

TI-Messenger

Advancing Secure Healthcare Communication
within Germany

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Agenda

- 1. Introduction**
- 2. Telematics Infrastructure (TI) – Fundamentals**
- 3. TI-Messenger Architecture**
- 4. Operational Challenges in a Federated Environment**
- 5. Market Situation 2024**
- 6. Future Outlook**
- 7. Conclusion and Q&A**

Introduction

What is the gematik?

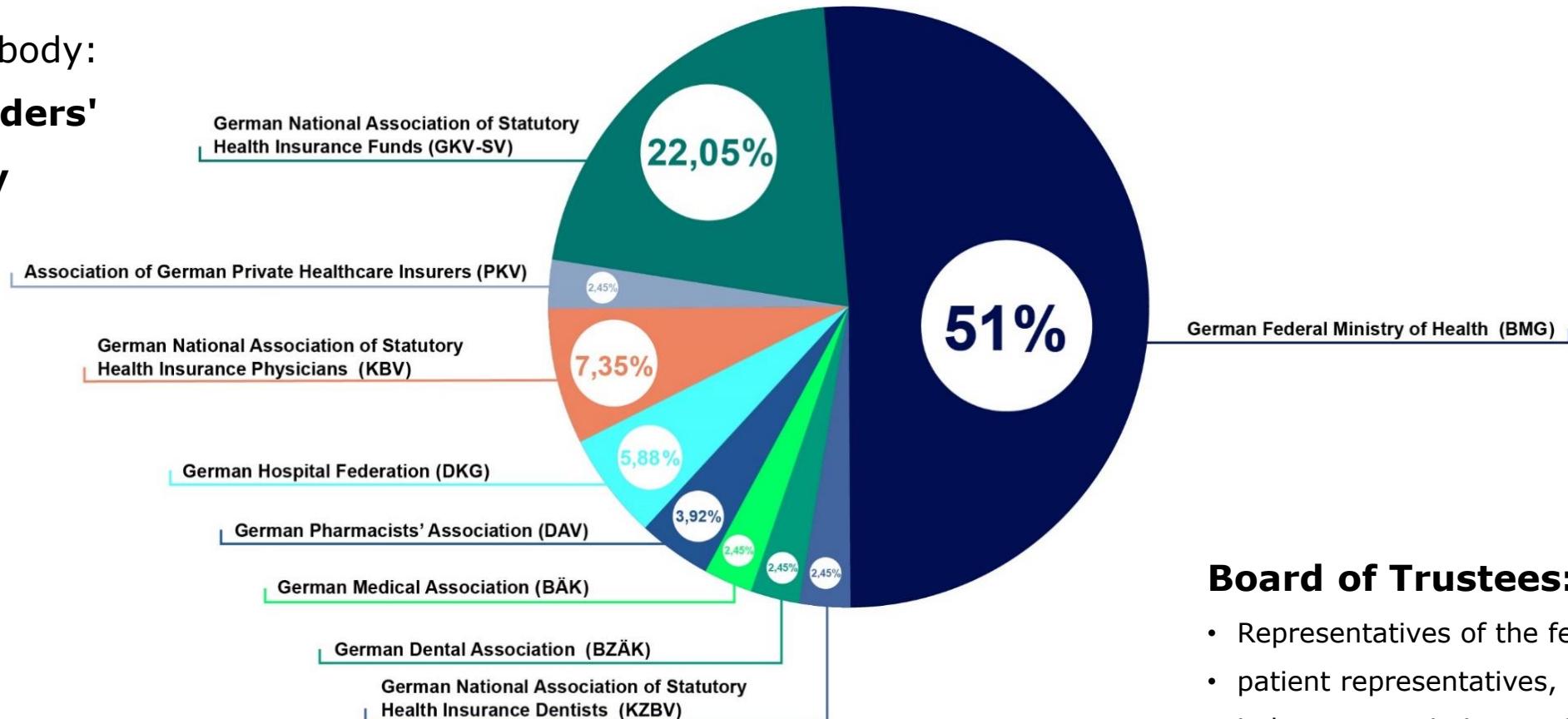
- **National Digital Health Agency**
responsible e.g.
 - for the **telematics infrastructure (TI)**,
the central platform for **digital applications** in the German healthcare system
 - ensures that TI **is and remains secure, efficient and user-friendly**
 - is a coordinating body for the **Interop Council**
- Approx. **450 employees**, founded in **2005**



gematik's shareholders

Supreme body:

Shareholders' assembly



Board of Trustees:

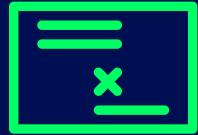
- Representatives of the federal states,
- patient representatives,
- industry associations, science,
- general practitioners, nursing, etc.

*The division of the shares is regulated by law.

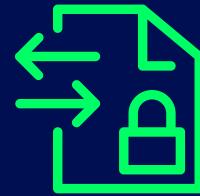
The German Federal Ministry of Health (BMG) holds 51%. The remaining shares are split between the organizations representing health insurers and the organizations representing healthcare providers.



Insurance status
(VSDM)



E-Prescription
(E-Rezept)



Secure mail
(KIM)



Messaging
(TI-Messenger)



Health Record
(Elektronische
Patientenakte (ePA))



Medication plan
(E-Medikationsplan)



Patient Summary
(Notfalldaten-
management)



Public Health
(DEMIS)

What is the TI-Messenger?

Secure Communication Solution in Healthcare



What is the TI-Messenger?

- A secure, privacy-compliant messaging platform for healthcare.
- Developed by gematik



Benefits:

- Enhances communication efficiency in healthcare
- Reduces paperwork and FAX usage
- Increased security in communication



Key Features

- Data Security
- Cross-Sector Communication
- Interoperability



Target Audience:

- Doctors, nursing staff, therapists, and other healthcare providers.
- Institutions such as hospitals, clinics, and pharmacies.
- Insured individuals.

TI-Messenger Features



Exchange text messages,
voice messages, photos and
documents in PDF



Creation of case-related
chat groups for exchange
between several HCPs



Locating all institutions
that use the TI-Messenger
in the nationwide address
book



Archiving of case-related
communication in the local
Electronic Health Record



Issuing individual
authorisations, e.g. for
doctors and nurses

TI-Messenger Variants

User Centricity

Focus Health Professionals
TI-Messenger Pro

Service providers and payers can communicate securely within organizations, bilaterally, and across sectors.



For all stakeholders in healthcare provision

Focus Patients
TI-Messenger ePA

Insured individuals can communicate with healthcare professionals through the messenger in the electronic patient record App (ePA)



Insured individuals

Focus Digital Health Applications
TI-Messenger Connect

Integration of messengers into third-party products and platforms.



Integration into external applications & services

TI-Messenger Resources

TI-Messenger Fachportal:

- <https://fachportal.gematik.de/anwendungen/ti-messenger>

TI-Messenger Specifications:

- Base Spec.: https://gemspec.gematik.de/docs/gemSpec/gemSpec_TI-M_Basis/latest/
- ePA Spec.: https://gemspec.gematik.de/docs/gemSpec/gemSpec_TI-M_ePA/latest/
- Pro Spec.: coming soon

TI-Messenger & VZD FHIR Resources:

- <https://simplifier.net/tim>
- <https://simplifier.net/vzd-fhir-directory>

TI-Messenger Gemmunity (Forum):

- https://www.gemmunity.de/community?id=community_forum&sys_id=271b7d301b74e9107f5a42609b4bcb75

TI-Messenger additional resources at GitHub:

- <https://github.com/gematik/api-ti-messenger>

TI-Messenger Source Code Akquinet Test Master (Referenzimplementierung):

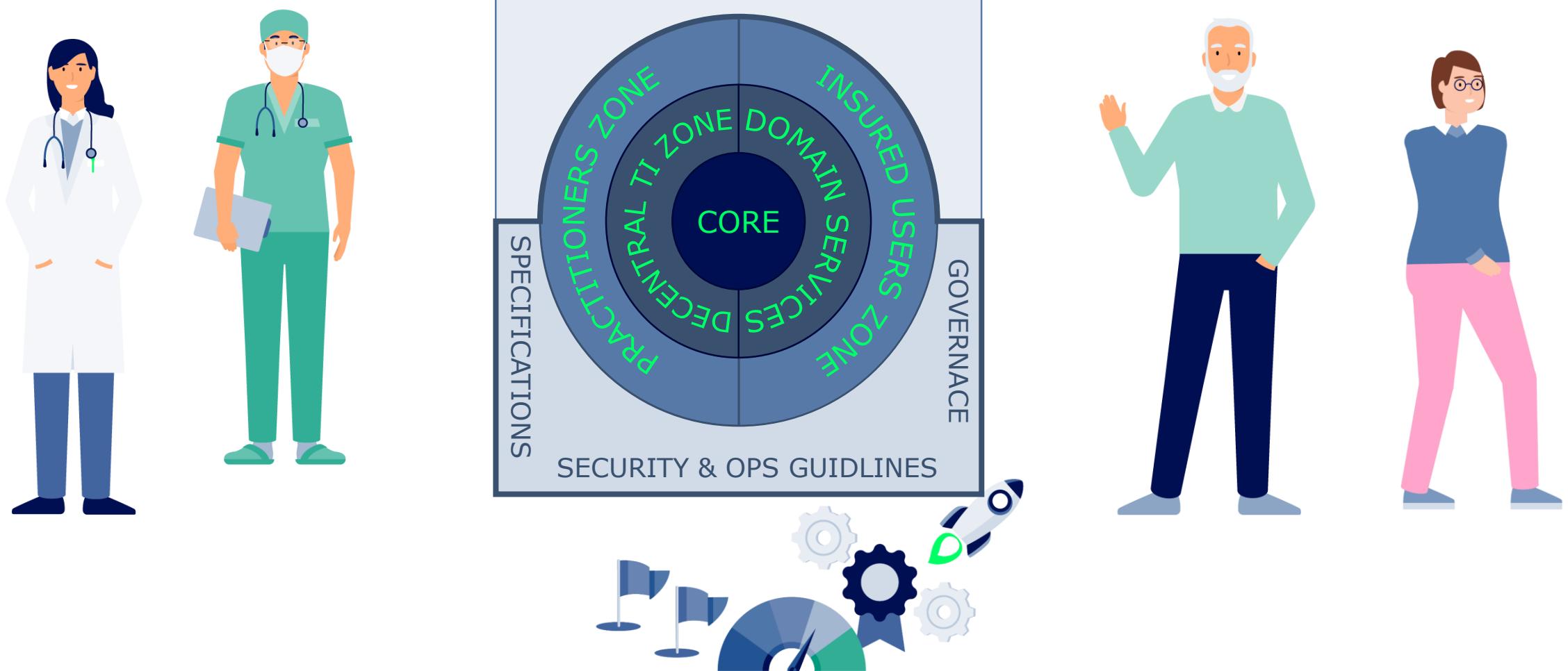
- <https://github.com/tim-ref>

Telematics Infrastructure (TI) – Fundamentals

German Telematics Infrastructure (TI): Architecture Overview

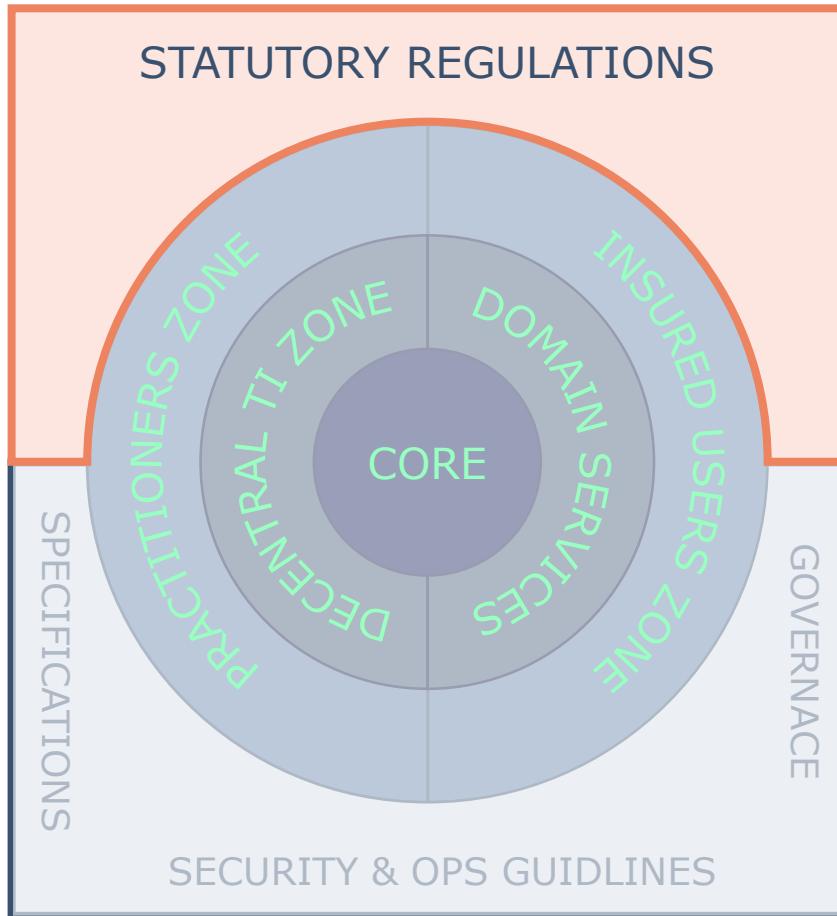
Secure Digital Healthcare Network

§: The Fifth Book of the Social Code (SGB V) in Germany



German Telematics Infrastructure (TI)

Governed by statutory regulations and security guidelines



Statutory regulations define the mandate of gematik, Germany's Digital Health Agency, and the products it must provide to the healthcare system, as passed by the German Parliament (Bundestag)

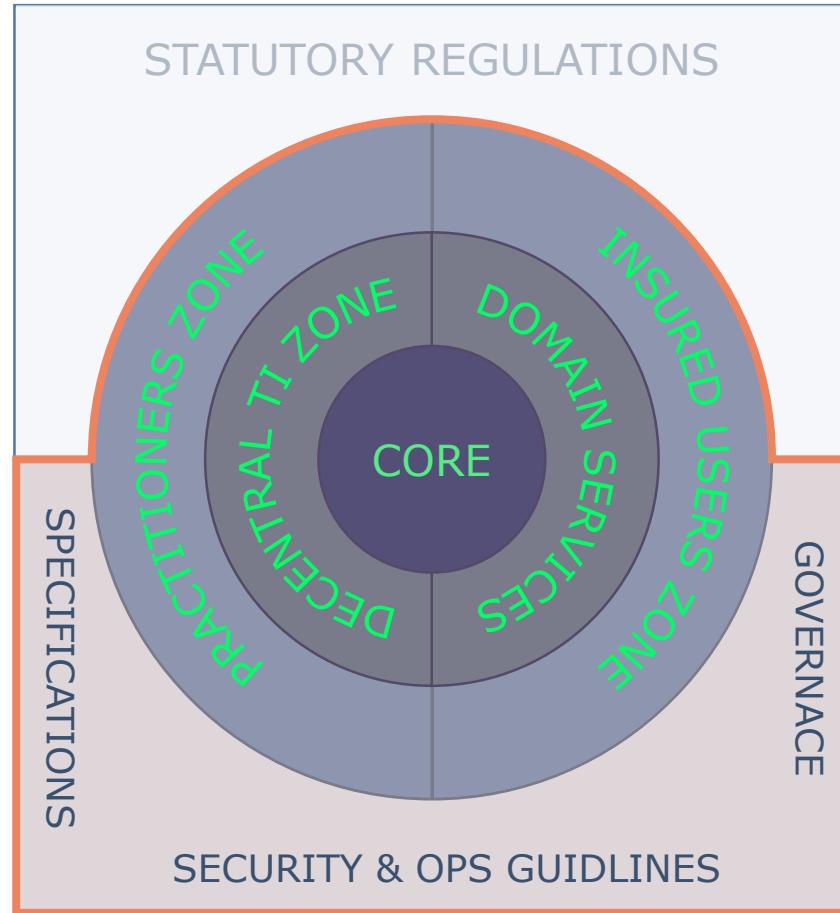
- § 306 SGB V - Establishment and Structure of the Telematics Infrastructure.
- § 307 SGB V - Data Protection Responsibilities in the Telematics Infrastructure
- § 310 SGB V - Structure and Ownership of the Gesellschaft für Telematik.
- § 311 SGB V - Responsibilities of the Gesellschaft für Telematik.
- § 312 SGB V - Tasks Assigned to the Gesellschaft für Telematik
- § 313 SGB V - Electronic Directory Service of the Telematics Infrastructure.
- § 334 SGB V - Applications of the Telematics Infrastructure (Key applications include the electronic patient record, electronic prescriptions, and emergency data).



Federal Ministry
of Health

German Telematics Infrastructure (TI)

Connecting healthcare providers and users securely



German Telematics Infrastructure (TI): Secure digital healthcare network



gematik: Specifies all TI components and applications



Industry: Develops solutions based on gematik specifications



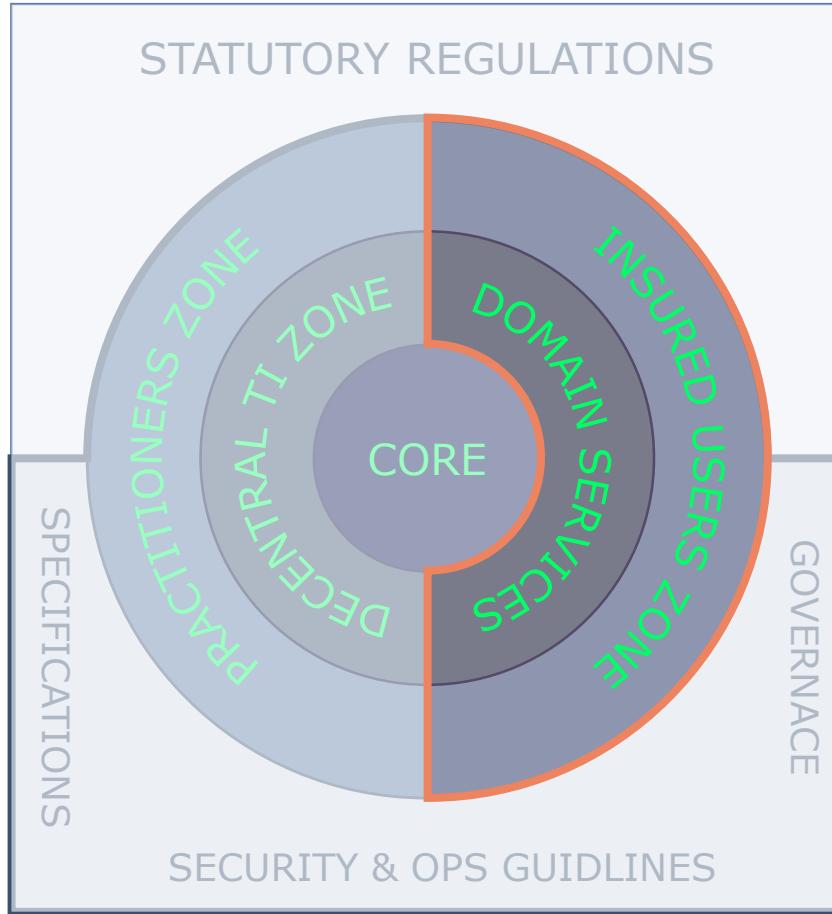
gematik: Approves products for TI use, ensuring standards



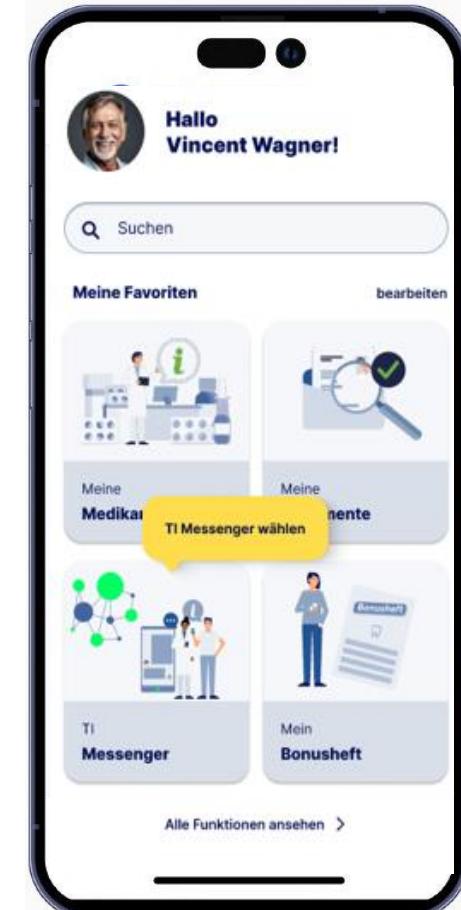
Regulatory: gematik oversees security, data protection, operations

German Telematics Infrastructure (TI)

Patient access to health services and data

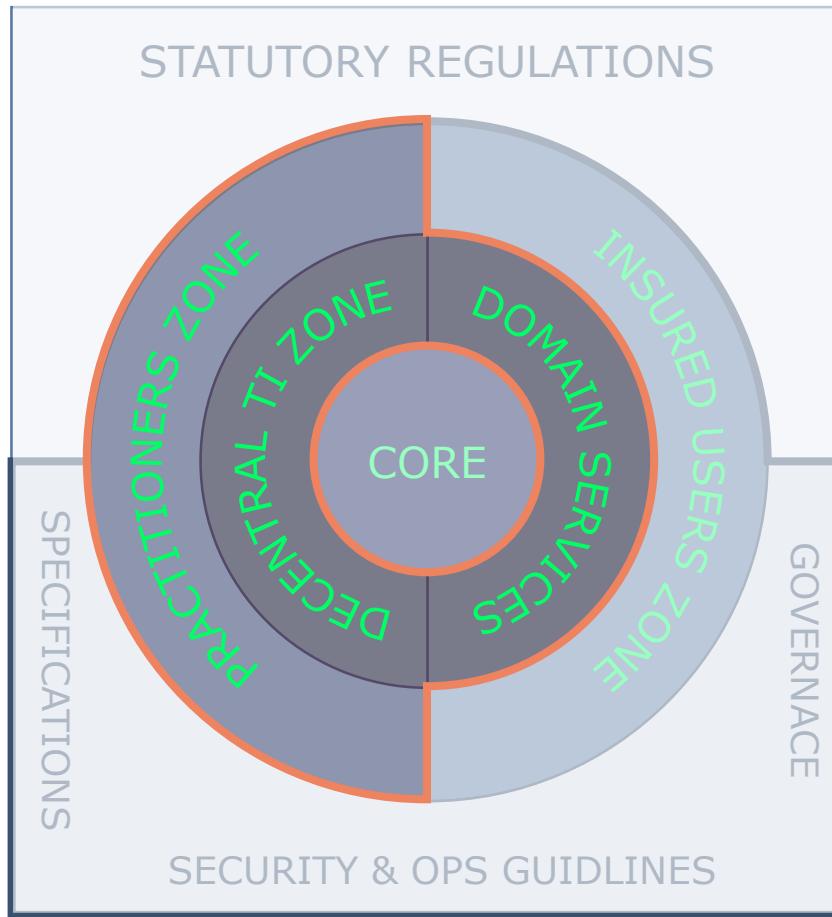


Secure access for insured individuals to the Telematics Infrastructure (TI) via eGK and mobile apps for ePA and E-Rezept services.



German Telematics Infrastructure (TI)

Access points for healthcare providers

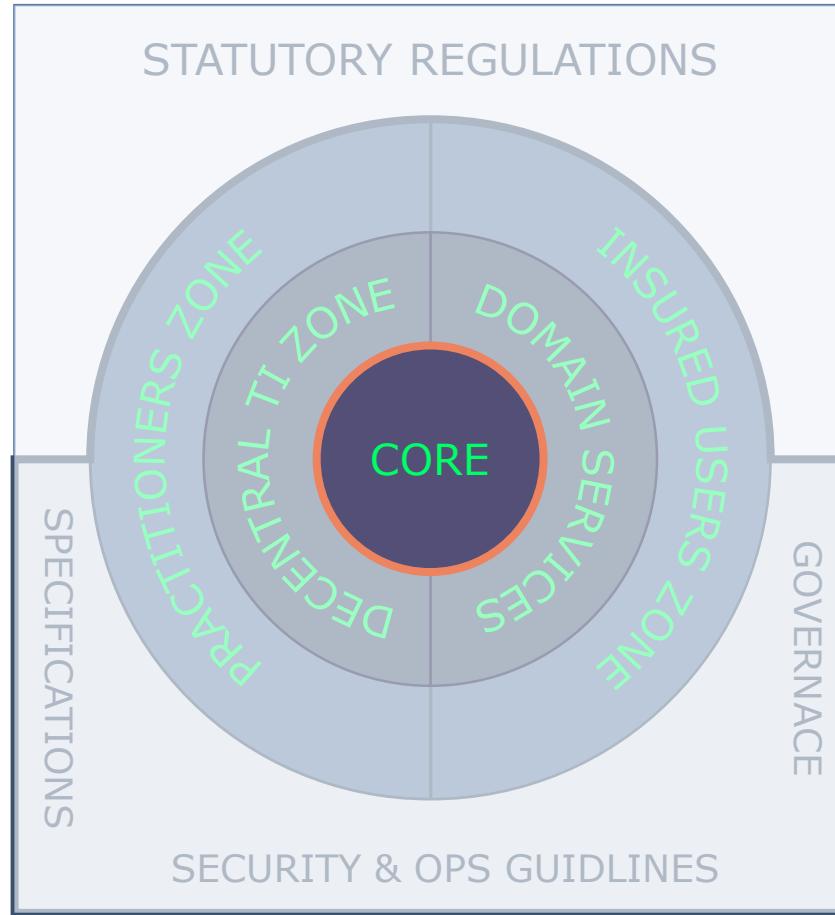


Secure access for healthcare providers to the Telematics Infrastructure (TI) via decentralized components in practices, hospitals, and pharmacies.

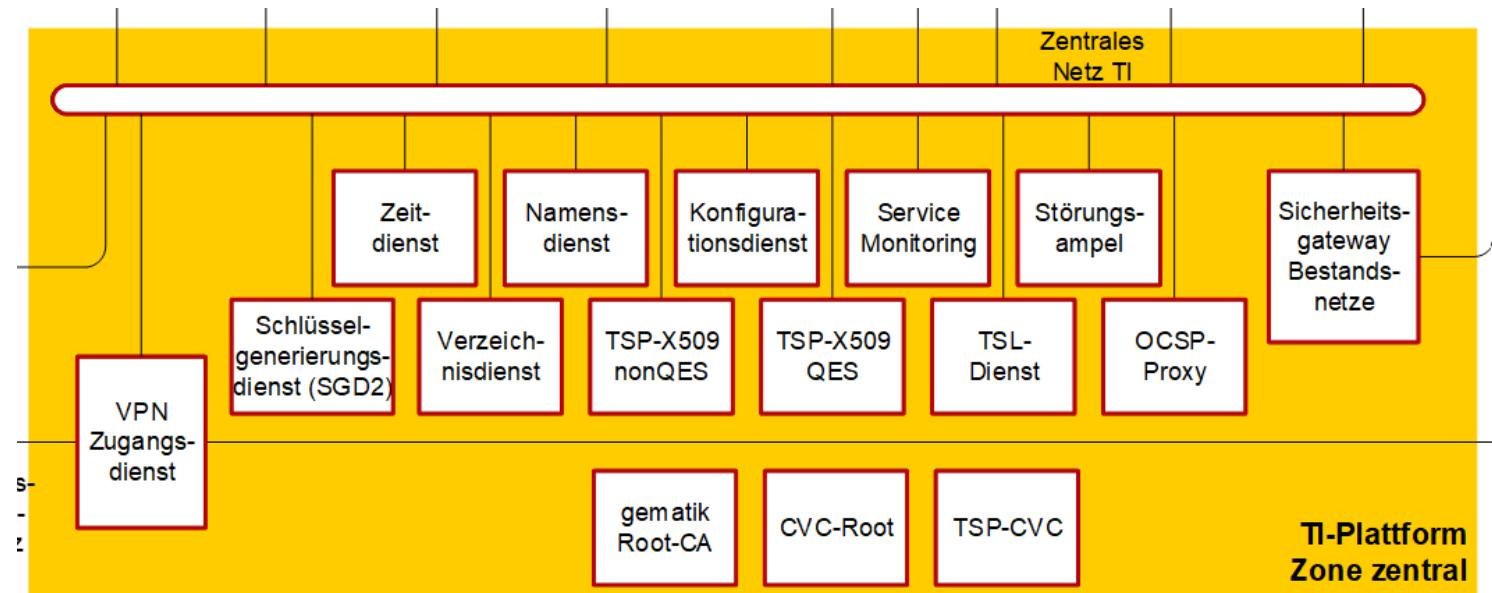


German Telematics Infrastructure (TI): Architecture Overview

Central services for secure communication & management



Core Zone of TI Architecture: Central services enabling secure communication and management within the Telematics Infrastructure. Includes VPN access, key generation, directory, time synchronization, configuration, monitoring, security gateways, and certificate services.



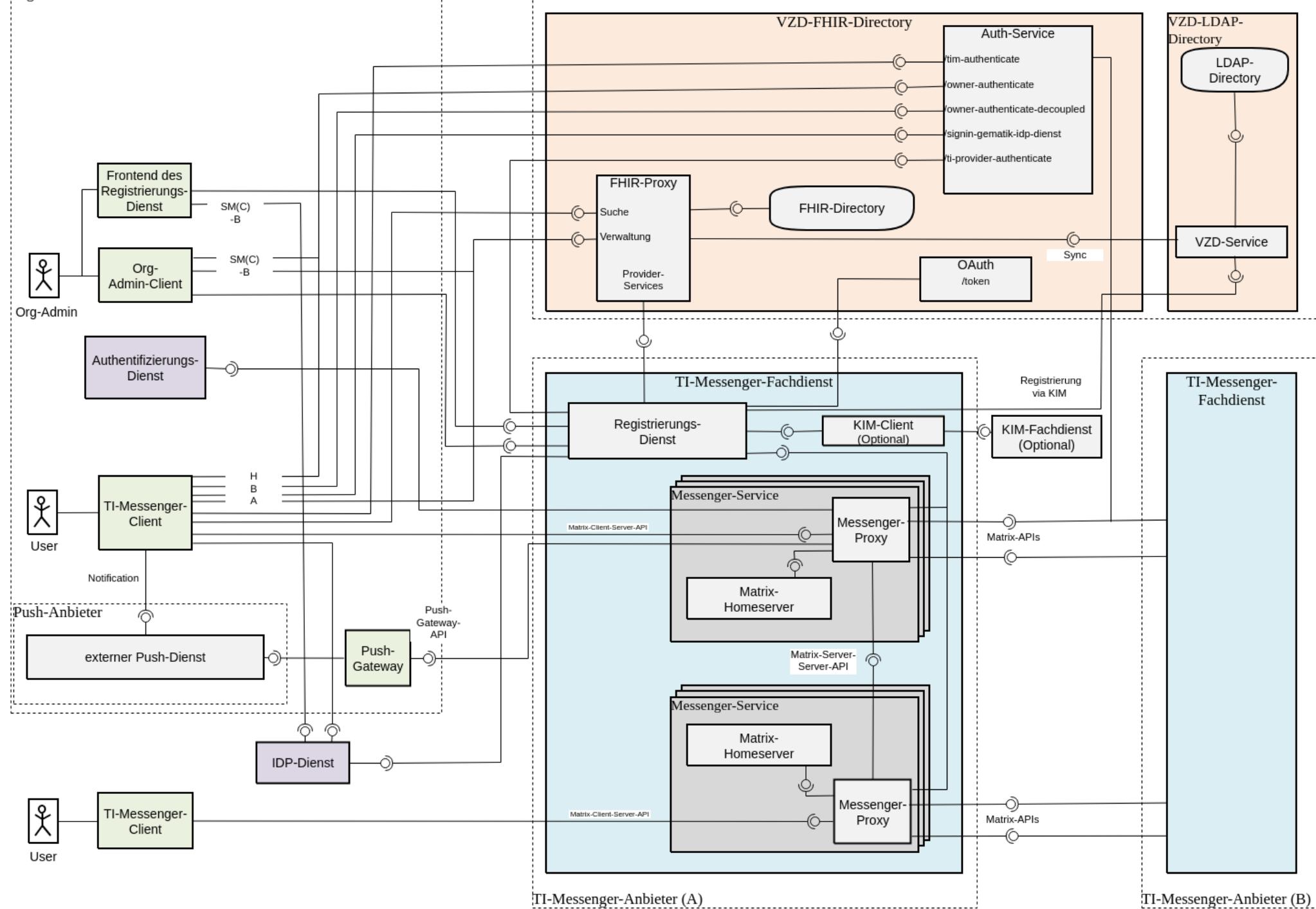
TI-Messenger Architecture

TI-Messenger

Quality Attributes

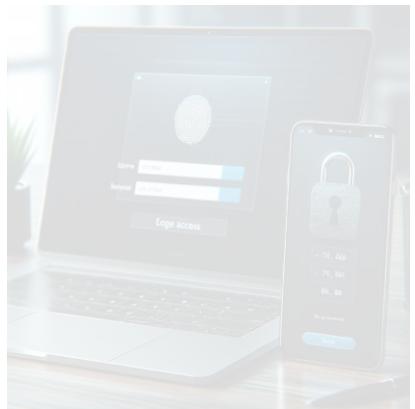
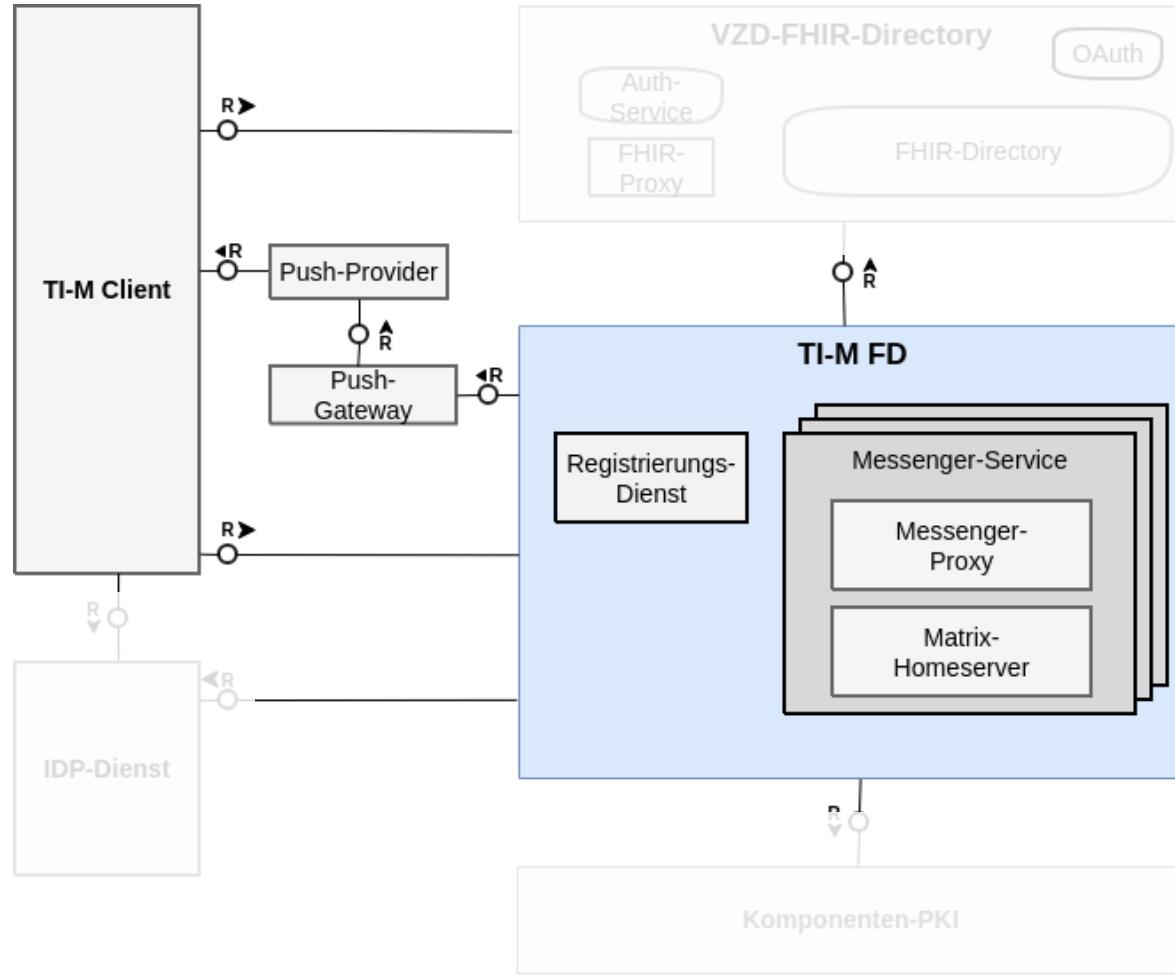
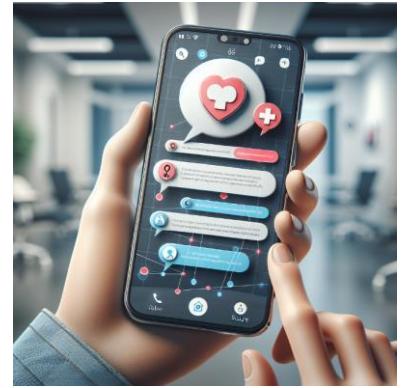
- Security and Data Protection
- Interoperability
- User-Friendliness
- Reliability and Performance
- Flexibility and Adaptability
- Regulatory Compliance





Architecture Overview

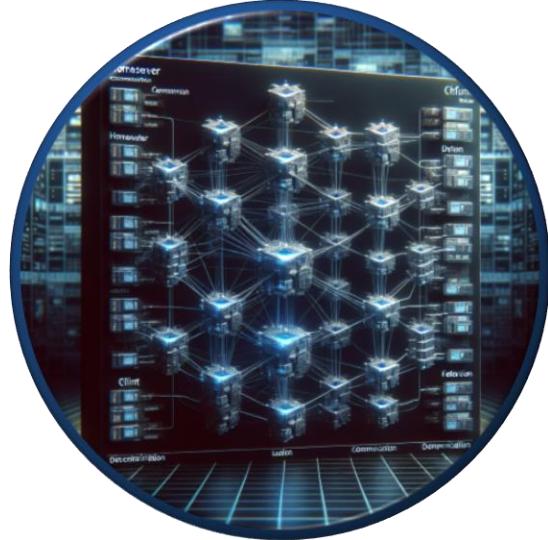
Core components of the TI-Messenger



Security Features

Description of encryption and other security measures

Matrix-Protocol



- Specified by the Matrix Foundation
- Decentralized instant messaging
- End-to-end encryption

Double-Ratchet-Algorithm



- Developed by Moxie Marlinspike
- E2EE between users
- Key ratcheting mechanism based on two interlocking KDFs
- Used in Signal

Olm/Megolm



- Specified by the Matrix Foundation
- Based on the Double Ratchet Algorithm (Olm)
- Extension (Megolm) to improve speed in large rooms

Security Features

Access Control



Registration Service

Authorized organizations have access to register their messenger services



Federation List

Includes all authorized Matrix domains of the messenger services



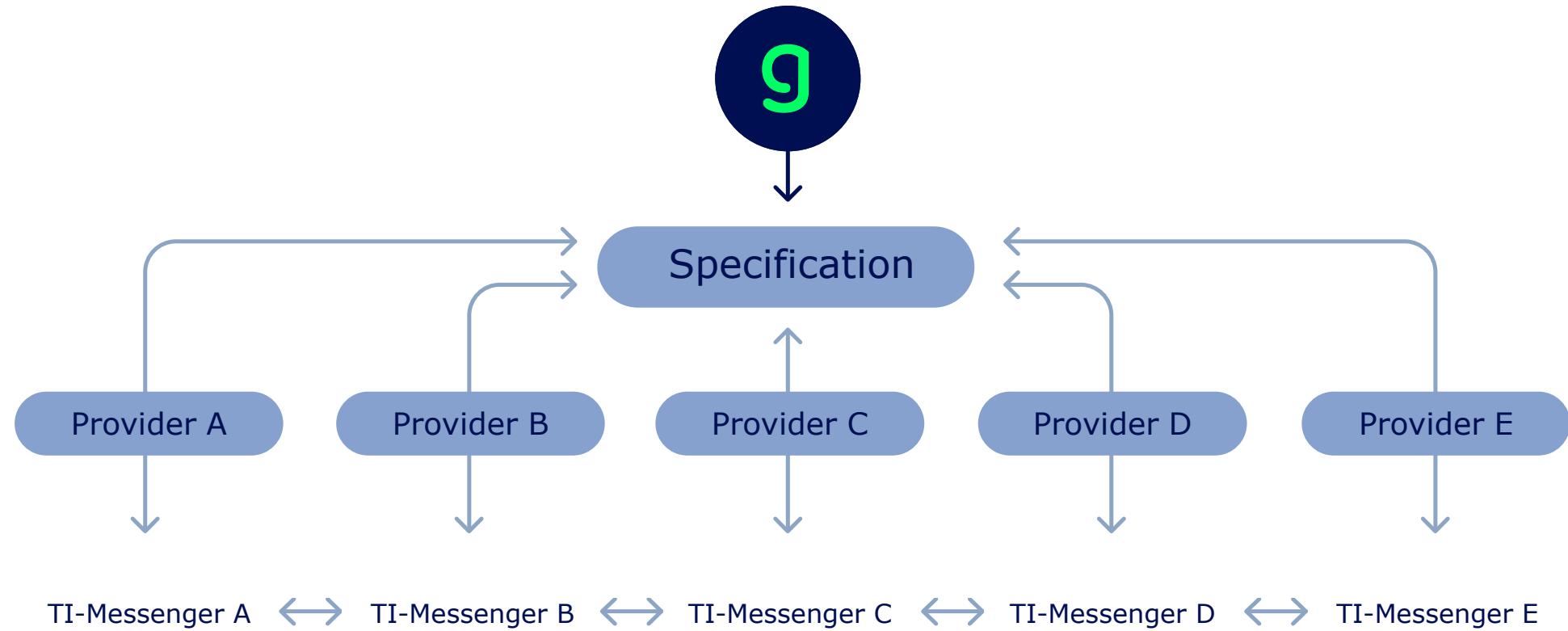
Messenger Proxy

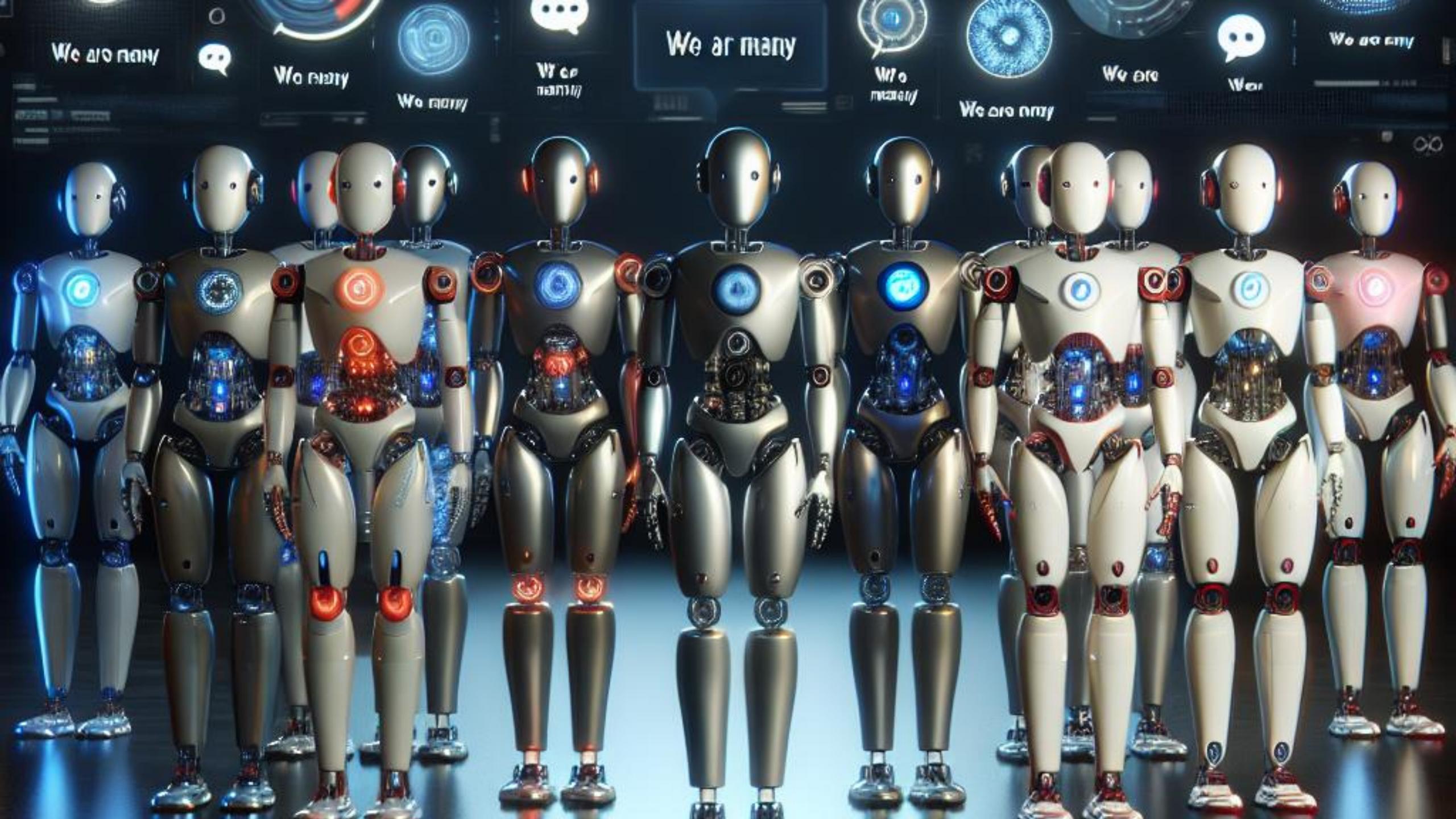
Checks federation membership by matching with the federation list

Operational Challenges in a Federated Environment

Operational Challenges in a Federated Environment

Mastering Interoperability in a Complex Provider Landscape





We are many



We many

We many

We many

We are many

We many

We are many

We are

We

We are many

Operational Challenges in a Federated Environment

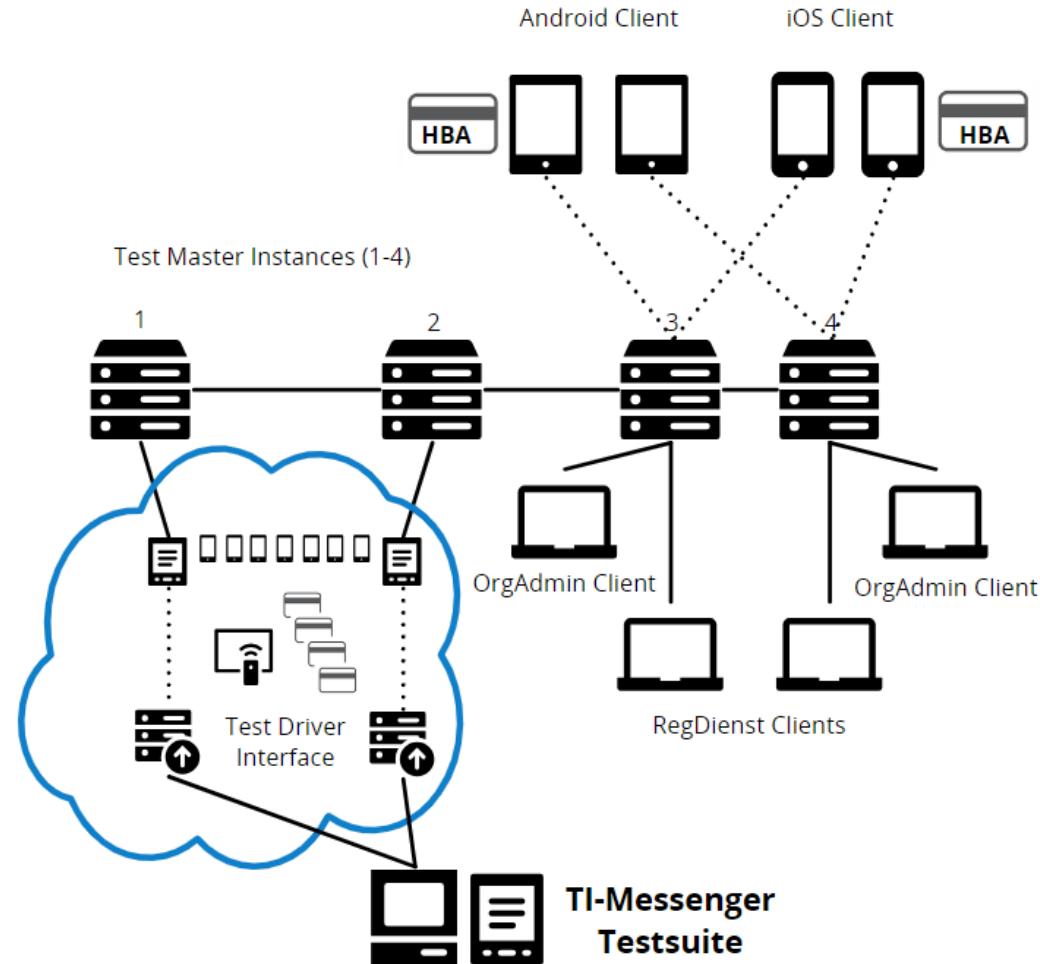
Overview of market participants

The image is a collage of logos and snippets from various companies involved in the federated environment:

- akquinet**: A logo featuring a large white 'T' on a pink square background.
- Famedly**: A logo with a stylized 'F' and 'M' inside a grey square.
- arvato BERTELSMANN**: A logo with the word "arvato" in blue and "BERTELSMA NN" in smaller letters below it, with "Awesome Technologies" text above.
- A W E S O M E TECHNOLOGIES**: A black rectangular logo with white text.
- CGM**: A logo with a blue circle containing "CGM" and "IN" below it.
- KOSY**: A logo with a blue and green abstract shape followed by "KOSY".
- STACKIT**: A logo with a blue square containing a white 'S' and the word "STACKIT".
- WARUM STACKIT**: Text on a teal bar.
- RISE TIM**: A purple logo with a white diamond icon.
- DGN Deutsches Gesundheitsnetz**: A logo with "DGN" in blue and "Deutsches Gesundheitsnetz" in smaller text.
- IBM iX**: A logo with "IBM iX" in white on a dark background.
- element**: A logo with a green circular icon and the word "element".
- Produkt Lösungen Ressourcen Blog Preise Herunterladen**: A horizontal menu bar.
- Telematik-Infrastruktur-Messenger**: Text below the IBM iX logo.
- Deutsch**: A language selection button.
- Der TI-Messenger der Gesundheit**: Text at the bottom left.
- Warum die Basis von Matrix**: Text at the bottom left.
- gem**: Text at the bottom left.
- MIT WEITEREN GEBAUDEREINIGUNGEN**: Text at the bottom right.
- Kontaktformular Bildungskontakt Daten**: Text at the bottom right.

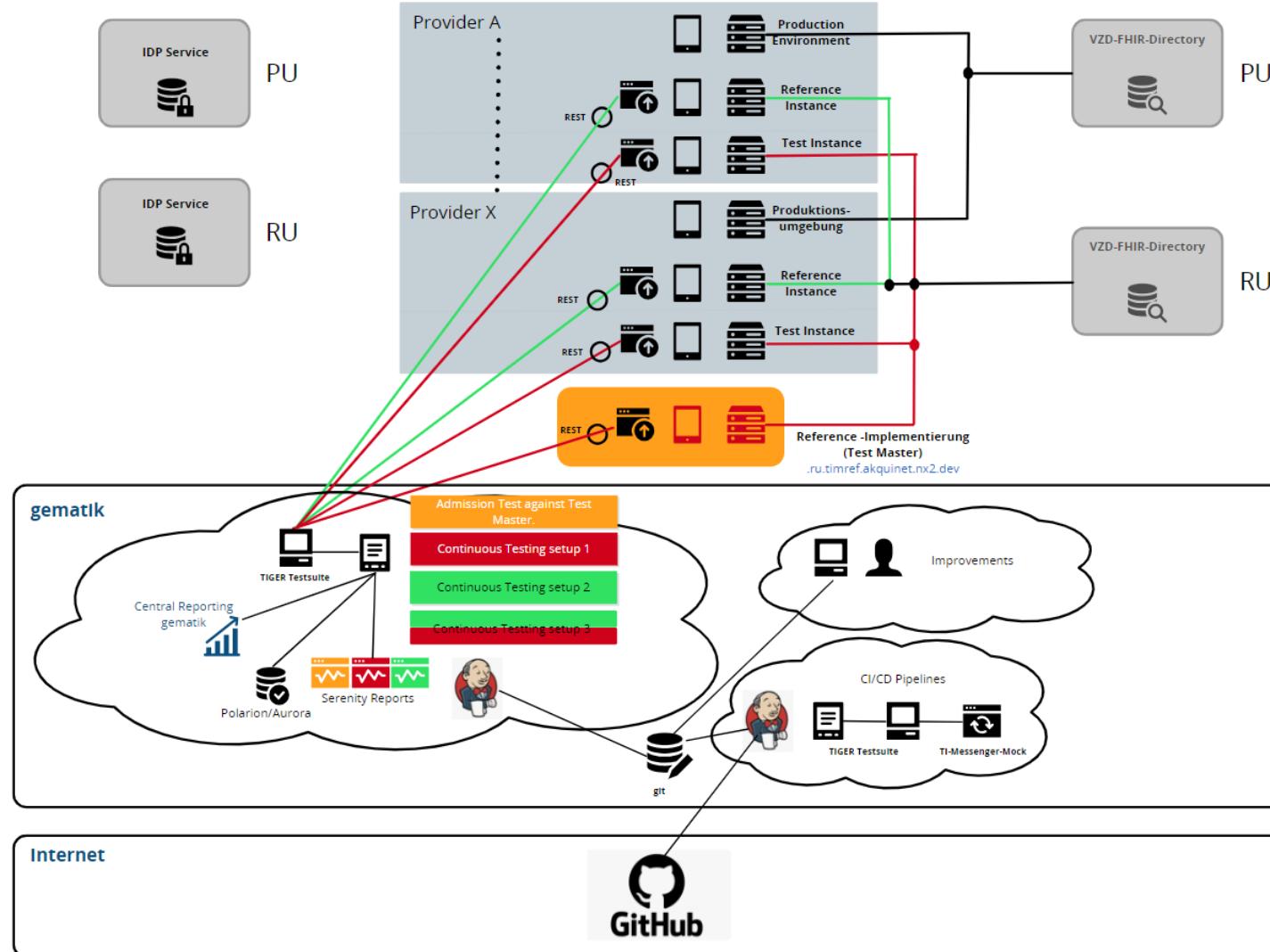
Operational Challenges in a Federated Environment

Mastering Interoperability – Test Master as Reference



Operational Challenges in a Federated Environment

IOP & Continuous Testing



Test Environment (TU):

Used for testing and validating new features and updates in a controlled setting.

Reference Environment (RU):

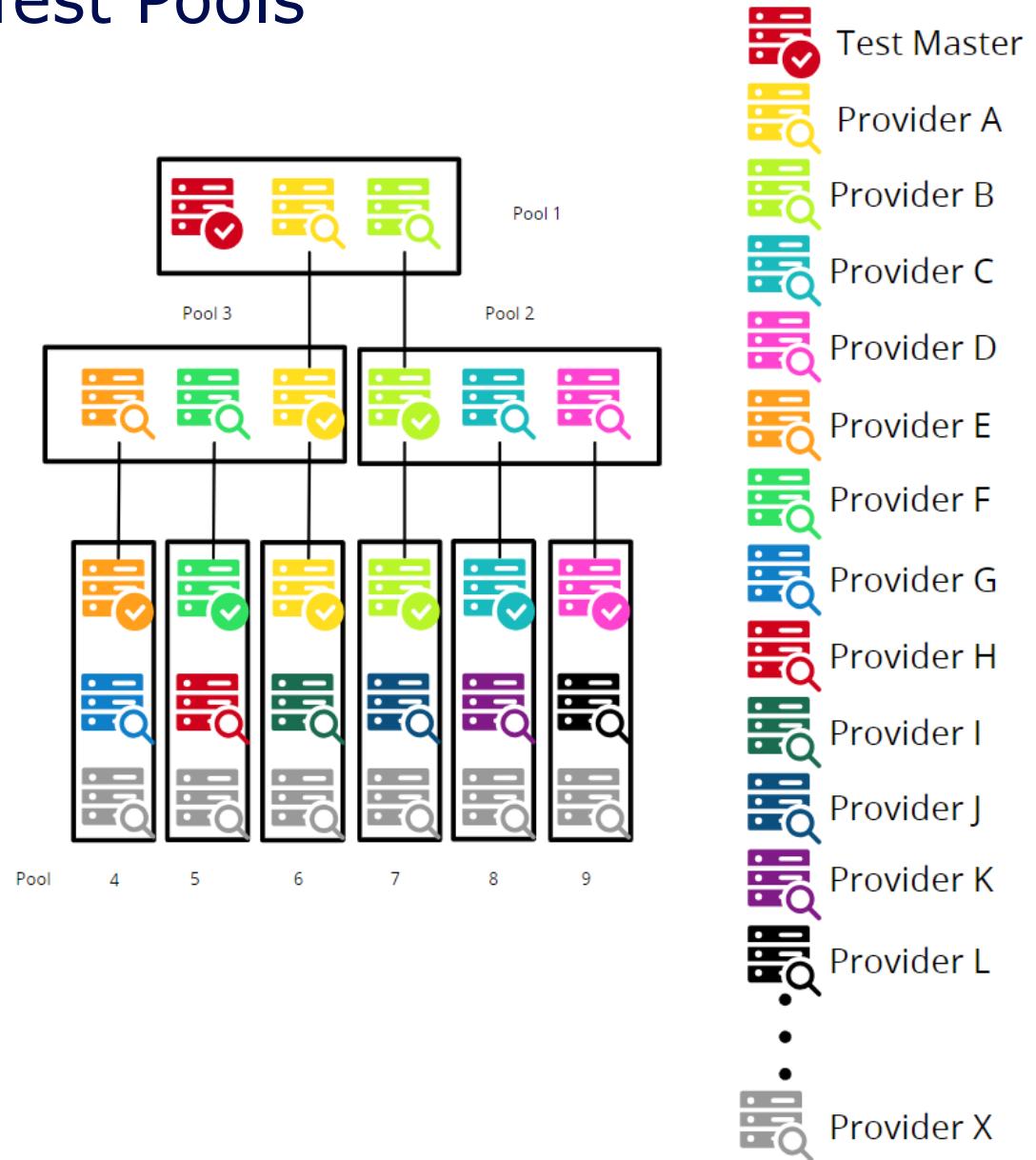
Serves as a benchmark for testing, ensuring compatibility and performance consistency.

Production Environment (PU):

The live environment where TI-Messenger services are actively used by end-users.

Operational Challenges in a Federated Environment

Scaling Utilizing Test Pools



Operational Challenges in a Federated Environment

Service Provider Management



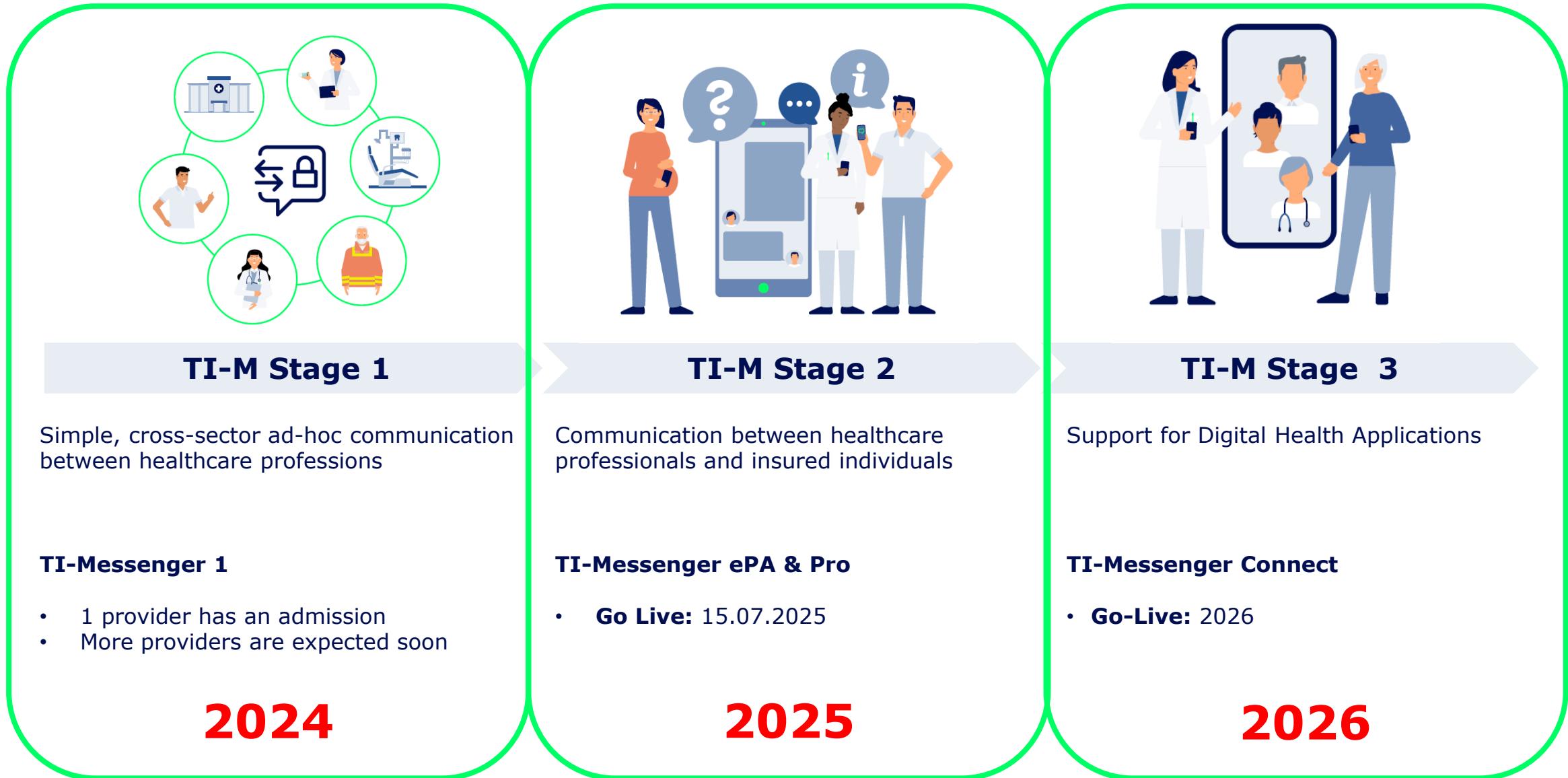
gematik monitors and governs

- TI Service Healthcare Status
- TI Service KPIs
- TI Security Breaches and fixes

gematik does not have access to healthcare records or personal data of patients!

Market Situation

TI-Messenger – The Road Goes Ever On



TI-Messenger – The Road Goes Ever On



TI-M Stage 1

TI-M Stage 2

TI-M Stage 3



And many More!

Future Outlook

Feature Backlog

Prioritization of Backlog is in Coordination

Stage	Feature	User Value	Urgency
1	Automation and Bots	In Work	
2	TI-M Connect		
2	Onboarding		
3	Integration		
3	Access Management II		
3	Language and video communication		
4	Search and Find II		
4	Messaging and room management II		
4	Structured Data		

gematik. Healthy Prospects.

Contact:



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