The Printer Working Group

IPP Workgroup Session, Day 1

February 7, 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
- 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)

Agenda

February 7, 2018 (Pacific Standard Time)

When	What
10:30 - 11:30	IPP Workgroup Status, IPP 3D Liaisons
11:30 - 12:00	Lunch Break
12:00 - 2:00	Google Summer of Code and "Welcome to Printing with IPP"
2:00 - 2:15	Break
2:15 - 3:30	IPP Job Save Password

February 8, 2018

When	What
9:00 - 12:00	IPP System Service
12:00 - 12:30	Lunch Break
12:30 - 3:00	OAuth2 and IPP Authentication and Next Steps

Charter

- 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

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 System Service (SYSTEM)
  - Michael Sweet (Apple) – IPP System Service (SYSTEM)
  - Smith Kennedy (HP Inc.) – Various white papers

Status (1/3)

- PWG Specifications in development:
  - IPP System Service v1.0 (SYSTEM) - Prototype Draft

- IPP Registration Documents in development:
  - IPP Authentication Methods - Interim Draft
  - IPP Job Save Password - 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

- 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

Status (3/3)

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

IETF IPP/1.1 Updates

- RFCs 8010 and 8011 have been published which replace (obsolete) RFCs 2910, 2911, 3381 (deprecated job progress attributes), and 3382 (collection attribute syntax)
- Published RFCs:
  - http://tools.ietf.org/html/rfc8010
  - http://tools.ietf.org/html/rfc8011
- **Pending:** Advance RFC 8010 and 8011 to IETF Internet Standard through status change
  - IESG process described in RFCs 2026 and 6410
  - Mike and Ira working on this - will contact area directors after IETF 101

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
  - Need MSI package update for Windows
- Planning future 1.1 errata update for manual and tools in 2018
- Potential ipptool additions for improved resiliency and security?

Self-Certification 1.1 Update

- Planning future 1.1 errata update for manual and tools in 2018:
  - More tests: Cancel-My-Jobs, Close-Job, Identify-Printer
  - Portal changes: Record specific capabilities (type of finishers, etc.)
  - Other necessary changes that are not simple bug fixes in the tools/ submission portal
  - Also review process stuff - how long can vendors continue to submit 1.0 results after 1.1 is approved?
- Proposed Schedule:
  - 1.1 errata update: Initial draft/betas in Q2 2018

Enhancements for ipptool

- TLS/1.3 includes mandatory use of randomly generated extensions on the client side to improve interoperability and resiliency ("GREASE"):
  - https://www.youtube.com/watch?v=_mE_JmwFi1Y&t=1s
- Other security testing software makes use of "fuzzing" to validate input handling:
  - https://en.wikipedia.org/wiki/Fuzzing
- Q: Should we try to incorporate that into IPP?
  - ipptool options/directives?
  - Client recommendations?

IPP 3D Liaison Discussions

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

The Printer Working Group

Lunch Break

OpenPrinting Google Summer of Code

- Linux Foundation has been approved to participate
  - More than 100 university students expressed interest prior to approval
  - Now going through resumes, etc.
- Page for 2018 project ideas:
  - https://wiki.linuxfoundation.org/gsoc/google-summer-code-2018

"Welcome to Printing with IPP"

- A short introduction to IPP client development
- Needs a real title
  - Title should expand IPP to Internet Printing Protocol due to acronym collisions - acronyms.thefreedictionary.com/IPP shows 102 different expansions of IPP!
- Target audience is developers new to IPP, typically enterprise web applications
- Development being tracked in a new Github repository:
  - https://github.com/istopwg/pwg-books
- Goal is to provide EPUB, PDF, and online HTML versions that we can point people to as needed
- Not our typical standards document!
- Volunteer editors (so far): Smith Kennedy (HP), Mike Sweet (Apple), Pete Zehler (Xerox)

The Printer Working Group

Break

IPP Job Save Password

- Interim draft:
  - https://ftp.pwg.org/pub/pwg/ipp/whitepaper/tb-savepassword-20180205-rev.pdf
- Discussions:
  - https://www.pwg.org/pipermail/ipp/2017/019446.html
  - Encryption isn't a requirement, but access control *is*
  - Use cases and flow of information: do we have enough here?
  - Security considerations: putting "save-password" in "job-save-disposition" exposed the password in the Job Ticket - maybe we need to refactor this: "job-save-accesses (1setOf collection)" attribute to provide credentials for saving to a URI like we do for document-access (INFRA) and destination-accesses (FaxOut)?
    - See next slide...
  - Overlap with Encrypted Documents?

Security and Attributes

- IPP attributes may contain sensitive/confidential/personally-identifying information
  - requesting-user-name/job-originating-user-name ("John Doe, CEO"), job-name/document-name ("Jane Doe's Performance Review"), etc.
- IPP attributes may also contain security credentials
  - destination-accesses, document-access, document-password, job-password, job-password-encryption
  - *These attributes REQUIRE data protection in transit and at rest*
- Historically sensitive information is only available to authenticated Clients
- Security credentials are *never* returned by the Get-Jobs, Get-Job-Attributes, Get-Documents, or Get-Document-Attributes operations
  - IPP INFRA provides them via the Fetch-Job and Fetch-Document operations, which require authentication with an approved proxy-role account

The Printer Working Group

IPP Workgroup Session, Day 2

February 8, 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
- 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)

Agenda

February 7, 2018 (Pacific Standard Time)

When	What
10:30 - 11:30	IPP Workgroup Status, IPP 3D Liaisons
11:30 - 12:00	Lunch Break
12:00 - 2:00	Google Summer of Code and "Welcome to Printing with IPP"
2:00 - 2:15	Break
2:15 - 3:30	IPP Job Save Password

February 8, 2018

When	What
9:00 - 12:00	IPP System Service
12:00 - 12:30	Lunch Break
12:30 - 3:00	OAuth2 and IPP Authentication and Next Steps

IPP System Service (SYSTEM)

- Current prototype draft at:
  - https://ftp.pwg.org/pub/pwg/ipp/wd/wd-ippsystem10-20180112-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 Q2/Q3 2018

The Printer Working Group

Lunch Break

IPP Authentication Methods

- Current white paper:
  - https://ftp.pwg.org/pub/pwg/ipp/whitepaper/tb-ippauth-20171205-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)
  - Maybe HTTP MutualAuth and others in the future

IPP and OAuth 2.0

- OAuth 2.0 (RFC 6749) defines four (sometimes confusing) roles: Authorization Server, Client, Resource Owner, and Resource Server
- OAuth 2.0 uses a multi-step authentication process:
  - Step 1 involves a web-based authorization/authentication process where a Client requests authorization from the Resource Owner (via the Client's web browser viewing a page on the Authorization Server)
    - If successful, the Client client gets a "grant" approving access in a redirection URL with URL-encoded form variables
    - PKCE (RFC 7636) is used for "native apps" to securely perform this step
  - Step 2 involves the Client requesting an "access token" from the Authorization Server using the grant it got from step 1. This request is a HTTP POST using form variables
  - Step 3 involves the Client supplying the access token to the Resource Server to authenticate/authorize access to the resource. For IPP/HTTP the Bearer method (RFC 6750) is used

IPP and OAuth 2.0 (con't)

- OAuth 2.0 also has a password grant method where you supply a username and password and get an access token
  - Replaces steps 1 and 2 on the previous slide with a single POST with the credentials (no web browser needed)
  - Not widely implemented since it does not support things like two-factor authentication, captchas, and other enhancements to the traditional username + password approach
- Printers that implement OAuth 2.0 as an authentication method also must use token introspection (RFC 7662)
  - https://tools.ietf.org/html/rfc7662
- Good background reading:
  - https://aaronparecki.com/oauth-2-simplified/

mOAuth Project

- mOAuth is a basic OAuth 2.0 client/server implementation that is geared towards testing and development of OAuth-based services. The client library supports authorization of native macOS, iOS, and Linux applications with PKCE:
  - https://github.com/michaelrsweet/moauth
  - https://michaelrsweet.github.io/moauth
- The server is both an Authorization Server and a Resource Server that supports:
  - User account authentication/authorization using PAM
  - Traditional web-based authorization grants with redirection as well as resource owner password credentials grants
  - Token introspection for services
  - Basic Resource Server functionality with implicit and explicit ACLs
  - Customizable web interface
- License: Apache 2.0 w/GPL2+LGPL2 exception
- Status: Nearing beta release

The Printer Working Group

Future Projects

Future Projects

- IPP Document Encryption v1.0 (Smith)
- IPP Everywhere Client Self-Certification
- IPP Everywhere MFD / IPP Everywhere 2.0
- IPP Transform Service v1.0 (Ira/Paul)

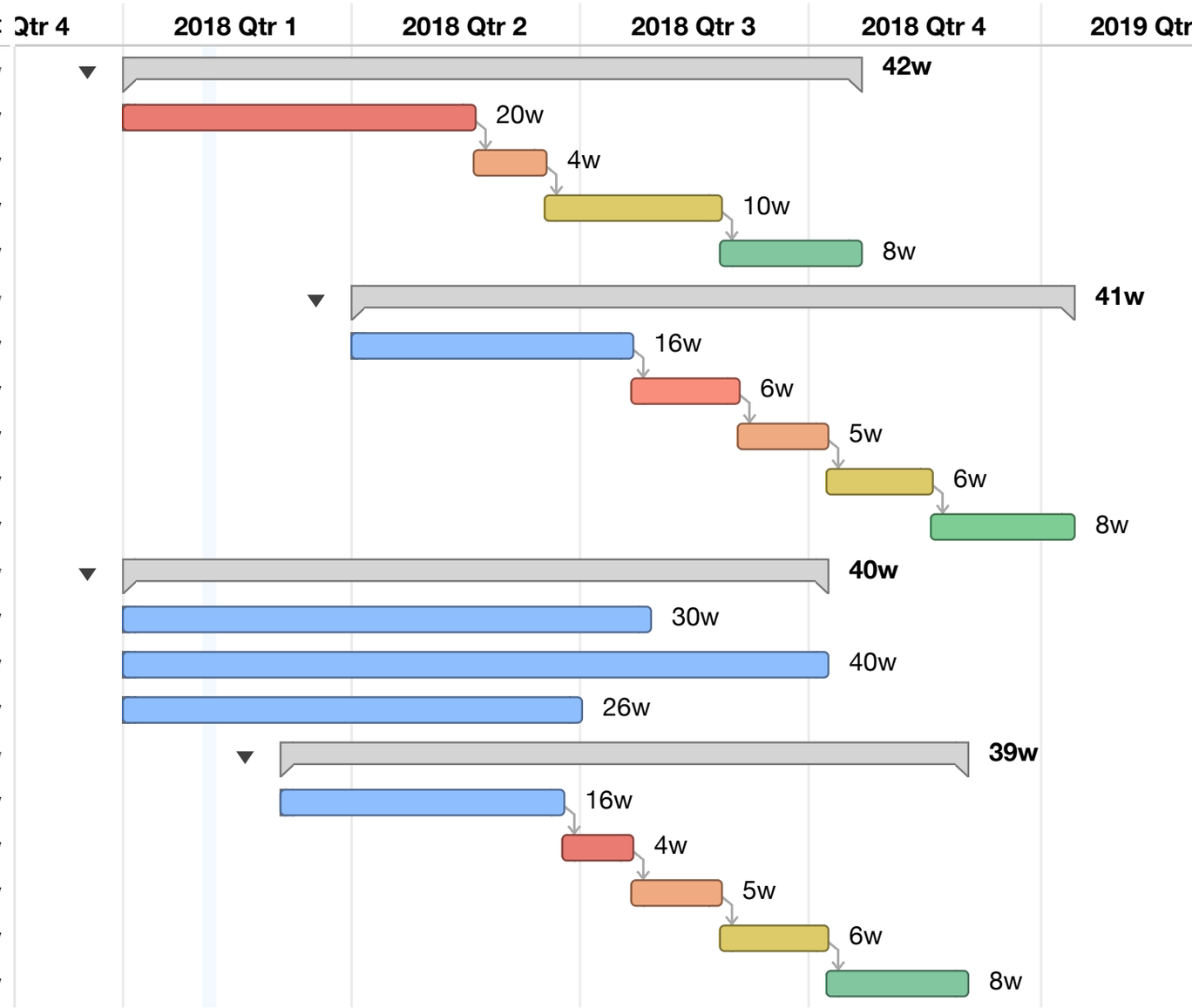
- Also:
  - Q: Should the PWG/IPP WG shift from a focus on specifications to reference implementations & certification?

The Printer Working Group

Next Steps

Next Steps

Title	Effort
1) IPP System Service v1.0 (SYSTEM)	**42w**
• 1.1) Prototype Working Drafts	20w
• 1.2) Workgroup Last Call	4w
• 1.3) PWG Last Call	10w
• 1.4) PWG Formal Approval	8w
2) IPP Everywhere Printer Self-Certification v1.1 (SELFCERT)	**41w**
• 2.1) Interim Working Drafts	16w
• 2.2) Prototype Working Drafts	6w
• 2.3) Workgroup Last Call	5w
• 2.4) PWG Last Call	6w
• 2.5) PWG Formal Approval	8w
3) IPP Registrations/White Papers	**96w**
• 3.1) IPP Authentication Methods	30w
• 3.2) IPP Job Save Password	40w
• 3.3) Welcome to Printing with IPP	26w
4) MFD Alerts v1.1	**39w**
• 4.1) Interim Working Drafts	16w
• 4.2) Prototype Working Drafts	4w
• 4.3) Workgroup Last Call	5w
• 4.4) PWG Last Call	6w
• 4.5) PWG Formal Approval	8w



Next Steps

- Advance IPP/1.1 to IETF Internet Standard
  - Request change of status after IETF 101
- IPP Authentication Methods, IPP Job Save Password (Smith)
  - Continue developing as white papers/registrations
- "Welcome to Printing with IPP" Book (Mike/Pete/Smith)
  - Continue developing, publish drafts ASAP
- IPP System Service (Ira/Mike)
  - Stable working draft in Q2/Q3 2018
- IPP Everywhere Printer Self-Certification Manual v1.1 (Mike/Smith)
  - Interim working draft in Q2 2018
- MFD Alerts v1.1 (Ira/Mike/Smith - Errata Update)
  - Initial working draft in Q1/Q2 2018

More Information

- We welcome participation from all interested parties
- IPP Working Group web page
  - http://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 15, 2018 and March 1, 2018 at 3pm ET