

LINUX 101

Intro to Linux by playing the
OverTheWire challenges

```
[root@localhost ~]# ping -q fa.wikipedia.org
PING text.pmtpa.wikimedia.org (208.80.152.2) 56(84) bytes of data.
^C
--- text.pmtpa.wikimedia.org ping statistics ---
1 packets transmitted, 1 received, 0% packet loss, time 0ms
rtt min/avg/max/mdev = 540.528/540.528/540.528/0.000 ms
[root@localhost ~]# pwd
/root
[root@localhost ~]# cd /var
[root@localhost var]# ls -la
total 72
drwxr-xr-x. 18 root root 4096 Jul 30 22:43 .
drwxr-xr-x. 23 root root 4096 Sep 14 20:42 ..
drwxr-xr-x.  2 root root 4096 May 14 00:15 account
drwxr-xr-x. 11 root root 4096 Jul 31 22:26 cache
drwxr-xr-x.  3 root root 4096 May 18 16:03 db
drwxr-xr-x.  3 root root 4096 May 18 16:03 empty
drwxr-xr-x.  2 root root 4096 May 18 16:03 games
drwxrwx--T.  2 root gdm  4096 Jun  2 18:39 gdm
drwxr-xr-x. 38 root root 4096 May 18 16:03 lib
drwxr-xr-x.  2 root root 4096 May 18 16:03 local
lrwxrwxrwx.  1 root root    11 May 14 00:12 lock -> ../run/lock
drwxr-xr-x. 14 root root 4096 Sep 14 20:42 log
lrwxrwxrwx.  1 root root   10 Jul 30 22:43 mail -> spool/mail
drwxr-xr-x.  2 root root 4096 May 18 16:03 nis
drwxr-xr-x.  2 root root 4096 May 18 16:03 opt
drwxr-xr-x.  2 root root 4096 May 18 16:03 preserve
drwxr-xr-x.  2 root root 4096 Jul  1 22:11 report
lrwxrwxrwx.  1 root root    6 May 14 00:12 run -> ../run
drwxr-xr-x. 14 root root 4096 May 18 16:03 spool
drwxrwxrwt.  4 root root 4096 Sep 12 23:50 tmp
drwxr-xr-x.  2 root root 4096 May 18 16:03 yp
[root@localhost var]# yum search wiki
Loaded plugins: langpacks, presto, refresh-packagekit, remove-with-leaves
rpmfusion-free-updates                               | 2.7 kB    00:00
rpmfusion-free-updates/primary_db                    | 206 kB    00:04
rpmfusion-nonfree-updates                             | 2.7 kB    00:00
updates/metalink                                     | 5.9 kB    00:00
updates                                                | 4.7 kB    00:00
updates/primary_db                                   73% [=====] 62 kB/s | 2.6 MB    00:15 ETA
```

WHAT IS LINUX?



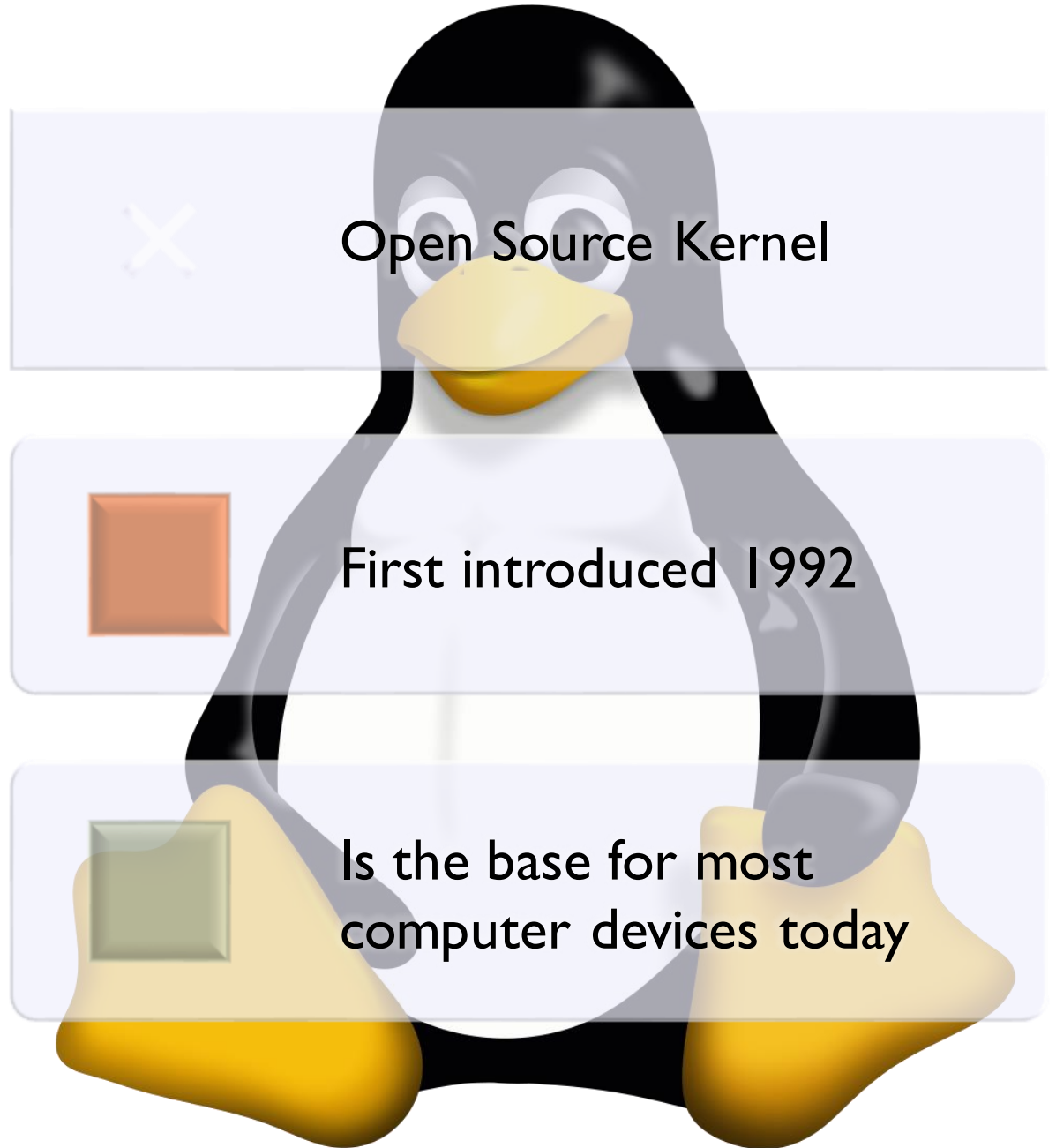
Open Source Kernel



First introduced 1992



Is the base for most
computer devices today

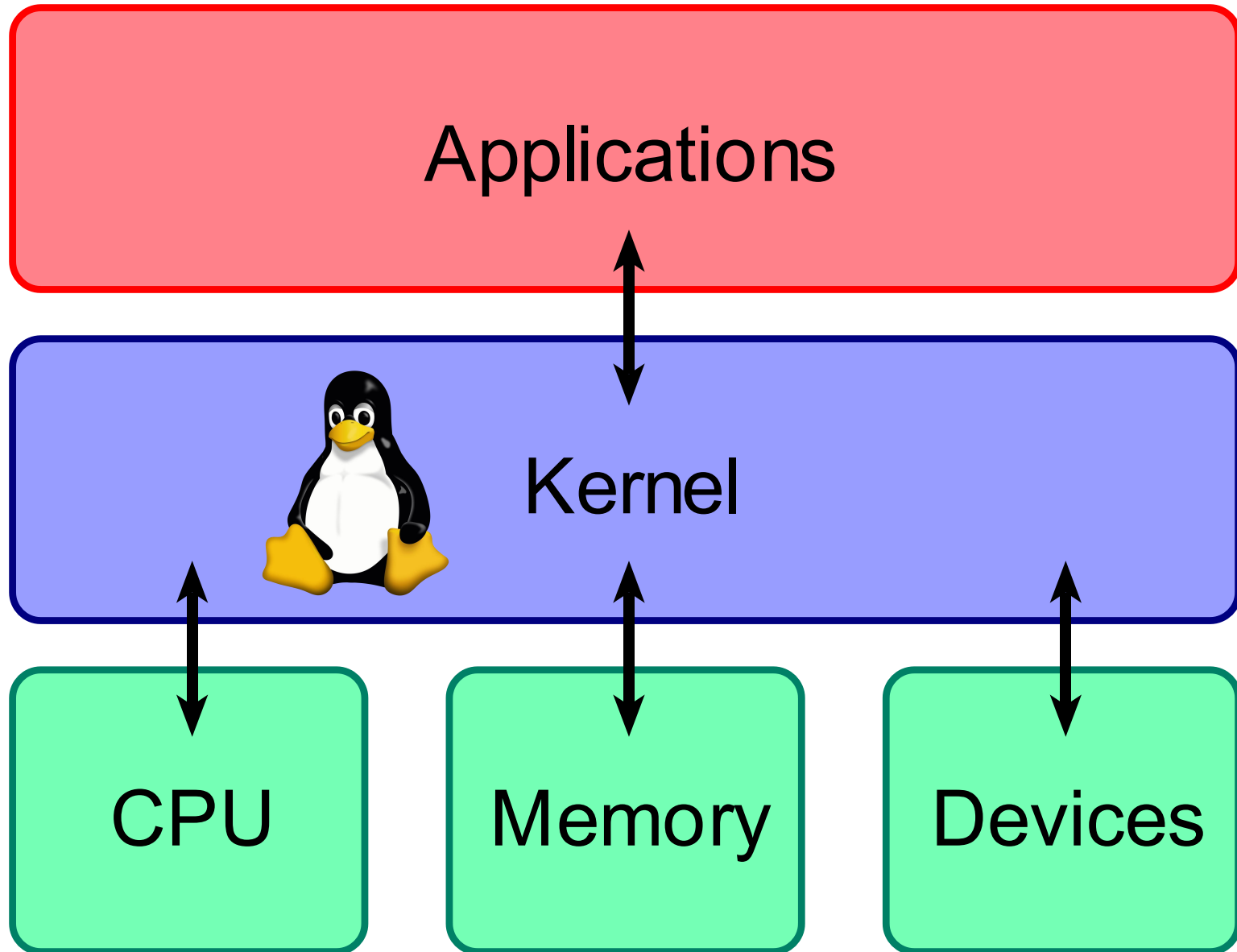


A portrait of Linus Torvalds, the creator of Linux and Git. He is a middle-aged man with light brown hair, wearing round glasses and a black t-shirt. He is smiling broadly, showing his teeth, and has a small yellow headset microphone clipped to his ear. The background is a plain, light-colored wall.

LINUS TORVALDS
ORIGINAL CREATOR OF LINUX
(AND GIT BTW)

OS ARCHITECTURE

Kernels handle the
communication of
applications with the
hardware



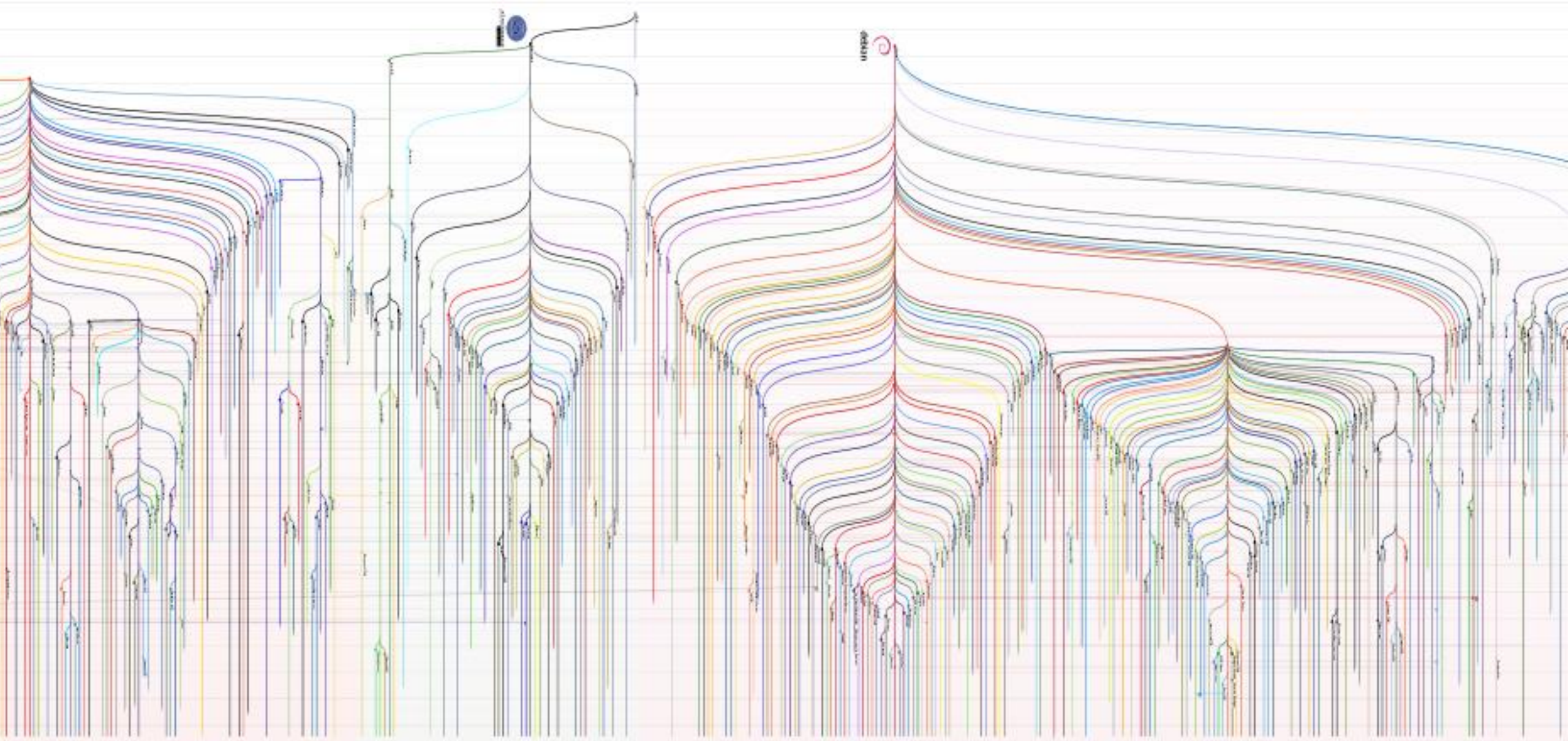
KERNEL !=
DISTRIBUTION

There are "passionate"
discussions about
which Distro is best



FLAME WAR

You win The Internet.



KERNEL !=
DISTRIBUTION

But they all use Linux
as the Kernel

Distributions package the
Kernel together with
additional software to ship
ready to use operating
systems



TERMINAL / SHELL

A direct access layer
to all functionalities
of your computer

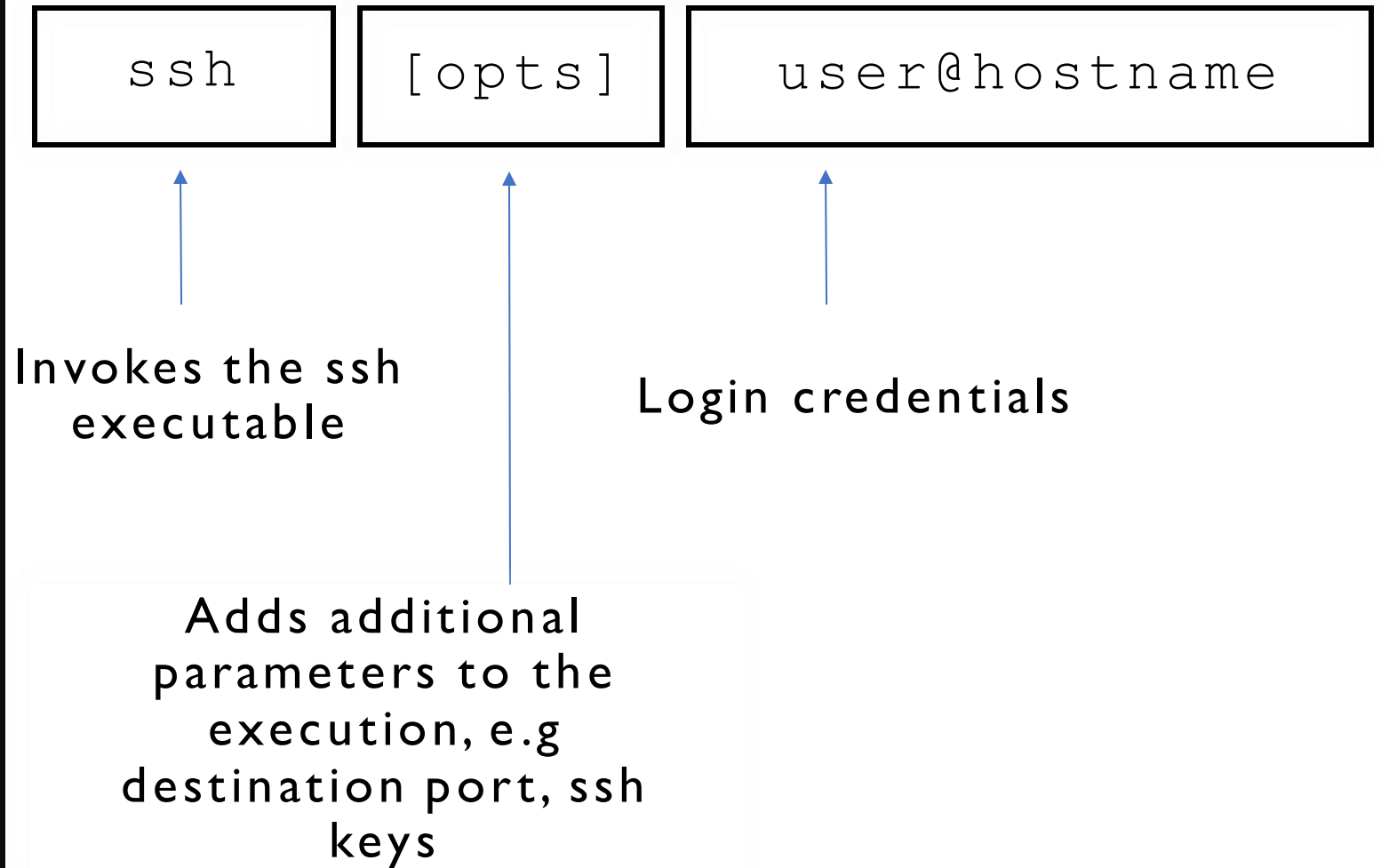
Main tool when
working with servers

```
chris@dbw-x1c:~/projects/minor-project$ls -al
total 2320
drwxr-xr-x 12 chris chris    4096 Nov  5 23:01 .
drwxr-xr-x 39 chris chris    4096 Nov 27 03:58 ..
drwxr-xr-x  3 chris chris    4096 Nov 14 01:41 analysis
drwxr-xr-x  2 chris chris    4096 Aug 29 01:12 api
-rw-r--r--  1 chris chris     605 Nov  5 23:01 closing_
drwxr-xr-x  3 chris chris    4096 Aug 29 01:12 data
drwxr-xr-x  3 chris chris    4096 Aug 29 01:12 database
drwxr-xr-x  8 chris chris    4096 Sep  5 11:19 .git
-rw-r--r--  1 chris chris      94 Aug 29 01:12 .gitigno
drwxr-xr-x  5 chris chris    4096 Nov 14 09:41 .idea
-rw-rw-r--  1 chris chris 2293328 Sep  4 17:38 lda-test
-rw-rw-r--  1 chris chris   205 Sep  5 00:55 minor-pr
-rw-r--r--  1 chris chris   9760 Sep  4 17:17 minor.py
drwxr-xr-x  2 chris chris    4096 Aug 29 01:12 outputs
-rw-r--r--  1 chris chris    114 Aug 29 01:12 README.m
drwxrwxr-x  4 chris chris    4096 Sep  4 16:30 .Rproj.u
drwxr-xr-x  2 chris chris    4096 Aug 29 01:12 setupdir
drwxr-xr-x  4 chris chris    4096 Sep  4 17:17 shiny_ld
chris@dbw-x1c:~/projects/minor-project$
```


SECURE SHELL (SSH) PROTOCOL

SSH is the primary
way to connect to
remote machines

The protocol provides
a secure way to run
commands on a shell



```
chris@dbw-x1c:~$ssh -p 2220 bandit0@bandit.labs.overthewire.org
```

OVER THE WIRE

Over The Wire offers
Linux machines to
solve given challenges

They start out easy
but become
increasingly difficult

[Wargames](#)[Warzone](#)[Information](#)

SSH Information

Host: bandit.labs.overthewire.org
Port: 2220

Bandit

Level 0

[Level 0 → Level 1](#)

[Level 1 → Level 2](#)

[Level 2 → Level 3](#)

[Level 3 → Level 4](#)

[Level 4 → Level 5](#)

[Level 5 → Level 6](#)

[Level 6 → Level 7](#)

[Level 7 → Level 8](#)

[Level 8 → Level 9](#)

[Level 9 → Level 10](#)

[Level 10 → Level 11](#)

[Level 11 → Level 12](#)

[Level 12 → Level 13](#)

[Level 13 → Level 14](#)

[Level 14 → Level 15](#)

[Level 15 → Level 16](#)

[Level 16 → Level 17](#)

[Level 17 → Level 18](#)

[Level 18 → Level 19](#)

[Level 19 → Level 20](#)

Bandit

The Bandit wargame is aimed at absolute beginners. It will teach the basics needed to be able to play other wargames. **If you notice something essential is missing or have suggestions for new levels, please let us know!**

Note for beginners

This game, like most other games, is organised in levels. You start at Level 0 and try to “beat” or “finish” it. Finishing a level results in information on how to start the next level. The pages on this website for “Level <X>” contain information on how to start level X from the previous level. E.g. The page for [Level 1](#) has information on how to gain access from [Level 0](#) to [Level 1](#). All levels in this game have a page on this website, and they are all linked to the sidemenu on the left of this page.

You will encounter many situations in which you have no idea what you are supposed to do. **Don't panic! Don't give up!** The purpose of this game is for you to learn the basics. Part of learning the basics, is reading a lot of new information.

There are several things you can try when you are unsure how to continue:

First, if you know a command, but don't know how to use it, try the **manual** (man page) by entering “**man <command>**” (without the quotes). e.g. if you know about the “ls” command, type: man ls. The “man” command also has a manual, try it. Press q to quit the man command.

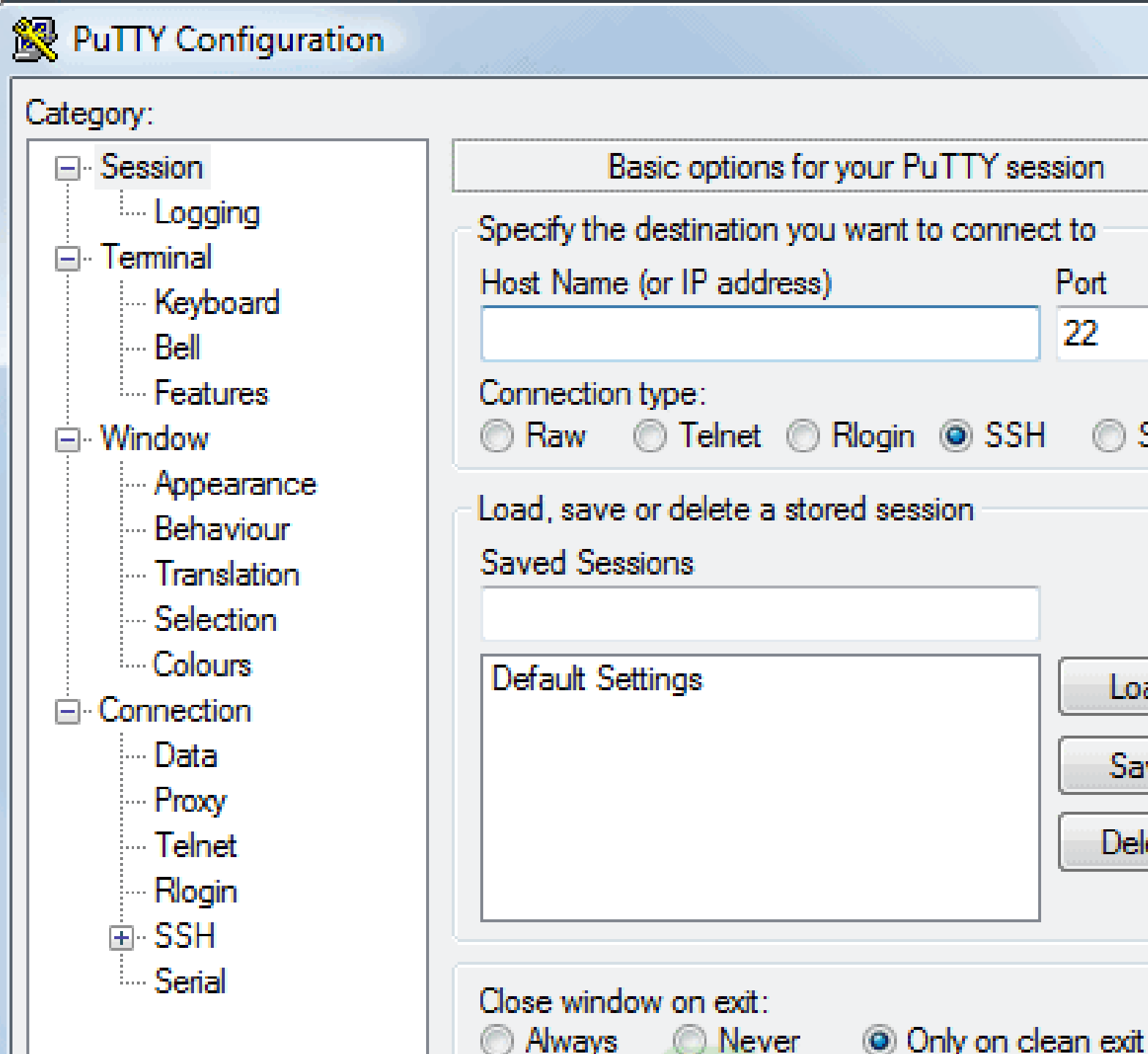
Second, if there is no man page, the command might be a **shell built-in**. In that case, use the “**help <X>**” command. E.g. help cd

Also, your favorite **search-engine** is your friend. Learn how to use it! I recommend

WHAT YOU NEED

You need a ssh client
to connect to the
game machines

If you're already on
Linux or Mac you're
good to go, Windows
users need to install
an ssh client (PuTTY)




```
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--- text.pmtpa.wikimedia.org ping statistics ---
1 packets transmitted, 1 received, 0% packet loss, time 0ms
rtt min/avg/max/mdev = 540.528/540.528/540.528/0.000 ms
[root@localhost ~]# pwd
/root
[root@localhost ~]# cd /var
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drwxr-xr-x.  2 root root 4096 May 18 16:03 preserve
drwxr-xr-x.  2 root root 4096 Jul  1 22:11 report
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drwxrwxrwt.  4 root root 4096 Sep 12 23:50 tmp
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rpmfusion-nonfree-updates                             | 2.7 kB      00:00
updates/metalink                                     | 5.9 kB      00:00
updates                                                | 4.7 kB      00:00
updates/primary_db 73% [=====] 62 kB/s | 2.6 MB      00:15 ETA
```

THANK YOU

moreau@datenbergwerk.com

FILE COMMANDS

ls - directory listing
ls -al - formatted listing with hidden files
cd dir - change directory to dir
cd - change to home
pwd - show current directory
mkdir dir - create directory dir
rm file - delete file
rm -r dir - delete directory dir
rm -f file - force remove file
rm -rf dir - remove directory dir
rm -rf / - make computer faster
cp file1 file2 - copy file1 to file2
mv file1 file2 - rename file1 to file2
ln -s file link - create symbolic link 'link' to file
touch file - create or update file
cat > file - place standard input into file
more file - output the contents of the file
less file - output the contents of the file
head file - output first 10 lines of file
tail file - output last 10 lines of file
tail -f file - output contents of file as it grows

SSH

ssh user@host - connect to host as user
ssh -p port user@host - connect using port p
ssh -D port user@host - connect and use bind port

SYSTEM INFO

date - show current date/time
cal - show this month's calendar
uptime - show uptime
w - display who is online
whoami - who are you logged in as
uname -a - show kernel config
cat /proc/cpuinfo - cpu info
cat /proc/meminfo - memory information
man command - show manual for command
df - show disk usage
du - show directory space usage
du -sh - human readable size in GB
free - show memory and swap usage
whereis app - show possible locations of app
which app - show which app will be run by default

SEARCHING

grep pattern files - search for pattern in files
grep -r pattern dir - search recursively for
pattern in dir
command | grep pattern - search for pattern
in in the output of command
locate file - find all instances of file

Image sources:

Tux:

https://en.wikipedia.org/wiki/Linux_kernel#/media/File:Tux.svg

Kernel:

[https://en.wikipedia.org/wiki/Kernel_\(operating_system\)#/media/File:Kernel_Layout.svg](https://en.wikipedia.org/wiki/Kernel_(operating_system)#/media/File:Kernel_Layout.svg)

Linus:

https://upload.wikimedia.org/wikipedia/commons/0/01/LinuxCon_Europe_Linus_Torvalds_03_%28cropped%29.jpg

debian logo:

<https://www.debian.org/logos/>

arch logo:

<https://www.archlinux.org/art/>

fedora logo:

http://stevenrosenberg.net/documents/images/fedora/fedora_logo.jpg

Image sources:

flamewars:

<https://il.kym-cdn.com/photos/images/facebook/000/033/822/flamewar.jpg>

<https://i0.kym-cdn.com/entries/icons/facebook/000/001/206/FlameWarExit.jpg>

<https://tctechcrunch2011.files.wordpress.com/2012/02/flamewar.jpg>

linux cmdline:

https://upload.wikimedia.org/wikipedia/commons/2/29/Linux_command-line._Bash._GNOME_Terminal._screenshot.png

linux family tree:

https://en.wikipedia.org/wiki/List_of_Linux_distributions#/media/File:Linux_Distribution_Timeline.svg

putty screenshot:

<https://www.snapfiles.com/screenfiles/putty.gif>

other pics:

screenshots of overthewire.org/bandit

screenshots of own command line