

The German

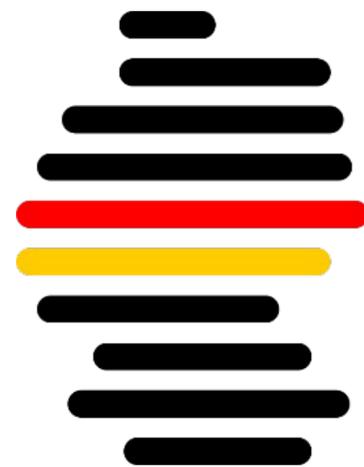
BundesMessenger

Matrix Conference 2025-10-06 – Kai A. Hiller – BWI GmbH

About Kai



- From Germany, Karlsruhe
- Computer Science MSc at KIT
- FOSS contributor to Fedora, GNOME, Matrix
- IT-Architect for the BundesMessenger
- Doing my passion for a job now



What is the BundesMessenger?



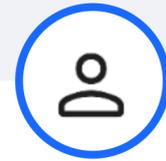
Just another messaging app

What is the BundesMessenger?



Purpose

Sovereign
messaging
for the
German
public sector



Users

- Municipalities
- Agencies
- Fire departments
- Bundeswehr
- ...

~250k users



Platforms



Android

iOS

iOS



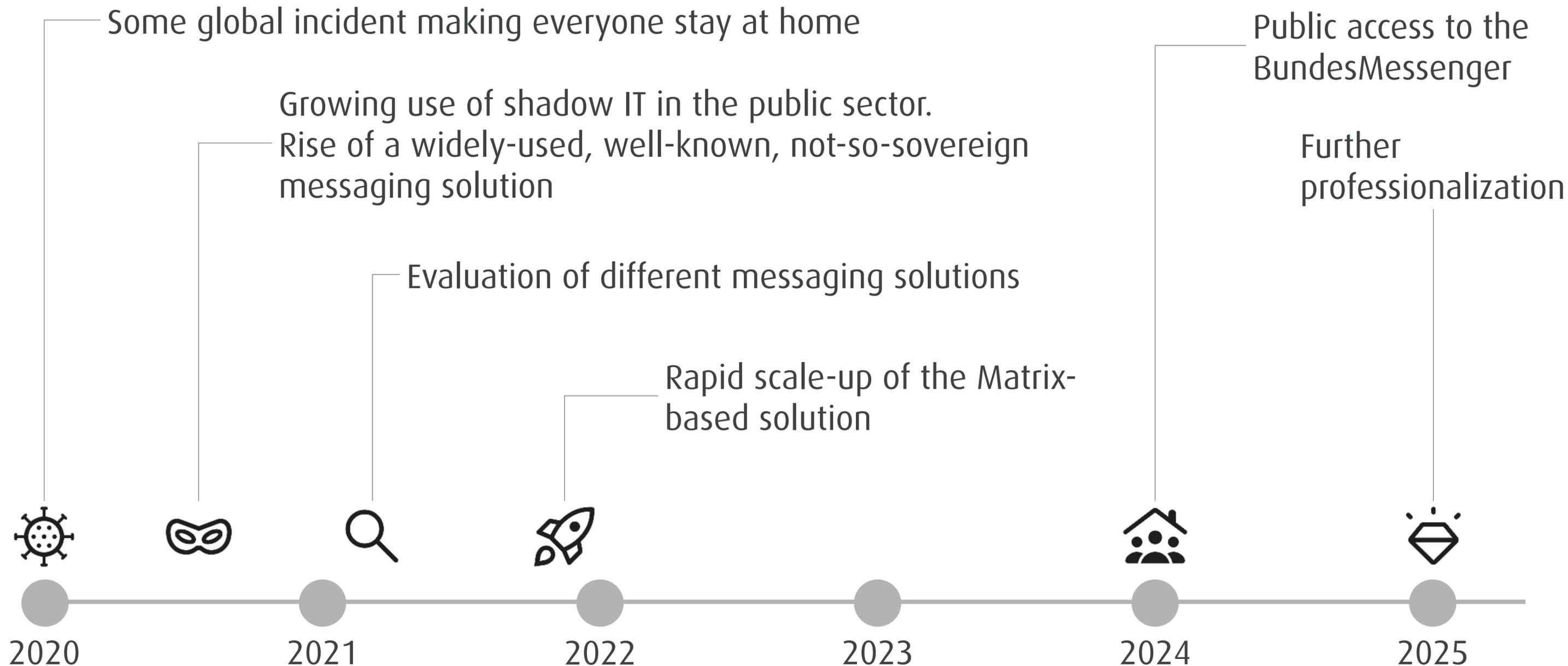
Web



Made by


BWI
IT für Deutschland

A Small History

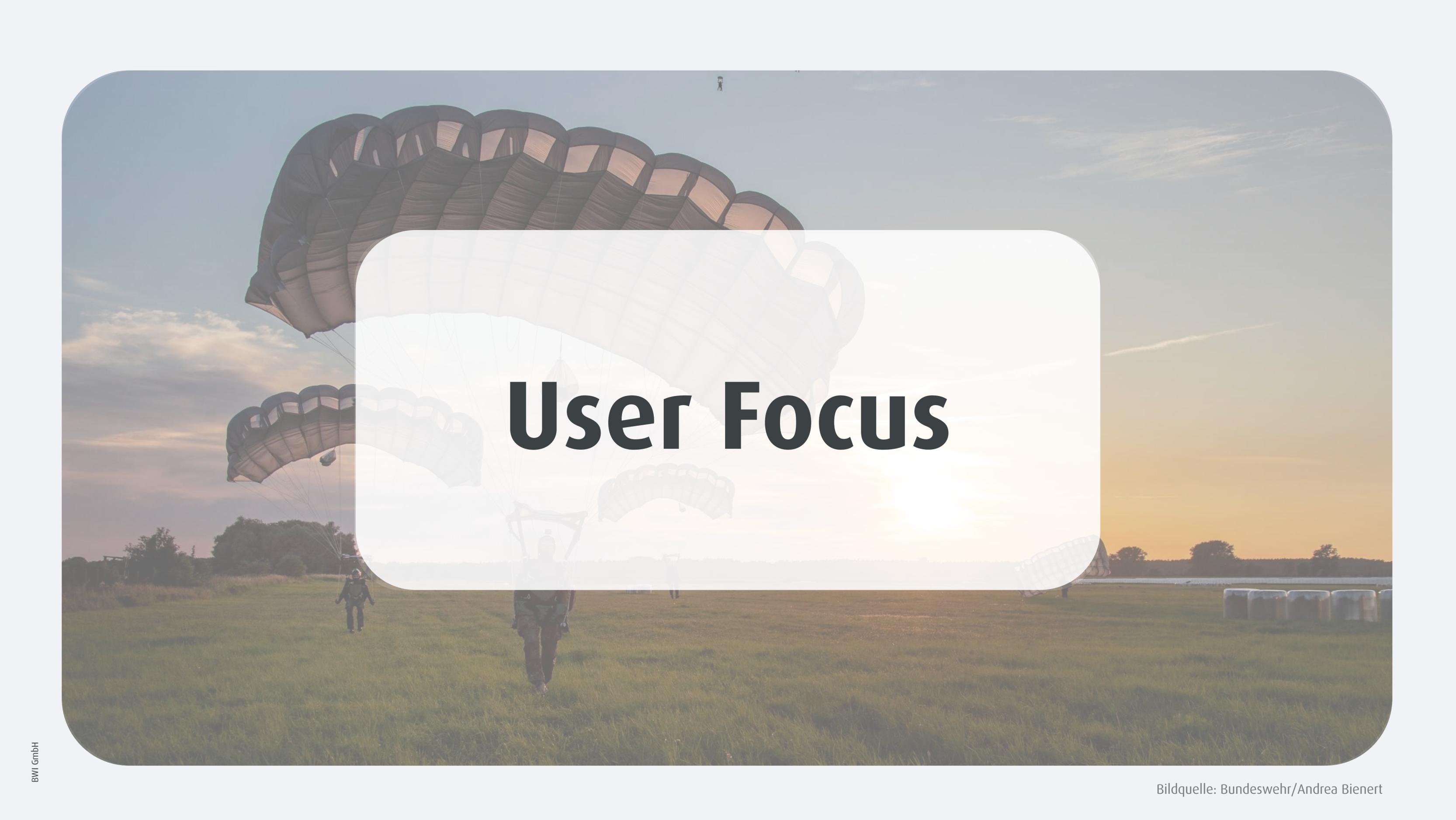


BundesMessenger Specialties



- 01 User Focus
- 02 Controlled Federation
- 03 Being Downstream
- 04 Heterogeneous Deployments
- 05 Hardening
- 06 FOSS Engagement

User Focus



Apps



- Simple and familiar
- Keep a strong focus on users
- Less features than upstream apps
- More polished, integrated and tested



Accessibility



- Universal Design
- Easy navigation, self-explanatory design and readable contrasts help everyone
- Broad and heterogeneous range of users
- From power users, disabled people to field and office workers

User Testing



- BundesMessenger Usability Lab
- Prompt and record user actions
- Perform interviews
- Data-driven design decisions
- Analyzed results inform development



VS



Controlled Federation

Föderiert

Controlled Federation



- The BundesMessenger operates a private federation
- Built on MSC1383 ACLs
- BundesMessenger instance administrators have the freedom to choose their federation peers
- Federation is never forced, gives control to the individual entities

Spec-compatibility is important for us, federation with the public Matrix network could be enabled

Design Pattern



- Clear and easy to grasp indication
- Distinguish federated from non-federated rooms and users
- All places where room or user avatars are shown
- Multiple rounds of user tests



Bruno

Föderiert

User Education



- Announcements of federation
- Articles and help sites
- In-app welcome screen and banner





Being Downstream

BundesMessenger Projects



1

Unmodified Use

- Synapse
- MAS
- Sygnal
- ...

2

In-house Projects

- Helm Chart
- Admin Portal
- Container Factory

3

BuM is Downstream

- BundesMessenger Android
- BundesMessenger iOS
- BundesMessenger Web
- RustSDK

Downstream Projects



BuM Android

- Element Android
- Beta version using ElementX Android



BuM iOS

- Element iOS
- Beta version using ElementX iOS



BuM Web

- Element Web



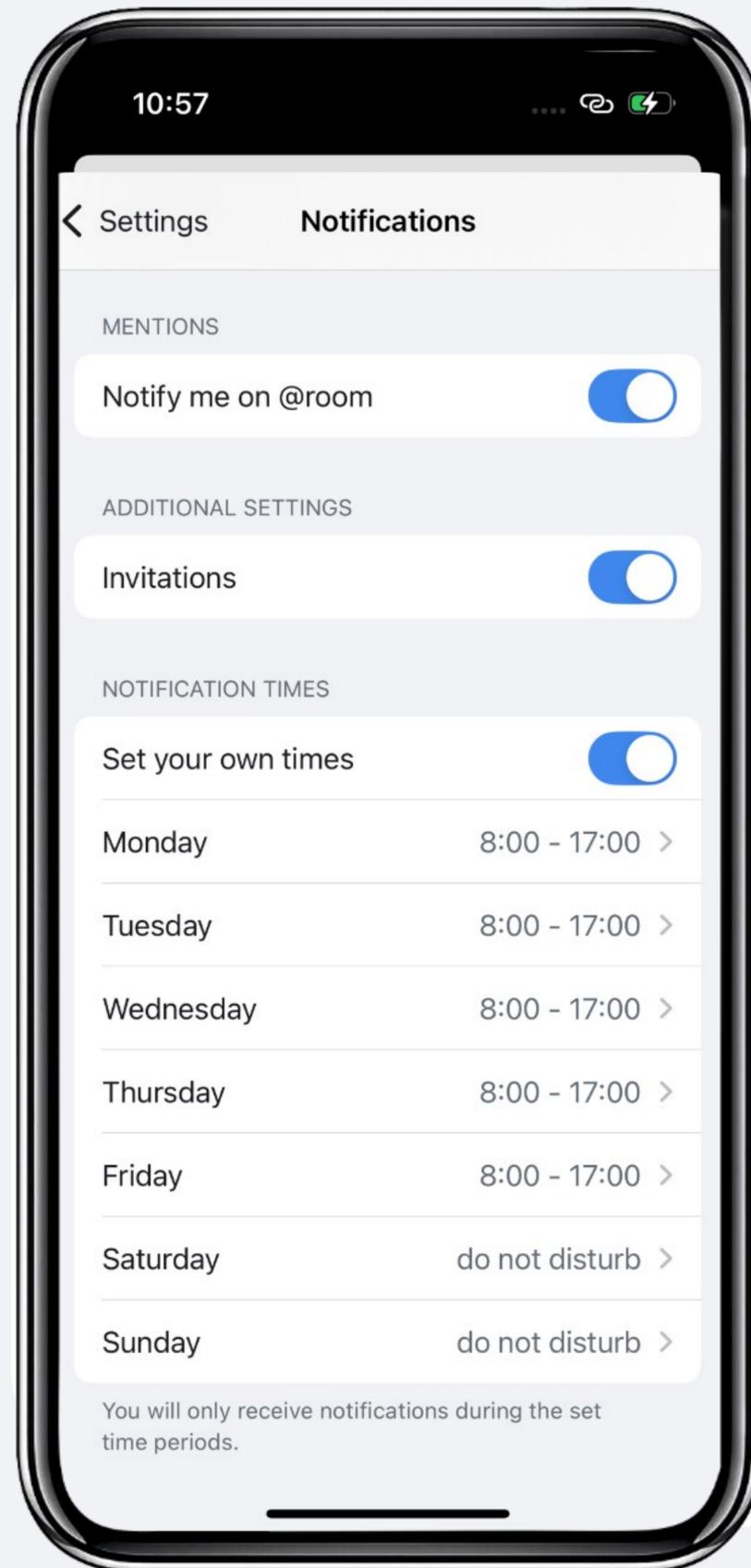
RustSDK

- Tightly integrated into mobile apps
- Modifications required for downstream features



Downstream Features

- Special-cased “My Notes” room
- Per-room user roles
- Mandatory backup on startup
- Custom localization tailored at target audience
- Server maintenance messages
- Notifications only during work hours





Bundes Messenger

- ~10% custom code
- Monthly rebases
- Modularized code for maintainability
- In-line documentation for GIT merges
- Focus on X-Apps
- Upstream collaboration

Heterogeneous Deployments

Cloud Deployments

Deployments

Heterogeneous Deployments



- BundesMessenger is open, versatile and federated
- Results in different deployment types
- Each with custom challenges and requirements

Deployment Types



One-Click

- For small communities
- Up-and-running in a day
- Pre-configured with best practices



SaaS

- Offered by a third-party
- Deployment must be highly automated
- Hard separation between host admins and instance admins



On-Premise

- Professional deployment
- Configured by domain experts
- High degree of customization and integration

Admin Portal



Benutzerübersicht

8

Aktive Nutzer
Insgesamt

6

Admins In
Synapse

Alle Benutzer

Q Suche

ID/NAME ↓

ERST

alexander Admin

04.0

Alexander Schmitt

andrea

0

- Web-based management of homeservers
- No access to host infrastructure and config files required
- Important for SaaS operations as well as ease of use
- Developed for the BundesMessenger in conjunction with new APIs

Cloud technologies



- Cloud-native with Kubernetes and Helm
- Follow industry best-practices
- Don't simply bundle up applications, but adapt them to cloud concepts
- High degree of automation
- Improve reliability and security





Hardening

Security Measures



- Cloud infrastructure best practices
- Regular security audits
- Network policies
- Ensure configs contain no secrets and key material
- Formal security disclosure process (Get in touch!)
- Container and app hardening

Container Hardening



- Custom container builds on hardened infrastructure
- Root-less containers
- Immutable filesystem
- Bill Of Materials
- Regular rebuilds
- CVE monitoring
- General hygiene like stripping, linting

App Hardening



- Regular pen testings
- Only encrypted rooms and events
- Cautious OS integrations
- Restrictive caching
- PIN-Code

Classified Information



- Security guidelines by the Federal Office for Information Security (BSI)
- IGBvC derives technical requirements
- Kyverno rules for static analysis and runtime validation

<https://gitlab.opencode.de/ig-bvc/policy-entwicklung>

Federal Office for Information Security

Germany's central IT security agency

Interessengemeinschaft
Betrieb von Containern

Public sector coalition
for cloud technologies



BundesMessenger



FOSS Engagement



FOSS Engagement



Partners

Co-operation with small and big players in the Matrix ecosystem



Development

In-house development of multiple Matrix projects



Financial

Substantial financial contributions to Matrix development



Spec

Active contributions to improve the Matrix Spec

We are giving back



- Everything we develop is put out under a Free Software license
- Not only application source code, but also IaC configuration
- Code is hosted on the German OpenCoDE platform



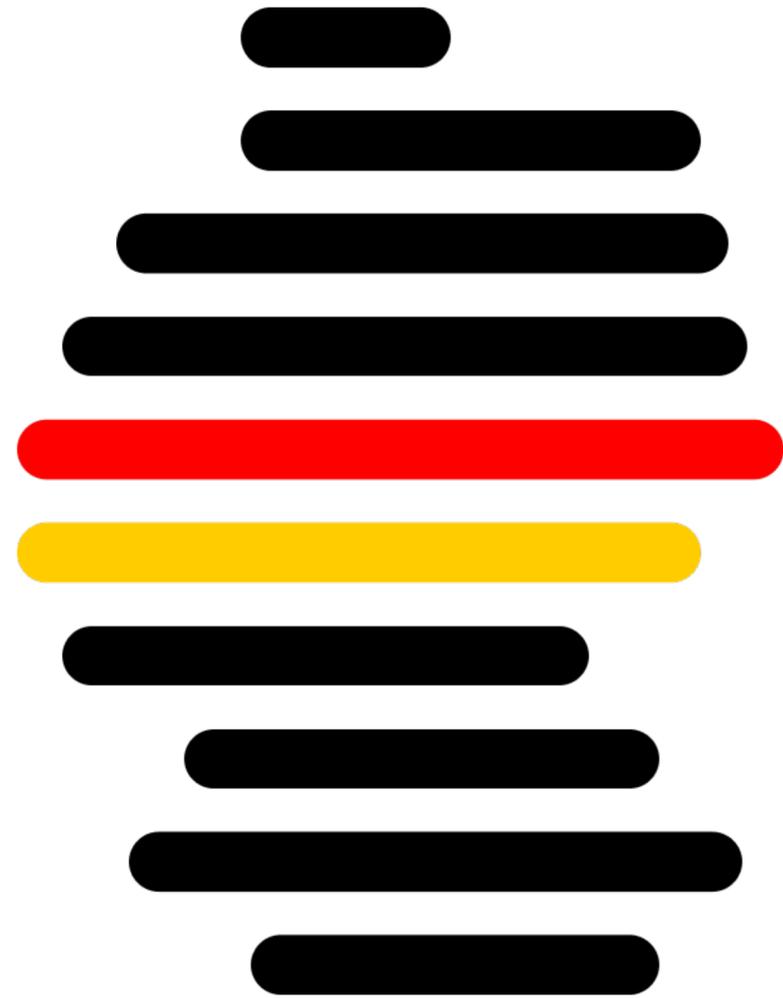
Try it out!



Get your own BundesMessenger demo running in minutes with our Helm chart.



<https://gitlab.opencode.de/bwi/bundesmessenger/backend/helm-chart>



**Thank you,
Matrix contributors!**

Get in touch with BundesMessenger



[#opencodebum:matrix.org](#)



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Vielen Dank!

