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Linux Command Line and Security Basics

(1, 2 & 3) Updating, Upgrading, and Rebooting the System

```
haines@nico:~$ ssh
usage: ssh [-46AaCfGgKkMNnqsTtVvXxYy] [-B bind_interface]
           [-b bind_address] [-c cipher_spec] [-D [bind_address:]port]
           [-E log_file] [-e escape_char] [-F configfile] [-I pkcs11]
           [-i identity_file] [-J [user@]host[:port]] [-L address]
           [-l login_name] [-m mac_spec] [-O ctl_cmd] [-o option] [-p port]
           [-Q query_option] [-R address] [-S ctl_path] [-W host:port]
           [-w local_tun[:remote_tun]] destination [command [argument ...]]
haines@nico:~$ sudo apt update
[sudo] password for haines:
Hit:1 http://ports.ubuntu.com/ubuntu-ports jammy InRelease
Get:2 http://ports.ubuntu.com/ubuntu-ports jammy-updates InRelease [128 kB]
Get:3 http://ports.ubuntu.com/ubuntu-ports jammy-backports InRelease [127 kB]
Get:4 http://ports.ubuntu.com/ubuntu-ports jammy-security InRelease [129 kB]
Get:5 http://ports.ubuntu.com/ubuntu-ports jammy-updates/main arm64 DEP-11 Metadata [112 kB]
Get:6 http://ports.ubuntu.com/ubuntu-ports jammy-updates/restricted arm64 DEP-11 Metadata [212 B]
Get:7 http://ports.ubuntu.com/ubuntu-ports jammy-updates/universe arm64 DEP-11 Metadata [356 kB]
Get:8 http://ports.ubuntu.com/ubuntu-ports jammy-updates/multiverse arm64 DEP-11 Metadata [212 B]
Get:9 http://ports.ubuntu.com/ubuntu-ports jammy-backports/main arm64 DEP-11 Metadata [3,572 B]
Get:10 http://ports.ubuntu.com/ubuntu-ports jammy-backports/restricted arm64 DEP-11 Metadata [212 B]
Get:11 http://ports.ubuntu.com/ubuntu-ports jammy-backports/universe arm64 DEP-11 Metadata [9,264 B]
Get:12 http://ports.ubuntu.com/ubuntu-ports jammy-backports/multiverse arm64 DEP-11 Metadata [212 B]
Get:13 http://ports.ubuntu.com/ubuntu-ports jammy-security/main arm64 DEP-11 Metadata [54.6 kB]
Get:14 http://ports.ubuntu.com/ubuntu-ports jammy-security/restricted arm64 DEP-11 Metadata [208 B]
Get:15 http://ports.ubuntu.com/ubuntu-ports jammy-security/universe arm64 DEP-11 Metadata [125 kB]
Get:16 http://ports.ubuntu.com/ubuntu-ports jammy-security/multiverse arm64 DEP-11 Metadata [208 B]
Fetched 1,046 kB in 1s (758 kB/s)
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
9 packages can be upgraded. Run 'apt list --upgradable' to see them.
haines@nico:~$ apt list upgradable
Listing... Done
haines@nico:~$ sudo apt upgrade
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
```

...

```
No containers need to be restarted.

No user sessions are running outdated binaries.

No VM guests are running outdated hypervisor (qemu) binaries on this host.
haines@nico:~$ reboot
```

User Tasks

(4) Changing the current user to root

```
haines@nico:~$ sudo su root
root@nico:/home/haines#
```

(5) What is the difference between the command useradd (e.g. “bobby”) and adduser (e.g. “sally”)?

useradd:

```
root@nico:/home/haines# useradd bobby
```

These steps, including setting password and values, are unique to **adduser:**

```
root@nico:/home/haines# adduser sally
Adding user `sally' ...
Adding new group `sally' (1004) ...
Adding new user `sally' (1004) with group `sally' ...
Creating home directory `/home/sally' ...
Copying files from `/etc/skel' ...
New password:
BAD PASSWORD: The password is shorter than 8 characters
Retype new password:
passwd: password updated successfully
Changing the user information for sally
Enter the new value, or press ENTER for the default
        Full Name []:
        Room Number []:
        Work Phone []:
        Home Phone []:
        Other []:
Is the information correct? [Y/n] y
```

By using `sudo cat /etc/passwd` or `sudo less /etc/passwd`, the 2 new users will display as follows:

```
bobby:x:1003:1003::/home/bobby:/bin/sh
sally:x:1004:1004:,,,:/home/sally:/bin/bash
```

(6) Changing/logging into another user (e.g. to “sally”)

```
root@nico:/home/haines# sudo su sally
sally@nico:/home/haines$
```

(7) When attempting to create a new user (e.g. “earl”) as another user (e.g. “sally”)

Sally does not have sufficient permission or sudo access to add a new user. Attempting to do so will result in these outcomes:

```
sally@nico:/home/haines$ useradd earl
useradd: Permission denied.
useradd: cannot lock /etc/passwd; try again later.
```

```
sally@nico:/home/haines$ sudo useradd earl
[sudo] password for sally:
sally is not in the sudoers file.  This incident will be reported.
```

(8) Returning to the original user and deleting a user (e.g. “earl”) (when/if it exists)

```
sally@nico:/home/haines$ exit
exit
haines@nico:~$ sudo userdel earl
```

(9) Changing a user’s password (e.g. “sally”)

```
haines@nico:~$ sudo passwd sally
New password:
BAD PASSWORD: The password is shorter than 8 characters
Retype new password:
passwd: password updated successfully
```

(10 and 11) Returning to the ubuntu (original) user and displaying their user ID

```
haines@nico:~$ id
uid=1000(haines) gid=1000(haines) groups=1000(haines),4(adm),24(cdrom),27(sudo),
30(dip),46(plugdev),110(lxd)
```

Group Tasks

(12) What groups does the current user belong to?

```
haines@nico:~$ id
uid=1000(haines) gid=1000(haines) groups=1000(haines),4(adm),24(cdrom),27(sudo),
30(dip),46(plugdev),110(lxd)
```

1000(haines), 4(adm), 24(cdrom), 27(sudo), 30(dip), 46(plugdev), 110(lxd)

(13) Granting user (e.g. “sally”) sudo perms, who can now add new users

```
haines@nico:~$ sudo usermod -a -G sudo sally
[sudo] password for haines:
haines@nico:~$ id sally
uid=1004(sally) gid=1004(sally) groups=1004(sally),27(sudo)
haines@nico:~$ sudo su sally
To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

sally@nico:/home/haines$ sudo useradd earl
[sudo] password for sally:
sally@nico:/home/haines$
```

(14, 15 & 16) Creating a new group, adding a user (e.g. “sally”) to it, and checking what other groups the user is in

```
haines@nico:~$ sudo groupadd cybersec
haines@nico:~$ sudo usermod -a -G cybersec sally
haines@nico:~$ id sally
uid=1004(sally) gid=1004(sally) groups=1004(sally),27(sudo),1008(cybersec)
```

Permission and Access Control Lists

(17) Make a new directory and find it’s permissions

```
haines@nico:~$ mkdir lab1
haines@nico:~$ ls -la lab1
total 8
drwxrwxr-x  2 haines haines 4096 Oct  3 02:48 .
```

- the owner (haines) has permissions to read, write and execute
- the group owner (haines) has permissions to read, write, and execute as well
- other users have permissions to read and execute

(18) Creating a new executable bash file that prints “Hello World”

This is the creation and initialization of the command in the terminal:

```
haines@nico:~$ cd lab1
haines@nico:~/lab1$ nano helloWorld
haines@nico:~/lab1$ chmod u+x helloWorld
haines@nico:~/lab1$ ./helloWorld
Hello World
```

This is what the text inside the bash file looks like:

```
  GNU nano 6.2                          helloWorld
#!/bin/bash

echo "Hello World"
```

(19) Change the group permissions of the helloWorld bash file to also be able to write and execute

```
haines@nico:~/lab1$ ls -la helloWorld
-rwxrw-r-- 1 haines haines 32 Oct  3 03:00 helloWorld
haines@nico:~/lab1$ chmod 774 helloWorld
haines@nico:~/lab1$ ls -la helloWorld
-rwxrwxr-- 1 haines haines 32 Oct  3 03:00 helloWorld
```

(20 & 21) getfacl and setfacl (e.g. “sally”) to update/add permissions

```
haines@nico:~/lab1$ getfacl helloWorld
# file: helloWorld
# owner: haines
# group: haines
user::rwx
group::rwx
other::r--

haines@nico:~/lab1$ setfacl -m u:sally:rw- helloWorld
haines@nico:~/lab1$ getfacl helloWorld
# file: helloWorld
# owner: haines
# group: haines
user::rwx
user:sally:rw-
group::rwx
mask::rwx
other::r--
```