Advanced Unix System Administration

Lecture 8
March 10, 2008

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Startup and Shutdown

- System shutdown
  - Run shutdown scripts first
  - Kill all processes: send SIGTERM to all processes, wait a few seconds, then send SIGKILL to make sure they're dead
  - Sync/unmount disks, then power down or restart
  - SysV: last two steps actually run from the shutdown scripts, invoked by init
  - BSD: halt(8)/reboot(8) take care of all steps

Startup and Shutdown

- Criticisms of classic init
  - Inefficient – processes not started in parallel, SysV init requires launching lots of shells
  - Manual establishment of order of tasks and daemon load order required
  - Provides no monitoring of services and restarting of those that died
  - Shutdown procedure is an ugly hack

Startup and Shutdown

- “Requires-depends” init handling
  - Used in FreeBSD and NetBSD
  - Standard BSD init binary
  - /etc/rc{,.shutdown} uses a program rcorder(8) to examine “Requires”, “Depends”, “Provides” lines in scripts in /etc/rc.d and provide an order to run them in
  - Allows dynamic ordering of tasks, parallelization (though currently not parallel)

Startup and Shutdown

- Replacing init
  - SMF (Solaris 10+): dependency-based XML config allowing parallel launch of processes and automatic restarting of services; “milestones” separate stages of bootup
  - launchd (OS X 10.4+): dependency-based XML config allowing parallel launch; also replaces/extends cron and inetd
  - Upstart (Ubuntu 6.10+): event-based structure for controlling processes; also may in future replace/extend cron and (maybe) inetd

A Tour of Userspace

- init
- syslogd(8)
  - Programs call openlog(), closelog(), syslog() to write to /dev/log
  - Daemon picks up log messages, and writes them to logs, pipes, or over the network
  - Usually picks up kernel messages in a system-dependent manner
  - Configured in /etc/syslog.conf

A Tour of Userspace

- cron(8)
  - Runs commands at intervals based on contents of crontab files
  - Crontabs installed using crontab(1)
  - For systems not up all the time, anacron(8) can be used to ensure that cron jobs get run
- atd(8)
  - Runs commands at scheduled time
  - Jobs installed using at(1)

A Tour of Userspace

- inetd(8)
  - Service multiplexer
  - Listens on lots of ports for incoming connections, hands them off to other programs
  - Configured via /etc/inetd.conf (usually)
  - Advantages: services run only when needed
  - Disadvantages: very poor performance

A Tour of Userspace

- portmap(8)/rpcbind(1M)
  - Multiplexing scheme for Sun/ONC RPC services
  - Clients connect to port 111 and get a list of running RPC services
  - Advantages: allows dynamic port assignments for running services, ports > 1024 to be used
  - Disadvantages: gives lots of information for an attacker

A Tour of Userspace

- C library
  - Provides more comfortable/less implementation-dependent interface to the kernel
  - Provides standard/required functions
  - Provides timezone interpretation and localization features
- gettext(1)/msgformat(1)
  - Provides standard interface to localized messages

A Tour of Userspace

- Mail transport agent
  - Programs expect /usr/lib/sendmail or /usr/sbin/sendmail to allow sending mail
  - Traditionally this is Sendmail, but could be almost anything nowadays
- X Window System
  - Provides graphical display services to X clients
  - Network transparent