

Transformation to a Model Based Enterprise at MTU Aero Engines

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Hello!

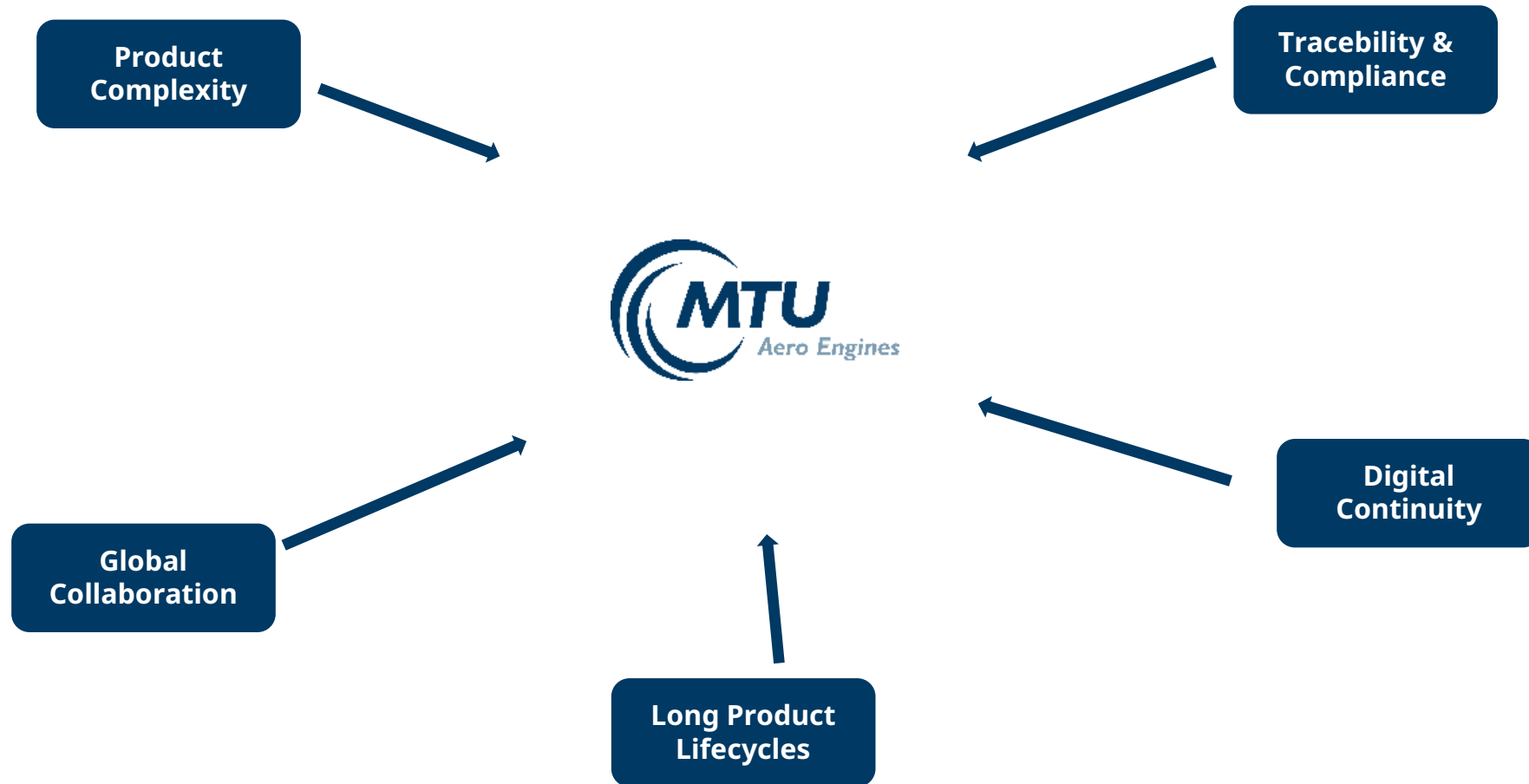


Robert Klöppner
CAD-PLM Method Development
Project Lead

MTU Aero Engines: Passion for Engines 90 Years and Beyond



Why MTU is transforming towards a Model-Based Enterprise

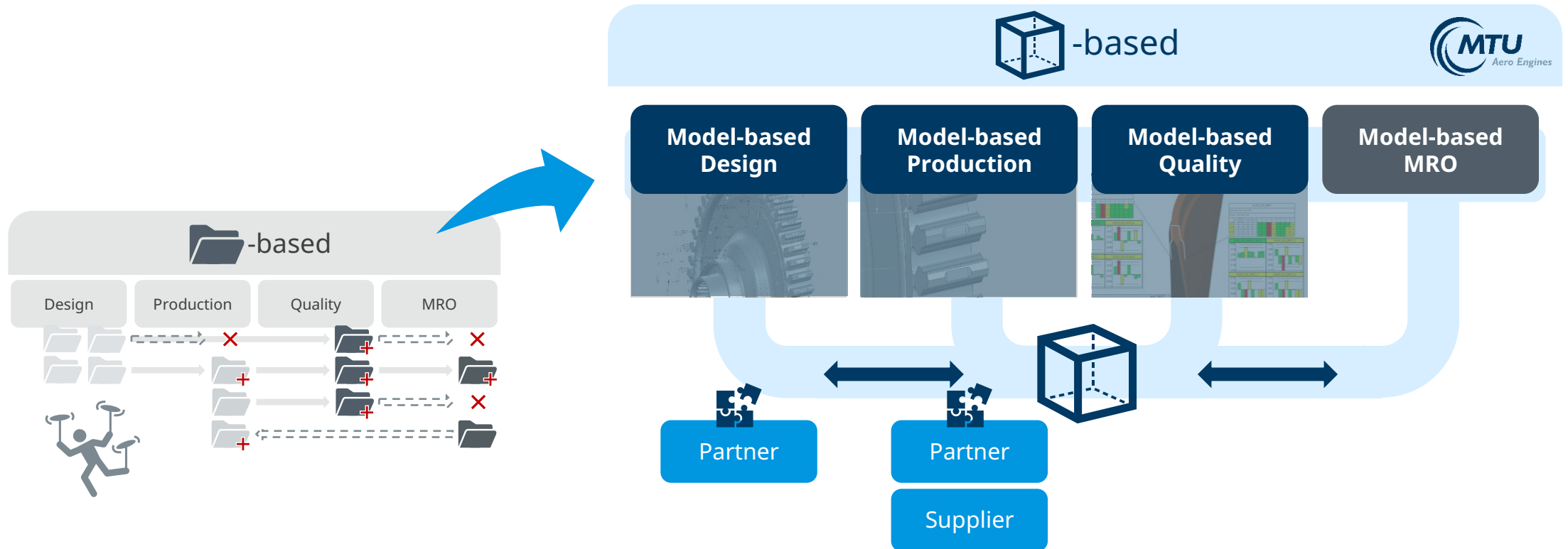


For MTU, interoperability is the foundation for digital continuity across the entire engine lifecycle.

Vision



The basic principle of model-based working: A strategic paradigm shift from documents to an intelligent 3D model and connected data



Paradigm shift away from siloed documents



Replace the drawing with an **intelligent 3D model**



Single-source-of-truth for the entire value chain

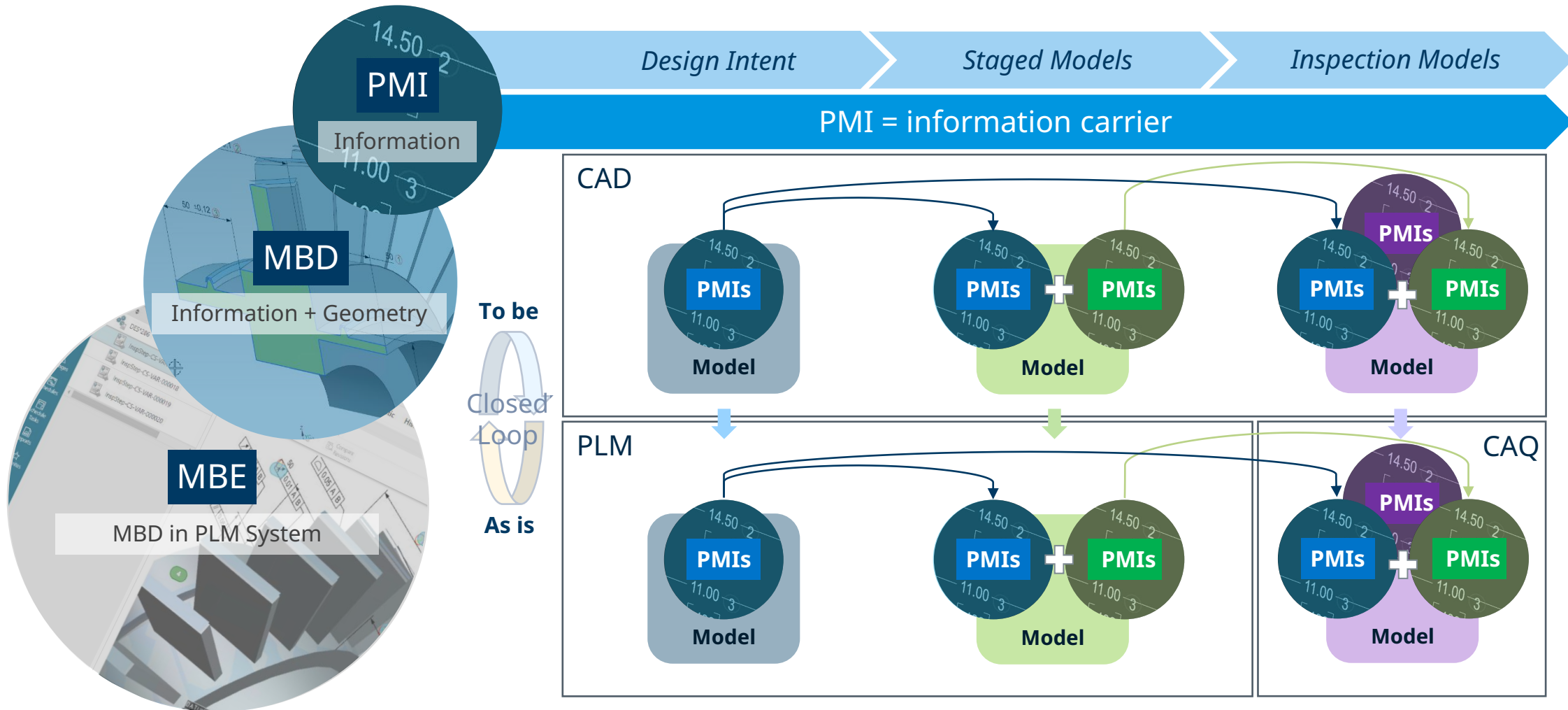


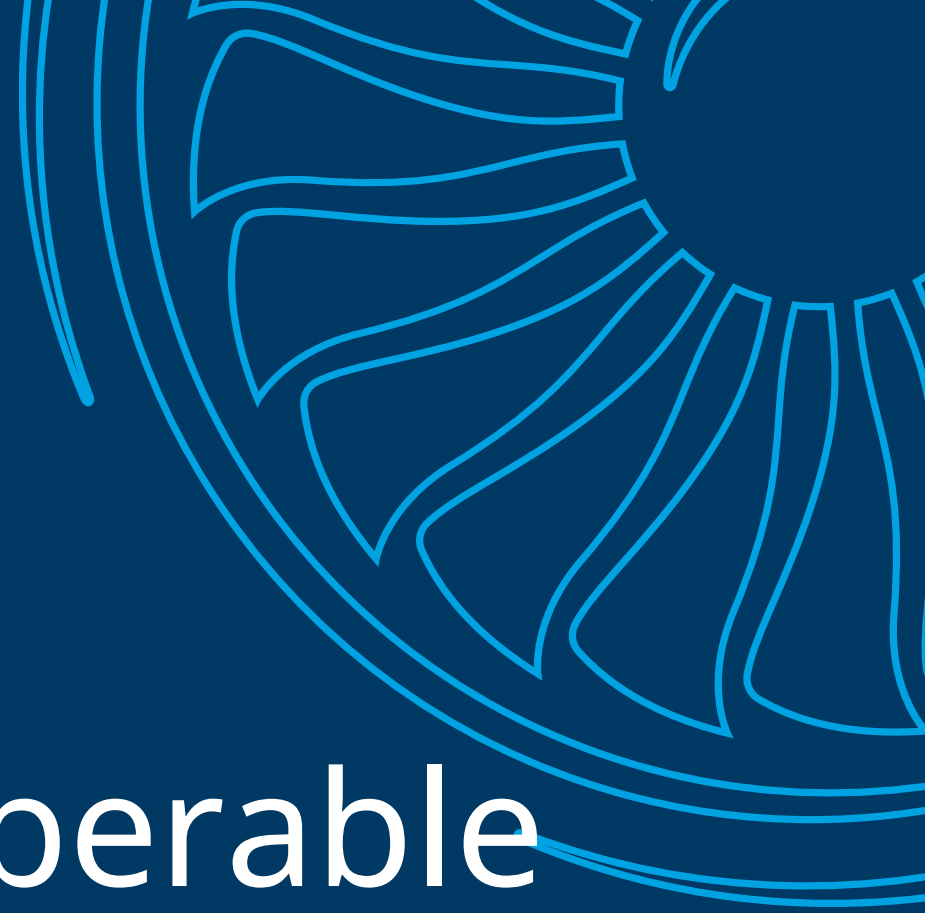
Machine-readable and user-friendly data



Manage lifecycle data **without system breaks**

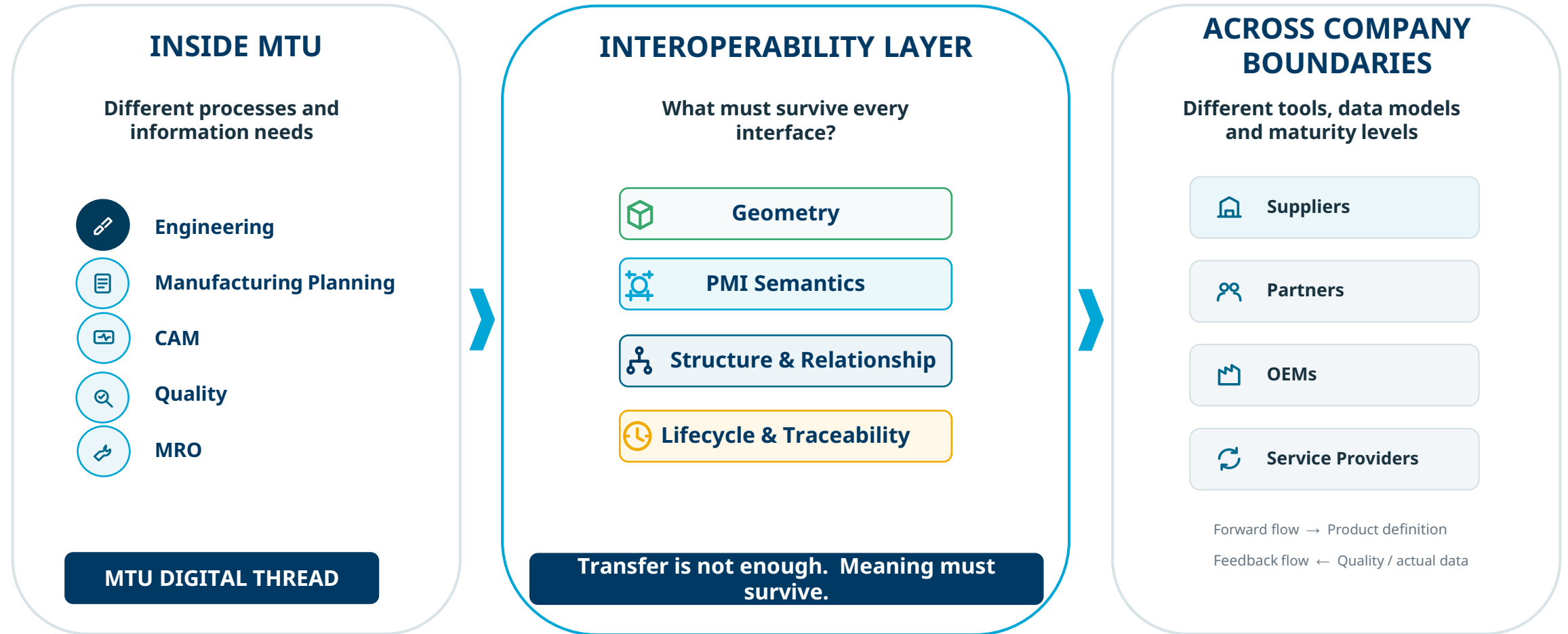
Foundation for digital continuity: MTU introduces PMIs as central information carrier for the entire value chain





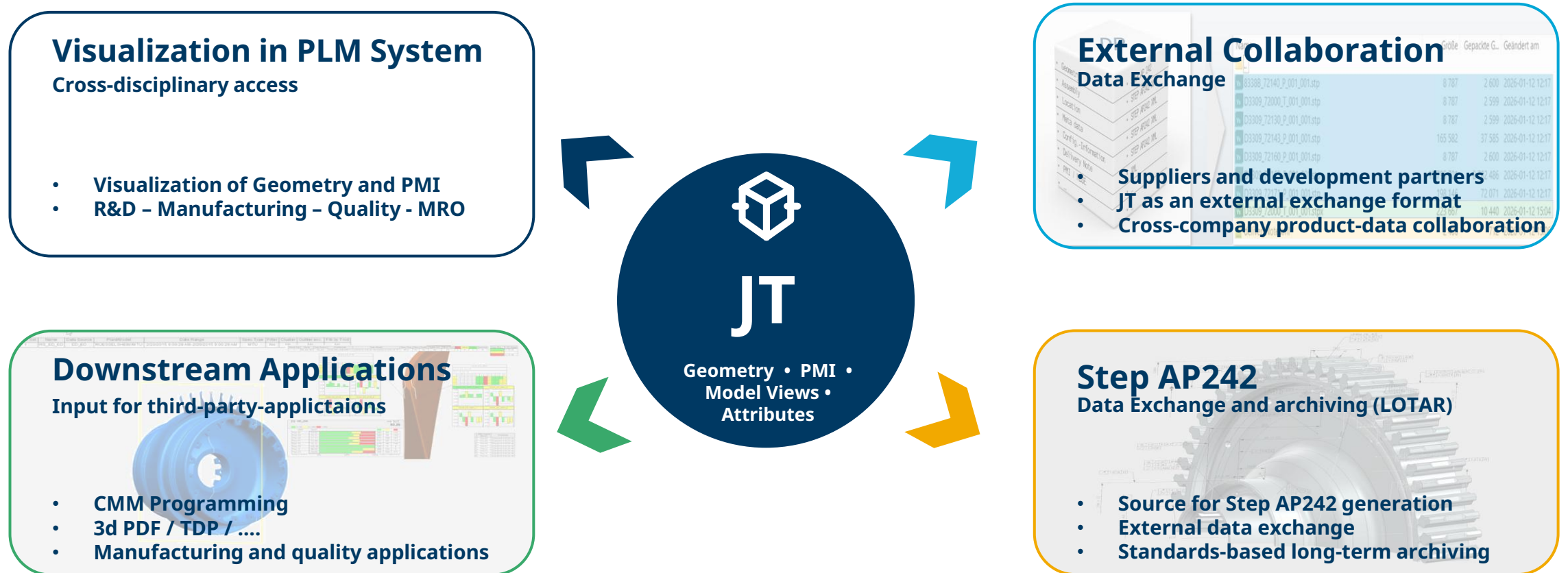
Building the Interoperable Enterprise

Interoperability is not optional



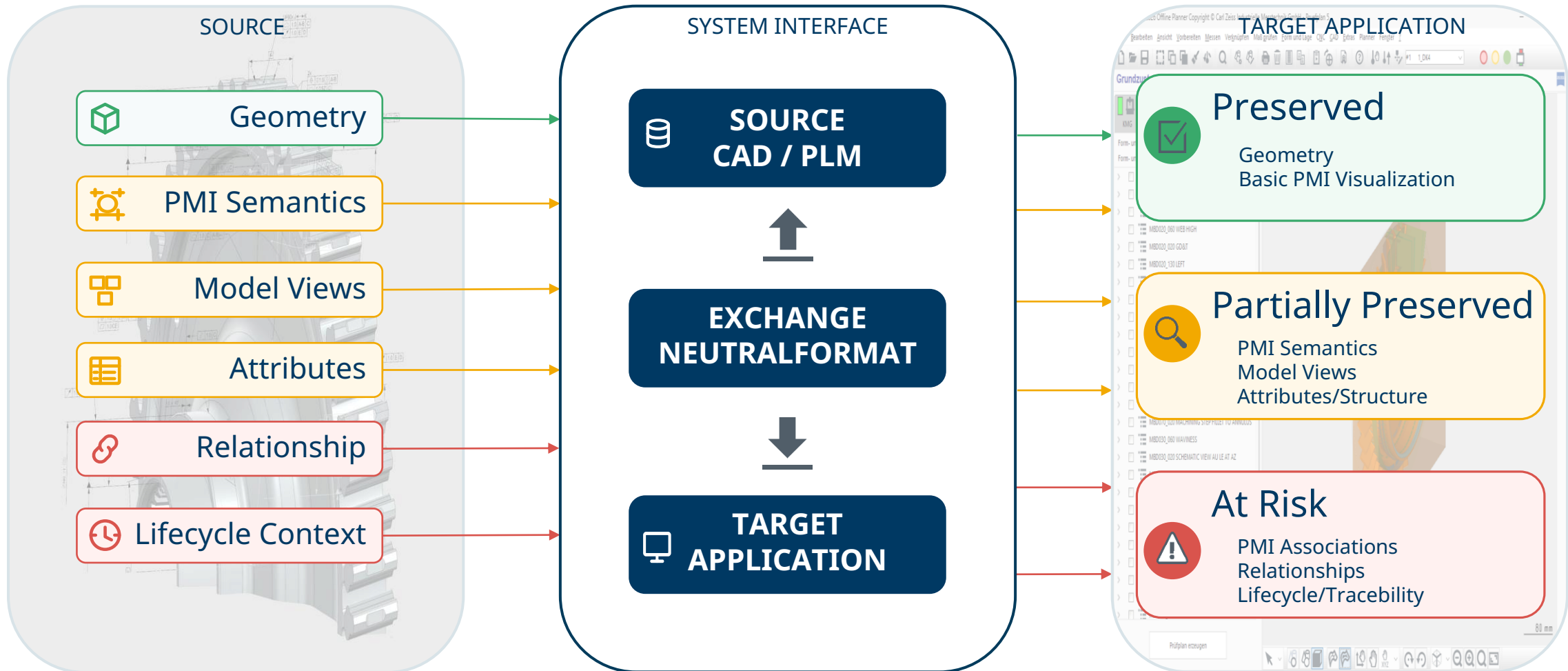
A Model-Based Enterprise cannot end at a system interface or at the company boundary.

JT as a Backbone of the Model-Based Value Chain at MTU

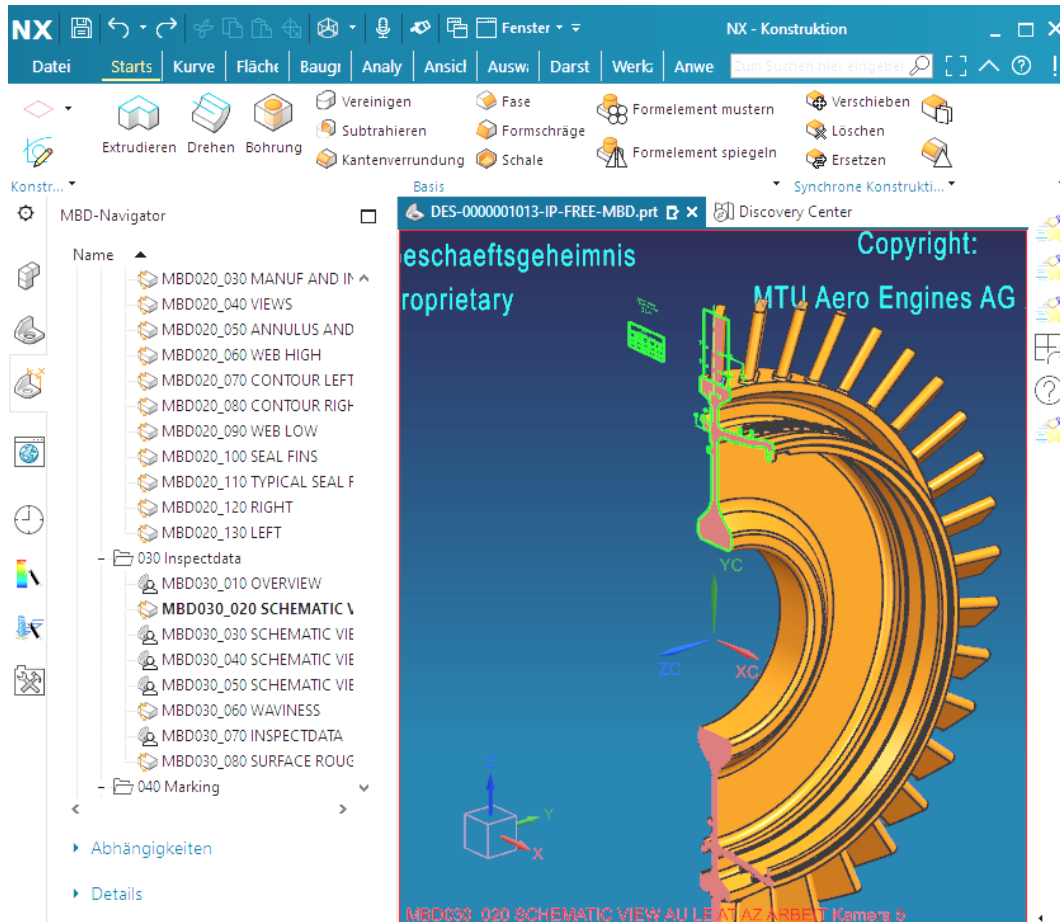


JT makes model-based product information accessible, reusable and exchangeable across disciplines, systems and company boundaries.

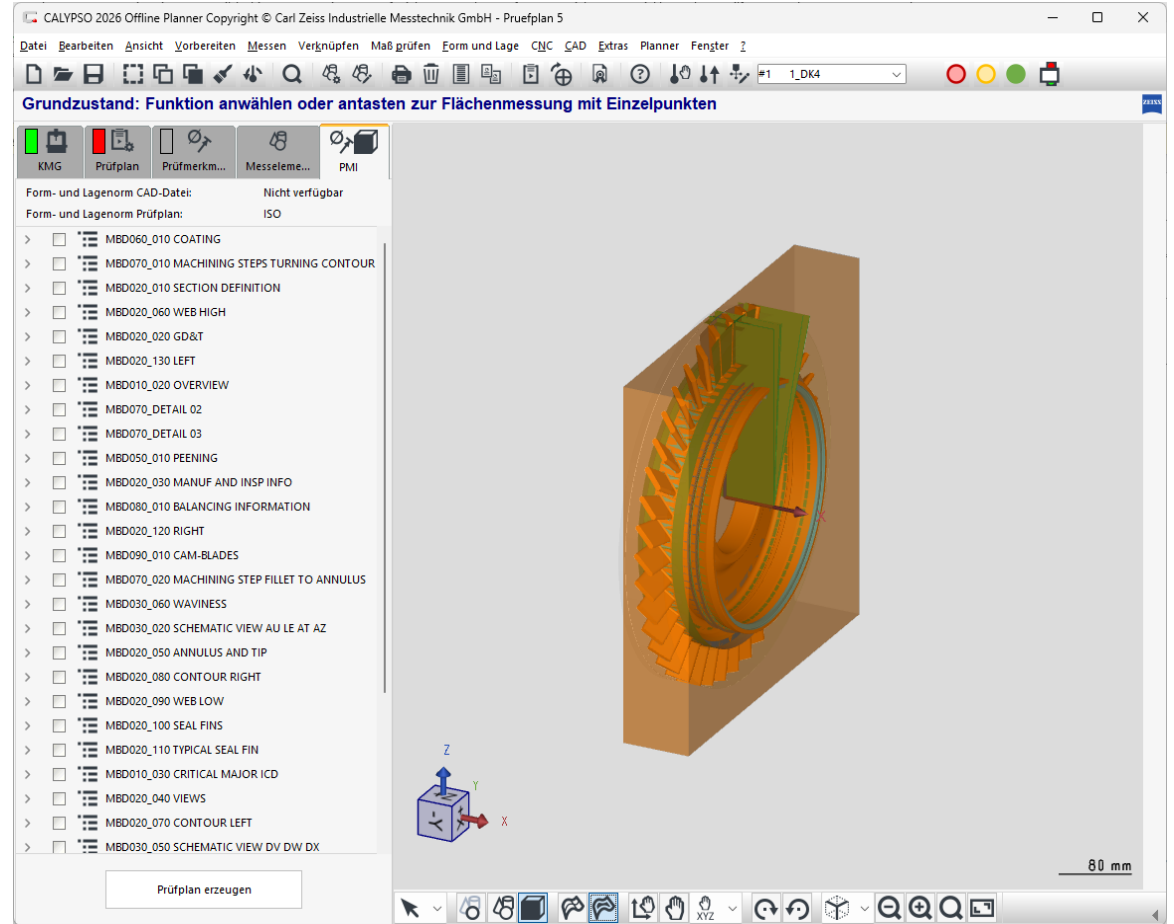
Interoperability Challenges: Preserving intelligence across interfaces



Challenges at the interface with Quality: Addressing loss of structure and intelligence from the MBD – By the example of the CMM programming



MBD coming from design

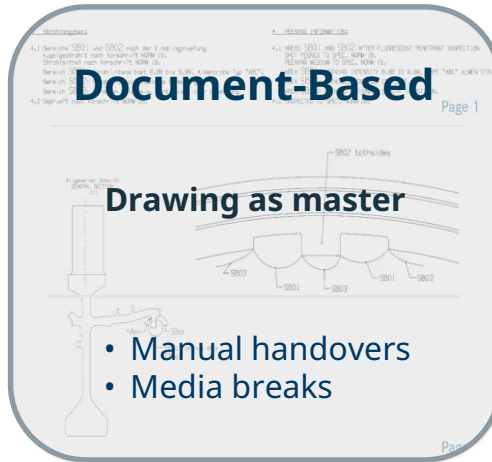


MBD imported for CMM

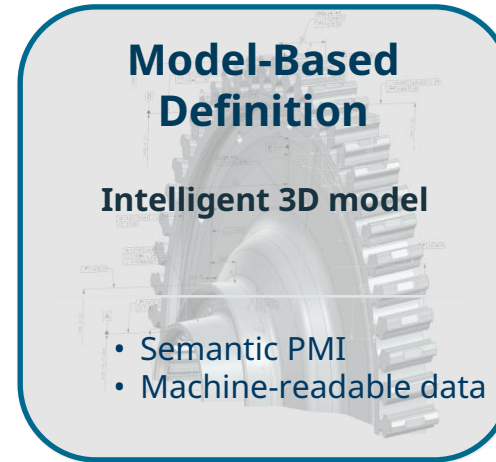


The Journey So Far

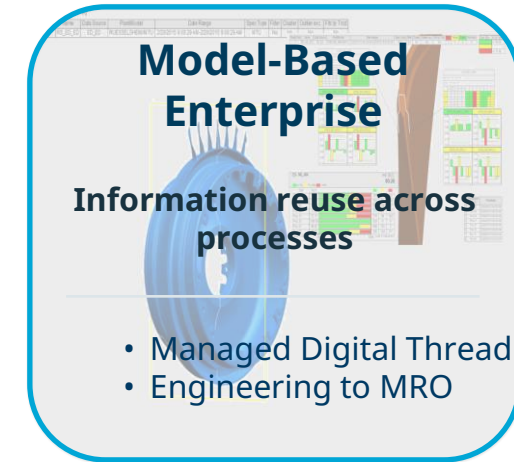
The Journey Towards a Model-Based Enterprise



STARTING POINT



FOUNDATION ESTABLISHED



CURRENT IMPLEMENTATION

MTU PROGRESS AND CURRENT FOCUS

Capabilities Established

- Digital Thread in the PLM System
- MBD method-development expertise
- PMI-based product definition
- Supplier tryout initiated

Implementation in Progress

- Expansion to MTU core components
- Supplier collaboration
- Product and software development
- Downstream process integration

Challenges to Scale

- Digital continuity e.g. CMM programming
- Semantic preservation across interfaces
- Component-specific adaptations
- Scalability across the component spectrum

What we learned on the journey to a Model-Based Enterprise

Information Reuse

Create once, reuse across the value chain.

- PMI reused downstream
- No repeated data entry
- Consistent product definition

Better Understanding

3D context reduces ambiguity and misinterpretation.

- Clear visualization
- Geometry and PMI associated
- Improved design-intent clarity

Less Rework

Model-based information reduces manual recreation.

- Less re-modeling
- Reduced CAM preparation
- Fewer version conflicts

Interoperability Matters

The challenge is preserving intelligence across systems.

- PMI semantics and structure
- CAQ / CMM interfaces
- Supplier collaboration

The value of MBE is not created in CAD. It is created when trusted information is reused across the value chain.



Benefits and opportunities

Enhancing MTU's system capabilities by implementing key functionalities for MBE is an enabler for the future in different aspects

Lifecycle management

Traceable information

No system breaks or duplicates

Machine-readable information

Automated functionalities

Single-source-of-truth

Closed-loop of information

Increased process **efficiency**

Enhanced process & data **transparency**

Better **communication & collaboration** internally and externally

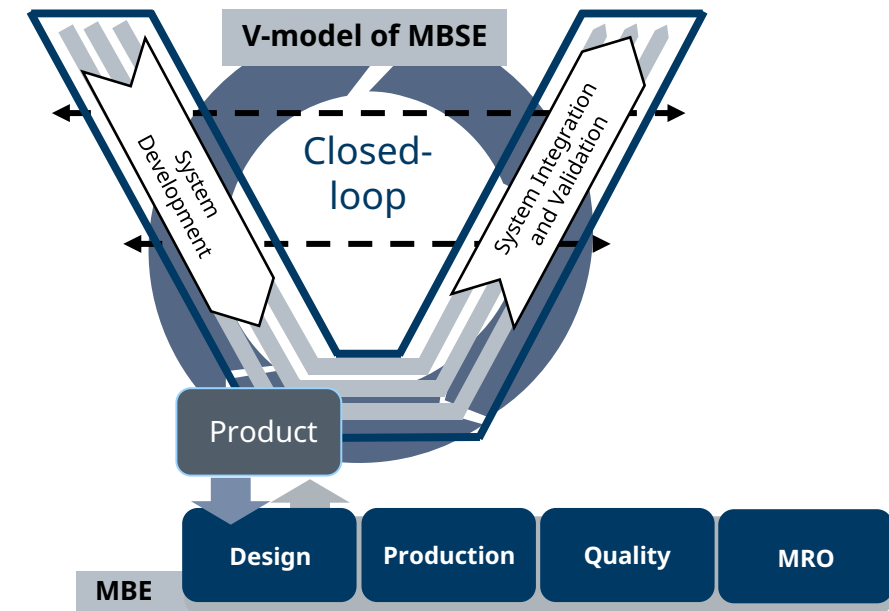
Support of **decision-making** processes and **optimization** initiatives

State-of-the-art technology and digital **eye level with partners**

Mastering complexity of products, ways-of-working and supply chains of the future

Enabler for strategic projects

Traceable and addressable data along the value chain will keep offering compelling opportunities in the future



Enabler for **Dimensional Planning and Validation (DPV)**



Establish connection to MBSE for the overarching MBE

Key Takeaways

MBD defines the product.

An intelligent 3D model with semantic PMI establishes the trusted product definition.

MBE connects the value chain.

The business value emerges when information is consumed and reused from Engineering to MRO.

Interoperability enables the ecosystem.

JT connects MTU internally. JT and STEP AP242 extend the digital thread to suppliers and partners.

Trusted. Connected. Reusable.

Engineering information across the complete lifecycle



Name

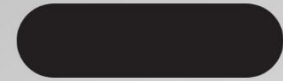
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It was a pleasure!