The Printer Working Group

IPP Workgroup Session

August 6, 2024

Before We Begin...

- PWG Antitrust Policy:
  - https://www.pwg.org/chair/membership_docs/pwg-antitrust- policy.pdf
  - The IEEE-ISTO Printer Working Group ("PWG") will not become involved in the business decisions of its Members. The PWG strictly complies with applicable antitrust laws. Every PWG meeting attendee shall comply with this policy. The PWG Officers and PWG Workgroup Officers are responsible to ensure that this policy is adhered to in all PWG activities.
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  - TL;DR: Anything you say in a PWG meeting or email to a PWG address can be used in a PWG Document
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- **This meeting is being recorded to assist in preparation of minutes but will not be published**

Agenda

August 6, 2024 (US Eastern Standard Time)

When	What
10:00 - 11:00	PWG Plenary
11:00 - 12:00	IPP WG: Status / Prototype-Ready Specifications
12:00 - 12:45	Lunch Break
12:45 - 14:00	IPP WG: IPP System Service v1.1

August 7, 2024 (US Eastern Standard Time)

When	What
10:00 - 11:00	IDS WG
11:00 - 11:30	IPP WG: IPP Shared Infrastructure Extensions v1.1
11:30 - 12:00	IPP WG: IPP/2.x Fourth Edition
12:00 - 12:45	Lunch Break
12:45 - 13:45	IPP WG: 3D Printing Discussions
13:45 - 14:00	IPP WG: Next Steps

Charter

- Current charter:
  - https://ftp.pwg.org/pub/pwg/ipp/charter/ch-ipp-charter-20240510.pdf
- The Internet Printing Protocol (IPP) workgroup is chartered with the maintenance of IPP and the IETF IPP registry, and support for new clients, network architectures (Cloud, SDN), MFD/Imaging service bindings, and emerging technologies such as 3D Printing
- In addition, we maintain the IETF Finisher MIB, Job MIB, and Printer MIB registries, the PWG MIBs, the PWG Semantic Model schema, and handle synchronization with changes in IPP

Errata

- Pending:
  - PWG 5100.6-2003 (IPP Page Overrides v1.0): 2 issues
  - PWG 5100.8-2003 (IPP "-actuals" v1.0): 1 issue
  - PWG 5100.9-2009 (IPP Printer State Extensions v1.0): 2 issues
  - PWG 5100.15-2014 (IPP FaxOut v1.0): 2 issues
  - PWG 5100.19-2015 (IPP Implementor's Guide v2.0): 9 issues
  - PWG 5107.3-2019 (MFD Alerts v1.1): 1 issue
- In-Progress:
  - PWG 5100.12-2015 (IPP 2.0, 2.1, and 2.2): 2 issues
  - PWG 5100.14-2020 (IPP Everywhere v1.1): 4 issues
  - PWG 5100.18-2015 (IPP Shared Infrastructure Extensions v1.0): 8 issues
  - PWG 5100.20-2020 (IPP Everywhere v1.1 Self-Cert): 1 issue
  - PWG 5100.22-2019 (IPP System Service v1.0): 3 issues

Other Active Working Drafts (1/2)

- IPP Everywhere v2.0 (EVE):
  - https://ftp.pwg.org/pub/pwg/ipp/wd/wd-ippeve20-20240426-rev.pdf
  - Prototype draft

- IPP Everywhere Printer Self-Certification Manual v2.0 (EVESELFCERT)
  - https://ftp.pwg.org/pub/pwg/ipp/wd/wd-ippeveselfcert20-20220510-rev.pdf
  - Interim draft
  - Still working on new self-certification tools/UI

- IPP Wi-Fi Configuration Extensions v1.0 (WIFI):
  - https://ftp.pwg.org/pub/pwg/ipp/wd/wd-ippwifi10-20240731.pdf
  - Prototype draft
  - Has been in shipping printers since 2012

- ACME-Based Provisioning of IoT Devices:
  - https://datatracker.ietf.org/doc/draft-sweet-iot-acme/
  - Still awaiting decision from IETF Area Directors

- IPP OAuth Extensions v1.0 (OAUTH)
  - https://ftp.pwg.org/pub/pwg/ipp/wd/wd-ippoauth10-20240624-rev.pdf
  - Stable draft
  - Prototyping in CUPS and PAPPL
  - PWG Last Call Q3/Q4 2024
- IPP Encrypted Jobs and Documents v1.0 (TRUSTNOONE)
  - https://ftp.pwg.org/pub/pwg/ipp/wd/wd-ipptrustnoone10-20210519.pdf
  - Prototype draft
  - Initial prototyping in CUPS branch, still needs work

![The Printer Working Group logo]

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Lunch Break

August 6, 2024

IPP workgroup resuming at 12:45pm ET

IPP System Service v1.1 (SYSTEM)

- Prototype draft:
  - https://ftp.pwg.org/pub/pwg/ipp/wd/wd-ippsystem11-20240731-rev.pdf
- Errata update of PWG 5100.22-2019:
  - Fixes typos
  - Updates references
  - Merges System Service Discovery registration content
  - Adds Register-Output-Device extensions for X.509 authentication
- Proposed changes:
  - Extend support for firmware updates
- Prototyping status:
  - Currently prototyping additions in PAPPL
  - https://github.com/michaelrsweet/pappl
- Proposed schedule:
  - Stable draft Q3/Q4 2024

Extending Firmware Update Support

- Goals/Use Cases:
  - Client-supplied firmware updates
  - Client-initiated firmware updates
  - Autonomous firmware updates

- Current support:
  - The IPP System Service specification (PWG 5100.22) exposes firmware resources that can be uploaded and installed to a System object
  - The IPP Driver Replacement Extensions specification (PWG 5100.13) exposes four Printer Status attributes: "printer-firmware-name (1setOf name(MAX))", "printer-firmware-patches (1setOf text(MAX))", "printer-firmware-string-version (1setOf text(MAX))", and "printer-firmware-version (1setOf octetString(MAX))"
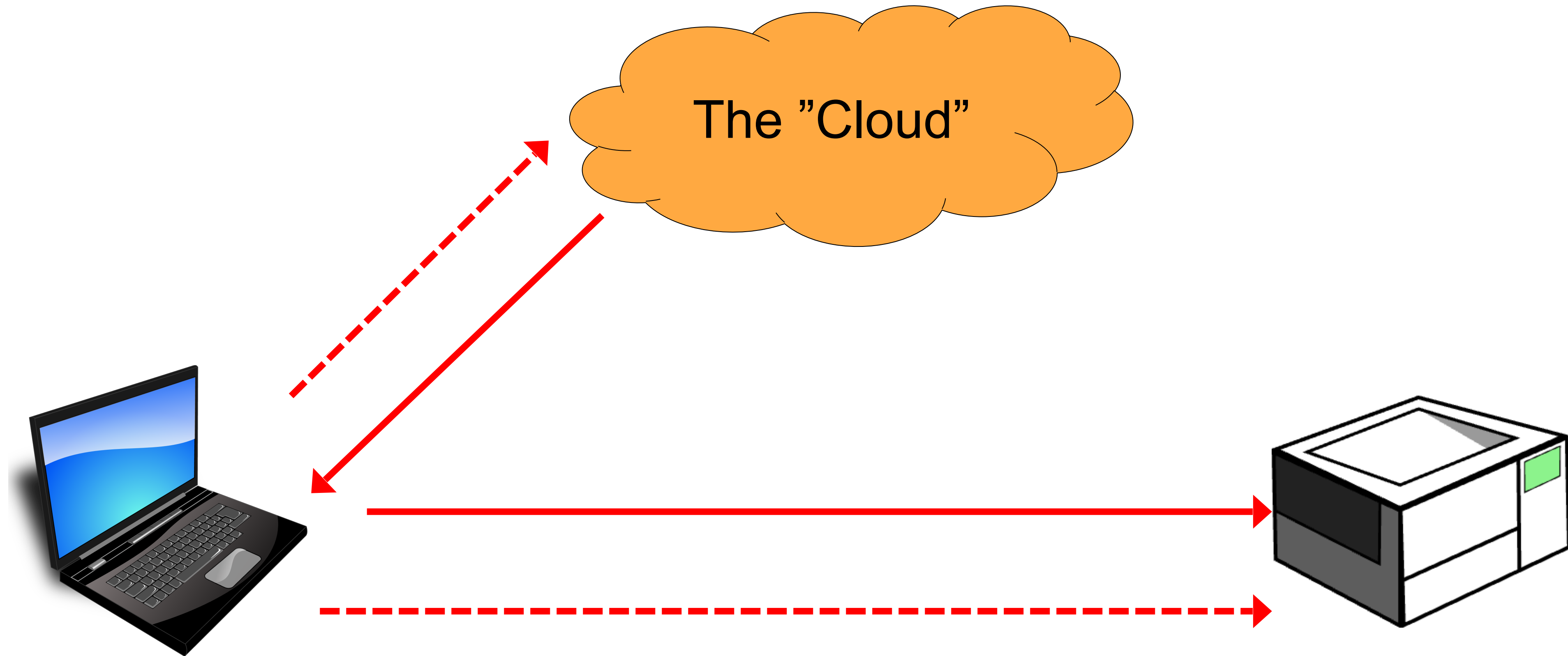
The "Cloud"

- Client queries firmware version(s) from Printer/System and available version(s) in Cloud
  - When new firmware exists, Client downloads firmware package from Cloud and delivers to Printer/System
- IPP handles the Client-to-Printer/System part but not the Cloud part
- Firmware package verification must be done by the Printer/System

# Client-Initiated Firmware Updates

The "Cloud"
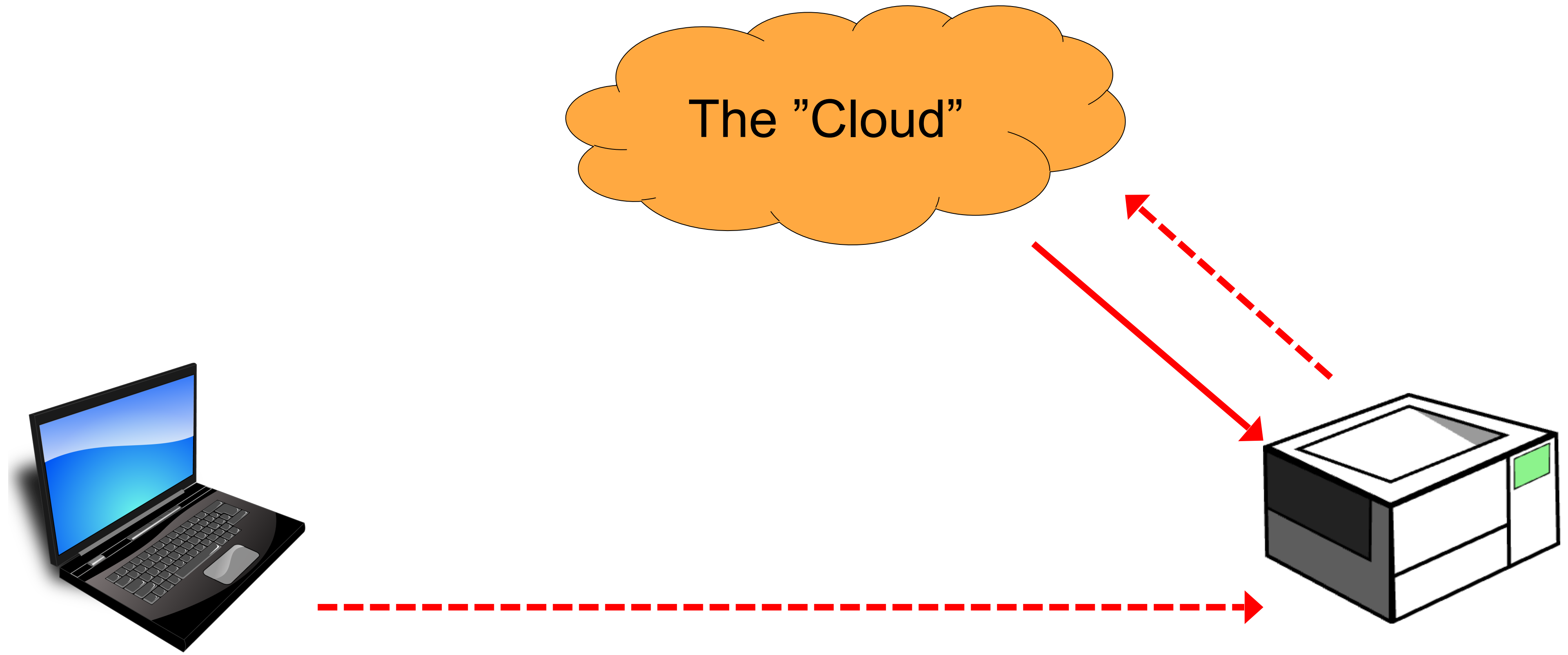
Client-Initiated Firmware Updates

- Client sends a request to a Printer/System to check for firmware updates
- Printer/System queries a trusted Cloud source for firmware updates
    - If new firmware exists, Printer/System downloads update, verifies it, installs it, and activates it
    - Might be performed by a separate component from the Printer/System

The "Cloud"
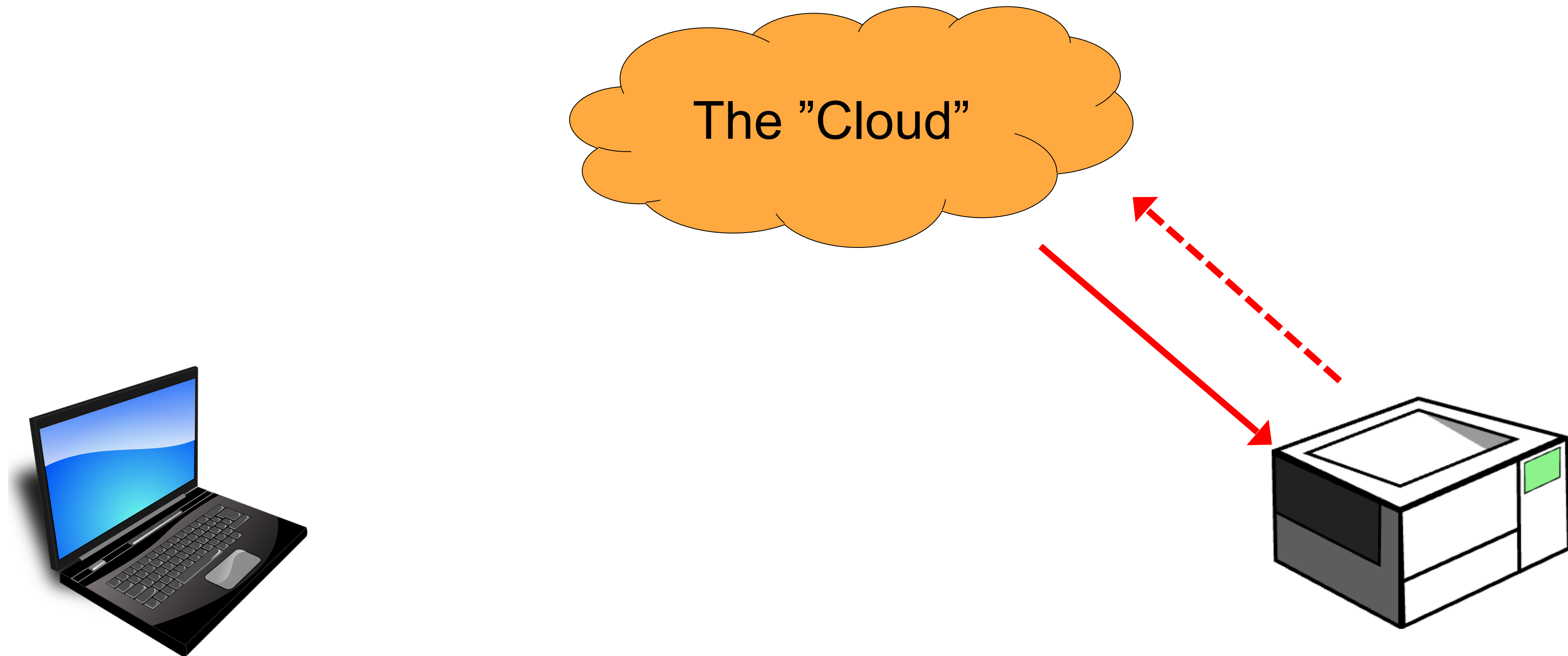
Autonomous Firmware Updates

- Printer/System queries trusted Cloud service for firmware updates on a schedule OR trusted Cloud service sends notification to Printer/System when a firmware update is available
  - If new firmware exists, Printer/System downloads update, verifies it, installs it, and activates it
  - As with Client-Initiated updates, might be performed by a separate component
- No Client involvement
  - Admin Client might be notified and/or see the update when querying the Printer/System

Firmware Update Proposals

- Proposed extensions:
  - Add Printer Status attributes to signal the availability of firmware updates from the manufacturer: "printer-firmware-update-string-version (1setOf text(MAX))", "printer-firmware-update-uri (uri)", and "printer-firmware-update-version (1setOf octetString(MAX))"
  - Add Printer/System operations to query/install available firmware updates from a trusted source
  - Add INFRA operations to notify when firmware updates are available, and to be able to securely download/verify them
- What about resident and user applications?
  - Exposed in IPP System Service in "system-resident-application-xxx" and "system-user-application-xxx" System Status attributes
  - Also HCD Attributes
- What about update packages?
  - Standard formats?
  - Update multiple components vs single components, and how that maps to multiple status attributes
- Best practices for activating updates?

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13:45 - 14:00	IPP WG: Next Steps

IPP Shared Infrastructure Extensions v1.1 (INFRA)

- Prototype draft:
  - https://ftp.pwg.org/pub/pwg/ipp/wd/wd-ippinfra11-20240726-rev.pdf
- Errata update of PWG 5100.18-2015:
  - Fixed typos
  - Updated references
  - Reference OAUTH and SYSTEM specifications
  - Sync up with EPX - Release Printing and Proof Printing
- Prototyping status:
  - Currently prototyping additions in PAPPL
  - https://github.com/michaelrsweet/pappl
- Proposed schedule:
  - Stable draft Q3/Q4 2024

Internet Printing Protocol/2.x Fourth Edition

- Stable Draft:
  - https://ftp.pwg.org/pub/pwg/ipp/wd/wd-ippbase23-20240803-rev.pdf
- Errata update of PWG 5100.12-2015:
  - Clarification about Get-Printer-Attributes operation
  - Definition of classes or categories of printers
  - Updated document references, including an informative reference to IPP Everywhere
  - Simplified reference tables and conformance requirements
  - New history of the development of the Internet Printing Protocol
- Prototyping Status:
  - IPP 2.0, 2.1, and 2.2 are in shipping printers; dependent specifications are prototyped separately
- Proposed Schedule:
  - PWG Last Call Q3/Q4 2024

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Lunch Break

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IPP workgroup resuming at 12:45pm ET

3D Printing and Scanning Discussions

- Current documents:
  - PWG 5100.21-2019: IPP 3D Printing Extensions v1.1
  - PWG 5199.5-2017: PWG 3D Print Job Ticket and Associated Capabilities v1.0 (PJT3D)
  - PWG 5199.7-2019: PWG Safe G-Code Subset for 3D Printing v1.0
- Discussion:
  - ASTM F42.07.07
  - ICAM 2024
  - VDMA OPC UA
  - Declined Events in 2024

- Need to reach out to Stephan Mansour - Chair of ASTM F42.07.07 - Construction | Co-Convenor of ISO/TC 261/JG 80 for guidance on how to position the proposed PWG webinar recording we are planning to produce on Safe G-Code. How does it support the mission of F42.07.07 and therefore fit into the ASTM F42 - PWG Liaison framework?

  - https://3dprint.com/309035/astm-f42-iso-tc-261-meetings-the-nitty-gritty-of-additive-manufacturing/

  - Goal is to set a standard for additive construction to make sure that whatever is printed is safe and stands the test of time.

  - Mansour explained that Standard 52939:2023 is one of the first published under ASTM and ISO together, and that it essentially bridges the gap between traditional construction and AC. Because there aren't any existing standards that define how to certify 3D printed construction elements, they're turning to the standards everyone's already used to in construction, and showing how these can be used to certify 3D printed structures as well.

- Idea - develop IPP 3D tool to help you efficiently use 3D Concrete Printers

- Planning to Attend the ASTM International Conference on Additive Manufacturing (ICAM 2024 – Oct 28-Nov 1, 2024 – Atlanta, GA):
  - IDS - Alan Sukert presentation
  - Possible IPP 3D cloud for secure transmission presentation opportunity
  - Possible Safe G-Code presentation opportunity

VDMA OPC UA

- VDMA OPC UA for Additive Manufacturing
  - Report on Joint Working Group 40540 activities

Declined Events in 2024 (1/2)

- Did not pursue presenting PWG Safe G-Code at the following events:
  - 4th RILEM International Conference on Concrete and Digital Fabrication (Digital Concrete 2024) – September 4-6th, 2024 in Munich, Germany
  - Transportation Research Board Conference on Advancing Additive Manufacturing and Construction in Transportation – November 7-8, 2024 in Irvine, CA

- Decided not to pursue Formnext related activities this calendar year:
  - The Standards Forum hosted by Formnext and sponsored by ASTM Center of Excellence with assistance from the US Commercial Service will occur on either the first or second day of the upcoming Formnext Tradeshow in Frankfurt, Germany:
    - November 19-22, 2024 – Frankfurt, Germany
    - https://formnext.mesago.com/frankfurt/en.html
  - International Manufacturing Technology Show (IMTS 2024) – Additive Manufacturing Sector accelerated by formnext – As a precursor to the commencement of the annual Formnext Chicago tradeshow beginning in 2025, formnext sponsor Messe Frankfurt has partnered with the IMTS exhibition organizer to develop an Additive Manufacturing section in the IMTS exhibitor space. IMTS will take place in Chicago, IL at McCormick Place:
    - September 9-14, 2024
    - https://www.imts.com/

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Next Steps

- Internet Printing Protocol/2.x Fourth Edition (Mike)
  - PWG Last Call in Q3/Q4 2024
- IPP OAuth Extensions v1.0 (Mike/Piotr)
  - PWG Last Call in Q3/Q4 2024
- IPP Shared Infrastructure Extensions v1.1 (Mike)
  - Stable draft in Q3/Q4 2024
- IPP System Service v1.1 (Mike)
  - Stable draft in Q3/Q4 2024

More Information

- We welcome participation from all interested parties
- IPP Working Group web page
    - https://www.pwg.org/ipp/index.html
- Subscribe to the IPP mailing list
    - https://www.pwg.org/mailman/listinfo/ipp
- IPP WG holds bi-weekly phone conferences announced on the IPP mailing list
    - Next conference calls scheduled for Thursday, August 29 and September 12, 2024 at 3pm ET