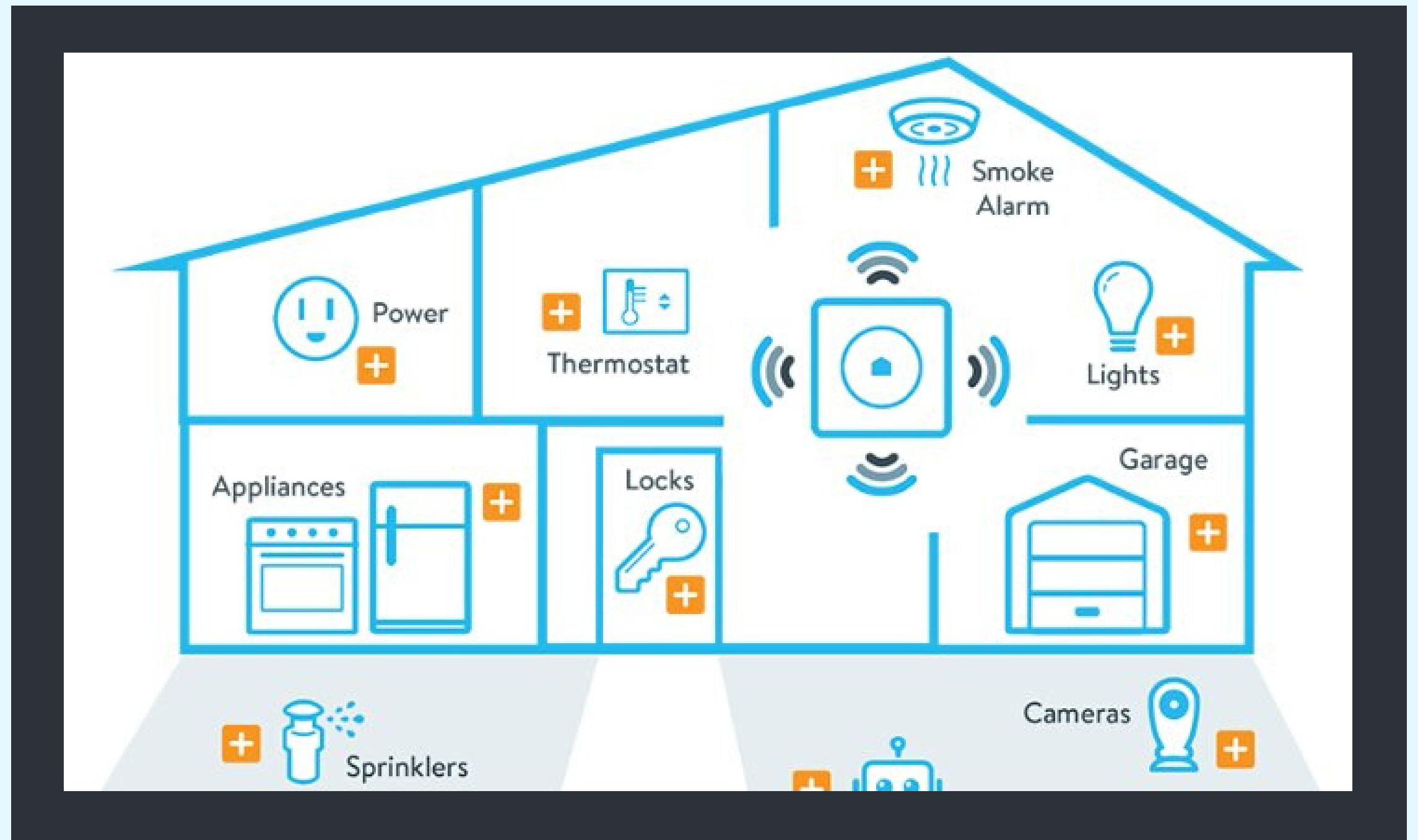


# INTEGRAČNÝ SOFTVÉR PRE SMART HOME INŠPIROVANÝ MIKROSLUŽBAMI

Bc. Patrícia Szepesiová  
Vedúci práce: RNDr. František Galčík, PhD.

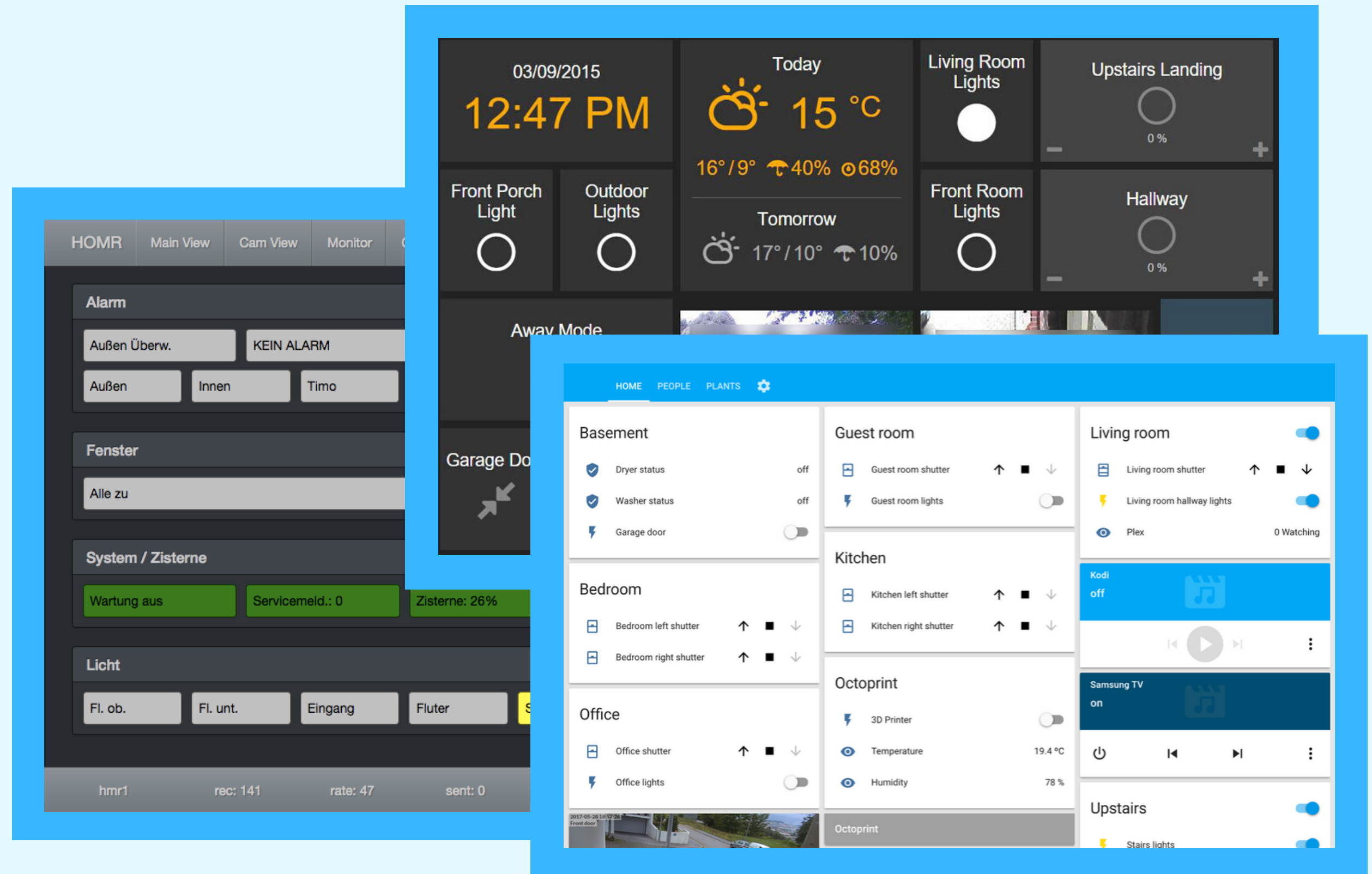
# INTERNET VECÍ

- rychlý vývoj
- miliardy zariadení
- dostupnosť
  
- bezpečnosť
- finančné náklady
- komfort



# EXISTUJÚCE RIEŠENIA

- Home Assistant
- Domoticz
- openHAB
- control-freak
- FHEM
- Homegear
- homekit2mqtt
- Home.Pi
- Node-RED
- pimatic

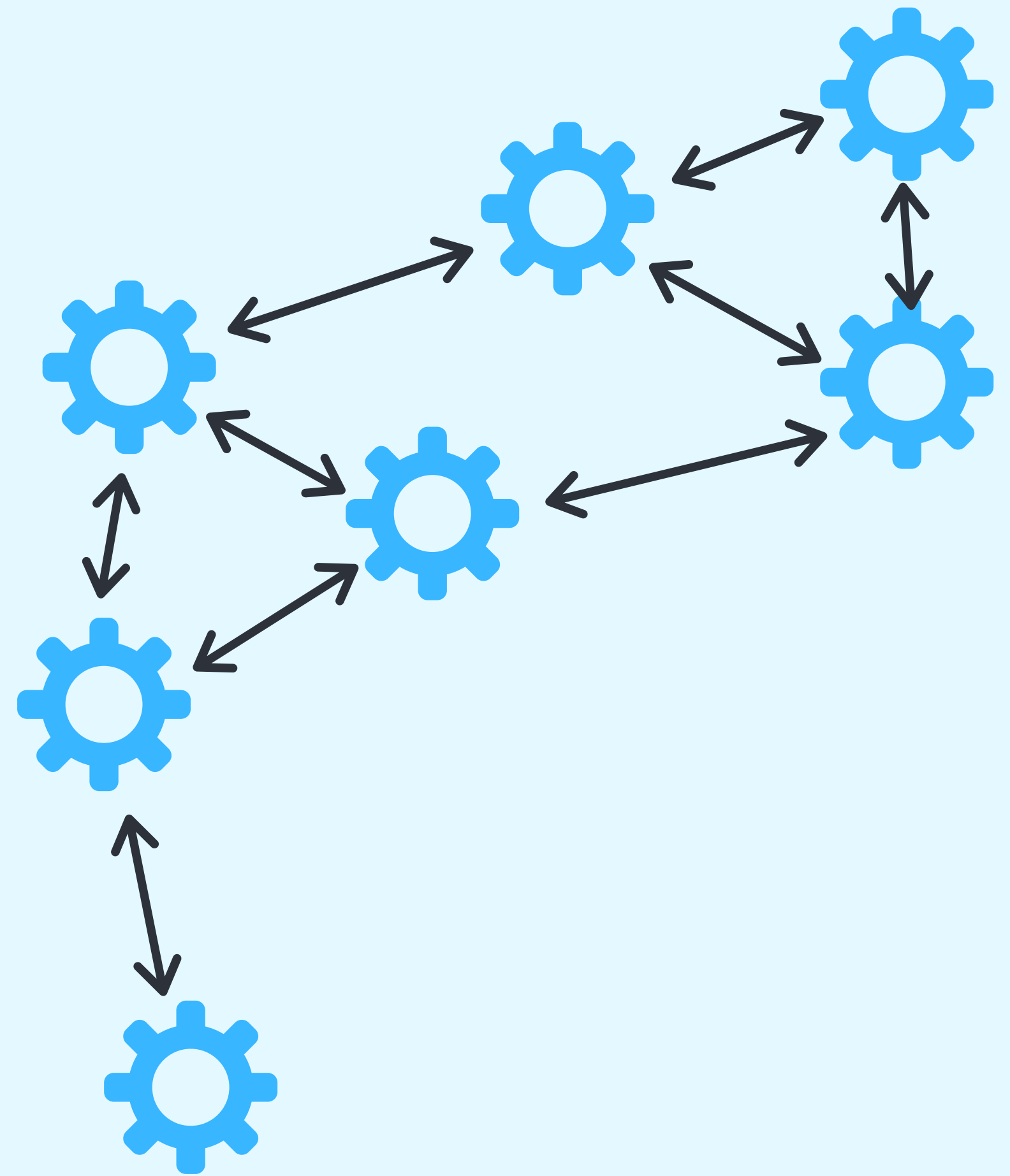


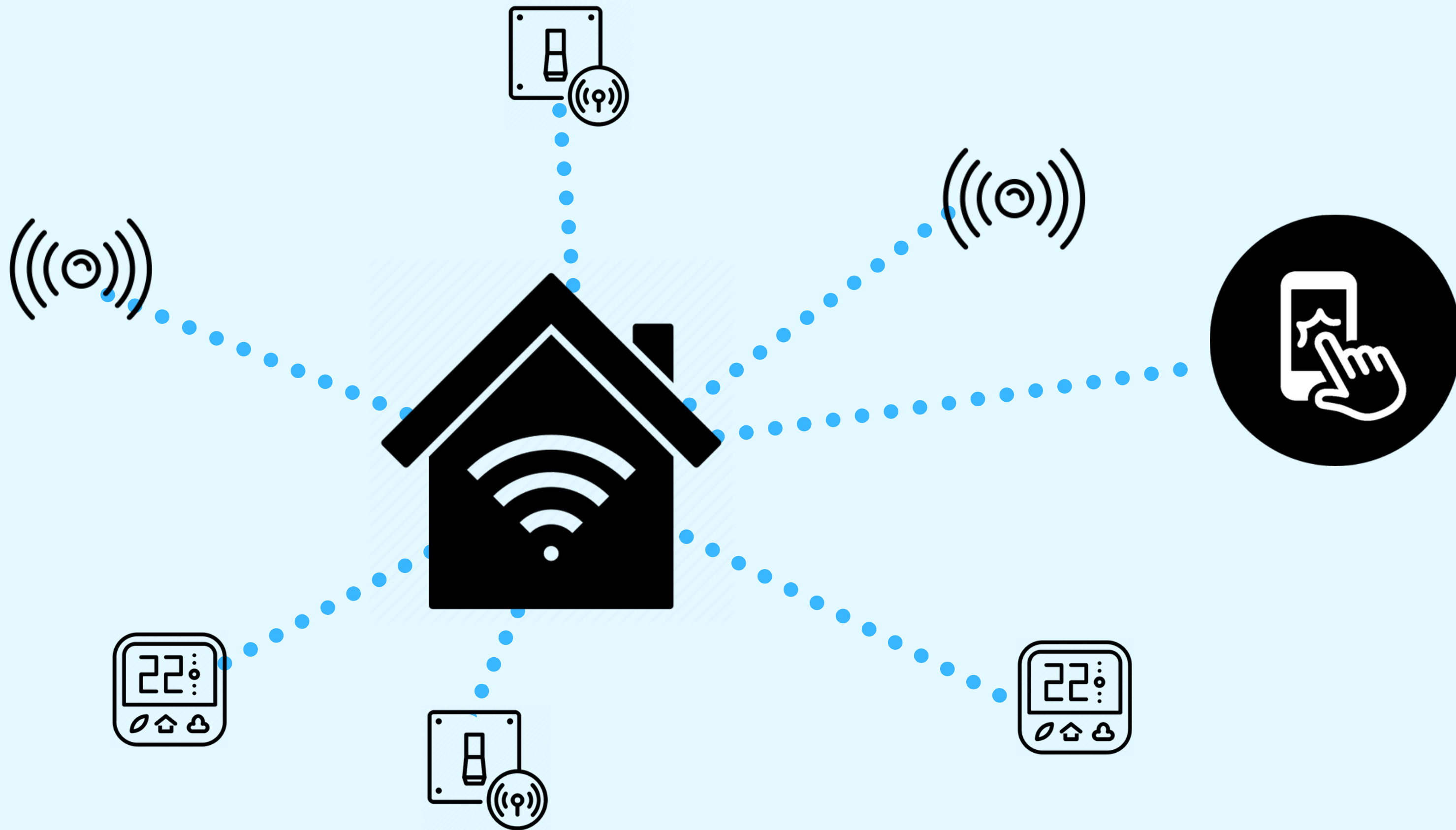
# EXISTUJÚCE RIEŠENIA

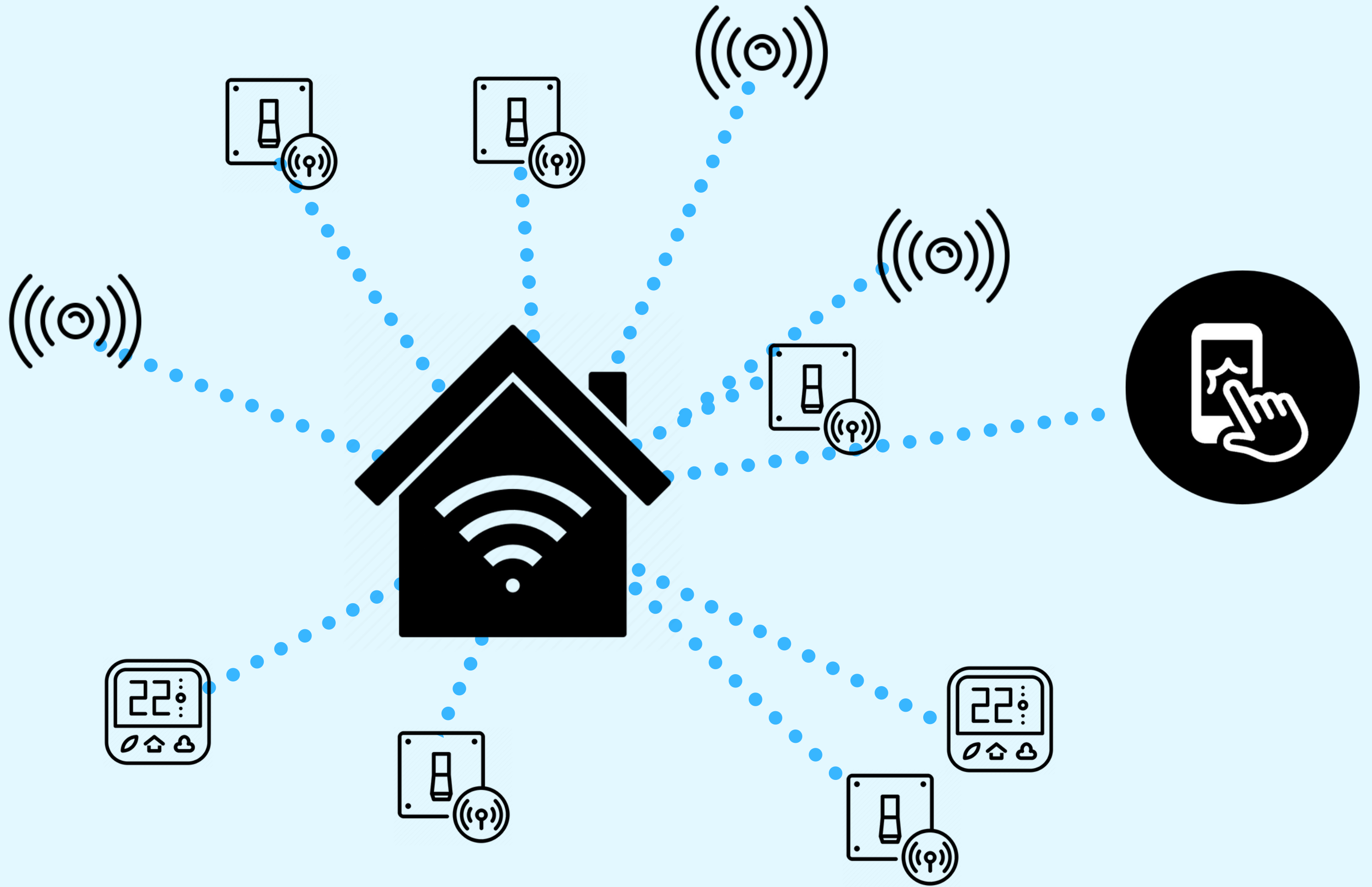
- komplexné aplikácie
- "ťažké" riešenia vyžadujúce výkonný server a/alebo cloud
- nevhodné pre iot zariadenia
- komplikované a neflexibilné pridávanie funkcionality

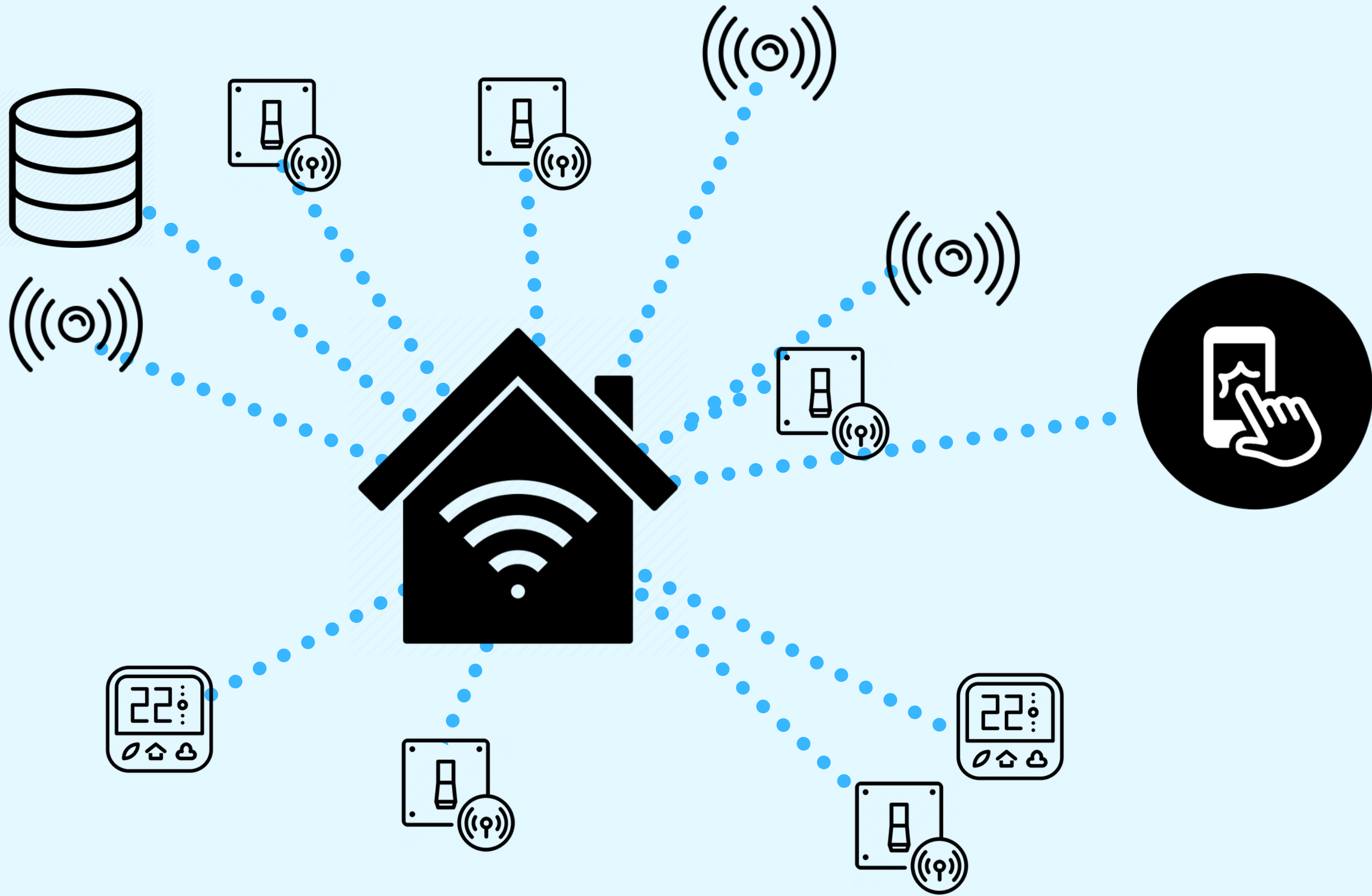
# NÁVRH RIEŠENIA

- Modulárny prístup
- Dynamicky sa meniace podmienky
- Architektúra mikroslužieb
  - čoraz využívanéjšia
  - samostatné nezávislé procesy
  - špecializácia na jednu úlohu

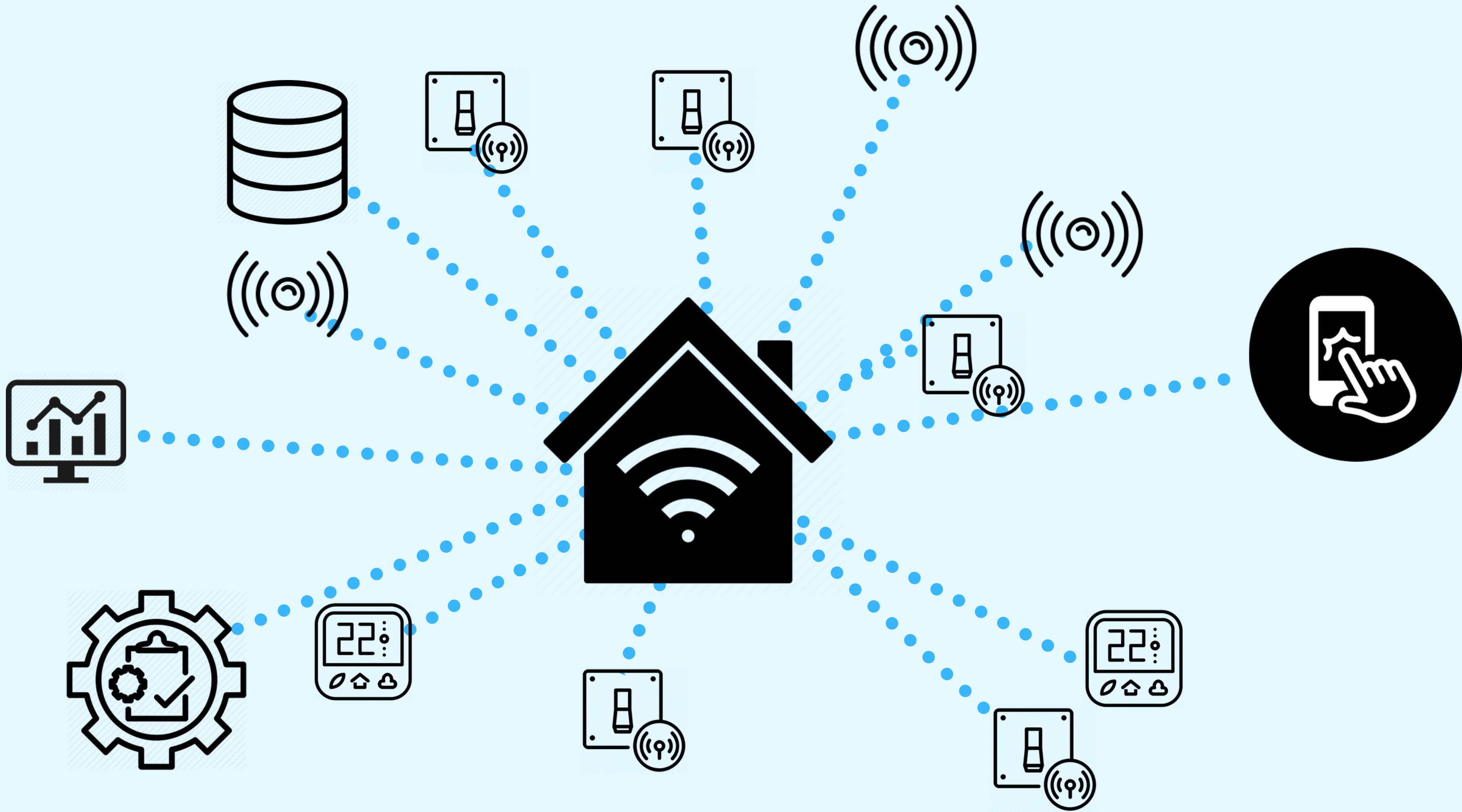


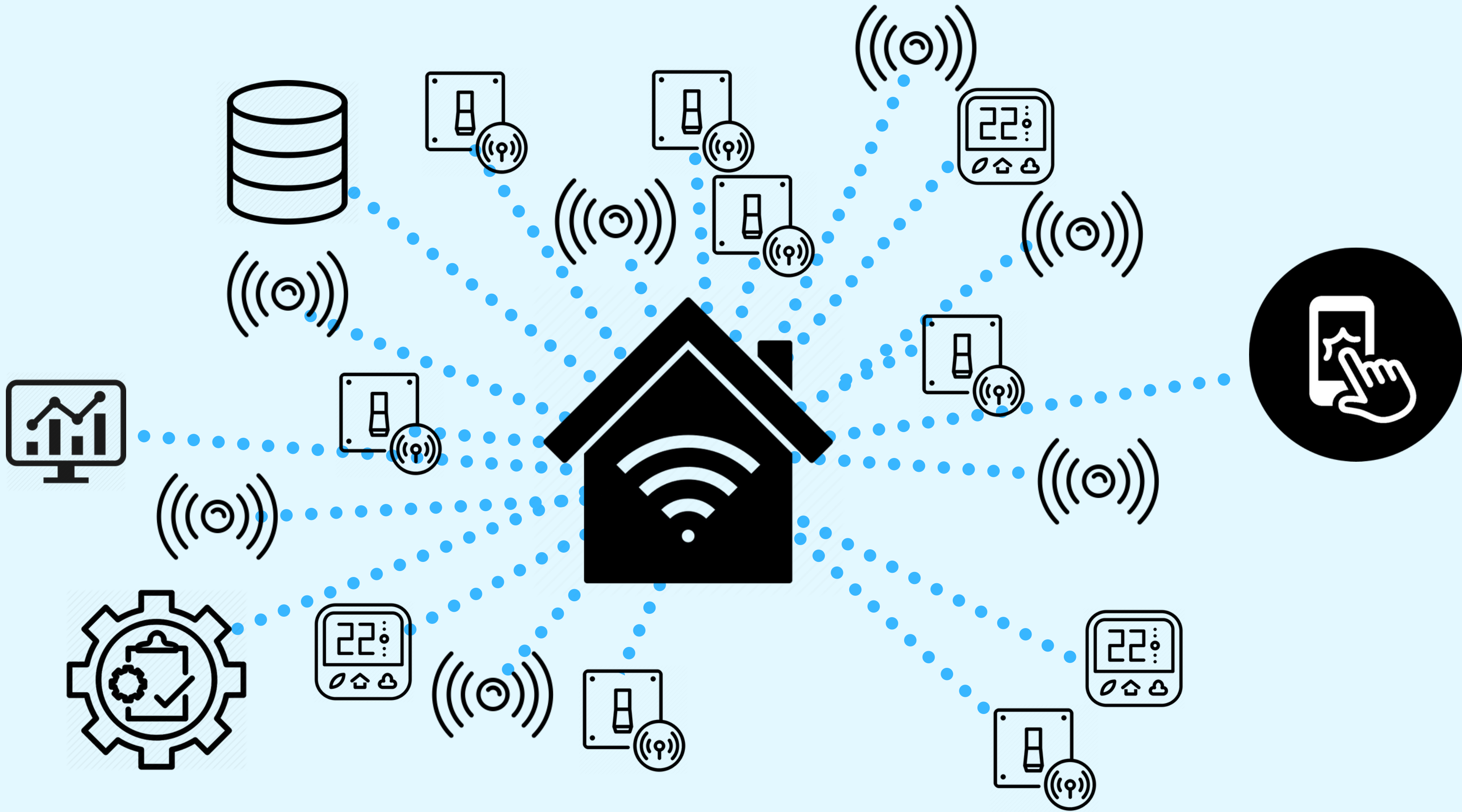






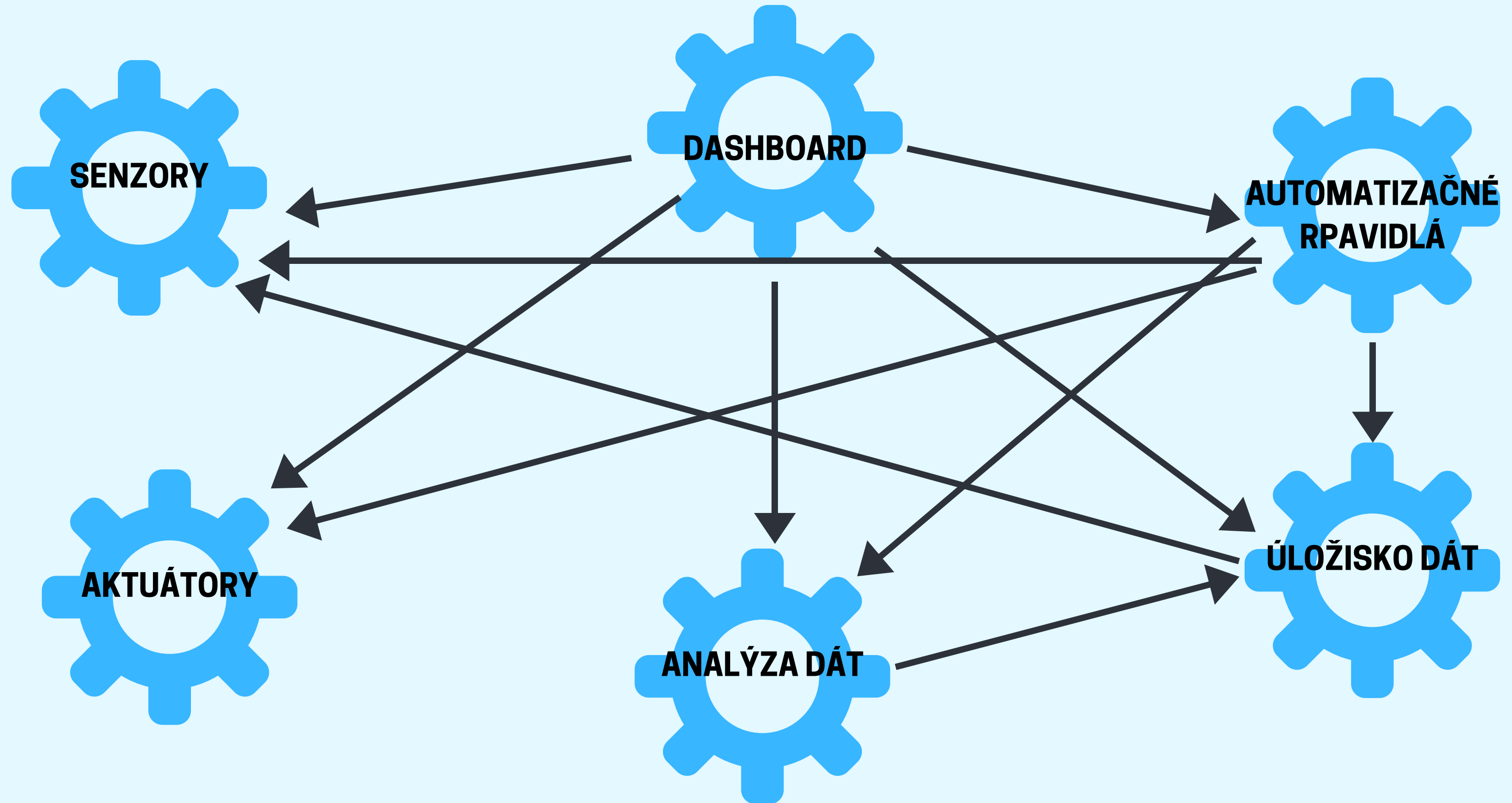




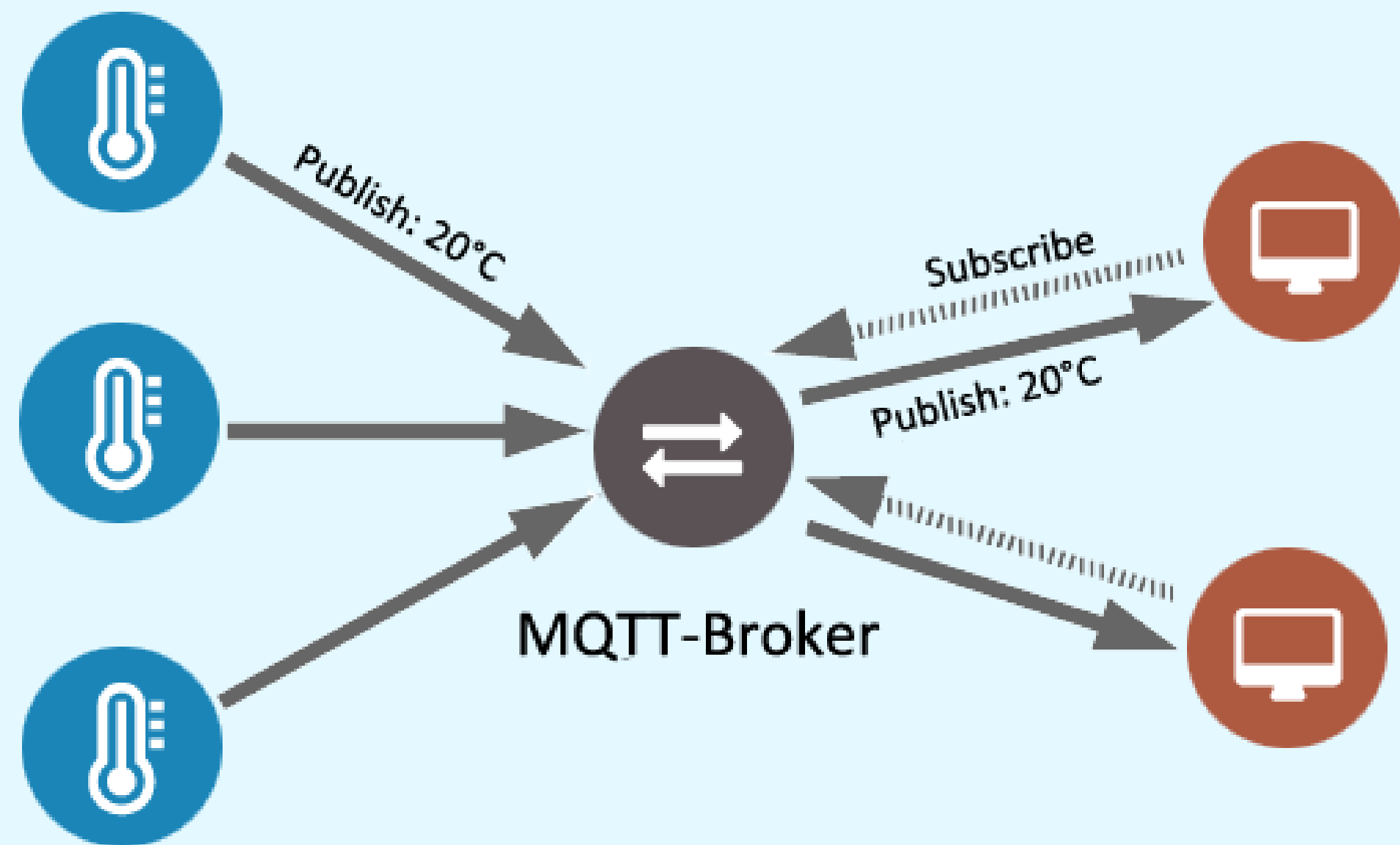




# INTEGRAČNÝ SOFTVÉR



# MQTT PROTOKOL



- publish-subscribe model
- vhodný pre iot

# MQTT SUBSCRIBE

- TOPIC

`upjs/jesenna/P09/teplota`

- WILDCARDS

`upjs/jesenna/+/teplota`

`upjs/jesenna/#`

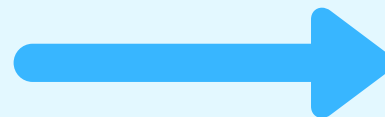
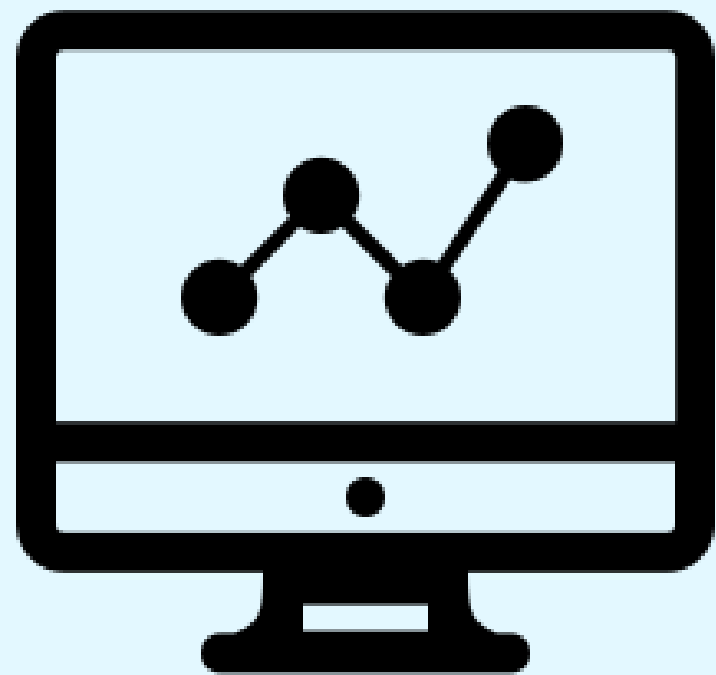
# POINT-TO-POINT KOMUNIKÁCIA

Subscribe

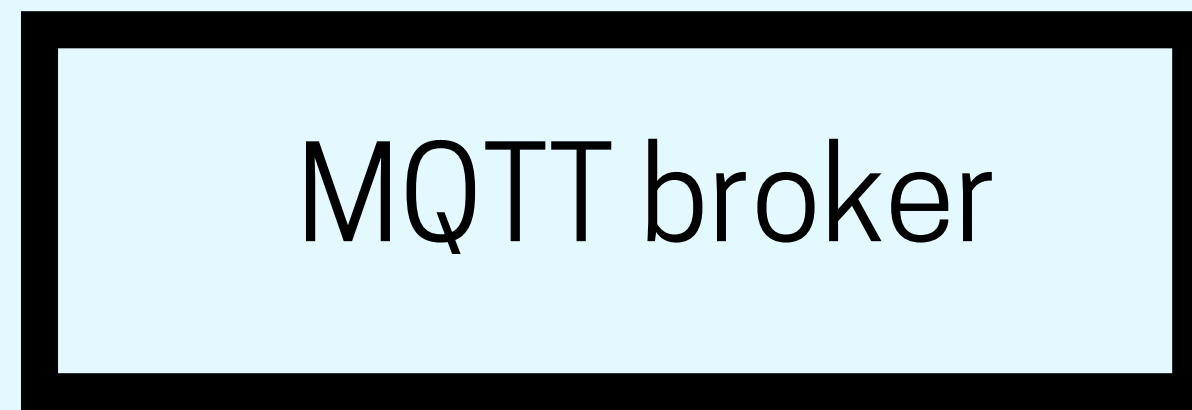
Topic: service/john/inbox/[aa7334f7-c6b1-4915-a352-71fb6ce80d67](#)

Dashboard

user: john



MQTT broker



History



# POINT-TO-POINT KOMUNIKÁCIA

Publish

Topic: service/history/request

Payload: {

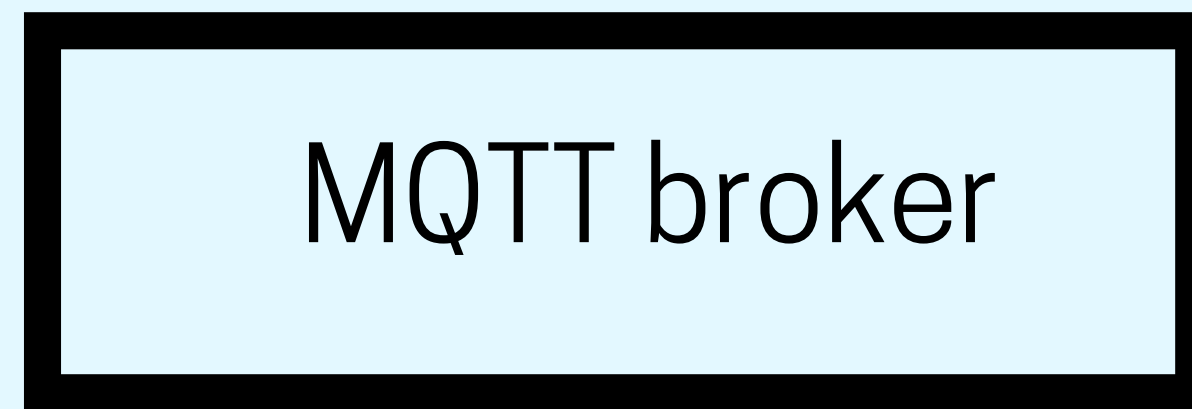
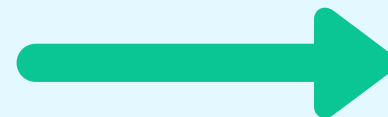
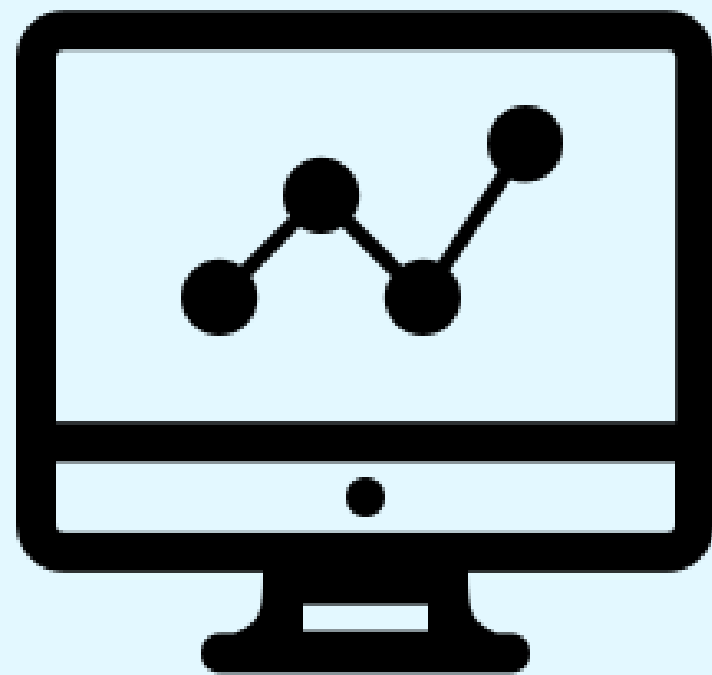
request : ...,

responseTopic: service/john/inbox/aa7334f7-c6b1-4915-a352-71fb6ce80d67

}

Dashboard

user: john



History





# POINT-TO-POINT KOMUNIKÁCIA

Publish

Topic: service/history/request

Payload: {

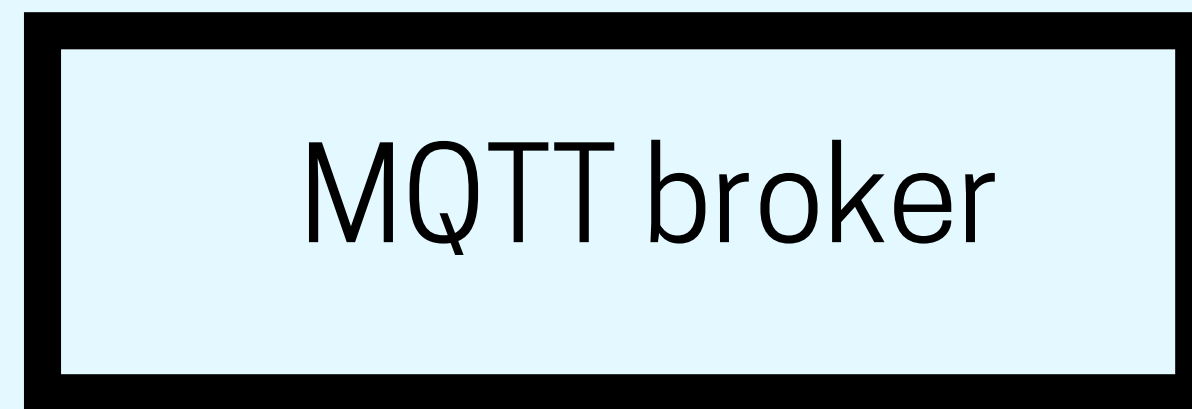
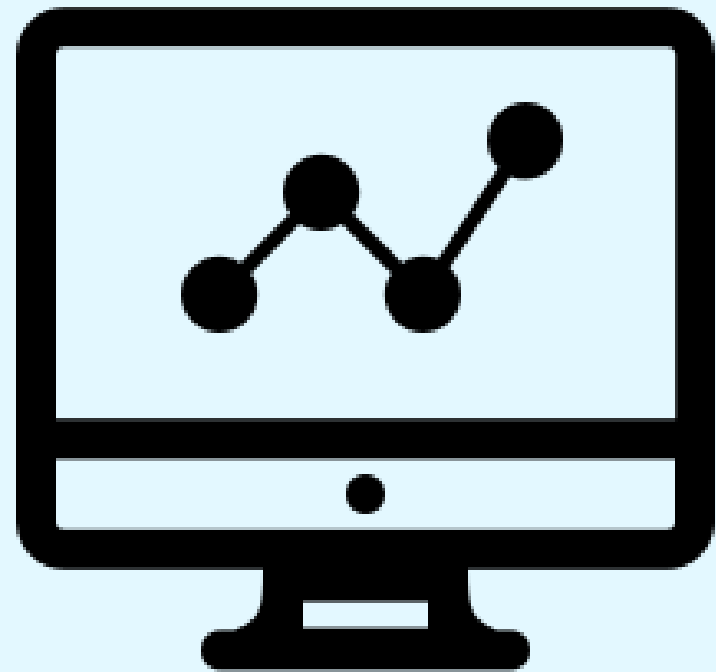
request : ...,

responseTopic: service/john/inbox/aa7334f7-c6b1-4915-a352-71fb6ce80d67

}

Dashboard

user: john



History



# POINT-TO-POINT KOMUNIKÁCIA

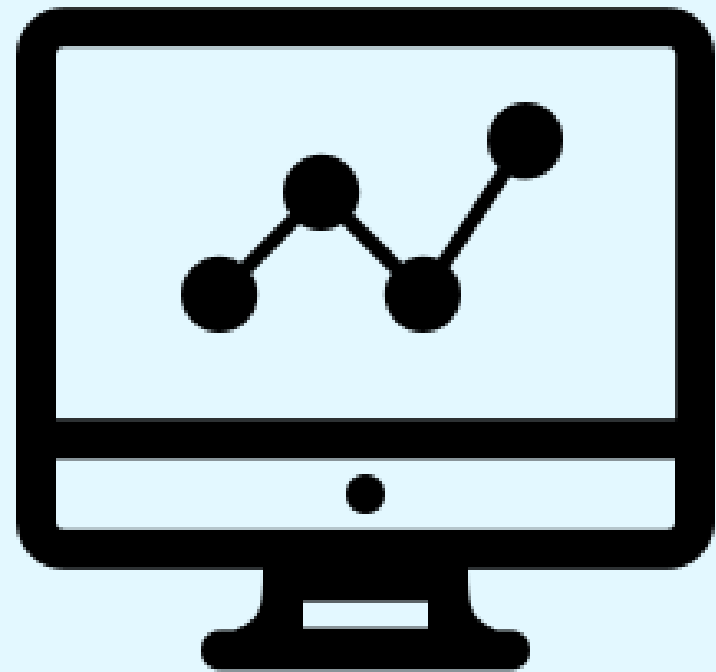
Publish

Topic: service/john/inbox/aa7334f7-c6b1-4915-a352-71fb6ce80d67

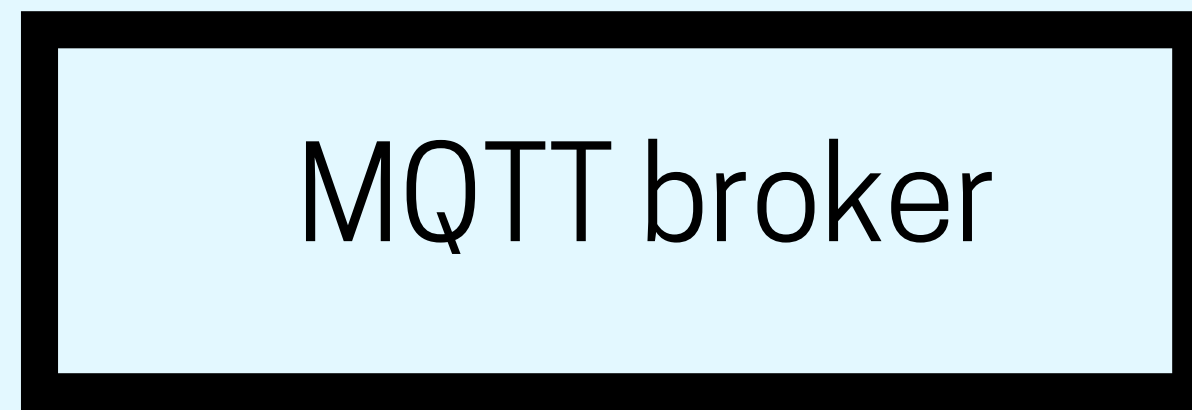
```
Payload: {  
  data : ...,  
}
```

Dashboard

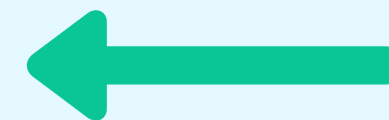
user: john



MQTT broker



History



# POINT-TO-POINT KOMUNIKÁCIA

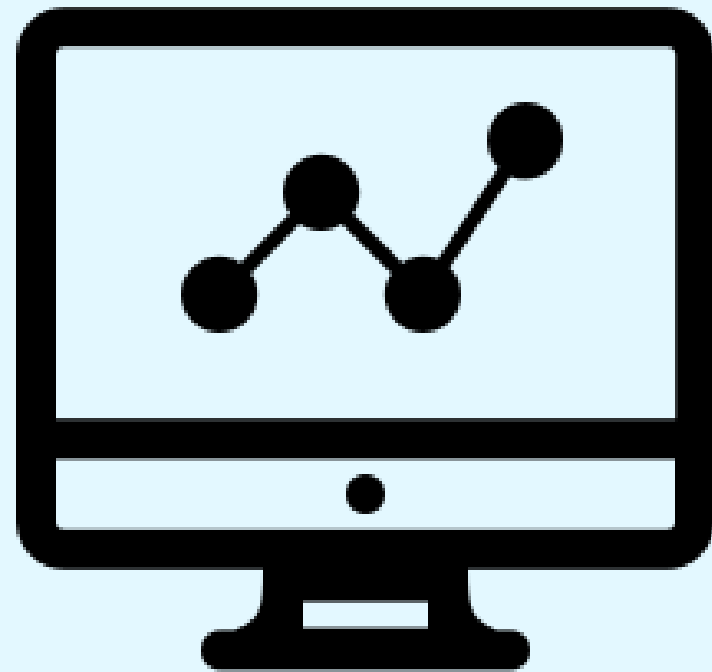
Publish

Topic: service/john/inbox/aa7334f7-c6b1-4915-a352-71fb6ce80d67

```
Payload: {  
  data : ...,  
}
```

Dashboard

user: john

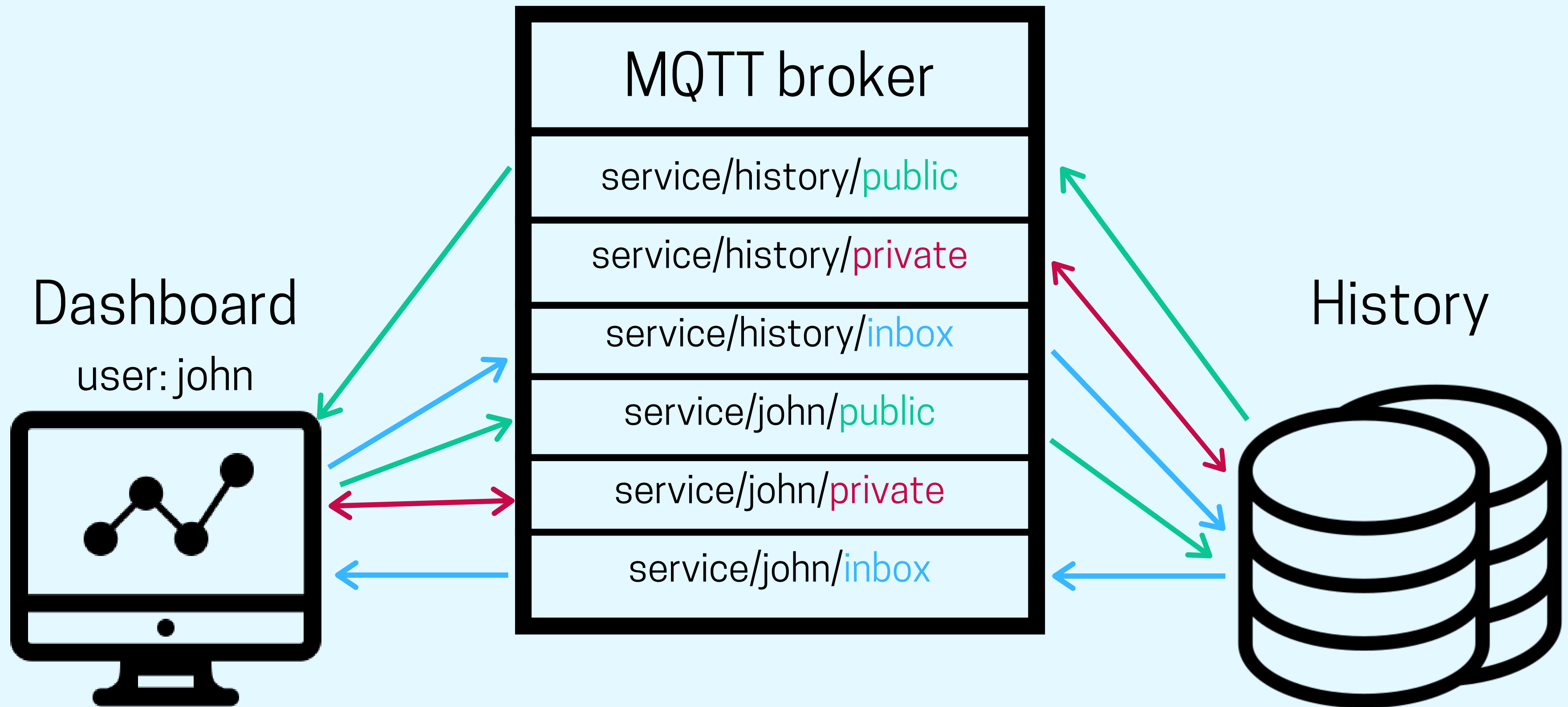


MQTT broker

History



# PRÍSTUPOVÉ PRÁVA



# PRÍSTUPOVÉ PRÁVA

- pattern readwrite service/%u/#
- pattern read service/+/public/#
- pattern write service/+/inbox/#

# ÚLOŽISKO DÁT

- databázy pre časové rady
  - TimescaleDB
- ľahké databázové systémy
  - SQLite

# ÚLOŽISKO DÁT - KONFIGURÁCIA

- vytvorenie tabuliek
- prihlásenie na topicy
  - {  
    topic: ...  
    tableName: ...  
    dataType: ...  
}

# ÚLOŽISKO DÁT - POŽIADAVKA

- **posledných N hodnôt**

- **topic:** service/history/inbox/requests/interval

- **request:** {

- responseTopic: ...

- topic: ...

- interval: ...

- }

- **od - do**

- **topic:** service/history/inbox/requests/fromto

- **request:** {

- responseTopic: ...

- topic: ...

- from: ...

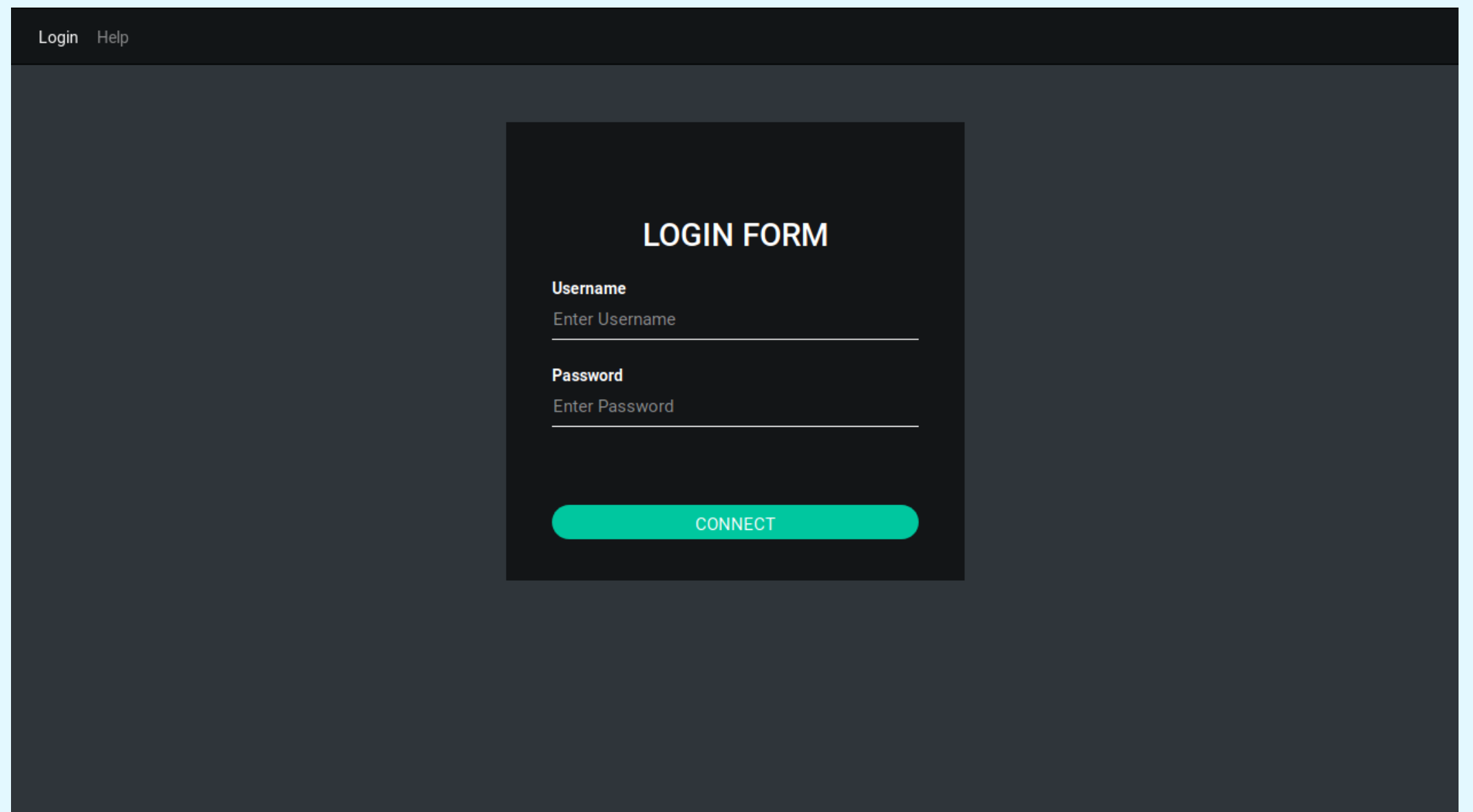
- to: ...

- }



# DASHBOARD - AUTENTIFIKÁCIA

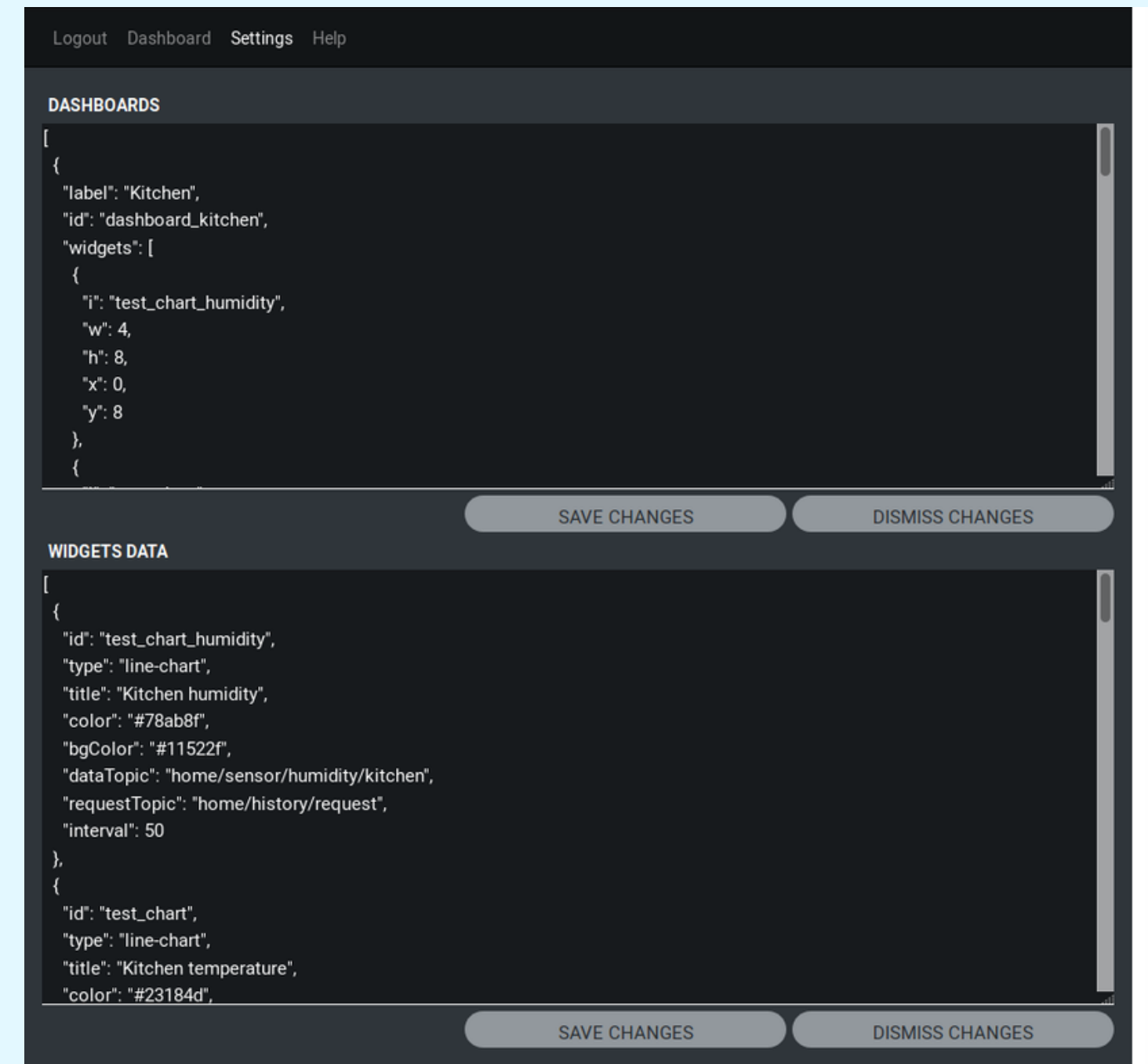
- statické stránky - react, redux
- websockety
- `service/username/#`



The image shows a dark-themed dashboard with a login form. At the top left, there are links for "Login" and "Help". The main content area is a dark gray rectangle. In the center of this area is a white rounded rectangle containing the "LOGIN FORM". The form has two input fields: "Username" with the placeholder text "Enter Username" and "Password" with the placeholder text "Enter Password". Below the input fields is a red rounded button labeled "CONNECT".

# DASHBOARD - KONFIGURÁCIA

- service/username/private/config/dashboards
- service/username/private/config/widgets



The screenshot displays a web interface for dashboard configuration. At the top, there is a navigation bar with links for "Logout", "Dashboard", "Settings", and "Help". The main content is divided into two sections: "DASHBOARDS" and "WIDGETS DATA".

**DASHBOARDS**

```
[
  {
    "label": "Kitchen",
    "id": "dashboard_kitchen",
    "widgets": [
      {
        "i": "test_chart_humidity",
        "w": 4,
        "h": 8,
        "x": 0,
        "y": 8
      },
      {

```

Below the JSON configuration, there are two buttons: "SAVE CHANGES" and "DISMISS CHANGES".

**WIDGETS DATA**

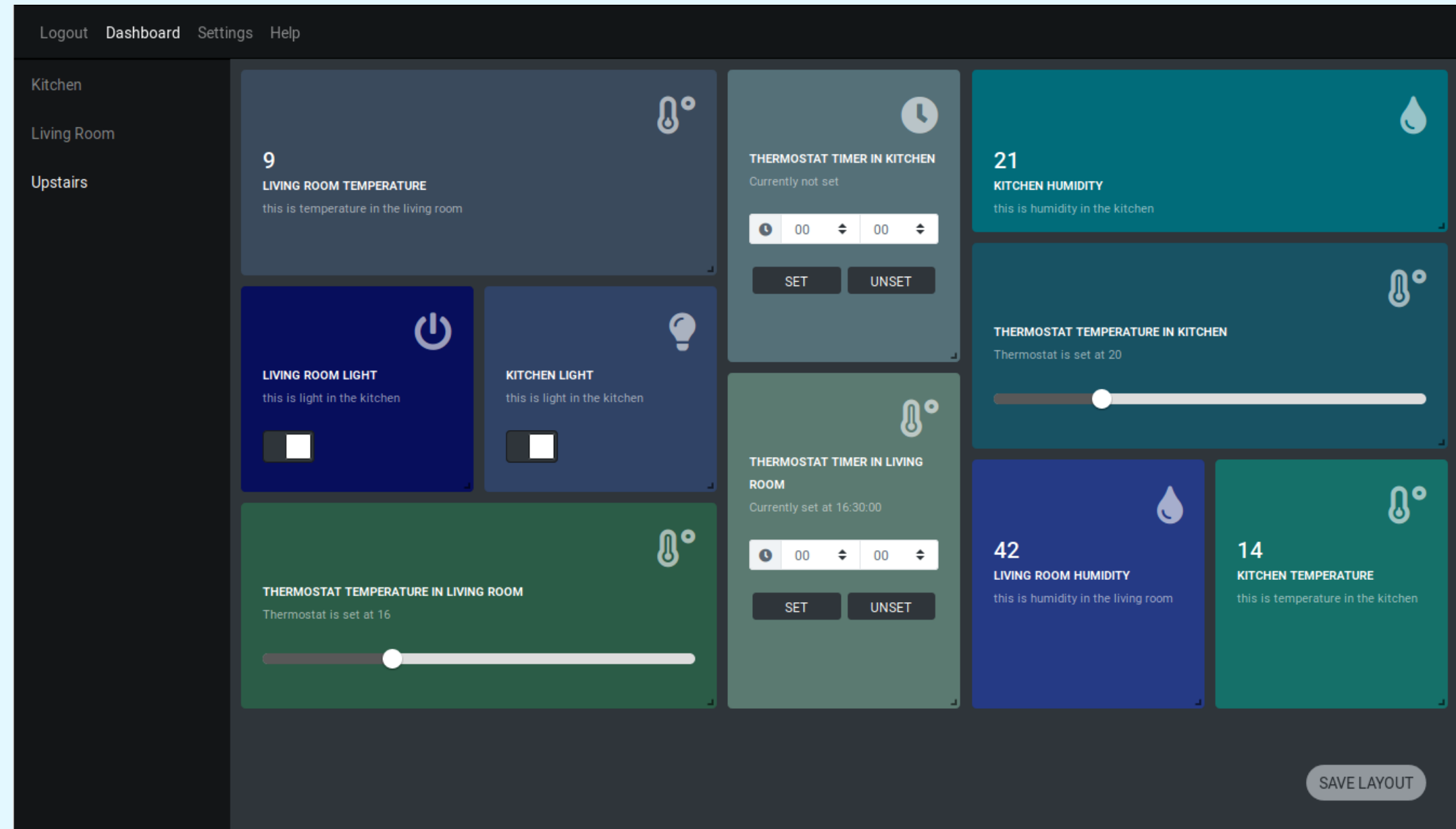
```
[
  {
    "id": "test_chart_humidity",
    "type": "line-chart",
    "title": "Kitchen humidity",
    "color": "#78ab8f",
    "bgColor": "#11522f",
    "dataTopic": "home/sensor/humidity/kitchen",
    "requestTopic": "home/history/request",
    "interval": 50
  },
  {
    "id": "test_chart",
    "type": "line-chart",
    "title": "Kitchen temperature",
    "color": "#23184d",

```

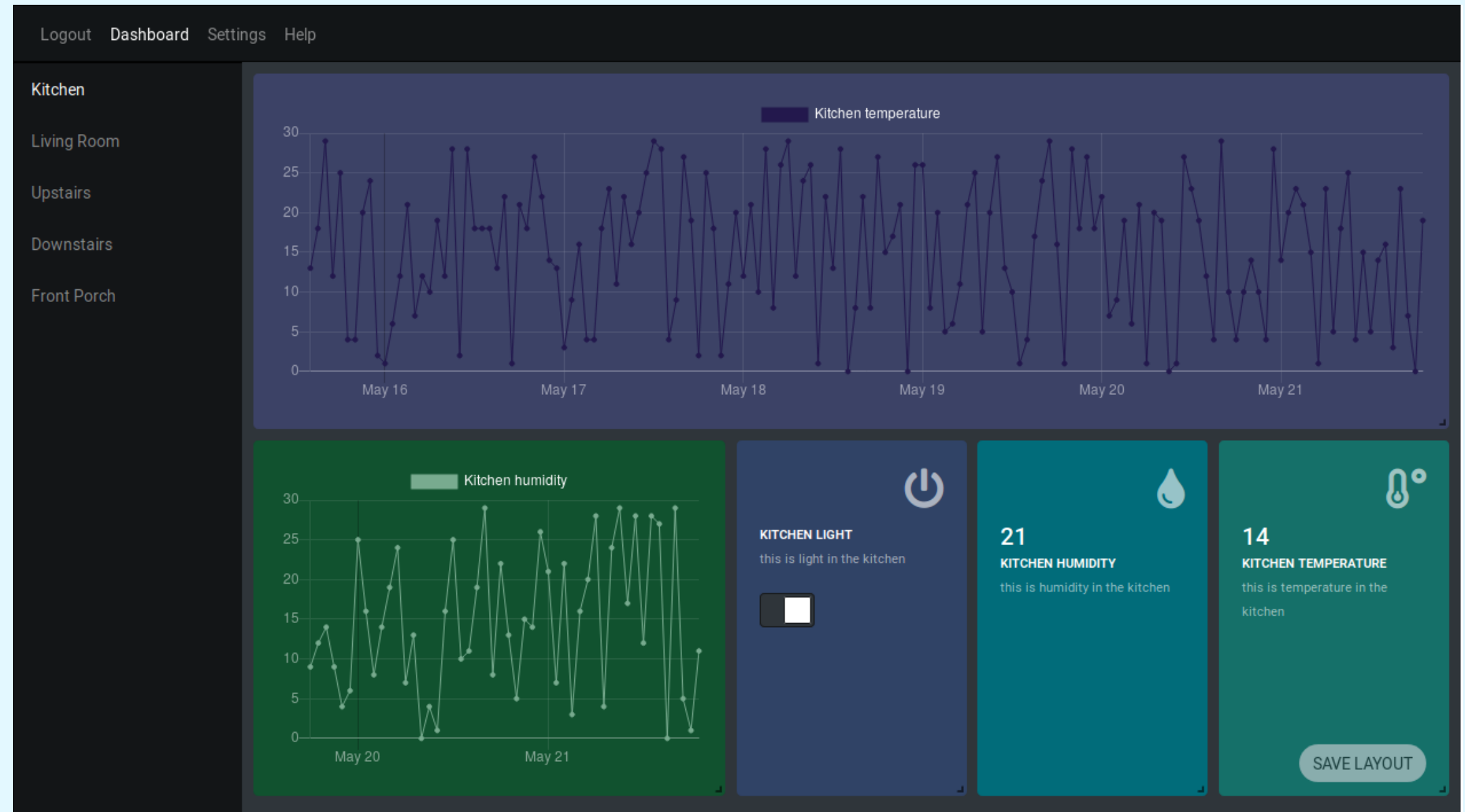
Below the JSON configuration, there are two buttons: "SAVE CHANGES" and "DISMISS CHANGES".

# DASHBOARD - WIDGETY

```
{  
  "id": "kitchen_temperature",  
  "type": "info",  
  "icon": "temperature",  
  "title": "Kitchen Temperature",  
  "info": "this is temperature in the kitchen",  
  "color": "#157069",  
  "readTopic": "service/sensor/public/temperature/kitchen"  
}
```



# DASHBOARD - WIDGETY



```
{  
  "id": "test_chart",  
  "type": "line-chart",  
  "title": "Kitchen temperature",  
  "color": "#23184d",  
  "bgColor": "#3c4266",  
  "dataTopic": "service/sensor/public/temperature/kitchen",  
  "requestTopic": "service/history/inbox/request/interval",  
  "interval": 150  
}
```

UKÁŽKA ...

# SUMARIZÁCIA

- Voľnosť pri vývoji systému a pridvávaní komponentov
- Voľnosť výberu technológií pre jednotlivé komponenty
- Jendoduchý vývoj a testovanie
- Škálovateľnosť
- Odolnosť voči chybám
- Výber najvhodnejších technológií
- Edge computing - technika presúvania výpočtov z cloudu na iot zariadenia

ĎAKUJEM ZA POZORNOST