

OpenPrinting

We make printing just work!

**Till Kamppeter – OpenPrinting
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What we are doing



- Development of printing **architecture, technology, infrastructure** on Linux, Unix, and POSIX-style operating systems
- Collaboration with **IEEE-ISTO Printer Working Group (PWG)** especially on the **Internet Printing Protocol (IPP)**
- **Driverless scanning** support in cooperation with SANE
- Integration of printing with the **desktop environment**, esp. print dialogs and printer setup tools
- Integration in **all types of operating systems** (classic DEB, RPM, .../immutable) with **all packaging methods** (Snap, Docker, ...)
- **Printer/driver compatibility look-up lists**
- Helping **manufacturers** on printer driver design and integration

How it all began ...



- I was **system administrator** in Theoretical Physics department in 1997-2000
- We had **Unix** (SGI, Digital) and **Linux** (SUSE) machines
- **Printing via LPD**
- **2 PostScript laser printers: 2 trays, Duplex** (Off/Long Edge/Short Edge)
- **LPD has no support for options**, but **tricky scripting** (by my predecessors) allowed users to select tray and duplex mode
- We got **color laser with many more options**, only **proprietary GUI** to select everything

How it all began ...



- **CUPS 1.x** came in the beginning 2000
- **Article about CUPS** in German “Linux Magazin”, by **Kurt Pfeifle**, made me discover CUPS
- I **deployed CUPS in department**, fully supports PostScript printers, including all options via PPD (PostScript Printer Description) files
=> **Makes color laser fully supported under Linux**
- CUPS only has command line interface for options, so I quickly wrote up a **simple print dialog** (X Printing Panel, XPP) with FLTK toolkit.
- **Published it on Freshmeat**
- **Kurt Pfeifle discovered it**, invited me to the **LinuxTag 2000**, largest free software show in Europe, in July 2000 ...

How it all began ...



- ... and in August 2000 **I lived in Paris!** (Do not try to speak French to me)
- Hired by **MandrakeSoft**, first task to **switch their distro to use CUPS!**
- I had to **package CUPS ...**
- ... but also get **PPD files for all the printer drivers** which were available for LPD
- There was the **linuxprinting.org** site with a printer/driver compatibility database and an **automatic PPD file generator**, Foomatic
- There was not enough driver data, had to fill in **invocation command lines** and **option lists**
- **All this made the fall-2000 edition of Mandrake Linux work with CUPS, without loss of support for any printer!**

How it all began



- Printing got **much easier** with Mandrake Linux
- And I did a lot of **evangelism** and **community work**:
 - **Community booths about OpenPrinting** on LinuxTag 2001-2006
 - Half-day and full-day **workshops about CUPS** on system administrator and developer and admin conferences
 - Many **talks** on different conferences
 - Organized **hackfests**
- All this **made the other distributions follow**, making CUPS the standard
- **Other printing systems**, like LPD, LPRng, PPR, ... **disappeared** and got not maintained any more

How it all began



- Co-founded **OpenPrinting** in 2001
- Participated in **development of printing-related APIs**
- **Organized first OpenPrinting Summit** in 2006 in Atlanta, Georgia
- On the Summit **Ian Murdock** (founder of Deb**Ian**) **invited me to work at Free Standards Group full-time to merge linuxprinting.org into OpenPrinting and manage OpenPrinting.**
- In 2007 **Free Standards Group and OSDL merged** to be **the Linux Foundation** and so OpenPrinting got part of the Linux Foundation
- From 2006 on **I worked full-time on OpenPrinting**, full-time at the Linux Foundation, 1/3 part-time at **Canonical** (for Ubuntu packaging)
- **Got one of the 8 fellows of the Linux Foundation**

How it all began



- I organized **annual OpenPrinting Summits**, later together with the Printer Working Group (PWG)
- Since 2008 I organized the **participation of the Linux Foundation in the Google Summer of Code**, accepted every year
- From 2015 on I worked together with **Aveek Basu** (that time at Lexmark India). Aveek found GSoC contributors at Indian universities, most from IIT Mandi. He also created a **selection process** for OpenPrinting GSoC contributors

Achievements



- Made **CUPS** the **standard printing system** for POSIX-style operating systems
- **All free printer drivers work with CUPS**
- Switched **standard print job format** from PostScript to **PDF**
- **Grand unified Ghostscript:** Merged Mike Sweet's ESP Ghostscript fork and all third-party drivers into upstream Ghostscript at Artifex.
- **system-config-printer**
- **cups-filters:** Continued drivers and backends which Apple dropped
- **Common Print Dialog Backends**
- **CUPS Snap**
- **All free printer drivers in Printer Applications**

Areas of work



- **Maintaining the components**
 - CUPS
 - cups-filters
 - Common Print Dialog Backends (CPDB)
 - pappl-retrofit
- **Printer compatibility databases**
 - Foomatic
 - List of driverless printers

Areas of work



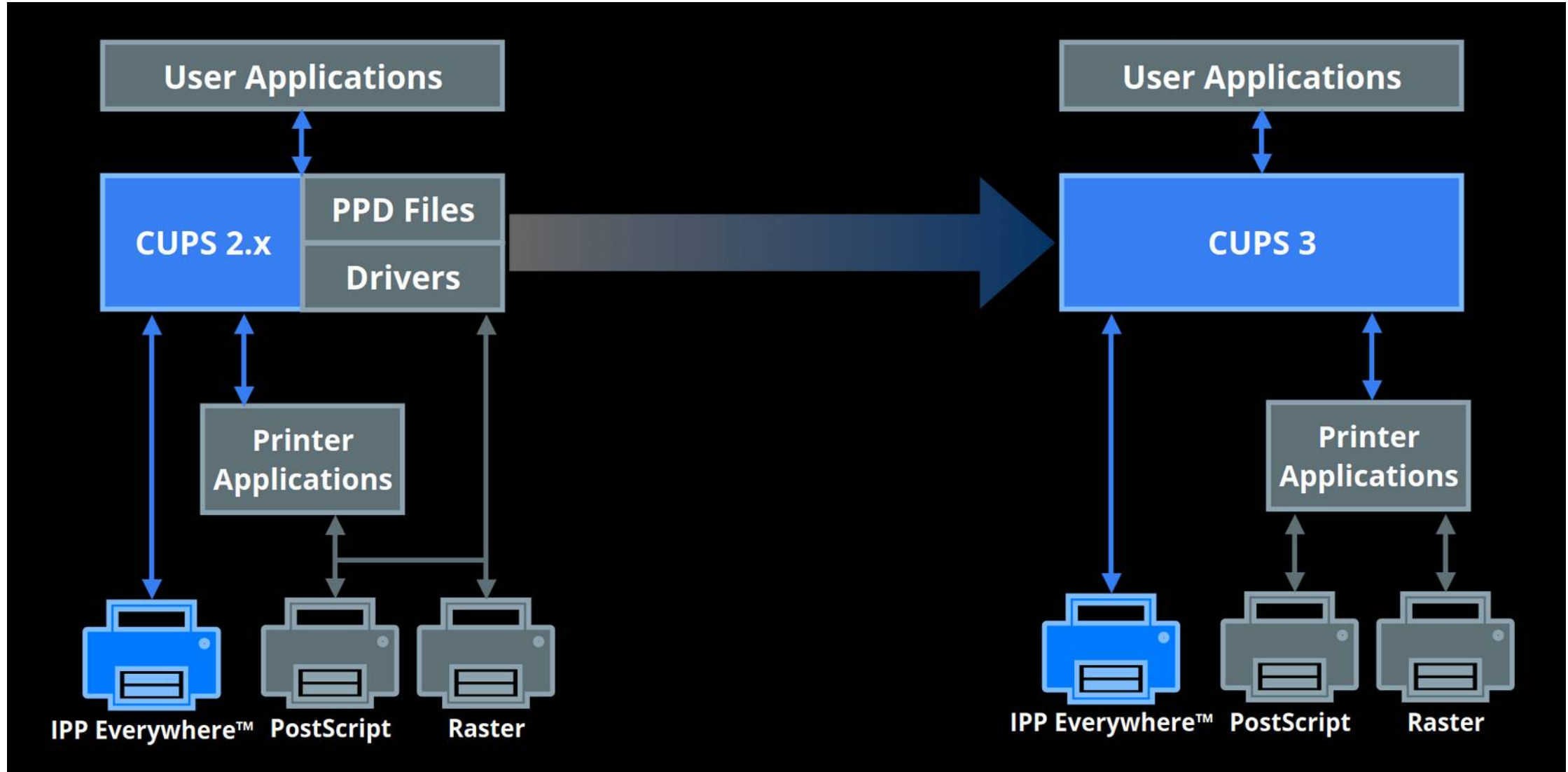
- **Collaboration with Printer Working Group (PWG)**, maintainer of Internet Printing Protocol (IPP) and other standards
- Helping **printer manufacturers** to make drivers correctly
- Design of **general printing system architecture**
- **Desktop** Integration
 - Printer setup tools
 - Print dialogs
- Intergration in **immutable distributions**
- **Distribution-independent packaging** (Snap, podman, Docker, ...)

New Architecture for Printing and Scanning



- **Modern printers are driverless IPP**
 - Auto-discoverable via DNS-SD
 - Tell full capabilities via IPP
 - Use standard job formats: PDF, PWG Raster, Apple Raster, PCLm
- **Stop supporting PostScript Printer Description files (PPD, deprecated)**
- **CUPS gets all-IPP**, no classic PPD/filter-based drivers (CUPS 3.x)
- Driver still needed? Use **Printer Application**, a software **emulation of IPP printers**

New Architecture for Printing and Scanning



New Architecture for Printing and Scanning



- Needs
 - Desktop integration
 - **Printer setup tools:** GNOME Control Center, KDE, desktop-independent, for further desktops
 - **Print dialogs:** CPDB support for GTK and Qt dialogs, also for LibreOffice, Mozilla (Firefox, Thunderbird), Chromium Browser
 - **Native Printer (Scanner) Applications** for HPLIP, Gutenprint
 - **Scanner Applications to replace SANE**



- **CUPS 2.5.x**
 - **Features**
 - Discovery: **“Wide-area” DNS-SD** (DNS-SD over traditional DNS)
 - Localization: **Join Weblate, multi-language PPDs** for driverless IPP
 - **Oauth 2.0/OpenID** authentication
 - **“job-sheets-col”** (banner pages on specific media using standard formats)
 - **API backports from libcups3**: HTML form, IPP file, JSON/JWT, X.509 certificates
 - **Beta1 release**: somewhere in March 2024?

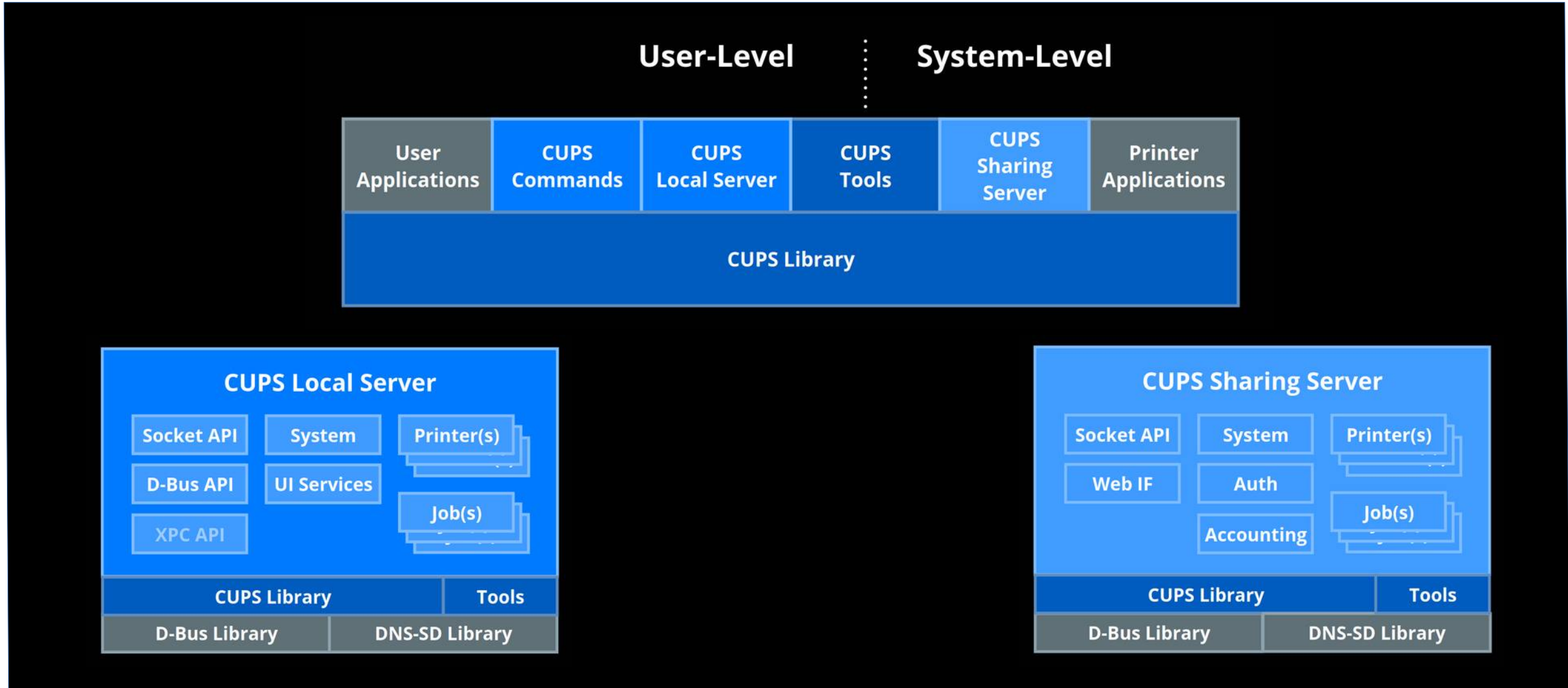


- **CUPS 3.x**
 - **Features**
 - **Modularization**
 - **libcups3** + CUPS tools (ipptool, ...)
 - **Local server** + command line utilities (lp, lpstat, ...)
 - **Sharing server**
 - **All-IPP – New Architecture**
 - => **Printer Applications** required for legacy printers
 - To be **removed**: PPD support, Kerberos support
 - All components to be released up to the **end of 2024**
 - Switchover in **Ubuntu 25.04**



- **CUPS 3.x**
 - **Local server**
 - Handles **local print requests** for desktop/mobile devices
 - Only **temporary IPP Everywhere print queues**
 - **Runs as user**
 - **UNIX domain socket** (D-Bus to poll socket path)
 - **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

CUPS



Windows Protected Print



- **“New Architecture” also under Windows**
- Microsoft introduces **Windows Protected Print**
 - **All-IPP – Only driverless IPP printers (Mopria) supported**
 - **Legacy printers not supported any more by Microsoft**
=> Workaround: Printer Applications under WSL
 - Underlying code is said to come from **Mopria – No CUPS**
 - Important reason for doing this is also **security**, doing away with third-party (manufacturer) drivers and their vulnerabilities
 - **Print Support Apps (PSA):** Apps which add printer-specific software extensions – **Is that driverless???**

Get involved



- **Code, bug triage, CI testing, packaging, documentation, web site**
- **Google Summer of Code: Contributor, Mentor**
<https://wiki.linuxfoundation.org/gsoc/google-summer-code-2024>
- OpenPrinting **GitHub**: <https://github.com/OpenPrinting/>
- OpenPrinting **mailing list**: printing-architecture@lists.linux.dev
<https://lore.kernel.org/printing-architecture/>
<https://subspace.kernel.org/lists.linux.dev.html>
- **Mastodon**: #OpenPrinting
- **OpenPrinting News (monthly)**: <https://openprinting.github.io/news/>