Manual, Packages and Logs

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Manual pages

- Most Linux commands have an associated manual page
  - Often known as a manpage
- Viewed with the “man” command
  - e.g.) $man ls
- Press “q” to quit and return to the shell prompt

Example of a manual page

```
kbkim@ubuntu: ~
File  Edit  View  Terminal  Help
LS(1)                        User Commands                        LS(1)

NAME
       ls - list directory contents

SYNOPSIS
       ls [OPTION]... [FILE]...

DESCRIPTION
       List information about the FILEs (the current directory by default).
       Sort entries alphabetically if none of -cftuvSUX nor --sort.

       Mandatory arguments to long options are mandatory for short  options
       too.

       -a, --all
              do not ignore entries starting with .

       -A, --almost-all
              do not list implied . and ..
 Manual page ls(1) line 1
```

Navigating within manual pages

- “man” uses the “less” viewer
- Use the cursor keys for scrolling
- Other common key strokes:
  - Space → jump down a page
  - b → jump back up a page
  - /word → search for the next occurrence of “word”
  - n → repeat the previous search
  - g → go to the top
  - q → quit
- Help on all keystrokes is available with “h”

Format of a Manual page

- Manpages have a traditional format
- Manpages for user commands tend to have some or all of these sections:
  - NAME → name and single-line reason for the command
  - SYNOPSIS → possible arguments
  - DESCRIPTION → fuller explanation of the command
  - OPTIONS
  - FILES → any files the command needs
  - ENVIRONMENT → pertinent environment variables
  - BUGS, AUTHORS, SEE ALSO

Section of Manual

- Each manpage is in a section of the manual
- User commands are in section 1
- Different sections can contain pages of the same name
  - The “passwd” page in section 1 describes the “/usr/bin/passwd” command
    → passwd(1) : brought by **“man 1 passwd”**
  - The “passwd” page in section 5 describes the “/etc/passwd” file
    → passwd(5) : brought by **“man 5 passwd”**

Example of section of the manual

```
kbkim@ubuntu: ~
File  Edit  View  Terminal  Help
PASSWD(1)                    User Commands                    PASSWD(1)

NAME
       passwd - change user password

SYNOPSIS
       passwd [options] [LOGIN]

DESCRIPTION
       The passwd command changes passwords for user accounts. A normal
       user may only change the password for his/her own account, while the
 Manual page passwd(1) line 1
```

```
kbkim@ubuntu: ~
File  Edit  View  Terminal  Help
PASSWD(5)              File Formats and Conversions              PASSWD(5)

NAME
       passwd - the password file

DESCRIPTION
       /etc/passwd contains one line for each user account, with seven
       fields delimited by colons (":"). These fields are:

       ·   login name

 Manual page passwd(5) line 1
```

Manual Section Numbering

- Most commands are documented in section 1
  - This is the first place man looks
- Other sections may be needed

Section	Description
1	General command (or user program)
2	System calls
3	Library functions, covering in particular the C standard Library
4	Special files (usually devices, those found in /dev) and drivers
5	File formats and conventions
6	Games and screensavers
7	Miscellanea
8	System administration commands and daemons

Determining Available Man pages

- “what is” command
  - Lists manpages with the specified name
- Section number in brackets
- Single-line description from the NAME section
- Useful for quickly discovering what a command does
- “man –f “ is equivalent to “whatis”

Example of whatis

kbkim@ubuntu: ~

File Edit View Terminal Help

```
kbkim@ubuntu:~$ whatis
whatis what?
kbkim@ubuntu:~$ whatis passwd
passwd (5)           - the password file
passwd (1ssl)        - compute password hashes
passwd (1)           - change user password
kbkim@ubuntu:~$ whatis tac
tac (1)              - concatenate and print files in reverse
kbkim@ubuntu:~$ whatis printf
printf (3)           - formatted output conversion
printf (1)           - format and print data
kbkim@ubuntu:~$ man -f passwd
passwd (5)           - the password file
passwd (1ssl)        - compute password hashes
passwd (1)           - change user password
kbkim@ubuntu:~$
```

Printing Manual Pages

- "–t" option generate a postscript version of manual pages

Searching for Manpages

- “apropos”
  - To search for pages with a NAME section matching a particular keyword
- Can’t restrict the search to a particular section
  - We can use “grep”
- “man –k” is equivalent to “apropos”

Example of apropos

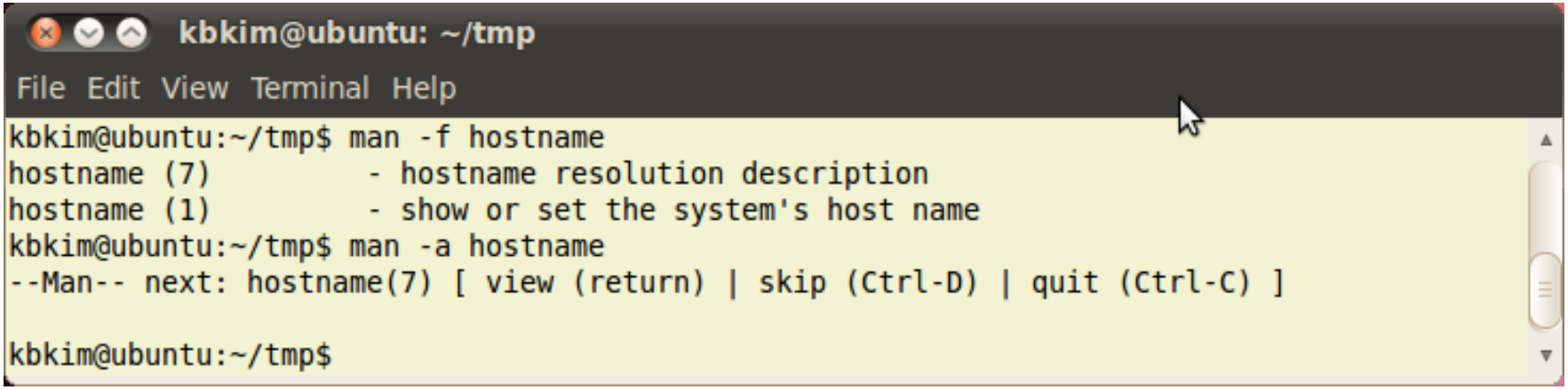
kbkim@ubuntu: ~/tmp

File Edit View Terminal Help

```
kbkim@ubuntu:~/tmp$ apropos open | wc
     66     536    3787
kbkim@ubuntu:~/tmp$ man -k open | wc
     66     536    3787
kbkim@ubuntu:~/tmp$ apropos open | grep '(1)'
compiz (1)           - OpenGL window and compositing manager
gnome-open (1)       - Open files and URLs using the GNOME file handlers
gpg (1)              - OpenPGP encryption and signing tool
gpgsplit (1)         - Split an OpenPGP message into packets
gpgv (1)             - Verify OpenPGP signatures
nc_openbsd (1)       - arbitrary TCP and UDP connections and listens
oocalc (1)           - OpenOffice.org office suite
oodraw (1)           - OpenOffice.org office suite
ooffice (1)          - OpenOffice.org office suite
oofromtemplate (1)   - OpenOffice.org office suite
ooimpress (1)        - OpenOffice.org office suite
oomath (1)           - OpenOffice.org office suite
ooweb (1)            - OpenOffice.org office suite
oowriter (1)         - OpenOffice.org office suite
open (1)             - start a program on a new virtual terminal (VT).
openoffice (1)       - OpenOffice.org office suite
openvt (1)           - start a program on a new virtual terminal (VT).
rlogin (1)           - OpenSSH SSH client (remote login program)
rsh (1)              - OpenSSH SSH client (remote login program)
slogin (1)           - OpenSSH SSH client (remote login program)
ssh (1)              - OpenSSH SSH client (remote login program)
unopkg (1)           - OpenOffice.org Extension Manager
xdg-open (1)         - opens a file or URL in the user's preferred application
kbkim@ubuntu:~/tmp$
```

Displaying all manpages

- “man –a”
  - Display all pages which have a particular name, regardless of their section
    - Display and wait for quit
    - Then chose to view/skip/quit the next manpage



Searching the contents of all Man pages

- “man –K”
  - Search through the textual contents of the entire manual
  - Uppercase k !!
- Not particularly useful
  - Many false matches obscuring the desired data
  - Slow to search so much text
  - Tedious to respond to each prompt

Finding the right manual page

- Sometimes commands' documentation are not quite where expected
- Related commands can be grouped together on one page
  - e.g.) gzip, gunzip and zcat are in one man page
  - Can be misleading if you look up one command and start reading the description of another

Example of “man gzip”

```
kbkim@ubuntu: ~/tmp
File  Edit  View  Terminal  Help
GZIP(1)                                                          GZIP(1)

NAME
       gzip, gunzip, zcat - compress or expand files

SYNOPSIS
       gzip [ -acdfhlLnNrtvV19 ] [-S suffix] [ name ...  ]
       gunzip [ -acfhlLnNrtvV ] [-S suffix] [ name ...  ]
       zcat [ -fhLV ] [ name ...  ]

DESCRIPTION
       Gzip reduces the size of the named files using Lempel-Ziv coding (LZ77).  When-
       ever possible, each file is replaced by one with the extension .gz, while keep-
       ing  the  same  ownership  modes,  access and modification times.  (The default
       extension is -gz for VMS, z for MSDOS, OS/2 FAT, Windows NT FAT and Atari.)  If
       no  files  are  specified, or if a file name is "-", the standard input is com-
       pressed to the standard output.  Gzip will only  attempt  to  compress  regular
       files.  In particular, it will ignore symbolic links.

       If the compressed file name is too long for its file system, gzip truncates it.
       Gzip attempts to truncate only the parts of the file name longer than 3 charac-
       ters.  (A part is delimited by dots.) If the name consists of small parts only,
       the longest parts are truncated. For example, if file names are limited  to  14
 Manual page gzip(1) line 1
```

Help on Shell Builtins

- Shell built-in commands are documented in shell's manpages
  - cd(1) refers the reader to bash(1)
  - echo(1) relates to "/bin/echo", but in most shells "echo" is a separate built-in command
- "help" command
  - Display brief explanations of builtin functions

Example of help

kbkim@ubuntu: ~/tmp

File Edit View Terminal Help

```
kbkim@ubuntu:~/tmp$ help cd
cd: cd [-L|-P] [dir]
    Change the shell working directory.

    Change the current directory to DIR.  The default DIR is the value of the
    HOME shell variable.

    The variable CDPATH defines the search path for the directory containing
    DIR.  Alternative directory names in CDPATH are separated by a colon (:).
    A null directory name is the same as the current directory.  If DIR begins
    with a slash (/), then CDPATH is not used.

    If the directory is not found, and the shell option `cdable_vars' is set,
    the word is assumed to be  a variable name.  If that variable has a value,
    its value is used for DIR.

    Options:
        -L      force symbolic links to be followed
        -P      use the physical directory structure without following symbolic
        links

    The default is to follow symbolic links, as if `-L' were specified.

    Exit Status:
    Returns 0 if the directory is changed; non-zero otherwise.
kbkim@ubuntu:~/tmp$
```

Location of manual pages

- Manpages are stored in the filesystem
- “man -aw” to find the locations of a given manpage
  - Show the locations of all manpages with a given name
- Common locations for manpages include “/usr/man” and “/usr/share/man”
  - Locally installed packages often put manpages under “/usr/share/man”

Example of “man –aw”

```
kbkim@ubuntu: ~
File  Edit  View  Terminal  Help
kbkim@ubuntu:~$ man -aw passwd
/usr/share/man/man1/passwd.1.gz
/usr/share/man/man1/passwd.1ssl.gz
/usr/share/man/man5/passwd.5.gz
kbkim@ubuntu:~$ ls /usr/share/man
cs  es  fr           fr.UTF-8  hu  it  ko    man2  man4  man6  man8  pt_BR  sv  zh_CN
de  fi  fr.ISO8859-1 gl        id  ja  man1  man3  man5  man7  pl    ru     tr  zh_TW
kbkim@ubuntu:~$ ls -l /usr/share/man/man1 | wc
   1287   10638   82751
kbkim@ubuntu:~$ man -aw zcat
/usr/share/man/man1/gzip.1.gz
kbkim@ubuntu:~$ man -aw gunzip
/usr/share/man/man1/gzip.1.gz
kbkim@ubuntu:~$ man -aw gzip
/usr/share/man/man1/gzip.1.gz
kbkim@ubuntu:~$ ls -l /usr/share/man/man1/gunzip*
lrwxrwxrwx 1 root root 9 2012-03-21 07:43 /usr/share/man/man1/gunzip.1.gz -> gzip.1.gz
kbkim@ubuntu:~$ ls -l /usr/share/man/man1/gzip*
-rw-r--r-- 1 root root 6250 2010-08-16 23:57 /usr/share/man/man1/gzip.1.gz
kbkim@ubuntu:~$ ls -l /usr/share/man/man1/zcat*
lrwxrwxrwx 1 root root 9 2012-03-21 07:43 /usr/share/man/man1/zcat.1.gz -> gzip.1.gz
kbkim@ubuntu:~$
```

Info pages

- GNU's documentation system
  - GNU utilities have info pages
  - Often duplicating man pages
  - An info page may be split into nodes
  - Use hyperlinks between nodes
- Scroll with the cursor keys, PgUp and PgDn
- Hyperlinks
  - Tab : find next, Enter : follow hyperlink, l : return to previous location
  - n, p, u : next, previous, up node

Example of “info ls”

```
kbkim@ubuntu: ~
File  Edit  View  Terminal  Help
File: coreutils.info,  Node: ls invocation,  Next: dir invocation,  Up: Directory listing

10.1 `ls': List directory contents
==================================

The `ls' program lists information about files (of any type, including
directories).  Options and file arguments can be intermixed
arbitrarily, as usual.

   For non-option command-line arguments that are directories, by
default `ls' lists the contents of directories, not recursively, and
omitting files with names beginning with `.'.  For other non-option
arguments, by default `ls' lists just the file name.  If no non-option
argument is specified, `ls' operates on the current directory, acting
as if it had been invoked with a single argument of `.'.

   By default, the output is sorted alphabetically, according to the
locale settings in effect.(1) If standard output is a terminal, the
output is in columns (sorted vertically) and control characters are
output as question marks; otherwise, the output is listed one per line
and control characters are output as-is.
--zz-Info: (coreutils.info.gz)ls invocation, 56 lines --Top--------------------------------
Welcome to Info version 4.13. Type h for help, m for menu item.
```

Documents in “/usr/share/doc”

- Sometimes the main(or only) documentation of a program is not available as man or info pages
- “/usr/share/doc/” contains other format of documentation
  - Usually plain text
  - Sometimes HTML
  - Subdirectory per package, such as “/usr/share/doc/grep/”

Contents of “/usr/share/doc”

- Documentation in “/usr/share/doc” is often information only relevant to system administration of a package, not users of it
  - Installation instructions, license, change log
- Sometimes more user-friendly documentation than elsewhere
  - HTML help is more common for interactive applications and very rare for traditional unix command
  - Programs ported from other platforms often have documentation in “/usr/share/doc” rather than man pages

Package Management

- Packages
  - Bundles of software and metadata
    - Software's full name
    - Description of its purpose
    - Version number
    - Vendor
    - Checksum
    - A list of **dependencies** necessary for the software to run properly
- Package Management system
  - A collection of tools to automate the process of
    - Installing software packages
    - Upgrading software packages
    - Configuring software packages
    - Removing software packages

Different to File archives

- File archiver
  - A computer program that combines a number of files together into one archive file for easier transportation or storage
- Metadata
  - Data (or information) about other data
- Tar (Tarball) and Zip
- Commonly used for source and binary distribution on Unix-like platforms

Dependency Problems

- Executable programs are derived from source code and libraries
- The make (compiling and linking) process requires the description of all dependencies between those files
- Broken, extraneous, faulty, forgotten, or incompatible dependencies cause programming mistakes or bugs
- Dependency Hell
  - Many dependencies – high coupling
  - Long chains of dependencies
  - Conflicting dependencies
  - Circular dependencies
- Version Numbers
  - Partial solution to dependency problems
  - Naming conventions are inconsistent

Package Management Systems

- Different Linux distribution may use different package management systems

			Front Ends	
Base	**Package**	**Tool**	**CLI**	**GUI**
dpkg	.deb	apt	apt-get aptitude dselect jigdo	synaptic
rpm	.rpm	rpm apt-rpm YUM ZYpp	rpm apt-rpm yum yast pcon urpmi *jigdo* ???	yumex KYum yast gnome-packagekit kpackagekit pup [pirut] *pyjigdo* ???

dpkg – package manager for Debian
rpm – Red-hat Package Manager

dpkg

- A package manager for Debian-based system
- **dpkg -l**
  - List all packages installed on the system
- **dpkg -L package_name**
  - List the files installed by a package
- **dpkg -S file_path**
  - Search a package which contains the given file
- **dpkg -i package_deb_name.deb**
  - Install a local package deb file
- **dpkg -r package_name**
  - Remove a package
  - *Not Recommended !!*

apt-get

- Ubuntu's Advanced Packaging Tool (APT)
- Command-line tool for server administrators
- **apt-get install package_name**
  - Install a package
- **apt-get remove package_name**
  - Remove a package
  - "--purge" option : remove the package configuration files as well
- **apt-get upgrade**
  - Upgrade the installed packages
  - We need updated information : package index
- **apt-get update**
  - Update the APT package index from the repository defined in the "/etc/apt/source.list"
- All the activities are logged in the "**/var/log/dpkg.log**" file

Repository

- APT uses APT system repository
- What is a repository?
  - A collection of files, plus an index
  - Centralized repositories by distribution
  - Repositories may be structured differently
  - Cryptographically signed with GPG keys to authenticate identity
    - GPG : GNU Privacy Guard
      - Alternative to the PGP (Pretty Good Privacy) suite of cryptographic software

Ubuntu repository

- "/etc/apt/sources.list"
  - Configuration of Ubuntu's APT system repositories
- Types
  - **Main** – Canonical-supported free and open-source software
  - **Restricted** – Proprietary drivers for devices
  - **Universe** – Community-maintained free an open-source software
  - **Multiverse** – Software restricted by copyright or legal issues
    - e.g. DVD player open source software with closed source drivers/libraries

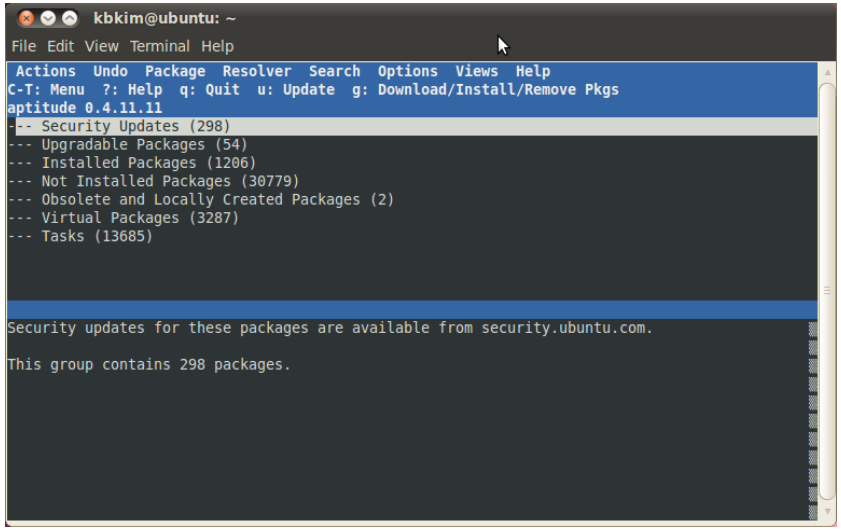
kbkim@ubuntu: ~

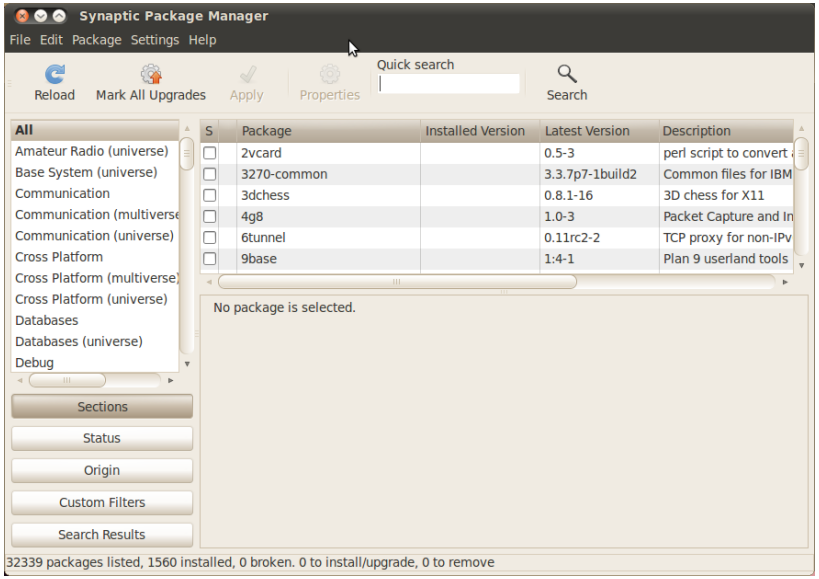
File Edit View Terminal Help

```
kbkim@ubuntu:~$ cat /etc/apt/sources.list | more
#deb cdrom:[Ubuntu 10.04.4 LTS _Lucid Lynx_ - Release i386 (20120214.2)]/ lucid
main restricted
# See http://help.ubuntu.com/community/UpgradeNotes for how to upgrade to
# newer versions of the distribution.

deb http://ftp.daum.net/ubuntu/ lucid main restricted
deb-src http://ftp.daum.net/ubuntu/ lucid main restricted

## Major bug fix updates produced after the final release of the
## distribution.
deb http://ftp.daum.net/ubuntu/ lucid-updates main restricted
deb-src http://ftp.daum.net/ubuntu/ lucid-updates main restricted

## N.B. software from this repository is ENTIRELY UNSUPPORTED by the Ubuntu
## team. Also, please note that software in universe WILL NOT receive any
## review or updates from the Ubuntu security team.
deb http://ftp.daum.net/ubuntu/ lucid universe
deb-src http://ftp.daum.net/ubuntu/ lucid universe
deb http://ftp.daum.net/ubuntu/ lucid-updates universe
deb-src http://ftp.daum.net/ubuntu/ lucid-updates universe

## N.B. software from this repository is ENTIRELY UNSUPPORTED by the Ubuntu
## team, and may not be under a free licence. Please satisfy yourself as to
## your rights to use the software. Also, please note that software in
## multiverse WILL NOT receive any review or updates from the Ubuntu
## security team.
deb http://ftp.daum.net/ubuntu/ lucid multiverse
deb-src http://ftp.daum.net/ubuntu/ lucid multiverse
deb http://ftp.daum.net/ubuntu/ lucid-updates multiverse
deb-src http://ftp.daum.net/ubuntu/ lucid-updates multiverse

## Uncomment the following two lines to add software from the 'backports'
## repository.
## N.B. software from this repository may not have been tested as
## extensively as that contained in the main release, although it includes
```

Other APT systems in Ubuntu

- Aptitude
  - Menu-driven, text-based front-end to the APT system
- Synaptic
  - GUI based APT system





Snappy in Ubuntu

- Software deployment and package management system
  - Developed by Canonical (developer of Ubuntu)
  - Designed to work for Internet of Things, Cloud, and desktop computing
  - Basically provided by Ubuntu from version 16
- Commands
  - sudo snap find
  - sudo snap install <pakage>
  - sudo snap list
  - sudo snap changes
  - sudo snap refresh
  - sudo snap remove <패키지>
  - sudo snap remove core --revision <number>

Logging

- Many events that occur on a Linux system should be logged for administrative purposes
- Linux has a facility called “syslog” that allows any service or part of the system to log such events
  - c.f.) “rsyslog” in ubuntu
- Events can be selected based on severity (level) and/or on the service that encountered the event (facility)
- Messages can go to files, to the system console, or to a centralized syslog server running on another machine

rsyslog in ubuntu

kbkim@ubuntu: ~

File Edit View Terminal Help

```
kbkim@ubuntu:~$ man -k rsyslog
rsyslog.conf (5)     - rsyslogd(8) configuration file
rsyslogd (8)         - reliable and extended syslogd
kbkim@ubuntu:~$ ls /etc/rsyslog*
/etc/rsyslog.conf

/etc/rsyslog.d:
20-ufw.conf  50-default.conf
kbkim@ubuntu:~$ ps -ef | grep rsyslog
syslog     720     1  0 16:04 ?        00:00:00 rsyslogd -c4
kbkim     2167  1954  0 16:10 pts/0    00:00:00 grep --color=auto rsyslog
kbkim@ubuntu:~$
```

Configuration of rsyslog

- Configuration is in “/etc/rsyslog.conf” and “/etc/rsyslog.d”
  - Form : facility.level destination
- The facility is the creator of messages
  - One of auth, authpriv, cron, daemon, kern, lpr, mail, news, syslog, user, or local0 through local7
- The level is a severity threshold beyond which messages will be logged
  - (lowest to highest)
  - debug, info, notice, warning, err, crit, alert, emerg
- The “destination” indicates where messages selected by the facility and level will be sent
  - Normally the name of a log file or a device

Details of Facility

- auth → security/authorization messages
- authpriv → security/authorization messages (more sensitive)
- cron → clock daemon
- daemon → system daemon without separate facility
- ftp → ftp daemon
- kern → kernel message
- lpr → line printer subsystem
- mail → mail subsystem
- news → USENET news subsystem
- syslog → message generated internally by rsyslogd

Details of Level

- emerg → system is unusable
- alert → action must be taken immediately
- crit → critical conditions
- err → error conditions
- warning → warning conditions
- notice → normal, but significant, condition
- info → informational message
- debug → debug-level message

Example of configuration

/etc/rsyslog.d/50-default.conf

kbkim@ubuntu: ~

File Edit View Terminal Help

```
#  Default rules for rsyslog.
#
#                       For more information see rsyslog.conf(5) and /etc/rsyslo
g.conf

#
# First some standard log files.  Log by facility.
#
auth,authpriv.*                 /var/log/auth.log
*.*;auth,authpriv.none          -/var/log/syslog
#cron.*                         /var/log/cron.log
daemon.*                        -/var/log/daemon.log
kern.*                          -/var/log/kern.log
lpr.*                           -/var/log/lpr.log
mail.*                          -/var/log/mail.log
user.*                          -/var/log/user.log

#
# Logging for the mail system.  Split it up so that
# it is easy to write scripts to parse these files.
#
mail.info                       -/var/log/mail.info
mail.warn                       -/var/log/mail.warn
mail.err                        /var/log/mail.err
```

kbkim@ubuntu: ~

File Edit View Terminal Help

```
#
daemon.*;mail.*;\
        news.err;\
        *.=debug;*.=info;\
        *.=notice;*.=warn       |/dev/xconsole
                                                        68,2-9        Bot
```

Reconfiguration of rsyslog

- If you change the configuration of rsyslog, you need to tell rsyslog to re-read the configuration
- Accomplished by sending the rsyslogd process a SIGHUP (hang up) signal
  - e.g.) #kill –HUP /usr/sbin/rsyslogd
- Alternative way : use init script of rsyslog
  - e.g.) #service rsyslog start

Examining logs

- Sometimes need to manually scan log files for notable activity
- Since logs are plain text, you can use standard text-processing tools like to examine them
- Location of log files
  - /var/log
- Which tools can be used?
  - less, grep, tail, vi…

Examples

kbkim@ubuntu: /var/log

File Edit View Terminal Help

```
kbkim@ubuntu:~$ cd /var/log
kbkim@ubuntu:/var/log$ ls
apparmor          debug.3.gz        kern.log.3.
apt               debug.4.gz        kern.log.4.
auth.log          dist-upgrade      lastlog
auth.log.1        dmesg             lpr.log
auth.log.2.gz     dmesg.0           lpr.log.1
auth.log.3.gz     dmesg.1.gz        mail.err
auth.log.4.gz     dmesg.2.gz        mail.info
boot              dmesg.3.gz        mail.log
boot.log          dmesg.4.gz        mail.warn
bootstrap.log     dpkg.log          messages
btmp              dpkg.log.1        messages.1
btmp.1.gz         dpkg.log.2.gz     messages.2.
ConsoleKit        faillog           messages.3.
cups              fontconfig.log    messages.4.
daemon.log        fsck              news
daemon.log.1      gdm               pm-powersav
daemon.log.2.gz   installer         pm-powersav
daemon.log.3.gz   jockey.log        pm-powersav
daemon.log.4.gz   jockey.log.1      pycentral.l
debug             kern.log          samba
debug.1           kern.log.1        speech-disp
debug.2.gz        kern.log.2.gz     syslog
kbkim@ubuntu:/var/log$
```

kbkim@ubuntu: /var/log

File Edit View Terminal Help

```
May 20 16:23:46 ubuntu rsyslogd: [origin software="rsyslogd" swVersion="4.2.0"
x-pid="720" x-info="http://www.rsyslog.com"] rsyslogd was HUPed, type 'lightwei
ght'.
May 20 16:28:49 ubuntu kernel: Kernel logging (proc) stopped.
May 20 16:28:49 ubuntu kernel: imklog 4.2.0, log source = /proc/kmsg started.
May 20 16:28:49 ubuntu rsyslogd: [origin software="rsyslogd" swVersion="4.2.0"
x-pid="2597" x-info="http://www.rsyslog.com"] (re)start
May 20 16:28:49 ubuntu rsyslogd: rsyslogd's groupid changed to 103
May 20 16:28:49 ubuntu rsyslogd: rsyslogd's userid changed to 101
May 20 16:28:54 ubuntu kernel: Kernel logging (proc) stopped.
May 20 16:28:54 ubuntu rsyslogd: [origin software="rsyslogd" swVersion="4.2.0"
x-pid="2597" x-info="http://www.rsyslog.com"] exiting on signal 15.
May 20 16:28:54 ubuntu kernel: imklog 4.2.0, log source = /proc/kmsg started.
May 20 16:28:54 ubuntu rsyslogd: [origin software="rsyslogd" swVersion="4.2.0"
x-pid="2607" x-info="http://www.rsyslog.com"] (re)start
May 20 16:28:54 ubuntu rsyslogd: rsyslogd's groupid changed to 103
May 20 16:28:54 ubuntu rsyslogd: rsyslogd's userid changed to 101
May 20 16:29:40 ubuntu kernel: Kernel logging (proc) stopped.
May 20 16:29:40 ubuntu rsyslogd: [origin software="rsyslogd" swVersion="4.2.0"
x-pid="2607" x-info="http://www.rsyslog.com"] exiting on signal 15.
May 20 16:29:40 ubuntu kernel: imklog 4.2.0, log source = /proc/kmsg started.
May 20 16:29:40 ubuntu rsyslogd: [origin software="rsyslogd" swVersion="4.2.0"
x-pid="2646" x-info="http://www.rsyslog.com"] (re)start
May 20 16:29:40 ubuntu rsyslogd: rsyslogd's groupid changed to 103
"messages" [readonly] 24L, 2237C                          1,1           Top
```

Log rotation

- rsyslog will normally allow log files to grow without bound
  - Until you run out of disk space
- The solution is to use log rotation
  - A scheme whereby existing log files are periodically renamed and ultimately deleted
- “logrotate” command to perform rotation
  - Run daily by “cron”
- “logrotate” can be configured with “/etc/logrotate.conf”

Example of logrotate.conf

kbkim@ubuntu: /etc

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```
# see "man logrotate" for details
# rotate log files weekly
weekly

# keep 4 weeks worth of backlogs
rotate 4

# create new (empty) log files after rotating old ones
create

# uncomment this if you want your log files compressed
#compress

# packages drop log rotation information into this directory
include /etc/logrotate.d

# no packages own wtmp, or btmp -- we'll rotate them here
/var/log/wtmp {
    missingok
    monthly
    create 0664 root utmp
    rotate 1
}

/var/log/btmp {
"logrotate.conf" [readonly] 32 lines --3%--                    1,1           Top
```

daily, weekly, monthly, yearly

Older ones are removed

We may use “size” option. (e.g. sige 10M)

compress is default, noncompress, delaycompress

kbkim@ubuntu

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```
/var/log/syslog
{
        rotate 7
        daily
        missingok
        notifempty
        delaycompress
        compress
        postrotate
                reload r
        endscript
}

/var/log/mail.info
/var/log/mail.warn
/var/log/mail.err
/var/log/mail.log
/var/log/daemon.log
/var/log/kern.log
/var/log/auth.log
/var/log/user.log
/var/log/lpr.log
/var/log/cron.log
/var/log/debug
/var/log/messages
"/etc/logrotate.d/rsyslog" [readonly] 37L, 515C              1,1           Top
```