

**You said:**

file management linux cmd with basic to advance with all the important flags in them that can be used please - all the important and basic to advance file mangament cmd please

**ChatGPT said:**

Here's a list of essential Linux file management commands, ranging from basic to advanced, with important flags that you can use for various tasks:

## 1. `ls` - List Directory Contents

- **Basic:** `ls`
- **Flags:**
  - `-l`: Long format, shows detailed information (permissions, size, owner, etc.)
  - `-a`: Show hidden files (files starting with a dot)
  - `-h`: Human-readable sizes (e.g., 1K, 234M)
  - `-R`: Recursively list directories
  - `-S`: Sort by file size
  - `-t`: Sort by modification time
  - `--color`: Colorize output

Example: `ls -l -h -a`

## 2. `cd` - Change Directory

- **Basic:** `cd /path/to/directory`
- **Flags:**
  - `cd ~`: Change to home directory
  - `cd -`: Go back to the previous directory
  - `cd ..`: Go up one level

## 3. `pwd` - Print Working Directory

- **Basic:** `pwd`
  - Prints the full path of the current directory.

## 4. `mkdir` - Make Directory

- **Basic:** `mkdir directory_name`
- **Flags:**
  - `-p`: Create parent directories if they do not exist
  - `-v`: Show verbose output of directories created

Example: `mkdir -p /path/to/new/directory`

## 5. `rmdir` - Remove Empty Directory

- **Basic:** `rmdir directory_name`
- **Flags:**
  - `-p`: Remove parent directories as well if empty
  - `-v`: Verbose output

## 6. `rm` - Remove Files or Directories

- **Basic:** `rm filename`
- **Flags:**
  - `-r`: Recursively remove directories and their contents
  - `-f`: Force removal without confirmation
  - `-i`: Prompt before every removal
  - `-v`: Verbose output

Example: `rm -rf directory_name` (Caution: This will delete a directory and all its contents)

## 7. `cp` - Copy Files or Directories

- **Basic:** `cp source destination`
- **Flags:**
  - `-r`: Copy directories recursively
  - `-i`: Prompt before overwriting files
  - `-v`: Verbose output
  - `-u`: Copy only when the source file is newer or the destination is missing

Example: `cp -r folder1 folder2`

## 8. `mv` - Move or Rename Files/Directories

- **Basic:** `mv source destination`
- **Flags:**
  - `-i`: Prompt before overwriting files
  - `-u`: Move only when the source file is newer
  - `-v`: Verbose output

Example: `mv oldname.txt newname.txt`

## 9. `touch` - Create Empty Files or Change Timestamps

- **Basic:** `touch filename`
- **Flags:**
  - `-c`: Do not create a new file if it doesn't exist
  - `-t`: Set a specific timestamp (e.g., `touch -t 202304050730 filename`)

## 10. `find` - Search for Files

- **Basic:** `find /path/to/search -name filename`
- **Flags:**
  - `-name`: Search by file name
  - `-type`: Search by type (e.g., `f` for files, `d` for directories)
  - `-exec`: Execute a command on the files found
  - `-mtime`: Search by modification time (e.g., `+7` for files modified more than 7 days ago)
  - `-size`: Search by size (e.g., `+100M` for files larger than 100MB)

Example: `find /path/to/search -name "*.txt" -exec ls -l {} \;`

## 11. `cat` - Concatenate and Display Files

- **Basic:** `cat filename`
- **Flags:**
  - `-n`: Number lines
  - `-b`: Number non-empty lines
  - `-E`: Show `$` at the end of each line

## 12. `more` and `less` - View File Contents

- **Basic:** `more filename` or `less filename`
- **Flags for `more`:**
  - `-c`: Clear screen before displaying
- **Flags for `less`:**
  - `-N`: Show line numbers
  - `-S`: Disable line wrapping

## 13. `head` - Show the Beginning of a File

- **Basic:** `head filename`
- **Flags:**
  - `-n`: Display a specific number of lines (e.g., `head -n 20 filename`)

## 14. `tail` - Show the End of a File

- **Basic:** `tail filename`
- **Flags:**
  - `-n`: Show the last N lines (e.g., `tail -n 50 filename`)
  - `-f`: Continuously monitor the file as it grows (useful for logs)

## 15. `chmod` - Change File Permissions

- **Basic:** `chmod permissions filename`
- **Flags:**
  - `-R`: Apply recursively to directories and files
  - Numeric mode: `chmod 755 filename` (e.g., 755 for `rwxr-xr-x`)
  - Symbolic mode: `chmod u+x filename` (e.g., add execute for user)

## 16. `chown` - Change File Ownership

- **Basic:** `chown user:group filename`
- **Flags:**
  - `-R`: Apply recursively to directories and files

## 17. `ln` - Create Hard and Symbolic Links

- **Basic:** `ln source link_name` (hard link)
- **Flags:**
  - `-s`: Create a symbolic (soft) link
  - `-f`: Force the creation of the link

## 18. `tar` - Archive Files

- **Basic:** `tar -cf archive.tar files`
- **Flags:**
  - `-x`: Extract files from an archive
  - `-v`: Verbose output
  - `-z`: Compress using gzip (e.g., `tar -czf archive.tar.gz files`)
  - `-j`: Compress using bzip2 (e.g., `tar -cjf archive.tar.bz2 files`)
  - `-J`: Compress using xz (e.g., `tar -cJf archive.tar.xz files`)

## 19. `zip` and `unzip` - Create and Extract ZIP Files

- **Basic:**
  - `zip archive.zip files`: Create a ZIP archive
  - `unzip archive.zip`: Extract a ZIP archive
- **Flags:**
  - `-r`: Recursively zip directories
  - `-d`: Extract to a specific directory (e.g., `unzip archive.zip -d /path/to/dir`)

## 20. `df` - Display Disk Space Usage

- **Basic:** `df`
- **Flags:**
  - `-h`: Human-readable format (e.g., 1K, 234M)
  - `-T`: Show file system type

## 21. `du` - Estimate File Space Usage

- **Basic:** `du filename`
- **Flags:**
  - `-h`: Human-readable format
  - `-s`: **Show only total size for a directory**
  - `-a`: Show size for files and directories

## 22. `stat` - Display File Status

- **Basic:** `stat filename`
- **Flags:**
  - `-c`: Specify output format (e.g., `stat -c %s filename` for file size)

## 23. `sync` - Synchronize Data to Disk

- **Basic:** `sync`
  - This command flushes the file system buffer, writing data to disk.

## 24. `mount` and `umount` - Mount and Unmount File Systems

- **Basic:**
  - `mount /dev/sdX /mnt`: Mount a device to a directory
  - `umount /mnt`: Unmount a device

## 25. `file` - Determine File Type

- **Basic:** `file filename`
- **Flags:**
  - `-i`: Display MIME type

## 26. `shred` - Securely Delete Files

- **Basic:** `shred -u filename`
- **Flags:**
  - `-n`: Specify the number of overwrite passes (default is 3)
  - `-z`: Add a final pass with zeros to hide shredding

## 27. `bzip2` and `gzip` - Compress and Decompress Files

- **Basic:**
  - `gzip filename`: Compress
  - `gzip -d filename.gz`: Decompress
  - `bzip2 filename`: Compress
  - `bzip2 -d filename.bz2`: Decompress

## 28. `rsync` - Synchronize Files and Directories

- **Basic:** `rsync -av source/ destination/`
- **Flags:**
  - `-a`: Archive mode (preserves permissions, symlinks, etc.)
  - `-v`: Verbose output
  - `-z`: Compress during transfer
  - `--delete`: Delete files in the destination that no longer exist in the source

## 29. `alias` - Create Command Aliases

- **Basic:** `alias name='command'`
- **Flags:**
  - `unalias name`: Remove an alias

This list covers the basic and some advanced file management tasks in Linux. Each command can be combined with different options and flags to customize its behavior for specific use cases.

**You said:**

**System Monitoring and Performance cmd** with basic to advance with all the important flags in them that can be used please - all the important and basic to advance system monitoring cmd please include all cmds

**ChatGPT said:**

Here is a comprehensive list of basic to advanced system monitoring commands with relevant flags and explanations for Linux-based systems (command-line interface). These commands help you monitor different aspects of system performance, including CPU, memory, disk, network, and processes.

### 1. `top`

**Purpose:** Displays real-time system summary and process information.

- `top` – Display system information (CPU, memory, processes).

- `top -u <user>` – Show processes for a specific user.
- `top -p <pid>` – Show specific process by PID.
- `top -d <seconds>` – Set the update delay interval (in seconds).
- `top -n <count>` – Show the output for a specified number of iterations.
- `top -c` – Show full command lines of processes.

## 2. `htop`

**Purpose:** Interactive process viewer (more user-friendly version of `top`).

- `htop` – Start the interactive viewer.
- `htop -u <user>` – Show processes for a specific user.
- `htop -s <field>` – Sort processes by specific fields (e.g., CPU, memory).
- `htop -d <delay>` – Adjust the delay between updates.

## 3. `ps`

**Purpose:** Display information about active processes.

- `ps aux` – Show all processes running on the system.
- `ps -ef` – Show all processes with full command lines.
- `ps -u <user>` – Show processes for a specific user.
- `ps -p <pid>` – Show a specific process by PID.
- `ps -eo pid,comm,%cpu,%mem` – Show specific fields (PID, command, CPU, memory).

## 4. `vmstat`

**Purpose:** Report virtual memory statistics.

- `vmstat 1` – Report every second.
- `vmstat -s` – Show memory statistics in a human-readable format.
- `vmstat -d` – Report disk statistics.

## 5. `free`

**Purpose:** Display memory usage.

- `free` – Show memory usage (RAM and swap).
- `free -h` – Show human-readable memory values (e.g., MB, GB).
- `free -m` – Display memory in megabytes.
- `free -g` – Display memory in gigabytes.

## 6. `iostat`

**Purpose:** Display CPU and input/output statistics for devices.

- `iostat` – Show CPU and I/O statistics.
- `iostat -d` – Show device statistics.
- `iostat -c` – Show CPU statistics.
- `iostat -x` – Show extended device statistics.

## 7. `sar`

**Purpose:** Collect and report system activity information.

- `sar -u 1 3` – Show CPU usage every 1 second, 3 times.
- `sar -r` – Show memory usage.
- `sar -d` – Show disk activity.
- `sar -n DEV` – Show network activity.

## 8. `dstat`

**Purpose:** Versatile resource statistics tool.

- `dstat` – Show CPU, disk, network, and I/O stats.
- `dstat -c` – Show only CPU stats.
- `dstat -d` – Show only disk stats.
- `dstat -n` – Show only network stats.
- `dstat -t` – Show time stats.

## 9. `netstat`

**Purpose:** Show network connections, routing tables, interface statistics.

- `netstat -tuln` – Show active listening ports.
- `netstat -tulpn` – Show active connections with the associated program.
- `netstat -i` – Show network interface statistics.
- `netstat -rn` – Show routing tables.
- `netstat -s` – Show network statistics.

## 10. `ss`

**Purpose:** Utility to investigate sockets.

- `ss` – Show all sockets.
- `ss -tuln` – Show listening sockets.
- `ss -p` – Show process using the socket.
- `ss -s` – Show summary of socket statistics.

## 11. `uptime`



**Purpose:** Show how long the system has been running.

- `uptime` – Displays the uptime, number of users, and load averages.

## 12. `lsof`

**Purpose:** List open files and processes using them.

- `lsof` – Show all open files.
- `lsof -i` – Show all network connections.
- `lsof -u <user>` – Show files opened by a specific user.
- `lsof +D <directory>` – Show files opened in a specific directory.

## 13. `df`

**Purpose:** Report file system disk space usage.

- `df` – Show **disk space usage for mounted filesystems**.
- `df -h` – Human-readable format (e.g., MB, GB).
- `df -T` – Show file system types.
- `df -i` – Show inode usage.

## 14. `du`

**Purpose:** Estimate **file space usage**.

- `du` – Show the disk usage of files and directories.
- `du -sh <directory>` – Show total disk usage of a directory in human-readable format.
- `du -ah` – Show disk usage of all files and directories.

## 15. `watch`

**Purpose:** Execute a program periodically and show output.

- `watch <command>` – Run a command every 2 seconds by default.
- `watch -n <seconds> <command>` – Run the command at custom intervals.
- `watch -d <command>` – Highlight changes in the output.

## 16. `lscpu`

**Purpose:** Display information about the CPU architecture.

- `lscpu` – Show detailed CPU architecture information.

## 17. `lsblk`

**Purpose:** List information about block devices (disks).

- `lsblk` – List all block devices.
- `lsblk -f` – Show file system information.
- `lsblk -o NAME,SIZE,TYPE,MOUNTPOINT` – Custom output columns.

## 18. `systemctl`

**Purpose:** Control the systemd system and service manager.

- `systemctl status` – Show system and service manager status.
- `systemctl status <service>` – Show specific service status.
- `systemctl list-units --type=service` – List all active services.
- `systemctl start <service>` – Start a service.
- `systemctl stop <service>` – Stop a service.

## 19. `journalctl`

**Purpose:** Query and display logs from `systemd` journal.

- `journalctl` – Show all system logs.
- `journalctl -u <service>` – Show logs for a specific service.
- `journalctl -f` – Follow the log output.
- `journalctl --since "2025-04-05"` – Show logs since a specific date.

## 20. `atop`

**Purpose:** Advanced system and process monitoring tool.

- `atop` – Start the tool to monitor system and process activities.
- `atop -r <file>` – Read a log file recorded by atop.
- `atop -d <seconds>` – Update every x seconds.

## 21. `sar` (Sysstat)

**Purpose:** Collect and report system activity information.

- `sar -u 1 3` – Report CPU utilization every second, three times.
- `sar -r` – Show memory statistics.
- `sar -d` – Show disk statistics.

## 22. `tcpdump`

**Purpose:** Network traffic capture.

- `tcpdump` – Capture network traffic.
- `tcpdump -i <interface>` – Capture traffic from a specific network interface.
- `tcpdump -n` – Don't resolve hostnames.
- `tcpdump -v` – Increase verbosity.

## 23. `iftop`

**Purpose:** Display bandwidth usage on an interface.

- `iftop` – Show bandwidth usage on each connection.
- `iftop -ni <interface>` – Show bandwidth on a specific interface.

## 24. `uptime`

**Purpose:** Show system uptime and load averages.

- `uptime` – Displays the system uptime and load averages.

## 25. `mpstat`

**Purpose:** Report CPU statistics.

- `mpstat` – Show CPU stats for each processor.
- `mpstat -P ALL` – Show stats for all processors.

These commands give a powerful toolkit for monitoring various aspects of system performance, whether you're looking at system load, memory usage, disk activity, network stats, or process information. You can combine them, use them in scripts, or simply run them in real-time for a more detailed view of your system.

**You said:**

continue please with more system monitoring cmd advance cmds please that are used by devops engineer

**ChatGPT said:**

Here are more advanced system monitoring commands commonly used by **DevOps Engineers** for deeper insights into system performance, troubleshooting, and infrastructure management. These tools focus on monitoring, debugging, and enhancing the reliability and performance of systems and applications in production environments.

## 26. `strace`

**Purpose:** Trace system calls and signals.

- `strace -p <pid>` – Attach to a running process by its PID and trace system calls.
- `strace -e trace=<syscall>` – Trace a specific system call (e.g., `read`, `write`).
- `strace -o <file>` – Save the output to a file.
- `strace -f` – Trace child processes (forks).
- `strace -c` – Count time, calls, and errors for each system call.

## 27. `dmesg`

**Purpose:** Print kernel ring buffer messages, typically for debugging hardware issues.

- `dmesg` – Display kernel messages.
- `dmesg | grep <pattern>` – Filter messages based on a pattern.
- `dmesg -T` – Show human-readable timestamps.
- `dmesg --clear` – Clear the kernel ring buffer.

## 28. `sysctl`

**Purpose:** Interface to change kernel parameters at runtime.

- `sysctl -a` – Display all available kernel parameters.
- `sysctl -w <parameter>=<value>` – Set a specific kernel parameter.
- `sysctl net.ipv4.ip_forward=1` – Enable IP forwarding (e.g., for routing).
- `sysctl -p` – Load settings from `/etc/sysctl.conf` or a configuration file.

## 29. `pidstat`

**Purpose:** Collect and display statistics by process.

- `pidstat` – Show CPU, memory, and other statistics for processes.
- `pidstat -u` – Display CPU usage by process.
- `pidstat -r` – Show memory usage by process.
- `pidstat -d` – Show I/O statistics for processes.
- `pidstat -p <pid>` – Display stats for a specific process.

## 30. `netcat (nc)`

**Purpose:** Network utility for reading from and writing to network connections.

- `nc -l <port>` – Start listening on a specific port.
- `nc <host> <port>` – Connect to a remote host and port.
- `nc -zv <host> <port-range>` – Scan a range of ports on a remote host.
- `nc -w 5 <host> <port>` – Set a timeout of 5 seconds for a connection.

## 31. `curl`

**Purpose:** Transfer data from or to a server.

- `curl -I <URL>` – Show only the HTTP header information.
- `curl -O <URL>` – Download a file.
- `curl -L <URL>` – Follow redirects.
- `curl -u <user>:<password> <URL>` – Make an authenticated request.
- `curl -X POST <URL> -d "<data>"` – Make a POST request with data.
- `curl --silent --show-error <URL>` – Suppress output except for errors.

### 32. **ncdu**

**Purpose:** Disk usage analyzer with a user-friendly interface.

- `ncdu` – Display disk usage and allow interactive navigation.
- `ncdu <path>` – Analyze disk usage for a specific path or directory.

### 33. **tshark**

**Purpose:** Network protocol analyzer (similar to `tcpdump`, but with more features).

- `tshark` – Start capturing packets.
- `tshark -i <interface>` – Capture packets from a specific interface.
- `tshark -f "<filter>"` – Capture only specific packets based on a filter (e.g., `tcp port 80`).
- `tshark -w <file>` – Save captured packets to a file.

### 34. **tcpdump**

**Purpose:** Capture network traffic and troubleshoot networking issues.

- `tcpdump -i <interface>` – Capture packets on a specified network interface.
- `tcpdump -s 0 -A` – Capture and display full packet contents (useful for HTTP traffic).
- `tcpdump -n` – Don't resolve hostnames (show IP addresses).
- `tcpdump -v` – Verbose output (more detailed packet info).
- `tcpdump -X` – Show packet contents in hexadecimal and ASCII.
- `tcpdump 'port 80'` – Capture HTTP traffic.

### 35. **bpfcc / bpftrace**

**Purpose:** Tools for tracing and monitoring Linux kernel events with eBPF (Extended Berkeley Packet Filter).

- `bpfcc` – Use BPF tools to trace and debug system performance.
- `bpftrace` – Dynamic tracing tool that allows custom tracing scripts.

- `bpfttrace -e 'tracepoint:syscalls:sys_enter_open { @[comm] = count(); }'`  
– Trace the `open()` system call.
- `bpfttrace -e 'kprobe:vfs_read { printf("PID %d read %d bytes\n", pid, args->count); }'` – Trace file reads.

### 36. inotifywait

**Purpose:** Monitor file system events using inotify.

- `inotifywait -m <directory>` – Monitor events in a directory.
- `inotifywait -r` – Monitor directories recursively.
- `inotifywait -e <event> <file>` – Monitor a specific event (e.g., create, delete).

Networking cmd with basic to advance with all the important flags in them that can be used please - all the important and basic to advance networking cmd please include all cmds used by devops engineer please

ChatGPT said:

Here's a comprehensive list of **basic to advanced networking commands** with flags that are frequently used by **DevOps Engineers**. These commands can help you troubleshoot, configure, and monitor networking issues on Linux systems.

## Basic Networking Commands

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### 1. ifconfig

**Purpose:** Display and configure network interfaces.

- `ifconfig` – Show all network interfaces and their IP addresses.
- `ifconfig <interface>` – Show specific interface (e.g., `eth0`, `wlan0`).
- `ifconfig <interface> up` – Bring up a network interface.
- `ifconfig <interface> down` – Bring down a network interface.
- `ifconfig <interface> <IP>` – Assign an IP address to an interface.
- `ifconfig <interface> netmask <netmask>` – Set the netmask for the interface.

## 2. `ip`

**Purpose:** A more modern and powerful alternative to `ifconfig` for network management.

- `ip a` – Show all network interfaces and their IP addresses.
- `ip link show` – Display link information (e.g., interface status).
- `ip addr show` – Show IP addresses assigned to all interfaces.
- `ip link set <interface> up` – Bring the interface up.
- `ip link set <interface> down` – Bring the interface down.
- `ip addr add <IP>/24 dev <interface>` – Assign a new IP to an interface.
- `ip route show` – Display the routing table.
- `ip route add <destination> via <gateway>` – Add a new route.

## 3. `ping`

**Purpose:** Send ICMP echo requests to check network connectivity.

- `ping <hostname or IP>` – Ping a host by its IP address or hostname.
- `ping -c <count> <hostname>` – Send a specific number of packets.
- `ping -i <interval> <hostname>` – Set the interval between packets.
- `ping -t <ttl> <hostname>` – Set the TTL (Time To Live) for packets.
- `ping -s <size> <hostname>` – Send packets of a specific size.
- `ping -4 <hostname>` – Force the use of IPv4.
- `ping -6 <hostname>` – Force the use of IPv6.

## 4. `traceroute`

**Purpose:** Trace the route packets take to a destination.

- `traceroute <hostname>` – Trace the route to a remote host.
- `traceroute -m <max_hops> <hostname>` – Set the maximum number of hops.
- `traceroute -T` – Use TCP packets for tracing.
- `traceroute -I` – Use ICMP packets for tracing.

## 5. `nslookup`

**Purpose:** Query DNS to obtain domain name or IP address information.

- `nslookup <hostname>` – Query the IP address of a given hostname.
- `nslookup <IP>` – Query the domain name for a given IP.
- `nslookup -type=MX <domain>` – Query MX (mail) records for a domain.
- `nslookup -type=NS <domain>` – Query the name servers for a domain.

## 6. dig

**Purpose:** Perform DNS lookups and query DNS servers.

- `dig <hostname>` – Perform a basic DNS lookup for a domain.
- `dig @<DNS server> <hostname>` – Query a specific DNS server.
- `dig <hostname> A` – Query A (address) record for a domain.
- `dig <hostname> MX` – Query MX (mail) record for a domain.
- `dig +short <hostname>` – Shorten output to show only the result.

## 7. route

**Purpose:** View and configure network routing tables.

- `route` – Show the current routing table.
- `route -n` – Show the routing table with numeric addresses (no DNS resolution).
- `route add <destination> gw <gateway>` – Add a new route to a destination.
- `route del <destination>` – Delete a specific route.

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# Advanced Networking Commands

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## 8. netstat

**Purpose:** Display network connections, routing tables, interface statistics, etc.

- `netstat` – Show active connections and listening ports.
- `netstat -tuln` – Display TCP and UDP ports that are open and listening.
- `netstat -an` – Display all network connections (IP and port).
- `netstat -s` – Show network statistics.
- `netstat -i` – Show network interfaces and packet statistics.
- `netstat -r` – Show the routing table.

## 9. ss



**Purpose:** Utility to investigate sockets.

- `ss` – Display all sockets.
- `ss -tuln` – Display listening TCP and UDP sockets.
- `ss -a` – Show all sockets (listening and non-listening).
- `ss -p` – Display processes using the sockets.
- `ss -r` – Display routing information.

## 10. netcat (nc)

**Purpose:** A versatile tool for network debugging and banner grabbing.

- `nc -zv <hostname> <port>` – Scan a specific port or range of ports.
- `nc -l <port>` – Listen on a specific port for incoming connections.
- `nc <hostname> <port>` – Connect to a host on a specific port.
- `nc -u <hostname> <port>` – Use UDP instead of TCP.
- `nc -v <hostname> <port>` – Verbose output for connection details.

## 11. tcpdump

**Purpose:** Capture network traffic and display the packets.

- `tcpdump` – Capture packets on the default interface.
- `tcpdump -i <interface>` – Capture on a specific network interface.
- `tcpdump -n` – Do not resolve hostnames or port names.
- `tcpdump -v` – Show more verbose packet information.
- `tcpdump -c <count>` – Capture a specific number of packets.
- `tcpdump -w <file>` – Save the captured packets to a file.
- `tcpdump 'port 80'` – Capture HTTP traffic.
- `tcpdump -A` – Display packet contents in ASCII format.
- `tcpdump -X` – Display packet contents in both hex and ASCII.

## 12. iftop

**Purpose:** Display bandwidth usage on a network interface in real-time.

- `iftop` – Display real-time bandwidth usage.
- `iftop -i <interface>` – Specify the network interface to monitor.
- `iftop -n` – Show numerical addresses (do not resolve hostnames).
- `iftop -P` – Show port numbers along with IP addresses.

## 13. nmap

**Purpose:** Network exploration and security auditing tool.

- `nmap <hostname>` – Perform a simple scan of a host.
- `nmap -sP <IP-range>` – Perform a ping scan to identify live hosts.
- `nmap -p <ports> <hostname>` – Scan specific ports (e.g., `-p 80,443`).
- `nmap -sS <hostname>` – Perform a SYN scan (stealth scan).
- `nmap -O <hostname>` – OS detection.
- `nmap -A <hostname>` – Enable OS detection, version detection, script scanning, and traceroute.

## 14. `mtr`

**Purpose:** A network diagnostic tool combining `traceroute` and `ping`.

- `mtr <hostname>` – Continuous traceroute and ping to a destination.
- `mtr -r <hostname>` – Generate a report instead of continuous output.
- `mtr -c <count> <hostname>` – Set the number of pings to send.

## 15. `arp`

**Purpose:** View and manipulate the system's ARP (Address Resolution Protocol) cache.

- `arp -a` – Display the current ARP table.
- `arp -d <IP>` – Delete an entry from the ARP table.
- `arp -s <IP> <MAC>` – Manually add a static entry to the ARP table.

## 16. `ethtool`

**Purpose:** Query and control network device settings.

- `ethtool <interface>` – Display information about a network interface.
- `ethtool -s <interface> speed <speed> duplex <duplex>` – Change the speed and duplex settings of a network interface.
- `ethtool -p <interface>` – Blink the LED on a network interface to help locate it.

## 17. `iwconfig`

**Purpose:** Configure wireless network interfaces.

- `iwconfig` – Display wireless network information.
- `iwconfig <interface> essid <SSID>` – Connect to a specific Wi-Fi network.
- `iwconfig <interface> mode <mode>` – Set the mode of the wireless interface (e.g., `managed`, `ad-hoc`).

## 18. `ip link`

**Purpose:** Display or modify network device attributes.

- `ip link show` – Display detailed information about network interfaces.
- `ip link set <interface> up/down` – Bring the interface up or down.
- `ip link set <interface> mtu <mtu_size>` – Change the MTU size for an interface.

## 19. `sshd` (SSH Daemon)

**Purpose:** Manage SSH access and configurations.

- `sshd -T` – Show current configuration options.
- `sshd -f <config_file>` – Use a specific SSH configuration file.
- `sshd -D` – Run in the foreground (useful for debugging).

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## Cloud/Container Specific Networking Commands

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## 20. `docker network`

**Purpose:** Manage Docker network settings.

- `docker network ls` – List all Docker networks.
- `docker network inspect <network_name>` – Inspect a specific Docker network.
- `docker network create <network_name>` – Create a new Docker network.
- `docker network connect <network_name> <container_name>` – Connect a container to a network.

## 21. `kubectl get svc`

**Purpose:** Retrieve the details of Kubernetes services.

- `kubectl get svc` – List all services in the current namespace.
- `kubectl get svc <service_name>` – Get details of a specific service.
- `kubectl describe svc <service_name>` – Detailed information on the service, including networking details.

---

These commands, along with their options and flags, are crucial for diagnosing, configuring, and optimizing networking in any system or infrastructure. DevOps Engineers often use them to ensure reliable network performance, security, and troubleshooting in both on-premise and cloud-based environments.

**You said:**

please continue with more advance linux networking cmds used by devops engineer

ChatGPT said:

Here's a continuation of **advanced Linux networking commands** that are typically used by **DevOps Engineers** for deep network diagnostics, configuration, performance monitoring, and troubleshooting. These commands are important when working with complex network setups, performance tuning, and cloud or containerized environments.

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## 22. `ss` (Socket Stat)

**Purpose:** A more modern and faster alternative to `netstat` for analyzing socket connections.

- `ss -tuln` – Display all listening TCP and UDP sockets.
- `ss -an` – Show all network connections in numeric form (no DNS resolution).
- `ss -p` – Show the processes associated with each socket.
- `ss -s` – Display socket statistics (summary).
- `ss -o state established` – Show only established connections.
- `ss -r` – Display routing information along with socket statistics.
- `ss -A` – Show application layer statistics.

## 23. `nft` (Netfilter)

**Purpose:** Interface for configuring packet filtering and network address translation (NAT).

- `nft list ruleset` – Display all the rules in the firewall.
- `nft add rule inet filter input tcp dport 22 accept` – Add a rule to allow incoming SSH connections.
- `nft flush ruleset` – Flush all rules from the ruleset.
- `nft delete rule inet filter input handle 4` – Delete a specific rule by its handle number.
- `nft list table inet filter` – List the rules in the filter table.
- `nft add chain inet filter input { type filter hook input priority 0 \;`  
} – Add a chain to filter incoming packets.

## 24. `iptables`

**Purpose:** Configure packet filtering rules in the Linux kernel firewall.

- `iptables -L` – List all active firewall rules.
- `iptables -A INPUT -p tcp --dport 80 -j ACCEPT` – Allow incoming HTTP traffic.
- `iptables -A INPUT -p tcp --dport 443 -j ACCEPT` – Allow incoming HTTPS traffic.

- `iptables -A INPUT -p tcp --dport 22 -s <IP> -j ACCEPT` – Allow SSH traffic from a specific IP.
- `iptables -D INPUT -p tcp --dport 80 -j ACCEPT` – Remove the rule allowing HTTP traffic.
- `iptables -F` – Flush all rules in the filter table.
- `iptables -t nat -A PREROUTING -p tcp --dport 80 -j DNAT --to-destination 192.168.1.2:8080` – Redirect HTTP traffic to a different destination.

## 25. **firewalld**

**Purpose:** Manage firewall rules dynamically with `firewalld`.

- `firewall-cmd --list-all` – Show the current firewall settings and rules.
- `firewall-cmd --zone=public --add-port=8080/tcp --permanent` – Open port 8080 permanently.
- `firewall-cmd --reload` – Reload the firewall to apply new rules.
- `firewall-cmd --zone=public --remove-port=8080/tcp --permanent` – Close port 8080.
- `firewall-cmd --list-ports` – Show open ports.

## 26. **bpftrace**

**Purpose:** Dynamic tracing tool for observing and troubleshooting kernel-level events using BPF (Berkeley Packet Filter).

- `bpftrace -e 'tracepoint:syscalls:sys_enter_open { printf("%s opened\n", str(args->filename)); }'` – Trace all open system calls.
- `bpftrace -e 'kprobe:vfs_read { printf("PID %d read %d bytes\n", pid, args->count); }'` – Trace file reads.
- `bpftrace -e 'tracepoint:net:net_dev_xmit { @[args->dev_name] = count(); }'` – Count network transmissions for each device.

## 27. **tcpdump with Advanced Filtering**

**Purpose:** Advanced packet capture with specific filters.

- `tcpdump -i eth0 port 443` – Capture packets on port 443 (HTTPS).
- `tcpdump -i eth0 'tcp[tcpflags] & tcp-push != 0'` – Capture TCP packets with the PUSH flag set.
- `tcpdump -i eth0 'src host <IP>'` – Capture packets from a specific source IP.
- `tcpdump -i eth0 'dst host <IP>'` – Capture packets destined to a specific IP.
- `tcpdump -i eth0 -w capture.pcap` – Write captured packets to a file.
- `tcpdump -r capture.pcap` – Read packets from a capture file.
- `tcpdump -i eth0 -v` – Increase verbosity of the output.

## 28. `ip rule`

**Purpose:** Used to configure policy-based routing.

- `ip rule show` – Display the current routing rules.
- `ip rule add from <IP> table <table_id>` – Add a rule to route traffic from a specific IP through a custom routing table.
- `ip rule delete from <IP>` – Delete the rule for traffic from a specific IP.
- `ip rule add iif <interface> table <table_id>` – Route traffic coming from a specific interface through a particular table.

## 29. `tc` (Traffic Control)

**Purpose:** Control network traffic on interfaces.

- `tc qdisc show` – Show the current queuing disciplines (QDisc) for interfaces.
- `tc qdisc add dev eth0 root netem delay 100ms` – Add network delay to interface `eth0`.
- `tc qdisc change dev eth0 root netem loss 5%` – Simulate 5% packet loss on `eth0`.
- `tc class add dev eth0 parent 1:1 classid 1:10 htb rate 1mbit` – Add a traffic class with a rate limit.
- `tc filter add dev eth0 protocol ip parent 1:0 prio 1 u32 match ip dport 80 0xffff flowid 1:10` – Filter HTTP traffic and assign it to a specific traffic class.

## 30. `ethtool` (Advanced)

**Purpose:** Query and modify network interface driver and hardware settings.

- `ethtool eth0` – Display settings for the `eth0` network interface.
- `ethtool -s eth0 speed 1000 duplex full` – Set the speed and duplex mode for the interface.
- `ethtool -p eth0` – Blink the LED to locate the physical interface.
- `ethtool -i eth0` – Display driver information for the network interface.
- `ethtool -S eth0` – Show statistics about the network interface.

## 31. `nmcli`

**Purpose:** Command-line interface for NetworkManager (useful for managing network connections).

- `nmcli connection show` – List all active network connections.
- `nmcli device status` – Show the status of all network devices.
- `nmcli connection add type ethernet con-name eth0 ifname eth0` – Add a new Ethernet connection.
- `nmcli device disconnect eth0` – Disconnect a specific network interface.

- `nmcli device wifi list` – List available Wi-Fi networks.

## 32. `conntrack`

**Purpose:** Used to view and manage the connection tracking subsystem in the Linux kernel.

- `conntrack -L` – List all tracked connections.
- `conntrack -F` – Flush all tracked connections.
- `conntrack -D` – Delete a specific connection from the connection table.
- `conntrack -L -p tcp` – List all tracked TCP connections.
- `conntrack -E` – Display connection events in real-time.

## 33. `wireshark`

**Purpose:** A GUI-based network protocol analyzer (often used in tandem with `tcpdump` for deep packet inspection).

- Launch Wireshark and capture packets from a specific interface.
- `wireshark` – Start Wireshark GUI.
- `wireshark -i <interface>` – Start Wireshark and capture packets from a specific interface.
- Wireshark supports advanced filtering using display filters (e.g., `http, ip.addr==192.168.1.1`).

## 34. `bridge`

**Purpose:** Configure and manage network bridges.

- `bridge link` – Show the status of all network bridges.
- `bridge fdb show` – Show the Forwarding Database (FDB) for a bridge.
- `bridge vlan` – Show or configure VLANs on a bridge.
- `bridge addbr br0` – Create a new network bridge.
- `bridge addif br0 eth0` – Add an interface to the bridge.

## 35. `bmon`

**Purpose:** Bandwidth monitor and rate estimator for Linux.

- `bmon` – Display bandwidth usage in real-time.
- `bmon -p` – Display statistics for all interfaces.
- `bmon -c` – Show detailed statistics in a continuous mode.

Package Management cmd with basic to advance with all the important flags in them that can be used please - all the important and basic to advance package mgmt linux or ubuntu cmd please include all cmds

ChatGPT said:

Here's a comprehensive list of **package management commands** used in **Linux** and **Ubuntu** for managing software packages, including installation, removal, updates, and repository management. These commands range from basic to advanced usage, specifically designed for **Debian-based distributions** like Ubuntu, and **RedHat-based distributions** (e.g., CentOS, RHEL).

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## For Debian/Ubuntu-based Systems (APT)

APT (Advanced Package Tool) is the package management system for Debian-based distributions like Ubuntu. It manages packages, handles installations, upgrades, and dependencies.

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### 1. apt-get

**Purpose:** Command-line tool for handling packages (installation, upgrade, removal).

- `apt-get update` – Update the list of available packages from all configured repositories.
- `apt-get upgrade` – Upgrade all installed packages to the latest versions.
- `apt-get dist-upgrade` – Perform an upgrade, handling changing dependencies.
- `apt-get install <package>` – Install a package.
- `apt-get install <package>=<version>` – Install a specific version of a package.
- `apt-get remove <package>` – Remove a package (without removing configuration files).
- `apt-get purge <package>` – Remove a package along with its configuration files.
- `apt-get autoremove` – Remove packages that were installed automatically and are no longer required.
- `apt-get clean` – Remove downloaded package files (.deb) to free up space.
- `apt-get autoclean` – Clean the cache, removing only outdated package files.
- `apt-get check` – Check for broken dependencies.
- `apt-get source <package>` – Download the source code for a package.
- `apt-get install <package> --reinstall` – Reinstall a package.
- `apt-get -f install` – Fix broken dependencies by installing missing packages.



## 2. apt-cache

**Purpose:** Search and query information about available packages.

- `apt-cache search <package_name>` – Search for a package by name.
- `apt-cache show <package_name>` – Display detailed information about a package.
- `apt-cache depends <package_name>` – Show package dependencies.
- `apt-cache rdepends <package_name>` – Show packages that depend on the given package.
- `apt-cache policy <package_name>` – Show the available versions and the installed version of a package.

## 3. apt

**Purpose:** A more user-friendly front-end for APT, introduced in newer versions of Ubuntu.

- `apt update` – Update the list of available packages.
- `apt upgrade` – Upgrade installed packages to the latest versions.
- `apt install <package>` – Install a package.
- `apt remove <package>` – Remove a package.
- `apt search <package_name>` – Search for a package in the repository.
- `apt show <package>` – Display detailed information about a package.
- `apt list --installed` – List installed packages.
- `apt list --upgradable` – List all packages that have updates available.
- `apt purge <package>` – Remove a package along with its configuration files.
- `apt autoremove` – Remove unnecessary packages.
- `apt list <package>` – Check if a package is installed.

## 4. dpkg

**Purpose:** Low-level tool to handle `.deb` packages.

- `dpkg -i <package.deb>` – Install a `.deb` package.
- `dpkg -r <package>` – Remove a package.
- `dpkg -P <package>` – Purge a package (remove configuration files too).
- `dpkg -l` – List all installed packages.
- `dpkg -L <package>` – List all files installed by a package.
- `dpkg -S <file>` – Find which package a specific file belongs to.
- `dpkg -C` – Check for broken packages.
- `dpkg --configure -a` – Configure unpacked packages.
- `dpkg -s <package>` – Show detailed information about an installed package.
- `dpkg -p <package>` – Show information about an installed package in a more human-readable format.

## 5. apt-key

**Purpose:** Manage the trusted keys for APT repositories.

- `apt-key list` – List the keys used by APT.
  - `apt-key adv --keyserver <keyserver> --recv-keys <key_id>` – Add a GPG key to APT.
  - `apt-key del <key_id>` – Delete a specific key from APT's trusted keys.
- 

## For Red Hat/CentOS/Fedora (YUM/DNF)

YUM (Yellowdog Updater Modified) and DNF (Dandified YUM) are the default package managers for RedHat-based distributions, such as CentOS and Fedora.

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### 6. `yum` (for older RedHat/CentOS/Fedora systems)

**Purpose:** Package management utility for RPM-based distributions.

- `yum update` – Update all installed packages to the latest version.
- `yum install <package>` – Install a package.
- `yum remove <package>` – Remove a package.
- `yum list installed` – List all installed packages.
- `yum list available` – List all available packages from repositories.
- `yum search <package>` – Search for a package in the repositories.
- `yum info <package>` – Show detailed information about a package.
- `yum groupinstall <group>` – Install a group of packages (e.g., `yum groupinstall "Development Tools"`).
- `yum groupremove <group>` – Remove a group of packages.
- `yum autoremove` – Remove unnecessary packages that were installed as dependencies.
- `yum clean all` – Clean the repository metadata and cache.
- `yum downgrade <package>` – Downgrade a package to an earlier version.

### 7. `dnf` (for newer RedHat/CentOS/Fedora systems)

**Purpose:** DNF is the next-generation package manager, replacing YUM.

- `dnf update` – Update all installed packages to the latest version.
- `dnf install <package>` – Install a package.
- `dnf remove <package>` – Remove a package.
- `dnf list installed` – List installed packages.
- `dnf list available` – List available packages from the repository.
- `dnf search <package>` – Search for a package in the repositories.
- `dnf info <package>` – Display detailed information about a package.

- `dnf groupinstall <group>` – Install a group of packages.
  - `dnf groupremove <group>` – Remove a group of packages.
  - `dnf autoremove` – Remove unnecessary packages.
  - `dnf clean all` – Clean metadata and cached data.
  - `dnf downgrade <package>` – Downgrade a package.
- 

## Package Management Commands for Other Tools

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### 8. `snap` (Snap Package Management)

**Purpose:** Manage Snap packages (used for installing self-contained software packages).

- `snap install <package>` – Install a Snap package.
- `snap remove <package>` – Remove a Snap package.
- `snap list` – List all installed Snap packages.
- `snap refresh` – Refresh (update) Snap packages.
- `snap info <package>` – Show detailed information about a Snap package.
- `snap find <package>` – Search for a Snap package.
- `snap version` – Show the version of Snap installed on the system.

### 9. `flatpak` (Flatpak Package Management)

**Purpose:** Manage Flatpak packages (another format for self-contained software).

- `flatpak install <package>` – Install a Flatpak package.
  - `flatpak uninstall <package>` – Uninstall a Flatpak package.
  - `flatpak list` – List installed Flatpak packages.
  - `flatpak update` – Update Flatpak packages.
  - `flatpak search <package>` – Search for a Flatpak package.
  - `flatpak info <package>` – Show detailed information about a Flatpak package.
- 

## Managing Package Repositories

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### 10. `add-apt-repository` (for Ubuntu/Debian)

**Purpose:** Add a Personal Package Archive (PPA) or repository.

- `add-apt-repository <ppa>` – Add a PPA repository (e.g., `add-apt-repository ppa:mozillateam/firefox-next`).
- `add-apt-repository --remove <ppa>` – Remove a PPA repository.
- `add-apt-repository -y <repository>` – Automatically accept the repository addition.

## 11. `apt-add-repository` (for Ubuntu/Debian)

**Purpose:** Add new repositories to your system.

- `apt-add-repository <repository>` – Add a repository to the system.
- `apt-add-repository -r <repository>` – Remove a repository from the system.

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## Other Useful Package Management Commands

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## 12. `update-alternatives`

**Purpose:** Set default applications for different services (e.g., Java, Python).

- `update-alternatives --config <service>` – Select the default version of a service.
- `update-alternatives --display <service>` – Show all available alternatives for a service.

## 13. `dpkg-reconfigure`

**Purpose:** Reconfigure installed packages.

- `dpkg-reconfigure <package>` – Reconfigure an installed package (e.g., to reconfigure locales or X11 server settings).

User and Permission Management cmd with basic to advance with all the important flags in them that can be used by devops engineer please - all the important and basic to advance user and permission mgmt cmd please include all cmds

ChatGPT said:

Here's a comprehensive list of **user and permission management commands** that **DevOps engineers** commonly use in Linux/Ubuntu systems. These commands cover everything from basic user creation and permission management to advanced topics such as managing groups, controlling access, and modifying system permissions.

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## User Management Commands

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### 1. useradd

**Purpose:** Create a new user.

- `useradd <username>` – Create a new user with the default settings.
- `useradd -m <username>` – Create a user and create the home directory.
- `useradd -d /home/<path> <username>` – Specify a custom home directory for the user.
- `useradd -s /bin/bash <username>` – Specify a custom shell for the user.
- `useradd -G <group1>,<group2> <username>` – Add the user to specific groups.
- `useradd -e <YYYY-MM-DD> <username>` – Set the account expiry date.

### 2. usermod

**Purpose:** Modify an existing user account.

- `usermod -aG <group> <username>` – Add a user to an existing group.
- `usermod -g <group> <username>` – Change the primary group for a user.
- `usermod -s /bin/zsh <username>` – Change the user's shell.
- `usermod -L <username>` – Lock the user account (prevents login).
- `usermod -U <username>` – Unlock a previously locked user account.
- `usermod -e <YYYY-MM-DD> <username>` – Set the account expiry date.

### 3. userdel

**Purpose:** Delete a user account.

- `userdel <username>` – Delete the user but retain their home directory.
- `userdel -r <username>` – Delete the user and their home directory.

#### **4. groupadd**

**Purpose:** Create a new group.

- `groupadd <groupname>` – Create a new group.
- `groupadd -g <gid> <groupname>` – Create a group with a specific GID.
- `groupadd -f <groupname>` – Force creation if the group already exists.

#### **5. groupdel**

**Purpose:** Delete a group.

- `groupdel <groupname>` – Delete a group.

#### **6. groupmod**

**Purpose:** Modify an existing group.

- `groupmod -n <new_groupname> <groupname>` – Rename a group.
- `groupmod -g <gid> <groupname>` – Change the GID of an existing group.

#### **7. chage**

**Purpose:** Change user password expiry information.

- `chage -l <username>` – Show password expiry information for a user.
- `chage -M <days> <username>` – Set the maximum number of days before a password must be changed.
- `chage -m <days> <username>` – Set the minimum number of days between password changes.
- `chage -W <days> <username>` – Set the number of days before a password expires that the user will be warned.
- `chage -I <days> <username>` – Set the number of days of inactivity before the account is disabled.

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## **Password Management Commands**

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#### **8. passwd**

**Purpose:** Change user passwords.

- `passwd <username>` – Change the password for a specific user.
  - `passwd -l <username>` – Lock the password for a user (disables login).
  - `passwd -u <username>` – Unlock the password for a user.
  - `passwd -e <username>` – Expire the password (forces the user to change the password at next login).
  - `passwd -d <username>` – Delete the password for a user (allows login with no password).
  - `passwd -S <username>` – Show the status of the user's password (locked, expired, etc.).
- 

## File and Directory Permissions Commands

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### 9. `chmod`

**Purpose:** Change file or directory permissions.

- `chmod <permissions> <file>` – Set specific permissions for a file or directory.
  - `<permissions>` can be in symbolic (e.g., `rx`) or numeric format (e.g., `755`).
- `chmod u+x <file>` – Give execute permission to the user (owner).
- `chmod g-w <file>` – Remove write permission from the group.
- `chmod o+r <file>` – Add read permission for others.
- `chmod 755 <file>` – Set permission for the owner to read, write, execute, and others to read and execute.
- `chmod -R 777 <directory>` – Recursively set all permissions to full access for all users (use with caution).

### 10. `chown`

**Purpose:** Change file or directory ownership.

- `chown <user>:<group> <file>` – Change the owner and group of a file or directory.
- `chown <user> <file>` – Change the owner of a file or directory.
- `chown :<group> <file>` – Change the group ownership of a file or directory.
- `chown -R <user>:<group> <directory>` – Recursively change ownership for all files and directories inside a directory.
- `chown --reference=<file1> <file2>` – Set the ownership of `file2` to be the same as `file1`.

### 11. `chgrp`

**Purpose:** Change group ownership of a file or directory.

- `chgrp <group> <file>` – Change the group of a file or directory.
- `chgrp -R <group> <directory>` – Recursively change the group for all files and directories inside a directory.

## 12. `umask`

**Purpose:** Set default file permissions for newly created files.

- `umask` – Display the current umask value.
- `umask <value>` – Set the umask value (e.g., `umask 022` sets default permissions of 755 for files).
- `umask 0777` – Set the umask value to allow no permissions by default.

## 13. `setfacl`

**Purpose:** Set file access control lists (ACLs) to provide more granular permissions.

- `setfacl -m u:<username>:<permissions> <file>` – Set ACL for a user on a file or directory (e.g., `setfacl -m u:john:rwx file`).
- `setfacl -x u:<username> <file>` – Remove ACL for a user.
- `setfacl -R -m u:<username>:<permissions> <directory>` – Set ACL recursively.
- `setfacl -b <file>` – Remove all ACLs from a file.

## 14. `getfacl`

**Purpose:** Get the ACLs for a file or directory.

- `getfacl <file>` – Display the ACLs for a file.
- `getfacl -R <directory>` – Display ACLs recursively for all files in a directory.

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# File System Permissions

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## 15. `umask`

**Purpose:** Set default permissions for files and directories.

- `umask` – Show current default file creation permissions.
- `umask 0022` – Set default file permissions to 755.
- `umask 0077` – Restrict file permissions to 700 (only the owner has access).



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## Sudo and Access Control Commands

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### 16. `sudo`

**Purpose:** Execute commands with superuser (root) privileges.

- `sudo <command>` – Run a command as the root user.
- `sudo -u <user> <command>` – Run a command as a specific user.
- `sudo -l` – List the allowed (and forbidden) commands for the current user.
- `sudo visudo` – Edit the sudoers file (used to configure sudo permissions).

### 17. `visudo`

**Purpose:** Edit the sudoers file safely.

- `visudo` – Open the sudoers file in a safe mode that checks for syntax errors before saving.
- `visudo -f <file>` – Edit a different sudoers file.

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## Other User and Permission Management Commands

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### 18. `id`

**Purpose:** Display user ID (UID), group ID (GID), and groups for a user.

- `id` – Display the current user's UID, GID, and groups.
- `id <username>` – Display UID, GID, and groups for a specific user.

### 19. `groups`

**Purpose:** Display the groups a user belongs to.

- `groups` – Show the groups the current user is part of.
- `groups <username>` – Show the groups for a specific user.

### 20. `whoami`

**Purpose:** Display the current logged-in user.

- `whoami` – Output the username of the current user.

## 21. `w`

**Purpose:** Show who is logged in and what they are doing.

- `w` – Display who is logged in and their activities.
- `w -h` – Hide the header in the output.

## 22. `last`

**Purpose:** Show the last logins of users.

- `last` – Display login history for users.
- `last -a` – Show the host name from where the user logged in.

## 23. `finger`

**Purpose:** Show information about users.

- `finger <username>` – Display information about a specific user.
- `finger` – Display information about all users currently logged in.

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## ACL (Access Control Lists)

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## 24. `setfacl`

**Purpose:** Set file access control lists (ACLs) to provide more granular permissions.

- `setfacl -m u:<username>:<permissions> <file>` – Set ACL for a user on a file (e.g., `setfacl -m u:john:rwX file`).
- `setfacl -x u:<username> <file>` – Remove ACL for a user.

---

These **user and permission management commands** provide **DevOps engineers** with the necessary tools to create and manage user accounts, groups, permissions, and access control. Whether you're managing access for a few users or for thousands in an enterprise setting, these commands help you maintain secure systems and ensure proper user access control.

**You said:**

continue with more file and mangmt advance cmds please

**ChatGPT said:**

Continuing with more **advanced file management commands** used by **DevOps engineers** for handling files and directories in Linux systems. These commands go beyond the basic file manipulation tasks and provide powerful features for managing large datasets, automating tasks, and improving efficiency.

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## Advanced File and Directory Management Commands

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### 1. find

**Purpose:** Search for files and directories in a directory hierarchy based on conditions like name, size, type, etc.

- `find /path/to/search -name <filename>` – Search for a file by name.
- `find /path/to/search -type f` – Find all regular files.
- `find /path/to/search -type d` – Find all directories.
- `find /path/to/search -size +100M` – Find files larger than 100MB.
- `find /path/to/search -name "*.log" -exec rm {} \;` – Find all .log files and delete them.
- `find /path/to/search -mtime -7` – Find files modified in the last 7 days.
- `find /path/to/search -empty` – Find empty files or directories.
- `find /path/to/search -name "*.txt" -exec mv {} /path/to/destination/ \;` – Move .txt files to another directory.
- `find /path/to/search -user <username>` – Find files owned by a specific user.

### 2. locate

**Purpose:** Quickly find the location of a file using an indexed database (faster than `find`).

- `locate <filename>` – Find the full path of a file.
- `locate -i <filename>` – Perform a case-insensitive search.
- `updatedb` – Update the file database for `locate` (run as root).
- `locate -r <pattern>` – Use regular expressions to search for files.
- `locate --existing <pattern>` – Show only files that currently exist.

### 3. xargs

**Purpose:** Build and execute command lines from input (typically from `find`, `echo`, or other commands).

- `find . -name "*.log" | xargs rm` – Delete all `.log` files found by `find`.
- `echo "file1 file2 file3" | xargs cp -t /destination/` – Copy multiple files to a destination directory.
- `cat file_list.txt | xargs -n 1 curl -O` – Download multiple files listed in a text file.

## 4. `tar`

**Purpose:** Archive files and directories into a `.tar` file (can also compress).

- `tar -cf archive.tar <directory_or_files>` – Create an uncompressed archive.
- `tar -czf archive.tar.gz <directory_or_files>` – Create a `.tar.gz` compressed archive.
- `tar -xvf archive.tar` – Extract the contents of a `.tar` archive.
- `tar -xzvf archive.tar.gz` – Extract a `.tar.gz` archive.
- `tar -tvf archive.tar` – List the contents of a `.tar` archive without extracting.
- `tar -czf backup.tar.gz --exclude='*.log' <directory>` – Create a compressed archive, excluding `.log` files.
- `tar -C /path/to/destination -xvf archive.tar` – Extract a `.tar` archive to a specific destination.

## 5. `gzip` and `gunzip`

**Purpose:** Compress and decompress files using the `gzip` compression algorithm.

- `gzip <file>` – Compress a file to `.gz` format.
- `gunzip <file.gz>` – Decompress a `.gz` file.
- `gzip -c <file> > file.gz` – Compress and write the output to a new file without modifying the original.
- `gzip -d <file.gz>` – Decompress a `.gz` file.
- `gzip -r <directory>` – Recursively compress all files in a directory.

## 6. `zip` and `unzip`

**Purpose:** Create `.zip` archives and extract them.

- `zip archive.zip file1 file2` – Create a `.zip` archive with multiple files.
- `unzip archive.zip` – Extract a `.zip` archive.
- `zip -r archive.zip <directory>` – Create a `.zip` archive of an entire directory.
- `unzip -l archive.zip` – List the contents of a `.zip` archive without extracting.
- `unzip -d /path/to/destination archive.zip` – Extract a `.zip` archive to a specific directory.

## 7. **rsync**

**Purpose:** Synchronize files and directories between locations.

- `rsync -av <source> <destination>` – Copy files/directories with verbose output and preserve attributes.
- `rsync -avz <source> <destination>` – Compress files while transferring.
- `rsync -av --delete <source> <destination>` – Synchronize files and delete files that no longer exist at the source.
- `rsync -n -av <source> <destination>` – Perform a dry-run (no changes, just show what will happen).
- `rsync -z --exclude='*.log' <source> <destination>` – Sync while excluding specific files (e.g., .log files).
- `rsync -avz /path/to/source/ user@remote:/path/to/destination/` – Sync to a remote server over SSH.

## 8. **mv**

**Purpose:** Move or rename files and directories.

- `mv <source> <destination>` – Move a file to a new location.
- `mv <oldname> <newname>` – Rename a file.
- `mv -i <source> <destination>` – Prompt before overwriting files.
- `mv -u <source> <destination>` – Move only if the source file is newer than the destination.

## 9. **cp**

**Purpose:** Copy files or directories.

- `cp <source> <destination>` – Copy a file.
- `cp -r <source> <destination>` – Copy a directory recursively.
- `cp -u <source> <destination>` – Copy only if the source file is newer than the destination.
- `cp -i <source> <destination>` – Prompt before overwriting an existing file.
- `cp -a <source> <destination>` – Copy files and preserve attributes like timestamps, ownership, and permissions.

## 10. **ln**

**Purpose:** Create links to files or directories.

- `ln <source> <link>` – Create a hard link to a file.
- `ln -s <source> <link>` – Create a symbolic (soft) link to a file or directory.

- `ln -f <source> <link>` – Force the creation of a link by overwriting an existing file or link.
- `ln -s /path/to/original /path/to/symlink` – Create a symbolic link to a file or directory.

## 11. `diff`

**Purpose:** Compare files line by line.

- `diff <file1> <file2>` – Compare two files line by line.
- `diff -u <file1> <file2>` – Show the differences in unified format.
- `diff -r <dir1> <dir2>` – Compare directories recursively.
- `diff -i <file1> <file2>` – Ignore case differences when comparing.
- `diff -w <file1> <file2>` – Ignore all white space when comparing.

## 12. `cmp`

**Purpose:** Compare two files byte by byte.

- `cmp <file1> <file2>` – Compare two files and return the first byte that differs.
- `cmp -b <file1> <file2>` – Show the differing bytes when comparing files.

## 13. `file`

**Purpose:** Determine the type of a file.

- `file <filename>` – Display the type of a file (e.g., text, image, executable).
- `file -i <filename>` – Display the MIME type of a file.

## 14. `du`

**Purpose:** Estimate file and directory space usage.

- `du <directory>` – Show the disk usage of a directory.
- `du -sh <directory>` – Show the total disk usage of a directory in human-readable format.
- `du -a <directory>` – Show disk usage for all files and directories.
- `du -h --max-depth=1` – Display disk usage for each subdirectory, limited to a depth of 1.
- `du -c <directory>` – Show total disk usage for a directory along with individual usage for each file/folder.

## 15. `stat`

**Purpose:** Display detailed information about a file or directory.

- `stat <filename>` – Display file statistics, including size, permissions, timestamps, etc.
- `stat --format=%s <filename>` – Display only the size of a file.
- `stat --format=%x <filename>` – Display the last access time of a file.

## 16. `tee`

**Purpose:** Read from standard input and write to standard output and files simultaneously.

- `command | tee <file>` – Save the output of a command to a file and also display it on the terminal.
- `command | tee -a <file>` – Append output to a file rather than overwriting it.

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## Advanced Compression and Decompression

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## 17. `xz`

**Purpose:** Compress and decompress files using the xz compression algorithm.

- `xz <file>` – Compress a file using xz (results in .xz file).
- `xz -d <file.xz>` – Decompress a .xz file.
- `xz -k <file>` – Compress a file and keep the original file.
- `xz -l <file.xz>` – Show the compressed size and other details of a .xz file.
- `xz -z <file>` – Compress a file using the default compression level.

## 18. `7z`

**Purpose:** Create and extract .7z archives.

- `7z a archive.7z <file_or_directory>` – Create a .7z archive.
- `7z x archive.7z` – Extract a .7z archive.
- `7z t archive.7z` – Test the integrity of a .7z archive.

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## Miscellaneous Advanced File Management

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## 19. `shred`

**Purpose:** Securely delete a file by overwriting it multiple times.

- `shred -u <file>` – Shred a file and remove it securely.
- `shred -n 5 -z <file>` – Shred a file 5 times and add a final pass of zeroes.

## **20. mount and umount**

**Purpose:** Mount and unmount filesystems.

- `mount <device> <mount_point>` – Mount a filesystem or device to a directory.
- `umount <mount_point>` – Unmount a filesystem from a directory.



Process Management cmd with basic to advance with all the important flags in them that can be used by devops engineer please - all the important and basic to advance process mgmt cmd please include all cmds

ChatGPT said:

Here's a comprehensive list of **process management commands** for Linux systems, covering **basic to advanced** commands with important flags and examples. These commands are essential for **DevOps engineers** when it comes to monitoring, controlling, and troubleshooting processes and tasks on a Linux system.

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## Basic Process Management Commands

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### 1. `ps` (Process Status)

**Purpose:** Show information about active processes.

- `ps` – Display the processes running in the current terminal session.
- `ps aux` – Show all running processes on the system, including other users' processes.
- `ps -ef` – Display all processes in full format.
- `ps -e` – Show all processes running on the system.
- `ps -f` – Show full information (including command arguments) for each process.
- `ps -u <username>` – Show processes owned by a specific user.
- `ps -p <pid>` – Show information about a specific process by its PID.
- `ps -o pid,comm,%cpu,%mem` – Show only selected columns (PID, command, CPU, memory).
- `ps -C <command>` – Show processes for a specific command (e.g., `ps -C nginx`).

### 2. `top`

**Purpose:** Display a real-time view of the system's resource usage (CPU, memory, processes).

- `top` – Display the system's process list and resource usage in real-time.
- `top -u <username>` – Show processes for a specific user.
- `top -p <pid>` – Monitor a specific process by PID.
- `top -d <seconds>` – Set the delay for updates (e.g., `-d 2` updates every 2 seconds).
- `top -n <count>` – Show a specific number of iterations (e.g., `top -n 10` shows 10 updates).
- `top -c` – Show full command lines for each process.
- `top -s <field>` – Sort processes by a specific field (e.g., `cpu`, `mem`).
- `top -H` – Show threads of processes.

### 3. **htop**

**Purpose:** Interactive, user-friendly version of `top` for process monitoring.

- `htop` – Start the interactive process viewer.
- `htop -u <username>` – Show processes for a specific user.
- `htop -s <field>` – Sort processes by a specified field (e.g., CPU, memory).
- `htop -d <delay>` – Set the delay between updates (e.g., `htop -d 2` updates every 2 seconds).
- `htop -p <pid>` – Show specific process by PID.
- `htop -v` – Show version of `htop`.

### 4. **pgrep**

**Purpose:** Find processes based on name and other attributes.

- `pgrep <pattern>` – Find processes matching a pattern (e.g., `pgrep nginx`).
- `pgrep -u <username>` – Find processes owned by a specific user.
- `pgrep -f <pattern>` – Search for processes by their full command line.
- `pgrep -a <pattern>` – Display the process ID and the command line of matching processes.

### 5. **pidof**

**Purpose:** Find the process ID (PID) of a running program.

- `pidof <program>` – Find the PID of a running program (e.g., `pidof nginx`).
- `pidof -x <command>` – Find PIDs of processes that match a specific command.

### 6. **kill**

**Purpose:** Terminate processes by sending signals.

- `kill <pid>` – Send the default `TERM` signal to terminate a process by its PID.
- `kill -9 <pid>` – Send the `KILL` signal to forcibly terminate a process.
- `kill -15 <pid>` – Send the `TERM` signal to gracefully terminate a process.
- `kill -l` – List all available signals.
- `killall <name>` – Terminate all processes with a specific name (e.g., `killall nginx`).

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## Advanced Process Management Commands

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## 7. nice

**Purpose:** Run a command with a modified scheduling priority (affects CPU scheduling).

- `nice -n <priority> <command>` – Run a command with a specified nice value (e.g., `nice -n 10 command`).
- `nice -n -10 <command>` – Run a command with a higher priority (lower nice value).
- `nice -n 0 <command>` – Run a command with the default priority.

## 8. renice

**Purpose:** Change the priority (nice value) of an already running process.

- `renice <priority> -p <pid>` – Change the nice value of a process by its PID.
- `renice -n <priority> -u <username>` – Change the nice value of processes owned by a specific user.
- `renice -n -5 -p 1234` – Set the priority of a process with PID 1234 to -5 (higher priority).

## 9. nohup

**Purpose:** Run a command immune to hangups (ignores SIGHUP), typically used to run commands in the background.

- `nohup <command> &` – Run a command in the background, ignoring hangups.
- `nohup <command> > output.log 2>&1 &` – Redirect the output of a background process to a log file.

## 10. at

**Purpose:** Schedule a command to run once at a specified time.

- `at <time>` – Open the `at` prompt to schedule a command.
  - E.g., `at 2:00 PM` or `at now + 1 hour`.
- `atq` – Display the list of pending `at` jobs.
- `atrm <job_id>` – Remove a specific job from the `at` queue.

## 11. cron and crontab

**Purpose:** Automate tasks by scheduling them to run at regular intervals.

- `crontab -e` – Edit the cron jobs for the current user.
- `crontab -l` – List all cron jobs for the current user.
- `crontab -r` – Remove all cron jobs for the current user.
- `cron` – Start the cron daemon.

- `crontab -u <username> -e` – Edit the cron jobs for a specific user.
- **Example cron job syntax:**
  - `* * * * * <command>` – Run `<command>` every minute.
  - `0 5 * * * <command>` – Run `<command>` at 5 AM daily.

## 12. `systemctl`

**Purpose:** Control the systemd system and service manager (starting, stopping, managing system services).

- `systemctl status <service>` – Show the status of a specific service (e.g., `systemctl status nginx`).
- `systemctl start <service>` – Start a service (e.g., `systemctl start nginx`).
- `systemctl stop <service>` – Stop a service.
- `systemctl restart <service>` – Restart a service.
- `systemctl enable <service>` – Enable a service to start on boot.
- `systemctl disable <service>` – Disable a service from starting on boot.
- `systemctl list-units` – List all active units (services, sockets, etc.).
- `systemctl kill <pid>` – Kill a process using its PID.
- `systemctl show <service>` – Show detailed information about a service.
- `systemctl mask <service>` – Mask a service, preventing it from being started.

## 13. `journalctl`

**Purpose:** Query and display logs from `systemd` journal (logs for processes, services).

- `journalctl` – Show logs for all services and processes.
- `journalctl -u <service>` – Show logs for a specific service (e.g., `journalctl -u nginx`).
- `journalctl -f` – Show real-time logs as they are written (similar to `tail -f`).
- `journalctl -p <priority>` – Filter logs by priority (e.g., `journalctl -p err` shows only error logs).
- `journalctl --since "2023-01-01"` – Show logs since a specific date.

## 14. `strace`

**Purpose:** Trace system calls and signals for a process.

- `strace -p <pid>` – Attach to a running process and trace its system calls.
- `strace -f -p <pid>` – Trace child processes as well.
- `strace <command>` – Run a command and trace its system calls (e.g., `strace ls`).
- `strace -e trace=<syscall>` – Trace a specific system call (e.g., `strace -e trace=open`).

## 15. `lsof`

**Purpose:** List open files and processes using them.

- `lsuf` – List all open files on the system.
  - `lsuf -i :<port>` – List processes using a specific network port.
  - `lsuf -u <username>` – List open files by a specific user.
  - `lsuf -p <pid>` – List open files for a specific process by its PID.
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## Process Monitoring and Troubleshooting

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### 16. `uptime`

**Purpose:** Show how long the system has been running, number of users, and load averages.

- `uptime` – Display system uptime, number of users, and load averages for the last 1, 5, and 15 minutes.

### 17. `nice`

**Purpose:** Set the priority (nice value) of a process.

- `nice -n <priority> <command>` – Start a command with a specific priority (e.g., `nice -n 10 command`).
- `nice -n -10 <command>` – Start a command with higher priority (lower nice value).

### 18. `watch`

**Purpose:** Run a command periodically and show the output in real-time.

- `watch <command>` – Run a command every 2 seconds by default.
  - `watch -n <seconds> <command>` – Set a custom interval (e.g., `watch -n 5 df -h` runs `df` every 5 seconds).
- 

These **process management commands** are powerful tools for **DevOps engineers** to monitor, control, and troubleshoot processes on Linux systems. Whether you need to check process status, set priorities, schedule jobs, or investigate resource usage, these commands provide a broad range of capabilities to keep your system and applications running smoothly.

**You said:**

continue with more advance process mgmt cmds used by devops engineer please

ChatGPT said:

Continuing with **more advanced process management commands** for **DevOps engineers** that can be used to monitor, control, and troubleshoot processes, especially in large-scale environments, or when dealing with complex systems. These commands are crucial for managing processes effectively in production systems, handling system resource usage, and debugging applications.

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## Advanced Process Management Commands

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### 19. `systemd-cgls`

**Purpose:** Display the control groups of all processes in the system.

- `systemd-cgls` – Display the control group hierarchy for processes managed by `systemd`.
- `systemd-cgls <service>` – Show the control group of a specific service.
- `systemd-cgls --user` – Show control groups for user-level processes.

### 20. `systemd-analyze`

**Purpose:** Analyze and measure `systemd` startup performance and boot times.

- `systemd-analyze` – Show the total time spent on boot.
- `systemd-analyze blame` – Show which services took the longest to start.
- `systemd-analyze critical-chain` – Show the critical chain of services that directly impact the boot time.
- `systemd-analyze plot > boot-time.svg` – Create a boot time plot (SVG format) for visual analysis.

### 21. `cgroups` (Control Groups)

**Purpose:** Manage resource allocation for processes and services.

- `cgroupcreate -g memory,cpu:/mygroup` – Create a new control group (e.g., `mygroup` for memory and CPU resource management).
- `cgroupset -r memory.limit_in_bytes=100M /mygroup` – Set memory limit for the control group.
- `cgroupexec -g memory,cpu:/mygroup <command>` – Execute a command under a specific control group.
- `cat /sys/fs/cgroup/memory/mygroup/memory.usage_in_bytes` – Show the memory usage of a specific control group.
- `cgroupdelete memory,cpu:/mygroup` – Delete a control group.

## 22. `htop` (Advanced)

**Purpose:** A more advanced and user-friendly version of `top` for process management and monitoring.

- `htop` – Start an interactive process viewer with more features and easier navigation.
- `htop -u <username>` – Show processes belonging to a specific user.
- `htop -p <pid>` – Display information about a specific process.
- `htop -d <delay>` – Set a custom delay between updates in milliseconds (e.g., `htop -d 500` for a 500ms delay).
- `htop -s <column>` – Sort processes by a specific column (e.g., CPU, memory).
- `htop -M` – Show memory usage in the format of MB, GB, etc.

## 23. `perf`

**Purpose:** Performance monitoring and profiling tool for Linux.

- `perf top` – Display a live profile of the processes consuming the most CPU.
- `perf stat <command>` – Collect performance statistics (e.g., CPU cycles, instructions) for a specific command.
- `perf record -p <pid>` – Record performance data for a specific process.
- `perf report` – Show a report of the recorded performance data.
- `perf trace` – Trace system calls and events for a process.
- `perf record -g <command>` – Record a call graph (useful for profiling).

## 24. `lsof` (Advanced Usage)

**Purpose:** List open files, processes using them, and network connections.

- `lsof` – Show all open files by all processes.
- `lsof -i` – Show all network connections (both listening and established).
- `lsof -i :<port>` – List processes using a specific port.
- `lsof -p <pid>` – List files opened by a specific process (given by PID).
- `lsof +D <directory>` – List open files in a specific directory and its subdirectories.
- `lsof -u <username>` – Show all files opened by a specific user.
- `lsof -t -i :<port>` – Get the PID(s) of processes using a specific port (useful for killing processes).

## 25. `killall` (Advanced)

**Purpose:** Kill processes by name rather than PID.

- `killall <process_name>` – Kill all processes with a specific name (e.g., `killall nginx`).
- `killall -u <username>` – Kill all processes owned by a specific user.

- `killall -9 <process_name>` – Forcefully terminate all processes with a specific name.
- `killall -r <pattern>` – Kill processes by matching a regular expression (e.g., `killall -r 'nginx.*'`).

## 26. **strace** (Advanced)

**Purpose:** Trace system calls and signals used by a process.

- `strace -p <pid>` – Attach to a running process and trace its system calls.
- `strace -f <pid>` – Trace child processes as well (e.g., `strace -f -p <pid>`).
- `strace -e trace=<syscall>` – Trace only specific system calls (e.g., `strace -e trace=open`).
- `strace -o <file>` – Write the output of `strace` to a file (e.g., `strace -o output.log <command>`).
- `strace -c <command>` – Report statistics on system calls used by a command.
- `strace -t <command>` – Include timestamps for system calls.

## 27. **time**

**Purpose:** Measure the time a process takes to execute.

- `time <command>` – Display the real time, user time, and system time for executing a command.
- `time -v <command>` – Show detailed timing information, including memory usage, page faults, and I/O operations.
- `time <command> > output.log 2>&1` – Redirect both standard output and error to a file.

## 28. **ftrace**

**Purpose:** Kernel tracing for detailed information on function calls and events.

- `echo function > /sys/kernel/debug/tracing/current_tracer` – Set the tracer to function.
- `cat /sys/kernel/debug/tracing/trace` – View the kernel trace buffer.
- `echo 1 > /sys/kernel/debug/tracing/tracing_on` – Start tracing.
- `echo 0 > /sys/kernel/debug/tracing/tracing_on` – Stop tracing.
- `trace-cmd` – Collect and analyze kernel trace events.

## 29. **dstat**

**Purpose:** Show various system statistics in real time.

- `dstat` – Display general system performance stats like CPU, memory, disk, and network usage.



- `dsstat -c` – Show only CPU stats.
- `dsstat -d` – Show only disk stats.
- `dsstat -n` – Show only network stats.
- `dsstat -t` – Display timestamp with each statistic.
- `dsstat -g` – Show page faults and garbage collection stats.

### 30. **watch**

**Purpose:** Run a command periodically and show its output in real-time.

- `watch <command>` – Run a command every 2 seconds by default (e.g., `watch df -h`).
- `watch -n <seconds> <command>` – Set the interval in seconds between command executions (e.g., `watch -n 5 uptime`).
- `watch -d <command>` – Highlight the changes in the output.
- `watch -t <command>` – Run the command without showing the header.

### 31. **sysctl**

**Purpose:** Control kernel parameters at runtime, including those related to processes.

- `sysctl -a` – Show all kernel parameters.
- `sysctl vm.overcommit_memory=1` – Set the kernel overcommit memory policy (tune memory management).
- `sysctl -w fs.inotify.max_user_watches=524288` – Increase the maximum number of user watches for inotify.
- `sysctl -p` – Apply changes from the `/etc/sysctl.conf` file.
- `sysctl -w kernel.pid_max=65535` – Set the maximum number of process IDs.

### 32. **ulimit**

**Purpose:** Control user process resource limits.

- `ulimit -a` – Show all current limits (e.g., maximum open files, processes).
- `ulimit -u <number>` – Set the maximum number of processes available to a user.
- `ulimit -n <number>` – Set the maximum number of open file descriptors.
- `ulimit -s <size>` – Set the stack size for processes.
- `ulimit -c <size>` – Set the core dump file size limit.

### 33. **psacct / acct**

**Purpose:** Account for process usage and record user activity.

- `ac` – Display the total time spent by users in the system.
- `lastcomm` – Show information about the commands previously executed by users.
- `sa` – Report on CPU time used by all processes.

Text Processing cmd with basic to advance with all the important flags in them that can be used by devops engineer please - all the important and basic to advance test processing cmd please include all cmds

ChatGPT said:

Here's a comprehensive list of **text processing commands** used in **Linux** systems, ranging from **basic to advanced**, that **DevOps engineers** can use for working with and manipulating text files and data. These commands help in tasks such as searching, filtering, sorting, and transforming text data, which are common requirements for log analysis, configuration file editing, and automating workflows.

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## Basic Text Processing Commands

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### 1. `cat` (Concatenate)

**Purpose:** Display the contents of a file or concatenate multiple files.

- `cat <file>` – Display the content of a file.
- `cat file1 file2` – Concatenate and display the content of multiple files.
- `cat <file> > newfile` – Redirect the content of a file to a new file.
- `cat <file> >> newfile` – Append the content of a file to another file.

### 2. `echo`

**Purpose:** Print text or variables to the terminal or redirect to a file.

- `echo "Hello World"` – Display a simple string.
- `echo $HOME` – Display the value of an environment variable.
- `echo "Hello World" > output.txt` – Write the output to a file.
- `echo -n "Hello"` – Print without a trailing newline.

### 3. head

**Purpose:** Display the first few lines of a file.

- `head <file>` – Display the first 10 lines of a file.
- `head -n <number> <file>` – Display the first <number> lines (e.g., `head -n 20 file.txt`).
- `head -c <number> <file>` – Display the first <number> bytes of a file.

### 4. tail

**Purpose:** Display the last few lines of a file.

- `tail <file>` – Display the last 10 lines of a file.
- `tail -n <number> <file>` – Display the last <number> lines.
- `tail -f <file>` – Display the last lines of a file and follow it (useful for log files).
- `tail -c <number> <file>` – Display the last <number> bytes of a file.

### 5. cut

**Purpose:** Remove sections from each line of a file (often used to extract columns).

- `cut -d':' -f1 <file>` – Display the first field of each line using : as the delimiter.
- `cut -d',' -f1,3 <file>` – Display the first and third fields (columns).
- `cut -c 1-10 <file>` – Display the first 10 characters of each line.

### 6. tr

**Purpose:** Translate or delete characters from the input.

- `tr 'a-z' 'A-Z'` – Convert lowercase characters to uppercase.
- `echo "hello" | tr 'a-z' 'A-Z'` – Convert lowercase to uppercase using a pipeline.
- `tr -d '[:space:]' <file>` – Delete all spaces from the input file.
- `echo "123 456 789" | tr ' ' '\n'` – Replace spaces with newlines.

### 7. sort

**Purpose:** Sort lines in a file or input.

- `sort <file>` – Sort lines of a file alphabetically.
- `sort -n <file>` – Sort lines numerically.
- `sort -r <file>` – Sort lines in reverse order.
- `sort -u <file>` – Sort and remove duplicate lines.
- `sort -k <column_number> <file>` – Sort by a specific column.
- `sort -t, -k1,1 <file>` – Sort a CSV file by the first column.

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## Intermediate Text Processing Commands

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### 8. `grep`

**Purpose:** Search for patterns in text files using regular expressions.

- `grep <pattern> <file>` – Search for a pattern in a file.
- `grep -i <pattern> <file>` – Perform a case-insensitive search.
- `grep -r <pattern> <directory>` – Search recursively through a directory.
- `grep -v <pattern> <file>` – Show lines that do **not** match the pattern.
- `grep -l <pattern> <files>` – Show the names of files that contain the pattern.
- `grep -n <pattern> <file>` – Show line numbers along with matching lines.
- `grep -c <pattern> <file>` – Count the number of lines matching the pattern.

### 9. `sed` (Stream Editor)

**Purpose:** Stream editor for performing basic text transformations.

- `sed 's/old/new/' <file>` – Replace the first occurrence of `old` with `new` in each line.
- `sed 's/old/new/g' <file>` – Replace all occurrences of `old` with `new` in each line.
- `sed -i 's/old/new/g' <file>` – In-place replace all occurrences of `old` with `new`.
- `sed '2d' <file>` – Delete the second line of a file.
- `sed '1,3d' <file>` – Delete lines 1 to 3.
- `sed -n '5,10p' <file>` – Print lines 5 to 10.
- `sed -e 's/foo/bar/g' -e 's/baz/qux/g' <file>` – Apply multiple transformations.

### 10. `awk`

**Purpose:** A powerful programming language for pattern scanning and processing.

- `awk '{print $1}' <file>` – Print the first column of a file.
- `awk '{print $1, $3}' <file>` – Print the first and third columns of a file.
- `awk -F: '{print $1}' <file>` – Set the field delimiter to `:` (useful for `/etc/passwd`).
- `awk '{if ($3 > 50) print $1}' <file>` – Print the first column where the third column is greater than 50.
- `awk '{sum += $2} END {print sum}' <file>` – Calculate the sum of the second column.
- `awk 'BEGIN {FS=","} {print $1, $2}' <file>` – Use a comma as the field separator and print the first and second columns.

### 11. `uniq`

**Purpose:** Report or omit repeated lines in a file.

- `uniq <file>` – Display only unique lines in a file.
- `uniq -c <file>` – Display the count of occurrences for each unique line.
- `uniq -d <file>` – Show only the duplicate lines.
- `sort <file> | uniq` – Remove duplicate lines (sort first to group duplicates).

## 12. `wc` (Word Count)

**Purpose:** Count lines, words, and characters in a file.

- `wc <file>` – Display the line, word, and byte counts for a file.
- `wc -l <file>` – Display only the line count.
- `wc -w <file>` – Display only the word count.
- `wc -c <file>` – Display only the byte count.

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## Advanced Text Processing Commands

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## 13. `tee`

**Purpose:** Read from standard input and write to both standard output and files simultaneously.

- `command | tee <file>` – Save the output of a command to a file and display it on the terminal.
- `command | tee -a <file>` – Append output to a file rather than overwriting it.
- `command | tee >(command2)` – Pipe the output to another command in parallel.

## 14. `diff`

**Purpose:** Compare files line by line.

- `diff <file1> <file2>` – Compare two files and show differences.
- `diff -u <file1> <file2>` – Show differences in unified format (easier to read).
- `diff -r <dir1> <dir2>` – Recursively compare two directories.
- `diff -q <file1> <file2>` – Show only whether files differ or not (suppress detailed output).

## 15. `cut` with Delimiters

**Purpose:** Extract specific sections of text or files.

- `cut -d, -f1,2 <file>` – Extract the first and second fields from a comma-separated file.
- `cut -f1,3 -d" "` – Extract the first and third fields, using space as delimiter.

## 16. paste

**Purpose:** Merge lines of files.

- `paste file1 file2` – Merge lines from two files side by side, separated by tabs.
- `paste -d, file1 file2` – Merge files side by side, using a comma as a delimiter.

## 17. sort with Advanced Options

**Purpose:** Sort text or files with advanced options.

- `sort -t, -k2,2 <file>` – Sort a comma-separated file by the second column.
- `sort -k2 -n <file>` – Sort the second column numerically.
- `sort -u <file>` – Sort and remove duplicate lines.

## 18. column

**Purpose:** Format text into neatly aligned columns.

- `column -t <file>` – Format the file content into neatly aligned columns.
- `echo -e "a b c\nd e f" | column -t` – Convert space-separated text into columns.

## 19. sed with Regular Expressions

**Purpose:** Perform complex text transformations using regex.

- `sed 's/\b[a-z]/\U&/g' <file>` – Capitalize the first letter of each word using word boundaries (`\b`).
- `sed 's/\([0-9]\)/[\1]/g' <file>` – Add square brackets around digits.
- `sed 's/\(.*\)/prefix_\1/' <file>` – Add a prefix to each line of the file.

## 20. xargs

**Purpose:** Build and execute commands from input.

- `find . -name "*.log" | xargs rm` – Delete all `.log` files found by `find`.
- `echo "file1 file2 file3" | xargs cp -t /destination/` – Copy multiple files to a directory.
- `cat file_list.txt | xargs -n 1 curl -O` – Download a list of files from URLs specified in a file.

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## Log Analysis and File Search

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### 21. `grep` with Regular Expressions

**Purpose:** Search for complex patterns in files using regular expressions.

- `grep -P '^d{4}-d{2}-d{2}' <file>` – Search for lines that match a specific date format (e.g., YYYY-MM-DD).
- `grep -E '^start|end$' <file>` – Search for lines that match either "start" or "end" at the beginning or end of a line.

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These **text processing commands** help **DevOps engineers** efficiently manipulate, filter, search, and transform text data, especially for handling logs, configuration files, system outputs, and other data sources. From simple tasks like extracting columns to more complex ones involving regular expressions and automated processing with `xargs`, these commands are vital for automating workflows and managing large volumes of textual data.

**You said:**

continue with text processing cmds please

**ChatGPT said:**

Certainly! Here is a **continuation of advanced text processing commands** for **DevOps engineers**. These commands provide additional capabilities for working with and manipulating text, whether you're dealing with large logs, system outputs, or complex data transformations.

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## More Advanced Text Processing Commands

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### 22. `split`

**Purpose:** Split a file into pieces based on lines or size.

- `split <file>` – Split a file into multiple smaller files (default splits by 1000 lines).
- `split -l <number> <file>` – Split the file into chunks of `<number>` lines (e.g., `split -l 500 file.txt`).

- `split -b <size> <file>` – Split the file into chunks of a specified size (e.g., `split -b 10M file.txt`).
- `split -d -l <number> <file>` – Use numeric suffixes instead of alphabetical ones.
- `split -a <length> <file>` – Set the length of the suffix (default is 2 characters).

## 23. `fmt`

**Purpose:** Simple text formatter that formats text to a specific width.

- `fmt <file>` – Format the text to a default width of 75 characters.
- `fmt -w <width> <file>` – Set a specific line width (e.g., `fmt -w 50 file.txt`).
- `fmt -c <file>` – Display the file with the original spacing and paragraph structure.

## 24. `tr` (Advanced)

**Purpose:** Perform advanced transformations on characters.

- `echo "aabbcc" | tr -d "a"` – Delete all occurrences of the character "a".
- `echo "hello" | tr 'a-z' 'A-Z'` – Convert lowercase letters to uppercase.
- `echo "hello 123" | tr -cd '[:alnum:]'` – Delete everything except alphanumeric characters (letters and numbers).
- `echo "hello world" | tr ' ' '\n'` – Replace spaces with newlines.

## 25. `nl`

**Purpose:** Number the lines of a file.

- `nl <file>` – Number the lines of a file.
- `nl -ba <file>` – Number all lines, including empty lines.
- `nl -s ' - ' <file>` – Customize the separator between the line number and text (e.g., using ' - ').
- `nl -n ln <file>` – Number lines with leading zeros.

## 26. `comm`

**Purpose:** Compare two sorted files line by line.

- `comm <file1> <file2>` – Compare two files line by line and output three columns: lines only in `file1`, lines only in `file2`, and common lines.
- `comm -1 <file1> <file2>` – Suppress lines that appear only in the first file.
- `comm -2 <file1> <file2>` – Suppress lines that appear only in the second file.
- `comm -3 <file1> <file2>` – Suppress lines that appear in both files.

## 27. `tee` with Multiple Output Files



**Purpose:** Write to multiple files simultaneously while also displaying output on the terminal.

- `command | tee file1 file2` – Write output to both `file1` and `file2` and also display it on the terminal.
- `command | tee -a file1` – Append the output of a command to `file1`.

## 28. `paste` with Custom Delimiters

**Purpose:** Merge lines of files side by side with custom delimiters.

- `paste file1 file2` – Merge two files side by side with a tab delimiter.
- `paste -d, file1 file2` – Use a comma as a delimiter.
- `paste -d'|' file1 file2` – Use a pipe (`|`) as a delimiter.
- `paste -s file1 file2` – Paste lines of the files serially (as opposed to side by side).

## 29. `rev`

**Purpose:** Reverse the lines of a file.

- `rev <file>` – Reverse the characters of each line in the file.
- `echo "hello" | rev` – Reverse the string "hello" to "olleh".

## 30. `xargs` (Advanced)

**Purpose:** Construct argument lists and execute commands using input from standard input or files.

- `find . -name "*.txt" | xargs wc -l` – Count the lines in all `.txt` files in the current directory and subdirectories.
- `echo "file1 file2" | xargs -n 1 cp` – Copy each file one by one.
- `echo "file1 file2 file3" | xargs -I {} mv {} /destination/` – Move multiple files to a specific directory using placeholders.
- `find /path -type f -print0 | xargs -0 rm` – Delete files safely with handling special characters (using `-0` and `-print0`).

## 31. `sort` with Complex Sorting

**Purpose:** Sort files based on different criteria (e.g., numeric, by column).

- `sort <file>` – Sort a file alphabetically.
- `sort -n <file>` – Sort the file numerically (useful for numbers instead of alphabetical sorting).
- `sort -r <file>` – Sort in reverse order.
- `sort -k2 <file>` – Sort by the second column.

- `sort -t, -k2,2 <file>` – Sort a CSV file by the second column (using comma as the delimiter).

## 32. `grep` with Extended Regular Expressions

**Purpose:** Use advanced regular expressions for more complex pattern matching.

- `grep -E 'foo|bar' <file>` – Search for "foo" or "bar" (extended regular expressions).
- `grep -P '\d{3}-\d{2}-\d{4}' <file>` – Use Perl-compatible regex to search for a social security number pattern.
- `grep -o 'foo.*' <file>` – Output only the matched portion of the lines that contain "foo" and everything after it.

## 33. `sed` for In-place Editing

**Purpose:** Edit files directly and apply transformations.

- `sed -i 's/old/new/g' <file>` – In-place replace all occurrences of `old` with `new` in the file.
- `sed -i '1s/^/Hello /' <file>` – Add "Hello " at the beginning of the first line in the file.
- `sed -i 's/^[^ ]*/&t/' <file>` – Insert a tab after the first word in each line.
- `sed -i '/pattern/d' <file>` – Delete all lines containing a specific pattern.

## 34. `awk` (Advanced Usage)

**Purpose:** Use `awk` for advanced text processing with pattern matching and text transformation.

- `awk '{print $1, $2}' <file>` – Print the first two fields (columns) of a file.
- `awk '$1 > 100 {print $1, $2}' <file>` – Print the first and second columns where the first column is greater than 100.
- `awk -F, '{print $1, $3}' <file>` – Use comma as a field separator and print the first and third columns.
- `awk 'BEGIN {FS=":"} {print $1}' <file>` – Set the field separator to colon and print the first column.
- `awk '{sum += $2} END {print sum}' <file>` – Sum the values in the second column and print the result at the end.

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## Working with JSON and XML

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## 35. `jq`

**Purpose:** Process JSON data (a powerful tool for working with structured data).

- `cat file.json | jq .` – Pretty-print the contents of a JSON file.
- `cat file.json | jq '.key'` – Extract the value of a specific key.
- `cat file.json | jq '.items[] | .name'` – Extract the "name" field from all items in an array.
- `cat file.json | jq '.user | {name: .name, age: .age}'` – Extract specific keys and output them in a new structure.
- `cat file.json | jq '.users | length'` – Get the number of elements in a JSON array.

### 36. `xmlstarlet`

**Purpose:** Process and transform XML data.

- `xmlstarlet fo <file.xml>` – Format an XML file (prettify).
- `xmlstarlet sel -t -v "//name" <file.xml>` – Extract all values of the `<name>` tag.
- `xmlstarlet ed -d "//book[price>100]" <file.xml>` – Delete all `<book>` elements where the price is greater than 100.
- `xmlstarlet fo file.xml > file_pretty.xml` – Format an XML file and save it.

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## Log Processing

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### 37. `logrotate`

**Purpose:** Rotate logs and manage log files.

- `/etc/logrotate.conf` – Configuration file for log rotation settings.
- `logrotate -d /etc/logrotate.conf` – Debug and simulate the log rotation process.
- `logrotate -f /etc/logrotate.conf` – Force a log rotation based on the configuration file.

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## Miscellaneous Advanced Text Processing Commands

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### 38. `fmt` for Text Wrapping

**Purpose:** Automatically wrap text at a specific line length.

- `fmt -w <width> <file>` – Wrap text to a specified width (e.g., `fmt -w 50` to wrap lines at 50 characters).
- `fmt -c <file>` – Format a file while preserving the original structure.

## Compression and Archiving

ChatGPT said:

Here's a detailed list of **compression and archiving commands** used by **DevOps engineers** for managing file compression, archiving, and extraction in **Linux** systems. These commands help you compress large files, create archives, and extract content in an efficient manner, especially useful for backup, file transfer, and system administration.

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## Compression and Archiving Commands

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### 1. `tar` (Tape Archive)

**Purpose:** Create archives and extract files.

- `tar -cf archive.tar <files>` – Create an uncompressed archive from files or directories.
- `tar -czf archive.tar.gz <files>` – Create a `.tar.gz` compressed archive (gzip).
- `tar -cjf archive.tar.bz2 <files>` – Create a `.tar.bz2` compressed archive (bzip2).
- `tar -cJf archive.tar.xz <files>` – Create a `.tar.xz` compressed archive (xz).
- `tar -xvf archive.tar` – Extract files from a `.tar` archive.

- `tar -xzf archive.tar.gz` – Extract files from a `.tar.gz` archive.
- `tar -xjf archive.tar.bz2` – Extract files from a `.tar.bz2` archive.
- `tar -xJf archive.tar.xz` – Extract files from a `.tar.xz` archive.
- `tar -tvf archive.tar` – List the contents of a `.tar` archive without extracting.
- `tar -xzvf archive.tar.gz` – Extract a `.tar.gz` archive with verbose output.
- `tar -cf archive.tar --exclude='*.log' <directory>` – Create an archive excluding `.log` files.

## 2. gzip

**Purpose:** Compress files using the `gzip` algorithm.

- `gzip <file>` – Compress a file to `.gz` format (e.g., `file.txt` becomes `file.txt.gz`).
- `gzip -d <file.gz>` – Decompress a `.gz` file.
- `gzip -c <file>` – Compress a file and write to `stdout`, leaving the original file intact.
- `gzip -k <file>` – Keep the original file while compressing.
- `gzip -r <directory>` – Compress all files in a directory recursively.
- `gzip -l <file.gz>` – Display information about a compressed file.

## 3. gunzip

**Purpose:** Decompress files that were compressed with `gzip`.

- `gunzip <file.gz>` – Decompress a `.gz` file.
- `gunzip -c <file.gz>` – Decompress a `.gz` file and write the output to `stdout`.
- `gunzip -k <file.gz>` – Decompress a `.gz` file and keep the original file.

## 4. bzip2

**Purpose:** Compress files using the `bzip2` algorithm.

- `bzip2 <file>` – Compress a file to `.bz2` format.
- `bzip2 -d <file.bz2>` – Decompress a `.bz2` file.
- `bzip2 -c <file>` – Compress a file and write the output to `stdout`.
- `bzip2 -k <file>` – Keep the original file while compressing.
- `bzip2 -z <file>` – Compress a file using `bzip2`.
- `bzip2 -l <file.bz2>` – Display compression statistics of a `.bz2` file.

## 5. bunzip2

**Purpose:** Decompress files that were compressed with `bzip2`.

- `bunzip2 <file.bz2>` – Decompress a `.bz2` file.
- `bunzip2 -k <file.bz2>` – Decompress and keep the original `.bz2` file.

## 6. xz

**Purpose:** Compress files using the xz algorithm, which provides higher compression ratios.

- `xz <file>` – Compress a file to .xz format.
- `xz -d <file.xz>` – Decompress a .xz file.
- `xz -c <file>` – Compress a file and write to `stdout`, leaving the original file intact.
- `xz -k <file>` – Keep the original file while compressing.
- `xz -r <directory>` – Compress all files in a directory recursively.
- `xz -l <file.xz>` – Display information about a .xz file.
- `xz -z <file>` – Compress a file with xz.

## 7. 7z (7-Zip)

**Purpose:** High compression file archiver, supports multiple formats.

- `7z a archive.7z <files>` – Create a .7z archive from files.
- `7z x archive.7z` – Extract files from a .7z archive.
- `7z t archive.7z` – Test the integrity of a .7z archive.
- `7z l archive.7z` – List the contents of a .7z archive.
- `7z e archive.7z` – Extract files from a .7z archive (without directory structure).
- `7z a archive.7z -p<password> <files>` – Create an encrypted archive with a password.

## 8. zip

**Purpose:** Create and extract .zip archives.

- `zip archive.zip <files>` – Create a .zip archive.
- `zip -r archive.zip <directory>` – Recursively zip all files in a directory.
- `zip -e archive.zip <files>` – Create an encrypted .zip archive.
- `zip -d archive.zip <file>` – Delete a file from a .zip archive.
- `zip -u archive.zip <file>` – Update an existing .zip archive by adding new files.
- `unzip archive.zip` – Extract files from a .zip archive.
- `unzip -l archive.zip` – List the contents of a .zip archive.
- `unzip -d <directory> archive.zip` – Extract the .zip archive into a specific directory.

## 9. unzip

**Purpose:** Extract files from .zip archives.

- `unzip <file.zip>` – Extract a .zip archive.
- `unzip -d <directory> <file.zip>` – Extract to a specific directory.
- `unzip -l <file.zip>` – List the contents of a .zip archive without extracting.

- `unzip -o <file.zip>` – Overwrite existing files when extracting.

## 10. `rar` and `unrar`

**Purpose:** Create and extract `.rar` archives.

- `rar a archive.rar <files>` – Create a `.rar` archive.
- `unrar x archive.rar` – Extract the contents of a `.rar` archive.
- `unrar l archive.rar` – List the contents of a `.rar` archive.
- `unrar e archive.rar` – Extract files to the current directory.

## 11. `zstd` (Zstandard)

**Purpose:** Fast compression algorithm, often used in modern applications.

- `zstd <file>` – Compress a file using `zstd` (creates a `.zst` file).
- `zstd -d <file.zst>` – Decompress a `.zst` file.
- `zstd -c <file>` – Compress a file to `stdout`, keeping the original.
- `zstd -k <file>` – Compress a file while keeping the original file.

## 12. `ar`

**Purpose:** Create, modify, and extract from archive files (commonly used for creating `.deb` packages).

- `ar -cvf archive.a <files>` – Create an archive `.a` file.
- `ar -x archive.a` – Extract files from an archive `.a` file.
- `ar -t archive.a` – List the contents of an archive `.a` file.

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## Compression/Archiving with File Management Tools

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## 13. `rsync`

**Purpose:** Efficient file synchronization and transfer, including compression.

- `rsync -av <source> <destination>` – Copy files from source to destination while preserving attributes.
- `rsync -avz <source> <destination>` – Compress files during transfer using `gzip` compression.
- `rsync -avz --delete <source> <destination>` – Synchronize directories and delete files in the destination that no longer exist in the source.

- `rsync -z` – Compress file data during the transfer.

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## Using Compression/Archiving for Backup and Automation

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### 14. `tar` for Backup

**Purpose:** Create a backup of a directory or entire system.

- `tar -czf backup.tar.gz <directory>` – Create a compressed backup of a directory.
- `tar -czf backup.tar.gz --exclude='*.log' <directory>` – Exclude specific file types (e.g., `.log` files) from the backup.
- `tar -czf backup_$(date +%F).tar.gz <directory>` – Create a date-stamped backup archive.
- `tar -xzf backup.tar.gz -C /path/to/restore/` – Extract backup to a specific directory.

### 15. `logrotate`

**Purpose:** Automatically rotate, compress, and remove old log files.

- `/etc/logrotate.conf` – The main configuration file for `logrotate`.
- `logrotate -d /etc/logrotate.conf` – Debug and simulate log rotation.
- `logrotate -f /etc/logrotate.conf` – Force the rotation of logs according to the configuration file.

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These **compression and archiving commands** are critical for **DevOps engineers** to manage data efficiently, create backups, transfer files, and maintain system logs. The combination of utilities like `tar`, `gzip`, `bzip2`, `xz`, and `zip`, among others, offers flexibility and performance in compressing and archiving large datasets, handling system backups, and reducing the amount of storage required for long-term data retention. These tools are essential for automating the backup process, handling large log files, and transferring data between servers.

**You said:**

continue with text processing cmds

**ChatGPT said:**

Continuing with more **advanced text processing commands** for **DevOps engineers**, these tools and commands are essential for automating tasks, analyzing logs, processing structured data, and



manipulating large datasets in a variety of formats. These commands allow you to filter, transform, and format text, and can be particularly useful for working with log files, configuration files, and large data streams.

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## Advanced Text Processing Commands (Continued)

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### 16. `sort` with Complex Options

**Purpose:** Sort lines in text files or output streams based on various criteria.

- `sort -t',' -k2,2 <file>` – Sort a CSV file by the second column (using a comma as the delimiter).
- `sort -k1,1n -k2,2r <file>` – Sort first by the first column (numerically), then by the second column (in reverse order).
- `sort -u <file>` – Sort and remove duplicate lines.
- `sort -o sorted.txt <file>` – Sort the file and output the result into a new file.
- `sort -n -k3 <file>` – Sort a file numerically based on the third column.

### 17. `uniq` with Advanced Flags

**Purpose:** Filter out duplicate lines in a file or stream of text.

- `uniq <file>` – Remove consecutive duplicate lines from a file.
- `uniq -c <file>` – Prefix each line with the count of occurrences.
- `uniq -d <file>` – Display only lines that are duplicated.
- `uniq -u <file>` – Display only unique lines (lines that are not repeated).
- `sort <file> | uniq -c` – Sort a file first and then count duplicates.

### 18. `grep` with Extended and Perl-Compatible Regex

**Purpose:** Perform complex pattern matching using regular expressions.

- `grep -P 'pattern' <file>` – Use Perl-compatible regular expressions (PCRE) to search.
- `grep -E 'pattern' <file>` – Use extended regular expressions (ERE).
- `grep -o 'pattern' <file>` – Print only the matched part of the lines, rather than the entire line.
- `grep -A <num> <pattern> <file>` – Show <num> lines after the matching line.
- `grep -B <num> <pattern> <file>` – Show <num> lines before the matching line.
- `grep -C <num> <pattern> <file>` – Show <num> lines before and after the matching line.

## 19. sed (Stream Editor) with Advanced Patterns

**Purpose:** Use `sed` for complex text replacements, substitutions, and transformations.

- `sed 's/\b[[:alpha:]]*/\U&/g' <file>` – Capitalize every word in a file.
- `sed 's/^\([0-9]\)/[\1]/g' <file>` – Add square brackets around digits at the start of lines.
- `sed -n 's/hello/world/p' <file>` – Replace 'hello' with 'world' and print only lines that match.
- `sed -i 's/foo/bar/g' <file>` – Replace all occurrences of `foo` with `bar` in place (modifying the file).
- `sed '2d' <file>` – Delete the second line of a file.
- `sed '/pattern/d' <file>` – Delete lines that match a pattern.

## 20. awk (Advanced Usage)

**Purpose:** Powerful programming language for pattern scanning and processing.

- `awk '{print $1}' <file>` – Print the first column of each line.
- `awk '{sum += $2} END {print sum}' <file>` – Calculate the sum of the second column.
- `awk 'BEGIN {FS=":"} {print $1}' <file>` – Set the field separator to colon (:) and print the first column.
- `awk '{if ($3 > 50) print $1, $3}' <file>` – Print the first and third columns where the third column is greater than 50.
- `awk '{print NR, $0}' <file>` – Print line number along with the entire line.
- `awk 'BEGIN {OFS="\t"} {print $1, $2}' <file>` – Set the output field separator (OFS) to a tab and print the first and second columns.

## 21. find with exec for Advanced Text Processing

**Purpose:** Combine `find` with other commands for powerful search and text processing.

- `find . -name "*.log" -exec cat {} \;` – Find all `.log` files and print their contents.
- `find . -name "*.txt" -exec sed -i 's/foo/bar/g' {} \;` – Replace "foo" with "bar" in all `.txt` files.
- `find . -name "*.log" -exec grep -H "error" {} \;` – Search for "error" in all `.log` files and show the filename.
- `find . -type f -exec awk '{print $1}' {} \;` – Print the first column from all files found.

## 22. xargs with Multiple Arguments

**Purpose:** Build and execute commands from standard input, handle multiple arguments.

- `find . -name "*.log" | xargs wc -l` – Count lines in all `.log` files found by `find`.
- `echo "file1 file2 file3" | xargs -n 1 cp` – Copy each file one by one to a destination.
- `echo "file1 file2 file3" | xargs -I {} mv {} /destination/` – Move multiple files to a specific directory.
- `echo "file1 file2 file3" | xargs -n 2 rm` – Delete files in pairs (run `rm` twice for every two files).

## 23. `tee` with Filters

**Purpose:** Read from standard input, write to both standard output and files.

- `echo "output" | tee file.txt` – Write the output to `file.txt` and also display it on the terminal.
- `echo "output" | tee >(grep "pattern")` – Send the output to a filter and display the results.
- `echo "output" | tee file1 file2` – Write the output to multiple files.

## 24. `tr` for Multi-character Replacement

**Purpose:** Transform or delete characters.

- `echo "hello world" | tr 'a-z' 'A-Z'` – Convert all lowercase letters to uppercase.
- `echo "foo 123 bar" | tr -d '[:digit:]'` – Remove all digits from the input.
- `echo "apple banana cherry" | tr ' ' '\n'` – Replace spaces with newlines to separate words.
- `echo "a,b,c" | tr ',' ';'`  – Replace commas with semicolons.

## 25. `nl` (Number Lines)

**Purpose:** Number the lines in a file.

- `nl <file>` – Number the lines in the file.
- `nl -ba <file>` – Number all lines, including empty ones.
- `nl -s ' ' <file>` – Set the separator between the line number and text to a space.
- `nl -n ln <file>` – Use leading zeros for line numbers.

## 26. `split` with Custom File Sizes

**Purpose:** Split a file into smaller files based on size or number of lines.

- `split -l <lines> <file>` – Split the file into smaller files, each containing `<lines>` lines.
- `split -b <size> <file>` – Split the file into smaller files, each of size `<size>` (e.g., `split -b 5M file.txt` to split into 5MB chunks).

- `split -d -l <lines> <file>` – Use numeric suffixes instead of the default alphabetic ones.

## 27. `column` for Formatted Output

**Purpose:** Format text into neat columns.

- `column -t <file>` – Format the contents of a file into neatly aligned columns.
- `echo -e "a b c\nd e f" | column -t` – Convert space-separated text into aligned columns.
- `cat file.txt | column -s ',' -t` – Format comma-separated values into columns.

## 28. `logrotate` for Automated Log File Management

**Purpose:** Automatically rotate, compress, and manage log files.

- `logrotate /etc/logrotate.conf` – Apply log rotation rules specified in the configuration file.
- `logrotate -d /etc/logrotate.conf` – Dry-run to simulate log rotation.
- `logrotate -f /etc/logrotate.conf` – Force log rotation regardless of the time interval.
- `/etc/logrotate.d/<service>` – Service-specific configuration files for rotating logs (e.g., for Apache, MySQL).

## 29. `jq` for JSON Processing

**Purpose:** Parse and manipulate JSON data.

- `cat file.json | jq .` – Pretty-print the JSON content of a file.
- `cat file.json | jq '.key'` – Extract the value of a specific key.
- `cat file.json | jq '.users[] | .name'` – Extract the "name" field from each element of an array.
- `cat file.json | jq '.user | {name: .name, age: .age}'` – Extract specific keys and output them in a custom structure.

---

These **advanced text processing commands** provide the **DevOps engineer** w



## CMD ALLSSS

System Monitoring and Performance cmd with basic to advance with all the important flags in them that can be used please - all the important and basic to advance system monitoring cmd please include all cmds

ChatGPT said:

Here is a comprehensive list of basic to advanced system monitoring commands with relevant flags and explanations for Linux-based systems (command-line interface). These commands help you monitor different aspects of system performance, including CPU, memory, disk, network, and processes.

### 1. `top`

**Purpose:** Displays real-time system summary and process information.

- `top` – Display system information (CPU, memory, processes).
- `top -u <user>` – Show processes for a specific user.
- `top -p <pid>` – Show specific process by PID.
- `top -d <seconds>` – Set the update delay interval (in seconds).
- `top -n <count>` – Show the output for a specified number of iterations.
- `top -c` – Show full command lines of processes.

### 2. `htop`

**Purpose:** Interactive process viewer (more user-friendly version of `top`).

- `htop` – Start the interactive viewer.
- `htop -u <user>` – Show processes for a specific user.

- `htop -s <field>` – Sort processes by specific fields (e.g., CPU, memory).
- `htop -d <delay>` – Adjust the delay between updates.

### 3. **ps**

**Purpose:** Display information about active processes.

- `ps aux` – Show all processes running on the system.
- `ps -ef` – Show all processes with full command lines.
- `ps -u <user>` – Show processes for a specific user.
- `ps -p <pid>` – Show a specific process by PID.
- `ps -eo pid,comm,%cpu,%mem` – Show specific fields (PID, command, CPU, memory).

### 4. **vmstat**

**Purpose:** Report virtual memory statistics.

- `vmstat 1` – Report every second.
- `vmstat -s` – Show memory statistics in a human-readable format.
- `vmstat -d` – Report disk statistics.

### 5. **free**

**Purpose:** Display memory usage.

- `free` – Show memory usage (RAM and swap).
- `free -h` – Show human-readable memory values (e.g., MB, GB).
- `free -m` – Display memory in megabytes.
- `free -g` – Display memory in gigabytes.

### 6. **iostat**

**Purpose:** Display CPU and input/output statistics for devices.

- `iostat` – Show CPU and I/O statistics.
- `iostat -d` – Show device statistics.
- `iostat -c` – Show CPU statistics.
- `iostat -x` – Show extended device statistics.

### 7. **sar**

**Purpose:** Collect and report system activity information.

- `sar -u 1 3` – Show CPU usage every 1 second, 3 times.
- `sar -r` – Show memory usage.

- `sar -d` – Show disk activity.
- `sar -n DEV` – Show network activity.

## 8. **dstat**

**Purpose:** Versatile resource statistics tool.

- `dstat` – Show CPU, disk, network, and I/O stats.
- `dstat -c` – Show only CPU stats.
- `dstat -d` – Show only disk stats.
- `dstat -n` – Show only network stats.
- `dstat -t` – Show time stats.

## 9. **netstat**

**Purpose:** Show network connections, routing tables, interface statistics.

- `netstat -tuln` – Show active listening ports.
- `netstat -tulpn` – Show active connections with the associated program.
- `netstat -i` – Show network interface statistics.
- `netstat -rn` – Show routing tables.
- `netstat -s` – Show network statistics.

## 10. **ss**

**Purpose:** Utility to investigate sockets.

- `ss` – Show all sockets.
- `ss -tuln` – Show listening sockets.
- `ss -p` – Show process using the socket.
- `ss -s` – Show summary of socket statistics.

## 11. **uptime**

**Purpose:** Show how long the system has been running.

- `uptime` – Displays the uptime, number of users, and load averages.

## 12. **lsof**

**Purpose:** List open files and processes using them.

- `lsof` – Show all open files.
- `lsof -i` – Show all network connections.
- `lsof -u <user>` – Show files opened by a specific user.



- `lsolf +D <directory>` – Show files opened in a specific directory.

### 13. `df`

**Purpose:** Report file system disk space usage.

- `df` – Show disk space usage for mounted filesystems.
- `df -h` – Human-readable format (e.g., MB, GB).
- `df -T` – Show file system types.
- `df -i` – Show inode usage.

### 14. `du`

**Purpose:** Estimate file space usage.

- `du` – Show the disk usage of files and directories.
- `du -sh <directory>` – Show total disk usage of a directory in human-readable format.
- `du -ah` – Show disk usage of all files and directories.

### 15. `watch`

**Purpose:** Execute a program periodically and show output.

- `watch <command>` – Run a command every 2 seconds by default.
- `watch -n <seconds> <command>` – Run the command at custom intervals.
- `watch -d <command>` – Highlight changes in the output.

### 16. `lscpu`

**Purpose:** Display information about the CPU architecture.

- `lscpu` – Show detailed CPU architecture information.

### 17. `lsblk`

**Purpose:** List information about block devices (disks).

- `lsblk` – List all block devices.
- `lsblk -f` – Show file system information.
- `lsblk -o NAME,SIZE,TYPE,MOUNTPOINT` – Custom output columns.

### 18. `systemctl`

**Purpose:** Control the systemd system and service manager.

- `systemctl status` – Show system and service manager status.
- `systemctl status <service>` – Show specific service status.
- `systemctl list-units --type=service` – List all active services.
- `systemctl start <service>` – Start a service.
- `systemctl stop <service>` – Stop a service.

## 19. `journalctl`

**Purpose:** Query and display logs from `systemd` journal.

- `journalctl` – Show all system logs.
- `journalctl -u <service>` – Show logs for a specific service.
- `journalctl -f` – Follow the log output.
- `journalctl --since "2025-04-05"` – Show logs since a specific date.

## 20. `atop`

**Purpose:** Advanced system and process monitoring tool.

- `atop` – Start the tool to monitor system and process activities.
- `atop -r <file>` – Read a log file recorded by `atop`.
- `atop -d <seconds>` – Update every x seconds.

## 21. `sar` (Sysstat)

**Purpose:** Collect and report system activity information.

- `sar -u 1 3` – Report CPU utilization every second, three times.
- `sar -r` – Show memory statistics.
- `sar -d` – Show disk statistics.

## 22. `tcpdump`

**Purpose:** Network traffic capture.

- `tcpdump` – Capture network traffic.
- `tcpdump -i <interface>` – Capture traffic from a specific network interface.
- `tcpdump -n` – Don't resolve hostnames.
- `tcpdump -v` – Increase verbosity.

## 23. `iftop`

**Purpose:** Display bandwidth usage on an interface.

- `iftop` – Show bandwidth usage on each connection.

- `iftop -ni <interface>` – Show bandwidth on a specific interface.

## 24. `uptime`

**Purpose:** Show system uptime and load averages.

- `uptime` – Displays the system uptime and load averages.

## 25. `mpstat`

**Purpose:** Report CPU statistics.

- `mpstat` – Show CPU stats for each processor.
- `mpstat -P ALL` – Show stats for all processors.

These commands give a powerful toolkit for monitoring various aspects of system performance, whether you're looking at system load, memory usage, disk activity, network stats, or process information. You can combine them, use them in scripts, or simply run them in real-time for a more detailed view of your system.

**You said:**

continue please with more system monitoring cmd advance cmds please that are used by devops engineer

**ChatGPT said:**

Here are more advanced system monitoring commands commonly used by **DevOps Engineers** for deeper insights into system performance, troubleshooting, and infrastructure management. These tools focus on monitoring, debugging, and enhancing the reliability and performance of systems and applications in production environments.

## 26. `strace`

**Purpose:** Trace system calls and signals.

- `strace -p <pid>` – Attach to a running process by its PID and trace system calls.
- `strace -e trace=<syscall>` – Trace a specific system call (e.g., `read`, `write`).
- `strace -o <file>` – Save the output to a file.
- `strace -f` – Trace child processes (forks).
- `strace -c` – Count time, calls, and errors for each system call.

## 27. `dmesg`

**Purpose:** Print kernel ring buffer messages, typically for debugging hardware issues.

- `dmesg` – Display kernel messages.
- `dmesg | grep <pattern>` – Filter messages based on a pattern.
- `dmesg -T` – Show human-readable timestamps.
- `dmesg --clear` – Clear the kernel ring buffer.

## 28. `sysctl`

**Purpose:** Interface to change kernel parameters at runtime.

- `sysctl -a` – Display all available kernel parameters.
- `sysctl -w <parameter>=<value>` – Set a specific kernel parameter.
- `sysctl net.ipv4.ip_forward=1` – Enable IP forwarding (e.g., for routing).
- `sysctl -p` – Load settings from `/etc/sysctl.conf` or a configuration file.

## 29. `pidstat`

**Purpose:** Collect and display statistics by process.

- `pidstat` – Show CPU, memory, and other statistics for processes.
- `pidstat -u` – Display CPU usage by process.
- `pidstat -r` – Show memory usage by process.
- `pidstat -d` – Show I/O statistics for processes.
- `pidstat -p <pid>` – Display stats for a specific process.

## 30. `netcat (nc)`

**Purpose:** Network utility for reading from and writing to network connections.

- `nc -l <port>` – Start listening on a specific port.
- `nc <host> <port>` – Connect to a remote host and port.
- `nc -zv <host> <port-range>` – Scan a range of ports on a remote host.
- `nc -w 5 <host> <port>` – Set a timeout of 5 seconds for a connection.

## 31. `curl`

**Purpose:** Transfer data from or to a server.

- `curl -I <URL>` – Show only the HTTP header information.
- `curl -O <URL>` – Download a file.
- `curl -L <URL>` – Follow redirects.
- `curl -u <user>:<password> <URL>` – Make an authenticated request.
- `curl -X POST <URL> -d "<data>"` – Make a POST request with data.
- `curl --silent --show-error <URL>` – Suppress output except for errors.

## 32. `ncdu`

**Purpose:** Disk usage analyzer with a user-friendly interface.

- `ncdu` – Display disk usage and allow interactive navigation.
- `ncdu <path>` – Analyze disk usage for a specific path or directory.

### 33. `tshark`

**Purpose:** Network protocol analyzer (similar to `tcpdump`, but with more features).

- `tshark` – Start capturing packets.
- `tshark -i <interface>` – Capture packets from a specific interface.
- `tshark -f "<filter>"` – Capture only specific packets based on a filter (e.g., `tcp port 80`).
- `tshark -w <file>` – Save captured packets to a file.

### 34. `tcpdump`

**Purpose:** Capture network traffic and troubleshoot networking issues.

- `tcpdump -i <interface>` – Capture packets on a specified network interface.
- `tcpdump -s 0 -A` – Capture and display full packet contents (useful for HTTP traffic).
- `tcpdump -n` – Don't resolve hostnames (show IP addresses).
- `tcpdump -v` – Verbose output (more detailed packet info).
- `tcpdump -X` – Show packet contents in hexadecimal and ASCII.
- `tcpdump 'port 80'` – Capture HTTP traffic.

### 35. `bpfcc` / `bpftrace`

**Purpose:** Tools for tracing and monitoring Linux kernel events with eBPF (Extended Berkeley Packet Filter).

- `bpfcc` – Use BPF tools to trace and debug system performance.
- `bpftrace` – Dynamic tracing tool that allows custom tracing scripts.
- `bpftrace -e 'tracepoint:syscalls:sys_enter_open { @[comm] = count(); }'` – Trace the `open()` system call.
- `bpftrace -e 'kprobe:vfs_read { printf("PID %d read %d bytes\n", pid, args->count); }'` – Trace file reads.

### 36. `inotifywait`

**Purpose:** Monitor file system events using `inotify`.

- `inotifywait -m <directory>` – Monitor events in a directory.
- `inotifywait -r` – Monitor directories recursively.
- `inotifywait -e <event> <file>` – Monitor a specific event (e.g., `create`, `delete`).

### 37. `monitorix`

**Purpose:** A system and network monitoring tool designed to collect and display various system parameters.

- `monitorix` – Launch the web-based monitoring interface.
- It provides detailed visual reports on system metrics, such as CPU, memory, disk, network, and many other metrics.

### 38. `collectd`

**Purpose:** Collect performance metrics periodically.

- `collectd` – Start the `collectd` daemon to gather metrics.
- `collectd` integrates with tools like Graphite, InfluxDB, and Prometheus to provide real-time visualizations.

### 39. `prometheus`

**Purpose:** A powerful monitoring and alerting system, widely used for cloud-native applications and services.

- Prometheus scrapes metrics from HTTP endpoints exposed by services and stores them for analysis and alerting.
- Prometheus can be used with `node_exporter` to monitor system-level metrics (e.g., CPU, memory, disk, network).

### 40. `grafana`

**Purpose:** A data visualization and monitoring platform that integrates with Prometheus, InfluxDB, and other sources.

- `grafana` – Access the Grafana web interface to visualize metrics from various sources.
- You can set up dashboards and alerts based on metrics from Prometheus, InfluxDB, or other monitoring systems.

### 41. `docker stats`

**Purpose:** Display container resource usage statistics.

- `docker stats` – Show real-time statistics for all running Docker containers.
- `docker stats <container_name>` – Show statistics for a specific container.
- `docker stats --no-stream` – Show a one-time snapshot of container stats.

### 42. `kubectl top`

**Purpose:** Monitor Kubernetes cluster resources.

- `kubectl top nodes` – Show resource usage (CPU, memory) for all nodes in a Kubernetes cluster.
- `kubectl top pods` – Show resource usage for all pods in the cluster.
- `kubectl top pod <pod_name>` – Show resource usage for a specific pod.
- `kubectl top pod <pod_name> --namespace=<namespace>` – Show resource usage for a specific pod in a namespace.

### 43. `docker-compose logs`

**Purpose:** View logs from Docker Compose-managed containers.

- `docker-compose logs` – Show logs for all containers in a Compose project.
- `docker-compose logs <service>` – Show logs for a specific service.

### 44. `aws cloudwatch`

**Purpose:** Monitor AWS cloud resources and applications in real-time.

- `aws cloudwatch get-metric-data` – Retrieve metric data from CloudWatch.
- `aws cloudwatch describe-alarms` – List CloudWatch alarms.
- `aws cloudwatch put-metric-data` – Publish custom metrics to CloudWatch.

### 45. `datadog agent status`

**Purpose:** Monitor infrastructure and application performance using Datadog.

- `datadog-agent status` – Show the status of the Datadog agent and its integrations.
- `datadog-agent check` – Run a health check for a specific integration.

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These advanced system monitoring tools and commands are essential for **DevOps Engineers** working in production environments. They help ensure that applications run smoothly, proactively identify potential issues, and optimize system performance. Many of these tools are also integral parts of continuous integration/continuous deployment (CI/CD) pipelines and cloud-native monitoring solutions.

**You said:**

Networking cmd with basic to advance with all the important flags in them that can be used please - all the important and basic to advance networking cmd please include all cmds used by devops engineer please

**ChatGPT said:**

Here's a comprehensive list of **basic to advanced networking commands** with flags that are frequently used by **DevOps Engineers**. These commands can help you troubleshoot, configure, and monitor networking issues on Linux systems.

## Basic Networking Commands

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### 1. `ifconfig`

**Purpose:** Display and configure network interfaces.

- `ifconfig` – Show all network interfaces and their IP addresses.
- `ifconfig <interface>` – Show specific interface (e.g., `eth0`, `wlan0`).
- `ifconfig <interface> up` – Bring up a network interface.
- `ifconfig <interface> down` – Bring down a network interface.
- `ifconfig <interface> <IP>` – Assign an IP address to an interface.
- `ifconfig <interface> netmask <netmask>` – Set the netmask for the interface.

### 2. `ip`

**Purpose:** A more modern and powerful alternative to `ifconfig` for network management.

- `ip a` – Show all network interfaces and their IP addresses.
- `ip link show` – Display link information (e.g., interface status).
- `ip addr show` – Show IP addresses assigned to all interfaces.
- `ip link set <interface> up` – Bring the interface up.
- `ip link set <interface> down` – Bring the interface down.
- `ip addr add <IP>/24 dev <interface>` – Assign a new IP to an interface.
- `ip route show` – Display the routing table.
- `ip route add <destination> via <gateway>` – Add a new route.

### 3. `ping`

**Purpose:** Send ICMP echo requests to check network connectivity.

- `ping <hostname or IP>` – Ping a host by its IP address or hostname.
- `ping -c <count> <hostname>` – Send a specific number of packets.
- `ping -i <interval> <hostname>` – Set the interval between packets.
- `ping -t <ttl> <hostname>` – Set the TTL (Time To Live) for packets.
- `ping -s <size> <hostname>` – Send packets of a specific size.
- `ping -4 <hostname>` – Force the use of IPv4.
- `ping -6 <hostname>` – Force the use of IPv6.

### 4. `traceroute`



**Purpose:** Trace the route packets take to a destination.

- `traceroute <hostname>` – Trace the route to a remote host.
- `traceroute -m <max_hops> <hostname>` – Set the maximum number of hops.
- `traceroute -T` – Use TCP packets for tracing.
- `traceroute -I` – Use ICMP packets for tracing.

## 5. `nslookup`

**Purpose:** Query DNS to obtain domain name or IP address information.

- `nslookup <hostname>` – Query the IP address of a given hostname.
- `nslookup <IP>` – Query the domain name for a given IP.
- `nslookup -type=MX <domain>` – Query MX (mail) records for a domain.
- `nslookup -type=NS <domain>` – Query the name servers for a domain.

## 6. `dig`

**Purpose:** Perform DNS lookups and query DNS servers.

- `dig <hostname>` – Perform a basic DNS lookup for a domain.
- `dig @<DNS server> <hostname>` – Query a specific DNS server.
- `dig <hostname> A` – Query A (address) record for a domain.
- `dig <hostname> MX` – Query MX (mail) record for a domain.
- `dig +short <hostname>` – Shorten output to show only the result.

## 7. `route`

**Purpose:** View and configure network routing tables.

- `route` – Show the current routing table.
- `route -n` – Show the routing table with numeric addresses (no DNS resolution).
- `route add <destination> gw <gateway>` – Add a new route to a destination.
- `route del <destination>` – Delete a specific route.

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# Advanced Networking Commands

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## 8. `netstat`

**Purpose:** Display network connections, routing tables, interface statistics, etc.

- `netstat` – Show active connections and listening ports.
- `netstat -tuln` – Display TCP and UDP ports that are open and listening.
- `netstat -an` – Display all network connections (IP and port).
- `netstat -s` – Show network statistics.
- `netstat -i` – Show network interfaces and packet statistics.
- `netstat -r` – Show the routing table.

## 9. `ss`

**Purpose:** Utility to investigate sockets.

- `ss` – Display all sockets.
- `ss -tuln` – Display listening TCP and UDP sockets.
- `ss -a` – Show all sockets (listening and non-listening).
- `ss -p` – Display processes using the sockets.
- `ss -r` – Display routing information.

## 10. `netcat (nc)`

**Purpose:** A versatile tool for network debugging and banner grabbing.

- `nc -zv <hostname> <port>` – Scan a specific port or range of ports.
- `nc -l <port>` – Listen on a specific port for incoming connections.
- `nc <hostname> <port>` – Connect to a host on a specific port.
- `nc -u <hostname> <port>` – Use UDP instead of TCP.
- `nc -v <hostname> <port>` – Verbose output for connection details.

## 11. `tcpdump`

**Purpose:** Capture network traffic and display the packets.

- `tcpdump` – Capture packets on the default interface.
- `tcpdump -i <interface>` – Capture on a specific network interface.
- `tcpdump -n` – Do not resolve hostnames or port names.
- `tcpdump -v` – Show more verbose packet information.
- `tcpdump -c <count>` – Capture a specific number of packets.
- `tcpdump -w <file>` – Save the captured packets to a file.
- `tcpdump 'port 80'` – Capture HTTP traffic.
- `tcpdump -A` – Display packet contents in ASCII format.
- `tcpdump -X` – Display packet contents in both hex and ASCII.

## 12. `iftop`

**Purpose:** Display bandwidth usage on a network interface in real-time.

- `iftop` – Display real-time bandwidth usage.
- `iftop -i <interface>` – Specify the network interface to monitor.
- `iftop -n` – Show numerical addresses (do not resolve hostnames).
- `iftop -P` – Show port numbers along with IP addresses.

### 13. `nmap`

**Purpose:** Network exploration and security auditing tool.

- `nmap <hostname>` – Perform a simple scan of a host.
- `nmap -sP <IP-range>` – Perform a ping scan to identify live hosts.
- `nmap -p <ports> <hostname>` – Scan specific ports (e.g., `-p 80,443`).
- `nmap -sS <hostname>` – Perform a SYN scan (stealth scan).
- `nmap -O <hostname>` – OS detection.
- `nmap -A <hostname>` – Enable OS detection, version detection, script scanning, and traceroute.

### 14. `mtr`

**Purpose:** A network diagnostic tool combining `traceroute` and `ping`.

- `mtr <hostname>` – Continuous traceroute and ping to a destination.
- `mtr -r <hostname>` – Generate a report instead of continuous output.
- `mtr -c <count> <hostname>` – Set the number of pings to send.

### 15. `arp`

**Purpose:** View and manipulate the system's ARP (Address Resolution Protocol) cache.

- `arp -a` – Display the current ARP table.
- `arp -d <IP>` – Delete an entry from the ARP table.
- `arp -s <IP> <MAC>` – Manually add a static entry to the ARP table.

### 16. `ethtool`

**Purpose:** Query and control network device settings.

- `ethtool <interface>` – Display information about a network interface.
- `ethtool -s <interface> speed <speed> duplex <duplex>` – Change the speed and duplex settings of a network interface.
- `ethtool -p <interface>` – Blink the LED on a network interface to help locate it.

### 17. `iwconfig`

**Purpose:** Configure wireless network interfaces.

- `iwconfig` – Display wireless network information.
- `iwconfig <interface> essid <SSID>` – Connect to a specific Wi-Fi network.
- `iwconfig <interface> mode <mode>` – Set the mode of the wireless interface (e.g., managed, ad-hoc).

## 18. `ip link`

**Purpose:** Display or modify network device attributes.

- `ip link show` – Display detailed information about network interfaces.
- `ip link set <interface> up/down` – Bring the interface up or down.
- `ip link set <interface> mtu <mtu_size>` – Change the MTU size for an interface.

## 19. `sshd` (SSH Daemon)

**Purpose:** Manage SSH access and configurations.

- `sshd -T` – Show current configuration options.
- `sshd -f <config_file>` – Use a specific SSH configuration file.
- `sshd -D` – Run in the foreground (useful for debugging).

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## Cloud/Container Specific Networking Commands

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## 20. `docker network`

**Purpose:** Manage Docker network settings.

- `docker network ls` – List all Docker networks.
- `docker network inspect <network_name>` – Inspect a specific Docker network.
- `docker network create <network_name>` – Create a new Docker network.
- `docker network connect <network_name> <container_name>` – Connect a container to a network.

## 21. `kubectl get svc`

**Purpose:** Retrieve the details of Kubernetes services.

- `kubectl get svc` – List all services in the current namespace.
- `kubectl get svc <service_name>` – Get details of a specific service.
- `kubectl describe svc <service_name>` – Detailed information on the service, including networking details.

---

These commands, along with their options and flags, are crucial for diagnosing, configuring, and optimizing networking in any system or infrastructure. DevOps Engineers often use them to ensure reliable network performance, security, and troubleshooting in both on-premise and cloud-based environments.

**You said:**

please continue with more advance linux networking cmds used by devops engineer

**ChatGPT said:**

Here's a continuation of **advanced Linux networking commands** that are typically used by **DevOps Engineers** for deep network diagnostics, configuration, performance monitoring, and troubleshooting. These commands are important when working with complex network setups, performance tuning, and cloud or containerized environments.

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## 22. `ss` (Socket Stat)

**Purpose:** A more modern and faster alternative to `netstat` for analyzing socket connections.

- `ss -tuln` – Display all listening TCP and UDP sockets.
- `ss -an` – Show all network connections in numeric form (no DNS resolution).
- `ss -p` – Show the processes associated with each socket.
- `ss -s` – Display socket statistics (summary).
- `ss -o state established` – Show only established connections.
- `ss -r` – Display routing information along with socket statistics.
- `ss -A` – Show application layer statistics.

## 23. `nft` (Netfilter)

**Purpose:** Interface for configuring packet filtering and network address translation (NAT).

- `nft list ruleset` – Display all the rules in the firewall.
- `nft add rule inet filter input tcp dport 22 accept` – Add a rule to allow incoming SSH connections.
- `nft flush ruleset` – Flush all rules from the ruleset.
- `nft delete rule inet filter input handle 4` – Delete a specific rule by its handle number.
- `nft list table inet filter` – List the rules in the filter table.
- `nft add chain inet filter input { type filter hook input priority 0 \;`  
} – Add a chain to filter incoming packets.

## 24. iptables

**Purpose:** Configure packet filtering rules in the Linux kernel firewall.

- `iptables -L` – List all active firewall rules.
- `iptables -A INPUT -p tcp --dport 80 -j ACCEPT` – Allow incoming HTTP traffic.
- `iptables -A INPUT -p tcp --dport 443 -j ACCEPT` – Allow incoming HTTPS traffic.
- `iptables -A INPUT -p tcp --dport 22 -s <IP> -j ACCEPT` – Allow SSH traffic from a specific IP.
- `iptables -D INPUT -p tcp --dport 80 -j ACCEPT` – Remove the rule allowing HTTP traffic.
- `iptables -F` – Flush all rules in the filter table.
- `iptables -t nat -A PREROUTING -p tcp --dport 80 -j DNAT --to-destination 192.168.1.2:8080` – Redirect HTTP traffic to a different destination.

## 25. firewalld

**Purpose:** Manage firewall rules dynamically with `firewalld`.

- `firewall-cmd --list-all` – Show the current firewall settings and rules.
- `firewall-cmd --zone=public --add-port=8080/tcp --permanent` – Open port 8080 permanently.
- `firewall-cmd --reload` – Reload the firewall to apply new rules.
- `firewall-cmd --zone=public --remove-port=8080/tcp --permanent` – Close port 8080.
- `firewall-cmd --list-ports` – Show open ports.

## 26. bpftrace

**Purpose:** Dynamic tracing tool for observing and troubleshooting kernel-level events using BPF (Berkeley Packet Filter).

- `bpftrace -e 'tracepoint:syscalls:sys_enter_open { printf("%s opened\n", str(args->filename)); }'` – Trace all open system calls.
- `bpftrace -e 'kprobe:vfs_read { printf("PID %d read %d bytes\n", pid, args->count); }'` – Trace file reads.
- `bpftrace -e 'tracepoint:net:net_dev_xmit { @[args->dev_name] = count(); }'` – Count network transmissions for each device.

## 27. tcpdump with Advanced Filtering

**Purpose:** Advanced packet capture with specific filters.

- `tcpdump -i eth0 port 443` – Capture packets on port 443 (HTTPS).

- `tcpdump -i eth0 'tcp[tcpflags] & tcp-push != 0'` – Capture TCP packets with the PUSH flag set.
- `tcpdump -i eth0 'src host <IP>'` – Capture packets from a specific source IP.
- `tcpdump -i eth0 'dst host <IP>'` – Capture packets destined to a specific IP.
- `tcpdump -i eth0 -w capture.pcap` – Write captured packets to a file.
- `tcpdump -r capture.pcap` – Read packets from a capture file.
- `tcpdump -i eth0 -v` – Increase verbosity of the output.

## 28. `ip rule`

**Purpose:** Used to configure policy-based routing.

- `ip rule show` – Display the current routing rules.
- `ip rule add from <IP> table <table_id>` – Add a rule to route traffic from a specific IP through a custom routing table.
- `ip rule delete from <IP>` – Delete the rule for traffic from a specific IP.
- `ip rule add iif <interface> table <table_id>` – Route traffic coming from a specific interface through a particular table.

## 29. `tc` (Traffic Control)

**Purpose:** Control network traffic on interfaces.

- `tc qdisc show` – Show the current queuing disciplines (QDisc) for interfaces.
- `tc qdisc add dev eth0 root netem delay 100ms` – Add network delay to interface `eth0`.
- `tc qdisc change dev eth0 root netem loss 5%` – Simulate 5% packet loss on `eth0`.
- `tc class add dev eth0 parent 1:1 classid 1:10 htb rate 1mbit` – Add a traffic class with a rate limit.
- `tc filter add dev eth0 protocol ip parent 1:0 prio 1 u32 match ip dport 80 0xffff flowid 1:10` – Filter HTTP traffic and assign it to a specific traffic class.

## 30. `ethtool` (Advanced)

**Purpose:** Query and modify network interface driver and hardware settings.

- `ethtool eth0` – Display settings for the `eth0` network interface.
- `ethtool -s eth0 speed 1000 duplex full` – Set the speed and duplex mode for the interface.
- `ethtool -p eth0` – Blink the LED to locate the physical interface.
- `ethtool -i eth0` – Display driver information for the network interface.
- `ethtool -S eth0` – Show statistics about the network interface.

## 31. `nmcli`

**Purpose:** Command-line interface for NetworkManager (useful for managing network connections).

- `nmcli connection show` – List all active network connections.
- `nmcli device status` – Show the status of all network devices.
- `nmcli connection add type ethernet con-name eth0 ifname eth0` – Add a new Ethernet connection.
- `nmcli device disconnect eth0` – Disconnect a specific network interface.
- `nmcli device wifi list` – List available Wi-Fi networks.

### 32. `conntrack`

**Purpose:** Used to view and manage the connection tracking subsystem in the Linux kernel.

- `conntrack -L` – List all tracked connections.
- `conntrack -F` – Flush all tracked connections.
- `conntrack -D` – Delete a specific connection from the connection table.
- `conntrack -L -p tcp` – List all tracked TCP connections.
- `conntrack -E` – Display connection events in real-time.

### 33. `wireshark`

**Purpose:** A GUI-based network protocol analyzer (often used in tandem with `tcpdump` for deep packet inspection).

- Launch Wireshark and capture packets from a specific interface.
- `wireshark` – Start Wireshark GUI.
- `wireshark -i <interface>` – Start Wireshark and capture packets from a specific interface.
- Wireshark supports advanced filtering using display filters (e.g., `http, ip.addr==192.168.1.1`).

### 34. `bridge`

**Purpose:** Configure and manage network bridges.

- `bridge link` – Show the status of all network bridges.
- `bridge fdb show` – Show the Forwarding Database (FDB) for a bridge.
- `bridge vlan` – Show or configure VLANs on a bridge.
- `bridge addbr br0` – Create a new network bridge.
- `bridge addif br0 eth0` – Add an interface to the bridge.

### 35. `bmon`

**Purpose:** Bandwidth monitor and rate estimator for Linux.



- `bmon` – Display bandwidth usage in real-time.
  - `bmon -p` – Display statistics for all interfaces.
  - `bmon -c` – Show detailed statistics in a continuous mode.
- 

## Cloud and Container Networking Tools

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### 36. `docker network inspect`

**Purpose:** Display detailed information about Docker network configurations.

- `docker network ls` – List all Docker networks.
- `docker network inspect <network_name>` – Show detailed information about a specific Docker network.
- `docker network create <network_name>` – Create a new custom network for Docker containers.
- `docker network connect <network_name> <container_name>` – Attach a container to a network.
- `docker network disconnect <network_name> <container_name>` – Disconnect a container from a network.

### 37. `kubectl get pods -o wide`

**Purpose:** Retrieve detailed networking information for Kubernetes pods.

- `kubectl get pods -o wide` – Show IP addresses, node names, and container info.
  - `kubectl exec <pod_name> -- /bin/bash` – Access the pod's shell for troubleshooting.
  - `kubectl describe pod <pod_name>` – View detailed pod and network-related information.
- 

These **advanced networking commands** are essential for DevOps engineers working in production environments, cloud infrastructures, or containerized systems. These tools help in diagnosing network issues, optimizing performance, and maintaining a reliable network configuration. Whether you're working with traditional systems, Docker, Kubernetes, or cloud networks, these commands enable fine-grained control and detailed insights into network traffic and configurations.

**You said:**

Package Management cmd with basic to advance with all the important flags in them that can be used please - all the important and basic to advance package mgmt linux or ubuntu cmd please include all cmds

ChatGPT said:

Here's a comprehensive list of **package management commands** used in **Linux** and **Ubuntu** for managing software packages, including installation, removal, updates, and repository management. These commands range from basic to advanced usage, specifically designed for **Debian-based distributions** like Ubuntu, and **RedHat-based distributions** (e.g., CentOS, RHEL).

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## For Debian/Ubuntu-based Systems (APT)

APT (Advanced Package Tool) is the package management system for Debian-based distributions like Ubuntu. It manages packages, handles installations, upgrades, and dependencies.

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### 1. apt-get

**Purpose:** Command-line tool for handling packages (installation, upgrade, removal).

- `apt-get update` – Update the list of available packages from all configured repositories.
- `apt-get upgrade` – Upgrade all installed packages to the latest versions.
- `apt-get dist-upgrade` – Perform an upgrade, handling changing dependencies.
- `apt-get install <package>` – Install a package.
- `apt-get install <package>=<version>` – Install a specific version of a package.
- `apt-get remove <package>` – Remove a package (without removing configuration files).
- `apt-get purge <package>` – Remove a package along with its configuration files.
- `apt-get autoremove` – Remove packages that were installed automatically and are no longer required.
- `apt-get clean` – Remove downloaded package files (.deb) to free up space.
- `apt-get autoclean` – Clean the cache, removing only outdated package files.
- `apt-get check` – Check for broken dependencies.
- `apt-get source <package>` – Download the source code for a package.
- `apt-get install <package> --reinstall` – Reinstall a package.
- `apt-get -f install` – Fix broken dependencies by installing missing packages.

### 2. apt-cache

**Purpose:** Search and query information about available packages.

- `apt-cache search <package_name>` – Search for a package by name.
- `apt-cache show <package_name>` – Display detailed information about a package.
- `apt-cache depends <package_name>` – Show package dependencies.
- `apt-cache rdepends <package_name>` – Show packages that depend on the given package.
- `apt-cache policy <package_name>` – Show the available versions and the installed version of a package.

### 3. apt

**Purpose:** A more user-friendly front-end for APT, introduced in newer versions of Ubuntu.

- `apt update` – Update the list of available packages.
- `apt upgrade` – Upgrade installed packages to the latest versions.
- `apt install <package>` – Install a package.
- `apt remove <package>` – Remove a package.
- `apt search <package_name>` – Search for a package in the repository.
- `apt show <package>` – Display detailed information about a package.
- `apt list --installed` – List installed packages.
- `apt list --upgradable` – List all packages that have updates available.
- `apt purge <package>` – Remove a package along with its configuration files.
- `apt autoremove` – Remove unnecessary packages.
- `apt list <package>` – Check if a package is installed.

### 4. dpkg

**Purpose:** Low-level tool to handle `.deb` packages.

- `dpkg -i <package.deb>` – Install a `.deb` package.
- `dpkg -r <package>` – Remove a package.
- `dpkg -P <package>` – Purge a package (remove configuration files too).
- `dpkg -l` – List all installed packages.
- `dpkg -L <package>` – List all files installed by a package.
- `dpkg -S <file>` – Find which package a specific file belongs to.
- `dpkg -C` – Check for broken packages.
- `dpkg --configure -a` – Configure unpacked packages.
- `dpkg -s <package>` – Show detailed information about an installed package.
- `dpkg -p <package>` – Show information about an installed package in a more human-readable format.

### 5. apt-key

**Purpose:** Manage the trusted keys for APT repositories.

- `apt-key list` – List the keys used by APT.

- `apt-key adv --keyserver <keyserver> --recv-keys <key_id>` – Add a GPG key to APT.
  - `apt-key del <key_id>` – Delete a specific key from APT's trusted keys.
- 

## For Red Hat/CentOS/Fedora (YUM/DNF)

YUM (Yellowdog Updater Modified) and DNF (Dandified YUM) are the default package managers for RedHat-based distributions, such as CentOS and Fedora.

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### 6. `yum` (for older RedHat/CentOS/Fedora systems)

**Purpose:** Package management utility for RPM-based distributions.

- `yum update` – Update all installed packages to the latest version.
- `yum install <package>` – Install a package.
- `yum remove <package>` – Remove a package.
- `yum list installed` – List all installed packages.
- `yum list available` – List all available packages from repositories.
- `yum search <package>` – Search for a package in the repositories.
- `yum info <package>` – Show detailed information about a package.
- `yum groupinstall <group>` – Install a group of packages (e.g., `yum groupinstall "Development Tools"`).
- `yum groupremove <group>` – Remove a group of packages.
- `yum autoremove` – Remove unnecessary packages that were installed as dependencies.
- `yum clean all` – Clean the repository metadata and cache.
- `yum downgrade <package>` – Downgrade a package to an earlier version.

### 7. `dnf` (for newer RedHat/CentOS/Fedora systems)

**Purpose:** DNF is the next-generation package manager, replacing YUM.

- `dnf update` – Update all installed packages to the latest version.
- `dnf install <package>` – Install a package.
- `dnf remove <package>` – Remove a package.
- `dnf list installed` – List installed packages.
- `dnf list available` – List available packages from the repository.
- `dnf search <package>` – Search for a package in the repositories.
- `dnf info <package>` – Display detailed information about a package.
- `dnf groupinstall <group>` – Install a group of packages.
- `dnf groupremove <group>` – Remove a group of packages.
- `dnf autoremove` – Remove unnecessary packages.

- `dnf clean all` – Clean metadata and cached data.
  - `dnf downgrade <package>` – Downgrade a package.
- 

## Package Management Commands for Other Tools

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### 8. `snap` (Snap Package Management)

**Purpose:** Manage Snap packages (used for installing self-contained software packages).

- `snap install <package>` – Install a Snap package.
- `snap remove <package>` – Remove a Snap package.
- `snap list` – List all installed Snap packages.
- `snap refresh` – Refresh (update) Snap packages.
- `snap info <package>` – Show detailed information about a Snap package.
- `snap find <package>` – Search for a Snap package.
- `snap version` – Show the version of Snap installed on the system.

### 9. `flatpak` (Flatpak Package Management)

**Purpose:** Manage Flatpak packages (another format for self-contained software).

- `flatpak install <package>` – Install a Flatpak package.
  - `flatpak uninstall <package>` – Uninstall a Flatpak package.
  - `flatpak list` – List installed Flatpak packages.
  - `flatpak update` – Update Flatpak packages.
  - `flatpak search <package>` – Search for a Flatpak package.
  - `flatpak info <package>` – Show detailed information about a Flatpak package.
- 

## Managing Package Repositories

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### 10. `add-apt-repository` (for Ubuntu/Debian)

**Purpose:** Add a Personal Package Archive (PPA) or repository.

- `add-apt-repository <ppa>` – Add a PPA repository (e.g., `add-apt-repository ppa:mozillateam/firefox-next`).
- `add-apt-repository --remove <ppa>` – Remove a PPA repository.

- `add-apt-repository -y <repository>` – Automatically accept the repository addition.

## 11. `apt-add-repository` (for Ubuntu/Debian)

**Purpose:** Add new repositories to your system.

- `apt-add-repository <repository>` – Add a repository to the system.
- `apt-add-repository -r <repository>` – Remove a repository from the system.

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## Other Useful Package Management Commands

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## 12. `update-alternatives`

**Purpose:** Set default applications for different services (e.g., Java, Python).

- `update-alternatives --config <service>` – Select the default version of a service.
- `update-alternatives --display <service>` – Show all available alternatives for a service.

## 13. `dpkg-reconfigure`

**Purpose:** Reconfigure installed packages.

- `dpkg-reconfigure <package>` – Reconfigure an installed package (e.g., to reconfigure locales or X11 server settings).

---

These **package management commands** allow you to effectively handle software installation, updates, removal, and configuration on both **Debian-based** (Ubuntu) and **RedHat-based** (CentOS, RHEL) systems. Additionally, tools like **Snap** and **Flatpak** enable you to manage modern containerized applications, while commands like **add-apt-repository** and **update-alternatives** provide more advanced control over repositories and default applications.

These are crucial for **DevOps Engineers** and system administrators to manage and maintain a reliable software environment on Linux systems.

**You said:**

User and Permission Management cmd with basic to advance with all the important flags in them that can be used by devops engineer please - all the important and basic to advance user and permission mgmt cmd please include all cmds

ChatGPT said:

Here's a comprehensive list of **user and permission management commands** that **DevOps engineers** commonly use in Linux/Ubuntu systems. These commands cover everything from basic user creation and permission management to advanced topics such as managing groups, controlling access, and modifying system permissions.

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## User Management Commands

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### 1. useradd

**Purpose:** Create a new user.

- `useradd <username>` – Create a new user with the default settings.
- `useradd -m <username>` – Create a user and create the home directory.
- `useradd -d /home/<path> <username>` – Specify a custom home directory for the user.
- `useradd -s /bin/bash <username>` – Specify a custom shell for the user.
- `useradd -G <group1>,<group2> <username>` – Add the user to specific groups.
- `useradd -e <YYYY-MM-DD> <username>` – Set the account expiry date.

### 2. usermod

**Purpose:** Modify an existing user account.

- `usermod -aG <group> <username>` – Add a user to an existing group.
- `usermod -g <group> <username>` – Change the primary group for a user.
- `usermod -s /bin/zsh <username>` – Change the user's shell.
- `usermod -L <username>` – Lock the user account (prevents login).
- `usermod -U <username>` – Unlock a previously locked user account.
- `usermod -e <YYYY-MM-DD> <username>` – Set the account expiry date.

### 3. userdel

**Purpose:** Delete a user account.

- `userdel <username>` – Delete the user but retain their home directory.
- `userdel -r <username>` – Delete the user and their home directory.

## 4. groupadd

**Purpose:** Create a new group.

- `groupadd <groupname>` – Create a new group.
- `groupadd -g <gid> <groupname>` – Create a group with a specific GID.
- `groupadd -f <groupname>` – Force creation if the group already exists.

## 5. groupdel

**Purpose:** Delete a group.

- `groupdel <groupname>` – Delete a group.

## 6. groupmod

**Purpose:** Modify an existing group.

- `groupmod -n <new_groupname> <groupname>` – Rename a group.
- `groupmod -g <gid> <groupname>` – Change the GID of an existing group.

## 7. chage

**Purpose:** Change user password expiry information.

- `chage -l <username>` – Show password expiry information for a user.
- `chage -M <days> <username>` – Set the maximum number of days before a password must be changed.
- `chage -m <days> <username>` – Set the minimum number of days between password changes.
- `chage -W <days> <username>` – Set the number of days before a password expires that the user will be warned.
- `chage -I <days> <username>` – Set the number of days of inactivity before the account is disabled.

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## Password Management Commands

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## 8. passwd

**Purpose:** Change user passwords.



- `passwd <username>` – Change the password for a specific user.
  - `passwd -l <username>` – Lock the password for a user (disables login).
  - `passwd -u <username>` – Unlock the password for a user.
  - `passwd -e <username>` – Expire the password (forces the user to change the password at next login).
  - `passwd -d <username>` – Delete the password for a user (allows login with no password).
  - `passwd -S <username>` – Show the status of the user's password (locked, expired, etc.).
- 

## File and Directory Permissions Commands

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### 9. `chmod`

**Purpose:** Change file or directory permissions.

- `chmod <permissions> <file>` – Set specific permissions for a file or directory.
  - `<permissions>` can be in symbolic (e.g., `rwX`) or numeric format (e.g., `755`).
- `chmod u+x <file>` – Give execute permission to the user (owner).
- `chmod g-w <file>` – Remove write permission from the group.
- `chmod o+r <file>` – Add read permission for others.
- `chmod 755 <file>` – Set permission for the owner to read, write, execute, and others to read and execute.
- `chmod -R 777 <directory>` – Recursively set all permissions to full access for all users (use with caution).

### 10. `chown`

**Purpose:** Change file or directory ownership.

- `chown <user>:<group> <file>` – Change the owner and group of a file or directory.
- `chown <user> <file>` – Change the owner of a file or directory.
- `chown :<group> <file>` – Change the group ownership of a file or directory.
- `chown -R <user>:<group> <directory>` – Recursively change ownership for all files and directories inside a directory.
- `chown --reference=<file1> <file2>` – Set the ownership of `file2` to be the same as `file1`.

### 11. `chgrp`

**Purpose:** Change group ownership of a file or directory.

- `chgrp <group> <file>` – Change the group of a file or directory.
- `chgrp -R <group> <directory>` – Recursively change the group for all files and directories inside a directory.

## 12. `umask`

**Purpose:** Set default file permissions for newly created files.

- `umask` – Display the current umask value.
- `umask <value>` – Set the umask value (e.g., `umask 022` sets default permissions of 755 for files).
- `umask 0777` – Set the umask value to allow no permissions by default.

## 13. `setfacl`

**Purpose:** Set file access control lists (ACLs) to provide more granular permissions.

- `setfacl -m u:<username>:<permissions> <file>` – Set ACL for a user on a file or directory (e.g., `setfacl -m u:john:rwX file`).
- `setfacl -x u:<username> <file>` – Remove ACL for a user.
- `setfacl -R -m u:<username>:<permissions> <directory>` – Set ACL recursively.
- `setfacl -b <file>` – Remove all ACLs from a file.

## 14. `getfacl`

**Purpose:** Get the ACLs for a file or directory.

- `getfacl <file>` – Display the ACLs for a file.
- `getfacl -R <directory>` – Display ACLs recursively for all files in a directory.

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## File System Permissions

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## 15. `umask`

**Purpose:** Set default permissions for files and directories.

- `umask` – Show current default file creation permissions.
  - `umask 0022` – Set default file permissions to 755.
  - `umask 0077` – Restrict file permissions to 700 (only the owner has access).
-

## Sudo and Access Control Commands

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### 16. `sudo`

**Purpose:** Execute commands with superuser (root) privileges.

- `sudo <command>` – Run a command as the root user.
- `sudo -u <user> <command>` – Run a command as a specific user.
- `sudo -l` – List the allowed (and forbidden) commands for the current user.
- `sudo visudo` – Edit the sudoers file (used to configure sudo permissions).

### 17. `visudo`

**Purpose:** Edit the sudoers file safely.

- `visudo` – Open the sudoers file in a safe mode that checks for syntax errors before saving.
- `visudo -f <file>` – Edit a different sudoers file.

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## Other User and Permission Management Commands

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### 18. `id`

**Purpose:** Display user ID (UID), group ID (GID), and groups for a user.

- `id` – Display the current user's UID, GID, and groups.
- `id <username>` – Display UID, GID, and groups for a specific user.

### 19. `groups`

**Purpose:** Display the groups a user belongs to.

- `groups` – Show the groups the current user is part of.
- `groups <username>` – Show the groups for a specific user.

### 20. `whoami`

**Purpose:** Display the current logged-in user.

- `whoami` – Output the username of the current user.

## 21. `w`

**Purpose:** Show who is logged in and what they are doing.

- `w` – Display who is logged in and their activities.
- `w -h` – Hide the header in the output.

## 22. `last`

**Purpose:** Show the last logins of users.

- `last` – Display login history for users.
- `last -a` – Show the host name from where the user logged in.

## 23. `finger`

**Purpose:** Show information about users.

- `finger <username>` – Display information about a specific user.
- `finger` – Display information about all users currently logged in.

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## ACL (Access Control Lists)

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## 24. `setfacl`

**Purpose:** Set file access control lists (ACLs) to provide more granular permissions.

- `setfacl -m u:<username>:<permissions> <file>` – Set ACL for a user on a file (e.g., `setfacl -m u:john:rwX file`).
- `setfacl -x u:<username> <file>` – Remove ACL for a user.

---

These **user and permission management commands** provide **DevOps engineers** with the necessary tools to create and manage user accounts, groups, permissions, and access control. Whether you're managing access for a few users or for thousands in an enterprise setting, these commands help you maintain secure systems and ensure proper user access control.

**You said:**

continue with more file and mangmt advance cmds please

ChatGPT said:

Continuing with more **advanced file management commands** used by **DevOps engineers** for handling files and directories in Linux systems. These commands go beyond the basic file manipulation tasks and provide powerful features for managing large datasets, automating tasks, and improving efficiency.

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## Advanced File and Directory Management Commands

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### 1. find

**Purpose:** Search for files and directories in a directory hierarchy based on conditions like name, size, type, etc.

- `find /path/to/search -name <filename>` – Search for a file by name.
- `find /path/to/search -type f` – Find all regular files.
- `find /path/to/search -type d` – Find all directories.
- `find /path/to/search -size +100M` – Find files larger than 100MB.
- `find /path/to/search -name "*.log" -exec rm {} \;` – Find all `.log` files and delete them.
- `find /path/to/search -mtime -7` – Find files modified in the last 7 days.
- `find /path/to/search -empty` – Find empty files or directories.
- `find /path/to/search -name "*.txt" -exec mv {} /path/to/destination/ \;` – Move `.txt` files to another directory.
- `find /path/to/search -user <username>` – Find files owned by a specific user.

### 2. locate

**Purpose:** Quickly find the location of a file using an indexed database (faster than `find`).

- `locate <filename>` – Find the full path of a file.
- `locate -i <filename>` – Perform a case-insensitive search.
- `updatedb` – Update the file database for `locate` (run as root).
- `locate -r <pattern>` – Use regular expressions to search for files.
- `locate --existing <pattern>` – Show only files that currently exist.

### 3. xargs

**Purpose:** Build and execute command lines from input (typically from `find`, `echo`, or other commands).

- `find . -name "*.log" | xargs rm` – Delete all .log files found by find.
- `echo "file1 file2 file3" | xargs cp -t /destination/` – Copy multiple files to a destination directory.
- `cat file_list.txt | xargs -n 1 curl -O` – Download multiple files listed in a text file.

## 4. tar

**Purpose:** Archive files and directories into a .tar file (can also compress).

- `tar -cf archive.tar <directory_or_files>` – Create an uncompressed archive.
- `tar -czf archive.tar.gz <directory_or_files>` – Create a .tar.gz compressed archive.
- `tar -xvf archive.tar` – Extract the contents of a .tar archive.
- `tar -xzvf archive.tar.gz` – Extract a .tar.gz archive.
- `tar -tvf archive.tar` – List the contents of a .tar archive without extracting.
- `tar -czf backup.tar.gz --exclude='*.log' <directory>` – Create a compressed archive, excluding .log files.
- `tar -C /path/to/destination -xvf archive.tar` – Extract a .tar archive to a specific destination.

## 5. gzip and gunzip

**Purpose:** Compress and decompress files using the gzip compression algorithm.

- `gzip <file>` – Compress a file to .gz format.
- `gunzip <file.gz>` – Decompress a .gz file.
- `gzip -c <file> > file.gz` – Compress and write the output to a new file without modifying the original.
- `gzip -d <file.gz>` – Decompress a .gz file.
- `gzip -r <directory>` – Recursively compress all files in a directory.

## 6. zip and unzip

**Purpose:** Create .zip archives and extract them.

- `zip archive.zip file1 file2` – Create a .zip archive with multiple files.
- `unzip archive.zip` – Extract a .zip archive.
- `zip -r archive.zip <directory>` – Create a .zip archive of an entire directory.
- `unzip -l archive.zip` – List the contents of a .zip archive without extracting.
- `unzip -d /path/to/destination archive.zip` – Extract a .zip archive to a specific directory.

## 7. rsync

**Purpose:** Synchronize files and directories between locations.

- `rsync -av <source> <destination>` – Copy files/directories with verbose output and preserve attributes.
- `rsync -avz <source> <destination>` – Compress files while transferring.
- `rsync -av --delete <source> <destination>` – Synchronize files and delete files that no longer exist at the source.
- `rsync -n -av <source> <destination>` – Perform a dry-run (no changes, just show what will happen).
- `rsync -z --exclude='*.log' <source> <destination>` – Sync while excluding specific files (e.g., .log files).
- `rsync -avz /path/to/source/ user@remote:/path/to/destination/` – Sync to a remote server over SSH.

## 8. `mv`

**Purpose:** Move or rename files and directories.

- `mv <source> <destination>` – Move a file to a new location.
- `mv <oldname> <newname>` – Rename a file.
- `mv -i <source> <destination>` – Prompt before overwriting files.
- `mv -u <source> <destination>` – Move only if the source file is newer than the destination.

## 9. `cp`

**Purpose:** Copy files or directories.

- `cp <source> <destination>` – Copy a file.
- `cp -r <source> <destination>` – Copy a directory recursively.
- `cp -u <source> <destination>` – Copy only if the source file is newer than the destination.
- `cp -i <source> <destination>` – Prompt before overwriting an existing file.
- `cp -a <source> <destination>` – Copy files and preserve attributes like timestamps, ownership, and permissions.

## 10. `ln`

**Purpose:** Create links to files or directories.

- `ln <source> <link>` – Create a hard link to a file.
- `ln -s <source> <link>` – Create a symbolic (soft) link to a file or directory.
- `ln -f <source> <link>` – Force the creation of a link by overwriting an existing file or link.

- `ln -s /path/to/original /path/to/symlink` – Create a symbolic link to a file or directory.

## 11. `diff`

**Purpose:** Compare files line by line.

- `diff <file1> <file2>` – Compare two files line by line.
- `diff -u <file1> <file2>` – Show the differences in unified format.
- `diff -r <dir1> <dir2>` – Compare directories recursively.
- `diff -i <file1> <file2>` – Ignore case differences when comparing.
- `diff -w <file1> <file2>` – Ignore all white space when comparing.

## 12. `cmp`

**Purpose:** Compare two files byte by byte.

- `cmp <file1> <file2>` – Compare two files and return the first byte that differs.
- `cmp -b <file1> <file2>` – Show the differing bytes when comparing files.

## 13. `file`

**Purpose:** Determine the type of a file.

- `file <filename>` – Display the type of a file (e.g., text, image, executable).
- `file -i <filename>` – Display the MIME type of a file.

## 14. `du`

**Purpose:** Estimate file and directory space usage.

- `du <directory>` – Show the disk usage of a directory.
- `du -sh <directory>` – Show the total disk usage of a directory in human-readable format.
- `du -a <directory>` – Show disk usage for all files and directories.
- `du -h --max-depth=1` – Display disk usage for each subdirectory, limited to a depth of 1.
- `du -c <directory>` – Show total disk usage for a directory along with individual usage for each file/folder.

## 15. `stat`

**Purpose:** Display detailed information about a file or directory.

- `stat <filename>` – Display file statistics, including size, permissions, timestamps, etc.



- `stat --format=%s <filename>` – Display only the size of a file.
- `stat --format=%x <filename>` – Display the last access time of a file.

## 16. tee

**Purpose:** Read from standard input and write to standard output and files simultaneously.

- `command | tee <file>` – Save the output of a command to a file and also display it on the terminal.
  - `command | tee -a <file>` – Append output to a file rather than overwriting it.
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## Advanced Compression and Decompression

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## 17. xz

**Purpose:** Compress and decompress files using the xz compression algorithm.

- `xz <file>` – Compress a file using xz (results in .xz file).
- `xz -d <file.xz>` – Decompress a .xz file.
- `xz -k <file>` – Compress a file and keep the original file.
- `xz -l <file.xz>` – Show the compressed size and other details of a .xz file.
- `xz -z <file>` – Compress a file using the default compression level.

## 18. 7z

**Purpose:** Create and extract .7z archives.

- `7z a archive.7z <file_or_directory>` – Create a .7z archive.
  - `7z x archive.7z` – Extract a .7z archive.
  - `7z t archive.7z` – Test the integrity of a .7z archive.
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## Miscellaneous Advanced File Management

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## 19. shred

**Purpose:** Securely delete a file by overwriting it multiple times.

- `shred -u <file>` – Shred a file and remove it securely.
- `shred -n 5 -z <file>` – Shred a file 5 times and add a final pass of zeroes.

## 20. `mount` and `umount`

**Purpose:** Mount and unmount filesystems.

- `mount <device> <mount_point>` – Mount a filesystem or device to a directory.
- `umount <mount_point>` – Unmount a filesystem from a directory.

These **advanced file management commands** provide **DevOps engineers** with the tools they need for efficient file handling, system backup, synchronization, and advanced file manipulation. Whether you're working with large datasets, automating file management tasks, or compressing and archiving files, these commands are essential for managing files effectively in a Linux environment.

**You said:**

Process Management cmd with basic to advance with all the important flags in them that can be used by devops engineer please - all the important and basic to advance process mgmt cmd please include all cmds

**ChatGPT said:**

Here's a comprehensive list of **process management commands** for Linux systems, covering **basic to advanced** commands with important flags and examples. These commands are essential for **DevOps engineers** when it comes to monitoring, controlling, and troubleshooting processes and tasks on a Linux system.

## Basic Process Management Commands

### 1. `ps` (Process Status)

**Purpose:** Show information about active processes.

- `ps` – Display the processes running in the current terminal session.
- `ps aux` – Show all running processes on the system, including other users' processes.
- `ps -ef` – Display all processes in full format.
- `ps -e` – Show all processes running on the system.
- `ps -f` – Show full information (including command arguments) for each process.

- `ps -u <username>` – Show processes owned by a specific user.
- `ps -p <pid>` – Show information about a specific process by its PID.
- `ps -o pid,comm,%cpu,%mem` – Show only selected columns (PID, command, CPU, memory).
- `ps -C <command>` – Show processes for a specific command (e.g., `ps -C nginx`).

## 2. top

**Purpose:** Display a real-time view of the system's resource usage (CPU, memory, processes).

- `top` – Display the system's process list and resource usage in real-time.
- `top -u <username>` – Show processes for a specific user.
- `top -p <pid>` – Monitor a specific process by PID.
- `top -d <seconds>` – Set the delay for updates (e.g., `-d 2` updates every 2 seconds).
- `top -n <count>` – Show a specific number of iterations (e.g., `top -n 10` shows 10 updates).
- `top -c` – Show full command lines for each process.
- `top -s <field>` – Sort processes by a specific field (e.g., `cpu`, `mem`).
- `top -H` – Show threads of processes.

## 3. htop

**Purpose:** Interactive, user-friendly version of `top` for process monitoring.

- `htop` – Start the interactive process viewer.
- `htop -u <username>` – Show processes for a specific user.
- `htop -s <field>` – Sort processes by a specified field (e.g., CPU, memory).
- `htop -d <delay>` – Set the delay between updates (e.g., `htop -d 2` updates every 2 seconds).
- `htop -p <pid>` – Show specific process by PID.
- `htop -v` – Show version of `htop`.

## 4. pgrep

**Purpose:** Find processes based on name and other attributes.

- `pgrep <pattern>` – Find processes matching a pattern (e.g., `pgrep nginx`).
- `pgrep -u <username>` – Find processes owned by a specific user.
- `pgrep -f <pattern>` – Search for processes by their full command line.
- `pgrep -a <pattern>` – Display the process ID and the command line of matching processes.

## 5. pidof

**Purpose:** Find the process ID (PID) of a running program.

- `pidof <program>` – Find the PID of a running program (e.g., `pidof nginx`).
- `pidof -x <command>` – Find PIDs of processes that match a specific command.

## 6. `kill`

**Purpose:** Terminate processes by sending signals.

- `kill <pid>` – Send the default `TERM` signal to terminate a process by its PID.
- `kill -9 <pid>` – Send the `KILL` signal to forcibly terminate a process.
- `kill -15 <pid>` – Send the `TERM` signal to gracefully terminate a process.
- `kill -l` – List all available signals.
- `killall <name>` – Terminate all processes with a specific name (e.g., `killall nginx`).

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## Advanced Process Management Commands

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## 7. `nice`

**Purpose:** Run a command with a modified scheduling priority (affects CPU scheduling).

- `nice -n <priority> <command>` – Run a command with a specified nice value (e.g., `nice -n 10 command`).
- `nice -n -10 <command>` – Run a command with a higher priority (lower nice value).
- `nice -n 0 <command>` – Run a command with the default priority.

## 8. `renice`

**Purpose:** Change the priority (nice value) of an already running process.

- `renice <priority> -p <pid>` – Change the nice value of a process by its PID.
- `renice -n <priority> -u <username>` – Change the nice value of processes owned by a specific user.
- `renice -n -5 -p 1234` – Set the priority of a process with PID 1234 to -5 (higher priority).

## 9. `nohup`

**Purpose:** Run a command immune to hangups (ignores `SIGHUP`), typically used to run commands in the background.

- `nohup <command> &` – Run a command in the background, ignoring hangups.

- `nohup <command> > output.log 2>&1 &` – Redirect the output of a background process to a log file.

## 10. `at`

**Purpose:** Schedule a command to run once at a specified time.

- `at <time>` – Open the `at` prompt to schedule a command.
  - E.g., `at 2:00 PM` or `at now + 1 hour`.
- `atq` – Display the list of pending `at` jobs.
- `atrm <job_id>` – Remove a specific job from the `at` queue.

## 11. `cron` and `crontab`

**Purpose:** Automate tasks by scheduling them to run at regular intervals.

- `crontab -e` – Edit the cron jobs for the current user.
- `crontab -l` – List all cron jobs for the current user.
- `crontab -r` – Remove all cron jobs for the current user.
- `cron` – Start the cron daemon.
- `crontab -u <username> -e` – Edit the cron jobs for a specific user.
- Example cron job syntax:
  - `* * * * * <command>` – Run `<command>` every minute.
  - `0 5 * * * <command>` – Run `<command>` at 5 AM daily.

## 12. `systemctl`

**Purpose:** Control the `systemd` system and service manager (starting, stopping, managing system services).

- `systemctl status <service>` – Show the status of a specific service (e.g., `systemctl status nginx`).
- `systemctl start <service>` – Start a service (e.g., `systemctl start nginx`).
- `systemctl stop <service>` – Stop a service.
- `systemctl restart <service>` – Restart a service.
- `systemctl enable <service>` – Enable a service to start on boot.
- `systemctl disable <service>` – Disable a service from starting on boot.
- `systemctl list-units` – List all active units (services, sockets, etc.).
- `systemctl kill <pid>` – Kill a process using its PID.
- `systemctl show <service>` – Show detailed information about a service.
- `systemctl mask <service>` – Mask a service, preventing it from being started.

## 13. `journalctl`

**Purpose:** Query and display logs from `systemd` journal (logs for processes, services).

- `journalctl` – Show logs for all services and processes.
- `journalctl -u <service>` – Show logs for a specific service (e.g., `journalctl -u nginx`).
- `journalctl -f` – Show real-time logs as they are written (similar to `tail -f`).
- `journalctl -p <priority>` – Filter logs by priority (e.g., `journalctl -p err` shows only error logs).
- `journalctl --since "2023-01-01"` – Show logs since a specific date.

## 14. `strace`

**Purpose:** Trace system calls and signals for a process.

- `strace -p <pid>` – Attach to a running process and trace its system calls.
- `strace -f -p <pid>` – Trace child processes as well.
- `strace <command>` – Run a command and trace its system calls (e.g., `strace ls`).
- `strace -e trace=<syscall>` – Trace a specific system call (e.g., `strace -e trace=open`).

## 15. `lsof`

**Purpose:** List open files and processes using them.

- `lsof` – List all open files on the system.
- `lsof -i :<port>` – List processes using a specific network port.
- `lsof -u <username>` – List open files by a specific user.
- `lsof -p <pid>` – List open files for a specific process by its PID.

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# Process Monitoring and Troubleshooting

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## 16. `uptime`

**Purpose:** Show how long the system has been running, number of users, and load averages.

- `uptime` – Display system uptime, number of users, and load averages for the last 1, 5, and 15 minutes.

## 17. `nice`

**Purpose:** Set the priority (nice value) of a process.

- `nice -n <priority> <command>` – Start a command with a specific priority (e.g., `nice -n 10 command`).
- `nice -n -10 <command>` – Start a command with higher priority (lower nice value).

## 18. `watch`

**Purpose:** Run a command periodically and show the output in real-time.

- `watch <command>` – Run a command every 2 seconds by default.
- `watch -n <seconds> <command>` – Set a custom interval (e.g., `watch -n 5 df -h` runs `df` every 5 seconds).

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These **process management commands** are powerful tools for **DevOps engineers** to monitor, control, and troubleshoot processes on Linux systems. Whether you need to check process status, set priorities, schedule jobs, or investigate resource usage, these commands provide a broad range of capabilities to keep your system and applications running smoothly.

**You said:**

continue with more advance process mgmt cmds used by devops engineer please

ChatGPT said:

Continuing with **more advanced process management commands** for **DevOps engineers** that can be used to monitor, control, and troubleshoot processes, especially in large-scale environments, or when dealing with complex systems. These commands are crucial for managing processes effectively in production systems, handling system resource usage, and debugging applications.

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## Advanced Process Management Commands

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## 19. `systemd-cgls`

**Purpose:** Display the control groups of all processes in the system.

- `systemd-cgls` – Display the control group hierarchy for processes managed by `systemd`.
- `systemd-cgls <service>` – Show the control group of a specific service.
- `systemd-cgls --user` – Show control groups for user-level processes.

## 20. `systemd-analyze`

**Purpose:** Analyze and measure `systemd` startup performance and boot times.

- `systemd-analyze` – Show the total time spent on boot.
- `systemd-analyze blame` – Show which services took the longest to start.
- `systemd-analyze critical-chain` – Show the critical chain of services that directly impact the boot time.
- `systemd-analyze plot > boot-time.svg` – Create a boot time plot (SVG format) for visual analysis.

## 21. `cgroups` (Control Groups)

**Purpose:** Manage resource allocation for processes and services.

- `cgroupcreate -g memory,cpu:/mygroup` – Create a new control group (e.g., `mygroup` for memory and CPU resource management).
- `cgroupset -r memory.limit_in_bytes=100M /mygroup` – Set memory limit for the control group.
- `cgroupexec -g memory,cpu:/mygroup <command>` – Execute a command under a specific control group.
- `cat /sys/fs/cgroup/memory/mygroup/memory.usage_in_bytes` – Show the memory usage of a specific control group.
- `cgroupdelete memory,cpu:/mygroup` – Delete a control group.

## 22. `htop` (Advanced)

**Purpose:** A more advanced and user-friendly version of `top` for process management and monitoring.

- `htop` – Start an interactive process viewer with more features and easier navigation.
- `htop -u <username>` – Show processes belonging to a specific user.
- `htop -p <pid>` – Display information about a specific process.
- `htop -d <delay>` – Set a custom delay between updates in milliseconds (e.g., `htop -d 500` for a 500ms delay).
- `htop -s <column>` – Sort processes by a specific column (e.g., CPU, memory).
- `htop -M` – Show memory usage in the format of MB, GB, etc.

## 23. `perf`

**Purpose:** Performance monitoring and profiling tool for Linux.

- `perf top` – Display a live profile of the processes consuming the most CPU.
- `perf stat <command>` – Collect performance statistics (e.g., CPU cycles, instructions) for a specific command.
- `perf record -p <pid>` – Record performance data for a specific process.
- `perf report` – Show a report of the recorded performance data.



- `perf trace` – Trace system calls and events for a process.
- `perf record -g <command>` – Record a call graph (useful for profiling).

## 24. `lsof` (Advanced Usage)

**Purpose:** List open files, processes using them, and network connections.

- `lsof` – Show all open files by all processes.
- `lsof -i` – Show all network connections (both listening and established).
- `lsof -i :<port>` – List processes using a specific port.
- `lsof -p <pid>` – List files opened by a specific process (given by PID).
- `lsof +D <directory>` – List open files in a specific directory and its subdirectories.
- `lsof -u <username>` – Show all files opened by a specific user.
- `lsof -t -i :<port>` – Get the PID(s) of processes using a specific port (useful for killing processes).

## 25. `killall` (Advanced)

**Purpose:** Kill processes by name rather than PID.

- `killall <process_name>` – Kill all processes with a specific name (e.g., `killall nginx`).
- `killall -u <username>` – Kill all processes owned by a specific user.
- `killall -9 <process_name>` – Forcefully terminate all processes with a specific name.
- `killall -r <pattern>` – Kill processes by matching a regular expression (e.g., `killall -r 'nginx.*'`).

## 26. `strace` (Advanced)

**Purpose:** Trace system calls and signals used by a process.

- `strace -p <pid>` – Attach to a running process and trace its system calls.
- `strace -f <pid>` – Trace child processes as well (e.g., `strace -f -p <pid>`).
- `strace -e trace=<syscall>` – Trace only specific system calls (e.g., `strace -e trace=open`).
- `strace -o <file>` – Write the output of `strace` to a file (e.g., `strace -o output.log <command>`).
- `strace -c <command>` – Report statistics on system calls used by a command.
- `strace -t <command>` – Include timestamps for system calls.

## 27. `time`

**Purpose:** Measure the time a process takes to execute.

- `time <command>` – Display the real time, user time, and system time for executing a command.
- `time -v <command>` – Show detailed timing information, including memory usage, page faults, and I/O operations.
- `time <command> > output.log 2>&1` – Redirect both standard output and error to a file.

## 28. `ftrace`

**Purpose:** Kernel tracing for detailed information on function calls and events.

- `echo function > /sys/kernel/debug/tracing/current_tracer` – Set the tracer to function.
- `cat /sys/kernel/debug/tracing/trace` – View the kernel trace buffer.
- `echo 1 > /sys/kernel/debug/tracing/tracing_on` – Start tracing.
- `echo 0 > /sys/kernel/debug/tracing/tracing_on` – Stop tracing.
- `trace-cmd` – Collect and analyze kernel trace events.

## 29. `dstat`

**Purpose:** Show various system statistics in real time.

- `dstat` – Display general system performance stats like CPU, memory, disk, and network usage.
- `dstat -c` – Show only CPU stats.
- `dstat -d` – Show only disk stats.
- `dstat -n` – Show only network stats.
- `dstat -t` – Display timestamp with each statistic.
- `dstat -g` – Show page faults and garbage collection stats.

## 30. `watch`

**Purpose:** Run a command periodically and show its output in real-time.

- `watch <command>` – Run a command every 2 seconds by default (e.g., `watch df -h`).
- `watch -n <seconds> <command>` – Set the interval in seconds between command executions (e.g., `watch -n 5 uptime`).
- `watch -d <command>` – Highlight the changes in the output.
- `watch -t <command>` – Run the command without showing the header.

## 31. `sysctl`

**Purpose:** Control kernel parameters at runtime, including those related to processes.

- `sysctl -a` – Show all kernel parameters.

- `sysctl vm.overcommit_memory=1` – Set the kernel overcommit memory policy (tune memory management).
- `sysctl -w fs.inotify.max_user_watches=524288` – Increase the maximum number of user watches for inotify.
- `sysctl -p` – Apply changes from the `/etc/sysctl.conf` file.
- `sysctl -w kernel.pid_max=65535` – Set the maximum number of process IDs.

## 32. `ulimit`

**Purpose:** Control user process resource limits.

- `ulimit -a` – Show all current limits (e.g., maximum open files, processes).
- `ulimit -u <number>` – Set the maximum number of processes available to a user.
- `ulimit -n <number>` – Set the maximum number of open file descriptors.
- `ulimit -s <size>` – Set the stack size for processes.
- `ulimit -c <size>` – Set the core dump file size limit.

## 33. `psacct` / `acct`

**Purpose:** Account for process usage and record user activity.

- `ac` – Display the total time spent by users in the system.
- `lastcomm` – Show information about the commands previously executed by users.
- `sa` – Report on CPU time used by all processes.

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These **advanced process management commands** provide **DevOps engineers** with the necessary tools to monitor, control, and optimize processes in a production environment. These tools help in fine-tuning resource management, profiling performance, analyzing system calls, and debugging processes, making them critical for ensuring smooth and efficient operation of systems and applications.

**You said:**

Text Processing cmd with basic to advance with all the important flags in them that can be used by devops engineer please - all the important and basic to advance test processing cmd please include all cmds

**ChatGPT said:**

Here's a comprehensive list of **text processing commands** used in **Linux** systems, ranging from **basic to advanced**, that **DevOps engineers** can use for working with and manipulating text files and data. These commands help in tasks such as searching, filtering, sorting, and transforming text data, which are common requirements for log analysis, configuration file editing, and automating workflows.

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## Basic Text Processing Commands

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### 1. `cat` (Concatenate)

**Purpose:** Display the contents of a file or concatenate multiple files.

- `cat <file>` – Display the content of a file.
- `cat file1 file2` – Concatenate and display the content of multiple files.
- `cat <file> > newfile` – Redirect the content of a file to a new file.
- `cat <file> >> newfile` – Append the content of a file to another file.

### 2. `echo`

**Purpose:** Print text or variables to the terminal or redirect to a file.

- `echo "Hello World"` – Display a simple string.
- `echo $HOME` – Display the value of an environment variable.
- `echo "Hello World" > output.txt` – Write the output to a file.
- `echo -n "Hello"` – Print without a trailing newline.

### 3. `head`

**Purpose:** Display the first few lines of a file.

- `head <file>` – Display the first 10 lines of a file.
- `head -n <number> <file>` – Display the first <number> lines (e.g., `head -n 20 file.txt`).
- `head -c <number> <file>` – Display the first <number> bytes of a file.

### 4. `tail`

**Purpose:** Display the last few lines of a file.

- `tail <file>` – Display the last 10 lines of a file.
- `tail -n <number> <file>` – Display the last <number> lines.
- `tail -f <file>` – Display the last lines of a file and follow it (useful for log files).
- `tail -c <number> <file>` – Display the last <number> bytes of a file.

### 5. `cut`

**Purpose:** Remove sections from each line of a file (often used to extract columns).

- `cut -d':' -f1 <file>` – Display the first field of each line using `:` as the delimiter.
- `cut -d',' -f1,3 <file>` – Display the first and third fields (columns).
- `cut -c 1-10 <file>` – Display the first 10 characters of each line.

## 6. `tr`

**Purpose:** Translate or delete characters from the input.

- `tr 'a-z' 'A-Z'` – Convert lowercase characters to uppercase.
- `echo "hello" | tr 'a-z' 'A-Z'` – Convert lowercase to uppercase using a pipeline.
- `tr -d '[:space:]' <file>` – Delete all spaces from the input file.
- `echo "123 456 789" | tr ' ' '\n'` – Replace spaces with newlines.

## 7. `sort`

**Purpose:** Sort lines in a file or input.

- `sort <file>` – Sort lines of a file alphabetically.
- `sort -n <file>` – Sort lines numerically.
- `sort -r <file>` – Sort lines in reverse order.
- `sort -u <file>` – Sort and remove duplicate lines.
- `sort -k <column_number> <file>` – Sort by a specific column.
- `sort -t, -k1,1 <file>` – Sort a CSV file by the first column.

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# Intermediate Text Processing Commands

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## 8. `grep`

**Purpose:** Search for patterns in text files using regular expressions.

- `grep <pattern> <file>` – Search for a pattern in a file.
- `grep -i <pattern> <file>` – Perform a case-insensitive search.
- `grep -r <pattern> <directory>` – Search recursively through a directory.
- `grep -v <pattern> <file>` – Show lines that do **not** match the pattern.
- `grep -l <pattern> <files>` – Show the names of files that contain the pattern.
- `grep -n <pattern> <file>` – Show line numbers along with matching lines.
- `grep -c <pattern> <file>` – Count the number of lines matching the pattern.

## 9. `sed` (Stream Editor)

**Purpose:** Stream editor for performing basic text transformations.

- `sed 's/old/new/' <file>` – Replace the first occurrence of `old` with `new` in each line.
- `sed 's/old/new/g' <file>` – Replace all occurrences of `old` with `new` in each line.
- `sed -i 's/old/new/g' <file>` – In-place replace all occurrences of `old` with `new`.
- `sed '2d' <file>` – Delete the second line of a file.
- `sed '1,3d' <file>` – Delete lines 1 to 3.
- `sed -n '5,10p' <file>` – Print lines 5 to 10.
- `sed -e 's/foo/bar/g' -e 's/baz/qux/g' <file>` – Apply multiple transformations.

## 10. `awk`

**Purpose:** A powerful programming language for pattern scanning and processing.

- `awk '{print $1}' <file>` – Print the first column of a file.
- `awk '{print $1, $3}' <file>` – Print the first and third columns of a file.
- `awk -F: '{print $1}' <file>` – Set the field delimiter to `:` (useful for `/etc/passwd`).
- `awk '{if ($3 > 50) print $1}' <file>` – Print the first column where the third column is greater than 50.
- `awk '{sum += $2} END {print sum}' <file>` – Calculate the sum of the second column.
- `awk 'BEGIN {FS=","} {print $1, $2}' <file>` – Use a comma as the field separator and print the first and second columns.

## 11. `uniq`

**Purpose:** Report or omit repeated lines in a file.

- `uniq <file>` – Display only unique lines in a file.
- `uniq -c <file>` – Display the count of occurrences for each unique line.
- `uniq -d <file>` – Show only the duplicate lines.
- `sort <file> | uniq` – Remove duplicate lines (sort first to group duplicates).

## 12. `wc` (Word Count)

**Purpose:** Count lines, words, and characters in a file.

- `wc <file>` – Display the line, word, and byte counts for a file.
- `wc -l <file>` – Display only the line count.
- `wc -w <file>` – Display only the word count.
- `wc -c <file>` – Display only the byte count.

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## Advanced Text Processing Commands

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### 13. tee

**Purpose:** Read from standard input and write to both standard output and files simultaneously.

- `command | tee <file>` – Save the output of a command to a file and display it on the terminal.
- `command | tee -a <file>` – Append output to a file rather than overwriting it.
- `command | tee >(command2)` – Pipe the output to another command in parallel.

### 14. diff

**Purpose:** Compare files line by line.

- `diff <file1> <file2>` – Compare two files and show differences.
- `diff -u <file1> <file2>` – Show differences in unified format (easier to read).
- `diff -r <dir1> <dir2>` – Recursively compare two directories.
- `diff -q <file1> <file2>` – Show only whether files differ or not (suppress detailed output).

### 15. cut with Delimiters

**Purpose:** Extract specific sections of text or files.

- `cut -d, -f1,2 <file>` – Extract the first and second fields from a comma-separated file.
- `cut -f1,3 -d" " <file>` – Extract the first and third fields, using space as delimiter.

### 16. paste

**Purpose:** Merge lines of files.

- `paste file1 file2` – Merge lines from two files side by side, separated by tabs.
- `paste -d, file1 file2` – Merge files side by side, using a comma as a delimiter.

### 17. sort with Advanced Options

**Purpose:** Sort text or files with advanced options.

- `sort -t, -k2,2 <file>` – Sort a comma-separated file by the second column.
- `sort -k2 -n <file>` – Sort the second column numerically.
- `sort -u <file>` – Sort and remove duplicate lines.

### 18. column

**Purpose:** Format text into neatly aligned columns.

- `column -t <file>` – Format the file content into neatly aligned columns.
- `echo -e "a b c\nd e f" | column -t` – Convert space-separated text into columns.

## 19. `sed` with Regular Expressions

**Purpose:** Perform complex text transformations using regex.

- `sed 's/\b[a-z]/\U&/g' <file>` – Capitalize the first letter of each word using word boundaries (`\b`).
- `sed 's/\([0-9]\)/[\1]/g' <file>` – Add square brackets around digits.
- `sed 's/(.*)/prefix_\1/' <file>` – Add a prefix to each line of the file.

## 20. `xargs`

**Purpose:** Build and execute commands from input.

- `find . -name "*.log" | xargs rm` – Delete all `.log` files found by `find`.
- `echo "file1 file2 file3" | xargs cp -t /destination/` – Copy multiple files to a directory.
- `cat file_list.txt | xargs -n 1 curl -O` – Download a list of files from URLs specified in a file.

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## Log Analysis and File Search

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## 21. `grep` with Regular Expressions

**Purpose:** Search for complex patterns in files using regular expressions.

- `grep -P '^d{4}-d{2}-d{2}' <file>` – Search for lines that match a specific date format (e.g., `YYYY-MM-DD`).
- `grep -E '^start|end$' <file>` – Search for lines that match either "start" or "end" at the beginning or end of a line.

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These **text processing commands** help **DevOps engineers** efficiently manipulate, filter, search, and transform text data, especially for handling logs, configuration files, system outputs, and other data sources. From simple tasks like extracting columns to more complex ones involving regular expressions and automated processing with `xargs`, these commands are vital for automating workflows and managing large volumes of textual data.

**You said:**



continue with text processing cmds please

ChatGPT said:

Certainly! Here is a **continuation of advanced text processing commands for DevOps engineers**. These commands provide additional capabilities for working with and manipulating text, whether you're dealing with large logs, system outputs, or complex data transformations.

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## More Advanced Text Processing Commands

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### 22. `split`

**Purpose:** Split a file into pieces based on lines or size.

- `split <file>` – Split a file into multiple smaller files (default splits by 1000 lines).
- `split -l <number> <file>` – Split the file into chunks of `<number>` lines (e.g., `split -l 500 file.txt`).
- `split -b <size> <file>` – Split the file into chunks of a specified size (e.g., `split -b 10M file.txt`).
- `split -d -l <number> <file>` – Use numeric suffixes instead of alphabetical ones.
- `split -a <length> <file>` – Set the length of the suffix (default is 2 characters).

### 23. `fmt`

**Purpose:** Simple text formatter that formats text to a specific width.

- `fmt <file>` – Format the text to a default width of 75 characters.
- `fmt -w <width> <file>` – Set a specific line width (e.g., `fmt -w 50 file.txt`).
- `fmt -c <file>` – Display the file with the original spacing and paragraph structure.

### 24. `tr` (Advanced)

**Purpose:** Perform advanced transformations on characters.

- `echo "aabbcc" | tr -d "a"` – Delete all occurrences of the character "a".
- `echo "hello" | tr 'a-z' 'A-Z'` – Convert lowercase letters to uppercase.
- `echo "hello 123" | tr -cd '[:alnum:]'` – Delete everything except alphanumeric characters (letters and numbers).
- `echo "hello world" | tr ' ' '\n'` – Replace spaces with newlines.

### 25. `n1`

**Purpose:** Number the lines of a file.

- `nl <file>` – Number the lines of a file.
- `nl -ba <file>` – Number all lines, including empty lines.
- `nl -s ' - ' <file>` – Customize the separator between the line number and text (e.g., using ' - ').
- `nl -n ln <file>` – Number lines with leading zeros.

## 26. `comm`

**Purpose:** Compare two sorted files line by line.

- `comm <file1> <file2>` – Compare two files line by line and output three columns: lines only in `file1`, lines only in `file2`, and common lines.
- `comm -1 <file1> <file2>` – Suppress lines that appear only in the first file.
- `comm -2 <file1> <file2>` – Suppress lines that appear only in the second file.
- `comm -3 <file1> <file2>` – Suppress lines that appear in both files.

## 27. `tee` with Multiple Output Files

**Purpose:** Write to multiple files simultaneously while also displaying output on the terminal.

- `command | tee file1 file2` – Write output to both `file1` and `file2` and also display it on the terminal.
- `command | tee -a file1` – Append the output of a command to `file1`.

## 28. `paste` with Custom Delimiters

**Purpose:** Merge lines of files side by side with custom delimiters.

- `paste file1 file2` – Merge two files side by side with a tab delimiter.
- `paste -d, file1 file2` – Use a comma as a delimiter.
- `paste -d'|' file1 file2` – Use a pipe (`|`) as a delimiter.
- `paste -s file1 file2` – Paste lines of the files serially (as opposed to side by side).

## 29. `rev`

**Purpose:** Reverse the lines of a file.

- `rev <file>` – Reverse the characters of each line in the file.
- `echo "hello" | rev` – Reverse the string "hello" to "olleh".

## 30. `xargs` (Advanced)

**Purpose:** Construct argument lists and execute commands using input from standard input or files.

- `find . -name "*.txt" | xargs wc -l` – Count the lines in all `.txt` files in the current directory and subdirectories.
- `echo "file1 file2" | xargs -n 1 cp` – Copy each file one by one.
- `echo "file1 file2 file3" | xargs -I {} mv {} /destination/` – Move multiple files to a specific directory using placeholders.
- `find /path -type f -print0 | xargs -0 rm` – Delete files safely with handling special characters (using `-0` and `-print0`).

### 31. `sort` with Complex Sorting

**Purpose:** Sort files based on different criteria (e.g., numeric, by column).

- `sort <file>` – Sort a file alphabetically.
- `sort -n <file>` – Sort the file numerically (useful for numbers instead of alphabetical sorting).
- `sort -r <file>` – Sort in reverse order.
- `sort -k2 <file>` – Sort by the second column.
- `sort -t, -k2,2 <file>` – Sort a CSV file by the second column (using comma as the delimiter).

### 32. `grep` with Extended Regular Expressions

**Purpose:** Use advanced regular expressions for more complex pattern matching.

- `grep -E 'foo|bar' <file>` – Search for "foo" or "bar" (extended regular expressions).
- `grep -P '\d{3}-\d{2}-\d{4}' <file>` – Use Perl-compatible regex to search for a social security number pattern.
- `grep -o 'foo.*' <file>` – Output only the matched portion of the lines that contain "foo" and everything after it.

### 33. `sed` for In-place Editing

**Purpose:** Edit files directly and apply transformations.

- `sed -i 's/old/new/g' <file>` – In-place replace all occurrences of `old` with `new` in the file.
- `sed -i '1s/^/Hello /' <file>` – Add "Hello " at the beginning of the first line in the file.
- `sed -i 's/^[^ ]*/&t/' <file>` – Insert a tab after the first word in each line.
- `sed -i '/pattern/d' <file>` – Delete all lines containing a specific pattern.

### 34. `awk` (Advanced Usage)

**Purpose:** Use `awk` for advanced text processing with pattern matching and text transformation.

- `awk '{print $1, $2}' <file>` – Print the first two fields (columns) of a file.
  - `awk '$1 > 100 {print $1, $2}' <file>` – Print the first and second columns where the first column is greater than 100.
  - `awk -F, '{print $1, $3}' <file>` – Use comma as a field separator and print the first and third columns.
  - `awk 'BEGIN {FS=":"} {print $1}' <file>` – Set the field separator to colon and print the first column.
  - `awk '{sum += $2} END {print sum}' <file>` – Sum the values in the second column and print the result at the end.
- 

## Working with JSON and XML

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### 35. `jq`

**Purpose:** Process JSON data (a powerful tool for working with structured data).

- `cat file.json | jq .` – Pretty-print the contents of a JSON file.
- `cat file.json | jq '.key'` – Extract the value of a specific key.
- `cat file.json | jq '.items[] | .name'` – Extract the "name" field from all items in an array.
- `cat file.json | jq '.user | {name: .name, age: .age}'` – Extract specific keys and output them in a new structure.
- `cat file.json | jq '.users | length'` – Get the number of elements in a JSON array.

### 36. `xmlstarlet`

**Purpose:** Process and transform XML data.

- `xmlstarlet fo <file.xml>` – Format an XML file (prettify).
  - `xmlstarlet sel -t -v "//name" <file.xml>` – Extract all values of the `<name>` tag.
  - `xmlstarlet ed -d "//book[price>100]" <file.xml>` – Delete all `<book>` elements where the price is greater than 100.
  - `xmlstarlet fo file.xml > file_pretty.xml` – Format an XML file and save it.
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## Log Processing

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## 37. logrotate

**Purpose:** Rotate logs and manage log files.

- `/etc/logrotate.conf` – Configuration file for log rotation settings.
  - `logrotate -d /etc/logrotate.conf` – Debug and simulate the log rotation process.
  - `logrotate -f /etc/logrotate.conf` – Force a log rotation based on the configuration file.
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## Miscellaneous Advanced Text Processing Commands

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### 38. fmt for Text Wrapping

**Purpose:** Automatically wrap text at a specific line length.

- `fmt -w <width> <file>` – Wrap text to a specified width (e.g., `fmt -w 50` to wrap lines at 50 characters).
  - `fmt -c <file>` – Format a file while preserving the original structure.
- 

These **advanced text processing commands** provide **DevOps engineers** with powerful tools to manipulate, transform, and filter large datasets, configuration files, logs, and other text-based data. By combining commands such as `awk`, `sed`, `grep`, `jq`, and `xmlstarlet`, engineers can automate complex tasks, analyze logs, and process structured data with precision. These commands are essential for managing configurations, processing logs, and transforming data across systems.

**You said:**

Compression and Archiving

ChatGPT said:

Here's a detailed list of **compression and archiving commands** used by **DevOps engineers** for managing file compression, archiving, and extraction in **Linux** systems. These commands help you compress large files, create archives, and extract content in an efficient manner, especially useful for backup, file transfer, and system administration.

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# Compression and Archiving Commands

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## 1. tar (Tape Archive)

**Purpose:** Create archives and extract files.

- `tar -cf archive.tar <files>` – Create an uncompressed archive from files or directories.
- `tar -czf archive.tar.gz <files>` – Create a `.tar.gz` compressed archive (gzip).
- `tar -cjf archive.tar.bz2 <files>` – Create a `.tar.bz2` compressed archive (bzip2).
- `tar -cJf archive.tar.xz <files>` – Create a `.tar.xz` compressed archive (xz).
- `tar -xf archive.tar` – Extract files from a `.tar` archive.
- `tar -xzf archive.tar.gz` – Extract files from a `.tar.gz` archive.
- `tar -xjf archive.tar.bz2` – Extract files from a `.tar.bz2` archive.
- `tar -xJf archive.tar.xz` – Extract files from a `.tar.xz` archive.
- `tar -tvf archive.tar` – List the contents of a `.tar` archive without extracting.
- `tar -xzvf archive.tar.gz` – Extract a `.tar.gz` archive with verbose output.
- `tar -cf archive.tar --exclude='*.log' <directory>` – Create an archive excluding `.log` files.

## 2. gzip

**Purpose:** Compress files using the `gzip` algorithm.

- `gzip <file>` – Compress a file to `.gz` format (e.g., `file.txt` becomes `file.txt.gz`).
- `gzip -d <file.gz>` – Decompress a `.gz` file.
- `gzip -c <file>` – Compress a file and write to `stdout`, leaving the original file intact.
- `gzip -k <file>` – Keep the original file while compressing.
- `gzip -r <directory>` – Compress all files in a directory recursively.
- `gzip -l <file.gz>` – Display information about a compressed file.

## 3. gunzip

**Purpose:** Decompress files that were compressed with `gzip`.

- `gunzip <file.gz>` – Decompress a `.gz` file.
- `gunzip -c <file.gz>` – Decompress a `.gz` file and write the output to `stdout`.
- `gunzip -k <file.gz>` – Decompress a `.gz` file and keep the original file.

## 4. bzip2

**Purpose:** Compress files using the `bzip2` algorithm.

- `bzip2 <file>` – Compress a file to `.bz2` format.
- `bzip2 -d <file.bz2>` – Decompress a `.bz2` file.
- `bzip2 -c <file>` – Compress a file and write the output to `stdout`.
- `bzip2 -k <file>` – Keep the original file while compressing.
- `bzip2 -z <file>` – Compress a file using `bzip2`.
- `bzip2 -l <file.bz2>` – Display compression statistics of a `.bz2` file.

## 5. `bunzip2`

**Purpose:** Decompress files that were compressed with `bzip2`.

- `bunzip2 <file.bz2>` – Decompress a `.bz2` file.
- `bunzip2 -k <file.bz2>` – Decompress and keep the original `.bz2` file.

## 6. `xz`

**Purpose:** Compress files using the `xz` algorithm, which provides higher compression ratios.

- `xz <file>` – Compress a file to `.xz` format.
- `xz -d <file.xz>` – Decompress a `.xz` file.
- `xz -c <file>` – Compress a file and write to `stdout`, leaving the original file intact.
- `xz -k <file>` – Keep the original file while compressing.
- `xz -r <directory>` – Compress all files in a directory recursively.
- `xz -l <file.xz>` – Display information about a `.xz` file.
- `xz -z <file>` – Compress a file with `xz`.

## 7. `7z` (7-Zip)

**Purpose:** High compression file archiver, supports multiple formats.

- `7z a archive.7z <files>` – Create a `.7z` archive from files.
- `7z x archive.7z` – Extract files from a `.7z` archive.
- `7z t archive.7z` – Test the integrity of a `.7z` archive.
- `7z l archive.7z` – List the contents of a `.7z` archive.
- `7z e archive.7z` – Extract files from a `.7z` archive (without directory structure).
- `7z a archive.7z -p<password> <files>` – Create an encrypted archive with a password.

## 8. `zip`

**Purpose:** Create and extract `.zip` archives.

- `zip archive.zip <files>` – Create a `.zip` archive.
- `zip -r archive.zip <directory>` – Recursively zip all files in a directory.
- `zip -e archive.zip <files>` – Create an encrypted `.zip` archive.

- `zip -d archive.zip <file>` – Delete a file from a `.zip` archive.
- `zip -u archive.zip <file>` – Update an existing `.zip` archive by adding new files.
- `unzip archive.zip` – Extract files from a `.zip` archive.
- `unzip -l archive.zip` – List the contents of a `.zip` archive.
- `unzip -d <directory> archive.zip` – Extract the `.zip` archive into a specific directory.

## 9. unzip

**Purpose:** Extract files from `.zip` archives.

- `unzip <file.zip>` – Extract a `.zip` archive.
- `unzip -d <directory> <file.zip>` – Extract to a specific directory.
- `unzip -l <file.zip>` – List the contents of a `.zip` archive without extracting.
- `unzip -o <file.zip>` – Overwrite existing files when extracting.

## 10. rar and unrar

**Purpose:** Create and extract `.rar` archives.

- `rar a archive.rar <files>` – Create a `.rar` archive.
- `unrar x archive.rar` – Extract the contents of a `.rar` archive.
- `unrar l archive.rar` – List the contents of a `.rar` archive.
- `unrar e archive.rar` – Extract files to the current directory.

## 11. zstd (Zstandard)

**Purpose:** Fast compression algorithm, often used in modern applications.

- `zstd <file>` – Compress a file using `zstd` (creates a `.zst` file).
- `zstd -d <file.zst>` – Decompress a `.zst` file.
- `zstd -c <file>` – Compress a file to `stdout`, keeping the original.
- `zstd -k <file>` – Compress a file while keeping the original file.

## 12. ar

**Purpose:** Create, modify, and extract from archive files (commonly used for creating `.deb` packages).

- `ar -cvf archive.a <files>` – Create an archive `.a` file.
  - `ar -x archive.a` – Extract files from an archive `.a` file.
  - `ar -t archive.a` – List the contents of an archive `.a` file.
-



## Compression/Archiving with File Management Tools

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### 13. `rsync`

**Purpose:** Efficient file synchronization and transfer, including compression.

- `rsync -av <source> <destination>` – Copy files from source to destination while preserving attributes.
  - `rsync -avz <source> <destination>` – Compress files during transfer using `gzip` compression.
  - `rsync -avz --delete <source> <destination>` – Synchronize directories and delete files in the destination that no longer exist in the source.
  - `rsync -z` – Compress file data during the transfer.
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## Using Compression/Archiving for Backup and Automation

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### 14. `tar` for Backup

**Purpose:** Create a backup of a directory or entire system.

- `tar -czf backup.tar.gz <directory>` – Create a compressed backup of a directory.
- `tar -czf backup.tar.gz --exclude='*.log' <directory>` – Exclude specific file types (e.g., `.log` files) from the backup.
- `tar -czf backup_$(date +%F).tar.gz <directory>` – Create a date-stamped backup archive.
- `tar -xzf backup.tar.gz -C /path/to/restore/` – Extract backup to a specific directory.

### 15. `logrotate`

**Purpose:** Automatically rotate, compress, and remove old log files.

- `/etc/logrotate.conf` – The main configuration file for `logrotate`.
  - `logrotate -d /etc/logrotate.conf` – Debug and simulate log rotation.
  - `logrotate -f /etc/logrotate.conf` – Force the rotation of logs according to the configuration file.
-

These **compression and archiving commands** are critical for **DevOps engineers** to manage data efficiently, create backups, transfer files, and maintain system logs. The combination of utilities like `tar`, `gzip`, `bzip2`, `xz`, and `zip`, among others, offers flexibility and performance in compressing and archiving large datasets, handling system backups, and reducing the amount of storage required for long-term data retention. These tools are essential for automating the backup process, handling large log files, and transferring data between servers.

**You said:**

continue with text processing cmds

**ChatGPT said:**

Continuing with more **advanced text processing commands** for **DevOps engineers**, these tools and commands are essential for automating tasks, analyzing logs, processing structured data, and manipulating large datasets in a variety of formats. These commands allow you to filter, transform, and format text, and can be particularly useful for working with log files, configuration files, and large data streams.

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## Advanced Text Processing Commands (Continued)

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### 16. `sort` with Complex Options

**Purpose:** Sort lines in text files or output streams based on various criteria.

- `sort -t',' -k2,2 <file>` – Sort a CSV file by the second column (using a comma as the delimiter).
- `sort -k1,1n -k2,2r <file>` – Sort first by the first column (numerically), then by the second column (in reverse order).
- `sort -u <file>` – Sort and remove duplicate lines.
- `sort -o sorted.txt <file>` – Sort the file and output the result into a new file.
- `sort -n -k3 <file>` – Sort a file numerically based on the third column.

### 17. `uniq` with Advanced Flags

**Purpose:** Filter out duplicate lines in a file or stream of text.

- `uniq <file>` – Remove consecutive duplicate lines from a file.
- `uniq -c <file>` – Prefix each line with the count of occurrences.
- `uniq -d <file>` – Display only lines that are duplicated.
- `uniq -u <file>` – Display only unique lines (lines that are not repeated).
- `sort <file> | uniq -c` – Sort a file first and then count duplicates.

## 18. **grep** with Extended and Perl-Compatible Regex

**Purpose:** Perform complex pattern matching using regular expressions.

- `grep -P 'pattern' <file>` – Use Perl-compatible regular expressions (PCRE) to search.
- `grep -E 'pattern' <file>` – Use extended regular expressions (ERE).
- `grep -o 'pattern' <file>` – Print only the matched part of the lines, rather than the entire line.
- `grep -A <num> <pattern> <file>` – Show <num> lines after the matching line.
- `grep -B <num> <pattern> <file>` – Show <num> lines before the matching line.
- `grep -C <num> <pattern> <file>` – Show <num> lines before and after the matching line.

## 19. **sed** (Stream Editor) with Advanced Patterns

**Purpose:** Use `sed` for complex text replacements, substitutions, and transformations.

- `sed 's/\b[[:alpha:]]*/\U&/g' <file>` – Capitalize every word in a file.
- `sed 's/^\([0-9]\)/[\1]/g' <file>` – Add square brackets around digits at the start of lines.
- `sed -n 's/hello/world/p' <file>` – Replace 'hello' with 'world' and print only lines that match.
- `sed -i 's/foo/bar/g' <file>` – Replace all occurrences of `foo` with `bar` in place (modifying the file).
- `sed '2d' <file>` – Delete the second line of a file.
- `sed '/pattern/d' <file>` – Delete lines that match a pattern.

## 20. **awk** (Advanced Usage)

**Purpose:** Powerful programming language for pattern scanning and processing.

- `awk '{print $1}' <file>` – Print the first column of each line.
- `awk '{sum += $2} END {print sum}' <file>` – Calculate the sum of the second column.
- `awk 'BEGIN {FS=":"} {print $1}' <file>` – Set the field separator to colon (:) and print the first column.
- `awk '{if ($3 > 50) print $1, $3}' <file>` – Print the first and third columns where the third column is greater than 50.
- `awk '{print NR, $0}' <file>` – Print line number along with the entire line.
- `awk 'BEGIN {OFS="\t"} {print $1, $2}' <file>` – Set the output field separator (OFS) to a tab and print the first and second columns.

## 21. **find** with **exec** for Advanced Text Processing

**Purpose:** Combine `find` with other commands for powerful search and text processing.

- `find . -name "*.log" -exec cat {} \;` – Find all `.log` files and print their contents.
- `find . -name "*.txt" -exec sed -i 's/foo/bar/g' {} \;` – Replace "foo" with "bar" in all `.txt` files.
- `find . -name "*.log" -exec grep -H "error" {} \;` – Search for "error" in all `.log` files and show the filename.
- `find . -type f -exec awk '{print $1}' {} \;` – Print the first column from all files found.

## 22. `xargs` with Multiple Arguments

**Purpose:** Build and execute commands from standard input, handle multiple arguments.

- `find . -name "*.log" | xargs wc -l` – Count lines in all `.log` files found by `find`.
- `echo "file1 file2 file3" | xargs -n 1 cp` – Copy each file one by one to a destination.
- `echo "file1 file2 file3" | xargs -I {} mv {} /destination/` – Move multiple files to a specific directory.
- `echo "file1 file2 file3" | xargs -n 2 rm` – Delete files in pairs (run `rm` twice for every two files).

## 23. `tee` with Filters

**Purpose:** Read from standard input, write to both standard output and files.

- `echo "output" | tee file.txt` – Write the output to `file.txt` and also display it on the terminal.
- `echo "output" | tee >(grep "pattern")` – Send the output to a filter and display the results.
- `echo "output" | tee file1 file2` – Write the output to multiple files.

## 24. `tr` for Multi-character Replacement

**Purpose:** Transform or delete characters.

- `echo "hello world" | tr 'a-z' 'A-Z'` – Convert all lowercase letters to uppercase.
- `echo "foo 123 bar" | tr -d '[:digit:]'` – Remove all digits from the input.
- `echo "apple banana cherry" | tr ' ' '\n'` – Replace spaces with newlines to separate words.
- `echo "a,b,c" | tr ',' ';'`  – Replace commas with semicolons.

## 25. `n1` (Number Lines)

**Purpose:** Number the lines in a file.

- `nl <file>` – Number the lines in the file.
- `nl -ba <file>` – Number all lines, including empty ones.
- `nl -s ' ' <file>` – Set the separator between the line number and text to a space.
- `nl -n ln <file>` – Use leading zeros for line numbers.

## 26. `split` with Custom File Sizes

**Purpose:** Split a file into smaller files based on size or number of lines.

- `split -l <lines> <file>` – Split the file into smaller files, each containing <lines> lines.
- `split -b <size> <file>` – Split the file into smaller files, each of size <size> (e.g., `split -b 5M file.txt` to split into 5MB chunks).
- `split -d -l <lines> <file>` – Use numeric suffixes instead of the default alphabetic ones.

## 27. `column` for Formatted Output

**Purpose:** Format text into neat columns.

- `column -t <file>` – Format the contents of a file into neatly aligned columns.
- `echo -e "a b c\nd e f" | column -t` – Convert space-separated text into aligned columns.
- `cat file.txt | column -s ',' -t` – Format comma-separated values into columns.

## 28. `logrotate` for Automated Log File Management

**Purpose:** Automatically rotate, compress, and manage log files.

- `logrotate /etc/logrotate.conf` – Apply log rotation rules specified in the configuration file.
- `logrotate -d /etc/logrotate.conf` – Dry-run to simulate log rotation.
- `logrotate -f /etc/logrotate.conf` – Force log rotation regardless of the time interval.
- `/etc/logrotate.d/<service>` – Service-specific configuration files for rotating logs (e.g., for Apache, MySQL).

## 29. `jq` for JSON Processing

**Purpose:** Parse and manipulate JSON data.

- `cat file.json | jq .` – Pretty-print the JSON content of a file.
- `cat file.json | jq '.key'` – Extract the value of a specific key.

- `cat file.json | jq '.users[] | .name'` – Extract the "name" field from each element of an array.
  - `cat file.json | jq '.user | {name: .name, age: .age}'` – Extract specific keys and output them in a custom structure.
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These **advanced text processing commands** provide the **DevOps engineer** with a full suite of tools to manipulate, search, format, and transform text data in Linux-based systems. These commands are vital for tasks such as log file analysis, data extraction, file transformation, and automating workflows. By mastering these commands, engineers can automate the management of configurations, system outputs, and complex datasets efficiently.



ChatGPT can make mistakes. Check important info.



