DATA FOR PUBLIC GOOD

LAYER	COMPONENTS
Data Consumers *Industry / Government*	AI/ML applications · Flood prediction · Health registry · Data-driven policymaking · Evidence-based research
Data Studio ★ NEW *Agentic apps*	Automated data onboarding agent · Automated data consumption agent · Catalogue publishing agent
Agentic Layer *AI interfaces*	MCP server · Chatbot · No-code environment · Automated classification
IUDX Portal *Consumer-facing UI*	Catalogue · Admin portal · Visualization · Notebook IDE
Sandbox ★ NEW *Model training & hosting*	GPU/CPU infrastructure · Model serving · Notebook IDE
Community ★ NEW *Hackathons & discussions*	Challenge management · Hackathon hosting · Submission & evaluation · Discussion forum
Application Marketplace ★ NEW *App store for IUDX data*	Sector applications · App delivery layer · Dashboards · Developer APIs
Control Plane *Central directory services*	AAA — auth, authorization, identity & logs · Catalogue server — resource discovery · Consent validator — validation, revocation & access control
Data Plane *Provider-controlled resource servers*	RS — data ingestion mode · RS — API gateway mode · OGC server · Streaming server · Data ingestion adaptors · API gateway connectors · OGC adaptors · Files server
Privacy Preserving Plane *TEE + anonymization*	TEE — consumer apps & use cases · Data anonymization engine · Data anonymization pipeline
Sectors Served *Data providers*	Agriculture · Urban local bodies · Health · Traffic & transport · Disaster management

ARCHITECTURE DEEP DIVE

Control Plane: The API Interface for Data Discovery

The Control Plane is the central API layer for securely managing, discovering, and accessing data and models across the IUDX ecosystem. It comprises four core services — Data Discovery, Identity, AAA, and Auditing — exposed through five standardised interfaces.

Control Plane: The API Interface for Data Discovery

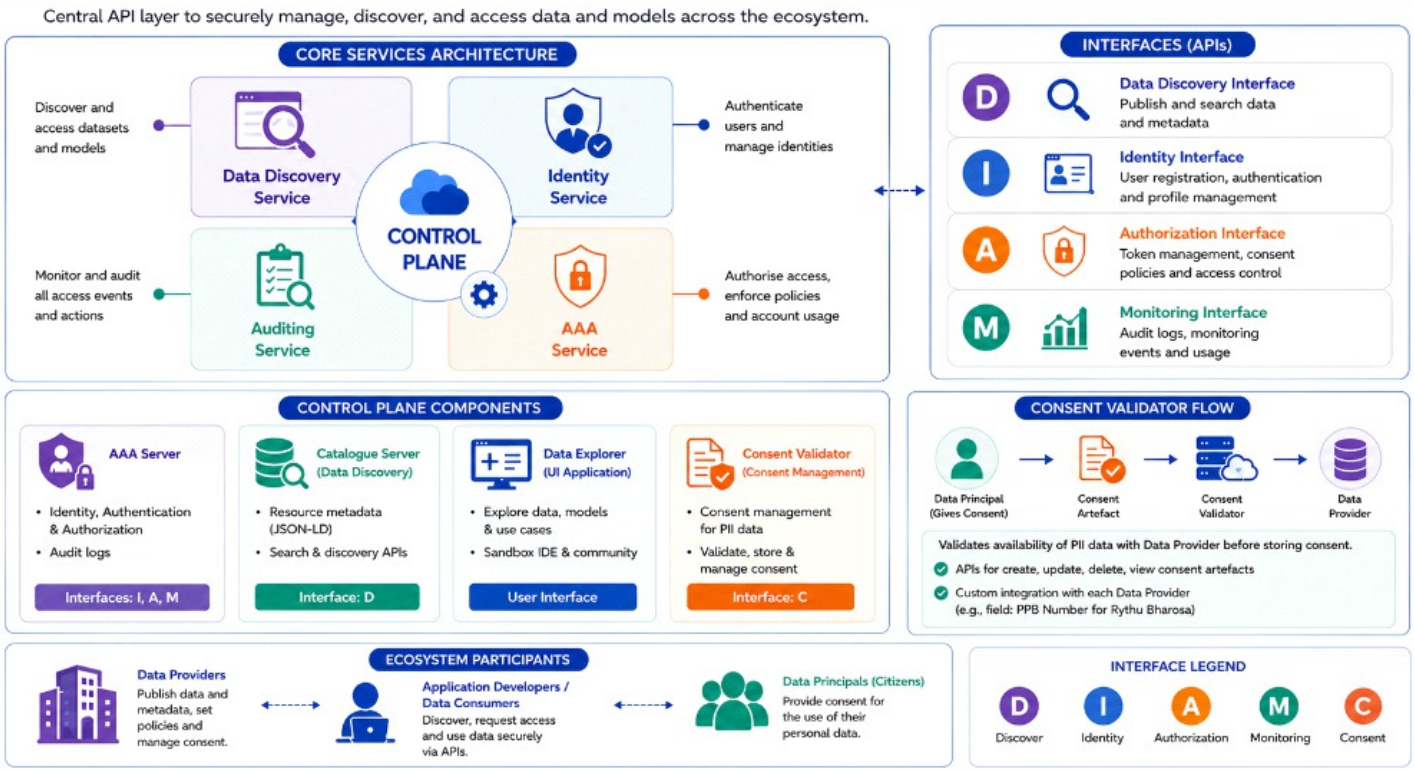

Figure: Control Plane Architecture — Core Services, APIs, Components and Consent Validator Flow

AAA Server — Identity, authentication & authorization, and audit logs — interfaces I, A, M

Catalogue Server — Resource metadata in NGSI-LD format, search & discovery APIs — interface D

Consent Validator — Consent management for PII data, validation, storage & custom integration per provider — interface C

Data Explorer — UI application for exploring data, models & use cases, including Sandbox IDE & community

Data Plane: The API Interface for Data Access

The Data Plane is the provider-controlled layer that manages all data ingestion and access. It supports multiple real-world data sources and two deployment modes — Data Ingestion Mode (providers push data) and API Gateway Mode (data fetched on demand).

Data Plane: The API Interface for Data Access

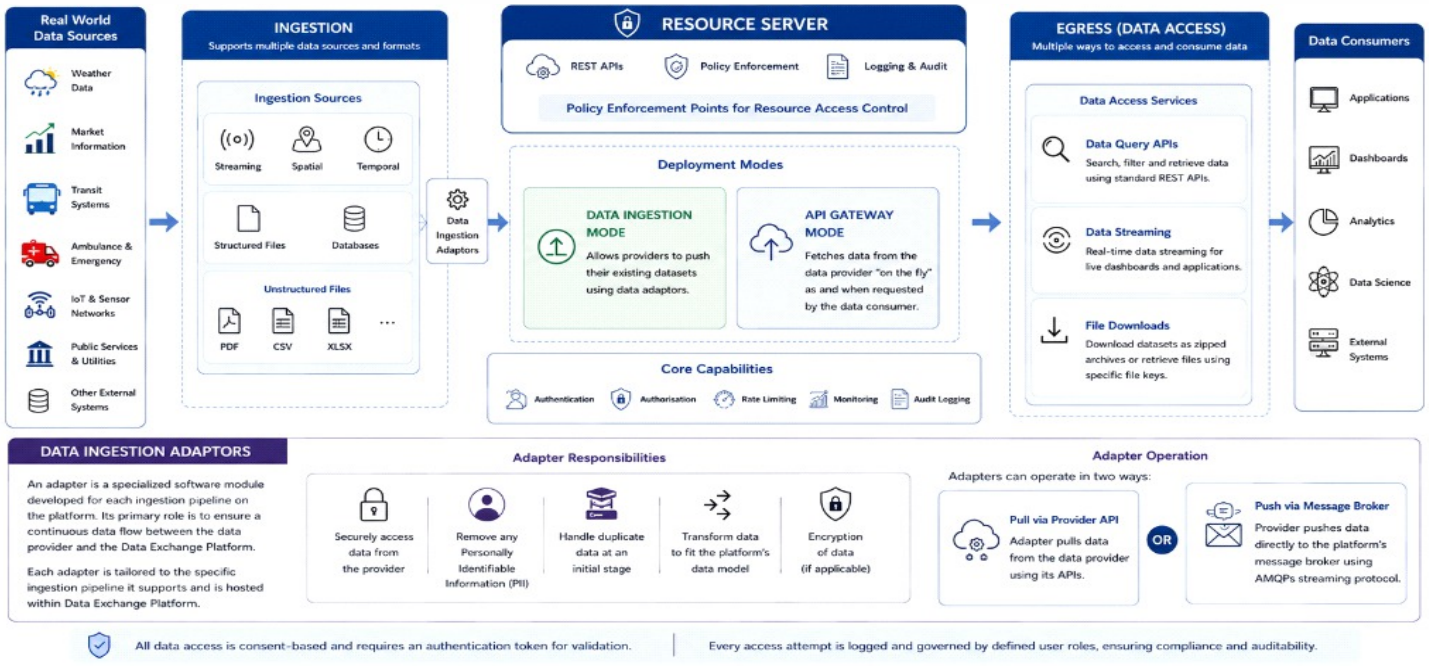

Figure: Data Plane Architecture — Ingestion, Resource Server, and Egress (Data Access)

Data Ingestion Mode — Allows providers to push their existing datasets using data adaptors

API Gateway Mode — Fetches data from the data provider "on the fly" as and when requested by the data consumer

Data Ingestion Adaptors — Specialized modules for each ingestion pipeline — securely removing PII, handling duplicates, transforming data, and encrypting where applicable

Egress — Data Access Services — Data Query APIs, Data Streaming for real-time dashboards, and File Downloads