Dev and App roles for SCHC header compression over IEEE 802.15.4 networks

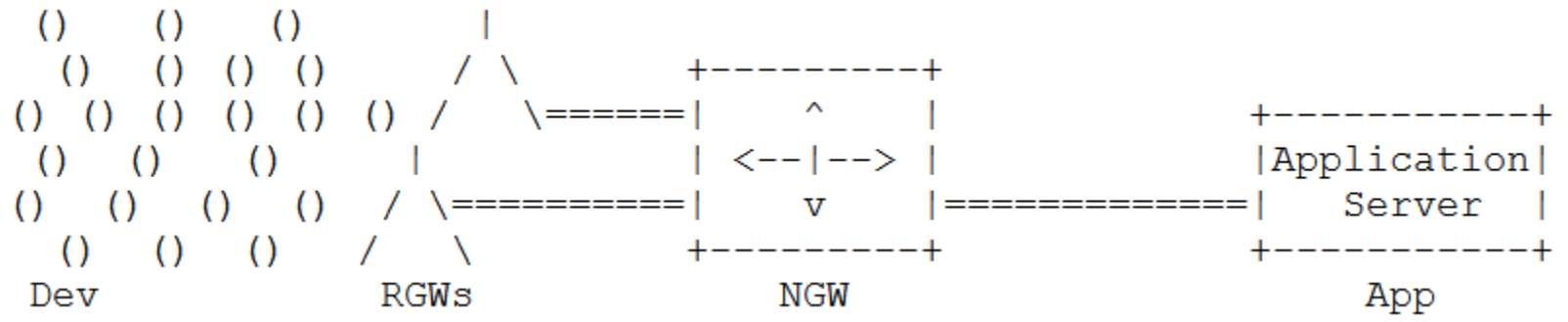
Related draft:

draft-gomez-6lo-schc-15dot4-01

February 2022

Dev and App

- RFC 8376 defines “Dev” and “App”
  - Dev: “sensor, actuator, device, object”
  - App: “application” or “application server”
- RFC 8724 uses “Dev” and “App”
  - App: “It runs an application sending/receiving packets to/from the Dev.”
  - App: “… is the endpoint of the application- level protocol on the Internet side”



Source: RFC 8724

Uplink and Downlink

- RFC 8724 defines “Uplink” and “Downlink” based on “Dev” and “App”
  - Uplink: from Dev to App
  - Downlink: from App to Dev

Dev and App in LPWAN

- The Dev and App roles fit well the LPWAN scenario:
  - A SCHC entity knows whether it corresponds to Dev or App
  - RFC 8724: compression rules for some IPv6 and UDP header fields (Prefix, IID, Port) are expressed in terms of Dev and App
    - NOT by the position of these fields in the headers
  - Advantage: the same Rule can be used for C/D for both directions:
    - When a Dev has to compress, a source address/port corresponds to the Dev address/port in a Rule
    - When a Dev has to decompress, a source address/port corresponds to an App address/port in a Rule

Dev/App in 802.15.4 networks?

- Star topology networks, with the constrained devices talking to some “network side” App
  - The current Dev/App model fits well here as well…

- However, in mesh topologies:
  - There may be peer-to-peer scenarios where two constrained devices talk to each other
    - It is less clear which is the role that corresponds to each… Both are candidates to be “Dev”…

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- Examples

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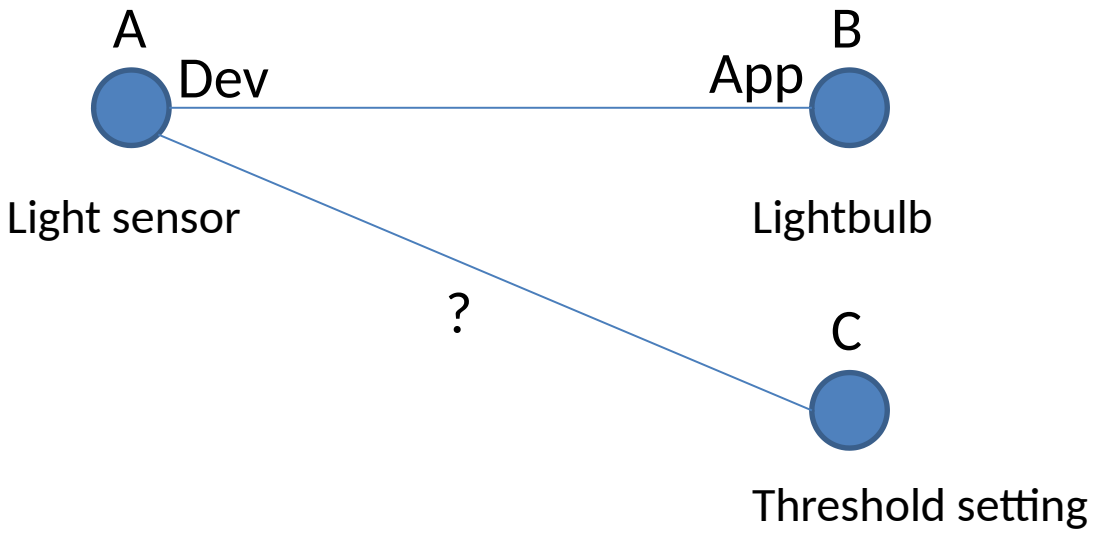
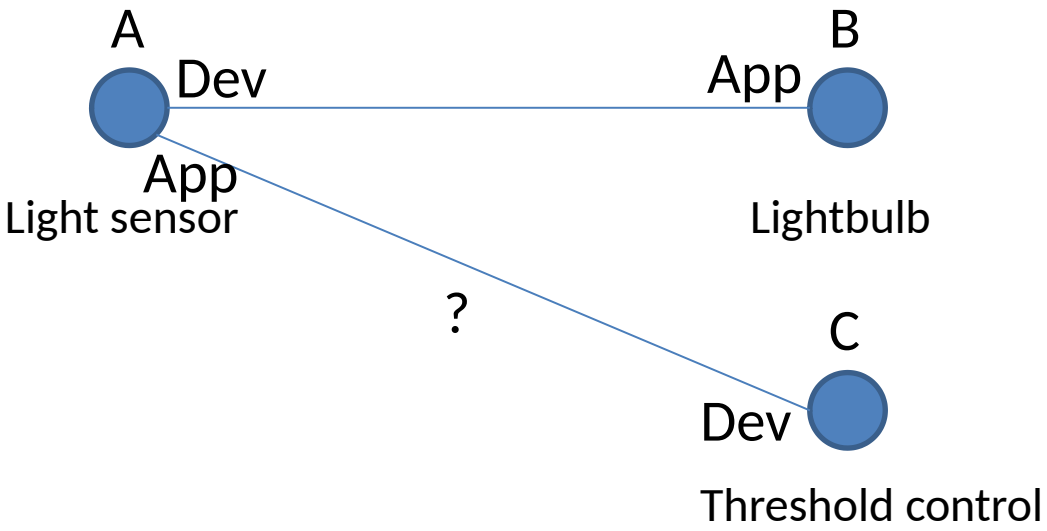


Dev/App in 802.15.4 networks?

- Examples



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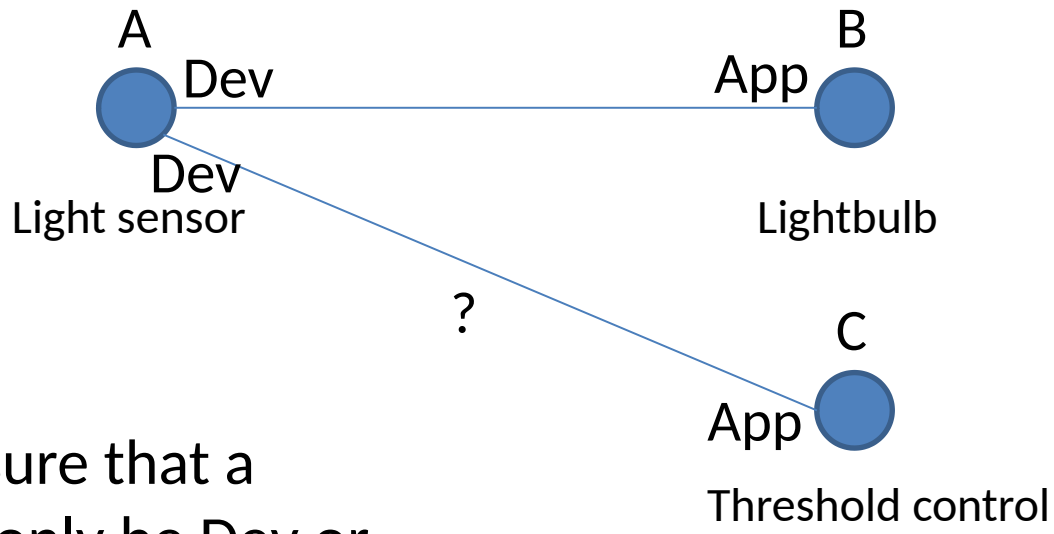

Can we ensure that a device will only be Dev or App for all its interactions? As scenarios become more complex, probably not…

Dev and App in 802.15.4 networks?

- For the peer-to-peer scenario:
  - If we stick to RFC 8724, each device might need to know whether it is “Dev” or “App” when talking to another device
    - Additional complexity: a SCHC entity may need to know its role even for each possible communication endpoint
  - Another approach: use “Source” and “Destination” in the Rules, instead of “Dev” or “App”
    - Avoids the previous complexity, although it requires one Rule for each direction
    - Extends RFC 8724 for a peer-to-peer scenario

Dev and App in 802.15.4 networks?

- For the peer-to-peer scenario, another consequence:
  - If we stick to RFC 8724, each device might need to know whether it is “Dev” or “App” when talking to another device
    - “Uplink” and “Downlink” are specific to each pair of endpoints
  - Another approach: use “Transmit” and “Receive” in the Rules, instead of “Uplink” or “Downlink”