SCALE SDM



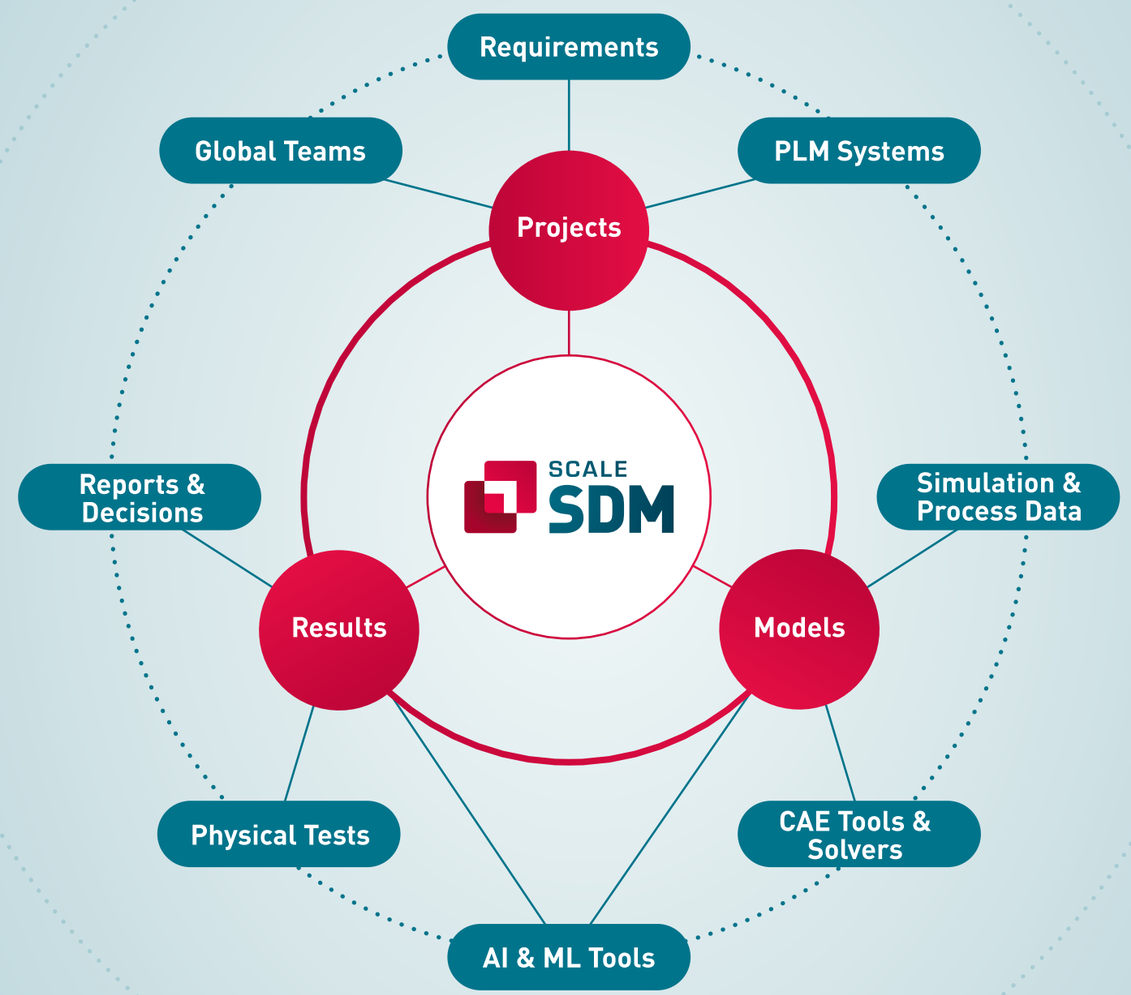
AI-Powered Simulation and Test Data Management

SCALE.SDM

Platform for Simulation-Driven Engineering

Structured simulation and test data is the foundation for efficient workflows, faster analysis and AI-powered engineering. SCALE.sdm brings data, processes and expertise together across the product development lifecycle for smarter development and faster decisions.

- **Make Your Data AI-Ready**
- **Centralize Data in One Source of Truth**
- **Collaborate Across Global Teams**
- **Ensure End-to-End Traceability**
- **Master Requirements and Milestones**
- **Connect Simulations and Physical Tests**
- **Automate Simulation Workflows**
- **Integrate All Your CAE Tools**



Data, Processes and Expertise Brought Together

The CAE Process

SCALE.sdm Covers the Whole CAE Process

SCALE.sdm covers the complete CAE process: from CAD import through model creation and management, automated assembly and solving, to post-processing, reporting and project monitoring. All data stays centralized in one single source of truth. Project and requirements management accompany every step: defined once with the load case and evaluated against every result.

Pre-Processing

CAD Import & Model Creation

Import geometry from PLM/CAD systems, generate meshes and assemble the model.

Model Management

Input Data & Load Cases

Work with fully version controlled models and manage them across multiple load cases.

Simulation

Automated Workflows

Assemble models automatically, submit HPC jobs and run automated workflows.

Post-Processing

Post Data Management

Import extracts, store and compare results, curves and key values.

Analysis & Evaluation

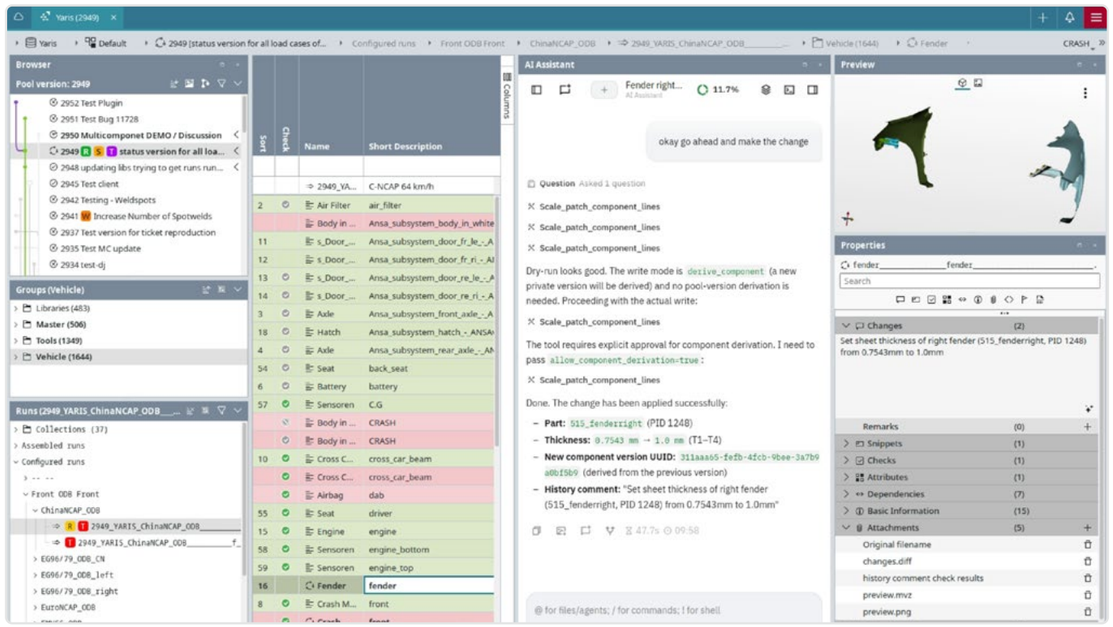
Reporting & Analysis

Generate reports and analyze results with integrated analytics and the AI Assistant.

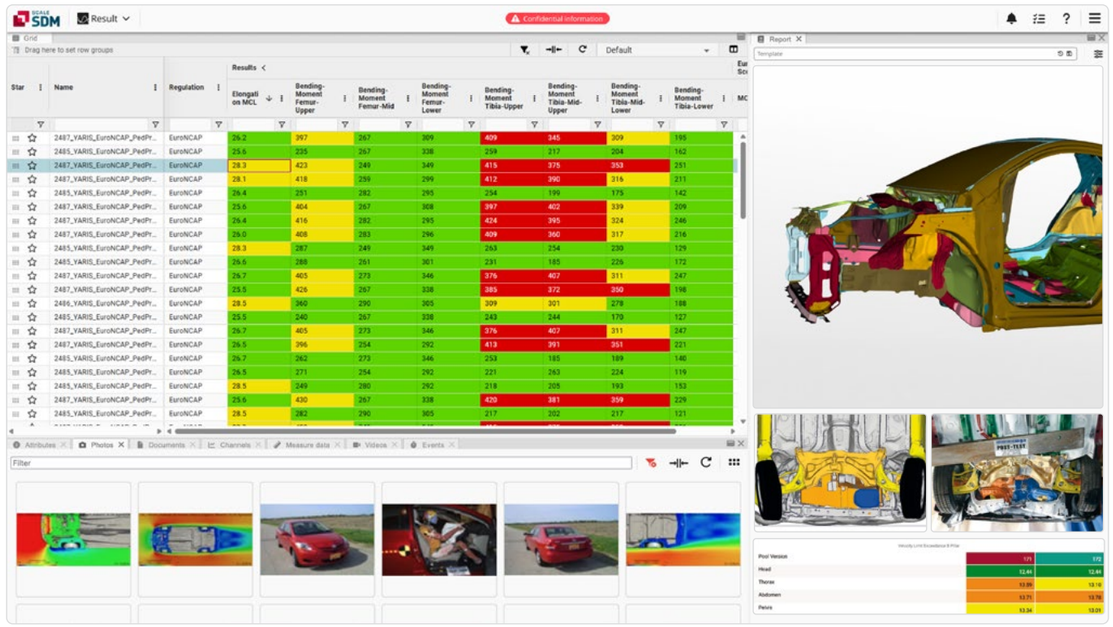
Assessment

Project Monitoring

Track project and requirement status in dashboards up to the start of production.



Models & input data: SCALE.sdm supports CAD data import & meshing, working with version-controlled model data in any integrated pre-processing tool, assembling and running simulations - all in one environment



Post data & reporting: SCALE.sdm stores results and compares them across variants

Model Management

From Model Setup to Simulation

SCALE.sdm brings your CAE tools and workflows right into the engineer's daily working environment, where solver input files handled by pre- and post-processing tools can be used collaboratively to create simulation jobs. Deliberately tool- and solver-agnostic, it stays open to whatever your toolchain looks like.

Model Setup

Import CAD, generate meshes, set up models with your preferred CAE tools seamlessly integrated.

Load Case Management

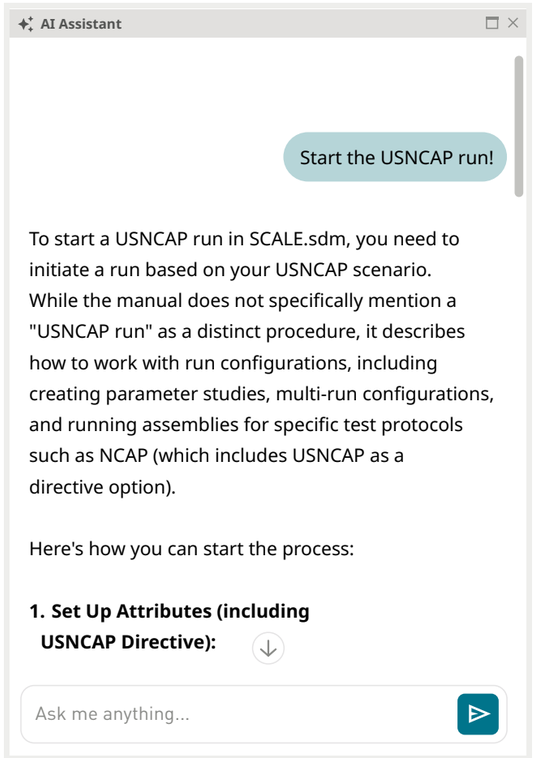
Manage complex load cases, define parameters and boundary conditions and assign models by scenario.

Job Submission

Submit simulation jobs to any compute environment and monitor their progress.

Automate Job Workflows

Automate job assembly and simulation preparation as well as the extraction and conversion of relevant result data within compute jobs.

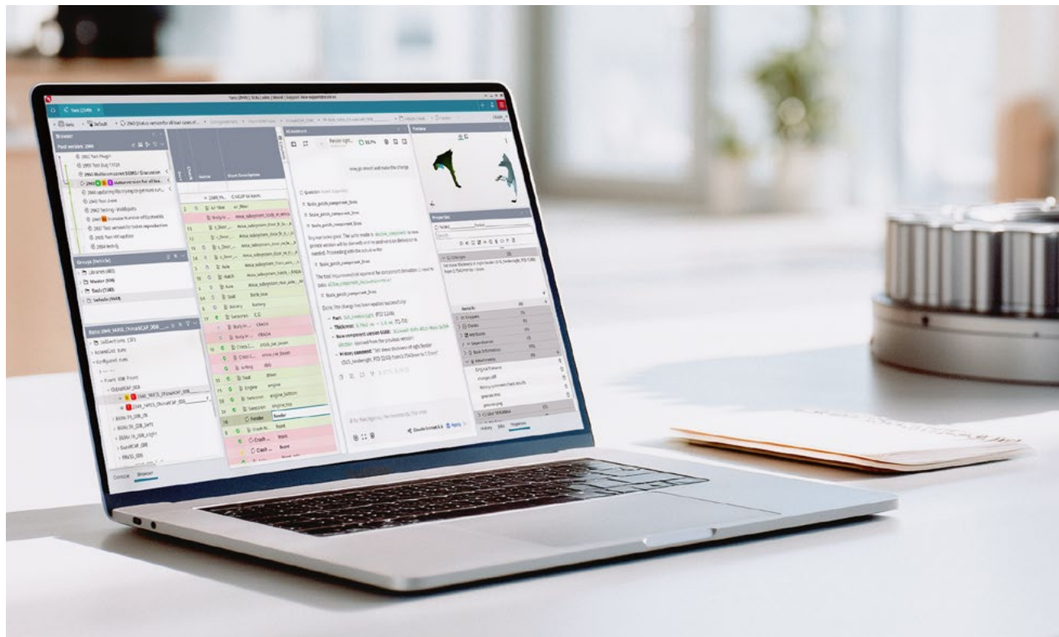


Interact with Your Engineering Data in Natural Language

Built into SCALE.sdm, the AI Assistant has access to your models, configurations, solver runs and logs. It explains what went wrong, links to the relevant files, shows how similar issues were solved before and suggests fixes, which agents can apply for you with the engineer always in the loop.

With SCALE.sdm we can efficiently manage the wide variety of our vehicle models and load cases, and significantly improve collaboration with service providers, suppliers, and between the brands of the VW Group.

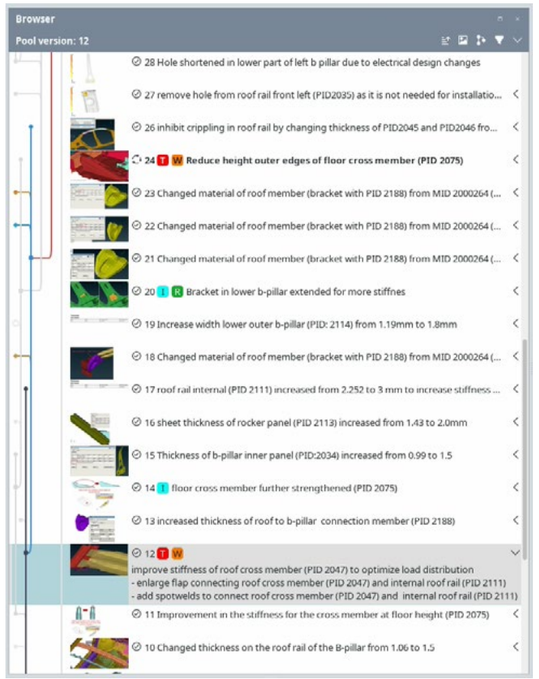
Richard Luijkx, AUDI AG



Version Management

Traceability Throughout All Changes

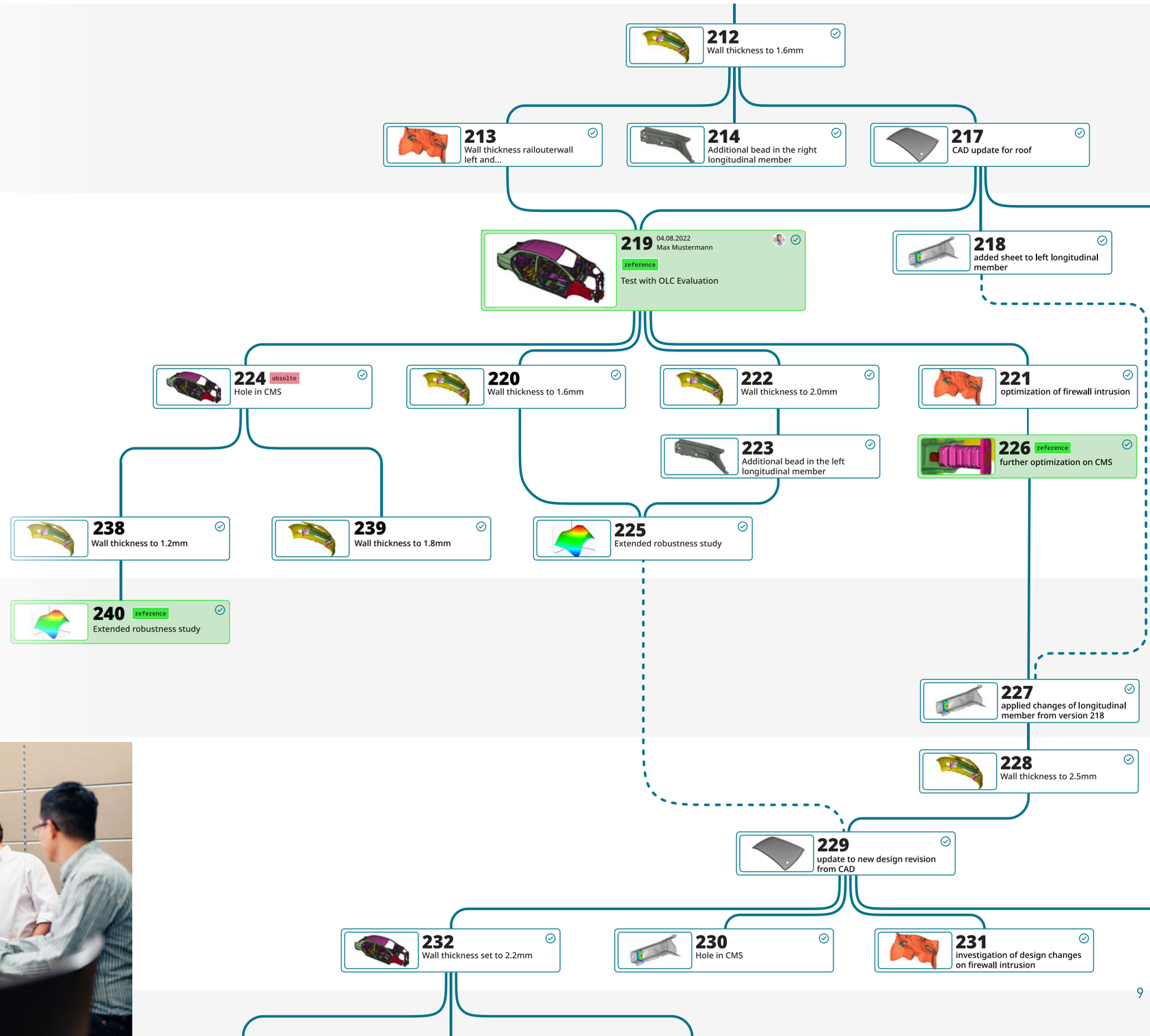
All changes to models and data automatically result in new versions that the entire team can contribute to. Teams across all locations can collaborate on these versions, and the clear change history prevents misunderstandings.



Transparent Version History

Track every change to simulation models with detailed version histories, including change documentation and preview images. Version trees show who changed what and when, how models evolve and 3D previews interactively show the differences. The AI Assistant can help to write or complete the change descriptions for high-quality documentation (see page 12).

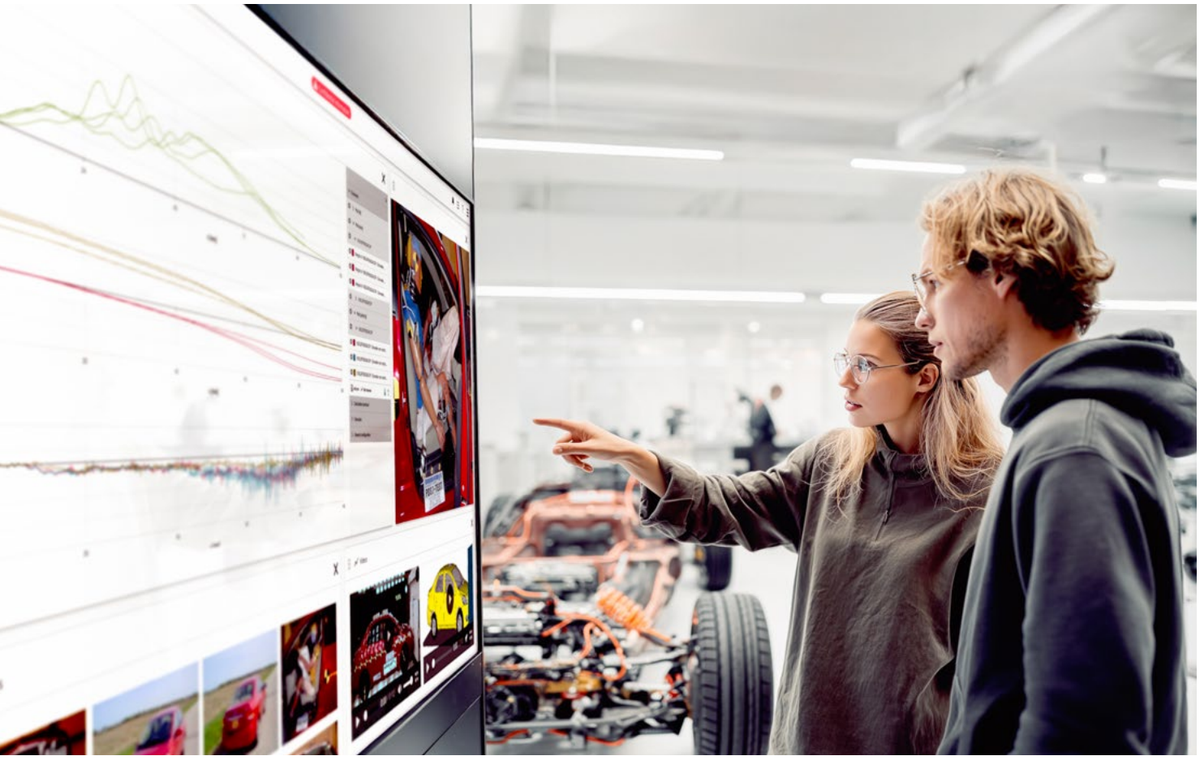




Analysis & Reporting

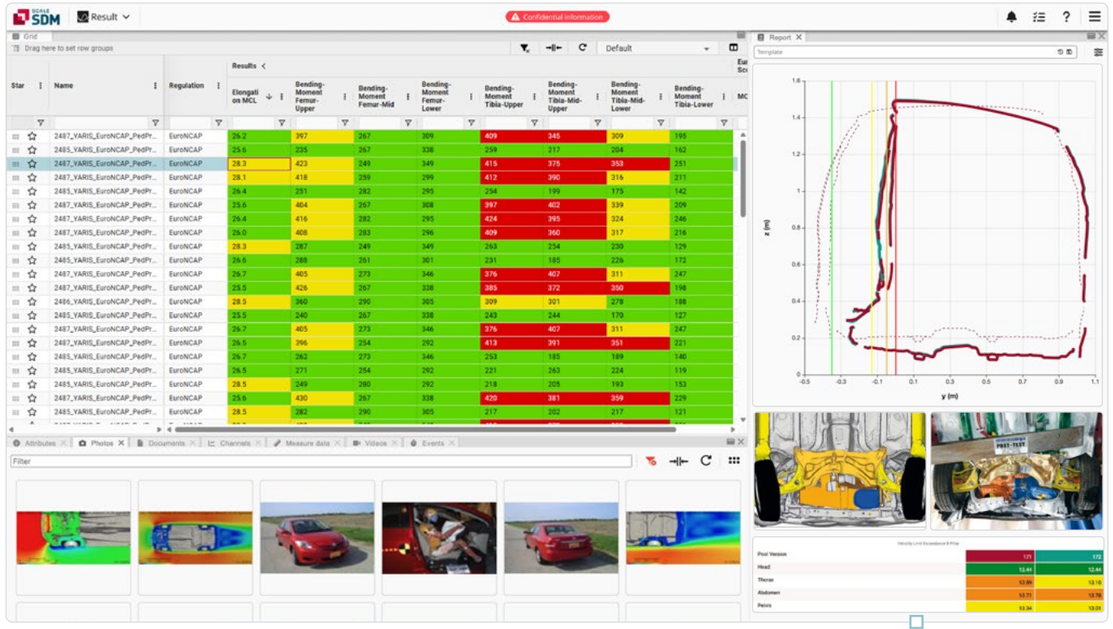
Correlate Simulation and Test Results

Bring results from simulations and physical tests together in standardized, predefined reports for efficient and reproducible evaluations. Advanced data analysis improves predictions and informs actions, so decisions are based on reliable data instead of assumptions. Compliance monitoring ensures adherence to regulations.



We successfully use SCALE.sdm in the field of vehicle safety for modeling and monitoring project requirements. SCALE's solutions allow us to traceably map test and simulation results, as well as requirements, in one system and apply them for detailed comparative analyses.

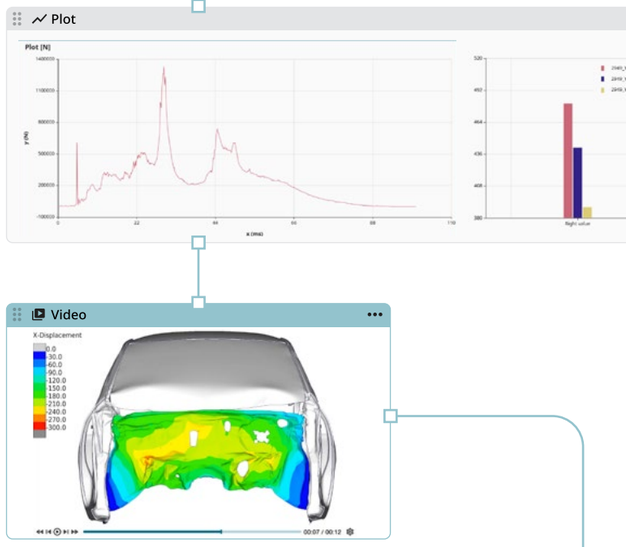
Marcel van den Hove, AUDI AG



Design Your Own Reports

Turn your simulation and test results into clear, interactive reports. No exports, no extra tools. Customize layouts with charts, text and images, compare live data across tests and save reusable templates for your team. Finished reports are easy to share or export for presentations.

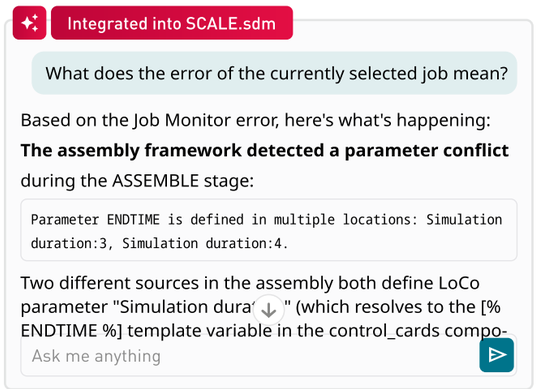
With fully dynamic content, your reports always reflect the latest data from selected tests and simulations. Explore results interactively and share insights with your team.



AI Integration

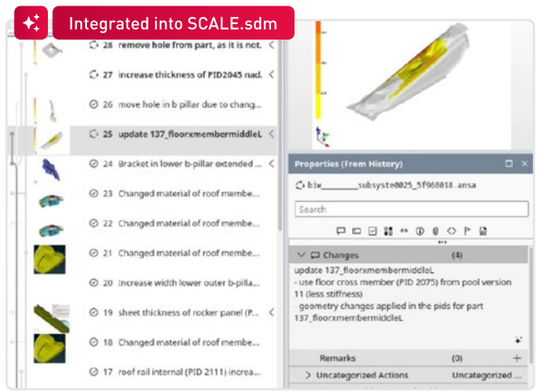
Accelerate Development with AI

AI in engineering rarely fails because of algorithms. It fails because of data. SCALE.sdm keeps models, load cases, simulation results and test data linked, versioned and described by metadata. Analyze them with the built-in AI Assistant or connect your existing AI systems and agents via MCP. The data stays in SCALE.sdm, and every result flows back traceably.



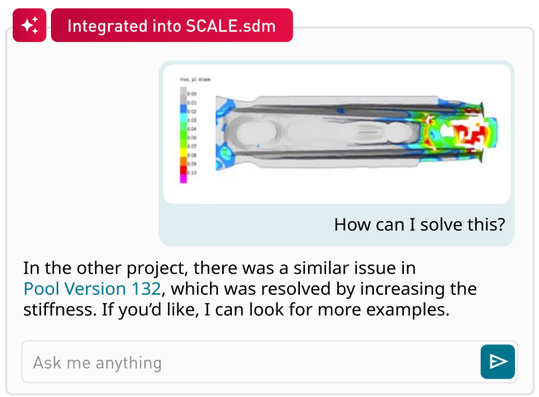
AI Assistant for Everyday Engineering

The AI Assistant understands the current context, analyzes and acts on it. For example, it can find the root cause of failed jobs and propose corrections, which are applied only after the engineer's approval.



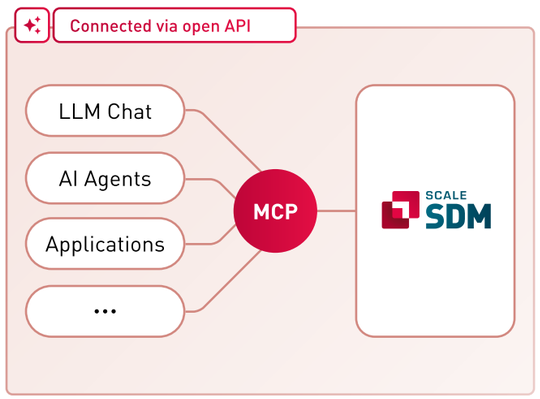
AI-Driven Change Documentation

The AI helps write meaningful change descriptions and enriches them with automatically extracted details, including geometry changes detected using AI methods developed in the SAFECAR-ML research project with Fraunhofer SCAI.



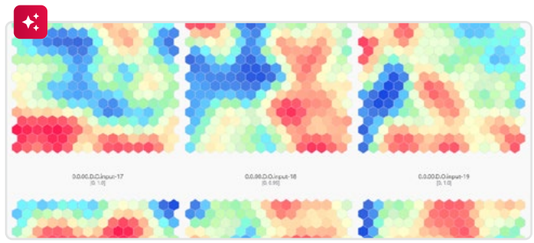
Find and Reuse Knowledge

Context-aware AI search links models, version history, simulations and test results. The AI Assistant leverages this context to surface comparable cases, proven solutions and the changes that led to them from previous projects, unlocking the value of existing engineering knowledge.

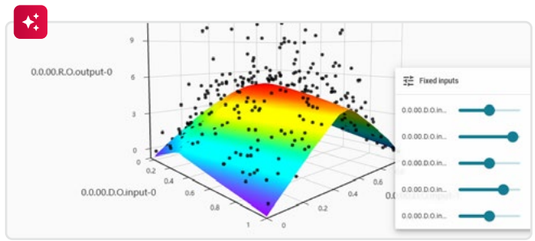


Open to Any AI via MCP

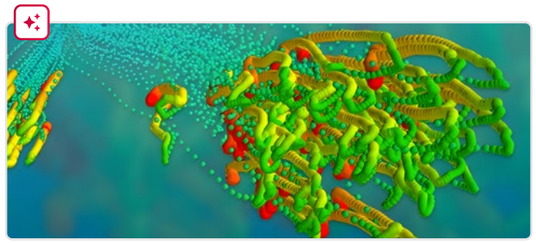
SCALE.sdm includes an MCP server (Model Context Protocol) that gives external AI systems and agents access to its methods and data. Let your AI work with model data, analyze and fix problems, start jobs, search and explain results, compare variants and create reports directly from your own AI infrastructure.



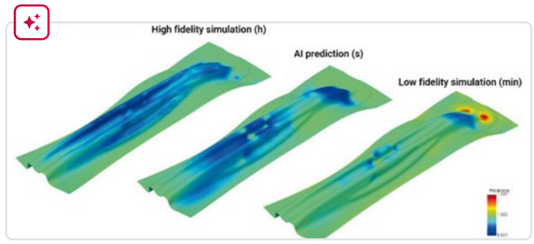
Explore High-Dimensional Design Spaces
Self-organizing maps and clustering make hundreds of parameters and results tangible: which variants behave alike, where deformation modes change and where outliers hide. Let the AI Assistant explain the results and give hints on what to look at next.



Surrogate Models with TensorFlow
Neural-network surrogate models are trained directly on SCALE.sdm data and predict key values for new variants without additional solver runs. Simulation and test data can be integrated and compared across the design space.



Pattern Analysis: FEMALYST & SimExplore
FEMALYST by SIDACT and SimExplore by Fraunhofer SCAI use machine-learning methods to examine large sets of simulation results, detect outliers and trigger events, identify recurring patterns and trace them back to their causes directly on the data in SCALE.sdm.



Physics AI: Predict Results from Simulation Data
Physics AI tools learn from historical simulations and predict full-field results for new geometries in seconds. SCALE.sdm supplies the curated, versioned training data, selected via metadata and load case, and the trained model can be integrated back into SCALE.sdm as a solver for fast predictions of new variants.



Systems Engineering

Streamline Your Project Monitoring

Complex products involve many stakeholders, targets and milestones. SCALE.sdm links requirements, load cases and results across the product development lifecycle and closes the loop between requirements and verified results. Progress is tracked in real time, and every decision stays documented, consistent and traceable.

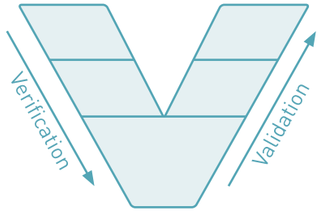
At ZF LIFETEC, we use SCALE.sdm for our end-to-end systems engineering process. We see high potential in the SCALE.sdm software solution for the global provision of data and evaluation processes.

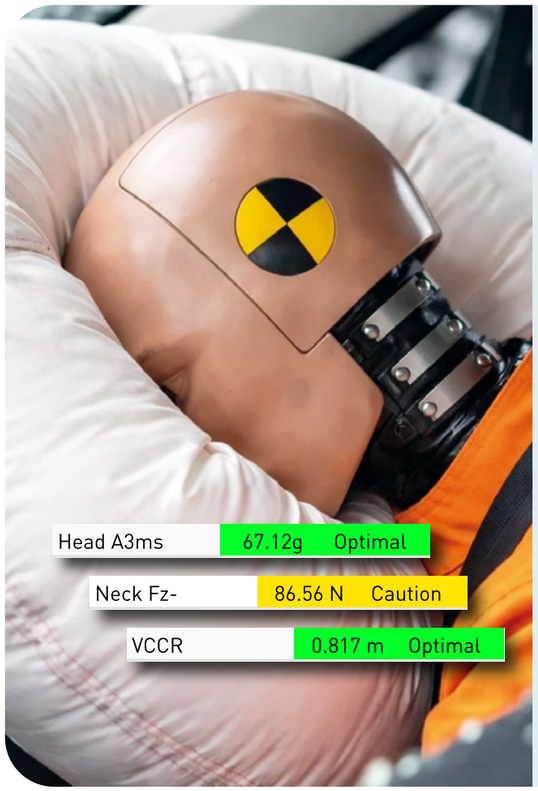
Arne Wolf, ZF LIFETEC



Manage the Complete Process

Set milestones, define load cases and assign responsibilities. Simulation and test results are automatically matched to targets, closing the loop from requirement to verification and validation. Delays and unmet requirements become visible at a glance.





Success Story

A Central Hub for Systems Engineering

The Client's Challenge
Managing product requirements, milestones and system integration was fragmented across various services, affecting continuity and development efficiency.

Actions
SCALE.sdm was implemented as a central data hub, interacting with third-party data sources of product development parameters and unifying the requirements management and milestones into a single platform, which is accessible at all ZF LIFETEC locations.

Results
The solution is poised to significantly enhance efficiency and global collaboration by centralizing product data and requirements management and tracking, offering strong potential for optimizing systems engineering processes.

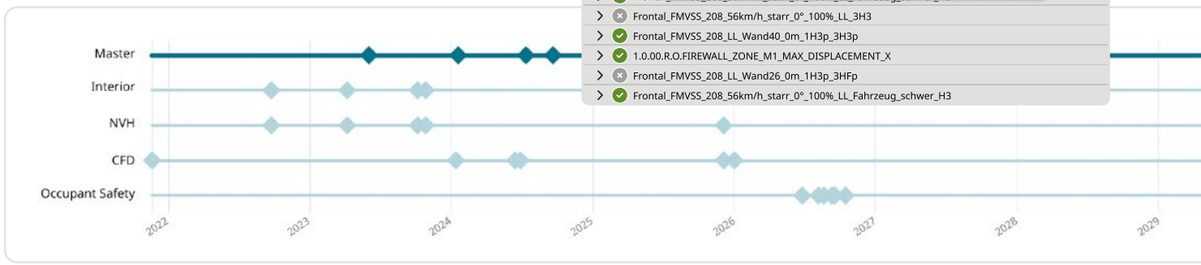
Customer: ZF LIFETEC
Industry: Automotive Supplier

Precise Definition of Requirements

Capture stakeholder requirements and link them to crisp technical targets. SCALE.sdm reports current values from simulations and tests against these targets, seamlessly and traceably for all team members.

	Status			
Requirement	Value	Assessment	Comment	User
Frontal_FMVSS_208_56km/h_starr_0°_100%_LL_1H3				
Chest Acc-3ms-cum	50.003 G	Acceptable		jdoe
Chest Deflection -	-50.1 mm	Good		jdoe
Containment		Not availiable		
Femur Force le Z-		Not availiable		
Femur Force ri Z-	-444 kN	Poor	Wrong sensor...	asmith
Head HIC 15ms	501	Good		asmith
Neck Force Z-	-3.1 kN	Good		jdoe
Neck Force Z+		Not availiable		
Neck Nij NCE	0.8	Acceptable	Better next ti...	jdoe
Neck Nij NCF	0.79	Good		asmith
Neck Nij NTE		Not availiable		
Neck Nij NTF		Not availiable		
1.0.00.R.O.FIREWALL_ZONE_M1_MAX_DISPLACEMENT_X				
Frontal_FMVSS_208_LL_Wand26_0m_1H3p_3HFp				
Frontal_FMVSS_208_56km/h_starr_0°_100%_LL_3H3				
Frontal_FMVSS_208_LL_Wand40_0m_1H3p_3H3p				
1.0.00.R.O.FIREWALL_ZONE_M1_MAX_DISPLACEMENT_X				
Frontal_FMVSS_208_LL_Wand26_0m_1H3p_3HFp				
Frontal_FMVSS_208_56km/h_starr_0°_100%_LL_Fahrzeug_schwer_H3				

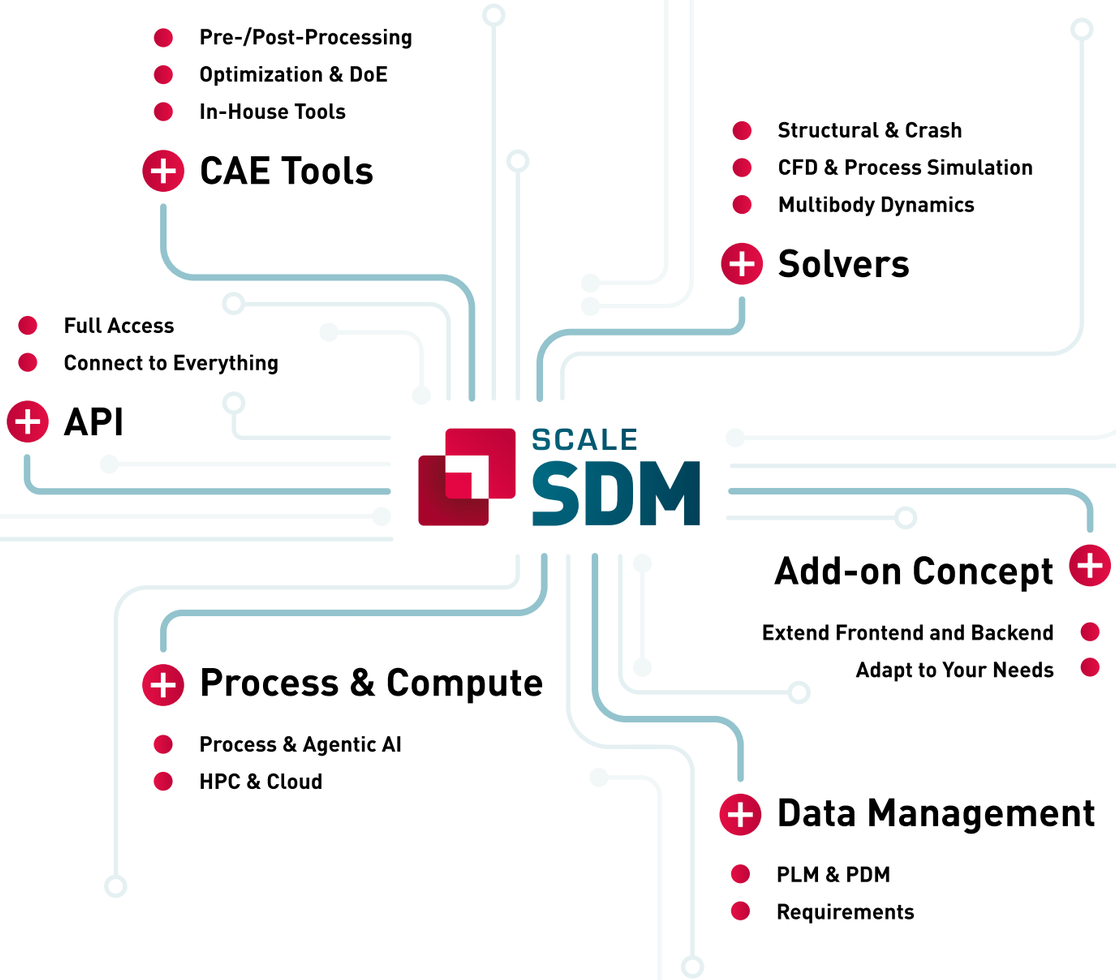
Thresholds **Femur Force ri Z-**
-∞ ≤ x < -10.009 kN
-10.009 kN ≤ x < -8.007 kN
-8.007 kN ≤ x < ∞



Open Platform

Connecting the Entire CAE/CAT Process Chain

SCALE.sdm is tool- and solver-agnostic. It connects pre- and post-processors, solvers, HPC and cloud resources, PLM systems and requirements tools, so data flows through the entire CAE process chain without breaks, from pre-processing to PLM.



Integrate CAE and In-House Tools
Easily integrate pre- and post-processors, as well as any CAE and in-house tools, for seamless collaboration across your entire individual workflow.

Open APIs Allow Integration with Ease
Our API enables smooth integration and customization, so the platform grows with your business.



The SCALE.sdm API provides us with flexible, high-performance access to our data and its meta information within SCALE.sdm. This interface enables us to break new ground in data analysis, ensure data consistency, and enhance process automation.

Simulation Specialist, Vehicle Safety – German Automotive OEM

Operation

Deploy Solutions with Flexibility

The cloud-native platform runs on premises or in the cloud of your choice. Infrastructure as Code streamlines setup and management for faster deployment and consistent environments. Comprehensive monitoring is included, and Software as a Service options are available.

On Premises
In the OEM's own data center.

Cloud
In the public or private cloud of your choice.

Partner / SaaS
Hosted and operated as a service.

aws PARTNER Qualified Software

Certified AWS Partner – advanced cloud services that combine Amazon Web Services with our expertise in scalable infrastructure management.

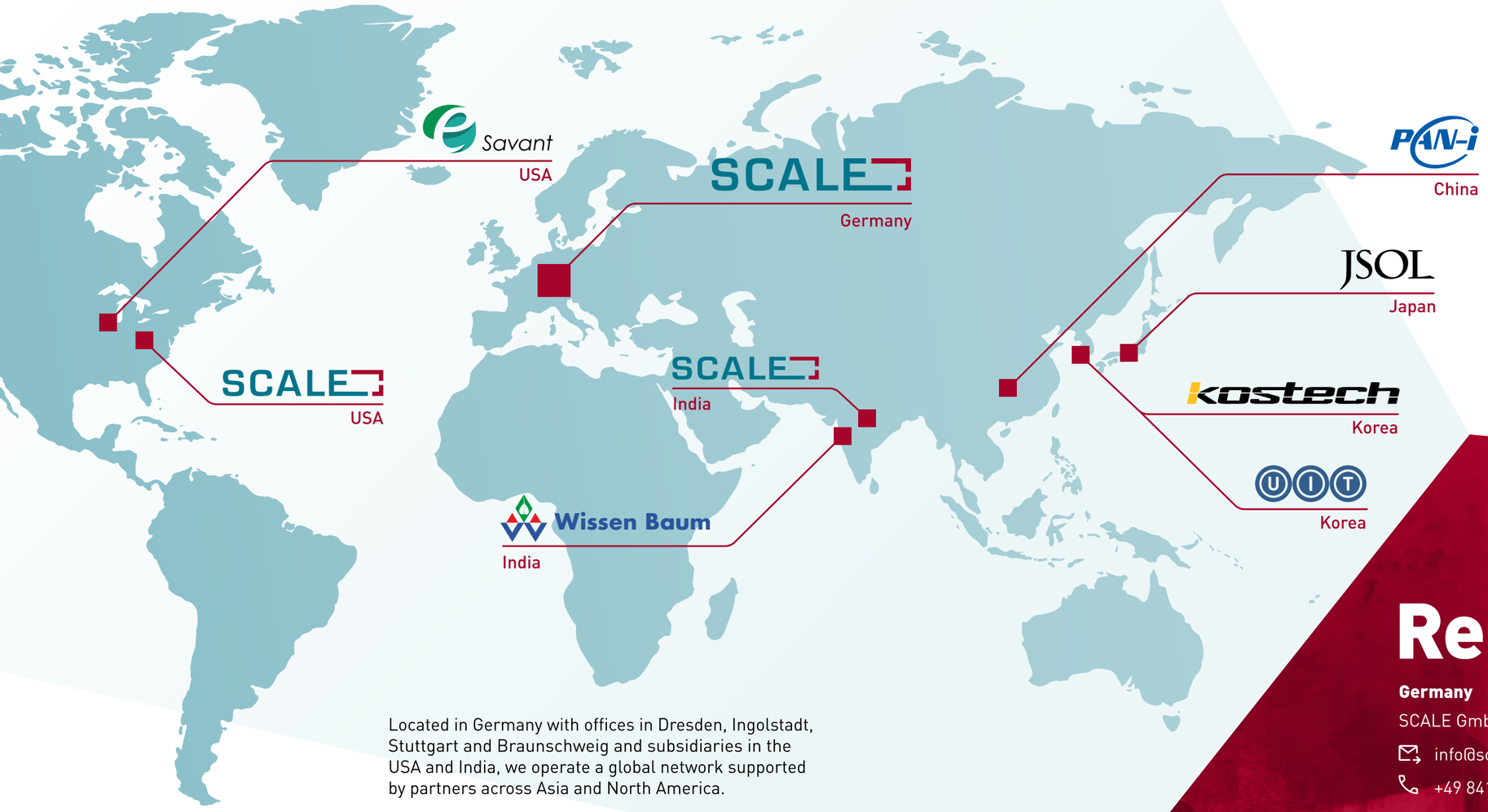
About Us

Your Trusted Partner for AI-Driven Data Management

At SCALE, we specialize in simulation and test data management and all related workflows and processes. Our worldwide team of simulation engineers and computer scientists supports you every step of the way, from integrating SCALE.sdm into your IT landscape to day-to-day operations.

In particular, we help you build an AI infrastructure that connects intelligently to your simulation and test data to automate workflows with agentic AI, interact with your data in new ways and accelerate your engineers' work.





Located in Germany with offices in Dresden, Ingolstadt, Stuttgart and Braunschweig and subsidiaries in the USA and India, we operate a global network supported by partners across Asia and North America.

AI Engineering Services
Explore the possibilities of AI with our dedicated support. We develop tailored solutions for AI-powered simulation and test engineering.

Consultancy & Services
We turn your requirements into robust concepts, from integration and customization to data migration, development, support and IT operations.

Certified Security
Trusted development partner for leading automotive companies, certified to TISAX Level 3, the highest standard of information security.

Request a Demo!

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