



Simpl: Enabling the data space ecosystem

Data Sharing Festival 2025

Simpl: Enabling the data space ecosystem

Introducing the Speaker



Nicolas Auricchio

Lead Architect Simpl-Open

Sovereign-X

Simpl

What is Simpl?

open-source means built-in trust & security, flexibility to deploy, simplicity to customise

middleware are software suites that enable applications and databases to work seamlessly together and provide a flawless user experience

Simpl is the **open-source** smart **middleware** that enables **cloud-to-edge federations** and **all major data initiatives** funded by the European Commission

all major data initiatives, in particular the development of **Common European Data Spaces** modular and interoperable way.

cloud-to-edge federations put together resources across cloud and edge computing environments as a cohesive system, creating a seamless integrated infrastructure that combines the strength of both cloud and edge computing.

About the Simpl Programme

The Simpl Programme has three core products

Simpl-Open

- Open-source
- Middleware
- Cloud to edge federations
- Enabling major data initiatives

Simpl-Live

- **Distinct instances** of Simpl-Open software stack
- Deployed for **specific sectoral data spaces**/ initiatives
- European Commission plays an **active role** in their management.

Simpl-Labs

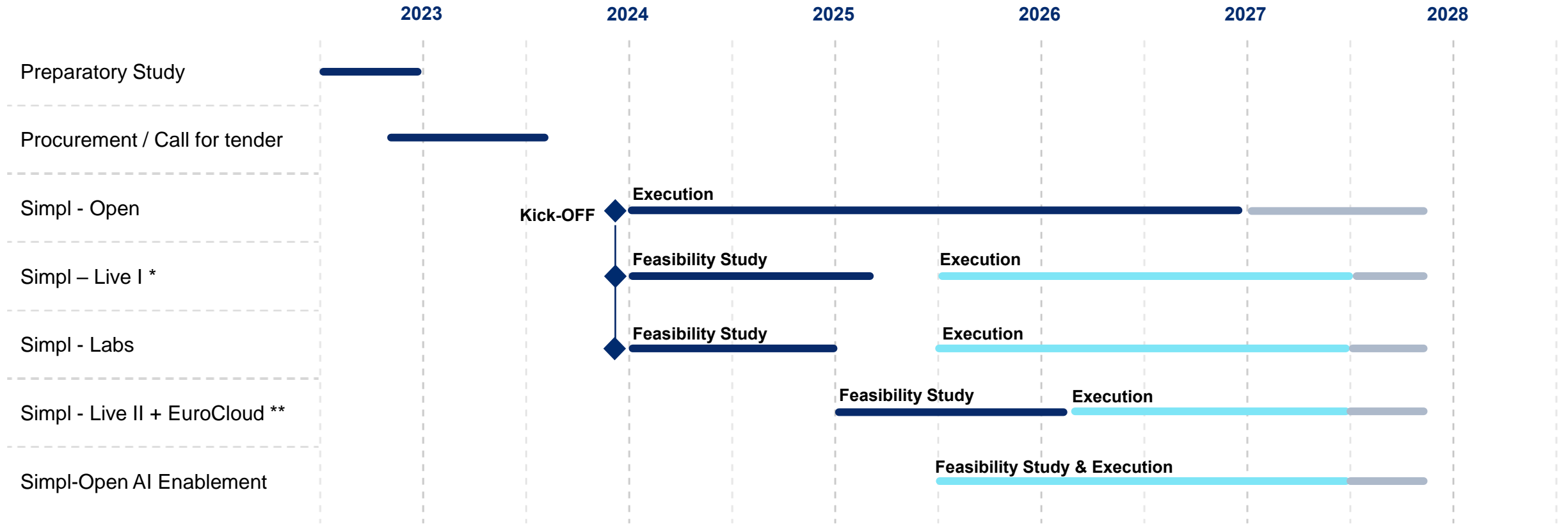
- Playground environment for Simpl-Open.
- Interoperability test for existing data spaces.



The Simpl Programme Roadmap

Simpl-Open, Simpl-Live, and Simpl-Labs

- Committed scope
- Possible Follow up - Implementation of Simpl Live/Labs; Simpl-Live Feasibility Studies for new data space initiatives
- Potential next step still to be validated



* Data spaces included: PPDS, EHDS2, LDS, EOSC, DestinE, SCDS

** Data spaces included: CEADS, GDDS, CEMDS, CEEDS

Overview of Simpl-Live Feasibility Studies 2024 (Contract 1)

The assessment of the feasibility of Simpl-Open deployment has been conducted with six initiatives



Public Procurement Data Space (PPDS)

Unites European public procurement data.



European Health Data Space of Secondary Data (EHDS2)

Enables secondary use of health data for research and policy.



Language Data Space (LDS)

Platform for multilingual language data sharing and reuse.



European Open Science Cloud (EOSC)

Seamless research data storage, management, and analysis across borders.



Destination Earth (DestinE)

"Digital Earth" model to monitor&predict interaction between nature and human activities.



Smart Communities Data Space (SCDS)

Trustworthy AI and interoperability for cross-sectoral government services.

Overview of Simpl-Live Feasibility Studies 2025 (Contract 2)

The assessment of the feasibility of the Simpl-Open deployment will be continued with five selected initiatives



Energy Data Space

Supports innovative energy services aligned with sustainability goals, promoting sector integration



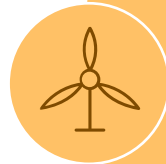
Agriculture Data Space

Optimizes natural resource use and stimulates data-driven innovations in agriculture by facilitating data sharing



European Mobility Data Space

Enhances efficiency, safety and sustainability by data access, pooling, and sharing in transport



Green Deal Data Space

Enables access to environmental and climate data for a sustainable Europe by creating a data ecosystem



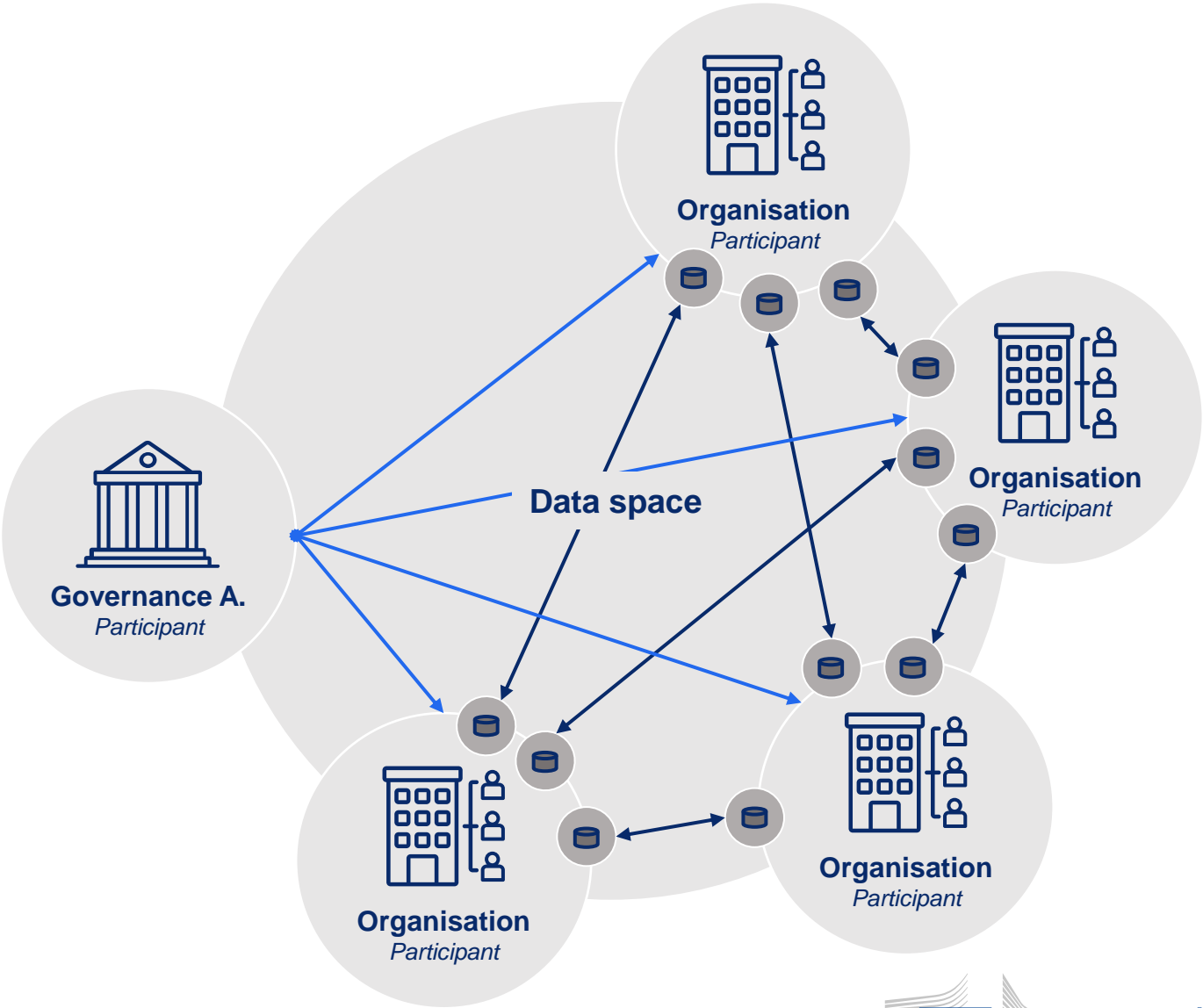
EuroCloud initiative

European Commission initiative to foster a true federation of EU public sector cloud and edge infrastructures, services and data to enable resource sharing amongst participating EU public sector organisations.

Data space fundamentals influencing Simpl-Open

The data space context

- Data spaces are data & service sharing ecosystems.
- Technology and contracts need to work hand in hand to enforce proper data sharing.
- Simpl-Open brings new features that allow a stronger technology-based enforcement.



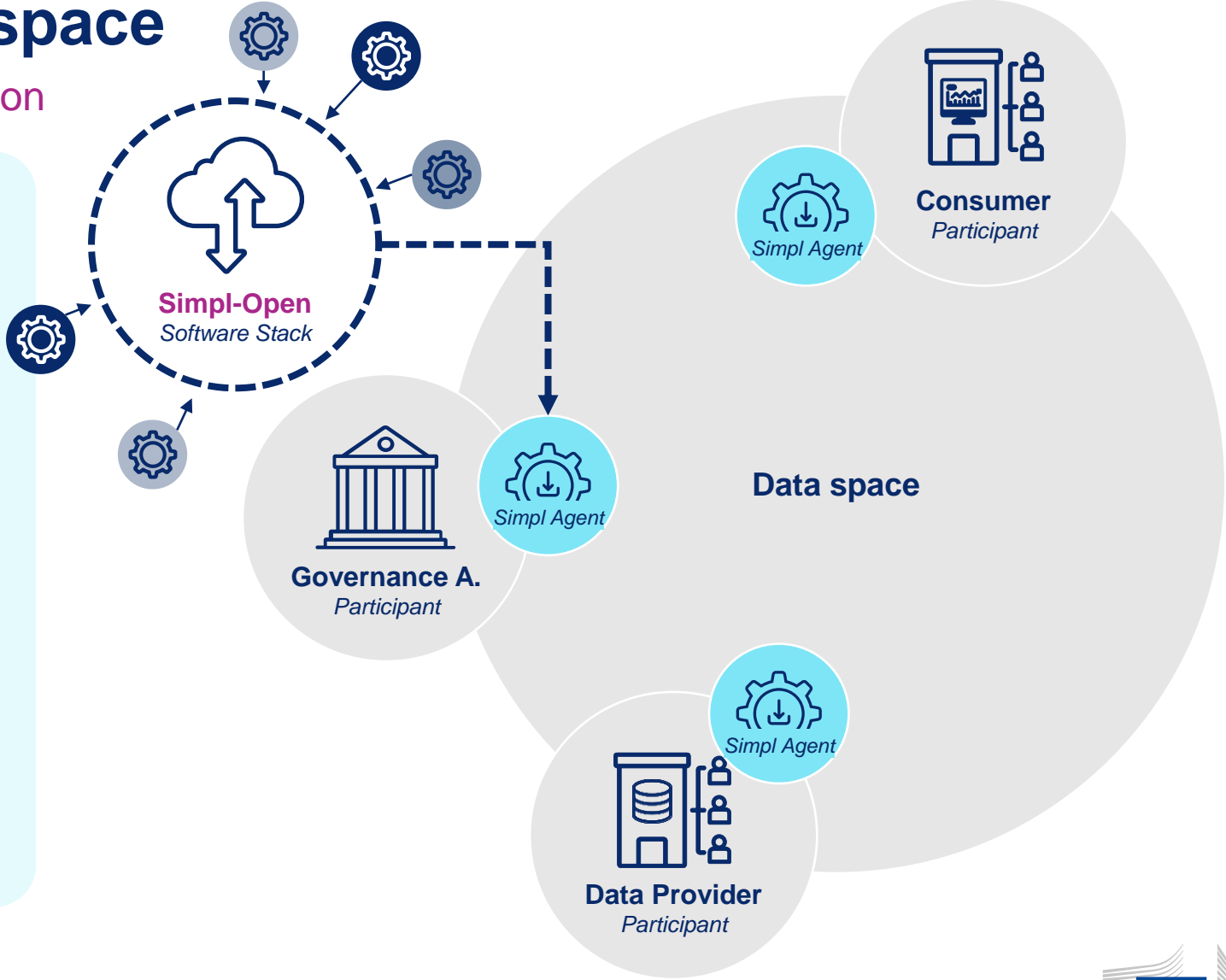
Simpl-Open covers the full landscape of a data space

Simpl-Open unique value proposition

Reuse, develop, integrate:

Simpl-Open:

- Identifies suitable existing components.
- Develops from scratch missing components.
- Integrates them to simplify the deployment and set up of a data space.



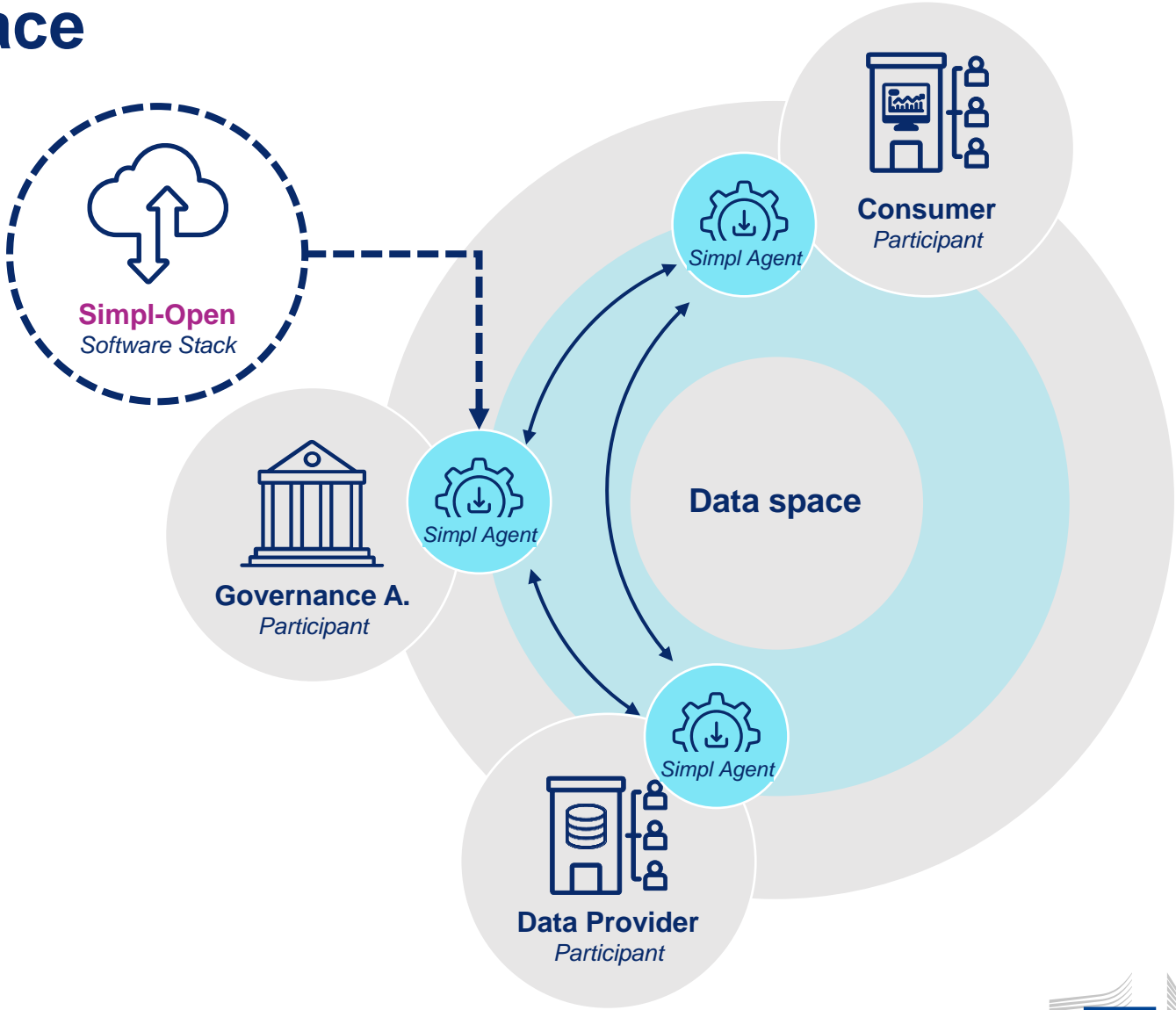
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Simpl-Open unique value proposition

Reuse, develop, integrate:

Engrained security:

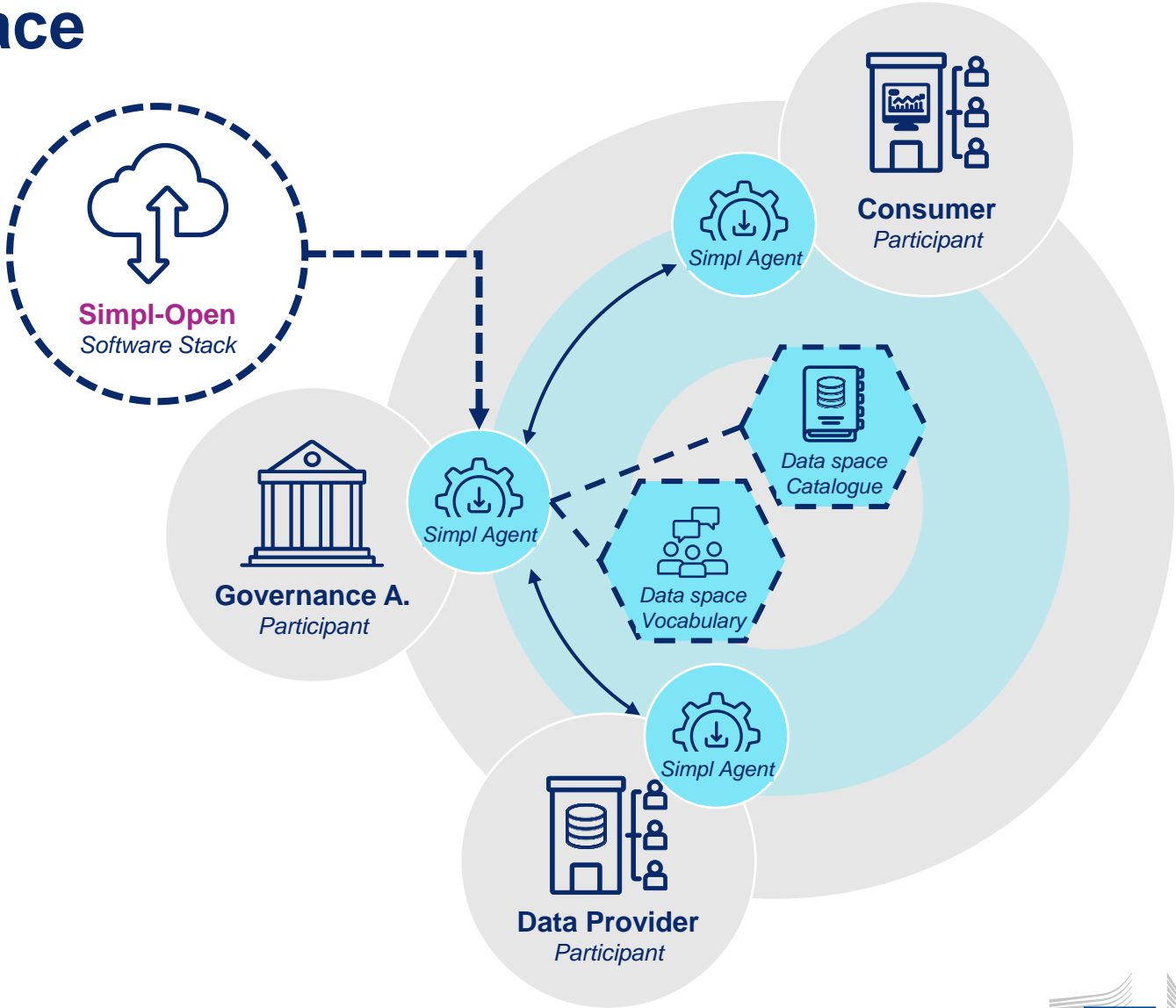
The set-up of Simpl-Open secure communication is part of the onboarding of new participants.



Simpl-Open covers the full landscape of a data space

Simpl-Open unique value proposition

- Reuse, develop, integrate:
- Engrained security:
- Flexibility through configuration:
Each data space can configure numerous elements, such as the rules for onboarding, the definition of identity attributes, the metadata required for publishing datasets/services, etc.



Simpl-Open covers the full landscape of a data space

Simpl-Open unique value proposition

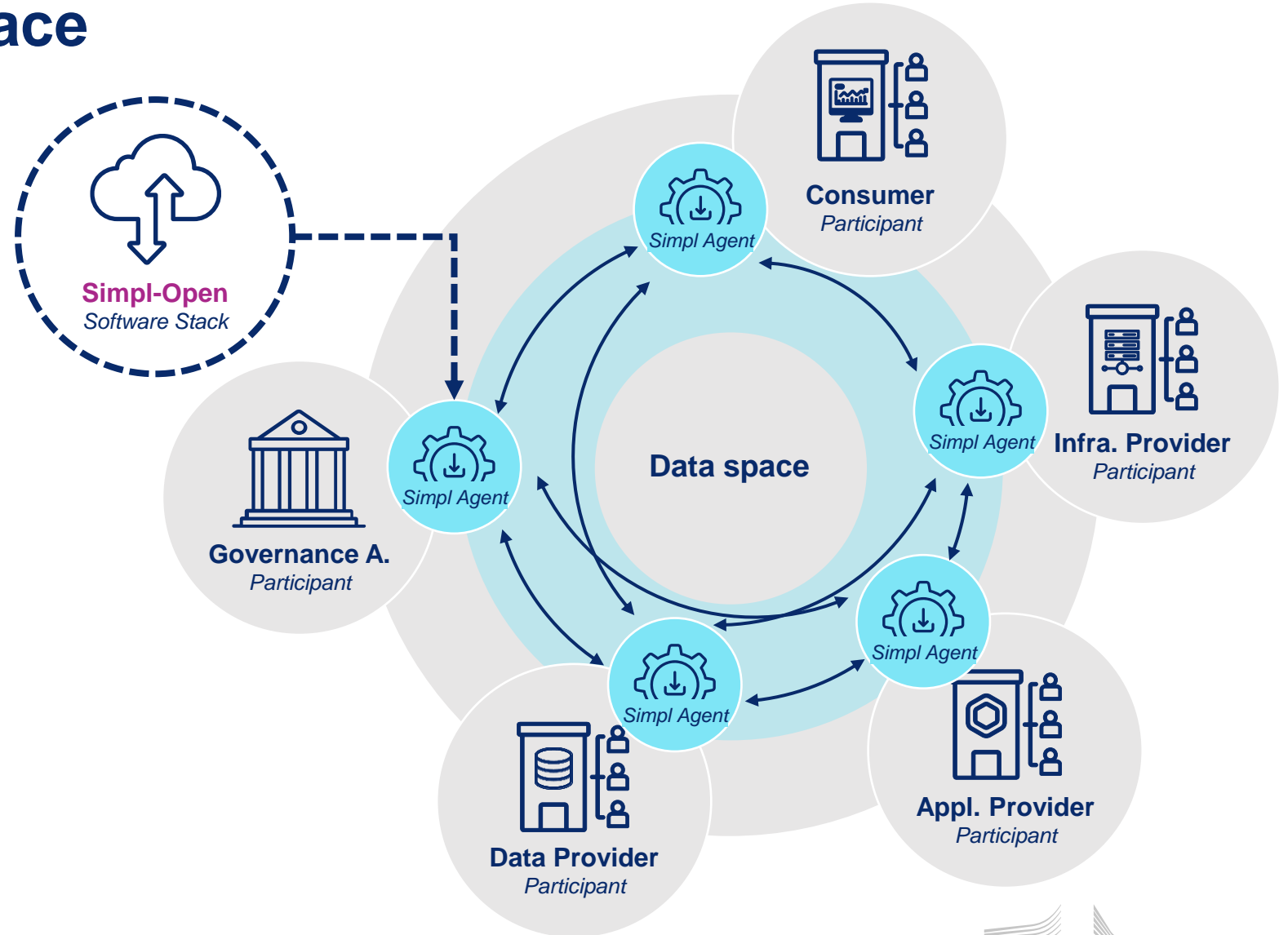
Reuse, develop, integrate:

Engrained security:

Flexibility through configuration:

Inclusion of new types of providers:

Simpl-Open also considers Infrastructure and Application providers, enabling providers to bundle infrastructure, application and datasets as they see the need.



Simpl-Open covers the full landscape of a data space

Simpl-Open unique value proposition

Reuse, develop, integrate:

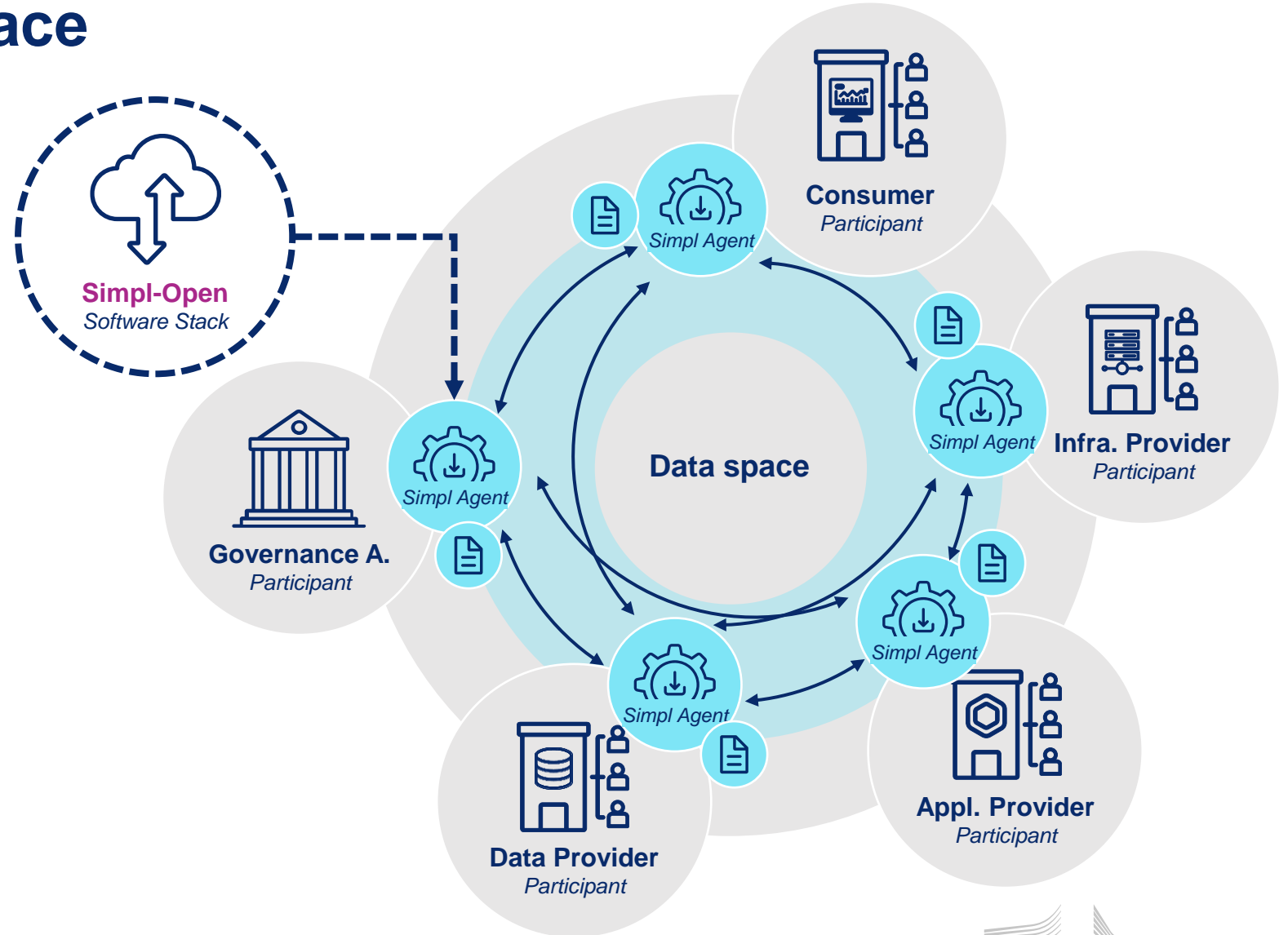
Engrained security:

Flexibility through configuration:

Inclusion of new types of providers:

Improved data sovereignty:

Simpl-Open provides the possibility to define access policies, usage policies and contracts.
Simpl-Open also enables custom data sharing alternatives.



Simpl-Open State of play

Business Processes partially covered by MVP release



● BP's covered in the MVP ● BP's covered in today's demo

The screenshot shows a web browser window with the URL <https://simpl-programme.ec.europa.eu/book-page/3a-onboarding-new-dataspace-participant-providers-data-application-infrastructure>. The page header includes the European Commission logo and a 'Log in' button. Below the header is a dark blue navigation bar with the text 'Simpl Programme' and a menu with 'Home', 'Community', 'Development', 'Publications', and 'About'. The main content area features a 'BOOK PAGE' section with the title '3a - Onboarding of a New Dataspace Participant - Providers (data - application - infrastructure) & Consumers'. Below the title, there is a '1 comment' indicator and social sharing icons. The page content is divided into two columns: a main text column on the left and a 'Table of contents' column on the right. The main text includes a 'Description' section with two paragraphs. The first paragraph states: 'To help understand the content of this document, readers should familiarize themselves with the [key definitions](#) and [actors](#) and the business process introduction containing the [diagram legend](#).' The second paragraph states: 'The onboarding process for a new Applicant details the tasks and decisions required to onboard a new organisation to a Dataspace. Both Providers and Consumers can apply to a Dataspace and will be referred to as (Dataspace) Applicants from here on.' The third paragraph states: 'The Applicant Representative submits the onboarding requests to the Governance Authority. Upon approval, they set up the Simpl-Agent, a local gateway enabling interaction with the dataspace. As such installing the Simpl-Agent is a crucial step for onboarding to the dataspace. The Applicant Representative must install and configure the Simpl-Agent. After successful setup, the Applicant receives the necessary security credentials, completing the onboarding process and allowing'. The 'Table of contents' column lists the following items: '1 - Setup of Dataspace: Role of Governance Authority', '2 - Setup of ID/Trust, Catalogues and Vocabulary', '3a - Onboarding of a New Dataspace Participant - Providers (data - application - infrastructure) & Consumers', '3a.1 - Onboarding of a new data space participant - attribute placement during onboarding', '3a.2 - Onboarding of a new data space participant - finalizing onboarding', and '3a.3 - Onboarding of a new data space participant - review of the onboarding request'.

Explore the Business Processes in full and shape Simpl-Open with us

The Business Processes of Simpl-Open are available for review and feedback on the Simpl-Open website

Q&A

Showcasing Simpl- Open Minimum Viable Product

Data Sharing Festival 2025



Open

Showcasing Simpl-Open Minimum Viable Product

Introducing the Speakers



Melanie Mirjana Friedrich
IT Architect Simpl-Open
Sovereign-X



Nicolas Auricchio
Lead Architect Simpl-Open,
Sovereign-X

The background is a dark blue field filled with a complex pattern of thin, colorful lines in shades of teal, light blue, orange, and pink. These lines form various shapes, including vertical lines, U-turns, and loops, some ending in small dots of the same color. The overall effect is reminiscent of a circuit board or a stylized data visualization.

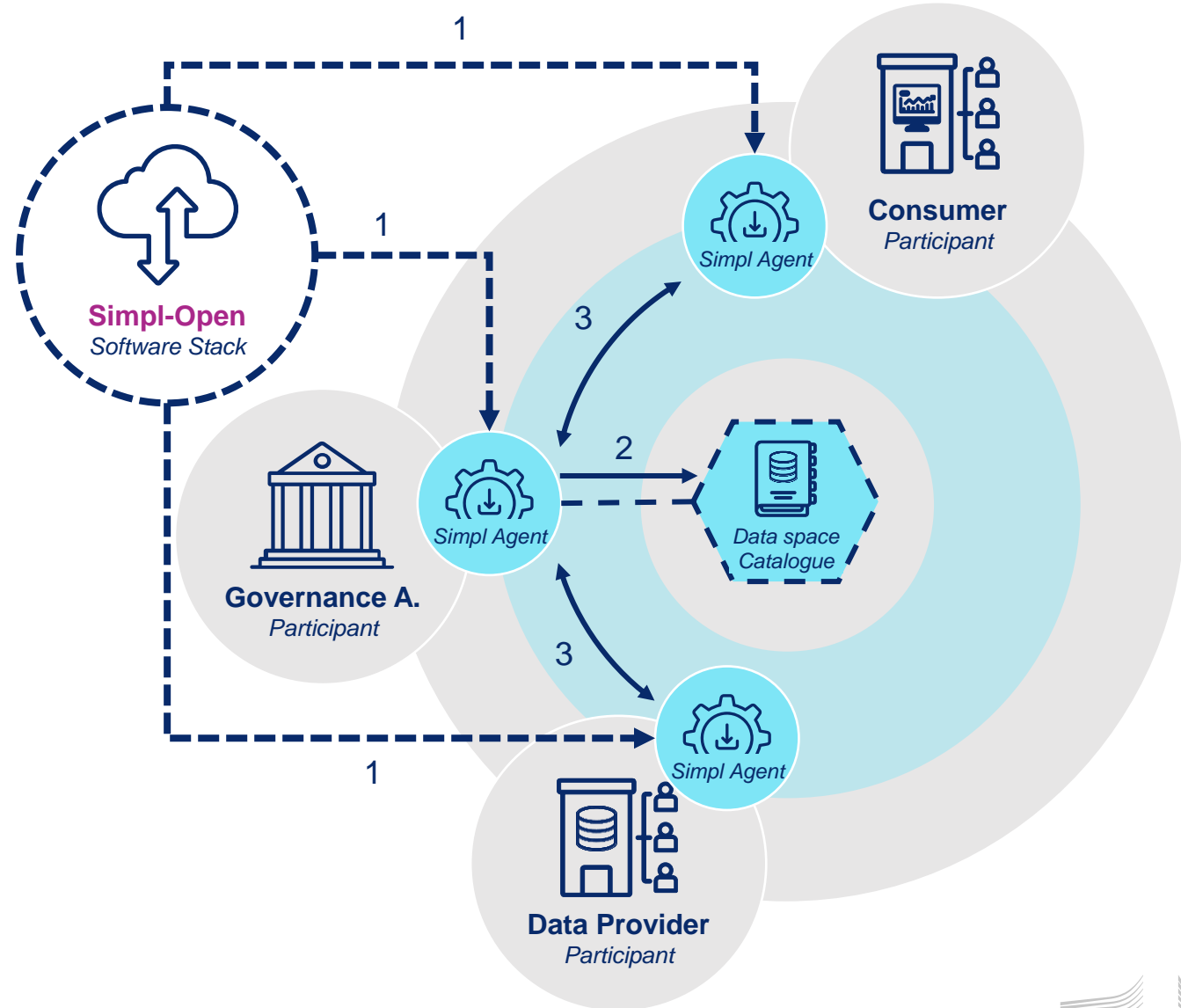
Minimum Viable Product

Demo

Setup of the demo

What has been prepared upfront

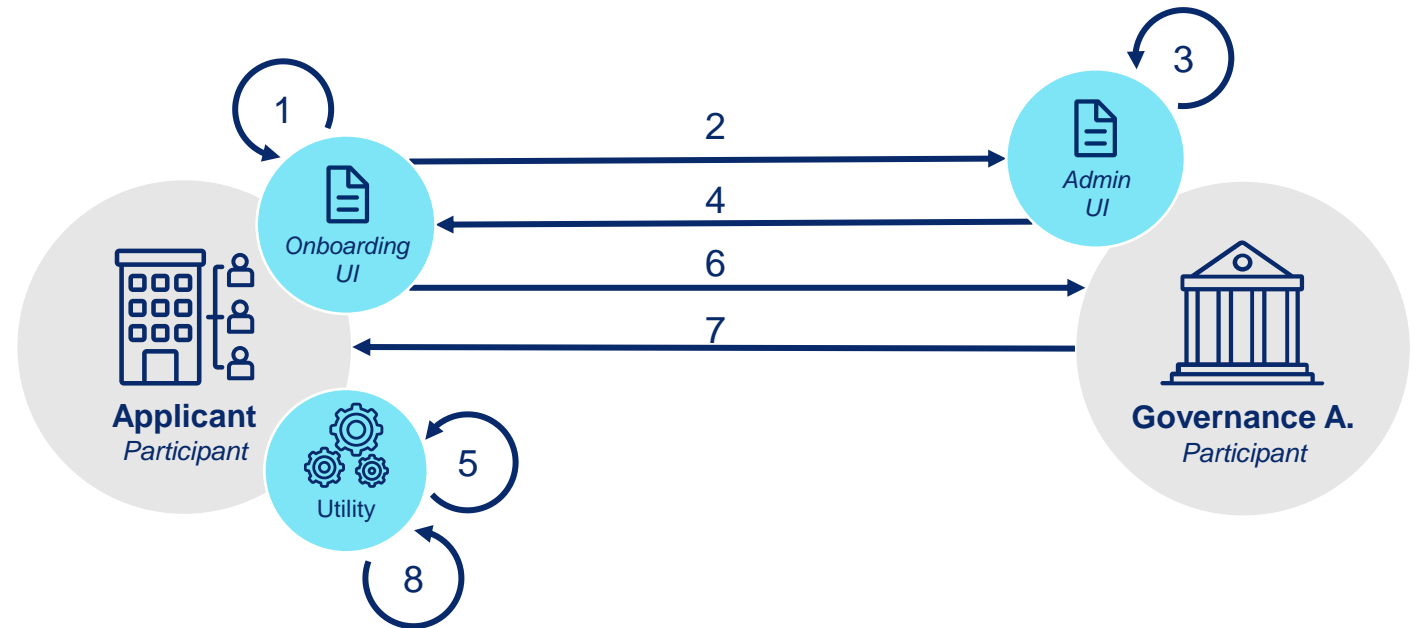
1. Simpl agents have been installed for the Governance Authority, a Provider and a Consumer.
2. Governance Authority configured the catalogue by loading the schema and vocabulary.
3. Consumer and Provider have been onboarded, received their security credentials and configured their agent with it.



Onboarding

Zoom into the process

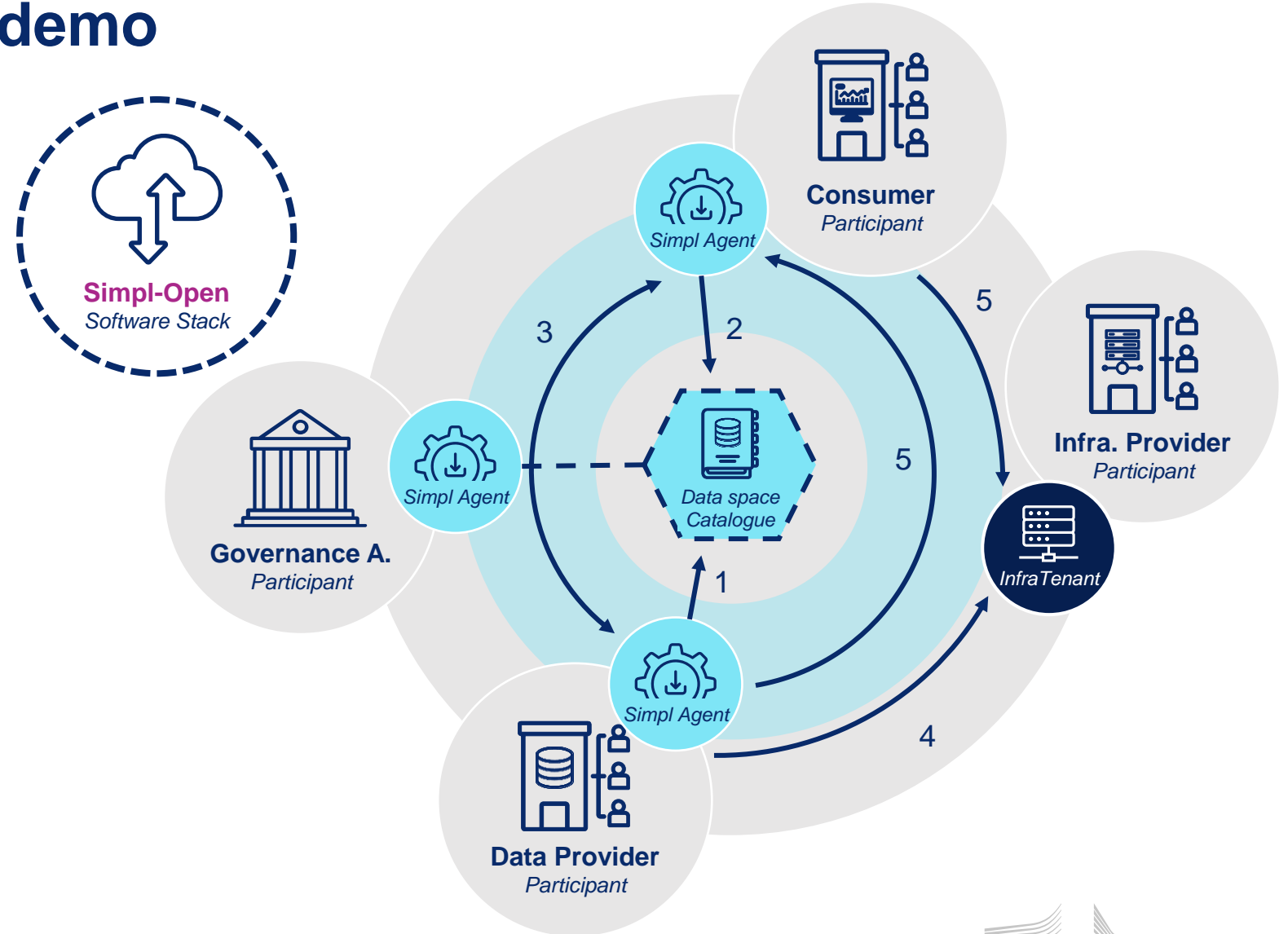
- Applicant prepares (1) and submits (2) an onboarding request.
- Governance Authority reviews (3) and approves/rejects the request (4).
- Applicant generates security credentials request (5).
- Applicant uploads security credentials request (6) and downloads signed credentials (7).
- Applicant configures security credentials in the agent (8).



A bird-eye view on the demo

What you will see in this demo

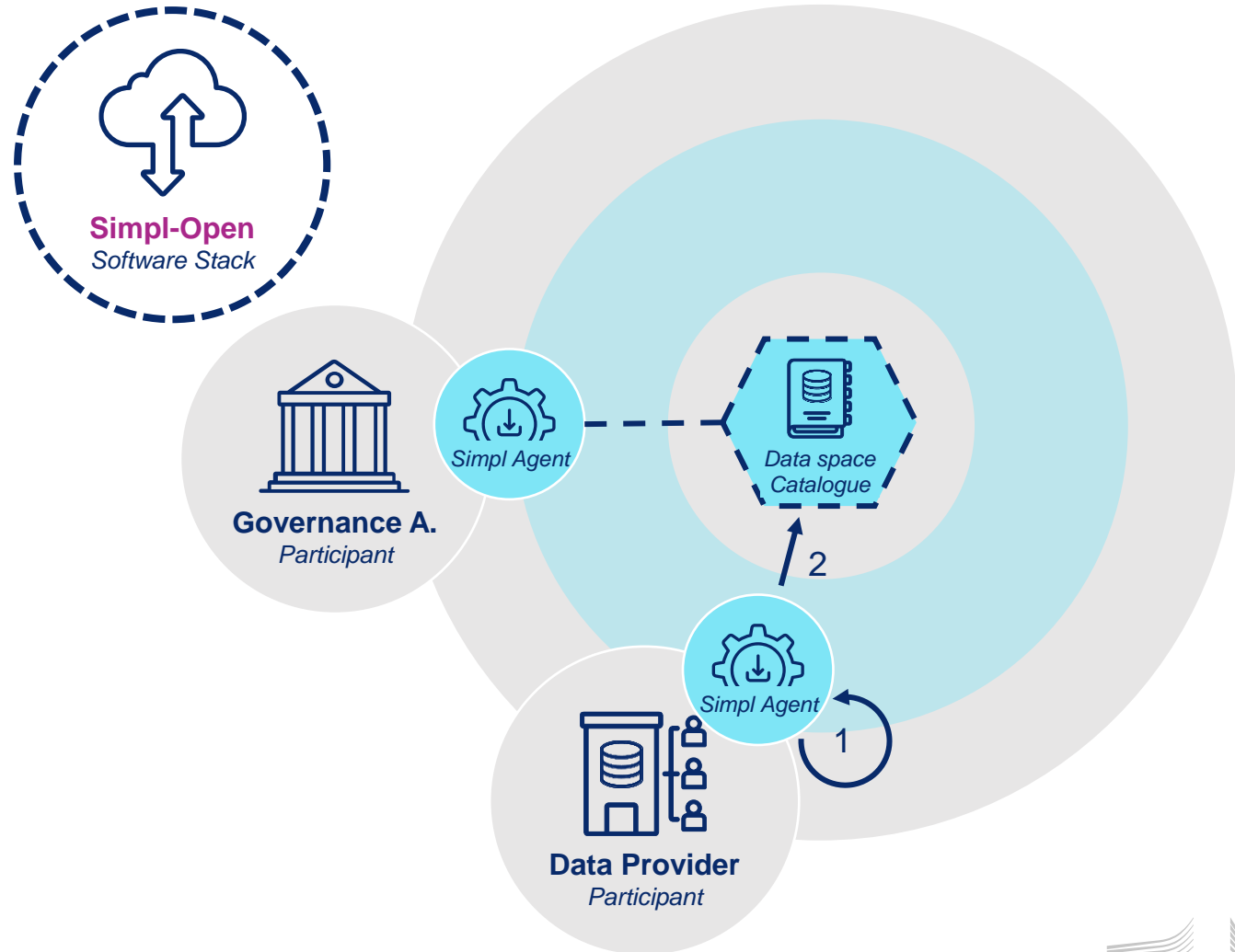
1. A provider publishes a service offering (combining data, application and infrastructure) to the catalogue.
2. A consumer discovers the service offering with its details from the catalogue.
3. The consumer establishes a contract with the provider to consume the service.
4. The provider provisions the resources (infrastructure tenant with data accessible through an application).
5. The consumer receives the access information and consumes the resource.



Publication of a resource in the catalogue

Simpl-Open MVP Demo

1. Data Provider prepares service offering (combining data, application and infrastructure) with the visual editor provided by the Simpl Agent.
2. Data Provider publishes the service offering on the data space catalogue.

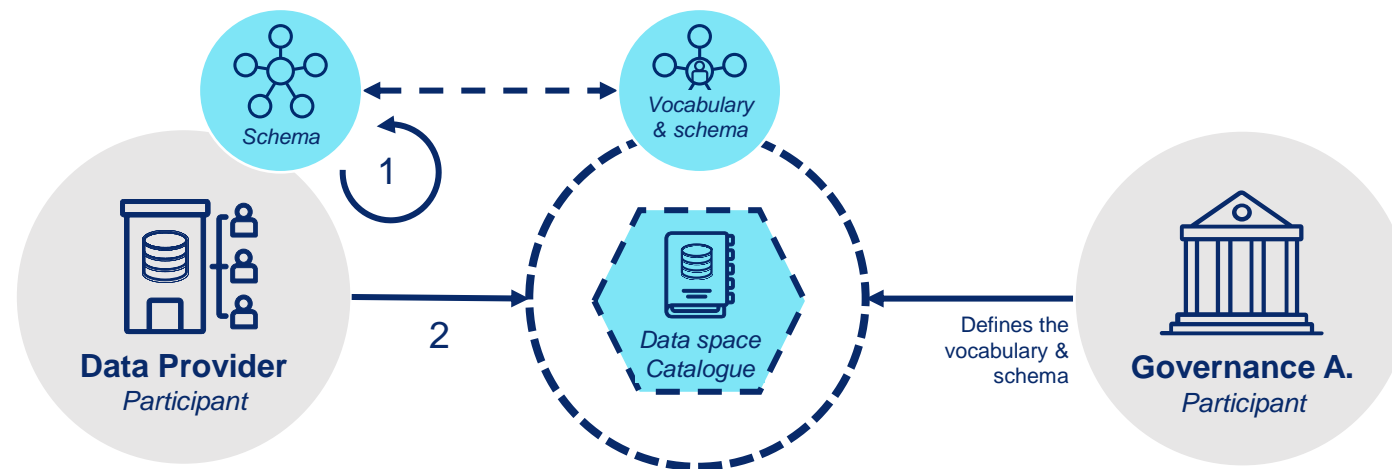


5. Provider adds a new resource to the catalogue

Syntax & Semantic Validation

Zoom into Validation

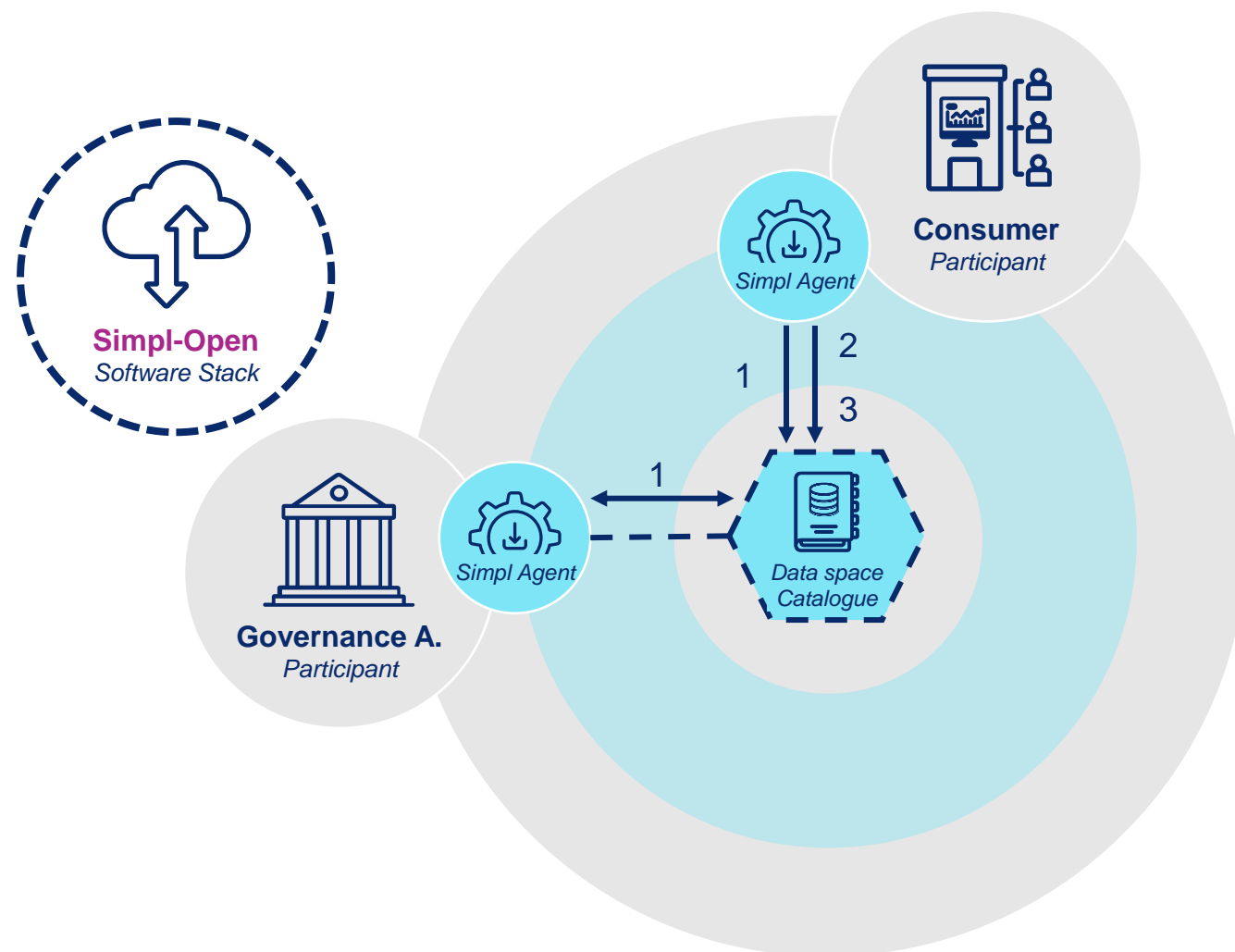
- Ensure Integrity and Consistency of the Resource Description in the Data Catalogue
- Syntax Validation: The data types and value constraints are validated
- Semantic Validation: Ensure conformance with vocabularies



Search of resources in the catalogue

Simpl-Open MVP Demo

1. Consumer logs-in with its credentials to the catalogue.
2. Consumer uses the quick search function to browse through service offerings.
3. Consumer consults a specific service offering description.

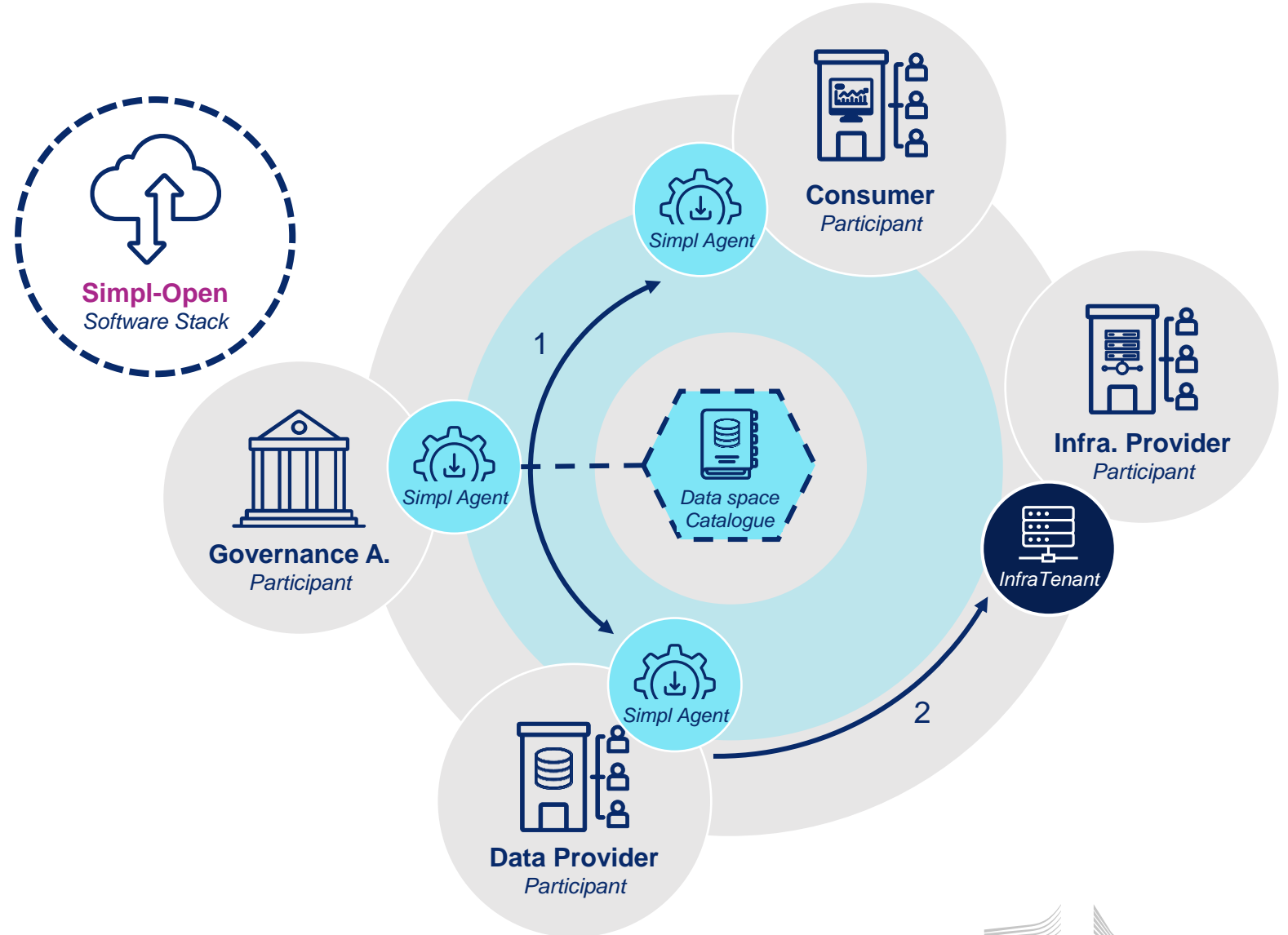


6. Consumer searches resources on catalogues

Consumption of a bundled service (infra, data and application)

Simpl-Open MVP Demo

1. Consumer requests the service offering from the Provider and establishes a contract.
2. Data Provider sets up a Virtual Machine on the cloud that runs a pre-configured analysis application.

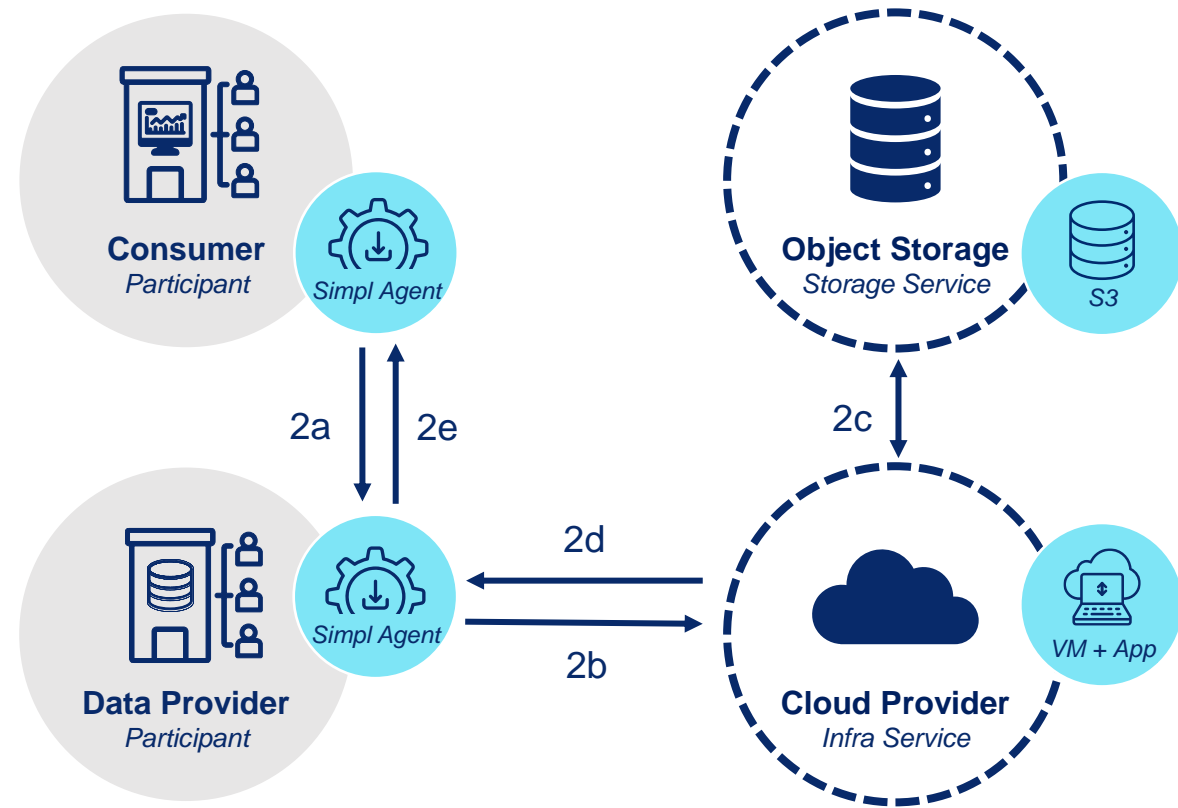


7. a d pro
8. Consumer uses an infrastructure resource from provider

Multi-Cloud Sovereign Data & Service Sharing

Zoom into service set-up (step 2)

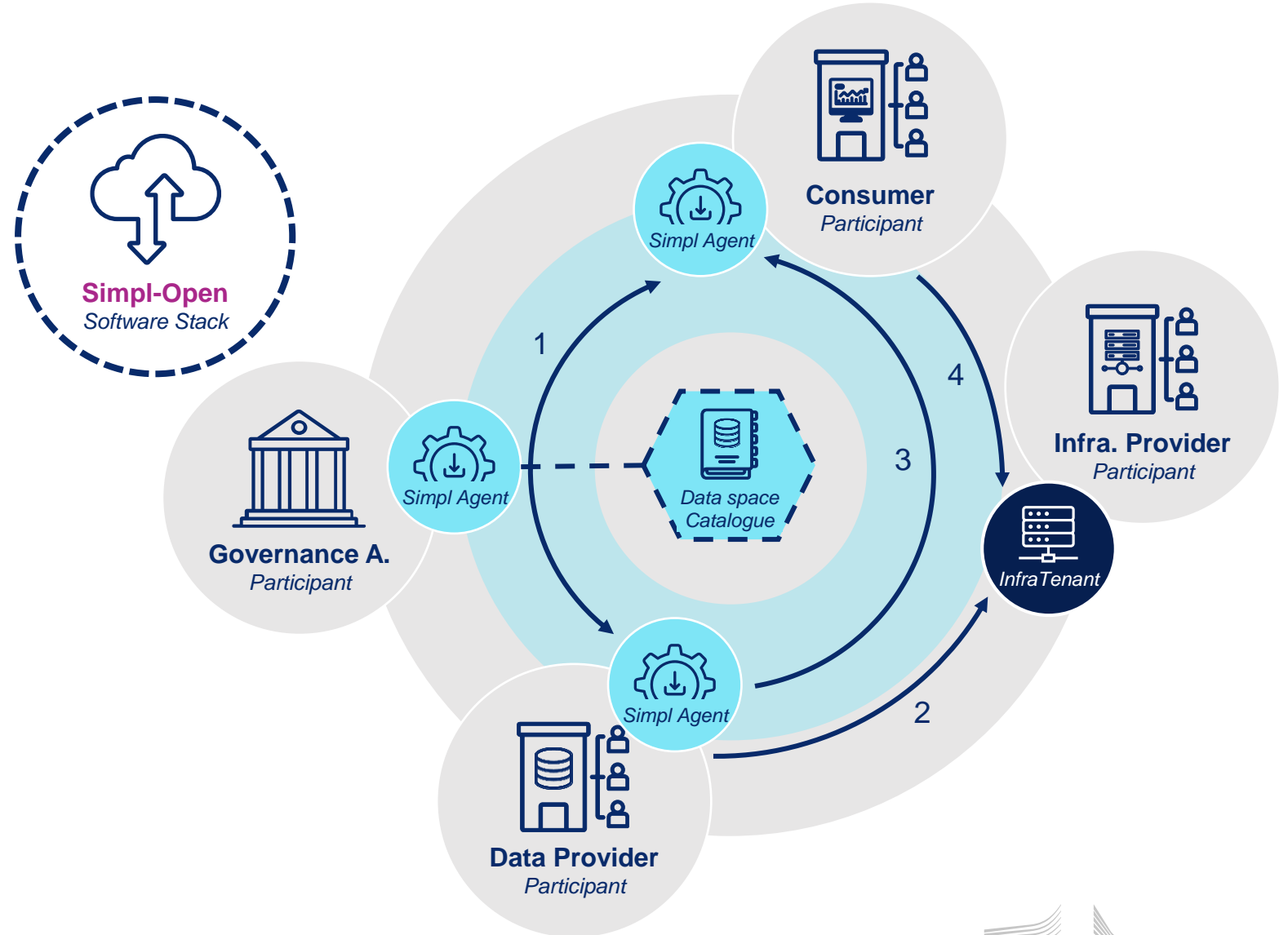
- Provisioning of infrastructure resource on another cloud provider (multi-cloud).
- Assignment of Storage resource from Storage providers (multi-cloud)
- Deployment of applications on the provisioned infrastructure resource



Consumption of a bundled service (infra, data and application)

Simpl-Open MVP Demo

1. Consumer requests the service offering from the Provider and establishes a contract.
2. Data Provider sets up a Virtual Machine on the cloud that runs a pre-configured analysis application.
3. Provider provides the link of the application and its credentials to the Consumer.
4. Consumer connects to the application and uses the service.



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pro

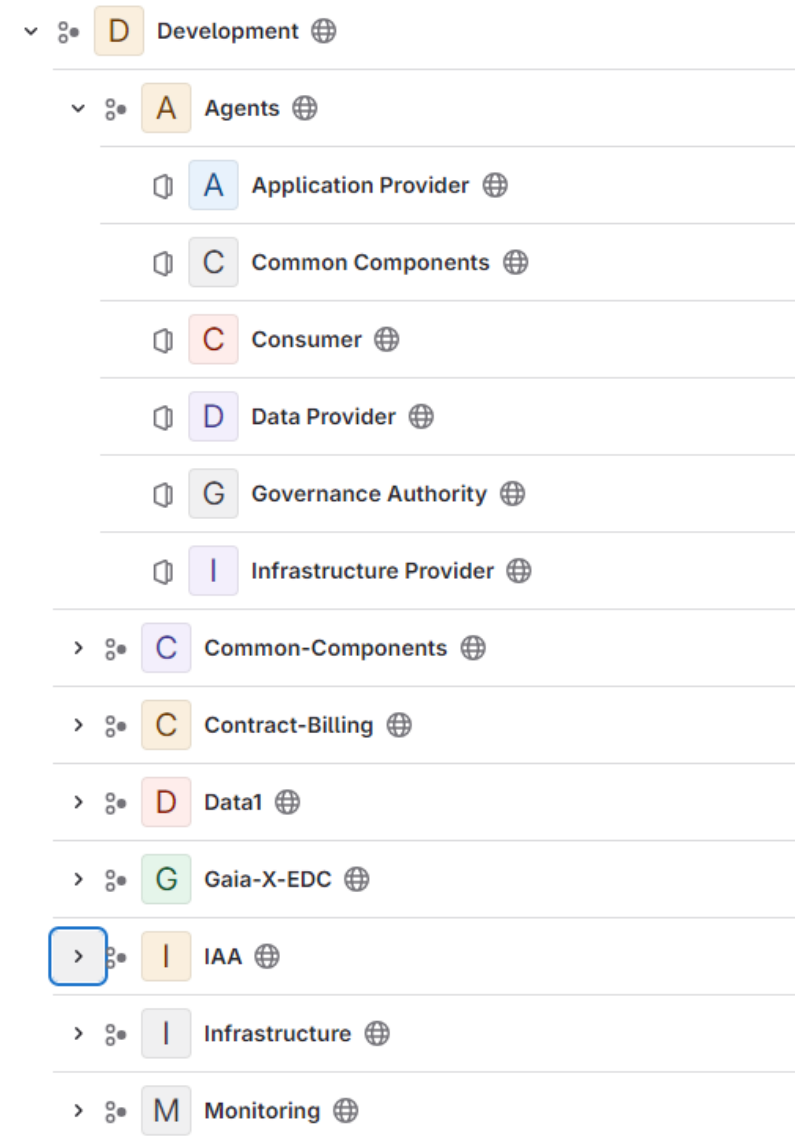
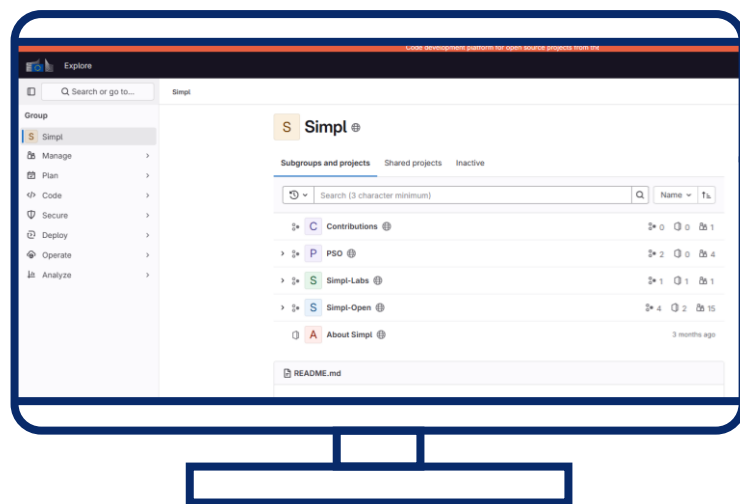
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fro

9. Consumer uses applications or data resources from provider

The Simpl-Open code is open source

Openness is a key part of the architecture approach

- Source code is freely accessible in code.europa.eu/simpl
- Installation and user readme.md files are part of the available packages.
- Releases are available for download.





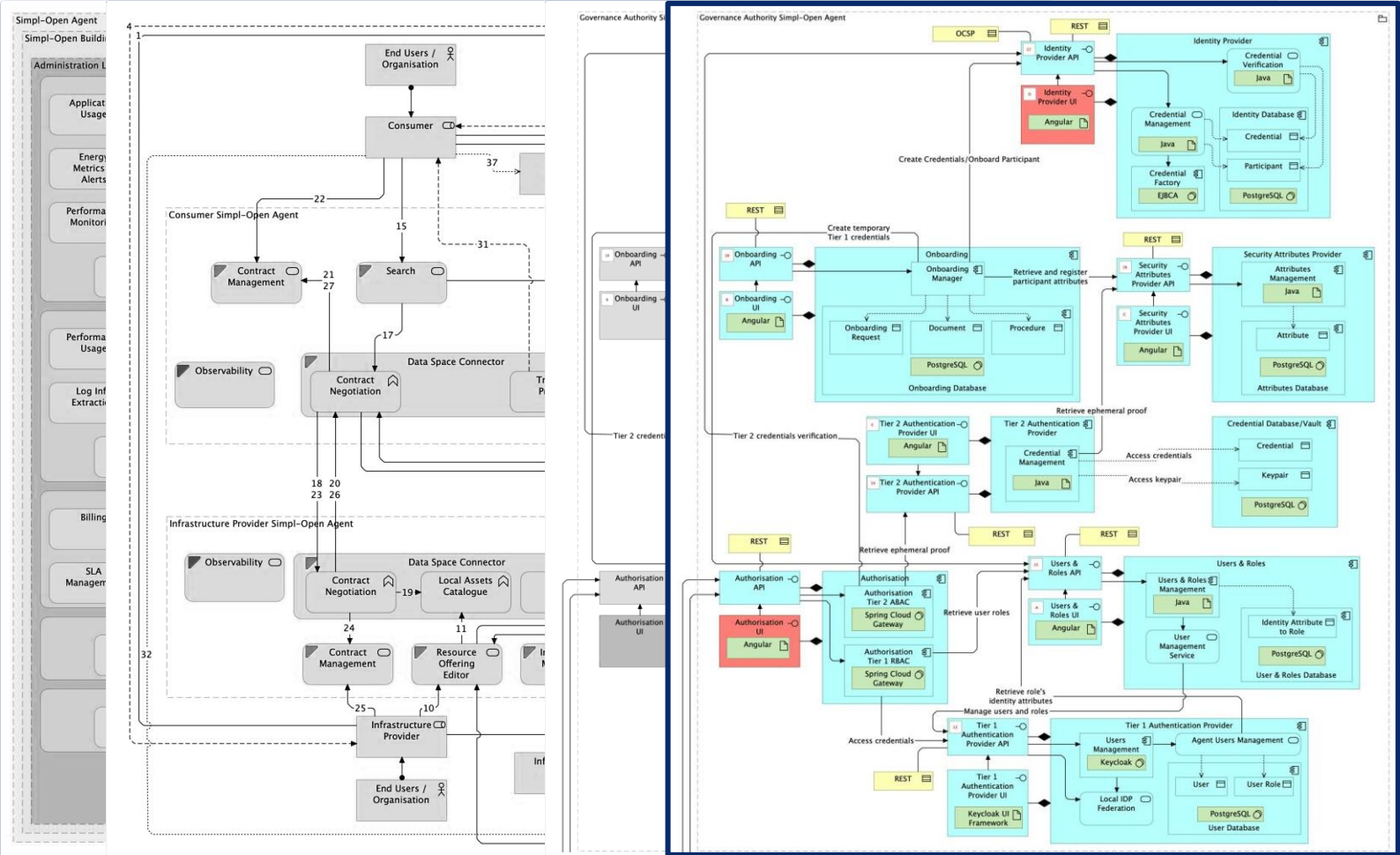
Introduction to the architecture approach and domains

Introduction to the workshop

Introduction to the Architecture

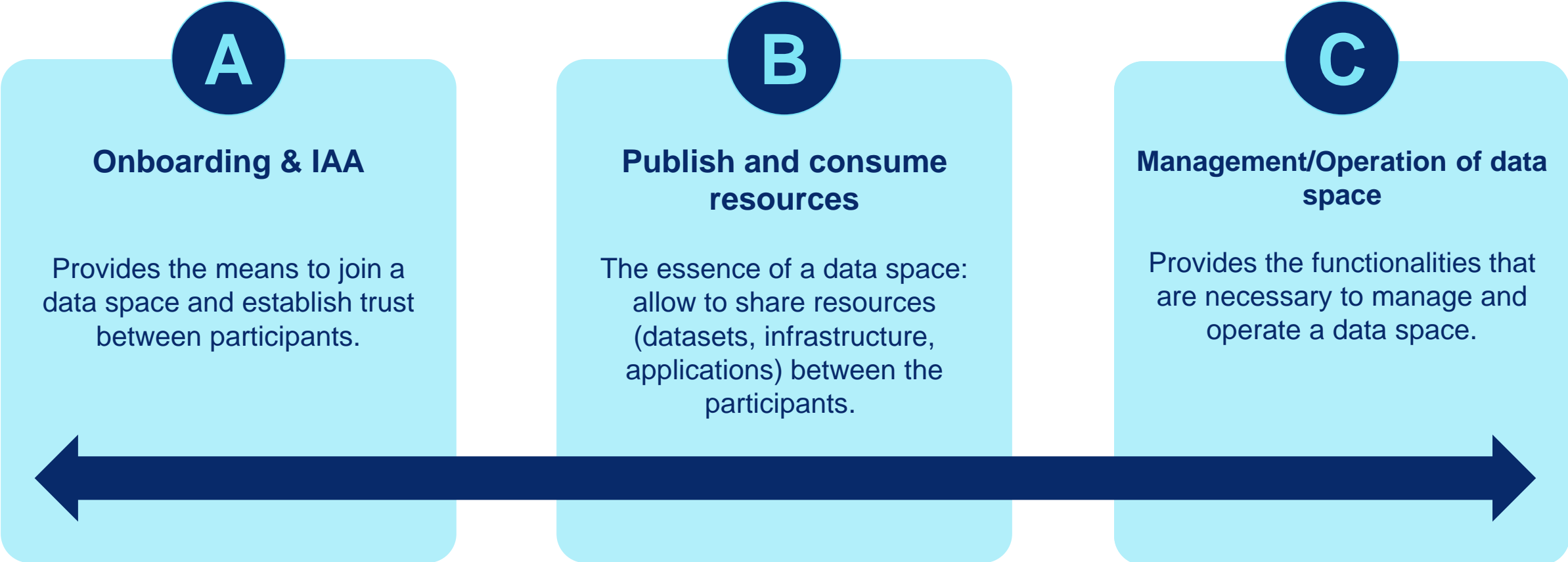
The architecture of Simpl-Open is created using a layered approach

- High-Level Architecture
- Business Architecture
- Application Architecture
- Technology Architecture



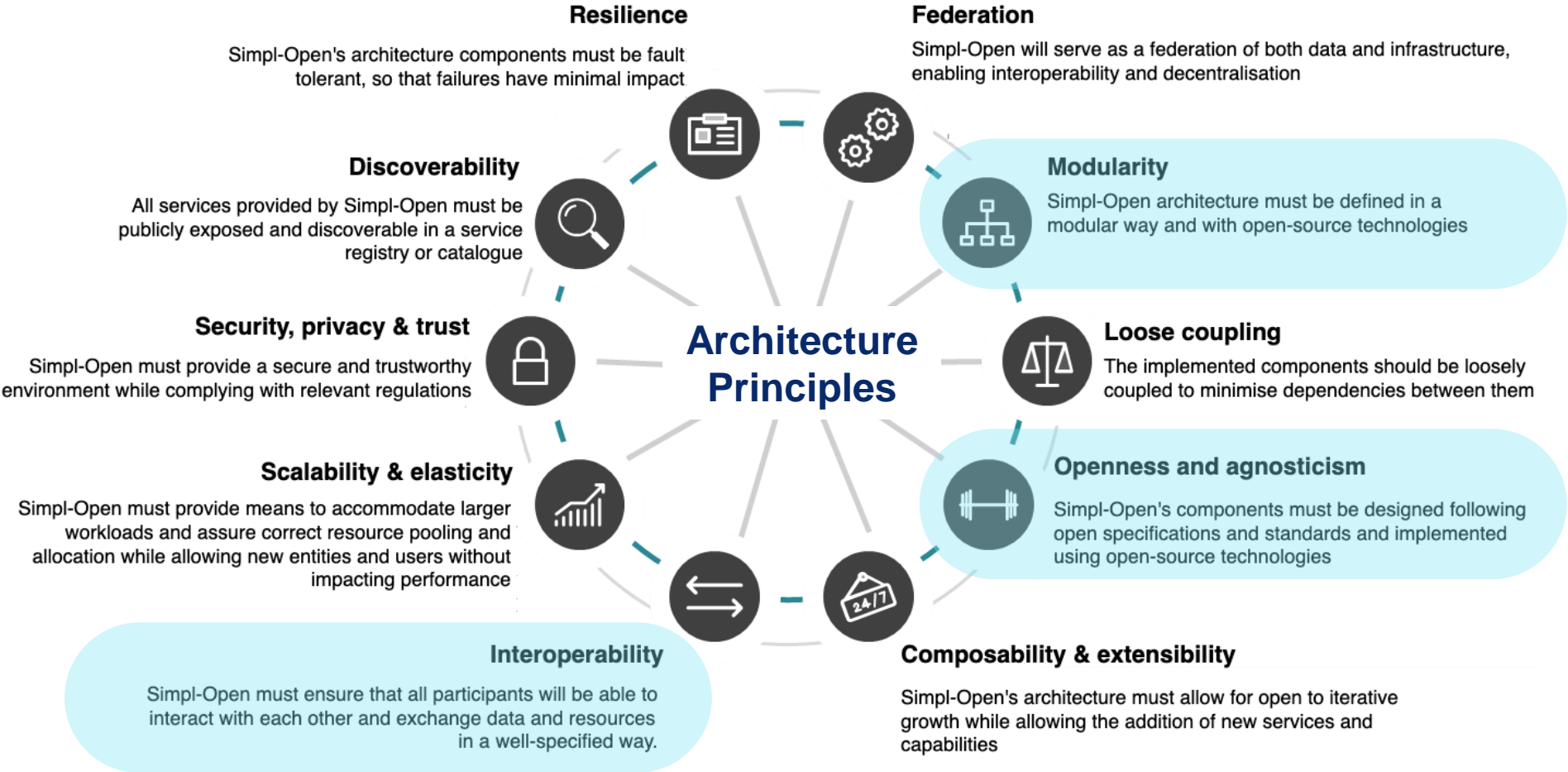
Introduction to the Architecture

Simpl-Open is decomposed into 3 functional domains

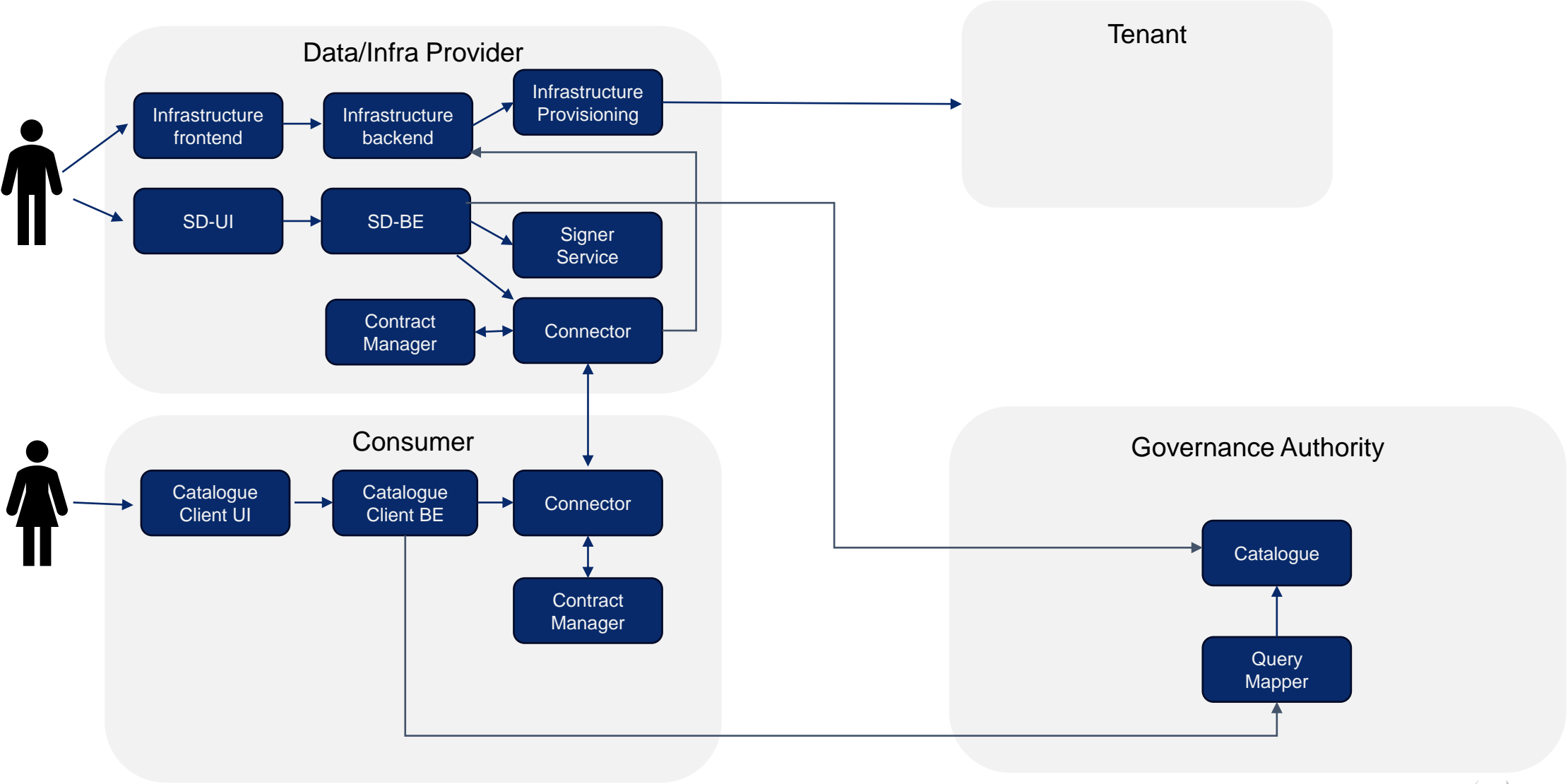


Introduction to the Architecture

Key architecture principles



Simplified Architecture Components



Simpl-Open Technology

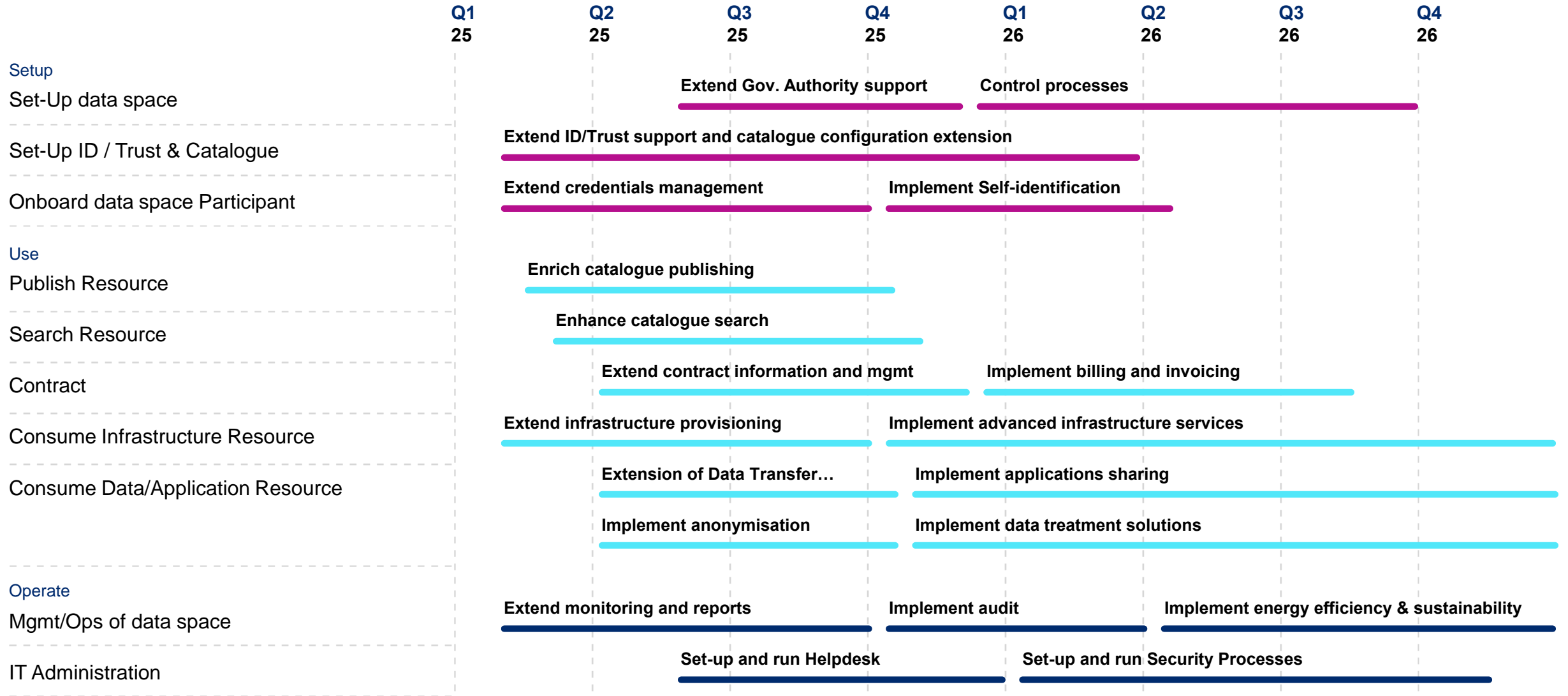
Current Technology Choices for Simpl-Open Components

Component	Technology	Capability
Self-Descriptions (SD)	SD (GX-Trustframework)	Metadata Description
SD Creator	XFSC SD Tooling	Metadata Description
Data Space Catalogue	XFSC Federated Catalogue	Data Discovery
Signer Service	XFSC Signer	Signature
Connector	EDC	Data Exchange
Infrastructure Provisioning	Crossplane	Infrastructure Provisioning
Authentication	Keycloak	Authentication Provider
Identity Provider	EJBCA	Identity Provider
Authorisation	Spring Cloud Gateway	Authorisation



Next steps for Simpl-Open

Roadmap



Get involved and participate

It's Simpl!



Webinars & Workshops

Join technical and business sessions, online and in person.



Website

Visit our website for Simpl documentation, requirements and latest news.



Social Media

Join and engage with our growing community!



Forum

Keep a look out for Simpl's forum launch! Coming soon!



Surveys

Help us improve!



Code Repository

Check out and review the code!



Scan me for more information about Simpl





Mark the date!

Simpl Annual Community Event

29 January 2026



Q&A



IAA Architecture

Identification Authentication Authorization and
Onboarding

Two-tier approach - summary

IAA will not issue:

- Digital identities, only integrate existing ones (EU Login, eID, EUDIW, ...);
- Digital signature certificates or PIDs, rely on existing ones (eIDAS, EUDIW, ...);

Tier 1

IAA for participant's agent end users.

Follows access control based on roles (RBAC).

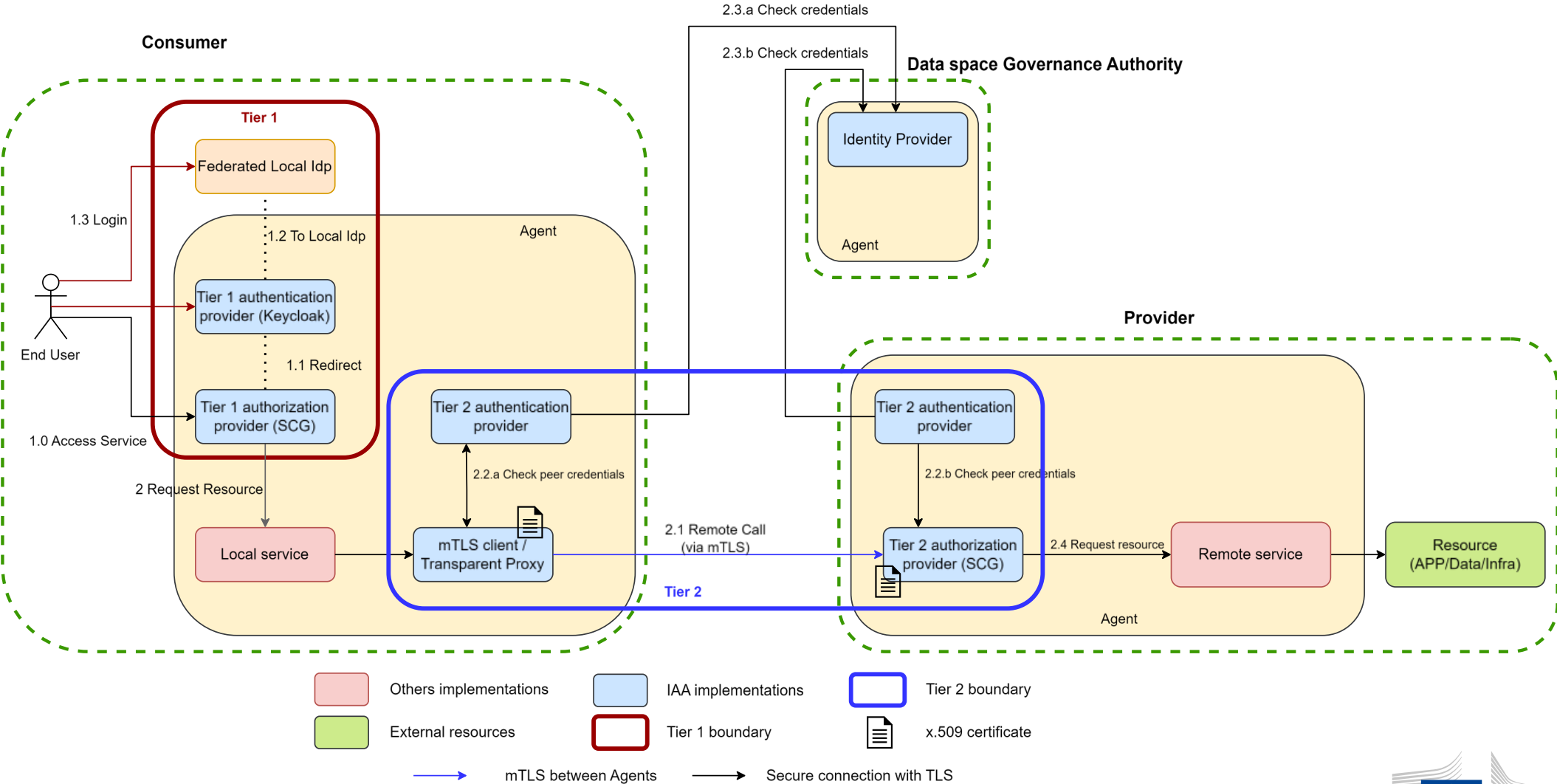
Tier 2

IAA for communication between data space agents.

Follows access control based on identity attributes (ABAC).

The access to the data space functionalities is exclusively performed through Tier 1, end users see only his/her agent's functionalities.

Two-tier approach - diagram



Identity attributes

Defined by the data space Governance Authority (GA), used to identify:

- Participant types (GA, consumer, data/app/infra provider);
- Permissions across all agents (searching catalogue, publishing on catalogue,...);
- Rights to perform specific actions data space wide (signing contracts, consuming resources, ...);

Given by the GA to any participant.

Assignable – by the participant's governance to a role; any user with that role inherits the attribute (permission/right).

Read-only (predefined):

- Have the same meaning data space-wide and eventually across data spaces (enabling common federation identity attributes);
- Not editable by the GA;
- Used to enforce ABAC in the tier 2 communication;

Customizable:

- Allows to define additional data space permissions/rights;

Roles and relation with identity attributes

Defined by the governance of a participant, are standard OIDC roles and are used to:

- Specify types of end users in the agent;
- Regulate the access of agent's features and functionalities;

Relation with assignable identity attributes allows the governance of a participant to:

- Delegate to a role one or more of its data space wide rights or permissions;
- Manage the received attributes independently, distributing them to groups of its end users;
- Establish which role (end users) operates *on behalf of* the participant;

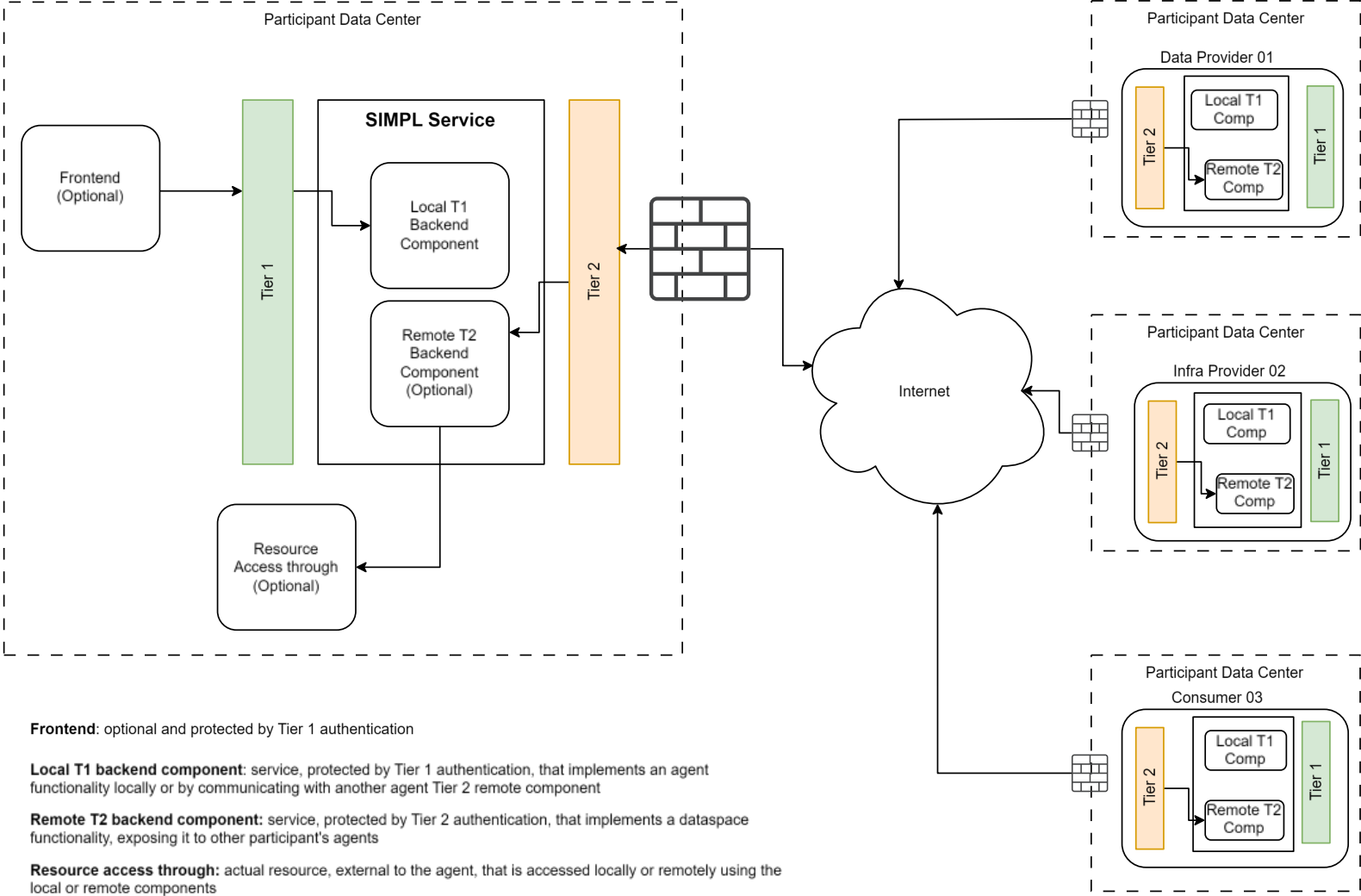
An example of an identity attribute as a right is the RESEARCHER identity attribute used in the catalogue search engine to filter service offerings results.



Anatomy of Simpl-Open service

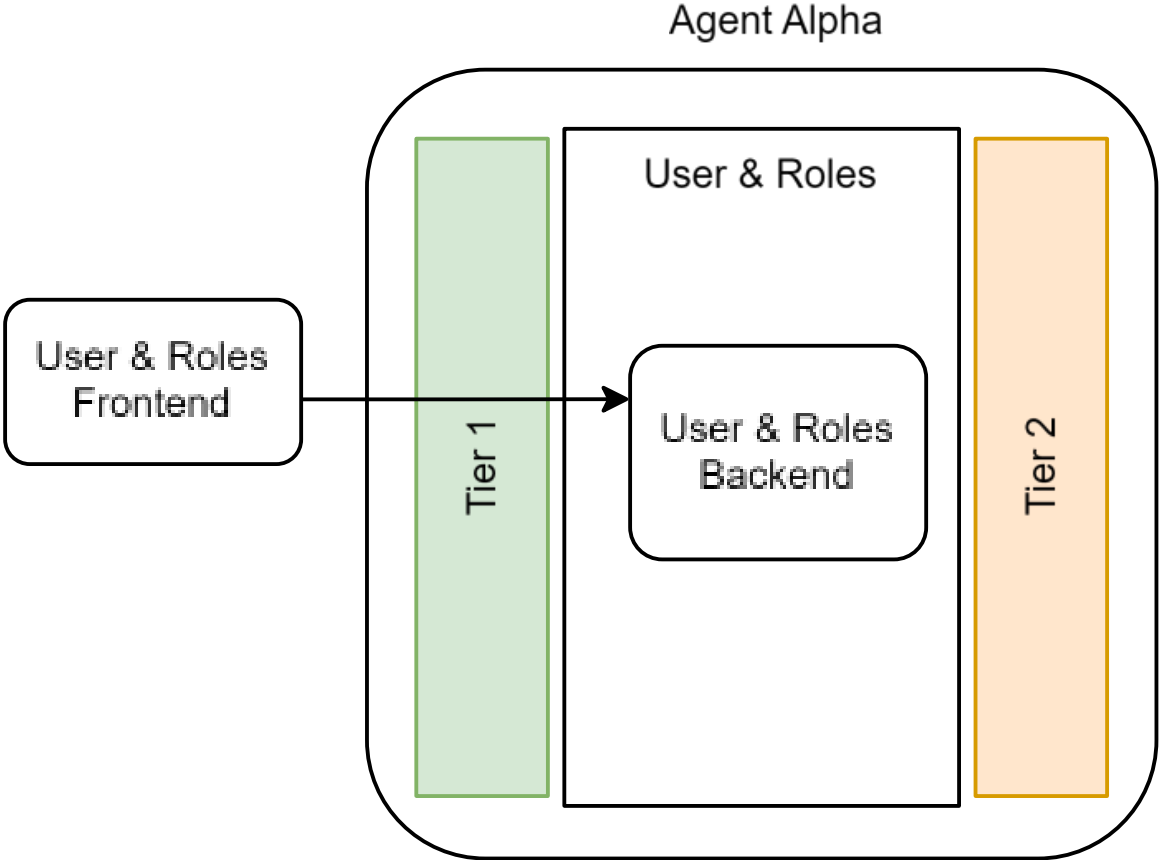
Identification Authentication Authorization and
Onboarding

Anatomy of a service



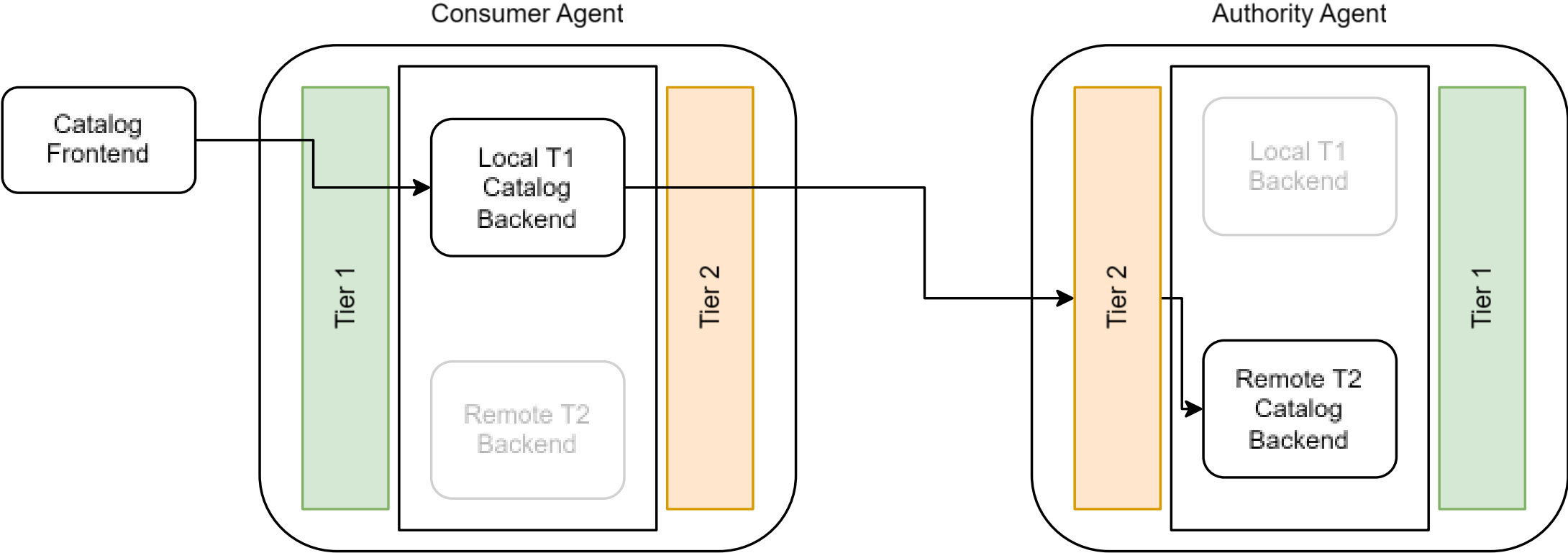
Built-in - Local service

Uses a frontend (optional) and a local tier 1 backend.
Implements a local core functionality: e.g. users and roles management.



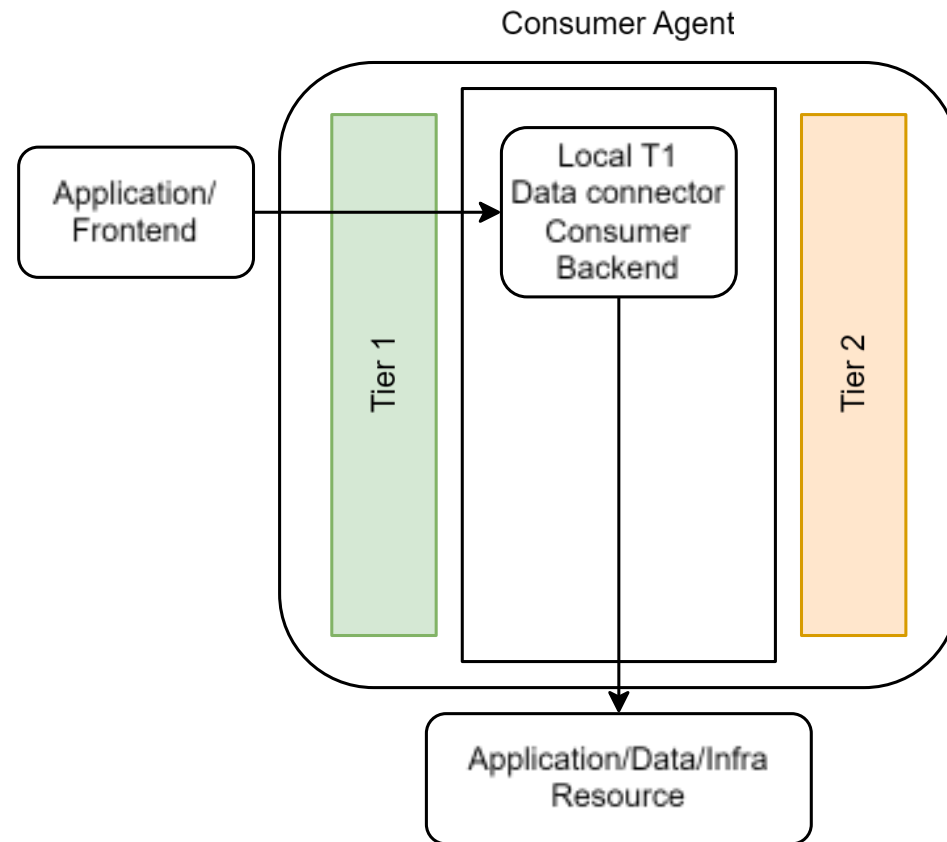
Built-in - Across agent's service

Uses a frontend (optional) and a local Tier 1 backend, working with a remote Tier 2 backend. Implements a remote core functionality: e.g. searching catalogue.



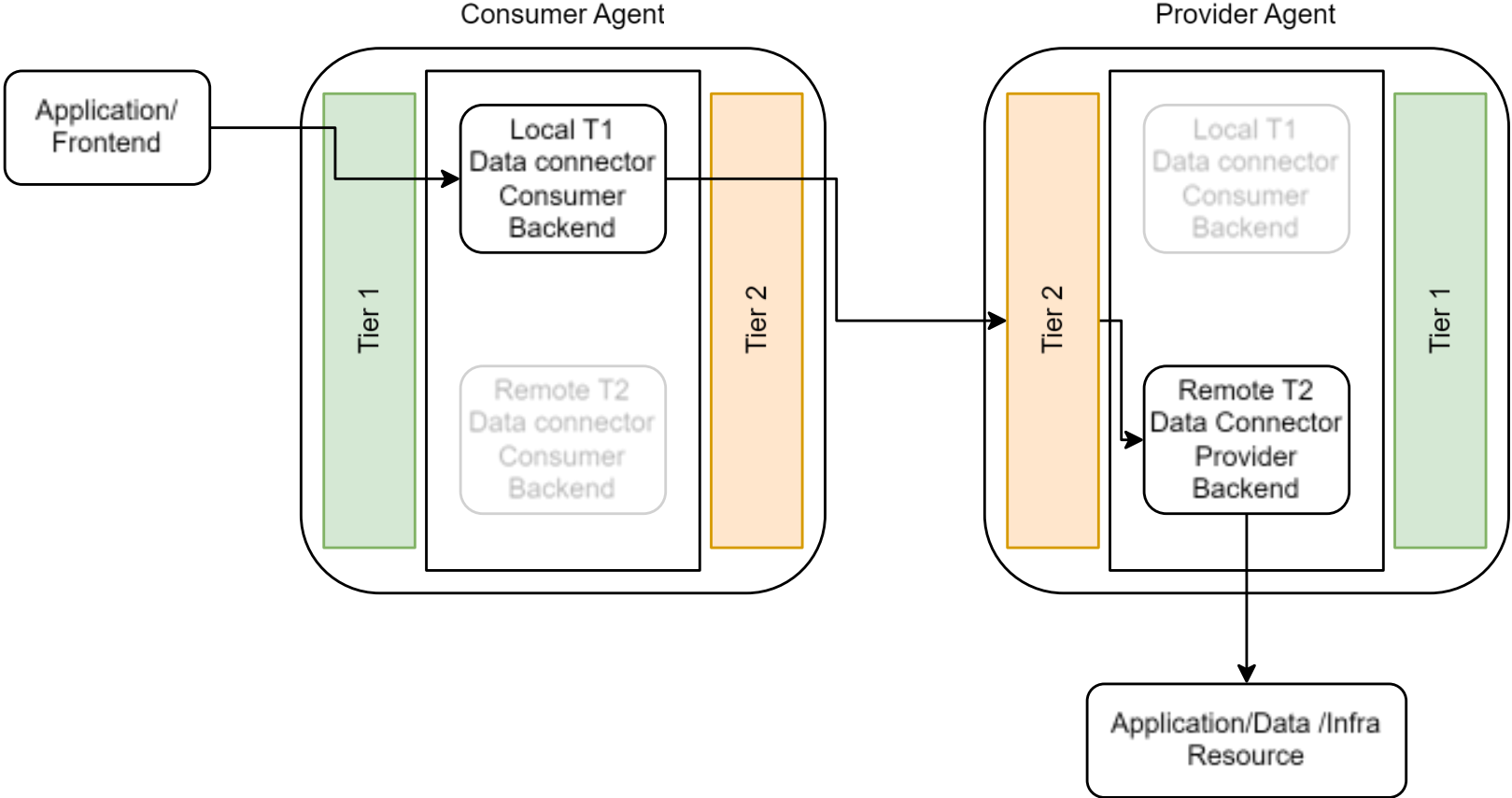
Access-through - Local service

Uses a frontend (optional) and a local Tier 1 backend that accesses a local resource (external to the agent).



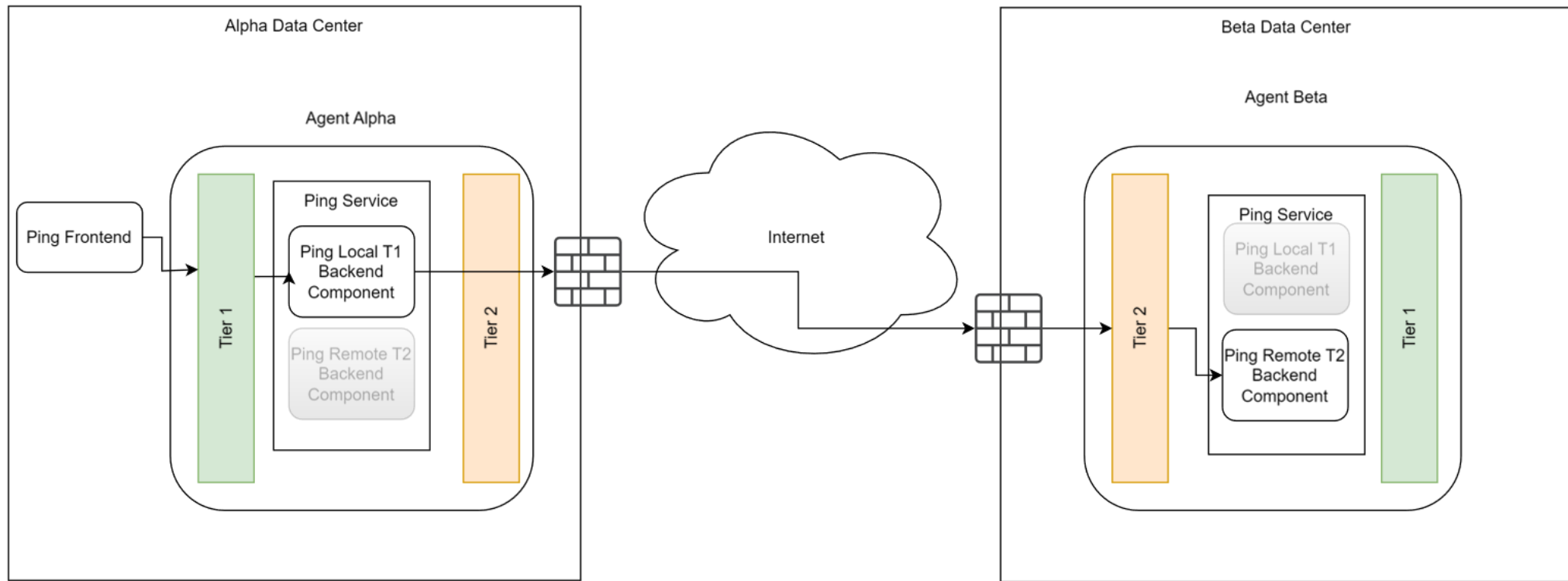
Access-through - Across agent's service

Uses a frontend (optional) and a local Tier 1 backend, working with a remote Tier 2 backend, accessing a remote resource (external to the agent).



An example: “Echo”

Example of a IAA enabled service: will become the template project to integrate IAA functionalities





Interoperability

Identification Authentication Authorization and
Onboarding

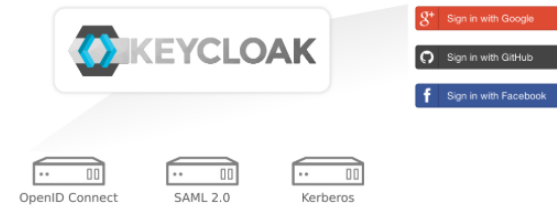
Interoperability of IAA

Built-in in Keycloak:

Identity Brokering and Social Login

Enabling login with social networks is easy to add through the admin console. It's just a matter of selecting the social network you want to add. No code or changes to your application is required.

Keycloak can also authenticate users with existing OpenID Connect or SAML 2.0 Identity Providers. Again, this is just a matter of configuring the Identity Provider through the admin console.



User Federation

Keycloak has built-in support to connect to existing LDAP or Active Directory servers. You can also implement your own provider if you have users in other stores, such as a relational database.



Additional integrations*:

- OIDC4VC (EUDIW, OCM, walt.id, ...);
- EU Login;
- eID;

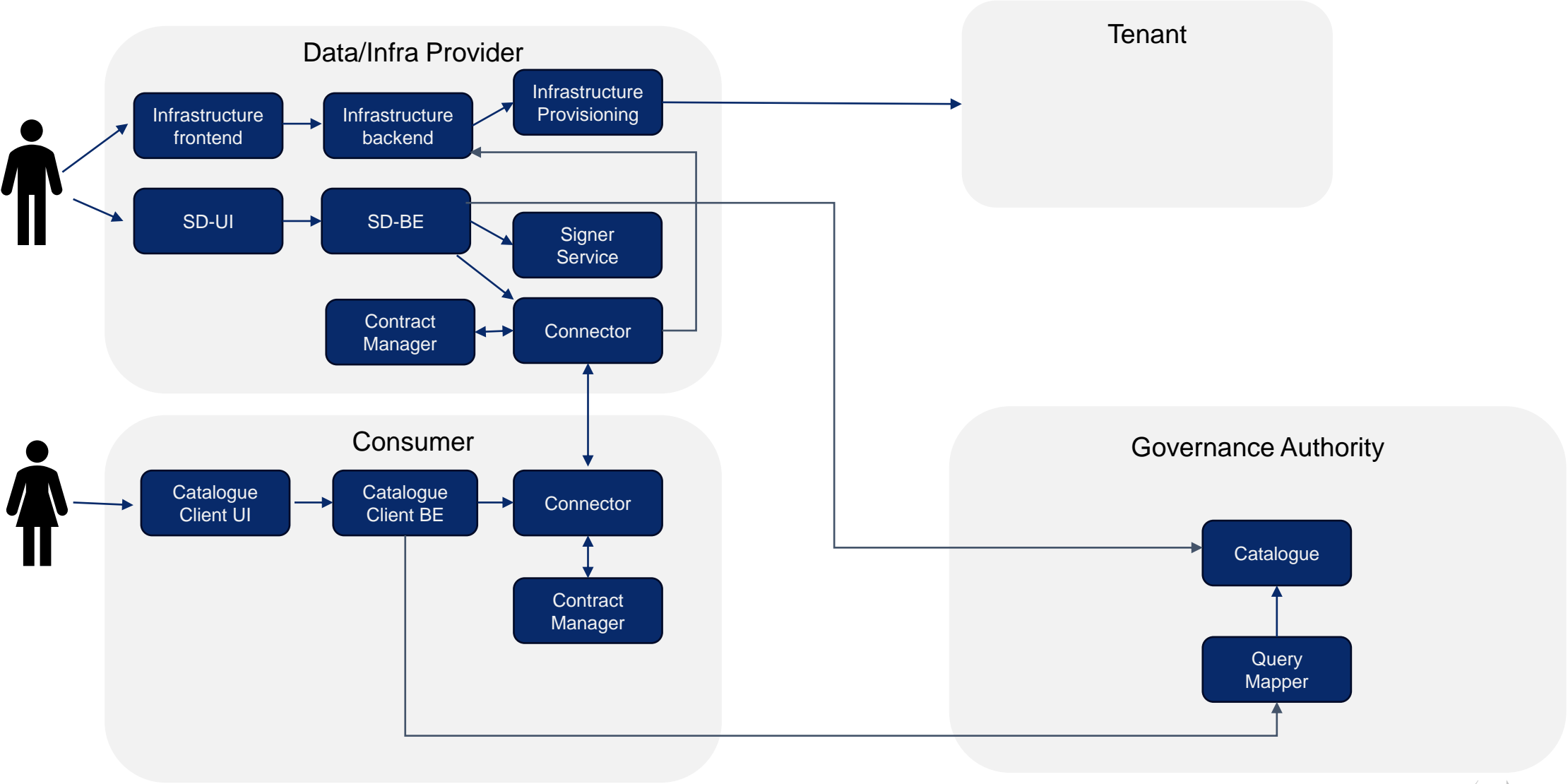
* not part of MVP



Use of a data space

Creating & Consuming Service Offerings

Simplified Architecture Components



Agenda

Break out: Use of a data space

1

Simplified Architecture

- Fundamental architecture concepts.

2

Deployment Scripts

- Explaining Deployment Scripts and their structure.
- How to add deployment scripts and How to add infra or bundle offerings to the catalogue.

3

Creating and Adding Service Offerings

- Explaining usage and access policies and their types.
- Using identity attributes with access policies.
- Validation process for the Self-Descriptions.

4

Search of Service Offering

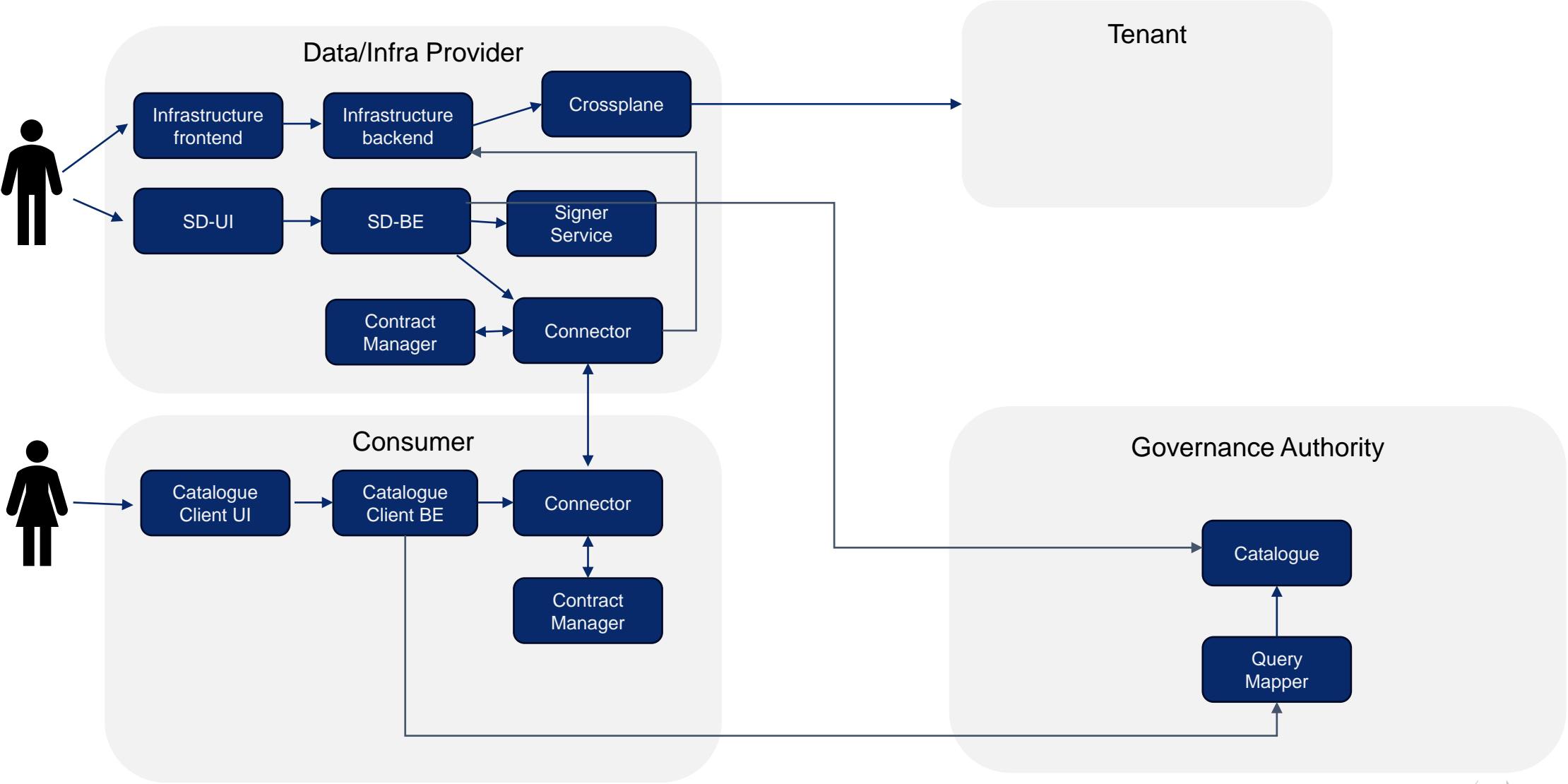
- Show different users with different access levels, searching for Resource Descriptions that they do/don't have access to.
- Show Quick Search and Advanced Search.

5

Consumption

- Requesting and receiving a dataset via connector (traditional data space use case)
- Reviewing the offers and their policies, contracting and accessing the resource (Bundle).

Simplified Architecture Components



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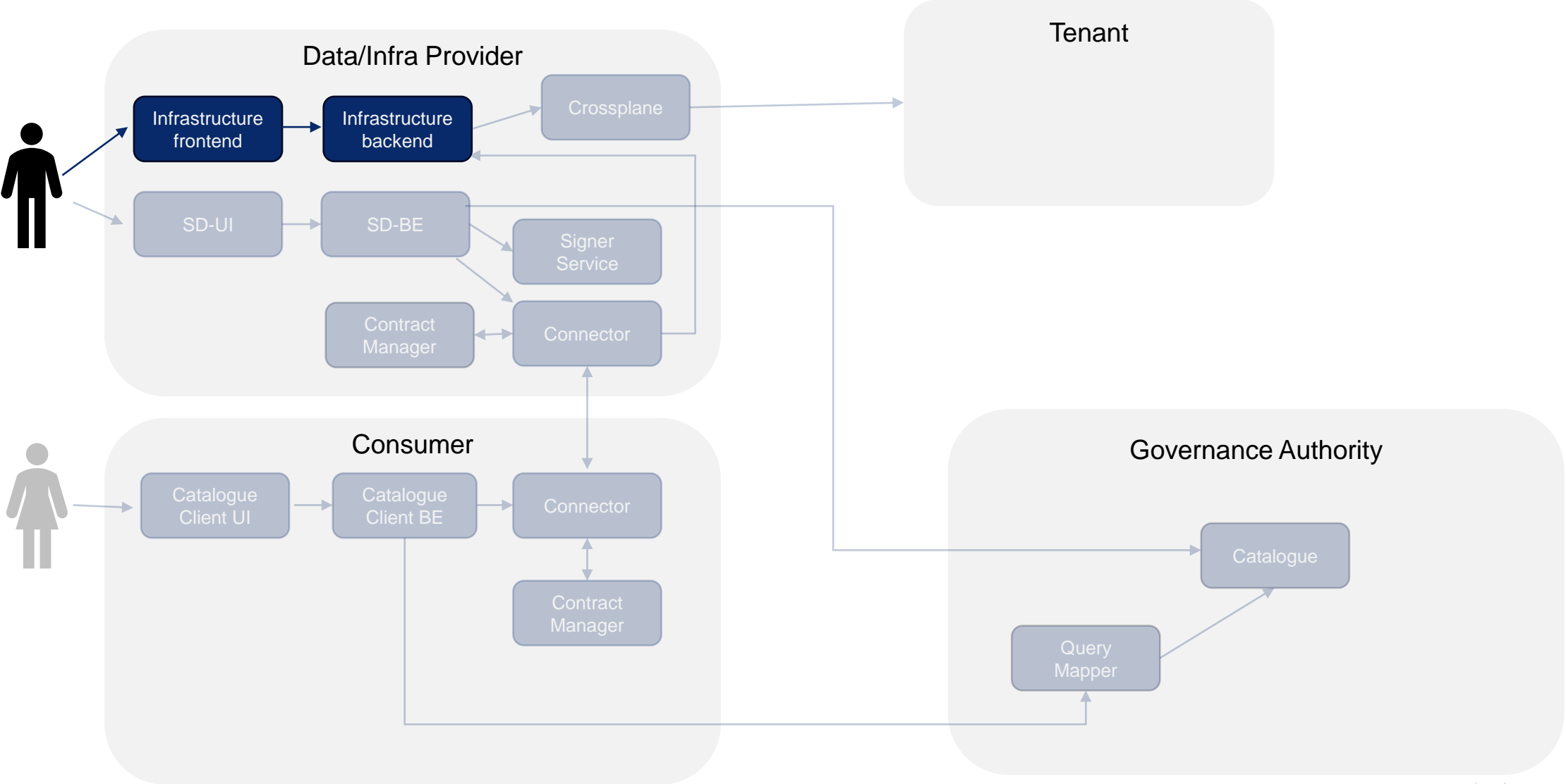
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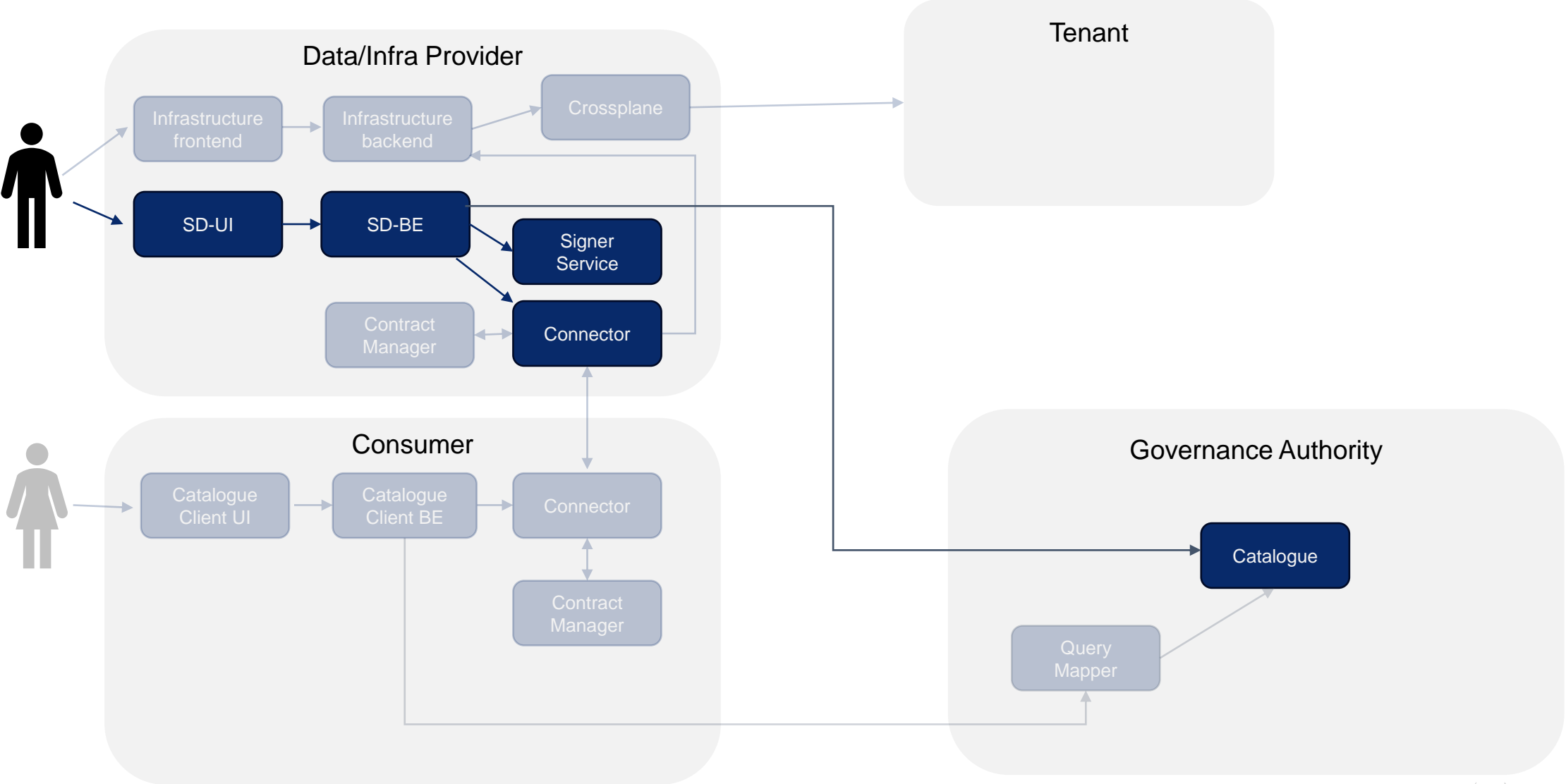
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Creating and Adding Service Offerings



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Creating and Adding Service Offerings

- Explaining usage and access policies and their types.
- Using identity attributes with access policies.
- Validation process for the Self-Descriptions.

4

Search of Service Offering

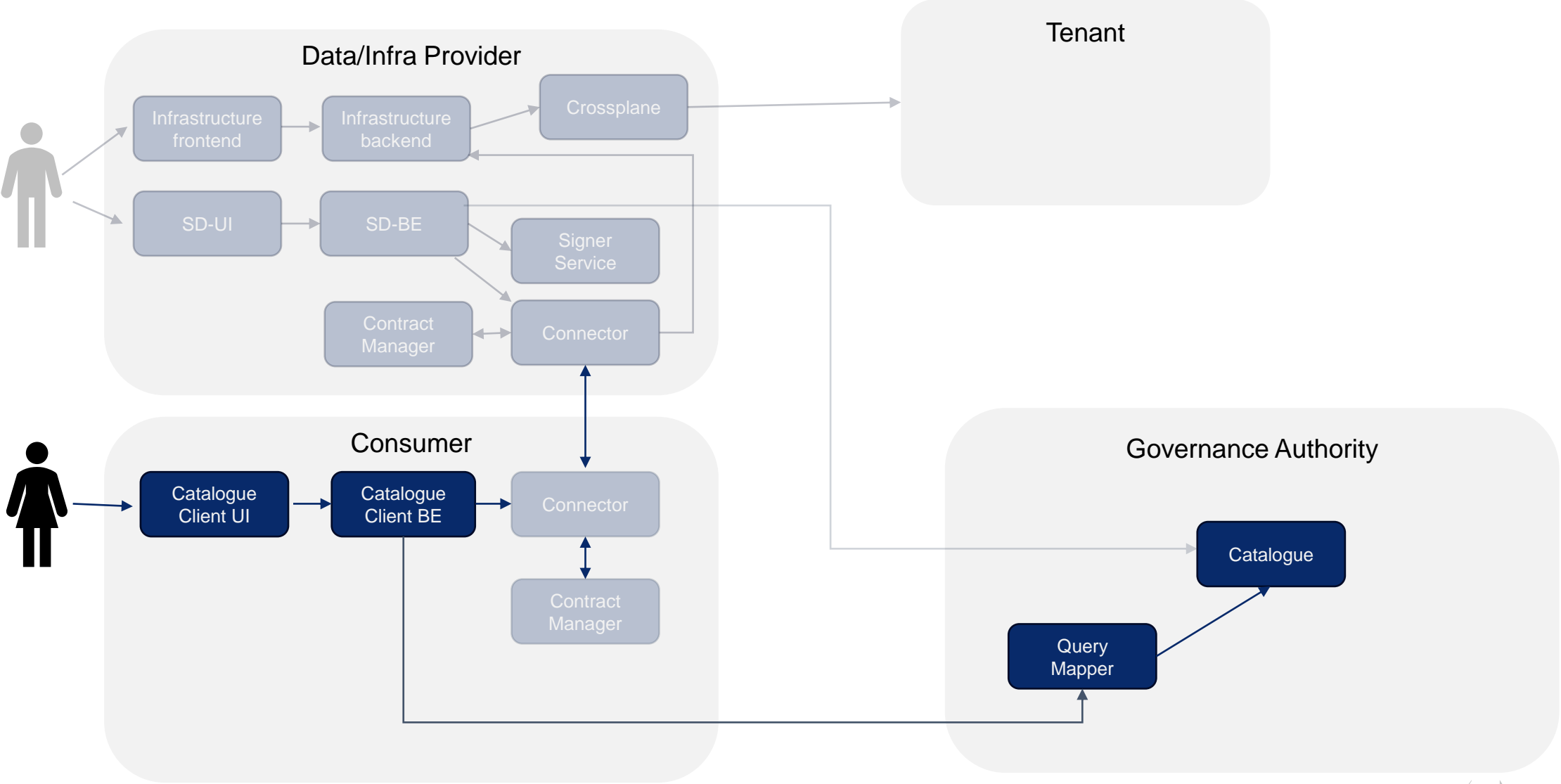
- Show different users with different access levels, searching for Resource Descriptions that they do/don't have access to.
- Show Quick Search and Advanced Search.

5

Consumption

- Requesting and receiving a dataset via connector (traditional data space use case)
- Reviewing the offers and their policies, contracting and accessing the resource (Bundle).

Search of Service Offering



Agenda

Break out: Use of a data space

1

Simplified Architecture

- Fundamental architecture concepts.

2

Deployment Scripts

- Explaining Deployment Scripts and their structure.
- How to add deployment scripts and How to add infra or bundle offerings to the catalogue.

3

Creating and Adding Service Offerings

- Explaining usage and access policies and their types.
- Using identity attributes with access policies.
- Validation process for the Self-Descriptions.

4

Search of Service Offering

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Consumption

