CUPS Plenary

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Introduction

- CUPS is the standards-based, open source printing system developed by Apple Inc. for OS X and other UNIX®-like operating systems.

- CUPS 2.1.x is the current stable branch

  - 2.1.4 coming out soon

  - One more 2.1.x release planned

- CUPS 2.2.x is the current development branch

  - Beta testing will start June/July 2016

  - Probable 2.2.0 release October 2016

We've Moved!

- CUPS is now hosted on Github

    - Repository: https://github.com/apple/cups

    - Web Site: http://www.cups.org

- Mailing lists still hosted by Apple:

    - https://lists.cups.org/mailman/listinfo

- Same license, same contribution policies, etc.

- Security bug reports should be submitted to "security@cups.org" instead of Github

    - Routed through Apple Product Security

CUPS Developer "Cheats"

- #define _CUPS_NO_DEPRECATED 1

  - Turns off compatibility defines/typedefs for enums

  - Marks deprecated functions and types as unavailable so you get a compile error instead of a warning

- #define _IPP_PRIVATE_STRUCTURES 1

  - Makes ipp_t structure public for existing source code

  - Not a long-term solution - use public API instead

- #define _PPD_DEPRECATED ""

  - Turns off PPD warnings

CUPS 2.1 Release History

- CUPS 2.1.0 released August 31, 2015

- CUPS 2.1.1 released November 30, 2015

  - but withdrawn due to a bad tarball/tag

- CUPS 2.1.2 released December 2, 2015

  - USB and IPP printing fixes

  - Security hardening changes

- CUPS 2.1.3 released February 5, 2016

  - General bug fixes

CUPS 2.2 Preview

- Local Print Queues

- Performance Improvements

Local Print Queues

- The scheduler now supports a new CUPS-Create-Local-Printer user operation

  - Local printers only accept local print jobs and live only as long as needed to print jobs to IPP printers

- The CUPS printing APIs now create local print queues automatically when printing to a discovered printer

- Any uncompleted jobs are lost if the system is rebooted

- Local print queues can be "upgraded" to regular queues by an administrator

Local Print Queues (con't)

- CUPS-Create-Local-Printer Request:

  - Operation attributes group:

    - attributes-charset (charset)

    - attributes-natural-language (naturalLanguage)

  - Printer attributes group:

    - printer-name (name(127))

    - device-uri (uri)

    - OPTIONAL printer-device-id (text(1023))

    - OPTIONAL printer-geo-location (uri)

    - OPTIONAL printer-info (text(127))

    - OPTIONAL printer-location (text(127))

Local Print Queues (con't)

- **CUPS-Create-Local-Printer Response:**

  - Operation attributes group:

    - attributes-charset (charset)

    - attributes-natural-language (naturalLanguage)

  - Printer attributes group:

    - printer-id (integer(0:65535))

    - printer-is-accepting-jobs (boolean)

    - printer-state (type1 enum)

    - printer-state-reasons (1setOf type2 keyword)

    - printer-uri-supported (1setOf uri)

Performance Improvements

- Restart time worse than cold start time

  - Memory deallocations (free calls) for printer state/attributes dominate restart times

  - Still investigating solutions (always do cold start is one way)

- Get-Jobs with first-job-id can be slow

  - Search time for "job-id" in job list

  - Switching to "first-index" attribute for the web interface (faster and standard IPP attribute defined in PWG 5100.13)

ippsample Project

- New Github project:

  - https://github.com/istopwg/ippsample

- Sample implementations of IPP Client, Printer (server), and Proxy

    - Experimental code

- Based on CUPS code base with same license (LGPL2)

- Printer and Proxy implementations support transforms from PDF and JPEG to PWG Raster and HP PCL

ippsample Programs

- ippfind - general purpose "find" program for printers (as found in CUPS)

- ippproxy - implementation of IPP Proxy for generic HP PCL and IPP Everywhere printers

- ippserver - implementation of IPP Printer/ Infrastructure Printer

- ipptool - general purpose program for sending requests an doing tests

- ipptransform - tool for converting PDF and JPEG files into PWG Raster and HP PCL

ippserver

- Enhanced version of the sample code included with CUPS

- Supports previous "single queue" mode like the original sample code, plus a new configuration directory mode that allows for the configuration of multiple queues (IPP Printers) and other settings

- Supports notifications

- Supports transforms (via ipptransform tool)

- Supports both regular ("direct printing") and Infrastructure Printer ("Cloud printing") modes

ipptransform

- Uses CoreGraphics (OS X) or MuPDF (all) to rasterize files

  - Configurable memory limits (banded output)

- Supports sRGB, sGray, and Black color spaces

- Supports "copies", "media", "media-col", "page-ranges", "print-color-mode", "print-quality", "print-scaling", "printer-resolution", and "sides" Job Template attributes

ippsample Demo

CUPS Future

CUPS Future

- Continue development/investigation of ippsample code

  - launchd/systemd integration

  - Additional auth mechanisms (MutualAuth, OAuth, etc.)

  - System Service implementation, local queues?

  - Release printing proxy

  - 3D extensions support

  - User commands (lp, lpr, etc.)?

CUPS Future

- Additional discovery/directory service support

  - Bring back LDAP support, this time using the standard schema

  - DNS-SD/mDNS enhancements being discussed in the IETF

    - http://tools.ietf.org/wg/dnssd/

  - Configuration profiles

Resources

- CUPS Web Site

  - http://www.cups.org/

- CUPS Repository

  - https://github.com/apple/cups

- IPP Sample Code Repository

  - https://github.com/istopwg/ippsample

Q&A