

# IPP Everywhere Introduction

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# Topics

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- Why IPP Everywhere?
- Discovery Protocols
- Document Formats
- IPP Extensions
- Next steps

# Why IPP Everywhere?

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# Reason #1: Printer Drivers

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*Google search results:*

*“Windows Printer Driver Files”*

*- about 19,700,000*

*“Mac OS X Printer Driver Files”*

*- about 10,100,000*

*“Linux Printer Driver Files”*

*- about 2,340,000*

# Printer Drivers

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- The single largest software component of Windows and Mac OS X
  - Lines of code AND installed size
- Often little code-sharing between drivers or platforms
- CUPS-based operating systems can use the same driver code BUT architectures vary widely
- Hard to support and distribute for more than a few platforms
  - New operating systems coming out DAILY for very interesting consumer and computing devices
  - New devices do not follow the old use model

## Reason #2: Standards

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*“The nice thing about standards is that there are so many of them to choose from.”*

*- Andrew S. Tenenbaum*

# Multiple “Standards”

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- Every printer vendor has (re)invented their own “standard” discovery protocols, print protocols, and page description languages
- No other peripheral industry works this way (anymore):
  - Mass storage: 1 standard per interface (SCSI, IEEE1394, ATA, SATA, USB, etc.)
  - Keyboards and mice: 1 standard per interface (PS/2, USB)
  - Cameras: 1 standard per interface (IEEE1394, USB)

# Reason #3: User Experience

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*Google search results:*

*“Printing does not work”*

*- about 298,000,000*

*“Printing works”*

*- about 30,700,000*



# User Experience

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- Many users have a poor printing experience
- Difficult setup (particularly for network printing)
- Printer and printer driver often do not cater to the user
  - Technical jargon and knowledge are often required
  - Confusing options, different for every vendor
- Software provided in the box is usually out-of-date, requiring a large download from the vendor's web site

# How Can We Help?

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*“Simplicity is the ultimate sophistication.”*

*- Leonardo DaVinci*

*“Three Rules of Work: Out of clutter find simplicity; From discord find harmony; In the middle of difficulty lies opportunity.”*

*- Albert Einstein*

# Define a Single Standard

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- One standard that brings together all of the pieces needed for network printing
  - We should also think about scanning
- Some pieces may be interface-dependent:
  - Discovery
  - Transport
- Others may depend on the printer:
  - File formats

# Define a Single Standard

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- The end result should allow printers to work as easily as any other peripheral with today's computing devices **WITHOUT** printer-specific software from the printer vendor

# “Driverless Printing”

# Guidelines

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- Not supporting every feature and capability of a printer with the standard is OK
- Focus on:
  - Print quality
  - User experience
  - Support for all kinds of printers
- Limit the number of optional items
  - Improves interoperability and consistency
  - Will make the standard simpler
- Support wired *and* wireless clients and printers

# Guidelines

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- As much as possible, base our work on existing standards, for example:
  - DNS-SD/Multicast DNS for network discovery
  - IPP/2.0 and HTTP/1.1 for network transport
  - JPEG, PDF, and CUPS Raster (or some variant) for print formats
- Provide easy extension support for extra features and capabilities
  - Allow vendors to work WITH the standard instead of around it!

# Discovery Protocols

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# Discovery Protocols

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- DNS-SD, Multicast DNS, and Zero-Configuration Networking
  - Apple's "Bonjour" protocol suite
- LDAP
- SLP
- SNMP
- UPnP
- WS-Discovery



# Document Formats

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# Document Formats

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- Vector formats
  - Typically for higher-cost printers with large amounts of memory and often mass storage capabilities
  - Harder to support in printers, usually easy to produce from clients
- Raster formats
  - Typically for lower-cost printers with small amounts of memory
  - Easy to support in printers, usually easy to produce from clients
- Printer cost issues probably require support for a raster format
  - The vector format can be optional

# Vector Formats

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- Existing formats
  - PDF
    - ISO 19005 aka PDF/a
    - ISO 32000 aka PDF 1.7
    - PWG 5102.3 aka PDF/is
  - PCL 6 aka PCL XL
  - PostScript
  - (Open)XPS
- Requirements
  - Streamable from client
  - Multi-page
  - Flexible color space and depth
  - Device-independent

# Raster Formats

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- Existing Formats
  - CUPS Raster (v2)
  - JPEG (JFIF, JBIG2, EXIF)
  - JPEG 2000
  - PNG/MNG
  - TIFF
- Requirements
  - Low overhead/cost on client and printer
  - Streamable on both client and printer
  - Multi-page
  - Flexible color space and depth
  - Device-independent

# IPP Extensions

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# IPP Extensions

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- Expose 1284 device ID: "printer-device-id (text)"
- Expose Printer MIB OIDs as IPP attributes such as CUPS Marker Attributes
- Provide icon(s) representing the printer in standard format (PNG): "printer-icons (1setOf uri)"
- Color: rendering intent for out-of-gamut colors
- "output-mode (type2 keyword)" to pick between color and monochrome

# IPP Extensions

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- Additional finishings enums for roll-fed printers: trim-after-pages, trim-after-documents, trim-after-job
- Additional media-col member attributes:
  - media-bottom-margin (integer), media-left-margin (integer), media-right-margin (integer), media-top-margin (integer) to provide document margins (printer can choose proper mode to satisfy)
  - media-source (type3 keyword) to specify the input source/tray
  - Also media-\*-supported first-class attributes to list supported values

# IPP Extensions

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- PWG 5100.6: Page Overrides
- PWG 5100.X: Job and Printer Operations Set 2 (for media-col-database)



# Next Steps

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- Charter new work for the IPP WG:
  - <ftp://ftp.pwg.org/pub/pwg/ipp/wd/wd-ippeverywhere-charter-20100417.pdf>
- Collaborate via wiki and mailing lists:
  - <http://pwg-wiki.wikispaces.com/IPP+Everywhere>
  - <http://www.pwg.org/mailhelp.html>