Creating a low power consumption Print Server

Sub-titled:
An update on Raspberry Pi's
and
What is AArch64, A64, arm64, ARMv8-A, Cortex-A53 & A72?

Waikato Linux Users Group
Ian Stewart
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Print Server - Considerations

- Raspberry Pi / ARM chip has low power consumption
- R-Pi with 64 bit instruction set. AArch64 or A64.
- Linux OS compiled for A64. Ubuntu Server 18.04.3
- Print Server utilities.
- Common Unix Printing System (CUPS)
- Special Drivers
- Remote Management
- Multi-core CPUs
- 4 x USB Ports for printers
- Headless
- Private LAN
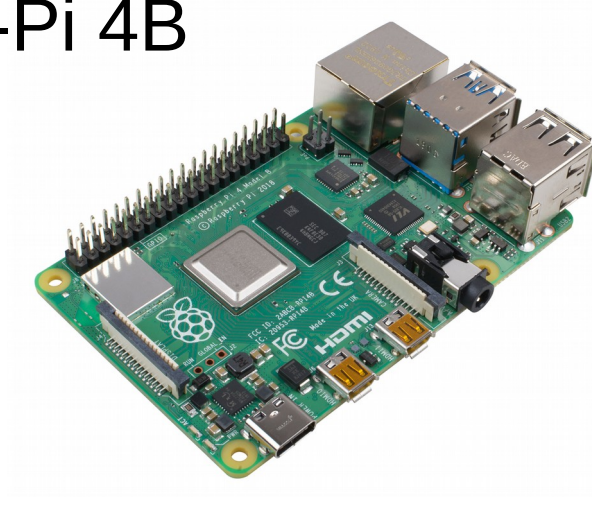
Raspberry Pi's - Multi-core 64/32 bit ARMv8-A

Rpi Version	Model	Broadcom	Cores	Clock
2	B V1.2	BCM2837	4 x Cortex A53	900MHz
3	B	BCM2837	4 x Cortex A53	1.2GHz
3	B+	BCM2837-B0	4 x Cortex A53	1.4GHz
4	B	BCM2711	4 x Cortex-A72	1.5GHz

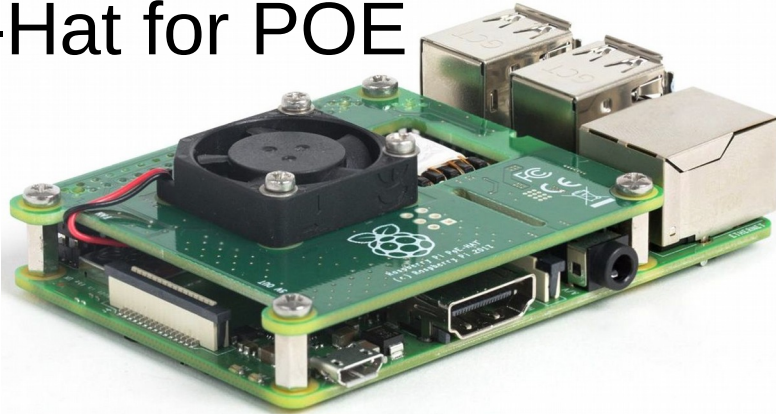# Raspberry Pi's AArch64 - AMDv8-A

R-Pi 3B+

R-Pi 4B

Hi-Hat for POE

Pi Compute Module - 3+

R-Pi 4B Overview – New Features

BCM2711
4 x Cortex-A72
1.5GHz

40 Pin General-purpose input/output Header

PoE HAT Header

Separate Memory Chips: 1GB, 2GB, 4GB

2.4/5GHz Wirless Bluetooth 5.0

Micro SD Card Slot

2-lane MIPI DSI display port

Gigabit Ethernet

2 x USB 3.0

2 x USB 2.0

USB-C Power Port 5V/3A

4-pole stereo audio

2 × micro HDMI ports(up to 4Kp60)

2-lane MIPI CSI camera port
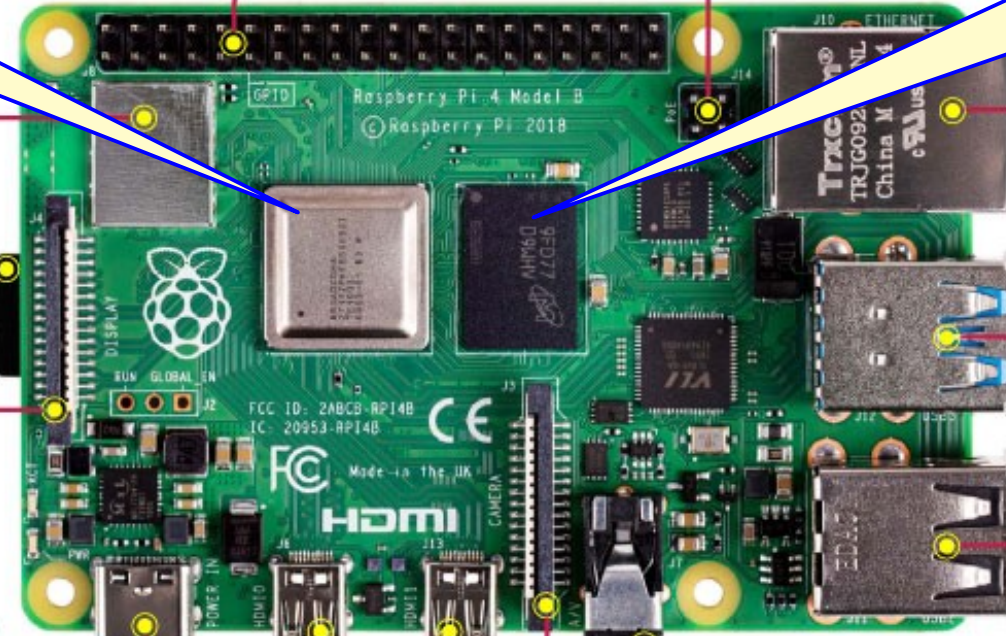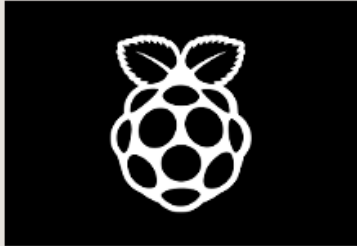
Raspberry Pi – Operating Systems

https://www.raspberrypi.org/downloads/

18.04.2 armhf 32 bit
or
arm64 beta

Downloads

Raspbian is our official operating system for **all** models of the Raspberry Pi.
Download it here, or use **NOOBS**, our easy installer for Raspbian and more.

NOOBS

Raspbian

Debian 10 – Buster
armhf – 32 bit

Third Party Operating System Images

Ubuntu MATE

Ubuntu Core
Hardened for security, optimised for production

Ubuntu Server
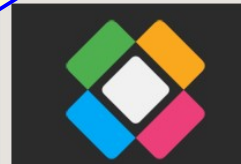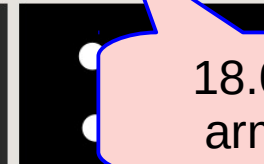
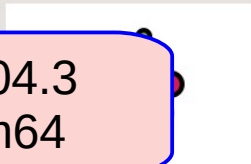Windows 10 IoT Core

18.?? armhf

18.04.3
arm64

OSMC

LibreELEC

Mozilla WebThings

PiNet

RISC OS

Weather Station

IchigoJam RPi

Ubuntu Mate – Download options

Raspberry Pi (recommended)

For aarch32 (ARMv7) computers, like:

- Raspberry Pi Model B 2
- Raspberry Pi Model B 3
- Raspberry Pi Model B 3+

Raspberry Pi (experimental)

For aarch64 (ARMv8) computers, like:

- Raspberry Pi Model B 3
- Raspberry Pi Model B 3+

Which release would you like?

for a Raspberry Pi ARMv7 32-bit system

Which release would you like?

for a Raspberry Pi ARMv8 64-bit system

18.04.2 (Bionic)

Bring the traditional desktop experience to your Raspberry Pi!

Supported until April 2021

beta1

⬇ ubuntu-mate-18.04.2-beta1-desktop-armhf+raspi-ext4.img.xz

⬇ ubuntu-mate-18.04.2-beta1-desktop-arm64+raspi3-ext4.img.xz

Download Size   1.2 GB

Download Size   1.2 GB

Download Ubuntu Server 18.04.3 arm64

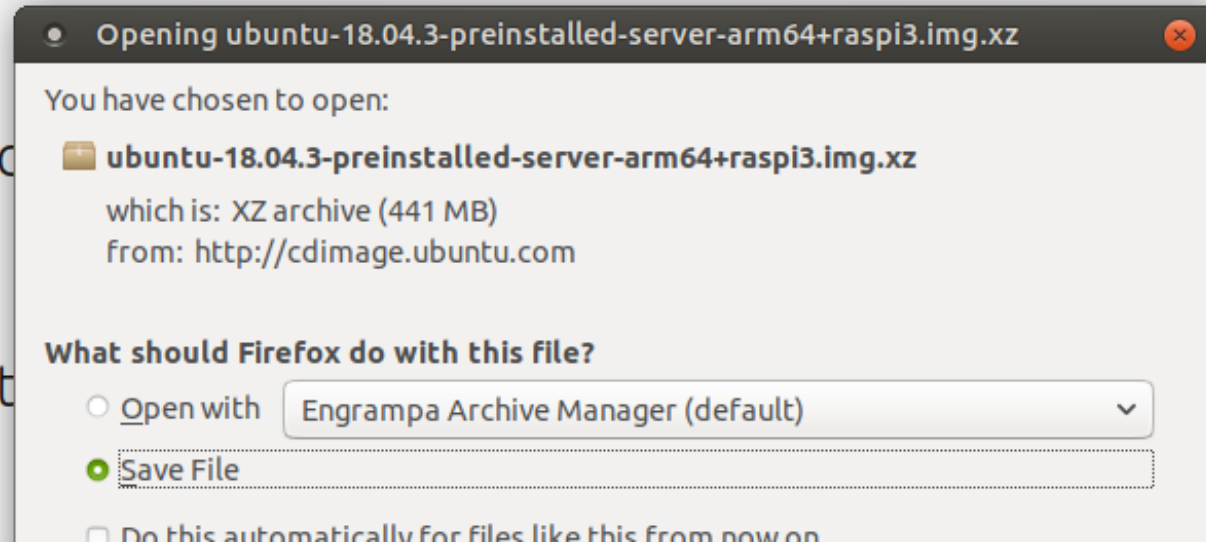## Installation instructions

1 Download Ubuntu Server

Get the correct Ubuntu Server image for your board:

> ARM64 for
> R-Pi 3

- Ubuntu Server image for Raspberry Pi 2. ⬈
- Ubuntu Server image for Raspberry Pi 3 ⬈
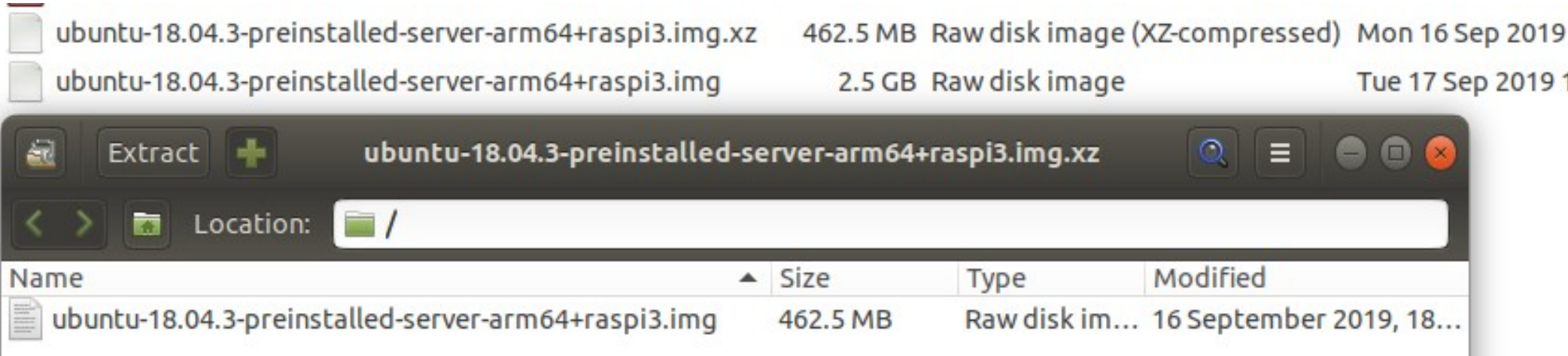- You can verify the integrity of the files using the SHA256SUM ⬈ and SHA256SUM.gpg ⬈ files.

2 Flash the mi~~c~~

Opening ubuntu-18.04.3-preinstalled-server-arm64+raspi3.img.xz

You have chosen to open:

📦 **ubuntu-18.04.3-preinstalled-server-arm64+raspi3.img.xz**

which is: XZ archive (441 MB)
from: http://cdimage.ubuntu.com

What should Firefox do with this file?

○ Open with   Engrampa Archive Manager (default)   ⌄

● Save File

☐ Do this automatically for files like this from now on

card by following the

3 Install Ubunt~~u~~

e board. You can

ower adaptor into the

Archive Manager - extracts the .img file

ubuntu-18.04.3-preinstalled-server-arm64+raspi3.img.xz	462.5 MB	Raw disk image (XZ-compressed)	Mon 16 Sep 2019
ubuntu-18.04.3-preinstalled-server-arm64+raspi3.img	2.5 GB	Raw disk image	Tue 17 Sep 2019 1

Extract ➕ **ubuntu-18.04.3-preinstalled-server-arm64+raspi3.img.xz** 🔍 ≡ ⊖ ⊡ ✖

< > 🏠 Location: 📁 /

Name	▲ Size	Type	Modified
ubuntu-18.04.3-preinstalled-server-arm64+raspi3.img	462.5 MB	Raw disk im...	16 September 2019, 18...

- Install to SD-Card using dd...

```
$ sudo dd bs=32M if=ubuntu-18.04.3-preinstalled-server-arm64+raspi3.img
of=/dev/sdb status=progress conv=fsync
75+1 records in
75+1 records out
2521340928 bytes (2.5 GB, 2.3 GiB) copied, 298.925 s, 8.4 MB/s
```

Boot R-Pi – Start Tailoring

- Insert SD-Card into R-Pi
- Boot R-Pi
- Login to ubuntu account, password: ubuntu
- Forced to change password.
- Plug into ethernet and get dhcp server address.
- `$ sudo apt update`
- `$ sudo apt dist-upgrade` # <-- 58 Packages
- `$ reboot`

Optional: Implement networking policy.
- Change Hostname.
- Modem providing fixed IP.

Create print-server

- **$ sudo apt install tasksel**
- **$ sudo tasksel**
- From Tasksel Menu, note "Cloud Image" installed.
- Select installation of "Print Server" applications (122 files).
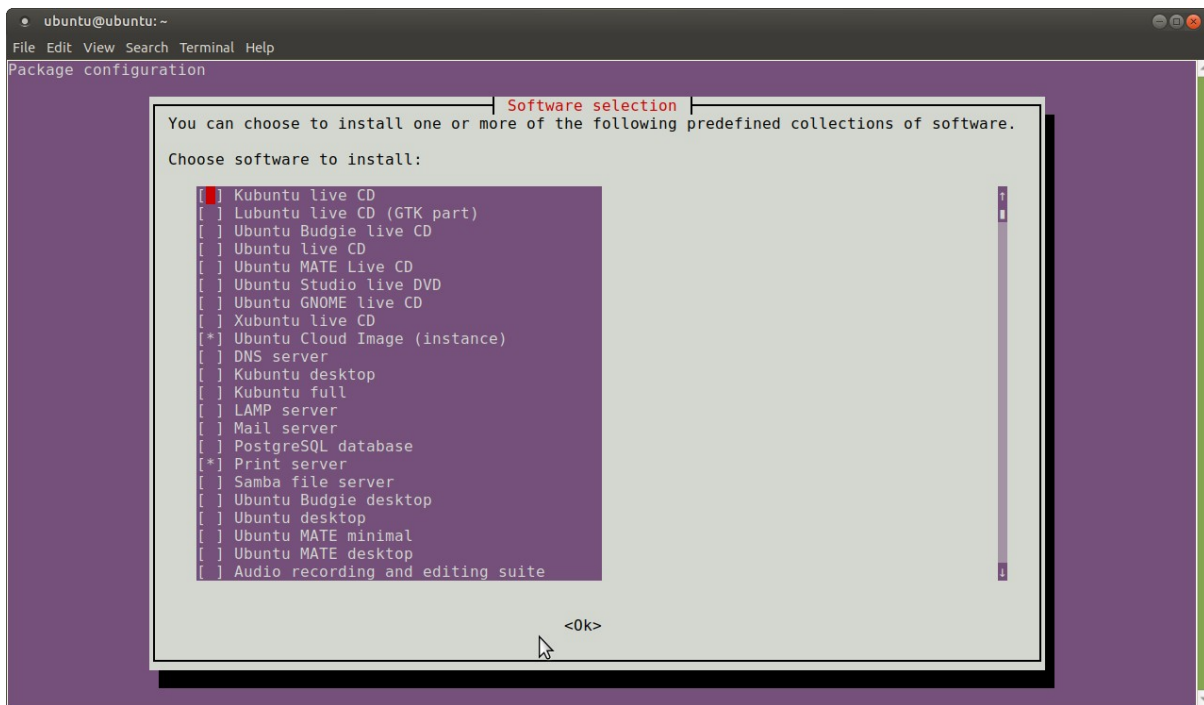
Create print-server

Does the printer need special drivers?
- **$ apt-cache search printer-driver**

Returns:
all, brlaser, c2050, c2esp, cjet, cups, dymo, escpr, foo2zjs, foo2zjs, fujixerox, gutenprint, hpcups, hpijs, indexbraille, locale, m2300w, min12xxw, oki, OpenPrinting, pnm2ppa, postscript, ptouch, pxljr, sag, splix

Example:
- **$ sudo apt install printer-driver-brlaser**

SSH into "ubuntu" account on print server

- In this case the print-server was dhcp served 10.1.1.9

```
$ ssh ubuntu@10.1.1.9
ubuntu@10.1.1.9's password:
Welcome to Ubuntu 18.04.3 LTS (GNU/Linux 4.15.0-1041-raspi2 aarch64)

 * Documentation:  https://help.ubuntu.com
 * Management:     https://landscape.canonical.com
 * Support:        https://ubuntu.com/advantage

  System information as of Tue Sep 17 00:47:59 UTC 2019

  System load:  2.5                Processes:           133
  Usage of /:   5.5% of 28.21GB    Users logged in:     1
  Memory usage: 27%                IP address for eth0: 10.1.1.9
  Swap usage:   0%
```

2018 Q1

ARM Architecture 64 amd64 ARMv8-A

DHCP served IP address

Set CUPS for remote administration

- **ubuntu@ubuntu:~$ sudo cupsctl --remote-admin --remote-any –share-printers**

 Add "ubuntu" account to the lpadmin group
- **ubuntu@ubuntu:~$ sudo usermod -a -G lpadmin ubuntu**

Check CUPS status

```
ubuntu@ubuntu:~$ sudo service cups restart
ubuntu@ubuntu:~$ sudo service cups status
● cups.service - CUPS Scheduler
   Loaded: loaded (/lib/systemd/system/cups.service; enabled; vendor
preset: enabled)
   Active: active (running) since Tue 2019-09-17 01:20:34 UTC; 2s ago
     Docs: man:cupsd(8)
 Main PID: 6530 (cupsd)
    Tasks: 3 (limit: 1056)
   CGroup: /system.slice/cups.service
           ├─6530 /usr/sbin/cupsd -l
           └─6533 /usr/lib/cups/notifier/dbus dbus://

Sep 17 01:19:21 ubuntu systemd[1]: Started CUPS Scheduler.
```

CUPS Remote Administration

Browser window titled "Administration - CUPS 2.2.7 - Mozilla Firefox"

Address bar: 10.1.1.9:631/admin

Callout: **10.1.1.9:631**

Navigation: CUPS.org | Home | Administration | Classes | Help | Jobs | Printers

Administration

Printers

[Add Printer] [Find New Printers] [Manage Printers]

Classes

[Add Class] [Manage Classes]

Jobs

[Manage Jobs]

RSS Subscriptions

[Add RSS Subscription]

Server

[Edit Configuration File] [View Access Log] [View Error Log]
[View Page Log]

Server Settings:

Advanced ▶
- ☑ Share printers connected to this system
    - ☑ Allow printing from the Internet
- ☑ Allow remote administration
- ☐ Use Kerberos authentication (FAQ)
- ☐ Allow users to cancel any job (not just their own)
- ☐ Save debugging information for troubleshooting

[Change Settings]

CUPS - Authorisation

CUPS – Add Printer

Add Printer

Add Printer

Local Printers: ○ Brother DCP-7065DN (Brother DCP-7065DN) → *Via USB port on R-Pi*
○ CUPS-BRF (Virtual Braille BRF Printer)
○ Serial Port #1

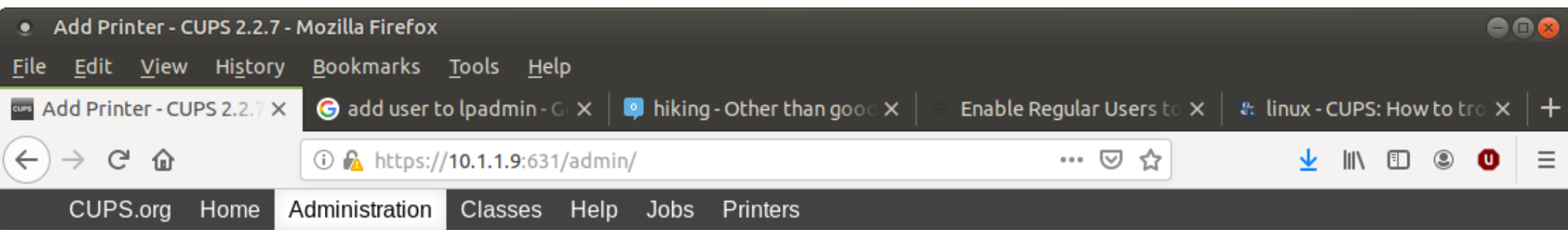**Discovered Network Printers:** ○ Brother DCP-7065DN (Brother DCP-7065DN) → *Via Ethernet connection to LAN*

Other Network Printers: ○ Internet Printing Protocol (ipp)
○ Internet Printing Protocol (http)
○ Backend Error Handler
○ Internet Printing Protocol (ipps)
○ AppSocket/HP JetDirect
○ Internet Printing Protocol (https)
○ LPD/LPR Host or Printer

[Continue]

CUPS – Select USB connection to Printer

CUPS – Add Shared Printer

CUPS – Using brlaser driver

Add Printer

Name: Brother_DCP-7065DN

Description: Brother DCP-7065DN

Location:

Connection: usb://Brother/DCP-7065DN?serial=E69895C1N312327

Sharing: Share This Printer

Make: Brother [Select Another Make/Manufacturer]

Model:
```
Brother DCP-7065DN, using brlaser v4 (en)
Brother DCP-1200 - CUPS+Gutenprint v5.2.13 (en)
Brother DCP-1200 Foomatic/hl1250 (recommended) (en)
Brother DCP-1200 Foomatic/ljet2p (en)
Brother DCP-1510 series, using brlaser v4 (en)
Brother DCP-7010 Foomatic/hl1250 (recommended) (en)
Brother DCP-7010 Foomatic/lj4dith (en)
Brother DCP-7010 Foomatic/ljet4 (en)
Brother DCP-7010 Foomatic/ljet4d (en)
Brother DCP-7020 Foomatic/hl1250 (recommended) (en)
```

Or Provide a PPD File: [Browse...] No file selected.

[Add Printer]

CUPS – Changing Printer Setup

CUPS – Print Test Page

Brother_DCP-7065DN

Brother_DCP-7065DN (Idle, Accepting Jobs, Shared)

| Maintenance ⌄ | Administration ⌄ |

- Maintenance
- Print Test Page
- Pause Printer
- Reject Jobs
- Move All Jobs
- Cancel All Jobs

er DCP-7065DN

er DCP-7065DN, using brlaser v4 (grayscale, 2-sided printing)

/Brother/DCP-7065DN?serial=E69895C1N312327

heets=none, none media=iso_a4_210x297mm sides=two-sided-long-edge

Search in Brother_DCP-7065DN: [_____] [Search] [Clear]

[Show Completed Jobs] [Show All Jobs]

Jobs listed in print order; held jobs appear first.

CUPS – Status

Brother_DCP-7065DN (Idle, Accepting Jobs, Shared)

[Maintenance ˅] [Administration ˅]

Description: Brother DCP-7065DN
Location:
Driver: Brother DCP-7065DN, using brlaser v4 (grayscale, 2-sided printing)
Connection: usb://Brother/DCP-7065DN?serial=E69895C1N312327
Defaults: job-sheets=none, none media=iso_a4_210x297mm sides=two-sided-long-edge

Jobs

Search in Brother_DCP-7065DN: [   ] [Search] [Clear]

[Show Active Jobs] [Show All Jobs]

Jobs listed in descending order.

ID	Name	User	Size	Pages	State	Control
Brother_DCP-7065DN-1	Unknown	Withheld	1k	2	completed at Tue Sep 17 01:44:29 2019	[Reprint Job]

Computers on the Network

- Click on System -> Administration -> Printers
- The print servers printer will now appear with the print-servers Hostname in its name.
- Proceed to print to this print server printer.

print server "ubuntu" printer
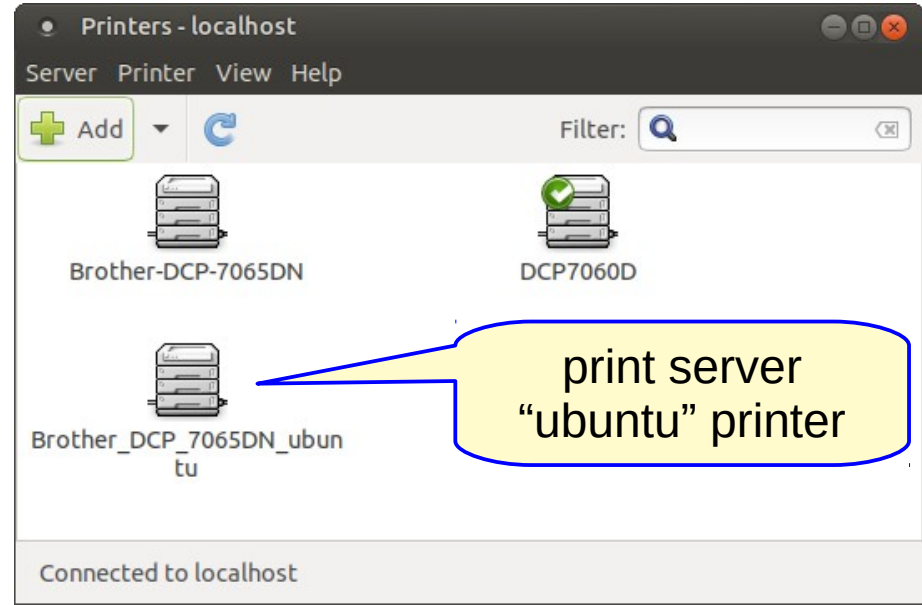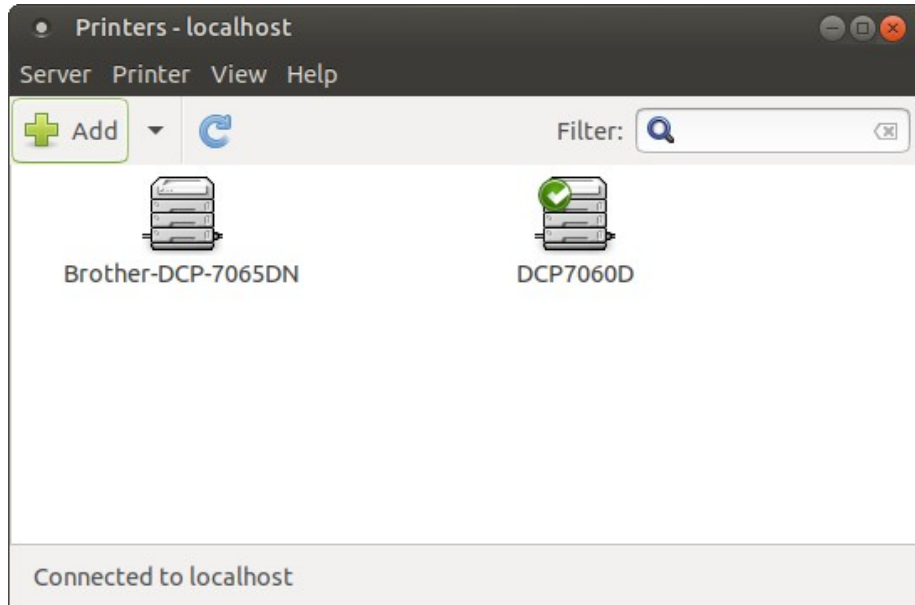
Computers on the Network

Questions / Discussion