# systemd and Linux Watchdog

Run a program at... login? = .profile file boot? = systemd

What to do if software locks up?



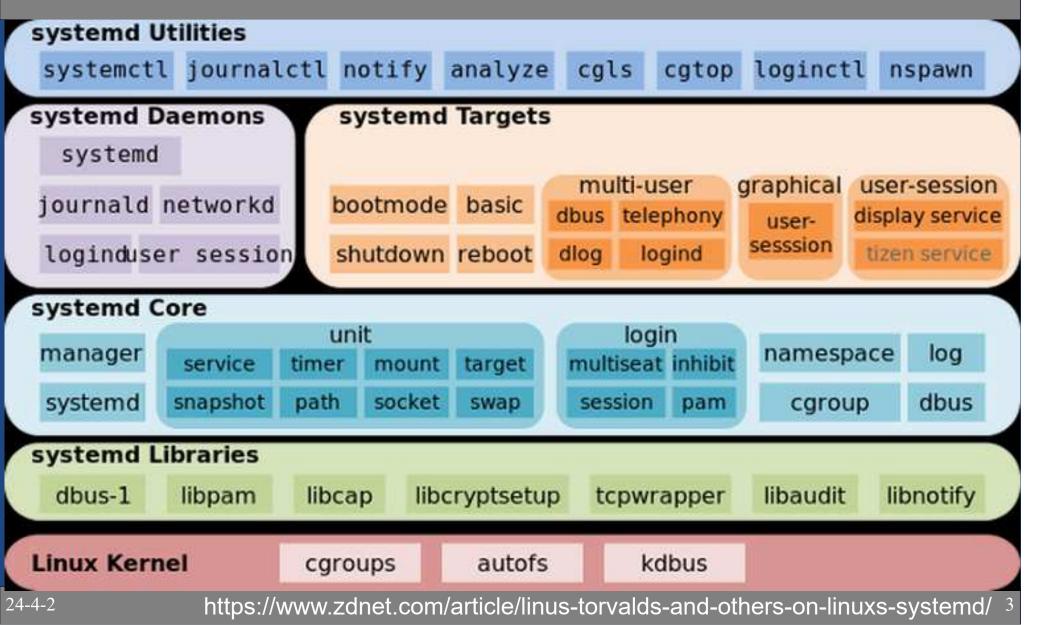
### systemd

- systemd used by most Linux distros as first userspace application to be run by the kernel.
  - 'd' means daemon:

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 Use systemd to run programs at boot (and many other things).

#### Jack of All Trades



### systemd

- Replaces old "init" system:
  - Manages dependencies and allows concurrency when starting up applications
  - Does many things: login, networking, mounting, etc
- Controversy
  - Violates usual \*nix philosophy of do one thing well.
     http://www.zdnet.com/article/linus-torvalds-and-others-on-linuxs-systemd/
  - Some lead developers are said to have a bad attitude towards fixing "their" bugs.
- It's installed on the Beaglebone, so we'll use it!
  - Copy your code to BBG's eMMC (vs run over NFS).

#### Create a systemd service

Setup .service file:

 (bbg)\$ cd /lib/systemd/system
 (bbg)\$ sudo nano foo.service

Assume 11-HttpsProcTimer example installed to /opt/

[Unit]

Description=HTTPS server to view /proc on port 8042

Use absolute paths

[Service]

User=root

WorkingDirectory=/opt/10-HttpsProcTimer-copy/

ExecStart=/usr/bin/node /opt/10-HttpsProcTimer-copy/server.js

SyslogIdentifier=HttpsProcServer

[Install]

WantedBy=multi-user.target

#### Controlling a Service

- Configure to run at startup (bbg)\$ systemctl enable foo.service
- Manually Starting/Stopping (bbg)\$ systemctl start foo.service
  - Can replace start with stop or restart

Demo: Browse to https://192.168.7.2:3042 after reboot

```
    Status
```

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(bbg)$ systemctl status foo.service
(bbg)$ journalctl -u foo.service
(bbg)$ systemctl | grep HTTPS
```

### Startup Script Suggestions

- If your app needs some startup steps, try a script:
  - copy app to file system (not running via NFS)
  - add 10s delay at startup
    - I have found that some hardware configuration commands can fail if done too soon.
  - add 1s delay between commands
    - Allows the system time for the previous setup action to complete.
  - change to the required directory

## Linux Watchdog

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#### Watchdog

#### Watchdog Timer

- Guards against system locking-up:
- Working software periodically "hits" (pets!) the WD.

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#### Applications

- Most embedded systems use a watchdog: allow it to recover from faults (SW and some HW).
- Critical in applications where humans cannot reboot.

#### Watchdog Usage

- Usage
  - Opening "file" /dev/watchdog; starts timer
  - Writing anything to it resets timeout
     If timeout expires it resets board.
  - What should happen when the program exits?..

- Console demo (bbg)\$ cat > /dev/watchdog
- Can compile kernel to disallow turning off watchdog:
  - CONFIG WATCHDOG NOWAYOUT