



ENSURE - INTEGRATION OF VOLUNTEERS IN DISASTER MANAGEMENT



Ulrich Meissen & Frank Fuchs-Kittowski, May 11th, 2015, **ISESS 2017**, Zadar, Croatia



AGENDA

1. Motivation
2. Conceptual architecture for mobile crowdtasking systems
3. ENSURE system concept
4. ENSURE system architecture
5. ENSURE implementation and evaluation
6. Summary and outlook

VOLUNTEERS IN DISASTER MANAGEMENT

Current state of communication

- Social Media (Facebook, Twitter, etc.)
- Group organisation (Facebook-groups, Whatsapp, email-lists, Google maps)
- Bevölkerungsaufrufe über Radio/TV



POTENTIALS OF VOLUNTEERS

Example of the flood disaster 2013

- Establishment of support locations
- First aid
- Direct support of response forces



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POTENTIALS OF VOLUNTEERS

Example of the flood disaster 2013

- Establishment of support locations
- First aid
- Direct support of response forces

=> More potentials through individual capabilities

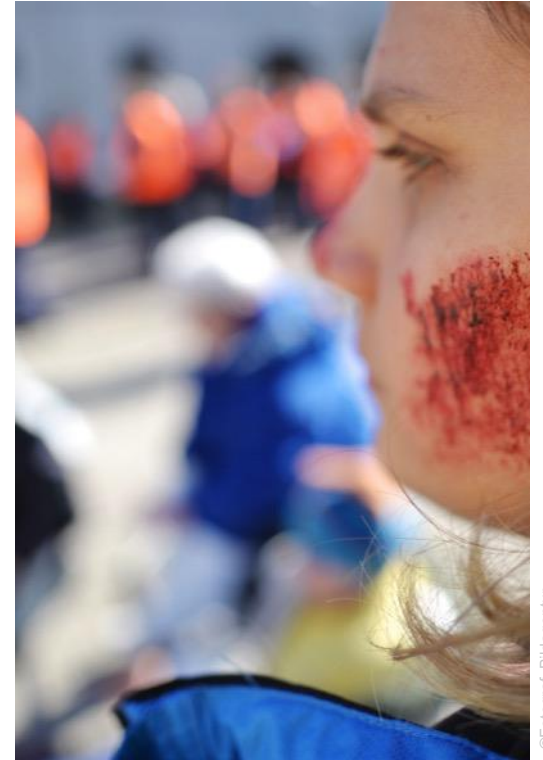
- access to buildings (caretaker)
- local knowledge
- technical/medical capabilities



VOLUNTEER INTEGRATION AND COOPERATION

Challenges

- To many or not enough volunteers
- Ineffective support



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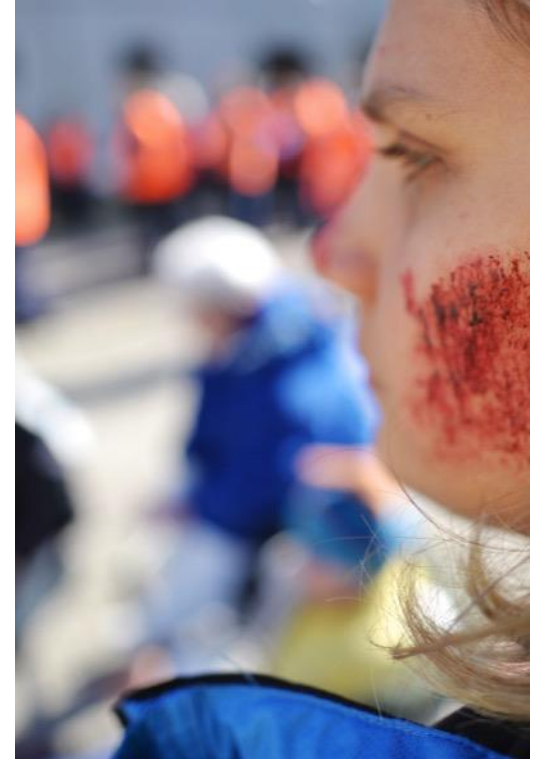
VOLUNTEER INTEGRATION AND COOPERATION

Challenges

- To many or not enough volunteers
- Ineffective support

=>

- Missing tools of coordination
- Best practices (organisational and **technical**)



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TRANSFERRING SUCH CONCEPTS TO VOLUNTEER SUPPORT

Main functional requirements

- Registration of volunteers
- Profiling of volunteers
- Notification of volunteers
- Activation/guidance of volunteers



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FUNCTIONALITY OF ENSURE

REGISTRATION AND PROFILING OF VOLUNTEERS

1) Profile information

- Age
- Relevant roles
- Capabilities
- Psychological aspects (through indirect questionnaire)

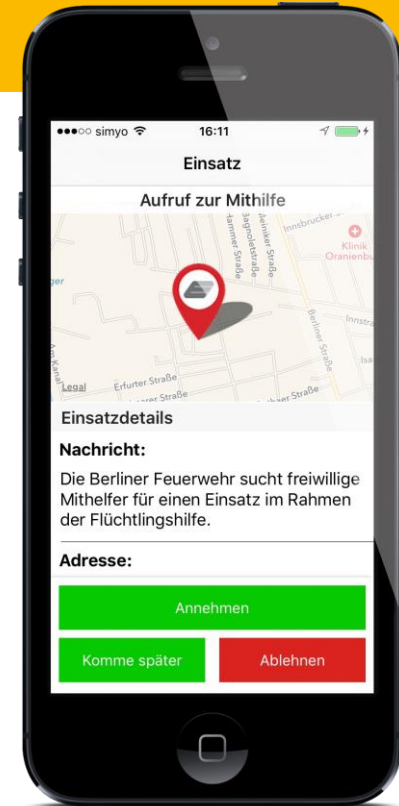
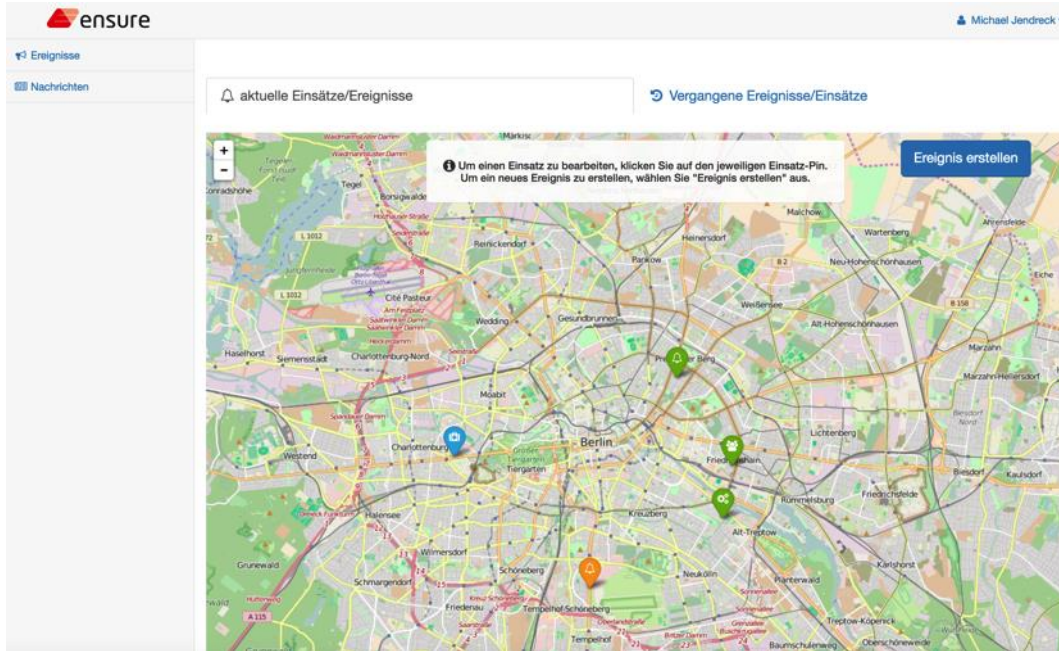
2) Context information

- Location
- Topic



FUNCTIONALITY OF ENSURE

NOTIFICATION OF VOLUNTEERS



FUNCTIONALITY OF ENSURE ACTIVATION OF VOLUNTEERS

Topic-based

The screenshot shows the 'Einsatz erstellen' (Create Task) form in the ENSURE system. The interface is divided into several sections:

- Einsetzungsort:** A map showing the location of the task, with a blue pin indicating the specific location.
- Formularfelder:** Fields for 'Straße' (Prenzlauer 28), 'Stadt' (Berlin), and 'PLZ' (10965).
- Einsetzungsbeschreibung:** Fields for 'Überschrift' (Title), 'Beschreibung' (Description), and 'Typ' (Other).
- Planung:** Fields for 'Start' and 'Ende' (End), and a 'Systeme Ankomst' (System Arrival) field.
- Aufgaben:** A section for defining tasks, currently showing 'Noch keine Aufgaben definiert.' (No tasks defined yet).
- Hinweise:** A section for providing instructions, currently showing 'Noch keine Hinweise definiert.' (No instructions defined yet).

At the bottom, there are two buttons: 'Erstellen ✓' (Create) and 'Abbrechen ⓪' (Cancel).

Location-based

The screenshot shows the 'Ad-hoc Einsatz' (Ad-hoc Task) form in the ENSURE system. The interface is divided into several sections:

- Map:** A map showing the location of the task, with a blue circle indicating the radius of the search area.
- Formularfelder:** Fields for 'Einsatzstart in 18 Stunden' (Task start in 18 hours), 'Benötigte Helfer' (Required helpers: 4), 'Erforderte Fitness' (Required fitness), 'Erforderte Sozialkompetenz' (Required social skills), 'Einsetzung' (New ad-hoc task), and 'Radius' (650m).
- Aufgaben:** A section for defining tasks, currently showing 'Noch keine Aufgaben definiert.' (No tasks defined yet).
- Hinweise:** A section for providing instructions, currently showing 'Noch keine Hinweise definiert.' (No instructions defined yet).

At the bottom, there are two buttons: 'Erstellen ✓' (Create) and 'Abbrechen ⓪' (Cancel).

FUNCTIONALITY OF ENSURE ACTIVATION OF VOLUNTEERS

The image displays three overlapping screenshots of the ENSURE web application interface, illustrating the process of activating a volunteer for a specific activity.

Left Screenshot: Activity Overview
Title: Sandsackbefüllung und -verbau
Author: Von Michael Jendreck / jms
Text: **Was?** Wir bitten Sie, uns bei der Befüllung und beim Verbau von Sandsäcken zu unterstützen.
Wann? Erstellt am 14.4.2016 - 16:00 Uhr, Endet am 14.4.2016 - 22:00 Uhr
Wo Tunnelstraße 8, 10245 Berlin
Action: Anzeigen

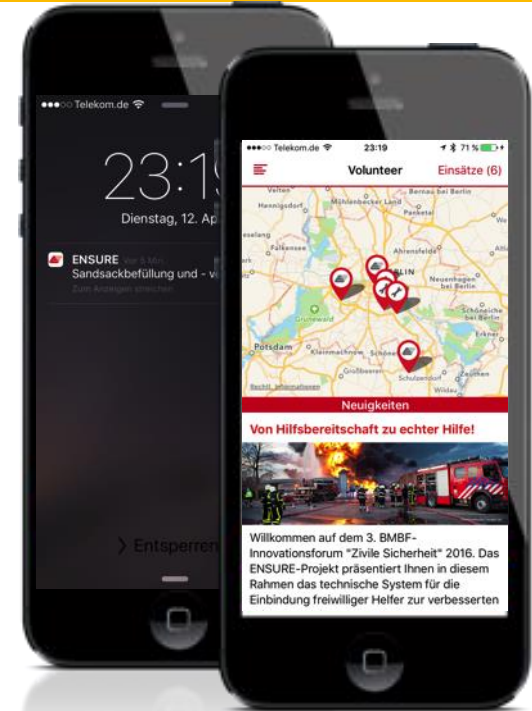
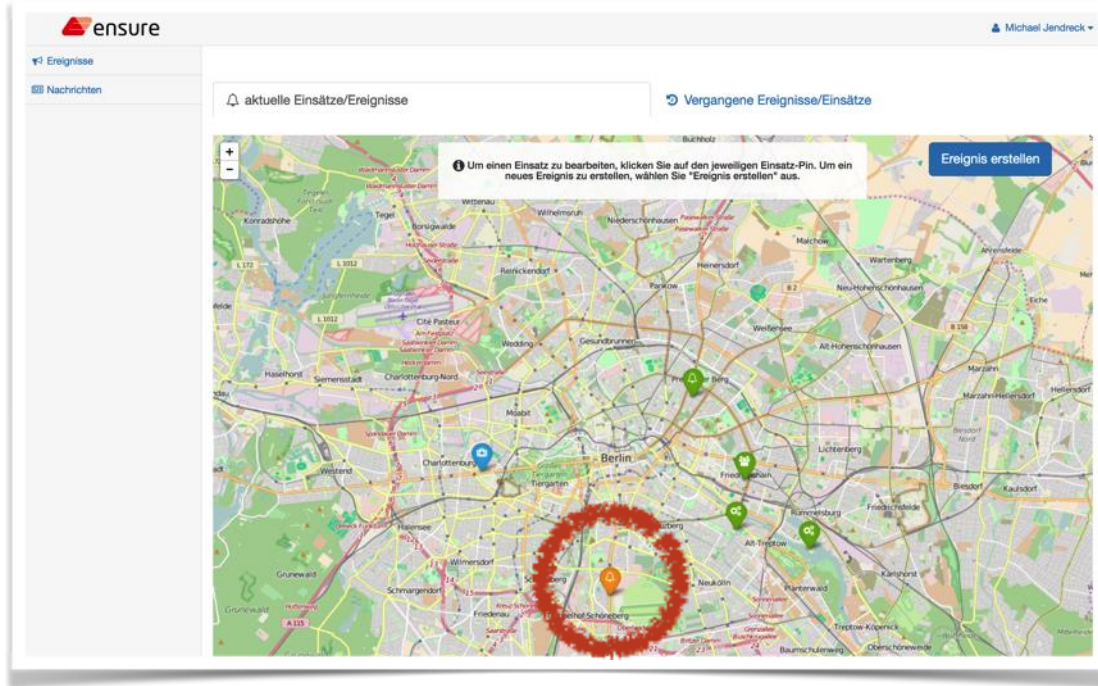
Middle Screenshot: Activity Configuration
Title: Einsatz Konfigurationen
Status: Dieser Einsatz ist nicht veröffentlicht.
Location: Tunnelstraße 8, Berlin, PLZ 10245
Description: Sandsackbefüllung und -verbau. Wir bitten Sie, uns bei der Befüllung und beim Verbau von Sandsäcken zu unterstützen.
Planning: Start 14.04.2016, 16:00; Ende 14.04.2016, 22:00; Späteste Anwesenheit 14.04.2016, 16:00
Tasks: Aktivierung mitbringen, Schuler mitbringen
Hints: Aktivieren Sie bitte auf Ihre Arbeitszeit.
Actions: Speichern, Beenden, Veröffentlichen, Zurück zur Karte (Abbrechen)

Right Screenshot: Confirmation Dialog
Title: Wollen Sie den Einsatz Sandsackbefüllung und -verbau veröffentlichen?
Text: Wenn ja, werden andere Sie nicht bei diesem Einsatz teilnehmen können.
Buttons: Ja, Nein

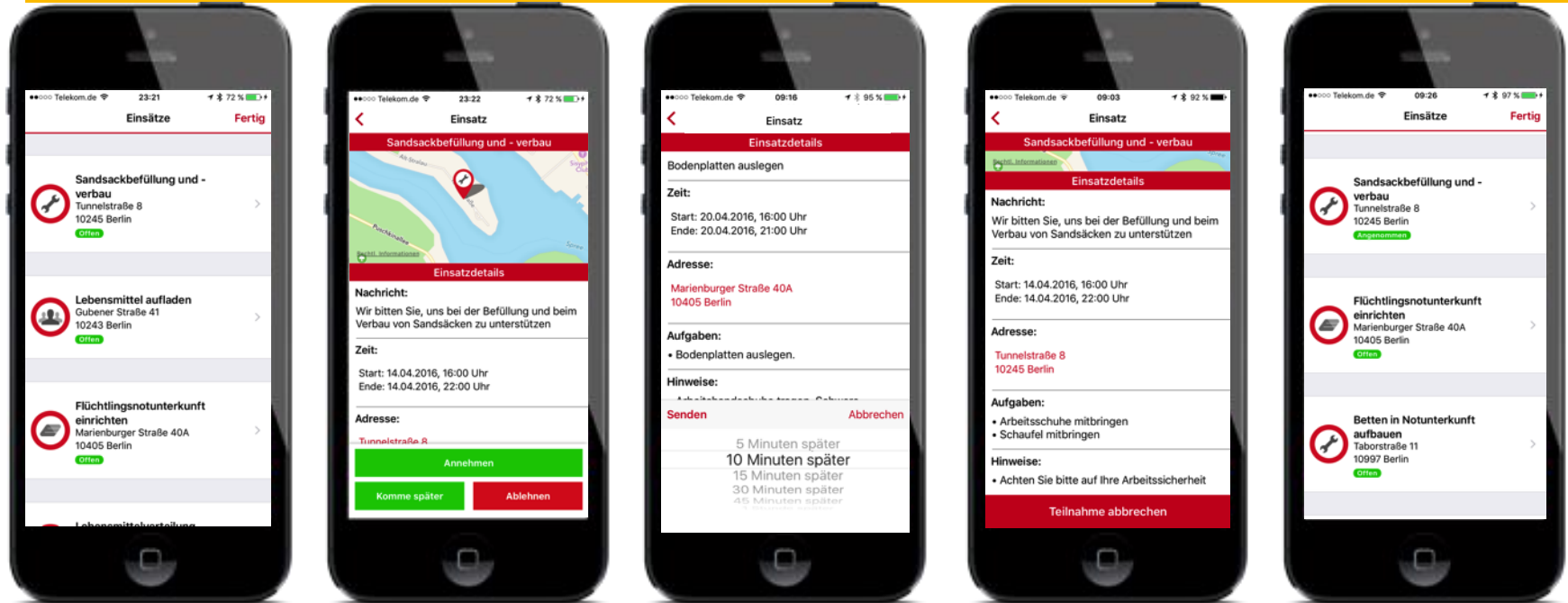
Background Screenshot: Activity Details
Title: Einsatz Konfigurationen
Status: Dieser Einsatz ist nicht veröffentlicht.
Location: Tunnelstraße 8, Berlin, PLZ 10245
Description: Sandsackbefüllung und -verbau. Wir bitten Sie, uns bei der Befüllung und beim Verbau von Sandsäcken zu unterstützen.
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FUNCTIONALITY OF ENSURE

ACTIVATION OF VOLUNTEERS



FUNCTIONALITY OF ENSURE ACTIVATION AND GUIDANCE OF VOLUNTEERS



TRANSFERRING SUCH CONCEPTS TO VOLUNTEER SUPPORT

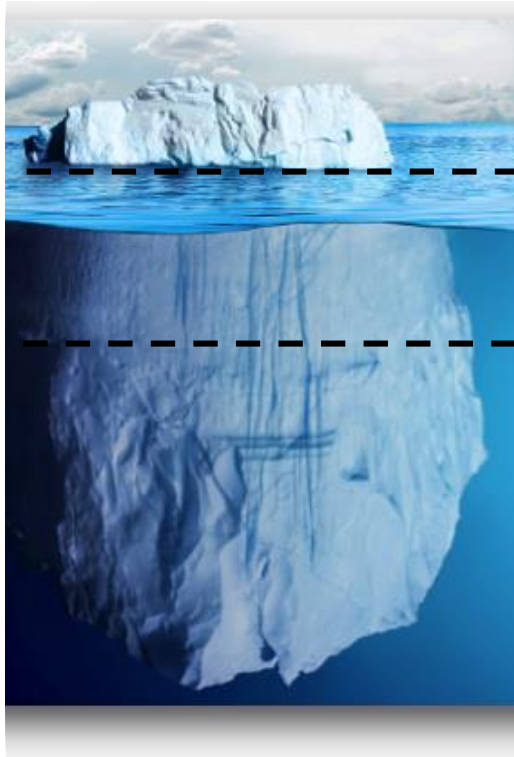
Main non-functional requirements

- Mass applicability (performance/robustness)
- Adaptability to target groups
- Usability for action support
- Adaptability to disaster situations
- Compliance to regulations and privacy



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ENSURE – SYSTEM CONCEPT



App

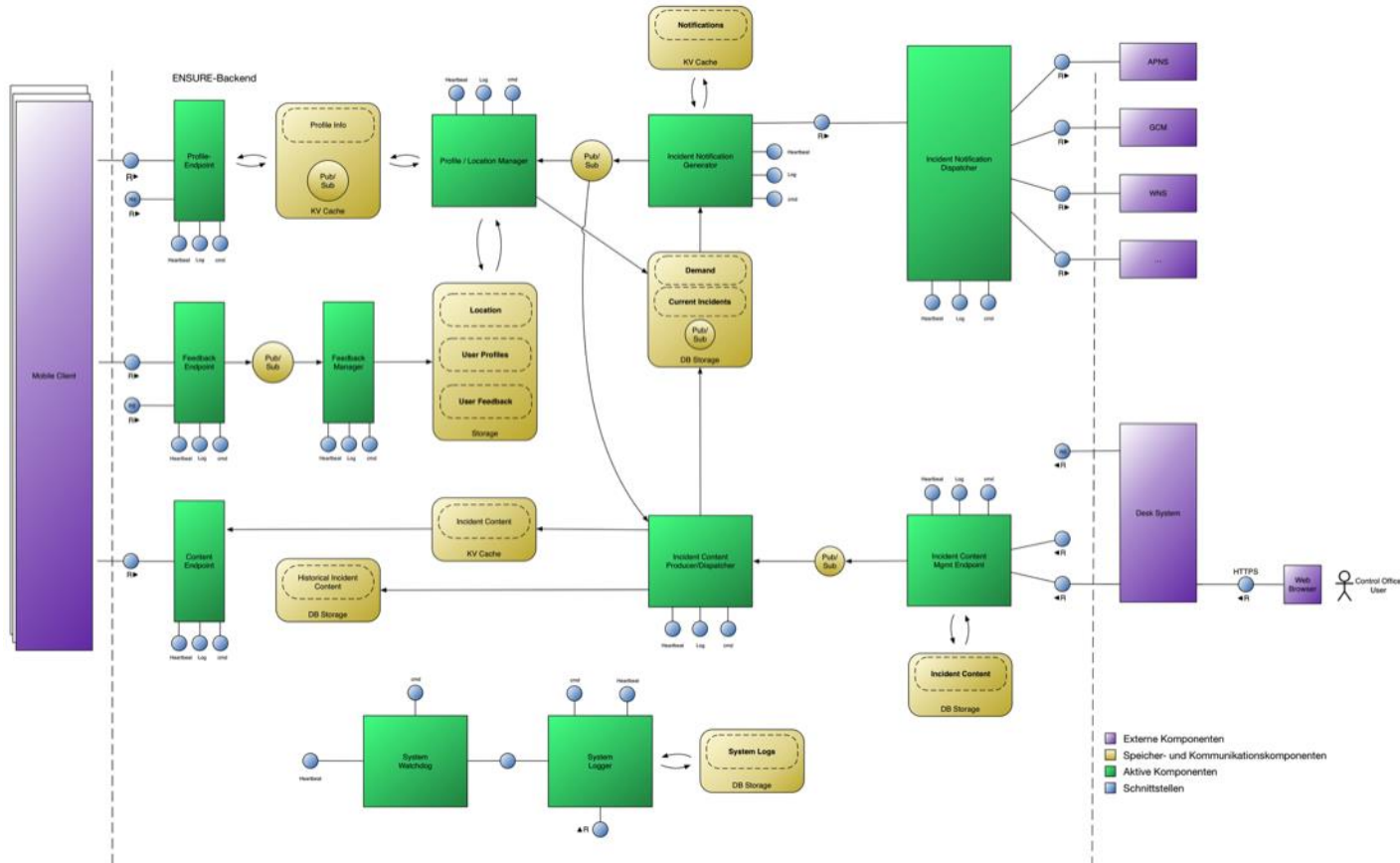


Control client

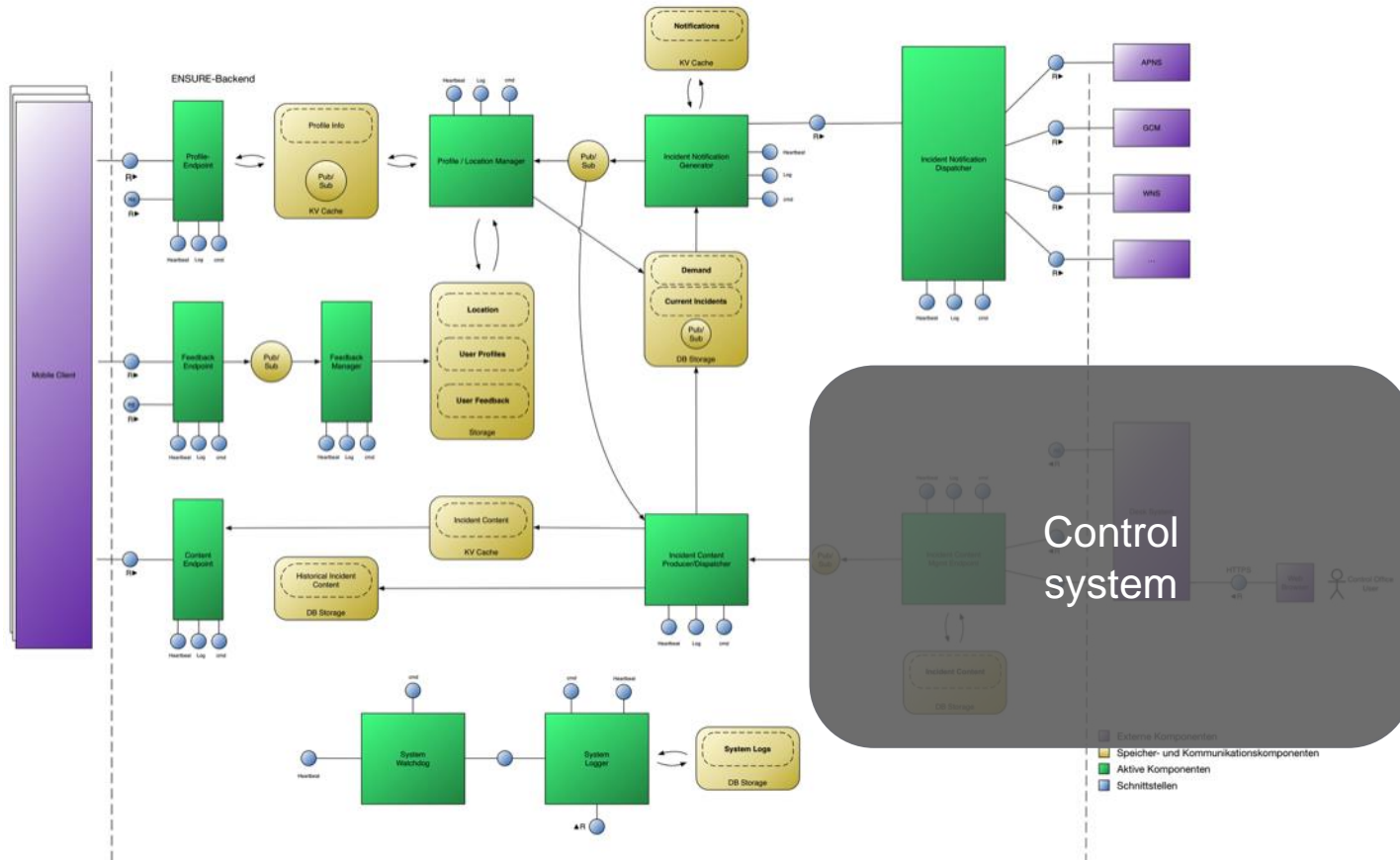


Backend system

ENSURE-BACKEND – SYSTEM ARCHITECTURE

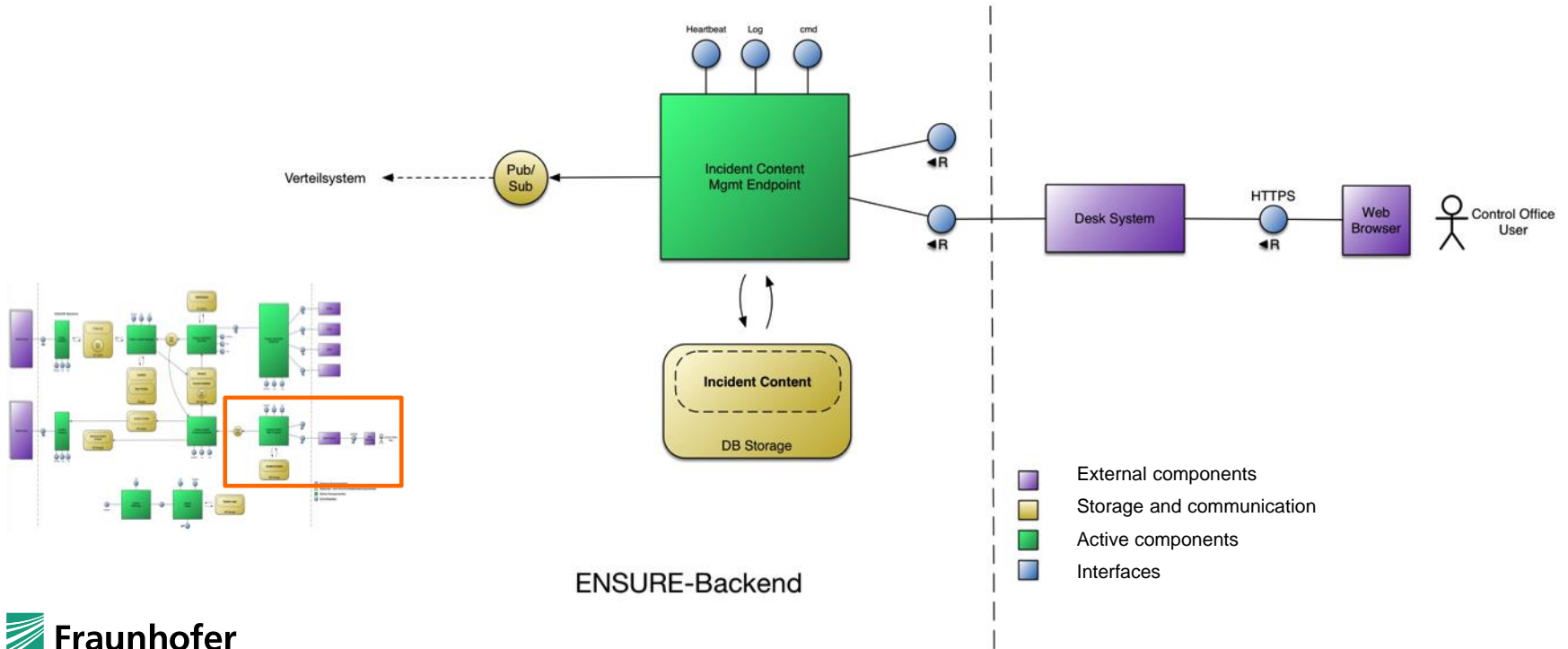


ENSURE-BACKEND – SYSTEM ARCHITECTURE

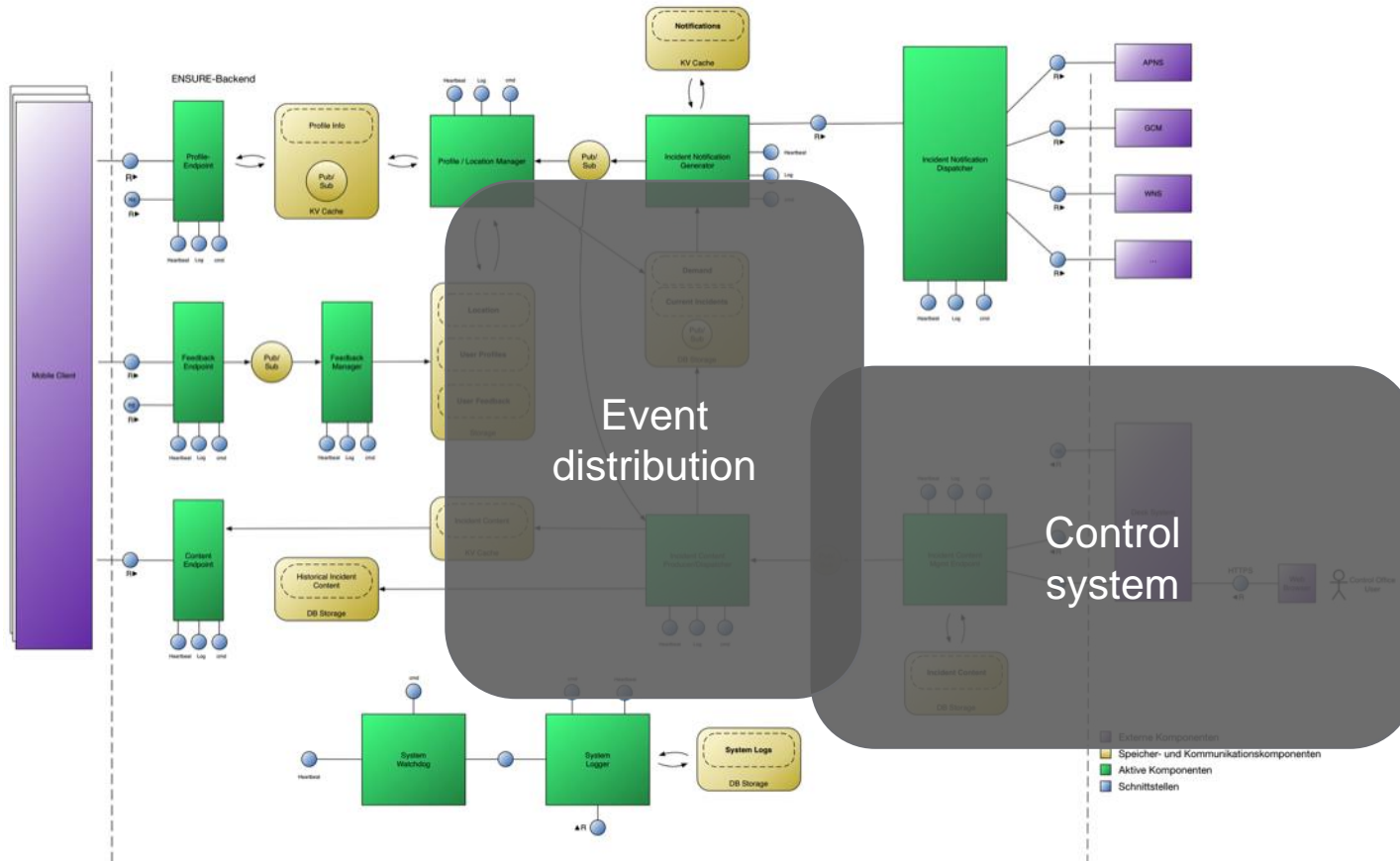


ENSURE-BACKEND – SYSTEM ARCHITECTURE

Control system (alerting, requests, activation)



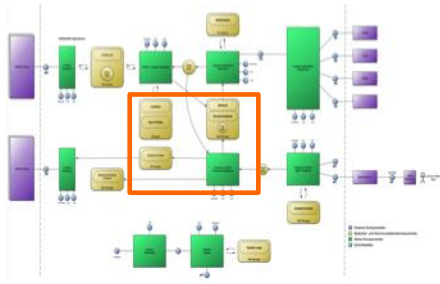
ENSURE-BACKEND – SYSTEM ARCHITECTURE



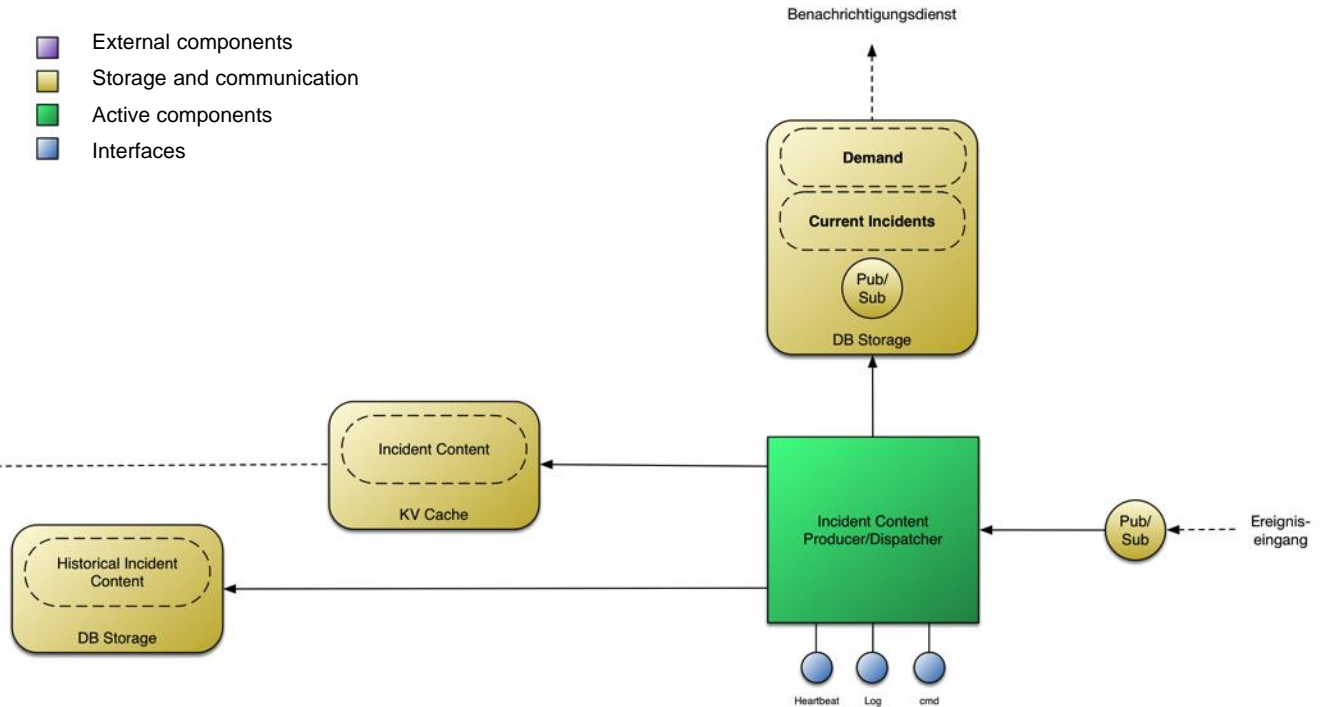
ENSURE-BACKEND – SYSTEM ARCHITECTURE

Event distribution

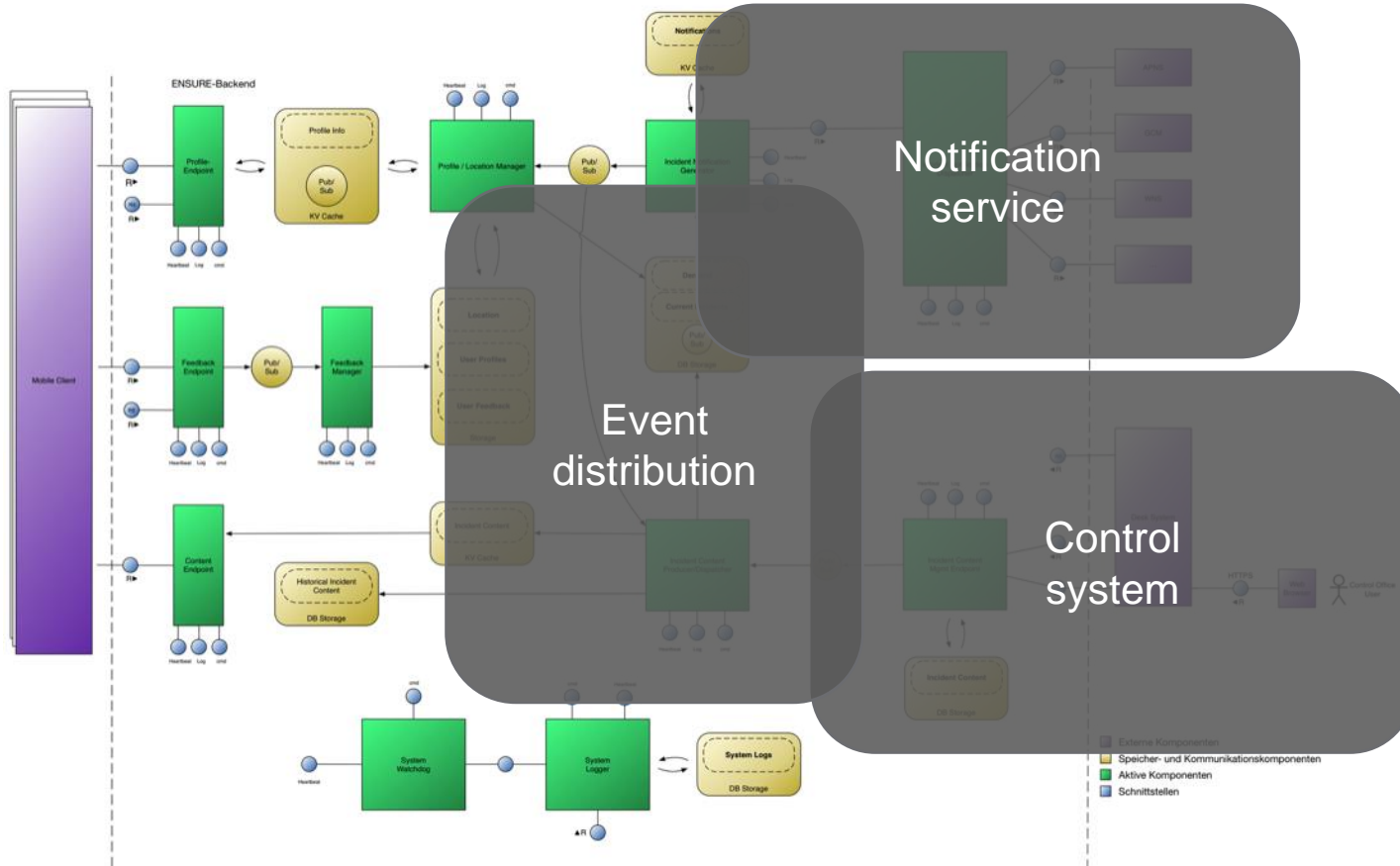
- External components
- Storage and communication
- Active components
- Interfaces



Abrufen von Inhalten

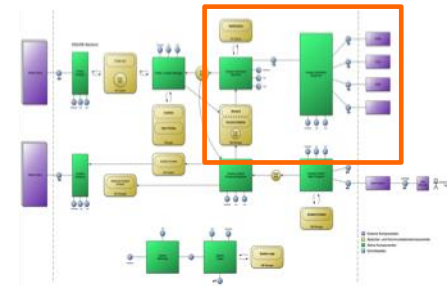
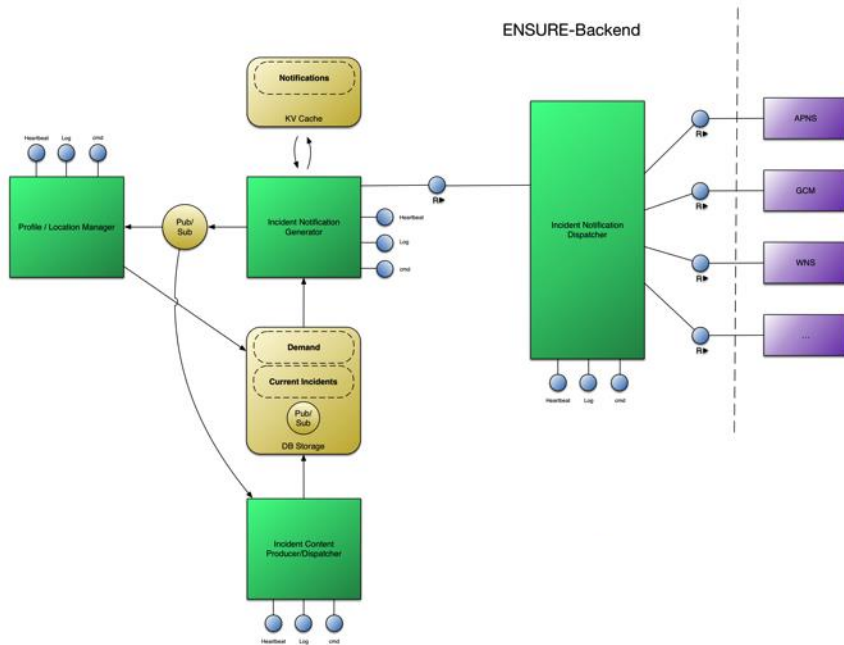


ENSURE-BACKEND – SYSTEM ARCHITECTURE

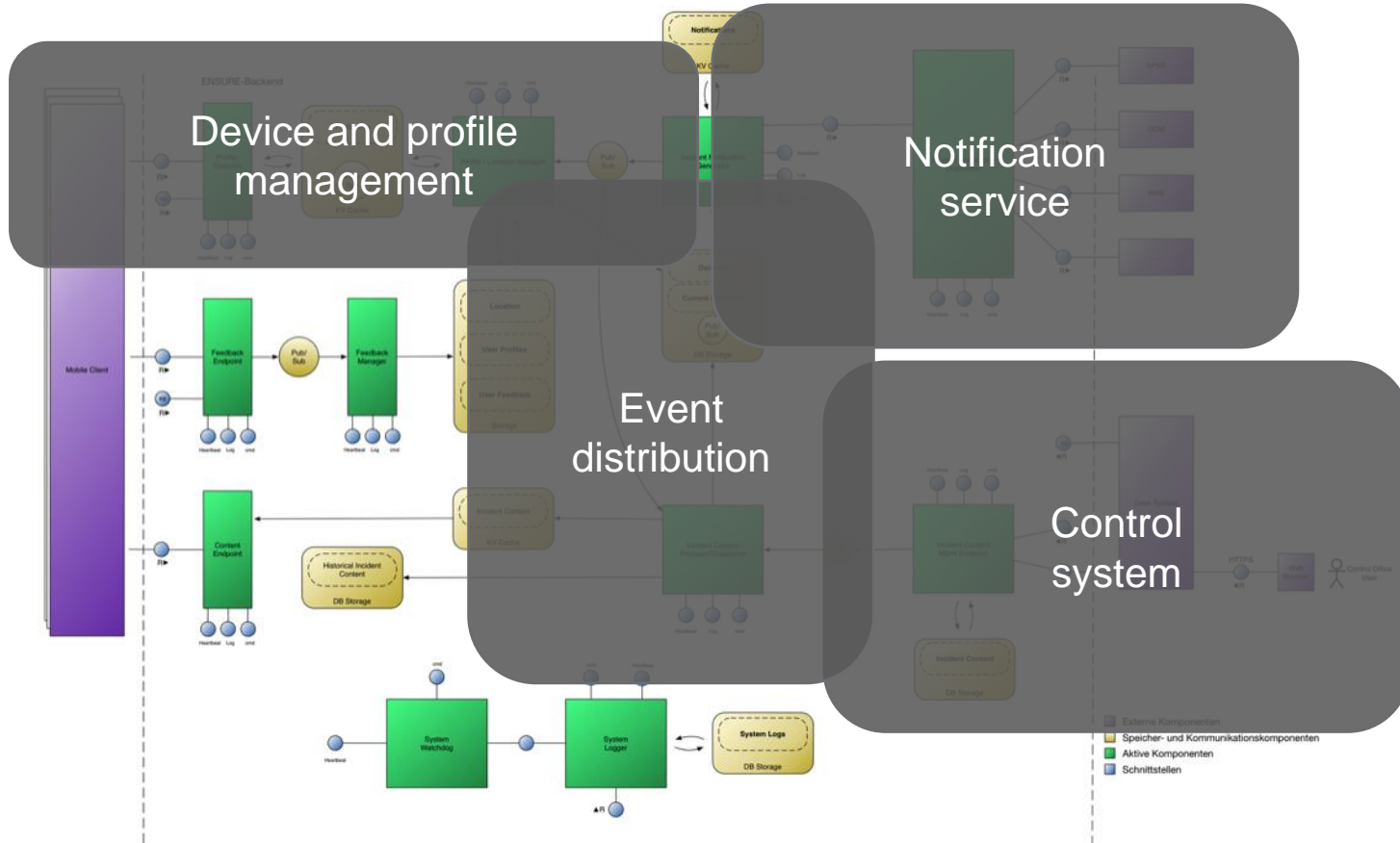


ENSURE-BACKEND – SYSTEM ARCHITECTURE

Notification service

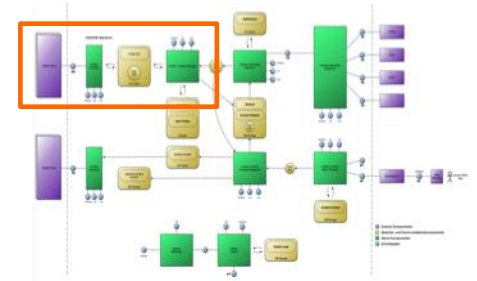
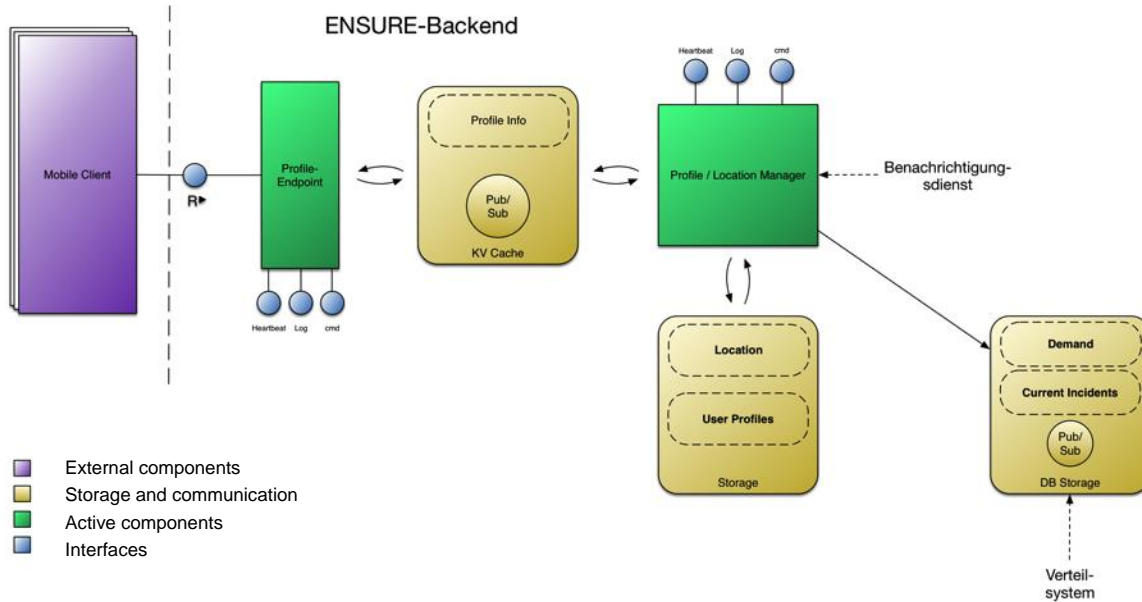


ENSURE-BACKEND – SYSTEM ARCHITECTURE

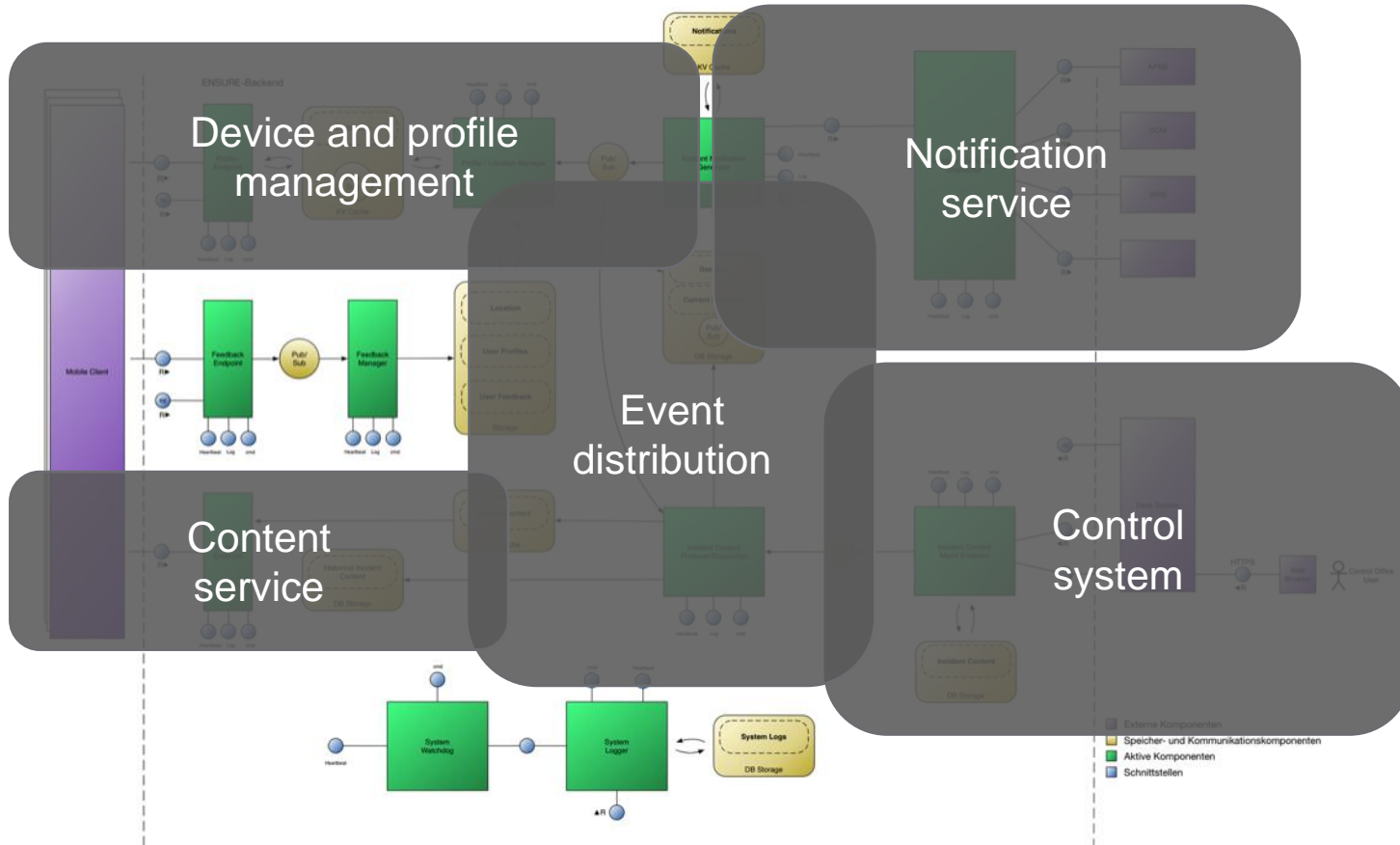


ENSURE-BACKEND – SYSTEM ARCHITECTURE

Device and profile management

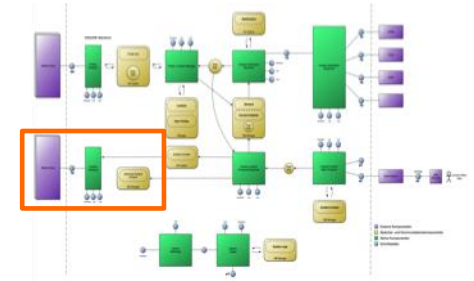
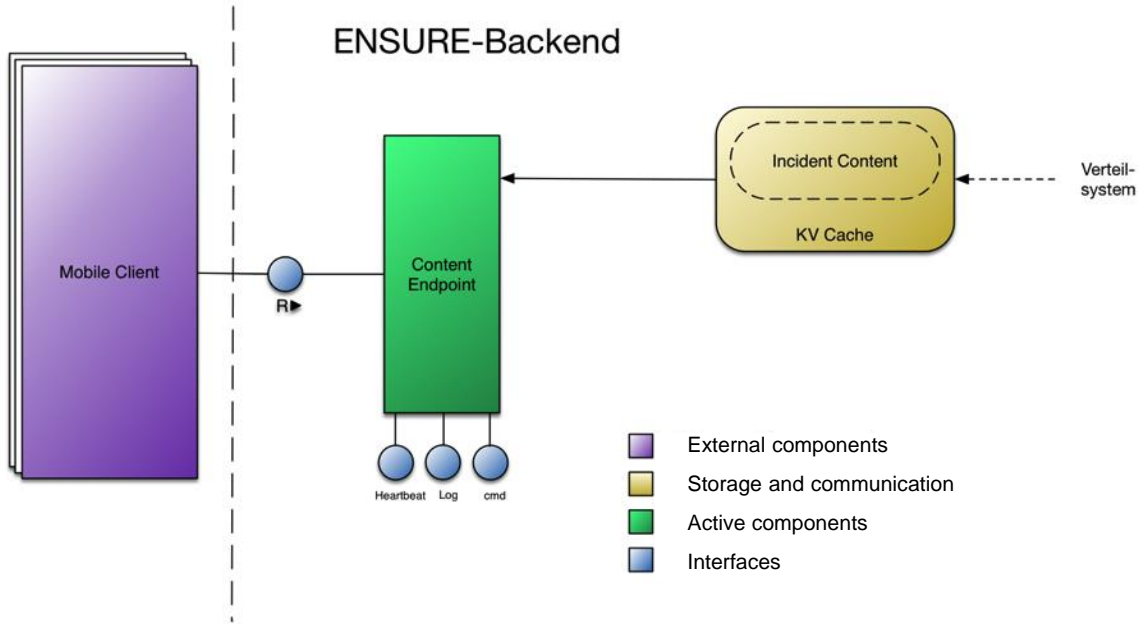


ENSURE-BACKEND – SYSTEM ARCHITECTURE

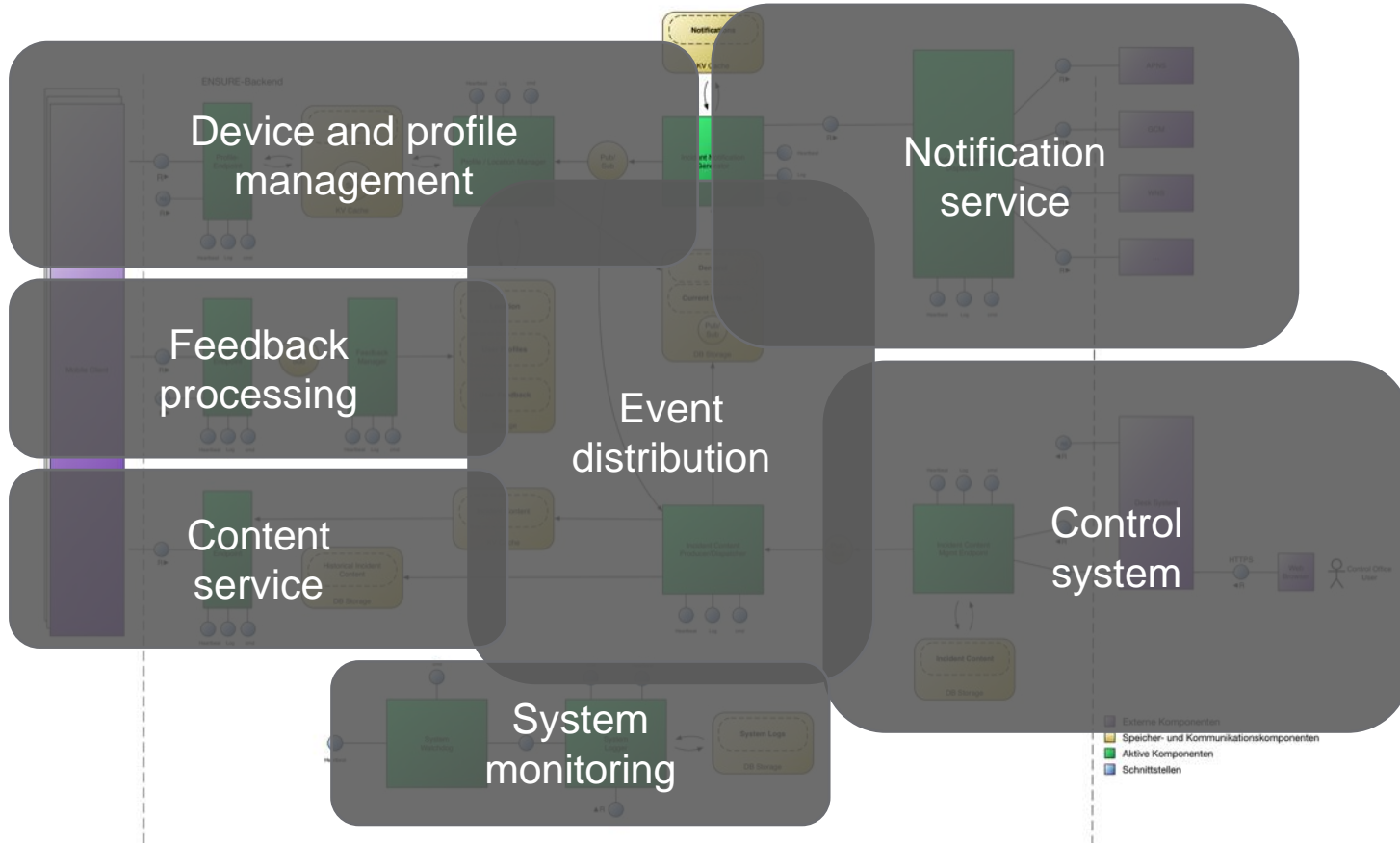


ENSURE-BACKEND – SYSTEM ARCHITECTURE

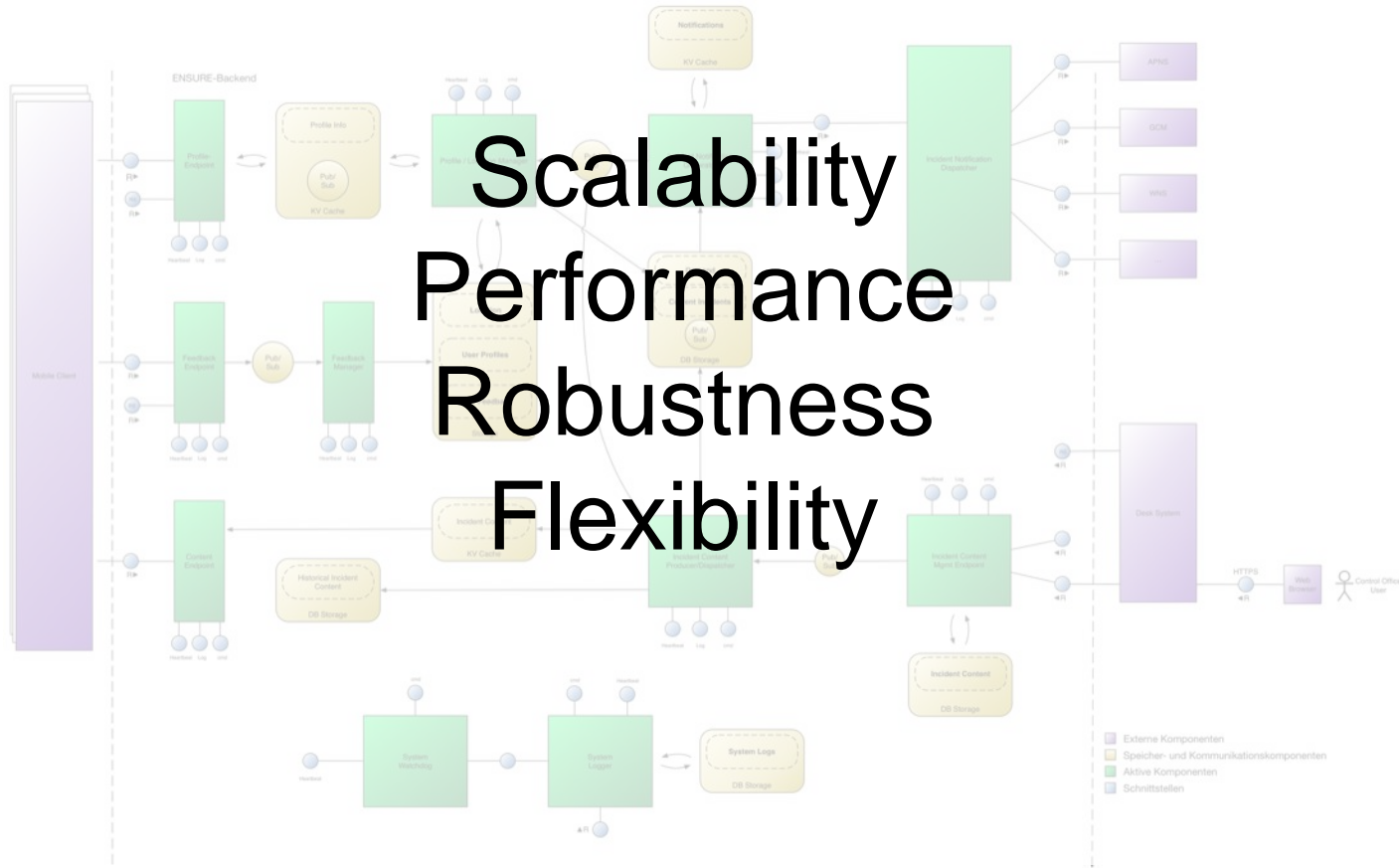
Content service



ENSURE-BACKEND – SYSTEM ARCHITECTURE



ENSURE-BACKEND – SYSTEM ARCHITEKTURE

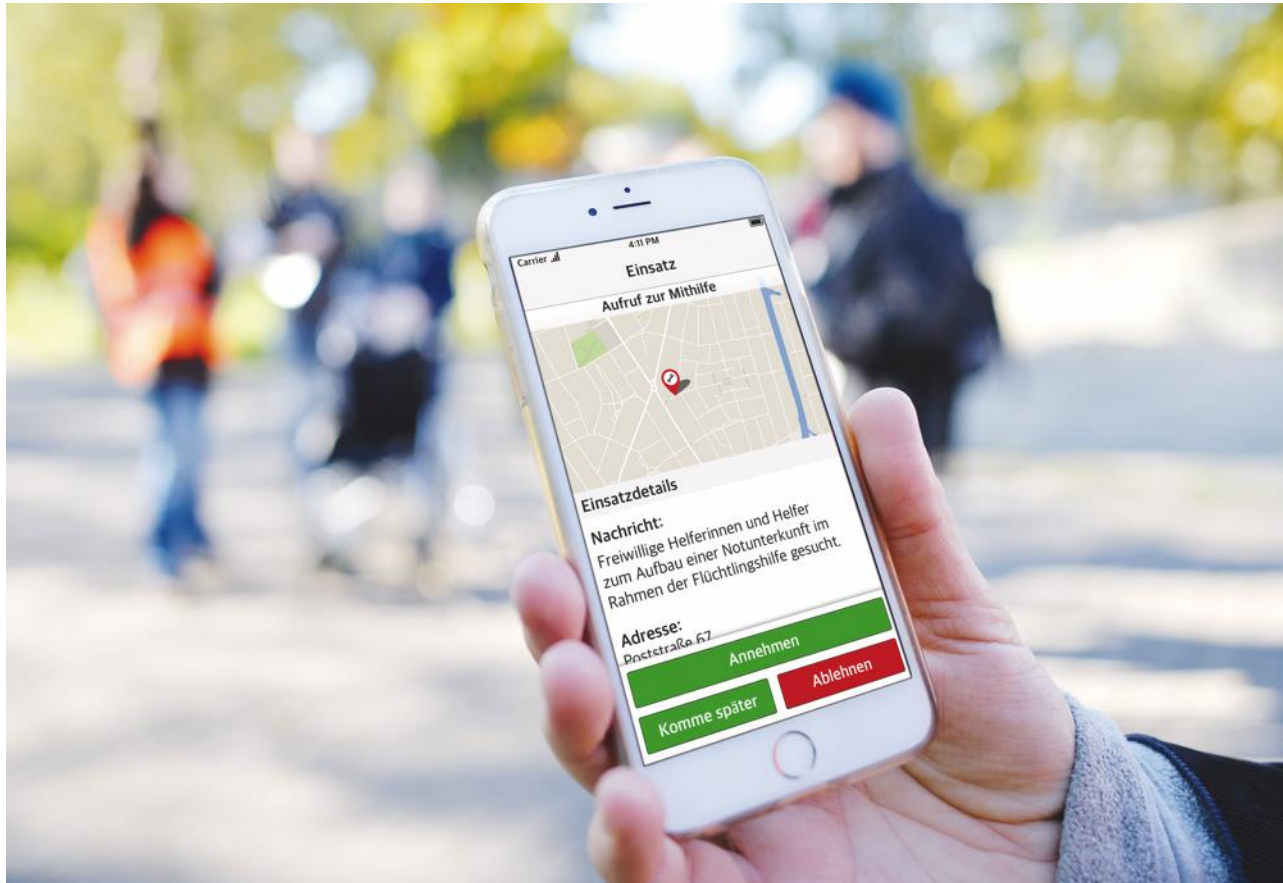


IMPLEMENTATION

- Java script
- Event-driven architecture
- Micro services
- NoSQL-Database
- Model view view model pattern



EVALUATION: 6 MONTH TEST PHASE WITH BERLIN FIRE DPT.



EVALUATION: 6 MONTH TEST PHASE WITH BERLIN FIRE DPT.



EVALUATION: 6 MONTH TEST PHASE WITH BERLIN FIRE DPT.



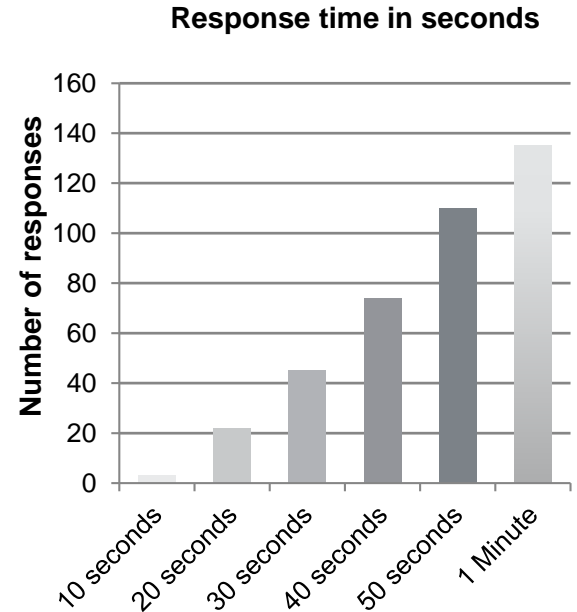
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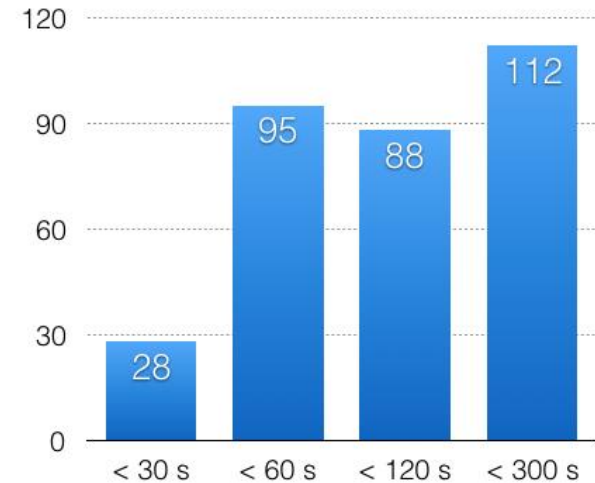
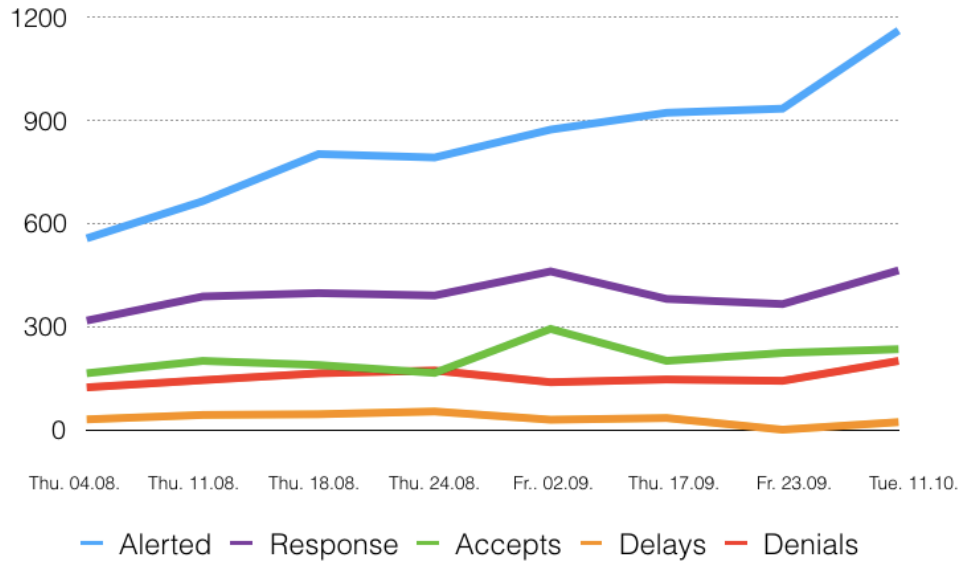
One test case example in summer 2016

- Test activation from 17.09.2016
 - 10:16:28 Alerting initiated
 - 10:16:30 **921** Test persons alerted
- **22 Responses** after 20 s
- **135 Antworten** in einer Minute
- **355 Antworten** nach 5 Minuten
- participate : **200**
- with delay: **34**
- denial: **146**



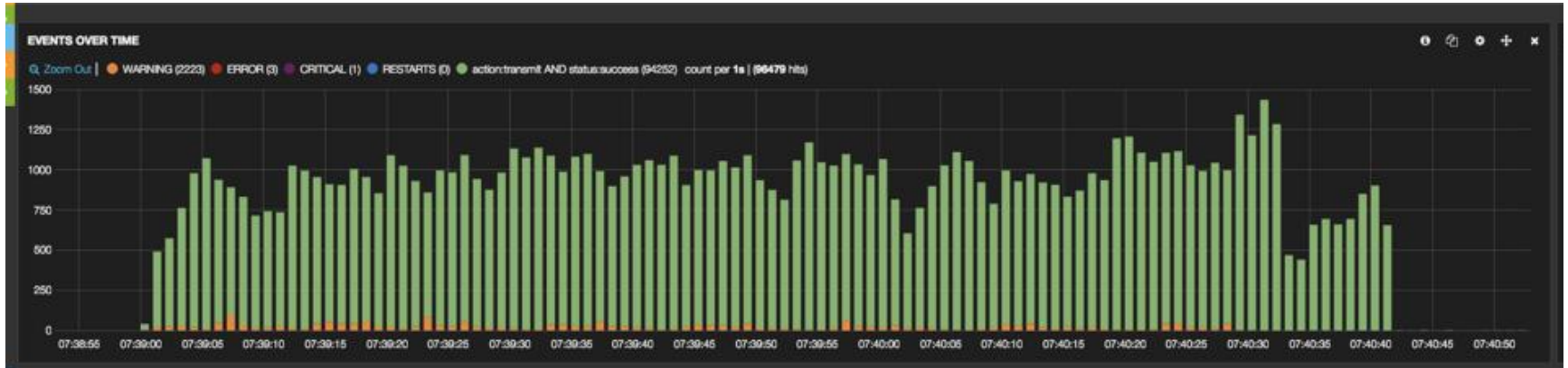
EVALUATION: 6 MONTH TEST PHASE WITH BERLIN FIRE DPT.

Observations during test phase



EVALUATION: 6 MONTH TEST PHASE WITH BERLIN FIRE DPT.

Scalability and performance



The shows that these 95.000 activations were sent out within 1 minute and 42 seconds. The testing environment consisted of 2 servers (CX40, 2VCores, 8GB Ram).

Full 24/7 during 6 months with no failure or downtime



Thank you!



www.ensure-projekt.de

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