

Smart House

Engineering Adaptive Mobile Applications

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Problem of daily routines

- Gunther has a big apartment and he needs to do housework. Gunter is a businessman, he is really busy! He has no time for such simple stuff.



Approach

- Modular structure: all parts interchangeable
- Popular Hardware: cheap MCUs
- Commodity user-devices: runs on any smartphone
- Exploitation of standards: ease of expanding and maintenance
- Android/Web: use smartphone or a browser with equal convenience to control the system.
- Position tracking: focus on relevant locations



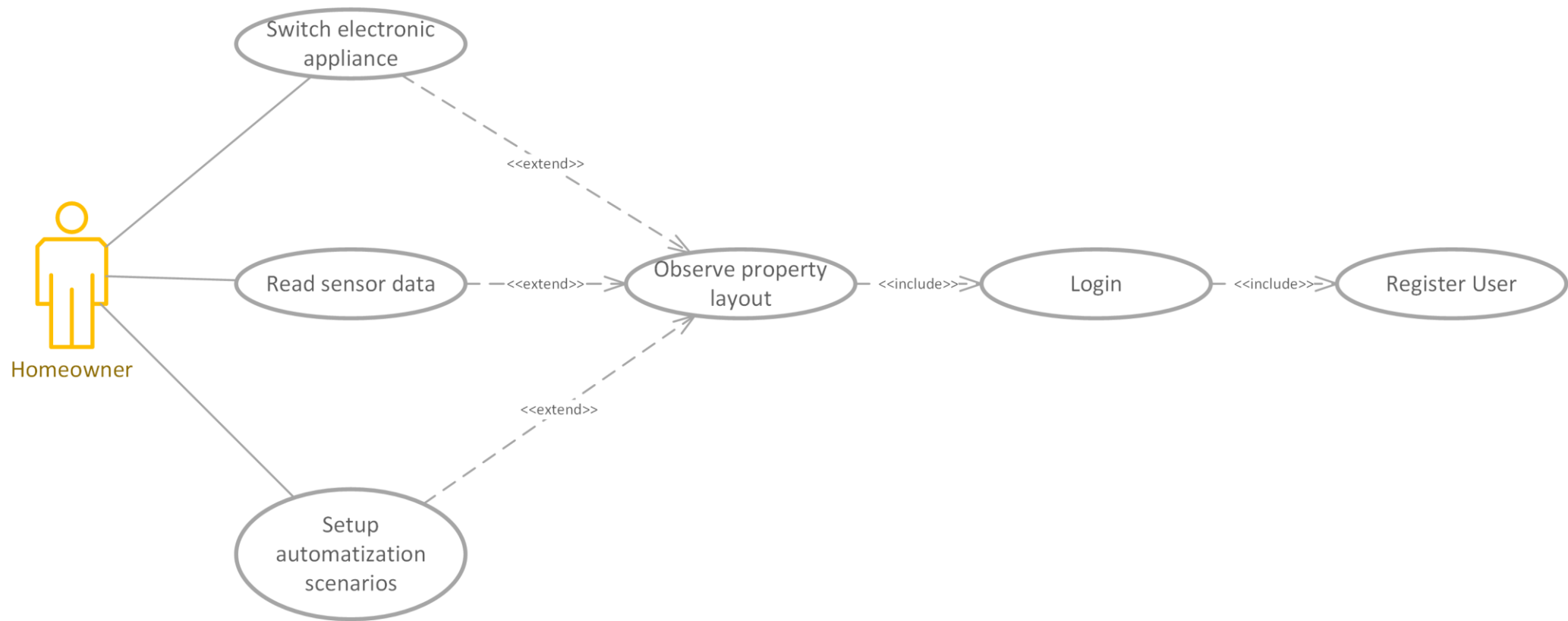
Benefits

- Plug-and-play systems enables low-effort installation of new components
- Low-cost hardware decreases your overall expenditures
- With position tracking the application response time is about one second

Who is interested?

- Any homeowner wants to make some action automatic.
 - Why is it so dark? Where is the switch?!
 - What is the current temperature here? I want A/C on!
 - What is the current humidity? I want dry air!
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- Nowadays we need to do all this manually.
 - Smart House will do your job!
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- Target user group: Owner of a big house/flat

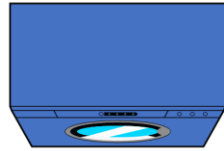
Use Cases



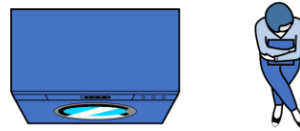
Challenge: User leaves the apartment

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



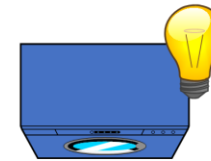
Problematic situation: user leaves the apartment
The application cannot use trusted LAN connection to fetch updates



SmartHouse changes network mode to WAN
Enables untrusted connection features, e.g. authentication and encryption



SmartHouse notifies user about state change



User returns home, network mode is LAN again



Challenge: Battery low

Storyboard Persona: Student Scenario: smartphone battery is low

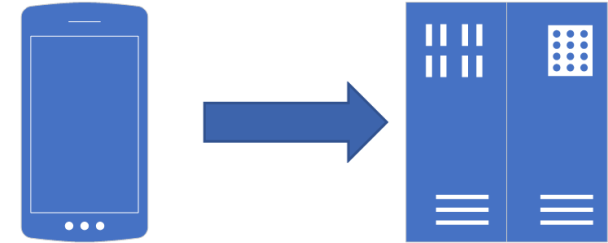
User actively uses the smartphone
for the whole day



Problematic situation: Now the
battery is low
The app is draining battery power to
fetch updates regularly



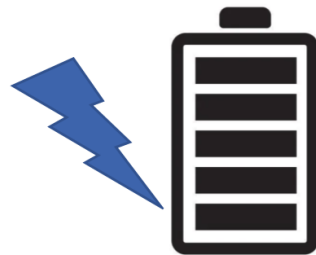
SmartHouse changes interaction
scheme to push-only



Battery life is extended



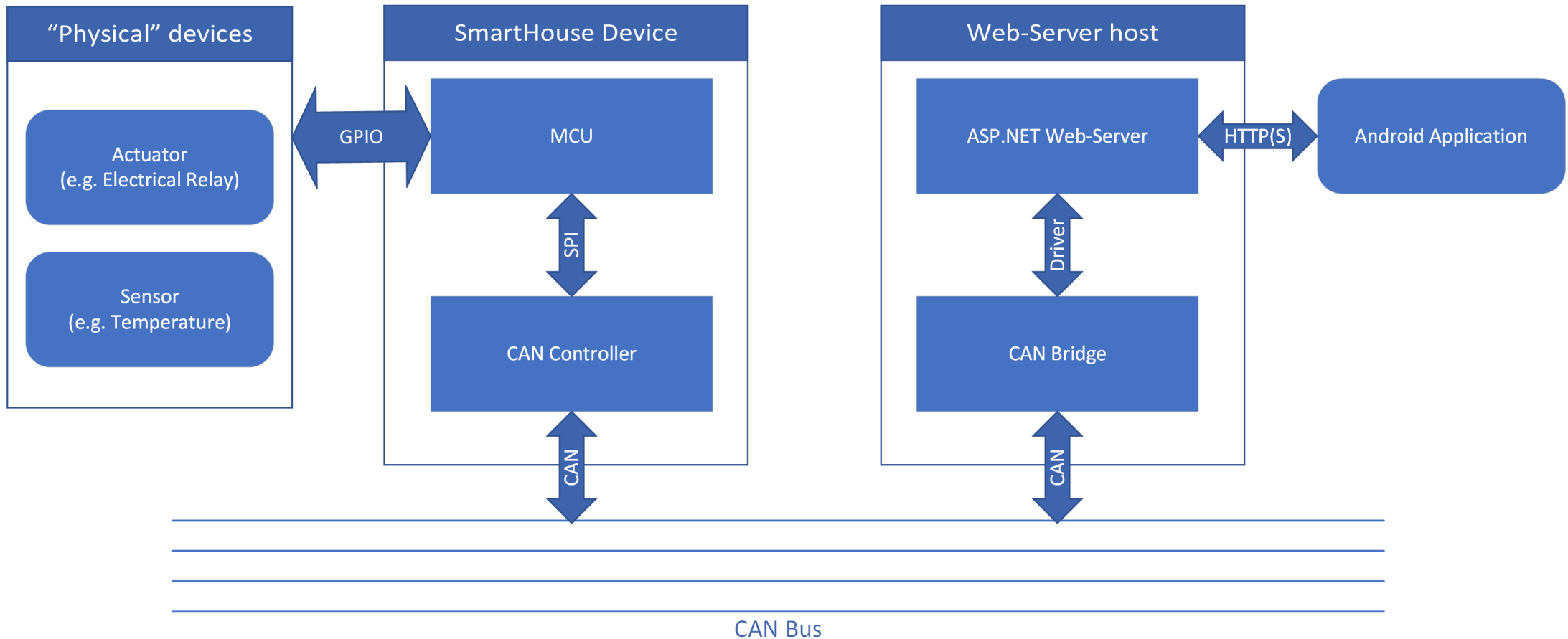
User plugs the phone in and
SmartHouse is pull-push again



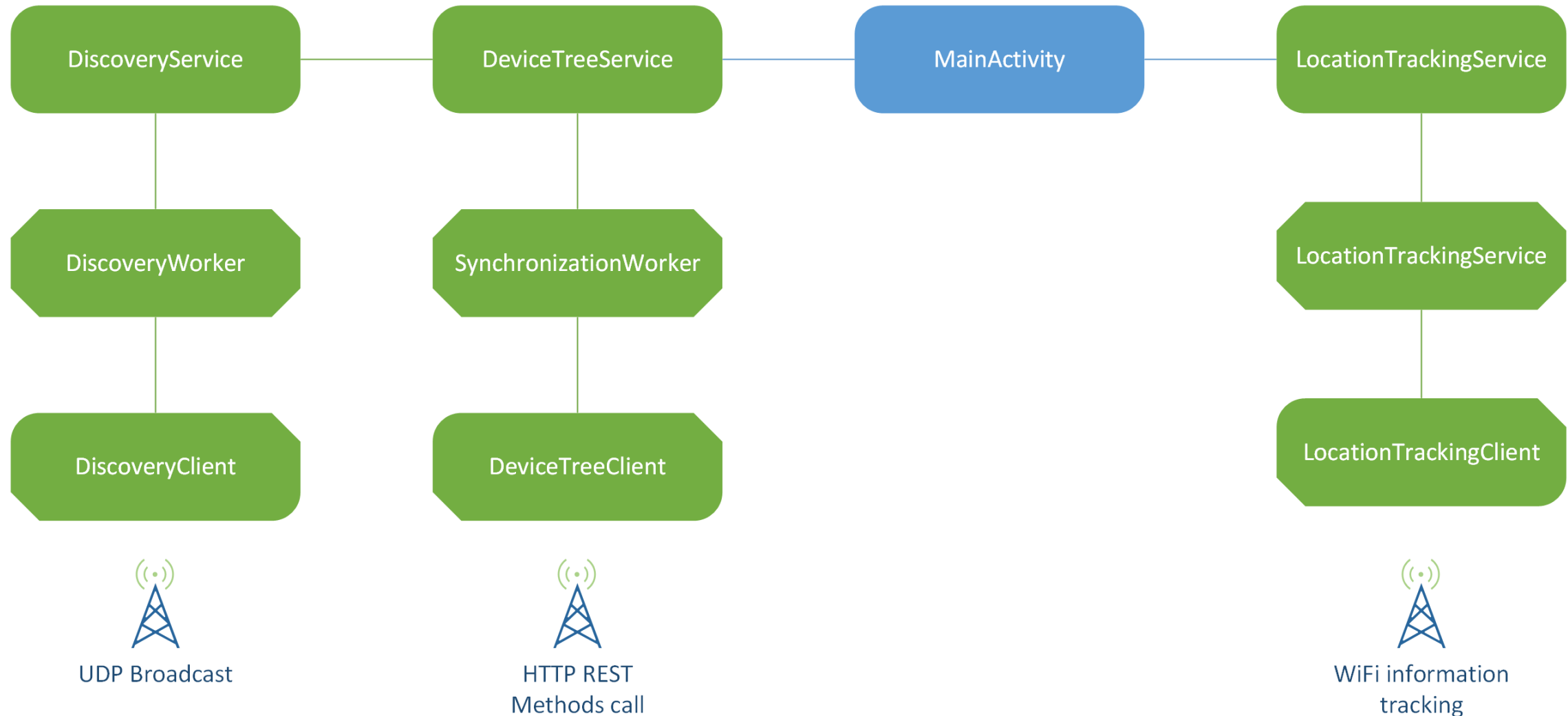
Key functions

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

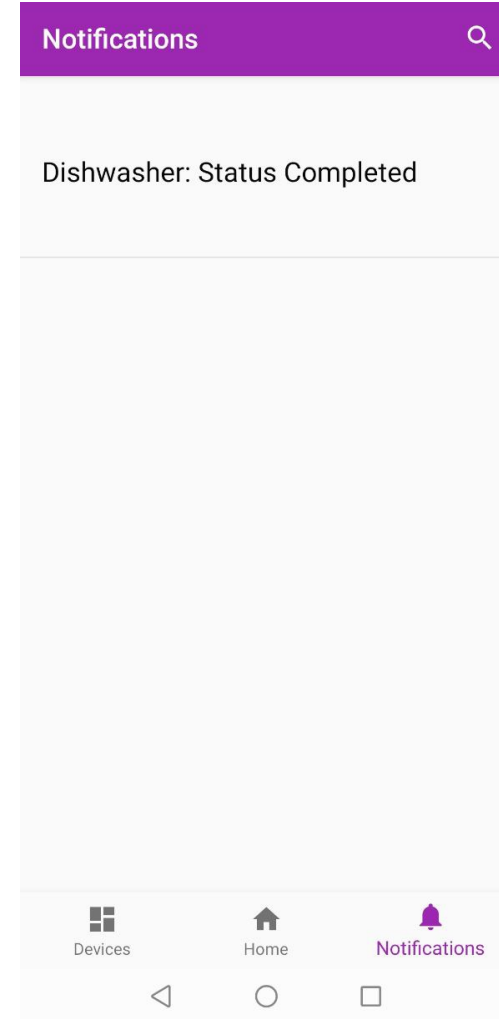
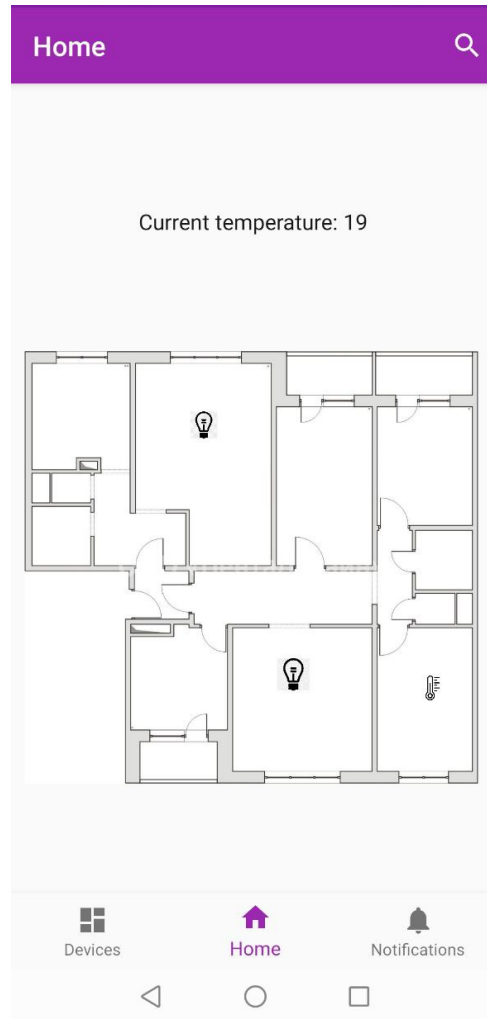
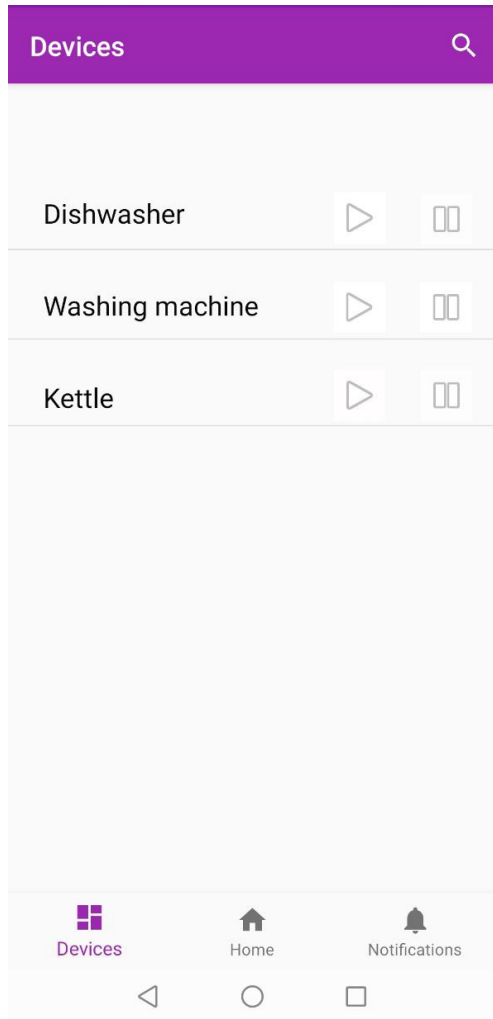
Hardware Structure diagram



Software Component Structure diagram



UI



Contributors

Dmitriy Monakhov: Backend developing

Anastasia Lykhtar: Frontend developing