

System Information & Troubleshooting (Plus)

Linux Commands Course · Section 18

Goal

Learn how to **gather system information, monitor performance, and inspect hardware** using built-in Linux commands.

This helps you diagnose issues, verify configurations, and understand your system's environment.

System Facts – `uname`, `hostnamectl`, `lsb_release`

Kernel and architecture

```
uname -a
```

Example output:

```
Linux workstation 6.8.0-45-generic #1 SMP x86_64 GNU/Linux
```

Displays kernel name, version, architecture, and OS type.

Host identity

```
hostnamectl
```

Output example:

```
Static hostname: workstation
Icon name: computer-laptop
Chassis: laptop
Machine ID: 3c68f3e8d9284f2d8b22a
Boot ID: 86b9e1c9bbd64c83bb7e2
Operating System: Ubuntu 24.04 LTS
Kernel: Linux 6.8.0-45-generic
Architecture: x86-64
```

Distribution info

```
lsb_release -a
```

or

```
cat /etc/os-release
```

Shows distribution name, release, and codename.

Quick Health Snapshot

🖥️ Uptime and load

```
uptime
```

Output:

```
10:25:41 up 3 days,  2:41,  3 users,  load average: 0.20, 0.25, 0.18
```

Shows system uptime and average CPU load over 1, 5, and 15 minutes.

📊 Memory usage

```
free -h
```

Example:

	total	used	free	shared	buff/cache	available
Mem:	15Gi	3.5Gi	9.4Gi	256Mi	2.2Gi	11Gi
Swap:	2.0Gi	0.0Gi	2.0Gi			

📈 System performance overview

```
vmstat 2 5
```

- Displays CPU, memory, swap, and I/O stats every 2 seconds (5 times).

📊 Disk I/O stats

```
iostat -x 2 3
```

- Requires `sysstat` package (`sudo apt install sysstat`).
- Shows read/write rates and utilization per device.

Kernel Messages – dmesg

Displays boot and kernel messages.

```
dmesg | less
```

Filter for hardware errors:

```
dmesg | grep -i error
```

Or view only recent messages:

```
dmesg --ctime | tail -n 20
```

Helpful for diagnosing device issues or driver problems.

Hardware Overview

CPU Information

```
lscpu
```

Example output:

```
Architecture:          x86_64
CPU(s):                8
Model name:            Intel(R) Core(TM) i7-10750H CPU @ 2.60GHz
Thread(s) per core:    2
Core(s) per socket:    6
```

Memory Layout

```
lsmem
```

Shows detected memory blocks and sizes.

PCI Devices – lspci

Lists hardware on the PCI bus (network cards, GPUs, etc.).

```
lspci | less
```

Example snippet:

```
00:02.0 VGA compatible controller: Intel Corporation UHD Graphics  
01:00.0 3D controller: NVIDIA Corporation RTX 3060
```

Add `-v` or `-vv` for verbose details.

USB Devices – lsusb

Show all connected USB devices.

```
lsusb
```

Example output:

```
Bus 001 Device 004: ID 046d:c52b Logitech USB Receiver  
Bus 002 Device 002: ID 0781:5567 SanDisk Cruzer Blade
```

Use `lsusb -t` for a tree view by USB port.

System BIOS and Hardware Metadata – dmidecode

`dmidecode` reads the DMI/SMBIOS table for low-level system details.

```
sudo dmidecode | less
```

Examples of sections:

- BIOS version and vendor
- Baseboard (motherboard) info
- Chassis and serial numbers
- Memory slot info

To target a specific type:

```
sudo dmidecode -t bios  
sudo dmidecode -t memory  
sudo dmidecode -t system
```

Read-only – safe to inspect, not modify.

Example – Quick System Summary

Combine tools for a complete picture:

```
echo "==== SYSTEM ===="
hostnamectl
echo "==== CPU ===="
lscpu | grep 'Model name'
echo "==== MEMORY ===="
free -h
echo "==== DISKS ===="
lsblk -f
echo "==== NETWORK ===="
ip a | grep inet
```

This gives an at-a-glance report of your machine.

Recap

- **System facts:** `uname, hostnamectl, lsb_release, /etc/os-release`
- **Health:** `uptime, free -h, vmstat, iostat, dmesg`
- **Hardware:** `lscpu, lsmem, lspci, lsusb, dmidecode`

These commands together let you audit, benchmark, and troubleshoot your Linux system effectively.

Practice

1. Find your kernel version and CPU model.
 2. Check uptime and system load averages.
 3. View available memory and swap usage.
 4. List all PCI and USB devices.
 5. Get BIOS info using `dmidecode -t bios`.
 6. Run a quick system report combining the above tools.
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Next Up

Security & Firewall