The Free Standards Group

Building the Foundation of Open Source

Trademarks

- Linux is a registered trademark of Linus Torvalds
- UNIX is a registered trademark of The Open Group
- POSIX is a registered trademark of the IEEE
- LSB is a registered trademark of the Free Standards Group

Outline and Agenda

- **Linux & Standards: A Little History**
- **The Free Standards Group**
  - Who/What/How
  - Workgroups
    - LSB
    - OpenI18N
    - OpenPrinting
  - **ISO/IEC JTC1/SC22**
  - **Future Directions**

Linux History

- Linux started life as a clone of Andrew Tanenbaum's Minix OS
  - Kernel written by Linus Torvalds in 1991
  - System commands and utilities primarily from GNU effort
  - Small core team maintains kernel
- Rapid growth of development and user community
  - Proven threat to traditional UNIX market
  - Microsoft perceives Linux as a market threat

Linux History

- Linux has one major difference from UNIX
  - One Linux Kernel maintained by Linus Torvalds and core team of volunteers
  - One set of core libraries, commands and tools
- Linux remains a multi-vendor technology
  - Different companies package Linux kernel, libraries and tools in different ways
  - A very different standards problem from U*X in 1980's
    - Release disparities, not version disparities

Linux & Standards

"Standards are one of the enabling factors behind the success of Linux. If it weren't for the adoption of the right standards by Linus Torvalds and other developers, Linux would likely be a small footnote in the history of operating systems. "

Dan Quinlan, Free Standards Group Chairman

Linux & Standards

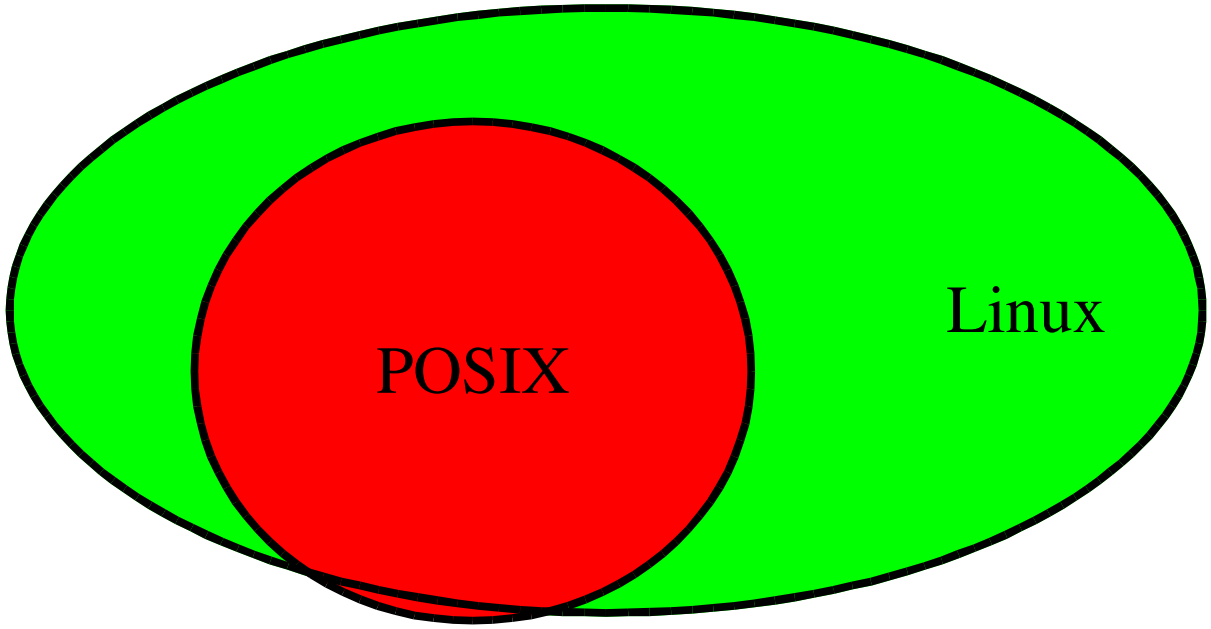
- Linux has always been a player in the standards game
  - What's new is JTC1's interest!
- Linux follows (though may not always be strictly conforming to) many international standards
  - POSIX
  - UNIX
  - TCP/IP

Linux & Standards

- Linux developers are involved in standards development:
  - Heavily involved in Austin Group revision of POSIX
  - Unicode Technical Committee
  - ISO/IEC JTC1/SC2/WG2
  - W3C Internationalisation Activity Group
  - Localization Industry Standards Association
    - LISA OSCAR SIG

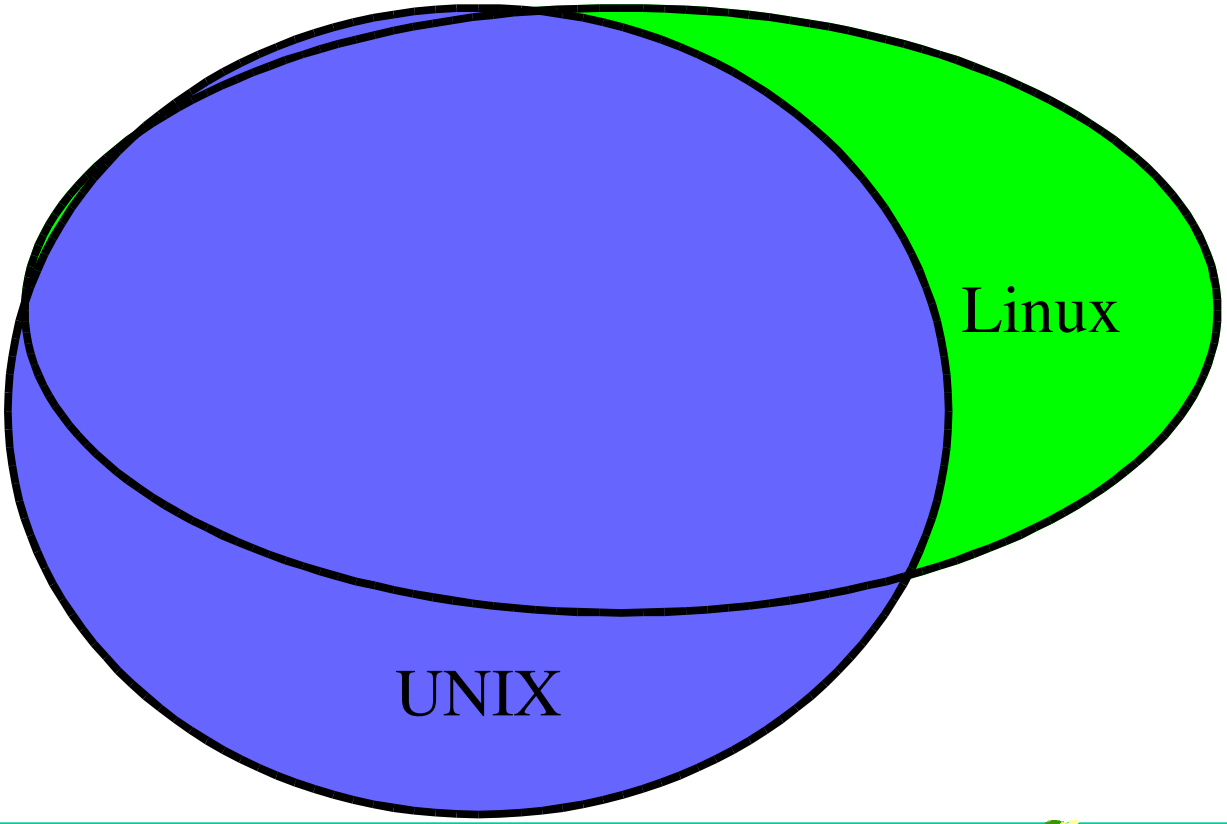
Linux, UNIX & POSIX

- Linux != POSIX



Linux, UNIX & POSIX

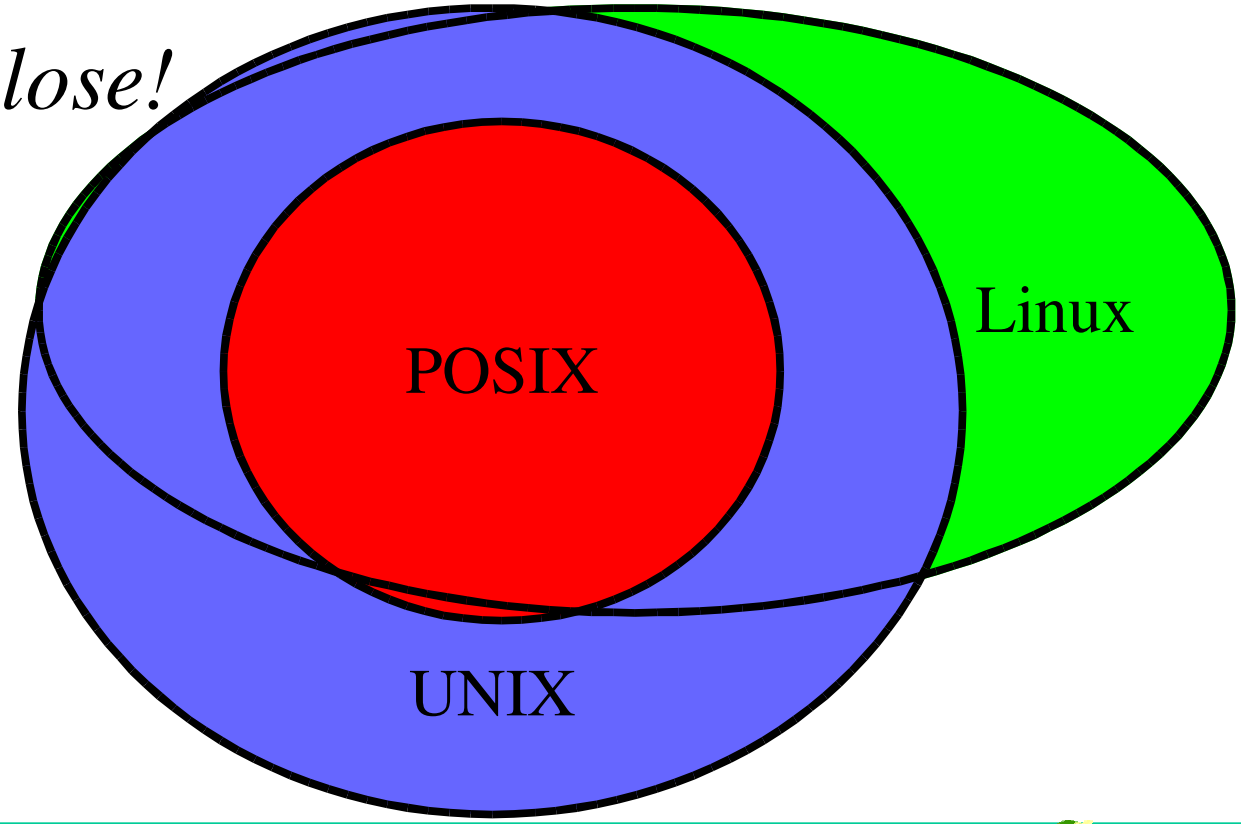
- Linux != UNIX



Linux, UNIX & POSIX

- Linux != POSIX
- Linux != UNIX

But it's real close!



Linux, UNIX & POSIX

- The GNU libc (glibc) is very close to the Single UNIX Specification Version 3 (Austin Group)
  - Several interfaces not in glibc and mandatory in SUS V2 were made optional for v3
  - Latest glibc includes NPTL, the Native POSIX Thread Library for Linux, which is much closer to full POSIX thread semantics than its predecessors
- The LSB test program shares core common test suites which have been a catalyst to some of this

Linux & Market Fragmentation

- Just as in the early days of POSIX development, multiple, incompatible, vendor implementations
  - Need to port applications from one vendor's version of Linux to another
  - File system layout inconsistencies
  - Library version problems
  - User and group incompatibilities

Linux & Market Fragmentation

"The Free Standards Group's efforts are an important component of the continued success of open source."

Linus Torvalds

Background

- What is the Free Standards Group?

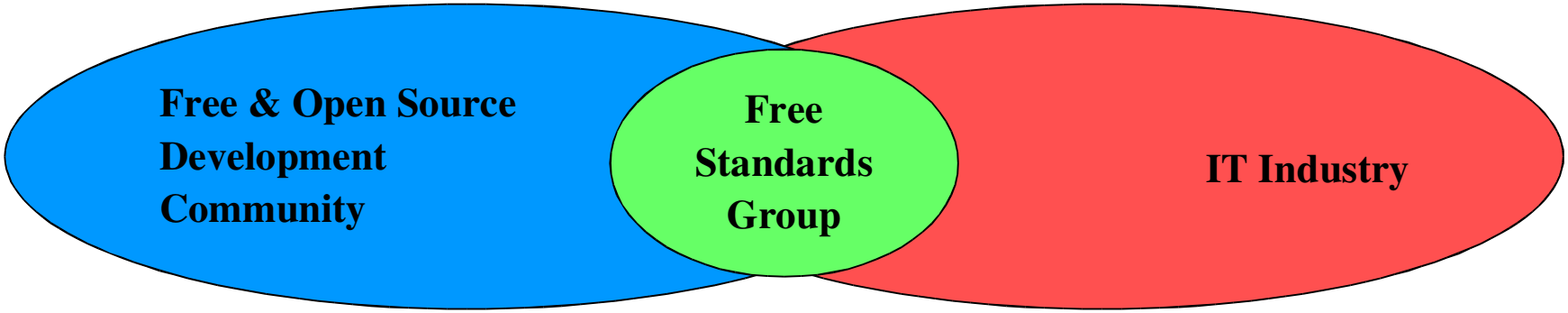
  The Free Standards Group develops and makes freely available standards, tools and compliance testing, allowing for application portability across multi-vendor platforms.

  California nonprofit, member supported organization

Background

- What is the Free Standards Group?

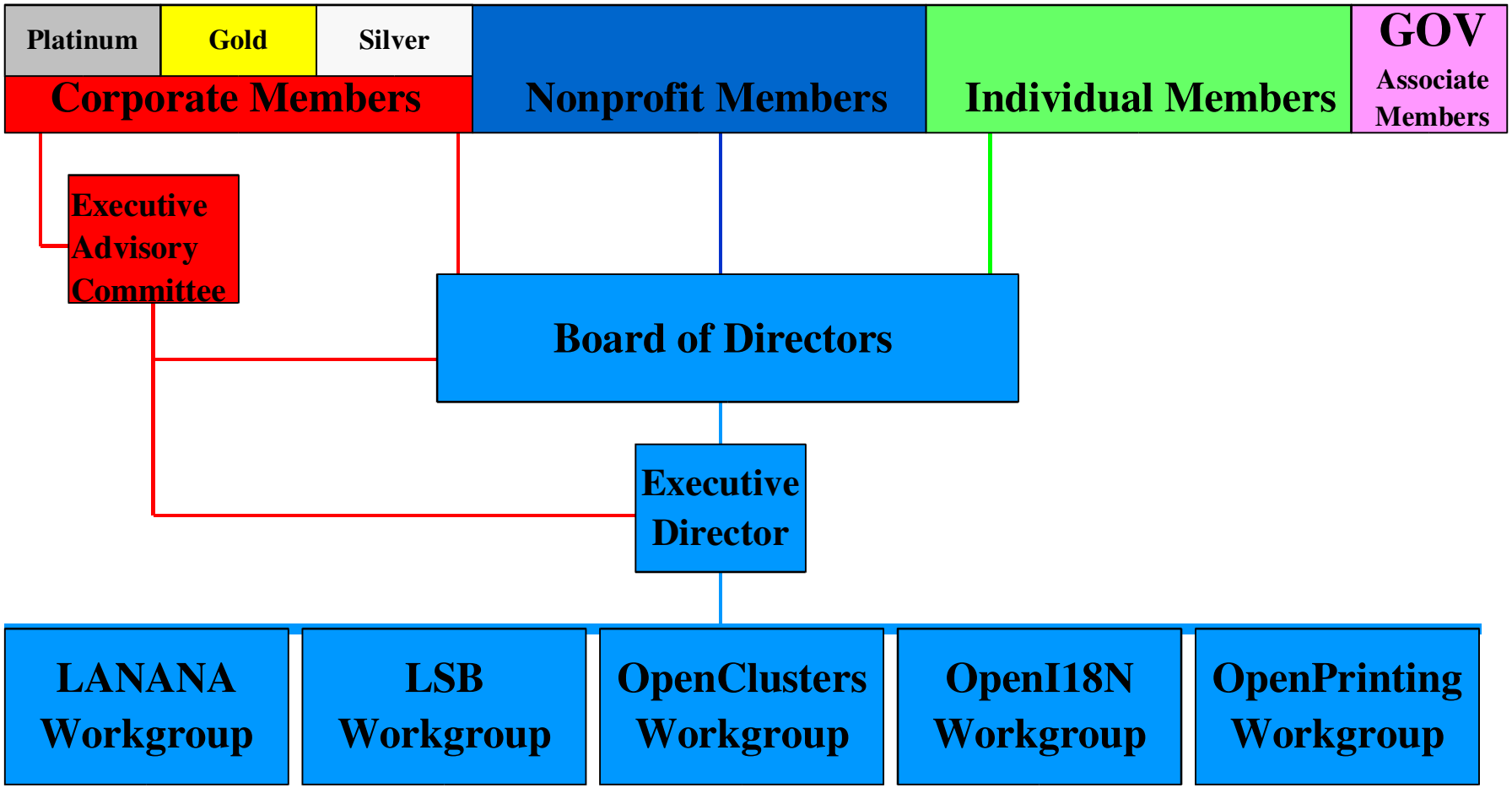
  An umbrella group for several open source standards efforts, the Free Standards Group acts as a key facilitator between the needs of the free and open source development community from which it came and the IT industry that increasingly relies on Linux as a solutions platform



Membership

- Corporate
  - Platinum – HP, IBM, Intel
  - Gold – SCO Group, Conectiva, MandrakeSoft, Miracle Linux, MontaVista, Red Hat, Sun Microsystems, SuSE, Turbolinux, VA Software
  - Silver – AMD, Dell
- Nonprofit – OSDL, PC Open Architecture Developers' Group (OADG), Software in the Public Interest (SPI), Software Liberty Association of Taiwan (SLAT), USENIX
- Individual
- Government

Organizational Chart



Participation in a Workgroup

- Each Workgroup has open attendance

  No need to be a member of the FSG to participate in a Workgroup's activities

  Anyone can submit comments on documents

  Membership in the Free Standards Group will allow you to affect the way a project is run

  Only members can run for board seats

  Only members can be work group chairs

Workgroups

- LSB – Linux Standards Base
- OpenI18N – Open Internationalisation Institutive has created a foundation for language globalization
- OpenPrinting – Standardizing on a scalable print environment in Linux
- LANANA – Authority for Linux Namespace assignment

LSB Goals

- The goals of the Linux Standards Base
  - To develop and promote a set of standards that will increase binary compatibility among Linux distributions
  - To enable software applications to run on any compliant system.
  - To help coordinate efforts to recruit software vendors to port and write products for Linux.

LSB Goals

- The goals of the Linux Standards Base
  - To preserve backwards compatibility without locking out future progress
  - To allow runtime environments to still be unique (and provide added value) by only standardizing the base system.
  - To avoid fragmentation of the base functionality of Linux.

Why is the LSB needed?

- For developers of Linux based applications (both ISV's and open source software developers) the LSB:
  - Minimizes issues in porting code from another Linux platform by providing binary compatibility
  - Allows a package to perform the same way regardless of the Linux runtime environment or emulation of such Release disparities, not version disparities

Why is the LSB needed?

- To make application developer's lives easier

  With the LSB, ISVs and application developers can spend more time building enhancements rather than verifying that their code works not just on the many Linux distributions but the different versions of a single distribution (e.g. Red Hat 7.3 and 8.0, etc.)

Why is the LSB needed?

- To make operating system vendors lives easier

  By adhering to the standard, operating system vendors can reach a wider market, assuring that binary compatibility for applications is not an issue for their products.

Why is the LSB Needed

- To make end users lives easier
  - Customers are starting to demand LSB Certified solutions due to their promise of easier system administration, applications that run "out of the box" and lack of vendor lock-in.

What is the LSB

- An Application Binary Interface (ABI)
  - Different approach to POSIX / UNIX (source API standards)
- A generic, processor-independent specification, plus a number of architecture specific supplements

What the LSB is not

- **Not** a mechanism to bring about one “Linux”
  - One port - multiple platform choices
    - Just as POSIX allowed multiple implementations
- It does not specify the Linux kernel level
  - The kernel can be any version that provides conforming interfaces
- It does not cover languages other than C
  - Future directions include other languages

LSB Standards Alignment

- Built on industry standards
  - IEEE Std 1003.1-1996 (Old POSIX.1)
  - IEEE Std 1003.2-1992 (Old POSIX.2)
  - The Open Group Single UNIX Specification Version 2 (aka UNIX98)
  - AT&T (Caldera/SCO) SVID, Issue 3 1989-2001
    - + at least 32 other public, open standards

LSB Runtime Conformance

- Behavioral Test Suites available
  - LSB-FHS
  - VSX-PCTS
  - LSB-OS
  - LSB-USRGROUPS
- Binary Test Suites
  - Examine what libraries provide etc
- Application Battery

LSB Certification

- LSB Certification program launched in July 2002
  - Certified Runtime Environments
    - Currently 19 certified platforms from 8 different vendors
  - Certified Applications
    - Application batteries for IA32, Itanium, and PPC-32
  - Branding
  - Development and Test Tools
    - Includes “Self Testing/Compliance” program

LSB as a Profile

- The LSB is in effect a profile of the underlying base API standards
  - Sets minimum-maximums and maximum-minimums
  - Mandates certain options
- It does permit some exceptions to underlying standards
- Adds restrictions

LSB Additional Requirements

- In addition to requirements from underlying specs – non ABI
  - Users & Groups
  - File Hierarchy Standard
    - This is actually from a base standard
  - System Initialization
  - Package Format and Installation

LSB Specification

- Object File Formats
- Dynamic Linking
- Base Libraries & I18N
- Utility Libraries
- Graphics Libraries
- Packaging
- Commands & Utilities
- Standard Shell
- Users & Groups
- Filesystem Hierarchy
- System
- Initialization

OpenI18N

- Formerly known as LI18NUX
  - No longer Linux specific
- Charter
  - To propose and coordinate any Internationalisation techniques, conventions, guidelines and activities within the open source community

OpenI18N Scope

- Focused on software/application portability and interoperability in the international context
- Aims to provide a common open source environment where applications can be executed and behave correctly worldwide, with different scripts, cultures and languages
- Based on existing practices

OpenI18N Background

The Li18nux Workgroup was created in September 1999. In October 2002, the workgroup was re-structured and renamed to OpenI18N. The objective of this re-structure was to reflect the workgroup's commitment to support open source internationalisation activities. This facilitates collaboration among Free Standards Group workgroups. Internationalisation continues to be a challenge for open source community

OpenI18N Subgroups

- Technical and administrative subgroups are established as necessary
  - Internationalisation Architecture
  - API and Application Development Environment
  - Graphic User Interfaces
  - Text Processing Tools
  - Web Technologies
  - Input Method

OpenI18N Subgroups

- Typography
- Globalizable Document
- Inter-Application Collaboration
- Heterogeneous Inter-connectivity
- Printing
- Public relations

OpenI18N Achievements

- A number of technologies delivered worldwide to date:
  - Li18nux (the precursor of OpenI18N) 2000 Specification and test suite
  - Locale naming guideline 1.0: adopted by glibc and others.
  - Universal locale repository 1.0: adopted by glibc.
  - Many IIIMF language engines and bindings to popular environments.

OpenI18N Achievements

- A number of technologies delivered worldwide to date:
  - OpenI18N certification process
  - Many internationalisation patches to Linux distributions
  - Active involvement with regional mandatory standards such as GB18030 and BIG5.

LANANA

- The Linux Assigned Names And Numbers Authority
  - c.f. IANA (the Internet Assigned Numbers authority)
  - Registration authority
  - Avoidance of name-space collisions
  - Package naming
  - Device naming

LANANA

- Collision avoidance gives
  - Better interoperability
  - More broadly available drivers
  - More applications for Linux!
- Several Namespaces managed
  - Devices
  - Packages
  - Initialization & Cron entries

OpenPrinting

- Standardizing a Scalable Print Environment
  - Management
  - Reliability
  - Security
  - Scalability
  - printer feature access
  - Network accessibility

OpenPrinting Goals

- Standards need to be generated around the following areas:
  - Desktop
    - Device Discovery
      - Ability to identify the device and establish a connection for printing to said device
    - Spooler
      - Ability for applications to enumerate the device and submit jobs
    - Capabilities
      - Ability to understand what the capabilities of the device are

OpenPrinting Goals

- Desktop continued
  - Queue
    - Ability to fetch print queue information
  - Print Job
    - Ability to fetch job information or to act on a job already in the process of being printed
  - Notification
    - Ability to provide information back to the system about the state of a job

OpenPrinting Goals

- Desktop continued
  - Basic Print Support
    - Ability to provide a consistent set of print support regardless of the connection type or the print device. Consistent refers to a consistent page format given paper size, resolution, paper type, paper handling, and graphics output
  - Content Rendering
    - Ability to send document data (in the form of raster or PS) with a job description file (job ticket) to a print server. This print server represents a particular printer. It establishes the printing process with the printer, and collects and reports status back to the initiator

OpenPrinting Goals

- Network
  - Network Queue
    - Ability to provide print queue information to a non-Linux client (Samba interface to a Windows client)
  - Dynamic Discovery
    - Ability to discover a device and its capabilities on the fly

OpenPrinting

- Based on Existing Practice and Standards
  - IPP
  - LPRnG (RFC 1178)
  - Cups

Where Do We Go From Here?

- The FSG is actively seeking members and participants in all these projects
- FSG philosophy is to find good, existing, open standards and build on them
- No desire for invention
  - Expermintal / Recommended Practice
- No shackles on core developers

What Should ISO/IEC Do?

- Continue involvement in Austin Group
  - After WG15 demise, this is reassigned to SC22
  - Use this group to add additional Linux interfaces where appropriate to POSIX
- Help Prevent Linux and POSIX divergence
  - And any appearance of such
    - Two distinct standards, one for POSIX, one for Linux would be bad
  - Promote Linux in the same way that POSIX helped promote UNIX

What Is FSG Doing?

- Formal Liaison between FSG and SC22
  - PAS Submitter
  - LSB would be first document to submit
- Work with ECMA
  - All roads lead to Rome
- Other Ideas (general brainstorming session)

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