Internet Printing Protocol Workgroup Meeting Minutes
February 7 and 8, 2018

Meeting was called to order at approximately 10:30am PT on February 7, 2018 and 9am PT on February 8, 2018.

Attendees

Gupta Gyaneshwar (Okidata)
Smith Kennedy (HP)
Jeremy Leber (Lexmark)
Ira McDonald (High North)
Michael Sweet (Apple)
Paul Tykodi (TCS)
Bill Wagner (TIC)
Rick Yardumian (Canon)

Agenda Items

1. IP Policy and Minute Taker
    - IP policy accepted, Smith taking minutes
2. Slides:
    - Slide 11 (Self-Cert 1.1):
        - Might want to have at least a year for submitting with older tools, continue discussions later
        - Maybe also offer optional tests for new operations/attributes like Get-User-Printer-Attributes
        - Also IPP INFRA tests/tools?
        - Also let's start looking at IPP Everywhere roadmap - when to update, what to add, etc.
            - Maybe a (small) errata update of IPP Everywhere to 1.1 in parallel with 1.1 self-cert?
            - Reference new RFC 8010/8011, IPP 2.0, and IPP Finishings 2.x specs
            - Recommend Get-User-Printer-Attributes support
            - Drop WS-Discovery and OpenXPS?
    - Slide 12 (GREASE and Fuzzing)
        - Q: Should we try to incorporate that into IPP?
            - A: Yes, sounds like a good idea
        - Q: Do we need something added to ipptool?
            - A: Not strictly necessary since you can generate random test files
            - Some fuzzing can't be done in the test file
            - How to do GREASE without ipptool support?
            - How to record failed tests?

        - Github issue tracking this is: https://github.com/istopwg/ippsample/issues/71
    - Q: Do we need something added to ippserver?
        - A: Not strictly necessary since you can generate random conf files
        - But need a "GREASE" mode
    - Q: Do we want to make any Client/Printer recommendations?
        - A: Maybe in the future do a best practice document once we have done something
- Slide 13 (IPP 3D Liaisons)
    - 3MF: Still need to get permission to use logo, add PJT3D to 3MF, important for desktop 3D printing and service bureaus
        - Action: Smith to follow-up on the 3MF liaison agreement
    - NIST also has effort to standardize service bureau use case, get NIST to push for embedded PWG job ticket in PWG, 3MF, etc.
    - Press request:
        - Want an update on IPP 3D/PJT3D progress since DRUPA
        - Should talk up all of the standards liaisons, too (we're done defining, people working on implementations, sample code available)
        - Looping in Anne Price to review
- Slide 15 (OpenPrinting Google Summer of Code)
    - Schedule:
        - Feb 12th to March 12th: Students review project ideas, apply
        - End of April: Google approved applications
        - May to August 14: Working period
        - Maybe get some GSoC love for ipptool/ippserver and fuzzing/GREASE
    - Getting a lot of good people applying for OpenPrinting projects
- Slide 16 (IPP book)
    - Markdown Table syntax: https://help.github.com/articles/organizing-information-with-tables/
    - https://github.com/istopwg/pwg-books/blob/master/ippguide/intro.md
        - "What is IPP?"
            - Q: Do we need all of the history/details of the origin of IPP?
                - A: Probably not, move out
                - Maybe a preface, or appendix, or whatever targeted at managers and architects
                - Maintain focus on developers; others may find it useful but developers are the focus.
            - Simplify to "IPP is supported by all modern network printers and replaces all vendor-specific network protocols, including port 9100 printing and LPD/lpr."
            - Talk about encryption, authentication, security, etc.
        - Q: Intro as a series of bullets?

        - Maybe, think about it...
    - Q: Should we talk about security/confidentiality issues with port 9100/lpr?
        - A: Yes!
        - EU General Data Privacy Rules goes into effect in May 2018, very strict about privacy and confidentiality.
    - "IPP Overview"
        - Add note about legacy protocols not supporting encryption, authentication, etc.
    - Q: Maybe include an example conversation before key concepts for printing a file?
        - A: Yes, but just a simple, high-level example
        - Get-Printer-Attributes request ->
        - <- capabilities and status
        - Print-Job request with print file ->
        - <- job identifier and status
        - (might also be good for a presentation for Paul - long PDF or a series of slides?)
    - "Operations":
        - Common operations are the same as in the IIG 2.0 (Get-Printer-Attributes, Print-Job, Create-Job, Send-Document, Cancel-Job, Get-Jobs, Get-Job-Attributes)
    - Q: What about discovery?
        - A: Should talk a little about this, link from intro to another chapter/appendix on it?
- Slide 18 (IPP Job Save Password):
    - Advantage of job-save-accesses is that we can include other credentials for authenticating storage on the network URL and support other types of encryption
    - Saved file may not be original document format, often is an intermediate format with its own obfuscation/risk mitigation
    - Encryption is not required/specified, just security credentials (password, etc.) to authorize subsequent access/use of the saved job
        - Avoid mentioning encryption in this document (at least with regards to the storage/saving of job)
        - Access control/authorization/protection
    - "Save Password" is perhaps confusing too, "resubmit password", "access password", etc. instead
    - Q: Is it always a passphrase or do we need more?
        - A: Always a passphrase for internal printer storage, just need extra stuff if the file is on a network storage device (FTP/HTTP/HTTPS)
    - So define "job-save-access (collection)" or "job-save-accesses (1setOf collection)"
        - Copy member attributes from "document-access (collection)"
        - Use "access-password" member attribute for reprint

password
- Address how to save encrypted documents someplace else.
- access-repertoire-supported/configured attributes, too.
- Clarify that Resubmit-Job does not copy/use original job-save-access(es) operation attribute, just as "job--save-disposition" is not copied from the original job.
- Q: What about privacy of Job object attributes - does IPP say anything about?
  - A: Only admin, operator, owner see all attributes, others see a limited list (ID, URI, state)
  - No standard way to block attributes for admins or operators
  - Also man-in-the-middle concerns
  - CUPS provides policy controls for this
  - Q: Do we define an extension for this?
    - A: Maybe, needs further discussion
    - Need to be careful not to be as complex as XACML, etc.
    - "document-private-access (type2 keyword)" and "document-private-attributes (1setOf type2 keyword)" Printer Status attributes that report the security configuration for Documents
    - "job-private-access (type2 keyword)" and "job-private-attributes (1setOf type2 keyword)" Printer Status attributes that report the security configuration for Jobs
    - "subscription-private-access (type2 keyword)" and "subscription-private-attributes (1setOf type2 keyword)" Printer Status attributes that report the security configuration for Subscriptions
    - xxx-private-access values are "all", "default", "none", "owner"
    - xxx-private-attributes values are "all", "default", "none", or a list of attributes
    - Status attributes are always available, Description/Template attributes controlled by these
  - Action: Mike to post initial draft of IPP Privacy Attributes based on CUPS policy settings

3. IPP Document Encryption Slides
   - http://ftp.pwg.org/pub/pwg/ipp/slides/ipp-document-encryption-february-18.pdf
   - Slide 2: strike last bullet
   - Slide 3: Also SMIME
   - Slide 5:
     - Misspelled repertoire
     - Q: Is the document a totally opaque byte stream or is it an identifiable structured file?
       - A: Advantages to the identifiable structured file with

metadata
        - One of the reasons for the proposed solution on slide 6 :)
    - Slide 6:
        - Operation attributes all in the clear, but Job Template/Description attributes could be in the application/ipp-pgp-encrypted portion
            - Introduces some changes to processing/attribute validation/ attribute fidelity
        - The application/ipp-pgp-encrypted portion is a continuation of the application/ipp portion
        - Q: How does OpenPGP compare to SMIME for compatibility?
            - A: SMIME is a mixed bag due to X.509 cert requirements changes
        - Q: Can PGP do trusted CAs like SMIME/X.509
            - A: Yes, through web-of-trust and distributed trust servers
    - Can also do signing only, so maybe an application/ipp-pgp-signed MIME media type for that? Still the same encoding...
    - Action: Smith to incorporation document encryption contents into new IPP Encrypted Jobs and Documents (TRUSTNOONE) registration document
4. IPP System Service (Mike/Ira)
    - https://ftp.pwg.org/pub/pwg/ipp/wd/wd-ippsystem10-20180112-rev.pdf
    - Section 6.3.4 (Delete-Printer)
        - Line 1959: "MAY not" -> "might not"
    - Section 6.3.4.1 (Delete-Printer Request)
        - Line 1967: "part of a Register-Output-Device request" change to "Delete-Printer"...
    - Section 6.3.4.2 (Delete-Printer Response)
        - Line 1983: "part of a Register-Output-Device response" change to "Delete-Printer"...
        - Add system attributes group with system-state/-reasons attributes (copy from 6.3.10.2)
    - Section 6.3.13 (Restart-System)
        - Line 2469: Missing closing quote around "software rejuvenation"
    - Figure 1: Fix fuzzy figure
    - Finish security considerations and post updated prototype draft
    - Prototyping efforts in ippsample still in early phases
        - Attributes, enums, and operation codes are added
        - Need to implement all of the operations, objects
        - Mike will fill out the IPP System Service Prototype project tasks on Github
            - https://github.com/istopwg/ippsample/projects/1
5. Future Stuff/Roadmap
    - TLS implementations:
        - WolfSSL : small footprint, maybe support in ippsample?
    - IPP Document Encryption (Smith/Mike)
        - Can also add application/ipp-smime-encrypted/signed MIME media type for SMIME-style encryption/signing with X.509 certs, "printer-smime-x509-certificate (1setOf text(MAX))" attribute, etc.

        - What about the Job Receipt? Can we expose an encrypted/signed receipt using a public key supplied in the job ticket
            - "job-actuals-pgp-encrypted (1setOf octetString(MAX))" Job Status attribute or something like that for a secure job receipt?
            - "pgp-public-key (1setOf text(MAX))" operation attribute for the Client to provide a public key to use for the encrypted job receipt, and/or use default public key set out-of-band (default for user or printer).
        - Next steps: Smith will combine two approaches into a new (Word format) draft that Mike and Smith can work on
        - New working title: "IPP Encrypted Jobs and Documents (TRUSTNOONE)"?
- IPP Everywhere Client Self-Certification
    - Great idea, but how to do it?
        - Instrument ippserver, record the requests the client sends, and then score/rate its performance?
        - Lot of work, but is it worth the effort?
    - Much smaller number of clients than printers
        - Lots of Android (direct) printing apps
        - Linux/macOS have UI on top of CUPS
        - iOS has AirPrint UI/system service
    - What does self-certification mean? Most of what we've talk about is debugging/rating quality of implementation, not validation of implementation
        - IIG 2.0 doesn't provide hard-and-fast conformance requirements
        - Scoring would be based on which method was used (1 = good, 2 = better, etc.)
    - Q: What would the motivation be?
        - A: For printers there is a marketing advantage, but not for clients
        - More a debugging aid
    - Certification -> Evaluation tool
    - Resistance from UI developers to following standards and/or making changes - "they know better", etc.
    - Mike: so far the only printer development tool that has traction is ippserver (to simulate different printers)
        - Github issue tracking adding repository of reference config files
            - Original request was for vendor devices, but that isn't viable
            - Can create reference devices with specific capabilities to test against
        - Are there other things we can add to ippserver/ipptool to make it more useful for this kind of testing?
            - ipptool test files for duplexers, finishers, saved jobs,

            job-password, etc?
            - Additional logging (job/document ticket and receipt) to verify what is sent from client
            - Log analysis tools?
            - Print file analysis/lint tools?
        - Also IPP developer book will be available to better explain how IPP works, maybe that will be helpful
    - Q: Create test files for all specs?
        - A: Not always appropriate/feasible, identify areas over time and write tests as needed
    - Consensus:
        - Self-certification: No
        - Development tools: Maybe
        - Support files for ipptool/ippserver: Yes
        - Analysis/link tools for print files: Yes
- IPP Everywhere MFD / IPP Everywhere 2.0
    - Until IPP Scan is in shipping products, not worth the effort.
    - Revisit next year (2019)
- IPP Everywhere 1.1 (Mike)
    - Talked about on first day
    - Minor errata update with the following changes:
        - Reference new RFC 7472/8010/8011, IPP 2.0, and IPP Finishings 2.x specs
        - Recommend Get-User-Printer-Attributes operation support
        - Drop WS-Discovery and OpenXPS requirements
        - Recommend support for TLS 1.3
        - Recommend using /ipp/print in printer URIs
    - Could be useful to encourage vendors towards future requirements
    - Tentative schedule: finish up by end of Q3 2018
    - Mike will be editor
    - Action: Mike to post initial draft of IPP Everywhere v1.1
- IPP Transform Service v1.0 (Ira/Paul)
    - The spec itself is medium difficulty effort (like Scan or FaxOut)
    - But prototyping is a very steep hill for advancing beyond prototype phase
        - ippserver/ipptransform provide some of the bits, but no support for separate transform service object at this time.
    - Paul is likely not available to do any work on it right now
    - Revisit next year (2019)
- Q: Should the PWG/IPP WG shift from a focus on specifications to reference implementations & certification?
    - A: Not enough developers to support it
    - Interesting idea to always have reference code and testing tools, but would need a lot of developer time
    - ipptool test files and ippsample prototyping take you a little bit of the way
    - Need to overcome inertia to get better adoption of IPP Scan/

Transform/Infra/System, then we may see a greater need for certification

6. IPP Authentication Methods
    - https://ftp.pwg.org/pub/pwg/ipp/whitepaper/tb-ippauth-20180123-rev.pdf
        - Note updated document
    - Section 5.1:
        - Drop "As in most other contexts" lead-in
        - Most "If the printer implements the ..." part to the front of the printer-xri-supported attribute stuff.
        - "to allow access" instead of "to authorize access"
    - Section 5.1.4:
        - Line 143: "browser; when the ..." -> "browser. When the"
    - Line 156:
        - Should be "X.509 Certificate Authentication" (not TLS)
        - Fix heading
    - Lines 158-162:
        - Reword
        - TLS session establishes (proves) client certificate as part of negotiation, but Printer then needs to evaluate the trust for the client's certificate (approved CA or pinned cert)
        - Response from a Printer for certificate auth is HTTP 200, client-error-forbidden (certificate provided, client has no access), client-error-not-authenticated (certificate not provided, no TLS), client-error-not-authorized (certificate not provided in TLS handshake)
    - Section 8.1.2:
        - HTTP keep-alive only in force when printer responds with an IPP message, otherwise Client needs to close connection to Printer and re-connect for next attempt.
    - Stopped in section 8
7. Next Steps
    - Add IPP Encrypted Jobs and Documents (TRUSTNOONE): Finishing up Q2 2019
    - Add IPP Privacy Attributes: Finishing up end of Q3 2018?
    - Add IPP Everywhere v1.1: Start in Q3 2018
    - Push start of 1.1 self-cert to Q4 2018

Next Steps / Open Actions

- Next IPP WG conference call on Thursday, February 15, 2018 and March 1 from 3:00-4:30pm ET
- Action: Smith to follow-up on the 3MF liaison agreement
- Action: Mike to post initial draft of IPP Privacy Attributes based on CUPS policy settings (DONE)
- Action: Smith to incorporation document encryption contents into new IPP Encrypted Jobs and Documents (TRUSTNOONE) registration document
- Action: Mike to post initial draft of IPP Everywhere v1.1

- Action: Mike to publish mptray best practice document (DONE)
- Action: Mike to post IPP GUPA registrations to IANA IPP registry (PENDING)
- Action: Mike to post IPP Presets registrations to IANA IPP registry (PENDING)
- Action: Mike/Ira to request IESG change of status for RFC 8010/8011 to Internet Standard (PENDING - after IETF 101)
- Action: Mike to document ippserver setup on Raspberry Pi for 3D (IN PROGRESS)