

Introduction to Linux

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When will you use linux?

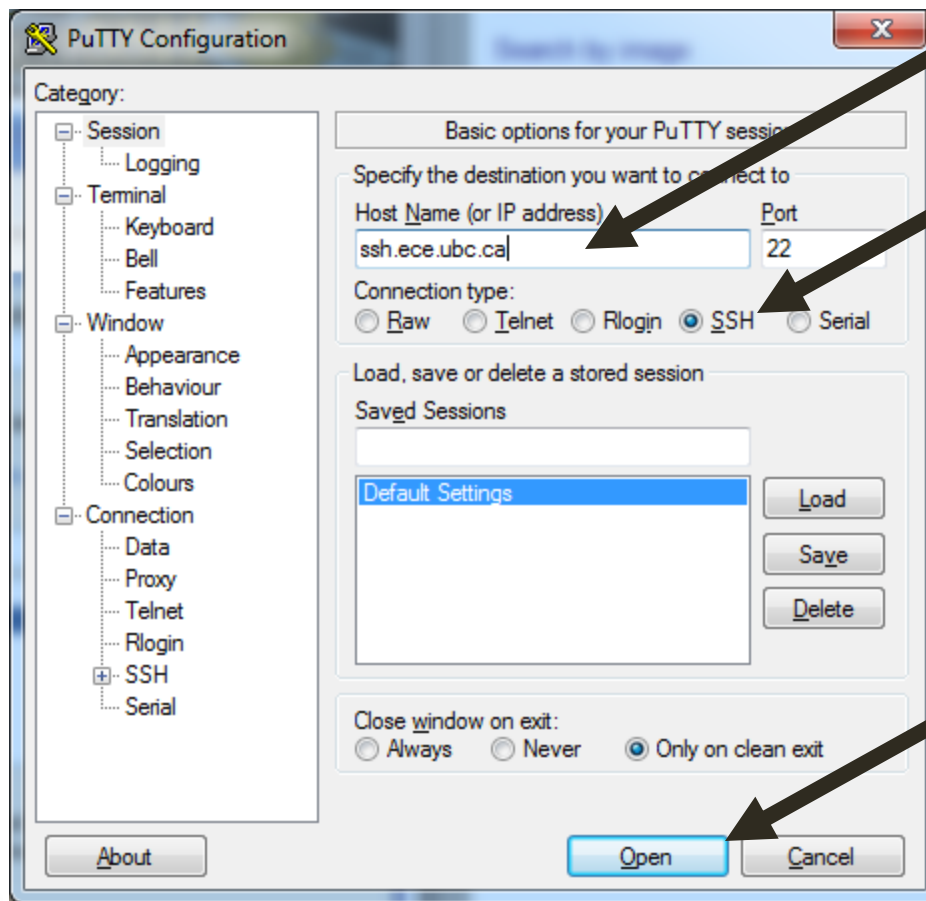
- On our own computer (Maybe)
- Connecting to a department server (Definitely)

How to connect to a Linux machine?

- From a Linux or Mac computer:
 - Open the **terminal** application
 - Type **ssh <username>@<computer_name>**
 - Username: jeffg
 - Computer: ssh
 - Computer address: ssh.ece.ubc.ca
 - Example: `ssh jeffg@ssh.ece.ubc.ca`
- Provide your password when prompted

From a Windows Machine

- Download putty.exe www.putty.org



The Command Line

- When using Linux we have to become familiar with the command line
- On our own Linux machines we can use the GUI (graphical interface)
- Connected to remote machines (like dept. servers) we have to use command line
- Using the command line, we will learn to:
 - Navigate the file system
 - Create/Edit/Copy/Delete/Move/Rename files
 - Run programs

FileSystem

	Windows	Linux
Top-Level Directory	C:\	/
Directory Separator	\	/
Example Directory	C:\users\jeff\stuff	/home/jeff/stuff

Directory Navigation

- Changing directory: **cd <directory>**
 - `cd /home/jeff/stuff`
 - Use the 'Tab' key for automatic completion
- Listing contents of directory: **ls <folder_path(optional)>**
- Where am I?: **pwd** (Print Working Directory)
- Shortcut to your home directory: **~**
 - `cd ~`
 - `ls ~`
 - `ls ~/stuff`
- Linux manual pages (**man**) contain help for most commands:
 - `man ls`
 - Or just use google!

More Directory Navigation

- Make a directory: `mkdir <path_to_new_directory>`
 - `mkdir /home/jeff/new_stuff`
 - `mkdir ~/new_stuff`
- Relative Directories:
 - `.` – Current Directory
 - `..` – Up-one-level directory
- Examples:
 - `mkdir ../new_directory`

Creating and Editing Text Documents

- Many different text editors available, ranging from simple to powerful (vim, emacs)
- We will be using nano: **nano** <file_to_open>
 - nano ~/documents/class_notes.txt
- Open an existing file: Just specify the path to the file
- Make a new file: Just specify the path of the file to create:
 - nano ~/stuff/new_file.txt
- If you are opening an existing file and it looks empty, you may have incorrectly typed the path, and Linux is making a new file
 - Just quit without saving and no new file will be created

Redirection

- Sometimes you want to save the output of a program to a file instead of viewing it on the screen
- You can redirect using '>':
 - `ls ~/stuff > new_file.txt`
- If the output file already exists it will be overwritten.
- If you want to add to the end of a file instead of replacing it, use >>:
 - `cp -rv ~/thesis ~/backup/thesis >> log.txt`

Viewing Text Documents

- There are many utilities to quickly view file contents:
- `cat`: Display the entire file at once
- `less`: Display the file one screen page at a time
 - Press spacebar to go to the next page
 - Press 'q' to quit
- `head`: first 10 lines of a file
- `tail`: last 10 lines of a file

Moving, Copying, Renaming

- Copy files: **cp** <source> <destination>
 - `cp ~/pictures/abc.jpg ~/backup/abc.jpg`
 - `cp document.pdf ../document.pdf`
- Moving files: **mv** <source> <destination>
 - `mv ~/downloads/song.mp3 ~/music/song.mp3`
- Renaming : Just move the file and provide a new name!
 - `mv ~/document1.doc ~/thesis.doc`

Program Options

- Sometimes you must specify options when running programs
- Typically this is done using a dash (-) and flags

- Example:

```
cp -rv ~/music ~/backup
```

- r & v are options:
 - r – recursive: copies all of the directories within these directories
 - v – verbose: Provides detailed output. It will list every file being copied
- Linux manual pages (man) contain all of the available options or just use Google!

Deleting Files

- Use the **rm** command: **rm <file_to_delete>**
- Need to delete a directory and all of its contents?
 - Use the -r option:
 - `rm -r ~/temp_folder`
- You can specify multiple files:
 - `rm ~/file1.txt ~/file2.txt ~/file3.txt`
- You can use the ***** as a wildcard
 - `rm ~/*.mp3` (Remove all mp3s in your home directory)
 - `rm -r ~/*.mp3` (ALSO check all sub-directories)
 - `rm ~/*temp*` (Remove files with temp in their name)

Process Management

- Sometimes commands can run for a long time
- Stop a running command: CTRL+c
- Pause: CTRL+z Resume: fg (stands for foreground)
- Run a command in the background : Add **&** to the command:
 - `cp ~/huge_dir ~/backup/huge_dir &`
- Get a list of running commands: **ps**
- Running commands sorted by CPU use: **top**

- Stop a background process using ID: **kill <ID>**
 - Get the ID from running **ps**
 - If this doesn't work, use the -9 option to force kill: `kill -9 <ID>`

- Stop all processes with a given name: **kill <name>**
 - `kill -9 cp`

Conveniences

- Tab key for auto completion
- Use the UP arrow to move through history of commands
- System dependent:
- **history**
 - !<#> to re-execute that command

Resources

- <http://help.ece.ubc.ca> (ECE IT help)
- Use the Linux manual pages: **man cp**
- **Google it!**