Introduction to the LSB (Linux Standards Base)

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Presentation Overview

- **Open Source Software**
- **The problem of Variation**
- **What is the LSB and how does it help?**
  - Working with the Linux community
- **LSB Details**
  - The standard, testing tools and certifications
- **An LSB Application Porting Project**
  - An invitation to particpate in the ITSC PlugFest

Open Source Software

- **You rely on it every day**
  - Two thirds of web sites are served using the Apache Open Source Software
  - The biggest sites on the Internet such as Google, Ebay, Yahoo and Amazon are using Open Source Software
  - Approximately 20% of new servers are shipped or installed with the Linux OS

Open Source Software

- **You rely on it every day**
  - The vast majority of the Domain Name System (DNS) is implemented using Open Source Software
  - Linux, an Open Source Operating System is being used by Corporations, Governments, Schools, Businesses and Individuals.
  - The Fabric of the Internet is built on Open Source Software!

What is Open Source?

- **Open Source can be seen as 3 things**
  - Open Source Software
  - Open Source Development Model
  - Open Source Community

What is Open Source?

- **Open Source Software**
  - Software that is unencumbered
    - Source code for developers
    - Binary code for users
  - Allows free redistribution
    - No costly licensing fees, change to a support model
  - Allows creation of derived works
    - You have the source to change it to suite your needs
  - See http://www.opensource.org/ for a full definition

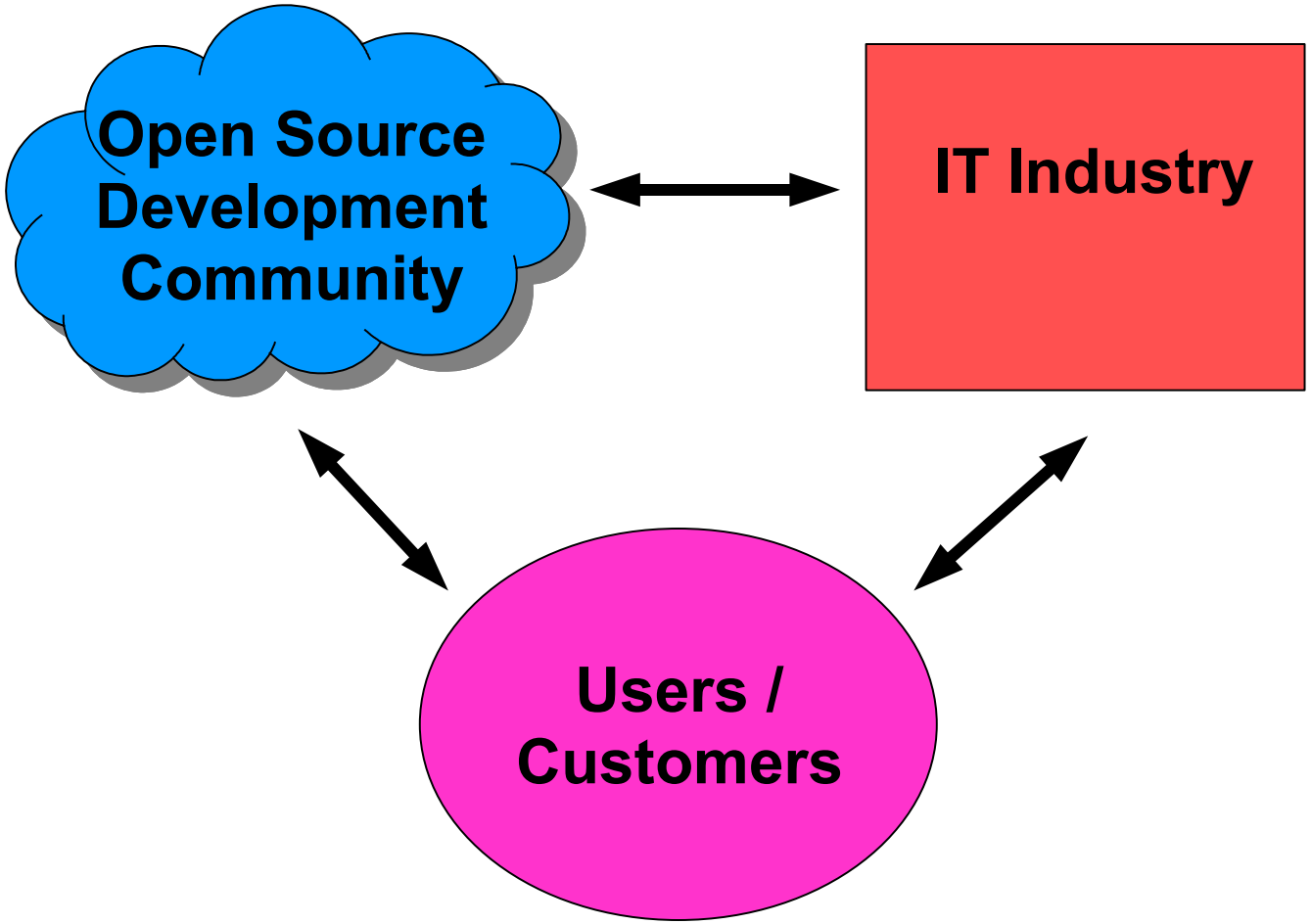
What is Open Source?

- **Open Source Development Model**
  - A superior development model that takes advantage of this access to source code
  - Build on existing code, lower cost of development
  - Shared common goals
    - Amortise development cost with others
  - Open collaboration using the Internet
  - End users can contribute directly to the development process
    - it is not being done behind closed doors

What is Open Source?

- **Open Source Community**
  - The individuals, IT vendors, end user corporations and business that are producers, consumers or supporters of Open Source Software
  - Communication is rapid and distributed
  - Many choices for end user support
    - Go straight to the developers for support
    - Get commercial support from a OSS solution vendor such as Red Hat, Novell, Dell, HP, Sun, IBM, etc, ...
    - Use the source Luke, do it yourself!

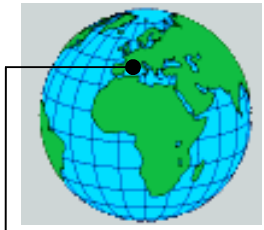
What is Open Source?



The problem of Variation

Open Source Software's biggest challenge is *variation!*

The problem of Variation

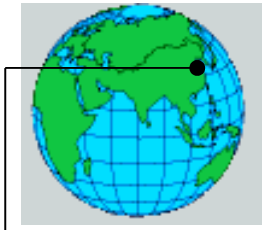


Debian

Mandriva

SUSE

SOT Linux

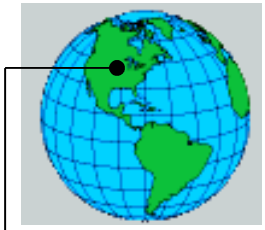


Asianux

Miracle

Red Flag

Turbolinux



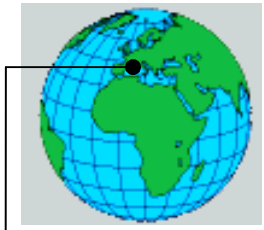
Mandriva

Debian

Rocks Cluster

Red Hat

The problem of Variation

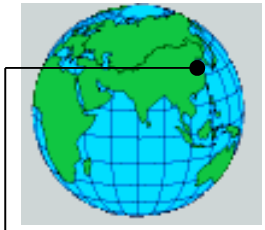


Debian
2.0, 3.0, 3.1, ...

Mandriva
2006, 10.1, 9.2, ...

SUSE
10.0, 9.3, 9.0, ...

SOT Linux
R2, R1, 2003, ...

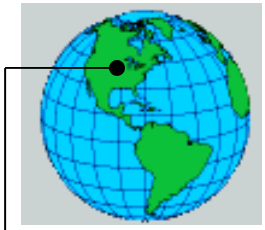


Asianux
2.0, 1.0, ...

Miracle
3.0, 2.1, 2.0, 1,0, ...

Red Flag
5.0, 4.1, 4.0, 3.2, ...

Turbolinux
10, 8, 7, 6.0, 4.2, ...



Mandriva
2006, 10.1, 9.2

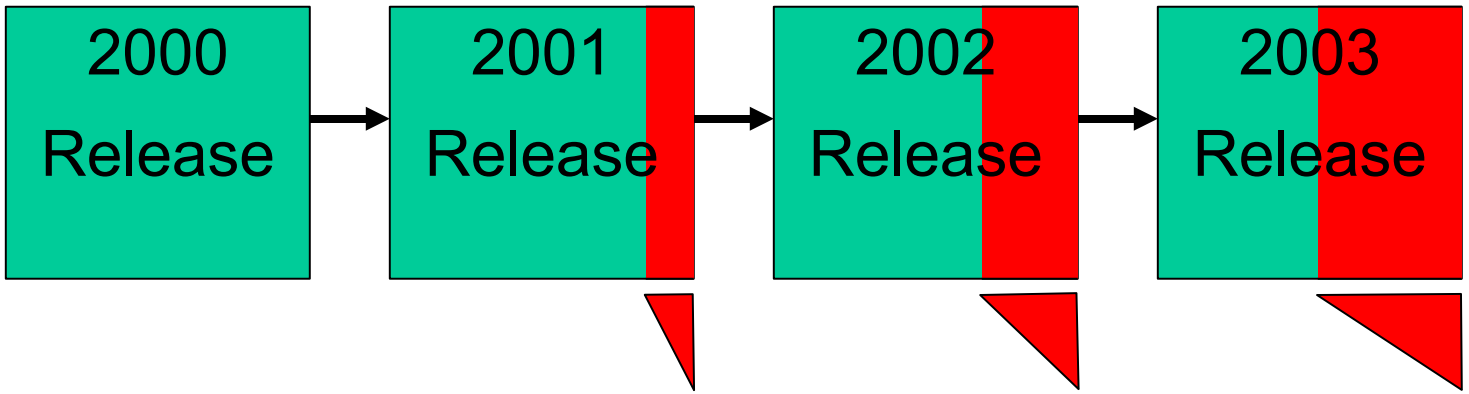
Debian
2.0, 3.0, 3.1, ...

Rocks Cluster
4.1, 4.0, 3.3, ...

Red Hat
9.0, 8.0, 7.3, ...

Linux Pre-LSB Certification

- **Each distro has their own variations**
  - Linux Distribution 'X'



  - Dissimilar variations from previous product release
  - Differences in libraries, commands, filesytem locations etc

The Solution

- **The Free Standards Group**
  - A member based non-profit organisation
  - Creating standards for a unified base of Linux
  - Bridging the needs of the Free and Open Source Development Community and IT Industry
  - Setting the foundation for the next stage of Linux growth:
    - Portable Commercial Applications on Linux
  - See http://www.freestandards.org/

The LSB (Linux Standards Base)

- **A formal comprehensive behavioral description of the Linux system and a method for proving it**
  - Guides and verifies both the operating system and applications
  - Developed and adopted by the Open Source community
  - Supported by IT Industry leaders
  - Demanded by large IT customers
  - A workgroup under the FSG

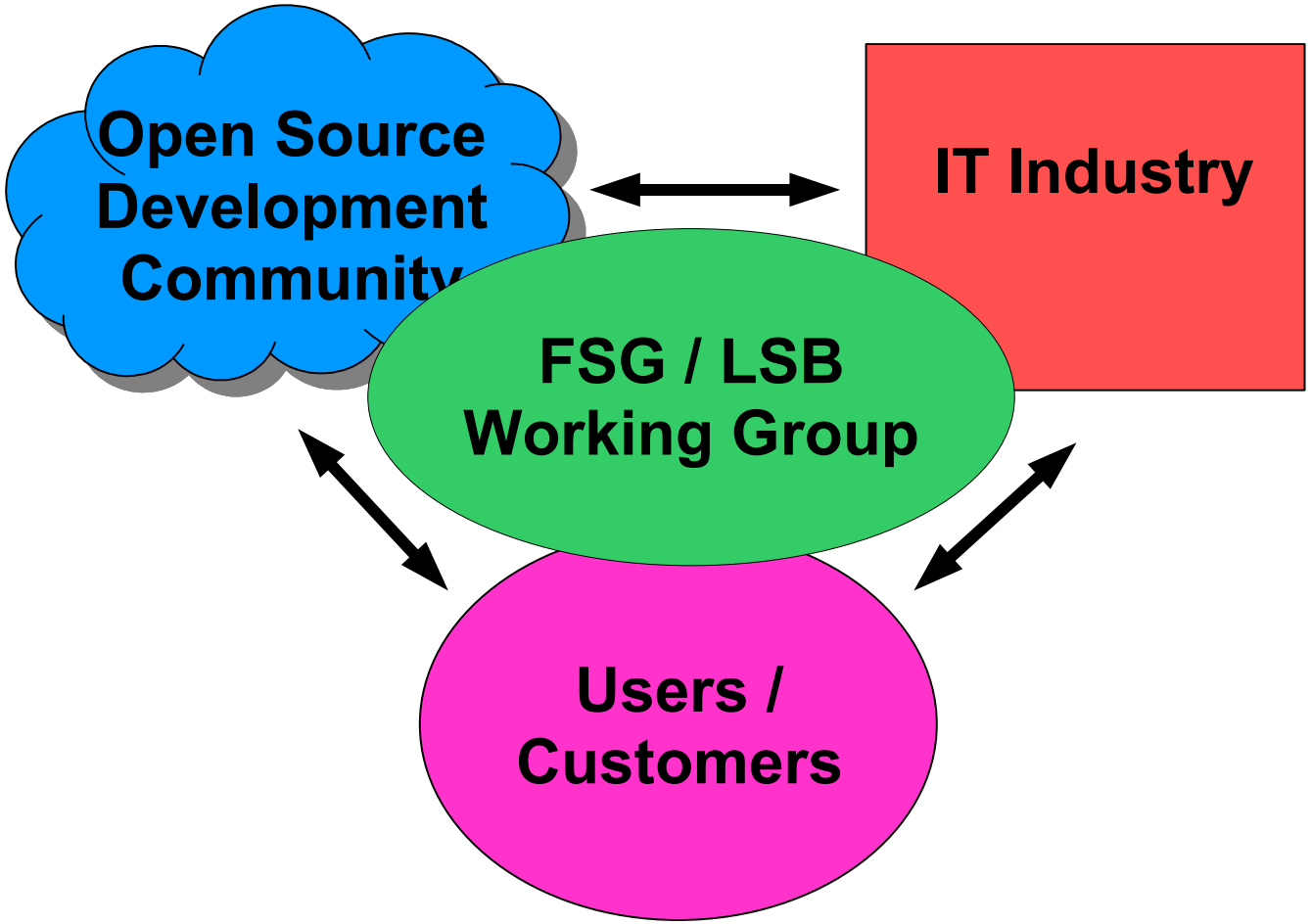
The LSB (Linux Standards Base)

- **Based on existing standards**
  - ELF – Executable and Linking Format
  - FHS – Filesystem Hierarchy Standard
  - ISO C90 & C99
  - POSIX
  - SUS – Single Unix Specification
  - X11 Interface standards
  - OpenGL

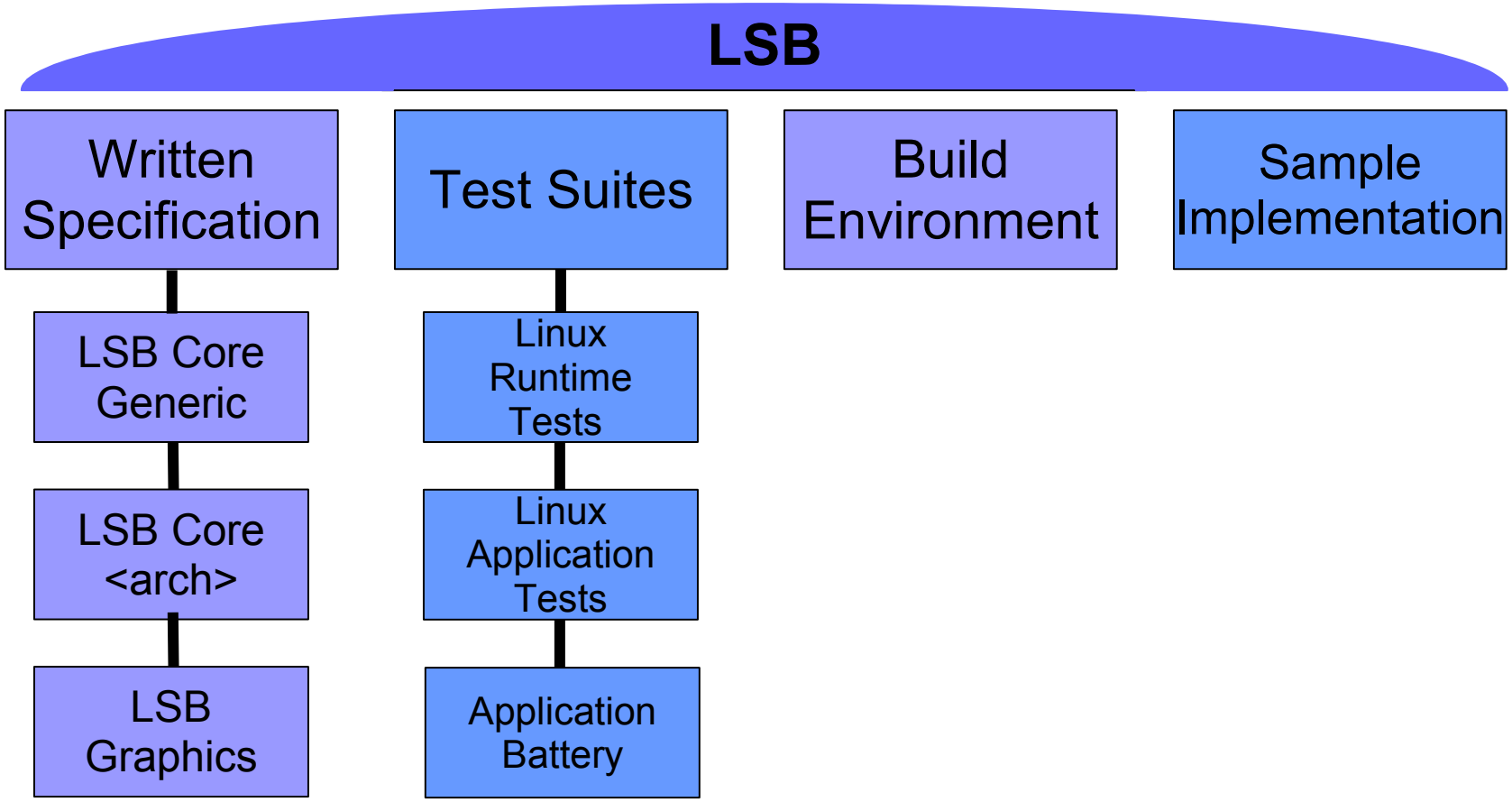
The LSB (Linux Standards Base)

- **Working with the community**
  - Adopts existing practices and works with the developers of the various Open Source projects to standarise what is being done
  - Not a top down approach like tradtional standards development
  - Feedback from LSB testing goes back to the development community
    - eg. A lot of glibc symbol stability and POSIX compliance has been fed back from the LSB WG

The LSB: Working with the community



LSB: The Details



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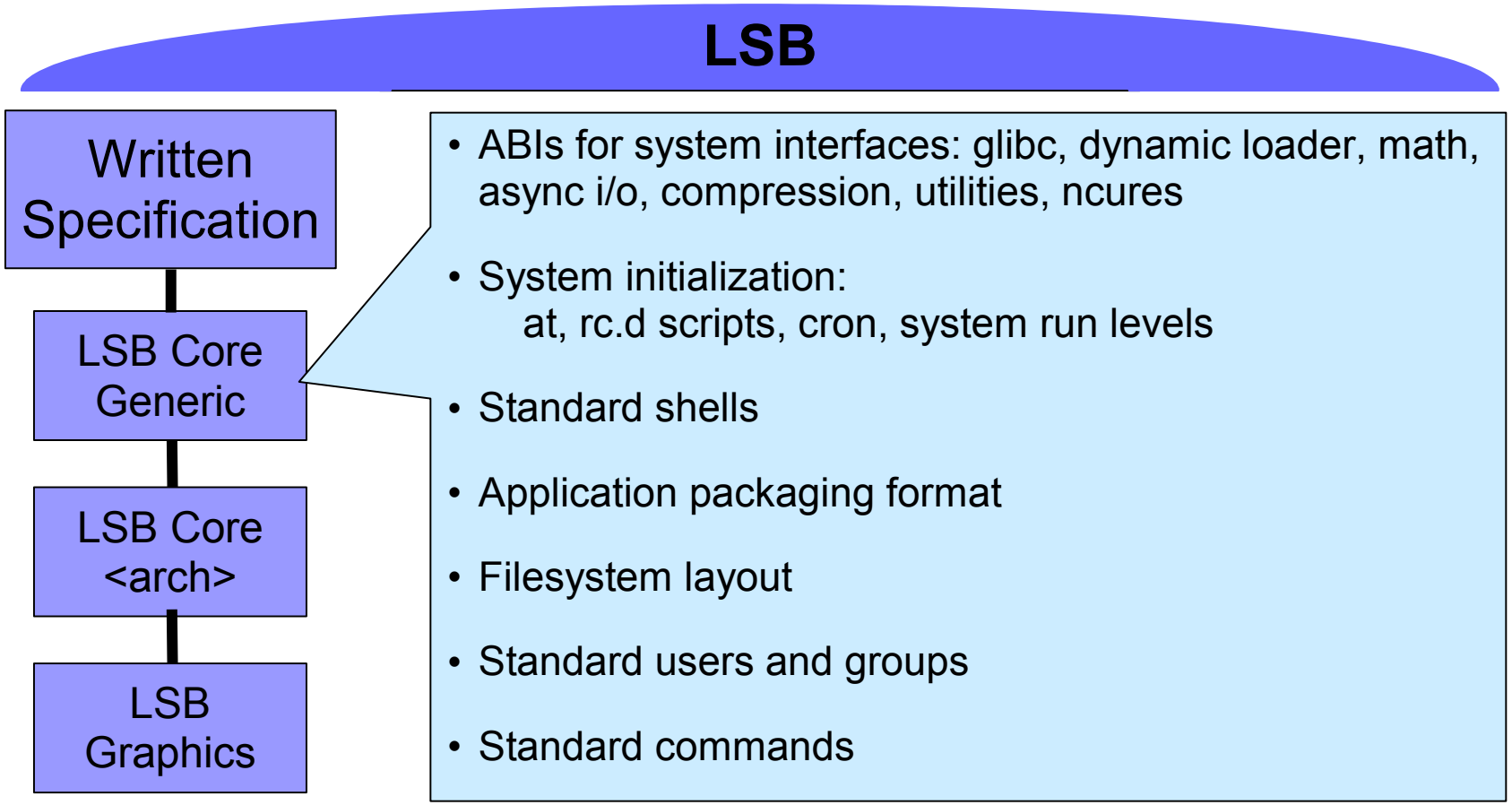

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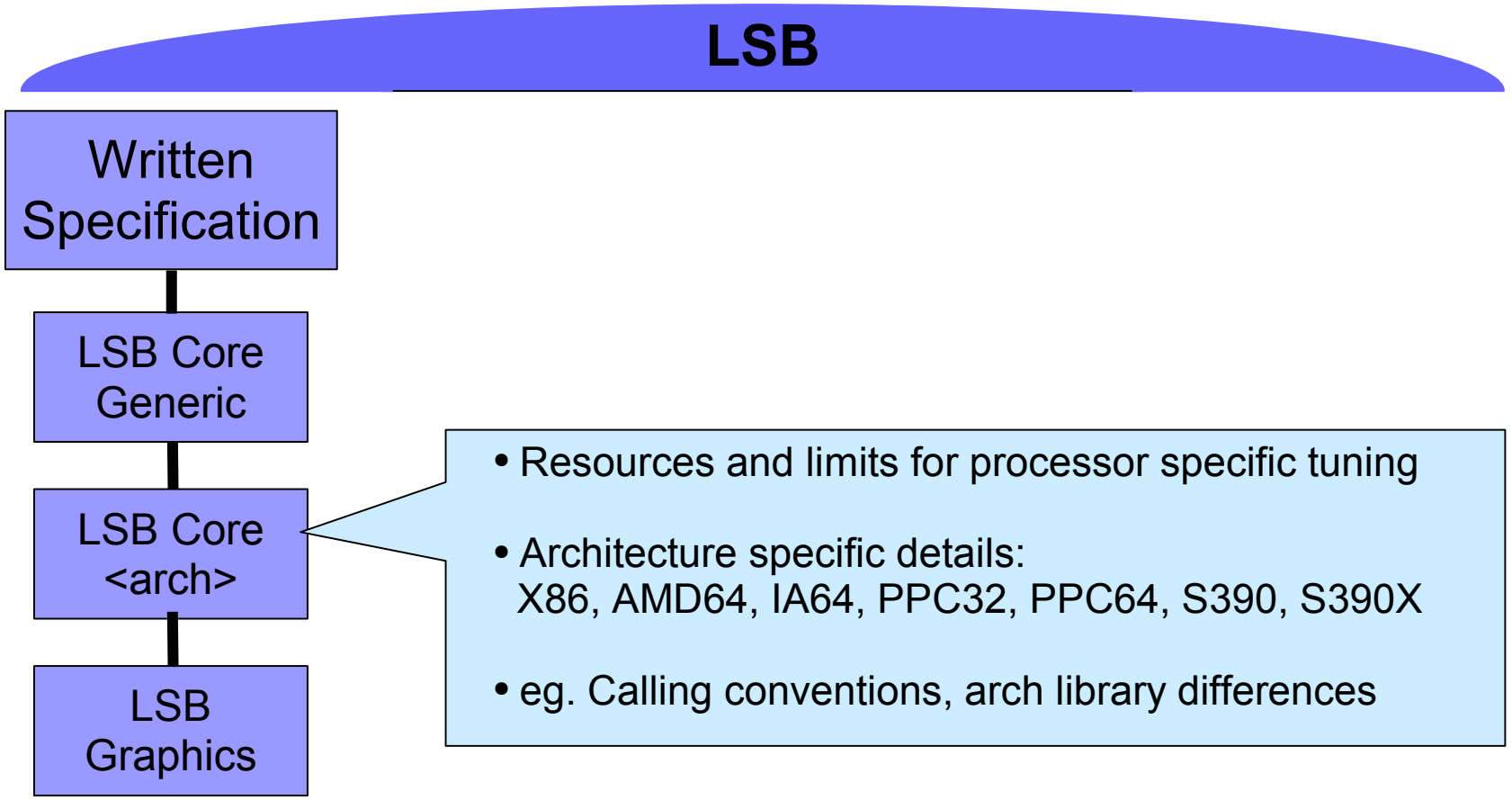

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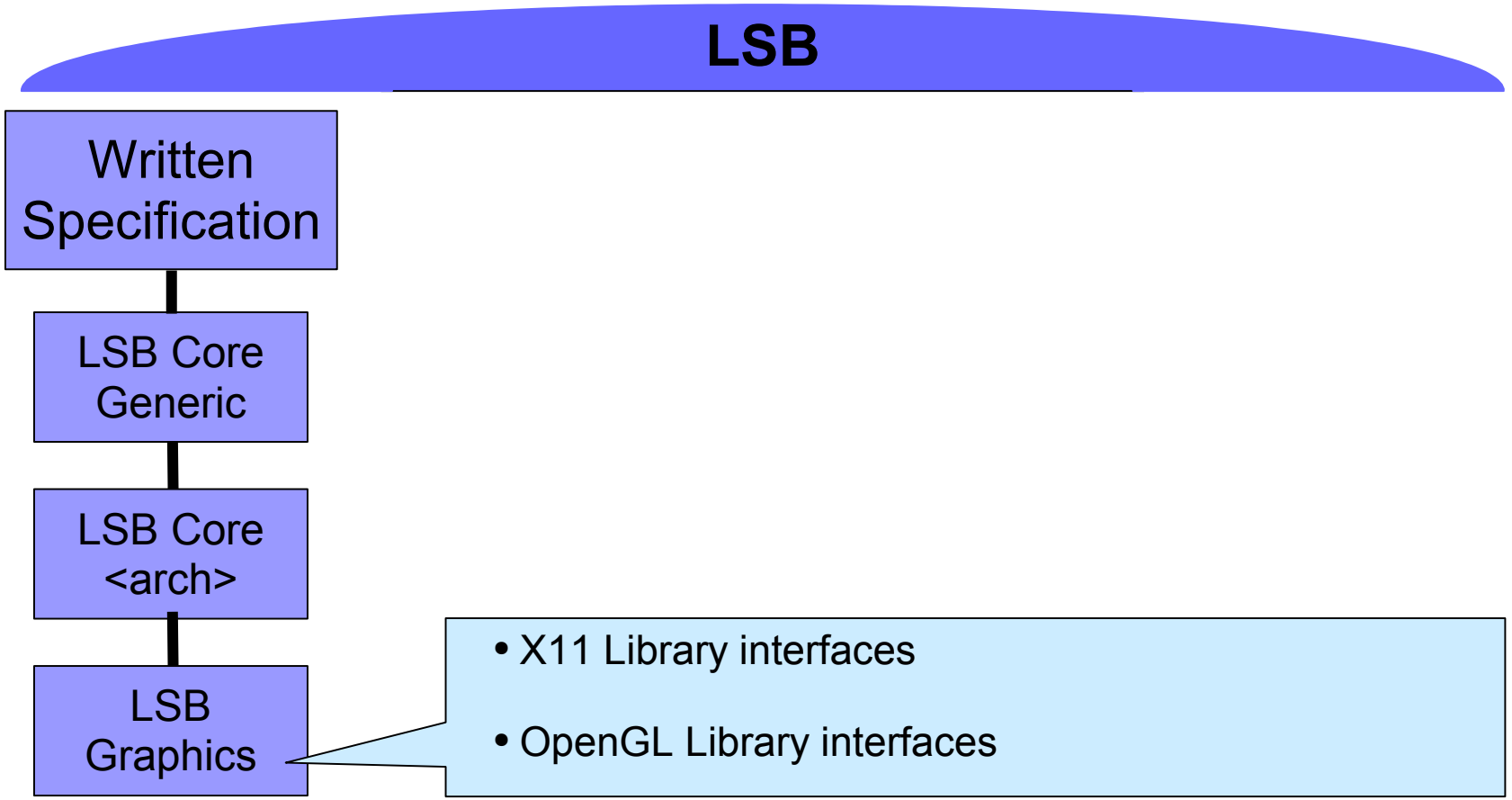

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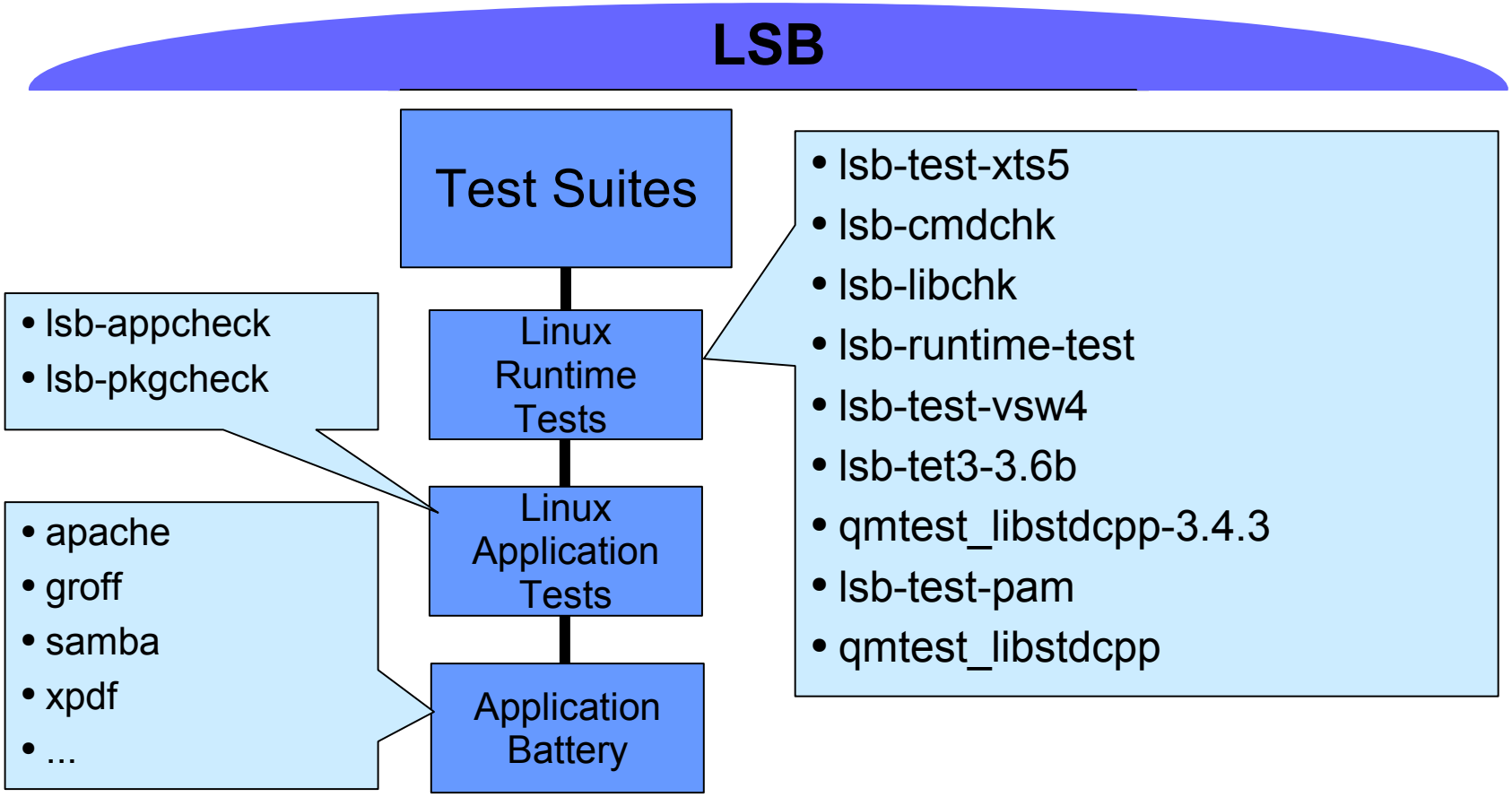


LSB: The Details

- Tools and files to facilitate properly building an LSB compliant application
- Fast path for ISVs to build LSB Certifiable products

Build Environment

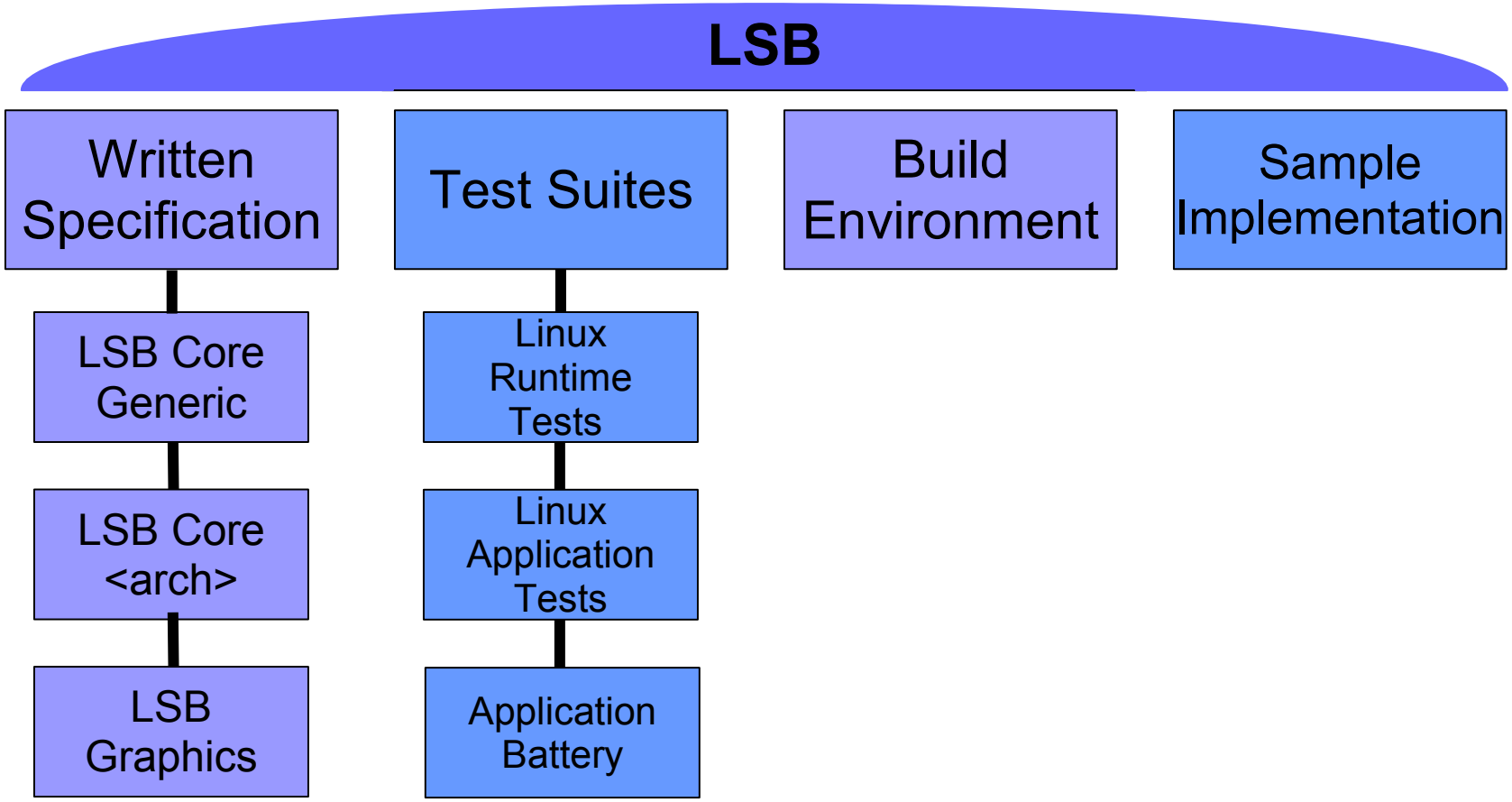
LSB: The Details

LSB

Sample Implementation

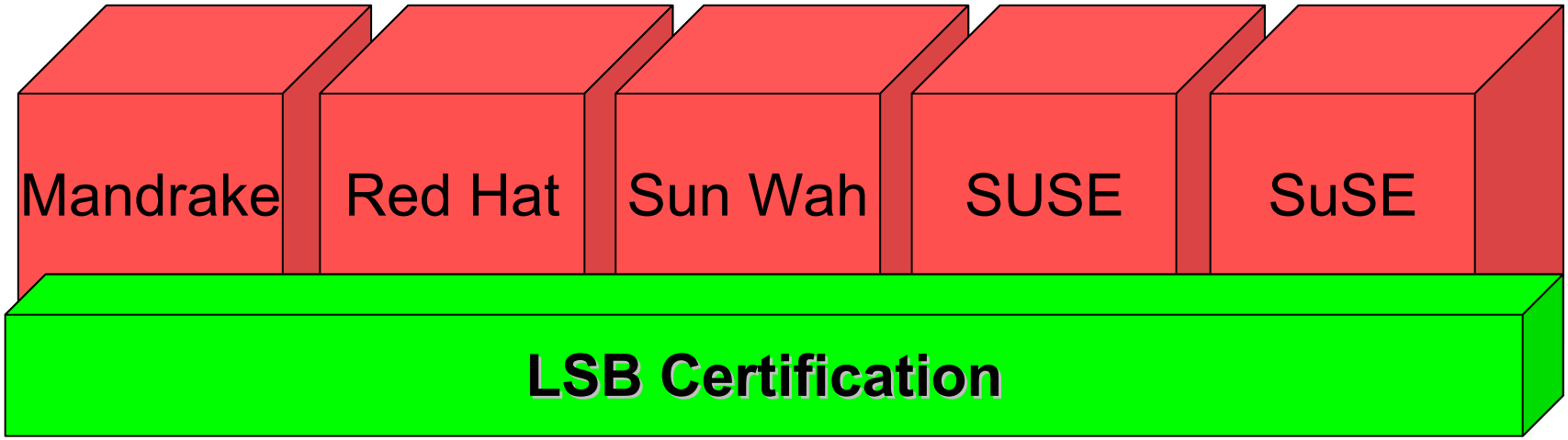
- Minimal runtime LSB system that can be used to run applications and test suites
- Used for validation of spec, tests, and applications
- The SI can be used in one of three modes:
    1. chroot to existing system
    2. bootable into a UML based virtual system
    3. bootable on real hardware

LSB: The Details

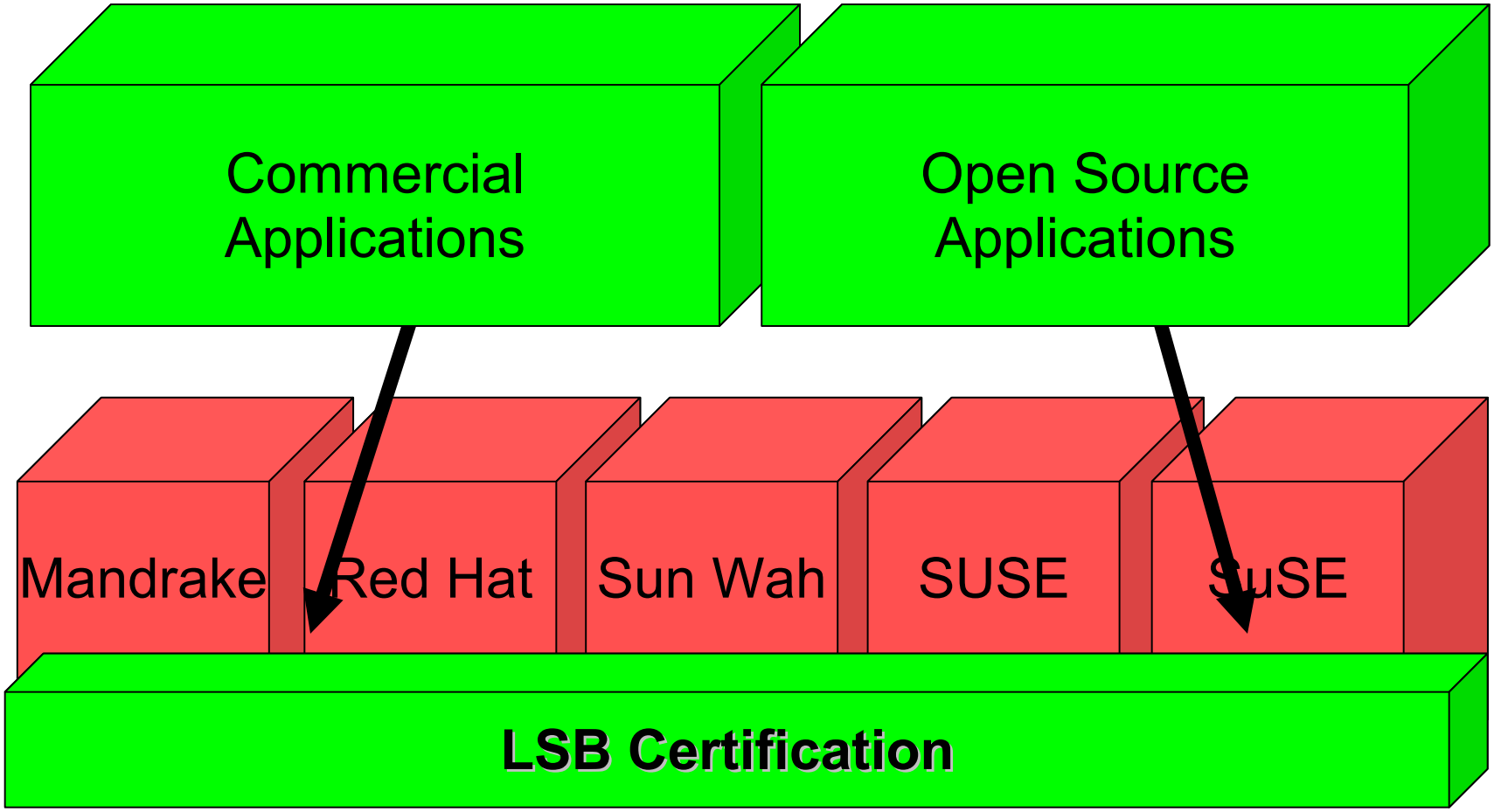


LSB: A binary commonality layer

- **Not just a source level specification like POSIX or SUS**



LSB: A binary commonality layer



Every Major Distro Certified

- Mandriva Corporate Server
- Progeny Linux
- RedHat EL
- SUSE Linux
- Novell Desktop Linux
- SunWah Rays LX
- Sun Java Desktop
- ThizLinux

LSB has major support

- **Currently the FSG is supported by major vendors in the world of Linux including**
  - Red Hat, Novell, MandrakeSoft, Conectiva, Progeny, TurboLinux, Red Flag Linux, Miracle Linux, Beijing Co-Create Software Company, Sun Wah Linux, Thiz Linux, IBM, Intel, HP, AMD, Dell, Sun Microsystems, Veritas, BakBone, Google, Trolltech, MySQL, Levanta, UGS, and many more. All major distribution vendors support the LSB standard.

LSB Customer Demand

- **The world's largest IT customer is the US Department of Defense**
  - DOD requires LSB for all Linux based purchases
- **Major Wall Street firms such as Credit Suisse First Boston have built LSB into their procurement policies**
- **Customers can avoid vendor lock-in by implementing standards**

LSB International Standard

- **The Free Standards Group is recognised by ISO/IEC JTC 1**
  - FSG is a PAS submitter to JTC1
  - Able to submit standards directly
- **LSB 3.1 has just been submitted to ISO/IEC for publication as an International Standard**
  - LSB 3.1 will become known as IS 23360

LSB Futures

- **Additional libraries**
  - libssl, libcrypto (OpenSSL)
  - libxml2 (Expat)
  - libldap, liblber (OpenLDAP)
- **LSB Desktop**
  - Standardise desktop libraries
    - Qt, Gtk
    - KDE, Gnome
  - Standardise icon, menu installation, etc across distros (working with freedesktop.org)

LSB Training

- **LSB Awareness**
  - More developers need to become aware of LSB and its potential benefits
  - One RPM per arch for all supported distros
- **LSB Training**
  - An LSB Tutorial will be presented at Linux.conf.au in Dunedin, New Zealand the week of Jan 23.
  - http://linux.conf.au/abstract.php?id=440

LSB Enables Binary Compatibility Today

- **Portable binary packages are now a reality**
  - The work over the previous few years of the LSB working group has culminated in a stable set of versioned symbols and conforming commands across multiple vendor's Linux systems
- **Still not many developers are using LSB tools to build and package**
  - Still have RPM dependancy hell with multiple different vendor specific RPM repositories

ITSC Plugfest

- **ITSC is holding a LSB PlugFest in 2006**
  - In conjunction with
    - LUGS, Spring Singapore, CICC, SCS, SITF, ITMA and The Open Group
  - Will be testing compatiblity of LSB Applications
  - Targeted at ISVs developing Applications on Linux
  - Participants are asked to register interest by Nov 30
  - An ITSC certificate will be issued to participants that pass the LSB certification tests
  - Details available at http://www.itsc.org.sg/
  - Or email **committee at lugs dot org dot sg**

LSB Application Porting Project

- **Proposal**
  - Create portable binary packages for popular open source software applications
- **OpenPKG**
  - OpenPKG is a cross-platform RPM-based Unix software packaging system: http://www.openpkg.org
  - Repository of over 800 RPM package specifications
  - Provides common RPM build system and toolchain bootstrap across Linux and Unix environments
  - Currently only SRC RPMS are portable between systems. There is no binary compatibility

LSB Application Porting Project

- **Proposal**
  - Augment the OpenPKG system with support for building with the LSB tools and adding the capability to create portable binary RPMs across LSB compliant Linux systems
  - Add patches to OpenPKG packages where needed to allow them to compile against the LSB stub libraries and headers

LSB Application Porting Project

- **Feasibility**
  - Assess maturity of LSB build environment, no large porting effort has yet been undertaken
  - The output of this can be fed back to the LSB working group to improve the LSB build environment
  - Acceptability of the addition of LSB build support to OpenPKG by the OpenPKG developers
  - Acceptability of LSB porting patches to upstream packages

LSB Application Porting Project

- **Work done to date**
  - Porting of the base openpkg build system has been done on x86 which includes rpm, bash, gzip, tar curl, ...
  - Gcc, make and binutils packages have been ported
  - We now have a binary portable build system bootstrap and toolchain
  - Many more packages to port :)
  - Will be submitting for testing at ITSC PlugFest
  - Contact me if you'd like to get involved

Thank You

Michael Clark <michael at metaparadigm dot com>

http://oss.metaparadigm.com/lsb/