



# The Printer Working Group

IPP Workgroup Session, Day 1  
February 13, 2019

# PWG IP Policy



- "This meeting is being held in accordance with the PWG Intellectual Property Policy"
  - [http://www.pwg.org/chair/membership\\_docs/pwg-ip-policy.pdf](http://www.pwg.org/chair/membership_docs/pwg-ip-policy.pdf)
- TL;DR: Anything you say in a PWG meeting or email to a PWG address can be used in a PWG standard
  - (but please do read the IP policy above if you haven't done so)



## February 13, 2019 (Mountain Standard Time)

When	What
09:00 - 10:15	PWG Plenary
10:15 - 10:30	IPP WG: Status
10:30 - 11:00	IPP WG: IPP Everywhere v1.1
11:00 - 11:30	Break / Lunch
11:30 - 12:15	IPP WG: 3D Liaison Status Report and Discussion
12:15 - 13:00	IPP WG: IPP 3D v1.1, PWG Safe G-Code
13:00 - 13:15	Break
13:15 - 14:30	IPP WG: IPP System Service
14:30 - 15:00	IPP WG: IPP Authentication Methods



## February 14, 2019 (Mountain Standard Time)

When	What
09:00 - 11:00	IDS WG: Status and Discussion
11:00 - 11:30	Break / Lunch
11:30 - 13:00	IPP WG: IPP JPS2 v2.0
13:00 - 13:15	Break
13:15 - 13:45	IPP WG: MFD Alerts v1.1
13:45 - 14:30	IPP WG: IPP Document Object v1.1
14:30 - 15:00	IPP WG: Next Steps



- Current charter:
  - <http://ftp.pwg.org/pub/pwg/ipp/charter/ch-ipp-charter-20170615.pdf>
- The Internet Printing Protocol (IPP) workgroup is chartered with the maintenance of IPP, the IETF IPP registry, and support for new clients, network architectures (Cloud, SDN), service bindings for MFDs and Imaging Systems, and emerging technologies such as 3D Printing
- In addition, we maintain the IETF Finisher MIB, Job MIB, and Printer MIB registries, and handle synchronization with changes in IPP



- **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 System Service, MFD Alerts v1.1
  - Michael Sweet (Apple) – IPP 3D Printing Extensions v1.1, IPP Document Object v1.1, IPP Encrypted Jobs and Documents, IPP Everywhere v1.1, IPP Everywhere Printer Self-Certification Manual v1.1, IPP Job Extensions v1.1, IPP System Service, PWG Safe G-Code
  - Smith Kennedy (HP Inc.) – IPP Authentication Methods, IPP Encrypted Jobs and Documents, IPP Job and Printer Extensions - Set 2 v2.0 (JPS2)

# Status (1/2)



- **PWG Specifications in development:**
  - IPP 3D Printing Extensions v1.1
    - IPP WG Last Call
    - Interim Draft
    - Stable Draft
    - Prototype Draft
  - IPP Document Object v1.1
    - Interim Draft
  - IPP Everywhere v1.1
    - Stable Draft
  - IPP Everywhere Printer Self-Certification Manual v1.1
    - Prototype Draft
  - IPP Job Extensions v1.1
    - Interim Draft
  - IPP Job and Printer Extensions - Set 2 v2.0
    - Initial Draft
  - IPP System Service v1.0
    - Prototype Draft
  - MFD Alerts v1.1
    - Interim Draft
- **IPP Best Practices in development:**
  - IPP Authentication Methods
    - PWG Last Call
  - IPP Encrypted Jobs and Documents
    - Interim Draft
  - PWG Safe G-Code Subset for 3D Printing
    - PWG Last Call



- Up-to-date pending IANA registrations online:
  - <http://www.pwg.org/ipp/ipp-registrations.xml>
  - Continue to maintain this in parallel for new specifications
  - Github repository: <https://github.com/istopwg/ippregistry>
- IPP Everywhere Printer Self-Certifications:
  - <https://www.pwg.org/printers>
  - 355 printers currently listed (tripled since August 2017)
  - Second 1.0 self-certification tools update released in October 2017
  - Third 1.0 self-certification tools update released in November 2018
- IPP Sample Code:
  - Github repository:
    - <https://github.com/istopwg/ippsample>
  - Fork of CUPS code includes ipppfind, ippproxy, ippserver, ipptool, ippptransform, and ippptransform3d





- IPP 3D Printing Extensions v1.1 (IPP WG Last Call)
  - <https://ftp.pwg.org/pub/pwg/ipp/wd/wd-ipp3d11-20190201.pdf>
  - Ends February 15, 2019
- IPP Authentication Methods (PWG Last Call)
  - <https://ftp.pwg.org/pub/pwg/ipp/wd/wd-ippauth-20190117.pdf>
  - Ends February 28, 2019
- PWG Safe G-Code Subset for 3D Printing (PWG Last Call)
  - <https://ftp.pwg.org/pub/pwg/ipp/wd/wd-pwgsafegcode10-20190117.pdf>
  - Ends February 28, 2019
- Please review these documents and respond before the corresponding deadlines so that we can advance them to PWG Formal Vote/Call for Objections as appropriate



# Errata Updates

- We currently have four older specifications being updated:
  - IPP Document Object v1.1
  - IPP Job Extensions v1.1
  - IPP Job and Printer Extensions - Set 2 v2.0
  - MFD Alerts v1.1
- Many attributes are being marked obsolete, in most cases because the attribute turned out to have poor interoperability, bad side-effects, or duplicated the functionality of another existing attribute
- Q: Should we include the rationale/lessons learned behind these changes in the corresponding errata updates?
- Q: How can we apply these lessons-learned to future specifications and updates?



# Errata Updates (con't)

- IPP Document Object v1.1
  - The Delete-Document operation being obsoleted because it destroys accounting information
  - Imported the (already optional) "document-charset" Document Status attribute from IPP Job Extensions
  - The "compression" and "document-digital-signature" Document Status attributes are obsolete because they serve no purpose
  - The "document-format-details", "document-format-details-detected", "document-format-version", and "document-format-version-detected" Document Status attributes are obsolete because these attributes have poor interoperability (no registered values, no standard value formats) and have serious privacy issues
  - "impressions-completed-current-copy" and Attributes being obsoleted because the parent specification (RFC 3381) is obsolete
  - The Overview of Changes section includes a brief rationale for all of these
  - Just v1.1 because nothing new has been added



# Errata Updates (con't)

- IPP Job Extensions v1.1
  - Added a RECOMMENDED "job-mandatory-attributes-supported" Printer Description attribute so that fine-grained attribute fidelity capabilities can be discovered by the Client
  - Removed the (already optional) "document-charset" Document Status attribute, which is now in the IPP Document Object v1.1 spec
  - The "document-digital-signature" operation attribute is obsolete because it serves no purpose
  - The "document-format-details" and "document-format-version" attributes are obsolete because these attributes have poor interoperability (no registered values, no standard value formats) and have serious privacy issues
  - The "job-copies", "job-cover-back", etc. attributes are obsolete because they duplicate the corresponding "copies", "cover-back", etc. attributes and are incompatible with STD 92's "multiple-document-handling" attribute
  - Just v1.1 because nothing has been added that increases conformance requirements



# Errata Updates (con't)

- IPP Job and Printer Extensions - Set 2 v2.0
  - The "job-save-disposition" attribute is obsolete because it doesn't do what is needed for whole-job retention on a MFD
    - New (simpler) Retained Job functionality will replace it, with well-defined amendments to the Job lifecycle in STD 92
  - v2.0 because major new functionality is being added



# IPP Everywhere Self-Certification

- Resources:
  - <http://www.pwg.org/ipp/everywhere.html> (for tools/info)
  - <https://www.pwg.org/ippeveselfcert> (submission form)
  - <http://www.pwg.org/printers> (printer list)
  - <https://github.com/istopwg/ippeveselfcert> (Github repo)
- Released v1.0 Update 3 of self-certification tools on November 9th, 2018
  - Fixes all known issues in v1.0 tools
  - v1.0 is tracking CUPS 2.2.x (current stable branch)
- Planning future 1.1 errata update for manual and tools in Q1 2019
  - v1.1 will track CUPS 2.3.x (current development branch)

# IPP Everywhere v1.1



- Stable draft of core specification:
  - <https://ftp.pwg.org/pub/pwg/ipp/wd/wd-ippeve11-20190128-rev.pdf>
- Prototype draft of manual:
  - <https://ftp.pwg.org/pub/pwg/ipp/wd/wd-ippeveselfcert11-20180704-rev.pdf>
- Q: Because the PWG server infrastructure will be changing on its own scheduler, should we separate the submission process (web site) from the certification process (manual+tools)?
- Proposed schedule:
  - Stable drafts and beta tools Q1 2019



# Self-Certification 1.1 Tools Update

- Align with conformance requirements in v1.1 spec
- More tests for required operations: Cancel-My-Jobs, Close-Job, Identify-Printer
- New OS requirements
  - Linux: Ubuntu LTS 18.04 (64-bit Intel)
  - macOS: 10.14 or later (64-bit Intel)
  - Windows: 7 or later (64-bit Intel)
- New submission tool
  - Locally "validate" the testing results and then generate a file that can be submitted to the PWG
  - Generated file could be submitted to ippeveselfcert mailing list, Github issue tracker, etc.





# Self-Certification 1.1 Manual Update

- Update instructions for 1.1 tools
- Update section 8 (submission) to use local submission tool
  - Existing submission page (<https://www.pwg.org/ippeveselfcert>) can become a static web page providing instructions and/or redirect to correct Github issue tracker
  - Instructions would tell tester to run the submission tool to create a submission file, and then direct them to the web page to proceed further



# Self-Certification Portal Update

- Work-in-progress available at:
  - <https://beta.pwg.org/printers>
- Move to Github issues/pull requests (dependent on new web server architecture)
  - Could also accept submission files via ippeveselfcert list
- Printer list page updates:
  - Track implementation type: logical device (server) vs. physical device (printer)
  - Track specific capabilities (type of finishers, etc.)
- Existing submissions will be updated by hand (only 2 have finishers, all are printers)



# The Printer Working Group

Lunch Break

*Resuming at 11:30am MT*



# IPP 3D Liaison Discussions

- ASTM Committee F42 on Additive Manufacturing Technologies
  - <https://www.astm.org/COMMITTEE/F42.htm>
- ISO/IEC JTC 1 WG 12 3D Printing and Scanning eCommittee
  - <https://isotc.iso.org/livelink/livelink?func=ll&objId=19905763&objAction=browse&viewType=1>
  - Participation in the ISO initiative is currently via the INCITS Ad Hoc.
- 3D PDF Consortium
  - <https://www.3dpdfconsortium.org>
- 3D Concrete Printing Standards Development
  - NIST
  - ACI
  - ASTM
- 3MF Consortium
  - <https://www.3mf.io>



# IPP 3D Printing Extensions v1.1

- **Stable draft:**
  - <https://ftp.pwg.org/pub/pwg/ipp/wd/wd-ipp3d11-20190201-rev.pdf>
- **Errata update**
  - Address specific implementation issues on entry-level 3D printers
  - Enable support for generic cloud/local slicing services (PWG Safe G-Code/3MF Slice Extension)
  - Define naming convention for "material-type" values
- **IPP WG Last Call ends February 15, 2019**
- **Proposed schedule:**
  - PWG Call for Objections Q1 2019

# PWG Safe G-Code Subset for 3D Printing



- Stable draft:
  - <https://ftp.pwg.org/pub/pwg/ipp/wd/wd-pwgsafegcode10-20190117-rev.pdf>
- Best Practice document that defines a common subset of G-Code for FDM printers
  - Convenient format for adoption by existing 3D printers
  - Targeting only as a best practice document because G-Code isn't an ideal long-term intermediate format
- PWG Last Call ends February 28, 2019
- Proposed schedule:
  - PWG Formal Vote Q1 2019



# The Printer Working Group

Break

*Resuming at 1:15pm MT*



# IPP System Service (SYSTEM)

- Current prototype draft at:
  - <https://ftp.pwg.org/pub/pwg/ipp/wd/wd-ippsystem10-20190130-rev.pdf>
- Combines and implements a concrete IPP binding of the following abstract Semantic Model 2.0 services and objects:
  - PWG 5108.06: System Object and System Control Service
  - PWG 5108.03: Network Resource Service
  - PWG 5109.1: Cloud Imaging Requirements and Model
- Almost all required attributes and operations have been prototyped in the ippsample project (see next)
- Proposed Schedule:
  - Stable draft in Q1 2019





# IPP System Service Prototyping

- Prototyped resource objects in ippserver
  - Resource types currently supported: ICC profiles, icons/images, and strings files
- Identified some missing attributes:
  - "resource-signature (1setOf octetString)" Resource Status attribute (copied from operation attribute of same name)
  - Cancel-Resource: "message (text(127))" operation attribute, same as Cancel-Job in STD 92
  - Create-Resource: "resource-string-version (octetString)" and "resource-version (text(MAX))" operation attributes
- Currently implementing Allocate-Printer-Resources
  - Q: Should we add a "resource-natural-language (naturalLanguage)" attribute for localized resources like strings files? That would allow Allocate-Printer-Resources to auto-update the printer-strings-uri/languages-supported attributes



# IPP Authentication Methods

- Stable draft:
  - <https://ftp.pwg.org/pub/pwg/ipp/wd/wd-ippauth10-20190117-rev.pdf>
- Provides an overview of how HTTP authentication methods are used with IPP
  - Currently HTTP Basic, HTTP Digest, HTTP Bearer (OAuth 2.0), HTTP Negotiate (Kerberos), TLS Client Certificate
  - Discussion about SAML authentication with OAuth 2.0
- PWG Last Call ends February 28, 2019
- Proposed Schedule:
  - PWG Formal Vote Q1 2019



# The Printer Working Group

IPP Workgroup Session, Day 2  
February 14, 2019

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13:45 - 14:30	IPP WG: IPP Document Object v1.1
14:30 - 15:00	IPP WG: Next Steps

# IPP Job and Printer Extensions - Set 2 v2.0 (JPS2)



- Interim draft:
  - <https://ftp.pwg.org/pub/pwg/ipp/wd/wd-ippjobprinterext2v20-20190214.pdf>
- Discussion slides:
  - <https://ftp.pwg.org/pub/pwg/ipp/slides/IPP-Job-Storage-v2-20190214.pdf>
- Changes:
  - Obsolescence of job-save-disposition
  - Addition of job-reprint-password, job-retain-until
- Proposed schedule:
  - Prototype draft Q3 2019



# The Printer Working Group

Break

*Resuming at 1:15pm MT*

# MFD Alerts v1.1



- Initial draft:
  - <https://ftp.pwg.org/pub/pwg/ipp/wd/wd-pwgmfalerts11-20190213-rev.pdf>
- Changes:
  - New marker supply alerts
  - General cleanup/registration fixes
- Proposed schedule:
  - Prototype draft Q2 2019





# IPP Document Object v1.1

- Prototype draft:
  - <https://ftp.pwg.org/pub/pwg/ipp/wd/wd-ippdocobject11-20190129-rev.pdf>
- Proposed schedule:
  - Stable draft and IPP WG Last Call in Q1 2019



# The Printer Working Group

## Next Steps



# Next Steps

- **IPP Authentication Methods (Smith)**
  - PWG Formal Vote in Q1 2019
- **IPP Document Object v1.1 (Mike)**
  - Stable draft and IPP WG Last Call in Q1 2019
- **IPP Everywhere and Self-Certification v1.1 (Mike/Smith)**
  - Stable working drafts/beta tools in Q1 2019
- **IPP Job Extensions v1.1 (Mike)**
  - Stable draft and IPP WG Last Call in Q1 2019
- **IPP Job and Printer Extensions - Set 2 v2.0 (Smith)**
  - Prototype draft in Q3 2019



# Next Steps (con't)

- IPP System Service (Ira/Mike)
  - Stable working draft and IPP WG Last Call in Q2 2019
- IPP 3D Printing Extensions v1.1 (Mike)
  - PWG Call for Objections in Q1 2019
- PWG Safe G-Code Subset for 3D Printing (Mike)
  - PWG Formal Vote in Q1 2019
- MFD Alerts v1.1 (Ira - Errata Update)
  - Stable draft and IPP WG Last Call in Q1 2019
- Investigate other errata updates:
  - RFC 3996: 'ippget' Pull Notification Method
- IPP Encrypted Jobs and Documents (Mike/Smith)
  - Prototype draft in Q3 2019



# More Information

- We welcome participation from all interested parties
- IPP Working Group web page
  - <https://www.pwg.org/ipp/index.html>
- Subscribe to the IPP mailing list
  - <https://www.pwg.org/mailman/listinfo/ipp>
- IPP WG holds bi-weekly phone conferences announced on the IPP mailing list
  - Next conference calls scheduled for Thursday, February 28, 2018 and March 14, 2019 at 3pm ET