

SCALE.sdm

Software Solution for Management of Simulation Data

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Overview



Introduction SCALE.sdm

- Software modules
- Key Features
- Unique selling points



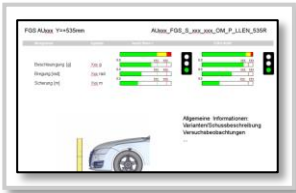
Decentralization of Vehicle Development

- Integration of suppliers and engineering providers
- Connecting multiple locations
- Version management



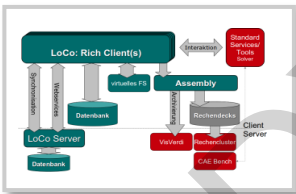
Graphical User Interfaces

- CadMe - Distributed Meshing Processes
- LoCo - Workbench for simulation engineers
- CAViT - Post data management



Result Assessment

- Access to simulation and test data
- Evaluation, comparison, visualization
- Report generation



Adaption and Customization (*open system*)

- Configuration
- Process integration (*support for solvers and CAE-disciplines*)
- Integration with existing IT-environments / 3rd party software
- Operation

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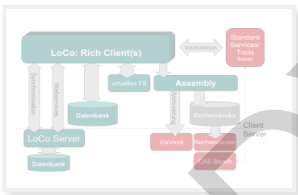
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- LoCo - Workbench for simulation engineers
- CAViT - Post data management - GUI Overview



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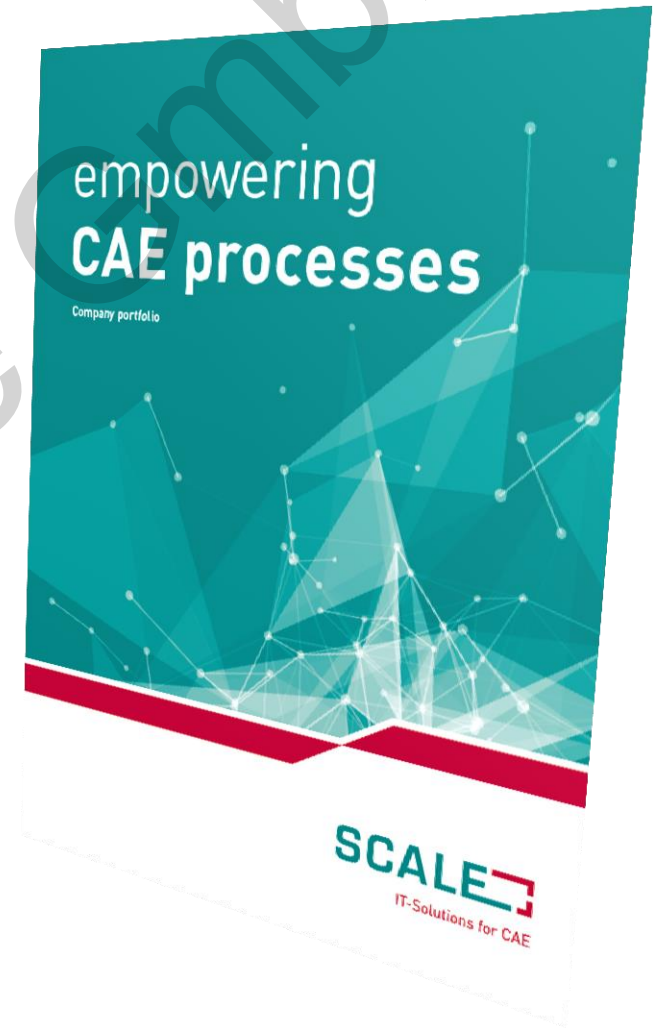


Adaption and Customization (*open system*)

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SCALE GmbH – IT Solutions for CAE

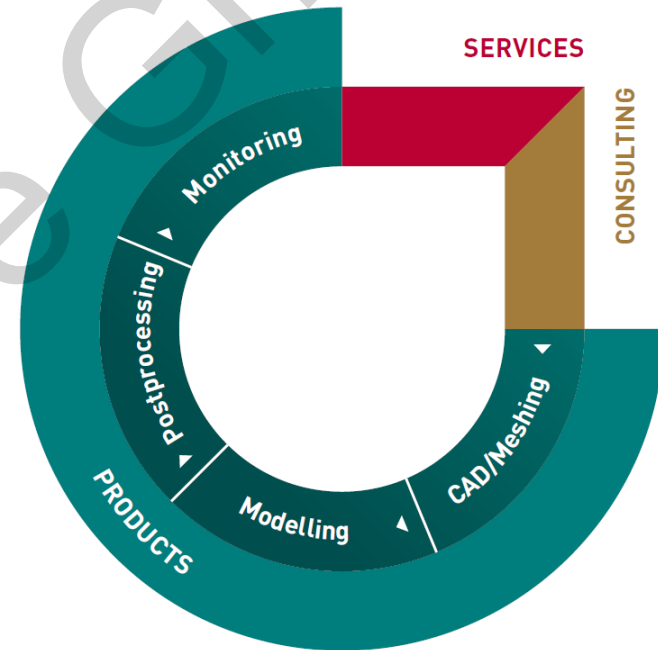
- Start of SCALE GmbH at 2014-09-01
- SCALE is a 100% subsidiary of DYNAmore
- Currently ~35 people (engineers and computer scientists), dedicated to „CAE process-, and data management“
- Offices in Germany
 - Stuttgart
 - Ingolstadt
 - Dresden (Software development)
- SCALE stands for "Scalable Solutions in Simulation Data and Process Management"



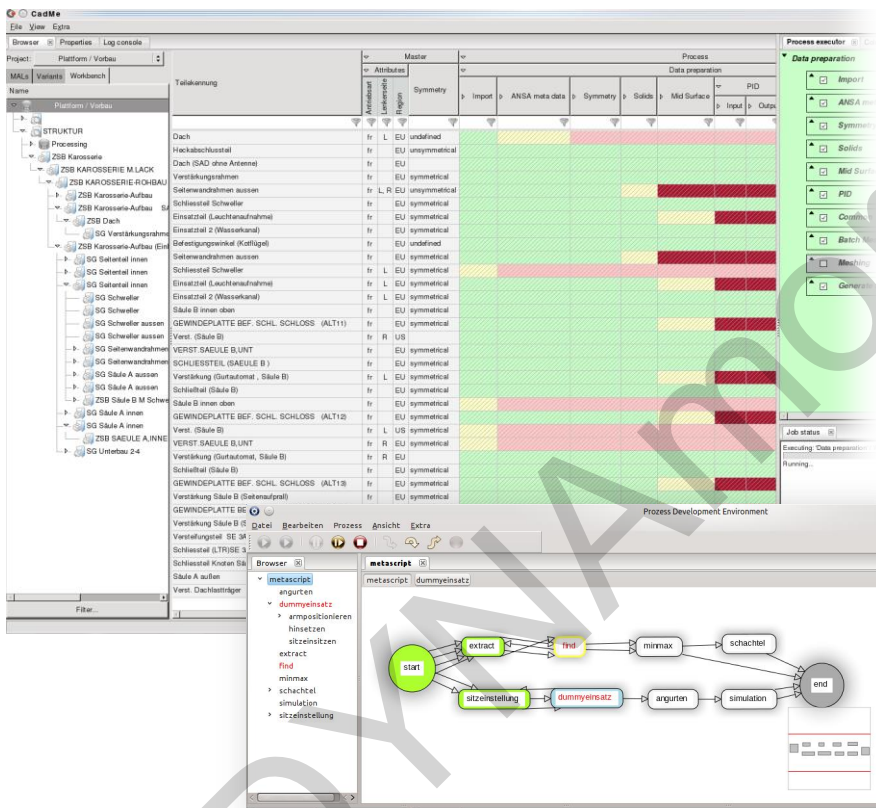
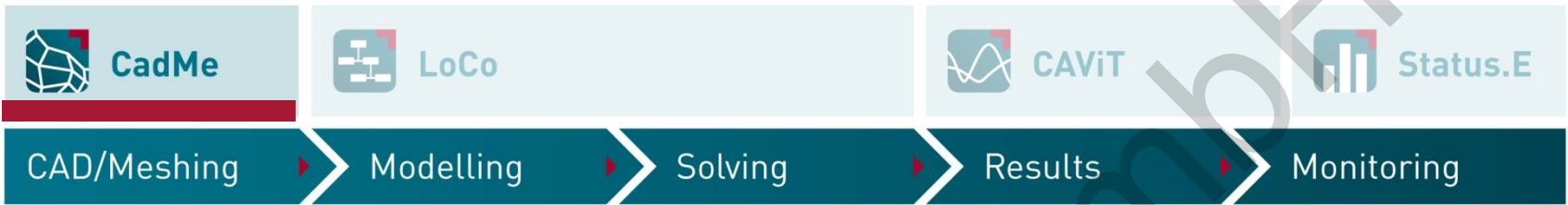
SCALE GmbH – IT Solutions for CAE

Portfolio

- Standard software solutions for CAE process und data management
- Individual software projects on customer order
 - Requirement analysis
 - Consulting
 - Conceptual design, planning
 - Specifications
 - Implementation and project management
- FEM methods and processes
- Staff at SCALE are a mix of experienced CAE engineers and professional computer scientists



SCALE.sdm: Components



■ CAD Interface

- Update and check of new CAD-versions with meshed parts

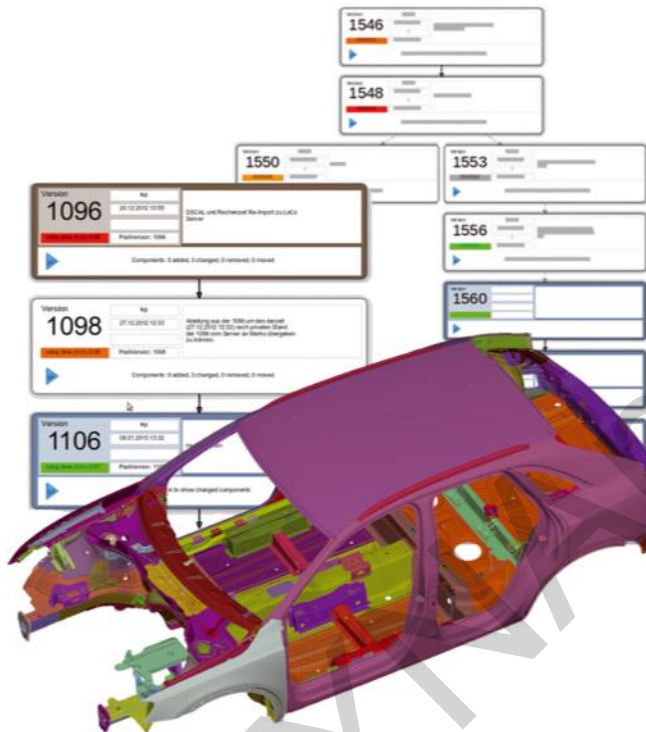
■ Meshing Process

- Support of meshing process
- Provision of data
- Flexible adaptable process
- Integrated tools for process modeling
- Integration of preprocessors (*ANSA, Hypermesh, ...*)

■ Data Management

- Synchronization of work flow for all participants (*internal and external*)
- Changes appear instantly for all team members
- Role and right management

SCALE.sdm: *Components*



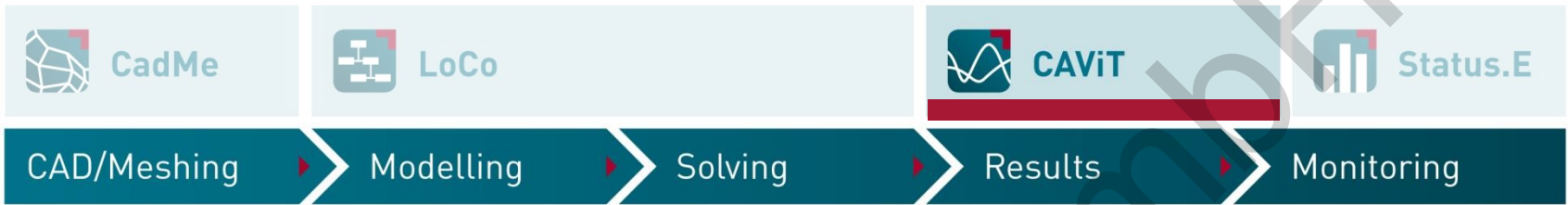
■ Simulation Data- / Variant Management

- Workbench for Simulation Engineers
- Unique RichClient/Offline-concept with sync-mechanism (*internal/external*)

■ Workflows / Features

- Integration of arbitrary CAE processes
- Solver: PAM-Crash, LS-DYNA, Nastran, Abaqus, ...
- Job submit and monitoring
- Optimization, robustness, DOE, ...
- Quality checks of models
- Advanced security features
 - Two factor authentication
 - Encryption
 - Sophisticated roles and rights management
- Distributed, collaborative work environment
-

SCALE.sdm: Components



The screenshot shows the SCALE.sdm software interface. On the left, there are panels for 'Projekte' (Projects), 'Szenario' (Scenario), and 'Darstellung' (Display). The 'Projekte' panel shows a list of projects with columns for 'Projekt', 'CBII', 'VV', 'CBII', and 'VV'. The 'Szenario' panel shows a tree view of scenarios like 'Europa', 'NAR', 'Japan', etc. The 'Darstellung' panel shows a 'Zeitstrahl' (Timeline) with 'Darstellen' (Display) checked. The main area is a 'Tabelle' (Table) with columns: 'Tag', 'Projekt', 'Testname', 'Direktive', 'Bearbeitungs-Status bzw. release level', and 'Head'. The table contains several rows of test results, with some rows highlighted in yellow and green. Below the table, there is a 'Zeitstrahl' (Timeline) showing 'Project 10', 'Project 13', and 'Project 17' with dates and milestones.

Tag	Projekt	Testname	Direktive	Bearbeitungs-Status bzw. release level	Head
	Project 17	Test 184	FMVSS208	CARRIED_O	324.7
	Project 17	Test 192	FMVSS208	CARRIED_O	
	Project 17	Test 199	FMVSS208	CARRIED_O	587.7
	Project 17	Test 173	FMVSS208	CREATED	337.8
	Project 17	Test 175	FMVSS208	CREATED	
	Project 17	Test 176	FMVSS208	CREATED	479.0
	Project 17	Test 177	FMVSS208	CREATED	352.3
	Project 17	Test 178	FMVSS208	CREATED	420.7
	Project 17	Test 179	FMVSS208	CREATED	316.8
	Project 17	Test 180	FMVSS208	CREATED	
	Project 17	Test 182	FMVSS208	CREATED	
	Project 17	Test 183	FMVSS208	CREATED	494.7
	Project 17	Test 188	FMVSS208	CREATED	414.7
	Project 17	Test 191	FMVSS208	CREATED	

■ Post Data Management

- Procurement and provision of outcome data from **simulation** and **experiment**
- Comparison and visualization of simulation and experimental data

■ Features

- Assessment of simulation and experimental results (*szenario based*)
- Easy integration of any application and processes (*Plugins for e.g. Animator, Falcon,..*)
- Automatic report generation
- ...

SCALE.sdm: Components



CadMe



LoCo



CAViT



Status.E

CAD/Meshing

Modelling

Solving

Results

Monitoring

■ Requirements Management

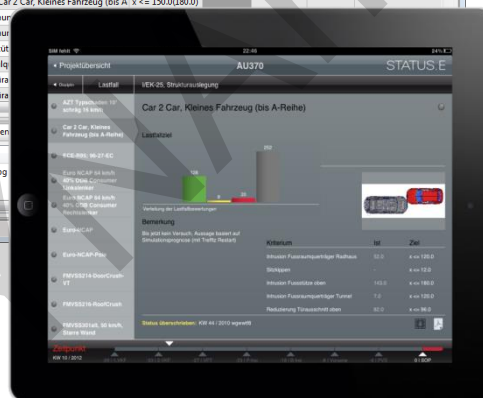
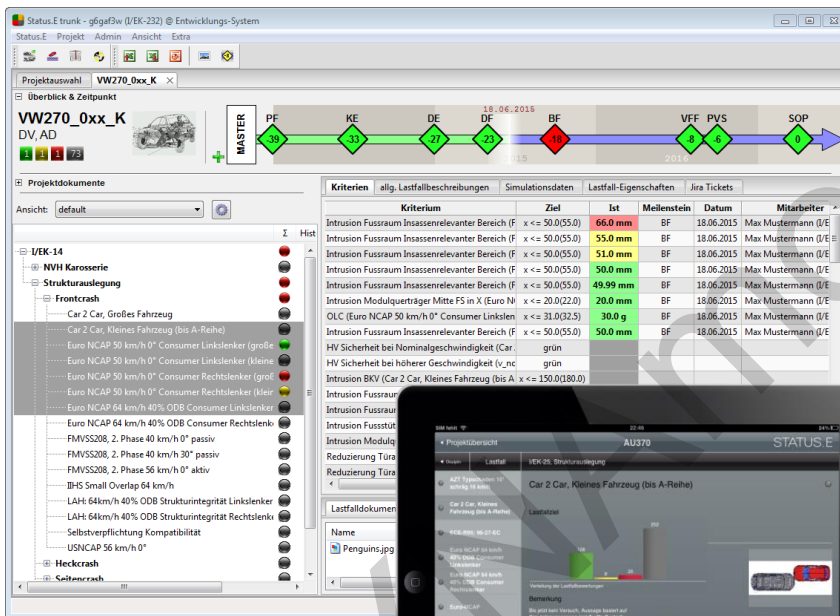
- Management of project and milestone specific Requirements
- Automatic generation of specifications
- Change management

■ Status Monitoring

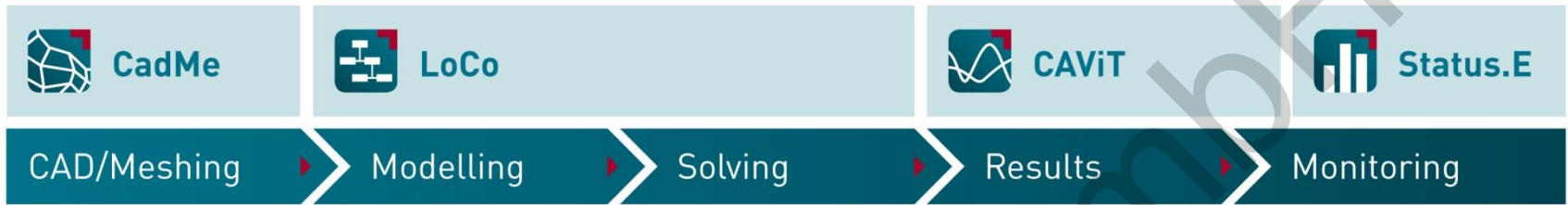
- Monitoring of the performance of simulation and test requirements with respect to project milestones
- Aggregated review over CAE-disciplines and simulation departments

■ Documentation

- Integrated document management system
- Automatic generation of status reports (*ppt, doc, pdf*)



SCALE.sdm: *Software Solution for Management of Simulation Data*



SCALE

■ Focused

- One dedicated App for each user group
- Reduced to meet the requirements of the use cases in question

■ Flexible

- Software components can be combined as required
- Easy integration of new disciplines and processes

■ Integrated

- All software components work seamless together
- Performant integration of pre and post processors

■ Decentralized

- Unique synchronizing technologies for distributed teams

■ Scalable

- Business logic close to the users
- Advanced compression techniques to reduce bandwidth and storage requirements

Customers



Audi



PORSCHE



Volkswagen

DAIMLER



SEAT



TAKATA

automotive
engineering

iauv

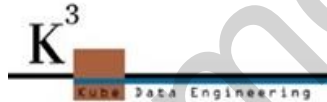


Volkswagen
Osnabrück

solute



Volkswagen
do Brasil



bertrandt

Porsche Engineering
driving technologies

SEMCON



TECOSIM
better life by simulation



Applus⁺
IDIADA

cidaut
Transport and Energy
Research and Development Foundation



esi
get it right[®]

SCALE

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- Unique selling points



Decentralization of Vehicle Development

- Integration of suppliers and engineering providers
- Connecting multiple locations
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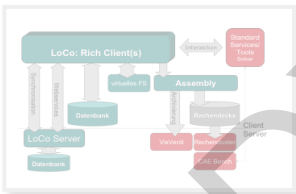
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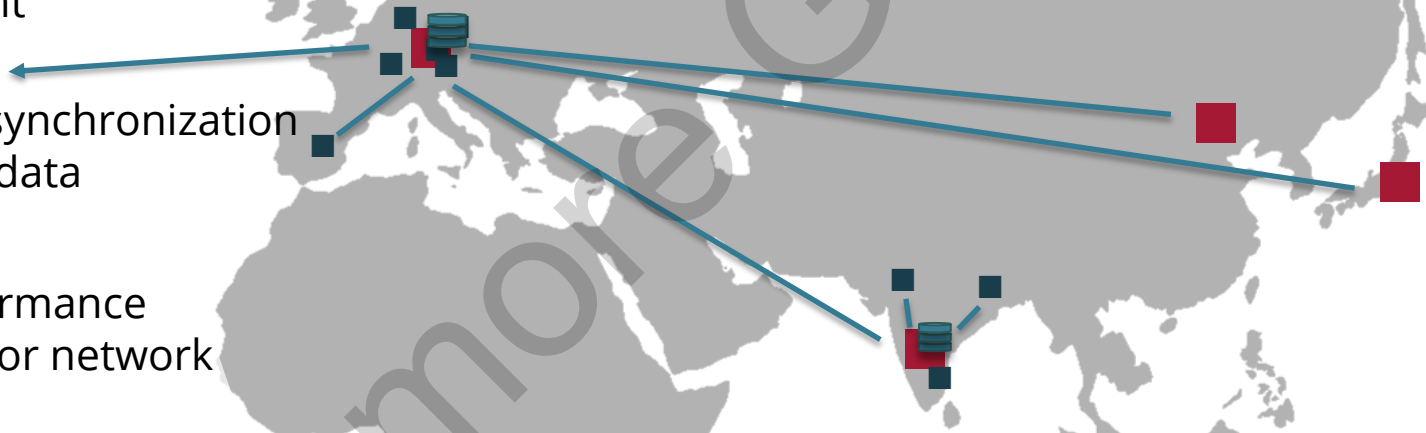
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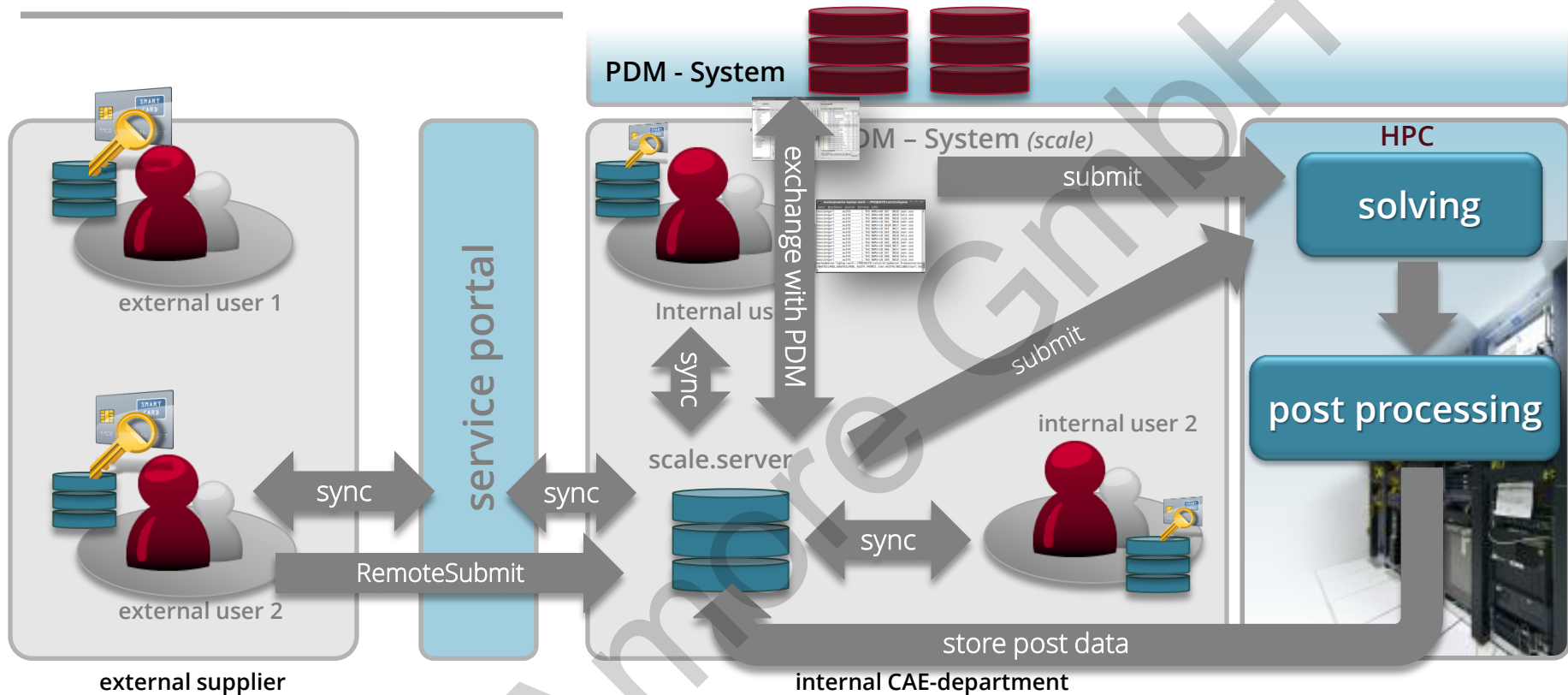
SCALE.sdm: *scaling development by decentralization*

■ Suppliers and Service Partners

- Direct integration in CAE development process
- Uniform working environment
- Automatic synchronization of relevant data
- Good performance even for poor network bandwidth
- Complying with high security requirements
 - encrypted storage
 - encrypted transfer
 - two factor authentication and encryption



SCALE.sdm: Workflow, Teamwork and Synchronization



Sync

decentralized

- Central data storage, synchronization with local workstations (*cloud like infrastructure*)
- Encrypted transfer, encrypted storage (*two factor authentication and encryption*)
- Offline handling of data (*RichClient*)

Offline / Online

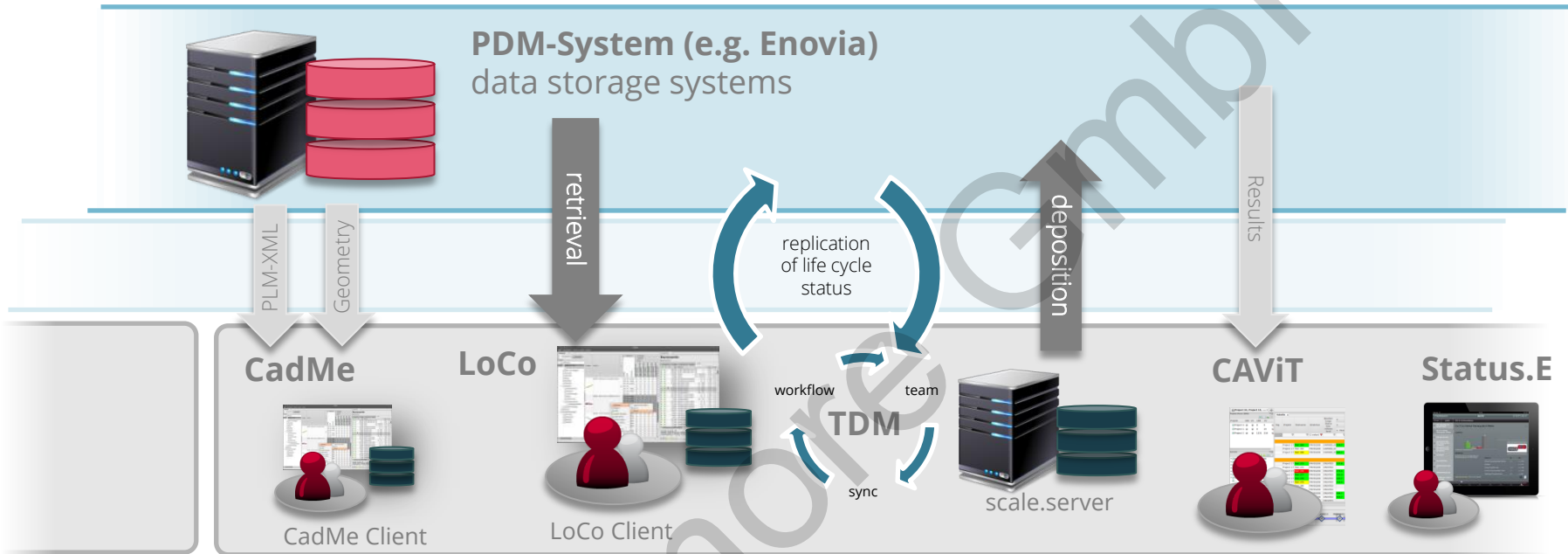
performance

- Users/Teams are independent of servers and infrastructure
- Users work with local data
- Good performance while application of preprocessing tools

Integration

- Integration with existing PDM Infrastructure as TDM-System (*Team Data Management*)

SCALE.sdm: *Integration with PDM Systemen* (Team Data Management)



- **Automated / integrated data deposition and retrieval from connected Storage and PDM-Systems**
 - Automatic deposition of important variants from LoCo
 - Easy retrieval of stored variants
 - Usage of system APIs for access to
- **Automatic cleanup: storage space in SCALE.server might be restricted** *(by time and/or size)*
- **Replication of life cycle status** *(reference, status, ...)*

SCALE.sdm: *Version management*

■ Every object is versioned

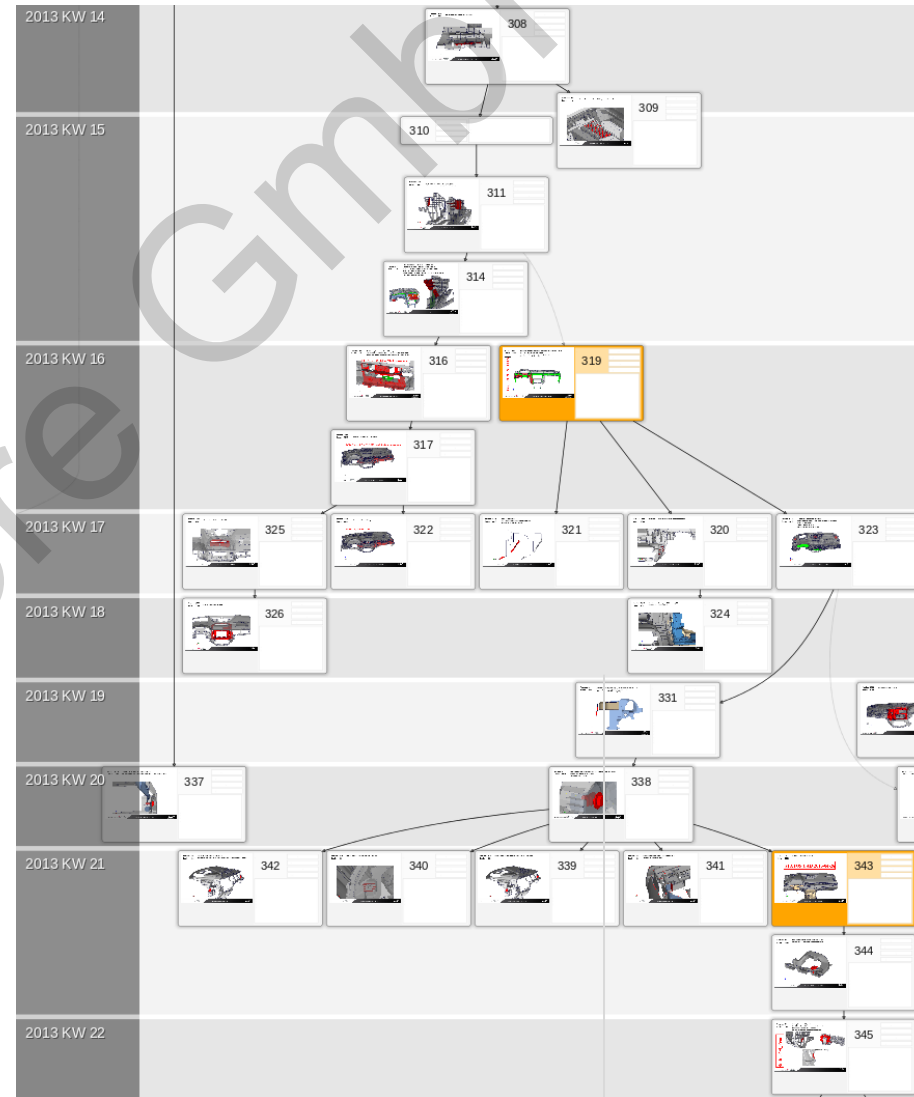
Simulation Runs
Scripts **Modules** Folders
Meshes Parameters Geometries

■ Motivation

- Simulation is change driven
- Simultaneous work on the same files
- Each action is documented
- Powerful features to merge changes

■ Audit trail and Versioning

- Versioning extends audit trail over time
- Audit trail represented by data structure
- The audit trail becomes multi dimensional



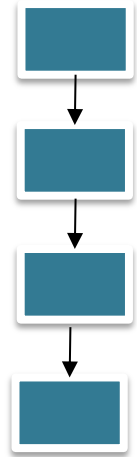
SCALE.sdm: *Version management*

■ „Lock Modify Write“ (*classical PDM Systems*)

- Objects are locked if one person is working with them
- After the work is done users need to check in the changed items
- Problematic in situations where team members need to work independently
- No simultaneous working with the same objects
- Instant access to changes of coworkers
- Always consistent data (*no merging of data required*)



CadMe

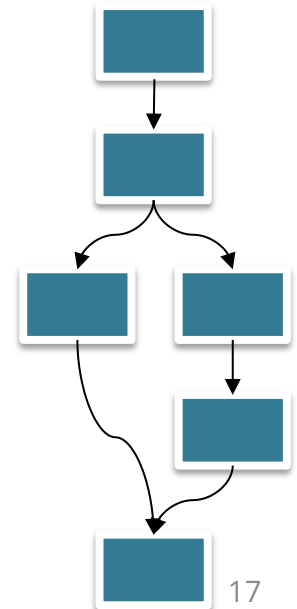


■ „Copy Modify Merge“ (*LoCo, git, svn, ...*)

- Objects can be used instantly (*on changes a copy will be created*)
- No „check in“ – „check out“ necessary
- Users can act independently from other users and servers
- Simultaneous work on the same objects is possible
- It might be required to merge branches



LoCo



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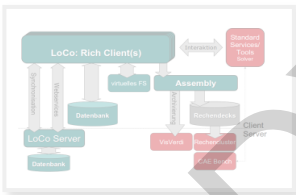
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CadMe: Distributed Meshing Processes



Imported CAD-Part structure from PDM-System for navigation

The screenshot displays the CadMe software interface. On the left is a tree view of CAD parts under 'Platform / Vorbau'. The main area is a table with columns for 'Teilenummer', 'Attributes', 'Symmetry', and 'Data preparation'. The 'Data preparation' column contains a grid of colored cells (green, yellow, red) representing different processes for each part. On the right, a 'Process executor' panel shows a list of processes with checkboxes and 'run on selected' buttons. At the bottom, a 'Process Development Environment' window shows a flowchart with nodes like 'extract', 'find', 'minmax', 'schachtel', 'end', 'sitzeinstellung', 'dummyeinsatz', 'angurten', and 'simulation'. A 'metascript' window is also visible, showing a script for 'dummyeinsatz'.

Teilenummer	Attributes	Symmetry	Import	ANSA meta data	Symmetry	Solids	Mid Surface	PID
Dach	fr L EU	undefined						
Heckabschluss	fr EU	unsymmetrical						
Dach (SAD ohne Antenne)	fr EU							
Verstärkungsrahmen	fr EU	symmetrical						
Seitenwandrahmen aussen	fr L, R EU	unsymmetrical						
Schliessteil Schweller	fr EU	symmetrical						
Einsatzteil (Leuchtenaufnahme)	fr EU	symmetrical						
Einsatzteil 2 (Wasserkanal)	fr EU	symmetrical						
Befestigungswinkel (Kofflülge)	fr EU	undefined						
Seitenwandrahmen aussen	fr EU	symmetrical						
Schliessteil Schweller	fr L EU	symmetrical						
Einsatzteil (Leuchtenaufnahme)	fr L EU	symmetrical						
Einsatzteil 2 (Wasserkanal)	fr L EU	symmetrical						
Säule B innen oben	fr EU	symmetrical						
GEWINDEPLATTE BEF. SCHL. SCHLOSS (ALT11)	fr EU	symmetrical						
Verst. (Säule B)	fr R US							
VERST.SAEULE B,UNT	fr EU	symmetrical						
SCHLIESSTEIL (SAEULE B)	fr EU	symmetrical						
Verstärkung (Gurtautomat, Säule B)	fr L EU	symmetrical						
Schließteil (Säule B)	fr EU	symmetrical						
Säule B innen oben	fr EU	symmetrical						
GEWINDEPLATTE BEF. SCHL. SCHLOSS (ALT12)	fr EU	symmetrical						
Verst. (Säule B)	fr L US	symmetrical						
VERST.SAE								

Integrated process development environment (PDE) in development

List of parts with overview on process status of each part



Display of Full Model & Sub-Models

- Defined, standardized outline of the overall model
- Shared availability of all sub-models
- Clear responsibilities (role management) for sub-models through access control
- Users have on demand access to the current model and sub-model state
- Usage similar to Windows file explorer



Image	Name	Short description	Attributes	Pool version	Short owner
	Tank	quattro Sattel		46	M. Thiele
	Tank	Tank Hamstoff		46	M. Thiele
	Fahrwerk	Alufelgen17		46	M. Thiele
	Fahrwerk	HiRa und Lenker		46	M. Thiele
	Fahrwerk	Alufelgen17		46	M. Thiele
	Fahrwerk	Differential		46	M. Thiele
	Fahrwerk	HiRa und Lenker		46	M. Thiele
	Lenkung	lenkgetriebe			M. Thiele
	Lenkung	lenksaeule			M. Thiele
	Lenkung	lenkteleskop			M. Thiele
	Pedalerie	pedalbock			M. Thiele
	CMS	ueberzug vo			M. Thiele
	CMS	Stoßfaenger hinten		46	M. Thiele
	CMS	ueberzug hi NSM		46	M. Thiele
	Frontklappe	NSMAS inkl Scharniere		46	M. Thiele
	Heckklappe	NSMAS inkl Scharniere		46	M. Thiele

Intuitive

- Contextual actions

Clarity

- Listing of all simulation files (sub-models)
- Thumbnails for quick overview

Integration

- Integration of any 3rd party product to edit model data (e.g. any text editor, ANSA, Primer, Hypermesh, etc.)

LoCo: Workbench for Simulation Engineers



The screenshot displays the LoCo software interface. On the left, a tree view shows the project structure under 'Studies' and 'Runs'. The main area shows a list of components grouped into categories like 'Front end', 'Mass', 'Master', 'Material', and 'Packages'. A context menu is open over the 'Radiator' component, with 'Export to file' highlighted. A blue callout box points to the 'Radiator' component with the text 'Choose a component'. Another blue callout box points to the 'Export to file' menu item with the text 'Easy export of the component to a file'. The right panel shows the 'Radiator' component's history and BOM.

Choose a component

Easy export of the component to a file

Name	Short description	Region	Impact Art	Barrier	Hand Drive	Position	FileType	Disziplin	Z_Position	Version
Front end (3 components)										
18	Radiator									
14	Crash Management									
15	Crash Management									
Mass (1 component)										
1	Additional Ma									
Master (1 component)										
0	Master									
Material (1 component)										
17	Material									
Packages (4 components)										
10	Battery									
20	Water Tank									
?	ABC Filter									



LoCo2

File Edit View Extra

Browser

Active pool: AU49

Pool	Preview	Assemblies
Name		
AU491		
Konzept 1		
M. Liebscher		
T. Landschoff		
M. Thiele		
Dach		
Front		
3		
8		
36		
37		
38		
40		
41		
43		
45		
46		
47		
US-NCAP 56		
EU-NCAP 56		
Heck		
Seite		
Tuer		
DM421		
Konzept 1		
lep		
vuvg65u		
vuvg10ft		

Image	Name	Short description	Attributes	Pool version	Short owner
	Frontend	--		46	M. Thiele
	Kuehler	--		46	M. Thiele
	Scheinwerfer	scheinwerfer vo NSM		46	M. Thiele
	CMS	Stossfaenger vorne		46	M. Thiele
	CMS	ueberzug vo NSM		46	M. Thiele
	CMS	Stossfaenger hinten		46	M. Thiele
	Tuer	Tuerscheibe oben		46	M. Thiele
	Tuer	Rohbau inkl Schloss		46	M. Thiele
	Tuer	Tuerscheibe oben		46	M. Thiele
	Frontscheibe	--		46	M. Thiele
	Karosserie	EU Verst Saeule B		46	M. Thiele
	Karosserie	Heckscheibe		46	M. Thiele

History Graph

- Visualization of variant order
- Tracking of target values
- Comments
- Thumbnails with visualization of changed parts
- Different zoom levels

Pool View History Model Properties

1 Initialer Import

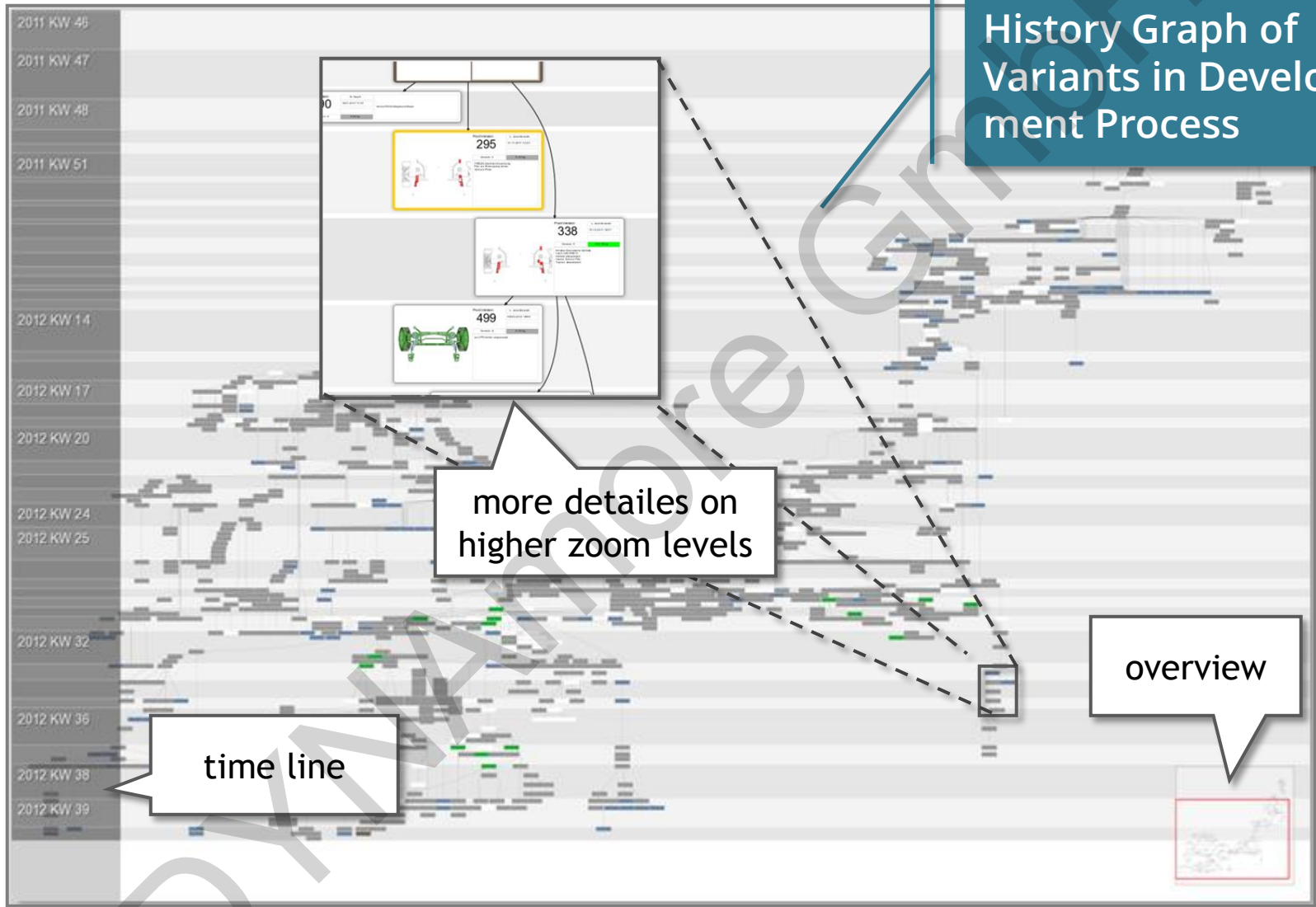
8 Eine andere Änderung am Türschloss

11 Am Rahmen kann man Masse...

9 Und schon wieder am Türschloss...

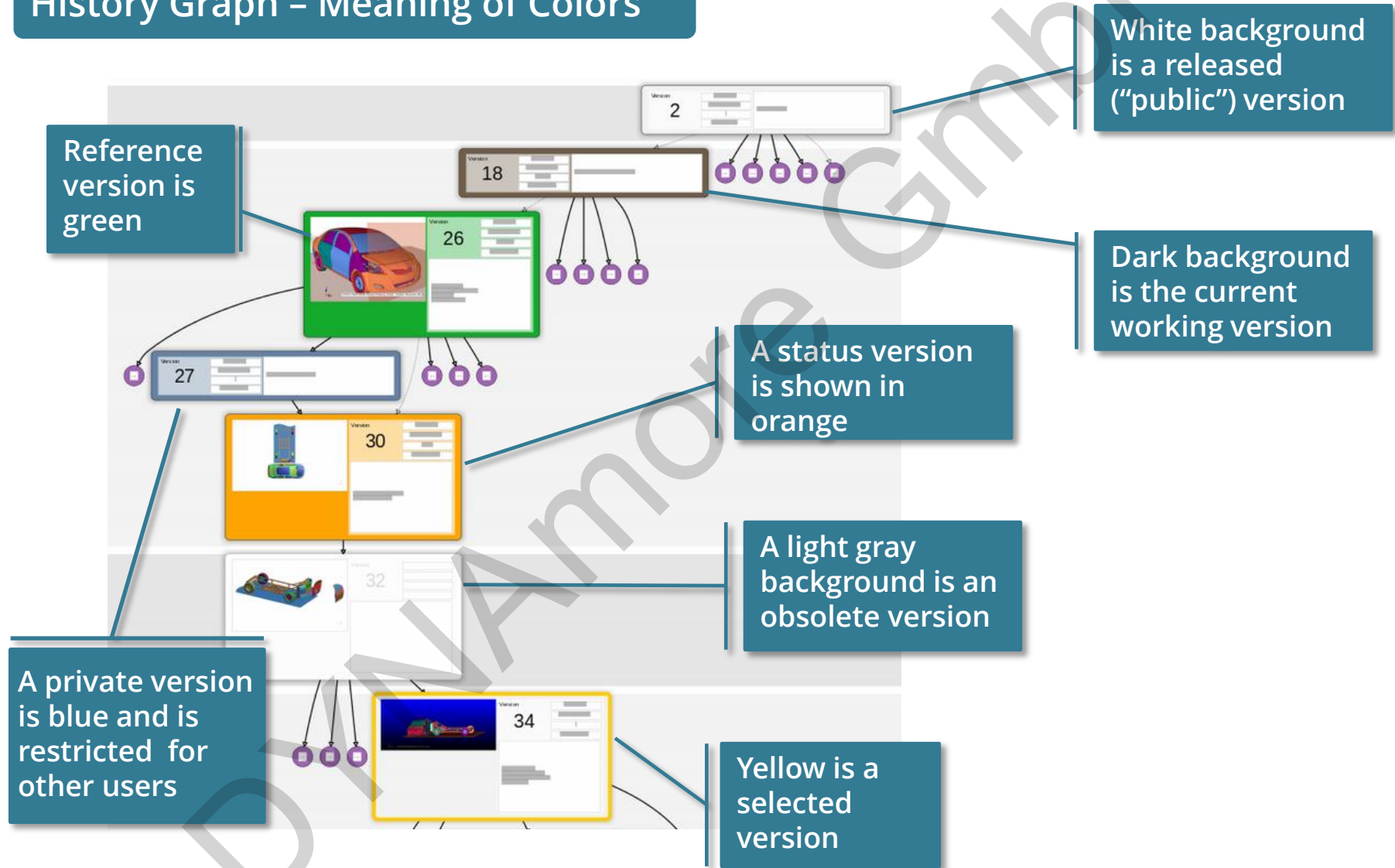
15 Aber auch die Masse

10 Und noch ein Test





History Graph – Meaning of Colors





LoCo2

File Edit View Extra

Browser

Active pool: AU49

Image	Name	Short description	Attributes	Pool version	Short owner
	Frontend	--		46	M. Thiele
	Kühler	--		46	M. Thiele
	Scheinwerfer	scheinwerfer vo NSM		46	M. Thiele
	CMS	Stossfaenger vorne		46	M. Thiele
	CMS	ueberzug vo NSM		46	M. Thiele
	CMS	Stossfaenger hinten		46	M. Thiele
	Tuer	Robbau inkl Schloss		46	M. Thiele
	Tuer	Tuerscheibe oben		46	M. Thiele
	Tuer	Robbau inkl Schloss		46	M. Thiele
	Tuer	Tuerscheibe oben		46	M. Thiele
	Frontscheibe	--		46	M. Thiele
	Karosserie	EU Verst Saeule B		46	M. Thiele
	Karosserie	Heckscheibe		46	M. Thiele

Pool View History Model Properties

Include-Checks: Ergebnisse

- ✗ Elementqualitaet
 - ✗ SHE:Quads < Minimum ANGLE [PAM-CRASH]
 - ✗ SHE:SKEW [NASTRAN]
 - ✗ SHE:Total Shell Elements OFF
 - zu viele schlechte Elemente: 16.342
 - ✓ SHE:Trias < Minimum ANGLE [PAM-CRASH]
 - ✓ SOL:Hexas > Maximum ANGLE [PAM-CRASH]
 - ✓ SOL:Pentas < Minimum ANGLE [PAM-CRASH]
 - ✗ SOL:Total Solids Elements OFF
 - zu viele schlechte Elemente: 100.000
 - ✓ SOL:WARP [PAM-CRASH]
- ✓ Nummerierungskonvention
 - ✓ CONTACT
 - ✓ ELEM
 - ✓ ELEM. BAR
 - ✓ ELEM. SHELL
 - ✓ ELEM. SOLID
 - ✓ ELEM. TETR4
 - ✓ FUNCTION
 - ✓ MATER
 - ✓ NODE
 - ✓ NODE_ELEM
 - ✓ PART
 - ✓ RIGID BODY
 - ✓ TIED
- ⚡ Gruppen - Definiert/Referenziert

Quality Management

- Check at each import
- User defined checks configurable
- Sanctionable on the basis of a quality index

LoCo: Workbench for Simulation Engineers



The screenshot displays the LoCo software interface. The main window shows a tree view on the left with the active pool set to AU49. The central area contains a table of parts. A blue callout box highlights the 'Bill of Materials' section, listing two key features: an overview of all parts and their properties (mass, materials...), and the ability to perform 'on the fly' modifications to gauge thicknesses. On the right, a 'Pool View' window is open for the component 'V40 Barriere', showing a detailed BOM table with columns for S, D, PID, PName, Thickr, and TotalMas. The table lists various components like 'Deckplatte Stahl', 'RIGIDWALL', and 'Anschlussplatte Stahl'. A summary at the bottom of the Pool View window indicates 14 parts and a total mass of 1.3 kg.

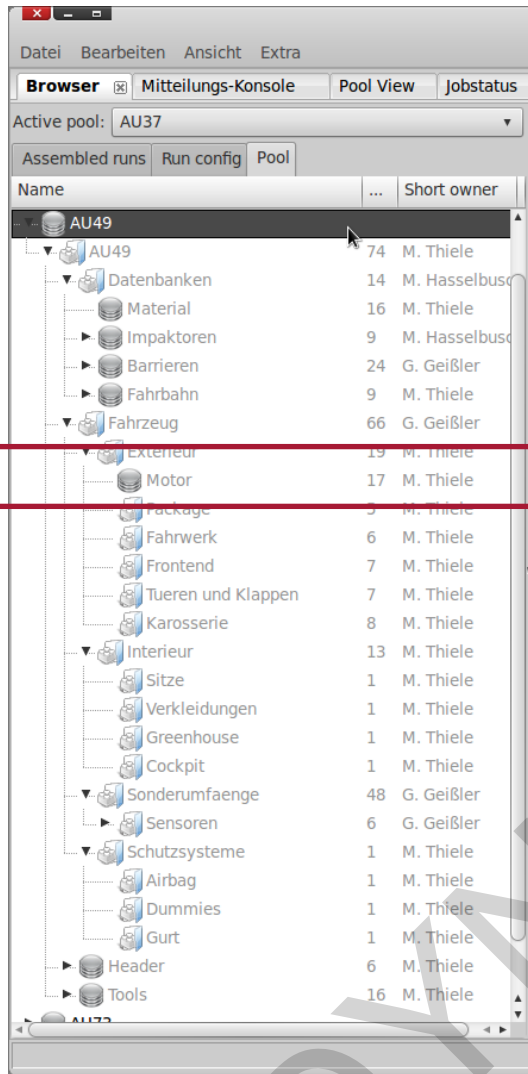
Bill of Materials

- Overview of all parts and their properties (mass, materials...)
- „On the fly“-modification of gauge thicknesses

S	D	PID	PName	Thickr	TotalMas
✓		9807001	Deckplatte Stahl	...	20.00
✓		9807999	RIGIDWALL	...	1.00
✓	↑	9807002	Anschlussplatte Stahl	...	1.20
✓		9999000	Part Versionsnummer	...	1.00
✓		9808001	STAHL BAR Messbalken mit...	...	-
✓		9805001	DECKBLECH VORN	...	0.81
✓		9805002	DECKBLECH OBEN	...	0.81
✓		9805003	DECKBLECH UNTEN	...	0.81
✓		9806001	BUMPER-DECKBLECH	...	0.81
✓		9899003	TIED Part Klebekontakt Barr...	...	-
✓		9899002	TIED Part Klebekontakt Bu...	...	-
✓		9899001	TIED Part Klebekontakt Bu...	...	-
✗		9801001	BLOCK	...	-
✗		9802001	BUMPER	...	-

Number of parts: 14
Total: ?
Total (Selection): 1.3 kg (S: 1.319 kg / N: 0.000 kg), dM: +0.000 kg

LoCo: Component Management / Modeling Aspects



- **Homogeneity:** Common components wherever possible

- **Libraries:** Direct access and integration

- Materials

- Barriers

- Impactors

- Engines

- Dummies

- ...

- **Access Control:** Not everybody can edit any component (*e.g. materials*)

- **Uniform structure for all projects**



■ Job Submit

Instant start of jobs on the HPC-cluster

- Models are assembled directly in the datacenter at the HPC-cluster
- A minimum of data has to be transferred
- Jobs start instantly

■ Job Control

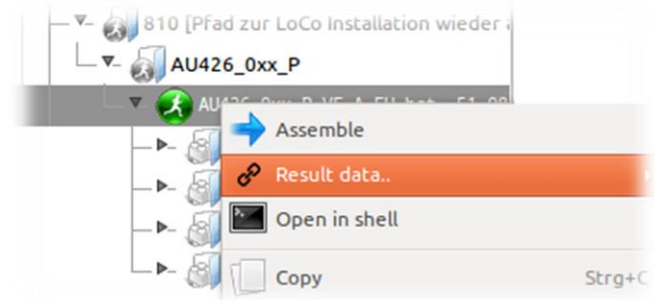
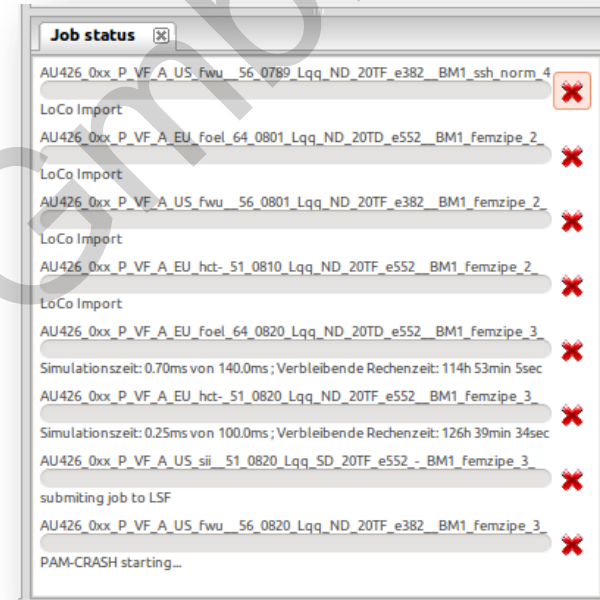
Monitoring job progress on the HPC-cluster

- Continuous feedback on job progress
- Stopping of jobs

■ Result Access

Retrieving and accessing result data

- Automatic download of result data
- Access to result data of other users
- Direct integration with post processors





Projects
displayed projects and contextual actions

Selection / Filter
scenario based selection of tests and simulations

View settings
settings of table, graph and time line

Tag	Projekt	Testname	Direktive	Bearbeitungs-Status	Wert
Project 17	Test 199	FMVSS208	CARRIED_OI		587.7
Project 17	Test 173	FMVSS208	CREATED		337.8
Project 17	Test 182	FMVSS208	CREATED		
Project 17	Test 183	FMVSS208	CREATED		494.7
Project 17	Test 188	FMVSS208	CREATED		414.7

KW/Jahr	Graph
KW 42 2009	Test 199
KW 46 2009	Test 199
KW 06 2010	Test 199, Test 173
KW 07 2010	Test 199
KW 08 2010	Test 199, Test 173, Test 182, Test 183, Test 188
KW 10 2010	Test 199, Test 173
KW 12 2010	Test 199
KW 16 2010	Test 199
KW 17 2010	Test 199
KW 18 2010	Test 199
KW 23 2010	Test 199
KW 25 2010	Test 199
KW 43 2010	Test 199, Test 173, Test 182, Test 183, Test 188
KW 44 2010	Test 199, Test 173, Test 182, Test 183, Test 188

Projekt (Preset: DEMO)

Projekt	CBII	VV	CBII	VV
Project 1	0	5		
Project 1	0	19		
Project 1	1231	216		

Szenario

- Europa: 378
- NAR: 945
- Japan: 6
- China: 17
- Korea: 0
- Sensor: 21
- Sonstiges: 29
- ...: 2

Darstellung

- Zeitstrahl
 - Darstellen
- Tabelle
 - Datum
 - Ersteller
- Dummy
 - Fa
 - Head
 - Nij
 - Neck forces
 - Chest

Meilenstein 4 (2013) - Meilenstein 5 (2014)

Umgebung: Unknown Offline Modus

CAViT: Post data management - GUI Overview



The screenshot displays the CAViT GUI interface. On the left, there are panels for 'Projekte' (Projects) and 'Szenario' (Scenario). The 'Projekte' panel shows a list of projects with checkboxes and numerical values. The 'Szenario' panel shows a tree view of scenarios with checkboxes and numerical values. The main area is divided into three views: 'Tabelle' (Table), 'Graph', and 'Zeitstrahl' (Gantt chart). The 'Tabelle' view shows a list of tests with columns for Tag, Projekt, Testname, Direktive, and Bearbeitungs-Status bzw. release level. The 'Graph' view shows a timeline of tests and simulations. The 'Zeitstrahl' view shows a Gantt chart for Project 17 with milestones and a timeline from 2013 to 2014.

Graph view
of tests and simulations

Tabular view
of tests and simulations

Tag	Projekt	Testname	Direktive	Bearbeitungs-Status bzw. release level	Value
Project 17	Test 184	FMVSS208	CARRIED_OI	324.7	
Project 17	Test 192	FMVSS208	CARRIED_OI		
Project 17	Test 199	FMVSS208	CARRIED_OI	587.7	
Project 17	Test 173	FMVSS208	CREATED	337.8	
Project 17	Test 175	FMVSS208	CREATED		
Project 17	Test 176				
Project 17	Test 177				
Project 17	Test 178				
Project 17	Test 179				
Project 17	Test 180				
Project 17	Test 182				
Project 17	Test 183				
Project 17	Test 188	FMVSS208	CREATED	414.7	
Project 17	Test 191	FMVSS208	CRFATED		

Zeitstrahl
Project 10 Project 13 **Project 17**

Von: 28.11.2012
Bis: 24.08.2014

Meilenstein 3 (-6) Meilenstein 4 (-3) Meilenstein 5 (0)

2013 2014

Umgebung: Unknown Offline Modus

CAViT: Post data management - GUI Overview



CAViT - V2.

CAViT Ansicht Extra Hilfe

Sitzungen Mitteilungs-Konsole

Project106 Project106 x Project106

Seitenschutz (ver. 1.1.9)

Projekte

- Project106 71
 - CAE-Bench 25
 - VisVerdi/Falcon 46
- Ordner

Szenario

- RdW Gesetz 5
 - ECER95 Barriere 5
- RdW Consumer 24
 - EuroNCAP 2014 18
 - EuroNCAP 2015 2
 - JapanNCAP 1
 - ChinaNCAP 2
 - KoreaNCAP 0
 - AE-MDB Barriere 1
- NAR Gesetz 6
 - FMVSS214 Barriere 1
 - FMVSS214 Pfahl ES2re 3
 - FMVSS214 Pfahl SID2s 1
 - FMVSS214 Pfahl WS 50% 0
 - FMVSS214 Pfahl WS 5% 0

Tabellenkonfiguration

- Name
- Versuchsgrund
- Label
- Datum
- Allgemeine-Info
- Versuchs-Info
- Simulations-Info
- Insassen
 - vorne
 - DUMMY Typ

Table

Tag	Variante				
Test_525					
Test_549					
377					402.6
377					
Test_524					
Test_524					
Test_528					
Test_526					
Test_524					1702.6
Test_5265					
Test_5247		339.4		24.5	873.4
Test_5282					
Test_5264					
377		96.0	1422.1	25.1	562.1
377		182.1		30.1	
Test_5281					
Test_5274					
Test_5250		42.7		19.2	675.3
Test_5251		34.0		1.2	676.8
Test_5270					
Test_5252		429.2	1276.1	1227.0	51.4
Test_5253					
377		23.0		314.8	15.9
					261.5

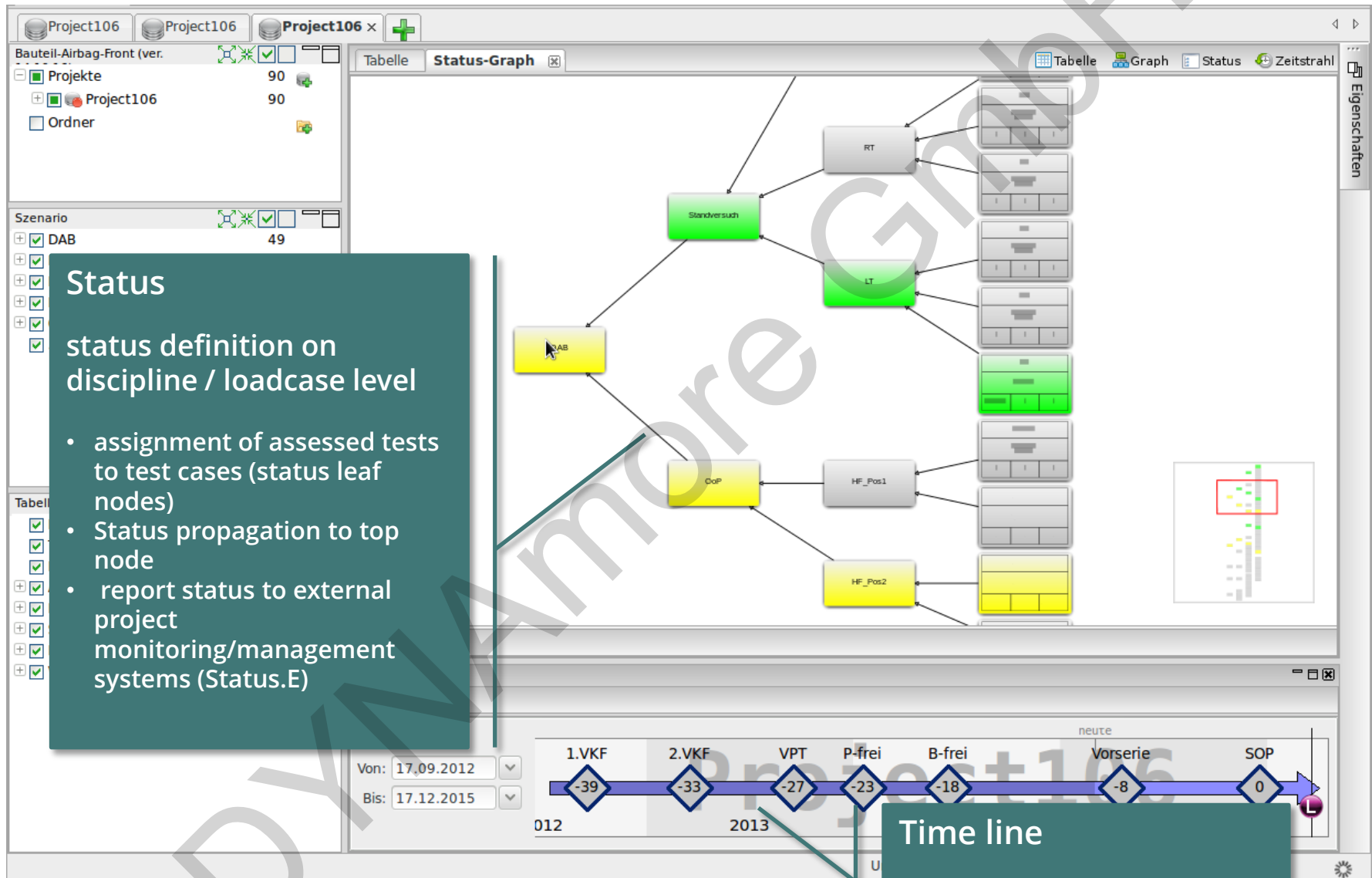
Property panel

Visualization of simulation / test data

- Attributes / Key-Results
- Channels
- Images
- Movies/Solver output files
- Documents
- Measure data

Eigenschaften

Isocode	Name	Wert
Test_5134 (93 Elemente)		
0.0.00.D.0.GENERAL_...		0
0.0.00.D.0.GENERAL_...	Project	Pro...
0.0.00.D.0.GENERAL_...	Bjo...	Bjo...
0.0.00.D.0.GENERAL_...	Tes...	Tes...
0.0.00.D.0.GENERAL_...	Release...	1
0.0.00.D.0.GENERAL_...	VsimId ...	II2...
0.0.00.D.0.GENERAL_...		23.03
0.0.00.D.0.GENERAL_...		Eur...
0.0.00.D.0.GENERAL_...	Discipline	Occ...
0.0.00.D.0.GENERAL_...		871
0.0.00.D.0.GENERAL_...		262
0.0.00.D.0.GENERAL_...		258
0.0.00.D.0.GENERAL_...		Bjo...
0.0.00.D.0.GENERAL_...		sas
0.0.00.D.0.GENERAL_...		256
0.0.00.D.0.GENERAL_...		Upd...
0.0.00.D.0.GENERAL_...		AU6...
0.0.00.D.0.GENERAL_...		0
0.0.00.D.0.GENERAL_...	Descrip...	Typ...
0.0.00.D.0.GENERAL_...		links
0.0.00.D.0.GENERAL_...		Seite
0.0.00.D.0.GENERAL_...		Bar...
0.0.00.D.0.GENERAL_...		377
0.0.00.R.0.GENERAL_...		23.03
1.0.00.D.0.GENERAL_...		AU127
1.0.00.D.0.VEHICLE_...		PVS
1.0.00.D.0.VEHICLE_...		LL
1.0.00.D.0.VEHICLE_...		EUR...



Status

status definition on discipline / loadcase level

- assignment of assessed tests to test cases (status leaf nodes)
- Status propagation to top node
- report status to external project monitoring/management systems (Status.E)

Time line

milestones of the product development plan

Overview



Introduction SCALE.sdm

- Software modules
- Key Features
- Unique selling points



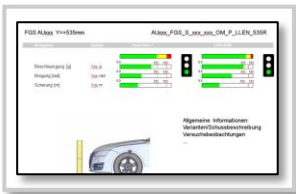
Decentralization of Vehicle Development

- Integration of suppliers and engineering providers
- Connecting multiple locations
- Version management



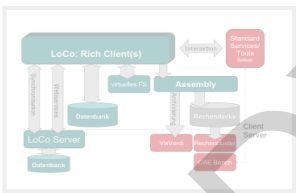
Graphical User Interfaces

- CadMe - Distributed Meshing Processes
- LoCo - Workbench for simulation engineers
- CAViT - Post data management - GUI Overview



Result Assessment

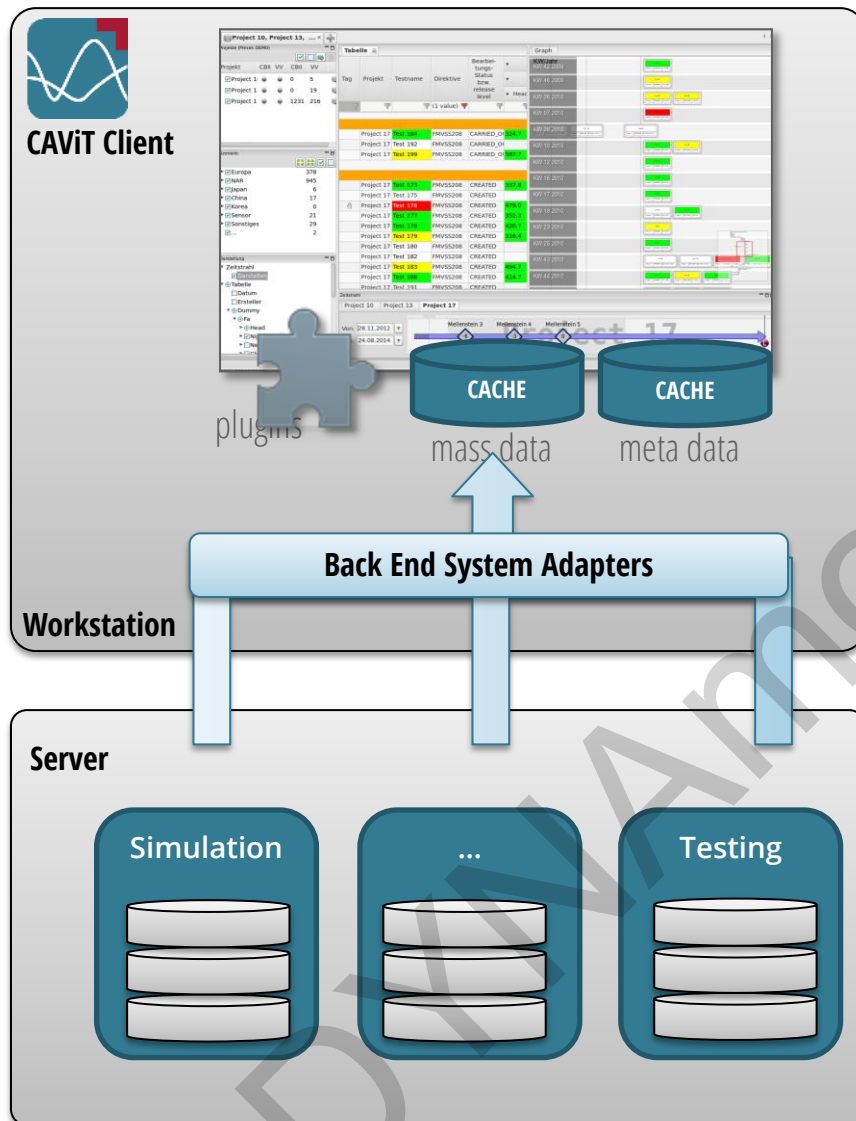
- Access to simulation and test data
- Evaluation, comparison, visualization
- Report generation



Adaption and Customization (*open system*)

- Configuration
- Process integration (*support for solvers and CAE-disciplines*)
- Integration with existing IT-environments / 3rd party software
- Operation

Result Assessment: *Data Acquisition with CAViT*



■ Obtaining data

- data source can be existing storage solutions, typically different ones for test and simulation results
- CAViT acquires data through specific interfaces provided by the storage solutions (*e.g. LoCo, CB, Midas, TestDBs, ...*)
- CAViT as a viewing tool does not have its own central storage and does not introduce additional redundancy

■ Data formats

- CAViT provides a uniform presentation of simulation and test data
- Test/simulation data are converted or mapped if necessary
- CAViT can handle various data standards used in testing *e.g. ASAM ODS* data types and *ISO-MME* representations of mass data

Result Assessment: *Rating with CAViT*

Tabelle													
Tag	Projekt	Testname	Direktive	Bearbeitungs-Status bzw. release level	Dummy								
					Fa				Bf				
					Head	Nij	Chest	Femur forces	Head	Nij	Neck forces	Chest	Femur f
			(1 value)										
Project 17	Test 169	FMVSS208	RESULTS_LI	341.3	0.358	225.9	-136.398	159.5	0.088	368.672	132.0	-146.225	
Project 17	Test 170	FMVSS208	RESULTS_LI	265.5	0.259	199.6	-3663.381	298.4	0.209	1331.546	295.0	-3137.337	
Project 17	Test 181	FMV			0.374	418.8	-1570.725	401.3	0.511	818.66	363.0	-1221.459	
Project 17	Test 185	FMV			0.404	385.7	-5123.01	395.5	0.478				
Project 17	Test 186	FMV			0.965	383.3	-3676.409	448.3	0.292				
Project 17	Test 187	FMV			0.336	414.8	-2070.42	519.7	0.254				
Project 17	Test 190	FMVSS208	RESULTS_LI	414.9	0.313	401.7	-2057.361	409.2	0.233				
Project 17	Test 195	FMVSS208	RESULTS_LI	421.8	0.387	452.0	-2920.323	521.9	0.197				
Project 17	Test 196	FMVSS208	RESULTS_LI	357.9	0.594	352.3	-3852.632	471.2	0.315	1393.98	523.2	-5073.077	
Project 17	Test 197	FMV			0.527	349.9	-3654.675	417.0	0.424	1184.988	329.3	-3395.39	
Project 17	Test 200	FMV			0.413	497.8	-2875.21	720.7	0.362	1362.665	570.5	-3030.944	
Project 17	Test 202	FMV											
Project 17	Test 206	FMV			0.544	450.1	-6005.892	394.5	0.263	1342.658	495.0	-5791.279	
Project 17	Test 208	FMV			0.299	373.4	-1701.184	379.9	0.199	564.18	353.3	-1666.115	
Project 17	Test 213	FMVSS208	RESULTS_LI	388.0	0.338	380.0	-1898.346	440.2	0.21	715.672	356.8	-1834.536	
Project 17	Test 0	FMVSS208	SCHEDULED	318.1	0.657	177.2	-842.122	243.1	0.201	342.251	177.2	-1023.332	
Project 17	Test 168	FMVSS208	SCHEDULED	191.8	0.216	199.4	-3410.745	274.7	0.313	1095.316	212.1	-2788.526	
Project 17	Test 171	FMVSS208	SCHEDULED	344.4	0.853	415.5	-3296.156	453.1	0.221	667.155	420.6	-1767.151	
Project 17	Test 172	FMVSS208	SCHEDULED	651.7	0.303	454.3	-3201.094	497.9	0.246	919.118	412.5	-2399.386	

manual rating

suggested rating (aggregated)

automated rating of key results of tests and simulations based on load case dependent limits

Result Assessment: Rating Aggregation

Tag	Projekt	Testname	Direktive	Bearbeitungs-Status bzw.	Fa			
					Head	Chest	Femur forces	
	Project 17	Test 181	FMVSS208	RESULTS_LIS	488.0	0.374	118.8	-1570.725
	Project 17	Test 185	FMVSS208	RESULTS_LIS	368.3	0.404	185.7	-5123.01
	Project 17	Test 186	FMVSS208	RESULTS_LIS	376.8	0.965	183.3	-3676.409
	Project 17	Test 187	FMVSS208	RESULTS_LIS	461.0	0.336	114.8	-2070.42
	Project 17	Test 190	FMVSS208	RESULTS_LIS	414.9	0.313	101.7	-2057.361
	Project 17	Test 195	FMVSS208	RESULTS_LIS	421.8	0.387	152.0	-2920.323
	Project 17	Test 196	FMVSS208	RESULTS_LIS	357.9	0.594	152.3	-3852.632
	Project 17	Test 197	FMVSS208	RESULTS_LIS	275.2	0.527	349.9	-3654.675
	Project 17	Test 200	FMVSS208	RESULTS_LIS	581.2	0.413	497.8	-2875.21
	Project 17	Test 202	FMVSS208	RESULTS_LIS				
	Project 17	Test 206	FMVSS208	RESULTS_LIS	407.1	0.544	450.1	-6005.892
	Project 17	Test 208	FMVSS208	RESULTS_LIS	333.9	0.299	373.4	-1701.184
	Project 17	Test 213	FMVSS208	RESULTS_LIS	388.0	0.338	380.0	-1998.346
	Project 17	Test 0	FMVSS208	SCHEDULED	318.1	0.657	177.2	-842.122
	Project 17	Test 168	FMVSS208	SCHEDULED	191.8	0.216	199.4	-3410.745
	Project 17	Test 171	FMVSS208	SCHEDULED	344.4	0.853	415.5	-3296.156
	Project 17	Test 172	FMVSS208	SCHEDULED	651.7	0.303	454.3	-3201.094

Value and rating aggregation

Expanded view

Nij			
Nij CE	Nij CF	Nij TE	Nij TF
0.065	0.001	0.358	0.191
0.033	0.066	0.208	0.259
0.296	0.008	0.359	0.374
0.028	0.083	0.404	0.313
0.818	0.131	0.965	0.129
0.085	0.074	0.149	0.336
0.062	0.003	0.213	0.313
0.005	0.081	0.238	0.387
0.252	0.110	0.594	0.133
0.000	0.120	0.527	0.122

CAViT: Plugin / Scripting Interface

■ Interfacing

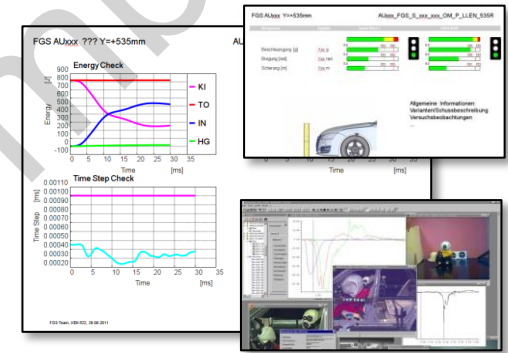
- Integration of post processors, third party tools
- Report generation with external tools (e.g. GNS Animator)

■ Plugin

- Plugin concept for customization, proprietary code or user defined scripts
- Python (interpreter is built in) or any other script language may be used

PDF/PPTs Reports

Report generation with external tools and viewers



CAViT - V2.

CAViT Ansicht Extra Hilfe

Sitzungen [x] Mitteilungs-Konsole

Project106 Project106 x Project106 +

Seitenschutz (ver. 1.1.9)

Projekte 71

- Project106 71
- CAE-Bench 25
- VisVerdi/Falcon 46

Ordner

Szenario

- RdW Gesetz 5
- ECER95 Barriere 5
- RdW Consumer 24
- EuroNCAP 2014 18
- EuroNCAP 2015 2
- JapanNCAP 1
- ChinaNCAP 1
- KoreaNCAP 0
- AE-MDB Barriere 1
- NAR Gesetz 6

Tag	Projekt	Testname	Direktive	Bearbeitungs-Status bzw. release level	RESULTS_LI	341.3	0.358
	Project 17	Test 169	FMVSS208		RESULTS_LI	265.5	0.259
	Project 17	Test 170	FMVSS208		RESULTS_LI	488.0	0.374
	Project 17	Test 181	FMVSS208		RESULTS_LI	368.3	0.404
	Project 17	Test 185	FMVSS208		RESULTS_LI	376.8	0.965
	Project 17	Test 186	FMVSS208		RESULTS_LI	461.0	0.330
	Project 17	Test 187	FMVSS208		RESULTS_LI	414.9	0.313
	Project 17	Test 190	FMVSS208		RESULTS_LI	421.8	0.387
	Project 17	Test 195	FMVSS208		RESULTS_LI	357.9	0.594
	Project 17	Test 196	FMVSS208		RESULTS_LI	275.2	0.527
	Project 17	Test 197	FMVSS208		RESULTS_LI	271.2	0.527
	Project 17	Test 198	FMVSS208		RESULTS_LI	271.2	0.527

Status.E Project Monitoring

Exporting assessed results to Status.E

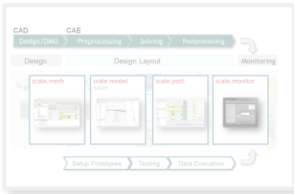


Export nach Status.E

Lastfall	Test	Wert
Fahrerlager OoP HF Position 1		
Status/Bemerkung		In Ordnung
Maßnahmen		nichtes zu tun
Manuelle Statusbeschreibung		
Kriterien		
Fahrerlager OoP HF Position 2		
Status/Bemerkung		noch nicht ausreichend
Maßnahmen		nachbessern
Manuelle Statusbeschreibung		
Kriterien		
Birrusendrückung	AL3371_KP_L15_02_OoP_L_3Y16+00_V002_B014_8120_038_a_grun	0.003
HEC 15	AL3371_KP_L15_02_OoP_L_3Y16+00_V002_B014_8120_038_a_grun	151.88
NICE1	AL3371_KP_L15_02_OoP_L_3Y16+00_V002_B014_8120_038_a_grun	0.423
NITE1	AL3371_KP_L15_02_OoP_L_3Y16+00_V002_B014_8120_038_a_grun	1.003
NICE2	AL3371_KP_L15_02_OoP_L_3Y16+00_V002_B014_8120_038_a_grun	0.013
NITE2	AL3371_KP_L15_02_OoP_L_3Y16+00_V002_B014_8120_038_a_grun	0.258

Abbrechen Export

Agenda



Introduction SCALE.sdm

- Software Components
- Key Features
- Unique selling points



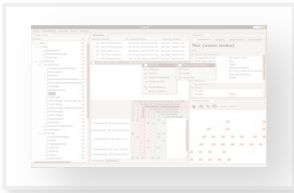
Decentralization of Development

- Integration of suppliers and engineering providers
- Connecting multiple locations
- Version management



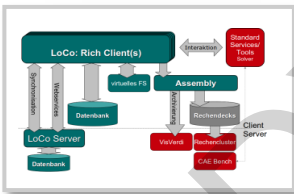
Modell Generation and Assembly

- Assembly processes
- Attribute based allocation of content
- Jobsubmit and monitoring



Result Assessment

- Accessing simultaneously Simulation and Test Results (*rich client*)
- Report Generation

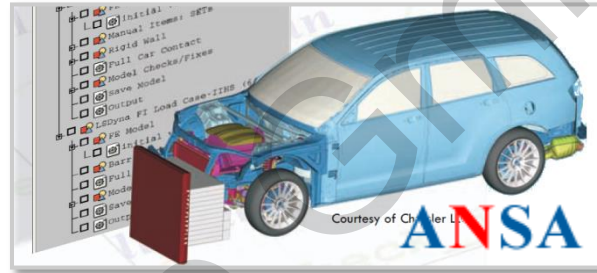
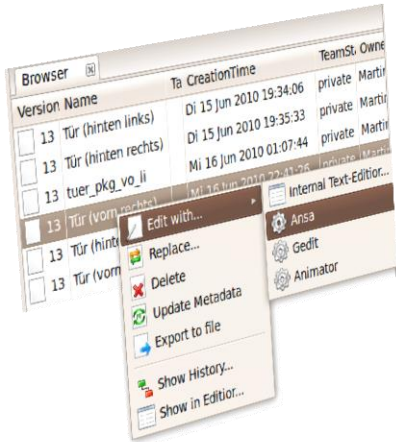


Adaption and Customization (*open system*)

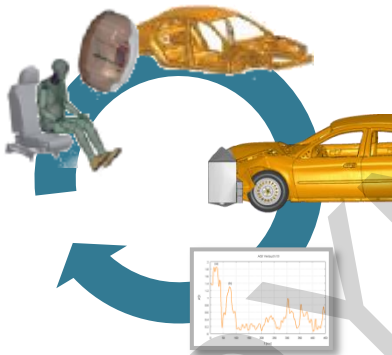
- Configuration
- Process integration (*support for solvers and CAE-disciplines*)
- Integration with existing IT-environments / 3rd party software
- Operation

SCALE.sdm: Focus on integration of 3rd party tools

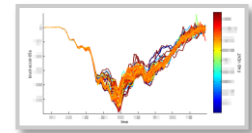
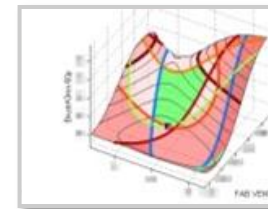
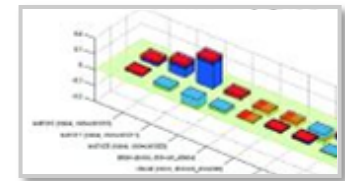
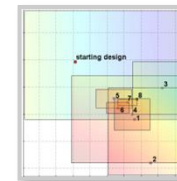
Direct application of any external tools (*Ansa, Animator, nedit, vi, user scripts, etc...*)



Integration of DOE Studies / Optimization

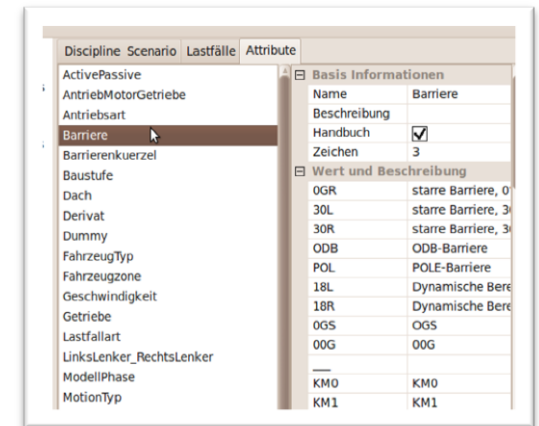
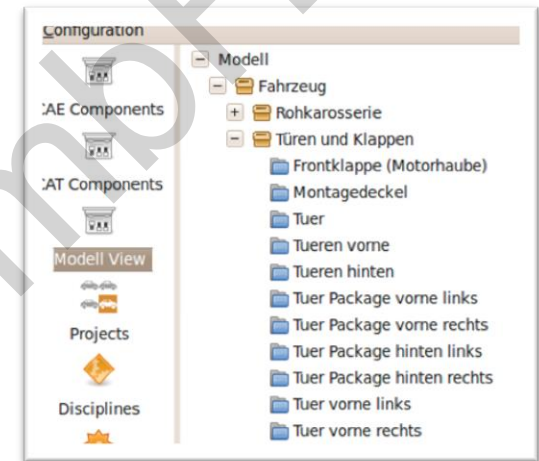


- Models are parameterized within the data management system
- Simulation models are assembled automatically
- Access to optimization software such as LS-OPT



SCALE.sdm: *Configurability*

- System is completely configurable by customer
 - No involvement of IT-departments or developers required to implement or change processes
- Specific configurations for individual user groups (*Department, Discipline, Project, ...*)
 - Project structure
 - Attributes / Metadata
 - Filters
- GUI for KeyUsers
 - Fast response times upon user requests
 - Independence from developers
- XML syntax for advanced configuration
 - Covers full feature set of application
- Scripting for individual processes
 - Tightly integrated with full version control for each script
 - Rich Python API



SCALE.sdm: *Solvers and disciplines*

- **Flexibility for easy and fast integration of processes**
 - New disciplines, processes, solvers
 - Fast response times to user requests
- **Integrated scripting interface and version management**
 - Advanced process development
 - Independent from code changes of the core software
- **Solver independent**
 - Any simulation solver can be used
 - Existing solver related inhouse scripts can be integrated
- **Simple adaption to new CAE disciplines**
 - Can be performed by user / customer
 - No code changes in SCALE.sdm necessary



Main current development priorities, upcoming features



Enhanced Data Compression [input/results]
storage cost reduction and minimum transmission time



Web Client
convenient access to data, particularly for monitoring



Integration with Collaboration and Ticket Systems
Jira, Open Project, ... for SDM related task management



UI Redesign of SDM-Client
more intuitive, more efficient, more modern appeal

SCALE 

<http://www.scale.eu>