Case Study:

Ensuring the data delivery with IoT Protocols

Workshop on New Frontiers in IoT

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Context

- To enable connectivity between two endpoints
- To increase the applicability of IoT
- To address different challenges
  - Mobility issues

Problems

- Most of the services are expected to be
  - on fixed locations and standard PC's.
  - Delivered to non mobile devices/users.

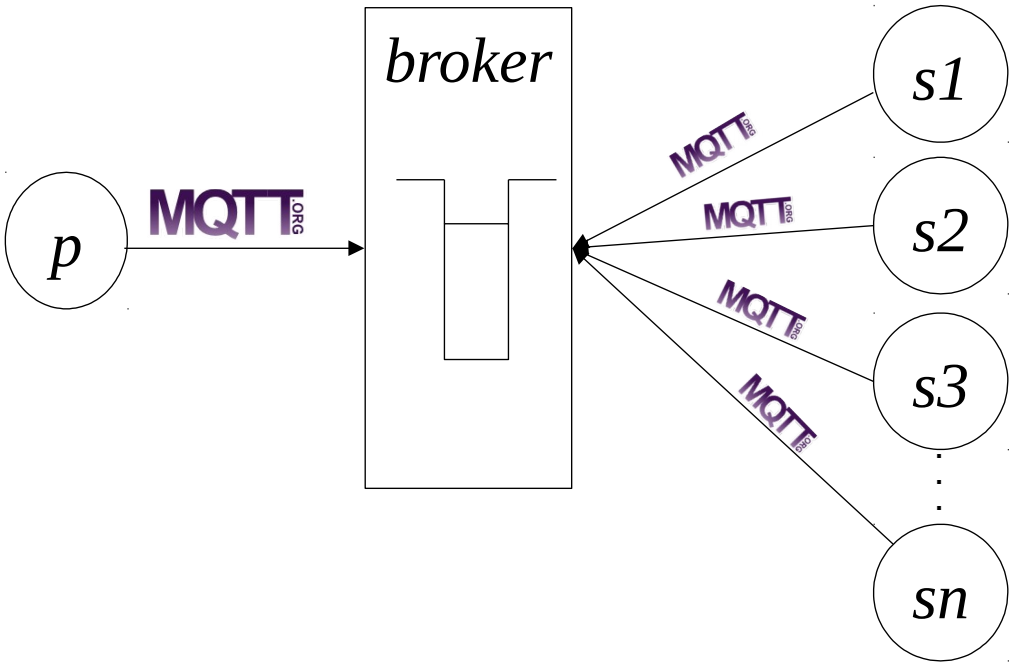
- Adding mobility implies:
  - Connection losses
  - Losses of information

IoT Data Transfer Protocols

- HTTP as Restful API
- CoAP
- MQTT
- AMQP
- XMPP
- STOMP
- DDS
- DNP3
- LWM2M
- ...

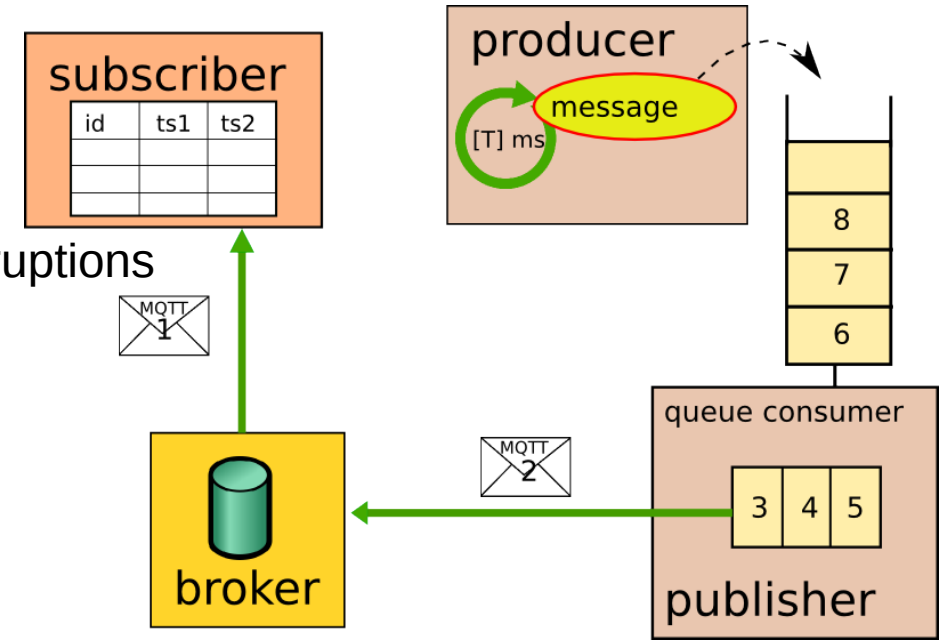
MQTT - Message Queue Telemetric Transport

- Designed for IoT, M2M, and constrained networks
- Open, simple, easy to implement
- Lightweight (Minimal overhead)
- Publish and Subscribe Architecture
- Based on top of TCP
- 3 levels of QoS
  - Fire and forget
  - At least once
  - Exactly once



Previous Work

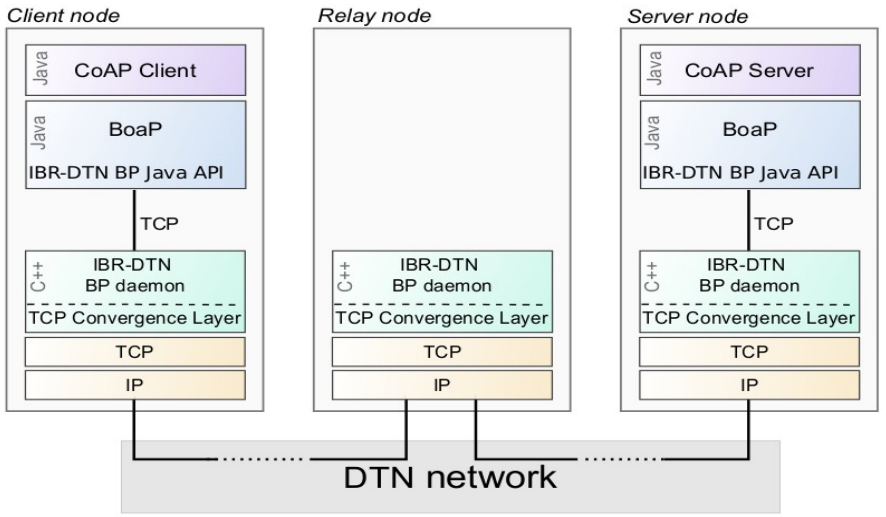
- Maintain the publish/subscribe architecture
- Intermediate buffering (process decoupled)
  - the data generation process
  - the data sending process
- Allow recovery
  - In presence of disruption periods
  - Channels and connections that suffer interruptions
  - Even frequent, longer periods
- Network control mechanism
  - To create new connections
  - To close aborted sessions

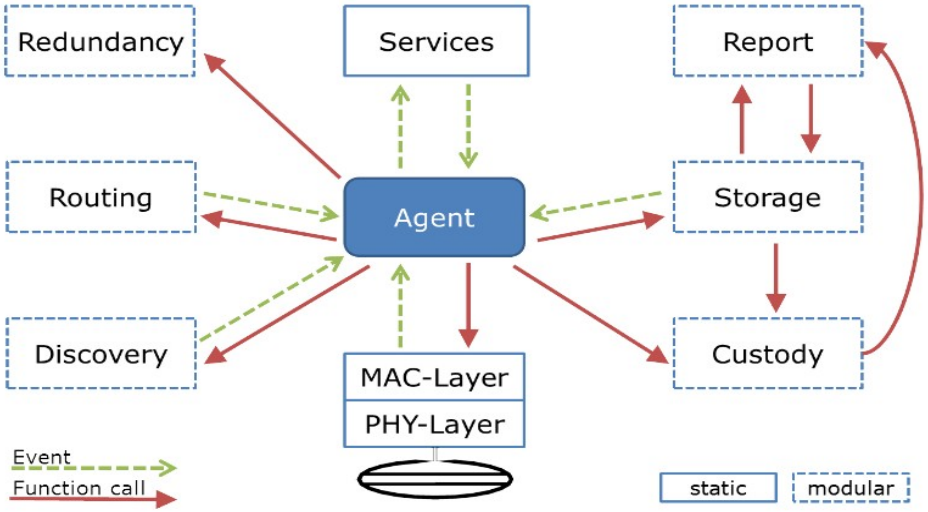


Luzuriaga J. et. al. “Handling Mobility in IoT applications using the MQTT protocol”, Proceedings of the Sixth International Conference ITA2015.

Related Work

CoAP over BP for a Delay-Tolerant Internet of Things





An Overview of μDTN: Unifying DTNs and WSNs

Auzias M., Yves Mahéo Y. and Raimbault F., “CoAP over BP for a Delay-Tolerant Internet of Things”, 2015.

Zengen G., Büsching F., Pöttner W., and Wolf L. "An Overview of µ DTN: Unifying DTNs and WSNs", 2012.

µDTN – micro Delay Tolerant Networks

- DTN implementation for Contiki OS
- Suitable for low-power wireless sensor nodes
- Wireless communication via IEEE 802.15.4
- Developed by the Technical University of Braunschweig in 2012
- Interoperability with IBR-DTN on Linux

https://www.ibr.cs.tu-bs.de/trac/mudtn/

Future Work

- Enable the Delay Tolerant Network with Publish and Subscribe architecture.
  - Implementation of a BP binding for MQTT
  - Preliminary tests

Thank you.

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