National Digital Twin Programme

Industry Day

22nd October 2025

Tag us in your posts

#NationalDigitalTwin

@Department for Business and Trade

Event agenda

Arrival, tea and coffee

30m

Lunch and networking

1h

Break

30m

09:00 | 10:00 | 11:00 | 12:00 | 13:00 | 14:00 | 15:00 | 16:00 | 17:00

Welcome address
Rodney Berkeley CBE | Director - Infrastructure and Technology, Department for Business and Trade

Achievements from the last two years
Alex Luck, Programme Director | Alex Atudosie, Programme Manager

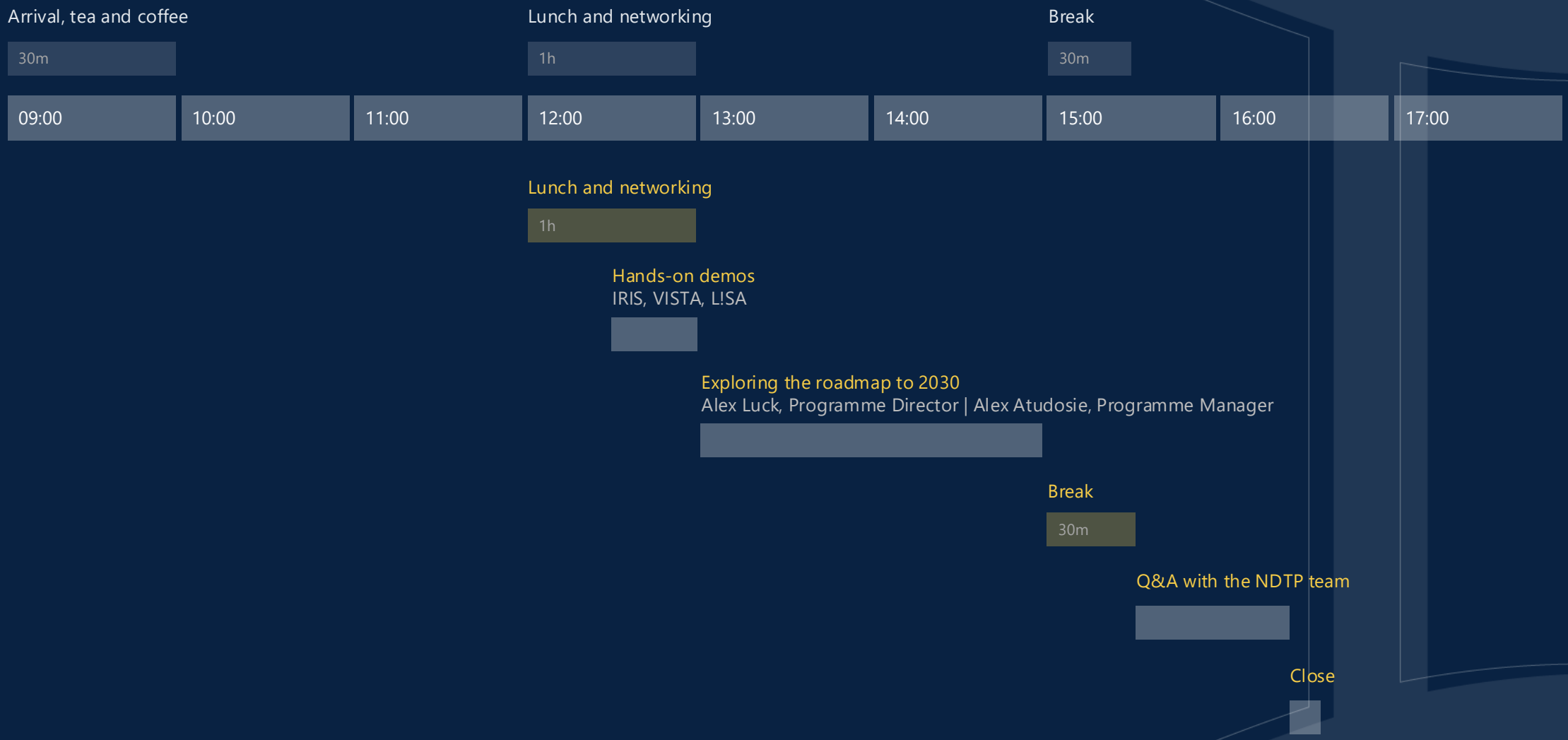
Partner spotlight - NESO
Simon Evans, Programme Director for Virtual Energy System, NESO

Lunch and networking

1h

Hands-on demos
IRIS, VISTA, L!SA

Event agenda



Rodney Berkeley CBE

Director Infrastructure and Technology

Department for Business and Trade

Alexandra Luck

Programme Director

National Digital Twin Programme

What happened since our last Industry Day?

We continue to use the NDTP principles and development attributes

The Programme will:

1	Deliver value demonstrated through measurable, tangible benefit
2	Develop and promote open, reusable assets, released incrementally
3	Promote a culture of honesty and transparency
4	Prioritise accessibility and inclusivity
5	Bridge the digital skills and cultural gap
6	Establish the rules of the road
7	Establish strategic ownership and governance

What happened since our last Industry Day?

We continue to use the NDTP principles and development attributes

Digital twins, individually and when connected, must be

1	Safe
2	Secure
3	Trustworthy [Transparency | Accessibility | Control]
4	Ethical [Individual rights | Privacy | Non-discrimination | Non-manipulation]
5	Sustainable [Economically | Socially | Environmentally]
6	Adaptable [Robust | Resilient | Extendable | Extant]
7	Interoperable

What happened since our last Industry Day?

We continue to focus on the four focus areas

Operating frameworks

- Legal
- Sustainability
- Ethics
- Technical
- Safety
- Security
- Commercial
- Governance
- Delivery principles
- Development attributes
- X-Government alignment

Data and technology

- Integration architecture
- Ontology
- Data visualisation
- Data sources, quality, interoperability
- Model interoperability
- Open-source repository

Skills, culture and engagement

- Skills gap – current & next gen
- Communication and outreach
- Stakeholder engagement

Demonstrator programme

- Retrofitting in housing
- Energy system
- Asset resilience, emergency planning and response
- Vulnerable people

What happened since our last Industry Day?

We continue to focus on the four focus areas and have made significant progress on...

Operating frameworks

- Legal
- Sustainability
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What happened since our last Industry Day?

We continue to deliver with a very small team

Alexandra Luck

Programme Director

National Digital Twin Programme

NDTP@BusinessAndTrade.gov.uk

Alex Atudosie

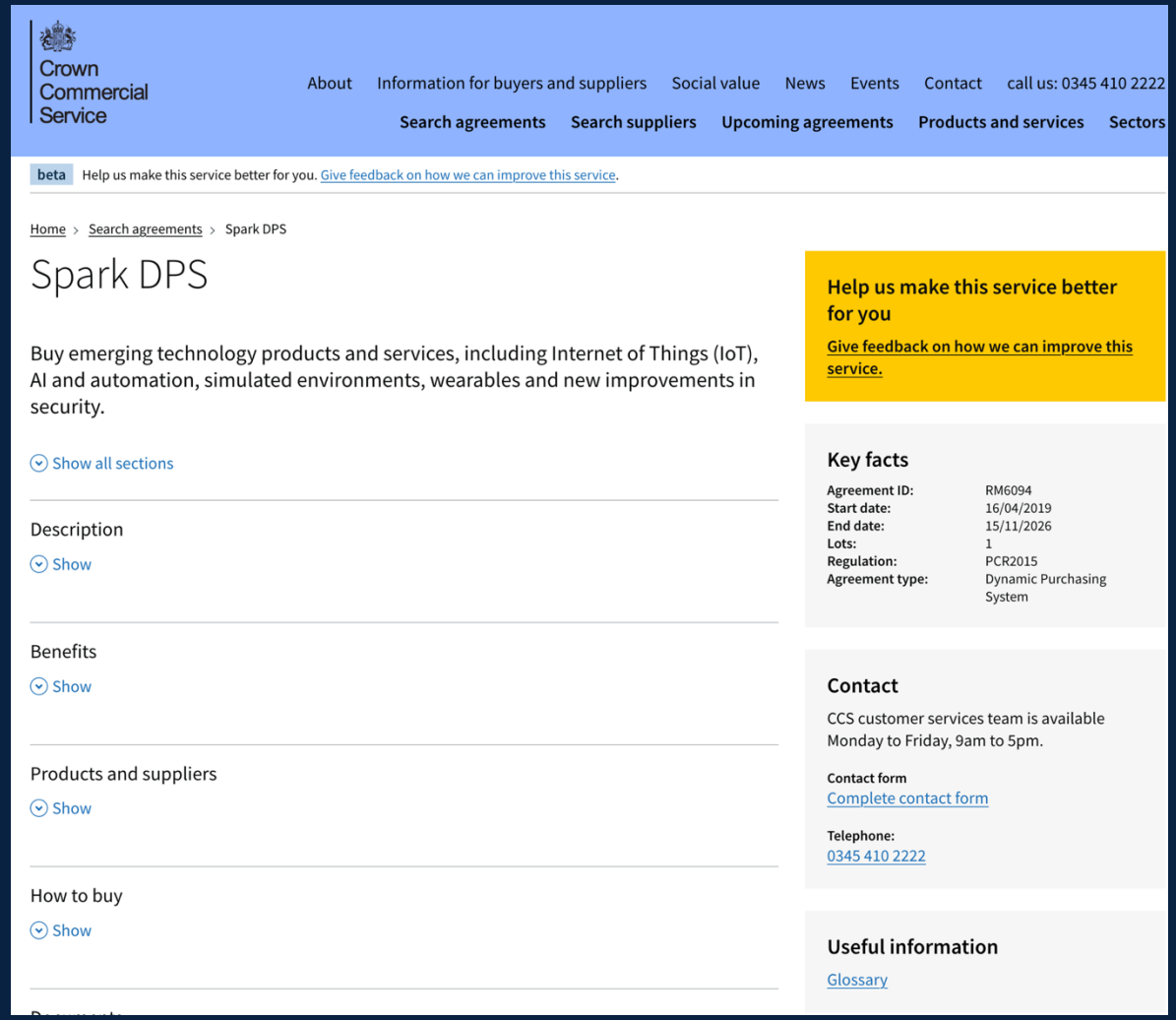
Programme Manager

National Digital Twin Programme

NDTP@BusinessAndTrade.gov.uk

What happened since our last Industry Day?

We have brought procurement in-house and are now working directly with suppliers

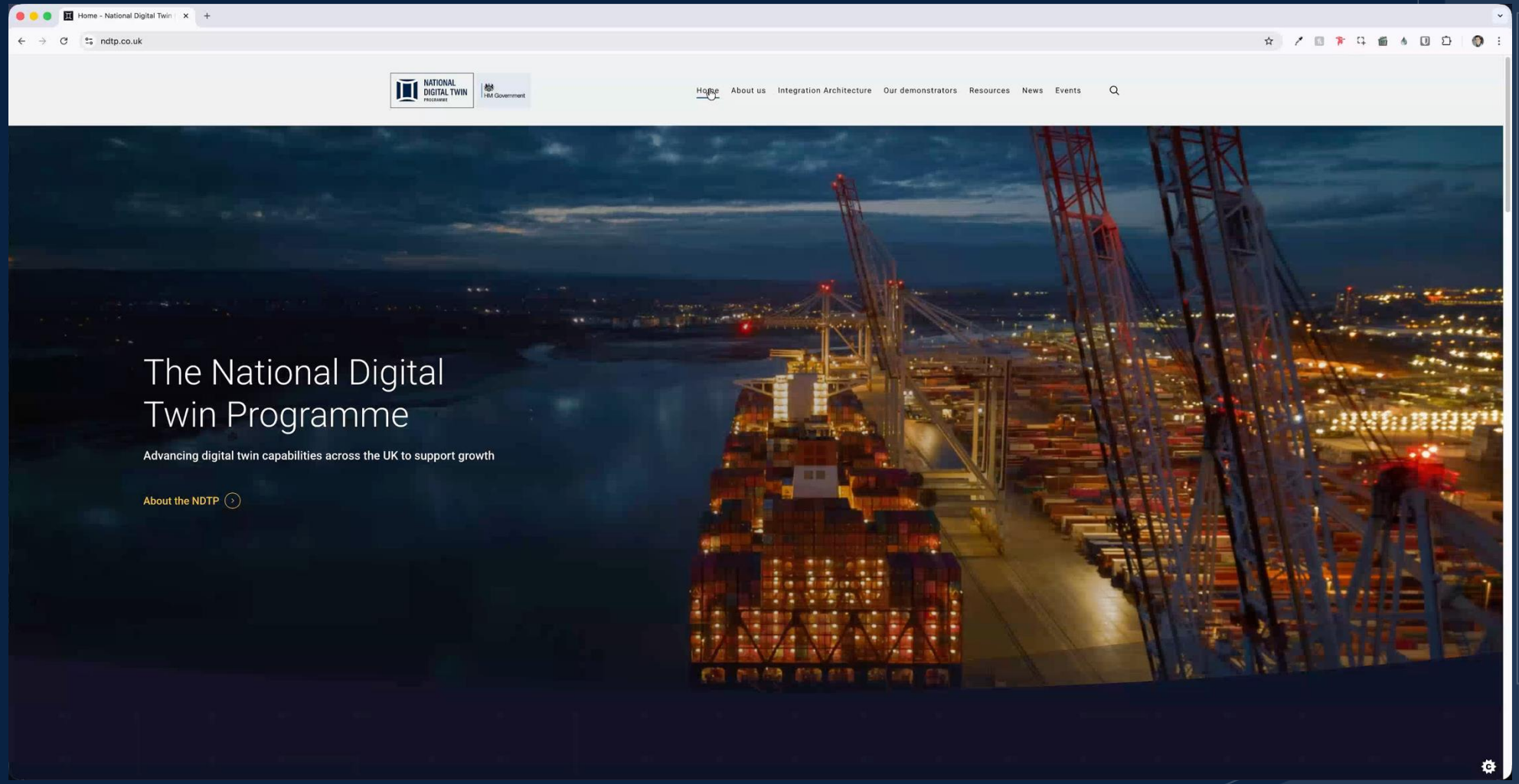


What happened since our last Industry Day?

The National Digital Twin Resilience Challenge 2025

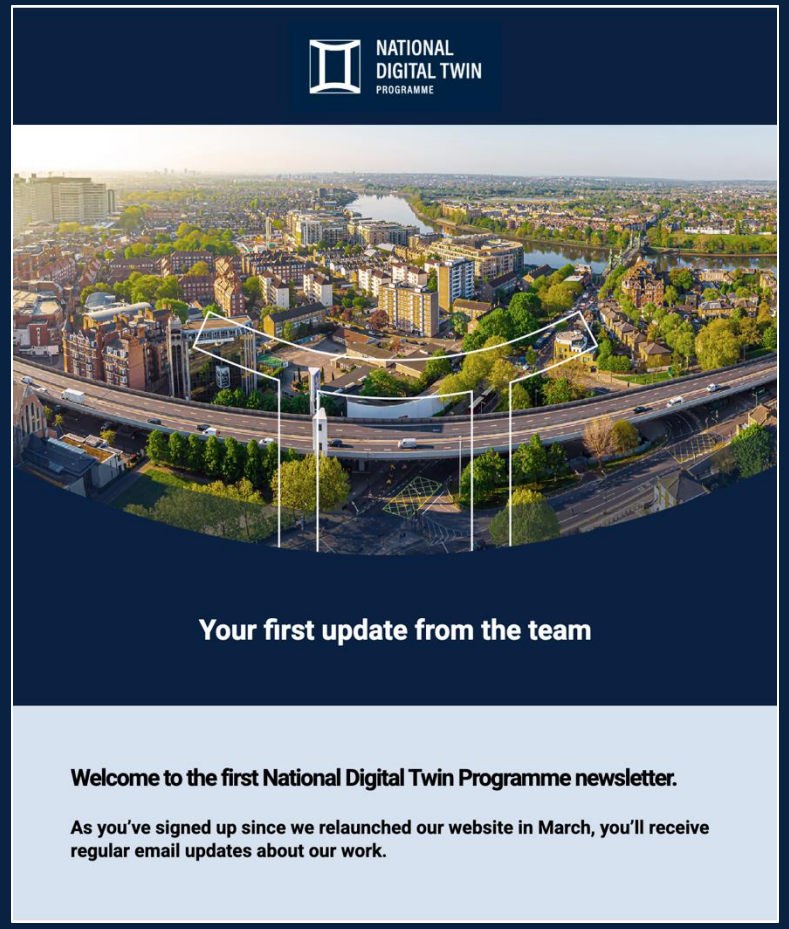
What happened since our last Industry Day?

We have a (recently updated) companion website



What happened since our last Industry Day?

We have (recently updated) launched a newsletter sent every 2 months



SCAN ME

Next newsletter out on **Wed, 29th Oct**

Alex Atudosie

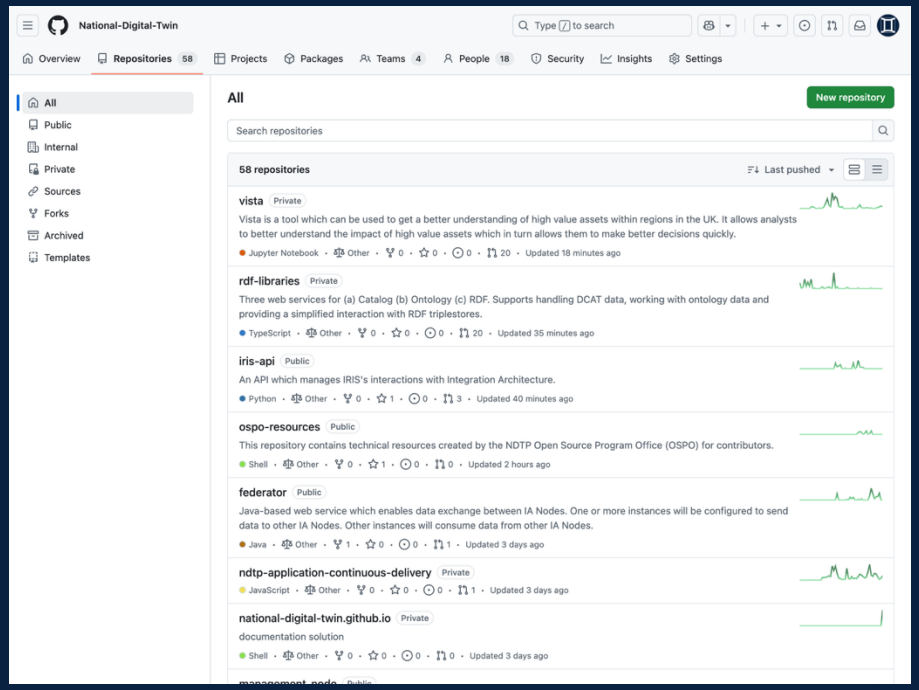
Programme Manager

National Digital Twin Programme

What happened since our last Industry Day?

Established strong open-source foundations

Stood up a GitHub Organisation



https://github.com/orgs/**National-Digital-Twin**

Consolidated development work

- Took control of al NDTP codebases
- Applied neutral consistent branding throughout
- This improved visibility and consistency across all projects

Brought all software development under our own GitHub Org.

What happened since our last Industry Day?

Established strong open-source foundations

Standardised practices

- We set clear expectations for code creation, review, and maintenance
  - Version control
  - Branching
  - Documentation
  - Contribution
- Delivery practices became standardised and consistent

Established a common framework for how we work with code.

Built Open-Source Governance

- We created a suite of Markdown files
  - README
  - **AKNOWLEDGEMENTS**
  - MAINTAINERS
  - SECURITY
  - Etc…
- Informed by best practice and Open UK, to support repeatable and responsible open sourcing

Developed reusable templates and guidance for open publication

What happened since our last Industry Day?

Established strong open-source foundations

Initial public release – 31 March 2025

0.90.0 – 2025-03-31

Initial Public Release (Pre-Stable)

This is the first public release of this repository under NDTP's open-source governance model.
Since this release is **pre-1.0.0**, changes may still occur that are **not fully backward-compatible**.

Initial Features

- Key functionality for loading data into an IA Node via SPARQL file upload and Kafka message stream topic.
- Key functionality for querying data in an IA Node via SPARQL and GraphQL.
- Key functionality for integrating rdf-abac component.

Known Limitations

- Some components are subject to change before `1.0.0`.
- APIs may evolve based on partner feedback and internal testing.

Launched our first open-source project.

Embedded governance for internal development

- We adopted best practice from the Good Governance Handbook from the OSPO Alliance
- Developed a InnerSource licensing model

Developed robust internal development processes.

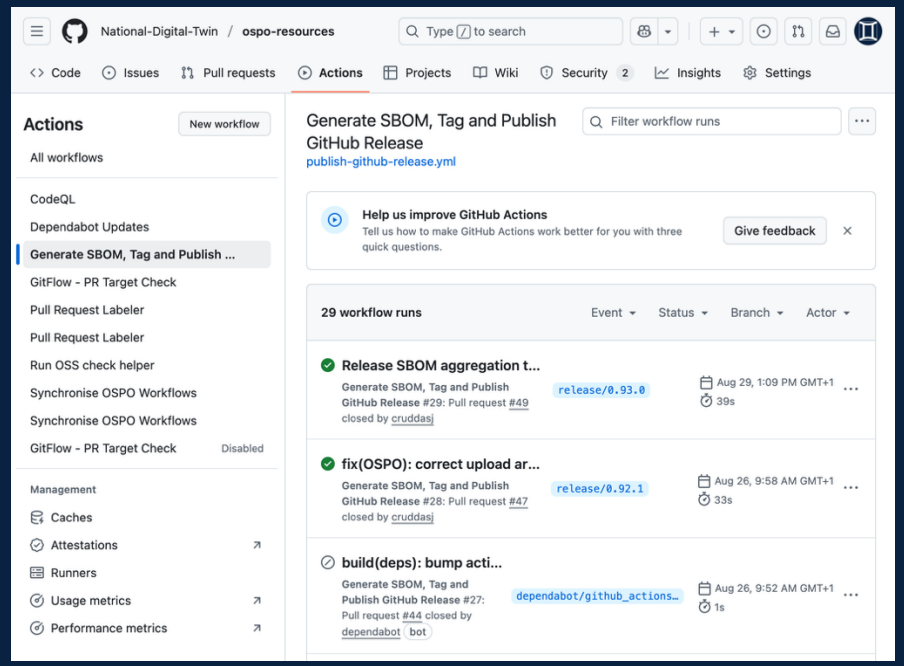
What happened since our last Industry Day?

Established strong open-source foundations

Joined the OSPO Alliance

Strengthened community links.

Shared OSPO resource publicly



Made our frameworks and tools available for wider use.

NDT : from one node to a National Node Net

How digital services are structured…a conceptual table using a familiar cloud toolset

	Infrastructure as a Service	*Platform* as a Service	*Software* as a Service
	IaaS	PaaS	SaaS
	The foundation everything runs on.	*Development environment where things are built.*	*The final user-facing application most people interact with.*
What does the cloud provider deliver?	Basic computing resources – virtual machines, networking, and storage – that you manage and build upon.	Infrastructure AND managed platform for developing, running, and deploying applications. You don't manage servers or runtime.	A fully managed application that user can access directly, with no need to manage servers, storage, or code.
Familiar examples (Microsoft 365)	Azure Virtual Machines Azure Storage Azure Networking	Microsoft Windows Server SQL Server .NET Azure Kubernetes Service	Word Excel Teams

NDT : from one node to a National Node Net

Where does the Integration Architecture sit?

	Infrastructure as a Service	*Platform* as a Service	*Software* as a Service
	IaaS	PaaS	SaaS
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The National Digital Twin		The Integration Architecture GitHub	IRIS, NOVA, VISTA, L!SA, SALUS
Definition		Open-source, deployable platform that enables secure data exchange	Open, deployable applications which use the IA platform, and other data sources.
Notes		Coexists with existing (legacy) systems Deployable on existing public cloud environments (e.g., AWS, Azure)	

NDT : from one node to a National Node Net

What would a Node of the Integration Architecture look like in my cloud environment?

	Infrastructure as a Service	*Platform as a Service*	*Software as a Service*
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The National Digital Twin		The Integration Architecture (Node)	

Public Cloud providers	AWS	Azure
Compute, storage, networking	EC2 (compute), S3 (storage), ECR (container registry), Route 53 (DNS), CloudFront (content delivery)	Block blob GPv2, Azure Container Registry, Azure DNZ, Azure Front Door
Container orchestration & runtime	Amazon Elastic Kubernetes Service	Azure Kubernetes Service
Security, identity, and access management	Amazon Cognito, AWS Secrets Manager	Azure Active Directory, Key Vault
Data and messaging	Amazon RDS (PostgreSQL), Amazon DocumentDB (Mongo DB)	Azure DB PostgreSQL, Azure Cosmos DB, Azure Event Hubs

NDT : from one node to a National Node Net

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	Infrastructure as a Service	*Platform as a Service*	*Software as a Service*
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The National Digital Twin		The Integration Architecture (Node)	
Public Cloud providers Compute, storage, networking Container orchestration & runtime Security, identity, and access management Data and messaging	The IA Node is PaaS deployed on top of IaaS (+ managed services), cloud agnostic, and portable through **Infrastructure as Code (IaC)** to ensure fast and consistent deployments		

Infrastructure as Code (IaC) means to define and set up IT infrastructure (e.g., servers, storage, networks using code rather than manual configuration.

It automates and standardises how environments are built.

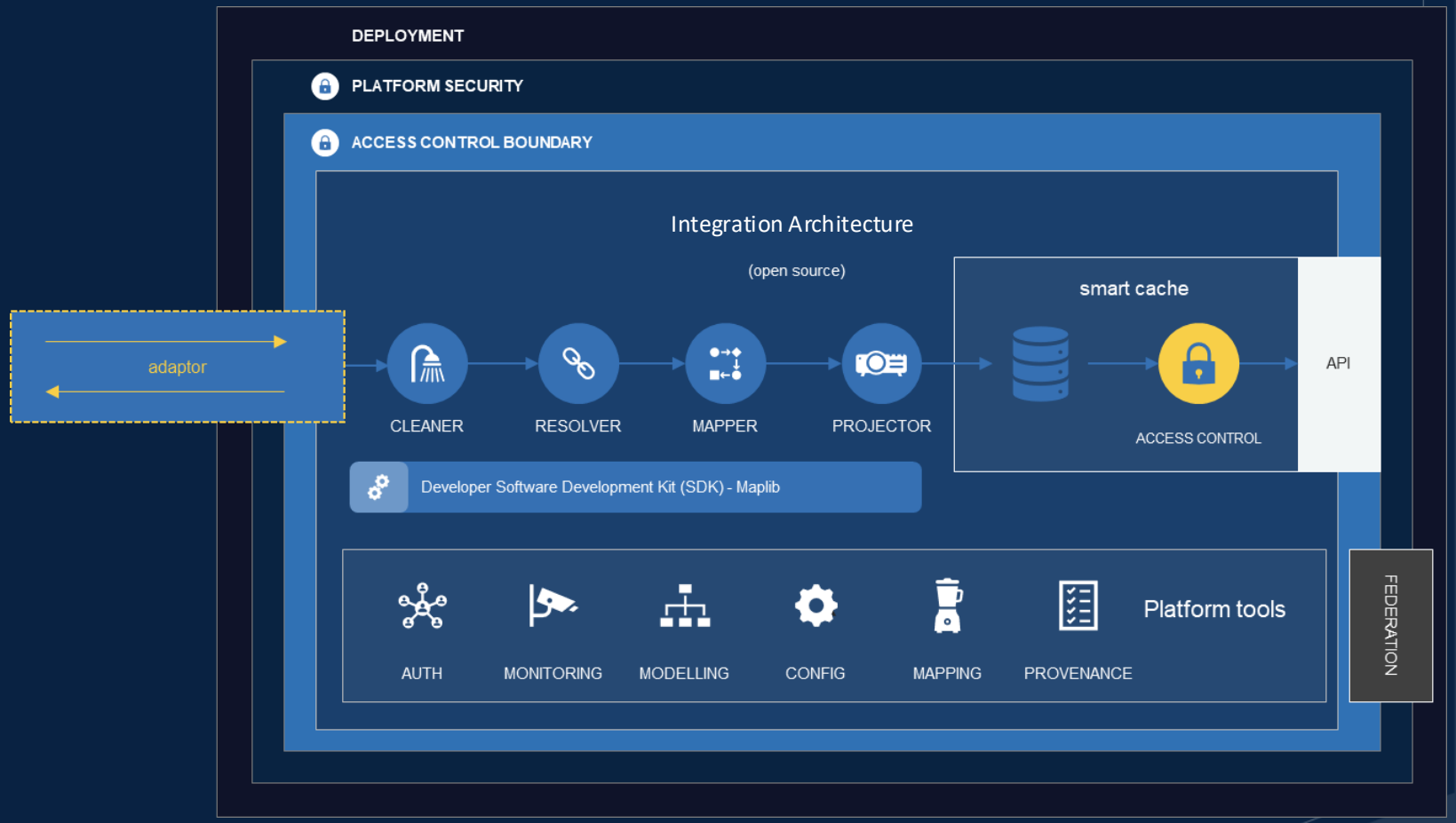
NDT : from one node to a National Node Net

What is an IA Node, and what does it contain?

- Deployable platform software
- Secure, open-source, public solution (avoid vendor lock-in)
- Enables organisation to manage, govern, and share data
- Crown IP, permissively licensed sovereign asset

Significant progress on...

The development of the Integration Architecture



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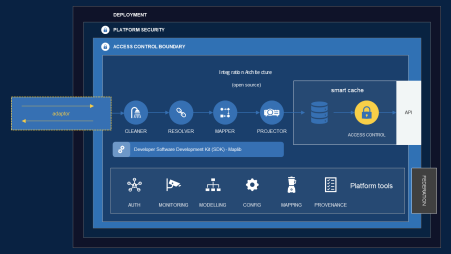
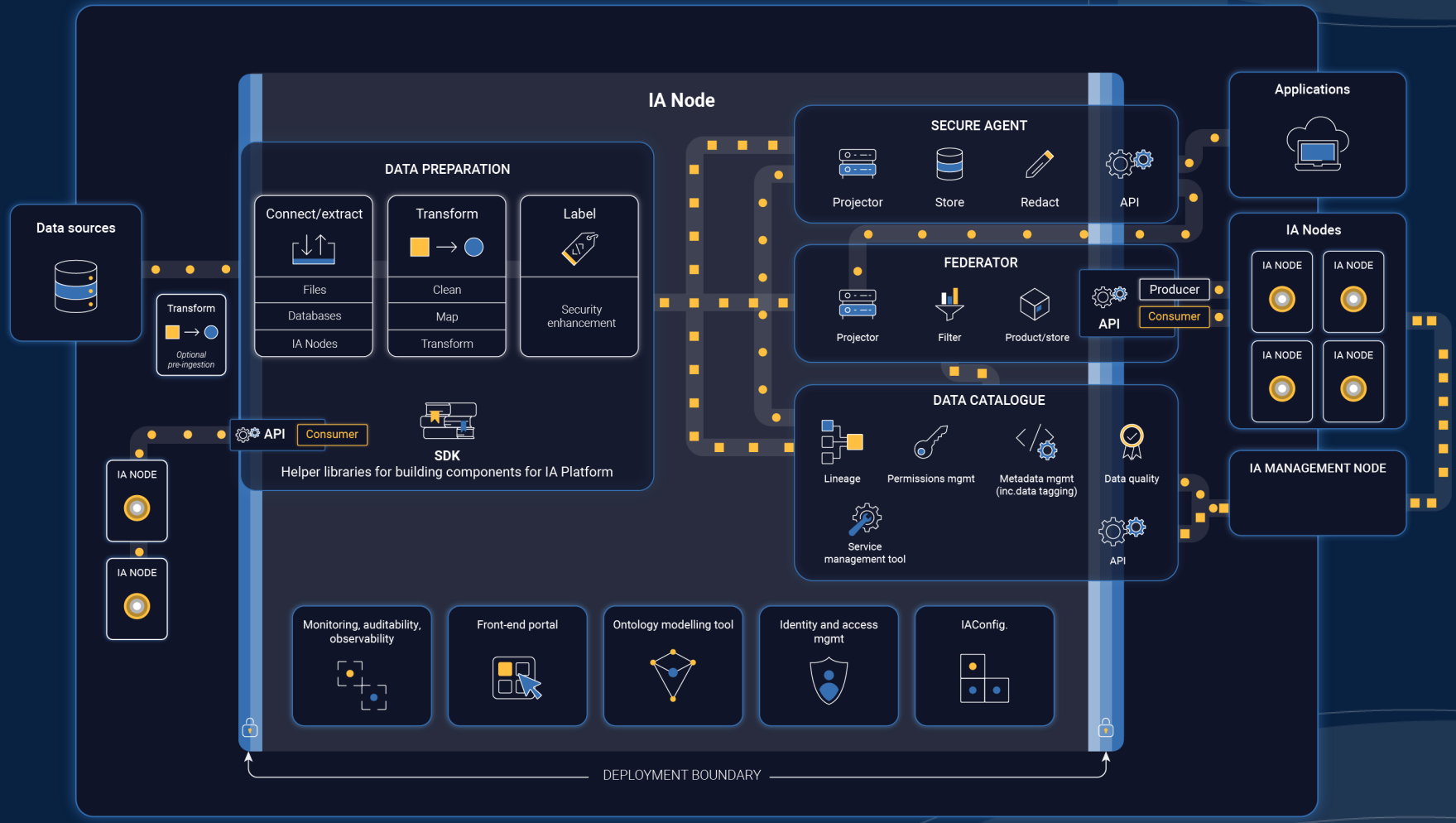
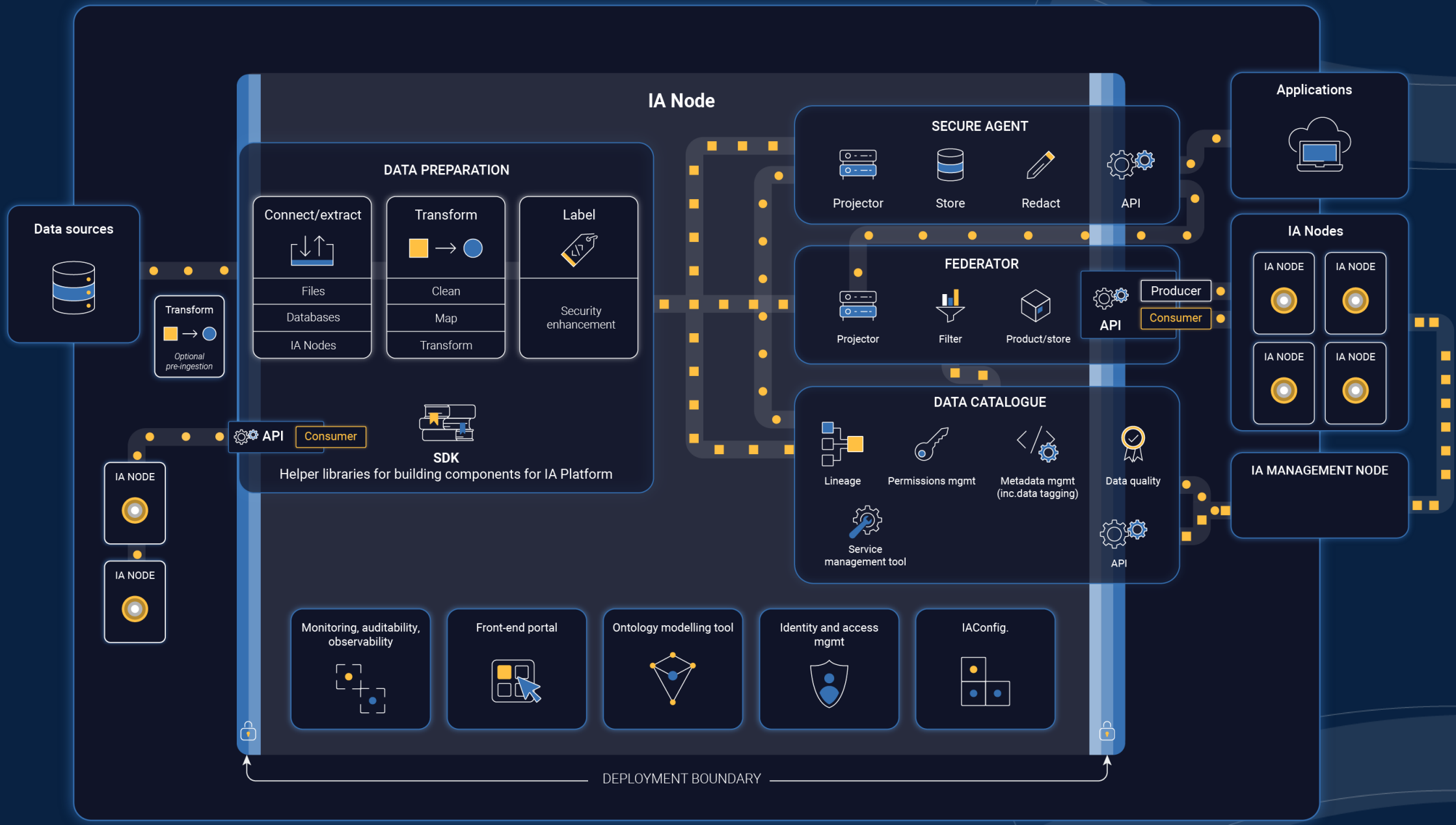
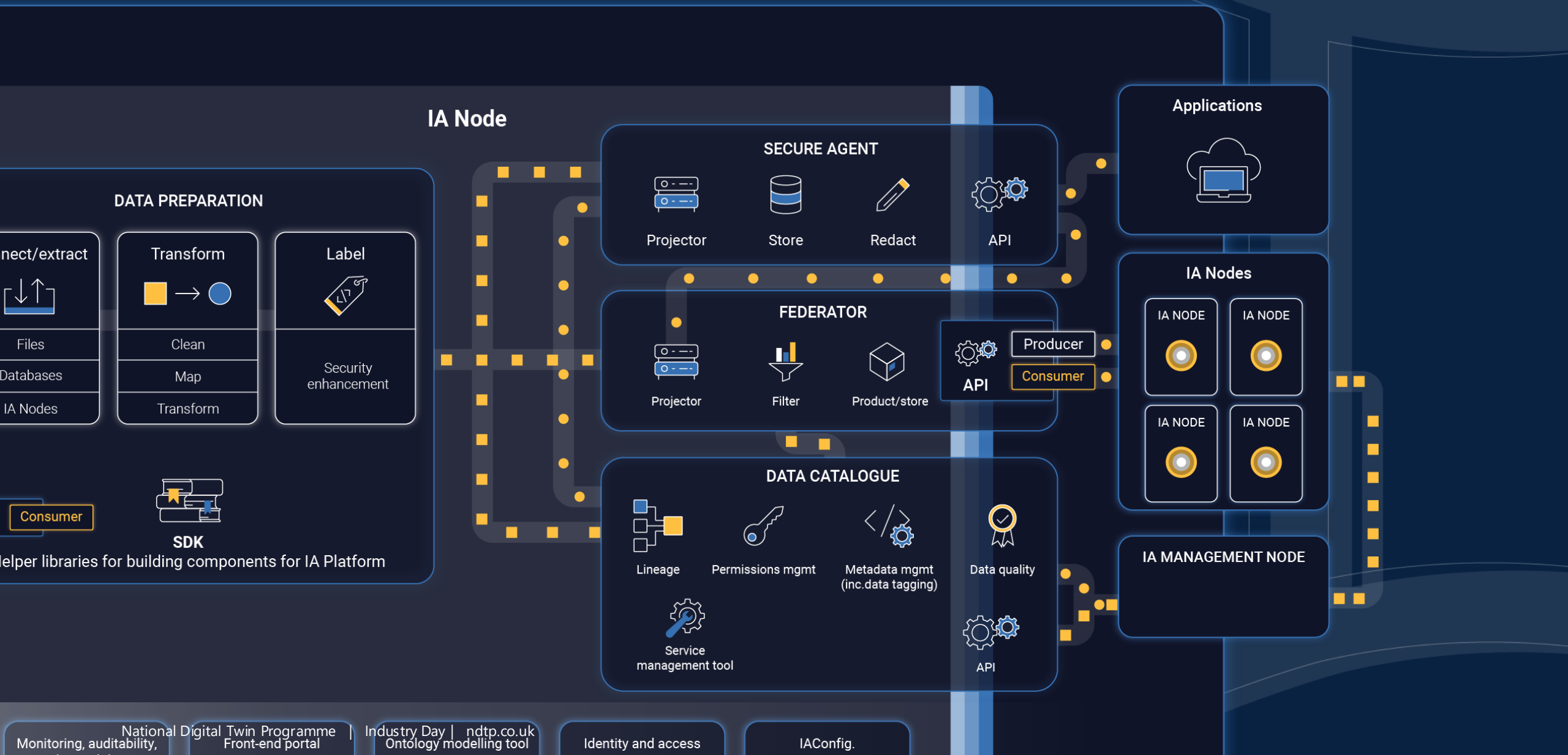





IA Node
DATA PREPARATION
Connect/extract
Files
Databases
IA Nodes
Transform
Clean
Map
Transform
Label
Security enhancement
SDK
Helper libraries for building components for IA Platform
Data sources
Transform
Optional pre-ingestion
API
Consumer
IA NODE
IA NODE
SECURE AGENT
Projector
Store
Redact
API
FEDERATOR
Projector
Filter
Product/store
API
Producer
Consumer
DATA CATALOGUE
Lineage
Permissions mgmt
Metadata mgmt (inc.data tagging)
Data quality
Service management tool
API
Monitoring, auditability, observability
Front-end portal
Ontology modelling tool
Identity and access mgmt
IAConfig.
DEPLOYMENT BOUNDARY
Applications
IA Nodes
IA NODE
IA NODE
IA NODE
IA NODE
IA MANAGEMENT NODE

Significant progress on...

The development of the Integration Architecture

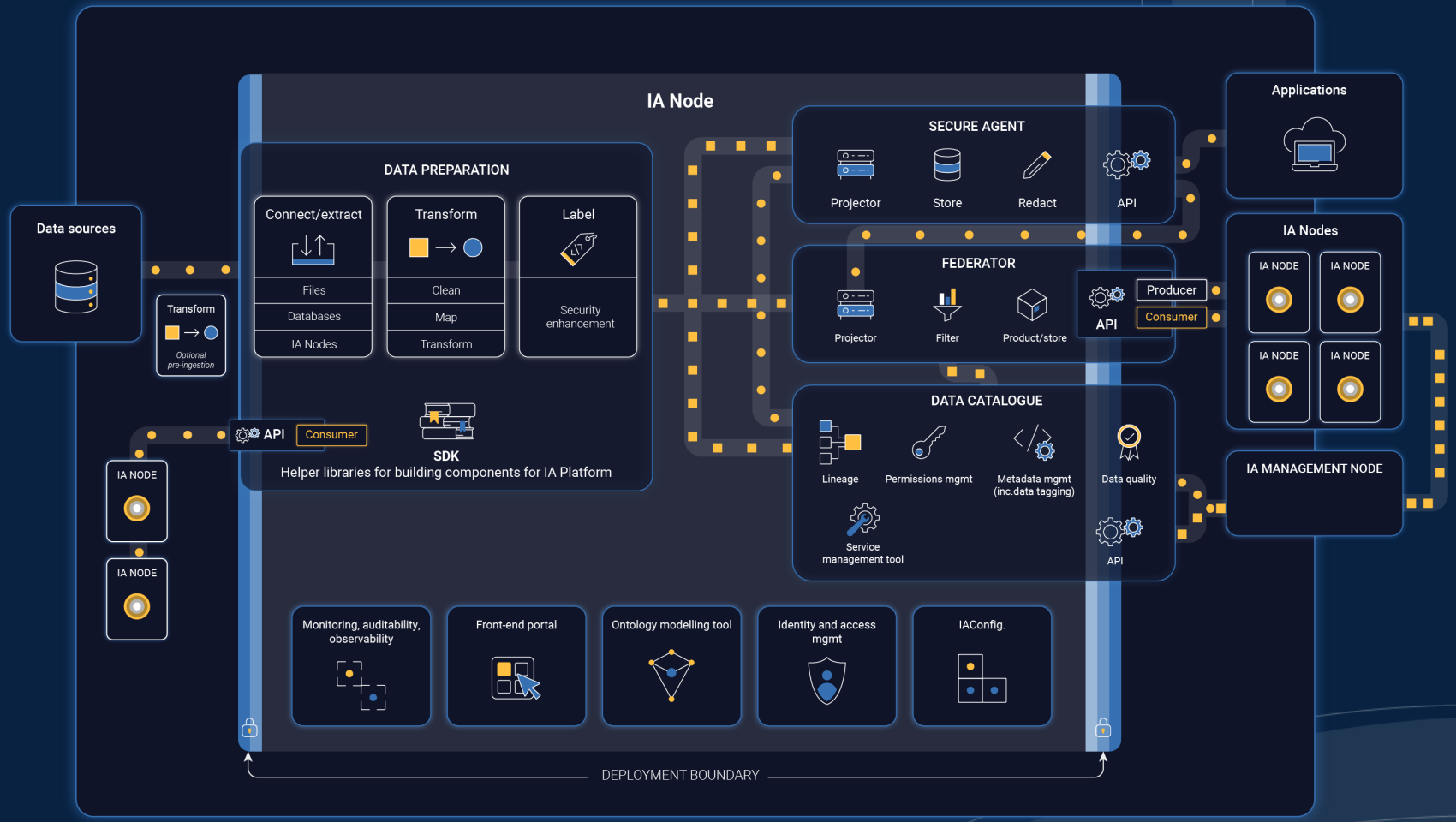


Significant progress on...

The development of the Integration Architecture

Key features:

1. Ingest and connect
2. Transform and map
3. Secure and label
4. Catalogue and audit
5. **Expose/ share**

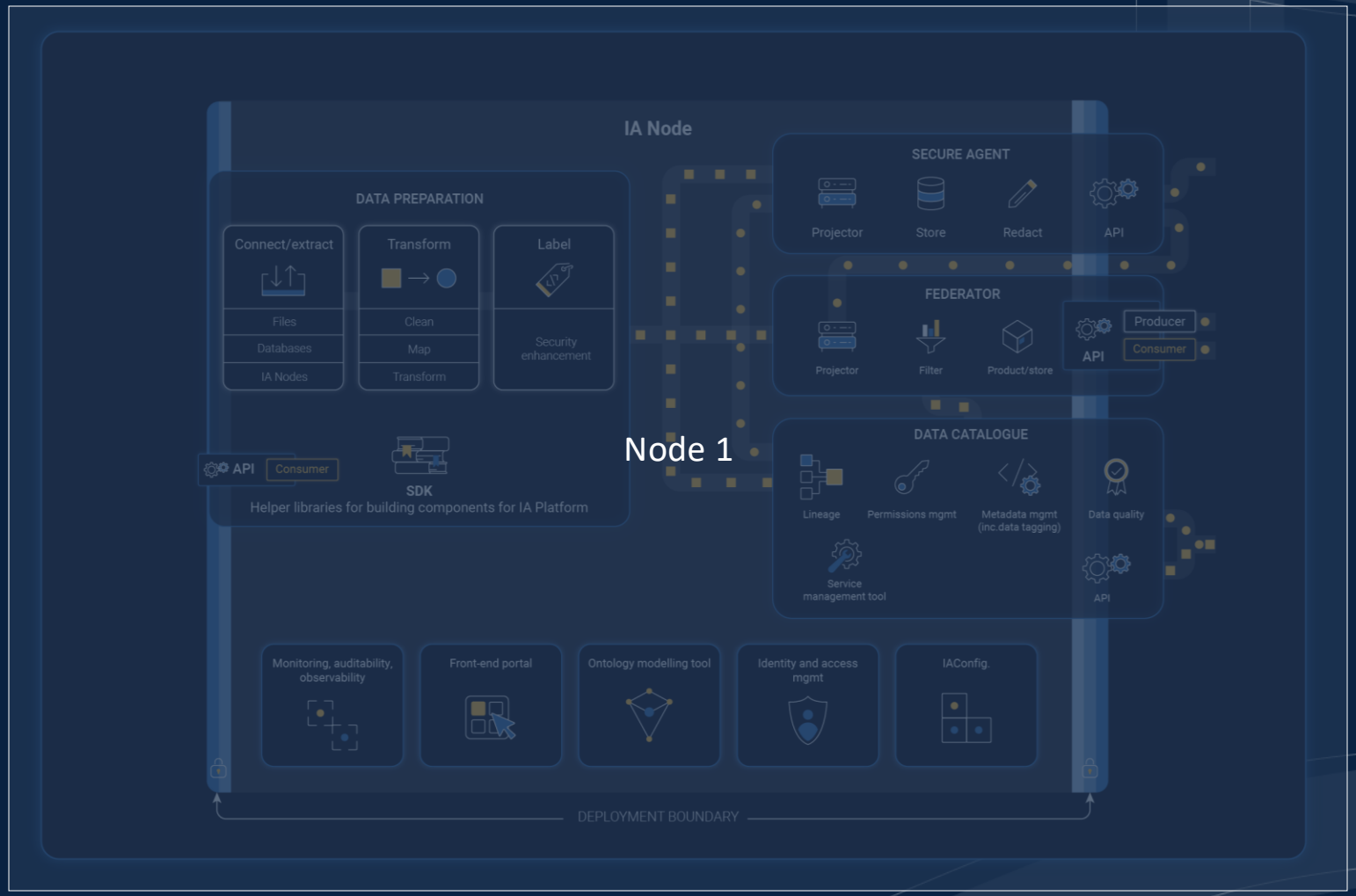


Significant progress on...

The development of the Integration Architecture

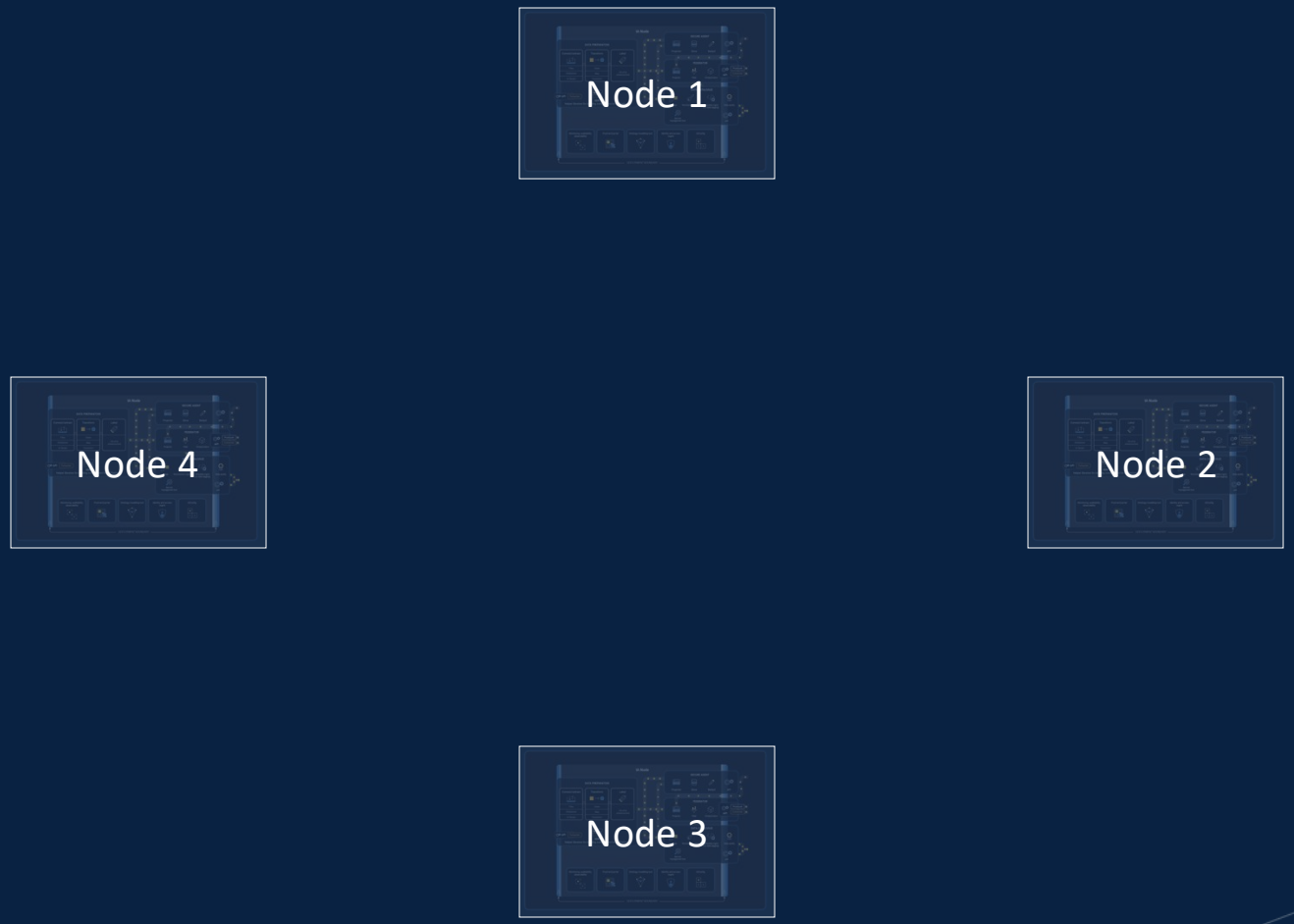
Significant progress on...

Connecting different IA nodes to each other



Significant progress on…

Connecting different IA nodes to each other



Significant progress on…

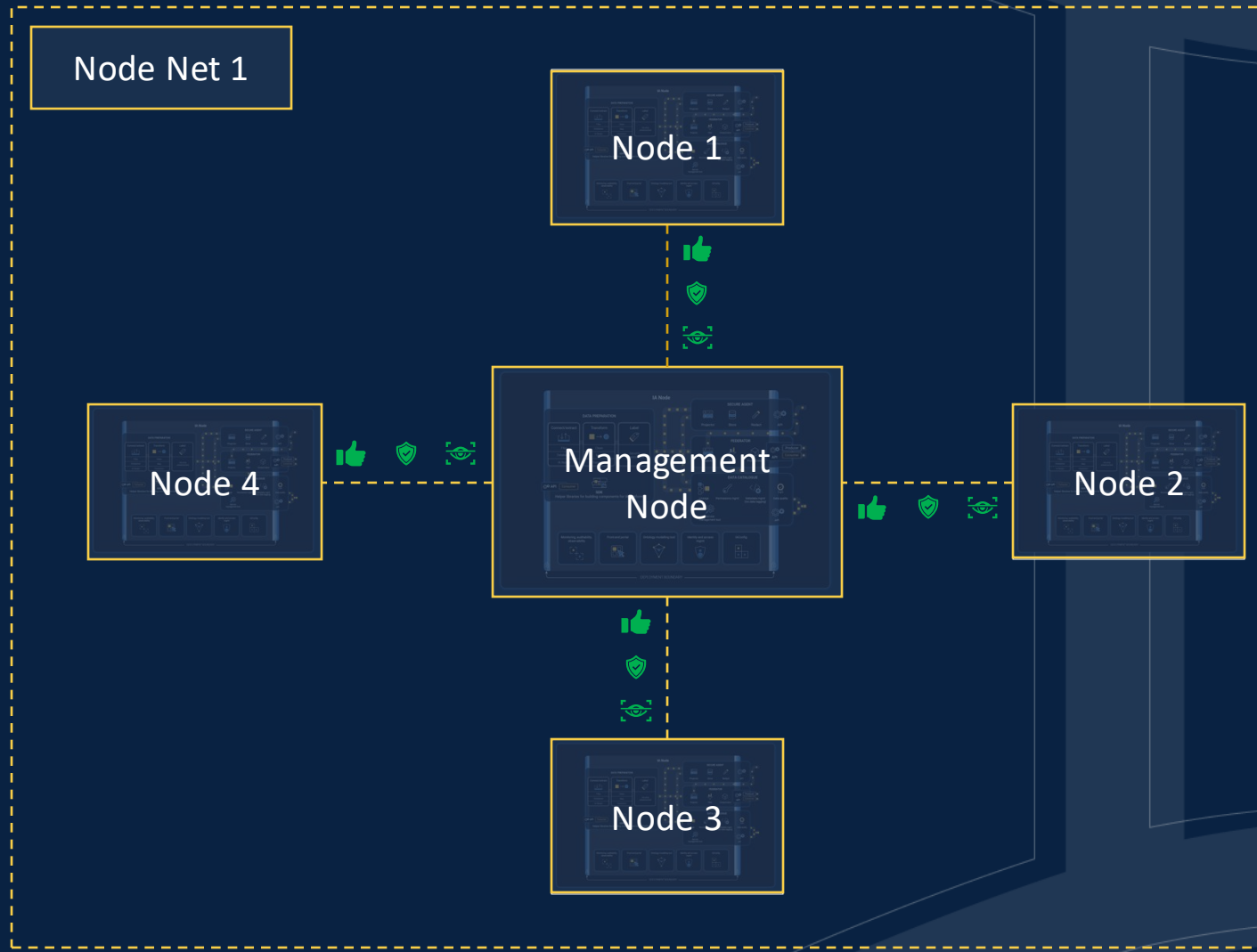
Connecting different IA nodes to each other

Significant progress on...

The Management Node

The Management Node:

1. Facilitates onboarding of Nodes
2. Handles trust and identity
3. Establishes a Node Net



The Management Node was open sourced in **September 2025**

Significant progress on...

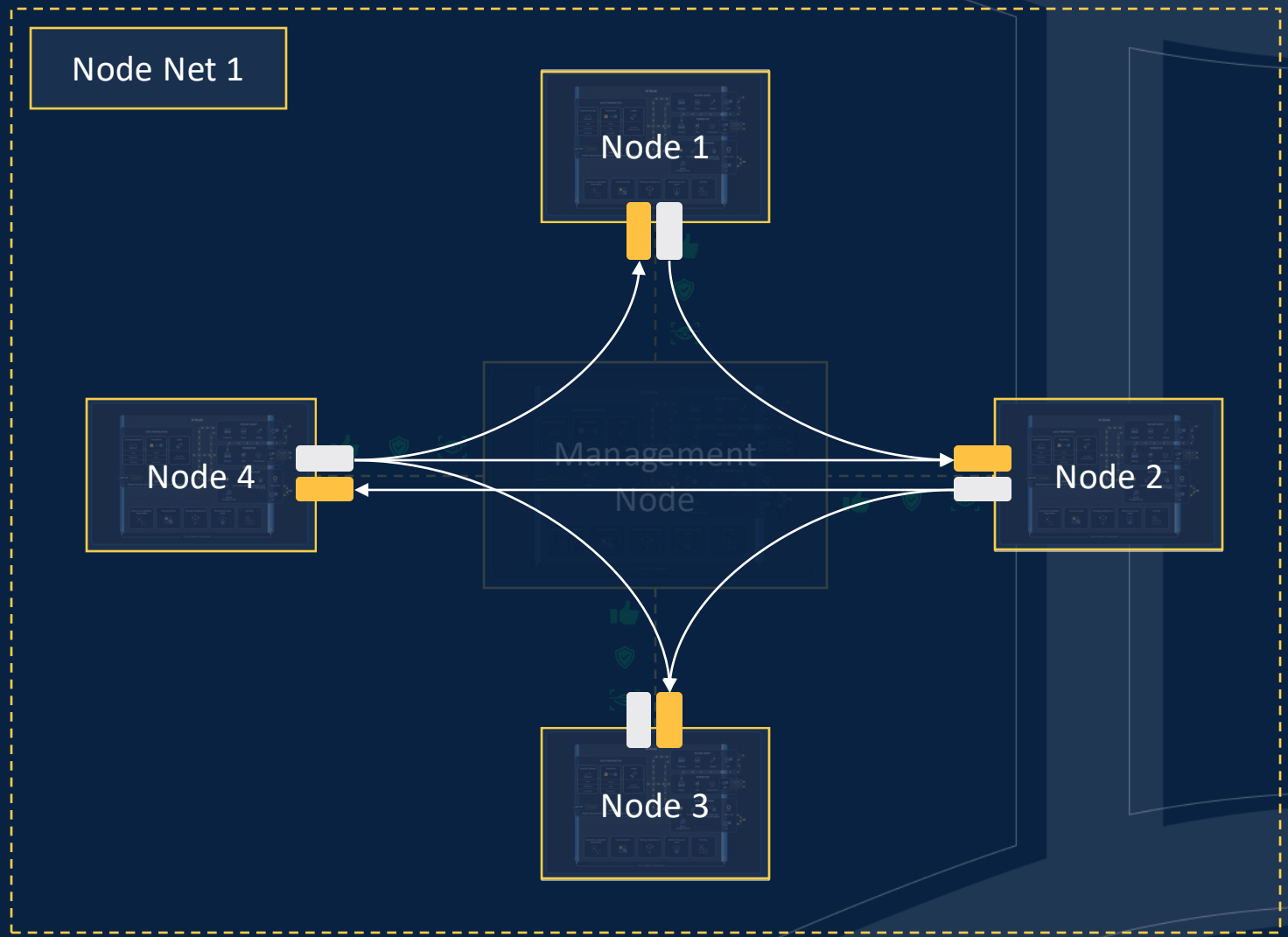
The Federator

The Federator:

1. Has multiple send/receive points for redundancy

2. Obtains configurations dynamically

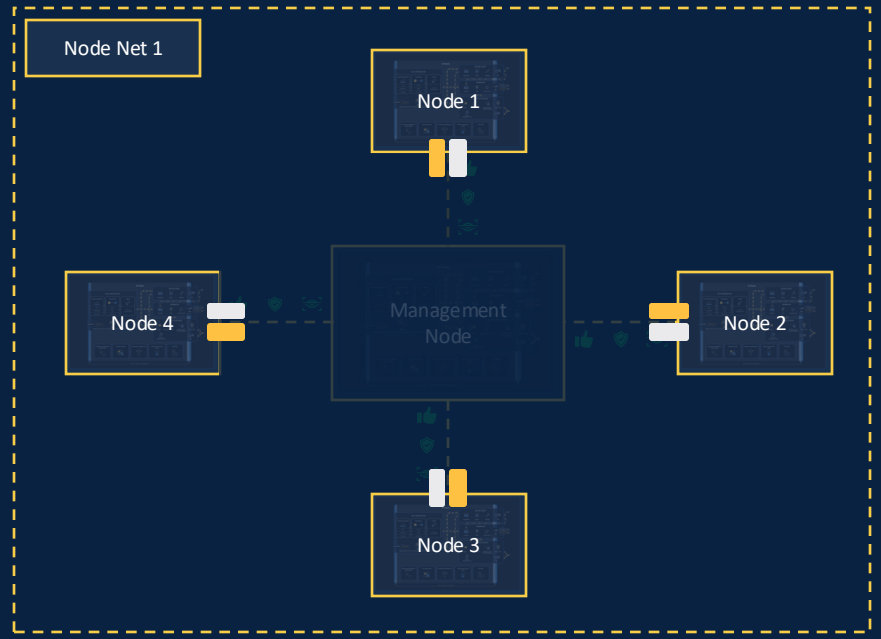
3. Controls what data is shared with filters and security labels



V1.0.0. of the Federator was open sourced in **September 2025**

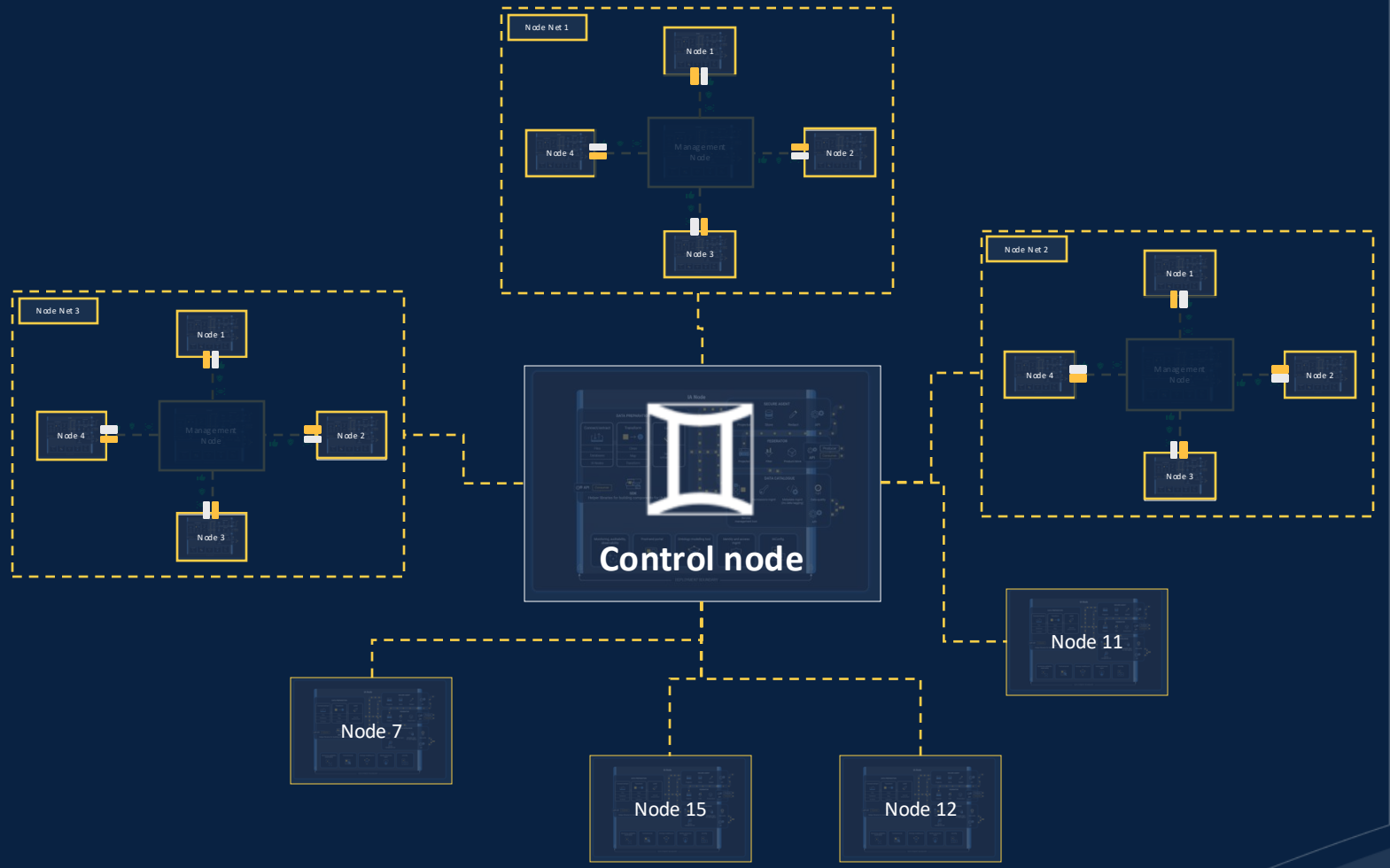
Significant progress on...

Deploying Node Nets (N2)



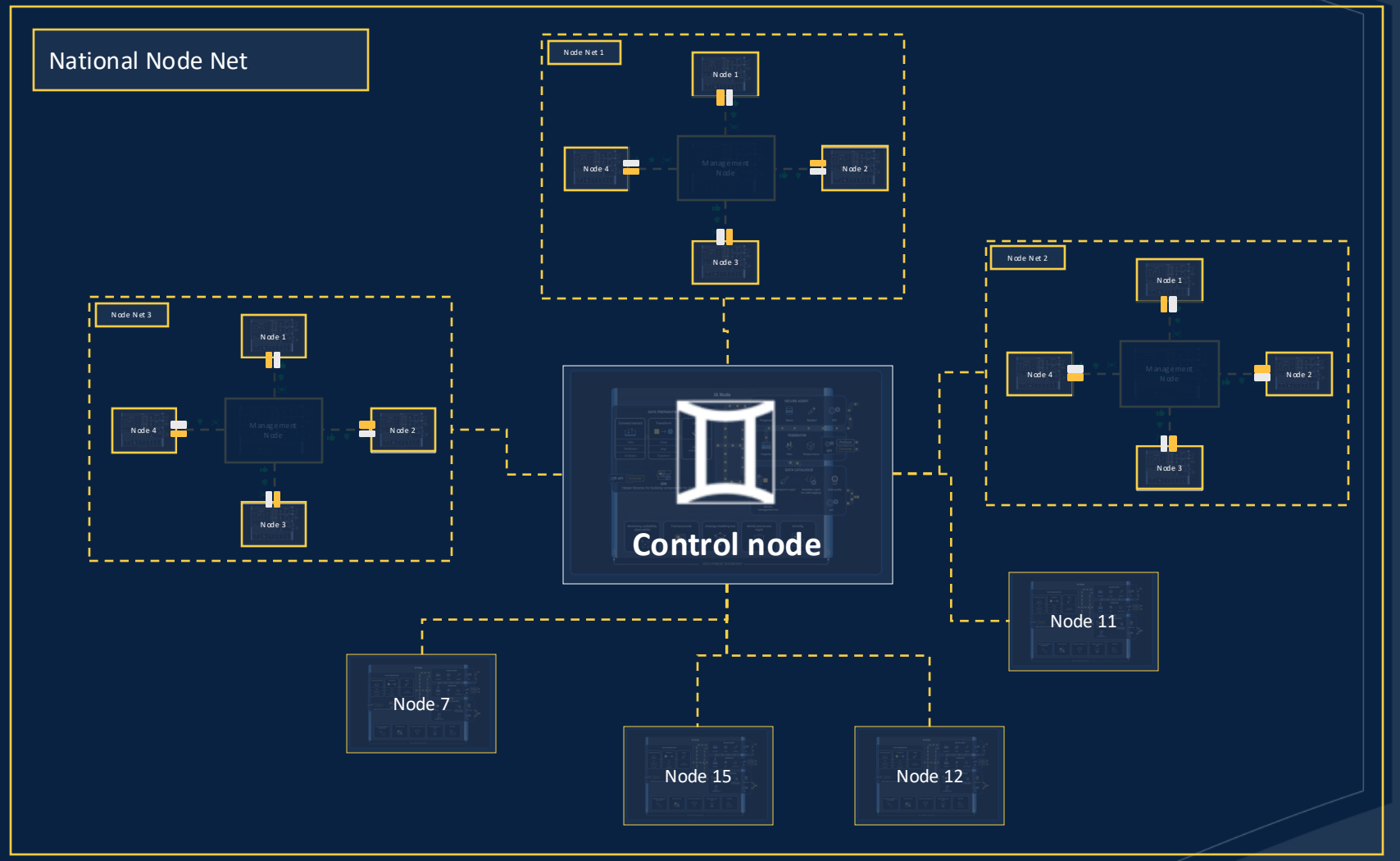
Vision for the future

The Control Node and National Node Net (N3)



The National Node Net

…the trusted data-sharing infrastructure that underpins the UK's National Digital Twin



What happened since our last Industry Day?

The demonstrators have evolved

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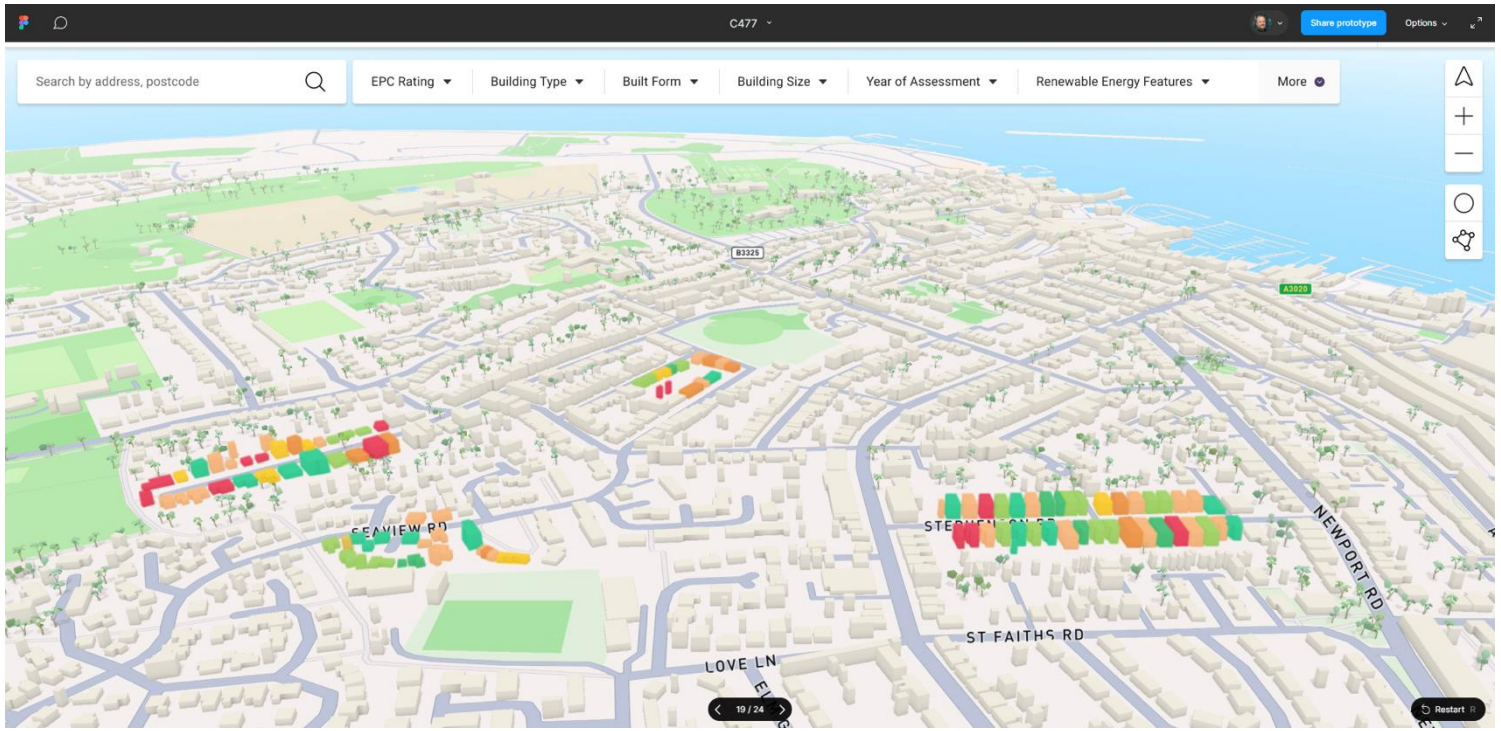
NEW NOVA

NEW L!SA

VISTA

NEW SALUS



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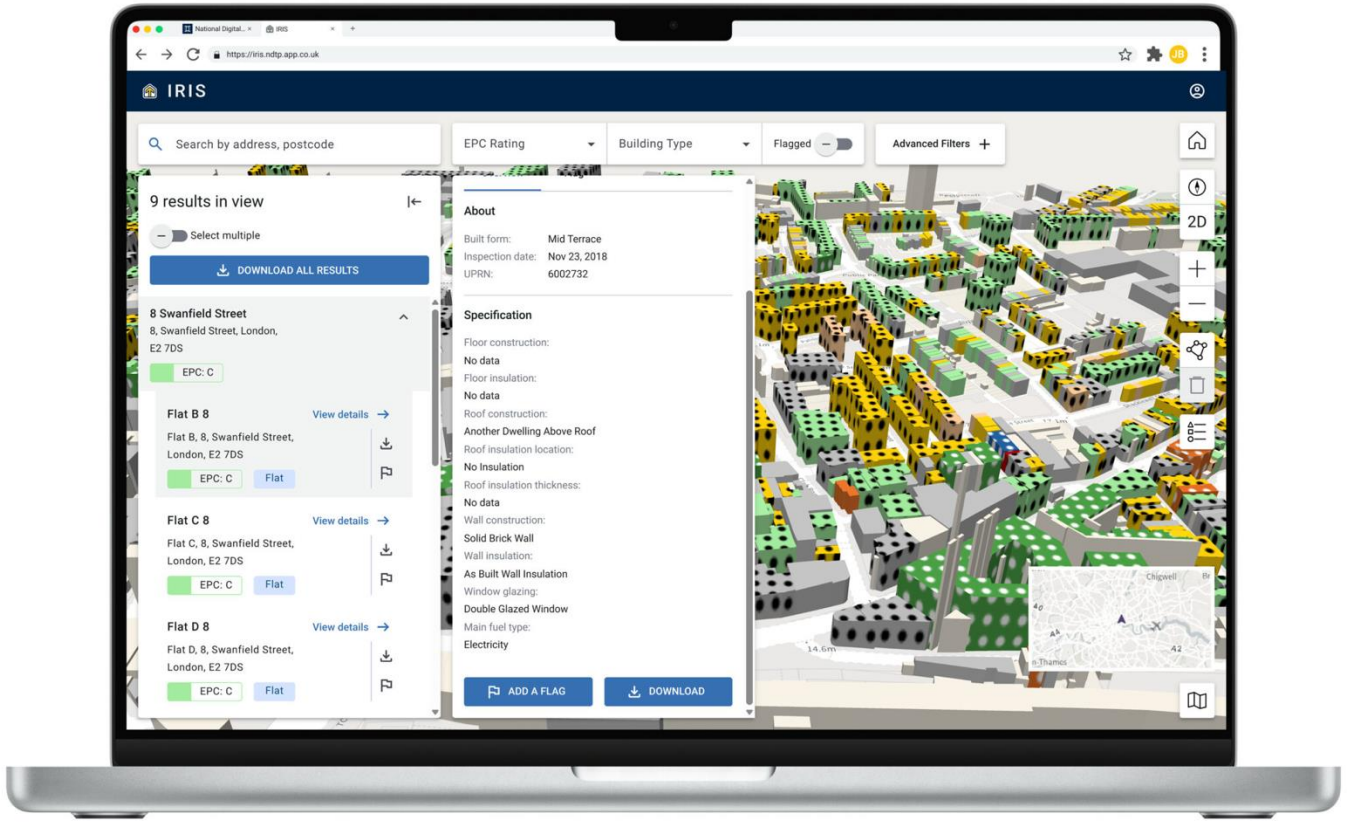

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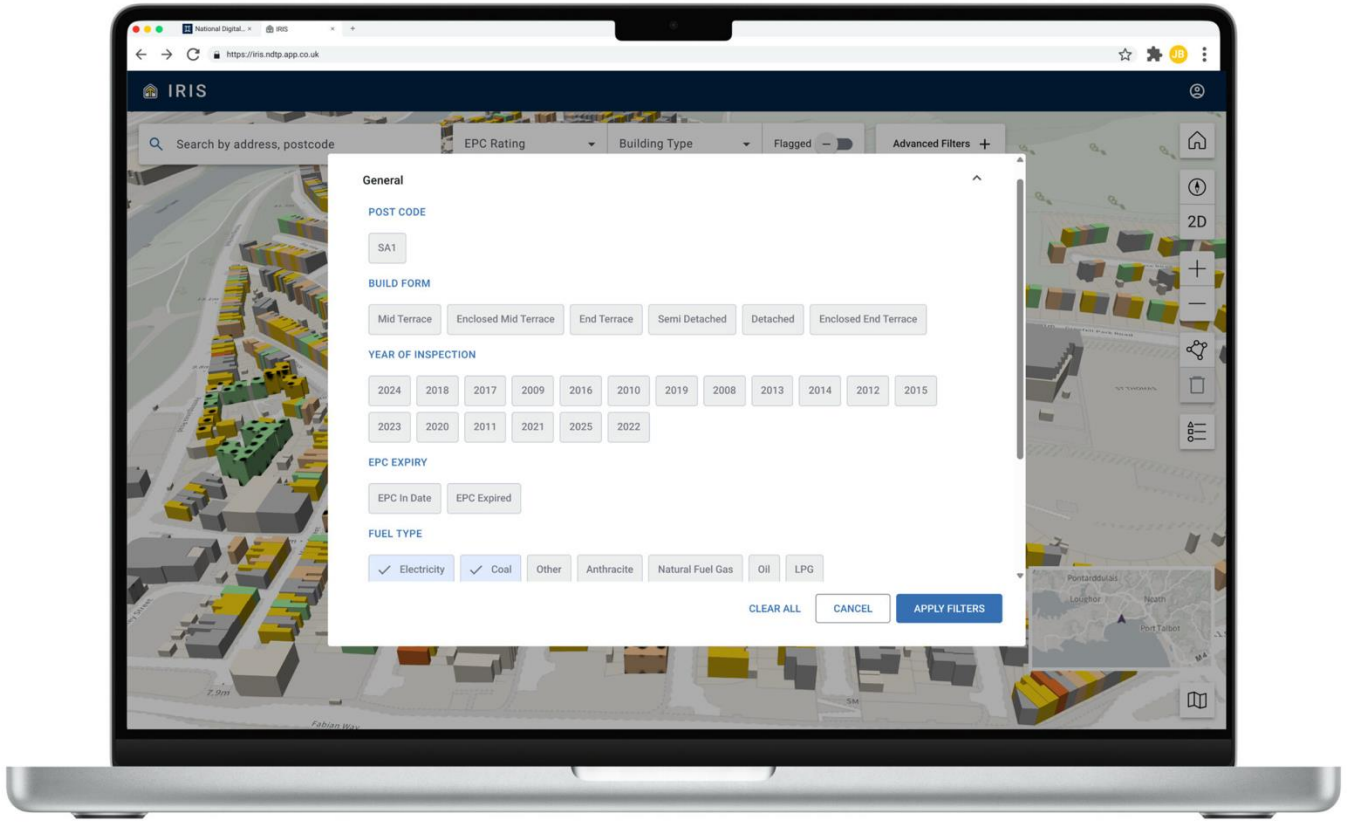

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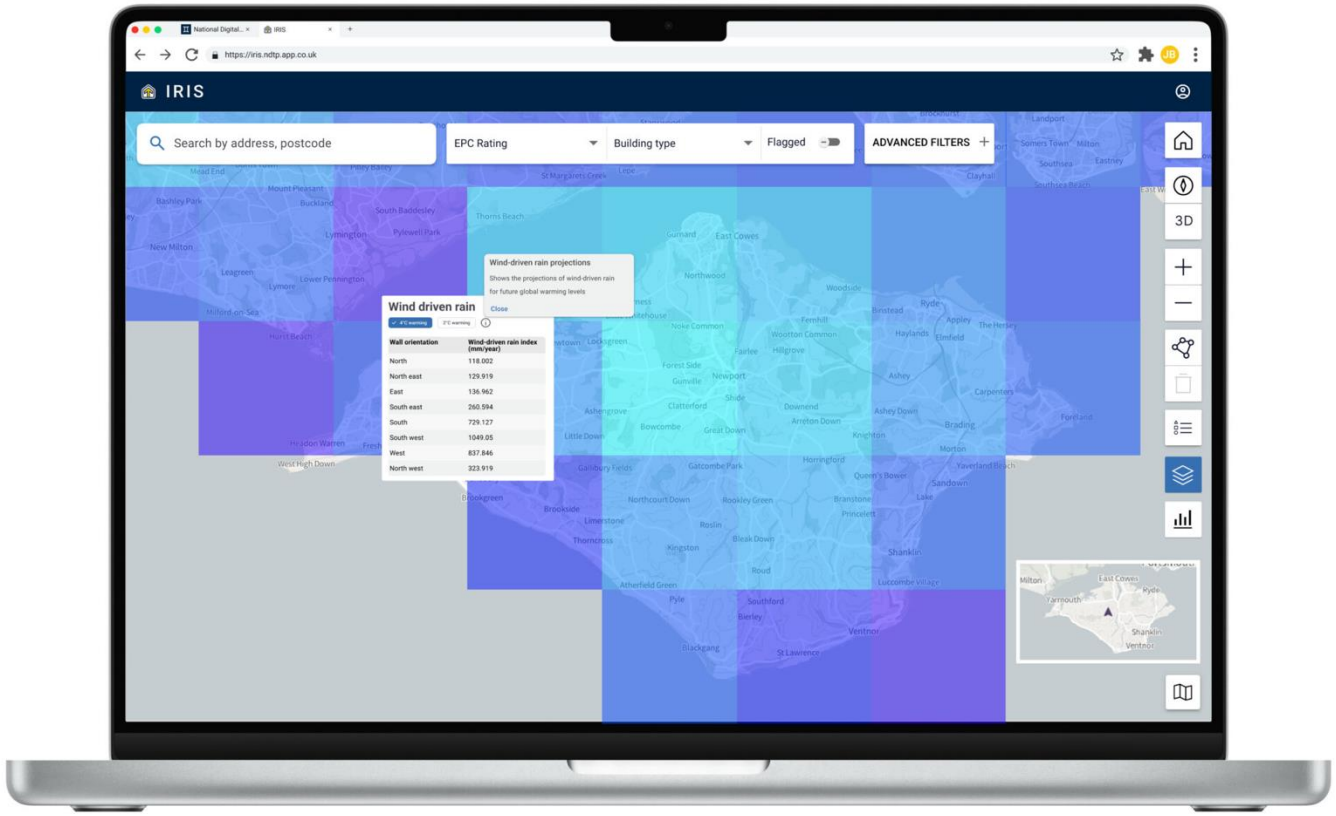

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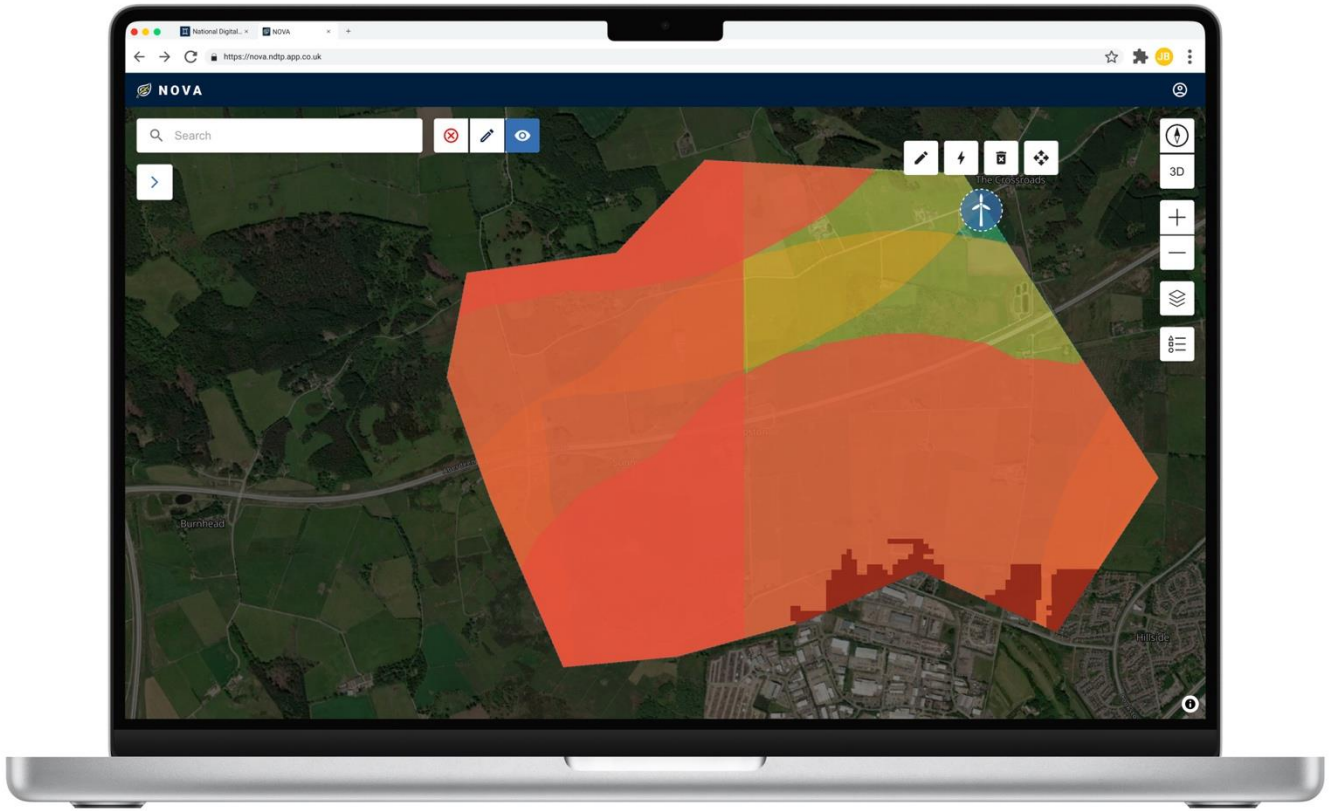

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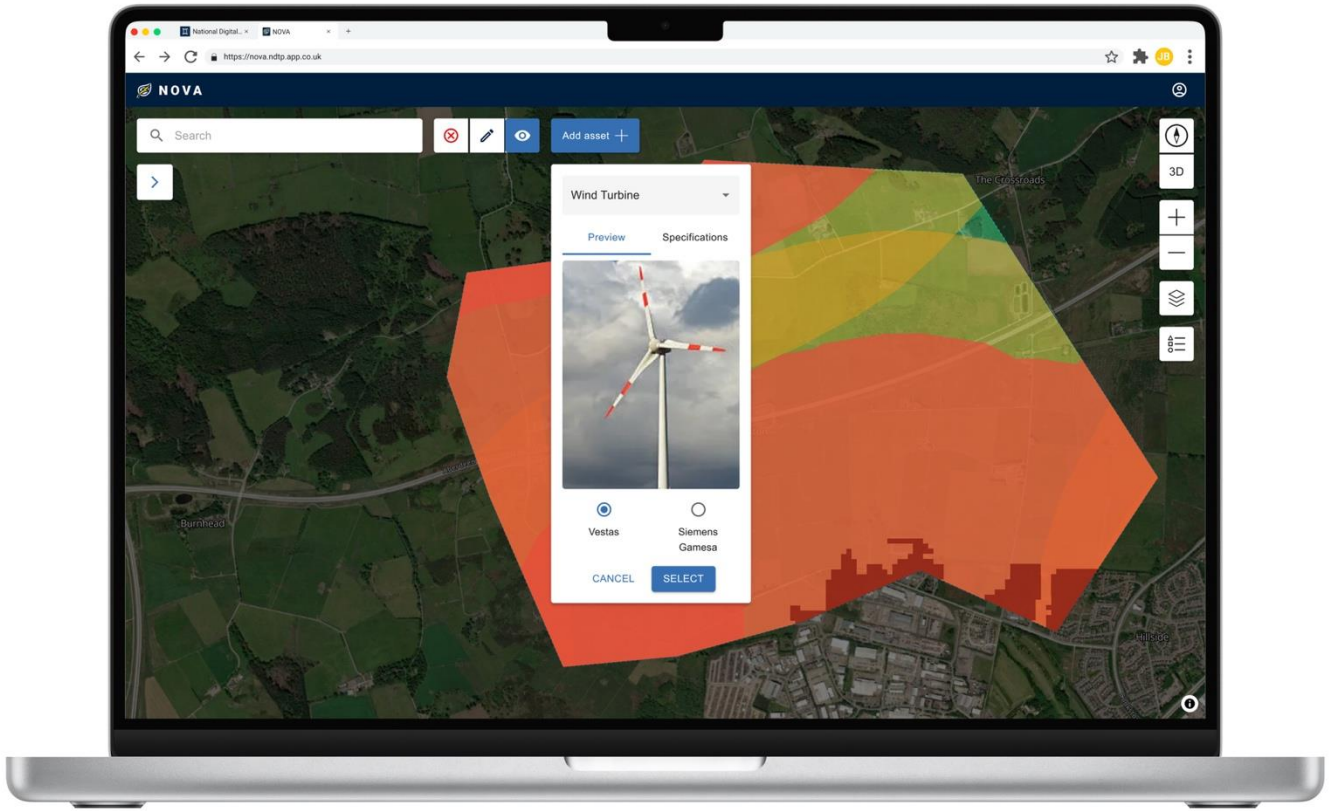

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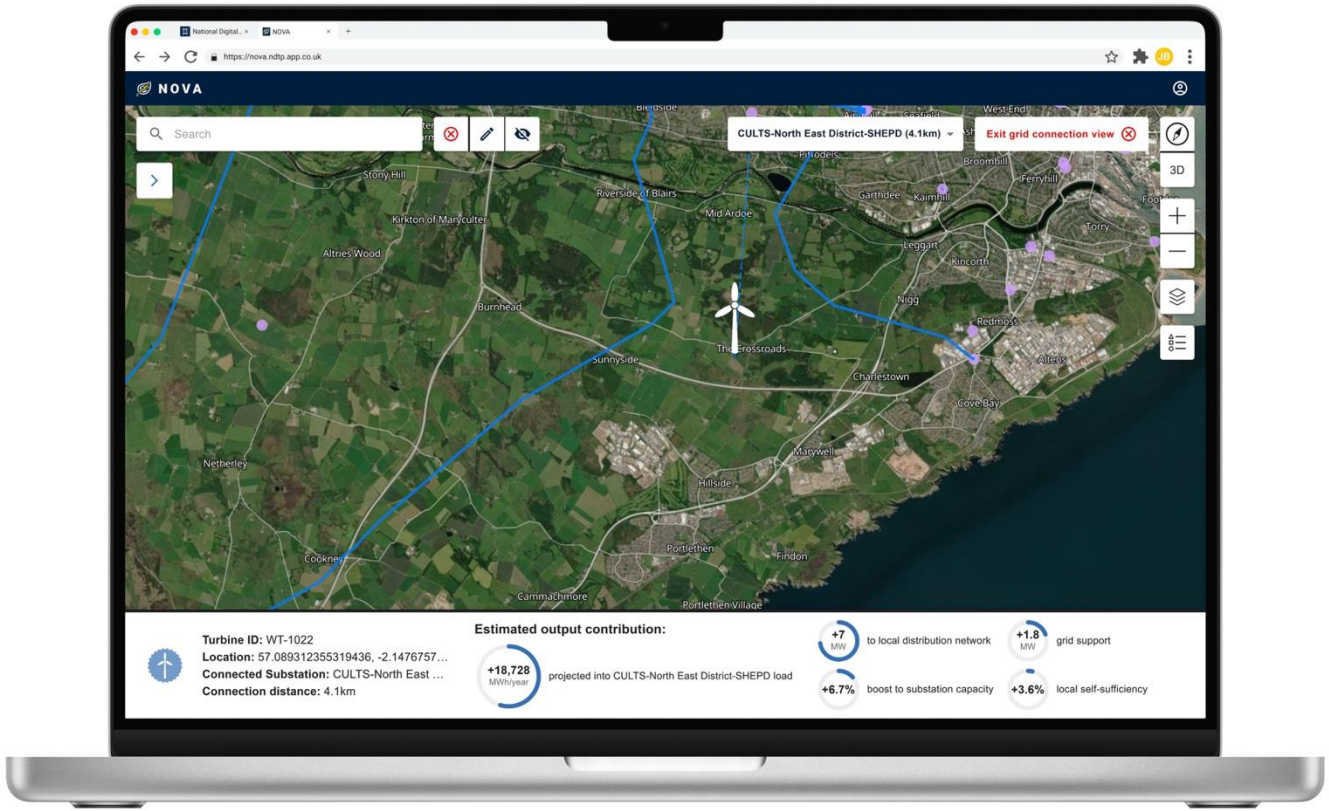

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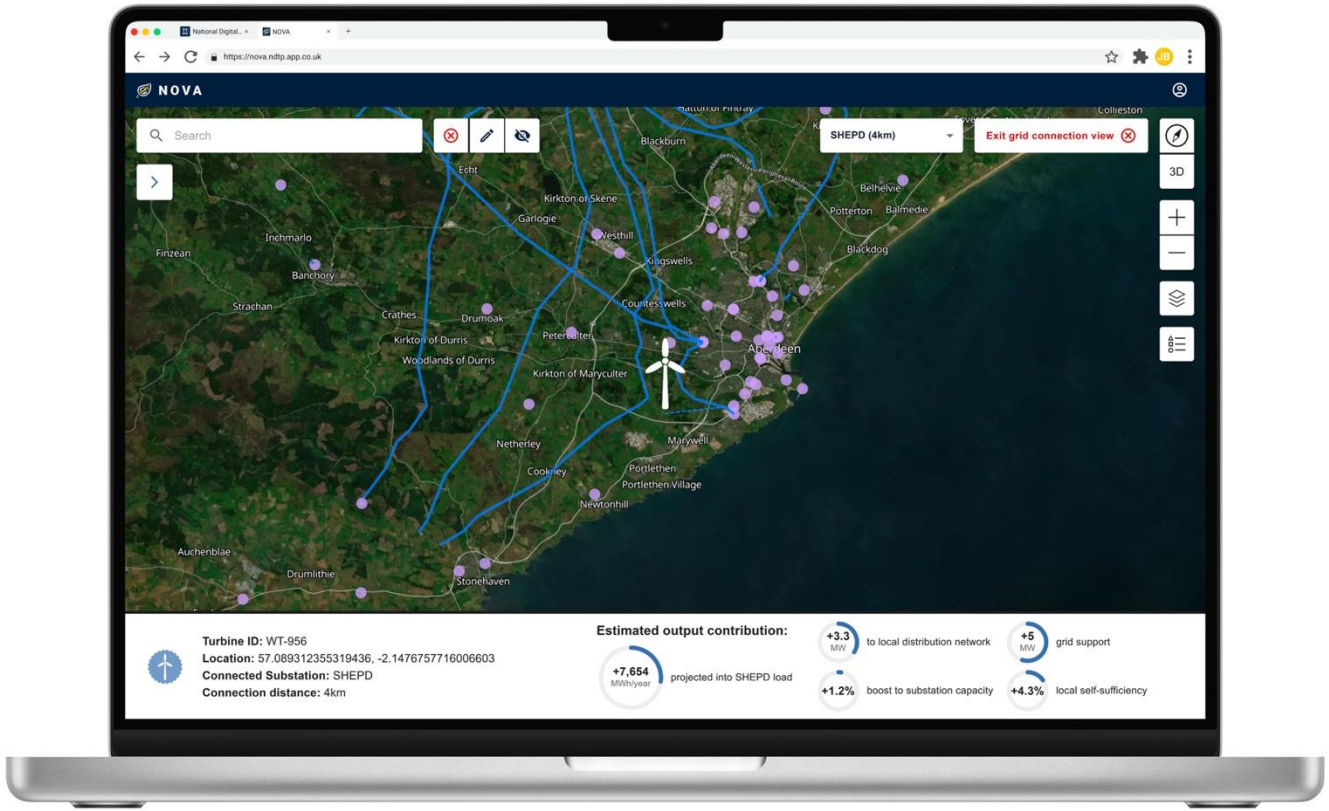

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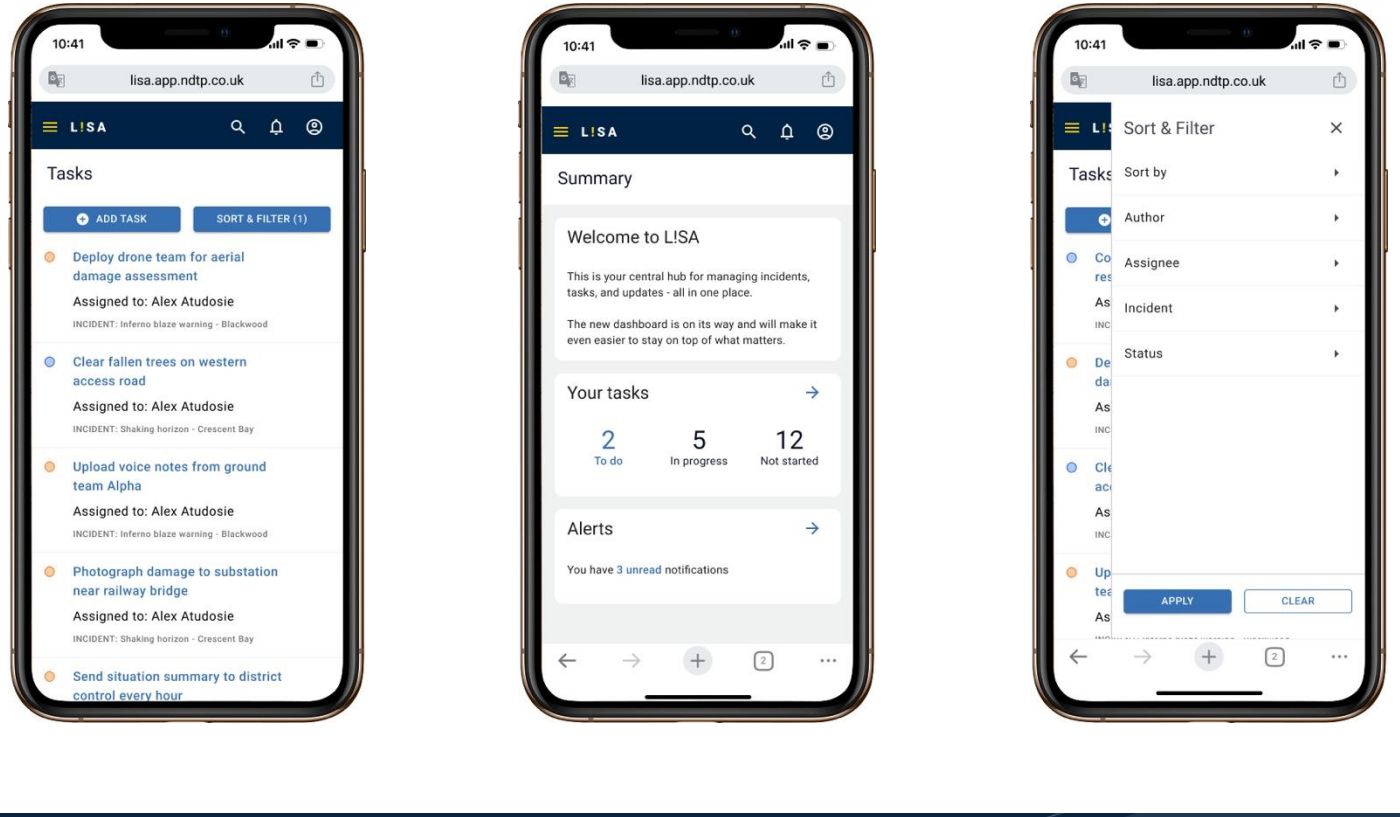

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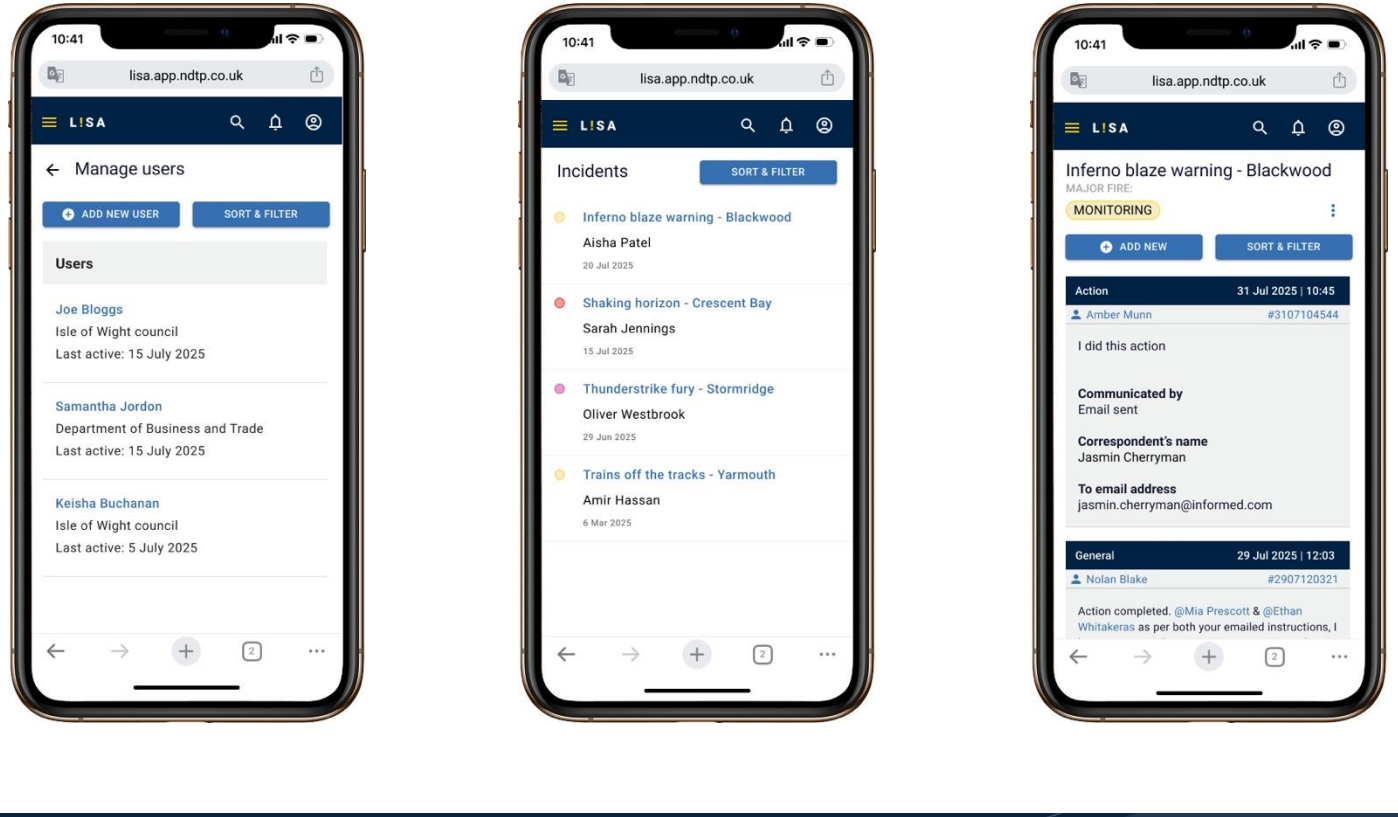

Simon Evans

Programme Director

Virtual Energy System, NESO

Lunch and networking

- ❑ Scan to subscribe to our newsletter
- ❑ See our demos from 12:30 to 13:00
- ❑ Keep a snack for the break at 15:00

Starting at 13:00:

- ❑ NDTP Roadmap to 2030 (five-year horizon, industry participation, and effective bidding)

Tag us in your posts
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Event agenda

Arrival, tea and coffee

30m

Lunch and networking

1h

Break

30m

09:00 | 10:00 | 11:00 | 12:00 | 13:00 | 14:00 | 15:00 | 16:00 | 17:00

Lunch and networking

1h

Hands-on demos
IRIS, VISTA, L!SA

Exploring the roadmap to 2030
Alex Luck, Programme Director | Alex Atudosie, Programme Manager

Break

30m

Q&A with the NDTP team

Close

Exploring the roadmap to 2030

Session purpose

To share the NDTP's **roadmap**, highlight immediate and future opportunities for **industry participation** and explain how to **bid effectively.**

- Brief recap – from programme delivery to national platform
- Five year horizon: build → transition → operate
- Key outcomes

Exploring the roadmap to 2030

Session purpose

To share the NDTP's **roadmap**, highlight immediate and future opportunities for **industry participation** and explain how to **bid effectively.**

- Modular IA development
- Demonstrator enhancements and development
- Specialist support (e.g., cybersecurity, testing)
- Skills and education
- Service delivery

Exploring the roadmap to 2030

Session purpose

To share the NDTP's **roadmap**, highlight immediate and future opportunities for **industry participation** and explain how to **bid effectively.**

- Evolving the supply ecosystem
- Route to Market
- What we look for
- Common pitfalls to avoid

Exploring the roadmap to 2030

To share the NDTP's roadmap ,highlight immediate and future opportunities for industry participation and explain how to bid effectively.

Operating frameworks

- Legal
- Sustainability
- Ethics
- Technical
- Safety
- Security
- Commercial
- Governance
- Delivery principles
- Development attributes
- X-Government alignment

Data and technology

- Integration architecture
- Ontology
- Data visualisation
- Data sources, quality, interoperability
- Model interoperability
- Open-source repository

Skills, culture and engagement

- Skills gap – current & next gen
- Communication and outreach
- Stakeholder engagement

Demonstrator programme

- Retrofitting in housing
- Energy system
- Asset resilience, emergency planning and response
- Vulnerable people

Legend:

Areas of significant progress

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Legend:

- Areas of new (& continued) immediate focus
- Medium-long term focus
- Areas of significant progress

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Legend:

- Areas of new (& continued) immediate focus
- Medium-long term focus
- Areas of significant progress
- Continued slow burners

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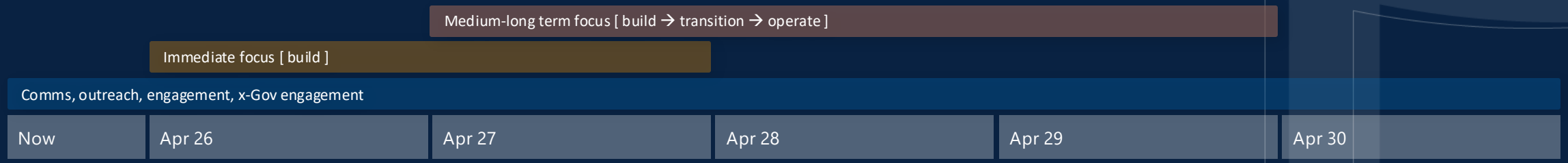

Demonstrator development
IRIS, VISTA, L!SA

Integration Architecture
Federator, Management Node, Data Catalogue

Information Exchange Standard
Modularisation release, Release ies-building

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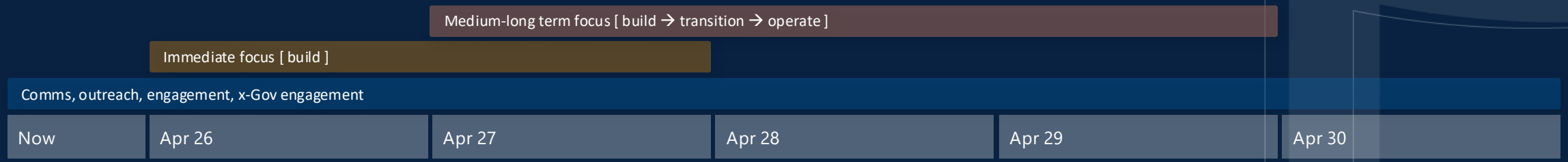

IA as Open-Source project
Co-development, co-delivery, IA modularisation, additional partners

Support IA deployments
Departments, agencies, public bodies, priority sectors

Testing as a Function
Supplier partner

Cybersecurity assurance and resilience
Supplier partner

Operating frameworks – design, develop, deploy, test, repeat
Legal, Safety, Security

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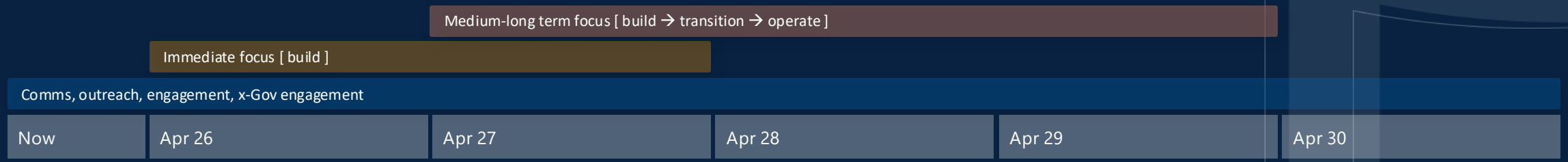

Testing as a Function
Supplier partner

Operating frameworks – design, develop, deploy, test, repeat
Sustainability & Service Model (fin. & env.), Legal-Commercial integration

Ecosystem growth and x-Gov adoption
Encourage third party innovation, formalise partnerships with devolved administrations

Model interoperability
Interoperability standards and reference models, large-scale model data, semantic interoperability across sectors

Knowledge, skills, community development
Comprehensive knowledge base, establish skills/accreditation framework, publish open learning resource

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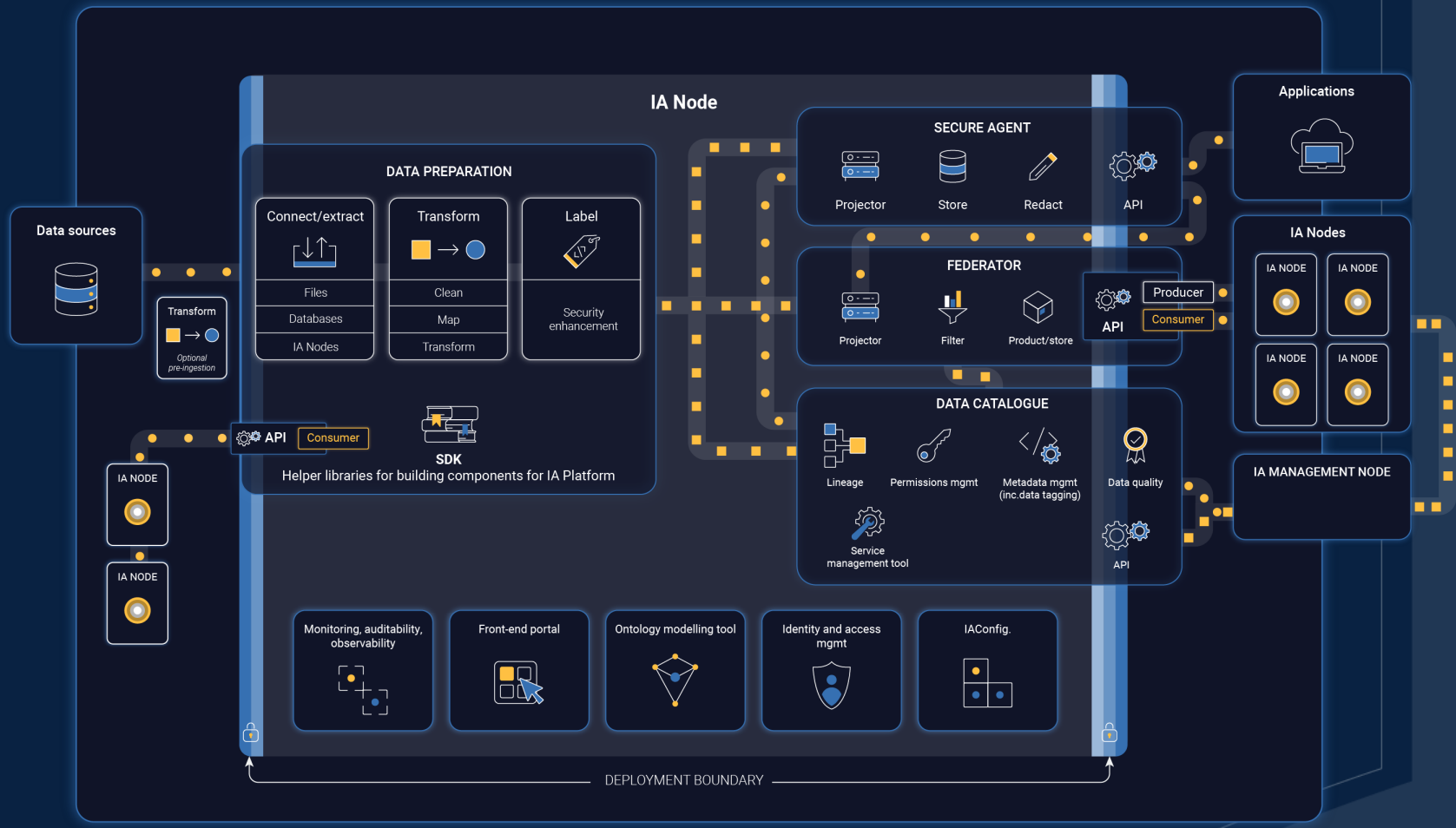

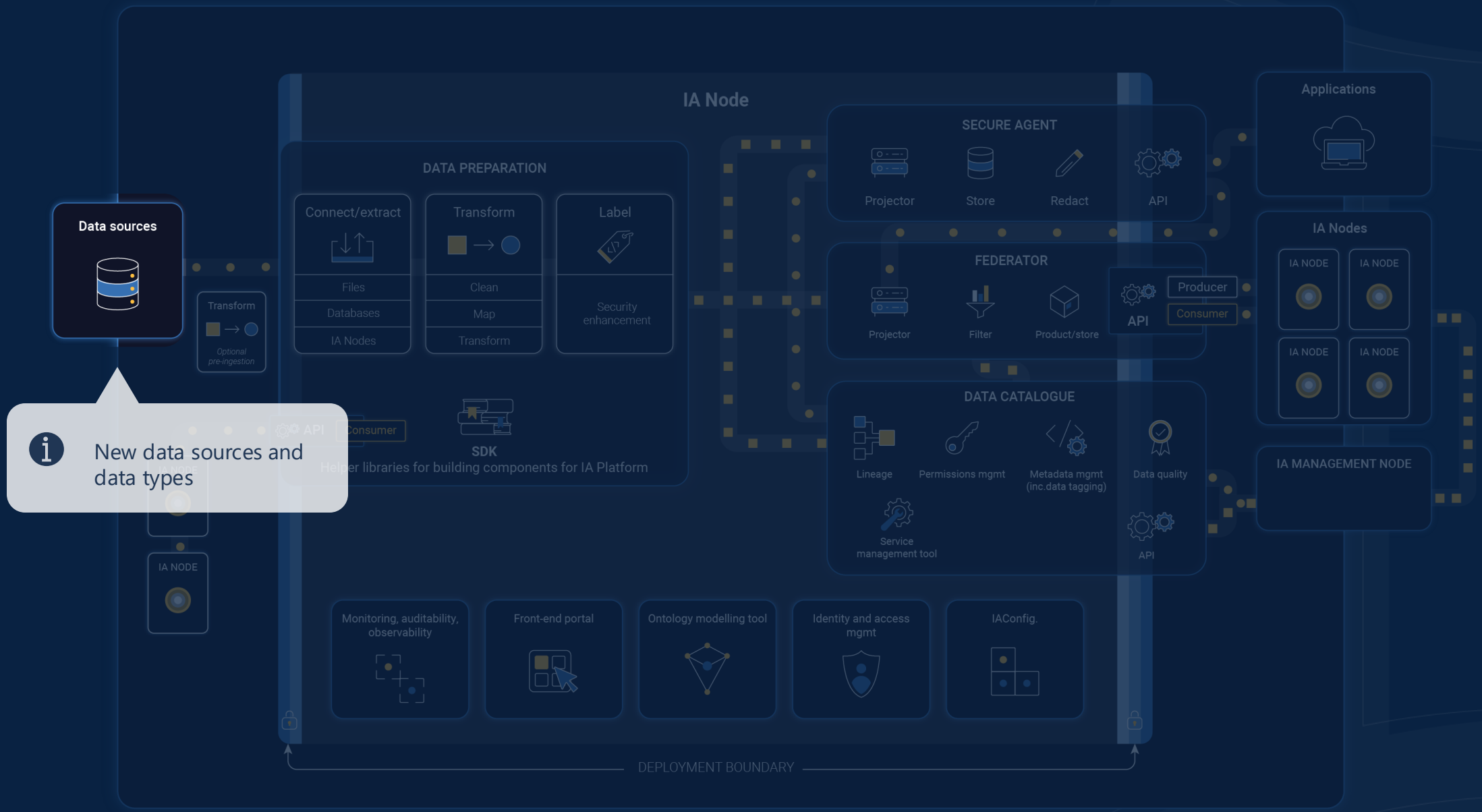
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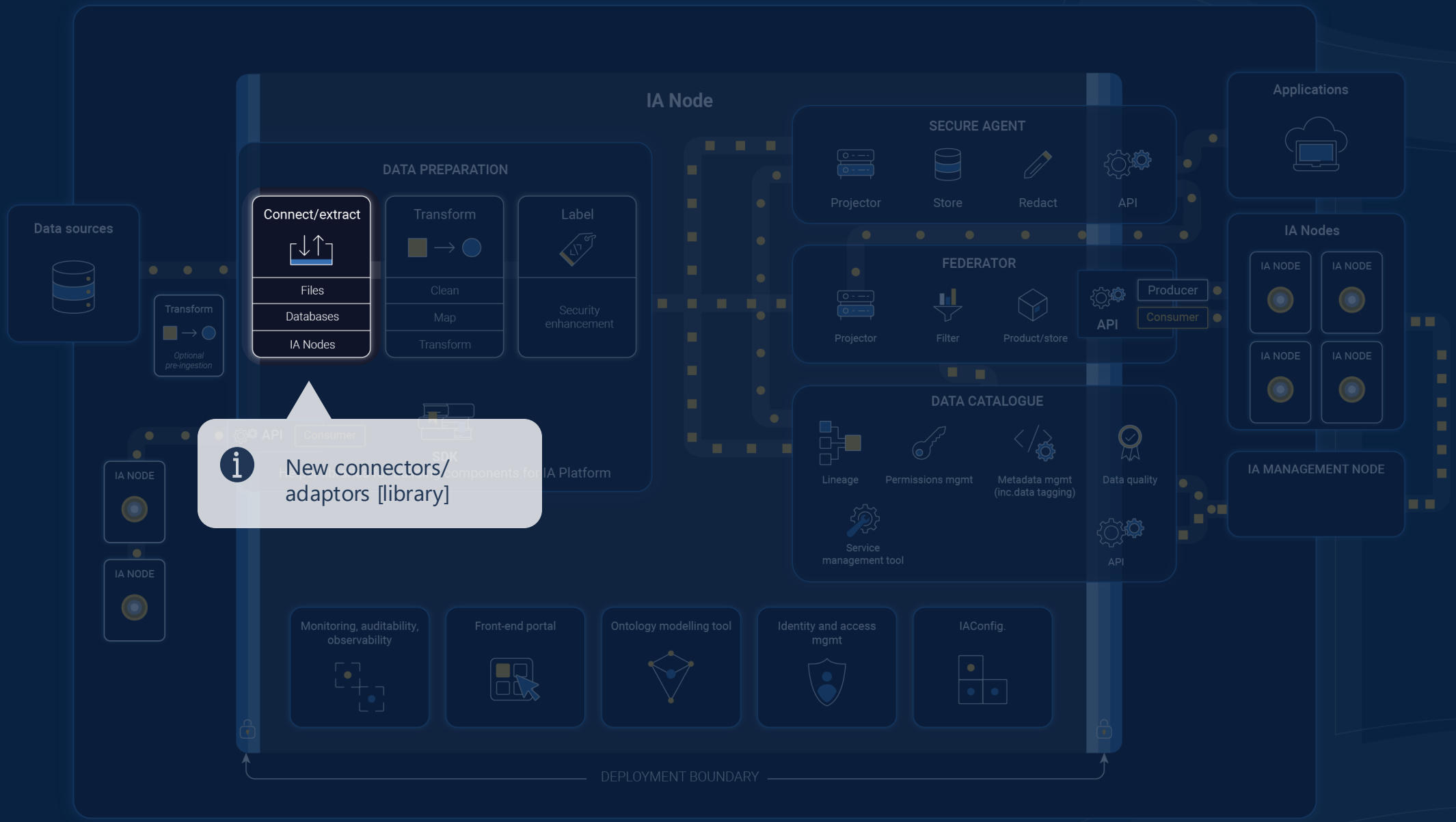
New data sources and data types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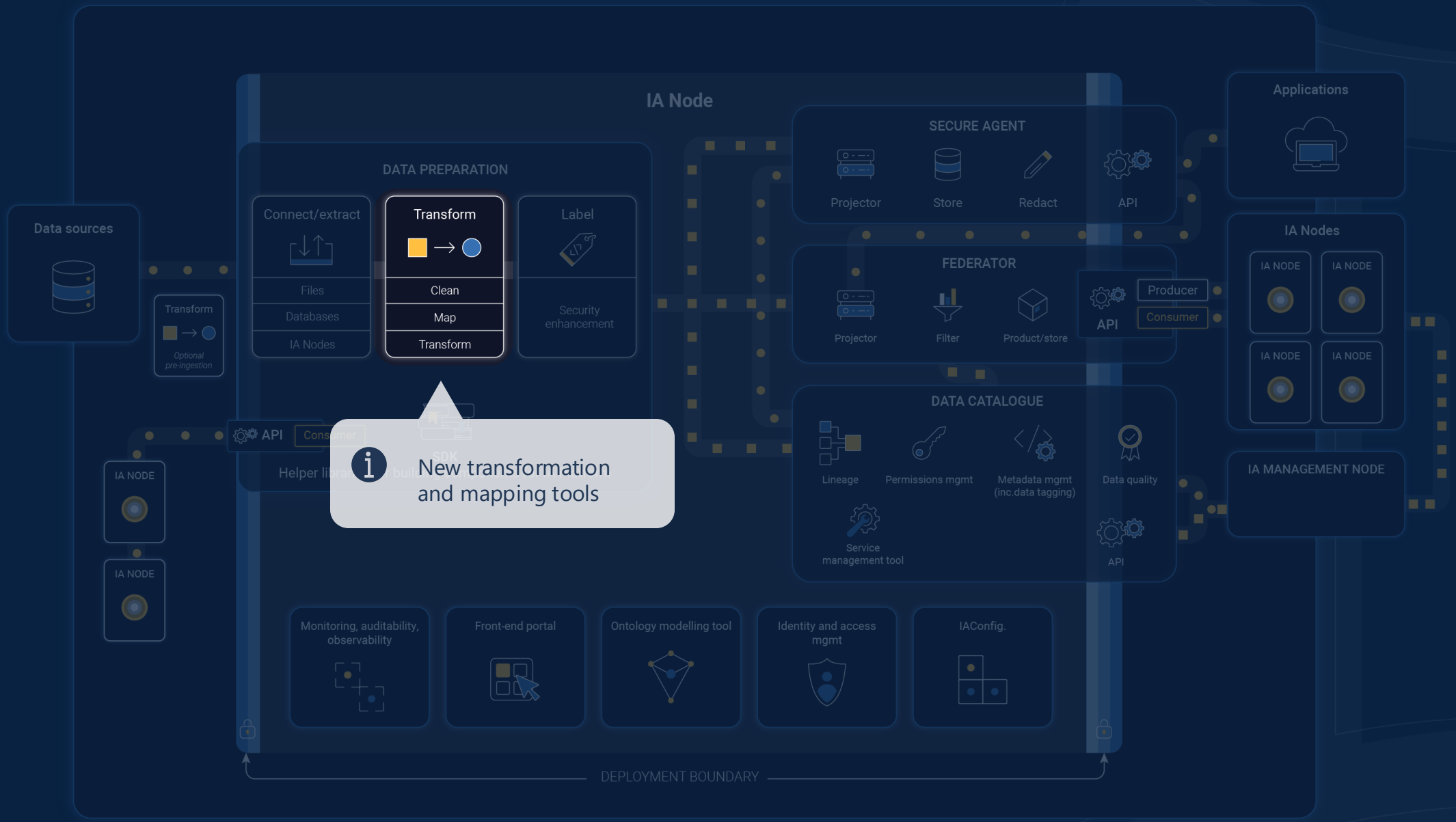
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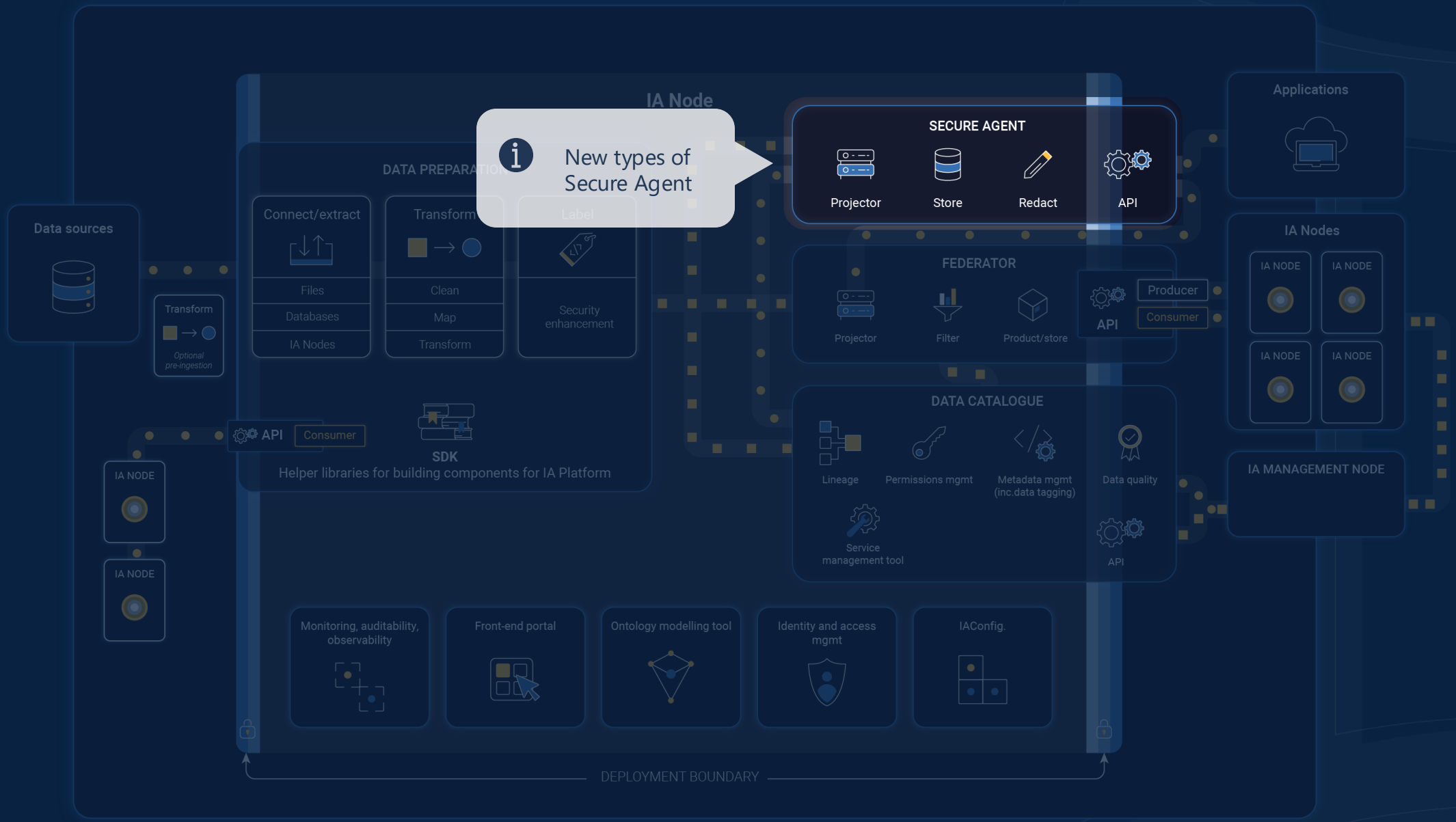
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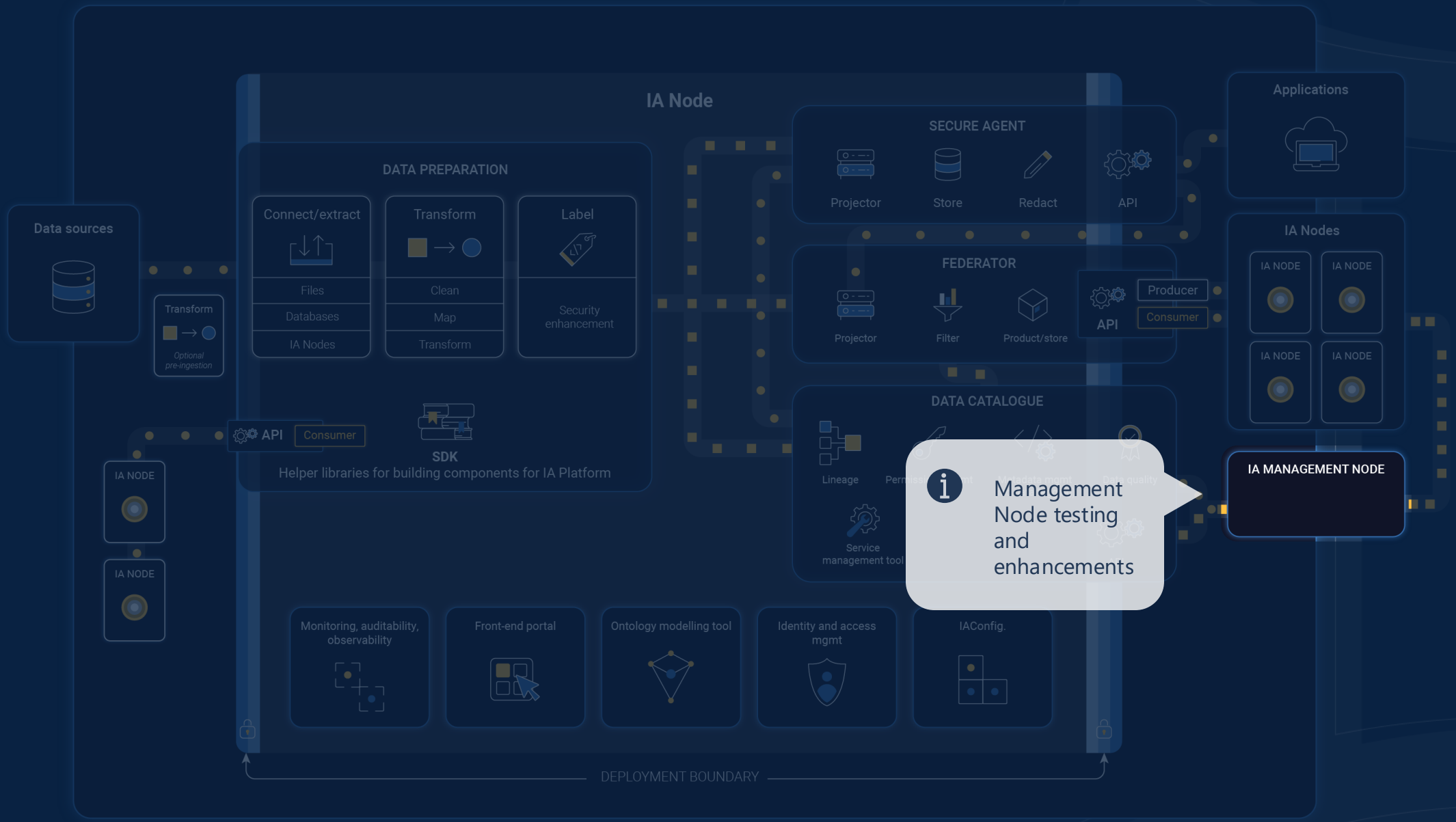
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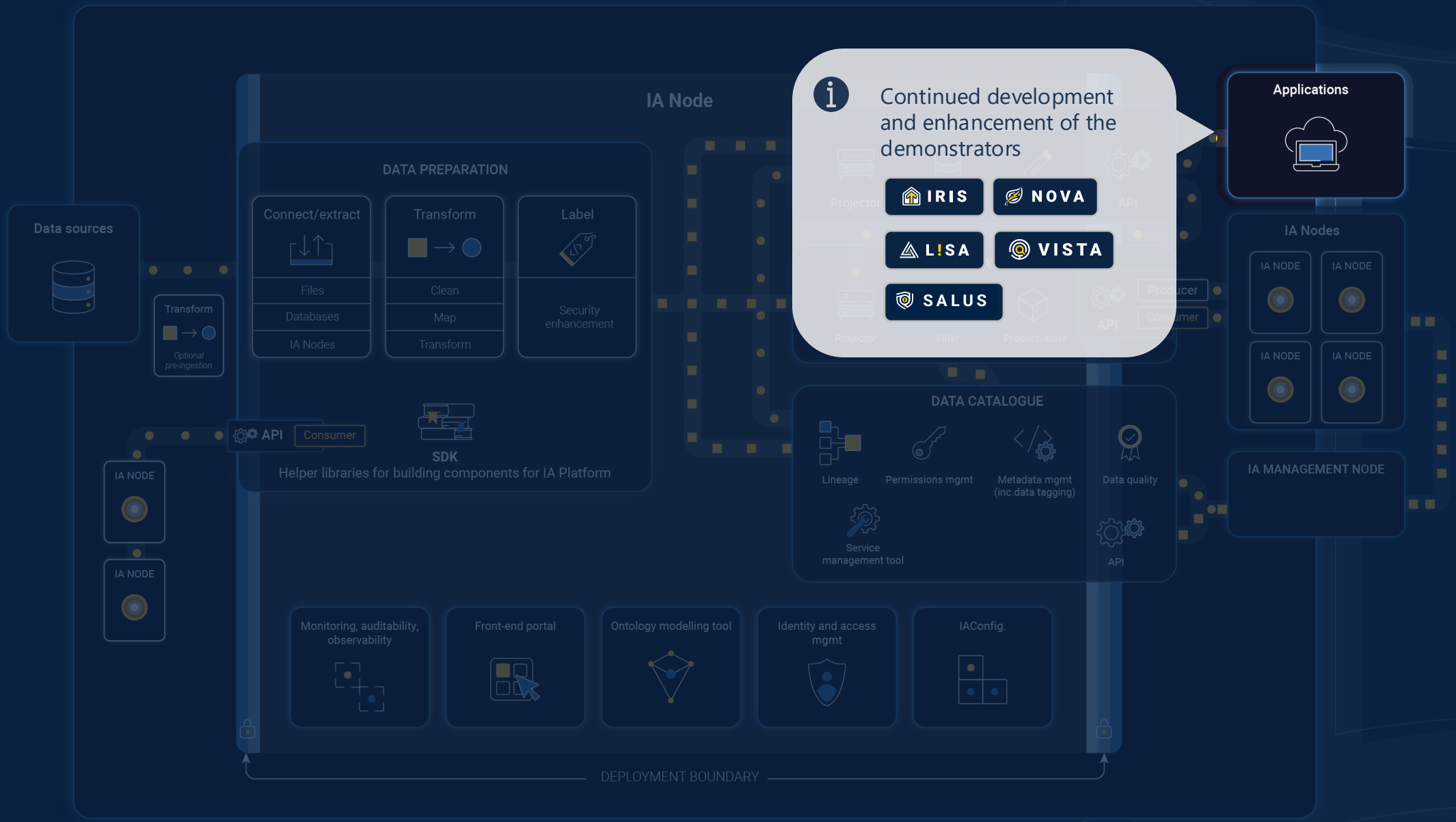
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Exploring the roadmap to 2030

To share the NDTP's roadmap ,highlight immediate and future opportunities for industry participation and explain how to bid effectively.

Evolving the supply ecosystem

- Modular tech enables multi-supplier delivery
- Opportunities for MSEs, niche specialists, and large partners
- Varied supplier base builds resilience and innovation

Route to Market

- Transparent, competitive process
- In- house procurement using CCS frameworks (e.g., Spark DPS)
- Open calls for specific capabilities (e.g., testing, cyber)
- Opportunities published through official government channels

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What we look for

- Evidence of people and skills, not just case studies (i.e., using the SFIA Framework)
- Named individuals tied to project examples
- CVs linked to real project delivery
- Working in the open (e.g., GitHub, GitLab) and transparent collaboration
- Strong technical product management capability as force multiplier

Common pitfalls to avoid

- Over-reliance on AI-generated text. Always keep a human in the loop
- Generic, copy-pasted internal collateral that doesn't answer the question
- Missing mandatory evidence (watch for "must" and "should")
- Over-emphasis on past prestige rather than current capability
- Superficial responses that lack technical depth

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Engage and stay informed

- Use our official channels first (e.g., email, website, newsletter)
- Website update regularly – check back every few months
- Newsletter by-monthly
- 30-min supplier calls – come prepared and avoid repeating web content
- We do not buy data or software directly
- Open-source contributions and genuine innovation always welcome

In summary…

- Understand the NDTP context and do your research
- Show real skills, real people, real evidence
- Work in the open, be transparent and collaborative
- Use AI responsibly

Break

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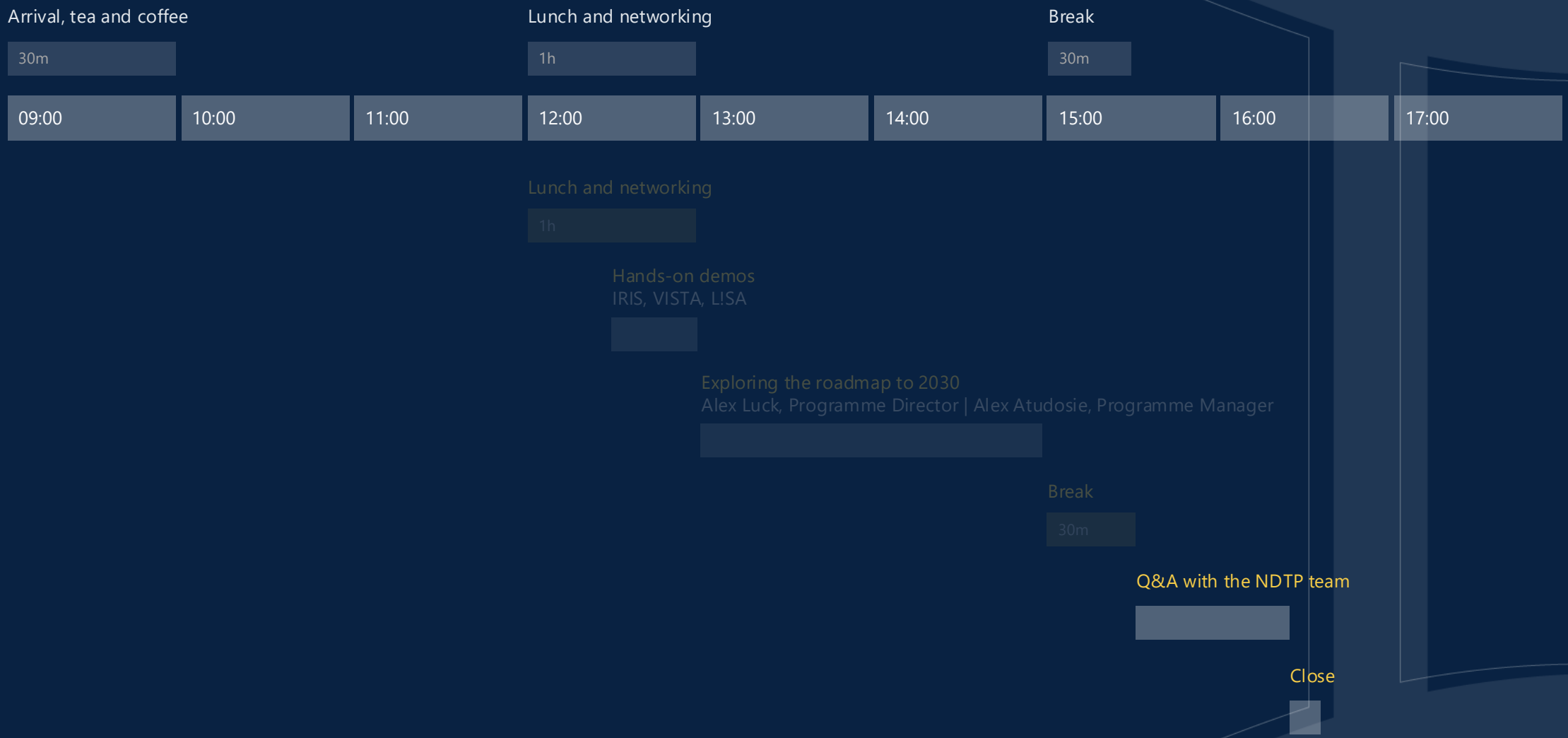

Q&A

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Wrap up

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