Debian’s init system - Past, Present and Future (and some numbers)

Michael Biebl

Linux Plumbers Conference 2010, Boston/MA

4. November 2010
About Debian

- around 1000 developers
- around 30000 binary packages
- base of a lot of derivative distributions
- flexibility one of its strengths (but also weaknesses)
- release cycles around 18-24 months
- strong relationship between package and maintainer (DD/DM), though teams become more and more wide spread
sysvinit / SysV init scripts

- sysvinit is the default init system in Debian (essential package)
  0/6  halt/reboot
- runlevels: 1  single-user
  2-5  multi-user
- single-user mode semantics are weird (S vs. 1)
- special runlevel S (/etc/rcS.d/) for system configuration/initialization.
- /etc/inittab
  - gettys: 1:2345, 2-6:23
  - calls /etc/init.d/rc runlevel
  - powerfail and ctrlaltdel
- interface for package maintainer: invoke-rc.d/update-rc.d
- start priorities are static, provided by the package maintainer
 LSB header information can be used to calculate the start priorities dynamically, which in turn makes it much easier to fix bugs in the boot sequence
dependency information to start services in parallel (startpar)
all SysV init scripts were updated to contain an LSB init header
effort started with lenny, mostly driven by Petter Reinholdtsen
insserv will be enabled by default in squeeze: LSB header information is reasonably well tested
LSB logging and helper functions via /lib/lsb/init-functions (lsb-base)
Example:

### BEGIN INIT INFO

# Provides: network-manager
# Required-Start: $remote_fs dbus udev
# Required-Stop: $remote_fs dbus udev
# Should-Start: $syslog
# Should-Stop: $syslog
# Default-Start: 2 3 4 5
# Default-Stop: 0 1 6
# Short-Description: network connection manager
# Description: Daemon for automatically switching network connections to the best available connection.

### END INIT INFO
Analysed LSB header information sorted by popcon\(^1\) data for unstable:

- **1001** packages shipping **1077** SysV init scripts
- long tail:
  - dpkg: 93694 installations
  - 1. util-linux (93679), 10. acpid (85877), 100. setserial (3348)
  - 500. sleepd (88)
- only 2 did not have an LSB init header (RC bug)
- **647** packages sourcing `/lib/lsb/init-functions`

\(^1\)http://popcon.debian.org
Some statistics...(contd)

**Default-Start:**

<table>
<thead>
<tr>
<th>S</th>
<th>&quot;&quot;</th>
<th>12345</th>
<th>S2345</th>
<th>rest</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 3 4 5</td>
<td>924</td>
<td>119</td>
<td>17</td>
<td>5</td>
</tr>
</tbody>
</table>

- 'S': 119, rather long list, needs further inspection
- "": hm, what? start on shutdown: not supported by systemd
- 'S 2 3 4 5': portmap/nfs-common: causes problems in systemd

**Default-Stop:**

<table>
<thead>
<tr>
<th>0 1 6</th>
<th>&quot;&quot;</th>
<th>0 6</th>
<th>1</th>
<th>rest</th>
</tr>
</thead>
<tbody>
<tr>
<td>851</td>
<td>129</td>
<td>52</td>
<td>37</td>
<td>8</td>
</tr>
</tbody>
</table>

- "": teardown: services which don’t need a “clean” shutdown and can simply be killed
- '0 6' and '1': probably just buggy
current state of systemd in Debian

- Tollef Fog Heen maintainer of systemd in Debian
- v11 available from experimental, along with dbus 1.4
- systemd runs with default kernel from squeeze/sid (cherry-pick for /sys/fs/cgroup patch)
- uses LSB/sysv init scripts
- works mostly fine (chokes on nfs-common/portmap though which is part of a default installation unfortunately, dep cycle on shutdown)
integration work / TODO

- native mount for v12
- ship more native system unit files in packages (currently on hold due to freeze)
- hook for lsb-base: redirect `/etc/init.d/foo action` → `systemctl action foo.service`
- interface for package maintainer scripts, support in debhelper/cdbs
- clean up `/etc/rcS.d` (tmpfiles as general interface?)
- kFreeBSD port: figure out, how to support this plattform (or not)
looking ahead

▶ realistically, we have to plan with at least 3 release cycles (before ripping out any compat code)
▶ ship as option in wheezy
▶ make it awesome, so users/admins will want to use it
▶ providing a fallback plan will make people feel safe to try it
▶ allow a gradual transition
▶ acknowledge that Debian users are more conservative and expect that upgrades don’t break their system
▶ there is no mechanism in Debian to force something like systemd into the distribution, but having
  ▶ a dedicated maintainer/team
  ▶ a clear view of the impact of such a change
  ▶ a (rough) consensus among fellow DDs (at least those maintaining relevant packages)
▶ makes such a large transition possible