3DEXPERIENCE DISCOVERY DAY 2026

AI SUMMARY

USING MBSE TO MANAGE COMPLEX INDUSTRIAL ENTERPRISE ARCHITECTURES



KEY TAKEAWAYS

Why Complex Industrial Enterprises Need MBSE and UAF

Staged Implementation Builds Credible System Analysis Capability

Addressing Adoption Barriers and Leveraging AI in Modeling

DASSAULT SYSTEMES

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Göran Tuomas
Lead Systems Architect LKAB

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Using MBSE to Manage Complex Industrial Enterprise Architectures
Thursday, November 12, 2026

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In a large European mining and minerals group, strategic investment decisions span multi□billion sales, long lived assets, strict environmental rules, and uncertain markets. The session described how the company is transforming its way of understanding this complexity by introducing model based systems engineering and the Unified Architecture Framework. Instead of relying on disconnected spreadsheets and local models, the enterprise now seeks an integrated, decision ready view of its end-to-end value chain, from mines to logistics, customers, and future low carbon technologies.

The mining value chain stretches across several mines, processing plants, railways, ports, and customer segments, meaning disturbances in one node propagate across the system. Legacy practice based on Excel and isolated engineering models could not capture long-term interactions or compare options consistently. At the same time, the enterprise is modernizing, extracting minerals from waste and planning hydrogen-based iron production. These developments introduce new assets, dependencies, risks, and decision paths, strengthening the need for a frame linking technology, capacity, environment, logistics, and value.

To avoid adopting methods for their own sake, the initiative began with a cross-functional pre-study that identified capability needs and confirmed business value. The team then built a "good enough" pilot model focused on comparing transformation scenarios through enterprise-level KPIs and long-term analyses. Recognizing fragmented data as a major risk, they launched an IT program to define a single source of truth, while maintaining temporary databases that enabled ongoing system analysis and guided the larger data initiative toward the information the business needs.

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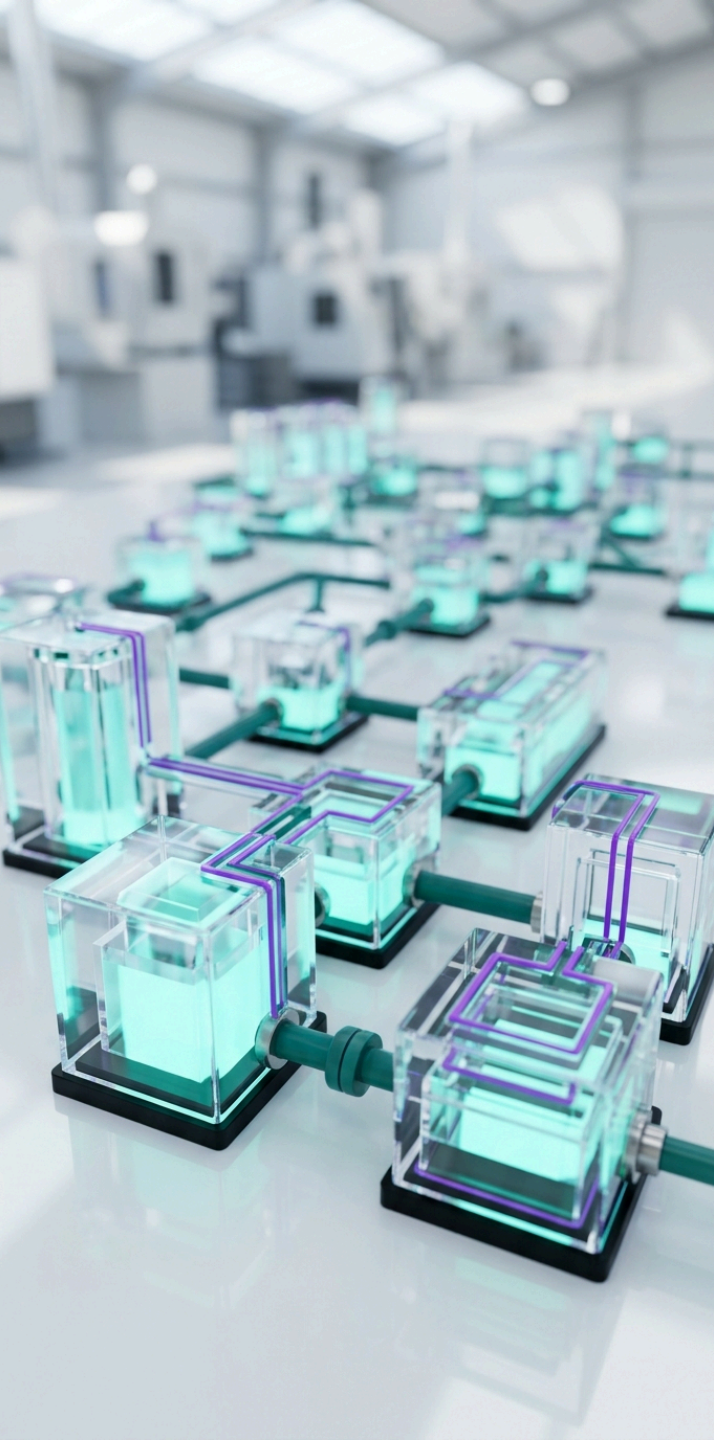

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Alongside models, the team implemented an architecture backbone using the Unified Architecture Framework and related tooling. This enterprise information model links strategy to execution by capturing current and future scenarios, roadmaps, projects, and assets, and serves as a collaboration space across organizational boundaries. Simulation results feed back into the architecture, and vice versa. Early value cases included optimizing flue-gas cleaning investments across multiple plants and analyzing how to increase production of one product by exposing bottlenecks in rail, port handling, and storage capacity.

Implementation faced barriers: cultural resistance from model owners, productivity dips while people acquired new skills, and the need for clear methods, governance, and integrated toolchains. Cybersecurity considerations further constrained how models and data could be shared. Despite this, the enterprise has institutionalized system analysis as a line function, expanded the team, and built trust by delivering decisions backed by explicit assumptions. Spreadsheet complexity is decreasing, result quality is improving, and managers are gaining insight into how strategy connects to projects and assets.

Looking ahead, the team plans to refine models, expand use cases, strengthen governance, and connect analyses more tightly with core operational systems. At the same time, the enterprise is experimenting with AI, particularly code‑assisted development, to accelerate modeling, explore more scenarios, and bring work in‑house that previously went to consultants. This raises new questions about infrastructure choices, cloud versus on premises deployments, data handling, and security. The speaker stressed that system understanding remains essential to steer AI and digital tools toward trustworthy, decision‑ready insights.

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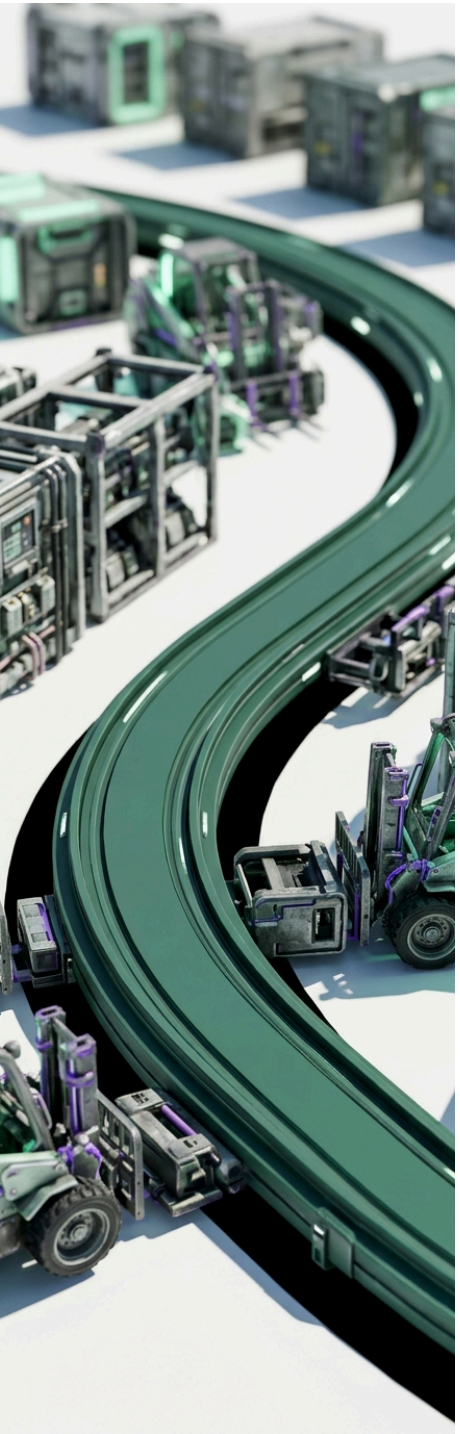

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Why Complex Industrial Enterprises Need MBSE and UAF

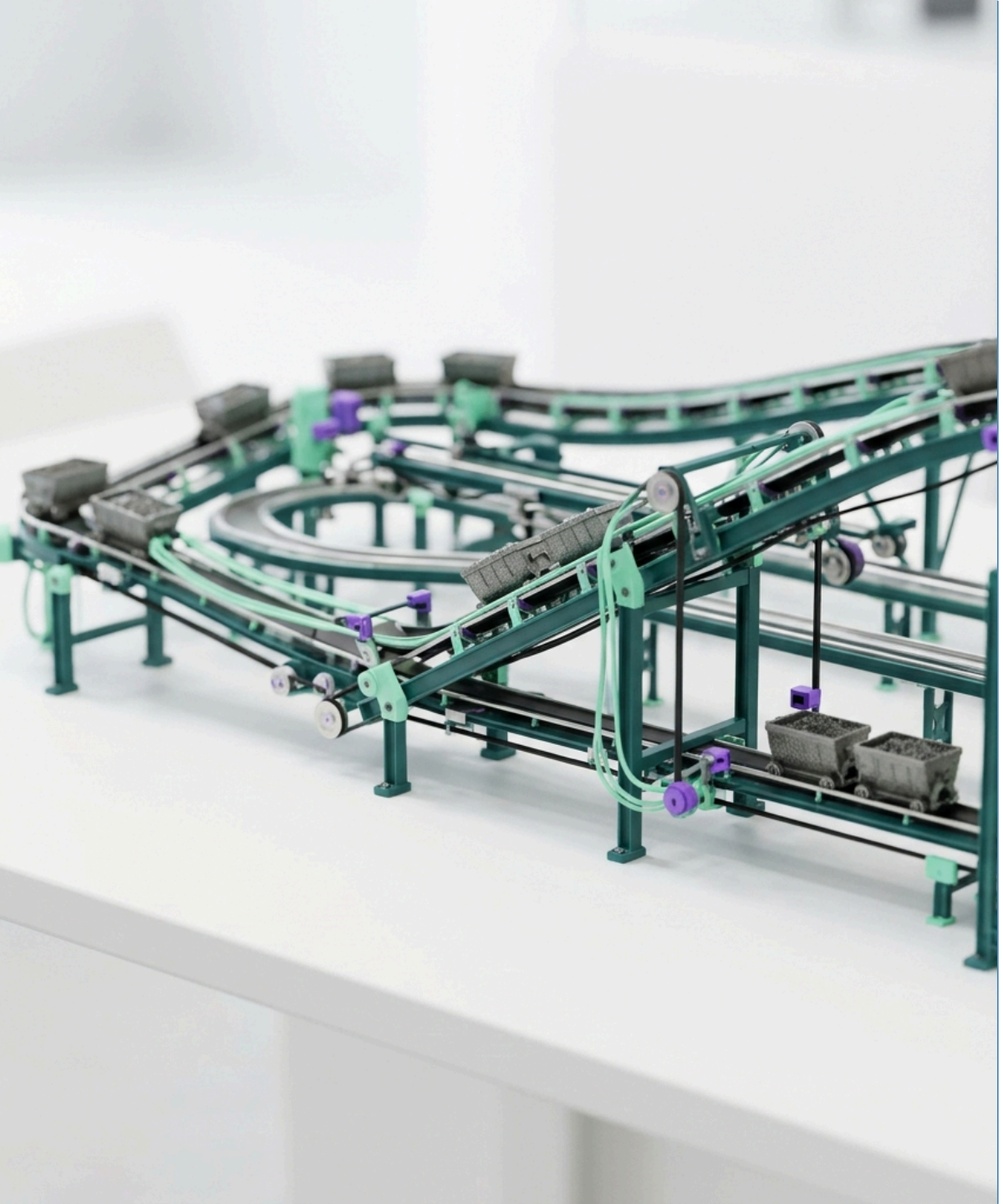
The company operates a tightly coupled, multi-site production chain with long-lived assets, uncertain technologies, strict environmental constraints, and fragmented data, making strategic investment choices highly interdependent and risky, so model-based systems engineering and UAF provide the needed holistic, decision-ready view.

Staged Implementation Builds Credible System Analysis Capability

A staged approach began with a business case, then a decision focused pilot model using block-based process representations, followed by defining trusted data foundations, building a UAF architecture backbone linking strategy to execution, and demonstrating value through multi-plant emissions and logistics investment use cases.

Addressing Adoption Barriers and Leveraging AI in Modeling

Key adoption barriers include local culture resistance, skills gaps, unclear modeling governance, toolchain integration challenges, and strict cybersecurity. Despite this, enterprise modeling now improves option comparison and transparency, while AI-assisted co-development accelerates scenario exploration and reduces consultant dependence when guided by system expertise.



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