Lesson Module Checklist

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

- Lab tested
- Youtube Videos uploaded

- Forum created and registration tested
- Opus accounts made and populated
- CIS 90 VMs created and configured
- Surveys and PW sheet posted

- Rosters printed
- Add codes printed

- Backup slides on flash drive
- Wireless lapel mic + 9v spares
- Key card for door

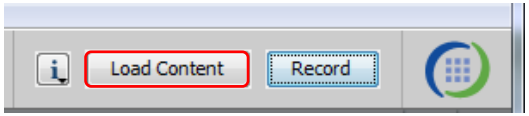
CIS 90 - Lesson 1

Instructor: **Rich Simms**
Dial-in: **888-450-4821**
Passcode: **761867**

Ahmad	Anthony							Buzz	Carlos
Cliff	Cody	Darren	Elijah	Emily	Enrique	James	Jon M.	Jon W.	Jordan
Joseph	Joshua	Juan	Kiernan	Maria	Mark	Mathew	Mike C.	Michael F.	Mike M.
Miles	Nick L.	Nicholas T.	Patrick	Rebecca	Ricardo	Robert	Ruth	Shea	Steve
Tess	Tim	Trevor	Troy	Walter	Zachary	tbd	tbd	tbd	tbd

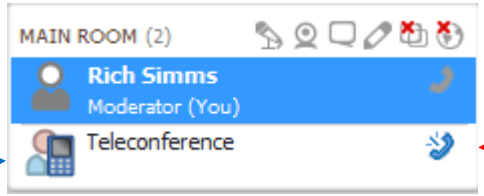
Email me (risimms@cabrillo.edu) a relatively current photo of your face for 3 points extra credit

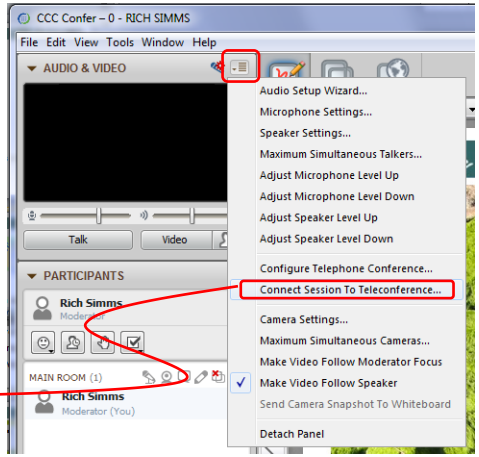
[ ] Preload White Board with *cis*lesson??*-WB*



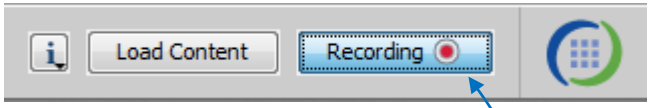
[ ] Connect session to Teleconference

Session now connected to teleconference





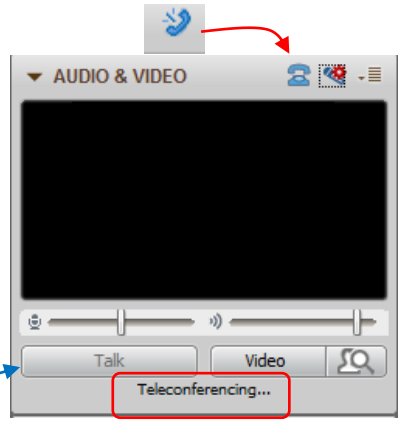
[ ] Is recording on?



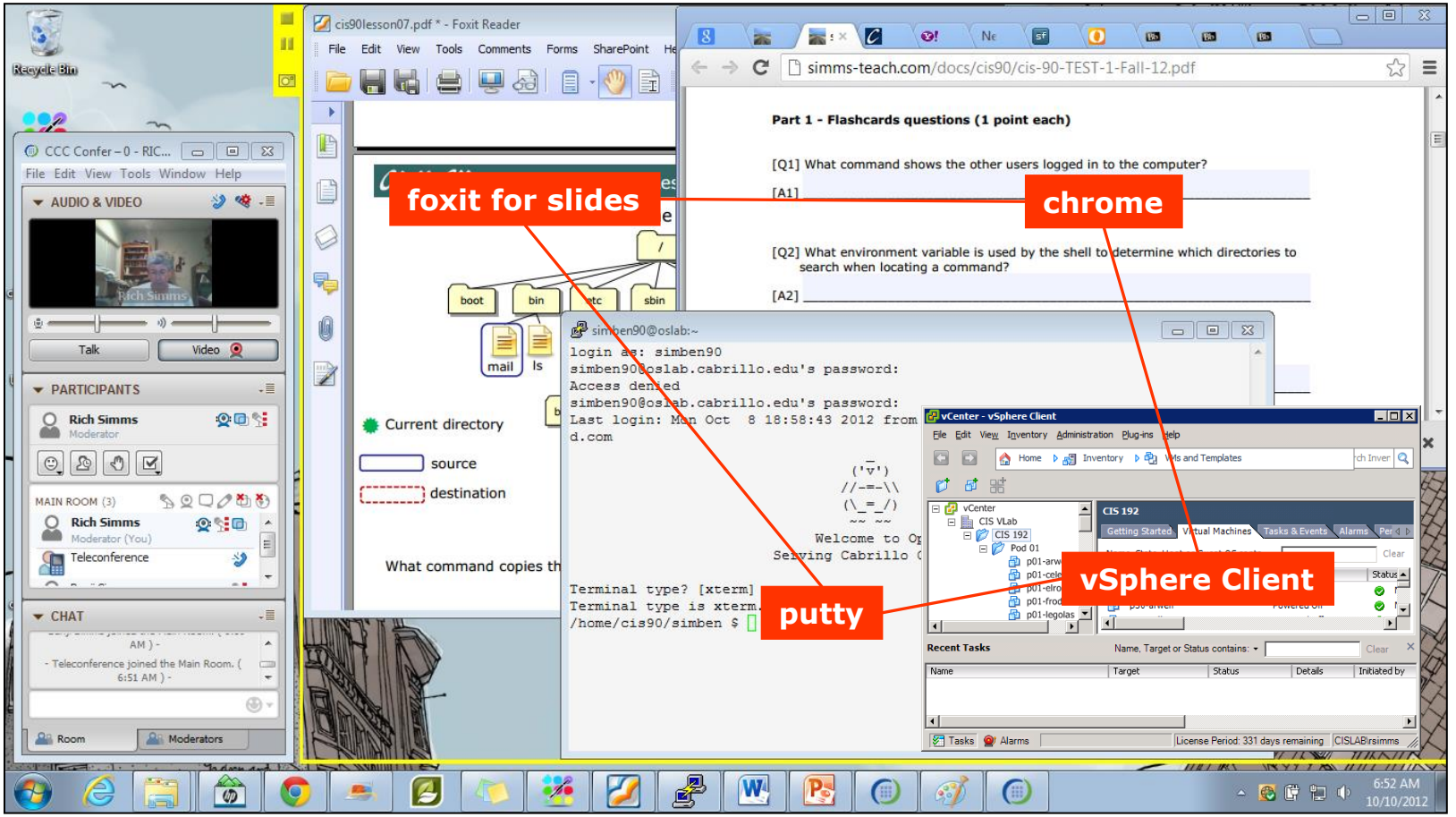
Red dot means recording

[ ] Use teleconferencing, not mic

Should be greyed out



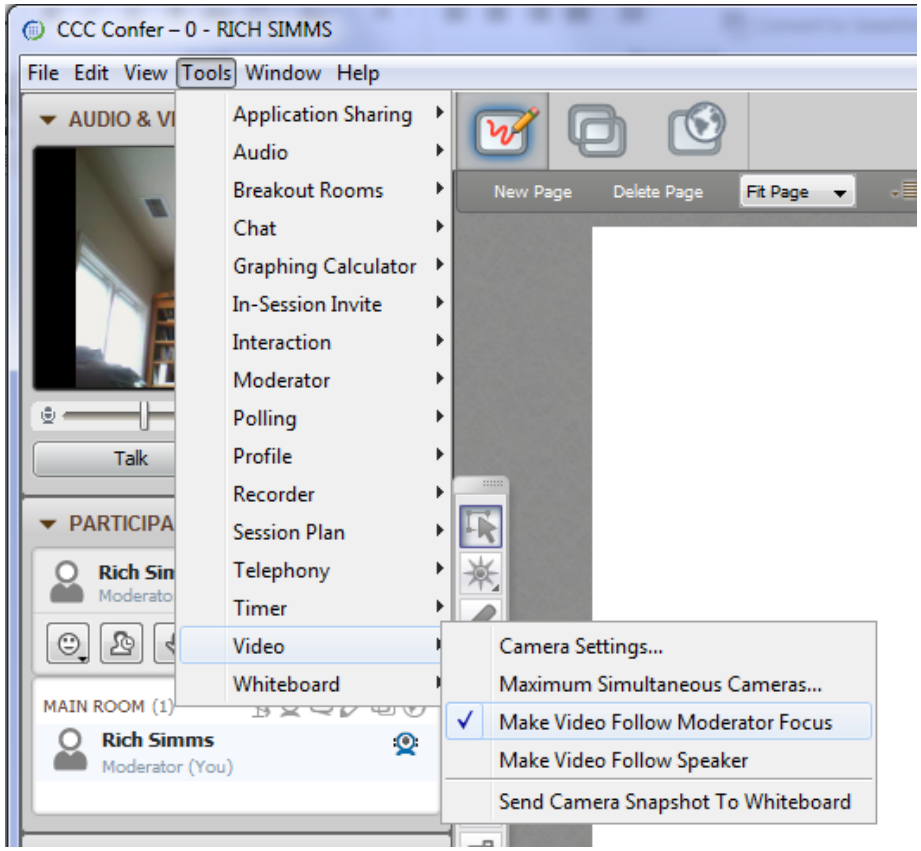
- [ ] **Video (webcam) optional**
- [ ] **layout and share apps**



CCC Confer

[ ] Video (webcam) optional

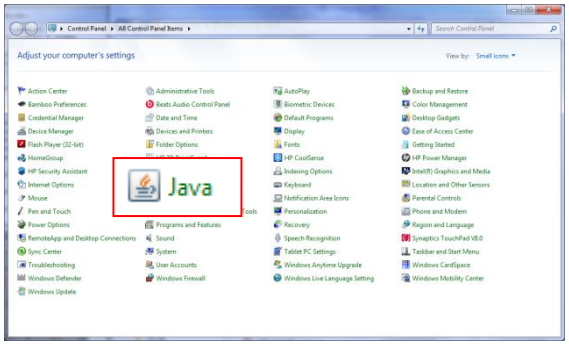
[ ] Follow moderator



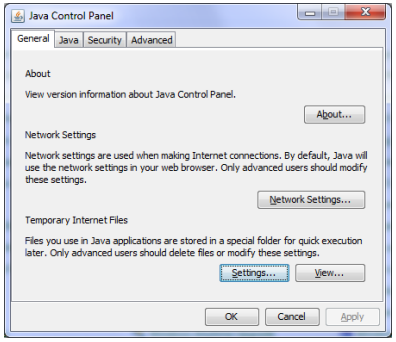
Universal Fix for CCC Confer:

1) Shrink (500 MB) and delete Java cache
2) Uninstall and reinstall latest Java runtime

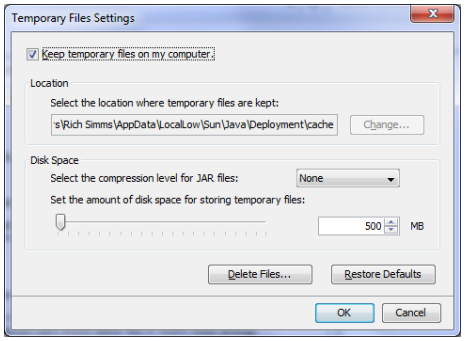
Control Panel (small icons)



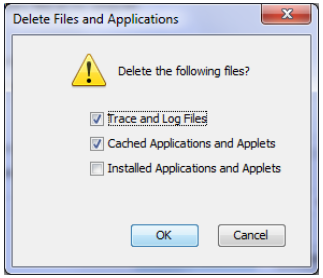
General Tab > Settings…



500MB cache size



Delete these



Google Java download

Student Learner Outcomes

1. Navigate and manage the UNIX/Linux file system by viewing, copying, moving, renaming, creating, and removing files and directories.
2. Use the UNIX features of file redirection and pipelines to control the flow of data to and from various commands.
3. With the aid of online manual pages, execute UNIX system commands from either a keyboard or a shell script using correct command syntax.

Introductions

Introductions and Credits

Jim Griffin
- Created this Linux course
- Created Opus and the CIS VLab
- Jim's site: http://cabrillo.edu/~jgriffin/

Rich Simms
- HP Alumnus
- 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 (http://teacherjohn.com/)

Class and Linux Overview

Objectives	Agenda
• Understand how this course works • Use Opus (SSH) • Use VLab VMs (SSH) • Use Graphical Desktops (VLab) • Use Virtual TTY terminals (VLab) • Learn first UNIX/Linux commands	• Introductions • How this class works • Lab resources • What is a computer • Software overview • UNIX/Linux Overview • First Commands • Housekeeping • SSH (secure shell) • Navigating systems • Lab 1 • Using VLab • Graphical desktops • Virtual tty consoles • Wrap up

Attending class

CIS 90 is available online

- Wednesdays - 9:00AM to 12:05PM
  - Meets in room 828 on the Aptos Main Campus
  - Meets simutaneously online in this virtual classroom for remote students

How to attend class each week:

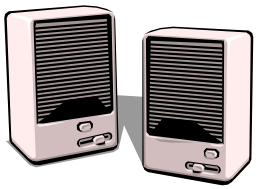
Option 1: **Online (synchronous)** - connect online to the "live" virtual classroom using CCC Confer from on or off campus.

Option 2: **Traditional** - drive to campus, find parking, walk up to the 800 building and take a seat in the classroom.

Option 3: **Online (asynchronous)** - watch the archived class recording using CCC Confer at a later time.

Option 1: **Online (synchronous)** - connect online to the virtual classroom using CCC Confer from on or off campus.

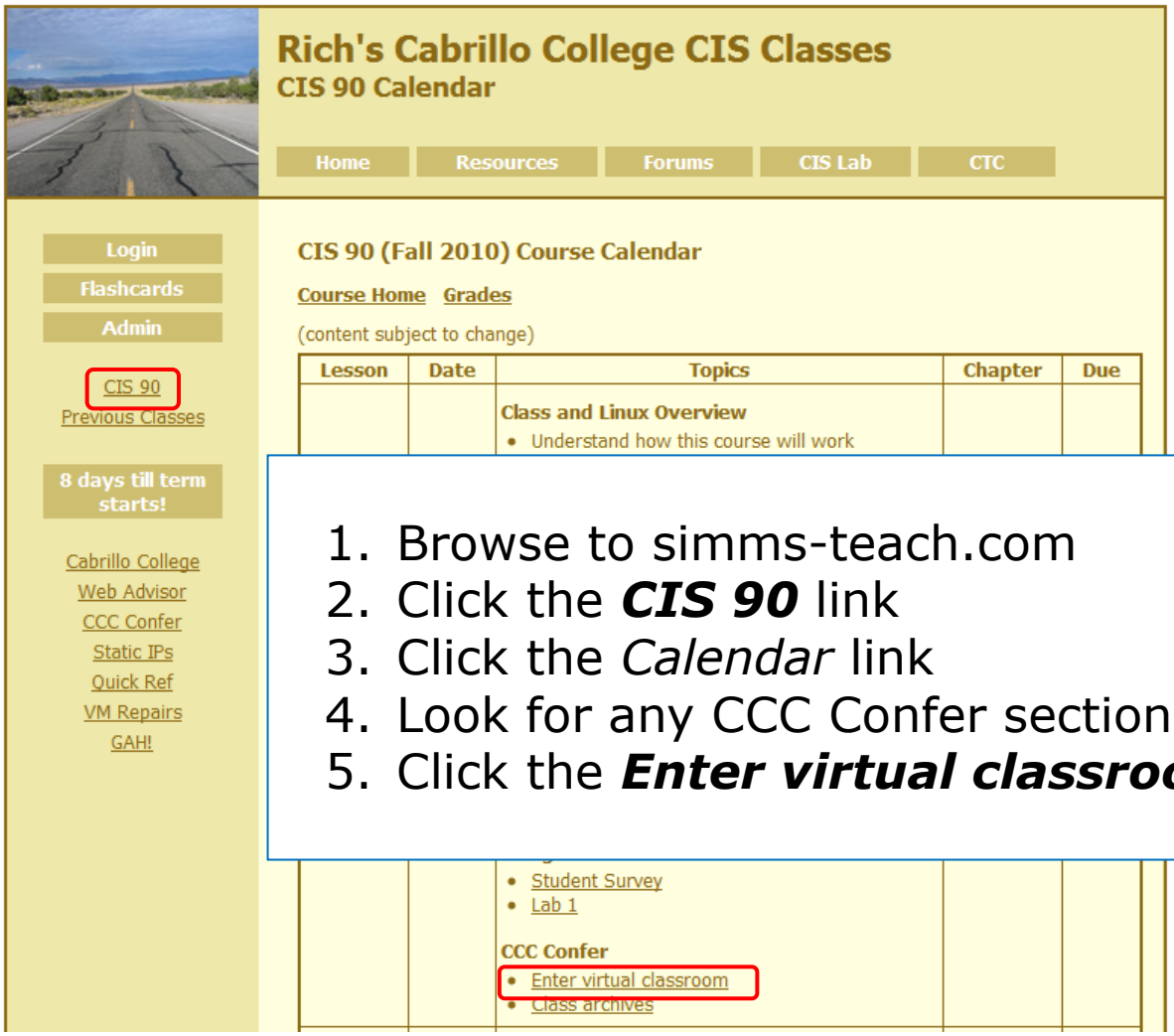
- Listen using your computer's speakers/headset or with your phone using the dial-in number



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

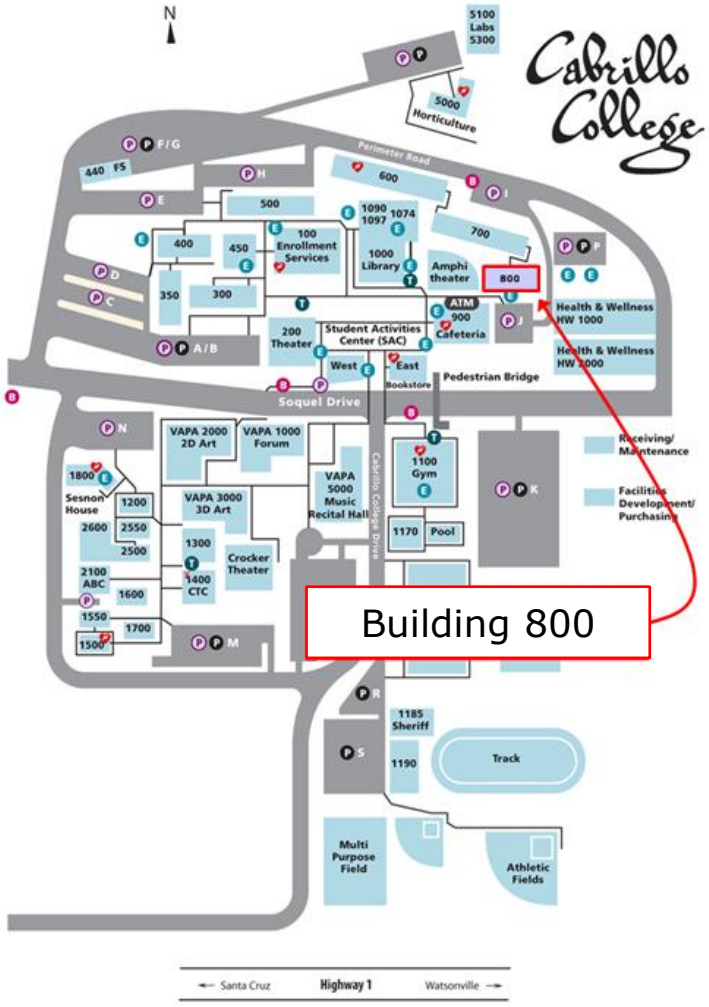
Dialing in by phone (or Skype) is best because you can ask and answer questions by speaking rather than use a chat window

Option 1: **Online (synchronous)** - connect online to the virtual classroom using CCC Confer from on or off campus.



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

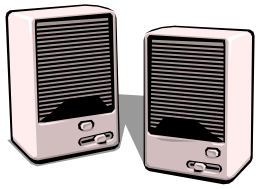
Option 2: **Traditional**



Drive to campus, find parking, walk over to the 800 building and take a seat in the classroom.

Option 3: **Online (asynchronous)** - watch the archived class recording using CCC Confer at a later time.

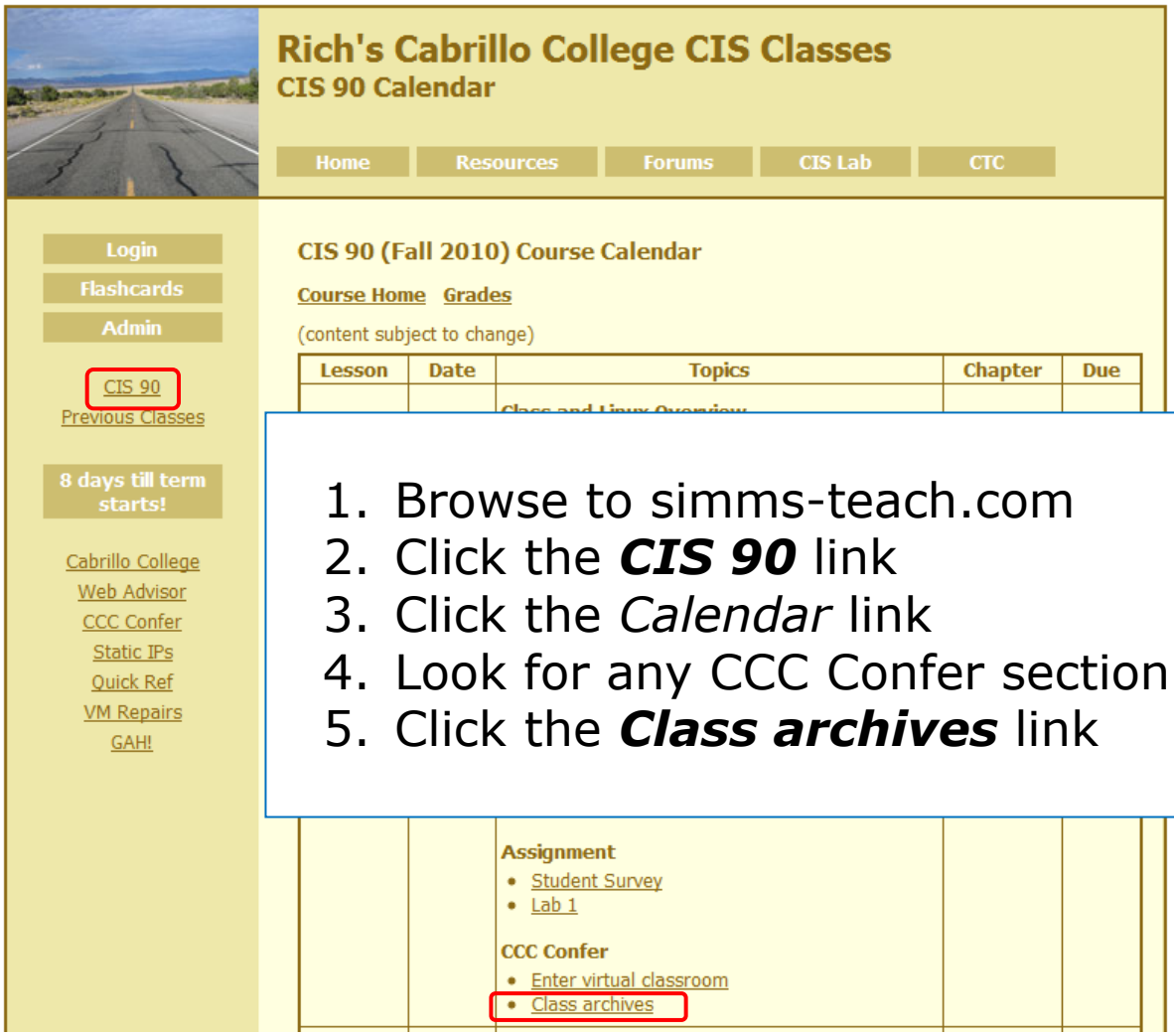
- Listen using your computer's speakers/headset or with your phone using the dial-in number



- Use the CIS forum to ask questions

Important: Option 3 is great for those that work when class is held. However they will need to do some extra planning to handle the first minute quizzes and the final exam. See the "how this class works" module.

Option 3: **Online (asynchronous)** - watch the archived class recording using CCC Confer at a later time.



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 ***Class archives*** link

CCC Confer

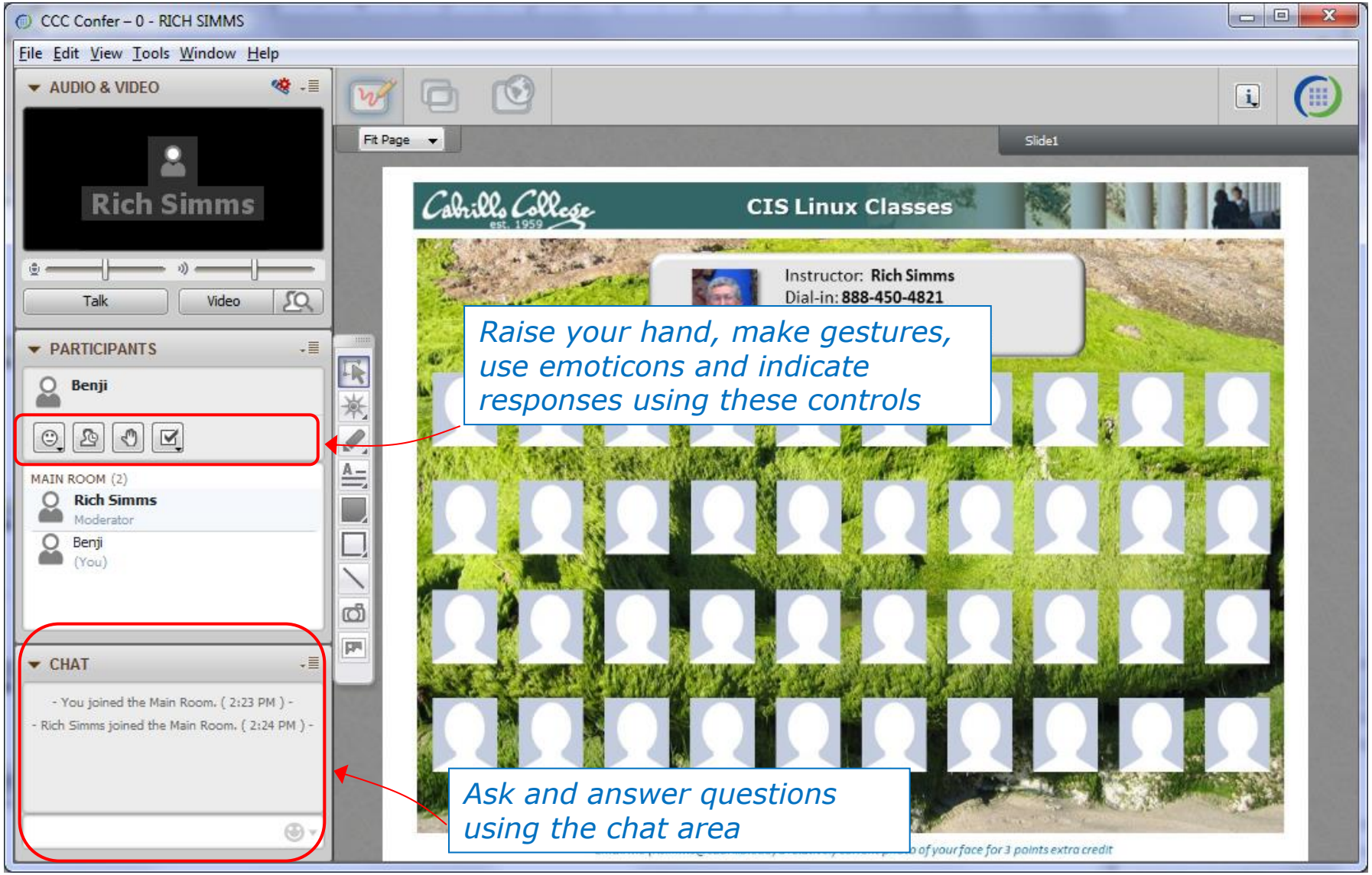
CCC Confer - Is your computer ready?

http://www.cccconfer.org/support/supportReadiness.aspx

CCC Confer - Java may be downloaded the first time you use CCC Confer

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

CCC Confer - Attending class online



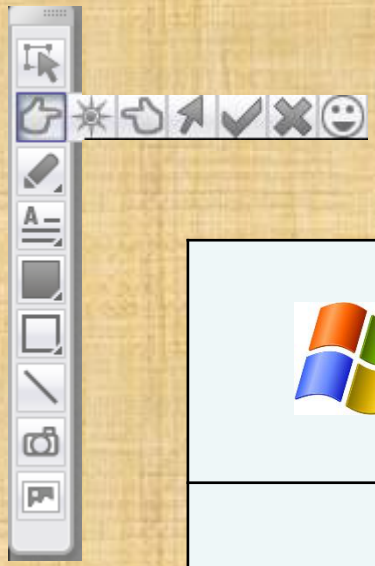
CCC Confer - Attending class online

When dialed in by phone you can use:

*0 Contact the operator for assistance.

*6 Mute/unmute your individual line with a private announcement.

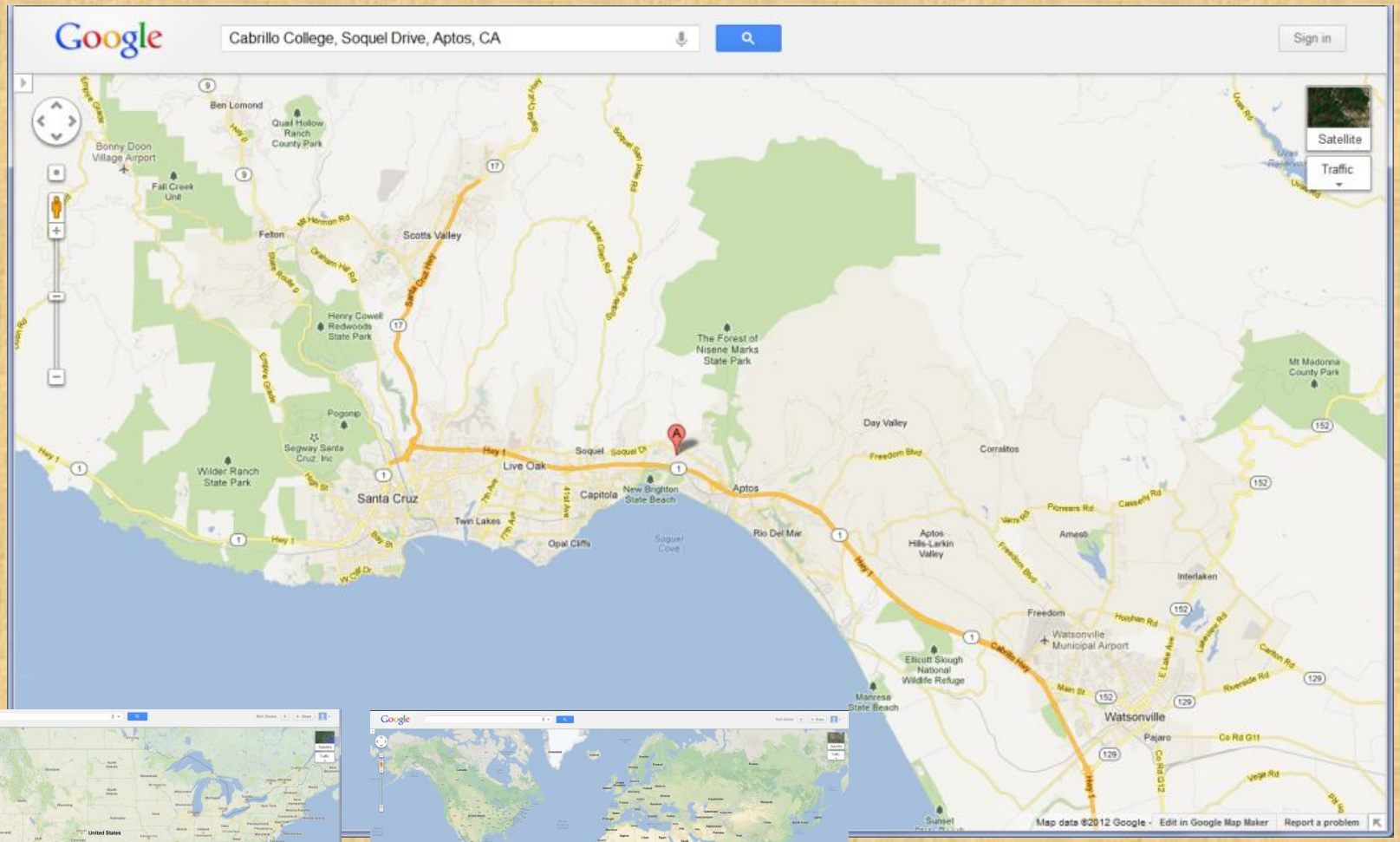
Switch to preloaded whiteboard

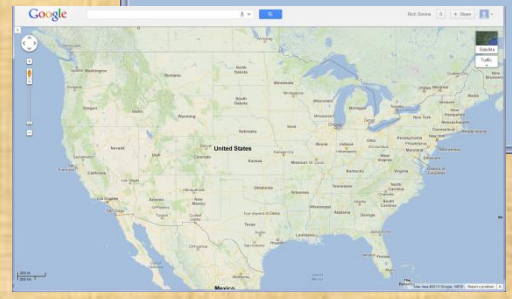


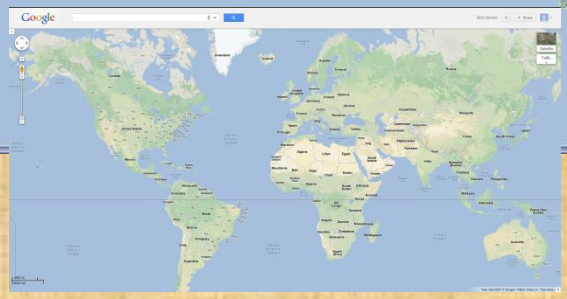
Class Activity
What kind of computer did you use to join CCC Confer?

			Other

Class Activity – Where are you now?







Turn Recording Off
Stay on preloaded whiteboard

Roll Call

Login Credentials

Usernames and passwords

If you are attending class by watching the recordings in the archives contact the instructor at: risimms@cabrillo.edu to get the slides on login credentials.

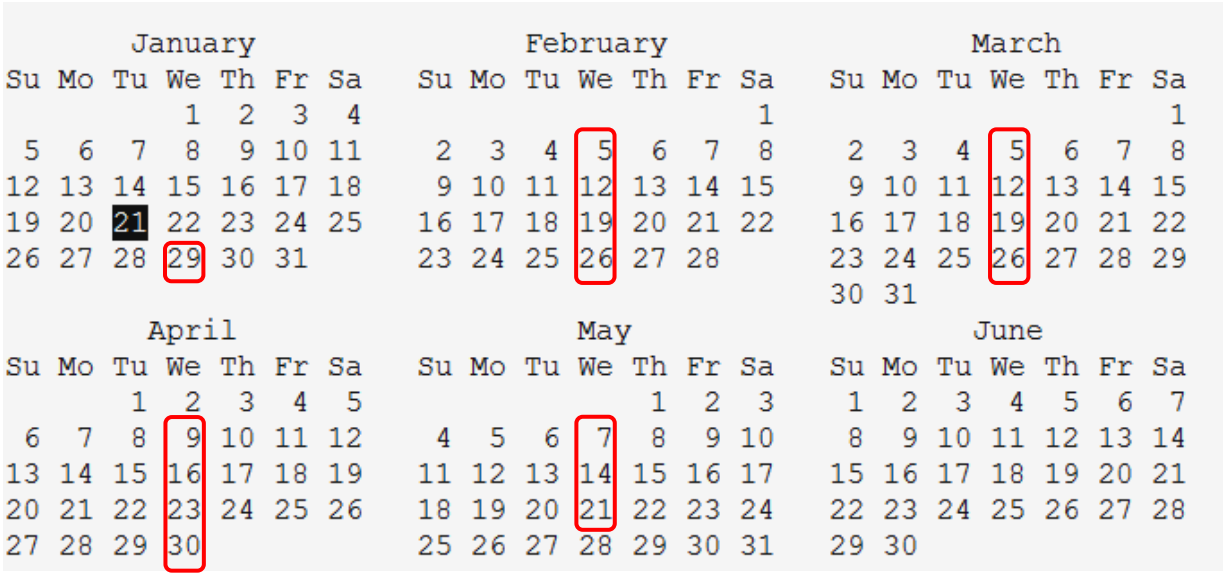
Turn Recording On
Switch back to shared slides

How this class works

CIS 90
Spring 2014

Class meets in room **828** and **online** every **Wednesday morning**:

- ***9:00-12:05AM**, from **Jan 29th** to **May 14th**
- 15 lessons (class meetings) total
- Face-to-face final exam at **7:00-9:50AM**, on **May 21st**, in room **828 (not online using CCC Confer)**



January						
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	

February						
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	

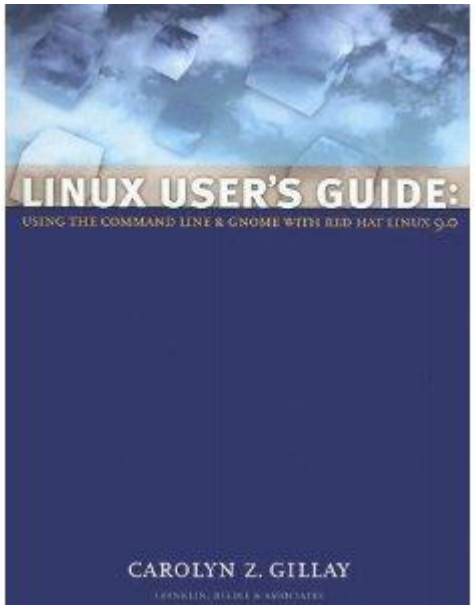
March						
Su	Mo	Tu	We	Th	Fr	Sa
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

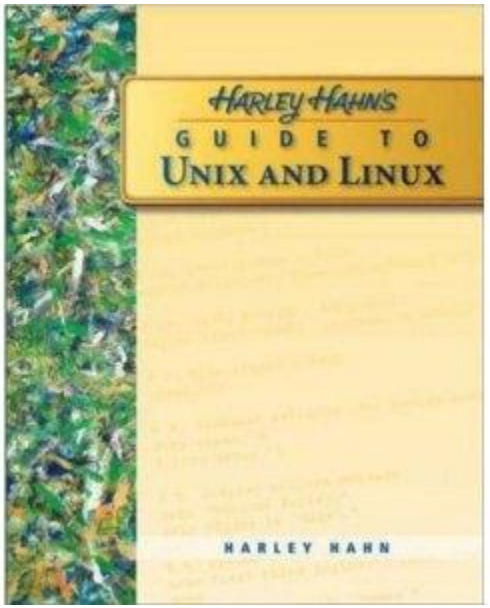
April						
Su	Mo	Tu	We	Th	Fr	Sa
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			

May						
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

June						
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					

**You may attend any class by either coming to room 828 or remotely using CCC Confer*





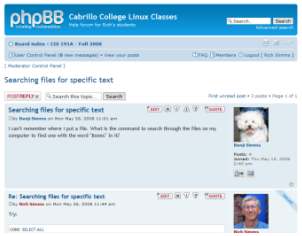
Optional Textbooks:

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



Use Forum to collaborate with classmates

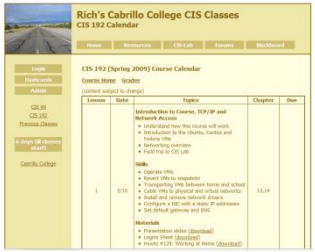
Wednesday

"First minute" quiz

Lecture on new lesson material

Class activities

Previous week lab assignments due 11:59PM (Opus time)

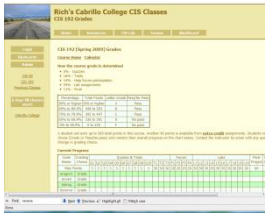


Calendar Page

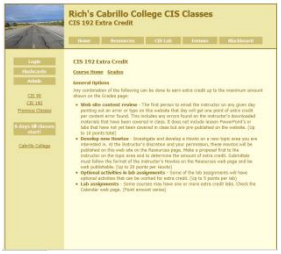
Thursday

is grading day

Work Lab Assignments in the CIS Lab or from home



Check progress on the Grades Page



Check Extra Credit Page if you need some more points

Contacting the instructor

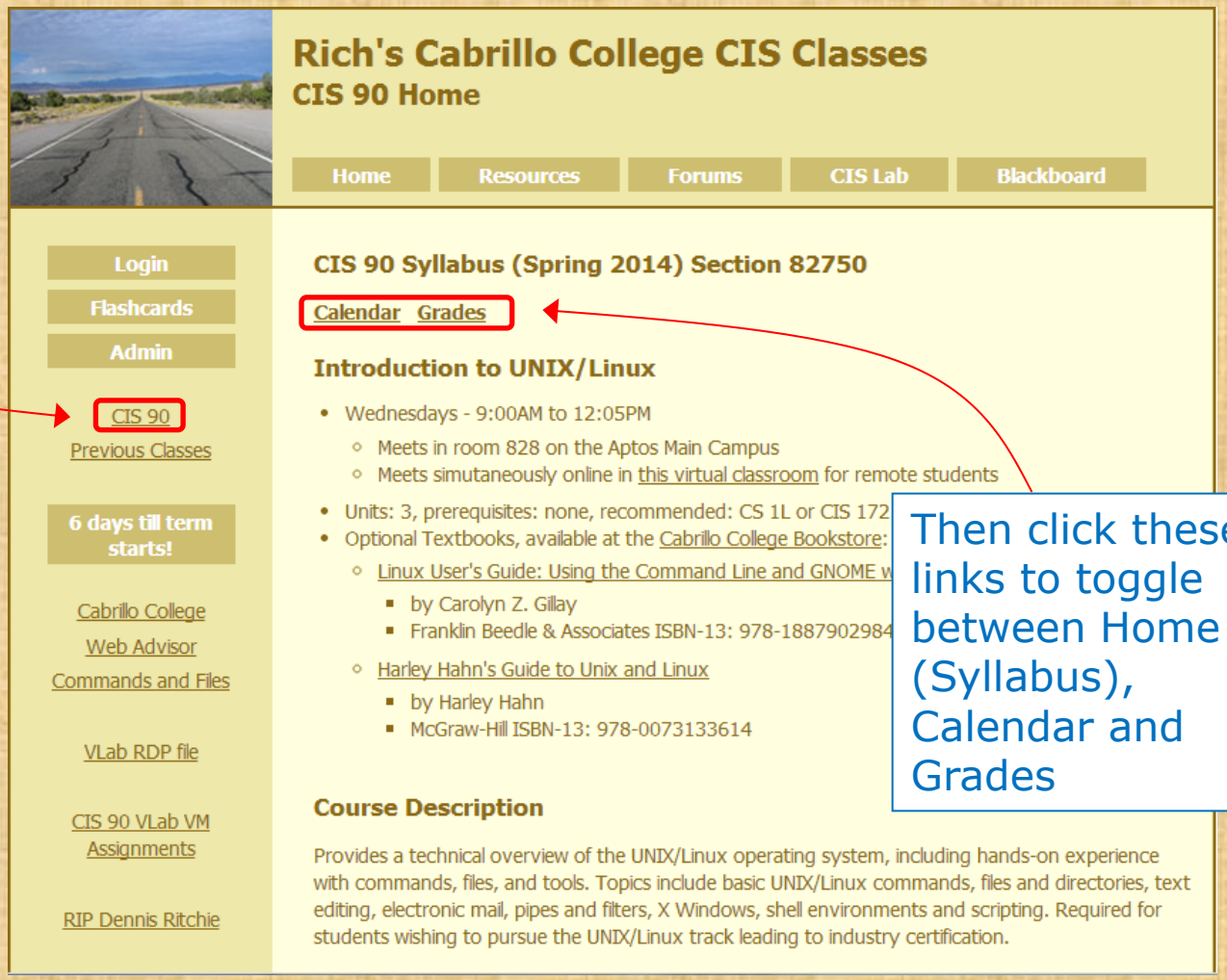
- Use the forum for the fastest response on technical or class related questions.
- Use email for personal matters only. If it's NOT personal I will most likely ask you to post your question on the forum and will answer it there instead so other students may benefit from the answer.
- Weekly office hours: 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*



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


Rich's Cabrillo College CIS Classes
CIS 90 Home

Home | Resources | Forums | CIS Lab | CCC

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 2301 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: CIS 1L or CIS 172
- Optional Textbooks (available at the Cabrillo College Bookstore):
  - Linux User's Guide: Using the Command Line and GNOME with Red Hat Linux 9.0
    - by Garrison E. Gibbs
    - Franklin Beedie & 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.

The material learned in this course is applicable to all versions of Linux and UNIX such and Red Hat, Ubuntu, HP-UX, Suse, Solaris, Debian, etc. Students will have accounts and remote access to a Linux server on campus for use during class and at home.

Student Learner Outcomes

Upon succesful 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

Some 50 shell commands will be covered that will let a student login remotely, navigate the file system, create and modify files/directories, set permissions, run & schedule programs/scripts, manage processes, do searches, do text editing with vi, and use regular expressions. Shell scripting will be covered to construct custom commands from basic commands. Students will learn how to develop a custom shell script using commands they have learned.

Taught in Both Physical and Virtual Classrooms

Don't miss class because your car broke down, you are out of town, hate the commute, or baby-sitting fell through. This class will be taught using CCC Confer. CCC Confer is a web conferencing application that allows you to participate over the Internet online.

All students in section 68884 will meet online every week using CCC Confer. With the permission of the instructor, students may be able to attend the physical class in Room 2301 if space is available.

Students in section 67727 are also welcome to attend class using CCC Confer whenever they wish.

The passcode and dial-in number for CCC Confer will be emailed out to all registered students. Email the instructor if you need the dial-in number and passcode.

A Day in the Life

Most classes will start with a **first minute quiz**. The reason for this is to get the class successfully started on time. The quiz questions will always be published a week earlier. Students can work together or use the forum to work out the answers in advance. Students must be in their seat when the class starts to take this quiz. There are no makeups for students arriving late or who miss class.

Following the quiz there will usually be a short amount of time for any housekeeping items that are necessary. After that the instructor will take questions on the previous weeks lesson or lab assignment before moving on.

The lecture on the new material will then begin. The lecture format will use the whiteboard, PowerPoints and live demonstrations. Periodic breaks will happen usually around the start of each hour.

In general during class, the computers will be on so students can view the presentation and Google information. There will also be frequent class activities to break up the lecture and give students some time to try out what they just learned. The last part of the class will cover the upcoming lab assignment.

Computer Lab and TBA Hours

This course includes both lecture and lab activities. The day and time of the lecture portion are shown above and in the Cabrillo Schedule. The lab activities comprise the TBAs (to be arranged) portion of the course. The TBA lab activities are required and designed to continue the learning process. The CIS lab provides students with practical hands-on experience where they implement what they learn in lecture on live Linux systems. The CIS Lab is located in the CTC (building 1400). This lab has the equipment for doing lab assignments and are available to all CIS students. The Opus server, available remotely over the Internet, is another Linux resource for CIS unux students. Roped each weekly lab assignment to take an average of 3 hr 5 min to complete. As you would expect, some labs will require less time while others will require more. Please plan accordingly.

Late Work Will Not Be Accepted

Please complete all assignments on time as they will not be accepted if they are late. This will help both the student and instructor keep the class moving and avoid log jams at the end of the term. All assignments are due by midnight (Pacific Time) of the due date shown in the Course Calendar. If an assignment is not complete by the deadline it is better to turn in what you have completed before deadline than no submittal at all. There is always extra credit work for students needing extra points.

Contacting the Instructor

Instructor contact information and office hours are shown on Cabrillo Setup page. The preferred way to get help is to post to the Help Forum. All other methods (office visit, phone call away, email or the forum is faster and prefered. For personal matters use office hours or email. Please include the name of the class in your email subject lines to get past spam filters. For everything else use the Help Forum and everyone can benefit from the public questions and answers.

Help Forum

There is an electronic Help Forum for this class. This forum is intended to be a place where students can share information, ask questions, and get answers. The forum is especially intended to be a resource for completing lab assignments. It offers a way to ask questions about an obstacle or some less-than-meaningful error message, and to share solutions to those problems. Everyone should be courteous and respectful on the forum. Off-topic, rude or otherwise inappropriate posts will be removed. Joining the forum requires member registration with a real first and last name. Fake or anonymous screen names will not be allowed to register. Avatars that are photographs of the forum member are a great way for everyone to get to know each other.

Web Site

All the important course information is on http://simms-teach.com. This includes links to the forums, resources, lab assignments, flash-cards, lecture slides, grades, and the course calendar. Note that this material may change. If you print something like a lab assignment, please check the web site before submitting your work to make sure you have the latest version. The flash-cards are an optional tool students can use to drill important Linux knowledge into their brains.

Classroom Etiquette

It is important to have an effective, distraction-free physical classroom environment for learning. To minimize distractions all **cell phones should be turned off** or at least silenced. Never carry on conversations during the lecture as this is probably the most annoying distraction possible to those sitting nearby.

For students in the physical classroom, computers can be turned on for viewing lecture slides loadm, Googe'ing related technical information, and doing classroom exercises. A students full attention is desired so the computers should not be used during lecture for email or anything that would distract them or others from the material being taught.

For students in the virtual classroom, please use the chat window in CCC Confer to ask questions and communicate with the instructor or other classmates.

Please plan on coming to all classes. If class will be missed let the instructor know ahead of time. It is the students responsibility to get any missed material or information from other classmates (the forum is a good way to do this). Please note that being disruptive is grounds for being dropped from the class by the instructor.

Grading Policy

Grading will be based on the total number of points students earn doing quizzes, tests, lab assignments, forum participation, and final. Visit the Grades Page to see exactly how grades are determined and to track progress.

For some flexibility, personal preferences and family emergencies there are a number of extra credit opportunities. For students looking for more challenge or some additional points see the Extra Credit Page.

Students who just want to learn and not mess around with grades, can always take the class as pass/no pass. Indicate this on the Student Survey provided in the first class. You can change your mind later by contacting the instructor.

Special Learning Needs

Students with disabilities, including "invisible" disabilities such as chronic illnesses, learning disabilities, and mental disabilities, are encouraged to schedule their classes and appropriate accommodations to the instructor during office hours. Please bring documentation verification of your disability from the Learning Skills or DSPS offices and a counselor or specialists recommendations for accommodating your needs.

As required by the Americans with Disabilities Act (ADA), accommodations are provided to insure equal opportunity for students with verified disabilities. If you need assistance with an accommodation, please contact the Learning Skills Program at 831-479-6220 (for students with learning disabilities and attention deficit disorders) or Disabled Student Programs and Services (DSPS) at 831-479-6379 or 831-479-6421 (TTY) to make arrangements as soon as possible.

Missing Classes and Drops

It is the students responsibility to officially withdraw from classes. If you miss more than two classes, the instructor may drop you from the course enrollment unless prior arrangements have been made and agreed to.

Course Syllabus
(on the CIS 90 home page)

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

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

Links to virtual classroom and archived recordings

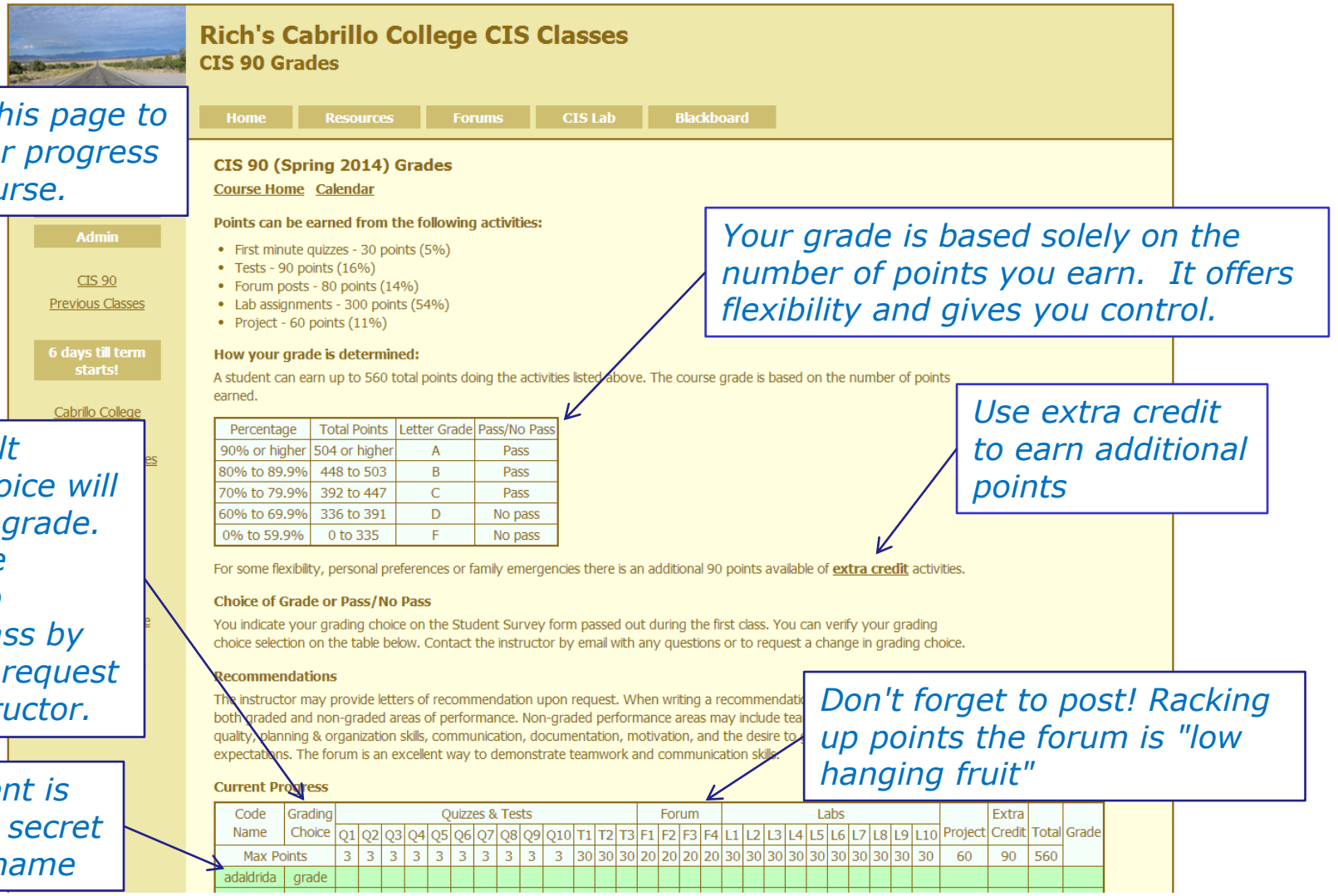
References to material in the textbook

Lab assignment

Test

5	3/10	**Quiz 4** **Review** • Review lessons 1-4 • Practice skills • Learn about filename expansion characters **Materials** • Presentation slides (download) • Practice test (download) **Assignment** • NA **CCC Confer** • Enter virtual classroom • Class archives		Lab 4
6	3/17	**Managing Files** • Creating • Copying • Moving • Renaming • Removing • Linking **Materials** • Presentation slides (download) **Test #1** • Test (download) **Assignment** • Lab 5 **CCC Confer** • 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 | Blackboard

CIS 90 (Spring 2014) Grades
Course Home Calendar

Points can be earned from the following activities:

- First minute quizzes - 30 points (5%)
- Tests - 90 points (16%)
- Forum posts - 80 points (14%)
- Lab assignments - 300 points (54%)
- Project - 60 points (11%)

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 recommendati both graded and non-graded areas of performance. Non-graded performance areas may include tea quality, planning & organization skills, communication, documentation, motivation, and the desire to 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	3	30	30	30	20	20	20	20	30	30	30	30	30	30	30	30	30	30	60	90	560	
adaldrida	grade																															

Monitor this page to track your progress in the course.

Your grade is based solely on the number of points you earn. It offers flexibility and gives you control.

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.

Don't forget to post! Racking up points the forum is "low hanging fruit"

Each student is assigned a secret LOR code name

More on Grading

CIS 90 (Spring 2014) Grades

Course Home Calendar

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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.

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

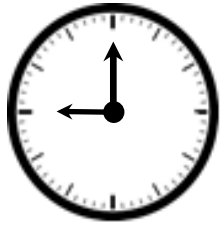
More on Grading

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 at 11:59PM will get no credit if turned in ***one minute late*** *at 12:00AM (midnight) the next day*

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 9:00AM sharp. Answers are emailed to the instructor. 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.
- The quiz questions are given out in advance and students can use the forum to collaborate on answers prior to class.
- Quizzes are open book/notes. Students may not give or ask others for assistance while taking a quiz.
- There are no makeup's for these quizzes and they must be turned in within the first few minutes of class.
- Students that attend by watching the archives can do some extra credit work instead. In the past working students have joined the class briefly at the start just to take the quiz and then return to work.

More on Grading

Tests (3 tests, 30 points each)

- Tests will be distributed by during the last hour 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 a Linux server to verify an answer.
- Tests are open notes, open book, and open computer.
- Tests are designed to take about and hour 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 828 on campus. Long distance students must arrange to take the test with a local proctor.

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

There is a cap on extra credit points so plan carefully!

Making the fine print large

Please don't forget:

1) No makeup's for missed quizzes

2) Quiz answers in the wrong order or not emailed in the first few minutes will not be accepted

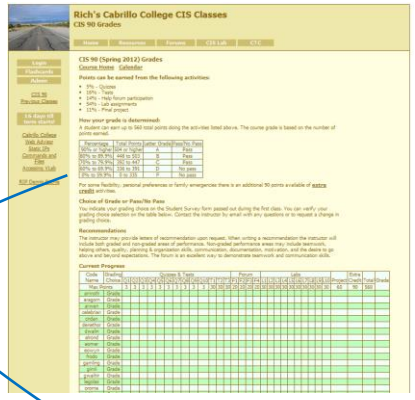
3) Late work (lab assignments) will not be accepted. For example, a lab assignment due at 11:59PM will get no credit if turned in **one minute late** at 12:00AM (midnight) the next day

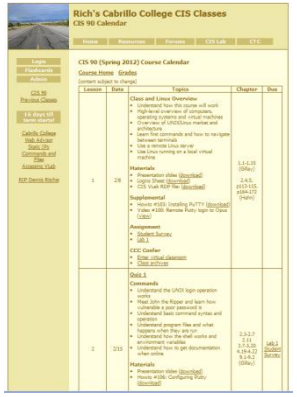
Tip: if you have not completed a lab assignment, **please turn in what you have done for partial credit.**

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

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.





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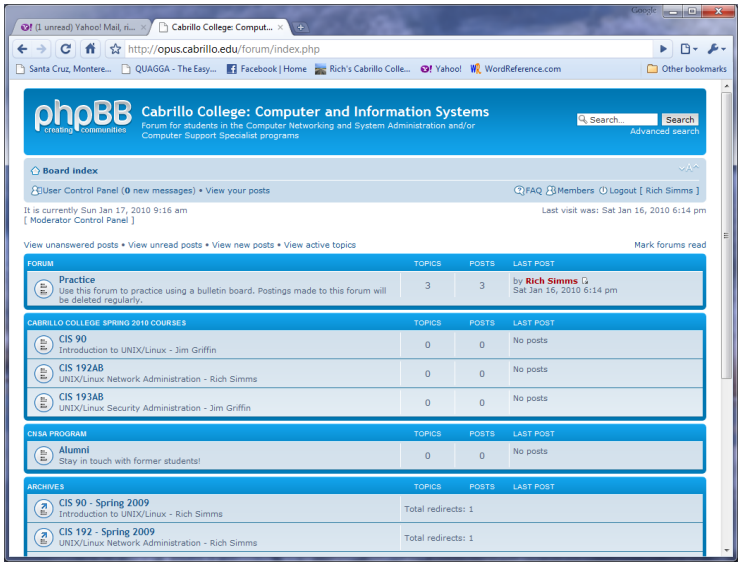
60% to 69.9%	336 to 391	D	No pass
0% to 59.9%	0 to 335	F	No pass

At the end of the course I use the table on the Grades web page to determine your grade

Help Forum

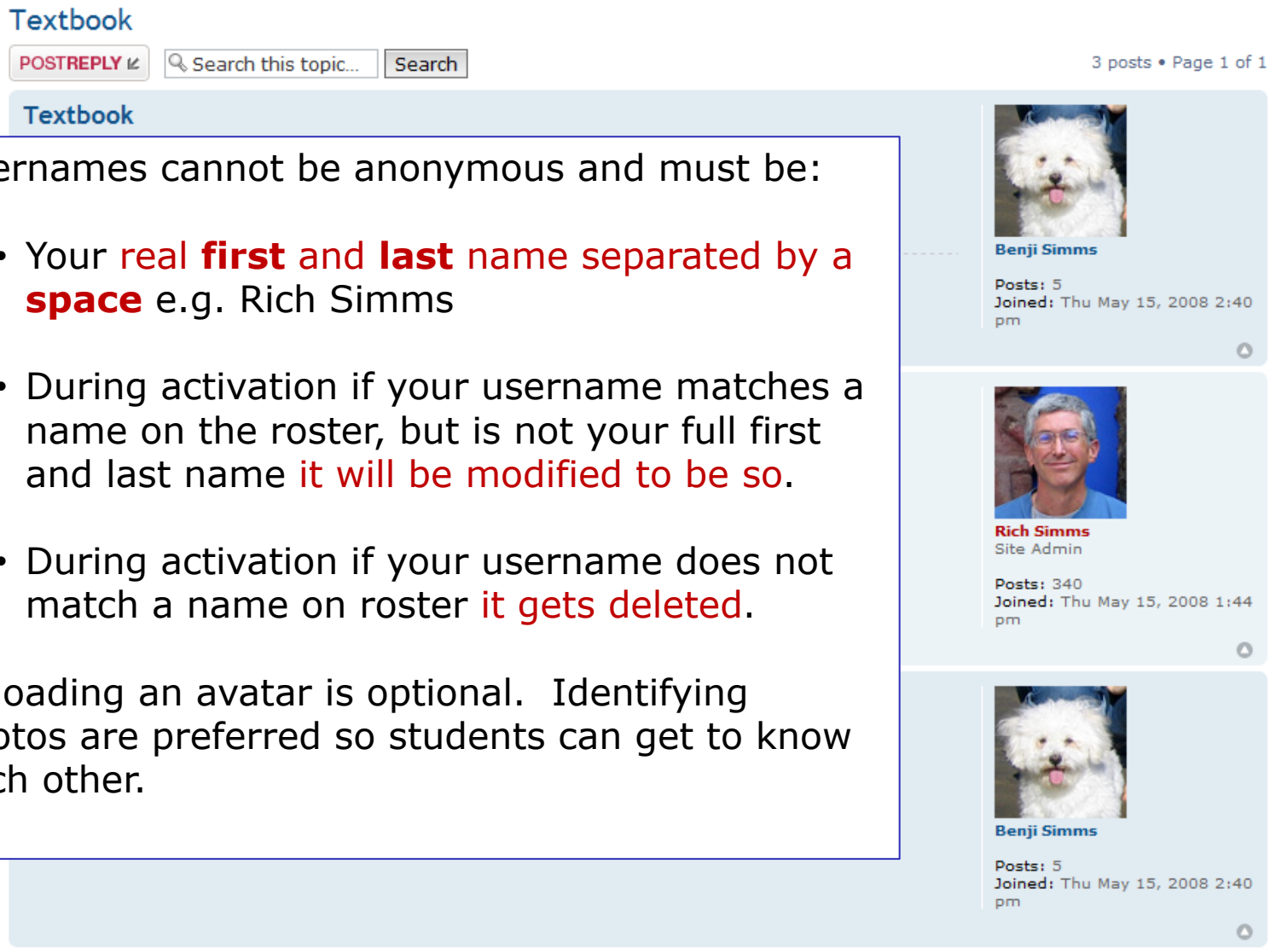
Online Help Forum



- Post questions and answers
- Collaborate on lab assignments
- Share UNIX/Linux information
- Post class notes for classmates who miss class
- Get clarifications
- 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 posting period)

Class Forum



- Usernames cannot be anonymous and must be:
  - Your real **first** and **last** name separated by a **space** e.g. Rich Simms
  - During activation if your username matches a name on the roster, but is not your full first and last name it will be modified to be so.
  - During activation if your username does not match a name on roster it gets deleted.
- Uploading an avatar is optional. Identifying photos are preferred so students can get to know each other.

Class Forum

Optional, but handy is to subscribe to a forum.

After logging in:

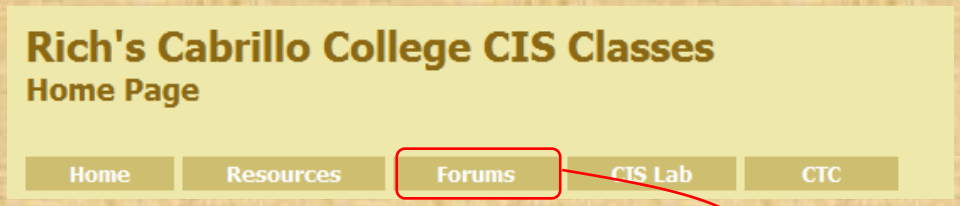
1. Go to the class forum.
2. Click the "Subscribe forum" box at the lower left. When subscribed you get email notifications when new posts are made.
3. To unsubscribe, click it again.

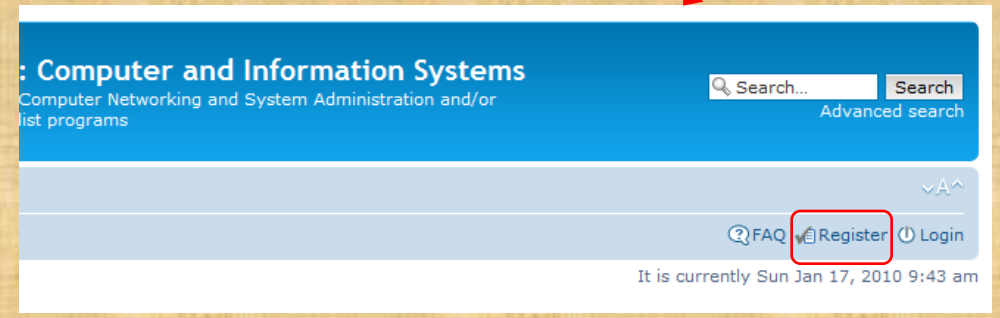
Unsubscribed looks like this

Subscribed looks like this

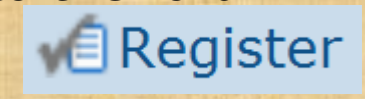
Class Activity
Forum Registration

Click the Forums link on http://**simms-teach.com**





To Register:

1. Browse to the forum
2. Click on 

3. Review and agree to terms
4. Your **Username** must:
   - be your first and last name separated by a space
   - e.g. Benji 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 VLab Playground

Configured for
Command Line Only

Opus

Sun-Hwa and Sun-Hwa-II

Other UNIX/Linux servers

Catalina
Doc
Razia
Thabiti
Kakenya
Son-of-Opus
Baby-Opus

Configured for
Graphics and Command Line

P01-Arwen

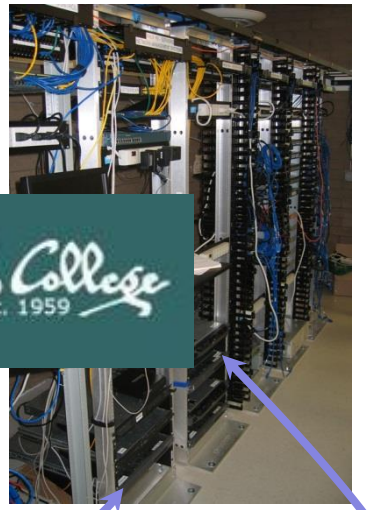
Each student gets their own Arwen VM for the term

P50-Arwen

All the systems are virtual machines (VMs) running on the CIS VLab servers. They are available from on or off-campus

Work at home or off-campus

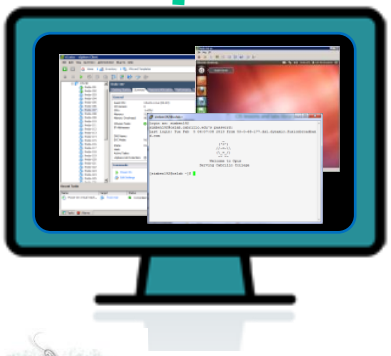
CIS Lab on
Aptos Campus



Internet

cislab (Win 2008)

vCenter (VMware appliance)
vmserver3 (VMware ESXi)



Home

School

Provides remote access to everything needed for CIS students to complete lab assignments

Work in the CIS Lab

Instructors, lab assistants and equipment are available for CIS students to work on assignments.

Lab Assistants:

Geoff

Leandro

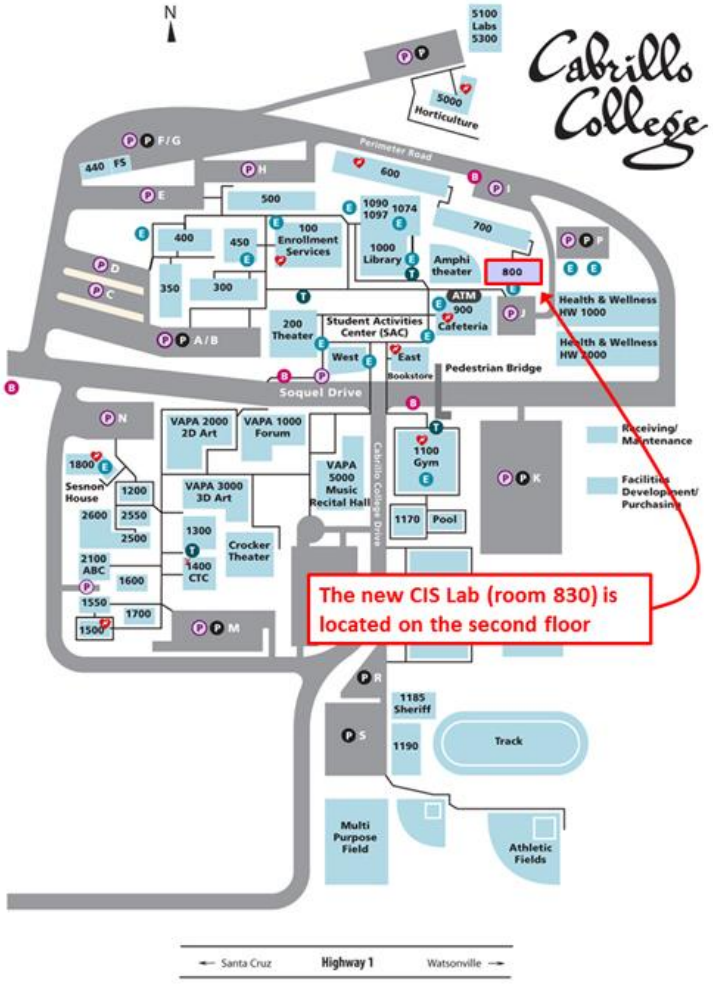
CIS 90 Tutoring Available:

Contact: Matt Smithey
matthewsmithey@gmail.com
831-566-8402

Use this link to see the schedule and location

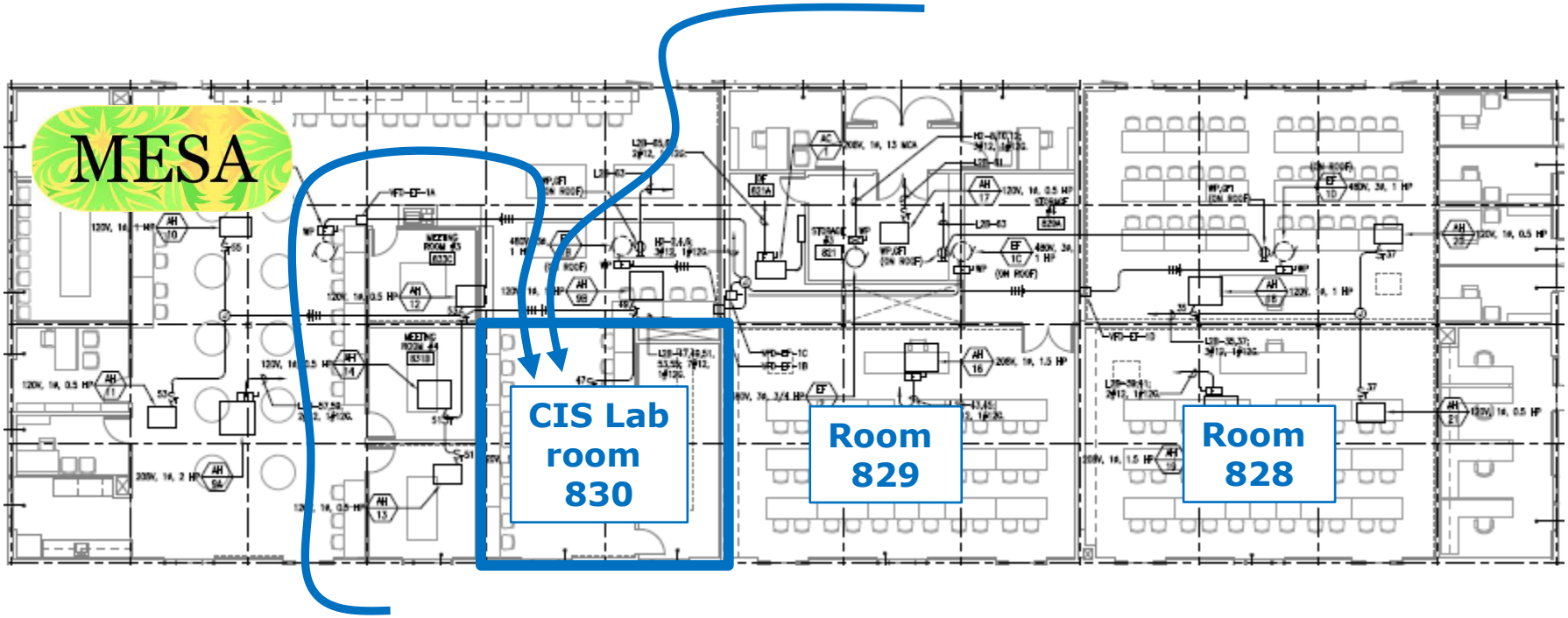
The CIS Lab

Building 800 - room 830



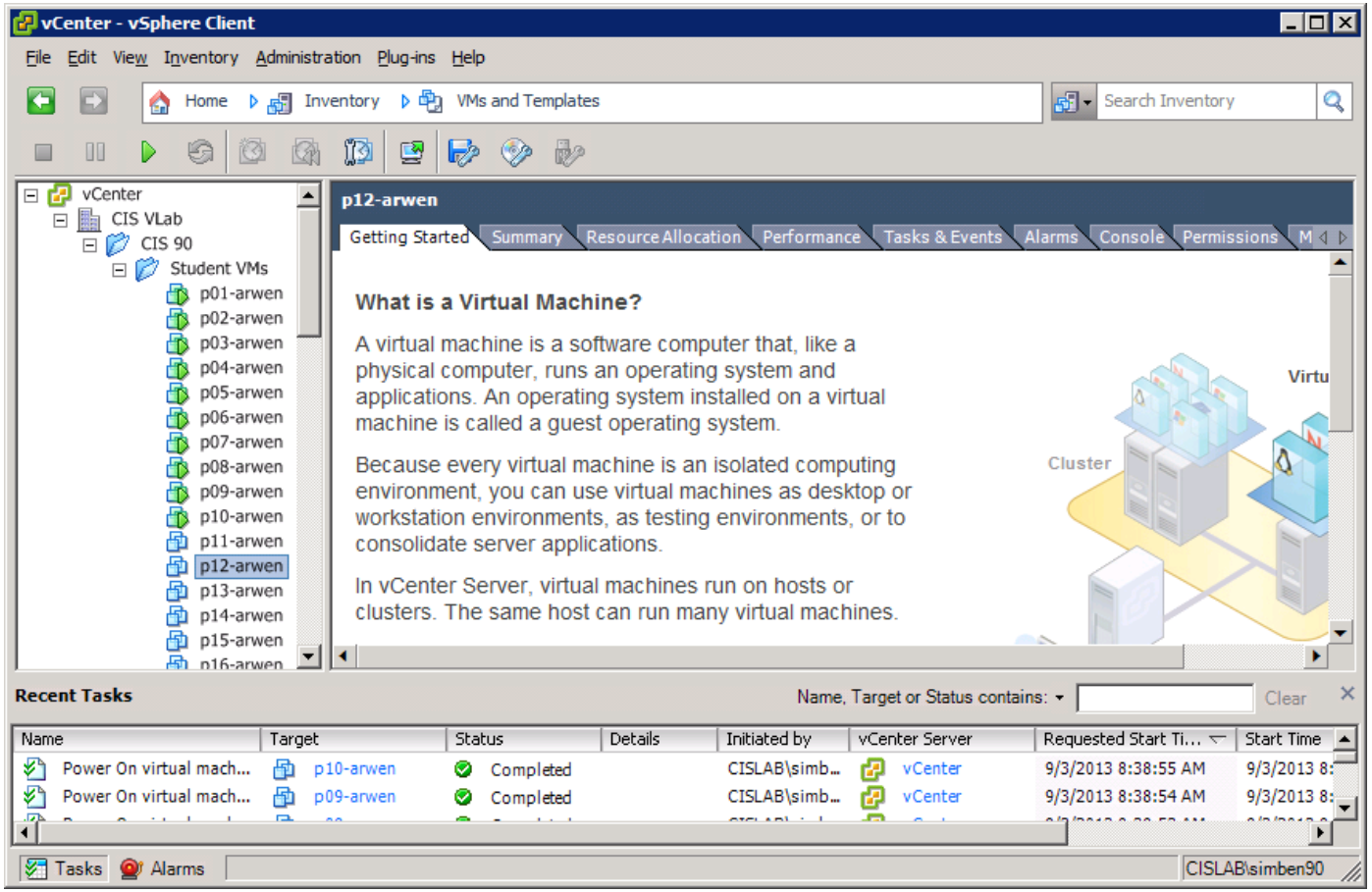
The CIS Lab

Building 800 - room 830



The CIS Lab is inside the MESA Center

CIS VLab
(A virtual lab for CIS students)



Each student gets their own Arwen VM for the term

What is a computer

What is a computer?


smart phone


tablet


desktop


mobile "laptop"


blade server


"heavy iron" server


Virtual Machine


supercomputer

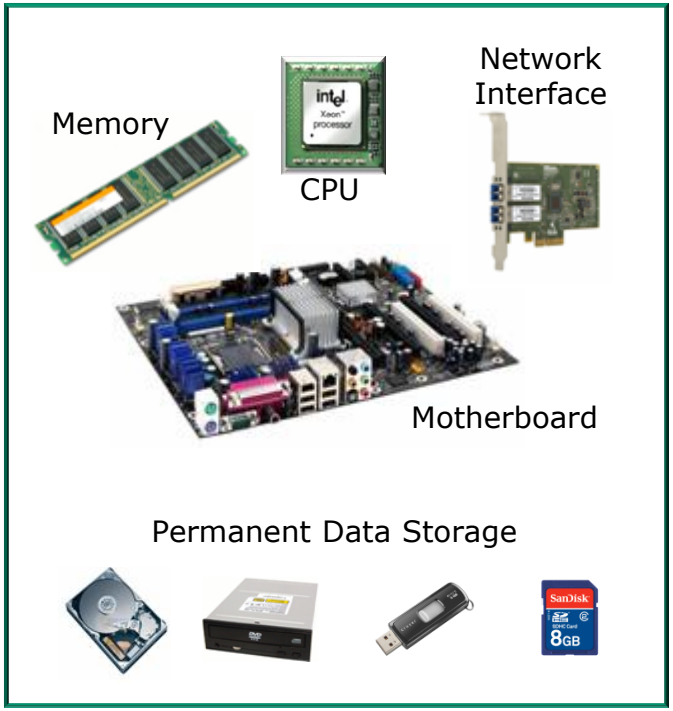

"pizza box" 1U rack server


Raspberry Pi

Computers come in a wide variety of form factors

What is a computer?

Hardware



Software

Programs/Apps

Operating System

At a high level all computers have the same basic hardware and software components

Software

Software

Users

Software: Programs/Apps

- Interface to users via graphics (GUI) or command line (CLI)
- Some programs come with the OS
- Additional programs can be purchased or downloaded
- Programs use the OS for all access hardware resources

Examples: office apps, utilities, network services, games, email, web browsers, graphics, media players, databases, command line shells, CAD/CAM, contact management, accounting, enterprise applications, custom software, etc.

Software: Operating System (OS)

- Shares hardware resources
- Loads and executes programs
- Manages processes (running programs)
- Manages memory
- Manages the file system
- Provides input/output services
- Monitors the system
- Network stack services

Examples: Windows, Linux, Unix

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") General Public License, COPYLEFT
- Examples: GNU/Linux, gimp, emacs, gcc

Proprietary

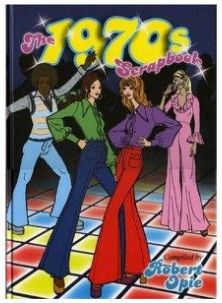
- Source code is not available
- Intellectual property
- Must be licensed to use
- Examples: Adobe Photoshop, Microsoft Windows, Mac OS X, AT&T UNIX System V

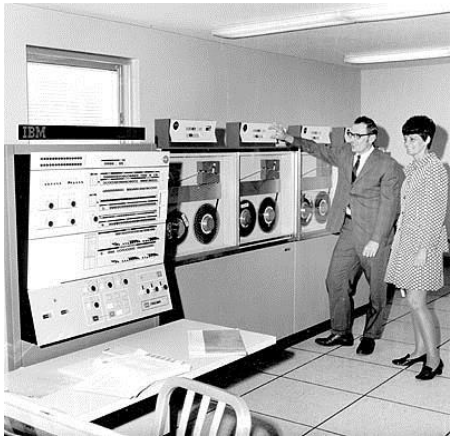
Why Study UNIX/Linux?

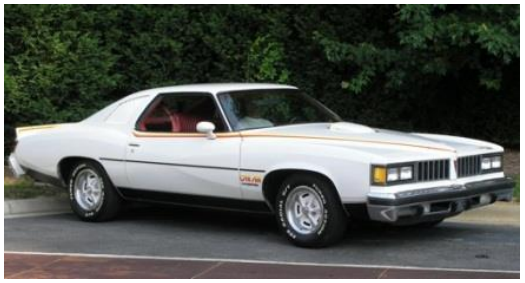
In 1971 Ken Thompson and Dennis Ritchie developed Unix at AT&T's Bell Labs

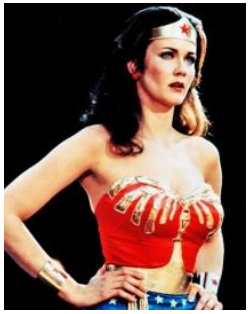
In 1971 Ken Thompson and Dennis Ritchie developed Unix at AT&T's Bell Labs

Isn't UNIX/Linux an antique Operating System dating back to the early 70's that belongs in a museum?









Heck NO !!

UNIX/Linux is widely used, constantly improved and growing fast!

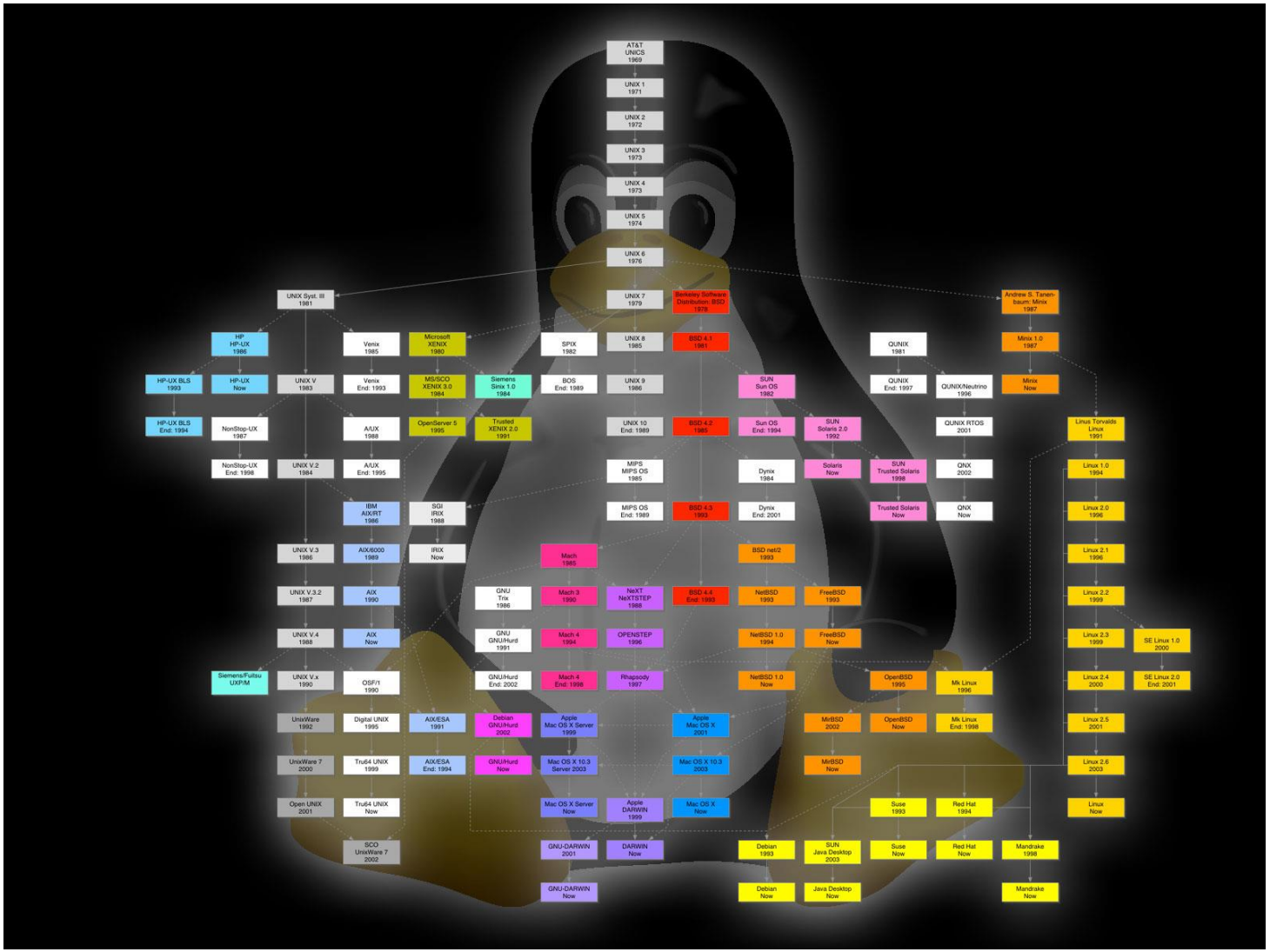
- Embedded in smartphones, tablets and many other appliances.
- Internet servers - Web, DNS, DHCP, Net News, Mail, etc.
- Enterprise and mission critical applications - Large databases, Enterprise Resource Management (ERM), Customer Relationship Management (CRM), data warehouse, manufacturing, supply chain management, etc.
- Hollywood - feature animation, visual effects, rendering farms.
- Number-crunching super computers for research.
- Companies like Google, Amazon, Facebook, PayPal, Yahoo etc. are using it to run their businesses on

Businesses and organizations that run on Linux

http://www.comparebusinessproducts.com/fyi/50-places-linux-running-you-might-not-expect

UNIX family tree

UNIX/Linux Family Tree



http://www.freebsdnews.net/wp-content/uploads/unix_family_history_tree_1600x1200.jpg

UNIX

UNIX Operating Systems

SCO UNIX

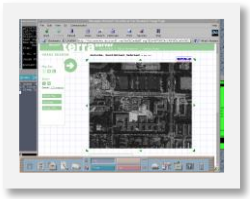
PC servers

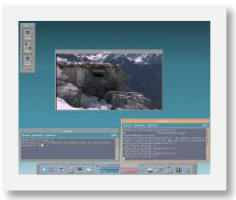
Berkeley Software Distribution

PDP 11, VAX, components found in Windows (network) and Mac OS X (Darwin)

AIX

IBM servers, mainframes and workstations





HP-UX

HP servers and workstations

Solaris

Sun servers and workstations

Desktops and laptops

Apple Mac OS X and iOS

Smartphones and tablets

UNIX operating systems are found on all types of computers from high end commercial mainframes, servers, and workstations to consumer focused Apple desktop and mobile devices

Embedded UNIX in Apple Products

Apple iOS

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

Sources: http://en.wikipedia.org/wiki/Darwin_(operating_system)
http://en.wikipedia.org/wiki/IOS_(Apple)
http://code.google.com/p/mobileterminal/

(GNU) Linux

Various Linux Distributions for PCs and Servers

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 Linux Distro Downloads

15 Most Downloaded Distribution Versions (last 30 Days)	15 Most Downloaded Distributions (Ever)
1. BackTrack 5 R3 (194567)	1. Fedora
2. CentOS 6.3 (61005)	2. Red Hat Enterprise Linux
3. BackTrack 5 R2 (9363)	3. Mandriva
4. Puppy Linux 5.4 (8294)	4. SUSE
5. Zorin OS 6.2 "Lite" (4588)	5. Ubuntu
6. FreeBSD 8.3 (2119)	6. CentOS
7. Slax 7.0.4 (1744)	7. Damn Small Linux
8. Damn Small Linux 4.4.10 (1454)	8. Knoppix
9. Ubuntu 12.10 (1397)	9. Debian
10. Ubuntu 12.04.2 (734)	10. Slackware
11. Oracle Linux 6 Update 1 (498)	11. PCLinuxOS
12. KNOPPIX 7.0.4 (419)	12. MEPIS
13. KNOPPIX 5.1.1 (398)	13. Linux Mint
14. Oracle Linux 6.3 (381)	14. Gentoo
15. Wifislax 4.3 (354)	15. Puppy Linux

Jan 21, 2014

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

Embedded Linux (just a few)

Katana Robotic Arm

Asus RT-AC66U wireless router

Tivo

Yamaha Disklavier Mark IV

Android

Some TomTom GPS models

Garmin Nuvi 5000

Buffalo NAS storage

Virgin America Personal Entertainment

MikroTik Routers

Sony TVs

Android Tablets

Raspberry Pi

http://linuxgizmos.com/category/devices/

The Open-Source Car

Summary: *Toyota is joining the Linux Foundation.*

By Steven J. Vaughan-Nichols for Linux and Open Source | July 5, 2011 -- 10:13 GMT (03:13 PDT)

Follow @sjvn

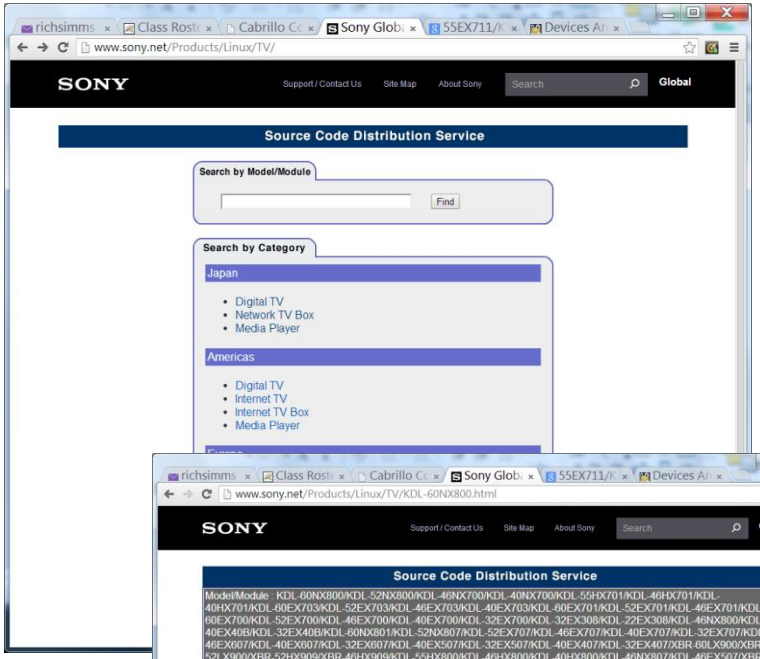
Besides a V6 as your engine, your car is very likely to soon be running Linux under the hood. The Linux Foundation will be announcing today that Toyota is joining the Foundation.

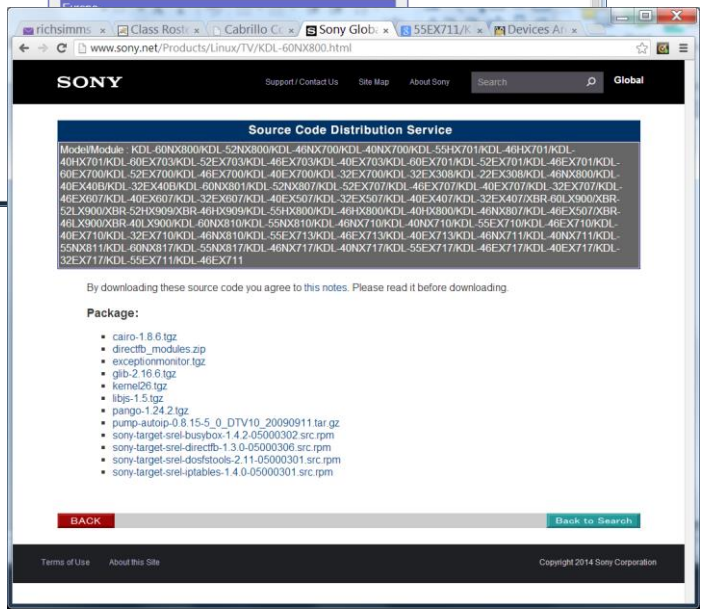
Some of you may be wondering, "What the heck is a car company doing joining the Linux Foundation?" The answer is easy. As the Foundation puts it, "A major shift is underway in the automotive industry. Car-makers are using new technologies to deliver on consumer expectations for the same connectivity in their cars as they've come to expect in their homes and offices. From dashboard computing to In-Vehicle-Infotainment (IVI), automobiles are becoming the latest wireless devices - on wheels."

And, what's one of the most popular systems for dashboard computing, heads-up driving displays and IVI? It's Linux, of course.

< snipped >

http://www.zdnet.com/blog/open-source/the-open-source-car/9193





http://www.sony.net/Products/Linux/common/search.html

UNIX/Linux Architecture simplified

UNIX/Linux Architecture
Simplified View - Four Major Components

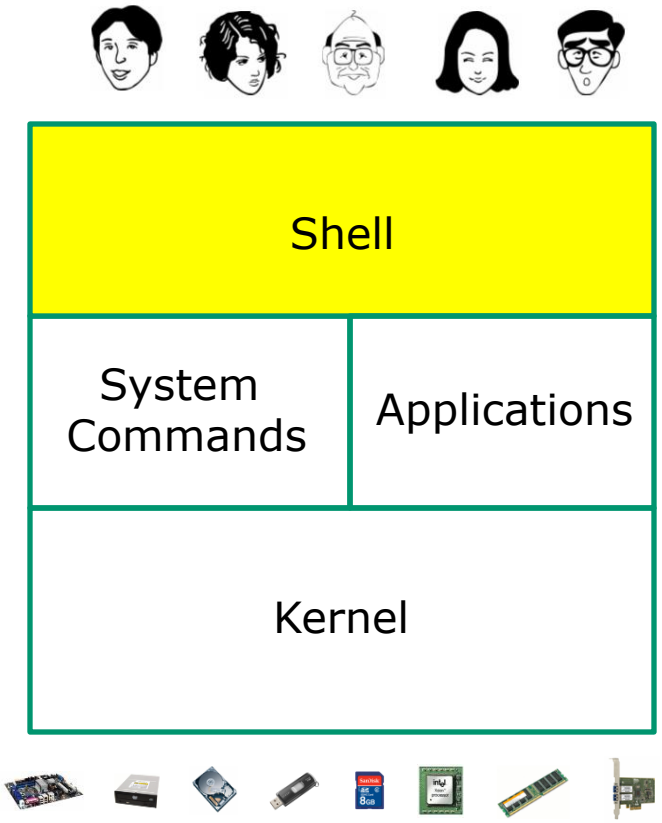
Users

Software

Shell (a program)	
System Commands (programs)	Applications (programs)
Kernel (low level operating system functions)	

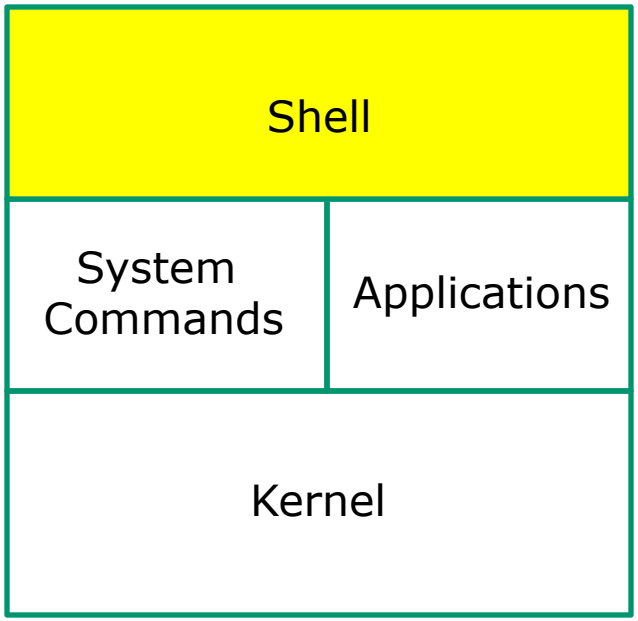
Hardware

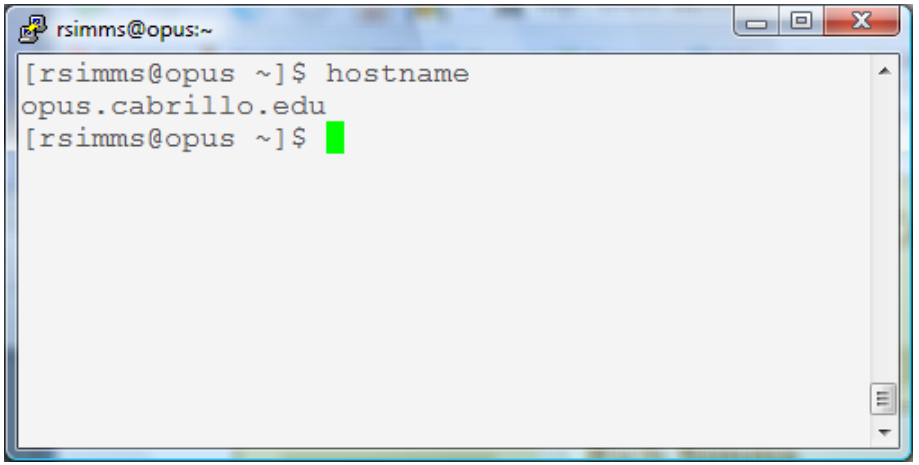
UNIX/Linux Architecture
The Shell

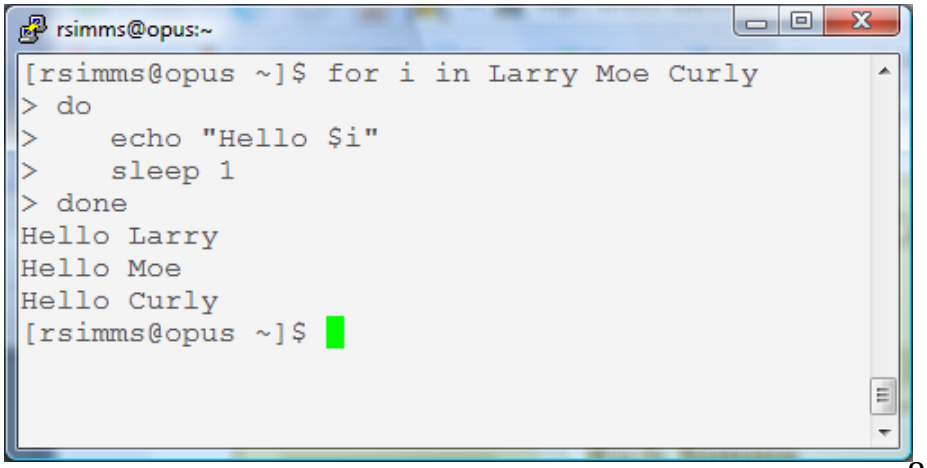


- Allows users to interact with the computer via a "command line".
- Prompts for a command, parses the command, finds the right program and gets that program executed.
- Called a "shell" because it hides the underlying operating system.
- Many shell programs are available:
  sh (Bourne shell), bash ("Born/Bourne" 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

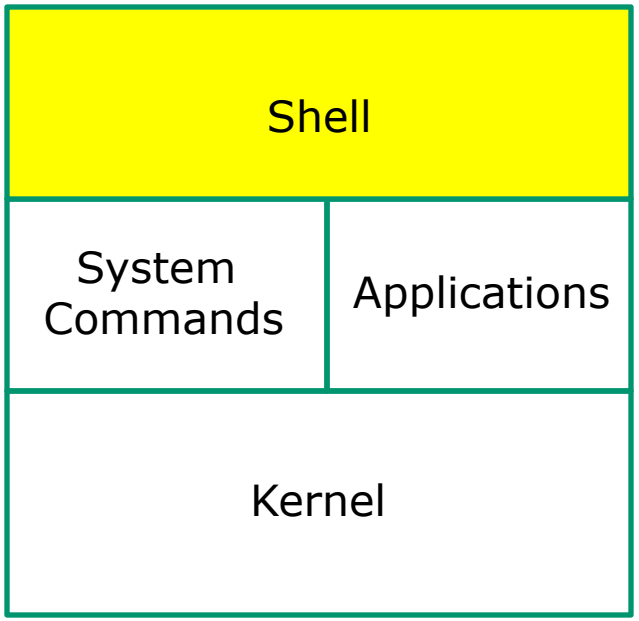






The shell is a user interface and a programming language

UNIX/Linux Architecture
Various types of user interfaces



Shell Command Line Interface (CLI)

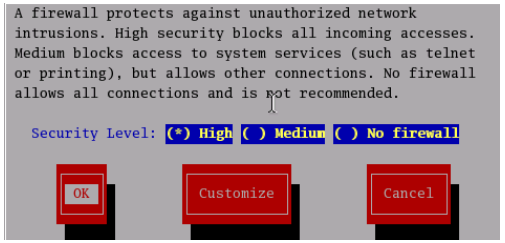
```
[root@frida root]# iptables -L -t nat
Chain PREROUTING (policy ACCEPT)
target     prot opt source               destination

Chain POSTROUTING (policy ACCEPT)
target     prot opt source               destination

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

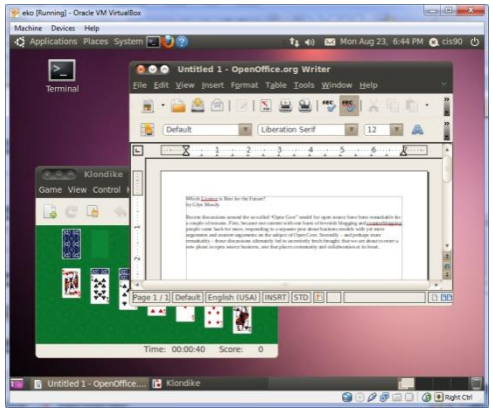
bash

Text User Interface (TUI)



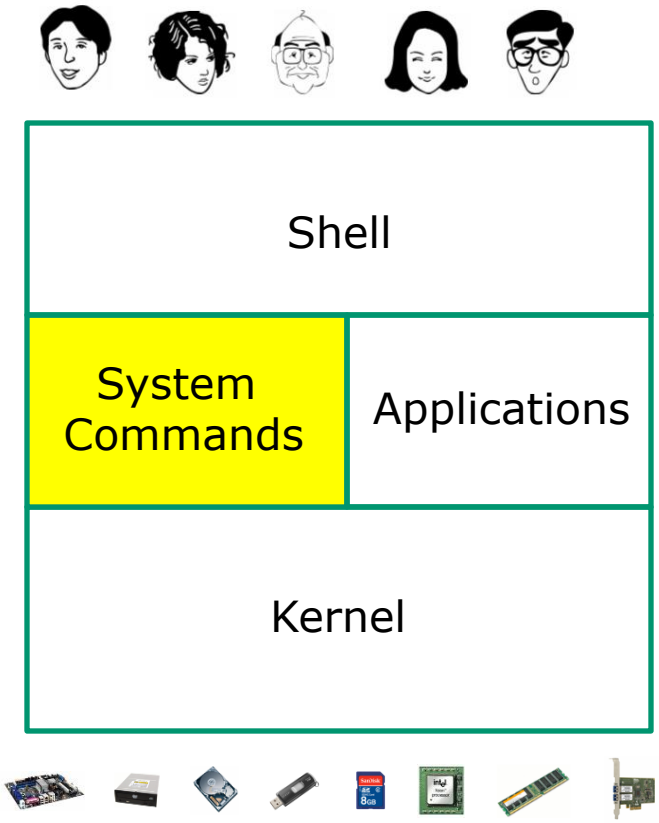
Lokkit Utility (uses curses library)

Graphic shells or desktops (GUI)



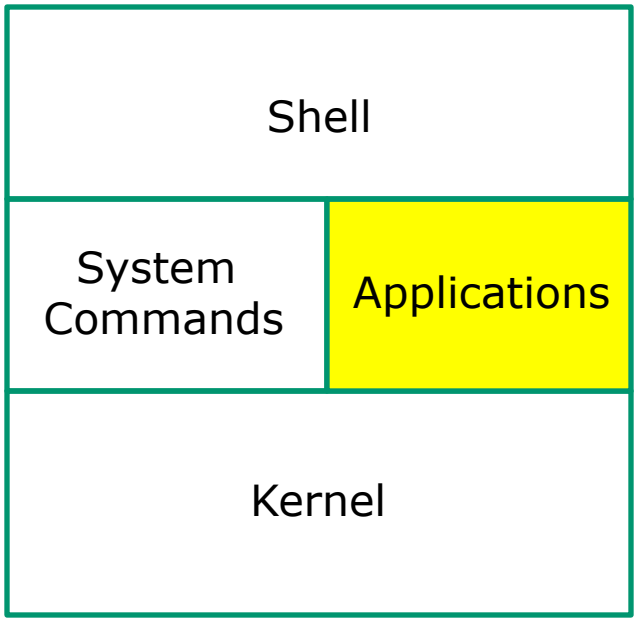
gnome

UNIX/Linux Architecture
System Commands



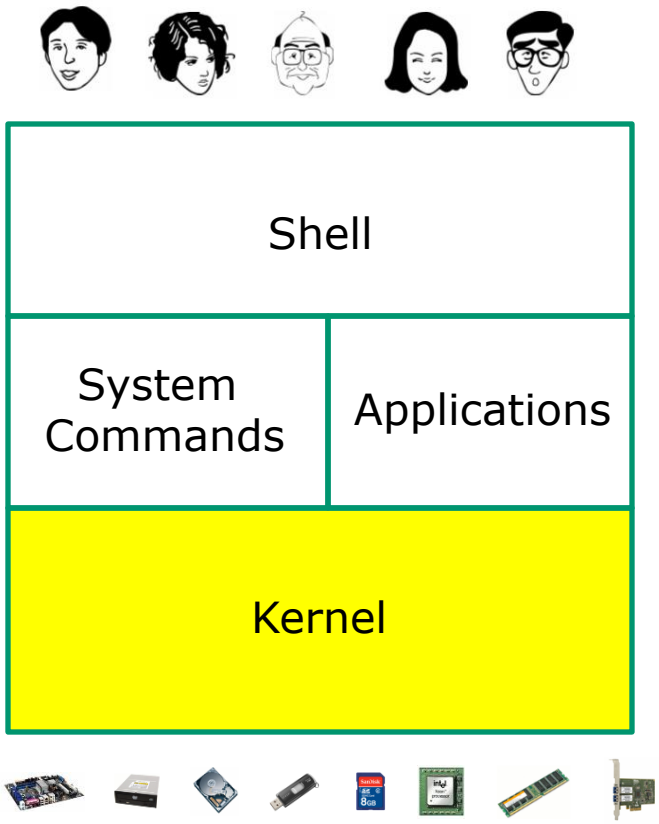
- 100's of system commands and utilities .
- Commands like **ls** (list directories), **cat** (print a file), **rm** (remove a file), … etc.
- Utilities like **vi** (text editor), **sort** (sorts file contents), **find** (searches), … etc.
- Larger utilities like **sendmail** (email), **tar** (backup),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

UNIX/Linux Architecture
Applications



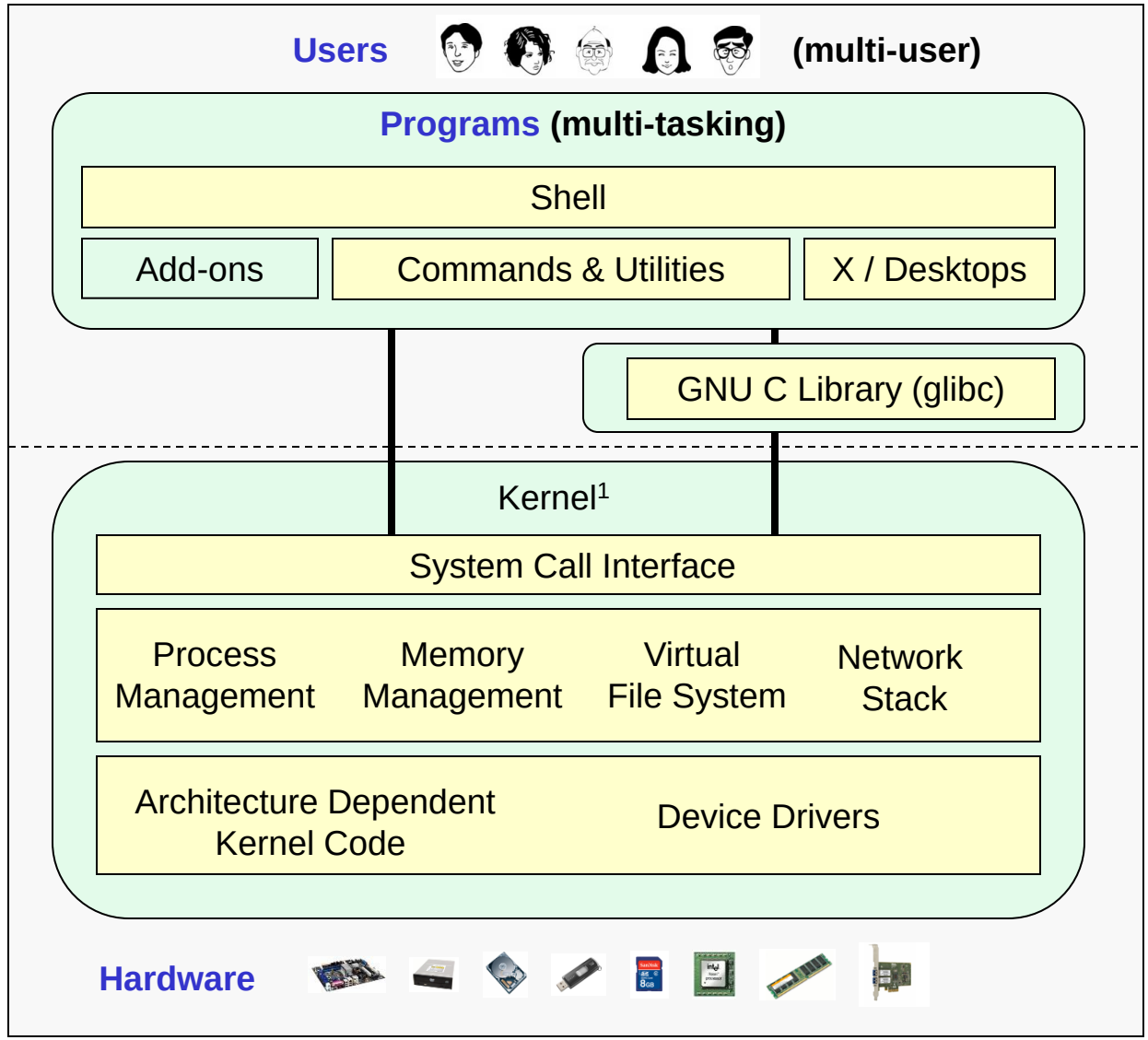
- Could be included in the distribution or optionally installed.
- Could be an add-on program developed by an ISV (Independent Software Vendor) or Open Source organization.
- Could be an in-house developed custom application.
- Examples are **Apache** (web server), **GIMP** (GNU image manipulation program),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

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.

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

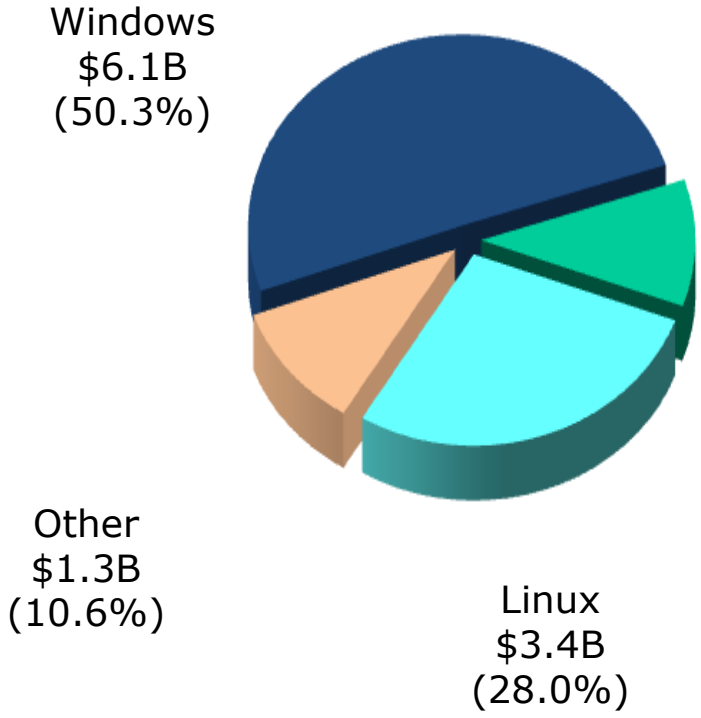
UNIX/Linux Design "Observations"

- 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 modular "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 !!

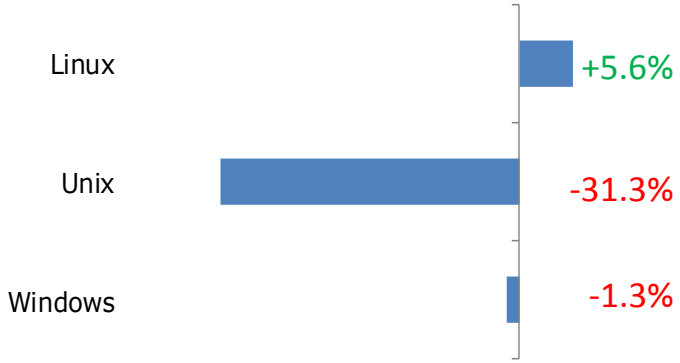
Market Share


Worldwide Server Market

$12.1 Billion Server Revenue Q3 2013



Year over Year Change



Source: IDC, Nov 2013

http://www.idc.com/getdoc.jsp?containerId=prUS24476413

Website hits by browser OS

Dec 2011[2]

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%

15.8%

Jan 2013[3]

Operating Systems		
1	Windows 7	44.13%
2	Windows XP	23.70%
3	iOS	8.79%
4	Apple OS X	8.52%
5	Windows Vista	5.48%
6	Android	3.75%
7	Windows 8	2.28%
8	Linux	1.74%
9	BlackBerry	0.61%
10	SymbianOS	0.23%

22.8%

Dec 2013[3]

Operating Systems		
1	Windows 7	40.93%
2	Windows XP	14.32%
3	Mac OS X	8.45%
4	iOS 7	7.33%
5	Windows 8	7.20%
6	Android 4	5.31%
7	Windows Vista	3.26%
8	Linux	2.12%
9	iOS 6	2.08%
10	Android 2	1.15%

26.3%

1-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.

2-This report was generated 01/31/2013 based on the last 15,000 page views to each website tracked by W3Counter. W3Counter's sample currently includes 63,187 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 12/31/2013 based on the last 15,000 page views to each website tracked by W3Counter. W3Counter's sample currently includes 71,069 websites. The browser market share graph includes data from all versions of the named browser families, not only the top 10 as listed below.

W3Counter

source: http://www.w3counter.com/globalstats.php

Smartphones

Worldwide Smartphone Sales to End Users by Operating System in 3Q13 (Thousands of Units)

	Operating System	3Q13 Units	3Q13 Market Share (%)	3Q12 Units	3Q12 Market Share (%)
Google	Android ↑	205,022.7	81.9	124,552.3	72.6
Apple	iOS ↓	30,330.0	12.1	24,620.3	14.3
	Microsoft ↑	8,912.3	3.6	3,993.6	2.3
	BlackBerry	4,400.7	1.8	8,946.8	5.2
	Bada	633.3	0.3	4,454.7	2.6
	Symbian	457.5	0.2	4,401.3	2.6
	Others	475.2	0.2	683.7	0.4
	Total	**250,231.7**	**100.0**	**171,652.7**	**100.0**

Source: Gartner (November 2013)

http://www.gartner.com/newsroom/id/2623415

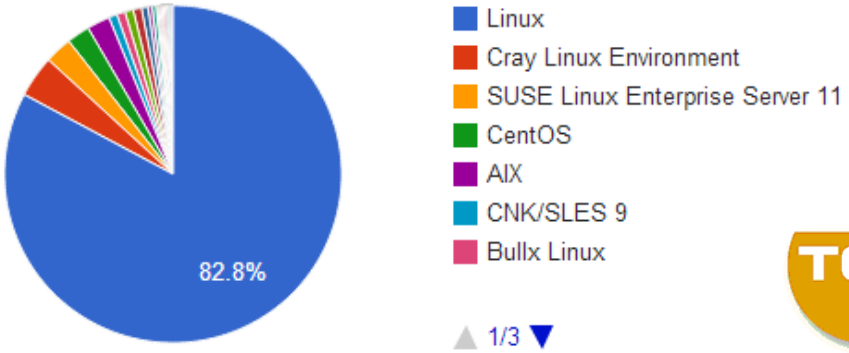
Tablets

Top Tablet Operating Systems, Shipments, and Market Share, Second Quarter 2013 (Shipments in Millions)

Vendor	2Q13 Unit Shipments	2Q13 Market Share	2Q12 Unit Shipments	2Q12 Market Share	Year-over-Year Growth
1. Android ↑ (Google)	28.2	62.6%	10.7	38.0%	162.9%
2. iOS ↓ (Apple)	14.6	32.5%	17.0	60.3%	-14.1%
3. Windows ↑	1.8	4.0%	0.3	1.0%	527.0%
4. Windows RT	0.2	0.5%	N/A	N/A	N/A
5. BlackBerry OS	0.1	0.3%	0.2	0.7%	-32.8%
Others	0.1	0.2%	N/A	N/A	N/A
Total	**45.1**	**100.0%**	**28.3**	**100.0%**	**59.6%**

http://www.idc.com/getdoc.jsp?containerId=prUS24253413

Operating System Share (by system)
November 2013



Linux dominates the Supercomputer market

TOP500® SUPERCOMPUTER SITES

Operating System	Count	System Share (%)	Rmax (GFlops)	Rpeak (GFlops)	Cores
Linux	414	82.8	158,369,073	230,603,624	14,277,307
Cray Linux Environment	20	4	30,911,722	43,804,792	1,302,984
SUSE Linux Enterprise Server 11	13	2.6	9,174,795	13,081,620	432,150
CentOS	11	2.2	2,685,015	3,654,410	192,552
AIX	11	2.2	3,496,347	4,208,920	137,536
CNK/SLES 9	4	0.8	1,184,521	1,420,492	417,792
Bullx Linux	4	0.8	1,103,827	1,330,204	50,960
RHEL 6.2	4	0.8	1,738,900	2,132,582	102,528
Redhat Enterprise Linux 6	4	0.8	2,571,639	3,388,905	321,976
bullx SUperCOmputer Suite A.E.2.1	3	0.6	2,942,070	3,583,180	165,888
Redhat Linux	2	0.4	327,834	424,760	26,636
SLES10 + SGI ProPack 5	2	0.4	398,000	439,910	38,400
RHEL 6.1	1	0.2	230,600	340,915	37,056
SUSE Linux	1	0.2	274,800	308,283	26,304
Kylin Linux	1	0.2	33,862,700	54,902,400	3,120,000
Super-UX	1	0.2	122,400	131,072	1,280
Windows Azure	1	0.2	151,300	167,731	8,064
CNL	1	0.2	165,600	201,216	20,960
Windows HPC 2008	1	0.2	180,600	233,472	30,720
Scientific Linux	1	0.2	188,725	199,680	9,600


Tianhe-2 supercomputer in China


Cray XK7 Titan at Oak Ridge National Lab


Sequoia, IBM BlueGene/Q at Lawrence Livermore Lab


Fujitsu K computer in Japan

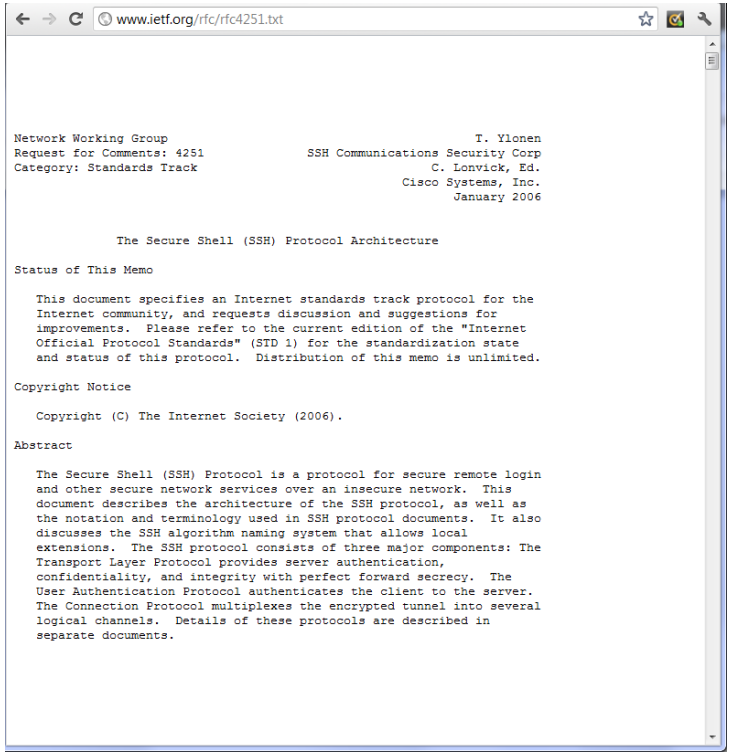

Mira, IBM BlueGene/Q at Argonne Lab

Source: http://www.top500.org/statistics/list/

SSH (secure shell)

Getting the car keys

SSH (secure shell) is a standards based protocol for remotely logging into and running commands on a UNIX/Linux system



www.ietf.org/rfc/rfc4251.txt

Network Working Group T. Ylonen
Request for Comments: 4251 SSH Communications Security Corp
Category: Standards Track C. Lonvick, Ed.
Cisco Systems, Inc.
January 2006

The Secure Shell (SSH) Protocol Architecture

Status of This Memo

This document specifies an Internet standards track protocol for the Internet community, and requests discussion and suggestions for improvements. Please refer to the current edition of the "Internet Official Protocol Standards" (STD 1) for the standardization state and status of this protocol. Distribution of this memo is unlimited.

Copyright Notice

Copyright (C) The Internet Society (2006).

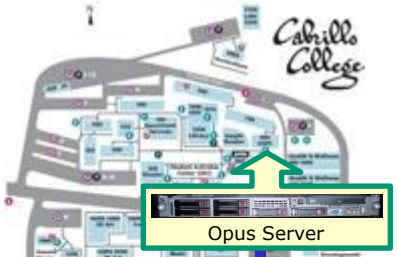
Abstract

The Secure Shell (SSH) Protocol is a protocol for secure remote login and other secure network services over an insecure network. This document describes the architecture of the SSH protocol, as well as the notation and terminology used in SSH protocol documents. It also discusses the SSH algorithm naming system that allows local extensions. The SSH protocol consists of three major components: The Transport Layer Protocol provides server authentication, confidentiality, and integrity with perfect forward secrecy. The User Authentication Protocol authenticates the client to the server. The Connection Protocol multiplexes the encrypted tunnel into several logical channels. Details of these protocols are described in separate documents.

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

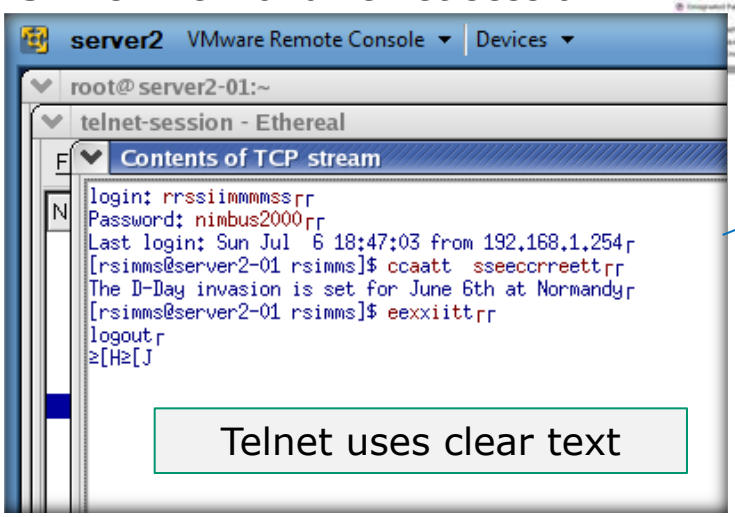
Picture credit:
http://www.cs.umd.edu/faq/ssh.html

SSH is a network protocol that enables secure connections between computers

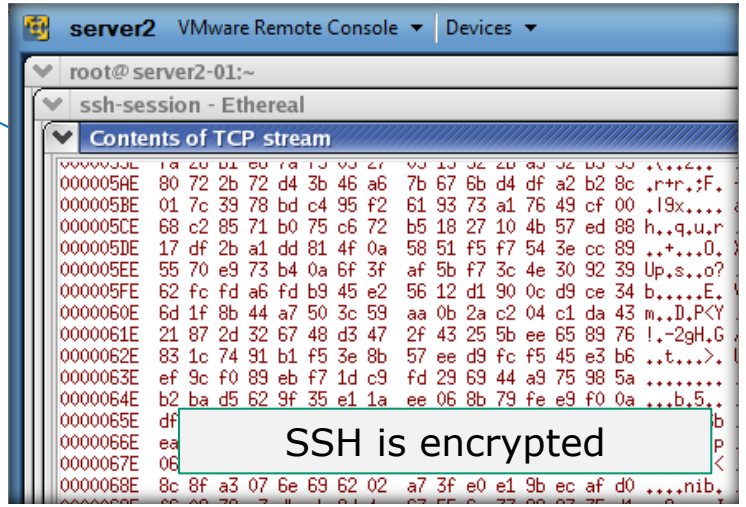


Remote Server

Old way: **telnet**
Sniffer view of a Telnet session



New way: **ssh**
Sniffer view of a SSH session



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

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

Local computer at home or on campus

SSH client tools may need to be installed

- Linux and Mac already have SSH built in (i.e. the **ssh** command)
- Android smartphones and tablets can use SSH apps such as the **ConnectBot** or **Juice** apps
- Apple iPhones and tablets can use ssh apps such as the **iSSH** app
- Windows users can download and install the **Putty** app

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

Class Activity – SSH Prep

Operating System	 **Students in the classroom**	 **Students at home**
	 • Run the Putty program	 • Google "putty download" • Download the putty.exe binary to your desktop • Run the Putty program http://www.chiark.greenend.org.uk/~sgtatham/putty/download.html
 		• Run the terminal app

Logging Into Opus via SSH

Start the car engine

Logging into Opus from your home or classroom computer

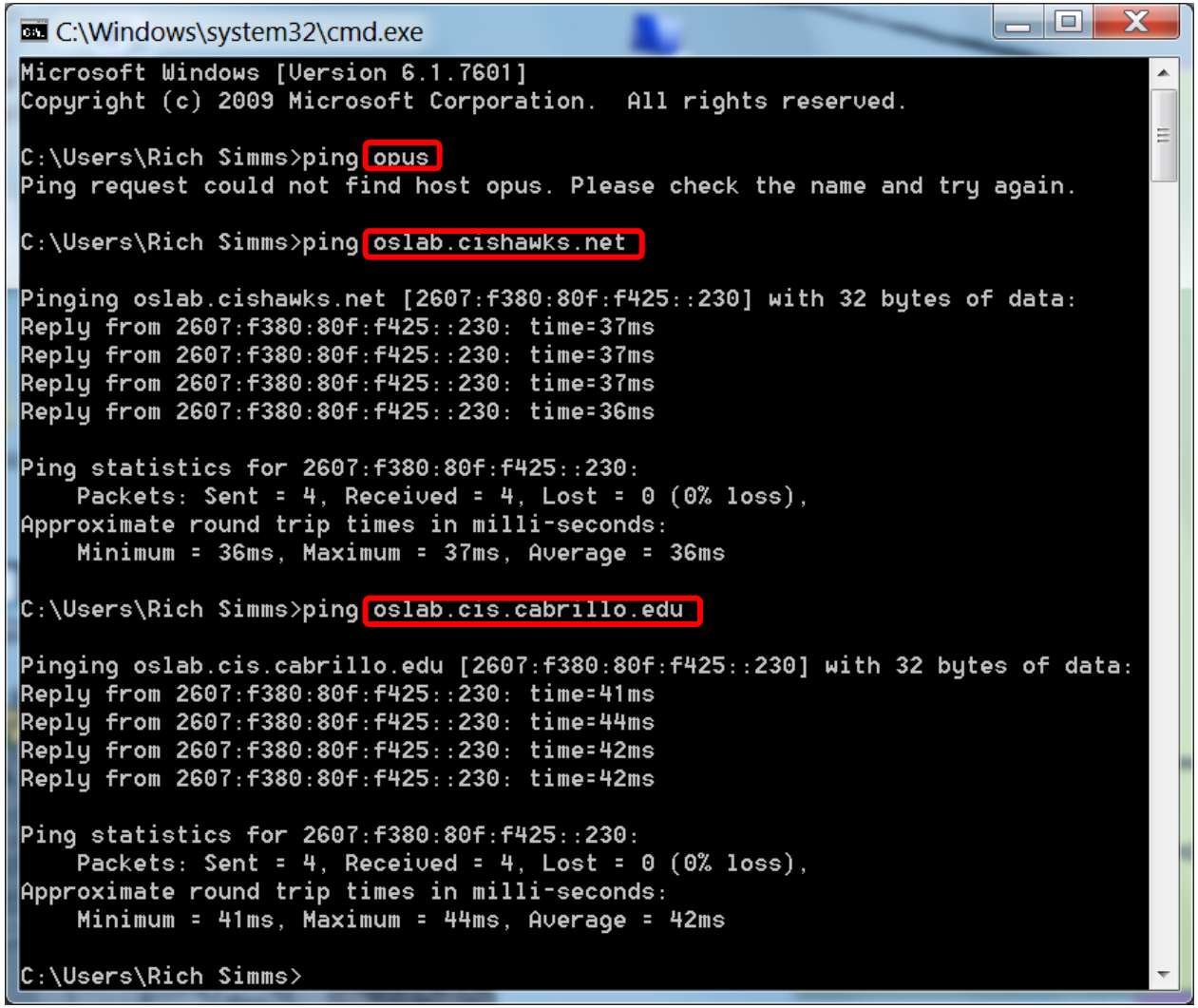
Opus (AKA oslab)

- The primary server used in CIS 90 is Opus. Opus is the name of a CentOS Linux server that runs in the CIS datacenter.
- Externally, on the Internet this server currently goes by two hostnames:

  oslab.cis.cabrillo.edu
  oslab.cishawks.net

- Internally, in the CIS Lab or classrooms, this server also goes by just the "Opus" hostname.

Using ping command to test network connectivity



Outside of the CIS Lab and CIS classrooms you must refer to the Opus server as either "oslab.cishawks.net" or "oslab.cis.cabrillo.edu" to connect.

Using ping command to test network connectivity

```
Linux Mint 15 Olivia p03-arwen tty1
p03-arwen login: cis90
Password:
Last login: Sun Sep  1 19:48:05 PDT 2013 on tty5
Welcome to Linux Mint 15 Olivia (GNU/Linux 3.8.0-26-generic x86_64)

Welcome to Linux Mint
 * Documentation:  http://www.linuxmint.com
cis90@p03-arwen:~ > ping -c2 opus
PING oslab.cis.cabrillo.edu (172.30.5.20) 56(84) bytes of data.
64 bytes from opus.cis.cabrillo.edu (172.30.5.20): icmp_req=1 ttl=63 time=0.547 ms
64 bytes from opus.cis.cabrillo.edu (172.30.5.20): icmp_req=2 ttl=63 time=0.672 ms

--- oslab.cis.cabrillo.edu ping statistics ---
2 packets transmitted, 2 received, 0% packet loss, time 1001ms
rtt min/avg/max/mdev = 0.547/0.609/0.672/0.067 ms
cis90@p03-arwen:~ > ping -c2 oslab.cishawks.net
PING oslab.cishawks.net (172.30.5.20) 56(84) bytes of data.
64 bytes from opus.cis.cabrillo.edu (172.30.5.20): icmp_req=1 ttl=63 time=0.683 ms
64 bytes from opus.cis.cabrillo.edu (172.30.5.20): icmp_req=2 ttl=63 time=0.674 ms

--- oslab.cishawks.net ping statistics ---
2 packets transmitted, 2 received, 0% packet loss, time 1001ms
rtt min/avg/max/mdev = 0.674/0.678/0.683/0.026 ms
cis90@p03-arwen:~ > ping -c2 oslab.cis.cabrillo.edu
PING oslab.cis.cabrillo.edu (172.30.5.20) 56(84) bytes of data.
64 bytes from opus.cis.cabrillo.edu (172.30.5.20): icmp_req=1 ttl=63 time=0.560 ms
64 bytes from opus.cis.cabrillo.edu (172.30.5.20): icmp_req=2 ttl=63 time=0.618 ms

--- oslab.cis.cabrillo.edu ping statistics ---
2 packets transmitted, 2 received, 0% packet loss, time 1001ms
rtt min/avg/max/mdev = 0.560/0.589/0.618/0.029 ms
cis90@p03-arwen:~ >
```

Inside the CIS Lab and CIS classrooms you may refer to the Opus server as "opus", "oslab.cishawks.net" or "oslab.cis.cabrillo.edu" to connect.

SSH connection to a UNIX/Linux Server

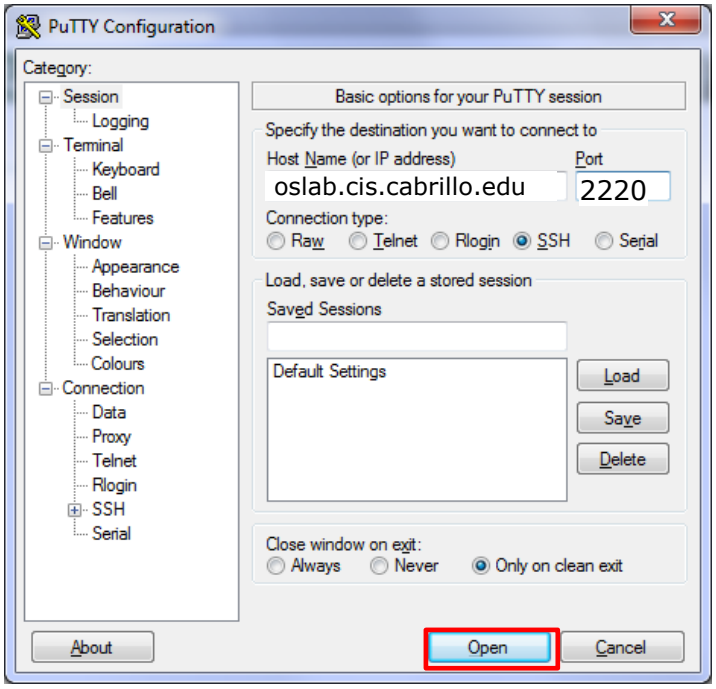
You need to know three things:

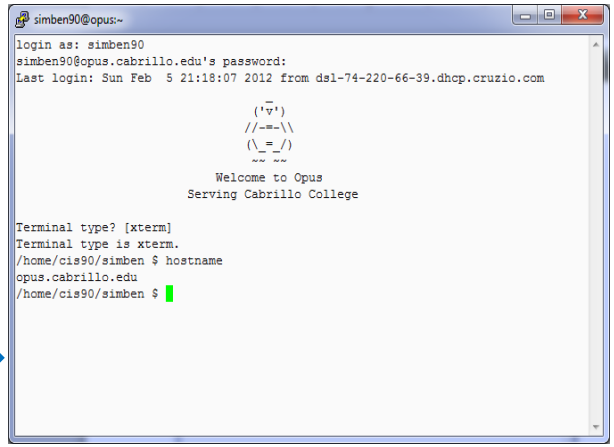
- The **hostname** or **IP Address** of the remote server (hostnames must be *fully qualified domain names* when going over the Internet)
- Your **login credentials** (**username** and **password**) on the remote server
- The **port number** the SSH service is listening on (the default is port 22)

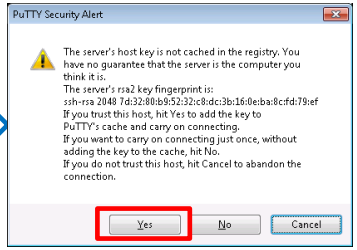
Logging into Opus from **home** via **Windows**

Opus

On Windows run Putty





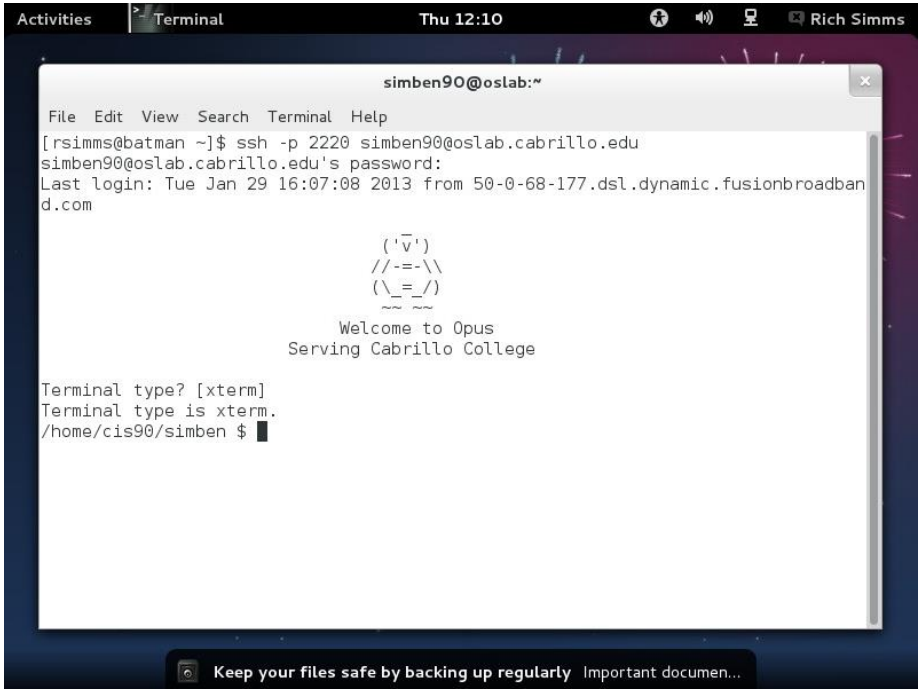


The first time a connection is made to a server this warning is displayed.

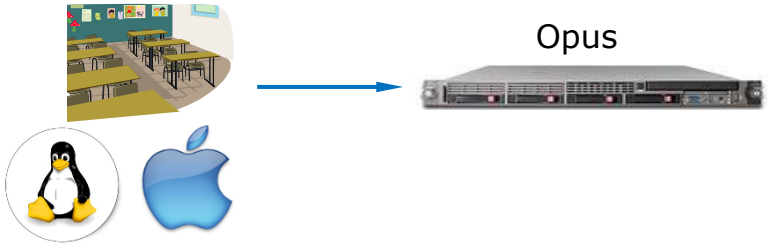
Logging into Opus from **home** via **Mac** or **Linux** computer

Opus

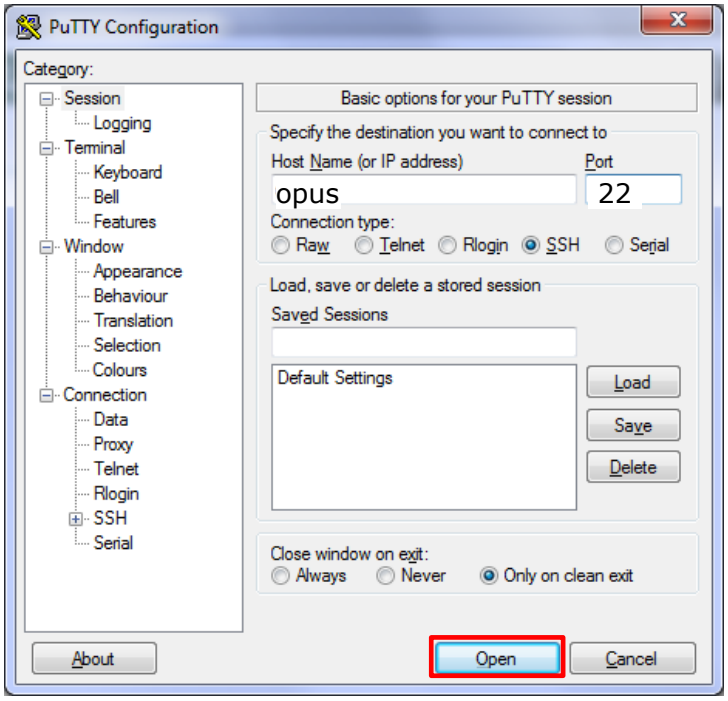
On a Mac or Linux terminal:
ssh -p 2220 *username*@**oslab.cis.cabrillo.edu**



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



On Windows run Putty:



On a Mac or Linux terminal:

ssh *username*@**opus**

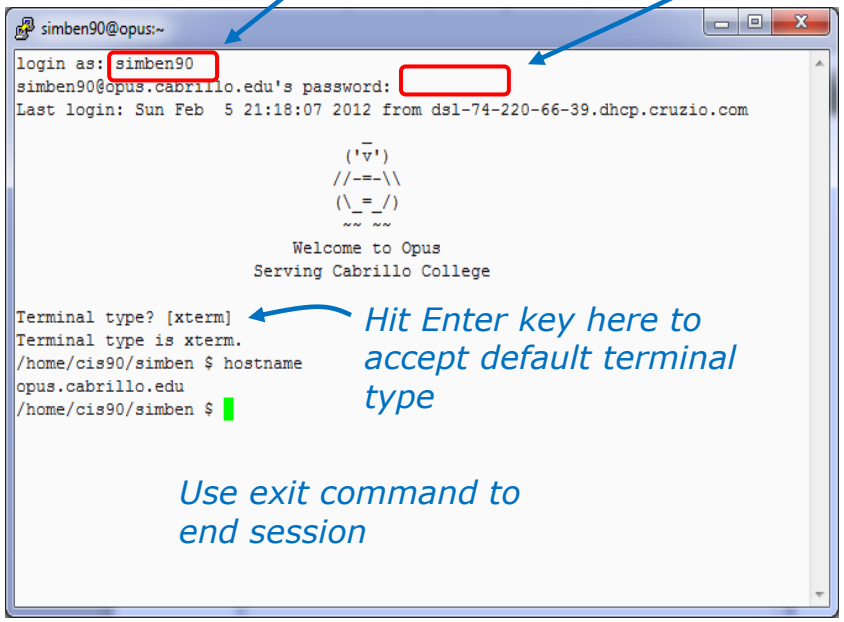
When connected to the CIS network rather than the Cabrillo campus network you can just use "opus" as the hostname with port 22

Accessing Opus from a Windows PC using Putty

Log in with username and password

username

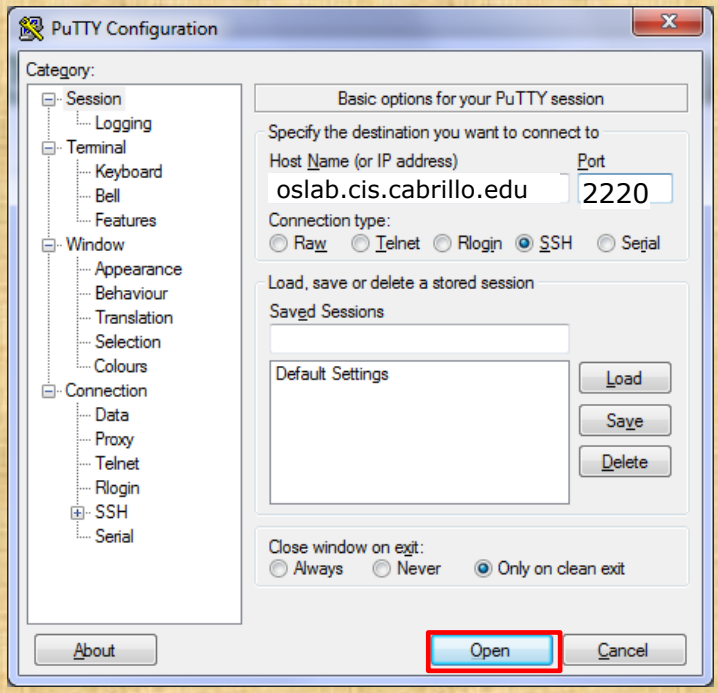
password
(not echoed)

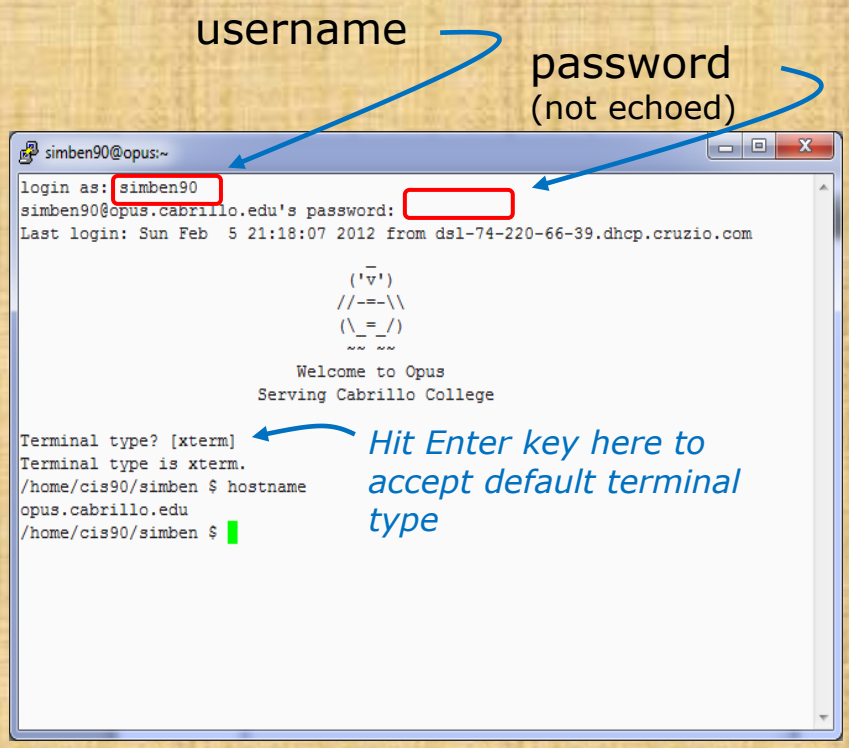


Note: If you specified the username in Putty or on the ssh command you will not be prompted for the username again.

Class Activity
Log into Opus

On Windows run Putty





Respond "yes" to security fingerprint alert if it appears

On a Mac or Linux terminal type:

ssh -p 2220 *username*@**oslab.cis.cabrillo.edu**

Lesson 1 Commands

First driving lesson

First commands for your toolbox

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, including the name of the shell being run
uname	- show the 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	- shows your terminal device
id	- show user info including username/UID and group/GID
history	- show previous commands
exit	- terminate your shell and log off

Logging in via ssh

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

                          _
                         ('v')
                        //-=-\\
                        (\_=_/)
                         ~~ ~~
                    Welcome to Opus
                 Serving Cabrillo College

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

Hit Enter key here to accept default terminal type

Shell prompt - used by the shell to prompt the user to enter a command

cal command

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

cal command continued

```
/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*

date command

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

*The **date** command runs the date program which putputs the current date and time.*

CLI terminology: prompt-command-output

*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
```

Class Activity

What day of the week was December 7th, 1941?

Hint: use the **cal** command

Write your answer in the chat window

clear command

```
/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)

hostname command

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

*The **hostname** command shows the name of the system you are interacting with.*

ps command

*The **ps** command shows the processes (programs loaded into memory and running) belonging to your username.*

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

name of the shell being run

*This is an easy way to see the name of the shell program. In this example the **bash** shell is being run.*

Some common shells:

sh: Bourne shell
bash: born-again shell
ksh: Korn shell
csh: C shell

Class Activity

What shell is this user running?

```
razia:~> ps
  PID TTY          TIME CMD
 3196 pts/0    00:00:00 sh
 3230 pts/0    00:00:00 ps
razia:~>
```

Write your answer in the chat window

uname command

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

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

cat command (to show the name of the distribution)

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

Name of distro *Version of distro*

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

*These two **cat** commands can usually be used to show the name of the **Linux distribution** being used.*

In this example the CentOS 6.2 distribution is being used.

cat command (to show the name of the distribution)

```
simben90@doc:~$ cat /etc/issue
Ubuntu 13.04 \n \l
```

Name of distro

Version of distro

```
simben90@doc:~$ cat /etc/*-release
DISTRIB_ID=Ubuntu
DISTRIB_RELEASE=13.04
DISTRIB_CODENAME=raring
DISTRIB_DESCRIPTION="Ubuntu 13.04"
NAME="Ubuntu"
VERSION="13.04, Raring Ringtail"
ID=ubuntu
ID_LIKE=debian
PRETTY_NAME="Ubuntu 13.04"
VERSION_ID="13.04"
HOME_URL="http://www.ubuntu.com/"
SUPPORT_URL="http://help.ubuntu.com/"
BUG_REPORT_URL="http://bugs.launchpad.net/ubuntu/"
```

*These two **cat** commands can usually be used to show the name of the **Linux distribution** being used.*

In this example the Ubunu 13.04 distribution is being used.

who command

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

username

terminal device used for login session

date and time of login

where (hostname or IP address) user logged in from

Class Activity

Where (hostname or IP address) did you log into Opus from?

Hint: use the **who** command

Write your answer in the chat window

who am i command

```
/home/cis90/simben $ who am i
simben90 pts/0        2012-08-27 09:00 (50-0-68-235.dsl.dynamic.fusion.com)
```

username	*terminal device used for login session*	*date and time of login*	*where (hostname or IP address) user logged in from*

*The **who** command with arguments "**am**" and "**i** outputs only one line which is the specific login session you are using.*

This is a good way to distinguish which session you are currently interacting with when you have more than one login session underway.

Class Activity

What terminal device are you using for your Opus login session?

Write your answer in the chat window

tty command

```
/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

Class Activity

Does output from the **who**, **who am i** and **tty** commands indicate the same terminal device for your login session?

Write your answer in the chat window

id command

```
/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
```

UID number *username*

*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 (UID) 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 milhom90 is 1002 and for rsimms it is 201.*

Class Activity

What is your username and UID number?

Write your answer in the chat window

history command

```
/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*

Class Activity

What is the first command you used on Opus?

Write your answer in the chat window

exit command

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

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

Housekeeping

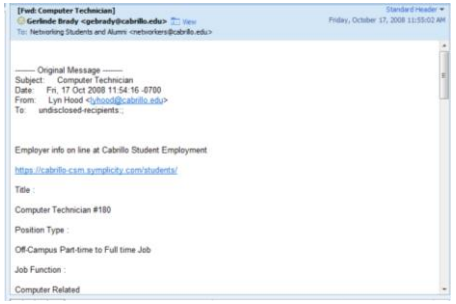
- Add codes available after class
  - You can stop by before you leave or email me
  - Last day to add is 2/8/2014

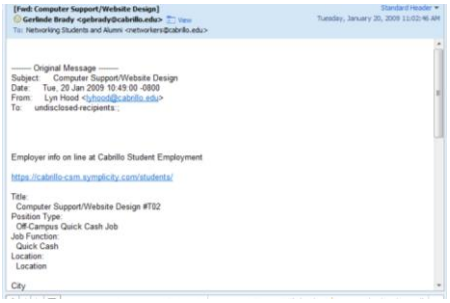
Cabrillo Networking Program Mailing list

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

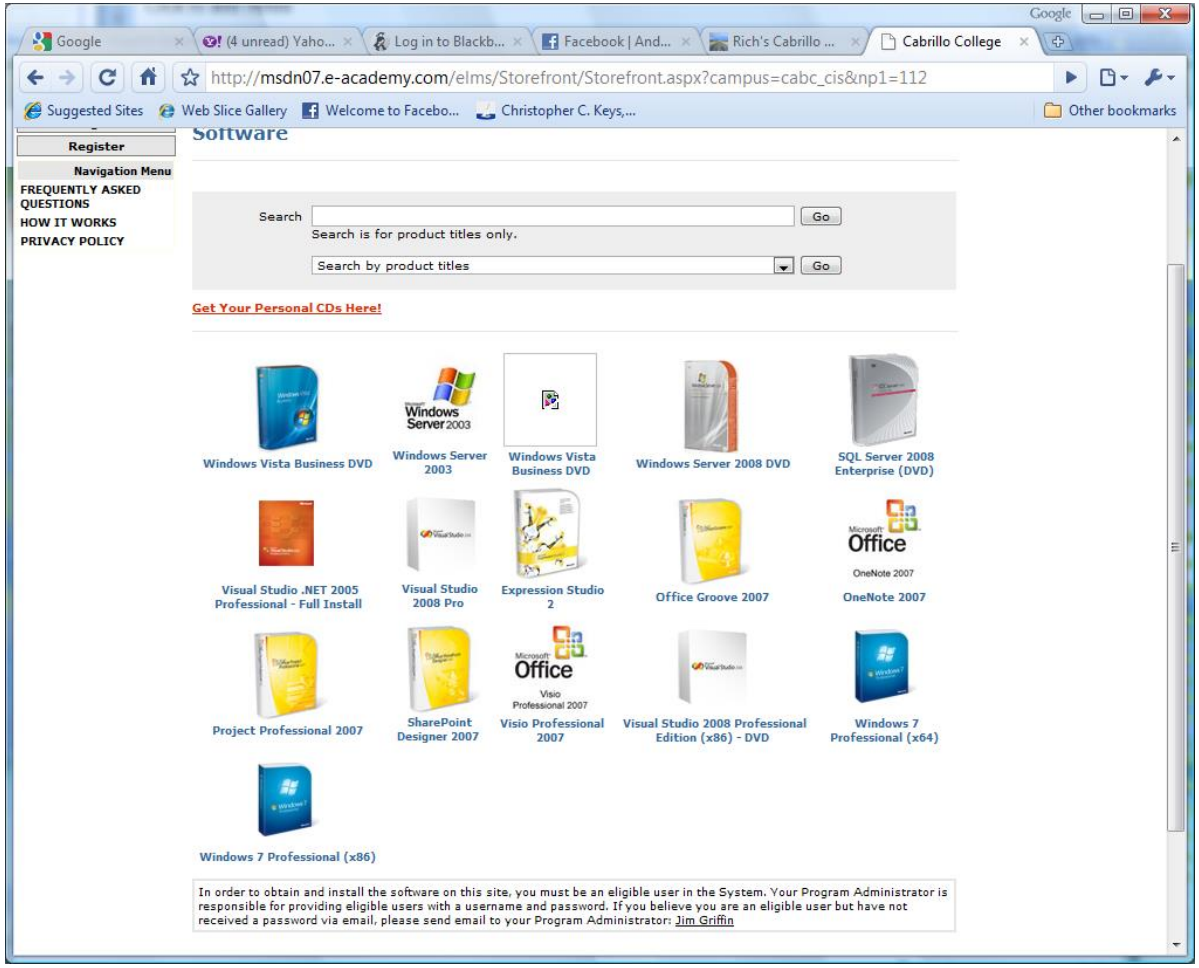
networkers-subscribe@cabrillo.edu

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





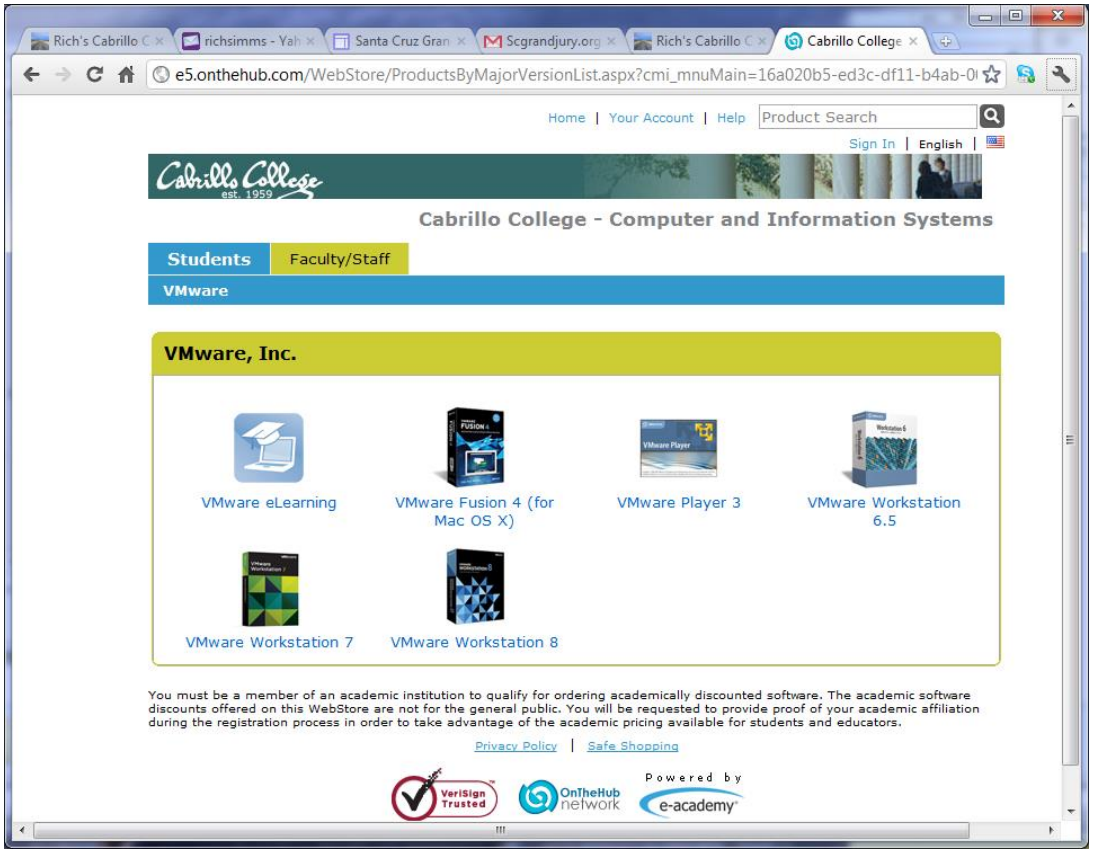
MSDN Academic Alliance



- 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

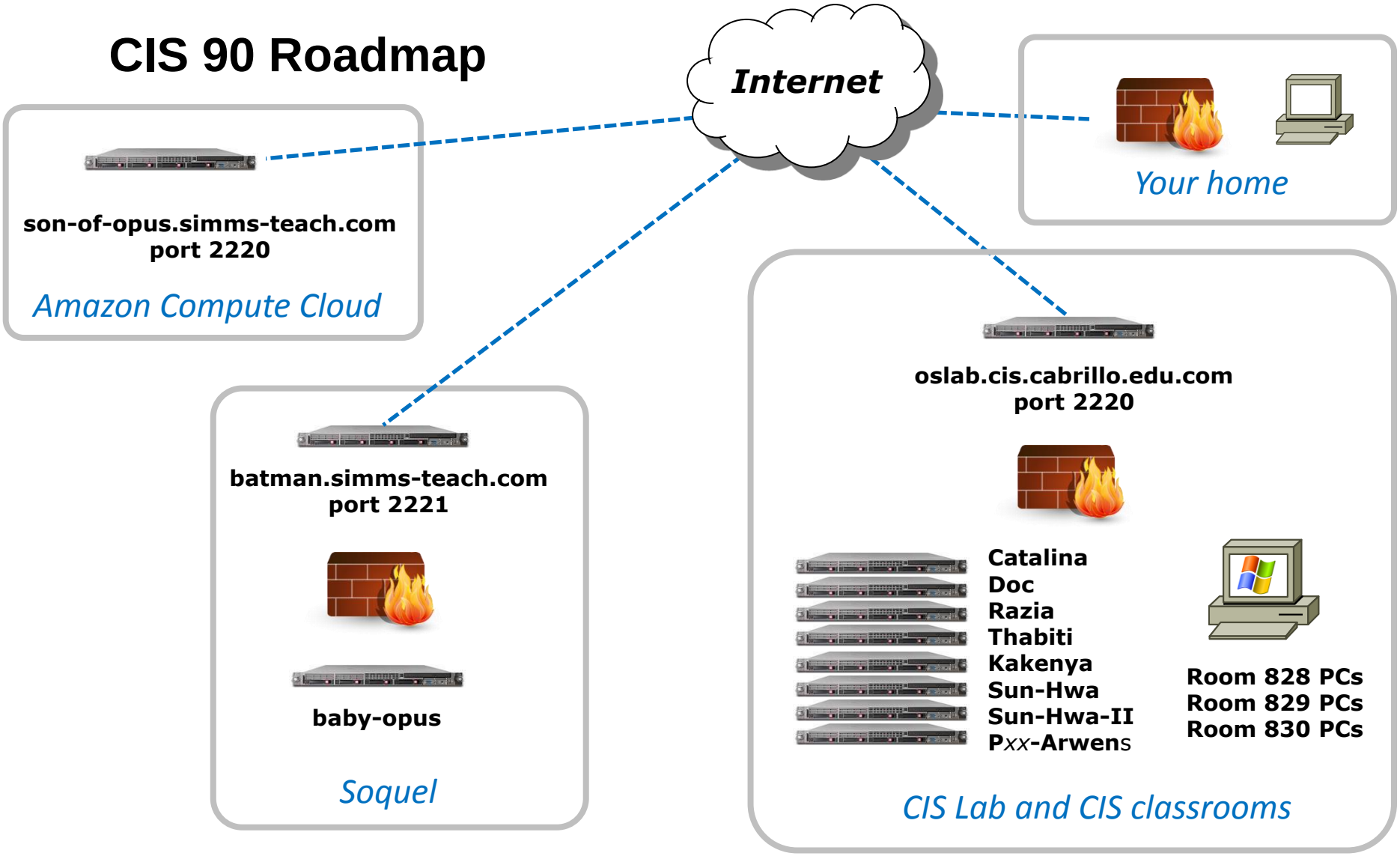
Observatory Theft

If you have any information about the recent theft of telescopes and binoculars from the Cabrillo observatory please contact the Sheriff's office:

Tip Line	**454-2847**

Navigating the Internet to connect to CIS 90 systems

CIS 90 Roadmap

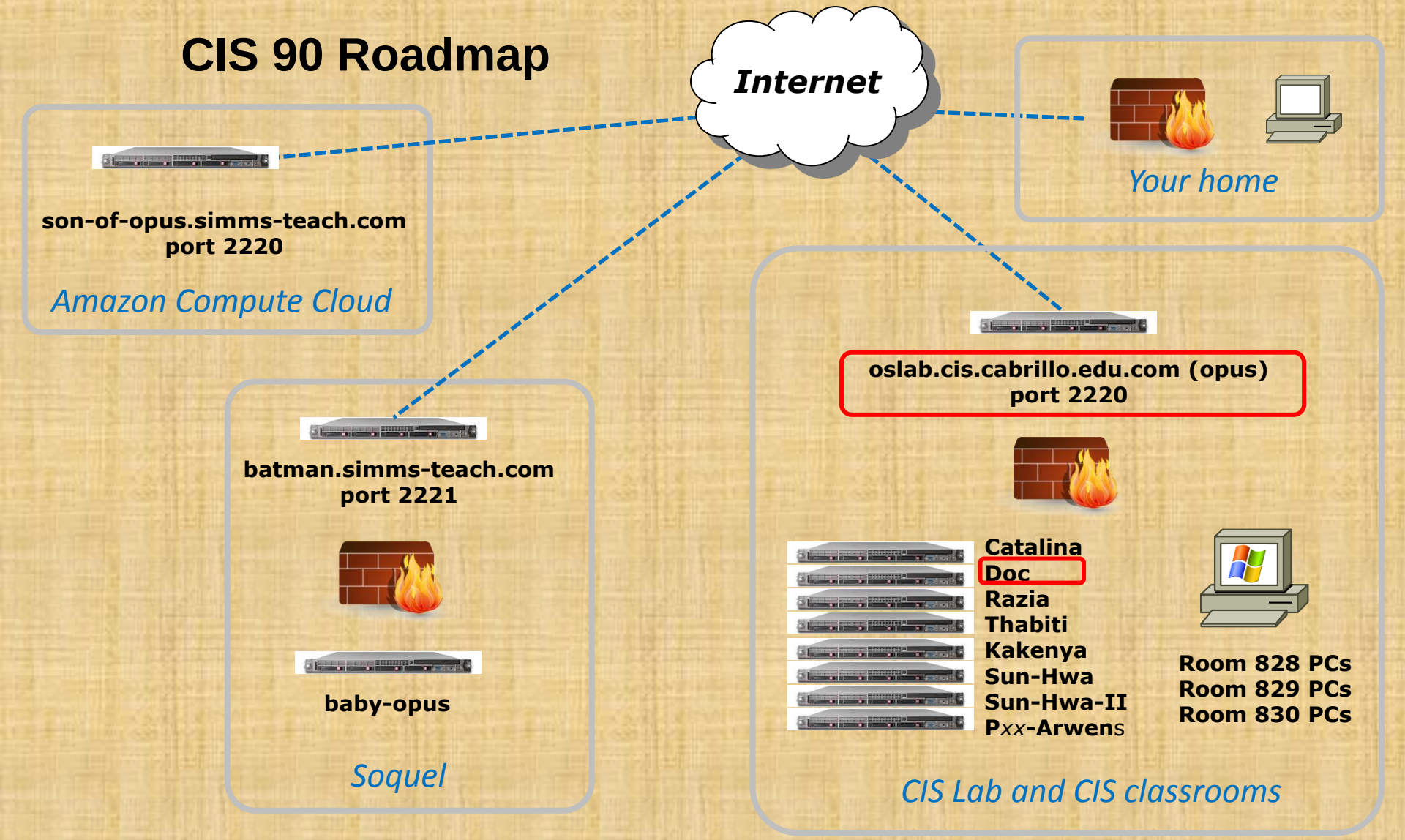


The CIS 90 Rules of the Road for SSH connections

We will be connecting from one server to another using SSH

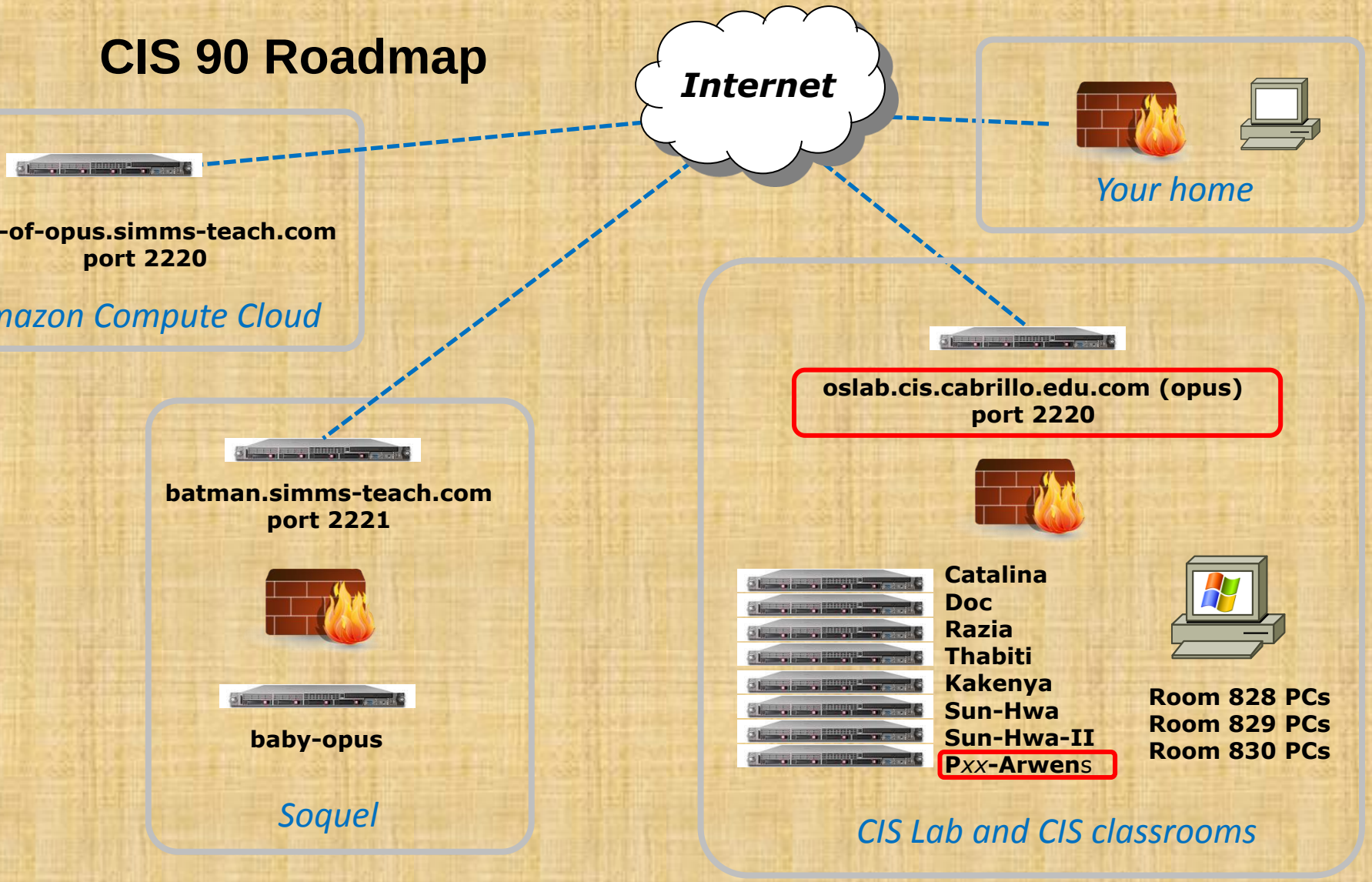
- Servers on the Internet have public IP addresses.
- Servers behind the firewall have private IP addresses.
- Local servers inside a firewall can connect with each other and connect to any remote Internet server that has a public address.
- Servers at one location cannot connect directly to private servers at another location protected by a firewall.
- Some servers like Opus (oslab) and Batman have both public and private addresses. These servers can be used as SSH gateways to reach the private servers behind their associated firewalls.
- Non-standard SSH ports in the may be required to connect into some servers. This is often used to minimize "botnet attacks".

CIS 90 Roadmap



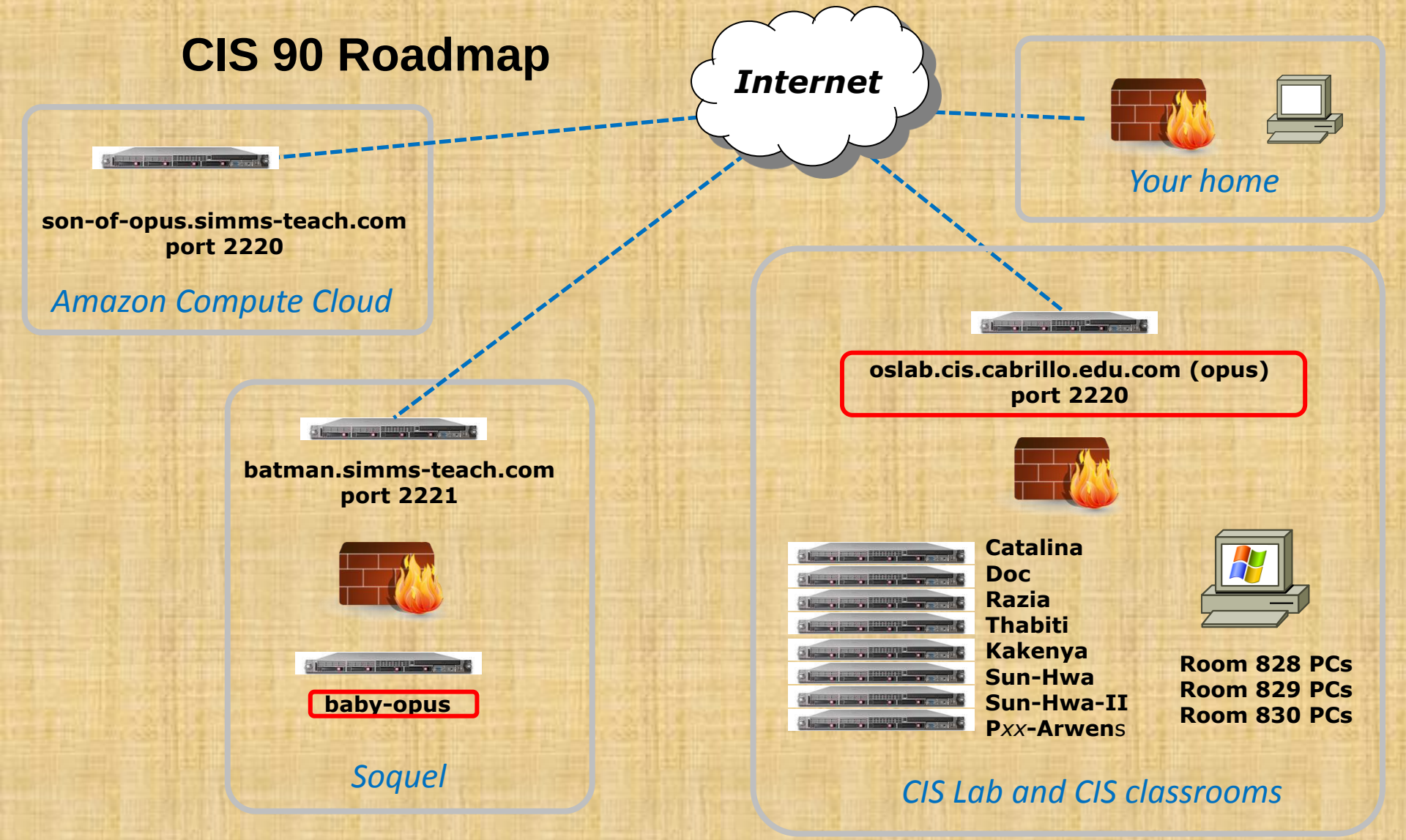
From Opus, can you connect to Doc?
(Write you answer in the chat window)

CIS 90 Roadmap



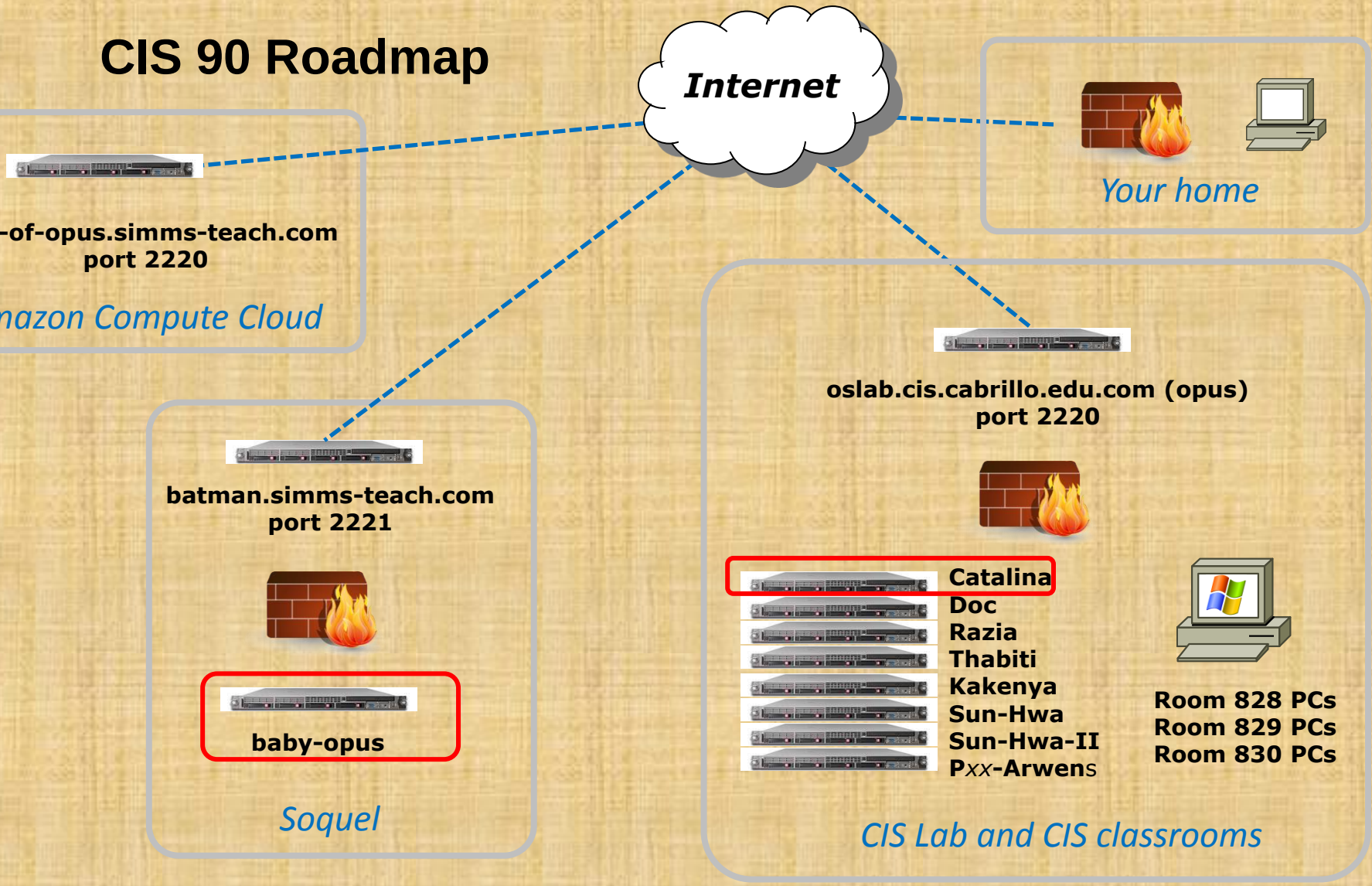
From Opus, can you connect to P17-Arwen?
(Write you answer in the chat window)

CIS 90 Roadmap



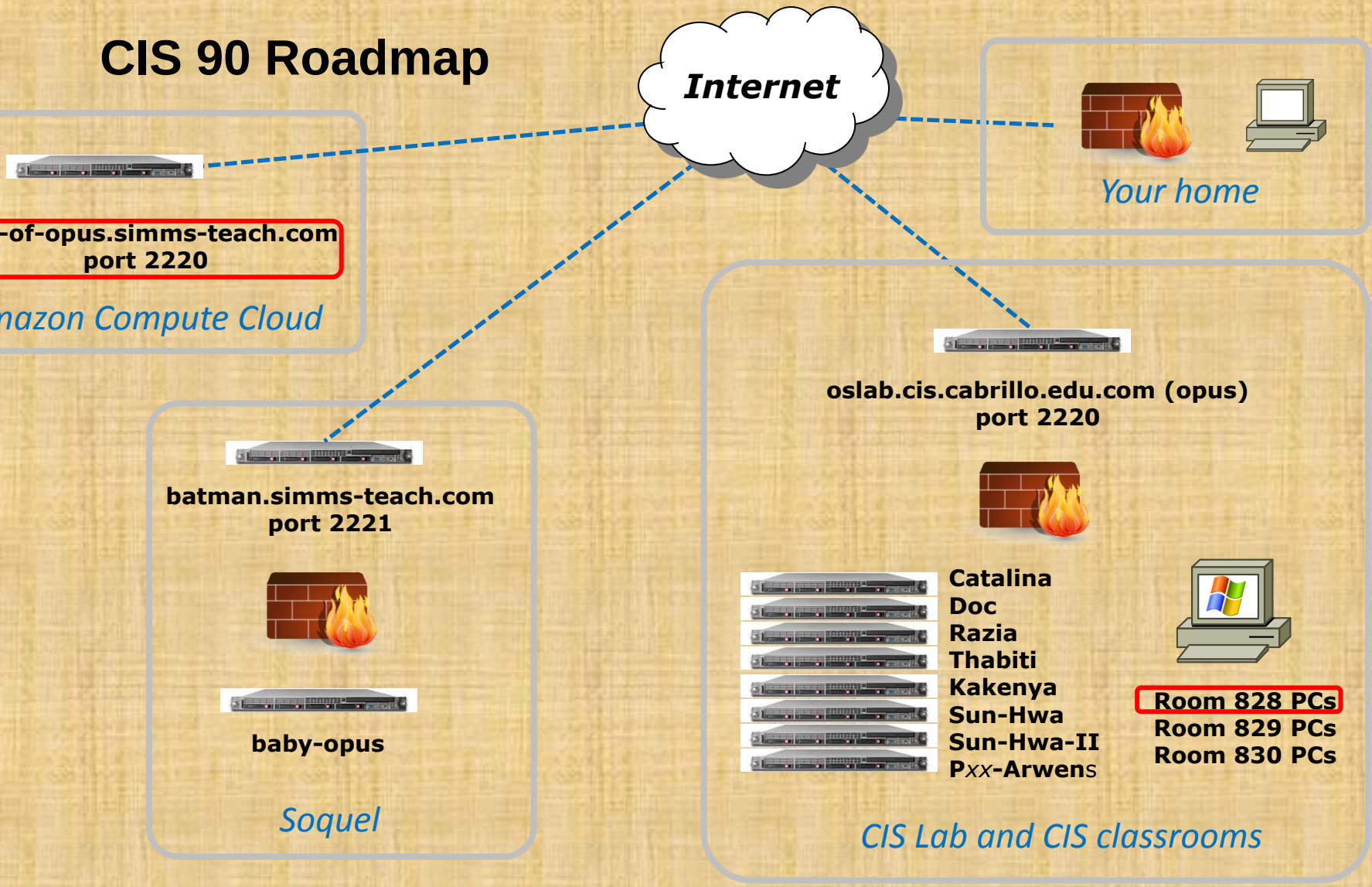
From Opus, can you connect to Baby-Opus?
(Write you answer in the chat window)

CIS 90 Roadmap



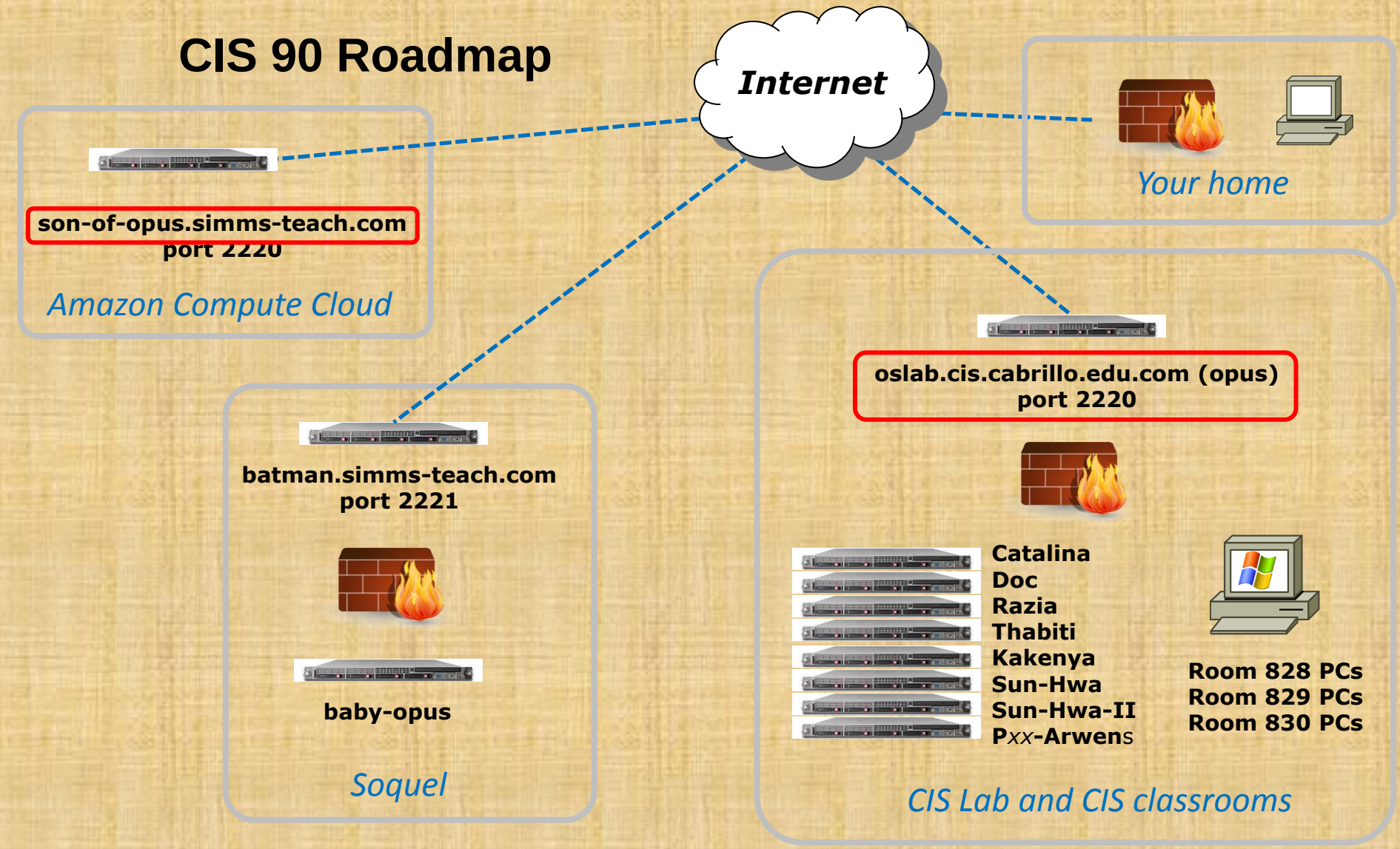
From Baby-Opus, can you connect to Catalina?
(Write you answer in the chat window)

CIS 90 Roadmap



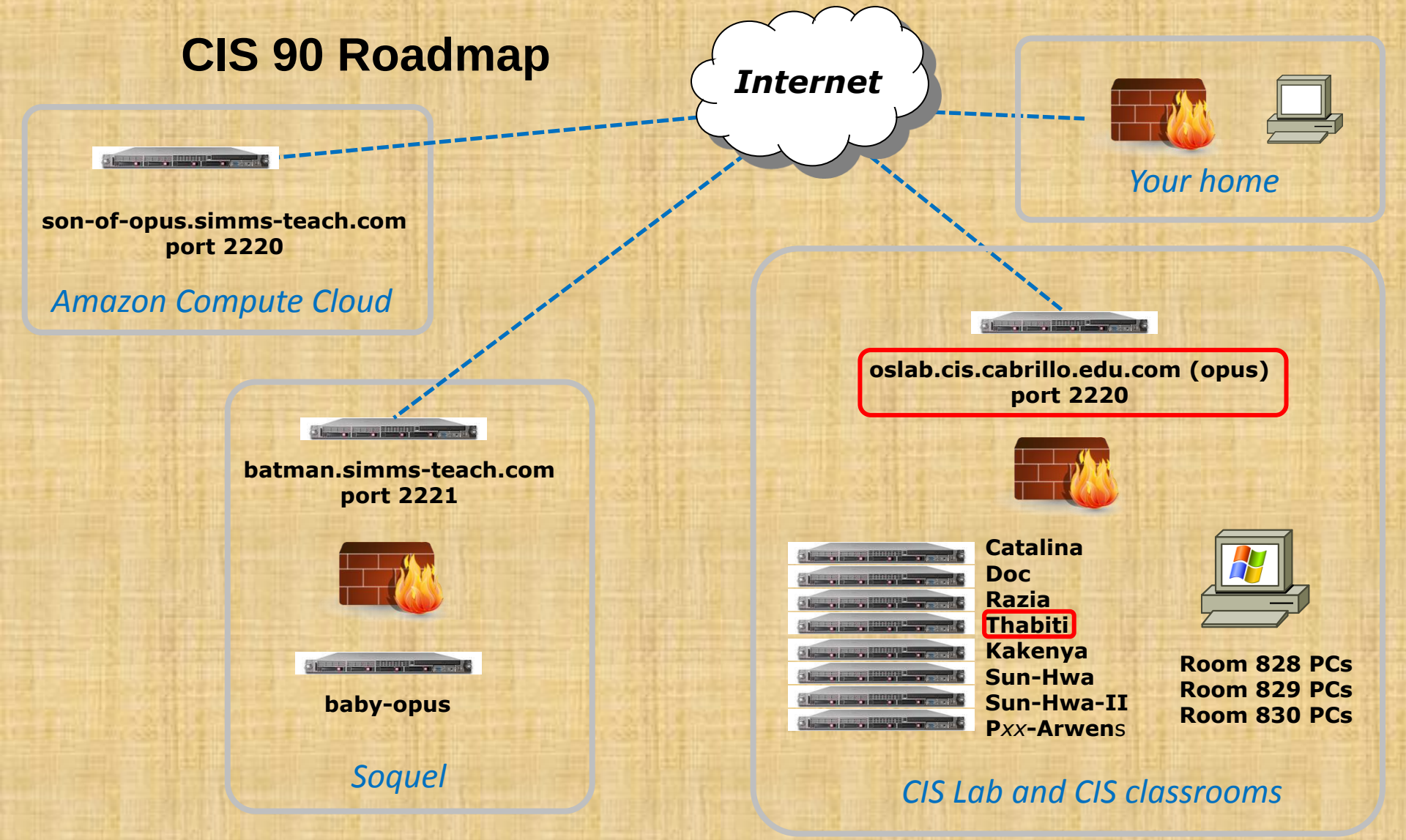
From a PC in room 828, can you connect to Son-of-Opus? (Write you answer in the chat window)

CIS 90 Roadmap



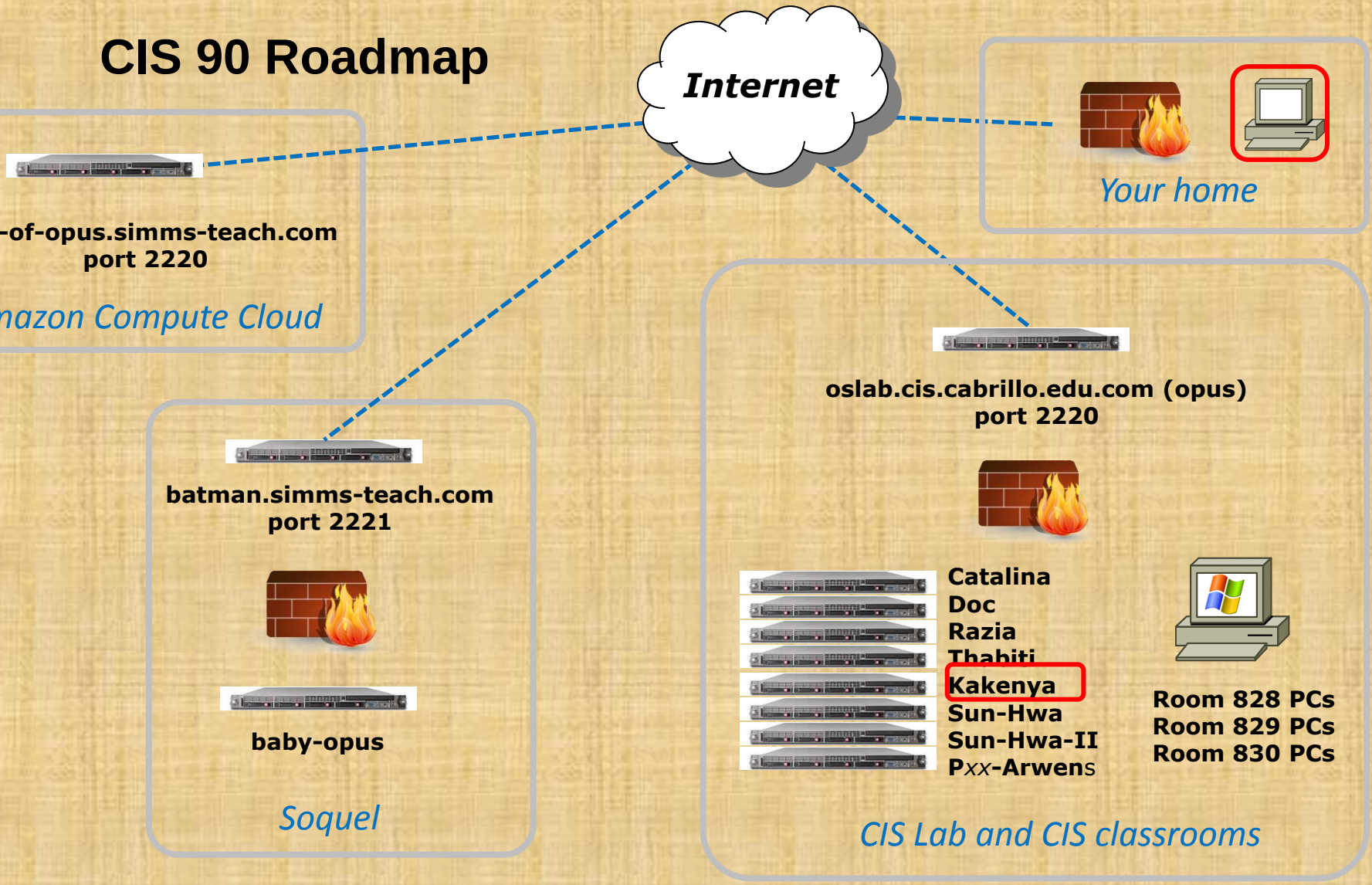
From Opus, can you connect to Son-of-Opus?
(Write you answer in the chat window)

CIS 90 Roadmap



From Thabiti, can you connect to Opus?
(Write you answer in the chat window)

CIS 90 Roadmap



From your home computer, can you connect to Sun-Hwa? (Write you answer in the chat window)

From Opus, can you connect to Doc?
(yes)

From Opus, can you connect to P17-Arwen?
(yes)

From Opus, can you connect to Baby-Opus?
(no, to get past the firewall you must first connect to batman, then from batman connect to baby-opus)

From Baby-Opus, can you connect to Catalina?
(no, to get past the firewall you must first connect to Opus, then from Opus connect to Catalina)

From a PC in room 828, can you connect to Son-of-Opus?
(yes)

From Opus, can you connect to Son-of-Opus?
(yes)

From Thabiti, can you connect to Opus?
(yes)

From your home computer, can you connect to Sun-Hwa?
(no, to get past the firweall you must first connect to Opus, then from Opus connect to Sun-Hwa)

The ssh command

ssh command
(to securely log into a remote UNIX/Linux system)

Basic command syntax:

Optional. Specifies the port on the remote system. The default is port 22.

ssh -p *nnnn username*@*hostname*

Optional. Specifies the account username on the remote system. The default is the username on the local system.

Required. This can be the hostname or IP address of the remote system. If a hostname is used for a server on the Internet it must be the long fully qualified domain name (FQDN).

Example **ssh** command
Logging into a P*xx*-Arwen system from Opus

username *short hostname*

```
/home/cis90/simben $ ssh cis90@p03-arwen
The authenticity of host 'p03-arwen (172.20.90.3)' can't be established.
RSA key fingerprint is 8b:a0:ef:d2:52:e4:f3:a3:c2:41:b5:93:89:c3:1d:58.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added 'p03-arwen,172.20.90.3' (RSA) to the list of
known hosts.
cis90@p03-arwen's password:
Welcome to Linux Mint 15 Olivia (GNU/Linux 3.8.0-26-generic x86_64)

Welcome to Linux Mint
 * Documentation:  http://www.linuxmint.com
Last login: Mon Jan 27 17:13:33 2014 from opus.cis.cabrillo.edu
cis90@p03-arwen:~ > exit
logout
Connection to p03-arwen closed.
/home/cis90/simben $
```

password is typed but not echoed

Note how the prompt changes (highlighted above) when on a different system

Example **ssh** command
Logging into son-of-opus from Opus

non-standard ssh port *username* *FQDN hostname*

```
/home/cis90/simben $ ssh -p 2220 simben90@son-of-opus.simms-teach.com
simben90@son-of-opus.simms-teach.com's password:
Last login: Mon Jan 27 18:14:32 2014 from oslab.cis.cabrillo.edu

                 _
                ('v')
               //-=-\\
               (\_=_/)
                ~~ ~~
          Welcome to Son of Opus
          Serving Cabrillo College


[simben90@son-of-opus ~]$ exit
logout
Connection to son-of-opus.simms-teach.com closed.
/home/cis90/simben $
```

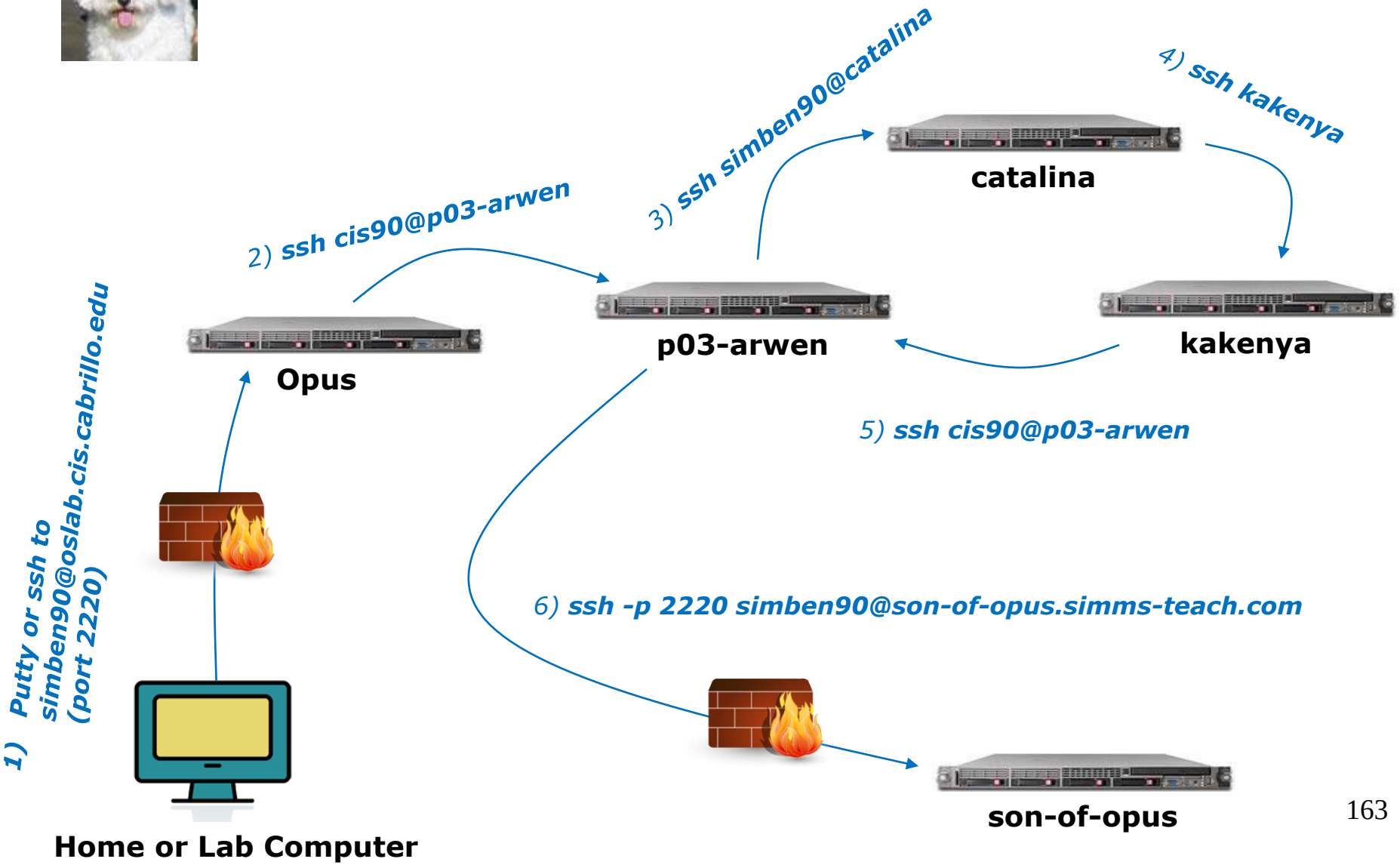
password is typed

Note how the prompt changes (highlighted above) when on different systems

Logging Into VLab VMs via Opus

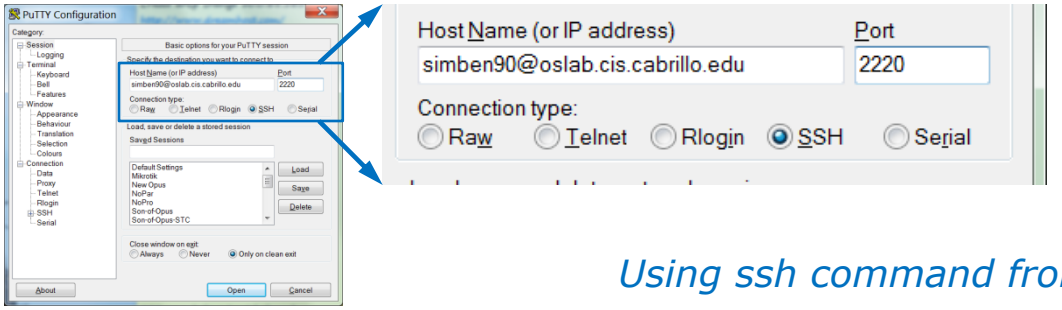
Second driving lesson

Benji's journey through some VLab VMs



1) From home to Opus

Using Putty from Windows



Using ssh command from Mac or Linux

ssh -p 2220 simben90@oslab.cis.cabrillo.edu

```
Using username "simben90".
simben90@oslab.cis.cabrillo.edu's password:
Last login: Fri Jan 31 08:35:34 2014 from 2001:470:1f05:9b3:1813:dc30:fca7:5126

                                    _
                                   ('v')
                                  //-=-\\
                                  (\_=_/)
                                   ~~ ~~
                              Welcome to Opus
                          Serving Cabrillo College

Terminal type? [xterm]
Terminal type is xterm.
/home/cis90/simben $ who
simben90 pts/0        2014-01-31 09:08 (2001:470:1f05:9b3:1813:dc30:fca7:5126)
/home/cis90/simben $
```

2) From Opus to Arwen

```
/home/cis90/simben $ ssh cis90@p03-arwen
cis90@p03-arwen's password:
Welcome to Linux Mint 15 Olivia (GNU/Linux 3.8.0-26-generic x86_64)

Welcome to Linux Mint
 * Documentation:  http://www.linuxmint.com
Last login: Fri Jan 31 09:02:23 2014 from kakenya.local
cis90@p03-arwen:~ > who
cis90    pts/0        2014-01-31 09:17 (opus.cis.cabrillo.edu)
cis90@p03-arwen:~ >
```

Since no port was specified, ssh will use the default port 22.

The Arwen VMs only have the generic cis90 user account. Because cis90 is a different account than the one we are using on Opus it must be specified on the ssh command.

Every student has their own Arwen VM for the term. The p03-arwen VM was assigned to Benji.

The DNS settings on Opus will append cis.cabrillo.edu automatically so you can just specify the short hostname "p03-arwen" rather than the full "p03-arwen.cis.cabrillo.edu"

3) From Arwen to Catalina

```
cis90@p03-arwen:~ > ssh simben90@catalina
simben90@catalina's password:
Linux catalina 3.2.0-4-amd64 #1 SMP Debian 3.2.46-1+deb7u1 x86_64
                     __                .__   .__
  ____ _____ _/  |_______   |  | |__| ____ _____
_/ ___\\__  \\   __\__  \  |  | |  |/    \\__  \
\  \___ / __ \|  |  / __ \|  |_|  |   |  \/ __ \_
 \___  >____  /__| (____  /____/__|___|  (____  /
     \/     \/          \/             \/     \/

Welcome to Catalina
Last login: Fri Jan 31 08:43:43 2014 from p03-arwen.cis.cabrillo.edu
simben90@catalina:~$ who
(unknown) tty7         2013-12-04 10:01 (:0)
root     tty1         2013-12-30 12:18
lemrob90 pts/0        2014-01-31 09:10 (830ss03.local)
simben90 pts/1        2014-01-31 09:15 (p03-arwen.cis.cabrillo.edu)
romeo    pts/2        2014-01-28 10:45 (sun-hwa.cis.cabrillo.edu)
juliet   pts/3        2014-01-28 10:47 (sun-hwa.cis.cabrillo.edu)
simben90@catalina:~$
```

The Catalina VM has all the student accounts. Because we are using a different username on Catalina it must be specified on the ssh command.

We are using the default port 22 and the short hostname for Catalina.

4) From Catalina to Kakenya

```
simben90@catalina:~$ ssh kakenya
simben90@kakenya's password:
Last login: Fri Jan 31 08:48:33 2014 from 172.20.90.201

 __                 __
|  | _______   |  | __ ____    ____ ___.__._____
|  |/ /\__  \  |  |/ // __ \ /    <   |  |\__  \
|    <  / __ \|    <\  ___/|   |  \___  | / __ \_
|__|_ \(____  /__|_ \\___  >___|  / ____|(____  /
     \/     \/     \/    \/     \/\/          \/

Welcome to Kakenya

[simben90@kakenya ~]$ who
root     tty2         2014-01-02 16:13
simben90 pts/0        2014-01-31 09:21 (172.20.90.201)
[simben90@kakenya ~]$
```

We are taking all the defaults this time. The port defaults to port 22, the username defaults to simben90, and we are using the short hostname for kakenya.

5) From Kakenya back to Arwen

```
[simben90@kakenya ~]$ ssh cis90@p03-arwen
cis90@p03-arwen's password:
Welcome to Linux Mint 15 Olivia (GNU/Linux 3.8.0-26-generic x86_64)

Welcome to Linux Mint
 * Documentation:  http://www.linuxmint.com
Last login: Fri Jan 31 09:17:53 2014 from opus.cis.cabrillo.edu
s90@p03-arwen:~ > who
cis90    pts/0        2014-01-31 09:17 (opus.cis.cabrillo.edu)
cis90    pts/2        2014-01-31 09:38 (kakenya.local)
cis90@p03-arwen:~ >
```

Since we will use a different username on Arwen than the one we are using on Kakenya we need to specify it on the ssh command.

Note in the who output are previous login session (originated from opus) is still running.

6) From Arwen to Son-of-Opus

```
cis90@p03-arwen:~ > ssh -p 2220 simben90@son-of-opus.simms-teach.com
simben90@son-of-opus.simms-teach.com's password:
Last login: Fri Jan 31 09:07:19 2014 from 207.62.187.227

                                    _
                                   ('v')
                                  //-=-\\
                                  (\_=_/)
                                   ~~ ~~
                          Welcome to Son of Opus
                         Serving Cabrillo College


[simben90@son-of-opus ~]$ who
simben90 pts/1        2014-01-31 09:44 (207.62.187.227)
[simben90@son-of-opus ~]$
```

Since we need to go out into the Internet to get to Son-of-Opus we need to specify everything: port, username and full hostname.

simben90@oslab:~

```
[simben90@son-of-opus ~]$ hostname
son-of-opus.cishawks.net
[simben90@son-of-opus ~]$ exit
logout
Connection to son-of-opus.simms-teach.com closed.
cis90@p03-arwen:~ > hostname
p03-arwen
cis90@p03-arwen:~ > exit
logout
Connection to p03-arwen closed.
[simben90@kakenya ~]$ hostname
kakenya.cishawks.net
[simben90@kakenya ~]$ exit
logout
Connection to kakenya closed.
simben90@catalina:~$ hostname
catalina
simben90@catalina:~$ exit
logout
Connection to catalina closed.
cis90@p03-arwen:~ > hostname
p03-arwen
cis90@p03-arwen:~ > exit
logout
Connection to p03-arwen closed.
/home/cis90/simben $ hostname
oslab.cishawks.net
/home/cis90/simben $
```

*When you **ssh** to another server it's like that new server is placed on top of a stack*

*When you **exit** a server it's like you pop it off the top of the stack and return to the previous server underneath*

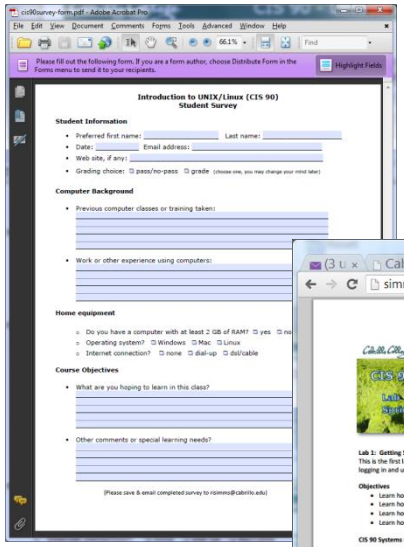
Source: http://weblogs.sun-sentinel.com/features/food/restaurants/blog/breakfast/

Assignment

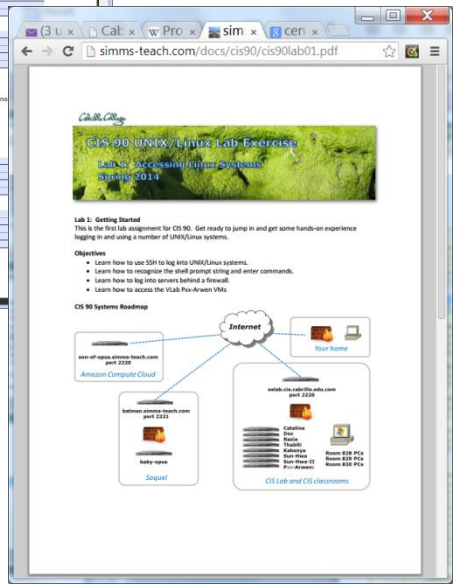
http://simms-teach.com/cis90calendar.php

Lesson	Date	Topics	Chapter	Due
1	1/27	**Class and Linux Overview** • Understand how this course will work • High-level overview of computers, operating systems and virtual machines • Overview of UNIX/Linux market and architecture • Use Linux running on a local virtual machine **Materials** • Presentation slides (download) • Login Credentials Sheet (download) • CIS VLab RDP file **Supplemental** • Howto #142: Accessing Opus (download) • Howto #307: Accessing VLab (download) **Assignment** • Student Survey • Lab 1 **CCC Confer** • Enter virtual classroom • Class archives	1.1-1.15 (Gilay) 2,4,5, p113-115, p164-172 (Hahn)	
2	2/5	Quiz 1 **Commands** • 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 **Materials**	2.3-2.7 2.11 3.7-3.20 4.19-4.22 9.1-9.2 (Gilay)	Lab 1 Student Survey

Assigned on 1/27



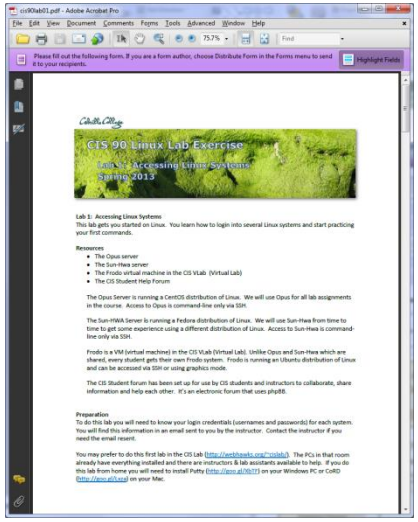
Survey



Lab 1

Both due by 11:59PM on 2/5

Lab Assignments



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.
- It's best if you fully understand each step as you do it. Use Google or refer back to lesson slides to understand the commands you are using.
- Use Google when trouble-shooting
- Keep a growing cheat sheet of commands and examples.
- Partner with another student – "two heads are better than one" (at least most of the time!)
- Use the forum to collaborate and share specific tips you learned while doing a lab.
- Late work is not accepted so submit what you have for partial credit.

If we have time

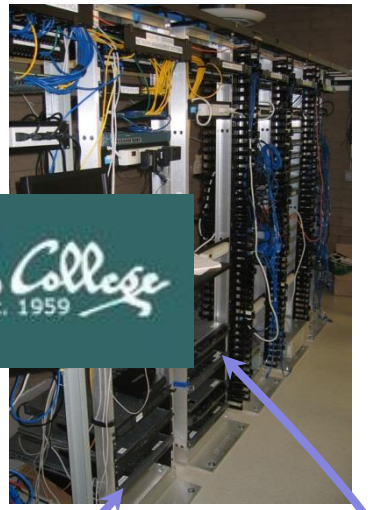
Using CIS VLab (Virtual Lab)

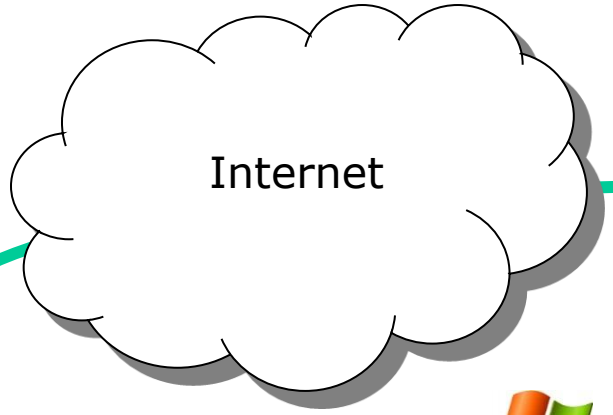
Third driving lesson

Lab Resources

Remote Access to **CIS VLab**

Room 1403 on Aptos Campus





cislab (Win 2008)

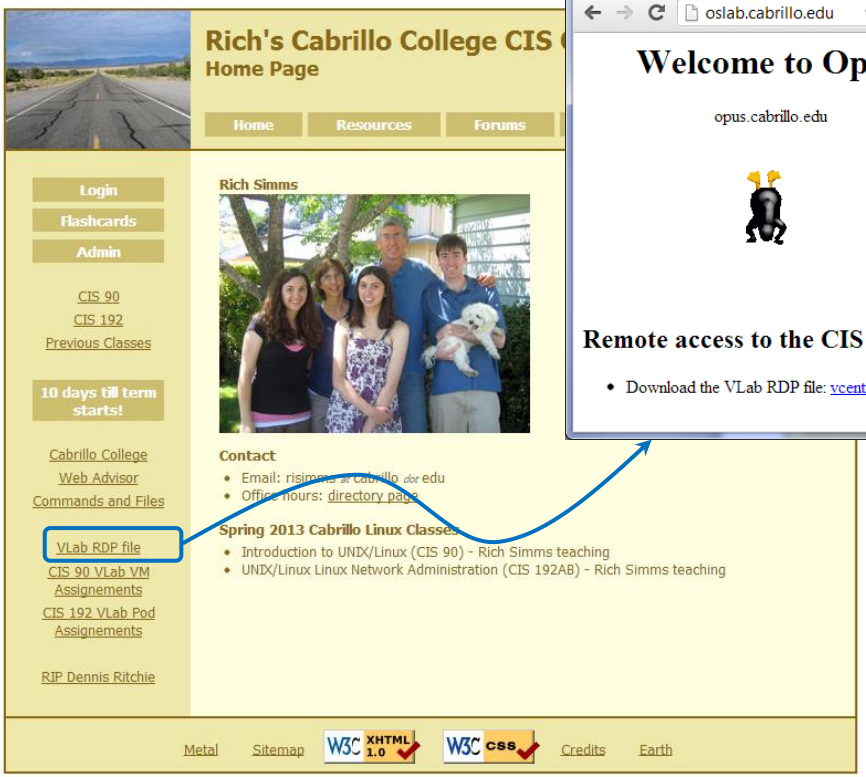
vCenter (VMware appliance)
vmserver3 (VMware ESXi)

Home

School

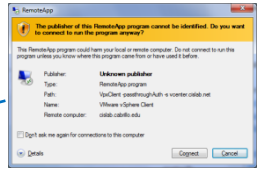
You can access the course VMs from school or home

Getting to CIS VLab



Open

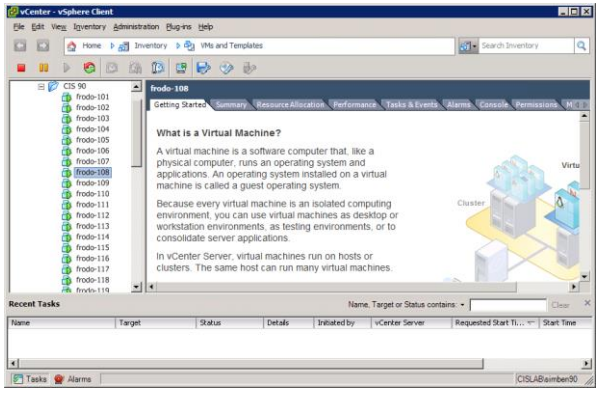
Login



Connect

Ignore

Wait …



Locate and select your assigned VM

1

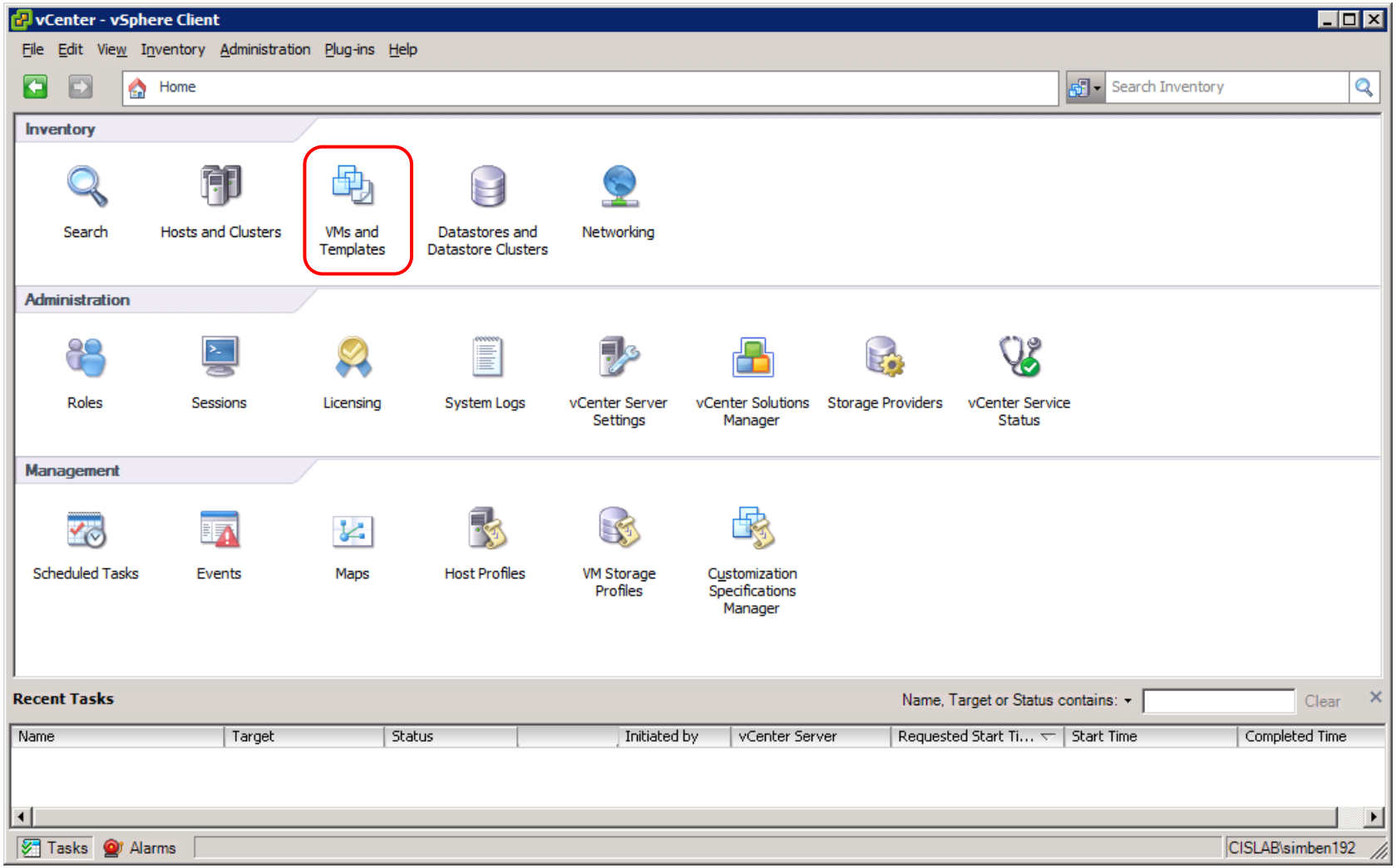
2

1) *Download the vcenter.rdp file to your desktop and then open it to access VLab.*

2) *Mac users only **will need to install CoRD**.*

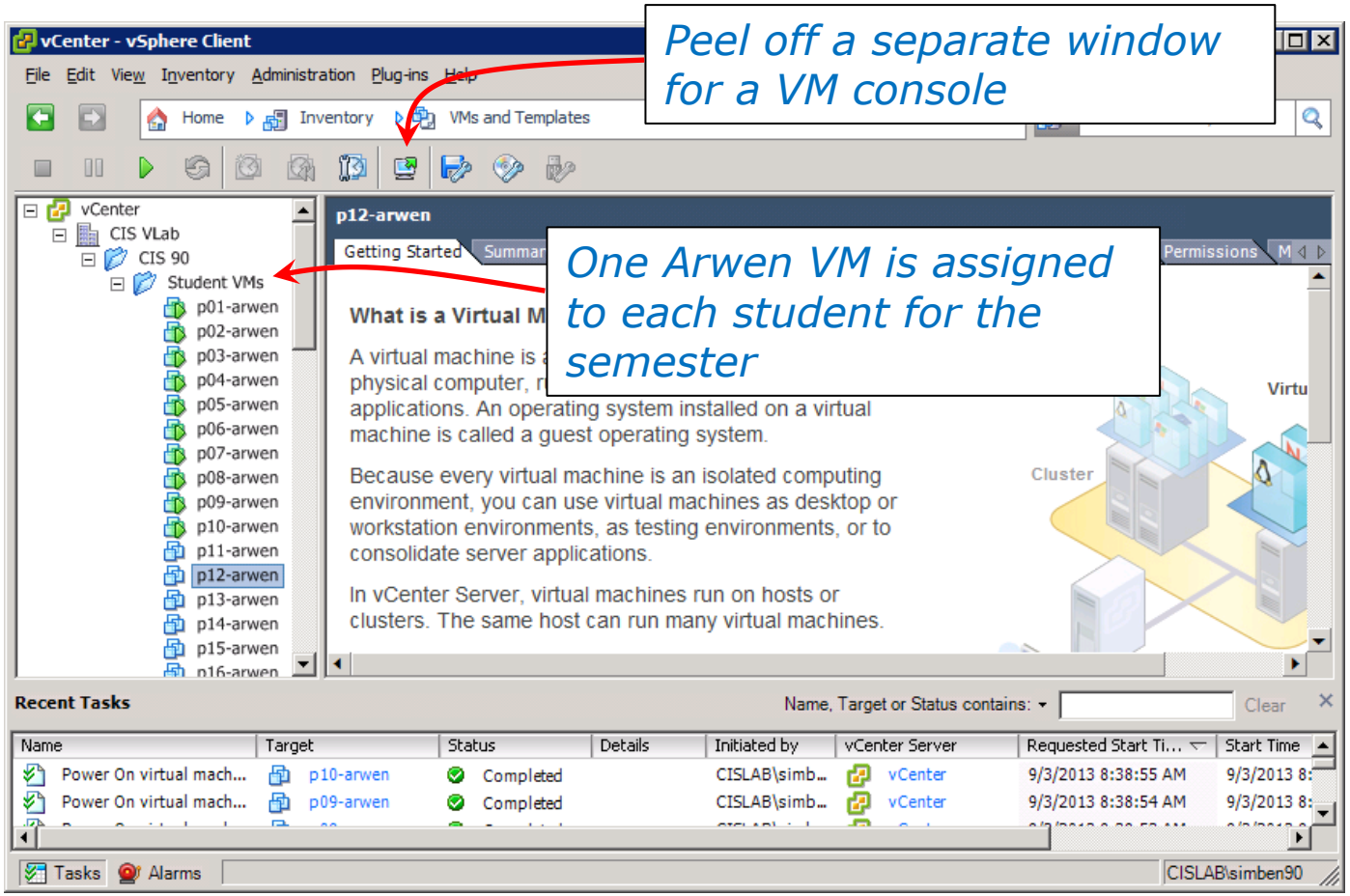
3) *When entering your username and password you must preface your username with the "cislab\", for example Benji would use: cislab\simben90*

CIS VLab Home View



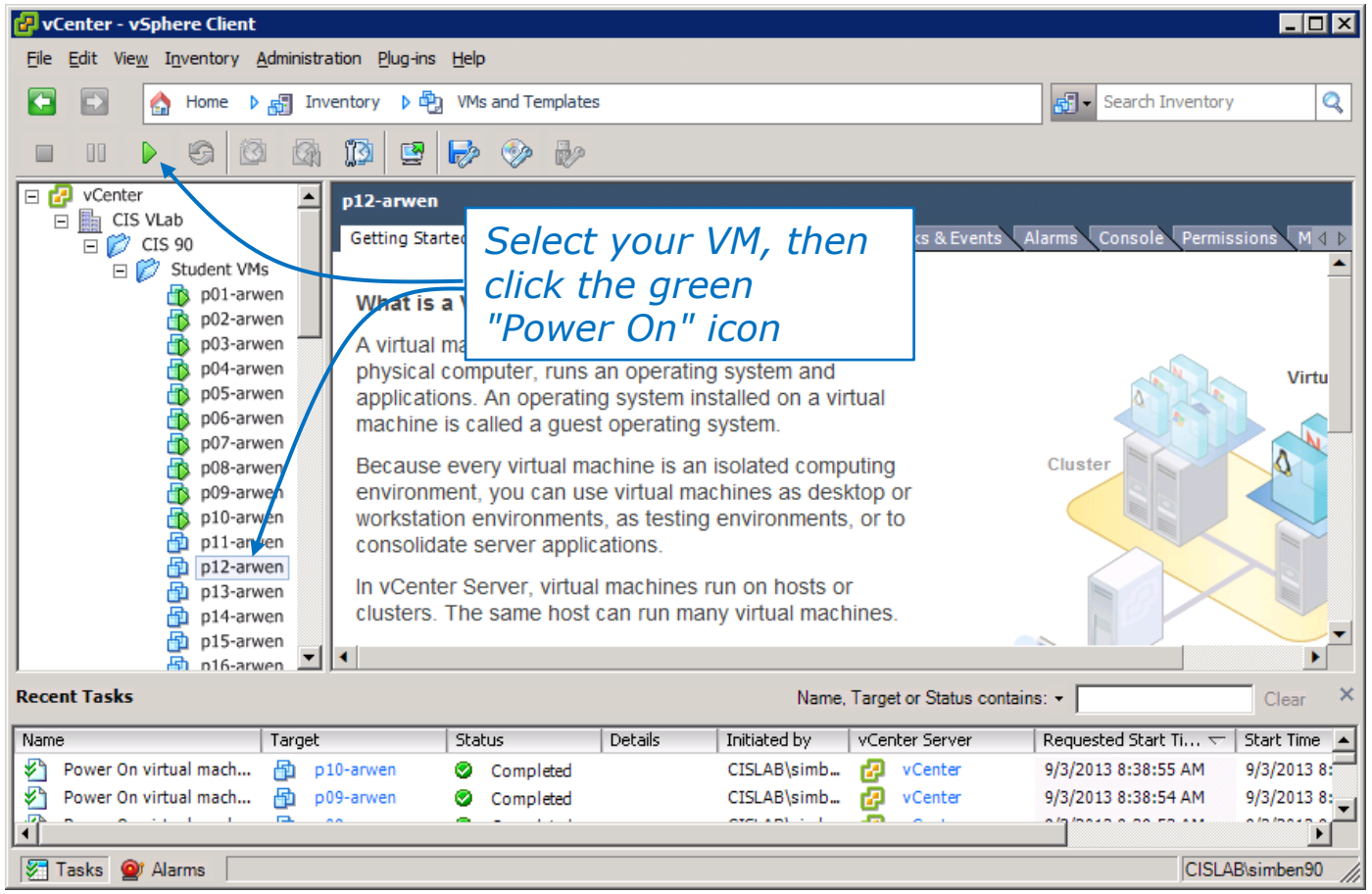
Click VMs and Templates to get to your course VMs

CIS Vlab VMs and Templates View

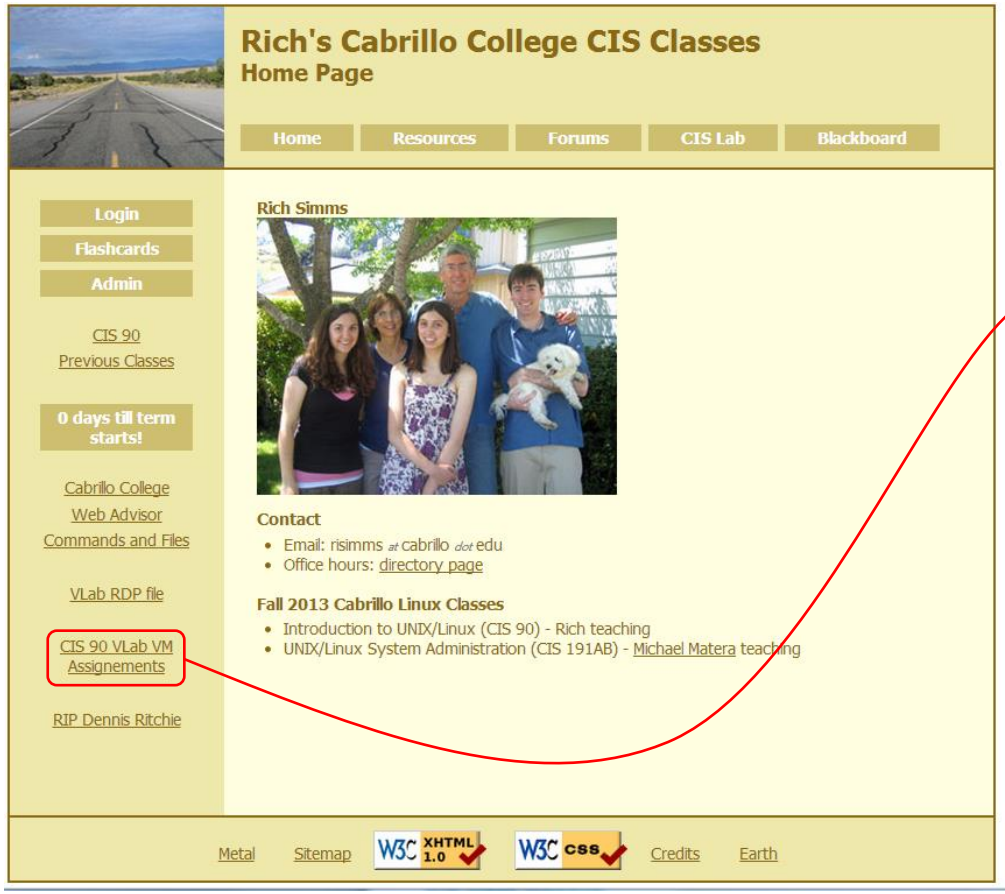


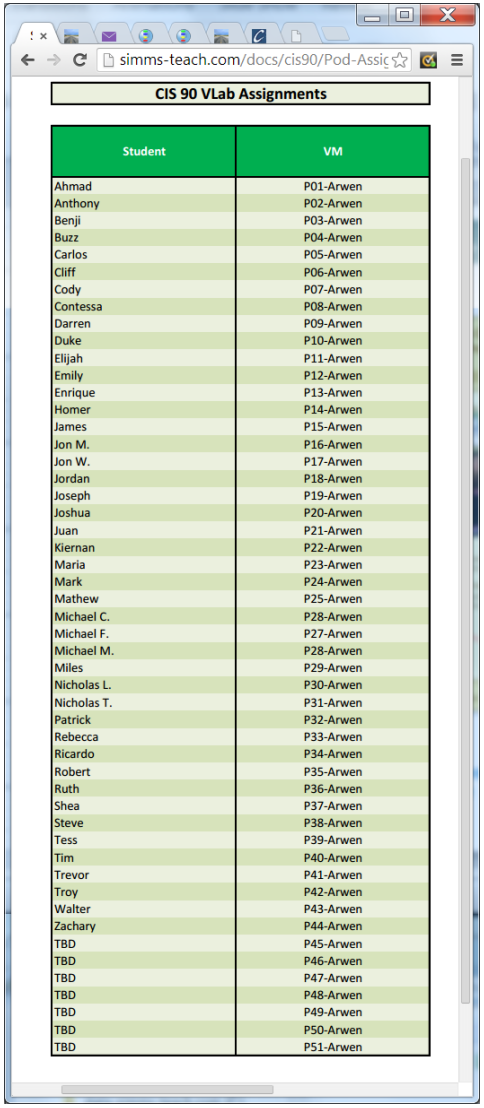
VMware vSphere Client

Powering On a VM



Note that p01-arwen through p10-arwen VMs are already powered on

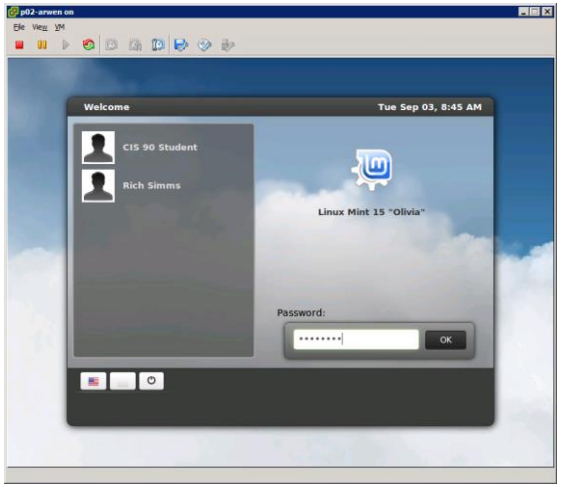




Student	VM
Ahmad	P01-Arwen
Anthony	P02-Arwen
Benji	P03-Arwen
Buzz	P04-Arwen
Carlos	P05-Arwen
Cliff	P06-Arwen
Cody	P07-Arwen
Contessa	P08-Arwen
Darren	P09-Arwen
Duke	P10-Arwen
Elijah	P11-Arwen
Emily	P12-Arwen
Enrique	P13-Arwen
Homer	P14-Arwen
James	P15-Arwen
Jon M.	P16-Arwen
Jon W.	P17-Arwen
Jordan	P18-Arwen
Joseph	P19-Arwen
Joshua	P20-Arwen
Juan	P21-Arwen
Kiernan	P22-Arwen
Maria	P23-Arwen
Mark	P24-Arwen
Mathew	P25-Arwen
Michael C.	P28-Arwen
Michael F.	P27-Arwen
Michael M.	P28-Arwen
Miles	P29-Arwen
Nicholas L.	P30-Arwen
Nicholas T.	P31-Arwen
Patrick	P32-Arwen
Rebecca	P33-Arwen
Ricardo	P34-Arwen
Robert	P35-Arwen
Ruth	P36-Arwen
Shea	P37-Arwen
Steve	P38-Arwen
Tess	P39-Arwen
Tim	P40-Arwen
Trevor	P41-Arwen
Troy	P42-Arwen
Walter	P43-Arwen
Zachary	P44-Arwen
TBD	P45-Arwen
TBD	P46-Arwen
TBD	P47-Arwen
TBD	P48-Arwen
TBD	P49-Arwen
TBD	P50-Arwen
TBD	P51-Arwen

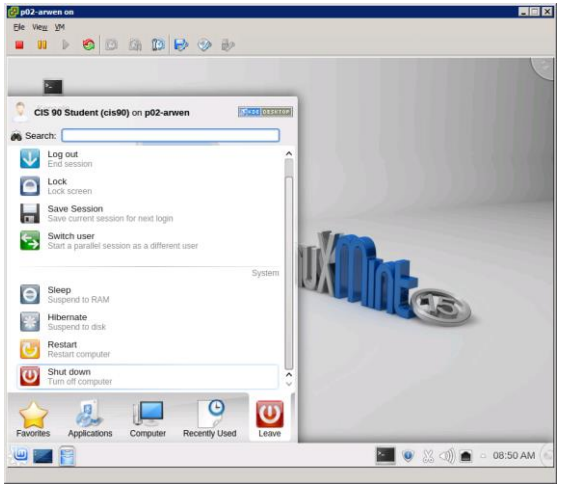
To see which Arwen VM is yours use the link on the class website

Log in as
CIS 90 Student

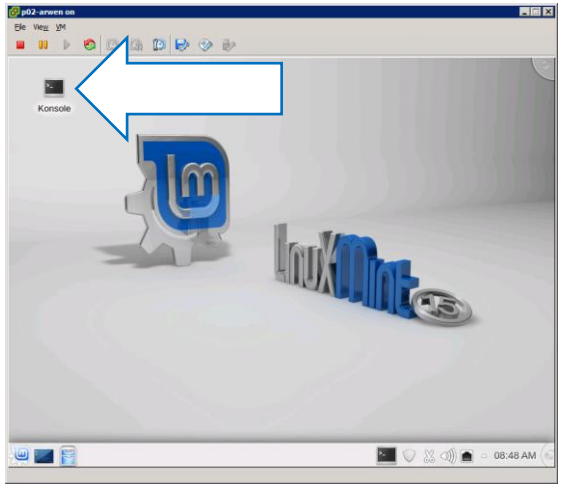


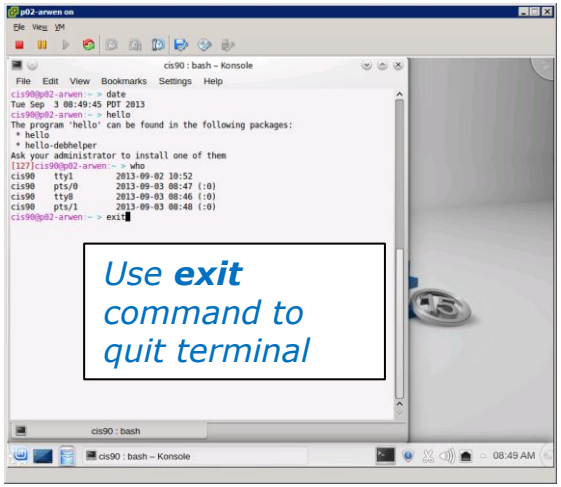
The Arwen VM

Shutdown using
> Leave > Shut Down…

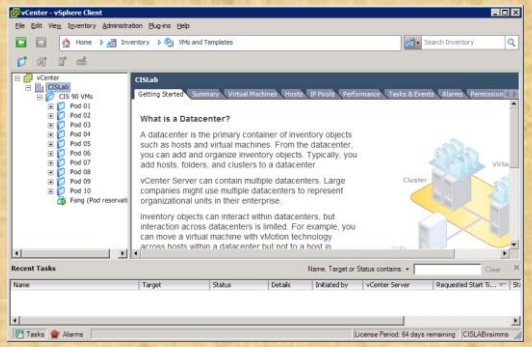


To get a graphical terminal
Terminal icon (under System Settings)





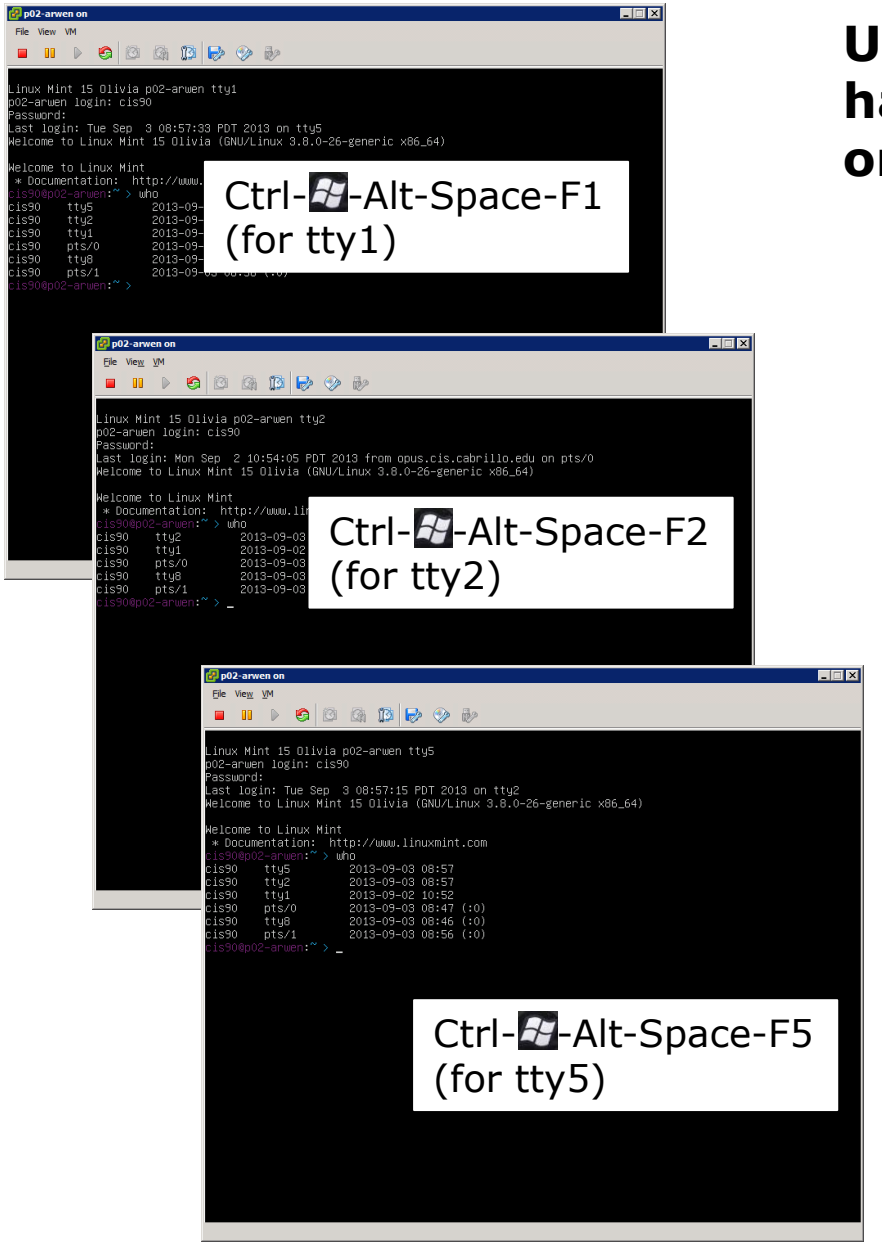
Class Activity



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

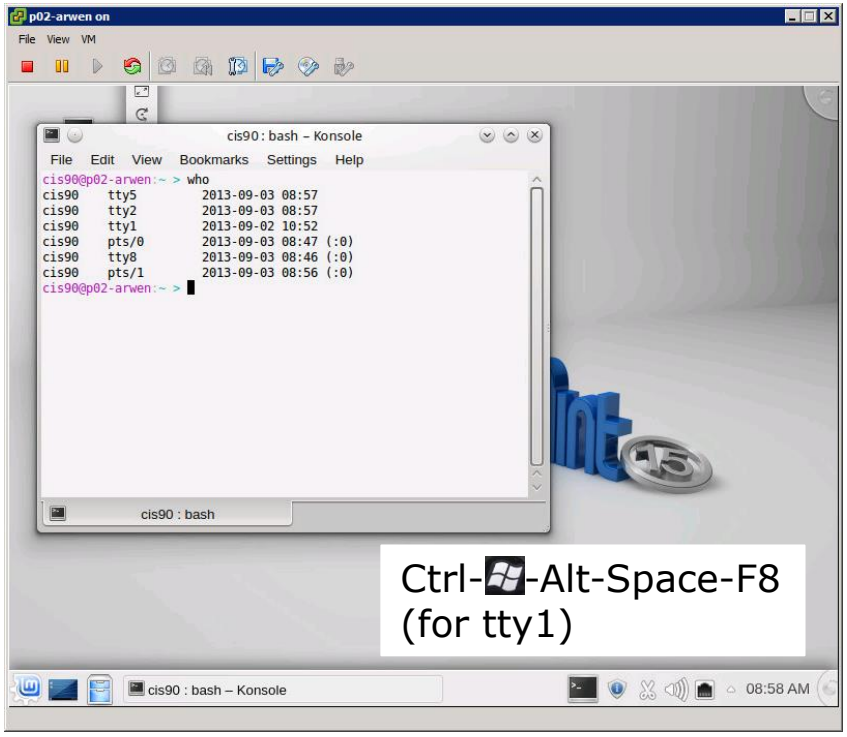
- Find your Arwen VM
- Power it on (if it's not already)
- Open a separate console for your Arwen VM
- Login as CIS 90 Student into the graphical desktop
- Run a terminal on the graphical desktop
- Shut down the VM

Virtual/Console tty Terminals

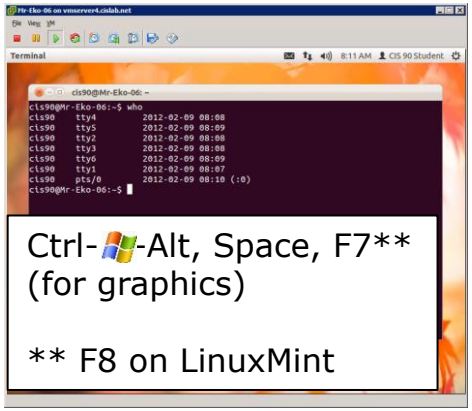


Use virtual terminals (tty's) to have multiple login sessions on one system

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



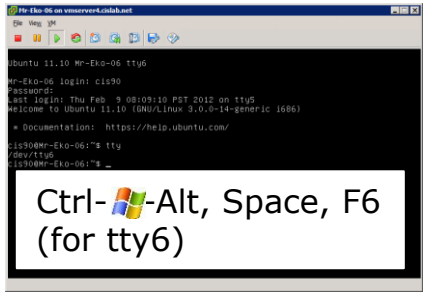
Changing Virtual TTY Terminals using **VMware vSphere**



Ctrl-⊞-Alt, Space, F7**
(for graphics)

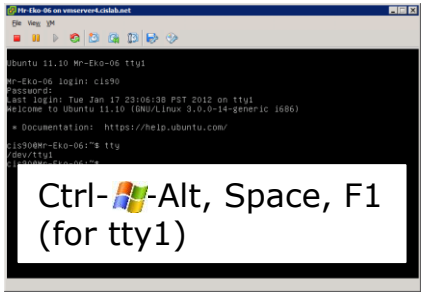
** F8 on LinuxMint

Windows PC Keyboard

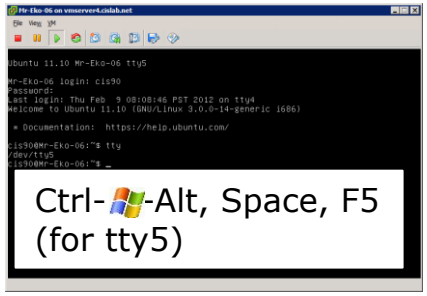


Ctrl-⊞-Alt, Space, F6
(for tty6)

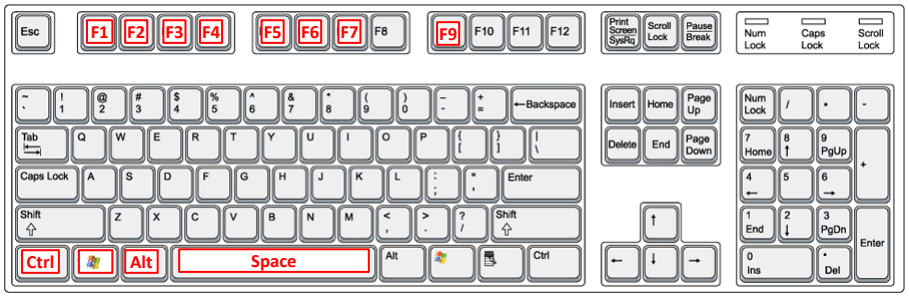
While holding down Crtl-⊞-Alt keys, tap Space, then tap Fn key*

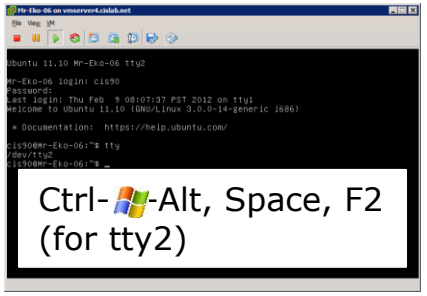


Ctrl-⊞-Alt, Space, F1
(for tty1)

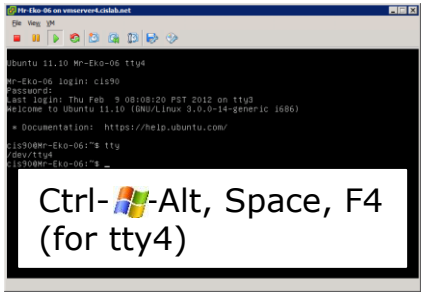


Ctrl-⊞-Alt, Space, F5
(for tty5)

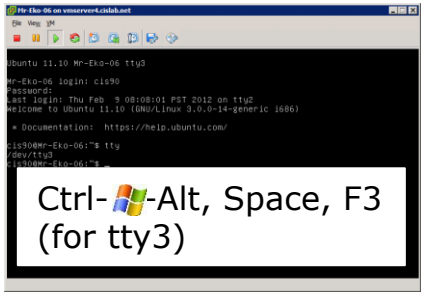




Ctrl-⊞-Alt, Space, F2
(for tty2)



Ctrl-⊞-Alt, Space, F4
(for tty4)



Ctrl-⊞-Alt, Space, F3
(for tty3)

*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

Changing Virtual Terminals on VMware Linux VMs

VMware operations	
On PC Keyboard:	While holding down the Ctrl-⊞-Alt keys, tap spacebar then tap f1, f2, ... or f7.
On Mac keyboard:	Hold down Control and Option keys, tap the spacebar, hold down fn key (in addition to Control and Option keys) and tap f1, f2, ... or f7.

Pressing the ⊞ on some Windows keyboards may not be necessary

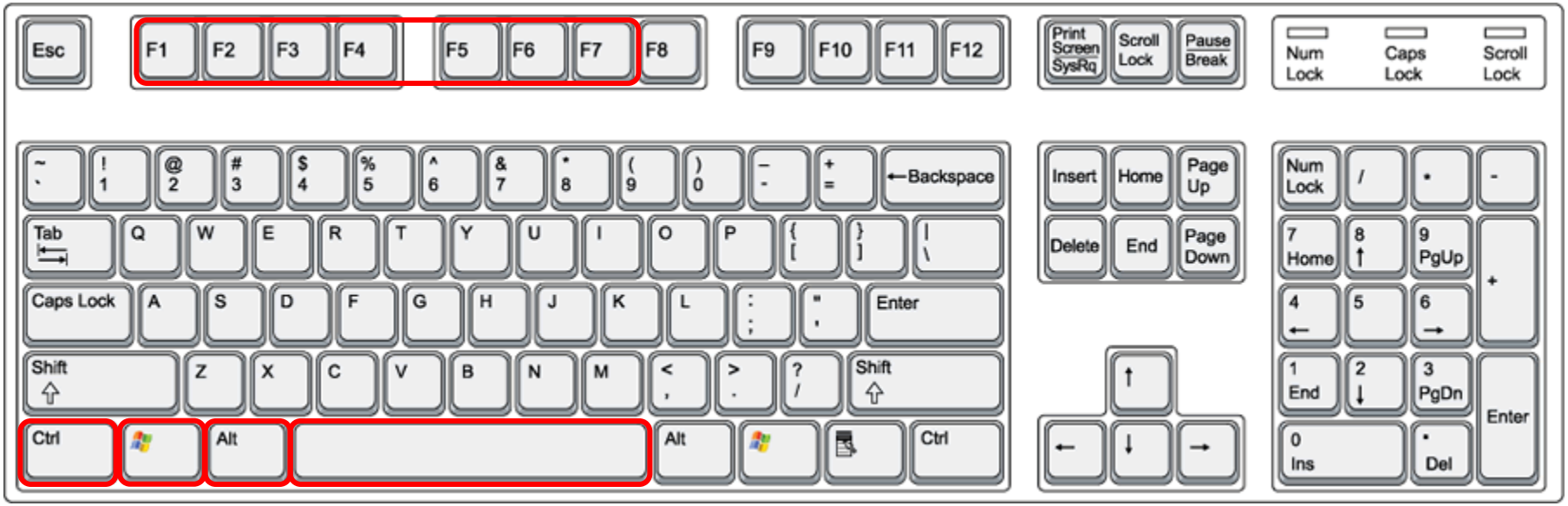
F7 is graphics mode for the Ubuntu VMs.

The Centos VMs do not have a graphics mode components installed (run level 3 only)

Note: the spacebar does not need to be tapped on a physical (non-VM) system. This is only required when changing virtual terminals on VMware VMs.

VMware VM Operations

Changing Virtual Terminals with a PC keyboard



On PC keyboard:

While holding down the **Ctrl-**⊞**-Alt** keys,
tap **Spacebar** then tap **F***N* key
(where *N*=1-7 to specify a function key)

VMware VM Operations

Changing Virtual Terminals with a Mac keyboard

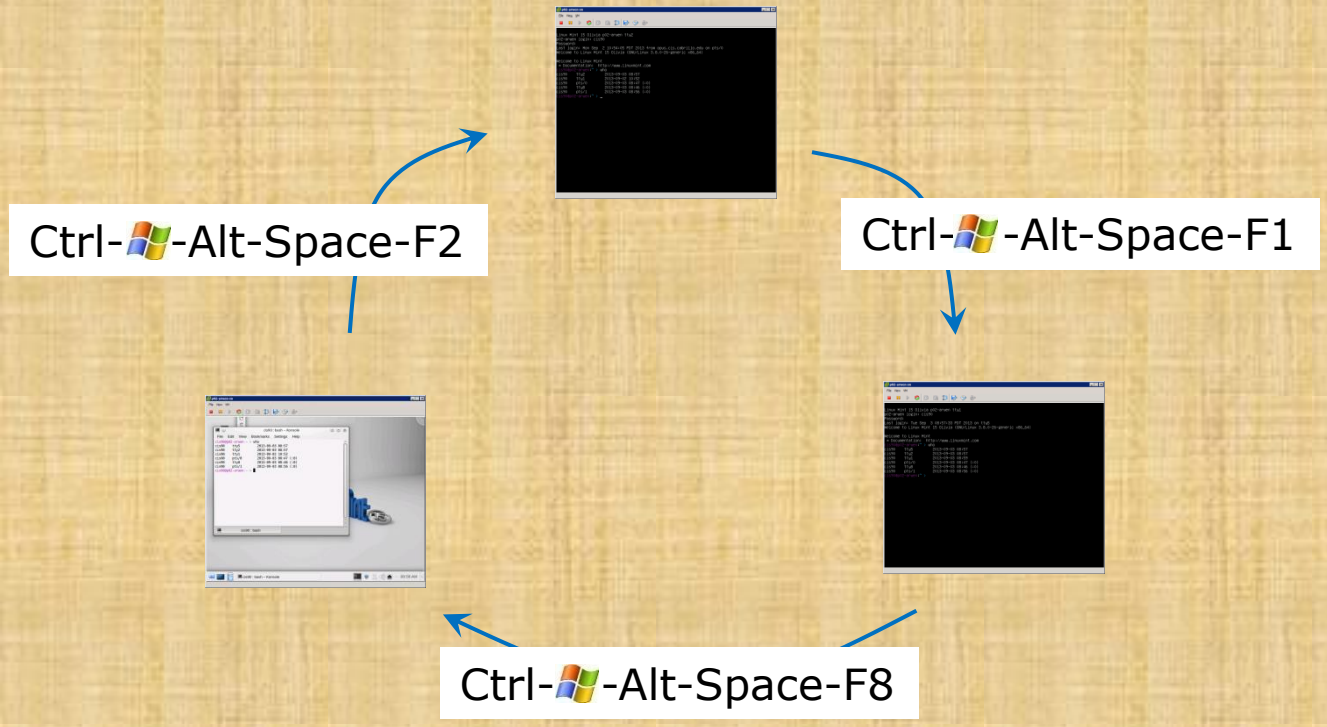
On Mac keyboard:

While holding down the **control-option** keys

tap **Spacebar** then tap **fn-F*N*** keys

(where *N*=1-7 to specify a function key)

Class Activity



On your Arwen VM:

- Try changing between the graphical desktop and the TTYs
- Login as cis90 on tty1 and tty2
- Run a terminal on the graphical desktop
- Use the who command to see how many logins there are

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
ifconfig	- show IP address
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?

Backup

Logging Into VLab VMs via Opus

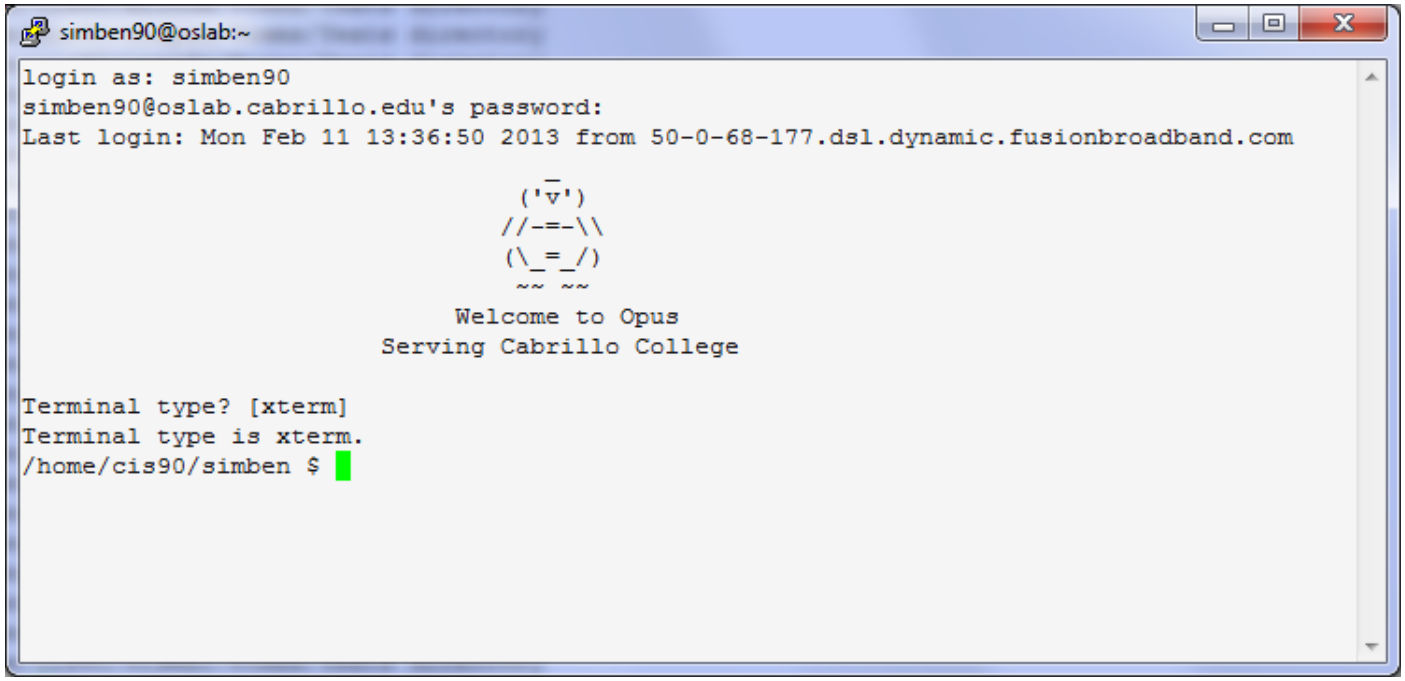
Using IP addresses

More commands for your toolbox

ifconfig	*show IP address*

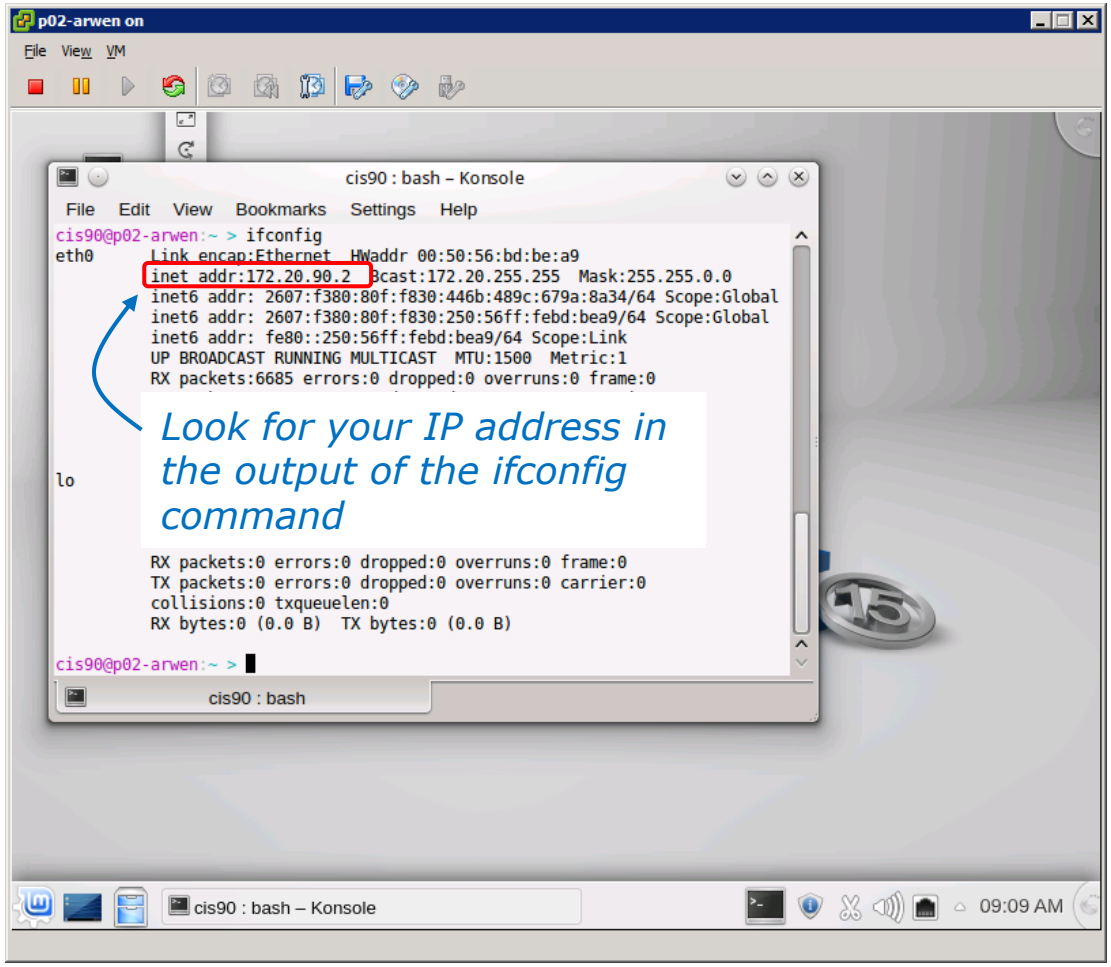
Logging into your Arwen VM from Opus

Step 1 - Log into Opus



Logging into your Arwen VM from Opus

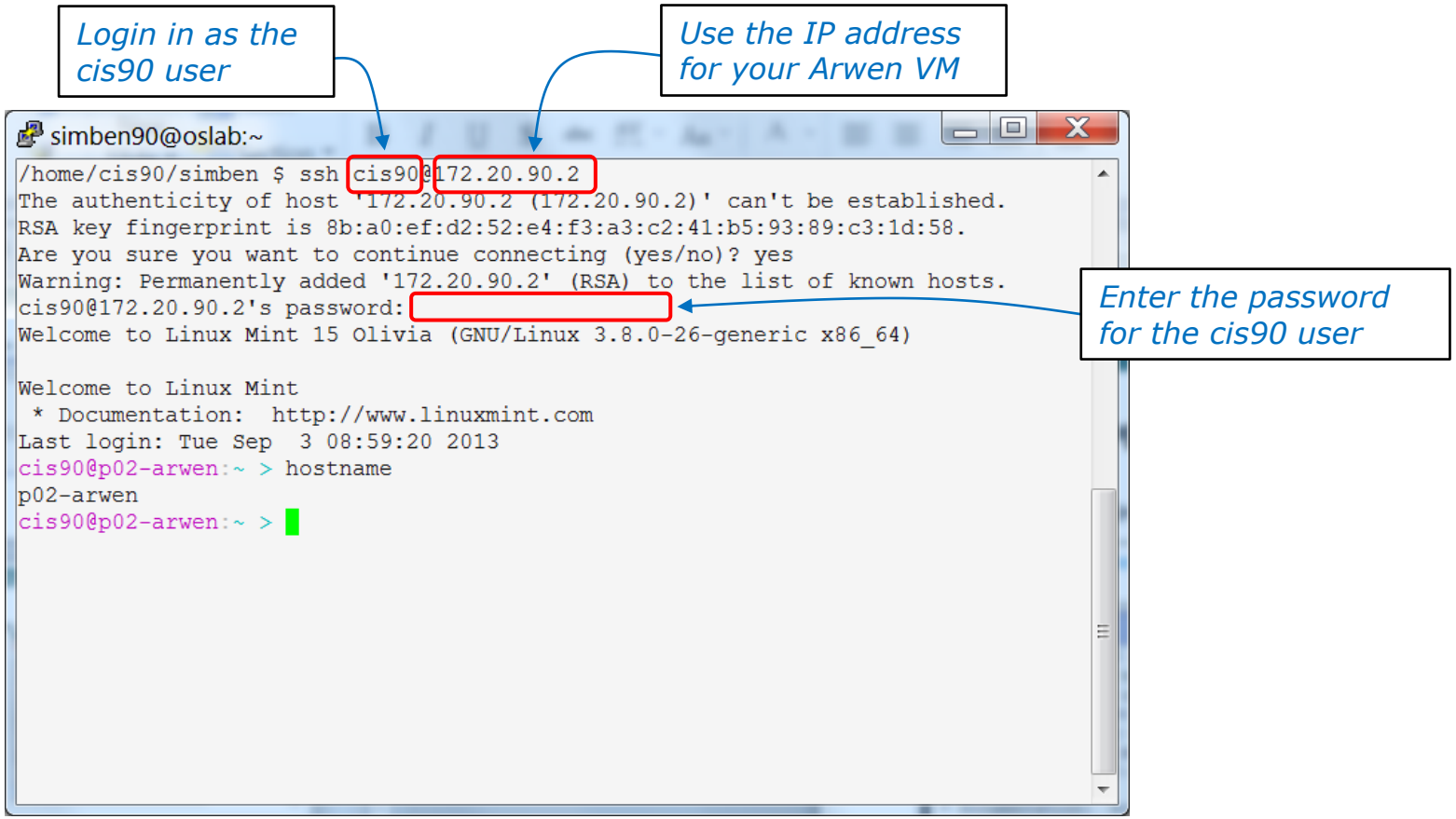
Step 2 - Run a terminal on your Arwen VM and type the **ifconfig** command



To specify just the eth0 interface use: ***ifconfig eth0***

Logging into your Arwen VM from Opus

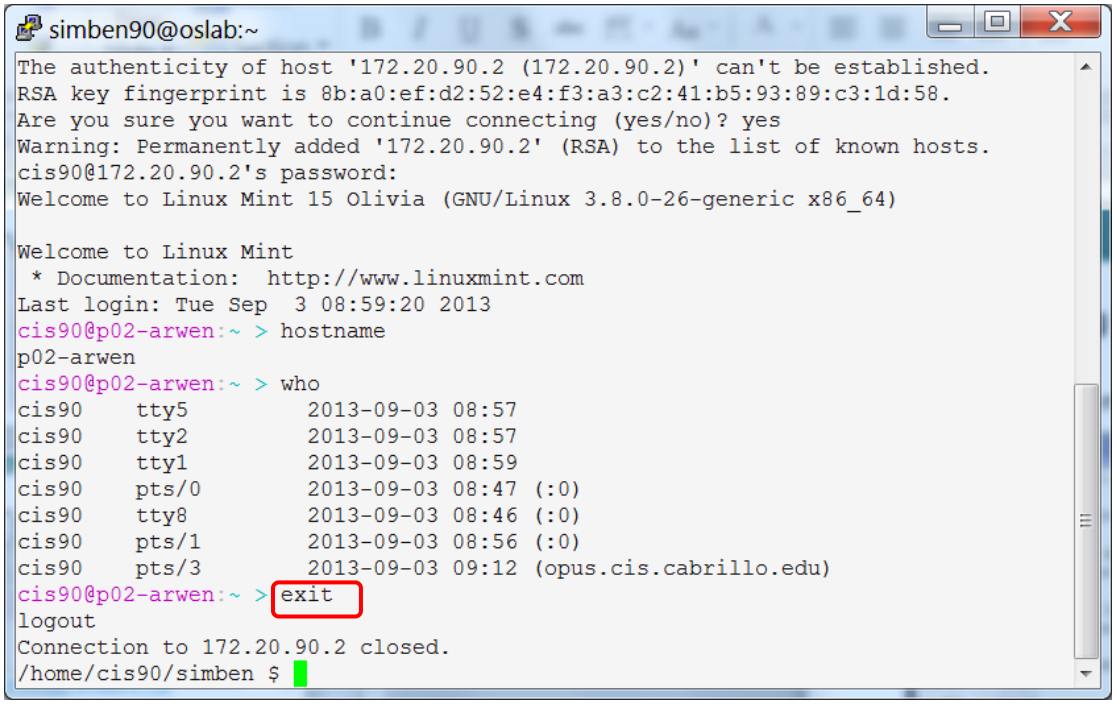
Step 3 - Use SSH to login to Arwen from Opus



Notice the prompt changes after logging into Arwen to indicate you are now communicating with a different Linux system

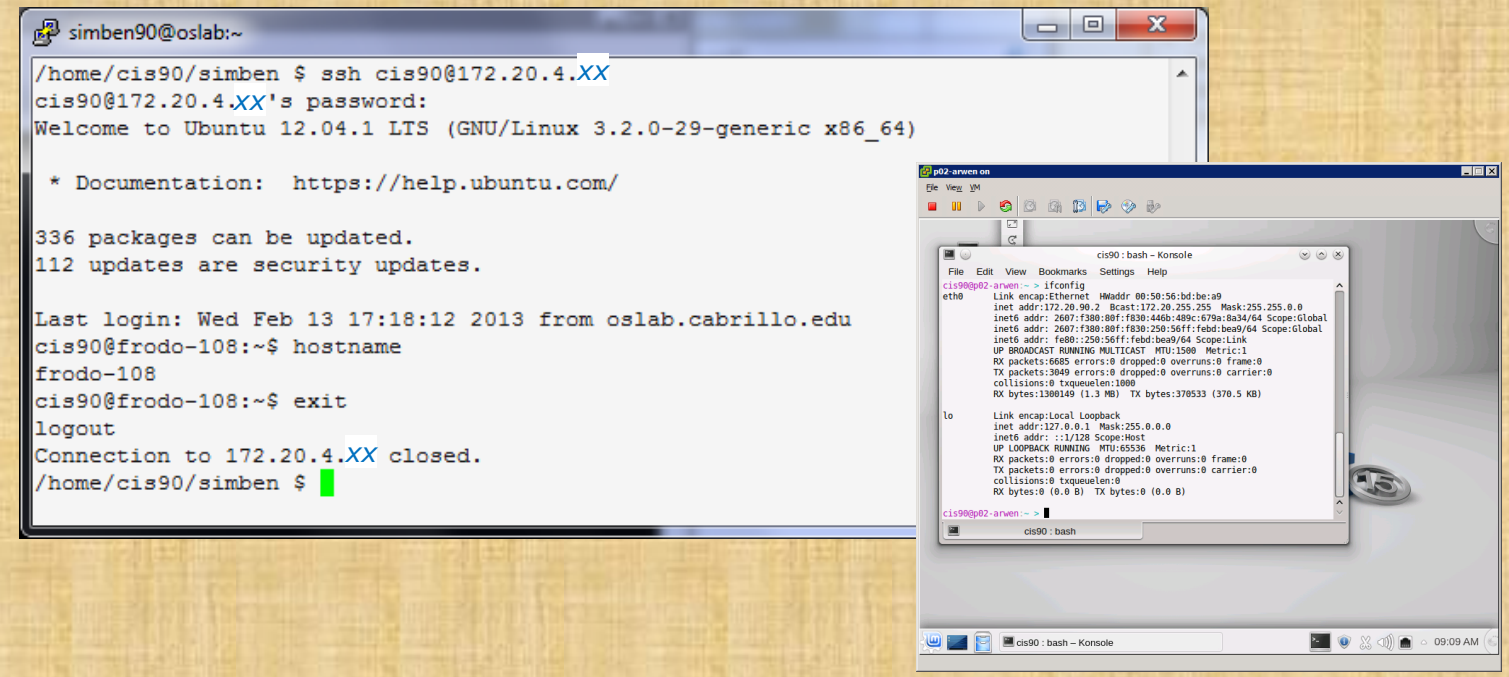
Logging out of your Arwen VM and back to Opus

Use the exit command on Arwen to pop back to Opus



Notice the prompt changes after exiting Arwen to indicate you are back on Opus again

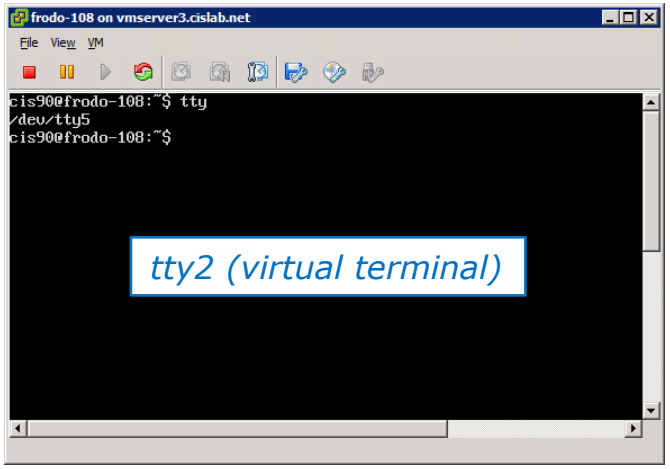
Class Activity

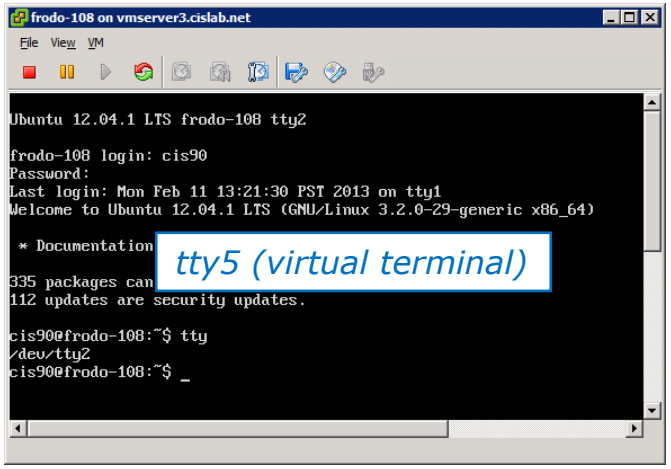


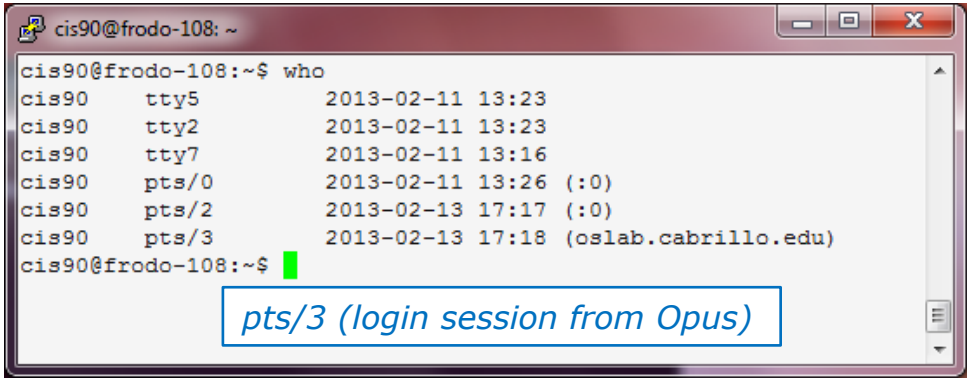
1. Use Putty (or a Mac terminal) and login to Opus
2. In VLab, determine your Arwen's IP address with the **ifconfig** command
3. Use **ssh cis90@**<*ip address*> to login to your Arwen from Opus
4. Check your prompt on Arwen -- is it your assigned Arwen VM?
5. Use the **exit** command to end the Arwen session and return to Opus

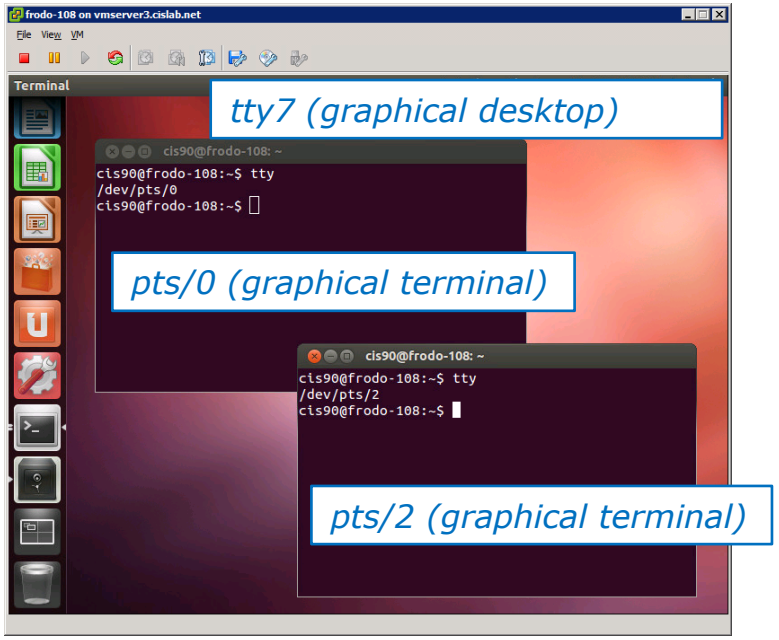
More on who command

Deciphering **who** command output (Ubuntu 12.04)







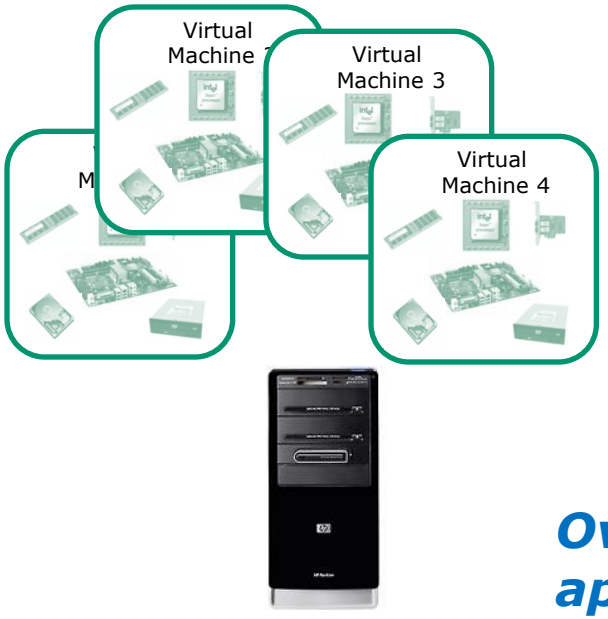


Virtual Machines

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.

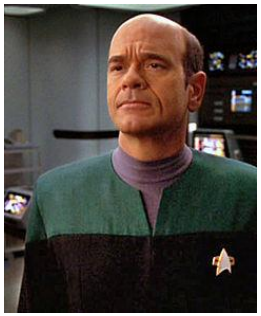
- These simulated computers are called virtual machines or VMs.



- 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.

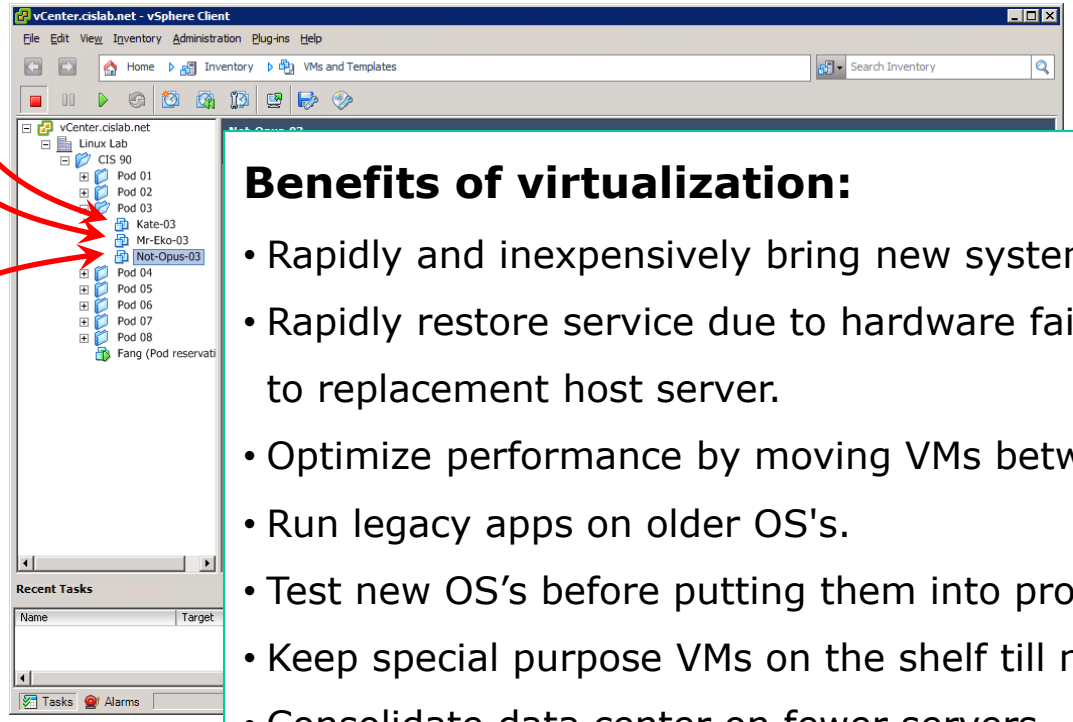


The EMH doctor on Star Trek Voyager was a simulation

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