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COEN 177L

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Instruction to set up Virtual Machine with Kernel

OBJECTIVE

1. Learn how to set up and use a virtual machine in Linux with VMware
2. Learn basic GUI commands that help navigate in kernel-level Operating System
3. Learn how to do FTP and modification to root-source files

TOOLS

1. Computer with Linux System
2. Minix3 kernel from VMware
3. No Machine Enterprise Client (Optional)---help establishes a virtual Linux environment

NOTE

1. Since I have a computer that runs on Windows, I also must switch to a Linux system first then set up the virtual machine.

PROCEDURES

1. Download required software
   1. Using local Linux computer
      1. No need to install Linux
      2. Need to install VMware minix3
         1. Go to <https://www.virtualbox.org/>, download *virtualbox*,

a public platform that contains the kernel we are looking for

* + - 1. Find *minix\_R3.3.0-588a35b.iso.bz2* in *virtualbox,* download, extract and install it on your local computer
  1. Using remote Linux computer
     1. Use NoMachine Enterprsie Client to access Linux
        1. Go to <https://www.nomachine.com/download/download&id=16> and download the client on your local computer
        2. Go to <https://quota.engr.scu.edu/nx/ECC-NX-Linux.nxs>, enter **your SCU username and password** from SCU portal to download the configuration file
        3. Save the file in your Lab folder, and run it
        4. The username and password are also **your SCU username and password**
        5. After Log in, you have access to remote Linux system at SCU ECC
     2. No need to install minix3 on your computer
        1. The VMware software is provided by the Remote Linux Environment.

1. Set up Minix3 kernel in Linux
   1. Using local Linux computer (not mentioned)
      1. Not sure how this works because I do not have a Linux system
   2. Using remote Linux computer (my approach)
      1. Open a **command terminal** in NoMachine Client
      2. Type **setup vmware (tell the VMware kernel to prepare to run)**
      3. Type **minix-get-image (set up a user profile)**
      4. Type **vmware & (boot up the kernel, PLEASE WAIT FOR A WHILE)**

Graphical user interface, text

Description automatically generatedA window like below should pop up with a **“minix3”** option; click on the option and then the **“power on”** button to start the kernel

Text

Description automatically generatedThis is how the kernel terminal looks like after starting; **it should be a different terminal** as compared to the original command terminal in Nomachine

* + 1. ***Text

       Description automatically generated***After setting up, type **passwd** to create a password for this log-in session

Above is a picture of what the kernel should look like after setting up password

1. **File transfer using Minix3**
   1. We can use the OS protocol FTP to conduct file transfer between two systems.
      1. In the Minix3 terminal, type **tcpd ftp /usr/bin/in.ftpd &** so the kernel recognizes the FTP protocol
      2. Text

         Description automatically generatedThen type **ifconfig** to check the current IP address of the kernel
      3. Now on the Nomachine terminal, type **FTP <your Minix 3 address>** (in my case it is **172.16.127.128**) to establish a FTP connection between the machine with the kernel machine.

*Text

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* + 1. **After Entering username and password,we are ready to transfer files!**
  1. Common commands to navigate in the file system
     1. Minix 3
        1. Pwd --- current position in the computer file system
        2. Ls --- all files in current location
        3. Cd --- change directory to …
        4. Cd .. --- go back one position
     2. Local in FTP
        1. Lcd --- current position
        2. Lcd <folder> --- change to the folder position
  2. Example: navigate to **usr/src** in Minix 3
     1. First, we do a **pwd to** check where we are
        1. We should see “/root” 🡪 we are in a folder that has no other folders around it.
        2. This means that we are not in the right folder; /usr should be the first folder not /root
     2. Secondly, we do a **ls** to see what is inside our location
        1. Text

           Description automatically generatedThis is to check that **/usr** is not in the folder, that means we need to look to the previous location
     3. Thirdly we do a **cd..** to go back one location
     4. Fourthly, we do a **ls** to check what we have in this location
        1. Text

           Description automatically generatedWe should find **/usr** as one of the folders
     5. Lastly, we **cd usr** and then **cd src** to go into the /usr/src folder
  3. To find specific files with specific pattern
     1. Use **grep** keyword
        1. Grep -<format><pattern> <file>
        2. Grep -i 🡪 ignore case-sensitivity
        3. <\*file> 🡪 look for all of type file
     2. **Example: look for all .c files containing the word “copyright”**
        1. Grep -i copyright \*.c
           1. -i looks for every case of “copyright”
           2. \*.c looks for every .c file in the current position
     3. To locate a .c file in the kernel that contains copyright
        1. We do **cd kernel** and then perform the grep syntax above

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* + 1. **grep** returns the file(s) that contains the pattern in the current directory
    2. We can see that in the file ***main.c***, we found the word “Copyright
  1. Finally, file transfer….
     1. Navigate to the same location where ***main.c*** is in (/usr/src/kernel) in the NoMachine terminal
     2. Run **get main.c** and to get main.c from virtual kernel to local
     3. Use **put** to transfer from local to virtual

1. Modifying Files
   1. To modify the copyright statement
      1. We first need to find the line number where copyright is contained
      2. Use **grep -n copyright main.c** 🡪 returns the line number where copyright appears
      3. Text

         Description automatically generatedChange the string that contains “copyright” to some random sentences in the **copied main.c**, and save it
2. Modifying kernel
   1. Put the modified kernel file back to the original system
      1. Navigate to /usr/src/kernel with NoMachine terminal
      2. Remove the original main.c using **rm main.c**
      3. Use ftp 🡪 put main.c to put the new version in
   2. In the kernel, use **makeworld** to recompile the kernel

Text

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* 1. Then use **reboot**, to restart kernel to see the changes

*Text

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If done correctly, we can see the changes in Copyright statement we made