Everyday systemd

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Overview

How does systemd model the world?

Example

Running carrotbot.

Common Tasks

Getting around a systemd machine.

What is a system manager?

Manages low-level details of the system across

- Boot
- Runtime
- Shutdown

Responsibilities include

- Hardware configuration
- Mounting filesystems
- Supervising services

And *ordering* the above.

Everything is a unit

- **Service**
- Socket
- Device
- **Mount**
- Automount
- Swap
- **Target**
- Path
- Timer
- Slice
- Scope

Units go in:

- /etc/systemd/system/*
- /run/systemd/system/*
- /lib/systemd/system/*

(Or user-specific directories. We won't discuss that here.)

A Simple Unit: hello.service

```
[Unit]
Description=My Service
Wants=network-online.target
After=network-online.target

[Service]
Type=simple
ExecStart=/bin/sh -c \
  'while echo hello, world; do sleep 10; done'

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

Dependencies vs. ordering

```
[Unit]
```

```
Wants=network-online.target
```

“When you start this unit, be sure to start the network-online.target unit too”

```
After=network-online.target
```

“Only start this unit once network-online.target has started”

Enabling and disabling units

Enable a unit:

```
systemctl enable --now hello.service
```

[Install] says what to do:

```
WantedBy=multi-user.target
```

Is usually what you want.

Auto-generated units

- Services
  - Generated from /etc/init.d/
- Mount units
  - Generated from /etc/fstab and /etc/crypttab
  - Options provide more control:
    - x-systemd.requires=
    - Automount
    - Timeouts
  - See man pages:
    - systemd.mount(5)
    - systemd-fstab-generator(8)
    - systemd-cryptsetup-generator(8)

Example

Running carrotbot

Common Tasks

Getting stuff done

What's up?

```
# systemctl status
● jame
      State: running
       Jobs: 0 queued
     Failed: 0 units
      Since: Sun 2018-08-05 23:18:29 PDT; 1 weeks 1 days ago
     CGroup: /
             ├─init.scope
             │ ├─   1 /lib/systemd/systemd --system --deserialize 20
             │ └─1048 /sbin/cgmanager -m name=systemd
             ├─system.slice
             │ ├─avahi-daemon.service
             │ │ ├─1129 avahi-daemon: running [jame.local
             │ │ └─1161 avahi-daemon: chroot helpe
             │ ├─thermald.service
             │ │ └─1008 /usr/sbin/thermald --no-daemon --dbus-enable
             │ ├─dbus.service
             │ │ └─1049 /usr/bin/dbus-daemon --system --address=systemd: --nofork --nopidfile --systemd-...
             │ ├─ModemManager.service
             │ │ └─1123 /usr/sbin/ModemManager
             │ ├─cron.service
             │ │ └─1016 /usr/sbin/cron -f
             │ ├─lvm2-lvmetad.service
             │ │ └─311 /sbin/lvmetad -f
             │ ...
```

How’re ya doin’?

```
# systemctl status hello
● hello.service - My Service
   Loaded: loaded (/etc/systemd/system/hello.service; enabled; vendor preset: enabled)
   Active: active (running) since Tue 2018-08-14 18:34:51 PDT; 7min ago
 Main PID: 1222 (sh)
   CGroup: /system.slice/hello.service
           ├─1222 /bin/sh -c while echo hello, world; do sleep 10; done
           └─3651 sleep 10

Aug 14 18:40:51 omicron sh[1222]: hello, world
Aug 14 18:41:01 omicron sh[1222]: hello, world
Aug 14 18:41:11 omicron sh[1222]: hello, world
Aug 14 18:41:21 omicron sh[1222]: hello, world
Aug 14 18:41:31 omicron sh[1222]: hello, world
Aug 14 18:41:41 omicron sh[1222]: hello, world
Aug 14 18:41:51 omicron sh[1222]: hello, world
Aug 14 18:42:01 omicron sh[1222]: hello, world
Aug 14 18:42:11 omicron sh[1222]: hello, world
Aug 14 18:42:21 omicron sh[1222]: hello, world
```

What's broken?

```
$ systemctl --failed
```

```
  UNIT                                LOAD       ACTIVE SUB DESCRIPTION
● mnt-Music.mount                     not-found  failed failed mnt-Music.mount
● networking.service                  loaded     failed failed Raise network interfaces

LOAD   = Reflects whether the unit definition was properly loaded.
ACTIVE = The high-level unit activation state, i.e. generalization of SUB.
SUB    = The low-level unit activation state, values depend on unit type.

4 loaded units listed. Pass --all to see loaded but inactive units, too.
To show all installed unit files use 'systemctl list-unit-files'.
```

Tweaking units

Make small changes to upstream units:

```
# systemctl edit foo.service
```

Opens $EDITOR to create a file in “dropin” directory:

```
/etc/systemd/system/foo.service.d/
```

Don’t forget to systemctl daemon-reload!

What's in a unit?

```
# systemctl cat hello.service
# /etc/systemd/system/hello.service
[Unit]
Description=My Service
Wants=network-online.target
After=network-online.target

[Service]
Type=simple
ExecStart=/bin/sh -c \
   'while echo hello, world; do sleep 10; done'

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

Show me everything

```
# systemctl show hello.service
Restart=no
NotifyAccess=none
RestartUSec=100ms
TimeoutStartUSec=1min 30s
TimeoutStopUSec=1min 30s
RuntimeMaxUSec=infinity
WatchdogUSec=0
WatchdogTimestampMonotonic=0
FailureAction=none
PermissionsStartOnly=no
RootDirectoryStartOnly=no
RemainAfterExit=no
GuessMainPID=yes
MainPID=0
ControlPID=0
FileDescriptorStoreMax=0
NFileDescriptorStore=0
StatusErrno=0
```

What have you been up to?

```
# journalctl -u hello.service
-- Logs begin at Tue 2018-08-14 18:34:27 PDT, end at Tue 2018-08-14 18:54:32 PDT.
--
Aug 14 18:34:51 omicron systemd[1]: Started My Service.
Aug 14 18:34:51 omicron sh[1222]: hello, world
Aug 14 18:35:01 omicron sh[1222]: hello, world
Aug 14 18:35:11 omicron sh[1222]: hello, world
Aug 14 18:35:21 omicron sh[1222]: hello, world
Aug 14 18:35:31 omicron sh[1222]: hello, world
Aug 14 18:35:41 omicron sh[1222]: hello, world
Aug 14 18:35:51 omicron sh[1222]: hello, world
Aug 14 18:36:01 omicron sh[1222]: hello, world
Aug 14 18:36:11 omicron sh[1222]: hello, world
Aug 14 18:36:21 omicron sh[1222]: hello, world
Aug 14 18:36:31 omicron sh[1222]: hello, world
Aug 14 18:36:41 omicron sh[1222]: hello, world
Aug 14 18:36:51 omicron sh[1222]: hello, world
Aug 14 18:37:01 omicron sh[1222]: hello, world
Aug 14 18:37:11 omicron sh[1222]: hello, world
```

Neat trick

Add to your crontab:

```
@daily journalctl -u hello --since '1 day ago' --priority notice --quiet
```

Get a daily e-mail with any errors.

(Does require the unit log to syslog or the journal.)

Documentation

Some notes

- Key manpages:
  - systemd.unit(5)
  - systemd.service(5)
  - systemctl(1)
- systemd for Administrators
  - Nice gradual introduction

Questions