**# Linux System Monitoring**

## Introduction to System Monitoring

Monitoring system resources is essential to ensure optimal performance, detect issues, and troubleshoot problems in Linux. Various tools allow us to monitor CPU, memory, disk usage, network activity, and running processes.

## Index of Commands Covered

### CPU and Memory Monitoring

- `top` – Real-time system monitoring

- `htop` – Interactive process viewer (requires installation)

- `vmstat` – Report system performance statistics

- `free -m` – Show memory usage

### Disk Monitoring

- `df -h` – Check disk space usage

- `du -sh /path` – Show disk usage of a specific directory

- `iostat` – Display CPU and disk I/O statistics

### Network Monitoring

- `ifconfig` – Show network interfaces (deprecated, use `ip a`)

- `ip a` – Show network interface details

- `netstat -tulnp` – Show active connections and listening ports

- `ss -tulnp` – Alternative to `netstat` for socket statistics

- `ping hostname` – Test network connectivity

- `traceroute hostname` – Show network path to a host

- `nslookup domain` – Get DNS resolution details

### Log Monitoring

- `tail -f /var/log/syslog` – Live monitoring of system logs

- `journalctl -f` – Live system logs for systemd-based distros

- `dmesg | tail` – View kernel logs

## CPU and Memory Monitoring

### Using `top`

To view real-time CPU and memory usage:

```bash

top

```

Press `q` to quit.

### Using `htop`

A user-friendly alternative:

```bash

htop

```

Use arrow keys to navigate and `F9` to kill processes.

### Using `vmstat`

To check CPU, memory, and I/O stats:

```bash

vmstat 1 5 # Update every 1 sec, show 5 updates

```

### Checking Memory Usage

```bash

free -m

```

Shows free and used memory in megabytes.

## Disk Monitoring

### Using `df`

Check available disk space:

```bash

df -h

```

### Using `du`

Find the size of a directory:

```bash

du -sh /var/log

```

### Using `iostat`

Check disk and CPU usage:

```bash

iostat

```

## Network Monitoring

### Checking Network Interfaces

```bash

ip a # Show IP addresses and interfaces

```

### Viewing Open Ports and Connections

```bash

netstat -tulnp # Show listening ports

ss -tulnp # Alternative to netstat

```

### Testing Connectivity

```bash

ping google.com # Test internet connection

traceroute google.com # Trace the path to Google

```

### Checking DNS Resolution

```bash

nslookup example.com

```

## Log Monitoring

### Live Monitoring of System Logs

```bash

tail -f /var/log/syslog # Follow logs in real-time

journalctl -f # Systemd logs

```

### Checking Kernel Logs

```bash

dmesg | tail

```