



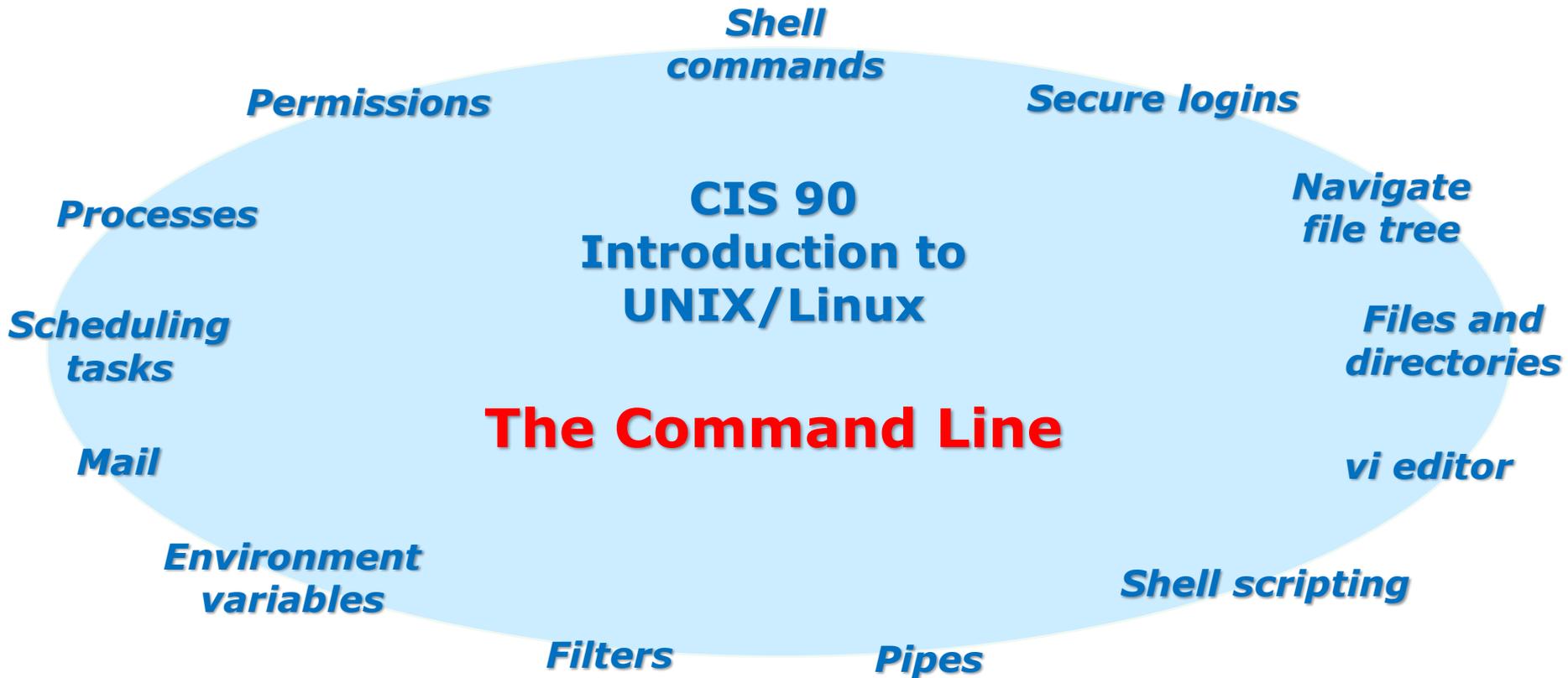
## Rich's CCC Confer checklist - setup

*Last updated 12/5/2018*

- Zoom recording named and published for previous lesson
- Slides posted
- Print out agenda slide and annotate page numbers
- Flash cards
- 1st minute quiz
- Web Calendar updated
- Bring some Linux ISOs on flash drive
- Canvas Practice Test 3 ready and scheduled
- Practice Test systems ready
- Schedule midnight turnin directory lock
- Schedule midnight backup of all myscript files
- Backup slides, CCC info, handouts on flash drive
- Spare 9v battery for mic
- Key card for classroom door

<https://zoom.us>

- Putty + Slides + Chrome
- Enable/Disable attendee sharing
  - ^ > Advanced Sharing Options > Only Host
- Enable/Disable attended annotations
  - Share > More > Disable Attendee Sharing



### **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 and Credits



Jim Griffin

- Created this Linux course
- Created Opus and the CIS VLab
- Jim's site: <https://web.archive.org/web/20140209023942/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. John's site: <http://teacherjohn.com/>
- Jaclyn Kostner for many webinar best practices: e.g. mug shot page.



## Student checklist - Before class starts

simms-teach.com/cis90calendar.php

Rich's Cabrillo College CIS Classes  
CIS 90 Calendar

CIS 90 (Fall 2014) Calendar

Course Dates: [Genda](#) [Calendar](#)

[CIS 90](#)

Lesson	Date	Topics	Links
		<p><b>Class and Litera Overview</b></p> <ul style="list-style-type: none"> <li>Understand how the course will work</li> <li>High-level overview of computers, operating systems, and virtual machines</li> <li>Overview of LINUX/Linux market and architecture</li> <li>Using SSH for remote network exits</li> <li>Using terminals and the command line</li> </ul>	
	9/2	<p><b>Methods</b></p> <p><a href="#">Presentation slides (download)</a></p>	<p>2.4.5 p163-172 p164-172 (high)</p>
		<p><b>Supplemental</b></p> <ul style="list-style-type: none"> <li>Howto #148: Logging into Opus (download)</li> </ul>	
		<p><b>Assignments</b></p> <ul style="list-style-type: none"> <li><a href="#">Student Survey</a></li> <li><a href="#">Lab 1</a></li> </ul>	
		<p><b>CCS Center</b></p> <p><a href="#">Enter virtual classroom</a></p>	
		<p><b>Quiz 1</b></p>	
		<p><b>Commands</b></p>	

1. Browse to:  
**http://simms-teach.com**
2. Click the **CIS 90** link.
3. Click the **Calendar** link.
4. Locate today's lesson.
5. Find the **Presentation slides** for the lesson and **download** for easier viewing.
6. Click the **Enter virtual classroom** link to join ConferZoom.
7. Log into Opus-II with Putty or ssh command.



## Student checklist - Before class starts

Google

ConferZoom

Downloaded PDF of Lesson Slides. I like Foxit Reader so I can take notes using annotations.

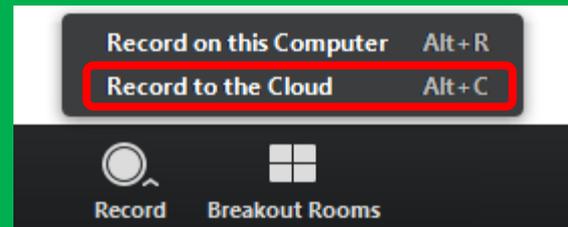
The screenshot shows a Zoom meeting interface with several windows open. In the background, there is a Google search page and the CIS 90 website. The website has a navigation menu with 'Home', 'Resources', and 'Forums'. A 'Login' button is visible. Below the navigation, there is a 'CIS 90 (Spring 2018) Calendar' section with a table of lessons. The table has columns for 'Lesson', 'Date', and 'Topics'. The first row shows Lesson 1 on 1/31 with topics including 'Class and Linux Overview', 'Understand how this course works', 'Overview of computers and networks', 'Learn how to login via ssh', and 'Learn first UNIX/Linux commands'. Below the table, there are sections for 'Materials', 'Supplemental', and 'Assignment'. The 'Materials' section lists 'Presentation slides (download)', 'Log in credentials worksheet (download)', and 'Howto #146: Logging into a remote host (download)'. The 'Supplemental' section lists 'Lab 1'. The 'Assignment' section lists 'Student Survey'. The 'ConferZoom' window is in the foreground, showing a Zoom meeting with a video of a white car with its door open and the text 'Get into the car'. The Zoom interface includes a toolbar with 'Unmute', 'Start Video', 'Invite', 'Participants', 'Share Screen', 'Chat', 'Record', and 'Leave Meeting'. A terminal window is also visible, showing a login prompt and a password prompt.

CIS 90 website Calendar page

One or more login sessions to Opus-II

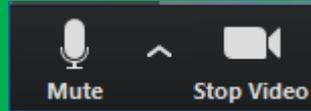


# Start



# Start Recording

Audio Check



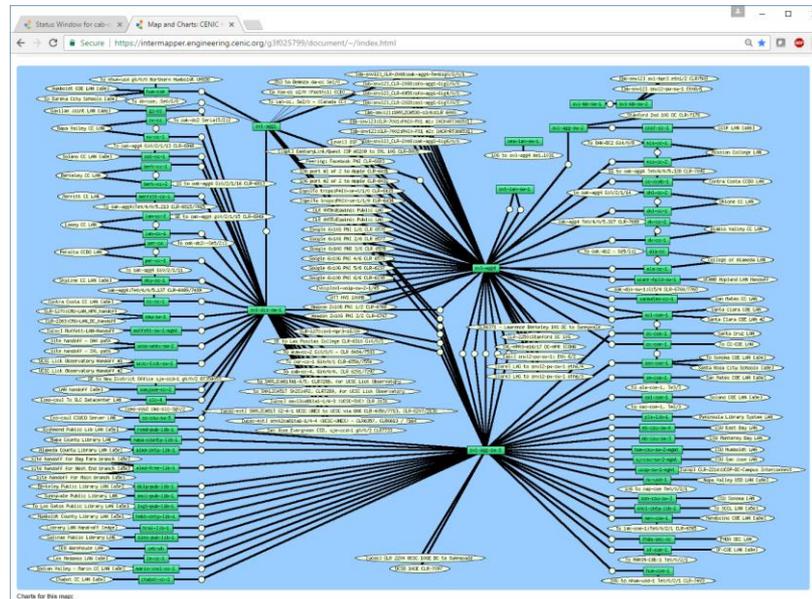
Start Recording

# Audio & video Check

## Quiz

**No Quiz  
Today !**

# Network Check



[https://intermapper.engineering.cenic.org/g3f025799/  
document/~!/index.html](https://intermapper.engineering.cenic.org/g3f025799/document/~!/index.html)



Instructor: **Rich Simms**  
Dial-in: **408-638-0968 (toll)**  
Meeting ID: **426 283 384**



Mikey



Jona



Joseph



Tara Marie



Fredi



Carina



Isaac



Matthew



Erik



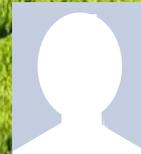
Tony



Victor



Dominic



Ryan L.



Alejandra



Blair



Zari



Danny



Gabriel



Janelly



Austin



Aaron



Ryan M.

## Quiz

**No Quiz  
Today !**



## File Transfer and Review

### Objectives

- Transfer project files to Windows and Linux systems
- Prepare for final exam

### Agenda

- No Quiz
- Questions
- Housekeeping
- Final Exam (Test 3)
- Test 3 Tips
- File transfer continued
- Compressed archives
- Make your own Opus-II
- Project Presentations
- Workshop
- Wrap up

## Class Activity



If you haven't already,  
log into Opus-II

## Class Activity

**Lesson 3**

**Electronic Mail**

- Guest speaker: Denise Moore on OTC (On-The-Job) training programs
- Learn how to use the LINC communication tools write and /bin/mail
- Overview on and-to and mail

**Materials**

- Presentation slides ([download](#))

**Supplemental**

- Howto #318: Accessing vLab ([download](#))

**Assignment**

- Read/skim Lesson 3 slides

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

If you haven't already,  
download the lesson slides

## Class Activity

	<ul style="list-style-type: none"><li>• <a href="#">Read/skim Lesson 1 slides</a></li><li>• <a href="#">Student Survey</a></li><li>• <a href="#">Lab 1</a></li></ul>
	<b>ConferZoom</b> <ul style="list-style-type: none"><li>• <a href="#">Enter virtual classroom</a></li><li>• <a href="#">Class archives</a></li></ul>
	<b>Quiz 1</b>
	<b>Commenda</b> <ul style="list-style-type: none"><li>• Understand how the UNIX login operation</li></ul>

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

If you haven't already, join  
ConferZoom classroom

## Before class starts activity

To save time download a CentOS Minimal ISO from:

<https://www.centos.org/download/>



To save even more time download and install VirtualBox from:

<https://www.virtualbox.org/wiki/Downloads>





# Questions

# Questions?

Lesson material?

Labs? Tests?

How this course works?

• Graded work & tests  
in home directories

• Answers in  
/home/cis90/answers

*Who questions much, shall learn  
much, and retain much.*

- Francis Bacon

*If you don't ask, you don't get.*

- Mahatma Gandhi

Chinese  
Proverb

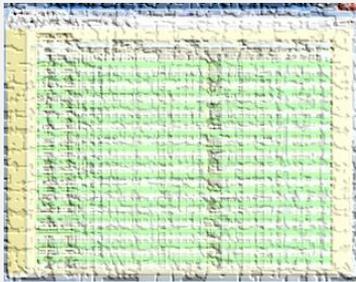
他問一個問題，五分鐘是個傻子，他不問一個問題仍然是一個  
傻瓜永遠。

*He who asks a question is a fool for five minutes; he who does not ask a question  
remains a fool forever.*

## Review your progress in the course

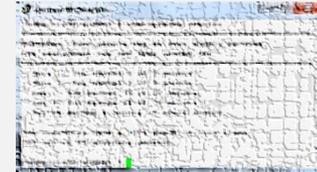
### Check the website Grades page

<http://simms-teach.com/cis90grades.php>



### Or check on Opus-II

**checkgrades** *codename*  
(where *codename* is your LOR codename)



Written by Jesse Warren a past CIS 90 Alumnus

- **Send me your survey to get your LOR codename.**
- **Graded labs and tests are in your home directories.**

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

**At the end of the term I'll add up all your points and assign you a grade using this table**

### Points that could have been earned:

10 quizzes: 30 points  
 10 labs: 300 points  
 2 tests: 60 points  
 3 forum quarters: 60 points  
**Total: 450 points**

## Extra Credit

### On the forum

Be sure to monitor the forum as I may post extra credit opportunities without any other notice!

In lesson slides  
(search for extra credit)

### On some labs

**Extra credit (2 points)**

For a small taste of what you would learn in CIS 191 let's add a new user to your Arya VM. Once added we will see how the new account is represented in `/etc/passwd` and `/etc/shadow`.

1. Log into your Arya VM as the cis90 user. Make sure it's your VM and not someone else's.
2. Install the latest updates:  
`sudo apt-get update`  
`sudo apt-get upgrade`
3. Add a new user account for yourself. You may make whatever username you wish. The example below shows how Benji would make the same username he uses on Opus:  
`sudo useradd -G sudo -c "Benji Simms" -m -s /bin/bash simben90`



### On the website

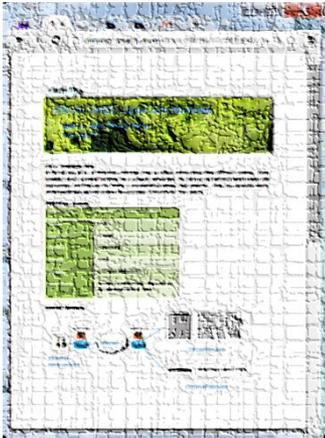
<http://simms-teach.com/cis90grades.php>

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

<http://simms-teach.com/cis90extracredit.php>

• **Website content review** - The first person to email the instructor pointing out an error or typo on this website will get one point of extra credit for each unique error. The email must specify the specific document or web page, pinpoint the location of the error, and specify what the correction should be. Duplicate errors count as a single point. This does not apply to pre-published material that has been updated but not yet presented in class. (Up to 20 points total)

## Lab Assignments -- Pearls of Wisdom



- Don't wait till the last minute to start.
- Plan for things to go wrong and give yourself time to ask questions and get answers.
- 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.
- Keep a growing cheat sheet of commands and examples.
- Study groups are very productive and beneficial.
- Use the forum to collaborate, ask questions, get clarifications and share tips you learned while doing a lab.
- **Late work is not accepted** so submit what you have for partial credit.

## Getting Help When Stuck on an Assignment

- Google the topic/error message.
- Search the Lesson Slides (they are PDFs) for a relevant example on how to do something.
- Check the forum. Someone else may have run into the same issue and found a way past it. If not start a new topic, explain what you are trying to do and what you have tried so far.
- Talk to a STEM center tutor/assistant.
- Come see me during my office or lab hours:

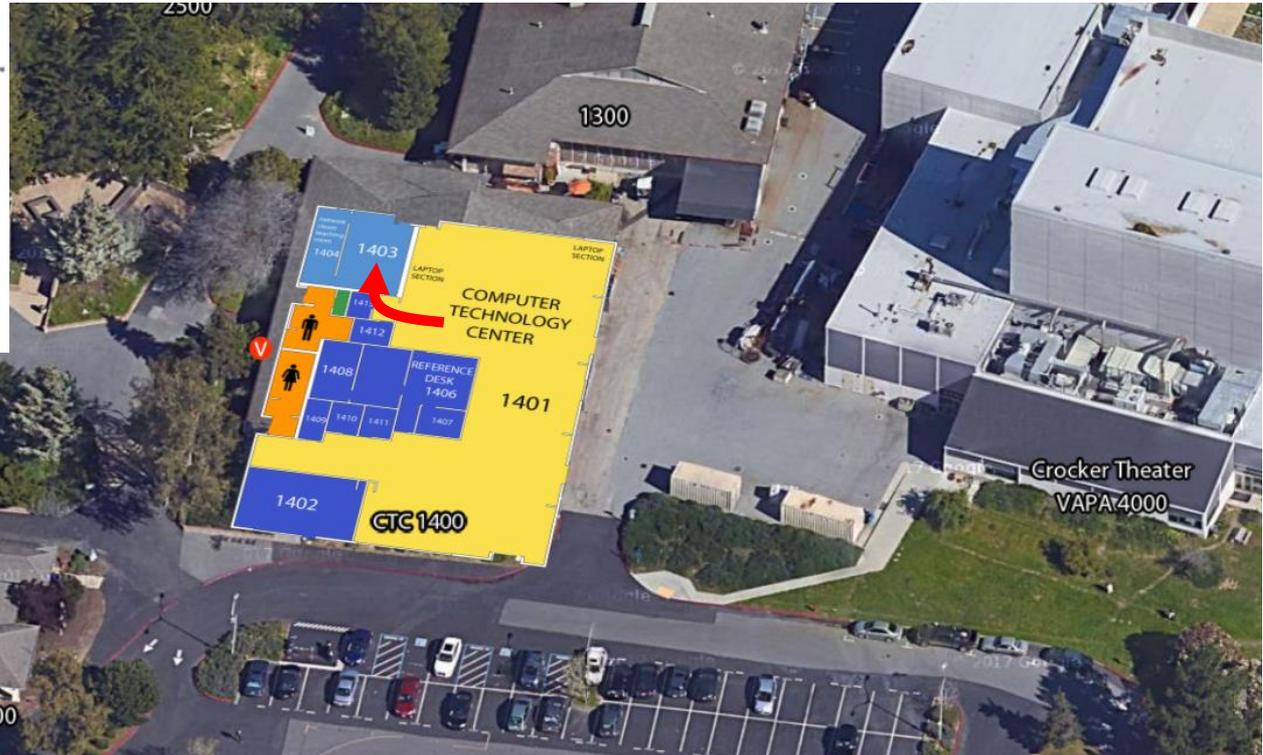
<https://www.cabrillo.edu/salsa/listing.php?staffId=1426>

**I'm in the CTC (room 1403) every Tuesday from 3:30-5:00 pm.**

- Make use of the Open Questions time at the start of every class.
- Make a cheat sheet of commands and examples so you never again get stuck on the same thing!

*CIS Labs always involve some troubleshooting!*

# CTC - Building 1400 On lower campus



I will be in the CTC (room 1403) every Tuesday afternoon from 3:30-5:00

## Help Available in the CIS Lab

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



**Rich's Cabrillo College CIS Classes**  
Home Page

Home

Resources

Forums

CIS Lab

Canvas

CIS Lab & Datacenter  
Aptos Campus

Home Resources NETLAB VLab Location

Announcements

The CIS Lab is in the STEM Center in building 800.  
A great place to work on lab assignments and get help from student lab assistants and instructors on the schedule below.

STEM CIS/CS hours

Today Jan 28 - Feb 3, 2018 Week

Time	Sun 1/28	Mon 1/29	Tue 1/30	Wed 1/31	Thu 2/1	Fri 2/2	Sat 2/3
10am							
11am							
12pm							
1pm							
2pm		Jeffrey Bergamini CS Instructor Carter Frost CIS/CS					
3pm							
4pm							
5pm							
6pm							
7pm							

Events shown in time zone: Pacific Time

W3C XHTML 1.0 W3C CSS

*To see schedule, click the CIS Lab link on the website and use the "Week" calendar view*



# The slippery slope



- 1) If you didn't submit the last lab ...
- 2) If you were in class and didn't submit the last quiz ...
- 3) If you didn't send me the student survey assigned in Lesson 1 ...
- 4) If you haven't made a forum post in the last quarter of the course ...
- 5) If you had trouble doing the last test ...

*Please contact me by email, see me during my office hours or when I'm in the CTC*

Email: [risimms@cabrillo.edu](mailto:risimms@cabrillo.edu)

# Housekeeping





**Project is  
due tonight!**

**Don't forget  
to submit  
your  
project!**

- Final project **due 11:59 PM** tonight.
- Don't forget to **submit** using the instructions:

➔ `cp myscript /home/rsimms/turnin/cis90/myscript.$LOGNAME`

- Project presentations after lesson material today.
- Final exam is next week **1-3:50pm Monday Dec 10<sup>th</sup>**.
- Extra credit labs and forum posts due 11:59 PM day of the final exam.
- Practice test for final exam is available now.
- Practice test server will shutdown 30 minutes before the final exam.



Possible Points	Requirements
30	Implementing all five tasks (6 points each): <ul style="list-style-type: none"> <li>Requirements for each task: <ul style="list-style-type: none"> <li>Minimum of 12 "original" lines of bash script</li> <li>Has one or more non-generic comments to explain what it is doing</li> <li>Has user interaction</li> </ul> </li> </ul>
24	At least six bash constructs from this list: <ul style="list-style-type: none"> <li>Redirecting stdin (4 points)</li> <li>Redirecting stdout (4 points)</li> <li>Redirecting stderr (4 points)</li> <li>Use of permissions (4 points)</li> <li>Use of filename expansion characters (4 points)</li> <li>Use of absolute path (4 points)</li> <li>Use of relative path (4 points)</li> <li>Use of a PID (4 points)</li> <li>Use of inodes (4 points)</li> <li>Use of links (4 points)</li> <li>Use of color (4 points)</li> <li>Use of scheduling (4 points)</li> <li>Use of a GID or group (4 points)</li> <li>Use of a UID or user (4 points)</li> <li>Use of a /dev/tty device (4 points)</li> <li>Use of a signal (4 points)</li> <li>Use of piping (4 points)</li> <li>Use of an environment variable (4 points)</li> <li>Use of /bin/mail (4 points)</li> <li>Use of a conditional (4 points)</li> <li>Use of \$(<i>command</i>)</li> </ul> <p>The maximum for this section is 24 points.</p>
6	Present your script to the class
<b>Points lost</b>	
-15	Fails to run from <b>allscripts</b>
-15	Other students in the class are unable to read and execute your script.
-15	Error messages are displayed when running one or more tasks
-up to 90	No credit for any task which contains unoriginal script code that: <ul style="list-style-type: none"> <li>Doesn't give full credit to the original author.</li> <li>Doesn't indicate where the code was obtained from.</li> <li>Doesn't include licensing terms.</li> <li>Violates copyright or licensing terms.</li> </ul>
-up to 90	For any "malware" scripts that steal credentials, exfiltrate confidential information, remove or encrypt a user's files or creates a denial of service condition on Opus-II.
<b>Extra credit</b>	
30	Up to three additional tasks (10 points each)

## Grading Rubric for Final Project

*Make sure a classmate and run your script using allscripts!*

*Plagiarizing another author's code is a NO-NO! All points lost!*

*Scripts that result in unauthorized hacking" is a NO-NO! All points lost!*

# Make backup copies of your script

*modify, debug, modify, debug, ... rest*

```
/home/cis90/simben/bin $ cp myscript myscript.v1
```

*modify, debug, modify, debug, ... rest*

```
/home/cis90/simben/bin $ cp myscript myscript.v2
```

*modify, debug, modify, debug, ... rest*

```
/home/cis90/simben/bin $ cp myscript myscript.v3
```



# Final Exam (Test 3)

## Heads up on Final Exam

Test #3 (final exam) is **MONDAY December 10th 1-3:50PM**

<b>Mon</b>	12/10	<b>Test #3 (the final exam)</b>	<u>5 posts</u> <u>Lab X1</u> <u>Lab X2</u>
		<p><b>Time</b></p> <ul style="list-style-type: none"> <li>MONDAY 1:00PM - 3:50PM in Room 828 or online</li> </ul> <p><b>Materials</b></p> <ul style="list-style-type: none"> <li>Presentation slides (<u>download</u>)</li> <li>Test (<u>canvas</u>)</li> </ul> <p><b>ConferZoom</b></p> <ul style="list-style-type: none"> <li><u>Enter virtual classroom</u></li> <li><u>Class archives</u></li> </ul>	

*Extra credit Labs X1/X2  
and final posts  
**due by 11:59PM***

***Final grades available by  
the end of the next day***

- All students will take the test at the same time. The test must be completed by **3:50PM**.
- Working and long distance students can take the test online via ConferZoom and Canvas.
- Working students will need to plan ahead to arrange time off from work for the test.
- Test #3 is **mandatory** (even if you have all the points you want)

## FALL 2018 FINAL EXAMINATIONS SCHEDULE DECEMBER 10 TO DECEMBER 15

### DAYTIME FINAL SCHEDULE

**Daytime Classes:** All times in bold refer to the beginning times of classes. **MW/Daily** means Monday alone, Wednesday alone, Monday and Wednesday or any 3 or more days in any combination. **TTH** means Tuesday alone, Thursday alone, or Tuesday and Thursday. **Classes meeting other combinations of days and/or hours not listed must have a final schedule approved by the Division Dean.**

STARTING CLASS TIME / DAY(S)	EXAM HOUR	EXAM DATE
<i>Classes starting between:</i>		
6:30 am and 8:55 am, MW/Daily	7:00 am-9:50 am	Monday, December 10
9:00 am and 10:15 am, MW/Daily	7:00 am-9:50 am	Wednesday, December 12
10:20 am and 11:35 am, MW/Daily	10:00 am-12:50 pm	Monday, December 10
11:40 am and 12:55 pm, MW/Daily	10:00 am-12:50 pm	Wednesday, December 12
1:00 pm and 2:15 pm, MW/Daily	1:00 pm-3:50 pm	Monday, December 10
2:20 pm and 3:35 pm, MW/Daily	1:00 pm-3:50 pm	Wednesday, December 12
3:40 pm and 5:30 pm, MW/Daily	4:00 pm-6:50 pm	Wednesday, December 12

#### CIS 90

#### Introduction to UNIX/Linux

Provides a technical overview of the UNIX/Linux operating system, including hands-on experience with commands, files, and tools. Recommended Preparation: CIS 1L or CIS 72.

Transfer Credit: Transfers to CSU;UC

Section	Days	Times	Units	Instructor	Room
1	W	1:00PM-4:05PM	3.00	R.Simms	OL
&	Arr.	Arr.		R.Simms	OL
Section 1 is an ONLINE course. Meets weekly throughout the semester online during the scheduled times by remote technology with an additional 50 min online lab per week. For details, see instructor's web page at <a href="http://go.cabrillo.edu/online">go.cabrillo.edu/online</a> . This course has zero cost for textbooks.					
2	W	1:00PM-4:05PM	3.00	R.Simms	828
&	Arr.	Arr.		R.Simms	OL
Section 2 is a Hybrid ONLINE course. Meets weekly throughout the semester at the scheduled times with an additional 50 min online lab per week. For details, see instructor's web page at <a href="http://go.cabrillo.edu/online">go.cabrillo.edu/online</a> . This course has zero cost for textbooks.					

## Final Exam (Test #3)

- **The final exam will be Test #3  
(worth 30 points + 3 points extra credit)**
  - Open book, open notes, open computer.
  - During the test you must work alone and not ask or give assistance to others.
  - Canvas test, so make sure you can log into Canvas before the test starts so you don't waste valuable time on this activity.

# Final Exam (Test #3)

## • Canvas Practice Test 3

### ➤ Advice:

- ❖ Work EVERY question on the practice test and make a personal reference sheet for remembering how to do things
  - ❖ Use your reference sheet on the final exam.
  - ❖ Take the practice test more than once. Use the **restore** command to reset your directory on the testing system
- Use of study groups and the forum are a great way to work on the practice test and prepare for the final exam!



# Test 3

# Tips

Practice Test



**Do the practice test  
multiple times.**

**Use the restore command  
for a fresh start.**

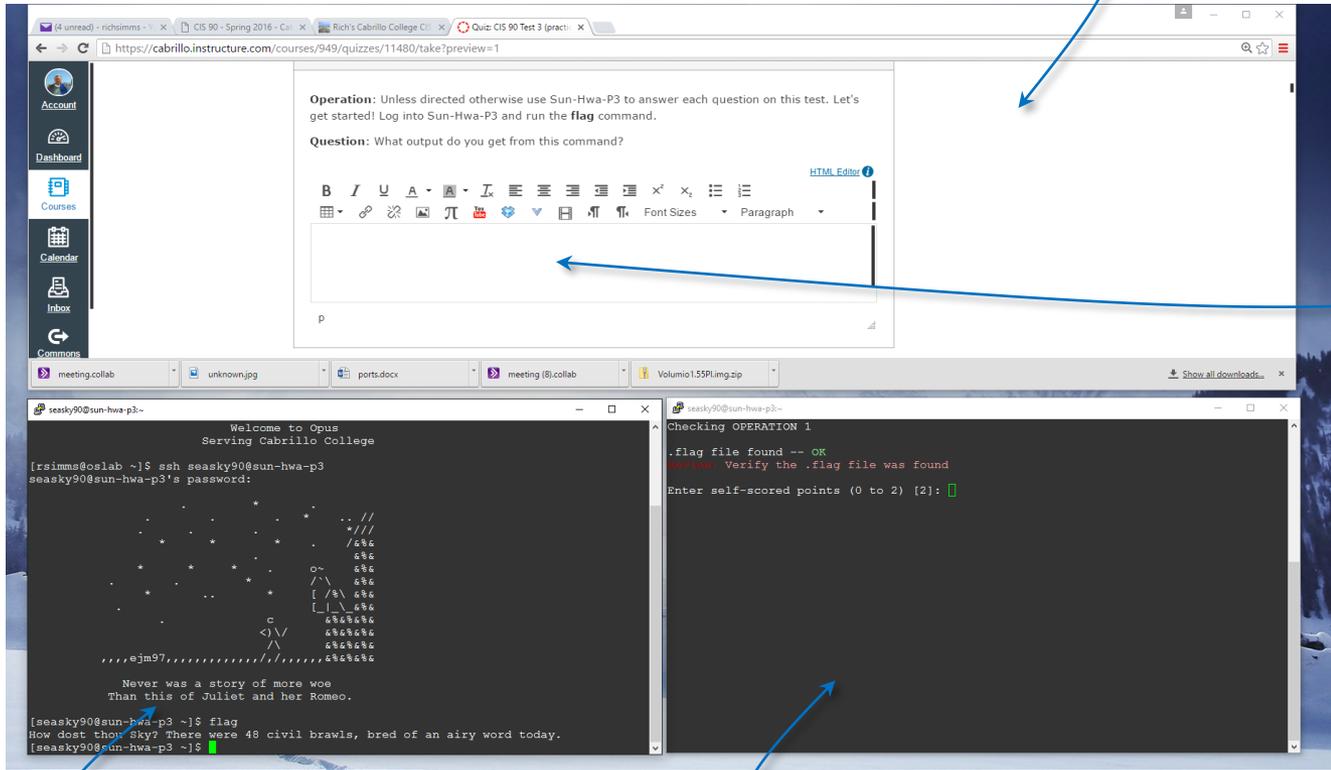


# Test Tips

Screen layout

## Screen Layout

Re-size Canvas to show just one question at a time



Note: You can copy and paste text from your session into Blackboard if needed

One session to work the questions in

Another session to run the check script in, show specs, send signals etc.

# Test Tips

Use the -v (verbose option) to double check your work

## The -v (verbose) option

```
[rsimms@oslab ~]$ mkdir fun
[rsimms@oslab ~]$ touch fun/funny

[rsimms@oslab ~]$ chmod -R 700 fun

[rsimms@oslab ~]$ chmod -Rv 750 fun
mode of `fun' changed to 0750 (rwxr-x---)
mode of `fun/funny' changed to 0750 (rwxr-x---)

[rsimms@oslab ~]$ touch dog cat

[rsimms@oslab ~]$ mv dog fun

[rsimms@oslab ~]$ mv -v cat fun
`cat' -> `fun/cat'
```

*Notice how using the -v option gives you additional feedback*

# Test Tips

head and tail pipelines  
grep -n

## Sample Task

**Find a block of text in a large file that contains a specific text string. Then write a script that displays that block of text.**

**Examine the *dickens* file in the */home/cis90/depot* directory and find the block of lines containing this quote:**

```
"Father is so much kinder than he used to be"
```

*In the dickens file, which line number contains the quote above?*

*Write your answer in the chat window*

## One way: use grep to find the quote in the file

*Use grep to find the quote in the file*

```
/home/cis90/simben $ grep "much kinder" ../depot/dickens  
for ever and ever. Father is so much kinder than he used to be, that
```

*The -n option on grep shows the line number*

```
/home/cis90/simben $ grep -n "much kinder" ../depot/dickens  
305:for ever and ever. Father is so much kinder than he used to be, that
```

*Using grep we see that the quote is on line 305 of the dickens file*

## Use vi to view the block of lines containing the quote

```
vi ../depot/dickens
```

```
simben90@oslab:~
It opened; and a little girl, much younger than the boy, came darting in,
and putting her arms about his neck, and often kissing him, addressed
him as her "Dear, dear brother."

"I have come to bring you home, dear brother!" said the child, clapping
her tiny hands, and bending down to laugh. "To bring you home, home,
home!"

"Home, little Fan?" returned the boy.

"Yes!" said the child, brimful of glee. "Home, for good and all. Home,
for ever and ever. █Father is so much kinder than he used to be, that
home's like Heaven! He spoke so gently to me one dear night when I
was going to bed, that I was not afraid to ask him once more if you
might come home; and he said Yes, you should; and sent me in a coach to
bring you. And you're to be a man!" said the child, opening her eyes,
"and are never to come back here; but first, we're to be together all
the Christmas long, and have the merriest time in all the world."

"You are quite a woman, little Fan!"exclaimed the boy.

She clapped her hands and laughed, and tried to touch his head; but being
too little, laughed again, and stood on tiptoe to embrace him. Then she
```

305,19 43%

*For a script to output the circled block of text above we must determine the line numbers of the start and end of the block*

*Starts on  
line 304* →

```
simben90@oslab:~  
It opened; and a little girl, much younger than the boy, came darting in,  
and putting her arms about his neck, and often kissing him, addressed  
him as her "Dear, dear brother."  
  
"I have come to bring you home, dear brother!" said the child, clapping  
her tiny hands, and bending down to laugh. "To bring you home, home,  
home!"  
  
"Home, little Fan?" returned the boy.  
  
"Yes!" said the child, brimful of glee. "Home, for good and all. Home,  
for ever and ever. Father is so much kinder than he used to be, that  
home's like Heaven! He spoke so gently to me one dear night when I
```

*Ends on  
line 311* →

```
simben90@oslab:~  
It opened; and a little girl, much younger than the boy, came darting in,  
and putting her arms about his neck, and often kissing him, addressed  
him as her "Dear, dear brother."  
  
"I have come to bring you home, dear brother!" said the child, clapping  
her tiny hands, and bending down to laugh. "To bring you home, home,  
home!"  
  
"Home, little Fan?" returned the boy.  
  
"Yes!" said the child, brimful of glee. "Home, for good and all. Home,  
for ever and ever. Father is so much kinder than he used to be, that  
home's like Heaven! He spoke so gently to me one dear night when I  
was going to bed, that I was not afraid to ask him once more if you  
might come home; and he said Yes, you should; and sent me in a coach to  
bring you. And you're to be a man!" said the child, opening her eyes,  
"and are never to come back here; but first, we're to be together all  
the Christmas long, and have the merriest time in all the world."  
  
"You are quite a woman, little Fan!" exclaimed the boy.  
  
She clapped her hands and laughed, and tried to touch his head; but being  
too little, laughed again, and stood on tiptoe to embrace him. Then she
```

304,1

311,1

*Just move the cursor in vi and the line number in the lower right changes*

`/home/cis90/depot/dickens`

```
simben90@oslab:~
It opened; and a little girl, much younger than the boy, came darting in,
and putting her arms about his neck, and often kissing him, addressed
him as her "Dear, dear brother."

"I have come to bring you home, dear brother!" said the child, clapping
her tiny hands, and bending down to laugh. "To bring you home, home,
home!"

"Home, little Fan?" returned the boy.

"Yes!" said the child, brimful of glee. "Home, for good and all. Home,
for ever and ever. Father is so much kinder than he used to be, that
home's like Heaven! He spoke so gently to me one dear night when I
was going to bed, that I was not afraid to ask him once more if you
might come home; and he said Yes, you should; and sent me in a coach to
bring you. And you're to be a man!" said the child, opening her eyes,
"and are never to come back here; but first, we're to be together all
the Christmas long, and have the merriest time in all the world."

"You are quite a woman, little Fan!" exclaimed the boy.

She clapped her hands and laughed, and tried to touch his head; but being
too little, laughed again, and stood on tiptoe to embrace him. Then she
```

305,19 43%

*Starts on  
line 304*

*Ends on  
line 311*

*What pipeline command using head and tail would print just the block of text above?*

*Write your answer in the chat window*

*The last line of  
the block is 311*

*The number of lines in  
the block would be  
 $311 - 304 + 1$   
or 8 lines*

```
/home/cis90/simben $ head -n311 ../depot/dickens | tail -n8  
"Yes!" said the child, brimful of glee. "Home, for good and all. Home,  
for ever and ever. Father is so much kinder than he used to be, that  
home's like Heaven! He spoke so gently to me one dear night when I  
was going to bed, that I was not afraid to ask him once more if you  
might come home; and he said Yes, you should; and sent me in a coach to  
bring you. And you're to be a man!" said the child, opening her eyes,  
"and are never to come back here; but first, we're to be together all  
the Christmas long, and have the merriest time in all the world."  
/home/cis90/simben $
```

*This is how you would use a head and tail pipeline to print just  
the block of text in the file containing the quote*

*Let's now make that long command into a script named dickens101*

```
/home/cis90/simben $ vi dickens101
/home/cis90/simben $ cat dickens101
head -n311 ../depot/dickens | tail -n8
```

```
/home/cis90/simben $ chmod +x dickens101
/home/cis90/simben $ dickens101
```

```
"Yes!" said the child, brimful of glee. "Home, for good and all. Home,
for ever and ever. Father is so much kinder than he used to be, that
home's like Heaven! He spoke so gently to me one dear night when I
was going to bed, that I was not afraid to ask him once more if you
might come home; and he said Yes, you should; and sent me in a coach to
bring you. And you're to be a man!" said the child, opening her eyes,
"and are never to come back here; but first, we're to be together all
the Christmas long, and have the merriest time in all the world."
/home/cis90/simben $
```

*Now we have a one-line script to print the block of text containing the quote*

*The last line of  
the block is 311*

*The number of lines in  
the block would be  
 $311 - 304 + 1$   
or 8 lines*

```
/home/cis90/simben $ head -n311 ../depot/dickens | tail -n8
```

```
"Yes!" said the child, brimful of glee. "Home, for good and all. Home,  
for ever and ever. Father is so much kinder than he used to be, that  
home's like Heaven! He spoke so gently to me one dear night when I  
was going to bed, that I was not afraid to ask him once more if you  
might come home; and he said Yes, you should; and sent me in a coach to  
bring you. And you're to be a man!" said the child, opening her eyes,  
"and are never to come back here; but first, we're to be together all  
the Christmas long, and have the merriest time in all the world."  
/home/cis90/simben $
```

```
/home/cis90/simben $ sed -n '304,311p' ../depot/dickens
```

```
"Yes!" said the child, brimful of glee. "Home, for good and all. Home,  
for ever and ever. Father is so much kinder than he used to be, that  
home's like Heaven! He spoke so gently to me one dear night when I  
was going to bed, that I was not afraid to ask him once more if you  
might come home; and he said Yes, you should; and sent me in a coach to  
bring you. And you're to be a man!" said the child, opening her eyes,  
"and are never to come back here; but first, we're to be together all  
the Christmas long, and have the merriest time in all the world."  
/home/cis90/simben $
```

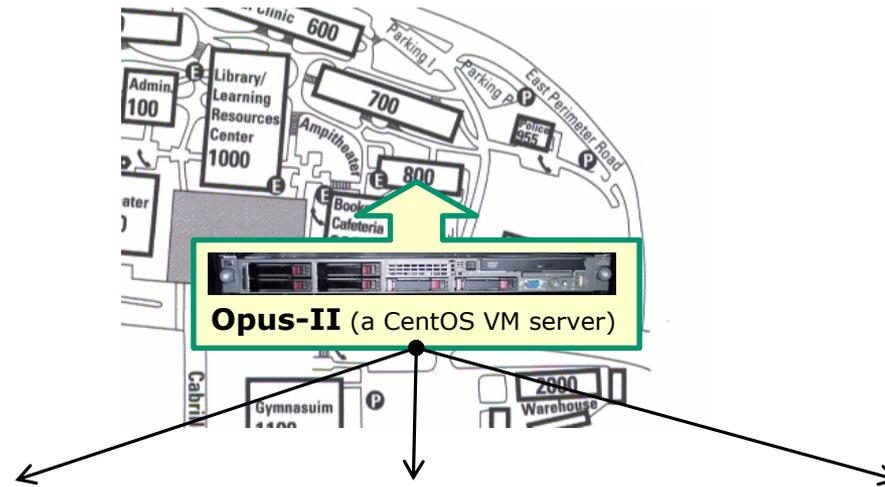
*There is an easier way using the sed (stream editor) command  
as shown above*



# File transfer continued

# File Transfer

Downloading your Opus-II files to your home computer



Windows



Mac



Linux

## First, let's backup your home directory on Opus-II

```
/home/cis90/simben $ tar czf simben90.tgz .  
tar: .: file changed as we read it
```

*The tarball (archive) simben90.tgz is created. The tarball does not include itself. The error message warns the directory changed during backup (new tarball added).*

```
/home/cis90/simben $ ls -lh simben90.tgz  
-rw-rw-r--. 1 simben90 cis90 79K May 10 16:11 simben90.tgz
```

*The -h (human readable) option shows the simben90.tgz tarball is 79K bytes in size*

```
/home/cis90/simben $ tar tzf simben90.tgz | wc -l  
197
```

*197 files were backed up*

## Next, let's look at some file transfer tools

- Between Linux and Windows:
  - **Filezilla** or related applications
- Between Linux and Linux/Mac:
  - **Filezilla** or related applications
  - **scp** command

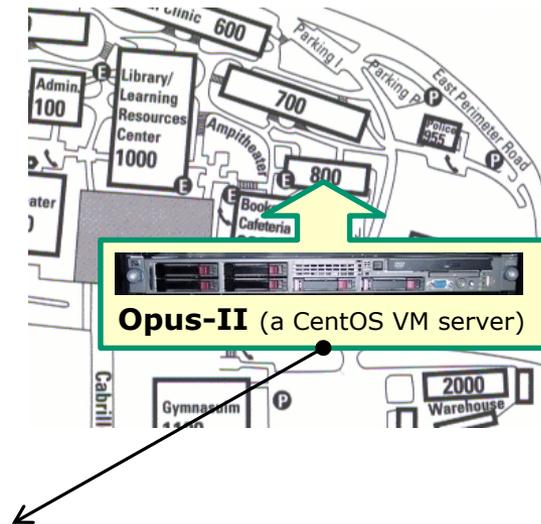


# File Transfer To Windows

## FileZilla

# File Transfer

Downloading your Opus-II files to your home computer



Windows

Using  FileZilla

# File Transfer

<http://filezilla-project.org>

Rich's Cabrillo College CIS x | CIS 90 - Spring 2016 - Cal x | Google Image Result for x | FileZilla - Client Download x

← → ↻ [https://filezilla-project.org/download.php?show\\_all=1](https://filezilla-project.org/download.php?show_all=1) ☆ ☰

## FileZilla

The free FTP solution

Home

**FileZilla**  
Features  
Screenshots  
Download  
Documentation

**FileZilla Server**  
Download

**Community**  
Forum  
Project page  
Wiki

**General**  
FAQ  
Contact  
License  
Privacy Policy

**Development**  
Source code  
Nightly builds  
Translations  
Version history  
Changelog  
Issue tracker

**Other projects**  
libfilezilla  
Octochess

PayPal

### Client Download

The latest stable version of FileZilla Client is 3.17.0.1

Please select the file appropriate for your platform below.

- ♦ **Windows (64bit)**
  - [FileZilla\\_3.17.0.1\\_win64-setup.exe](#) ⓘ (recommended)
  - [FileZilla\\_3.17.0.1\\_win64.zip](#) ⓘ

The 64bit versions of Windows Vista, 7, 8, 8.1 and 10 are supported.
- ♦ **Windows (32bit)**
  - [FileZilla\\_3.17.0.1\\_win32-setup.exe](#) ⓘ (recommended)
  - [FileZilla\\_3.17.0.1\\_win32.zip](#) ⓘ

The 32bit versions of Windows Vista, 7, 8, 8.1 and 10 are supported.
- ♦ **Linux**
  - [FileZilla\\_3.17.0.1\\_i586-linux-gnu.tar.bz2](#) ⓘ
  - [FileZilla\\_3.17.0.1\\_x86\\_64-linux-gnu.tar.bz2](#) ⓘ

Built for Debian 8.0 (Jessie). It is highly recommended to use the package management system of your distribution or to manually compile FileZilla if you are running a different flavour of Linux.
- ♦ **Mac OS X**
  - [FileZilla\\_3.17.0.1\\_macosx-x86.app.tar.bz2](#) ⓘ

*Download and install FileZilla on your Windows PC*

## **FileZilla** On Windows, connect to your account on Opus-II

The screenshot shows the FileZilla client interface with several yellow callout boxes providing instructions:

- Opus-II username**: Points to the Username field containing "simben90".
- Port: 2220**: Points to the Port field containing "2220".
- Host: sftp://opus-ii.cis.cabrillo.edu**: Points to the Host field containing "sftp://opus-ii.cis.cabrillo.edu".
- Opus-II Password**: Points to the Password field, which is currently masked with dots.
- Click to connect**: Points to the "Quickconnect" button.

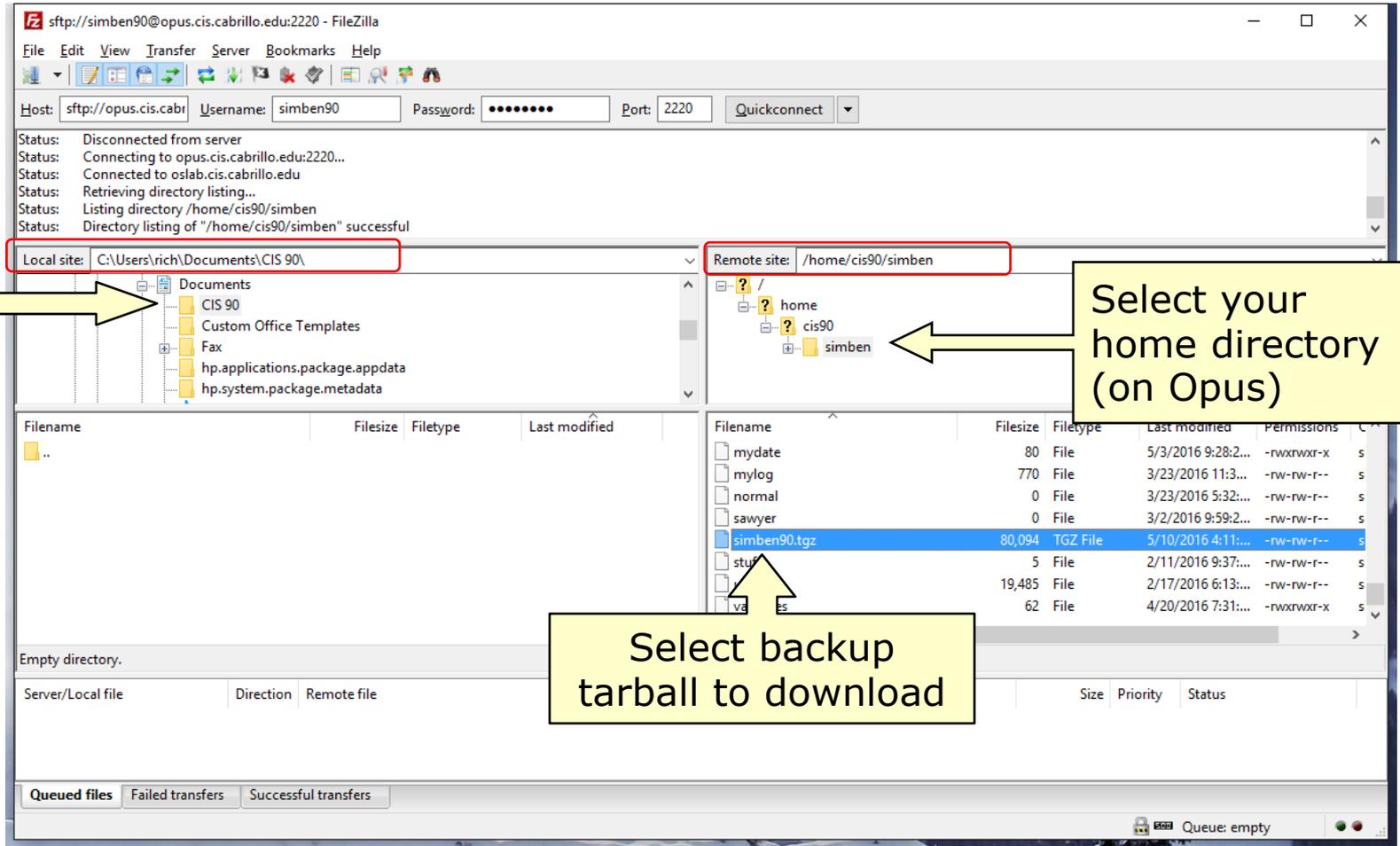
The interface also displays connection status messages, local and remote file listings, and a transfer queue at the bottom.

Server/Local file	Direction	Remote file	Size	Priority	Status

Queued files | Failed transfers | Successful transfers

Queue: empty

## **Select destination and source directories**



The screenshot shows the FileZilla interface with the following details:

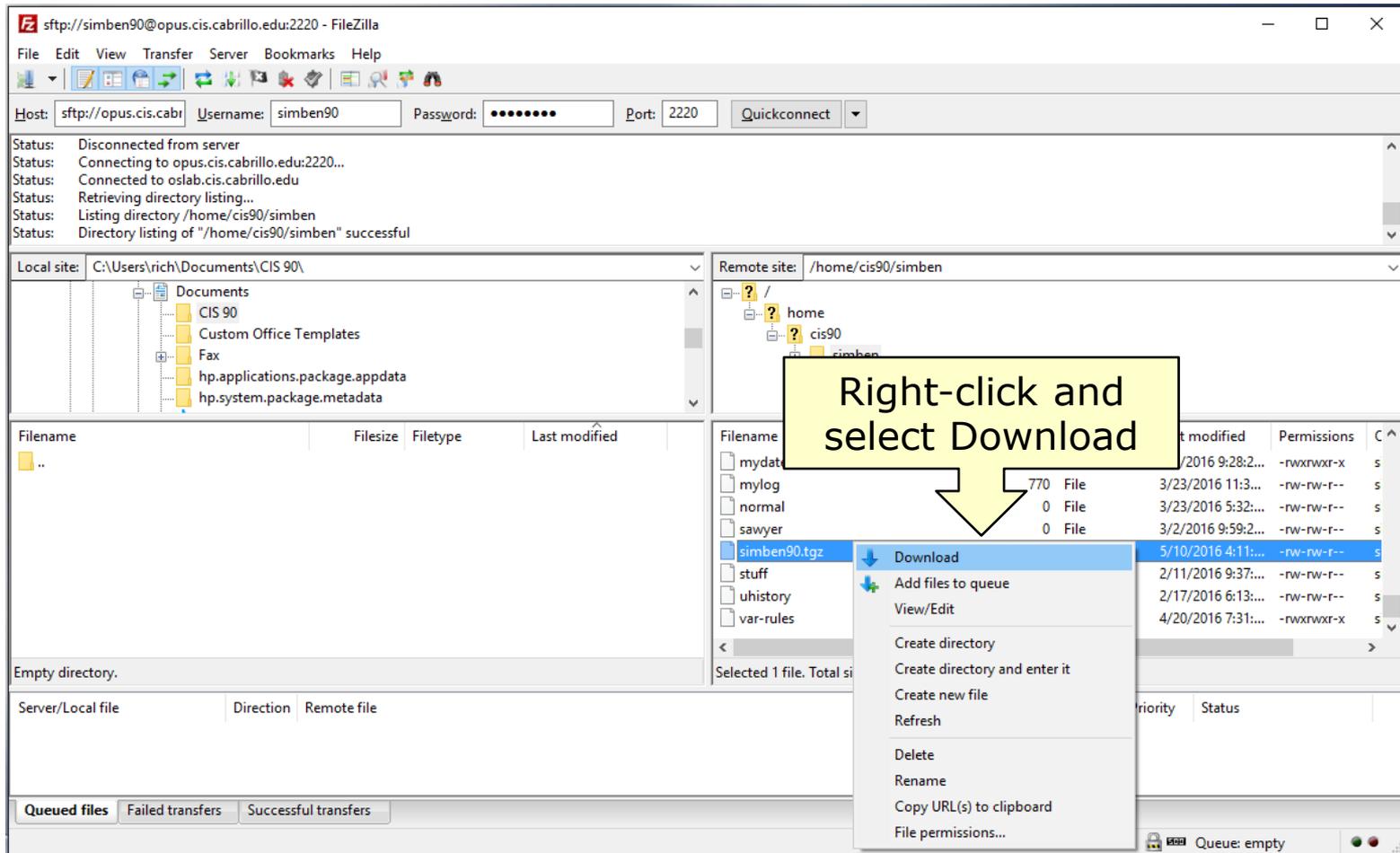
- Local site:** C:\Users\vich\Documents\CIS 90\ (highlighted with a red box and a callout: "Create and select destination folder")
- Remote site:** /home/cis90/simben (highlighted with a red box and a callout: "Select your home directory (on Opus)")
- Local File List:**

Filename	Filesize	Filetype	Last modified
..			
- Remote File List:**

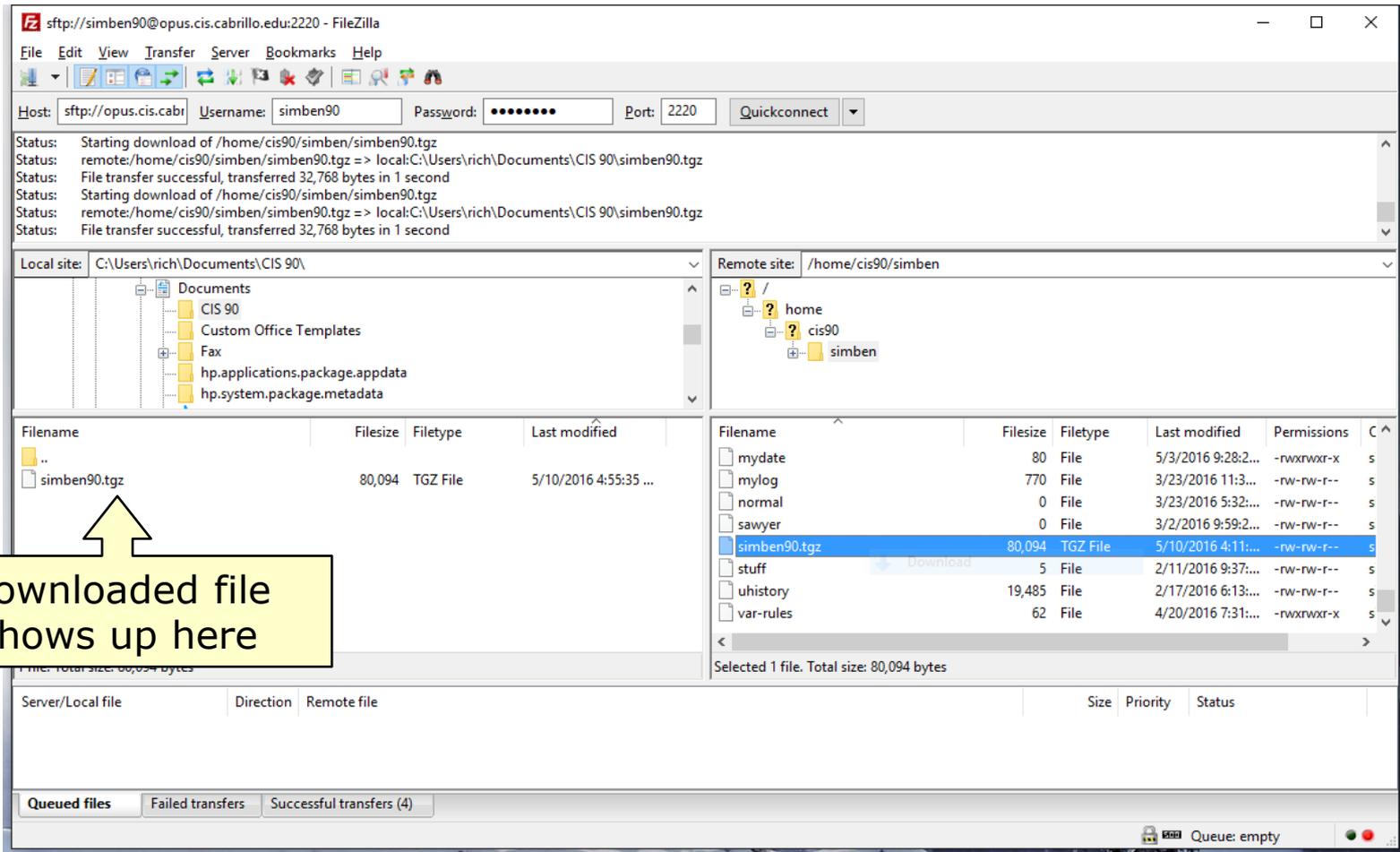
Filename	Filesize	Filetype	Last modified	Permissions
mydate	80	File	5/3/2016 9:28:2...	-rwxrwxr-x
mylog	770	File	3/23/2016 11:3:...	-rw-rw-r--
normal	0	File	3/23/2016 5:32:...	-rw-rw-r--
sawyer	0	File	3/2/2016 9:59:2...	-rw-rw-r--
simben90.tgz	80,094	TGZ File	5/10/2016 4:11:...	-rw-rw-r--
stu	5	File	2/11/2016 9:37:...	-rw-rw-r--
va	19,485	File	2/17/2016 6:13:...	-rw-rw-r--
es	62	File	4/20/2016 7:31:...	-rwxrwxr-x
- Callout:** "Select backup tarball to download" with an arrow pointing to the file `simben90.tgz`.

Select local Windows folder on the left and Opus-II file to download on the right

## FileZilla Initiate Download



## FileZilla Monitor transfer progress



Host: sftp://opus.cis.cabrillo.edu:2220    Username: simben90    Password: .....    Port: 2220    Quickconnect

Status: Starting download of /home/cis90/simben/simben90.tgz  
 Status: remote:/home/cis90/simben/simben90.tgz => local:C:\Users\rich\Documents\CIS 90\simben90.tgz  
 Status: File transfer successful, transferred 32,768 bytes in 1 second  
 Status: Starting download of /home/cis90/simben/simben90.tgz  
 Status: remote:/home/cis90/simben/simben90.tgz => local:C:\Users\rich\Documents\CIS 90\simben90.tgz  
 Status: File transfer successful, transferred 32,768 bytes in 1 second

Local site: C:\Users\rich\Documents\CIS 90\	Remote site: /home/cis90/simben																																																									
<table border="1"> <thead> <tr> <th>Filename</th> <th>Filesize</th> <th>Filetype</th> <th>Last modified</th> </tr> </thead> <tbody> <tr> <td>..</td> <td></td> <td></td> <td></td> </tr> <tr> <td>simben90.tgz</td> <td>80,094</td> <td>TGZ File</td> <td>5/10/2016 4:55:35 ...</td> </tr> </tbody> </table>	Filename	Filesize	Filetype	Last modified	..				simben90.tgz	80,094	TGZ File	5/10/2016 4:55:35 ...	<table border="1"> <thead> <tr> <th>Filename</th> <th>Filesize</th> <th>Filetype</th> <th>Last modified</th> <th>Permissions</th> </tr> </thead> <tbody> <tr> <td>mydate</td> <td>80</td> <td>File</td> <td>5/3/2016 9:28:2...</td> <td>-rwxrwxr-x</td> </tr> <tr> <td>mylog</td> <td>770</td> <td>File</td> <td>3/23/2016 11:3...</td> <td>-rw-rw-r--</td> </tr> <tr> <td>normal</td> <td>0</td> <td>File</td> <td>3/23/2016 5:32...</td> <td>-rw-rw-r--</td> </tr> <tr> <td>sawyer</td> <td>0</td> <td>File</td> <td>3/2/2016 9:59:2...</td> <td>-rw-rw-r--</td> </tr> <tr> <td>simben90.tgz</td> <td>80,094</td> <td>TGZ File</td> <td>5/10/2016 4:11:...</td> <td>-rw-rw-r--</td> </tr> <tr> <td>stuff</td> <td>5</td> <td>File</td> <td>2/11/2016 9:37:...</td> <td>-rw-rw-r--</td> </tr> <tr> <td>uhistory</td> <td>19,485</td> <td>File</td> <td>2/17/2016 6:13:...</td> <td>-rw-rw-r--</td> </tr> <tr> <td>var-rules</td> <td>62</td> <td>File</td> <td>4/20/2016 7:31:...</td> <td>-rwxrwxr-x</td> </tr> </tbody> </table>	Filename	Filesize	Filetype	Last modified	Permissions	mydate	80	File	5/3/2016 9:28:2...	-rwxrwxr-x	mylog	770	File	3/23/2016 11:3...	-rw-rw-r--	normal	0	File	3/23/2016 5:32...	-rw-rw-r--	sawyer	0	File	3/2/2016 9:59:2...	-rw-rw-r--	simben90.tgz	80,094	TGZ File	5/10/2016 4:11:...	-rw-rw-r--	stuff	5	File	2/11/2016 9:37:...	-rw-rw-r--	uhistory	19,485	File	2/17/2016 6:13:...	-rw-rw-r--	var-rules	62	File	4/20/2016 7:31:...	-rwxrwxr-x
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var-rules	62	File	4/20/2016 7:31:...	-rwxrwxr-x																																																						

Selected 1 file. Total size: 80,094 bytes

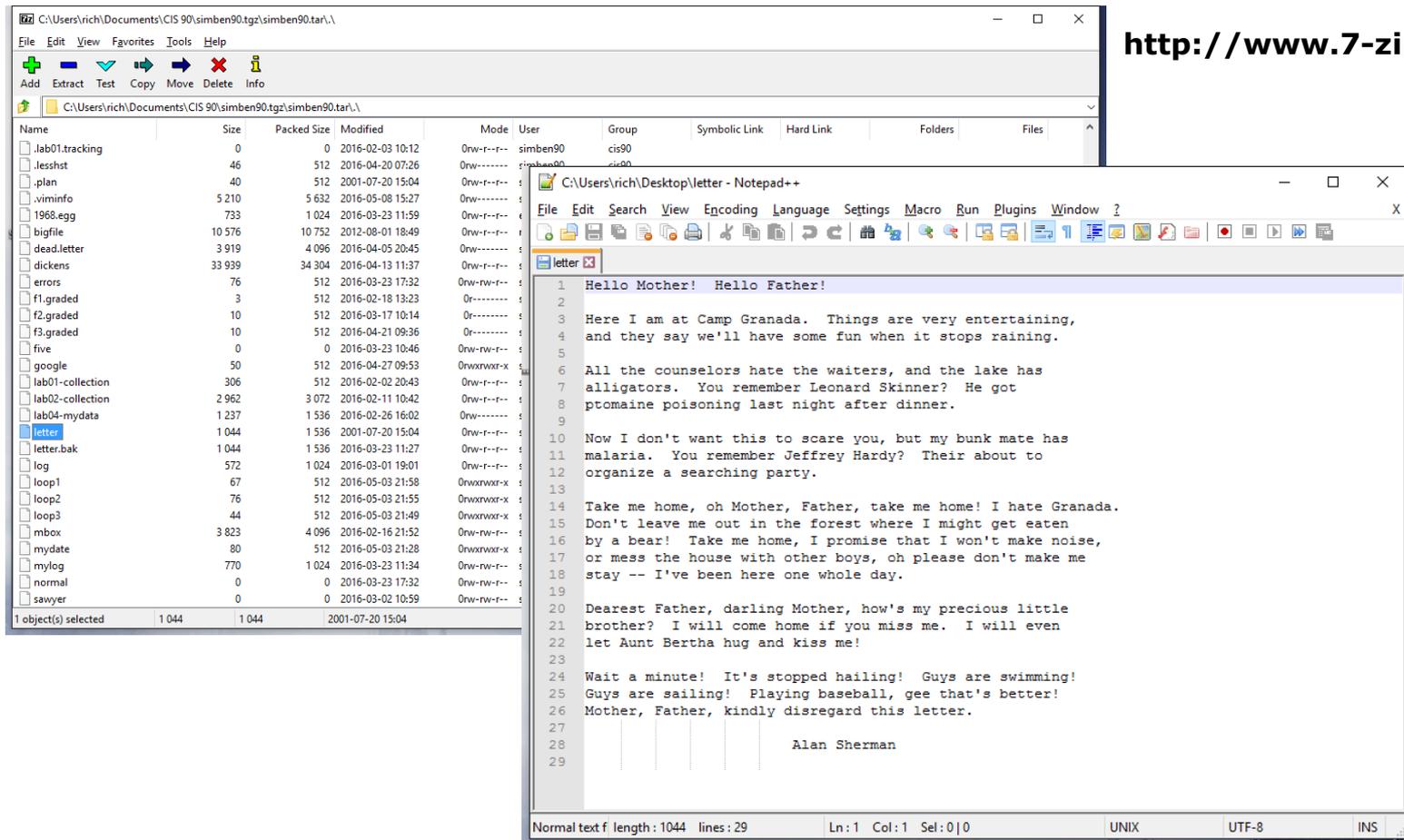
Queued files    Failed transfers    Successful transfers (4)

Downloaded file shows up here

## FileZilla File transfers

You can use 7-zip to view or extract files from the archive

<http://www.7-zip.org/>



The screenshot shows two windows. The top window is FileZilla, displaying a file list for the local path C:\Users\rich\Documents\CIS 90\simben90.tgz\simben90.tar\.

Name	Size	Packed Size	Modified	Mode	User	Group	Symbolic Link	Hard Link	Folders	Files
lab01.tracking	0	0	2016-02-03 10:12	Orw-r--r--	simben90	cis90				
leshst	46	512	2016-04-20 07:26	Orw-r--r--	simben90	cis90				
plan	40	512	2001-07-20 15:04	Orw-r--r--	simben90	cis90				
viminfo	5 210	5 632	2016-05-08 15:27	Orw-r--r--	simben90	cis90				
1968.egg	733	1 024	2016-03-23 11:59	Orw-r--r--	simben90	cis90				
bigfile	10 576	10 752	2012-08-01 18:49	Orw-r--r--	simben90	cis90				
dead.letter	3 919	4 096	2016-04-05 20:45	Orw-r--r--	simben90	cis90				
dickens	33 939	34 304	2016-04-13 11:37	Orw-r--r--	simben90	cis90				
errors	76	512	2016-03-23 17:32	Orw-r--r--	simben90	cis90				
f1.graded	3	512	2016-02-18 13:23	Orw-r--r--	simben90	cis90				
f2.graded	10	512	2016-03-17 10:14	Orw-r--r--	simben90	cis90				
f3.graded	10	512	2016-04-21 09:36	Orw-r--r--	simben90	cis90				
five	0	0	2016-03-23 10:46	Orw-r--r--	simben90	cis90				
google	50	512	2016-04-27 09:53	Orw-r--r--	simben90	cis90				
lab01-collection	306	512	2016-02-02 20:43	Orw-r--r--	simben90	cis90				
lab02-collection	2 962	3 072	2016-02-11 10:42	Orw-r--r--	simben90	cis90				
lab04-mydata	1 237	1 536	2016-02-26 16:02	Orw-r--r--	simben90	cis90				
letter	1 044	1 536	2001-07-20 15:04	Orw-r--r--	simben90	cis90				
letter.bak	1 044	1 536	2016-03-23 11:27	Orw-r--r--	simben90	cis90				
log	572	1 024	2016-03-01 19:01	Orw-r--r--	simben90	cis90				
loop1	67	512	2016-05-03 21:58	Orw-r--r--	simben90	cis90				
loop2	76	512	2016-05-03 21:55	Orw-r--r--	simben90	cis90				
loop3	44	512	2016-05-03 21:49	Orw-r--r--	simben90	cis90				
mbox	3 823	4 096	2016-02-16 21:52	Orw-r--r--	simben90	cis90				
mydate	80	512	2016-05-03 21:28	Orw-r--r--	simben90	cis90				
mylog	770	1 024	2016-03-23 11:34	Orw-r--r--	simben90	cis90				
normal	0	0	2016-03-23 17:32	Orw-r--r--	simben90	cis90				
sawyer	0	0	2016-03-02 10:59	Orw-r--r--	simben90	cis90				

The bottom window is Notepad++ showing the contents of the selected 'letter' file:

```

1 Hello Mother! Hello Father!
2
3 Here I am at Camp Granada. Things are very entertaining,
4 and they say we'll have some fun when it stops raining.
5
6 All the counselors hate the waiters, and the lake has
7 alligators. You remember Leonard Skinner? He got
8 ptomaine poisoning last night after dinner.
9
10 Now I don't want this to scare you, but my bunk mate has
11 malaria. You remember Jeffrey Hardy? Their about to
12 organize a searching party.
13
14 Take me home, oh Mother, Father, take me home! I hate Granada.
15 Don't leave me out in the forest where I might get eaten
16 by a bear! Take me home, I promise that I won't make noise,
17 or mess the house with other boys, oh please don't make me
18 stay -- I've been here one whole day.
19
20 Dearest Father, darling Mother, how's my precious little
21 brother? I will come home if you miss me. I will even
22 let Aunt Bertha hug and kiss me!
23
24 Wait a minute! It's stopped hailing! Guys are swimming!
25 Guys are sailing! Playing baseball, gee that's better!
26 Mother, Father, kindly disregard this letter.
27
28 Alan Sherman
29

```

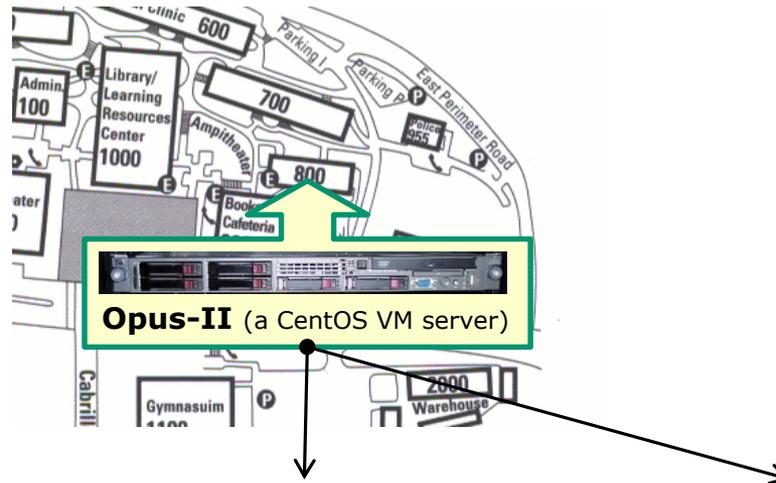
At the bottom of the Notepad++ window, it shows: Normal text f length: 1044 lines: 29 Ln: 1 Col: 1 Sel: 0|0 UNIX UTF-8 INS

# File Transfer Linux or Mac

scp

# File Transfer

Downloading your Opus-II files to your home computer



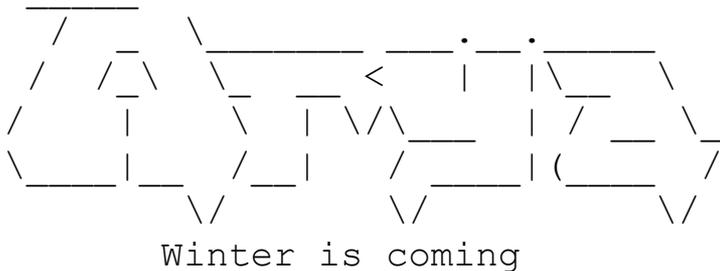
Mac



Linux

# File Transfer

Downloading your Opus-II files to your Linux system



```
Last login: Tue May 10 16:58:45 2016 from opus.cis.cabrillo.edu
cis90@Arya-03:~$ mkdir cis90
cis90@Arya-03:~$ cd cis90
cis90@Arya-03:~/cis90$ scp -P 2220 simben90@opus-ii.cis.cabrillo.edu:simben90.tgz .
simben90@opus-II.cis.cabrillo.edu's password:
simben90.tgz                                100% 78KB 78.2KB/s 00:00
cis90@Arya-03:~/cis90$
```

*Use the scp command on Linux or Mac to download the tarball on Opus-II*

# File Transfer

Extracting files from your backup tarball on your Linux VM

```

cis90@Arya-03:~/cis90$ tar xzf simben90.tgz
cis90@Arya-03:~/cis90$ ls
1968.egg      debian      f2.graded  L7-fun      loop2       sawyer
africa       Dell        f3.graded  lab01-collection  loop3       simben90.tgz
Apple        dickens     five       lab02-collection  mbox        slackware
basket       Directory3  fun        lab04-mydata    misc        stuff
bigfile      docs       google     lesson7       mydate     uhistory
bin          edits      Hidden     letter        mylog      var-rules
cis90_html   errors     HP         letter.bak     normal
class        etc        island     log           poems
dead.letter  f1.graded  jobs       loop1         redhat
cis90@Arya-03:~/cis90$

```

*Use the tar command on Linux or Mac to extract the files*



# Compressed Archives

gzip and gunzip  
tar -z option

## gzip and gunzip commands

```
/home/cis90/simben $ ls -l simben90.tar
-rw-rw-r--. 1 simben90 cis90 1751040 Dec 10 07:57 simben90.tar
```

*Uncompressed  
archive file*

*Next, compress the archive with **gzip***

```
/home/cis90/simben $ gzip simben90.tar
/home/cis90/simben $ ls -l simben90.tar.gz
-rw-rw-r--. 1 simben90 cis90 440895 Dec 10 07:57 simben90.tar.gz
```

*Compressed  
archive file*

*Later, uncompress the archive with **gunzip***

```
/home/cis90/simben $ gunzip simben90.tar.gz
/home/cis90/simben $ ls -l simben90.tar
-rw-rw-r--. 1 simben90 cis90 1751040 Dec 10 07:57 simben90.tar
```

*Use **gzip** and **gunzip** to compress and un-compress regular tar files.*

*Note: **gzip** renames the tar file by adding the **.gz** suffix and **gunzip** removes the suffix*

## tar -z option

```
/home/cis90/simben $ tar cf simben90.tar .
tar: ./Hidden: Cannot open: Permission denied
tar: ./simben90.tar: file is the archive; not dumped
tar: ./newer: Cannot open: Permission denied
tar: Exiting with failure status due to previous errors
```

*New tarball is  
NOT compressed.*

```
/home/cis90/simben $ ls -l simben90.tar
-rw-rw----. 1 simben90 cis90 768000 Dec  9 07:52 simben90.tar
/home/cis90/simben $
```

```
/home/cis90/simben $ rm simben90.tar
rm: remove regular file `simben90.tar'? y
```

```
/home/cis90/simben $ tar czf simben90.tar.gz .
tar: ./Hidden: Cannot open: Permission denied
tar: ./newer: Cannot open: Permission denied
tar: Exiting with failure status due to previous errors
```

*New tarball  
IS compressed.*

```
/home/cis90/simben $ ls -l simben90.tar.gz
-rw-rw----. 1 simben90 cis90 158724 Dec  9 07:51 simben90.tar.gz
```

*Use the z option to compress files when creating the tarball*

## tar -z option

```

/home/cis90/simben $ tar tvzf simben90.tar.gz | head
drwxr-xr-x simben90/cis90      0 2014-12-09 07:58 ./
-r----- simben90/staff 1111 2014-10-15 10:09 ./lab05.graded
-rw-r--r-- simben90/cis90    22 2014-10-21 09:25 ./names
-rw-r--r-- simben90/cis90    70 2014-11-02 17:12 ./bigshell
-r----- simben90/staff 1276 2014-09-17 10:28 ./lab02.graded
-rw----- simben90/root    410 2014-11-24 07:44 ./bash_profile.fq
-rw----- simben90/cis90 5146 2014-12-08 19:10 ./viminfo
-rw----- simben90/cis90  406 2014-11-20 11:49 ./bash_profile.bug
drwx--x--- simben90/cis90     0 2014-10-28 15:48 ./class/
dr-x-wx--- simben90/users     0 2014-10-28 15:48 ./class/labs/
/home/cis90/simben $

```

*Using the z option when extracting or viewing compressed tar files*

## .tar.gz vs .tgz

```

/home/cis90/simben $ tar czf simben90.tar.gz .
tar: ./Hidden: Cannot open: Permission denied
tar: .: file changed as we read it
tar: Exiting with failure status due to previous errors
/home/cis90/simben $ ls -l simben90.tar.gz
-rw-rw-r--. 1 simben90 cis90 147319 May 12 20:01 simben90.tar.gz
/home/cis90/simben $ rm simben90.tar.gz

```

```

/home/cis90/simben $ tar czf simben90.tgz .
tar: ./Hidden: Cannot open: Permission denied
tar: .: file changed as we read it
tar: Exiting with failure status due to previous errors
/home/cis90/simben $ ls -l simben90.tgz
-rw-rw-r--. 1 simben90 cis90 147319 May 12 20:01 simben90.tgz
/home/cis90/simben $ rm simben90.tgz

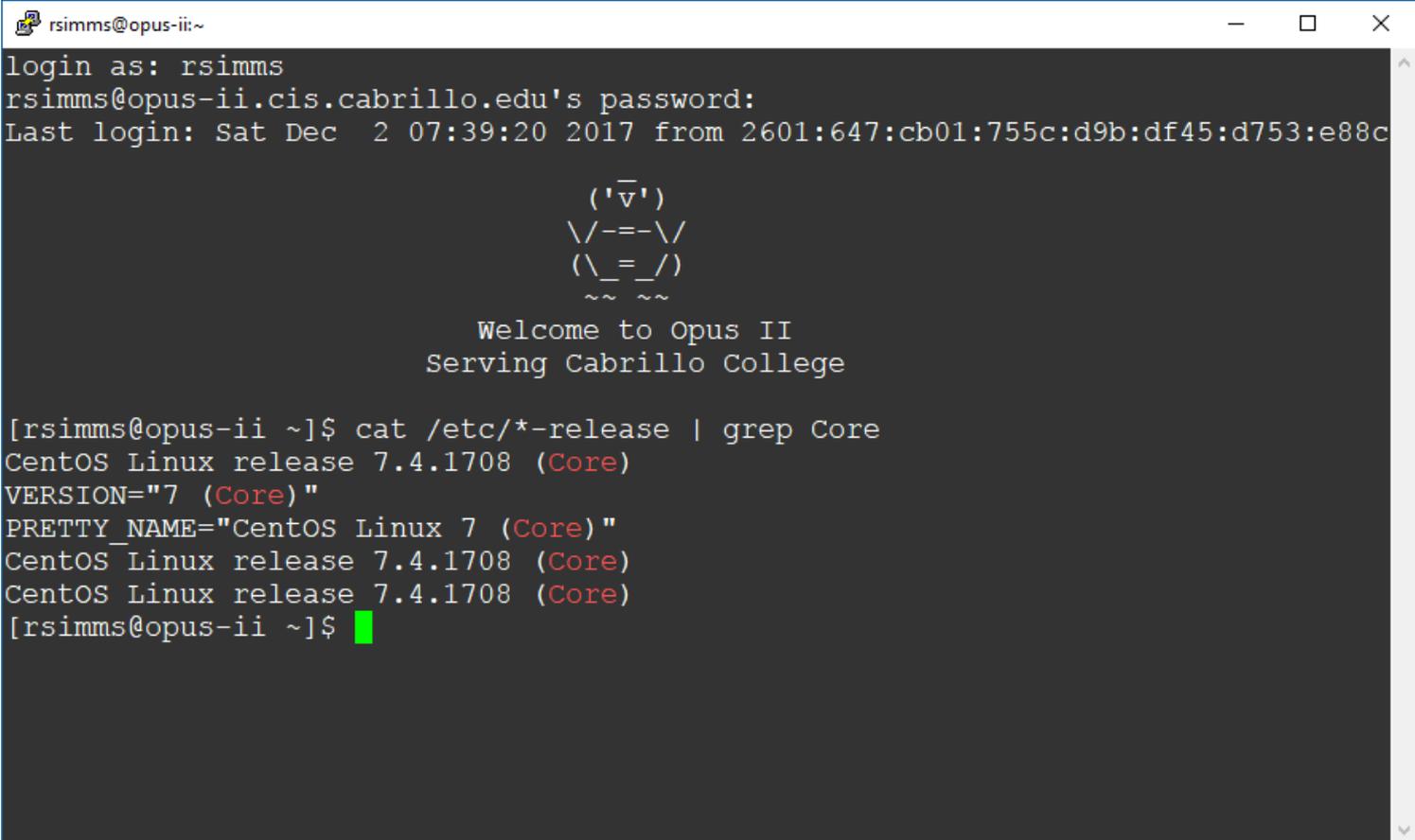
```

*The usage of .tgz and .tar.gz suffixes are equivalent and both indicate the tarball (archive) was compressed*



# Make your own Opus-II

## cat /etc/\*-release | grep Core



```
rsimms@opus-ii:~  
login as: rsimms  
rsimms@opus-ii.cis.cabrillo.edu's password:  
Last login: Sat Dec  2 07:39:20 2017 from 2601:647:cb01:755c:d9b:df45:d753:e88c  
  
      ( 'v' )  
     \ /--\ /  
    ( \  =  / )  
     ~ ~ ~ ~  
  
    Welcome to Opus II  
    Serving Cabrillo College  
  
[rsimms@opus-ii ~]$ cat /etc/*-release | grep Core  
CentOS Linux release 7.4.1708 (Core)  
VERSION="7 (Core)"  
PRETTY_NAME="CentOS Linux 7 (Core)"  
CentOS Linux release 7.4.1708 (Core)  
CentOS Linux release 7.4.1708 (Core)  
[rsimms@opus-ii ~]$
```

*Opus-II is a CentOS 7.4 Linux system*

# Ingredients

**To make your own Opus-II at home you will need to purchase the following items for your home computer:**

- A CentOS Linux distribution ... price: \$0.00
- Virtualization software
  - For Windows
    - VirtualBox ... price: \$0.00
    - *or* VMware Workstation ... price: \$0.00 (via VMware Academy)
  - For Mac
    - VirtualBox ... price: \$0.00
    - *or* VMware Fusion ... price: \$0.00 (via VMware Academy)
  - For Linux
    - VirtualBox ... price: \$0.00

<https://simms-teach.com/resources.php>

The screenshot shows a web browser window with the address bar displaying <https://simms-teach.com/resources.php>. The page title is "Rich's Cabrillo College CIS Classes Resources". The navigation menu includes "Home", "Resources", "Forums", "CIS Lab", and "Canvas". On the left sidebar, there are buttons for "Login", "Flashcards", and "Admin", along with links for "CIS 76", "CIS 90", "Previous Terms", "14 days till term ends!", "Cabrillo College Web Advisor", "VLab (classic)", "VLab (web)", "NETLAB+ PE", "NETLAB+ VE", "Annoying Issue List", and "CIS 76 VLab Pod". The main content area is titled "General Links" and contains several categories of links:

- Instructors**
  - Ed
  - Gerlinde
  - Jeffrey
  - Jim
  - John
  - Michael
  - Marcelo
  - Rick
  - Steve
  - Sam at CCSE
- Getting Linux/UNIX**
  - [Linux ISOs](#)
  - Kernels
  - RPMS (rpmfind)
  - RPMS (pbone)
- Academic Software for CIS Students**
  - Microsoft Webstore
  - [VMware Webstore](#)
- Virtualization**
  - [VirtualBox](#)
  - VMware ESXi and vSphere client
- Standards**
  - IEEE
  - IETF (RFCs)
- Academies**
  - Cisco NetSpace
- Palo Alto Networks**
  - PAN commands
- Making Strong Passwords**
  - Password Haystack
  - Ryan Riley
  - Strong passwords

*Shopping for the ingredients*



# ISO

# Get a Linux Distro

## Getting Linux Distributions ISOs

Rich's Cabrillo College CIS Classes Resources

Home Resources Forums CIS Lab Canvas

Login  
Flashcards  
Admin

CIS 76  
CIS 90  
Previous Terms

14 days till term ends!

Cabrillo College  
Web Advisor

VLab (classic)  
VLab (web)  
NETLAB+ PE  
NETLAB+ VE  
Annoying Issue List  
CIS 76 VLab Pod

General Links

<b>Instructors</b> <ul style="list-style-type: none"><li>Ed</li><li>Gerlinde</li><li>Jeffrey</li><li>Jim</li><li>John</li><li>Michael</li><li>Marcelo</li><li>Rick</li><li>Steve</li><li>Sam at CCSF</li></ul>	<b>Getting Linux/UNIX</b> <ul style="list-style-type: none"><li>Linux ISOs</li><li>Kernels</li><li>RPMs (rpmfind)</li><li>RPMs (pbone)</li></ul> <b>Academic Software for CIS Students</b> <ul style="list-style-type: none"><li>Microsoft Webstore</li><li>VMware Webstore</li></ul> <b>Virtualization</b> <ul style="list-style-type: none"><li>VirtualBox</li><li>VMware ESXi and vSphere client</li></ul> <b>Standards</b> <ul style="list-style-type: none"><li>IEEE</li><li>IETF (RFCs)</li></ul> <b>Academies</b> <ul style="list-style-type: none"><li>Cisco NetSpace</li></ul>	<b>Palo Alto Networks</b> <ul style="list-style-type: none"><li>PAN commands</li></ul> <b>Making Strong Passwords</b> <ul style="list-style-type: none"><li>Password Haystack</li><li>Ryan Riley</li><li>Strong passwords</li></ul>
--	---	---

## Linux Distros (Distributions)

The screenshot shows a web browser window at [iso.linuxquestions.org](http://iso.linuxquestions.org/). The page features a navigation menu on the left with sections like 'LQ ISOs', 'Search', 'Need Help?', 'Sponsored Links', 'Statistics', and 'LQ Job Board'. The main content area is titled 'Welcome to LQ ISOs' and includes a '15 Latest Linux Distribution Releases' list. In this list, 'CentOS' is highlighted with a red box. To the right, there is a 'Popular Linux Distributions' list also containing 'CentOS'. A 'VM TURBO' advertisement is visible at the top and bottom of the page. The browser's taskbar at the bottom shows two download windows for CentOS ISO files.

15 Latest Linux Distribution Releases	Popular Linux Distributions
1. <a href="#">gNewSense 4.0</a>	• <a href="#">Ubuntu</a>
2. <a href="#">Simplicity Linux 16.04</a>	• <a href="#">Fedora</a>
3. <a href="#">4MLinux 17.0</a>	• <a href="#">Linux Mint</a>
4. <a href="#">Voyager Live 16.04</a>	• <a href="#">openSUSE</a>
5. <a href="#">GParted Live 0.26.0-1</a>	• <a href="#">PCLinuxOS</a>
6. <a href="#">SparkyLinux 4.3</a>	• <a href="#">Debian</a>
7. <a href="#">Proxmox 4.2 "Virtual Environment"</a>	• <a href="#">Mageia</a>
8. <a href="#">Ubuntu GNOME 16.04</a>	• <a href="#">Slackware</a>
9. <a href="#">Black Lab Linux 7.6</a>	• <a href="#">CentOS</a>
10. <a href="#">Tails 2.3</a>	• <a href="#">Puppy</a>
11. <a href="#">Slackel 6.0.5 "Openbox"</a>	• <a href="#">Arch</a>
12. <a href="#">Mythbuntu 16.04</a>	• <a href="#">MEPIS</a>
13. <a href="#">KAOS 2016.04</a>	
14. <a href="#">OpenIndiana 2016.04</a>	
15. <a href="#">Ubuntu Kylin 16.04</a>	

## CentOS Distro

The screenshot shows a web browser window with the URL [iso.linuxquestions.org/centos/](http://iso.linuxquestions.org/centos/). The page features a navigation menu on the left with sections for 'LQ ISOs', 'Search', 'Need Help?', 'Sponsored Links', 'Statistics', and 'LQ Job Board'. The main content area is titled '34 versions of CentOS available' and includes a 'SoftLayer® Cloud' advertisement. Below the ad, there is a paragraph describing CentOS as an Enterprise-class Linux Distribution. A 'Related Links' section contains a red-bordered link to the 'Official website'. A table lists various CentOS versions with links to their respective reviews and the number of ISOs available in different groups. On the right side, there is a 'Main Menu' with links to forums, tutorials, and reviews, and an 'Ad' section for GearBest.

**LQ ISOs**

- Search
- Alphabetical List
- Latest Releases
- Release Notification
- Suggest Additions

**Search**

**Need Help?**

- Downloading ISOs
- Burning ISOs

**Sponsored Links**

- Red Hat Enterprise Linux
- Linux Enterprise Server
- Red Hat Linux
- Linux Laptops
- Linux Server
- Linux Software
- GNU/Linux

**Statistics**

**Distros:** 479  
**Versions:** 3069  
**Mirrors:** 1895  
**Downloads:** 75,524,703

**LQ Job Board**

**34 versions of CentOS available**

**SoftLayer® Cloud**  
 We Provide the Highest Level of Transparency & Control for Cloud.

CentOS is an [Enterprise](#)-class Linux Distribution derived from sources freely provided to the public by a prominent North American Enterprise Linux [vendor](#). CentOS conforms fully with the upstream vendors redistribution policy and aims to be 100% binary [compatible](#). (CentOS mainly changes [packages](#) to remove upstream vendor branding and artwork.)

**Related Links:** [CentOS Forum](#), [CentOS Reviews](#), [Official website](#)

Would you like to [receive an email](#) when a new [version](#) of CentOS is released? If so then [click here](#).

<a href="#">CentOS 7-1511</a>	<a href="#">Review CentOS 7-1511</a>	1 isos in 1 groups
<a href="#">CentOS 6.7</a>	<a href="#">Review CentOS 6.7</a>	7 isos in 4 groups
<a href="#">CentOS 6.6</a>	<a href="#">Review CentOS 6.6</a>	10 isos in 2 groups
<a href="#">CentOS 5.11</a>	<a href="#">Review CentOS 5.11</a>	10 isos in 2 groups
<a href="#">CentOS 7.0-1406</a>	<a href="#">Review CentOS 7.0-1406</a>	12 isos in 1 groups
<a href="#">CentOS 6.5</a>	<a href="#">Review CentOS 6.5</a>	18 isos in 2 groups
<a href="#">CentOS 5.10</a>	<a href="#">Review CentOS 5.10</a>	6 isos in 2 groups
<a href="#">CentOS 6.4</a>	<a href="#">Review CentOS 6.4</a>	10 isos in 2 groups
<a href="#">CentOS 5.9</a>	<a href="#">Review CentOS 5.9</a>	8 isos in 2 groups
<a href="#">CentOS 6.3</a>	<a href="#">Review CentOS 6.3</a>	10 isos in 2 groups

**Main Menu**

- Linux Forums
- Android Forum
- Chrome OS Forum
- Linux HCL
- Linux Tutorials
- Linux Wiki
- Distro Reviews
- Book Reviews

**Ad**

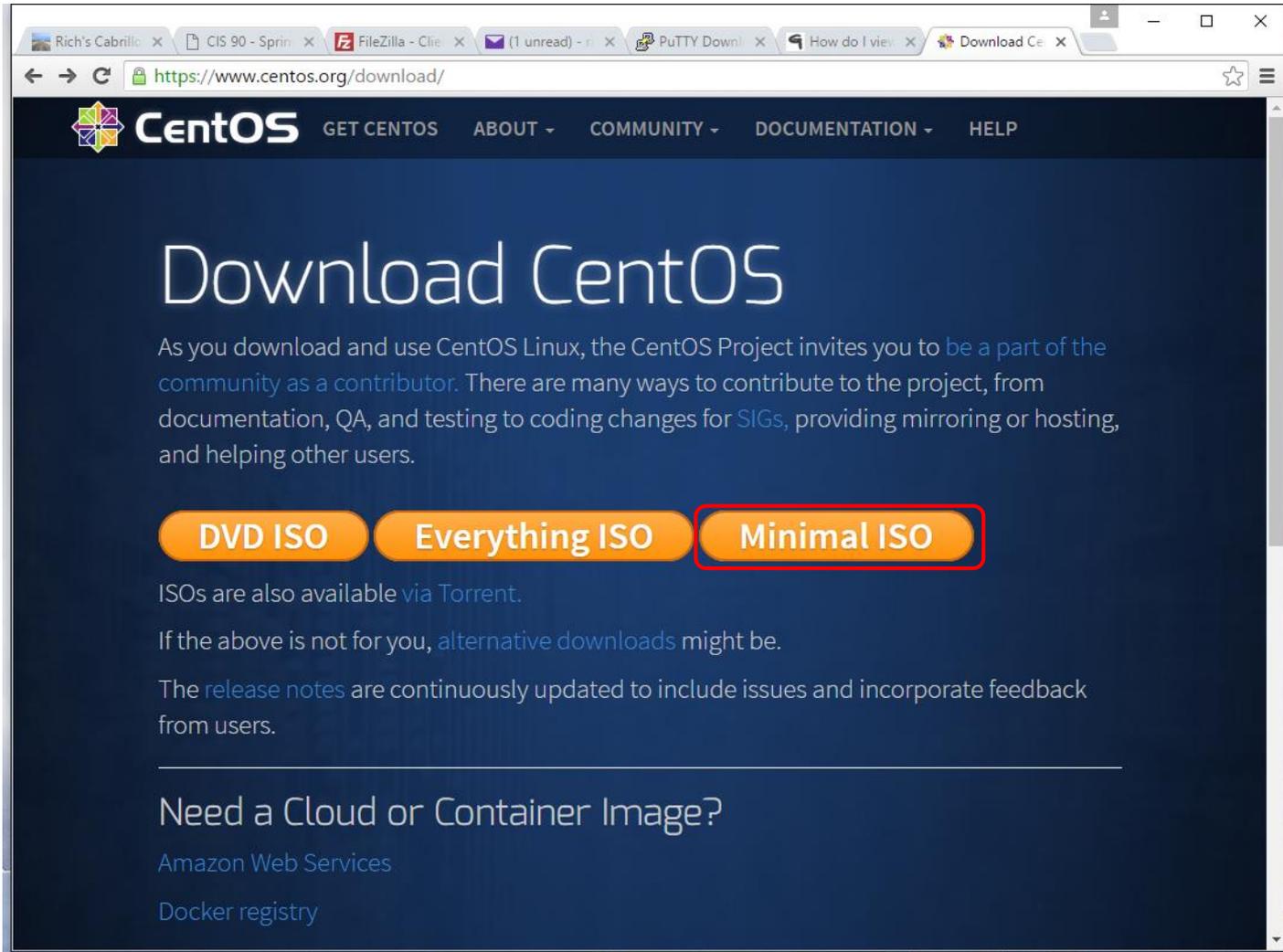
**GEARBEST**

- 41%
- 60%
- 54%
- \$4.66 **\$2.12** [Buy now](#)
- 41%
- 58%
- 54%
- 54%
- 50%
- 54%

## CentOS Official Website



## The Minimal ISO



The screenshot shows a web browser window displaying the CentOS download page. The browser's address bar shows the URL <https://www.centos.org/download/>. The page features the CentOS logo and navigation links: GET CENTOS, ABOUT, COMMUNITY, DOCUMENTATION, and HELP. The main heading is "Download CentOS". Below this, a paragraph explains that users are invited to be a part of the community as contributors. Three buttons are visible: "DVD ISO", "Everything ISO", and "Minimal ISO". The "Minimal ISO" button is highlighted with a red rectangular border. Below the buttons, there is text about ISO availability via Torrent, alternative downloads, and release notes. At the bottom, there is a section titled "Need a Cloud or Container Image?" with links to "Amazon Web Services" and "Docker registry".

<https://www.centos.org/download/>

## Pick a mirror and download ISO file

Rich's Cabrillo x | CIS 90 - Sprin x | FileZilla - Clie x | (1 unread) - r x | PuTTY Downl x | How do I vie x | CentOS Mirro x

isoredirect.centos.org/centos/7/isos/x86\_64/CentOS-7-x86\_64-Minimal-1511.iso

 **CentOS**

CentOS on the Web: [CentOS.org](#) | [Mailing Lists](#) | [Mirror List](#) | [IRC](#) | [Forums](#) | [Bugs](#) | [Donate](#)

In order to conserve the limited bandwidth available .iso images are not downloadable from mirror.centos.org

The following mirrors should have the ISO images available:

[http://mirror.evolvedservers.com/CentOS/7/isos/x86\\_64/CentOS-7-x86\\_64-Minimal-1511.iso](http://mirror.evolvedservers.com/CentOS/7/isos/x86_64/CentOS-7-x86_64-Minimal-1511.iso)

[http://mirror.us.leaseweb.net/centos/7/isos/x86\\_64/CentOS-7-x86\\_64-Minimal-1511.iso](http://mirror.us.leaseweb.net/centos/7/isos/x86_64/CentOS-7-x86_64-Minimal-1511.iso)

[http://mirror.rackspace.com/CentOS/7/isos/x86\\_64/CentOS-7-x86\\_64-Minimal-1511.iso](http://mirror.rackspace.com/CentOS/7/isos/x86_64/CentOS-7-x86_64-Minimal-1511.iso)

[http://centos.mbni.med.umich.edu/mirror/7/isos/x86\\_64/CentOS-7-x86\\_64-Minimal-1511.iso](http://centos.mbni.med.umich.edu/mirror/7/isos/x86_64/CentOS-7-x86_64-Minimal-1511.iso)

[http://mirror.us.oneandone.net/linux/distributions/centos/7/isos/x86\\_64/CentOS-7-x86\\_64-Minimal-1511.iso](http://mirror.us.oneandone.net/linux/distributions/centos/7/isos/x86_64/CentOS-7-x86_64-Minimal-1511.iso)

[http://mirror.solarvps.com/centos/7/isos/x86\\_64/CentOS-7-x86\\_64-Minimal-1511.iso](http://mirror.solarvps.com/centos/7/isos/x86_64/CentOS-7-x86_64-Minimal-1511.iso)

[http://mirrors.advancedhosters.com/centos/7/isos/x86\\_64/CentOS-7-x86\\_64-Minimal-1511.iso](http://mirrors.advancedhosters.com/centos/7/isos/x86_64/CentOS-7-x86_64-Minimal-1511.iso)

[http://mirror.tzulo.com/centos/7/isos/x86\\_64/CentOS-7-x86\\_64-Minimal-1511.iso](http://mirror.tzulo.com/centos/7/isos/x86_64/CentOS-7-x86_64-Minimal-1511.iso)

[http://dallas.tx.mirror.xygenhosting.com/CentOS/7/isos/x86\\_64/CentOS-7-x86\\_64-Minimal-1511.iso](http://dallas.tx.mirror.xygenhosting.com/CentOS/7/isos/x86_64/CentOS-7-x86_64-Minimal-1511.iso)

[http://mirror.steadfast.net/centos/7/isos/x86\\_64/CentOS-7-x86\\_64-Minimal-1511.iso](http://mirror.steadfast.net/centos/7/isos/x86_64/CentOS-7-x86_64-Minimal-1511.iso)

[http://mirrors.arsc.edu/centos/7/isos/x86\\_64/CentOS-7-x86\\_64-Minimal-1511.iso](http://mirrors.arsc.edu/centos/7/isos/x86_64/CentOS-7-x86_64-Minimal-1511.iso)

[http://mirror.chpc.utah.edu/pub/centos/7/isos/x86\\_64/CentOS-7-x86\\_64-Minimal-1511.iso](http://mirror.chpc.utah.edu/pub/centos/7/isos/x86_64/CentOS-7-x86_64-Minimal-1511.iso)

[http://mirror.scalabledns.com/centos/7/isos/x86\\_64/CentOS-7-x86\\_64-Minimal-1511.iso](http://mirror.scalabledns.com/centos/7/isos/x86_64/CentOS-7-x86_64-Minimal-1511.iso)

[http://centos.mirrors.hoobly.com/7/isos/x86\\_64/CentOS-7-x86\\_64-Minimal-1511.iso](http://centos.mirrors.hoobly.com/7/isos/x86_64/CentOS-7-x86_64-Minimal-1511.iso)

[http://pubmirrors.dal.corespace.com/centos/7/isos/x86\\_64/CentOS-7-x86\\_64-Minimal-1511.iso](http://pubmirrors.dal.corespace.com/centos/7/isos/x86_64/CentOS-7-x86_64-Minimal-1511.iso)

[http://mirror.supremebites.com/centos/7/isos/x86\\_64/CentOS-7-x86\\_64-Minimal-1511.iso](http://mirror.supremebites.com/centos/7/isos/x86_64/CentOS-7-x86_64-Minimal-1511.iso)

[http://mirrors.centos.webair.com/centos/7/isos/x86\\_64/CentOS-7-x86\\_64-Minimal-1511.iso](http://mirrors.centos.webair.com/centos/7/isos/x86_64/CentOS-7-x86_64-Minimal-1511.iso)

[http://mirror.math.princeton.edu/pub/centos/7/isos/x86\\_64/CentOS-7-x86\\_64-Minimal-1511.iso](http://mirror.math.princeton.edu/pub/centos/7/isos/x86_64/CentOS-7-x86_64-Minimal-1511.iso)

[http://centos.mirrors.wvstateu.edu/7/isos/x86\\_64/CentOS-7-x86\\_64-Minimal-1511.iso](http://centos.mirrors.wvstateu.edu/7/isos/x86_64/CentOS-7-x86_64-Minimal-1511.iso)

[http://mirrors.usc.edu/pub/linux/distributions/centos/7/isos/x86\\_64/CentOS-7-x86\\_64-Minimal-1511.iso](http://mirrors.usc.edu/pub/linux/distributions/centos/7/isos/x86_64/CentOS-7-x86_64-Minimal-1511.iso)

[http://mirrors.cmich.edu/centos/7/isos/x86\\_64/CentOS-7-x86\\_64-Minimal-1511.iso](http://mirrors.cmich.edu/centos/7/isos/x86_64/CentOS-7-x86_64-Minimal-1511.iso)

[http://dist1.800hosting.com/centos/7/isos/x86\\_64/CentOS-7-x86\\_64-Minimal-1511.iso](http://dist1.800hosting.com/centos/7/isos/x86_64/CentOS-7-x86_64-Minimal-1511.iso)

[http://mirror.lax.hugeserver.com/centos/7/isos/x86\\_64/CentOS-7-x86\\_64-Minimal-1511.iso](http://mirror.lax.hugeserver.com/centos/7/isos/x86_64/CentOS-7-x86_64-Minimal-1511.iso)

[http://mirror.vcu.edu/pub/gnu/linux/centos/7/isos/x86\\_64/CentOS-7-x86\\_64-Minimal-1511.iso](http://mirror.vcu.edu/pub/gnu/linux/centos/7/isos/x86_64/CentOS-7-x86_64-Minimal-1511.iso)

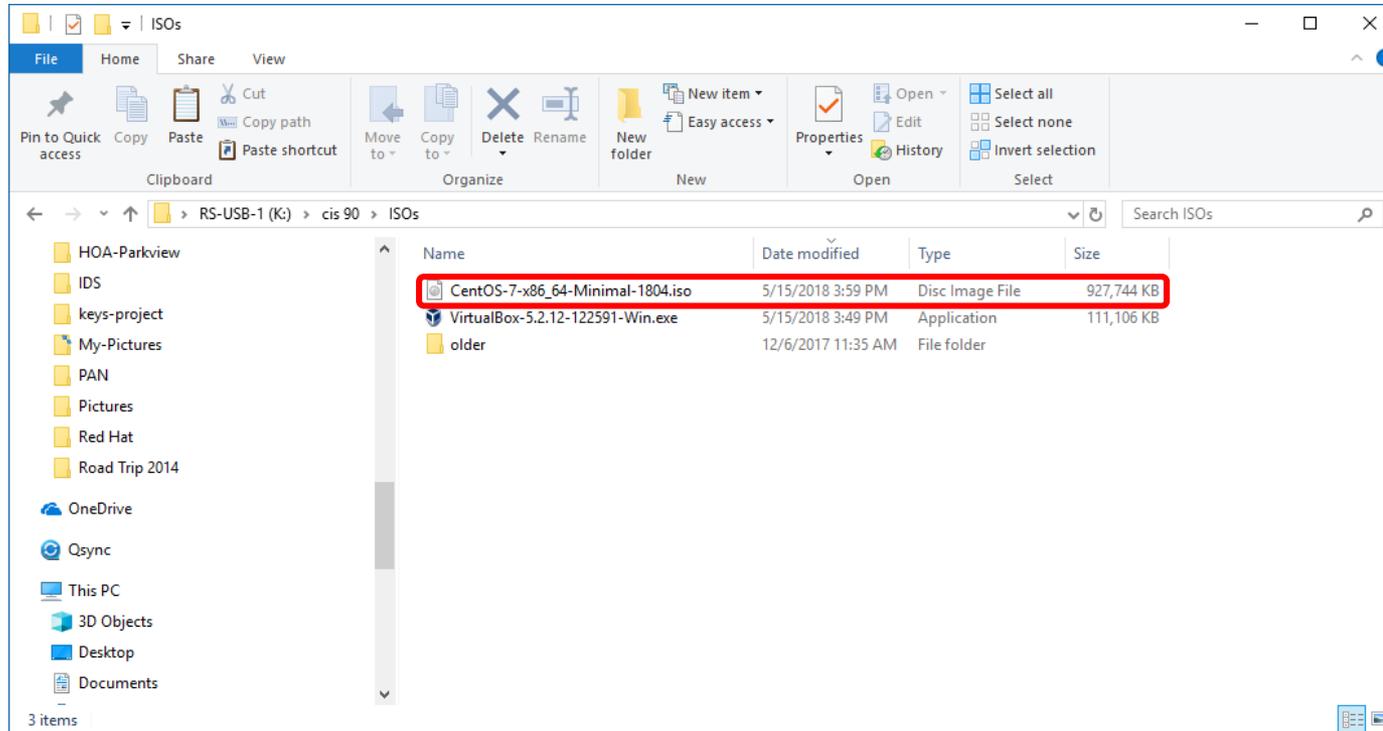
[http://centos-distro.1gservers.com/7/isos/x86\\_64/CentOS-7-x86\\_64-Minimal-1511.iso](http://centos-distro.1gservers.com/7/isos/x86_64/CentOS-7-x86_64-Minimal-1511.iso)

[http://mirror.cs.uwp.edu/pub/centos/7/isos/x86\\_64/CentOS-7-x86\\_64-Minimal-1511.iso](http://mirror.cs.uwp.edu/pub/centos/7/isos/x86_64/CentOS-7-x86_64-Minimal-1511.iso)

[http://mirrors.lga7.us.voxel.net/centos/7/isos/x86\\_64/CentOS-7-x86\\_64-Minimal-1511.iso](http://mirrors.lga7.us.voxel.net/centos/7/isos/x86_64/CentOS-7-x86_64-Minimal-1511.iso)

[http://isoredirect.centos.org/centos/7/isos/x86\\_64/CentOS-7-x86\\_64-Minimal-1804.iso](http://isoredirect.centos.org/centos/7/isos/x86_64/CentOS-7-x86_64-Minimal-1804.iso)

## Viewing Downloaded CentOS ISO



*Downloaded ISO image of the CentOS Linux distribution*



# Virtual Box

## Getting VirtualBox

Rich's Cabrillo College CIS Classes Resources

Home Resources Forums CIS Lab Canvas

Login  
Flashcards  
Admin  
CIS 76  
CIS 90  
Previous Terms  
14 days till term ends!  
Cabrillo College Web Advisor  
VLab (classic)  
VLab (web)  
NETLAB+ PE  
NETLAB+ VE  
Annoying Issue List  
CIS 76 VLab Pod

**General Links**

<b>Instructors</b> <ul style="list-style-type: none"><li>Ed</li><li>Gerlinde</li><li>Jeffrey</li><li>Jim</li><li>John</li><li>Michael</li><li>Marcelo</li><li>Rick</li><li>Steve</li><li>Sam at CCSE</li></ul> <b>Departments</b> <ul style="list-style-type: none"><li>CNSA</li><li>CIS</li><li>CS</li></ul>	<b>Getting Linux/UNIX</b> <ul style="list-style-type: none"><li>Linux ISOs</li><li>Kernels</li><li>RPMs (rpmfind)</li><li>RPMs (pbone)</li></ul> <b>Academic Software for CIS Students</b> <ul style="list-style-type: none"><li>Microsoft Webstore</li><li>VMware Webstore</li></ul> <b>Virtualization</b> <ul style="list-style-type: none"><li>VirtualBox</li><li>VMware ESXi and vSphere client</li></ul> <b>Standards</b> <ul style="list-style-type: none"><li>IEEE</li><li>IETF (RFCs)</li></ul> <b>Academies</b> <ul style="list-style-type: none"><li>Cisco NetSpace</li></ul>	<b>Palo Alto Networks</b> <ul style="list-style-type: none"><li>PAN commands</li></ul> <b>Making Strong Passwords</b> <ul style="list-style-type: none"><li>Password Haystack</li><li>Ryan Riley</li><li>Strong passwords</li></ul>
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## VirtualBox Download

Downloads - Oracle VM | x

Secure | <https://www.virtualbox.org/wiki/Downloads>

Apps | Yahoo | Cabrillo College | Health | Network | CIS 76 links | Lab Development | Home | Music | Training | Expand All | Other bookmarks

 **VirtualBox**  [Login](#) [Preferences](#)

### Download VirtualBox

Here you will find links to VirtualBox binaries and its source code.

#### VirtualBox binaries

By downloading, you agree to the terms and conditions of the respective license.

If you're looking for the latest VirtualBox 5.1 packages, see [VirtualBox 5.1 builds](#). Consider upgrading.

**VirtualBox 5.2.12 platform packages**

- ⇒ [Windows hosts](#)
- ⇒ [OS X hosts](#)
- ⇒ [Linux distributions](#)
- ⇒ [Solaris hosts](#)

The binaries are released under the terms of the GPL version 2.

See the [changelog](#) for what has changed.

You might want to compare the checksums to verify the integrity of downloaded packages. *The SHA256 checksums should be favored as the MD5 algorithm must be treated as insecure!*

- ⇒ [SHA256 checksums](#), [MD5 checksums](#)

**Note:** After upgrading VirtualBox it is recommended to upgrade the guest additions as well.

#### VirtualBox 5.2.12 Oracle VM VirtualBox Extension Pack

- ⇒ [All supported platforms](#)

Support for USB 2.0 and USB 3.0 devices, VirtualBox RDP, disk encryption, NVMe and PXE boot for Intel cards. See [this chapter from the User Manual](#) for an introduction to this Extension Pack. The Extension Pack binaries are released under the [VirtualBox Personal Use and Evaluation License \(PUEL\)](#). *Please install the same version extension pack as your installed version of VirtualBox.*

#### VirtualBox 5.2.12 Software Developer Kit (SDK)

- ⇒ [All platforms](#)

[User Manual](#)

## Enable Virtualization in the BIOS

Boot into your BIOS and enable the following:

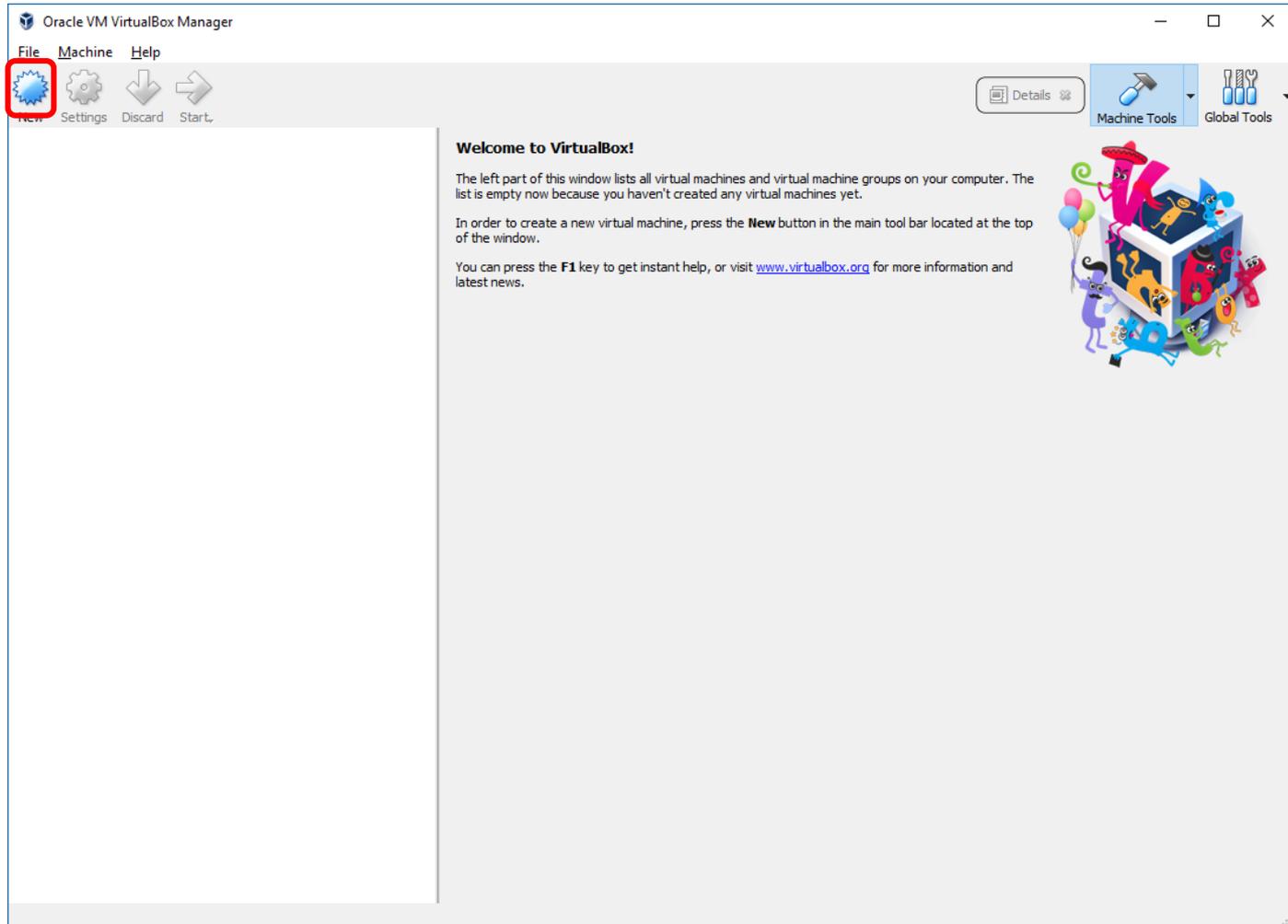
1. Intel Virtualization Technology (also known as Intel VT) or AMD-V.
2. If available, enable Intel VTd or AMD IOMMU.

<http://www.fixedbyvonnice.com/2014/11/virtualbox-showing-32-bit-guest-versions-64-bit-host-os/#.Wvzgw4gvyUI>

[https://docs-old.fedoraproject.org/en-US/Fedora/13/html/Virtualization\\_Guide/sect-Virtualization-Troubleshooting-Enabling\\_Intel\\_VT\\_and\\_AMD\\_V\\_virtualization\\_in BIOS.html](https://docs-old.fedoraproject.org/en-US/Fedora/13/html/Virtualization_Guide/sect-Virtualization-Troubleshooting-Enabling_Intel_VT_and_AMD_V_virtualization_in BIOS.html)

## Create a new VM

*Click the New button to create a new VM.*



*After downloading and installing VirtualBox.*

## Name, OS, RAM and Hard Drive

*Check that virtualization is enabled in your computer's BIOS so you can create 64 bit VMs*

← Create Virtual Machine

Name and operating system

Name: My-Opus

Type: Linux

Version: Red Hat (64-bit)

Memory size

4 MB 16384 MB

1024 MB

Hard disk

Do not add a virtual hard disk

Create a virtual hard disk now

Use an existing virtual hard disk file

Empty

Guided Mode Create Cancel

← Create Virtual Hard Disk

File location

My-Opus

File size

4.00 MB 2.00 TB

8.00 GB

Hard disk file type

VDI (VirtualBox Disk Image)

VHD (Virtual Hard Disk)

VMDK (Virtual Machine Disk)

HDD (Parallels Hard Disk)

QCOW (QEMU Copy-On-Write)

QED (QEMU enhanced disk)

Storage on physical hard disk

Dynamically allocated

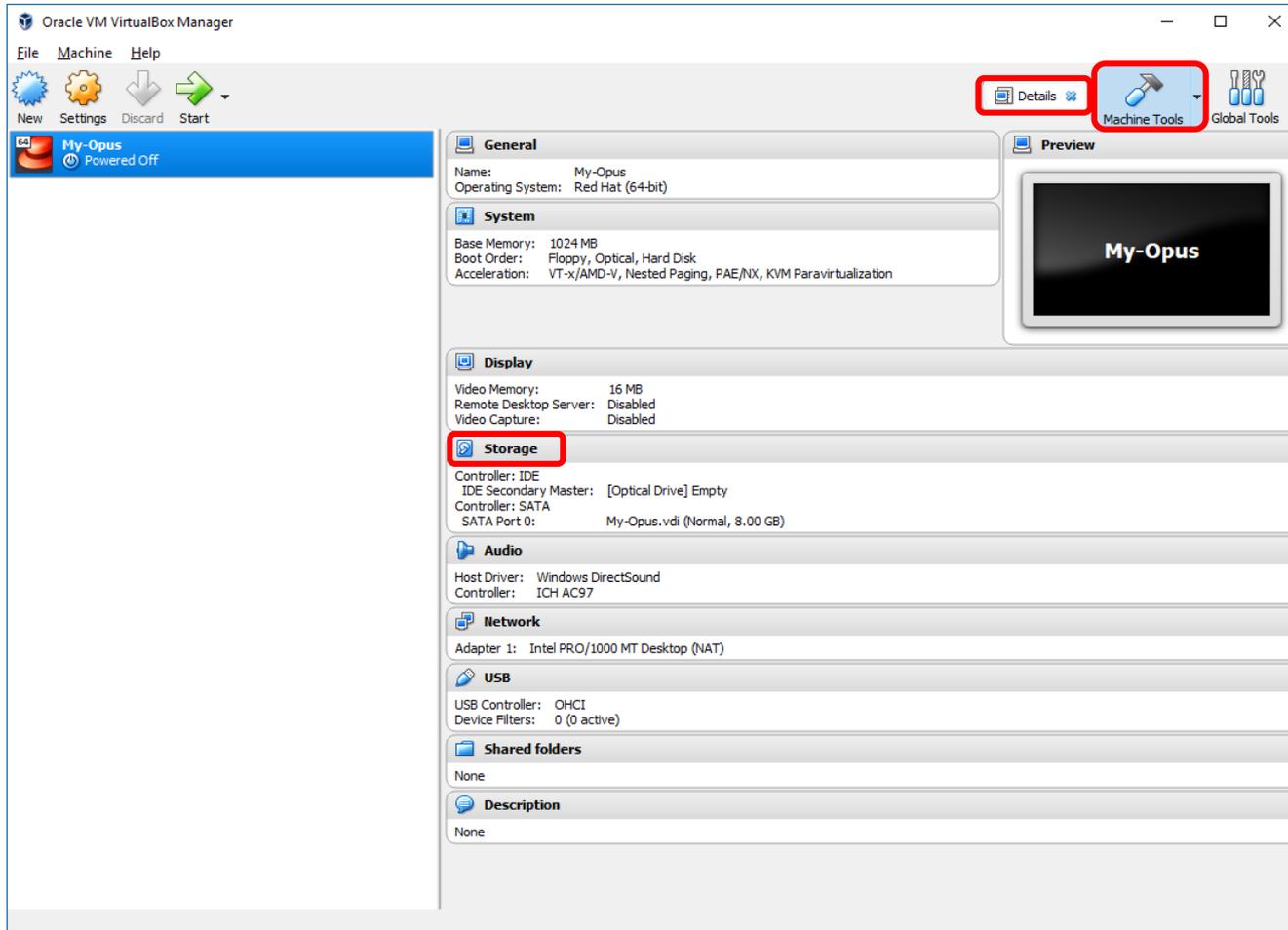
Fixed size

Split into files of less than 2GB

Guided Mode Create Cancel

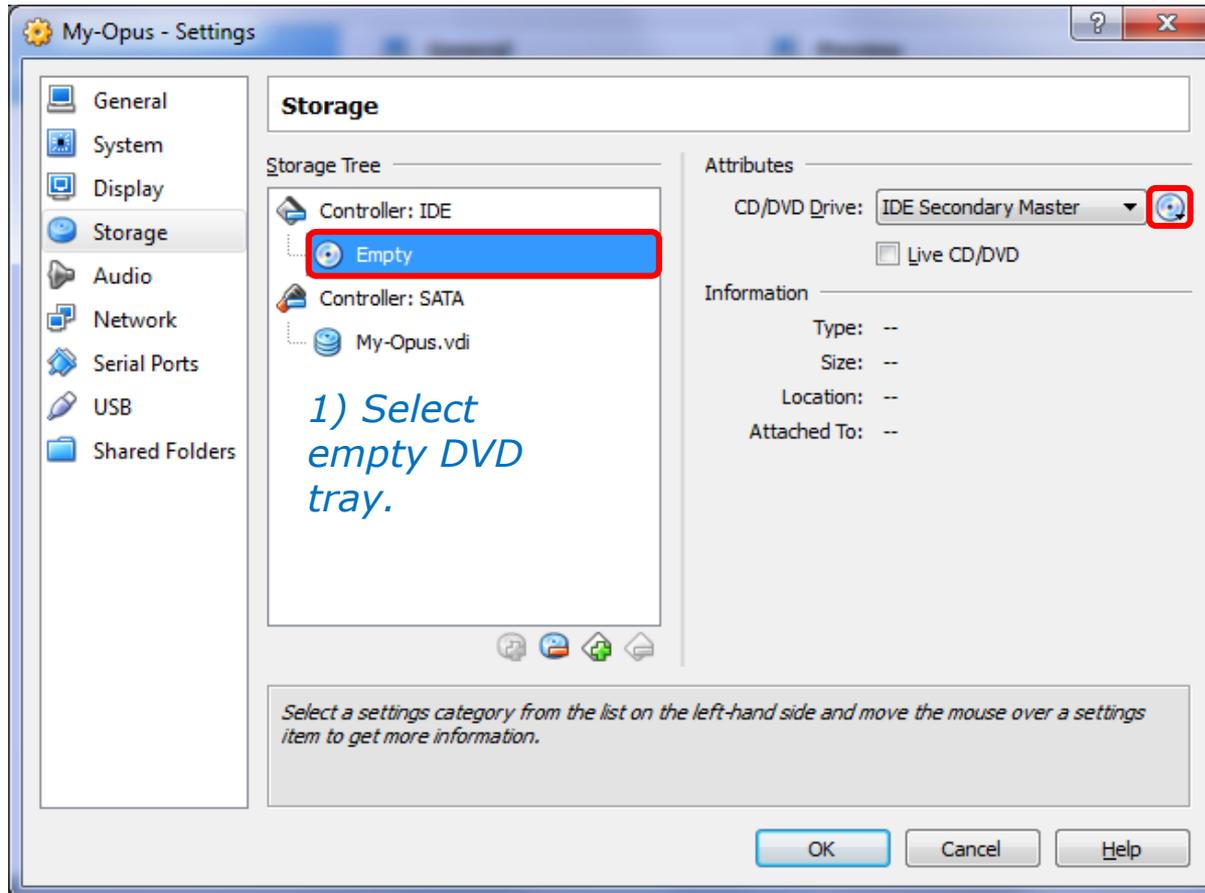
*After filling out the Name and operating system, keep pressing Create and take the defaults*

## Storage: Hard Disk Drive and DVD Drive



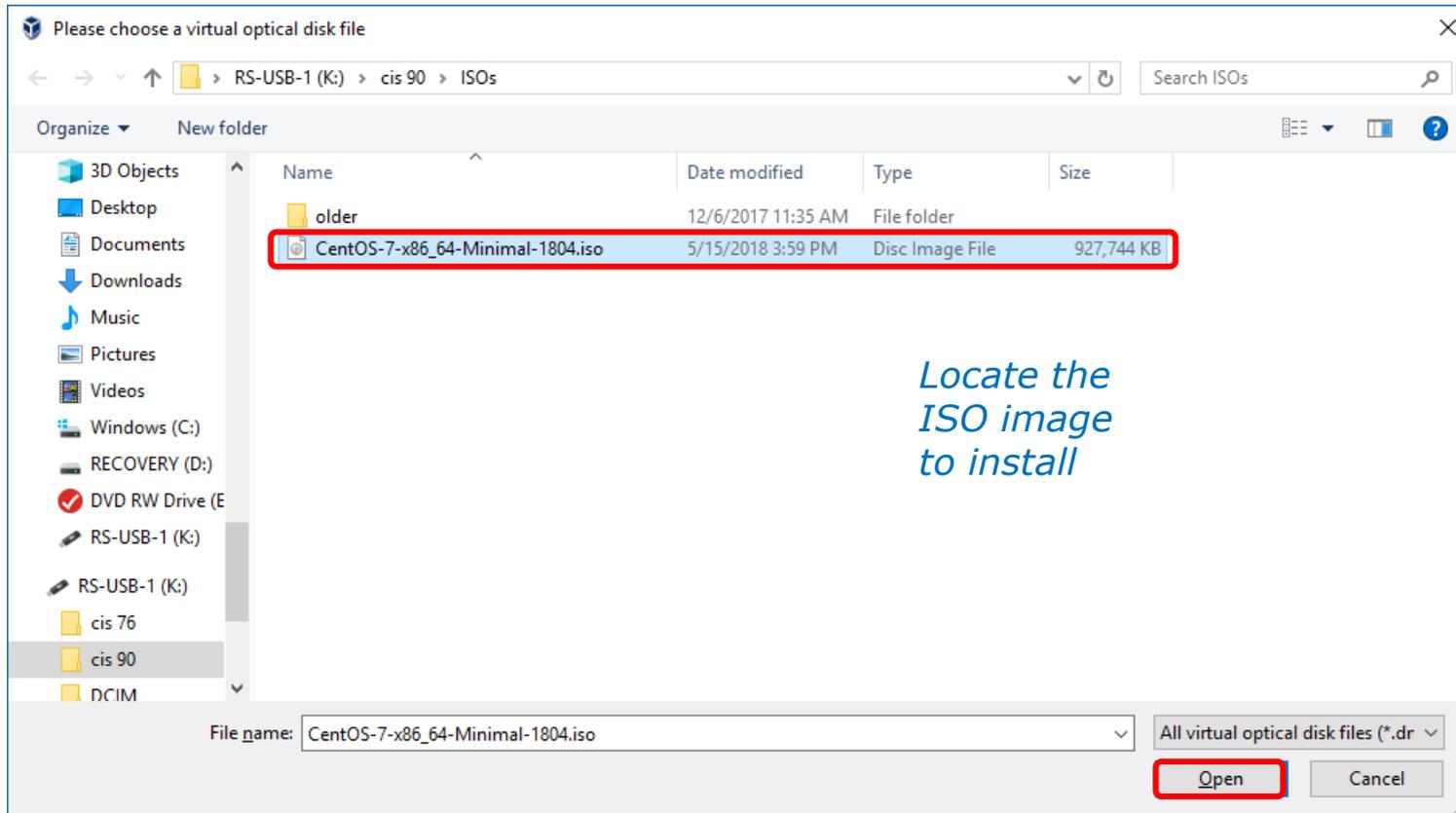
*The new VM has no operating system. Click on "Storage".*

Load the virtual CentOS "DVD" into the virtual DVD tray



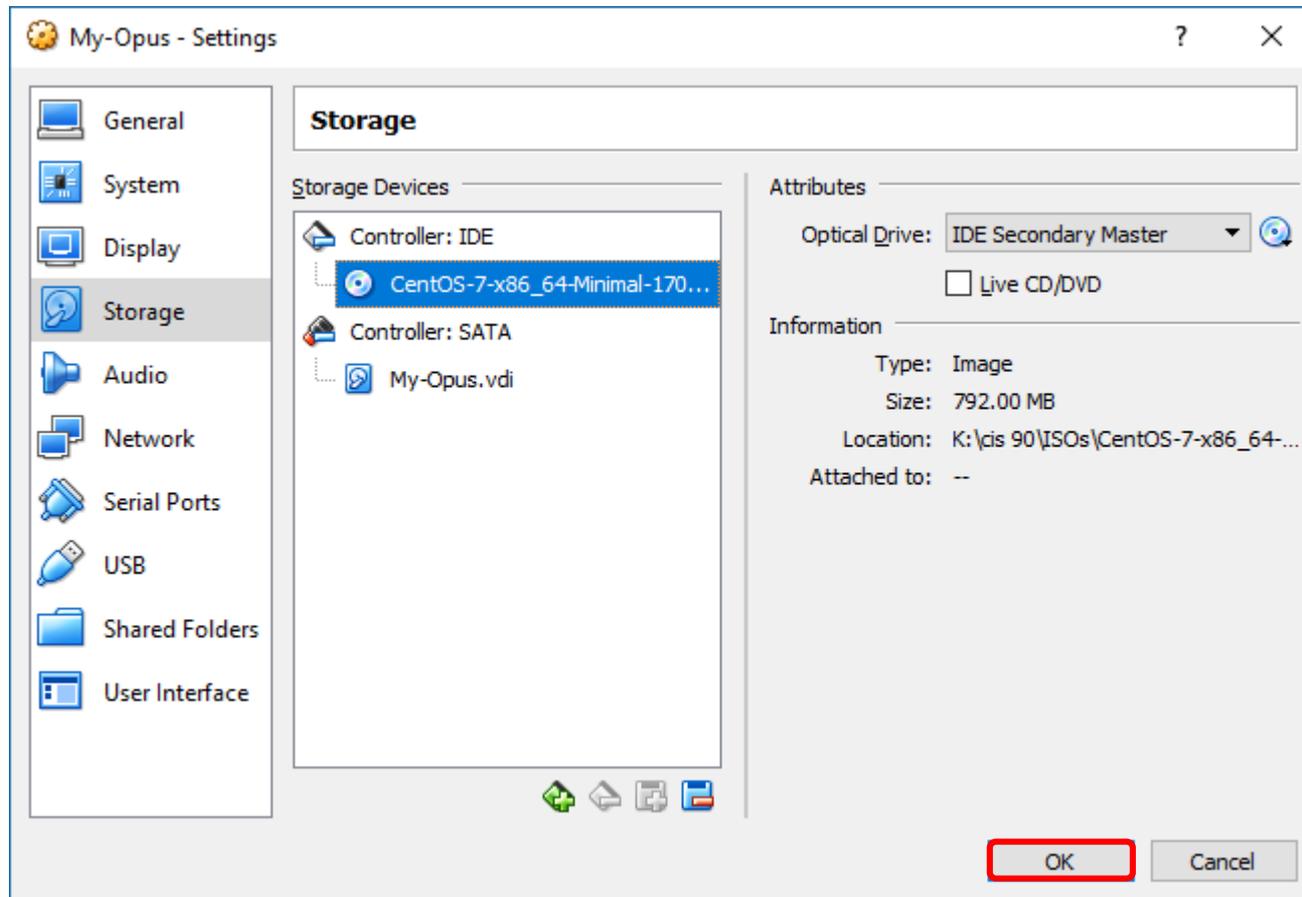
We will be booting from the DVD drive to install the CentOS distro.

## Selecting the DVD ISO image



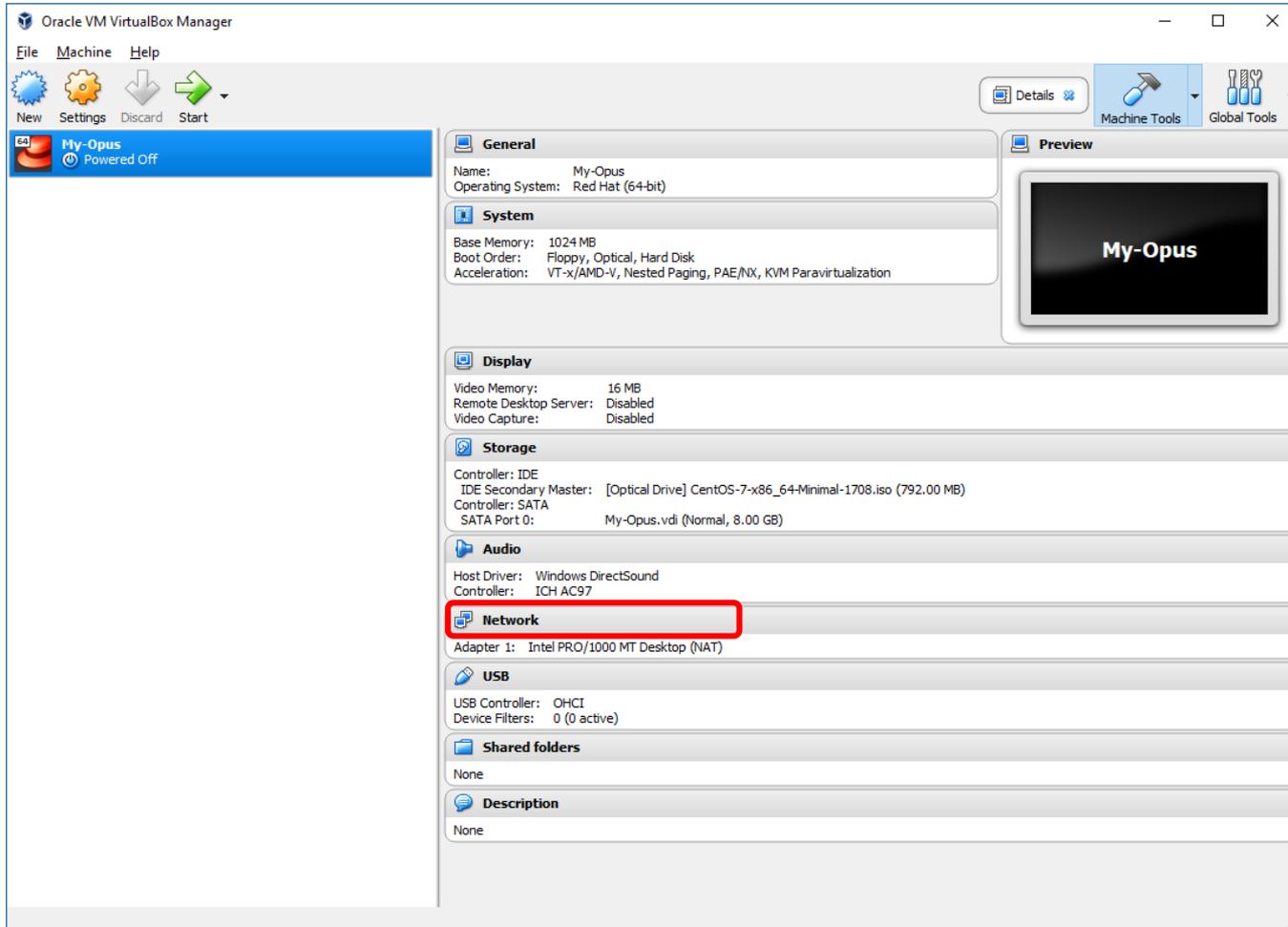
*Select the ISO image previously downloaded*

The "DVD" is loaded



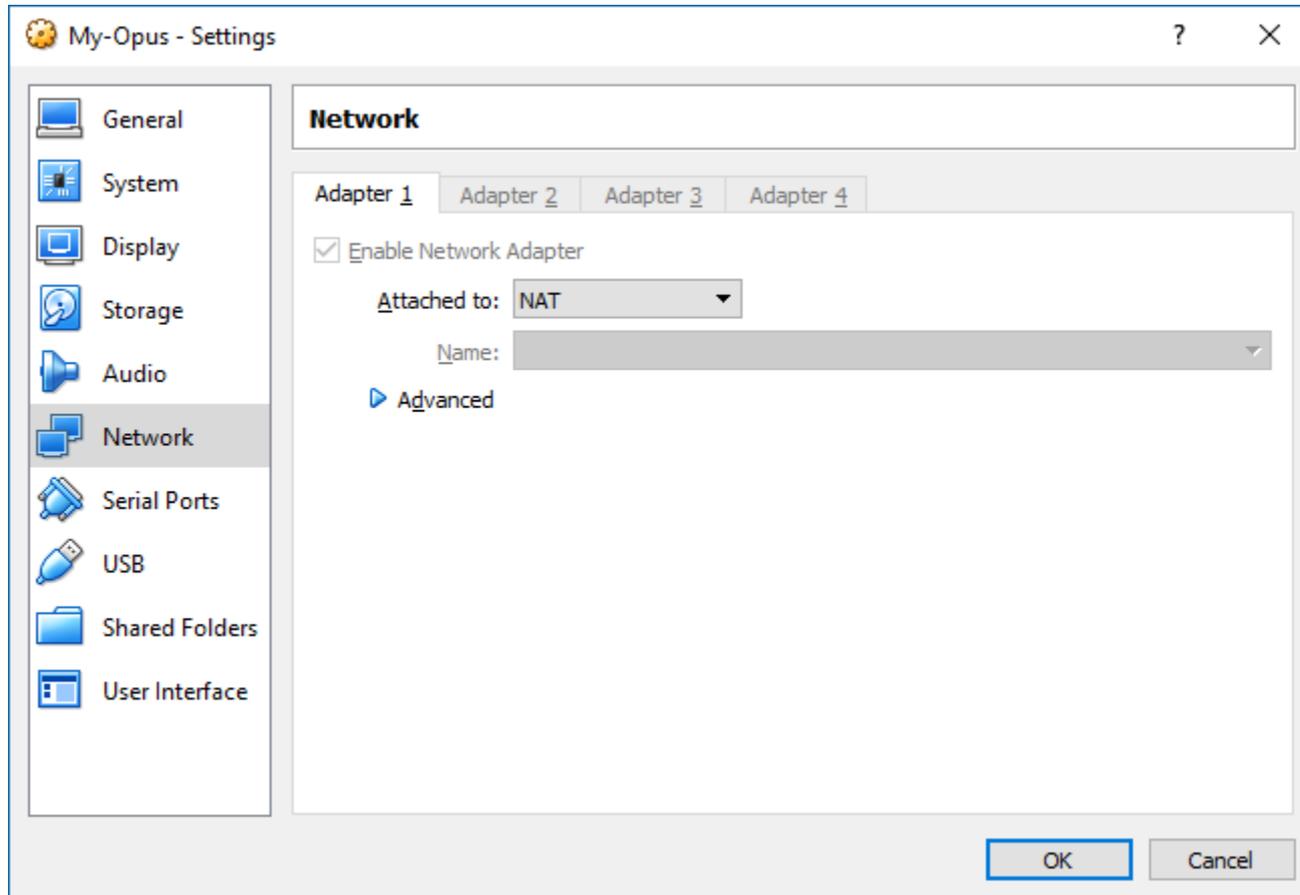
*The CD (and ISO image) is now in the virtual CD tray*

## Network Settings



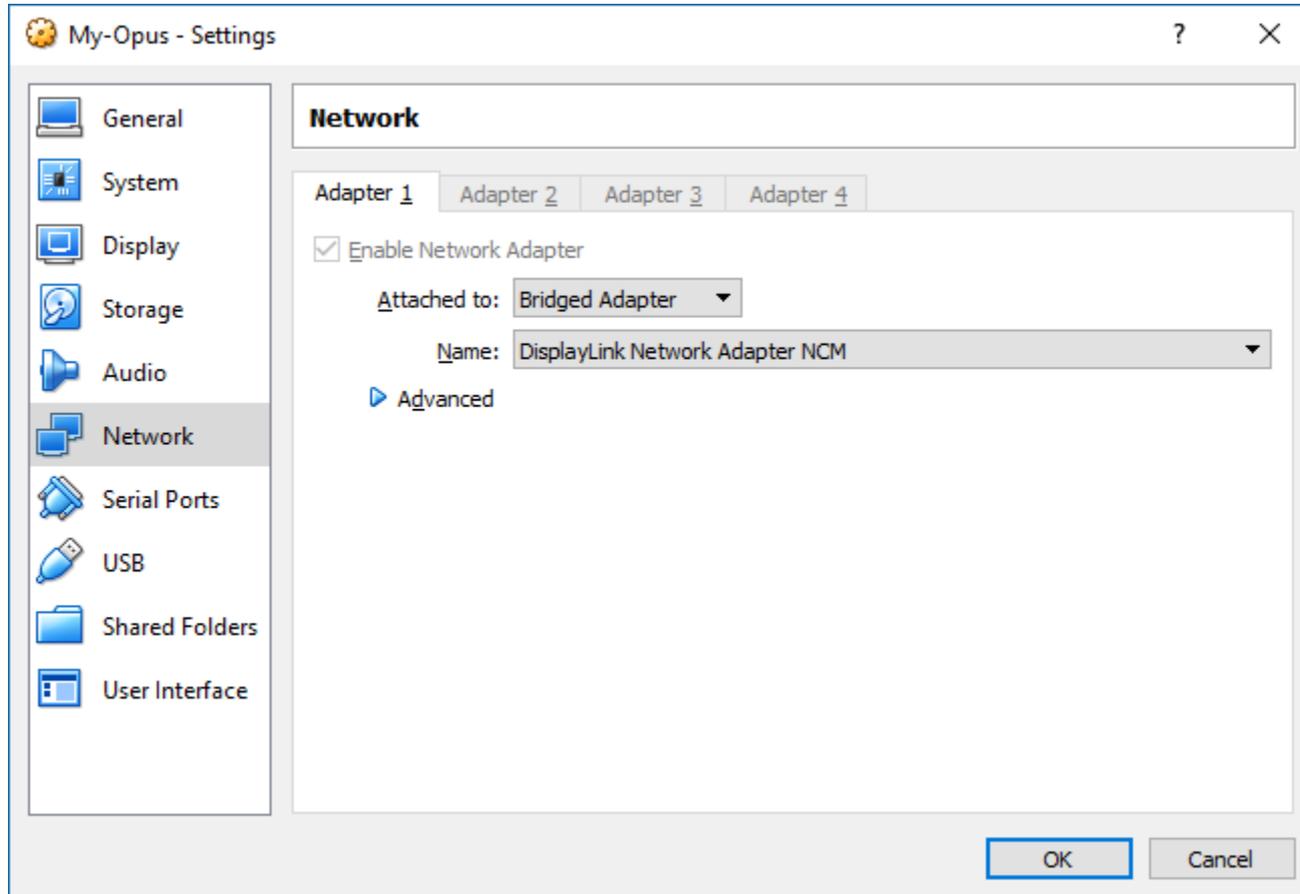
*Click on  
Network*

## Network Adapter Settings - NAT



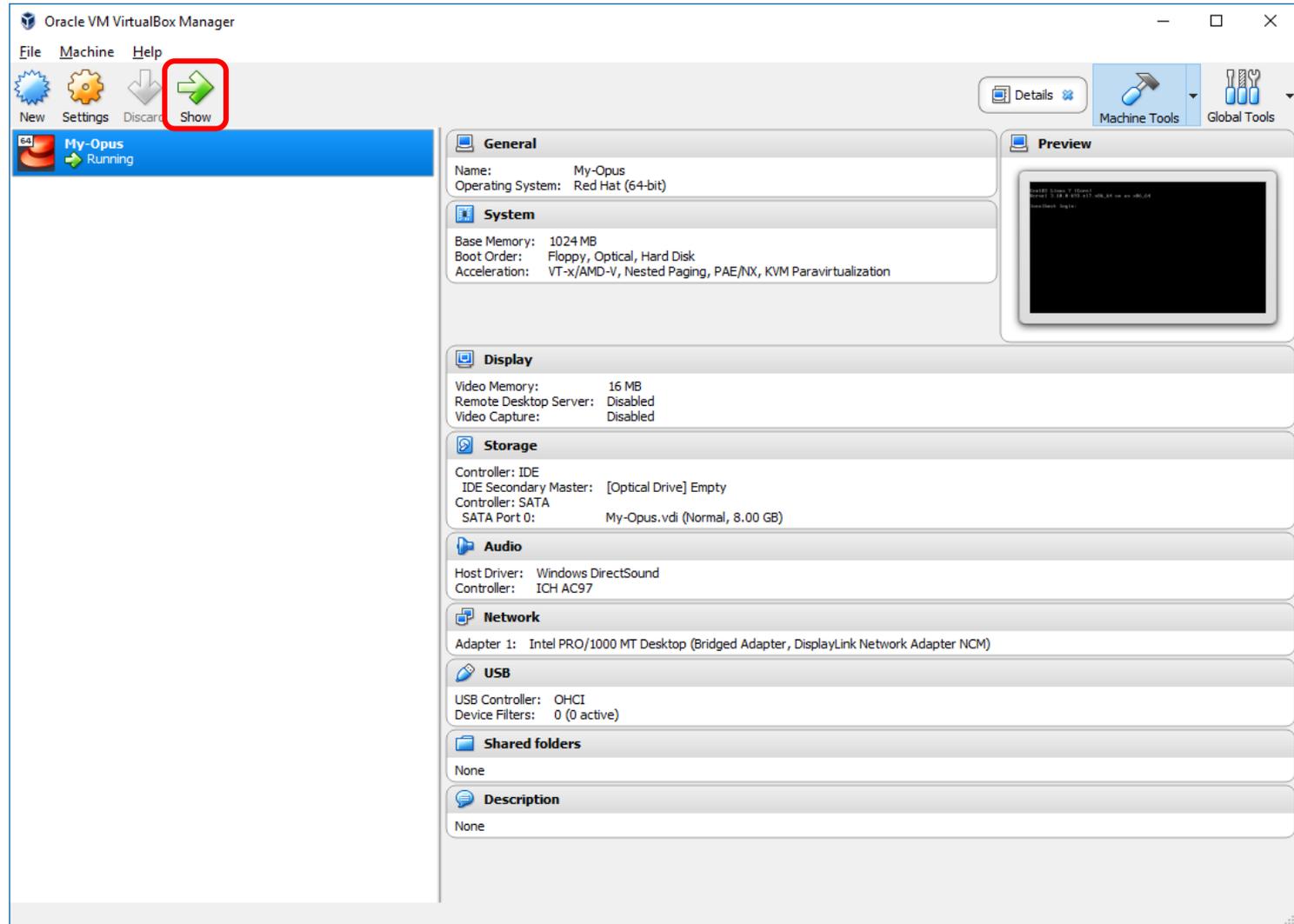
*Select NAT (Network Address Translation) so you can connect to network services from a private IP address.*

## Network Adapter Settings - Bridged

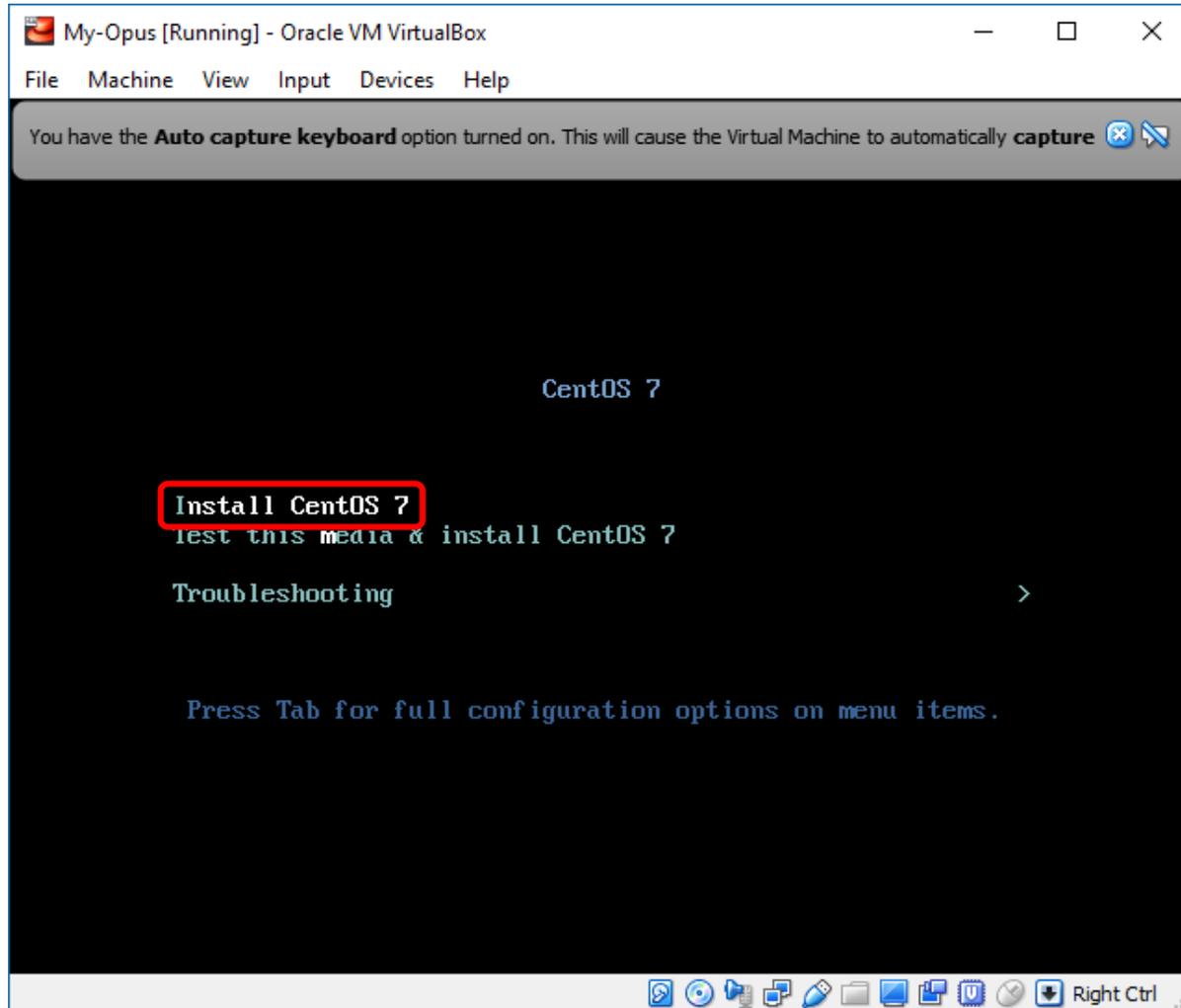


*Select Bridged if you want your new VM to be accessible to other systems on the network.*

## Power on your new VM



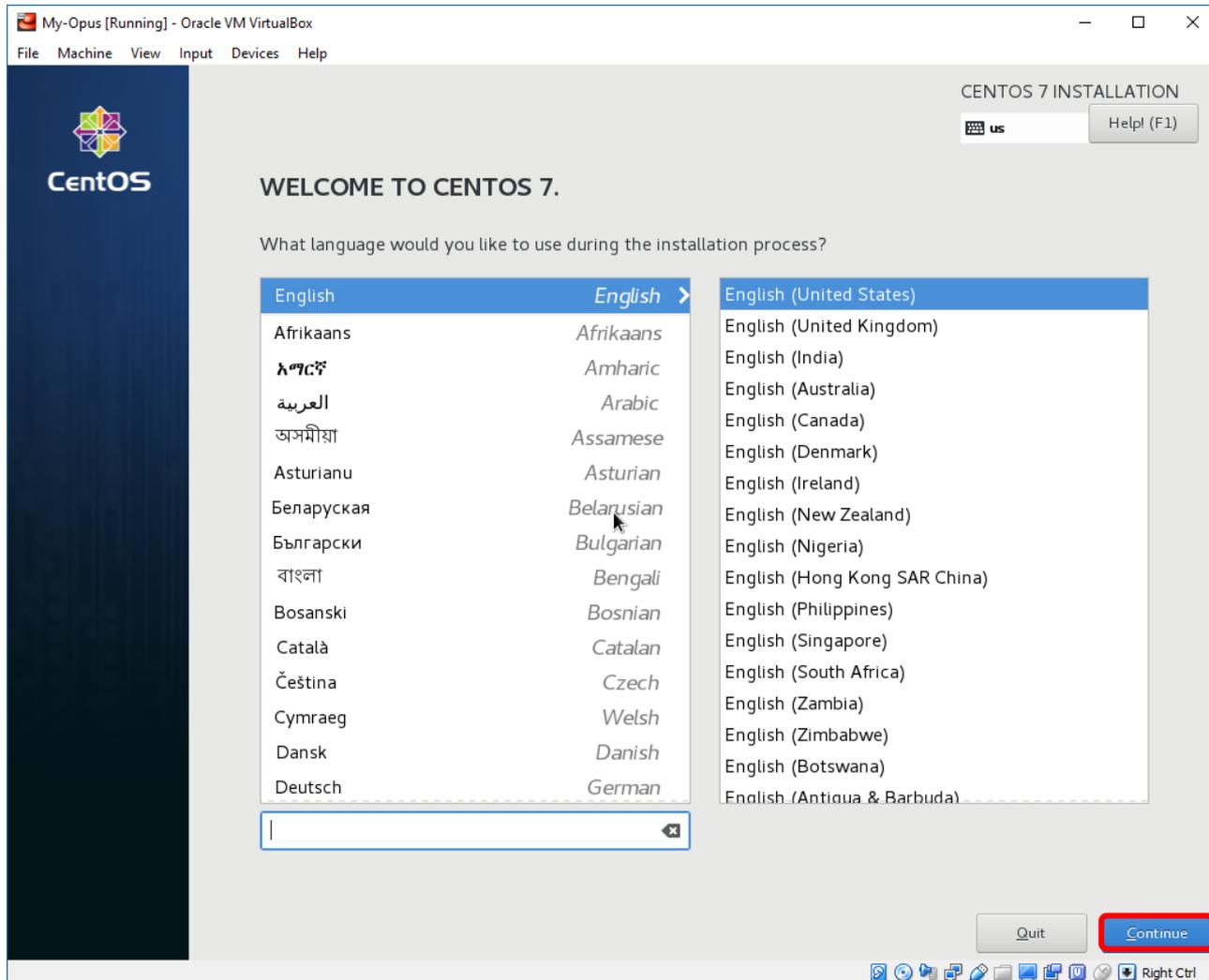
## Booting from the installation "DVD"



*Allow "Capture" of the mouse by the VM. Use right Ctrl to release if needed.*

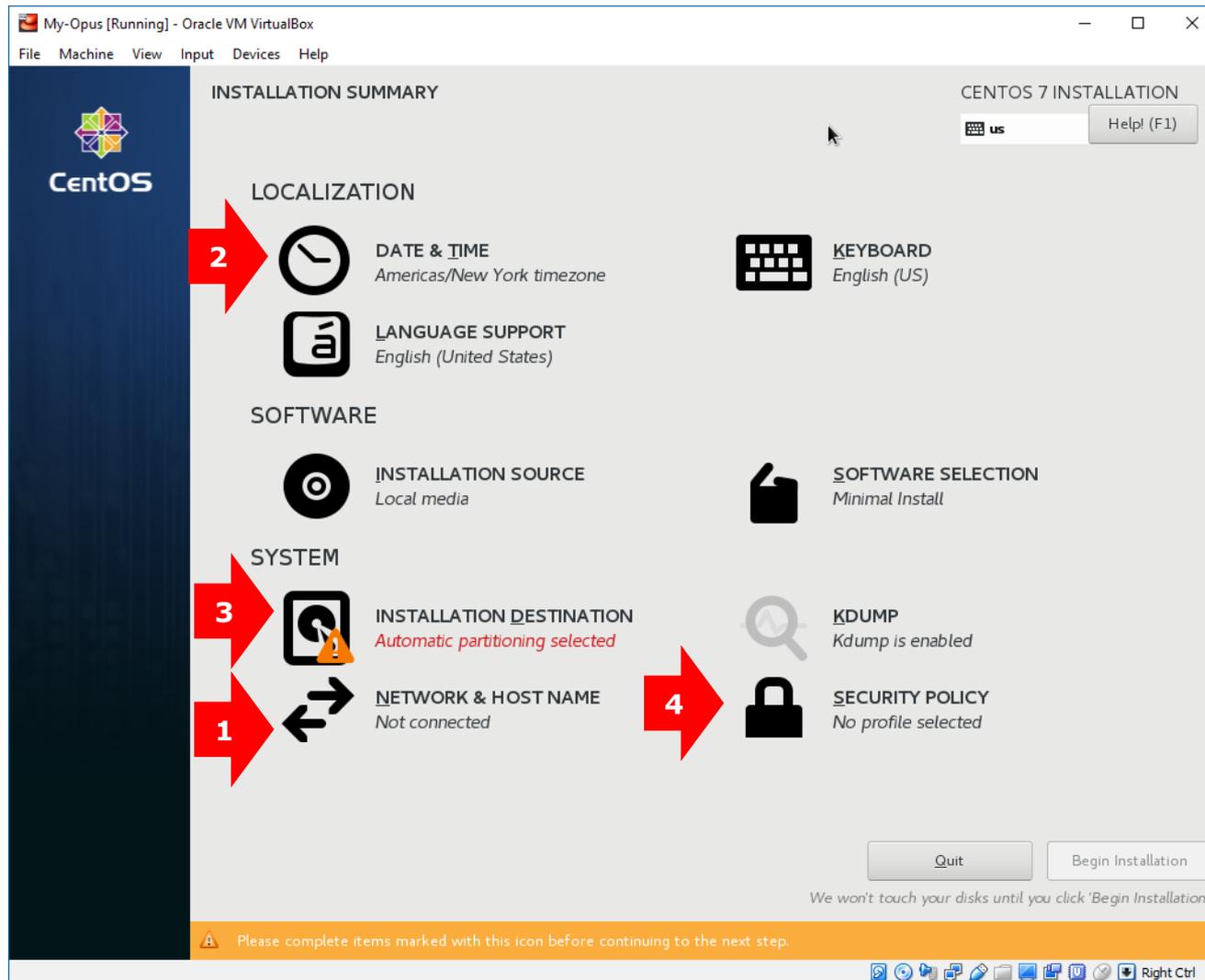
*Using arrow keys, select and enter "Install CentOS 7"*

## Language selection



The English (US) language was selected above

## Installation Settings





NETWORK & HOST NAME  
Not connected

## Configuring the Network Settings

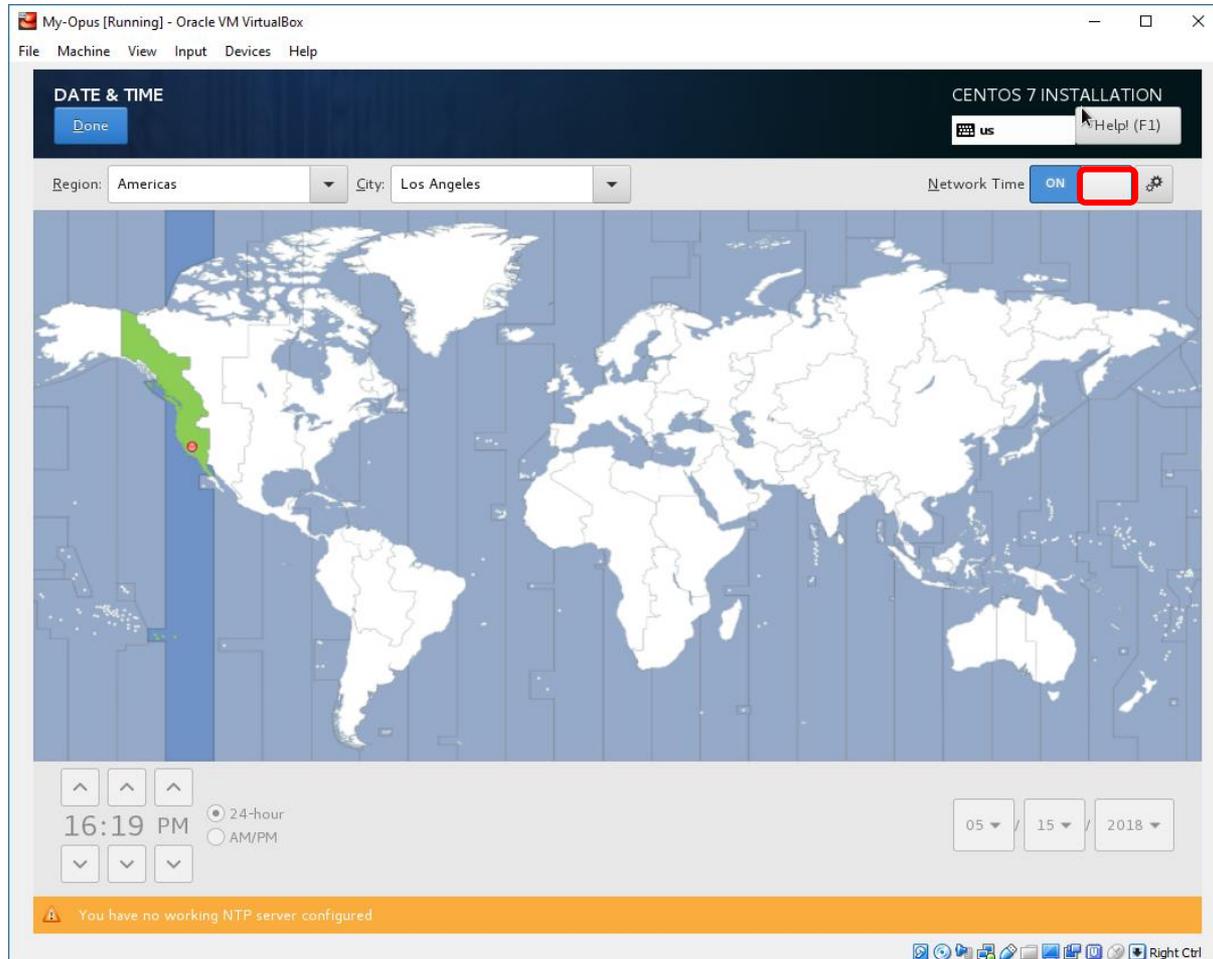
*Turn on Network Interface using default settings*

## LOCALIZATION



DATE & TIME  
Americas/New York timezone

## Configuring Data & Time



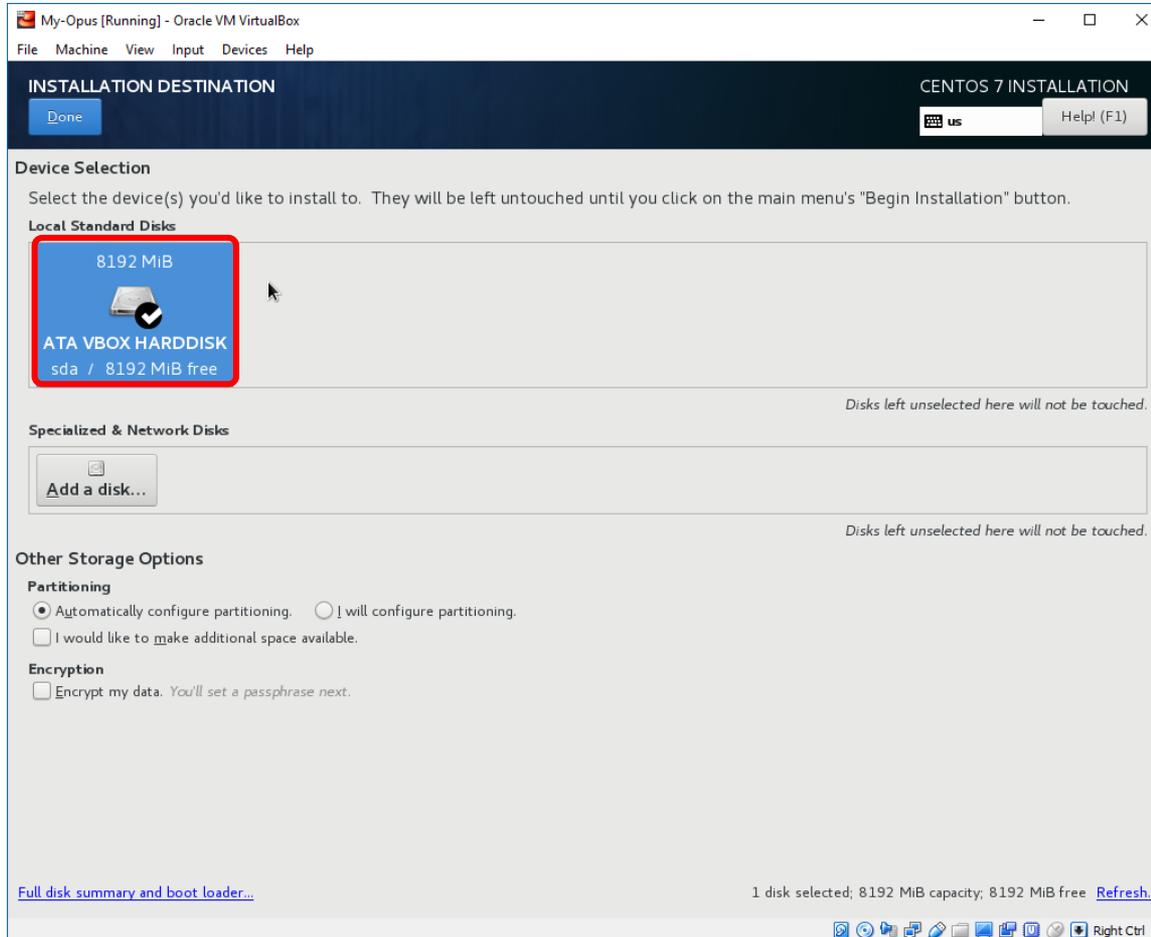
*Select your location enable Network Time*

## SYSTEM



INSTALLATION DESTINATION  
*Automatic partitioning selected*

## Configuring the Installation Drive



Select the hard drive

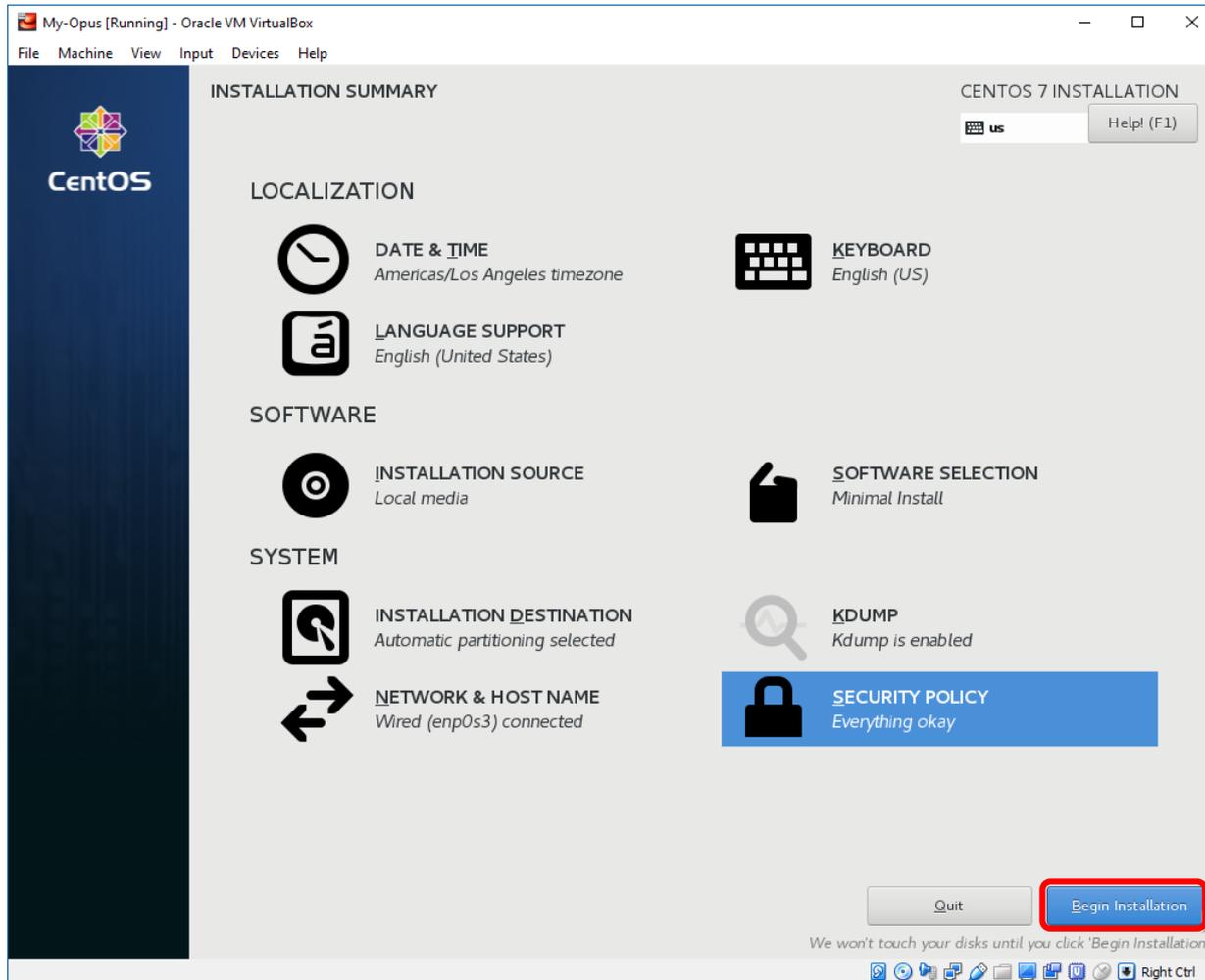


SECURITY POLICY  
No profile selected

## Configuring the Security Profile

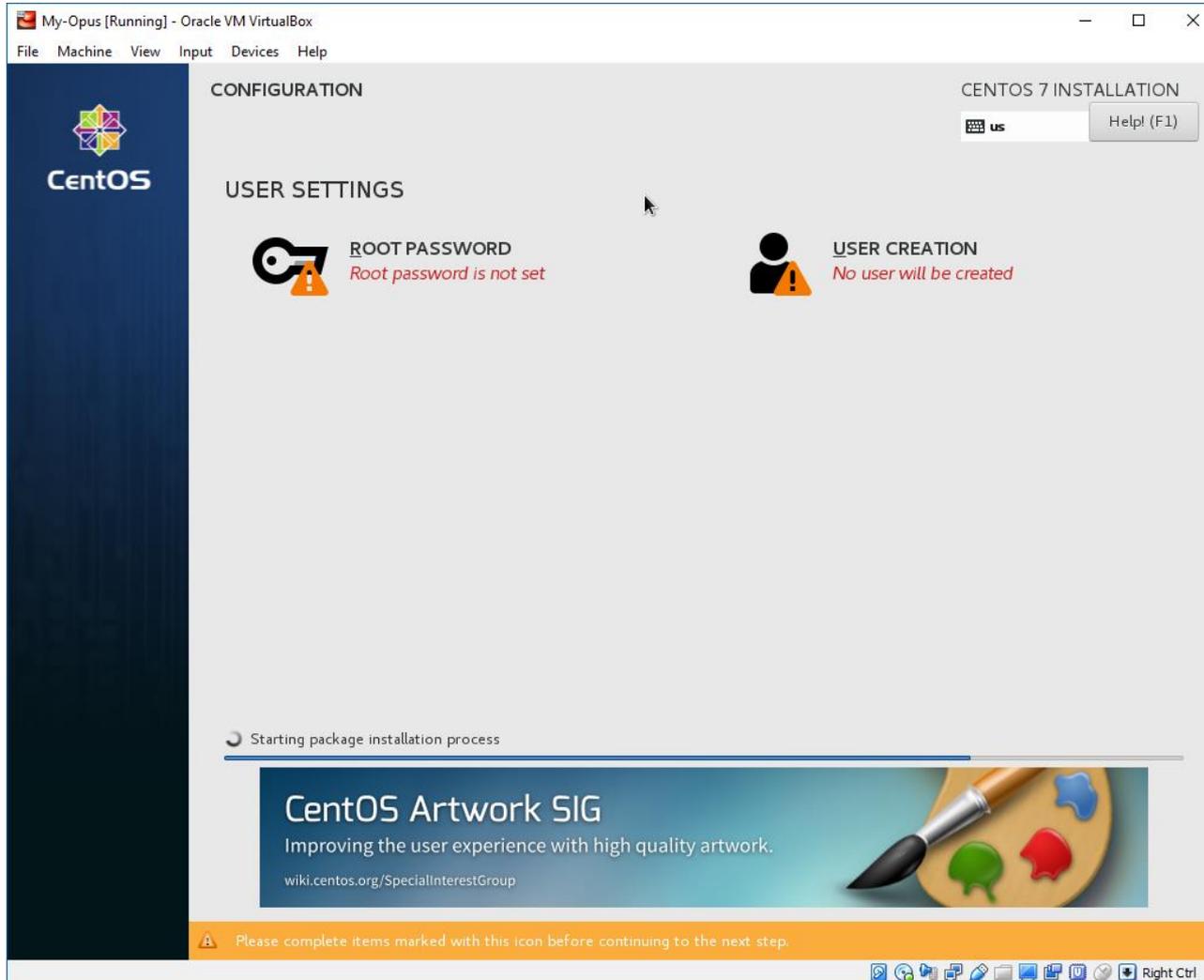
*Select Common Profile for General Purpose Systems*

## Start the Installation



*Click the Begin Installation button*

## Installation Starts



*We can set up initial users while installation is proceeding*



**ROOT PASSWORD**  
Root password is not set

## Set root password

My-Opus [Running] - Oracle VM VirtualBox

File Machine View Input Devices Help

**ROOT PASSWORD** CENTOS 7 INSTALLATION

Done us Help! (F1)

The root account is used for administering the system. Enter a password for the root user.

Root Password:

Strong

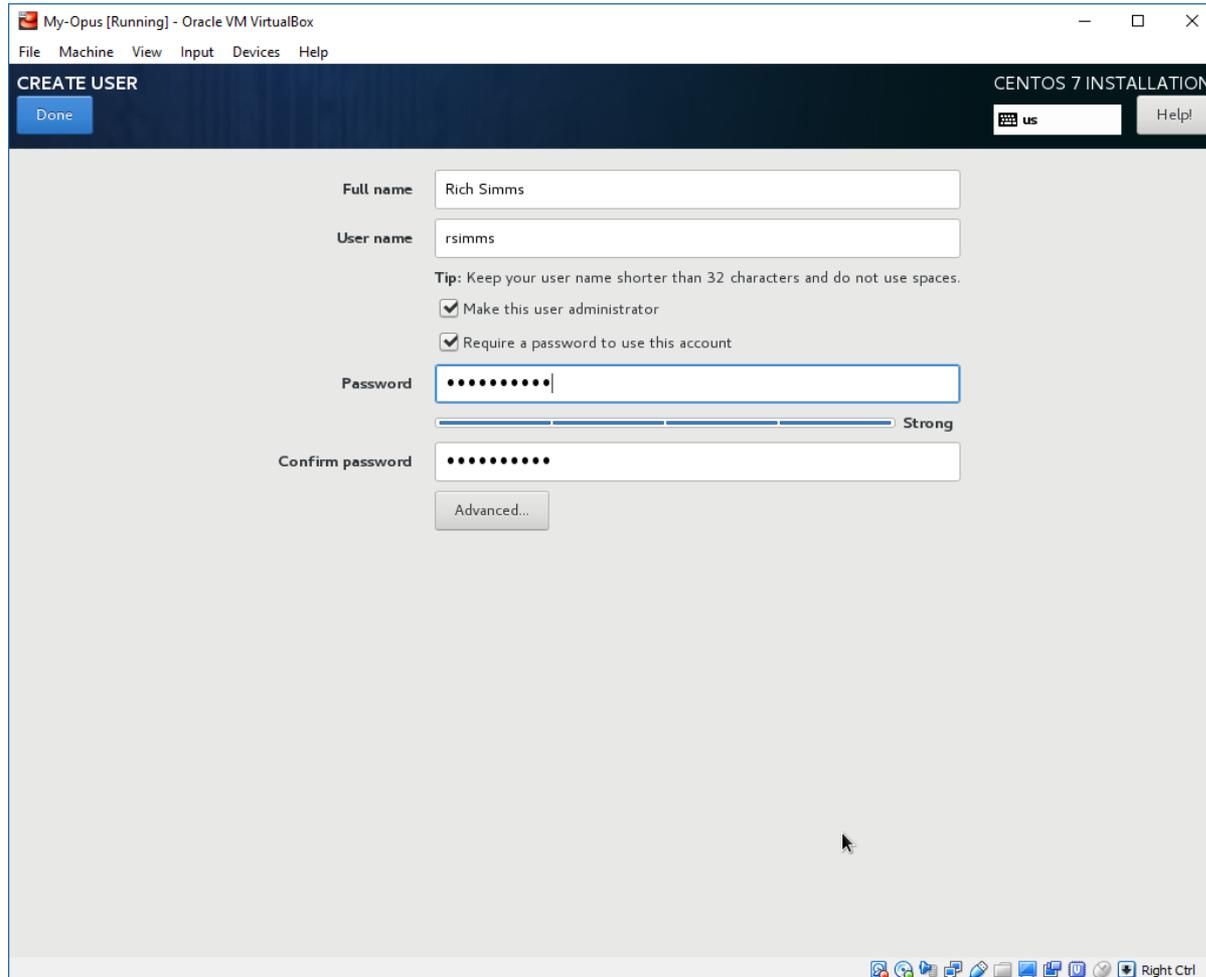
Confirm:

Right Ctrl



**USER CREATION**  
No user will be created

## Create first user



My-Opus [Running] - Oracle VM VirtualBox

File Machine View Input Devices Help

CREATE USER CENTOS 7 INSTALLATION

Done US Help!

Full name: Rich Simms

User name: rsimms

Tip: Keep your user name shorter than 32 characters and do not use spaces.

Make this user administrator

Require a password to use this account

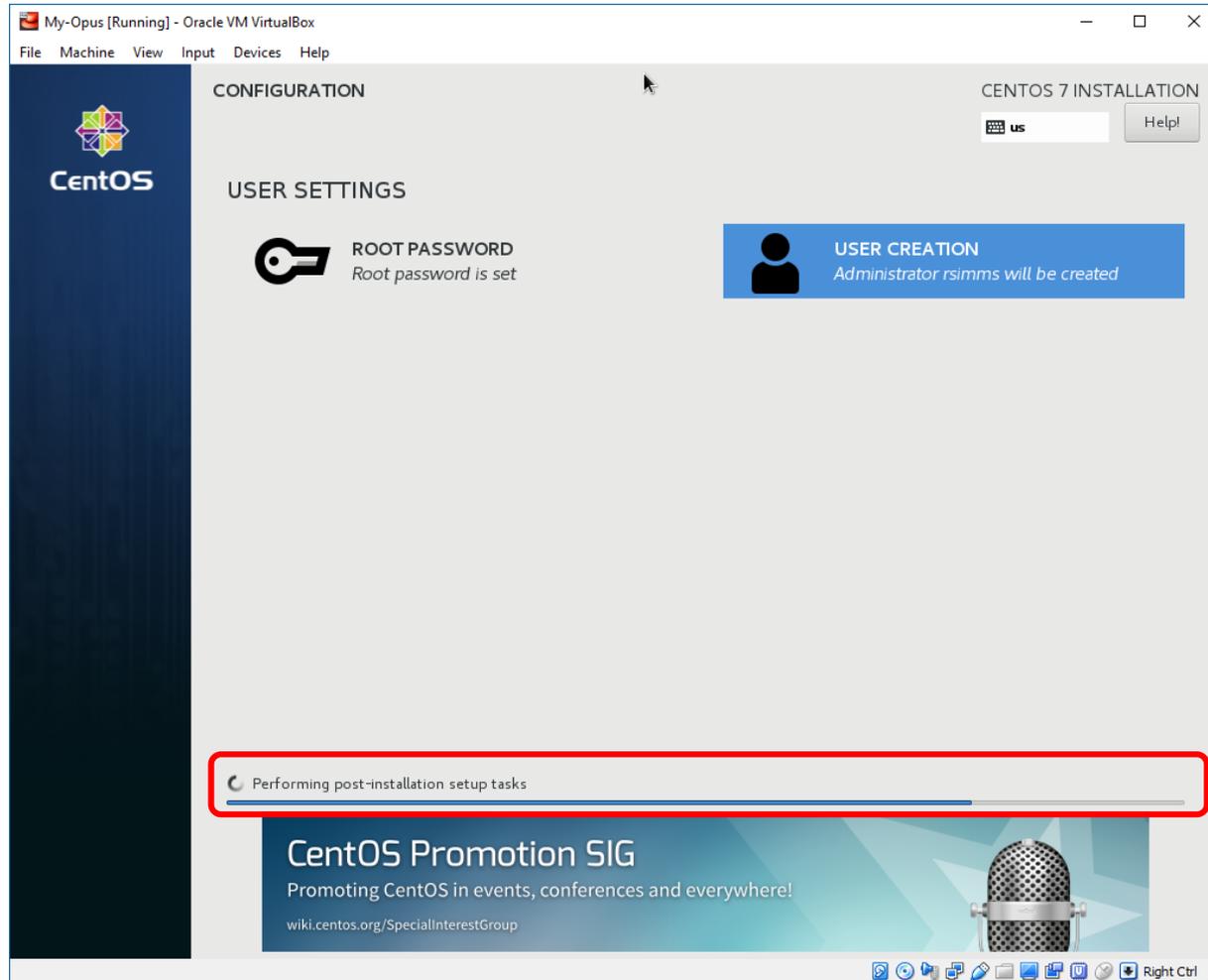
Password: [masked] Strong

Confirm password: [masked]

Advanced...

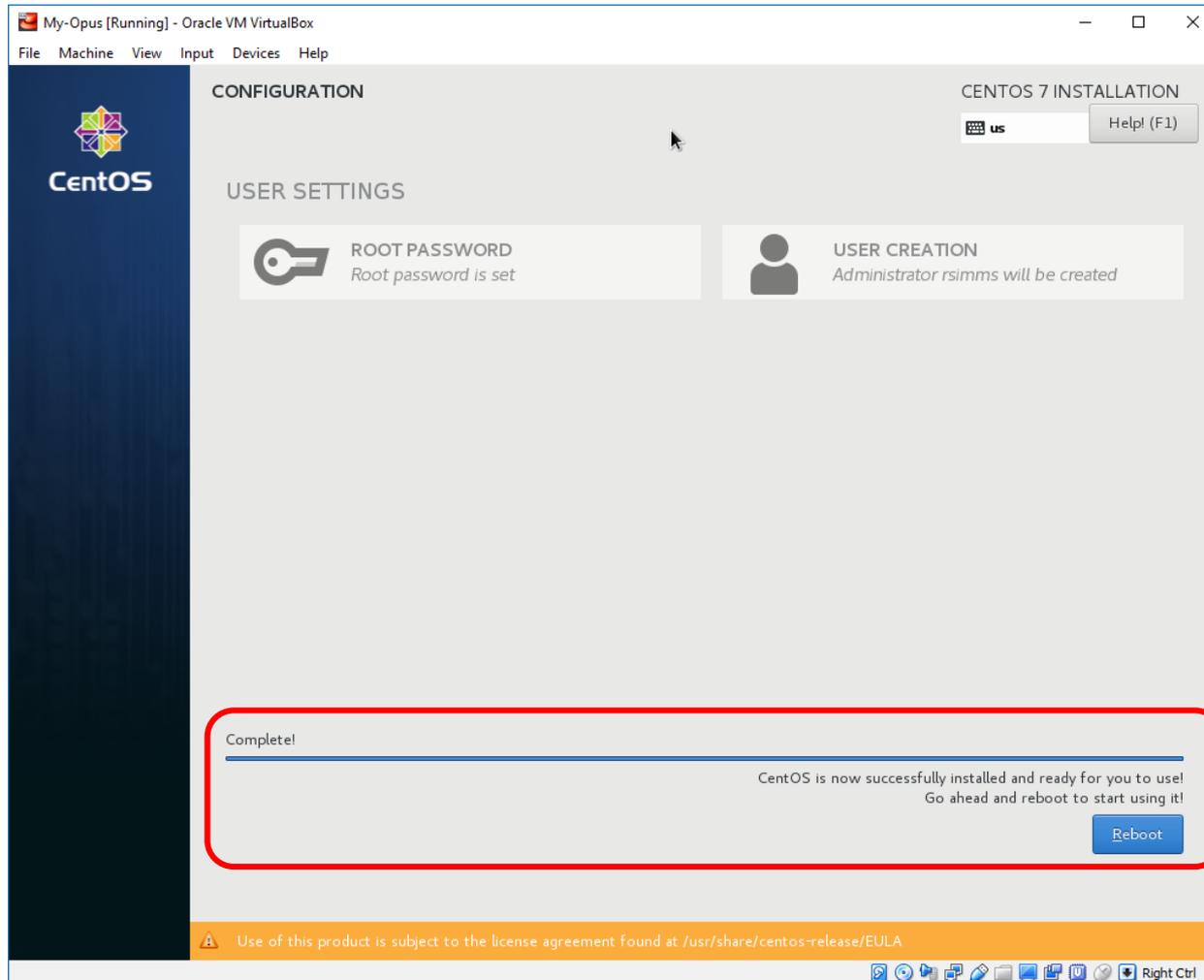
*Add yourself as an administrator*

## Installation Continues



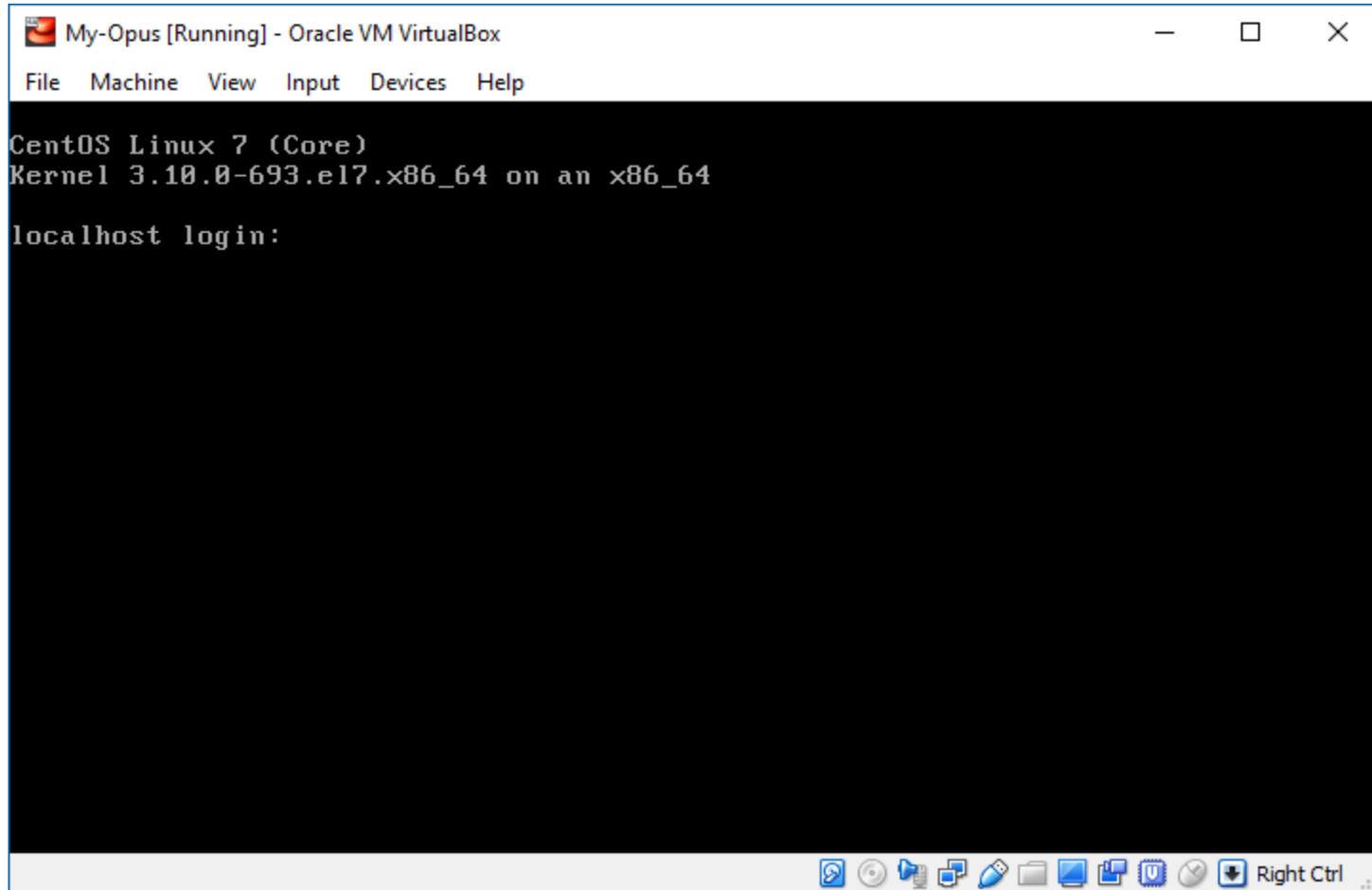
*Watch the progress bar moving ...*

## Installation Completed



*Click Reboot button*

## Login as regular user



*Login to your new Linux server using  
the regular user name you configured*

## Login as regular user

```
My-Opus [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help

CentOS Linux 7 (Core)
Kernel 3.10.0-693.el7.x86_64 on an x86_64

localhost login: rsimms
Password:
[rsimms@localhost ~]$_
```

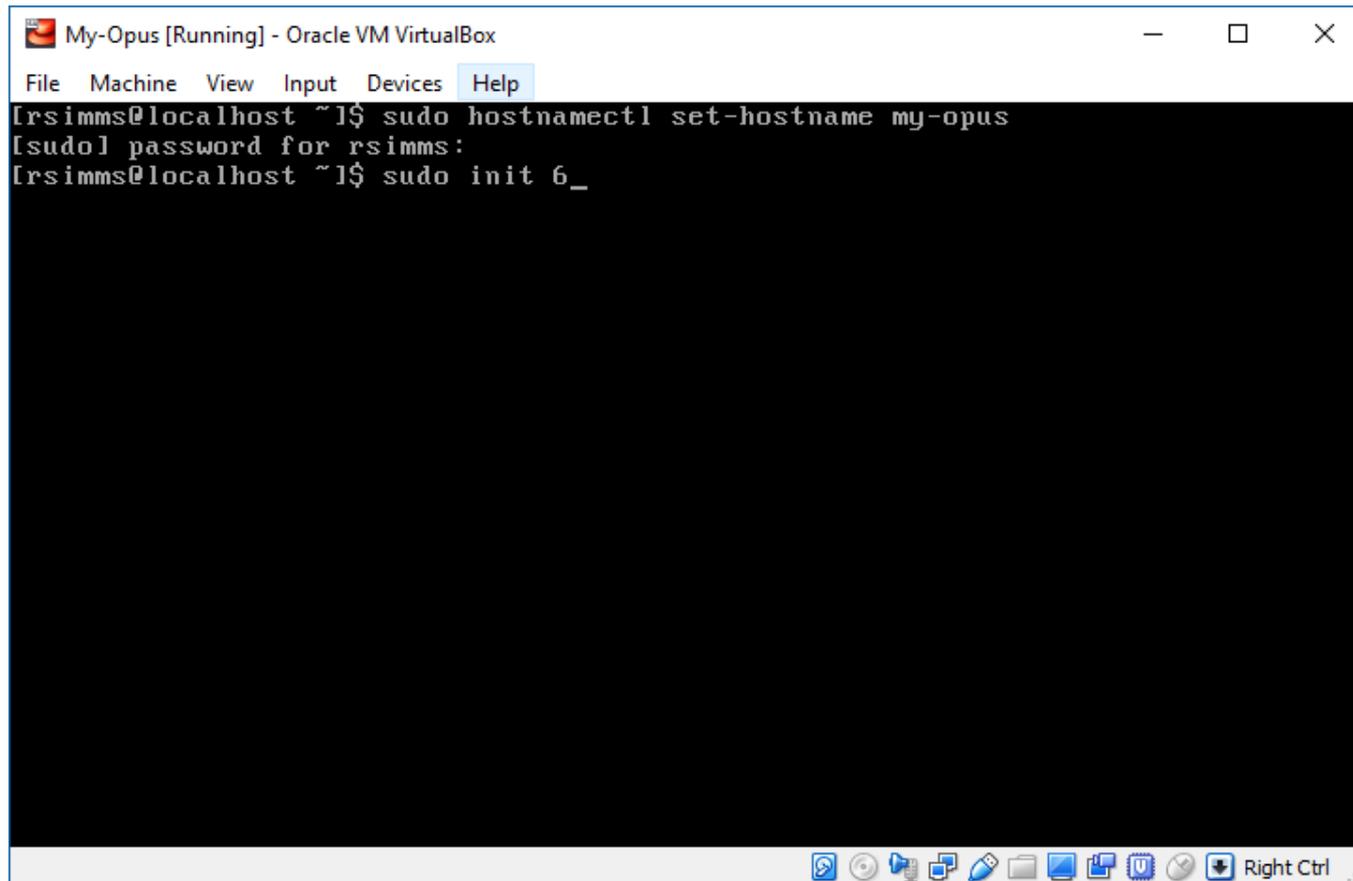
*Enter your regular username*

*Enter password (not echoed)*

*Login to your new Linux server using  
the regular username you configured*

## Configure Hostname

```
sudo hostnamectl set-hostname my-opus  
sudo init 6
```



```
My-Opus [Running] - Oracle VM VirtualBox  
File Machine View Input Devices Help  
[rsimms@localhost ~]$ sudo hostnamectl set-hostname my-opus  
[sudo] password for rsimms:  
[rsimms@localhost ~]$ sudo init 6_
```

*Configure the hostname and reboot*

## SSH into your new VM (if using bridged adapter)

### ip addr

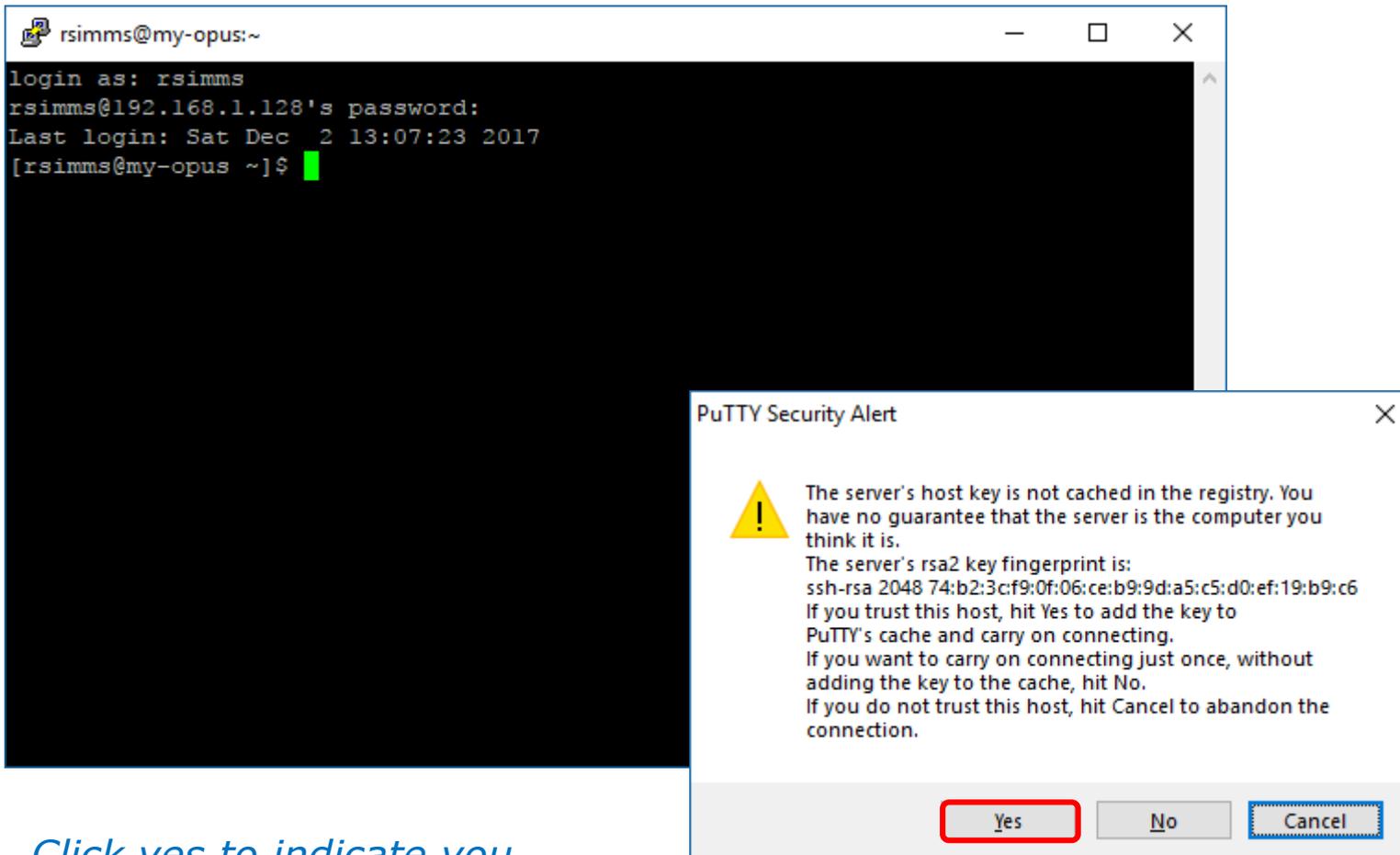
The image shows a terminal window titled "My-Opus [Running] - Oracle VM VirtualBox" with a black background. The terminal output shows the command `ip addr` being executed, displaying details for the `enp0s3` interface. The IP address `192.168.1.128` is highlighted with a red box. Overlaid on the terminal is the "PuTTY Configuration" dialog box. The "Host Name (or IP address)" field is set to `192.168.1.128` and the "Port" field is set to `22`. The "Connection type" is set to `SSH`. The "Saved Sessions" list includes "Default Settings", "172.30.10.x home", "192.168.1.home", "ASUS Router", "EH-Kali-XX", "NAS", and "RHEL7-server". The "Open" button is highlighted.

```

[rsimms@my-opus ~]$ ip addr
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN qlen 1
   link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
   inet 127.0.0.1/8 scope host lo
       valid_lft forever preferred_lft forever
   inet6 ::1/128 scope host
       valid_lft forever preferred_lft forever
2: enp0s3: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast qlen 1000
   link/ether 08:00:27:b8:81:dd brd ff:ff:ff:ff:ff:ff
   inet 192.168.1.128/24 brd 192.168.1.255 scope global dynamic noprefixroute
       valid_lft 86101sec preferred_lft 86101sec
   inet6 2601:647:cb01:755c:5e5:211:1:1 scope global dynamic mcastonly
       valid_lft 599sec preferred_lft 599sec
   inet6 fe80::dc6f:f01a:8f5a:ae14 scope link
       valid_lft forever preferred_lft forever
[rsimms@my-opus ~]$ _
  
```

*SSH using Putty or Mac terminal to your new Linux computer*

## SSH first time connection warning



*Click yes to indicate you trust the computer you are about to connect to*

## SSH fingerprint check

**ssh-keygen -E md5 -lf <(ssh-keyscan my-opus)**

```
My-Opus [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
[rsimms@my-opus ssh]$ ssh-keygen -E md5 -lf <(ssh-keyscan my-opus)
# my-opus:22 SSH-2.0-OpenSSH_7.4
# my-opus:22 SSH-2.0-OpenSSH_7.4
# my-opus:22 SSH-2.0-OpenSSH_7.4
2048 MD5:74:b2:3c:f9:0f:06:ce:b9:9d:a5:c5:d0:ef:19:b9:c6 my-opus (RSA)
256 MD5:62:7f:ad:69:26:43:18:eb:58:2c:13:00:24:e8:fd:ad my-opus (ECDSA)
256 MD5:7a:de:74:0a:92:b8:f5:5c:12:ad:de:a1:47:6b:d8:aa my-opus (ED25519)
[rsimms@my-opus ssh]$ _
```

*If you don't trust it,  
display the actual  
fingerprints and  
compare*

**PuTTY Security Alert**

 The server's host key is not cached in the registry. You have no guarantee that the server is the computer you think it is.

The server's rsa2 key fingerprint is:  
ssh-rsa 2048:74:b2:3c:f9:0f:06:ce:b9:9d:a5:c5:d0:ef:19:b9:c6

If you trust this host, hit Yes to add the key to PuTTY's cache and carry on connecting.  
If you want to carry on connecting just once, without adding the key to the cache, hit No.  
If you do not trust this host, hit Cancel to abandon the connection.

## Install Apache Web Server

**sudo yum -y install httpd**

```
rsimms@my-opus:~]$ sudo yum -y install httpd
[sudo] password for rsimms:
Loaded plugins: fastestmirror
Determining fastest mirrors
 * base: linux.mirrors.es.net
 * extras: linux.mirrors.es.net
 * updates: linux.mirrors.es.net
base | 3.6 kB 00:00
extras | 3.4 kB 00:00
updates | 3.4 kB 00:00
(1/4): extras/7/x86_64/primary_db | 125 kB 00:00
(2/4): base/7/x86_64/group_gz | 166 kB 00:00
(3/4): base/7/x86_64/primary_db | 5.9 MB 00:00
(4/4): updates/7/x86_64/primary_db | 1.0 MB 00:00
Resolving Dependencies
--> Running transaction check
--> Package httpd.x86_64 0:2.4.6-80.el7.centos will be installed
--> Processing Dependency: httpd-tools = 2.4.6-80.el7.centos for package: httpd-2.4.6-80.el7.centos.x86_64
--> Processing Dependency: /etc/mime.types for package: httpd-2.4.6-80.el7.centos.x86_64
--> Processing Dependency: libaprutil-1.so.0()(64bit) for package: httpd-2.4.6-80.el7.centos.x86_64
--> Processing Dependency: libapr-1.so.0()(64bit) for package: httpd-2.4.6-80.el7.centos.x86_64
--> Running transaction check
--> Package apr.x86_64 0:1.4.8-3.el7_4.1 will be installed
--> Package apr-util.x86_64 0:1.5.2-6.el7 will be installed
--> Package httpd-tools.x86_64 0:2.4.6-80.el7.centos will be installed
--> Package mailcap.noarch 0:2.1.41-2.el7 will be installed
--> Finished Dependency Resolution

Dependencies Resolved

=====
Package Arch Version Repository Size
=====
Installing:
httpd x86_64 2.4.6-80.el7.centos base 2.7 M
Installing for dependencies:
apr x86_64 1.4.8-3.el7_4.1 base 103 k
apr-util x86_64 1.5.2-6.el7 base 92 k
httpd-tools x86_64 2.4.6-80.el7.centos base 89 k
mailcap noarch 2.1.41-2.el7 base 31 k
Transaction Summary
=====
```

```
rsimms@my-opus:~]$ sudo yum -y install httpd
Install 1 Package (+4 Dependent packages)

Total download size: 3.0 M
Installed size: 10 M
Downloading packages:
warning: /var/cache/yum/x86_64/7/base/packages/apr-util-1.5.2-6.el7.x86_64.rpm:
Header V3 RSA/SHA256 Signature, key ID f4a80eb5: NOKEY
Public key for apr-util-1.5.2-6.el7.x86_64.rpm is not installed
(1/5): apr-util-1.5.2-6.el7.x86_64.rpm | 92 kB 00:00
(2/5): apr-1.4.8-3.el7_4.1.x86_64.rpm | 103 kB 00:00
(3/5): httpd-tools-2.4.6-80.el7.centos.x86_64.rpm | 89 kB 00:00
(4/5): mailcap-2.1.41-2.el7.noarch.rpm | 31 kB 00:00
(5/5): httpd-2.4.6-80.el7.centos.x86_64.rpm | 2.7 MB 00:00
-----
Total 5.5 MB/s | 3.0 MB 00:00
Retrieving key from file:///etc/pki/rpm-gpg/RPM-GPG-KEY-CentOS-7
Importing GPG key 0xF4A80EB5:
Userid : "CentOS-7 Key (CentOS 7 Official Signing Key) <security@centos.org>"
Fingerprint: 6341 ab27 53d7 9a78 a7c2 7bb1 24c6 a8a7 f4a8 0eb5
Package : centos-release-7-5.1804.el7.centos.x86_64 (@anaconda)
From : /etc/pki/rpm-gpg/RPM-GPG-KEY-CentOS-7
Running transaction check
Running transaction test
Transaction test succeeded
Running transaction
Installing : apr-1.4.8-3.el7_4.1.x86_64 1/5
Installing : apr-util-1.5.2-6.el7.x86_64 2/5
Installing : httpd-tools-2.4.6-80.el7.centos.x86_64 3/5
Installing : mailcap-2.1.41-2.el7.noarch 4/5
Installing : httpd-2.4.6-80.el7.centos.x86_64 5/5
Verifying : httpd-tools-2.4.6-80.el7.centos.x86_64 1/5
Verifying : apr-1.4.8-3.el7_4.1.x86_64 2/5
Verifying : mailcap-2.1.41-2.el7.noarch 3/5
Verifying : httpd-2.4.6-80.el7.centos.x86_64 4/5
Verifying : apr-util-1.5.2-6.el7.x86_64 5/5

Installed:
httpd.x86_64 0:2.4.6-80.el7.centos

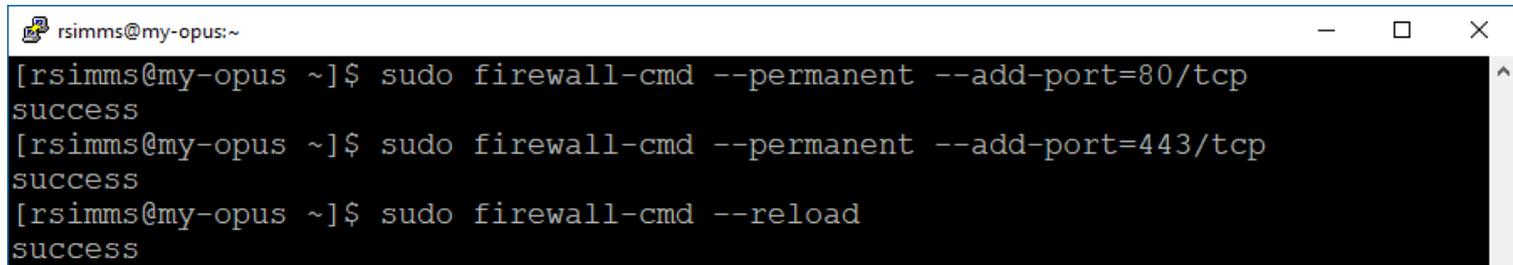
Dependency Installed:
apr.x86_64 0:1.4.8-3.el7_4.1 apr-util.x86_64 0:1.5.2-6.el7
httpd-tools.x86_64 0:2.4.6-80.el7.centos mailcap.noarch 0:2.1.41-2.el7

Complete!
rsimms@my-opus:~]$
```

*The httpd package is the Apache web server*

## Configure Firewall to allow incoming HTTP requests

```
sudo firewall-cmd --permanent --add-port=80/tcp  
sudo firewall-cmd --permanent --add-port=443/tcp  
sudo firewall-cmd --reload
```



```
rsimms@my-opus:~  
[rsimms@my-opus ~]$ sudo firewall-cmd --permanent --add-port=80/tcp  
success  
[rsimms@my-opus ~]$ sudo firewall-cmd --permanent --add-port=443/tcp  
success  
[rsimms@my-opus ~]$ sudo firewall-cmd --reload  
success
```

*Poke holes in the firewall for ports 80 (HTTP) and 443 (HTTPS).  
This allows remote users access to your Apache web server*

## Start and verify Apache Web Service

```
sudo systemctl start httpd
sudo systemctl enable httpd
sudo systemctl status httpd
```

```
[rsimms@my-opus ~]$ sudo systemctl start httpd
[rsimms@my-opus ~]$ sudo systemctl enable httpd
Created symlink from /etc/systemd/system/multi-user.target.wants/httpd.service to /usr/lib/systemd/system/httpd.service.
[rsimms@my-opus ~]$ sudo systemctl status httpd
● httpd.service - The Apache HTTP Server
   Loaded: loaded (/usr/lib/systemd/system/httpd.service; enabled; vendor preset: disabled)
   Active: active (running) since Sat 2017-12-02 13:24:19 PST; 16s ago
     Docs: man:httpd(8)
           man:apachectl(8)
  Main PID: 1265 (httpd)
   Status: "Total requests: 0; Current requests/sec: 0; Current traffic: 0 B/sec"
    CGroup: /system.slice/httpd.service
            └─1265 /usr/sbin/httpd -DFOREGROUND
              └─1266 /usr/sbin/httpd -DFOREGROUND
                └─1267 /usr/sbin/httpd -DFOREGROUND
                  └─1268 /usr/sbin/httpd -DFOREGROUND
                    └─1269 /usr/sbin/httpd -DFOREGROUND
                      └─1270 /usr/sbin/httpd -DFOREGROUND

Dec 02 13:24:19 my-opus systemd[1]: Starting The Apache HTTP Server...
Dec 02 13:24:19 my-opus httpd[1265]: AH00558: httpd: Could not reliably det...ge
Dec 02 13:24:19 my-opus systemd[1]: Started The Apache HTTP Server.
Hint: Some lines were ellipsized, use -l to show in full.
[rsimms@my-opus ~]$ █
```

*Start Apache and enable it to start automatically at boot*

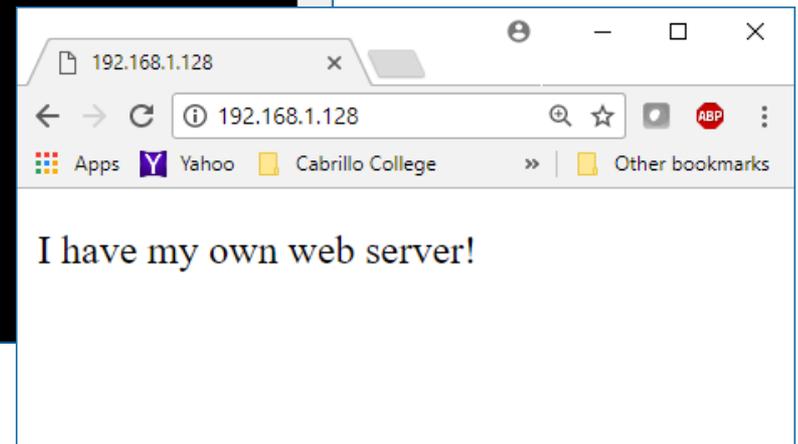
```
sudo vi /var/www/html/index.html  
cat /var/www/html/index.html
```

Make a sample webpage



```
rsimms@my-opus:~  
[rsimms@my-opus ~]$ sudo vi /var/www/html/index.html  
[rsimms@my-opus ~]$ cat /var/www/html/index.html  
<!DOCTYPE html>  
<html>  
<body>  
  
<p>I have my own web server!</p>  
  
</body>  
</html>  
[rsimms@my-opus ~]$
```

**Browse to your VM**



```
<!DOCTYPE html>  
<html>  
<body>
```

```
<p>I have my own web server!</p>
```

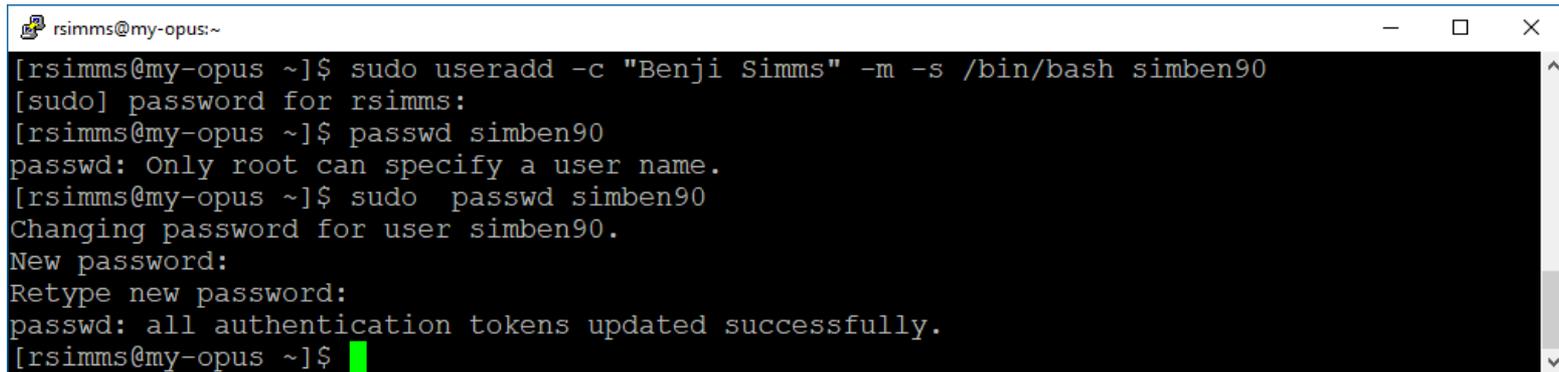
```
</body>  
</html>
```

*Make a little web page  
named index.html*



## Add your CIS 90 account

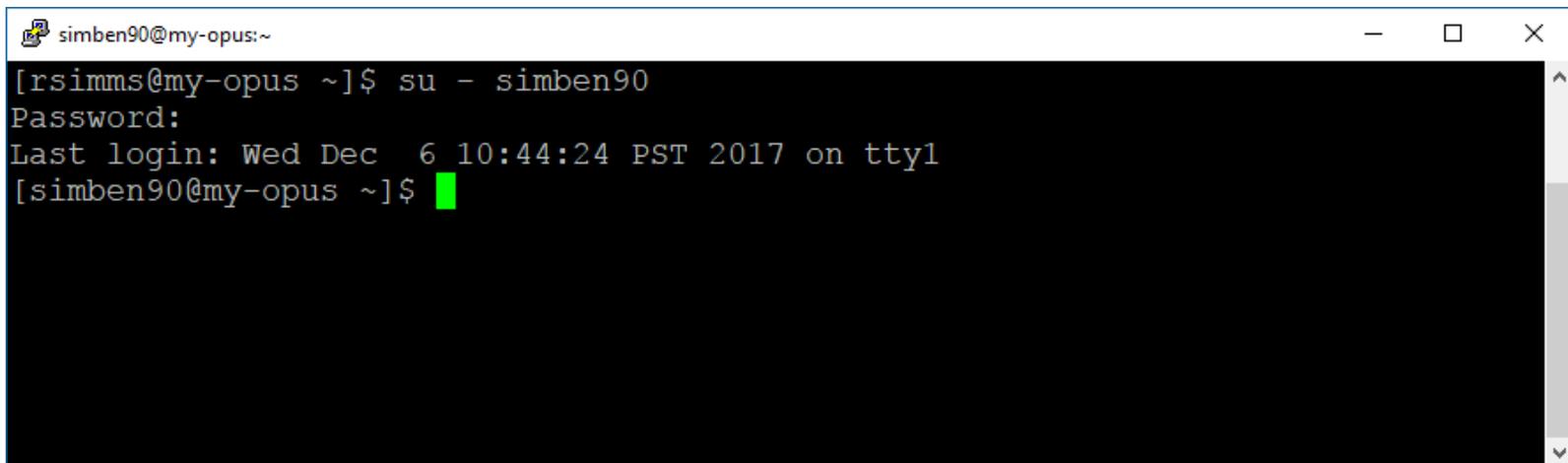
```
sudo useradd -c "Benji Simms" -m -s /bin/bash simben90  
sudo passwd simben90
```



```
rsimms@my-opus:~  
[rsimms@my-opus ~]$ sudo useradd -c "Benji Simms" -m -s /bin/bash simben90  
[sudo] password for rsimms:  
[rsimms@my-opus ~]$ passwd simben90  
passwd: Only root can specify a user name.  
[rsimms@my-opus ~]$ sudo passwd simben90  
Changing password for user simben90.  
New password:  
Retype new password:  
passwd: all authentication tokens updated successfully.  
[rsimms@my-opus ~]$
```

Switch to your CIS 90 account

**su - simben90**



```
simben90@my-opus:~  
[rsimms@my-opus ~]$ su - simben90  
Password:  
Last login: Wed Dec 6 10:44:24 PST 2017 on tty1  
[simben90@my-opus ~]$
```

*Switch to your CIS 90 account*

## Copy your files on Opus to your new VM

```
scp -r -P 2220 opus-ii.cis.cabrillo.edu:* .
yes
```

```
simben90@my-opus:~
[simben90@my-opus ~]$ scp -r -P 2220 opus-ii.cis.cabrillo.edu:* .
The authenticity of host '[opus-ii.cis.cabrillo.edu]:2220 ([2607:f380:80f:f425::244]:2220)'
can't be established.
ECDSA key fingerprint is SHA256:xKmlxeB/u8y3dW61lLYniQzigUQmlpdcPS2mPdd8SV0.
ECDSA key fingerprint is MD5:b3:bc:ad:b3:a9:38:ab:9e:5a:bb:7b:d0:3c:e5:57:e6.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added '[opus-ii.cis.cabrillo.edu]:2220,[2607:f380:80f:f425::244]:2220'
(ECDSA) to the list of known hosts.
simben90@opus-ii.cis.cabrillo.edu's password:
address                100%   22      1.4KB/s   00:00
badevents              100% 1010    32.8KB/s  00:00
treat5                 100%  795    42.3KB/s  00:00
bigfile                100%  10KB   612.5KB/s 00:00
bigfile.bak           100%  10KB   615.7KB/s 00:00
bigshell               100%   70     3.8KB/s   00:00
enlightenment         100% 3442   150.0KB/s 00:00
treed                  100%  190    11.1KB/s  00:00
zoom                   100%   74     3.4KB/s   00:00
app                    100%  220    14.5KB/s  00:00
hi                     100%  107     7.4KB/s   00:00
I                      100%  375    16.2KB/s  00:00
tryme                  100%  174     7.2KB/s   00:00
banner                 100%  15KB   800.2KB/s 00:00
simple.c                100%  598    27.6KB/s  00:00
simple                  100% 8768   490.9KB/s 00:00
simpleplus.cpp          100%  630    42.3KB/s  00:00
```

*Copy your CIS 90 files recursively from Opus-II*

Make sure you got them all

**ls**

```

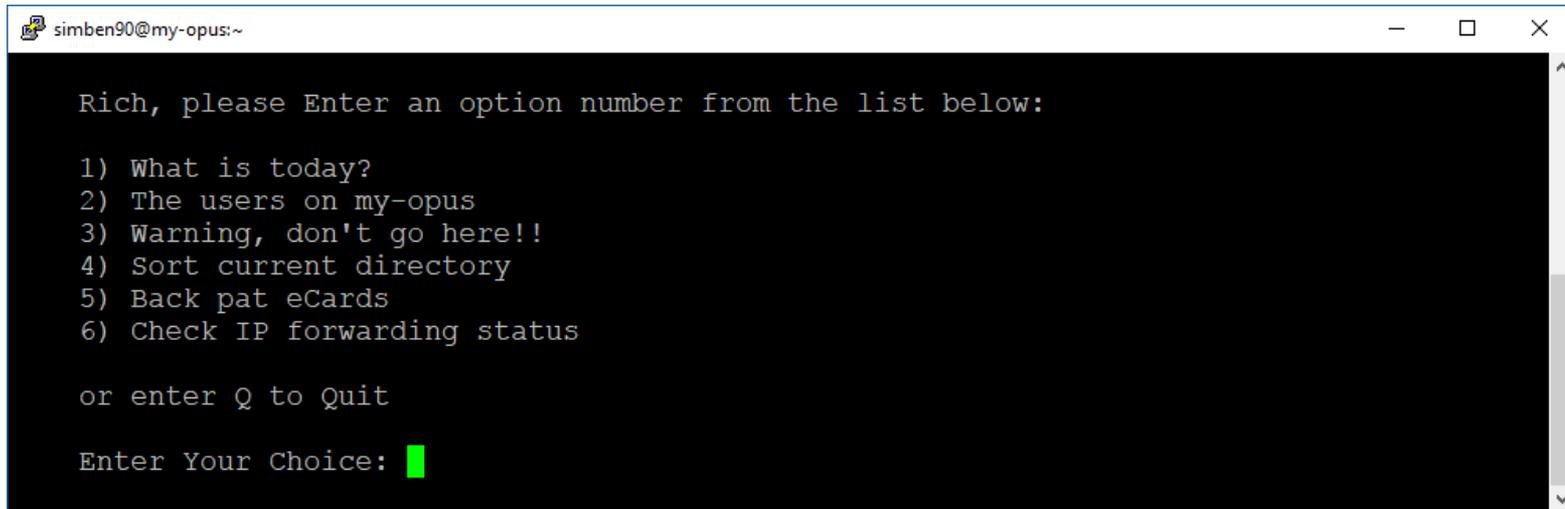
simben90@my-opus:~
[simben90@my-opus ~]$ ls
address      dead.letter  f1.graded   lab07       mission     text.fxd
badevents    Directory3   f2.graded   lab08       mylog       timecal
bag          dogs         f3.graded   lab09       poems       trash
bigfile      dogs.tar     files.out   lab09.graded proposal1    treat1
bigfile.bak  dulces      Hidden      Lab2.0       proposal2   uhistory
bigshell     dups        jobs        Lab2.1       proposal3   uhistory.bak
bin          edits       lab01.graded labx2        scratch     uhistory.rsimms
bin.tar      empty       lab02-collection letter       sweets      what_am_i
candy        example777  lab04.graded log          text.err    words
cis90_html   example808  lab04-mydata Miscellaneous text.fixed
[simben90@my-opus ~]$

```

*Listing of home directory on new VM*

## Run your final project

### bin/myscript

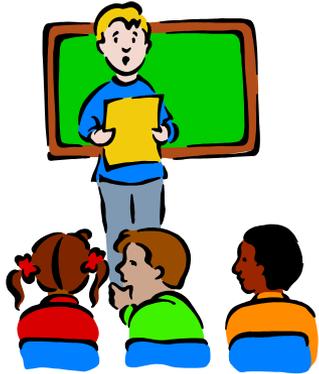
A terminal window titled 'simben90@my-opus:~' with standard window controls. The terminal displays a script prompt: 'Rich, please Enter an option number from the list below:'. Below this is a numbered list of six options: '1) What is today?', '2) The users on my-opus', '3) Warning, don't go here!!', '4) Sort current directory', '5) Back pat eCards', and '6) Check IP forwarding status'. The prompt continues with 'or enter Q to Quit' and 'Enter Your Choice: ' followed by a green cursor block.

```
simben90@my-opus:~  
Rich, please Enter an option number from the list below:  
  
1) What is today?  
2) The users on my-opus  
3) Warning, don't go here!!  
4) Sort current directory  
5) Back pat eCards  
6) Check IP forwarding status  
  
or enter Q to Quit  
Enter Your Choice: █
```

*Check you can still run your final project*



# Project Presentations



**To demo your project and earn six points:**

Remote students - Share desktop when it is your turn.

Classroom students - use the instructor station at the front of the room.



# **Workshop (If time permits)**

**Projects  
Practice Test  
Make an Opus**

# Assignment



**Do Practice Test #3**

**Five Posts**

**Lab X1 (extra credit)**

**Lab X2 (extra credit)**



## Notes to instructor

### Practice Test System

- [ ] Start: `echo "/root/unlock-cis90; rm -f atq/etc/nologin" | at [end of L15]`
- [ ] End: `echo "/root/lock-cis90; cp /etc/nologin.bak /etc/nologin" | at [T-30]`

### Canvas Practice Test:

- [ ] availability from = *[end of L15]*, due & available until = *[T-30]*
- [ ] remove password on practice test on Canvas *[start of L15]*
- [ ] moderate any accommodations 1.5x = +85m 2x=+170m (

### Real Test system

- [ ] Start: `echo "/root/unlock-cis90; rm -f /etc/nologin" | at [T-0]`
- [ ] End: `echo "./lock-cis90-1.0" | at [T+170] 9:50 am`
- [ ] End: `echo "./lock-cis90-1.5" | at [T+255] 11:15 am`
- [ ] End: `echo "./lock-cis90-2.0" | at [T+340] 12:40 pm`
- [ ] End: `echo "cp /etc/nologin.bak /etc/nologin " | at [splashdown + 170 minutes]`  
`date -d "07:00 today + xxx minutes" +%H:%M'`

### Canvas Real Test:

- [ ] availability from = *[T-0]*, due & available until = *[splashdown]*
- [ ] remove password on real test on Canvas *[T-0]*
- [ ] moderate time limit any accommodations 1.5x = +85m 2x=+170m and customize due times



# Wrap up

New commands:

tar

gzip

gunzip

Backup and restore files

Zip and compress files

Unzip files

New Files and Directories:

Next Class is the Final Exam (Test #3)

Test #3

Five Posts

Lab X1 (extra credit)

Lab X2 (extra credit)



# Backup

End Meeting

End  
Meeting