ULI101: INTRODUCTION TO UNIX / LINUX AND THE INTERNET

WEEK 6 LESSON 1:

TRANSFERRING FILES BETWEEN COMPUTERS
ISSUING REMOTE COMPUTER COMMANDS ON LOCAL COMPUTERS

LESSON 1 TOPICS

Transferring Files Between Computers:

SSH Suite of Utilities:

- Purpose / Using the `scp` utility / Using the `sftp` utility
- Issuing commands on remote computers from local computers (`ssh` `[Linux Command(s)]`)
- Demonstration

Mail Utility:

- Purpose / Using the `mail` utility
- Sending Messages / File Attachments
- Demonstration

Perform Week 6 Tutorial (Due first Friday AFTER reading week)

- Investigations 1, 2 & 3
- Review Questions (Questions 1 – 12)

TRANSFERRING FILES BETWEEN UNIX / LINUX SERVERS

It is important to learn how to transfer files from your Matrix account to other computers.

Reasons for Transferring Files from Matrix:

- **Backup** your work in case of **accidental deletion**
- **Save space** on your Matrix account

You will learn different methods to securely **transfer** files between your Matrix Linux account and other computers.
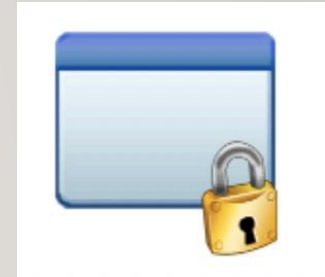
TRANSFERRING FILES BETWEEN UNIX / LINUX SERVERS

The **ssh** Linux command is a **suite** (collection) of **utilties** to allow the user to **securely connect** among Unix / Linux servers, as well as **securely copy** and **transfer** files among Unix/Linux servers.

There are two additional utilities in addition to the **ssh** utility to allow secure transfer of files between computers:

- **scp** (secure copy)
- **sftp** (secure file transmission protocol)

SSH / SCP / SFTP

TRANSFERRING FILES BETWEEN UNIX / LINUX SERVERS

either log in one of account, and then transfer files between two systems

Secure Copy (scp)

Usage:

if destination doesn't exist, create a new file

```
scp local.file user@host:destination-pathname
scp local.file user@host:    copy to current directory
scp user@host:file-pathname local-pathname
```
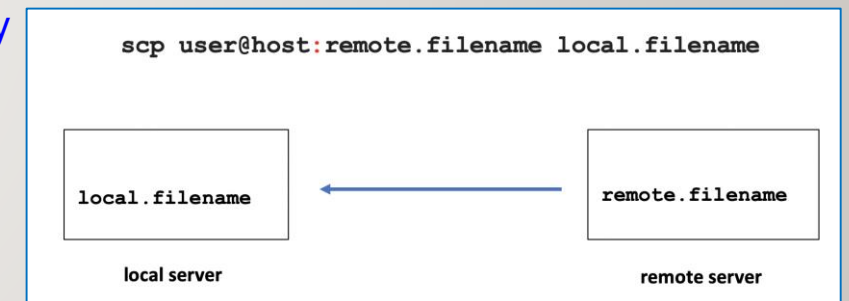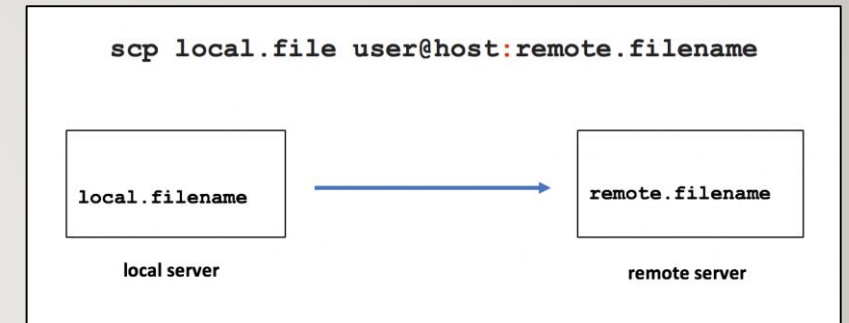
home directory on my laptop is not the same pathname as my home directory on the matrix

The usage for the **scp** command is like the **cp** command with the addition of host names.

The most common **mistake** that students make is forgetting to add the **colon** character " : " after the remote hostname.   without : , it is just simply the same to cp.

The username in the command can be **omitted** if the username is the same on both servers. Multiple file and **recursive** directory copy (i.e. option **-R**) is supported.

adding ./ is important when the fileName includes : in it
scp ./status:new matrix:worknewer

```
scp local.file user@host:remote.filename
```

| local.filename | → | remote.filename |

local server   remote server

```
scp user@host:remote.filename local.filename
```

| local.filename | ← | remote.filename |

local server   remote server

TRANSFERRING FILES BETWEEN UNIX / LINUX SERVERS

Instructor Demonstration

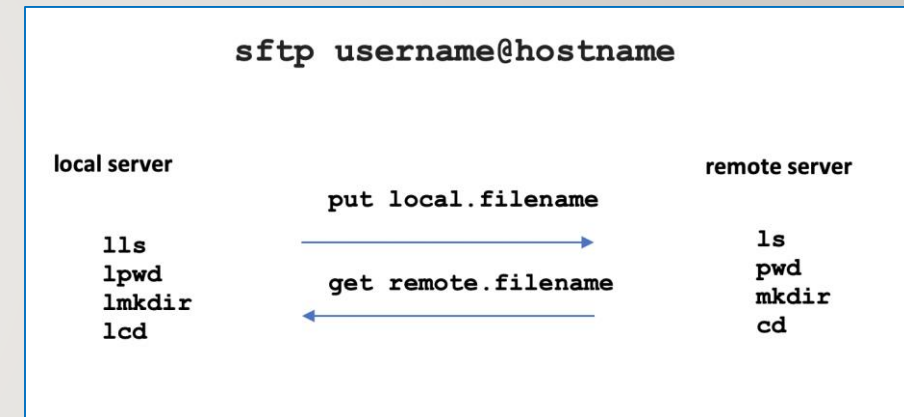Your instructor will now demonstrate using the **scp** command.

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Secure File Transmission Protocol (sftp)

sftp is a utility to connect to a shell that allows a user
to **issue ftp commands** to access and transfer files
between servers.

FTP is an acronym for **File Transfer Protocol**
that provides a set of **rules** on how to convert data that is
transferred between computer servers
(both identical and different operating systems).

```
sftp username@hostname
```

local server   remote server

                          put local.filename
lls   ───────────────────────────────────►   ls
lpwd   pwd
lmkdir   get remote.filename   mkdir
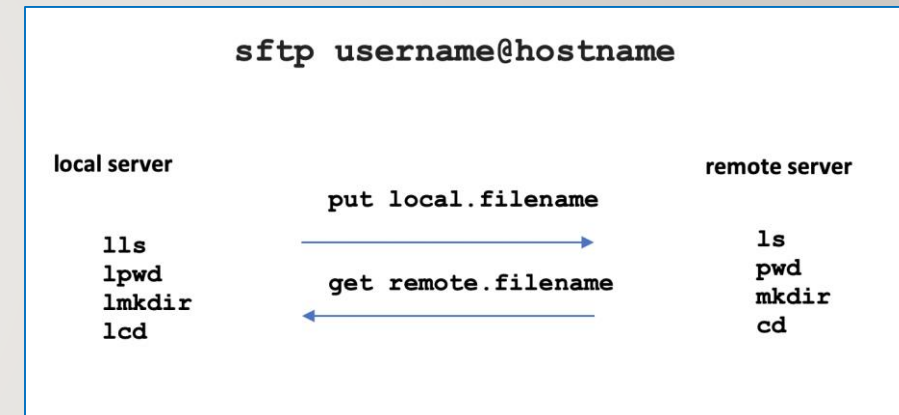lcd   ◄───────────────────────────────────   cd

TRANSFERRING FILES BETWEEN UNIX / LINUX SERVERS

Secure File Transmission Protocol (sftp)

When you login via the sftp command, the **sftp command prompt** appears. This prompt acts like the Bash shell prompt, but with a limited number of commands.

The table below displays common **FTP commands** for transferring files between servers.

Operation	Local Server	Remote Server
Display current working directory	`lpwd`	`pwd`
Display directory contents	`lls`	`ls`
Create Directory	`lmkdir`	`mkdir`
Change directory location	`lcd`	`cd`
Upload file to remote server	`put`	
Download file to local server	`get`	

```
sftp username@hostname

local server                                          remote server
                        put local.filename
   lls                  ───────────────────►              ls
   lpwd                                                   pwd
   lmkdir               get remote.filename               mkdir
   lcd                  ◄───────────────────              cd
```

VERIFYING COPIED / TRANSFERRED FILES

**Running Remote Matrix Commands
on your Local Computer**

You can use the **ssh** command to issue Unix/Linux commands on a **remote** server <u>without</u> logging into a remote session.
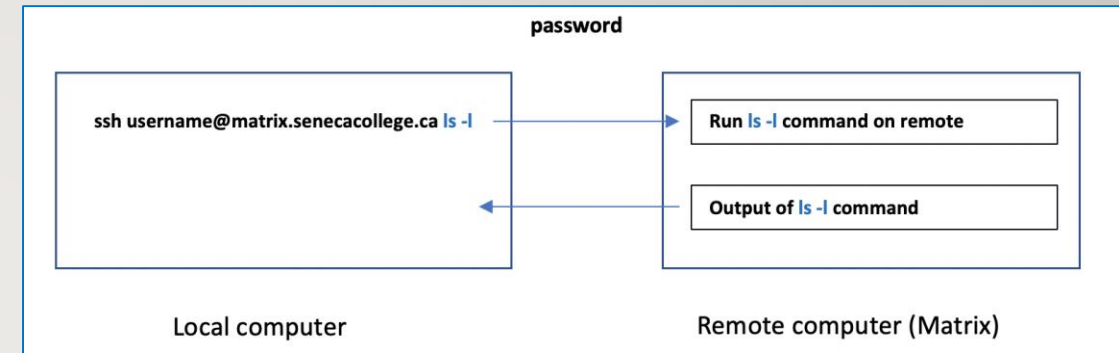
`ssh username@matrix.senecacollege.ca ls -l`

You will be prompted for your Matrix account password, then the contents of your home directory in your remote Matrix account will be displayed, although you will **remain** on your <u>local</u> computer.

password

ssh username@matrix.senecacollege.ca ls -l → Run ls -l command on remote

Output of ls -l command

Local computer   Remote computer (Matrix)


```
ssh username@matrix.senecacollege.ca ls -l other.txt
###############################################################
#
# Welcome to Matrix
#
# You are accessing a private utility and information that is strictly
# confidential on a server owned by Seneca College and maintained by
# Information Technology Services
#
# All connection attempts are logged and strictly monitored.
# All unauthorized connection attempts will be fully investigated
# and dealt with appropriately.
#
# All activities on this system are governed by
# Seneca Information Technology Acceptable Use Policy
# For complete ITAU policy visit http://www.senecacollege.ca/policies/itau.html
#
###############################################################
Starting September 1, 2020, Login to VPN will be required to SSH to matrix.

Students: studentvpn.senecacollege.ca
Faculty: senecavpn.senecacollege.ca

Instruction on using VPN: https://inside.senecacollege.ca/its/services/vpn/"

username@matrix.senecacollege.ca's password:
-rw-r--r-- 1 username users 22 Jan 27 10:55 other.txt
```

TRANSFERRING FILES BETWEEN UNIX / LINUX SERVERS

Instructor Demonstration

Your instructor will now demonstrate using the **ssh** command

to issue commands on your remote Matrix server to verify

files have been properly copied / transferred files between computers..

TRANSFERRING FILES BETWEEN UNIX / LINUX SERVERS

Graphical SFTP Application

Although it is important to learn how to use command-line sftp and is considered coverage for *quizzes*, *midterm* and *final exams*, there are **graphical sftp** applications to make it more "**user-friendly**".

NOTE: Based on issues with the implementation of the Seneca VPN, you cannot connect to your Matrix account unless you run the graphical SSH Client application via **MyApps** at a Seneca computer lab.

You can refer to **Online Tutorial 1 INVESIGATION1** to run the graphical SSH Client application via MyApps at Seneca.
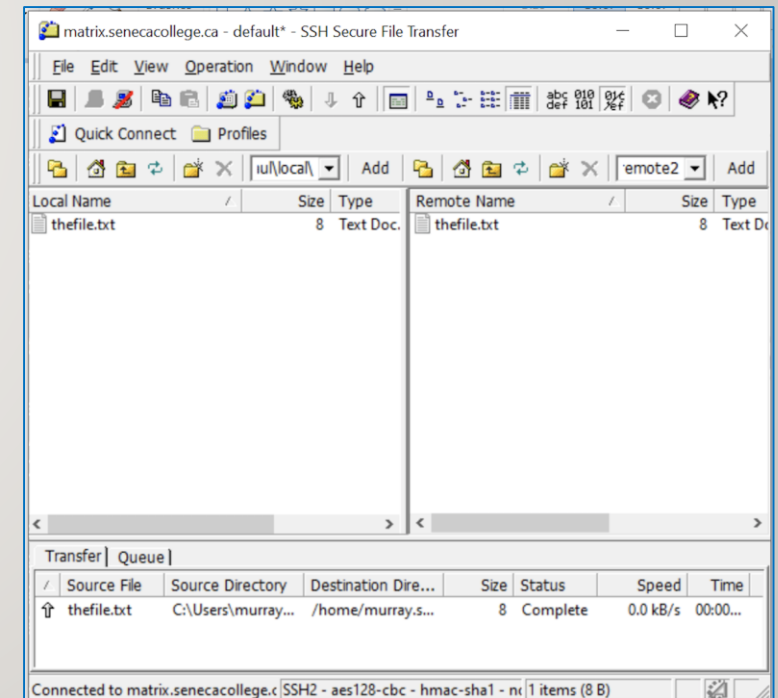
TRANSFERRING FILES BETWEEN UNIX / LINUX SERVERS

Instructor Demonstration

Your instructor will now demonstrate using the **sftp** command
and the Secure Shell graphical SFTP application
(if at Seneca computer lab).

TRANSFERRING FILES BETWEEN UNIX / LINUX SERVERS

UNIX Mail (mail)

The **Matrix** server is also an **email server** that can allow you to **send** emails messages to <u>other</u> email accounts.

NOTE: In order to use the **mail** command on a Linux computer at home, you must first install and run an **email server** and have the appropriate **mail client application** installed.

TRANSFERRING FILES BETWEEN UNIX / LINUX SERVERS

UNIX Mail (mail)

Steps to Send an Email Message:

1. Type: `mail username@hostname` and press **ENTER**
2. Enter **subject line** and press **ENTER**
3. Type the **body of the message** and then when finished, press `ctrl+d` to send message
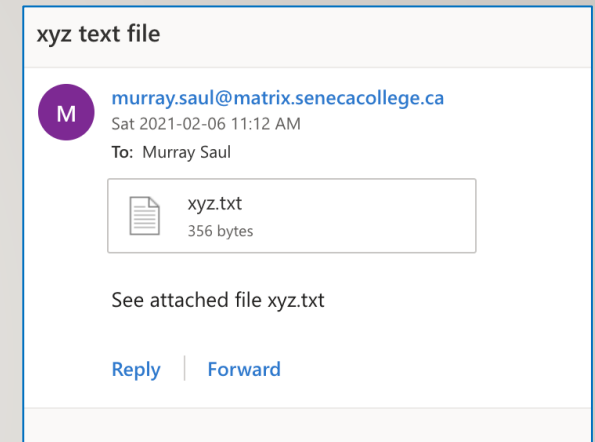
NOTE: You can use the **mail** command with the **-a** option to specify a file to send as an attachment to your email message.

Example:
`mail recipient@hostname -a filename`

The content of that filename is the content of the message

```
[ murray.saul ] cat xyz.txt
This is file xyz.txt
[ murray.saul ]
[ murray.saul ] mail -a xyz.txt murray.saul@senecacollege.ca
Subject: xyz text file
See attached file xyz.txt
EOT
[ murray.saul ]
```

---

xyz text file

M murray.saul@matrix.senecacollege.ca
Sat 2021-02-06 11:12 AM
To: Murray Saul

xyz.txt
356 bytes

See attached file xyz.txt

Reply | Forward

TRANSFERRING FILES BETWEEN UNIX / LINUX SERVERS

UNIX Mail (mail)

Alternative Method to Send Email with Attachment

Use the **-s** option in the command to specify the subject line of the command and use **stdin** redirection to send a text file as the body of the message.

NOTE: You would have to use this method since you have used **stdin** redirection to attach the file's so you can't input the subject line from the terminal! You should notice that the contents of the file are displayed in text in the email message as opposed to a file attachment.

ctrl d : end the email
OR using . : end the mail

Example:
```
mail -s "your subject line" recipient@hostname < filename
```

> **xyz text file**
>
> M murray.saul@matrix.senecacollege.ca
>   Sat 2021-02-06 10:38 AM
>   **To:** Murray Saul
>
> This is file xyz.txt
>
> Reply | Forward

```
[ murray.saul ]
[ murray.saul ] cat xyz.txt
This is file xyz.txt
[ murray.saul ]
[ murray.saul ] mail —s "xyz text file" murray.saul@senecacollege.ca < xyz.txt
[ murray.saul ]
```

TRANSFERRING FILES BETWEEN UNIX / LINUX SERVERS

Instructor Demonstration

Your instructor will now demonstrate using the **mail** command.

HOMEWORK

Getting Practice

Perform **Week 6 Tutorial:**
(Due: Friday Week 8 @ midnight for a 2% grade):

- INVESTIGATION 1: USING SECURE COPY

- INVESTIGATION 2: USING SECURE FILE TRANSMISSION CONTROL PROTOCOL

- INVESTIGATION 3: USING THE MAIL COMMAND TO SEND FILE ATTACHMENTS

- LINUX PRACTICE QUESTIONS (Questions 1 – 12)