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4IT-B

**ITP111 – System Administration and Maintenance**
**MIDTERM – LABORATORY ACTIVITY 1**
Basic Ubuntu Server Commands

## BASIC UBUNTU SERVER COMMANDS

### SYSTEM INFORMATION

a. **Check System Information:**
   - Display the system's kernel version:
     *uname -r*

```
lucky@luckyd:~$ uname -r
6.8.0-45-generic
```

   - Check disk usage of the filesystem:
     *df -h*

```
lucky@luckyd:~$ df -h
Filesystem                         Size  Used Avail Use% Mounted on
tmpfs                              197M  1.1M  196M   1% /run
/dev/mapper/ubuntu--vg-ubuntu--lv   12G  4.3G  6.4G  40% /
tmpfs                              985M     0  985M   0% /dev/shm
tmpfs                              5.0M     0  5.0M   0% /run/lock
/dev/sda2                          2.0G   95M  1.7G   6% /boot
tmpfs                              197M   12K  197M   1% /run/user/1000
```

   - Check memory usage:
     *free -h*

/

```
lucky@luckyd:~$ free -h
               total        used        free      shared  buff/cache   available
Mem:           1.9Gi       299Mi       1.5Gi       1.1Mi       269Mi       1.6Gi
Swap:          2.0Gi          0B       2.0Gi
```

b. **File System Navigation:**
   - Navigate to the /var/log directory and list its contents:
     *cd /var/log*
     *ls -lh*

```
lucky@luckyd:~$ cd /var/log
lucky@luckyd:/var/log$ ls -lh
total 1.1M
-rw-r--r--  1 root      root            34K Oct  4 02:20 alternatives.log
-rw-r-----  1 root      adm              0 Oct  4 02:24 apport.log
drwxr-xr-x  2 root      root           4.0K Oct  4 02:20 apt
-rw-r-----  1 syslog    adm            3.3K Oct  4 02:25 auth.log
-rw-r--r--  1 root      root            60K Aug 27 14:18 bootstrap.log
-rw-rw----  1 root      utmp           384 Oct  4 02:24 btmp
-rw-r-----  1 syslog    adm             82K Oct  4 02:24 cloud-init.log
-rw-r-----  1 root      adm            4.6K Oct  4 02:24 cloud-init-output.log
drwxr-xr-x  2 root      root           4.0K Aug 21 16:55 dist-upgrade
-rw-r-----  1 root      adm             50K Oct  4 02:24 dmesg
-rw-r--r--  1 root      root           625K Oct  4 02:20 dpkg.log
-rw-r--r--  1 root      root             0 Aug 27 14:18 faillog
drwxrwx---  4 root      adm            4.0K Oct  4 02:20 installer
drwxr-sr-x+ 3 root      systemd-journal 4.0K Oct  4 02:23 journal
-rw-r-----  1 syslog    adm             58K Oct  4 02:24 kern.log
drwxr-xr-x  2 landscape landscape      4.0K Aug 27 14:26 landscape
-rw-rw-r--  1 root      utmp             0 Aug 27 14:18 lastlog
drwx------  2 root      root           4.0K Aug 27 14:21 private
lrwxrwxrwx  1 root      root             39 Aug 27 14:21 README -> ../../usr/share/doc/systemd/README.logs
-rw-r-----  1 syslog    adm            121K Oct  4 02:29 syslog
drwxr-xr-x  2 root      root           4.0K Oct  4 02:24 sysstat
drwxr-x---  2 root      adm            4.0K Oct  4 02:24 unattended-upgrades
-rw-rw-r--  1 root      utmp           1.5K Oct  4 02:24 wtmp
```

## FILE MANAGEMENT

a. **Creation:**
   - Create a new directory project inside your home directory:
     *mkdir ~/project*
   - Create an empty file called logfile.txt inside project:
     *touch ~/project/logfile.txt*
   - Copy the logfile.txt file to /tmp directory:
     *cp ~/project/logfile.txt /tmp/*

```
lucky@luckyd:~$ mkdir ~/project
lucky@luckyd:~$ touch ~/project/logfile.txt
lucky@luckyd:~$ cp ~/project/logfile.txt /tmp
lucky@luckyd:~$ cp ~/project/logfile.txt /tmp/
lucky@luckyd:~$ ls ~/project
logfile.txt
lucky@luckyd:~$ ls /tmp/
logfile.txt                                                    systemd-private-9b4dfc1ca526455ba02794833a051708-systemd-logind.service-r61Xf0
snap-private-tmp                                               systemd-private-9b4dfc1ca526455ba02794833a051708-systemd-resolved.service-eSIIEL
systemd-private-9b4dfc1ca526455ba02794833a051708-ModemManager.service-bsDjT3  systemd-private-9b4dfc1ca526455ba02794833a051708-systemd-timesyncd.service-96NFEL
systemd-private-9b4dfc1ca526455ba02794833a051708-polkit.service-BWuWwA
```

b. **View and Edit Files:**
   - Display the first 10 lines of a system log file:
     *head -n 10 /var/log/syslog*

```
lucky@luckyd:~$ head -n 10 /var/log/syslog
2024-10-04T02:24:04.409328+00:00 luckyd lvm[301]:   1 logical volume(s) in volume group "ubuntu-vg" monitored
2024-10-04T02:24:04.409832+00:00 luckyd systemd-modules-load[318]: Inserted module 'msr'
2024-10-04T02:24:04.409840+00:00 luckyd systemd[1]: Mounted dev-hugepages.mount - Huge Pages File System.
2024-10-04T02:24:04.409842+00:00 luckyd systemd-modules-load[318]: Inserted module 'dm_multipath'
2024-10-04T02:24:04.409844+00:00 luckyd systemd[1]: Mounted dev-mqueue.mount - POSIX Message Queue File System.
2024-10-04T02:24:04.409846+00:00 luckyd systemd[1]: Mounted sys-kernel-debug.mount - Kernel Debug File System.
2024-10-04T02:24:04.409848+00:00 luckyd systemd[1]: Mounted sys-kernel-tracing.mount - Kernel Trace File System.
2024-10-04T02:24:04.409850+00:00 luckyd systemd[1]: Finished keyboard-setup.service - Set the console keyboard layout.
2024-10-04T02:24:04.409853+00:00 luckyd systemd[1]: Finished kmod-static-nodes.service - Create List of Static Device Nodes.
2024-10-04T02:24:04.409855+00:00 luckyd systemd[1]: Finished lvm2-monitor.service - Monitoring of LVM2 mirrors, snapshots etc. using dmeventd or progress polli
g.
```

   - Use nano to edit logfile.txt, write some content, and save:
     *nano ~/project/logfile.txt*

```
  GNU nano 7.2                          /home/lucky/project/logfile.txt *                                M
luckyd pogi
File Name to Write: /home/lucky/project/logfile.txt
^G Help              M-D DOS Format       M-A Append           M-B Backup File
^C Cancel            M-M Mac Format       M-P Prepend          ^T Browse
```

**USER AND GROUP MANAGEMENT**

a. **Create a New User:**
   - Add a new user webadmin:
     *sudo adduser webadmin*

```
lucky@luckyd:~$ sudo adduser webadmin
[sudo] password for lucky:
info: Adding user `webadmin' ...
info: Selecting UID/GID from range 1000 to 59999 ...
info: Adding new group `webadmin' (1001) ...
info: Adding new user `webadmin' (1001) with group `webadmin (1001)' ...
info: Creating home directory `/home/webadmin' ...
info: Copying files from `/etc/skel' ...
New password:
Retype new password:
passwd: password updated successfully
Changing the user information for webadmin
Enter the new value, or press ENTER for the default
        Full Name []: lucky d
        Room Number []: 2
        Work Phone []: 123
        Home Phone []: 1234
        Other []: n/a
Is the information correct? [Y/n] y
info: Adding new user `webadmin' to supplemental / extra groups `users' ...
info: Adding user `webadmin' to group `users' ...
```

b. **Grant Administrative Privileges:**
   - Add webadmin to the sudo group:
     *sudo usermod -aG sudo webadmin*

```
lucky@luckyd:~$ sudo usermod -aG sudo webadmin
lucky@luckyd:~$ groups
lucky adm cdrom sudo dip plugdev lxd
```

c. **Check User Groups:**
   - Display the groups the current user belongs to:
     *Groups*

```
lucky@luckyd:~$ sudo usermod -aG sudo webadmin
lucky@luckyd:~$ groups
lucky adm cdrom sudo dip plugdev lxd
```

**FILE PERMISSION AND OWNERSHIP**

a. **Change Permissions:**
   - Make logfile.txt readable and writable by the user, but not executable:
     *chmod 644 ~/project/logfile.txt*

```
lucky@luckyd:~$ chmod 644 ~/project/logfile.txt
lucky@luckyd:~$ ls -l ~/project/logfile.txt
-rw-r--r-- 1 lucky lucky 12 Oct  4 02:38 /home/lucky/project/logfile.txt
```

b. **Change Ownership:**
   - Change the ownership of logfile.txt to the webadmin user:
     *sudo chown webadmin:webadmin ~/project/logfile.txt*

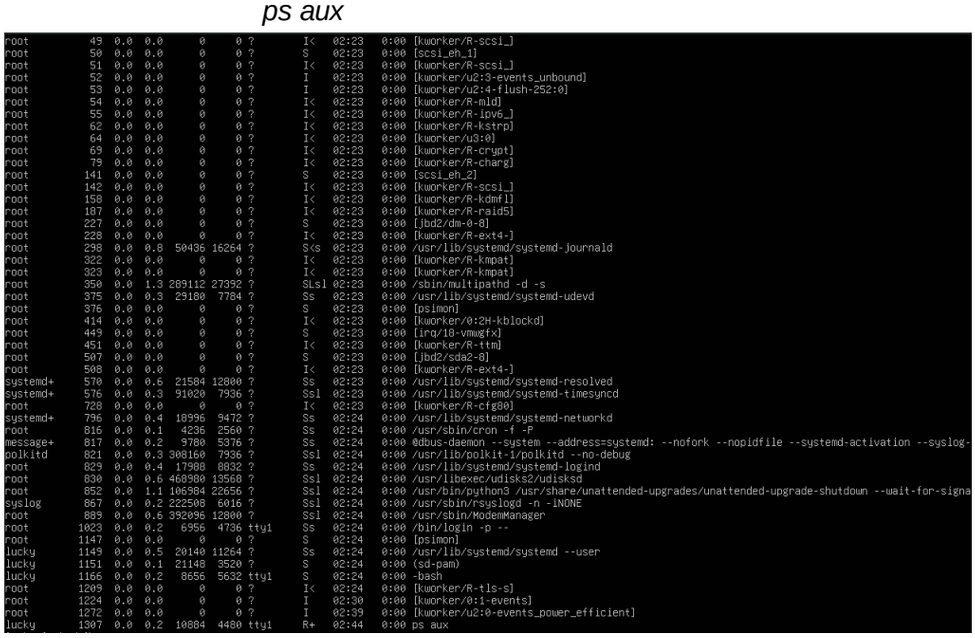
```
lucky@luckyd:~$ sudo chown webadmin:webadmin ~/project/logfile.txt
lucky@luckyd:~$ ls -l ~/project/logfile.txt
-rw-r--r-- 1 webadmin webadmin 12 Oct  4 02:38 /home/lucky/project/logfile.txt
```

## ADVANCE UBUNTU SERVER COMMANDS

### 1. Process Management

1. **List Active Processes:**
   - Display a list of currently running processes:

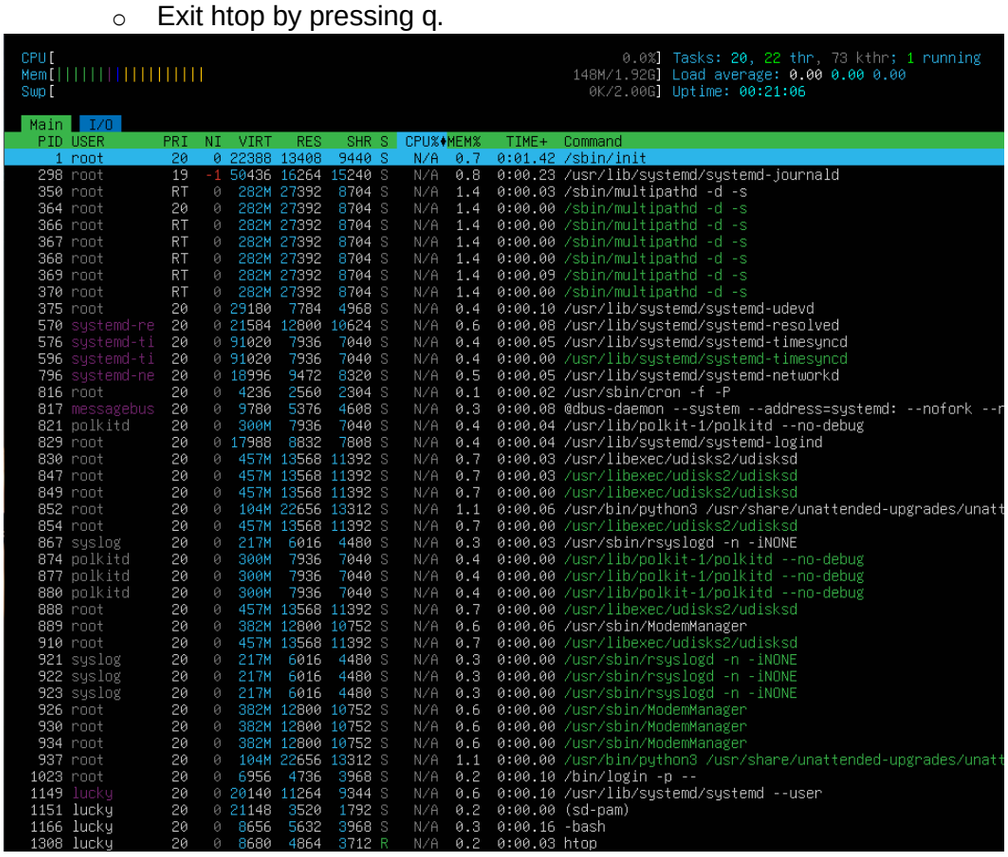
     *ps aux*




2. **Monitor System in Real-Time:**

   *htop*

   - Exit htop by pressing q.



3. **Kill a Process:**
   - Find the process ID (PID) of a running program (e.g., nano) and kill it:
     *ps aux | grep nano*
     *kill <PID>*

```
lucky@luckyd:~$ kill 1234
-bash: kill: (1234) - No such process
```

**2. Package Management**

1. **Update System Packages:**
   - Update the package list and upgrade installed packages:
     *sudo apt update*
     *sudo apt upgrade*

```
lucky@luckyd:~$ sudo apt update
Hit:1 http://security.ubuntu.com/ubuntu noble-security InRelease
Hit:2 http://ph.archive.ubuntu.com/ubuntu noble InRelease
Hit:3 http://ph.archive.ubuntu.com/ubuntu noble-updates InRelease
Hit:4 http://ph.archive.ubuntu.com/ubuntu noble-backports InRelease
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
35 packages can be upgraded. Run 'apt list --upgradable' to see them.
lucky@luckyd:~$ sudo apt upgrade
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
Calculating upgrade... Done
The following upgrades have been deferred due to phasing:
  python3-distupgrade ubuntu-release-upgrader-core
The following packages will be upgraded:
  apparmor cloud-init cloud-initramfs-copymods cloud-initramfs-dyn-netconf cryptsetup cryptsetup-bin cryptsetup-initram
  initramfs-tools initramfs-tools-bin initramfs-tools-core libapparmor1 libcryptsetup12 libdevmapper-event1.02.1 libdevm
  libproc2-0 lvm2 lxd-agent-loader mdadm open-vm-tools overlayroot procps python3-update-manager systemd-hwe-hwdb tmux u
  ubuntu-pro-client-l10n update-manager-core
33 upgraded, 0 newly installed, 0 to remove and 2 not upgraded.
Need to get 11.9 MB of archives.
After this operation, 242 kB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://ph.archive.ubuntu.com/ubuntu noble-updates/main amd64 ubuntu-drivers-common amd64 1:0.9.7.6ubuntu3.1 [64.5
Get:2 http://ph.archive.ubuntu.com/ubuntu noble-updates/main amd64 libproc2-0 amd64 2:4.0.4-4ubuntu3.1 [59.4 kB]
Get:3 http://ph.archive.ubuntu.com/ubuntu noble-updates/main amd64 procps amd64 2:4.0.4-4ubuntu3.1 [708 kB]
3% [3 procps 202 kB/708 kB 29%]
```

2. **Install a New Package:**
   - Install the nginx web server:
     *sudo apt install nginx*

```
lucky@luckyd:~$ sudo apt install nginx
[sudo] password for lucky:
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  nginx-common
Suggested packages:
  fcgiwrap nginx-doc ssl-cert
The following NEW packages will be installed:
  nginx nginx-common
0 upgraded, 2 newly installed, 0 to remove and 35 not upgraded.
Need to get 552 kB of archives.
After this operation, 1,596 kB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://ph.archive.ubuntu.com/ubuntu noble-updates/main amd64 nginx-common all 1.24.0-2ubuntu7.1 [31.2 kB]
Get:2 http://ph.archive.ubuntu.com/ubuntu noble-updates/main amd64 nginx amd64 1.24.0-2ubuntu7.1 [521 kB]
Fetched 552 kB in 2s (262 kB/s)
Preconfiguring packages ...
Selecting previously unselected package nginx-common.
(Reading database ... 80609 files and directories currently installed.)
Preparing to unpack .../nginx-common_1.24.0-2ubuntu7.1_all.deb ...
Unpacking nginx-common (1.24.0-2ubuntu7.1) ...
Selecting previously unselected package nginx.
Preparing to unpack .../nginx_1.24.0-2ubuntu7.1_amd64.deb ...
Unpacking nginx (1.24.0-2ubuntu7.1) ...
Setting up nginx (1.24.0-2ubuntu7.1) ...
Setting up nginx-common (1.24.0-2ubuntu7.1) ...
Created symlink /etc/systemd/system/multi-user.target.wants/nginx.service → /usr/lib/systemd/system/nginx.service.
Processing triggers for ufw (0.36.2-6) ...
Processing triggers for man-db (2.12.0-4build2) ...
Scanning processes...
Scanning linux images...

Running kernel seems to be up-to-date.

No services need to be restarted.

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.
```

3. **Check Service Status:**
    - Check if nginx is running:
        *sudo systemctl status nginx*
    - Start the service if it's not running:
        *sudo systemctl start nginx*

```
lucky@luckyd:~$ sudo systemctl status nginx
● nginx.service - A high performance web server and a reverse proxy server
     Loaded: loaded (/usr/lib/systemd/system/nginx.service; enabled; preset: enabled)
     Active: active (running) since Fri 2024-10-04 02:53:29 UTC; 51s ago
       Docs: man:nginx(8)
    Process: 1118 ExecStartPre=/usr/sbin/nginx -t -q -g daemon on; master_process on; (code=exited, status=0/SUCCESS)
    Process: 1120 ExecStart=/usr/sbin/nginx -g daemon on; master_process on; (code=exited, status=0/SUCCESS)
   Main PID: 1121 (nginx)
      Tasks: 2 (limit: 2276)
     Memory: 1.7M (peak: 1.9M)
        CPU: 6ms
     CGroup: /system.slice/nginx.service
             ├─1121 "nginx: master process /usr/sbin/nginx -g daemon on; master_process on;"
             └─1122 "nginx: worker process"

Oct 04 02:53:29 luckyd systemd[1]: Starting nginx.service - A high performance web server and a reverse proxy server...
Oct 04 02:53:29 luckyd systemd[1]: Started nginx.service - A high performance web server and a reverse proxy server.
```

**3. Networking and Firewall Configuration**

1. **Check Network Interfaces:**
    - Display active network interfaces:
        ip addr show

```
lucky@luckyd:~$ ip addr show
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
       valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host noprefixroute
       valid_lft forever preferred_lft forever
2: enp0s3: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP group default qlen 1000
    link/ether 08:00:27:19:db:c0 brd ff:ff:ff:ff:ff:ff
    inet 10.0.2.15/24 metric 100 brd 10.0.2.255 scope global dynamic enp0s3
       valid_lft 86233sec preferred_lft 86233sec
    inet6 fe80::a00:27ff:fe19:dbc0/64 scope link
       valid_lft forever preferred_lft forever
```

2. **Test Network Connectivity:**
    - Ping a remote server (e.g., Google's DNS):
        ping 8.8.8.8

```
lucky@luckyd:~$ ping 8.8.8.8
PING 8.8.8.8 (8.8.8.8) 56(84) bytes of data.
64 bytes from 8.8.8.8: icmp_seq=1 ttl=54 time=5.43 ms
64 bytes from 8.8.8.8: icmp_seq=2 ttl=54 time=4.24 ms
64 bytes from 8.8.8.8: icmp_seq=3 ttl=54 time=4.04 ms
64 bytes from 8.8.8.8: icmp_seq=4 ttl=54 time=4.35 ms
64 bytes from 8.8.8.8: icmp_seq=5 ttl=54 time=3.67 ms
64 bytes from 8.8.8.8: icmp_seq=6 ttl=54 time=4.32 ms
64 bytes from 8.8.8.8: icmp_seq=7 ttl=54 time=4.45 ms
64 bytes from 8.8.8.8: icmp_seq=8 ttl=54 time=4.04 ms
64 bytes from 8.8.8.8: icmp_seq=9 ttl=54 time=4.18 ms
64 bytes from 8.8.8.8: icmp_seq=10 ttl=54 time=4.32 ms
64 bytes from 8.8.8.8: icmp_seq=11 ttl=54 time=3.67 ms
^[S64 bytes from 8.8.8.8: icmp_seq=12 ttl=54 time=3.68 ms
64 bytes from 8.8.8.8: icmp_seq=13 ttl=54 time=4.42 ms
64 bytes from 8.8.8.8: icmp_seq=14 ttl=54 time=4.27 ms
```

3. **Configure the UFW Firewall:**
    - Enable UFW (Uncomplicated Firewall) and allow SSH connections:
        *sudo ufw allow OpenSSH*
        *sudo ufw enable*
    - Allow HTTP traffic (for nginx):
        *sudo ufw allow 'Nginx HTTP'*
    - Check UFW status:
        *sudo ufw status*

```
lucky@luckyd:~$ sudo ufw allow OpenSSH
[sudo] password for lucky:
ERROR: Could not find a profile matching 'OpenSSH'
lucky@luckyd:~$ sudo ufw enable
Firewall is active and enabled on system startup
lucky@luckyd:~$ sudo ufw allow OpenSSH
ERROR: Could not find a profile matching 'OpenSSH'
lucky@luckyd:~$ sudo ufw allow 'Nginx HTTP'
Rule added
Rule added (v6)
lucky@luckyd:~$ sudo ufw status
Status: active

To                         Action      From
--                         ------      ----
Nginx HTTP                 ALLOW       Anywhere
Nginx HTTP (v6)            ALLOW       Anywhere (v6)

lucky@luckyd:~$ _
```

**4. Backup and Restore**

1. **Create a Backup Using tar:**
    - Create a backup of your project directory:
        *tar -czvf project-backup.tar.gz ~/project*
2. **Extract the Backup:**
    - Restore the backup by extracting it into a new directory:
        *mkdir ~/project-restore*
        *tar -xzvf project-backup.tar.gz -C ~/project-restore*

```
lucky@luckyd:~$ sudo tar -czvf project-backup.tar.gz ~/project
tar: Removing leading `/' from member names
/home/lucky/project/
/home/lucky/project/logfile.txt
lucky@luckyd:~$ mkdir ~/project-restore
lucky@luckyd:~$ tar -xzvf project-backup.tar.gz -C ~/project-restore
home/lucky/project/
home/lucky/project/logfile.txt
```