

# CUPS Plenary

Joint PWG / Open Printing Summit - May 2023  
Michael R Sweet (Lakeside Robotics)



**Open Printing**  
making printing just work



# Before We Begin...

- PWG Antitrust Policy:
  - [https://www.pwg.org/chair/membership\\_docs/pwg-antitrust-policy.pdf](https://www.pwg.org/chair/membership_docs/pwg-antitrust-policy.pdf)
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  - [https://www.pwg.org/chair/membership\\_docs/pwg-ip-policy.pdf](https://www.pwg.org/chair/membership_docs/pwg-ip-policy.pdf)
  - TL;DR: Anything you say in a PWG meeting or email to a PWG address can be used in a PWG standard
  - (but please do read the IP policy above if you haven't done so)
- *This meeting is being recorded*

# Topics

- Introduction
- CUPS 2.4.x
- CUPS 2.5
- Deprecations
- Future Stuff
- Resources

# Introduction

- CUPS is the standards-based, open source printing system developed by OpenPrinting for Linux® and other Unix®-like operating systems. CUPS uses IPP Everywhere™ to support printing to local and network printers
- CUPS is provided under the Apache License v2.0 with an exception that allows linking to GPL2-only software (like Gutenprint)
- The CUPS web site, source code, and bug database are hosted on Github
  - <https://openprinting.github.io/cups>
  - <https://github.com/openprinting/cups/>

# CUPS 2.4.x

# CUPS 2.4.x

- Release manager: Zdenek Dohnal
- Release history:
  - CUPS 2.4.0 - November 29, 2021
  - CUPS 2.4.1 - January 27, 2022
  - CUPS 2.4.2 - May 26, 2022
- Release schedule:
  - CUPS 2.4.3 - Soon
    - Fixes many bugs including TLS and IPP/PPD option handling issues
  - CUPS 2.4.4 - September/October 2023
  - CUPS 2.4.5 - January/February 2024

# CUPS 2.5

# CUPS 2.5 - Next Feature Release

- Release manager: Till Kamppeter
- Release schedule:
  - CUPS 2.5b1 - November/December 2023?
  - CUPS 2.5rc1 - January/February 2024?
  - CUPS 2.5.0 - February/March 2024?
- Features:
  - Discovery improvements: "wide-area" DNS-SD lookups and configuration profiles
  - Localization improvements: multiple languages in IPP Everywhere PPDs, centralize localization efforts
  - OAuth 2.0/OpenID authentication: default callback
  - "job-sheets-col" and better "media-col" attribute support
  - X.509 certificate management improvements
  - Back-porting of other CUPS 3.0 APIs as appropriate



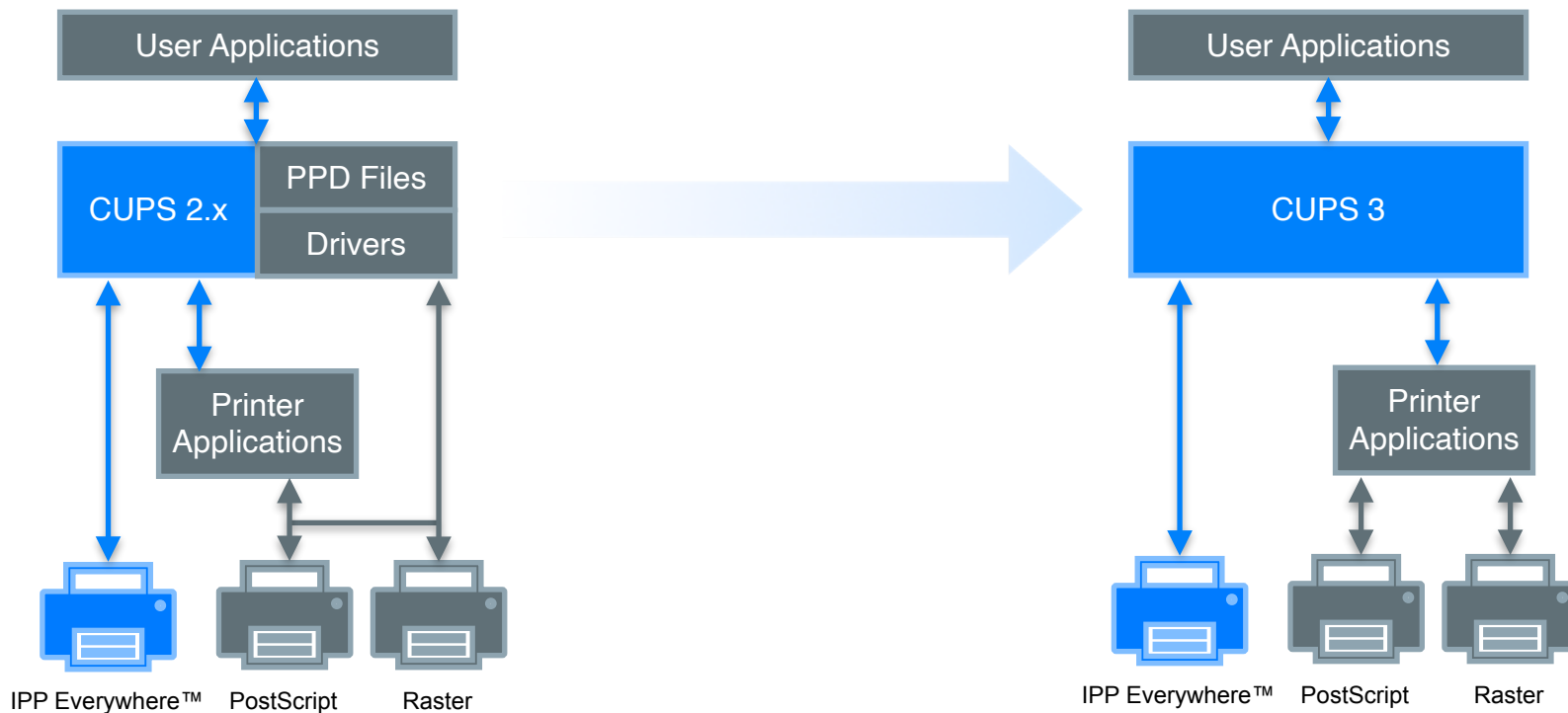
# CUPS 2.5 - OAuth 2.0/OpenID

- Replacement for Kerberos SSO
  - Doesn't require root access or user changing gymnastics like Kerberos
- Many open source solutions available, including my own:
  - <https://www.msweet.org/moauth>
- SAML and Webauthn authentication backends are commonly available, too
- Support OpenID/RFC 8414 compliant OAuth 2.0 authorization servers
  - Authorization server is reported via IPP "oauth-authorization-server-uri (uri)" attribute
  - Will follow in-progress IPP OAuth Extensions v1.0 draft
- Bearer and refresh tokens will be cached per-user/auth-server
- Authorization UI will be presented using embedded web view - only available when printing from system console
  - Command-line tool for registering bearer token, too

A satellite is visible in the upper center of the frame, positioned above the Earth's horizon. The satellite has a spherical body with various instruments and a lens-like structure. The Earth's surface below is covered in a dense layer of white clouds, with some darker landmasses visible through the cloud cover. The horizon line is a thin blue arc separating the dark space from the bright atmosphere and clouds of the planet.

# Future Stuff

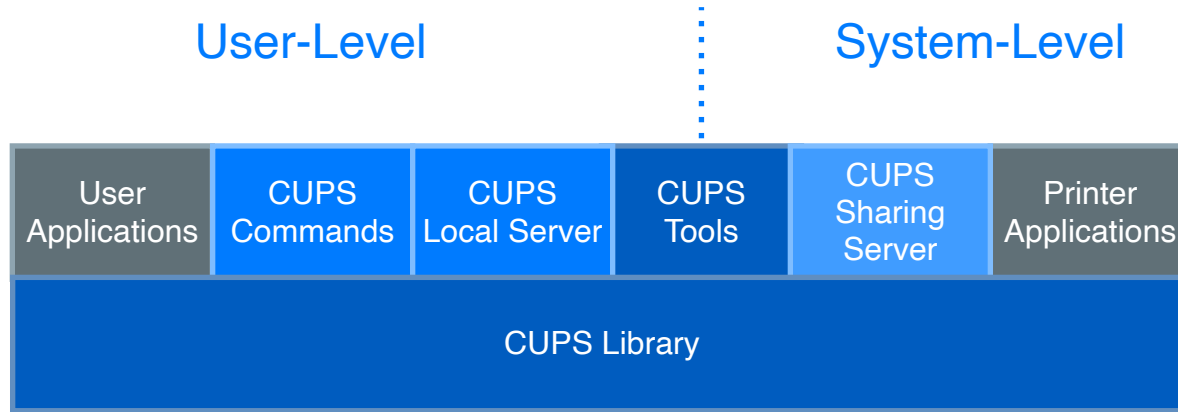
# Transition of Printing



# CUPS 3.0 - Modular Printing Architecture

- Commands: lp, lpr, lpstat, cancel, etc.
- Local Server
  - Handles local print requests for desktop/mobile devices
  - Only temporary IPP Everywhere print queues
  - Runs as user
  - UNIX domain socket and/or D-Bus API and/or XPC API
- Sharing Server
  - Handles network print requests and local printing on headless servers
  - Full print accounting/ACLs/pre-processing of documents
  - OAuth 2 and PAM-based authentication/authorization
  - IPP Shared Infrastructure Extensions/System support
- Tools
  - ippeveprinter, ippfind, ipptool, ipptransform
- Library: libcups

# CUPS 3.0 - Overview

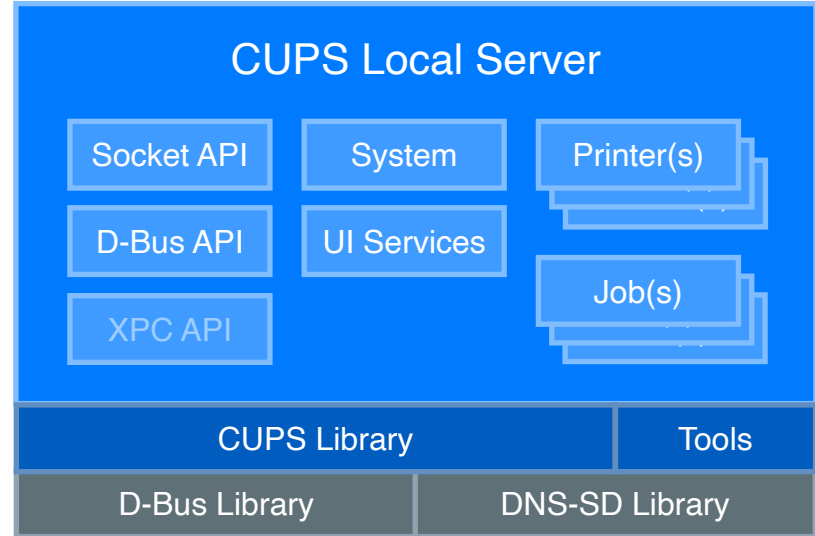


# CUPS 3.0 - Library

- New requirements:
  - C99, DNS-SD (Avahi or mDNSResponder), TLS (GNU TLS, LibreSSL, or OpenSSL), ZLIB, POSIX or Windows threading
- New APIs:
  - IPP test file, HTML form, JSON, JWT, and X.509 APIs
- Removed all deprecated APIs
- Naming and calling conventions have been normalized - see "MIGRATING.md" document
- New shared library major version - not binary compatible with CUPS 2.x and earlier

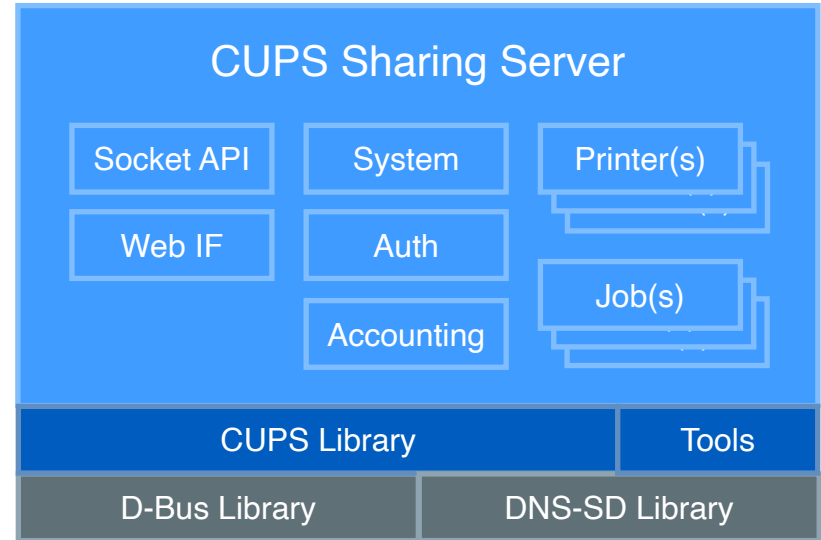
# CUPS 3.0 - Local Server

- Handles all discovery and communications with printers
- Handles authentication, authorization, consent, and notification UI
- Converts to/from PDF/raster as needed for printers
- Job history is limited to the current session/login
- No web interface
- Configuration limited to listing specific printers or servers that cannot be discovered via DNS-SD ("profiles")



# CUPS 3.0 - Sharing Server

- Handles all communications with printers
- Authorization/consent/notification UI needs to be handled by client
- Converts to/from PDF/raster as needed for printers
- Job history is configurable
- Web interface
- Configuration similar to existing cupsd
- OAuth token introspection (RFC 7662) or JWT inspection and scopes for ACLs





# CUPS 3.0 - Challenges

- Much broader scope and integration than the original CUPS work
- Desktop support - need to uplift GNOME/KDE/XFCE desktops to new D-Bus API for printing, authorization, consent UI
- Need developers to work on the local and sharing servers, desktop UI/ services
  - Can probably use/adapt PAPPL code for the core server bits
  - Much of the print dialog work can be repurposed
  - Probably have existing authorization/notification UI we can use
- Graphics libraries - current PDF tools/libraries have problematic licenses or other limitations

# CUPS 3.0 - Progress

- Commands and Local Server (cups-local project)
  - <https://github.com/OpenPrinting/cups-local>
- Sharing Server (cups-sharing project)
  - <https://github.com/OpenPrinting/cups-sharing>
- Tools and Library (libcups project)
  - <https://github.com/OpenPrinting/libcups>
  - Still have to implement D-Bus API and bring over ippttransform tool

# Resources

- CUPS Web Site
  - <https://openprinting.github.io/cups>
  - CUPS v3 information:
    - <https://openprinting.github.io/cups/cups3.html>
- CUPS Repositories
  - <https://github.com/OpenPrinting/cups>
  - <https://github.com/OpenPrinting/cups-local>
  - <https://github.com/OpenPrinting/cups-sharing>
  - <https://github.com/OpenPrinting/libcups>