

Consolidating Germany's administrative communication: Towards a joint Matrix-based architecture

Dominik Braun (FITKO)

Matrix Conference 2025 | 16 October 2025



Dominik Braun

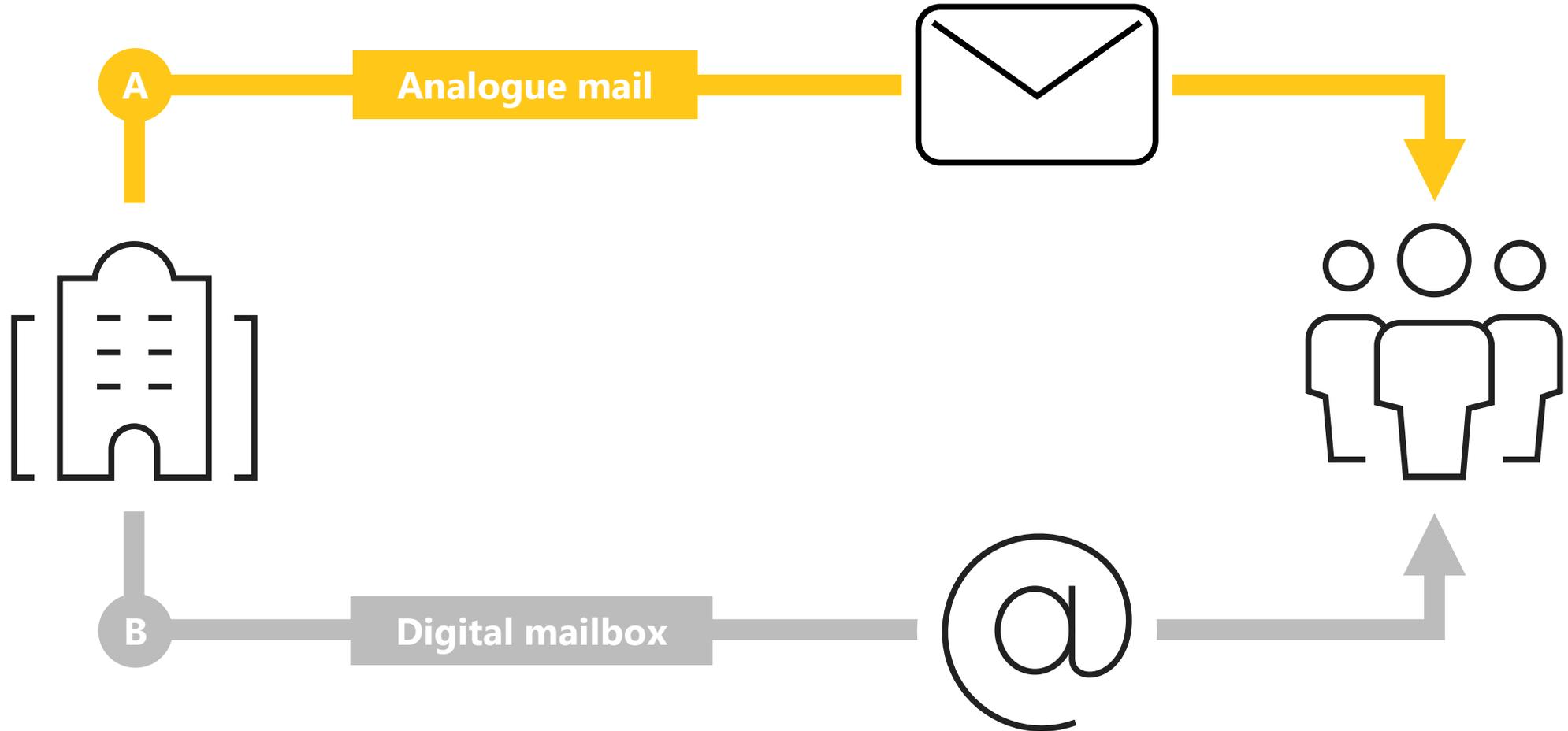
Officer for Federal IT Architecture Management
FITKO – Federal IT Cooperation

› **What I did/do at FITKO:**

- › *Framework Concept for Federal IT Architecture Management*
- › Work on the target architecture and governance model of the German Administrative Cloud (DVC) through the DVC implementation project
- › Project lead for the new federal target architecture for G2X inbox and communication infrastructure in German public administration

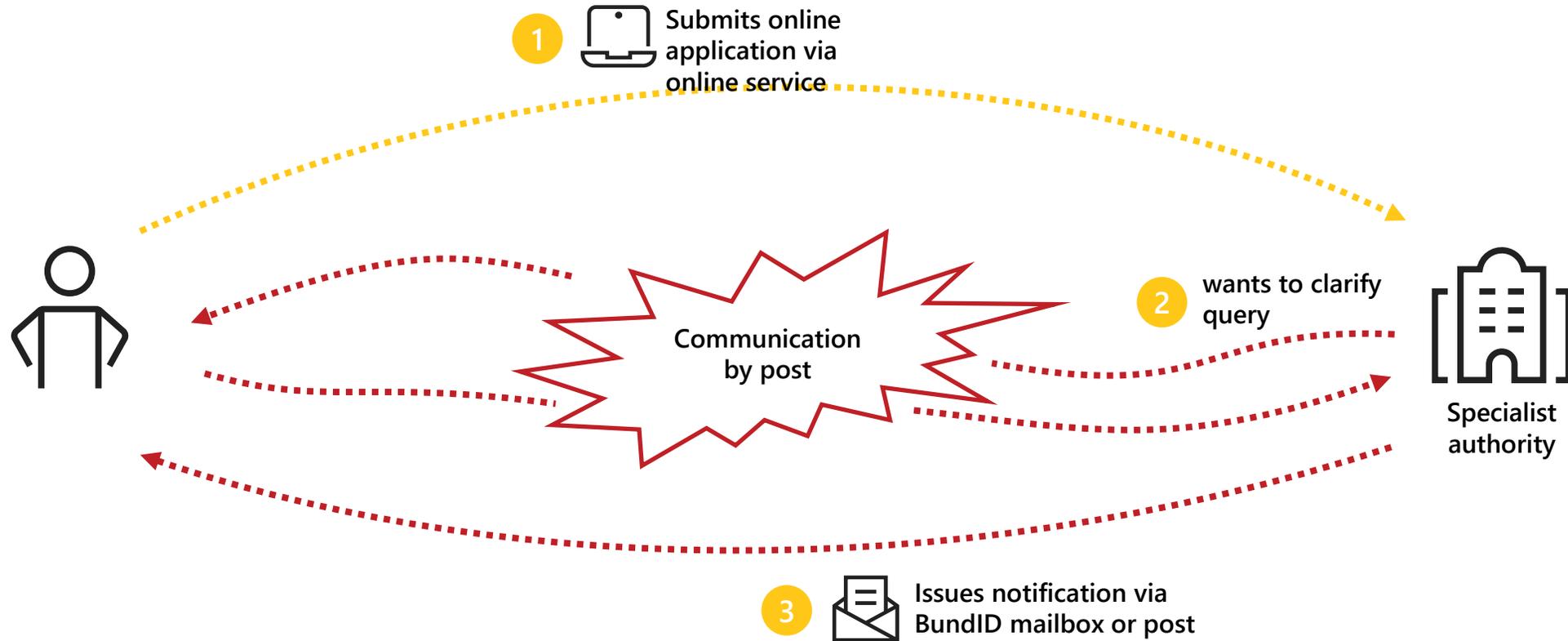
Administrative communication in the German public administration

Status Quo



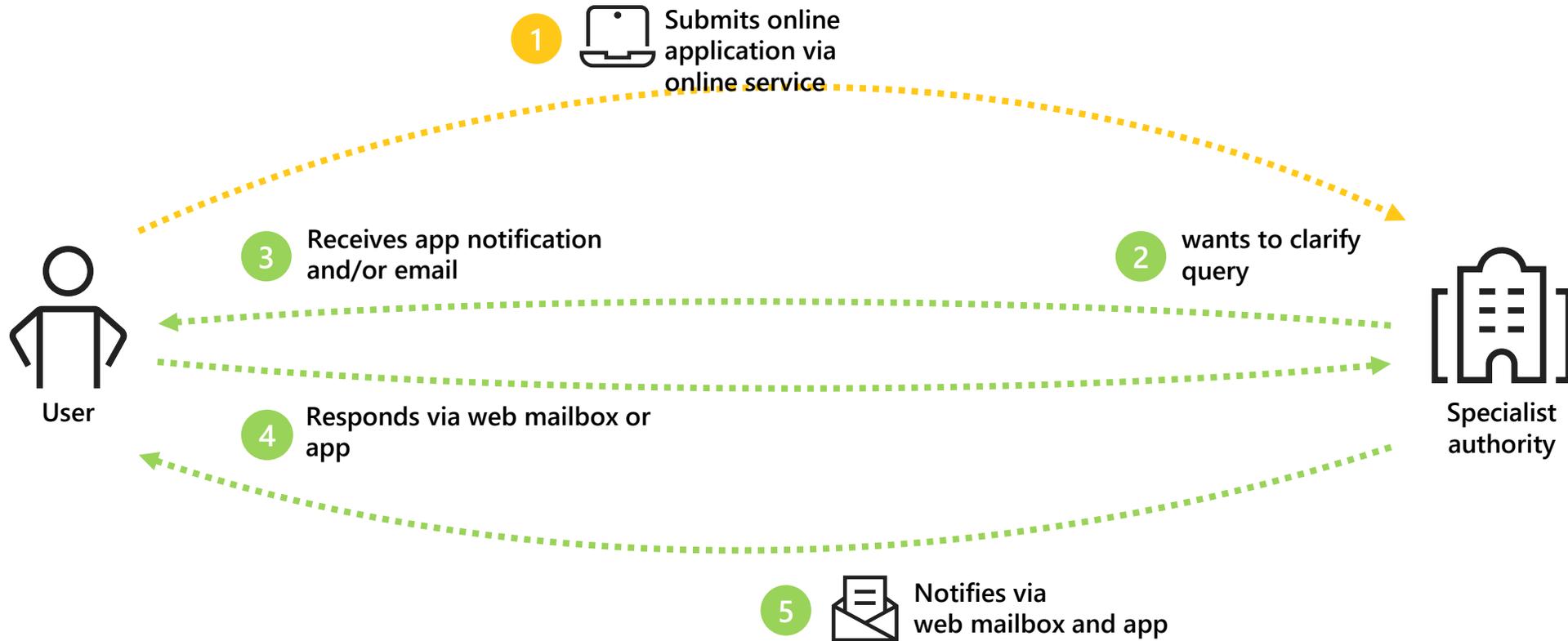
UX problem: Media break in the communication flow of online applications

Status quo



UX vision: Smooth end-to-end online interactions without media breaks

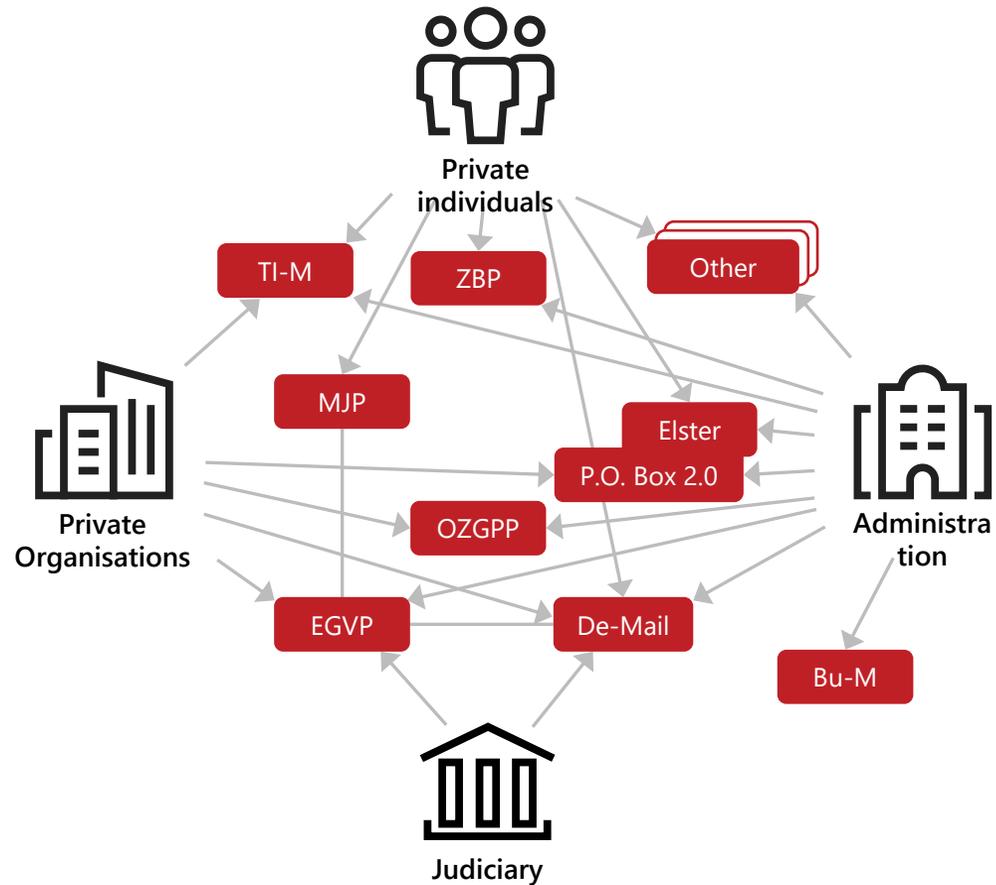
Vision



Digital communication should be optional in practice.

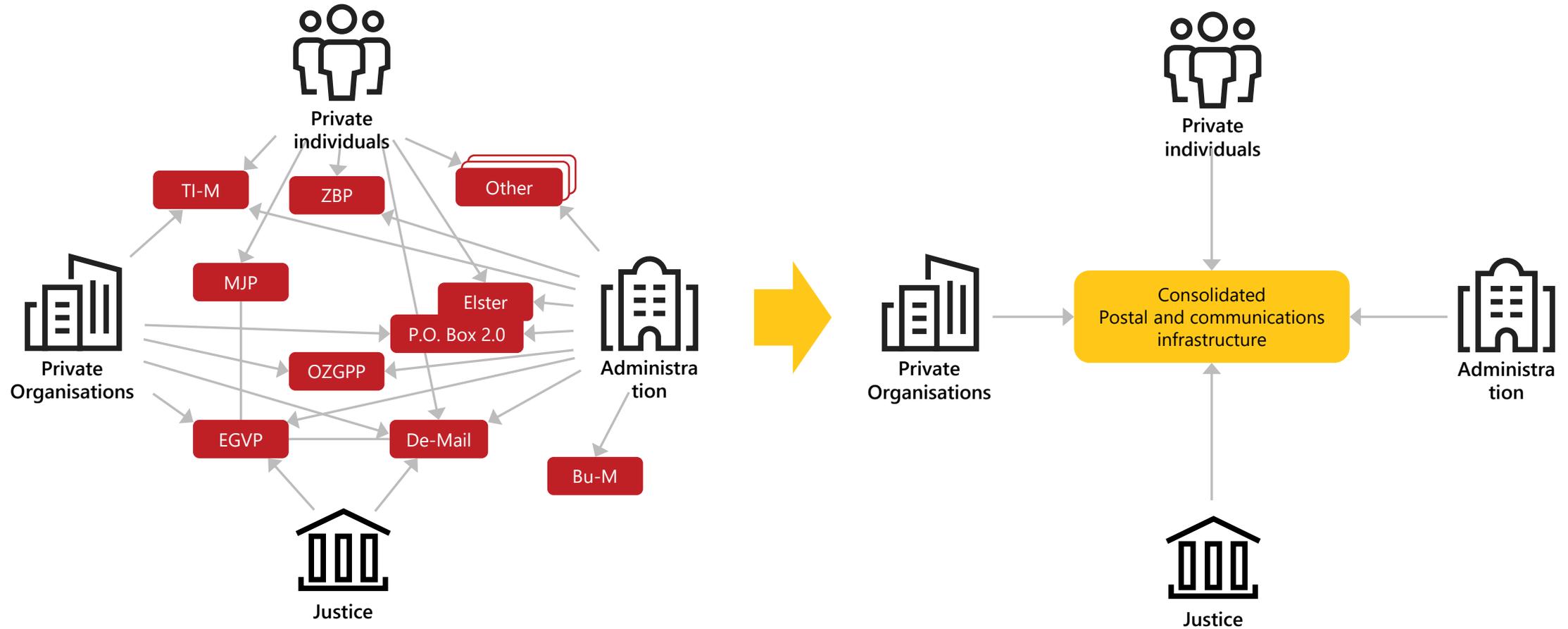
Architecture problem: Many different and in part outdated ,mailbox' solutions developed by different organisations

Status Quo



Architecture vision: Consolidation towards a unconsolidated federal communications infrastructure

Vision

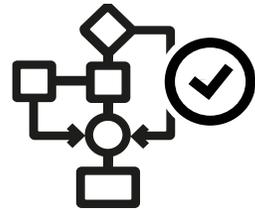


In summary: What are we trying to achieve?

Design goals



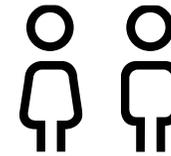
**Dismantle
barriers to
technical
connection
and use**



**Promote cost-
effective
operation
through
consolidation**



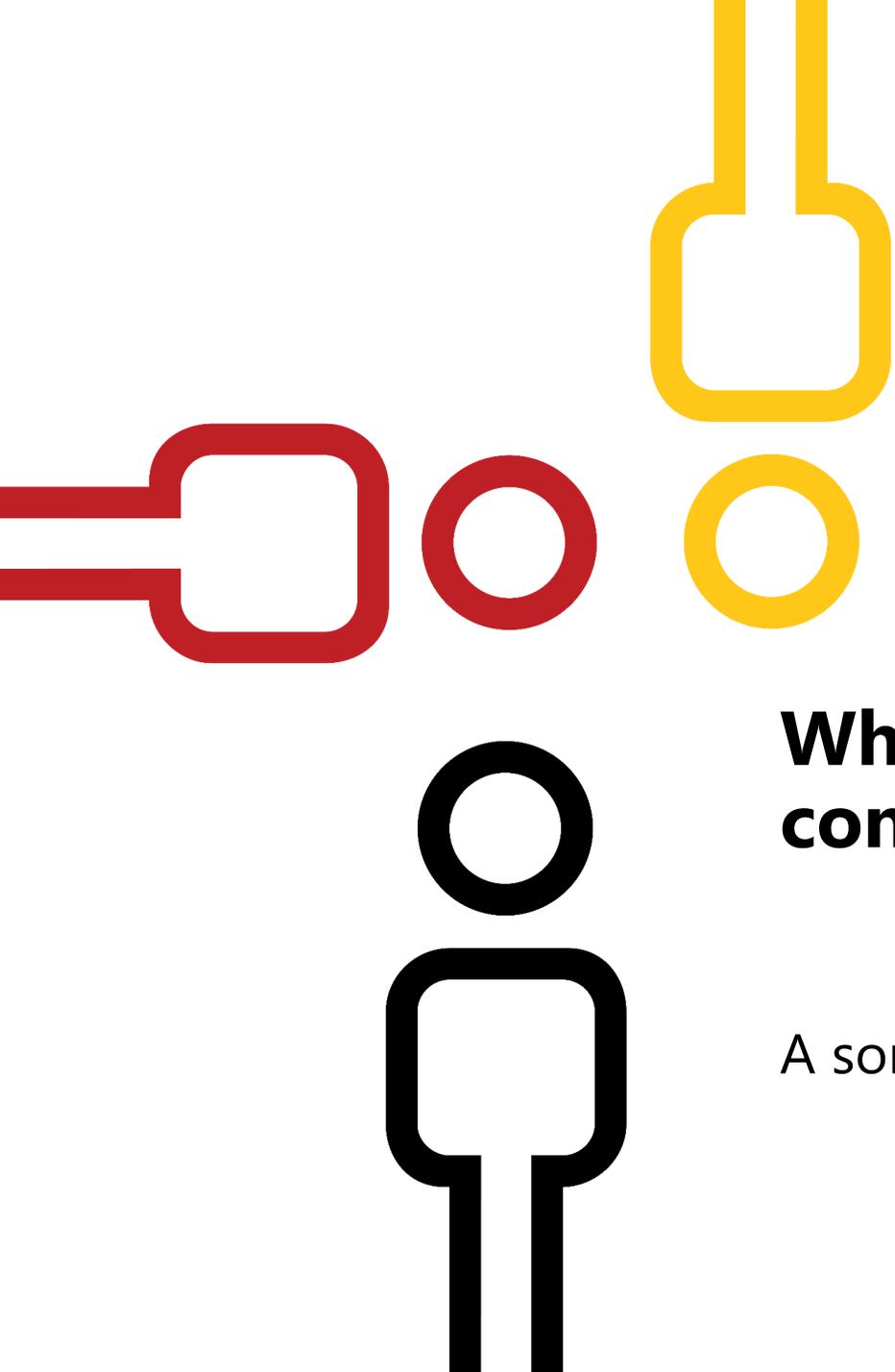
**Promote
End-to-end
encryption
(E2EE)**



**Improve user
experience**



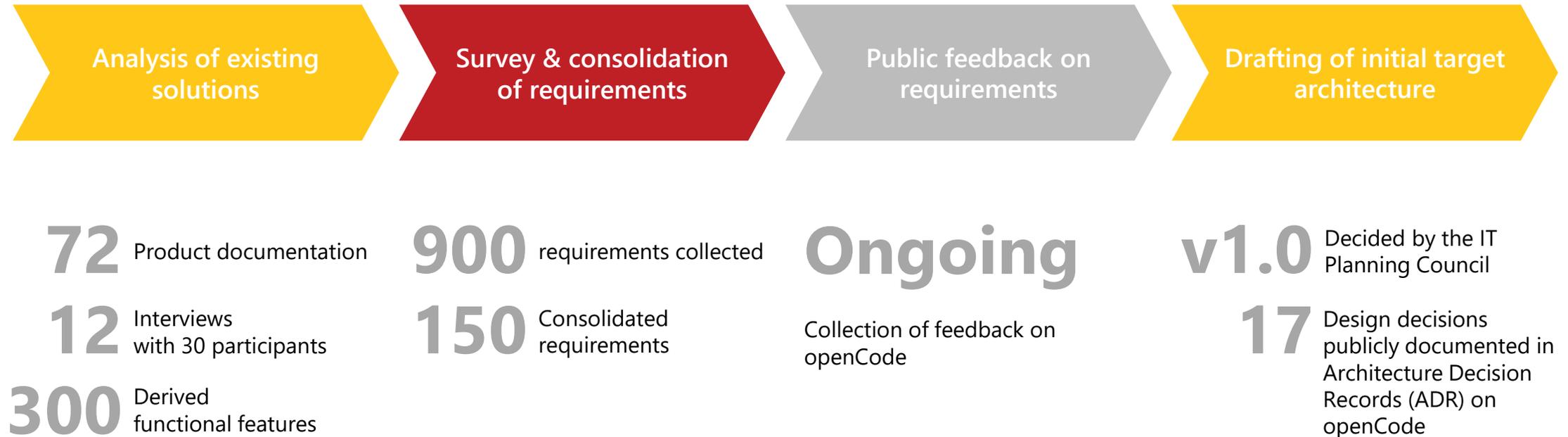
**Enable
continuous
state-of-the-art
development**



What requirements must the consolidated infrastructure meet?

A somewhat dry snapshot of our list of requirements.

What happened so far: The requirements gathering process



Requirements are public on the openCode gitlab

... in German, at least

Thema: Übergreifend

👉👏 -- Jetzt Feedback zu übergreifenden Anforderungen geben

Subthema ¹	Konsolidierte Anforderung	Anforderungs-ID ²
NA	[Das System] soll vollständig E2E digitalisierte Verwaltungsprozesse unterstützen.	ANF_FUN_ÜBE_002
NA	[Das System] ist auf eine nahtlose und intuitive Nutzererfahrung ausgelegt, die es allen [Nutzer:innen] - unabhängig von ihrer technischen Vorerfahrung - ermöglicht, die Funktionen mühelos zu nutzen, auch bei nur gelegentlicher Nutzung.	BED_BEN_ÜBE_008
NA	[Das System] ermöglicht eine medienbruchfreie Kommunikation.	BED_BEN_ÜBE_002
NA	[Das System] ist sehr einfach nutzbar, um eine hohe Akzeptanz zu erfahren.	BED_AKZ_ÜBE_001
NA	[Das System] ermöglicht eine barrierefreie und inklusive Kommunikation.	BED_BAR_ÜBE_003
NA	[Das System] erfüllt die Anforderungen an die Barrierefreiheit gemäß der Barrierefreie-Informationstechnik-Verordnung BITV 2.0.	BED_BAR_ÜBE_007
NA	[Das System] ermöglicht [Privatpersonen] und [privaten Organisationen] über einen einzigen Zugang eine Kommunikation über alle Bereiche der [öffentlichen Stellen] hinweg (Allgemeine Innere Verwaltung; Schulwesen; Wissenschaft; Forschung und Kultur; Gesundheit; Sport und Erholung; Sozialwesen; Steuerverwaltung; Wirtschaftsförderung; Gesundheitswesen; Justizverwaltung; usw.).	RAH_ÜBE_144
NA	[Das System] ermöglicht den verschiedenen Staatsgewalten (Judikative, Exekutive, Legislative) die unabhängige Wahrnehmung ihrer verfassungsmäßigen Rolle.	RAH_ÜBE_143
NA	[Das System] erfüllt die Anforderungen des Servicestandards für die digitale Verwaltung (DIN SPEC 66336 - Qualitätsanforderungen für Onlineservices und -portale der öffentlichen Verwaltung).	RAH_VOR_006
NA	Die Bestandteile [des Systems] sind unter einer offenen Software-Lizenz lizenziert.	POR_AUS_HER_002
NA	[Das System] ist bezüglich seiner Komponenten/Dienste modular aufgebaut und lose gekoppelt.	WAR_MOD_ÜBE_001
NA	Die Nutzung [des Systems] sollte für [Privatpersonen] kostenfrei sein, da Gebührenerhebungen eine erhebliche Barriere für die Akzeptanz und den flächendeckenden Erfolg dieser Kommunikationsinfrastruktur darstellen würden und für einen digitalen Basisdienst der öffentlichen Verwaltung nicht angemessen wären.	RAH_ÜBE_148
NA	[Das System] ist für [Privatpersonen] kostenfrei d.h. ohne Nutzungsgebühren nutzbar.	RAH_ÜBE_149

Thema: Use Cases

👉👏 -- Jetzt Feedback zu Anforderungen für Use Cases geben

Subthema	Konsolidierte Anforderung	Anforderungs-ID
Use Case	[Öffentliche Stellen] können [elektronischen Schriftverkehr] in Form von [Nachrichten] mit [Nutzer:innen] und untereinander austauschen.	ANF_FUN_USE_036
Use Case	[Nutzer:innen] können mit am [Portalverbund] angeschlossenen [öffentlichen Stellen] vorgangsbezogen kommunizieren. (i.S.v. §2 Abs. 7 OZG)	ANF_FUN_USE_001
Use Case	[Das System] ermöglicht es [Online-Diensten] und [Fachverfahren] [Nachrichten] in das [Postfach] einer [Privatperson] und/oder einer [privaten Organisation] zuzustellen.	ANF_FUN_USE_060



https://gitlab.opencode.de/it-planungsrat/fit-ab/zapuk/-/blob/main/konsolidierte-anforderungen/Konsolidierte-Anforderungen.md?ref_type=heads

○ Some important requirements

Modern user experience

- RAH_ÜBE_144: [The system] enables [private individuals] and [private organisations] to communicate **across all areas of [public authorities] via a single access point.**
- ANF_FUN_USE_055: [The system] enables **[real-time communication]** between two [users].
- ANF_ARC_ARC_016: [Private individuals] can use [the system] easily and **conveniently via a mobile app or responsive web-based access.**
- ANF_FUN_USE_069: [The system] supports **bidirectional communication**, which may be restricted to unidirectional by the [sender].

(and many more...)

○ Some important requirements

Identity and authenticity

- ANF_FUN_USE_066: [The system] enables the **legally binding and confidential transmission** of [messages] and [attachments].
- ANF_FUN_IDE_001: The **role of a [sender]** ([public authority], [private organisation], [private individual], etc.) must be **recognisable** in a [message].
- ANF_FUN_ADR_024: [The system] **does not use globally unique identifiers** that refer directly or indirectly to [natural persons] recognisable in a [message].
- ANF_FUN_ADR_039: **[Private individuals] may only be contacted** via [the system] with **their prior consent**; consent may be revoked at any time.
- ANF_FUN_ADR_025: [The system] must **support representation rules and powers of attorney**.

(and many more...)

○ Some important requirements

Openness and connectivity

- ANF_FUN_TRA_017: [The system] transports [messages] **via the internet.**
- ANF_ARC_ANB_006: The functionalities [of the system] are available to [users] without functional restrictions via **programming interfaces** (implementation of the API-first approach).
- ANF_ARC_ANB_007: **All interfaces [of the system] are based on open standards.**
- POR_AUS_HER_002: The components [of the system] **are licensed under an open software licence.**
- ANF_ARC_ANB_021: All interfaces [of the system] can be **accessed without the need for proprietary components.**
- ANF_ARC_ANB_009: **All interfaces [of the system] are structured, complete and publicly available.**

(and many more...)

○ Some important requirements

Security and encryption

- SIC_VER_ÜBE_026: [The system] ensures **end-to-end encryption** of transmitted [messages] (including [attachments] and [confidential metadata]).
- SIC_VER_ÜBE_029: The encryption method used supports modern cryptographic features such as **perfect forward secrecy (PFS), post-compromise security (PCS**, also known as future secrecy) and **plausible deniability**.
- ANF_ARC_ARC_050: [The system] should **manage cryptographic keys** for [users] (especially [private individuals]) as **automatically and transparently as possible in the background**. Manual interaction with keys should only be necessary in clearly defined exceptional cases, if at all.

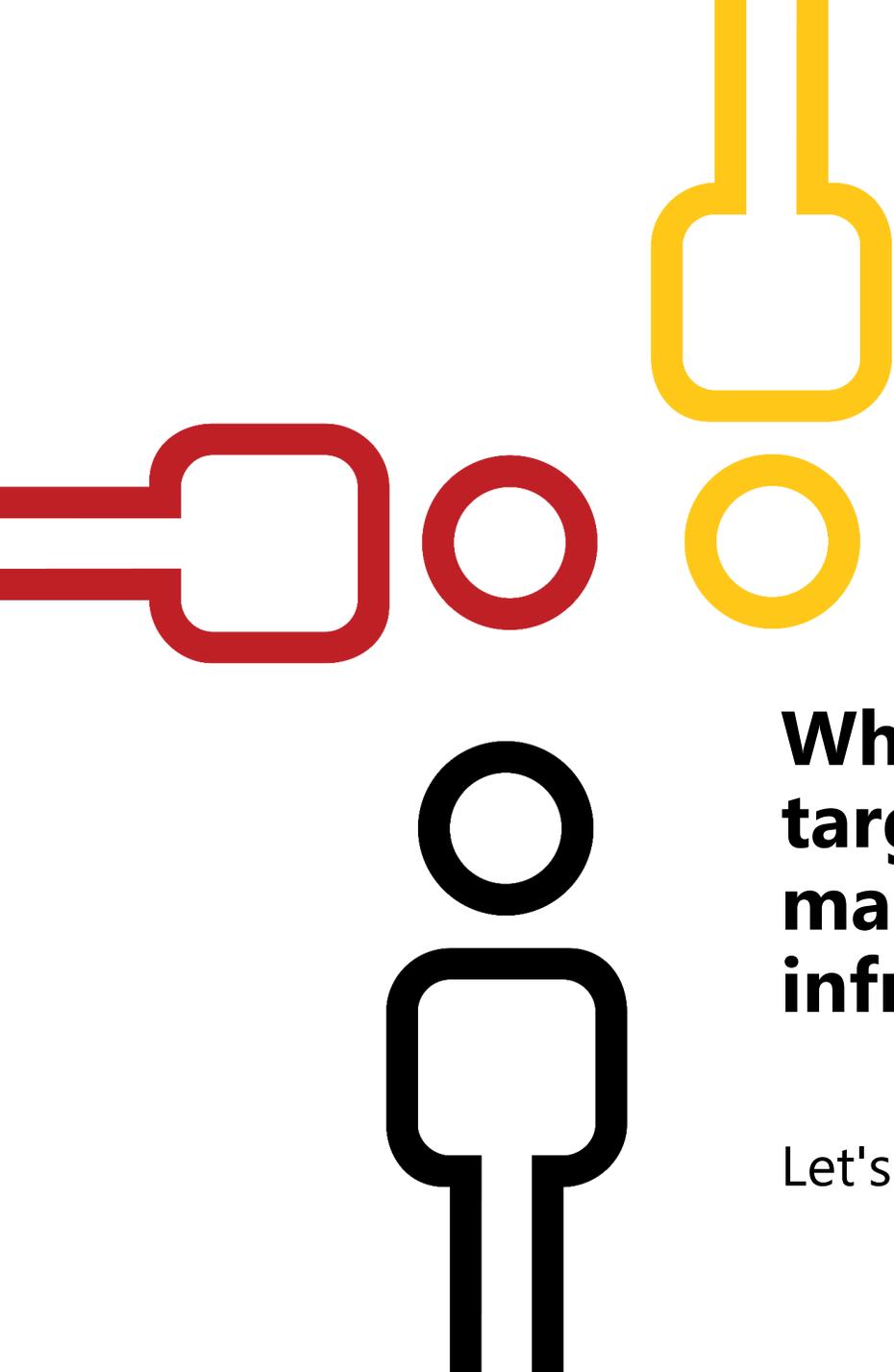
(and many more...)

○ Some important requirements

Sovereignty

- ZUV_ÜBE_RES_002: [The system] must be designed to be **organisationally and technically resilient** in order to ensure the exchange of messages even in crisis situations.
- RAH_ÜBE_143: [The system] enables the **various branches of government (judiciary, executive, legislature) to perform their constitutional roles independently.**

(and many more...)

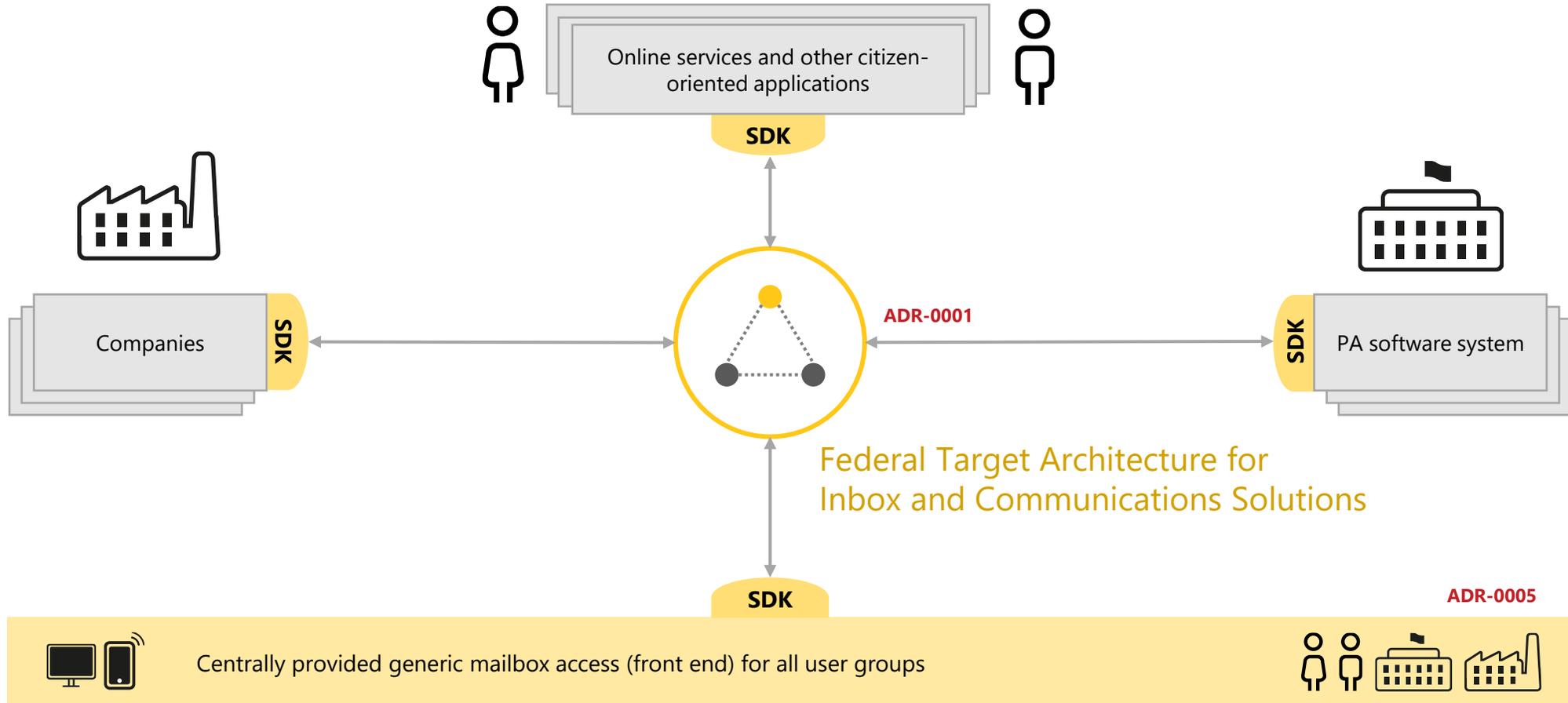


What does Germany's new federal target architecture for a consolidated mailbox and communications infrastructure look like?

Let's zoom in.

Target architecture: User groups and general setup

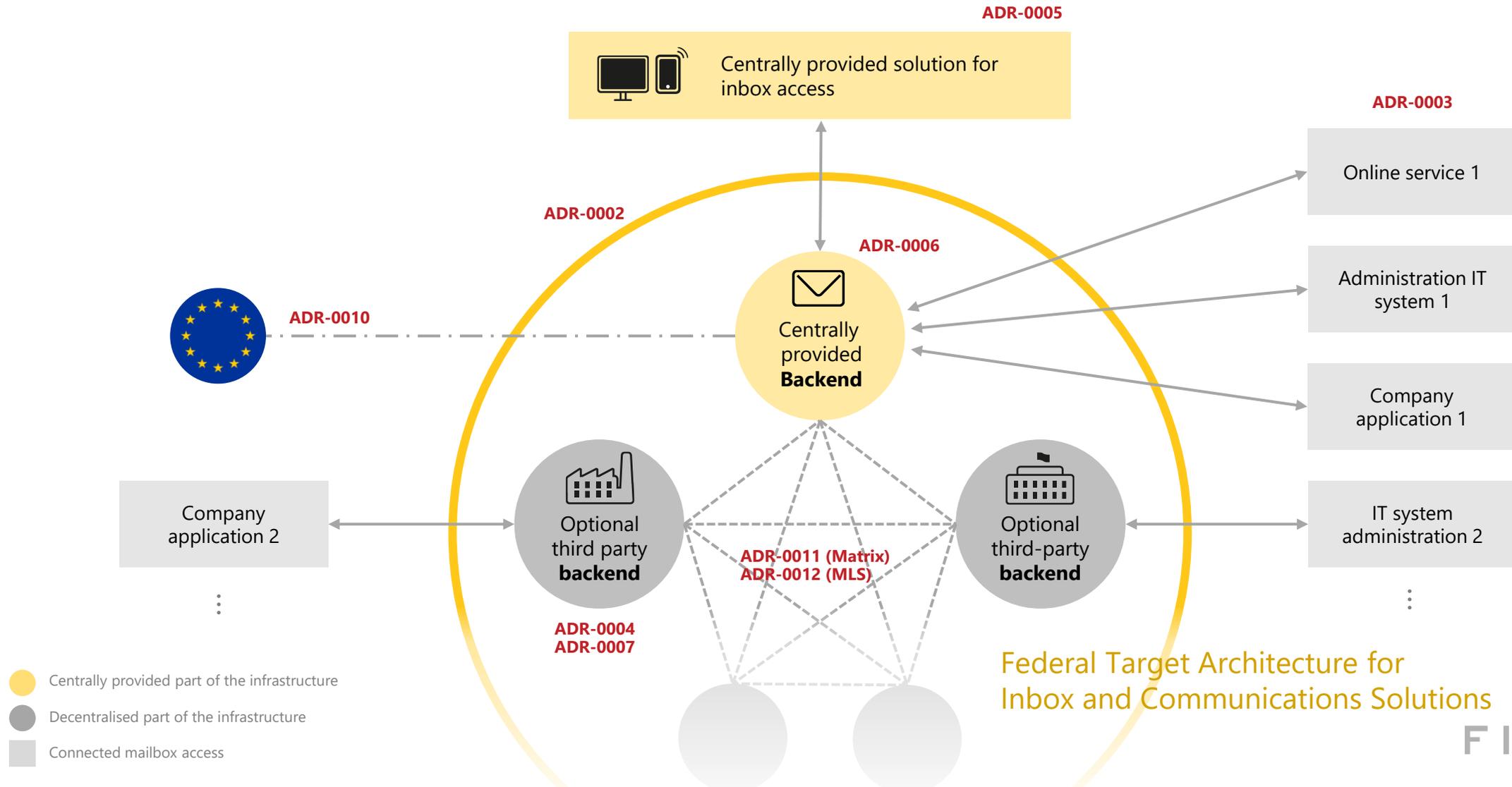
Overview target architecture



- **ADR-001:** The infrastructure is modular and can be expanded with a few cross-sectional functions. It is a cross-sectional or **basic component** that is **agnostic in terms of subject matter**. Subject-specific processes and functions are not anchored in the infrastructure.

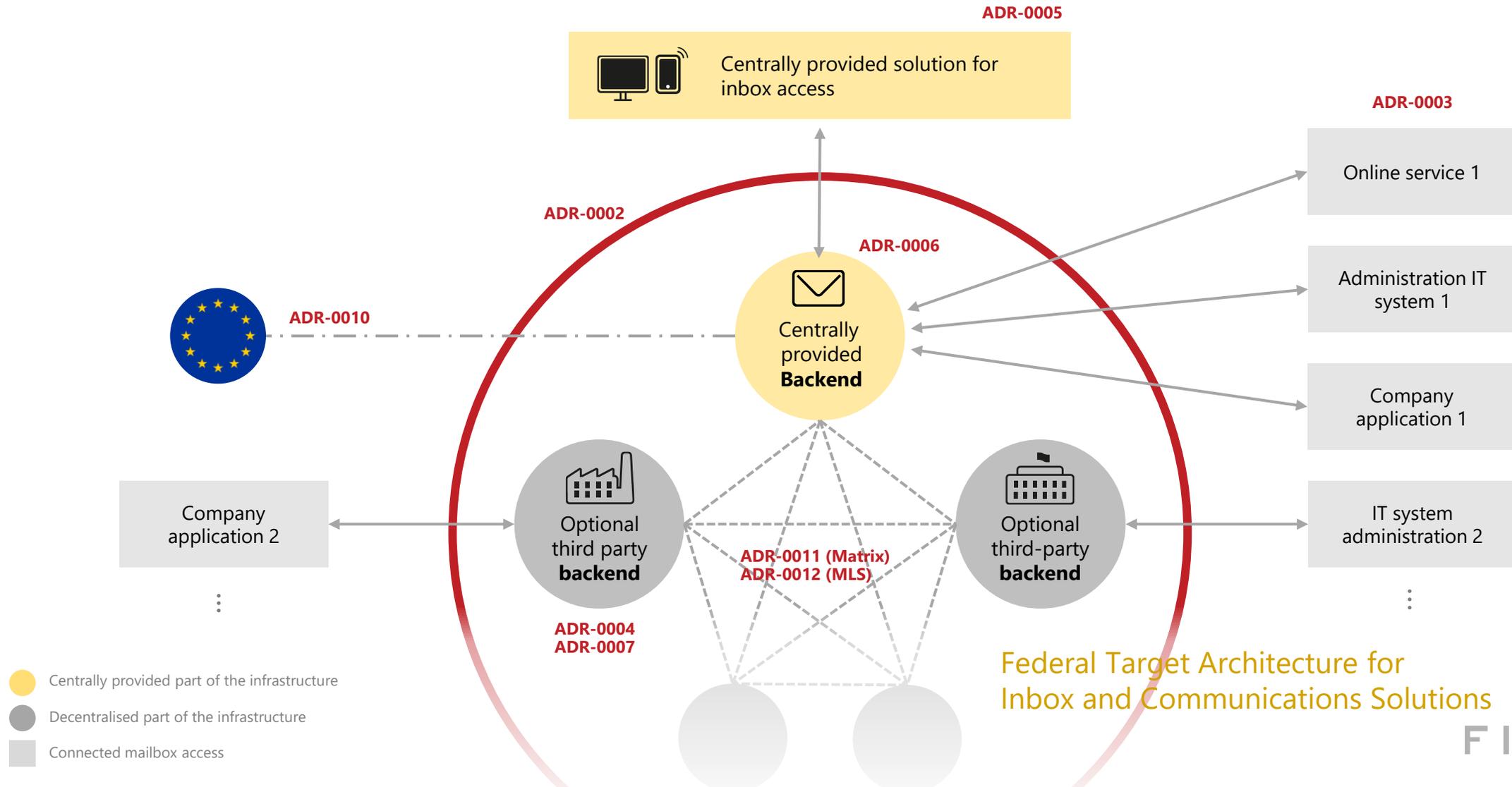
Target architecture: Topology of the infrastructure

Overview target architecture



Target architecture: Topology of the infrastructure

Overview target architecture

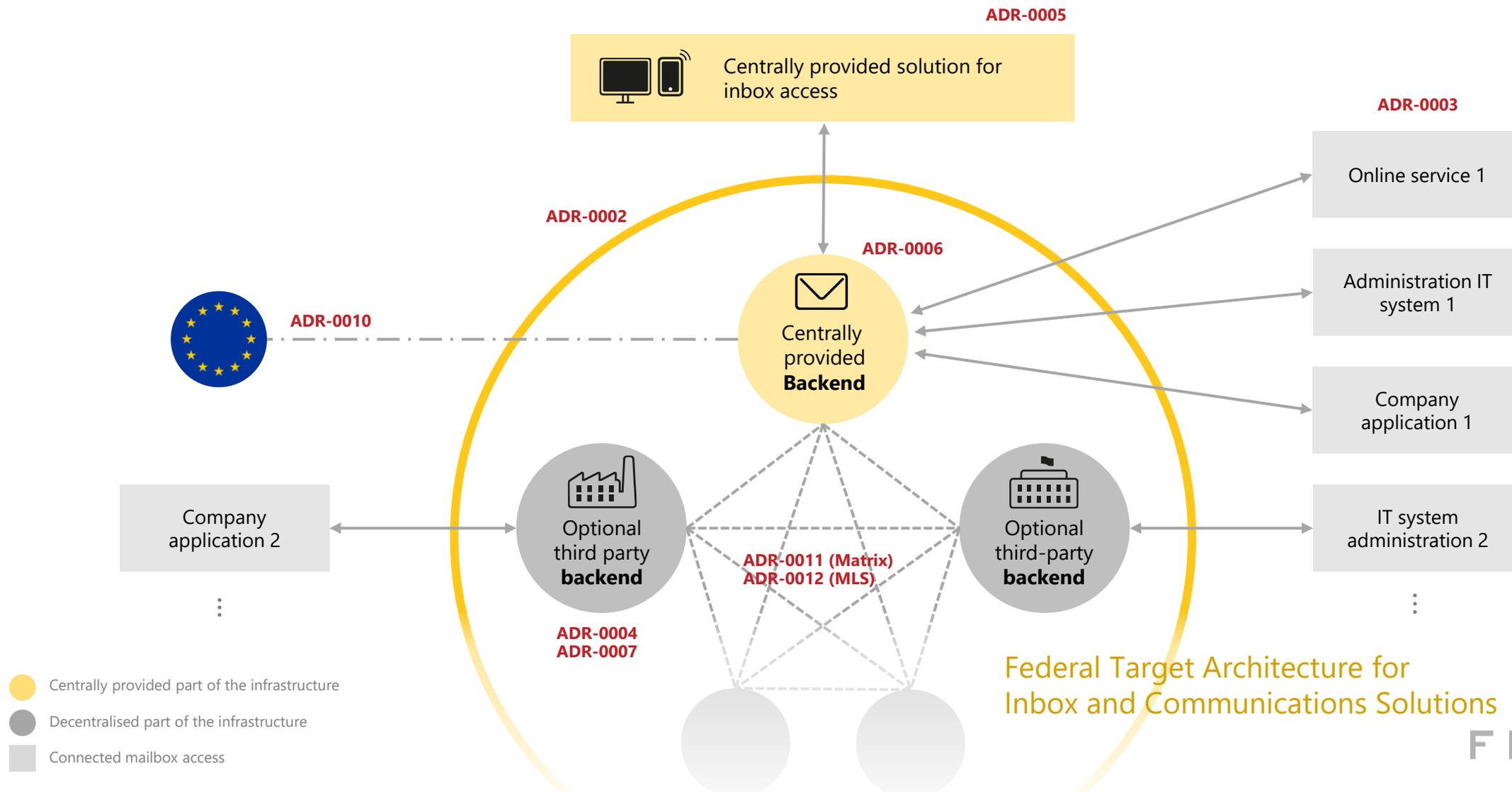


ADR-002

- **ADR-002:** The topology of the infrastructure follows **a hybrid approach** with both centrally provided clients and backends, as well as **optional decentralised components provided by third parties**, which together form a **federated communications network**.

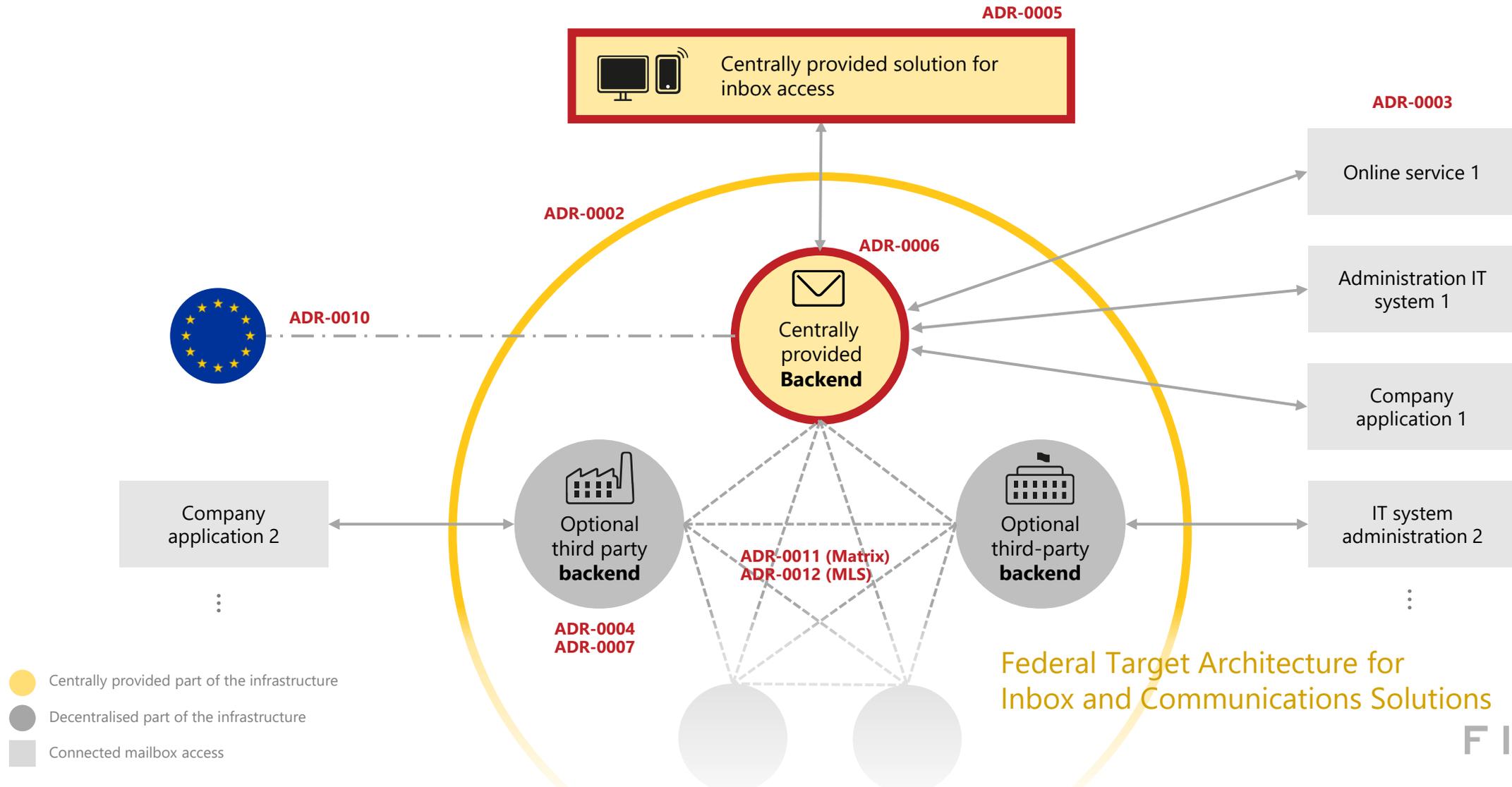
Target architecture: Centrally provided building blocks as a voluntary offer

Overview target architecture



Target architecture: Centrally provided building blocks as a voluntary offer

Overview target architecture

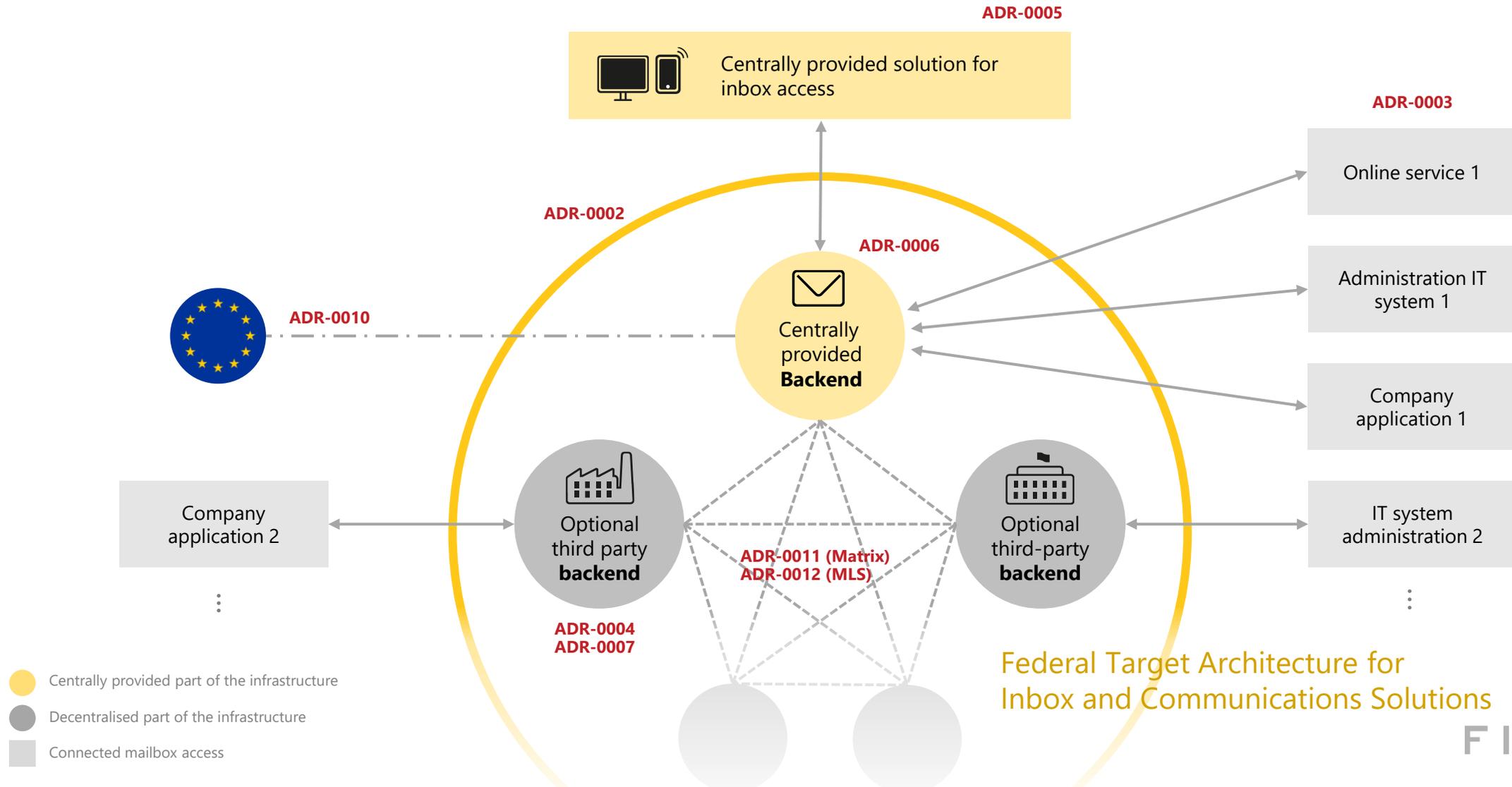


ADR-005 and ADR-006

- **ADR-005:** As a **native part of the infrastructure**, a technically agnostic mailbox **client is provided** centrally for all [users]. The modular configuration of the solution allows its range of functions to be adapted to the needs of [user] groups.
- **ADR-006:** As a **native part of the infrastructure**, a mailbox **backend is provided** centrally for all users (in addition to any mailbox backends operated by third parties).

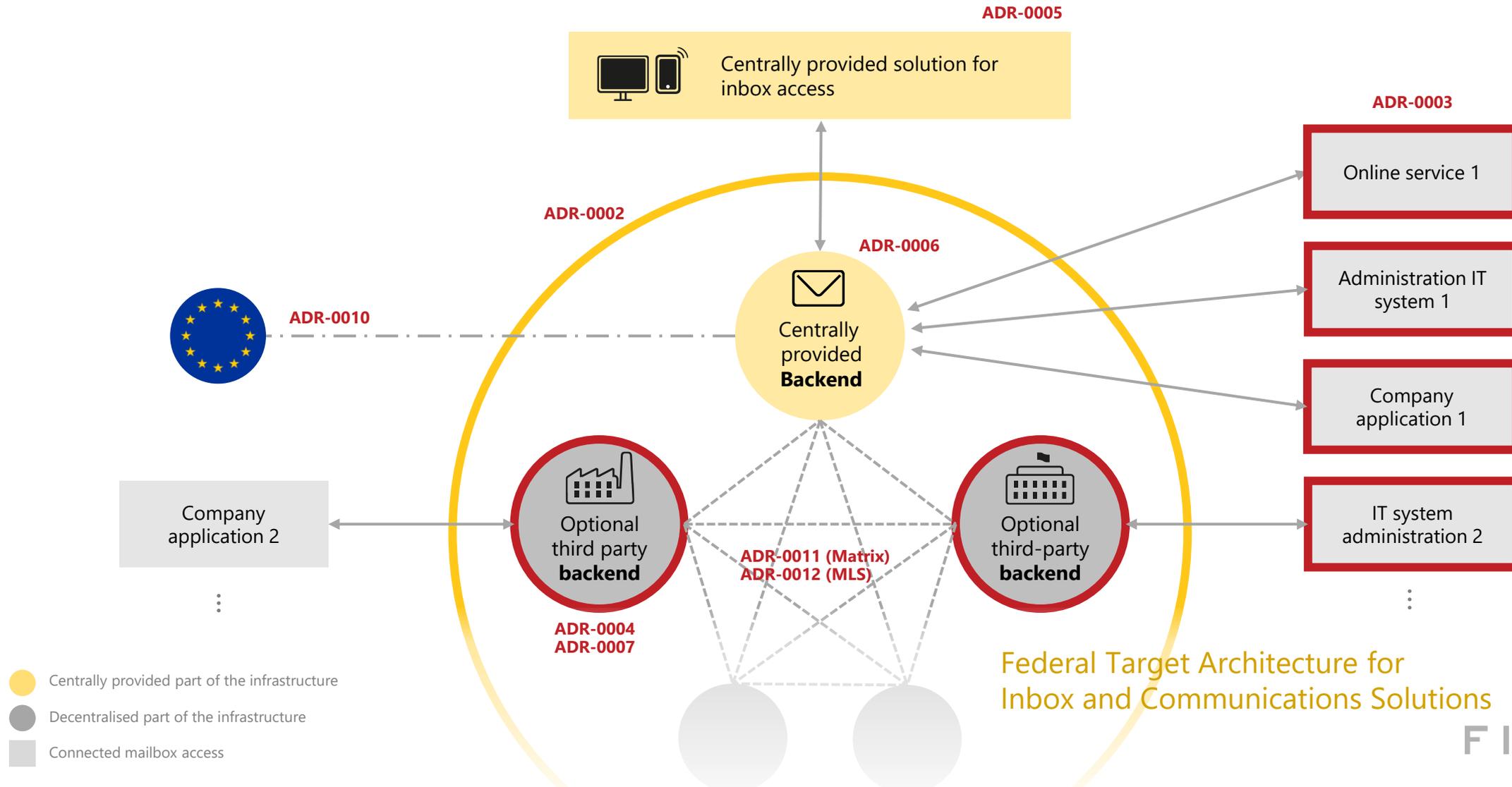
Target architecture: Open ecosystem of development and operations

Overview target architecture



Target architecture: Open ecosystem of development and operations

Overview target architecture

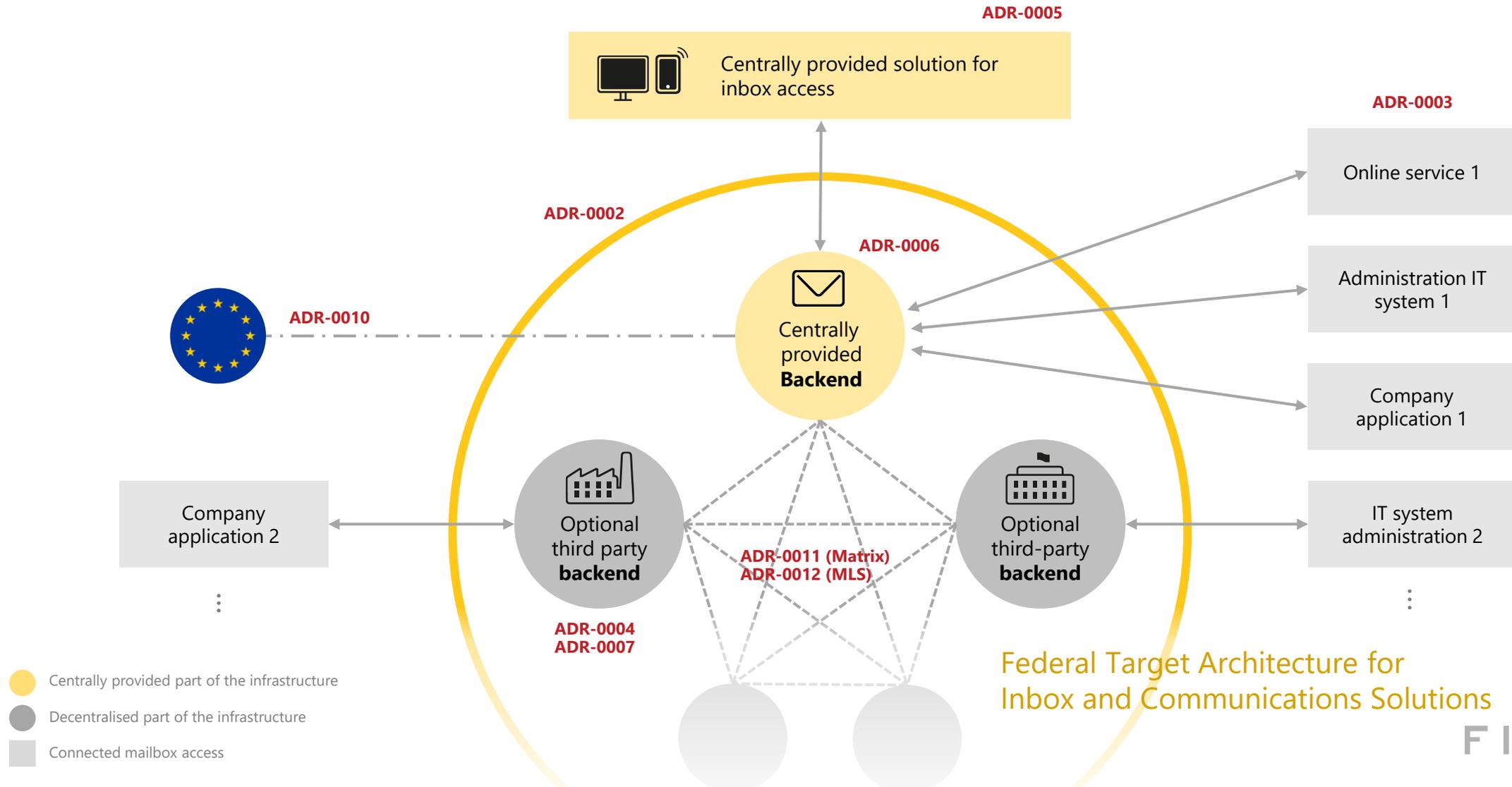


ADR-003, ADR-004 and ADR-007

- **ADR-003: Open development and provision of mailbox client**, including by third parties: The connection of any client-side applications to the infrastructure is permitted without significant restrictions or verification.
- **ADR-004: Open development and provision of mailbox backends**, including by third parties: Any backend systems may be included in the communications network after prior registration and subject to the connection conditions.
- **ADR-007:** Third-party implementations of mailbox backends are unconditionally permitted against the backdrop of a zero-trust paradigm. **A standard or reference implementation** of mailbox backends is developed centrally and made available for reuse.

Target architecture: Matrix (and MLS) as E2EE communications layer

Overview of target architecture

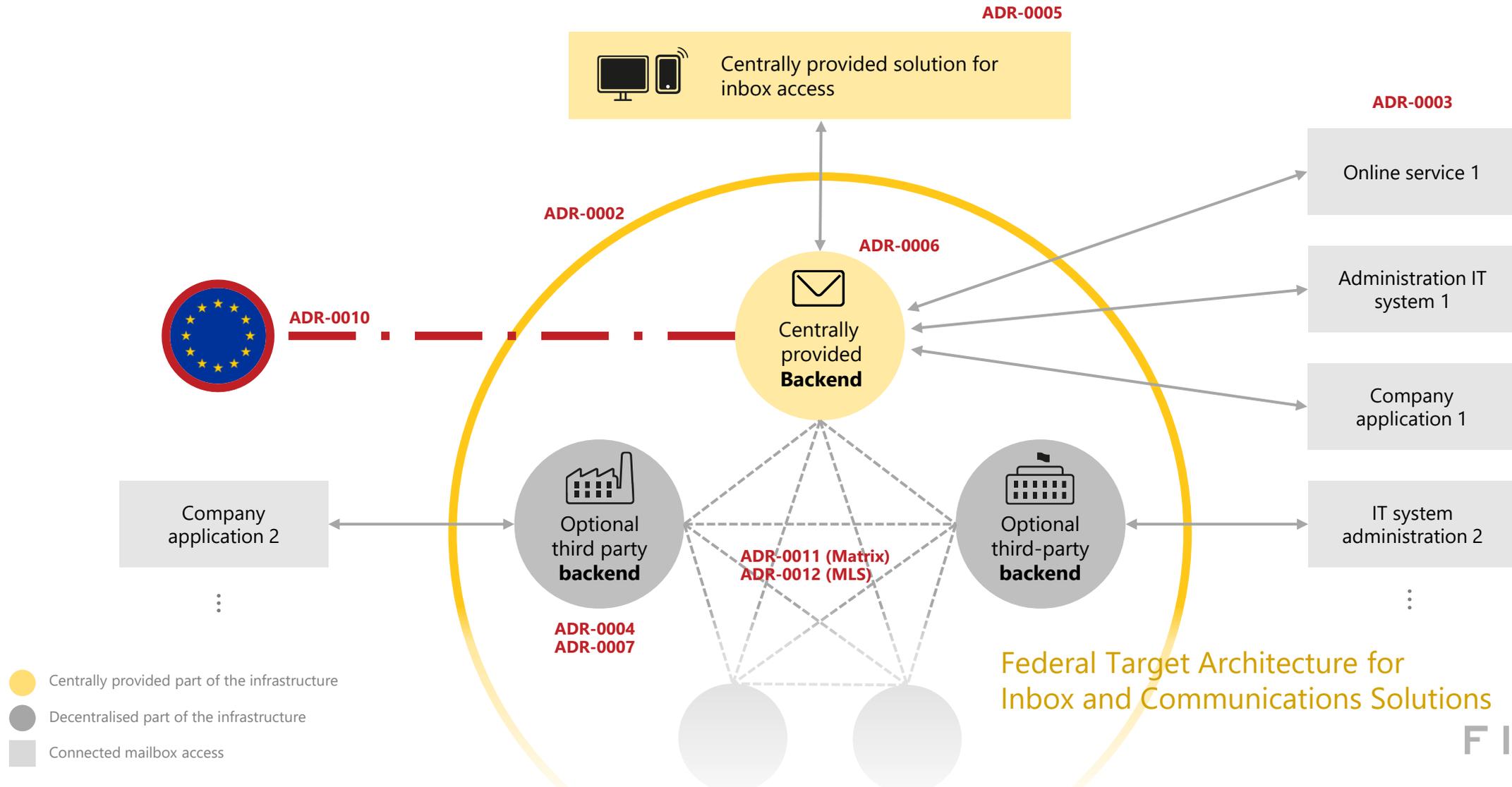


ADR-011, ADR-012 and ADR-013

- **ADR-011:** Use of the open international **Matrix standard as the communication layer** of the infrastructure
- **ADR-012:** Use of open international **Messaging Layer Security (MLS) standards as the end-to-end encryption layer** of the infrastructure
- **ADR-013:** Authenticity is established through mutual authentication of [users] in the encrypted channel of the end-to-end encryption layer.

Target architecture: Interoperability with third-party infrastructures

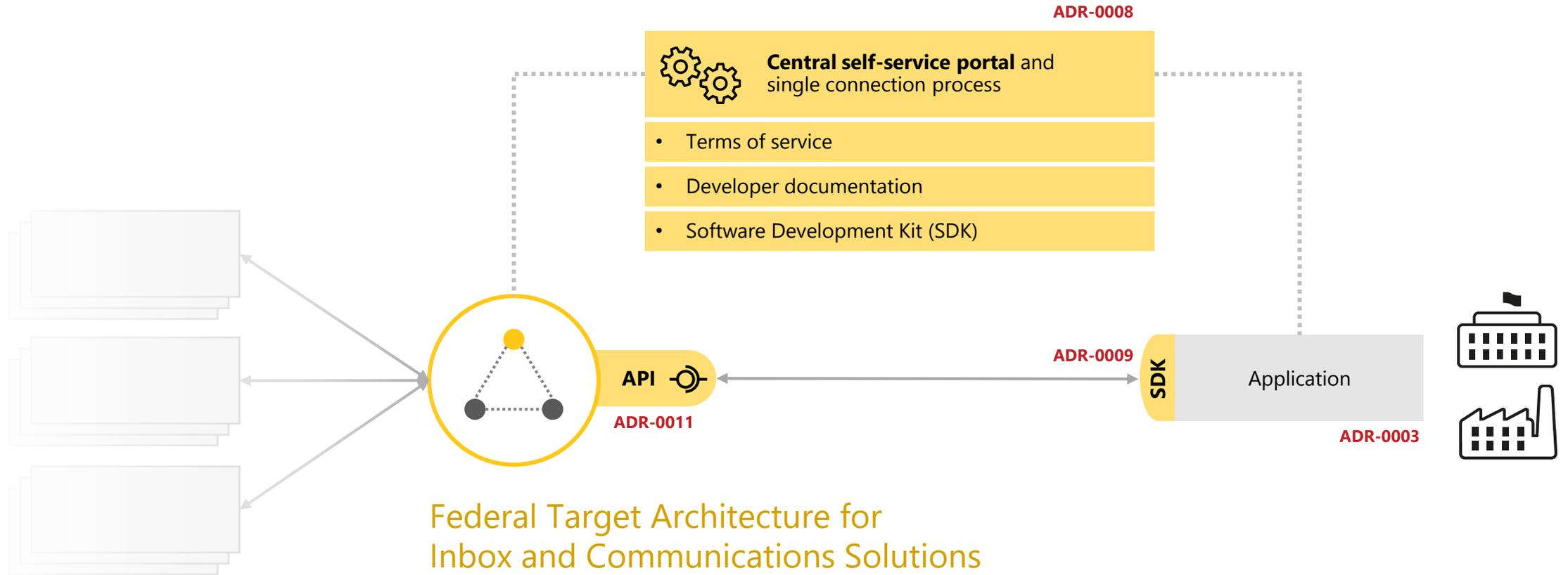
Overview target architecture



- **ADR-10: Interoperability with external systems** outside the scope of the target architecture, in particular systems in the EU and other EU countries, is established at **the end-to-end encryption layer** (through the use of protocol converters).

Target architecture: Connectivity and developer support

Overview target architecture



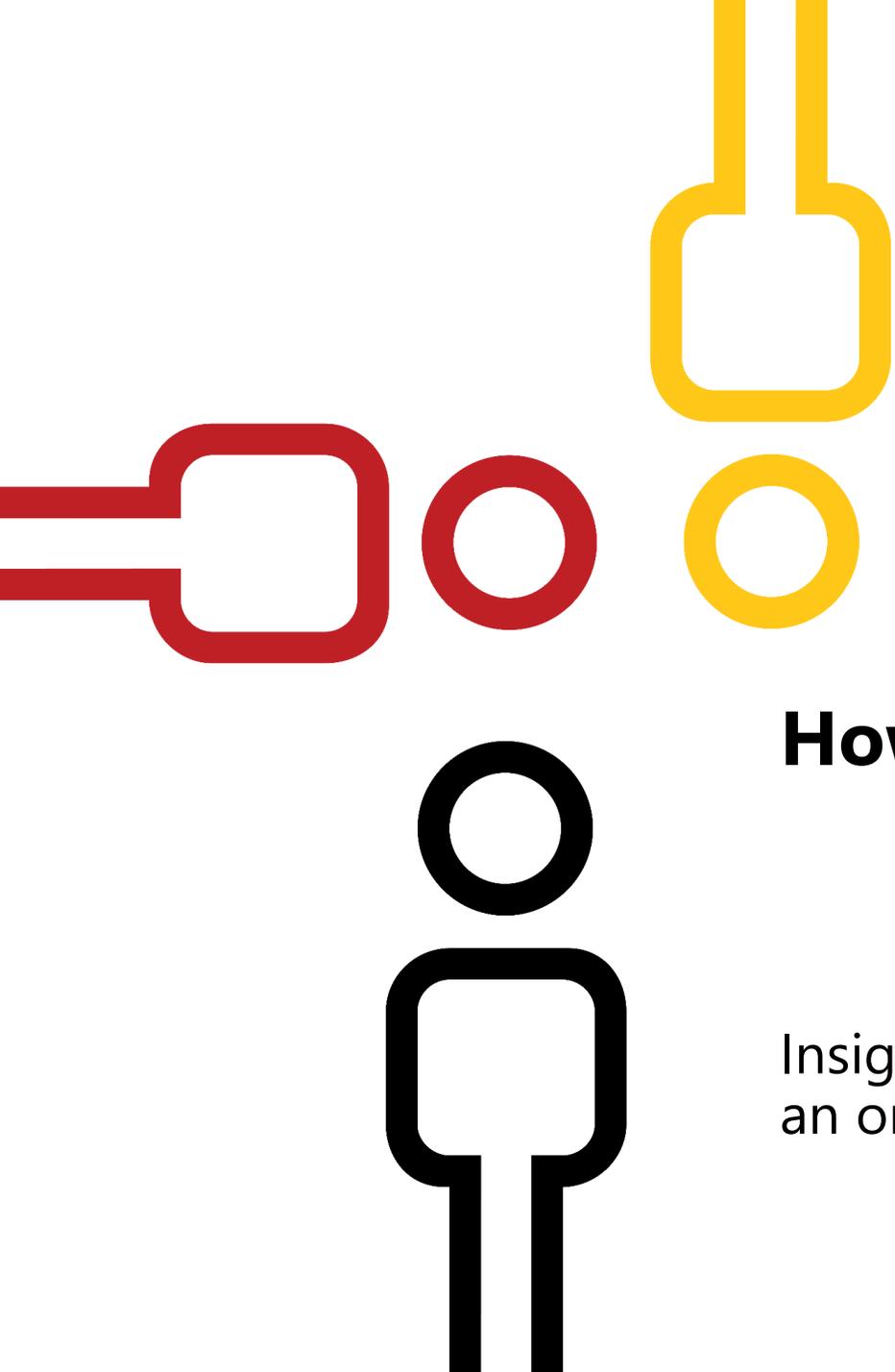
ADR-008 and ADR-009

- **ADR-008:** Uniform process for connecting mailbox clients and mailbox backends to the infrastructure via a **central self-service portal (SSP) for connection for all [user] groups.**
- **ADR-009:** Central **provision of software development kits (SDK)** to support the simplified, secure and consistent connection of mailbox clients to the infrastructure.

Architectural decisions for the target architecture P&K

Architecture Decision Records (ADR)

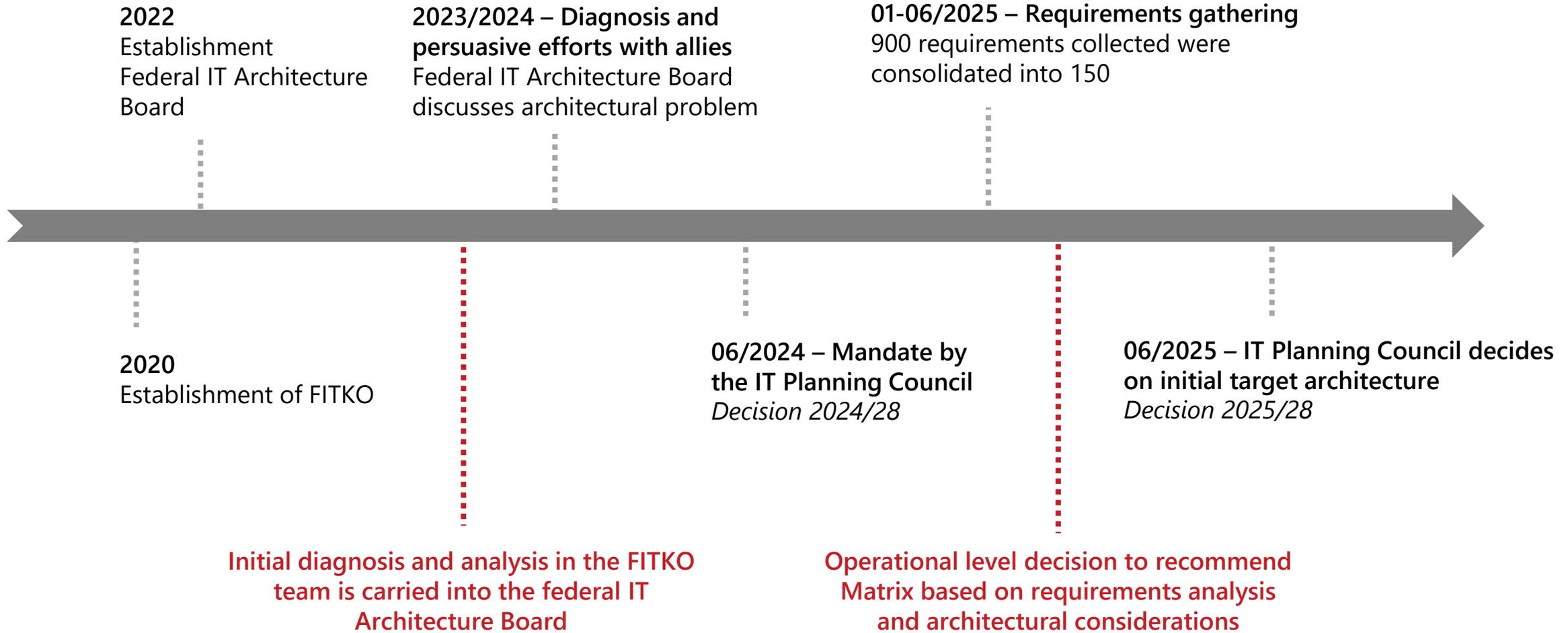
ADR	Summary of the architecture decision
ADR-0001	The infrastructure is modular and can be expanded with a few cross-sectional functions. It is essentially an agnostic cross-sectional or basic component. Specialist processes and functions are not anchored in the infrastructure. agnostic cross-sectional or basic component. Subject-specific processes and functions are not anchored in the infrastructure.
ADR-0002	The topology of the infrastructure follows a hybrid approach with both centrally provided mailbox access and mailbox backends, and optional decentralised components provided by third parties, which together form a federated communications network.
ADR-0003	Open development and provision of mailbox access , including by third parties: Any client-side applications may be connected to the infrastructure is permitted without significant restrictions or verification.
ADR-0004	Open development and provision of mailbox backends , including by third parties: The inclusion of any backend systems into the communications network is permitted after prior registration and subject to compliance with the connection conditions .
ADR-0005	As a native part of the infrastructure, technically agnostic mailbox access is provided centrally for all [users]. The modular configuration of the solution allows its range of functions to be adapted to the needs of [user] groups.
ADR-0006	As a native part of the infrastructure, a mailbox backend is provided centrally for all [users] (in addition to any mailbox backends operated by third parties).
ADR-0007	Third-party implementations of mailbox backends are unconditionally permitted against the backdrop of a zero-trust paradigm . A standard or reference implementation of mailbox backends is developed centrally and made available for reuse.
ADR-0008	Uniform process for connecting mailbox accesses and mailbox backends to the infrastructure via a central self-service portal (SSP) for connection for all [user] groups.
ADR-0009	Central provision of software development kits (SDK) to support the simplified, secure and consistent connection of mailbox accesses to the infrastructure.
ADR-0010	Interoperability with external systems outside the scope of the target architecture, in particular systems in the EU and other EU countries , is established at the end-to-end encryption layer level (through the use of protocol converters).
ADR-0011	Use of the open international Matrix standard as the communication layer of the infrastructure.
ADR-0012	Use of open international standards Messaging Layer Security (MLS) as the end-to-end encryption layer of the infrastructure
ADR-0013	Authenticity is established through mutual authentication of [users] in the encrypted channel of the end-to-end encryption layer .

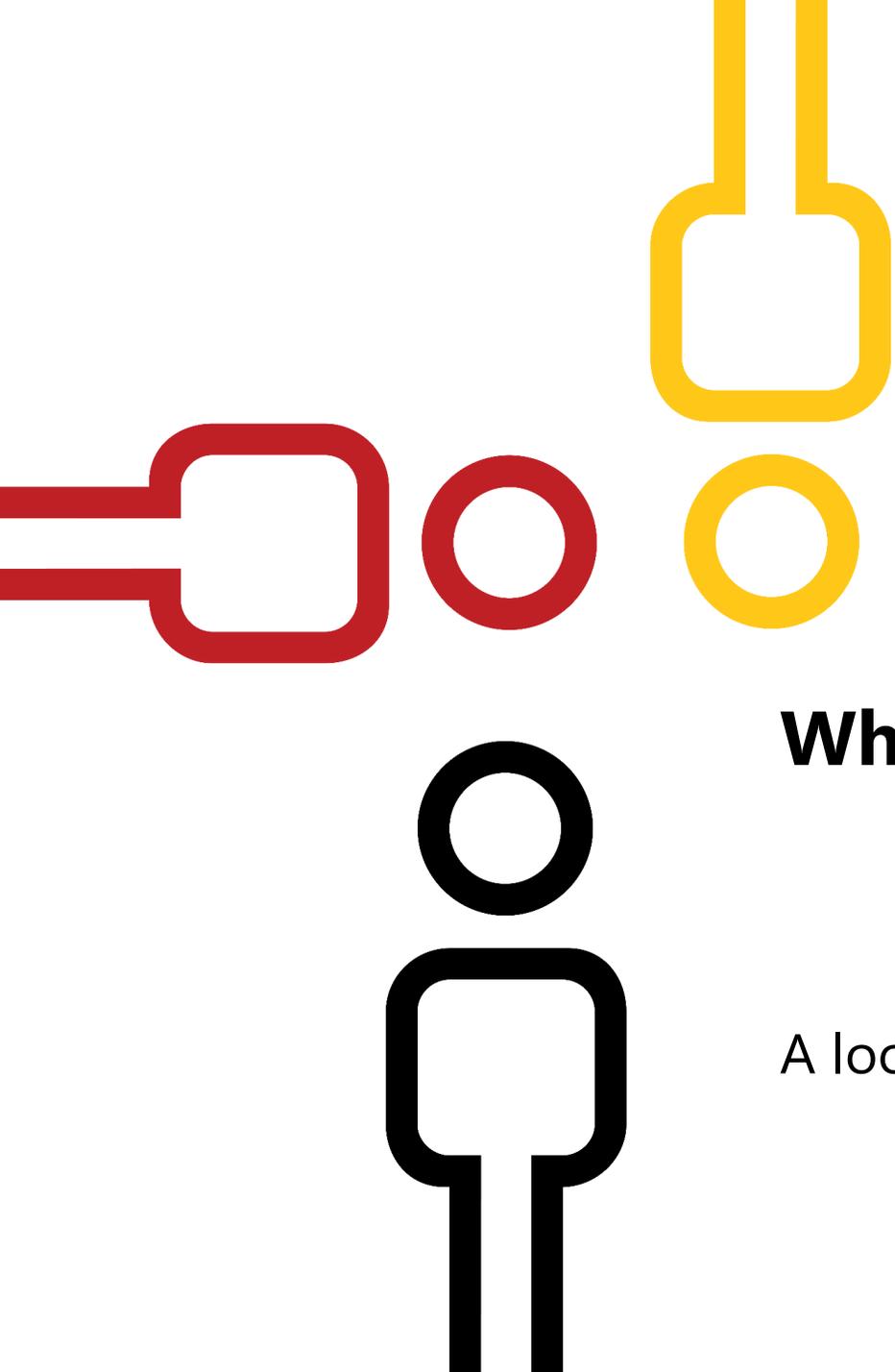


How did we get here?

Insights from a long journey and an ongoing administrative policy process.

An anecdotal timeline



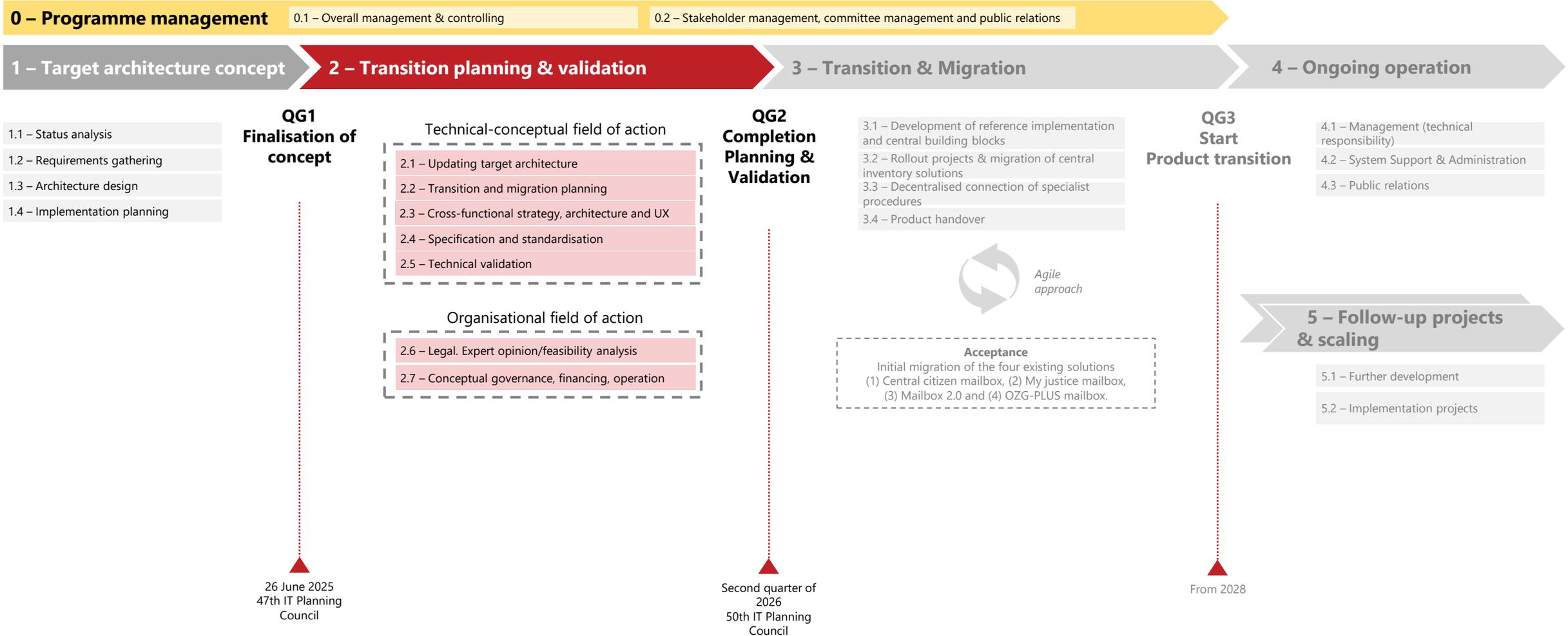


What will happen next?

A look ahead.

ZaPuK implementation programme

Procedure 2025 to 2026



Phase 2: Transition planning and validation

Next steps until summer 2026

Legal opinion &
feasibility analysis

Governance &
Financing

Integration into standards and
higher-level architectures

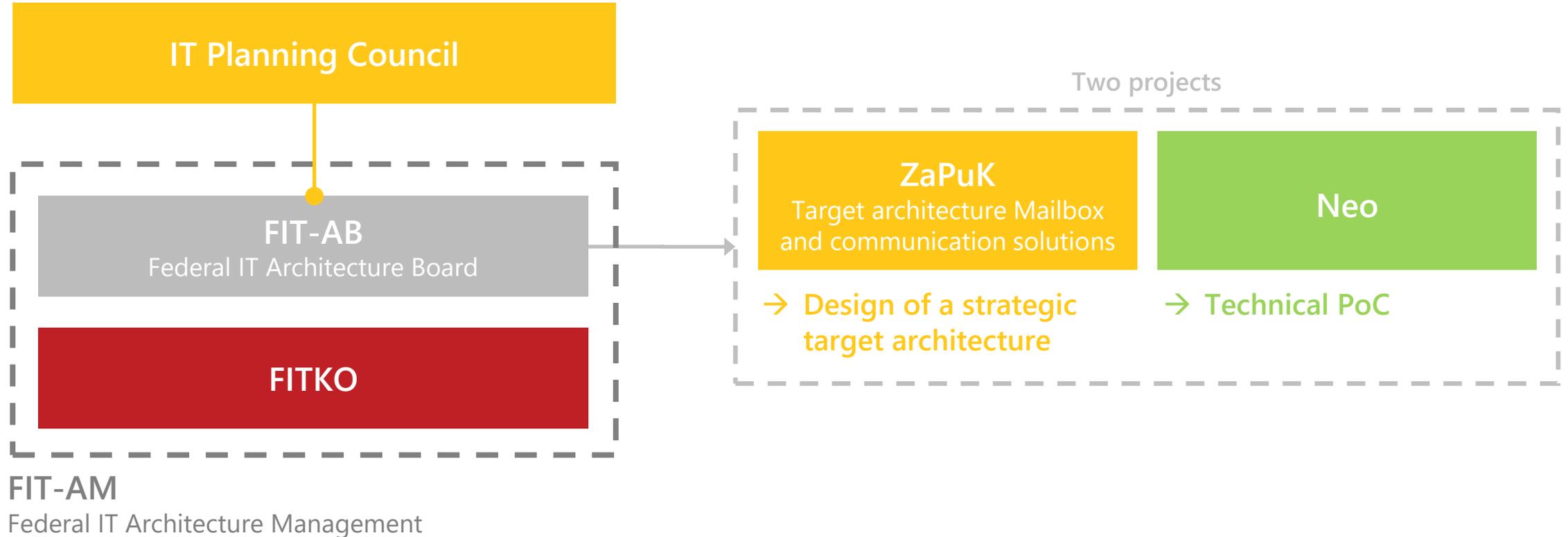
Technical proofs of concept

Coordination of ministerial conferences

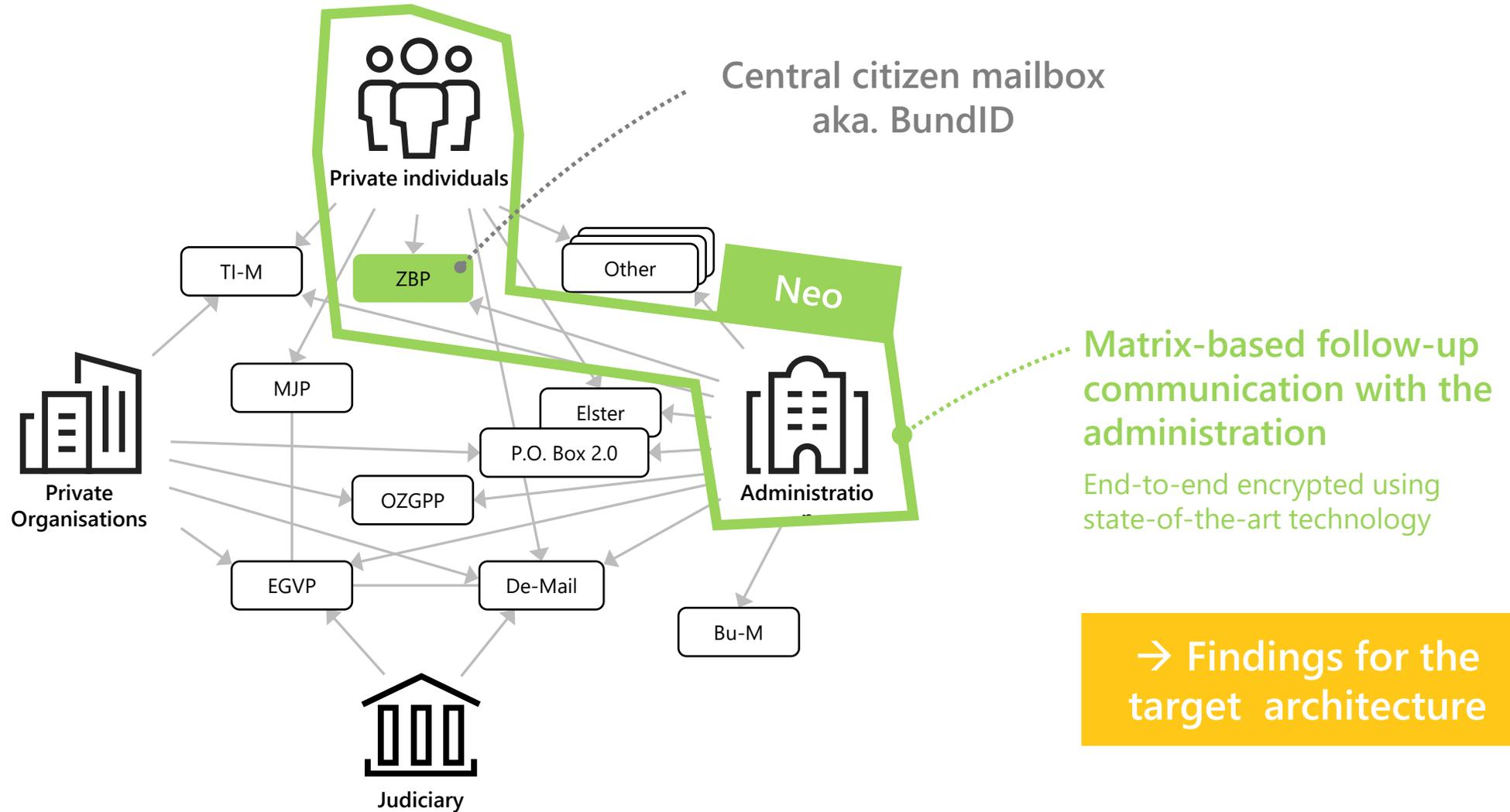
Transition and migration planning

Refining the target architecture

Practical evidence runs parallel: Project Neo



Practical proof runs parallel: Project Neo



→ Findings for the target architecture

Want to learn more about Neo? Catch our second talk later today.

2:10 PM	Consolidating Germany's administrative communication: Towards a joint Matrix-based architecture	50min	Dominik Braun	Public Sector
3:00 PM				
3:10 PM	Trialing Matrix within the European Commission for resilient and sovereign communications	25min	Nicolas Dubois	Public Sector
3:30 PM				
3:40 PM	Coffee Break	25min		
4:00 PM				
4:10 PM	The German BundesMessenger	50min	Kai A. Hiller	Public Sector
4:30 PM				
5:10 PM	An Update on reaching the German Government via Matrix	50min	networkException	Public Sector
5:30 PM				

This is us right now!

Catch the session on the 'Neo' technical PoC later today:

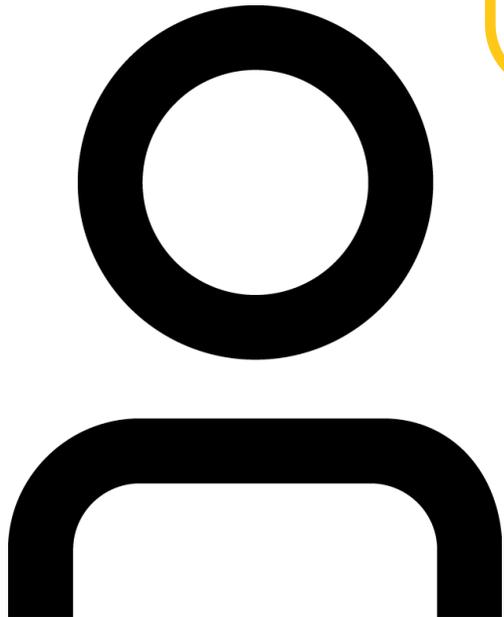
An update on reaching the German government via Matrix

Thursday, 16 October 2025 | 17:10
Room: Ada Byron

Kontakt

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