Introduction

The Keil UV ision software used to develop programs for ARM based microprocessor systems is designed to run on Microsoft Windows operating systems. For CPTR-215 class we will be using the Keil software running under the Microsoft XP operating system on a virtual PC created using software called VirtualBox (made by Oracle). We will be running VirtualBox (vbox for short) on a PC using the Linux operating system (A Redhat distribution of Linux). We use Redhat Linux, a commercially supported distribution of Linux, because we use commercially created software that is checked out, debugged, and supported on this operating system. There are many different people or groups putting together Linux distributions for which the most visible and significant differences tend to involve the graphical user interface (GUI). The underlying kernel of the operating system likely differs little, but for those of you accustom to using other Linux distributions there will be differences in the graphical user interface. I'm sorry that we can't provide everyone's favorite GUI.

Some setup is required before you can use VirtualBox and the Keil software. I have created a vbox configuration that contains MS windows XP with the Keil software installed. Oracle calls this an "appliance". The next section describes how to start Virtual Box, install this "appliance", and configure it.

Logging into WWU Linux computers

In what historically was referred to as the "Sun lab" (at one time the computers in this lab were ones made by Sun Microsystems), now the Linux lab, are a set of Dell computers on which RedHat Linux is installed. While each computer has its own hard drive for local use, user files are all kept on a central server. Thus you can log into any computer and you will have exactly the same view of your files. A characteristic of Unix, and now Linux operating systems, is that they were designed to support multiple users from day one. Hence, when you configure the features of a program or change the way the graphical user interface is configured those characteristics are saved for each user and when you come back to work the next time, on any machine, the configuration that will be used is the one you set up during your earlier session.

When not in use, the video output to the monitor is muted. Move the mouse or press a key on the keyboard to cause the login screen to be displayed.

The user name for the Linux machines is the same as that which you use on other campus computers or web pages, i.e. your first_name.last_name, and the password is the same. (This is accomplished using what is referred to as Active Directory. Thus even if you have not previously logged into the Linux computers you should be able to do so and an account and file tree will be created for you).

Getting started with Linux



After successfully logging in there should be a screen that looks something like this:

Here is the upper left corner of the screen in more detail. To log off, click System on the tool bar.



Loading the pre-configured Virtual PC & Keil software

- 1) To start Vbox, click on **Applications** at the left end of the tool bar at the top of the screen
- 2) On the drop-down menu find *System Tools*, and on that submenu select *Oracle VM Virtual Box*.

Applications	Place	es System 🥪 🕸 🚭 🐻
S Accessories	•	
📁 Electronics	•	
🔞 Games	٠	
b Graphics	•	
🖏 Internet	•	
😵 Office	٠	
S Programming	٠	
[Sound & Video	•	
System Tools	•	S Audit Configuration
🗶 Wine	•	CD Writer
👸 Add/Remove Sof	tware	Configuration Editor
		Disk Usage Analyzer
		🖄 File Browser
		Htop
		KCron
		KDat
		C Kdump
		ኛ Keyring Manager
		Kickstart
		Network Tools
		NmapFE NmapFE
		S Oracle VM VirtualBox
		RHN Registration
		🔧 SELinux Troubleshooter
		😪 Software Updater
		🐼 Traceroute
		C User Profile Editor
		Wacom Control Panel
		🔜 x3270

The following window will open:



Sometimes there will be notices regarding new versions. Don't download these. Just click OK.

3) Click on **File** at the left of the tool bar.



On the drop-down box select Import

<u>V</u> irtual Media Manager	Ctrl+D
🕟 Import Appliance 🗲	
ด Export Appliance	Ctrl+E
🏈 <u>P</u> references	Ctrl+G
∕⊽ E <u>x</u> it	Ctrl+Q

The import Wizard should appear:

Û	Appliance Import Wizard	X		
	Welcome to the Appliance Import Wizard!			
	This wizard will guide you through importing an appliance.			
	Use the Next button to go to the next page of the wizard and the Back button to return to the previous page. You can also press Cancel if you want to cancel the execution of this wizard.			
	VirtualBox currently supports importing appliances saved in the Open Virtualization Format (OVF). To continue, select the file to import below:			
	Choose			
	< <u>B</u> ack <u>N</u> ext > Cancel			

Click **Choose**. The following window will open. If you have copied the cptr215.ova file from the /home/classes/cptr215 folder to your own account the screen should look something like this. Click on cptr215.ova and then click Open.

If you have not copied the file to your own account (better not to), then navigate to /home/classes/cptr215 and select cptr215.ova. Then click **open**.

9	Select an applianc	e to import	×
Look in: 🛅 /ł	nome/larry.student	€ ♦ ♦ ♠	🔛 📰 🔳
Computer	cptr215 demo Desktop cptr215.ova		
File <u>n</u> ame: cptr2	215.ova		<u>Open</u>
Files of type: Ope	n Virtualization Format (*.ova *.ovf)	\$	Cancel

The path and file chosen will appear on this screen. Click Next.

9	Appliance Import Wizard	X
	Welcome to the Appliance Import Wizard!	
	This wizard will guide you through importing an appliance.	
	Use the Next button to go to the next page of the wizard and the Back button to return to the previous page. You can also press Cancel if you want to cancel the execution of this wizard.	
	VirtualBox currently supports importing appliances saved in the Open Virtualization Format (OVF). To continue, select the file to import below:	
	< Back Next > Cancel	

The next screen that appears shows key settings. Use them as shown.

Ŷ	Appliance In	nport Wizard	X
	Appliance Import Set These are the virtual machines cor imported VirtualBox machines. You clicking on the items and disable of	tings ntained in the appliance and the suggested settings of the can change many of the properties shown by double- thers using the check boxes below.	
	Description	Configuration	
	Virtual System 1		
	😪 🛞 Name	cptr215	
	🛷 🐼 Guest OS Type	🛃 Windows XP	
	CPU	1	
	RAM	256 MB	
	• OVD	\checkmark	
	🧼 🖉 USB Controller	\checkmark	
	🕀 🤛 Sound Card	✓ICH AC97	
	🗗 🗗 Network Adapter	✓ PCnet-FAST III (Am79C973)	
	- 🔷 Hard Disk Controller (IDE)	PIIX4	
	🖻 🔷 Hard Disk Controller (IDE)	PIIX4	
	🛛 🎯 Virtual Disk Image	/home/larry.student/VirtualBox VMs/cptr215/cptr215-disk	
	Beinitialize the MAC address of	all network cards	
		Restore Defaults < Back	

Click Import

9	Appliance In	nport Wizard	0
	Appliance Import Set These are the virtual machines con imported VirtualBox machines. You clicking on the items and disable of	tings ntained in the appliance and the suggested settings of the i can change many of the properties shown by double- others using the check boxes below.	
	Description	Configuration	
	Virtual System 1		
	😪 😪 Name	cptr215	
	😡 Guest OS Type	🕵 Windows XP	
	Importing Appliance: Imp	oorting appliance '/home/larry.s	
	Importing virtual dis	k image 'cptr215-disk1.vmdk' (2/2) 30% 😢	
	Hard Disk Controller (IDE)	PIIX4	
	🖃 📎 Hard Disk Controller (IDE)	PIIX4	
	Sirtual Disk Image	/home/larry.student/VirtualBox VMs/cptr215/cptr215-disk	
	<u>R</u> einitialize the MAC address of	all network cards	
		Restore Defaults < Back	

The import process will take several minutes and you will observe the remaining time value fluctuate up and down as the process proceeds. When import is complete the following should be displayed:



There are a couple configuration items to take care of before using the virtual machine. Click on **CPTR215** to select that virtual machine.

9	Oracle VM VirtualBox Manager	
<u>F</u> ile <u>M</u> achine <u>H</u> elp		
New Settings Start Disca	rd	Snapshots
cptr215	📃 General 📃 Preview	
Newered Off	Name: cptr215 OS Type: Windows XP	
	I System	
	Base Memory: 256 MB Boot Order: Floppy, CD/DVD-ROM, Hard Disk Acceleration: VT-x/AMD-V,	tr215
	🖳 Display	
	Video Memory: 16 MB Remote Desktop Server: Disabled	
	(2) Storage	
	IDE Controller IDE Primary Master: cptr215-dis (Normal, 5. IDE Secondary Master (CD/DVD): Empty	k1.vmdk 12 GB)
	Audio	
	Host Driver: ALSA Audio Driver Controller: ICH AC97	

Next click on **Settings**. And then in the left panel click on **Shared Folders**

 General System Display 	Shared Folders		\	
 Storage Audio Network Serial Ports USB Shared Folders 	Name Path Machine Folders	Auto-Mount	Access	
Help	Adds a new shared folder definition.			

On the right side of the Shared Folders screen is a small green icon with a + in it. Click on that icon to add a path to the folders in your Linux account. You will want to keep your design files in your Linux folders rather than in folders in the virtual machine. That way you can access your files with programs outside the virtual machine.

٢	Add Share X	٩	Add Share 🗙
Folder Path:		Folder Path:	/home/larry.student
Tolder Name.		Folder Name.	<u>R</u> ead-only
	Auto-mount		✓ Auto-mount
	Cancel		Cancel

An easy way to specify the folder path is to type it in as shown above on the right, but change *larry.student* to your user name. Select **Auto-mount** so that every time you start up Vbox it will automatically connect to your Linux folders.

Click **OK** and here is what you should see (only with your user name):

٩		cptr215 - Settings			×
📃 General	Shared Fold	ers			
🔝 System	Foldors List				
🖳 Display	<u>P</u> olders List	C .H			
Storage	Name	Path	Auto-Mount	Access	
🐌 Audio	larrydent	t /home/larry.student	Yes	Full	
🖶 Network					
🔉 Serial Ports					
🖉 USB					
💼 Shared Folders					
	Select a setting	s catagony from the list on	the left hand side and	movo tho	
	mouse over a se	ettings item to get more in	formation.	nove the	
				1997 Barris	
<u>H</u> elp			🛛 🖸 Cance	I 🖉	<u>o</u> ĸ
			-		



Starting a Virtual Machine



Click on **Start** to start the virtual machine. You may see a screen like that below. Click **OK**



After you have started up the virtual PC, click on the Keil icon and start the Keil software. Using the Keil software you will need to create a project and the screen may look something like this:

Create New Pro	oject	? 🗙
Save in:	💡 My Computer 💽 🗲 🗈 📸 🖽 -	
My Recent Documents Desktop My Documents	 Local Disk (C:) VirtualBox Guest Additions (D:) Iarry.student on 'vboxsrv' (E:) Shared Documents student's Documents 	
My Network Places	File name:	Save
	Save as type: Project Files (*.uv2)	Lancel

Note that there is a drive E. That is the path to the Linux files and that is where you should create your projects and save your programs (of course the user name will be yours).