Printer Applications

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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 "ipppserver" in the CUPS "test" directory

• Renamed to "ippeveprinter" for CUPS 2.3 with 3 modes:
  • Basic "legacy" mode emulating simple laser/inkjet printers from ipppserver
  • 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/ippsample) / [https://github.com/istopwg/ippeveselfcert](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](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
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](https://github.com/michaelrsweet/pappl)

- Printer application for the CUPS rastertohpp driver (will eventually move under Open Printing):
  - [https://github.com/michaelrsweet/hp-printer-app](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:
- 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:

• 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:

- IPP Everywhere™ v1.1 specifications:

- IPP Everywhere™ printer self-certification tools:
  - https://istopwg.github.io/ippeveselfcert

- IPP FaxOut Service specification:

- IPP Scan Service specification: