Internet Printing Protocol Workgroup Meeting Minutes
November 20-21, 2019

Meeting was called to order at approximately 10am MT.

Attendees

Cihan Colakoglu (Kyocera Document Solutions)
Gupta Gyaneshwar (OKI)
Sean Kau (Google)
Smith Kennedy (HP)
Jeremy Leber (Lexmark)
Ira McDonald (High North)
Chris Rizzo (Xerox)
Michael Sweet (Apple)
Bill Wagner (TIC)
Rick Yardumian (Canon)

Agenda Items

1. IP Policy and Minute Taker
   - http://www.pwg.org/chair/membership_docs/pwg-ip-policy.pdf
   - IP policy accepted, Mike taking minutes
2. IPP Status
   - https://ftp.pwg.org/pub/pwg/ipp/slides/ipp-wg-agenda-november-19.pdf
   - Slide 5: Note we also support PWG MIBs
   - Slides 12 and 13 should be before the lunch break slide
   - Add slide for GovPrint slides
     - including link to Basecamp workgroup
3. IPP Everywhere
   - https://ftp.pwg.org/pub/pwg/ipp/wd/wd-ippeve11-20190827-rev.pdf
     - Stable draft
   - https://ftp.pwg.org/pub/pwg/ipp/wd/wd-ippeveselfcert11-20190827-rev.pdf
     - Prototype draft
   - Hoping to get beta of update 4 out before the end of the year
4. UK GovPrint Presentation
   - https://ftp.pwg.org/pub/pwg/ipp/white/ReleasePrinting-20191118.pdf
   - Slide 18:
     - Add note that this only appears as needed
   - Slide 19:
     - Only shown as needed (typically once per user) - add note
     - Needs to be shown for each user (not just at queue creation time)
     - Should have link to privacy policy link
5. IPP System Service v1.0

- https://ftp.pwg.org/pub/pwg/ipp/wd/wd-ippsystem10-20191022.pdf
- Stable draft
- PWG Formal Vote ends December 22, 2019
- Have quorum (6 votes, all yes, with some editorial comments)
- OpenPrinting wants to do a GSoC project to bring in scanning and other services
- Q: What about cloud printing?
  - A: IPP System + IPP INFRA provide everything needed
  - But may want slides or a white paper or section in Job Accounting to provide the details of how to implement a cloud solution using IPP System + IPP INFRA
6. IPP Enterprise Printing Extensions v2.0
  - https://ftp.pwg.org/pub/pwg/ipp/wd/wd-ippepx20-20191010-rev.pdf
  - Resuming at section 4.4
  - Section 4: Title should be "model"
  - Section 4.x:
    - Add tables of relevant attributes for each feature
  - Section 4.4:
    - Reword slightly to note that "job-password-action" is optional
  - Section 4.5:
    - Line 531: lowercase feature
  - Section 5 should "New Attributes"
    - Subsections for operations, job template, etc.
  - Section 5.1:
    - Use CONDITIONALLY REQUIRED with second sentence saying that Printers that support X feature MUST support this attribute
    - Lines 570-571: Make this a reference to the "new semantic for existing operations" subsection on Create-Job, Print-Job, and Print-URI for the job-password-xxx attributes
    - Line 576: "so that THE new copy"
  - Section 5.2:
    - Lines 588-589 (hold-job): Drop everything after first sentence, say this value MUST be supported.
    - Update PWG5100.11 reference to include year (prior version of this spec)
    - No job-password-action-default - must support 'hold-job' and that is the default if not specified for backwards-compatibility
    - Rename "process-and-retain" to "process-job", mention job retention until the user enters the password or the admin-configured retention time expires.
    - Drop 'retain-only'
    - Add a note about why the default is always 'hold-job' (for backwards compatibility)
    - Do some cleanup here
  - Section 5.3:
    - Consensus is to drop name syntax
    - Make note of it in the Changes section, and here.

- Section 6.2:
    - Consensus is to drop job-pause-after
- Section 6.5: "job-storage" make this an operation attribute, copied to Job Status attribute of same name
- Section 6.6:
    - Lines 674-677: Don't put job-password in proof-print-supported - job-password is an operation attribute and wouldn't be included in the proof-print collection
    - Maybe specify "proof-print" in Get-Printer-Attributes to get the filtered job-password-supported value when proof-print is requested
        - printer-get-attributes-supported lists which attributes are used for filtering Get-Printer-Attributes responses
- Section 6.6.x: "This REQUIRED member attribute"
- Section 6.6.1:
    - Line 684: The range of allowed values is reported in the proof-print-copies-supported attribute.
    - Note legacy usage of 0 copies for performing simple job storage, use new method going forward (with reference to 5100.11-2010)
- Section 7.1:
    - "job-storage" contains a copy of the operation attribute of the same name
- Section 8.3:
    - Drop definitions, reference job-password-action operation attribute and section, printer MUST list 'hold-job'
- Section 8.4:
    - "specifies which cryptographic hashes" instead of "encryption methods"
        - Probably make the same changes to the "job-password-encryption" operation attribute definition
    - Table 2:
        - Keep 'none' since most passwords are simple 4-6 digit PINs and printing happens over a security connection by default these days. But add a note to only use over TLS with simple PINs
        - Add new note for sha (not clearly specified in 5100.10-2010)
        - Add "deprecated" to 'md' values
        - Drop "The encryption method uses the" from each item
    - "Secure Print" needs to be fixed
- Sections 8.5, 8.6, 8.7:
    - Fix references (part of this spec)
- Global: Look for "section XX"
- Section 8.9: Delete
- Section 8.14:
    - Update job-password support to use Get-Printer-Attributes filter (a la proof-print), move to job-storage section
    - "This CONDITIONALLY REQUIRED attribute lists the supported member attributes of the "job-storage" operation attribute. Printers

that support Job Storage MUST support this attribute."
- Q: Doing filtered Get-Printer-Attributes seems awkward
- A: Having additional attributes hard to scale, but maybe if there is a serious need
- Filtered also works for Get-User-Printer-Attributes
- Q: proof-print is a Job Template and not an operation attribute?
- A: Can't change it for backwards compatibility reasons
- Note this in the definition - normally not settable after Job Creation
- Section 8.19:
- This CONDITIONALLY REQUIRED... Printers that support Proof Print MUST support this attribute.
- Drop talk of job-password
- Global: CONDITIONALLY REQUIRED for all attributes based on features.
- Section 9.x: Add job-password-action
- Section 9.2:
- Allow job-password-xxx in Validate-Job, but note that the values are thrown away, do not return in unsupported attributes
- Add a note here about change from 5100.10-2010
- Add to changes in v2.0
- Section 10.1:
- Turn into a list and include CONDITIONAL CONFORMANCE terminology per feature
- Section 10.2:
- Keep 'owner-authorized' - reword to be clear that Job Creation MUST be authenticated, Release-Job MUST be authenticated or release at Printer console MUST be authenticated (e.g. ID card, etc.)
- Section 10.3:
- Lowercase feature
- Don't use "existing values"
- Move second paragraph to section 4.x where the semantics of job storage are defined
- New values are CONDITIONALLY REQUIRED for printers that support Job Storage
- Reword a bit...
- Table 8 should be in section 4.x
- Section 10.4:
- Drop "and which-jobs-supported"
- Use CONDITIONALLY REQUIRED for values corresponding to a feature
- Sort keywords by name
- Lines 923-924: Move to section 4.x
- Section 11.1:
- Drop sheet-collate
- Drop pages-per-subset
- job-save-disposition feature has been made obsolete

- Also include all job-save-xxx and save-xxx attributes (-supported, -default)
- Add pdl-init-file-xxx to obsolete attributes
- Reference to 5100.11 should include year
- Section 11.2: Drop explanation column, all are obsolete because the feature from 5100.10-2010 has been made OBSOLETE.
- Section 11.x: "Table N lists the ??? defined in [PWG5100.11-2010] that are OBSOLETE"
- Global: References to PWG 5100.11 should include year (as an informative reference to old JPS2)
- Section 12.x:
  - Just two subsections for Printer and Client conformance, with a list of absolute requirements followed by the conditional requirements for each feature
- Section 13:
  - Drop mention of Unicode in XML
  - Maybe just copy from the latest template?
- Section 16.1:
  - Drop RFC2119 (already have BCP14)
  - Maybe drop other PWG5100.x specs (check for references)
  - Drop RFC3382
  - RFC 3629 needs to be STD63
  - Cleanup all references
- Section 16.2:
  - Add year to 5100.11
  - Cleanup unnecessary references.
7. IPP Production Printing Extensions v2.0
  - https://ftp.pwg.org/pub/pwg/ipp/wd/wd-ippppx20-20190923-rev.pdf
  - Section 5.1.3:
    - Q: What about queuing and nesting?
      - A: Would need a new keyword
      - 'tile'? to automatically tile to minimize media usage (typically for roll-fed), which is the semantics of the old HP/GL-2 plotter functions
      - Printers can merge Jobs using 'tile' to further optimize roll usage
  - Section 5.1.5:
    - Table 6: REQUIRED, not MUST, RECOMMENDED, not SHOULD
  - Just waiting on a prototype to advance to stable status
8. IPP Driverless Printing Extensions v2.0
  - https://ftp.pwg.org/pub/pwg/ipp/wd/wd-ippnodriver20-20191121-rev.pdf
  - Global: Input-Document should just be Document or Document data (no new definition)
    - Do we even use Input-Document anywhere?
  - Global: Input-Page should be Input Page, copy definition from RFC 8011
  - Global: Output-Document should be Set, copy definition from RFC 8011
  - Global: Output-Page should be Impression, copy definition from RFC 8011

- Section 2.4:
    - Line 293-294: Fix capitalization
    - Fix Input-Document (Document), Input-Page (Input Page), Output-Document (Set), and Output-Page (Impression)
- Q: Should we remove the paid imaging service attributes from this specification and add to an update of Transaction-Base Printing
    - A: Probably, consensus is to do an errata update of the TRANS spec
    - Action: Mike to add printer-charge-info-xxx attributes to a new draft of TRANS
- Section 3.1:
    - Line 425: Drop "Printer Description" from the localization item
- Section 3.2.x:
    - Drop any paid printing use cases
- Section 4.2:
    - Remove GUPA reference
    - Q: Should GUPA be added to this spec or in EPX?
        - A: Consensus is to add to EPX while we have that spec open
- Section 4.4:
    - "A supporting Client CAN retrieve these resources"
    - Add colon to "http"
    - "the protocol IDENTIFIED by the URI's scheme..."
    - Use Printer Resident
    - Also firewalls and other Client security software may block access on other ports (e.g. port 631 is allowed but port 80 is not)
    - Should return the actual URI, not something that will be redirected
- Section 4.5:
    - Add ICC Color Profile International Registry http://www.color.org/registry/index.xalter to references and mention it here
- Section 4.6:
    - Put OS references right after the names.
- Section 6.1:
    - document-password should be CONDITIONALLY REQUIRED for printers that support PDF
    - identify-actions should be CONDITIONALLY REQUIRED for printers that support Identify-Printer
- Section 6.1.1:
    - Copies to Job and Document Status attributes (read only)
- Global: Change JPS3ABNF reference to ABNF
- Global: document-metadata is a read-only attribute, put it in a Status subsection
- Section 6.1.2:
    - Drop OpenXPS and ECMA388 references
- Section 6.1.4:
    - This CONDITIONALLY REQUIRED operation attribute.
    - Move MUST to second sentence

- Stopped at section 6.2
9. IPP Encrypted Jobs and Documents v1.0
    - https://ftp.pwg.org/pub/pwg/ipp/wd/wd-ipptrustnoone10-20190418-rev.pdf
    - Deferred to a future meeting
10. Job Accounting with IPP v1.0
    - https://ftp.pwg.org/pub/pwg/ipp/wd/wd-ippaccounting10-20191022-rev.pdf
    - Q: What is "tighter security"?
        - A: Client validation of TLS certs hosted by Printer
        - Must be CA-signed, use a site root, etc.
        - Also Printer trust validation of Client
        - Not about attestation of client-supplied values
        - Focus on documenting the scope of things, not provide specific policy best practices
        - Concern about self-signed certs is Trust On First Use (TOFU) race/validation issues
    - Section 3.1.x:
        - Add a subsection for authentication/authorization/access-control
        - Add a subsection for TLS X.509 cert policies
    - Section 3.2.x:
        - Add a subsection for failed AAA
        - Add a subsection for failed TLS validation
    - Q: Do we have a way to have the printer send a code back to the client for printing?
        - A: Billing/Account ID is there, nothing for a one-time passcode
        - Law office - each associate has an identifier (separate from authenticated user)
        - Maybe expand 3.1.5 to include both accounting user ID and account/contract ID
        - Highlight use of job-account-id and job-accounting-user-id in addition to authenticated user identity
    - Make sure to reference IETF RFCs on TLS
        - Ira has a list
    - Section 3.3:
        - Add definition of user account configuration and requirements
    - Section 4.3:
        - Title: Job Creation Requests and Required/Recommended Attributes
        - Q: Does a Client have to do anything with requested attributes?
            - A: No, but the idea is to provide a way for the client to intelligently work with the printer
    - Global: Explicit Consent, not Informed Consent
    - Section 4.4:
        - Fix title
        - Fix figure 1 (bad rendition of dialog), add privacy policy link, Explicit Consent Dialog
        - Add a SHOULD for the Client to only show this once (or after any any changes) per user

- Q: What about job template attributes that are recorded (media, duplex, etc.), how should those be reported?
    - A: Not sure, doesn't fit with mandatory or requested
    - Chris: printer-attributes-collected?
    - Bill: We've never really tackled this sort user interaction before
    - Might also just be talked about in the privacy/data retention policy?
    - Line 231 MUST vs. SHOULD vs. can?
    - Keep talking about this in the future
- Section 5.1.1:
    - Q: What about job-originating-user-xxx, authenticated identity?
        - A: Need to talk more about this
        - Authentication is implicit consent (you entered the credentials, chose the certificate, etc.)
        - requesting-user-name would need explicit consent
    - Q: How are these values configured?
        - A: Configured manually by site administrator or provider
        - Add discussion to section 4
    - Q: Did we have something like this in SM?
        - A: Don't recall
- Q: Do we want an ipp-features-supported value of 'accounting' for this?
    - A: Maybe, talk about it more
- Q: Do we want to talk about clients needing to reconfigure if the print service config changes?
    - A: Yes, absolutely
    - Add a use case and then talk about it in section 4
- Stopped at section 6
11. 3D Printing Liaison Status
    - America Makes
        - New web portal we need to get setup on
    - ISO:
        - ISTO has requested a no-fee membership from INCITS, just waiting for the final approval
        - Paul has been invited to be an editor
    - 3D PDF:
        - Need to get liaison setup, should be relatively easy because they are also an open standards body
        - 3D PDF Consortium - go to FAQ http://3dpdfconsortium.org/resources/ and Membership Fees/Info http://3dpdfconsortium.org/membership-info/ no visible mention of liaisons w/ other SDOs
    - 3D Concrete
        - Could have several hundred participants!
            - Might hit some WebEx limits...
        - Lots of research on concrete formulations and not necessarily delivery
        - Some printers are 6-axis (X,Y,Z position and rotation)
            - Defined an extension of G-Code for this called RapidCode
            - Q: Should they use the PWG safe g-code MIME media type?

- - A: No, define a parallel MIME media type (still "safe")
    - Useful in the near term to figure out what works
    - application/vnd.???-rapidcode
  - Use CAD software exporting to G-Code/RapidCode
  - Regular slicers don't work - continuous fill vs. sequence of short segments
    - Might be useful metadata from printer to tell the Client the technology in use for the slicer to adapt
  - Print quality is specified differently then in the 2D realm
    - Layer thickness, speed are important
  - Drivers are cost savings, material savings, worker safety
  - Rendering to voxels, with tagging with job ticket/metrics information
    - Useful for QA, testing
  - 4 different kinds of 3D concrete printers
    - 6 DOF printer using RapidCode as a commercial product
    - Other printers are "bespoke" solutions using G-code
  - RAND Corporation did a presentation on security and the various dangers
    - Highlights how process-oriented interfaces are vulnerable to these things while intent-oriented interfaces like IPP are not
    - Can cause errors in printing that are hard to detect
  - Military is using Marines to run 3D printers in teams of 2 - how to make sure the technology can be used safely by general contractors, etc.
  - Q: Any talk of using two printers at once (for steel and concrete)?
    - A: Right now rebar is added manually, pausing between slices
    - Testing reproducible designs - theoretical strength vs. actual, optimizing material usage
    - Bridges and buildings assembled had 3x design strength
12. Next Steps
  - Encrypted Jobs and Documents: Q2 2020
  - Enterprise: Q1 2020
  - Driverless: Q2 2020
  - Job Accounting: Q2 2020
  - Transaction-Based Printing errata: Q1 2020 (Mike)
  - Mike may miss the Dec 5 meeting

Next Steps / Open Actions

- Next conference calls on December 5 and 19, 2019 at 3pm ET
- PWG F2F on November 20-21, 2019
- Action: Mike to add printer-charge-info-xxx attributes to a new draft of TRANS
- Action: Smith and Ira to provide 3D printing liaison slide updates
- Action: Paul to make a list of 3D printing projects for 2019-2020 (PENDING - attending lots of conferences)