Welcome! If you want to follow along, borrow a flash drive, copy the contents to your drive, and see the README. Or, download from:

thewoolleyweb.com/ci_for_the_rails_guy_or_gal

Warning: If you are reading this from a handout or virtual machine, it may be outdated. See latest at:

thewoolleyweb.com/ci_for_the_rails_guy_or_gal

CI for the Rails /G(uyIaI)/

Obligatory Boiler Plate

Who

Chad Woolley

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thewoolleyweb.com


PIVOTAL LABS

Who are YOU? CI?
Linux?
Virtualization?
Javascript
Testing?
Selenium?

What

CI == Continuous Integration

Martin Fowler - Seminal CI Article

Running all your tests on every commit

Automatically

How

Takahashi Method == Big Font!

Focused on how to install and make everything work together, not on details of how to use the tools

Just the basics, no obtuse shell tricks, won't use the latest extensions, wrappers, libraries, or plugins

But I encourage you to look into them, useful additions/ extensions will be mentioned later.

Well, maybe a few bleeding edge things, time permitting

Agenda:

1. Code: The simplest tutorial that could POSSIBLY work

Coding Tasks Outline

A. Install Linux on VMWare

B. Install Prereqs: ruby, java, mysql, svn, ant, alternate browser

C. Create sample Rails Project

D. cruisecontrol.rb setup

E. JsUnit Setup

F. Selenium Setup

Z. Git

2. Gettin' Fancier

3. Gotchas

4. Questions

Tools Used

Cross-Platform, Mostly* Free

* VMware is not free on all platforms

VMware

Parallels is a Virtualization Alternative

Or, you can skip Virtualization and install Ubuntu directly on a spare PC. Just burn the ISO image to a CD.

Ubuntu Linux

cruisecontrol.rb

JsUnit

Selenium

There is a lot of material in this presentation

We will move FAST

Maybe too fast for you to follow along during the preso (sorry!)

But it's all on the slides

Overachievers can yell “Bingo” if you finish it before I do.

Everyone else can pair up and help each other

Intended to be comprehensive, easily repeatable, generic, cross-platform

Contains everything* you need to try this on a real project

* “everything” except the stuff that doesn't work on your project or environment or latest versions. Error messages and Google are your friend :)

As a matter of fact, it almost certainly won't work perfectly for you. Integrating this stuff is hard, and new problems arise as tools and libraries evolve. Embrace the ~~bleeding~~ cutting edge, keep a positive attitude, and help fix bugs.

It's OK to sit back and watch

Try it at your home or workplace, at your own pace

You can try it on a mac, but slides target an Ubuntu VM for maximum portability and repeatability

Live!

No Hand Waving

(Warning: Obligatory lame attempt at humor coming up)

Their WILL be typos!

You down with OCD?

Then you'll know me!

Just please don't be “That Guy” (or Gal)!

You know, “That Guy” who stands up and wants to expound on irrelevant minutiae during the middle of a presentation...

Nitpicks, Flames and Hints Welcome...

...over beer, AFTER the tutorial

...but seriously, if you are a bit OCDish, you might make a good CI G(uylal) - because there's a lot of moving parts that all have to integrate...

...Continuously!

1. Time to Code!

WARNING: If you try to cut and paste commands from the presentation (and you can, they're all there), use the OpenOffice doc. Pasting from PDF inserts bad line breaks

A. Install Linux on VMWare

No time to install Linux live, but VMWare and images are on USB Keys

My Barebones Linux VM Setup:

Base:
VMWare on Macbook Pro 17”
Ubuntu 7.10 desktop VM from ISO
VMware Tools installed

Optional:
Change resolution (System > Preferences > Screen Resolution)
Mouse Acceleration and Sensitivity
Terminal scrollback

Everything should work pretty much the same on any modern Unix platform

Following are screenshots and instructions to set up basic Ubuntu on VMware

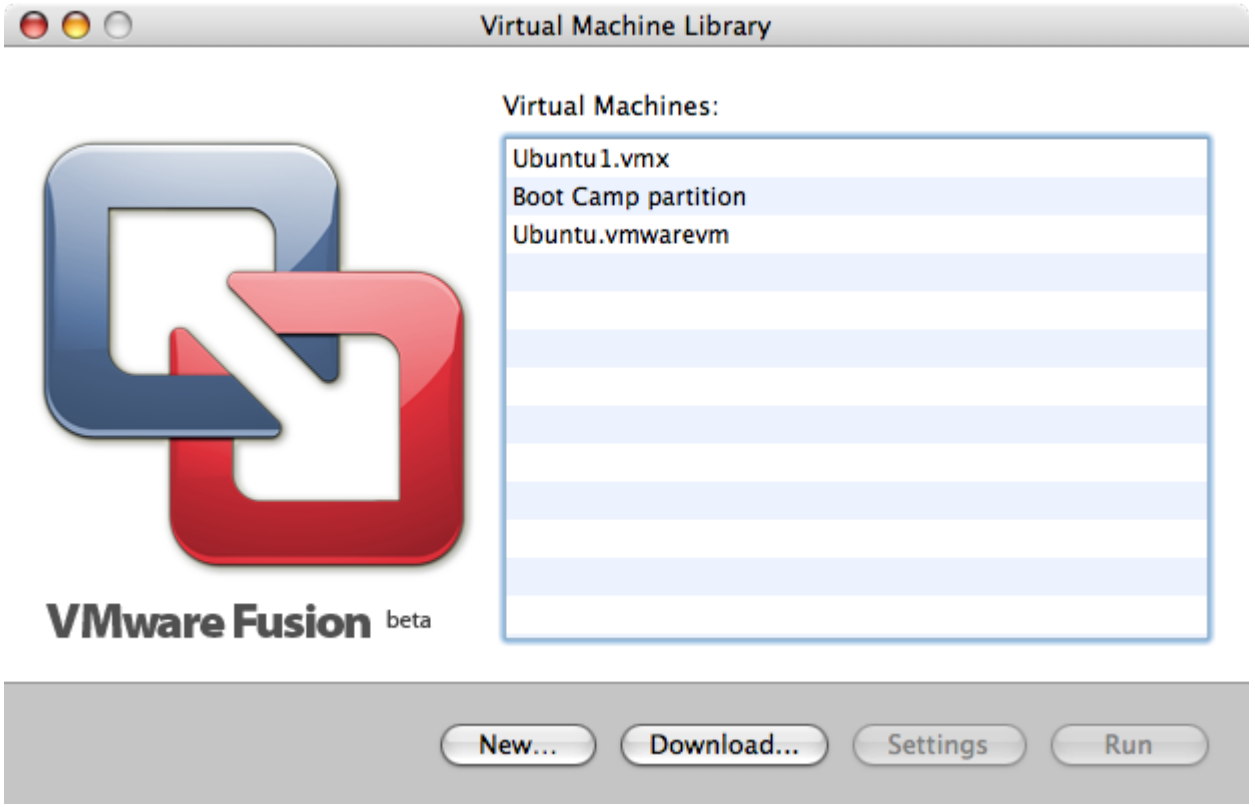
We will skip them for now, but you can use them as a guide when you try it later

Exact steps may vary depending on your hardware

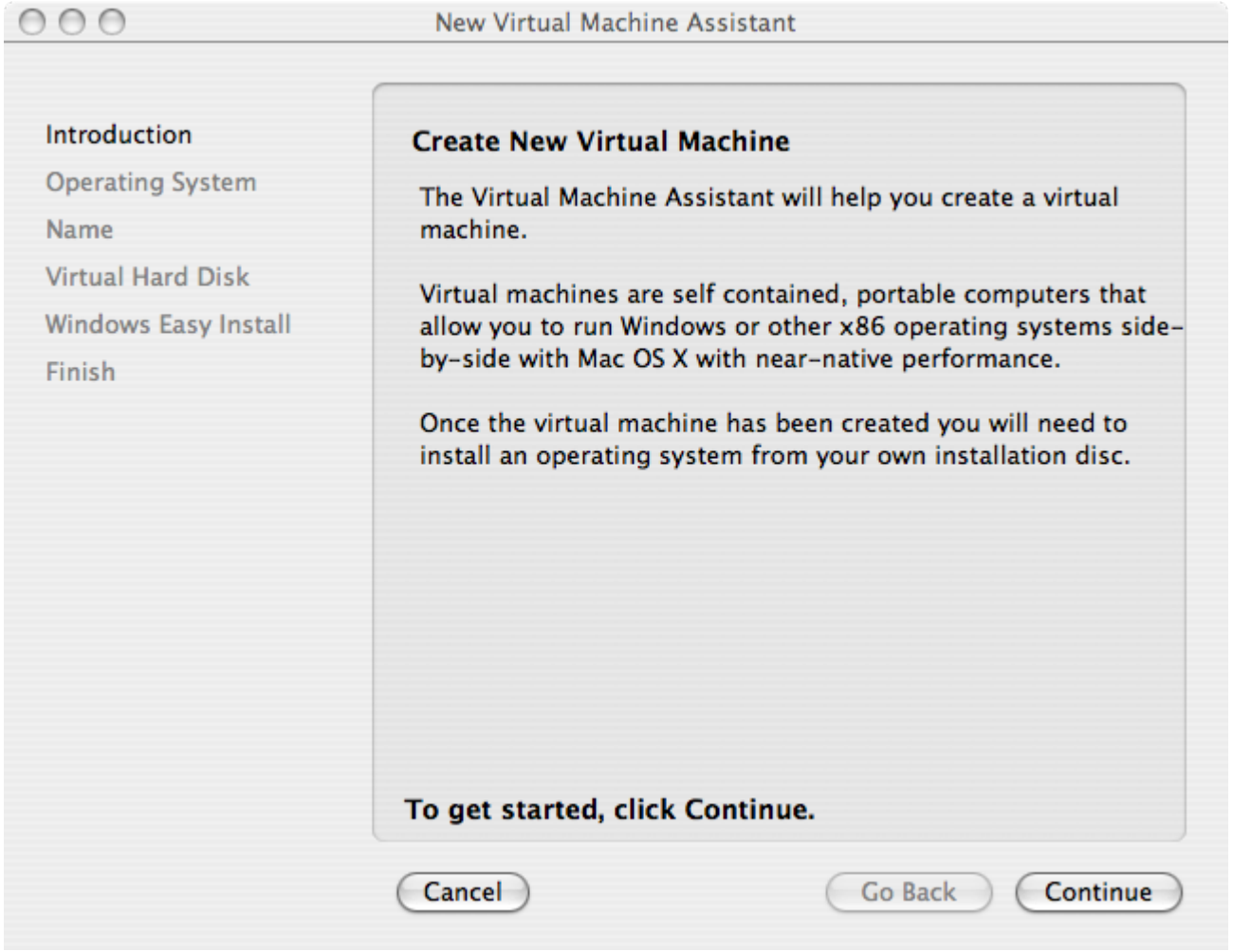
Original screenshots in /presentation /screenshots if these are too small to read

VMware Mac Setup: /presentation /screenshots /01a_mac_vmware_fusion_screenshots

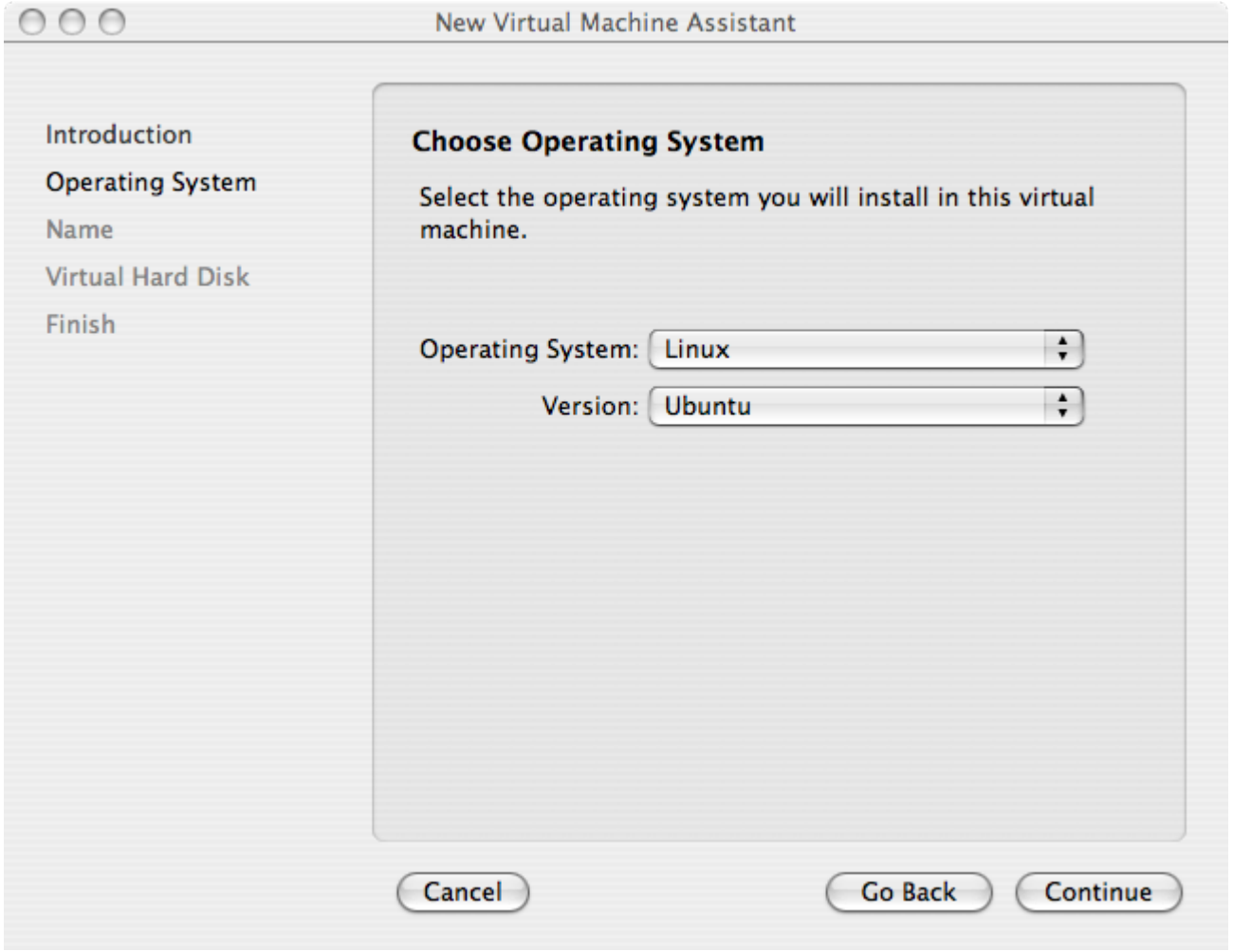
01_Virtual_Machine_Library.png



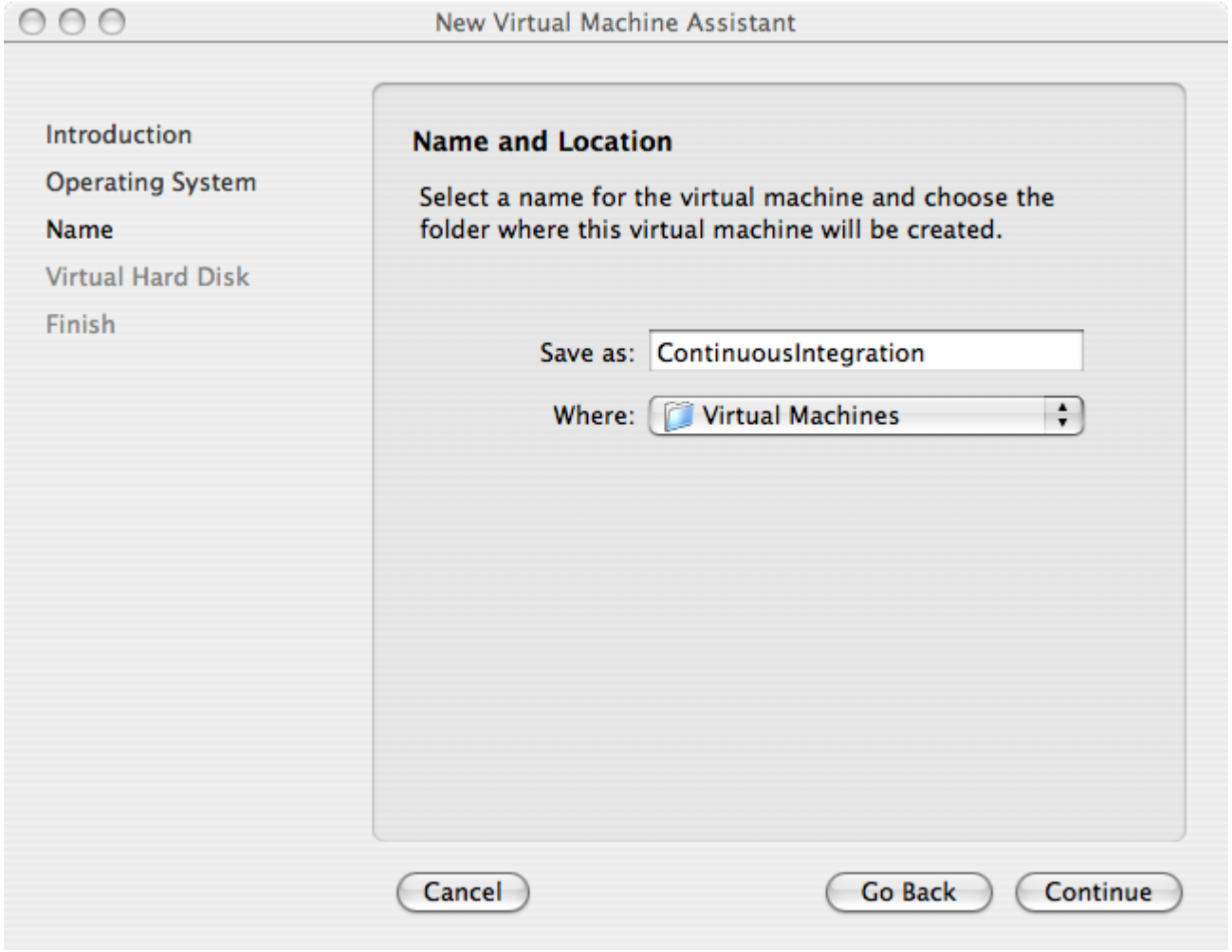
02_Create_New_Virtual_Machine.png



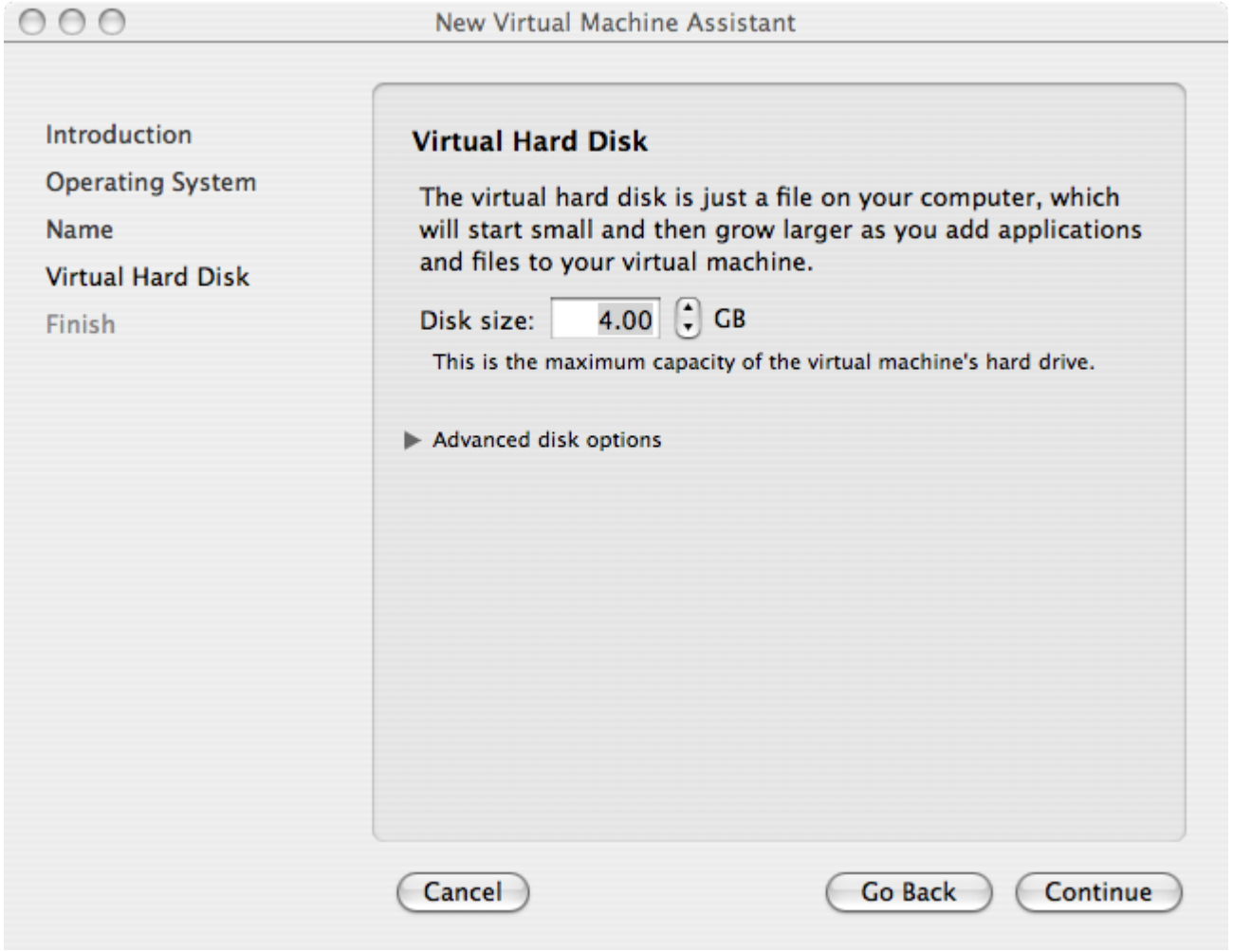
03_Choose_Operating_System.png



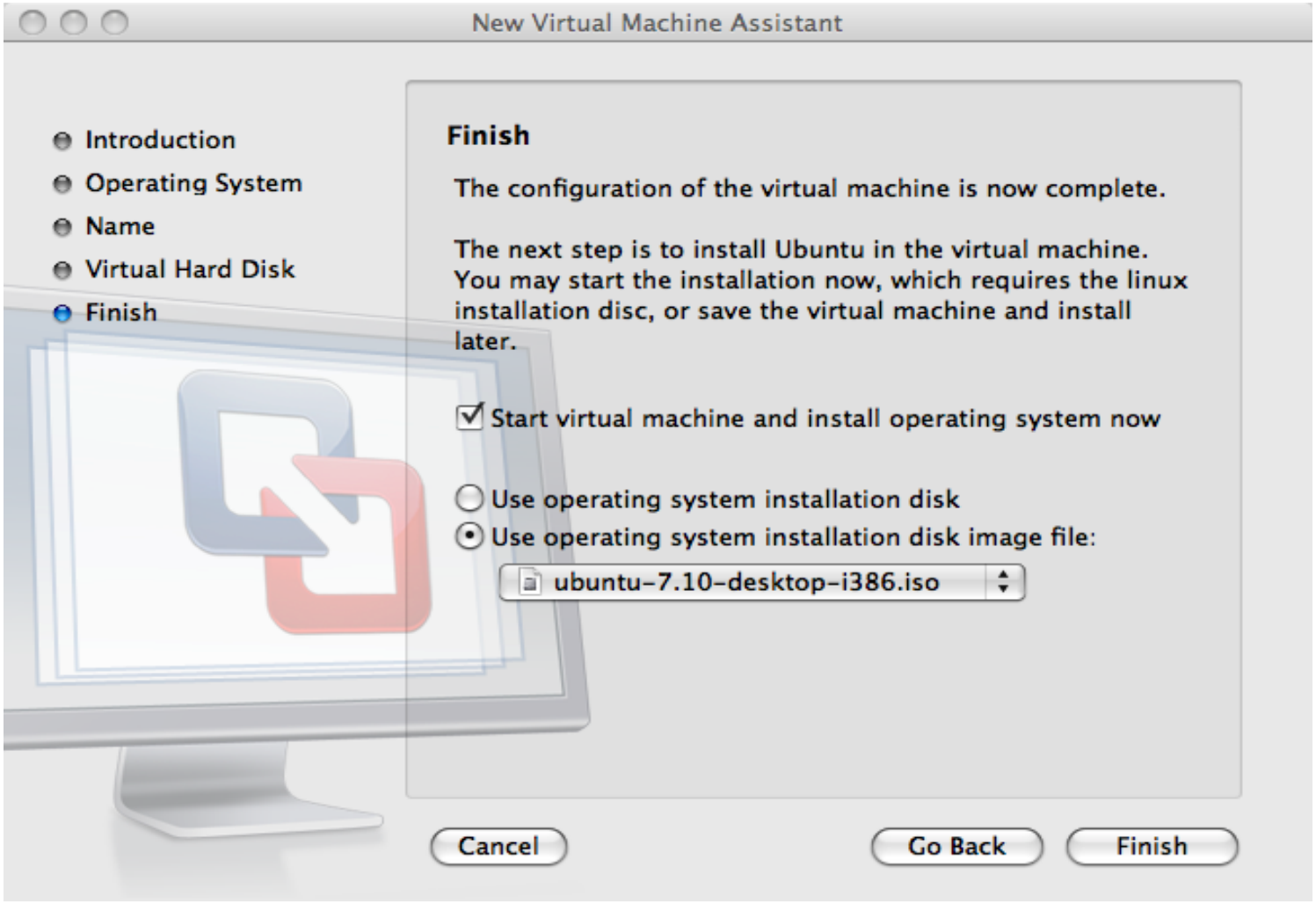
04_Name_and_Location.png



05_Virtual_Hard_Disk.png

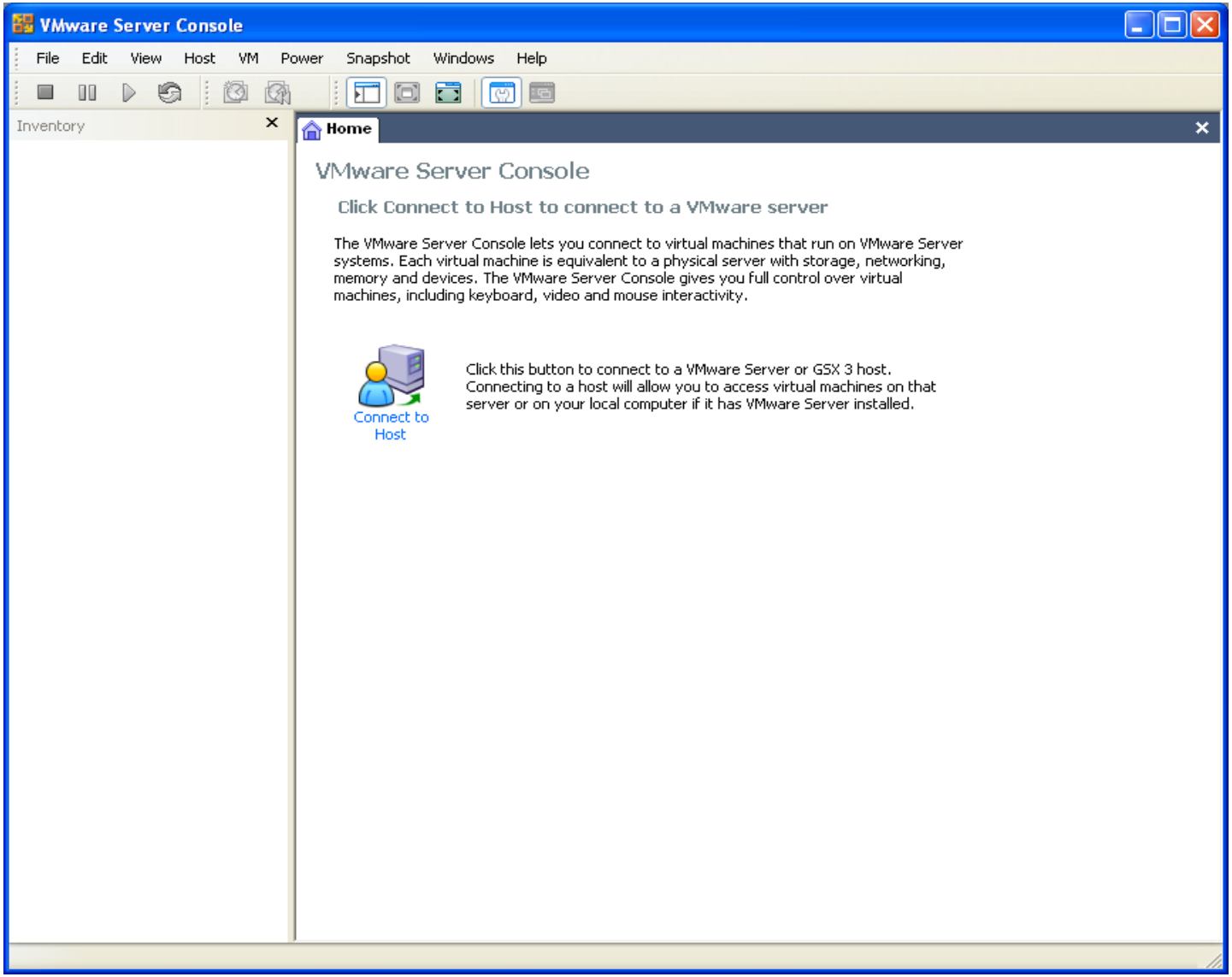


06_Finish.png

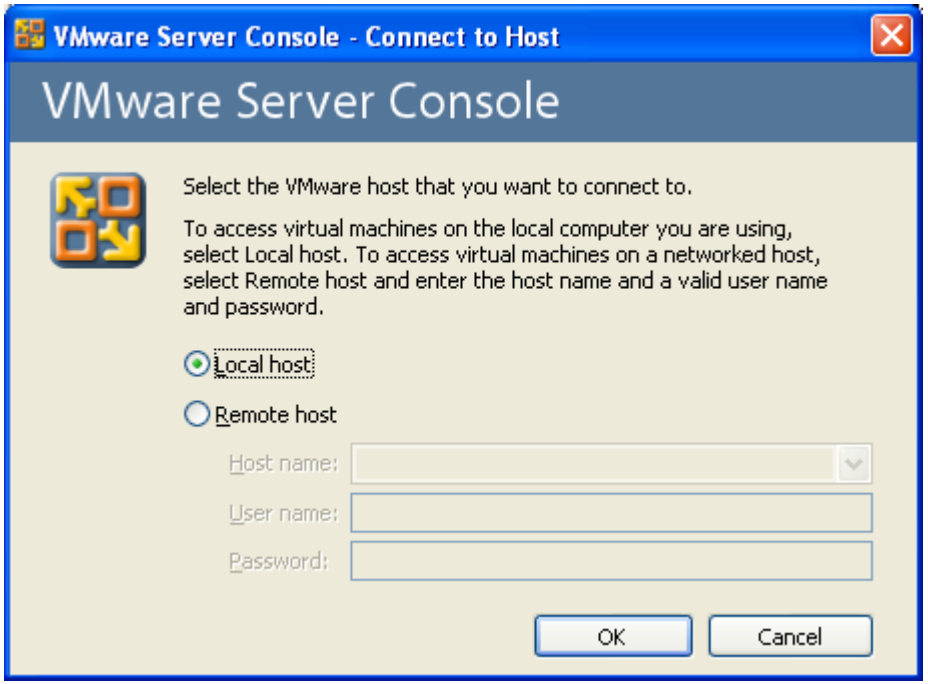


VMware Win Setup: /presentation /screenshots /01b_win_vmware_server_screenshots

01_VMware_Server_Console.PNG

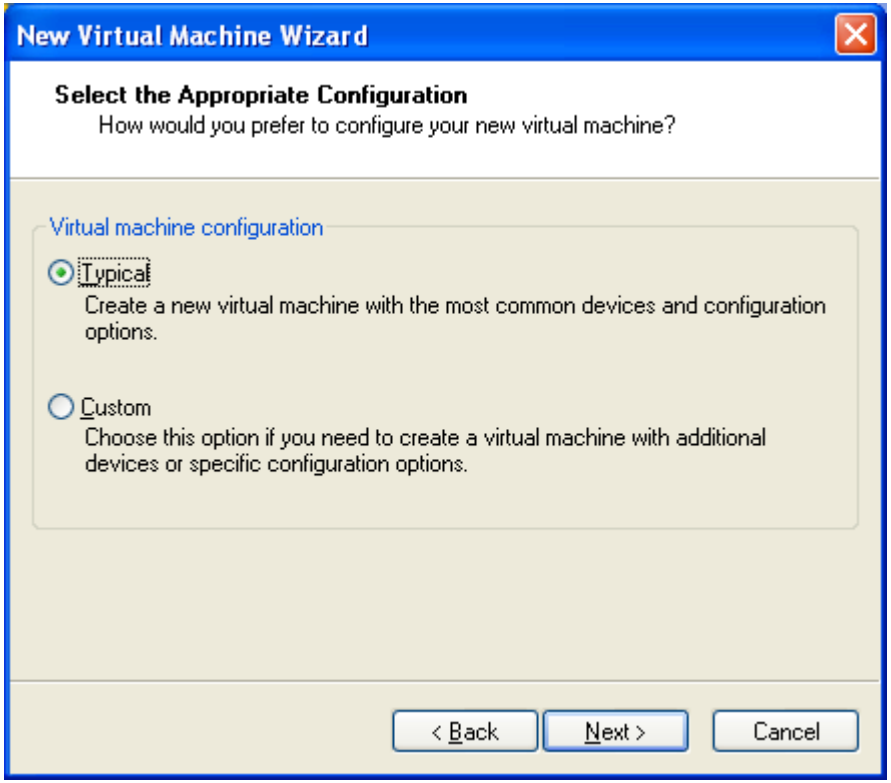


02_Connect_To_Host.PNG

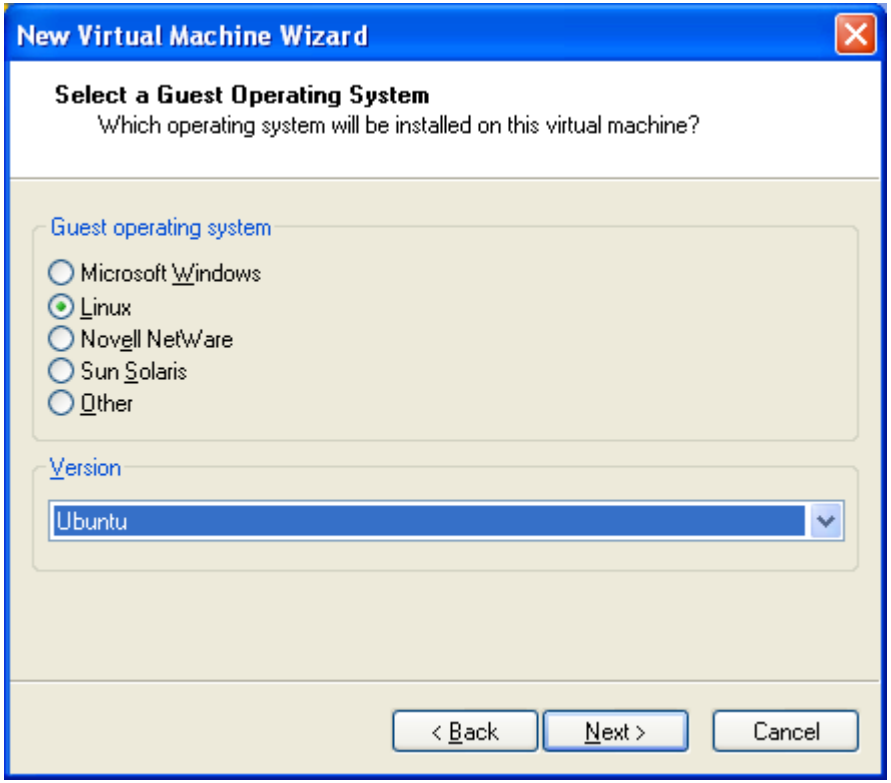


03_New_Virtual_Machine.PNG

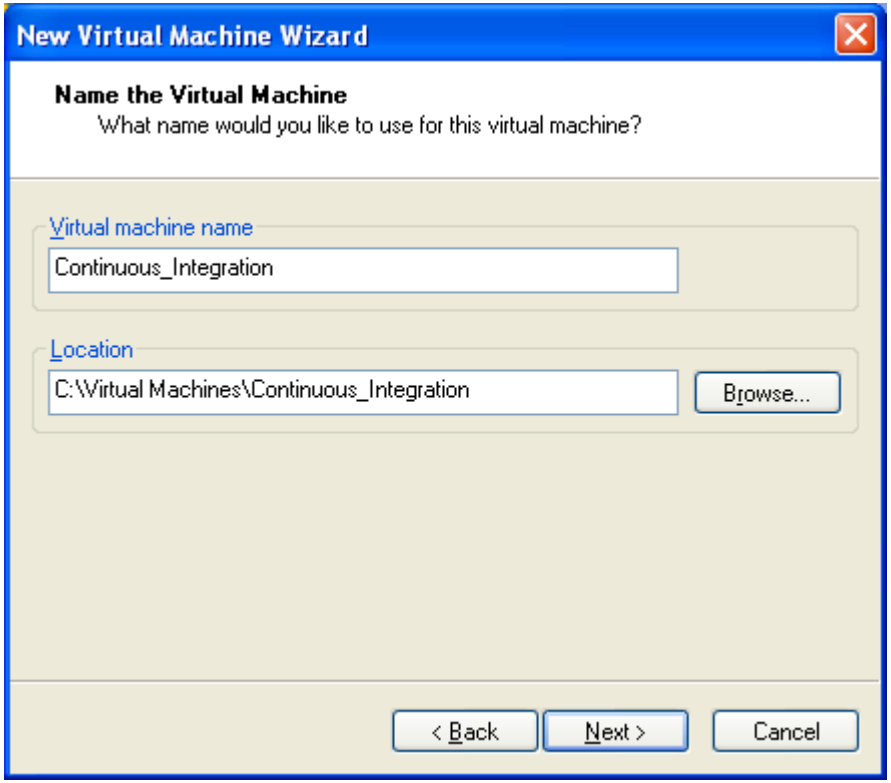
04_Virtual_Machine_Configuration.PNG



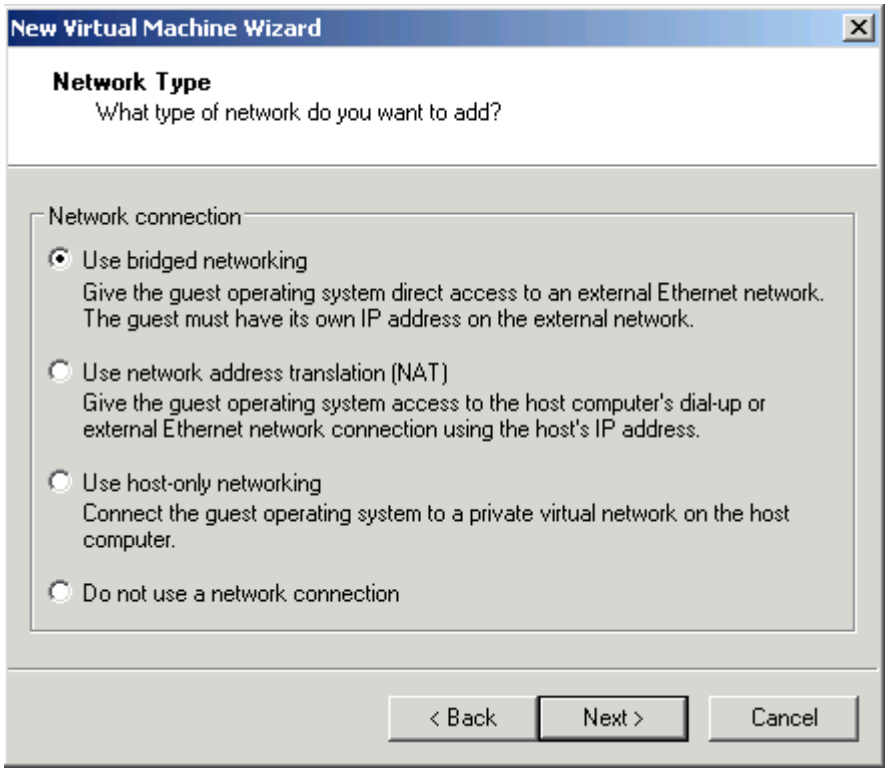
05_Select_a_Guest_Operating_System.PNG



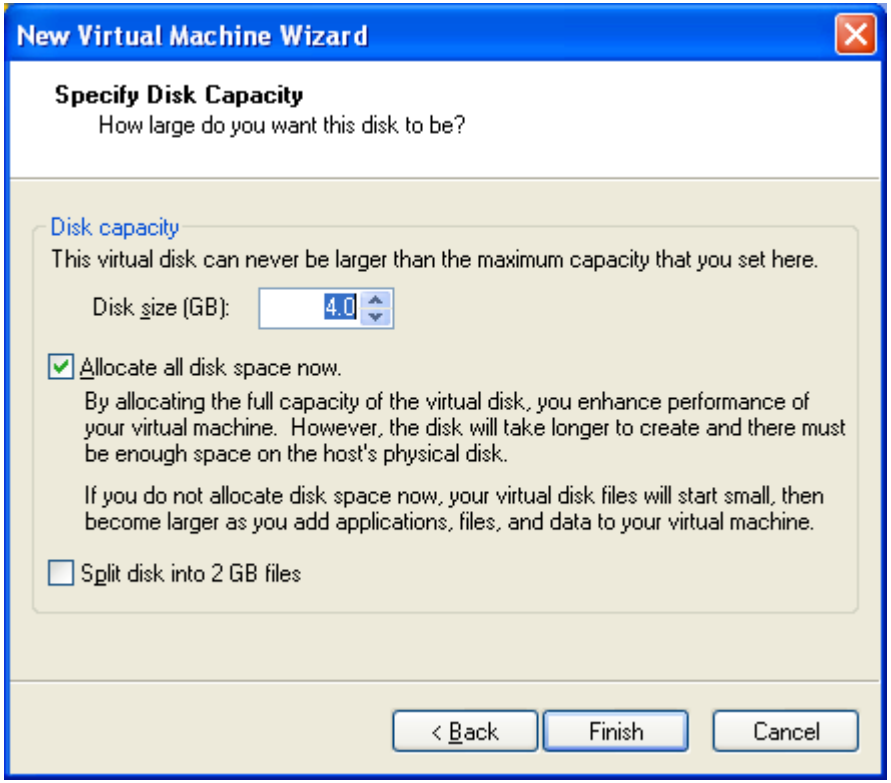
06_Name_the_Virtual_Machine.PNG



07_Network_Type.PNG



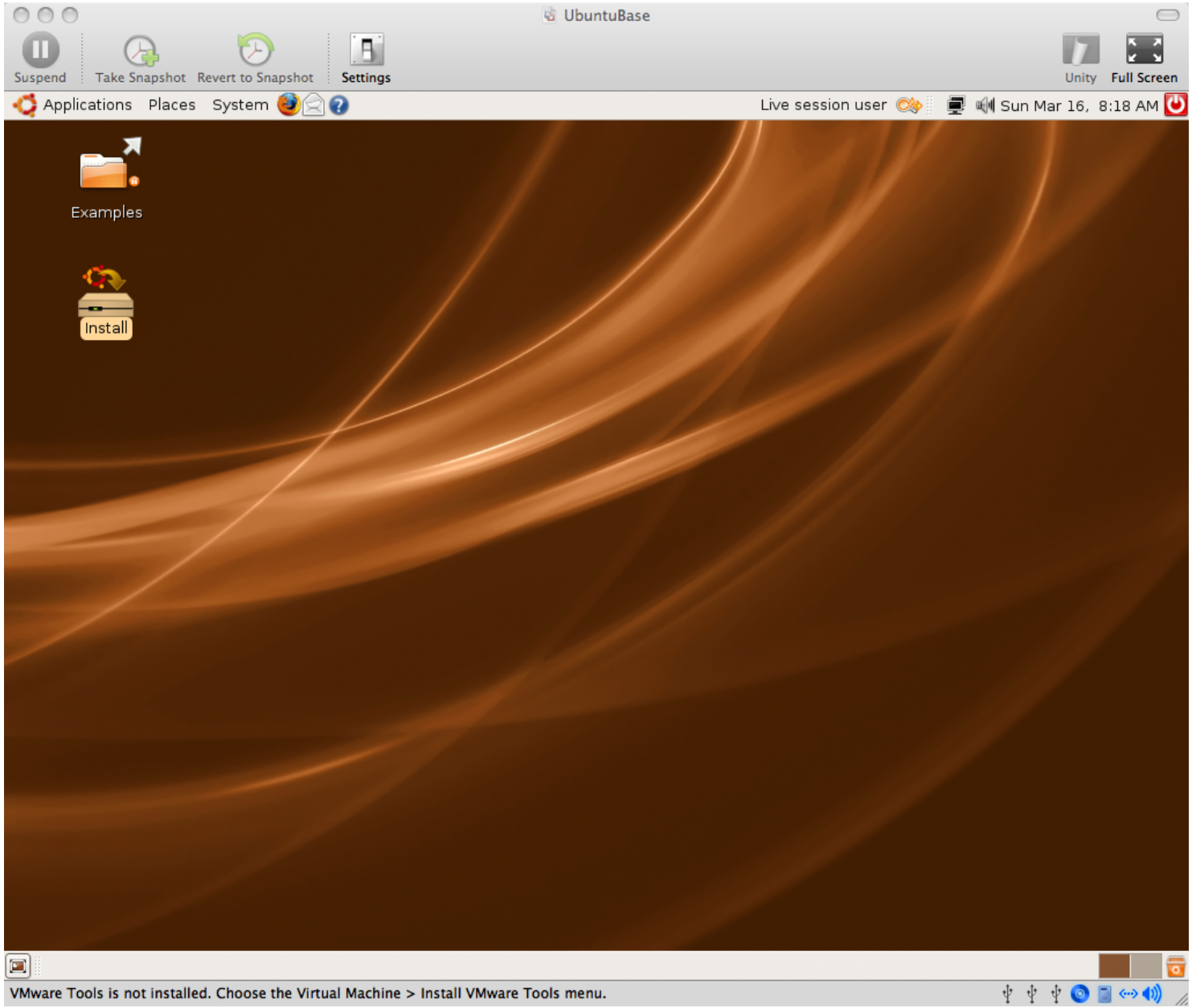
08_Specify_Disk_Capacity.PNG



Mac/Win Ubuntu VM Setup:
/presentation /screenshots /02_ubuntu_vm_ setup_screenshots

01_Start_or_Install_Ubuntu.png

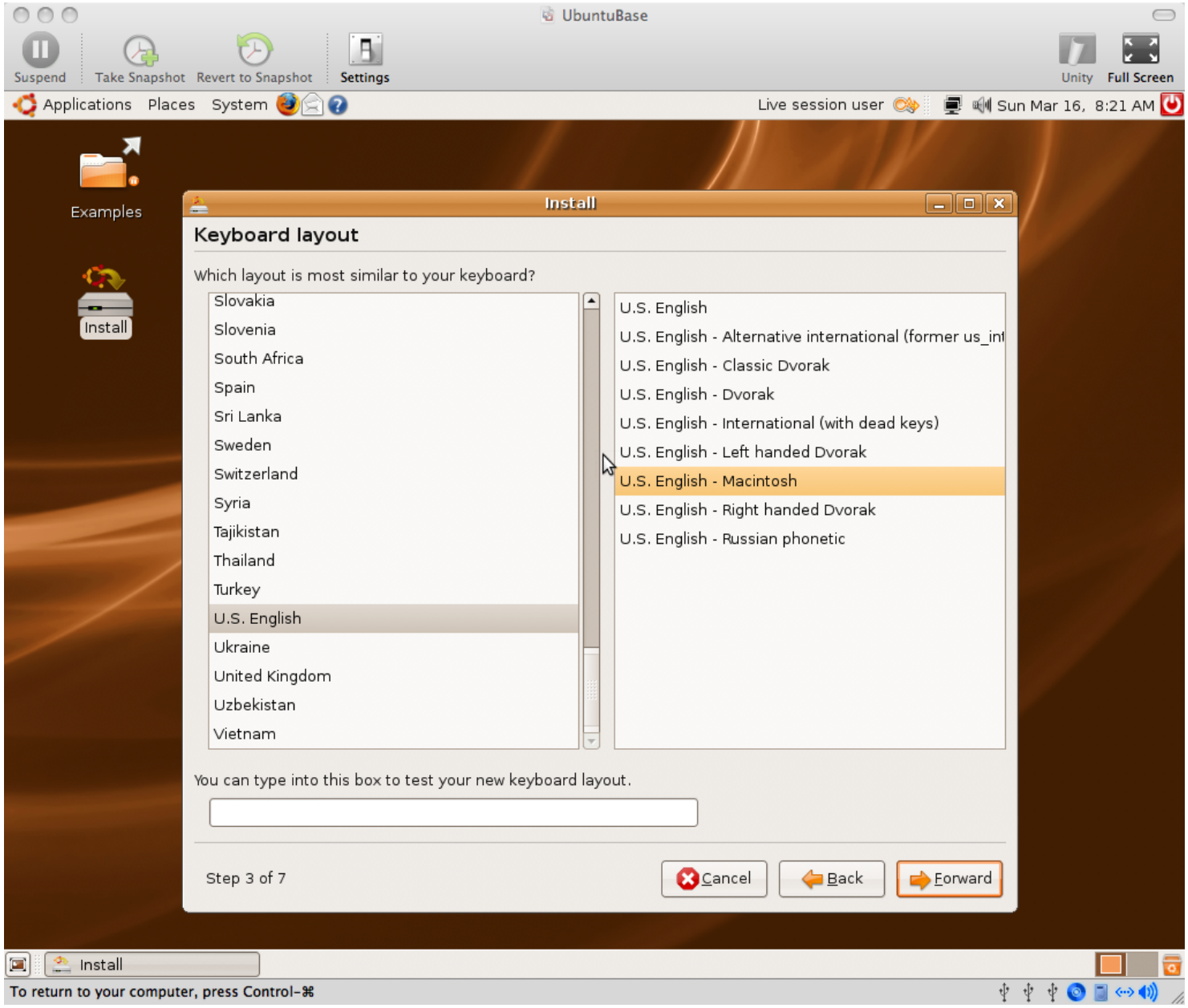
02_Install_Icon.png



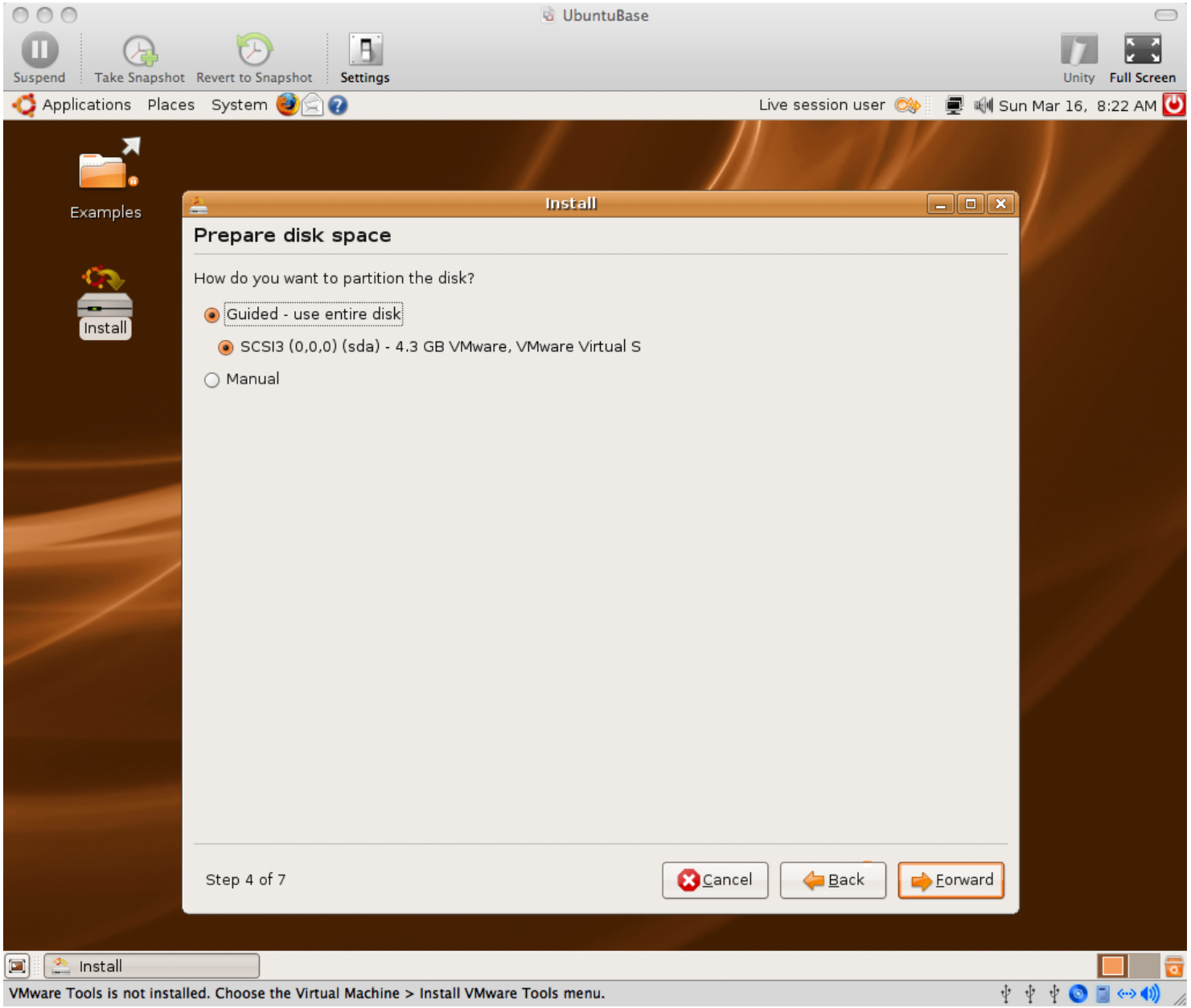
03_Welcome.png

04_Where_are_you.png

05_Keyboard_Layout.png

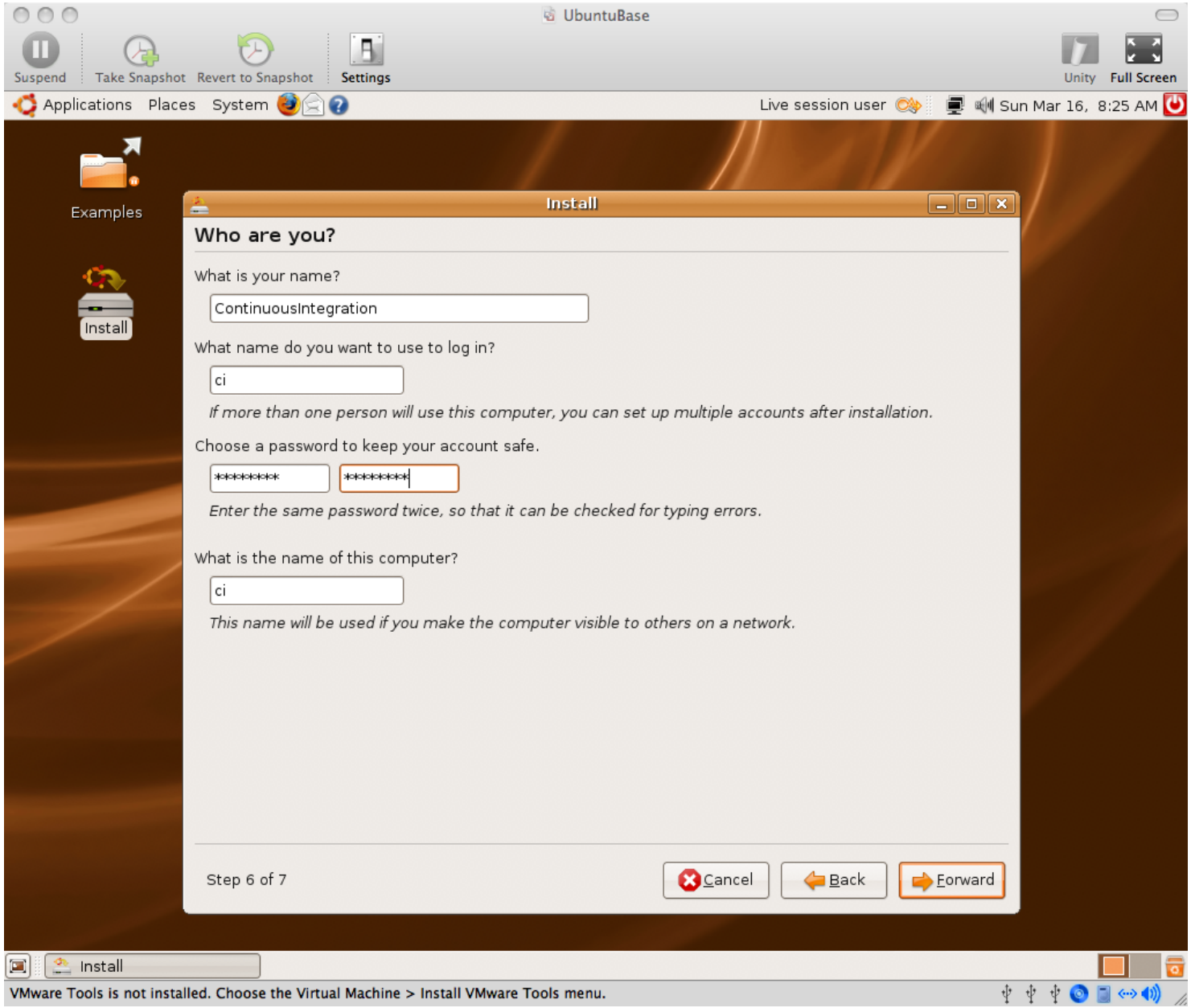


06_Prepare_disk_space.png

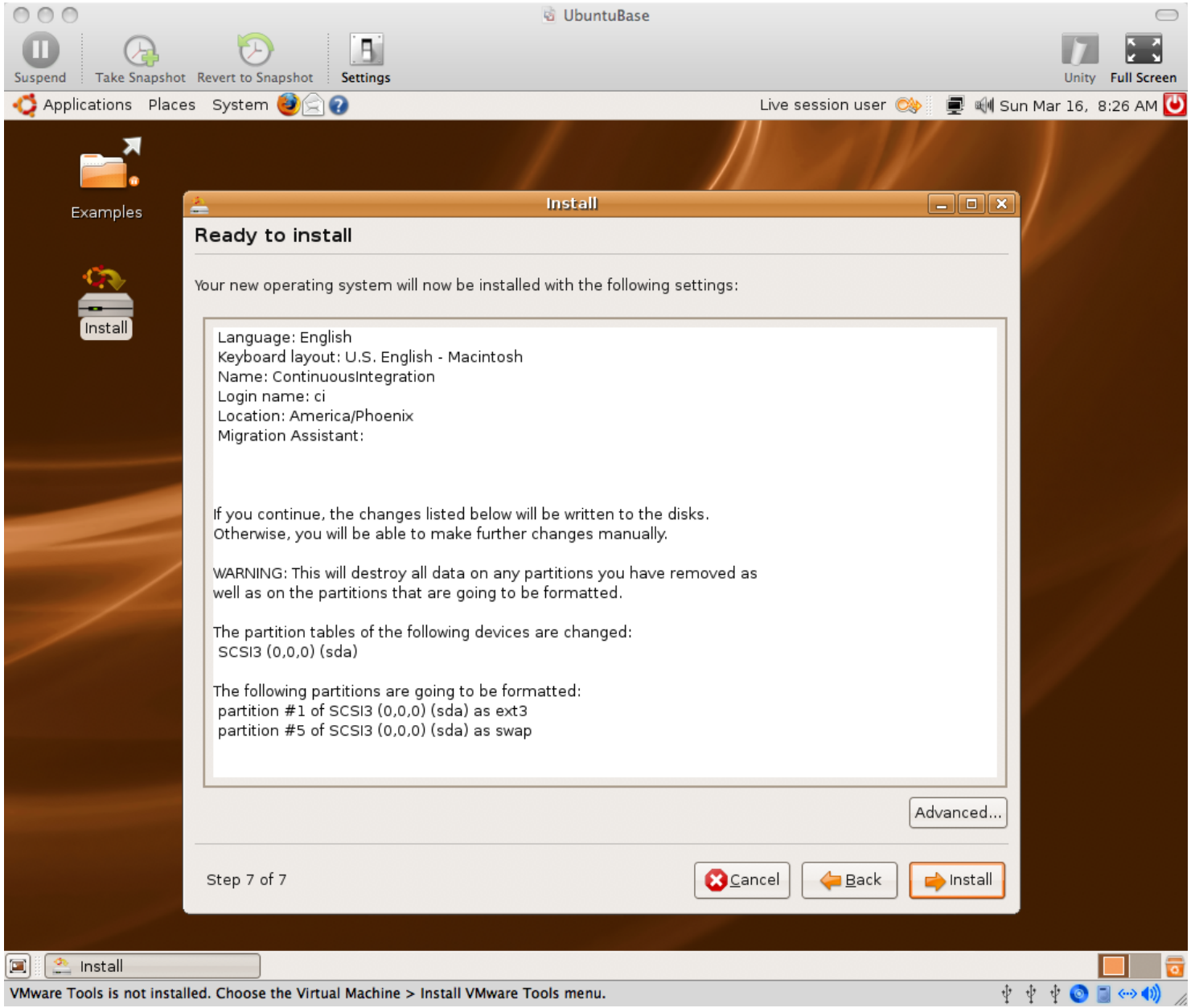


07_Guided_Partitioning.png

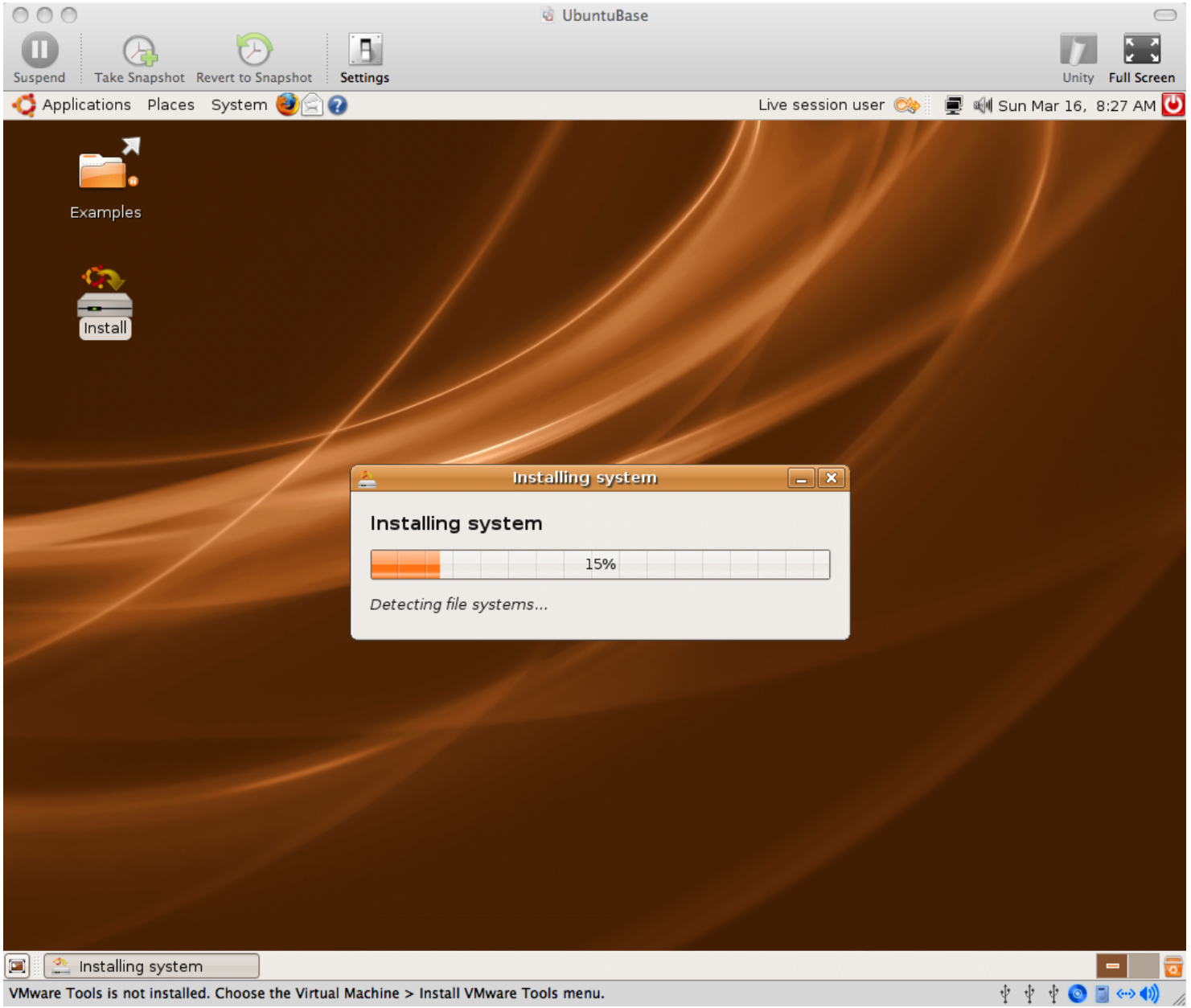
08_Who_are_you.png



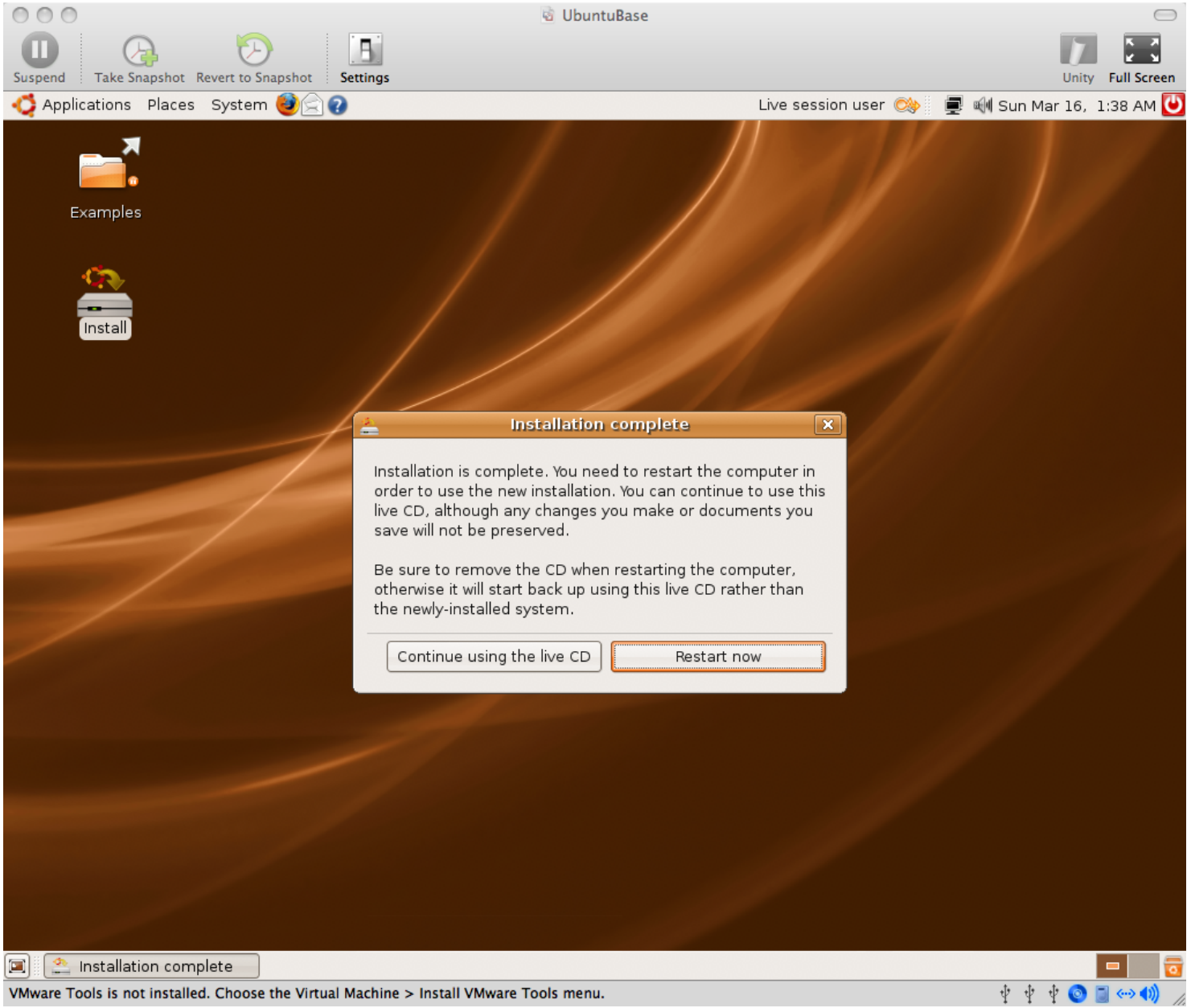
09_Ready_to_install.png



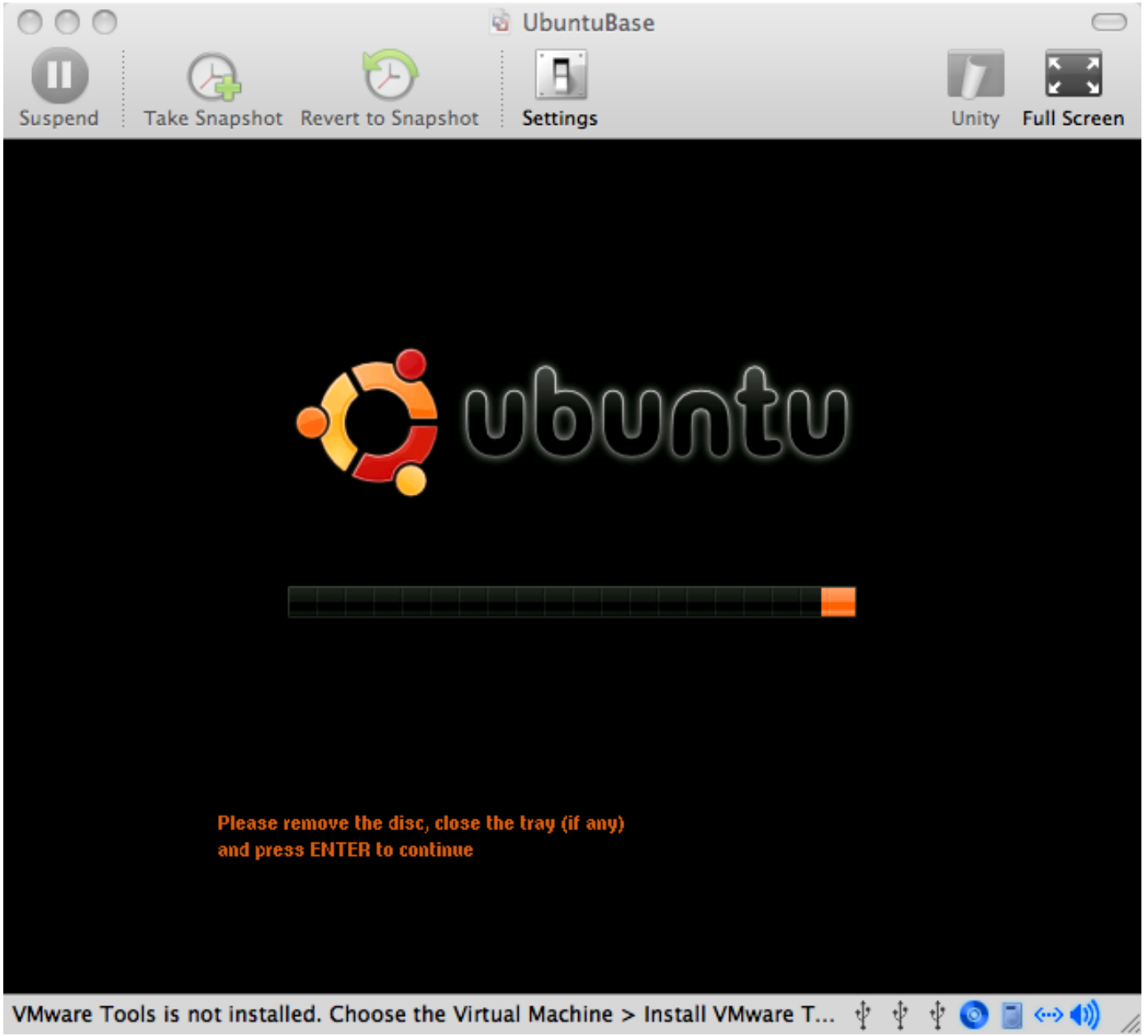
10_Installing_system.png



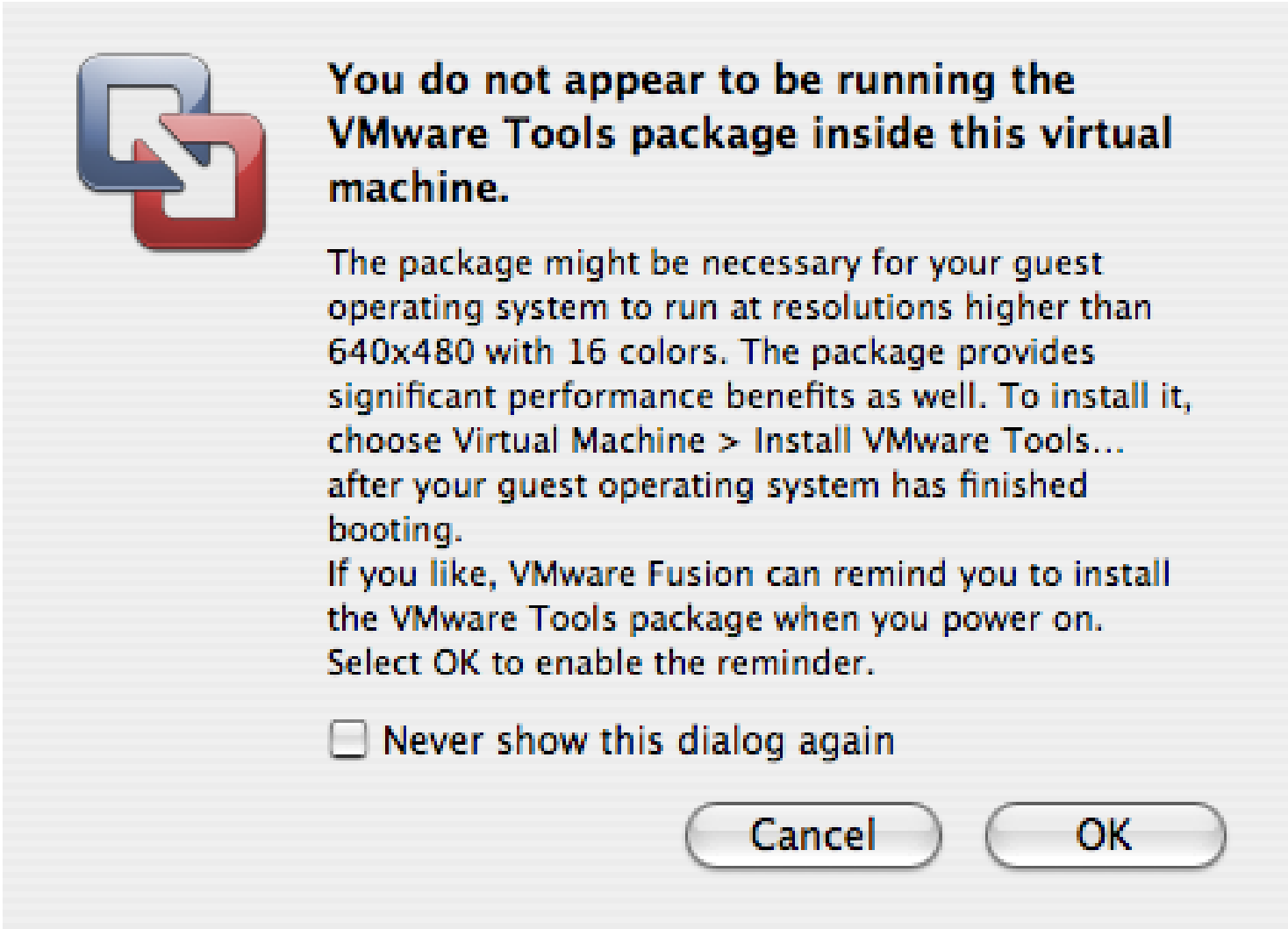
11_Installation_complete.png



12_Please_Remove_The_Disk.png



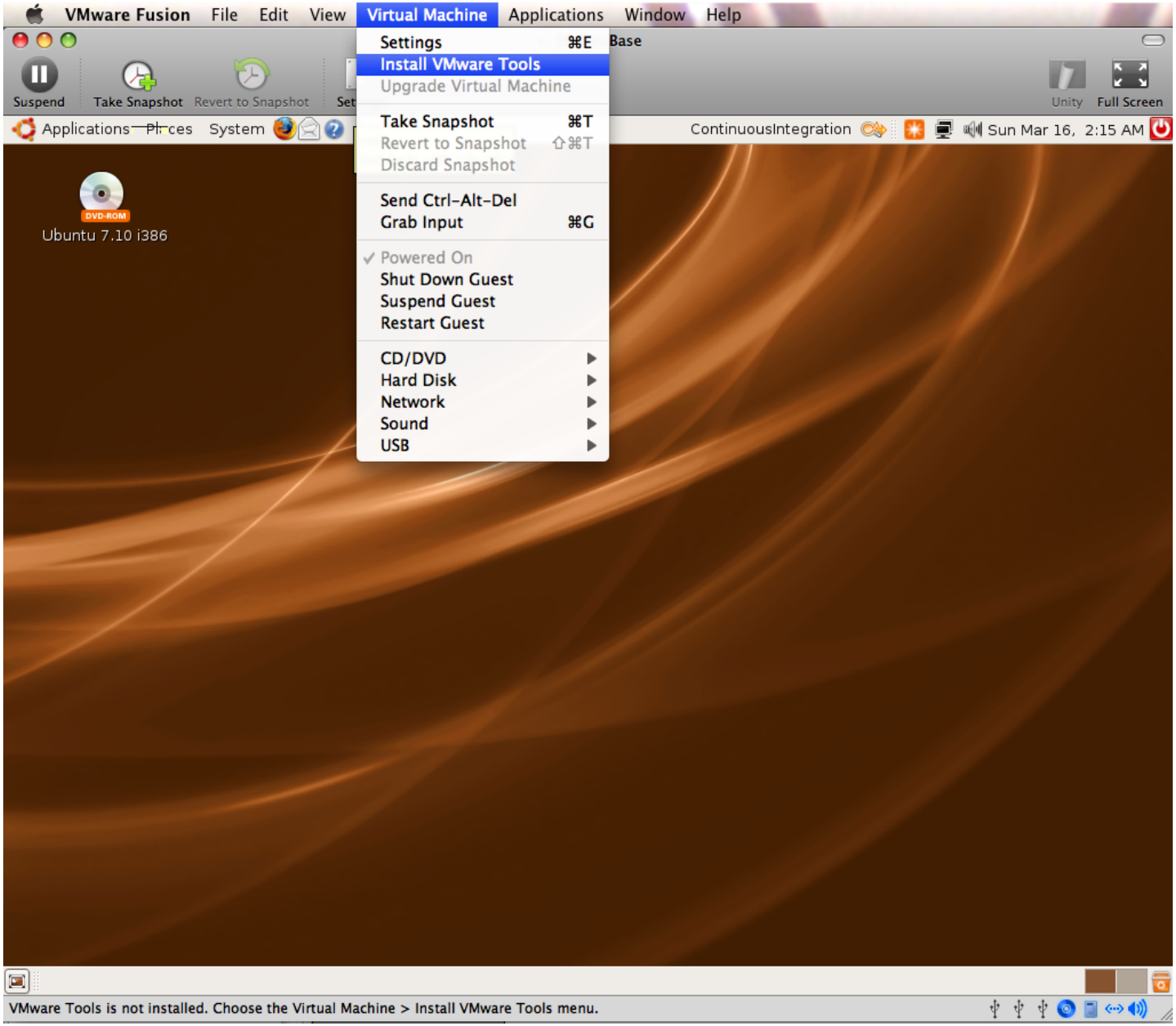
13_VMware_Tools_reminder.png



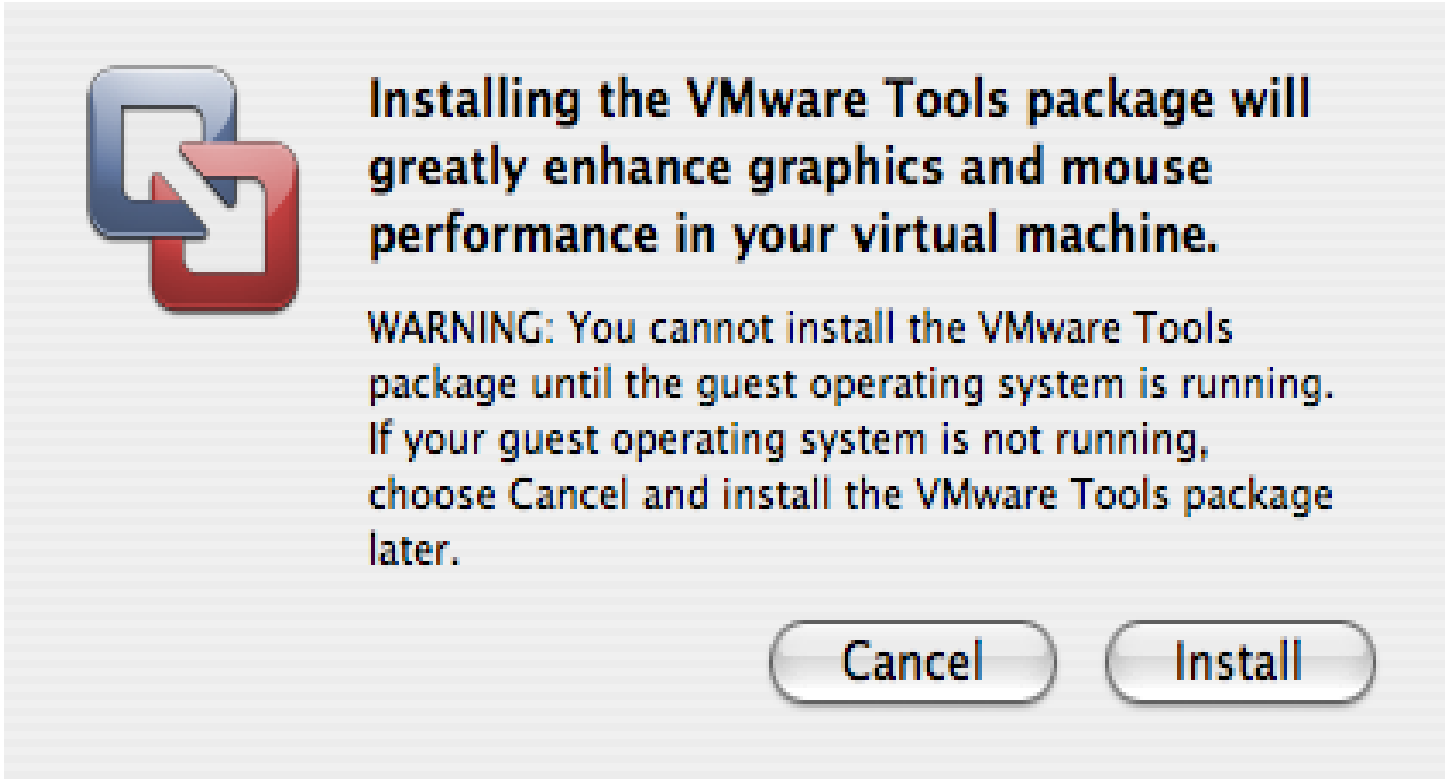
14_Login.png


UbuntuBase
Suspend
Take Snapshot
Revert to Snapshot
Settings
Unity
Full Screen
ubuntu
Username:
ci
VMware Tools is not installed. Choose the Virtual Machine > Install VMware Tools menu.

15_Virtual_Machine_Menu_Install_VMware_Tools.png



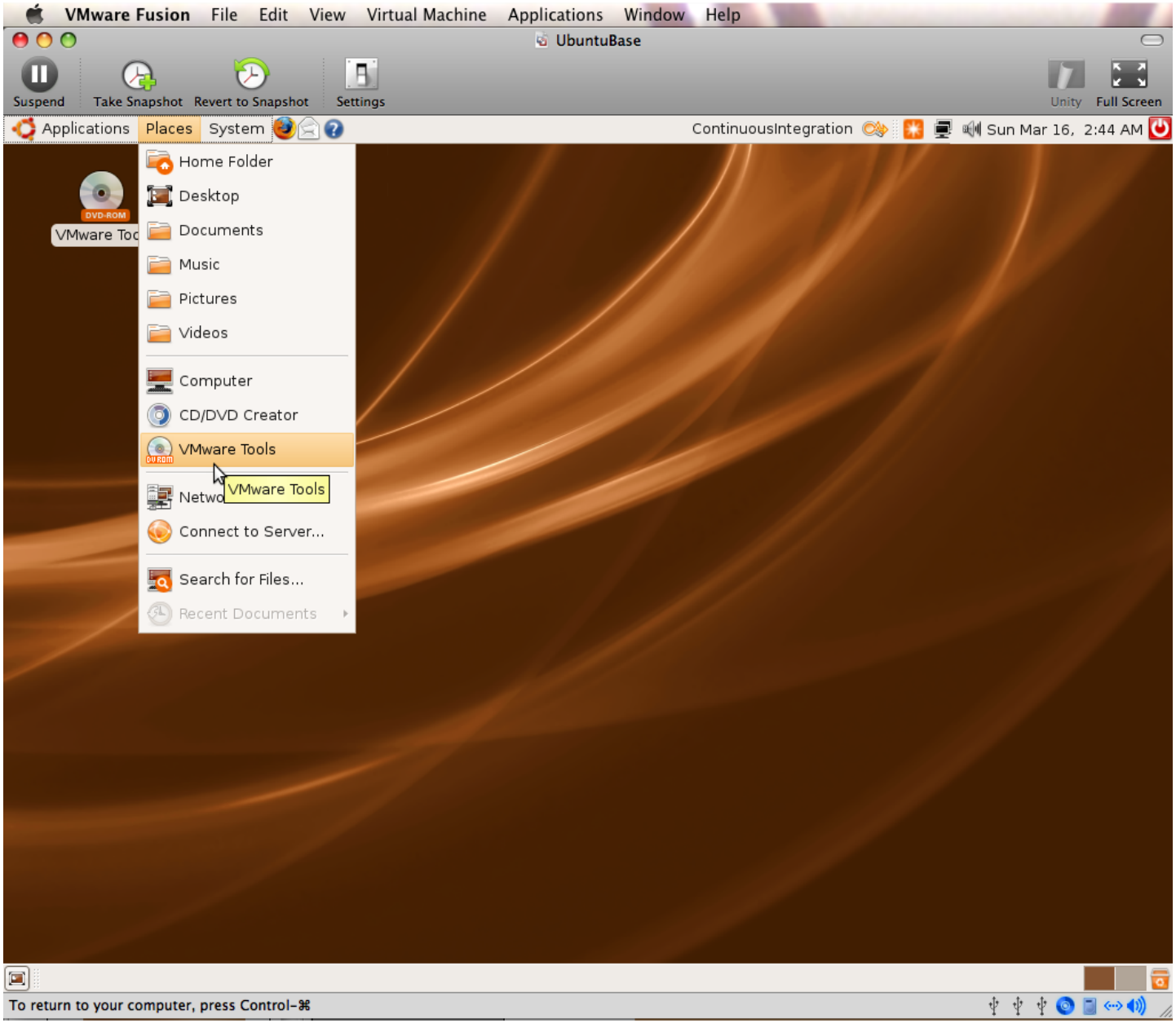
16_Installing_the_VMware_Tools_package.png



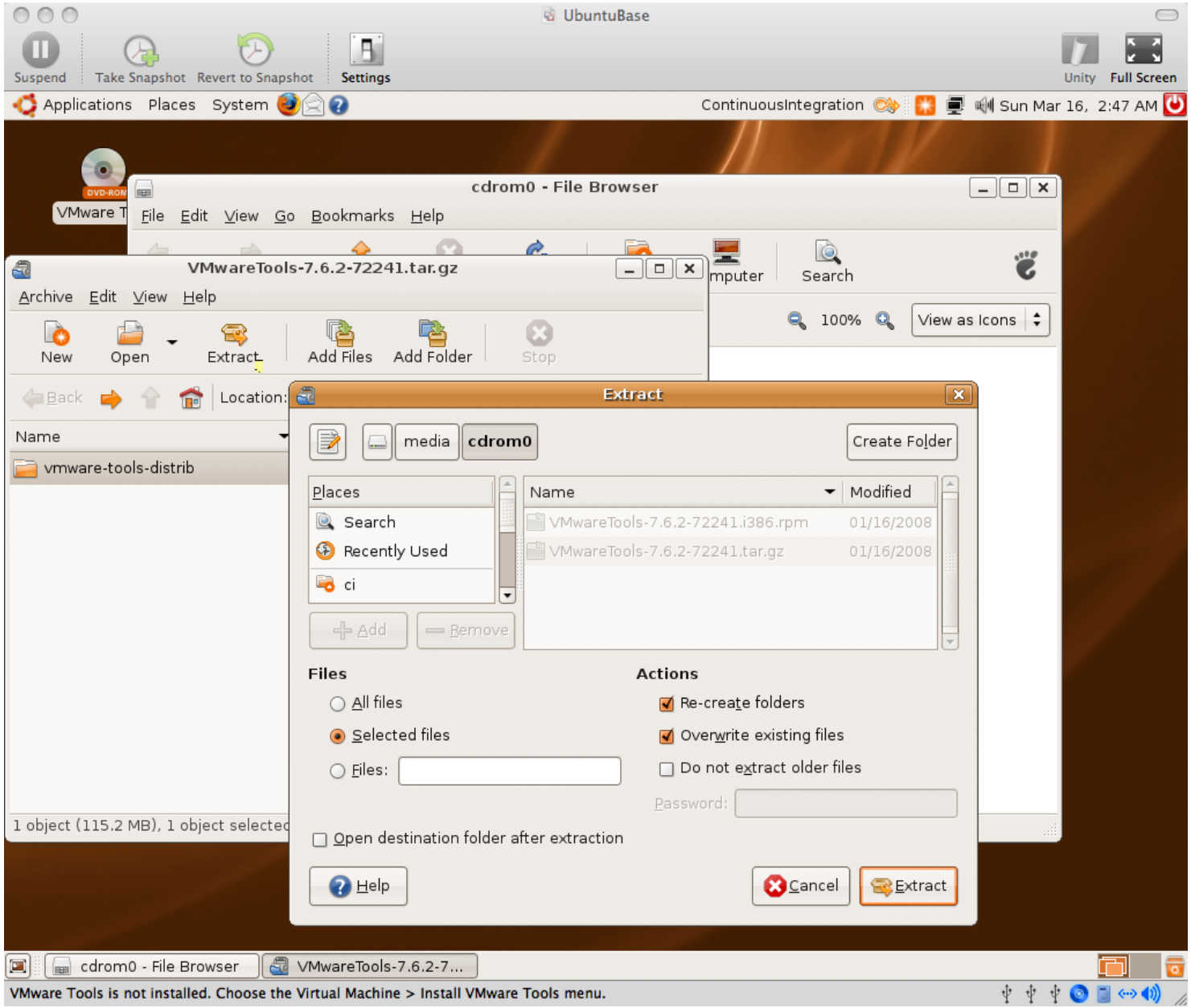
At this point, you may need to reboot (System -> Quit -> Restart) in order for the VMware Tools CD image to mount correctly, especially if you already have the Ubuntu ISO image mounted.

In fact, with Leopard/ VMWare Fusion 1.1.1/Ubuntu 7.10, the VMWare Tools image was corrupt until VM reboot. This didn't happen with Tiger/VMWare Fusion Beta/Ubuntu 7.04

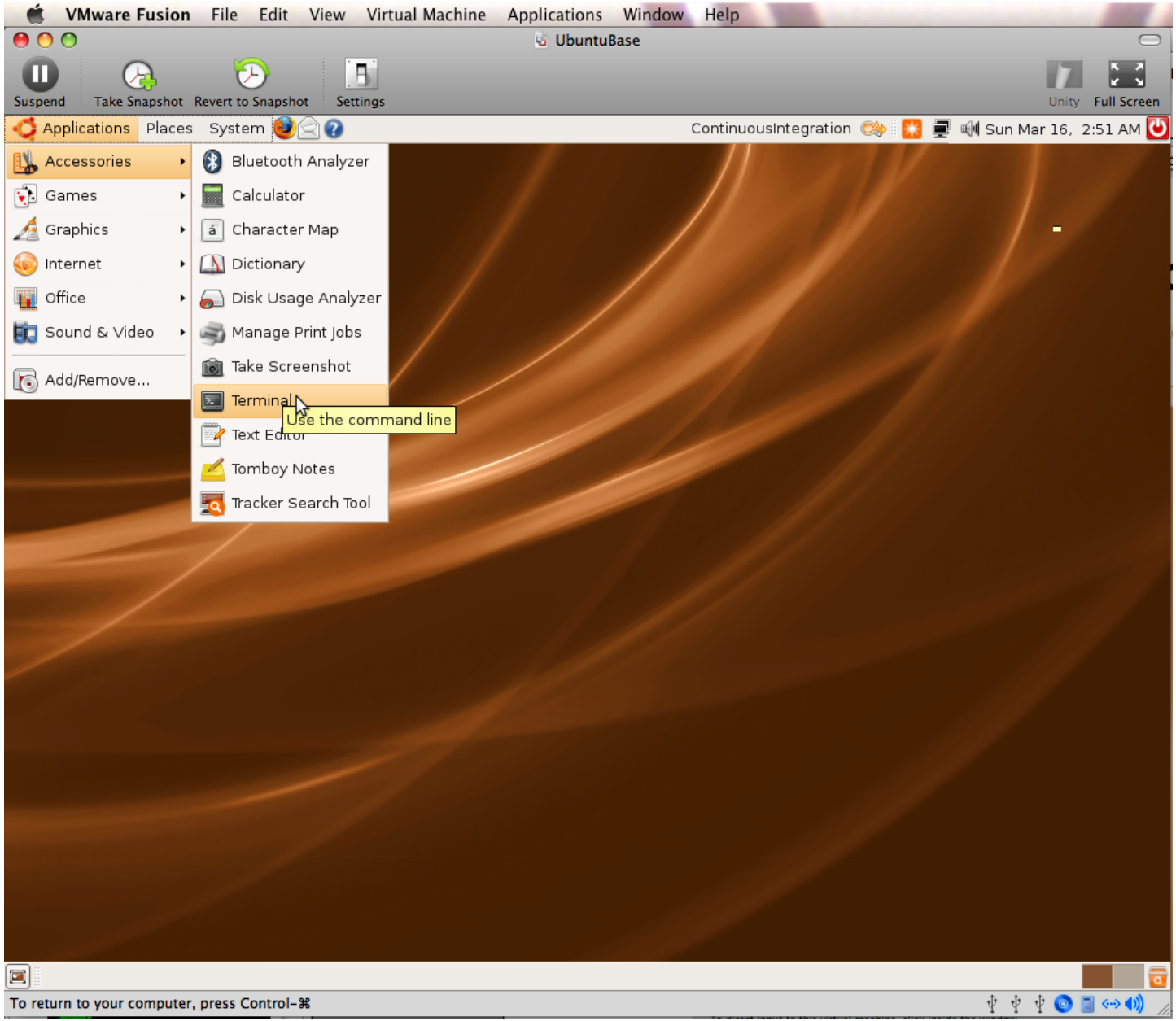
17_Open_VMWare_Tools_Image.png



18_Extract_VMware_Tools.png



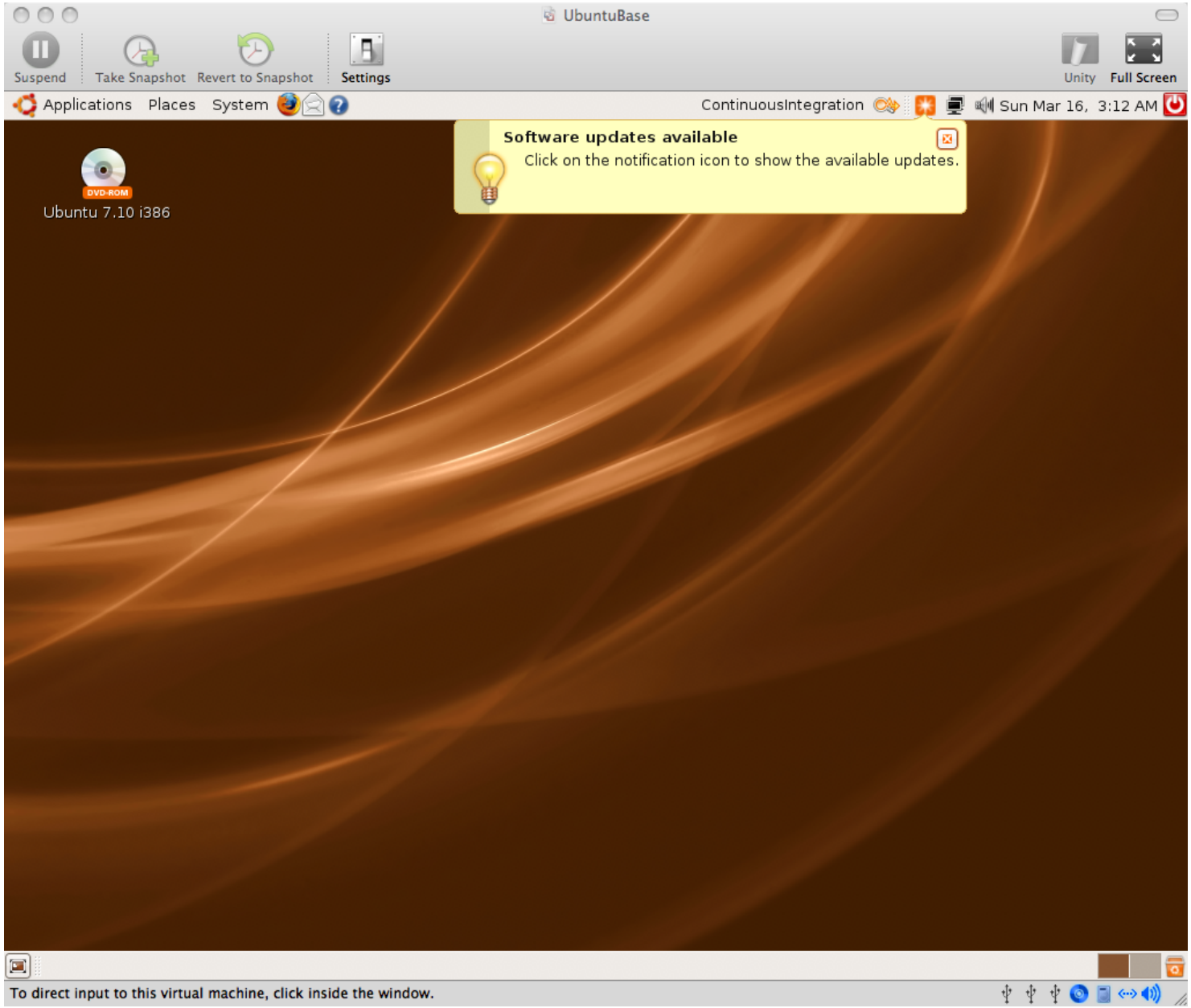
19_Applications_Accessories_Terminal.png



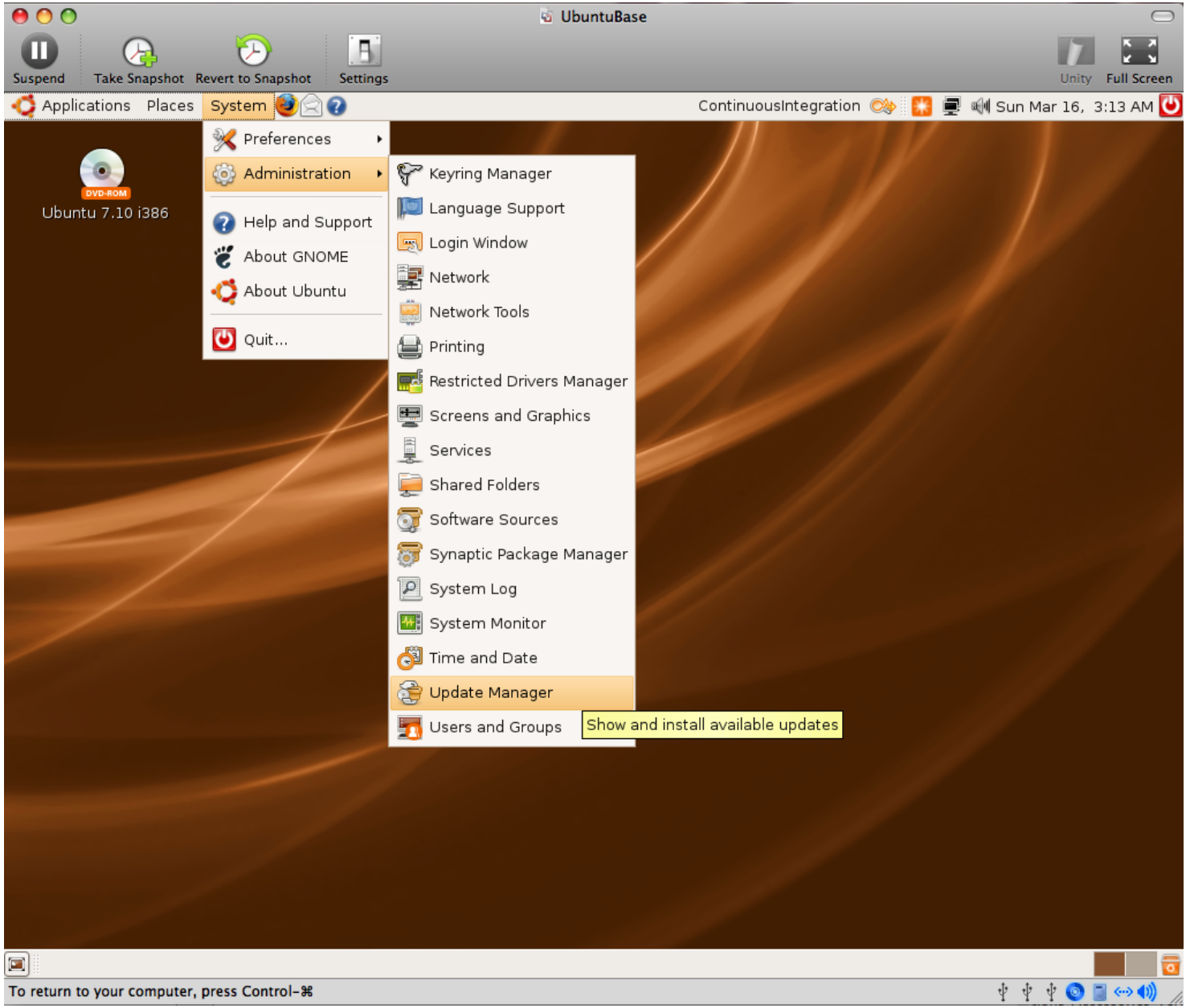
Install VMware Tools (Optional):

```
$ cd
$ tar -zxvf /media/cdrom0/VMwareTools-7.6.2-72241.tar.gz
$ cd ~/vmware-tools-distrib
$ sudo ./vmware-install.pl
# enter password for sudo
# hit enter repeatedly to accept defaults for all prompts, override display size if desired
# reboot (System -> Quit -> Restart)
```

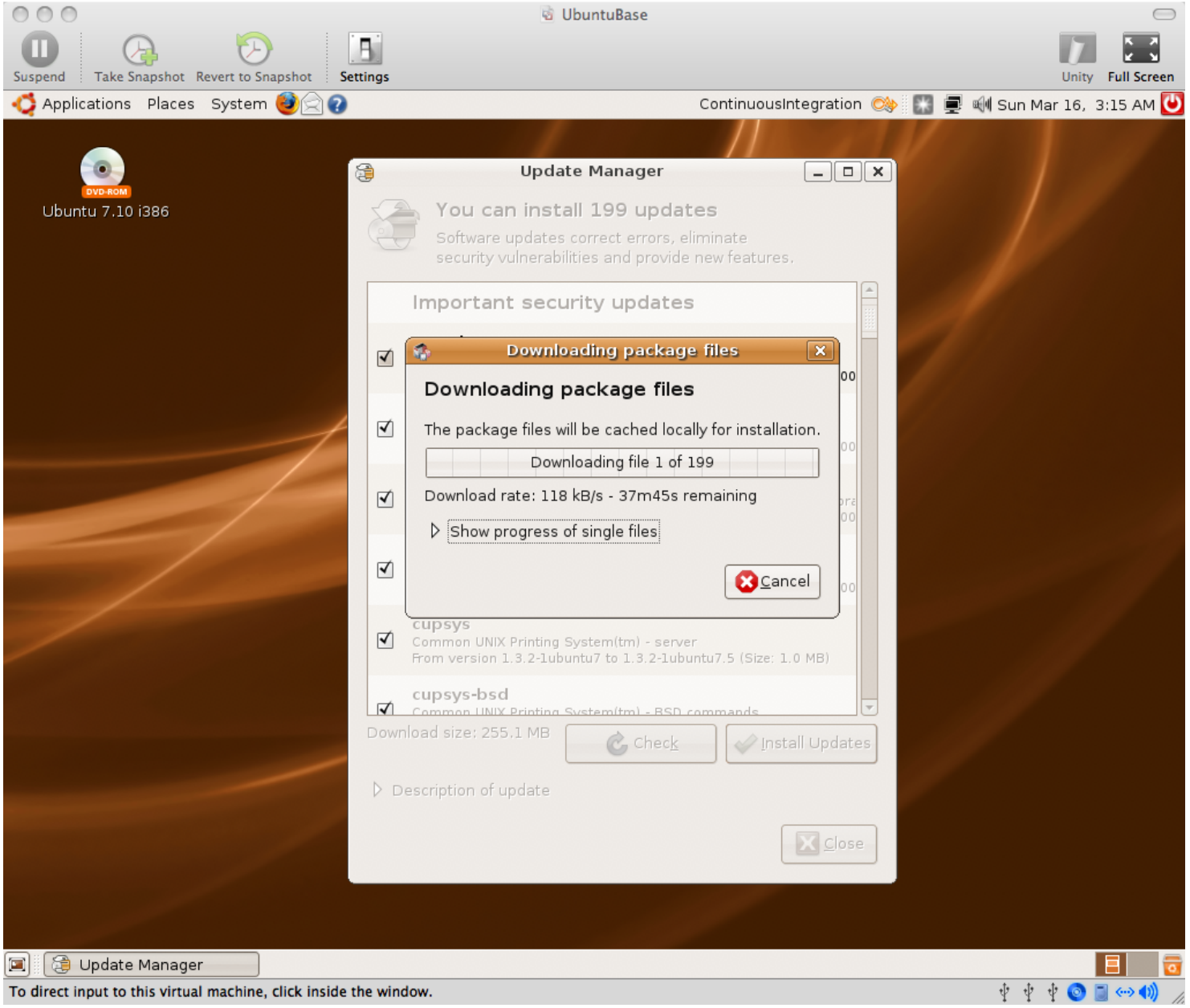
20_Software_Updates_Available.png



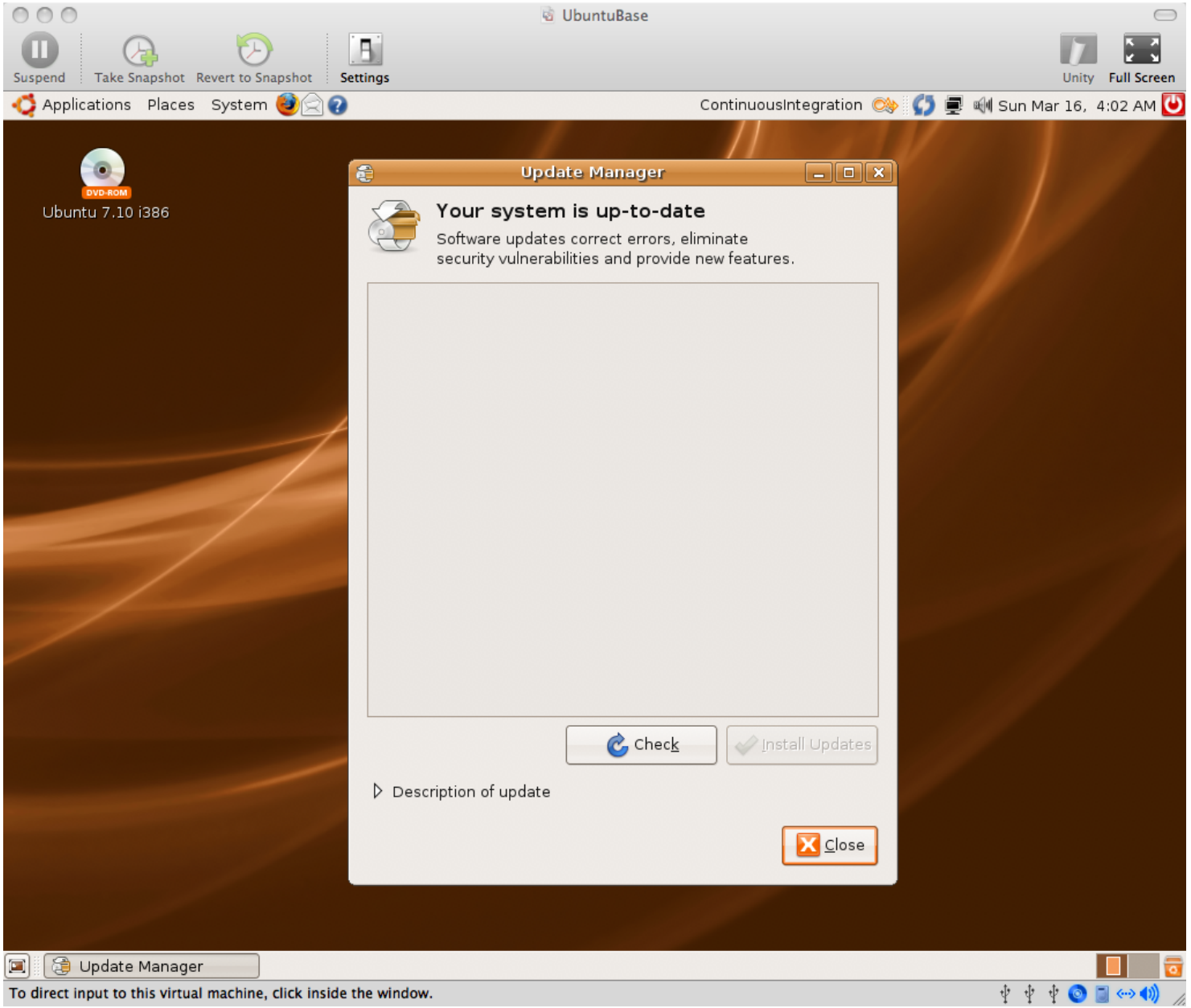
21_Update_Manager_Menu_Item.png



22_Update_Manager_Downloading_Package_Files.png

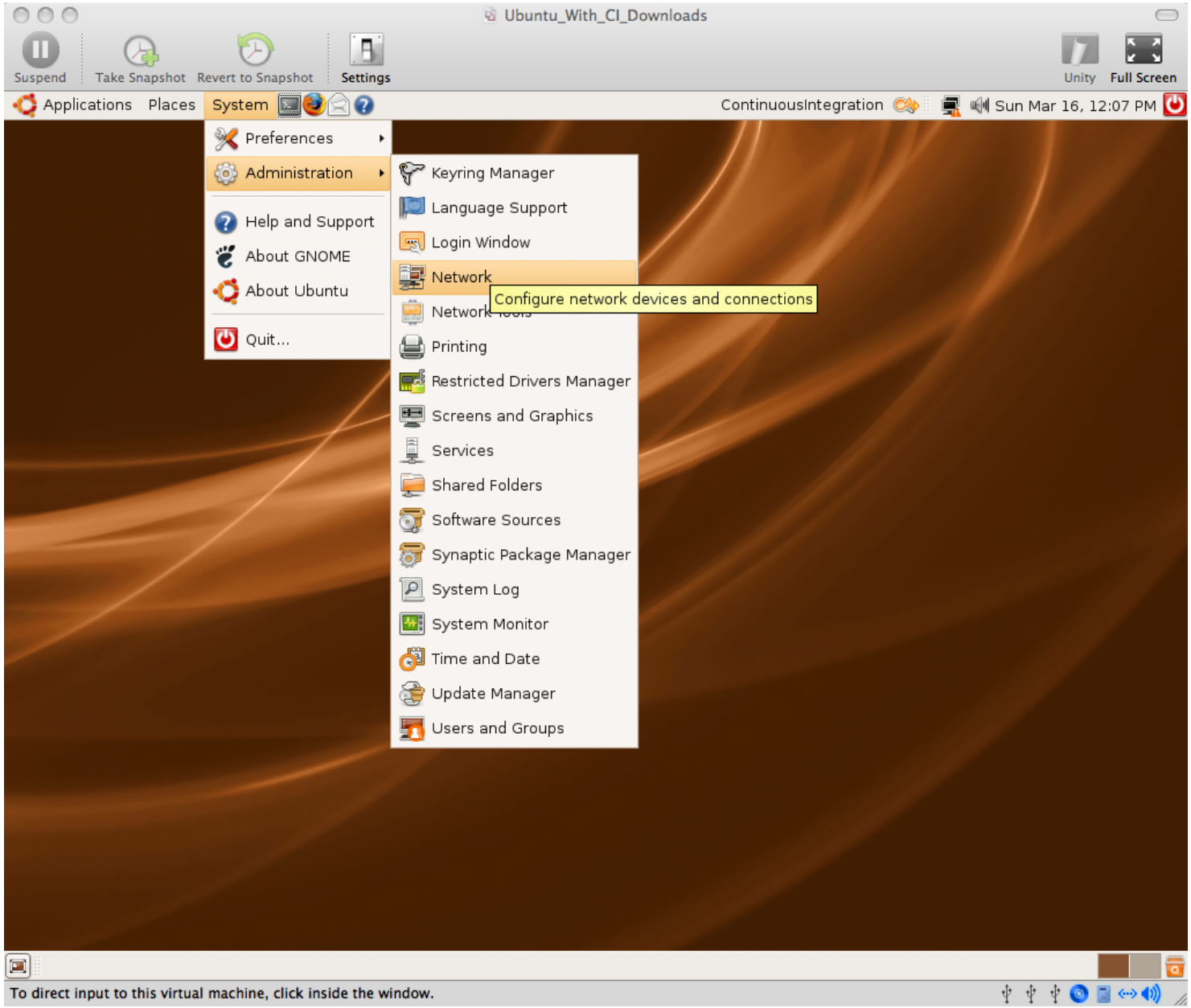


23_Your_System_is_Up_To_Date.png

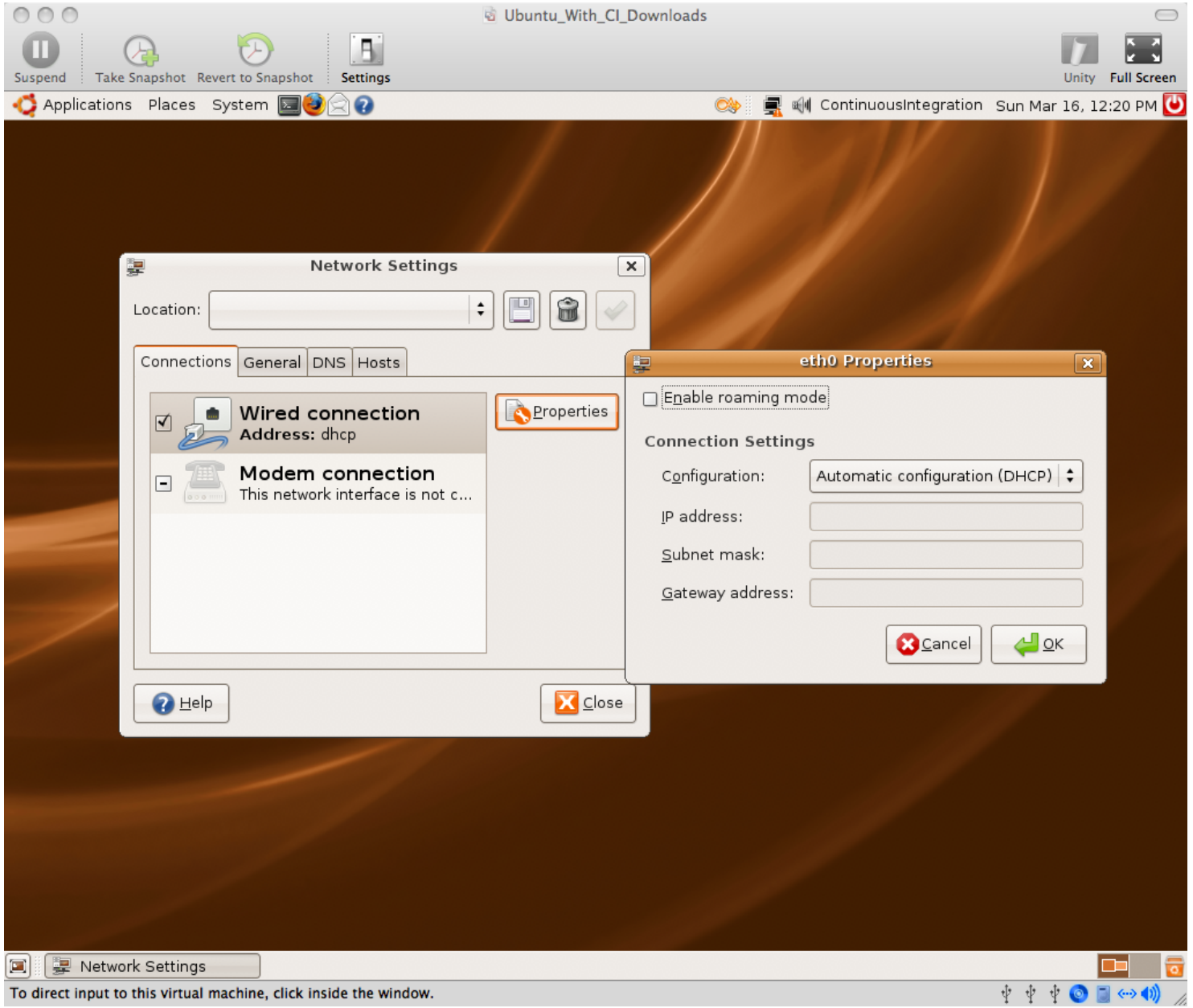


By default on Ubuntu 7.10, the virtual wired network connection was set to “enable roaming mode”. I had to manually disable this and enable DHCP to get network access.

24_Network_Administration.png

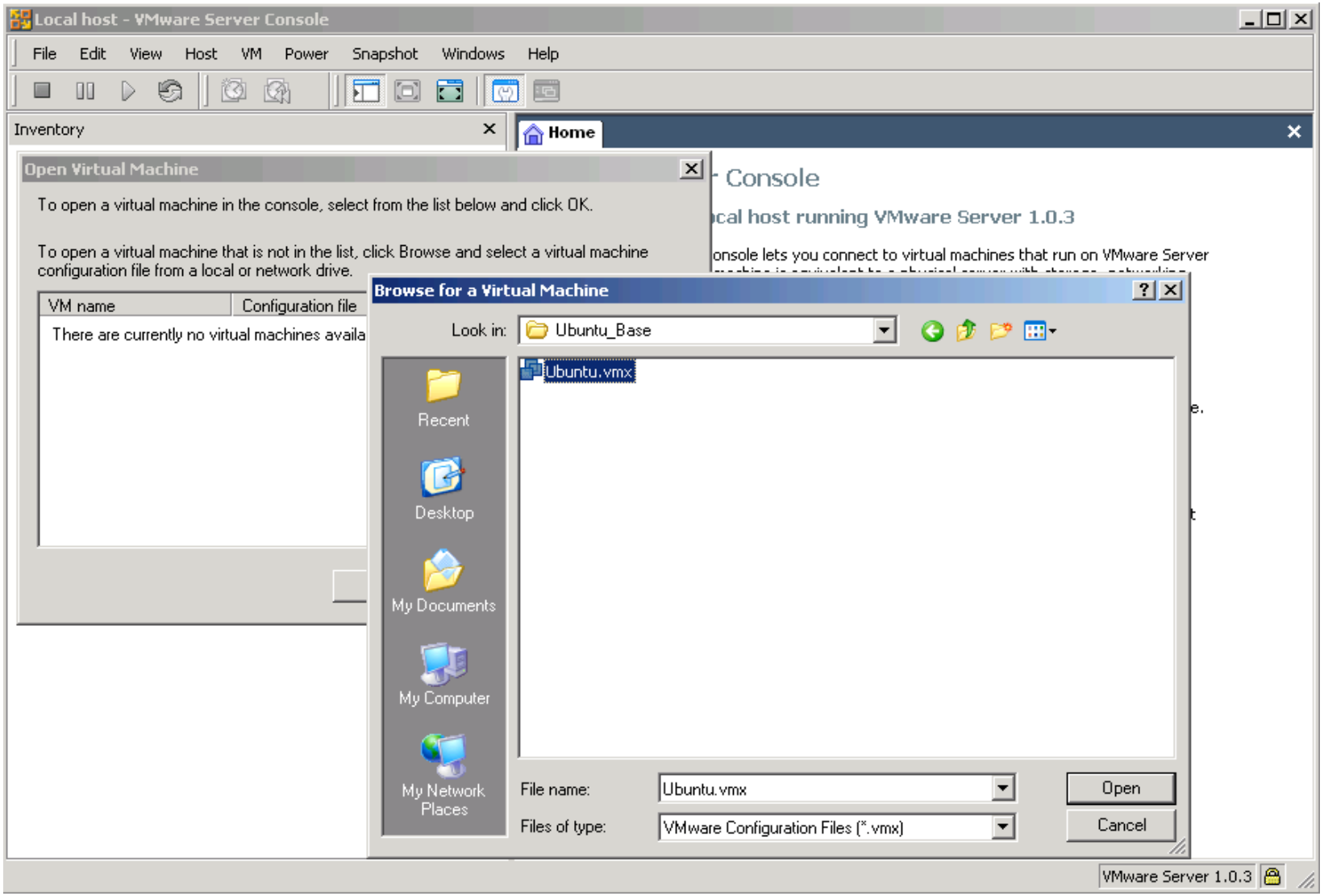


25_Checked_Wired_Connection_DHCP.png

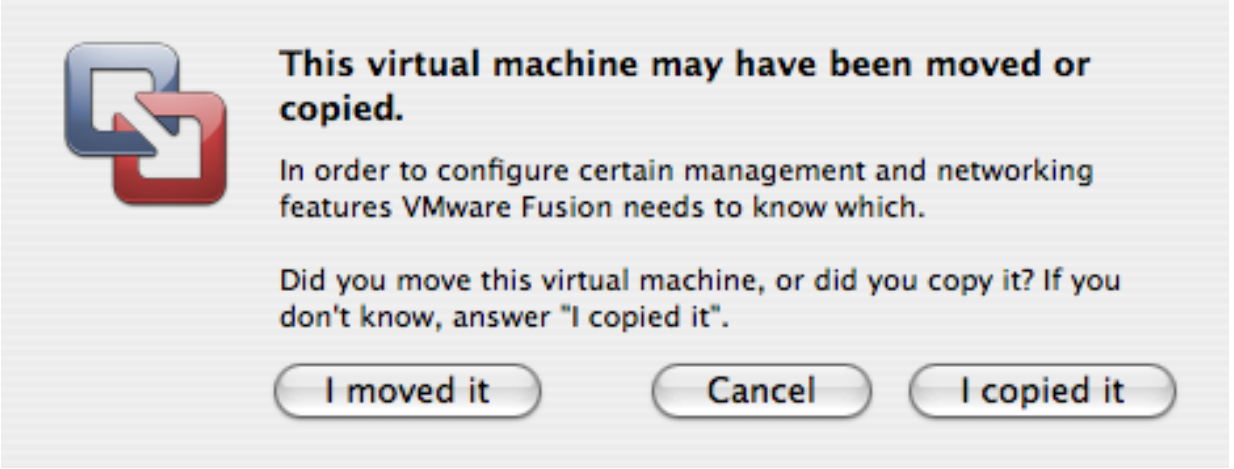


Opening an existing VM Image Copy: /presentation /screenshots /03_virtual_machine_copy

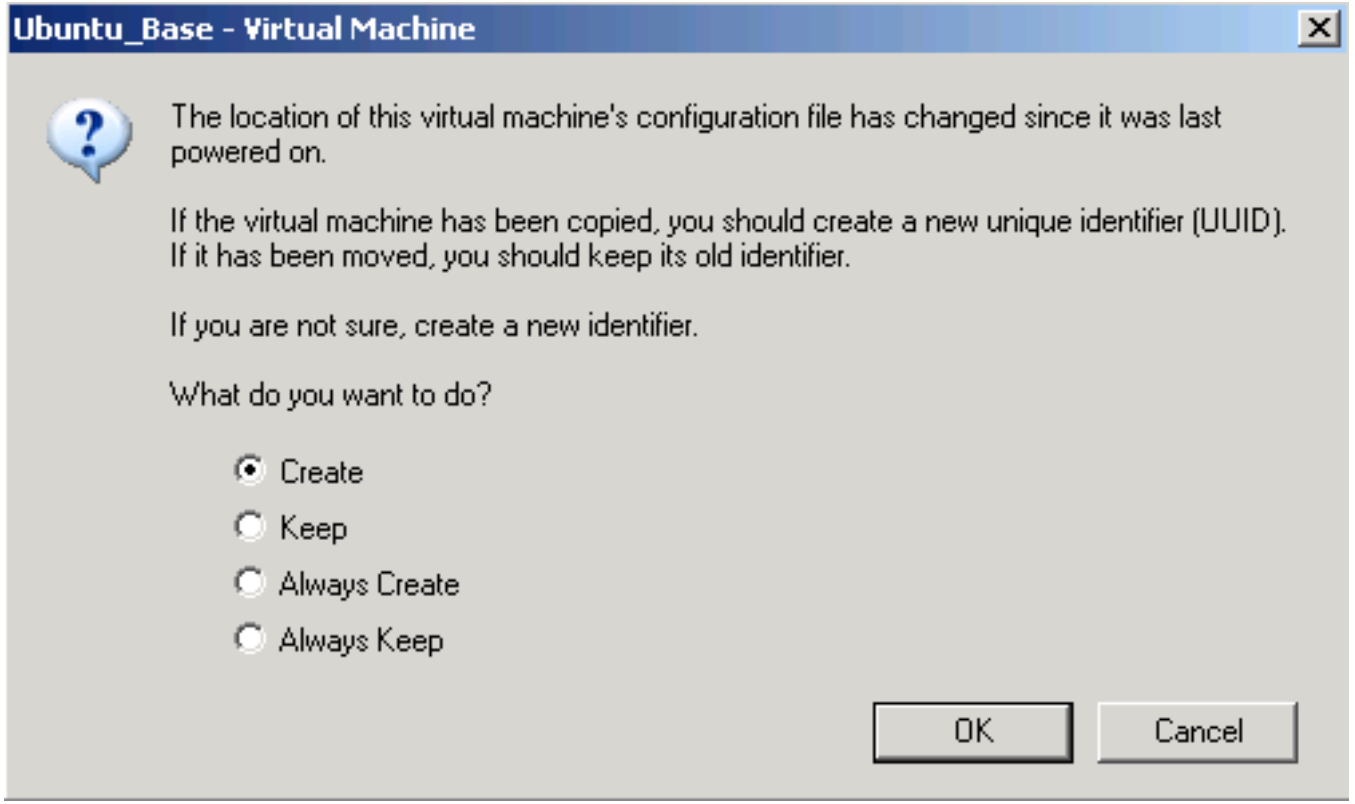
01_Browse_for_a_Virtual_Machine.PNG



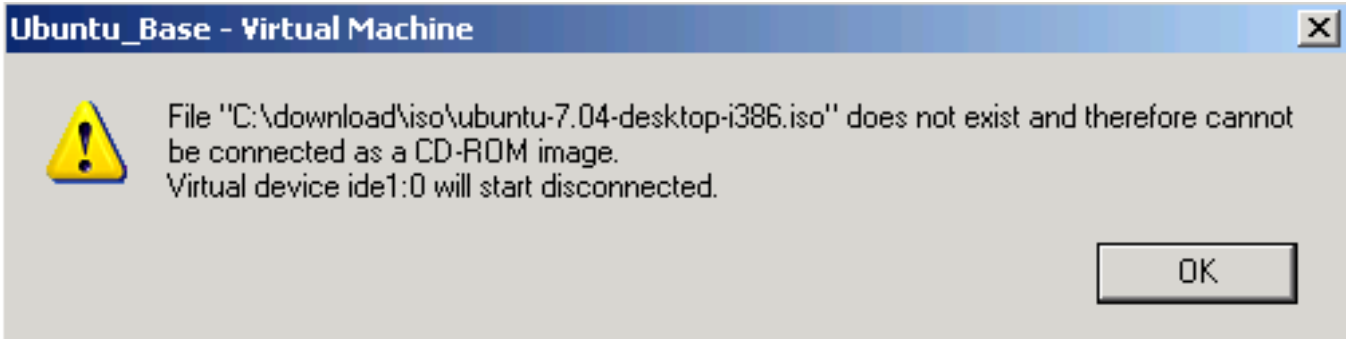
02a_Mac_Virtual_Machine_Copy.png



02b_Win_Virtual_Machine_Copy.png



03_Missing_ISO_CDROM_Image.PNG



Other Ubuntu Tweaks (Optional):

*** System -> Preferences -> Screen Resolution**
*** System -> Preferences -> Mouse**
*** Drag Applications -> Accessories -> Terminal icon to quick launch area**
*** Terminal -> Edit -> Current Profile -> Scrolling -> Scrollback = 99999**
*** Ctrl +, Ctrl - in Terminal to change font size**

B. Install Prerequisites

Legend
$ == shell input
# == comment or instructions
(nothing) == editor input or stdin

Example:
# sudo should prompt for a password unless you've sudo'd recently
$ sudo ls
password
should get file list

We will keep everything in the home dir, or "~" You can put it wherever you want

You can install ruby via aptitude, I will build from source to make the instructions more portable.

Install Ruby from source:
# This is already done on the VMware image "Ubuntu_With_CI_Downloads"
# install all prereqs/extensions in case you need them
$ sudo aptitude update
$ sudo aptitude install -y zlib1g zlib1g-dev
$ sudo aptitude install -y libssl-dev openssl
$ wget ftp://ftp.ruby-lang.org/pub/ruby/ruby-1.8.6-p114.tar.gz
$ tar -zxvf ruby-1.8.6-p114.tar.gz
$ cd ruby-1.8.6-p114
$ gedit ext/Setup
# Uncomment all "non-Win" lines (all except Win32API and win32ole) by removing "#"
$ ./configure
$ make
$ sudo make install

Install RubyGems:
# Already done on “CI_Downloads” image
$ cd
$ wget http://rubyforge.org/frs/download.php/35283/rubygems-1.1.1.tgz
# If this fails, check for a new mirror on:
# http://rubyforge.org/frs/?group_id=126
$ tar -zxvf rubygems-1.1.1.tgz
$ cd rubygems-1.1.1
$ sudo ruby setup.rb

Install Sun java:
 # Already done on “CI_Downloads” image
$ sudo aptitude install -y sun-java6-bin
 # accept all prompts

Install subversion:
 # Already done on “CI_Downloads” image
$ sudo aptitude install -y subversion

Install ant:
 # Already done on “CI_Downloads” image
 # All remaining downloads are in that image too, but won't be specifically pointed out
$ sudo aptitude install -y ant
$ sudo aptitude install -y ant-optional
 # By default, this installs Gnu java, not Sun's...

Install “Galeon” as an alternate browser
# because jsunit will kill the browser it is testing
$ sudo aptitude install -y galeon

Create Subversion Repo
$ svnadmin create repo

C. Create sample Ruby on Rails Project

Install sqlite3 and gem (default database for Rails)

```
$ sudo aptitude install -y libsqlite3-dev sqlite3
$ sudo gem install sqlite3-ruby
```

Install Rails

```
$ sudo gem install rails
# version used in this tutorial is 2.0.2
# later versions may behave differently
```

Create a rails project
$ rails mysite
$ cd mysite

Remove default index.html and create a page

```
$ rm public/index.html
$ script/generate scaffold User name:string
$ rake db:migrate
```

Test rails site
$ rake # should pass all tests
$ script/server
# New Terminal Tab: File -> Open Tab or Ctrl-Shift-T
# should be in mysite dir
$ firefox http://localhost:3000/users
# create a user

Import site into subversion

```
# back to Terminal, new tab
# change back to home dir (~)
$ cd
# remove temp files we don't want to check in
$ rm -rf mysite/log/*
$ rm -rf mysite/tmp
$ svn import mysite file:///home/ci/repo/mysite -m
"import"
$ rm -rf mysite
$ svn co file:///home/ci/repo/mysite mysite
```

Set svn:ignores
# ignore all temp files, always have a clean working copy. Boring and obsessive, but avoids 'mysterious' errors on CI due to missing files
$ cd mysite
$ export EDITOR=gedit
$ svn propedit svn:ignore .
tmp
logs
$ svn propedit svn:ignore log
# add * to ignore list
*
$ svn commit -m "ignores"
$ cd

D. cruisecontrol.rb setup

cruisecontrol.rb is still in active development. We will use the 1.3.0 release, but there are new features in trunk, like Git support

Check http://cruisecontrolrb.thoughtworks.com/projects for a recent, successfully building revision if you want to use trunk - as soon as they have their new Git repo building there ;)

Download and unzip cruisecontrol.rb:

```
$ wget
http://rubyforge.org/frs/download.php/36026/cruisecontrolrb-
1.3.0.tgz
# If this fails, check for a new mirror on:
# http://rubyforge.org/frs/?group_id=2918
$ tar -zxvf cruisecontrolrb-1.3.0.tgz
# rename cruise dir to cc
$ mv cruisecontrolrb-1.3.0 cc
```

Set up project in cruisecontrol

```
$ cd cc
$ ./cruise add MySite --url file:///home/ci/repo/mysite
$ ./cruise start
```

View cruisecontrol web page
Go to Galeon browser
Applications -> Internet -> Galeon to start
open http://localhost:3333
click MySite
Should be passing
Remember, this can be any non-firefox browser, we are just using a different one that won't get killed by jsunit

Take this opportunity to familiarize yourself with cruisecontrol.rb. It's not covered here ;)

http://cruisecontrolrb.thoughtworks.com/

```
Add cruise task to Rakefile
# Go back to Terminal, open another tab
# cd to Rails project dir
$ cd ~/mysite
$ gedit Rakefile
# Add cruise task to bottom after 'requires':
task :cruise do
  Rake::Task['test'].invoke
end
$ svn commit Rakefile -m "add cruise task"
# Check cruise webpage, should still be passing
```

Tweak firefox for automation
open or switch to firefox, navigate to 'about:config'
search for 'browser.sessionstore.resume_from_crash'
toggle to false
Edit - Preferences - Tabs - uncheck all warnings
Advanced - Update - turn off automatic updates
Note – sometimes this doesn't “take”...
Exit firefox

E. JsUnit Setup

Download and Unzip JsUnit

```
$ cd
$ wget
http://easynews.dl.sourceforge.net/sourceforge/jsuni
t/jsunit2.2alpha11.zip
$ unzip jsunit2.2alpha11.zip
# copy junit.jar file to Ant lib dir (required by Ant)
$ sudo cp jsunit/java/lib/junit.jar /usr/share/ant/lib/
```

Copy jsunit to your app and check in

```
$ cd ~/mysite/public/javascripts
$ mv ~/jsunit .
$ svn add jsunit
$ export EDITOR=gedit
$ svn propedit svn:ignore jsunit/logs
# add * to ignore list
*
$ svn propedit svn:executable jsunit/bin/unix/start-firefox.sh
# enter “true”
$ svn commit -m "add jsunit"
```

Create a jsunit test

```
$ mkdir test_pages
$ gedit test_pages/prototype_test.html
<html>
<head>
  <script language="JavaScript"
type="text/javascript"
src="../jsunit/app/jsUnitCore.js"></script>
  <script language="JavaScript"
type="text/javascript"  src="../prototype.js"></script>
  <script language="javascript">
    function testPrototypeWordSplit() {
      string = 'one two three';
      assertEquals('one', ($w(string))[0]);
    }
  </script>
</head>
<body></body>
</html>
```

Run the jsunit test manually from browser and commit

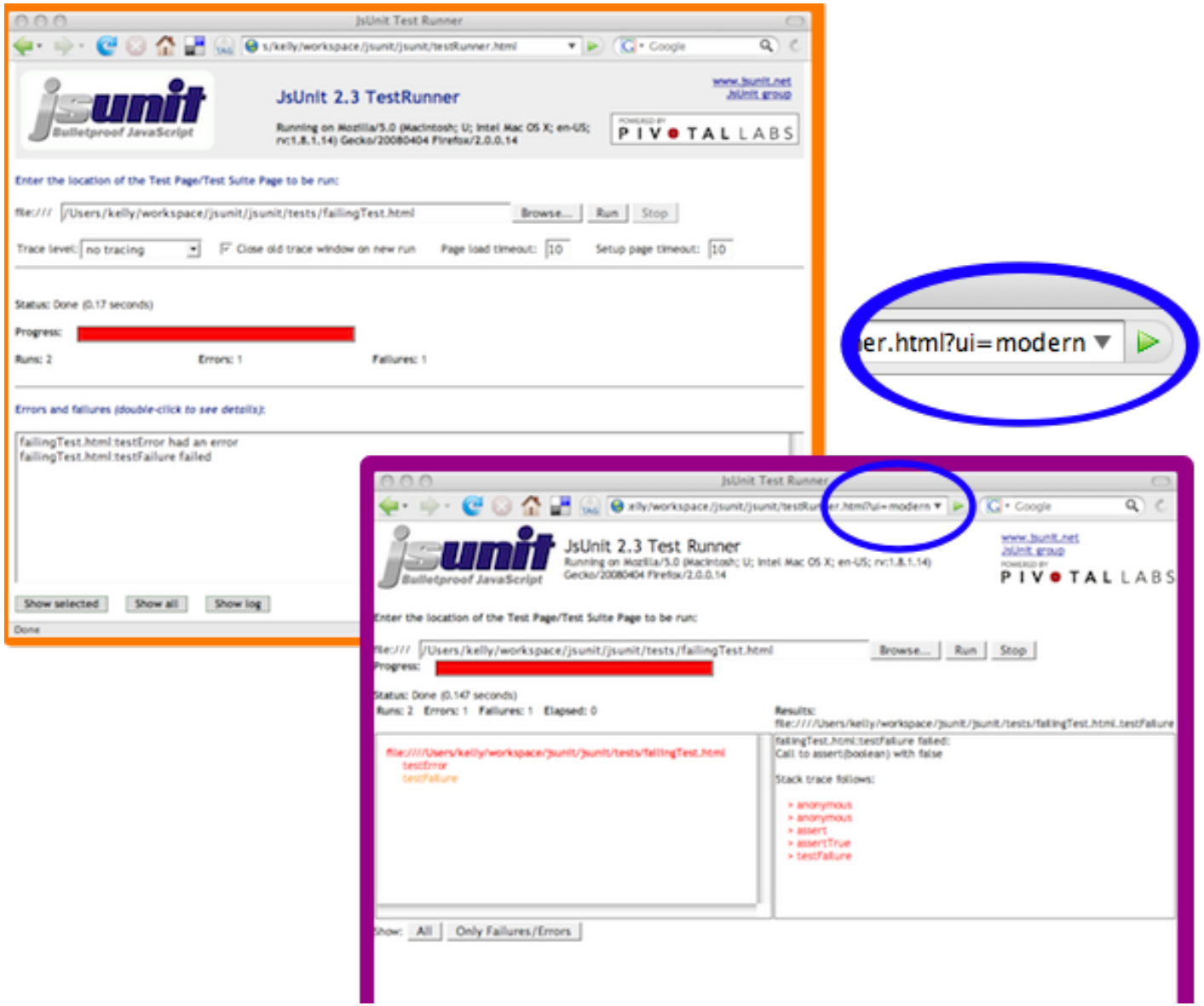
```
$ cd ~/mysite
$ ruby script/server # unless you still have it running

$ firefox http://localhost:3000/javascripts/jsunit/testRunner.html
# Enter this in the "Run" field and click “Run”:
http://localhost:3000/javascripts/test_pages/prototype_test.html
# exit Firefox, go back to terminal
$ svn add public/javascripts/test_pages
$ svn commit -m "jsunit test"
```

Take this opportunity to familiarize yourself with JsUnit and JsUnit Server. It's not covered here ;)

http://jsunit.net/

JsUnit Modern UI (in trunk)



"Punt" and make a manual jsunit_start_server script
# Because automated process management is not TSTTCPW for this tutorial, and it's hard
# This is also easily ported to a batch file on windows
$ cd ~/mysite
$ gedit script/jsunit_start_server.sh
ant -f /home/ci/mysite/public/javascripts/jsunit/build.xml -DbrowserFileNames=/home/ci/mysite/public/javascripts/jsunit/bin/unix/start-firefox.sh -Dport=8081 start_server

Check in jsunit_start_server script and leave it running

```
$ svn add script/jsunit_start_server.sh
$ svn propedit svn:executable
script/jsunit_start_server.sh
# add 'true' line
$ script/jsunit_start_server.sh
# ignore warning about tools.jar
# make sure it starts and leave it running
# (ctrl-c when you want to kill it later)
# open a new terminal tab
$ cd ~/mysite
$ svn ci -m "add jsunit start script"
```

Add jsunit task

```
$ gedit Rakefile
task :cruise do
  Rake::Task['test'].invoke
  Rake::Task['jsunit_distributed_test'].invoke
end

task :jsunit_distributed_test do
  output = `ant -f public/javascripts/jsunit/build.xml
-Durl=http:
//localhost:8080/jsunit/jsunit/testRunner.html?testPa
ge=/jsunit/test_pages/prototype_test.html
-DremoteMachineURLs=http://localhost:8081
-DresourceBase=public/javascripts distributed_test`
  raise "JsUnit Failed:\n" + output unless
$?.success?
  puts "JsUnit tests passed"
end
```

Commit jsunit task and check cruise
# Open cruise webpage under galeon, if not open
# jsunit will kill firefox, so we need a different browser
# Applications - Internet – Galeon, open http://localhost:3333
$ svn commit Rakefile -m "add jsunit_distributed_test task"
# Check cruise webpage, should still be passing
# You will see jsunit pop up Firefox automatically as the build is running

F. Selenium Setup

Install Selenium Gem
# WARNING: use capital “S” Selenium – there is another rubyforge lowercase “s” selenium project, and a dozen other similarly-named ones. WhatEVER...
$ sudo gem install Selenium --version=1.0.7
# NOTE: Version 1.0.7 currently has some mirror issue on RubyForge, if it doesn't download, try to pull from my gem server:
$ sudo gem install Selenium --source=http://gems.thewoolleyweb.com

Start selenium using command from Selenium gem
$ selenium
# make sure it starts and leave it running, ctrl-c to kill it
# Open new terminal tab

Set up selenium test dir

```
$ cd ~/mysite
$ mkdir test/selenium
```

Create selenium test stub

```
$ gedit test/selenium/user_test.rb
require 'test/unit'
require 'rubygems'
require 'selenium'

class UserTest < Test::Unit::TestCase
  def setup
    @browser = Selenium::SeleniumDriver.new("localhost",
4444, "*firefox /usr/lib/firefox/firefox-bin",
"http://localhost:3001", 10000)
    @browser.start
  end

  def teardown
    @browser.stop
  end

  def test_user_add_flow
  end
end
```

Fill in selenium test stub

```
$ gedit test/selenium/user_test.rb
  def test_user_add_flow
    timestamp = Time.new.to_s
    user_name = 'joe ' + timestamp
    @browser.open "http://localhost:3001/users"
    @browser.click "link=New user"
    @browser.wait_for_page_to_load
    @browser.type "id=user_name", user_name
    @browser.click "commit"
    @browser.wait_for_page_to_load
    assert @browser.is_text_present(user_name)
  end
```

Create selenium_test rake task including start and stop of server

```
$ gedit Rakefile
task :cruise do
  ...
  Rake::Task['selenium_test'].invoke
end

task :selenium_test do
  begin
    process = IO.popen("ruby /home/ci/.cruise/projects/MySite/work/script/server --port=3001")
    output = `ruby test/selenium/user_test.rb`
    raise "Selenium Failed:\n" + output unless $?.success?
    puts "Selenium tests passed"
  ensure
    Process.kill(9,process.pid)
  end
end
```

Check in and check cruise

```
$ svn add test/selenium
$ svn commit -m "selenium test"
# check cruise, it should run everything and be green
```

Break tests and fix them!
 # cause ruby/jsunit/selenium failures, and check them in
 # see cruise go red, then fix them
 # click links for ruby/selenium failures
 # there's a test bug! (next page after too many tests)
 # good to drop DB before each CI run...
 # This naive implementation has return code bugs (crash if webrick already running)

Same concept for other tools/ Languages/ CI Engines

Now for some bleeding edge ccrb + Git, hot off the press

Install Git:

```
# For some reason, Ubuntu/aptitude wanted to install git off the Ubuntu CD, so disable that
$ sudo gedit /etc/apt/sources.list
# comment first 'cdrom' line and save
$ sudo aptitude install -y git-core git-svn
```

Clone current svn repository to git:

```
$  git-svn clone file:///home/ci/repo/mysite ~/mysite-git
```

Clone and run trunk of ccrb, which has Git support:

```
$ git clone git://rubyforge.org/cruisecontrolrb.git ~/cc-git
# find tab currently running cc 1.3.0, ctrl-c to stop it (look for localhost:3333 in console)
$ cd ~/cc-git
$ ./cruise start
# go to a new tab
```

Create and run ccrb project for the mysite git project:
$ cd ~/cc-git
$ ./cruise add MySiteGit -s git -r /home/ci/mysite-git
# open/refresh Galeon for new project
Applications -> Internet -> Galeon -> localhost:3333
Click “Start Builder”
Watch for jsunit and selenium to run
should get a successful build!
Notice truncated GUID as build ID instead of svn revision

Coding Done!

2. Gettin' Fancier

All Handwaving Now

Multiplatform

Multibrowser

Farms

SeleniumGrid
JsUnitServer

Virtualization: One Box, Three Platforms mac/win/linux

Automate and Test Deployment Process

Test Rollback process!

Configuration Management / Version Control

Auto-tag Green Builds

Automatically pre-create Release Branches

Build ALL active branches under CI

Multiple Libraries/ Projects

Dependencies Among Common Libraries and Projects

Dependency modifications should trigger builds of all dependents

Consistent Tags/Baselines Among Projects: Naming/Usage

Versioning of Dependencies (or not):

Mainline / Snapshot / trunk / HEAD
vs
baselines / tags

Different Builds for Different Environments: Development vs Demo/Prod

Publishing Artifacts/ Dependencies:

Deployed (Jars/Gems) vs SCM (svn:externals)

Hackability vs Stability: Fear should not inhibit improvement of common libraries

What dependency versions are you running on prod? Is it the same as dev?

Cautious Optimism

http://tinyurl.com/2cvbj4

Nirvana: Green tags/artifacts instantly used across all dev environments, all deploys have known, green, stable, baselined dependencies

Suites: You can have more than one!

It's all about Feedback

Timely
vs
Comprehensive

Fast
vs
Thorough

Commit-Triggered vs Scheduled

Minimize Checkout Time

But safer to do clean builds

Get HUGE Dependencies and binaries out of Source Control if they take a long time to check out

RubyGems vs piston/ svn:externals

Metrics

Code Coverage - rcov

Mutation Testing – Heckle

Flog: Hurt Your Code

red/green trends

Build Length Trends

Notification

Information Radiator(s)

email

CCMenu / CCTray


RSS


IM

Growl

Ambient Orb

13” CRT with red/green background

Suggested audio for first failure, continued failure, fixed: Homer Simpson & Arnold Schwarzenegger Doh!, You Lack Discipline!, WooHoo! (The Louder the Better)

Whatever people will pay attention to!

Aggregate and display multiple ccrb instances via RSS feeds (easy Rails app)

Tool Shoutouts

jQuery
http://jquery.com

JSSpec

http://code.google.com/p/jssp

Polonium, js_spec (runner), Funkytown

http://rubyforge.org/projects/pivo

Screw::Unit

http://rubyforge.org/projects/screw

JsUnitTest

http://jsunittest.com/

3. Gotchas

Random Gotchas / Mantras:

*** “It's not easy being Green”**
*** Broken Windows are Bad (“Who cares, it's always red...”)**
*** False Negatives are Bad**
*** Crying Wolf (“it failed for no reason”)**
*** “Intermittent” failures (but it's not intermittent after you can reproduce it)**
*** “Works Locally” (is your local environment the same as CI? Which one is Prod closer to???)**
*** You can always “temporarily” disable a test in CI**
*** One disabled test is better than a red CI**
*** Browser Settings (autoupdate, etc) Preventing Browser Close**

More Random Gotchas:

*** False Positives are Bad too - being Green, when return code (echo $?) from some step is not 0**
*** Tricks to avoid false positives:**
  *** Use rake task exec**
  *** system(“cmd”) ll raise(“cmd failed)**
*** Test::Unit had return code bugs for a long time due to not handling entire Exception class hierarchy correctly (Finally fixed in Ruby 1.8.6/1.9???)**

4. Questions?

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