

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 user-space application to be run by the kernel.
 - 'd' means daemon:
 - ...
 - Use systemd to run programs at boot (and many other things).

Jack of All Trades

systemd Utilities

systemctl journalctl notify analyze cglsg cgtop loginctl nspawn

systemd Daemons

systemd

journalld networkd

logind user session

systemd Targets

bootmode basic

shutdown reboot

multi-user

dbus telephony

dlog logind

graphical

user-session

user-session

display service

tizen service

systemd Core

manager

systemd

unit

service timer mount target

snapshot path socket swap

login

multiseat inhibit

session pam

namespace

log

cgroup

dbus

systemd Libraries

dbus-1

libpam

libcap

libcryptsetup

tcpwrapper

libaudit

libnotify

Linux Kernel

cgroups

autofs

kdbus

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  
  
[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
```

Use
absolute
paths

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

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

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

Watchdog

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