

WHAT SETS IUDX APART

Seven Capabilities built into the architecture

These are not add-on features. They are architectural properties of the stack – making IUDX the sovereign AI-ready data infrastructure layer for India's public data economy.

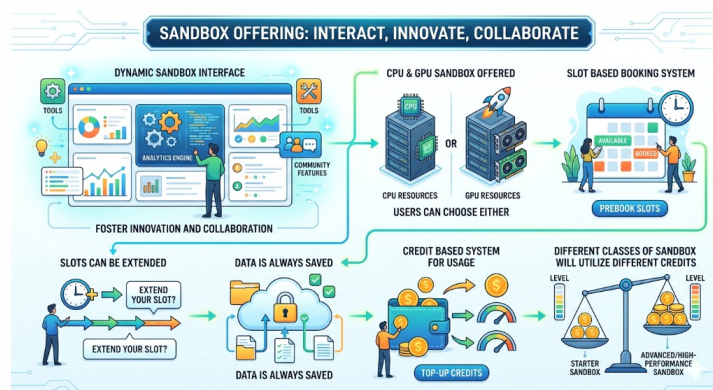
NEW 01 Data Studio

Agentic data lifecycle – automated end-to-end. Three agentic apps eliminate manual data integration entirely. Schema inference, NGSI-LD metadata generation, consent configuration, catalogue registration, and pipeline setup – all triggered by a single provider URI or consumer data requirement.

NEW 02 Sandbox for model training & hosting

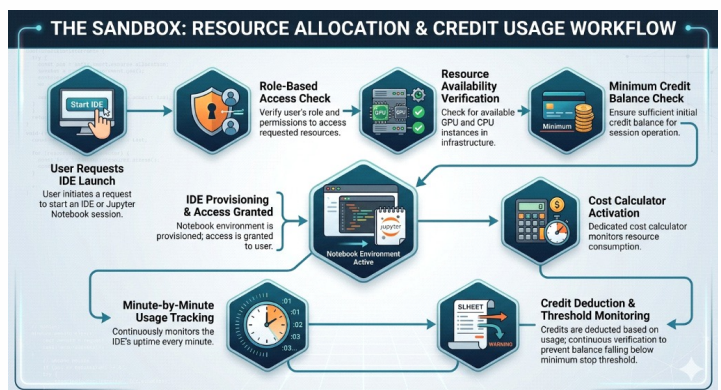
The only exchange with integrated GPU compute under data governance. Kubernetes-native GPU and CPU compute runs within the same governance boundary as the data. Trained models are deployed back into the exchange as callable MCP tools – closing the loop from data to model to service.

The Sandbox Interface: Data Innovation Hub



Sandbox Offering

The Sandbox interface carefully manages resource allocation and credit usage through a structured workflow, ensuring fair and efficient access to compute resources.



Allocation and Usage

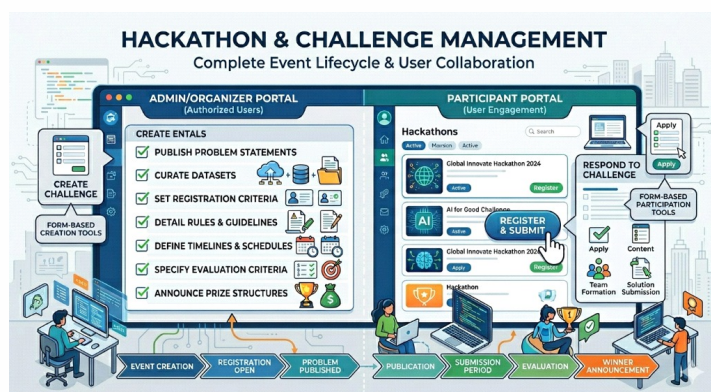
Systematic approach ensures that resource usage is transparently tracked and billed, giving users full control and visibility over their Sandbox expenditures.

Figure: Sandbox Interface – Data Innovation Hub with resource allocation & credit workflow

NEW 03 Community & hackathon platform

Built-in innovation infrastructure – native to the exchange. Challenge setup, participant onboarding, sandboxed data access, submission management, evaluation, and result publishing – all governed by the same AAA and consent infrastructure as data access.

The Sandbox Interface: Data Innovation Hub



Hackathon & Challenge Management

A Content Management System to host hackathons, challenges, and competitions, with a complete event lifecycle that includes problem statement publishing, dataset curation, registration criteria definition, detailed rules for participation and submission, timelines, evaluation criteria and prize structures.



Discussion Forum

A collaborative forum with Topic-Specific Threads, Categorized Discussions, Integration and tagging with Datasets/Models, upvoting of response, leaderboard, and moderation to facilitate knowledge-sharing among developers, data providers, and users.

Figure: Community Layer – Hackathon & Challenge Management and Discussion Forum

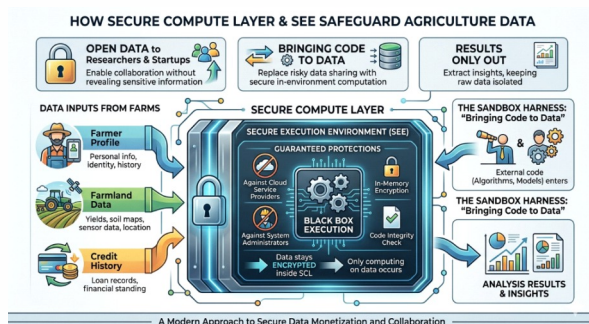
NEW 04 Application marketplace

A curated app store for IUDX data. Developers publish sector-specific data applications; government departments, urban local bodies, and researchers discover and deploy them in one step. Every app inherits the platform's governance – no separate integration needed.

05 Privacy preserving plane

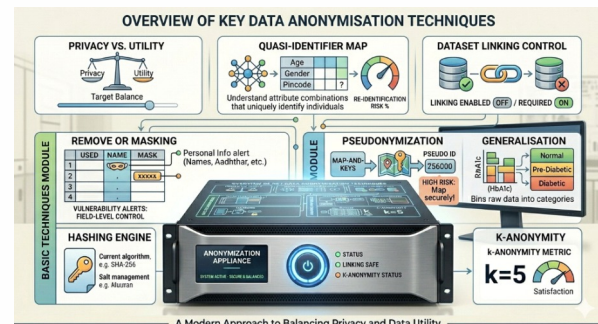
Sovereign AI on sensitive data – health, identity, finance. Hardware-isolated Trusted Execution Environments and automated anonymization pipelines enable AI workloads on data that cannot leave its sovereignty boundary, under mathematically bounded privacy guarantees.

The Sandbox Interface: Data Innovation Hub



Secure Compute Layer

SEE - Black boxes capable of running any computation, with guaranteed protection from very powerful adversaries such as cloud service providers, system administrators. With this, we can Open data to researchers and startups – without ever releasing it.



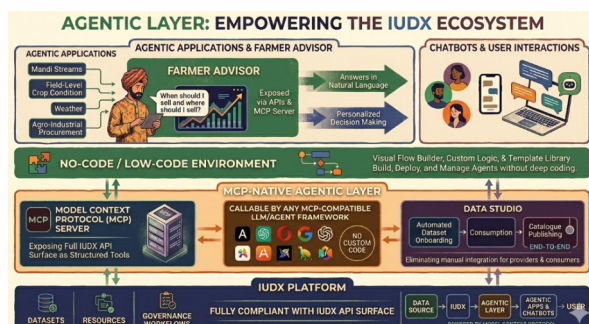
Anonymisation Techniques

Data anonymisation protects individual privacy while preserving analytical utility. Understanding the strengths, limitations, and implementation challenges of each technique is essential for selecting the right approach for your dataset.

Figure: Privacy Layer – Secure Compute Layer (TEE) and Data Anonymisation Techniques

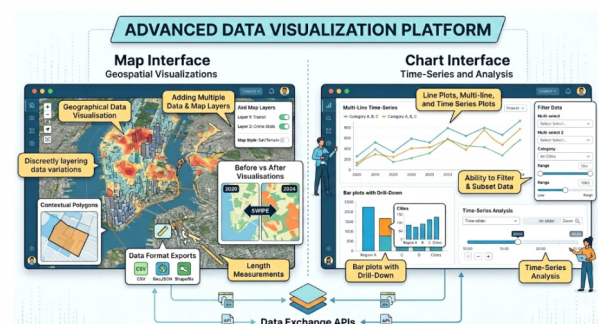
NEW 06 MCP-native agentic layer

Every API is an agent tool – no custom integration code. The full IUDX API surface – dataset search, temporal queries, spatial queries, access requests – is exposed as structured, discoverable MCP tools. Compatible with Claude, GPT-4, Gemini, LangChain, LlamaIndex, and open-source frameworks.



Agentic Layer

MCP-native Agentic Layer – exposing IUDX API surface as structured tools, making every dataset, resource, and governance workflow callable by any MCP-compatible LLM or agent framework without custom code along with Data Studio, No-Code Low-Code Environments



Advanced Data Visualization

Rich, interactive dashboards for exploring datasets and real-time insights. It shall support time-series analysis (using a chart interface), geospatial visualizations (using a map interface).

Figure: Agentic Layer & Advanced Data Visualization Platform

07 Standards-based control & data plane

Open by architecture – no proprietary lock-in at any layer. Every layer of the stack implements a recognised open standard. NGSI-LD, OGC API, FHIR, GTFS, OAuth 2.0, and BIS IS 18003 – ensuring full interoperability across India's Digital Public Infrastructure landscape.

ARCHITECTURE

Full stack – from provider to consumer

Every layer of the stack is shown below, ordered from data consumers at the top to sector data providers at the base. Every microservice is accessible via structured, policy-enforced APIs – inheriting IUDX's full consent, identity, and audit governance without requiring any custom middleware.

Microservice View

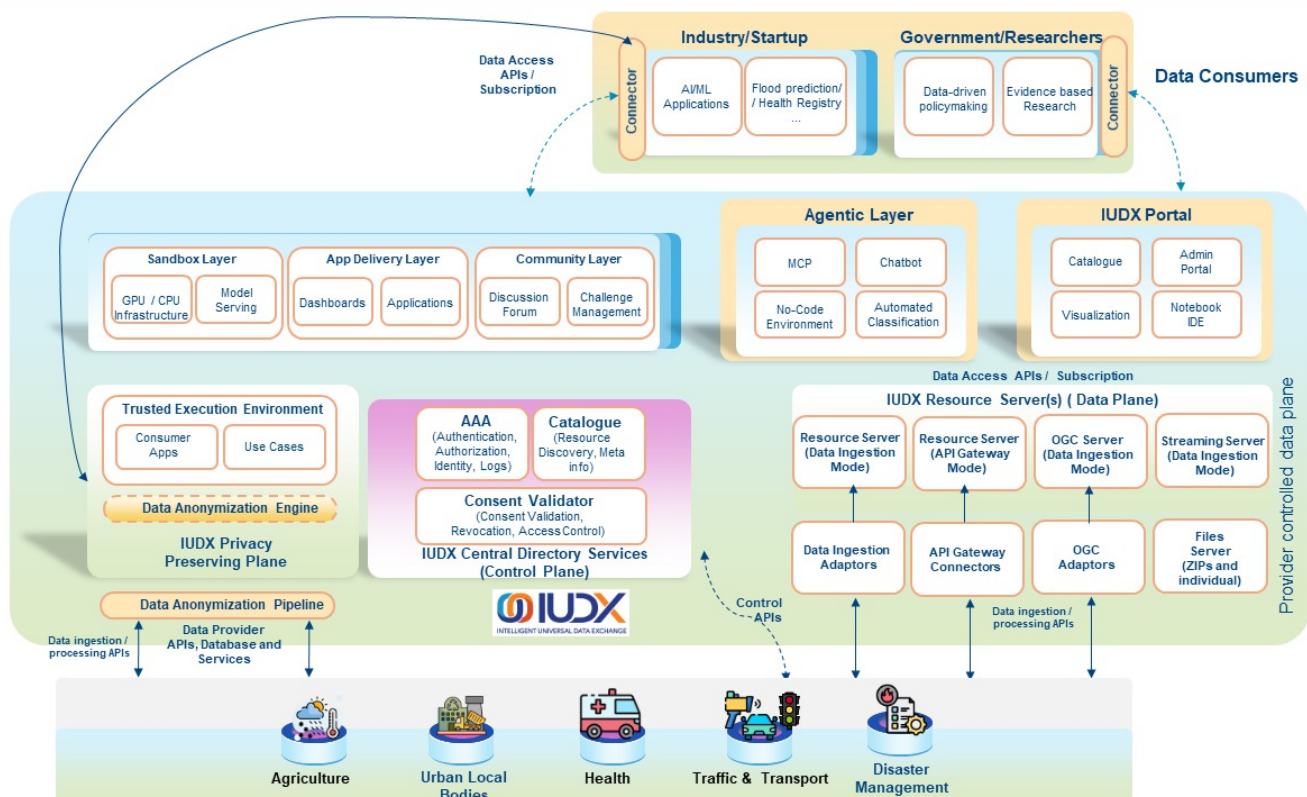


Figure: IUDX Full Stack – Microservice View (Provider to Consumer)