



The Printer Working Group

IPP in 2017 : An Overview

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Smith Kennedy, HP Inc.

PWG Chair



Overview

- Use Cases and IPP Solutions
- IPP Technologies
- Other Resources



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Use Cases and IPP Solutions



Use Case #1: Print Using Loaded Media

Jane is viewing a photo and would like to print the photo on the largest borderless photographic media loaded on her Printer.

After Jane initiates a print action from the phone and selects a Printer, the Client photo application automatically selects the largest borderless photographic media loaded on the Selected Printer and the highest print quality. Jane selects additional processing intent for the Job and confirms the print action. The Client sends a print job request to the Printer with the Job Ticket and local photo. The Printer validates the Job Ticket and document data and then prints the photo.



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IPP Technologies



IPP Technologies

- IPP Foundations : IPP/1.1 and IPP/2.0
- IPP Service Types
 - IPP Print : IPP Everywhere
 - IPP FaxOut
 - IPP Scan
 - IPP System Service
 - IPP 3D Printing Extensions
- Feature Definitions : Finishings, Media Sizes and Types
- Additional Facilities
 - IPP Events
 - IPP Shared Infrastructure Extensions
 - IPP Transaction Based Printing Extensions



IPP Foundations: IPP/1.1 and IPP/2.0

- IPP/1.1
 - RFC 8010 (replaced RFC 2910)
 - RFC 8011 (replaced RFC 2911)
 - Updated RFCs clarify ambiguous areas and resolve errata
- IPP/2.0
 - PWG 5100.12-2011
 - PWG Full Standard
 - Normatively differs from IPP/1.1, so version 2.0
 - Three levels: IPP/2.0, IPP/2.1, IPP/2.2
 - For different classes of devices

IPP Print : IPP Everywhere (PWG 5100.14)



IPP Everywhere

- An IPP print service supporting vendor-neutral “driverless” printing solutions
- Foundational requirements for all Clients and Printers to ensure basic interoperability:
 - Discovery via mDNS / DNS-SD
 - “_print” subtype of “_ipp._tcp” for filtering
 - IPP/2.0
 - PWG Raster and JPEG document formats
- Printer Certification via IPP Everywhere Self-Certification program
 - Submitted passing certification lists product on the PWG IPP Everywhere page and entitles vendor to icon use



IPP FaxOut : PWG 5100.15-2013

- Supports outbound faxing by leveraging many facilities of IPP Print, with some learnings from IPP Everywhere
 - PWG Raster document format support required
- Removed deprecated IPP operations (e.g. Print-Job)
- Added requirements to disambiguate IPP FaxOut from IPP Print
 - Mandatory “/ipp/faxout” default resource path
 - New DNS-SD service subtype
- Added new FaxOut specific operations and attributes
 - Add-Document-Images Operation
 - input-attributes (collection)
 - confirmation-sheet-print (boolean)
 - cover-sheet-info (collection | no-value)
 - ...



IPP Scan : PWG 5100.17-2014

- Extends IPP to support scanning
 - Requires PDF 1.7 document format support
 - One new operation
 - 17 new attributes
 - DNS-SD service definition and default resource path for this service type



IPP System Service (PWG SYSTEM-2017)

- In development – to be completed by end of 2017
- Service for interfacing with the IPP System object
 - Container that hosts instances of IPP Printer, FaxOut, Scan, 3D Print service objects
- Operations aid in the creation and management of these objects
- Get-Printers operation lists all available Printers
 - Given the user name, list will be those Printers available for that particular user (may require authentication)
 - Important aspect of print policy: Printer discovery results filtered by user



IPP 3D Printing : PWG 5100.21-2017

- Extends IPP with additional 3D printing attributes to bring IPP semantics and infrastructure and some design elements of IPP Everywhere to the 3D printing ecosystem
 - Required document format : 3MF
 - Service subtype and default resource path definition
- First version of IPP 3D Printing Extensions focused on supporting elements used in consumer / desktop FDM printers
 - Limited set of 20 material types (PLA and variants, ABS, wax, gold, titanium, chocolate, a few others)
- Ongoing liaison engagement with 3MF Consortium, ISO JTC1 TC261, AMSC, others



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Feature Definitions



Feature Definitions Evolution

- Evolution from earlier “keyword-based” attributes to the more contemporary “collection-based” attributes
 - “finishings-supported” → “finishings-col-ready”
 - “media-supported” → “medial-col-ready”
- Allows the Printer to provide detailed descriptions of its perception
- Better supports “feature-centric” service types and systems because the perception of a feature is described in detail, not based on “magic numbers” and a-priori knowledge
 - 'staple-top-left' in “finishings-col-ready” will provide the location of the staple relative to a reference edge, size, rotation, etc.



Feature Definitions

- Finishings 2.1 : PWG 5100.1-2017
 - Expanded “finishings-col” definitions
- Output Bin Extension : PWG 5100.2-2001
- Production Printing Attributes : PWG 5100.3-2001
 - High-fidelity media descriptions via “media-col”
 - High-fidelity finishings descriptions via “finishings-col”
- Page Overrides : PWG 5100.6-2003
- Printer State Extensions : PWG 5100.9-2009
- Job and Printer Extensions Set 2 : PWG 5100.11-2010
 - saved jobs
 - password (or PIN) released jobs
- Job and Printer Extensions Set 3 : PWG 5100.13-2012
 - Printer identification and location
 - Job constraints and resolvers
 - Localization catalogs
 - Supplies levels



2017 Work In Progress

- IPP System Service
 - Described earlier
- IPP Get-User-Printer-Attributes whitepaper
 - New operation that conveys per-user print settings (print policy)
- IPP Presets
 - IPP attribute that bundles together a set of Job Template Attributes with a localizable label and an optional attribute trigger to apply the settings in a batch
- IPP Authentication
 - Examination of different HTTP authentication schemes and how they should be properly integrated into an IPP Client implementation



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Other Resources



IPP Large System Support

- IPP Transaction Based Printing Extensions : PWG 5100.16-2013
 - User Accounts vs. Payment/Billing Accounts
 - PIN/Passcode Printing Release Printing
 - Priority of Service
 - Job Review

- IPP Shared Infrastructure Extensions : PWG 5100.18-2015
 - Supports IPP communications between an IPP Output Device and an IPP Print service in topologies where the IPP Print service is unable to initiate communications (e.g. when the IPP Print Service is a cloud print service and the IPP Output Device is behind a NAT router)



Guidance on Implementation

- IPP/1.1 Implementor's Guide : RFC 3196 (2001)
 - Targeted at assisting the creators of IPP Printers

- IPP Implementor's Guide v2 : PWG 5100.19-2015
 - Targeted at assisting the creators of IPP Clients as well as Printers
 - Examines many of the common interactions between IPP Clients and Printers and qualitatively judges them, with best practices outlined



Sample Implementations and Tools

- PWG Github Site : <https://istopwg.github.io>
 - ippsample: Sample implementations
 - ipptool : submit IPP operations, validate responses
 - ippserver : simulate an IPP Printer
 - ippfind : find IPP printers easily
 - ipptransform : convert files
 - ippeveselfcert : IPP Everywhere Self Certification Tools project
 - Report defects, request enhancements, contribute to the project

Other Questions / Comments

