Red Hat Enterprise Linux Cheatsheet

Essential commands for system administration and operations

This cheatsheet provides a quick reference to fundamental RHEL commands, system administration tasks, and advanced features, ideal for both beginners and experienced system administrators for efficient Linux operations.

System Information
Check system status and details

File Operations
Navigate and manage files

Package Management
Install and manage software

Service Management
Control system services

User Management
Manage users and permissions

System Information & Monitoring

System Version: `cat /etc/redhat-release`

Display the RHEL version and release information.

```
# Show RHEL version
cat /etc/redhat-release
# Alternative method
cat /etc/os-release
# Show kernel version
uname -r
# Show system architecture
uname -m
```

System Performance: `top` / `htop`

Display running processes and system resource usage.

```
# Real-time process monitor
top
# Enhanced process viewer (if installed)
htop
# Show process tree
pstree
# Show all processes
ps aux
```

Memory Information: `free` / `cat /proc/meminfo`

Display memory usage and availability.

```
# Show memory usage in human-readable format
free -h
# Show detailed memory information
cat /proc/meminfo
# Show swap usage
swapon --show
```

Disk Usage: `df` / `du`

Monitor filesystem and directory usage.

```
# Show filesystem usage
df -h
# Show directory sizes
du -sh /var/log/*
# Show largest directories
du -h --max-depth=1 / | sort -hr
```

System Uptime: `uptime` / `who`

Check system uptime and logged-in users.

```
# Show system uptime and load
uptime
# Show logged-in users
who
# Show current user
whoami
# Show last logins
last
```

Hardware Information: `lscpu` / `lsblk`

Display hardware components and configuration.

```
# Show CPU information
lscpu
# Show block devices
lsblk
# Show PCI devices
lspci
# Show USB devices
lsusb
```

Package Management

Manage software packages using yum/dnf for RHEL systems.

01

Package Installation: `dnf install` / `yum install`

Install software packages and dependencies.

```
# Install a package (RHEL 8+)
sudo dnf install package-name
# Install a package (RHEL 7)
sudo yum install package-name
# Install local RPM file
sudo rpm -i package.rpm
# Install from specific repository
sudo dnf install --enablerepo=repo-name package
```

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Package Updates: `dnf update` / `yum update`

Update packages to the latest versions.

```
# Update all packages
sudo dnf update
# Update specific package
sudo dnf update package-name
# Check for available updates
dnf check-update
# Update security patches only
sudo dnf update --security
```

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Package Information: `dnf info` / `rpm -q`

Query package information and dependencies.

```
# Show package information
dnf info package-name
# List installed packages
rpm -qa
# Search for packages
dnf search keyword
# Show package dependencies
dnf deplist package-name
```

File & Directory Operations

Navigation: `cd` / `pwd` / `ls`

Navigate filesystem and list contents.

```
# Change directory
cd /path/to/directory
# Show current directory
pwd
# List files and directories
ls -la
# List with file sizes
ls -lh
# Show hidden files
ls -a
```

File Operations: `cp` / `mv` / `rm`

Copy, move, and delete files and directories.

```
# Copy file
cp source.txt destination.txt
# Copy directory recursively
cp -r /source/dir/ /dest/dir/
# Move/rename file
mv oldname.txt newname.txt
# Remove file
rm filename.txt
# Remove directory recursively
rm -rf directory/
```

File Content: `cat` / `less` / `head` / `tail`

View and examine file contents.

```
# Display file content
cat filename.txt
# View file page by page
less filename.txt
# Show first 10 lines
head filename.txt
# Show last 10 lines
tail filename.txt
# Follow log file in real-time
tail -f /var/log/messages
```

File Permissions: `chmod` / `chown` / `chgrp`

Manage file permissions and ownership.

```
# Change file permissions
chmod 755 script.sh
# Change file ownership
sudo chown user:group filename.txt
# Change group ownership
sudo chgrp newgroup filename.txt
# Recursive permission change
sudo chmod -R 644 /path/to/directory/
```

File Search: `find` / `locate` / `grep`

Search for files and content within files.

```
# Find files by name
find /path -name "*.txt"
# Find files by size
find /path -size +100M
# Search text in files
grep "pattern" filename.txt
# Recursive text search
grep -r "pattern" /path/to/directory/
```

Archive & Compression: `tar` / `gzip`

Create and extract compressed archives.

```
# Create tar archive
tar -czf archive.tar.gz /path/to/directory/
# Extract tar archive
tar -xzf archive.tar.gz
# Create zip archive
zip -r archive.zip /path/to/directory/
# Extract zip archive
unzip archive.zip
```

Service Management

Service Control: `systemctl`

Manage system services using systemd.

```
# Start a service
sudo systemctl start service-name
# Stop a service
sudo systemctl stop service-name
# Restart a service
sudo systemctl restart service-name
# Check service status
systemctl status service-name
# Enable service at boot
sudo systemctl enable service-name
# Disable service at boot
sudo systemctl disable service-name
```

Service Information: `systemctl list-units`

List and query system services.

```
# List all active services
systemctl list-units --type=service
# List all enabled services
systemctl list-unit-files --type=service --state=enabled
# Show service dependencies
systemctl list-dependencies service-name
```

System Logs: `journalctl`

View and analyze system logs using journald.

```
# View all logs
journalctl
# View logs for specific service
journalctl -u service-name
# Follow logs in real-time
journalctl -f
# View logs from last boot
journalctl -b
# View logs by time range
journalctl --since "2024-01-01" --until "2024-01-31"
```

Process Management: `ps` / `kill` / `killall`

Monitor and control running processes.

```
# Show running processes
ps aux
# Kill process by PID
kill 1234
# Kill process by name
killall process-name
# Force kill process
kill -9 1234
# Show process hierarchy
pstree
```

User & Group Management

Manage user accounts, groups, and access control.

User Management: `useradd` / `usermod` / `userdel`

Create, modify, and delete user accounts.

```
# Add new user
sudo useradd -m username
# Set user password
sudo passwd username
# Modify user account
sudo usermod -aG groupname username
# Delete user account
sudo userdel -r username
# Lock user account
sudo usermod -L username
```

Group Management: `groupadd` / `groupmod` / `groupdel`

Create, modify, and delete groups.

```
# Add new group
sudo groupadd groupname
# Add user to group
sudo usermod -aG groupname username
# Remove user from group
sudo gpasswd -d username groupname
# Delete group
sudo groupdel groupname
# List user groups
groups username
```

Access Control: `su` / `sudo`

Switch users and execute commands with elevated privileges.

```
# Switch to root user
su -
# Switch to specific user
su - username
# Execute command as root
sudo command
# Edit sudoers file
sudo visudo
# Check sudo permissions
sudo -l
```

Network Configuration

Configure and troubleshoot network connections.

Network Information: `ip` / `nmcli`

Display network interface and configuration details.

```
# Show network interfaces
ip addr show
# Show routing table
ip route show
# Show network manager connections
nmcli connection show
# Show interface status
nmcli device status
```

Network Configuration: `nmtui` / `nmcli`

Configure network settings using NetworkManager.

```
# Text-based network configuration
sudo nmtui
# Add new connection
sudo nmcli connection add type ethernet con-name "eth0" ifname eth0
# Modify connection
sudo nmcli connection modify "eth0" ipv4.addresses 192.168.1.100/24
# Activate connection
sudo nmcli connection up "eth0"
```

Network Testing: `ping` / `curl` / `wget`

Test network connectivity and download files.

```
# Test connectivity
ping google.com
# Test specific port
telnet hostname 80
# Download file
wget http://example.com/file.txt
# Test HTTP requests
curl -I http://example.com
```

Firewall Management: `firewall-cmd`

Configure firewall rules using firewalld.

```
# Show firewall status
sudo firewall-cmd --state
# List active zones
sudo firewall-cmd --get-active-zones
# Add service to firewall
sudo firewall-cmd --permanent --add-service=http
# Reload firewall rules
sudo firewall-cmd --reload
```

Storage Management

Manage disks, filesystems, and logical volumes.

Disk Management: `fdisk` / `parted`

Create and manage disk partitions.

```
# List disk partitions
sudo fdisk -l
# Interactive partition editor
sudo fdisk /dev/sda
# Create partition table
sudo parted /dev/sda mklabel gpt
# Create new partition
sudo parted /dev/sda mkpart primary ext4 1MiB 100GiB
```

Filesystem Management: `mkfs` / `mount`

Create filesystems and mount storage devices.

```
# Create ext4 filesystem
sudo mkfs.ext4 /dev/sda1
# Mount filesystem
sudo mount /dev/sda1 /mnt/data
# Unmount filesystem
sudo umount /mnt/data
# Check filesystem
sudo fsck /dev/sda1
```

LVM Management: `pvcreate` / `vgcreate` / `lvcreate`

Manage Logical Volume Manager (LVM) storage.

```
# Create physical volume
sudo pvcreate /dev/sdb
# Create volume group
sudo vgcreate vg_data /dev/sdb
# Create logical volume
sudo lvcreate -L 10G -n lv_data vg_data
# Extend logical volume
sudo lvextend -L +5G /dev/vg_data/lv_data
```

Mount Configuration: `/etc/fstab`

Configure permanent mount points.

```
# Edit fstab file
sudo vi /etc/fstab
# Test fstab entries
sudo mount -a
# Show mounted filesystems
mount | column -t
```

Security & SELinux

Configure system security and SELinux policies.

SELinux Management: `getenforce` / `setenforce`

Control SELinux enforcement and policies.

```
# Check SELinux status
getenforce
# Set SELinux to permissive
sudo setenforce 0
# Set SELinux to enforcing
sudo setenforce 1
# Check SELinux context
ls -Z filename
# Change SELinux context
sudo chcon -t httpd_exec_t /path/to/file
```

SELinux Tools: `sealert` / `ausearch`

Analyze SELinux denials and audit logs.

```
# Check SELinux alerts
sudo sealert -a /var/log/audit/audit.log
# Search audit logs
sudo ausearch -m avc -ts recent
# Generate SELinux policy
sudo audit2allow -M mypolicy < /var/log/audit/audit.log
```

SSH Configuration: `/etc/ssh/sshd_config`

Configure SSH daemon for secure remote access.

```
# Edit SSH configuration
sudo vi /etc/ssh/sshd_config
# Restart SSH service
sudo systemctl restart sshd
# Test SSH connection
ssh user@hostname
# Copy SSH key
ssh-copy-id user@hostname
```

System Updates: `dnf update`

Keep system secure with regular updates.

```
# Update all packages
sudo dnf update
# Update security patches only
sudo dnf update --security
# Check for available updates
dnf check-update --security
# Enable automatic updates
sudo systemctl enable dnf-automatic.timer
```

Performance Monitoring

System Monitoring: `iostat` / `vmstat`

Monitor system performance and resource usage.

```
# Show I/O statistics
iostat -x 1
# Show virtual memory statistics
vmstat 1
# Show network statistics
ss -tuln
# Show disk I/O
iotop
```

Resource Usage: `sar` / `top`

Analyze historical and real-time system metrics.

```
# System activity report
sar -u 1 3
# Memory usage report
sar -r
# Network activity report
sar -n DEV
# Load average monitoring
uptime
```

Process Analysis: `strace` / `lsof`

Debug processes and file access.

```
# Trace system calls
strace -p 1234
# List open files
lsof
# Show files opened by process
lsof -p 1234
# Show network connections
lsof -i
```

Performance Tuning: `tuned`

Optimize system performance for specific workloads.

```
# List available profiles
tuned-adm list
# Show active profile
tuned-adm active
# Set performance profile
sudo tuned-adm profile throughput-performance
# Create custom profile
sudo tuned-adm profile_mode
```

RHEL Installation & Setup

Initial system setup and configuration tasks.

System Registration: `subscription-manager`

Register system with Red Hat Customer Portal.

```
# Register system
sudo subscription-manager register --username your_username
# Auto-attach subscriptions
sudo subscription-manager attach --auto
# List available subscriptions
subscription-manager list --available
# Show system status
subscription-manager status
```

Repository Management: `dnf config-manager`

Manage software repositories.

```
# List enabled repositories
dnf repolist
# Enable repository
sudo dnf config-manager --enable repository-name
# Disable repository
sudo dnf config-manager --disable repository-name
# Add new repository
sudo dnf config-manager --add-repo https://example.com/repo
```

System Configuration: `hostnamectl` / `timedatectl`

Configure basic system settings.

```
# Set hostname
sudo hostnamectl set-hostname new-hostname
# Show system information
hostnamectl
# Set timezone
sudo timedatectl set-timezone America/New_York
# Show time settings
timedatectl
```

Troubleshooting & Diagnostics

Common troubleshooting commands and techniques.

System Logs: `/var/log/`

Examine system log files for issues.

```
# View system messages
sudo tail -f /var/log/messages
# View authentication logs
sudo tail -f /var/log/secure
# View boot logs
sudo journalctl -b
# View kernel messages
dmesg | tail
```

Hardware Diagnostics: `dmidecode` / `lshw`

Examine hardware information and health.

```
# Show hardware information
sudo dmidecode -t system
# List hardware components
sudo lshw -short
# Check memory information
sudo dmidecode -t memory
# Show CPU information
lscpu
```

Network Troubleshooting: `netstat` / `ss`

Network diagnostic tools and utilities.

```
# Show network connections
ss -tuln
# Show routing table
ip route show
# Test DNS resolution
nslookup google.com
# Trace network path
traceroute google.com
```

Recovery & Rescue: `systemctl rescue`

System recovery and emergency procedures.

```
# Enter rescue mode
sudo systemctl rescue
# Enter emergency mode
sudo systemctl emergency
# Reset failed services
sudo systemctl reset-failed
# Reconfigure boot loader
sudo grub2-mkconfig -o /boot/grub2/grub.cfg
```

Automation & Scripting

Cron Jobs: `crontab`

Schedule automated tasks and maintenance.

```
# Edit user crontab
crontab -e
# List user crontab
crontab -l
# Remove user crontab
crontab -r
# Example: Run script daily at 2 AM
0 2 * * * /path/to/script.sh
```

Shell Scripting: `bash`

Create and execute shell scripts for automation.

```
#!/bin/bash
# Simple backup script
DATE=$(date +%Y%m%d)
tar -czf backup_$DATE.tar.gz /home/user/documents
echo "Backup completed: backup_$DATE.tar.gz"
```

Environment Variables: `export` / `env`

Manage environment variables and shell settings.

```
# Set environment variable
export MY_VAR="value"
# Show all environment variables
env
# Show specific variable
echo $PATH
# Add to PATH
export PATH=$PATH:/new/directory
```

System Automation: `systemd timers`

Create systemd-based scheduled tasks.

```
# Create timer unit file
sudo vi /etc/systemd/system/backup.timer
# Enable and start timer
sudo systemctl enable backup.timer
sudo systemctl start backup.timer
# List active timers
systemctl list-timers
```

Reference: This cheatsheet covers essential RHEL commands and system administration practices for efficient Linux operations and enterprise management.