Distributed Infrastructure for IoT

Carsten Bormann 2016-07-19

Why distributed?

- No trust in centralized function

  - Avoid rent-seeking opportunities

- Easier to operate (!)

- Latency!

Blockchain registries - the future of protocol operations

Alexander Pelov (a@ackl.io)

Protocols need registries that scale

- Protocols and the need for protocol codes
  - CoAP
    - Content-Format
  - CoOL
    - Structured Identifiers
      - IANA allocates SID range to Registrar
      - Registrar allocates sub-ranges to modules
      - (optional) modules can publish the identifiers and the corresponding SIDs (a SID file)

Problem

If no control – a greedy person can allocate all IDs

Blockchain

- Immutable, trustable registry
  - E.g. bitcoin – once a transaction has passed it stays in the blockchain forever
  - 80 bytes of "comment"

- Cheap, tamper-proof public databases
  - Land registries (Hunduras, Greece)

- Solution
  - Use blockchain to allocate the IDs
  - Open question: pricing
    - Pay for each allocated ID?

Data Sharing

- Distributed Infrastructure can be used to find data

- … and to store data

- Microservices can be paid for with "gas"

- Data can be paid for with micropayments

Reputation

- Users of information can evaluate its quality

- Make available signed, anonymous reputation information

- Authorization based on reputation ("AirBNB")

Local Processing

- Find a local "data center" within 1 ms RTT

- Obtain attestation of services

  - Authority-based

  - Reputation-based

- Help create one with "smart contracts"

Mobile code

- Can't upgrade everything at the same time

- Many functions can be solved in mobile code

    - Running in IoT devices (!)

    - Running in local data hubs

- Controlled resource usage