

# Linux Foundation Japan Symposium

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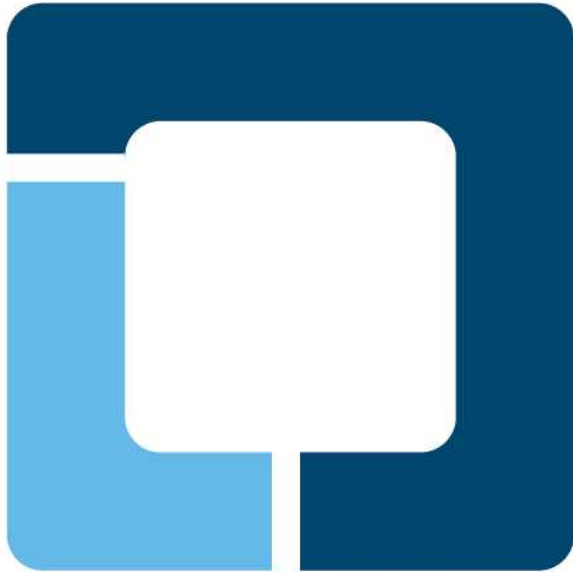
July 10, 2007





# Agenda

- **Carrier-Grade Linux (CGL)**
- **Linux Standard Base (LSB)**
- **OpenPrinting**



# Carrier Grade Linux Review



## Positives

- **First OSDL workgroup, founded 2001**
- **Helped legitimize, publicize, and market Linux in the Carrier world**
- **Provided forum for carriers to discuss initiatives**
- **Linux will replace proprietary carrier systems and CGL is helping catalyze that**

## Negatives

- **Created some bad feelings with kernel developers and the major distros**
- **CGL would often describe an important problem, but the proposed solution was often not what was accepted into mainline**
- **Proof-of-concept (POC) patches not yet accepted into the mainline should generally not be mandated (Priority 1) for commercial deployments**
- **Including requirements that are already satisfied by the mainline kernel makes the spec less useful**



# Kernel Developer and Enterprise Distro Viewpoint

- **There is, and should be, only one Linux: the latest version of which is released by Linus on kernel.org**
- **There are not separate Linuxes for security, embedded, mobile, server, desktop, carrier, etc.**
  - Although there are compile options
- **Distro's job is to take the kernel.org Linux and combine it with all of the other software necessary to make a workable OS for a given environment**
  - E.g., Red Hat, Novell, and Debian package and support 5,000 packages
  - All distros have an incentive to support the smallest number of kernel patches possible, as each one creates support and maintenance hassles
- **The kernel aspires to a meritocratic system for accepting new patches into the mainline kernel**
- **The kernel and distro communities are very interested in real-world problems not being solved by the current kernel**
  - Such as those experienced by carriers
  - The currency of LKML is ultimately patches, not requirements documents

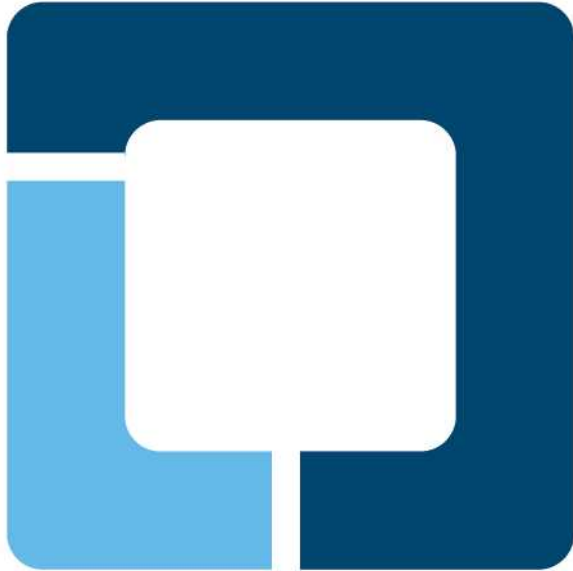


## 3 Options for CGL

- **Option 1: Declare victory and go home**
  - With CGL 4.0 released announce that CGL is closing down
  - Some similar work can continue in SCOPE
- **Option 2: Recharter CGL to focus on requirements**
  - Create a new CGL 5.0 document that specifies requirements (what) and justifications (why), but not implementations (how)
  - Create workgroups to write code to address specific shortcomings not being resolved by current vendors and get that code accepted into the kernel
  - Consider optional LSB module and certification for measurable non-kernel requirements
- **Option 3: Continue CGL as it has been**
  - Create 4.0 registration process with a committee to provide light verification
  - Hire initiative manager to facilitate development of new 5.0 spec
  - Continue to risk friction with kernel devs and major distros
- **Other combos possible**



- **Option 2 selected**
- **Group being rechartered**
- **CGL 4.0 registration based on CGL 3.2 process is now open**
- **New lines of communication open with kernel community**



# The Linux Standard Base



# Linux Foundation Standardization

- **LF is the standardization and certification authority for Linux**
- **The LSB is about doing three things:**
  - **Standards:** The Linux Standard Base (LSB) delivers application interoperability among all major Linux distributions
  - **Testing & Tools:** Comprehensive, user-friendly test suite, and a community-driven site for ISVs writing portable Linux apps
  - **Certification & Branding:** Branding campaign modeled on “Designed for Windows” logo program
- **The LSB prevents the fragmentation of the Linux platform**
  - The LSB means:
    - App vendors need to do only one port
    - Distro vendors get more apps ported to the Linux platform
    - End-users can choose their distro and their apps without vendor lock-in
  - All major Linux distributions are certifying
  - SAP, RealPlayer, and MySQL are certifying apps, with hundreds more in the queue



# Why Microsoft's platform has been so successful

- **Microsoft does the following very well:**
  - **Standards:** Rich, backward compatible API/ABI
    - Well-written DOS apps will run on Vista
    - De facto, proprietary standard makes it exceedingly difficult to create a compatible competitor (see OS/2 and WINE)
  - **Testing & Tools:** Windows Hardware Quality Lab (WHQL) provides driver testing (while app testing is shakier). As a developer program, MSDN is second to none
  - **Certification & Branding:** Designed for Windows logo program is a consumer-recognized symbol of interoperability



## What would it feel like if Linux fragmented?

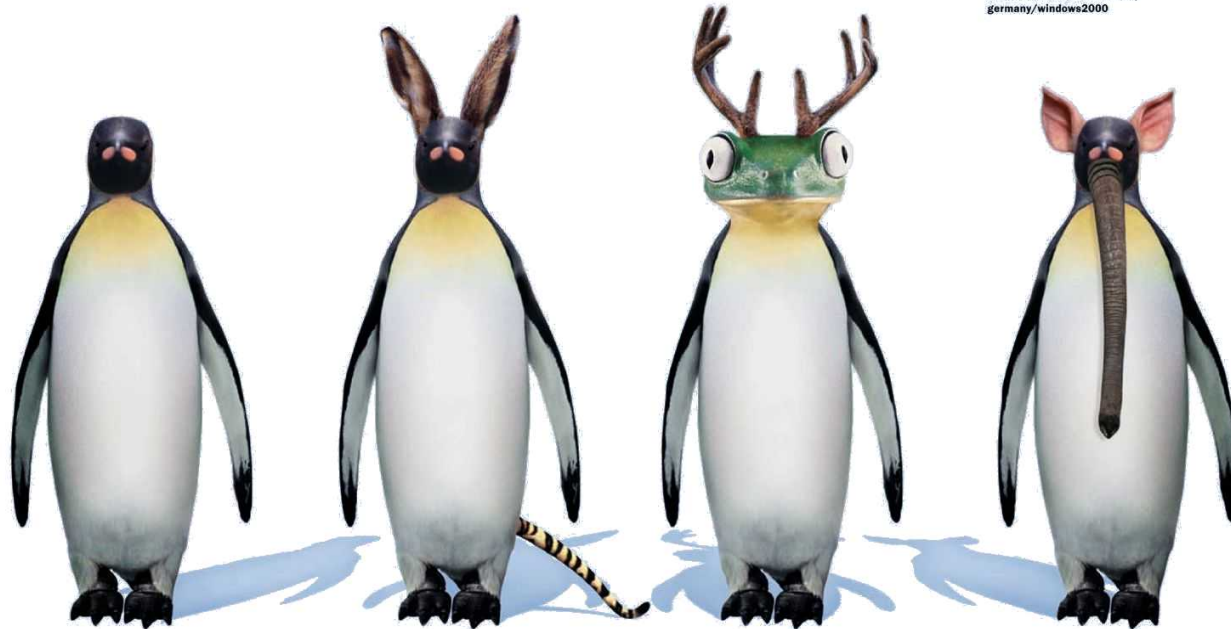
- **Linux would not be one platform**
- **Dramatically reduced network effect would slow innovation**
- **Years of porting effort if you choose the wrong distribution**
- **No competitive pressure keeping costs reasonable**



# Microsoft Hopes Linux Will Fragment

[An open operating system will certainly mutate. With Windows 2000, however, all services and components are integrated. That saves time and definitely money. More info at [www.microsoft.com/germany/windows2000](http://www.microsoft.com/germany/windows2000)]

Ein offenes Betriebssystem kann schon mal mutieren. Bei Windows 2000 hingegen gibt es alle Services und Dienste aus einer Hand. Das spart Zeit und somit wirklich Geld. Mehr Infos unter [www.microsoft.com/germany/windows2000](http://www.microsoft.com/germany/windows2000)



ein offenes betriebssystem hat nicht nur vorteile

[an open operating system doesn't just have advantages]



## Microsoft Is Still At It

**“A few actions that the model suggests Microsoft could do to remain competitive are: ... ‘Promote’ Linux's code forking. Infuse fear, uncertainty, and doubt into the Linux user community.”**

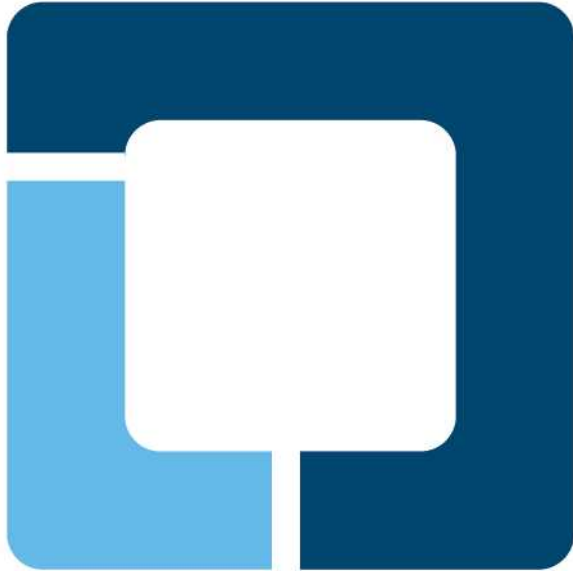
-- “Microsoft vs. Open Source: Who Will Win?” Ramon Casadesus-Masanell and Pankaj Ghemawat, Harvard Business School, June 2005

**“It's challenging for partners to build competencies to support Linux, because you never quite know what you're going to be supporting.”**

-- Ryan Gavin, Microsoft's director of platform strategy, August 2006

**“We believe every Linux customer basically has an undisclosed balance-sheet liability.”**

-- Steve Ballmer, discussing patent liability, November 2006



# The Linux Standard Base

Ensuring Interoperability



# Examples of What the Distros Agree On

- **Versions of libraries and compilers**
  - e.g., glibc 2.3.4 compiled with gcc 3.4 or higher
- **File Hierarchy Standard**
  - e.g., most utilities go in /usr/bin/
- **What libraries should be available**
  - e.g., OpenSSL, Perl, Python
- **Configuration Files**
  - Located in /etc/
- **GUI Libraries**
  - Both GTK and Qt should be supported
- **Packaging (well, they almost agree)**
  - rpm can be used directly or converted to .deb using alien



## Examples of What the Distros Don't Agree On Yet

- **Xgl vs. AIGLX for 3-D desktop graphics (i.e., eye candy)**
- **SELinux vs. AppArmor for security**
- **Which installer: anaconda, yast, d-i, or live-cd?**
- **What framework should be used for PDA syncing and backup?**



# Why Can't We All Just Get Along?

- **The Linux Standard Base is about agreeing about what we agree on**
- **Established interfaces are standardized by distros so apps can count on them**
- **The LSB means:**
  - App vendors need to do only one port
  - Distro vendors get more apps ported to the Linux platform
  - End-users can choose their distro and their apps without vendor lock-in
- **The LSB prevents the fragmentation of the Linux platform**
- **The LSB allows distros to innovate and customize in areas not yet standardized**
- **LSB Certification augments, but does not replace, app and distro certification programs**
- **The LSB is a collaborative forum for all stakeholders in the Linux platform**



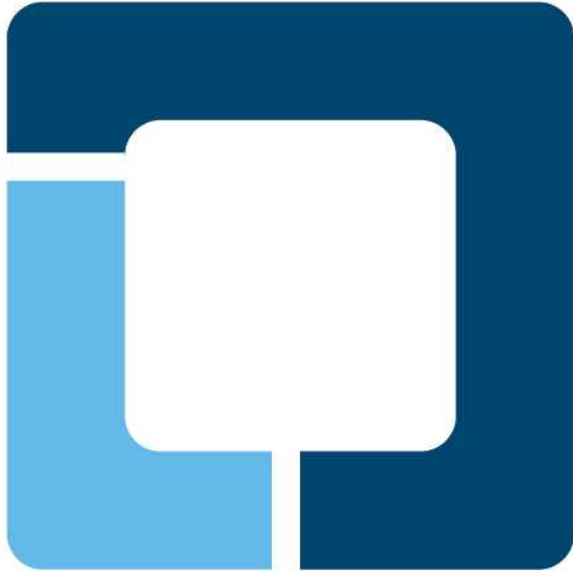
# How the LF Creates Standards

- **Standards are developed in an open process in working groups**
- **All of our specs, tests, and SDKs are open source**
- **We take a pragmatic approach: we specify the interfaces that the distros actually ship**
- **The large majority of our specs are based on interfaces developed upstream (e.g., QT, glibc), where we then document and write tests**
- **Forward-looking work (e.g., packaging, printing) is not added to the LSB until it is best practice (i.e., shipping in the distros)**
- **We align our release schedule with the distros'**
- **Because we focus on agreed interfaces, we're much faster than typical standards organizations**
- **We later submit our specs to become ISO standards such as ISO/IEC 23360:2006**



# The LSB Is Expanding to Hardware, Starting with Printing

- **Provide cross-distro printer support and access to full functionality of latest printers and Multi-Function Peripherals**
- **Reduce development, testing, and support burden for printer manufacturers, distros and ISVs**
- **A machine and human readable repository where drivers are housed and made available for automated updates and installation**
  - Based around [LinuxPrinting.org](http://LinuxPrinting.org), the standard source for Linux printer drivers
- **A distribution-independent printer testing and certification program**
  - A certified printer will work on every LSB-certified Linux
  - Ensure that a “Certified for Linux” mark on a printer box means that the printer just works on any LSB-certified distribution



# Testing & Tools



# The Community Recognizes the Need for Better Testing

***“Lack of testing is threatening the stability of Linux.”***

**– Andrew Morton, Linux kernel maintainer**

***“Through the definition and testing of operating system interfaces, the LSB creates a stable platform that benefits both developers and users.”***

**– Linus Torvalds, Creator of Linux**



# Why Tests Matter

- **Tests prevent bugs that break compatibility and cost time and money for upstream maintainers, distros, ISVs, and end users**
- **A recent example**
  - A bug in the 2.6 version of cpio (a standard backup utility) broke internationalization
  - No one caught the bug, not upstream, not the distros
  - LF tests identified the bug, but the buggy cpio was already in several top distros, including Debian and Fedora Core
  - An LF engineer fixed the bug, but the fix will take months to be incorporated by the distros
- **With a better test framework both the upstream maintainers and the distros could be running the tests and catching the bugs themselves right away**
- **Better test coverage means more bugs will be found**
  - LSB test coverage today is only ~20%



# We've Contracted with the RAS ISP

- **UniTESK Framework**
  - Developed by Russian Academy of Sciences (RAS) Institute of System Programming (ISP)
  - Initial development funded by Nortel in 1994
  - Other customers have been Microsoft, Intel, HP
- **Open Linux VERification (OLVER) was a demonstration project to show feasibility**
- **Leverage testing experience to build lighter-weight framework**
  - Hundreds of person years of development experience
  - Agreement to GPL framework and all tests
- **Highly experienced test coders available at \$42 K per year fully loaded**
  - 200 experienced engineers and researchers, about 25% of whom have PhDs



# What Better Testing Means

- **Ensure synchronization between testing and specification over time**
  - LSB is an interface standard, and interface standards are only as good as their test suites
- **Code coverage measurement becomes reliable metric**
  - We can report on % code coverage of shallow vs. deep tests and believe the results
- **We discover bugs where upstream packages don't match spec**
  - Our tests become an essential tool for upstream developers (like Ulrich and the cpio maintainers)
  - Getting our tests accepted as patches and used as part of ongoing package development ensures forward compatibility
- **We discover bugs where downstream distros don't match spec**
  - Our tests help distros ship more stable code, independent of LSB certification
- **Comprehensive testing strengthens the Linux ecosystem**
  - Fixing bugs means more apps work on more distros



# LSB Software Development Kit and Distribution Test Kit (DTK) Manager

- **LSB SDK bundles all tools developers need to build portable Linux apps**
  - Application development environment
  - Application Test Kit tools
  - Aims to be the LSB's validator.w3.org
- **Distribution Test Kit (DTK) Manager provides a user-friendly browser-based interface to run test suites**
  - To certify, just upload the passing test logs



# Linux Developer Network (LDN)

- **Central, community-based source of information for software developers writing portable Linux applications**
- **Software tools, standards, forums and content provided by the LF and the larger Linux community**
- **Small amount of custom-written content + lots of links**
- **Linux Developer Network provides central source for developers writing portable Linux apps (documentation, tutorials, etc.)**
- **Goal: Make it simple to build apps for Linux that are portable across distros**
- **Designed to be an “open source MSDN”**
- **<http://developer.linux-foundation.org/>**



# Linux Developer Network

## Introducing the LSB Developer Network!

[edit]



If you're interested in building portable Linux applications, you're in the right place. Help us build a Developer Network for Linux, bottom-up style! Learn how to easily [contribute](#). Or search our central directory of tutorials, how-tos and articles on building portable Linux applications. [More »](#)

[Read the press release »](#)

LDN Blog: [FSG launches Packaging workgroup](#)

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## Tools

[edit]

- [LSB Software Development Kit \(SDK\)](#)  
(make your application LSB compliant)
- [LSB Application Testkit](#)  
(test your application's compliance)
- [LSB Sample Implementation](#)  
(test your application in the minimal LSB environment)
- [Browse the LSB database](#)   
(check whether an interface is provided by the LSB)
- [Request an interface](#) if it's not in the database or the LSB roadmap
- [All downloads](#)

## Support

[edit]

- If you get stuck, get help on the [lsb-discuss](#) mailing

## Getting Started

[edit]

Don't know where to start?

- Which version of the LSB should I target? Take a look at [current and expected distribution coverage](#)
- [LSB Specification](#)
- [Porting to the Linux Standard Base tutorial](#)
- [Developing LSB Applications \(Part II of the LSB Book\)](#)
- [Using the LSB Development Environment \(Chapter 13 of the LSB Book\)](#)

## Featured Articles

[edit]

- [LSB Distribution Testing — How To \(February 26, 2007\)](#)
- [Mono brings Visual Basic Programming to Linux \(February 23, 2007\)](#)
- [Installation directories \(December 18, 2006\)](#)
- [Using the Linux Developer Network \(December 17, 2006\)](#)
- [Linux on board: Linux powers Nokia 770 \(December 3, 2006\)](#)
- [Linux for the PS3 \(October 17, 2006\)](#)
- [Free Standards Group Teams with O'Reilly Media to Offer Linux Developer Services \(October 17, 2006\)](#)

## Get Informed

[edit]

Highlighted Articles:

- [Software installation on Linux: Ian Murdock explains why Today, it sucks \(part 1\) and why Tomorrow, it won't \(part 2\).](#)
- [Read \*Porting Applications to Linux Standard Base Made Easy\* on the Intel Software Network.](#)
- [Would you like to find out if your application is LSB compliant? Download this lightweight \*Application Test Kit\* and find out](#)

## Browse

[edit]

### Certify with the LSB

The 20 most common problems, Certified products, The purpose of the LSB, ...

### Explore the Linux environment

Development tools and languages, Devices and drivers, The market, ...

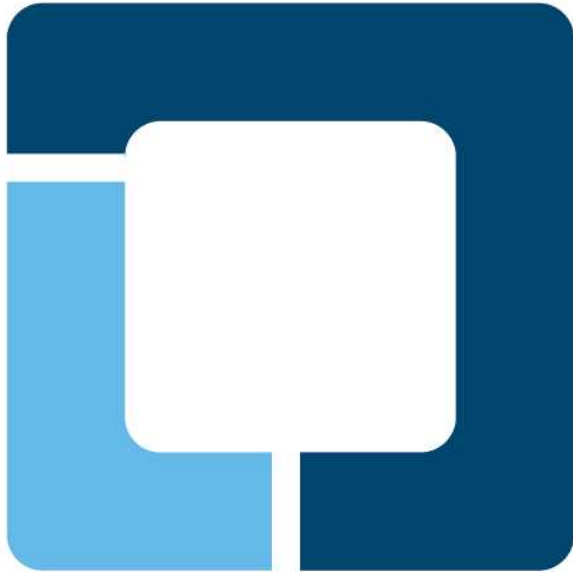
### Migrate from Unix

Case studies, Checklists for developers, Preparation, ...

### Port from Windows

User interface toolkits, Development environments, Case studies, ...

Browse articles by tag

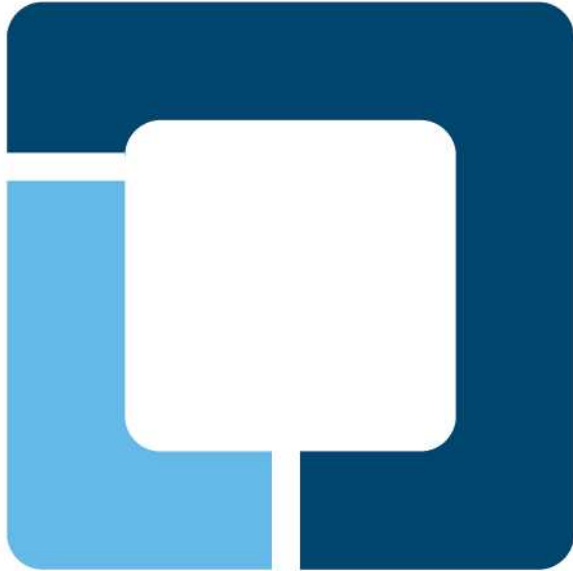


# Certification & Branding



# LF Is the Linux Certification Authority

- **Certification is offered for distributions and applications that pass the LF test suite**
  - After passing the tests using the Application Testkit Framework, this is as simple as clicking the “certify now” button to upload your test logs
- **LF writes the tests and hosts the certification framework**
  - Other organizations serve as certification authorities, hosted on our platform
- **The LSB Certified brand represents interoperability on the Linux platform**
- **This is being extended to printers, so that any Certified printer “just works” with any Certified distribution**
- **Certification can later be extended to other hardware**
- **Modeled on “Designed for Windows” logo program**



# OpenPrinting Update from the Collaboration Summit



# Printing Requirements in the LSB: Goals

- **For printer manufacturers:**
  - Easy way to make distribution-independent driver packages
    - Less effort for packaging and testing
    - Printers simply work with “Linux” easy to install for every user
- **For application developers:**
  - Easy implementation of printing functionality
    - Common interfaces in all distributions
    - Access to full functionality of all printers
- **For distribution vendors:**
  - One central, shared printer driver repository
    - No necessity of shipping all drivers
    - Less effort and expenses on maintaining driver packages



- **Additions to the LSB 3.2**
  - **For application developers:** Interfaces to give full functionality printer access
  - **For printer driver developers/printer manufacturers:** Interfaces and facilities to build distribution-independent printer drivers
- **Additions to OpenPrinting web services**
  - API for printer setup tools to be able to find, choose, and download driver packages (**DONE**)
  - First set of driver packages for testing (for LSB 3.1 + CUPS + Ghostscript + foomatic-rip, **DONE**)
- **LSB Driver Development Kit**
  - Tools: LSB packages of CUPS, Ghostscript, foomatic-rip (**DONE**)
  - RPM macro set (**DONE**)
  - Driver development and packaging HOWTO (**DONE**)
  - Planned: LSB packages of CUPS DDK and SANE



- **Testing and Certification program**
  - To be integrated with the LSB and the OpenPrinting database
  - Testing program to be developed with manufacturers, distribution vendors and certification organizations
  - Infrastructure for driver packages reached a working state -> Make testing and certification main subject of the Montreal Printing Summit



- **Tokyo OpenPrinting meeting will be held in conjunction with next Japan Symposium in first week of November**



- **General info**
  - <http://www.openprinting.org/>
- **For developers**
  - <http://www.linux-foundation.org/en/OpenPrinting/Development>
  - <http://www.linux-foundation.org/en/Developers>
- **For driver developers**
  - <http://www.linux-foundation.org/en/OpenPrinting/WritingAndPackagingPrinterDrivers>
- **For developers of printer setup tools**
  - <http://www.linux-foundation.org/en/OpenPrinting/Database/Query>
- **Available driver packages**
  - [http://www.openprinting.org/driver\\_list.cgi](http://www.openprinting.org/driver_list.cgi)



## Contact info for further discussion

**Join our workgroups and mailing lists:**

**[www.linux-foundation.org](http://www.linux-foundation.org)**

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