

Lesson Module Checklist

- Slides
- Flash cards
- First minute quiz
- Web calendar summary
- Web book pages
- Commands
- Howtos

- Lab
- Surveys and PW sheet posted
- Youtube Videos uploaded

- Forum created
- Opus accounts made and populated
- Pod VMs created

- Rosters printed

- Backup slides, Confer links, handouts on flash drive



- [] Has the phone bridge been added?
- [] Is recording on?
- [] Does the phone bridge have the mike?
- [] Share slides, putties, Chrome and VLab
- [] Disable spelling on PowerPoint



Instructor: **Rich Simms**

Dial-in: **888-450-4821**

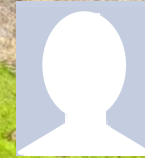
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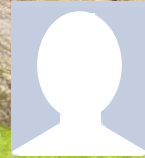
Justin



Garratt



Sean



Donald



Carlile



Carter



Dajan



Bryn



Rita



Kelly



Benjamin



Ray



Fidel



Michael



Evan



Efrain



Bjorn



Carlos P.



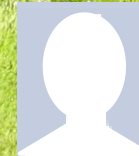
Joshua



Gustavo



David



Jacob



Humberto



Gwyneth



Ryan



Timothy



Steven



Stacey



Sean



Hannah



Jose



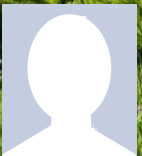
Max



Kristen



Evie



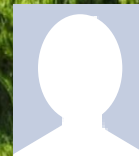
Jessica



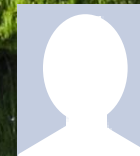
Chad



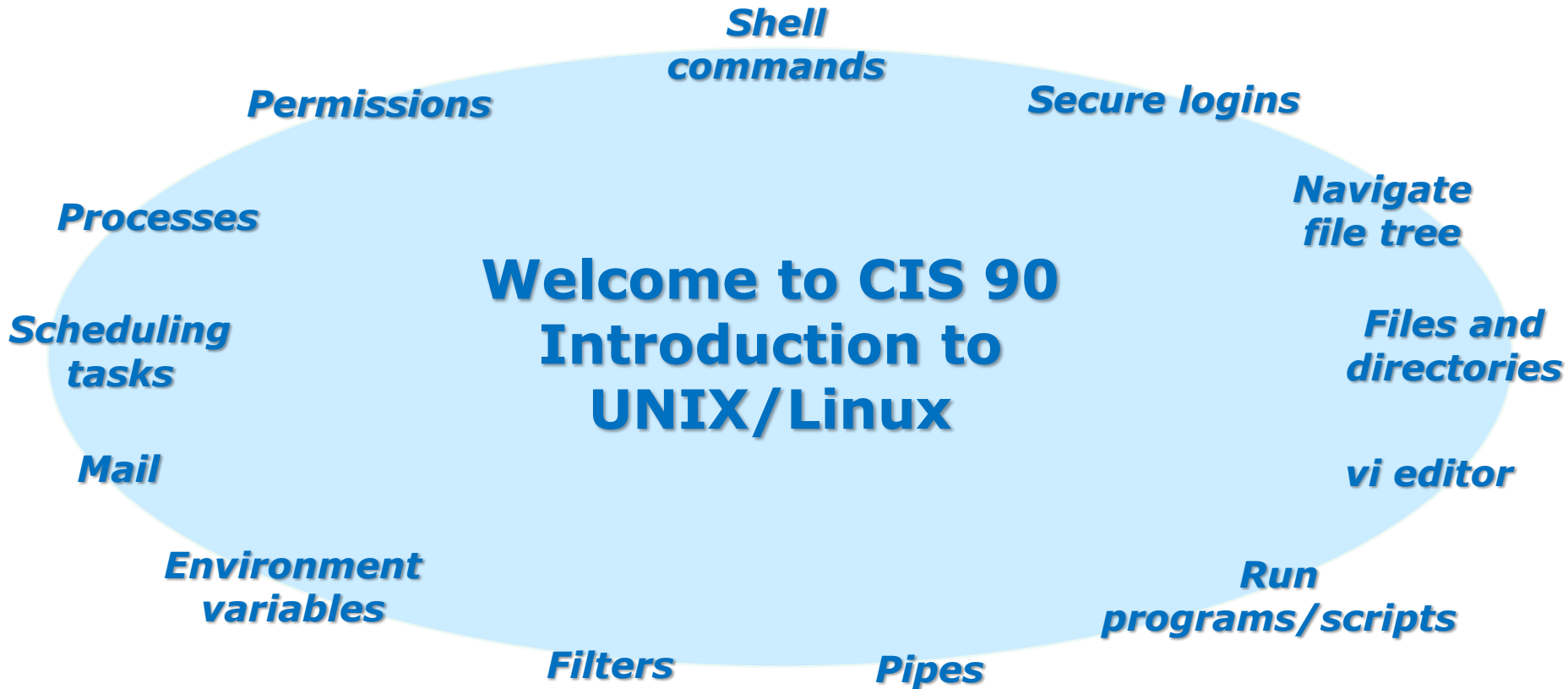
Andrew



Luis



Carlos R.



Student Learner Outcomes

- Upon successful completion of this course students will be able to:
 - Navigate and manage the UNIX/Linux file system
 - Automate and schedule tasks
 - Customize the shell environment

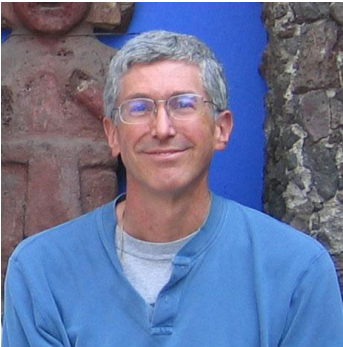
Introductions

Introductions and Credits



Jim Griffin

- Jim created this Linux course
- Jim's site: <http://cabrillo.edu/~jgriffin/>



Rich Simms

- Worked at HP for 27+ years
- Started teaching this course in 2008 when Jim went on sabbatical
- Rich's site: <http://simms-teach.com>

And thanks to John Govsky for many teaching best practices: e.g. the First Minute quizzes, the online forum, and the point grading system

Class and Linux Overview

Objectives

- Understand how this course works
- Use Opus (SSH)
- Use Pod VMs (SSH)
- Use Graphical Desktops (VLab)
- Use Virtual TTY terminals (VLab)
- Learn first UNIX/Linux commands
- Overview on UNIX/Linux

Agenda

- Introductions
- How this class works
- Using Opus and VLab
- Housekeeping
- UNIX/Linux Market
- Computers
- Virtual Machines
- UNIX/Linux Architecture
- First Commands
- Navigating Terminals
- Lab 1
- Wrap up



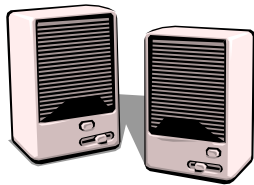
Virtual Classroom with CCC Confer



- Enables remote students to attend class
- CCC = California Community Colleges
- Web conferencing tool + phone bridge (conference call)
- Each class is recorded and archived for viewing later
- Local students in the classroom can also use it for viewing slides, using the chat window, polls, and online emoticons.



- Listen using your computer's speakers/headset or with your phone using the dial-in number



- Ask questions using the chat window or just speak if dialed in with your phone (or Skype)

Dialing in by phone (or Skype) is best because you can ask and answer questions by speaking rather than use a chat window

Class Activity

Enter the online virtual classroom

Rich's Cabrillo College CIS Classes
CIS 90 Calendar

Home Resources Forums CIS Lab CTC

Login
Flashcards
Admin
CIS 90
Previous Classes

8 days till term starts!

Cabrillo College
Web Advisor
CCC Confer
Static IPs
Quick Ref
VM Repairs
GAH!

CIS 90 (Fall 2010) Course Calendar
Course Home Grades

1. Browse to simms-teach.com
2. Click the *CIS 90* link
3. Click the *Calendar* link
4. Look for any CCC Confer section
5. Click the *Enter virtual classroom* link

1	9/1	<ul style="list-style-type: none">• Use Linux running on a local virtual machine <p>Materials</p> <ul style="list-style-type: none">• Presentation slides (download)• Logins Sheet (download)• Howto #103: Installing PuTTY (download)• Howto #301: Bringing the Eko VM home (download) <p>Assignment</p> <ul style="list-style-type: none">• Student Survey• Lab 1 <p>CCC Confer</p> <ul style="list-style-type: none">• Enter virtual classroom• Class archives	1.1-1.15 (Gillay)
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CCC Confer - Attending class online



CCC Confer uses Java which requires a download and installation of the Java Runtime Environment from java.com (Oracle)

CCC Confer - Attending class online

The screenshot displays the CCC Confer application window titled "CCC Confer - 0 - RICH SIMMS". The interface includes a menu bar (File, Edit, View, Tools, Window, Help), a toolbar with icons for drawing, erasing, and navigating, and a "Fit Page" dropdown. The main content area shows a slide titled "CIS Linux Classes" with the Cabrillo College logo and instructor information: "Instructor: Rich Simms" and "Dial-in: 888-450-4821". The slide background features a grid of 40 white silhouette icons representing participants. A red box highlights the "PARTICIPANTS" sidebar on the left, which lists "Benji" and "Rich Simms (Moderator)". Below the participants list, a red box highlights the "CHAT" area, showing a message log with entries: "- You joined the Main Room. (2:23 PM) -" and "- Rich Simms joined the Main Room. (2:24 PM) -". A red box also highlights the interaction icons (smiley face, hand, microphone, checkmark) located between the participants list and the chat area. A blue callout box with a red arrow pointing to the interaction icons contains the text: "Raise your hand, make gestures, use emoticons and indicate responses using these controls". Another blue callout box with a red arrow pointing to the chat area contains the text: "Ask public or private questions using the chat area".

CCC Confer - Attending class online



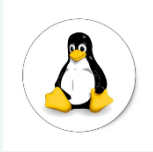
When dialed in by phone you can use:

- *0 Contact the operator for assistance.
- *6 Mute/unmute your individual line with a private announcement.

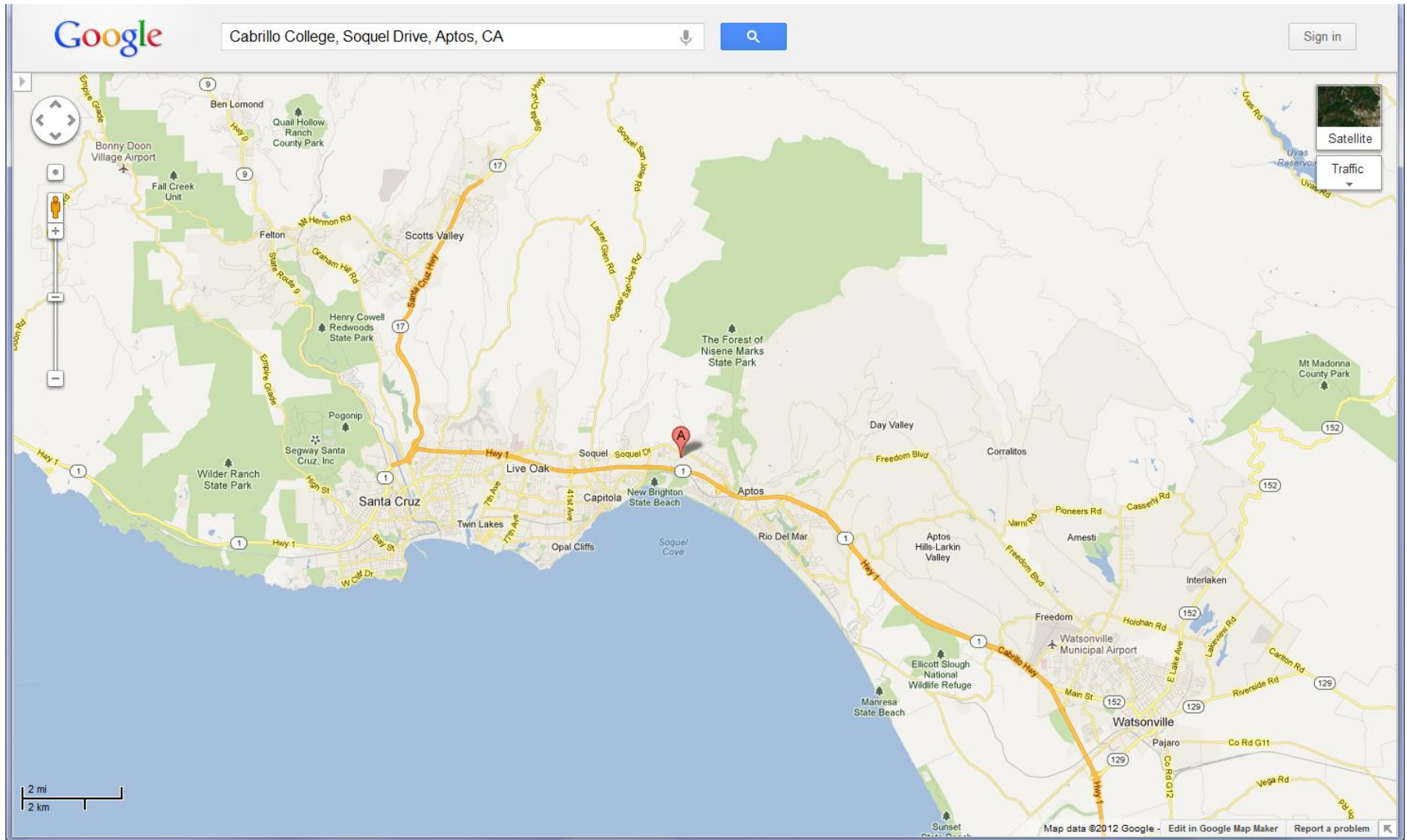


Class Activity

What kind of computer did you use to join CCC Confer?

			Other
Put your pointer here if using a Windows PC:	Put your pointer here if using a Apple Mac:	Put your pointer here if using a Linux system:	Put your pointer here if using something else:

Class Activity – Where are you now?



How this class works

CIS 90

Spring 2012

Class meets in room 2501 and online every Wednesday afternoon:

- 1:15-4:20PM, from Aug 29th to Dec 5th
- 15 lessons (class meetings) total
- Final exam (Test #3) at 1-3:50PM, on Dec 12th

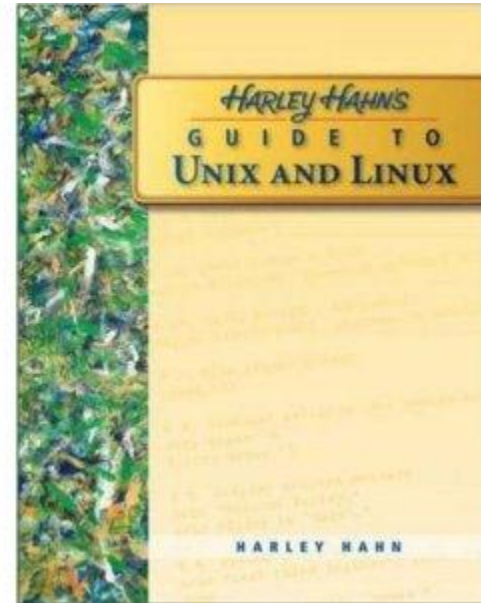
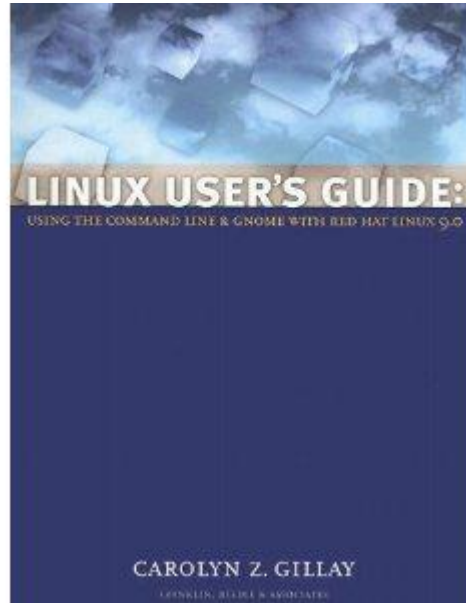
AUG 2012						
Su	Mo	Tu	We	Th	Fr	Sa
29	30	31	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	1

SEP 2012						
Su	Mo	Tu	We	Th	Fr	Sa
26	27	28	29	30	31	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	1	2	3	4	5	6

OCT 2012						
Su	Mo	Tu	We	Th	Fr	Sa
30	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	1	2	3

NOV 2012						
Su	Mo	Tu	We	Th	Fr	Sa
28	29	30	31	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	1

DEC 2012						
Su	Mo	Tu	We	Th	Fr	Sa
25	26	27	28	29	30	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31	1	2	3	4	5



Optional Textbooks:

Linux User's Guide: Using the Command Line and GNOME with Red Hat Linux 9.0
by Carolyn Z. Gillay
Franklin Beedle & Associates ISBN: 1887902988

Harley Hahn's Guide to Unix and Linux
by Harley Hahn
McGraw-Hill ISBN: 0073133612

The typical week
http://simms-teach.com

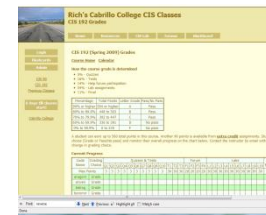
Wednesday

"First minute" quiz
Lecture on new lesson material
Class activities
Previous week lab assignments
due 11:59PM (Opus time)

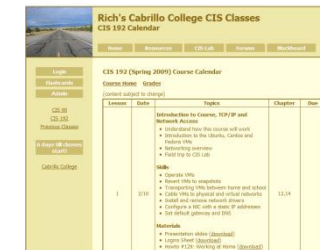
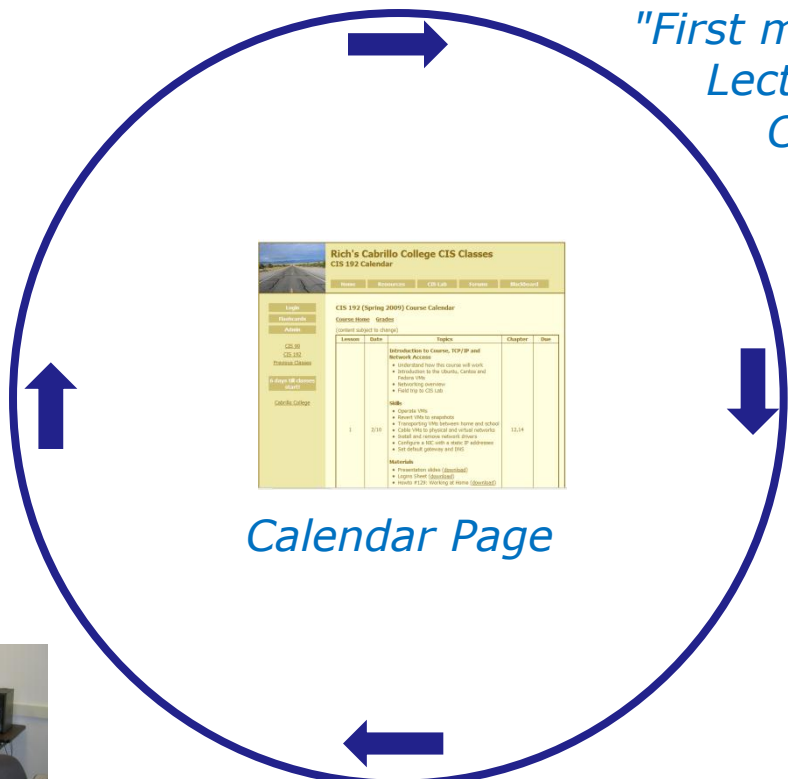
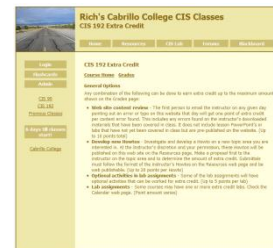


Thursday
is grading day

Check progress
on the Grades
Page



Check Extra Credit Page
if you need some more
points



Calendar Page



Use Forum to
ask and answer
questions



Work Lab Assignments
in the CIS Lab or from home

Contacting the instructor

- Use the forum for the fastest response on technical or class related questions.
- Use email for personal matters only. If it's NOT personal I will most likely ask you to post your question on the forum and will answer it there instead so other students may benefit from the answer.
- Weekly office hours:
<http://babyface.cabrillo.edu/salsa/listing.jsp?staffId=1426>
- Also available in the CIS Lab for help with lab assignments or class material:
<http://babyface.cabrillo.edu/salsa/listing.jsp?staffId=1426>
- Avoid leaving a message on voice mail. Checked rarely so don't expect a fast response!



Class Exercise (class website)

Please browse to: <http://simms-teach.com>

First click on **CIS 90** on left panel to see syllabus

Rich's Cabrillo College CIS Classes
CIS 90 Home

Home Resources Forums CIS Lab CTC

Login
Flashcards
Admin
CIS 90
Previous Classes

14 days till term starts!

[Cabrillo College](#)
[Web Advisor](#)
[CCC Confer](#)
[Static IPs](#)
[Quick Ref](#)
[VM Repairs](#)
[GAH!](#)

CIS 90 (Fall 2010) Sections 67727 and 68884

[Calendar](#) [Grades](#)

Introduction to UNIX/Linux

- Wednesdays - 1:15PM to 4:20PM
- ◦ Section 67727 meets in room 2501 on the Aptos Main Campus
- ◦ Section 68884 meets online at [CCC Confer](#)
- Open Lab - 3 hr 5 min per week to be arranged - in the CIS Lab
- Units: 3, prerequisites: none, recommended: CS 1L or CIS 1
- Optional Textbooks (available at the [Cabrillo College Bookstore](#))
 - [Linux User's Guide: Using the Command Line and GNOME](#)
 - by Carolyn Z. Gillay
 - Franklin Beedle & Associates ISBN: 1887902988
 - [Harley Hahn's Guide to Unix and Linux](#)
 - by Harley Hahn
 - McGraw-Hill ISBN: 0073133612

Course Description

Provides a technical overview of the UNIX/Linux operating system, including hands-on experience with commands, files, and tools.

This is a starter course for people interested in learning how to use a UNIX/Linux computer. It is also a prerequisite to all the follow-on UNIX/Linux classes taught at Cabrillo College.

Then click these links to toggle between Home (Syllabus), Calendar and Grades

Course Syllabus (on the CIS 90 home page)

It is a good idea to read through the syllabus carefully to avoid any surprises and get a good idea how this course works.

Rich's Cabrillo College CIS Classes
CIS 90 Home

Home Resources Forums CIS Lab CTE

Log In
Faculty
Admin
CIS 90 Home Page
CIS 90 Home Page

CIS 90 (Fall 2018) Sections 6727 and 6884
Course Goals

Introduction to UNIX/Linux

- Understand - 1.2.1.1.1 + 1.2.1.1.2
- Section 6884 meets online at CIS 90 Center
- Goals: 1. For 1st time users of UNIX/Linux, the CIS 90 Center will provide a hands-on introduction to the UNIX/Linux operating system.
- Goals: 2. For students who have experience with UNIX/Linux, the CIS 90 Center will provide a hands-on introduction to the UNIX/Linux operating system.
- Goals: 3. For students who have experience with UNIX/Linux, the CIS 90 Center will provide a hands-on introduction to the UNIX/Linux operating system.

Course Description

Process a basic user interface of the UNIX/Linux operating system, including hands-on experience with command-line, files, and basic.

This is a starter course for people interested in learning how to use a UNIX/Linux operating system. It is a prerequisite to all the following UNIX/Linux classes taught at Cabrillo College.

The material covered in this course is applicable to all versions of UNIX and Linux such as Red Hat, Ubuntu, Open SUSE, Suse Linux Enterprise Server, and Oracle Linux. The course is available to a physical server on campus for use during class and at home.

Student Learning Outcomes

Upon successful completion of this course students will be able to:

- Navigate and manage the UNIX/Linux file system
- Authenticate and authorize users
- Customize the shell environment

Some of your assignments will be based on tasks that will be a student's own responsibility to complete. The system creates and modifies files, directories, and permissions, and it also manages the system's configuration files. Students will be required to use the command-line interface to create files and directories, and to use the command-line interface to create files and directories. Students will learn how to perform a custom shell script using command-line interface.

Taught in Both Physical and Virtual Classrooms

Course materials are available on the CIS 90 Center. You are not out of luck. Take the syllabus or call the instructor. This class is available on the CIS 90 Center. CIS 90 Center is a virtual classroom for this course. You can visit and use the CIS 90 Center. All students in section 6884 will meet online each week using CIS 90 Center. With the exception of section 6727, all students will be able to attend the physical class from 2011. Please be advised.

Students in section 6727 are not welcome to attend class using CIS 90 Center unless they wish.

The password and user name for CIS 90 Center will be emailed out to all registered students. Email the instructor if you need the user name and password.

A Day in the Life

Each class will start with a 15-minute break. The reason for this is to get the class started on time. The class will start with a 15-minute break. The reason for this is to get the class started on time. The class will start with a 15-minute break. The reason for this is to get the class started on time.

Links

- [CIS 90 Home Page](#)
- [CIS 90 Center](#)
- [CIS 90 Center](#)
- [CIS 90 Center](#)

Course Calendar

First minute quiz

Lesson # and Date

What is due by 11:59PM (Opus time) that day

Lesson slides, feel free to download during class for local viewing

References to material in the textbook

Lab assignment

Test

5	3/10	<p>Quiz 4</p> <p>Review</p> <ul style="list-style-type: none"> Review lessons 1-4 Practice skills Learn about filename expansion characters <p>Materials</p> <ul style="list-style-type: none"> Presentation slides (download) Practice test (download) <p>Assignment</p> <ul style="list-style-type: none"> NA <p>CCC Confer</p> <ul style="list-style-type: none"> Enter virtual classroom Class archives 		Lab 4
6	3/17	<p>Managing Files</p> <ul style="list-style-type: none"> Creating Copying Moving Renaming Removing Linking <p>Materials</p> <ul style="list-style-type: none"> Presentation slides (download) <p>Test #1</p> <ul style="list-style-type: none"> Test (download) <p>Assignment</p> <ul style="list-style-type: none"> Lab 5 <p>CCC Confer</p> <ul style="list-style-type: none"> Enter virtual classroom Class archives 	5 8.13-8.16 (Gillay)	25 p715-729 (Hahn)

Course Grading

Rich's Cabrillo College CIS Classes

CIS 90 Grades

Home Resources Forums CIS Lab CTC

CIS 90 (Spring 2012) Grades

[Course Home](#) [Calendar](#)

Points can be earned from the following activities:

- 5% - Quizzes
- 16% - Tests
- 14% - Help forum participation
- 54% - Lab assignments
- 11% - Final project

How your grade is determined:

A student can earn up to 560 total points doing the activities listed above. The course grade is based on the number of points earned.

Percentage	Total Points	Letter Grade	Pass/No Pass
90% or higher	504 or higher	A	Pass
80% to 89.9%	448 to 503	B	Pass
70% to 79.9%	392 to 447	C	Pass
60% to 69.9%	336 to 391	D	No pass
0% to 59.9%	0 to 335	F	No pass

For some flexibility, personal preferences or family emergencies there is an additional 90 points available of **extra credit** activities.

Choice of Grade or Pass/No Pass

You indicate your grading choice on the Student Survey form passed out during the first class. You can verify your grading choice selection on the table below. Contact the instructor by email with any questions or to request a change in grading choice.

Recommendations

The instructor may provide letters of recommendation upon request. When writing a recommendation the instructor will include both graded and non-graded areas of performance. Non-graded performance areas may include teamwork, helping others, quality, planning & organization skills, communication, documentation, motivation, and the desire to go above and beyond expectations. The forum is an excellent way to demonstrate teamwork and communication skills.

Current Progress

Code Name	Grading Choice	Quizzes & Tests									Forum				Labs										Project	Extra Credit	Total	Grade				
		Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	T1	T2	T3	F1	F2	F3	F4	L1	L2	L3	L4	L5	L6					L7	L8	L9	L10
Max Points		3	3	3	3	3	3	3	3	3	30	30	30	20	20	20	20	30	30	30	30	30	30	30	30	30	30	30	30	60	90	560
amroth	Grade																															

Monitor this page to track your progress in the course.

You own your grade and its based solely on the number of points you earn.

Use extra credit to earn additional points

Your default grading choice will be a letter grade. This can be changed to Pass/No Pass by emailing a request to the instructor.

Each student is assigned a secret code name

Don't forget to post - with respect to earning points consider the forum as "low hanging fruit"

More on Grading

Points can be earned from the following activities:

- 5% - Quizzes
- 16% - Tests
- 14% - Help forum participation
- 54% - Lab assignments
- 11% - Final

Quizzes: $10 \times 3 = 30$ points
 Tests: $3 \times 30 = 90$ points
 Forum: $4 \times 20 = 80$ points
 Labs: $10 \times 30 = 300$ points
 Project: $1 \times 60 = 60$ points

How your grade is determined:

A student can earn up to 560 total points doing the activities listed above. The course grade is based on the number of points earned.

Percentage	Total Points	Letter Grade	Pass/No Pass
90% or higher	504 or higher	A	Pass
80% to 89.9%	448 to 503	B	Pass
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For some flexibility, personal preferences or family emergencies there is an **additional 90 points available** of **extra credit** activities.

Choice of Grade or Pass/No Pass

You indicate your grading choice on the Student Survey form passed out during the first class. You can verify your grading choice selection on the table below. Contact the instructor by email with any questions or to request a change in grading choice.

The student can decide the grade they want and how they want to earn it

Grading observations on previous classes

Code Name	Grading Choice	Quizzes & Tests												Forum				Labs										Final Project	Extra Credit	Total	Grade	
		Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	T1	T2	T3	F1	F2	F3	F4	L1	L2	L3	L4	L5	L6	L7	L8	L9					L10
Max Points		3	3	3	3	3	3	3	3	3	3	30	30	30	20	20	20	20	30	30	30	30	30	30	30	30	30	30	60	90	560	
aragorn	Grade	3	3	3	3	3	3	3	3	3	3	28	27	25	20	20	20	16	28	30	30	24	30	29	29	30	30	30	57		533	A
eomer	Grade	2	3	3	3	3	3	2		3	3	33	26		20	20	20	20	28	27	28	30	29	28	28	29	30	28	90	45	584	A
balrog	P/NP											26			12	0	0		28											66		NP
nazgul	Grade		2			3			3	3	1	24	19		20	8	20	20	28	24	30	24	28	30	29	30	30	30	9		415	C
sauron	Grade		3	3	3		0	1		3	3	28	22	18	20	0	20	20	30	28	30	28			29	30	30	27	90	35	501	B

Percentage	Total Points	Letter Grade	Pass/No Pass
90% or higher	504 or higher	A	Pass
80% to 89.9%	448 to 503	B	Pass
70% to 79.9%	392 to 447	C	Pass
60% to 69.9%	336 to 391	D	No pass
0% to 59.9%	0 to 335	F	No pass

- **Aragorn** got an A by doing solid work across the board and did no extra credit
- **Eomer** skipped the final yet still got an A by doing some extra credit
- **Balrog** probably should have just dropped the course
- **Sauron** kicked himself later for not doing any posts during the second quarter of the course to turn that B to an A

More on Grading

Lab Assignments (10 labs, 30 points each)

- Will be due at 11:59PM (Opus time) on the date shown on the course Calendar.
- **Late work is not accepted.** There is no credit for any work turned in after the deadline. If you don't complete a lab assignment, please turn in what you have, by the due date, for partial credit.
- Students may work together and collaborate on labs but they must submit their own work to get credit.
- Lab resources, instructors, and assistants are available in the CIS lab. In addition the Linux Opus server and the CIS VLab may be accessed from anywhere over the Internet.

A lab assignment due Wednesday night at 11:59PM (Opus time) will get no credit if turned in one minute late at 12:00AM Thursday!

More on Grading



"First Minute" quizzes (10 quizzes, 3 points each)

As an incentive to start class on time, 3 points are awarded for correctly answering 3 questions, in the correct order, at the very beginning of class.

- The quiz questions are shown on CCC Confer at **1:15PM** sharp.
- The quiz questions are given out in advance and students can use the forum to collaborate on answers prior to class.
- The **order of the questions** will not be known until the quiz is given! Emailed answers that are not in order will be marked as incorrect.
- Quizzes are open book/notes. Students may not give or ask others for assistance while taking a quiz.
- To take the quiz, students email the answers to the instructor.
- There are **no makeup's** for these quizzes and they **must be turned in within the first few minutes of class**.

More on Grading



Tests (3 tests, 30 points each)

- Test 1 and Test 2 will be distributed by during the last half of the class.
- Test 3 is the final exam.
- Tests are usually comprised of fill-in-the-blank type questions. Often you will have to use one of the Linux servers to check your answer.
- Tests are open notes, open book, and open computer.
- Tests are designed to take about 1.5 hours and be turned in at the end of class. To minimize "clock stress" on Test 1 and 2, you may continue to work on the test after class is over and turn it no later than 11:59PM.
- Students may not give or ask others for assistance while taking a test.
- Tests 1 and 2 may be taken remotely online. Students must take Test 3 (the final exam) in room 2501 on campus.

See the archived courses for an idea of what these tests are like

More on Grading

Forum Posts (4 quarters, up to 20 points per quarter)

- The end of each term quarter is shown on the course calendar.
- Each post in the forum for this class is worth 4 points, up to 20 points maximum per quarter.
- The posts for the quarter will be due at **11:59PM** (Forum time) on the date shown on the course Calendar.
- Extra posts in one quarter do not carry over to the next quarter.
- Only posts in the forum for this class will be counted.

As far as earning points, forum posts are "low hanging fruit" !!

More on Grading

Extra credit (up to 90 points)

- You need to attend to a family emergency and can't turn in a lab assignment on time ... don't worry!
- Your schedule/commute doesn't allow you to take any of the "first minute" quizzes don't worry!
- You crash and burn on a test ... don't worry!
- You just don't like making forum posts ... don't worry!
- ***There is a cap on extra credit points so plan carefully!***

There are ample extra credit opportunities which provide you with the flexibility to get the grade you want.

Course outline and syllabus

Please don't forget:

- 1) No makeup's for missed quizzes**
- 2) Late work (Labs assignments) will not be accepted**

If you have not completed a lab assignment, **please turn in what you have done for partial credit**

Don't panic though -- there are ample extra credit opportunities for students wanting or needing any extra points.

A lab assignment due Wednesday night at 11:59PM will get no credit if turned in one minute late at 12:00AM Thursday

Final word on Grading

- You control your grade for this course!
- Use the Grades web page to plan for the grade you wish to receive and track your progress.
- Use the Calendar web page to see due dates for all assignments.

Rich's Cabrillo College CIS Classes
CIS 90 Grades

Home Resources Forums CIS Lab CTC

Login

Flashcards

Admin

CIS 90

Previous Classes

16 days till term starts!

Cabrillo College

Web Advisor

Static IPs

Commands and Files

Accessing Vlab

RIP Dennis Ritchie

CIS 90 (Spring 2012) Grades
Course Home Calendar

Points can be earned from the following activities:

- 5% - Quizzes
- 16% - Tests
- 14% - Help forum participation
- 54% - Lab assignments
- 11% - Final project

How your grade is determined:
A student can earn up to 560 total points doing the activities listed above. The course grade is based on the number of points earned.

Percentage	Total Points	Lectr Grade	Pass/No Pass
90% or higher	504 or higher	A	Pass
80% to 89.9%	448 to 503	B	Pass
70% to 79.9%	392 to 447	C	Pass
60% to 69.9%	336 to 391	D	No pass
0% to 59.9%	0 to 335	F	No pass

For some flexibility, personal preferences or family emergencies there is an additional 90 points available of **extra credit** activities.

Choice of Grade or Pass/No Pass
You indicate your grading choice on the Student Survey form passed out during the first class. You can verify your grading choice selection on the table below. Contact the instructor by email with any questions or to request a change in grading choice.

Recommendations
The instructor may provide letters of recommendation upon request. When writing a recommendation the instructor will include both graded and non-graded areas of performance. Non-graded performance areas may include teamwork, helping others, quality, planning & organization skills, communication, documentation, motivation, and the desire to go above and beyond expectations. The forum is an excellent way to demonstrate teamwork and communication skills.

Current Progress

Code	Grading	Quizzes & Tests												Forum												Lab												Extra	Total	Grade
Name	Choice	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	T1	T2	T3	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	L1	L2	L3	L4	L5	L6	L7	L8	L9	L10	Project	Credit	Total			
ammoth	Grade	3	3	3	3	3	3	3	3	3	3	3	3	3	30	30	30	20	20	20	20	20	20	30	30	30	30	30	30	30	30	30	30	30	60	90	560			
stragon	Grade																																							
arvan	Grade																																							
celebrian	Grade																																							
lordan	Grade																																							
denethor	Grade																																							
divain	Grade																																							
elrond	Grade																																							
somer	Grade																																							
eeovyn	Grade																																							
frido	Grade																																							
gaming	Grade																																							
gimli	Grade																																							
gwalhir	Grade																																							
legolas	Grade																																							
orome	Grade																																							

Rich's Cabrillo College CIS Classes
CIS 90 Calendar

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CIS 90

Previous Classes

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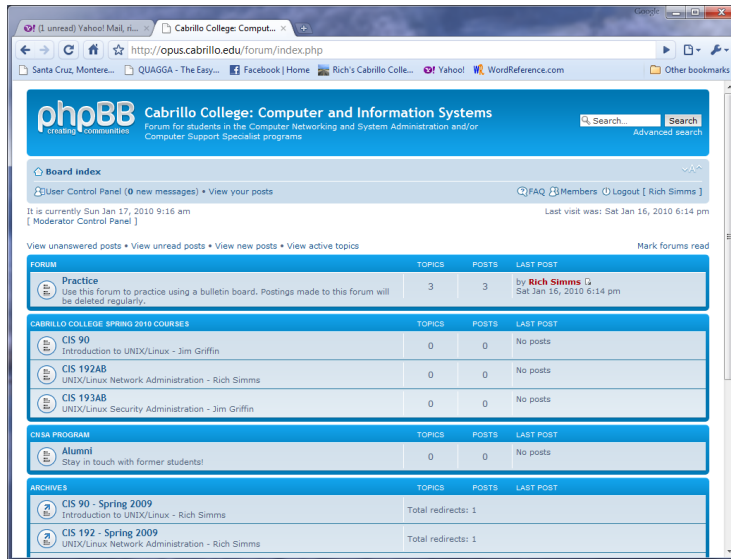
CIS 90 (Spring 2012) Course Calendar
Course Home Grades

(content subject to change)

Lesson	Date	Topics	Chapter	Due
1	2/8	<p>Class and Linux Overview</p> <ul style="list-style-type: none"> • Understand how this course will work • High-level overview of computers, operating systems and virtual machines • Overview of UNIX/Linux market and architecture • Learn first commands and how to navigate between terminals • Use a remote Linux server • Use Linux running on a local virtual machine <p>Materials</p> <ul style="list-style-type: none"> • Presentation slides (download) • Logins Sheet (download) • CIS Vlab RDP File (download) <p>Supplemental</p> <ul style="list-style-type: none"> • Howto #103: Installing PuTTY (download) • Video #100: Remote Putty login to Opus (video) <p>Assignment</p> <ul style="list-style-type: none"> • Student Survey • Lab 1 <p>CCC Confer</p> <ul style="list-style-type: none"> • Enter virtual classroom • Class archive 	1:14:15 (8:15)	2.4.5, p113-115, p164-172 (vahn)
2	2/15	<p>Quiz 1</p> <p>Commands</p> <ul style="list-style-type: none"> • Understand the UNIX login operation works • Meet John the Ripper and learn how vulnerable a poor password is • Understand basic command syntax and operation • Understand program files and what happens when they are run • Understand how the shell works and environment variables • Understand how to get documentation when online <p>Materials</p> <ul style="list-style-type: none"> • Presentation slides (download) • Howto #106: Configuring Putty (download) 	2.3-2.7, 2.11, 3.7.3-3.0, 4.19-4.22, 9.1-9.2 (dlay)	Lab 1 Student Survey

Help Forum

Online Help Forum



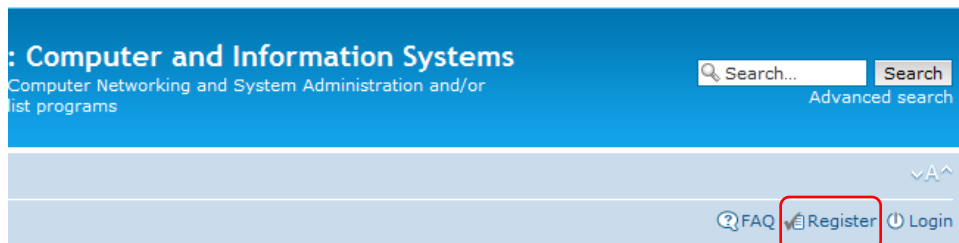
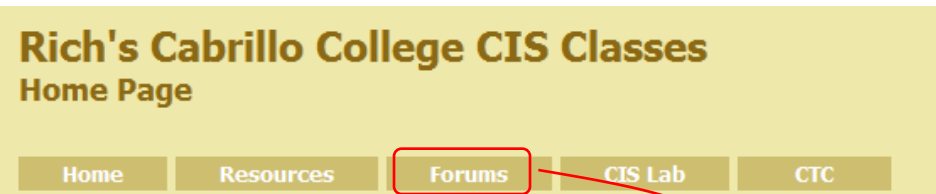
- Post questions and answers
- Collaborate on lab assignments
- Share UNIX/Linux information
- Post class notes for classmates who miss class
- Get clarifications on assignments
- Collaborate on quiz questions
- **Never post passwords!**



As an incentive to use the forum - students can earn 4 points per CIS 90 forum post (capped at 20 points for each 1/4 of the course calendar)


Class Activity Forum Registration

There is a Forums link on simms-teach.com



It is currently Sun Jan 17, 2010 9:43 am

To Register:

1. Browse to the forum
2. Click on  Register
3. Review and agree to terms
4. Your **Username** must be:
 - your **first and last name separated by a space**
 - e.g. Rich Simms
 - match a name on the class roster

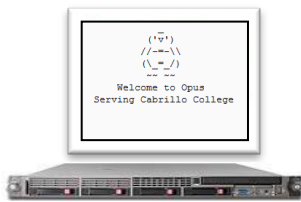
Note: If you have already registered you don't need to do it again. If your username is incomplete or does not match a name of the class roster it will be modified or deleted by the instructor.

Lab Resources

The CIS 90 Playground

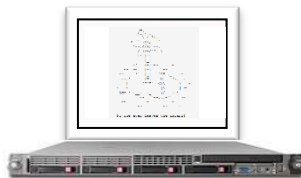
Command Line Only

Red Hat
Enterprise Linux



Opus

Fedora



Sun-Hwa

Graphics and Command Line

Linux Mint



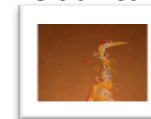
Pxx-Hugo

Debian



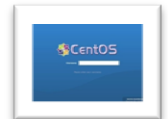
Pxx-Kate

Ubuntu



Pxx-Mr-Eko

CentOS



Pxx-Not-Opus

Pxx is the pod number, where xx = 01 to 10

OpenSUSE

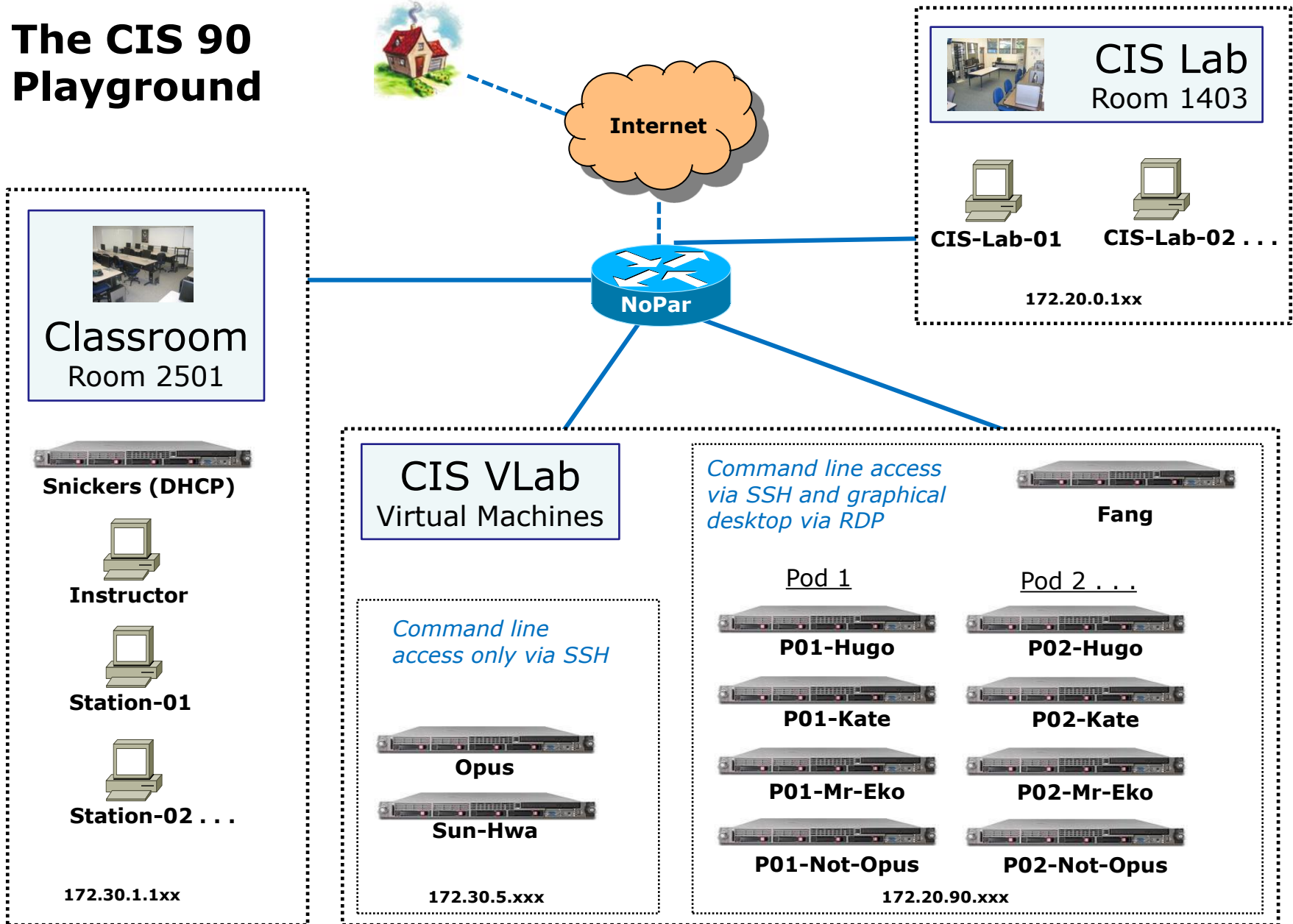


Fang

*Fang is used for
reserving the
graphics systems*

*All the systems above are virtual machines (VMs)
available remotely from on or off-campus*

The CIS 90 Playground



The CIS Lab

CTC Building Room 1403

There are ten stations (labeled CIS-Lab-XX) in the CIS Lab for use by CIS students.



Each station has:

- Putty (for SSH command line access to Opus and Sun-Hwa)
- RDP access to CIS 90 Pod VMs

Instructors and Lab Assistants are available (see schedule) to help students with lab assignments

Rich's Cabrillo College CIS Classes
Home Page

Home

Resources

Forums

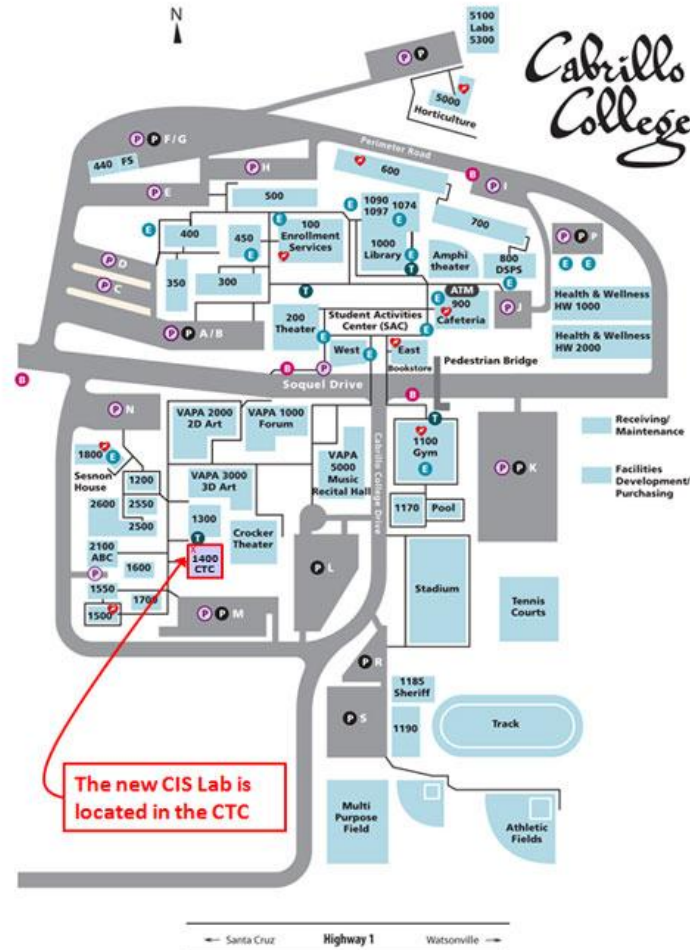
CIS Lab

CTC

Use these links to get the schedule and hours of operation

The CIS Lab

CTC Building Room 1403



Login Credentials

Username and passwords

Passwords

Turn OFF the recording

Logins and Passwords for CIS 90



Help Forum (<http://oslab.cabrillo.edu/forum>)

Username: _____

Password: _____



Opus (oslab.cabrillo.edu, port 2220)

Username: _____

Password: _____

VLab (cislab.cabrillo.edu)

Sun-Hwa (oslab.cabrillo.edu, port 2221)



Username: _____

Password: _____



Classroom PCs,

Lab PCs,

Hugo, Kate, Mr-Eko, and Not-Opus



Username: _____

Password: _____

This Logins sheet can be downloaded from the website.

See Lesson 1 materials on the Calendar page.

Contact the instructor at risimms@cabrillo.edu for your credentials if you miss this presentation.

Passwords

Turn recording back ON

SSH

Picture credit:
<http://www.cs.umd.edu/faq/ssh.html>



SSH is a network protocol that enables secure connections between computers

Remote Server



Sniffer view of a Telnet session

```

login: rssiimmmssr
Password: nimbus2000r
Last login: Sun Jul 6 18:47:03 from 192.168.1.254r
[rsimms@server2-01 rsimms]$ ccaatt sseeccreett
The D-Day invasion is set for June 6th at Normandyr
[rsimms@server2-01 rsimms]$ eexxiitt
logoutr
≥[H≥[J
    
```

Telnet - all clear text

With telnet, everything is transferred in clear text over the network

Sniffer view of a SSH session

```

000005AE 80 72 2b 72 d4 3b 46 a6 7b 67 6b d4 df a2 b2 8c ,r+r,;F.
000005BE 01 7c 39 78 bd c4 95 f2 61 93 73 a1 76 49 cf 00 ,l9x...
000005CE 68 c2 85 71 b0 75 c6 72 b5 18 27 10 4b 57 ed 88 h.,q.u,r
000005DE 17 df 2b a1 dd 81 4f 0a 58 51 f5 f7 54 3e cc 89 ...+.0.
000005EE 55 70 e9 73 b4 0a 6f 3f af 5b f7 3c 4e 30 92 39 Up,s..o?
000005FE 62 fc fd a6 fd b9 45 e2 56 12 d1 90 0c d9 ce 34 b.....E.
0000060E 6d 1f 8b 44 a7 50 3c 59 aa 0b 2a c2 04 c1 da 43 m..D,P<Y
0000061E 21 87 2d 32 67 48 d3 47 2f 43 25 5b ee 65 89 76 l,-2gH,G
0000062E 83 1c 74 91 b1 f5 3e 8b 57 ee d9 fc f5 45 e3 b6 ...t...>.
0000063E ef 9c f0 89 eb f7 1d c9 fd 29 69 44 a9 75 98 5a .....
0000064E b2 ba d5 62 9f 35 e1 1a ee 06 8b 79 fe e9 f0 0a ...b,5..
0000065E df
0000066E ea
0000067E 06
0000068E 8c 8f a3 07 6e 69 62 02 a7 3f e0 e1 9b ec af d0 ...nib.
    
```

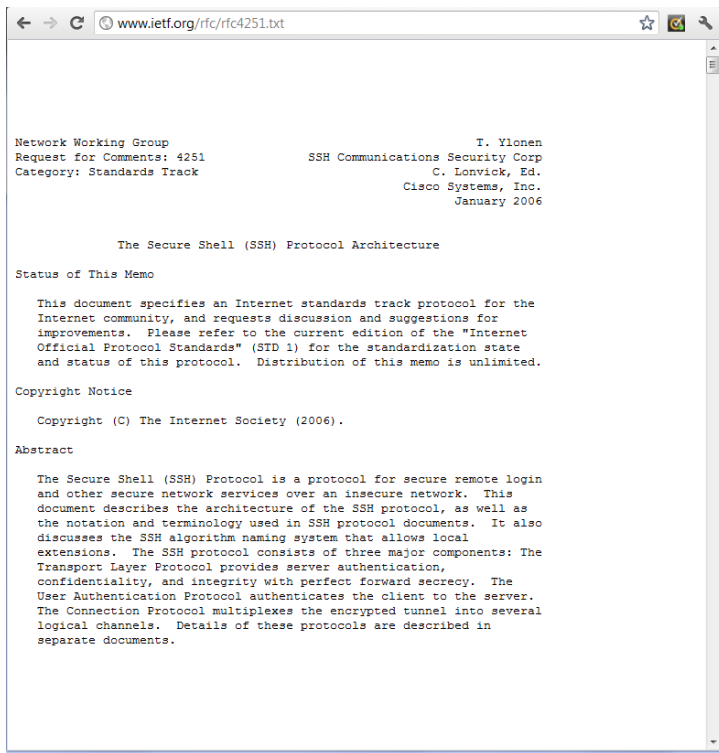
SSH - encrypted

With ssh, everything is encrypted. This is how we will access all remote systems in CIS 90.



Local computer

SSH is a standards based protocol



- See RFCs 4250 to 4254 at www.ietf.org
- “RFC” = Request for Comment
- “IETF” = Internet Engineering Task Force








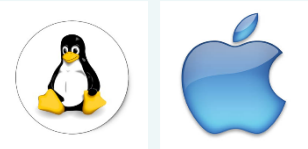
SSH tools

- Linux and Mac already have SSH built in
- Droid smartphones can use the ConnectBot app for SSH
- iPhones can use the iSSH app for SSH
- Windows can use the Putty app for SSH



Putty is written and maintained primarily by Simon Tatham.
<http://www.chiark.greenend.org.uk/~sgtatham/>
Thank you Simon!

Class Activity – SSH Prep

<p>Operating System</p>	 <p>Students in the classroom</p>	 <p>Students at home</p>
	 <ul style="list-style-type: none"> • Login as CIS90 on the classroom computer • Run the Putty program 	 <ul style="list-style-type: none"> • Google “putty download” • Download the putty.exe binary to your desktop • Run the Putty program <p>http://www.chiark.greenend.org.uk/~sgtatham/putty/download.html</p>
		<ul style="list-style-type: none"> • Run a Terminal

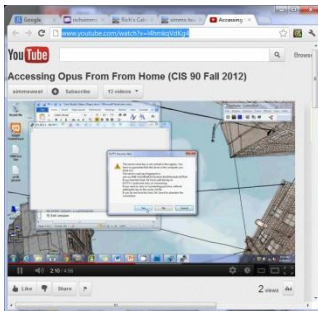
Logging Into Opus via SSH

Opus Howtos on the Website

Shows step-by-step how to access the CIS VLab



Howto #134: Remote Access to Opus (document)
<http://simms-teach.com/howtos/134-opus-access.pdf>



Accessing Opus from Windows (video)
<http://www.youtube.com/watch?v=l4hmkqVdKg4>

SSH connection to a UNIX/Linux Server

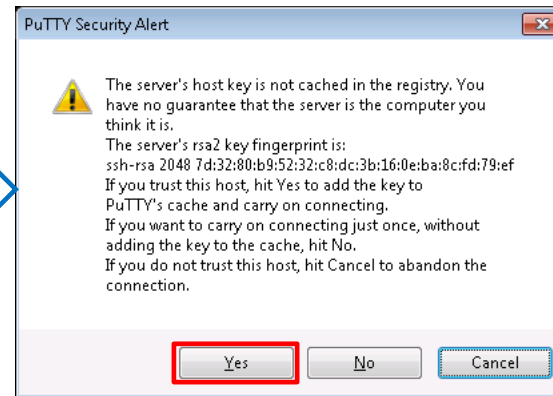
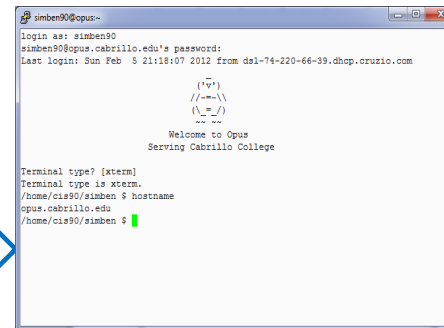
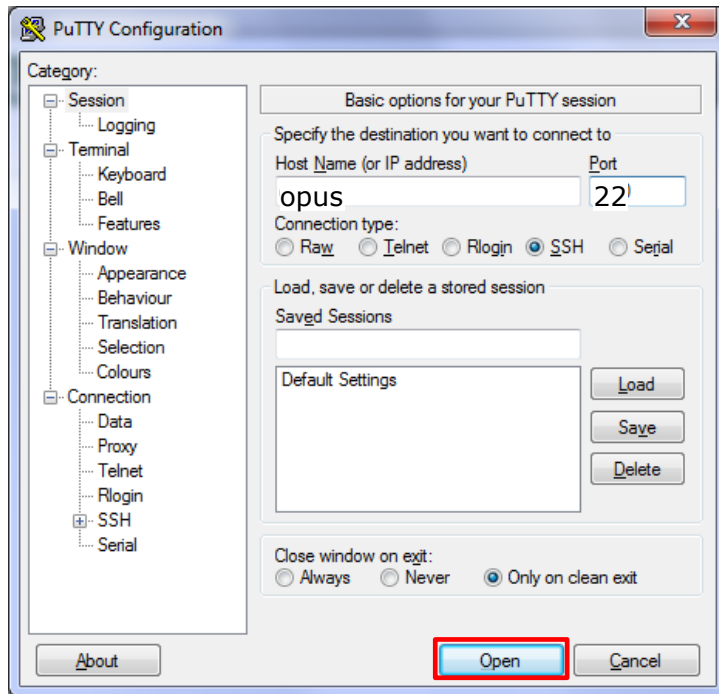
You need to know three things:

- The **hostname** of the remote server (must be a *fully qualified domain name* when going over the Internet)
- Your **login credentials** (username/password) on the remote server
- The **port number** the SSH service is listening on (the default is port 22)

Logging into Opus from **the classroom or CIS Lab**



On Windows run Putty



The first time a connection is made to a server this warning is displayed.

On a Mac or Linux terminal:

ssh username@opus *If not specified, the default port 22 is used*

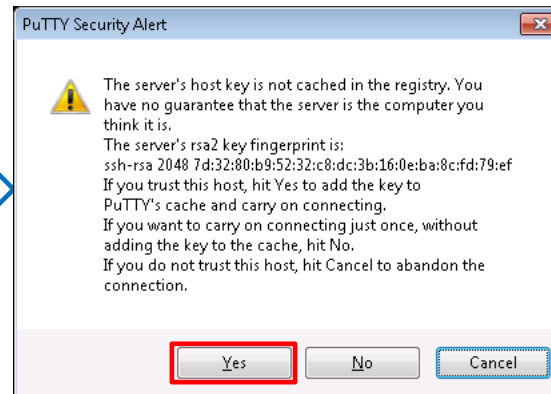
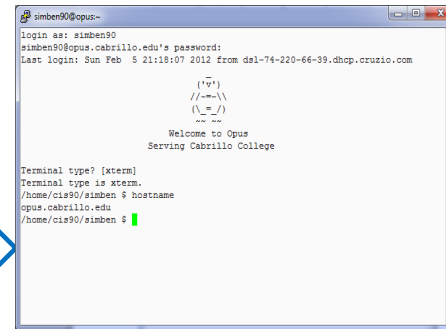
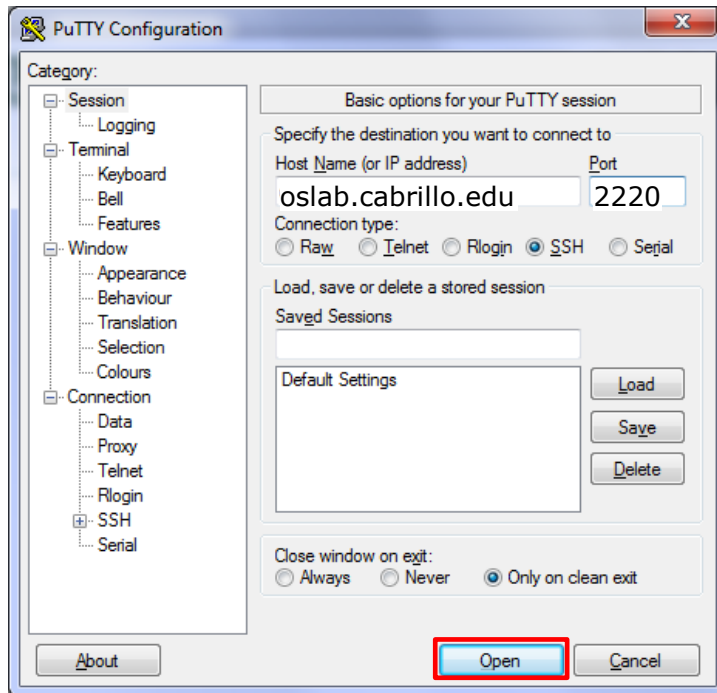
Logging into Opus from **home**



Opus



On Windows run Putty



The first time a connection is made to a server this warning is displayed.

On a Mac or Linux terminal:
ssh -p 2220 username@oslab.cabrillo.edu

Accessing Opus from a Windows PC using Putty Log in with username and password

username

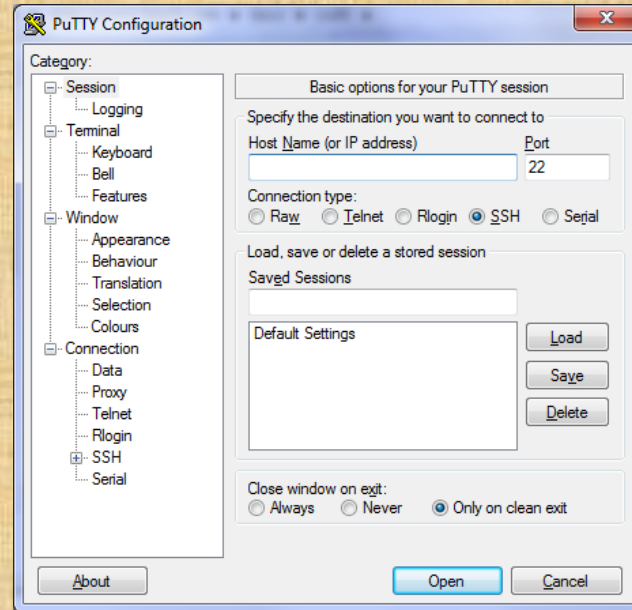
password
(not echoed)

```
simben90@opus:~  
login as: simben90  
simben90@opus.cabrillo.edu's password:   
Last login: Sun Feb  5 21:18:07 2012 from dsl-74-220-66-39.dhcp.cruzio.com  
  
      ( '~ ' )  
    //  --  \\  
   ( \  _  / )  
   ~ ~  ~ ~  
  
Welcome to Opus  
Serving Cabrillo College  
  
Terminal type? [xterm]  
Terminal type is xterm.  
/home/cis90/simben $ hostname  
opus.cabrillo.edu  
/home/cis90/simben $ █
```

*Hit Enter key here to
accept default terminal
type*

*Use exit command to
end session*

Class Activity



1. Use Putty (or a Mac terminal) and connect to Opus
2. Login using your unique username and password
3. Use the **exit** command to end the session

Lesson 1

Commmands

Lesson 1 Commands

- cal** - show calendar
- date** - show current time and date
- clear** - clear the terminal screen

- hostname** - show the name of the computer being accessed
- ps** - show processes (includes shell) being run
- uname** - show kernel name
- cat /etc/issue** - usually shows distro (distribution) name
- cat /etc/*-release** - usually shows distro (distribution) name

- who** - show everyone logged in
- who am i** - identifies which login session you are using
- tty** - show terminal device
- id** - show username and group information

- history** - show previous commands

- exit** - terminate your shell and log off

Lesson 1 Commands

```
login as: simben90
simben90@oslab.cabrillo.edu's password:
Last login: Sun Aug 26 08:54:09 2012 from 41-3-21-
105.dsl.dynamic.fusionbroadban
d.com
```

```
( 'v' )
//==-\
(\ _ _ /)
~~  ~~
```

```
Welcome to Opus
Serving Cabrillo College
```

```
Terminal type? [xterm]
Terminal type is xterm.
/home/cis90/simben $
```

Shell prompt

The initial shell prompt string on Opus, for the user simben90, is "/home/cis90/simben \$"

The prompt is used by the shell to request a command from the user.

Lesson 1 Commands

```
login as: simben90
simben90@oslab.cabrillo.edu's password:
Last login: Sun Aug 26 08:54:09 2012 from 41-3-21-
105.dsl.dynamic.fusionbroadban
d.com
```

```
( 'v' )
//==-\
(\ _ _ /)
~~  ~~
```

Welcome to Opus
Serving Cabrillo College

```
Terminal type? [xterm]
Terminal type is xterm.
/home/cis90/simben $
/home/cis90/simben $ cal
```

```
    August 2012
Su Mo Tu We Th Fr Sa
      1  2  3  4
  5  6  7  8  9 10 11
12 13 14 15 16 17 18
19 20 21 22 23 24 25
26 27 28 29 30 31
```

*Entering the **cal** command after the prompt tells the shell to run the cal program. The cal program shows a calendar for the current month.*

Lesson 1 Commands

```
/home/cis90/simben $ cal 12 2012  
    December 2012  
Su Mo Tu We Th Fr Sa  
      1  
 2  3  4  5  6  7  8  
 9 10 11 12 13 14 15  
16 17 18 19 20 21 22  
23 24 25 26 27 28 29  
30 31
```

*Adding month and year arguments to the **cal** command lets you specify any month of any year*

```
/home/cis90/simben $ date  
Mon Aug 27 09:01:29 PDT 2012
```

*The **date** command runs the date program which shows the current date and time*

Lesson 1 Commands

*This portion is the shell **prompt***

```
/home/cis90/simben $ cal 12 2012  
December 2012  
Su Mo Tu We Th Fr Sa  
1  
2 3 4 5 6 7 8  
9 10 11 12 13 14 15  
16 17 18 19 20 21 22  
23 24 25 26 27 28 29  
30 31
```

*This is the **command**
which includes two
arguments 12 and 2012*

```
/home/cis90/simben $ cal 12 2012  
December 2012  
Su Mo Tu We Th Fr Sa  
1  
2 3 4 5 6 7 8  
9 10 11 12 13 14 15  
16 17 18 19 20 21 22  
23 24 25 26 27 28 29  
30 31
```

*This is the **output** of
the command*

```
/home/cis90/simben $ cal 12 2012  
December 2012  
Su Mo Tu We Th Fr Sa  
1  
2 3 4 5 6 7 8  
9 10 11 12 13 14 15  
16 17 18 19 20 21 22  
23 24 25 26 27 28 29  
30 31
```

Lesson 1 Commands

```
/home/cis90/simben $ clear
```

Shell prompt

The clear command will clear the screen.

(On scrollable terminals you are still able to scroll back to see previous commands entered)

Lesson 1 Commands

```
/home/cis90/simben $ hostname  
opus.cislab.net
```

The **hostname** command shows the name of the system being interacted with

```
/home/cis90/simben $ ps  
  PID TTY          TIME CMD  
21629 pts/0    00:00:00 bash  
21674 pts/0    00:00:00 ps
```

The **ps** command shows the processes (programs loaded into memory and running) belonging to your username. This is an easy way to see the name of the shell program being used which is **bash** in this example.

```
/home/cis90/simben $ uname  
Linux
```

The **uname** command shows the name of the kernel being used. In this example the kernel is Linux.

```
/home/cis90/simben $ cat /etc/issue  
CentOS release 6.2 (Final)  
Kernel \r on \l
```

These two **cat** commands can usually be used to show the name of the Linux distribution being used. In this case version 6.2 of the CentOS distribution is being used.

```
/home/cis90/simben $ cat /etc/*-release  
CentOS release 6.2 (Final)  
CentOS release 6.2 (Final)  
CentOS release 6.2 (Final)
```

Lesson 1 Commands

```
/home/cis90/simben $ who
simben90 pts/0      2012-08-27 09:00 (50-0-68-235.dsl.dynamic.fusionbroadband.com)
milhom90 pts/1      2012-08-27 09:02 (50-0-68-235.dsl.dynamic.fusionbroadband.com)
rsimms    pts/2      2012-08-27 09:03 (50-0-68-235.dsl.dynamic.fusionbroadband.com)
rsimms    pts/3      2012-08-27 09:03 (50-0-68-235.dsl.dynamic.fusionbroadband.com)
cis90     pts/4      2012-08-27 09:55 (p1-hugo.cislab.net)
```

*The **who** commands show all users currently logged in. It also shows the terminal device they are using, when they logged in, and where they logged in from. For example, the cis90 user is using the pts/4 terminal device and logged in from the Hugo server in Pod 1 (p1-hugo) at 9:55AM on August 27th. The other uses are logged in from off campus.*

```
/home/cis90/simben $ who am i
simben90 pts/0      2012-08-27 09:00 (41-3-21-105.dsl.dynamic.fusionbroadband.com)
```

*The **who am i** command indicates the specific login session you are using. This is a good way to distinguish which session you are currently interacting when you have more than one login session underway.*

```
/home/cis90/simben $ tty
/dev/pts/0
```

*The **tty** command shows the terminal device being used for the login session. Note: "/dev/pts/0" is the same device as the abbreviated "pts/0" shown in the **who** and **who am i** command output. Every login session uses a unique terminal device*

Lesson 1 Commands

```
/home/cis90/simben $ id
uid=1001(simben90) gid=190(cis90) groups=190(cis90),100(users)
context=unconfined_u:unconfined_r:unconfined_t:s0-s0:c0.c1023
```

*The **id** command shows the username and UID (User ID) number as well as additional information. In the example above the user is simben90 and the user ID number is 1001*

```
/home/cis90/simben $ id milhom90
uid=1002(milhom90) gid=190(cis90) groups=190(cis90),100(users)
```

```
/home/cis90/simben $ id rsimms
uid=201(rsimms) gid=503(staff) groups=503(staff),100(users),190(cis90),191(cis191),192(cis192)
```

*Specifying a username as an argument on the **id** command will show user ID's for other users. For example the UID number for milhome90 is 1002 and for rsimms it is 201.*

```
/home/cis90/simben $ history
```

```
<snipped>
```

```
54 cal
55 cal 12 2012
56 date
57 clear
58 hostname
59 ps
60 uname
61 cat /etc/issue
62 cat /etc/*-release
63 who
64 who am i
65 tty
66 id
67 id milhome90
68 id milhom90
69 id rsimms
70 history
```

*The **history** command shows all previously entered commands*

```
/home/cis90/simben $ exit
```

*The **exit** command logs out and ends the session*

Class Activity

Use Putty (or a Mac terminal) and log into Opus

Try these commands:

- | | |
|---------------------------|--|
| cal | - show calendar |
| date | - show current time and date |
| clear | - clear the terminal screen |
| hostname | - show the name of the computer being accessed |
| ps | - show processes (includes shell) being run |
| uname | - show kernel name |
| cat /etc/issue | - usually shows distro (distribution) name |
| cat /etc/*-release | - usually shows distro (distribution) name |
| who | - show everyone logged in |
| who am i | - identifies which login session you are using |
| tty | - show terminal device |
| id | - show username and group information |
| history | - show previous commands |
| exit | - terminate your shell and log off |

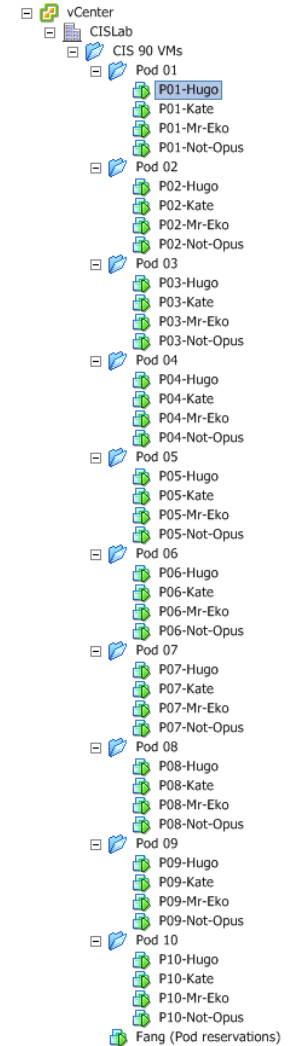


Logging Into Pod VMs via Opus

Logging into one of the CIS 90 pod servers from **Opus**



*First log into Opus,
then ssh to the desired server using the cis90 account*



```

simben90@opus:~
login as: simben90
simben90@oslab.cabrillo.edu's password:
Last login: Thu Aug  2 14:22:36 2012 from 50-0-68-235.dsl.dynamic.fusionbroadban
d.com

      ( 'v' )
    //--==\\
   ( \  _  / )
     ~ ~ ~ ~

Welcome to Opus
Serving Cabrillo College

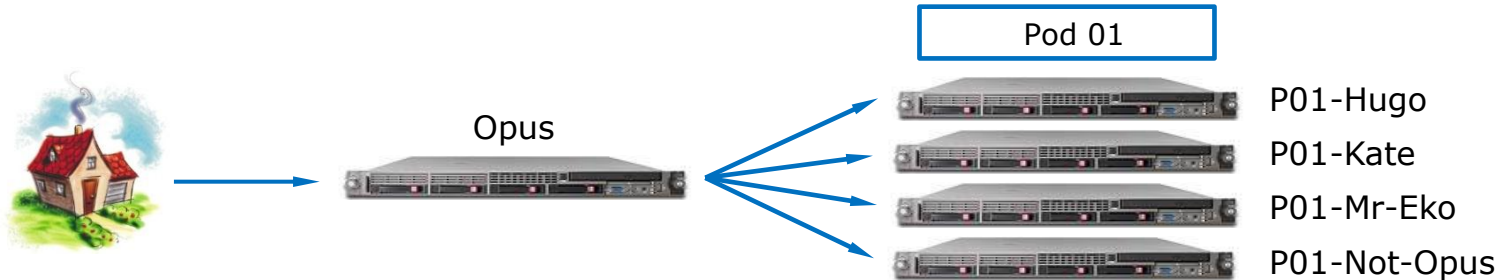
Terminal type? [xterm]
Terminal type is xterm.
/home/cis90/simben $ ssh cis90@P1-Hugo
cis90@p1-hugo's password:
Welcome to Linux Mint 13 Maya (GNU/Linux 3.2.0-23-generic x86_64)

Welcome to Linux Mint
* Documentation: http://www.linuxmint.com
Last login: Fri Aug  3 17:52:25 2012 from opus.cislab.net
cis90@P01-Hugo ~ $
    
```

*This logs you in to the
P1-Hugo server*

*Type the **exit** command to drop back
into Opus*

Logging into CIS 90 pod servers from **Opus**



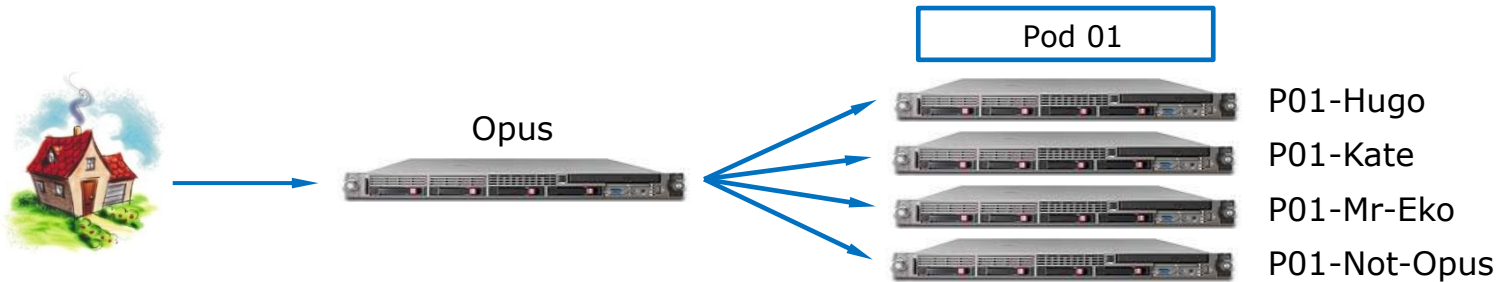
For example, after logging into Opus, log into P01-Mr-Eko from Opus with:

ssh cis90@p01-mr-eko

The hostname or IP address of the server you want to login to.

Individual student accounts have not been created on the CIS 90 Pod servers. Everyone can use the cis90 account instead.

Use the **hostname** command to show which computer your are interacting with



```
/home/cis90/simben $ hostname          Use hostname to see we are on Opus
opus.cislab.net
/home/cis90/simben $ ssh cis90@p01-hugo  ssh to P1-Hugo
The authenticity of host 'p01-hugo (172.20.90.11)' can't be established.
RSA key fingerprint is 86:d4:49:19:69:d9:2c:1b:48:94:57:6c:3e:e2:08:57.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added 'p01-hugo' (RSA) to the list of known hosts.
cis90@p01-hugo's password:
Welcome to Linux Mint 13 Maya (GNU/Linux 3.2.0-23-generic x86_64)
```

```
Welcome to Linux Mint
 * Documentation: http://www.linuxmint.com
Last login: Mon Aug 27 14:39:56 2012 from opus.cislab.net
cis90@P01-Hugo ~ $ hostname          Use hostname to see we are on P1-Hugo
P01-Hugo
cis90@P01-Hugo ~ $ exit             exit back to Opus
logout
Connection to p01-hugo closed.
/home/cis90/simben $ hostname          Use hostname to verify we are back on Opus again
opus.cislab.net
```

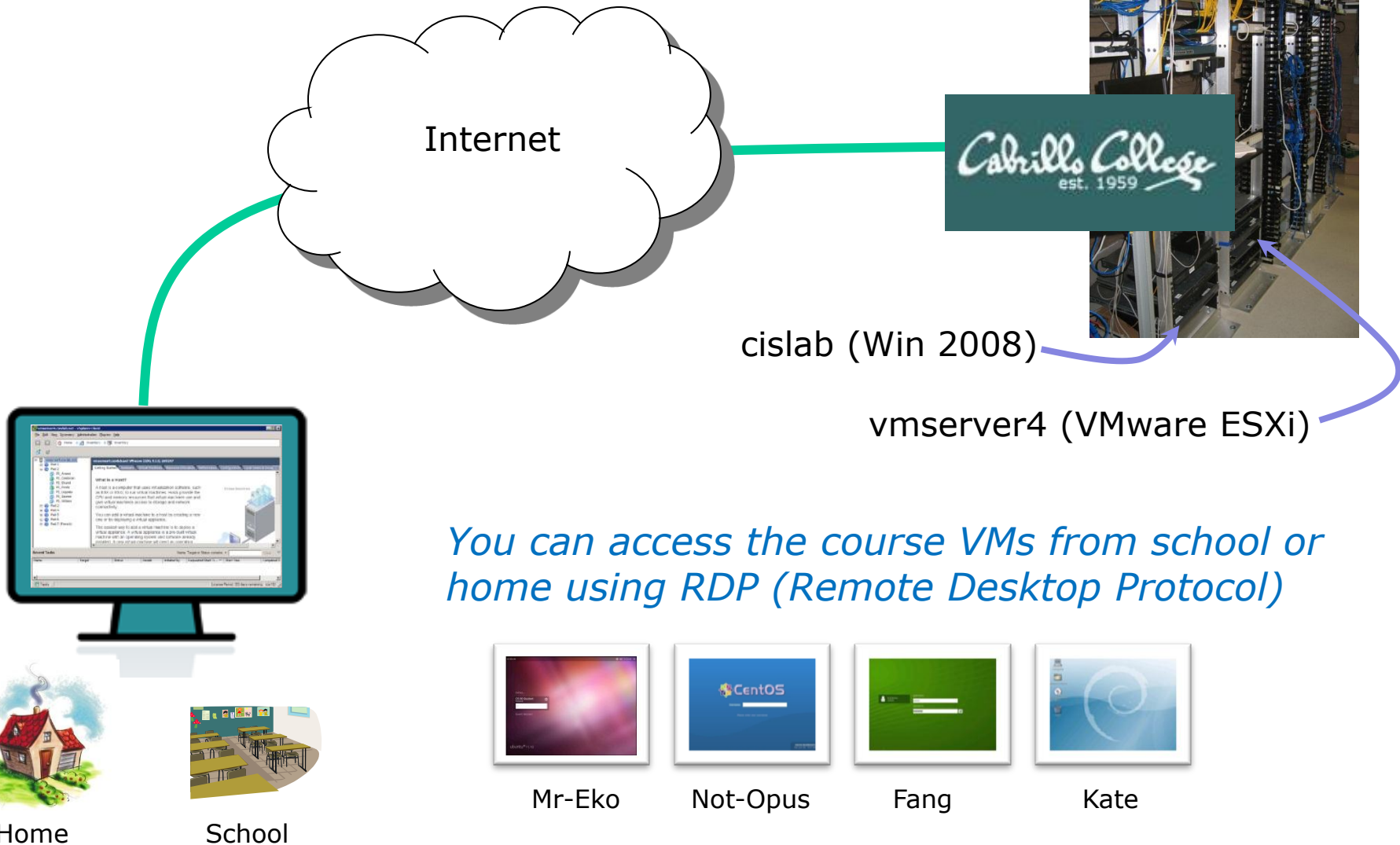


Using CIS VLab (Virtual Lab)

Lab Resources

Remote Access to **CIS VLab**

Room 1403 on Aptos Campus



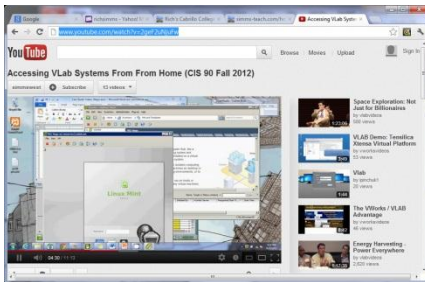
VLab Howtos on the Website

Shows step-by-step how to access the CIS VLab



Howto #305: Accessing Vlab (document)

<http://simms-teach.com/howtos/305-cis-90-vlab-access.pdf>



Accessing VLab from Windows (video)

<http://www.youtube.com/watch?v=2geF2uNjuFw>

CIS VLab

The screenshot shows the VMware vSphere Client interface. The left-hand pane displays a tree view of the vCenter inventory, including 'CISLab', 'CIS 90 VMs', and a list of pods (Pod 01 to Pod 10) and a 'Fang (Pod reservati...' entry. The main pane shows the details for a selected VM, 'P01-Mr-Eko', with a 'Getting Started' tab and a 'What is a Virtual Machine?' section. The bottom of the interface includes a 'Recent Tasks' table and a status bar.

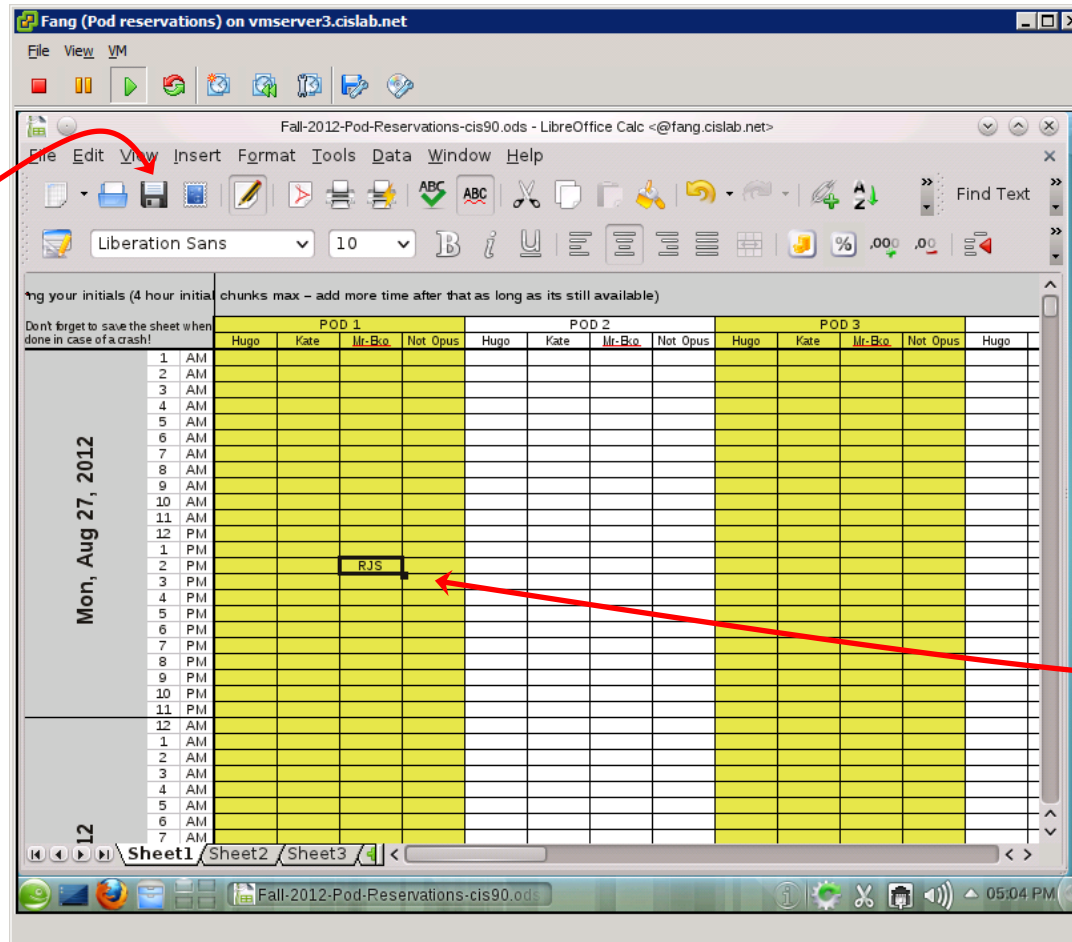
Peel off a separate window for a VM console

Each pod has four VMs: Hugo, Kate, Mr-Eko and Not-Opus

Use the spreadsheet on Fang to make pod reservations

Name	Target
------	--------

The Fang VM (openSUSE)



It's a good idea to save the spreadsheet after you make your changes

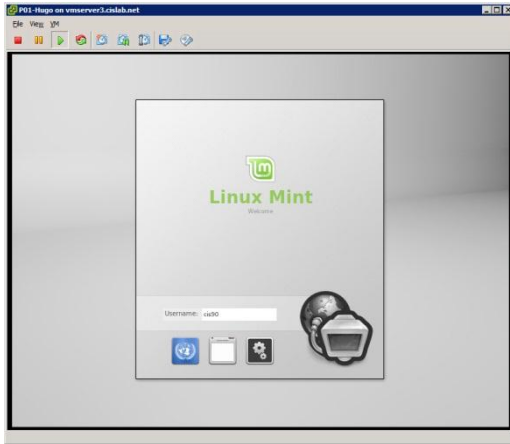
Type your initials into the spreadsheet cells to indicate the date, time and VMs you wish to reserve.

This spreadsheet does not enforce reservations it is just a way for multiple students to share common resources

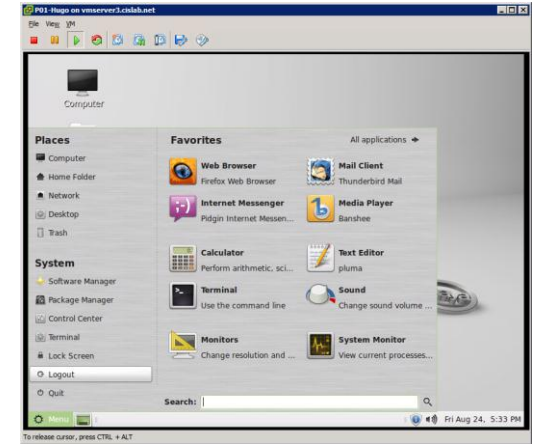
Log in as
cis90

The Hugo VM (Linux Mint)

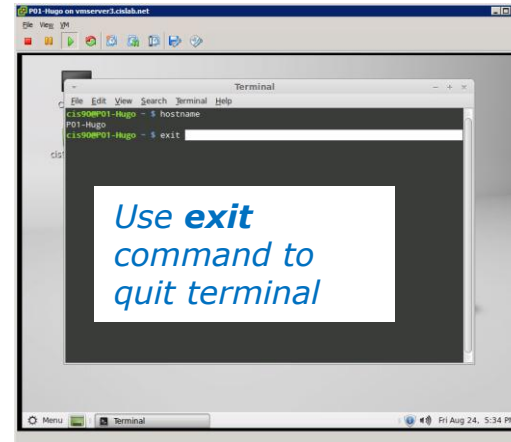
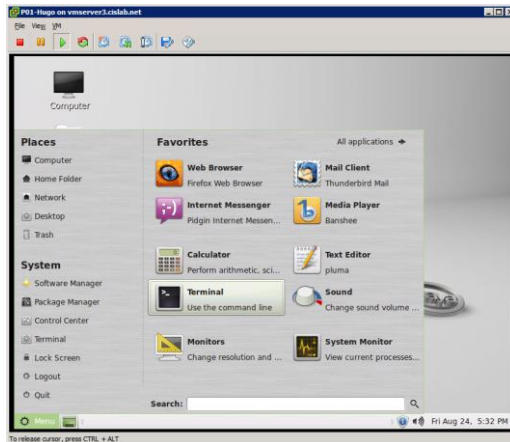
Log out using
Menu > Logout



Summary
Mouse control: good
TTYs: F1 to F6
Graphics: F9
Desktop: KDE



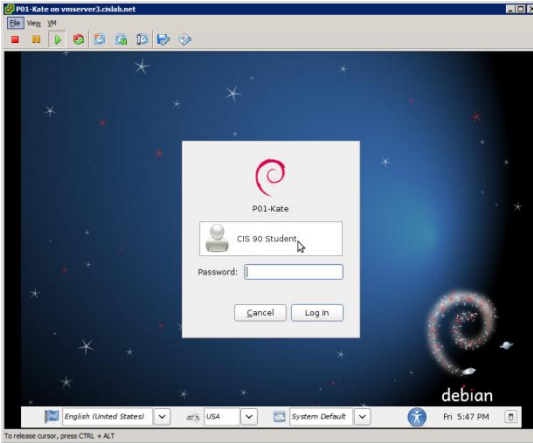
To get a graphical terminal
Menu > Terminal



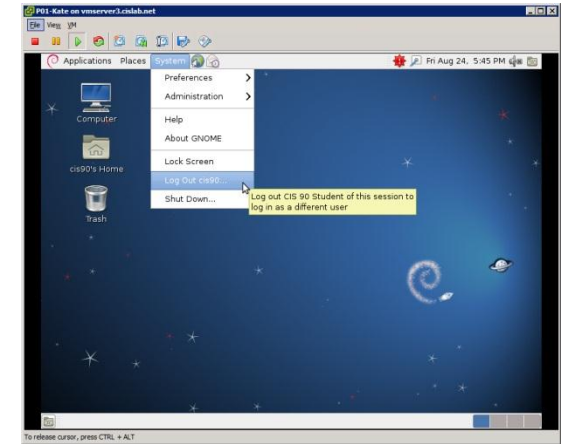
Log in as
CIS 90 Student

The Kate VM (Debian)

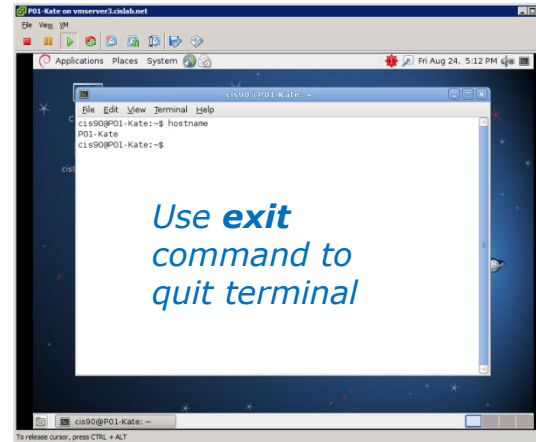
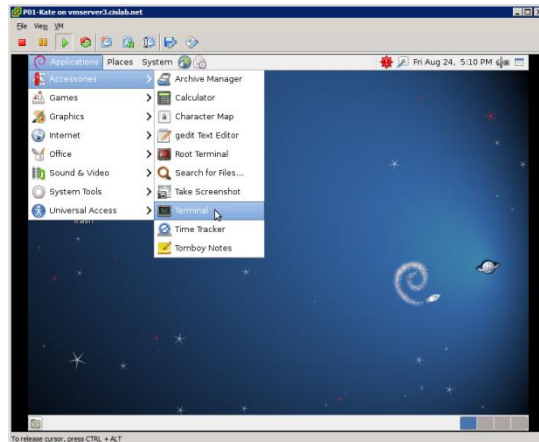
Log out using
System > Log Out cis90...



Summary
Mouse control: yucky
TTYs: F1 to F6
Graphics: F9
Desktop: GNOME



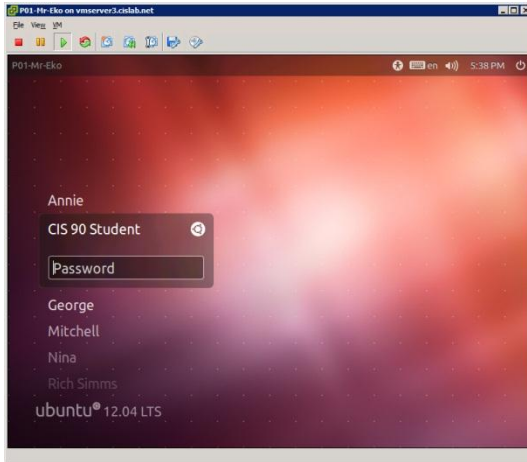
To get a graphical terminal
Applications > Accessories > Terminal



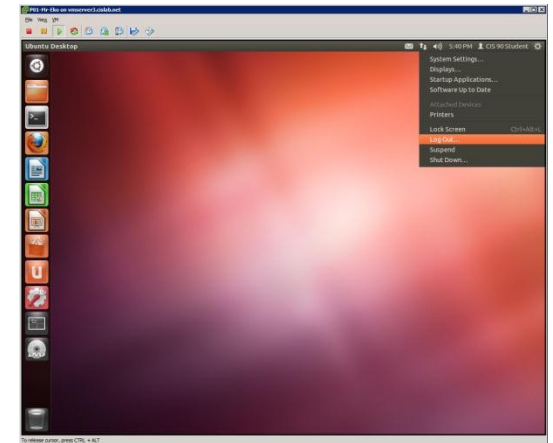
Log in as
CIS 90 Student

The Mr-Eko VM (Ubuntu)

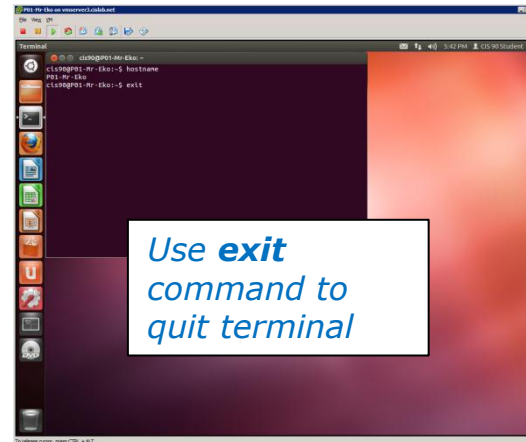
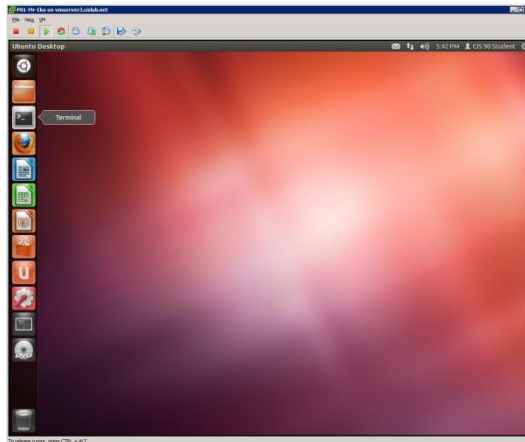
Log out using
 > **LogOut...**



Summary
Mouse control: good
TTYs: F1 to F6
Graphics: F7
Desktop: Unity



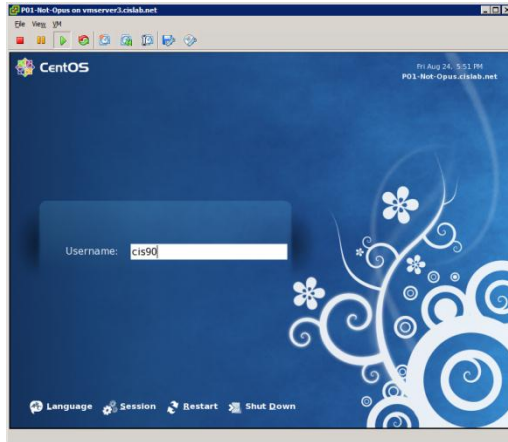
To get a graphical terminal
Terminal icon



Log in as
cis90

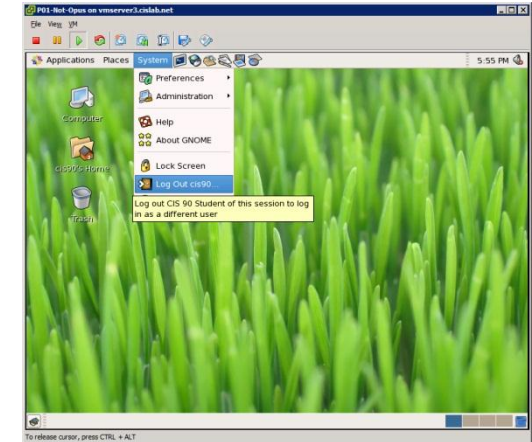
The Not-Opus VM (CentOS)

Log out using
System > Log Out cis90...

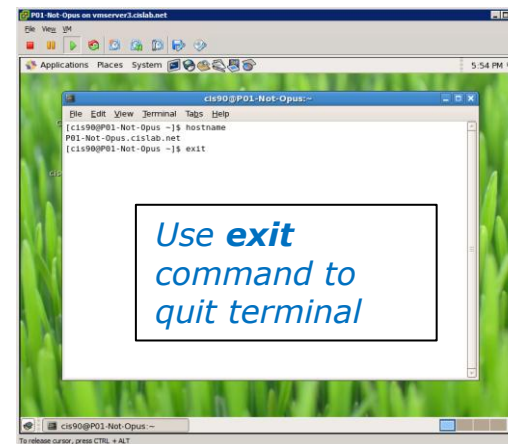
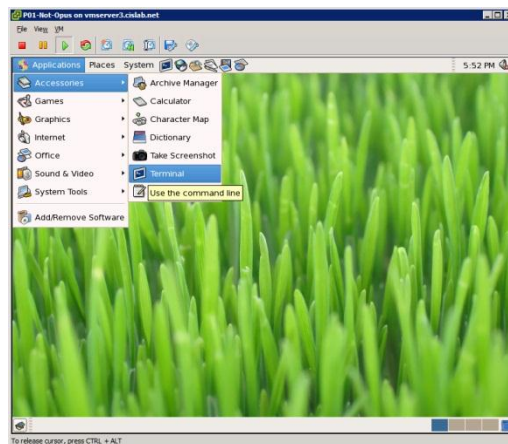


Summary

Mouse control: good
TTYs: F1 to F6
Graphics: F7
Desktop: GNOME




To get a graphical terminal
Applications > Accessories > Terminal




Virtual/Console tty Terminals

Use virtual terminals (tty's) to have multiple login sessions on one system

While holding down Ctrl--Alt keys, tap Space, then tap Fn key


```
Ubuntu 11.04 frodo tty1
```

```
frodo login: benji
Password:
Last login: Tue Feb  7 08:52:55 PST 2012 from 172.30.4.101 on pts/1
Welcome to Frodo (Ubuntu 11.04)
benji@frodo:~$ uname
Linux
benji@frodo:~$ _
```

Ctrl--Alt-Space-F1
(for tty1)


```
Ubuntu 11.04 frodo tty2
```

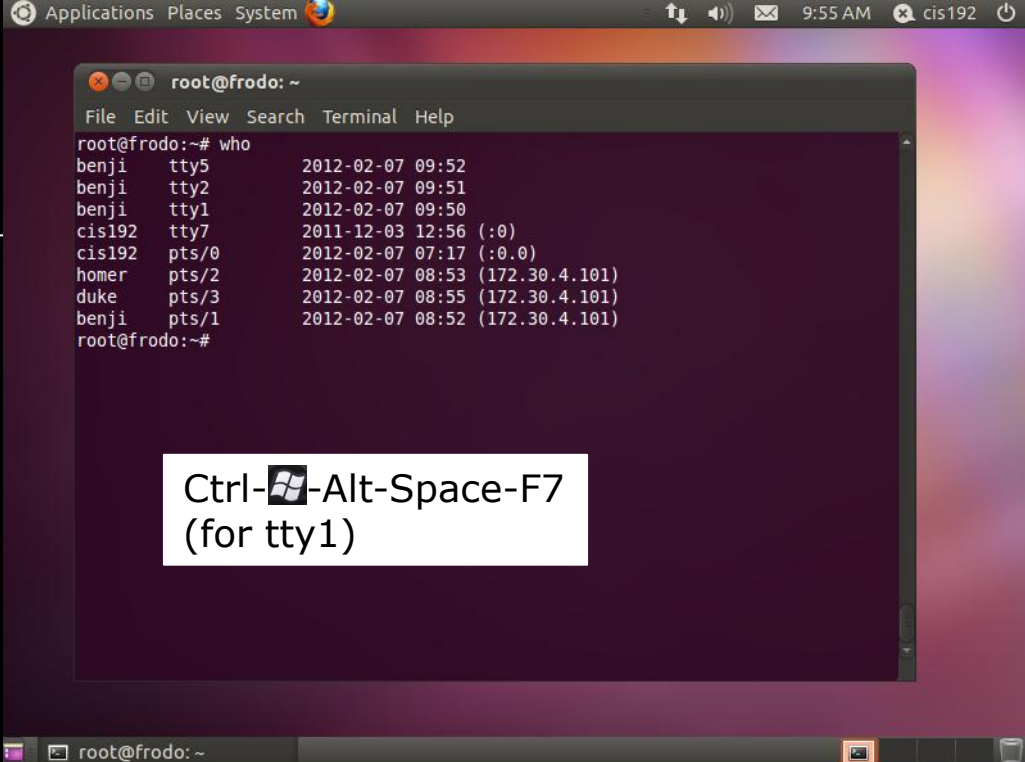
```
frodo login: benji
Password:
Last login: Tue Feb  7 09:50:35 PST 2012 on tty2
Welcome to Frodo (Ubuntu 11.04)
benji@frodo:~$ tty
/dev/tty2
benji@frodo:~$ ps
  PID TTY          TT
16314 tty2      00:00
17097 tty2      00:00
benji@frodo:~$
```

Ctrl--Alt-Space-F2
(for tty2)


```
Ubuntu 11.04 frodo tty5
```

```
frodo login: benji
Password:
Last login: Tue Feb  7 09:51:43 PST 2012 on tty2
Welcome to Frodo (Ubuntu 11.04)
benji@frodo:~$ hostname
frodo
benji@frodo:~$ ls
examples .desktop
benji@frodo:~$ date
Tue Feb  7 09:54:56 PST 2012
benji@frodo:~$ _
```

Ctrl--Alt-Space-F5
(for tty5)

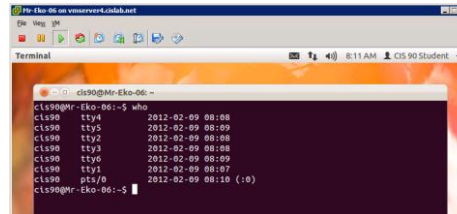
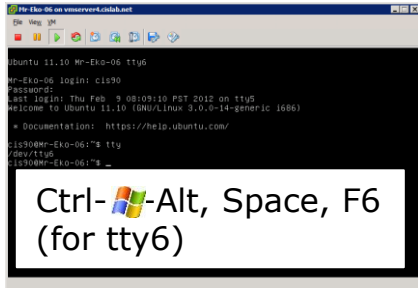


```
Applications Places System 9:55 AM cis192
root@frodo: ~
File Edit View Search Terminal Help
root@frodo:~# who
benji  tty5      2012-02-07 09:52
benji  tty2      2012-02-07 09:51
benji  tty1      2012-02-07 09:50
cis192 tty7      2011-12-03 12:56 (:0)
cis192 pts/0     2012-02-07 07:17 (:0.0)
homer  pts/2     2012-02-07 08:53 (172.30.4.101)
duke   pts/3     2012-02-07 08:55 (172.30.4.101)
benji  pts/1     2012-02-07 08:52 (172.30.4.101)
root@frodo:~#
```

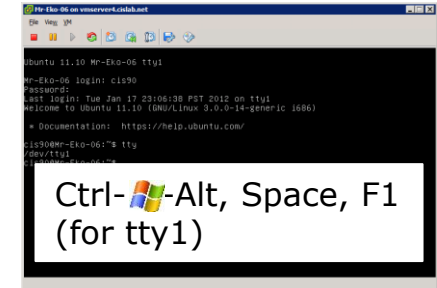
Ctrl--Alt-Space-F7
(for tty1)

Changing Virtual TTY Terminals using VMware vSphere

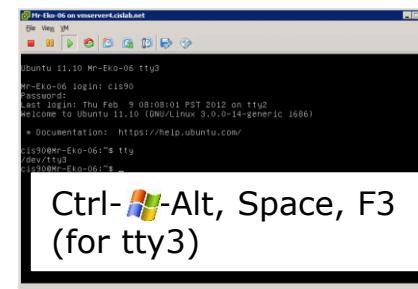
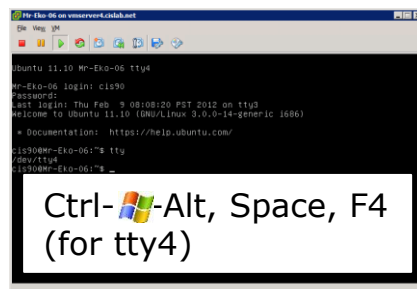
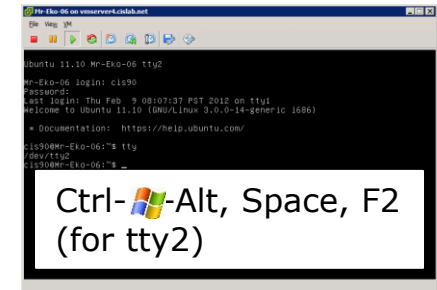
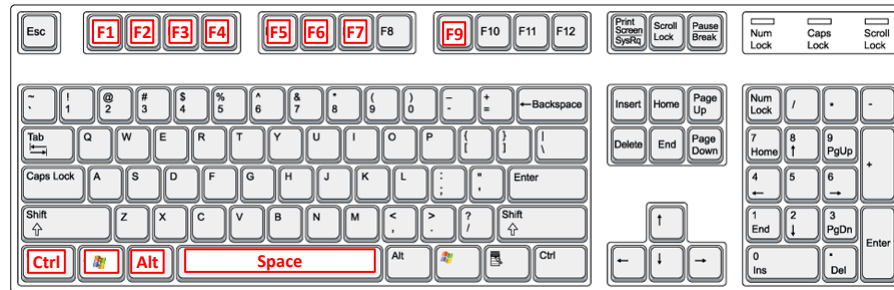
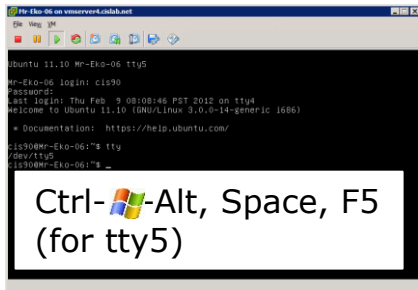
Windows PC Keyboard



** F9 on Linux Mint and Debian



While holding down Ctrl--Alt keys, tap Space, then tap Fn key*



*On some PC keyboards it is not necessary to use the key

Note: This is for vSphere only. The key and Space bar are not pressed for physical (non-VM) servers

Class Activity - CIS VLab

Rich's Cabrillo College CIS Classes
CIS 90 Calendar

Home Resources Forums CIS Lab CTC

Login
Flashcards
Admin

CIS 90
Previous Classes

0 days till term starts!

Cabrillo College
Web Advisor
Static IPs
Commands and Files
Accessing VLab
RIP Dennis Ritchie

CIS 90 (Fall 2012) Course Calendar
Course Home Grades
(content subject to change)

Lesson	Date	Topics	Chapter	Due
1	8/29	<p>Class and Linux Overview</p> <ul style="list-style-type: none"> Understand how this course will work High-level overview of computers, operating systems and virtual machines Overview of UNIX/Linux market and architecture Learn first commands and how to navigate between terminals Use a remote Linux server Use Linux running on a local virtual machine <p>Materials</p> <ul style="list-style-type: none"> Presentation slides (download) Logins Sheet (download) CIS VLab RDP file: (download) <p>Supplemental</p> <ul style="list-style-type: none"> Howto #134: Accessing Opus (download) Howto #305: Accessing VLab (download) 	1.1-1.15 (Gillay) 2.4.5 p113-115, p164-172 (Hahn)	



You must download and use the RDP file to access VLab with your unique credentials

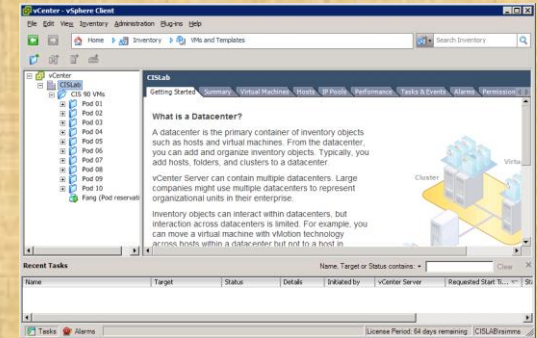
Class Activity - "Follow Along" Demo

POD 1				POD 2				POD 3			
Hugo	Kate	<u>Mr-Eko</u>	Not Opus	Hugo	Kate	<u>Mr-Eko</u>	Not Opus	Hugo	Kate	<u>Mr-Eko</u>	Not Opus
JRA	GAB	SJC	DRD	CLE	CBF	DAH	BUK	RCK	KML	BTL	RLM
JRA	GAB	SJC	DRD	CLE	CBF	DAH	BUK	RCK	KML	BTL	RLM
JRA	GAB	SJC	DRD	CLE	CBF	DAH	BUK	RCK	KML	BTL	RLM
JRA	GAB	SJC	DRD	CLE	CBF	DAH	BUK	RCK	KML	BTL	RLM

POD 4				POD 5				POD 6			
Hugo	Kate	<u>Mr-Eko</u>	Not Opus	Hugo	Kate	<u>Mr-Eko</u>	Not Opus	Hugo	Kate	<u>Mr-Eko</u>	Not Opus
FAM	MDM	EHN	EOO	BZP	CP	JCP	GR	DAS	JLW	HZ	GDG
FAM	MDM	EHN	EOO	BZP	CP	JCP	GR	DAS	JLW	HZ	GDG
FAM	MDM	EHN	EOO	BZP	CP	JCP	GR	DAS	JLW	HZ	GDG
FAM	MDM	EHN	EOO	BZP	CP	JCP	GR	DAS	JLW	HZ	GDG

POD 7				POD 8				POD 9			
Hugo	Kate	<u>Mr-Eko</u>	Not Opus	Hugo	Kate	<u>Mr-Eko</u>	Not Opus	Hugo	Kate	<u>Mr-Eko</u>	Not Opus
RAB	TWDO	SCP	SES	DKF	HEW	JRC	MBF	KLK	EV	JLR	CCM
RAB	TWDO	SCP	SES	DKF	HEW	JRC	MBF	KLK	EV	JLR	CCM
RAB	TWDO	SCP	SES	DKF	HEW	JRC	MBF	KLK	EV	JLR	CCM
RAB	TWDO	SCP	SES	DKF	HEW	JRC	MBF	KLK	EV	JLR	CCM

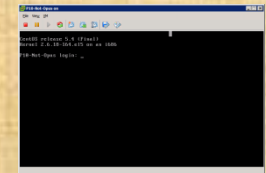
POD 10			
Hugo	Kate	<u>Mr-Eko</u>	Not Opus
AHE	LAG	COR	
AHE	LAG	COR	
AHE	LAG	COR	
AHE	LAG	COR	



VMware vSphere



Graphical Desktop



Virtual TTY terminal

Try logging into CIS VLab with your **own credentials**

- Use the reservation for you shown above (from Fang)
- Open the console of the VM reserved with vSphere
- Login as cis90 into the graphical desktop
- Try changing between the graphical desktop and the TTYs
- Logout when done

More on who command

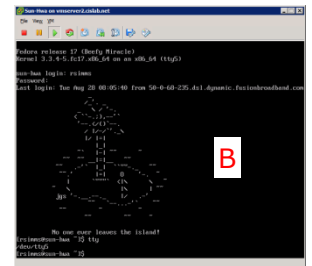
Deciphering **who** command output (Fedora 15) Teletype Terminals (tty), Pseudo Terminals (pts), X windows displays (:n)

	<i>terminal</i>	<i>date & time of login (where logged in from)</i>
<i>user</i>	<i>device</i>	
A rsimms	:0	2012-08-02 16:45 (:0)
cis90	tty2	2012-08-28 08:07
rsimms	pts/0	2012-08-02 16:45 (:0)
rsimms	pts/2	2012-08-02 16:46 (:0)
rsimms	pts/1	2012-08-02 17:02 (:0)
rsimms	pts/3	2012-08-02 17:03 (:0)
rsimms	pts/4	2012-08-02 17:12 (:0)
rsimms	pts/5	2012-08-02 17:13 (:0)
rsimms	pts/6	2012-08-02 17:38 (:0)
rsimms	pts/7	2012-08-02 17:39 (:0)
C rsimms	pts/8	2012-08-28 08:05 (70-14-68-145.dsl.com)
CISLAB\simben90	pts/9	2012-08-28 08:06 (70-14-68-145.dsl.com)
CISLAB\milhom90	tty3	2012-08-28 08:08
E cis90	pts/10	2012-08-28 08:11 (p9-hugo.cislab.net)
B rsimms	tty5	2012-08-28 08:12
D rsimms	pts/11	2012-08-28 08:29 (:0)

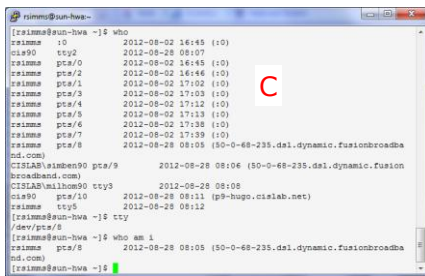
Note, a PTS (Pseudo Terminal) device will be either a graphical terminal on the desktop or a remote login from another computer



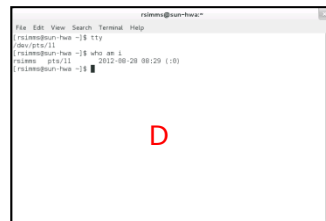
:0 – the graphical desktop



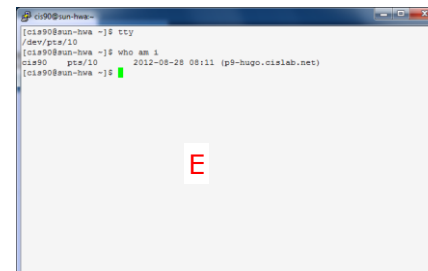
tty5 – a virtual terminal (Ctrl-Alt-F5)



pts/8 – an SSH login over the Internet from Windows PC



pts/11 – a graphical terminal on the desktop



pts/10 – an SSH login from Pod Server P9-Hugo

Deciphering **who** command output (Red Hat 9)

Teletype Terminals (tty), Pseudo Terminals (pts), X windows displays (:n)

/dev/pts/3 (Putty)

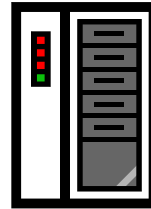
```
rsimms@frida:~$ who
root      tty1          Jun 23 16:00
rsimms    tty2          Jun 23 16:00
rsimms    :0            Jun 22 15:43
rsimms    pts/0         Jun 22 15:43 (:0.0)
root      pts/1         Jun 23 16:08 (192.168.0.25)
rsimms    pts/2         Jun 23 16:04 (:0.0)
rsimms    pts/3         Jun 23 16:08 (192.168.0.25)

rsimms@frida:~$ tty
/dev/pts/3
rsimms@frida:~$
```

```
root@frida:~# who
root      tty1          Jun 23 16:00
rsimms    tty2          Jun 23 16:00
rsimms    :0            Jun 22 15:43
rsimms    pts/0         Jun 22 15:43 (:0.0)
root      pts/1         Jun 23 16:08 (192.168.0.25)
rsimms    pts/2         Jun 23 16:04 (:0.0)
rsimms    pts/3         Jun 23 16:08 (192.168.0.25)

root@frida:~# ps
  PID TTY          TIME CMD
 3369 pts/1    00:00:00 bash
 3592 pts/1    00:00:00 ps

root@frida:~#
root@frida:~# tty
/dev/pts/1
root@frida:~#
```



/dev/tty/2 (Ctrl-Alt-F2)

```
rsimms@frida rsimms$ who
root      tty1          Jun 23 16:00
rsimms    tty2          Jun 23 16:00
rsimms    :0            Jun 22 15:43
rsimms    pts/0         Jun 22 15:43 (:0.0)
root      pts/1         Jun 23 16:08 (192.168.0.25)
rsimms    pts/2         Jun 23 16:04 (:0.0)
rsimms    pts/3         Jun 23 16:08 (192.168.0.25)

rsimms@frida rsimms$ tty
/dev/tty2
rsimms@frida rsimms$
```

```
root@frida root# who
root      tty1          Jun 23 16:00
rsimms    tty2          Jun 23 16:00
rsimms    :0            Jun 22 15:43
rsimms    pts/0         Jun 22 15:43 (:0.0)
root      pts/1         Jun 23 16:08 (192.168.0.25)
rsimms    pts/2         Jun 23 16:04 (:0.0)
rsimms    pts/3         Jun 23 16:08 (192.168.0.25)

root@frida root# tty
/dev/tty1
root@frida root#
```

:0 (Ctrl-Alt-F7)

```
rsimms@frida:~$ who
root      tty1          Jun 23 16:00
rsimms    tty2          Jun 23 16:00
rsimms    :0            Jun 22 15:43
rsimms    pts/0         Jun 22 15:43 (:0.0)
root      pts/1         Jun 23 16:08 (192.168.0.25)
rsimms    pts/2         Jun 23 16:04 (:0.0)
rsimms    pts/3         Jun 23 16:08 (192.168.0.25)

rsimms@frida rsimms$ tty
/dev/pts/0
rsimms@frida rsimms$
```

```
rsimms    pts/2         Jun 23 16:04 (:0.0)
rsimms    pts/3         Jun 23 16:08 (192.168.0.25)

rsimms@frida rsimms$ tty
/dev/pts/2
rsimms@frida rsimms$
```

/dev/tty/1 (Ctrl-Alt-F1)

/dev/pts/1 (Putty)

/dev/pts/0

/dev/pts/2

Output from who command:

```
root      tty1          Jun 23 16:00
rsimms    tty2          Jun 23 16:00
rsimms    :0            Jun 22 15:43
rsimms    pts/0         Jun 22 15:43 (:0.0)
root      pts/1         Jun 23 16:08 (192.168.0.25)
rsimms    pts/2         Jun 23 16:04 (:0.0)
rsimms    pts/3         Jun 23 16:08 (192.168.0.25)
```

Notes:

- :0 = X display 0
- :0.0 = X display 0, screen 0
- No scroll bars on tty's

Housekeeping

Can I add this class?

- Probably!
- The instructor will email add codes to students that request them after the first class meeting.
- The last day for students to add CIS 90 is Sept 8th.
- Enrolled and wait-listed students that don't show up or don't contact the instructor in advance ***will be dropped or lose their space on the wait list.***

Roll Call for both sections

Turn OFF the recording

Roll Call



Instructor: **Rich Simms**

Dial-in: **888-450-4821**

Passcode: **761867**



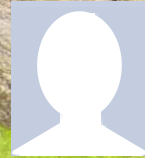
Justin



Garratt



Sean



Donald



Carlile



Carter



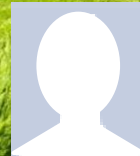
Dajan



Bryn



Rita



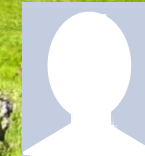
Kelly



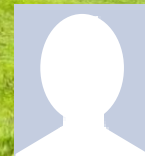
Benjamin



Ray



Fidel



Michael



Evan



Efrain



Bjorn



Carlos P.



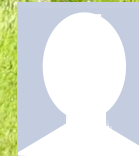
Joshua



Gustavo



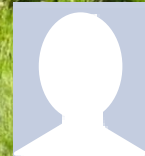
David



Jacob



Humberto



Gwyneth



Ryan



Timothy



Steven



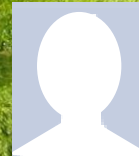
Stacey



Sean



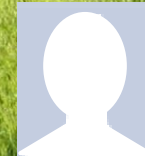
Hannah



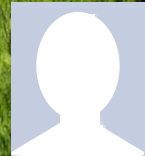
Jose



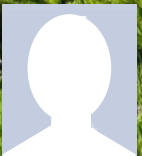
Max



Kristen



Evie



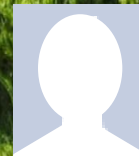
Jessica



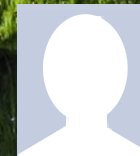
Chad



Andrew



Luis



Carlos R.

Roll Call for both sections

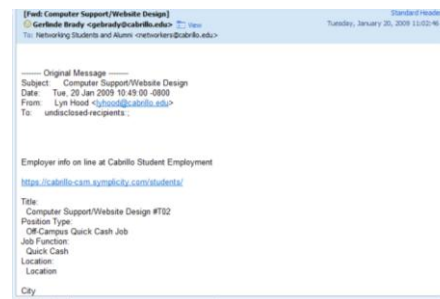
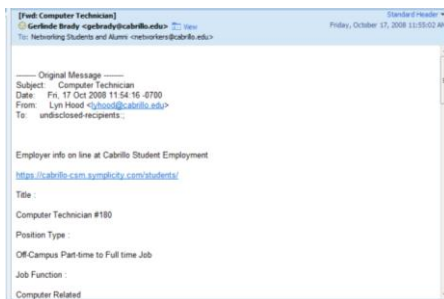
Turn recording back ON

Cabrillo Networking Program Mailing list

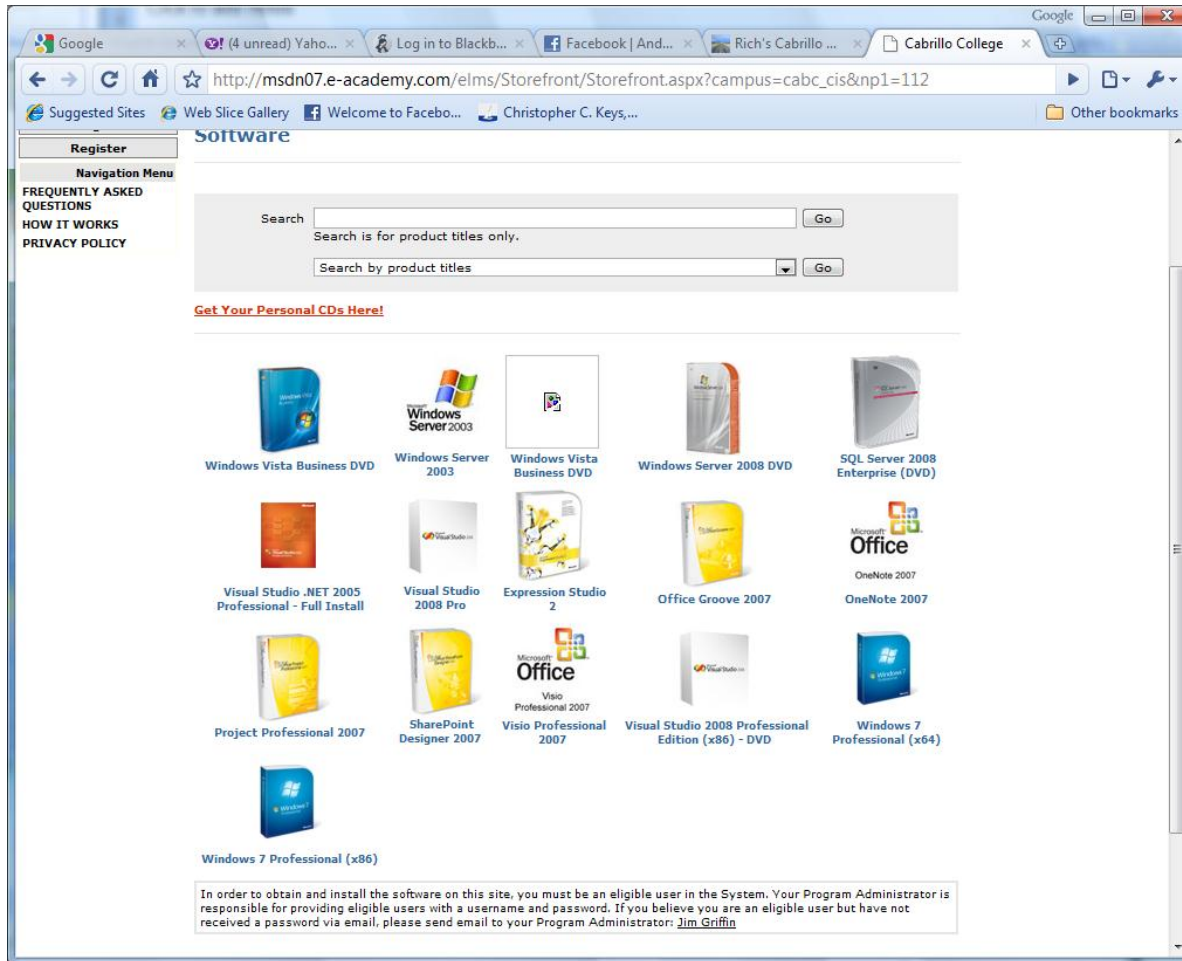
Subscribe by sending an email (no subject or body) to:

networkers-subscribe@cabrillo.edu

- Program information
- Certification information
- Career and job information
- Short-term classes, events, lectures, tours, etc.
- Surveys
- Networking info and links



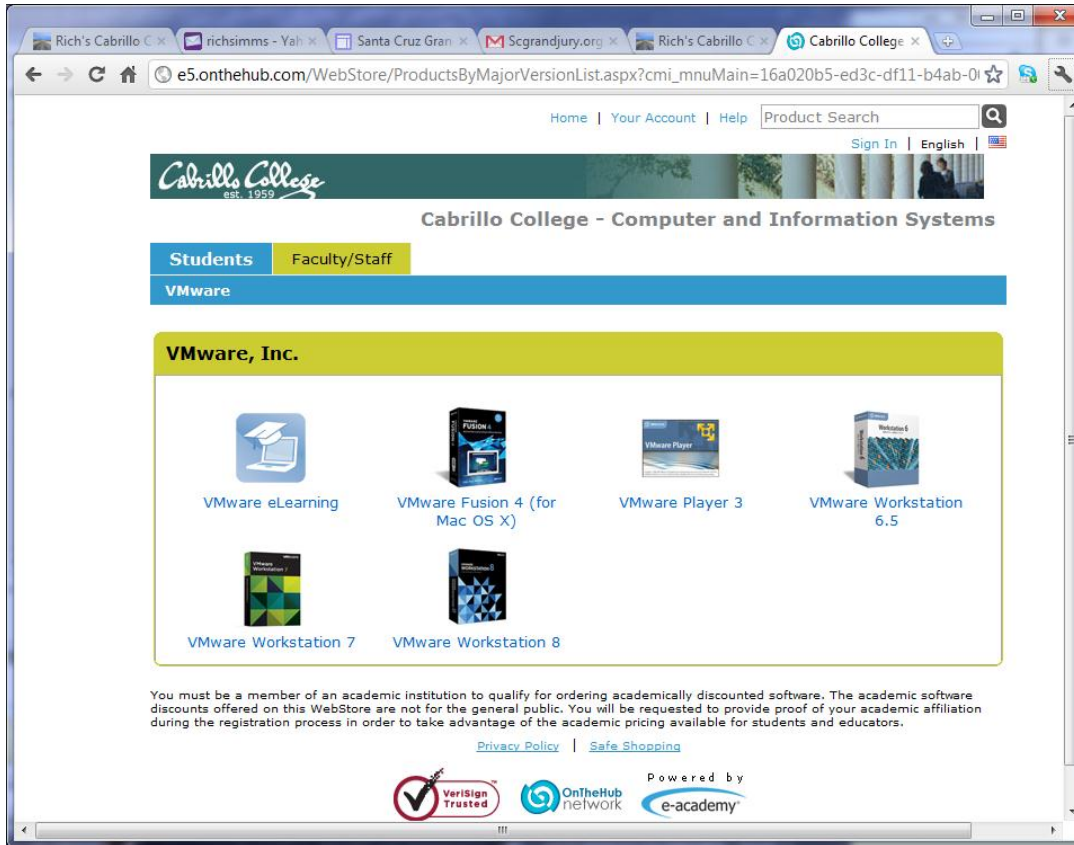
MSDN Academic Alliance



- Microsoft software for students registered in a CIS or CS class at Cabrillo
- Available after registration is final (two weeks after first class)

To get to this page, go to **<http://simms-teach.com/resources>** and click on the appropriate link in the Tools and Software section

VMware e-academy



- VMware software for students registered in a CIS or CS class at Cabrillo
- Available after registration is final (two weeks after first class)

To get to this page, go to **<http://simms-teach.com/resources>** and click on the appropriate link in the Tools and Software section



What is a computer

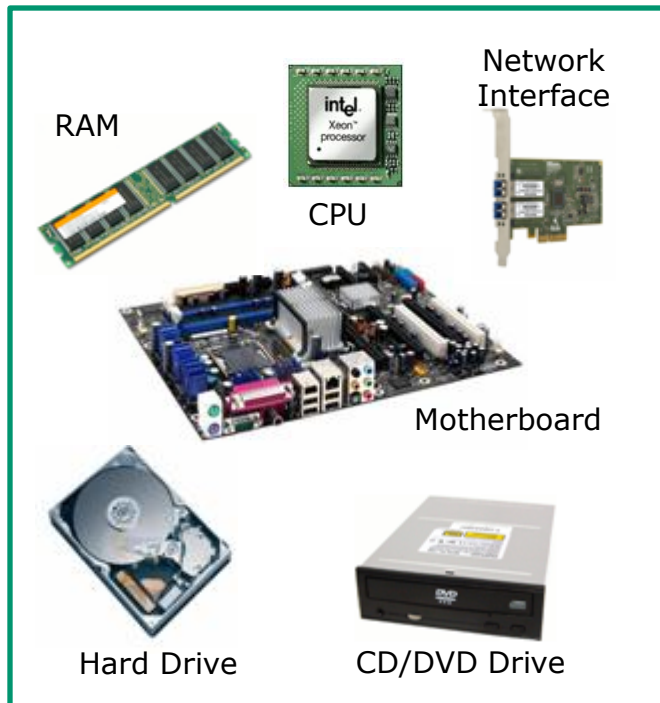
What is a computer?

Desktops



Usually one user at a time

Hardware



Software

Programs/Apps

Operating System



Desktop or Workstation

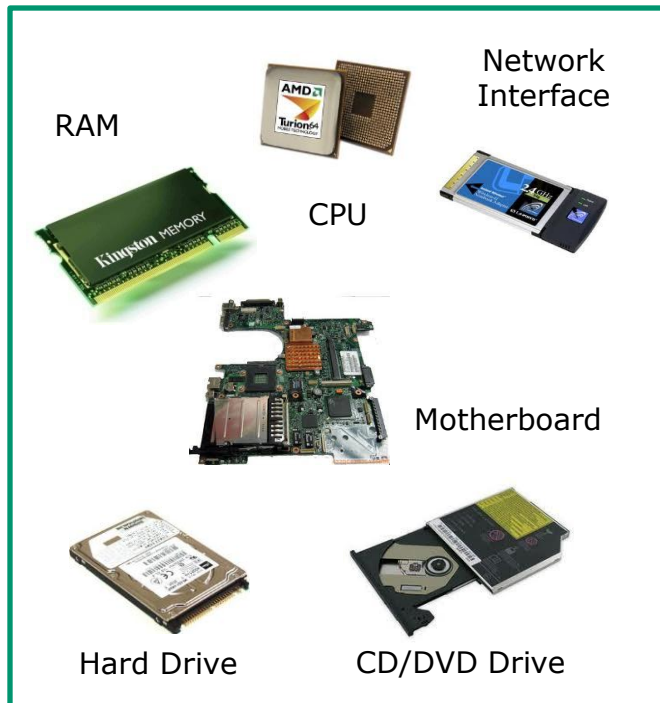
What is a computer?

Mobile Devices

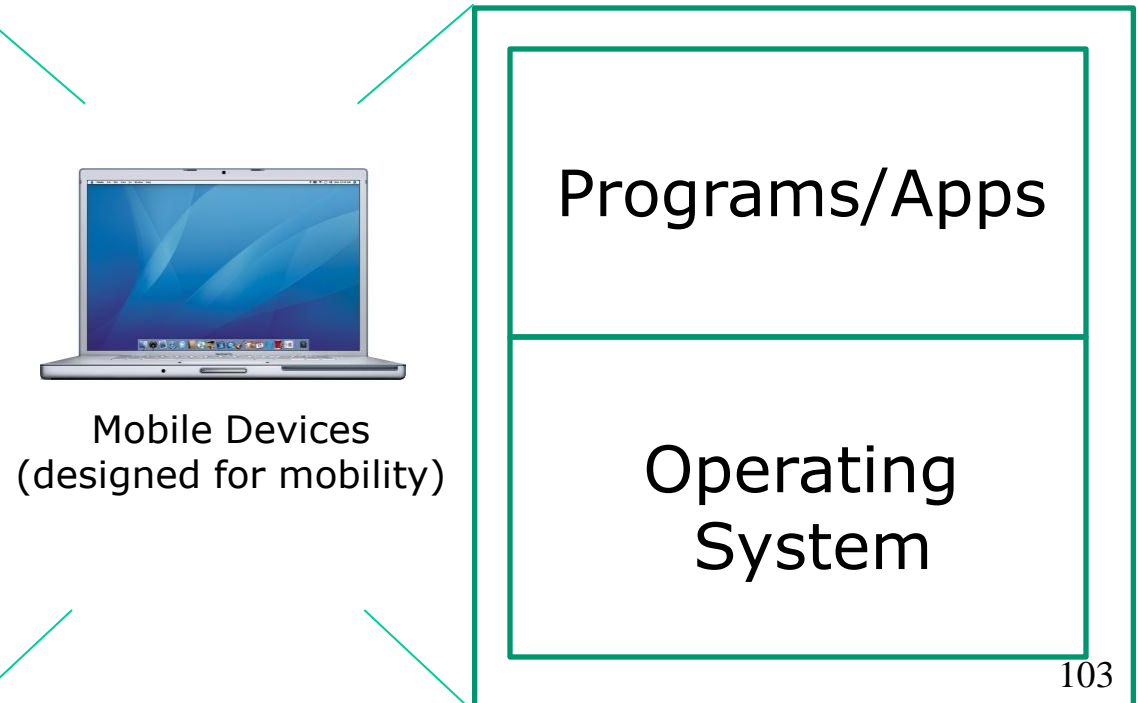


*Usually one
user at a time*

Hardware



Software



What is a computer?

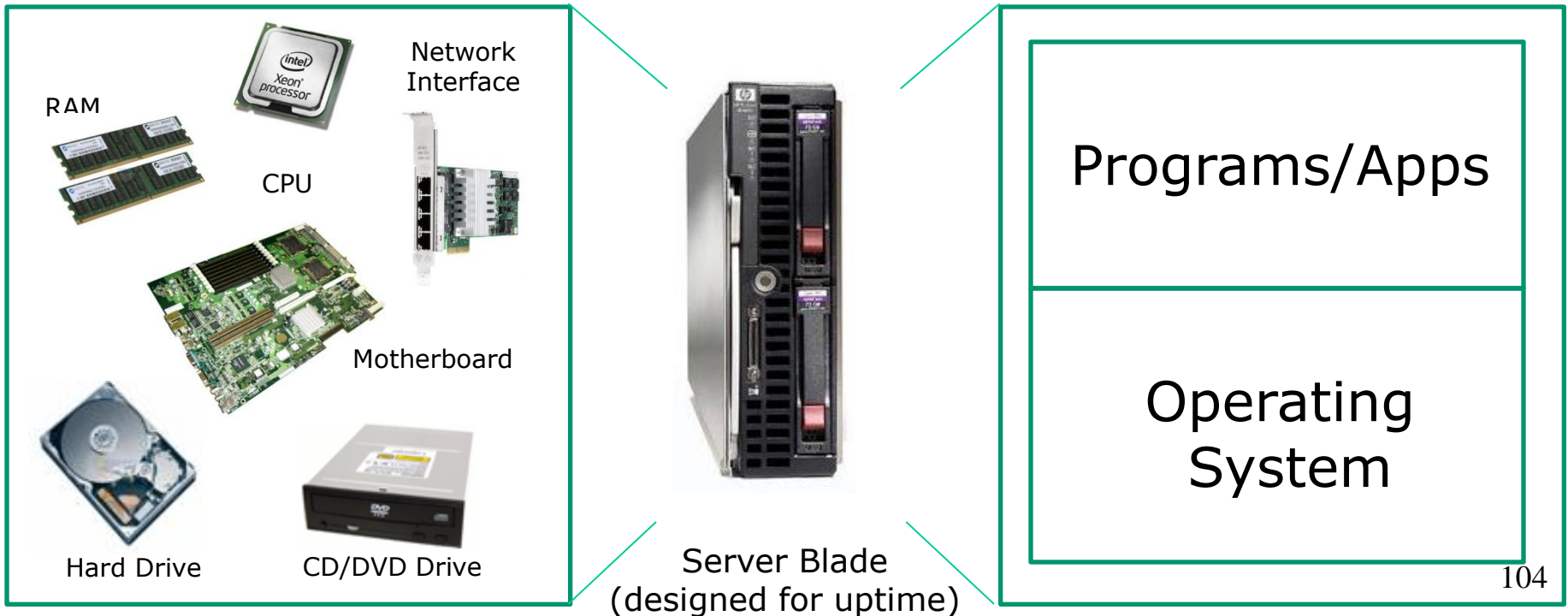
Servers



*Usually many users
at the same time*

Hardware

Software



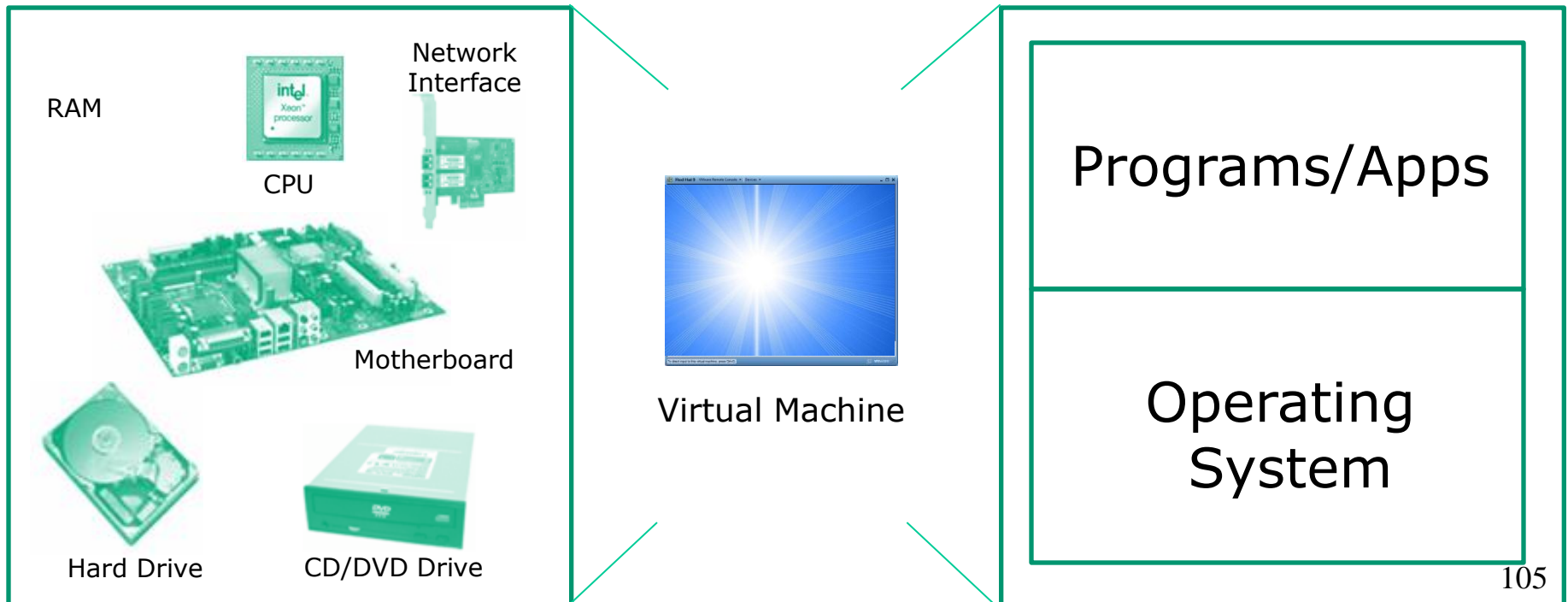
What is a computer?

Virtual Machines



Virtual Hardware

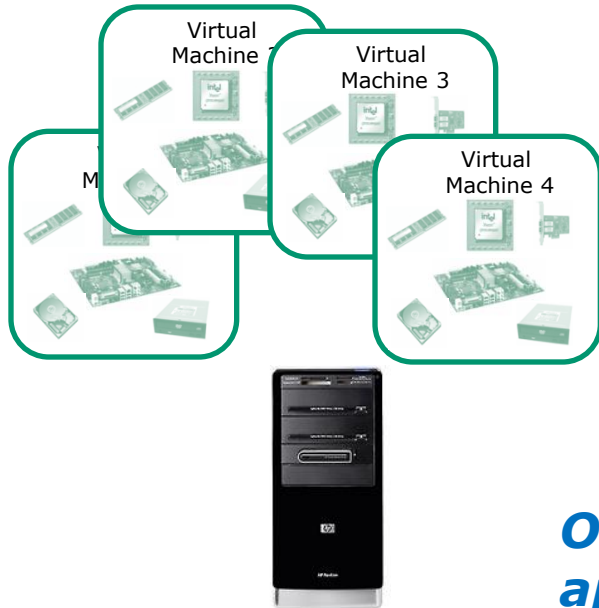
Software



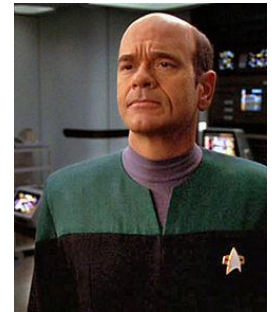
Virtual Machines

What is a virtual machine?

- There are software programs (e.g. VMWare, VirtualBox, MS Virtual Server) that simulate perfectly all the hardware of a real computer.
- These simulated computers are called virtual machines or VMs.



- You load an operating system and applications on virtual machines just like you would any other computer.
- The guest OS and apps don't even know they are not running on a "real" computer.
- Opus used to be a 1U rack mounted server. Now it's a VM on a server in building 1300.

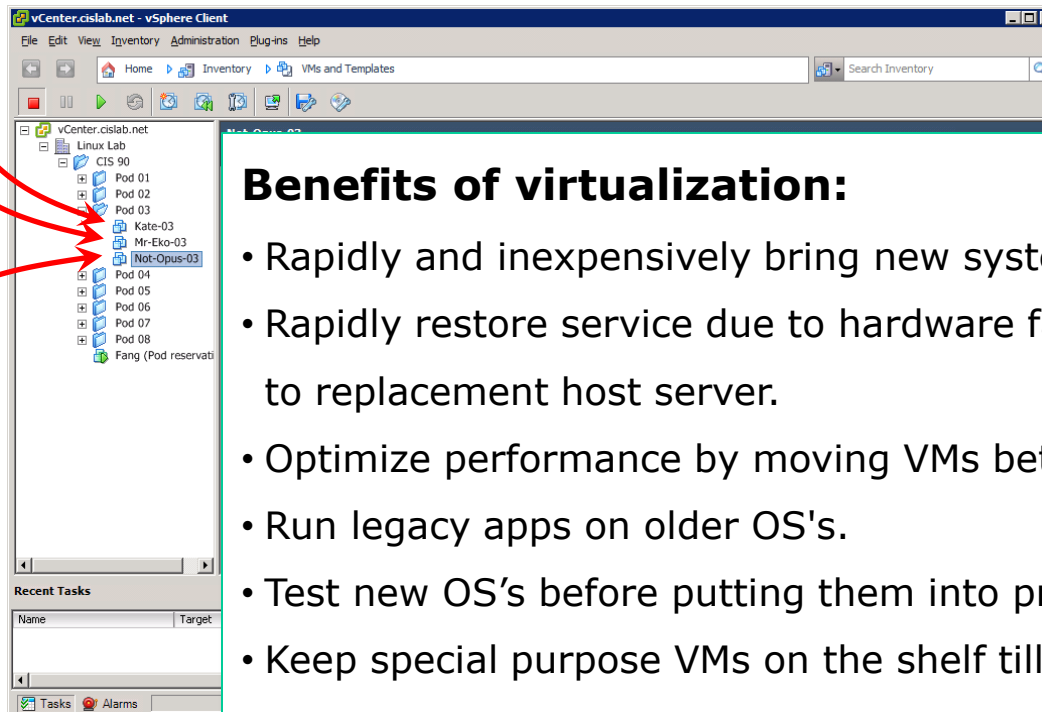


The EMH doctor on Star Trek Voyager was a simulation

Over the network, virtual machines appear just like any other computer.

Virtual Machines

*Multiple computers on one computer
... running at the same time
... sharing the same physical hardware*

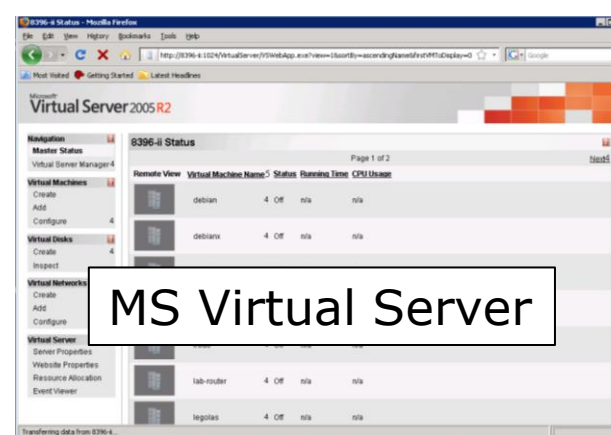
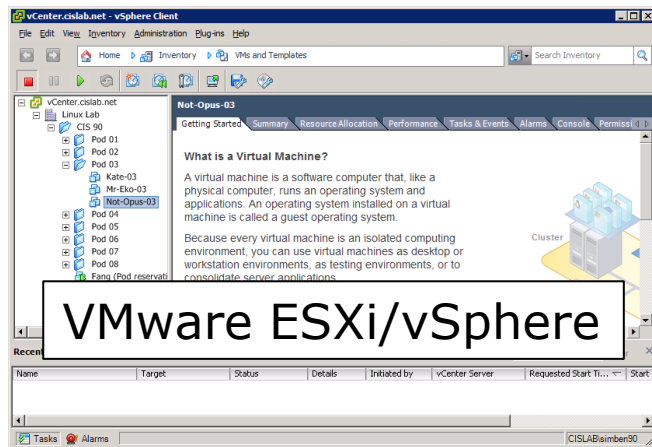
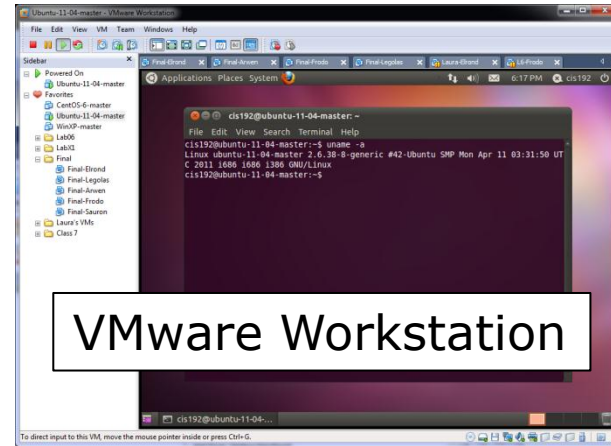
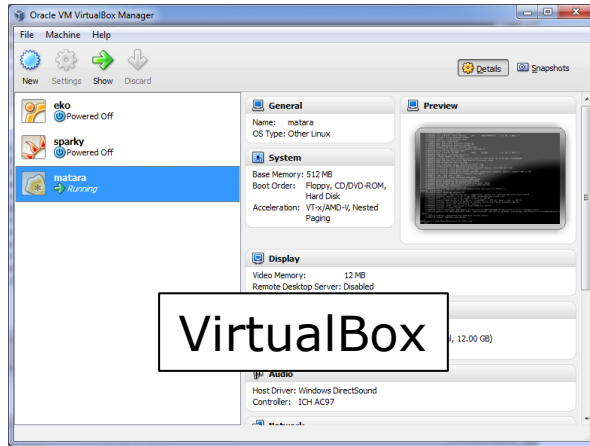


Benefits of virtualization:

- Rapidly and inexpensively bring new systems online.
- Rapidly restore service due to hardware failures by moving VMs to replacement host server.
- Optimize performance by moving VMs between physical hosts.
- Run legacy apps on older OS's.
- Test new OS's before putting them into production.
- Keep special purpose VMs on the shelf till needed.
- Consolidate data center on fewer servers.
- Students can have their own personal computer lab!



Various Virtualization Products



Software

Software – Programs/Apps

Users



Software

Programs/Apps

- Some programs come as part of the OS
- Some programs are add-ons purchases or downloads
- Provide the interface between user and computer
- Depends on the OS for all access to the hardware

Operating System

Hardware



Software – Programs/Apps

Users



Software

Programs (examples)

Common		Enterprise	UI	Browsers
Word games vi	Photoshop email iTunes	SAP Oracle custom	Explorer bash cmd.exe	Firefox IE Safari

Operating System

Hardware



Software - The Operating System

Users



Software

Programs

Operating System

- Interface to the hardware
- Shares hardware resources
- Schedules/executes programs
- Process management
- Input/output services
- System monitoring
- Network stack

Hardware



Software - The Operating System

Users



Software

Programs

Operating System (examples):



Windows 7
Windows Server



Red Hat Linux
Ubuntu Linux



Mac OS X
HP-UX

Hardware



Software Licensing

Public Domain (paid for by the taxpayer)

- Source code is available
- No license, no copyright, maybe modified and redistributed
- Examples: USGS mapping software, NASA aerodynamics software.

Open Source

- Source code is available
- Community of developers doing online collaboration
- Pragmatic redistribution licenses
- Examples: Apache, Firefox, Android, OpenOffice

Free Software Movement

- Source code is available
- GNU (“GNU is not UNIX”) license, COPYLEFT
- Examples: GNU/Linux, GIMP

Proprietary

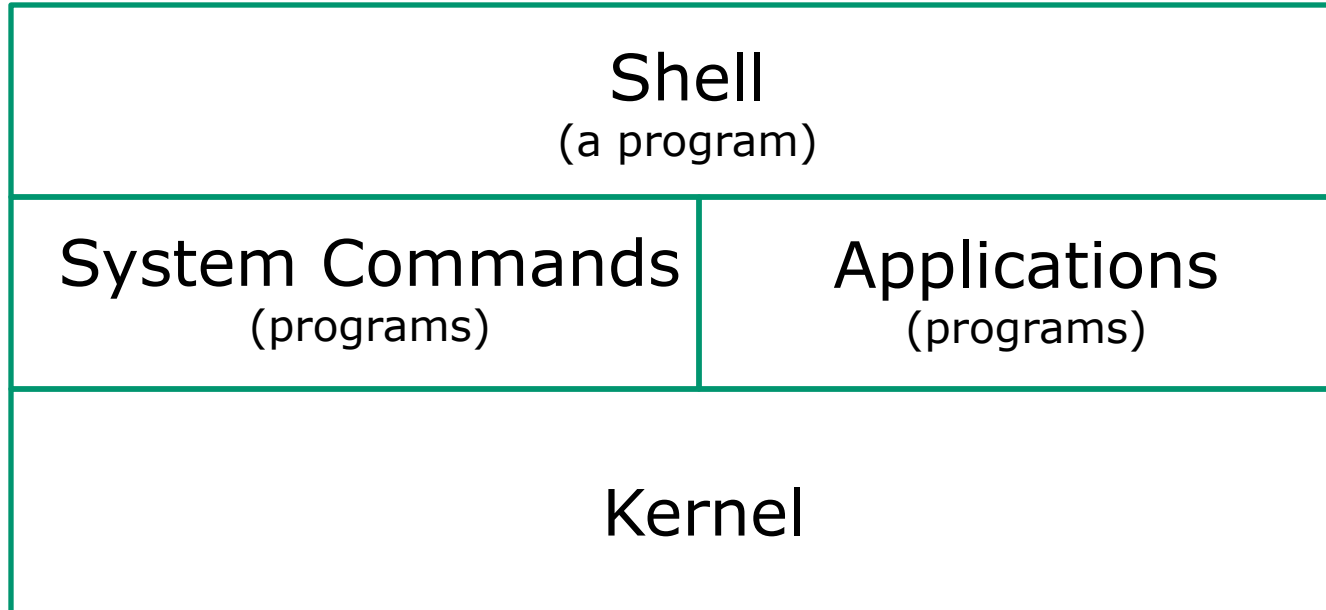
- Intellectual property
- Copyright law
- Examples: Adobe Photoshop, Microsoft Windows, Mac OS X, AT&T UNIX System V

UNIX/Linux Architecture simplified

UNIX/Linux Architecture

Simplified View - Four Major Components

Users

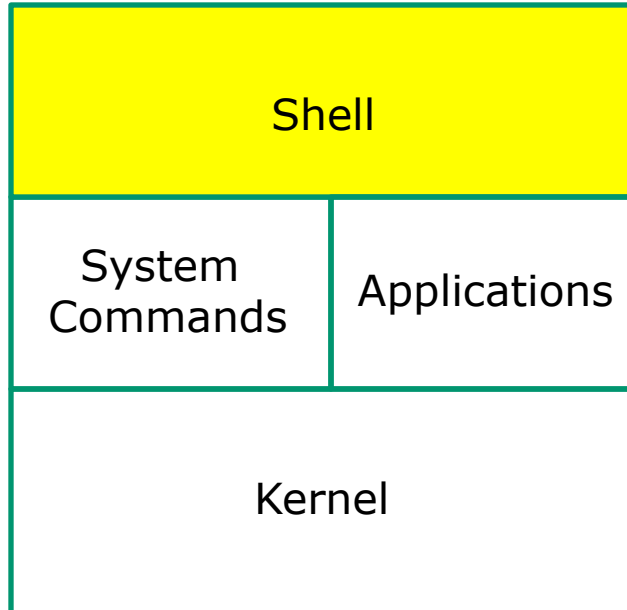


Hardware



UNIX/Linux Architecture

The Shell

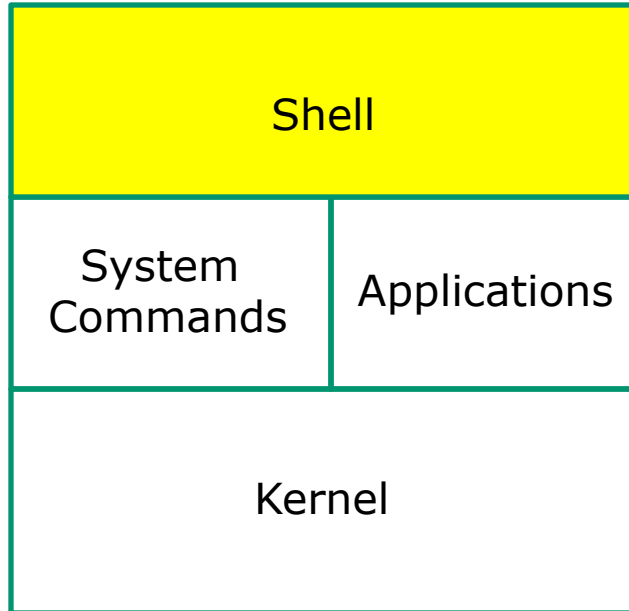


- Allows users to interact with the computer via a “command line”.
- Prompts for a command, parses the command, finds the right program and gets that program executed.
- Called a “shell” because it hides the underlying operating system.
- Many shell programs are available: sh (Bourne shell), bash (born again shell), csh (C shell), ksh (Korn shell).
- The shell is a user interface and a programming language (scripts).
- GNOME and KDE desktops could be called graphical shells



UNIX/Linux Architecture

The Shell is a user interface and a programming language



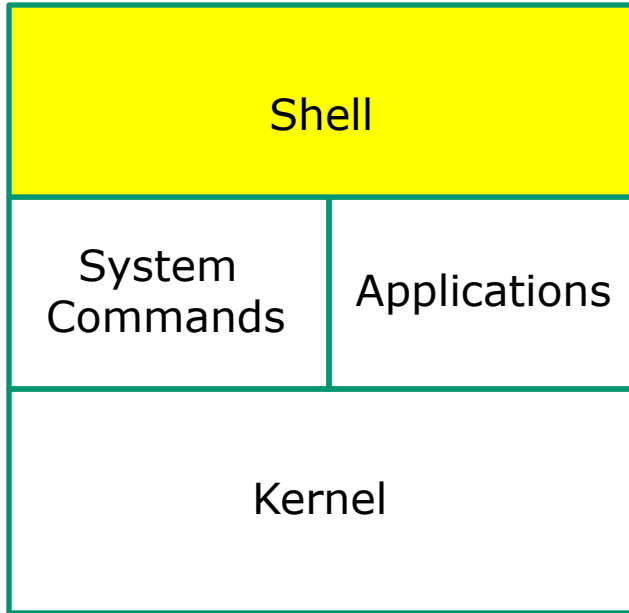
```
rsimms@opus:~  
[rsimms@opus ~]$ hostname  
opus.cabrillo.edu  
[rsimms@opus ~]$ █
```

```
rsimms@opus:~  
[rsimms@opus ~]$ for i in Larry Moe Curly  
> do  
>   echo "Hello $i"  
>   sleep 1  
> done  
Hello Larry  
Hello Moe  
Hello Curly  
[rsimms@opus ~]$ █
```



UNIX/Linux Architecture

Shells, graphical shells and in-between



Shell Command Line Interface (CLI)

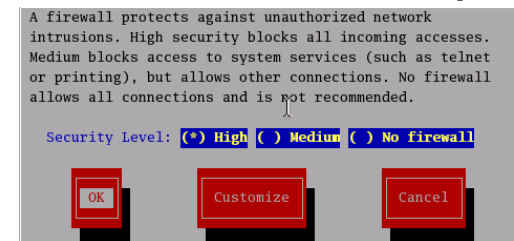
```
[root@frida root]# iptables -L -t nat
Chain PREROUTING (policy ACCEPT)
target     prot opt source                destination

Chain POSTROUTING (policy ACCEPT)
target     prot opt source                destination

Chain OUTPUT (policy ACCEPT)
target     prot opt source                destination
[root@frida root]#
```

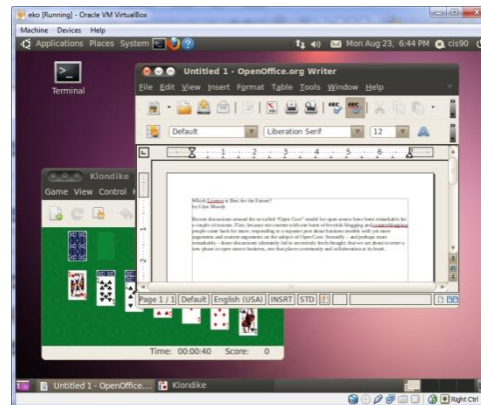
bash

Text User Interface (TUI)



Lokkit Utility (uses curses library)

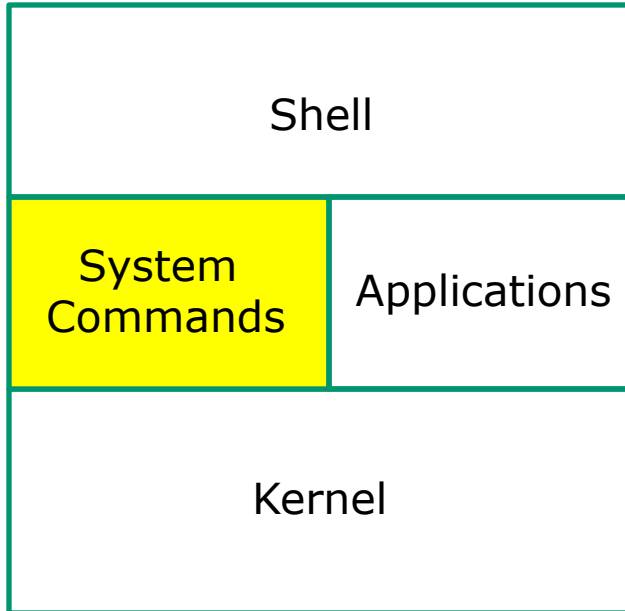
Graphic shells or desktops (GUI)



gnome

UNIX/Linux Architecture

System Commands

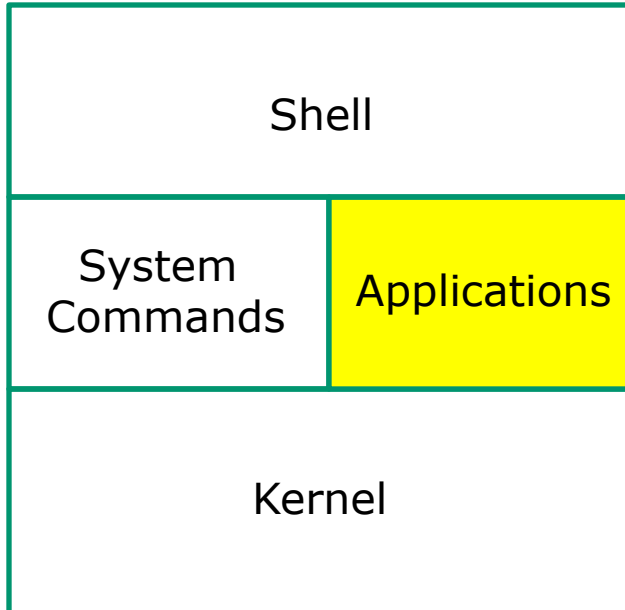


- 100's of system commands and utilities .
- Commands like **ls** (list directories), **cat** (print a file), **rm** (remove a file), ... etc.
- Utilities like **vi** (text editor), **sort** (sorts file contents), **find** (searches), ... etc.
- Larger utilities like **sendmail** (email), **tar** (backup), **tcpdump** (sniffer), ... etc.
- Administrative utilities like **useradd**, **groupadd**, **passwd** (change password), ... etc.



UNIX/Linux Architecture

Applications

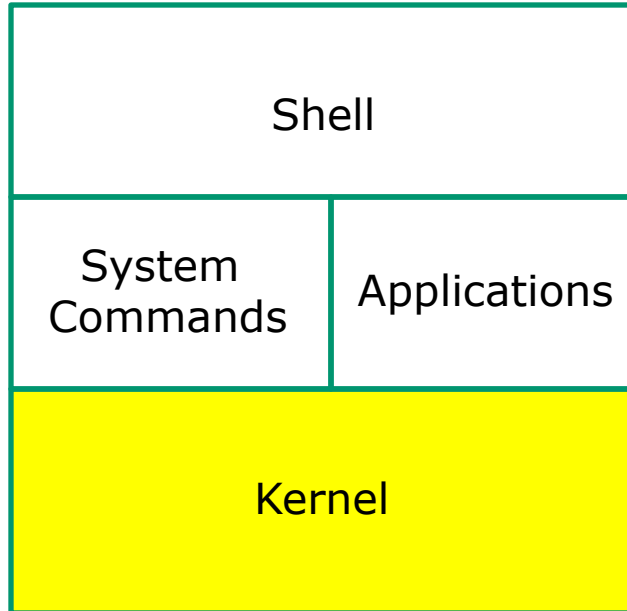


- Could be included in the distribution or optionally installed.
- Could be an add-on program developed by an ISV (Independent Software Vendor) or Open Source organization.
- Could be an in-house developed custom application.
- Examples are **Apache** (web server), **GIMP** (GNU image manipulation program), **OpenOffice** (word processing, spreadsheets, presentations), **Oracle** (commercial database), ... etc.



UNIX/Linux Architecture

Kernel

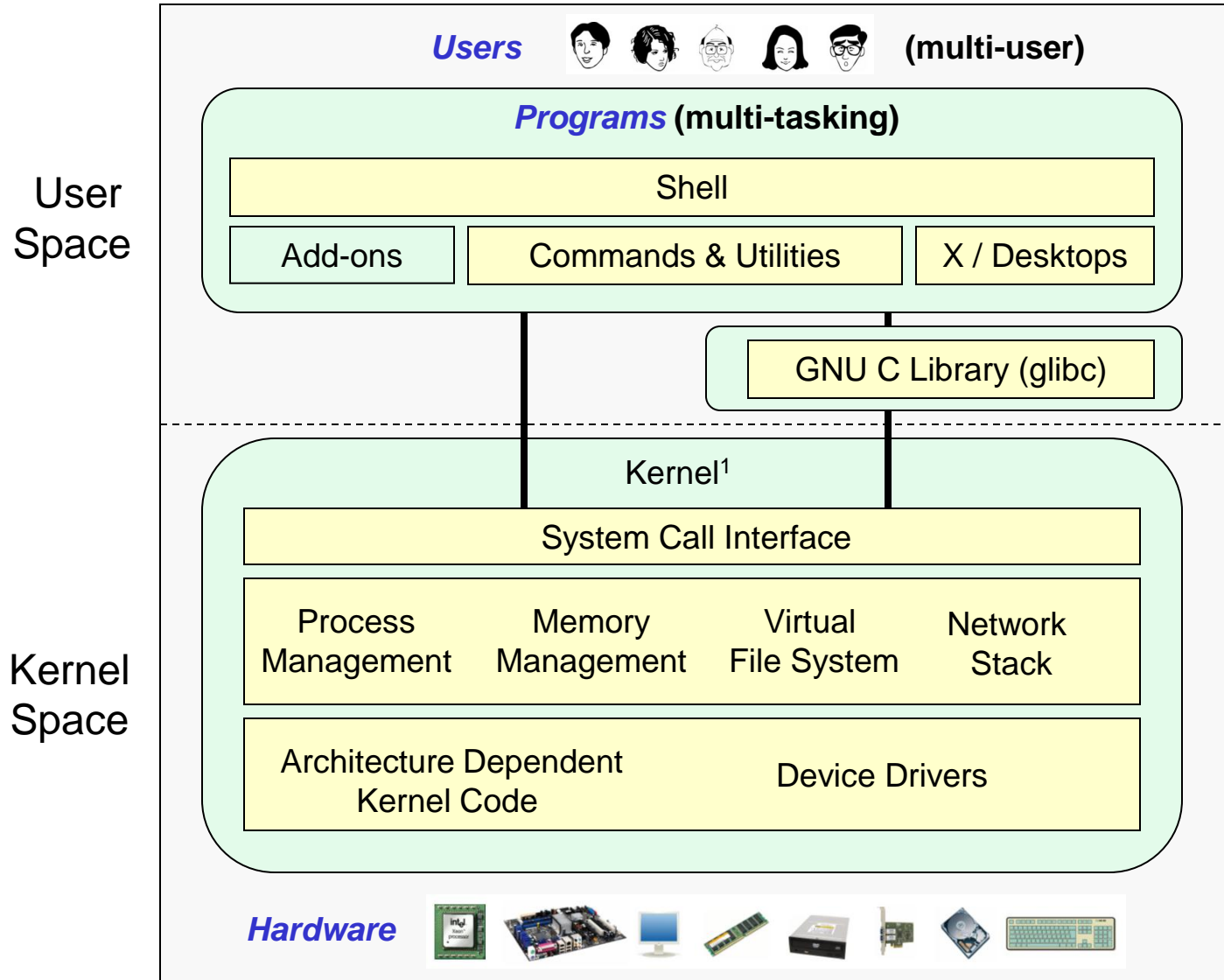


- Lowest level, inner-most core of the operating system.
- Process management - what programs are called when they are loaded and running).
- Memory management - handles all the reads and writes to memory (RAM and virtual memory)
- File System - handle all the reads and writes to files on drives.
- Network stack - provides the communication layers to exchange packets with other computers





All Linux distros are based on the GNU/Linux Operating System Architecture



Richard Stallman started the GNU project in 1983 to create a free UNIX-like OS. He Founded the Free Software Foundation in 1985. In 1989 he wrote the first version of the GNU General Public License



Linus Torvalds, as a student, initially conceived and assembled the Linux kernel in 1991. The kernel was later re-licensed under the GNU General Public License in 1992.

¹See "Anatomy of the Linux kernel" by M. Tim Jones at <http://www-128.ibm.com/developerworks/linux/library/l-linux-kernel/>

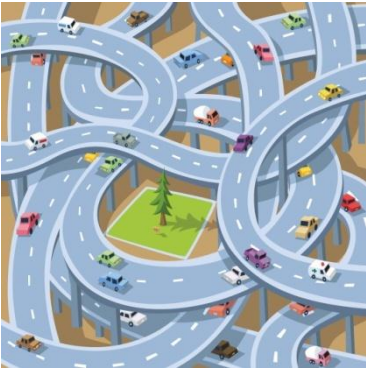


UNIX/Linux Design “Observations”

- Multi-tasking and multi-user capabilities
- Unlike Windows, the GUI does not run in the kernel (adds stability)
- Unlike Windows, multiple graphical desktops available
- Linux kernel is “monolithic”, not a “microkernel”
- Dynamic - can load and unload modules on the fly
- Programs restricted to the privileges of the user running them (more secure)
- Scalable - scales up to handle the largest enterprise and mission-critical applications
- Portable - runs on a variety of hardware platforms
- Reliable and robust
- Powerful, but NOT friendly !!

UNIX/Linux Market

Public Works Infrastructure



Roads



Water



Bridges



Airways



Power



Telecommunications

IT (Information Technology) Infrastructure



Network



Servers



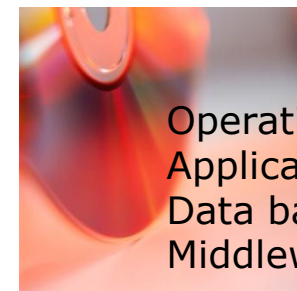
Storage



Desktops



Mobile



Operating Systems
Applications
Data bases
Middleware

Software

Computing Infrastructure Where UNIX/Linux is used

- Internet services - Web, DNS, DHCP, Net News, Mail, etc.
- Enterprise and mission critical applications - Large databases, Enterprise Resource Management (ERM), Customer Relationship Management (CRM), data warehouse, manufacturing, supply chain management, etc.
- Hollywood - feature animation, visual effects, rendering farms.
- Scientific applications and number-crunching
- Embedded in smartphones and other appliances

Operating Systems

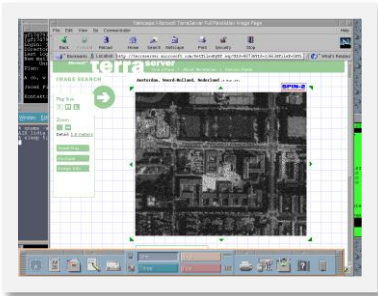
Various **UNIX** Based Products

SCO UNIX

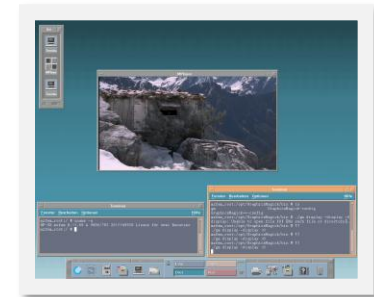


Berkeley
Software
Distribution

AIX



HP-UX



Solaris



Apple Mac OS X
and iOS



*The kernel is
UNIX based*

Operating Systems

Embedding **UNIX** in Products

Apple iOS



The Apple iOS, internally known as Darwin, like Mac OS X, runs on a UNIX like kernel (Mach kernel + BSD components)

Source: [http://en.wikipedia.org/wiki/Darwin_\(operating_system\)](http://en.wikipedia.org/wiki/Darwin_(operating_system))
[http://en.wikipedia.org/wiki/IOS_\(Apple\)](http://en.wikipedia.org/wiki/IOS_(Apple))

Operating Systems

Using a Terminal on an iPhone

Mobile Terminal

iPhone



```
ip4:- mobile$ uname -a
Darwin ip4 10.3.1 Darwin Kernel Version 10.3.1: Wed Aug  4 22:35:51 PDT 2010; r
oot:xnu-1504.55.33-10/RELEASE_ARM_S5L8930X iPhone3,1 arm N90AP Darwin
ip4:- mobile$
```

uname command

<http://code.google.com/p/mobileterminal/>

Operating Systems

Various **Linux** Distributions

OpenSUSE



Red Hat Enterprise Linux



Fedora



Debian



CentOS



Ubuntu



Mandriva




*Note: A distribution is built by a company or organization. They start with the **Linux kernel** then add a custom mix of open source components. They may then add some of their own unique software to differentiate their distribution.*



Tux, the penguin, is the Linux kernel mascot

iso.linuxquestions.org

15 Most Popular Downloads

15 Most Downloaded Distribution Versions (last 30 Days)	 15 Most Downloaded Distributions (Ever)
1. FreeBSD 8.3 (152941)	1. Fedora
2. Mandriva Linux 2011 (120840)	2. Mandriva
3. OS4 12.5 (68012)	3. Red Hat Enterprise Linux
4. CentOS 6.3 (46492)	4. SUSE
5. BackTrack 5 R3 (11165)	5. Ubuntu
6. Linux Mint 5 Elyssa (6043)	6. CentOS
7. Untangle Gateway 9.3 (3928)	7. Damn Small Linux
8. BackTrack 5 R2 (1807)	8. Linux XP
9. Ubuntu 12.04 (1480)	9. Knoppix
10. Fedora 17 (1200)	10. Debian
11. BackTrack 5 R1 (948)	11. Slackware
12. Damn Small Linux 4.4.10 (834)	12. MEPIS
13. Zorin OS 6 "Educational", "Gaming" (585)	13. PCLinuxOS
14. CentOS 5.5 (433)	14. Gentoo
15. Linux Mint 13 "KDE" (329)	15. Linspire

August 27, 2012

There are hundreds of Linux distributions. The one thing they have in common is they all use the Linux kernel.

Operating Systems

Embedding Linux in Products

Google Chrome OS
(coming soon)
for Netbooks and Tablets



Tivo



Buffalo
NAS storage



MikroTik Routers



Android



Operating Systems

Running a Terminal on a Droid smartphone

Android



Android Terminal Emulator

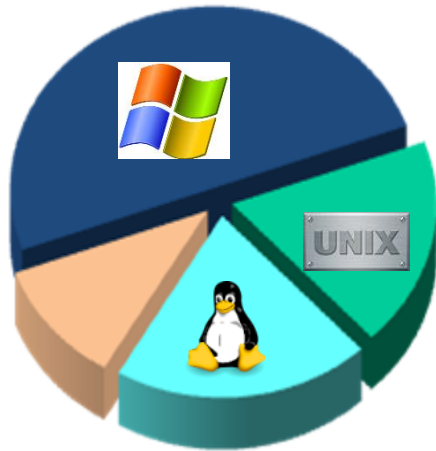
```
$ export PATH=/data/local/bin:$PATH
$ ls
sqlite_stmt_journals
cache
sdcard
etc
system
sys
sbin
proc
init.rc
init.goldfish.rc
init
default.prop
data
root
dev
$
```

export and ls commands

UNIX/Linux Overview

Server, PC, Smartphone markets

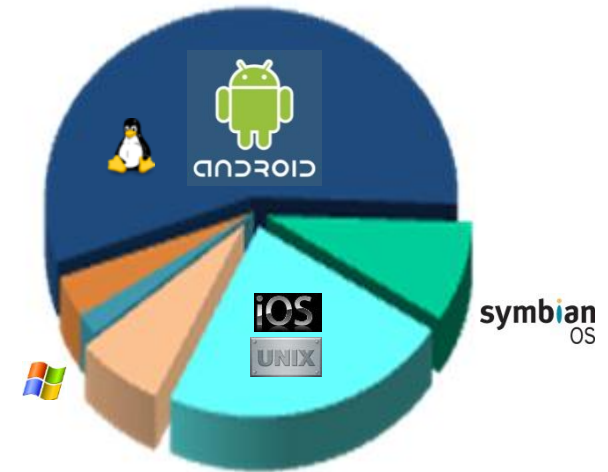
Servers



PC's



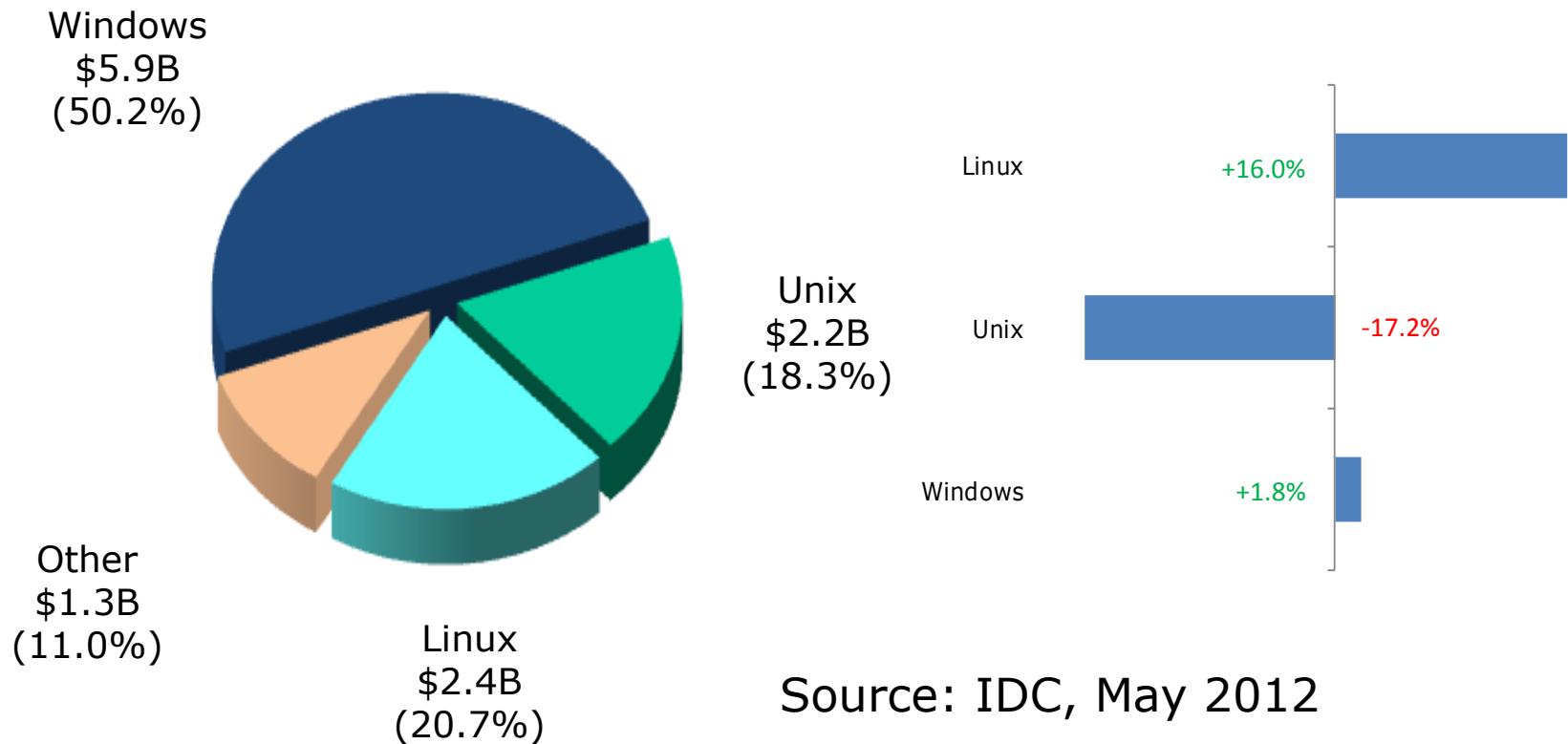
Smartphones



Worldwide Server Market

\$11.8 Billion Server Revenue 1Q 2012

Year over Year Change



Source: IDC, May 2012

Website hits by OS

Implies "ballpark market share" for PCs

Jul 2010¹

Operating Systems		
1	Windows XP	48.17%
2	Windows 7	17.02%
3	Windows Vista	16.60%
4	Mac OS X	4.84%
5	Linux	1.45%
6	Windows 2003	1.02%
7	iPhone OSX	0.56%
8	Windows 2000	0.31%
9	WAP	0.12%
10	Android	0.08%

Dec 2011²

Operating Systems		
1	Windows 7	37.60%
2	Windows XP	31.72%
3	Windows Vista	8.87%
4	Apple OS X	8.59%
5	Apple iOS	3.96%
6	Linux	1.64%
7	Android	1.64%
8	BlackBerry	0.68%
9	SymbianOS	0.23%
10	Windows 2000	0.09%

Jul 2012³

Operating Systems		
1	Windows 7	44.12%
2	Windows XP	27.06%
3	Apple OS X	8.66%
4	iOS	7.09%
5	Windows Vista	6.95%
6	Android	2.49%
7	Linux	1.75%
8	BlackBerry	0.64%
9	Windows 8	0.19%
10	SymbianOS	0.19%

1-This report was generated 07/31/2010 based on the last 15,000 page views to each website tracked by W3Counter. W3Counter's sample currently includes 38,996 websites. The browser market share graph includes data from all versions of the named browser families, not only the top 10 as listed below.

2-This report was generated 12/31/2011 based on the last 15,000 page views to each website tracked by W3Counter. W3Counter's sample currently includes 53,526 websites. The browser market share graph includes data from all versions of the named browser families, not only the top 10 as listed below.

3-This report was generated 07/31/2012 based on the last 15,000 page views to each website tracked by W3Counter. W3Counter's sample currently includes 59,310 websites. The browser market share graph includes data from all versions of the named browser families, not only the top 10 as listed below

Worldwide Smartphone Sales

**Worldwide Smartphone Sales to End Users by Operating System in 1Q12
(Thousands of Units)**

	Operating System	1Q12 Units	1Q12 Market Share (%)	1Q11 Units	1Q11 Market Share (%)
Google	Android ↑	81,067.4	56.1	36,350.1	36.4
Apple	iOS ↑	33,120.5	22.9	16,883.2	16.9
Nokia	Symbian ↓	12,466.9	8.6	27,598.5	27.7
Blackberry	Research In Motion ↓	9,939.3	6.9	13,004.0	13.0
	Bada	3,842.2	2.7	1,862.2	1.9
	Microsoft ↓	2,712.5	1.9	2,582.1	2.6
	Others	1,242.9	0.9	1,495.0	1.5
	Total	144,391.7	100.0	99,775.0	100.0

Source: Gartner (May 2012)

Additional information can be found in the Gartner report "Market Share: Mobile Devices, Worldwide, 1Q12." The report is available on Gartner's website at <http://www.gartner.com/resId=2015915>.

<http://www.gartner.com/it/page.jsp?id=2017015>

Assignment

<http://simms-teach.com/cis90calendar.php>

1	8/29	<ul style="list-style-type: none"> • Presentation slides (download) • Logins Sheet (download) • CIS VLab RDP file: (download) <p>Supplemental</p> <ul style="list-style-type: none"> • Howto #134: Accessing Opus (download) • Howto #305: Accessing VLab (download) <p>Assignment</p> <ul style="list-style-type: none"> • Student Survey • Lab 1 <p>CCC Confer</p> <ul style="list-style-type: none"> • Enter virtual classroom • Class archives 	2,4,5, p113-115, p164-172 (Hahn)	
2	9/5	<p>Quiz 1</p> <p>Commands</p> <ul style="list-style-type: none"> • Understand the UNIX login operation works • Meet John the Ripper and learn how vulnerable a poor password is • Understand basic command syntax and operation • Understand program files and what happens when they are run • Understand how the shell works and environment variables • Understand how to get documentation when online 	2.3-2.7 2.11 3.7-3.20 4.19-4.22 9.1-9.2	<p>Lab 1</p> <p>Student Survey</p>

Note: The first lab assignment and student survey is due by 11:59PM one week from today!

Student Survey

**Rich's Cabrillo College CIS Classes
CIS 90 Calendar**

Home Resources Forums CIS Lab CTC

CIS 90 (Fall 2010) Course Calendar
[Course Home](#) [Grades](#)
 (content subject to change)

Lesson	Date	Topics	Chapter	Due
1	9/1	<p>Class and Linux Overview</p> <ul style="list-style-type: none"> Understand how this course will work High-level overview of computers, operating systems and virtual machines Overview of UNIX/Linux market and architecture Learn first commands and how to navigate between terminals Use a remote Linux server Use Linux running on a local virtual machine <p>Materials</p> <ul style="list-style-type: none"> How this class works (download) Presentation slides (download) Logins Sheet (download) Howto #103: Installing PuTTY (download) Howto #301: Bringing the Eko VM home (download) <p>Assignment</p> <p>Student Survey</p> <p>CCC Confer</p> <ul style="list-style-type: none"> Enter virtual classroom Class archives 	1.1-1.15 (Gillay)	

Introduction to UNIX/Linux (CIS 90)
Student Survey

Student Information

- Preferred first name: _____ Last name: _____
- Date: _____ Email address: _____
- Web site, if any: _____
- Grading choice: pass/no-pass grade (choose one, you may change your mind later)

Computer Background

- Previous computer classes or training taken:

- Work or other experience using computers:

Home equipment

- Do you have a computer with at least 2 GB of RAM? yes no
- Operating system? Windows Mac Linux
- Internet connection? none dial-up ds/cable

Course Objectives

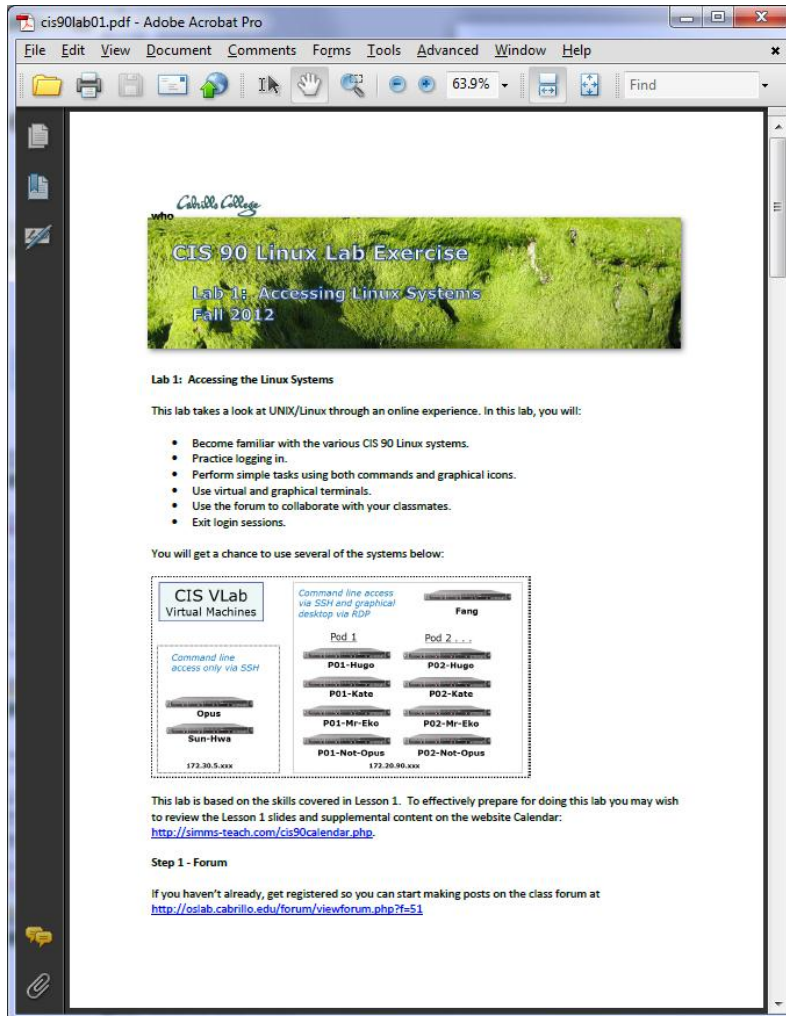
- What are you hoping to learn in this class?

- Other comments or special learning needs?

(Please save & email completed survey to risimms@cabrillo.edu)

Please **download** survey, fill it out, save it, and email to risimms@cabrillo.edu

Lab 1



Pearls of Wisdom:

- Don't wait till the last minute to start.
- The *slower* you go the *sooner* you will be finished.
- A few minutes reading the forum can save you hour(s).
- Line up materials, references, equipment and software ahead of time.
- Use Google when trouble-shooting
- **Late work is not accepted** so submit what you have for partial credit.

Wrap up

New shell commands:

cal	- show calendar
clear	- clear the terminal screen
date	- show current time and date
exit	- terminate your shell and log off
history	- show previous commands
hostname	- show the name of the computer being accessed
id	- show user and group id information
ps	- show processes (loaded programs) being run
ssh	- secure login to a remote system
uname	- show kernel name
tty	- show terminal device
who	- show everyone logged in
who am i	- identifies which login session you are using
Ctrl-Win-Alt-F1 to Ctrl-Win-Alt-F7	- change between terminals and X windows (graphics)

New Files and Directories:

VMware:

Ctrl-Alt	- to release mouse from VM
----------	----------------------------

Next Class

Assignment: Check the Calendar Page on the web site to see what is due next week.

**Lab 1
& Survey**

Quiz questions for next class:

- What part of UNIX/Linux is both a user interface and a programming language?
- What is the lowest level, inner-most component of a UNIX/Linux Operating System called?
- What command shows the other users logged in to the computer?

END

Backup

Excuse me,
but who am
I talking to?

What computer are we talking to?

Is it 8396-II (Windows), Opus (RHEL) or Frida (RH9)?

The screenshot shows a VMware Server Console window titled 'Local host - VMware Server Console'. Inside, there is a Windows desktop environment with a blue background. On the desktop, there are icons for 'My Documents', 'My Computer', 'Virtual Server Administr...', 'VMware Serv...', and 'VM Remote Control Client'. A green circle with the number '6' is overlaid on the desktop background. In the foreground, there are two terminal windows. The top one is a Windows Command Prompt window (1) showing the command 'hostname' and the output '8396-ii'. The bottom one is a Linux terminal window (2) showing the command 'hostname' and the output 'opus.cabrillo.edu'. To the right, there are two more Linux terminal windows. The top one (4) shows the command 'hostname' and the output 'frida.localdomain'. The bottom one (5) shows the command 'who' and the output listing users 'rsimms' and 'rsimms' with their login times and IP addresses. A green circle with the number '3' is overlaid on the Linux desktop background. The VMware Server Console window has a menu bar with 'File', 'Edit', 'View', 'Host', 'VM', 'Power', 'Snapshot', 'Windows', and 'Help'. The bottom status bar shows 'Thu Jul 03 3:35 PM' and 'VMware Server 1.0.5'.

1=??????
4=??????

2=??????
5=??????

3=??????
6=??????

What computer are we talking to? 8396-II (Windows), Opus (RHEL) or Frida (RH9)

1

```
C:\Documents and Settings\Administrator>hostname
8396-ii
C:\Documents and Settings\Administrator>
```

2

```
[rsimms@opus ~]$ hostname
opus.cabrillo.edu
[rsimms@opus ~]$
```

3

4

```
[rsimms@frida rsimms]$ hostname
frida.localdomain
[rsimms@frida rsimms]$
```

5

```
[rsimms@opus ~]$ who
rsimms pts/0    2008-07-03 10:52 (dsl-63-249-86-11.cruzio.c
rsimms pts/1    2008-07-03 15:56 (dsl-63-249-86-11.cruzio.c
[rsimms@opus ~]$ hostname
opus.cabrillo.edu
[rsimms@opus ~]$
```

6

Start Here
Trash

rsimms@frida:~
rsimms@opus:~

Thu Jul 03 3:35 PM

VMware Server 1.0.5

1=8396-ii
4=???????

2=???????
5=???????

3=???????
6=???????

What computer are we talking to? 8396-II (Windows), Opus (RHEL) or Frida (RH9)

1 = Windows Command Prompt output: `hostname` returns `8396-ii`

2 = Linux terminal (Opus) output: `hostname` returns `opus.cabrillo.edu`

3 = Linux desktop environment (Opus)

4 = Linux terminal (Frida) output: `hostname` returns `frida.localdomain`

5 = Linux terminal (Opus) output: `who` returns user info, `hostname` returns `opus.cabrillo.edu`

6 = Windows desktop environment (8396-II)

1=8396-ii
4=???????

2=Opus
5=???????

3=???????
6=???????

What computer are we talking to? 8396-II (Windows), Opus (RHEL) or Frida (RH9)

The screenshot shows a VMware Server Console window titled 'Local host - VMware Server Console'. Inside, there is a Windows desktop environment on the left and a Linux desktop environment on the right. The Windows desktop has a blue background with icons for 'My Documents', 'My Computer', 'Virtual Server Administr...', 'VMware Serv...', 'VM Remote Control Client', and 'VMware Serv...'. A 'Command Prompt' window (1) is open, showing the command 'hostname' and the output '8396-ii'. A terminal window (2) is also open, showing the command 'hostname' and the output 'opus.cabrillo.edu'. The Linux desktop has a blue background with icons for 'rsimms's Home', 'Start Here', and 'Trash'. A terminal window (3) is open, showing the command 'hostname' and the output 'opus.cabrillo.edu'. Another terminal window (4) is open, showing the command 'hostname' and the output 'frida.localdomain', and the command 'who' and the output of the 'who' command. A taskbar at the bottom shows the current active window (5) and a taskbar icon (6).

1=8396-ii
4=???????

2=Opus
5=???????

3=Frida
6=???????

What computer are we talking to? 8396-II (Windows), Opus (RHEL) or Frida (RH9)

The screenshot displays a VMware Server Console window titled "Local host - VMware Server Console". Inside, a Windows desktop environment is visible with several icons: "My Documents", "My Computer", "Virtual Server Administration", and "VMware Services". A "Command Prompt" window is open, showing the command `hostname` and the output `8396-ii`. Below the desktop, two Linux terminal windows are open. The first terminal, titled "rsimms@frida:~", shows the command `hostname` and the output `frida.localdomain`. The second terminal, titled "rsimms@opus:~", shows the command `who` and the output listing user information for "rsimms", followed by the command `hostname` and the output `opus.cabrillo.edu`. The VMware interface includes a menu bar (File, Edit, View, Host, VM, Power, Snapshot, Windows, Help), a toolbar with various icons, and a taskbar at the bottom with system tray icons and the date/time "Thu Jul 03 3:35 PM".

1=8396-ii
4=frida

2=Opus
5=???????

3=frida
6=???????

What computer are we talking to? 8396-II (Windows), Opus (RHEL) or Frida (RH9)

1 = Windows Command Prompt: `C:\Documents and Settings\Administrator>hostname`
`8396-ii`

2 = Linux Terminal (Opus): `[rsimms@opus ~]$ hostname`
`opus.cabrillo.edu`

3 = Linux Desktop (Frida)

4 = Linux Terminal (Frida): `[rsimms@frida rsimms]$ hostname`
`frida.localdomain`

5 = Linux Terminal (Opus): `[rsimms@opus ~]$ who`
`rsimms pts/0 2008-07-03 10:52 (dsl-63-249-86-11.cruzio.c`
`rsimms pts/1 2008-07-03 15:56 (dsl-63-249-86-11.cruzio.c`
`[rsimms@opus ~]$ hostname`
`opus.cabrillo.edu`

1=8396-ii
4=frida

2=Opus
5=Opus

3=Frida
6=??????

What computer are we talking to? 8396-II (Windows), Opus (RHEL) or Frida (RH9)

The screenshot displays a VMware Server Console window titled "Local host - VMware Server Console". Inside, there are three main components:

- Windows Desktop (8396-II):** A Windows XP-style desktop with a blue background. It features icons for "My Documents", "My Computer", "Virtual Server Administr...", "VMware Serv...", and "VM Remote Control Client". A "Command Prompt" window (1) is open, showing the command `hostname` and the output `8396-ii`. A "VMware Remote Control Client" window (6) is also visible.
- Linux Terminal (Opus):** A terminal window titled "rsimms@opus:~" showing the command `hostname` and the output `opus.cabrillo.edu` (2).
- Linux Terminal (Frida):** A terminal window titled "rsimms@frida:~" showing the command `hostname` and the output `frida.localdomain` (4). Below it, another terminal window titled "rsimms@opus:~" shows the command `who` and the output listing user sessions (3).

The VMware Server Console window has a taskbar at the bottom with icons for "rsimms@frida:~" and "rsimms@opus:~". The system tray shows the date and time: "Thu Jul 03 3:35 PM".

1=8396-ii
4=Frida

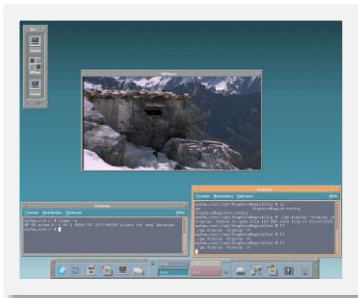
2=Opus
5=Opus

3=Frida
6=8396-ii

Operating Systems

Running a terminal on an HP-UX system

HP-UX



```
cupsim98.cup.hp.com - PuTTY
restrictions as set forth in sub-paragraph (c) (1) (ii) of the Rights in
Technical Data and Computer Software clause in DFARS 252.227-7013.

Hewlett-Packard Company
3000 Hanover Street
Palo Alto, CA 94304 U.S.A.

Rights for non-DOD U.S. Government Departments and Agencies are as set
forth in FAR 52.227-19(c) (1,2) .
You have mail.

Value of TERM has been set to "xterm".
WARNING: YOU ARE SUPERUSER !!

# ls /
.mozilla          .sw              home             sbin
.mozilla-license  bin              lib              stand
.profile          core             lost+found       tmp
.rnd              dev              net              usr
.ssh              etc              opt              var

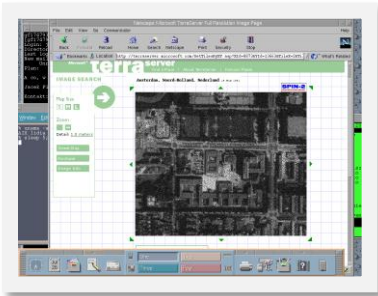
# uname -a
HP-UX cupsim98 B.11.23 U ia64 0564465391 unlimited-user license
#
```

ls and uname

Operating Systems

Running a terminal on an IBM AIX system

AIX



```
dtterm
Window Edit Options Help
$ uname -a
AIX aix 3 5 004518FC4C00
$ cat .screenrc
log off
hardstatus alwayslastline "%{-b ck} %?%-w%?%{+b}%n%f %t%{-b} %?%+w%? %= %l %
D %d/%m/%Y %0c "
hardstatus on
escape ^Tt
$
```

0 ksh 1 irssi 2 VMS ? ? Sat 15/03/2008 00:35

uname and cat commands

Operating Systems

Running a terminal on an Ubuntu system

Ubuntu



```
cis90@Mr-Eko-01: ~  
cis90@Mr-Eko-01:~$ ls  
Desktop    Downloads      Music    Public    Videos  
Documents  examples.desktop  Pictures  Templates  
cis90@Mr-Eko-01:~$ uname -a  
Linux Mr-Eko-01 3.0.0-14-generic #23-Ubuntu SMP Mon Nov 21 20:34:47 UTC 2011 i686  
i686 i386 GNU/Linux  
cis90@Mr-Eko-01:~$ █
```

ls and uname commands

Operating Systems

Embedding Linux in Products ... maybe?

vmware®

Is it based on Linux kernel or not?

Operating Systems

Maybe ... embedding Linux in Products?

Running terminal on VMware ESXi server



```

vmserver4.cislab.net - PuTTY
~ # ls /
altbootbank  lib          proc          tmp           vmupgrade
bin          lib64        productLocker usr
bootbank     local.tgz    skin          var
dev          locker       scratch       vmfs
etc          opt          store         vmimages

~ # cd vmfs/volumes/datastore2/cis90
/vmfs/volumes/4e09d8d2-b402bd78-bd1a-001321b5c0dd/cis90 # ls
Centos-5.4-master-clone1    Debian-06-00-03-master-clone6
Centos-5.4-master-clone2    Debian-06-00-03-master-clone7
Centos-5.4-master-clone3    Debian-06-00-03-master-clone8
Centos-5.4-master-clone4    Ubuntu-11.10-master-clone1
Centos-5.4-master-clone5    Ubuntu-11.10-master-clone2
Centos-5.4-master-clone6    Ubuntu-11.10-master-clone3
Centos-5.4-master-clone7    Ubuntu-11.10-master-clone4
Centos-5.4-master-clone8    Ubuntu-11.10-master-clone5
Debian-06-00-03-master-clone1  Ubuntu-11.10-master-clone6
Debian-06-00-03-master-clone2  Ubuntu-11.10-master-clone7
Debian-06-00-03-master-clone3  Ubuntu-11.10-master-clone8
Debian-06-00-03-master-clone4  copy-masters
Debian-06-00-03-master-clone5

/vmfs/volumes/4e09d8d2-b402bd78-bd1a-001321b5c0dd/cis90 # uname -a
VMkernel vmserver4.cislab.net 4.1.0 #1 SMP Release build-260247 May 18 2010 16:4
1:04 x86_64 unknown
/vmfs/volumes/4e09d8d2-b402bd78-bd1a-001321b5c0dd/cis90 #

```

ls, cd and uname commands

Linux distros mentioned by top server vendors

Server market share source: IDC 3Q11 report

Vendor	HP (29.8%)	IBM (29.8%)	Dell (15.1%)	Oracle/Sun (6.0%)
Red Hat Enterprise	✓	✓	✓	✓
Novell SUSE	✓	✓	✓	✓
Debian/GNU Linux	✓	✓		
Oracle EL	✓	✓		✓
Asianux	✓	✓		
Ubuntu	✓	✓		
CentOs	✓	✓		
Fedora	✓	✓		
OpenSUSE	✓	✓		

For CIS 90 we will be primarily using Red Hat Enterprise Linux

Multuser Multitasking OS

Multuser/Multitasking Operating System

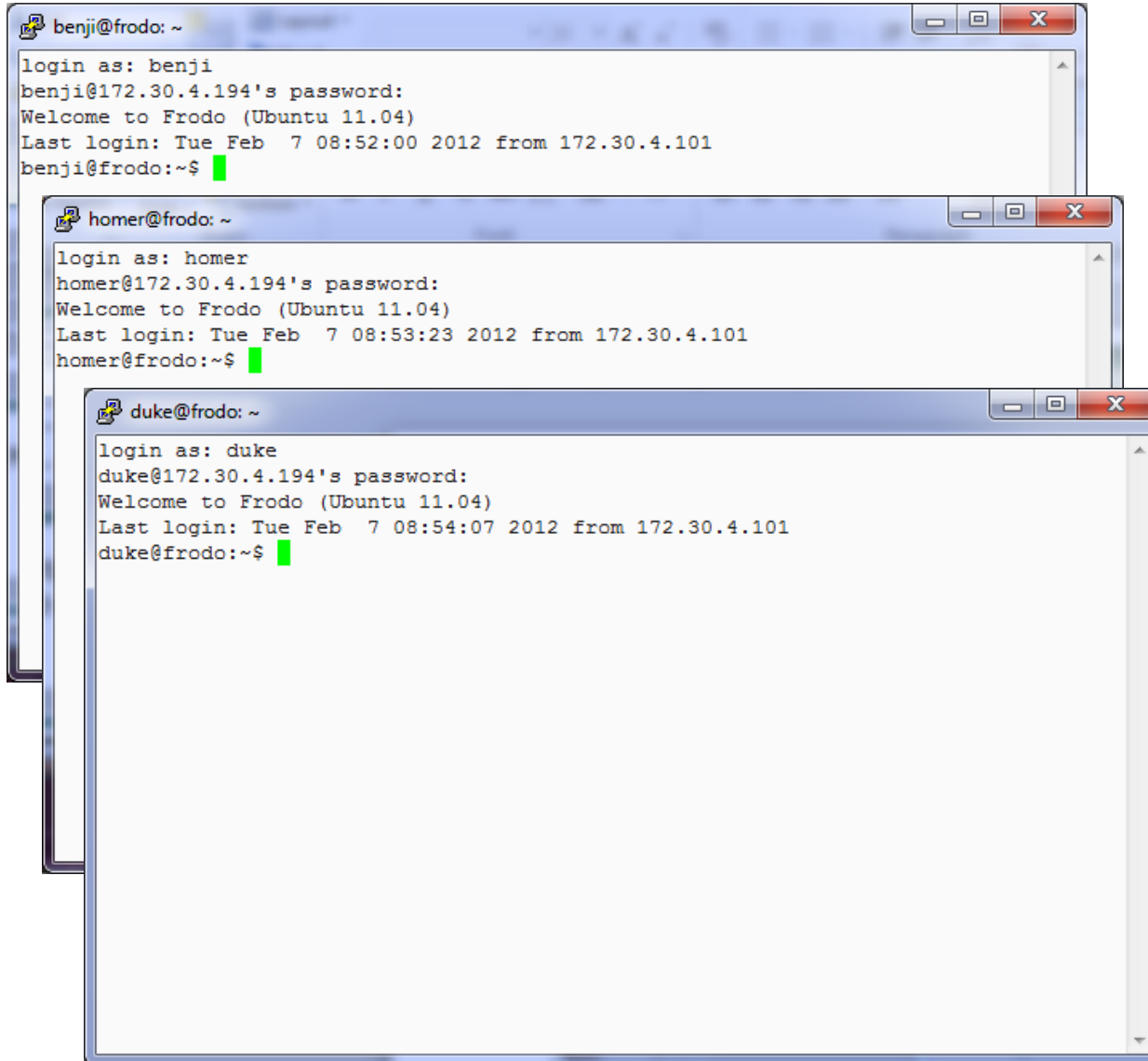
```

root@frodo: ~
File Edit View Search Terminal Help
root@frodo:~# useradd -m benji
root@frodo:~# useradd -m homer
root@frodo:~# useradd -m duke
root@frodo:~# passwd benji
Enter new UNIX password:
Retype new UNIX password:
passwd: password updated successfully
root@frodo:~# passwd homer
Enter new UNIX password:
Retype new UNIX password:
passwd: password updated successfully
root@frodo:~# passwd duke
Enter new UNIX password:
Retype new UNIX password:
passwd: password updated successfully
root@frodo:~# ifconfig eth0 | grep inet
inet addr:172.30.4.194 Bcast:172.30.4.255 Mask:255.255.255.0
inet6 addr: fe80::20c:29ff:fe77:9eaf/64 Scope:Link
root@frodo:~#
  
```

Let's add some more users to this Ubuntu server named Frodo

Note: You will learn system administration skills like this in CIS 191AB

Multuser/Multitasking Operating System



```
benji@frodo: ~  
login as: benji  
benji@172.30.4.194's password:  
Welcome to Frodo (Ubuntu 11.04)  
Last login: Tue Feb 7 08:52:00 2012 from 172.30.4.101  
benji@frodo:~$  
  
homer@frodo: ~  
login as: homer  
homer@172.30.4.194's password:  
Welcome to Frodo (Ubuntu 11.04)  
Last login: Tue Feb 7 08:53:23 2012 from 172.30.4.101  
homer@frodo:~$  
  
duke@frodo: ~  
login as: duke  
duke@172.30.4.194's password:  
Welcome to Frodo (Ubuntu 11.04)  
Last login: Tue Feb 7 08:54:07 2012 from 172.30.4.101  
duke@frodo:~$
```

Next let's log into Frodo from another computer using each of the new usernames

Multuser/Multitasking Operating System

The screenshot shows a terminal window titled 'root@frodo: ~' with a menu bar containing 'File', 'Edit', 'View', 'Search', 'Terminal', and 'Help'. The terminal output is as follows:

```

root@frodo:~# who
cis192  tty7      2011-12-03 12:56 (:0)
cis192  pts/0     2012-02-07 07:17 (:0.0)
homer   pts/2     2012-02-07 08:53 (172.30.4.101)
duke    pts/3     2012-02-07 08:55 (172.30.4.101)
benji   pts/1     2012-02-07 08:52 (172.30.4.101)
root@frodo:~#

```

Back on Frodo, use the **who** command to show all the users currently logged in

This shows the **multi-user** capability of the OS

Multuser/Multitasking Operating System

```
benji@frodo: ~
benji@frodo:~$ while true; do clear; banner "Hi $LOGNAME"; sleep 3; clear; sleep 1; done

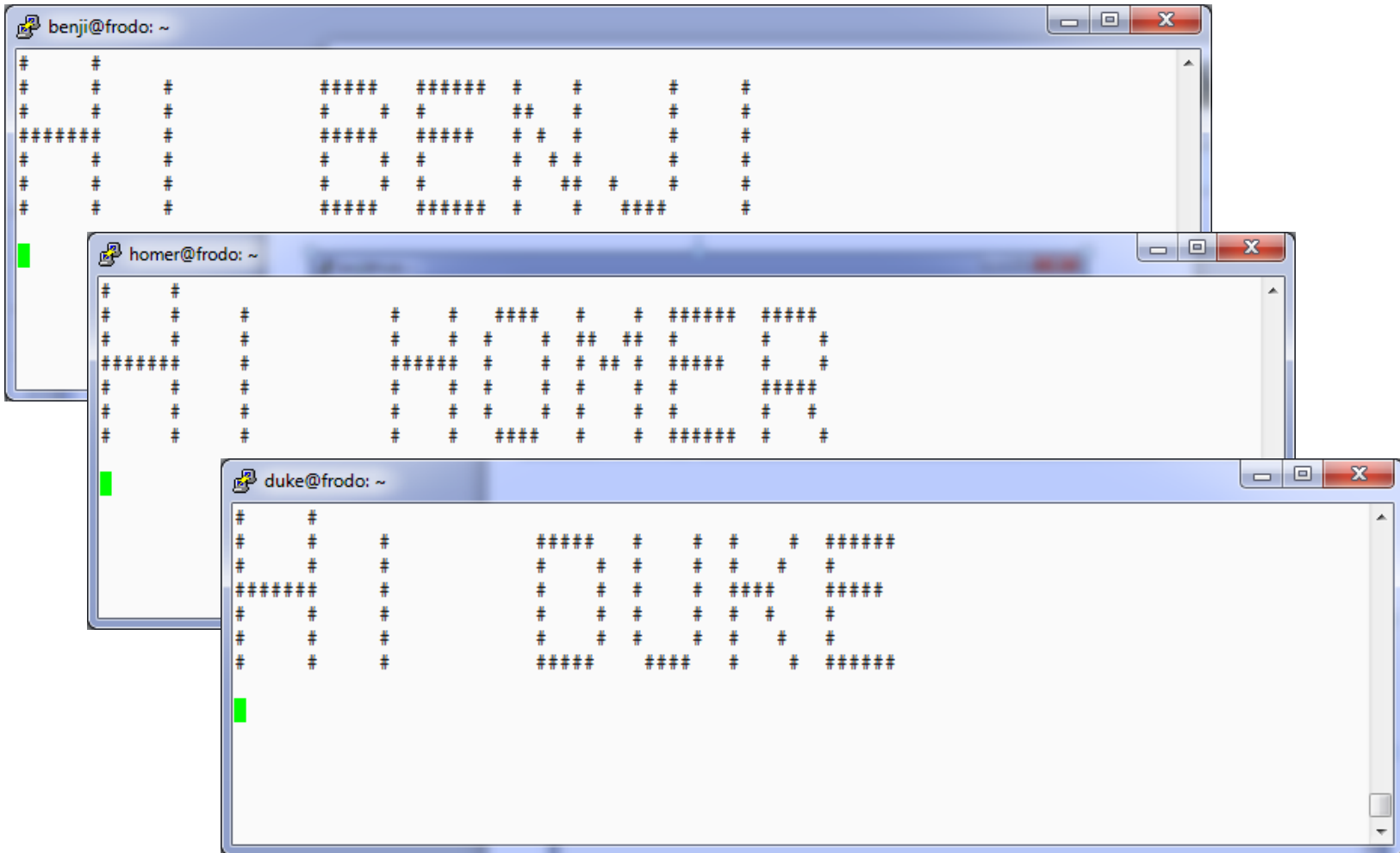
homer@frodo: ~
homer@frodo:~$ while true; do clear; banner "Hi $LOGNAME"; sleep 3; clear; sleep 1; done

duke@frodo: ~
duke@frodo:~$ while true; do clear; banner "Hi $LOGNAME"; sleep 3; clear; sleep 1; done
```

Next have each user run a simple script that flashes a banner of their name on screen repeatedly.

Note: You will learn UNIX scripting skills like this in CIS 130

Multuser/Multitasking Operating System



These simple scripts loop forever

Multuser/Multitasking Operating System

```

root@frodo: ~
File Edit View Search Terminal Help
top - 09:20:59 up 4:50, 5 users, load average: 0.03, 0.04, 0.05
Tasks: 149 total, 1 running, 147 sleeping, 0 stopped, 1 zombie
Cpu(s): 0.7%us, 4.3%sy, 0.0%ni, 95.0%id, 0.0%wa, 0.0%hi, 0.0%si, 0.0%st
Mem: 508000k total, 471088k used, 36912k free, 55148k buffers
Swap: 522236k total, 984k used, 521252k free, 210184k cached

  PID USER      PR  NI  VIRT  RES  SHR  S  %CPU  %MEM    TIME+  COMMAND
 1050 root        20   0 53396 24m 6864 S   1.0   4.9   1:43.84 Xorg
 8445 root        20   0 2632 1144  860 R   1.0   0.2    0:01.31 top
 1242 root        20   0 6128 2956 2308 S   0.7   0.6    0:36.41 vmtoolsd
 6948 homer       20   0 9588 6284 1544 S   0.7   1.2    0:01.61 bash
 2550 cis192     20   0 81104 24m 15m  S   0.3   5.0   0:46.74 vmware-user-loa
 3544 cis192     20   0 92140 14m 10m  S   0.3   3.0   0:24.06 gnome-terminal
 6705 benji      20   0 9588 6280 1548 S   0.3   1.2    0:02.31 bash
 7196 duke       20   0 9588 6276 1540 S   0.3   1.2    0:01.59 bash
    1 root        20   0 2920 1704 1232 S   0.0   0.3    0:02.22 init
    2 root        20   0     0     0     0 S   0.0   0.0    0:00.00 kthreadd
    3 root        20   0     0     0     0 S   0.0   0.0    0:00.72 ksoftirqd/0
    5 root        20   0     0     0     0 S   0.0   0.0    0:00.88 kworker/u:0
    6 root        RT   0     0     0     0 S   0.0   0.0    0:00.00 migration/0
    7 root         0 -20     0     0     0 S   0.0   0.0    0:00.00 cpuset
    8 root         0 -20     0     0     0 S   0.0   0.0    0:00.00 khelper
    9 root         0 -20     0     0     0 S   0.0   0.0    0:00.00 netns
   10 root        20   0     0     0     0 S   0.0   0.0    0:00.11 sync_supers
   11 root        20   0     0     0     0 S   0.0   0.0    0:00.00 bdi-default
  
```

Each PID represents a process being run by the operating system. This includes the scripts being run by the three new users.

They are all being run at the same time.

This illustrates **Multitasking**

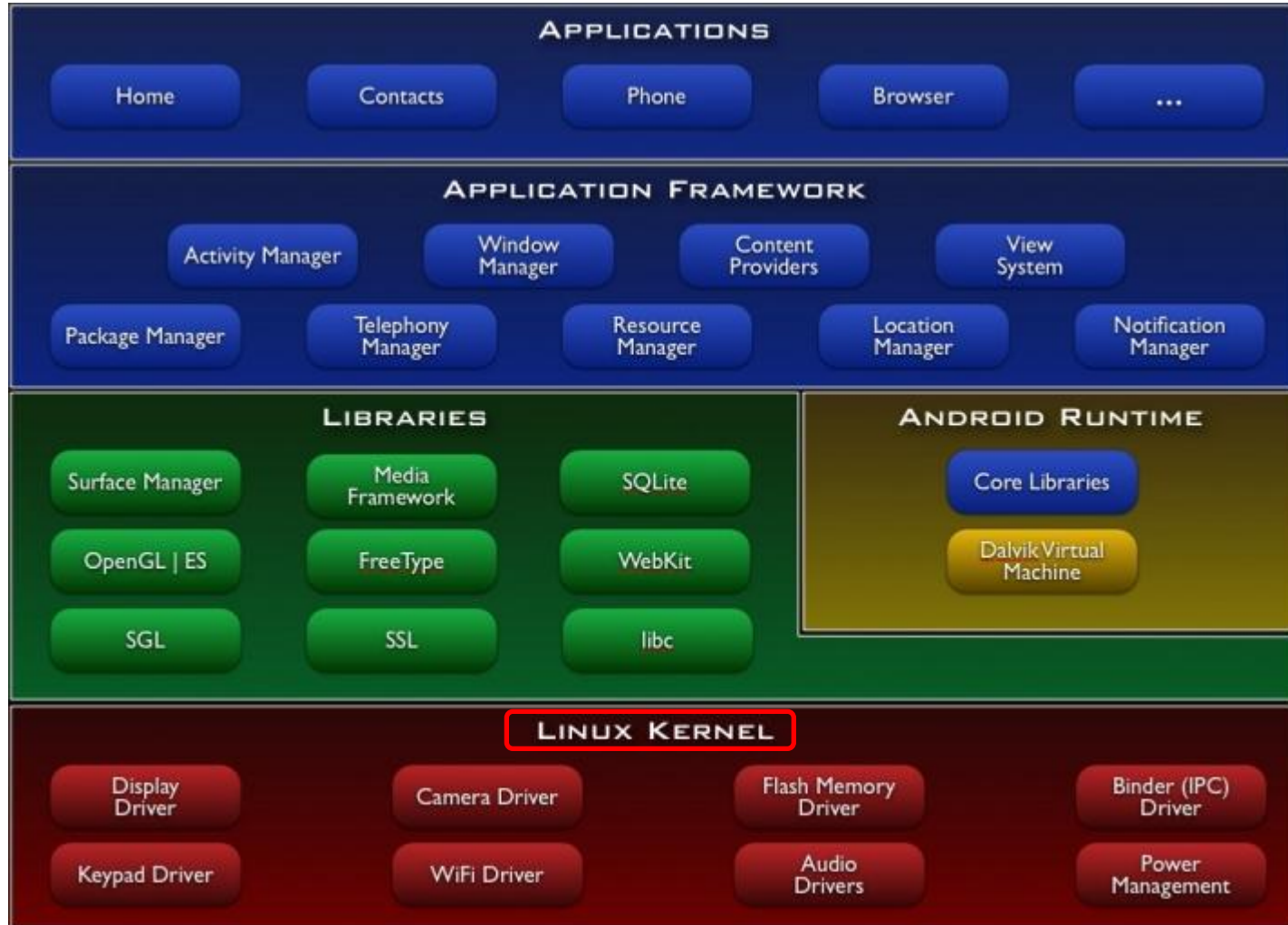
The Android software stack uses the Linux 2.6 kernel 

Android



Lets peel off the covers and look inside

The Android software stack uses the Linux 2.6 kernel 





UNIX/Linux Architectures

How is UNIX/Linux put together?

What are the fundamental components?

GNU/Linux Distributions

OpenSUSE



RedHat Enterprise Linux



Fedora



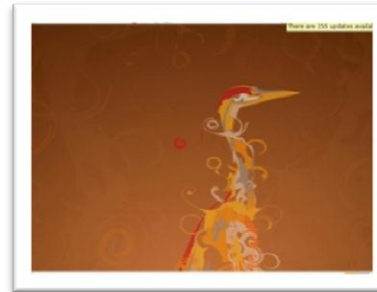
Debian



CentOS



Ubuntu



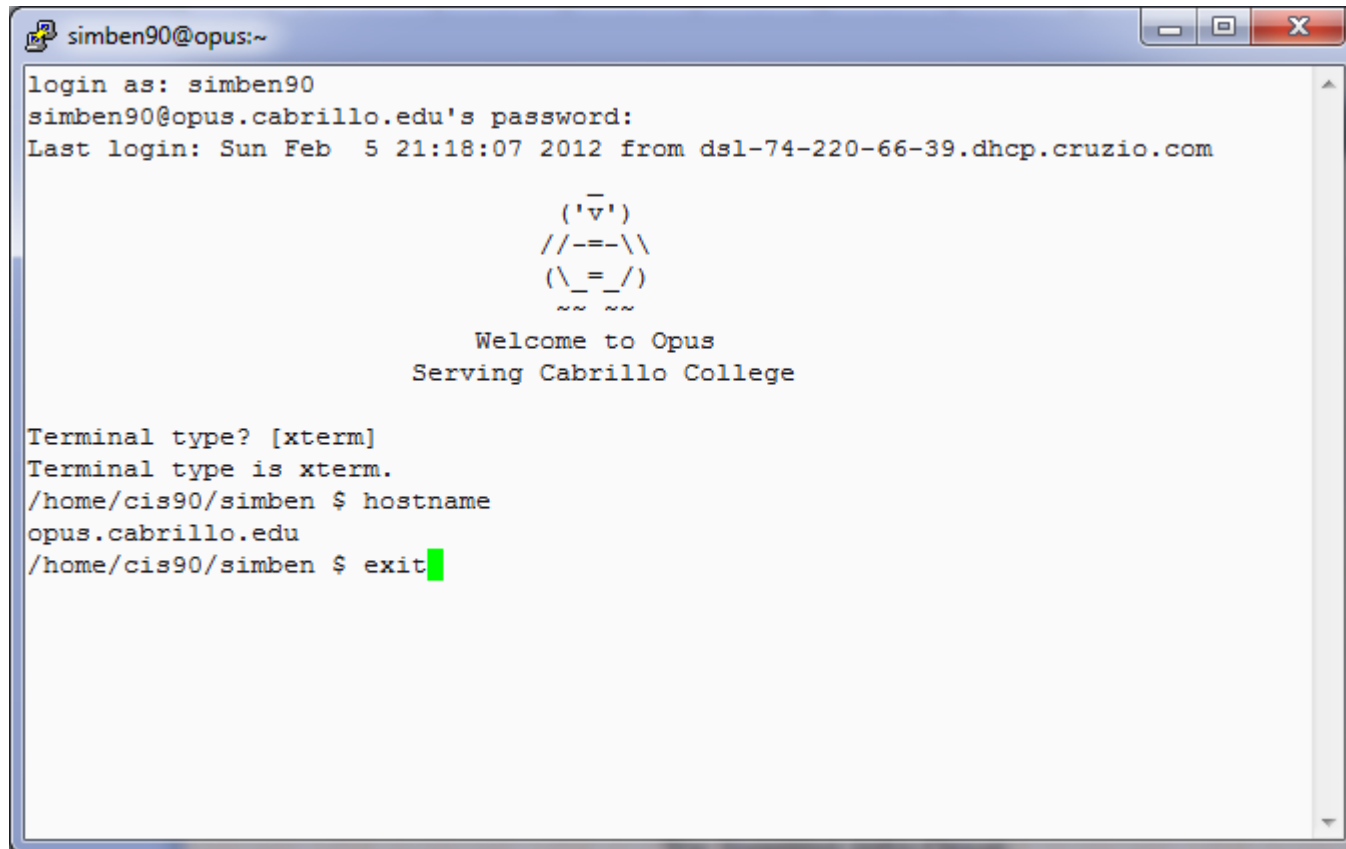
Mandriva



Lets peel off the covers and look inside

More on Lesson 1 Commmands

Class Activity

A terminal window titled 'simben90@opus:~' showing a successful login. The user 'simben90' logs in from 'dsl-74-220-66-39.dhcp.cruzio.com'. The system displays a welcome message: 'Welcome to Opus' and 'Serving Cabrillo College'. The user then runs 'hostname', which returns 'opus.cabrillo.edu', and finally 'exit' to close the session.

```
simben90@opus:~  
login as: simben90  
simben90@opus.cabrillo.edu's password:  
Last login: Sun Feb  5 21:18:07 2012 from dsl-74-220-66-39.dhcp.cruzio.com  
  
      (̄v̄)  
    //---\ \  
   (\_=_/)  
    ~ ~ ~  
  
    Welcome to Opus  
    Serving Cabrillo College  
  
Terminal type? [xterm]  
Terminal type is xterm.  
/home/cis90/simben $ hostname  
opus.cabrillo.edu  
/home/cis90/simben $ exit
```

Log into your account on Opus and as we learn the new commands in the upcoming section, try them out on Opus

who

shows who is logged in and which terminals they are using

```
[rsimms@frida rsimms]$ who
root      tty1      Jul  3 13:54
root      tty2      Jul  3 13:55
rsimms    tty3      Jul  3 13:55
cisco     :0        Jul  3 13:48
cisco     pts/0     Jul  3 13:49 (:0.0)
cisco     pts/1     Jul  3 13:49 (:0.0)
bsimms    pts/2     Jul  3 13:53 (192.168.0.26)
hmiller   pts/3     Jul  3 13:55 (192.168.0.26)
droddy    pts/4     Jul  3 13:57 (192.168.0.25)
```

Username

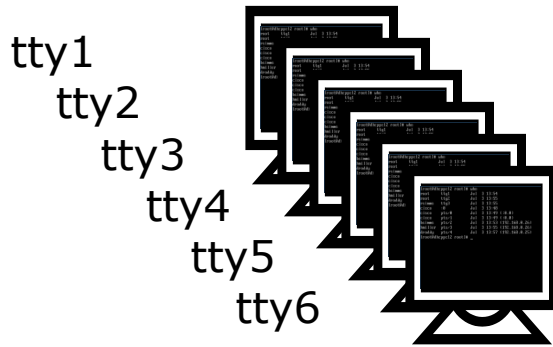
Terminal devices

Date and time of login

Where logged in from (blank or :0.0) if local, hostname or IP if remote

Note the same user can login more than once using different terminals

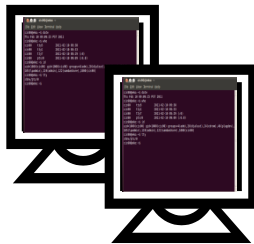
tty's (virtual terminals)



More pts's (SSH logins)

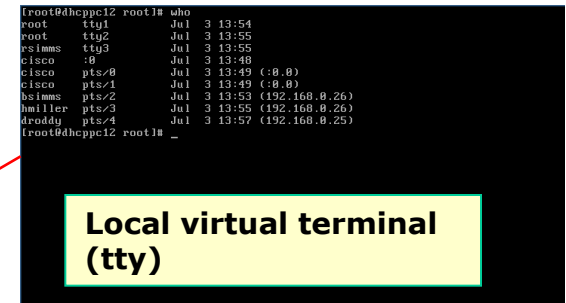
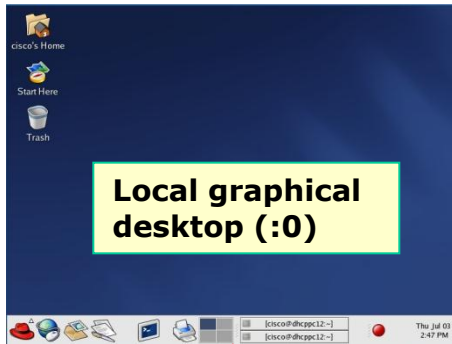


pts's
(graphical terminal windows)

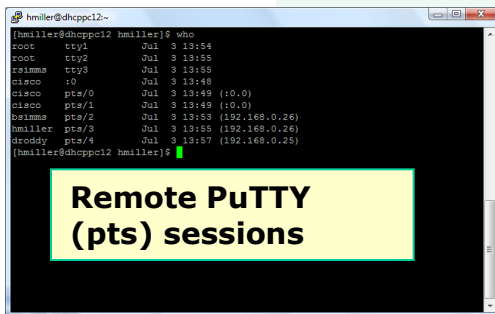
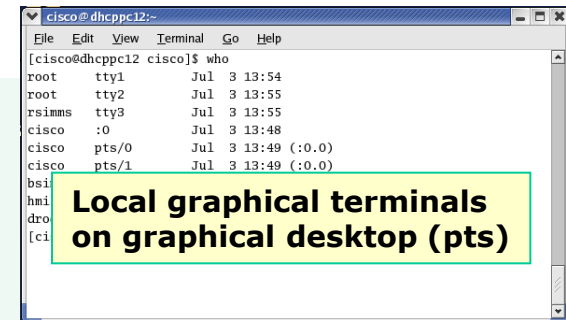


Always keep this mental model in mind that every UNIX/Linux computer has lots of terminals attached

who show who is logged on



```
[rsimms@frida rsimms]$ who
root    tty1    Jul  3 13:54
root    tty2    Jul  3 13:55
rsimms  tty3    Jul  3 13:55
cisco   :0      Jul  3 13:48
cisco   pts/0   Jul  3 13:49 (:0.0)
cisco   pts/1   Jul  3 13:49 (:0.0)
bsimms  pts/2   Jul  3 13:53 (192.168.0.26)
hmllder pts/3   Jul  3 13:55 (192.168.0.26)
droddy  pts/4   Jul  3 13:57 (192.168.0.25)
```



We can tell from this who output that root and rsimms are logged in on virtual terminals (tty1, tty2, and tty3). cisco has logged into the graphical desktop (:0) and opened two terminals there (:0.0). bsimms, hmllder and droddy are remotely logged in using PuTTY (pts/2, pts/3 and pts/4)

who (continued)

various who command options

```
[rsimms@frida rsimms]$ who am i
rsimms  tty3          Jul  3 13:55
```

Idle time

Process ID

```
[rsimms@frida rsimms]$ who -Hu
```

NAME	LINE	TIME	IDLE	PID	COMMENT
root	tty1	Jul 3 13:54	00:07	1390	
root	tty2	Jul 3 13:55	00:07	1391	
rsimms	tty3	Jul 3 13:55	00:07	1392	
cisco	:0	Jul 3 13:48	?	1451	
cisco	pts/0	Jul 3 13:49	00:03	1581	(:0.0)
cisco	pts/1	Jul 3 13:49	00:08	1581	(:0.0)
bsimms	pts/2	Jul 3 13:53	00:08	1753	(192.168.0.26)
hmiller	pts/3	Jul 3 13:55	.	1924	(192.168.0.26)
droddy	pts/4	Jul 3 13:57	00:04	1962	(192.168.0.25)

```
[rsimms@frida rsimms]$ who -q
```

```
root root rsimms cisco cisco cisco bsimms hmiller droddy
# users=9
```

H=add heading, u=show idle time, q=login names and count

id

Show user's UID, group membership and other info

UID (User ID)

Primary group

All groups a member of

```
[simmsben@opus ~]$ id
uid=1160(simmsben) gid=103(cis90) groups=100(users),103(cis90)
context=user_u:system_r:unconfined_t
```

```
[simmsben@opus ~]$ id root
uid=0(root) gid=0(root)
groups=0(root),1(bin),2(daemon),3(sys),4(adm),6(disk),10(wheel)
context=user_u:system_r:unconfined_t
```

May specify another user

UID (User ID)

SELinux identity, role and type

The **uid** (user ID number) of the *simmsben* user is 1160, the **uid** of *root* is 0. *root* is the "superuser" account.

clear

clear the terminal display

```
rsimms@opus:~$
0
pts/35 2010-05-19 15:34 14954 id=s/35 term=0 exit=
0
pts/36 2010-05-19 15:47 9037 id=s/36 term=0 exit=
0
[rsimms@opus ~]$
[rsimms@opus ~]$
[rsimms@opus ~]$
[rsimms@opus ~]$
[rsimms@opus ~]$ who -Hu
NAME LINE TIME IDLE PID COMMENT
rsimms pts/1 2010-08-24 11:12
root :0 2009-12-18 17:30
[rsimms@opus ~]$ who -Hi
who: Warning: -i will be removed in a future release
NAME LINE TIME
rsimms pts/1 2010-08-24 11:12
root :0 2009-12-18 17:30
[rsimms@opus ~]$ who -H
NAME LINE TIME
rsimms pts/1 2010-08-24 11:12
root :0 2009-12-18 17:30
[rsimms@opus ~]$ clear
```

```
rsimms@opus:~$
```

*This is what happens right after typing the **clear** command*

hostname

show the name of the current computer



```
/home/cis90/guest $ hostname  
opus.cabrillo.edu
```

*Connected to Opus
using PuTTY*



```
cis90@eko:~$ hostname  
eko
```

*Connected to Eko using
PuTTY*



```
C:\Users\Administrator> hostname  
dv2000
```

*In the DOS command
prompt on Windows*

Hostname will always tell you the name of the computer you are talking to. It even works in Windows!

cal

show calendar

```
[simmsben@opus ~]$ cal
      June 2008
Su Mo Tu We Th Fr Sa
  1  2  3  4  5  6  7
  8  9 10 11 12 13 14
15 16 17 18 19 20 21
22 23 24 25 26 27 28
29 30
```

If month and year not specified then current month is shown

```
[simmsben@opus ~]$ cal 9 2001
      September 2001
Su Mo Tu We Th Fr Sa
                1
  2  3  4  5  6  7  8
  9 10 11 12 13 14 15
16 17 18 19 20 21 22
23 24 25 26 27 28 29
30
```

*What day of the week were you born on? Specify your birth month and year as arguments to the **cal** command*

cal

show calendar

```
/home/cis90/guest $ cal 2010
```

```
2010
```

```

      January                February                March
Su Mo Tu We Th Fr Sa    Su Mo Tu We Th Fr Sa    Su Mo Tu We Th Fr Sa
                1 2          1 2 3 4 5 6          1 2 3 4 5 6
  3 4 5 6 7 8 9          7 8 9 10 11 12 13       7 8 9 10 11 12 13
 10 11 12 13 14 15 16    14 15 16 17 18 19 20       14 15 16 17 18 19 20
 17 18 19 20 21 22 23    21 22 23 24 25 26 27       21 22 23 24 25 26 27
 24 25 26 27 28 29 30    28                                28 29 30 31
 31

      April                  May                  June
Su Mo Tu We Th Fr Sa    Su Mo Tu We Th Fr Sa    Su Mo Tu We Th Fr Sa
                1 2 3          1                                1 2 3 4 5
  4 5 6 7 8 9 10        2 3 4 5 6 7 8          6 7 8 9 10 11 12
 11 12 13 14 15 16 17    9 10 11 12 13 14 15       13 14 15 16 17 18 19
 18 19 20 21 22 23 24    16 17 18 19 20 21 22       20 21 22 23 24 25 26
 25 26 27 28 29 30      23 24 25 26 27 28 29       27 28 29 30
 30 31

      July                   August                September
Su Mo Tu We Th Fr Sa    Su Mo Tu We Th Fr Sa    Su Mo Tu We Th Fr Sa
                1 2 3          1 2 3 4 5 6 7          1 2 3 4
  4 5 6 7 8 9 10        8 9 10 11 12 13 14       5 6 7 8 9 10 11
 11 12 13 14 15 16 17    15 16 17 18 19 20 21       12 13 14 15 16 17 18
 18 19 20 21 22 23 24    22 23 24 25 26 27 28       19 20 21 22 23 24 25
 25 26 27 28 29 30 31    29 30 31                   26 27 28 29 30

      October                November                December
Su Mo Tu We Th Fr Sa    Su Mo Tu We Th Fr Sa    Su Mo Tu We Th Fr Sa
                1 2          1 2 3 4 5 6          1 2 3 4
  3 4 5 6 7 8 9          7 8 9 10 11 12 13       5 6 7 8 9 10 11
 10 11 12 13 14 15 16    14 15 16 17 18 19 20       12 13 14 15 16 17 18
 17 18 19 20 21 22 23    21 22 23 24 25 26 27       19 20 21 22 23 24 25
 24 25 26 27 28 29 30    28 29 30                   26 27 28 29 30 31
 31

```

*Specify just the
year to see all 12
months*

ps

show active processes

When a program is loaded into memory and being executed (run) by the kernel it is called a process

```
[simmsben@opus ~]$ ps
  PID TTY          TIME CMD
 9444 pts/1        00:00:00 bash
10276 pts/1        00:00:00 ps
```

bash is the name of the shell you are using

Process ID

Name of the command being run

Controlling terminal devices being used to run process

Cumulative CPU time used

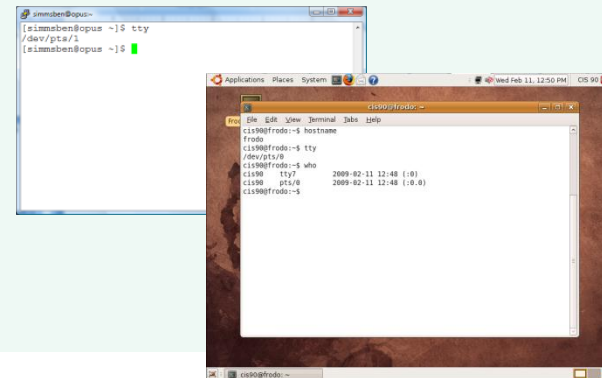
TIP: For Lab 1 this is how you answer the question on which shell you are using!

tty

show which terminal is being used for session

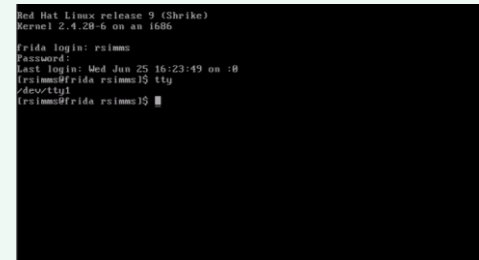
```
[simmsben@opus ~]$ tty  
/dev/pts/1
```

pts's are pseudo terminal devices. You will see these used for remote PuTTY sessions and for terminals you open on the graphical desktop.



```
[rsimms@frida rsimms]$ tty  
/dev/tty1
```

tty's are virtual teletype terminal devices tty1 through tty6. They are available locally by pressing Ctrl-Alt-F1 though Ctrl-Alt-F6



uname

show name of the operating system kernel

```
[simmsben@opus ~]$ uname  
Linux
```

uname shows the name of the operating system kernel

history

show command history

```
/home/cis90/guest $ history  
 1  date  
 2  cal  
 3  who  
 4  who am i  
 5  hostname  
 6  id  
 7  clear  
 8  ps  
 9  tty  
10  uname  
11  exit  
12  history
```

Separate histories are maintained for the same user while using different terminals.

Histories are merged when user has logged off them.

/sbin/ifconfig

show network interface status

```
cis192@frodo:~$ /sbin/ifconfig
eth0      Link encap:Ethernet  HWaddr 00:0c:29:6f:53:d9
          inet addr:192.168.0.24  Bcast:192.168.0.255  Mask:255.255.255.0
          inet6 addr: fe80::20c:29ff:fe6f:53d9/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:113172 errors:0 dropped:0 overruns:0 frame:0
          TX packets:728 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:15963968 (15.9 MB)  TX bytes:84589 (84.5 KB)
          Interrupt:18 Base address:0x1400

<snipped>
```

*The **inet addr** is the IP address for your system. Use this with Putty or SSH command for remote logins.*

Learn more on Linux Network Administration
by taking CIS 192AB

ssh

login to a remote system

Syntax: **ssh** *user@hostname*

Where

- *user* = the user login name
- *hostname* = the name or IP address of the remote computer

Examples:

```
ssh simben90@opus.cabrillo.edu
```

```
ssh cis90@172.30.4.198
```

```
ssh root@frida
```

ssh

login to a remote system

Example: ssh simben90@opus.cabrillo.edu

*user is **simben90***

*host is **opus.cabrillo.edu***

```
Terminal File Edit View Search Terminal Help 5:12 PM CIS 90 Student
simben90@opus:~
cis90@Mr-Eko-02:~$ ssh simben90@opus.cabrillo.edu
The authenticity of host 'opus.cabrillo.edu (207.62.186.9)' can't be established.
RSA key fingerprint is 81:dd:f1:62:52:93:61:6f:95:f4:3f:eb:42:3d:5a:43.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added 'opus.cabrillo.edu,207.62.186.9' (RSA) to the list of
known hosts.
simben90@opus.cabrillo.edu's password:
Last login: Mon Feb  6 19:05:39 2012 from 50-0-68-80.dsl.dynamic.fusionbroadband
.com

      ( ̄v' )
     //--\ \
    (\_=_/ )
     ~~~~

  Welcome to Opus
  Serving Cabrillo College

Terminal type? [xterm]
Terminal type is xterm.
/home/cis90/simben $
```

*The first time you login to a remote computer you will get this message, type **yes** to continue*

ssh

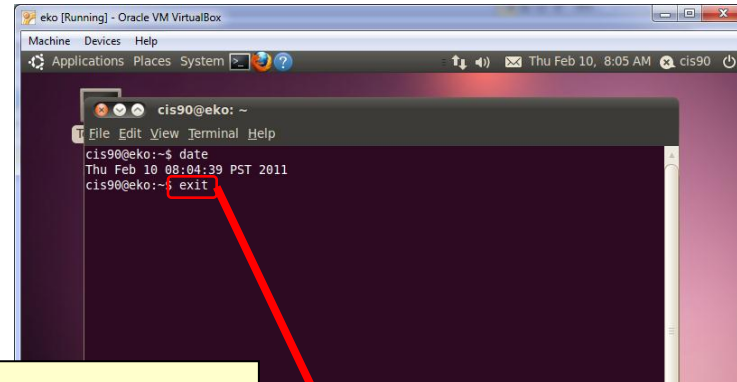
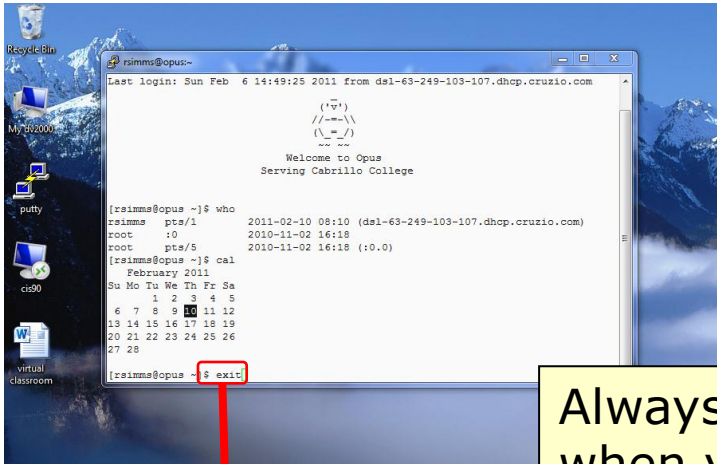
"ssh hopping"



We will start on my Windows notebook computer dv2000. From dv2000 Putty into Eko. From Eko, ssh into Opus. From Opus ssh into simms-teach.com

exit

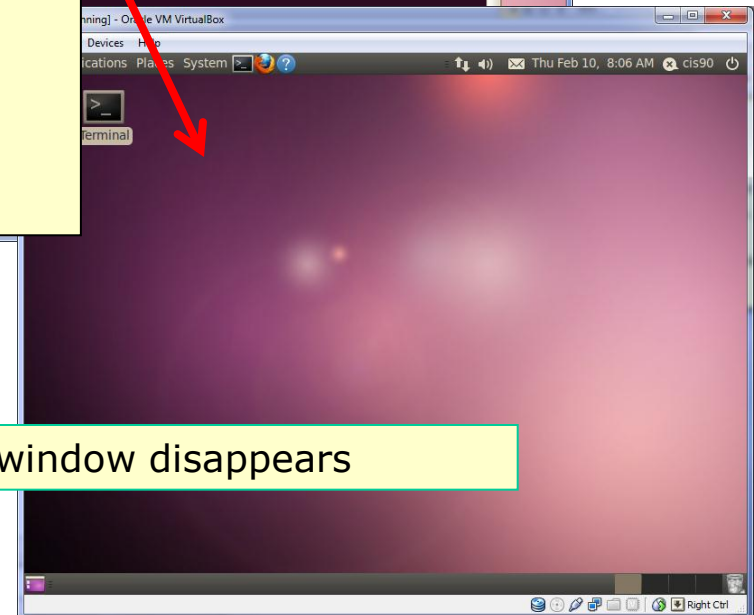
terminate shell and log off



Always log off
when you leave
your computer
unattended.



The shell is closed and your terminal window disappears



Course Lingo

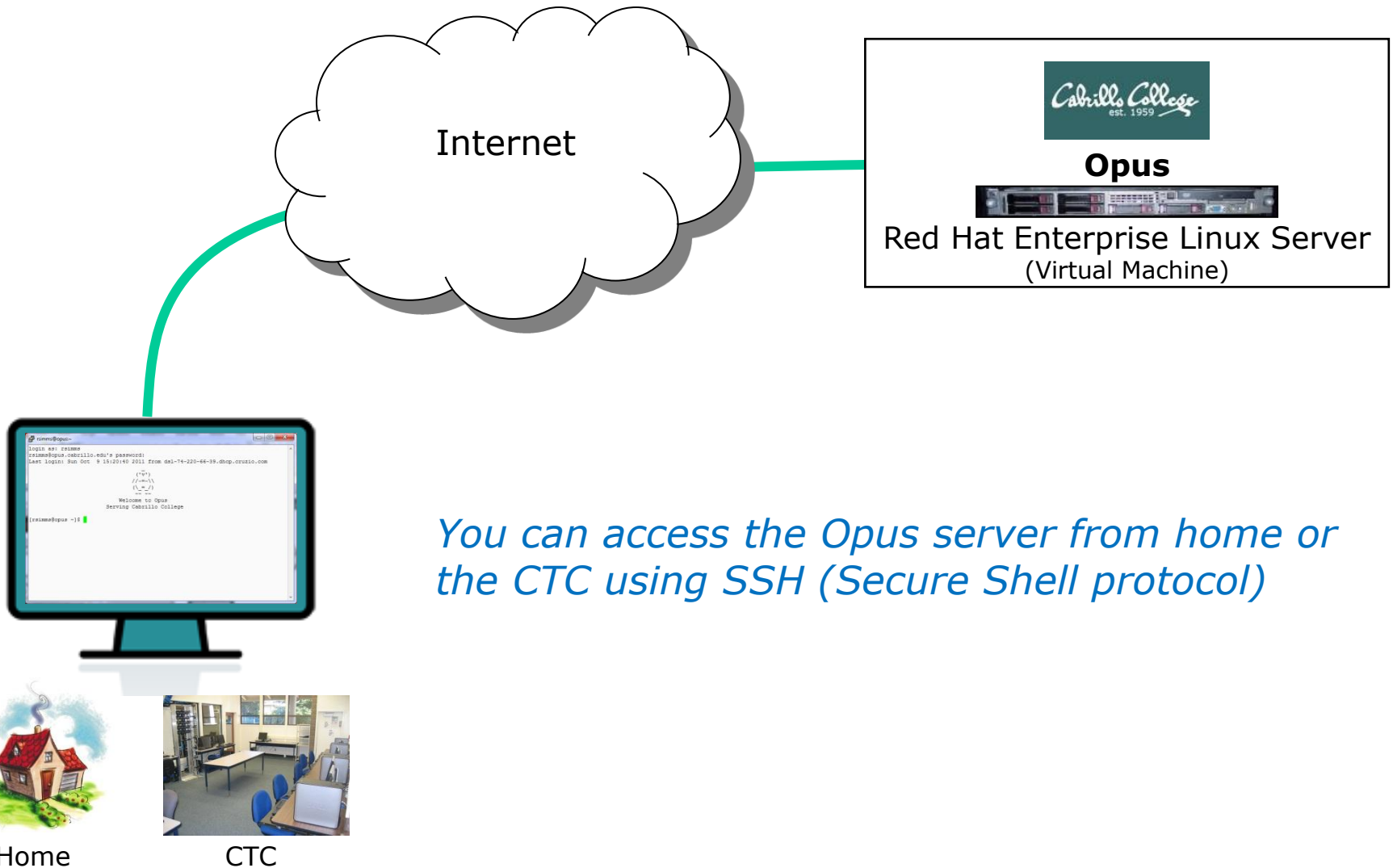
Some lingo for this class

- "**machine**" = the hardware portion of a computer
- "**VM**" = a virtual machine where the hardware is emulated by software
- "**server**" = typically a high end, always-on, computer designed to be used remotely by multiple users
- "**system**" = UNIX/Linux folks almost always refer to their UNIX/Linux servers as system.
- "**host**" = a computer or system on the network
- "**OS**" = Operating System
- "**distro**" = a distribution of Linux, e.g. Red Hat, SUSE, Ubuntu.
- "**SSH**" = secure shell
- "**shell**" = The user interface to UNIX/Linux
- "**SSH into Opus**" = use Putty on Windows or the ssh command on Linux to connect to Opus.
- "**Putty into Opus**" = run the Putty program on windows and connect remotely using SSH to the computer on campus named Opus

Some lingo for this class

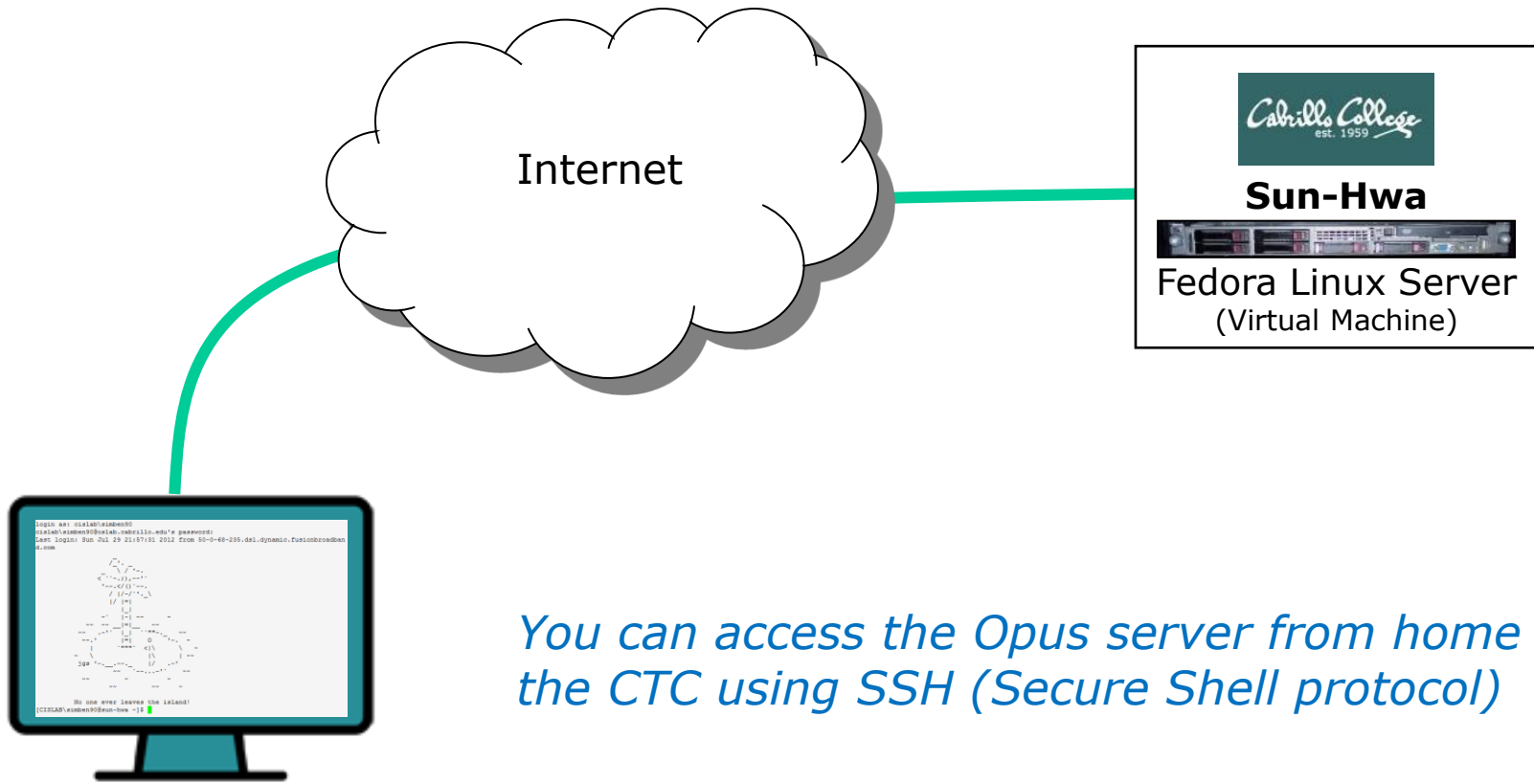
- ❖ "**console**" = a local terminal for entering commands.
- ❖ "**virtual terminal**" = when using a local console there are a number of virtual terminals that can be used. Ctrl-Alt-Fn, where $n=1$ to 7 will bring up different terminals. For example, Ctrl-Alt-F2 brings up tty2. These terminals have no scroll bars.
- ❖ "**tty**" = a teletype, very early and noisy way to interact with a computer. A teletype had a keyboard and a printer and was connected to a computer. The virtual terminals are named tty1, tty2, etc.
- ❖ "**graphical terminal**" = A terminal program that can be run on a graphical desktop. These terminals have scroll bars.
- ❖ "**bring up tty2**" - bring up the tty2 console by pressing Ctrl-Alt-F2 keys at the same time
- ❖ "**terminal emulator**" - programs like Putty that run on a PC and emulate a terminal.

Remote Access to **Opus**



You can access the Opus server from home or the CTC using SSH (Secure Shell protocol)

Remote Access to **Opus**



You can access the Opus server from home or the CTC using SSH (Secure Shell protocol)

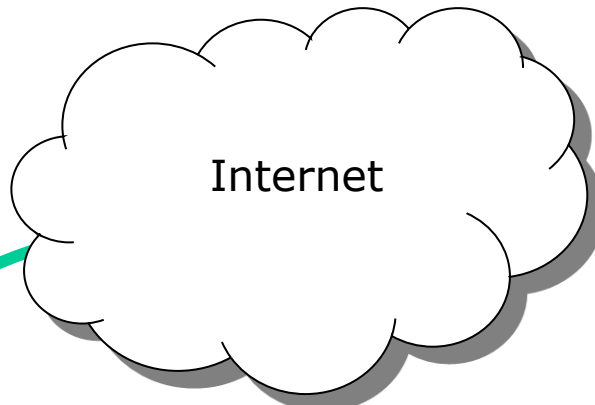


Home



CTC

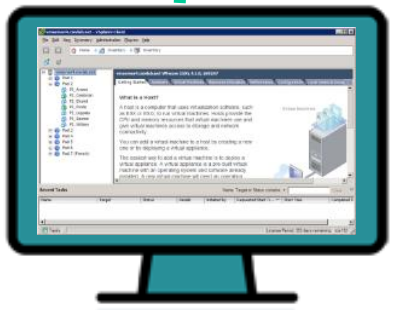
Room 1403 on Aptos Campus



cislab (Win 2008)

vmserver (VMware ESXi)

You can access the course VMs from home or the CTC using RDP (Remote Desktop Protocol)



Home

Lab or Classroom



Fang



Mr-Eko



Not-Opus



Kate



Hugo