Advanced Unix System Administration

Lecture 8
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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

A Tour of Userspace

- Name Service Switch
  - C library grew functions getpwnam(), etc., to have standard ways of reading /etc/passwd, looking up hostnames, etc.
  - NSS mechanism allows C library to load (via dlopen()) different providers for this information
  - Providers include files, DNS, NIS, NIS+; can be written/installed separately from libc
  - Configured via /etc/nsswitch.conf

A Tour of Userspace

- Pluggable Authentication Modules

  - (Mostly) standardized way of checking users' passwords

  - Allows powerful access controls, multiple authentication providers via dlopen()

  - Available on Linux, Free/NetBSD, Solaris, most commercial Unix

- BSD Authentication

  - Like PAM, but uses program helpers instead of shared libraries; OpenBSD and BSDi