



Daniel Dressler

What is ippusbxd

- Open source ipp over usb driver
- Licensed under corporate friendly Apache 2.0
- Depends on Libusb and posixs networking
- Development as a Google Summer of Code project
- Releasing for Linux soon! Hopefully
- Not to be confused with Mac's ippusbcd

What is IPP over USB

- Light weight standard at only 22 pages
- Ratified by USB forum in 2012
- Supported by Mac OSX
- Exposes printer's IPP server
- Can expose printer's embedded web server over localhost

DEMO

Example Data Flow

Interface #1

HTTP request: Ippusbxd => BULK OUT => Printer
HTTP response: Ippusbxd <= BULK IN <= Printer

Interface #2

HTTP request: Ippusbxd => BULK OUT => Printer
HTTP response: Ippusbxd <= BULK IN <= Printer

Interface #N

HTTP request: Ippusbxd => BULK OUT => Printer
HTTP response: Ippusbxd <= BULK IN <= Printer

Interactions may occur simultaneously

Known Issues

- TCP is connection oriented
- USB has no connections
- TCP has **software** limited connection count
- USB has **hardware** limited interface count

Solution: inspecting sizes

- Driver inspects HTTP message size and knows when interface goes out of use.

yet

- HTTP has five methods for marking size
- Two of HTTP's methods cannot be supported
- Encryption blocks reading size, cannot be supported

Not all valid HTTP message are supportable

What the printer should do

- Always use Content-length or Chunked Transfer-encoding for messages with bodys
- Always use full CRLF line endings in headers and chunked messages
- Reject any requests for encryption
- Reject any requests for file application defined message delimiting

Ippusbxd Control flow

Ippusbxd pools interfaces between every request-response cycle

1. Browser connects to ippusbxd
2. Browser sends request
3. ippusbxd acquires USB interface from pool
4. ippusbxd sends request over BULK OUT
5. ippusbxd polls BULK IN for printer's response
6. ippusbxd sends response to browser
7. ippusbxd returns interface to pool
8. Goto step 2

This allows ippusbxd to handle any number of TCP connections

Implementing IPP-USB in printers

- Existing embedded web servers and ipp printer servers will already handle the HTTP handling.
- Depending on implementation details supporting ipp over usb may be as simple as treating the usb interfaces as always open tcp connections

Q&A