

# Internet Printing Protocol Workgroup Meeting Minutes

## April 17-18, 2019

Meeting was called to order at approximately 9am ET on April 17, 2019 and 11am ET on April 18, 2019.

### Attendees

Aveek Basu (Lexmark)  
Cihan Colakoglu (Kyocera)  
Zdenek Dohnal (Red Hat)  
Brandon Jacobs (Lexmark)  
Till Kamppeter (Canonical)  
Sean Kau (Google)  
Smith Kennedy (HP)  
Jeremy Leber (Lexmark)  
Ira McDonald (High North)  
Jeremy Reitz (Xerox, Mopria)  
Michael Rhines (Qualcomm)  
Chris Rizzo (Xerox)  
Michael Sweet (Apple)  
Jacob Towery (Lexmark)  
Paul Tykodi (TCS)  
Michael Vhrel (Artifex)  
Bill Wagner (TIC)  
Uli Wehner (Ricoh)  
Rick Yardumian (Canon)

### Agenda Items

1. IP Policy and Minute Taker
  - [http://www.pwg.org/chair/membership\\_docs/pwg-ip-policy.pdf](http://www.pwg.org/chair/membership_docs/pwg-ip-policy.pdf)
  - IP policy accepted, Mike taking minutes
2. Status and Slides
  - <http://ftp.pwg.org/pub/pwg/ipp/slides/ipp-wg-agenda-april-19.pdf>
3. 3D Printing Topics
  - Q: Do we develop a GUI client prototype?
    - Could be independent program or an add-on to existing applications like Cura or OpenSCAD
    - Nice idea for encouraging adoption, better for demos than ipptool
    - A: Yes in principle, need to work out the details
    - Probably not a GSoC 2020 project - too big
    - Action: Smith to work out logistics of contracting for IPP 3D prototype GUI
    - Paul: would be really good to have a mock-up at least to show

people how it would all work

- Action: Mike to update the RAPID slide deck with a 3D Print dialog
- Q: Do we have contacts for vendors implementing this?
  - A: Some interest/curiosity, but nobody has committed to implementing it
  - Could still prototype with Raspberry Pi running ippserver connected to a 3D printer
- Q: Other print ticket properties needed for Concrete printing?
  - A: Probably, need to wait for this year's prototypes to determine what those properties are
- SME Rapid conference on May 20-23, Standards portion on the 21st
  - Paul will be representing the PWG
  - Ira forwarded the announcement to the IPP list
- SME partnered with University of Florida to develop web-based database - "iRAMP"
  - Allows people to discover solutions for specific technical problems
  - Paul will propose IPP 3D self-certification program a la IPP Everywhere that could be listed in this database
    - Will require some IPP WG resources...
- AMSE continues to coordinate 3D standards across US/International organizations
  - Promoting the current (2.0) report, with periodic updates
  - The PWG can provide updates
  - Q: Any discussion of also using 3MF?
    - 3D PDF and AMF seem to have more visibility in AMSC
    - 3MF seen as a competitor to AMF
- ISO/IEC JTC 1 WG 12
  - Developing standards on behalf of other technical committees
  - We can work to get the IPP 3D job ticket (via PWG SM schema) into PDF 3D
    - Lots of interest in the DOD supply chain - need to be able to automate and standardize formats
    - "3D iPDF" (3D interactive PDF)
  - Also standards for metadata embedded in PDFs
    - TC130 pulled from JDF and PDF VT
    - Not yet published, but soon
  - Both TC130 (graphics) and 3D PDF Consortium (US TAG for ISO PDF) are interested in doing 3D job ticketing with PWG
    - Q: Any feedback on the intent focus of PWG vs. process focus of JDF/VT?
    - They've asked for a proposal/draft that discusses the differences from the current 2D stuff
  - Will need some more PWG resources/involvement going forward
  - Q: Is INCITS still an ad-hoc?
    - A: No, voted to become a TC (Technical Committee) yesterday

- Paul will forward the information to the IPP list
- 3D Concrete Printing Standards Development
  - Separate from ASME efforts, were affected by government shutdown (delays)
  - Developing test files for a dozen different labs
  - Using ippsample tools to automate things
  - Goal is to learn about the different materials, what terms and properties need to be used - ACI will get that information to us when they are defined
  - Timeframe: summer 2019
  - Should be straight-forward from the PWG side of things
  - Q: What kind of involvement?
    - A: ACI will provide feedback/information, might require some extension to IPP 3D and materials-col...
- 4. IPP System Service
  - <https://ftp.pwg.org/pub/pwg/ipp/wd/wd-ippsystem10-20190130-rev.pdf>
  - Demo
  - Feedback from Sean:
    - Change device-xxx to smi2699-device-xxx in ippserver so that it is obvious that it is an implementation detail of the sample code and not a standard attribute
      - smi2699-device-command (name): Print command
      - smi2699-device-format (mimeType): Print output format
      - smi2699-device-uri (uri): Print output URI
      - Issue #173 in the ippsample project
  - Resource test #1 failed:
    - Need to fill in resource-format-accepted response attribute
    - Issue #174 in the ippsample project (FIXED)
  - Feedback from Smith:
    - Seems like printers sometimes come up in the stopped and not accepting states
    - Mike: Shouldn't happen for printers in the conf directory, but will happen for printers created with the Create-Printer operation (by design)
    - Smith will file issues as needed
  - Q: What was the demo setup?
    - A: 18-core iMac Pro with 128GB RAM and 4TB SSD, HP OfficeJet printer, ippsample as checked out from Github running on macOS 10.14.4
    - But any regular computer/laptop would work, definitely doesn't need that kind of horsepower....
  - Resource test #2 succeeded
  - Create-Printer accepts resource-ids that is a template for a printer
    - What is the format?
      - Could be application/ipp or some vendor format
      - Client just looks for template-printer resources and provides

- the resource ID
    - Attributes in request override template values
  - Mike will add to ippserver (Issue #175)
  - Talk about how to implement this
    - List errors/substitutions
    - Client can specify at most 1 template resource
    - Client attributes override template attribute
    - List types of resources that can be specified
  - Template resource types provide metadata (attributes) and not content, standard format is application/ipp but other types could be supported
  - Create-Job/Print-Job/Print-URI can accept template-job resource
  - Send-Document/Send-URI can accept template-document resource
  - Allocate-Printer-Resources only works for static resources (not templates or executables)
    - Printers need to be re-created to use a new template
  - Q: Is Q2 still a good target given the GSoC 2019 work?
    - A: Yes, get to stable draft and completed prototype in Q2
    - Hold off on PWG Last Call and Formal Vote until late Q3/early Q4 to given GSoC work a chance to expose any issues
5. Canon Proposal for New Attributes
- <https://ftp.pwg.org/pub/pwg/ipp/slides/20190417%20New%20IPP%20Attributes%20Proposal%20from%20Canon.pdf>
  - Borderless expansion
    - How to specify units?
      - Percentage doesn't work well (not precise enough) for large sizes
      - PWG units (hundredths of millimeters) have the precision, can be tailored by client
    - Mike: maybe a "media-overbleed (integer)" member attribute for media-col?
    - Sean: or have a content/imposition rectangle for the document data - something like that in PWG 5100.3
    - Q: What about aspect ratio?
      - A: Normally preserved, but an arbitrary content rectangle might override that?
      - Would need to specify semantics clearly
    - Q: Should this be a job template attribute or a printer configuration setting?
      - Might want different values for different sizes
      - Could work as a printer setting or a default for a job template
      - Is this something you fiddle with each job, or something you configure once or tweak as needed?
      - Canon and HP provide UI for each job, but is that the best solution/place?
      - A: Needs further discussion
  - Unidirectional Printing

- Q: Shouldn't this be captured by print-quality?
    - high = unidirectional
    - normal and draft = bidirectional
    - A: Use print-quality
  - Eliminate Upper and Lower Margins
    - Print optimization to imaged content
    - Q: What about just specifying a media with 0 height/length and let the printer just image the content area?
  - Banner printing
    - Already supported by finishings-col/trimming/trimming-when
    - trimming-offset can be used to adjust cut border
  - Composite
    - Overlays/templates/watermarks/variable data printing is not yet supported by IPP
    - imposition-template could be used but was never fully specified
  - Special print mode
    - print-content-optimize can handle that with a new value "barcodes" or some such
    - Job level with overrides possible on the page level
    - Also PDL attributes like "Interpolate" in PDF
6. IPP Everywhere
- Slide 15: Add link to the github printers page
  - Demo:
    - ippevesubmit help isn't aligned properly
    - ippevesubmit should ask if this is for a print server
    - ippevesubmit should write to "printer name.json"
  - Q: Do printers have to support DNS-SD?
    - A: Yes
    - mDNS might not be useful in enterprise environments, but DNS-SD with regular DNS is still possible and widely used
    - Printer must have the capability to do DNS-SD and mDNS, might not always (or ever) be turned on
  - Q: Can printers can certified as logical devices/print servers?
    - A: Why would you do this?
  - Q: Could we relax mDNS requirement for devices that are exclusively enterprise devices?
    - A: Maybe, how to specify (weight, size, etc.)?
    - Personal/Enterprise/Shared/SOHO
  - Make DNS-SD tests recommended, if not supplied must be print server/enterprise printer/logical device
    - Add "dnssd" key to printers.json file
    - Talk at future IPP meeting about how we want the printer listing page
  - Q: What is the value proposition of IPP Everywhere vs. AirPrint and Mopria?
    - A: IPP Everywhere is the only fully-open printing standard, is a very small delta from the other vendor standards, and doing all three will

- yield total compatibility with all operating systems
- HP: It's good for QA
- 7. IPP Enterprise Printing Extensions (EPX) v1.0
  - <https://ftp.pwg.org/pub/pwg/ipp/wd/wd-ippepe-20190327.pdf>
  - Abstract + Introduction:
    - Mention history/JPS2 and how we got here
  - Introduction:
    - Rewrite and expand - what is this spec about?
    - Table 1: Delete or move to 4.x subsections
  - Section 2.1:
    - BCP14
  - Section 2.4:
    - Drop job-state enum values from definitions - just reference them with a list of names or something.
  - Section 2.5:
    - Password Protected Job: Reword, include Reprocess-Job operation
    - Print-stream pages should be Input Pages from STD92
    - Proof Print Job: Proof Job, reword
    - Retained Job: Reword - can be copied using the Resubmit-Job or Reprocess-Job operations
    - Stored Job: talk about the document data being stored as-is
  - Global: Proof Print Job -> Proof Job
  - Section 3.1:
    - Drop A, B, D, E, F, and G
    - Lines 345-347: Drop talk of canceling sets of jobs
    - Use Stored Jobs, Proof Jobs, etc. (capitalized terms from 2.x)
    - Drop #4-7
    - Add bullet for password protection of Retained Jobs
  - Q: What's the difference between a Stored Job and a Retained Job?
    - A: Stored Job is explicitly retained (subset of retained jobs)
    - Define in terms of explicit user/admin intent (retain for a certain period of time)
    - Jobs that are only stored (not printed) still go to the 'completed' state, job-impressions-completed=0, job-media-sheets=0, job-pages-completed=N, job-k-octets-processed=N
  - Sections 3.2.1, 3.2.2:
    - Drop "MFD" or replace with "workgroup" or something like that
    - "only people with the original password can pick it up."
    - Continue discussion on IPP list, several comment from Sean
  - Section 9.1:
    - Drop mention of job-password for owner-authorized and reword
    - Also need to define semantics (and probably some job-state-reasons keywords) carefully to track the state of things...
  - Finished at section 3.2.3
- 8. IPP Job Extensions v2.0
  - <https://ftp.pwg.org/pub/pwg/ipp/wd-ippjobext20-20190315.pdf>

- Fate of "document-format-details":
  - KM would like some time to review and provide feedback
  - Jeremy will also provide info to Mopria members for feedback
  - Ira: Since this attribute seems to be implemented by several vendors, we should probably not obsolete it but we can deprecate things with a rationale and a description of the limitations
  - 1setOf syntax unnecessary
  - Member attributes:
    - "document-format": Redundant, make OBSOLETE
    - "document-format-device-id": Not used, make OBSOLETE
    - "document-format-version": Redundant, make OBSOLETE
    - "document-natural-language": Redundant, make OBSOLETE
    - "document-source-application-xxx": Note issues, keep
    - "document-source-os-xxx": Note issues, keep
  - Consensus is to make "document-format-details" DEPRECATED
    - Single value with document-source-application-xxx and document-source-os-xxx member attributes, all other member attributes obsolete
  - Consensus is to make "document-format", "document-format-device-id", "document-format-version", and "document-natural-language" member attributes OBSOLETE
  - Mike will post a summary to the IPP mailing list

#### 9. Job Accounting BoF

- Job Accounting: "Collection of Metadata to audit, bill, or otherwise report on the **origin**, processing, and **disposition** of Jobs and Documents."
  - From RFC 4949: " \$ COMSEC accounting (O) /U.S. Government/ The process of creating, collecting, and maintaining data records that describe the status and custody of designated items of COMSEC material. (See: accounting legend code.) Tutorial: Almost any secure information system needs to record a security audit trail, but a system that manages COMSEC material needs to record additional data about the status and custody of COMSEC items."
- Metadata: "Information about a Job or Document such as name, **originator**, owner, format, state, counters, dates and times, **content**, and template attributes."
- Use cases:
  - Add diagnostics/debugging - using accounting data to reproduce a problem
  - Add content auditing - printing inappropriate or disallowed things
  - Add client providing unique identifiers for account IDs, billing codes, etc.
  - Not for access control
- Requirements:
  - Add collection of application and OS
  - Authentication includes client, user, printer, server
  - Audit logging (5110.3)

- Printer metadata includes work counters
- Authentication:
  - TPM mechanisms to provide signed information
- Client Metadata:
  - job-accounting-user-id and job-account-id are sometimes used together
- Printer Metadata:
  - Talk about additional standardized attributes, such as method of authentication ("job-originating-user-authentication") and security ("job-originating-user-security")?
  - Talk about Client Metadata that is better generated by printer (job-impressions, job-k-octets, etc.)
  - Also look at Job Monitoring MIB properties that haven't made it to IPP yet
- Overall:
  - Include a trustworthiness discussion for different IPP attributes, e.g., page count
- Is it reasonable to include "job-account-id" in "printer-mandatory-job-attributes" for systems with Job Accounting enabled?
  - Yes, that is the designed mechanism for informing a Client which attributes are required.
  - Vendors should file bugs with the affected clients and/or implement defaults/workarounds as appropriate
- What about "document-metadata"?
  - Definitely PII, needs to be strongly protected
- What about "document-format-details"?
  - Keep DEPRECATED
  - Work on defining new source attributes with interoperability and verification
  - Mostly useful for diagnostics/debugging
- Validation:
  - Certificate validation/system validation (I trust the systems on my network to do the right things)
- Next steps:
  - Discuss parts at IPP workgroup conference calls
  - Collect discussions and present at another full BoF at August 2019 F2F

#### 10. IPP Encrypted Jobs and Documents

- <https://ftp.pwg.org/pub/pwg/ipp/wd/wd-ipptrustnoone10-20190131-rev.pdf>
- Section 2.4:
  - Add Job Receipt and Job Ticket definitions
  - Add Encrypted Job as a defined term
- Global: Change "encrypted Job" -> "Encrypted Job"
- Section 4:
  - Q: What about progress monitoring before the Job reaches a terminating state?
    - A: Can just remove the bit about "once it reaches a



terminating state", with the usual caveats that the receipt isn't stable until the job reaches a terminating state.

- Section 6.3:
  - Talk about access policies:
    - Originating user \*or\* specifically authorized users can request an encrypted receipt using corresponding PGP public keys
- Q: Can Client supply user's public key in print requests?
  - A: Yes, for use in verification/authentication, but the printer's public key is used to encrypt the request, not the user's public key (since the printer needs to decrypt the print request/document data
  - Supported combinations are:
    - Just printer's public key
    - Printer's public key + user password (unlock at device)
    - Printer's public key + user's public key (verify at device)
    - Printer's public key + user's public key + user password (verify and unlock at device)
- Section 7.1.3 and 7.2.2:
  - Say this is the Base64 (PEM) encoded version of the PGP public key
- Section 7.2.1:
  - "application/ipp+pgp-encrypted" is the MIME media type (+ not -)
- Section 11: Drop XML usage stuff
- Section 12:
  - MUST NOT use old PGP stuff that is subject to EFAIL (copy from 16.1)
  - RFC 8452 - look at/maybe reference?
- Section 13:
  - Scrub RFC2911 references
  - Add operations and operations-supported enums
- Section 13.3:
  - Drop
- Section 16.2:
  - "add of the time of this document there are no mitigations" or something like that
  - Fix broken reference "defined in ???"
- Q: Promote to standards track?
  - A: Yes, we have new, non-trivial operations and serious new content
- Abstract and introduction: Update to "specification" instead of "registration", mention new operations
- Make sure to post updated draft to both IPP and IDS mailing lists

#### 11. Next steps:

- IPP Document Object v1.1:
  - Drop mention of document-format-details
  - Start PWG Call for Objections
- Job Accounting:

- Work in parallel with IPP EPX to add any necessary attributes/values
- Mike has started a separate Best Practice draft based on the BoF slides and discussion
  - <https://ftp.pwg.org/pub/pwg/ipp/wd/wd-ippaccounting10-20190418.pdf>
- Maybe have an intermediate BoF/conference call specifically for accounting?
- Try to do some longer-term scheduling of IPP WG concall topics
- Can use May 2, 2019 for an IPP concall as well

## **Next Steps / Open Actions**

- Next conference call on April 25, 2019 at 3pm ET
- Action: Smith to work out logistics of contracting for IPP 3D prototype GUI
- Action: Mike to update the RAPID slide deck with a 3D Print dialog
- Action: Smith to follow-up on the 3MF liaison agreement (IN PROGRESS - meeting with 3MF liaison on 3/15)