Linux System Administration

Getting started with Linux

Day 1: Modules

1. Linux overview
2. Command Line Interface or the “CLI”
3. Permissions
4. Editors
5. Ubuntu Linux and more commands

Module 2: Command Line Interface

The format of a command

```
command [options] parameters
```

“Traditionally, UNIX command-line options consist of a dash, followed by one or more lowercase letters. The GNU utilities added a double-dash, followed by a complete word or compound word.”

Two very typical examples are:

`-h`

`--help`

and

`-v`

`--version`

Command parameters

The ***parameter*** is what the command ***acts on***.

Often there are multiple parameters.

In Unix UPPERCASE and lowercase for both options and parameters matter.

Spaces ___ are ___ critical ___ .

“`--  help`” is wrong.

“`--help`” is right.

Some command examples

Let's start simple:

Display a list of files:

```
ls
```

Display a list of files in a long listing format:

```
ls -l
```

Display a list of all files in a long listing format with human-readable file sizes:

```
ls -alh
```

Some command examples cont.

Some equivalent ways to do "`ls -alh`":

```
ls -lah
ls -l -a -h
ls -l –all --human-readable
```

Note that there is no double-dash option for "`-l`".
You can figure this out by typing:

```
man ls
```

Or by typing:

```
ls --help
```

Where's the parameter?

We typed the “`ls`” command with several options, but no parameter. Do you think “`ls`” uses a parameter?

What is the parameter for “`ls -l`”?

It is “.” -- our current directory.

“`ls -l`” and “`ls -l .`” are the same.

We'll discuss files and directories later.

A disconcerting Linux feature

If a command executes successfully there is no output returned from the command execution. *this is normal*.

That is, if you type:

```
cp file1 file2
```

The result is that you get your command prompt back. *Nothing means success*.

Let's give this a try...

A disconcerting Linux feature

Try doing the following on your machine:

```
$ cd                    [cd = change dir]
$ touch file1           [touch = create/update]
$ cp file1 file2        [cp = copy]
```

- The “$” indicates the command prompt for a normal user.
- A “#” usually means you are the *root* user.

Using pipes

In Unix it is very easy to use the result of one command as the input for another.

To do this we use the pipe symbol “|”. For example:

```
ls -l /sbin | sort
ls -l /sbin | sort | more
```

What will these commands do?

Stopping command output

Stopping commands with continuous output:

Terminate foreground program: CTRL+C

```
$ ping yahoo.com
PING yahoo.com (67.195.160.76): 56 data bytes
64 bytes from 67.195.160.76: icmp_seq=0 ttl=45 time=221.053 ms
64 bytes from 67.195.160.76: icmp_seq=1 ttl=45 time=224.145 ms
^C      ← here press CTRL + C
```

Terminate paging like “less <filename>”

```
$ less /etc/passwd
sysadm:x:1000:1000:System Administrator,,,:/home/sysadm:/bin/bash
postfix:x:104:113::/var/spool/postfix:/bin/false
mysql:x:105:115:MySQL Server,,,:/var/lib/mysql:/bin/false
(END)      ← press the “q” key
```

Proper command line use

The command line in Unix is *much more powerful* than what you may be used to in Windows. ***You can...***

...easily edit long commands

...find and recover past commands

...quickly copy and paste commands.

...auto-complete commands using the tab key (in *bash* shell).

Edit long commands

! Don't touch that keyboard!
Arrow keys are slooooooow...

Use *Home* and *End* instead (ctrl-a, shift-a)

Delete with *Backspace* not *Delete*.

Press <ENTER> *as soon as the command is correct*. You *do not* need to go to the end of the command.

Use “`history | grep string`”, then `!NN` instead of lots of up-arrows.

Find and recover past commands

As noted on the previous slide. Use:

```
$ history | grep “command string”
```

Find command number in resulting list.

Execute the command by typing:

```
$ !number
```

So, to find any command you typed “many” commands ago you can do:

```
$ history | grep command
```

Find and recover past commands

For last few commands use the up-arrow.

Don't re-type a long command if you just typed it.

Instead use the up arrow and adjust the command.

Copy and paste commands

In Unix/Linux once you highlight something it is *already* in your copy buffer.

To copy/paste in Linux/Unix do:

- Highlight text with left mouse cursor. It is now copied (like *ctrl-c* in Windows).
- Move mouse/cursor where you want (any window), and press the *middle* mouse button. This is paste (like *ctrl-v*).

In Windows / Mac use the traditional ctrl-c / ctrl-v

Copy and paste commands

Do this!!!

Good system administrator

==

Lazy Person

Goal State

Don't try to type a long command if you can copy / paste it instead.

Auto-complete commands with tab

Very, very, very powerful

“The tab key is good”, “the tab key is my friend”, “press the tab key”, “press it again” - This is your mantra.

Tab works in the *bash* shell. Note, the *root* user might not use the *bash* shell by default.

Auto-complete commands with tab

Core concept:

Once you type something unique, press TAB. If nothing happens, press TAB twice.

If text was unique text will auto-complete. A command will complete, directory name, file name, command parameters will all complete.

If not unique, press TAB twice. All possibilities will be displayed.

Works with file types based on command!

Auto-completion

We’ll do this now:

```
$ cat /etc       (TAB twice quickly)
$ cat /etc/netw            (TAB)
$ cat /etc/network/in      (TAB)
```

Viewing Files (part I)

Several ways to view a file:

1. `cat <filename>`
2. `more <filename`
3. `less <filename>`

- `cat` is short for *conCATenate*
- “`less` is `more`”

Obtaining “help”

To get help explaining commands you can do:

- `man <command>`
- `<command> --help`

man stands for “man”ual.

More on “man”

- `man man`

More on Linux directory structure:

- `man hier`

Your mission

Should you choose to accept it...

Pay close attention to options and parameters.

Use “`man command`” or “`command --help`” to figure out how each command works.

Use command line magic to save lots and lots and lots and lots of time.

A command acts upon its parameters based on the options you give to the command...

Questions

?

There's More

But, hopefully enough to get us started...

Some Resources

http://www.ubuntu.com

http://ubuntuforums.org

http://www.debian.org

http://ubuntuguide.org

http://en.wikipedia.org/wiki/Debian

http://en.wikipedia.org/wiki/Ubuntu_(Linux_distribution)

GIYF (Google Is Your Friend)