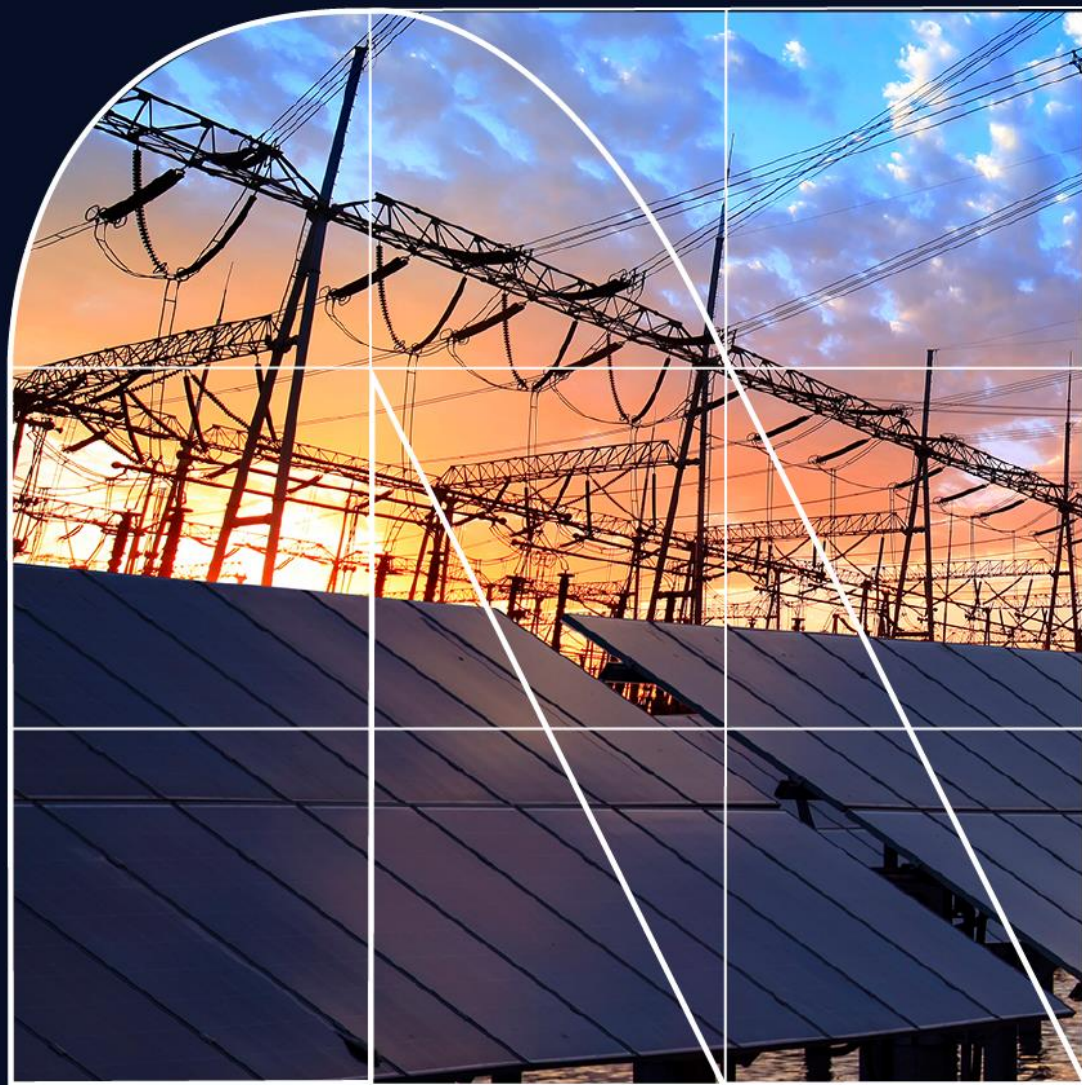
Use Case

Programme Design Validation Using the NTTDATA KANO™ AI Platform

Matt J Johnson

23 February 2026 | Document Version 1.0



Problem Statement

Gas and Power distribution companies in the UK must carefully manage capital delivery programmes involving complex project design validation, rigorous proposal reviews, and accurate cost estimation. Fragmented data and manual processes lead to suboptimal decision-making, delays, inaccurate costing, and inefficiencies.

Solution Overview

The solution integrates AI and Neo4j graph database technology into the capital delivery program lifecycle, explicitly focusing on programme design validation, detailed proposal reviews, and accurate cost estimation. Neo4j provides a centralised knowledge graph that captures the relationships between historical project designs, regulatory requirements, supplier performance, asset conditions, and dependencies. AI models leverage this interconnected data to proactively validate program designs, highlight potential risks, recommend improvements, and dynamically generate precise, evidence-based cost estimates, significantly enhancing decision-making accuracy and efficiency.

A typical Capital Delivery programme

This diagram illustrates a typical capital delivery programme, outlining the step-by-step journey of how infrastructure projects are planned, executed, and finalised within an electrical distribution company:

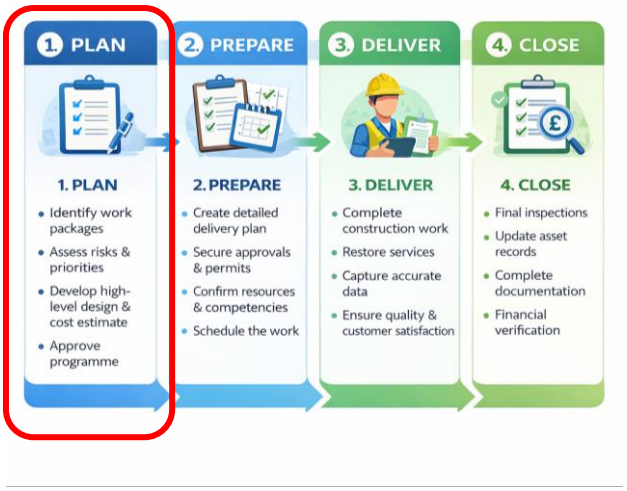


Figure 1 - A typical Capital Delivery Programme

It starts with the **Planning the Programme** stage, where initial proposals are reviewed and validated. This involves assessing risks to identify assets needing replacement, creating a high-level work plan, and collaborating with stakeholders to define specific projects clearly. Detailed planning is critical to ensure the projects address real network needs and align with the company's strategic goals.

Next, the process moves to **Preparing the Work Plan**, focusing on scheduling and resource management. Here, careful workforce coordination and engagement with local stakeholders occur, ensuring that everyone is well-

informed and minimising customer disruption. Clear communication and effective planning help ensure the work progresses smoothly and efficiently.

In the **Deliver stage**, work is carried out safely to manage the distribution network effectively with careful attention to data accuracy and quality. Once the physical work is completed, sites are reinstated to their original or improved condition, maintaining community trust.

Finally, the process moves into the **Closure stage**, where accurate and timely documentation is produced, data is recorded in asset repositories, and financial reviews are completed. This stage ensures a detailed and accurate record for regulatory compliance and future reference, completing the cycle of capital delivery with accountability and transparency.

The programme is designed to ensure clear communication, safe working practices, accurate cost estimation, and successful completion of infrastructure projects, which will benefit both the company and its customers.

This use case primarily focuses on improving the first step, "Planning the Programme." It leverages AI to adopt a ***"shift-left" approach***, where potential issues or inefficiencies are proactively identified and resolved much earlier. This allows Gas and Power distribution providers to optimise the programme upfront, significantly reducing costly redesigns, delays, or overruns and ultimately ensuring smoother, safer, and more cost-effective capital delivery.

An indication of the steps is highlighted below:

1.Programme & Project Data Integration (Neo4j):

- Historical and current programme data (design documents, project plans, previous cost estimates, actual spending).
- Regulatory compliance and design standards data.
- Supplier and contractor performance data (costs, schedules, reliability).
- Geospatial and asset dependency information.

2. AI-Driven Programme Design Validation:

- AI models automatically validate new program designs against previous successful projects, regulatory guidelines, and known dependencies stored in Neo4j.
- Identify and flag design risks, redundancies, regulatory non-compliance, or missing project interdependencies.

3. Intelligent Proposal Review & Optimisation:

- AI identifies cost-saving opportunities and recommends optimal project bundling, sequencing, and scope adjustments based on Neo4j's dependency and benchmarking data.
- Facilitate faster, evidence-based approvals and stakeholder reviews.

4. Enhanced Cost Estimation:

- ML algorithms trained on Neo4j-stored historical cost and performance data provide precise, data-driven cost estimates.
- Real-time cost scenario planning, sensitivity analysis, and dynamic updating based on changing project scope or market conditions.

Benefits

- **Reduced Programme Risk** - Early identification of design flaws, regulatory issues, or overlooked dependencies.
- **Improved Cost Accuracy** - Enhanced budgeting precision through data-driven estimation.
- **Faster Decision-Making** - Reduced delays through streamlined, AI-assisted program validation and proposal review.
- **Better Compliance and Transparency** - Documented, graph-linked evidence supporting regulatory and stakeholder scrutiny.

Example Scenario

The Capital Delivery partner receives a proposal for a significant reinforcement project to enhance network capacity in Southeast London. The project is driven by projected load growth and increased adoption of electric vehicles. Upon submission, the GraphDB knowledge graph instantly identifies historical data from similar urban reinforcement projects, highlighting key regulatory requirements (such as Ofgem's RIIO-ED2 compliance obligations) and asset dependencies involving substations, underground cables, and local grid constraints.

The AI-powered Design Validation Engine proactively identifies potential risks, such as overlooked asset interdependencies or conflicts with nearby planned maintenance activities, significantly reducing the likelihood of costly mid-project adjustments. Meanwhile, the Proposal Optimisation Engine recommends optimal bundling and sequencing strategies—for example, integrating cable replacement works with planned street excavations—to maximise cost efficiency and minimise disruption to local communities.

Simultaneously, the ML-driven Cost Estimation Engine generates a precise, dynamically adjustable budget estimate benchmarked against past projects and adjusted for current market conditions and supplier performance data. Stakeholders, including programme managers, cost estimators, and senior decision-makers, use interactive dashboards to explore real-time scenarios and adjustments. This rapidly produces a robust, evidence-backed investment proposal for regulatory review and approval. This integrated AI-driven process substantially improves decision quality, accelerates regulatory submissions, and positions the provider as a leader in efficient capital delivery.

Key Components of the Solution

The diagram below highlights the key technical components of the solution utilising the NTTDATA KANO™ Platform:

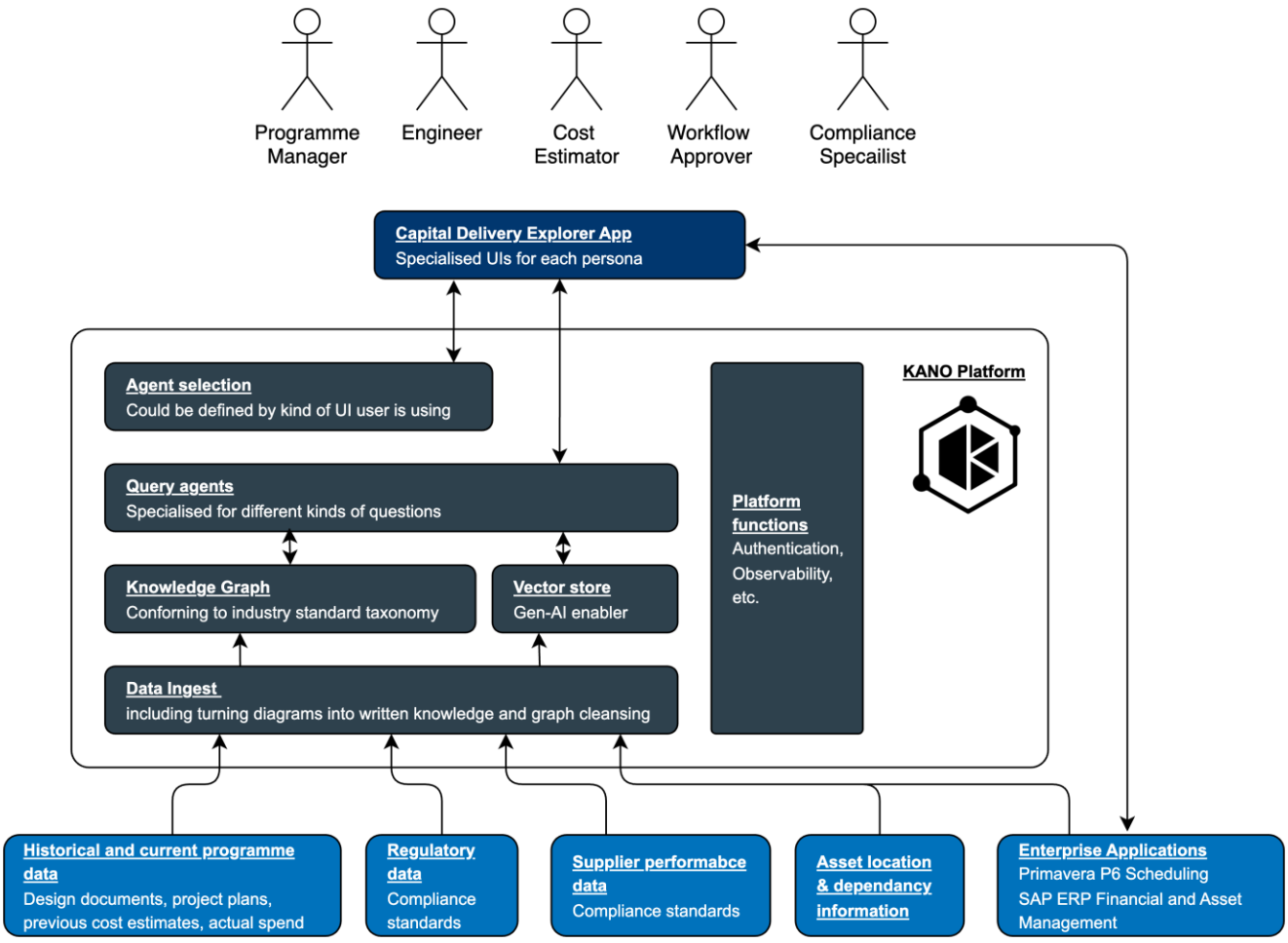


Figure 2 - Key Components of the Solution Utilising the NTTDATA KANO Platform

Together, these components form a sophisticated technical solution, enabling your organisation to validate programme designs earlier, produce accurate cost estimates, minimise rework, and confidently navigate regulatory complexities. Each component is explained below:

Capital Delivery Explorer Application (User Interface)

This application provides specialised user interfaces tailored to different roles, including Programme Managers, Engineers, Cost Estimators, Workflow appraisers, and Compliance Specialists. Each user has personalised access to relevant insights, reports, and dashboards designed specifically for their role.

Agent Selection Layer

This layer dynamically selects appropriate AI-powered agents based on the user's role or specific request from the interface. These intelligent agents are adapted to meet the precise informational needs of each user persona, ensuring users quickly receive accurate, relevant insights.

Query Agents

These are specialised AI-driven agents designed to handle different questions and queries. They interpret and respond to user queries, retrieving accurate information from underlying sources and ensuring relevant data is efficiently delivered to decision-makers.

Knowledge Graph (Neo4j)

At the solution's core, the Neo4j knowledge graph provides a unified repository for structured data. It consolidates historical programme information, regulatory compliance rules, supplier data, asset interdependencies, and geographic constraints into a structured format, allowing rapid and detailed analysis of relationships.

Vector Store

The Vector Store technology enables advanced AI and natural language capabilities. It complements the Knowledge Graph by facilitating quick retrieval and analysis of information, which is especially important when handling complex queries or providing contextual recommendations.

Platform Functions

The KANO platform provides essential infrastructure and governance capabilities, including secure authentication, observability, monitoring, and performance analytics. It ensures the entire architecture is robust, scalable, secure, and compliant with relevant industry standards and regulations.

Enterprise Application Integration (Primavera P6 and SAP ERP)

The architecture integrates with enterprise-level systems such as Primavera P6 (for robust scheduling, planning, and resource management) and SAP ERP (for financial management, budgeting, and asset management). This ensures that data flows smoothly across project management and financial processes, significantly enhancing the accuracy and timeliness of decision-making.

Data Sources

These include historical programme data, regulatory compliance data, supplier performance insights, and asset dependency information. Integrated into the Knowledge Graph, these sources form a unified foundation for robust, AI-driven decision-making.