Printer Applications

Michael R Sweet, Lakeside Robotics
August 28, 2020

Topics

- Talking about two Printer Applications and the Printer Application Framework today:

  - ippeveprinter (as extended in the ippsample/ippeveselfcert projects)

  - LPrint

  - PAPPL

- Each has a slightly different focus and capabilities

- All have a common heritage (CUPS)

- Also want to say a few things about iOS®/macOS® compatibility, facsimile, and scanning support

Printer Applications Are…

- A replacement for CUPS printer drivers

  - Options are replaced by IPP attributes

  - Driver-specific UI is provided by the Printer Application

- An implementation of an IPP Everywhere™ Printer

  - Basic IPP Everywhere support only requires PWG Raster, plus JPEG for color printers

  - CUPS library and sample code provide an easy-to-use framework for implementations

- Compatible with CUPS 1.4 and later

  - Can be compatible with iOS® 5 and later with a few small additions (DNS-SD subtype and "image/urf" document format)

  - macOS 10.8® and later support IPP Everywhere™ via the command-line, can be used from the GUI with the same changes needed for iOS support

ippeveprinter

- Started life as "ippserver" in the CUPS "test" directory

- Renamed to "ippeveprinter" for CUPS 2.3 with 3 modes:

  - Basic "legacy" mode emulating simple laser/inkjet printers from ippserver

  - PPD-based PostScript printer mode for supporting legacy PostScript printers

  - Attribute file mode for development and testing

- Uses CUPS backends to communicate with printers

- Manages a single printer, no background/daemon mode

ippeveprinter Enhancements

- Development continues in the IPP workgroup's ippsample and ippeveselfcert projects
  - https://github.com/istopwg/ippsample / https://github.com/istopwg/ippeveselfcert
  - Will be providing pull requests to Apple to incorporate these changes back into CUPS
- Enhancements:
  - Support for resource files (currently just a single strings file) for localizable attributes/values
  - Use system sounds for Identify-Printer (macOS only for now)
  - Support for Cancel-My-Jobs
  - Support for finishings-col attributes
- New "clone-printer" script that collects attributes, icon, and strings file from an IPP printer

LPrint

- Supports a variety of common label and receipt printers connected via network or USB

  - https://www.msweet.org/lprint

- Developed "on a dare"...

- Based loosely on the CUPS ippeveprinter source code

  - Multiple printer support via limited subset of IPP System Service

  - Background daemon (run on demand) handles all spooling and communication

  - Does not use CUPS backends

- Supports standalone operation/spooling without CUPS as well as running as an IPP Everywhere™ printer on the network that all CUPS clients can access

- Supports printing "raw", Apple/PWG Raster, and/or PNG files

LPrint

PAPPL: Printer Application Framework

- Current web site (will eventually move under Open Printing):

  - https://www.msweet.org/pappl

- A simple C-based framework/library for developing Printer Applications
  - Specifically developed to support the next major version of LPrint and a Gutenprint Printer Application
  - Sufficiently general purpose to support any kind of printer or driver that can be used on desktops, servers, and in embedded environments

- Supports JPEG, PNG, PWG Raster, Apple Raster, and "raw" printing to printers connected via USB and network (AppSocket/JetDirect) connections.

- Licensed under the Apache License Version 2.0 with an exception to allow linking against GPL2/LGPL2 software

- Targeting the first 1.0 release candidate in September/October 2020

PAPPL: Implementations

- Current PAPPL repository (will eventually move under Open Printing):

  - https://github.com/michaelrsweet/pappl

- Printer application for the CUPS rastertohp driver (will eventually move under Open Printing):

  - https://github.com/michaelrsweet/hp-printer-app

- Printer application for Gutenprint:

  - Sambhav Dusad (GSoC 2020 student) has started the effort

macOS®/iOS® Compatibility

- Printer Applications can support macOS and iOS clients fairly easily:

  - Support IPP Everywhere™

  - Support the Apple Raster format ("image/urf" MIME media type, handled by the CUPS raster API)

  - Advertise the "_universal" DNS-SD sub-type in addition to the "_print" sub-type

  - Implement the CUPS "marker-xxx" attributes so that macOS clients are able to show supply levels

  - Implement the "media-col-ready" and "media-ready" attributes so that iOS clients are able to select media

- *PAPPL handles all of this for the Printer Application...*

Facsimile Support

- The IPP FaxOut Service specification (PWG 5100.15-2014) defines how to support outgoing facsimile via IPP:

    - https://ftp.pwg.org/pub/pwg/candidates/cs-ippfaxout10-20140618-5100.15.pdf

- Some MFPs already support it as part of AirPrint

- Adding FaxOut support to PAPPL should be fairly straight-forward

- *Need to decide whether facsimile support is actually important in 2020...*

Scanning Support

- The IPP Scan Service specification (PWG 5100.17-2014) defines how to support scanning via IPP:

  - https://ftp.pwg.org/pub/pwg/candidates/cs-ippscan10-20140918-5100.17.pdf

- Adding Scan support to PAPPL is a major undertaking

  - Requires both a new driver interface and some changes to how jobs are processed

  - Have a few students interested in implementing IPP Scan support using PAPPL on top of SANE

- *AirPrint MFPs use a different (non-IPP) protocol to support scanning...*

Q&A

Resources (1/2)

- ippeveprinter
  - https://istopwg.github.io/ippsample
  - https://github.com/istopwg/ippsample
  - https://github.com/istopwg/ippeveselfcert
  - https://github.com/apple/cups (original CUPS source)
- LPrint
  - https://www.msweet.org/lprint
  - https://github.com/michaelrsweet/lprint
- PAPPL
  - https://www.msweet.org/pappl
  - https://github.com/michaelrsweet/pappl
  - https://github.com/michaelrsweet/hp-printer-app

Resources (2/2)

- IPP Everywhere™ v1.0 specifications:

  - https://ftp.pwg.org/pub/pwg/candidates/cs-ippeve10-20130128-5100.14.pdf

  - https://ftp.pwg.org/pub/pwg/candidates/cs-ippeveselfcert10-20160219-5100.20.pdf

- IPP Everywhere™ v1.1 specifications:

  - https://ftp.pwg.org/pub/pwg/candidates/cs-ippeve11-20200515-5100.14.pdf

  - https://ftp.pwg.org/pub/pwg/candidates/cs-ippeveselfcert11-20200515-5100.20.pdf

- IPP Everywhere™ printer self-certification tools:

  - https://istopwg.github.io/ippeveselfcert

- IPP FaxOut Service specification:

  - https://ftp.pwg.org/pub/pwg/candidates/cs-ippfaxout10-20140618-5100.15.pdf

- IPP Scan Service specification:

  - https://ftp.pwg.org/pub/pwg/candidates/cs-ippscan10-20140918-5100.17.pdf

Lakeside

Robotics