**Information Security - II**
Prof. V. Kamakoti
Department of Computer Science and Engineering
Indian Institute of Technology, Madras

Lecture - 01
Experimental Setup

So, welcome to the Experimental Setup which we will be following. In this course, I suggest that all of you look this experimental setup, understand this experimental setup very closely and we create this experimental setup in your laptop or your desktop system, so that as the course proceeds, you will start using this intensively. One of the main objectives of this course as the title suggests is, this Architectural 8 to Information Security. We need to understand the architectural in its full glory, what are all the features available in the architecture. We need to go as close as much possible to the hardware and understand it. So, to create an environment that is very conducive, to achieve this goal we have made this particular setup.

(Refer Slide Time: 01:09)
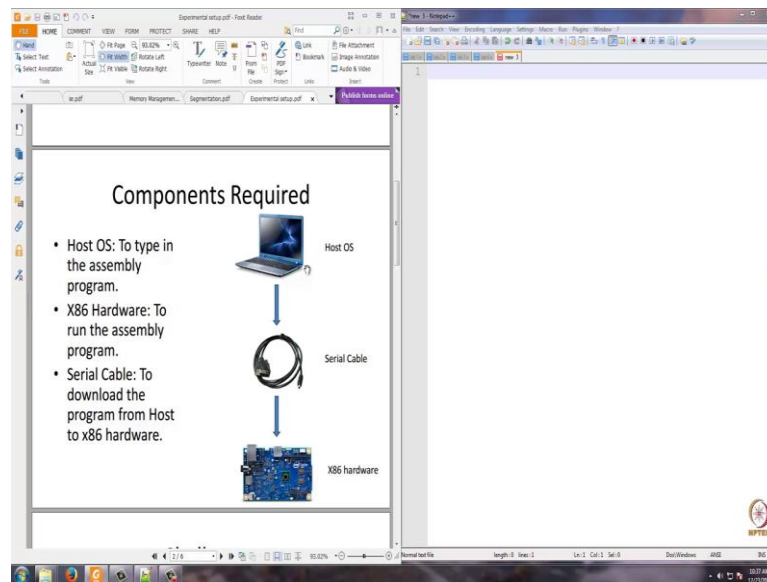
So, what is the actual real world setup? The real world is to have in x86 hardware which runs a minimalistic gdb kernel capable of executing serving as a remote gdb platform. The gdb is the new debugger. So, as you see there is x86 hardware which boots up. When any x86 hardware boots up, it boots up as in the real mode and then, there is the gdb

kernel which is stored in as a bootable operating system that small mini kernel will take the hardware to a protected mode privilege level zero, and the gdb kernel will also be thinking on the serial port to see if there are some programs that are basically sent from another system which we call as a host system, which you see on the top on the slide. So, when the program comes, it will take to load it and execute. It will also give some minimalistic features to go and debug how the programs are actually executed on the hardware.

Now, we have the host OS system as you see on the top which basically runs, it can run Linux or Window system and basically, it compiles the assembly code in an ELF format, J extended Linux format and it communicates through the serial port to x86 hardware. So, when the hardware is booted up, x86 is booted up. It waits on the serial port for a program that will be sent by the host system. So, the gdb kernel here loads the software that is communicated through the serial cable into the memory and executes it. Then, at the end of it, it also gives some interface, so that the host system can find out what actually happened in your x86 hardware. So, this is the setup.
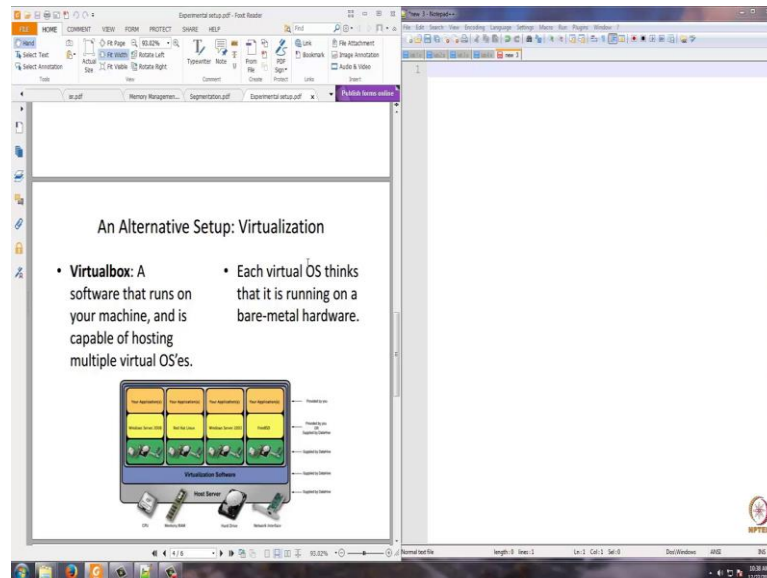
(Refer Slide Time: 03:34)
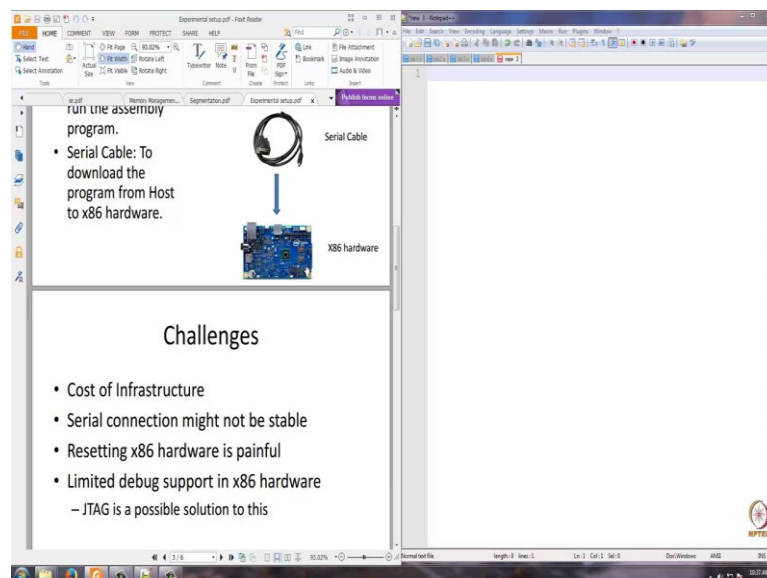
Now, this infrastructure that we have created has some challenges because, we now need two systems and you talk through a serial port and the serial. There can be vulnerability

to lot more errors and there can be you now, these are basically two loosely couple systems and for us to basically get that done; there are challenges. So, in order to make this whole experience much more or less painful, what we have done is we have used virtualization.

(Refer Slide Time: 04:03)

So, what is a virtual box? So, there is basically a virtualization software runs on top of a case operating system in which, you can create multiple virtual boxes and in each of the box can run as an individual machine.

(Refer Slide Time: 04:27)
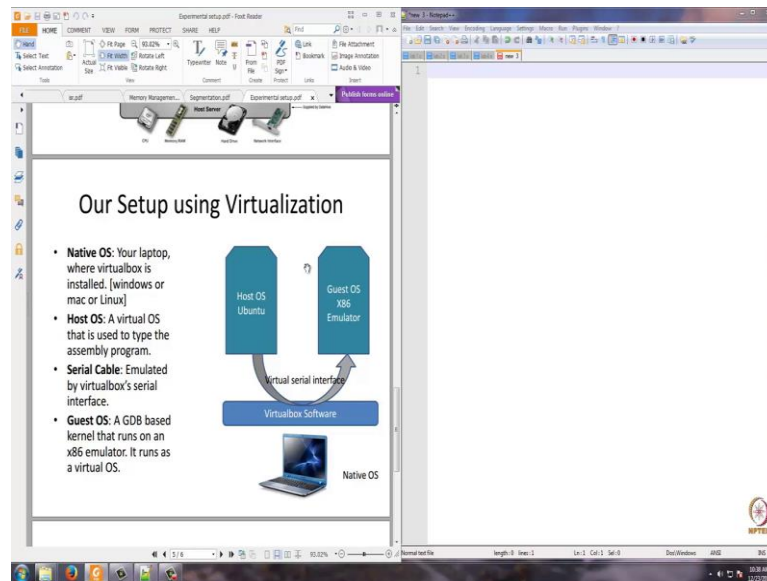
So, what we have done here is, we have installed a virtual box. The oracle virtual box on the base on your desktop or laptop, and on the virtual box, we created the virtualization software. We created two virtual boxes. One box will hold the host operating system, namely in this case Ubuntu and another would be a machine which mimics the x86 hardware which we call has the guest OS x86 simulator and between these two machines, we also mimic a serial port connector.

Now, this gives us an environment where we can use a single desktop and we can execute both the host machine and the guest machine instead of having them individually. So, both the host machine and the guest machine and x86 machine will be put in two different virtual boxes. These two boxes will be connected through a mimicked serial cable. So, we exactly reproduce this environment on the hardware setup here.
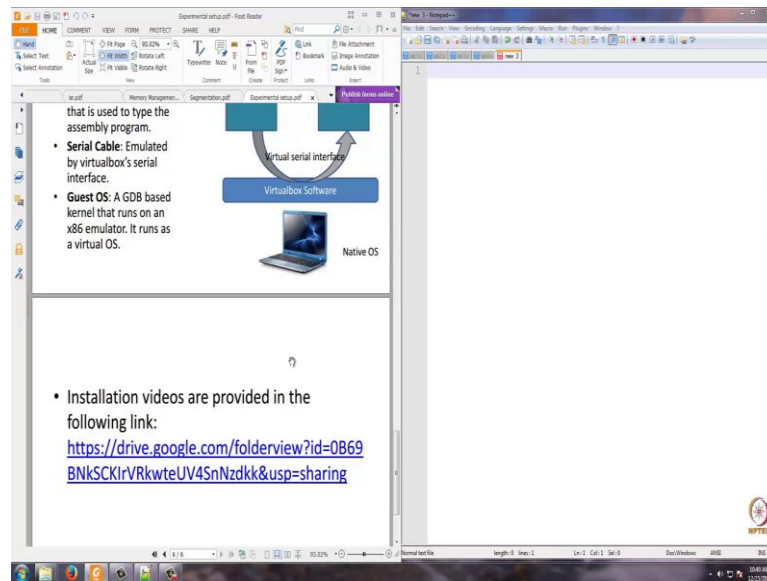
So, we will now go into the installation videos. They are provided in the flowing link. This link is also shared in the website. So, please do make this installation and be ready, so that we could take the lab sections and you can have a very nice, interesting, exciting experience.

Thank you.