



# The Printer Working Group

IPP Workgroup Session, Day 1  
August 15, 2018

# 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)



## August 15, 2018 (Mountain Daylight Time)

When	What
09:00 - 10:00	PWG Plenary
10:00 - 10:30	IPP WG: Status
10:30 - 11:00	IPP WG: IPP Everywhere v1.1
11:00 - 11:30	Break / Lunch
11:30 - 12:30	IPP WG: IPP Job Reprint Password
12:30 - 14:00	IPP WG: IPP System Service



## August 16, 2018 (Mountain Daylight Time)

When	What
09:00 - 10:30	IDS WG: Status and Discussion
10:30 - 11:00	IPP WG: TLS 1.3
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11:30 - 12:30	IPP WG: IPP Authentication Methods
12:30 - 13:45	IPP WG: IPP 3D v1.1, PWG Safe G-Code, PWG / AMSC / ISO 3D Discussion
13:45 - 14:00	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) – How to Use the Internet Printing Protocol, IPP 3D Printing Extensions v1.1, IPP Encrypted Jobs and Documents, IPP Everywhere v1.1, IPP Everywhere Printer Self-Certification Manual v1.1, IPP System Service, PWG Safe G-Code
  - Smith Kennedy (HP Inc.) – How to Use the Internet Printing Protocol, IPP Authentication Methods, IPP Encrypted Jobs and Documents, IPP Job Reprint Password
  - Peter Zehler (Xerox) - How to Use the Internet Printing Protocol

# Status (1/3)



- PWG Specifications in development:
  - IPP 3D Printing Extensions v1.1 - Prototype Draft
  - IPP Everywhere v1.1 - Prototype Draft
  - IPP Everywhere Printer Self-Certification Manual v1.1 - Prototype Draft
  - IPP System Service v1.0 - Prototype Draft
  - MFD Alerts v1.1 - Initial Draft
- IPP Registration Documents in development:
  - IPP Job Reprint Password - Prototype Draft
- IPP Best Practices in development:
  - IPP Authentication Methods - Interim Draft
  - IPP Encrypted Jobs and Documents - Interim Draft
  - PWG Safe G-Code Subset for 3D Printing - Stable Draft
- IPP Book in development:
  - How to Use the Internet Printing Protocol - Interim Draft

# Status (2/3)



- Recent IPP WG Approved Documents:
  - "IPP Get-User-Printer-Attributes" Registration
  - "IPP Presets" Registration
  - "Supporting Multi-Purpose Trays" Best Practice
  - "IPP Privacy Attributes" Registration
- Recent PWG Approved Documents:
  - PWG 3D Print Job Ticket and Associated Capabilities v1.0 (PJT3D)
  - PWG 5100.1-2017: IPP Finishings 2.1 (FIN)
  - PWG 5100.21-2017: IPP 3D Printing Extensions v1.0 (3D)
- Recent IETF RFCs:
  - RFC 8010: Internet Printing Protocol/1.1: Encoding and Transport
  - RFC 8011: Internet Printing Protocol/1.1: Model and Semantics
  - STD 92: Internet Printing Protocol/1.1 (RFCs 8010 and 8011)





- 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>
  - 272 printers currently listed (more than doubled since August 2017)
  - Second 1.0 self-certification tools update released in October 2017
  - *Third 1.0 self-certification tools update in testing*
- IPP Sample Code:
  - Github repository:
    - <https://github.com/istopwg/ippsample>
  - Fork of CUPS code includes ippfind, ippproxy, ippserver, ipptool, ipptransform, and ipptransform3d



- Test file projects are identifying multiple issues:
  - Technical errata for RFC 3996 (ippget) and PWG 5100.7 (JPS1)
  - ippserver/ipptransform bugs being tracked in new Conformance project:
    - <https://github.com/istopwg/ippsample/projects/6>
  - ipptool bugs:
    - "EXPECT foo IN-GROUP bar" didn't handle attributes that might appear in multiple groups
    - "WITH-VALUE" did not support octetString values
  - Also new ipptool enhancements being tracked for rangeOfInteger testing and sub-tests to automate testing of multiple (supported) values



# 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 2 of self-certification tools on October 13th, 2017
  - v1.0 is tracking CUPS 2.2.x (current stable branch)
  - Update 3 in testing to fix minor issues and Windows packaging, new sample raster files
- Planning future 1.1 errata update for manual and tools in 2018
  - v1.1 will track CUPS 2.3.x (current development branch)

# IPP Everywhere v1.1



- Prototype drafts:
  - <https://ftp.pwg.org/pub/pwg/ipp/wd/wd-ippeve11-20180704-rev.pdf>
  - <https://ftp.pwg.org/pub/pwg/ipp/wd/wd-ippeveselfcert11-20180704-rev.pdf>
- Proposed schedule:
  - Stable drafts and beta tools Q3/Q4 2018



# Self-Certification 1.1 Update

- Tool changes:
  - 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
    - macOS: 10.13 or later
    - Windows: 7 or later
- Portal changes:
  - 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 Job Reprint Password

- **Prototype draft:**
  - <https://ftp.pwg.org/pub/pwg/ipp/wd/wd-ippreprintpwd-20180620-rev.pdf>
- **Proposed schedule:**
  - Move to stable status and do an IPP WG Last Call ASAP



# IPP System Service (SYSTEM)

- Current prototype draft at:
  - <https://ftp.pwg.org/pub/pwg/ipp/wd/wd-ippsystem10-20180701-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
- Proposed Schedule:
  - Stable draft in Q4 2018





# The Printer Working Group

IPP Workgroup Session, Day 2

August 16, 2018

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13:45 - 14:00	IPP WG: Next Steps



- Final RFC published!
  - RFC 8446: The Transport Layer Security (TLS) Protocol Version 1.3
    - <https://tools.ietf.org/html/rfc8446>
- RFC 8447 updates the TLS/DTLS registry and policies
  - <https://tools.ietf.org/html/rfc8447>
- RFC 8449 updates the record size limit extension
  - <https://tools.ietf.org/html/rfc8449>
- Chrome, Firefox already support the final draft, expected to support the RFC version soon
  - Edge/Windows and Safari/macOS support coming
- TLS libraries with (announced) TLS 1.3 support:
  - OpenSSL starting with v1.1.1
  - GNU TLS starting with v3.6.3
  - SecureTransport (macOS) starting with macOS 10.14 and iOS 12



# TLS 1.3 (con't)

- Lots of confusion over this new version of TLS
  - [https://en.wikipedia.org/wiki/Transport\\_Layer\\_Security](https://en.wikipedia.org/wiki/Transport_Layer_Security)
  - Clients and Printers SHOULD start supporting TLS 1.3 as soon as possible
  - IPP WG meeting on September 13, 2018 will talk about TLS 1.3
- IPP Everywhere™ v1.1 adds "1.3" version to the TLS key in the TXT record to allow a Client to discover the maximum TLS version a Printer supports without connecting
  - ... but the only way to know for sure is to negotiate a TLS connection since the DNS-SD TXT record could be spoofed
- No IPP attributes or values for TLS 1.3
  - Most IPP Clients are looking for \_ipps advertisements (TLS) and not for a specific version of TLS
  - TLS version negotiation is handled separate from IPP just as DNS-SD is a discovery mechanism separate from IPP



# The Printer Working Group

Lunch Break

*Resuming at 11:30am MT*



# IPP Authentication Methods

- Current white paper:
  - <https://ftp.pwg.org/pub/pwg/ipp/whitepaper/tb-ippauth-20180629-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
  - Maybe HTTP MutualAuth and others in the future



# IPP 3D Printing Extensions v1.1

- Prototype draft:
  - <https://ftp.pwg.org/pub/pwg/ipp/wd/wd-ipp3d11-20180704-rev.pdf>
- Errata update to address specific implementation issues on entry-level 3D printers and enable support for generic cloud/local slicing services
- Proposed schedule:
  - Stable draft Q4 2018



# PWG Safe G-Code Subset for 3D Printing



- **Stable draft:**
  - <https://ftp.pwg.org/pub/pwg/ipp/wd/wd-pwgsafegcode10-20180704-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
- **Have solicited review from outside developers**
- **Discussion:**
  - Other G-Code commands required?
  - Other Printer Description or Job Template attributes required?
- **Proposed schedule:**
  - IPP WG Last Call Q4 2018



# IPP 3D Liaison Discussions

- ASTM Committee F42 on Additive Manufacturing Technologies
  - [www.astm.org/COMMITTEE/F42.htm](http://www.astm.org/COMMITTEE/F42.htm)
- IEEE Consumer 3D Printing Working Group (P3030)
  - [standards.ieee.org/develop/wg/C3DP.html](http://standards.ieee.org/develop/wg/C3DP.html)
- ISO/IEC JTC 1 3D Printing and Scanning Study Group
  - [www.iso.org/committee/45020.html](http://www.iso.org/committee/45020.html)
- 3D PDF Consortium
  - [www.3dpdfconsortium.org](http://www.3dpdfconsortium.org)
- 3MF Consortium
  - [www.3mf.io](http://www.3mf.io)
- Press requests
  - "3D Printing Industry" web site: [www.3dprintingindustry.com](http://www.3dprintingindustry.com)



# The Printer Working Group

## Next Steps



# Next Steps

- IPP Authentication Methods (Smith)
  - Continue developing as best practice
- IPP Job Reprint Password (Smith)
  - Move to stable status and do IPP WG Last Call
- "How to Use the Internet Printing Protocol" Book (Mike/Pete/Smith)
  - Publish stable version in Q4 2018, post updates as needed
- IPP System Service (Ira/Mike)
  - Stable working draft in Q4 2018
- IPP Everywhere and Self-Certification v1.1 (Mike/Smith)
  - Stable working drafts/beta tools in Q4 2018



# Next Steps (con't)

- IPP 3D Printing Extensions v1.1 (Mike)
  - Stable draft in Q4 2018
- PWG Safe G-Code Subset for 3D Printing (Mike)
  - IPP WG Last Call in Q4 2018
- MFD Alerts v1.1 (Ira - Errata Update)
  - Prototype working draft in Q1 2019
- Investigate other errata updates:
  - PWG 5100.5: IPP Document Object
  - PWG 5100.7: IPP Job and Printer Extensions
  - RFC 3996: 'ippget' Pull Notification Method
- IPP Encrypted Jobs and Documents (Mike/Smith)
  - Prototype draft in Q1 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, August 30 and September 13, 2018 at 3pm ET
  - September 13, 2018 meeting will discuss TLS 1.3 migration in depth