System info Host, CPU, memory

CONCEPTS

Most of these tools just format files under /proc and /sys, so the same data is available to scripts.

What is it? OS, kernel, host
↓ `uname / hostnamectl`
How busy? load, CPU, memory
↓ `uptime / vmstat / free`
What hardware? CPU, PCI, USB
↓ `lscpu / lspci / lsusb`
What went wrong? kernel log
↓ `dmesg`

Load average counts runnable tasks: compare it with nproc, not with 1.

free's available column, not free, tells how much memory new programs can still get; cache is reclaimable.

SYSTEM AND OS

`uname -a`
Kernel name, release, arch and host

`uname -r`
Kernel release only

`uname -m`
Machine architecture (x86_64, aarch64)

`hostnamectl`
Hostname, OS, kernel, virtualization

`hostname`
Print the current hostname

`sudo hostnamectl set-hostname <name>`
Set the static hostname

`cat /etc/os-release`
Distro name and version (ID, VERSION_ID)

UPTIME AND LOAD

`uptime`
Time up, users, load averages (1/5/15 min)

`uptime -p`
Uptime in words

`uptime -s`
Boot time as a timestamp

UPTIME AND LOAD (cont.)

`w`
Who is logged in and what they run

MEMORY

`free -h`
Memory and swap, human-readable

`free -h -s <sec>`
Repeat every <sec> seconds

`free -m`
Sizes in MiB

`grep -E 'MemAvailable|SwapFree' /proc/meminfo`
Read exact kernel counters

CPU

`lscpu`
Model, sockets, cores, threads, caches

`nproc`
CPUs usable by this process

`nproc --all`
Installed CPUs, ignoring limits

`lscpu -e`
One row per logical CPU

VMSTAT

`vmstat <sec> <count>`
Sample every <sec>, stop after <count>

`vmstat 1`
Sample every second until Ctrl+C

`vmstat -w <sec>`
Wide output for big numbers

`vmstat -t <sec>`
Add a timestamp column

vmstat columns

Column	Read it as
`r / b`	Runnable / blocked tasks; r above nproc means CPU-bound
`si / so`	Swap in / out; non-zero means memory pressure
`bi / bo`	Blocks read / written on disks
`us sy id wa`	CPU user, system, idle, I/O wait

The first vmstat line is an average since boot; judge the lines after it.

HARDWARE

`lspci`
List PCI devices (GPU, NIC, controllers)

`lspci -nnk`
IDs and the kernel driver in use

`lsusb`
List USB devices

`lsusb -t`
USB tree with drivers and speeds

`lsblk`
Disks and partitions as a tree

KERNEL LOG (DMESG)

`dmesg -T`
Log with readable timestamps

`dmesg --level=err,warn`
Only errors and warnings

`dmesg -w`
Follow new messages live

`dmesg -H`
Human mode: pager, colour, relative time

`dmesg | tail -n 30`
Latest messages

`dmesg -T | grep -i <word>`
Search the log

Many distros restrict dmesg to root (kernel.dmesg_restrict); use sudo, or journalctl -k.

USERS AND SESSIONS

`whoami`
Name of the current user

`id`
UID, GID and all groups

`id <user>`
Same for another user

`id -nG`
Group names only

`who`
Logged-in sessions

RECIPES

Quick host report

```
uname -srm
grep PRETTY_NAME /etc/os-release
uptime -p
nproc
free -h | head -2
```