Internet Printing Protocol Meeting Minutes
February 9-11, 2021

Meeting was called to order at 11am ET on February 9, 12:30pm ET on February 10, and 10:00am ET on February 11, 2021.

Attendees

Nick Bartolotti (Pharos)
Cihan Colakoglu
Andrew Flowers
Tim Holeski (Microsoft)
Amitha K. (Konica Minolta)
Sean Kau (Google)
Smith Kennedy (HP)
Jeremy Leber (Lexmark)
Ira McDonald (High North)
Mark Mulders (Konica Minolta)
Piotr Pawliczek
Michael Rhines (Qualcomm)
Anthony Suarez (Kyocera Document Solutions)
Michael Sweet (Lakeside Robotics)
Paul Tykodi (TCS)
Bill Wagner (TIC)
Uli Wehner (Ricoh)
Steven Young (Canon)
Michael Ziller

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. IPP Everywhere Self-Cert
    -   New HP issue for media-needed test
        -   Can't test for media-needed when streaming a PWG Raster job
        -   Mike: Can use JPEG if supported, otherwise look for media-empty?
        -   Smith: Some printers might not know the tray is empty until it tries to pull a sheet, but those printers probably also support JPEG so it might not be an issue?
        -   Mike: Longer-term solution needs major changes to ipptool
        -   Smith: What about splitting tests?
            -   Mike: but then we need to merge plist files
            -   Mike: Might be able to have a more limited ipptool extension to monitor print submission status in parallel (rather than full

parallel tests)
- Smith: ipptool monitoring extension could also help with Lexmark issue
3. IPP Driverless Printing Extensions v2.0
    - https://ftp.pwg.org/pub/pwg/ipp/wd/wd-ippnodriver20-20201029-rev.pdf
    - Lots of discussion of print quality
        - Plan to have an in-depth discussion of print quality at a future meeting
    - Paul: In the 3D space, defining quality as a combination of speed and layer thickness
        - Mike: This is analogous to printer-resolution in the 2D space, IPP 3D has print-speed and print-accuracy already
        - Smith: Also color is now available in some kinds of 3D printing
        - Paul: Sheet-based 3D printing company has gone out of business
4. IPP Evolution
    - IPP/2.0
        - Filename: wd-ippbase23-yyyymmdd
        - Title: will keep working on it
            - Internet Printing Protocol/2.0: Fourth Edition
            - Internet Printing Protocol/2.0 (3rd Revision)
            - IPP 2.0, 2.1, and 2.2
            - Think about other names...
        - Ira: Process/3.0 says you can't update a full standard?
            - Mike: Doesn't make sense, IETF, IEEE, ISO all support (even require) regular updates to full standards
            - For Process/4.0, remove the prohibition against updating full standards
    - IPP Everywhere 2.0
        - Sean: Concerned about adding certain vertical solutions - might confuse/scare aware implementors, "extra things to read"
            - Smith: It isn't about mandating support, just testing those features if they are supported
            - Sean: What about IPP Everywhere for Enterprise, for Cloud, etc.
            - Smith: So mini-certification for the vertical features?
            - Ira: Still need to update IPP Everywhere to v2.0
            - Smith: Don't want to have a bunch of redundant manuals/ specs
            - Mike: What about having the tools just look for ipp-features-supported and run sub-tests as part of the 2.0 self-cert.
5. Cloud/INFRA/System Extensions
    - Smith: One nice thing about using CSRs is that how CRTs are generated is not well defined
    - Sean: Will this be a best practice/conditional or a standard/required?
        - Mike: Conformance requirements but not mandatory to support everything (typical IPP)
        - Will make sure that Proxy/Infrastructure Printer can discover/

- specify the requirements/semantics
- IPP Registration has limited scope: adding to what is already there without making major semantic changes
    - More requires a standards-track document
- Want a small list of possible configurations to support/test
- Uli Wehner: has a customer that never wants to use a CSR, wants a way to install a CRT to use
- Ira: RFC 6125 is getting updated, goal is to stop using the commonName field and use subjectAltName (which is a list of "alternate" names) since commonName isn't useful anymore
    - https://datatracker.ietf.org/doc/draft-rsalz-use-san/
- Mike: Also need to address the naming and other fields in the X.509 CSR/ CRT
- OAuth:
    - Also need a way for the Proxy to discover what kind of authentication (X.509, basic, etc.) is needed for the OAuth server requests
    - Need to document the workflow:
        - Human registration/authorization
        - X.509 registration/provisioning (enterprise/MS UPS)
    - Smith: Would be good to have sequence diagrams
    - Sean: Need to talk about how to get OAuth server to talk to you (to the Proxy)
        - Sean and Mike may be able to do some prototyping for this
        - Github-like application authorization flow for OAuth
- Direct Printing:
    - Uli: What is the use case? Can already do this with current software solution
        - Mike: Seems like feature parity to me
    - Uli: One way around the impersonation problem is pull (release) printing
    - Sean: Can't the Client create two queues and link them?
        - Mike: That is certainly a potential implementation. But that doesn't address how the Client gets the separate URIs nor how the Proxy provides a URI to the Infrastructure Printer
    - Sean: Can't the system service return URIs on other devices?
        - Ira: Reading the spec, no. (6.1.4)
        - Sean: Would be useful to provide a way for the System to provide a shorter/faster connection to the printer
            - Mike: Can also use DNS-SD for this - local DNS server provides SRV records for any local printers, just as with mDNS
    - Mike: Key is to have a way for client to discover local + remote URIs, a proxy to provide its local URI, and security considerations to use the information securely
    - Sean: Use case - client to determine how the job will be routed
    - Uli: Use case - printer doesn't support format, sending job to a third

party (sounds an awful lot like Internet Fax?!?)
- Smith: Assumption is printing over LAN, but P2P (Wi-Fi Direct, etc.) is also a valid situation
  - Mike: ... with each instance having a different name, UUID, etc.
  - Smith: "ipp://uuid" or something like that, to find the printer by UUID?
- Stopped on Direct Printing slide (22)
6. Cloud/INFRA/System Extensions (con't)
   - Release Printing
     - Sean: Can just be done by the proxy configuration
     - Bill: Key is to not print anything until the user is at the printer to collect the output
     - Smith: Not sure the onus is on the Proxy, the Infrastructure Printer should be challenging the Proxy for authentication
     - Mike: How does Proxy authenticate as user?
       - OAuth on console?
       - NFC badge?
       - etc.
     - Smith: Do we need to support "double authentication" (auth Proxy + auth User)
       - Mike: TLS (X.509) + HTTP auth (user) for Proxy comm
       - How to specify
     - Use cases:
       - Walk up to printer, authenticate on device, choose jobs, print
       - Walk up to printer, authenticate on mobile device, choose jobs and printer and release (set-printer-attributes to set output-device value for Job)
     - Output device may not be assigned when job is submitted
       - Fanout may automatically select a suitable output device
       - Release printing delays selection until the user is at the printer
     - Sean: Do we need something to tell the Proxy to use this mode?
       - Mike: Might be useful to tell the Proxy whether to automatically pull or manually pull (release mode)
     - Smith: For release printing, the Proxy isn't waiting for a notification, it is initiating a Get-Jobs with the username and "my-jobs"
     - Uli: They use two separate queues - one for push printing, one for pull/release printing
     - Sean: Concerned about putting too much trust in Proxy to handle/validate credentials, should treat Proxy as potentially not trustworthy
       - Proxy just collects credentials and passes them on
       - Infrastructure Printer validates credentials
       - Security considerations to protect data at rest and in transit (already in 5100.18)
       - Mike: Make sure to provide recommendations on duration of

auth tokens, recommend against life-time tokens/passwords
- Smith: Would be nice to have a prototype for this
- Scan Support
    - Ira: OpenPrinting will have an IPP Scan gateway (open source) solution completed next spring
    - Mike: IPP Scan/eSCL similar level of effort to implement
    - Mike/Smith: Lower priority right now
    - Ira: If a major OS adopted IPP Scan, that would drive implementation
    - Mike: Cloud push scanning might be easiest with Proxy pushing data to the Infrastructure Printer
    - Uli: One issue with network scanning is that you need to be in two places at once? But you can push to OneDrive to avoid that?
        - That wouldn't require IPP Scan
        - Ira: You could do a Release Scan Job (to delay the scan portion until you are physically present) to fix this limitation
        - Mike: If we see adoption of IPP Scan, we'd want to update IPP Scan for Release Scanning
    - Tim: Scan support is in the investigation phase, haven't decided on anything yet. Biggest hurdle for IPP Scan is that it isn't supported by any shipping MFPs. Have been looking at eSCL.
- SNMP MIB Support
    - Mike will update slide 30 with full list
    - prtGeneralServicePerson -> "printer-service-contact (collection)"?
    - prtConsole*: no
    - prtCover: "printer-cover (1setOf octetString(MAX))" and "printer-cover-description (1setOf text(MAX))"
    - prtInterpreter: no
    - prtMediaPath: no
        - Uli: Most products include videos/text on the printer itself for clearing jams
    - hrSystem, hrDevice, hrSWRun, hrSWRunPerf: No
    - hrSWInstalled:
        - Will add IDS attributes later if needed
    - Will continue to discuss with Microsoft to confirm that everything important is covered
    - Action: Mike to post printer-service-contact and printer-cover/-description proposals to the IPP list
7. IPP Finishings 2.2
    - Did not get to this
    - Need to review and discuss normative requirements and decide whether the next version is 2.2 or 3.0
8. IPP Enterprise Printing Extensions v2.0
    - https://ftp.pwg.org/pub/pwg/ipp/wd/wd-ippepx20-20201029-rev.pdf
    - Resumed at section 6.4
    - Section 6.4.1:
        - "This CONDITIONALLY REQUIRED attribute provides the default

value of the "job-cancel-after" Job Template attribute (section ...). A Printer that supports ..."
- Section 6.4.x: Can omit "Printer Description" (that's the section)
- Section 6.4.2: "indicates" should be a different word
    - Action: Mike and Ira to come up with standard terminology for Job Template and Printer Description attribute descriptions
- Section 6.4.3:
    - Old name syntax is OBSOLETE
    - Make 'md#' and 'sha' values OBSOLETE
    - Delete "others coiuld be ..." sentence
    - Move Table 10 obsolete values to a separate section listing them instead.
    - Remove notes from table 10 as well
- Section 6.4.4:
    - Broken section reference on line 1009 (job-password-supported)
    - SK2: Resolved - 0 length passwords are valuable to support optional password/PIN protection
    - Talk about job-password-supported value MUST be greater or equal upper range of job-password-length-supported, job-password-supported is octets while job-password-length-supported is *characters*.
    - Document job-password-supported as a derived value from job-password-length-supported upper bound, provided for backwards compatibility
    - Tie all of the job-password-xxx attributes together under the feature name for conformance (Job Password method, CONDITIONALLY REQUIRED, etc.)
- Action: Mike to update templates to include attribute naming examples
- Section 6.4.6:
    - Drop "A Client interested ..." and add a second paragraph that explains that management Clients can use Set-Printer-Attributes to configure the site-allowed list as well as the currently configured list.
    - Move vendor stuff on lines 1029-1034 before the table, "For example".
    - Table 11:
        - Drop "Value must consist of"
        - US ASCII for first row
- Section 6.4.7:
    - Make it dependent on job-password-length-supported
    - SHOULD be omitted if job-password-length-supported upper bound is 0
    - Sean: What's up with supporting 255 octets without truncation?
        - Mike: I think the original discussions really had this as a value of 0 or 255 (not really a full range), but we can do away with that as a derived value
    - Specifies the maximum length without truncation

- - Upper range is now 765 (3 * 255)
- Sections 6.4.8 to 6.4.11:
  - Mike: Are these really enterprise, they sound more like production
    - Smith/Ira: Yes, enterprise usually has the recipient as the job owner, this is a third party recipient
    - Bill: Should clarify that the recipient is not the job owner
  - Move job-phone-xxx and job-recipient-xxx to PPX
  - Action: Mike to move job-phone-xxx and job-recipient-xxx from EPX to PPX
- IPP 2.x side-discussion:
  - Mike: IPP/2.1 only recommended EPX support, not required
  - Ira: We should change that
  - Mike: Noted, but it will be a breaking change (but a good change)
- Global: Simplify "foo member attribute or bar attribute" to "foo member attribute"
- Global: Use "normal" style for table rows (for spacing)
- Section 6.4.16: Second sentence should be the conformance requirement
- Section 6.1.4.3: Fix broken reference (6.4.16 instead of 6.4.20)
- Section 6.4.17: Drop table 12 and references to it (just a list of supported member attribute names)
- Section 6.4.18:
  - Drop the Clients MUST NOT bit
  - Maybe add "human-readable" to the description
  - Drop "but is not required..."
- Section 6.4.19:
  - SK4: proof-copies-default can't work because proof-copies range is 1:MAX and suspends after N copies, resolved once that is documented
- Section 6.2.4 should mention why there is no xxx-default and why the range is 1:MAX and not 0:MAX (suspend after 0 copies is basically job hold)
- Section 7.1:
  - MUST NOT return the "job-password" value (use the unsupported out-of-band value instead)
  - can return the "job-password-encryption" value or the unsupported out-of-band value per STD92
  - Smith: Do we confirm that arbitrary values/attributes handle unsupported attributes in accordance with STD92?
    - Mike: A little bit, but we could do more.
  - Bill: What about the Secure Transport requirement for Clients?
    - Mike: Intention is to require TLS for clear-text passwords?
    - Bill: But not for any passwords?
    - Mike: Intended to mirror STD 92 requirement for HTTP Basic vs. HTTP Digest authentication (basic requires TLS, digest recommends TLS)
  - "If Client supplies a "job-password" with the 'none' value for "job-password-encryption", it MUST use Secure Transport when

sending the request."
- Section 7.2:
    - MUST return the "job-storage" attribute in the Unsupported Attributes group [STD92].
- Global: Unsupported Attributes group (not uppercase Group)
- Section 7.3:
    - Add talk about returning client-error-unsupported-attributes-or-values status code with unsupported attributes group [STD92]
    - Unsupported job-storage-group value also gets client-error-xxx.
- Stopped at end of section 7.3.
9. 3D Liaisons
    - Plenty of competition between standards and proprietary solutions
    - Need to increase IPP 3D visibility vs. MT Connect
        - MT Connect is a low-level process-oriented machine control/ monitoring protocol
            - https://en.wikipedia.org/wiki/MTConnect - uses XML data - RESTful interface over HTTP - no login - no security - read-only interface
        - Maybe come up with a hybrid approach to provide MT Connect-like monitoring via IPP?
    - AMSC has a meeting in March 2021 to discuss updating their documents
    - INCITS is looking for projects, possible collaboration to do an IPP 3D Scanning protocol
    - Need to watch F42 committee to make sure we have all of their data elements covered
    - Women in 3D Printing meeting just happened
        - One presenter with AMNOW organization, Paul will reach out about PDF metadata and auto-extraction from the PDF file in their cloud service
            - May not be aware of IPP 3D or current PDF 3D efforts
    - DRUPA April 2021
        - Limited virtual tradeshow due to COVID-19
        - Paul will do a video presentation on 3D CCP
            - Will reuse this for ICAM 2021 as well
            - Paul will coordinate with Alan
    - Lots of vendors are now talking about security, privacy, etc.
        - Confidentiality and trustworthiness of document data is highest priority
            - Mike: TRUSTNOONE spec would seem to be important
            - PGP usage allows sender to specify which recipients can access the data (via public key encryption)
                - IPP Encrypted Jobs and Documents AND/OR PGP encrypted mail with 3MF/PDF file with embedded job tickets
                - Data is protected in transit and at rest
        - IPP INFRA/IPPS/IPP 3D provides security considerations but no concrete examples or recommendations about specific

implementations or technologies
- Anne Price has found a writer (IEEE fellow) that could do a white papers/articles to describe IPP and IPP 3D and INFRA
- PWG experts can provide source material to writer
- Smith: What about IPP 3D Production Printing Extensions v1.0 specification?
- How to get the information we need to develop it?
- Paul: Talking with contacts in MT-Connect and Women-in-3D-Printing presenter
- Smith: Should include INFRA, SAFEGCODE, and TRUSTNOONE in list of current documents, 3D CCP under proposed future work
- Paul: Many are keeping a public calendar of events/organizations you are tracking/working on
- Paul is working on this, wants to put up a web page
- Paul will send Mike the contents and a link to the AMSC page
10. Next Steps
- Call for objections ends Feb 26th for the new IPP Charter
- Smith to produce a IPP Finishings 3.0 draft with current draft's changes accepted
- Mike to produce another prototype draft of IPP Production Printing Extensions v2.0 with recipient attributes from EPX
- Finish review of EPX
- Slide 44: should say "web conferences" :)

Next Steps / Open Actions

- Next conference calls February 25 and March 11, 2021 at 3pm EST
- Action: Mike to post printer-service-contact and printer-cover/-description proposals to the IPP list
- Action: Mike and Ira to come up with standard terminology for Job Template and Printer Description attribute descriptions
- Action: Mike to update templates to include attribute naming examples
- Action: Mike to post new printer-state-reasons for storage state and printer-storage/-description attributes to IPP list (DONE)
- Action: Mike to post MS requests to IPP list (DONE - F2F slides)
- Action: Smith to review current print quality wiki page (PENDING)
- Action: Mike, Ira, and Smith to develop IPP Everywhere value proposition content (PENDING)