SOI Asia Workshop 2008
Pre-workshop Unix Basic Assignment

This document aims to provide basic Unix commands that operator needs to know to be able to follow lecture content of SOI Asia operator workshop. Participant should review the usage and do a practice on SOI Asia server with guidance and further explanation from senior SOI Asia operator at your site.

To do practice, you need a user account on SOI Asia server machine and root password. Remember to always use your user account to do practice unless the practicing command really require root permission.

1. User account command

passwd : Change your password.
This will let you enter a new password. Please use a password that is not a real word or name and has numbers or punctuation in it.

> *Practice.* Login your user and change password to new one. Do not practice this command with root user.
>
> **# passwd**

su : Become another user
"**su** username" attempt to login as another user, system authenticate by prompting password. Without specifying username, it is attempt to login as root.

exit : Logout
When you are login as a user, you logout by this command.

whoami : Check the current being user
It returns username that you are using now.

> *Practice.* Login your user, and check current being user. "su" to be root, and check that your user is changing to root. Logout user root, and check your user again.
>
> **# whoami**
> **# su**
> **# whoami**
> **# exit**
> **# whoami**

2. Manual and Process command

man : Show any UNIX command usages
"**man** command" shows purpose of command, its format, how to specify options and usage examples. Operator should use "man" to learn more about Unix commands given in this documents.

> *Practice*. Use **man** to learn how to use following commands
> **# man passwd**
> **# man su**
> **# man whoami**

ps : Show process status
"**ps**" show processes own by your user. "**ps –ax**" shows all processes currently running on your server. The output is formatted in columns. First column is process ID, third column is process status and last column is command name. Please find more information of other columns, how to interpret status information and how to use ps in a more complex manner by "man ps".

> *Practice.* Use ps to show processes of your user
> **# ps**
> Show all processes, and find what is process ID of /usr/sbin/sshd
> **# ps –ax**

3. Directory Command

ls : List the contents of a directory
"**ls** option dirname**"** lists content of "dirname" directory. If "dirname" is omitted, it lists current directory. Option "**–l"** gives a more information showing file type, size, owner and modification date of each file, option "-**la**" lists all files including those filenames begin with a dot such as . , .. (“.” represents current directory, “..” represents parent directory).

> *Practice*. Show content of current directory with different options and observe different outputs.
> **# ls**
> **# ls –l**
> **# ls -la**
>
> Show content of "/etc" directory and parent directory("..").
> **# ls –la /etc**
> **# ls –la ..**

cd : Change to a directory.
"**cd** dirname" move working directory to "dirname" directory. If "dirname" is omitted, it will move back to home directory.

pwd : Show current working directory
It prints out current working directory.

> *Practice*. Change directories and check where you are. Notice where is your home directory.
>
> **# cd**
> **# pwd**
> **# cd ..**
> **# pwd**
> **# cd /etc**
> **# pwd**
> **# cd**
> **# pwd**

mkdir : Create a new directory.
"**mkdir** dirname**"** will create a new subdirectory called "dirname**"**.

rmdir : Remove a directory.
"rmdir dirname "will remove a subdirectory "dirname". The directory must be completely empty of files before this command will work.

Practice. Create a directory name "test" on your home directory and remove it. During each step, observe the changing contents of your home directory.

```
# cd
# ls
# mkdir test
# ls
# cd test
# pwd
# ls
# cd ..
# rmdir test
# ls
```

4. File Copy/Move/Remove Command

cp : Copy a file.
"**cp** src dest" will make an exact copy of file "src" , with the name "dest". If "dest" is a subdirectory name, the command will instead copy file "src" into the subdirectory "dest" and use its original file name.

mv : Move (rename) a file.
"**mv** src dest" will move file "src" to file "dest". If "dest" is a subdirectory name, the command will instead move file into the subdirectory "dest" and use its original file name.

** Difference between "**cp**" and "**mv**" is that "**mv**" will delete the "src" file while "**cp**" will leave "src" file untouched **

rm : Remove (delete) a file.
"**rm** filename" will delete "filename". Once it is removed, there is no way to get it back!

Practice. Copy a file "/usr/share/man/man1/tar.1.gz" to home directory. You will find a new file in home directory with its original name.

 # cd
 # cp /usr/share/man/man1/tar.1.gz ./
 # ls

Copy tar.1.gz to another name, you will find a new file with new name and source file is still there.

 # cp tar.1.gz tar.2.gz
 # ls

Move tar.1.gz to another name "test", you will find a new file "test" and source file"tar.1.gz" disappears.

 # mv tar.1.gz test
 # ls

Remove "test" file
 # rm test
 # ls

Create a "test" directory, move file to the directory. Notice how "**mv tar.1.gz test**" command in previous step and "**mv tar.2.gz test**" works differently.

 # mkdir test
 # mv tar.2.gz test
 # ls
 # ls test

Remove "test" directory. The following commands cannot remove directory "test". Why? Because "**rm**" is for remove file only and "**rmdir**" cannot be used if directory is not empty.
 # rm test
 # rmdir test

Remove file in test directory and Remove test directory and practice file
 # rm test/tar.2.gz
 # rmdir test
 # ls

5. File Display Command

cat : Display the content of a file all at once.
"**cat** filename" will output content of "filename" to terminal at once. For long file, the beginning of the file will scroll off the top of the display window and you cannot see it.

more : Display the contents of a file one display screen at a time.
"**more** filename" will show you the contents of "filename". It will show the first page and then wait. Then you can press the spacebar to show the next page or press the return key to show the next line, or press the "**q"** key to quit viewing file.

less : Display the contents of a file a screen at a time. It is enhanced version of more, has more options and functions. If operator have time, check man page of less.

> *Practice*. Display file content using different commands and observe differences.
>
> **# cat /etc/group**
> **# more /etc/group**
> **# less /etc/group**

grep : Search file and print lines that match pattern.
"**grep** pattern filename" will print out each line in file "filename" that contains "pattern". It is case-sensitive search.

> *Practice.* Print line in file "/etc/group" that contain word "wheel"
>
> **# grep wheel /etc/group**

| : Pipe sign for output redirection
" command1 | command 2 " will send output of "command1" to be input of "command2"

> *Practice.* Display all process in the system page by page
> **# ps –ax | more**
>
> Search if process sshd is running or not
> **# ps –ax | grep sshd**
>
> Display Directory content page by page
> **# ls /etc | more**

6. File Editing Command

Vi is a Unix text editor program to be used in the SOI Asia operator workshop.
Typing "**vi filename**" will start an editor program to edit file "filename", it can be an existing file or a new file that you want to create.

Once you get into Vi program, there are two operating modes.

Command mode
This is the mode you are in whenever you begin to use vi. In this mode, you can type several types of commands, for examples, command to move around text, command to start editing text, command to save file, command to exit vi program or searching text. In this mode, whatever you type will be not be inserted into text file, but rather considered as commands. Pressing the ESC key will put you at command mode.

Insert mode
This is the mode you use to type (insert) text into a buffer. Whatever you type will be going into text file, you cannot use vi command in this mode.

Following are commands you can use to manipulate your text file, make sure you use them in command mode only. (Press ESC to get to command mode)

Saving and exiting vi

Save file and exit vi	:wq!
Exit vi	:q
Exit vi without saving file	:q!
Save file to name "filename"	:w filename

Entering text

To type text into file, you must enter insert mode. Choose the command that is best suited to the present position of the cursor and the editing task you want to do. After you type any of these letters, you will be in Insert mode and everything you type will be inserted into text file. Once finish inserting text or want to use any vi commands, press the ESC key to back to command mode.

Insert text after cursor	a
Insert text before cursor	i
Append text at the end of current line	A
Insert text at the start of current line	I
Open a new line below current line	O
Open a new line below current line	o

Deleting text

Delete current character	x
Delete current word	dw
Delete current line	dd
Delete next N line	Ndd
Undelete a word or a line	p

Moving in text file

Use arrow key	←↑↓→
Move to beginning of current line	0
Move to end of current line	$
Move to beginning of file	1G
Move to end of file	G
Move to line N	NG

Copy and paste text

Copy current line	yy
Copy N line including current line	Nyy
Paste in next line	p

Search text

Search pattern	/pattern
Repeat previous search	n

Replace text

Replace pattern1 with pattern2 on the same line	:s/pattern1/pattern2
Replace every pattern1 with pattern2 on the same line	:s/pattern1/pattern2/g
Replace every pattern1 with pattern2 in whole file	:g/pattern1/s//pattern2/g

VI Exercise

Ex 1. At your home directory, create a new file “test1” which contains following 2 lines, save and exit.

```
Hello, This is my vi test file
SOI Asia project stands for School of Internet Asia project
```

Ex 2. Edit file “test1” to contain following content. Change content on first line by using command “x” to delete unwanted characters and then inserting desired texts. Then use “G” to go to last line and press “o” to insert text at the last line..

```
Hello, This is my second practice
SOI Asia project stands for School of Internet Asia project
And I am one of operator team member of SOI Asia project
```

Ex 3. Search all occurrences of word “project” in file “test1” using command “/” and “n”.

Ex 4. Replace all occurrences of word “project” with word “activity”, save to new file name “test2”. Check that content of file “test1” and “test2” are different.

Ex 5. Edit file “test2” and delete the last line using command “dd”. Then copy remaining 2 lines and paste it 5 times. Now “test2” will contain following content, save but don’t exit vi.

```
Hello, This is my second practice
SOI Asia activity stands for School of Internet Asia activity
Hello, This is my second practice
SOI Asia activity stands for School of Internet Asia activity
Hello, This is my second practice
SOI Asia activity stands for School of Internet Asia activity
Hello, This is my second practice
SOI Asia activity stands for School of Internet Asia activity
Hello, This is my second practice
SOI Asia activity stands for School of Internet Asia activity
```

Ex 6. Moving to Line 7 of file “test2” using command “7G” and delete last 4 lines of file by command “4dd” and then undelete using “p”.

Ex 7. Copy and paste first line 3 times, save and exit. Final content of file “test2” is

```
Hello, This is my second practice
Hello, This is my second practice
Hello, This is my second practice
```

Hello, This is my second practice
SOI Asia activity stands for School of Internet Asia activity
Hello, This is my second practice
SOI Asia activity stands for School of Internet Asia activity
Hello, This is my second practice
SOI Asia activity stands for School of Internet Asia activity
Hello, This is my second practice
SOI Asia activity stands for School of Internet Asia activity
Hello, This is my second practice
SOI Asia activity stands for School of Internet Asia activity

Ex 8. Practicing command “0”, “$”, “1G”, “G” and “NG” to move cursor to different positions of the file “test2”.

Ex 9.Try to do Ex1-Ex8 practices many times until you are familiar with vi commands.

7. Basic network command

ifconfig – Show/set configuration of machine’s network interfaces
“**ifconfig** ifname” shows information of network interface “ifname”. If “ifname” is omitted, it shows all network interfaces. Output can be varies by OS but they commonly show link media type, MAC address, IPv4 and IPv6 of each interface.

ping – Use to check network reachability to a host
“**ping** host” sends an ICMP packet to query a machine “host”, “host” can be specified as either hostname or host’s IP. Target host will send an ICMP response back to the querying host. Ping will show querying result which is used to indicate the connectivity between your machine and that target host. Press Ctrl+c to stop ping.

Check IP of your machine using ifconfig command.
 # ifconfig

Ping to your machine using IP gather from previous step
 # ping your_machine_ip

Ping to servers in SFC, Japan.
 # ping 202.249.25.193
 # ping www.soi.wide.ad.jp

traceroute - Print the route a packet takes to network host
"**traceroute** host" will print the network route from your machine to "host", "host" can be specified as either hostname or host's IP.

Traceroute to your machine using IP gather from previous step
 # traceroute your_machine_ip

Traceroute to servers in SFC, Japan.
 # traceroute 202.249.25.193
 # traceroute www.soi.wide.ad.jp

tcpdump – Dump traffic on network
"**tcpdump –i** ifname" prints out the headers of all packets on a network interface "ifname". "tcpdump –i ifname expression" prints out packets matching expression. The "expression" can be specified in many ways, please use "man tcpdump" to check how to use it. You need to be root to be able to run this command. Press Ctrl+c to stop tcpdump.

Check interface name and IP of your machine using ifconfig command.
 # ifconfig

Tcpdump to see all packets on interface by using following command. Replace your_interface_name by your machine interface name.
 # tcpdump –i your_interface_name

Tcpdump to see packets that source and destination address is your machine. Replace your_interface_name by your machine interface name and replace your_machine_ip with your machine's IP gathered from ifconfig command.
 # tcpdump –i your_interface_name host your_machine_ip

Tcpdump to see multicast packets and ipv6 packets
 # tcpdump –i your_interface_name ip multicast
 # tcpdump –i your_interface_name ip6