Let us know what you think

Click ‘engage’ to rate sessions and ask questions

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Why we need Event Driven Design
and why RPC won’t work
Boy Scout?
Electrical Engineering
Connecting things with MQTT
What is MQTT

- Lightweight Protocol for IoT (and M2M)
- Resilient in poor network conditions
- Low Power
- Simple Broker
- Publish to / Subscribe from topics
MQTT Communication Basics

- **Thing**
  - **Client**
  - PUBLISH
    - topic: /v1/123xyd/data
  - SUBSCRIBE

- **Service**
  - **Broker**
MQTT Communication Basics

QoS 0 = at most once (fire and forget)

**Thing**

**Client**

PUBLISH QoS 0
topic: /v1/123xyd/data

**Service**

**Broker**
MQTT Communication Basics

QoS 1 = at least once

**Thing**

**Service**

Client

Broker

PUBLISH QoS 1

topic: /v1/123xyd/data

PUBACK
QoS 2 = exactly once

**Thing**

Client

Service

Broker

- PUBLISH QoS 2
- topic: /v1/123xyd/data
- PUBREC
- PUBREL
- PUBCOMP
no response is also a response
Advantages / Disadvantages

Light-weight
Low Power
no complicated Mime-types
no enums of errors
no fuss

No Feedback
No Feedback
No Feedback
Keep it Simple
A light bulb

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Simple Electric Circuit

- Power Pack: 2 D size batteries
- Switch
- 3 volt flashlight bulb
IoT Lightbulb
<table>
<thead>
<tr>
<th>Switch</th>
<th>Internet</th>
<th>Broker</th>
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Double Trouble
Staircase Lights (two way switch)

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<tr>
<th>Switch A up</th>
<th>Switch A down</th>
<th>Switch B up</th>
<th>Switch B down</th>
<th>Light</th>
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IoT Lightbulb

Subscribed

Publish

Ack

Ack

on

off

on

off
Too
Long
;
Didn’t
Write
The number of *errors* grows “exponentially” with the number of devices in a connected IoT system.
Smart building
Mitko

- Building as a development platform
- Data Center in a container
- Big Data Generator
- Intelligent Building
- Ability to Learn
Connecting the BMS

Vertex

Bacnet Adapter

Compressor
Main Boiler
DALI
AirCon Vents
Heating Vents
Fans
Cooling pump
Heating Pump
Adding Sensors for HVAC

BOSCH

150 WiFi enabled Modules
readings for:
- Temperature
- Humidity
- Barometric pressure
- Luminosity

relayr
bring things to life

50 Ethernet enabled Modules
readings for:
- Temperature
- Humidity
- Luminosity
- Sound levels
Adding the Sensors

- Compressor
- Main Boiler
- DALI
- AirCon Vents
- Heating Vents
- Fans
- Cooling pump
- Heating Pump
Enriching the data for presence

Measuring all probes from APs
  Detection
  Identification
  movement
  Presence

20 Facial recognition Door Locks
  no more name badges
Adding users to the picture

**Measuring Sentiment from Users**

- Temperature
- Heart Rate
- Blood Sugar
What do these rules do?

Lighting Management
Heating Management
Ventilation and Air Conditioning
IoT Lightbulb

Subscribed → Cloud → Publish → Ack

Lightbulb:
- on
- off
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In an (simple) HTTP World

- switch on light
- post command
- permission denied
- post command
- permission denied
Dumb Clients
import mqtt from 'mqtt';

var LightSwitch = function(id) {
    this.id = id;
};

LightSwitch.prototype.switchOn = function() {
    var err = function() {
        // DO SOMETHING HERE
    };

    mqtt.publish(err, {
        state: 1
    });
};

var mySwitch = new LightSwitch(123);
mySwitch.switchOn();
The Intelligence is in the Cloud

relayr

bring **things** to life

...or a local fog node
Simple Rules

Sensor Data

- Previous Data aggregates flags
- Trigger Points Messages
- Commands
  - App Notifications
  - Emails
  - State Modifications

DataStore

Config

Output Channels

Rule Execution

Output Data

Sensor data Timed Events
Multiple Rules

Presence Detected

Night Sequence

Manual Switching

Rules Engine
Strong disconnect between cause and action
Clients cannot maintain their own state
No guarantee on the outcome of a successfully executed function
Thank You!

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Connecting Things to the Internet since 2013
Please Remember to rate session

Thank you!

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