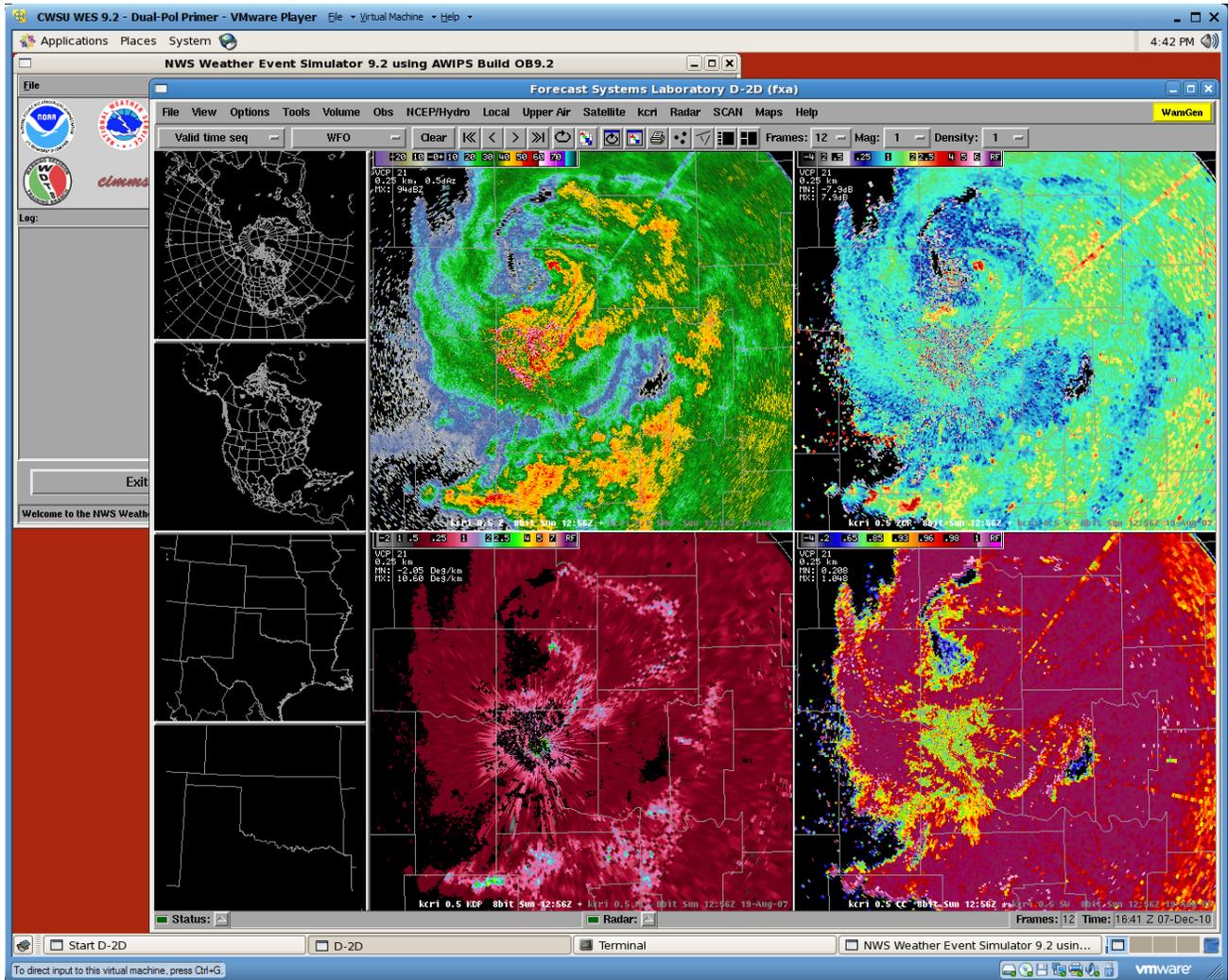


Virtual NWS Weather Event Simulator 9.2 for CWSUs External Drive Documentation for Linux



NOAA NWS Warning Decision Training Branch
Norman, OK

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Part I

Drive Installation and Usage Documentation

There are two connection options for transferring data between the external drive and the local computer: External Serial Advanced Technology Attachment (eSATA) or Universal Serial Bus (USB) 2.0. The eSATA technology allows for much faster transfer rates between devices compared to USB2.0. As a result, a connection via eSATA could allow for virtual machine playback directly from the external drive with no local case transfer. Because eSATA technology is still relatively new, your machine may not have any external eSATA ports available. The external drive kit comes with an internal eSATA bracket which can be installed by following the instructions in Section 1.

1 Installing the Internal eSATA Bracket (Optional)

If the machine does not have any external eSATA slots available, the package contains an internal eSATA bracket which can be installed inside the tower to provide eSATA connectivity to the drive. If the machine does not meet the prerequisites below, you can still connect the drive via USB 2.0 and follow the instructions from Section 2 onward.

1.1 Prerequisites

In order for installation to occur, the following prerequisites must apply to the machine:

- No external eSATA ports available
- An empty bracket slot in the back of the machine
- An open SATA slot on inside the machine

1.2 Instructions

The following hardware is needed to complete these steps:

- (a) Internal SATA to eSATA 1 Port Host Bracket with Cord

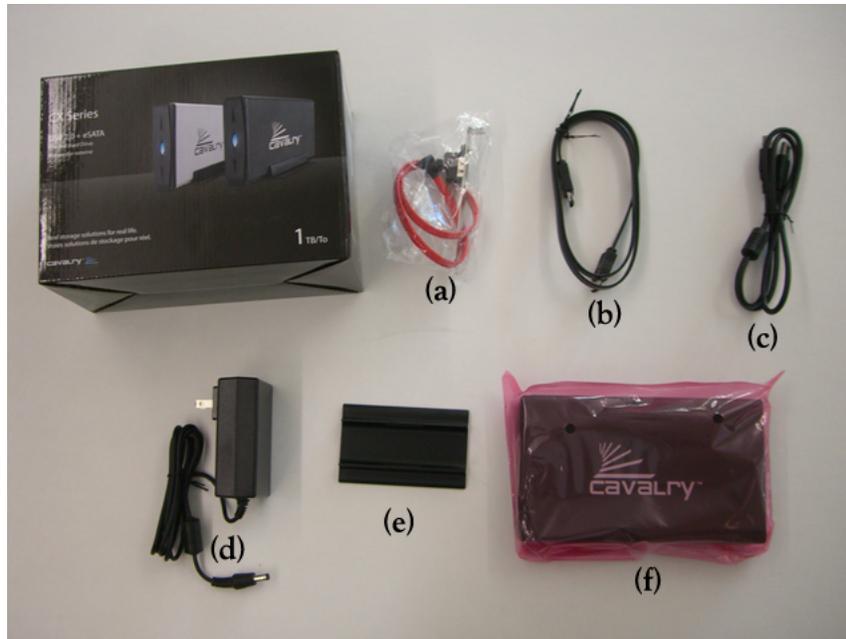


Figure 1: An overview of the external hardware components

If the above prerequisites are met, please follow the instructions below:

1. Power off the computer
2. Attaching the eSATA host bracket to the machine:

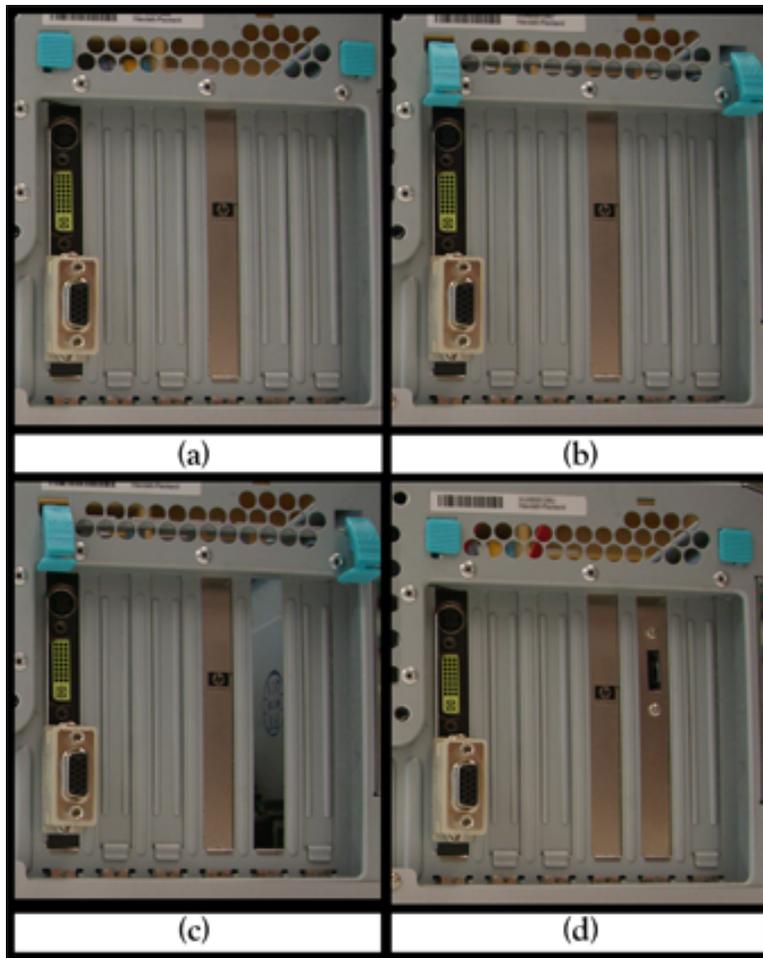


Figure 2: eSATA bracket installation.

- (a) Find an open access slot (e.g. SATA1) where the bracket can be placed.
 - (b) Open up the side of the machine and unlock any bracket tabs that are keeping the bracket slots in place.
 - (c) Pull out an empty placeholder bracket.
 - (d) Insert the eSATA bracket with the cord facing into the machine and lock the bracket into place..
3. Plugging the internal eSATA cord into the SATA slot:

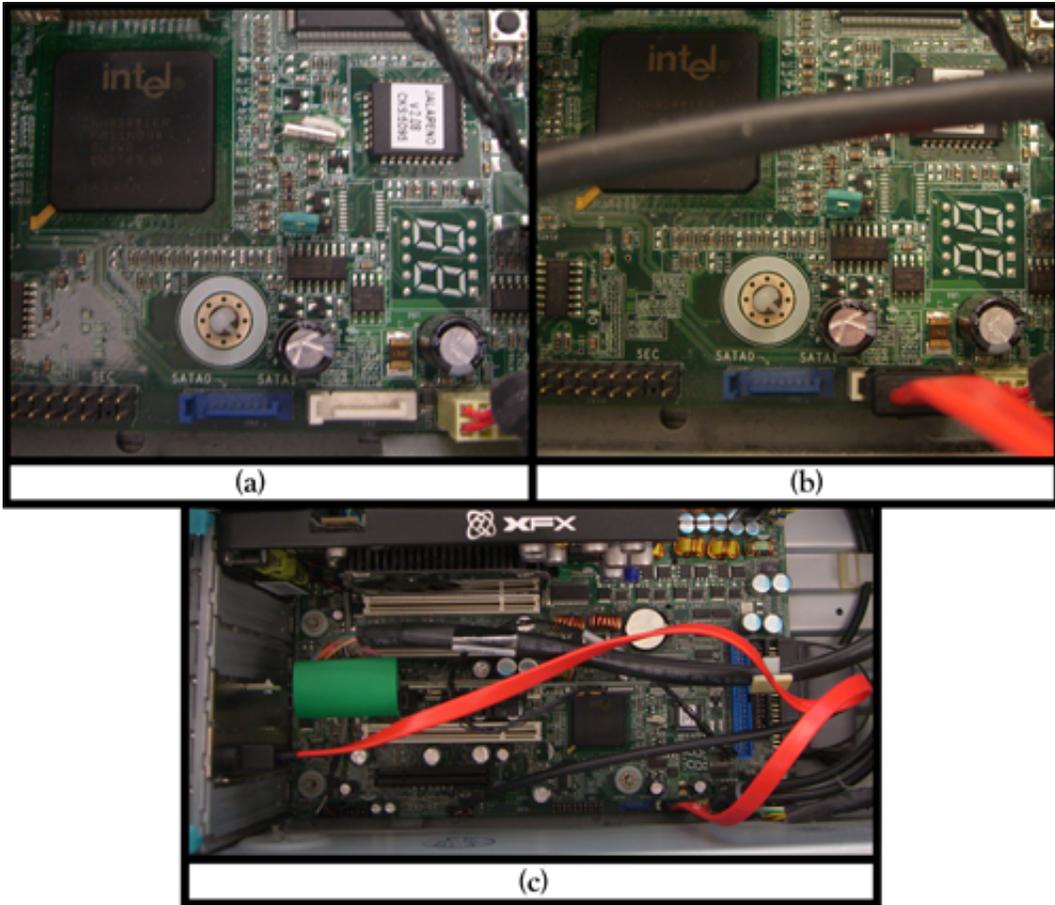


Figure 3: Connecting the internal eSATA cord.

- (a) Find an unoccupied SATA port inside the machine. The most likely location for this will be on the motherboard.
- (b) Plug the internal eSATA cord into the SATA slot.
- (c) You have completed the internal connection process. Close up the side of the machine.

2 Connecting the External Drive

2.1 Prerequisites

The following hardware is needed to complete these steps:

- (b) External eSATA Cord OR (c) External USB Cord
- (d) AC Power Adapter
- (e) External Hard Drive Stand
- (f) External Hard Drive

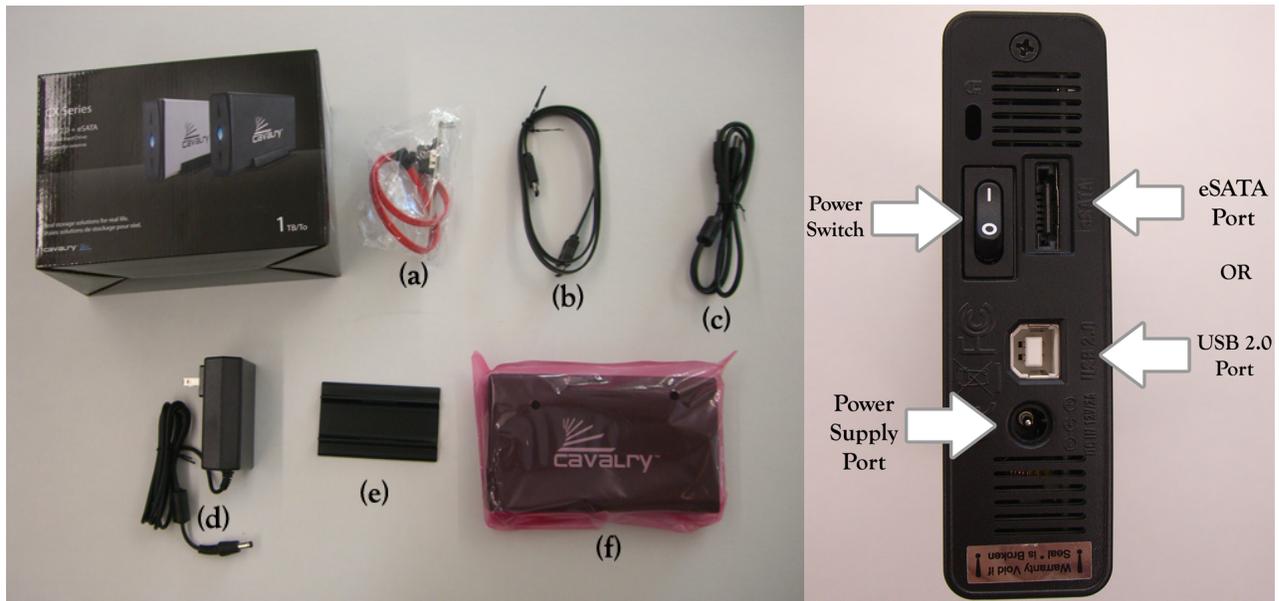


Figure 4: Kit components and drive inputs

2.2 Plugging in the External Drive

1. Ensure the computer is powered off.
2. If you are using eSATA, plug the external eSATA cord (b) into the back of the external drive. If you are using USB, plug the external USB cord (c) into the back of the external drive.
3. If you are using eSATA, plug the other end into an eSATA slot on the computer (either an available external eSATA slot or the slot installed with the eSATA host bracket on the back of the machine). If you are using USB, plug the other end into an open USB slot on the computer.
4. Plug in the external drive power supply (d) and place the drive into its stand (e).
5. Power on the external drive.

2.3 Changing the Boot Order

The existing AWIPS Remote Desktop (ARD) is an HP xw6600 with a RAID card. We found that with this Linux configuration, the default boot order will attempt to read the external drive first, before the internal drive. As a result, boot-up will fail because there is no operating system on the external drive. You will need to check the boot order in the BIOS to ensure the internal drive has boot priority.

1. Powering on the computer:

- (a) After pressing the power button, strike the F10 key when prompted to launch the Hewlett-Packard Setup Utility.
- (b) Navigate to the **Boot Order** menu item and strike the **Enter** key to load it.
- (c) On the HP xw6600, both the internal hard drive and external hard drive entries will appear in a sub-menu under **Hard Drives**. The external drive will appear as **Hitachi HDS721010CLA**, make sure this drive is below the options for the **Integrated IDE** and the internal drive. If you are using the old **ARD**, your internal drive entry will look something like this: **#2000 ID00 LUN0 HITACHI HUS153073VLS30**. After shifting the order, the **Hard Drive** section should look like this:
Integrated IDE
#2000 ID00 LUN0 HITACHI HUS153073VLS30
Hitachi HDS721010CLA
- (d) Save the new configuration and select the **Save Changes and Exit** menu item under the **File** menu to boot up the machine.

2.4 Creating a Shared User Account

To ensure there are no conflicting permissions between different levels of users when using or sharing machines, it is strongly recommended that a shared user account be built and used when maintaining or playing the virtual machines.

1. Log into the machine as the **root** user
2. Create a group account by typing in the following command:

```
%> groupadd <group_name>
```

WHERE

<group_name> = The name of the group you want to create

EXAMPLE: %> groupadd cwsu

- (a) In the example above, we are creating a group named **cwsu**. An entry for this group will be stored in the **/etc/group** file.

3. Create a user account by typing in the following command:

```
%> useradd <user_name> -d <home_directory> -g <group_name>
```

WHERE

<user_name> = Name of the user account

<home_directory> = Path of the home directory for the user account

<group_name> = Name of the group that the user will belong to (the group must already exist)

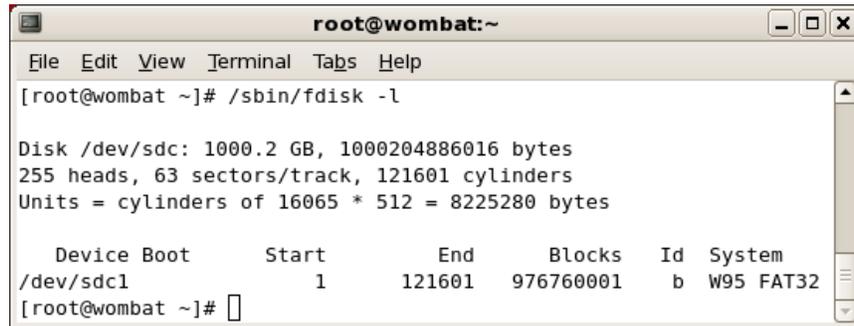
EXAMPLE: %> useradd cwsu -d /home/cwsu -g cwsu

- (a) In the example, we create a user named **cwsu**, with a home directory located in **/home/cwsu**, and this user will belong to the group (created in step 2) called **cwsu**. An entry for this user will be stored in the **/etc/passwd** file.

2.5 Mounting the Drive

1. Log into the machine as the `root` user.
2. Verifying drive connectivity to the machine:
 - (a) Open up a new terminal and type the following command (NOTE: The flag is a “lowercase L”):

```
%> /sbin/fdisk -l
```



```
root@wombat:~  
File Edit View Terminal Tabs Help  
[root@wombat ~]# /sbin/fdisk -l  
  
Disk /dev/sdc: 1000.2 GB, 1000204886016 bytes  
255 heads, 63 sectors/track, 121601 cylinders  
Units = cylinders of 16065 * 512 = 8225280 bytes  
  
   Device Boot      Start         End      Blocks   Id  System  
/dev/sdc1            1         121601     976760001    b   W95 FAT32  
[root@wombat ~]#
```

Figure 5: `/sbin/fdisk -l` output for the external drive

- (b) Look for the external drive, it is most likely the only drive with 1000.2 GB of space and a W95 FAT32 environment. Figure 5 shows a similar output that you should see with the newly connected external hard drive. In the example above, the external drive is mounted in the `/dev/sdc` disk and contains a single device boot partition entry of `/dev/sdc1`.
3. Create a directory where this drive should be mounted and provide permissions:
 - (a) Create the mount directory by typing the following command:

```
%> mkdir /wesdatamount
```

 - i. You can name this directory whatever you want, but for the remainder of these instructions, the mount folder will be located in `/wesdatamount`.
 - (b) Change ownership permissions by typing the following command:

```
%> chown <user>:<group> /wesdatamount
```

 - i. Where `<user>` and `<group>` are a shared user and group the can access system resources (created in Section 2.4). Assuming our shared user name is `cwsu` and our shared group name is also `cwsu`, the command would be as follows:

```
%> chown cwsu:cwsu /wesdatamount
```
 - (c) Open up permissions on the mount folder by typing the following command:

```
%> chmod 777 /wesdatamount
```
 4. Create a file systems table entry in `/etc/fstab`:
 - (a) Open the `/etc/fstab` file with any text editing program, in the example below, we use `vi`:

```
%> vi /etc/fstab
```
 - (b) Add an entry containing the following information:

```
<drive label entry>    <mount folder>    vfat    rw,umask=000    0 0
```

- i. <drive label entry> = The drive label or device partition entry. The drive is labeled as “wesdrive” by default. We recommend you use this label instead of the device partition.
- ii. <mount folder> = The mount directory specified in step 3. In the example provided, this directory was called /wesdatamount

Using the example entries above, the /etc/fstab line would be formatted as follows:

```
LABEL=wesdrive    /wesdatamount    vfat    rw,umask=000    0 0
```

(c) Save and quit out of the file

5. Mounting the disk to the mount folder:

(a) Type the following into a terminal window:

```
%> mount /wesdatamount
```

- i. /wesdatamount is the mount directory specified in step 3(a), if you gave your mount directory a different name, use that name in the entry above instead of /wesdatamount. You will be returned a terminal command prompt with a successful mount.

(b) With the disk mounted, you can check the size of the drive by typing the following into a terminal window:

```
%> df -h /wesdatamount
```

NOTE: If your mount directory name deviates from the name in these instructions, use your specified mount directory name. Figure 6 shows the output of the above command:



```
root@wombat:~  
File Edit View Terminal Tabs Help  
[root@wombat ~]# mount /wesdatamount  
[root@wombat ~]# df -h /wesdatamount  
Filesystem      Size  Used Avail Use% Mounted on  
/dev/sdc1       932G  289G  643G  32% /wesdatamount  
[root@wombat ~]#
```

Figure 6: The output of the df -h command if the drive was mounted successfully.

3 Installation/Uninstallation of the VMware Player Software

3.1 VMware Player Software Installation

The VMware Player The external drive contains two installers, one for each type of memory architecture:

- VMware-Player-3.1.3-324285.i386.bundle - for 32-bit operating systems
- VMware-Player-3.1.3-324285.x86_64.bundle - for 64-bit operating systems

1. Log on to the Linux machine as the root user
2. Launch a new terminal window
3. Type the following command to determine which architecture you have:

```
%> uname -i
```

- (a) If this returned `i386`, you will use the `VMware-Player-3.1.3-324285.i386.bundle`.
- (b) If this returned `x86_64`, you will use the `VMware-Player-3.1.3-324285.x86_64.bundle`.

4. Change directory to the location of the external drive on the Linux box and look for the `vm_installers` folder. In the example below, the drive was mounted to `/wesdatamount`, your mount location may vary.

```
EXAMPLE: %> cd /wesdatamount/vm_installers
```

5. Execute the `VMware-Player-3.1.3-324285.i386.bundle` or the `VMware-Player-3.1.3-324285.x86_64.bundle` installer (depending on your operating system architecture):

- (a) For 32-bit operating systems (`i386`), the command will be:

```
%> sh VMware-Player-3.1.0-261024.i386.bundle
```
- (b) For 62-bit operating systems (`x86_64`), the command will be:

```
%> sh VMware-Player-3.1.0-261024.x86_64.bundle
```

6. This will launch a Graphical User Interface (GUI) and you will be prompted with the following messages:

- (a) Would you like to check for product updates on startup?
 - i. Select `NO` and hit the `Next` button to go to the next screen
- (b) Would you like to help make VMware software better by sending anonymous system data and usage statistics to VMware?
 - i. Select `NO` and hit the `Next` button to go to the next screen
- (c) The product is ready to be installed.
 - i. Click on the `Install` button to begin installation
- (d) A successful installation will yield the following message: “Installation was successful.” If the installation is unsuccessful, examine the output generated to further troubleshoot the issue and run steps 2-4 again
 - i. Click on the `Close` button to exit the GUI

7. Log out of the machine as the root user.

3.2 VMware Player Software Uninstallation

1. Log on to the Linux machine as the root user.
2. Launch a new terminal window and type the following:

```
%> vmware-installer -u vmware-player
```

3. This will launch a Graphical User Interface (GUI) and you will be prompted with the following messages:
 - (a) All configuration information is about to be removed. Do you wish to keep your configuration files?
 - i. Select **NO** and hit the Next button to begin the uninstall process.
 - (b) A successful uninstallation will yield the following message: “Uninstallation was successful.”
 - i. Click on the **Close** button to exit the GUI.

4 Using VMware Player with WES Simulations

4.1 Starting Up a Virtual Machine

1. Log on to the Linux machine as the shared user (e.g. `cwsu`).
2. Open up a terminal window and type the following command:

```
%> vmplayer
```

NOTE: If this is the first time `vmplayer` is launched, you may receive a window with a End User License Agreement. Read through and press the **Accept** button if you agree to the terms.

- (a) This will open the VMware Player launcher menu (Figure 7)

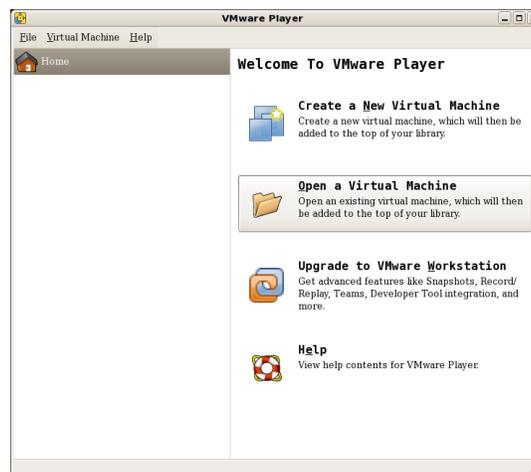


Figure 7: VMware Player Launcher Menu.

- (b) Select the **Open a Virtual Machine** button to launch the folder selector GUI (Figure 8)

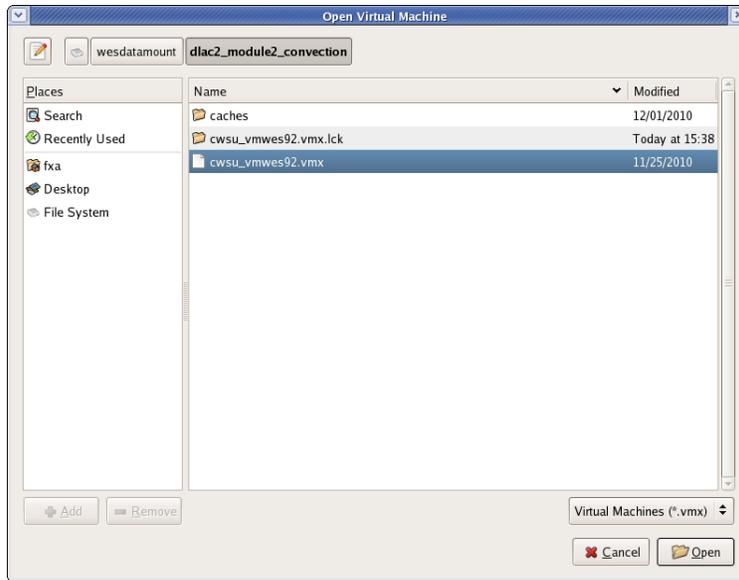


Figure 8: Virtual Machine Folder Selector

- i. Navigate to the directory path where the machine is located. For example, to view the “DLAC2: MODULE 2 - CONVECTION” simulation, navigate to the external drive and search for the dlac2_module2_convection folder (e.g. /wesdatamount/dlac2_module2_convection)
 - ii. Find the cwsu_vmwes92.vmx file and select it
 - iii. Click the Open button
- (c) There will now be a virtual machine entry in the VMware Player launcher menu. Select this entry and click on the Play virtual machine button to launch the machine (Figure 9)

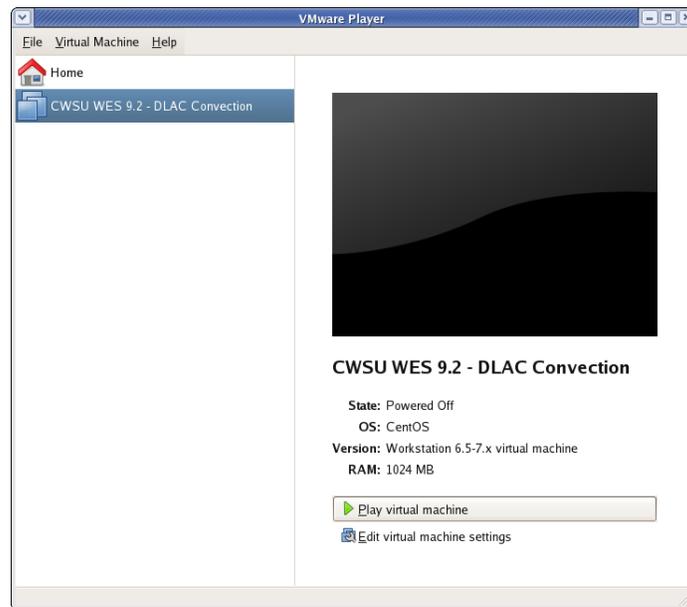


Figure 9: VMware Player Launcher Menu With A Virtual Machine Loaded

3. The main account user for the WES 9.2 virtual machine is the `fxa` user with a default password of `fxapass`. Use these credentials to log on to the machine.

NOTE: If this is the first time the WES 9.2 virtual machine is opened, you may receive the following prompt stating “This virtual machine may have been moved or copied...”. Click on the `I copied it` button. In addition, you may be prompted with VMware hints which can be disabled by selecting the `Never show this hint again` box and clicking the `OK` button.

CONGRATULATIONS! You are ready to use the Weather Event Simulator

4.2 Closing Down a Virtual Machine

4.2.1 Shutting down the Virtual Machine

1. Shutting down the WES 9.2 virtual machine can be done by selecting `System` → `Shut Down...` from the operating system inside the virtual machine (Figure 10)

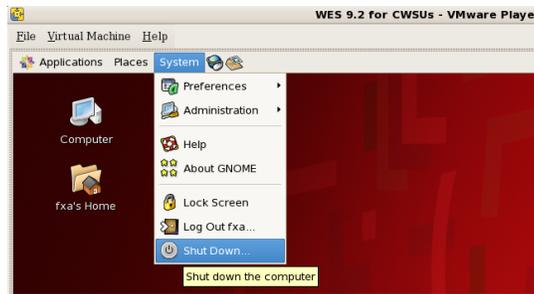
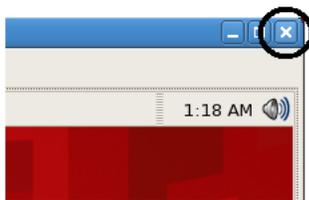


Figure 10: Shutting down the WES 9.2 virtual machine

4.2.2 Suspending the Virtual Machine

1. Suspending the virtual machine will save its current state (including the state of all applications and processes running within the virtual machine) to be restored later. This can be done by clicking the `X` button in the corner of the VMware Player window. The `X` button is located either in the upper-right hand corner of the VMware Player window if it is not maximized (Figure 11(a)) or at the top of the VMware Player window if it is maximized (Figure 11(b)).



(a)



(b)

Figure 11: Locations of Close Window (X) Button to Suspend the WES 9.2 Virtual Machine

Part II

Additional Scripts and Procedures

5 Transferring a Virtual Machine Folder to a Local Drive

The performance of the computer plays a role in the speed and behavior of the virtual machine. Some computers may not have the bandwidth to run the virtual machine directly off of the external drive. This is especially the case if the drive is connected via USB 2.0. If playing the machine off of the external drive yields sluggish performance, we recommend transferring the case to a local drive on the Linux machine using the instructions below.

1. Log on to the machine as the shared user (e.g. `cwsu`).
2. Launch a new terminal window
3. Change directory to the location of the external drive on the Linux box and look for the `linux_scripts` folder. In the example below, the drive was mounted to `/wesdatamount`, your mount location may vary.

EXAMPLE: `%> cd /wesdatamount/linux_scripts`

4. Run the `transfer_case_linux.csh` script along with a location local path where the virtual machine will be copied. In the example below, we will copy the virtual machine folder into `/usr/vmwes`, your output path may vary :

`%> csh transfer_case_linux.csh /usr/vmwes`

NOTE: The virtual machine folder can be from 20-50GB in size, ensure you have space available in destination path to hold the virtual machine contents before beginning the transfer.

- (a) You will be prompted to select a case from the list (Figure 12). Pick a valid number and that machine's contents will be transferred to the local machine.

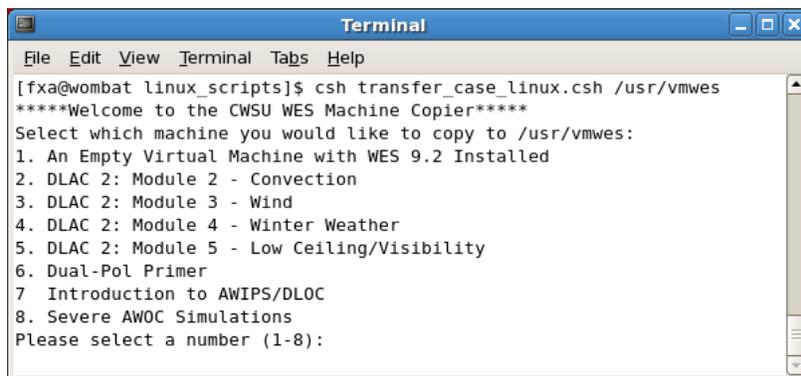


Figure 12: Case list for the `transfer_case_linux.csh` script

- (b) Continuing from the example above, choosing “6” will copy the `dualpol_primer` directory from the external drive to the `/usr/vmwes` path. Depending on the size of the virtual machine and the speed of your computer, this may take some time.
- (c) With the machine copied to your local drive, you can now launch the VMware player load the machine from this local path. See the “Using VMware-Player with WES Simulations (Linux)” document for instructions on how to launch/use VMware-Player.

6 Recovering a Corrupt Machine on the External Drive

If you suspect a virtual machine directory on the external drive is corrupt, we have provided compressed versions of all machines in a BACKUP directory on the external drive. You can restore this directory using the instructions below.

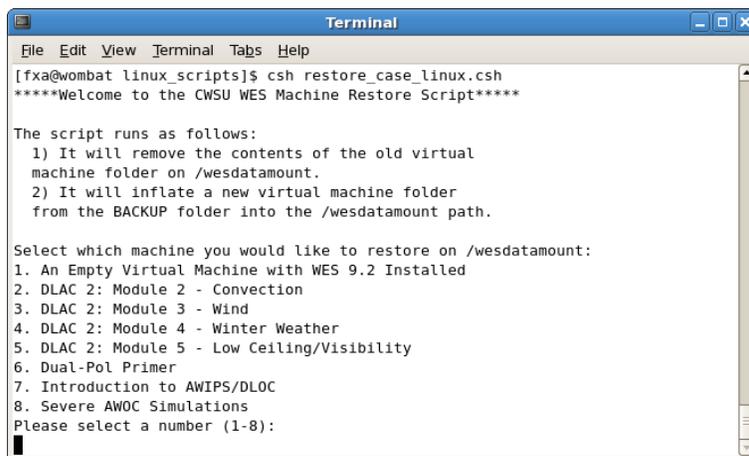
1. Log on to the machine as the shared user (e.g. `cwsu`).
2. Launch a new terminal window
3. Change directory to the location of the external drive on the Linux box and look for the `linux_scripts` folder. In the example below, the drive was mounted to `/wesdatamount`, your mount location may vary.

EXAMPLE: `%> cd /wesdatamount/linux_scripts`

4. Run the `restore_case_linux.csh` script

`%> csh restore_case_linux.csh`

- (a) You will be prompted to select a case from the list (Figure 13). Pick a valid number and that machine's contents will be transferred to the local machine.



```
Terminal
File Edit View Terminal Tabs Help
[fxa@wombat linux_scripts]$ csh restore_case_linux.csh
*****Welcome to the CWSU WES Machine Restore Script*****

The script runs as follows:
 1) It will remove the contents of the old virtual
    machine folder on /wesdatamount.
 2) It will inflate a new virtual machine folder
    from the BACKUP folder into the /wesdatamount path.

Select which machine you would like to restore on /wesdatamount:
 1. An Empty Virtual Machine with WES 9.2 Installed
 2. DLAC 2: Module 2 - Convection
 3. DLAC 2: Module 3 - Wind
 4. DLAC 2: Module 4 - Winter Weather
 5. DLAC 2: Module 5 - Low Ceiling/Visibility
 6. Dual-Pol Primer
 7. Introduction to AWIPS/DLOC
 8. Severe AWOC Simulations
Please select a number (1-8):
█
```

Figure 13: Case list for the `restore_case_linux.csh` script

- (b) Continuing from the example above, choosing “6” will remove the `/wesdatamount/dualpol_primer` directory, copy the `/wesdatamount/BACKUP/dualpol_primer` directory to `/wesdatamount/dualpol_primer`, and unzip the contents of `/wesdatamount/dualpol_primer`. Depending on the size of the virtual machine and the speed of your computer, this may take some time.
- (c) Once you receive a “`restore_case_linux.csh completed successfully!`” message, the machine is ready to be launched from the external drive or transferred to a local drive.

7 Installing the Advanced Linux Sound Architecture (ALSA) Sound Drivers

The VMware Player running on a RedHat Enterprise Linux 5 (RHEL5) requires ALSA version 1.0.16 or greater in order to hear sound played within the virtual machine. The external drive contains the ALSA .rpm files in the `vm_installers` directory.

NOTE: These RPM files assume you have a 32-bit RHEL5 architecture. If your system is different, please

1. Log on to the machine as the `root` user.
2. Change directory to the location of the external drive on the Linux box and look for the `vm_installers` folder. In the example below, the drive was mounted to `/wesdatamount`, your mount location may vary.

EXAMPLE: `%> cd /wesdatamount/vm_installers`

3. Update the ALSA RPMs by typing the following commands:

```
%> rpm --force -ihv alsa-lib-1.0.17-1.el5.i386.rpm
```

```
%> rpm --force -ihv alsa-lib-devel-1.0.17-1.el5.i386.rpm
```

```
%> rpm --force -ihv alsa-utils-1.0.17-1.el5.i386.rpm
```

4. Any suspended virtual machines will need to be rebooted in order for the new sound components to take effect. To shut down any open or suspended virtual machines, follow the steps in Section 10.