Open PAYGO Link

- Requirements and goals
  - Features
  - Targets and code size
- System overview
  - Internal commands & external data
  - State machines
  - Flow diagrams

Requirements and goals

Features

- Half-duplex communication over 1 wire core
- Easily integratable within existing devices with minor modifications or as an add-on board
- Support for resource models (set and get)
- Basic security (xor encryption, signatures ...)

Requirements and goals

Targets and code size

- Our actual target is an STM8s board with 8kb of flash and 1kb of RAM (to make cheap add-on boards).
- Many MCU families support addressable 9 bit uart.
- Actual OPLink firmware is around 4kb, with an expected 3-4kb for the CoAP, CBOR & main application code.
- Slave nodes are the most constrained, as appliances are usually more sensible to a price increase.

System overview

Internal commands and external data

- The OPLink frame is composed of a (2 byte) header, a (0 - 128 byte) payload and a (2 byte) CRC.
- The header contains the destination address, the message mode and the payload length [Addr, M + Len].
- The internal commands are not extensible and are used to configure the node after being connected.
- The external data refers to the CoAP (or any other protocol / data format) messages.

System overview

State machines

- Data reception control (Idle, Receiving, Ready)

  If the address matches the node address, a counter verifies that all the bytes have been read.

  A timeout is implemented to handle incomplete transmissions and requests.

  Reading from the receive buffer can be done asynchronously. The CRC is verified after reading the whole payload to avoid intermediate buffers.

System overview

State machines

- Network state & auto addressing (Disconnected, Plugged, Signal, Handshake, Connected)

  Slave nodes sense the network pull up, and after checking that the bus is idle they send a presence signal (collisions are avoided with random delays).

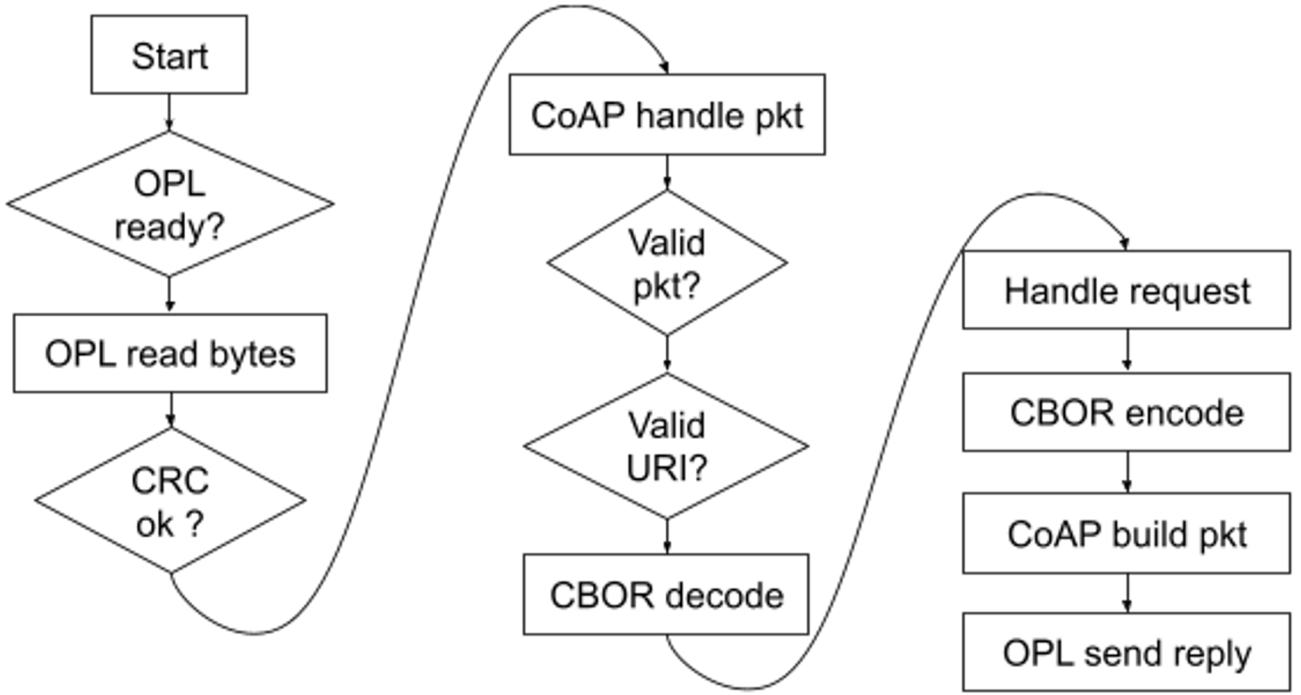
  Upon reception the master starts the handshake.

  Nodes can be connected and disconnected without the need of a power reset (in case of a separate connector).

System overview

Flow diagrams

- Slave: acts as a server with exposed resources



System overview

Flow diagrams

- Master: acts as a client sending GET and PUT requests