

Case Study

Global Auto
Manufacturer**INDUSTRY**

Manufacturing / Automotive

USE CASE

Knowledge Graph

GOAL

Reduce vehicle time to market by improving communication between different engineering domains

CHALLENGE

Different engineering teams used separate tools and data formats, slowing down product validation tests

SOLUTION

Built a Neo4j knowledge graph to standardize metadata and expedite the product validation life cycle

RESULTS

- Enterprise knowledge graph unifies testing data for faster, more accurate product decisions
- Shared metadata structure enables faster time to market for both new and existing vehicles

Major Japanese Auto Manufacturer**Manufacturer Reduces Time to Market with an Enterprise Knowledge Graph for Unified Testing Data**

A Japanese automotive OEM was struggling with inconsistent, siloed data across different teams, ultimately slowing down their vehicle development process. Using a Neo4j knowledge graph for standardized metadata, the manufacturer made cross-enterprise data exchange seamless and sped up its product validation life cycle.

The Company

This Japanese multinational enterprise is one of the top 10 automobile manufacturers worldwide, producing millions of internal combustion engines each year for automobiles, motorcycles, personal watercraft, power generators, garden equipment and more. The company also has significant investments in the fields of robotics, artificial intelligence and aerospace. With assembly plants on five continents and over 200,000 employees worldwide, the company reported \$130 billion in revenue in fiscal year 2018.

The Challenge

Vehicle testing is a time-consuming, yet essential, process for automotive OEMs. Test data needs to be collected and organized in order to troubleshoot and fix any defects before full-scale production begins.

The major Japanese auto manufacturer was struggling to make their critical test information useful for long-term product validation management (PVM). The manufacturer's product validation life cycle wasn't working because non-standardized vehicle test data couldn't effectively identify the root cause of problems, much less fix them.

Engineers from diverse domains – and even within the same domain – conducted tests differently and stored that test data in a variety of formats using different tools. As a result, data was inconsistent and siloed, rendering it useless to other teams.

The Strategy

One problem was that there wasn't always a clear boundary between domains. More often than not, domains overlapped. This meant that information across all teams was inherently connected and had to work together.

For example, a vibration problem observed during on-road testing could either be due to the engine or the vehicle structure. To identify the source of the problem, engineers across different teams needed to work across disciplines. In this case, a vehicle testing group would share the logged vibration data with the powertrain group, who would then check the load condition, the combustion data, and the time series ECU data about the engine torque to look for the main source of vibration.

Case Study

“With the help of Neo4j and BRIX PVM, we’ve built a knowledge graph that can incorporate well-defined semantics for tests, subtests, and measurements in a unified manner. We’re capturing the knowledge of an expert engineer”

– Engineer,
Japanese Auto Manufacturer

This interdisciplinary approach would require that information across all domains be standardized and connected at the database level for seamless data exchange. The auto manufacturer decided to work with [iASYS](#) to align their testing data with guidelines set forth by the Association for Standardization of Automation and Measuring Systems (ASAM).

The new product validation life cycle would need to integrate different engineering domains in a flexible, connected database system that meets the ASAM standards.

The Solution

Working with iASYS, the auto manufacturer decided to build a knowledge graph in [Neo4j](#) and integrate the whole product validation life cycle using the [BRIX PVM](#) solution.

The iASYS team designed a [knowledge graph](#) using Neo4j that connected all product validation life cycle data and allowed for enterprise-wide integration of domains and functions. They also created an engineering dictionary in the knowledge graph where key metadata was defined, such as test types, measurement characteristics, and measurement conditions.

“With the help of Neo4j and BRIX PVM, we’ve built a knowledge graph that can incorporate well-defined semantics for tests, subtests, and measurements in a unified manner. We’re capturing the knowledge of an expert engineer,” said an engineer on the project.

iASYS then mapped the manufacturer’s engineering domains onto a new standardized validation process. Meanwhile, BRIX PVM provided well-defined semantics for tests, subtests and measurements that enabled engineers to communicate across domains and platforms.

The Results

With the new standardized process built on top of a Neo4j knowledge graph, the whole product validation life cycle spoke a common metadata language.

Test information across all teams and domains could be accessed and reused at any given time. The unified metadata structure allowed engineers to understand the problems in a vehicle thoroughly and draw fast, accurate conclusions for practical next steps.

Going forward, the Japanese auto manufacturer is also looking to integrate natural language processing (NLP) into their enterprise knowledge graph.

The bottom line: The product testing and validation process ran smoother, testing data was reusable for future insights, and the manufacturer experienced a reduced time to market.

Neo4j is the leader in graph database technology. As the world’s most widely deployed graph database, we help global brands – including [Comcast](#), [NASA](#), [UBS](#), and [Volvo Cars](#) – to reveal and predict how people, processes and systems are interrelated.

Using this relationships-first approach, applications built with Neo4j tackle connected data challenges such as [analytics and artificial intelligence](#), [fraud detection](#), [real-time recommendations](#), and [knowledge graphs](#). Find out more at [neo4j.com](#).

Questions about Neo4j?

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