IPP Working Group Session

February 2, 2011

Wailea-Makena, HI

PWG F2F Meeting

IPP WG Meeting Agenda

9:00 - 9:10	Introductions, Minute Taker, Agenda Review
9:10 - 9:30	Current IPP WG status, charter update
9:30 - 10:30	JPS3: Color Management, Media Selection, Conflict Resolution, and Printer Identification
10:30 - 10:45	Break
10:45 - 12:00	IPP: CUPS Raster Subset (PWG Raster)
12:00 - 1:00	Lunch
1:00 - 2:30	Plenary
2:30 - 2:45	Break
2:45 - 4:30	IPP Everywhere: Proximity, Requirements Outline, Scoping, and Conformance Levels
4:30 - 5:00	Next steps, wrap-up

IPP WG Officers

- IPP WG Co-Chairs:
  - Paul Tykodi (TCS)
  - Ira McDonald (High North)
- IPP WG Secretary:
  - Michael Sweet (Apple)
- IPP WG Document Editors:
  - Ira McDonald (High North) – IPP Version 2.0, IPP Everywhere Requirements, IPP Everywhere, IPP JPS3
  - Michael Sweet (Apple) – IPP Version 2.0, IPP Everywhere Requirements, IPP Everywhere, IPP JPS3, PWG Raster

IPP WG Status

- PWG Formal Vote for IPP/2.0 SE in progress
  - Voting ends February 14, 2011
  - ftp://ftp.pwg.org/pub/pwg/ipp/wd/wd-ipp20-20110110.pdf
- How to Vote
  - Send email to:
    msweet"at"*apple*"dot"*com* (Mike Sweet, PWG Chair, IPP/2.0 SE Co-Editor)
    ptykodi"at"*tykodi*"dot"*com* (Paul Tykodi, PWG Secretary, IPP WG Co-Chair)
    blueroofmusic"at"*gmail*"dot"*com* (Ira McDonald, IPP WG Co-Chair, IPP/2.0 SE Co-Editor)
  - Put your vote in the subject:
    IPP 2.0 SE Formal Vote-<company name>-<last name>-*Yes*
    IPP 2.0 SE Formal Vote-<company name>-<last name>-*No*
    IPP 2.0 SE Formal Vote-<company name>-<last name>-*Abstain*

IPP Everywhere Charter Update

- Need to amend the charter to include:
    - IPPS URI Scheme (IETF RFC submission)
    - PWG Subset of CUPS Raster specification
- Remove monolithic requirements document and put the requirements and use models in the individual specifications
- Update milestones accordingly
- Proposed charter update at:
    - ftp://ftp.pwg.org/pub/pwg/ipp/wd/wd-ippeverywhere-charter-20110127.pdf

IPP Certification

- Printing Industries of America are doing certification for CIP4:
    - http://www.dpsmagazine.com/Content/ContentCT.asp?P=791&nID=4336
    - http://www.printing.org/
    - http://www.cip4.org/
- Should we approach CIP4 and/or Printing Industries of America to do something similar for IPP?

CUPS ipptool

- http://www.cups.org/software.php
- IPP/1.1, IPP/2.0, and IPP/2.1 conformance tests
  - Working on IPP/2.2 conformance test
- Binaries available for Linux, Mac OS X, and Windows
- Thousands of downloads since April
- New release coming soon:
  - Validate-Job tests
  - Tests for some PWG 5100.x specifications
  - IPP/2.2 conformance test?

CUPS ippserver

- Sample IPP/2.0 conforming server implementation
  - Current implementation saves jobs to a directory/folder
  - Also provides Bonjour service registration and simple HTTP status page
  - Ultimate goal is to provide as part of CUPS library and have it abstract away the basic semantic model data and behaviors with entry points that actually do the work (print, cancel, etc.)
  - LGPL2
- Part of the CUPS 1.5 developer snapshots at:
  - http://www.cups.org/software.php

IPP Everywhere

IPP Everywhere Topics

- Color Management
- Media Selection
- Conflict Resolution
- Proposals from HP:
  - Printer Marco Polo
  - Preferred Raster Resolution
  - IPP Scan
- CUPS Raster Subset (PWG Raster)
- Proximity
- Scoping and Conformance Levels
- Requirements Outline

Color Management

- Output rendering intent for out-of-gamut colors
  - "print-rendering-intent (type2 keyword)", "print-rendering-intent-supported (1setOf type2 keyword)", and "print-rendering-intent-default (type2 keyword)"
  - "absolute" = Clip out-of-gamut colors to preserve in-gamut accuracy but do not adjust the white point
  - "perceptual" = Map out-of-gamut colors at the expense of in-gamut accuracy
  - "relative" = Clip out-of-gamut colors to preserve in-gamut accuracy
  - "saturation" = Preserve saturated colors

Color Management

- Device ICC color profile(s) for soft proofing
  - "printer-icc-profiles (1setOf collection)"
  - Member attribute for "profile-uri (uri)" plus job template attributes (as member attributes) that select this profile

Color Management

- Pick output/print color mode
  - "print-color-mode (type2 keyword)", "print-color-mode-supported (1setOf type2 keyword)", and "print-color-mode-default (type2 keyword)"
  - "color" = full-color output
  - "monochrome" = 1-color output (typically grayscale)
  - "bi-level" = black and white "threshold" output
  - Others?

Media Selection

- 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?
- media-*-supported first-class attributes to list supported values?
- Extend Get-Printer-Attributes to filter on attributes other than document-format?
  - Useful for getting answers like "what are the supported media/ margins for duplex printing?"

Media Selection

- Borderless/Full-bleed printing
  - Obvious solution is to specify that setting all of the media-*-margin member attributes to 0 activates a special borderless printing mode
  - OK to scale photos/JPEGs
  - Use document content for things like PDF

Conflict Resolution

- Proposal based on CUPS Constraints implementation:
  - http://pwg-wiki.wikispaces.com/CUPS+UI+Constraints
  - "job-contraints-supported (1setOf collection)"
  - "job-resolvers-supported (1setOf collection)"
  - Allows clients to resolve conflicts without Validate-Job round-trips and ipp-attribute-fidelity set to true
- However, we should never get in a state where there are conflicts that cannot be automatically resolved
  - (except when ipp-attribute-fidelity is true, of course)
- Would it be useful/possible to define a standard priority/precedence for IPP Printers to support when resolving conflicting job template attribute values?

Proposal from HP:
Printer Marco Polo

- Used to identify device before the Print job is sent
  - Provides user re-assurance
  - Reduces jobs sent to the wrong location
- New Identify-Printer operation
  - Flashes lights, makes sounds, and/or displays something on the control panel to let the user know they have selected the right printer
  - Request includes attributes-charset, attributes-natural-language, printer-uri, and (optional) message attributes

Proposal from HP:
Preferred Raster Resolutions

- Used to allow the Printer to suggest a resolution to raster the job at based on existing job setting

- Validate-Job Response
  - Additional RECOMMENDED Response
    - raster-resolution-preferred (resolution)

- Allows the Printer to suggest a resolution at which the client should provide the raster data appropriate for a given print job

- Allows the Client to raster data at the appropriate resolution for the job setting (media, quality, etc.) as this resolution is most likely different then the resolution the Printer is capable of

Proposal from HP:
IPP Scan

- Most devices are multi-function these days, if we want IPP Everywhere to succeed it needs to address Scanning as well

- Extend IPP Everywhere with Scan

- Extend the current two-object model (Printer, Job) with a Scanner Object

- Extend the current IPP Operations with 4 additional ones
  - Get-Document
  - Get-URI
  - Scan-Job
  - Scan-URI

- Additional concept of Functional-Units allows the device to describe all Scan sources available

- Is this idea something worth pursuing?

CUPS Raster Subset
(PWG Raster)

- Draft specification posted:
  - ftp://ftp.pwg.org/pub/pwg/ipp/wd/wd-ippraster10-20110126.pdf
- Base specification on cups.org:
  - http://www.cups.org/spec-raster.html
  - Format is versioned - changes to current versions must be backwards compatible, new versions start with "clean slate"
  - Last new versions released in 2006 with CUPS 1.2

Feedback on the Proposed
PWG Subset of CUPS Raster

- 1.   It was my understand that a IEEE ISTO PWG Standard must not be the standardization of product or a specific company's implementation
  - a.   Thus, there is a great need for a PWG IPP Image format or PWG IPP Raster format; however, I believe that specifying it as a subset of the specific open-source or vendor product is not in line with PWG standards practices. This is not to say that is could not have a normative or informative reference to a specific open-source or vendor product but it should stand on its own with ties to a specific open-source or vendor product. Also, it should not use attribute names or variables that are identified with a specific open-source or vendor product.
  - b.   I am aware of other entities that wish to use an established format (i.e. CUPS Raster 2); but if PWG is going to standardize it, it should be PWG entity.

Response to Feedback

- 1. PWG Process 3.0 (http://www.pwg.org/chair/ membership_docs/pwg-process30.pdf) does not specify that a PWG standard must be an original creation of the PWG or that it cannot be based on an existing vendor, industry, or group standard. In fact, most PWG standards are necessarily based on existing standards from different sources. That said, if you have an alternative existing format you would like to propose as an alternative to CUPS Raster, please do so now.

Feedback on the Proposed
PWG Subset of CUPS Raster

- 2.	The specific open-source or vendor product that is being discussed is CUPS. So, the other concern with a standard that directly references CUPS is that CUPS is licensed by/under Apple and GPL.

  - a.	I have not heard or know that Apple has provided a Letter of Assurance on the use by others for the use a subset of CUPS definition. While, I believe that Apple would provide LOA upon request.

  - b.	On the other, if any or part of the content PWG is proposing to use from CUPS was/is part of CUPS that was/is under GPL before Apple's ownership; then there is the question if GPL license applies. Major print vendors may be at risk of either having to release their source code that is associated with CUPS content or even being sued by GPL proponents.

Response to Feedback

- 2. The reference implementation of CUPS Raster is provided under version 2 of the GNU LGPL and nothing would prevent a vendor from doing an independent implementation under alternative terms. Also, since CUPS Raster has not been formally included in any PWG standard to date, Apple naturally has not provided a LOA for that IP (yet).

CUPS License Information

- License information from cups.org for the reference implementation:

CUPS Imaging library now provided under the GNU LGPL
Created at 17:29 Oct 22, 2006 by mike, last modified at 17:29 Oct 22, 2006

Effective immediately, the CUPS Imaging library (libcupsimage*) is now provided under the same license as the CUPS API library, version 2 of the GNU Library General Public License. This change allows printer manufacturers and driver developers to ship CUPS raster drivers with or without source on all operating systems.

The license change will appear in the next stable release (1.2.6) and 1.3.x developer snapshot, and is retroactively available for CUPS 1.1 and later.

CUPS License Information (con't)

- Excerpt from CUPS License Agreement:

  CUPS™ is provided under the GNU General Public License ("GPL") and GNU Library General Public License ("LGPL"), Version 2, with exceptions for Apple operating systems and the OpenSSL toolkit. A copy of the exceptions and licenses follow this introduction.

  The GNU LGPL applies to the CUPS and CUPS Imaging libraries located in the "cups" and "filter" subdirectories of the CUPS source distribution and the files in the "test" subdirectory. The GNU GPL

  applies to the remainder of the CUPS distribution.

Proximity

- Proximity influences discovery, transport, and format choices

- Geolocation, organizational information, and network topology can all contribute to the "proximity calculation"

Proximity vs Topology

- ## Local (Wi-Fi/subnet) printing:
  - Discovery does not require dedicated infrastructure
  - Direct to Printer
  - High bandwidth, low-latency network

- ## Regional (intranet) printing:
  - Discovery requires dedicated infrastructure
  - Direct to Printer or multi-hop printing through server/service
  - Medium bandwidth, moderate-latency network

- ## Global (Internet/Cloud) printing:
  - Discovery requires dedicated infrastructure
  - Multi-hop printing through server/service and multiple firewalls
  - Low bandwidth, high-latency network

Requirements Outline

- **General**
  - No printer/vendor-specific driver
  - Low overhead for client and printer
- **Discovery Protocol**
  - LAN or global discovery
  - Compatible with various wireless technologies
  - Must not depend on managed infrastructure
  - Provides basic capabilities (color, duplex, photo, etc.), security features (TLS, etc.), geolocation (optional), and whether the printer is free or pay-to-print
- **Transport Protocol**
  - Encryption for security/privacy
  - Compression to reduce bandwidth requirements

Requirements Outline (con't)

- Attributes
  - Job tickets
    - Margin and source (tray) information in job ticket
    - Per-page overrides?
  - Location information (geolocation and organization)
  - Printer MIB properties/device status
  - Job accounting/cost information
  - Job, printer, subscription, and document UUIDs
  - PIN and paid printing support
  - Icon images in standard format
  - Color rendering intent, profiles
  - Method for printing color vs. grayscale vs bi-level
  - Roll-fed printer finishings
  - Client-side constraint identification and resolution

Requirements Outline (con't)

- Operations
  - Physically identify a printer
  - Get a filtered list of capabilities based on format and job ticket
  - Scanning support?
- Document Formats
  - Multi-page raster
  - Photo raster
  - Multi-page vector

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Scoping and Conformance Levels

- Which use cases/proximities do we tackle for IPP Everywhere?

- Do we want multiple conformance levels?

IPP WG Next Steps

- **IPP Version 2.0 Second Edition**
  - PWG Formal Vote ends February 14, 2011
- **IPP 2.0/2.1/2.2 Interoperability Testing**
  - Interoperability event in Q2/Q3 2011
- **IPP Everywhere**
  - Initial draft requirements in Q1 2011
  - Initial draft specifications in Q1 2011
  - PWG Last Call of Requirements in Q2 2011
  - Prototype draft specifications in Q3 2011
  - Interoperability event in Q4 2011

IPP WG Info / Participation

- We welcome participation from all interested parties
- IPP Working Group web page
  - http://www.pwg.org/ipp/index.html
- IPP Working Group wiki
  - http://pwg-wiki.wikispaces.com/IPP
- Subscribe to the IPP mailing list
  - http://www.pwg.org/mailhelp.html
- IPP WG holds bi-weekly phone conferences announced on the IPP mailing list
  - Next conference call is February 14, 2011 at 1pm (EST)