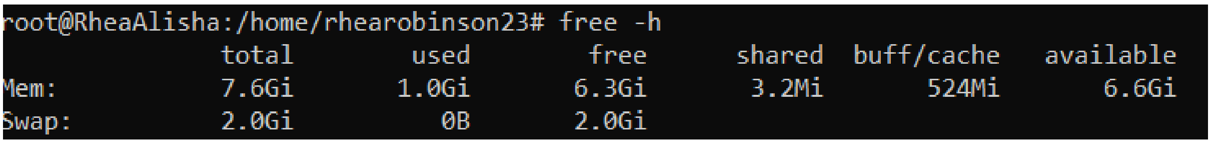
SRE TRAINING (DAY 12) - ADVANCED LINUX & JENKINS

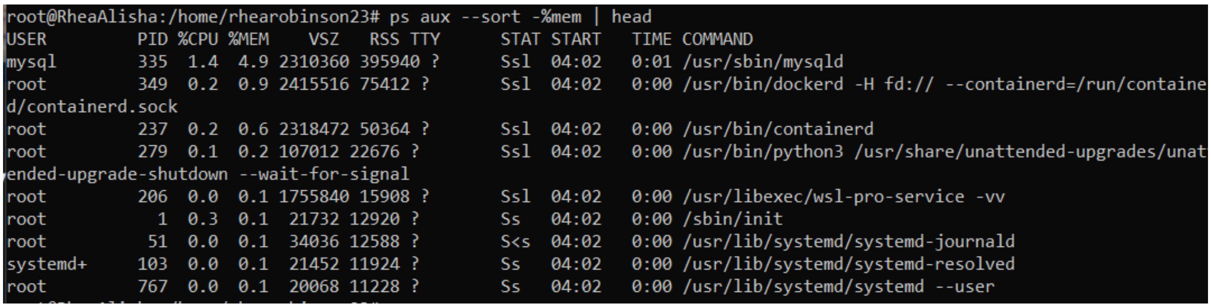
SOME MORE COMMANDS …

The `free -h` command displays the system's memory usage (RAM and swap) in a human-readable format



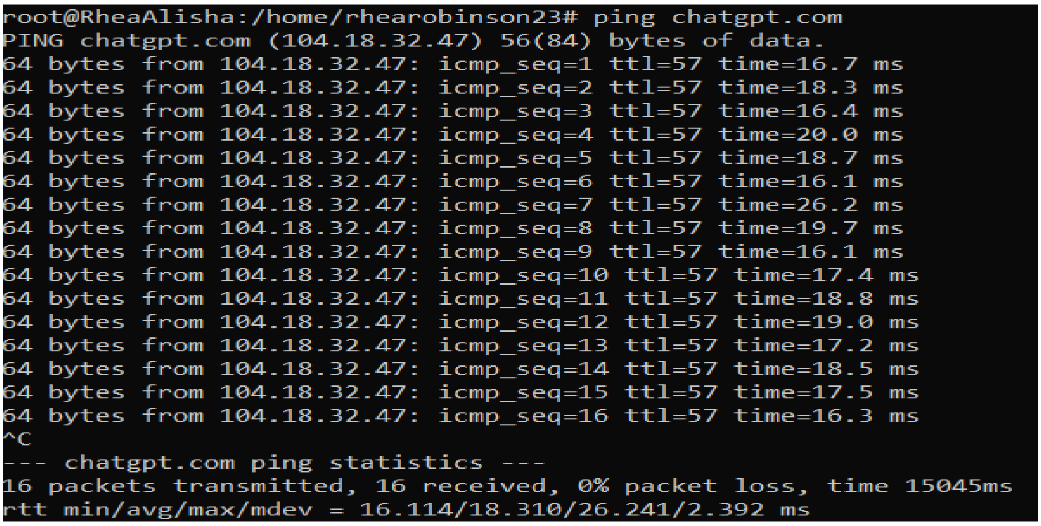
```
root@RheaAlisha:/home/rhearobinson23# free -h
               total        used        free      shared  buff/cache   available
Mem:           7.6Gi       1.0Gi       6.3Gi       3.2Mi       524Mi       6.6Gi
Swap:          2.0Gi          0B       2.0Gi
```

The command `ps aux --sort=-%mem` lists all running processes and sorts them by memory usage in descending order.



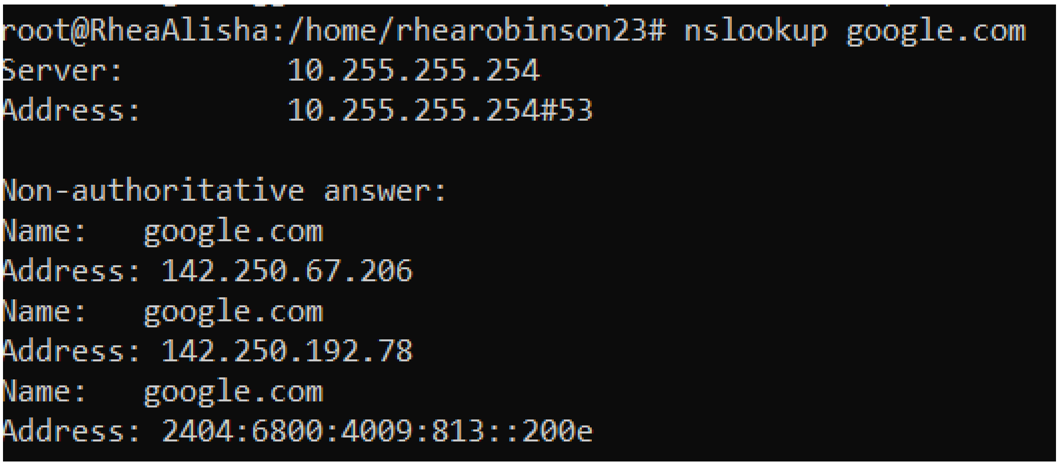
```
root@RheaAlisha:/home/rhearobinson23# ps aux --sort -%mem | head
USER         PID %CPU %MEM    VSZ   RSS TTY      STAT START   TIME COMMAND
mysql        335  1.4  4.9 2310360 395940 ?      Ssl  04:02   0:01 /usr/sbin/mysqld
root         349  0.2  0.9 2415516 75412 ?       Ssl  04:02   0:00 /usr/bin/dockerd -H fd:// --containerd=/run/containe
d/containerd.sock
root         237  0.2  0.6 2318472 50364 ?       Ssl  04:02   0:00 /usr/bin/containerd
root         279  0.1  0.2 107012 22676 ?        Ssl  04:02   0:00 /usr/bin/python3 /usr/share/unattended-upgrades/unat
ended-upgrade-shutdown --wait-for-signal
root         206  0.0  0.1 1755840 15908 ?       Ssl  04:02   0:00 /usr/libexec/wsl-pro-service -vv
root           1  0.3  0.1  21732 12920 ?        Ss   04:02   0:00 /sbin/init
root          51  0.0  0.1  34036 12588 ?        S<s  04:02   0:00 /usr/lib/systemd/systemd-journald
systemd+     103  0.0  0.1  21452 11924 ?        Ss   04:02   0:00 /usr/lib/systemd/systemd-resolved
root         767  0.0  0.1  20068 11228 ?        Ss   04:02   0:00 /usr/lib/systemd/systemd --user
```

The `ping` command checks the network connectivity between the host and a specified IP address or domain by sending ICMP echo requests and measuring the response time.



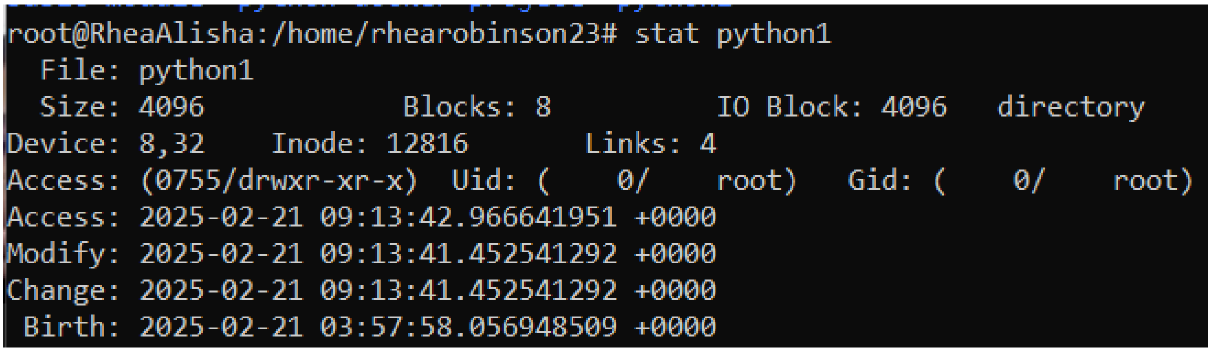
```
root@RheaAlisha:/home/rhearobinson23# ping chatgpt.com
PING chatgpt.com (104.18.32.47) 56(84) bytes of data.
64 bytes from 104.18.32.47: icmp_seq=1 ttl=57 time=16.7 ms
64 bytes from 104.18.32.47: icmp_seq=2 ttl=57 time=18.3 ms
64 bytes from 104.18.32.47: icmp_seq=3 ttl=57 time=16.4 ms
64 bytes from 104.18.32.47: icmp_seq=4 ttl=57 time=20.0 ms
64 bytes from 104.18.32.47: icmp_seq=5 ttl=57 time=18.7 ms
64 bytes from 104.18.32.47: icmp_seq=6 ttl=57 time=16.1 ms
64 bytes from 104.18.32.47: icmp_seq=7 ttl=57 time=26.2 ms
64 bytes from 104.18.32.47: icmp_seq=8 ttl=57 time=19.7 ms
64 bytes from 104.18.32.47: icmp_seq=9 ttl=57 time=16.1 ms
64 bytes from 104.18.32.47: icmp_seq=10 ttl=57 time=17.4 ms
64 bytes from 104.18.32.47: icmp_seq=11 ttl=57 time=18.8 ms
64 bytes from 104.18.32.47: icmp_seq=12 ttl=57 time=19.0 ms
64 bytes from 104.18.32.47: icmp_seq=13 ttl=57 time=17.2 ms
64 bytes from 104.18.32.47: icmp_seq=14 ttl=57 time=18.5 ms
64 bytes from 104.18.32.47: icmp_seq=15 ttl=57 time=17.5 ms
64 bytes from 104.18.32.47: icmp_seq=16 ttl=57 time=16.3 ms
^C
--- chatgpt.com ping statistics ---
16 packets transmitted, 16 received, 0% packet loss, time 15045ms
rtt min/avg/max/mdev = 16.114/18.310/26.241/2.392 ms
```

The nslookup command queries DNS (Domain Name System) to obtain domain name or IP address mapping information.



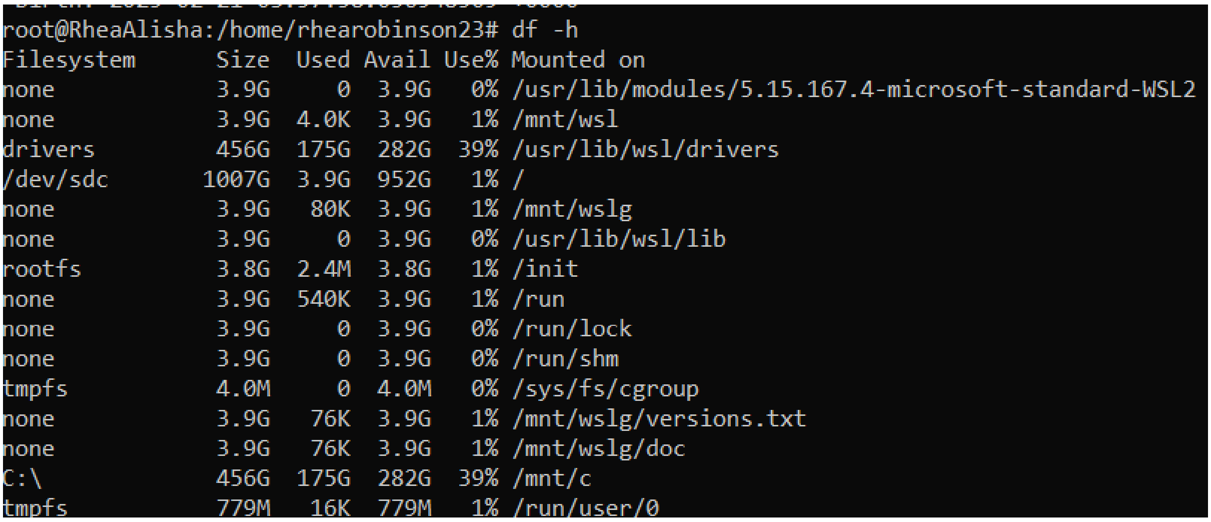
```
root@RheaAlisha:/home/rhearobinson23# nslookup google.com
Server:         10.255.255.254
Address:        10.255.255.254#53

Non-authoritative answer:
Name:   google.com
Address: 142.250.67.206
Name:   google.com
Address: 142.250.192.78
Name:   google.com
Address: 2404:6800:4009:813::200e
```

The stat command displays detailed information about a file or directory, including size, permissions, and timestamps.



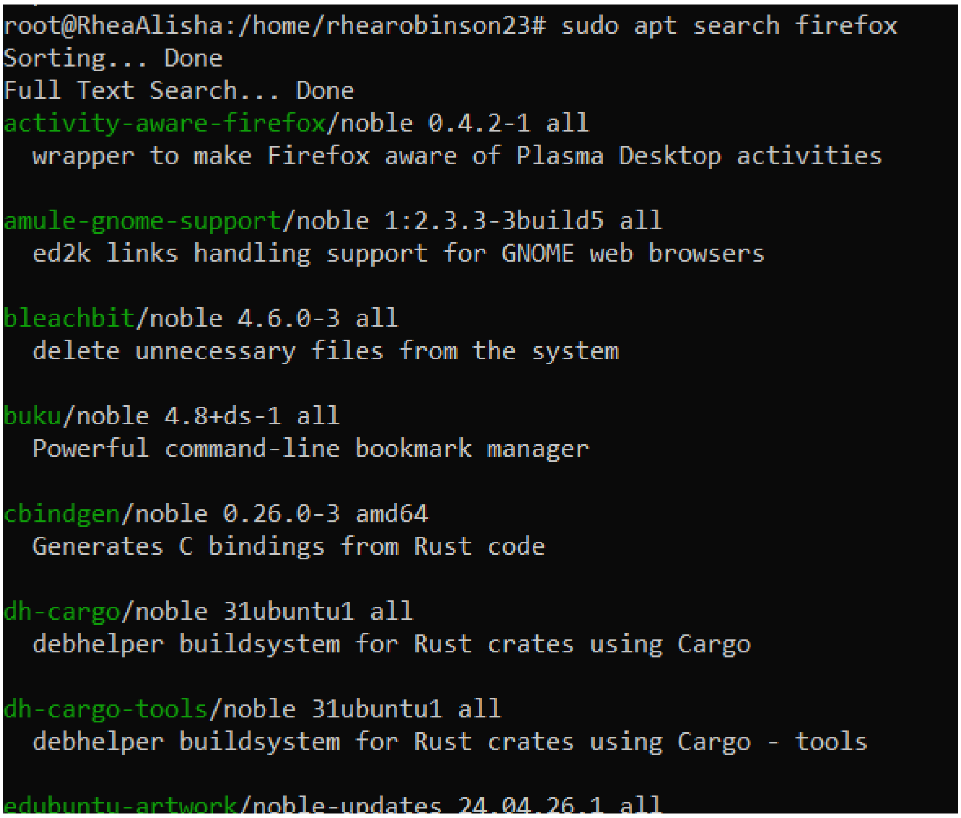
```
root@RheaAlisha:/home/rhearobinson23# stat python1
  File: python1
  Size: 4096            Blocks: 8          IO Block: 4096   directory
Device: 8,32    Inode: 12816       Links: 4
Access: (0755/drwxr-xr-x)  Uid: (    0/    root)   Gid: (    0/    root)
Access: 2025-02-21 09:13:42.966641951 +0000
Modify: 2025-02-21 09:13:41.452541292 +0000
Change: 2025-02-21 09:13:41.452541292 +0000
 Birth: 2025-02-21 03:57:58.056948509 +0000
```

The df -h command shows the disk space usage of all mounted file systems in a human-readable format



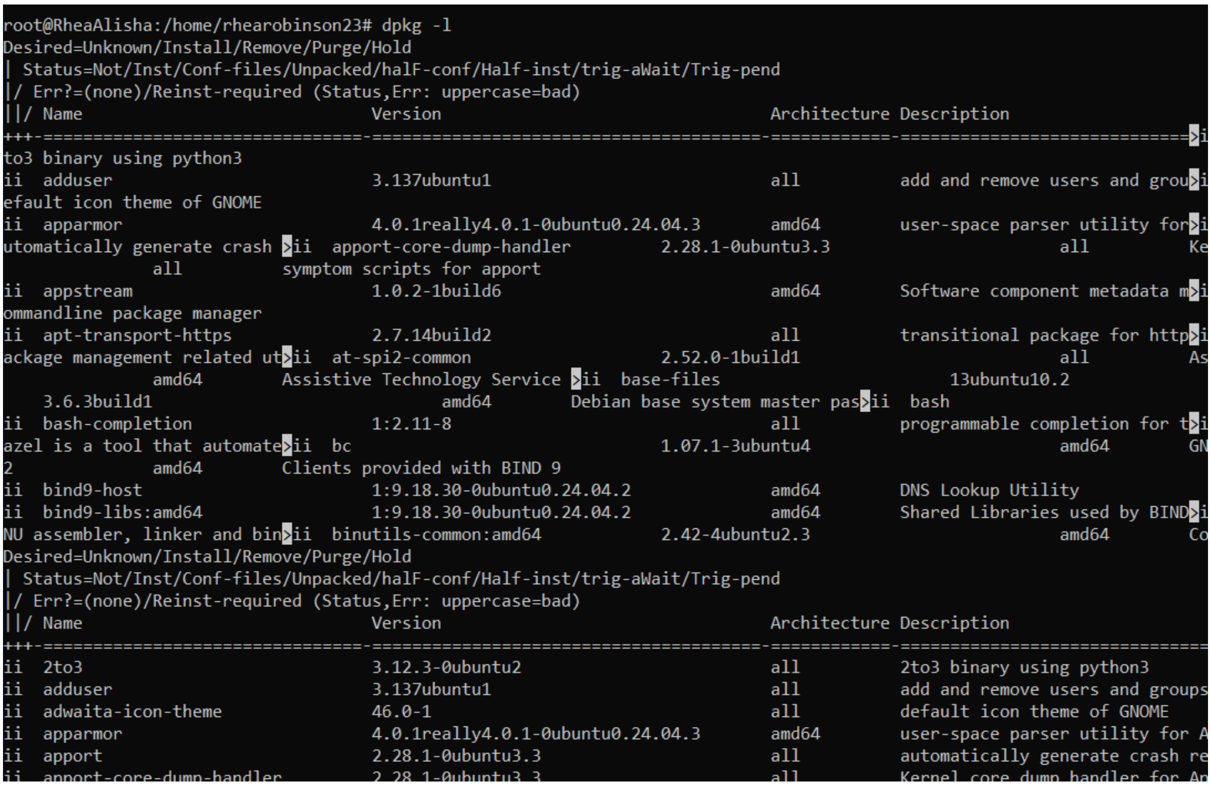
```
root@RheaAlisha:/home/rhearobinson23# df -h
Filesystem      Size  Used Avail Use% Mounted on
none            3.9G     0  3.9G   0% /usr/lib/modules/5.15.167.4-microsoft-standard-WSL2
none            3.9G  4.0K  3.9G   1% /mnt/wsl
drivers         456G  175G  282G  39% /usr/lib/wsl/drivers
/dev/sdc       1007G  3.9G  952G   1% /
none            3.9G   80K  3.9G   1% /mnt/wslg
none            3.9G     0  3.9G   0% /usr/lib/wsl/lib
rootfs          3.8G  2.4M  3.8G   1% /init
none            3.9G  540K  3.9G   1% /run
none            3.9G     0  3.9G   0% /run/lock
none            3.9G     0  3.9G   0% /run/shm
tmpfs           4.0M     0  4.0M   0% /sys/fs/cgroup
none            3.9G   76K  3.9G   1% /mnt/wslg/versions.txt
none            3.9G   76K  3.9G   1% /mnt/wslg/doc
C:\             456G  175G  282G  39% /mnt/c
tmpfs           779M   16K  779M   1% /run/user/0
```

The `sudo apt search` command searches for available packages in the APT package repository on Debian-based systems like Ubuntu.



```
root@RheaAlisha:/home/rhearobinson23# sudo apt search firefox
Sorting... Done
Full Text Search... Done
activity-aware-firefox/noble 0.4.2-1 all
  wrapper to make Firefox aware of Plasma Desktop activities

amule-gnome-support/noble 1:2.3.3-3build5 all
  ed2k links handling support for GNOME web browsers

bleachbit/noble 4.6.0-3 all
  delete unnecessary files from the system

buku/noble 4.8+ds-1 all
  Powerful command-line bookmark manager

cbindgen/noble 0.26.0-3 amd64
  Generates C bindings from Rust code

dh-cargo/noble 31ubuntu1 all
  debhelper buildsystem for Rust crates using Cargo

dh-cargo-tools/noble 31ubuntu1 all
  debhelper buildsystem for Rust crates using Cargo - tools

edubuntu-artwork/noble-updates 24.04.26.1 all
```

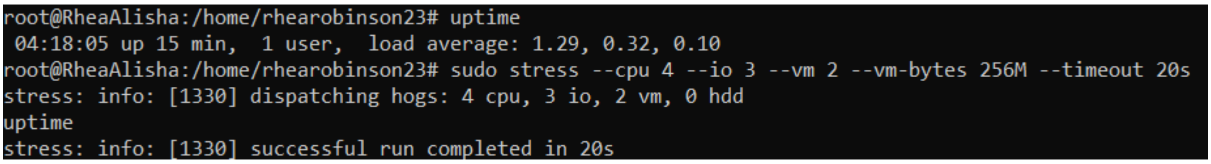
The `dpkg -l` command lists all installed packages on a Debian-based system along with their details, such as name, version, and description.



```
root@RheaAlisha:/home/rhearobinson23# dpkg -l
Desired=Unknown/Install/Remove/Purge/Hold
| Status=Not/Inst/Conf-files/Unpacked/halF-conf/Half-inst/trig-aWait/Trig-pend
|/ Err?=(none)/Reinst-required (Status,Err: uppercase=bad)
||/ Name                             Version                                 Architecture Description
+++-================================-=======================================-============-==============================>i
to3 binary using python3
ii  adduser                          3.137ubuntu1                            all          add and remove users and grou>i
efault icon theme of GNOME
ii  apparmor                         4.0.1really4.0.1-0ubuntu0.24.04.3       amd64        user-space parser utility for>i
utomatically generate crash >ii  apport-core-dump-handler         2.28.1-0ubuntu3.3                       all          Ke
               all          symptom scripts for apport
ii  appstream                        1.0.2-1build6                           amd64        Software component metadata m>i
ommandline package manager
ii  apt-transport-https              2.7.14build2                            all          transitional package for http>i
ackage management related ut>ii  at-spi2-common                   2.52.0-1build1                          all          As
               amd64        Assistive Technology Service >ii  base-files                       13ubuntu10.2
    3.6.3build1                            amd64        Debian base system master pas>ii  bash
ii  bash-completion                  1:2.11-8                                all          programmable completion for t>i
azel is a tool that automate>ii  bc                               1.07.1-3ubuntu4                         amd64        GN
2               amd64        Clients provided with BIND 9
ii  bind9-host                       1:9.18.30-0ubuntu0.24.04.2              amd64        DNS Lookup Utility
ii  bind9-libs:amd64                 1:9.18.30-0ubuntu0.24.04.2              amd64        Shared Libraries used by BIND>i
NU assembler, linker and bin>ii  binutils-common:amd64            2.42-4ubuntu2.3                         amd64        Co
Desired=Unknown/Install/Remove/Purge/Hold
| Status=Not/Inst/Conf-files/Unpacked/halF-conf/Half-inst/trig-aWait/Trig-pend
|/ Err?=(none)/Reinst-required (Status,Err: uppercase=bad)
||/ Name                             Version                                 Architecture Description
+++-================================-=======================================-============-===============================
ii  2to3                             3.12.3-0ubuntu2                         all          2to3 binary using python3
ii  adduser                          3.137ubuntu1                            all          add and remove users and groups
ii  adwaita-icon-theme               46.0-1                                  all          default icon theme of GNOME
ii  apparmor                         4.0.1really4.0.1-0ubuntu0.24.04.3       amd64        user-space parser utility for A
ii  apport                           2.28.1-0ubuntu3.3                       all          automatically generate crash re
ii  apport-core-dump-handler         2.28.1-0ubuntu3.3                       all          Kernel core dump handler for Ap
```

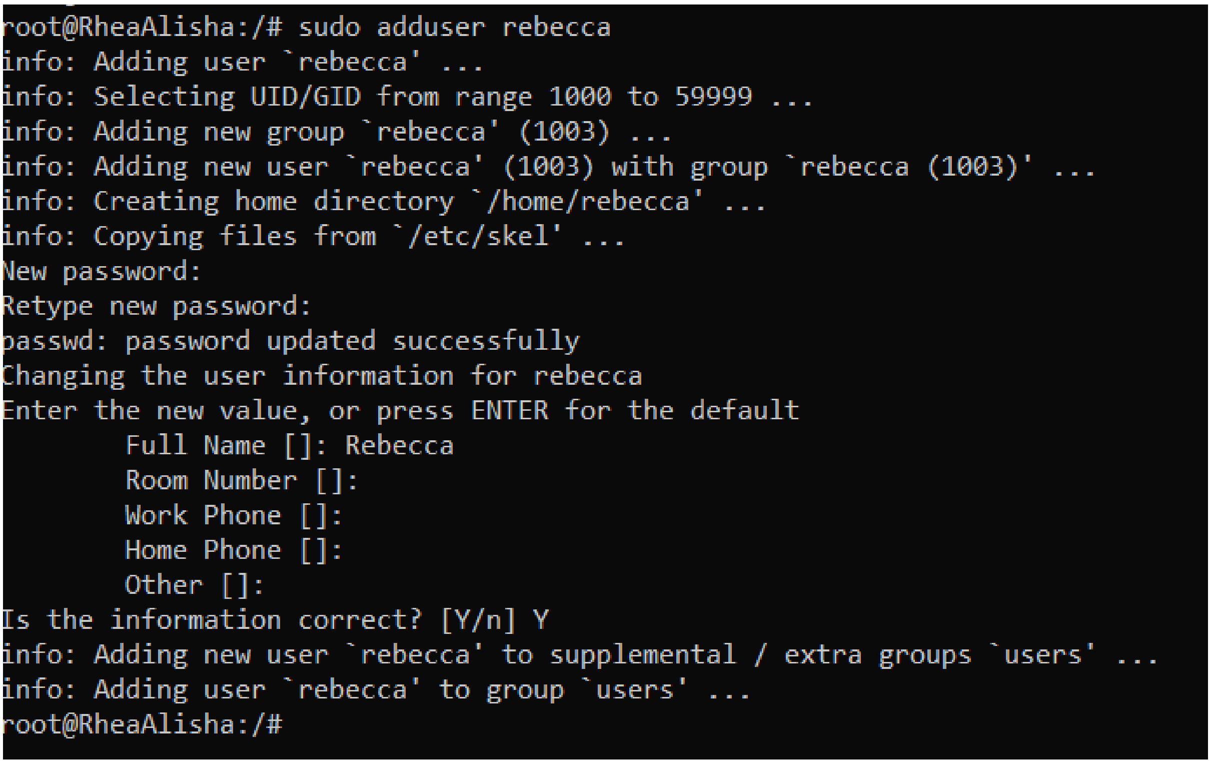
Stress testing is a process used to evaluate a system's stability, performance, and reliability by running it under extreme conditions or heavy workloads to identify potential failures or weaknesses.

The `sudo stress` command runs the stress tool with elevated privileges to impose workload on the system for stress testing.



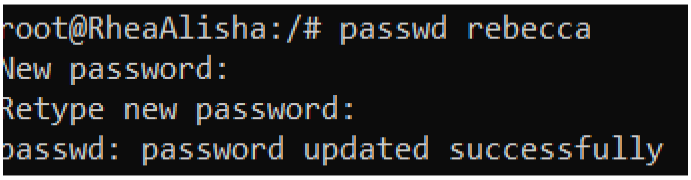
```
root@RheaAlisha:/home/rhearobinson23# uptime
 04:18:05 up 15 min,  1 user,  load average: 1.29, 0.32, 0.10
root@RheaAlisha:/home/rhearobinson23# sudo stress --cpu 4 --io 3 --vm 2 --vm-bytes 256M --timeout 20s
stress: info: [1330] dispatching hogs: 4 cpu, 3 io, 2 vm, 0 hdd
uptime
stress: info: [1330] successful run completed in 20s
```

Adding a user



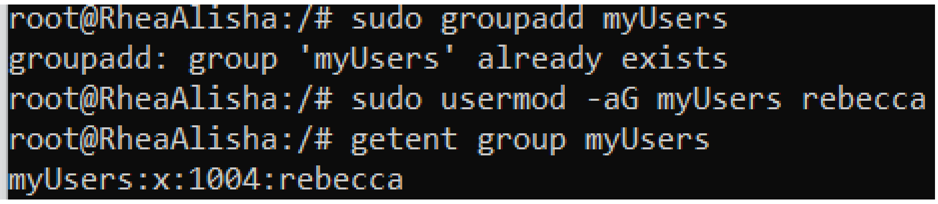
```
root@RheaAlisha:/# sudo adduser rebecca
info: Adding user `rebecca' ...
info: Selecting UID/GID from range 1000 to 59999 ...
info: Adding new group `rebecca' (1003) ...
info: Adding new user `rebecca' (1003) with group `rebecca (1003)' ...
info: Creating home directory `/home/rebecca' ...
info: Copying files from `/etc/skel' ...
New password:
Retype new password:
passwd: password updated successfully
Changing the user information for rebecca
Enter the new value, or press ENTER for the default
        Full Name []: Rebecca
        Room Number []:
        Work Phone []:
        Home Phone []:
        Other []:
Is the information correct? [Y/n] Y
info: Adding new user `rebecca' to supplemental / extra groups `users' ...
info: Adding user `rebecca' to group `users' ...
root@RheaAlisha:/#
```

Changing password



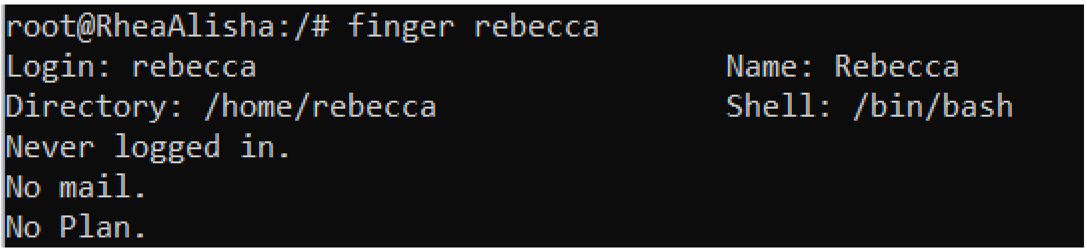
```
root@RheaAlisha:/# passwd rebecca
New password:
Retype new password:
passwd: password updated successfully
```

Creating a new group, adding user and viewing group



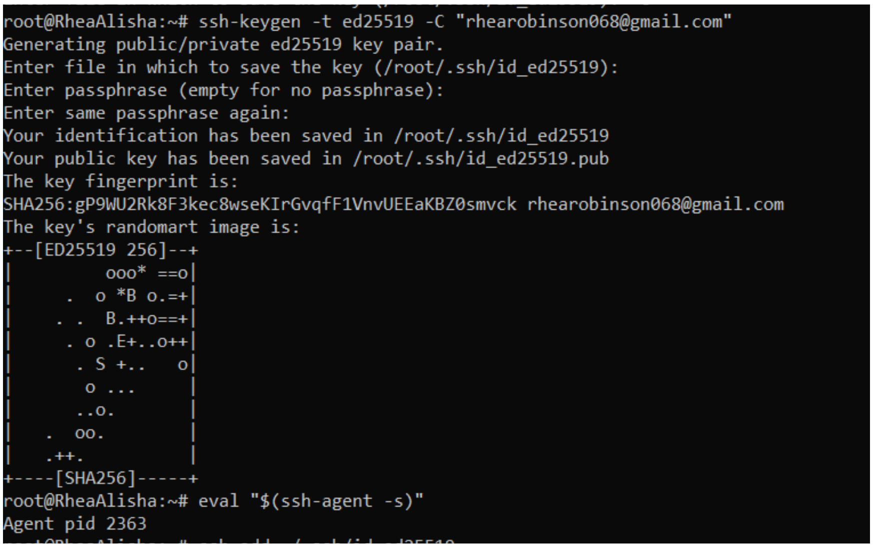
```
root@RheaAlisha:/# sudo groupadd myUsers
groupadd: group 'myUsers' already exists
root@RheaAlisha:/# sudo usermod -aG myUsers rebecca
root@RheaAlisha:/# getent group myUsers
myUsers:x:1004:rebecca
```

The `finger` command displays information about system users, including login name, real name, terminal, idle time, login time, and home directory.



```
root@RheaAlisha:/# finger rebecca
Login: rebecca                          Name: Rebecca
Directory: /home/rebecca                Shell: /bin/bash
Never logged in.
No mail.
No Plan.
```

SSH (Secure Shell)



```
root@RheaAlisha:~# ssh-keygen -t ed25519 -C "rhearobinson068@gmail.com"
Generating public/private ed25519 key pair.
Enter file in which to save the key (/root/.ssh/id_ed25519):
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in /root/.ssh/id_ed25519
Your public key has been saved in /root/.ssh/id_ed25519.pub
The key fingerprint is:
SHA256:gP9WU2Rk8F3kec8wseKIrGvqfF1VnvUEEaKBZ0smvck rhearobinson068@gmail.com
The key's randomart image is:
+--[ED25519 256]--+
|         ooo* ==o|
|     .  o *B o.=+|
|    . .  B.++o==+|
|     . o .E+..o++|
|      . S +..   o|
|       o ...     |
|      ..o.       |
|   .  oo.        |
|   .++.          |
+----[SHA256]-----+
root@RheaAlisha:~# eval "$(ssh-agent -s)"
Agent pid 2363
```

The ssh (Secure Shell) command is used to securely connect to a remote system over a network, allowing users to execute commands and manage the remote machine.

SSH Key and Agent Concepts

🔑 SSH Key

SSH keys are a pair of cryptographic keys used for secure authentication in SSH connections. They provide a more secure alternative to password-based login. The key pair includes a private key or public key.

ssh-keygen -t ed25519 -C "rhearobinson068@gmail.com"

*** RSA is one of the oldest and most widely supported public-key cryptosystems.**
*** ED25519 is a newer elliptic curve algorithm offering high security with better performance.**

🪢 SSH Agent

The SSH agent is a program that holds private keys in memory and manages them, allowing users to establish SSH connections without repeatedly entering passphrases.

- **It runs in the background and stores unlocked private keys during a session.**
- **Once a private key is added to the agent, SSH can use it automatically for authentication.**

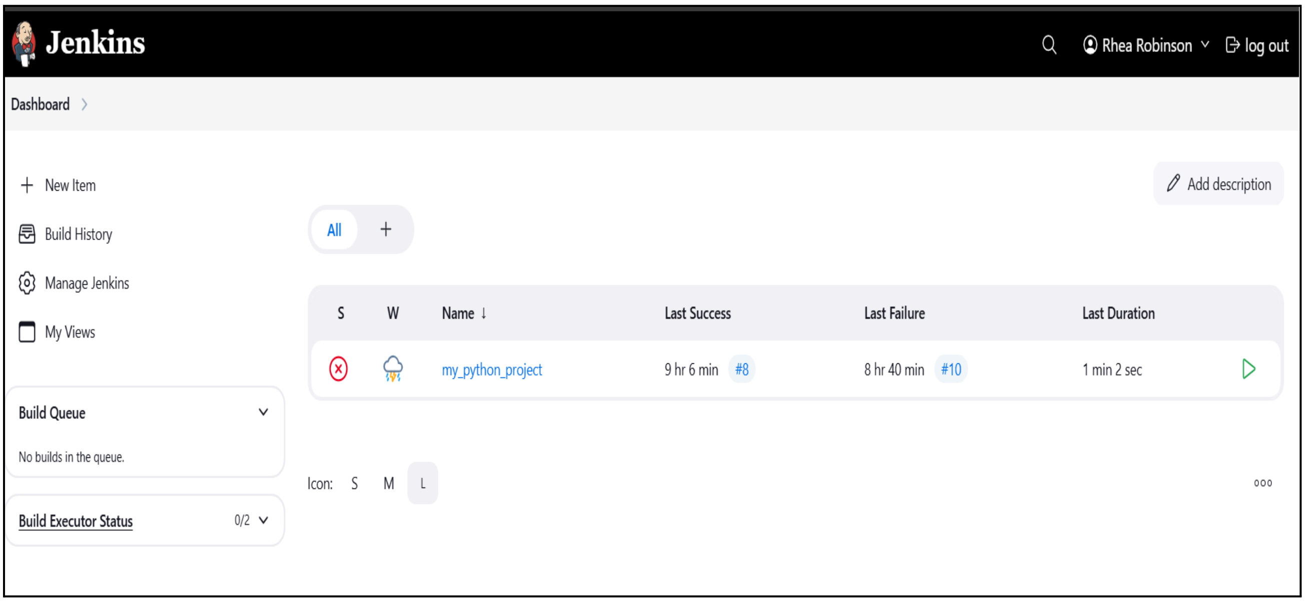
*** SSH agent identity refers to the SSH keys (private keys) that the SSH agent currently holds and uses to authenticate you when connecting to remote servers or services like GitHub.**

⚡ Jenkins

Jenkins is an open-source **automation server** used for **continuous integration (CI) and continuous delivery (CD)** in software development. It helps automate tasks like building, testing, and deploying applications, making the development process faster and more reliable.

How Jenkins Works (CI/CD Flow):

1. **Developer Pushes Code:** Code is pushed to a version control system (like GitHub).
2. **Jenkins Triggers Build:** Jenkins detects the code change and triggers a build.
3. **Testing:** Automated tests run to ensure code quality.
4. **Deployment:** If tests pass, Jenkins deploys the code to the production or staging environment.



S	W	Name ↓	Last Success	Last Failure	Last Duration	
⊗	⛈	my_python_project	9 hr 6 min #8	8 hr 40 min #10	1 min 2 sec	▷

Installation commands

```
sudo apt install openjdk-11-jdk -y
sudo apt install jenkins -y
wget -q -O - https://pkg.jenkins.io/debian-stable/jenkins.io.key | sudo apt-key add -
curl -fsSL https://pkg.jenkins.io/debian-stable/jenkins.io-2023.key | sudo tee
/usr/share/keyrings/jenkins-keyring.asc > /dev/null
echo "deb [signed-by=/usr/share/keyrings/jenkins-keyring.asc]
https://pkg.jenkins.io/debian-stable binary/" | sudo tee
/etc/apt/sources.list.d/jenkins.list > /dev/null
sudo apt update
sudo apt install fontconfig openjdk-17-jre -y
sudo apt install jenkins -y
sudo cat /var/lib/jenkins/secrets/initialAdminPassword
sudo usermod -aG docker jenkins
sudo systemctl restart jenkins
```