

# CAE Process Support by MIDAS and MEDINA

Software-Integration and  
Simulation Data Management.

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CAE-Process Support with MIDAS and MEDINA.  
Agenda.

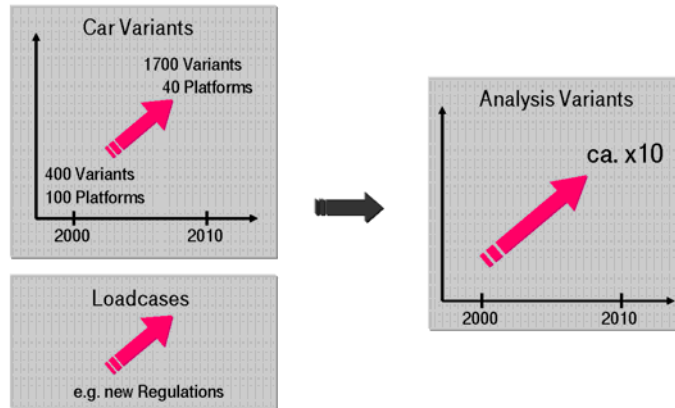
1. Introduction
2. Model Assembly / PreProcessing
3. Results Data Management / PostProcessing
4. Discussion

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**Introduction.**

Development of Analysis Variants in the Automotive Sector.

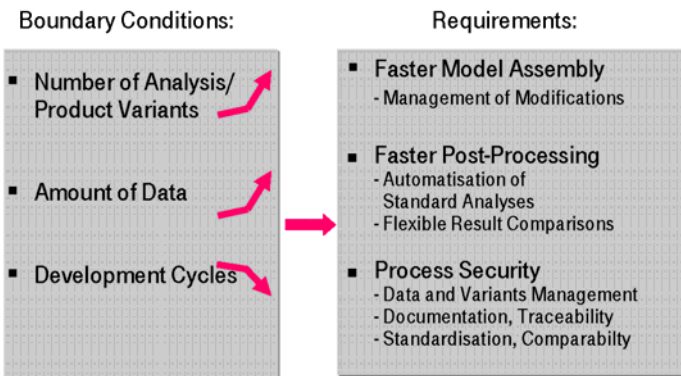


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**Introduction.**

Requirements for the CAE-Process.



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**Introduction.**

CAE-Process Support with MIDAS & MEDINA.

MIDAS + MEDINA :

- Software Integration
- Simulation Data Management

Approach:

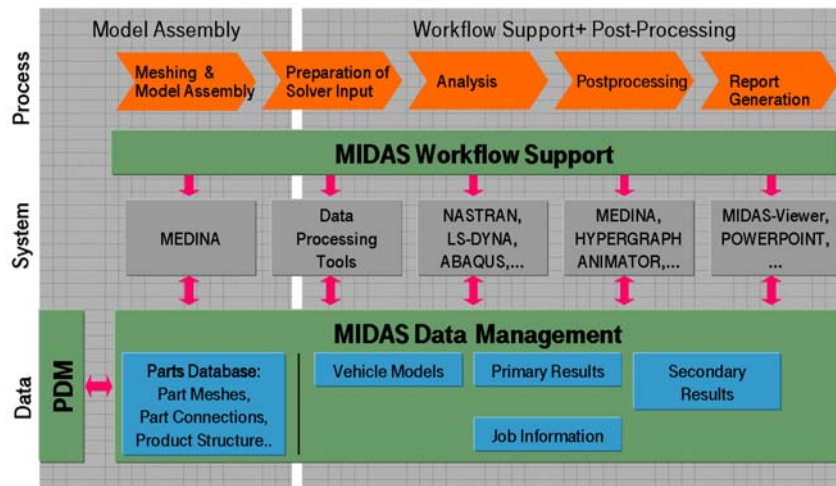
- From Modelling to Reporting
- Process + Data
- Embedding of customer-specif. Applications
- Integral
- Open
- Modular
- Platform-independent



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**Introduction.**

CAE System Landscape.



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Model Assembly.  
Sub-Process Model Assembly: Objectives.

Management of Changes

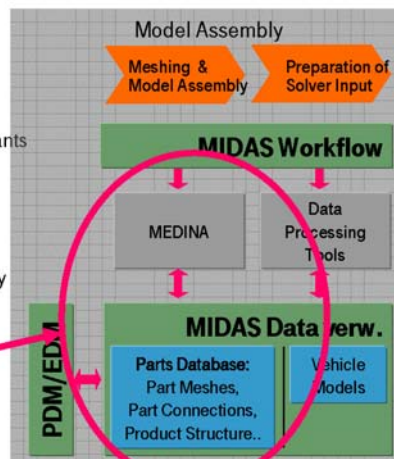
- Fast Insertion of Changes
- Prompt Update for all Loadcases and Product Variants
- Documentation of analyzed Product States

Process Acceleration

- Automatised Model Assembly

Solution Approach:

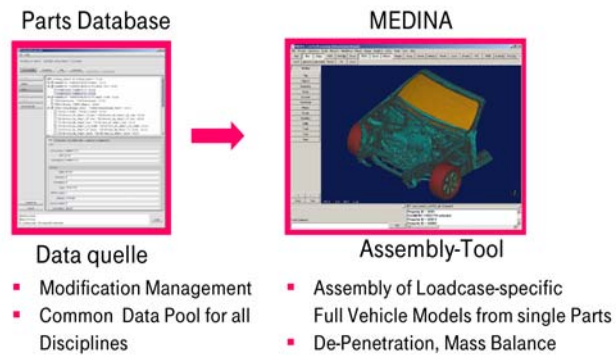
Combination of MEDINA and MIDAS Parts Database



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**Model Assembly.**

Tasks of MEDINA and MIDAS Parts Database.



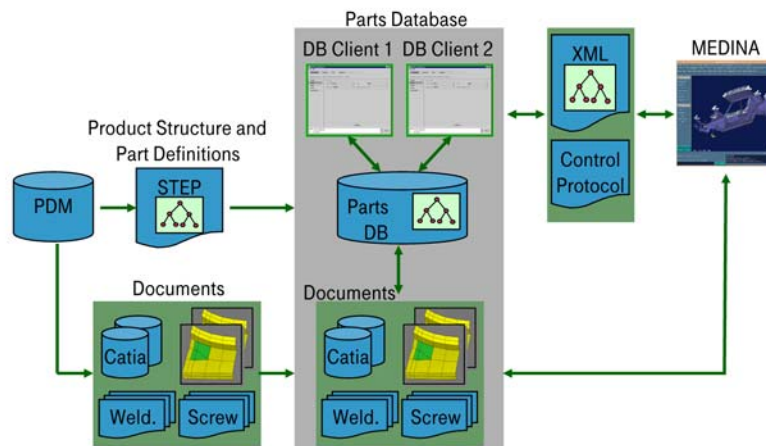
Objective: One-click Assembly of ready-to-solve Models from Database



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**Model Assembly.**

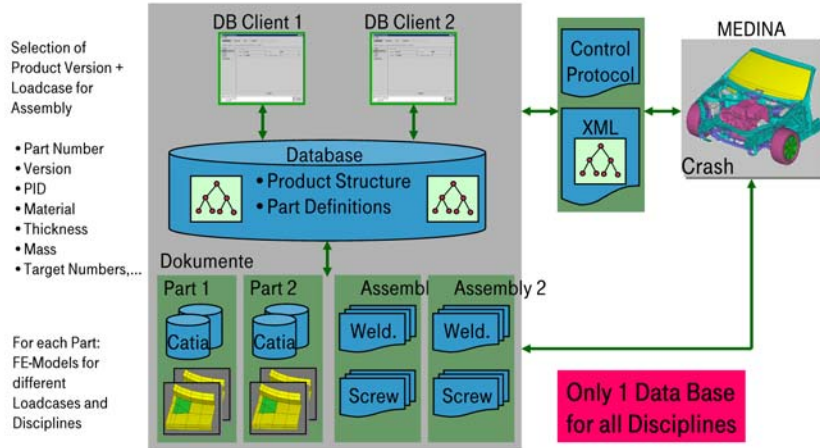
Overview Data Flow.



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**Model Assembly.**

Contents of Parts Database and Assembly-Process.



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**Model Assembly.**

Benefits: Modification Management.

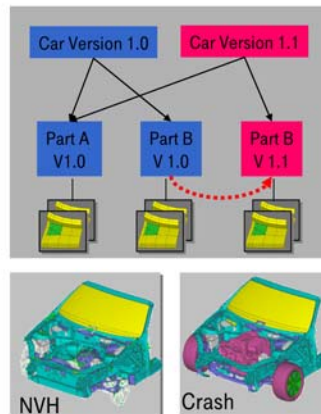
- Versioning Concept
- Variants Management

Benefit:

After Modifications faster,

prompt Model Update for

- all Loadcases/Disciplines
- all Car Variants



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**Model Assembly.**

Benefits: Assembly-Process.

Features in MEDINA + Parts Database:

- Adoption of complete Product Structure Information from PDM (incl. Versioning)
- Support of Part Number Areas for Nodes, Elements,...
- Support of Mirrored/Repeated Parts
- Support of Transformations for Construction/Mounting Position

Benefit:

- Documented, reproducible Computing Model States
- Time/Effort Savings for Modelling of Modifications
- Reuseability of Parts in Car Variants (same Part (e.g. Motor) at different Position)

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**Model Assembly.**

Benefits: Automatic Mass Balancing.

Process in MEDINA:

- Part-Attribute in Structure Tree (taken over from Database):
  - Target Mass per Part/Assembly
  - User-defined Mass Additions
- Computation of Structural Mass
- Generation of Added Masses
- Generation of Trim Masses (Remaining Difference to Target Mass)

Structural Mass	+	Added Masses	+	Trimmed Mass	=	Target Mass
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Benefit:

- Timesavings for all Modifications
- Mass Additions traceable and documented
- Error Minimisation

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### Model Assembly.

Benefits: Automatic De-Penetration.

#### Features:

- Automatic Elimination of Penetrations over Sheet Thickness (resp. Contact Thickness)
- Specification of Default Parts to include/exclude via MIDAS Parts Database

#### Benefit:

- Timesavings
- Error Minimisation



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### Model Assembly.

Benefits: Part Connections (I).

#### Modelling of Part Connections in MEDINA:

##### Connector Elements for

- |                 |          |
|-----------------|----------|
| ▪ Weld Spot     | SPOTWELD |
| ▪ Screw         | SCREW    |
| ▪ Bearing/Hinge | BEARING  |
- Weld Lines + Glueing: deferred to later Version of MEDINA

Import via Connector Lists from MIDAS Parts Database.



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**Model Assembly.**

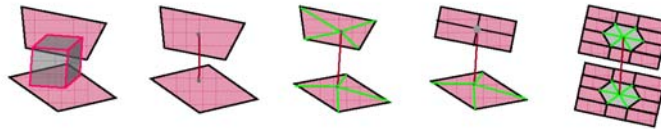
Benefit: Part Connections (II).

Features of Connector Elements:

- Mesh Independent
- Automatic Connection to Structure

Benefit:

- Connection-independent Modelling of Parts
- Simple Exchange of Parts for Modifications
- Different Part Models for different Disciplines/Loadcases

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**Model Assembly.**

Benefits: Part Connections (III).

Features of Connector Elements:

- Only 1 Connector for Triple Joints
- Reference to Part Numbers from PDM (or Property-Ids)

Benefit:

- 1:1 Relation of Connector Elements to Constructive Connection  
=> improved Control/Handling
- Simple Adoption e.g. of Weld Spot Lists from CAD  
without manual Transcription Part Number => Property
- Modified Lists can be passed to Construction 1:1

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**Model Assembly.**

Benefits: Part Connections (IV).

Connectors are Solver-independent and Generic.

Connector Element = Solver-independent Definition of Connections	Connector Property = Definition of Discretisation
<ul style="list-style-type: none"><li>• Geometry</li><li>• Parts</li><li>• Search Strategy</li><li>+ Parameter</li></ul>	<ul style="list-style-type: none"><li>• Discretisation rule for each Solver: NASTRAN: CWELD, HEXA,... PAMCRASH: PLINK,HEXA,...</li></ul>

Benefit:

- 1 Set of Connector Elements for all Solvers and Disciplines
- Minimal Maintenance, Consistency

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11.4.03, Seite 19**CAE-Process Support with MIDAS and MEDINA.**

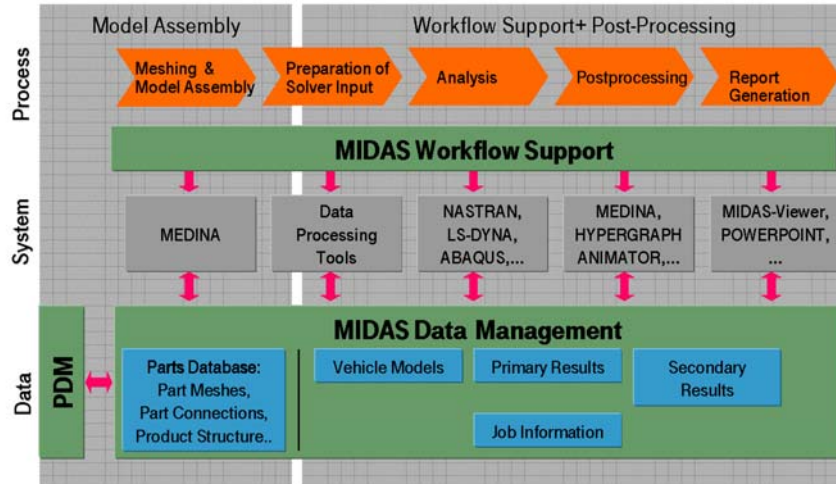
Agenda.

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**Result DataManagement / PostProcessing.**  
CAE System Landscape.



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**PostProcessing.**  
Process Support with MIDAS.



**Advantages :**

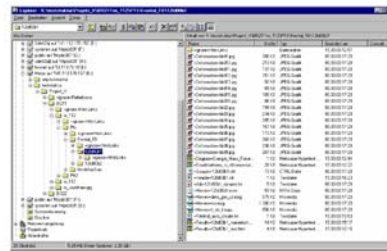
- Timesavings while increasing Process Security
- Flexible Variants Comparison by Dynamic Data Access
- Open Architecture regarding Applications and Data

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**PostProcessing.**  
MIDAS Data Management.

- Filesystem based
- Standardised, transparent Data Storage
- Split up into primary and secondary Results (Migration)



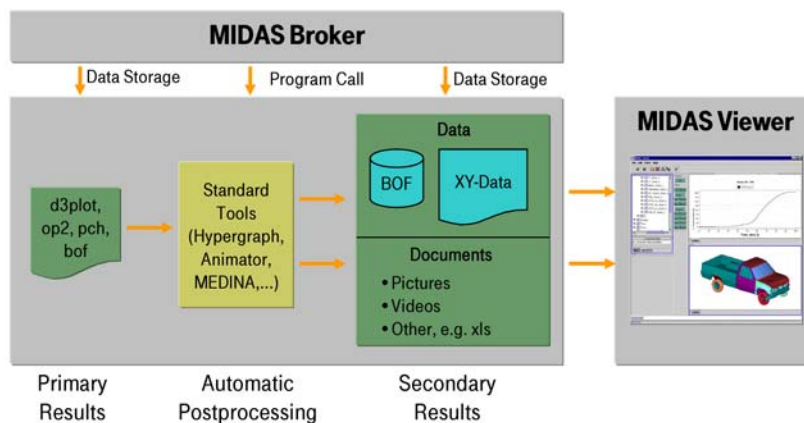
**Advantages:**

- Data accessible for the entire Team
- Use of existing Hardware + Data Migration Concepts
- Small Investments for Infrastructure and Operation
- Continuity: Benefits without Risk



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**PostProcessing.**  
MIDAS Data Management and Software Components.



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**PostProcessing.**

MIDAS Components : broker.

**Batch Procedure for Processing of Primary Results**

- Automatic Start
- Control Statements in Solver Deck
- Call of Standard Tools (Animator, MEDINA, Hypergraph,...)

**Functions:**

- Generation of Car Variants from Data Management
- Check of Compute Job towards Regular Completion
- Generation of Overview with „Solver“-typical Information
- Execution of Standard Analyses
- Execution of User Controlled Analysis
- Storage of all Associated Data of the Data Structure

**Benefit:**

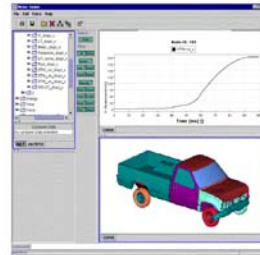
Relief of Routine Tasks, Timesavings, Comparability

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11.4.03, Seite 25**PostProcessing.**

MIDAS Components : viewer.

**User-Interface:**

- Navigate
- Visualise
- Filter
- Edit + Dynamical Comparisons
- Third-Party Applications
- Management of Additional Project Data (incl. Display)

One-click Interactive Execution of Comparisons between Variants  
(Diagrams, Tables)**Benefit:**

Timesavings, Improved Analysis Methods

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**PostProcessing.**  
Availability of MIDAS.

**Supported Applications:**

Crash	(LS-DYNA)	Productive for 2 years
NVH	(NASTRAN)	Productive for 6 months
Stiffness/Durability	(NASTRAN)	in Production

Openness with respect to Solvers and Embedding of Standard  
Postprocessors, e.g. MEDINA, Animator, Hypergraph,...

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**Thank you very much for  
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