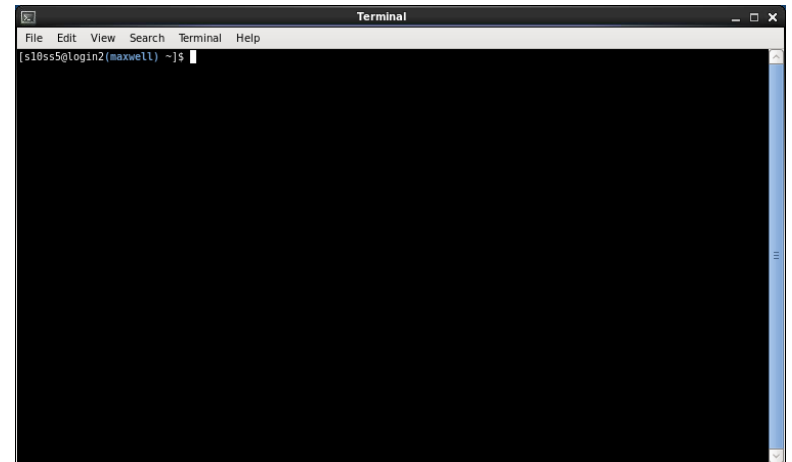


What We're Going To Do

- Why Unix?
- Cloud Computing
- Connecting to AWS
- Introduction to Unix Commands



Etiquette

- PowerPoint interspersed with Challenges
- Ask me questions
- Ask demonstrators
- Work together
- Cheat!

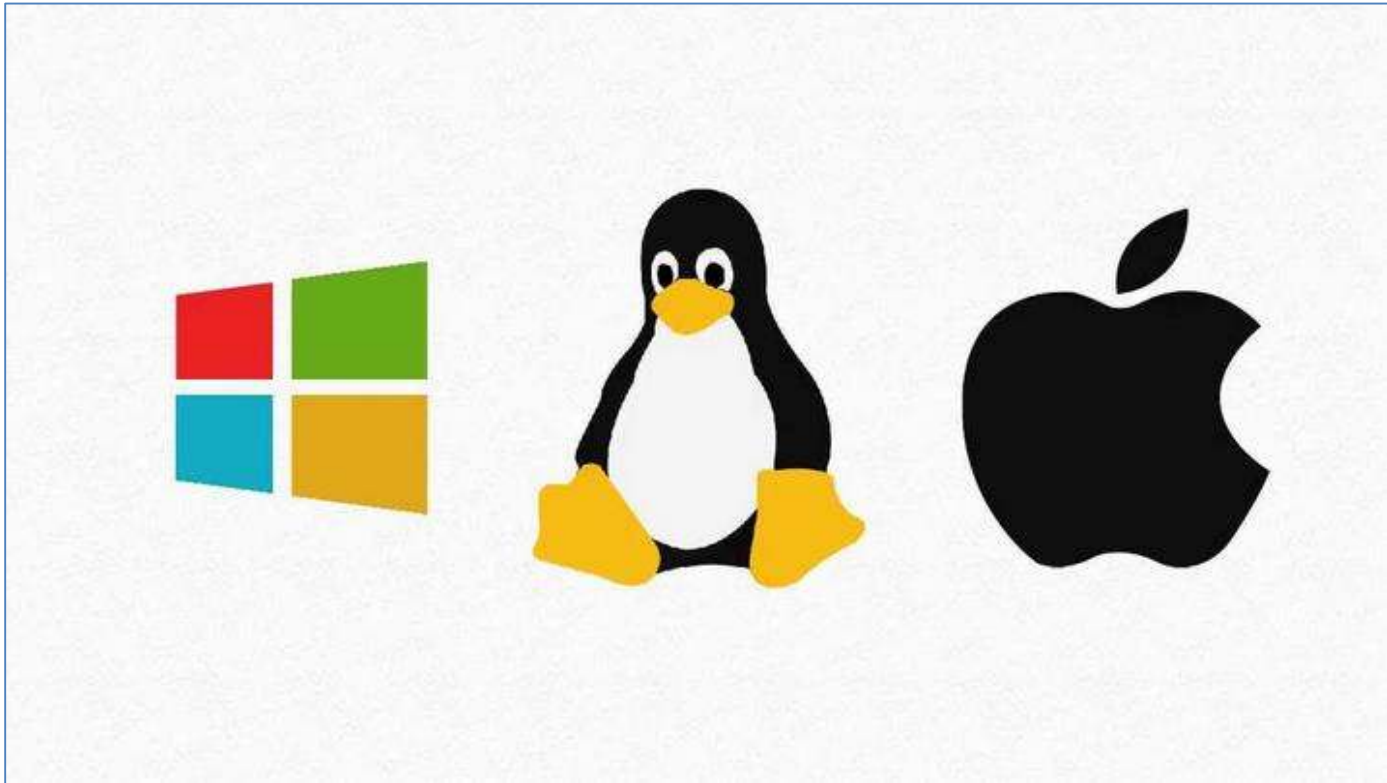


File Commands	System Info
ls - directory listing ls -al - formatted listing with hidden files cd <i>dir</i> - change directory to <i>dir</i> cd - change to home pwd - show current directory mkdir <i>dir</i> - create a directory <i>dir</i> rm <i>file</i> - delete <i>file</i> rm -r <i>dir</i> - delete directory <i>dir</i> rm -f <i>file</i> - force remove <i>file</i> rm -rf <i>dir</i> - force remove directory <i>dir</i> * cp <i>file1 file2</i> - copy <i>file1</i> to <i>file2</i> cp -r <i>dir1 dir2</i> - copy <i>dir1</i> to <i>dir2</i> ; create <i>dir2</i> if it doesn't exist mv <i>file1 file2</i> - rename or move <i>file1</i> to <i>file2</i> if <i>file2</i> is an existing directory, moves <i>file1</i> into directory <i>file2</i> ln -s <i>file link</i> - create symbolic link <i>link</i> to <i>file</i> touch <i>file</i> - create or update <i>file</i> cat > <i>file</i> - places standard input into <i>file</i> more <i>file</i> - output the contents of <i>file</i> head <i>file</i> - output the first 10 lines of <i>file</i> tail <i>file</i> - output the last 10 lines of <i>file</i> tail -f <i>file</i> - output the contents of <i>file</i> as it grows, starting with the last 10 lines	date - show the current date and time cal - show this month's calendar uptime - show current uptime w - display who is online whoami - who you are logged in as finger <i>user</i> - display information about <i>user</i> uname -a - show kernel information cat /proc/cpuinfo - cpu information cat /proc/meminfo - memory information man <i>command</i> - show the manual for <i>command</i> df - show disk usage du - show directory space usage free - show memory and swap usage whereis <i>app</i> - show possible locations of <i>app</i> which <i>app</i> - show which <i>app</i> will be run by default
Process Management	Compression
ps - display your currently active processes top - display all running processes kill <i>pid</i> - kill process id <i>pid</i> killall <i>proc</i> - kill all processes named <i>proc</i> * bg - lists stopped or background jobs; resume a stopped job in the background fg - brings the most recent job to foreground fg <i>n</i> - brings job <i>n</i> to the foreground	tar cf <i>file.tar files</i> - create a tar named <i>file.tar</i> containing <i>files</i> tar xf <i>file.tar</i> - extract the files from <i>file.tar</i> tar czf <i>file.tar.gz files</i> - create a tar with Gzip compression tar xzf <i>file.tar.gz</i> - extract a tar using Gzip tar cjf <i>file.tar.bz2</i> - create a tar with Bzip2 compression tar xjf <i>file.tar.bz2</i> - extract a tar using Bzip2 gzip <i>file</i> - compresses <i>file</i> and renames it to <i>file.gz</i> gzip -d <i>file.gz</i> - decompresses <i>file.gz</i> back to <i>file</i>
File Permissions	Network
chmod <i>octal file</i> - change the permissions of <i>file</i> to <i>octal</i> , which can be found separately for user, group, and world by adding: 4 - read (r) 2 - write (w) 1 - execute (x) Examples: chmod 777 - read, write, execute for all chmod 755 - rwx for owner, rx for group and world For more options, see man chmod .	ping <i>host</i> - ping <i>host</i> and output results whois <i>domain</i> - get whois information for <i>domain</i> dig <i>domain</i> - get DNS information for <i>domain</i> dig -x <i>host</i> - reverse lookup <i>host</i> wget <i>file</i> - download <i>file</i> wget -c <i>file</i> - continue a stopped download
SSH	Installation
ssh <i>user@host</i> - connect to <i>host</i> as <i>user</i> ssh -p <i>port user@host</i> - connect to <i>host</i> on port <i>port</i> as <i>user</i> ssh-copy-id <i>user@host</i> - add your key to <i>host</i> for <i>user</i> to enable a keyed or passwordless login	Install from source: ./configure make make install dpkg -i <i>pkg.deb</i> - install a package (Debian) rpm -Uvh <i>pkg.rpm</i> - install a package (RPM)
Searching	Shortcuts
grep <i>pattern files</i> - search for <i>pattern</i> in <i>files</i> grep -r <i>pattern dir</i> - search recursively for <i>pattern</i> in <i>dir</i> <i>command</i> grep <i>pattern</i> - search for <i>pattern</i> in the output of <i>command</i> locate <i>file</i> - find all instances of <i>file</i>	Ctrl+C - halts the current command Ctrl+Z - stops the current command, resume with fg in the foreground or bg in the background Ctrl+D - log out of current session, similar to exit Ctrl+W - erases one word in the current line Ctrl+U - erases the whole line Ctrl+R - type to bring up a recent command !! - repeats the last command exit - log out of current session
* use with extreme caution.	



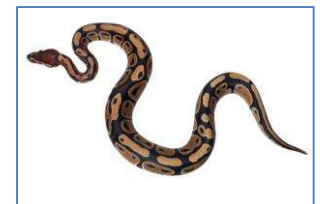
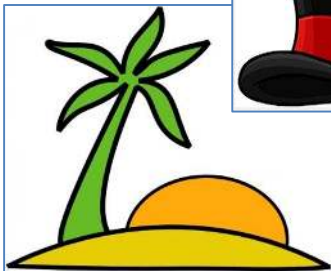
What is Unix?

- Operating System



Why Unix?

- Bioinformatics software designed to run on Unix platforms.
- Large amounts of data.
- Much faster than your Windows PC.



How Can We Use Unix?

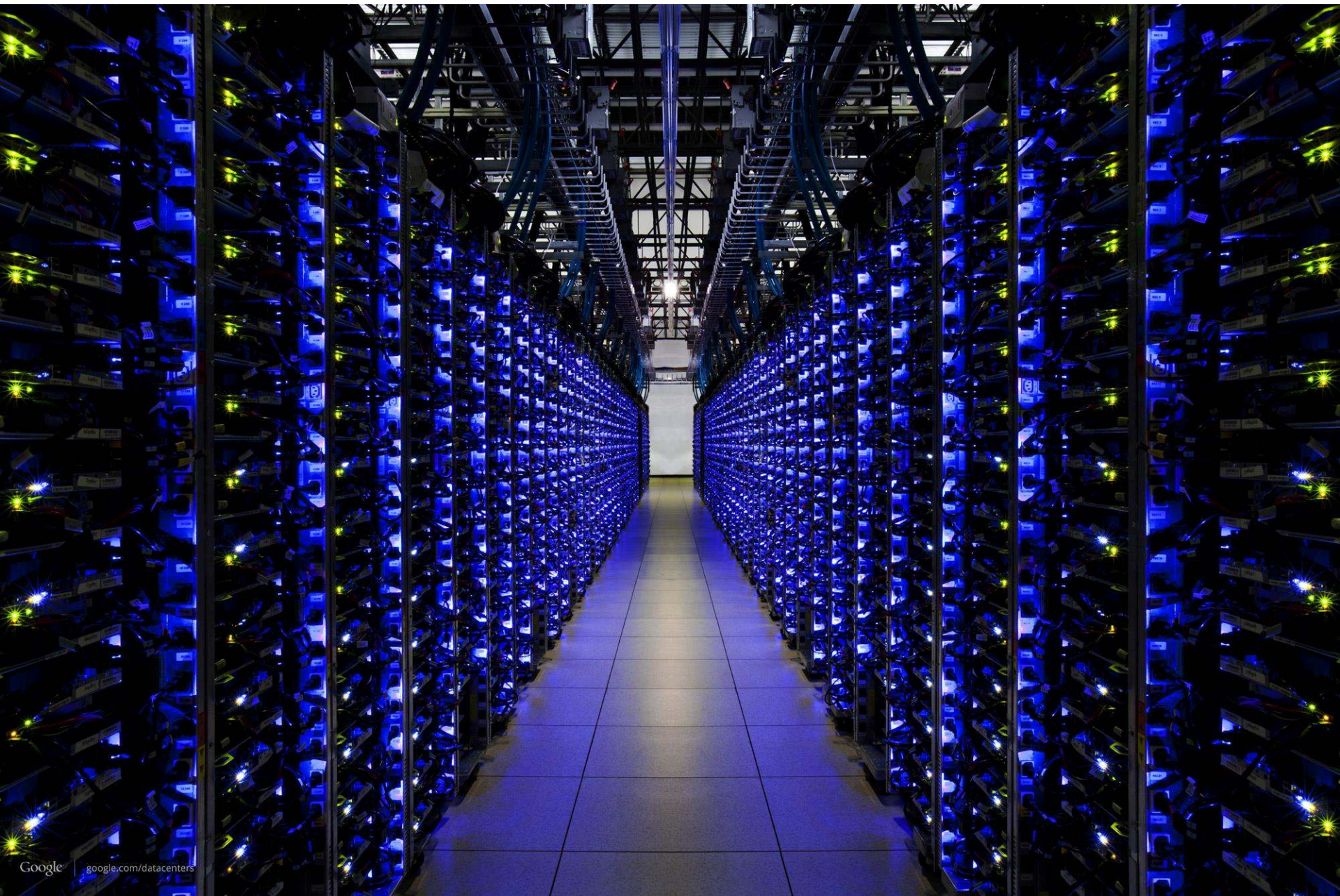
- Linux computers or servers.
- Compute clusters.
- The cloud.
 - What we're going to use this week

Download more graphics at www.psdgraphics.com



So What is Cloud Computing?



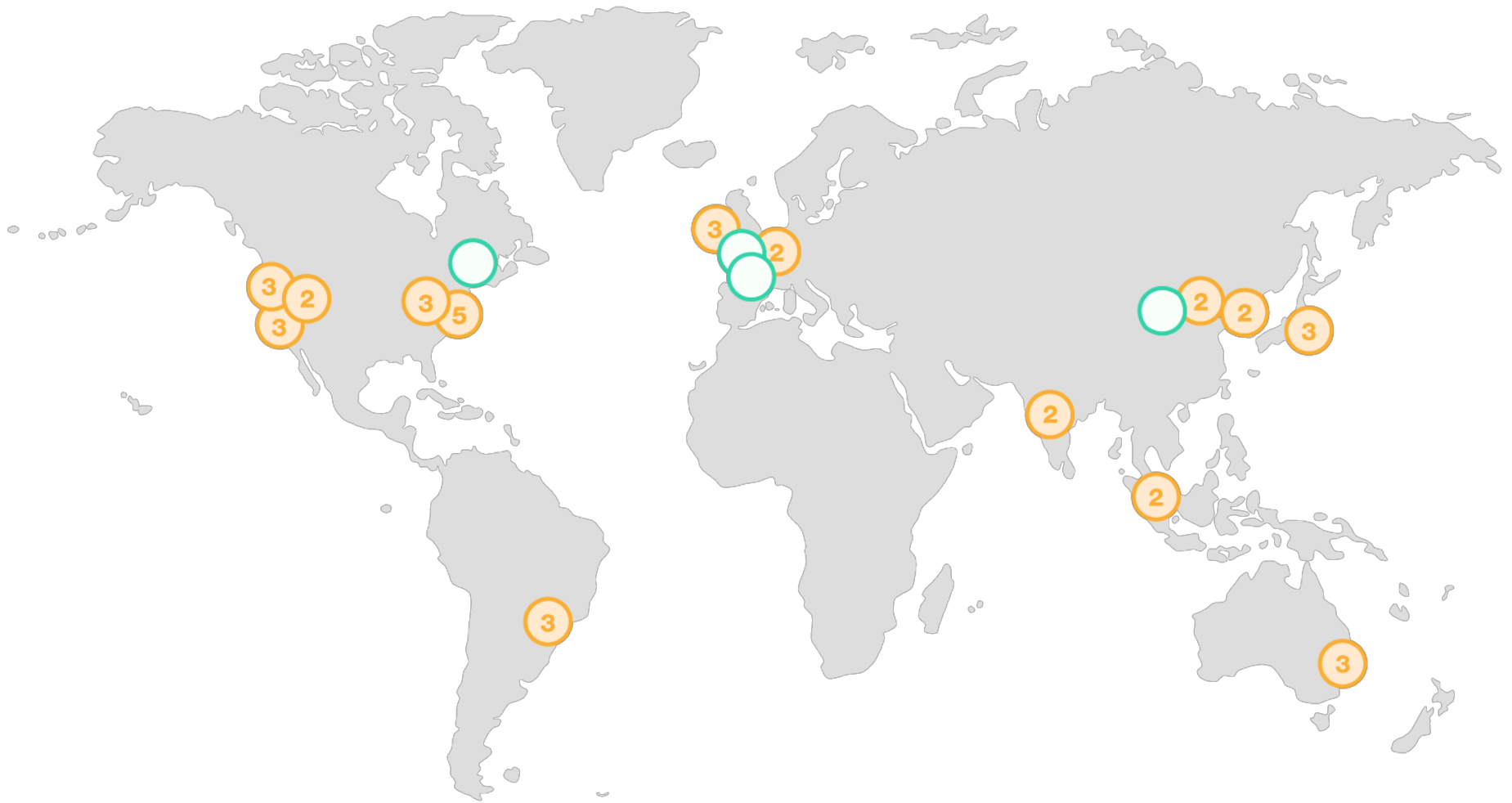


Cloud Computing Solutions



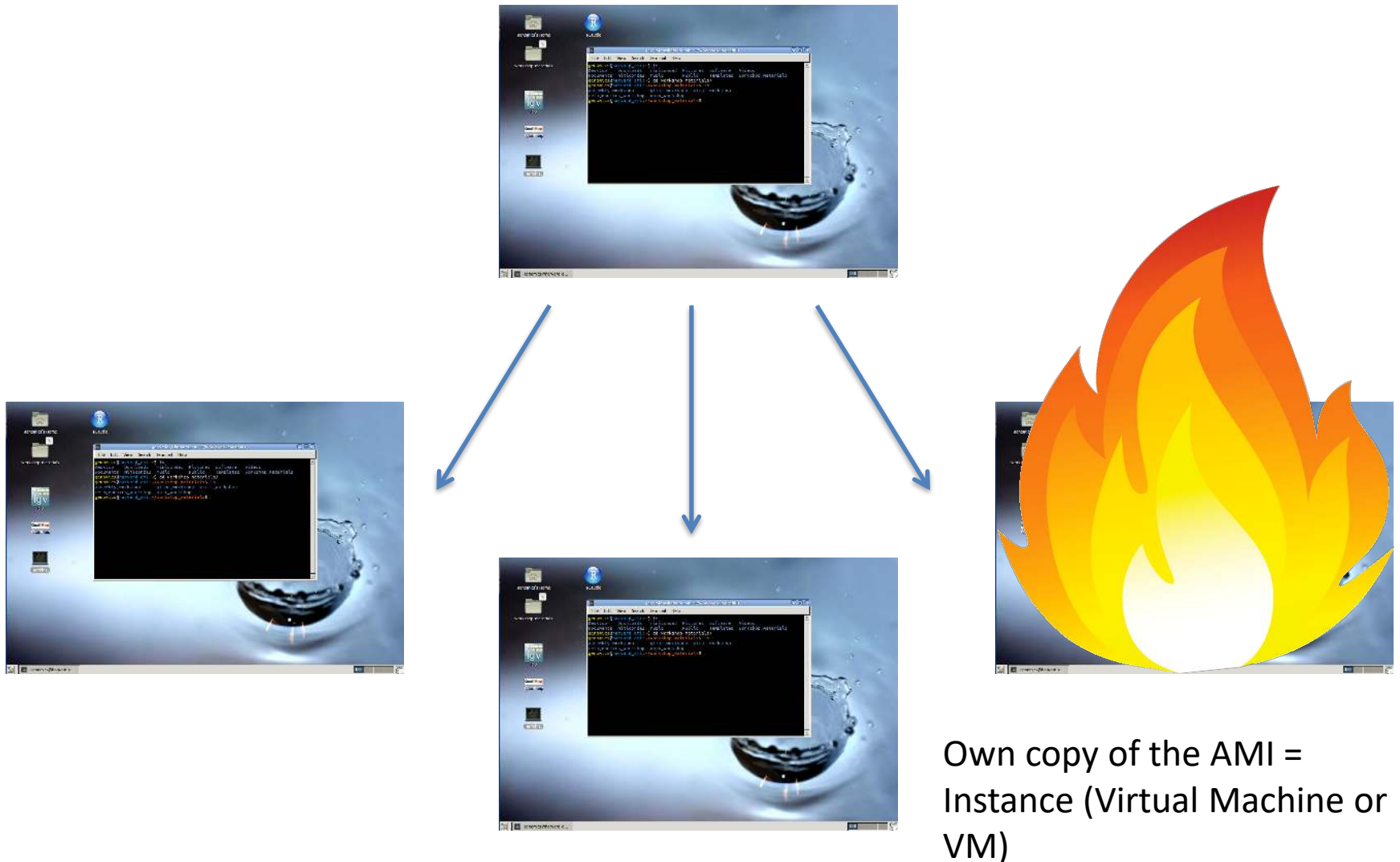
Google Compute Engine





AWS “Availability Zones” and Data Centres

How it Works



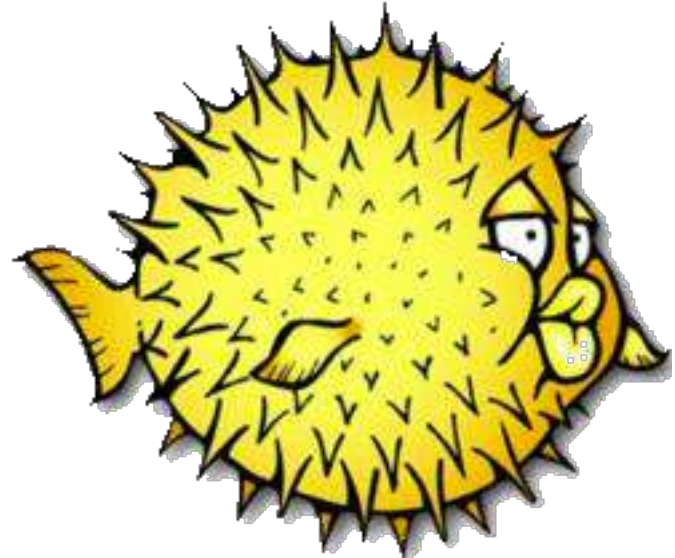
Terminology

- Creating an instance – *buying a brand new computer with software already installed.*
- Starting an instance – *turning that computer on.*
- Stopping an instance – *turning that computer off.*
- Terminating an instance – *setting that computer on fire and throwing it out of the window.*

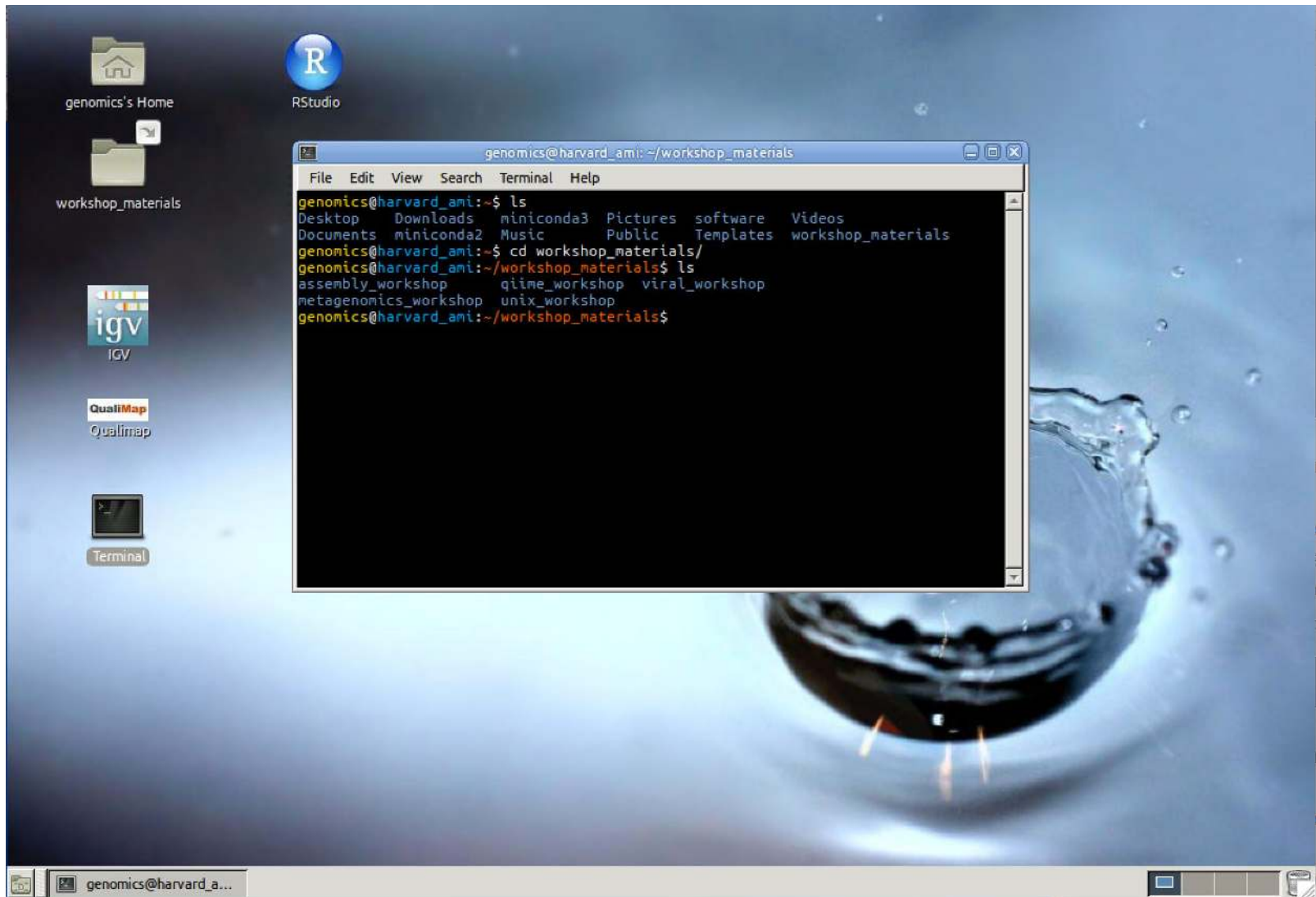
Connecting to Your Instance



Remote Desktop
Software
e.g. X2Go



Secure Shell –
“SSH”
e.g. SSH or PuTTY

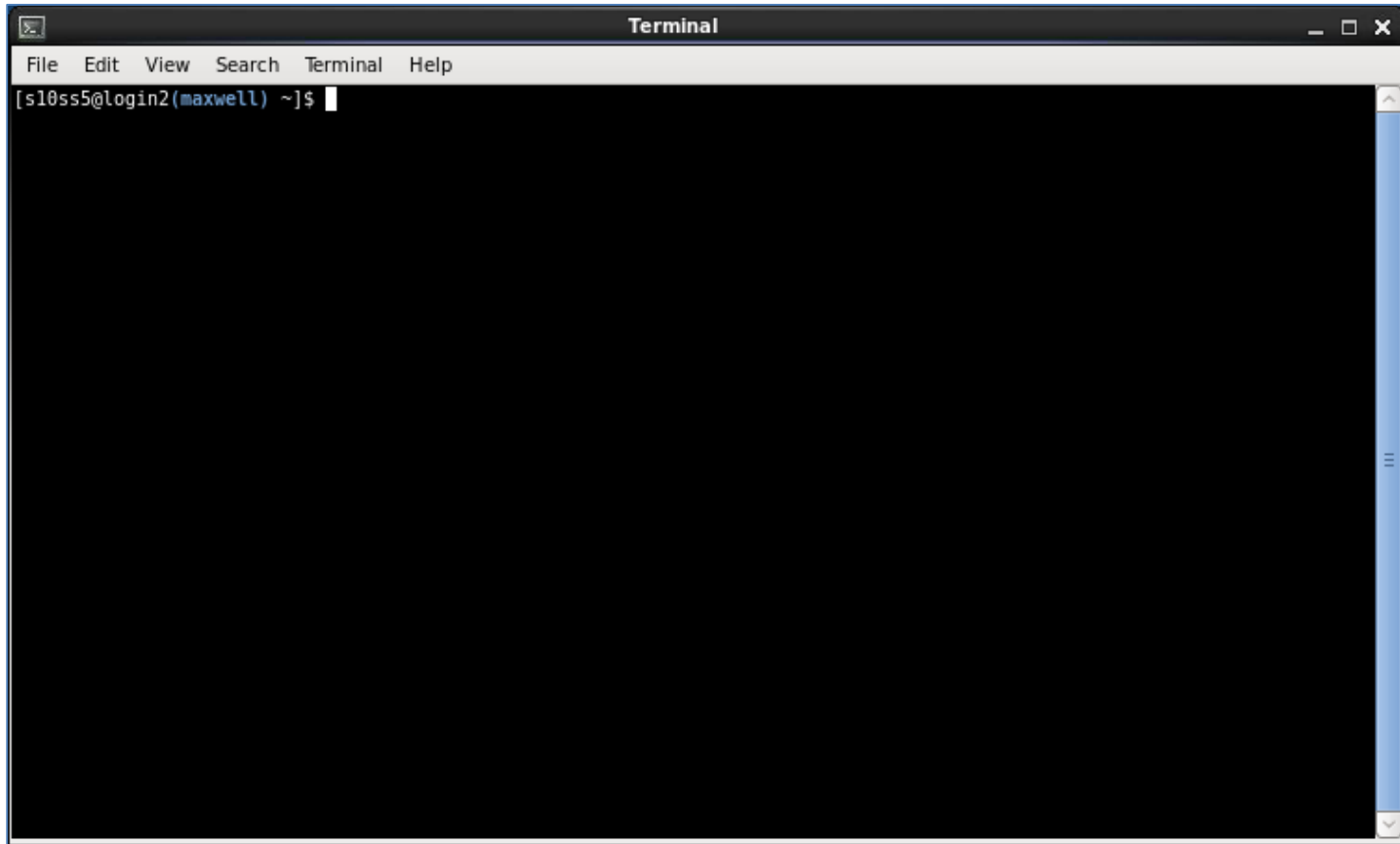


You're now connected to your instance and you're ready to learn some Unix!

Any Questions So Far?



The Terminal Window



The Command Line, The Shell, The Prompt

Where you see this “\$” followed by text, I want you to type the text on your command line

Catriona Wo... Catriona Scr... Eva Working Eva Script Exeter [Tutorial] Jonathon Wo... Jonathon Scr... Terminal Neil Working Neil Script

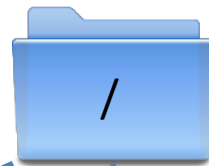
Location is Important

First Task – Where am I?

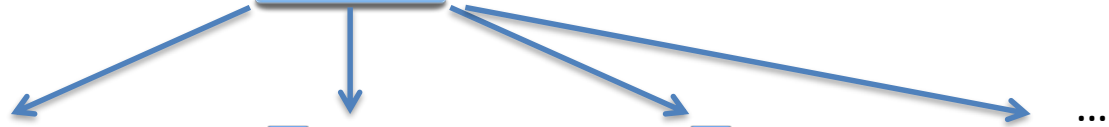
```
$ pwd
```

```
genomics@harvard_ami:~$ pwd  
/home/genomics  
genomics@harvard_ami:~$
```

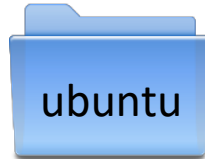
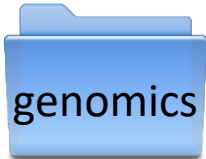
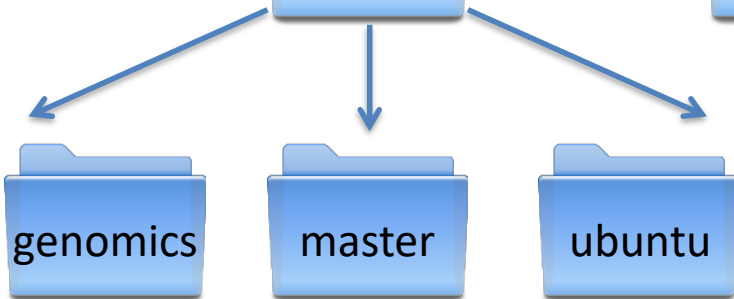
This is your “present working directory”

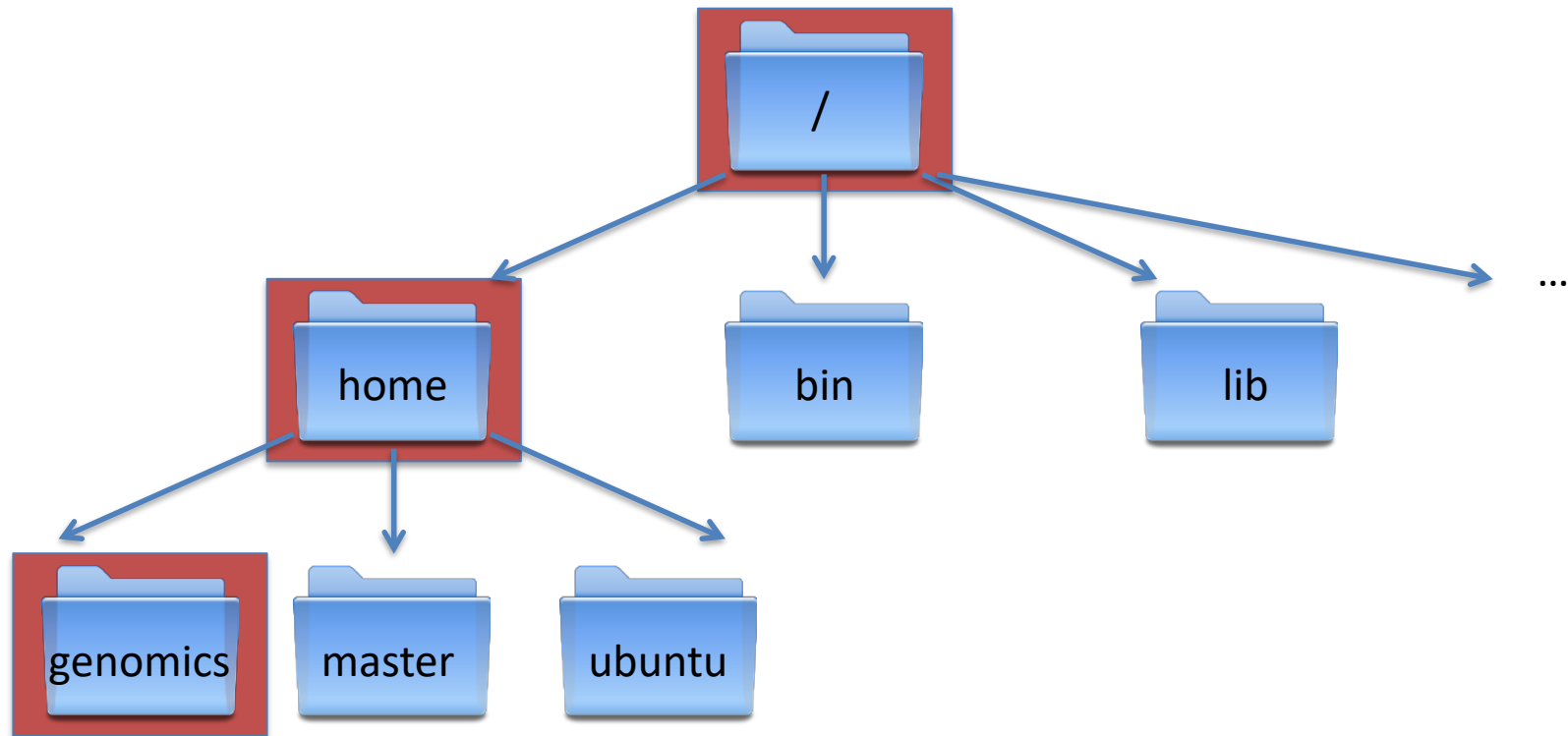


= ROOT

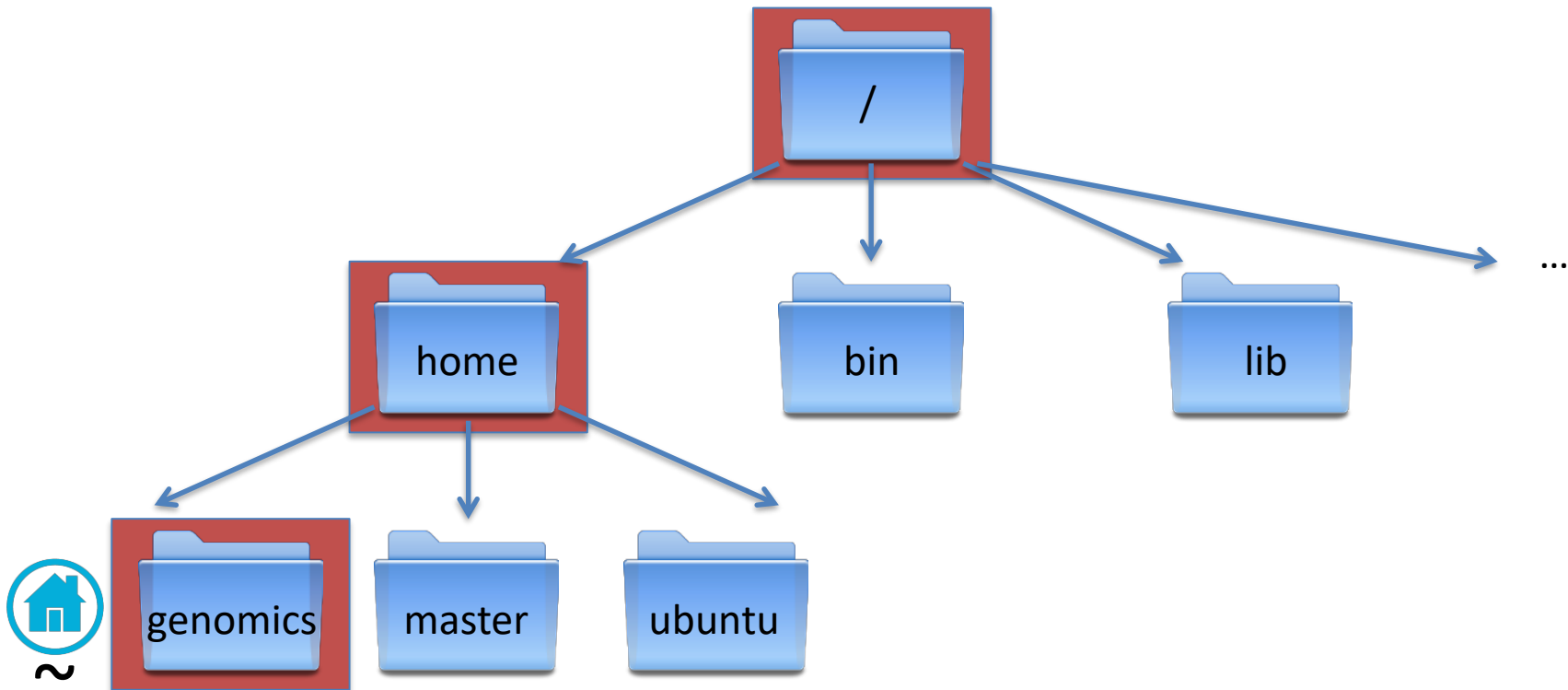


...





```
genomics@harvard_ami:~$ pwd
/home/genomics
genomics@harvard_ami:~$
```



```
genomics@harvard_ami:~$ pwd
/home/genomics
genomics@harvard_ami:~$
```

This location is also known
as your Home Directory

Tilde is shorthand for
Home:

~

Now let's create some directories and files

Make a directory

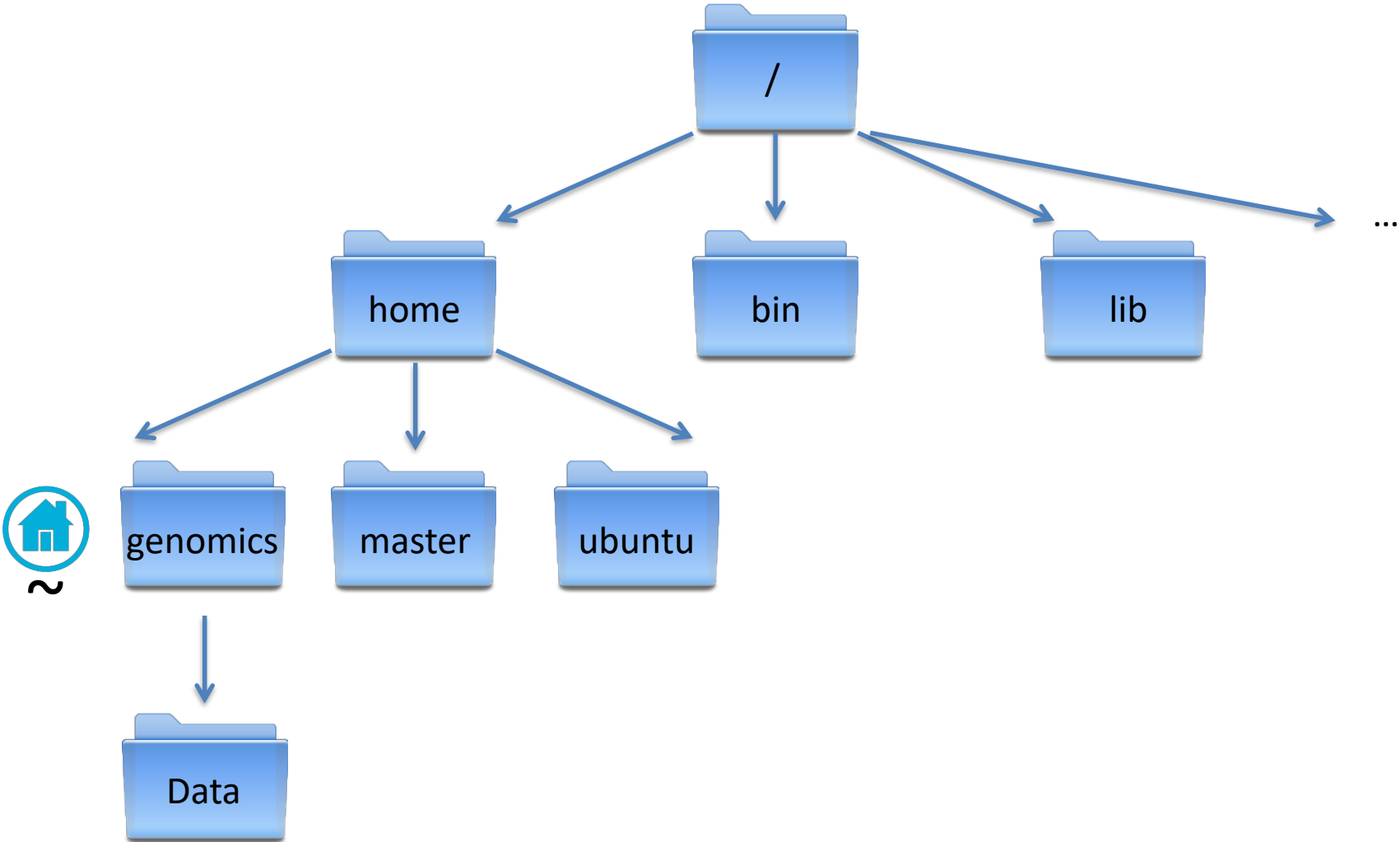
```
$ mkdir Data
```

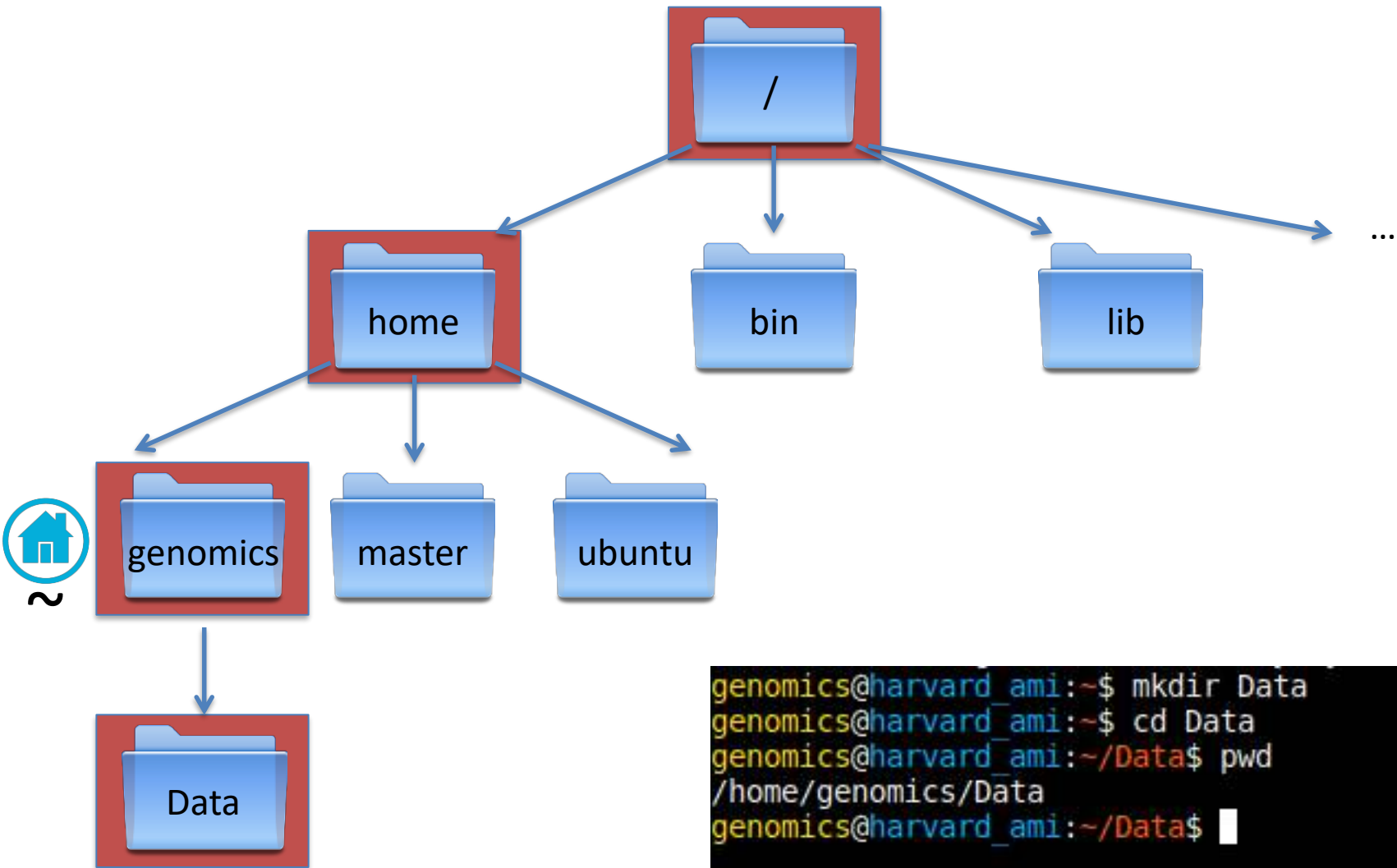
Change into this directory

```
$ cd Data
```

Now what is your present working directory?

NOTE! Directory names (and file names for the matter) can not contain spaces.
Underscores are often used instead if you want to separate words.





```
genomics@harvard_ami:~$ mkdir Data
genomics@harvard_ami:~$ cd Data
genomics@harvard_ami:~/Data$ pwd
/home/genomics/Data
genomics@harvard_ami:~/Data$
```

Now let's create some directories and files

Make an empty file

```
$ touch rags
```

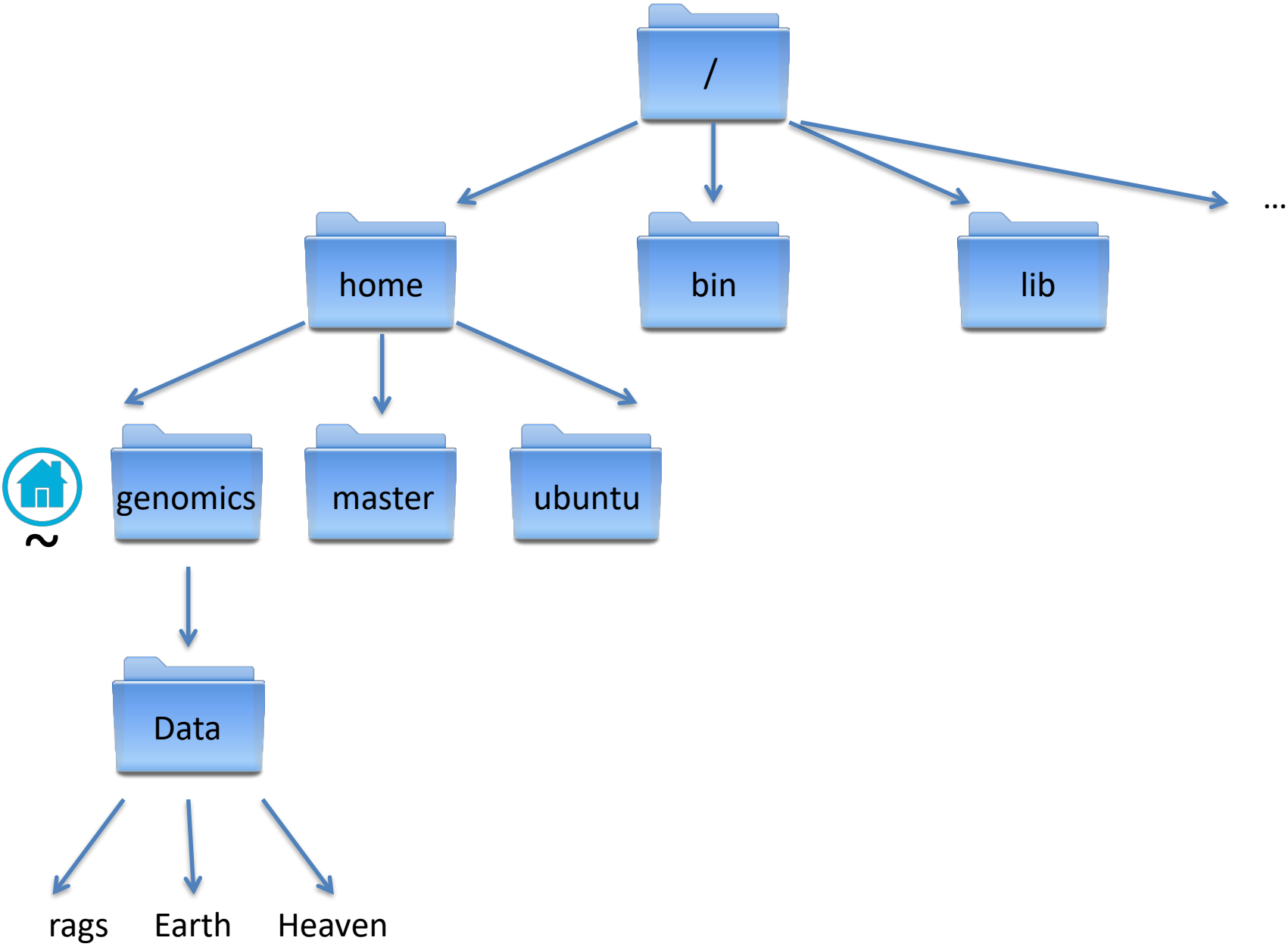
And another two

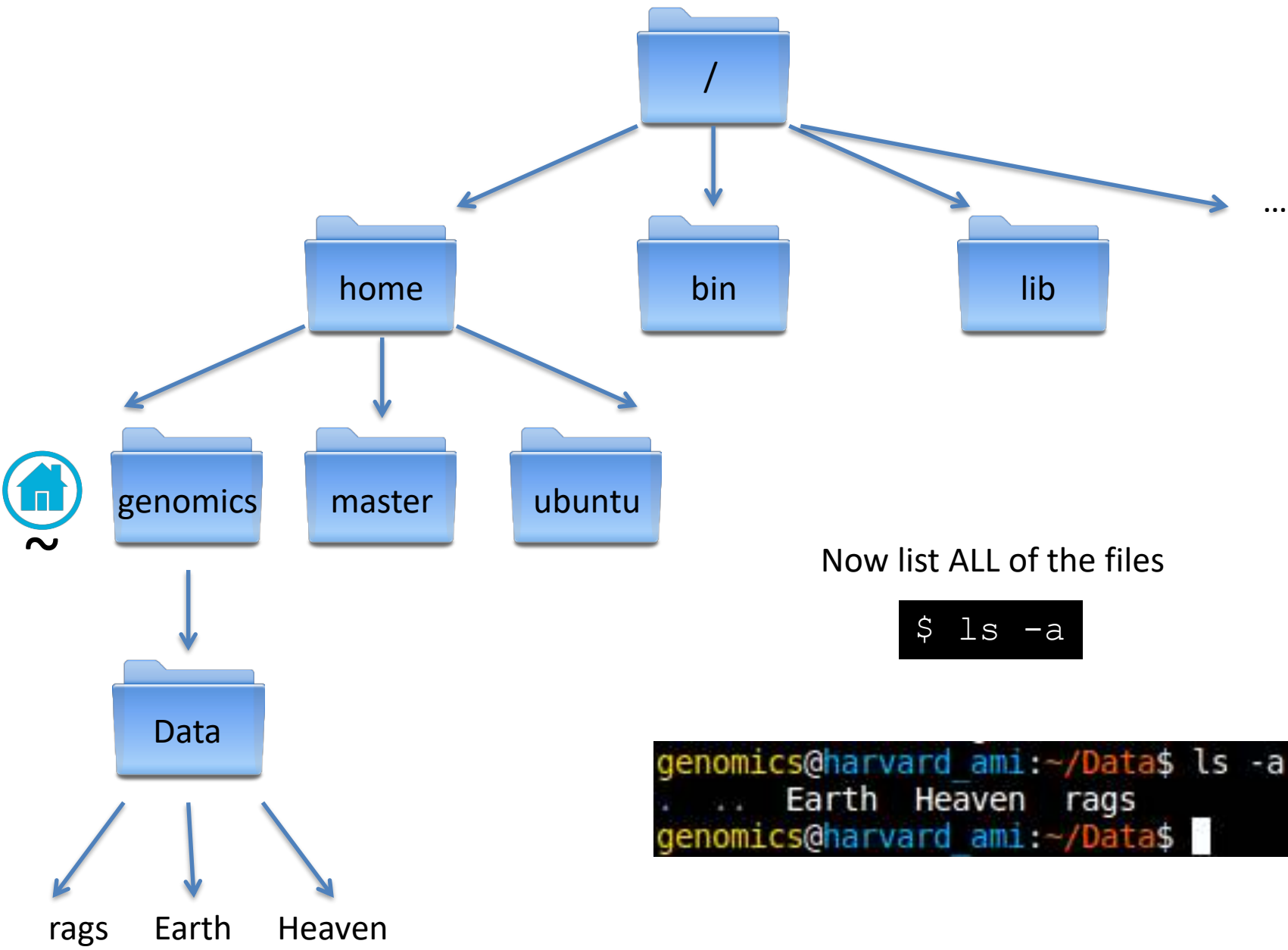
```
$ touch Earth Heaven
```

Now let's list the contents of the current directory (Data)

```
$ ls
```

```
genomics@harvard_ami:~/Data$ touch rags
genomics@harvard_ami:~/Data$ touch Earth Heaven
genomics@harvard_ami:~/Data$ ls
Earth Heaven rags
genomics@harvard_ami:~/Data$
```

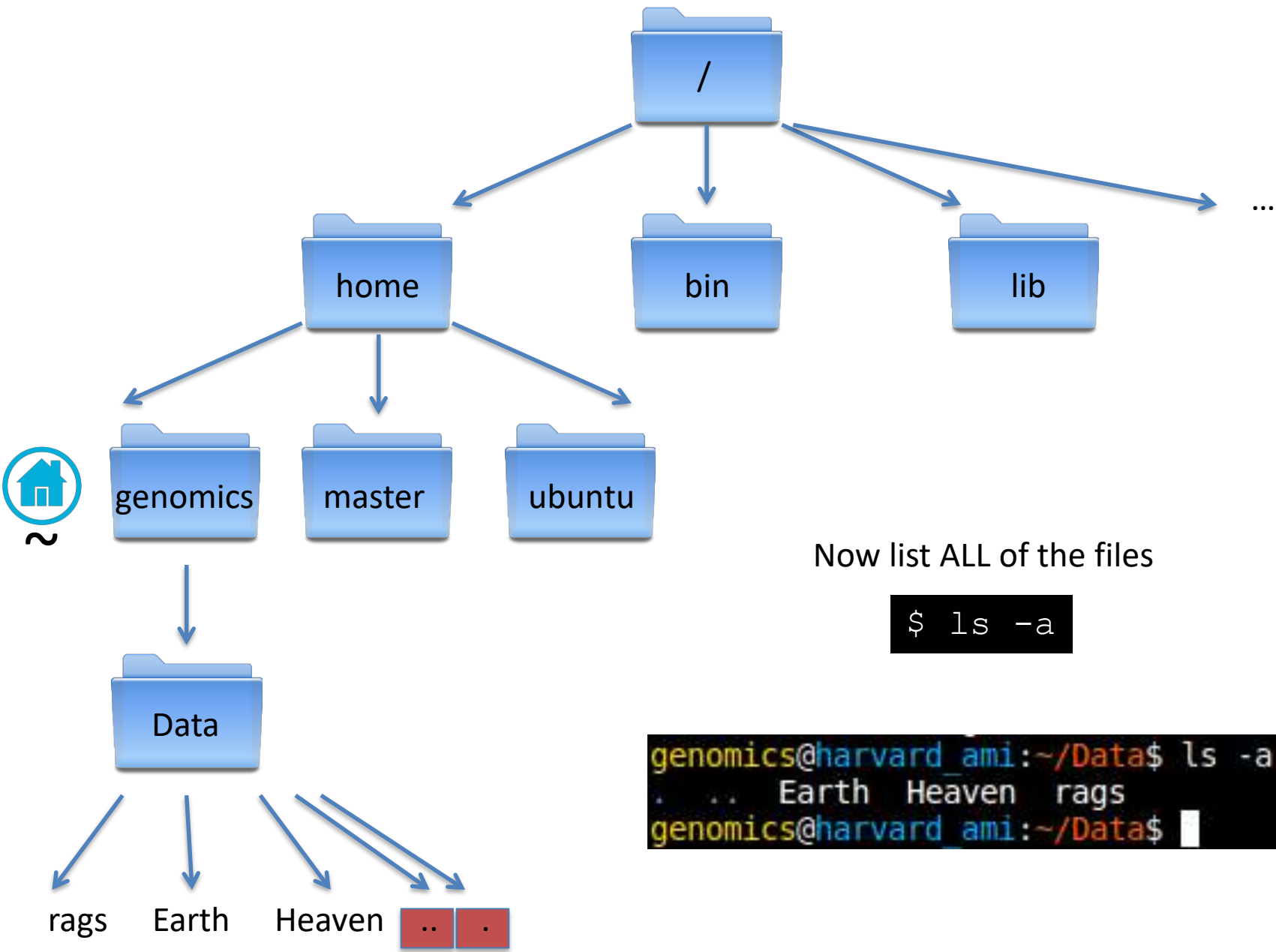




Now list ALL of the files

```
$ ls -a
```

```
genomics@harvard_ami:~/Data$ ls -a
.  ..  Earth  Heaven  rags
genomics@harvard_ami:~/Data$
```



Now list ALL of the files

```
$ ls -a
```

```
genomics@harvard_ami:~/Data$ ls -a
.  ..  Earth  Heaven  rags
genomics@harvard_ami:~/Data$
```

