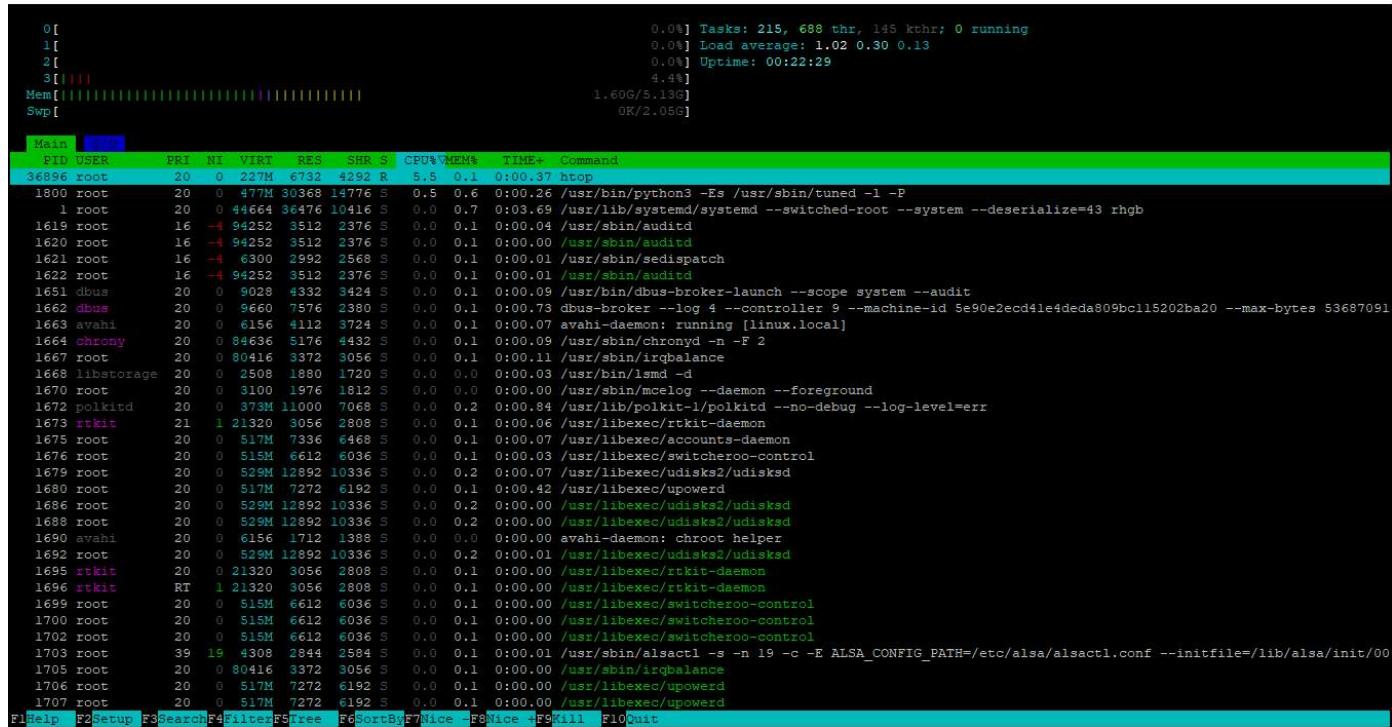


## Task 1: System Monitoring (My OS is CentOS 10)

## Install monitoring tools

```
sudo dnf install -y epel-release  
sudo dnf install -y htop nmon
```

## htop Screenshot



NMON

## Disk usage monitoring

```
df -h
du -sh /var/*
[root@localhost ~]# df -h
Filesystem      Size  Used Avail Use% Mounted on
/dev/mapper/cs-root  18G   4.3G   14G  25% /
devtmpfs        2.6G     0   2.6G   0% /dev
tmpfs          2.6G   84K   2.6G   1% /dev/shm
tmpfs          1.1G   26M   1.1G   3% /run
/dev/sda2       960M  423M  538M  44% /boot
tmpfs          526M  132K  526M   1% /run/user/1000
tmpfs          526M   56K  526M   1% /run/user/0
tmpfs          526M   76K  526M   1% /run/user/42
tmpfs          1.0M     0   1.0M   0% /run/credentials/systemd-journald.service
[root@localhost ~]# du -sh /var/*
0      /var/account
0      /var/adm
77M    /var/cache
0      /var/crash
0      /var/db
0      /var/empty
0      /var/ftp
0      /var/games
0      /var/kerberos
29M    /var/lib
0      /var/local
0      /var/lock
3.0M   /var/log
0      /var/mail
0      /var/nis
0      /var/opt
0      /var/preserve
0      /var/run
0      /var/spool
4.0K   /var/tmp
0      /var/yp
[root@localhost ~]# [REDACTED]
```

## Top resource-consuming processes

```
ps aux --sort=-%cpu | head -10
ps aux --sort=-%mem | head -10
[root@localhost ~]# ps aux --sort=-%cpu | head -10
USER      PID %CPU %MEM   VSZ   RSS TTY      STAT START   TIME COMMAND
root    36932  2.0  0.0 230840 4272 pts/3      R+  12:10  0:00 ps aux --sort=-%cpu
gdm     36322  1.7  4.2 4719520 226804 ?      S1  12:07  0:03 /usr/bin/gnome-shell
hero    32013  0.8  6.6 4903784 357680 ?      Ssl 11:46  0:12 /usr/bin/gnome-shell
gdm     35557  0.3  4.3 4721452 236228 ttyl   S1+ 11:58  0:02 /usr/bin/gnome-shell
hero    33660  0.2  0.5 640340 29856 ?      S1  11:46  0:03 /usr/libexec/ibus-extension-gtk3
root     1  0.2  0.6 44664 36476 ?      Ss  11:45  0:03 /usr/lib/systemd/systemd --switched-root --system --deserialize=43 rhgb
gdm     36605  0.1  1.9 1534560 102492 ?      S1  12:07  0:00 /usr/libexec/mutter-x11-frames
hero    34408  0.1  5.9 3000188 318100 ?      Ssl 11:47  0:02 /usr/bin/ptyxis --gapplication-service
root    36254  0.1  0.1 19112 10264 ?      Ss  12:07  0:00 /usr/lib/systemd/systemd-logind
[root@localhost ~]# [REDACTED]
```

```
[root@localhost ~]# ps aux --sort=-%mem | head -10
USER      PID %CPU %MEM   VSZ   RSS TTY      STAT START   TIME COMMAND
hero    32013  0.8  6.6 4903784 357684 ?      Ssl 11:46  0:12 /usr/bin/gnome-shell
hero    34408  0.1  5.9 3000188 318100 ?      Ssl 11:47  0:02 /usr/bin/ptyxis --gapplication-service
gdm     35557  0.3  4.3 4721452 236228 ttyl   S1+ 11:58  0:02 /usr/bin/gnome-shell
gdm     36322  1.5  4.2 4723680 226792 ?      S1  12:07  0:03 /usr/bin/gnome-shell
hero    33748  0.0  1.9 1416364 102556 ?      S1  11:46  0:01 /usr/bin/gnome-software --gapplication-service
gdm     36605  0.1  1.9 1534560 102492 ?      S1  12:07  0:00 /usr/libexec/mutter-x11-frames
gdm     35882  0.0  1.9 1534200 102444 ttyl   S1+ 11:58  0:00 /usr/libexec/mutter-x11-frames
root    1737  0.0  0.8 360920 45524 ?      Ssl 11:46  0:00 /usr/bin/python3 -sP /usr/sbin/firewalld --nofork --nrepid
gdm     35595  0.0  0.7 204968 41832 ttyl   S+  11:58  0:00 /usr/bin/Xwayland :1024 -rootless -noreset -accessx -core -auth /run/user/42/.mutter-Xwaylandauth.0X6
TI3 -listenfd 4 -listenfd 5 -displayfd 6 -initfd 7 -byteswappedclients -enable-ei-portal
[root@localhost ~]# [REDACTED]
```

### Logging system metrics

```
sudo mkdir -p /var/log/system-monitoring  
sudo nano /usr/local/bin/system_monitor.sh
```

```
[root@localhost ~]# sudo nano /usr/local/bin/system_monitor.sh  
[root@localhost ~]# cat /usr/local/bin/system_monitor.sh  
#!/bin/bash  
echo "===== $(date) =====" >> /var/log/system-monitoring/metrics.log  
df -h >> /var/log/system-monitoring/metrics.log  
free -m >> /var/log/system-monitoring/metrics.log  
ps aux --sort=-%cpu | head -5 >> /var/log/system-monitoring/metrics.log  
  
[root@localhost ~]#  
[root@localhost ~]#  
[root@localhost ~]#  
[root@localhost ~]# sudo chmod +x /usr/local/bin/system_monitor.sh  
[root@localhost ~]# crontab -e  
no crontab for root - using an empty one  
crontab: installing new crontab  
[root@localhost ~]# █
```

```
[root@localhost ~]# sudo crontab -l  
0 * * * * /usr/local/bin/system_monitor.sh  
0 0 * * 2 /usr/local/bin/apache_backup.sh  
0 0 * * 2 /usr/local/bin/nginx_backup.sh  
  
[root@localhost ~]# █
```

## Task 2: User Management

### Create users

```
sudo useradd sarah  
sudo useradd mike  
sudo passwd sarah  
sudo passwd mike
```

```
[root@localhost ~]# cat /etc/passwd | grep -E 'sarah|mike'  
sarah:x:1001:1001::/home/sarah:/bin/bash  
mike:x:1002:1002::/home/mike:/bin/bash  
[root@localhost ~]# █
```

### Create isolated directories

```
sudo mkdir -p /home/sarah/workspace
```

```
sudo mkdir -p /home/mike/workspace
```

```
sudo chown -R sarah:sarah /home/sarah/workspace
```

```
sudo chown -R mike:mike /home/mike/workspace
```

```
sudo chmod 700 /home/sarah/workspace
```

```
sudo chmod 700 /home/mike/workspace
```

```
[root@localhost ~]# ls -ld /home/sarah/workspace
ls -ld /home/mike/workspace
ls -ld /home/sarah/workspace
ls -ld /home/mike/workspace
drwx----- 2 sarah sarah 6 Jan  7 12:26 /home/sarah/workspace
drwx----- 2 mike mike 6 Jan  7 12:26 /home/mike/workspace
drwx----- 2 sarah sarah 6 Jan  7 12:26 /home/sarah/workspace
drwx----- 2 mike mike 6 Jan  7 12:26 /home/mike/workspace
[root@localhost ~]#
[root@localhost ~]#
[root@localhost ~]#
```

### Enforce password expiry (30 days)

```
sudo chage -M 30 sarah
```

```
sudo chage -M 30 mike
```

```
sudo mkdir -p /home/mike/workspace
[root@localhost ~]# sudo chown -R sarah:sarah /home/sarah/workspace
[root@localhost ~]# sudo chown -R mike:mike /home/mike/workspace
[root@localhost ~]# sudo chmod 700 /home/sarah/workspace
sudo chmod 700 /home/mike/workspace
[root@localhost ~]# sudo chage -M 30 sarah
sudo chage -M 30 mike
[root@localhost ~]# chage -l sarah
Last password change : Jan 07, 2026
Password expires      : Feb 06, 2026
Password inactive     : never
Account expires        : never
Minimum number of days between password change : 0
Maximum number of days between password change : 30
Number of days of warning before password expires : 7
[root@localhost ~]# chage -l mike
Last password change : Jan 07, 2026
Password expires      : Feb 06, 2026
Password inactive     : never
Account expires        : never
Minimum number of days between password change : 0
Maximum number of days between password change : 30
Number of days of warning before password expires : 7
[root@localhost ~]#
```

## Task 2: Backup Automation

### Create backup directory

```
sudo mkdir /backups  
sudo chmod 700 /backups
```

```
sudo nano /usr/local/bin/apache_backup.sh  
sudo chmod +x /usr/local/bin/apache_backup.sh
```

```
sudo nano /usr/local/bin/nginx_backup.sh  
sudo chmod +x /usr/local/bin/nginx_backup.sh
```

### Cron jobs (Tuesday 12:00 AM)

```
sudo crontab -e  
0 0 * * 2 /usr/local/bin/apache_backup.sh  
0 0 * * 2 /usr/local/bin/nginx_backup.sh  
[root@localhost ~]# sudo crontab -l  
0 * * * * /usr/local/bin/system_monitor.sh  
0 0 * * 2 /usr/local/bin/apache_backup.sh  
0 0 * * 2 /usr/local/bin/nginx_backup.sh
```

```
ls -lh /backups  
cat /backups/apache_verify.log  
cat /backups/nginx_verify.log
```

```
[root@localhost ~]# cat /usr/local/bin/apache_backup.sh
#!/bin/bash
DATE=$(date +%F)
tar -czvf /backups/apache_backup_$DATE.tar.gz /etc/httpd /var/www/html \
>> /backups/apache_verify.log
tar -tzf /backups/apache_backup_$DATE.tar.gz >> /backups/apache_verify.log
[root@localhost ~]#
[root@localhost ~]# sudo chmod +x /usr/local/bin/apache_backup.sh
[root@localhost ~]# sudo nano /usr/local/bin/nginx_backup.sh
[root@localhost ~]# sudo chmod +x /usr/local/bin/nginx_backup.sh
[root@localhost ~]# sudo crontab -e
crontab: installing new crontab
Backup of root's previous crontab saved to /root/.cache/crontab/crontab.bak
[root@localhost ~]#
[root@localhost ~]#
[root@localhost ~]# ls -lh /backups
total 0
[root@localhost ~]# cat /backups/apache_verify.log
cat: /backups/apache_verify.log: No such file or directory
[root@localhost ~]#
[root@localhost ~]# cat /backups/nginx_verify.log
cat: /backups/nginx_verify.log: No such file or directory
[root@localhost ~]#
[root@localhost ~]#
```

## Web Server Installation

### 1. Install Apache (HTTPD) – Sarah

```
sudo dnf install -y httpd
```

```
sudo systemctl start httpd
```

```
sudo systemctl enable httpd
```

```
systemctl status httpd
```

```
ls -ld /etc/httpd
```

```
ls -ld /var/www/html
```

```
[root@localhost ~]# systemctl status httpd
● httpd.service - The Apache HTTP Server
   Loaded: loaded (/usr/lib/systemd/system/httpd.service; enabled; preset: disabled)
   Active: active (running) since Wed 2026-01-07 12:49:19 IST; 8s ago
     Invocation: 5b4fb4ff761a40948f6c016d721ae408
       Docs: man:httpd.service(8)
    Main PID: 38980 (httpd)
      Status: "Started, listening on: port 80"
        Tasks: 177 (limit: 33238)
      Memory: 14M (peak: 14.7M)
        CPU: 134ms
      CGroup: /system.slice/httpd.service
              ├─38980 /usr/sbin/httpd -DFOREGROUND
              ├─38981 /usr/sbin/httpd -DFOREGROUND
              ├─38982 /usr/sbin/httpd -DFOREGROUND
              ├─38983 /usr/sbin/httpd -DFOREGROUND
              └─38996 /usr/sbin/httpd -DFOREGROUND
```

```
Jan 07 12:49:19 localhost.localdomain systemd[1]: Starting httpd.service - The Apache HTTP Server...
Jan 07 12:49:19 localhost.localdomain (httpd)[38980]: httpd.service: Referenced by /etc/httpd/conf.d/welcome.conf.
Jan 07 12:49:19 localhost.localdomain httpd[38980]: AH00558: httpd: Could not read configuration from /etc/httpd/conf.d/welcome.conf: Invalid command 'IndexOptions'.
Jan 07 12:49:19 localhost.localdomain httpd[38980]: Server configured, listening on port 80.
```

```
Jan 07 12:49:19 localhost.localdomain systemd[1]: Started httpd.service - The Apache HTTP Server...
```

```
lines 1-22/22 (END)
```

```
ef="https://www.centos.org/legal">Legal</a></span> <span class="border-start-2 ps-2"><a class="link-light link-offset-3 link-underline-opacity-25 link-underline-opacity-100-hover link-underline-light" href="https://www.centos.org/privacy">Privacy</a></span> <span class="border-start ms-2 ps-2"><a class="link-light link-offset-3 link-underline-opacity-25 link-underline-opacity-100-hover link-underline-light" href="https://git.centos.org/centos/centos.org">Site s/a></span>
        </div>
    </div>
</div>
</body>
</html>
[root@localhost ~]#
[root@localhost ~]#
[root@localhost ~]#
[root@localhost ~]# ls -ld /etc/httpd
ls -ld /var/www/html
drwxr-xr-x. 5 root root 105 Jan  7 12:48 /etc/httpd
drwxr-xr-x. 2 root root 6 Sep  8 05:30 /var/www/html
[root@localhost ~]#
```

curl <http://localhost>

## Install Nginx – Mike

```
sudo dnf install -y nginx
sudo systemctl start nginx
sudo systemctl enable nginx
```

## Firewall

```
sudo firewall-cmd --permanent --add-service=http
sudo firewall-cmd --reload
```

```
[root@localhost ~]# sudo firewall-cmd --permanent --add-service=http
sudo firewall-cmd --reload
success
success
[root@localhost ~]#
```