

CptS 360 (System Programming)

Unit 14: Daemon Processes

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Motivation

- ▶ Modern operating systems use daemons heavily.
- ▶ Servers typically run as daemons.
- ▶ Daemons make use of several low-level facilities we have already described.

References

- ▶ Stevens & Rago Ch. 13
- ▶ Stones & Matthew “Beginning Linux Programming”
- ▶ *man* pages

Daemon Characteristics

- ▶ parented by `initd/systemd`
- ▶ have no controlling tty
- ▶ run for a long time
 - So what's the main implication for program design?
- ▶ usually start at system boot
- ▶ usually stop at system halt

Watching Daemons

look at

```
$ ps -axj
```

and at

```
$ pstree
```

Daemon Coding Rules

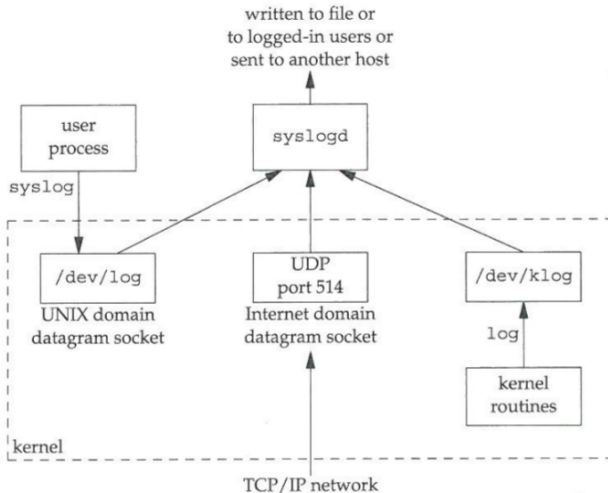
- ▶ Process forks and parent exits.
(Daemons vs. zombies.)
- ▶ *setsid(2)* is called.
This does what?
- ▶ `chdir()` to `"/"` or a daemon-specific directory.
in case of unmounts
- ▶ `umask(0)`
This does what?
- ▶ `close()` all open fd's, so they're not held by daemon
(see `demos/dn_skeletond/daemonize.c`)

Error Logging

- ▶ The former syslog (cf. textbook) logging facility is now rsyslog with better flexibility and upward compatibility.
- ▶ Its daemon is rsyslogd.
- ▶ *openlog(3)*
 - ▶ option
sets several logging options (via “|”)
 - ▶ facility
what type of program is doing the logging
- ▶ *syslog(3)* (not *syslog(2)*)
 - ▶ priority
- ▶ look at /etc/rsyslog.conf
- ▶ priority is combination of facility and level
- ▶ Depending on facility, you don't have to be root to use error logging.

BSD-style System Logging

(S & R Figure 13.2, with syslogd → rsyslogd)



Singleton Daemons

- ▶ Daemons make great servers. (Ask any dark wizard. B-))
- ▶ How to run a maximum of one daemon per system?
(see `demos/dn_skeletond/already_running.c` and
`demos/dn_skeletond/lockfile.c`)

Daemonic Conventions

- ▶ According to Stephen King, they're typically in Vegas. B-)
- ▶ name often ends in "d"
- ▶ lock files named *.lock, often in or below /var/run or /var/lib (q.v.)
- ▶ started by a script in or below /etc/systemd (was /etc/init.d)
- ▶ configurations in *name.conf*
- ▶ read config file at startup (of course)
 - ▶ read it again if sent SIGHUP
 - ▶ note: no controlling tty means SIGHUP is otherwise unlikely

Putting It All Together

```
(run demos/dn_skeletond)
```