Instructions for Virtual Machine (VM) Setup Using VirtualBox

This assignment uses Oracle's VirtualBox virtualization software that will allow you to run a version of Scientific Linux as a virtual machine (VM). VirtualBox already exists by default on all DICE machines. If you have done the Operating Systems (OS) course, the following instructions may seem familiar. The VM image for this assignment has dummynet link emulator and other relevant software pre-installed.

Creating the VM

Please read the following instructions to create a VM with dummynet based on VirtualBox. *NB.* These instructions work ONLY on DICE machines, and moreover, you must have an X display set. That is, you must either be on a DICE workstation, or you must be logged from via SSH with X display forwarding enabled (or you must have explicitly set an appropriate DISPLAY.) Do **NOT** run VirtualBox on any of the server machines in the School.

Open a terminal.

Create a directory for this assignment (e.g., comn-cwk) and "`cd`" into it.

Then issue the command:

```
% /disk/scratch/dummynet/createdummynetvm
```

Follow the on screen instructions. This step will create a VirtualBox VM called "DummynetSL6". It will also create a sub-directory called "dummynetshared" that you can access from within the DummynetSL6 VM by mounting it, as described later in this document.

Starting the VM

You can start the newly created VM from the command line in two ways:

```
% ./startvm.sh
```

OR

```
% VirtualBox
```

In the latter case, the VirtualBox GUI will appear. You will need to select "DummynetSL6" in the left hand side (if it is not already selected by default) and press the Start button on the top.

The virtual machine will automatically log into X as the user "vmuser" with the password "vmuserpw". For *root* access you should use the command "`su`" and enter "vmrootpw" when

prompted for a password. The virtual machine guest session should behave like any normal X Windows application and you can resize it or make it Fullscreen.

Shutting it down

To shutdown your virtual machine, choose the shutdown option via the system menu or type the following at the command line in a terminal (as root):

```
% shutdown -h now
```

Note that an unclean shutdown will have the same mangling effect on your virtual disk that an unclean shutdown of a real machine has on its real disks, so you should always follow this procedure.

Shared folder

When the VM is setup for you, a directory called "dummynetshared" gets created in your assignment directory. You can mount this in the VM by (as root):

```
mount -t vboxsf dummynetshared /mnt/shared
```

Additional persistent storage inside the VM

The VM has two virtual disks attached. One is mounted on /, and contains the system – it is a stripped down Scientific Linux system. NOTE that you cannot make any permanent changes to files to this disk image – any changes you make will be lost when you shutdown the VM. To provide VM-internal storage, a second disk is mounted on /work, and changes in here can be made as root and are persistent. Note that this second virtual disk is in reality a file in your filespace, so consumes part of your quota – so don't copy any BIG files into /work.

Miscellaneous

If you have an exisiting VirtualBox disk let the script create the dummynetwork.vdi file and then delete it and create a symbolic link from the other file to dummynetwork.vdi

E.g.,

```
% ln -s ~/work.vdi ./dummynetwork.vdi
```

Finally, you may (indeed, will!) get to a state where your console is wedged with a command not responding. It is not possible (currently) to `ssh` into your VM from outside; however, like all standard Linux systems, the system has six virtual (i.e. virtually virtual!) consoles available on the (virtually real) system console. You can switch to virtual console N by pressing Host-FnN, where Host is the right Control key (unless you've changed it). For example, to switch to virtual console 2, press Host-Fn2. You can then log in there.