

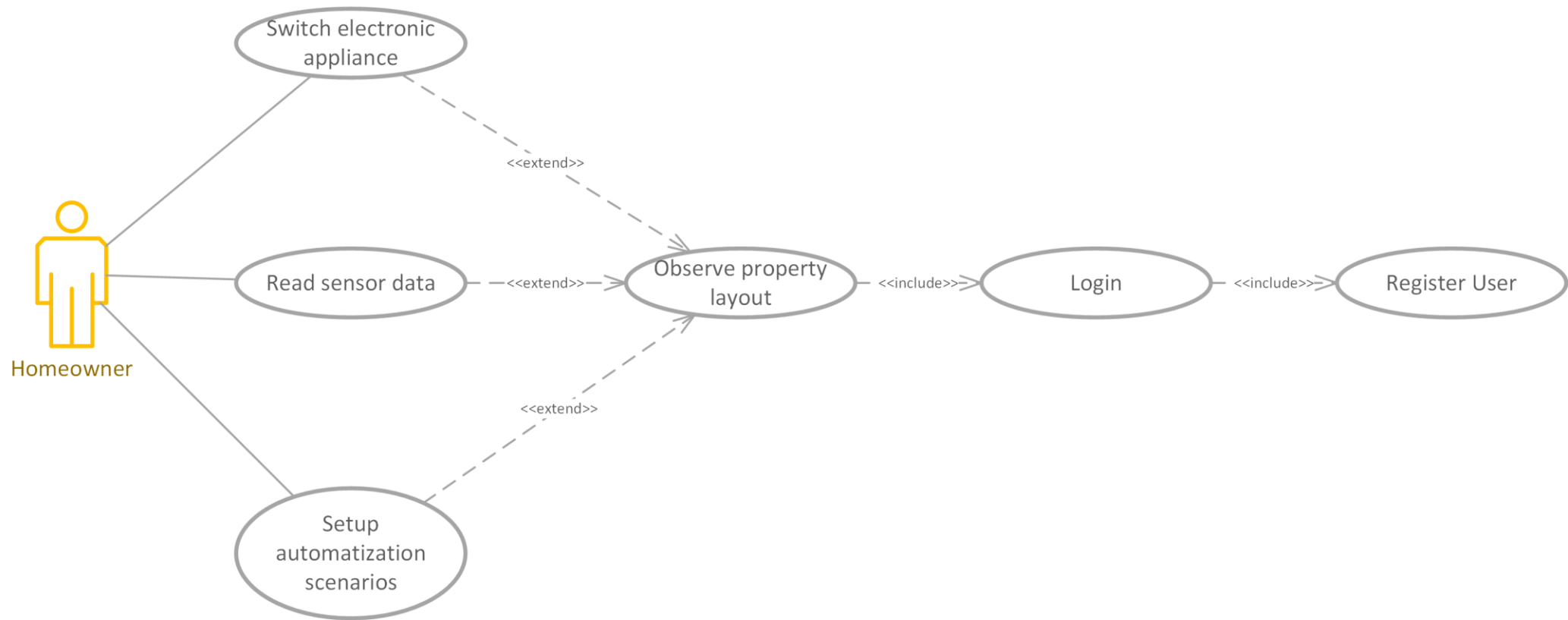
# Adaptation Concepts

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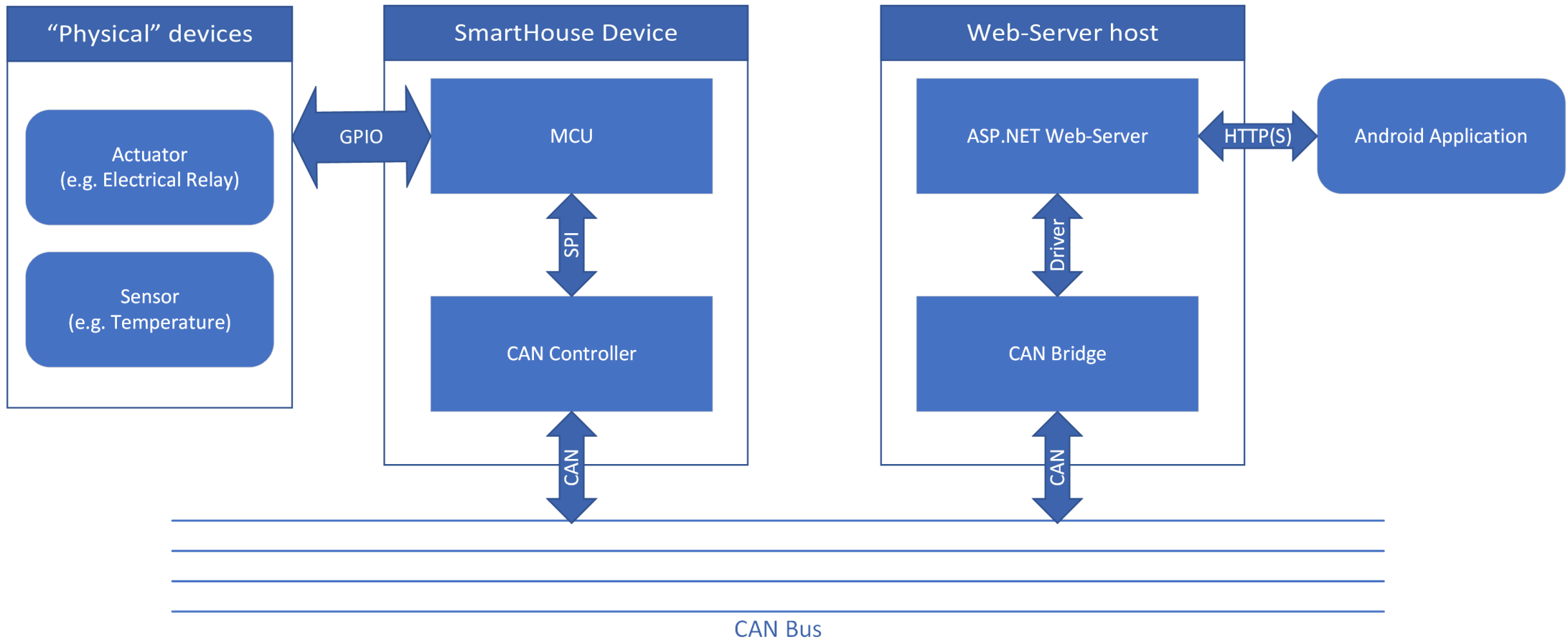
# Key functions

- Light control
- Reading Appliance state
- Remote control of appliance
- Automation scenarios
- Authorization. Separation of roles
- Reading sensor data

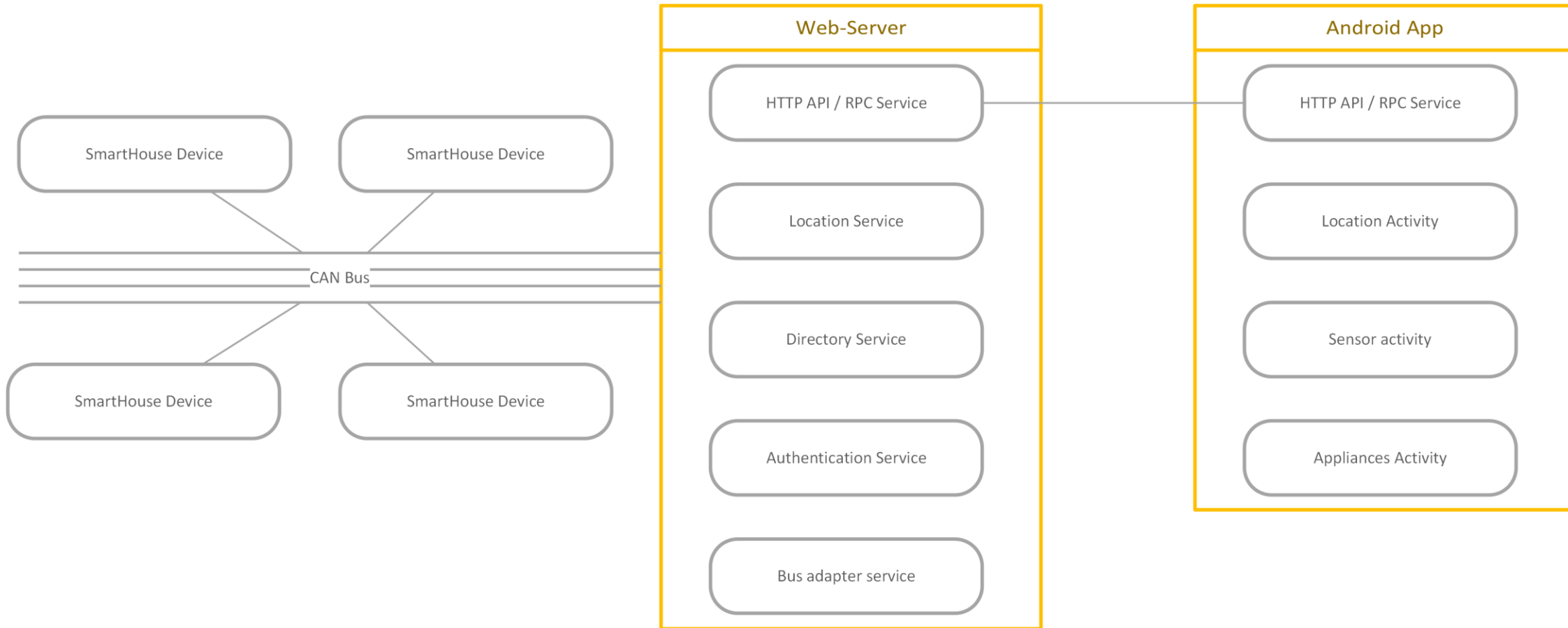
# Use Cases



# Hardware Structure diagram



# Software Component Structure diagram



# Adaptation – Wi-Fi location tracking

- Get network state
- Check if Wi-Fi SSID is in location tracking Data Base
- Measure signal strength and determine the current room
- Adaptation: select active room and update screen info depending on location

# Adaptation – energy saving

- Get battery state
- If battery has low charge, then disable server polling for SmartHouse states
- User can still update SmartHouse states manually and push updates manually

# Problem – user leaves the apartment

- We can detect that user is not at home via checking Wi-Fi state
- If it is the case, we should switch to WAN connection mode or to offline mode
- If we are using WAN mode, the app cannot use adaptation mechanism of location monitoring, but still provided the main features of SmartHouse
- If we are using offline mode, the app can only show last known states of SmartHouse equipment and queue user commands for future pushing to the server
- When user enters the apartment again, we switch to LAN mode



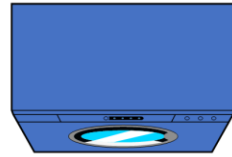
# Problem – battery low

- By default, the mobile app periodically polls the server for updates
- This requires a permanent connection, which uses lots of battery energy
- If the battery is low, we should switch polling off and make the user update state information manually
- We also can use Push-notifications, but this technology depends on Google services and thus is unavailable on some devices

# UX Storyline: User leaves the apartment

Storyboard    Persona: Student    Scenario: user leaves the apartment

User wants to go rest while the washing machine is working



User wants to return exactly when the machine stops



SmartHouse notifies user about state change



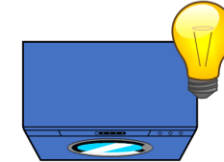
Problematic situation: user leaves the apartment



SmartHouse changes network mode to WAN



SmartHouse notifies user about state change



User returns home, network mode is LAN again



# UX Storyline: Battery low

Storyboard    Persona: Student    Scenario: smartphone battery is low

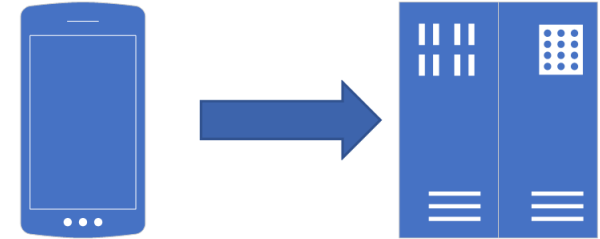
User actively uses the smartphone  
for the whole day



Problematic situation: Now the  
battery is low



SmartHouse changes interaction  
scheme to push-only



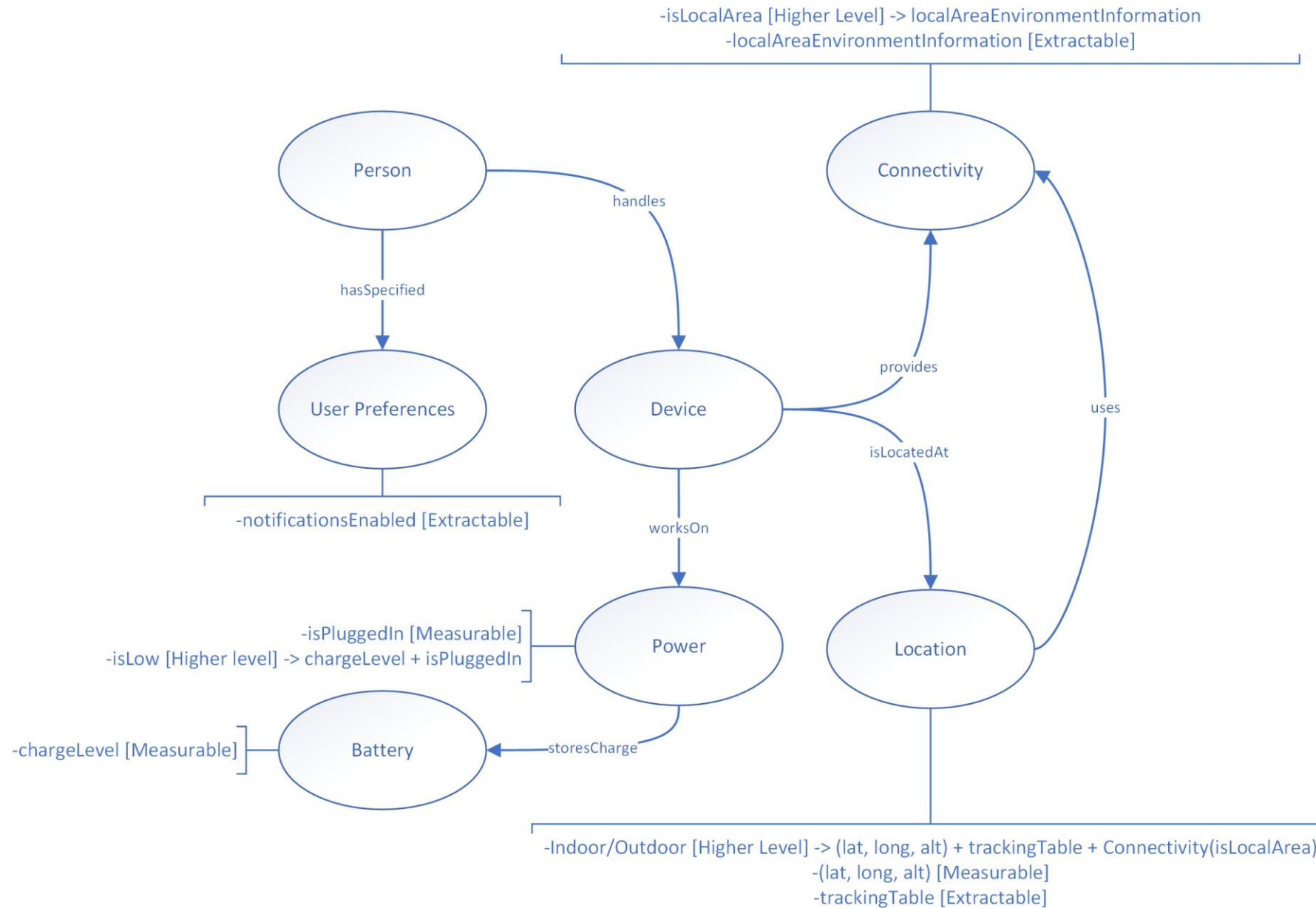
Battery life is extended



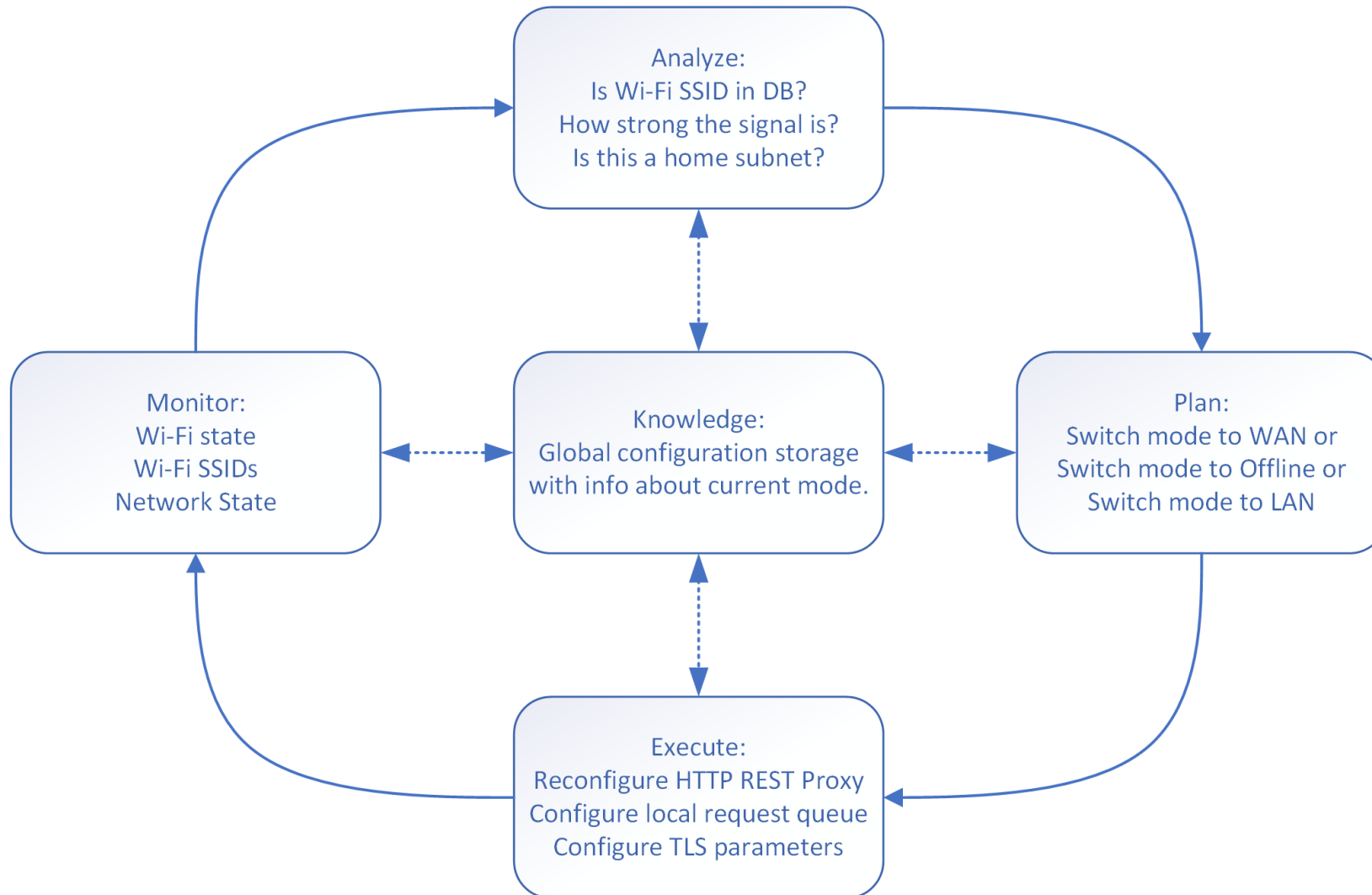
User plugs the phone in and  
SmartHouse is pull-push again



# Context Model



# MAPE-K for Connectivity and Offline Challenge



# MAPE-K for Energy Challenge

