System Commands
Online Degree Programme
B. Sc in Programming and Data Science
Diploma Level
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Lecture 1
Launching a Linux Virtual Machine

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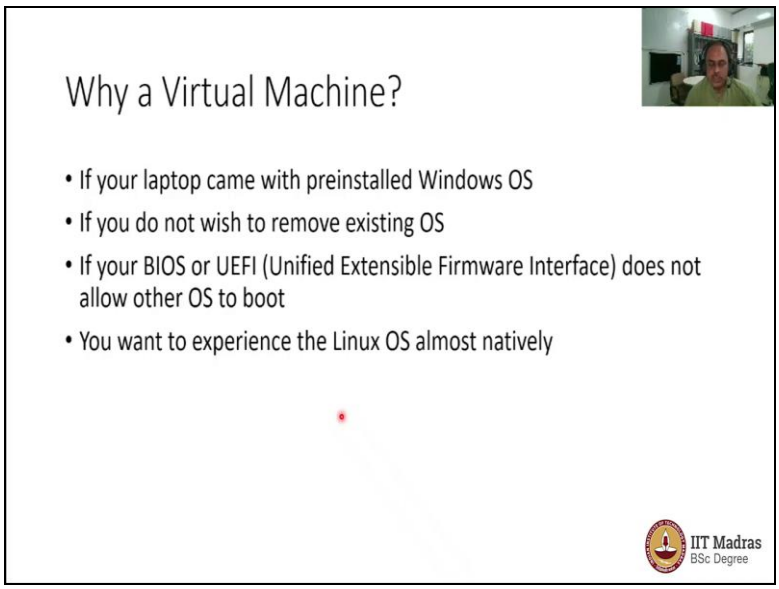

Let us look at the process of launching a Linux virtual machine. Why do you need a virtual machine? Sometimes when you buy a laptop it comes with pre-installed windows operating system and you may not want to remove the OS that came with the system because you have already paid for that and sometimes you may also not be able to have a dual booting option because your bios or your UEFI has been tied to the OEM.

And therefore it has not allowed you to have a dual boot. You would also need a virtual machine because you want to have the experience of using Linux operating system almost natively.

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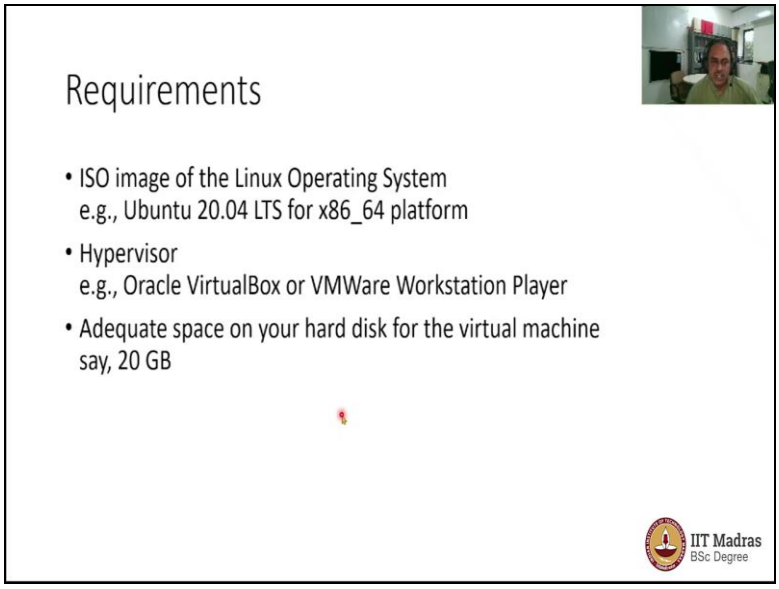

And. So, the requirements to have a virtual machine going on your laptop or a system that has pre-installed operating system such as windows is as follows. You first need to download an ISO image of the Linux operating system and I would recommend Ubuntu 20.04 long time support version which is currently the latest LTS version. The next version of 22.04 would appear at the end of April 2022.

And you will pick it up from the Ubuntu website for the platform x864 which is appropriate for a an Intel or AMD based laptop. You also need a hypervisor such as an Oracle Virtualbox or VMWARE workstation player and there are free versions available. So, you could download one of them and have it installed on your windows OS. You will also need some space to have the virtual machine up and running. The disk space required would be about 20GB that would be sufficient to get going but you also need some ram.

So, if your laptop has 4GB ram maybe it is not a good idea to have a virtual machine running on top of it but if it has 8 GB or more than your virtual machine will work quite fine.

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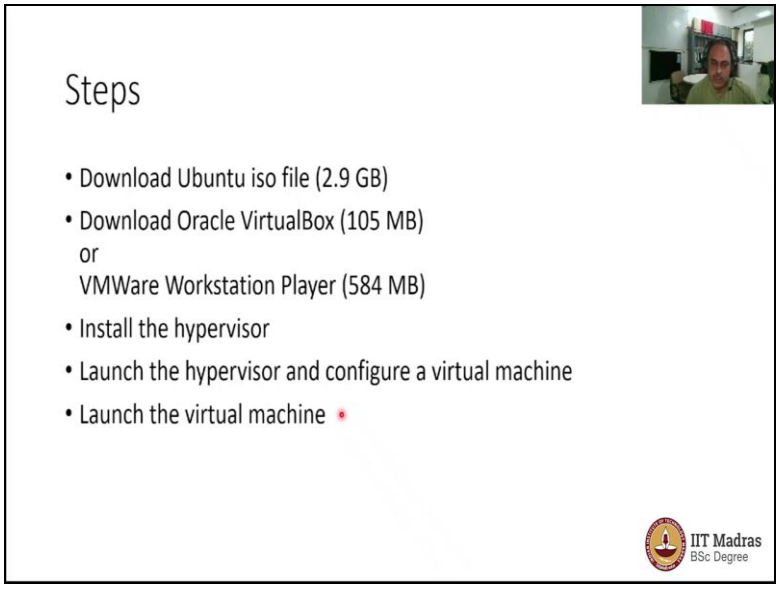

So, these are the steps that you require to follow first download the Ubuntu iso file which would be about 3GB in size right now and have it ready and download the oracle virtual box or the VMware workstation player which is available freely. Install the hypervisor and then you need to launch the hypervisor and configure a virtual machine. And then once you have done that you could then launch the virtual machine and have the experience of using the Linux OS on top of your windows OS almost natively.

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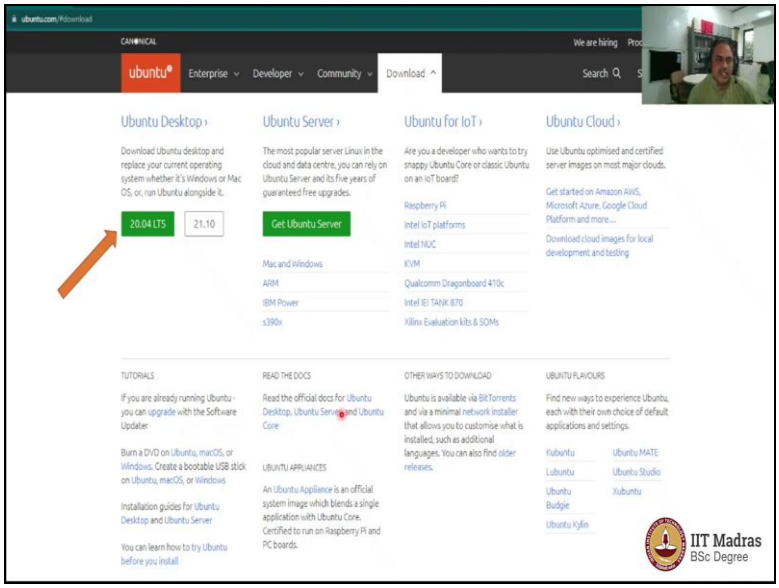

So, you can download the Ubuntu iso from Ubuntu.com and you could then you know click on the highlighted link 20.04 LTS and download the image.

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You could download the oracle virtual box from the website virtualbox.org and you need to click on the link meant for windows host because that is your host operating system and then use the exe file that comes to install the virtualbox.

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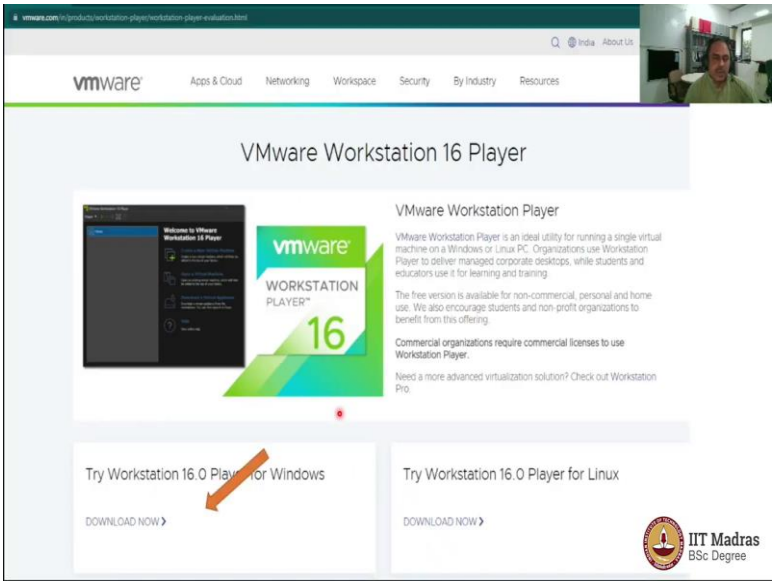

You can download the VMware workstation player from the VMware website by searching for it and you could pick up the windows version of it because your host operating system is windows.

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So, let us go and try out these to launch a virtual machine and see how that works out. So, we have downloaded the installation media. So, we will first install the virtualbox. So, right click on the icon and run it as an administrator you can override the alert and go

ahead and install it anyway. So, you see that it is installing now. So, there is an icon for oracle vm virtualbox created on the desktop.

So, here is the oracle virtualbox manager that has got launched. So, we now need to add a new virtual machine. So, we do that with the new icon that is here and we call this virtual machine as Ubuntu 20.04 and we need to assign how much of memory that you would like to use. So, we have let us 2 say 4 8 MB that is 2 GB of ram that we want to use for this Linux and we need to create a virtual hard disk it is a good size.

So, 10 GB is what is recommended. So, we can go ahead and use it here is where you could actually fine tune the size. So, I would go ahead and make it 20 GB. Now we now need to power on and have the operating system installed. So, look at the settings and the storage we would have the IDE. Let us add a CD there an iso image. So, we will choose an image file. So, the image file is now attached.

So, when it boots it would help to boot the Ubuntu installation medium after which the installation of os can happen on the virtual disk okay now let us boot this. So, all this has happening in a window. So, the booting of the virtual OS is happening within a window we can resize that to help us see little bit better the installation medium is being checked before commencing the installation process you could see that the Ubuntu has started installation process.

So, here we choose the option install Ubuntu the language of course is already highlighted as English proceed to continue we will just leave the default option to be normal installation and we do not need to download the updates while installing so that the installation can finish a bit early. So, the virtual disk is created by us there is nothing there in that. So, we can go ahead and say that the operating system can erase remember that it is only erasing the virtual disk and not the hard disk of your host operating system windows.

So, go ahead and then say yes install now you need to choose the time zone. So, we are choosing the one for India and we need to have the first account created. So, I will give my details here and you need to give a password for the very first account which will be the administrator and note down and keep it safe. So, that you do not forget it. So, as the

installation process is going on you could also see some icons that are glowing at the bottom that show what kind of an activity is happening.

So, as the operating system is being installed there is some activity writing to the virtual disk. So, that is the activity here. So, in case some network operations are happening the network icon also would blink. The installation can take few minutes. So, be patient and let it finish. So, the installation seems to have finished now. So, the installation is complete now. So, we can restart the virtual machine all right.

So, our virtual machine has now muted and I login with the password I gave by setting it up. So, we can skip some of these initial settings and now the virtual machine is up and running on the base host OS of windows 10 in our case and let us open the terminal okay and we now have the terminal command open and we can see that. So, it is running the kernel 5.11 and we have a full-fledged Ubuntu 20.04 lts up and running as a virtual machine on top of the windows.

Shut it down at any time that we are done with our work and we are back to the virtualbox manager and here we can any time change the settings. So, let us say we can go to the settings here and make more memory allocated for it. For example we do not want any additional devices to be attached only hard disk is sufficient we can do that okay and display also if you wish we want to give more memory we can do that.

And maybe we can make a slightly larger window there and then we can when we are ready we can just boot it and we can just do this whenever we need to work with the Ubuntu otherwise the host OS of windows 10 is not disturbed at all. So, in that sense it is a very nice way of being able to learn the command line environment on Ubuntu virtual machine. So, here in front of you I just booted the virtual machine again and I am logging in okay and then I open the terminal once more to show you that cycle of getting in to the terminal environment inside the vm which is running on top of the windows.

And then again coming out and shutting it down and that is a cycle that you can do whenever you want to spend your time with Ubuntu working with the whole OS. Now let us see how to install a virtual machine using the VMware workstation player. So, we

have downloaded that utility already. So, right click and run it as an administrator to install the VMware workstation player. So, we override the alert.

So, we see that the workstation player version 16 is starting to install we accept the license agreement and move on and let it install the standard options okay. So, we have now started to install that it will take about a minute or two to install the utility. So, the installation takes a couple of minutes. So, there is an icon on the desktop created by the utility which we could use to open the workstation player.

So, let us now finish the utility and launch the workstation player. So, we are going to use it for non-commercial use for free. So, we go ahead with that we get started by creating a new virtual machine and the installer disk we will have to tell and that will be already ready for us in the downloads folder the Ubuntu iso file is ready for us. So, we pick it up proceed further and of course it is asking the first user.

So, let us do that. So, we provide the credentials which we need to remember because that will be the first user for the operating system and it is asking how big is the virtual disks to be and we say 20 GB that is fine. So, we will have it that way and the disk can be multiple files it is a bit easier to move it around okay. So, we will just leave it with the default option. So, the virtual machine is now going to be created and it will get connected with the iso file for the installation of Ubuntu and we will leave the options as default.

So, that we will see how the Ubuntu gets installed with the default configurations. So, as you can note there is always this checking of the insulation medium that is done. So, the insulation medium has been checked and we are now seeing the Ubuntu screen which means that the Ubuntu has been booted from the installation medium and it is now setting up the OS. We can click on this arrow to see what is the background information to see some of the text output as the work is going on to install the operating system in the virtual disk.

This process will take couple of minutes depending upon the speed of your hardware. So, you have to be patient till the entire process is complete and the virtual machine has been booted to show you the login screen. So, while the installation is going on you will see

some slides to tell you about the features of the operating system. As part of installation Ubuntu would also check for some updates.

Now you see that the bootloader has been installed the installation also involves downloading some packages to keep some of the utilities latest in terms of the version the package updating seems to be over now. So, you will see that the OS will reboot by itself in workstation player to indicate that the installation is complete. The first booting may have taken few moments more but we are now ready with our virtual machine running Ubuntu 20.04 on top of windows OS thanks to the VMware workstation player.

So, let us now log in we log in with the credentials that we gave at the time of starting the new virtual machine and we skipped these things the initial welcome etcetera. And let us search for the terminal app and right click on that and add it to the favorites and that is there here. So, we start the thermal app. So, we have now the virtual machine up and running and we can now practice our command line environment right inside the virtual machine of Ubuntu 20.04 running on top of windows 10 host OS.

So, when we are done with our work of course we can move the content to some other location for safety but otherwise the machine is now ready to serve its purpose for us. So, when you are done with our work we can shut it down one more way of getting the Linux command line environment up and running on top of windows operating system is to install the so, called windows subsystem for Linux it is actually Ubuntu open system itself.

So, we have searched for windows subscriber Linux we pick up the link that is from the Microsoft dot com and go in and see that there is a description of what is available we will go ahead and install that by looking at the link. So, it is nothing but we need to install by using the administrator powershell. So, that let us open that okay. So, when I open for powershell we have those options available run as administrator. So, click on that and it is asking us to give some commands.

So, wsl minus minus install okay and that would then go on with the process of preparing the Ubuntu open system to run on top of windows natively supported by microsoft. So, this process takes couple of minutes. So, as you can notice it is the

Ubuntu OS that is being installed as the windows subsystem for Linux. So, we have rebooted the machine and as you can see the Ubuntu subsystem installation is proceeding.

So, after few minutes the window subsystem for Linux installation will require you to enter the user with which you can operate that particular subsystem. So, I enter that now the same thing as I did for the other virtual machines. These credentials should be kept safe because that would be the root user who can install the utilities on this subsystem and now the subsystem is up and running for us and we can just check it is running the kernel 5.10.

And we can explore the command line environment quite comfortably using the windows up system for Linux and I hope you will be able to get it up and running on your windows 10 or windows 11 quite easily. Let us see how to get the windows up system for Linux up and running. So, wsl is here. So, you open that and you would see that it is actually opening a terminal where you have the command line environment up and running. So, it is available now here you can see that we can boot a virtual machine on workstation player while the windows subsystem is also up and running on the screen.

So, we now log into the virtual machine then we open the terminal. So, now you can see that there are two different command line environment that is running on top of the windows open system one is the virtual machine of Ubuntu running on the host operating system. Thanks to the workstation player and there is a terminal environment that is running here and there is the other environment which is this basically the windows subsystem for Linux.

So, you can choose whichever you feel is sufficient for you to get going with the practice of command line environment that you are going to do as part of this course. You can explore the command line environment on the cloud as well as on your mobile phone. On the cloud you have the options like the replit dot com or cocalc dot com which we will see shortly. And on your phone you have the terabox app from frederick phone wall which will help you see a tiny command line environment right on your mobile phone.

Let us explore those options. Now if you are looking for a cloud-based environment to try out the command line exercises as part of this course I would recommend you to have a look at replit dot com website. So, I am opening that here. So, if you do not have a an account on Google or Facebook or Github you may want to sign up and create your own login there or you could just log in directly using your Google account.

And once you log in you would see a dashboard where you could actually create some projects. So, here we have a project that we could create and we need to give a name for the project and also what type of a project that is. So, we create that as a batch project and the name I would just choose it as Bsc demo okay. And once the project has been launched you could expand the terminal window here and click on the tab button for the shell.

And then you have the shell readily available for you in the cloud environment and what is it providing you? You could see that a kernel 5.11 is there available for you readily and the home directory is slash home slash runner that is where as a cloud user your stuff is all kept and the project that we have created just now Bsc demo is created there. So, that any script that you have made will be in that particular folder which is there in the profile so that you could actually look at it again once you want to make some changes later on.

You could actually revisit your scripts time to time to edit them and make them work as you wanted for any specific task for an assignment to practice etcetera and you could see that there are a lot of mount points that have been created here we can look at the meaning of these as we go along. So, how do we come out you could just click here and then log out. So, if you are interested in using the command line environment or learning the batch scripting using a public cloud environment on the browser then cocalc dot com is one such website.

You could sign in using either your Facebook account Github account Google account or Twitter account or you could also sign up to create a login for yourself I am getting in using my Google account. Once you get in there is a dashboard where you could create a new project unless you have already done that in a previous launch. So, I now create a new project you want you must give a name for that.

So, I call it as command line practice and create the project now once the project is created if there are some files that are available in the project it would be showing up here right now there is nothing there. But I need to first start the project okay now the project is running. So, I could now create notebooks or environments for me to work. So, I create the terminal environment and the time stamp is given as a unique identifier but I can just call it as cmd practice create.

And we now have a shell that is readily for us to practice the command and environment let me increase the font size a little bit so that the output is shown here. So, you could see that the cloud user is placed with the home directory as slash home slash user. And the cloud environment is providing us a kernel 5.11 version and there are a number of mount points that have been mounted here.

And we will look at that at some point later and you could see that if you create files they are all there in this folder. So, you could actually save them and then come back to visit them to edit scripts that you may want to do. And once you are done you can close the environment and also close this particular project click on the running status and stop the project. And let us say you do not want to keep this you could also delete the project and if you want it to run faster perhaps you may have to buy a license.

Now we are back to the dashboard and here you can see that there is one project that is already there. So, next time around we can actually enter this project to start working on what we have already created here. So, here I click on the common practice again and open the shell once more. So, I open the shell once more to see where we are and you could see that if you have created files they will be there and you can continue to work.

And we now close it stop the project and log out. If you are interested you could also try out the command line environment right on your mobile phone. Open the google play store and search for termix app you would notice it is from frederick phone wall go ahead and install that app. The installation will take just a couple of seconds if your network speed is good.

Open the app and using the keyboard on the screen you have a tiny terminal that is available for you to try out the command line environment. You will see that the home directory is somewhere under the turmoix environment and the terminal is using kernel 4.14 you would also see that there are a lot of mount points. You could use the storage of the phone.

And you also have confirmation that the environment you are using is actually the bash. So, go ahead and use command line environment right on your phone.

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