Instructions for Using SAS on the Tusker Supercomputer
at the University of Nebraska-Lincoln Holland Computing Center

Contents

Request a Group or an Account

To use the computing resources at the Holland Computing Center, you must first have an account. To request an account, you must specify the group to which your account belongs. Groups are created for faculty or campus research groups only.

To request a group (typically for faculty):

Visit http://hcc.unl.edu. Under the New Users menu on the top of the page, click on Request a Group and fill out the requested information. You will receive an email within a few days from the HCC regarding the status of the group you wish to create.

To request an account (within a group):

Visit http://hcc.unl.edu. Under the New Users menu on the top of the page, click on Request an Account. You must select the group for your account before proceeding. If you do not have a group and you are a student, request a group name from your advisor or collaborating faculty member. If you are a faculty member, request a group directly from the HCC (see previous section). Once the group has been selected, fill out the requested information. The HCC will first contact the group owner for permission to add your account. You will receive an email from the HCC regarding the status of your account within a few days.

Screenshot of http://hcc.unl.edu.

Install Secure Shell Software on your Computer

Connections to the Tusker server are through the Secure Shell Protocol. Such connections involve a terminal window for executing commands (similar to the old DOS prompt window) and a file-transfer window for uploading and downloading files from the server. This document uses the SSH Secure Shell program but others are available by searching Google for SSH programs.

1. Download the SSH Secure Shell program from
   http://software.dartmouth.edu/Windows/Connectivity/SSHSecureShell.zip.

2. Unzip the file you downloaded and double-click on the executable file to begin the installation.

3. Follow the prompts (the default options will work) through the end and click finish.

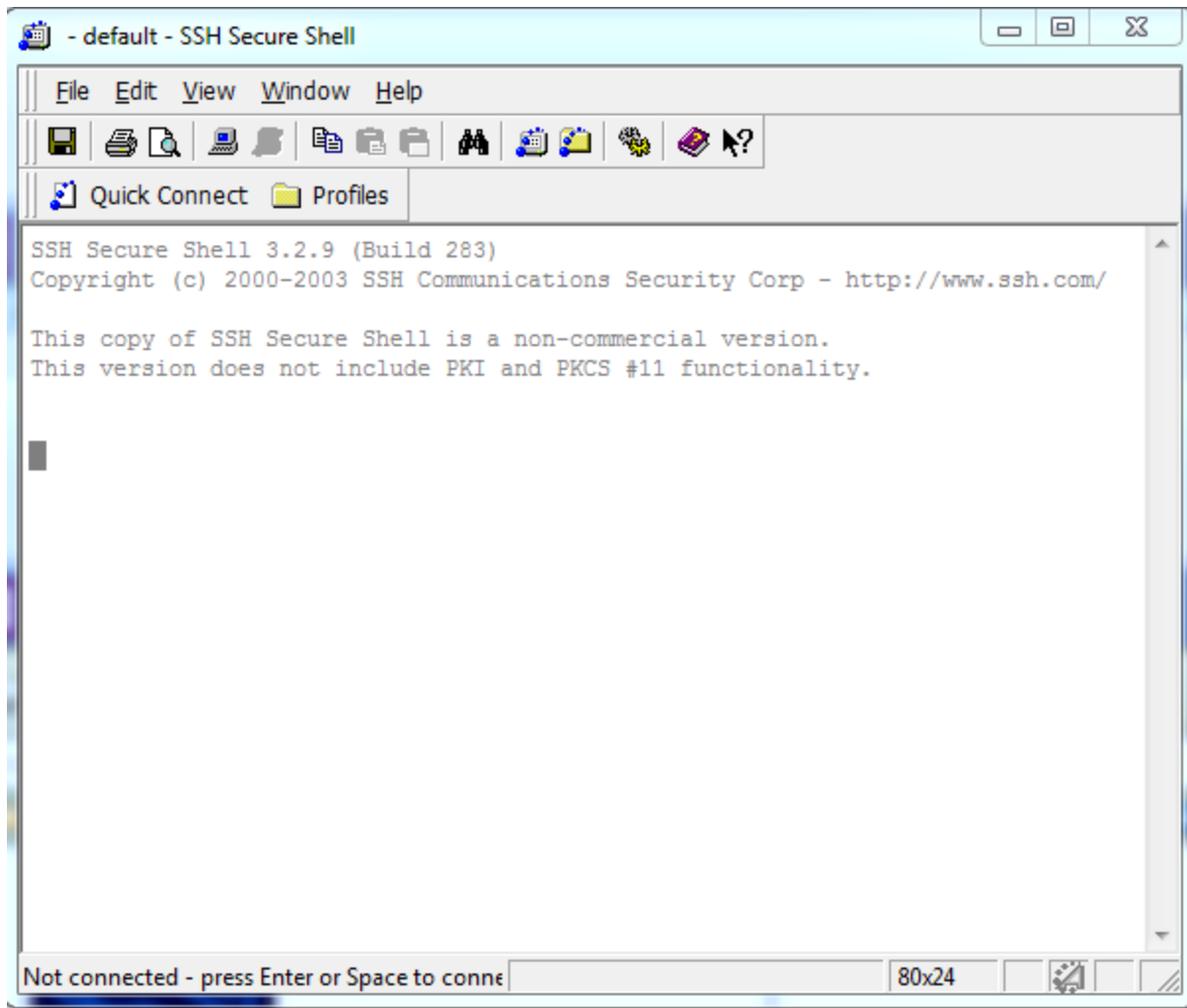# Connect to Tusker Using the SSH Terminal Client

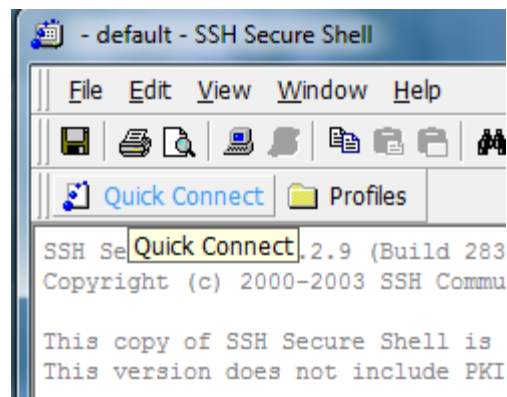To connect to the Tusker server using the SSH Terminal Client:

1. (In Windows) Start the SSH Terminal Client by going to Start…All Programs…SSH Secure Shell…Secure Shell Client
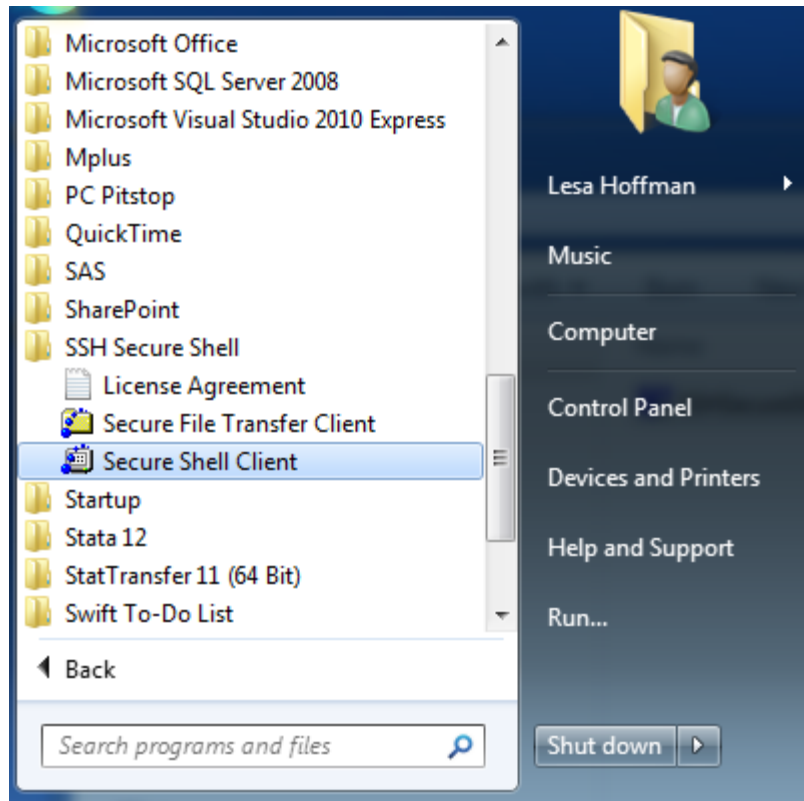
2. The SSH Client terminal window now appears:


3. Click on "Quick Connect":

4. In the "Connect to Remote Host" box, under Host Name put tusker.unl.edu. Under User Name put your account name. Leave Port Number as 22 and do not select an Authentication Method. Click on the Connect button (you must be connected to the internet to continue). Note: this information is only requested the first time you connect and is saved in the Tusker profile:
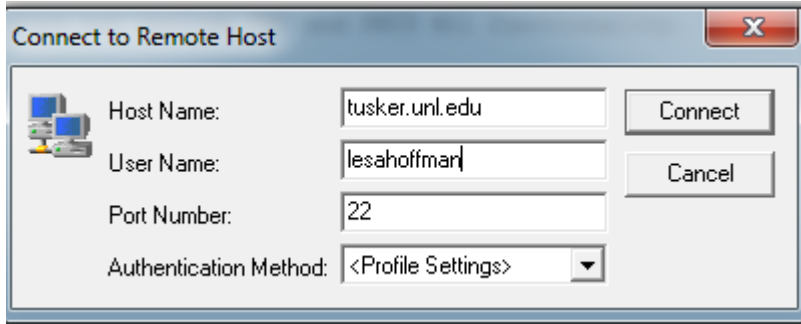
5. If this is your first time connecting to Tusker you will be asked to identify the host machine. When you see the Host Identification box, press the Yes button. You will not see this again.
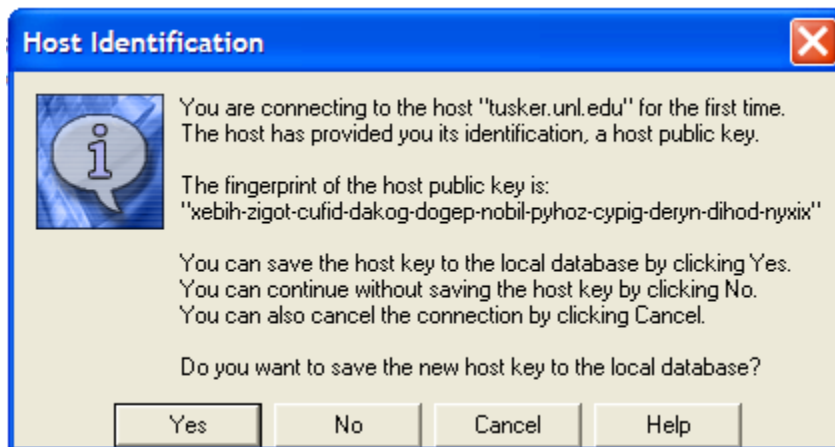
6. In the Add Profile box that appears, type the word "Tusker" and click "Add to Profiles". This will allow you to skip step #4 for future connections to Tusker. Note: this box only appears for a few seconds and then disappears. If you would like to add the profile after the box disappears, click on Profiles…Add Profile and the box will reappear.
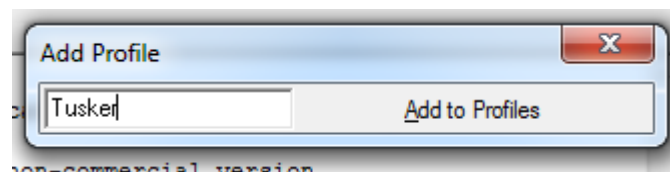
7. Once the SSH program connects to the Tusker server, you will be prompted to enter your password. Note: your password is unique to your HCC account and is not the password for your UNL ID. **This prompt will appear all subsequent times you connect to Tusker**:
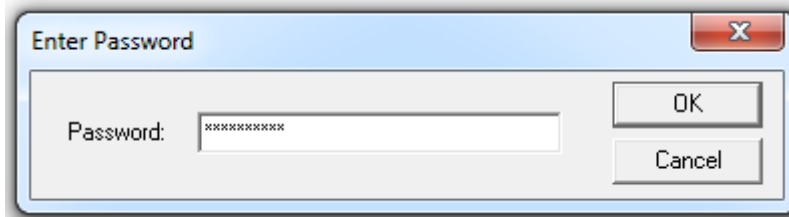
8. Once connected successfully, you will see the following prompt in the SSH Client window:
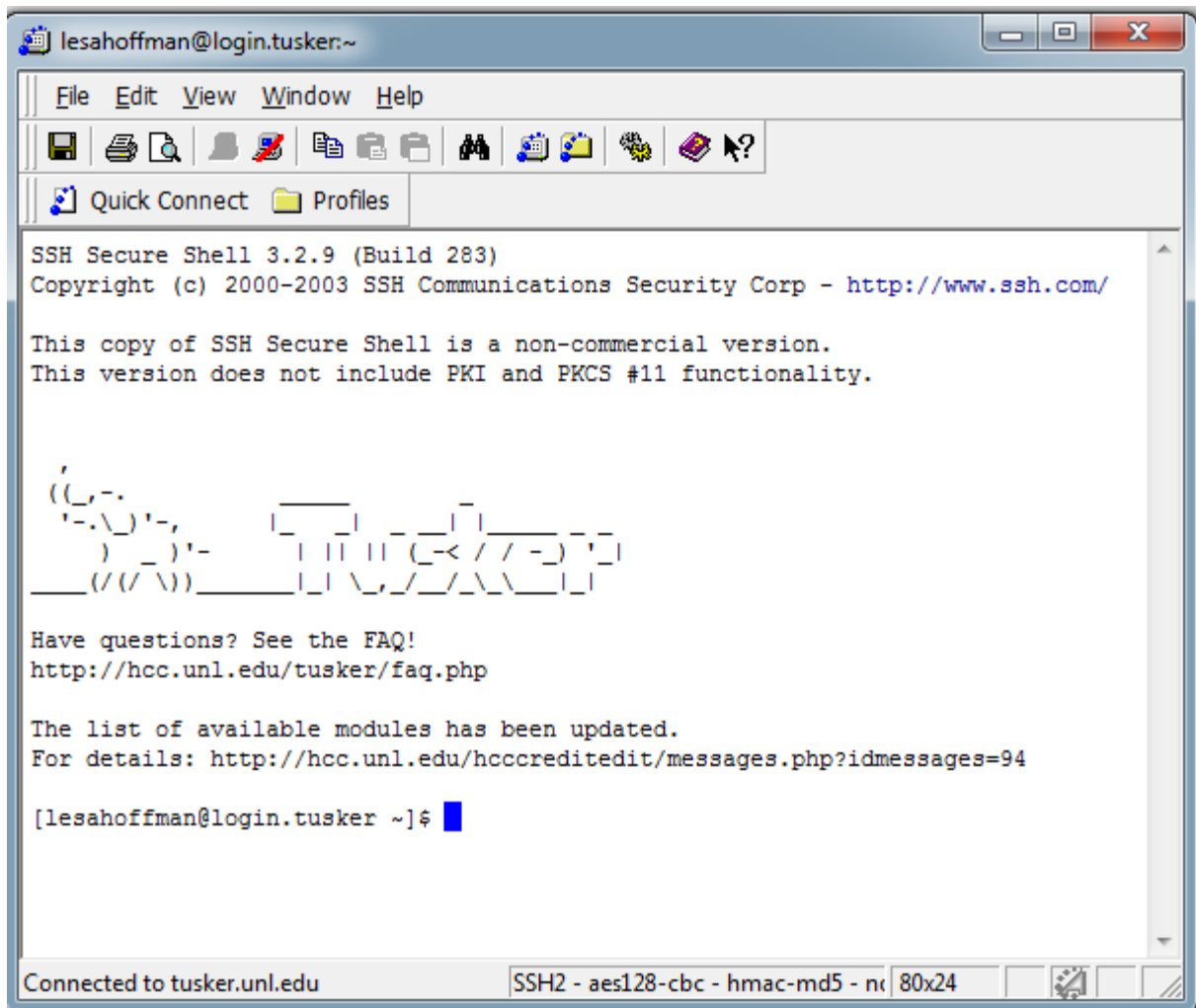
9. If you have created a profile (under step #6), then the next time you would like to connect to Tusker, click on Profiles…Tusker and you can omit step #4.
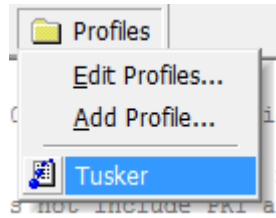
Open to Tusker Using the SSH File Transfer Client

Once you have connected to Tusker with the SSH Client, the next step is to connect with the SSH File Transfer Client. The SSH File Transfer Client is a menu-based program that uploads and downloads files to and from the Tusker server.

1. Connect to Tusker using the SSH Client Terminal (the previous step).

2. Once connected to Tusker, click on the icon with a yellow folder underneath blue dots

   You can find this icon in the middle of the screenshot below.
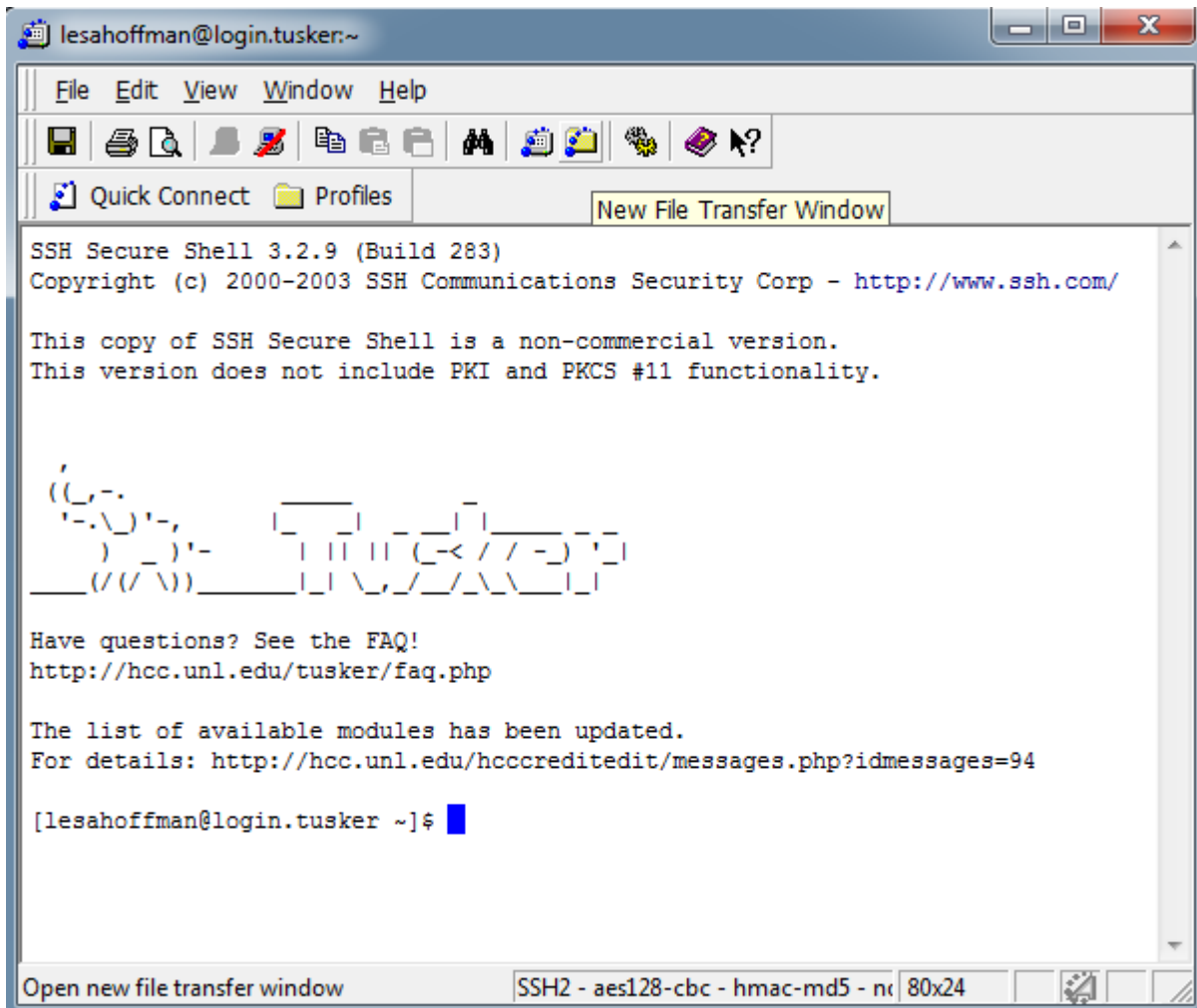
3. Once pressed, a new window appears:
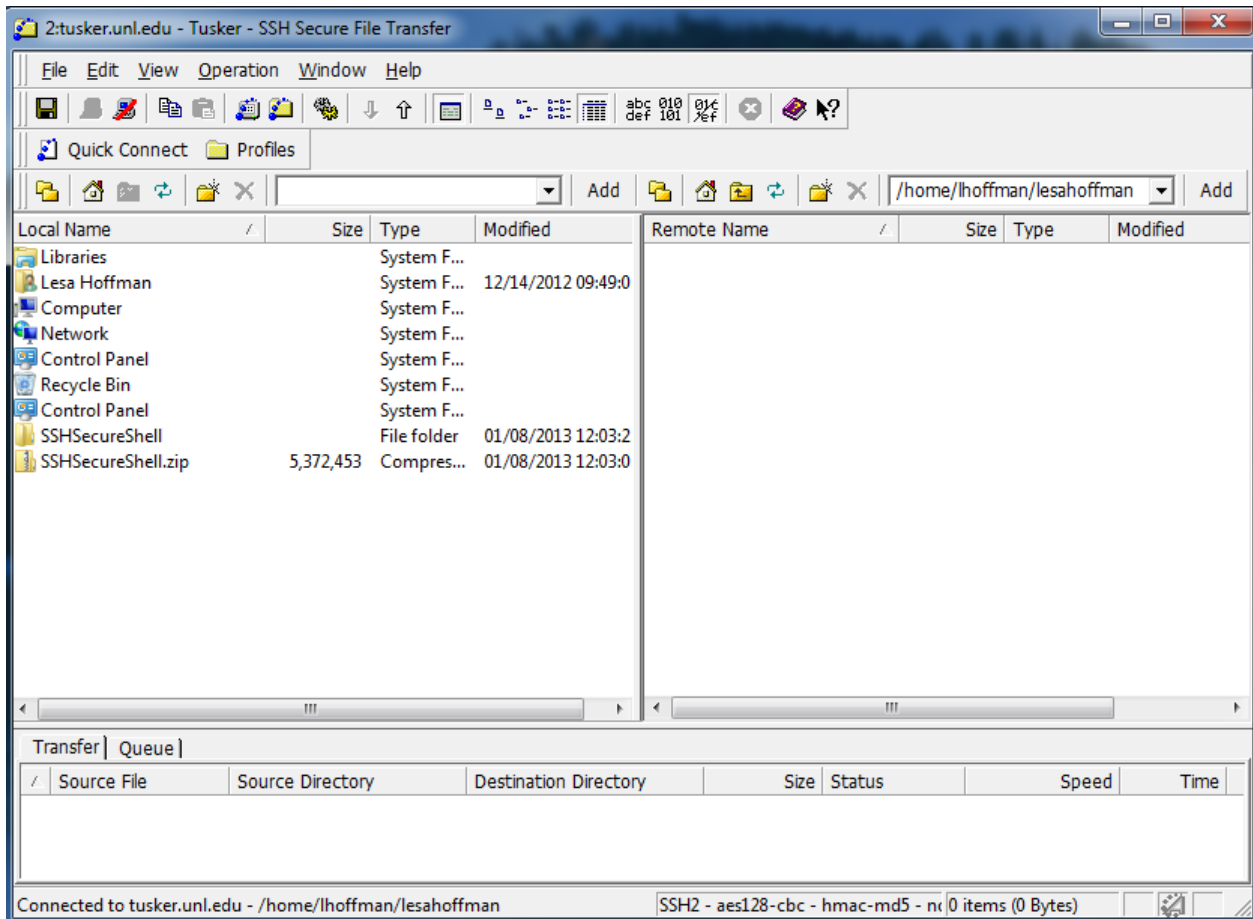
The window on the left is your computer. The window on the right is the home directory of the Tusker server. To move files from one to the other, first find the files by navigating through the folders and directories. After that, drag and drop from one to the other. You will see the file appear in the "transfer" box at the bottom of the screen.

Notes on the Tusker Server

- Visit http://hcc.unl.edu/hcccreditedit/faq.php?tp=Tusker for a list of Tusker FAQs.
- The server uses Linux so all commands entered must be Linux commands. For a tutorial on Linux, visit http://www.ee.surrey.ac.uk/Teaching/Unix/.
- A few commonly used Linux commands:
  - To change your password from the initial version given to you by the HCC type the passwd command
    - Note: you will not see any characters on the screen when you type your current or new passwords
  - ls – lists all files and folders in the current directory
  - pwd – lists the address of the current directory
  - cd /folder1/folder2 – changes directory to folder1/folder2

Running SAS on Tusker

Running SAS on Tusker involves the following:

- Uploading of the data file (using the SSH File Transfer Client)
- Uploading of the SAS syntax and corresponding data files (using the SSH File Transfer Client)
- Execution of SAS (using the SSH Client Terminal)
- Downloading of the SAS output file (using the SSH File Transfer Client)

SAS syntax files (ending by default with .sas), data files (ending by default with .sas7bdat), and output files (ending by default with .lst for the old-fashioned listing file) are plain-format text files. SAS will also output an html output file (ending by default in .htm). This example begins by creating a simple SAS syntax and excel data file to be imported into SAS. You can omit this step if you have your own files. For ease of access, all instructions will be for files placed in a folder on the desktop. This guide assumes you are using Windows (XP or more recent).

1. **On your (local) computer, create a folder named "SASTest" on your desktop:**
    a. Right click on the desktop and select New…Folder from the dropdown menu.
    b. Type "SASTest" for the folder name.
    c. Open the folder by double clicking on the icon on the desktop.

2. **Within the SASTest Tusker folder, create the SAS input file:**
    a. Right click within the folder window and select New…Text Document from the dropdown menu.
    b. Name the file test.sas (if a prompt asks you about changing the extension, click yes)
        i. Important note: if your new file does not end in .txt before renaming the file, your computer has disabled viewing of file extensions. Complete the following instructions to enable viewing of extensions before continuing.
        ii. Within the folder, press the Alt key.
        iii. On the menu that appears at the top of the window, select Tools…Folder Options.
        iv. In the Folder Options box, select the View tab.
        v. Uncheck the box beside "Hide extensions for known file types".
        vi. Click "Ok".
        vii. Rename the new text file you just created and make sure it reads test.sas. This means you do not need to have SAS in order to create text files that will be recognized as SAS syntax on the server.
    c. Open test.sas by double clicking on the icon in the folder.
        i. Important note: if you see a "windows cannot open the file" box appear, you must select the program to use by default to open files ending in .sas.
        ii. Click the radio button next to "Select a program from a list of installed programs".
        iii. Press Ok.
        iv. Find the WordPad program from the list of programs and select it by clicking on the icon. WordPad is a basic text editor that comes with Windows.

v. Press Ok.

vi. A blank file should now open in WordPad.

d. Copy and Paste the following text into the test.sas file open in WordPad. In each section of the pink text below (that gives the file location), make sure to change the third part to the name of your account. Here, the account name is lesahoffman.

```
* Generic session options - page and line size, no page breaks;
OPTIONS nonumber nodate nocenter pagesize=MAX linesize=120 formdlim=' ';

* Kill default titles on output, open html output window;
TITLE; ODS HTML;

* Create SAS library - make sure to change the third part to your account;
LIBNAME libtest "/home/lhoffman/lesahoffman/SASTest";

* Import test excel data file from same place as library above;
PROC IMPORT DATAFILE="/home/lhoffman/lesahoffman/SASTest/test.xls"
            OUT=work.test DBMS=XLS REPLACE;
      SHEET="Sheet1";
      GETNAMES=YES;
RUN;

* Run descriptives on var1;
PROC MEANS DATA=work.test;
      VAR var1;
RUN;

* Output as SAS data set;
DATA libtest.test;
      SET work.test;
RUN;
```

e. Save the file and exit WordPad.

3. **Within the SASTest folder, create a Microsoft Excel data file to be read into SAS:**

a. Open Excel.

b. Save the file as test.xls (although it is possible to import .xlsx files, for generality we do not do so here). Keep the worksheet name "Sheet1" as named by default.

c. Copy and Paste the following text into the open test.xls file:

var1

1

2

3

4

5

d. Save the file and exit Excel.

4. **Connect to Tusker using the SSH Client Terminal Program (follow instructions in previous section of this document if you have not already done so)**

5. **Open the SSH File Transfer Client (follow instructions in previous section of this document if you have not already done so)**

6. **Navigate on the left-hand side of the SSH Secure File Transfer Client window to where the SASTest folder is stored on your local machine. Shown below is the beginning and then end result:**
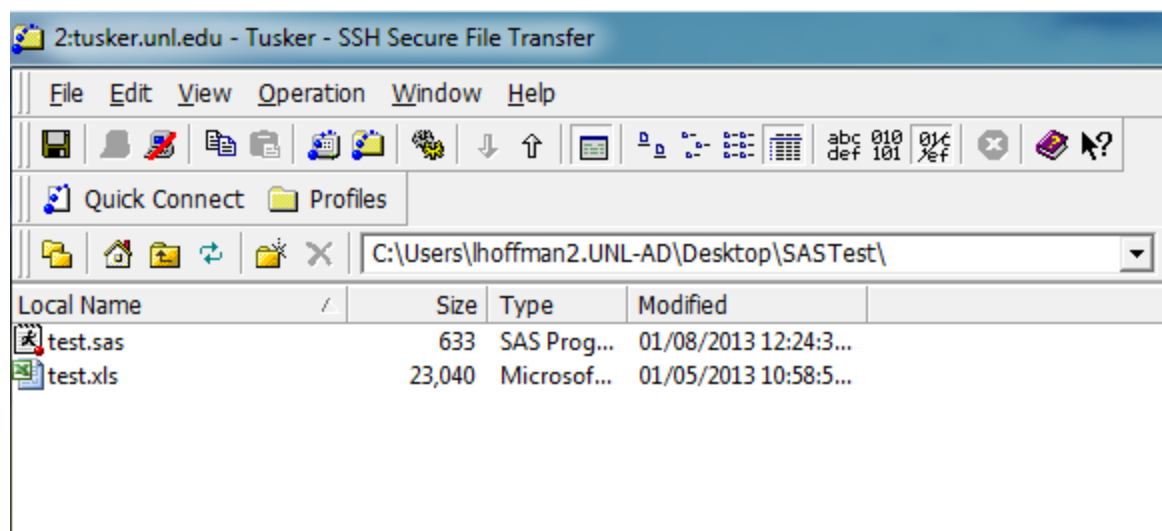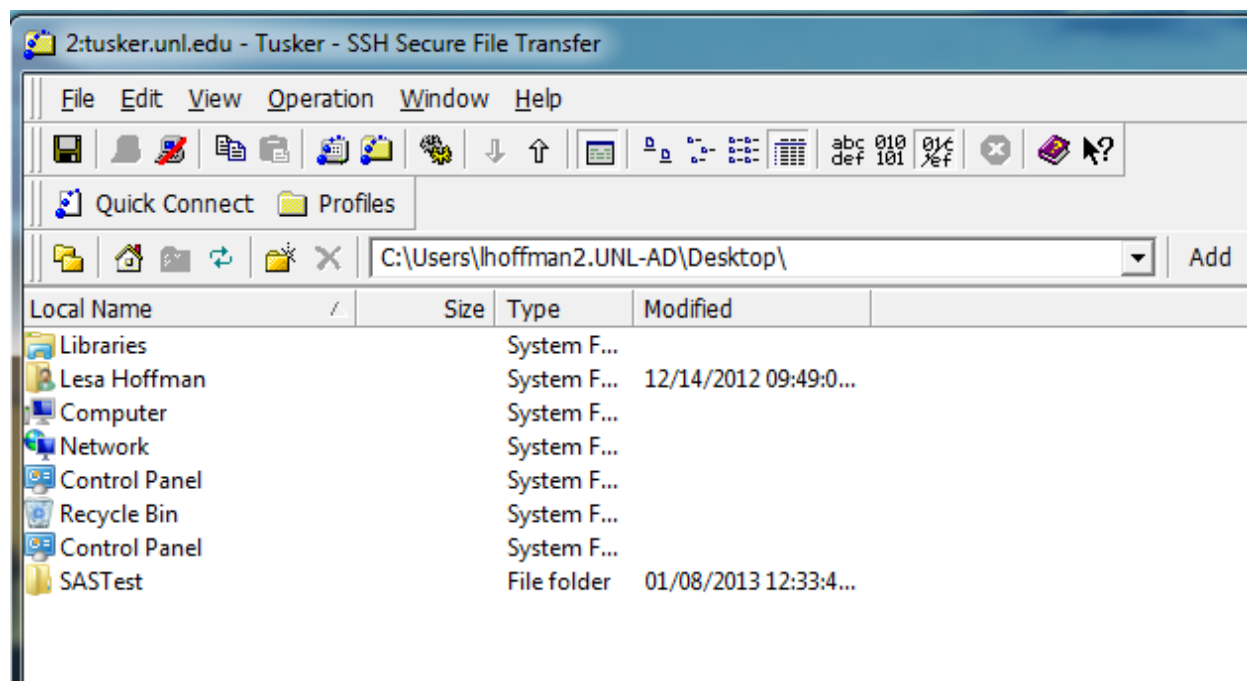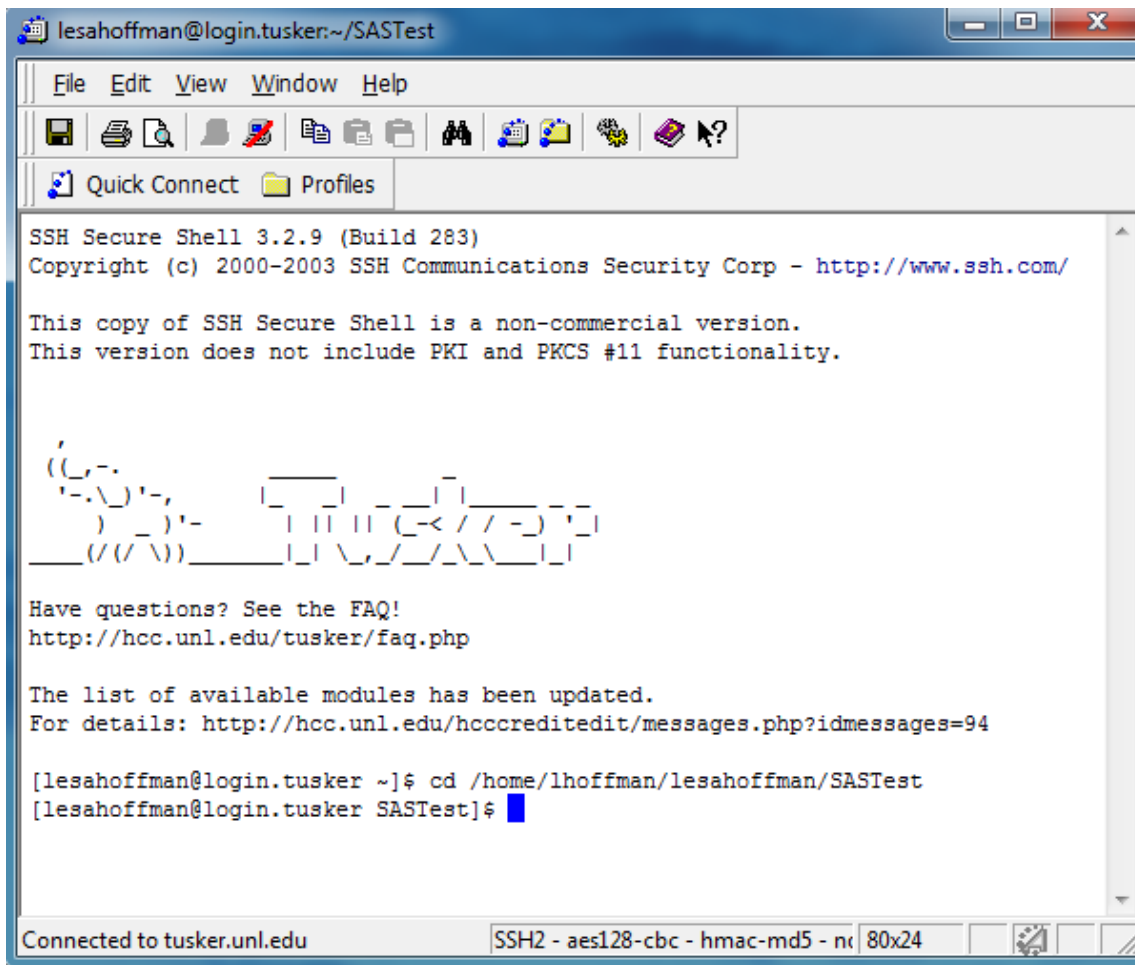
7. **Copy the SASTest folder to the server by dragging the icon from the left side to the right side.**
    a. Double click on the new folder and note the path in the dropdown box above the right hand side (the one shown below is /home/lhoffman/lesahoffman/SASTest). The path is needed to execute SAS. Please note that paths are case-sensitive and space-sensitive. Shown below is the end result once you are inside the folder on the server.
    b. You'll note the bottom window shoes the file transfer process.
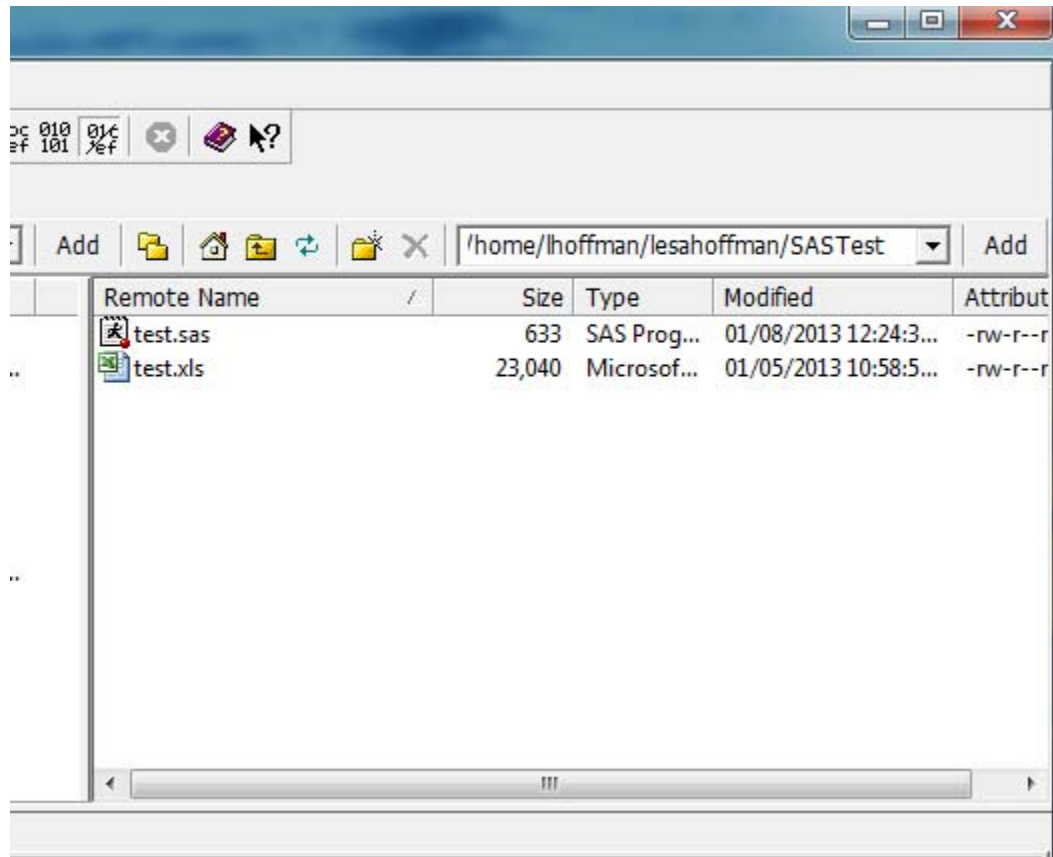
8. **Using the SSH Client Terminal, type the following commands at the prompt in order:**
    a. Type the following **cd [path to folder on Tusker from Step 7a above**; see example below for format], and hit enter. This changes the directory to the one where the data and syntax are stored which simplifies the command to execute SAS. Please note that the mouse cannot be used, nor can keyboard shortcuts (i.e., you cannot paste the path in, it must be typed). If you make a mistake, press the up arrow and it will return the previous line you typed so that you can use the arrow keys to move across the text.

b. Type the following, and hit enter: **module load sas/9.3**   This command loads SAS.

```
Have questions? See the FAQ!
http://hcc.unl.edu/tusker/faq.php

The list of available modules has been updated.
For details: http://hcc.unl.edu/hcccreditedit/messages.php?idmessages=94

[lesahoffman@login.tusker ~]$ cd /home/lhoffman/lesahoffman/SASTest
[lesahoffman@login.tusker SASTest]$ module load sas/9.3
[lesahoffman@login.tusker SASTest]$ █
```
Connected to tusker.unl.edu   SSH2 - aes128-cbc - hmac-md5 - n(80x24

c. Now type the following, and hit enter: **sas test.sas**   This command runs the test.sas syntax file with SAS. Please note that file names are case-sensitive and should not include spaces. To run a different file, change the file name listed after sas.

```
Have questions? See the FAQ!
http://hcc.unl.edu/tusker/faq.php

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[lesahoffman@login.tusker ~]$ cd /home/lhoffman/lesahoffman/SASTest
[lesahoffman@login.tusker SASTest]$ module load sas/9.3
[lesahoffman@login.tusker SASTest]$ sas test.sas
[lesahoffman@login.tusker SASTest]$ █
```
Connected to tusker.unl.edu   SSH2 - aes128-cbc - hmac-md5 - n(80x24

9. **Using the SSH File Transfer Client, download the saved data set, log file, output listing file, and output html file from the Tusker Server to your local machine:**

   a. Click on the icon above the right hand window to refresh the window on the right hand side (the Tusker server directory).
   b. Click on the new files: test.sas7bdat (SAS data file) test.log (SAS log file), test.lst (SAS output listing file), and sashtml.htm (SAS output html named by default as such).
   c. Drag and drop the files from the right-hand window (the Tusker server) to the left hand window (the directory on your local computer) so that you can work with them directly.
   d. The .log and .lst files are text files you can open via Wordpad. The .htm file will open with a web browser. The SAS data file ending in .sas7bdat can be opened via SAS or SPSS.