floppies
ii	sysvinit	2.84-2woody1	System-V like init.
ii	tar	1.13.25-2	GNU tar
ii	tasksel	1.18	Tool for selecting tasks for installation on Debian
ii	tcpd	7.6-9	Wietse Venema's TCP wrapper utilities
ii	tcpdump	3.6.2-2.4	A powerful tool for network monitoring and data analysis
ii	telnet	0.17-18	The telnet client.
ii	textutils	2.0-12	The GNU text file processing utilities.
ii	tomcat4	4.1.18-1	Java Servlet 2.3 engine with JSP 1.2 support
ii	unzip	5.50-1	De-archiver for .zip files
ii	util-linux	2.11n-4	Miscellaneous system utilities.
ii	wavtools	1.3.2-6	WAV play, record, and compression
ii	wget	1.8.1-6.1	retrieves files from the web
ii	whiptail	0.50.17-9.6	Displays user-friendly dialog boxes from shell scripts
ii	xfree86-common	4.1.0-16	X Window System (XFree86) infrastructure
ii	xlibs	4.1.0-16	X Window System client libraries
ii	zlib1g	1.1.4-1	compression library - runtime

10.3 Appendix C - 1.1.2-1 Final Package Listing

```
NZ-ONMS:~# COLUMNS=112 dpkg -l
```

```
Desired=Unknown/Install/Remove/Purge/Hold
```

```
| Status=Not/Installed/Config-files/Unpacked/Failed-config/Half-installed
```

```

|/ Err?=(none)/Hold/Reinst-required/X=both-problems (Status,Err: uppercase=bad)
||/ Name                Version                Description
+++=====
ii adduser                3.47                   Add and remove users and groups
ii ant                    1.4.1-4                Java based build tool like make
ii apt                    0.5.4                  Advanced front-end for dpkg
ii apt-utils              0.5.4                  APT utility programs
ii at                     3.1.8-11               Delayed job execution and batch processing
ii base-config            1.33.18                Debian base configuration package
ii base-files             3.0.2                  Debian base system miscellaneous files
ii base-passwd            3.4.1                  Debian Base System Password/Group Files
ii bash                   2.05a-11               The GNU Bourne Again SHell
ii binutils                2.12.90.0.1-4          The GNU assembler, linker and binary utilities.
ii bsdmainutils           5.20020211-4.99        More utilities from FreeBSD.
ii bsdutils                2.11n-7                Basic utilities from 4.4BSD-Lite.
ii bzip2                   1.0.2-1                A high-quality block-sorting file compressor - utilit.
ii console-common         0.7.14                 Basic infrastructure for text console configuration
ii console-data           1999.08.29-24.2        Keymaps, fonts, charset maps, fallback tables for con
ii console-tools          0.2.3-23.3             Linux console and font utilities.
ii console-tools-libs     0.2.3-23.3             Shared libraries for Linux console and font manipulat.
ii cpio                    2.4.2-39               GNU cpio -- a program to manage archives of files.
ii cpp                     2.95.4-14              The GNU C preprocessor.
ii cpp-2.95               2.95.4-11woody1        The GNU C preprocessor.
ii cron                    3.0p11-72              management of regular background processing
ii debconf                 1.0.32                  Debian configuration management system
ii debconf-utils          1.0.32                  debconf utilities
ii debhelper               4.0.2                   helper programs for debian/rules
ii debianutils             1.16.2woody1            Miscellaneous utilities specific to Debian.
ii dhcp-client             2.0p15-11               DHCP Client
ii diff                    2.7-29                  File comparison utilities
ii dpkg                    1.9.21                  Package maintenance system for Debian
ii dpkg-dev                1.9.21                  Package building tools for Debian
ii e2fsprogs               1.27-2                  The EXT2 file system utilities and libraries.
ii ed                       0.2-19                  The classic unix line editor
ii exim                    3.35-1woody2            An MTA (Mail Transport Agent)
ii fdutils                 5.3-7                   Linux floppy utilities
ii file                     3.37-3.1.woody.1        Determines file type using "magic" numbers
ii fileutils                4.1-10                  GNU file management utilities
ii findutils               4.1.7-2                 utilities for finding files--find, xargs, and locate
ii gcc                     2.95.4-14              The GNU C compiler.
ii gcc-2.95                2.95.4-11woody1        The GNU C compiler.
ii gettext-base            0.10.40-5              GNU Internationalization utilities for the base system
ii grep                     2.4.2-3                 GNU grep, egrep and fgrep.
ii groff-base              1.17.2-15.woody.1      GNU troff text-formatting system (base system componen
ii gzip                    1.3.2-3woody1           The GNU compression utility.
ii hostname                 2.09                     A utility to set/show the host name or domain name
ii html2text                1.3.0.1-1               An advanced HTML to text converter.
ii ifupdown                 0.6.4-4                 High level tools to configure network interfaces
ii info                     4.1-2                    Standalone GNU Info documentation browser
ii ipchains                 1.3.10-15               Network firewalling for Linux 2.2.x

```

ii	iptables	1.2.6a-5	IP packet filter administration tools for 2.4.4+ kernel
ii	j2sdk1.4	1.4.0-02.0	Java(TM) 2 Software Development Kit, Standard Edition
ii	java-common	0.14	Base of all Java packages
ii	klogd	1.4.1-10	Kernel Logging Daemon
ii	libbcel-java	5.0-1	analyze, create, and manipulate (binary) Java class files
ii	libbsf-java	2.2-1	Bean Scripting Framework
ii	libbz2-1.0	1.0.2-1	A high-quality block-sorting file compressor library
ii	libc6	2.2.5-11.5	GNU C Library: Shared libraries and Timezone data
ii	libcap1	1.10-12	support for getting/setting POSIX.1e capabilities
ii	libcommons-beanutils-j	1.6-2	utility for manipulating JavaBeans
ii	libcommons-collections	2.1-1	A set of abstract data type interfaces and implementations
ii	libcommons-digester-ja	1.1.1-1	A set of abstract data type interfaces and implementations
ii	libcommons-logging-jav	1.0.2-1	The common wrapper interface for several logging APIs
ii	libcommons-modeler-jav	1.0-2	A convenience library to use Java JMX(TM) technology.
ii	libdb2	2.7.7.0-7	The Berkeley database routines (run-time files).
ii	libdb3	3.2.9-16	Berkeley v3 Database Libraries [runtime]
ii	libdbd-pg-perl	1.01-3	a PostgreSQL interface for Perl 5 using DBI.
ii	libdbi-perl	1.21-2	The Perl5 Database Interface by Tim Bunce
ii	libgd-gif1	1.3-2	GD Graphics Library with gif support
ii	libgdbmg1	1.7.3-27	GNU dbm database routines (runtime version). [libc6 version]
ii	libgpmg1	1.19.6-12	General Purpose Mouse Library [libc6]
ii	libicmp-jni	1.1.2-1woody	Java native libs for ICMP
ii	libident	0.22-2	simple RFC1413 client library - runtime
ii	libiplike-pgsql	1.1.2-1woody	IPLike stored procedure for Postgresql
ii	libldap2	2.0.23-6.3	OpenLDAP libraries.
ii	liblockfile1	1.03	NFS-safe locking library, includes dotlockfile program
ii	liblog4j	1.2.7-0	Logging library for java.
ii	liblogkit-java	1.0.1-1	Lightweight and fast designed logging toolkit for Java
ii	libmx4j-java	1.1.1-1	An open source implementation of the JMX(TM) technology
ii	libncurses5	5.2.20020112a-7	Shared libraries for terminal handling
ii	libnewt0	0.50.17-9.6	Not Erik's Windowing Toolkit - text mode windowing widget
ii	libopennms-java	1.1.2-1woody	The Open Network Management System base libs
ii	libpam-modules	0.72-35	Pluggable Authentication Modules for PAM
ii	libpam-runtime	0.72-35	Runtime support for the PAM library
ii	libpam0g	0.72-35	Pluggable Authentication Modules library
ii	libpcap0	0.6.2-2	System interface for user-level packet capture.
ii	libpcre3	3.4-1.1	Philip Hazel's Perl Compatible Regular Expression library
ii	libpgsql2	7.2.1-2woody4	Shared library libpq.so.2 for PostgreSQL
ii	libpng2	1.0.12-3.woody.3	PNG library - runtime
ii	libpopt0	1.6.2-7	lib for parsing cmdline parameters
ii	libreadline4	4.2a-5	GNU readline and history libraries, run-time libraries
ii	libregexp-java	1.2.20010409-3	regular expression library for Java
ii	librrd0	1.0.35-2	Time-series data storage and display system (runtime)
ii	librrd0-jni	1.1.2-1woody	Java native libs for RRD
ii	libsasl7	1.5.27-3	Authentication abstraction library.
ii	libservlet2.3-java	4.0-3	Servlet 2.3 and JSP 1.2 Java classes and documentation
ii	libssl0.9.6	0.9.6c-2.woody.6	SSL shared libraries
ii	libstdc++2.10-glibc2.2	2.95.4-11woody1	The GNU stdc++ library
ii	libstdc++2.9-glibc2.1	2.91.66-4	The GNU stdc++ library (old egcs version)
ii	libtomcat4-java	4.1.18-1	Java Servlet engine -- core libraries

ii	libwrap0	7.6-9	Wietse Venema's TCP wrappers library
ii	libxalan-java	1.2.2-2	Java version of the Xalan XSLT processor.
ii	libxalan2-java	2.4.1-1	XSL Transformations (XSLT) processor in Java
ii	libxerces-java	1.4.3-1	Validating XML parser for Java
ii	libxerces2-java	2.0.1-1	Validating XML parser for Java
ii	lilo	22.2-3	LIlinux LOader - The Classic OS loader can load Linux and
ii	login	20000902-12	System login tools
ii	logrotate	3.5.9-8	Log rotation utility
ii	lynx	2.8.4.1b-3.2	Text-mode WWW Browser
ii	mailx	8.1.2-0.20020411cvs-1	A simple mail user agent.
ii	make	3.79.1-14	The GNU version of the "make" utility.
ii	makedev	2.3.1-58	Creates device files in /dev.
ii	man-db	2.3.20-18.woody.4	The on-line manual pager
ii	manpages	1.39-1.1	Man pages about using a Linux system.
ii	mawk	1.3.3-8	a pattern scanning and text processing language
ii	mbr	1.1.5-1	Master Boot Record for IBM-PC compatible computers.
ii	metamail	2.7-45woody.2	An implementation of MIME.
ii	modconf	0.2.43	Device Driver Configuration
ii	modutils	2.4.15-1	Linux module utilities.
ii	mount	2.11n-7	Tools for mounting and manipulating filesystems.
ii	nano	1.0.6-3	free Pico clone with some new features
ii	ncurses-base	5.2.20020112a-7	Descriptions of common terminal types
ii	ncurses-bin	5.2.20020112a-7	Terminal-related programs and man pages
ii	net-tools	1.60-4	The NET-3 networking toolkit
ii	netbase	4.07	Basic TCP/IP networking system
ii	netkit-inetd	0.10-9	The Internet Superserver
ii	netkit-ping	0.10-9	The ping utility from netkit
ii	nvi	1.79-20	4.4BSD re-implementation of vi.
ii	opennms	1.1.2-1woody	The Open Network Management System
ii	opennms-common	1.1.2-1woody	The Open Network Management System core
ii	opennms-db	1.1.2-1woody	The Open Network Management System
ii	opennms-server	1.1.2-1woody	The Open Network Management System
ii	opennms-webapp	1.1.2-1woody	The Open Network Management System web application front
ii	passwd	20000902-12	Change and administer password and group data.
ii	patch	2.5.4-11	Apply a diff file to an original
ii	pciutils	2.1.9-4	Linux PCI Utilities (for 2.[1234].x kernels)
ii	perl	5.6.1-8.6	Larry Wall's Practical Extraction and Report Language
ii	perl-base	5.6.1-8.6	The Pathologically Eclectic Rubbish Lister.
ii	perl-modules	5.6.1-8.6	Core Perl modules.
ii	postgresql	7.2.1-2woody4	Object-relational SQL database, descended from POSTGRES
ii	postgresql-client	7.2.1-2woody4	Front-end programs for PostgreSQL
ii	ppp	2.4.1.uus-4	Point-to-Point Protocol (PPP) daemon.
ii	pppconfig	2.0.14	A text menu based utility for configuring ppp.
ii	pppoe	3.3-1.1	PPP over Ethernet driver
ii	pppoeconf	0.9.10.6	configures PPPoE/ADSL
ii	procps	2.0.7-8.woody1	The /proc file system utilities.
ii	psmisc	20.2-2.1	Utilities that use the proc filesystem
ii	python	2.1.3-3.2	An interactive object-oriented scripting language (designed
ii	python2.1	2.1.3-3.2	An interactive object-oriented scripting language (version 2
ii	rrdtool	1.0.35-2	Time-series data storage and display system (programs and

ii	sed	3.02-8	The GNU sed stream editor.
ii	setserial	2.17-24	Controls configuration of serial ports.
ii	shellutils	2.0.11-11	The GNU shell programming utilities.
ii	slang1	1.4.4-7.2	The S-Lang programming library - runtime version.
ii	ssh	3.4p1-1.woody.3	Secure rlogin/rsh/rcp replacement (OpenSSH)
ii	sun-jdk1.4-installer	1.4.0-02.1	Installer for Sun Developer Kit for Linux, Java(TM) T
ii	sysklogd	1.4.1-10	System Logging Daemon
ii	syslinux	1.66-1	Bootloader for Linux/i386 using MS-DOS floppies
ii	sysvinit	2.84-2woody1	System-V like init.
ii	tar	1.13.25-2	GNU tar
ii	tasksel	1.18	Tool for selecting tasks for installation on Debian s
ii	tcpd	7.6-9	Wietse Venema's TCP wrapper utilities
ii	telnet	0.17-18	The telnet client.
ii	textutils	2.0-12	The GNU text file processing utilities.
ii	tomcat4	4.1.18-1	Java Servlet 2.3 engine with JSP 1.2 support
ii	util-linux	2.11n-7	Miscellaneous system utilities.
ii	vim	6.1.018-1	Vi IMproved - enhanced vi editor
ii	whiptail	0.50.17-9.6	Displays user-friendly dialog boxes from shell script
ii	zlib1g	1.1.4-1.0woody0	compression library - runtime

NZ-0NMS:~#

10.4 Appendix D - 1.1.2-1 installation transcript

```

NZ-0NMS:~# apt-get install opennms
Reading Package Lists... Done
Building Dependency Tree... Done
The following extra packages will be installed:
  ant libbcel-java libbsf-java libcommons-beanutils-java
  libcommons-collections-java libcommons-digester-java libcommons-logging-java
  libcommons-modeler-java libdbd-pg-perl libdbi-perl libgd-gif1 libicmp-jni
  libiplike-pgsql liblog4j liblogkit-java libmx4j-java libopennms-java
  libpgsql2 libpng2 libregexp-java librrd0 librrd0-jni libservlet2.3-java
  libtomcat4-java libxalan-java libxalan2-java libxerces-java libxerces2-java
  metamail opennms-common opennms-db opennms-server opennms-webapp postgresql
  postgresql-client python python2.1 rrdtool tomcat4
The following NEW packages will be installed:
  ant libbcel-java libbsf-java libcommons-beanutils-java
  libcommons-collections-java libcommons-digester-java libcommons-logging-java
  libcommons-modeler-java libdbd-pg-perl libdbi-perl libgd-gif1 libicmp-jni
  libiplike-pgsql liblog4j liblogkit-java libmx4j-java libopennms-java
  libpgsql2 libpng2 libregexp-java librrd0 librrd0-jni libservlet2.3-java
  libtomcat4-java libxalan-java libxalan2-java libxerces-java libxerces2-java
  metamail opennms opennms-common opennms-db opennms-server opennms-webapp
  postgresql postgresql-client python python2.1 rrdtool tomcat4
0 packages upgraded, 40 newly installed, 0 to remove and 0 not upgraded.
Need to get 35.5MB of archives. After unpacking 61.1MB will be used.
Do you want to continue? [Y/n]
Get:1 http://debian.yorku.ca stable/main libpng2 1.0.12-3.woody.3 [107kB]
Get:2 http://debian.opennms.org debian/opennms/stable libbcel-java 5.0-1 [882kB]

```

```
Get:3 http://security.debian.org stable/updates/main python2.1 2.1.3-3.2 [1592kB ]
Get:4 http://debian.yorku.ca stable/main libxerces-java 1.4.3-1 [756kB]
Get:5 http://debian.yorku.ca stable/contrib ant 1.4.1-4 [739kB]
Get:6 http://debian.opennms.org debian/opennms/stable libcommons-collections-jav a 2.1-1 [149kB]
Get:7 http://debian.opennms.org debian/opennms/stable liblog4j 1.2.7-0 [296kB]
Get:8 http://debian.yorku.ca stable/contrib libxalan-java 1.2.2-2 [424kB]
Get:9 http://debian.opennms.org debian/opennms/stable libcommons-logging-java 1. 0.2-1 [29.1kB]
Get:10 http://debian.yorku.ca stable/contrib libbsf-java 1:2.2-1 [88.4kB]
Get:11 http://debian.opennms.org debian/opennms/stable libcommons-beanutils-java 1.6-2 [111kB]
Get:12 http://debian.yorku.ca stable/contrib liblogkit-java 1.0.1-1 [74.4kB]
Get:13 http://debian.opennms.org debian/opennms/stable libxalan2-java 2.4.1-1 [1 062kB]
Get:14 http://debian.yorku.ca stable/contrib libcommons-digester-java 1.1.1-1 [5 7.3kB]
Get:15 http://debian.yorku.ca stable/contrib libxerces2-java 2.0.1-1 [491kB]
Get:16 http://security.debian.org stable/updates/main python 2.1.3-3.2 [25.5kB]
Get:17 http://security.debian.org stable/updates/main metamail 2.7-45woody.2 [15 0kB]
Get:18 http://debian.yorku.ca stable/main libpgsql2 7.2.1-2woody4 [65.3kB]
Get:19 http://debian.yorku.ca stable/main libdbi-perl 1.21-2 [338kB]
Get:20 http://debian.opennms.org debian/opennms/stable libmx4j-java 1.1.1-1 [410 kB]
Get:21 http://debian.yorku.ca stable/main libdbd-pg-perl 1.01-3 [62.6kB]
Get:22 http://debian.yorku.ca stable/main libgd-gif1 1.3-2 [62.1kB]
Get:23 http://debian.yorku.ca stable/main postgresql-client 7.2.1-2woody4 [281kB ]
Get:24 http://debian.opennms.org debian/opennms/stable libcommons-modeler-java 1 .0-2 [32.1kB]
Get:25 http://debian.opennms.org debian/opennms/stable libicmp-jni 1.1.2-1woody [18.5kB]
Get:26 http://debian.opennms.org debian/opennms/stable libiplike-pgsql 1.1.2-1wo ody [15.2kB]
Get:27 http://debian.opennms.org debian/opennms/stable librrd0-jni 1.1.2-1woody [15.9kB]
Get:28 http://debian.opennms.org debian/opennms/stable libopennms-java 1.1.2-1wo ody [3011kB]
Get:29 http://debian.yorku.ca stable/main postgresql 7.2.1-2woody4 [1551kB]
Get:30 http://debian.yorku.ca stable/main librrd0 1.0.35-2 [61.1kB]
Get:31 http://debian.yorku.ca stable/main libregexp-java 1.2.20010409-3 [85.7kB]
Get:32 http://debian.yorku.ca stable/main rrdtool 1.0.35-2 [581kB]
Get:33 http://debian.opennms.org debian/opennms/stable libservlet2.3-java 4.0-3 [279kB]
Get:34 http://debian.opennms.org debian/opennms/stable libtomcat4-java 4.1.18-1 [1534kB]
Get:35 http://debian.opennms.org debian/opennms/stable opennms-db 1.1.2-1woody [ 38.6kB]
Get:36 http://debian.opennms.org debian/opennms/stable opennms-common 1.1.2-1woo dy [43.3kB]
Get:37 http://debian.opennms.org debian/opennms/stable opennms-server 1.1.2-1woo dy [10.1MB]
Get:38 http://debian.opennms.org debian/opennms/stable tomcat4 4.1.18-1 [59.2kB]
Get:39 http://debian.opennms.org debian/opennms/stable opennms-webapp 1.1.2-1woo dy [9781kB]
Get:40 http://debian.opennms.org debian/opennms/stable opennms 1.1.2-1woody [14. 7kB]
Fetched 35.5MB in 3m37s (163kB/s)
Selecting previously deselected package libpng2.
(Reading database ... 10069 files and directories currently installed.)
Unpacking libpng2 (from ../libpng2_1.0.12-3.woody.3_i386.deb) ...
Selecting previously deselected package python2.1.
Unpacking python2.1 (from ../python2.1_2.1.3-3.2_i386.deb) ...
Selecting previously deselected package python.
Unpacking python (from ../python_2.1.3-3.2_all.deb) ...
Selecting previously deselected package libxerces-java.
Unpacking libxerces-java (from ../libxerces-java_1.4.3-1_all.deb) ...
Selecting previously deselected package ant.
Unpacking ant (from ../archives/ant_1.4.1-4_all.deb) ...
```

```
Selecting previously deselected package libbcel-java.
Unpacking libbcel-java (from .../libbcel-java_5.0-1_all.deb) ...
Selecting previously deselected package libxalan-java.
Unpacking libxalan-java (from .../libxalan-java_1.2.2-2_all.deb) ...
Selecting previously deselected package libbsf-java.
Unpacking libbsf-java (from .../libbsf-java_1%3a2.2-1_all.deb) ...
Selecting previously deselected package libcommons-collections-java.
Unpacking libcommons-collections-java (from .../libcommons-collections-java_2.1- 1_all.deb) ...
Selecting previously deselected package liblogkit-java.
Unpacking liblogkit-java (from .../liblogkit-java_1.0.1-1_all.deb) ...
Selecting previously deselected package liblog4j.
Unpacking liblog4j (from .../liblog4j_1.2.7-0_all.deb) ...
Selecting previously deselected package libcommons-logging-java.
Unpacking libcommons-logging-java (from .../libcommons-logging-java_1.0.2-1_all. deb) ...
Selecting previously deselected package libcommons-beanutils-java.
Unpacking libcommons-beanutils-java (from .../libcommons-beanutils-java_1.6-2_al l.deb) ...
Selecting previously deselected package libcommons-digester-java.
Unpacking libcommons-digester-java (from .../libcommons-digester-java_1.1.1-1_al l.deb) ...
Selecting previously deselected package libxerces2-java.
Unpacking libxerces2-java (from .../libxerces2-java_2.0.1-1_all.deb) ...
Selecting previously deselected package libxalan2-java.
Unpacking libxalan2-java (from .../libxalan2-java_2.4.1-1_all.deb) ...
Selecting previously deselected package libmx4j-java.
Unpacking libmx4j-java (from .../libmx4j-java_1.1.1-1_all.deb) ...
Selecting previously deselected package libcommons-modeler-java.
Unpacking libcommons-modeler-java (from .../libcommons-modeler-java_1.0-2_all.de b) ...
Selecting previously deselected package libpgsql2.
Unpacking libpgsql2 (from .../libpgsql2_7.2.1-2woody4_i386.deb) ...

Selecting previously deselected package libdbi-perl.
(Reading database ... 10606 files and directories currently installed.)
Unpacking libdbi-perl (from .../libdbi-perl_1.21-2_i386.deb) ...
Selecting previously deselected package libdbd-pg-perl.
Unpacking libdbd-pg-perl (from .../libdbd-pg-perl_1.01-3_i386.deb) ...
Selecting previously deselected package libgd-gif1.
Unpacking libgd-gif1 (from .../libgd-gif1_1.3-2_i386.deb) ...
Selecting previously deselected package libicmp-jni.
Unpacking libicmp-jni (from .../libicmp-jni_1.1.2-1woody_i386.deb) ...
Selecting previously deselected package postgresql-client.
Unpacking postgresql-client (from .../postgresql-client_7.2.1-2woody4_i386.deb) ...

Selecting previously deselected package postgresql.
Unpacking postgresql (from .../postgresql_7.2.1-2woody4_i386.deb) ...
```

Although you have no existing database files in the standard locations, you have a postgresql directory at /usr/lib/postgresql

To protect executables that you may need for dumping an older database, they are being moved to /usr/lib/postgresql/dumpall/unknown

```
Selecting previously deselected package libiplike-pgsql.
Unpacking libiplike-pgsql (from ../libiplike-pgsql_1.1.2-1woody_i386.deb) ...
Selecting previously deselected package librrd0.
Unpacking librrd0 (from ../librrd0_1.0.35-2_i386.deb) ...
Selecting previously deselected package librrd0-jni.
Unpacking librrd0-jni (from ../librrd0-jni_1.1.2-1woody_i386.deb) ...
Selecting previously deselected package libopennms-java.
Unpacking libopennms-java (from ../libopennms-java_1.1.2-1woody_all.deb) ...
Selecting previously deselected package libregexp-java.
Unpacking libregexp-java (from ../libregexp-java_1.2.20010409-3_all.deb) ...
Selecting previously deselected package libservlet2.3-java.
Unpacking libservlet2.3-java (from ../libservlet2.3-java_4.0-3_all.deb) ...
Selecting previously deselected package libtomcat4-java.
Unpacking libtomcat4-java (from ../libtomcat4-java_4.1.18-1_all.deb) ...
Selecting previously deselected package metamail.
Unpacking metamail (from ../metamail_2.7-45woody.2_i386.deb) ...
Selecting previously deselected package opennms-db.
Unpacking opennms-db (from ../opennms-db_1.1.2-1woody_all.deb) ...
Selecting previously deselected package opennms-common.
Unpacking opennms-common (from ../opennms-common_1.1.2-1woody_all.deb) ...
Selecting previously deselected package rrdtool.
Unpacking rrdtool (from ../rrdtool_1.0.35-2_i386.deb) ...
Selecting previously deselected package opennms-server.
Unpacking opennms-server (from ../opennms-server_1.1.2-1woody_all.deb) ...
```

Please modify the /etc/opennms files before
starting OpenNMS for the first time.

```
Selecting previously deselected package tomcat4.
(Reading database ... 11605 files and directories currently installed.)
Unpacking tomcat4 (from ../tomcat4_4.1.18-1_all.deb) ...
Selecting previously deselected package opennms-webapp.
Unpacking opennms-webapp (from ../opennms-webapp_1.1.2-1woody_all.deb) ...
Selecting previously deselected package opennms.
Unpacking opennms (from ../opennms_1.1.2-1woody_all.deb) ...
Setting up libpng2 (1.0.12-3.woody.3) ...
```

Setting up libxerces-java (1.4.3-1) ...

Setting up ant (1.4.1-4) ...

Setting up libbccl-java (5.0-1) ...

Setting up libcommons-collections-java (2.1-1) ...

Setting up liblogkit-java (1.0.1-1) ...

Setting up liblog4j (1.2.7-0) ...

Setting up libcommons-logging-java (1.0.2-1) ...

Setting up libcommons-beanutils-java (1.6-2) ...

Setting up libcommons-digester-java (1.1.1-1) ...

Setting up libxerces2-java (2.0.1-1) ...

Setting up libpgsql2 (7.2.1-2woody4) ...

Setting up libdbi-perl (1.21-2) ...

Setting up libdbd-pg-perl (1.01-3) ...

Setting up libgd-gif1 (1.3-2) ...

Setting up libicmp-jni (1.1.2-1woody) ...

Setting up postgresql-client (7.2.1-2woody4) ...

The file `/etc/postgresql/postgresql.env` provides the normal set-up for an ordinary user running PostgreSQL. It is automatically read by the wrapper script for PostgreSQL user commands in `postgresql-client`.

Setting up librrd0 (1.0.35-2) ...

Setting up librrd0-jni (1.1.2-1woody) ...

Setting up libopennms-java (1.1.2-1woody) ...

Setting up libregexp-java (1.2.20010409-3) ...

Setting up libservlet2.3-java (4.0-3) ...

Setting up metamail (2.7-45woody.2) ...

Setting up opennms-common (1.1.2-1woody) ...

Setting up rrdtool (1.0.35-2) ...

Setting up opennms-server (1.1.2-1woody) ...

If OpenNMS is unable to locate a valid Java2 environment, you will need to set `JAVA_HOME` manually in `/etc/default/opennms`.

Setting up python (2.1.3-3.2) ...

Setting up python2.1 (2.1.3-3.2) ...

Setting up libbsf-java (2.2-1) ...

Setting up libxalan-java (1.2.2-2) ...

Setting up libxalan2-java (2.4.1-1) ...

Setting up libmx4j-java (1.1.1-1) ...

Setting up libcommons-modeler-java (1.0-2) ...

Setting up postgresql (7.2.1-2woody4) ...

dpkg: --compare-versions takes three arguments: <version> <relation> <version>

Type dpkg --help for help about installing and deinstalling packages [*];

Use dselect for user-friendly package management;

Type dpkg -Dhelp for a list of dpkg debug flag values;

Type dpkg --force-help for a list of forcing options;

Type dpkg-deb --help for help about manipulating *.deb files;

Type dpkg --licence for copyright licence and lack of warranty (GNU GPL) [*].

Options marked [*] produce a lot of output - pipe it through 'less' or 'more' !

Creating missing home directory /var/lib/postgres for postgres

Updating /var/lib/postgres/.profile ...

PostgreSQL databases can be created with any one of a number of

different character encodings. Please choose the default encoding, which

will be used for all newly-created databases in the absence of a specific

encoding specification. The choices are:

SQL_ASCII	ASCII
EUC_JP	Japanese EUC
EUC_CN	Chinese EUC
EUC_KR	Korean EUC
EUC_TW	Taiwan EUC
UNICODE	Unicode(UTF-8)
MULE_INTERNAL	Mule internal
LATIN1	ISO 8859-1 English and some European languages
LATIN2	ISO 8859-2 English and some European languages
LATIN3	ISO 8859-3 English and some European languages
LATIN4	ISO 8859-4 English and some European languages
LATIN5	ISO 8859-5 English and some European languages
LATIN6	ISO 8859-10 ECMA-144 Latin Alphabet No.6
LATIN7	ISO 8859-13 Latin Alphabet No.7
LATIN8	ISO 8859-14 Latin Alphabet No.8
LATIN9	ISO 8859-15 Latin Alphabet No.9
LATIN10	ISO 8859-16 ASRO SR 14111 Latin Alphabet No.10
ISO-8859-5	ECMA-113 Latin/Cyrillic
ISO-8859-6	ECMA-114 Latin/Arabic
ISO-8859-7	ECMA-118 Latin/Greek
ISO-8859-8	ECMA-121 Latin/Hebrew
KOI8	KOI8-R
WIN	Windows CP1251
ALT	Windows CP866

Enter default encoding (SQL_ASCII):

```
Now installing the PostgreSQL database files in /var/lib/postgres/data
su - postgres -c cd /var/lib/postgres; . ~/.profile; LANG= initdb --encoding SQL_ASCII --pgdata /var/lib/postgres
The files belonging to this database system will be owned by user "postgres".
This user must also own the server process.
```

```
Fixing permissions on existing directory /var/lib/postgres/data... ok
creating directory /var/lib/postgres/data/base... ok
creating directory /var/lib/postgres/data/global... ok
creating directory /var/lib/postgres/data/pg_xlog... ok
creating directory /var/lib/postgres/data/pg_clog... ok
creating template1 database in /var/lib/postgres/data/base/1... ok
creating configuration files... ok
initializing pg_shadow... ok
enabling unlimited row size for system tables... ok
creating system views... ok
loading pg_description... ok
vacuuming database template1... ok
copying template1 to template0... ok
```

Success. You can now start the database server using:

```
/usr/lib/postgresql/bin/postmaster -D /var/lib/postgres/data
or
/usr/lib/postgresql/bin/pg_ctl -D /var/lib/postgres/data -l logfile start
```

PostgreSQL database now installed.

Use /usr/bin/createdb to create a specific database and
/usr/bin/createuser to enable other users to connect to a
PostgreSQL database.

In the first instance, these commands must be run by the
user 'postgres'.

```
Restarting PostgreSQL database: postmaster
No /usr/lib/postgresql/bin/postmaster found running; none killed.
Starting PostgreSQL postmaster.
postmaster successfully started
.
Enabling the PL procedural language in all PostgreSQL databases...
plpgsql added to template1
```

Setting up libiplike-pgsql (1.1.2-1woody) ...

```
Setting up libtomcat4-java (4.1.18-1) ...
Setting up opennms-db (1.1.2-1woody) ...
Restarting PostgreSQL database: postmaster
Stopped /usr/lib/postgresql/bin/postmaster (pid 2730 2731 2734).
Starting PostgreSQL postmaster.
postmaster successfully started
.
```

```
=====
OpenNMS Installer Version 0.6 (Revision 1)
=====
```

Configures PostgreSQL tables, users, and other miscellaneous settings.

```
* using 'opennms' as the PostgreSQL user for OpenNMS
* using 'opennms' as the PostgreSQL password for OpenNMS
* using 'opennms' as the PostgreSQL database name for OpenNMS
* I am being called from an RPM install
- reading table definitions... OK
- creating user "opennms"... OK
- creating database "opennms"... OK
- checking "nodeNxtId" minimum value... DBD::Pg::st execute failed: ERROR: Relation "node" does not exist
1
- removing sequence "nodeNxtId"... DBD::Pg::db do failed: ERROR: sequence "node_nxtid" does not exist
CLEAN
- creating sequence "nodeNxtId"... OK
- checking "serviceNxtId" minimum value... DBD::Pg::st execute failed: ERROR: Relation "service" does not exist
1
- removing sequence "serviceNxtId"... DBD::Pg::db do failed: ERROR: sequence "service_nxtid" does not exist
CLEAN
- creating sequence "serviceNxtId"... OK
- checking "eventsNxtId" minimum value... DBD::Pg::st execute failed: ERROR: Relation "events" does not exist
1
- removing sequence "eventsNxtId"... DBD::Pg::db do failed: ERROR: sequence "events_nxtid" does not exist
CLEAN
- creating sequence "eventsNxtId"... OK
- checking "outageNxtId" minimum value... DBD::Pg::st execute failed: ERROR: Relation "outages" does not exist
1
- removing sequence "outageNxtId"... DBD::Pg::db do failed: ERROR: sequence "outage_nxtid" does not exist
CLEAN
- creating sequence "outageNxtId"... OK
- checking "notifyNxtId" minimum value... DBD::Pg::st execute failed: ERROR: Relation "notifications" does not exist
1
- removing sequence "notifyNxtId"... DBD::Pg::db do failed: ERROR: sequence "notify_nxtid" does not exist
CLEAN
- creating sequence "notifyNxtId"... OK
- checking "vulnNxtId" minimum value... DBD::Pg::st execute failed: ERROR: Relation "vulnerabilities" does not exist
1
- removing sequence "vulnNxtId"... DBD::Pg::db do failed: ERROR: sequence "vuln_nxtid" does not exist
CLEAN
- creating sequence "vulnNxtId"... OK
- checking table distPoller... 9 tokens, CREATED
- checking table node... 16 tokens, CREATED
- checking table ipInterface... 8 tokens, CREATED
- checking table snmpInterface... 11 tokens, CREATED
- checking table service... 2 tokens, CREATED
- checking table ifServices... 10 tokens, CREATED
- checking table events... 33 tokens, CREATED
```

- checking table outages... 8 tokens, CREATED
- checking table vulnerabilities... 16 tokens, CREATED
- checking table vulnPlugins... 11 tokens, CREATED
- checking table notifications... 11 tokens, CREATED
- checking table usersNotified... 5 tokens, CREATED
- checking table assets... 36 tokens, CREATED
- creating index "node_id_idx"... OK
- creating index "node_label_idx"... OK
- creating index "ipinterface_nodeid_idx"... OK
- creating index "ipinterface_ifindex_idx"... OK
- creating index "ipinterface_iphostname_idx"... OK
- creating index "ipinterface_ismanaged_idx"... OK
- creating index "ipinterface_ipstatus_idx"... OK
- creating index "snmpinterface_nodeid_idx"... OK
- creating index "snmpinterface_ipaddr_idx"... OK
- creating index "ifservices_nodeid_idx"... OK
- creating index "ifservices_ipaddr_idx"... OK
- creating index "ifservices_ifindex_idx"... OK
- creating index "ifservices_serviceid_idx"... OK
- creating index "ifservices_status_idx"... OK
- creating index "ifservices_notify_idx"... OK
- creating index "events_id_idx"... OK
- creating index "events_uei_idx"... OK
- creating index "events_nodeid_idx"... OK
- creating index "events_ipaddr_idx"... OK
- creating index "events_serviceid_idx"... OK
- creating index "events_time_idx"... OK
- creating index "events_severity_idx"... OK
- creating index "events_log_idx"... OK
- creating index "events_display_idx"... OK
- creating index "events_ackuser_idx"... OK
- creating index "events_acktime_idx"... OK
- creating index "outages_id_idx"... OK
- creating index "outages_svclostid_idx"... OK
- creating index "outages_svcregainedid_idx"... OK
- creating index "outages_nodeid_idx"... OK
- creating index "outages_ipaddr_idx"... OK
- creating index "outages_serviceid_idx"... OK
- creating index "outages_regainedservice_idx"... OK
- creating index "vulnerabilities_id_idx"... OK
- creating index "vulnerabilities_nodeid_idx"... OK
- creating index "vulnerabilities_ipaddr_idx"... OK
- creating index "vulnerabilities_severity_idx"... OK
- creating index "vulnerabilities_port_idx"... OK
- creating index "vulnerabilities_protocol_idx"... OK
- creating index "vulnplugins_plugin_idx"... OK
- creating index "notifications_id_idx"... OK
- creating index "notifications_nodeid_idx"... OK
- creating index "notifications_ipaddr_idx"... OK
- creating index "notifications_serviceid_idx"... OK

```

- creating index "notifications_eventid_idx"... OK
- creating index "notifications_respondtime_idx"... OK
- creating index "notifications_answeredby_idx"... OK
- inserting initial table data for "distPoller"... OK
- checking if database "opennms" is unicode... DONE
- searching for PostgreSQL module directory... /usr/lib/postgresql/lib/opennms
- checking for stale iplike.so references... CLEAN
- checking for stale eventtime.so references... CLEAN
- adding iplike.so database function... OK
- adding PL/pgSQL call handler... EXISTS
- adding PL/pgSQL language module... EXISTS
- adding stored procedures...
  - getManagePercentAvailNodeWindow.sql... OK
  - getManagedOutageForIntfInWindow.sql... OK
  - getManagedOutageForNodeInWindow.sql... OK
  - getManagedServiceCountForIntf.sql... OK
  - getManagedServiceCountForNode.sql... OK
  - getOutageTimeInWindow.sql... OK
  - getPercentAvailabilityInWindow.sql... OK
  - getManagePercentAvailIntfWindow.sql... OK

```

<<< Configuration Complete >>>

I have modified access controls for the opennms database in /etc/postgresql/pg_hba.conf. Please check this to be sure it complies with your local security policies.

```

Setting up tomcat4 (4.1.18-1) ...
adduser: Warning: The home dir you specified already exists.
Adding system user tomcat4...
Adding new user tomcat4 (101) with group nogroup.
Not creating home directory.
Starting Tomcat 4.1 servlet engine using Java from /usr/lib/j2sdk1.4: tomcat4.

Setting up opennms-webapp (1.1.2-1woody) ...
Stopping Tomcat 4.1 servlet engine: ..... (killing) tom cat4.
Starting Tomcat 4.1 servlet engine using Java from /usr/lib/j2sdk1.4: tomcat4.

Setting up opennms (1.1.2-1woody) ...

```

10.5 Appendix E - 1.1.2-1 installation transcript with opennms-db failure

```

ibm-raid:~# apt-get install opennms
Reading Package Lists... Done
Building Dependency Tree... Done
The following extra packages will be installed:
ant libbccl-java libbsf-java libcommons-beanutils-java libcommons-collections-java

```

```
libcommons-digester-java libcommons-logging-java libcommons-modeler-java libdbd-pg-perl
libdbi-perl libgd-gif1 libicmp-jni libiplike-pgsql liblog4j liblogkit-java libmx4j-java
libopennms-java libpgsql2 libpng2 libregexp-java librrd0 librrd0-jni libservlet2.3-java
libtomcat4-java libxalan-java libxalan2-java libxerces-java libxerces2-java metamail
opennms-common opennms-db opennms-server opennms-webapp postgresql postgresql-client python
python2.1 rrdtool tomcat4
```

The following NEW packages will be installed:

```
ant libbcel-java libbsf-java libcommons-beanutils-java libcommons-collections-java
libcommons-digester-java libcommons-logging-java libcommons-modeler-java libdbd-pg-perl
libdbi-perl libgd-gif1 libicmp-jni libiplike-pgsql liblog4j liblogkit-java libmx4j-java
libopennms-java libpgsql2 libpng2 libregexp-java librrd0 librrd0-jni libservlet2.3-java
libtomcat4-java libxalan-java libxalan2-java libxerces-java libxerces2-java metamail opennms
opennms-common opennms-db opennms-server opennms-webapp postgresql postgresql-client python
python2.1 rrdtool tomcat4
```

0 packages upgraded, 40 newly installed, 0 to remove and 0 not upgraded.

Need to get 35.5MB of archives. After unpacking 61.0MB will be used.

Do you want to continue? [Y/n]

```
Get:1 http://mirror.direct.ca stable/main libxerces-java 1.4.3-1 [756kB]
Get:2 http://security.debian.org stable/updates/main libpng2 1.0.12-3.woody.3 [107kB]
Get:3 http://security.debian.org stable/updates/main python2.1 2.1.3-3.2 [1592kB]
Get:4 http://debian.opennms.org debian/opennms/stable libbcel-java 5.0-1 [882kB]
Get:5 http://mirror.direct.ca stable/contrib ant 1.4.1-4 [739kB]
Get:6 http://mirror.direct.ca stable/contrib libxalan-java 1.2.2-2 [424kB]
Get:7 http://debian.opennms.org debian/opennms/stable libcommons-collections-java 2.1-1 [149kB]
Get:8 http://mirror.direct.ca stable/contrib libbsf-java 1:2.2-1 [88.4kB]
Get:9 http://mirror.direct.ca stable/contrib liblogkit-java 1.0.1-1 [74.4kB]
Get:10 http://debian.opennms.org debian/opennms/stable liblog4j 1.2.7-0 [296kB]
Get:11 http://mirror.direct.ca stable/contrib libxerces2-java 2.0.1-1 [491kB]
Get:12 http://mirror.direct.ca stable/main libdbi-perl 1.21-2 [338kB]
Get:13 http://debian.opennms.org debian/opennms/stable libcommons-logging-java 1.0.2-1 [29.1kB]
Get:14 http://mirror.direct.ca stable/main libdbd-pg-perl 1.01-3 [62.6kB]
Get:15 http://mirror.direct.ca stable/main libgd-gif1 1.3-2 [62.1kB]
Get:16 http://debian.opennms.org debian/opennms/stable libcommons-beanutils-java 1.6-2 [111kB]
Get:17 http://mirror.direct.ca stable/main librrd0 1.0.35-2 [61.1kB]
Get:18 http://mirror.direct.ca stable/main libregexp-java 1.2.20010409-3 [85.7kB]
Get:19 http://mirror.direct.ca stable/main metamail 2.7-45 [155kB]
Get:20 http://mirror.direct.ca stable/main rrdtool 1.0.35-2 [581kB]
Get:21 http://debian.opennms.org debian/opennms/stable libcommons-digester-java 1.1.1-1 [57.3kB]
Get:22 http://debian.opennms.org debian/opennms/stable libxalan2-java 2.4.1-1 [1062kB]
Get:23 http://debian.opennms.org debian/opennms/stable libmx4j-java 1.1.1-1 [410kB]
Get:24 http://debian.opennms.org debian/opennms/stable libcommons-modeler-java 1.0-2 [32.1kB]
Get:25 http://debian.opennms.org debian/opennms/stable libicmp-jni 1.1.2-1woody [18.5kB]
Get:26 http://debian.opennms.org debian/opennms/stable libiplike-pgsql 1.1.2-1woody [15.2kB]
Get:27 http://debian.opennms.org debian/opennms/stable librrd0-jni 1.1.2-1woody [15.9kB]
Get:28 http://debian.opennms.org debian/opennms/stable libopennms-java 1.1.2-1woody [3011kB]
Get:29 http://security.debian.org stable/updates/main python 2.1.3-3.2 [25.5kB]
Get:30 http://security.debian.org stable/updates/main libpgsql2 7.2.1-2woody2 [65.2kB]
Get:31 http://security.debian.org stable/updates/main postgresql-client 7.2.1-2woody2 [280kB]
Get:32 http://security.debian.org stable/updates/main postgresql 7.2.1-2woody2 [1550kB]
Get:33 http://debian.opennms.org debian/opennms/stable libservlet2.3-java 4.0-3 [279kB]
```

```
Get:34 http://debian.opennms.org debian/opennms/stable libtomcat4-java 4.1.18-1 [1534kB]
Get:35 http://debian.opennms.org debian/opennms/stable opennms-db 1.1.2-1woody [38.6kB]
Get:36 http://debian.opennms.org debian/opennms/stable opennms-common 1.1.2-1woody [43.3kB]
Get:37 http://debian.opennms.org debian/opennms/stable opennms-server 1.1.2-1woody [10.1MB]
Get:38 http://debian.opennms.org debian/opennms/stable tomcat4 4.1.18-1 [59.2kB]
Get:39 http://debian.opennms.org debian/opennms/stable opennms-webapp 1.1.2-1woody [9781kB]
Get:40 http://debian.opennms.org debian/opennms/stable opennms 1.1.2-1woody [14.7kB]
Fetched 35.5MB in 3m19s (178kB/s)
Selecting previously deselected package libpng2.
(Reading database ... 9215 files and directories currently installed.)
Unpacking libpng2 (from ../libpng2_1.0.12-3.woody.3_i386.deb) ...
Selecting previously deselected package python2.1.
Unpacking python2.1 (from ../python2.1_2.1.3-3.2_i386.deb) ...
Selecting previously deselected package python.
Unpacking python (from ../python_2.1.3-3.2_all.deb) ...
Selecting previously deselected package libxerces-java.
Unpacking libxerces-java (from ../libxerces-java_1.4.3-1_all.deb) ...
Selecting previously deselected package ant.
Unpacking ant (from ../archives/ant_1.4.1-4_all.deb) ...
Selecting previously deselected package libbccl-java.
Unpacking libbccl-java (from ../libbccl-java_5.0-1_all.deb) ...
Selecting previously deselected package libxalan-java.
Unpacking libxalan-java (from ../libxalan-java_1.2.2-2_all.deb) ...
Selecting previously deselected package libbsf-java.
Unpacking libbsf-java (from ../libbsf-java_1%3a2.2-1_all.deb) ...
Selecting previously deselected package libcommons-collections-java.
Unpacking libcommons-collections-java (from ../libcommons-collections-java_2.1-1_all.deb) ...
Selecting previously deselected package liblogkit-java.
Unpacking liblogkit-java (from ../liblogkit-java_1.0.1-1_all.deb) ...
Selecting previously deselected package liblog4j.
Unpacking liblog4j (from ../liblog4j_1.2.7-0_all.deb) ...
Selecting previously deselected package libcommons-logging-java.
Unpacking libcommons-logging-java (from ../libcommons-logging-java_1.0.2-1_all.deb) ...
Selecting previously deselected package libcommons-beanutils-java.
Unpacking libcommons-beanutils-java (from ../libcommons-beanutils-java_1.6-2_all.deb) ...
Selecting previously deselected package libcommons-digester-java.
Unpacking libcommons-digester-java (from ../libcommons-digester-java_1.1.1-1_all.deb) ...
Selecting previously deselected package libxerces2-java.
Unpacking libxerces2-java (from ../libxerces2-java_2.0.1-1_all.deb) ...
Selecting previously deselected package libxalan2-java.
Unpacking libxalan2-java (from ../libxalan2-java_2.4.1-1_all.deb) ...
Selecting previously deselected package libmx4j-java.
Unpacking libmx4j-java (from ../libmx4j-java_1.1.1-1_all.deb) ...
Selecting previously deselected package libcommons-modeler-java.
Unpacking libcommons-modeler-java (from ../libcommons-modeler-java_1.0-2_all.deb) ...
Selecting previously deselected package libpgsql2.
Unpacking libpgsql2 (from ../libpgsql2_7.2.1-2woody2_i386.deb) ...
Selecting previously deselected package libdbi-perl.
(Reading database ... 9752 files and directories currently installed.)
Unpacking libdbi-perl (from ../libdbi-perl_1.21-2_i386.deb) ...
```

```
Selecting previously deselected package libdbd-pg-perl.
Unpacking libdbd-pg-perl (from ../libdbd-pg-perl_1.01-3_i386.deb) ...
Selecting previously deselected package libgd-gif1.
Unpacking libgd-gif1 (from ../libgd-gif1_1.3-2_i386.deb) ...
Selecting previously deselected package libicmp-jni.
Unpacking libicmp-jni (from ../libicmp-jni_1.1.2-1woody_i386.deb) ...
Selecting previously deselected package postgresql-client.
Unpacking postgresql-client (from ../postgresql-client_7.2.1-2woody2_i386.deb) ...
Selecting previously deselected package postgresql.
Unpacking postgresql (from ../postgresql_7.2.1-2woody2_i386.deb) ...
Although you have no existing database files in the standard locations,
you have a postgresql directory at /usr/lib/postgresql
To protect executables that you may need for dumping an older
database, they are being moved to /usr/lib/postgresql/dumpall/unknown
Selecting previously deselected package libiplike-pgsql.
Unpacking libiplike-pgsql (from ../libiplike-pgsql_1.1.2-1woody_i386.deb) ...
Selecting previously deselected package librrd0.
Unpacking librrd0 (from ../librrd0_1.0.35-2_i386.deb) ...
Selecting previously deselected package librrd0-jni.
Unpacking librrd0-jni (from ../librrd0-jni_1.1.2-1woody_i386.deb) ...
Selecting previously deselected package libopennms-java.
Unpacking libopennms-java (from ../libopennms-java_1.1.2-1woody_all.deb) ...
Selecting previously deselected package libregexp-java.
Unpacking libregexp-java (from ../libregexp-java_1.2.20010409-3_all.deb) ...
Selecting previously deselected package libservlet2.3-java.
Unpacking libservlet2.3-java (from ../libservlet2.3-java_4.0-3_all.deb) ...
Selecting previously deselected package libtomcat4-java.
Unpacking libtomcat4-java (from ../libtomcat4-java_4.1.18-1_all.deb) ...
Selecting previously deselected package metamail.
Unpacking metamail (from ../metamail_2.7-45_i386.deb) ...
Selecting previously deselected package opennms-db.
Unpacking opennms-db (from ../opennms-db_1.1.2-1woody_all.deb) ...
Selecting previously deselected package opennms-common.
Unpacking opennms-common (from ../opennms-common_1.1.2-1woody_all.deb) ...
Selecting previously deselected package rrdtool.
Unpacking rrdtool (from ../rrdtool_1.0.35-2_i386.deb) ...
Selecting previously deselected package opennms-server.
Unpacking opennms-server (from ../opennms-server_1.1.2-1woody_all.deb) ...
Please modify the /etc/opennms files before
starting OpenNMS for the first time.
Selecting previously deselected package tomcat4.
Unpacking tomcat4 (from ../tomcat4_4.1.18-1_all.deb) ...
Selecting previously deselected package opennms-webapp.
(Reading database ... 10807 files and directories currently installed.)
Unpacking opennms-webapp (from ../opennms-webapp_1.1.2-1woody_all.deb) ...
Selecting previously deselected package opennms.
Unpacking opennms (from ../opennms_1.1.2-1woody_all.deb) ...
Setting up libpng2 (1.0.12-3.woody.3) ...
Setting up libxerces-java (1.4.3-1) ...
Setting up ant (1.4.1-4)...
```

```

Setting up libbcel-java (5.0-1) ...
Setting up libcommons-collections-java (2.1-1) ...
Setting up liblogkit-java (1.0.1-1) ...
Setting up liblog4j (1.2.7-0) ...
Setting up libcommons-logging-java (1.0.2-1) ...
Setting up libcommons-beanutils-java (1.6-2) ...
Setting up libcommons-digester-java (1.1.1-1) ...
Setting up libxerces2-java (2.0.1-1) ...
Setting up libpgsql2 (7.2.1-2woody2) ...
Setting up libdbi-perl (1.21-2) ...
Setting up libdbd-pg-perl (1.01-3) ...
Setting up libgd-gif1 (1.3-2) ...
Setting up libicmp-jni (1.1.2-1woody) ...
Setting up postgresql-client (7.2.1-2woody2) ...
The file /etc/postgresql/postgresql.env provides the normal set-up for
an ordinary user running PostgreSQL. It is automatically read by the
wrapper script for PostgreSQL user commands in postgresql-client.
Setting up librrd0 (1.0.35-2) ...
Setting up librrd0-jni (1.1.2-1woody) ...
Setting up libopennms-java (1.1.2-1woody) ...
Setting up libregexp-java (1.2.20010409-3) ...
Setting up libservlet2.3-java (4.0-3) ...
Setting up metainstall (2.7-45) ...
Setting up opennms-common (1.1.2-1woody) ...
Setting up rrdtool (1.0.35-2) ...
Setting up opennms-server (1.1.2-1woody) ...
If OpenNMS is unable to locate a valid Java2 environment,
you will need to set JAVA_HOME manually in /etc/default/opennms.
Setting up python (2.1.3-3.2) ...
Setting up python2.1 (2.1.3-3.2) ...
Setting up libbsf-java (2.2-1) ...
Setting up libxalan-java (1.2.2-2) ...
Setting up libxalan2-java (2.4.1-1) ...
Setting up libmx4j-java (1.1.1-1) ...
Setting up libcommons-modeler-java (1.0-2) ...
Setting up postgresql (7.2.1-2woody2) ...
dpkg: --compare-versions takes three arguments: <version> <relation> <version>
Type dpkg --help for help about installing and deinstalling packages [*];
Use dselect for user-friendly package management;
Type dpkg -Dhelp for a list of dpkg debug flag values;
Type dpkg --force-help for a list of forcing options;
Type dpkg-deb --help for help about manipulating *.deb files;
Type dpkg --licence for copyright licence and lack of warranty (GNU GPL) [*].
Options marked [*] produce a lot of output - pipe it through 'less' or 'more' !
Creating missing home directory /var/lib/postgres for postgres
Updating /var/lib/postgres/.profile ...
PostgreSQL databases can be created with any one of a number of
different character encodings. Please choose the default encoding, which
will be used for all newly-created databases in the absence of a specific
encoding specification. The choices are:

```

```
SQL_ASCII ASCII
EUC_JP Japanese EUC
EUC_CN Chinese EUC
EUC_KR Korean EUC
EUC_TW Taiwan EUC
UNICODE Unicode(UTF-8)
MULE_INTERNAL Mule internal
LATIN1 ISO 8859-1 English and some European languages
LATIN2 ISO 8859-2 English and some European languages
LATIN3 ISO 8859-3 English and some European languages
LATIN4 ISO 8859-4 English and some European languages
LATIN5 ISO 8859-5 English and some European languages
LATIN6 ISO 8859-10 ECMA-144 Latin Alphabet No.6
LATIN7 ISO 8859-13 Latin Alphabet No.7
LATIN8 ISO 8859-14 Latin Alphabet No.8
LATIN9 ISO 8859-15 Latin Alphabet No.9
LATIN10 ISO 8859-16 ASRO SR 14111 Latin Alphabet No.10
ISO-8859-5 ECMA-113 Latin/Cyrillic
ISO-8859-6 ECMA-114 Latin/Arabic
ISO-8859-7 ECMA-118 Latin/Greek
ISO-8859-8 ECMA-121 Latin/Hebrew
KOI8 KOI8-R
WIN Windows CP1251
ALT Windows CP866
Enter default encoding (SQL_ASCII):
Now installing the PostgreSQL database files in /var/lib/postgres/data
su - postgres -c cd /var/lib/postgres; . ./profile; LANG= initdb --encoding SQL_ASCII --pgdata /var/lib/postgres
The files belonging to this database system will be owned by user "postgres".
This user must also own the server process.
Fixing permissions on existing directory /var/lib/postgres/data... ok
creating directory /var/lib/postgres/data/base... ok
creating directory /var/lib/postgres/data/global... ok
creating directory /var/lib/postgres/data/pg_xlog... ok
creating directory /var/lib/postgres/data/pg_clog... ok
creating template1 database in /var/lib/postgres/data/base/1... ok
creating configuration files... ok
initializing pg_shadow... ok
enabling unlimited row size for system tables... ok
creating system views... ok
loading pg_description... ok
vacuuming database template1... ok
copying template1 to template0... ok
Success. You can now start the database server using:
/usr/lib/postgresql/bin/postmaster -D /var/lib/postgres/data
or
/usr/lib/postgresql/bin/pg_ctl -D /var/lib/postgres/data -l logfile start
PostgreSQL database now installed.
Use /usr/bin/createdb to create a specific database and
/usr/bin/createuser to enable other users to connect to a
PostgreSQL database.
```

```

In the first instance, these commands must be run by the
user 'postgres'.
Restarting PostgreSQL database: postmaster
No /usr/lib/postgresql/bin/postmaster found running; none killed.
Starting PostgreSQL postmaster.
postmaster successfully started
.
Enabling the PL procedural language in all PostgreSQL databases...
plpgsql added to template1
Setting up libiplike-pgsql (1.1.2-1woody) ...
Setting up libtomcat4-java (4.1.18-1) ...
Setting up opennms-db (1.1.2-1woody) ...
Restarting PostgreSQL database: postmaster
Stopped /usr/lib/postgresql/bin/postmaster (pid 2515 2517 2519).
Starting PostgreSQL postmaster.
pg_ctl: Another postmaster may be running. Trying to start postmaster anyway.
postmaster successfully started
.
=====
OpenNMS Installer Version 0.6 (Revision 1)
=====
Configures PostgreSQL tables, users, and other miscellaneous settings.
* using 'opennms' as the PostgreSQL user for OpenNMS
* using 'opennms' as the PostgreSQL password for OpenNMS
* using 'opennms' as the PostgreSQL database name for OpenNMS
* I am being called from an RPM install
- reading table definitions... OK
DBI->connect(dbname=template1) failed: could not connect to server: No such file or directory at /usr/s
*** Unable to connect to the database!! ***
Be sure PostgreSQL is started and running correctly
before running this install script!
could not connect to server: No such file or directory
dpkg: error processing opennms-db (--configure):
subprocess post-installation script returned error exit status 255
Setting up tomcat4 (4.1.18-1) ...
adduser: Warning: The home dir you specified already exists.
Adding system user tomcat4...
Adding new user tomcat4 (101) with group nogroup.
Not creating home directory.
Starting Tomcat 4.1 servlet engine using Java from /usr/lib/j2sdk1.4: tomcat4.
Setting up opennms-webapp (1.1.2-1woody) ...
Stopping Tomcat 4.1 servlet engine: ..... (killing) . (killing) tomcat4.
Starting Tomcat 4.1 servlet engine using Java from /usr/lib/j2sdk1.4: tomcat4.
dpkg: dependency problems prevent configuration of opennms:
opennms depends on opennms-db (= 1.1.2-1woody); however:
Package opennms-db is not configured yet.
dpkg: error processing opennms (--configure):
dependency problems - leaving unconfigured
Errors were encountered while processing:
opennms-db

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opennms
E: Sub-process /usr/bin/dpkg returned an error code (1)
ibm-raid:~#
ibm-raid:~# apt-get install opennms
Reading Package Lists... Done
Building Dependency Tree... Done
Sorry, opennms is already the newest version.
0 packages upgraded, 0 newly installed, 0 to remove and 0 not upgraded.
2 packages not fully installed or removed.
Need to get 0B of archives. After unpacking 0B will be used.
Setting up opennms-db (1.1.2-1woody) ...
Restarting PostgreSQL database: postmaster
No /usr/lib/postgresql/bin/postmaster found running; none killed.
Starting PostgreSQL postmaster.
postmaster successfully started
.
=====
OpenNMS Installer Version 0.6 (Revision 1)
=====
Configures PostgreSQL tables, users, and other miscellaneous settings.
* using 'opennms' as the PostgreSQL user for OpenNMS
* using 'opennms' as the PostgreSQL password for OpenNMS
* using 'opennms' as the PostgreSQL database name for OpenNMS
* I am being called from an RPM install
- reading table definitions... OK
- creating user "opennms"... OK
- creating database "opennms"... OK
- checking "nodeNxtId" minimum value... DBD::Pg::st execute failed: ERROR: Relation "node" does not exist
1
- removing sequence "nodeNxtId"... DBD::Pg::db do failed: ERROR: sequence "nodenxtid" does not exist at
CLEAN
- creating sequence "nodeNxtId"... OK
- checking "serviceNxtId" minimum value... DBD::Pg::st execute failed: ERROR: Relation "service" does not exist
1
- removing sequence "serviceNxtId"... DBD::Pg::db do failed: ERROR: sequence "servicenxtid" does not exist
CLEAN
- creating sequence "serviceNxtId"... OK
- checking "eventsNxtId" minimum value... DBD::Pg::st execute failed: ERROR: Relation "events" does not exist
1
- removing sequence "eventsNxtId"... DBD::Pg::db do failed: ERROR: sequence "eventsnxtid" does not exist
CLEAN
- creating sequence "eventsNxtId"... OK
- checking "outageNxtId" minimum value... DBD::Pg::st execute failed: ERROR: Relation "outages" does not exist
1
- removing sequence "outageNxtId"... DBD::Pg::db do failed: ERROR: sequence "outagenxtid" does not exist
CLEAN
- creating sequence "outageNxtId"... OK
- checking "notifyNxtId" minimum value... DBD::Pg::st execute failed: ERROR: Relation "notifications" does not exist
1
- removing sequence "notifyNxtId"... DBD::Pg::db do failed: ERROR: sequence "notifynxtid" does not exist

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CLEAN

- creating sequence "notifyNxtId"... OK
- checking "vulnNxtId" minimum value... DBD::Pg::st execute failed: ERROR: Relation "vulnerabilities" does not exist
- 1
- removing sequence "vulnNxtId"... DBD::Pg::db do failed: ERROR: sequence "vulnnextid" does not exist at

CLEAN

- creating sequence "vulnNxtId"... OK
- checking table distPoller... 9 tokens, CREATED
- checking table node... 16 tokens, CREATED
- checking table ipInterface... 8 tokens, CREATED
- checking table snmpInterface... 11 tokens, CREATED
- checking table service... 2 tokens, CREATED
- checking table ifServices... 10 tokens, CREATED
- checking table events... 33 tokens, CREATED
- checking table outages... 8 tokens, CREATED
- checking table vulnerabilities... 16 tokens, CREATED
- checking table vulnPlugins... 11 tokens, CREATED
- checking table notifications... 11 tokens, CREATED
- checking table usersNotified... 5 tokens, CREATED
- checking table assets... 36 tokens, CREATED
- creating index "node_id_idx"... OK
- creating index "node_label_idx"... OK
- creating index "ipinterface_nodeid_idx"... OK
- creating index "ipinterface_ifindex_idx"... OK
- creating index "ipinterface_iphostname_idx"... OK
- creating index "ipinterface_ismanaged_idx"... OK
- creating index "ipinterface_ipstatus_idx"... OK
- creating index "snmpinterface_nodeid_idx"... OK
- creating index "snmpinterface_ipaddr_idx"... OK
- creating index "ifservices_nodeid_idx"... OK
- creating index "ifservices_ipaddr_idx"... OK
- creating index "ifservices_ifindex_idx"... OK
- creating index "ifservices_serviceid_idx"... OK
- creating index "ifservices_status_idx"... OK
- creating index "ifservices_notify_idx"... OK
- creating index "events_id_idx"... OK
- creating index "events_uei_idx"... OK
- creating index "events_nodeid_idx"... OK
- creating index "events_ipaddr_idx"... OK
- creating index "events_serviceid_idx"... OK
- creating index "events_time_idx"... OK
- creating index "events_severity_idx"... OK
- creating index "events_log_idx"... OK
- creating index "events_display_idx"... OK
- creating index "events_ackuser_idx"... OK
- creating index "events_acktime_idx"... OK
- creating index "outages_id_idx"... OK
- creating index "outages_svclostid_idx"... OK
- creating index "outages_svcregainedid_idx"... OK
- creating index "outages_nodeid_idx"... OK

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- creating index "outages_ipaddr_idx"... OK
- creating index "outages_serviceid_idx"... OK
- creating index "outages_regainedservice_idx"... OK
- creating index "vulnerabilities_id_idx"... OK
- creating index "vulnerabilities_nodeid_idx"... OK
- creating index "vulnerabilities_ipaddr_idx"... OK
- creating index "vulnerabilities_severity_idx"... OK
- creating index "vulnerabilities_port_idx"... OK
- creating index "vulnerabilities_protocol_idx"... OK
- creating index "vulnplugins_plugin_idx"... OK
- creating index "notifications_id_idx"... OK
- creating index "notifications_nodeid_idx"... OK
- creating index "notifications_ipaddr_idx"... OK
- creating index "notifications_serviceid_idx"... OK
- creating index "notifications_eventid_idx"... OK
- creating index "notifications_respondtime_idx"... OK
- creating index "notifications_answeredby_idx"... OK
- inserting initial table data for "distPoller"... OK
- checking Tomcat 4 for OpenNMS web UI... UPDATING:
- adding OpenNMS web UI context to server.xml... DONE
- checking if database "opennms" is unicode... DONE
- searching for PostgreSQL module directory... /usr/lib/postgresql/lib/opennms
- checking for stale iplike.so references... CLEAN
- checking for stale eventtime.so references... CLEAN
- adding iplike.so database function... OK
- adding PL/pgSQL call handler... EXISTS
- adding PL/pgSQL language module... EXISTS
- adding stored procedures...
- getManagedOutageForIntfInWindow.sql... OK
- getManagedOutageForNodeInWindow.sql... OK
- getManagedServiceCountForNode.sql... OK
- getManagePercentAvailNodeWindow.sql... OK
- getManagedServiceCountForIntf.sql... OK
- getManagePercentAvailIntfWindow.sql... OK
- getPercentAvailabilityInWindow.sql... OK
- getOutageTimeInWindow.sql... OK
<<< Configuration Complete >>>
I have modified access controls for the opennms database in
/etc/postgresql/pg_hba.conf. Please check this to be sure it
complies with your local security policies.
Setting up opennms (1.1.2-1woody) ...
```