

Day 2 – Phase 2: File & Directory Management + Search

1)

```
aya@aya-VirtualBox: ~/iot_logger
aya@aya-VirtualBox:~/Desktop$ cd ~
aya@aya-VirtualBox:~$ ls
Desktop  Downloads  Music      Public    snap      Videos
Documents  iot_logger  Pictures  scripts  Templates
aya@aya-VirtualBox:~$ cd iot_logger
aya@aya-VirtualBox:~/iot_logger$ ls
data  logs  scripts
aya@aya-VirtualBox:~/iot_logger$ cd scripts
bash: cd: scripts: No such file or directory
aya@aya-VirtualBox:~/iot_logger$ cd scrips
aya@aya-VirtualBox:~/iot_logger/scrips$ touch sensor_script
aya@aya-VirtualBox:~/iot_logger/scrips$ cd ..
aya@aya-VirtualBox:~/iot_logger$ cd logs
aya@aya-VirtualBox:~/iot_logger/logs$ touch temperature
aya@aya-VirtualBox:~/iot_logger/logs$ cd ..
```

2)

```
aya@aya-VirtualBox: ~/iot_logger/data
aya@aya-VirtualBox:~/iot_logger$ cp /etc/services data
aya@aya-VirtualBox:~/iot_logger$ man grep
aya@aya-VirtualBox:~/iot_logger$ cd data
aya@aya-VirtualBox:~/iot_logger/data$ grep -E "http|ssh" services
# Updated from https://www.iana.org/assignments/service-names-port-numbers/service-names-port-numbers.xhtml .
ssh      22/tcp      # SSH Remote Login Protocol
http     80/tcp      WWW        # WorldWideWeb HTTP
https    443/tcp     # https protocol over TLS/SSL
https    443/udp     # HTTP/3
http-alt 8080/tcp    webcache   # WWW caching service
```

3)

```
aya@aya-VirtualBox: ~/iot_logger/data
aya@aya-VirtualBox:~/iot_logger/data$ grep -E "^[0-9]" services
tcpmux   1/tcp      # TCP port service multiplexer
echo     7/tcp
echo     7/udp
discard  9/tcp      sink null
discard  9/udp      sink null
sysstat  11/tcp     users
daytime  13/tcp
daytime  13/udp
netstat  15/tcp
gotd     17/tcp     quote
chargen  19/tcp     ttytst source
chargen  19/udp     ttytst source
ftp-data 20/tcp
ftp      21/tcp
ftp      21/udp     fsp
ssh      22/tcp     # SSH Remote Login Protocol
telnet   23/tcp
smtp     25/tcp     mail
time     37/tcp     timserver
time     37/udp     timserver
whois    43/tcp     nicname
tacacs   49/tcp     # Login Host Protocol (TACACS)
tacacs   49/udp
domain   53/tcp     # Domain Name Server
domain   53/udp
bootps   67/udp
bootpc   68/udp
lftp     69/udp
gopher   70/tcp     # Internet Gopher
finger   79/tcp
http     80/tcp     www        # WorldWideWeb HTTP
kerberos 88/tcp     kerberos5  krb5       # Kerberos v5
kerberos 88/udp     kerberos5  krb5       # Kerberos v5
iso-tsap 102/tcp    tsap       # part of ISO
dicom    104/tcp    # Digital Imag. & Comm. 300
pop3     110/tcp    # POP version 3
sunrpc   111/tcp    portmapper # RPC 4.0 portmapper
sunrpc   111/udp    portmapper
auth     113/tcp    authentication tap ident
```

4)

```
aya@aya-VirtualBox: ~  
aya@aya-VirtualBox:~/Desktop$ cd ~  
aya@aya-VirtualBox:~$ man find  
aya@aya-VirtualBox:~$ find . -type f -name "*.txt"  
./snap/firefox/common/.mozilla/firefox/spafdhpf.default/serviceworker.txt  
./snap/firefox/common/.mozilla/firefox/spafdhpf.default/pkcs11.txt  
./thunderbird/6kenmhoa.default-release/pkcs11.txt  
./thunderbird/6kenmhoa.default-release/encrypted-openpgp-passphrase.txt  
./cache/tracker3/files/last-crawl.txt  
./cache/tracker3/files/first-index.txt  
aya@aya-VirtualBox:~$ find . -type f -name "*.txt~" delete  
find: paths must precede expression: `delete'  
aya@aya-VirtualBox:~$ find . -type f -name "*.txt~" -delete  
aya@aya-VirtualBox:~$ find . -type f -name "*.tmp" -delete
```

5)

```
aya@aya-VirtualBox: ~/iot_logger/logs  
aya@aya-VirtualBox:~$ cd iot_logger  
aya@aya-VirtualBox:~/iot_logger$ cd logs  
aya@aya-VirtualBox:~/iot_logger/logs$ ln -s temperature symbolic_link  
aya@aya-VirtualBox:~/iot_logger/logs$ ln temperature hard_link  
aya@aya-VirtualBox:~/iot_logger/logs$ ls  
hard_link symbolic_link temperature
```

6)

```
aya@aya-VirtualBox: ~/iot_logger  
aya@aya-VirtualBox:~/iot_logger/logs$ cd ..  
aya@aya-VirtualBox:~/iot_logger$ tree  
Command 'tree' not found, but can be installed with:  
sudo snap install tree # version 2.1.3+pkg-5852, or  
sudo apt install tree # version 2.0.2-1  
See 'snap info tree' for additional versions.  
aya@aya-VirtualBox:~/iot_logger$ ls -R  
.:  
data logs scripts  
  
./data:  
data services  
  
./logs:  
hard_link symbolic_link temperature  
  
./scripts:  
sensor_script
```

Open-Ended Questions

- 1) Everything on linux is as a file in which there are many file types such as the regular file which contains data such as text, images, executables, log like /etc/passwd, sample.txt. Another type of file is the directory (equivalent to folder in windows) which is a special file that contains other files such as /home. For the symbolic link, it is a shortcut to another file where it has a different inode than the original file and If the original file deletes, the link will break. For the device, there are two different types (character and block device) in which the character device provides direct access to hardware (character by character), and the block device it does the same function but it provides access to hardware in blocks such as dev/sda/
We check the file types using “ls -l” command in which the first character of each line shows the file type (- → regular file, d → directory, l → symbolic link, c → character device, b → block device)
- 2) Hard link: is a direct pointer to the original file in which it has the same inode of the original file, it increases the number of links, and when the original file is deleted, the hard link does not get affected. It may be considered as another filename referring to the exact same data (maybe as a backup to ensure file availability even if the original filename is deleted).
Symbolic link: is a shortcut or a reference to the original file which has a different inode from the original file, the number of links is the same, and when the file is deleted, the link does not work. It can be used if I want a shortcut to a file or directory like for the file descriptors (0: input, 1: output, 2: error) where these files have symbolic links to the terminals they are working on.
- 3) rmdir: used to delete empty directories only (if it is filled, it will fail to delete →Safer, since it won't delete data accidentally).
rm -r (recursive remove): deletes a directory and everything inside it (files & subdirectories) which is dangerous if not used carefully because it can delete large amounts of data by mistake from the user.