BT Group | neo4j

Meet SRIMS, a Scalable, Intent-Based Inventory Solution

Foreword

The twin forces of data volume and data complexity are forcing us to re-evaluate how we build modern data-intensive systems. Rigid relational models built around rows and tables are no longer sufficient in the face of today's data challenges. Instead, flexible new data models designed for complexity and volume are gaining popularity.

In telecoms, legacy data models tend to structure data in rows, tables, and joins despite the network-oriented language of the business. This technological-linguistic disconnect leads to business silos that defy value extraction, are brittle in the face of change, and ultimately lead to frustration, waste, and customer dissatisfaction. Given such forces, stasis is not an option.

Data should work with the business rather than acting as a technical impediment. In a business of networks, graphs are the natural language, and graph databases are its technical embodiment.

BT Group is a multinational telecommunications company and the UK's leading provider of fixed and mobile services. The natural model, agility, and raw performance of graph databases have allowed BT to move systems to real time, to gain operational insight that was previously hidden, to automate planning and design, and to enable business decisions to be taken quickly — all things that were difficult or impossible with previous systems.

One might expect such benefits to come with a significant price premium, but this is far from the case. Since the deployment of graph technology is far lighter weight than previous generations of databases, it has enabled the business to realise significant cost savings versus legacy systems. BT has been able to achieve the rare outcome of systems that have both better functionality and lower cost.

In this white paper, you'll learn how BT drives real-time inventory management with graph, and about the benefits of this technology transformation. We hope it will stimulate thoughts about how this technology can be used more broadly. BT now has a strong capability in modern graph databases and graph computing, and that capability has been revolutionary across their business.

The connected future is exciting!

Dr. Jim Webber
Chief Scientist
Neo4j

Sreenath Gopalakrishna
Director of Software Engineering BT

The Telco Inventory Management Crunch

Inventory management is a major pain point for telcos' operations and planning.

Essential data is usually buried deep in isolated silos. Once excavated, it can often be inaccurate and out of date. As networks become increasingly virtualised and cloud-based, many are discovering that their conventional inventory management solutions pose a serious technical and operational challenge. Often built on relational databases, these systems are too hierarchical and inflexible, offering limited functionality. To unlock superior advantages such as real-time visibility, rapid service delivery, or advanced change modelling capabilities, telcos are now turning to graph databases instead.

Graph databases focus on the concept of treating relationships between data as first-class entities (sometimes known as nodes and edges) and offer a substantial improvement in resolving typical data queries such as network resource reservation, path planning, product availability, or customer connection tracing. Compared to traditional approaches, the speed at which graph databases handle these tasks is significantly superior, often by orders of magnitude.

This project overview tells the story of how BT, a multinational telecommunications provider, used the Neo4j graph data platform to solve critical operational challenges. The platform was used not only to rebuild a pivotal part of its key operational support system, but also to develop the Service and Resource Inventory Management System (SRIMS, effectively a digital twin for BT Wholesale's Network Inventory).

Graph Database Advantages for Telcos

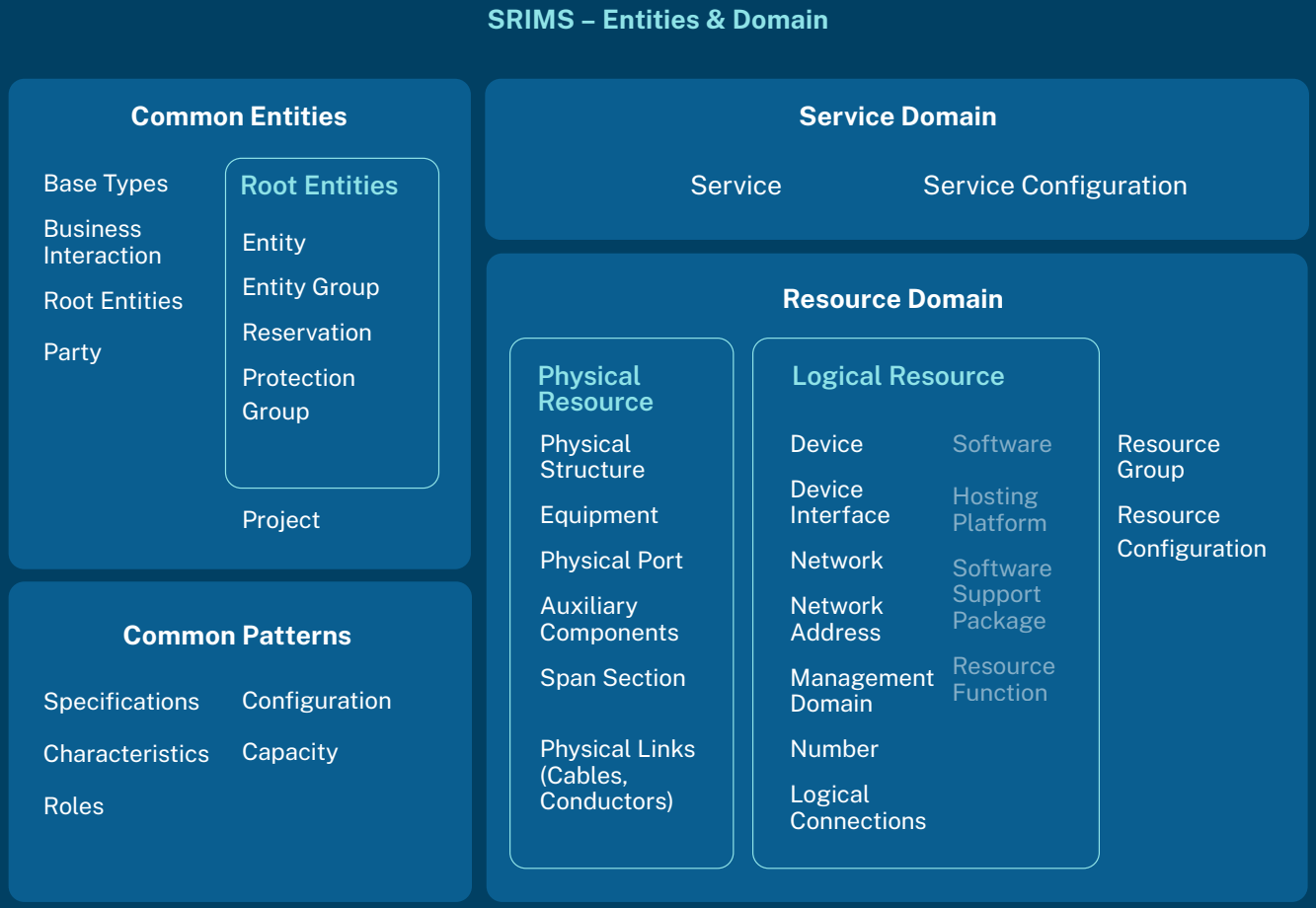
- Easy to extend and adapt graph databases
- Consolidate siloed data from different network devices, services and customers
- Provide a single view across customers and inventory, fault, and service platforms
- Model physical and virtual environments and assets, and performance
- Provide valuable insights into networks and utility using graph data science
- Increase efficiency by representing operational knowledge and best practice in a knowledge graph, which can be searched using AI-based language models

BT: Where Scale and Complexity Meet Innovation and Performance

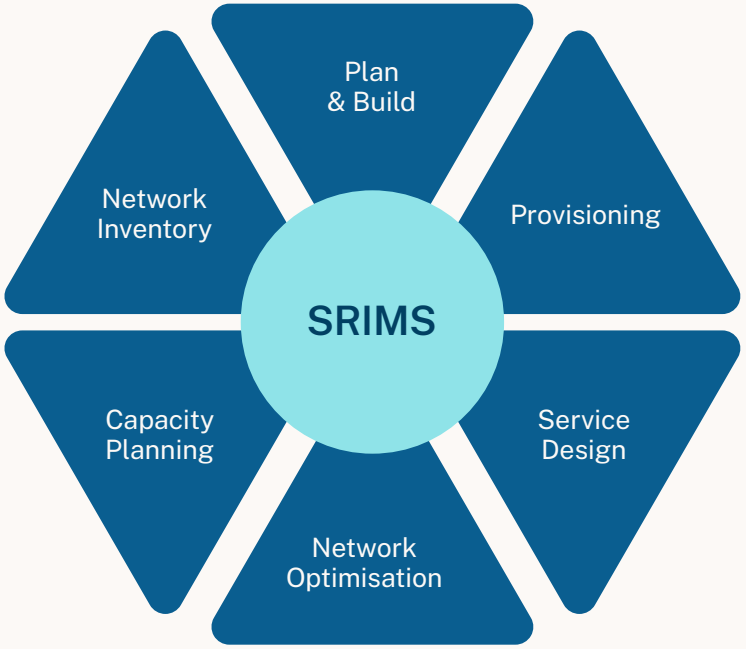
BT is the UK's largest core network, with 20,000 cell sites, 1,900 high-bandwidth ethernet exchanges, 28+ Tbps core traffic, and 150k ethernet-based circuits. It has the largest spectrum portfolio in the UK, underpinned by a highly resilient architecture that offers better-than-99.999% core availability.

Meet SRIMS, a Scalable, Intent-Based Inventory Solution

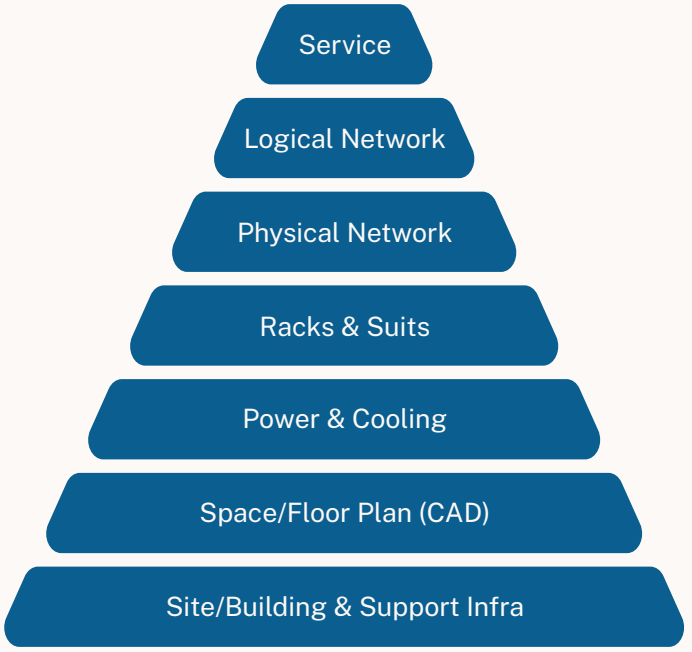
SRIMS is a visionary project led by the BT Networks OSS team to consolidate the telco's network inventory into a single integrated system to ensure data integrity. It provides a unified view across physical, logical, virtual, and service entities. It also incorporates a low code platform to support NetDevOps within its operations and support team.



SRIMS Capabilities



Information Layers Covered



The business-critical nature of the project is reflected in the numbers:

5,000+
order progress requests per hour

SRIMS performs service design and provisioning for various products.

50,000
product availability check requests per day

It handles tens of thousands of product availability check requests, each with strict SLAs.

3,000
Users

With peak time concurrency regularly passing 1,500.

Saved £1m
per day

Financial losses resulting from the inability to transact and process orders due to product non-availability.

BT Overhauls Ageing Inventory Systems for Unified Network Planning

BT chose Neo4j to replace an outgoing OrientDB legacy graph database network inventory platform.

At the time, BT's operating support system consisted of over 300 different IT systems, many of which were 15-20 years old. This disjointed approach slowed the evolution of their networks and delayed time to market.

With the existing system, BT was unable to access an end-to-end view of the inventory systems due to the associated costs and performance limitations.

No single, consistent source of truth resulted in heavy manual work and time-intensive analysis, while data silos hindered information sharing and collaboration between teams.

BT decided to rationalise this infrastructure with a more intuitive solution for end-to-end planning. The new approach needed to support one system of record for network planning and inventory.

This would allow engineers to understand the state of network resources and easily identify the need for additional capacity and routers in local exchanges, central offices, or data centres. It also needed enterprise-ready support and security features, which the existing system lacked.

BT Successfully Migrates Massive Network Inventory

1 The Approach

The solution was to migrate BT's extensive inventory graph database from OrientDB to Neo4j. The challenge set by BT was to make Neo4j fit their current way of operating, rather than BT changing their code. To achieve this, Neo4j's professional services consultants worked closely with BT's development team to complete the technical integration. This was rigorously tested against BT's priorities throughout the set-up phase.

As BT's platform was initially implemented using OrientDB APIs, Neo4j suggested using an OGM layer (Neo4j's object graph mapper software tool) to be the interface between this existing code and the new Neo4j database, therefore reusing the existing code with minimal changes.

2 Migration Planning

An international team led by BT OSS, Neo4j, and Technology Partners designed a Neo4j solution in parallel with the existing production platform, ensuring the key requirements would be met – functional accuracy, performance, and scalability. Migration planning was completed six months ahead of the go-live date to ensure the solution was tested thoroughly. Throughout this process, the SCRUM team met every two days, supported by the Neo4j professional services team, who acted as a link between the Neo4j technical teams and BT's technical team.

3 Execution

The new platform first went into production in parallel with the incumbent platform to ensure minimal disruption and continued testing for stability and operational effectiveness. Once satisfactorily tested, the switch to Neo4j was completed, and the legacy solution was taken out of service.

4 Status

At the time of writing, BT has consolidated several bespoke disjoint inventory systems into SRIMS, with the remaining systems planned for later this year and next.

Success to Date...

1,000x performance

The Neo4j SRIMS platform provides thousand-fold performance improvements over the previous relational database solution, enabling **radical new levels of efficiency and insight**.

Automated planning and design

BT achieved a high level of automation and self-service by using a **3D visualisation tool** alongside standardised network planning, meaning engineers can **start a workflow at the click of a mouse**. Features such as this have contributed to reductions in capacity planning time of up to 50%, as well as increased design accuracy.

Faster onboarding of new network capabilities

A real-time view of network capacity means resources can now be **rapidly reallocated** to reduce the time taken to roll out new services significantly.

Accelerated adoption of NetDevOps

NetDevOps — the recently emerged concept of empowering network engineers to rapidly test, build, and deploy code into the network — has been enabled by the use of graph technology from Neo4j. This has resulted in **much faster service delivery** and improved performance.

Fewer touchpoints, faster decisions

Previously, hundreds of people were involved in 'plan-and-build' processes. With the new software, tasks and **human decision points have been reduced by 60%** resulting in increasing emphasis on more sophisticated DevOps-like work.

Millions saved

Being able to retire multiple homegrown and commercial inventory systems has saved BT millions of pounds. **Current enterprise support costs associated with the techno-commercial model of open-source projects are a fraction** of those for legacy commercial inventory systems.

Neo4j's graph data platform has enabled BT to consolidate its physical, logical, virtual, and service inventory into a single source of truth, reducing costs and increasing the agility of its operations

To learn more about this project and the wider applications of our graph data platform, contact:

Graeme, Neo4j
graeme.coffey@neo4j.com

Sreenath, BT
sreenath.gopalakrishna@bt.com