XMANAI foundations for Explainable and Interoperable AI XMANAI Project

AI-MAN (ICT-38) Projects Cluster Workshops Series
"Data & Models Interoperability for AI Systems in Manufacturing"
November 17th 2022
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Vision at a glance

- AI is finding his way in industry

- Humans typically have little insight about AI itself and even less concerning the knowledge on how AI systems make any decisions or predictions due to the so-called "black-box effect".

- If not addressed properly, the lack of **explainability** and trust might jeopardize the full potential of AI. This is where Explainable AI (XAI) and the XMANAI project comes into action!

The project will deliver **"glass box" catalogue of hybrid and graph AI models** that are **explainable to a "human-in-the-loop"** maintaining security and privacy aspects, without greatly sacrificing AI performance. XMANAI provides the tools to navigate the AI's "transparency paradox", designing, developing and deploying a novel **Explainable AI Platform** powered by XAI models that inspire trust, augment human cognition and **solve concrete manufacturing problems with value-based explanations**.

Target Users: Data Scientists & Data Engineers; Business Users in Manufacturing

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MAKING AI UNDERSTANDABLE

Consortium

- 15 partners
- 7 nations

XMANAI

- **GA Number**: 957362
- **Title**: Explainable Manufacturing Artificial Intelligence
- **Dates:** 01/11/2020 - 30/04/2024
- **Status:** M25 (November 2022) of M42
- **Development status:**
  - First version of the integrated XAI platform for manufacturing delivered
  - First version of the XAI models delivered to end-users
  - Under experimentation with end-users (ongoing)

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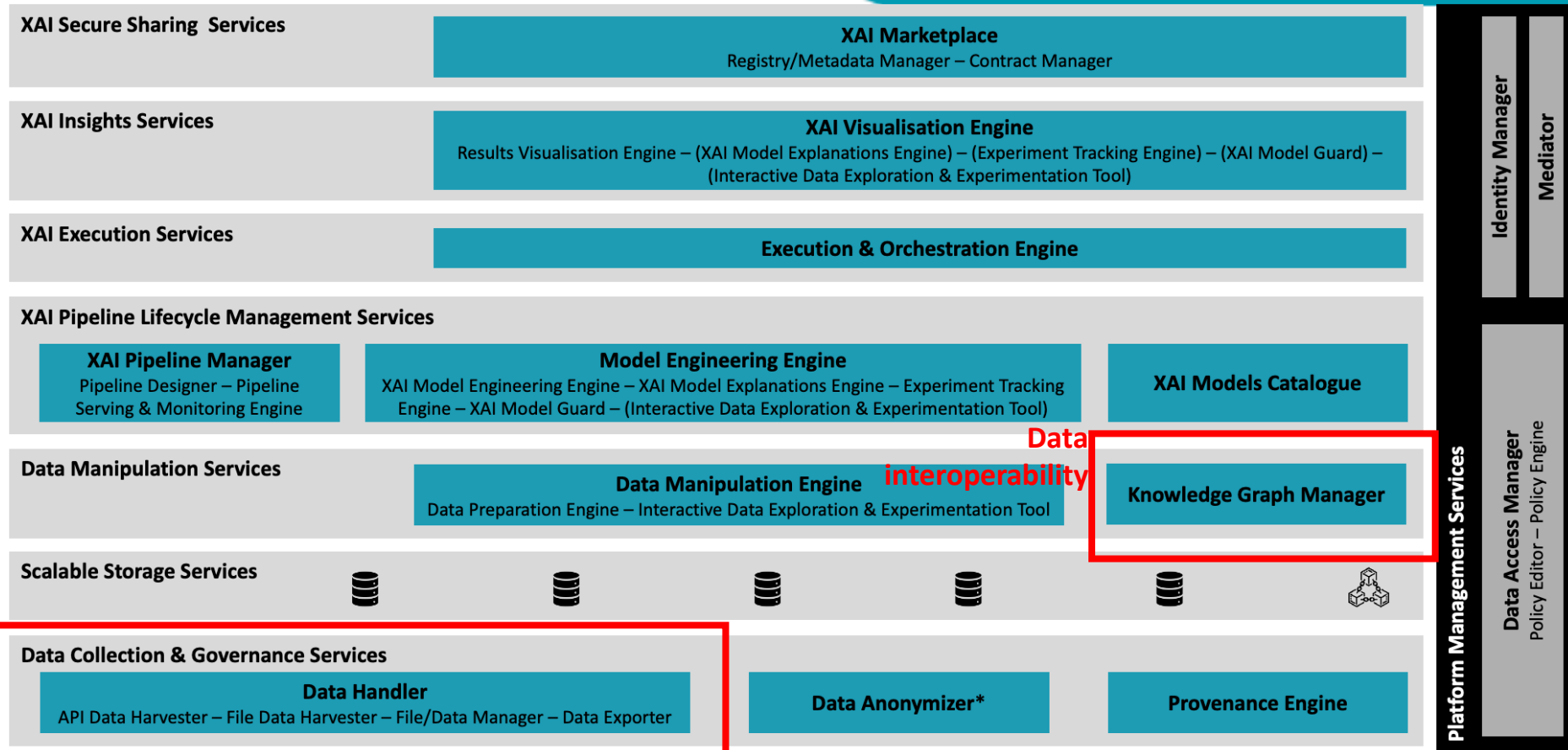# XMANAI Demonstrators

AI for Production Optimization

AI for Product Demand Planning

AI for Process/Product Quality Optimization

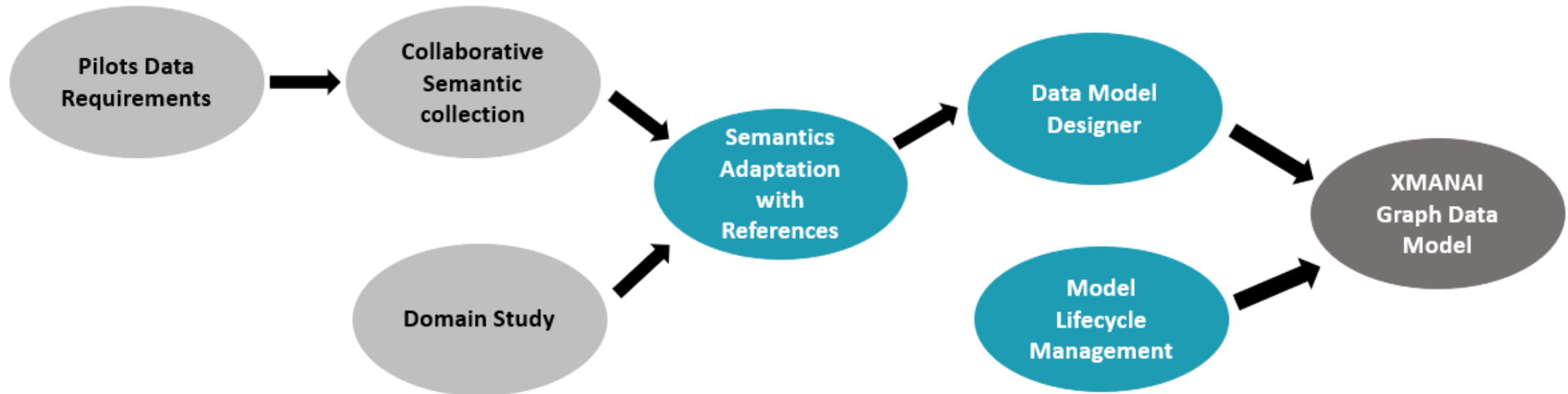AI for Smart Semi-autonomous Hybrid Measurement Planning

Architecture

XAI Secure Sharing Services	**XAI Marketplace** Registry/Metadata Manager – Contract Manager

XAI Insights Services	**XAI Visualisation Engine** Results Visualisation Engine – (XAI Model Explanations Engine) – (Experiment Tracking Engine) – (XAI Model Guard) – (Interactive Data Exploration & Experimentation Tool)

XAI Execution Services	**Execution & Orchestration Engine**

XAI Pipeline Lifecycle Management Services

XAI Pipeline Manager Pipeline Designer – Pipeline Serving & Monitoring Engine	**Model Engineering Engine** XAI Model Engineering Engine – XAI Model Explanations Engine – Experiment Tracking Engine – XAI Model Guard – (Interactive Data Exploration & Experimentation Tool)	**XAI Models Catalogue**

Data Manipulation Services

Data Manipulation Engine Data Preparation Engine – Interactive Data Exploration & Experimentation Tool	**Knowledge Graph Manager**

Data interoperability

Scalable Storage Services					

Data Collection & Governance Services

Data Handler API Data Harvester – File Data Harvester – File/Data Manager – Data Exporter	**Data Anonymizer***	**Provenance Engine**

Data model interoperability

Platform Management Services

Identity Manager

Mediator

Data Access Manager
Policy Editor – Policy Engine

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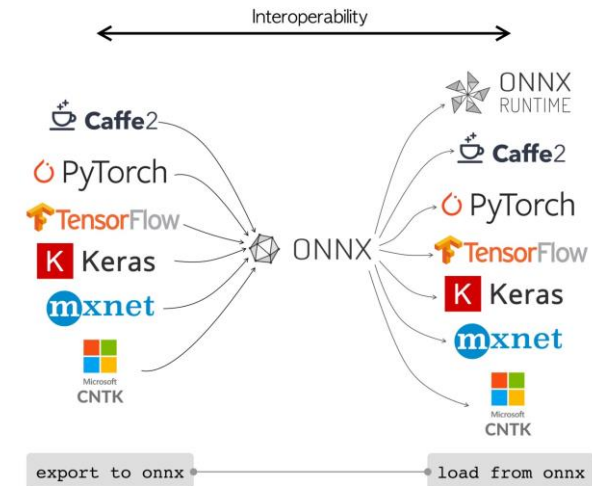
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XMANAI Data Model Methodology

Interoperability

- models are created at the end of the pipeline in collaboration with model engineering engine and executed

- Standards like ONNX can support cross library generic format. In XMANAI we didn't use it for the time being, we might use it for the future

- About explanation pipelines and explainability XMANAI is using its own format and we are not aware about standardisation activities

Thank your for your attention!

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