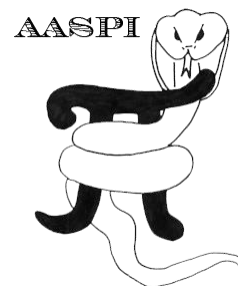


# Software Installation - Accessing Linux and Checking your Environmental Variables



## Accessing Linux and Checking your Environmental Variables

Although you may be fortunate enough to have a powerful multi-processor desktop running Linux, most of our sponsors do not. Most of our sponsors will have access to a desktop designed to run seismic interpretation software – either a Linux-based machine perhaps running Seisworks, Voxelgeo, or Geoframe software, or a windows-based PC running Petrel, Geomodeling, Kingdom Suite, or Transform software. In these cases, it may be most efficient (and avoid negatively impacting your local interpretation response time) to run remotely on a Linux cluster or compute server.

### Linking to a Linux compute server from a Linux desktop workstation

If you are a first time user of this software and somewhat unfamiliar with Linux, you will want to make sure that your DISPLAY variable is set to run on your local system. Specifically, if you log on to a server called *computer\_server.bigoil.com* from your workstation called *local\_workstation.bigoil.com* you will want to open a window on your Linux workstation (which may be a window using a Linux emulator such as **PuTTY** and **Xming** from your PC or some other “thin client”) and then type:

```
xhost +
```

This command allows anyone to display on your local Linux machine or emulator. Next, secure shell into your compute server by typing:

```
ssh compute_server.bigoil.com
```

Once there, look at the top of your xterm window, which may say something like

```
“your_userid” on local_workstation.bigoil.com.34
```

that indicates window number 34 is opened on your local workstation or emulator. If you are using a Bourne shell, in this window type

```
DISPLAY=local_workstation.bigoil.com:34.0; export DISPLAY
```

Under the bash shell this can be abbreviated as

```
export DISPLAY=local_workstation.bigout.com:34.0
```

In contrast, if you are using a C-shell in your installation, you may need to type

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```
setenv DISPLAY local_workstation.bigoil.com:34.0
```

To make sure your DISPLAY is correct, type

```
echo $DISPLAY
```

The 'echo' command should reply with 'local\_workstation.bigoil.com:34.0'.

In our environment at OU, we are able to use X-forwarding, which allows the compute-server to display back to the (Linux) area from which you started. If you have this capability, you would simply type

```
ssh -X computer_server.big_oil.com
```

Let's now test your DISPLAY parameters. Type in

```
xterm -bg lightpink &
```

A light pink colored **xterm** should pop up. If you get an error message, it's time to talk to a local IT person for help.

### Linking to a Linux compute server from a desktop PC running windows

At OU, all of our compute servers are in a locked, air-conditioned room, with our largest computer server in a different building almost 1 mile away from our desktop PCs. To access a Linux server from your PC, you will want to request your IT folks to download WinSCP and PuTTY or their equivalent. Since they are free, these are kind of software universities use. Don't be worried if your IT folks choose a more expensive communication protocol that better fits into your internal secure network.

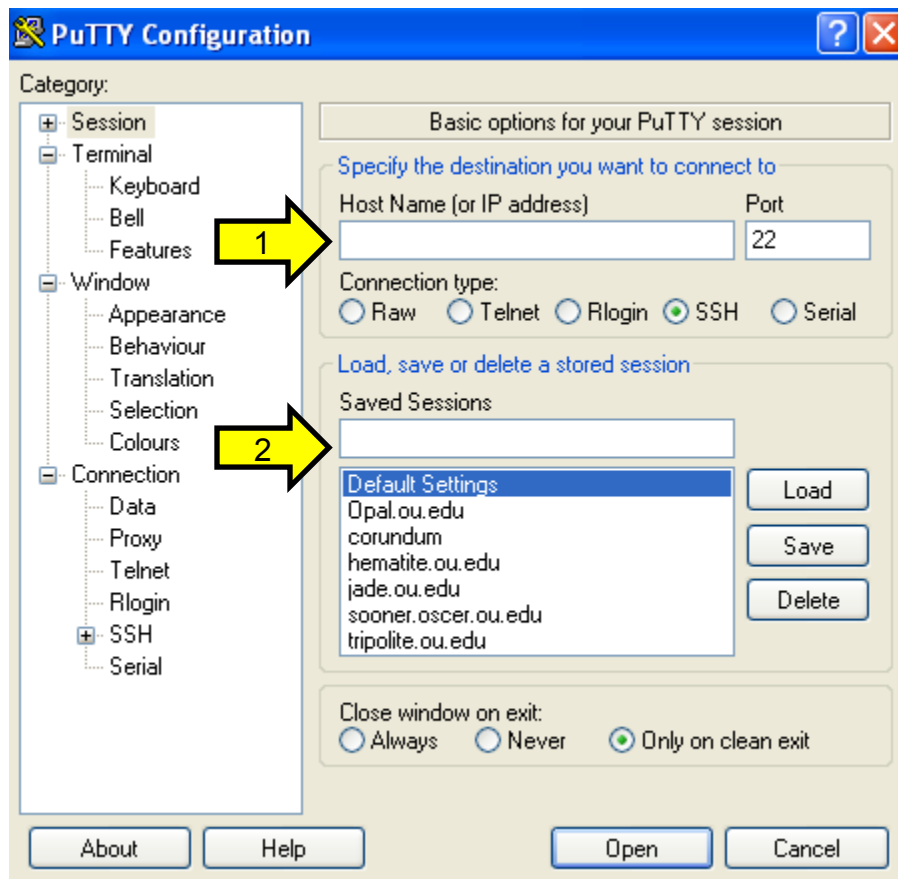
### Using PuTTY

After downloading and installing WinSCP and Putty onto my desktop, I see the following two icons:



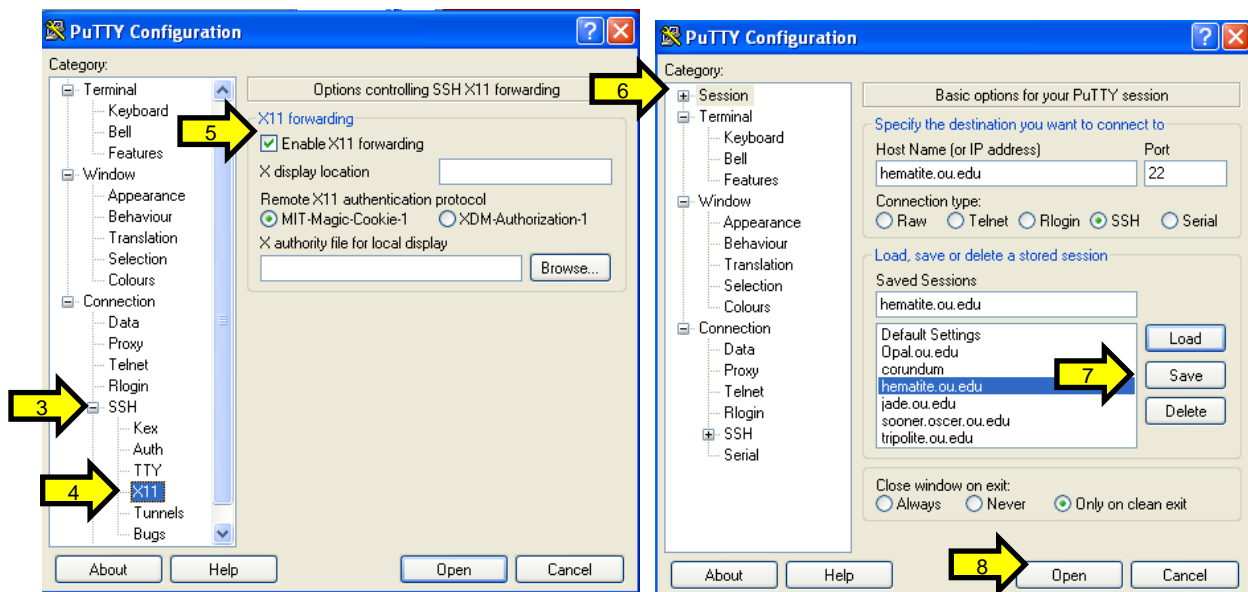
Click **PuTTY** and the window on the right pops up:

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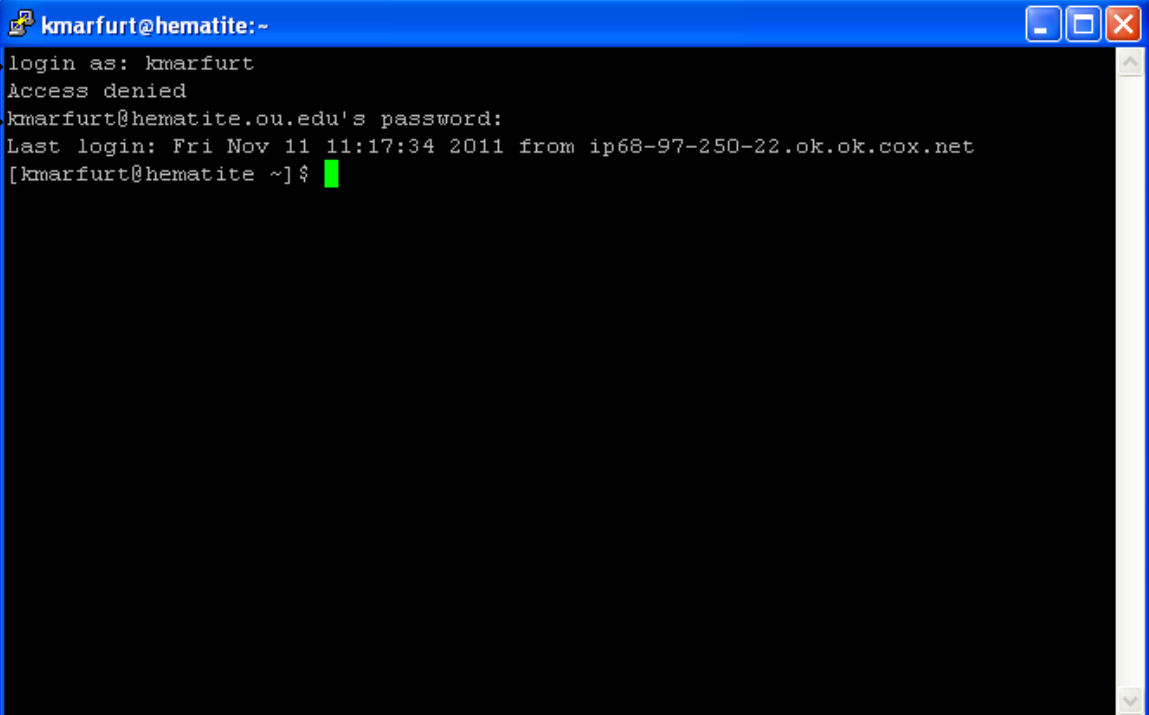
In your first invocation of PuTTY you will have blanks in the Saved Sessions area. At OU, type in 'hematite.ou.edu' under the (1) Host Name and (2) Saved Sessions areas. Don't click Open or Load yet. Obviously, you would type in the name of your local server outside of OU.

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Click (3) the SSH box to expand it. Then (4) click **X11**. Then (5) put a check mark in the Enable **X11** forwarding box. This allows any window you open on Linux to be forwarded to the PC from which you invoked **PuTTY**. Next, click (6) Session to return to the original session window. With the name of your saved session (in my case hematite.ou.edu) click (7) Save to save the file name and the **X11** forwarding settings. Finally, click (8) Open to open the **PuTTY** window.

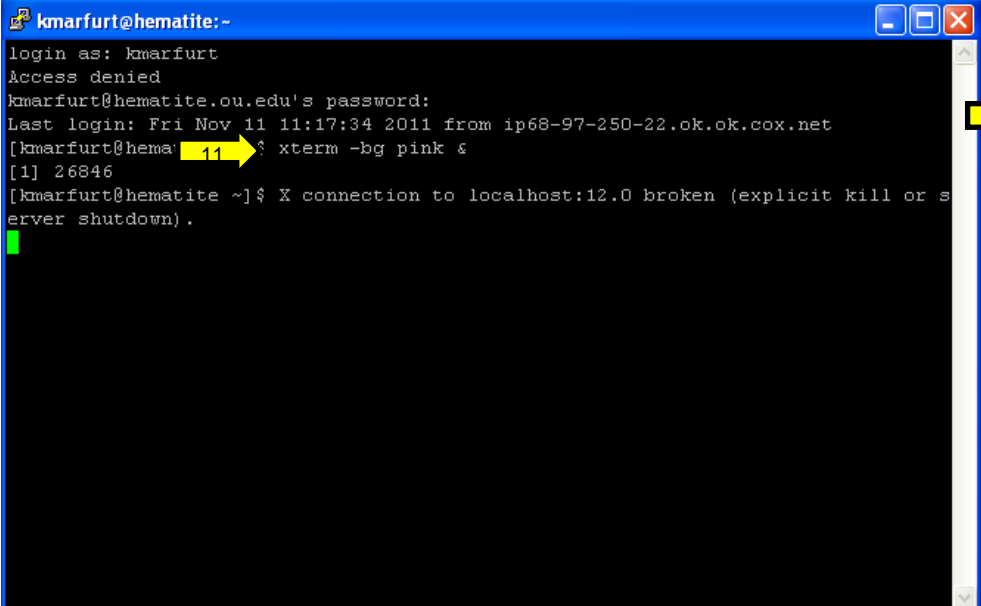
## Software Installation - Accessing Linux and Checking your Environmental Variables




```
kmarfurt@hematite:~  
login as: kmarfurt  
Access denied  
kmarfurt@hematite.ou.edu's password:  
Last login: Fri Nov 11 11:17:34 2011 from ip68-97-250-22.ok.ok.cox.net  
[kmarfurt@hematite ~]$
```

A terminal window titled 'kmarfurt@hematite:~' with a blue title bar. The window shows the login process. A yellow arrow labeled '9' points to the prompt 'login as: kmarfurt'. Another yellow arrow labeled '10' points to the password prompt 'kmarfurt@hematite.ou.edu's password:'. The terminal output shows 'Access denied' and the last login information. The prompt '[kmarfurt@hematite ~]\$' is followed by a green cursor.

I am (9) prompted for my login user id (in my case it is 'kmarfurt'. Your's will obviously be different. Next (10) I type in my password. I am now in the Linux environment on a machine called hematite.



```
kmarfurt@hematite:~  
login as: kmarfurt  
Access denied  
kmarfurt@hematite.ou.edu's password:  
Last login: Fri Nov 11 11:17:34 2011 from ip68-97-250-22.ok.ok.cox.net  
[kmarfurt@hema] $ xterm -bg pink &  
[1] 26846  
[kmarfurt@hematite ~]$ X connection to localhost:12.0 broken (explicit kill or server shutdown).  
█
```

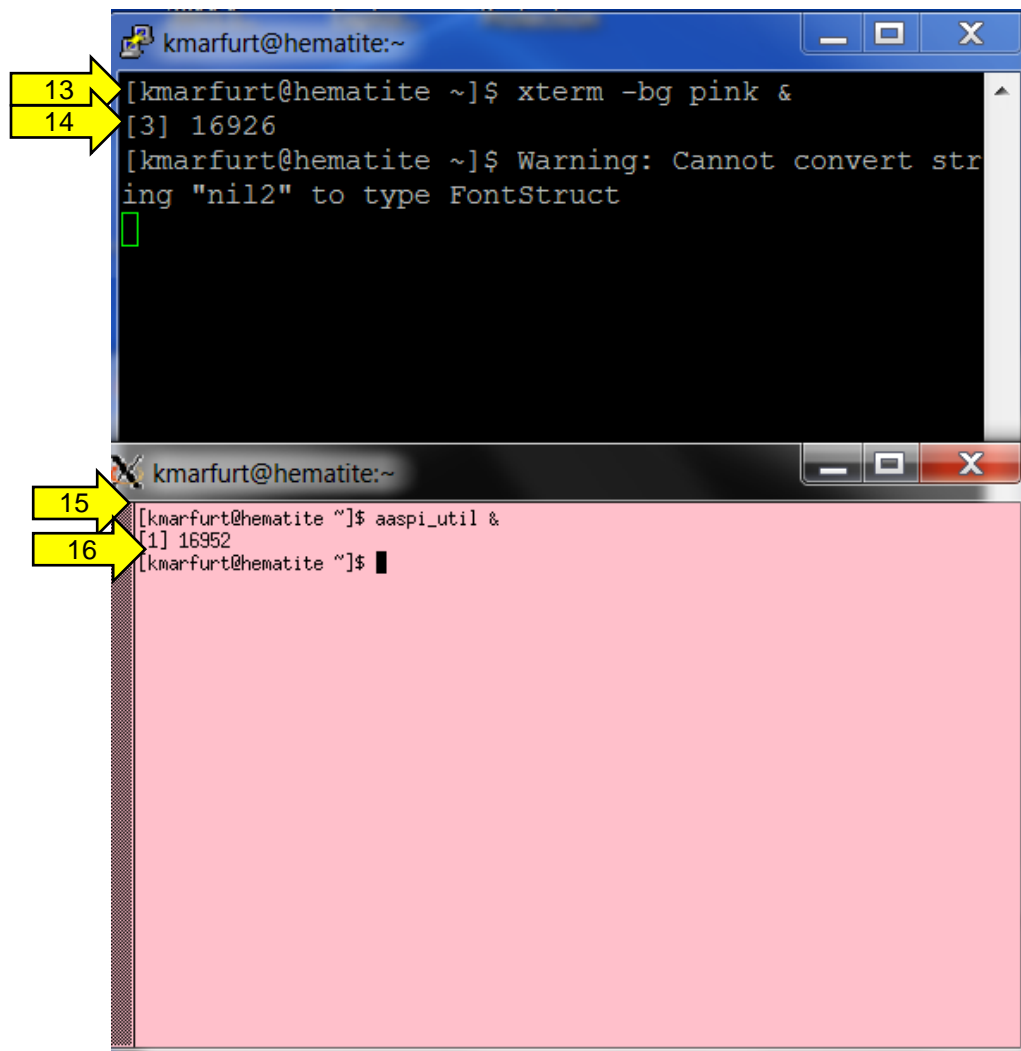


A terminal window titled 'kmarfurt@hematite:~' with a blue title bar. The window shows the login process and the execution of the command 'xterm -bg pink &'. A yellow arrow labeled '11' points to the command. The terminal output shows the command execution, the PID [1] 26846, and an error message: 'X connection to localhost:12.0 broken (explicit kill or server shutdown)'. To the right of the terminal window is a dark green icon for Xming, featuring a large 'X' with a red and blue circular element and the text 'Xming' below it. A yellow arrow labeled '12' points from the terminal window to the Xming icon.

I type in the Linux command (11) 'xterm -bg pink &' to open up a new X terminal. However, I receive a message that my X connection is broken. This error occurred because I failed to invoke Xming by clicking the Xming icon. Xming runs on the PC.

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Thus, you will only need to do this once unless you log out of the PC. (12) Click the Xming icon.



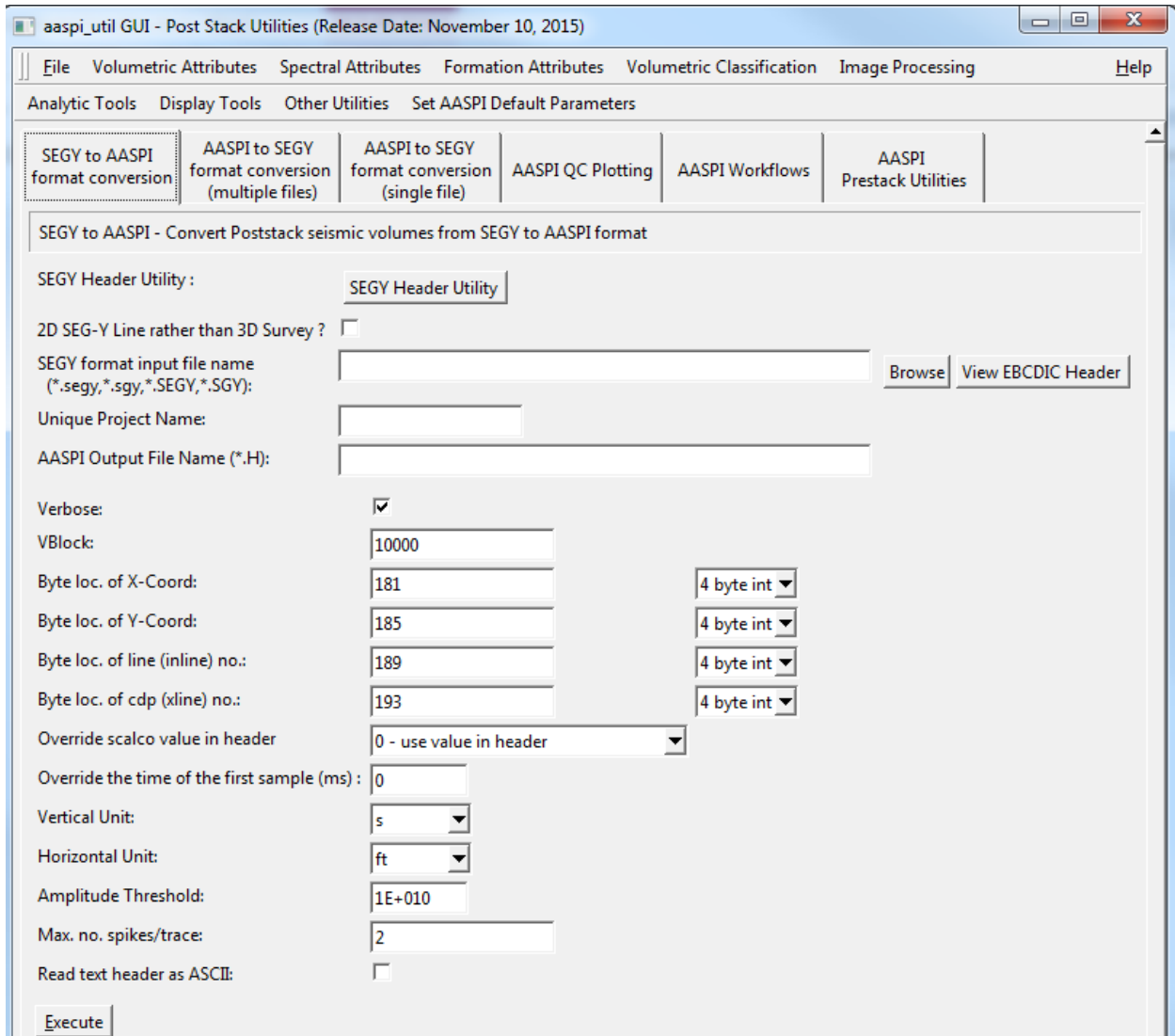
The image shows two terminal windows. The top window is titled 'kmarfurt@hematite:~' and contains the following text: [kmarfurt@hematite ~]\$ xterm -bg pink & [3] 16926 [kmarfurt@hematite ~]\$ Warning: Cannot convert string "nil2" to type FontStruct. A yellow arrow labeled '13' points to the command, and another labeled '14' points to the output. The bottom window is also titled 'kmarfurt@hematite:~' and contains: [kmarfurt@hematite ~]\$ aaspi\_util & [1] 16952 [kmarfurt@hematite ~]\$ █. A yellow arrow labeled '15' points to the command, and another labeled '16' points to the output. The background of the bottom window is pink.

I retype in the Linux command (13) 'xterm -bg pink &' . (14) A process id = 16926 appears telling me a new 'job' has been launched. A pink xterm appears. Finally, I invoke the aaspi utility GUI by (15) typing

```
aaspi_util &
```

giving rise to a (16) process id = 16952 and the window below:

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Using the **aaspi\_util** GUI will be discussed in different documentations.

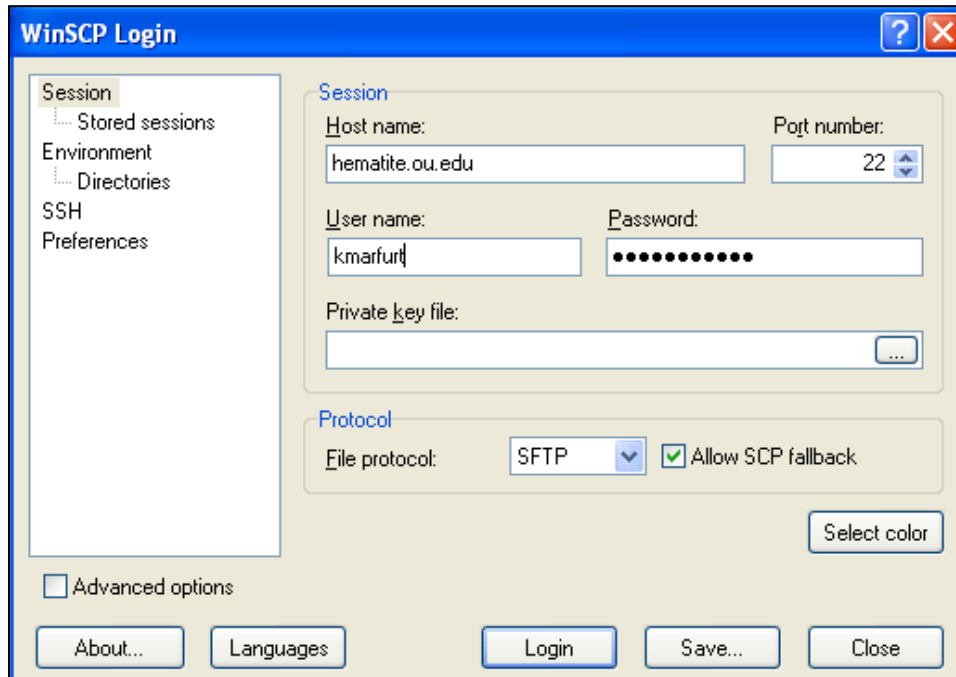
## **Using WinSCP**

To invoke WinSCP, I click the WinSCP icon

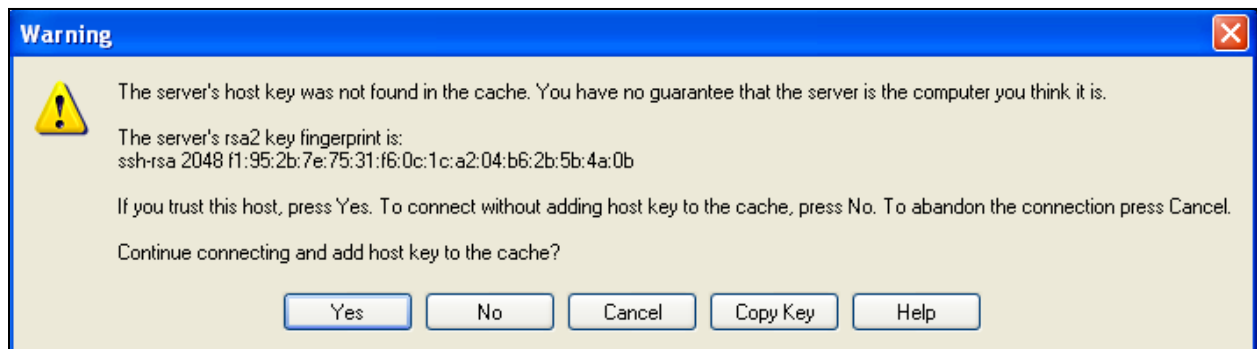


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to bring up the pop-up window:



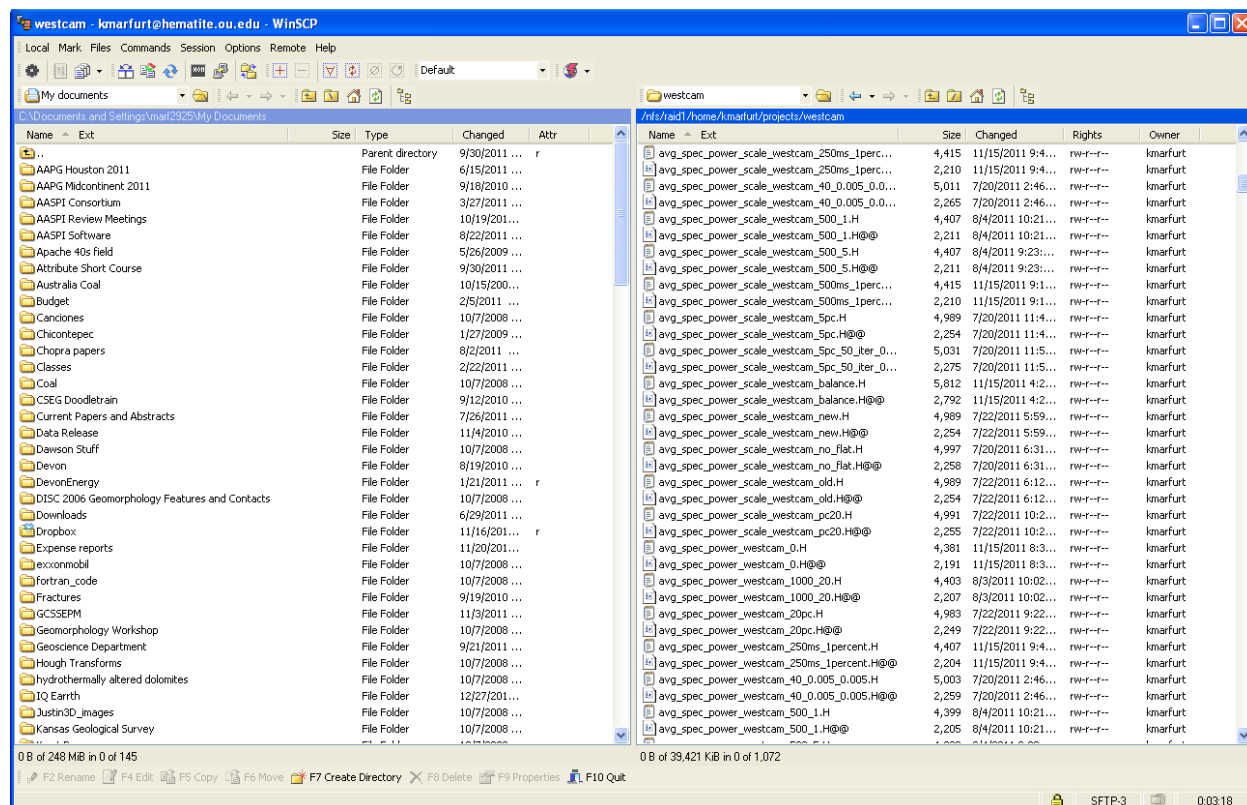
I type in the Host name (hematite.ou.edu) User name (kmarfurt) and Password (xxxxxx), and then click Login. If this is the first time you are connecting to the Linux system from this PC the Warning box below will appear. This prevents malware from connecting you to the North Korean nuclear arsenal.



After connecting the window below appears. The column of files on the left reside in the My documents folder on my laptop. The column of files on the right reside in the westcam directory on the Linux machine. To copy a file from one area to another, simply drag and drop. You can also drag and drop directly to/from a PC folder or file not in the left column, but it may first make a temporary file, slowing the process down somewhat.



# Software Installation - Accessing Linux and Checking your Environmental Variables



## Creating a project directory under Linux

Most workers will be assigned a login or data folder in which they can store their work. The first step is therefore to generate a project folder, then one for the Boonsville survey.

Don't forget to create a ".datapath" so that AASPI know where to output file to. If you forget this step, it is highly possible that your home directory (or the /tmp directory) will be flooded and quickly filled by AASPI output files. The best practice for datapath is to output into the current working project directory (i.e. "datapath=./").

If your system reserves a different storage location than your project directory, you can simply move your project directory into the storage location We highly recommend keeping the datapath to be your current working directory (i.e. "./") in order to make Windows and Linux working environment compatible with each other. However, if you wish to keep your project directory location, please read the next section regarding how to define your datapath that is different from your current working directory.

In the Boonsville directory create yet one more directory called **seggy**. Finally copy the seismic seggy-format data file into the seggy subdirectory. In Marfurt's case, the workflow is simply:

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```
cd ~kmarfurt
mkdir projects
cd projects
mkdir boonsville
vim .datapath
(Then type the following:
datapath=./
And save the file then quit)
cd boonsville
mkdir segy
cp /someplace/d_mig_boonsville.segy segy
ls -ltr segy
```

The final **ls** command should echo back the name *d\_mig\_boonsville.segy*. Once in your project directory, you are now ready to start. In fact, it is the best practice to start **aaspi\_util** from the project directory instead of launching it directly from your home directory, because in that way, all the output files would be in your project directory instead of floating all over your home directory.

### **Defining a datapath that is different from current working directory – a place in which to store your larger binary seismic data and attribute files**

If you wish to store larger binary outputs in a different location than your current working directory, you will need to create a file in your home directory called *.datapath*, where the dot '.' in front of the name indicates that the file will be invisible to Linux program **ls**. Open this file with your favorite editor (vim, nano, pico, etc.) and type in one line that reads like

```
datapath=/big_disk_drive/my_user_area/AASPI_Data/
```

and save the file. Do not forget the trailing '/' after the path name or you will create files one level up preceded with the letters **AASPI\_Data**. The **datapath** tells **aaspi\_io** or **SEP** where to write binary versus ascii files associated with the seismic data. These files can be quite large, such that it may be convenient to put them in a place that gets cleaned up every month or so.

The **AASPI** software uses **aaspi\_io**-format input, output, display, and command line utilities. The **aaspi\_io** format is a more portable version of the **SEP**-format developed by members of the Stanford Exploration Project, a geophysical consortium that has been continuously running since the late 1970s. Replacing **SEP** with **aaspi\_io** utilities enabled us to port the **AASPI** software to Windows.

I have a file called *d\_mig\_boonsville.H* in a project directory. If I edit this file, I note a line that says:

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```
in=/big_disk_drive/my_user_area/AASPI_Data/d_mig_boonsville.H@
```

that contains the binary seismic samples, and a header format file (hff) descriptor line that reads:

```
hff= d_mig_boonsville.H@@
```

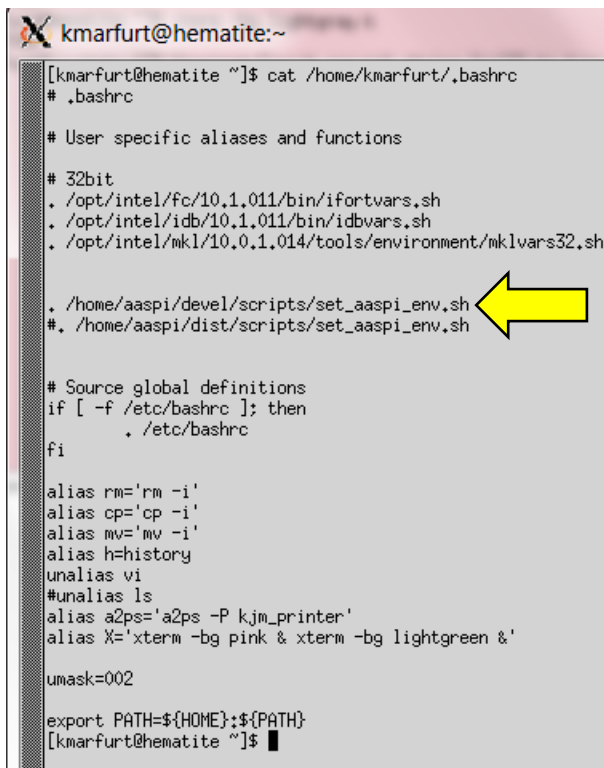
that will be in the local project directory. The *hff* file is also *ascii*. If I edit it, I will see a line that says

```
in=/big_disk_drive/my_user_area/AASPI_Data/d_mig_boonsville.H@@@
```

that contains the binary trace headers.

### Setting up AASPI Environment Variables

Finally, you need to make sure your `PATH` and `LD_LIBRARY_PATH` are set to see the AASPI software, which is achieved by sourcing the shell script `set_aaspi_env.sh`. Ideally, your system admin folks have stuck this into your `.bashrc` file. Editing this script Marfurt sees:



```
kmarfurt@hematite:~  
[kmarfurt@hematite ~]$ cat /home/kmarfurt/.bashrc  
# .bashrc  
  
# User specific aliases and functions  
  
# 32bit  
. /opt/intel/icc/10.1.0.11/bin/ifortvars.sh  
. /opt/intel/idb/10.1.0.11/bin/idbvars.sh  
. /opt/intel/mkl/10.0.1.014/tools/environment/mklvars32.sh  
  
. /home/aaspi/devel/scripts/set_aaspi_env.sh  
#. /home/aaspi/dist/scripts/set_aaspi_env.sh  
  
# Source global definitions  
if [ -f /etc/bashrc ]; then  
    . /etc/bashrc  
fi  
  
alias rm='rm -i'  
alias cp='cp -i'  
alias mv='mv -i'  
alias h=history  
unalias vi  
#unalias ls  
alias a2ps='a2ps -P kjm_printer'  
alias X='xterm -bg pink & xterm -bg lightgreen &'  
  
umask=002  
  
export PATH=${HOME}:${PATH}  
[kmarfurt@hematite ~]$
```

My version of `set_aaspi_env.sh` looks like

## Software Installation - Accessing Linux and Checking your Environmental Variables

```
kmarfurt@hematite:~  
[kmarfurt@hematite ~]$ cat /home/aaspi/devel/scripts/set_aaspi_env.sh  
#!/bin/bash  
#set -xv  
  
# set AASPI home dir  
#  
# YO! YO! Note that this is the DEVELOPMENT directory, not the DIST directory!  
#  
export AASPIHOME=/home/aaspi/devel  
  
# set shared library path  
if [ ${LD_LIBRARY_PATH}x == "x" ]; then  
    export LD_LIBRARY_PATH=${AASPIHOME}/lib:${AASPIHOME}/lib64  
else  
    export LD_LIBRARY_PATH=${LD_LIBRARY_PATH}:${AASPIHOME}/lib:${AASPIHOME}/lib64  
fi  
  
# set manual path  
if [ ${MANPATH}x == "x" ]; then  
    export MANPATH="man -w:${AASPIHOME}/ext_lib/openmpi/share/man:${AASPIHOME}/ext_lib/seplib/man:${AASPIHOME}/man  
else  
    export MANPATH=${MANPATH}:${AASPIHOME}/ext_lib/openmpi/share/man:${AASPIHOME}/ext_lib/seplib/man:${AASPIHOME}/man  
fi  
  
export PYTHONPATH=${AASPIHOME}/ext_lib/seplib/lib/python  
  
# set path  
export PATH=${AASPIHOME}/ext_lib/openmpi/bin:${PATH}:${AASPIHOME}/bin64:${AASPIHOME}/bin:${AASPIHOME}/scripts:${AASPIHOME}/  
ext_lib/seplib/bin
```

Your local IT person will want to define the variable `AASPIHOME` to the location where he or she has previously loaded the software (in my case it is `AASPIHOME=/home/aaspi/devel` which is our software development directory. This script should add the AASPI executables, libraries, man pages, and scripts after the current ones set in your Linux environment.

If all is well, you should be able to type:

```
which aaspi_util
```

and a long path name pointing to the location of the executable will show up. In the OU environment, it looks like

```
[kmarfurt@hematite ~]$ which aaspi_util  
/home/aaspi/devel/bin64/aaspi_util
```

If your path is incorrect, or if you misspelled the executable name, as shown below, you will get a message like this:

```
which aaspi_util:misspelled  
/usr/bin/which: no aaspi_util in (/home/kmarfurt:/home/aaspi/devel/ext_lib/openmpi/bin:/opt/intel/ibd/10.1.011/bin:/opt/intel/fc/10.1.011/bin:/home/kmarfurt:/home/aaspi/devel/ext_lib/openmpi/bin:/opt/intel/ibd/10.1.011/bin:/opt/intel/fc/10.1.011/bin:/usr/kerberos/bin:/usr/local/bin:/bin:/usr/bin:/home/aaspi/devel/bin64:/home/aaspi/devel/bin:/home/aaspi/devel/scripts:/home/aaspi/devel/ext_lib/seplib/bin:/home/kmarfurt/bin:/home/aaspi/devel/bin64:/home/aaspi/devel/bin:/home/aaspi/devel/scripts:/home/aaspi/devel/ext_lib/seplib/bin)
```

## Software Installation - Accessing Linux and Checking your Environmental Variables

The variables discussed in this section only need to be set once. If you acquire access to a new compute server, or wish to access that compute server from another machine (perhaps your laptop if such access is allowed in your company's environment) you will need to revisit this section again.

### Addressing Problems with Pop-up Windows that are too big

Depending on your environment, you may click the 'browse' button on one of the AASPI GUIs and the window that appears is larger than your screen size. It is unclear why this happens, but it is fairly simple to fix. If this occurs, in your home directory, you will find a file called

```
~/.foxrc/AASPI/GUI
```

Note the dot "." In front of .foxrc which indicates that it is a "hidden" Linux file, like your .bashrc file.

The contents of my version of ~/.foxrc/AASPI/GUI reads as follows

```
[File Dialog]
height=900
showhidden=0
width=900
style=4194304 .
```

If the width is greater than that of your terminal (mine was width=1300) change it appropriately with your favorite editor to a size smaller than your terminal width (in my case I set width=900).

Next, remove the write permission from this file so that the fox toolkit does not change it back to width=1300 again (as happened repeatedly to me) by typing

```
chmod -w ~/.foxrc/AASPI/GUI
```

Once changed, your browser window should fit inside your terminal display.