Introduction to Linux

Day 5/10

Prepared by:
Gaurav Pokhrel
Rohan Raj Poudel

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Gaurav P. | Rohan Raj P.

SSH:

Install Powershell first:

You may have it already installed, search for Windows PowerShell in search bar. If not install from:
[Installing PowerShell on Windows - PowerShell | Microsoft Learn](https://learn.microsoft.com/en-us/powershell/scripting/install/installing-powershell-on-windows?view=powershell-7.4)
https://learn.microsoft.com/en-us/powershell/scripting/install/installing-powershell-on-windows?view=powershell-7.4

Follow the steps mentioned in this site:

for installing ssh client and server.
[Get started with OpenSSH for Windows | Microsoft Learn](https://learn.microsoft.com/en-us/windows-server/administration/openssh/openssh_install_firstuse?tabs=powershell)
https://learn.microsoft.com/en-us/windows-server/administration/openssh/openssh_install_firstuse?tabs=powershell

For starting ssh in powershell:

```
Start-Service sshd
```

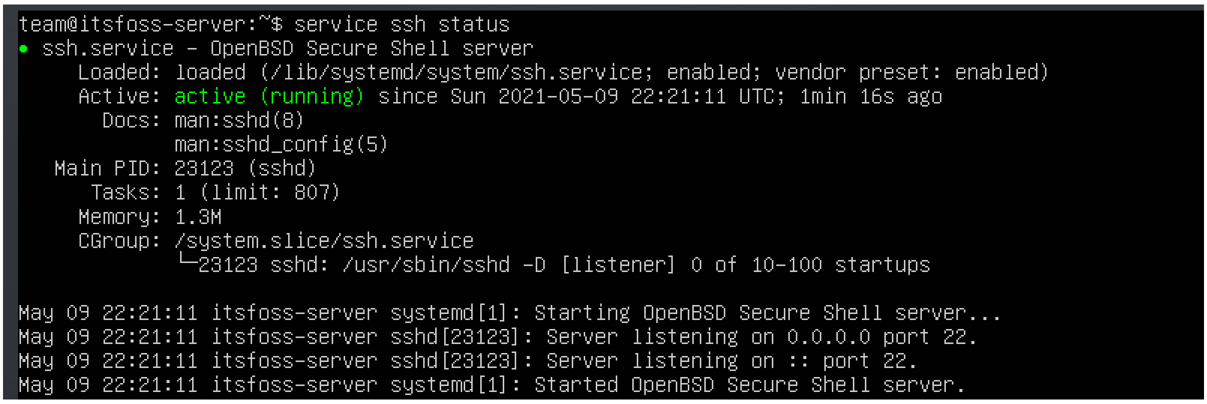
For connecting with client:

ssh [user_name]@[ip-address]
example: ssh student1@192.168.1.224
put the password of that user (student1) the you may proceed to operating the server.

For making the host server:

1. sudo apt update && sudo apt upgrade
2. sudo apt install openssh-server
3. service ssh status

You should see something like this:



```
team@itsfoss-server:~$ service ssh status
● ssh.service - OpenBSD Secure Shell server
     Loaded: loaded (/lib/systemd/system/ssh.service; enabled; vendor preset: enabled)
     Active: active (running) since Sun 2021-05-09 22:21:11 UTC; 1min 16s ago
       Docs: man:sshd(8)
             man:sshd_config(5)
   Main PID: 23123 (sshd)
      Tasks: 1 (limit: 807)
     Memory: 1.3M
     CGroup: /system.slice/ssh.service
             └─23123 sshd: /usr/sbin/sshd -D [listener] 0 of 10-100 startups

May 09 22:21:11 itsfoss-server systemd[1]: Starting OpenBSD Secure Shell server...
May 09 22:21:11 itsfoss-server sshd[23123]: Server listening on 0.0.0.0 port 22.
May 09 22:21:11 itsfoss-server sshd[23123]: Server listening on :: port 22.
May 09 22:21:11 itsfoss-server systemd[1]: Started OpenBSD Secure Shell server.
```

if not try doing:
sudo systemctl enable --now ssh

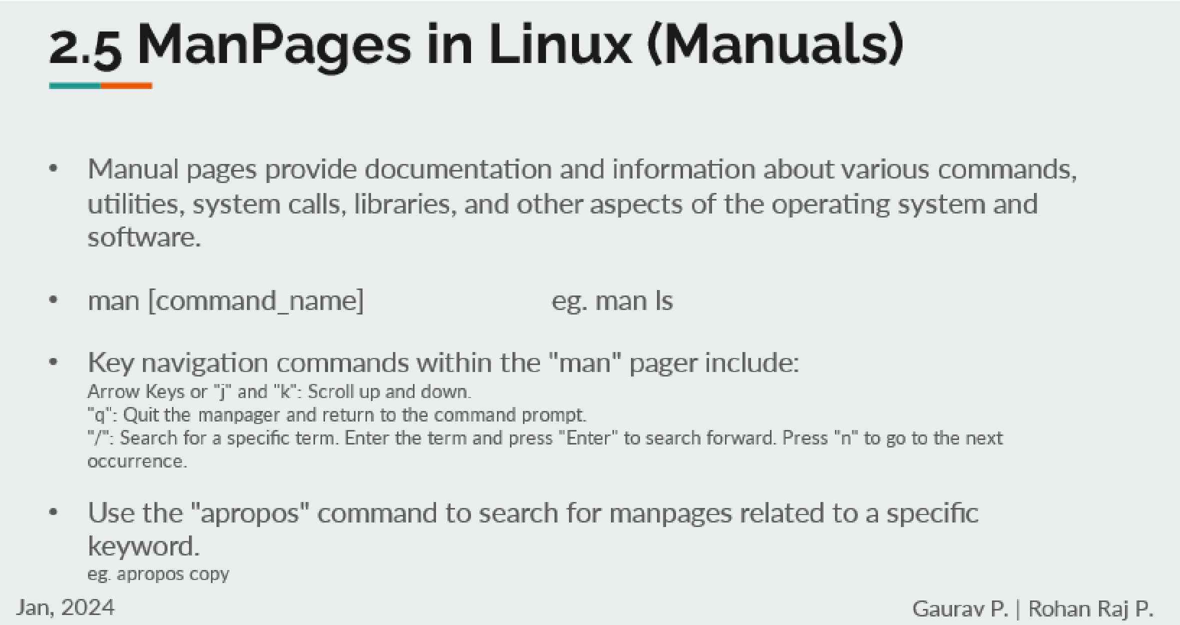
4. sudo ufw allow ssh

this is done to allow ssh through firewall

5. sudo service ssh start

this is done to start the service

Man Pages:



2.5 ManPages in Linux (Manuals)

- Manual pages provide documentation and information about various commands, utilities, system calls, libraries, and other aspects of the operating system and software.
- man [command_name]   eg. man ls
- Key navigation commands within the "man" pager include:
  Arrow Keys or "j" and "k": Scroll up and down.
  "q": Quit the manpager and return to the command prompt.
  "/": Search for a specific term. Enter the term and press "Enter" to search forward. Press "n" to go to the next occurrence.
- Use the "apropos" command to search for manpages related to a specific keyword.
  eg. apropos copy

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- Use normal scroll (of mouse/trackpad) or arrows key to move around
- Use ‘Space Key’ to move a page down
- Use ‘B’ key to move a page up
- Use ‘Q’ key to quit (as written in the last line of Man pages)
- Type ‘/ [keyword]’ to search for something in the man pages
- Normal searching of keyword in man pages in terminal
  man -k [keyword]
- Try man man to know more about man pages

Terminal Multiplexing:

- Tmux and Screen
- Install tmux using – sudo apt install tmux
- New terminal – (control+b) and type ‘%’
- Switch terminal – (control+b) and use arrow keys
- Detach terminal – (control+b) and type ‘d’
- **HW: Differences between screen and tmux**

Shell Scripting:

1. Shell = command interpreter
2. Shell script = file containing set of valid linux commands
3. We needed touch command to create a new file, let’s directly create new file this time:
   vi file.ext
   vim file_name.sh
   nano test.py
4. For vi and vim text editor
   - we need to go to insert mode by pressing ‘i’ key then we may be able to type in the text within it.
   - # to write some command
   - after completing the code, to write and exit the text editor we press ‘Esc’ and then type ‘:wq!’ then press enter
5. First script
   >> nano first.sh
   # This is my first script
   echo This is my first shell script
   >> sh first.sh   :: to run shell in sh
   >> bash first.sh   :: to run shell in bash

HW: Differences between bash and sh and their basic functionalities

```
>> cat first.sh          :: to view code written in the script file
```

6. Let's take some input from user and then display them back

```
>> nano second.sh
# Ask user for their name and their favorite number and display it
echo Can I get your name?
read nme
echo What is your favorite number?
read num
echo Hello $nme , I guess your fav number is $num .
>> sh second.sh
```

7. Expression handling

   - Operators

   plus (+) is +

   minus (-) is -

   multiply (* or x) is * [backward slash and asterisk]

   divide (/) is /

   modulus division (%) is %

   - evaluation of operation

   ```
   `expr $var1 [operator] $var2`                eg. `expr $a \* $b`
   $((var1 [operator] var2))                eg. $((a + b))
   ```

   -keep in mind the blank space while writing code

   ```
   >>nano third.sh
   # A simple calculator for two digits
   echo Enter two numbers
   read num1 num2
   echo Sum = `expr $num1 + $num2`
   echo Difference = `expr $num1 - $num2`
   echo Product = `expr $num1 \* $num2`
   echo Quotient  = `expr $num1 / $num2` and reminder = `expr $num1 % $num2`
   >> sh third.sh
   ```

   - ` is Acend, below Esc key, left side of number 1

8. Conditionals

   equal to : -eq

   greater than : -gt

   lesser than: -lt

   greater than or equal to : -ge

   lesser than or equal to : -le

   and: -a

   or: -o

   not: -n

- Normal if statement:

```
if [condition]
then
/Statements/
fi
```

eg:

```
read income
if [ $income -ge 100000 ]
then
echo You are rich
fi
```

- if then else

```
if [condition]
then
/Statements/
else
/Statements/
fi
```

eg:

```
read number
if [ $number -ge 0 ]
then
echo The given number is positive
else
echo The given number is negative
fi
```

- if - else if - else if - ……. – else

-need to close if statement with fi (with as many if written in the code)

```
>> nano largest
# Find largest of three numbers
read n1 n2 n3
if [ $n1 -ge $n2 -a $n1 -ge $n3 ]
then
echo $n1 is largest among all
else if [ $n2 -ge $n1 -a $n2 -ge $n3 ]
echo $n2 is largest among all
else if [ $n3 -ge $n1 -a $n3 -ge $n2 ]
echo $n3 is largest among all
else
echo Wrong Input
fi
fi
fi
>> sh largest.sh
```