systemd Services and logs

START HERE

`systemctl status <unit>`
State and recent log

`systemctl --failed`
What is broken?

`sudo systemctl start <unit>`
Start now

`journalctl -u <unit> -f`
Follow a unit's log

`sudo systemctl restart <unit>`
Stop, then start

`journalctl -b -p err`
Errors since boot

`sudo systemctl enable --now <unit>`
Start now and at boot

`sudo systemctl daemon-reload`
Re-read unit files

Unit file /etc/systemd/system → `daemon-reload` → **Loaded** known to systemd → `start` → **Active** running → `enable` → **Boot target** starts at boot

CONCEPTS

A unit is anything systemd manages: a service, timer, socket, target or mount. The .service suffix is optional on the command line.

enable only controls start at boot; start only controls now. Use enable --now for both.

Edit units in /etc/systemd/system (or via systemctl edit); /usr/lib/systemd/system belongs to the package and gets overwritten.

CONTROL SERVICES

`systemctl start <unit>`
Start a unit now
System units need root; add sudo.

`systemctl stop <unit>`
Stop a unit

`systemctl restart <unit>`
Stop and start again

`systemctl reload <unit>`
Re-read config without restart
Only works if the service defines a reload action.

`systemctl reload-or-restart <unit>`
Reload, else restart

`systemctl try-restart <unit>`
Restart only if running

`systemctl kill -s <signal> <unit>`
Signal a unit's processes

`systemctl reset-failed <unit>`
Clear the failed state

`systemctl --user <command>`
Manage your own user units

INSPECT

`systemctl status <unit>`
State, PID and last log lines

`systemctl is-active <unit>`
Print active state, exit code reflects it

`systemctl is-enabled <unit>`
Will it start at boot?

`systemctl list-units --type=service`
Loaded services

`systemctl --failed`
List failed units

`systemctl list-unit-files`
All installed unit files with state

INSPECT (cont.)

`systemctl cat <unit>`
Show unit file plus drop-ins

`systemctl show -p <property> <unit>`
Print one property

`systemctl list-dependencies <unit>`
Tree of required units

BOOT AND UNIT FILES

`systemctl enable <unit>`
Start at boot

`systemctl disable <unit>`
Do not start at boot

`systemctl enable --now <unit>`
Enable and start in one go

`systemctl disable --now <unit>`
Disable and stop in one go

`systemctl mask <unit>`
Block a unit from starting at all
Links the unit to /dev/null; undo with unmask.

`systemctl unmask <unit>`
Undo mask

`systemctl daemon-reload`
Re-read changed unit files

`systemctl edit <unit>`
Override settings in a drop-in

`systemctl edit --full <unit>`
Edit a full copy of the unit

`systemctl reboot`
Restart the machine

`systemctl poweroff`
Shut the machine down

LOGS (JOURNALCTL)

`journalctl -u <unit>`
Logs of one unit

`journalctl -u <unit> -f`
Follow new lines

`journalctl -n 100`
Last 100 entries

`journalctl -b`
Current boot only

`journalctl -b -1`
Previous boot

`journalctl -p err`
Errors and worse

`journalctl --since "<date>" --until "<date>"`
Time window
Accepts values like yesterday, "1 hour ago" or "2026-10-08 12:00".

LOGS (JOURNALCTL) (cont.)

`journalctl -g <regex>`
Filter messages by pattern

`journalctl -e`
Open pager at the end

`journalctl -r`
Newest first

`journalctl -k`
Kernel messages

`journalctl --vacuum-time=<time>`
Delete entries older than this

UNIT FILE BASICS

Minimal service

```
# /etc/systemd/system/myapp.service
[Unit]
Description=My app
After=network-online.target
Wants=network-online.target

[Service]
ExecStart=/usr/local/bin/myapp --serve
Restart=on-failure
User=myapp

[Install]
WantedBy=multi-user.target
```

Common directives

Directive	Meaning
`ExecStart=`	Command to run (absolute path)
`Restart=`	on-failure, always, no
`After= / Before=`	Ordering only
`Wants= / Requires=`	Pull in other units (weak / hard)
`WantedBy=`	Target that enables it
`Environment=`	Set VAR=value
`WorkingDirectory=`	Start directory
`Type=`	simple, exec, forking, oneshot, notify

Drop-in override

```
# systemctl edit myapp creates:
# /etc/systemd/system/myapp.service.d/override.conf
[Service]
Environment=LOG_LEVEL=debug
# clear a list setting before replacing it
ExecStart=
ExecStart=/usr/local/bin/myapp --debug
```

`systemd-analyze verify <file>`
Lint a unit file

TIMERS AND ONE-OFFS

`systemctl list-timers`
Timers and next/last run

TIMERS AND ONE-OFFS (cont.)

`systemctl list-timers --all`
Include inactive timers

`systemd-analyze calendar "<expr>"`
Check an OnCalendar expression

`systemd-run --user --on-active=<time> <cmd>`
Run a command later, once

`systemd-run --unit=<name> <cmd>`
Run a command as a transient service

OnCalendar examples

Expression	Fires
`daily`	Every midnight
`Mon *-*-* 09:00`	Mondays 09:00
`*-*-* *:00/15`	Every 15 min
`weekly`	Monday 00:00

Enable the .timer, not the .service. A timer starts the same-named service unless Unit= says otherwise.

BOOT ANALYSIS

`systemd-analyze`
Total boot time

`systemd-analyze blame`
Slowest units at boot

`systemd-analyze critical-chain`
Chain that delayed boot

RECIPES

Install and start a new service

```
sudoedit /etc/systemd/system/myapp.service
systemd-analyze verify /etc/systemd/system/myapp.service
sudo systemctl daemon-reload
sudo systemctl enable --now myapp
systemctl status myapp
```

Run a script every night

```
# backup.service: [Service] Type=oneshot, ExecStart=/usr/local/bin/backup
# backup.timer:
[Timer]
OnCalendar=*-*-* 02:30
Persistent=true
[Install]
WantedBy=timers.target
# then:
sudo systemctl enable --now backup.timer
```

Why did it fail?

```
systemctl --failed
systemctl status <unit>
journalctl -u <unit> -b -e
journalctl -u <unit> --since "10 min ago" -p warning
```