Future of Computing and Linux

1-13-2011

Opening Discussion

- Have you come up with any other questions about the course?
- Minute essay comments:
  - Why no creepy military tech?
  - Harvard Architecture
  - Where is Scala used? Why Scala?
  - If computers take over everything, how will non-computer people make money?
  - How long until self-driving cars will be in Texas?
  - What is CES?

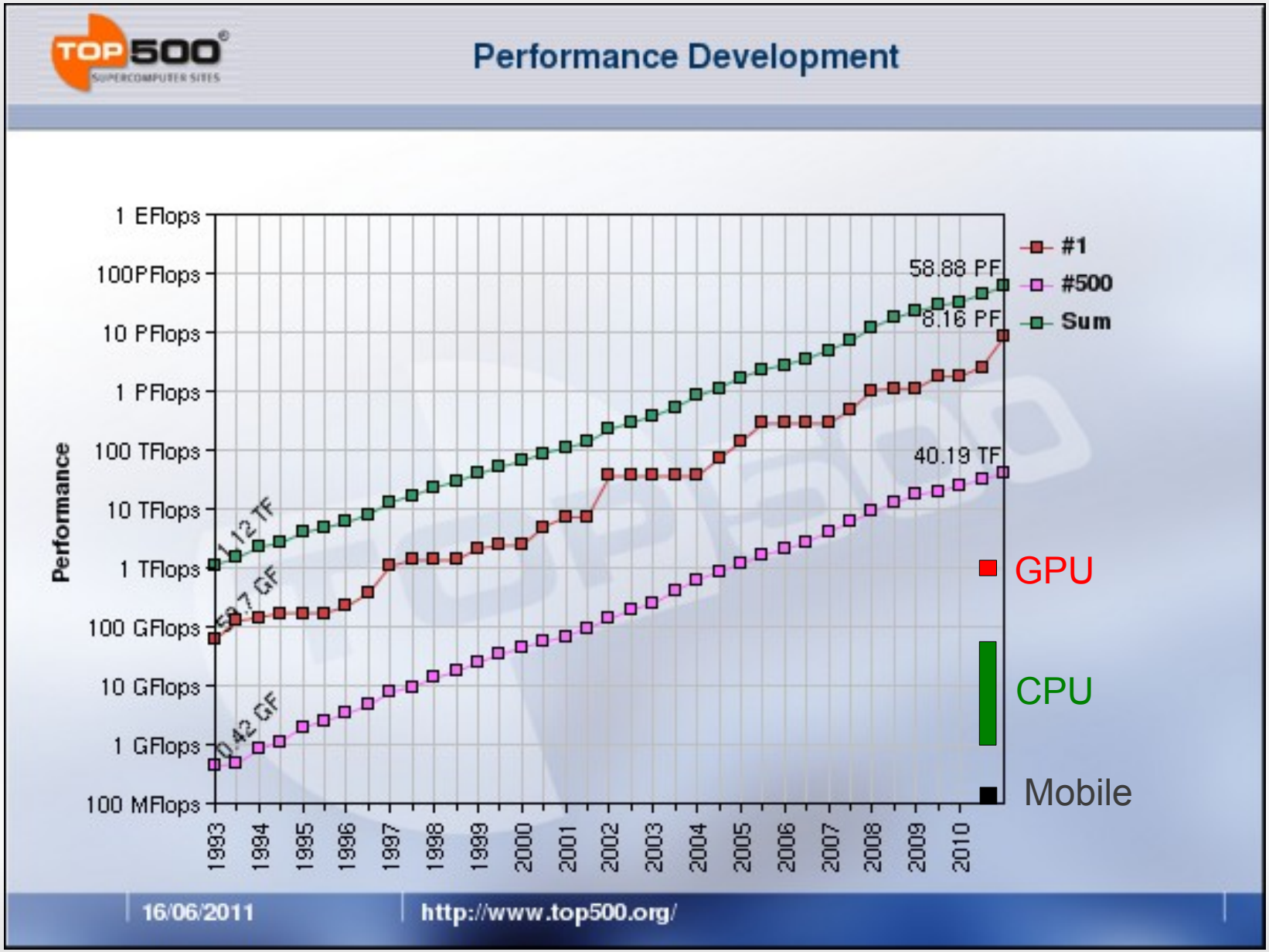
More Comments

- How far will we get into coding?

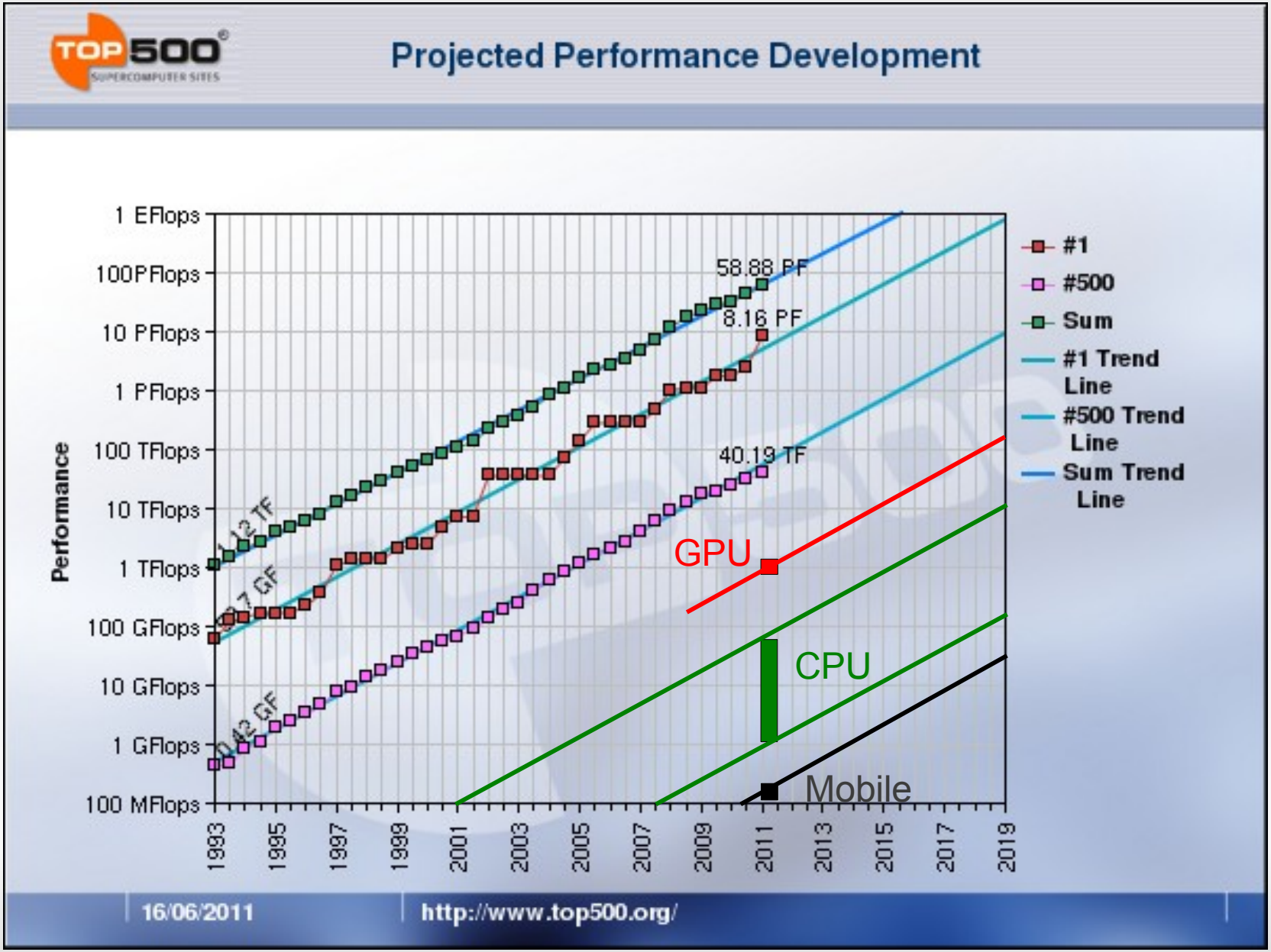
Cutting Edge

http://www.youtube.com/watch?v=6zXOW6v0c8s

Computing Power



The Power of Exponential Growth



Cost/GFLOP

Date	Approximate cost per GFLOPS	Technology	Comments
1961	US $1,100,000,000,000 ($1.1 trillion)	About 17 million IBM 1620 units costing $64,000 each	The 1620's multiplication operation takes 17.7 ms.[40]
1984	$15,000,000	Cray X-MP	
1997	$30,000	Two 16-processor Beowulf clusters with Pentium Pro microprocessors[41]	
April 2000	$1,000	Bunyip Beowulf cluster	Bunyip was the first sub-US$1/MFLOPS computing technology. It won the Gordon Bell Prize in 2000.
May 2000	$640	KLAT2	KLAT2 was the first computing technology which scaled to large applications while staying under US$1/MFLOPS.[42]
August 2003	$82	KASY0	KASY0 was the first sub-US$100/GFLOPS computing technology.[43]
August 2007	$48	Microwulf	As of August 2007, this 26.25 GFLOPS "personal" Beowulf cluster can be built for $1256.[44]
March 2011	$1.80	HPU4Science	This $30,000 cluster was built using only commercially available "gamer" grade hardware.[45]

http://en.wikipedia.org/wiki/FLOPS#Hardware_costs

Linux

- Go ahead and log in.
- Linux is just another OS, like Windows or Mac OS.
- Linux is primarily used in servers. Efforts are being put into making it a desktop OS.
- It has a GUI, but we will focus on doing things through the command line.
- Bring up a terminal.
- Change your password with passwd.

Command Line

- You are likely used to the point and click interface of a GUI.
- To run a program you double click on it or a file associated with it. Any other information has to be given after the program opens.
- With the command line you type in the name of the program you want to run. You can also specify any other information you want through command line arguments.

Files and Directories

- What you call folders were originally directories.
- Commands:
  - pwd – See current directory.
  - ls – List the contents of a directory.
  - mkdir/rmdir – Make and remove directories.
  - cp/mv/rm – Copy, move, remove files.
  - less/more/cat – See contents of files.

Tips

- Tab completion for file/directory names.
- ! - for last matching command.
- Ctrl-r to search your history.
- The man command for manual entries. Use the -k option to search.

Permissions

- Do ls with -l option to see permissions.
- Sets of rwx for user, group, and others.
- Use whoami and groups to find identity.
- Use chmod and chown to change permissions or ownership.

Remote

- Use ssh to login into one machine from another.
- Use scp to copy files from one machine to another.
- The website has a link to Putty which will give you these abilities from Windows. For Windows, consider running a virtual Linux install.

Other

- du – Lists disk usage
- grep – Searches for something inside of files.
- find – Find files.
- head – List the first several lines of a file.
- tail – List the last several lines of a file.
- top – Look at what is running on a machine.
- w – Look at who is logged into a machine.

I/O Redirection

- You can send a programs output to a file using > or >>.
- You can make a program use a file as input using <.
- You can do more interesting things by sending the output of one program to another with |.

Minute Essay

- Have you ever used a command-line interface before? What do you think of them based on what you have seen today?
- Try connecting to one of the Xena machines from your room. For example:
  - xena08.cs.trinity.edu