Cloud Printing BOF

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PWG F2F Meeting

Cloud Printing BOF Agenda

- Introduction
- Functional Model
- Requirements
- New Attributes
- Existing Document Formats
- Existing Protocols
- Next Steps

Introduction

- Cloud-based applications and solutions are increasingly common
- Cloud-based printing is emerging in several different forms
- Focus to date has been on modeling and understanding the use cases, requirements, and existing implementations
- Going forward we want to decide what, if anything, we should do about Cloud Printing in the Printer Working Group

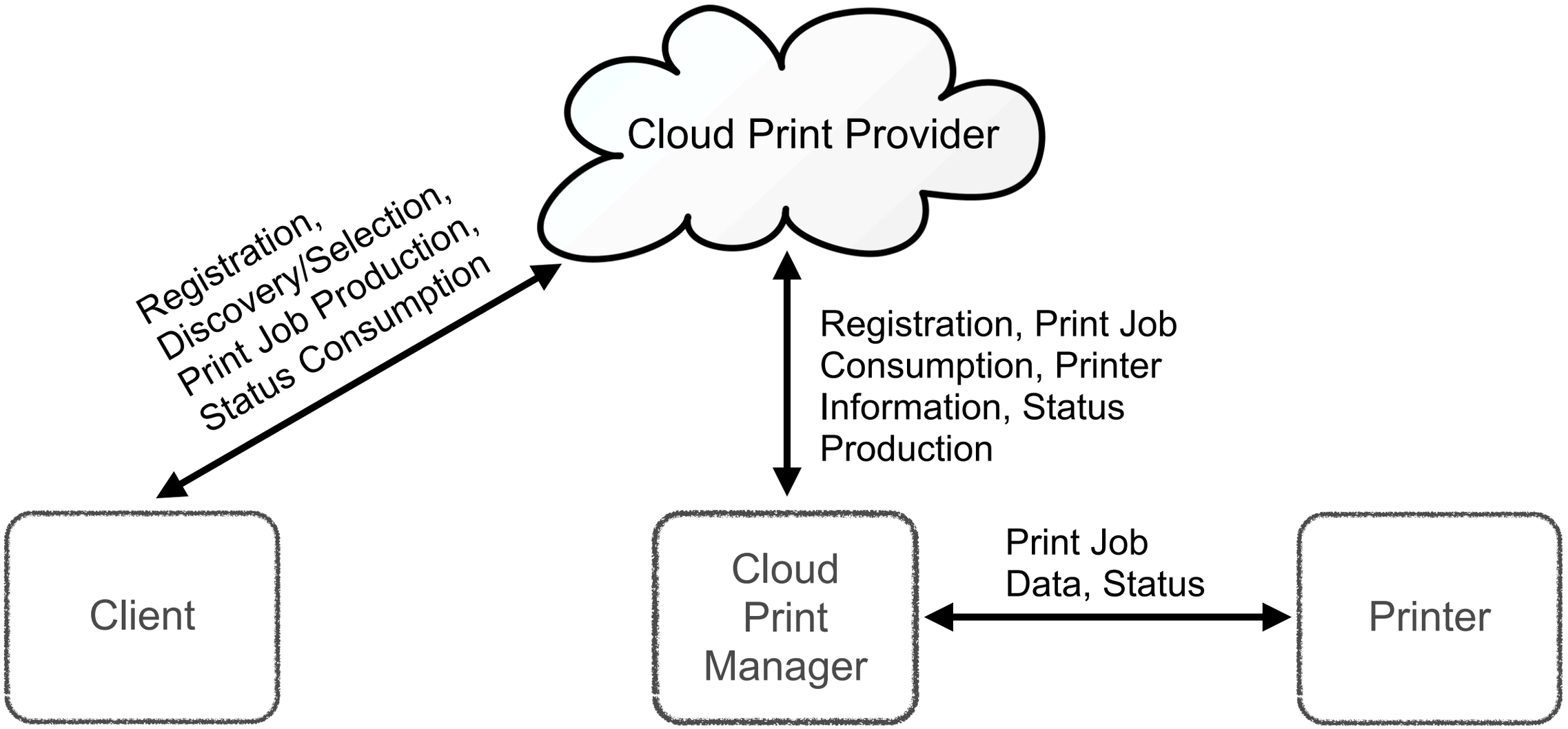
Functional Model

- Cloud: an on-demand shared computing resource available over a network, typically the public Internet or a company's private intranet
- Cloud Printing: any solution that connects a Client to a Printer through a shared Cloud Print Provider
- Cloud Print Provider: the software component that manages printing between Clients and Cloud Print Managers
- Cloud Print Manager: the software component that implements the interface between the Cloud Print Provider and Printer

Functional Model

- Client: standard IPP definition
- Printer: standard IPP definition
- Registration: process by which a Client or Cloud Print Manager associates itself with the Cloud Print Provider
- Discovery/Selection: process by which a Client finds candidate Printers and selects one for a subsequent print job

Functional Model



Requirements

- Registration
  - Allows for privacy/security/access control
- Discovery/Selection
  - Enumeration and/or selection of available/registered printers
- Job Tickets
  - Standard formats or representations with PWG semantics
- Document data/formats
  - Original content formats plus standard generic containers
- Fidelity/late transforms
  - Late transforms to minimize errors (particularly for cloud-to-cloud)
  - Choose the best transform format to preserve fidelity

Requirements

- Event notification
  - Cloud Print Provider to Client
  - Cloud Print Provider to Cloud Print Manager
  - Cloud Print Manager to Printer
  - Printer to Cloud Print Manager
  - Cloud Print Manager to Cloud Print Provider
  - Cloud Print Provider to Cloud Print Provider
- Encryption for privacy/security
  - X.509 authentication/authorization
  - Encryption of all data between Client, Cloud Print Provider, Cloud Print Manager, and potentially Printer
- Logging/accounting
  - Security auditing, maintenance, billing

Requirements

- Firewall/router/network traversal
  - All connections between Client, Cloud Print Provider, Cloud Print Manager, and Printer need to be considered

New Attributes

- Location information
  - printer-geo-location (uri)
  - printer-organization (1setOf text(MAX))
  - printer-organizational-unit (1setOf text(MAX))
- UUIDs
  - job-uuid (uri)
  - printer-uuid (uri)
  - subscription-uuid (uri)
- Paid printing information
  - printer-charge-info-uri (uri)
  - printer-mandatory-job-attributes (1setOf type2 keyword)
- Various types of credentials

Existing Document Formats

- CUPS Raster
  - V2 subset being discussed in IPP session tomorrow
- HTML/XHTML
  - For printing web pages and other content that tolerates changes in layout/pagination
    - Includes XHTML-Print
- JPEG
  - For printing photos
- PDF
  - High-level format for general printing
- Others
  - AI, DWG/DXF, Microsoft Office (DOC/DOCX, PPT/PPTX, XLS/XLSX), PS/EPS, PSD, PNG, RTF, SVG, XML + schema

Existing Protocols

- HTTP
  - "Mother" protocol for most Cloud Printing solutions
  - Provides many options for security and privacy
  - Multi-part/file content possible via MIME encoding
  - Also supports compression independent of content
  - HTTP-based protocols include IPP, JSON-RPC, REST(ful), SOAP, WSDL, and XMPP
- SMTP
  - "My printer has an email address"
  - Security/privacy through obscurity
  - Multi-part/file content possible via MIME encoding
  - Limited job ticket support (if any)
  - SMTP typically only used between the Client and Cloud Print Provider

Existing (HTTP-Based) Protocols

	IPP	JSON-RPC	REST(ful)	SOAP	WSDL	XMPP
Standards	YES	YES	NO[1]	YES	YES	YES
Web Apps	NO[2]	YES	YES	YES	YES	YES
Cloud Printing	LIMITED	NO	YES	YES	YES	YES
Print Document	YES	NO	YES	YES	YES	N/A
Print URI	YES	YES	YES	YES	YES	N/A
Job Tickets	YES	UNKNOWN	YES	YES	YES	N/A
Async Events	YES	YES	YES	YES	YES	YES

1 - There *is* a doctoral dissertation for Representative State Transfer (REST)...
2 - Technically you *could* write a web app that encoded and decoded IPP messages...

Next Steps

- What is the PWG's objective for Cloud Printing?
  - Best practices?
  - Actual interface/model/protocol specifications?
  - Influence Cloud Print providers to adopt PWG semantics?
- How do we proceed with Cloud Print Providers?
  - Write an informational/recommendation/best practices document?
    - Or expand the Wiki content to act as a living document?
  - Engage vendors to adopt existing PWG standards and/or models?
  - Work with vendors to develop a common standard?

Resources

- Cloud printing mailing list:
  - cloud@pwg.org
  - https://www.pwg.org/mailman/listinfo/cloud
- Cloud printing wiki:
  - http://pwg-wiki.wikispaces.com/Cloud+Printing