



Heimgard Technologies

Platform architecture



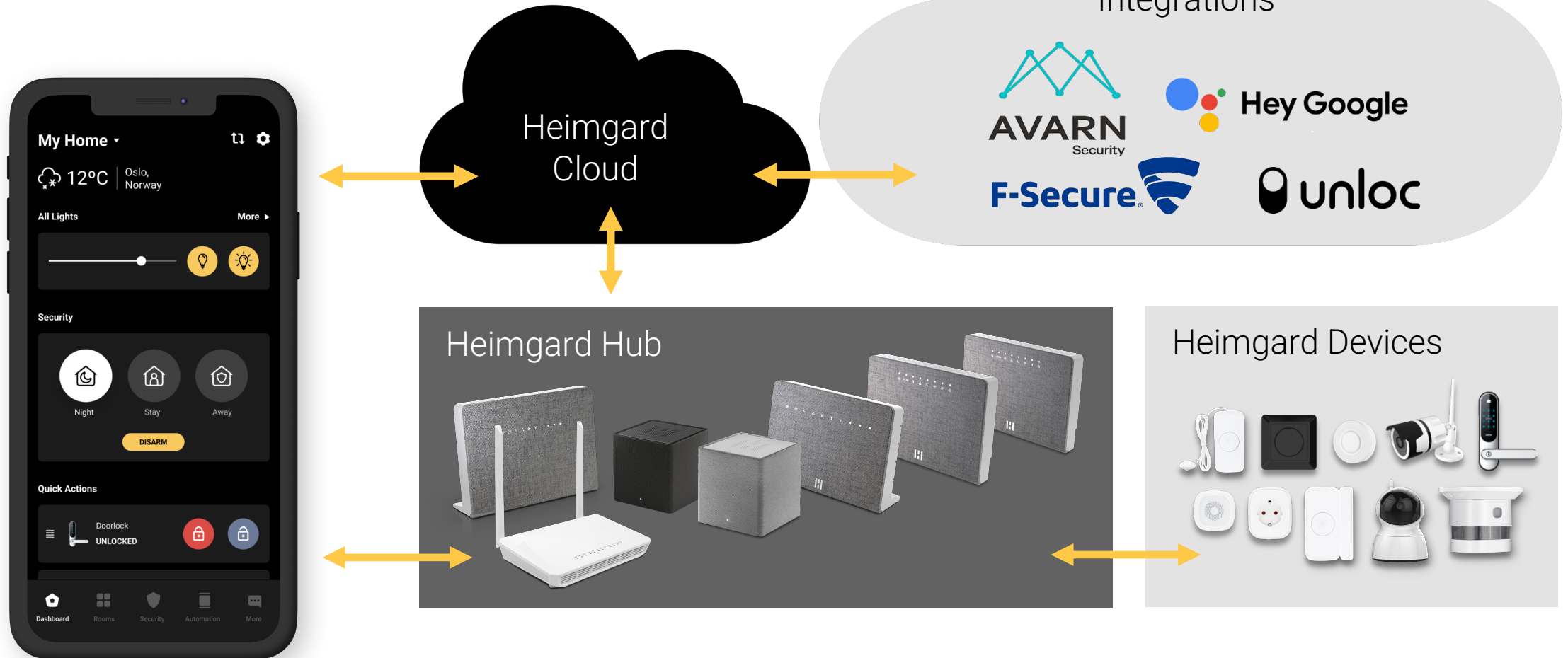
Development

- 🏠 48 R&D resources
 - ▶ Hardware development
 - ▶ Software development
 - ▶ Testers

- 🏠 Modern development processes
 - ▶ Involved product owners
 - ▶ Agile (SCRUM and Kanban)
 - ▶ CI pipelines adapted to software needs
 - ▶ Automated tests

- 🏠 In the works
 - ▶ Even higher test coverage
 - ▶ Feature flagging
 - ▶ Continuous deployment of cloud services

Platform overview



Platform design goals

At the core of any development – hardware and software

🏠 Completely flexible

- ▶ User experience
- ▶ Interoperability
- ▶ Scalability
 - White labeling
 - Extensibility

🏠 Completely secure

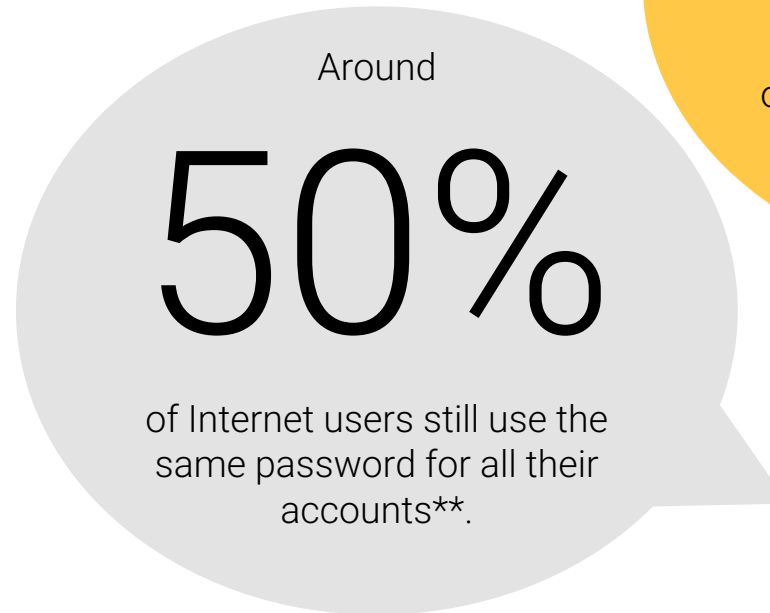
- ▶ Data privacy
- ▶ Data security

Mitigating risks

- 🏠 No username and password
- 🏠 No private data in our core cloud
- 🏠 End-to-end encryption of all data
- 🏠 Self-contained hubs

This helps us:

- 🏠 Minimize the attack vectors
- 🏠 Minimize our GDPR footprint



*Verizon, 2020)
**LastPass, 2021)

Personal data protection

- 🏠 We adopt and follow the set of strictest international privacy laws (currently GDPR)
- 🏠 Privacy by default
 - ▶ We aim to store the minimum amount of personal data for a service to function
- 🏠 Privacy by design
 - ▶ We have structural measures set up to consider privacy during development and we always consider data privacy first in our solutions using tools like pseudonymization and encryption.
- 🏠 Privacy risk assessment before we decide to use any 3rd party service
- 🏠 Annual re-evaluation of all risk assessments
- 🏠 Data processor agreements with all sub-contractors

GDPR in practice

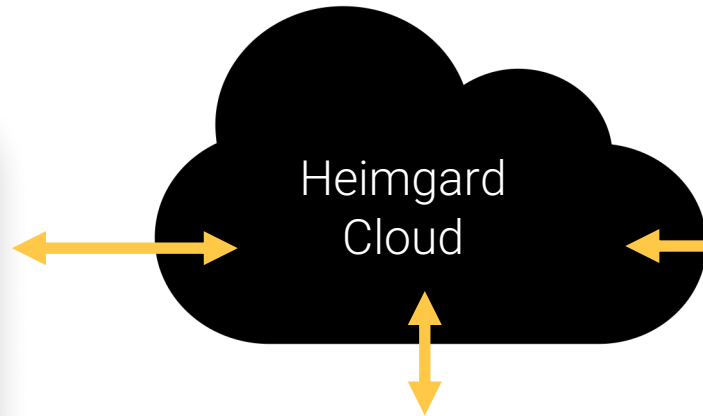
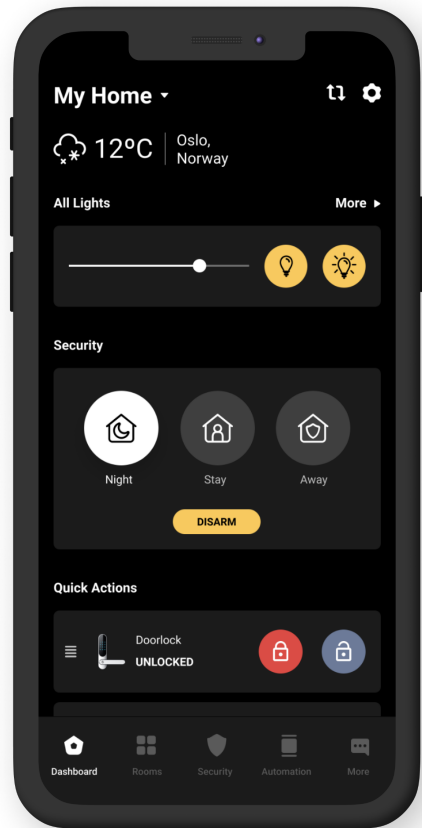
Heimgard

- 🏠 Heimgard Technologies AS is data-controller
- 🏠 Privacy by default: We claim legitimate interest
- 🏠 Use of consent only when needed
- 🏠 Google cloud servers in the EU
- 🏠 SCC (Standard Contractual Clauses) for data transfer outside of the EU

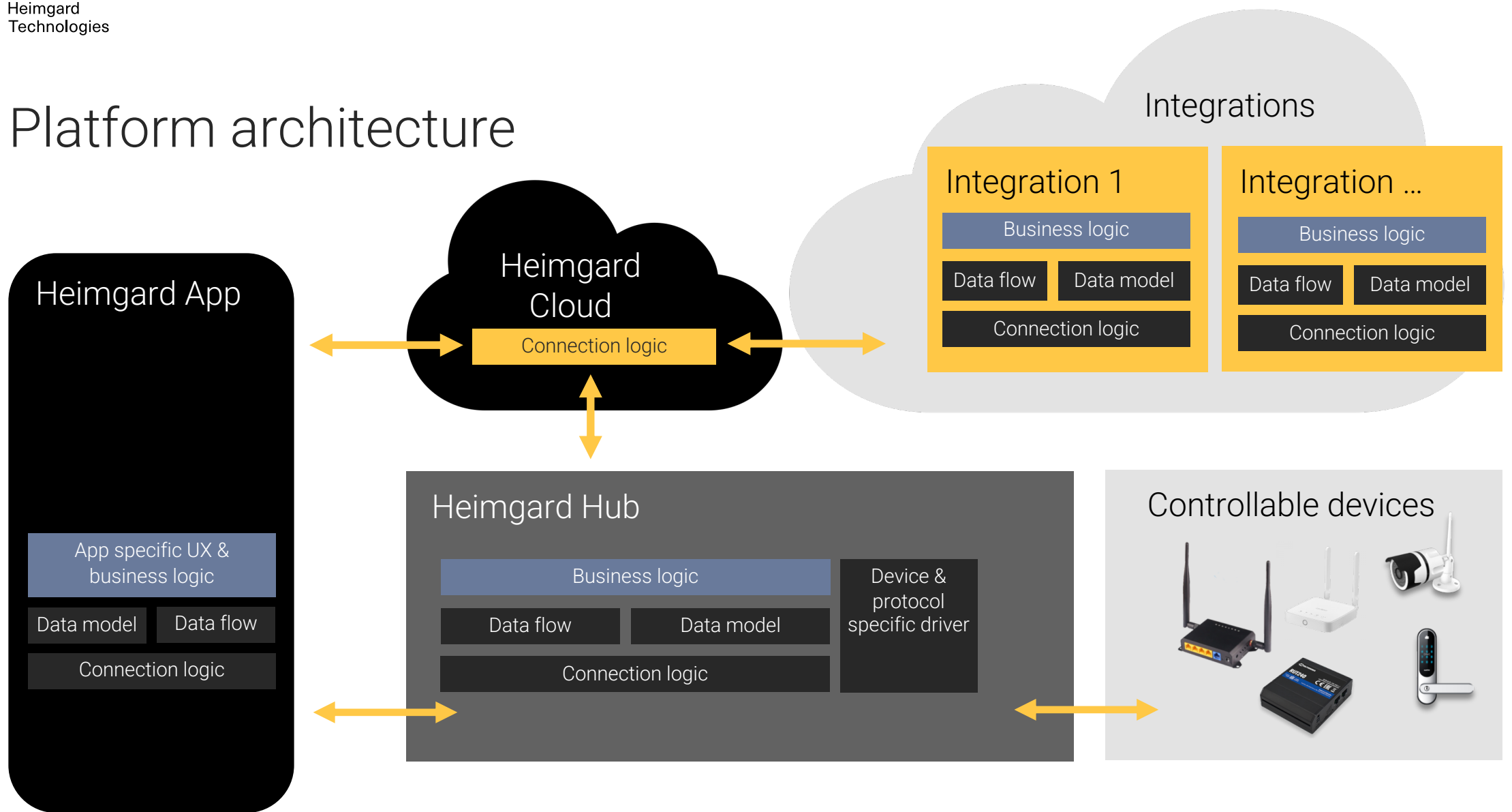
OEM

- 🏠 Heimgard Technologies AS is data-processor or joint-controller.
- 🏠 The customer is responsible for EULA and privacy policies.
- 🏠 Servers can be placed in any Google cloud location.
- 🏠 The customer can choose how much personal data to store both internally and in our system.

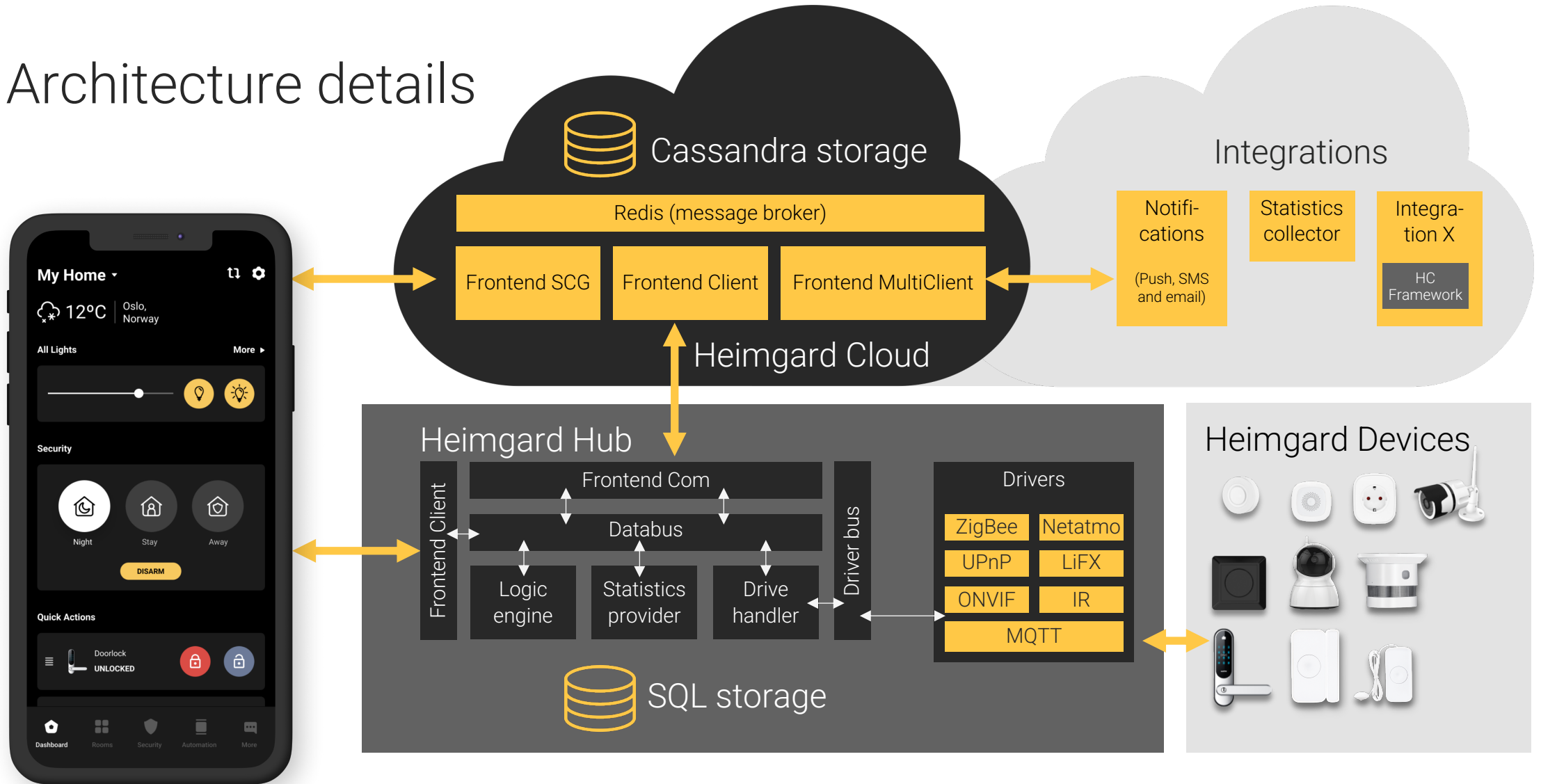
Platform overview



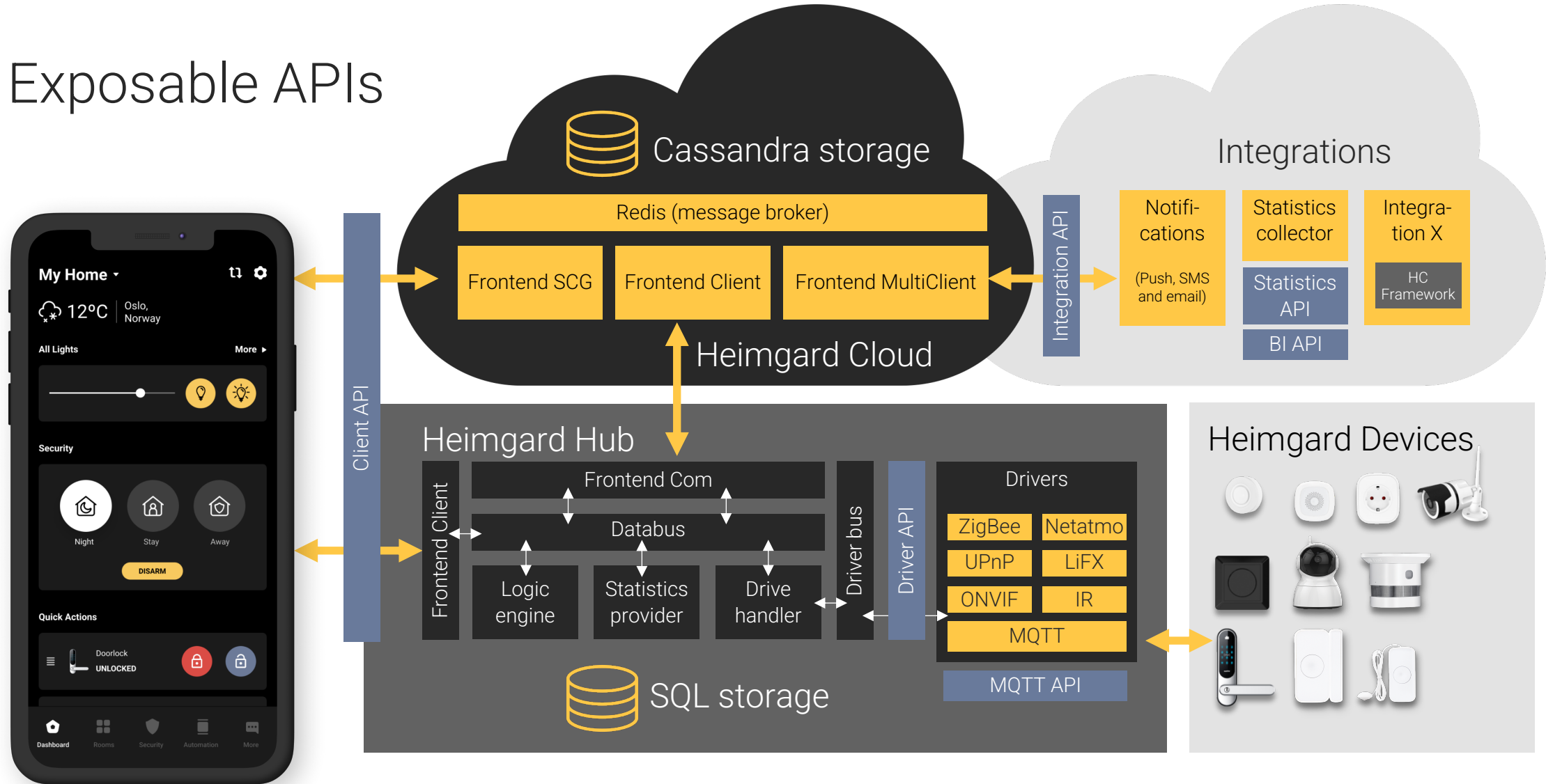
Platform architecture



Architecture details

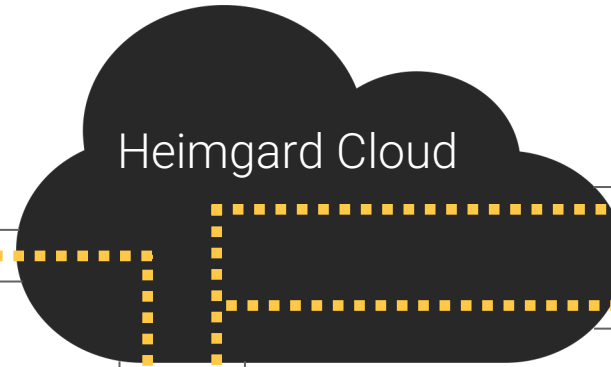
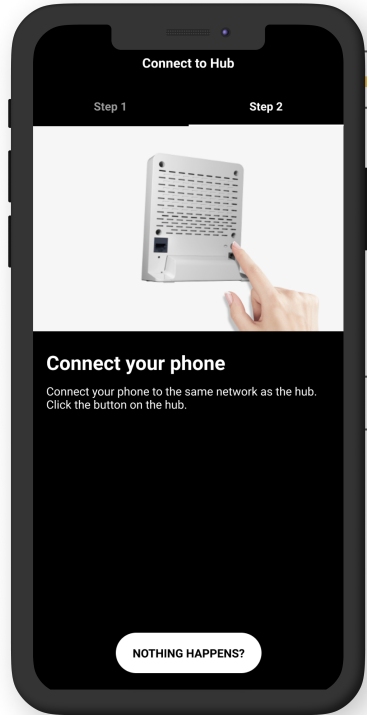


Exposable APIs



Privacy by design

- Point-to-point encryption
- End-to-end encryption
- No personal information stored in core cloud



Heimgard Cloud

- Keeps track of connected clients integrations and gateways.
- Routes packages to the correct destination
- Has no reachable API for device control on GW's

Heimgard Hub

- Public key cryptography identifier
- Keeps list of connected applications and integrations (valid public keys)
- Messages to integrations are sent with common Fernet key
- Full control over what data is sent to each app and integration.

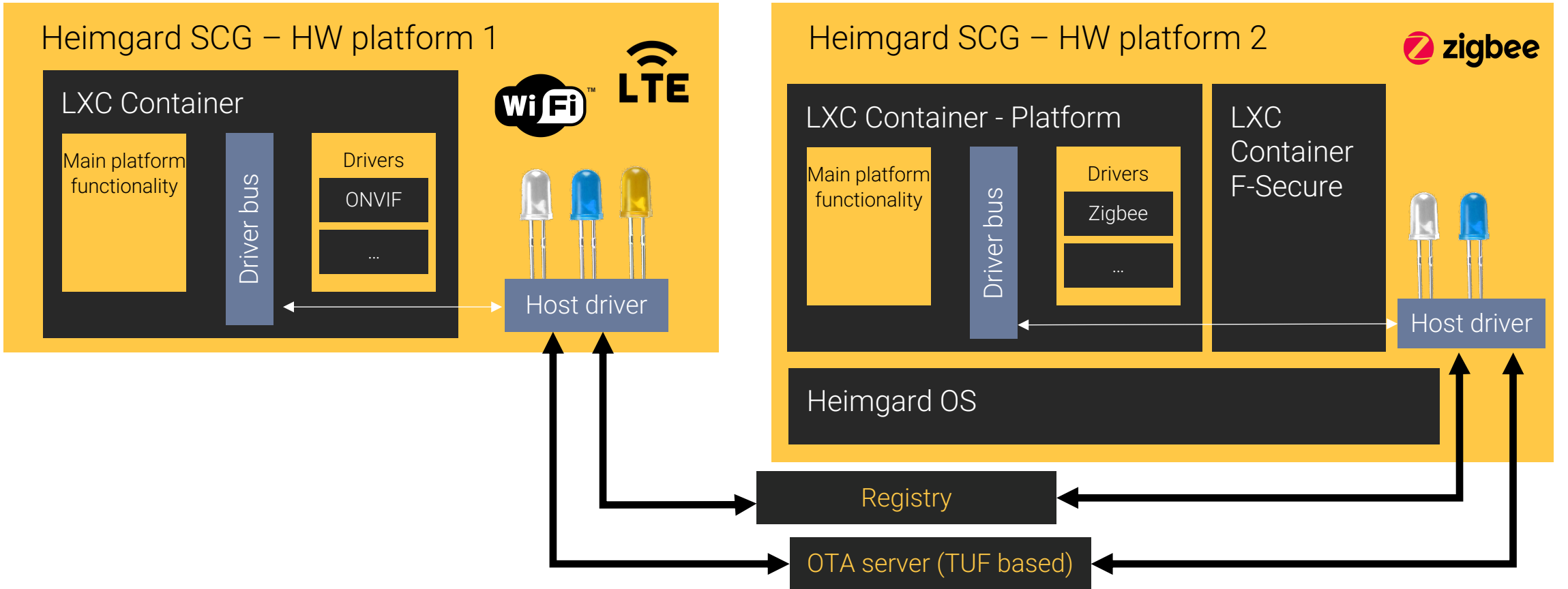
Integration 1

Public key cryptography identifier

Integration X

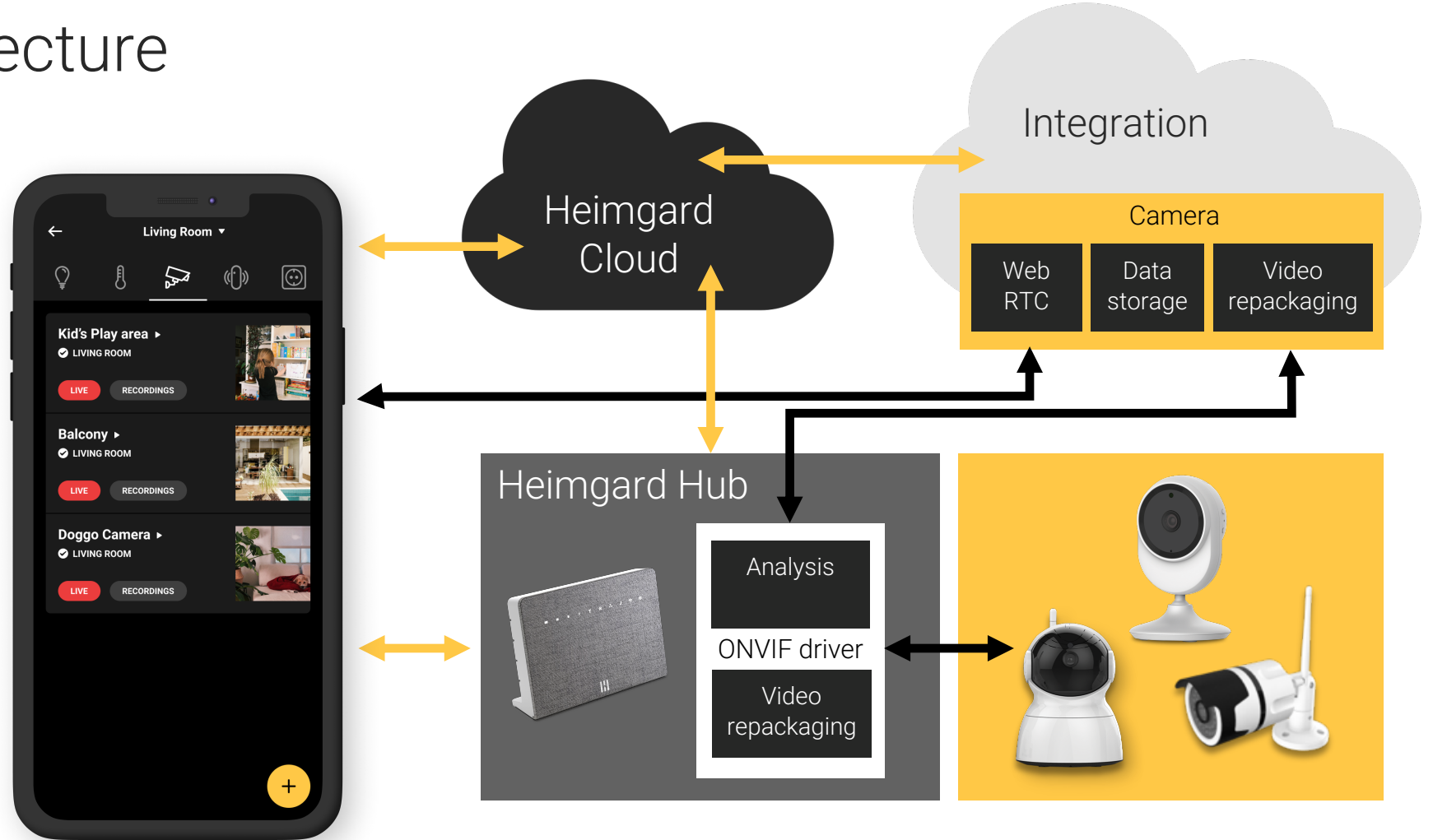
Hardware abstraction

Multi-gateway software to run on many CPE's Cloud



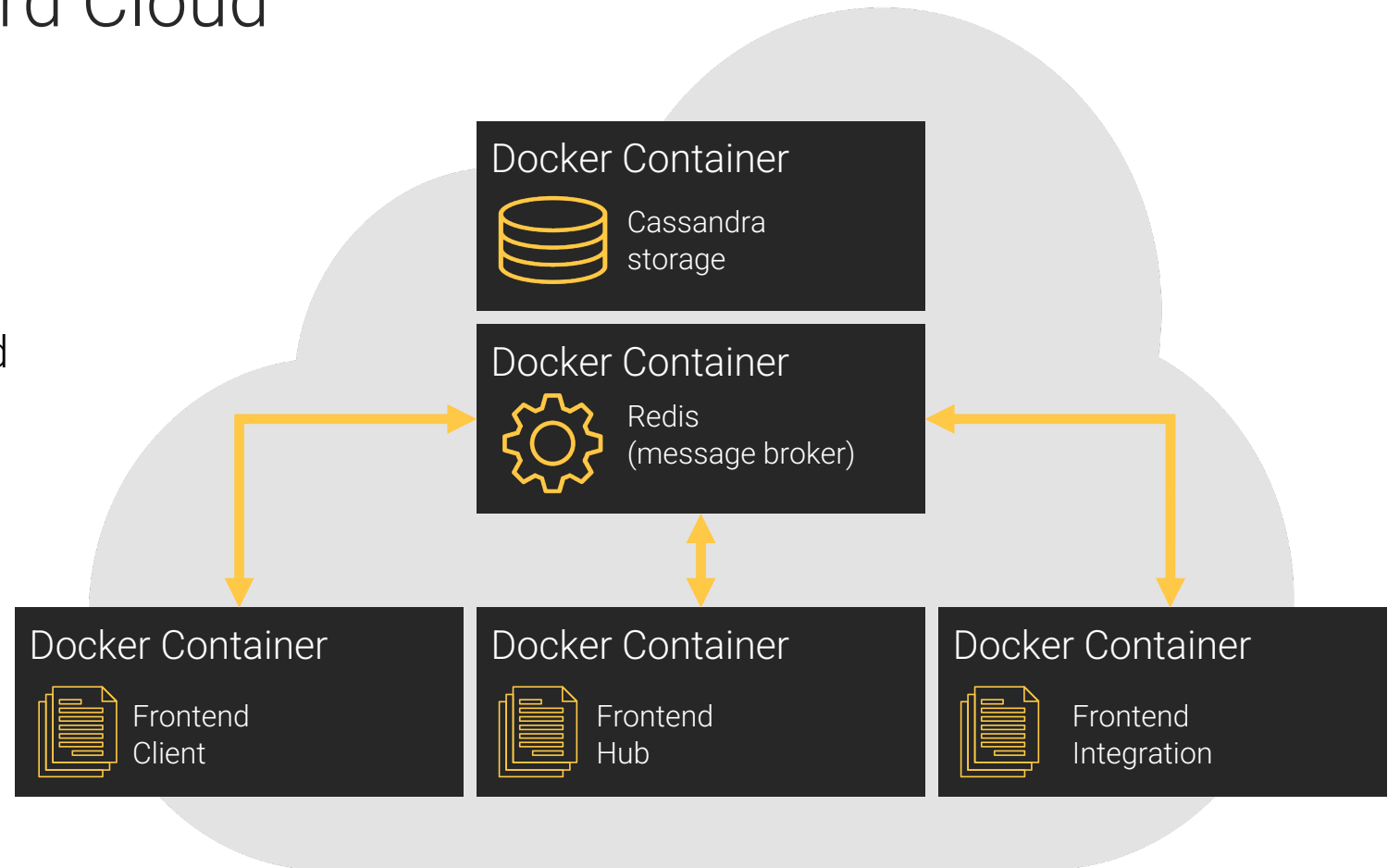
Camera architecture

- Yellow arrows: Signaling between app, gateway and cloud.
- Black arrows: Video and audio streams and audio return channel.



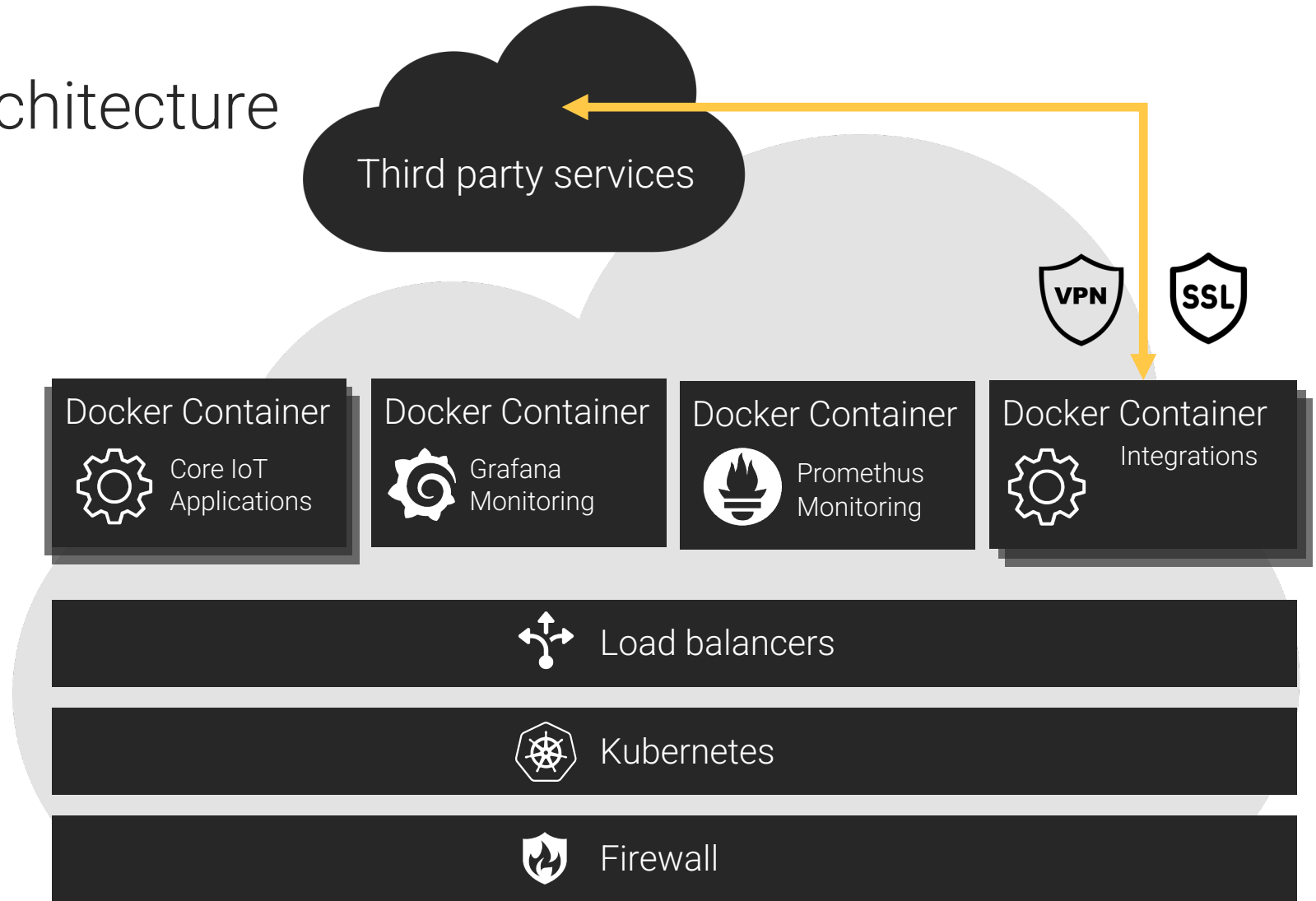
Scalability - Heimgard Cloud

- 🏠 Hubs are self-sustained and scale indefinitely
- 🏠 Current cloud solution verified to scale to minimum 200k gateways per cloud instance.
- 🏠 Plans for close to indefinite scaling ready for implementation on demand.



Cloud Runtime architecture

- Cloud applications deployed and orchestrated using Kubernetes & Docker
- Cloud hosting provided using Google Cloud Platform (GCP)
- No GCP specific features - easy to switch to another cloud provider supporting Kubernetes.



White label

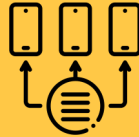
Three challenges:

1.



Branding

2.



Provisioning

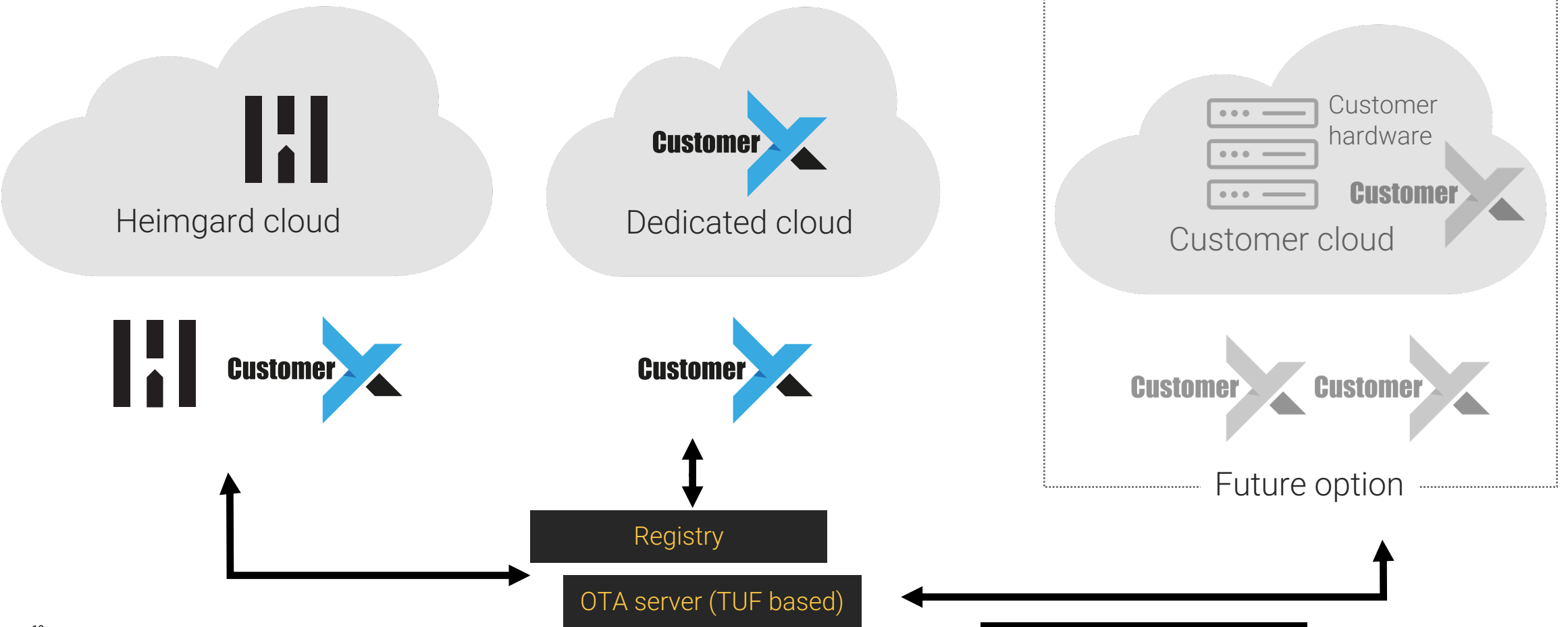
3.



Integration

- Easy to run separate cloud instance
- Hybrid app (HTML based), easy to adapt to other designs
- Modular integrations design makes it easy to integrate with third party payment, provisioning and support platforms
- Video storage is abstracted and can be redirected to the customers storage platform

Cloud Runtime configurations

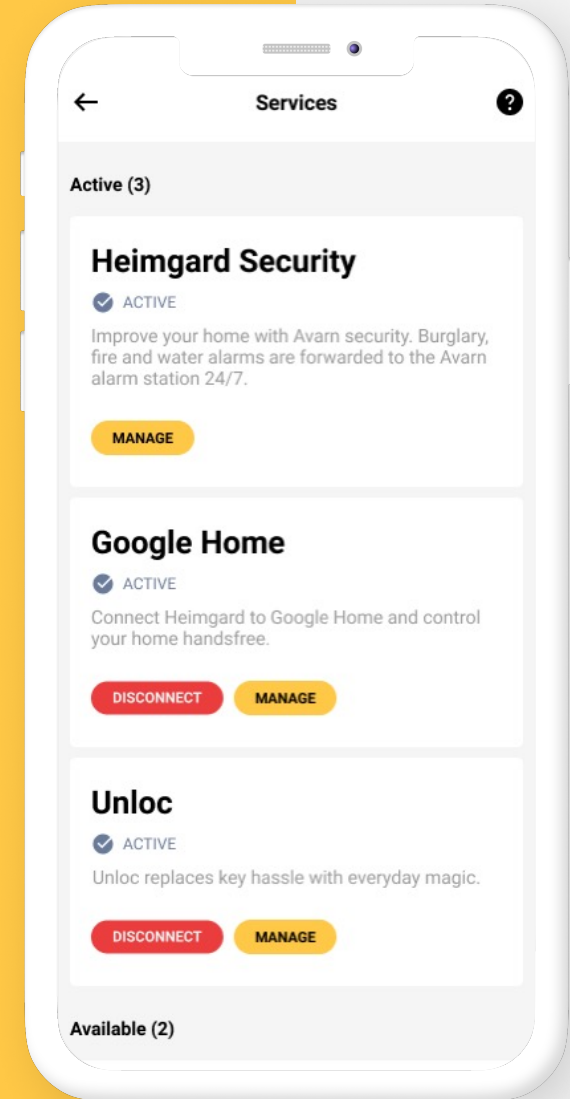


Smart home payment solution ready for

- 🏠 Home delivery
 - ▶ Postal
 - ▶ Groceries and more
- 🏠 Security
 - ▶ Alarm subscription
- 🏠 Internet
 - ▶ Wi-Fi Security
- 🏠 Insurance
 - ▶ In-home
 - ▶ Health

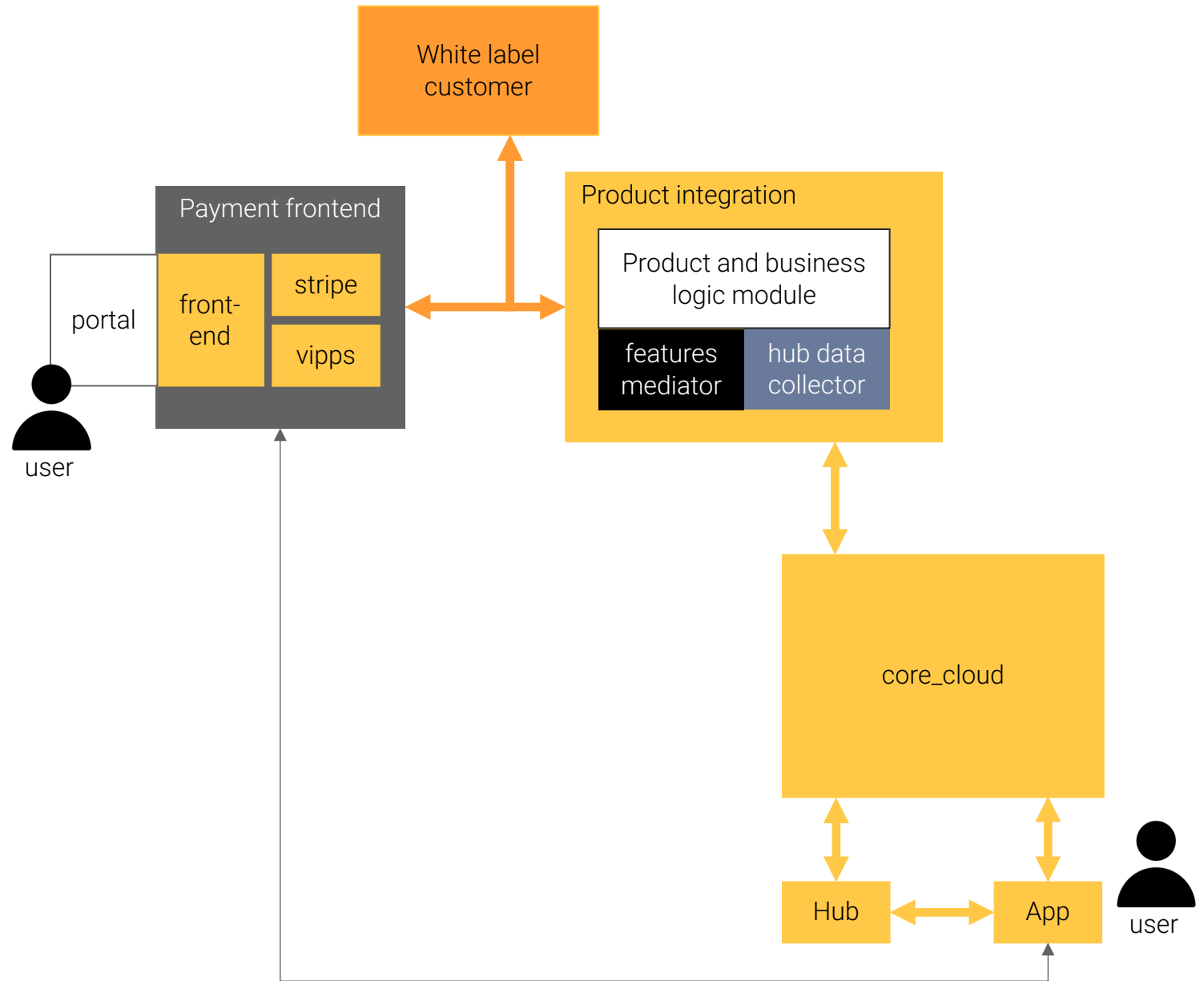


Smart app /
Smart payment



Payment

- Identifiable users and gateway owners
- Control gateway features conditionally
- Allow users to buy features
- Controllable by white labels or other external payment methods



Future



Thank you

