Internet Printing Protocol Workgroup Meeting Minutes
May 6-8, 2020

Meeting was called to order at approximately 11am EDT on May 6, 12:30pm EDT on May 7, and 10am EDT on May 8, 2020.

Attendees

Steve Algernon (Apple)
Cihan Colakoglu (Kyocera Document Solutions)
Till Kamppeter (Canonical/OpenPrinting)
Sean Kau (Google)
Smith Kennedy (HP)
Jeremy Leber (Lexmark)
Ira McDonald (High North)
Solomon Peachy (Gutenprint)
Michael Rhines (Qualcomm)
Chris Rizzo (Xerox)
Michael Sweet (Lakeside Robotics)
Paul Tykodi (TCS)
Rick Yardumian (Canon)
Bill Wagner (TIC)

Agenda Items

1. IP Policy and Minute Taker
    - https://www.pwg.org/chair/membership_docs/pwg-ip-policy.pdf
    - IP policy accepted, Mike taking minutes
2. Status
    - https://ftp.pwg.org/pub/pwg/ipp/slides/ipp-wg-agenda-may-20.pdf
3. IPP Everywhere 1.1
    - https://ftp.pwg.org/pub/pwg/ipp/wd/wd-ippeve11-20200417.pdf
    - https://ftp.pwg.org/pub/pwg/ipp/wd/wd-ippeveselfcert11-20200312.pdf
    - Verify that the IPP Everywhere landing page has a link to the self-certification page
4. Job Accounting with IPP v1.0
    - https://ftp.pwg.org/pub/pwg/ipp/wd/wd-ippaccounting10-20200427-rev.pdf
    - Section 2.x:
        - SAE uses term "Sensitive Data" as a superset of Personal Data
        - Add "Sensitive Data: Personal Data or other metadata that can be used to correlate or identify a Client or End User."
    - Section 3.x:
        - Add out-of-scope for how accounting data is collected beyond the Printer (i.e. cloud/fan-out/etc.)
    - Section 4:

    - "... is based on the following key principles:"
    - "Accuracy: All parties WILL supply ..."
    - "Confidentiality: All parties make best efforts to preserve the confidentiality of Personal Data"
    - "Consent: The Client obtains explicit consent from the End User to send Sensitive Data to the Printer, and the Printer is configured with a consent policy to accept and process Jobs from authorized End Users; and"
    - "Trust: All parties establish trust using standards and protocols."
    - Q: Do we need to say "any" metadata?
        - A: Yes, the list of PII metadata regularly changes, sometimes easy to identify a person with things like User-Agent
        - Also laws and best practices change - best to be conservative and require a printer to list everything it will collect
    - Talk about relationship between a Client and a Printer, works with any configuration (direct, print server, cloud, etc.)
- Section 4.1:
    - "and ASSOCIATED metadata"
    - "The validity of the Client NETWORK address ..."
    - "which can be used BY THE PRINTER ..." (move "by the Printer" to the middle of the sentence)
- Q: Do we allow unauthenticated job accounting?
    - A: Yes
- Q: Do we allow MUST/REQUIRED in a Best Practice?
    - A: Yes
    - We give document numbers to Requirements and Best Practices, and Requirements can have MUST/MUST NOT, so Best Practices should be able to as well
- Section 4.x: Replace conformance terms with declarative substitutes
- Section 4.4:
    - Printer has to assume the End User has provided explicit consent
    - No way to prove that the End User has provided explicit consent
    - "Fuzzy" trust that the Client is conforming to this best practice
- Ira will provide informative references to IETF RATS and ITU X.1254 work for remote attestation/etc.
- Section 4.5.:
    - "provide a METHOD for a ..."
- Section 4.6:
    - "Printers CAN AUTHENTICATE Client requests"
- Section 6.1: Update TLS reference
- Section 6.1/6.2: Add reference to IPP Authentication Methods BP
- Section 6.3:
    - SHOULD be collected and retained ONLY as necessary" (move only before "as necessary")
- Section 6.5:
    - Move Authenticated Guest to terminology

        - "Truthiness"
    - Section 7:
        - "lists IPP attributes COMMONLY used ..."
        - Q: Maybe say something about "-actual" attributes?
            - Yes, but not here, add another section in Printer conformance - SHOULD support "xxx-actuals" spec (PWG 5100.8?)
5. IPP Enterprise Printing Extensions v2.0
    - https://ftp.pwg.org/pub/pwg/ipp/wd/wd-ippepx20-20200504-rev.pdf
    - Abstract and Section 1: "CONCEPTUAL features" or "HIGH-LEVEL features"
    - Section 2.2
        - PIN Printing: Add "PIN" after numerical password, drop "Some Printers only SUPPORT a numerical password repertoire."
        - Release Job: "until the Printer receives some RELEASE action such as ... to RELEASE the Job into the 'processing' STATE" (release instead input, drop comma, drop double quotes around release, single quotes around processing)
        - Release Printing: "to release the Jobs into the 'processing' state.", "can be hosted on a Physical or Logical Device such as ..."
    - Section 2.4:
        - Job Creation Operation (capitalize):
            - "An IPP operation that creates a Job object, i.e. Create-Job, Print-Job, and Print-URI [STD92]."
        - Job Submission Operation:
            - "An IPP operation creates Jobs and Documents, i.e., Create-Job, Print-Job, Print-URI, Send-Document, and Send-URI [STD92]."
        - Production Printer: Check against definition in IPP 2.0, 2.1, and 2.2, do we need it?
            - Maybe definition of Enterprise Printer from 5100.12?
        - Password Release Job: "A Job" (not "the" Job)
        - Precedence: Remove
    - Section 2.5:
        - Italicize PIN
    - Section 3.1:
        - "Protected Job" should be "Release Job"
    - Section 3.2.x:
        - Update titles
        - "Releasing a Job using X" for the "protect" use cases
        - Focus on actions, not a feature description
        - Maybe UML diagrams can be in an appendix
    - Section 3.4:
        - 3: add "and" at the end
        - 4: "on its control panel or embedded web interface"
    - Section 3.5:
        - Use template text for initial sentence

    - 3: End User, mention the high-level "Print Policy" feature name
    - 4-6: attributes and values
    - Add IANA boilerplate from template
    - Don't forget the "and" at the end of the second-to-last item
- Section 4:
    - Title: "IPP Model for Enterprise Printing"
    - Add Print Policy to the list of conceptual features.
    - Drop second sentence and figure 3
    - Mike will try refactoring figure 3 to match the visual layout of Figure 3 from RFC 8011
- Section 4.1:
    - "Clients can request that a Printer ..." in first sentence
    - "Release Action" instead of "USER input used ..."
    - Spell out "3", "Release Action", separate with commas, User AUTHORIZATION
    - "Release Action" instead of "release method"
        - Maybe add Release Action to defined terms?
    - Switch to declarative language: A Client specifies one Release Action in a Job Creation request. If more than one Release Action is specified, the Printer rejects the Job Creation request."
        - Make sure conformance language is retained in the attribute/value definitions
    - Add "job-release-action (type2 keyword)" operation and Job Status attributes:
        - 'button-press'
        - 'owner-authorized'
        - 'password' (implied by "job-password")
        - Comes along for the ride when the Job is copied
        - Include semantics for Job Creation requests: operation attribute is copied to the Job Status attribute of the same name
    - List all of the allowed initial states
    - Line 536: "IF processing will result" (instead of "when")
    - Line 539: Drop comma before "unless the Release Job", or turn the sentence around
    - Move feature interactions to a separate section outside of 4.x (less confusing, can have conformance language then as well)
    - Decouple job-state from Job Release:
        - job-state-reasons provides the Release state information
        - While 1.0 says job-password holds a job, subsequent implementation experience shows that processing a job is also a valid implementation semantic - any job-state is OK for job-password
        - Also valid for a Printer to hold a job that has a release action
- Section 4.x: Use declarative language
- Global: "XXX operation request" can just be "XXX request", same for response

- Global: Make sure that defined terms are actually used.
- Global: Make sure "Protected Job" is renamed to "Release Job" throughout
- Stopped in section 4.1

6. IPP Production Printing Extensions v2.0
   - https://ftp.pwg.org/pub/pwg/ipp/wd/wd-ippppx20-20200429-rev.pdf
   - Section 5.1.3:
     - Q: What about combining banner with tile?
       - A: No common, vendors can extend, clients can format as well
     - Q: What's the value of doing this in the printer?
       - A: Puts common functionality in the Printer or print service so that all Clients don't have to do it
     - Add a quick note about vendor extensions (reference STD92)
7. IPP Driverless Printing Extensions v2.0
   - https://ftp.pwg.org/pub/pwg/ipp/wd/wd-ippnodriver20-20200204-rev.pdf
   - print-quality-col
     - Q: Does Client do anything different based on print-quality/print-color-mode?
       - A: Yes
       - print-color-mode='monochrome' usually means Client sends grayscale raster
       - print-quality='draft' usually means Client sends lower resolution raster
     - Q: Could clients send arbitrary print-quality-col values?
       - A: Yes, anything that is listed in a -supported attribute
       - Printer can reject or ignore combinations that don't make sense
       - IPP is always about best effort, not process declaration
     - Q: Should this be in production printing, or strip out the complexity?
     - Q: Is this necessary for common printers?
       - A: Yes, every inkjet printer and common office printers offer vendor-specific color/quality modes, no standard way to express it in IPP
     - Q: Should these be separate attributes?
       - A: No, years of experience shows that separate attributes for related intent is hard to maintain/scale
     - Mixing of use cases makes it hard to express
     - Do we replace existing attributes?
       - No
       - Not a simple replacement (like media with media-col or finishings with finishings-col)
       - print-quality/print-color-mode/print-rendering-intent/printer-resolution
     - HP just wanted printer-specific enums
       - but they mean nothing to Clients
     - Simplify for NODRIVER, put additional members in other specs?

- Keep:
    - quality-template (type2 keyword | name(MAX))
    - quality-percent (integer(-1:100)) with -1 meaning "not in a continuous range"
- For IPP 3D: "quality-dimensional-accuracy" and "quality-strength"
- print-quality-col-database (1setOf collection): List of standard "print-quality-col" templates
- print-quality-col-supported (1setOf keyword): List of supported member attributes
- quality-template-supported (1setOf (type2 keyword | name(MAX)): List of supported template names
- quality-percent-supported (integer(1:100)): Number of supported quality-percent values (granularity)
- quality-percent is most useful for ordering templates from a given printer, not useful between printers
    - Client/User needs some point of reference - why to choose one quality over another?
- Vendor terminology can be confusing - what does "Economode" mean, for example
    - Tooltip/help extensions in strings files helps for this
- Do we want a quality priority?
    - Speed
        - print-speed for label printers, could be used for others
    - Resources (ink/toner/etc.)
        - print-color-mode
    - Quality/resolution/shading/color reproduction
        - print-content-optimize can help for
- Smith: print-quality-hints-supported was a way to report all attributes (including vendor extensions) related to print quality
- Next steps:
    - Remove print-quality enum extensions
    - Add RECOMMENDED print-quality-col with only quality-template and quality-percent (0-100)
        - Leave -1 (out of range) off to the side and decide if it is needed later
    - Add print-quality-col-database/-supported, quality-template-supported, quality-percent-supported as above
- Ira: More important to get basic solution out now in NODRIVER, we can extend in the future
- Ira: Add "quality-info (text)" member?
    - Smith: Redundant with strings files?
    - Ira: But tooltip strings are single-line?
    - Smith: Think about it

8. 3D Printing Liaisons and Guidance
    - All trying to get process documentation/status and reproducible/reliable/quality output
    - Different vertical markets (concrete/manufacturing/medical/etc.) moving

forward at different speeds

- RAPID tried an all-virtual "marathon" Digital Additive Manufacturing Marathon 26 hour show last week
    - Paul presented and listened
    - Link3D was a sponsor
        - Software developer trying to create a generic 3D printing client
        - Simplify orchestration of whole process
        - Noted lack of standardization of file formats / protocols for MES
            - MES = Manufacturing Execution System
        - Mentioned various standards orgs doing work (not PWG)
        - Different materials/steps/processes/etc. per vertical
            - Think they need different standards for each vertical vs. common base standards with extensions for each vertical (IPP/PWG focus)
        - PWG seems to be "invisible" to other groups
            - Need to address this!
- Q: How to improve PWG visibility?
    - Mike: Need to show each vertical how the PWG SM applies to their processes/standards, then show how the same core can apply to other verticals
    - Right now we don't have that information
- Paul will send link to MT-Connect organization/standards
    - Do a good job of describing protocols/features/standards
    - Focused on a collection of special-purpose machines on a manufacturing line
- Q: Are the diagrams/presentations publicly available?
    - A: Paul will ask, presentations were provided on YouTube
- Q: Is the push-back on standards vendor-related?
    - A: Not directly, manufacturers of machinery are often using other vendor's software
- Q: If vendors adopted IPP, what would the likelihood of having IPP Clients?
    - A: Depends on what IPP will provide them
    - Current protocols/interfaces don't necessarily provide usage/status info
    - What information is available is usually device/vendor-specific
    - Everything is custom
    - Value add is to normalize/standardize the interface and information, which will allow for generic clients for all kinds of equipment
- Perceived IPP 3D "shortcomings":
    - "materials-col": How to standardize material types (using the current naming convention)
        - Need specific examples, but we have a convention for it ("org_reference")
    - Concrete - speed, throughput, and thickness are key to

(measurable) quality
        - May need extensions to current model, but focus on how it *is* extensible to support this information
    - Next steps:
        - Action: Paul to share Digital Additive Manufacturing Marathon content, if possible
        - Schedule IPP meetings to discuss in depth
        - Develop marketing/position materials showing how PWG/IPP 3D fits
            - Focus on abstract data model and semantics, referencing other standards for specific materials/verticals as needed (why duplicate work?)
            - Show all of the common bits, reference the specific standards for different kinds of usage which is reflected in extensions to the core model
            - Cost savings, common interfaces/protocols/security mechanisms, interoperability, efficiency
            - Mike: Maybe show how a printer works, treat it as a mini-manufacturing line, then show how we are hiding the details of the process and report higher-level details instead
        - Target presentation at 3D HEALS in June 2020
9. Next steps:
    - Push NODRIVER to Q4 2020
    - Q: Do we want to look at IPP INFRA again? (Cihan)
        - A: Sure, Cihan will post specific questions and we can go from there
        - Specific issues:
            - GCP is going away, people are looking for a replacement
            - Cloud-to-cloud
            - Use of certificates for device registration

Next Steps / Open Actions

- Next conference calls May 21 and June 4, 2020 at 3pm
- Next meeting: System Service Discovery, printer-supply issue, simplified print-quality-col
- Following meeting: EPX
- Action: Paul to share Digital Additive Manufacturing Marathon content, if possible
- Action: Mike to update document templates to use https: for all links (PENDING)
- Action: Mike to review section 11 of NODRIVER, suggest changes to be consistent with STD92 (PENDING)
- Action: Mike and Ira to contact UK GovPrint for current status (PENDING - on hold due to COVID-19)