LSB: OdyX m'a tuer

or... Why I tried to kill the LSB

https://deb.li/lsbkickban
OdyX
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- Since March 2012
  - LSB package maintainer
- Since ~ 2010
  - Debian Printing Team founder and package maintainer
- Since March 2015
  - Debian Technical Committee member, current chair
LSB
Linux Standard Base
But... what is it, really?
A project
Linux Foundation

The goal of the LSB is to develop and promote a set of open standards that will increase compatibility among Linux distributions and enable software applications to run on any compliant system even in binary form. In addition, the LSB will help coordinate efforts to recruit software vendors to port and write products for Linux Operating Systems.
... quite old

- LSB 1.0 — June 2001
- LSB 2.0 — August 2004
- LSB 3.0 — July 2005
- LSB 4.0 — November 2008
- LSB 5.0 — June 2015
Standards

- LSB Common
  - 24 pages
- LSB Core
  - 964 pages
- LSB Desktop
  - 2270 pages
- LSB Languages
  - 193 pages
- LSB Imaging
  - 91 pages
1771 two-sided pages!
The goal of the LSB is to enable software applications to run on any compliant system even in binary form.
5 aspects
FHS
Init
lsb_release
ABI
RPM
5 aspects

Filesystem Hierarchy Standard
System initialization
lsb_release
Binary compatibility
RedHat™ package format
FHS

Filesystem Hierarchy Standard
FHS

Top-level

- /bin: Essential user command binaries (for use by all users)
- /boot: Static files of the boot loader
- /dev: Device files
- /etc: Host-specific system configuration
- /lib: Essential shared libraries and kernel modules
- /media: Mount point for removable media
- /run: Run-time variable data
- /sbin: System binaries
- /tmp: Temporary files
- `/home`: User home directories
- `/root`: Home directory for the root user
- `/mnt`: Mount point for a temporarily mounted filesystem
- `/srv`: Data for services provided by this system
- `/opt`: Add-on application software packages
/usr

- /usr/bin: Most user commands
- /usr/include: Directory for standard include files.
- /usr/lib: Libraries for programming and packages
- /usr/local: Local hierarchy
- /usr/local/share: Local architecture-independent hierarchy
- /usr/sbin: Non-essential standard system binaries
- /usr/share: Architecture-independent data
- /usr/share/man: Manual pages
- /usr/share/misc: Miscellaneous architecture-independent data

/usr/libexec, /usr/lib<qual>, /usr/share/color, /usr/share/dict, /usr/share/ppd, /usr/share/sgml, /usr/share/xml & /usr/src
/var

- /var/cache: Application cache data
- /var/lib: Variable state information
- /var/lib/misc: Miscellaneous variable data
- /var/lock: Lock files
- /var/log: Log files and directories
- /var/opt: Variable data for /opt
- /var/run: Run-time variable data
- /var/spool: Application spool data
- /var/tmp: Temporary files preserved between system reboots

/var/account, /var/cache/fonts, /var/cache/man, /var/crash, /var/games, /var/lib/<editor>, /var/lib/color, /var/lib/hwclock, /var/mail, /var/spool/lpd, /var/spool/rwho, /var/yp
Debian Policy

vs FHS

- 2.3 with amendments (see §9.1.1)
- 3.0 is pending (see #787816)
VIII. System Initialization
VIII. System Initialization

Chapter 22

- Cron jobs
- Init Script Actions
- Comment Conventions for Init Scripts
- Installation and Removal of Init Scripts
- Run Levels
- Facility Names
From /etc/init.d/cups e.g.:

```
#!/bin/sh
### BEGIN INIT INFO
# Provides:          cups
# Required-Start:    $syslog $remote_fs
# Required-Stop:     $syslog $remote_fs
# Should-Start:      $network avahi-daemon slapd
# Should-Stop:       $network
# X-Start-Before:    samba
# X-Stop-After:      samba
# Default-Start:     2 3 4 5
# Default-Stop:      1
# Short-Description: CUPS Printing spooler and server
# Description:       Manage the CUPS Printing spooler and server; make it's web interface accessible on http://localhost:631/
### END INIT INFO
```
22.8 Init functions

- start_daemon
- killproc
- pidofproc
- log_success_msg
- log_failure_msg
- log_warning_msg
lsb_release
$ lsb_release -a
No LSB modules are available.
Distributor ID: Debian
Description: Debian GNU/Linux 9.0 (stretch)
Release: 9.0
Codename: stretch
lsb_release, & co!

- `ar` -- create and maintain library archives (DEPRECATED)
- `at` -- examine or delete jobs for later execution
- `awk` -- pattern scanning and processing language
- `batch` -- schedule commands to be executed in a batch queue
- `bc` -- an arbitrary precision calculator language
- `chfn` -- change user name and information
- `chsh` -- change login shell
- `col` -- filter reverse line feeds from input
- `cpio` -- copy file archives in and out
- ...

VI. Commands and Utilities

62 mandatory commands
ABI

Binary compatibility
III. Base Libraries

- libc
- libm
- libpthread
- libgcc_s
- libdl
- librt
- libcrypt
- libpam
IV. Utility Libraries

- libz
- libncurses
- libncursesw
- libutil
... etc ...

- LSB Core
  - X Network Security Services
    - libnss4
    - libnss3
    - libssl3

- LSB Desktop
  - II Graphic Libraries
    - libX11
    - libSM
    - libICE
  - III OpenGL Libraries
    - libGL
  - IV PNG12 library
    - libpng12
  - V JPEG library
    - libjpeg
  - VI Fontconfig library
    - libfontconfig
  - ...

- ...
There are actually a lot of libraries mandated by the LSB.
libz

- 15.2 Interfaces
  - Library: libz
  - SONAME: libz.so.1
- 15.2.1.1 Interfaces for Compression Library
  - adler32
  - compress
  - ...

libz.html
libz, compress

Synopsis

```
#include <zlib.h>
int compress(Bytef * dest, uLongf
```

Description

The `compress()` function shall attempt to compress `sourceLen` bytes of data in the buffer `source`, placing the result in the buffer `dest`.

On entry, `destLen` should point to a value describing the size of the `dest` buffer. The application should ensure that this value be at least `(sourceLen × 1.001) + 12`. On successful exit, (…)

`zlib-compress-1.html`
All-in-all

LSB 5.0, x86-64

- 66 libraries
- 883 headers (*.h)
- 36182 binary interfaces
- 10483 types
- 25008 constants
- 705 C++ classes

Some statistics on the LSB elements
IBM, in 2002

*Linux has taken the next evolutionary step* beyond the source code compatibility of UNIX. Instead of porting or rebuilding source code from one Linux release or distribution to another, *Linux has achieved binary compatibility between them all.*

Developing LSB-certified applications
RPM Package Format

This specification does not require the implementation to use RPM as the package manager; it only specifies the format of the package file and requires that implementations must have some method of installing conforming packages.

LSB Core, 25. Software Installation
In

debian
Multiple packages

• **alien**
  - Got introduced in 1997, just in time for bo (1.3)
  - Converts RPM packages to .deb packages

• **lsb**
  - Introduced in 2002, in time for woody (3.0)
Debian woody (3.0), July 2002

- LSB 1.1.0
- lsb_release was separated
- Only lsb

This package provides an implementation of version 1.1.0 of the Linux Standard Base for Debian on the Intel x86 architecture with the Linux kernel.

But...

LSB 1.1 assumes a 2.4 kernel. Debian ships a 2.2 kernel by default.
Debian sarge (3.1), June 2005

- LSB 2.0
- Packages
  - lsb
  - lsb-base
  - lsb-core
  - lsb-graphics
  - lsb-cxx
  - lsb-release (integrated, rewritten)

The intent of this package is to provide a best current practice way of installing LSB packages on Debian (...). Its presence does not imply that I or the Debian project believe that Debian fully complies with the Linux Standard Base, and should not be construed as a statement that Debian is LSB-compliant.
lsb-base

Introduction of the lsb-base package

This package only includes the init-functions shell library, which may be used by other packages' initialization scripts for console logging and other purposes.
sysvinit

- 2.86.ds1-2 (September 2005)
  - Starts to use the lsb-base functions, therefore depends on it
- 2.86.ds1-13 (February 2006)
  - Modifies the init script template /etc/init.d/skeleton to make it use /lib/lsb/init-functions
Roughly, since 2009, everyone has lsb-base installed.
Debian etch (4.0), April 2007

- LSB 3.1
- Packages
  - ...
  - lsb-desktop
  - lsb-qt4
Debian lenny (5.0), February 2009

- LSB 3.2
The long and slow ossification

Chris Lawrence maintained src: lsb from 2002 to 2011 (after Stretch's freeze)
Debian squeeze (5.0), February 2011

- Still LSB 3.2
- LSB 4.0 was announced in November 2008.
Ubuntu

- Since 2004 already, Ubuntu was maintaining a different pile of code
- In 2009, the `lsb` package is in version 4.0-0ubuntu5 for Karmic (09.10)
Hope...
OdyX has entered the game

- In **February 2012**, to prepare the package for *wheezy* (May 2013)
- Starts backporting the Ubuntu modifications
Everyone has lsb-base
That's scary
But a good learning experience
LSB 4.1
Tests for the python code
Left info blocks!
On other systems...
On Debian Wheezy!
Time for first compromises

- Qt3 was not released in Wheezy, but is still mandatory for LSB 4.1!

From its 4.1+Debian4+ version on, lsb-deskstop doesn't depend on Qt3 anymore. This is an explicit and Debian-specific derogation from the LSB 4.1 specification.

Qt3 is superseeded by Qt4 since 2005 and has been considered "end of life" since July 2007 by their upstream developers (Trolltech, then Nokia). Its support is also marked deprecated in the LSB specification since its 3.2 version (Jan 2008). As such, it is going to be removed from Debian soon.
It's 2012; Qt3 is deprecated since 2005
... and disappointment
From the distribution point of view

- Single go-to code for system initialization
  - lsb-base, init-functions
- Tools that all distros have
  - lsb-release
- Package to serve proprietary software
  - lsb-core, lsb-desktop
A new init system
systemd
For real (1/2)

Very few LSB applications available

- Google-Earth
- Epson printer drivers
For real (2/2)

Distribution of proprietary software happens:

- `wget --no-check-certificate -O - http://example.com/root-me.sh | sudo sh`
- `deb + rpm`
- `Containers`
We've only done half the job
We're mostly there, but...

- FHS has exceptions in the Debian Policy
- Debian is not "LSB-certified"
Certification?

- Distribution checker (~10h of tests)
- For what goal?
- Others:
  - LSB 4.0
    - Oracle 6
    - RHEL 6.0
    - Ubuntu 9.04
  - LSB 4.1
    - RHEL 7.0
Discussions

- BoF at DebConf14 (Portland, USA)
  - "Roughly noone cares"
- debian-devel & debian-lsb (Aug 2015)
Pulling the plug ...
The crux of the issue is, I think, whether this whole game is worth the work: I am yet to hear about software distribution happening through LSB packages. There are only 8 applications by 6 companies on the LSB certified applications list, of which only one is against LSB >= 4.

Debian LSB compliance
Debian doesn't *verify* LSB compatibility
Only RedHat's doing it
Nobody expects Debian to do it
Only has one maintainer
Asking for help

Roughly: we *could* be certified, but I'm not leading the effort.
Three months later

Nobody proposed hiself
Chain saw

- Removal of
  - lsb,
  - lsb-core,
  - lsb-graphics,
  - lsb-cxx,
  - lsb-desktop,
  - lsb-languages,
  - lsb-multimedia,
  - lsb-printing,
  - lsb-security,
  - lsb-invalid-mta,
- So we're left with...
  - lsb-base,
  - lsb-release
... Plugging it back
Proprietary software

- Google-Earth
- Epson
Discussions

- Bof @ DebConf16, Cape Town, ZA
For stretch
lsb-compat

- Version: 9.20161125
- Provides: lsb-core (= 4.1), lsb (= 4.1)
- Just enough for
  - Google-Earth
  - Epson
  - Others?
Yep. Dirty
On the Debian side

But Debian's not throwing all of the LSB overboard: we're still firmly standing behind the FHS (version 2.3 through Debian Policy: (...)) and our SysV init scripts mostly conform to LSB VIII.22.{2-8}. 
Reactions / Support

Spending further time on LSB compliance seems like a waste of time/resources at this point. (Moritz Mühlenhoff)

LSB seems pretty dead. I'm dubious there's much point in investing effort in this. (Russ Allbery)

Is there any point in (formally?) maintaining LSB compatibility? Is there any proprietary application that does actually benefit from it in the real world? (Marco d'Itri)
What happened from the LSB side?
In buster
Hit the final nails in the coffin

(Earlier this week)

- Make `lsb-base` non-essential
- Remove `lsb-compat`
Communicate about it?

- Through **Release notes**
- To Google & Epson?
- To the world?
Back to my introduction...

Will it make the LSB obsolete, or is it the final nail in Debian's coffin?
The LSB is long dead

Despite good intentions, it just didn't survive reality.

- ... applications
  - FLOSS applications are not distributed this way:
    - PPA's
    - snaps, flatpak, AppImage, ...
    - `wget -O ... | sudo sh`
  - systemctl is now reality
  - Containers are now reality

- ... distributions
  - The standard is what is in production, not the inverse.
  - The standardization process for the LSB has always been way too slow (see Qt3).
  - Binary compatibility is a *chimera!* (But... see Ubuntu-on-Windows!).
  - Corporate-backed distros have a *direct interest* to keep their clients captive (PPAs, RedHat-certified, etc)
Debian does not need the LSB

- Debian's role in the wide FLOSS ecosystem is established.
- Ubuntu, with its PPAs, have vastly democratized Debian packaging.
- deb & rpm worlds cohabit or circumvent.
Some closing thoughts

Giving up on LSB

- is a way to push everyone to package for Debian \textit{directly};
- but that's our view of the world!
We need to be supportive of the modern ways that are worked on to *ship software* to our users

- LSB is not such a modern way.
- But we are not bringing the Debian magic to vast ecosystems: npm, pip, ...
Debian is *not* about `dpkg` or `apt`.

Debian is about crafting the best technical arrangement to ship the free software that satisfies our criteria as widely as possible.
Questions ?
**Video sources**

- Simone Giertz - I made a robot to help me argue on the internet
  - https://www.youtube.com/watch?v=PJiRijiLwbQ
- Looney Tunes - That's all folks
  - https://www.youtube.com/watch?v=b9434BoGkNQ
- Tsarbomba gif

**Image sources**

- Linux Kernel interfaces
  - https://upload.wikimedia.org/wikipedia/commons/6/68/Linux_kernel_interfaces.svg
- GNU meditation
  - https://www.gnu.org/graphics/meditate.svg
- Non-Debian boot
  - http://vectorlinux.osuosl.org/docs/vl50/images/vl5dyn/vd5-boot.png
- Debian boot
  - https://i.stack.imgur.com/EHIM1.png
- Stretch logo
- Buster dog

All multimedia contents are © their respective authors.
Resources

- Linux Standard Base — Specifications Archive
  - The LSB 5.0 Specification - Common
  - The FHS 3.0 Specification
- LSB navigator
- Debian Popularity Contest

Threads

- OdyX
  - 2015-07, "Debian LSB compliance"
    - on debian-lsb@l.d.o
    - on LWN
  - 2015-09, "Status of the src:lsb package"
    - on debian-lsb@l.d.o
    - on LWN

Press coverage

- LWN: Debian dropping the Linux Standard Base
Merci de votre attention !

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- https://deb.li/lsbkickban