1. Count TCP Connection States

```
netstat -nat | awk '/^tcp/ {print $6}' | sort | uniq -c
```

- Lists connection counts by state (ESTABLISHED, TIME_WAIT, etc.).

2. Read Process Streams

```
ls -l /proc/PID/fd  # Shows file descriptors
cat /proc/PID/fd/0  # stdin (0)
cat /proc/PID/fd/1  # stdout (1)
cat /proc/PID/fd/2  # stderr (2)
```

- Requires root access for most processes.

3. Inode Basics

- What: A data structure storing file metadata (permissions, size, disk location).
- Purpose: Acts as a unique identifier for files (not names).

4. `touch` Command Steps

1. Filesystem allocates a new inode.
2. Updates directory entry to link filename to inode.
3. Sets timestamps in inode (created/modified/accessed).

5. `stat` Command Output

Shows:
- Inode number
- File type/permissions
- Hard link count
- Timestamps
- Size/block allocation

Example:
```
stat filename
```

6. `mv` Command Inode Behavior

- Same filesystem: Inode stays the same (only directory entry updates).
- Different filesystem: New inode created (file is copied then deleted).

7. How `ls` Works

1. Reads directory contents (list of filenames + inode numbers).
2. Fetches metadata from each inode.
3. Formats output (colors, sorting, etc.).

8. Process States in `top`

State	Meaning

State	Description
Running	Actively using CPU.
Sleeping	Waiting for I/O/event.
Zombie	Process terminated but parent hasn't waited.
Stopped	Paused by signal (e.g., Ctrl+Z).

9. High Load + Context Switches
- Possible causes:
  - CPU contention (too many processes).
  - I/O bottlenecks (disk/network).
  - Poorly tuned application (excessive threading).

10. Monitoring Tools Data Sources

Tool	Data Source
`atop`	`/proc` (processes, disk, network).
`htop`	`/proc/pid` stats + libncurses UI.
`nmon`	Kernel statistics (CPU/memory/disk).