INTRODUCTION TO COAP
THE REST PROTOCOL FOR M2M

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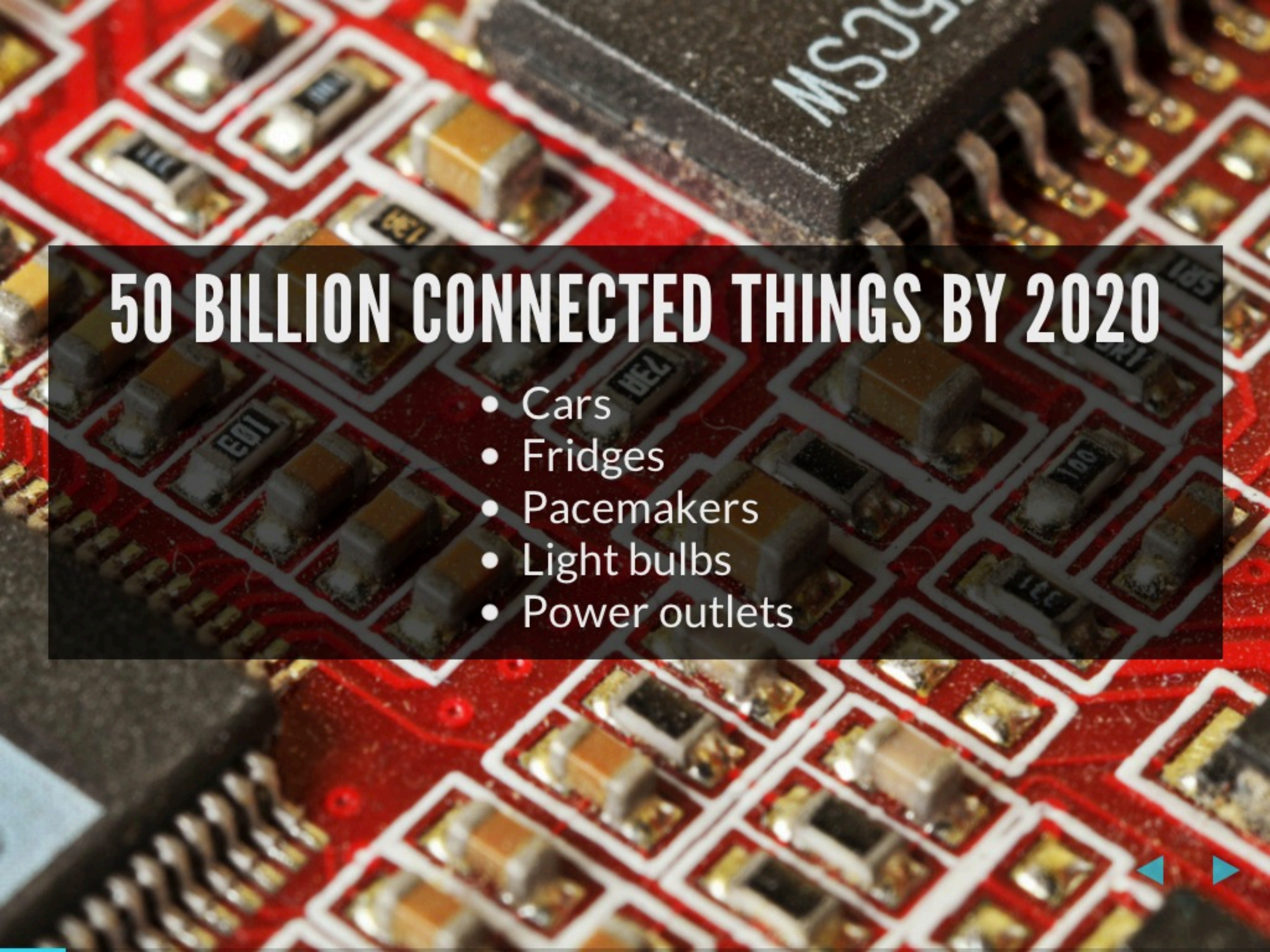
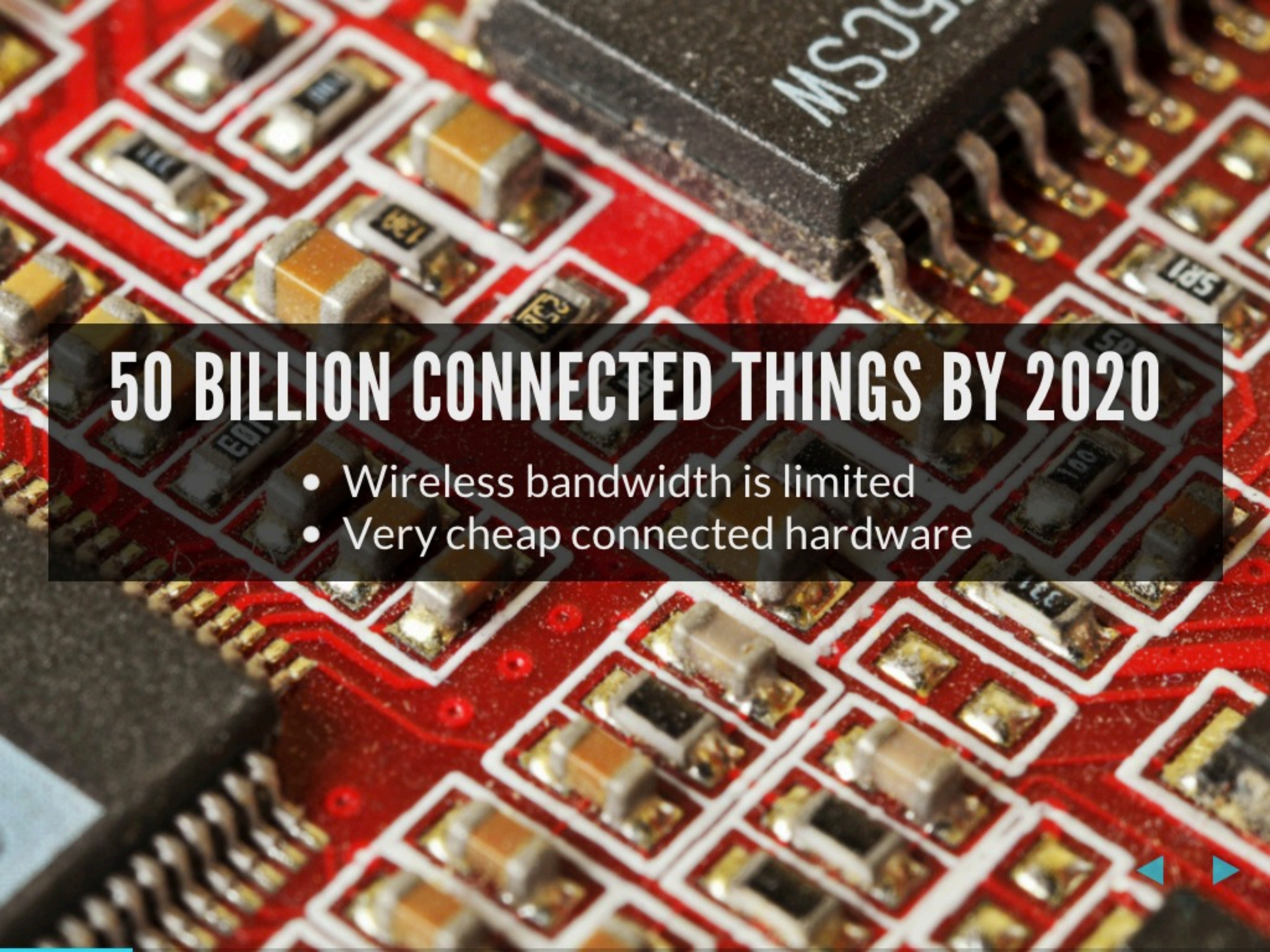


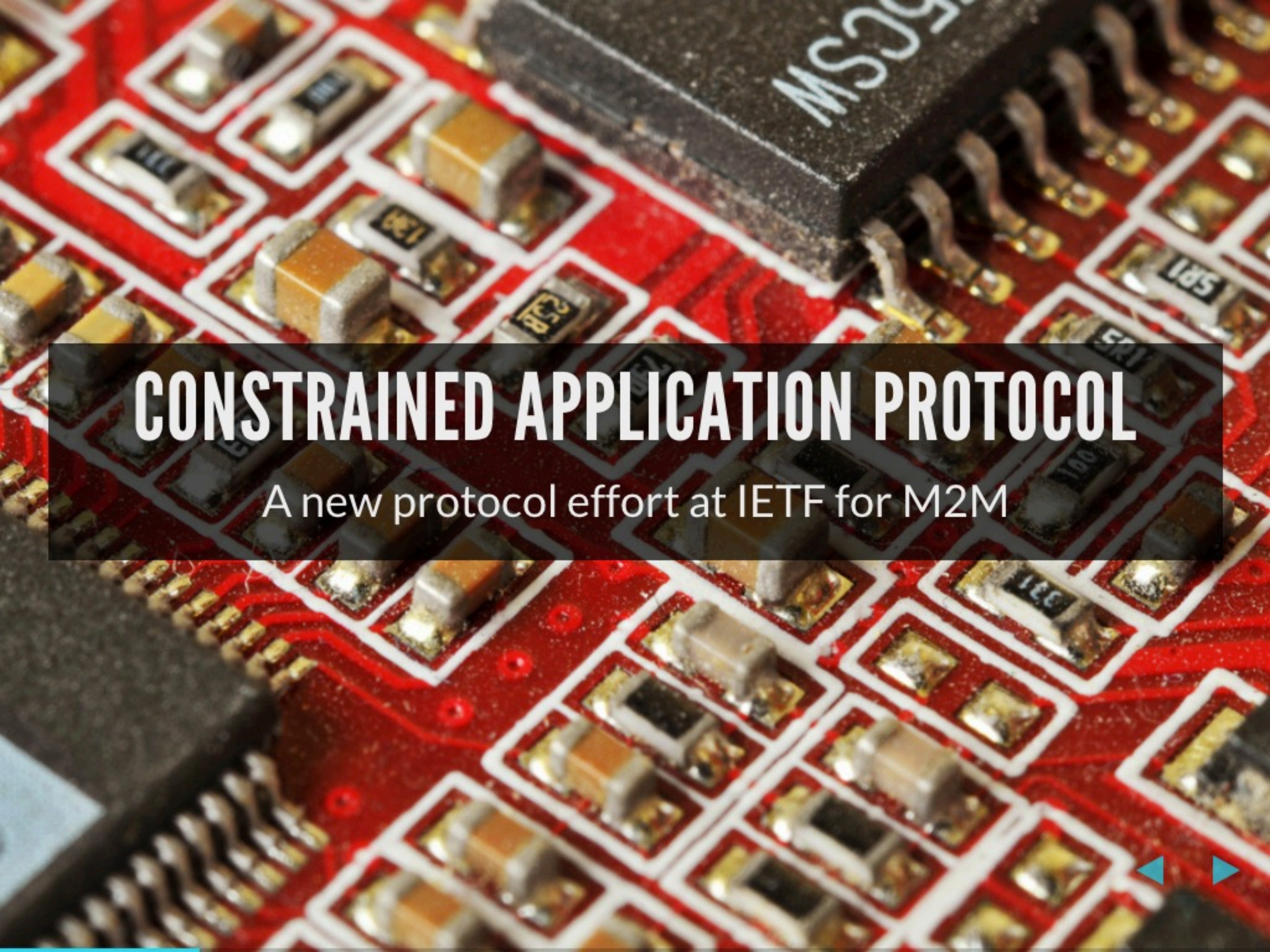
50 BILLION CONNECTED THINGS BY 2020

- Cars
- Fridges
- Pacemakers
- Light bulbs
- Power outlets



50 BILLION CONNECTED THINGS BY 2020

- Wireless bandwidth is limited
- Very cheap connected hardware



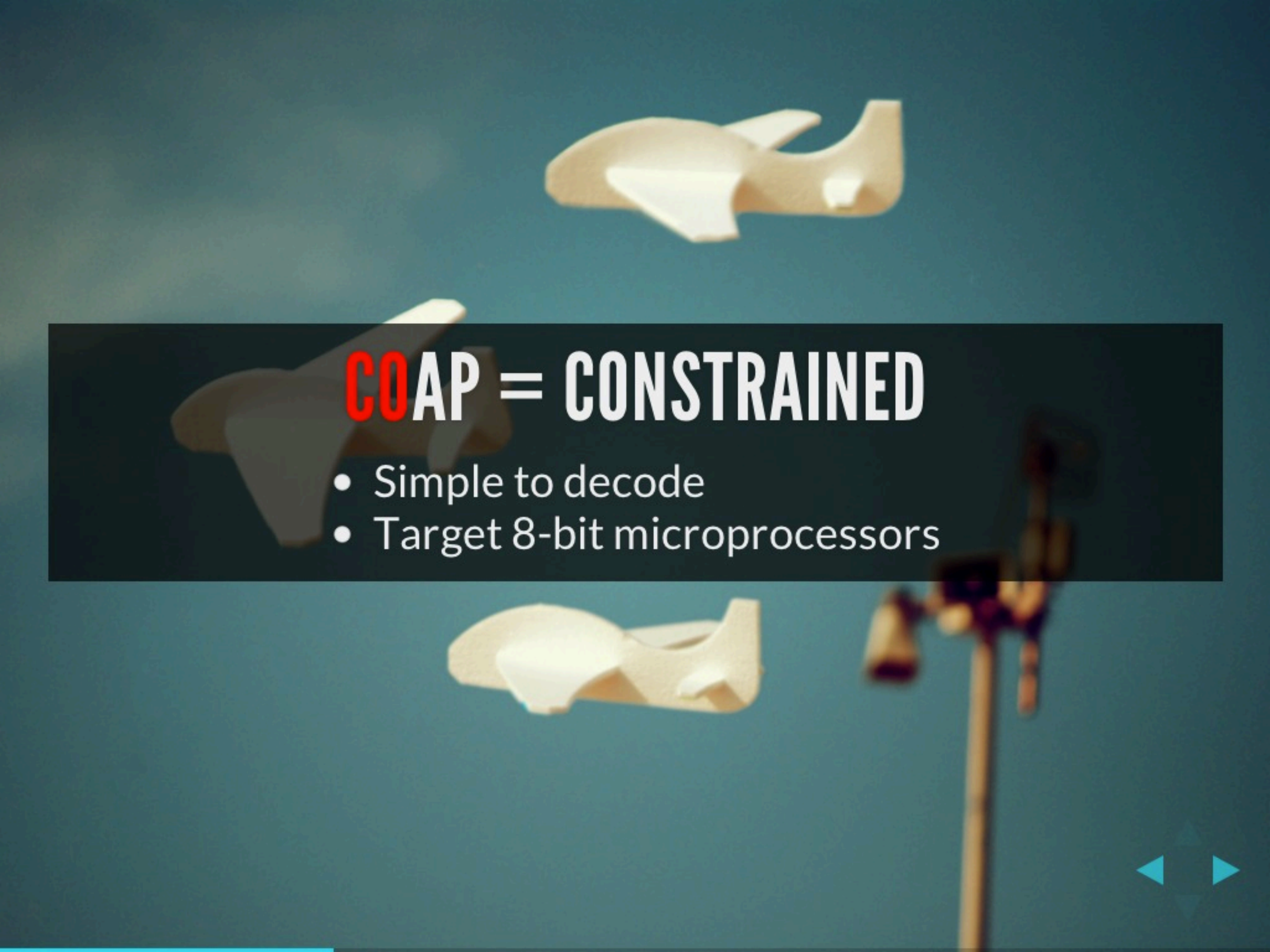
CONSTRAINED APPLICATION PROTOCOL

A new protocol effort at IETF for M2M

COAP = CONSTRAINED

binary and compact

```
 0                   1                   2                   3
 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|Ver| T |  TKL  |      Code     |          Message ID           |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|   Token (if any, TKL bytes) ...
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|   Options (if any) ...
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|1 1 1 1 1 1 1 1|    Payload (if any) ...
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```



COAP = CONSTRAINED

- Simple to decode
- Target 8-bit microprocessors

COAP = APPLICATION

- REST paradigm for things
- URI: coap://mysensor/room1/temperature/max

COAP = APPLICATION

HTTP-like verbs:

- `GET` for read
- `PUT`, `POST`, `DELETE` for mutation

COAP = PROTOCOL

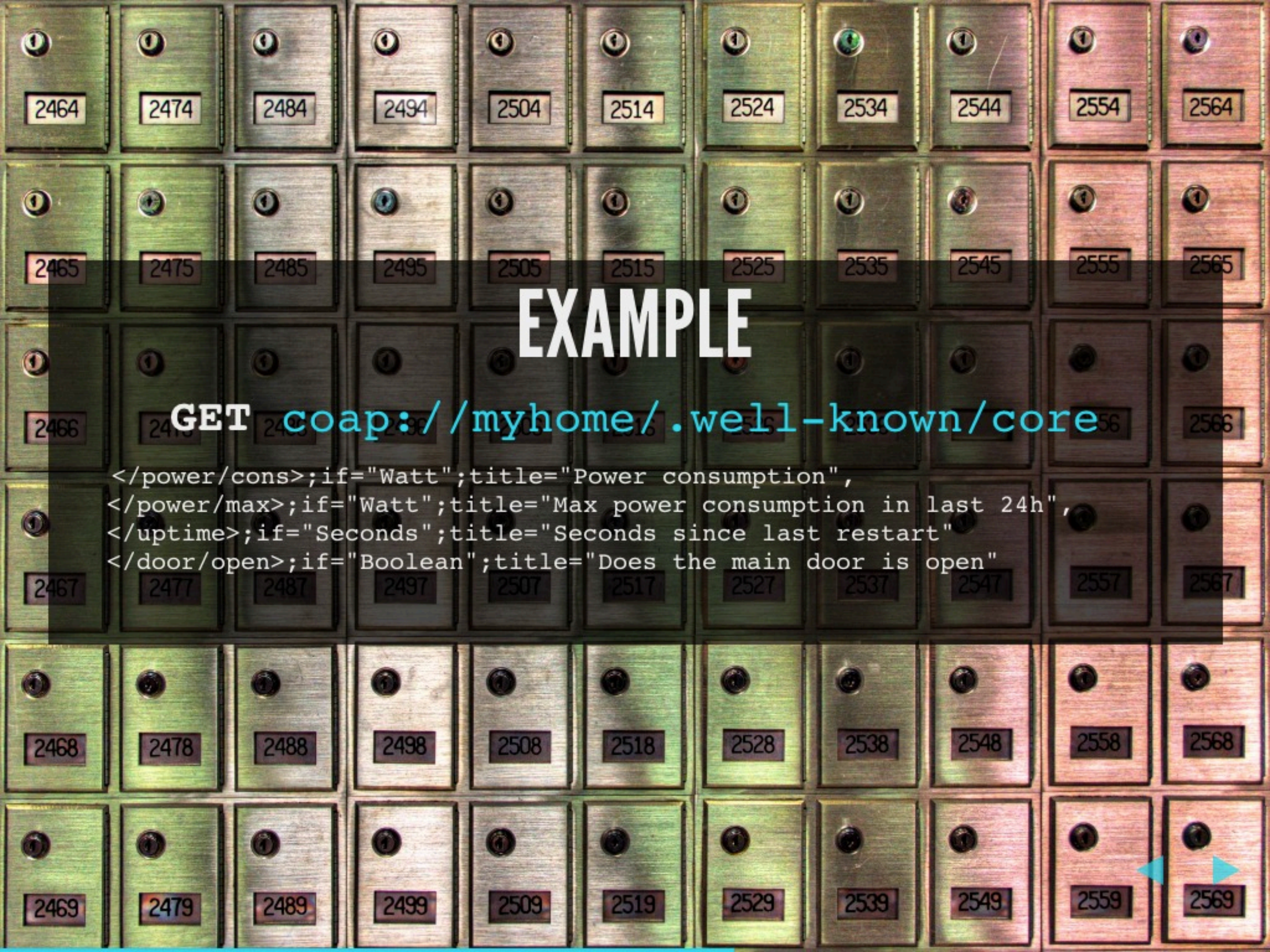
- IP/UDP only for easy implementation
- UDP to save some bandwidth

COAP = PROTOCOL

Security with DTLS (SSL/TLS for Datagram)

DISCOVERY AND METADATA

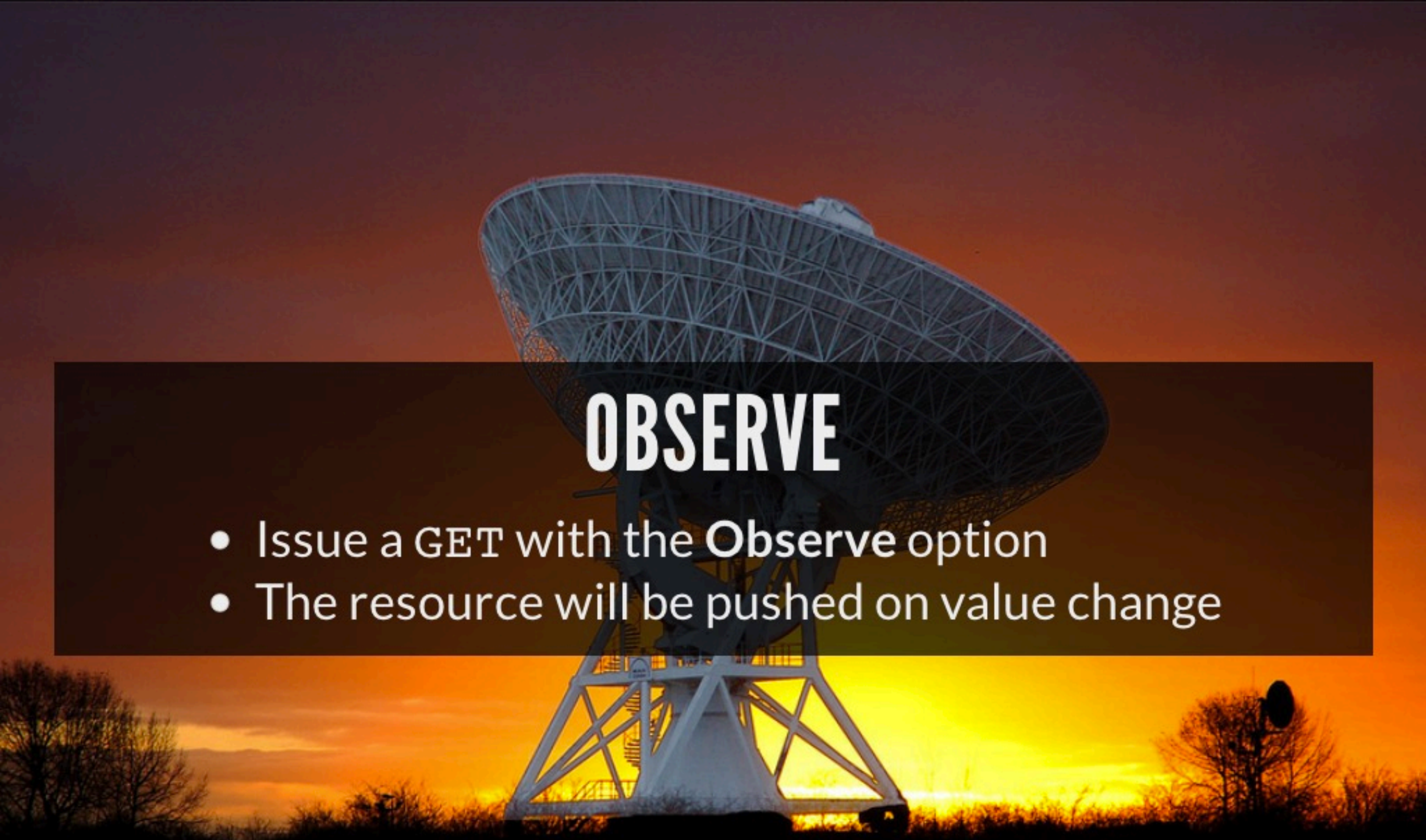
- Issue a `GET` on coap://myhome/.well-known/core
- Links to all the known resources!



EXAMPLE

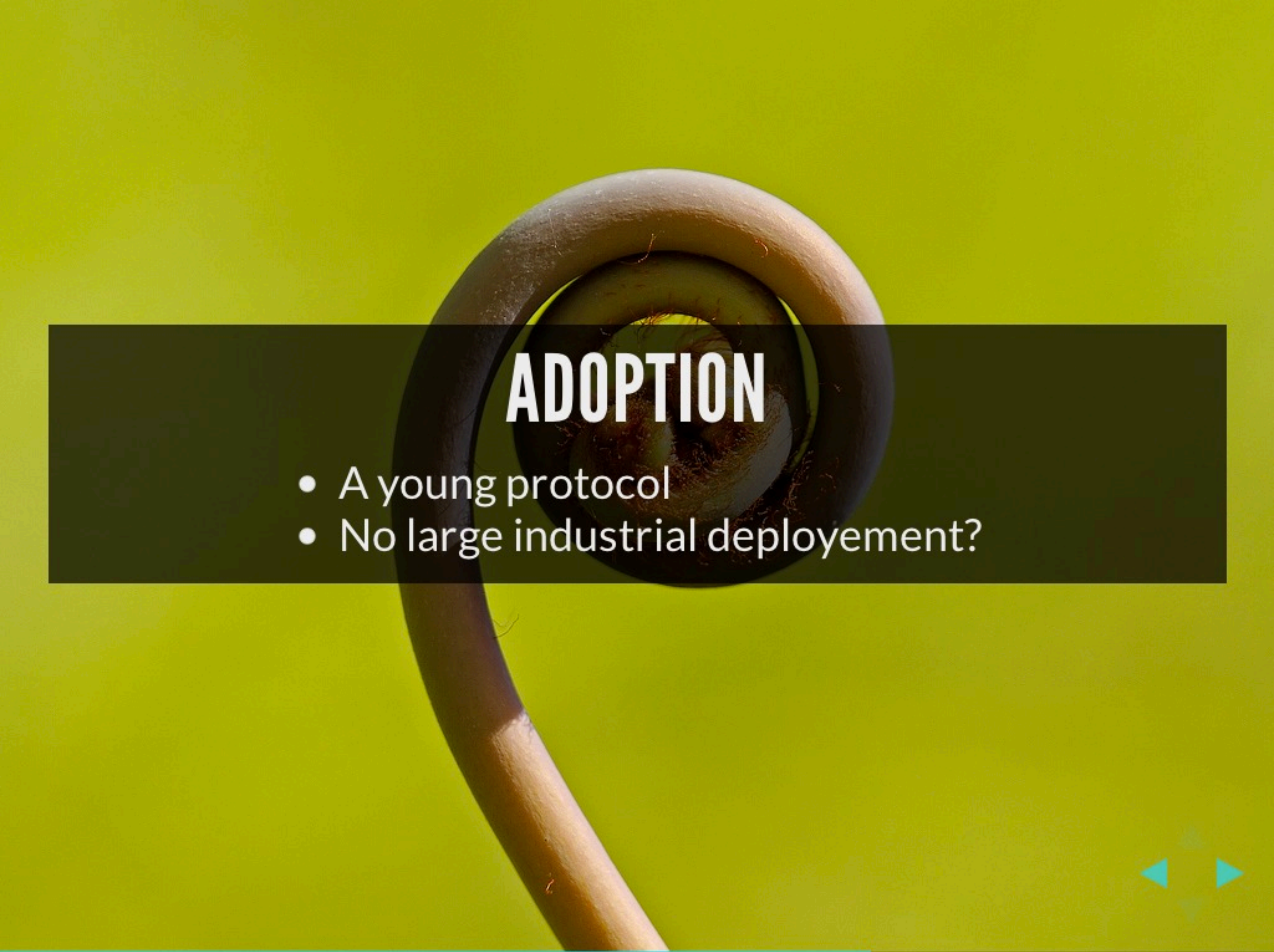
```
GET coap://myhome/.well-known/core
```

```
</power/cons>;if="Watt";title="Power consumption",
</power/max>;if="Watt";title="Max power consumption in last 24h",
</uptime>;if="Seconds";title="Seconds since last restart"
</door/open>;if="Boolean";title="Does the main door is open"
```



OBSERVE

- Issue a `GET` with the **Observe** option
- The resource will be pushed on value change



ADOPTION

- A young protocol
- No large industrial deployement?

ADOPTION

- Pushed in all the incoming M2M standards
- ETSI M2M: European Telecommunications Standard Institute
- OneM2M (ETSI, TIA, CCSA, ARIB, ATIS, etc..)

OMA LIGHTWEIGHT M2M

- Standard for device management on top of CoAP
- Provides a model for managing wireless devices
- Registration, bootstraping, firmware upgrades

OPENSOURCE

- **Contiki** – embedded O/S
- **Copper** – Firefox client plugin
- **Libcoap** – C CoAP library
- Even on **Arduino**!

APACHE MINA SUPPORTS COAP

- Java network application framework
- Fast and scalable: perfect for large number of devices!

COAP AT ECLIPSE M2M?

- Some interest for CoAP and OMA LW M2M
- Both server-side and client-side
- Join us! **m2m.eclipse.org**

THANKS!

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