cups-filters
The non-Apple part of CUPS, maintained by OpenPrinting

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- **cups-filters takes up everything from CUPS which Mac OS X does not need (CUPS 1.6.x)**
  - ➢ Started end of 2011 by OpenPrinting, overtaking most of CUPS' **filters**
  - ➢ Switched filters over from PostScript-centric to **PDF-centric** workflow
  - ➢ **cups-browsed** introduced end of 2012, to introduce browsing of DNS-SD-advertised remote CUPS queues, as CUPS dropped its own broadcasting/browsing

- **In 5 years of development cups-filters improved a lot**
  - ➢ Auto-create print queues for IPP network printers, especially **driverless** printing
  - ➢ **Mobile** printing support: No printer setup tool needed, auto-setup of printers, driverless, cups-browsed auto-shutdown
  - ➢ Load-balanced **printer clusters**, with client-side or server-side queueing of jobs
  - ➢ Do **legacy CUPS broadcasting/browsing** to work with old CUPS on remote machines
  - ➢ Filters support **Ghostscript**, **Poppler**, and **MuPDF** as PDF interpreter

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- **Driverless printing support with IPP Everywhere and Apple AirPrint printers**
  - ➤ **PPD generator** synced with the one in CUPS, on state of CUPS GIT (CUPS lacks public API)
  - ➤ **PDF**, **PWG Raster**, **Apple Raster**, **PCL-XL**, **PostScript**, **PCL 5c/e** (in this priority order) formats fully supported, pass-through of **JPEG** input files
  - ➤ cups-browsed: **Apple Raster** is known input format for IPP printer auto queue setup
  - ➤ **MIME conversion rules** updated
  - ➤ New "**driverless**" utility to allow setup of driverless printers with **conventional printer setup tools**. Works as backend to list the needed IPP URIs and as PPD/driver generator to generate the PPDs on-the-fly
  - ➤ **Fixes** on PWG/Apple Raster output generation (margins, ...).

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- **cups-browsed: Other new features**
  - ➢ Full support of **IPv6**
  - ➢ **Auto-generated IPP-printer queues** can get **shared** now
  - ➢ When generating IPP printer queues, default to using a **PPD file**
    - ▪ CUPS 2.2.x has dropped System V interface scripts (security)
  - ➢ Lots more of **configuration options**
    - ▪ **Queue types** to be created: Remote CUPS, IPP Everywhere, Apple AirPrint, Legacy IPP
    - ▪ **BrowseInterval** and **BrowseTimeout** for legacy CUPS Browsing
    - ▪ All **paths to files and directories** used by cups-browsed
  - ➢ **Fixed**
    - ▪ Hanging on shutdown
    - ▪ Saving and recovering option settings of auto-generated queues
    - ▪ Load-balanced print queues work also with legacy-CUPS-broadcasted printers
    - ▪ Load-balanced print queues allow full access to PPD options now

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- **Filters: Other new features**
  - ➢ Support of **MuPDF** as PDF interpreter, for lightweight mobile systems
    - ▪ **Free choice of PDF interpreter**: Ghostscript, Poppler, MuPDF
    - ▪ pdftops filter got MuPDF mode
    - ▪ rastertops filter added (for pdftops using mupdftoraster -> rastertops -> pstops)
  - ➢ New **texttotext** filter (for text-only printers)
    - ▪ Replaces textonly
    - ▪ Written in C
    - ▪ Highly configurable via PPD file options
  - ➢ Replaced all **shell-script-based filters** by **C programs** as CUPS does not allow direct PPD access any more, PPD access only via IPP now
  - ➢ Improved support for **Apple Raster input** (using Apple Raster support of CUPS)
  - ➢ Let Ghostscript do more accurate line graphics output on **low-resolution printers** (like bar codes on label printers)
  - ➢ **Page logging** into page_log (was a long-standing TODO)

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New features in cups-filters

- **General improvements**
  - ➤ **Debug log file** for cups-browsed
  - ➤ Improvements for **cross-compiling** and **building on build servers**
  - ➤ Support for **Snappy packaging** and generally running in **sandboxes**
    - ▪ Utilities like Ghostscript, MuPDF, ... run using the **$PATH** environment variable and not hard-coded build-time paths
    - ▪ All **paths for files** fully configurable
    - ▪ Use **CUPS' environment variables** to determine the location of CUPS' resources.
  - ➤ General **bug fixes** and **improvements** for compatibility with new CUPS versions and different systems

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- **pdftopdf to flatten filled forms into static content before doing its original work (GSoC student Pranjal Bhor)**

- **Support for the new local queues in CUPS 2.2.x**

  - Let cups-browsed create its generated queues as local queues

  - Queues are auto-removed on CUPS shutdown (on CUPS restart during cups-browsed session queues need to get re-created).

  - cups-browsed can be run by "normal" user, no root or "lpadmin" group membership needed

- **Move all OpenPrinting code to GitHub?**

  - Problem: No way to attach binary files (like sample print files) to issue tracker

  - Proprietary system

- **But moving all to GIT should be an improvement**

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ippusbxd – IPP-over-USB daemon

- **ippusbxd development**

  - Fixed all crashes, hangs, printer mess-ups, port blocked after exit → Daemon runs smoothly and shuts down cleanly

  - Robust communication between TCP and USB side, with reasonable time-outs, correct error handling, no unneeded fatal errors → Printer works reliably like a network printer

  - Added **DNS-SD broadcasting** of the printer

    - URI: ipp://localhost:60000/ipp/print

    - Admin interface: http://localhost:60000/

  - **Verbose logging** of all events

- **ippusbxd is feature-complete for now and there are no more feature additions planned as long as the standards and the client requirements do not change.**

- **Needed changes on Avahi**

  - Broadcast services on localhost/"lo" network interface (patch available)

  - Broadcast localhost services with "localhost" host name or make them work on system's hot name

cups-filters – Detailed description

- **From version 1.6.x on CUPS dropped features not needed for Mac OS X**

  - Filters for file conversion and Postscript workflow: imagetops, pdftops, pstoraster, …

  - Serial and parallel backends

  - CUPS broadcasting/browsing for automatic availability of shared printers on remote CUPS client, replacement technology DNS-SD has only broadcasting and no browsing, also incompatible with old CUPS versions

- **Dropped CUPS filters were put into there own source package on CUPS SVN → Seed for cups-filters**

- **cups-filters started by OpenPrinting end of 2011**

  - Legacy filters package of CUPS with pure PS workflow filters dropped

  - PDF workflow filters (formally maintained as CUPS add-on) added

  - cups-browsed added end of 2012 for DNS-SD browsing and legacy CUPS broadcasting/browsing

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- **Dropped CUPS filters made up a PostScript-based print workflow**

- **cups-filters supplies filters for the new PDF-based print workflow**

  - Filters from CUPS legacy package: commandtoescpx, commandtopclx, imagetoraster, pdftops, rastertoescpx, rastertopclx

  - PDF filters from OpenPrinting Japan: pdftopdf (old Poppler-based), pdftoraster (Poppler-based), pdftoopvp, imagetopdf

  - PDF filters from Google Summer of Code projects: texttopdf, pdftoijs, pdftopdf (new QPDF-based), rastertops

  - Also added: bannertopdf, texttotext, gstopdf, rastertopdf, gstoraster, gstopxl

  - Dropped filters from CUPS legacy package: Bannertops, imagetops, texttops

- **cups-filters adopts serial and parallel backends**

- **cups-filters used with Ghostscript, Poppler, or MuPDF as PDF interpreter, Ghostscript allows also PS input**

- **CUPS 1.6.x drops CUPS broadcasting and browsing**

- **CUPS 1.6.x does Bonjour broadcasting as defined as PWG standard, but does no Bonjour browsing**

- **cups-browsed solves the problems caused by this (works with all apps):**

  ➢ In **default configuration**, cups-browsed does **Bonjour browsing** and auto-generates local raw queues pointing to the discovered remote CUPS queues, solving the problem with remote CUPS 1.6.x servers

  ➢ **Legacy Option** (via config file): cups-browsed does **CUPS browsing** on CUPS 1.6.x clients with older remote CUPS servers

  ➢ **Legacy Option:** cups-browsed does **CUPS broadcasting** on CUPS 1.6.x servers for older remote CUPS clients.

  ➢ **Legacy Option:** cups-browsed does **BrowsePoll**, on CUPS 1.6.x clients for servers with broadcasting turned off.

- **Alternative: Adding Bonjour browsing to the print dialog (GUI apps using this dialog only!)**

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- **Mobile systems have different printing system demands:**
  - ➢ Move between different local networks (home, office, …)
  - ➢ No local printers, only network printers
  - ➢ Simple UI, no printer setup tool
  - ➢ Lightweight printing stack → No driver/PPD library
  - ➢ Save battery power, avoid permanently running daemons
- **cups-browsed browses DNS-SD broadcasts:**
  - ➢ It picks up remote CUPS queues
  - ➢ It picks up network-connected printers:
    - ▪ Only IPP printers, as they provide capability info
    - ▪ IPP Everywhere and AirPrint driverless (raster, excellent capability info)
    - ▪ Other known PDLs: PDF, PostScript, PCL 5c/5e/6/XL
    - ▪ Auto-generate PPD, create queue
  - ➢ Removes queues on shutdown or when printer disappears
- **cups-browsed optionally shuts down automatically when not needed any more**