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Siemens Digital Industries Software

## Simcenter 3D in a managed environment

Providing full traceability of simulation work and data in a product development context

### Solution benefits

- Deliver results faster by standardizing and automating simulation processes
- Support the increasing volume and complexity of simulation work by managing data and processes
- Reduce time to find data and enable greater re-use of work
- Increase confidence in your simulations with complete traceability from requirements through design and validation
- Provide visibility into the simulation process and results for program management and downstream operations
- Minimize implementation costs and risk by leveraging the proven Teamcenter platform as your common infrastructure solution

Simcenter™ 3D software can be used in a managed environment with Teamcenter® software for integration. When Simcenter 3D is used with Teamcenter integration, you can create, store and access your product simulation data in a Teamcenter database. It combines the power of Simcenter 3D in multiphysics modeling with the power of Teamcenter in storing and retrieving data in a controlled fashion.

In the Teamcenter solution for simulation process management data model, the idealized part file, the finite element method (FEM) file and the simulation file are stored as separate item revisions with defined relationships to the master part and to each other. This allows for full traceability of simulation work and data in the context of product development.

### Simulation process management support

Simulation process management is a Teamcenter packaged software solution that enables you to track and manage finite element analysis (FEA) data.

# Simcenter 3D in a managed environment

Using this data model and datasets, you can:

- Track item revisions for FEM and simulation files. When you create a new FEM or simulation, specify the number, name and revision
- Create an FEM and simulation on a locked master part
- Perform where-referenced queries on simulation data in Teamcenter. For example, you can find all simulations defined for a specific master part
- Create computer-aided engineering (CAE) data item revisions and edit their data relationships in the CAE manager in the Teamcenter client
- Create and manage CAE model structures in the CAE manager in the Teamcenter client and open those model structures in pre- and postprocessing as assembly FEMs

## Providing end-to-end traceability and time savings

Data authored with Simcenter 3D can be seamlessly captured and managed with Teamcenter software for simulation process management. The out-of-the-box CAE data model is used to capture and manage idealized parts, finite element models, simulation files, input decks, results and reports. All Simcenter 3D data is stored in the database with relationship links, thus providing traceability from a product all the way to the associated simulation results. Using the powerful search capabilities, analysts can quickly find simulation data based on attributes and relationships, thus eliminating rework and overhead in organizing and finding data.

## Leveraging structure management and automation

Assembly FEMs authored with Simcenter 3D can be managed in Teamcenter solutions for simulation process management along with complete traceability at the component, subassembly and assembly levels. Using automation capabilities, assembly FEMs can be automatically generated from a computer-aided design (CAD) assembly with automatic filtering of parts and re-use of any existing FEMs, which significantly speeds up the model build process.

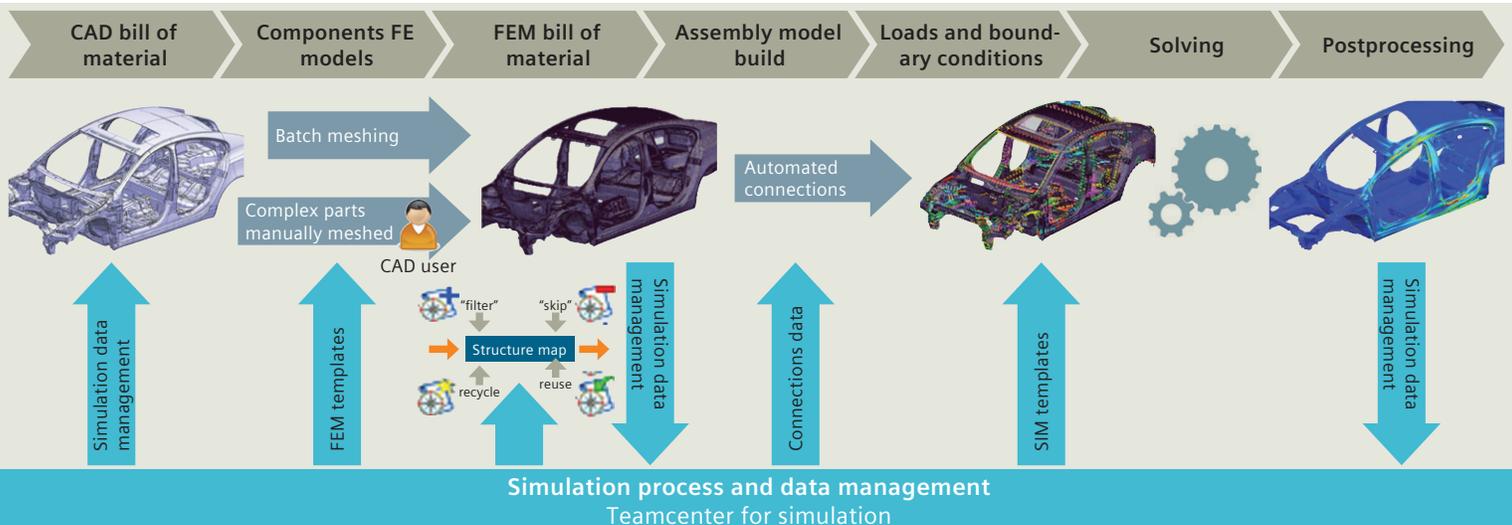
## Effectively managing large amounts of data

### Selective download of solution files

A CAE solution dataset may contain multiple results files and other solver-related files in addition to the simulation file. These files can be large, so to improve download times you may prefer not to download them every time the simulation file from Teamcenter is opened.

### Providing increased confidence and timely delivery of results

Simcenter 3D provides the ability to generate simulations and results with lightweight the JT™ data format representation. This enables analysts and other parties to visualize product data in Teamcenter without having to launch Simcenter 3D. This provides a framework from which CAE results and related reports can be communicated across the enterprise. Providing clearly traceable outcomes along with process efficiencies facilitates increased confidence and timely delivery of results.



**Industry applications**

Efficiently manage industry-specific CAE simulation processes, data, workflow and share them with all decision-makers to better understand product performance and deliver highly successful products faster.

**Automotive and transportation**

Original equipment manufacturers (OEMs) and supplier engineering organizations need to handle simulation data for an increased number of product variations and configurations to be designed, engineered and manufactured around the globe. As an example, simulation data management enables engineering teams to manage the body-in-white (BIW) CAE model build process, automate solves and generate reports. You can also effectively manage knowledge transfer of core product development processes and methods across global sites. Benefits include increased re-use of models, traceability and quality through standardization.

**Aerospace and defense**

Aerospace companies work in globally distributed environments that necessitate efficient collaboration across teams, OEMs and suppliers. As an example, the aerostructure development process involves managing the integration of global and local models coming from different teams. Additionally, product development data needs to be securely stored for a long time. By capturing technical performance verification and providing continuous access to verified data, the simulation process and data management create a collaborative development environment, including suppliers and partners worldwide. Access to the latest and most accurate information has been demonstrated to

simplify processes, minimize post-design changes and rework and ensure deployment of best practices, which can boost program efficiency.

**Marine**

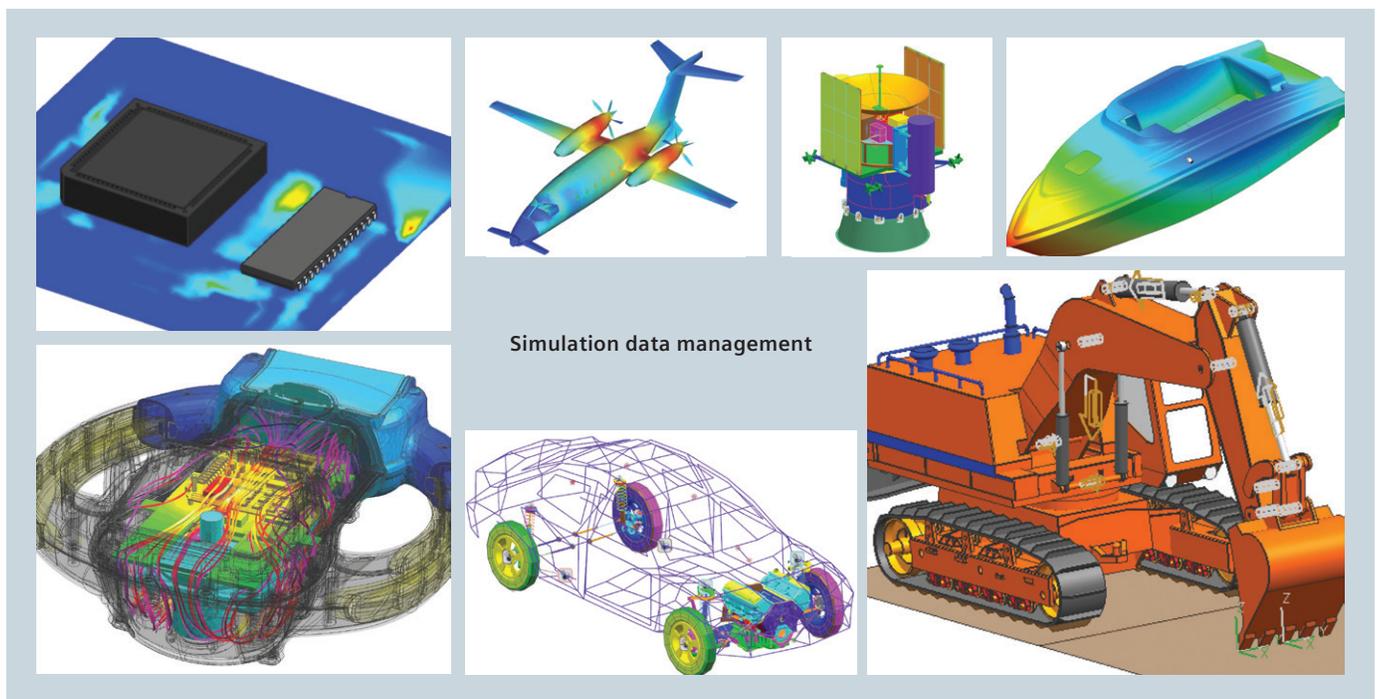
The marine industry also works with complex structures and can benefit from using simulation data and process management to ensure fast and secure implementation of product upgrades and modifications.

**Industrial machinery and heavy equipment**

Companies in agriculture, mining and other heavy equipment manufacturing as well the rotating machinery industry share many of the same needs as companies in the automotive and aerospace industries. As such, simulation data and process management are critical needs in these industries. Predicting performance using advanced multidisciplinary simulation techniques and managing requirements to ensure that all downstream design-manufacturing implications are considered during the early stages of product development requires an open product lifecycle management (PLM) system that is capable of handling CAE data from multiple tools.

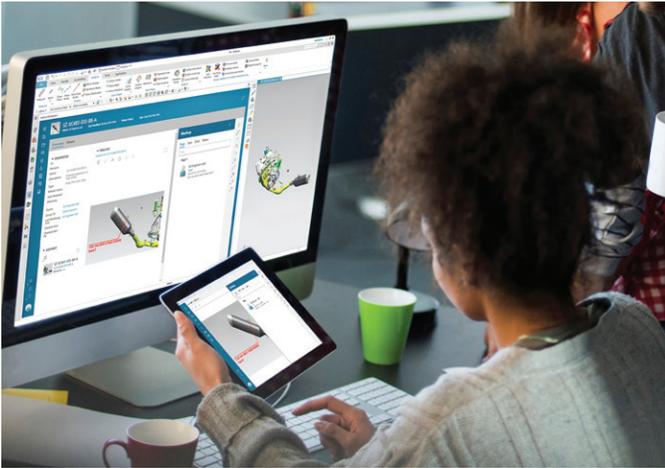
**Consumer goods**

Sporting goods and toy companies want to deliver personalized products and highly customized design by adopting new methods and materials across the value chain. From design through manufacturing, access to the latest simulation data is paramount for fast moving consumer goods companies to develop the right product, on time the first time.



# Embedded Client

Embedded Client provides global integrated synchronized management of all product and simulation data, comprehensive knowledge of the best process, for the complete aspects of product development from requirements through manufacturing.



## Module benefits

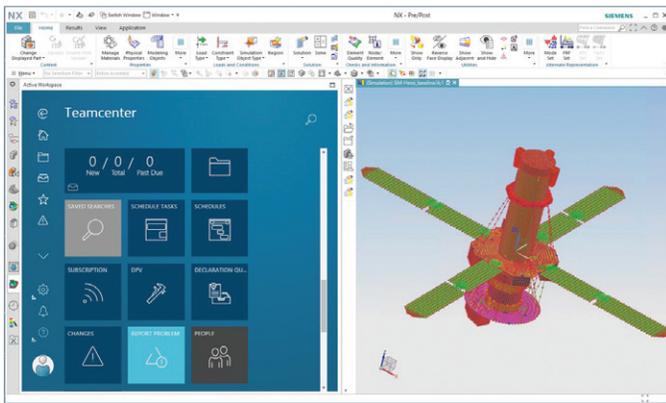
- Manage and accelerate design/simulation collaboration for any size engineering team
- Provides seamless management, control and security for your design and simulation data
- Search rapidly for designs and simulations, manage data revisions, manage product configurations and changes to those product configurations in single or multi-site deployments.
- Access instantly live global product/simulation information
- Manage successfully your most precious asset – product and simulation knowledge

## Key features

- Assembly Digital mock-up & multi-CAD
- Teamcenter Navigator:
  - Quick intuitive Teamcenter navigation and searches let you rapidly find the right data to load into the NX/Simcenter 3D session
  - Data for CAM, CAE, routing and mechatronics
- Embedded Active Workspace:
  - Extended access to PLM data: design datasheet, design BOM, where used, MS Office documents, classification, images, requirements
  - Cross-probing to NX navigators and graphics
  - Access to the inbox, submit to workflows

# Simulation Author

This product provides a complete solution to manage simulation data, processes and tools (Simcenter 3D and others) in context with the product data. This product provides additional capabilities for managing Simcenter 3D data beyond what is included in Embedded Client software (refer to capabilities chart).



## Module benefits

- Removes overhead of organizing and managing simulation data
- Provides end-to-end traceability of simulation data
- Eliminates rework through re-use of existing data
- Improves the efficiency of the model build process through automation and re-use
- Provides a collaborative environment in which simulation tasks can be distributed and executed
- Increases the confidence in the simulation results

## Key features

- Simulation data and lifecycle management
- Simulation structure management and automation
- Simulation tool and process management
- Simulation results visualization and reporting

# Capabilities chart

General capabilities	Specific capabilities	Embedded Client	Simulation Author
Simulation data and lifecycle management	Perform lifecycle operations (create, revise, update, delete etc.) of CAE data from Simcenter 3D GUI	•	•
	Perform lifecycle operations (create, revise, update, delete etc.) of CAE data from Teamcenter GUI		•
	Access to CAE manager application for navigation of CAE data		•
	Access to and management of key performance indicator (KPI) table		•
	Out of date model and out of date analysis detection in Teamcenter		•
	Recipe based creation of multiple CAE objects through CAE packages		•
	Monitor status of models and analysis (attributes, files, and variants) through simulation Dashboards		•
Simulation structure management and automation	Manual creation of AFEMs from Simcenter 3D GUI and capture them in the database	•	•
	Manual creation of AFEMs from Teamcenter GUI		•
	Compare AFEM with CAD structure for changes and update (Inspector)		•
	Compare AFEMs (CAE BOM compare)		•
	Automatic generation of AFEMs from CAD structure with reuse of models (through structure maps)		•
	Automated model creation through execution of Teamcenter workflows		•
Simulation tool and process management	Execute meshing and run solver on local machine through Simcenter 3D GUI	•	•
	Perform batch meshing from Teamcenter using Simcenter 3D on local, server or remote (HPC) machines		•
	Perform solver execution from Teamcenter on local, server or remote (HPC) machines		•
	Monitor the progress of jobs (batch meshing or solver)		•
Simulation results visualization and reporting	Access to CAE Manager application for JT visualization of CAE data		•
	Generate CAE JT files from Simcenter 3D GUI	•	•
	Generate CAE JT files from native result files in batch from Teamcenter through an NX Open utility		•

**Legend:**

• = included in module

+ = additional product required

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