Ethiopian Free and Open Source Software Network (EFOSSNet)

Basic Linux Administration Training

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System Updates

System Updates

- Install and remove applications
- RPM: Adding, updating software.
- Red Hat automated system update: up2date.
- YUM/YUMEX: Adding, updating RPM's.

Read Hat Package Manager

- There are two principal package mangers:
  - RPM
  - dpkg- Debian Package Manger
- RPM
  - FOSS
  - Developed by Red Hat
  - Helps to build both source and binary distribution
  - Manage dependencies and Automate installation
  - Installed Software Database
  - Remove software
  - Package verification option

RPM (cont`d)

- Installing and Removing software
  - To install a package

    #rpm –i rpm-name.rpm
  - it reads the specified file, extract the files, and install the in the correct location.
  - To download from internet and install a package:

    #rpm –i ftp://ftp.site.com/pub/packagename.rpm
  - To remove a package:

    #rpm –e rpm-name.rpm
- Consult the man page for detail

- Example:

gPhoto2 project

#rpm –qi gphoto2-2.2.6-1.1

#rpm –u /media/cdrom/gphoto2-2.2.6-1.1.i386.rpm

rpm –qa

#rpm –i /media/cdrom/mc-4.6.1a-0.15.FC4.i386.rpm

rpm –qi mc-4.6.1a-0.15.FC4

RPM (cont`d)

- Package verification:

  #rpm –va

- RPM Query
  - Identifies what package a given file belong and prints information about the package

    #rpm –qf {filename}

    #rpm –qf /sbin/insmod
  - Information about the RPM package file itself

    #rpm –qi {rpmfile}

    #rpm –qi module-init-tools.3.1-3

    #rpm –qi zip-2.3.8.i386.rpm

    #rpm –ql zip-2.3.8.i386.rpm

RPM

- Building package using RPM
  - Steps:
    - Prepare a source code
    - Construct a patch of changes made on the source code
    - Create RPM spec file
    - Ensure all files are in their proper locations
    - create the RPM package
  - #more *.spec
- Building RPM Tree
  - Defined in /etc/rpmrc or /usr/slib/rpmrc
- Building a package:

  #rpm -ba filename.spec

Data compression

Gzip,gunzip and zcat commands

Example:

#gzip /var/log/messages

#gunzip /var/log/messages

#gzip –d /var/log/messages

#gunzip –c /var/log/messages

tar - archive files

- combines files into one device or filename for archiving purposes.
- ***tar*** does not compress the files; it merely makes a large quantity of files more manageable.

Syntax

tar [options] {target file} {Source files}

- Common Options

  c create an archive (begin writting at the start of the file)

  t table of contents list

  x extract from an archive

  v prints additional information

  f **specify the output file**

  d **Compress the target and the source**

  b archive block size

  z Process the output through gzip, and gnuzip

- ***tar*** will accept its options either with or without a preceding hyphen (-).

tar (cont`d)

- Example:

  #tar –cvf /dev/rmt0 {files}

- Examples

  Given the files and size indications below:

  45 logs.beauty, 89 logs.bottom, 74 logs.photon, 84 logs.top

  tar can combine these into one file, **logfile.tar**:

  # tar -cf logfile.tar logs.* ; ls -s logfile.tar

  304 logfile.tar

tar (cont`d)

- To extract the files from files you would first uncompress them, or use the appropriate zcat command and pipe the output into :

  #zcat archive.tar.Z | tar -xvf -

- where the hyphen at the end of the ***tar*** command indicates that the file is taken from **stdin**.

tar (cont`d)

- Before installing:
  - Uncompress and untar the file:

    #gzip –d file

    #tar xvf file
  - GNU Linux tar uncompress and extract at the same time
    - #tar zxvf file
  - make command

cpio (cont`d)

- Copy In, Out
- Similar with tar, except tar copies device files, located in /dev, and empty directories, unlike cpio.
- Common Options

  i extract form archive

  o create an archive

  p prints content of the archive

  f through gzip, and gnuzip
- Example:

  #cpio –iv < /dev/rmt0

  #find / -owner student | cpio –pdv /home/student/newdir

Automating package management and updates

- Updates should be applied regularly
- Most Linux distributions provide tools for automatically updating packages
  - package manager managers
- Some of the most common pmms :
  - Advanced Package Tool (APT)
    - **apt-get *update***
    - **apt-get *upgrade***
  - **up2date**
  - Yellowdog's Updater Modified (**yum**)

yum

- An interactive, automated update program
- Used to maintain systems using rpm

  #yum options command package(s)

  Command:

  install

  update

  check-update

  remove

  List

- Files:
  - /etc/yum.conf
  - /var/cahche/yum/

System Monitoring

System Monitoring

- The system accounting is tracking information about the system.
- Information is tracked until the system shutdown.
- The information that is tracked is as follows:
  - Users logging in and out of the system
  - How much and many resources a user processes has taken
  - How much disk space has been used by the users' files

☺ As an administrator keep your eye on the system and disk

System logs

- Log files
  - Log files document events
    - /var/log/messages - system Messages- syslogs
    - /var/log/secure - Logging by PAM of network access attemts
    - /dmesg - Log of system boot. Also see command Dmesg
    - /var/log/boot.log - Log of system init Process
    - /xferlog.1 - File transfer log
    - /lastlog -Requires the use of the lastlog command to examine contents
    - /maillog - log fromm sendmail daemon
- examples:

#cd /var/log

#grep "^Mar 11" message

#grep "^mar 10 messeges.1 | grep 'su'

#grep "su:" messages

#grep "su (" message* | grep –vE '(session opened | session closed)'

Log files

- Boot logs:- /var/log/boot.log
  - #head -20 boot.log.2
  - # grep –E '(warning|erron\crit|fatal)' boot.log*
- Tracking Hackers
  - **/secure-** lists security related events

    #cd /

    #head /var/log/secure

Logrotate :- Log Rotate

- Minimizing the size of log files while making them accessible .
- periodically backup log file by renameing it.
- The program will also allow the system administrator to set the limit for the number of logs or their size.
- Configuration file: /etc/logrotate.conf .
- Directory for logrotate configuration scripts: /etc/logrotate.d/

find command

- **Syntax**

  find directory [search options] [actions]

- **Common Options**
  - For the time search options the notation in days, **n** is:
    - **+n** more than **n** days
    - **n** exactly **n** days
    - **-n** less than **n** days
  - Some file characteristics that ***find*** can search for are:
    - **time** that the file was last accessed or changed
    - **-atime** n access time, true if accessed **n** days ago
    - **-ctime** n change time, true if the files status was changed **n** days ago
    - **-mtim**e n modified time, true if the files data was modified **n** days ago
  - -**newer** filename true if newer than **filename**
  - **-type** type **type** of **file**, where **type** can be:
    - **b** block special file
    - **c** character special file
    - **d** directory
    - **l** symbolic link
    - **p** named pipe (fifo)
    - **f** regular file

find (cont`d)

- Examples:
  - All files with general read or execute permission set, and then to change the permissions on those files to disallow this:

    [user@efossnet ~]# find . \(-perm -004 -o -perm -001 \)
    -exec chmod o-rx {} \; -exec ls -al {} \;
  - All files accessed five days ago

    [user@efossnet ~]# find . -atime +5

    [user@efossnet ~]# find . -atime +5

Command	Description
vmstat	Monitor virtual memory
free	Display amount of free and used memory in the system. (Also: cat /proc/meminfo)
pmap	Display/examine memory map and libraries (so).
cat /proc/sys/vm/freepages	Display virtual memory "free pages". One may increase/decrease this limit: echo 300 400 500 > /proc/sys/vm/freepages
cat /proc/version	Display Linux kernel version in use.
cat /etc/redhat-release	Display Red Hat Linux Release. (also /etc/issue)
uptime	Tell how long the system has been running. Also number of users and system's load average.
w	Show who is logged on and what they are doing.
/sbin/lsmod	List all currently loaded kernel modules. Same as cat /proc/modules
/sbin/runlevel	Displays the system's current runlevel.
Service	Display status of system services.

Process Management

Process

- Program at execution.
- Types of processes:
  - Interactive
  - Automatic
  - Daemon
- Background versus foreground processes
  - Commands
    - jobs

      [user@efossnet ~]#jobs
    - fg

      [user@efossnet ~]#fg % jobNum
    - bg

      [user@efossnet ~]#{ctrl + z }

      [user@efossnet ~]#bg% jobNum

Process (cont`d)

- Process Priority
  - Changing priority
    - nice Command

      [user@efossnet ~]#nice -20 find / -print 2>dev/null >tmp>listing
      [user@efossnet ~]$p#

      [user@efossnet ~]#nice -15 find / -print 2>dev/null >tmp>listing
      [user@efossnet ~]$p#

    - renice Command

      [user@efossnet ~]#renice +20 -u
      500: old priority 0, new priority 10
      [user@efossnet ~]$p#

Process (cont`d)

- Characteristics:
  - PID
  - The parent PPID
  - Nice number
  - Terminal or TTY
  - User name of the real and effective user (RUID and EUID)
  - Real and effective group owner (RGID and EGID)

Process (cont`d)

- Viewing process table
  - Ps command

    [user@efossnet ~]$ps

    [user@efossnet ~]$ps –a

    [user@efossnet ~]$ ps –f

    [user@efossnet ~]$ ps -l

    [user@efossnet ~]$ps -ef | grep *username*
- Relationship between processes
  - Pstree command

    [user@efossnet ~]$ pstree
- Memory and CPU Usage Statistics
  - top command

    [user@efossnet ~]$ top
- Ending a Process
  - Kill command

    [user@efossnet ~]$ kill pid

Job Scheduling

at command

- **at command**
  - Enables you to run command at a specific time.
  - The job run only once
  - Syntax:

    #at {time}
  - Time is specified before the date:
    - at HH:MM month-name day with an optional year
    - at midnight MMDDYY
    - at HH PM today
    - at noon DD.MM.YY
    - at 14:30 19.03.06
    - at noon tomorrow
    - now : runs the job now
    - now + 5 days

at (cont`d)

- The daemon /usr/sbin/atd will run jobs scheduled with the at command.
- The system initially configured to only enable the root user to use the at command.
- Access control to the command is controlled using the files:
  - /etc/at.allow :-list of user id's permitted to use the at command and
  - /etc/at.deny:- if the deny file exist all users except those in at.deny file are permitted to use at.
- After entering the time specification at the command prompt at command will respond with PS2 prompt (it's "at>" prompt) upon which you enter the command you wish to execute folowed by "Enter".
- More commands may be entered. When done enter "control-d".
- The command atq or at-l enables the user to see his or her own queued jobs.
- Each spooled job is saved as a text file in the directory /var/spool/atjobs
- It is possible to cancel scheduled jobs prior to execution time by using at –d or atrm commands.
- at command used -m options to tell the system to mail to the user when the job is done.
- -f option instructs at to read the command list from a file.

at (cont`d)

- There is a similar command called **batch** which is almost similar with at command except it runs the commands based on the system utilization.
- If the system load is too high, batch will not run the command.

Example

 # cat < atdemo
hostname
date
w
who
df –v
netstat -i
{ ctr +c}
 # at now
at>./atdemo
at>
#atq
1 2005-12-25 10:30 tstdemon //Jobnumber date time jobs

Working with Cron

- cron command runs a job at a regular interval.- Scheduling a re-occuring task
  - cron reads a file with command and times named crontab as in cron table
  - each user has his/her won crontab file.
  - Scheduling access and control:
  - The administrator can allow users to use this facility with specific control by using the /etc/cron.deny and /etc/cron.allow files.
  - The at facility may be controlled with the /etc/at.deny and /etc/at.allow files.

Cron (cont`d)

- A user can list the content of his current crontab using the command:

  #crontab -l
- To remove crontab use:

  #Crontab –r To edit the crontabs entries:

  #Crontab –e
- A user can see only his/her own crontab file. but the root can see an crontab file using a command:

  #Crontab –u “username”
- The six fields in the crontab entry are:
  - Minutes(0-59)
  - Hours(0-23)
  - Day of Month(1-31)
  - Month(1 -12)
  - Day of week (0=Sunday , 6=Saturday)

Thank You