

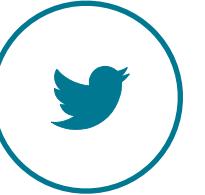
BUILDING AUTOMATION IN THE BROWSER

An Experience Report

@merelyChristina & @merelyAnna

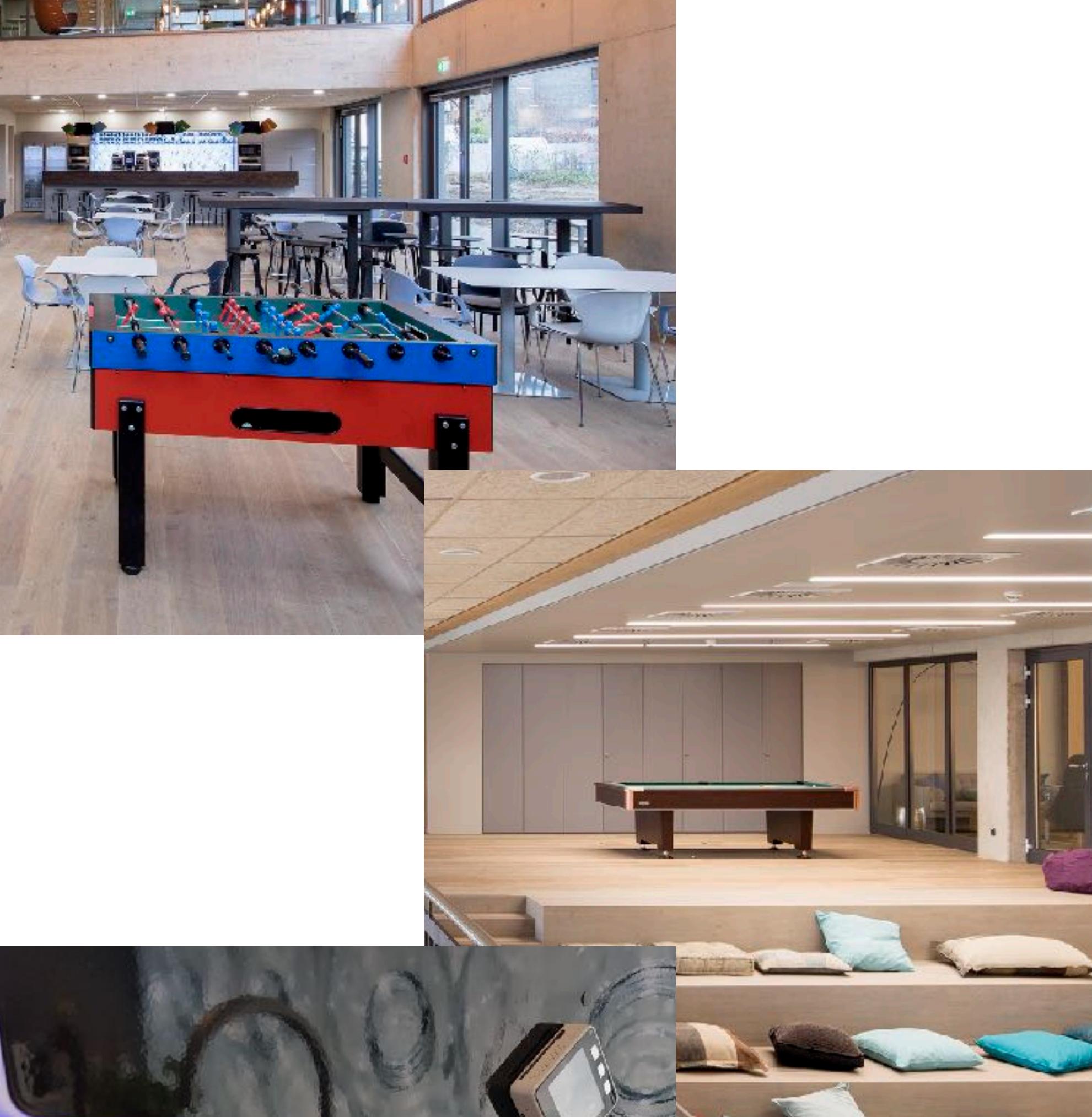
Who are we?



CHRISTINA
 merelyChristina

ANNA
 merelyAnna





New Building with a lot of stuff

=

Smart Building

New Building with lots of stuff

~~Small building~~

NOPE

Why: No automation...

No access... No control

New Building



Lots of sensors



Some shiny new software

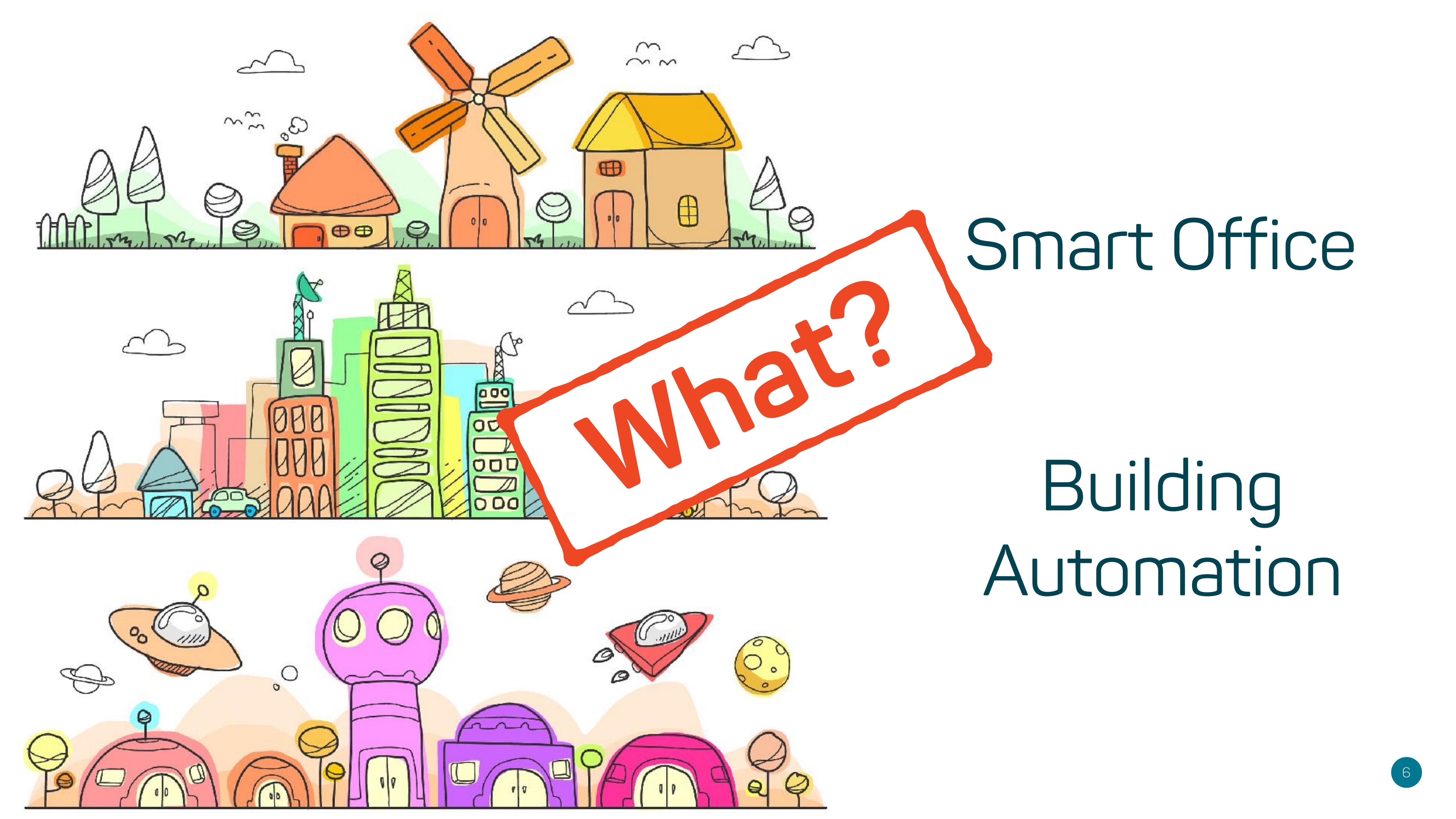


New Building

Some new software
Lots of +
Maybe?

=





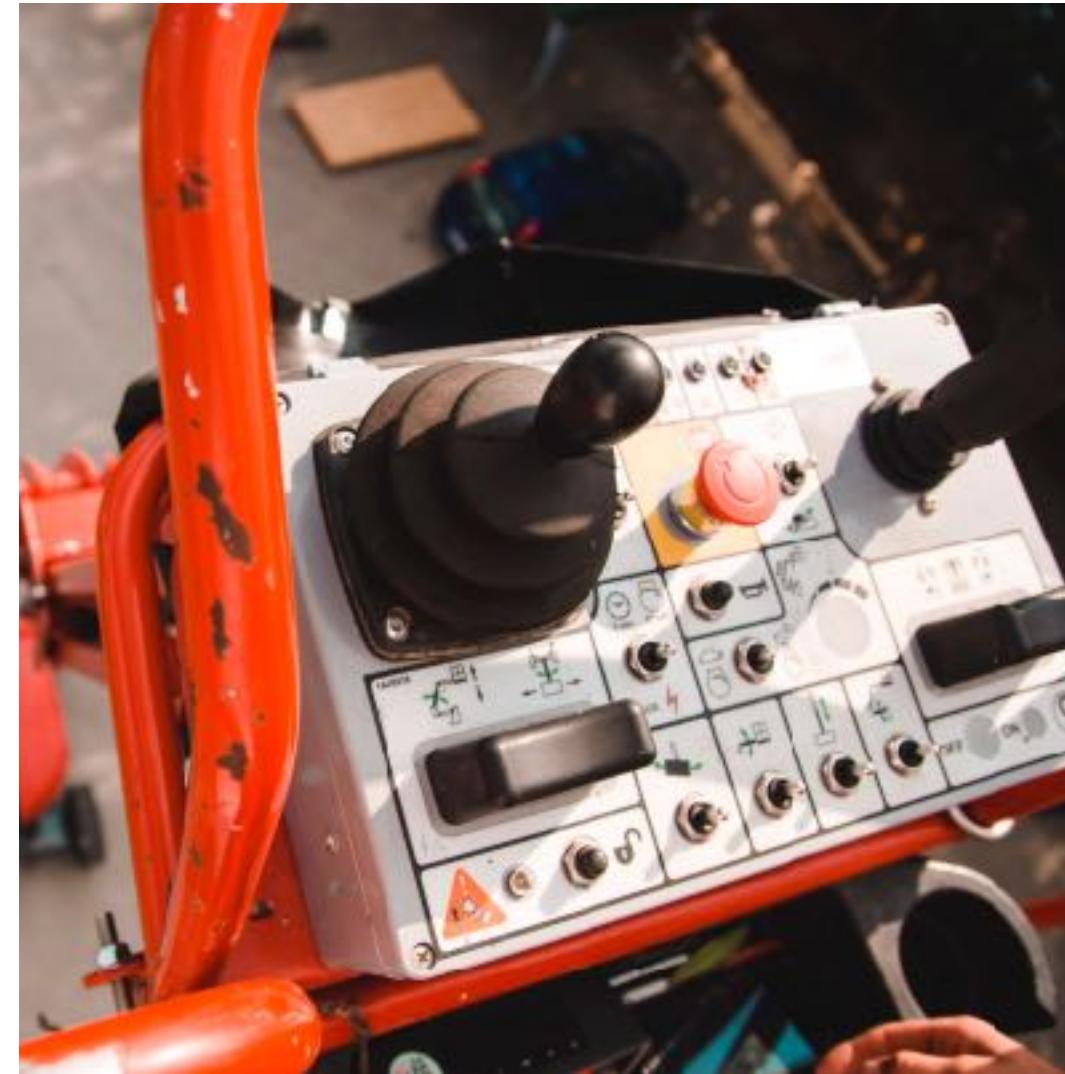
Smart Office Building Automation

What?

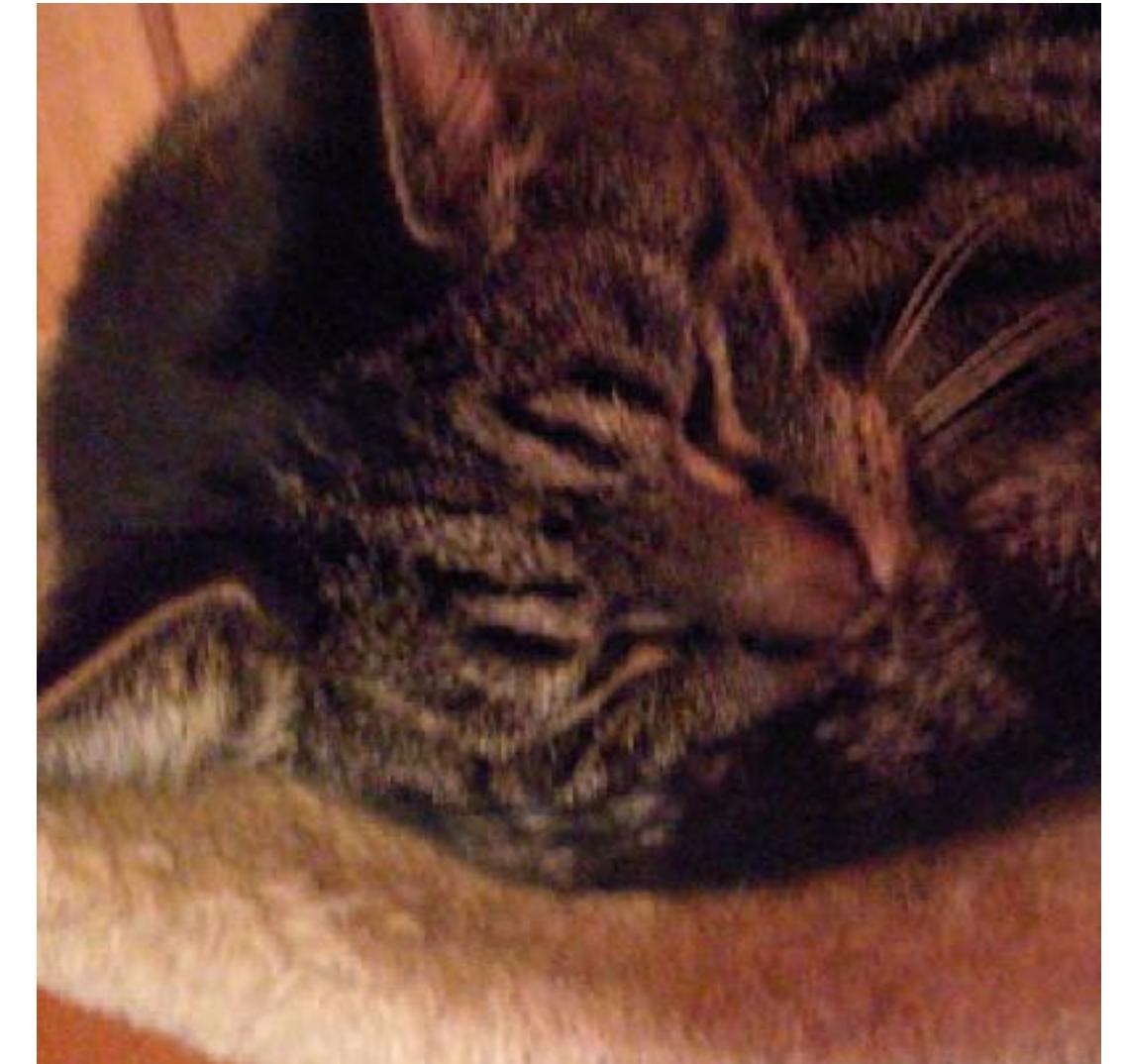
Smart Building? Office Automation?



Automated

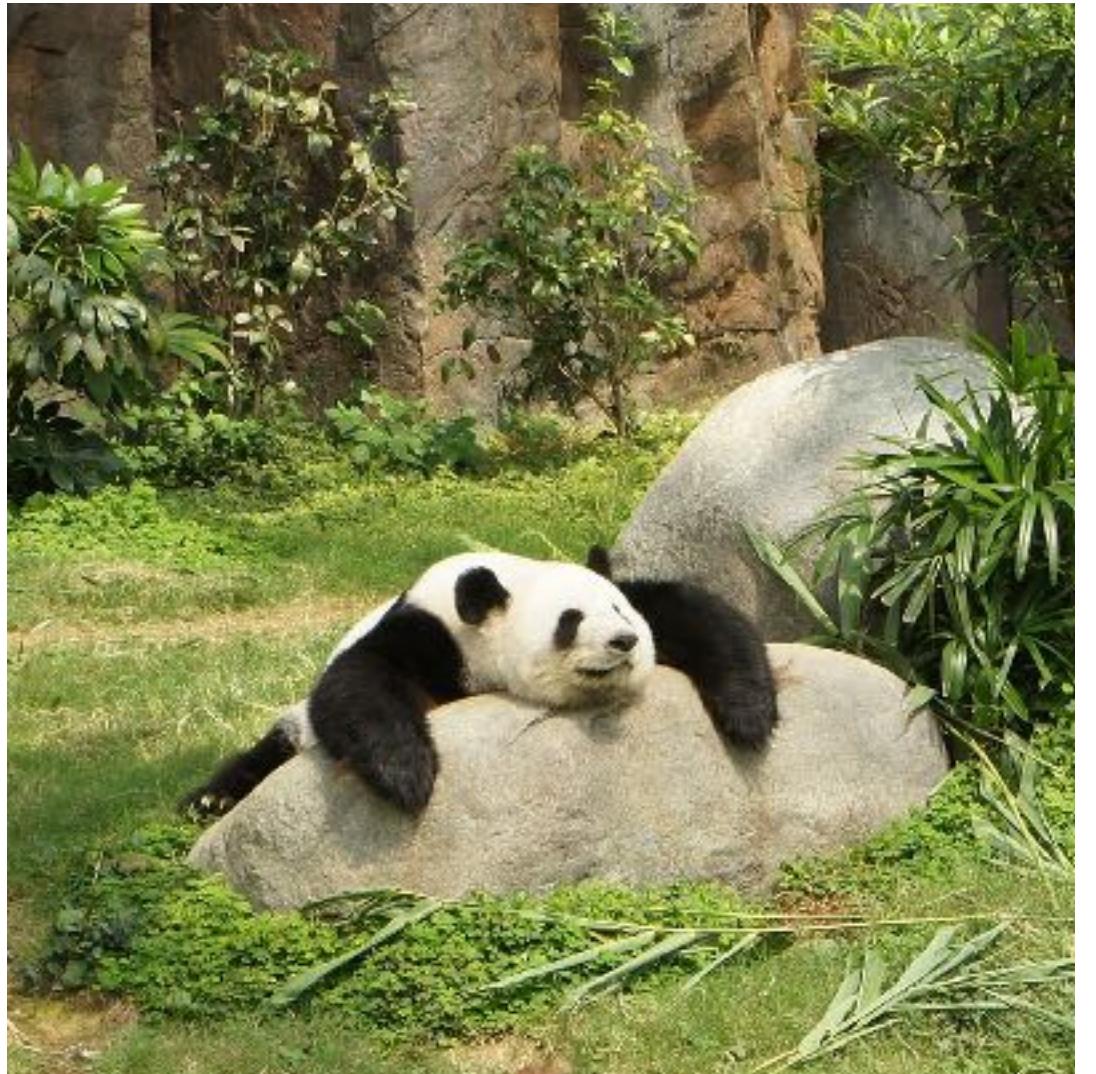


Controls



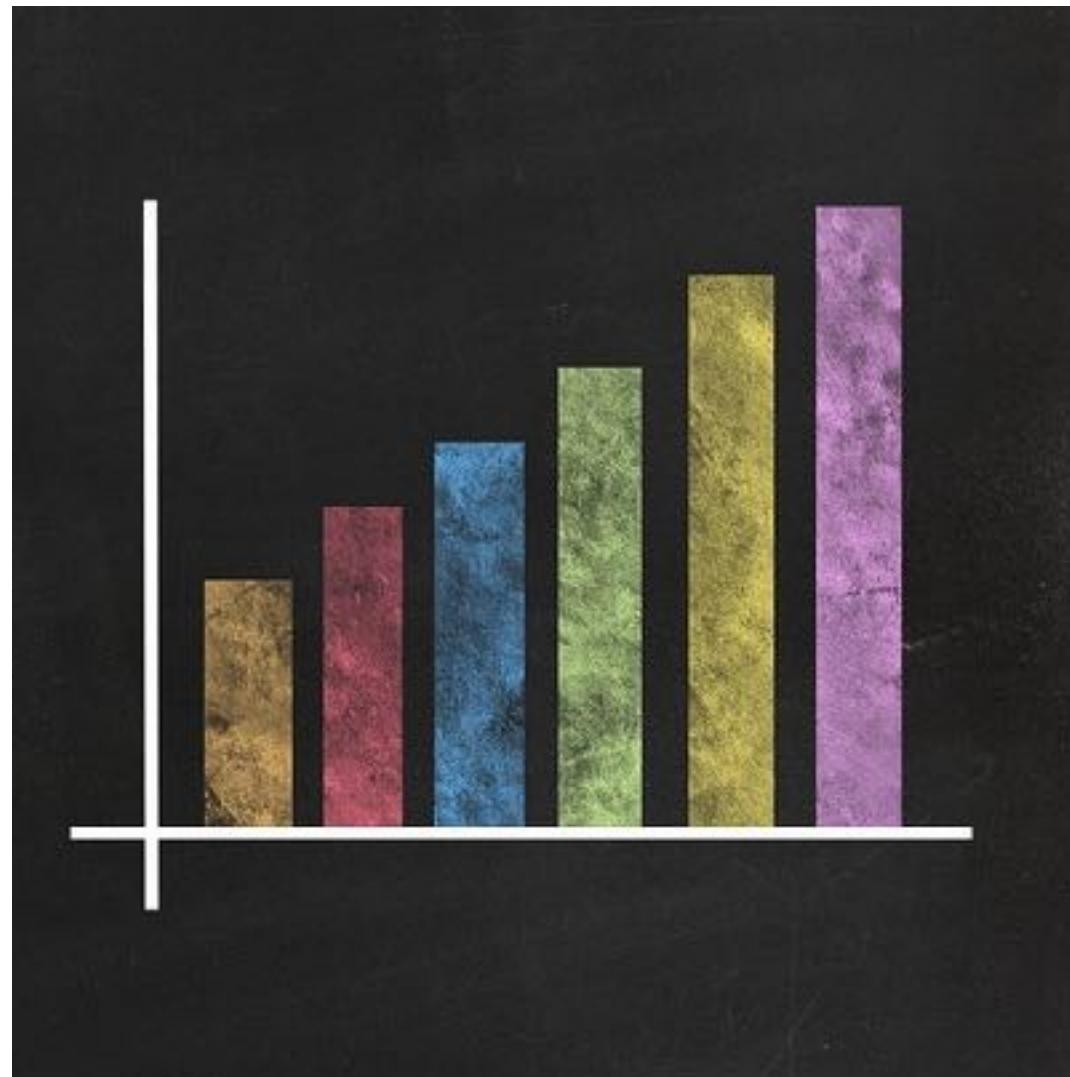
Comfort

Why?

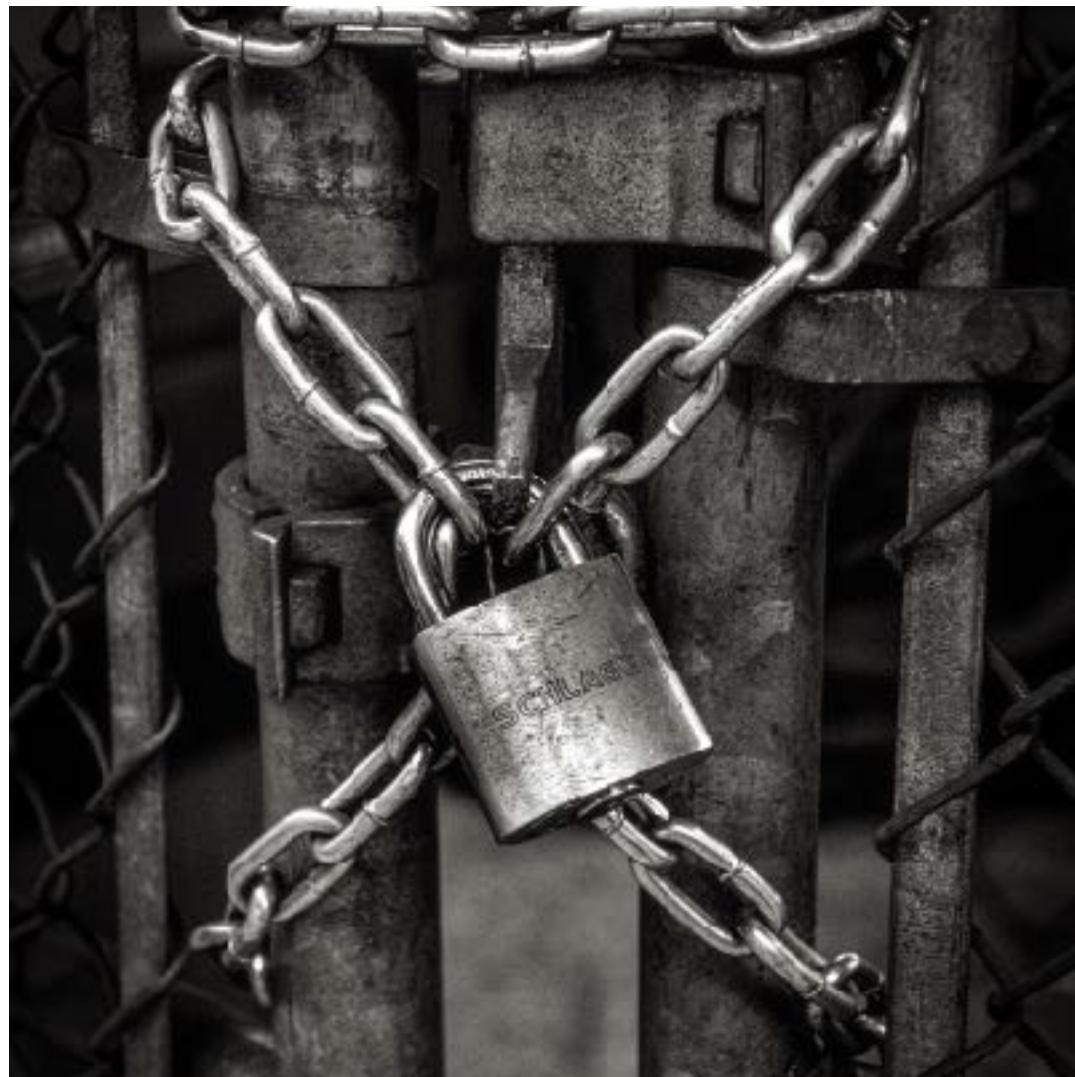


Lazy

Why?



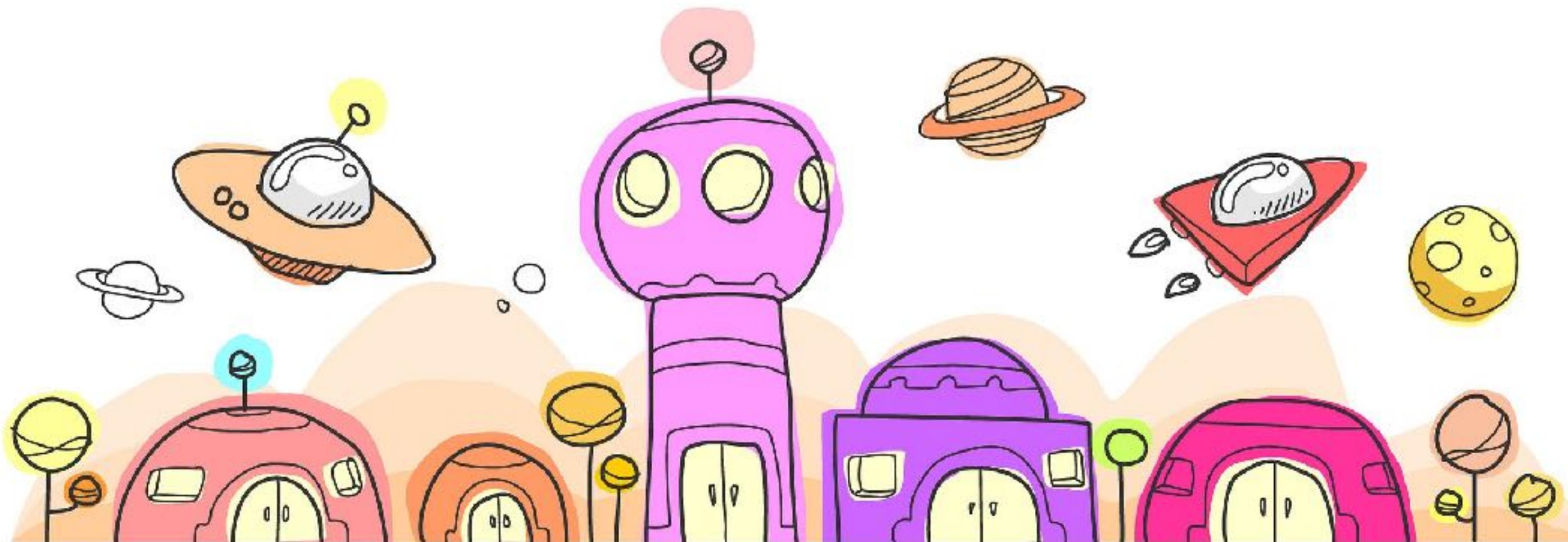
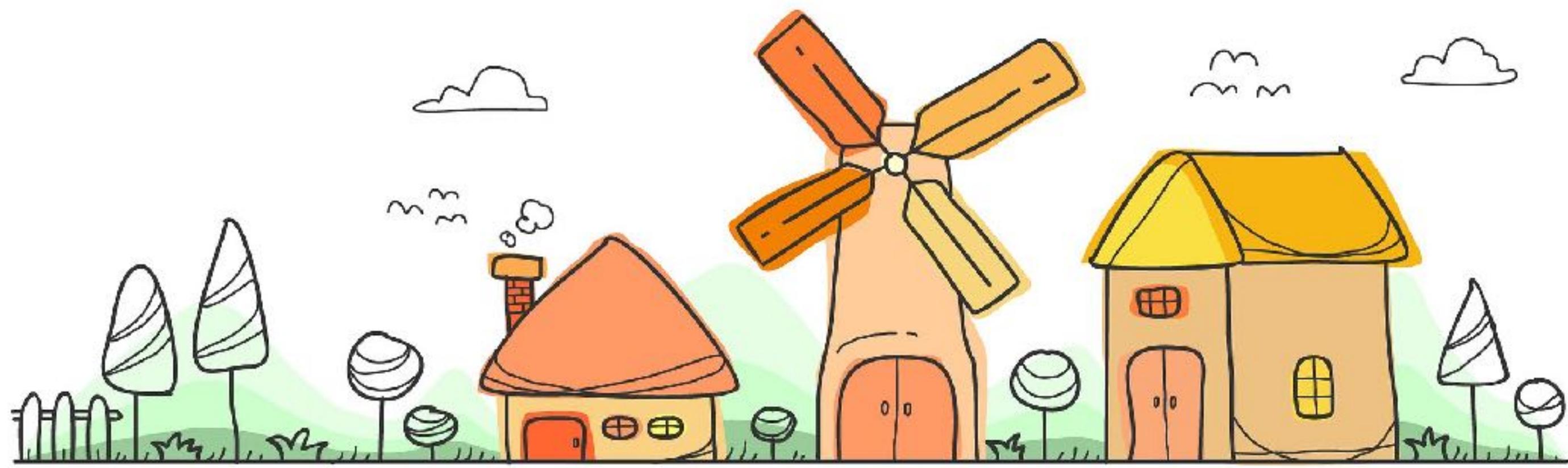
Improvement



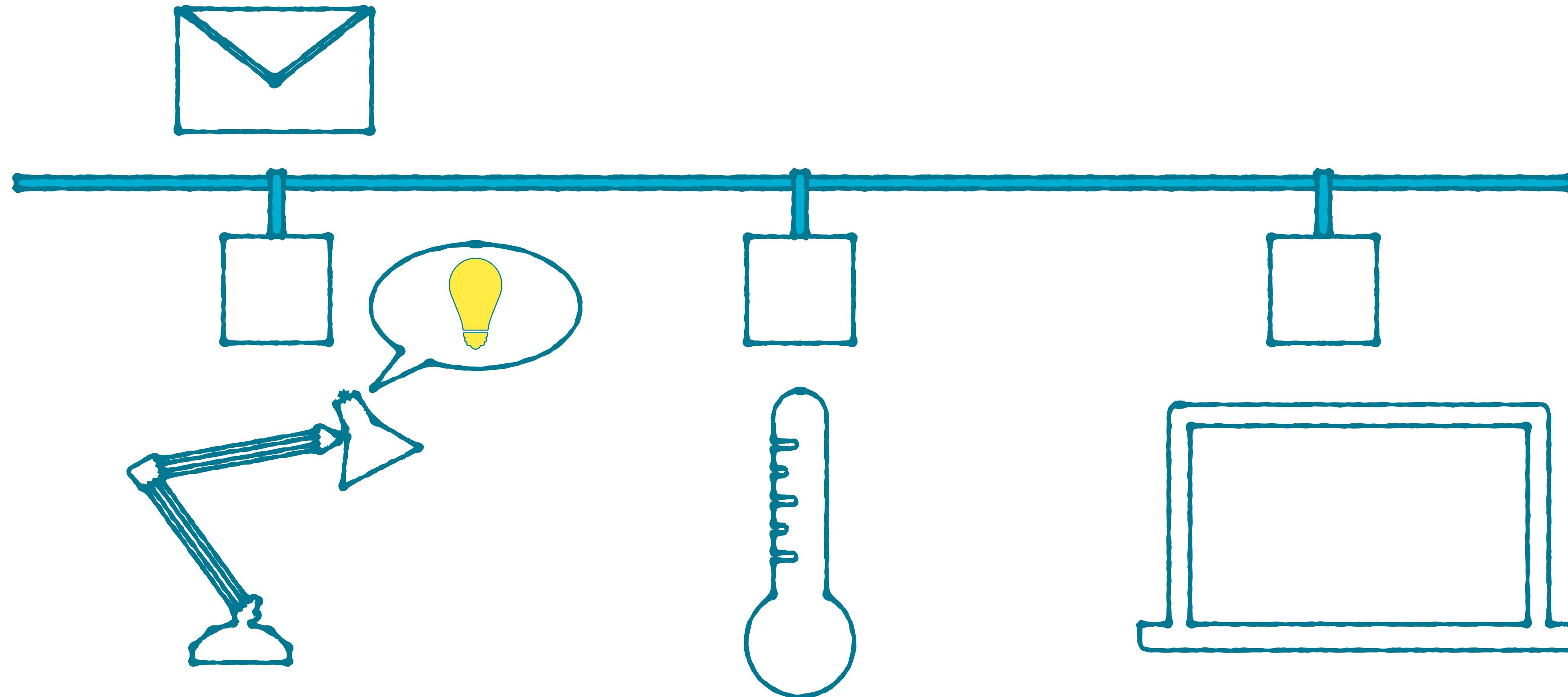
Security

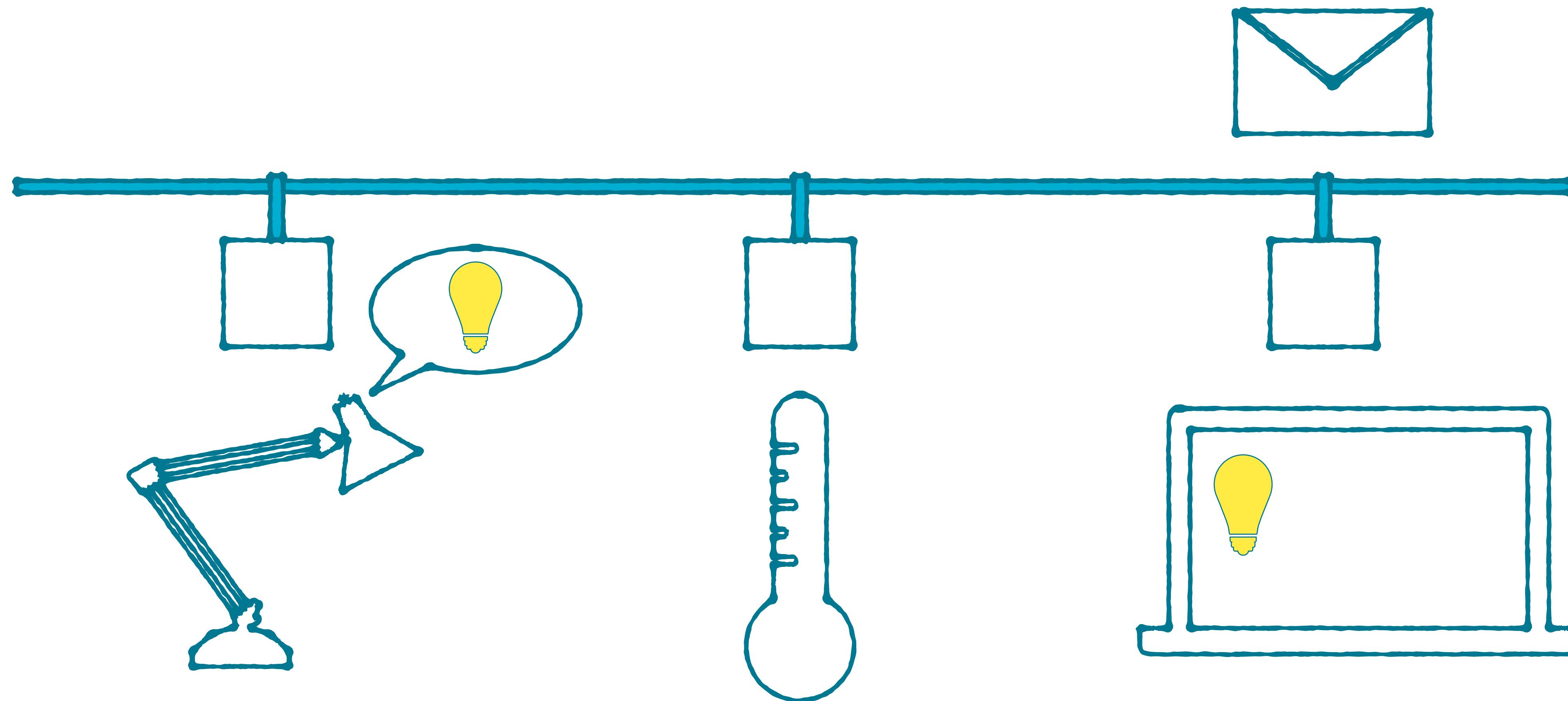


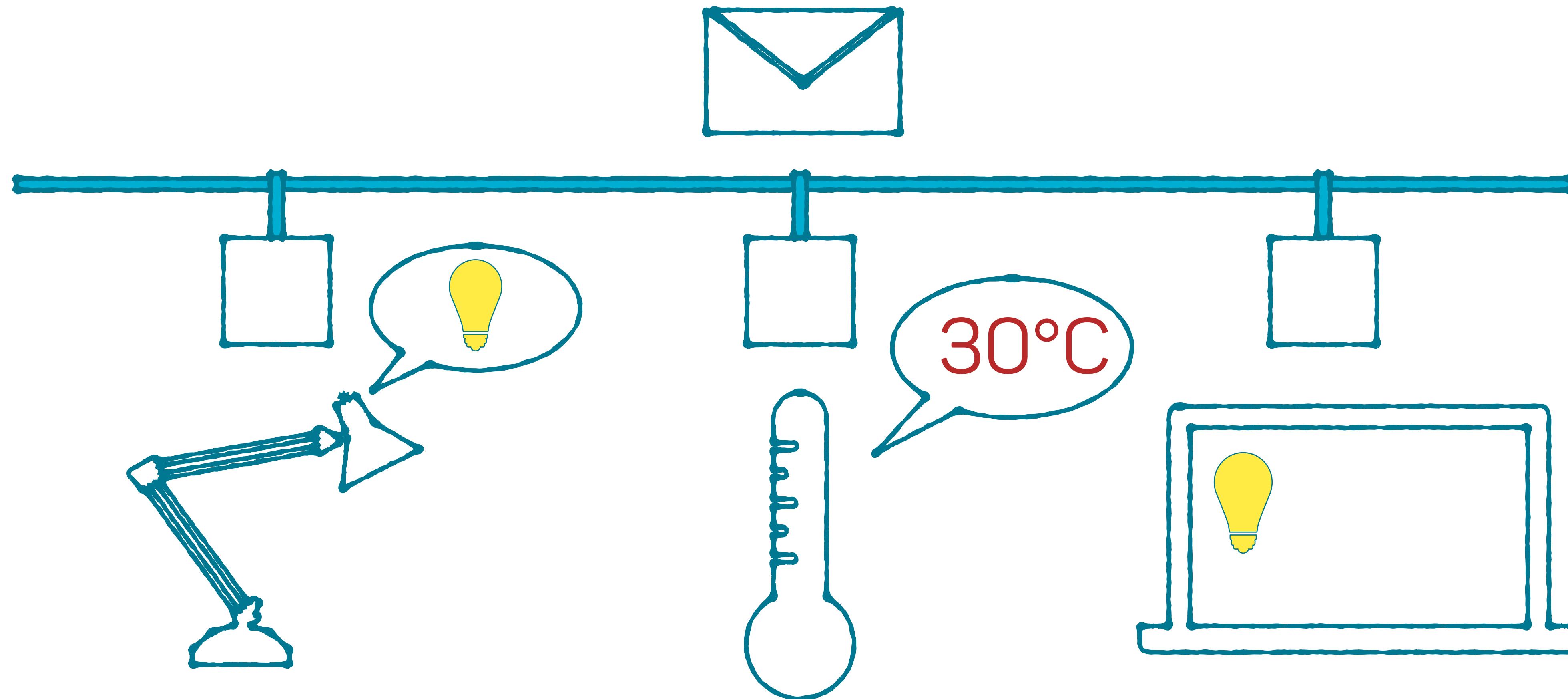
Fun

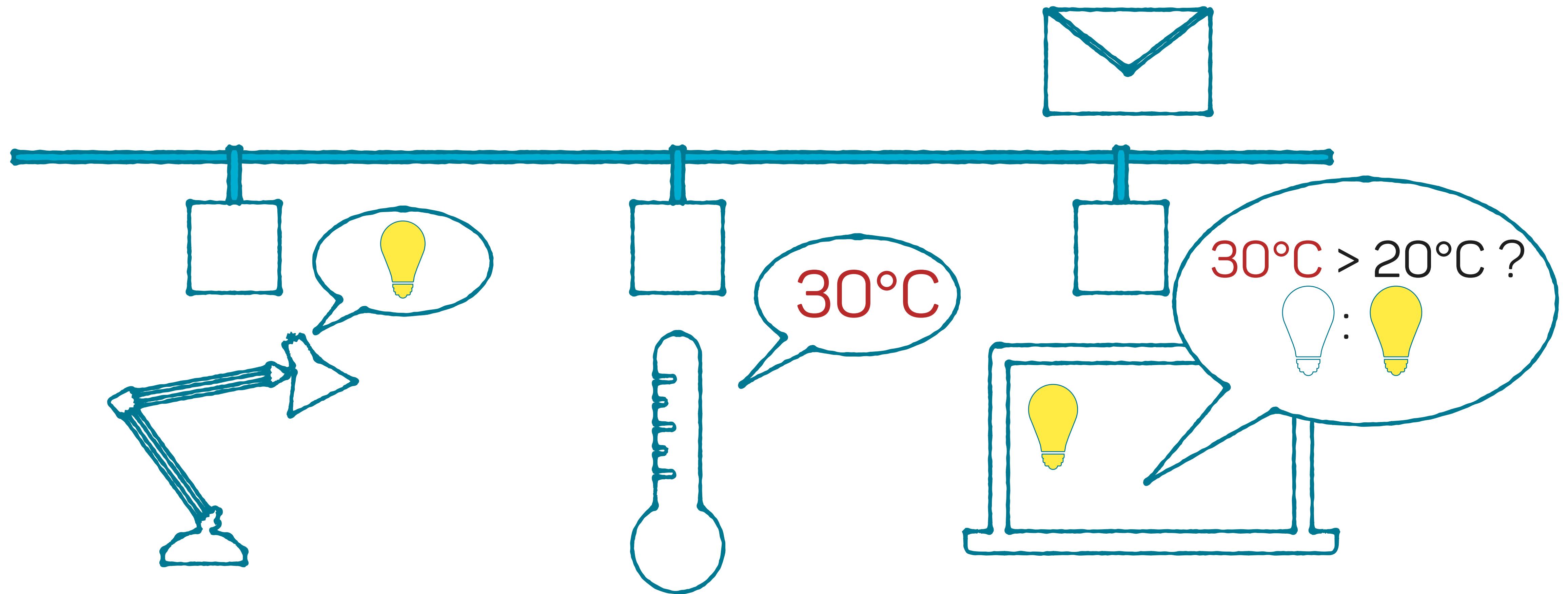


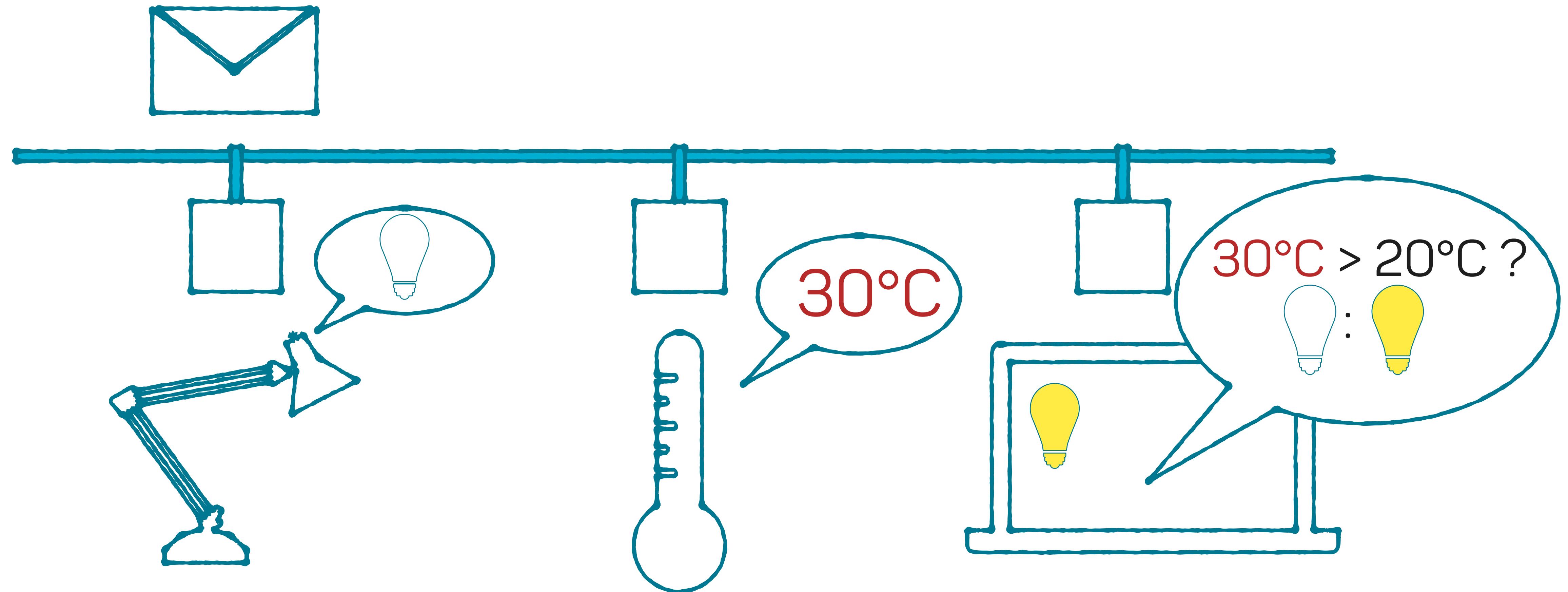
Smart Office with KNX!











Which sensors ?



windows



shutters



lamps

So ... I can control the building with KNX?

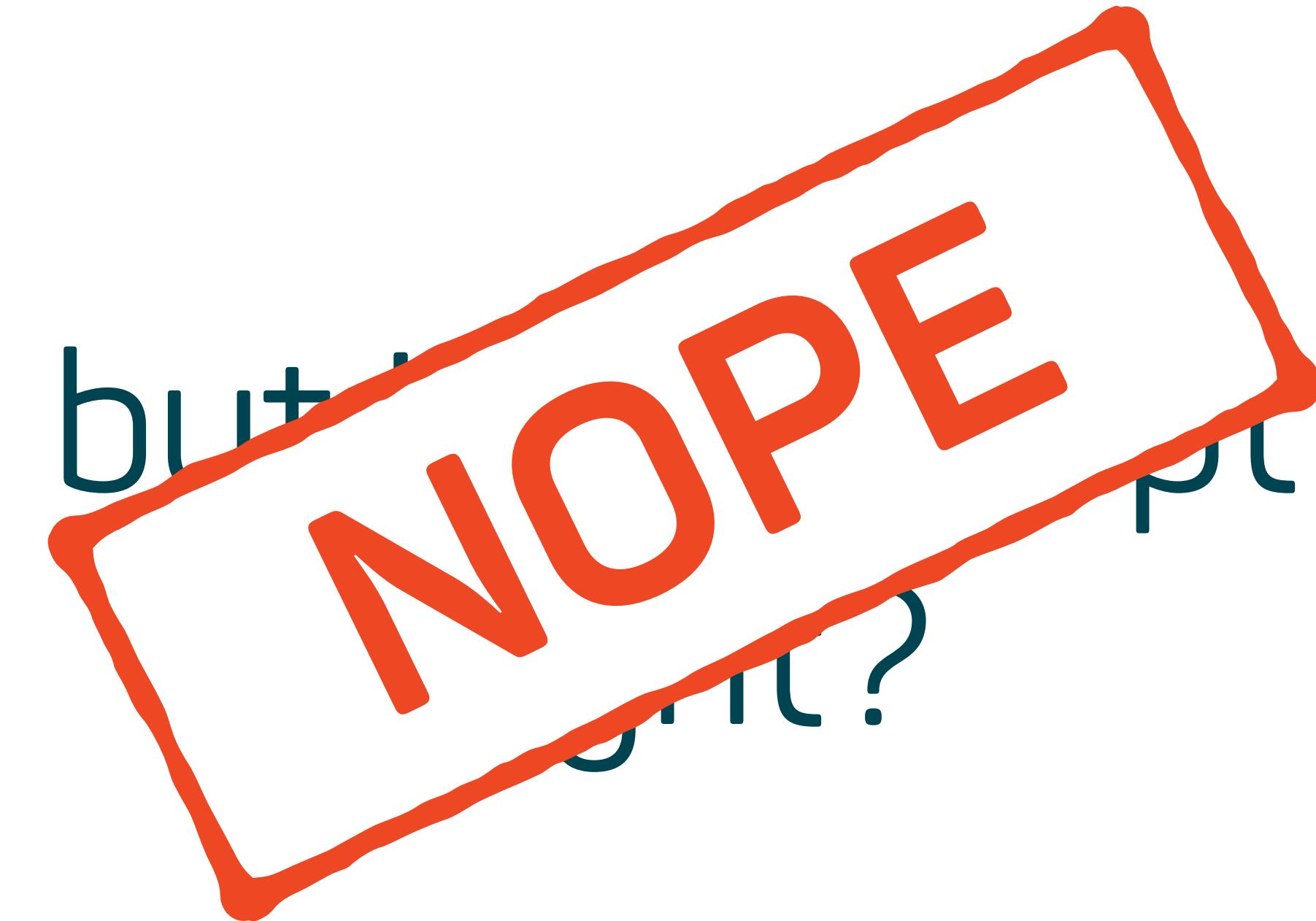
So ... I can control
my building with KNX?



why: no UI

So ... no UI, but I can script something,
right?

So ... no UI, but I
want something,



Why: only binary



But...

...I want to control it
too

ARCHITECTURE



openHAB



OpenHab - UIs

The screenshot shows the OpenHAB user interface with the following details:

- Left Sidebar:** A vertical sidebar with the "openHAB" logo at the top. Below it are links: Control, Inbox, Configuration (selected), System, Bindings (selected), Services, Things, Items, Add-ons, and Preferences.
- Central Area:** The title "Configuration > Bindings" is displayed. A large blue "+" button is present. Below it, two binding entries are listed:
 - Chromecast Binding** (chromecast) by Kai Kreuzer
 - Network Binding** (network) by Marc Mettke, David Graeff
- Right Panel:** A list of "Rolläden OG2" items, each with a small icon, a name, and control buttons (up, down, delete). The items are:
 - OG2 NordOst Rolladen 1
 - OG2 NordOst Rolladen 2
 - OG2 NordOst Rolladen 3
 - OG2 NordWest Rolladen 1 (bei Nick)
 - OG2 NordWest Rolladen 2
 - OG2 NordWest Rolladen 3
 - OG2 NordWest Rolladen 4
 - OG2 NordWest Rolladen 5
 - OG2 SüdWest Rolladen 1 (bei Marc)
 - OG2 SüdWest Rolladen 2
 - OG2 SüdWest Rolladen 3

OpenHab - Scripting Support

```
Switch Kitchen_Light "Kitchen Light" {mqtt="<...>, >[...]" }
```

```
String Bedroom_Sonos_CurrentTitle "Title [%s]" (gBedRoom) {channel="sonos:..."} 
```

```
Number Bathroom_WashingMachine_Power "Power [%.0f W]" <energy> (gPower)  
{channel="homematic:..."} 
```

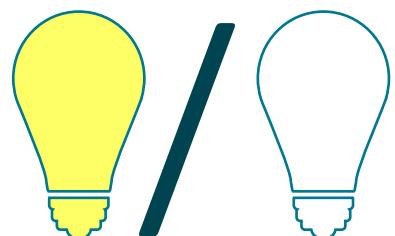
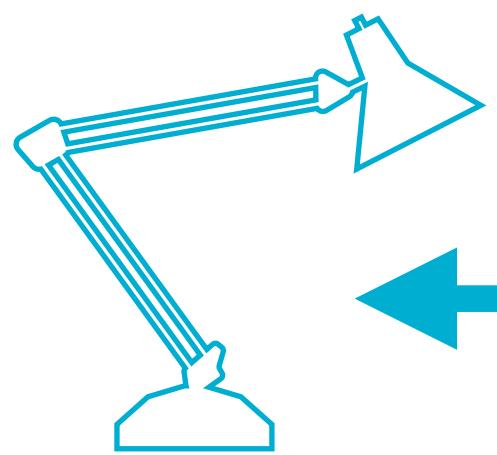


PARTY



OpenHab

Things

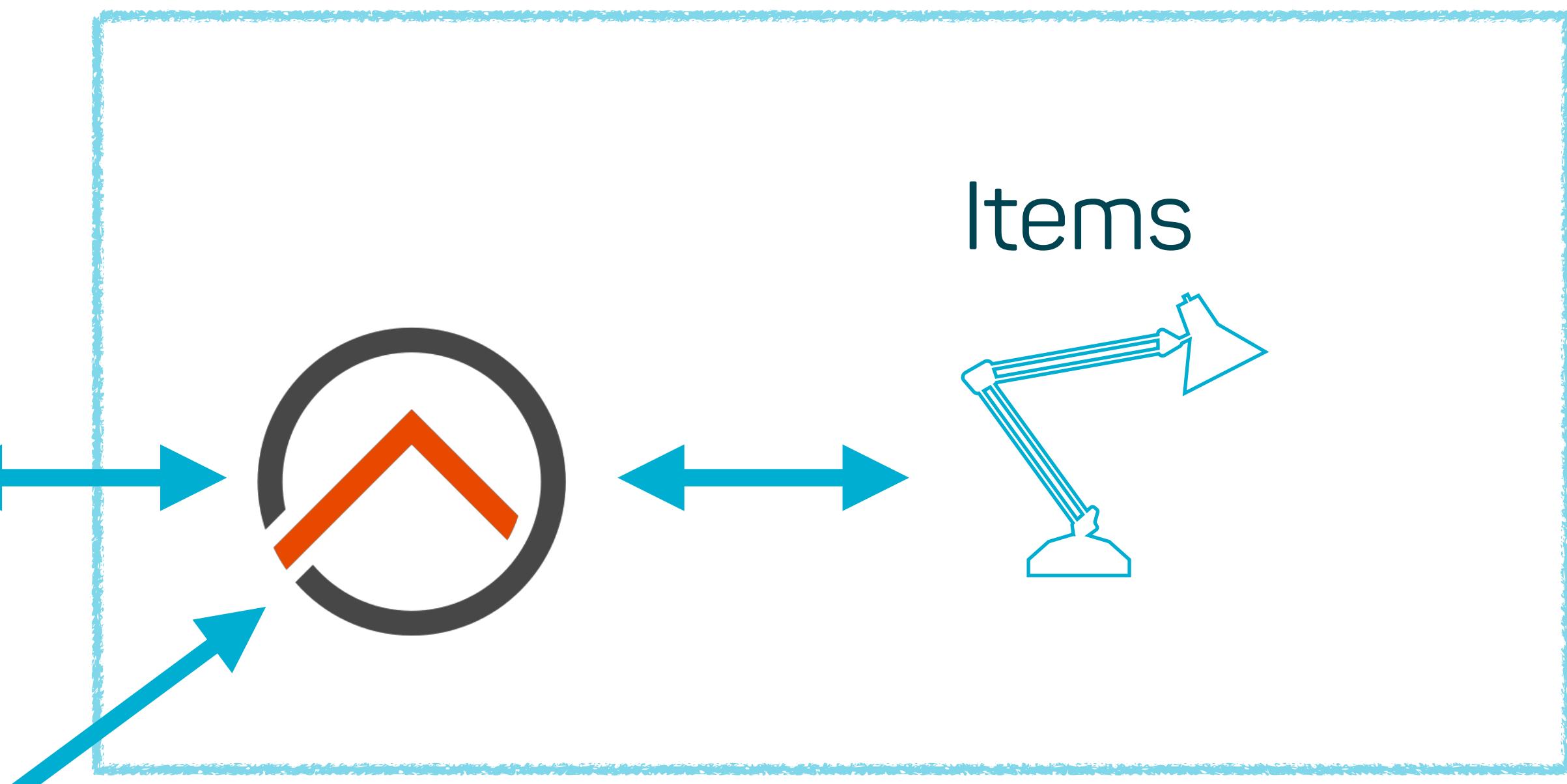
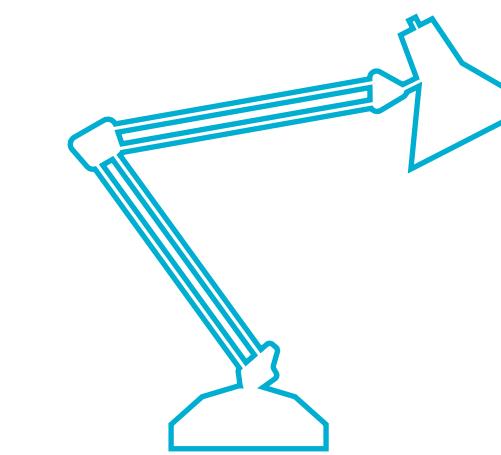


Channel

Bindings



Items



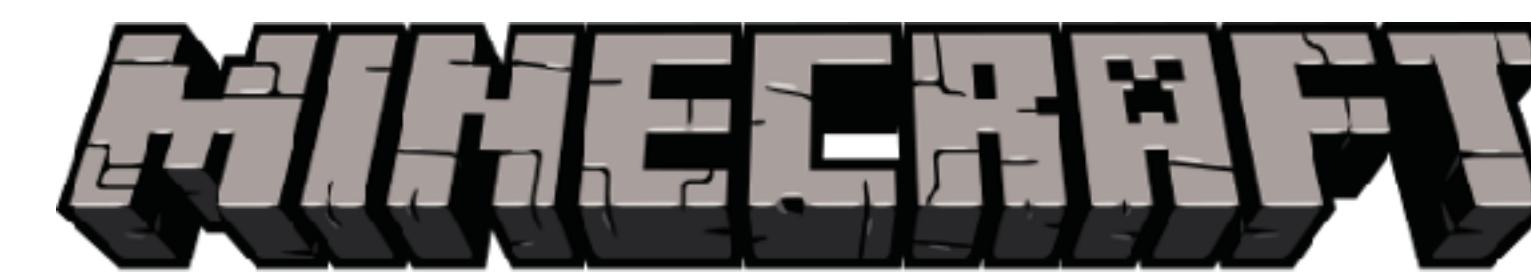
Wait a second, bindings....

Does it mean we can add more?



Wait a second, bindings....

Does it mean we can add more?



We are done, right ?

- ✓ KNX Sensor Support
- ✓ UI
- ✓ Scripting
- ✓ OpenHab Sensor Support



Again, that was the wrong shutter 😳

THE UI



Where is North East?
Somebody got a compass?



Who is Nick?
And where is his desk?



Which shutter is no. 4?
On which side do you start counting?



WHUT?
Confusion!

← Rolläden OG2



OG2 NordOst Rolladen 1



OG2 NordOst Rolladen 2



OG2 NordOst Rolladen 3



OG2 NordWest Rolladen 1 (bei Nick)



OG2 NordWest Rolladen 2



OG2 NordWest Rolladen 3



OG2 NordWest Rolladen 4



OG2 NordWest Rolladen 5



OG2 SüdWest Rolladen 1 (bei Marc)



OG2 SüdWest Rolladen 2

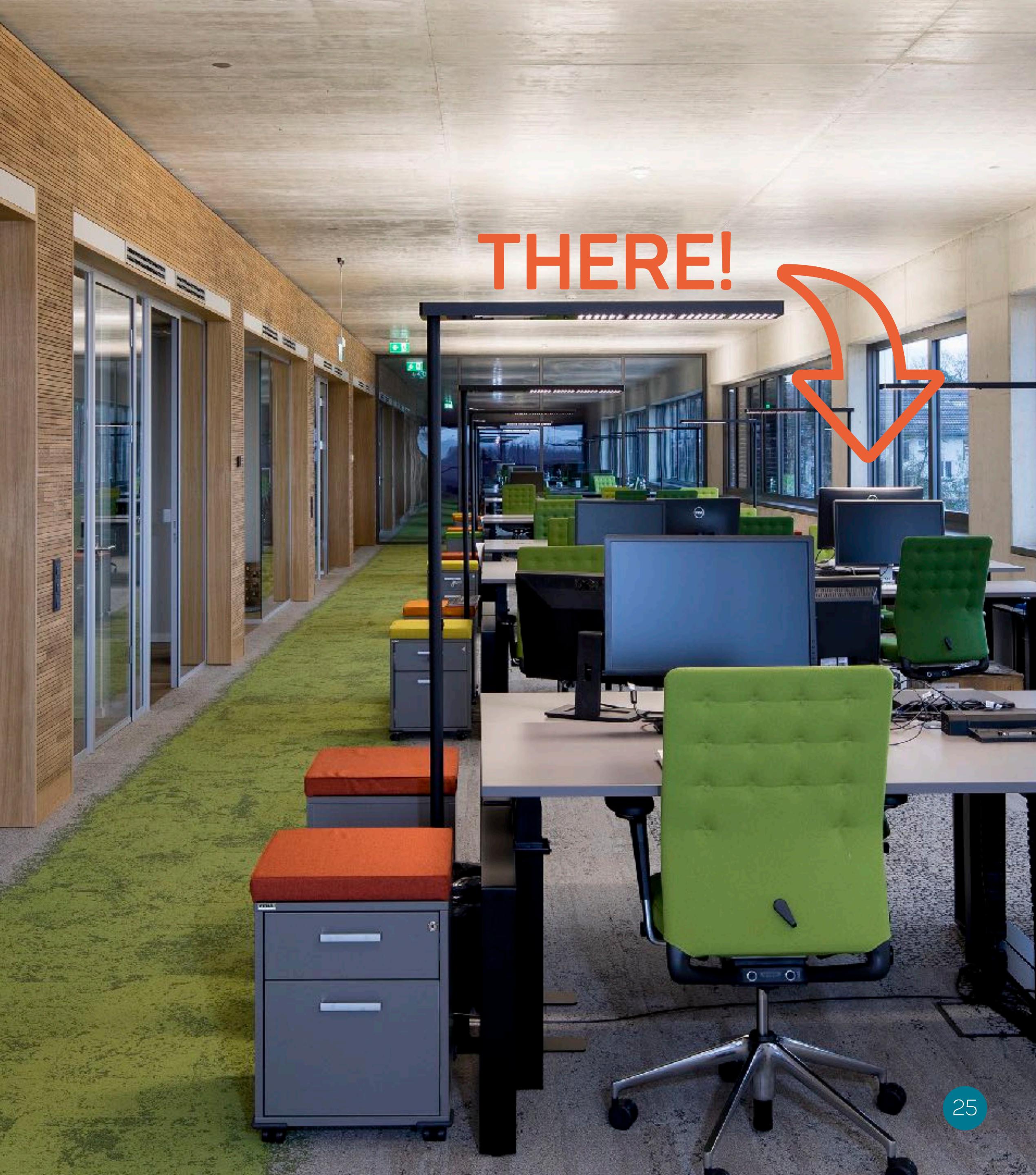


OG2 SüdWest Rolladen 3



BUT...

... I know where my
desk is!





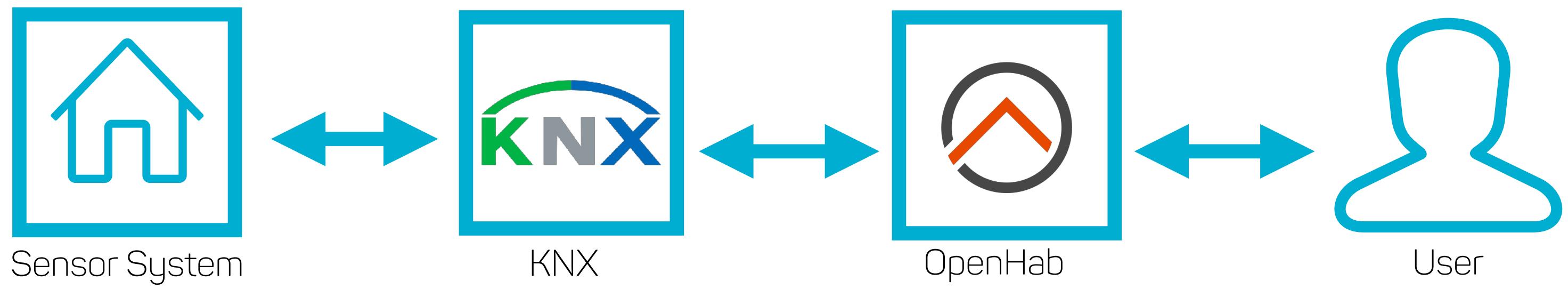
An IDEA

ONE DASHBOARD

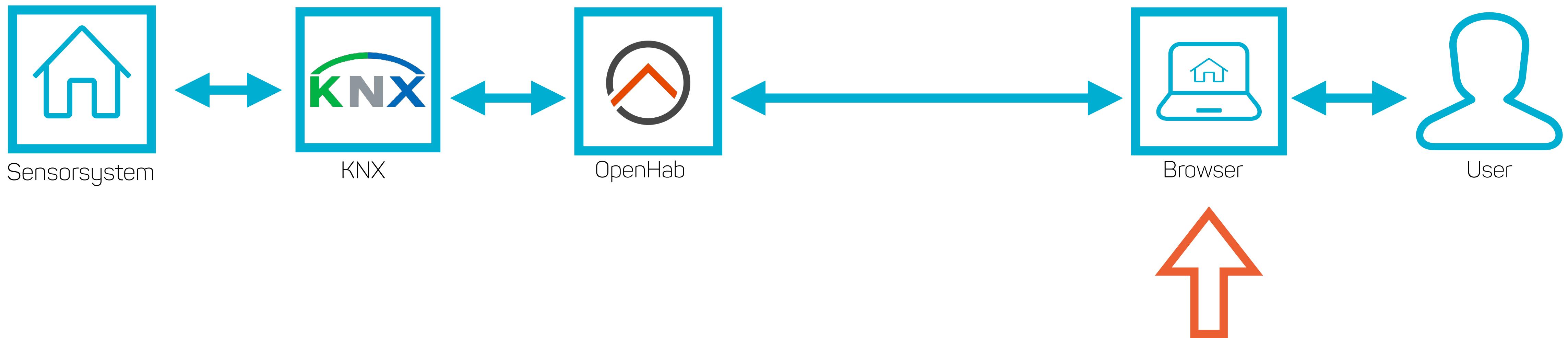


TO RULE THEM ALL

ARCHITECTURE



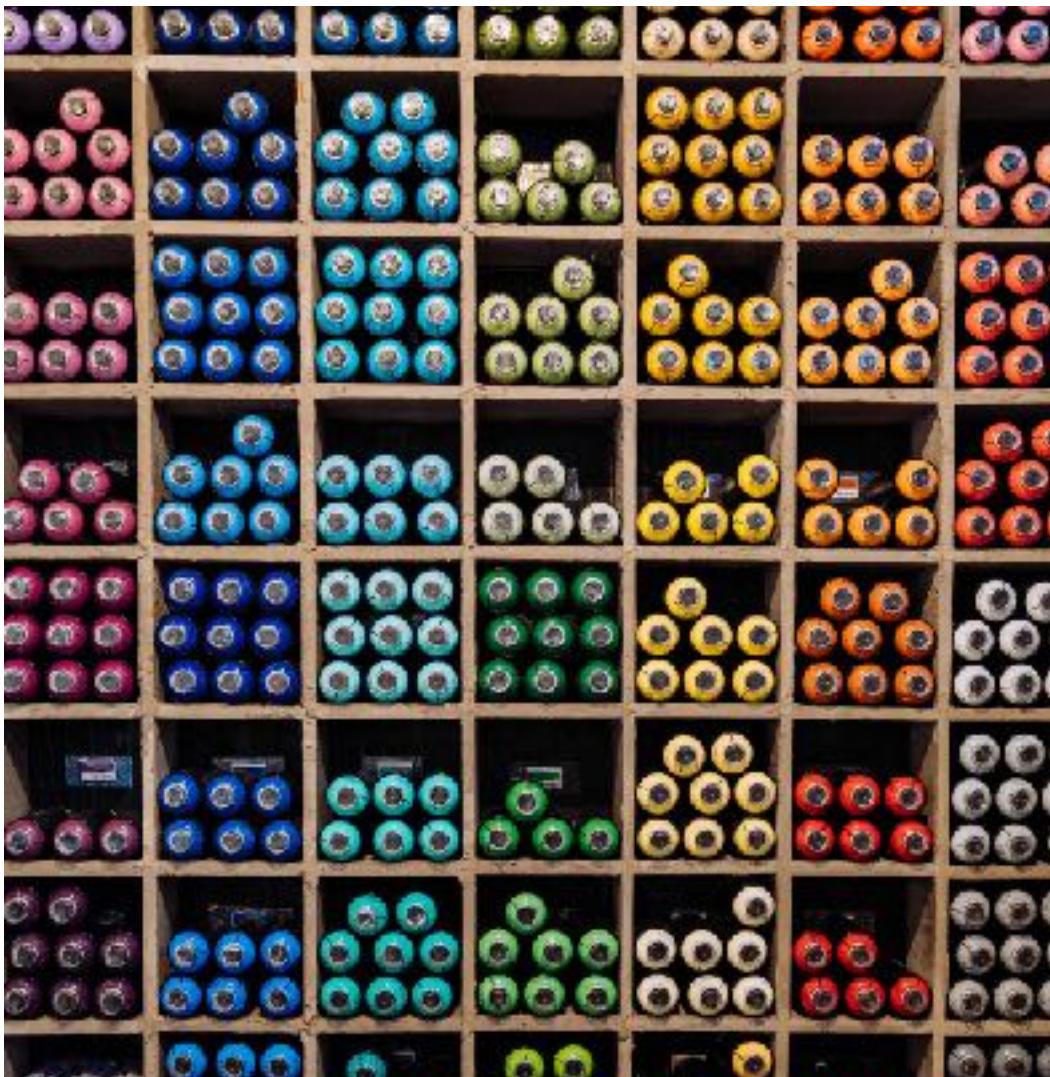
ARCHITECTURE



Requirements



Intuitive



Neat



Available

Cafeteria

22.99



CAFETERIA_DECKENLEUCHTE_EINGA

Aus



CAFETERIA_DECKENLEUCHTE_MITTE

Aus



CAFETERIA_DECKENLEUCHTE_THEKE

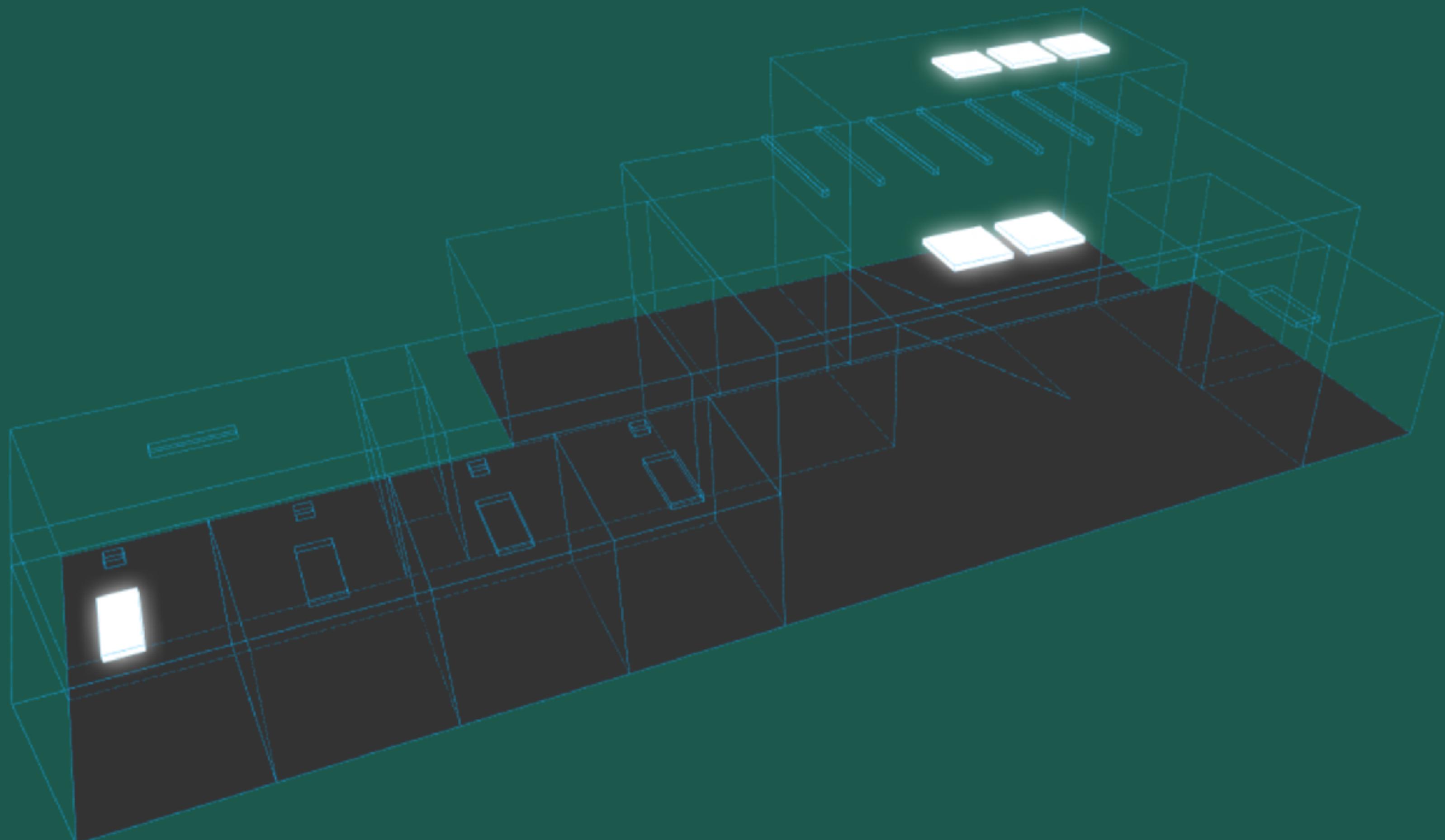
Aus

06.09.2018 11:40 - 12:40

Abstimmung Projekt XY

06.09.2018 12:40 - 13:40

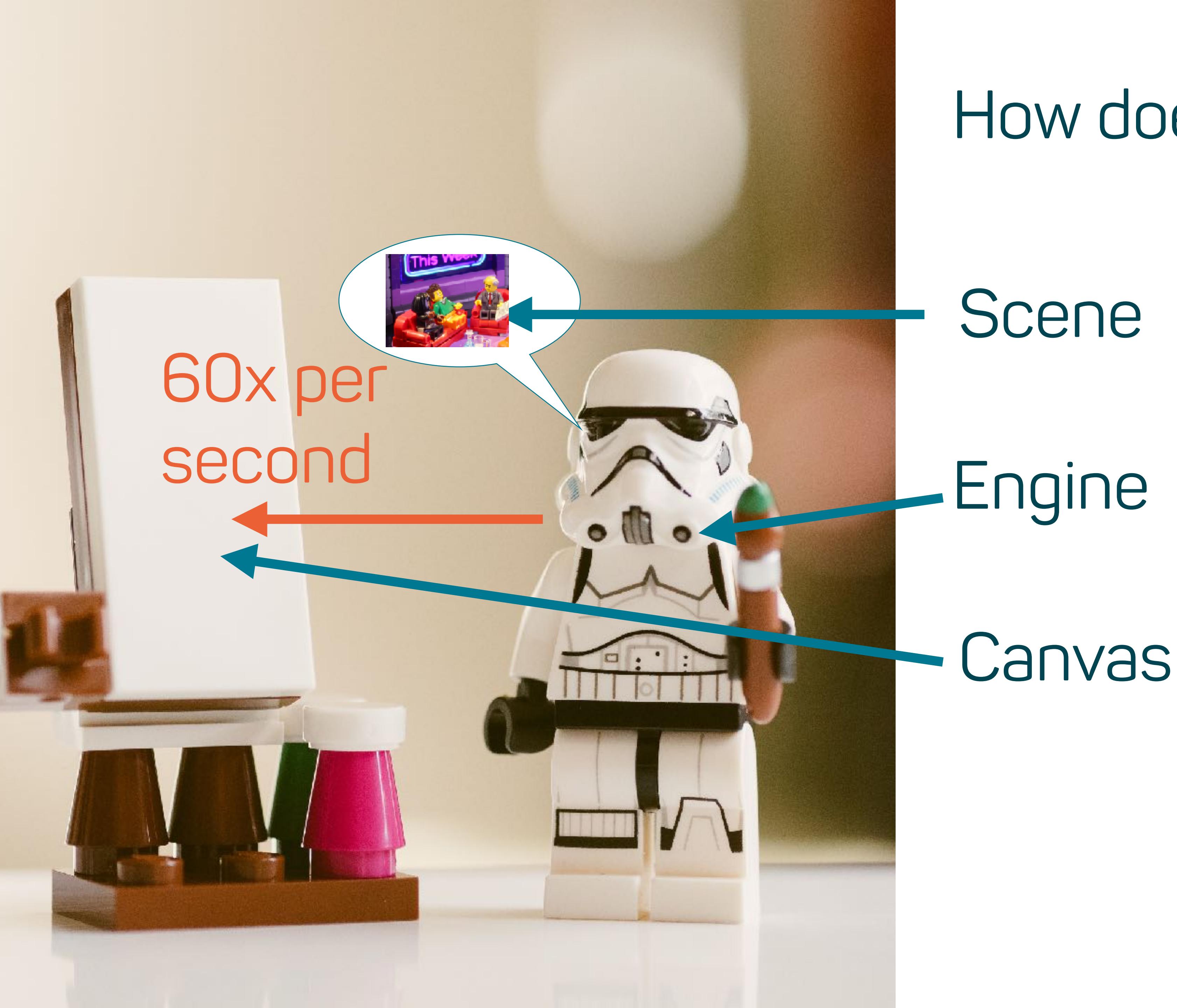
Bewerbungsgespräch



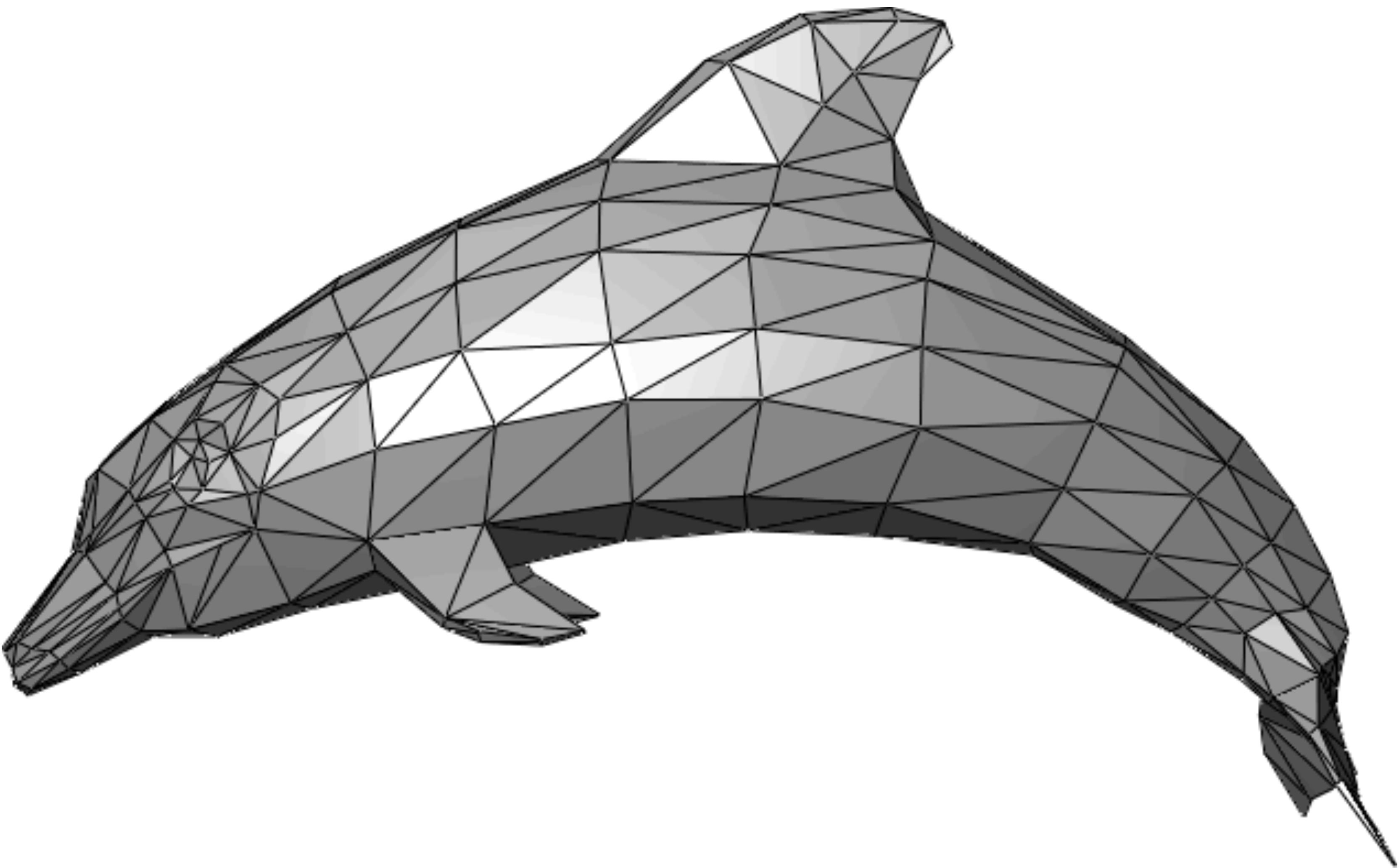
Frontend Stack



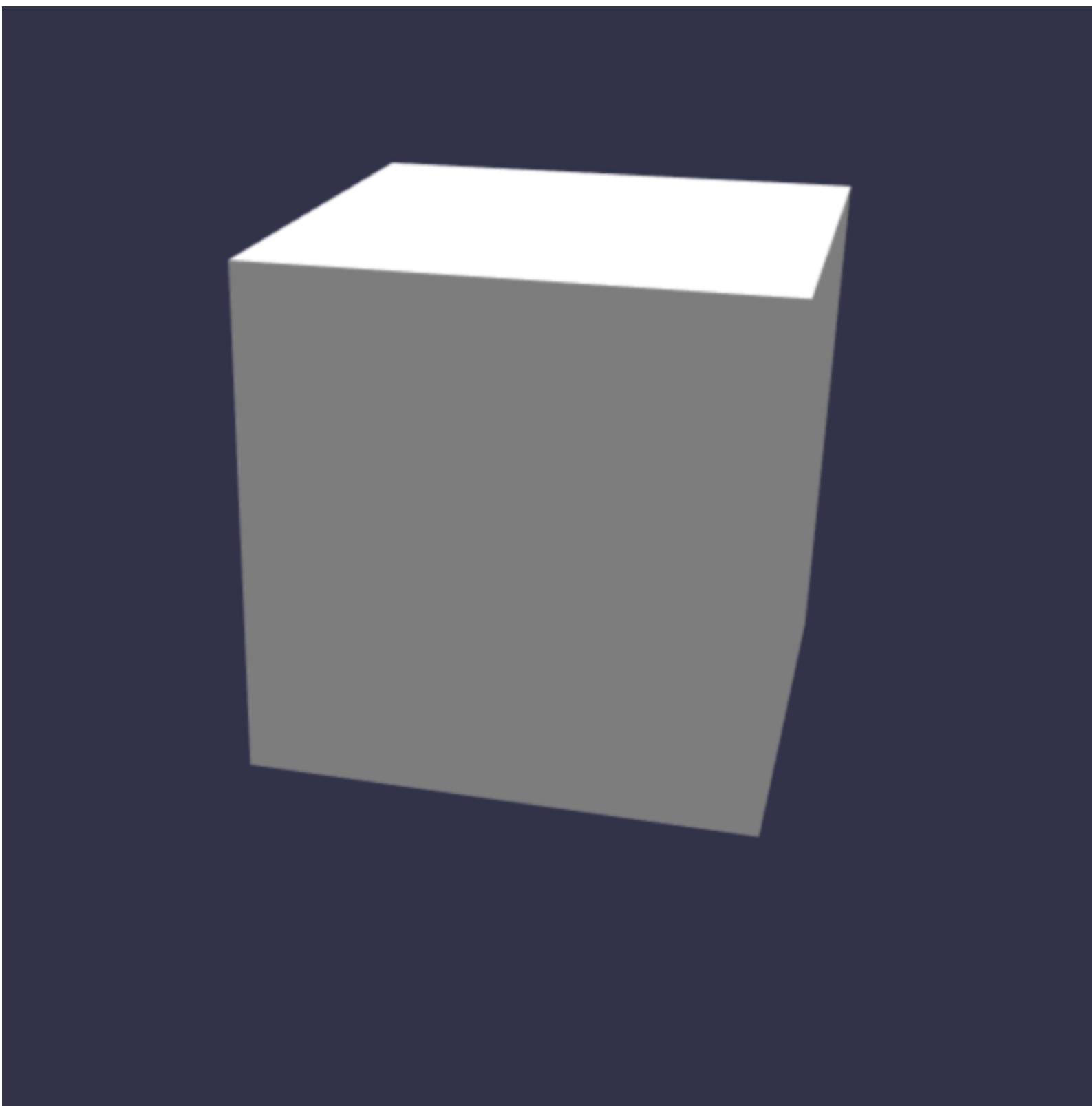
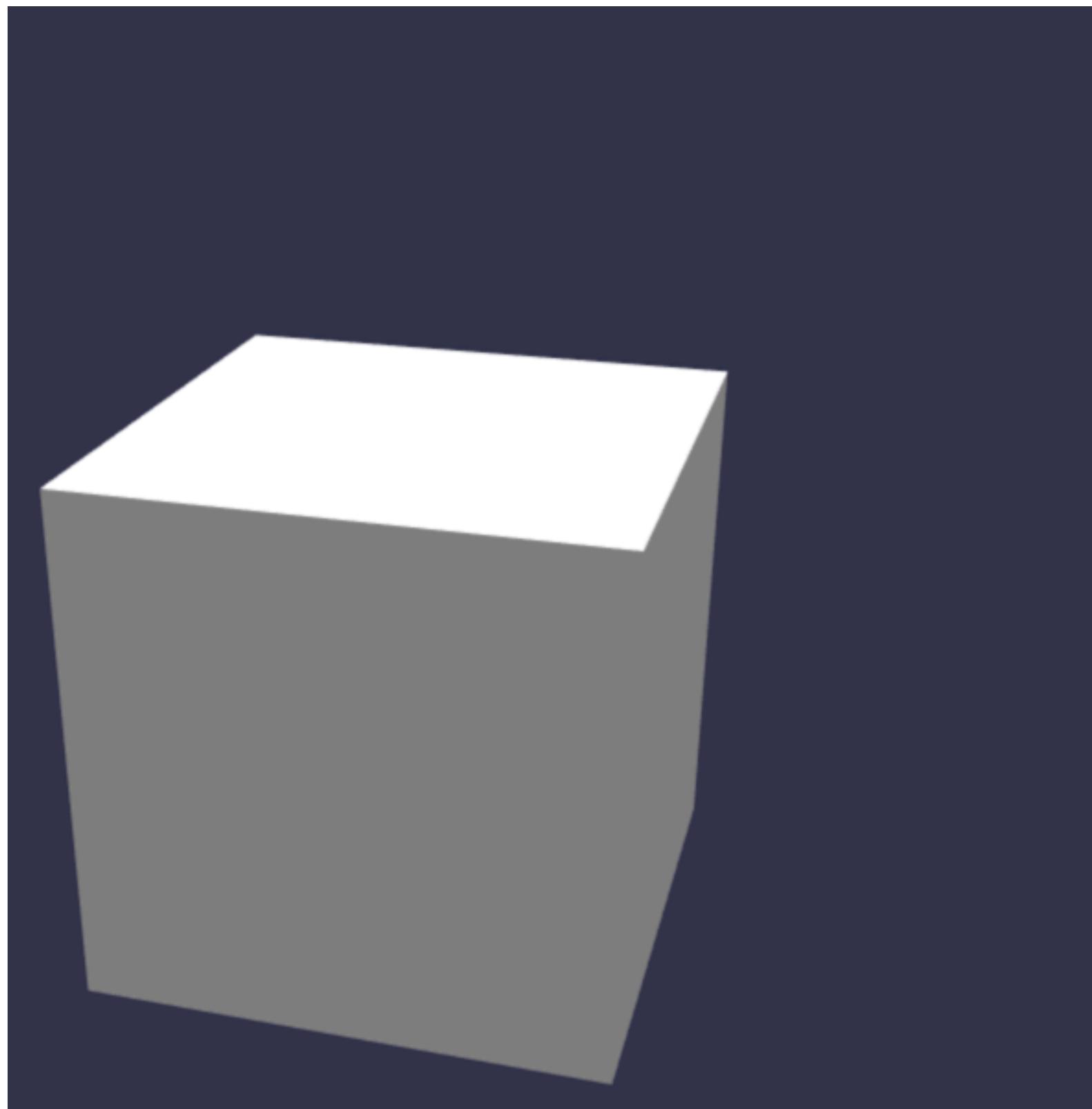
How does it work?



Mesh



Boxes! Lot's of boxes :D



Cafeteria

22.99



CAFETERIA_DECKENLEUCHTE_EINGA

Aus



CAFETERIA_DECKENLEUCHTE_MITTE

Aus



CAFETERIA_DECKENLEUCHTE_THEKE

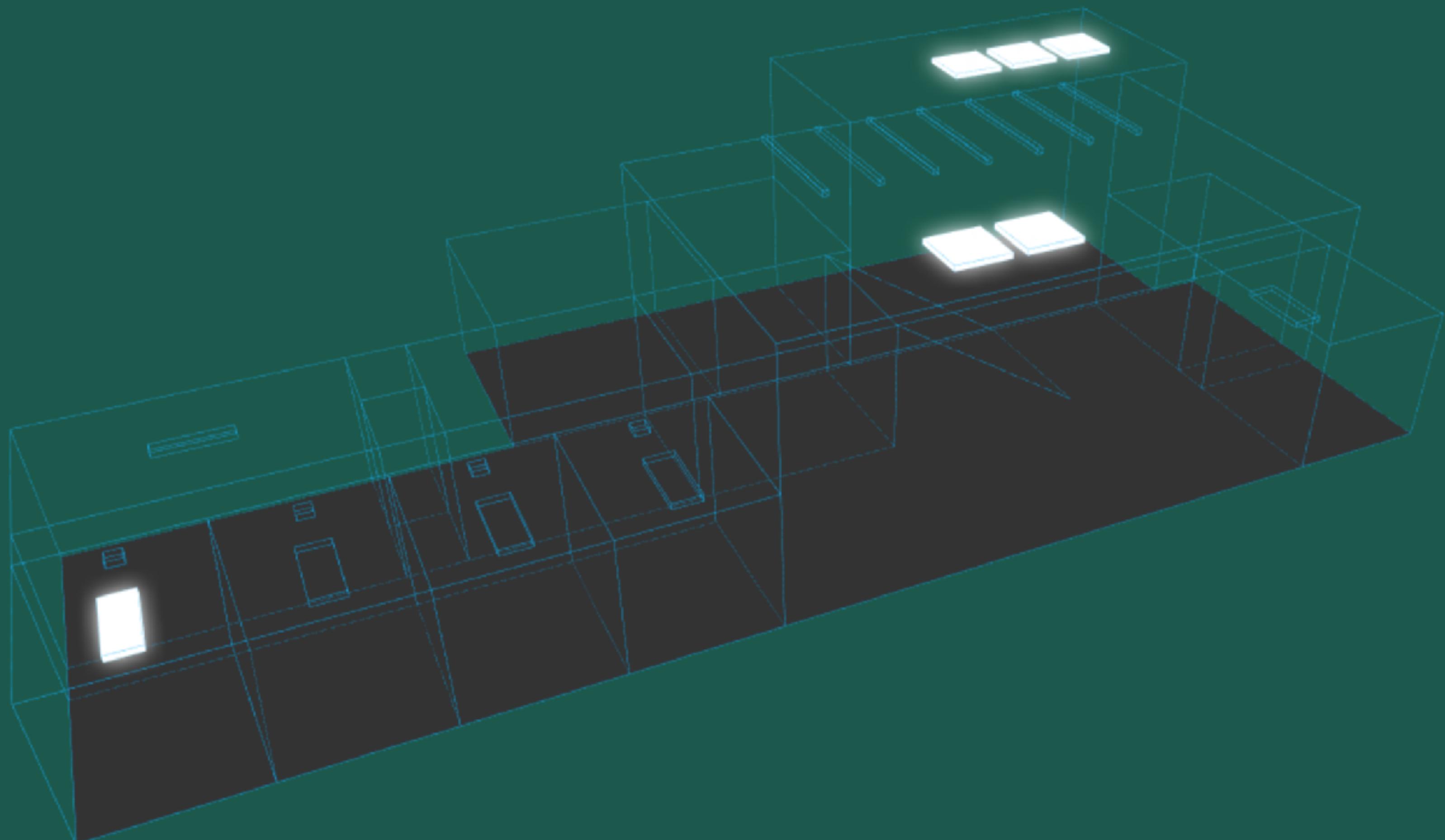
Aus

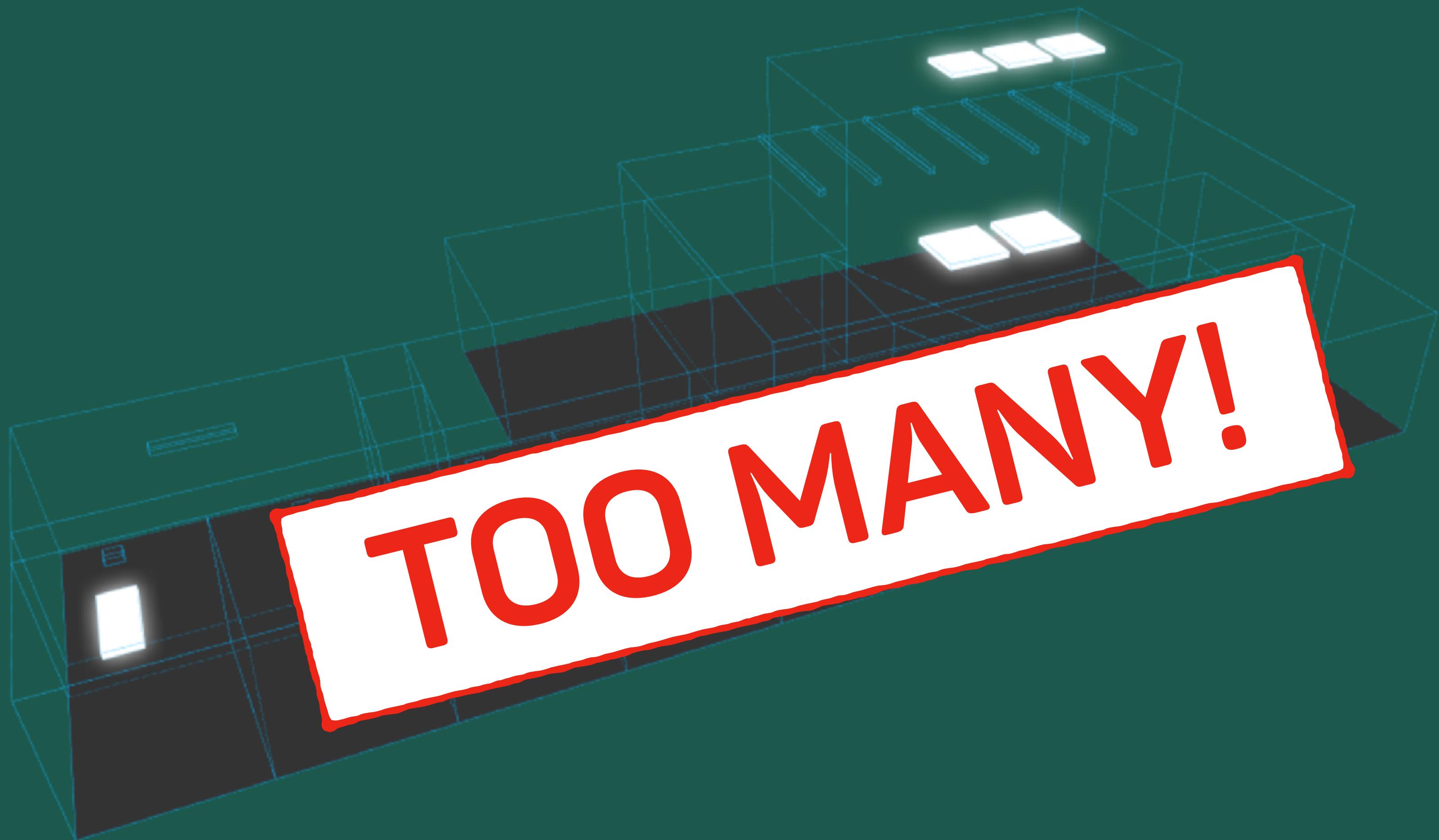
06.09.2018 11:40 - 12:40

Abstimmung Projekt XY

06.09.2018 12:40 - 13:40

Bewerbungsgespräch





Cafeteria

22.99

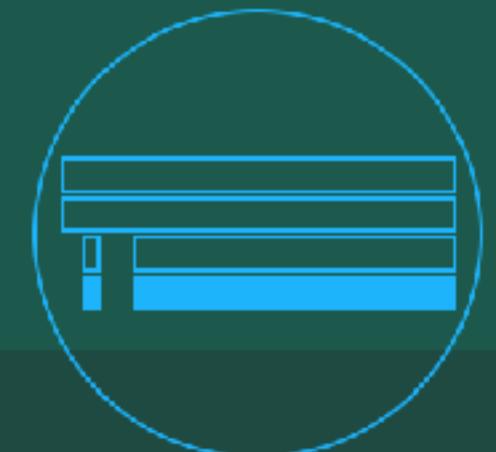
CAFETERIA_DECKENLEUCHTE_EINGAU
Aus

CAFETERIA_DECKENLEUCHTE_MITTE
Aus

CAFETERIA_DECKENLEUCHTE_THEKE
Aus

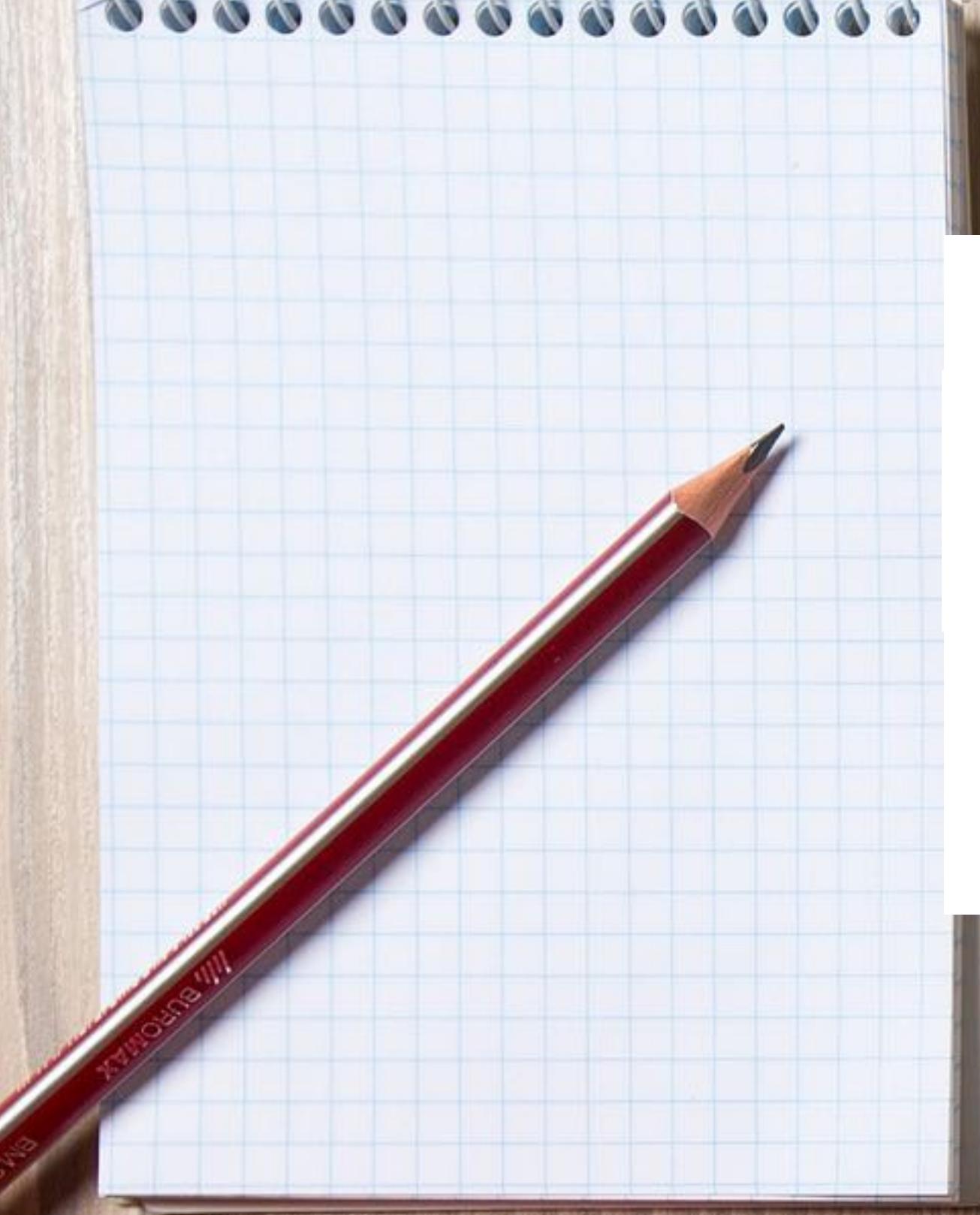
06.09.2018 11:40 - 12:40
Abstimmung Projekt XY

06.09.2018 12:40 - 13:40
Bewerbungsgespräch

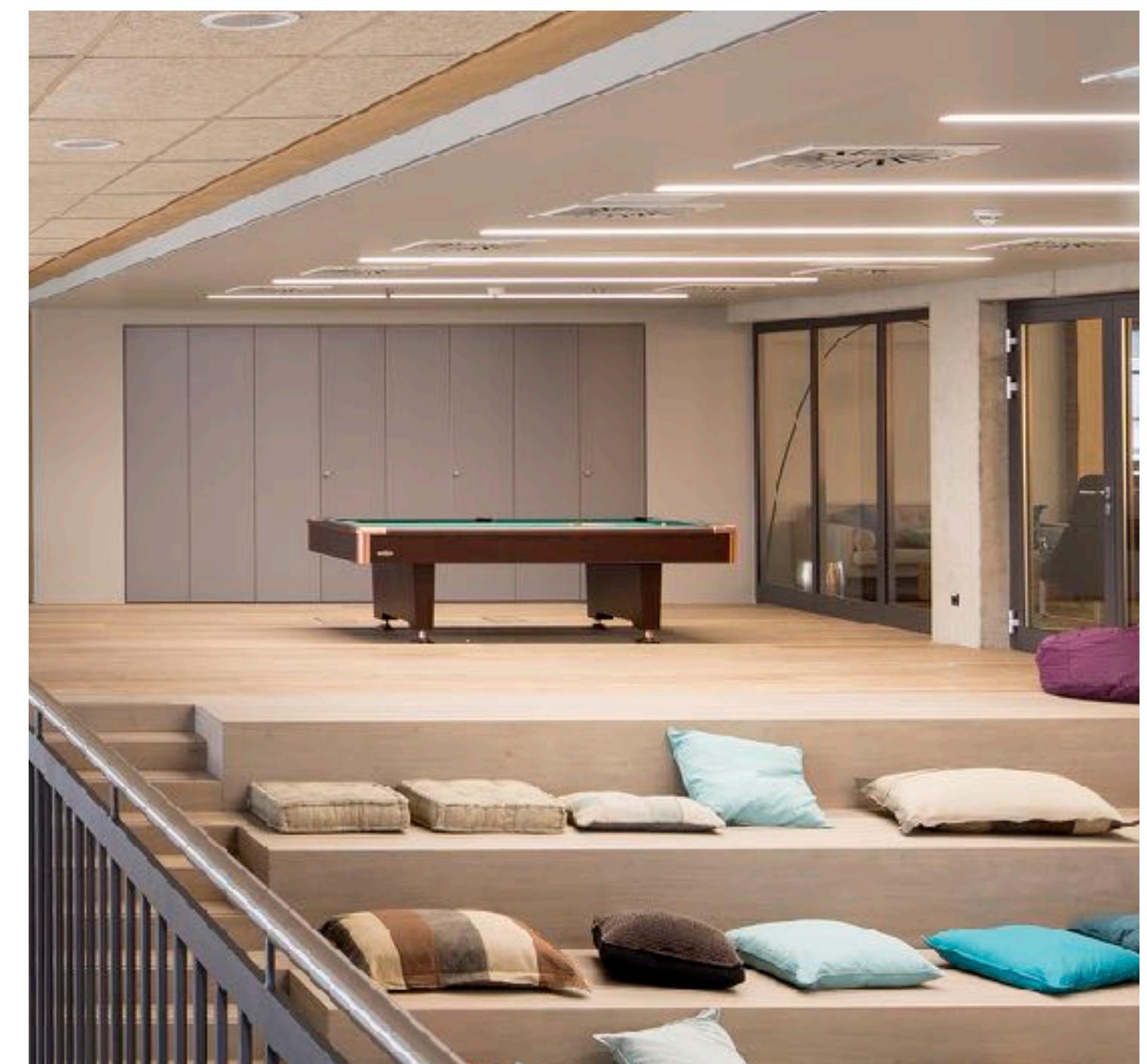


More sensors

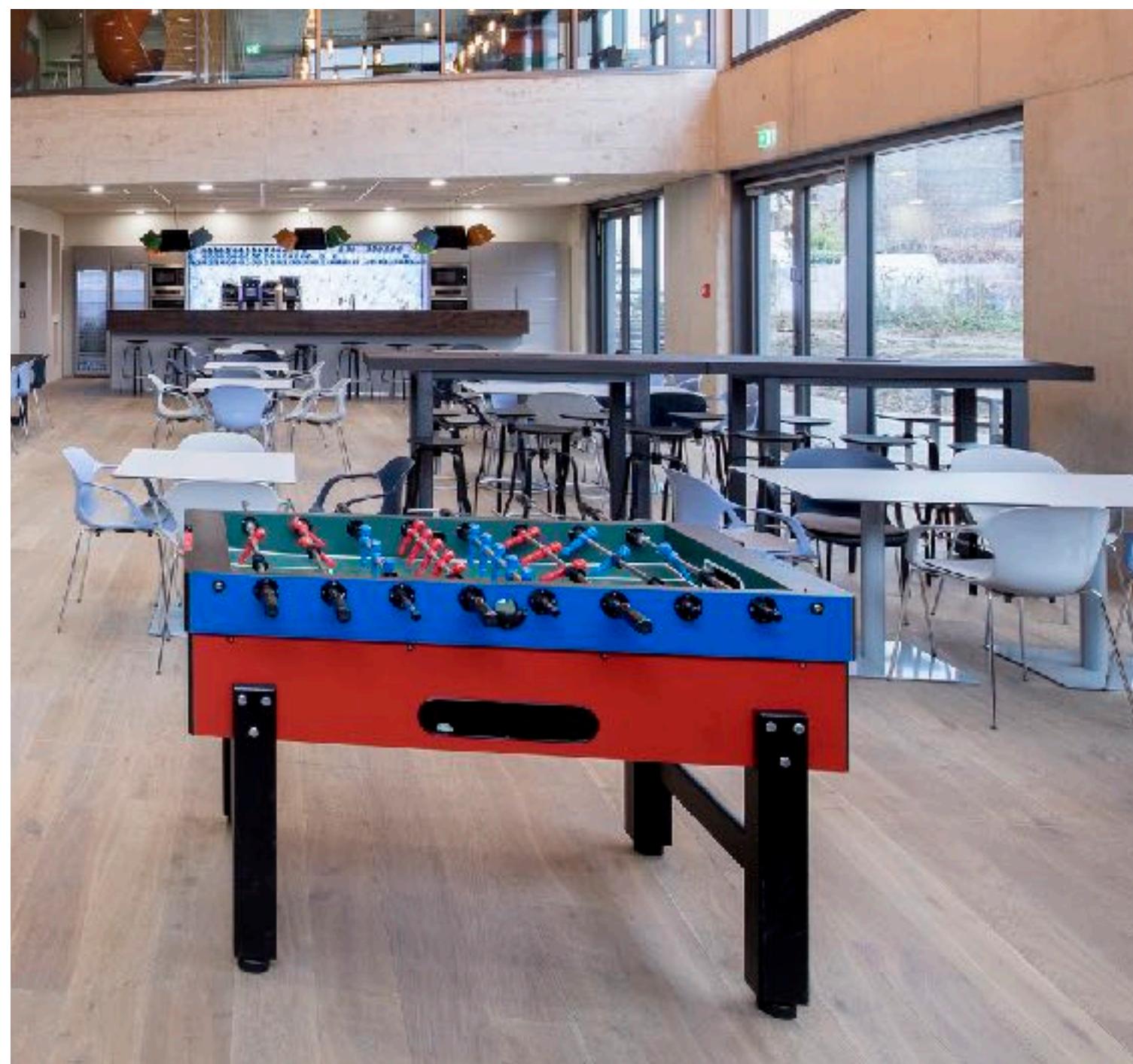
DIY sensor ?



DIY Sensors



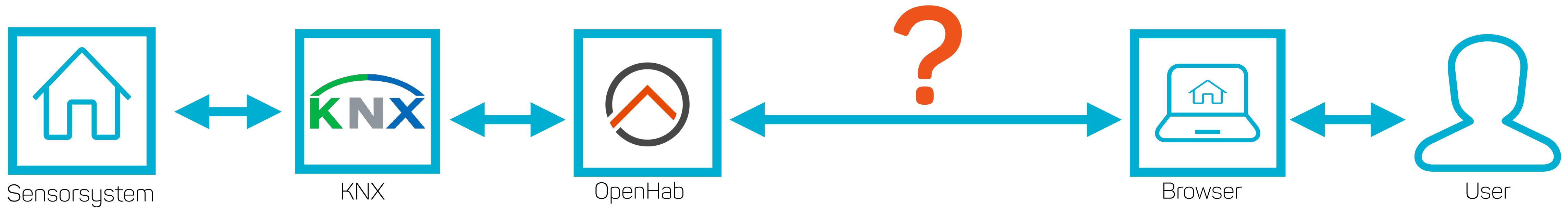
DIY Sensors

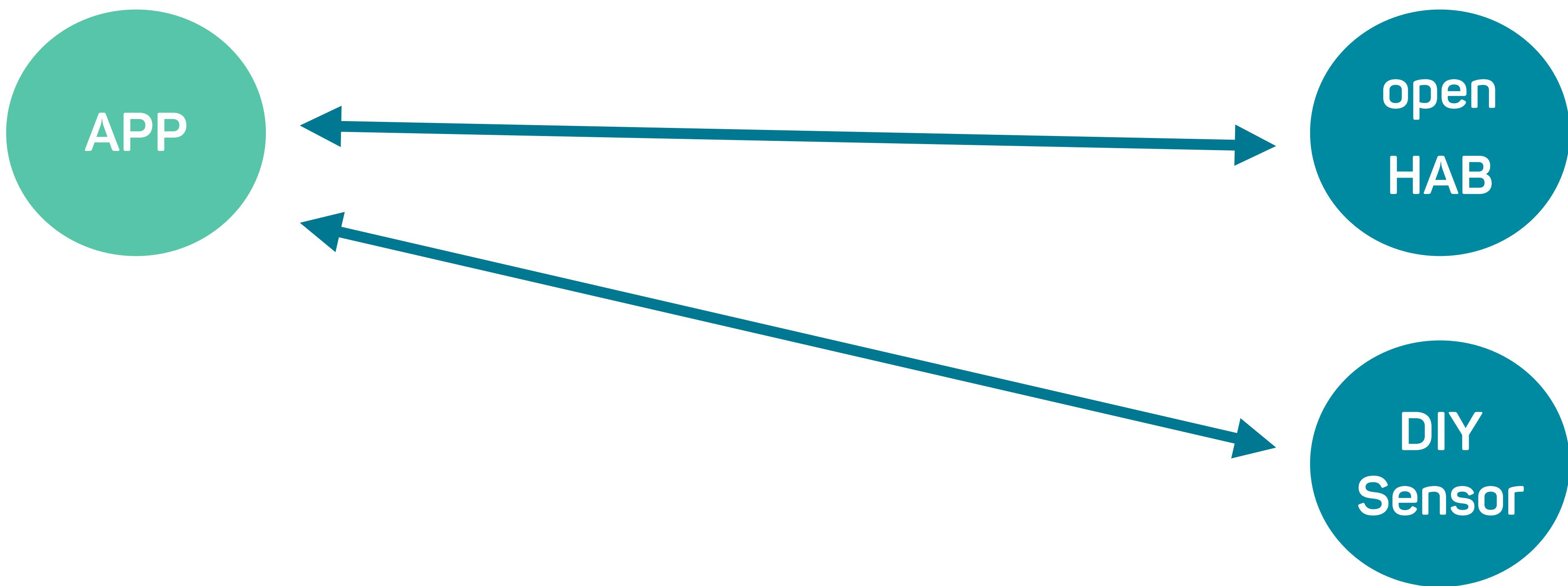


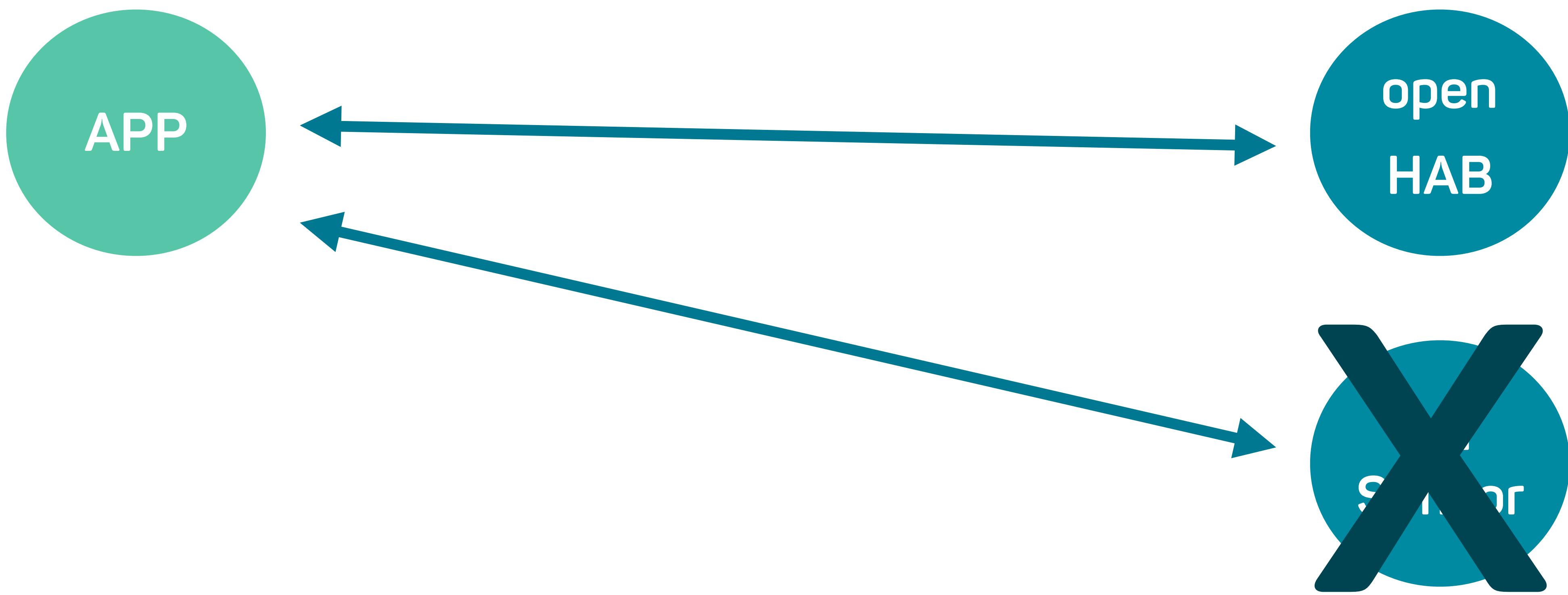
AWS IoT

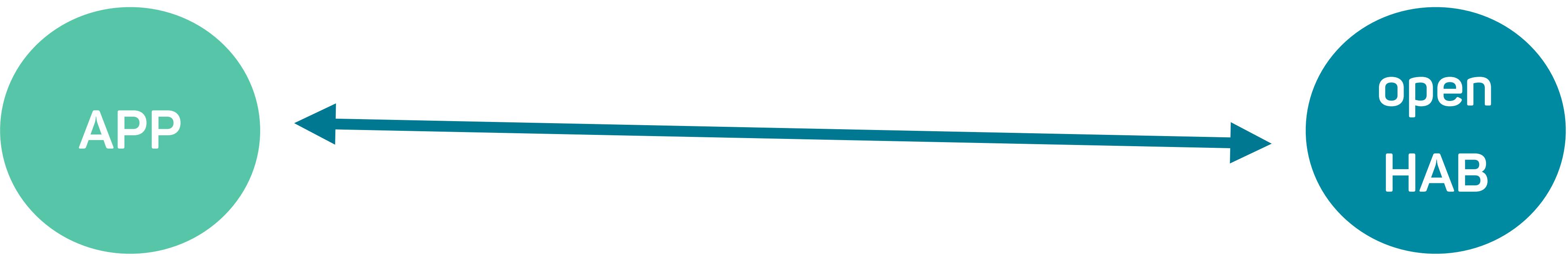


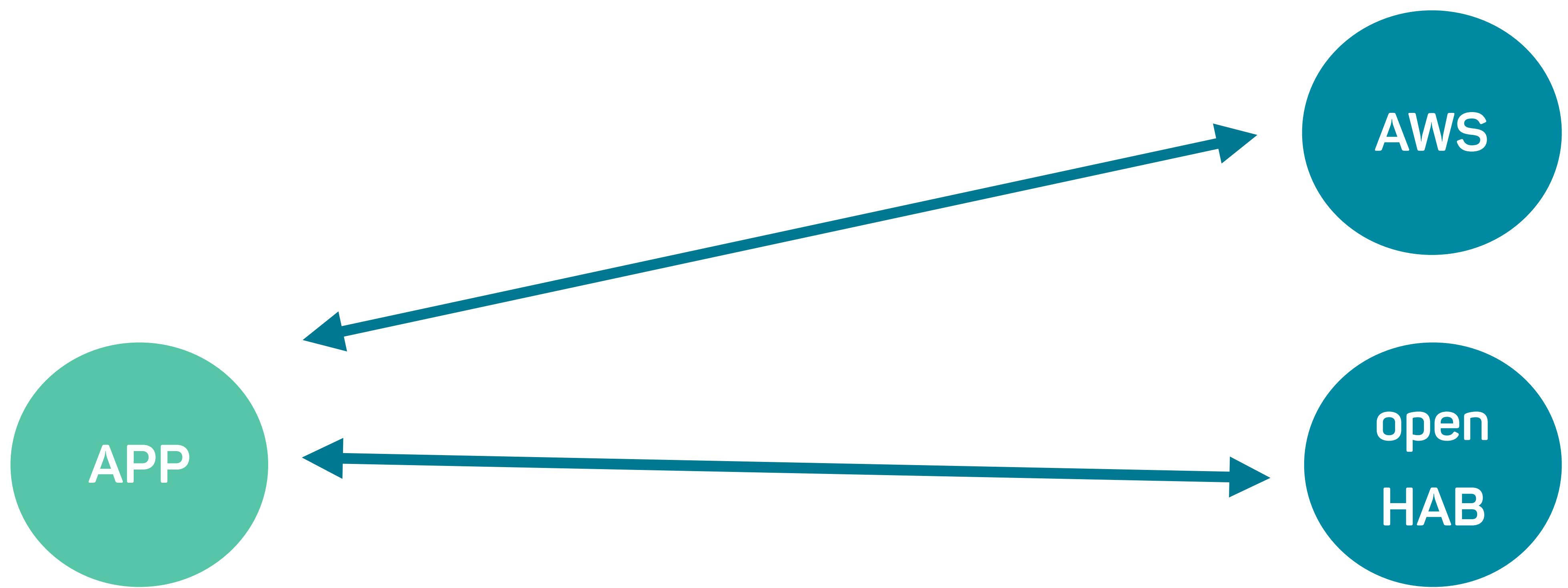
ARCHITECTURE

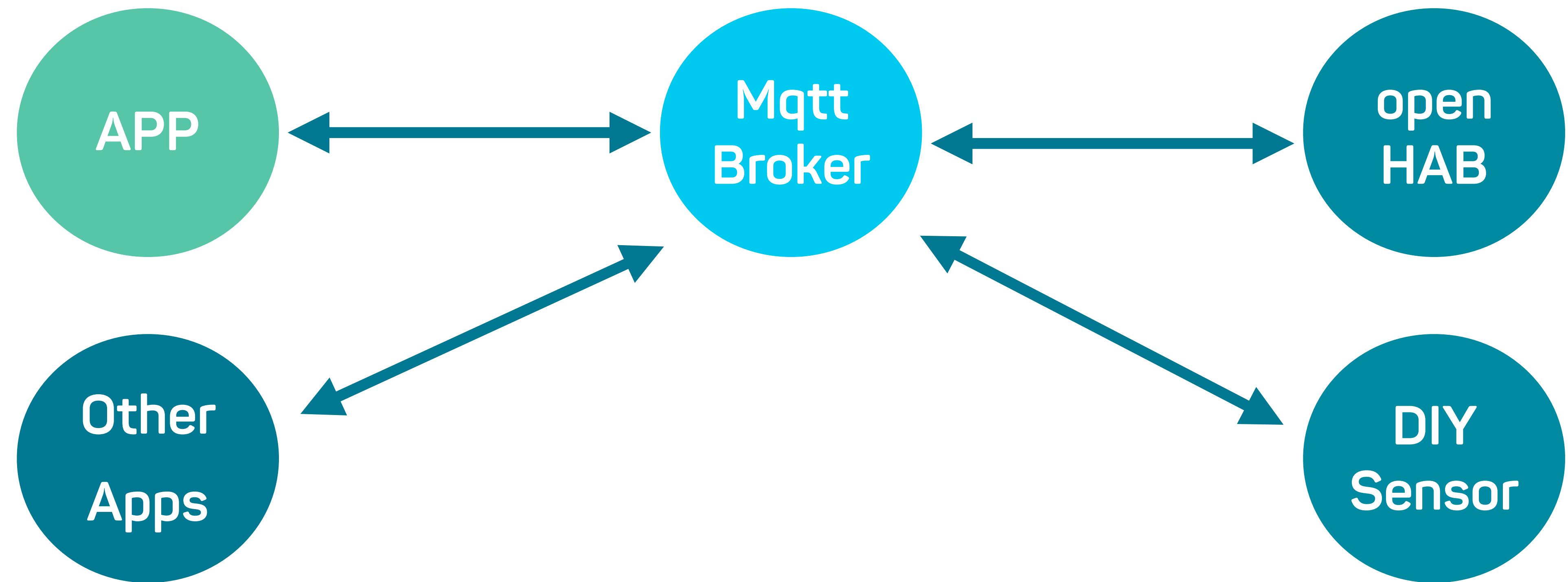


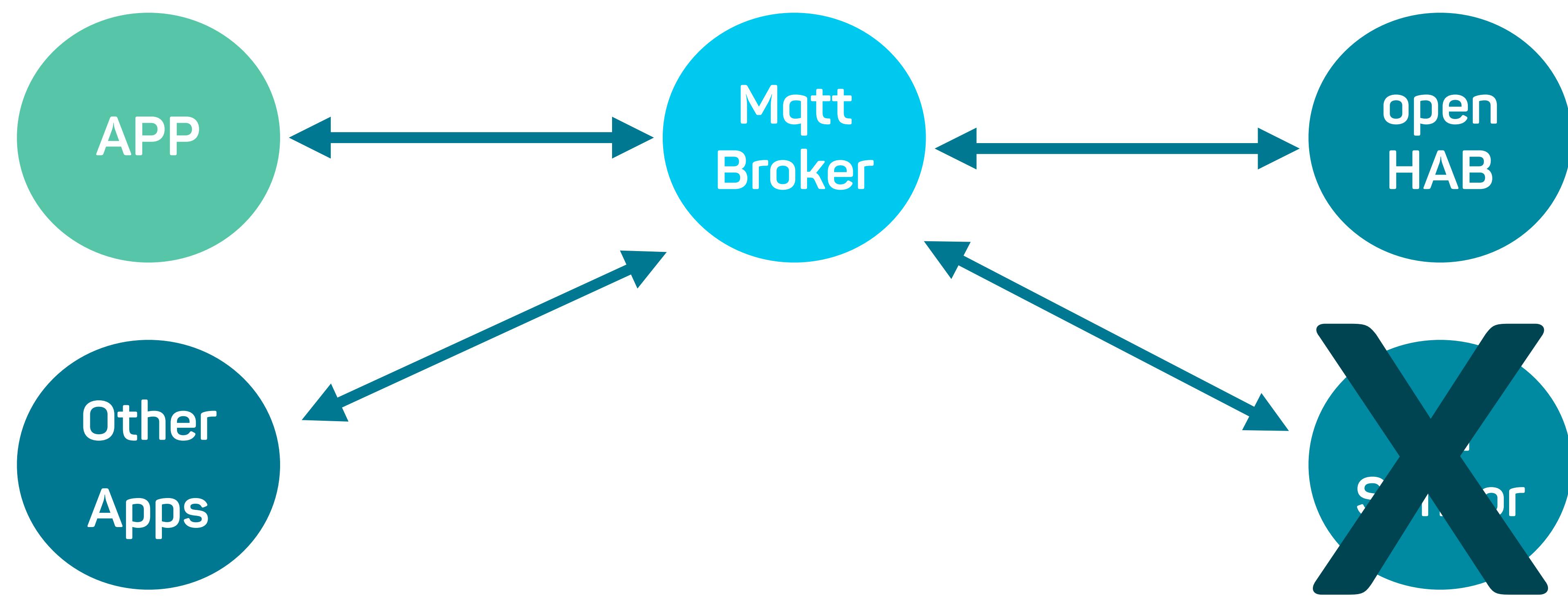


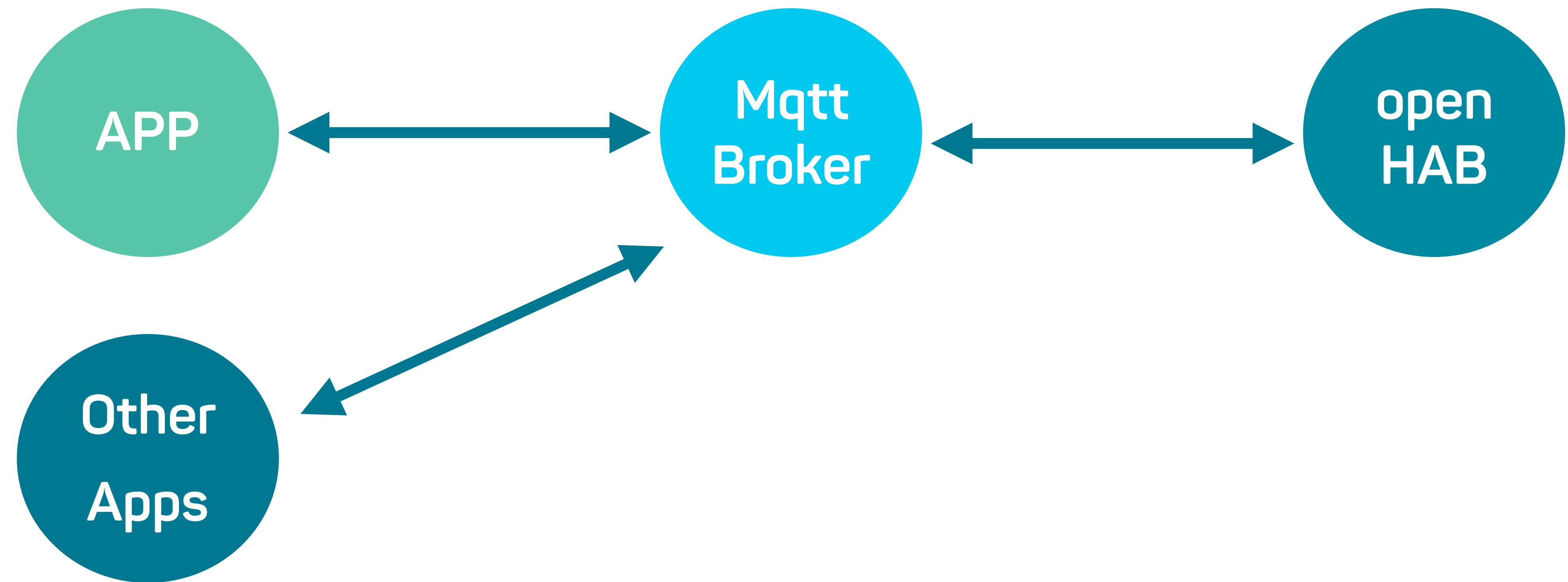


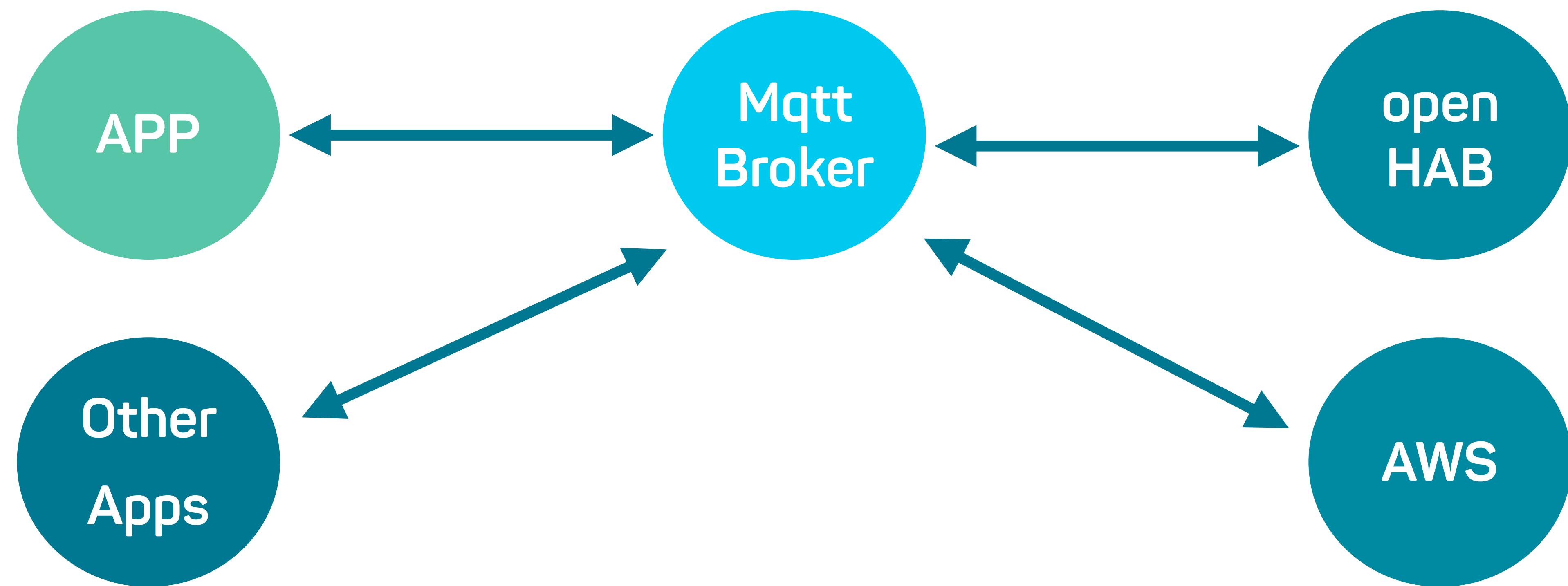




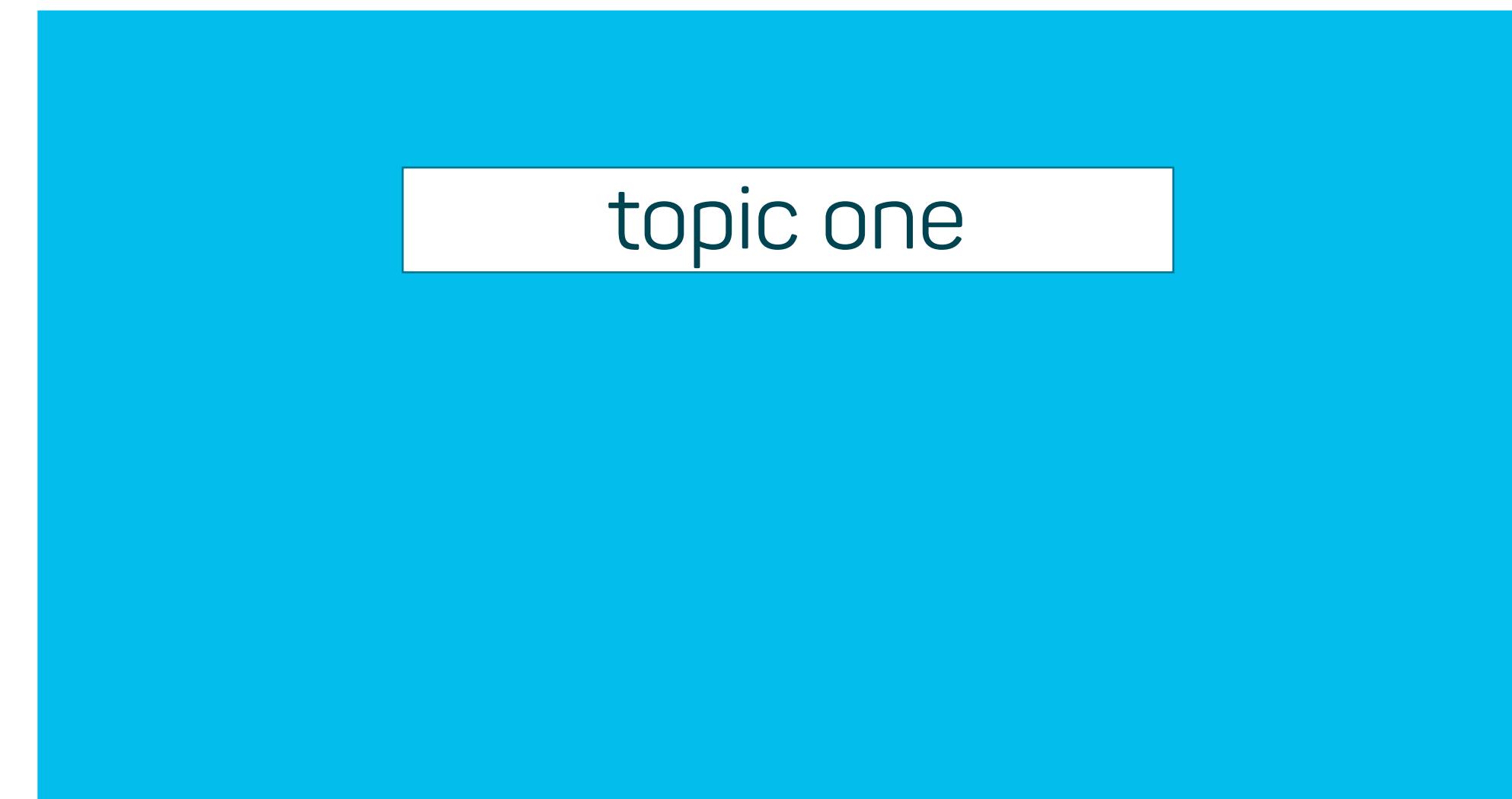






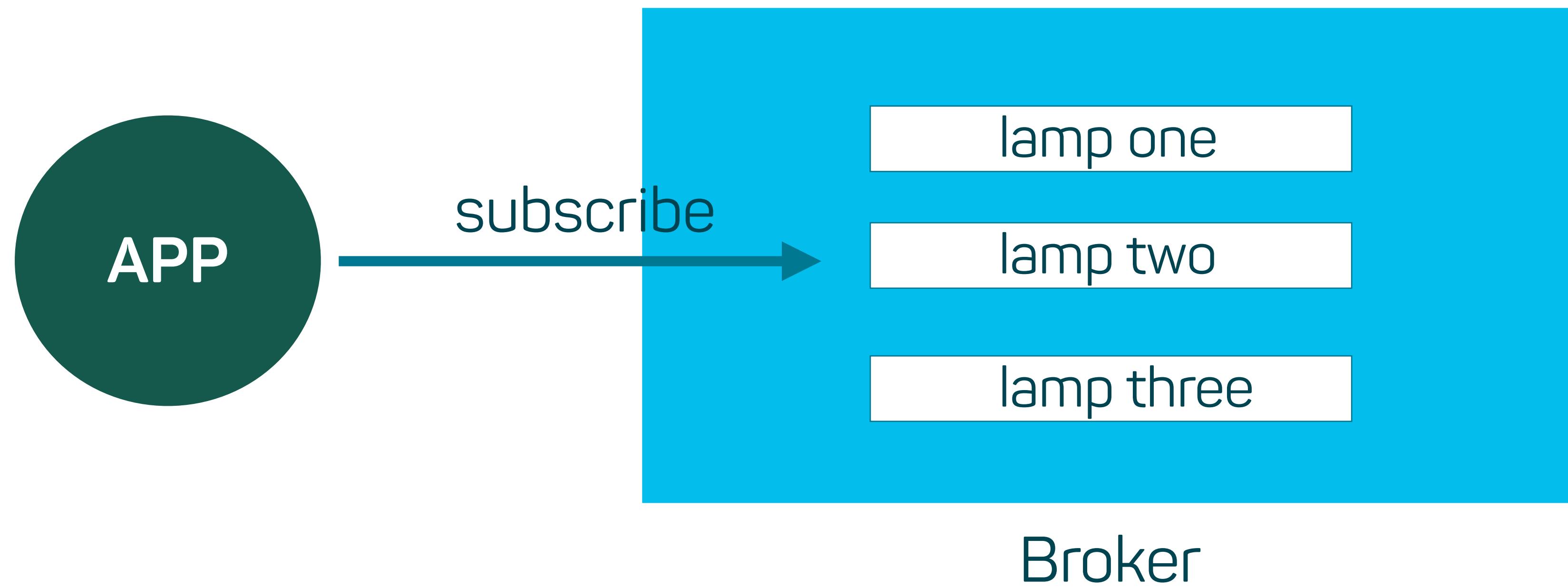


Message Broker Basics

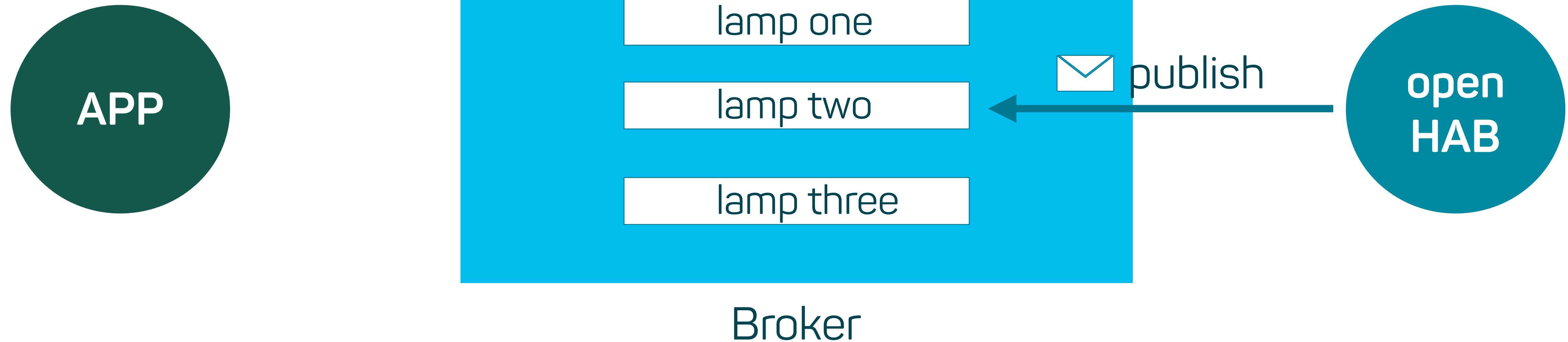


Broker

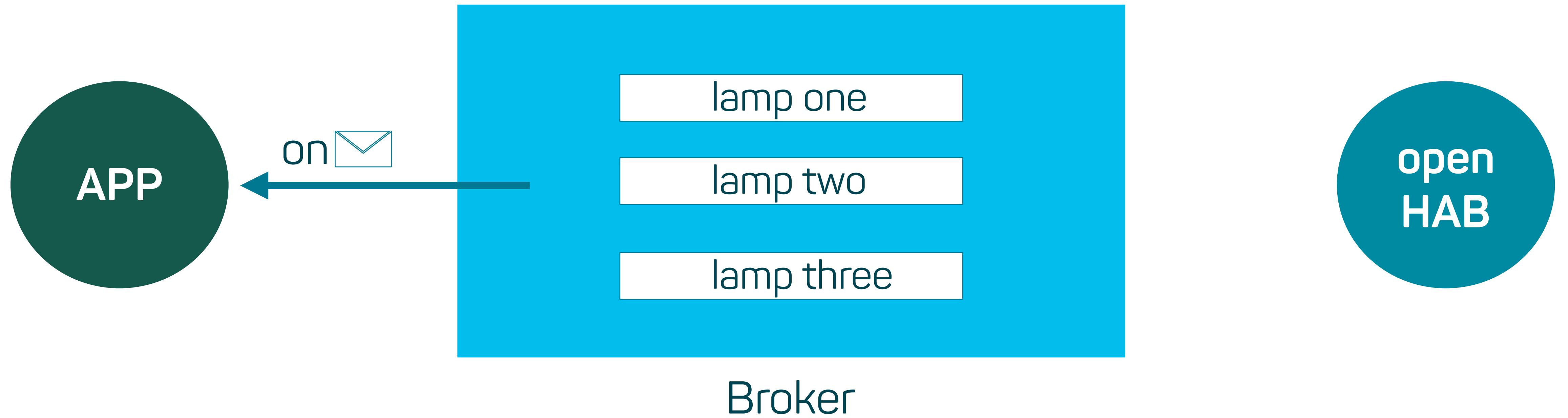
Message Broker Basics



Message Broker Basics



Message Broker Basics



THE
BACKEND

Backend stack

EXPRESS

+



socket.io

=



That's
all ?!

MQTT-Service Realtime



```
const app = express();
const server = http.createServer(app);
const io = socketServer(server);

io.on("connection", (socket) => {
  const client = mqtt.connect("mqtts://someIP:somePort", someLoginData);

  client.on("connect", () => {
    topicList.forEach(topic => {
      client.subscribe(topic);
    });
  });

  client.on("message", (topic, message) => {
    io.emit("UPDATE_FRONTEND_SENSOR_STATE", {
      message
    });
  });
}

socket.on("TOGGLE_SOMETHING", payload => {
  client.publish("UPDATE_REAL_SENSOR_STATE", payload);
});
});
```



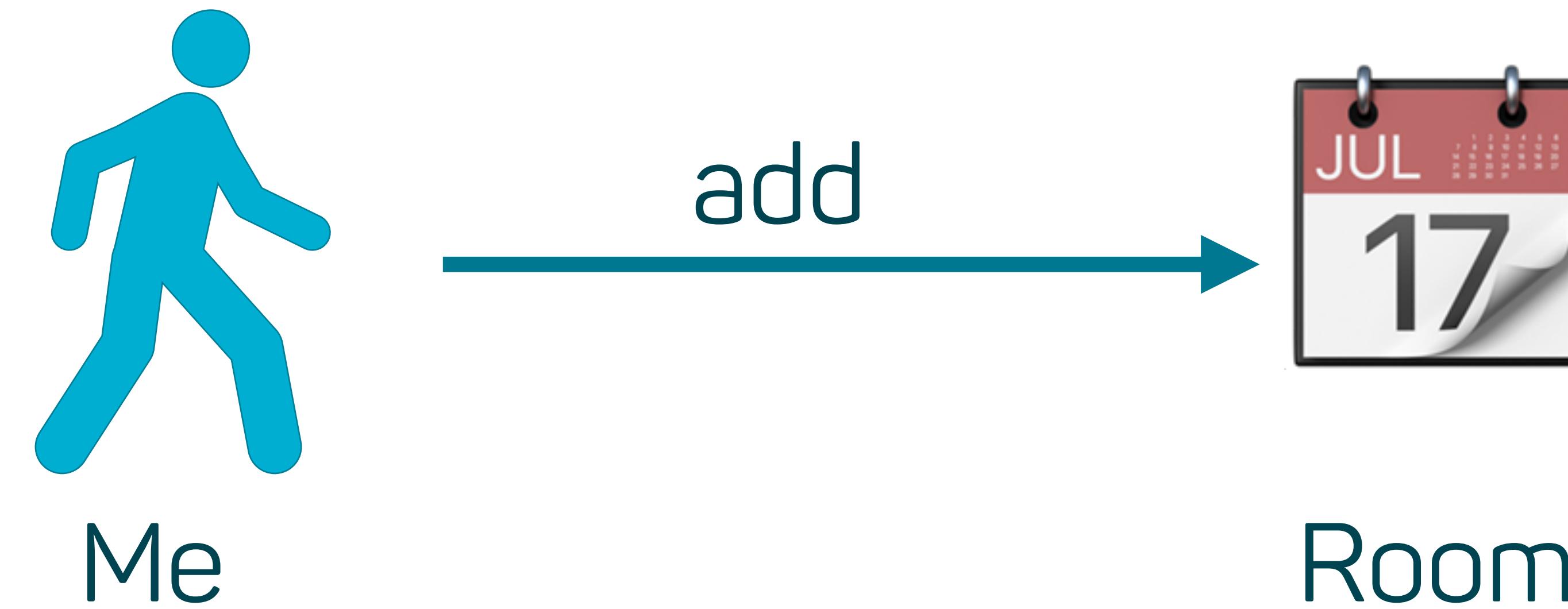
Room Bingo:

Which one is free ???

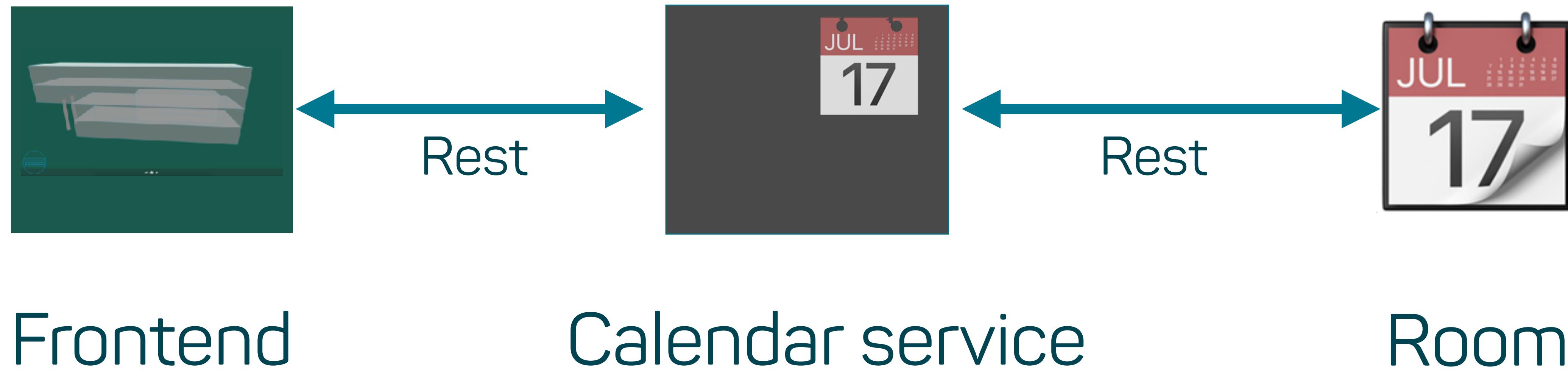
How can I find a free room ?



How can I find a free room ?



How can the app check the room ?



Frontend

Calendar service

Room

Calender Service Stack

EXPRESS

E01-04

22.00

MEETING_4_LAMP_1 An

MEETING_4_LAMP_2 An

ROLLERSHUTTER_EG_MEETING_4

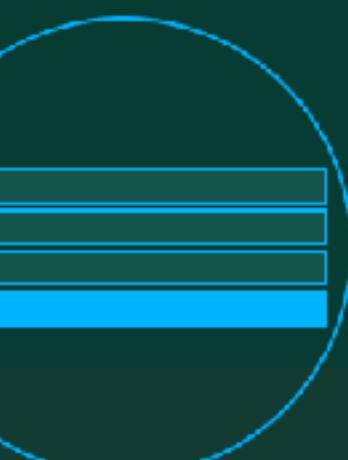
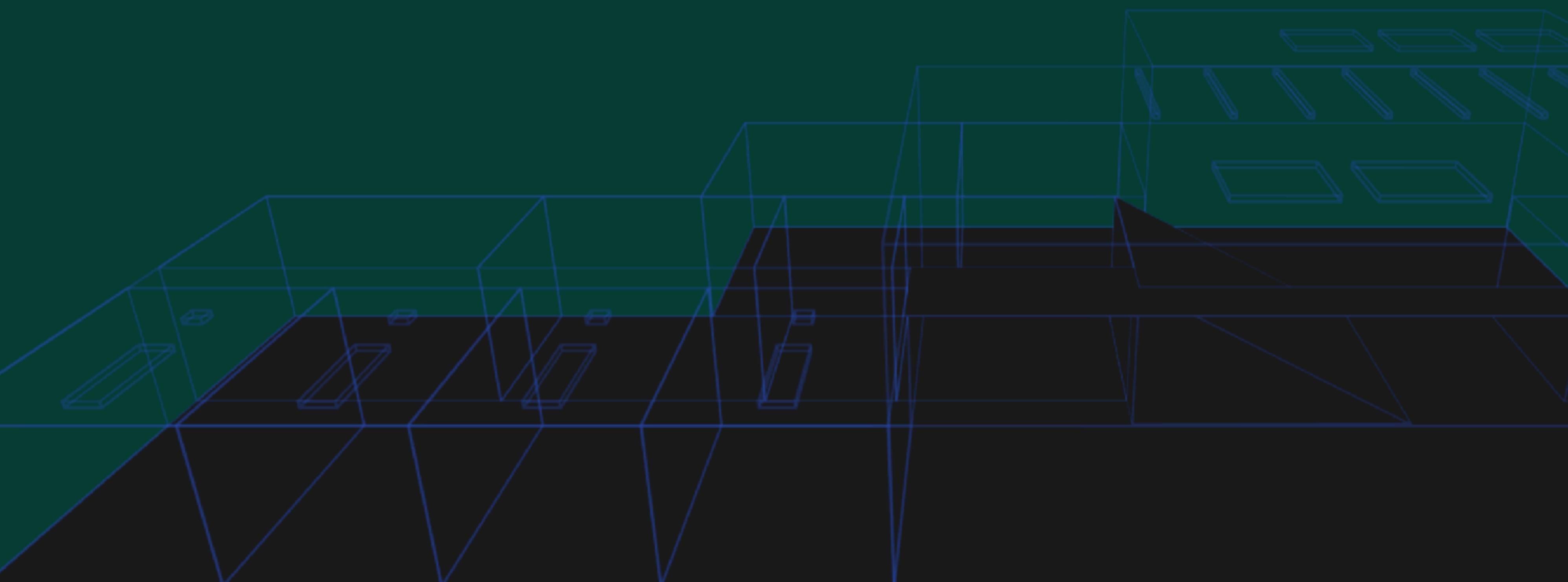
Oben

07.05.2019 22:42 - 23:42

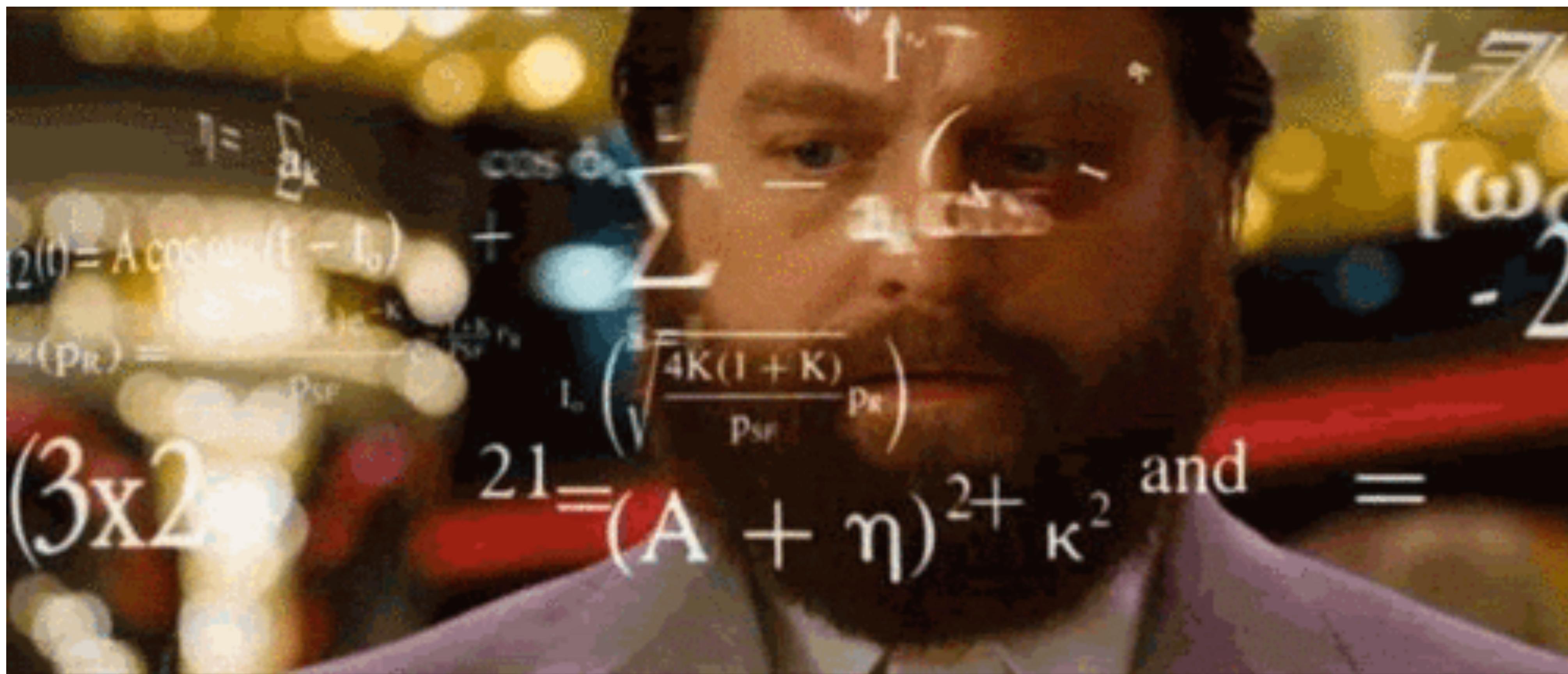
Abstimmung Projekt XY

07.05.2019 23:42 - 00:42

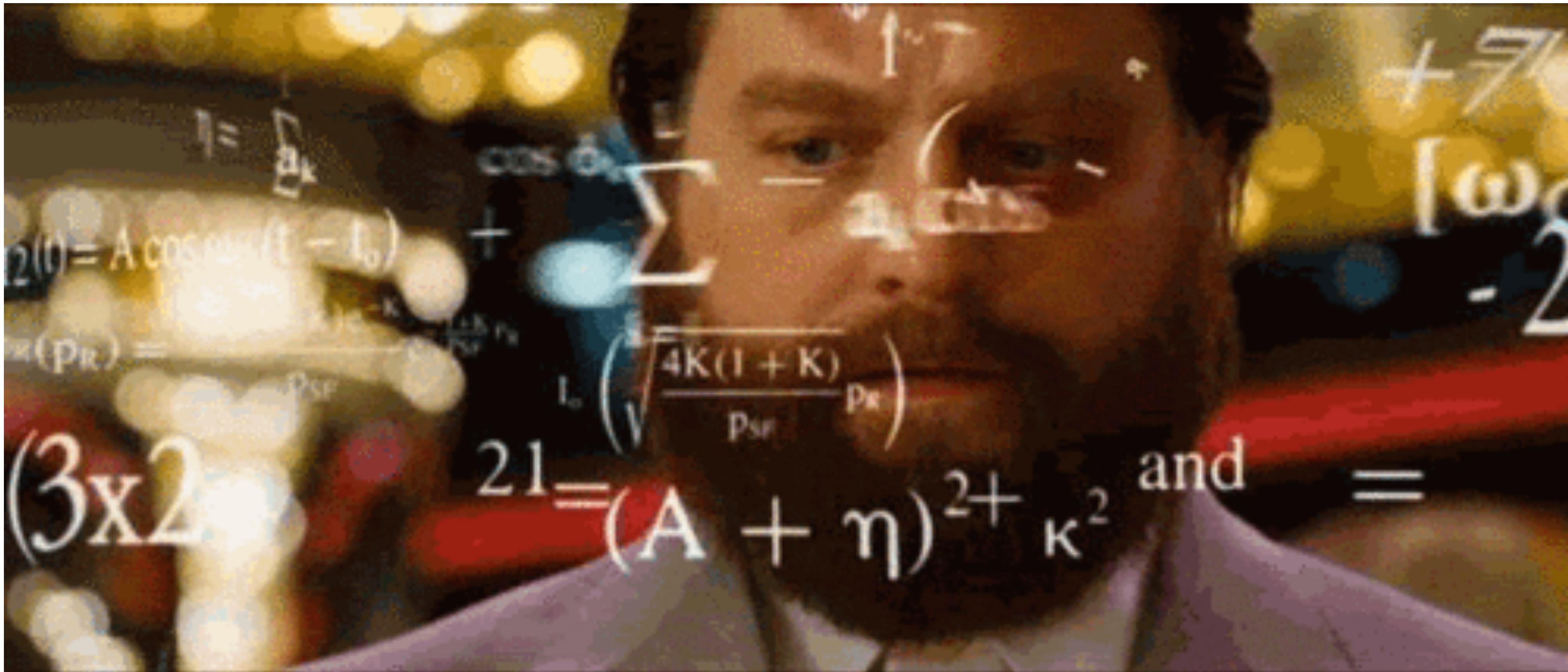
Bewerbungsgespräch



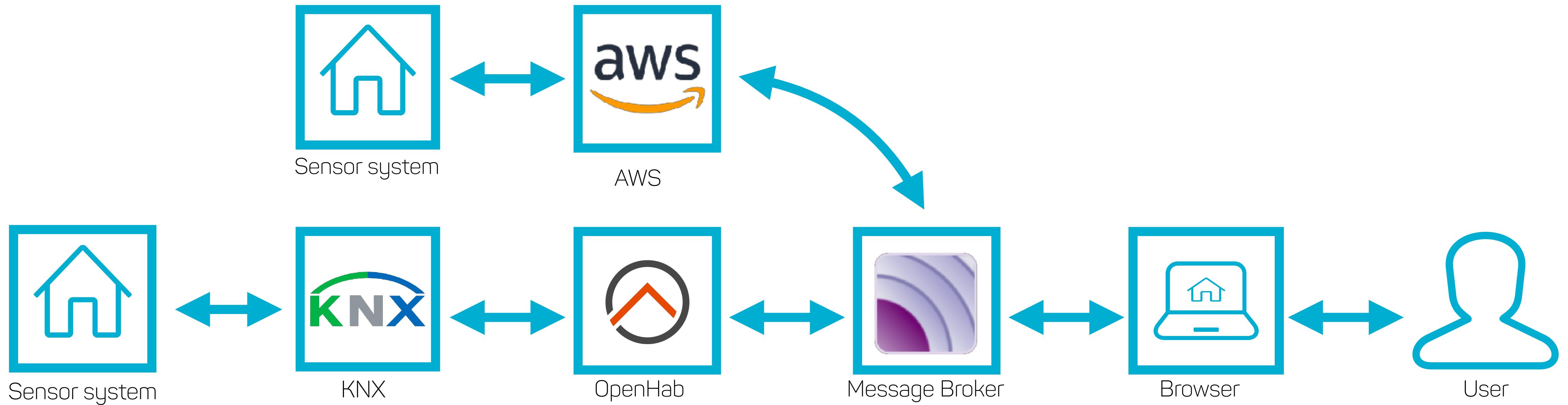
Too much input !!!!



Too much input !!!!



FINAL ARCHITECTURE (for now...)



PITFALLS



OUR OWN INFRASTRUCTURE



OUR OWN (LACK OF) KNOWLEDGE



PITFALLS

PITFALLS



Hardware (KNX)



UX & UI

NIC JONES
AZZEFERIN
ELLBEYLAF
ERNANDEZ
DO'SHAINEE

PITFALLS



Hardware (KNX)



UX & UI



Naming

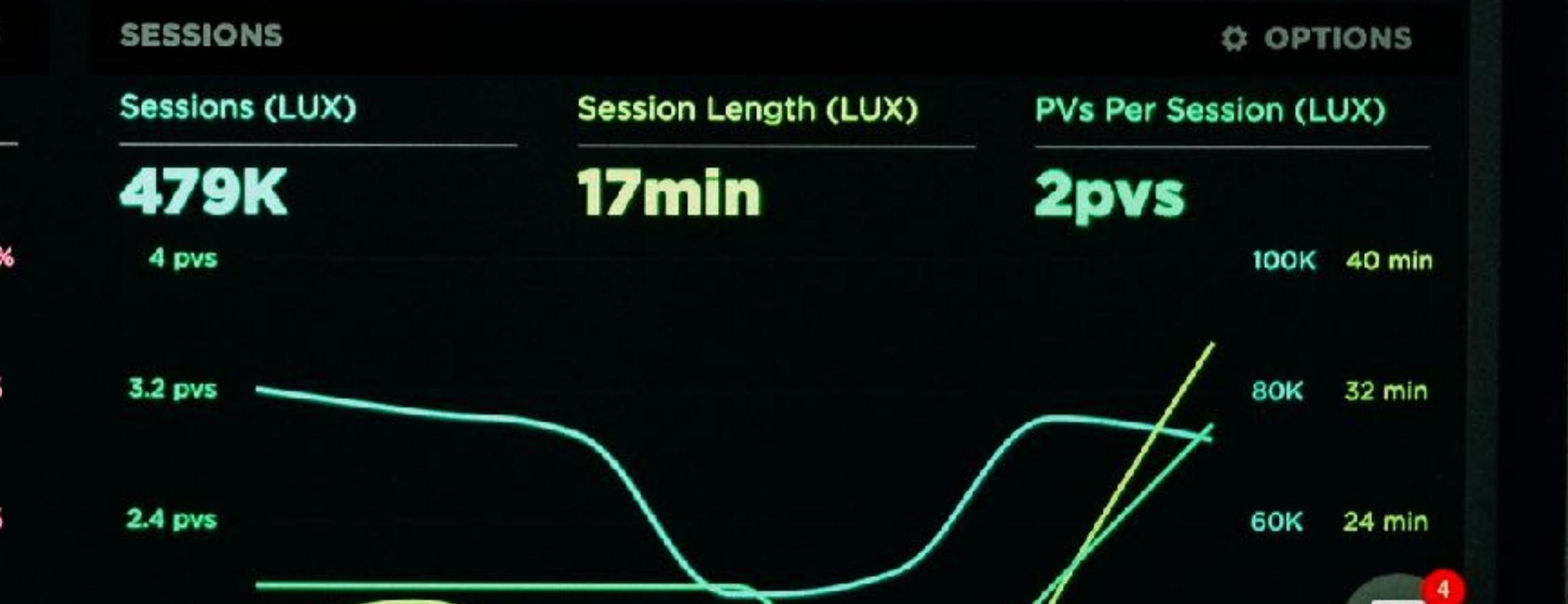
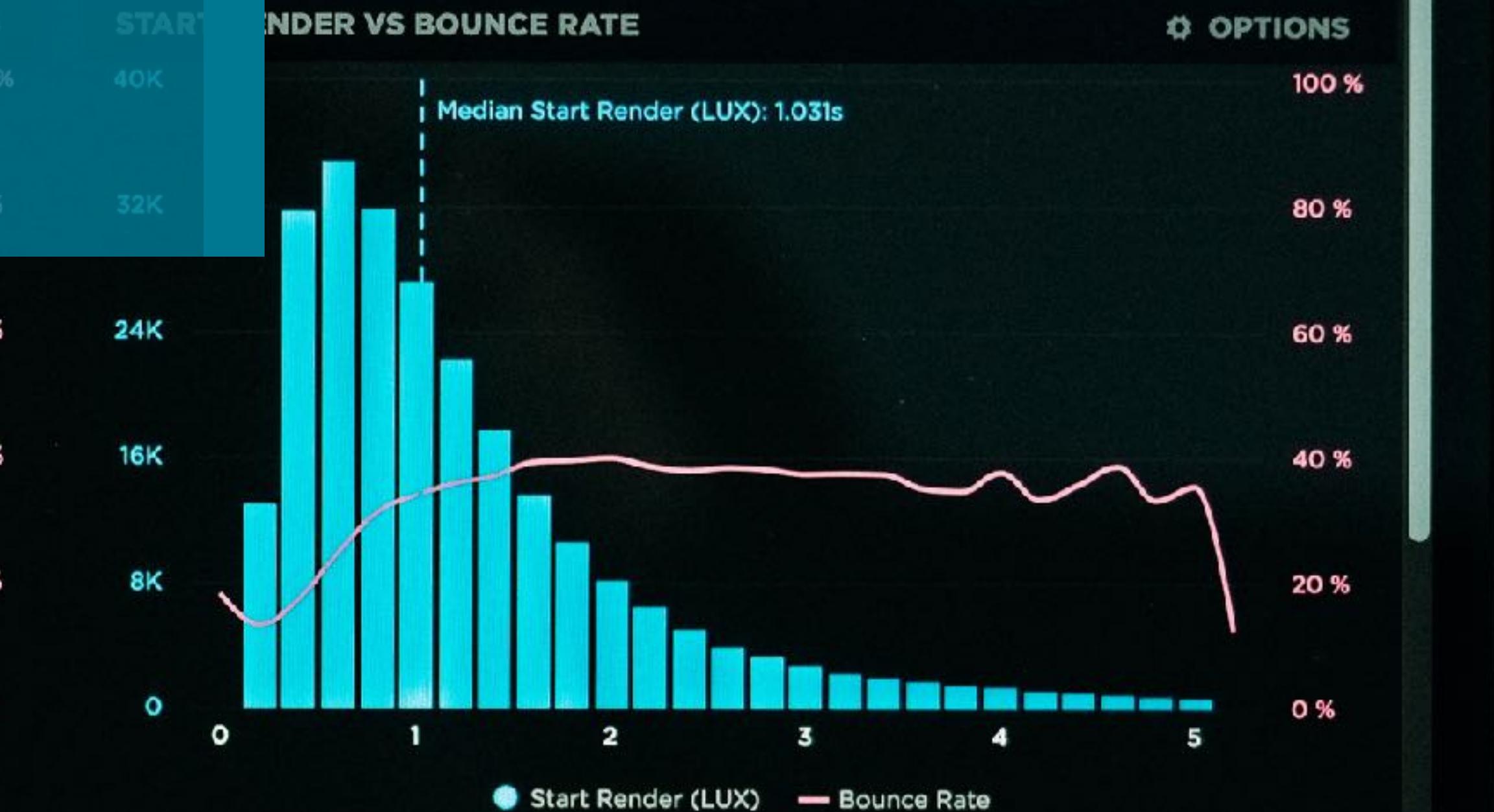
LESSONS LEARNED



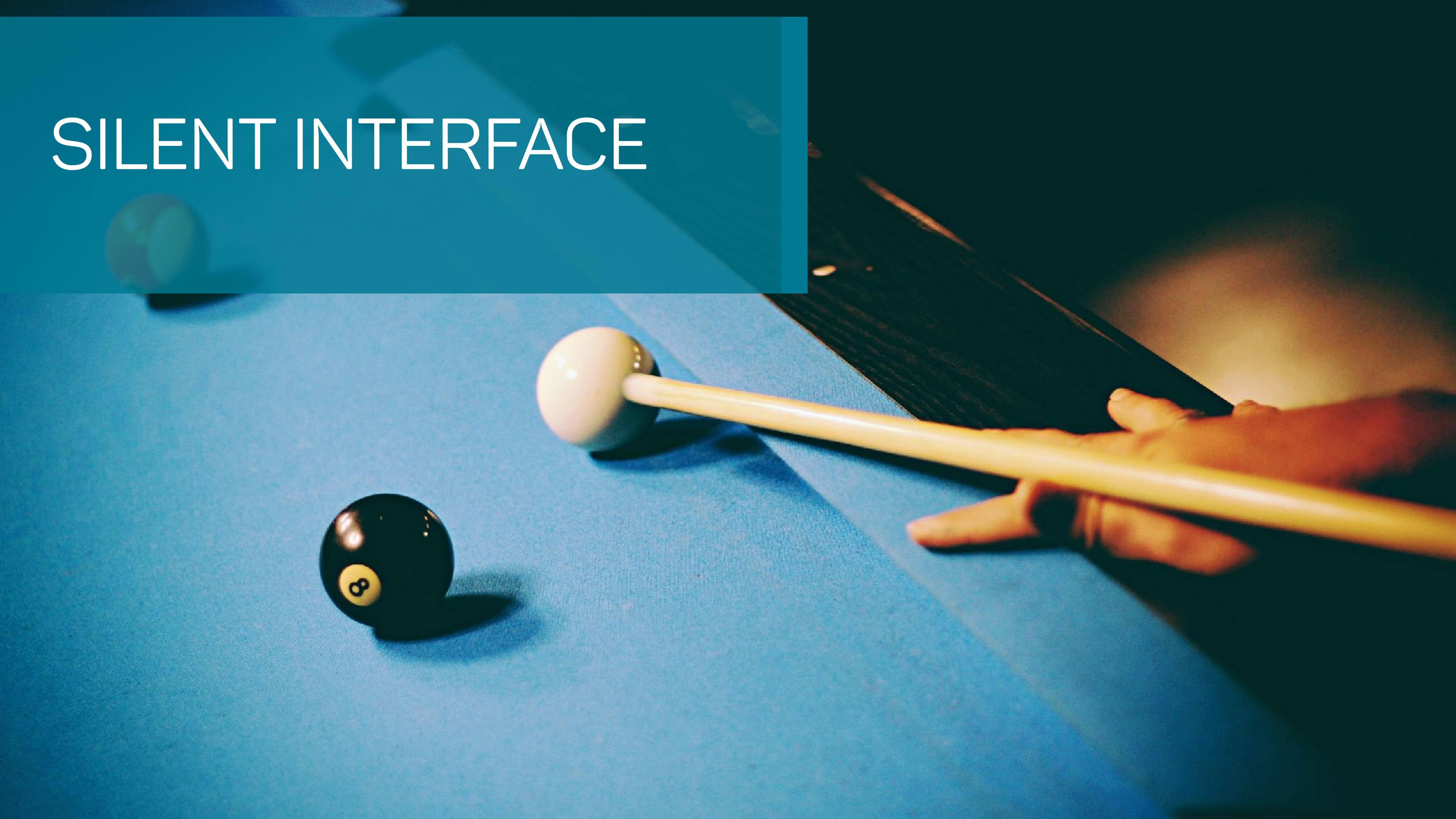
SECURITY



AVAILABILITY



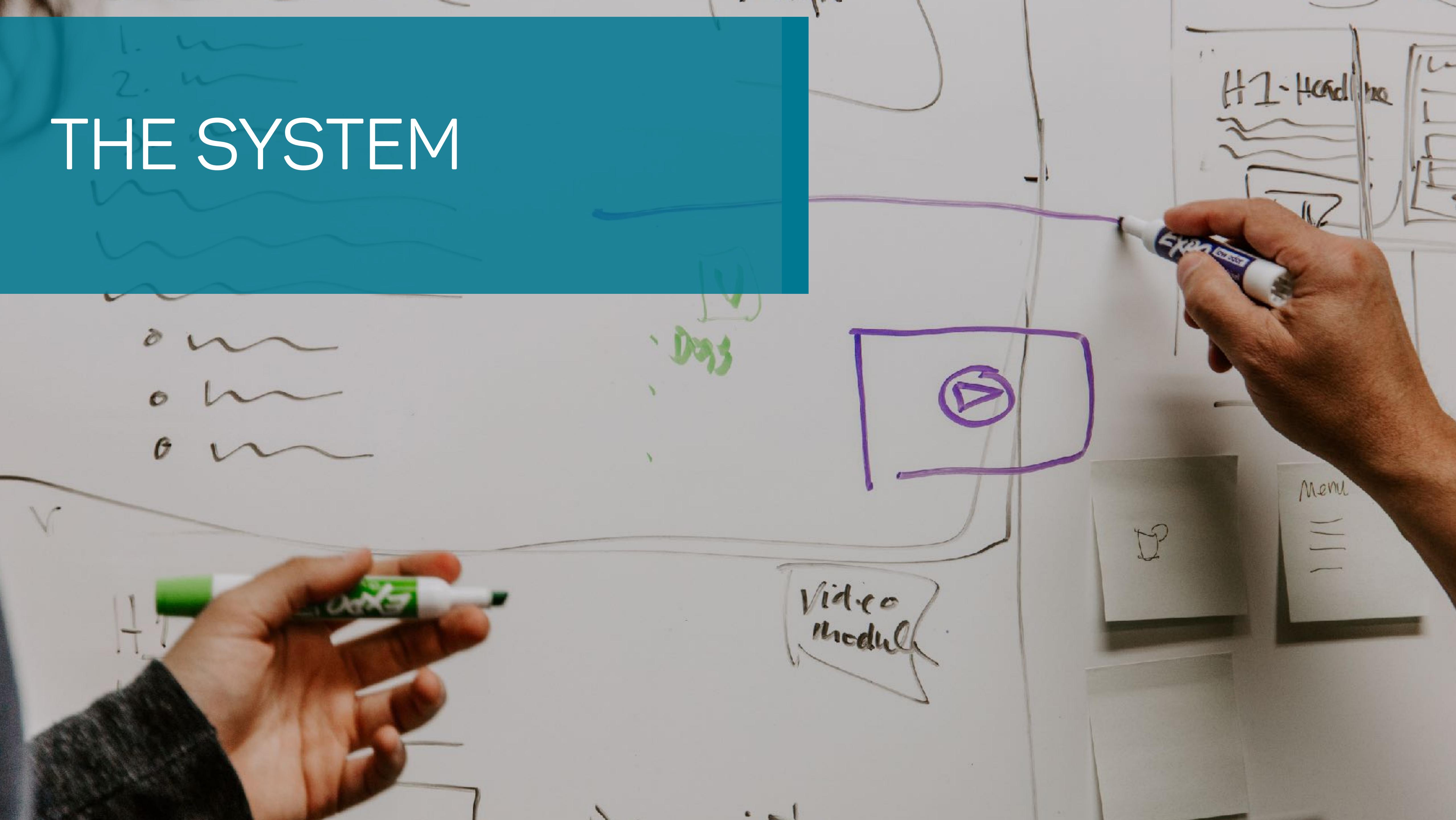
SILENT INTERFACE



MANUAL Fallback



THE SYSTEM



THE SYSTEM



Expandable

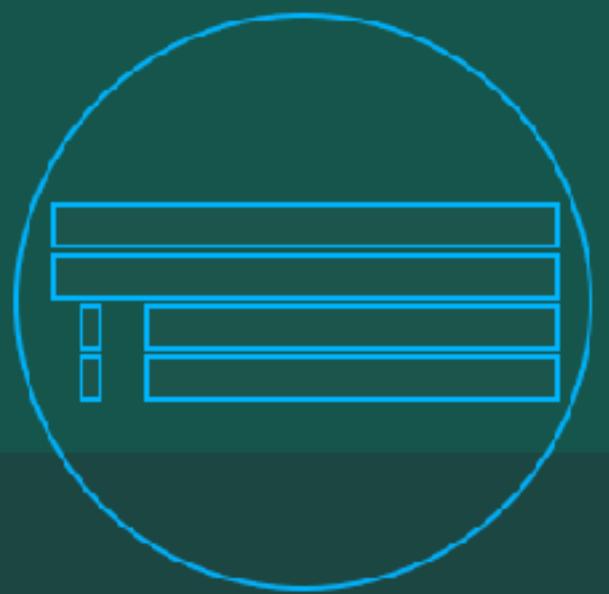


Closed



Isolated

FRONTEND



FRONTEND



Intuitive & Easy

Neat & Structured

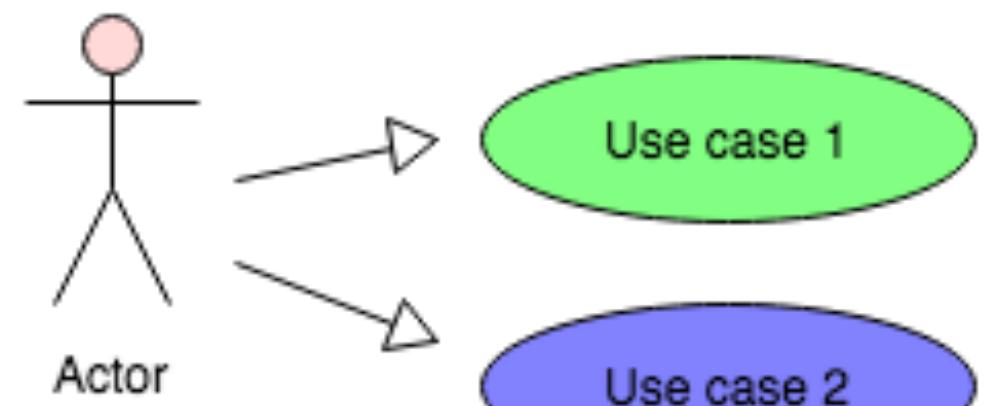


Naming is hard

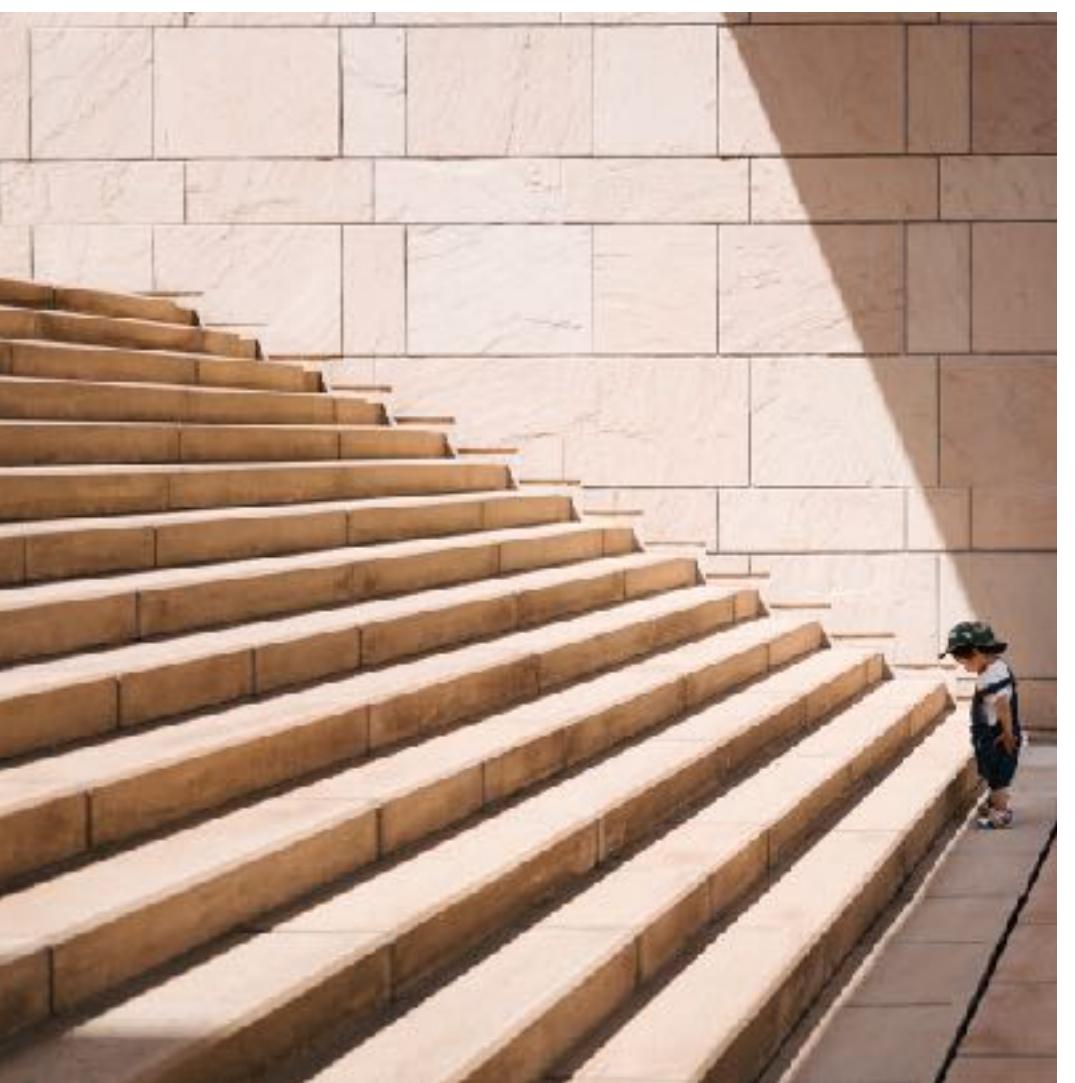
OUR EXPERIENCE (aka Conclusion)



OUR EXPERIENCE (aka Conclusion)



Challenge



Use Case



Fun

LIVE DEMO

Also, time for questions :)

QUESTIONS?

COME TALK TO US! :)



CHRISTINA
• merelyChristina



ANNA
• merelyAnna