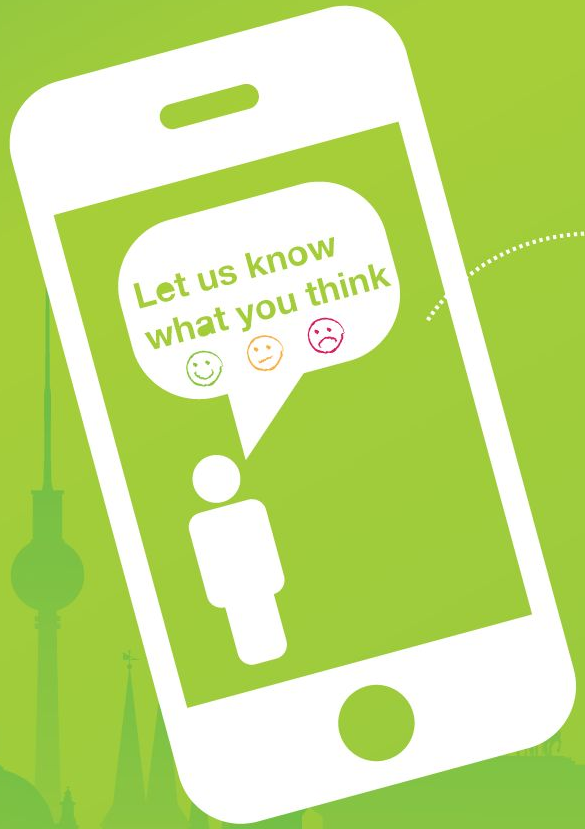
goto; conference



Click ‘engage’
to rate sessions
and ask questions

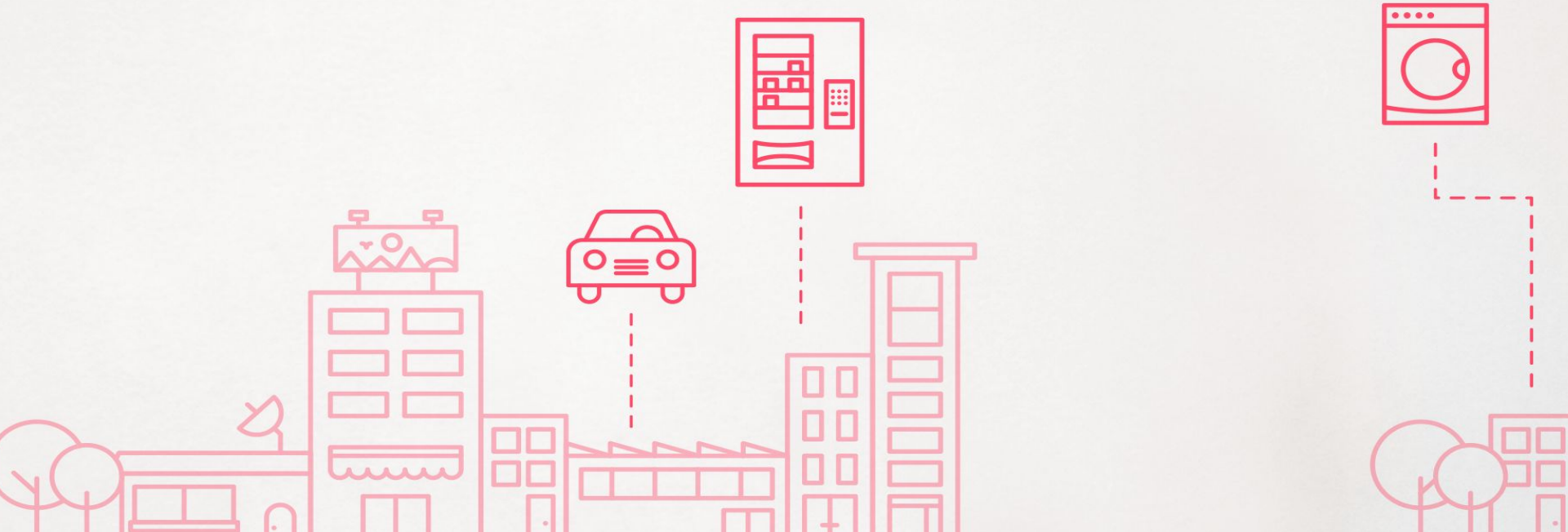
Follow us on Twitter @GOTOber

www.gotober.com

Why we need Event Driven Design

and why RPC won't work

relayr
bring things to life



About Me

relayr

bring **things** to life

Paul Hopton Co-Founder & Chief Engineer

@hoptonpaul | https://github.com/paulhopton | https://www.linkedin.com/in/paulhopton

Boy Scout?

Electrical Engineering

Connecting things with MQTT

What is MQTT

Lightweight Protocol for IoT (and M2M)

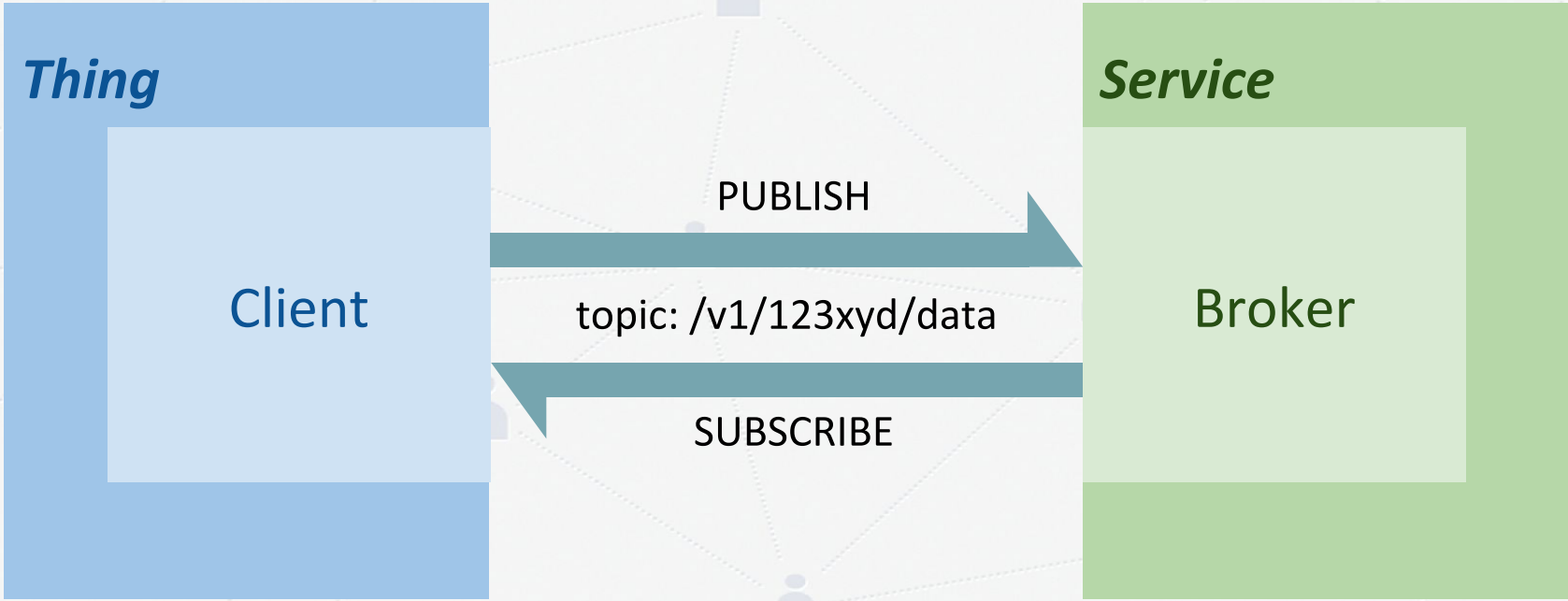
Resilient in poor network conditions

Low Power

Simple Broker

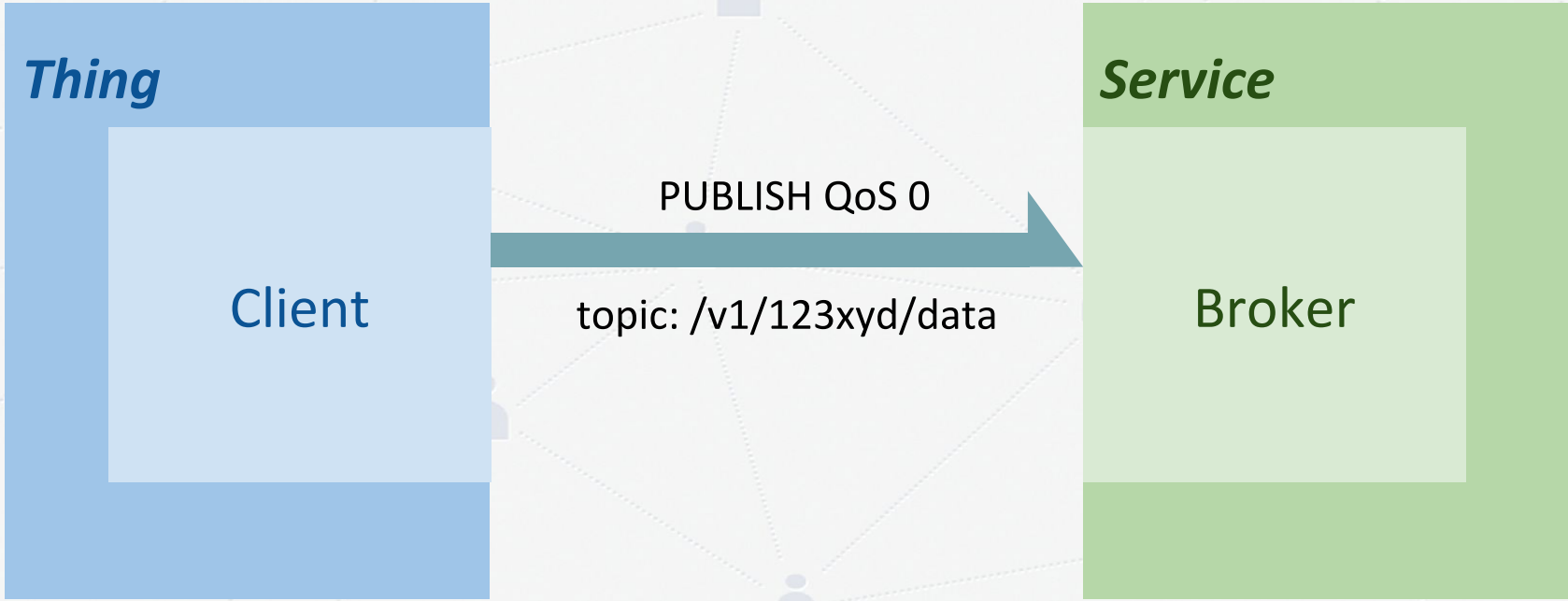
Publish to / Subscribe from topics

MQTT Communication Basics



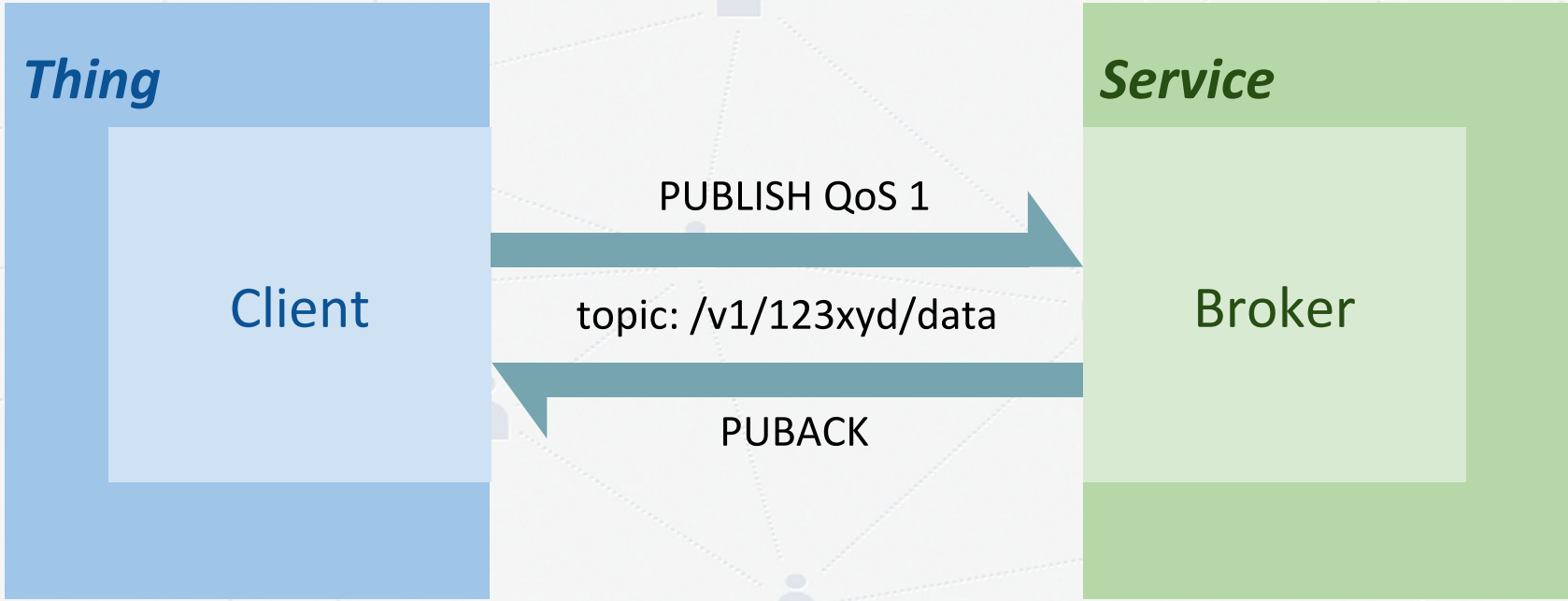
MQTT Communication Basics

QoS 0 = at most once (fire and forget)



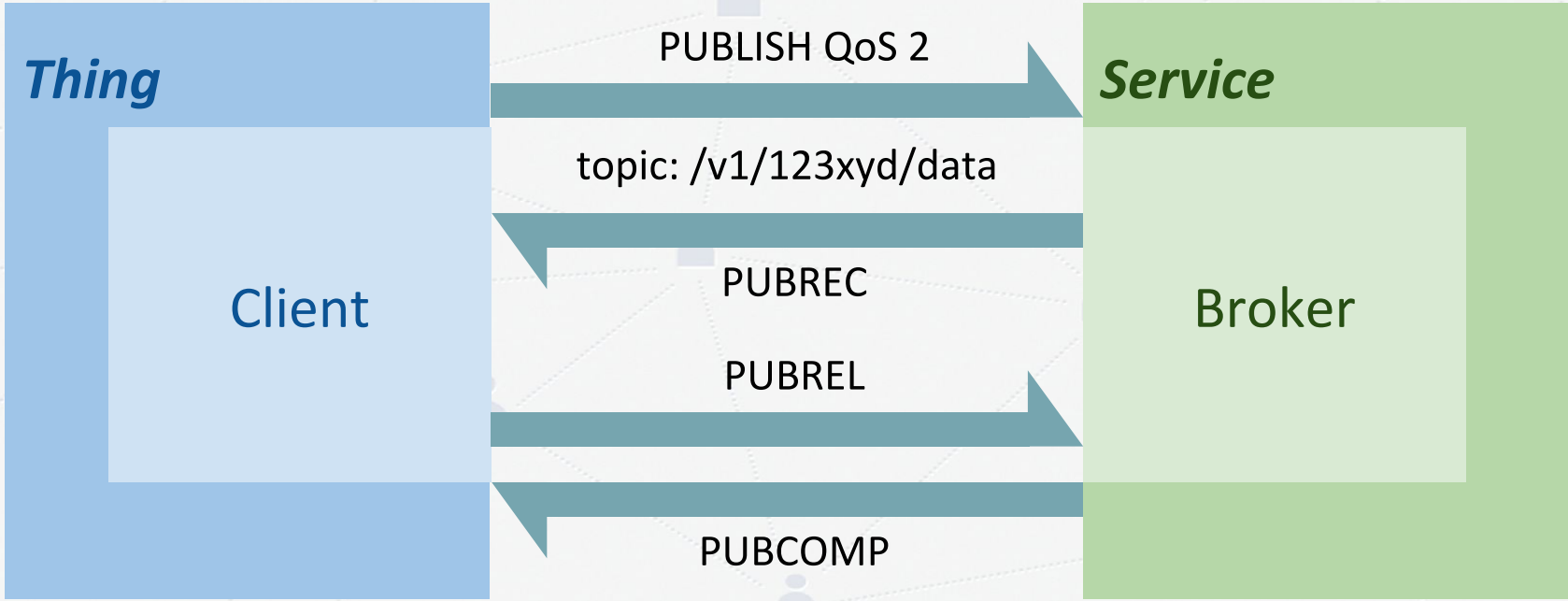
MQTT Communication Basics

QoS 1 = at least once



MQTT Communication Basics

QoS 2 = exactly once



no response is also a response

Advantages / Disadvantages

Light-weight

Low Power

no complicated Mime-types

no enums of errors

no fuss

No Feedback

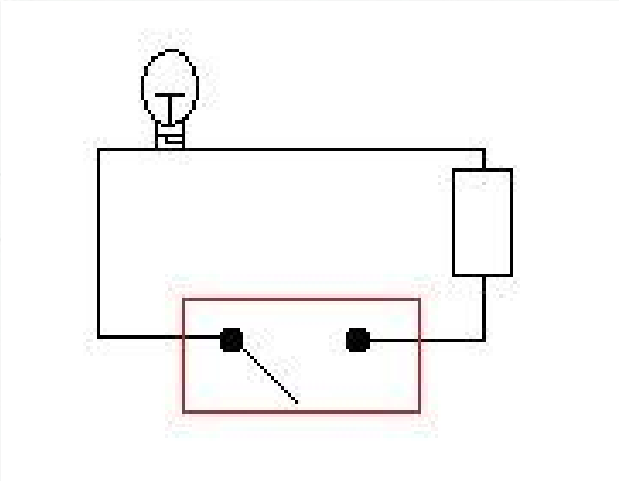
No Feedback

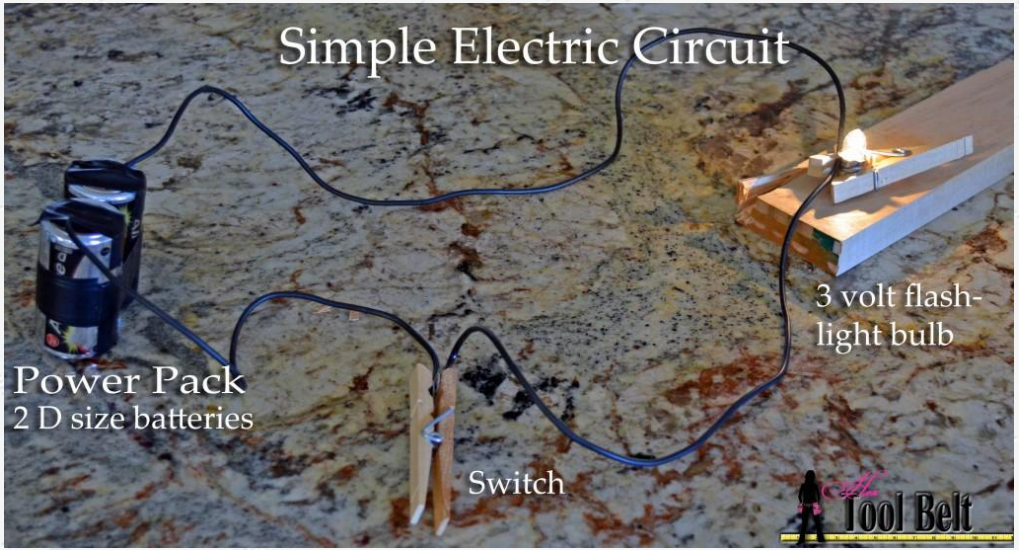
No Feedback

Keep it Simple

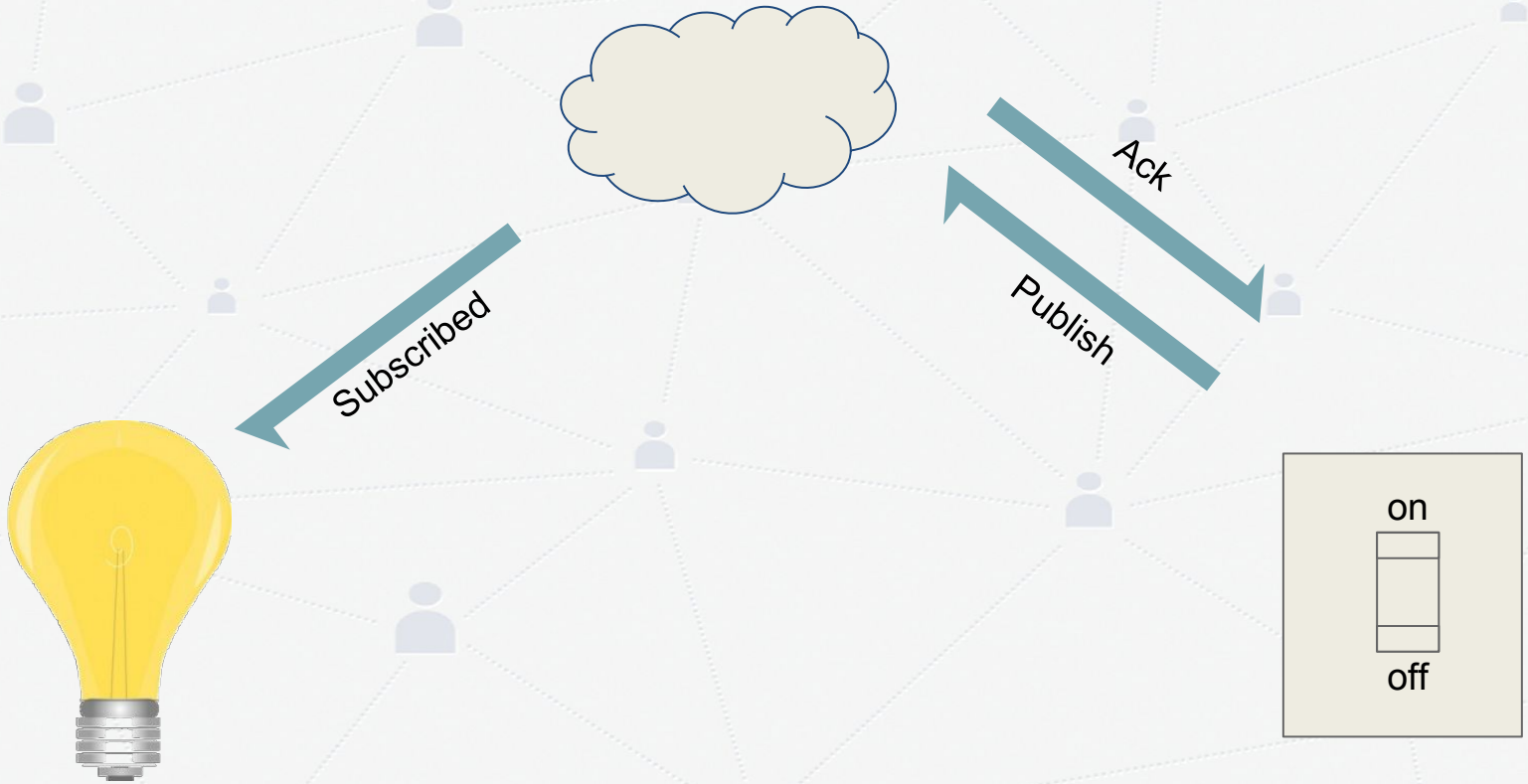
A light bulb

Switch	Bulb
1	1
0	0





IoT Lightbulb



States

Switch	Internet	Broker	Internet	Light
0	0	0	0	0
1	0	0	0	0
1	1	1	1	0
1	1	1	1	1

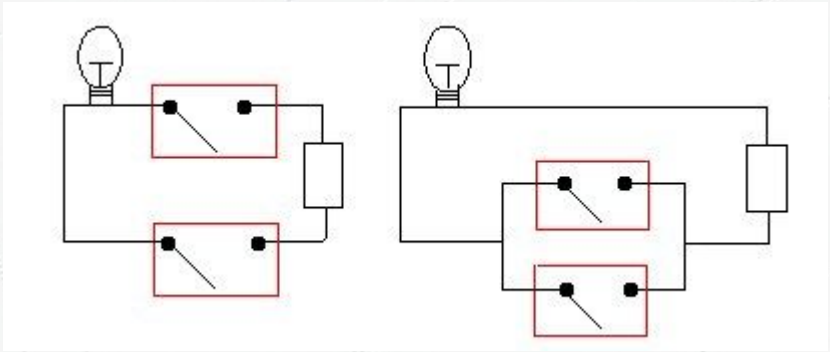
▪ ▪ ▪

1	1	0	1	0
1	0	1	1	0
0	1	1	1	0
1	1	1	0	0

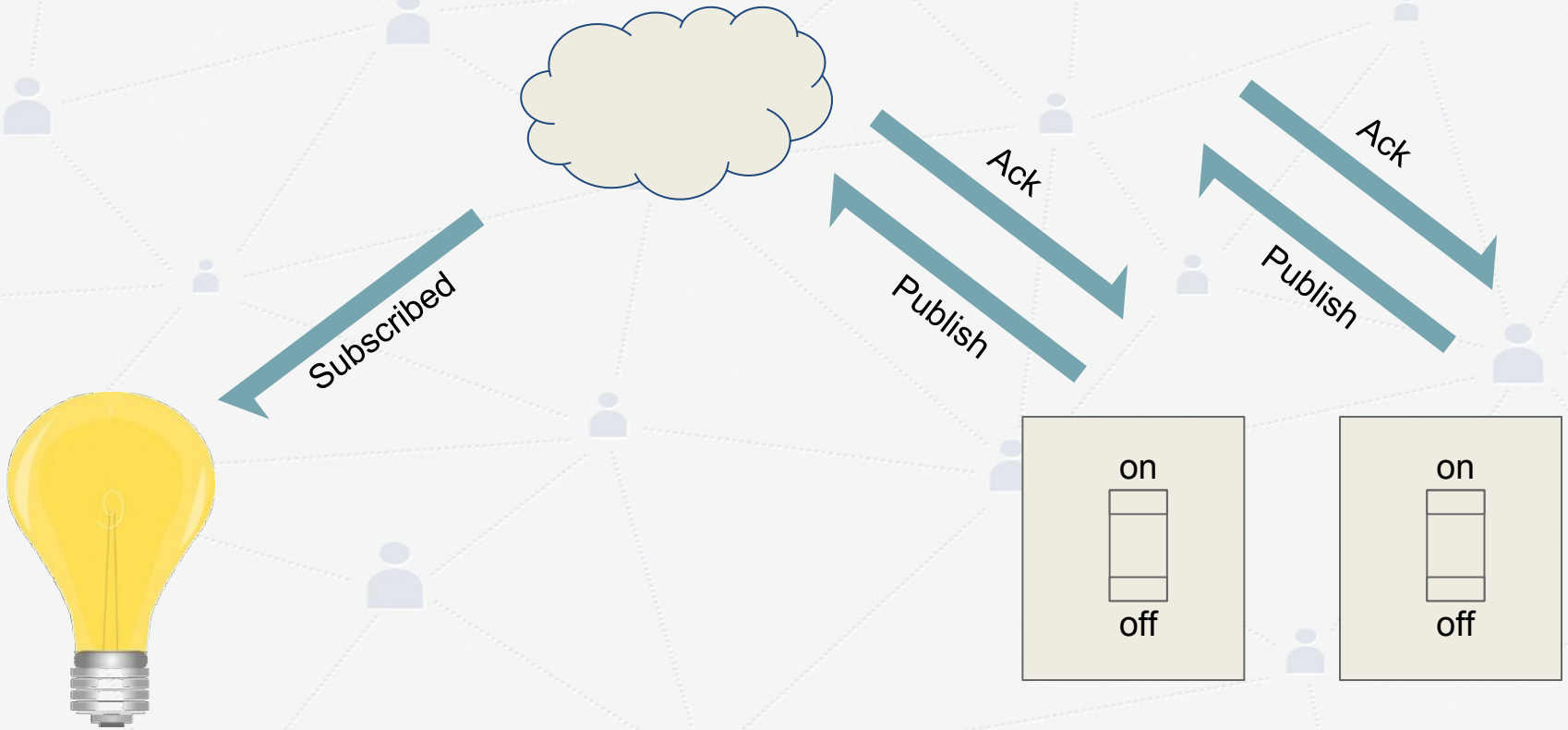
Double Trouble

Staircase Lights (two way switch)

Switch A up	Switch A down	Switch B up	Switch B down	Light
1	0	1	0	1
1	0	0	1	0
0	1	1	0	0
0	1	1	0	1



IoT Lighbulb



Error States

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

General Architecture

Open Berlin

Fog Gateway

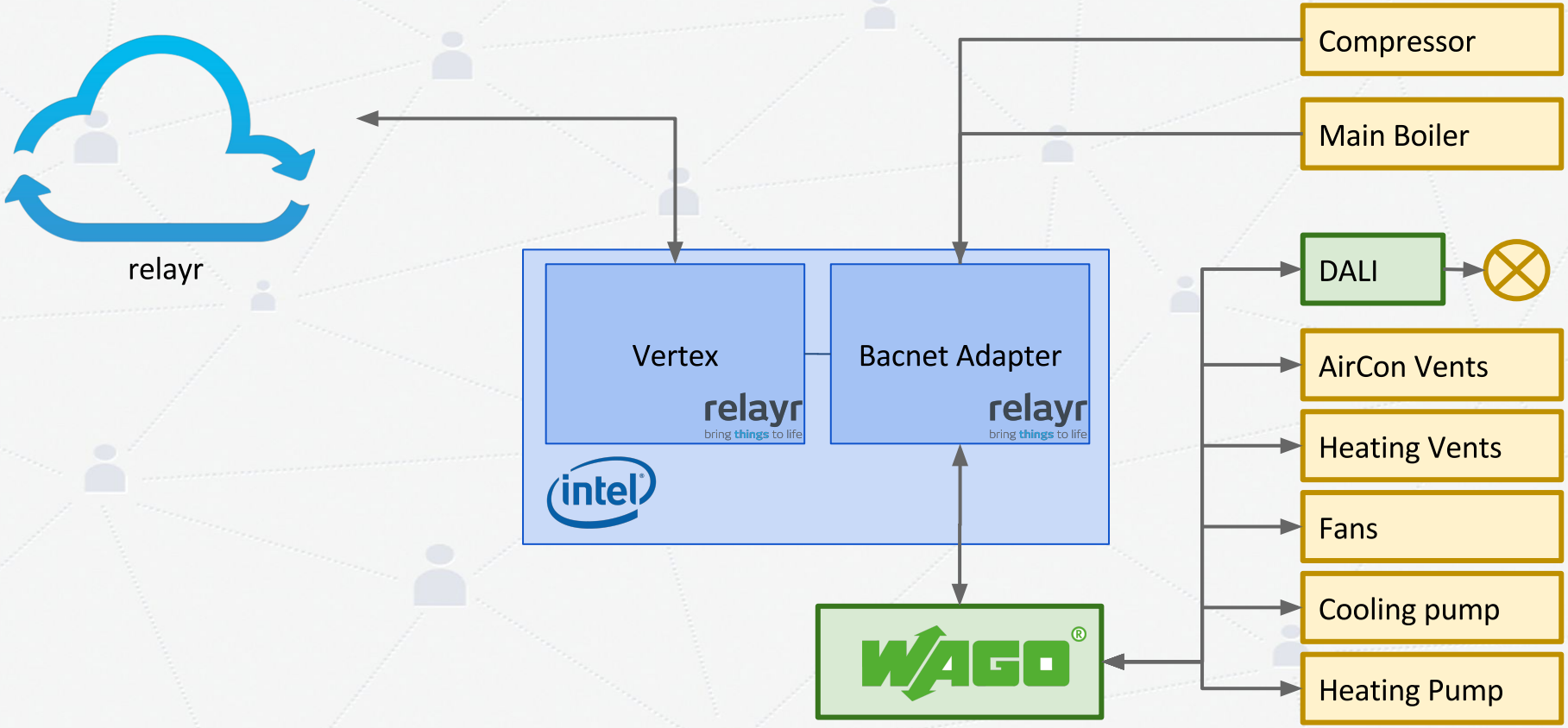
IoT Cloud

CISCO

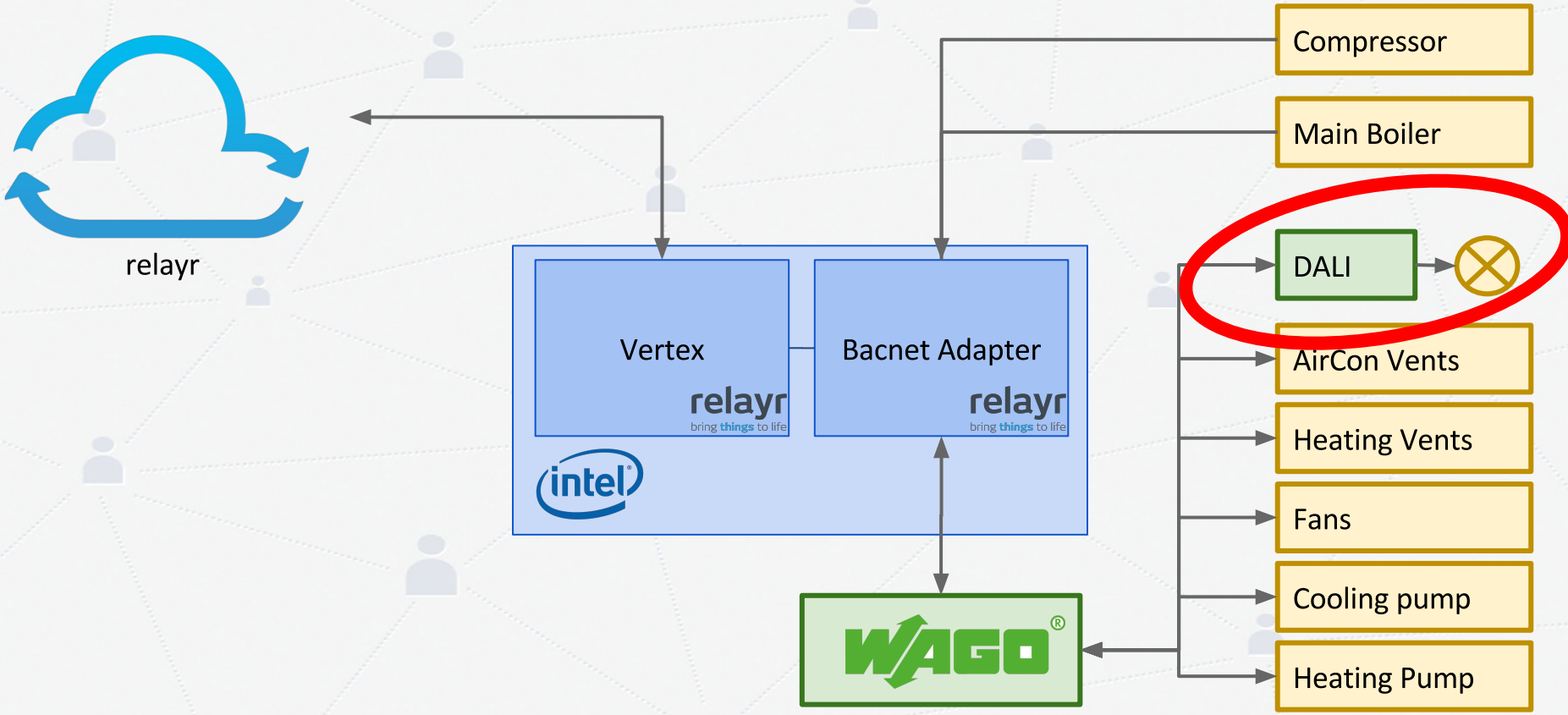
intel

relayr
bring things to life

Connecting the BMS



Connecting the BMS



Adding Sensors for HVAC

BOSCH

150 WiFi enabled Modules

readings for:

- Temperature
- Humidity
- Barometric pressure
- Luminosity

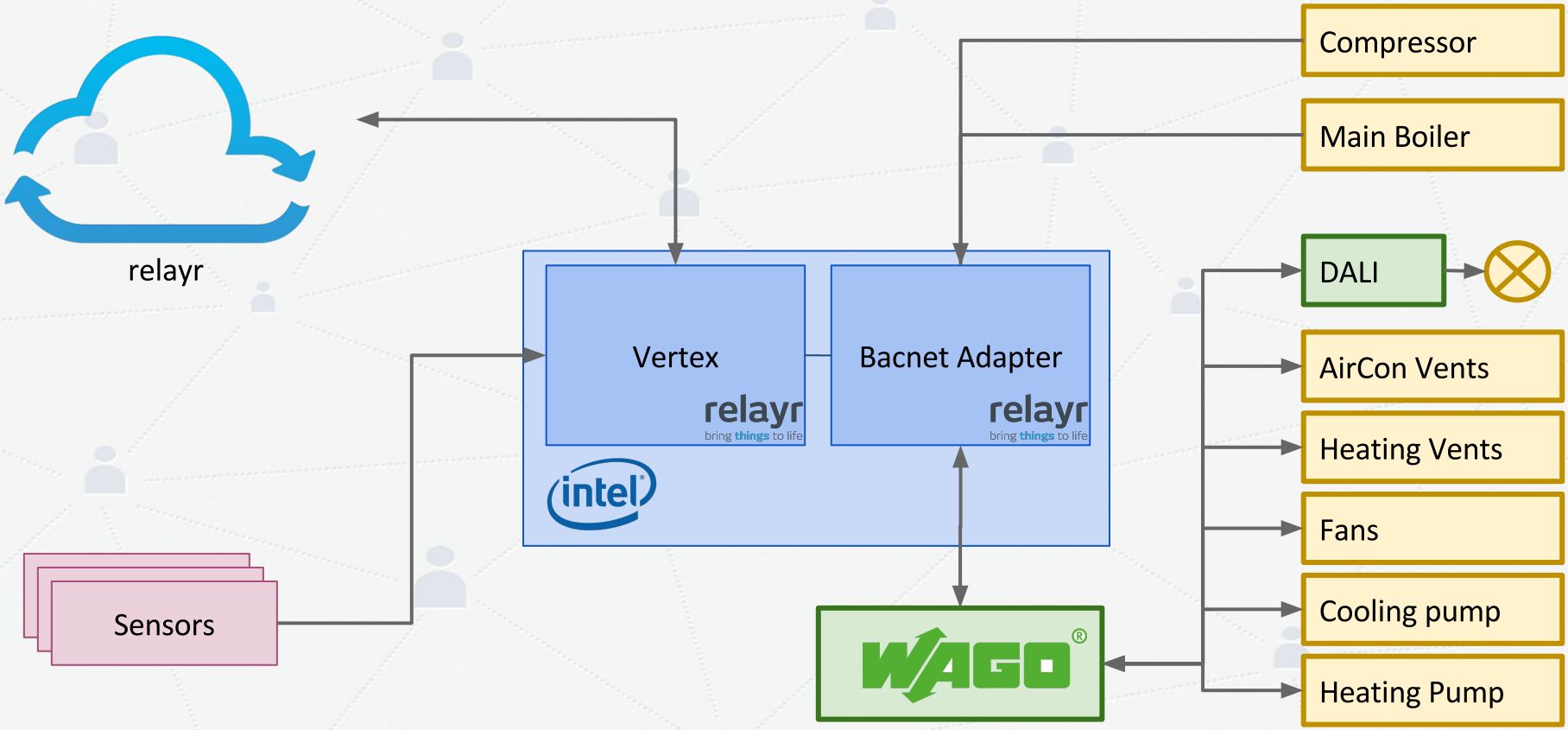
relayr
bring things to life

50 Ethernet enabled Modules

readings for:

- Temperature
- Humidity
- Luminosity
- Sound levels

Adding the Sensors



Enriching the data for presence

cisco Meraki

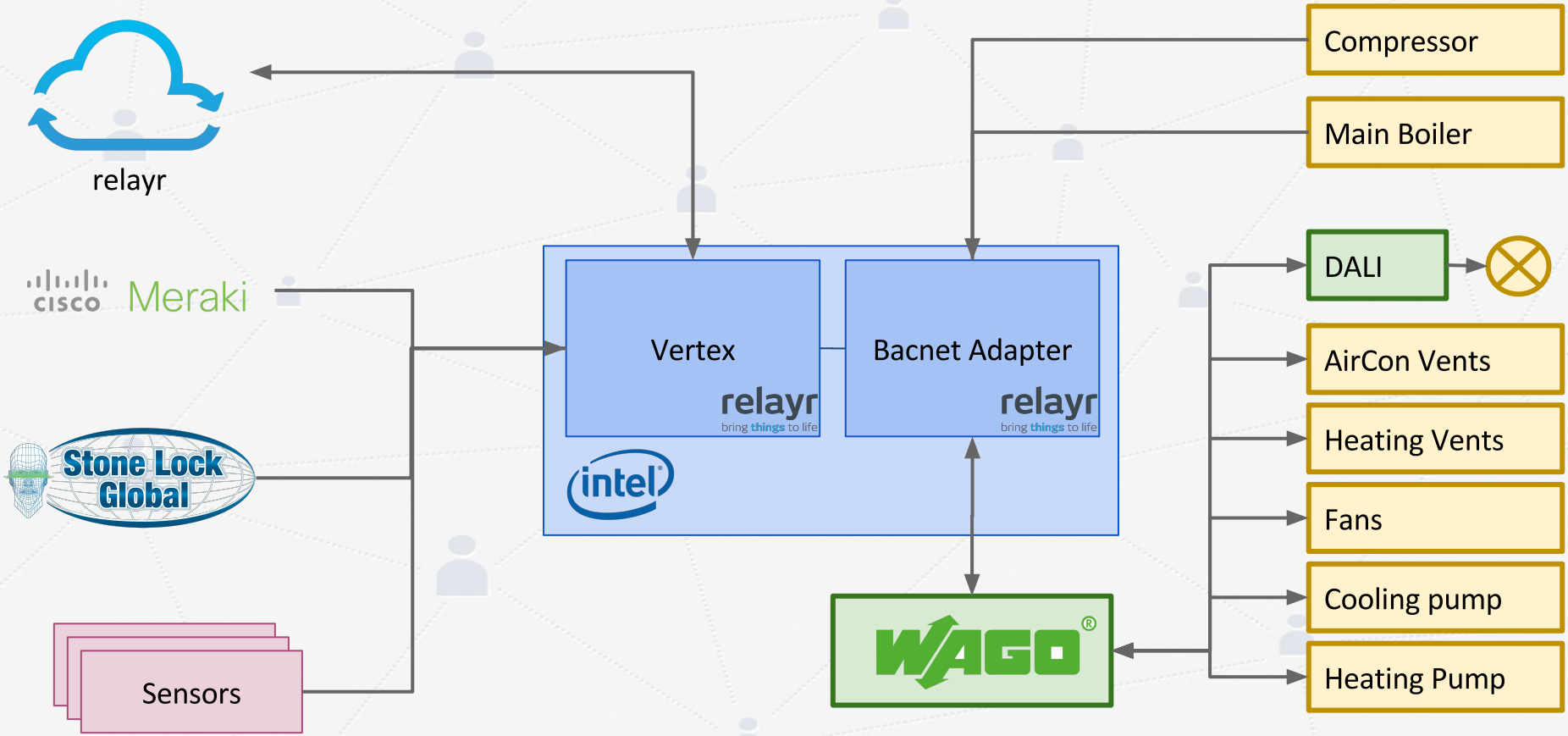
Measuring all probes from APs

- Detection
- Identification
- movement
- Presence

20 Facial recognition Door Locks

no more name badges

Enriching the Data



Adding users to the picture

Measuring Sentiment from Users

- Temperature
- Heart Rate
- Blood Sugar

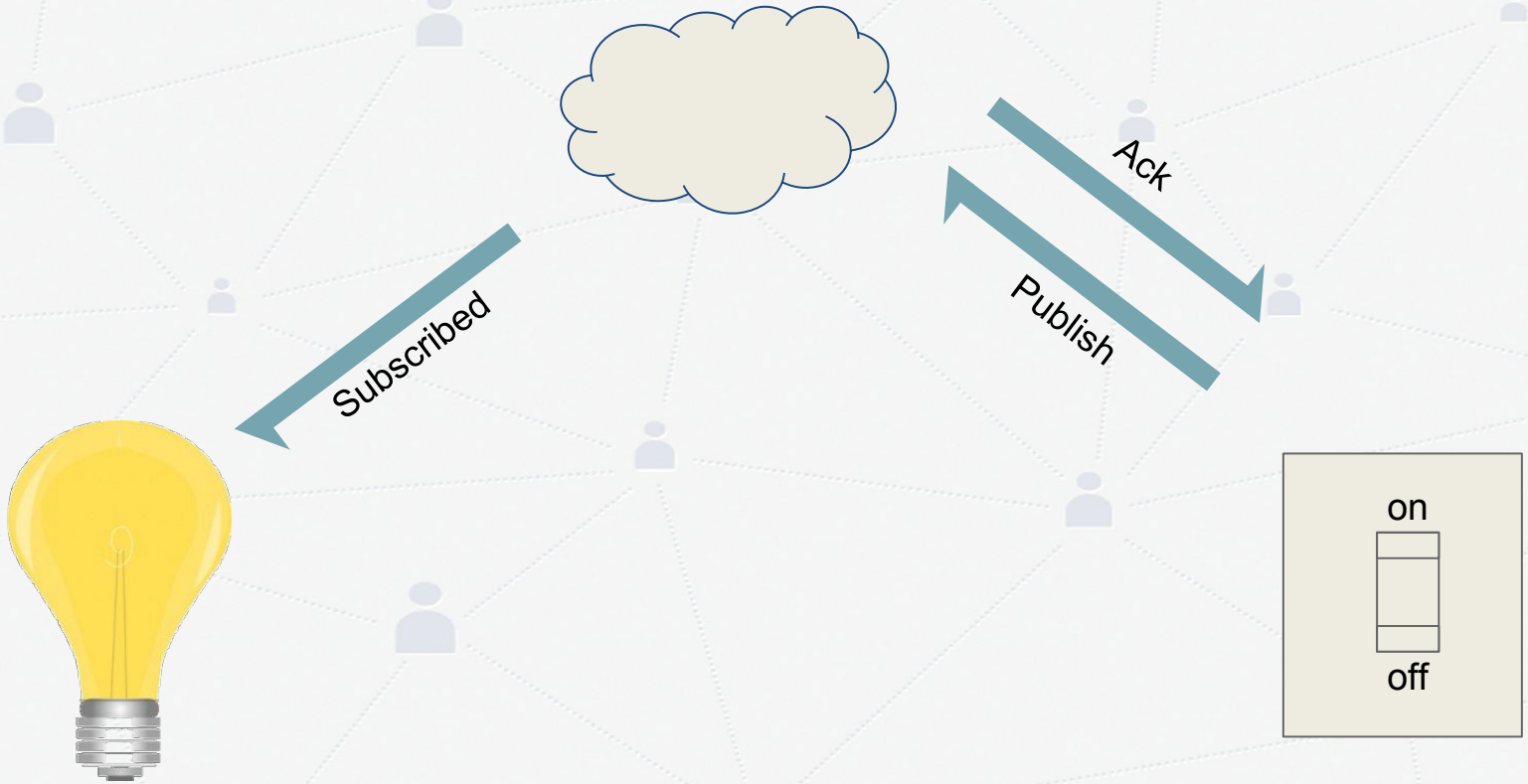
What do these rules do?

Lighting Management

Heating Management

Ventilation and Air Conditioning

IoT Lightbulb



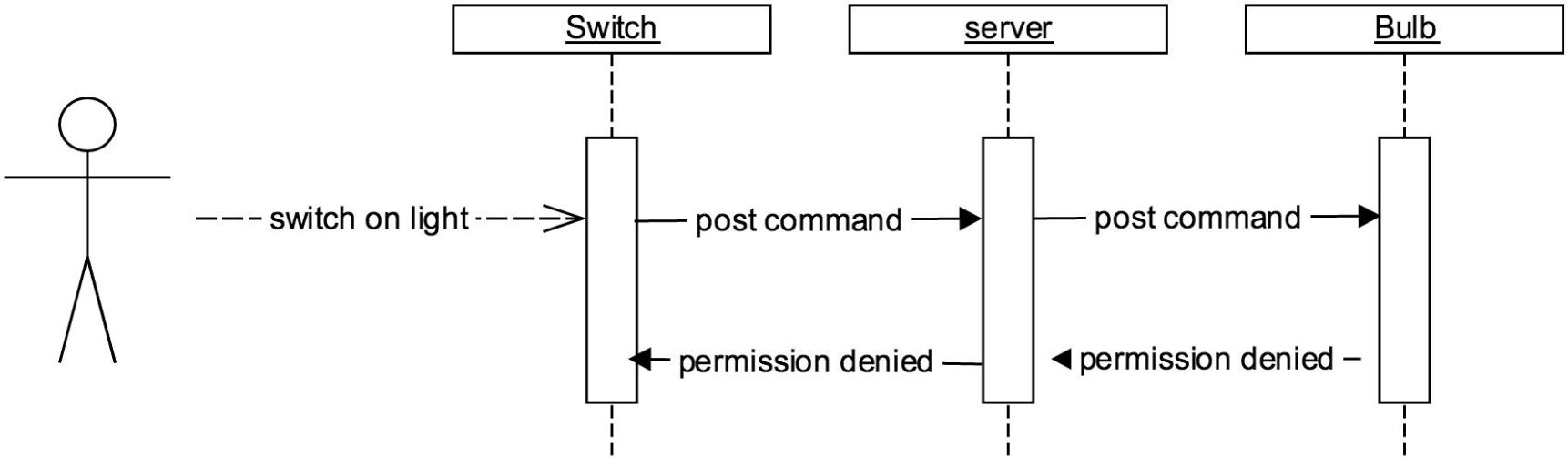
States

Switch	Internet	Broker	Internet	Light
0	0	0	0	0
1	0	0	0	0
1	1	1	1	0
1	1	1	1	1

▪ ▪ ▪

1	1	0	1	0
1	0	1	1	0
0	1	1	1	0
1	1	1	1	0

In an (simple) HTTP World

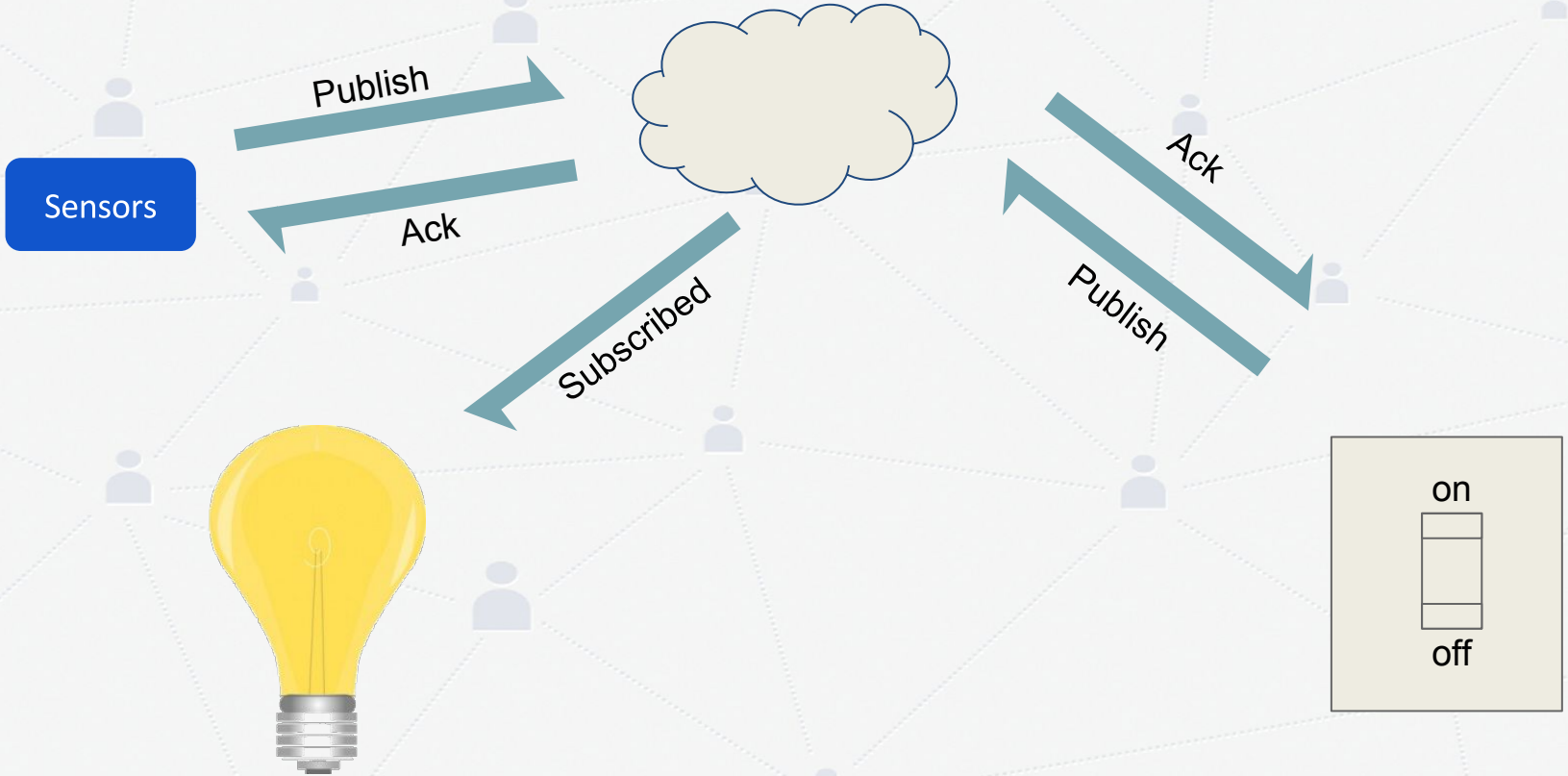


Dumb Clients

How does a light switch handle an error

```
1  import mqtt from 'mqtt';
2
3  var LightSwitch = function(id) {
4      this.id = id;
5  };
6
7  LightSwitch.prototype.switchOn = function() {
8
9      var err = function() {
10         // DO SOMETHING HERE
11     };
12
13     mqtt.publish(err, {
14         state: 1
15     });
16
17 };
18
19 var mySwitch = new LightSwitch(123);
20 mySwitch.switchOn();
```

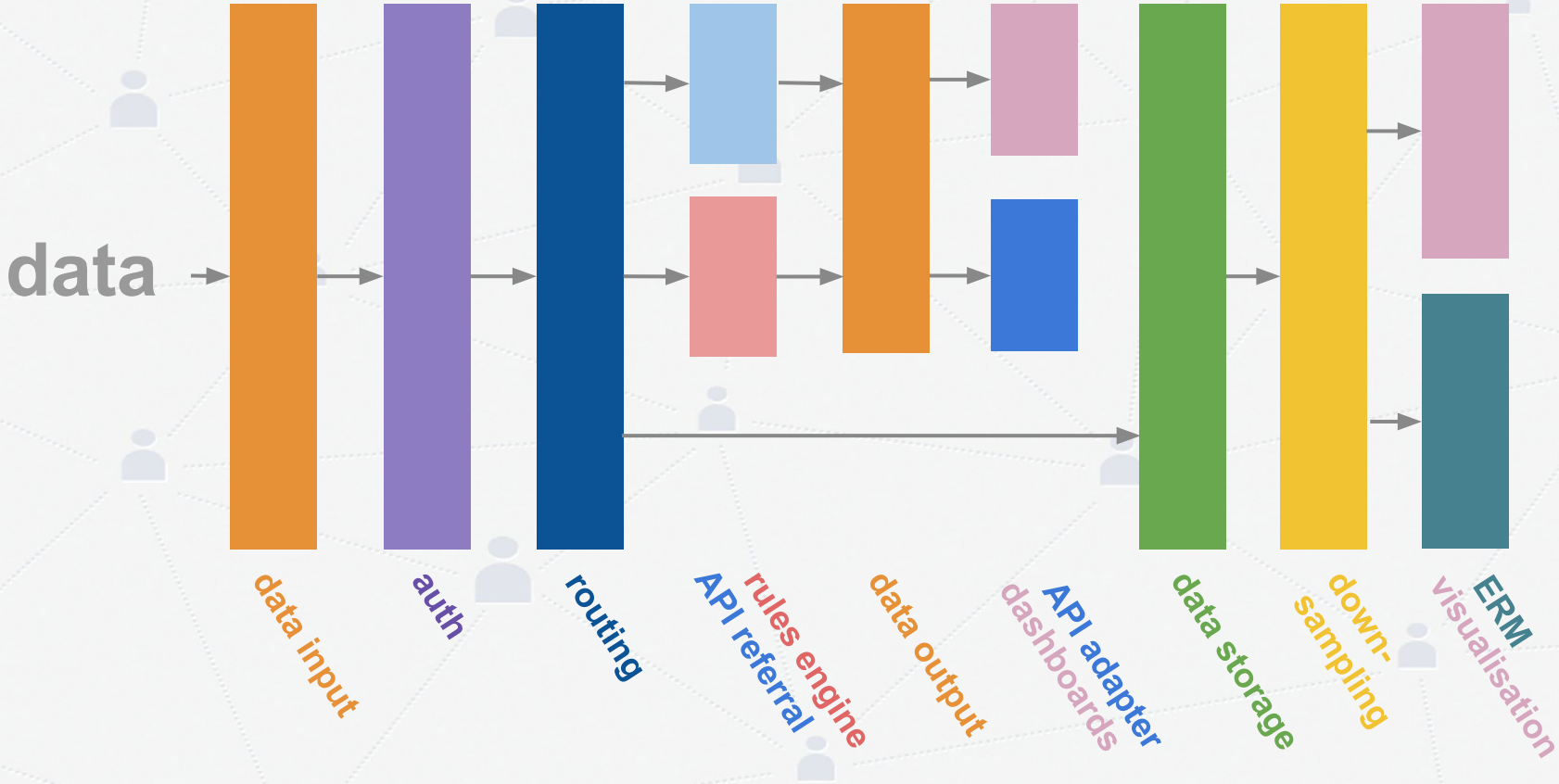
IoT Lightbulb



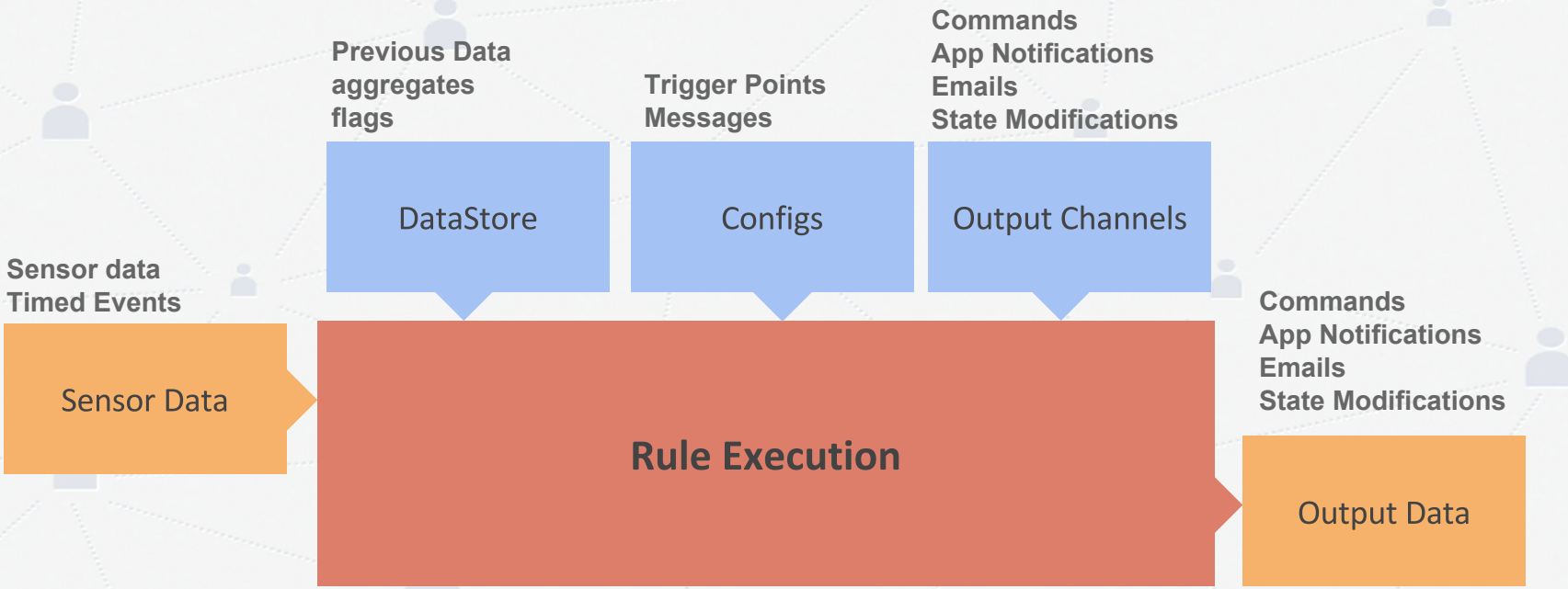
The Intelligence is in the Cloud

...or a local fog node

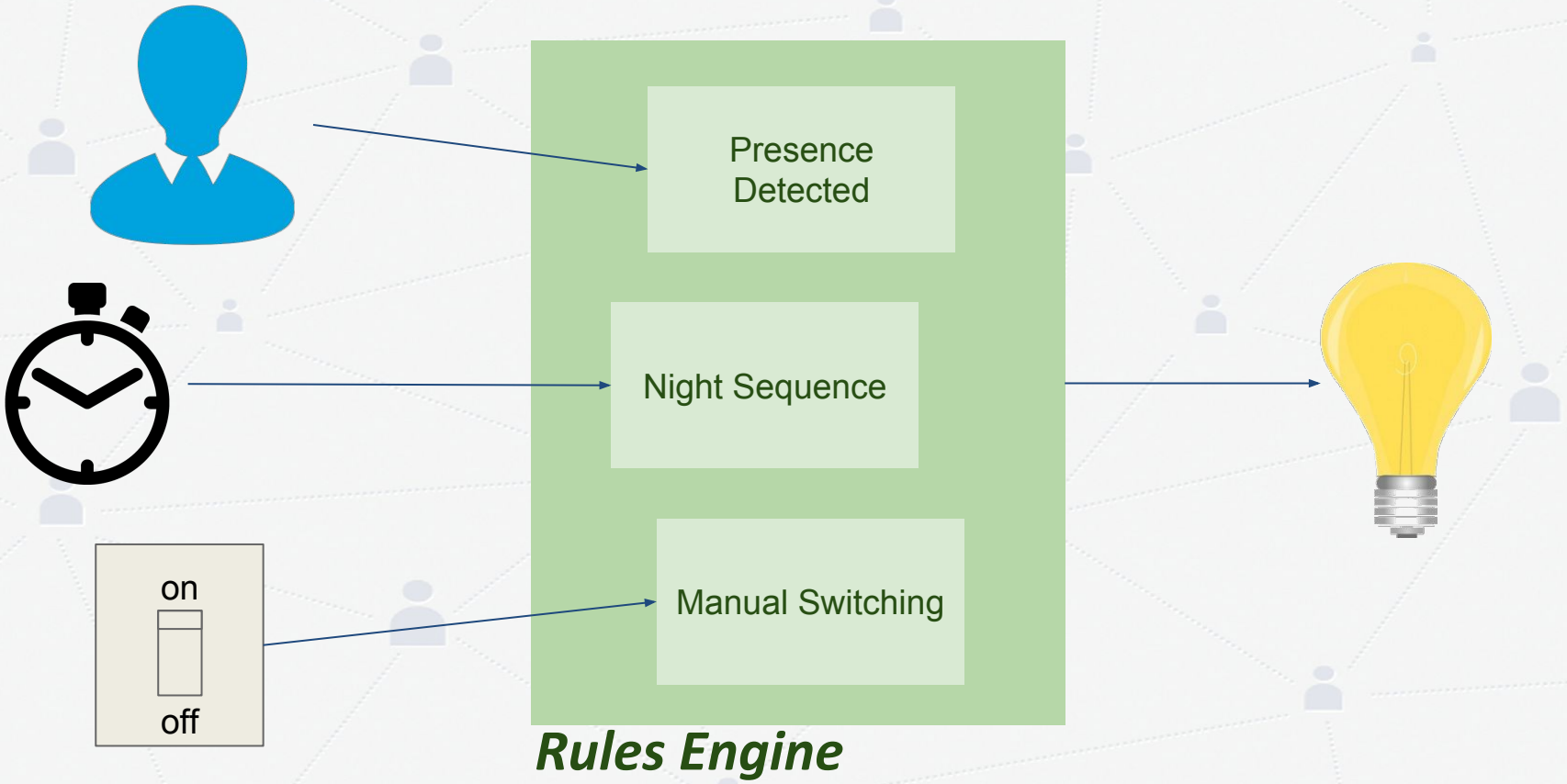
Data Journey



Simple Rules



Multiple Rules



Principle

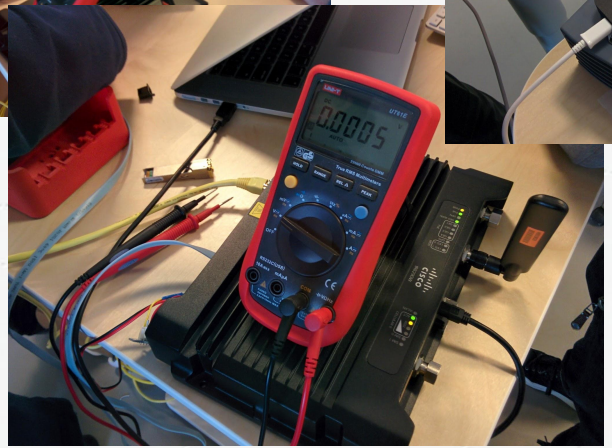
Strong disconnect between cause and action

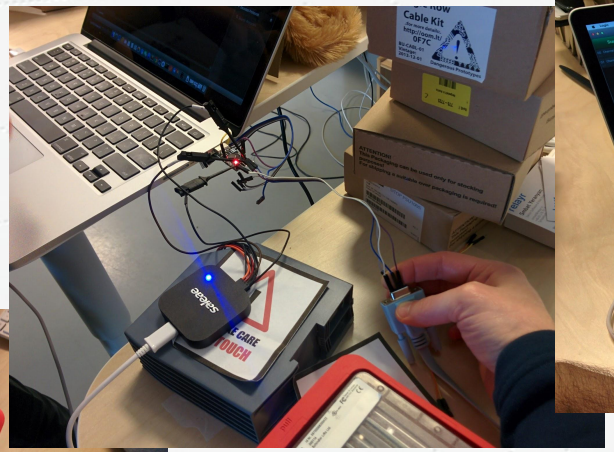
Clients cannot maintain their own state

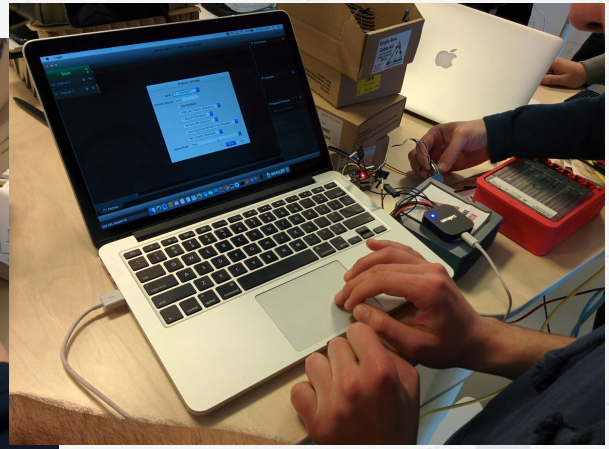
No guarantee on the outcome of a successfully executed function

Thank You!

www.relayr.io/jobs







Connecting Things to the Internet since 2013

goto; conference

Please

Remember to rate session

Thank you!

Follow us on Twitter @GOTOber

www.gotober.com