# Open Printing

Linux Plumbers Conference - 2019

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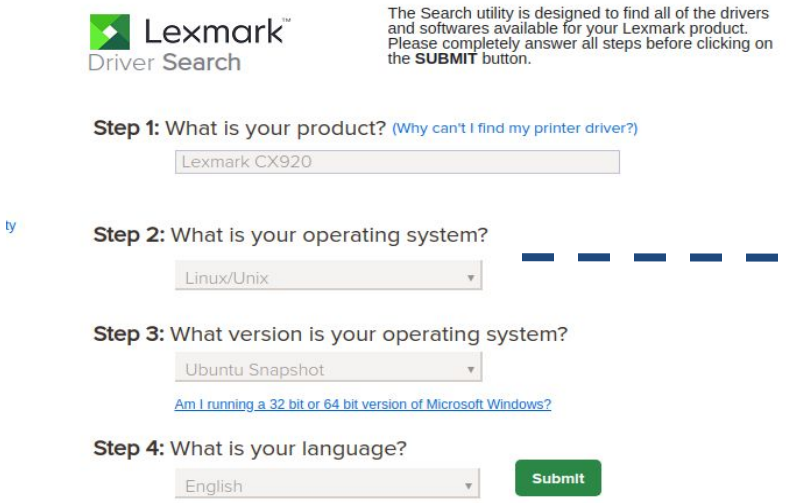
# Agenda

## What will we discuss today:

- Printing today in Linux
- Common Print Dialog Backends
- Working with SANE to make IPP scanning a reality
- Printer/Scanner Applications - The new format for printer and scanner drivers
- The future of Printer Setup Tools - IPP Driverless Printing and IPP System Service
- 3D Printing without the use of any slicer

# Do you remember how you print?



Lexmark
Driver Search

The Search utility is designed to find all of the drivers and softwares available for your Lexmark product. Please completely answer all steps before clicking on the **SUBMIT** button.

ty

**Step 1:** What is your product? (Why can't I find my printer driver?)

Lexmark CX920

**Step 2:** What is your operating system?

Linux/Unix

**Step 3:** What version is your operating system?

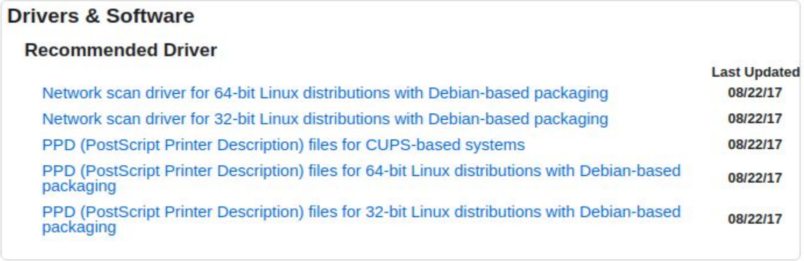
Ubuntu Snapshot

Am I running a 32 bit or 64 bit version of Microsoft Windows?

**Step 4:** What is your language?

English

**Install**



**Drivers & Software**

**Recommended Driver**

| | Last Updated |
|---|---|
| Network scan driver for 64-bit Linux distributions with Debian-based packaging | 08/22/17 |
| Network scan driver for 32-bit Linux distributions with Debian-based packaging | 08/22/17 |
| PPD (PostScript Printer Description) files for CUPS-based systems | 08/22/17 |
| PPD (PostScript Printer Description) files for 64-bit Linux distributions with Debian-based packaging | 08/22/17 |
| PPD (PostScript Printer Description) files for 32-bit Linux distributions with Debian-based packaging | 08/22/17 |

**Download**

**Print**

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# Printing Today in Linux

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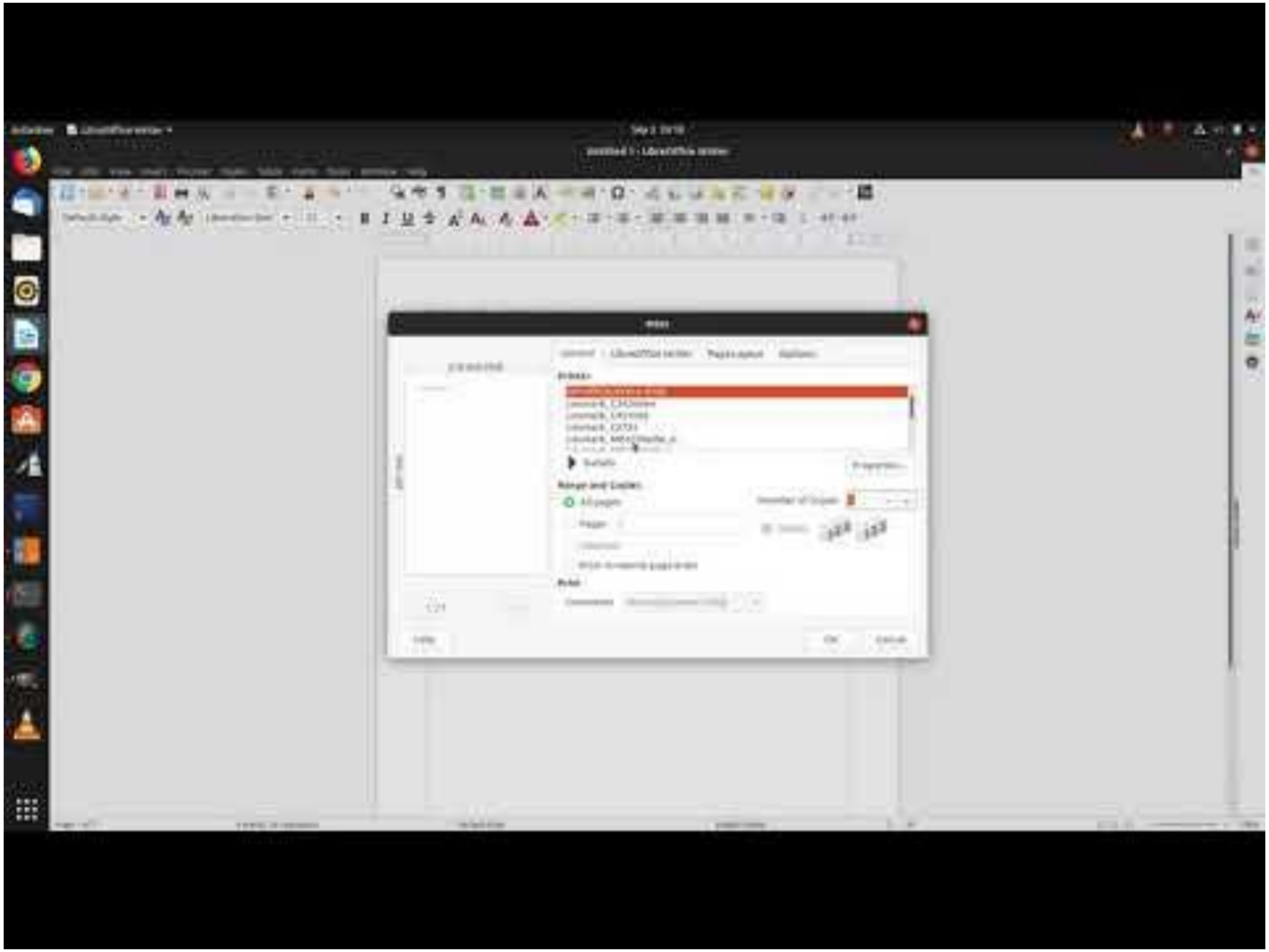
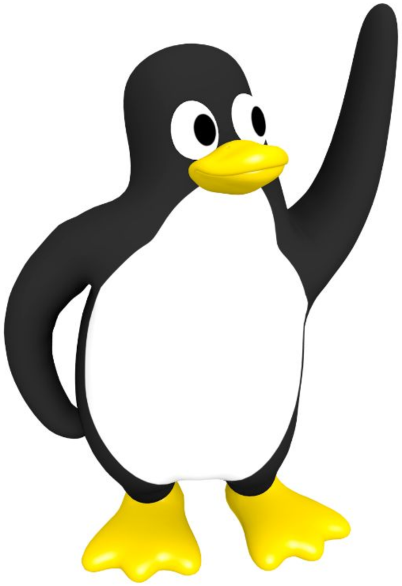
# How easy is it to print now…?



# What we do at Open Printing?

## What we do..!!

- Works on the development of new printing architectures, technologies, printing infrastructure, and interface standards for Linux and UNIX-style operating systems
- Collaborates with IEEE-ISTO Printer Working Group (PWG) on IPP projects
- Is working with SANE to make IPP scanning a reality
- Maintains cups-filters which allows CUPS to be used on any Unix-based (non-macOS) system
- Is responsible for the Foomatic database
- Is working on Common Print Dialog Backends project



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# Common Print Dialog Backend

## Common Print Dialog

## Idea

- Unified, hassle-free printing experience across Linux
- Decouple print technologies (CUPS, IPP, GCP...) from GUI toolkits/ app development (Qt, GTK...)

## Design

- Frontend libraries for major toolkits (Qt, GTK...)
- Backend libraries for everyone

# Common Print Dialog Backend

## Implementation

- The GUI toolkit print dialog is the frontend and there is one backend for each print technology available via D-Bus
- Backends available for CUPS, GCP...
- To provide a new print technology to the system, the provider only needs to supply an appropriate Common Print Dialog Backend, in case of changes he updates his backend
- Backends can be provided via sandboxed packaging, like Snaps

# Common Print Dialog Backend

## How does it work?

- Print dialog asks for available printers, each backend supplies its printers and updates live while the dialog is operational
- User selects printer, dialog requests list of user-settable options from the backend, backend polls needed info from printer, returns info to dialog
- User sets options and prints job, dialog passes on the job to the printer

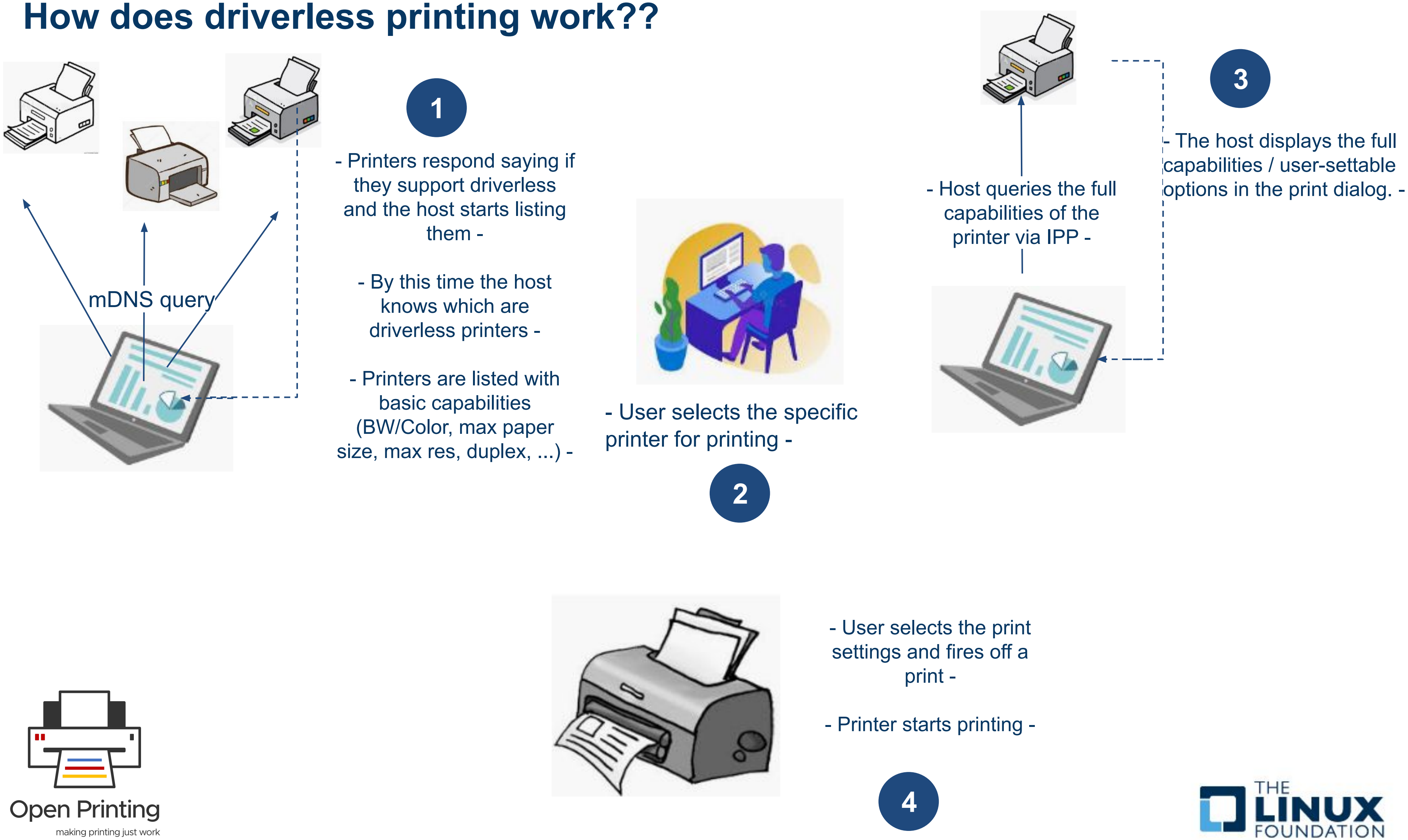
## Challenges

Three major challenges today:

1. Integration
2. Integration
3. Integration

# IPP Printing

## How does driverless printing work??



1

- Printers respond saying if they support driverless and the host starts listing them -

- By this time the host knows which are driverless printers -

- Printers are listed with basic capabilities (BW/Color, max paper size, max res, duplex, ...) -

2

- User selects the specific printer for printing -

3

- Host queries the full capabilities of the printer via IPP -

- The host displays the full capabilities / user-settable options in the print dialog. -

4

- User selects the print settings and fires off a print -

- Printer starts printing -

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# IPP Scanning

## Where scanning in Linux stands today:

- Still following the ages old process of driver installation
- IPP scanning infrastructure not in place like that of print
- IPP scanning standards have already been defined by PWG
- Need support from manufacturers designing firmware for driverless IPP scanning
- SANE community & Open Printing needs to collaborate and work together

## How it is supposed to work

- Like printer, an IPP scanner appears as an IPP server in the network, standard port is also 631
- The scanner has a URI, typically **`ipp://HOST:631/ipp/scan`**
- A multi-function device has both resources with its URIs: **`ipp://HOST:631/ipp/print`**, **`ipp://HOST:631/ipp/scan`**
- As for printing there are IPP requests to query capability info, initiate scan jobs, get status
- The host does not need any device-specific info, all it can get through IPP requests

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# Printer/Scanner Applications

## What are Printer/Scanner Applications?

- Local emulation of an IPP printer/scanner providing driverless printing/scanning to appropriate applications
- Printer/Scanner Application advertises itself via DNS-SD (aka mDNS, Bonjour) and clients communicate via IP (IPP protocol).
- Printer Application contains the filter to conver input to printer's format and sends job off to printer, Scanner Application passes on scan request with scanner's communication protocol. -> Application is the driver
- Printer/Scanner applications can also do other tasks, like IPP-overUSB (ippusbxd), also cups-browsed could be turned into a Printer Application (for clustering, legacy CUPS servers, …)

## Why do we want Printer/Scanner Applications?

- Client applications and CUPS do only handle IPP printers/scanners, no PPDs (Postscript Printer Description in a world of PDF), no printer-model-specific filters
- No drivers need to get placed in the system's file system, communication via IP -> Easy sandboxed packaging (Snap, flatpack, …), one package for all distributions
- Printer/Scanner Applications can be configured in a standardized way via IPP System Service
- Full driverless use of Multi-Function Printers: Printing, Scanning, Fax, Configuration/Admin

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# The Future of Printer Setup Tools - IPP

## Current Printer Setup Tools:

- Create a print queue: Select a printer, assign a driver to it
- Select default option settings for each print queue
- Configure hardware of network printer (not USB printer) via web interface with browser (not printer setup tool)

## Printer Setup Tools will change:

- Thanks to IPP driverless printing print queues set up automatically, both network and USB printers (IPP-over-USB, ippusbxd)
- Configurartion of Printer hardware via IPP System Service (replaces web admin interfaces)
- If printer needs driver, install driver snap to make the printer appear as (locally emulated) driverless IPP printer
- Configure printer clustering with cups-browsed

## Needed GUI interfaces in modern Printer Management Tool:

- Queue overview with access to: Default options, jobs, Hardware config interface
- Hardware configuration via IPP System Service
- Driver Snap search for non-driverless printers/scanners (as long as Snap Store apps do not have hardware association by itself)

# The Future of Printer Setup Tools - IPP

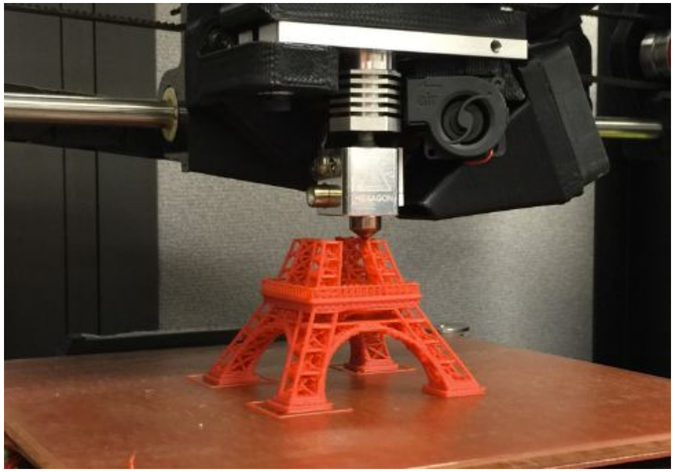
## To Do:

- Find implementors for GTK and Qt
- Abstraction layer between GU and printer access? Add to scp-dbus-service?
- Feature request to Snap Store client applications: Hardware association, make snaps be automatically searched for by present hardware (not only printers and scanners)
- Possible GSoC project ideas

# 3D Printing without the use of any slicer

Design

Slice



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# What Can We Change In 3D Print

- A filter that can convert a 3D design to gcode.
- A common PDL (or should we call it ODL - Object Description Language).
- PWG has already defined the standards.
- Maybe driverless 3D printer in future.

# Thank You

# Thank You !!

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