Devops Shack

Top 100 Linux Debug Commands Explained

By Devops Shack

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SYSTEM INFORMATION & OS DETAILS

1. uname -a → Shows kernel name, version, architecture. ***(Check kernel compatibility or bug reports)***
➤ `uname -a`

2. hostnamectl → Displays hostname, OS, and kernel version. ***(Quick OS summary)***
➤ `hostnamectl`

3. lsb_release -a → Distro version and release info. ***(Used to confirm repo compatibility)***
➤ `lsb_release -a`

4. cat /etc/os-release → OS info file. ***(Universal across distros)***
➤ `cat /etc/os-release`

5. uptime → System uptime + load averages. ***(Diagnose sustained system load)***
➤ `uptime`

6. whoami → Current logged-in user. ***(For permission verification)***
➤ `whoami`

7. id → Displays UID, GID, and group membership. ***(Helps with permission debugging)***
➤ `id`

8. dmesg -T | less → Kernel messages with timestamps. ***(Driver errors, disk/NIC issues)***
➤ `dmesg -T | grep error`

9. journalctl -k -b → Kernel log since boot. *(Detect boot-level issues)*
➤ `journalctl -k -b`

10. hostname -I → System IPs. *(Useful for multi-NIC servers)*
➤ `hostname -I`

CPU, MEMORY & PROCESS DEBUG

11. top → Live CPU, RAM, and process monitoring.
➤ `top`

12. htop → Advanced version of top with colors & search.
➤ `htop`

13. vmstat 1 → CPU/memory/swap overview every 1 sec. *(Spot bottlenecks)*
➤ `vmstat 1`

14. sar -u 1 5 → Historical CPU stats. *(Find recurring spikes)*
➤ `sar -u 1 5`

15. mpstat -P ALL 1 → Per-core CPU load. *(Identify single-thread overload)*
➤ `mpstat -P ALL 1`

16. free -h → Memory & swap usage. *(Detect memory leaks)*
➤ `free -h`

17. ps aux --sort=-%cpu | head → Top CPU consumers.
➤ `ps aux --sort=-%cpu | head`

18. pidstat -p <pid> 1 → Per-process CPU, memory, I/O usage.
➤ `pidstat -p 1234 1`

19. pstree -pa → Process hierarchy. *(Trace parent-child relations)*
➤ `pstree -pa`

20. nice / renice → Change process CPU priority. *(Fix starving processes)*
➤ `renice -n 10 -p 1234`

21. kill -9 <pid> → Force kill hung processes.

➤ `kill -9 4567`

22. ulimit -a → Display user resource limits. *(Useful for ulimit errors)*
➤ `ulimit -a`

23. oomctl / journalctl | grep -i oom → Check for OOM kills.
➤ `journalctl -k | grep -i oom`

24. ps -eo pid,cmd,etime → Process elapsed time. *(Long-running process detection)*
➤ `ps -eo pid,cmd,etime`

25. lsof -p <pid> → List open files by a process. *(Memory/file descriptor leaks)*
➤ `lsof -p 1234`

DISK & FILESYSTEM DEBUG

26. df -hT → Filesystem type and usage. *(Full disk detection)*
➤ `df -hT`

*27. du -sh / | sort -h** → Top space consumers.
➤ `du -sh /var/* | sort -h`

28. lsblk -f → View block devices, labels, FS types.
➤ `lsblk -f`

29. blkid → Show UUIDs and labels of drives. *(fstab troubleshooting)*
➤ `blkid`

30. mount | column -t → Display mounted filesystems.
➤ `mount | column -t`

31. findmnt /path → Check where a directory is mounted.
➤ `findmnt /var`

32. iostat -xz 1 → Disk I/O performance (reads/writes, queue, latency).
➤ `iostat -xz 1`

33. iotop -oPa → Monitor live per-process disk usage.
➤ `iotop -oPa`

34. smartctl -a /dev/sda → Disk health check. ***(Detect failing drives)***
➤ `smartctl -a /dev/sda`

35. hdparm -Tt /dev/sda → Test read/write speed.
➤ `hdparm -Tt /dev/sda`

36. fsck -n /dev/sda1 → Check filesystem consistency (non-destructive).
➤ `fsck -n /dev/sda1`

37. xfs_repair -n /dev/sda1 → Check XFS file systems.
➤ `xfs_repair -n /dev/sda1`

38. btrfs scrub status / → Check Btrfs integrity.
➤ `btrfs scrub status /`

39. lsof +D /path → See which files are open in a directory.
➤ `lsof +D /var/log`

40. fuser -vm /mnt/data → Identify which process is using a mount.
➤ `fuser -vm /mnt/data`

NETWORK DEBUG

41. ip addr → View network interfaces.
➤ `ip addr`

42. ip route → Routing table & gateway check.
➤ `ip route`

43. ss -tulpn → Listening ports and processes. ***(Modern netstat)***
➤ `ss -tulpn`

44. ss -s → Socket summary (TIME_WAIT, ESTAB).
➤ `ss -s`

45. ping -c 4 host → Check network reachability.

➤ `ping -c 4 8.8.8.8`

46. traceroute host → Trace route hops. *(Network delay localization)*
➤ `traceroute google.com`

47. mtr -rw host → Live route & packet loss test.
➤ `mtr -rw 1.1.1.1`

48. dig +short example.com → DNS resolution test.
➤ `dig +short example.com`

49. nslookup example.com → Alternative DNS test.
➤ `nslookup example.com`

50. curl -v URL → Verbose HTTP test. *(TLS, redirects, proxy)*
➤ `curl -v https://devopsshack.com`

51. wget --server-response URL → Inspect HTTP headers.
➤ `wget --server-response https://site.com`

52. nc -vz host port → Check TCP connectivity. *(Firewall debugging)*
➤ `nc -vz 10.0.0.1 22`

53. telnet host port → Test open ports (legacy).
➤ `telnet 10.0.0.1 443`

54. ethtool eth0 → Check NIC link speed & errors.
➤ `ethtool eth0`

55. ifconfig -a → Legacy network info. *(Still used on older servers)*
➤ `ifconfig -a`

56. nmcli device status → NetworkManager device summary.
➤ `nmcli device status`

57. ip neigh → Show ARP table. *(Neighbor resolution)*
➤ `ip neigh`

58. nmap -sT -p 1-1024 host → Scan open ports. *(Security debugging)*
➤ `nmap -sT -p 22,80,443 localhost`

59. tcpdump -i eth0 port 80 → Capture packets on port.
➤ `tcpdump -nn -i eth0 port 443`

60. ngrep -d any 'Host:' tcp port 80 → Filtered packet view.
➤ `ngrep -d any 'Host:' tcp port 80`

61. iperf3 -c host → Bandwidth test.
➤ `iperf3 -c server_ip`

62. netstat -rn → Routing table summary. *(Legacy check)*
➤ `netstat -rn`

63. ss -tan state established → Show active TCP connections.
➤ `ss -tan state established`

64. arp -n → ARP table cache. *(MAC resolution issues)*
➤ `arp -n`

65. route -n → Old-school routing check.
➤ `route -n`

LOGS, SERVICES & BOOT

66. journalctl -xe → View system logs with errors.
➤ `journalctl -xe`

67. journalctl -u nginx → Service-specific logs.
➤ `journalctl -u nginx`

68. systemctl status nginx → Service health & last log lines.
➤ `systemctl status nginx`

69. systemctl list-units --type=service → All active services.
➤ `systemctl list-units --type=service`

70. systemctl cat nginx → View exact unit file content.
➤ `systemctl cat nginx`

71. systemd-analyze blame → Show boot time breakdown.
➤ `systemd-analyze blame`

72. systemd-analyze critical-chain → Dependency boot chain.
➤ `systemd-analyze critical-chain`

73. loginctl list-sessions → Active user sessions.
➤ `loginctl list-sessions`

74. last -10 → Last 10 user logins.
➤ `last -10`

75. who / w → Logged-in users and activity.
➤ `who`

76. dmesg | tail -20 → Latest kernel events.
➤ `dmesg | tail -20`

77. lsmod → Loaded kernel modules. *(Driver troubleshooting)*
➤ `lsmod`

78. modinfo <module> → Module version & parameters.
➤ `modinfo e1000`

79. insmod / rmmod → Load/unload kernel modules. *(Advanced debugging)*
➤ `rmmod <module>`

80. journalctl -b -1 → Previous boot logs.
➤ `journalctl -b -1`

FILES, TEXT & PERMISSIONS

81. find /path -type f -mtime -1 → Files changed in last day.
➤ `find /var/log -type f -mtime -1`

82. grep -Rin "error" /var/log → Recursively search logs.
➤ `grep -Rin "Connection refused" /var/log`

83. awk '{print $1,$7}' access.log | sort | uniq -c | sort -nr → Parse logs.
➤ Log summarization.

84. diff file1 file2 → Compare configs.
➤ `diff nginx.conf nginx.conf.bak`

85. stat file → Show file timestamps, inode.
➤ `stat /etc/passwd`

86. file file.bin → Detect file type. *(ELF, text, compressed)*
➤ `file ./binary`

87. md5sum / sha256sum file → Verify integrity.
➤ `sha256sum download.iso`

88. tar -tvf archive.tar.gz → List archive contents.
➤ `tar -tvf backup.tar.gz`

89. gzip -d file.gz / zcat file.gz → Decompress logs.
➤ `zcat syslog.1.gz`

90. chattr +i / lsattr file → File immutability check.
➤ `lsattr /etc/hosts`

91. chmod / chown → Fix permissions/ownership.
➤ `chmod 644 /var/log/app.log`

92. lsof +L1 → Detect deleted files still open. *(Disk full mystery fix)*
➤ `lsof +L1`

93. wc -l file → Count lines. *(Log size check)*
➤ `wc -l error.log`

94. head / tail -n → Quick file preview.
➤ `tail -n 20 /var/log/messages`

95. tee file.log → Display and save output.
➤ `ping 8.8.8.8 | tee ping.log`

ADVANCED DEBUGGING & PERFORMANCE

96. strace -f -p <pid> → Trace syscalls. ***(Hang/Crash root cause)***

➤ `strace -f -p 1234`

97. ltrace ./binary → Trace library calls. ***(Runtime issues)***

➤ `ltrace ./app`

98. perf top / perf stat → Performance profiling.

➤ `perf stat ./program`

99. time cmd → Measure command execution time.

➤ `time ./deploy.sh`

100. sar -n DEV 1 3 → Network throughput stats. ***(Traffic analysis)***

➤ `sar -n DEV 1 3`