



MSR goes ASAM

Argumentor

MSR-MEDOC, Ulrich Vogel, BMW Group



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Präliminarien

Projektbeteiligte
Firmen

MSR-MEDOC [MEDOC]

Name Rollen	Abteilung	Adresse	Kontakt
Ulrich Vogel	BMW Group		

Versionsinformation

Dokumentteil	Herausgeber			
	Firma	Version	Status	Anmerkungen
1 RD 2001-03-21 Details siehe Nr. 1, Seite	Ulrich Vogel			

1 Presentation Slides

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MSR Agenda structure



❖ History, Mission, Organisation of the MSR Consortium

MSR

❖ Proceeding proposed by MSR for a ‚merger‘

❖ Organisation of the MSR MEDOC

❖ Goals, scope and lessons learned of MEDOC

❖ Expectations of MEDOC for an ASAM e.V. merger

MEDOC

❖ Use cases for MSRSYS, MSRSW, MSRCC

❖ A short demo of a MSRSYS implementation at BMW

❖ History, scope, organisation and results of MEGMA

MEGMA

❖ Examples, Outlook and next steps to go

Abbildung 1: Agenda

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Proceeding proposed by MSR for a ,merger‘

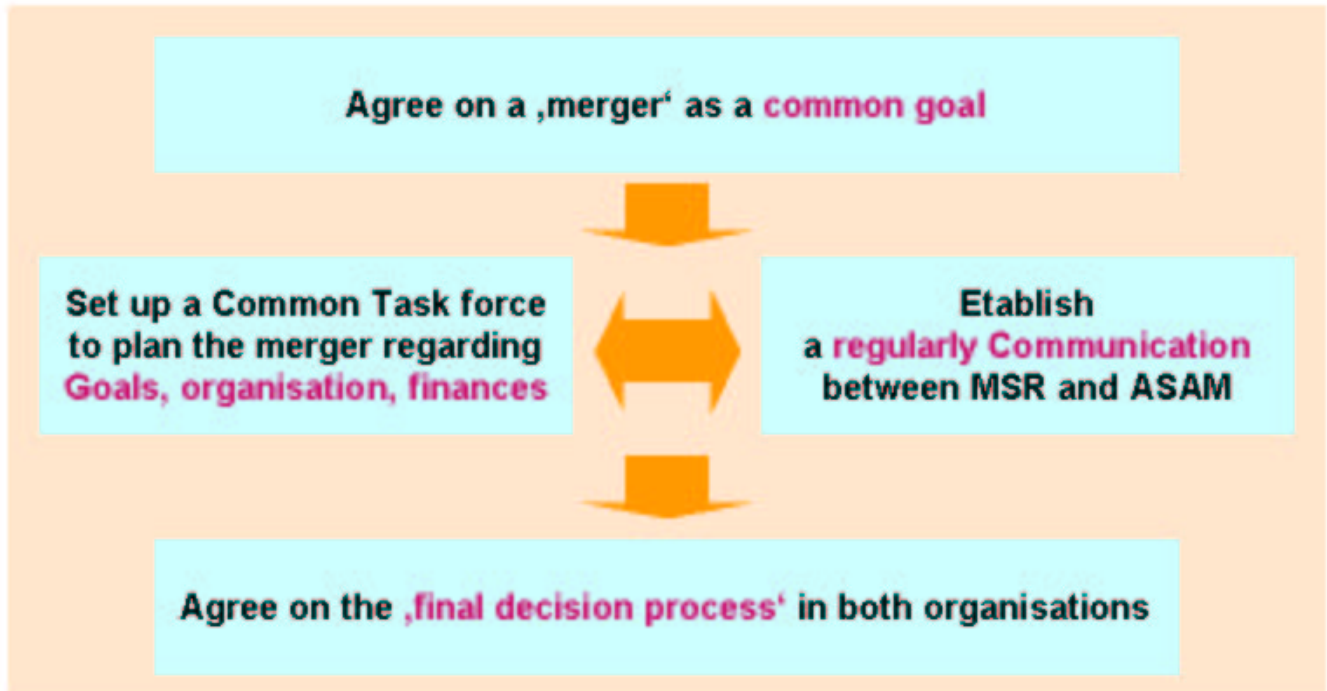


Abbildung 2: MEDOC Proposed Proceeding

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History 1: Where it all started



We have the year 1990

An initiative of the top manager of the development (E-Leiter) of the german car makers (Audi, BMW, DC, Porsche, VW):

Foundation as so called ,E-Leiter Arbeitskreis', a common working group, MSR is organized at within the strategy circle 4, electric/electronics.

The goal was development of cost reduction potentials by cooperation in non competitive areas and the use of synergy potentials in a common project

Abbildung 3: MSR History

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MSR History 2: Who are MSR?

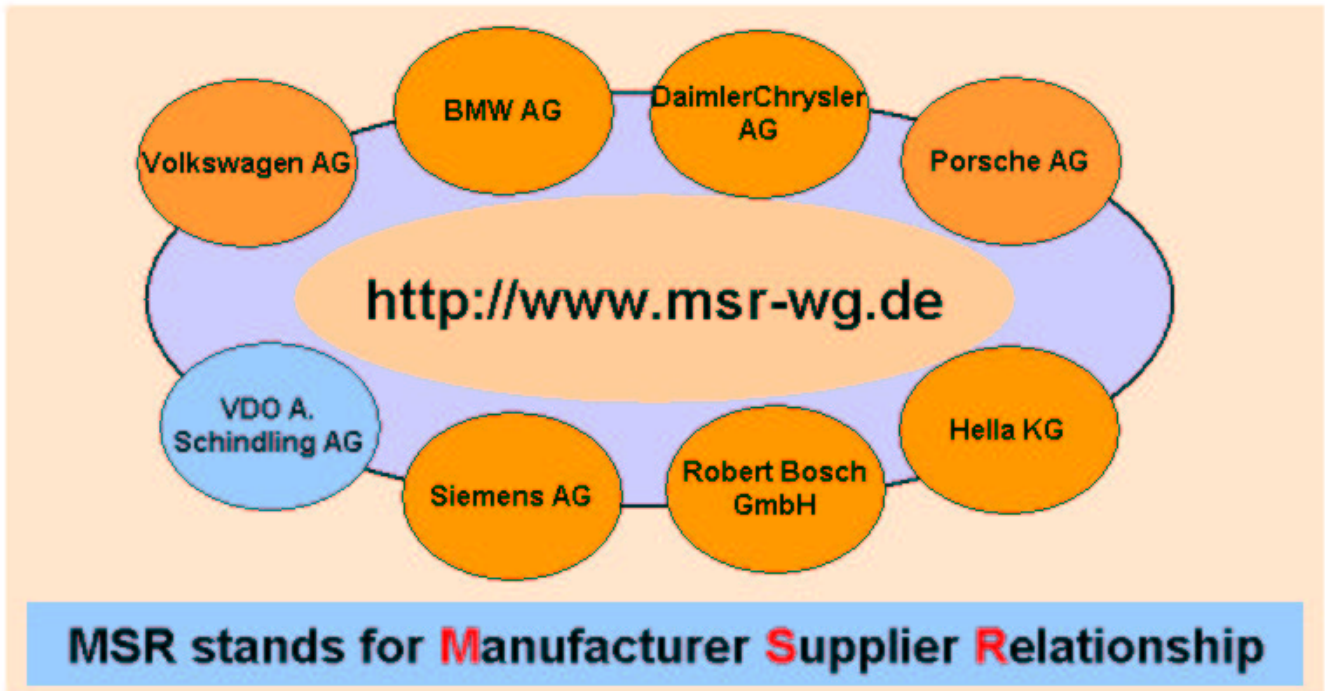


Abbildung 4: MSR Members

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History 3: Phases of MSR and MEDOC

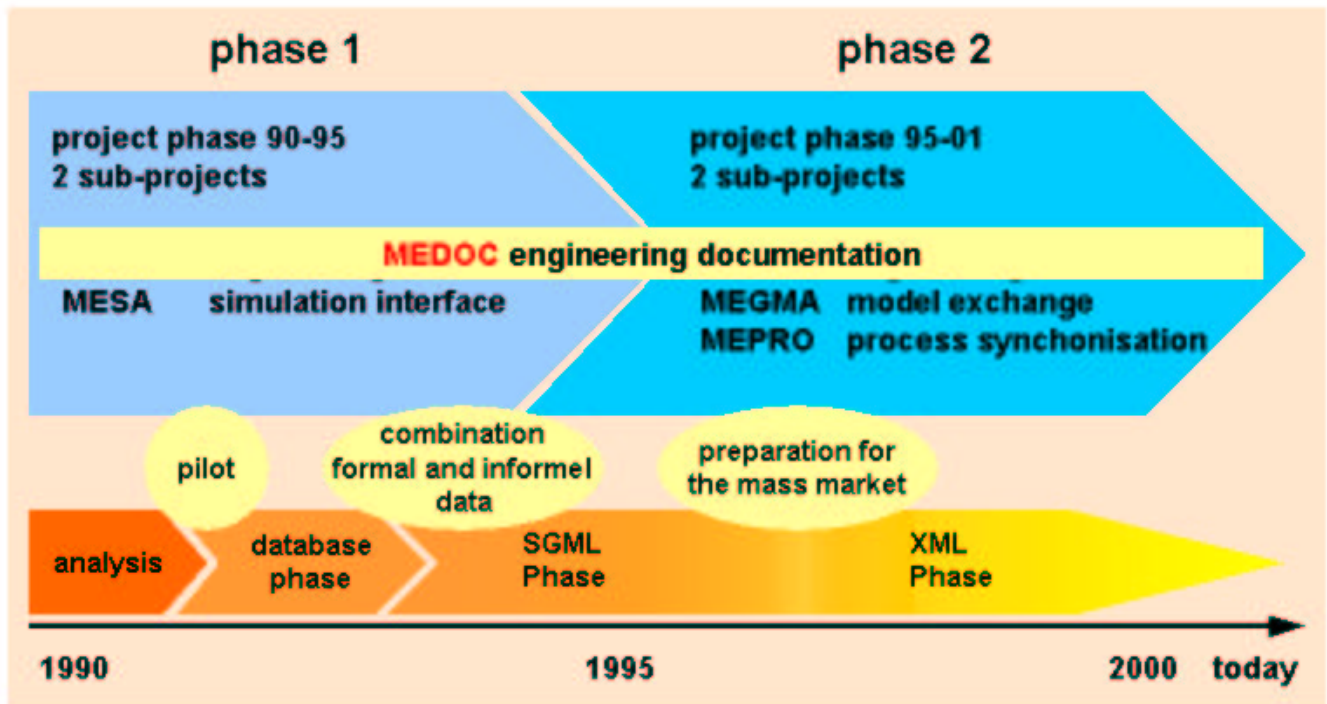


Abbildung 5: MEDOC Phases

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Organisation MSR

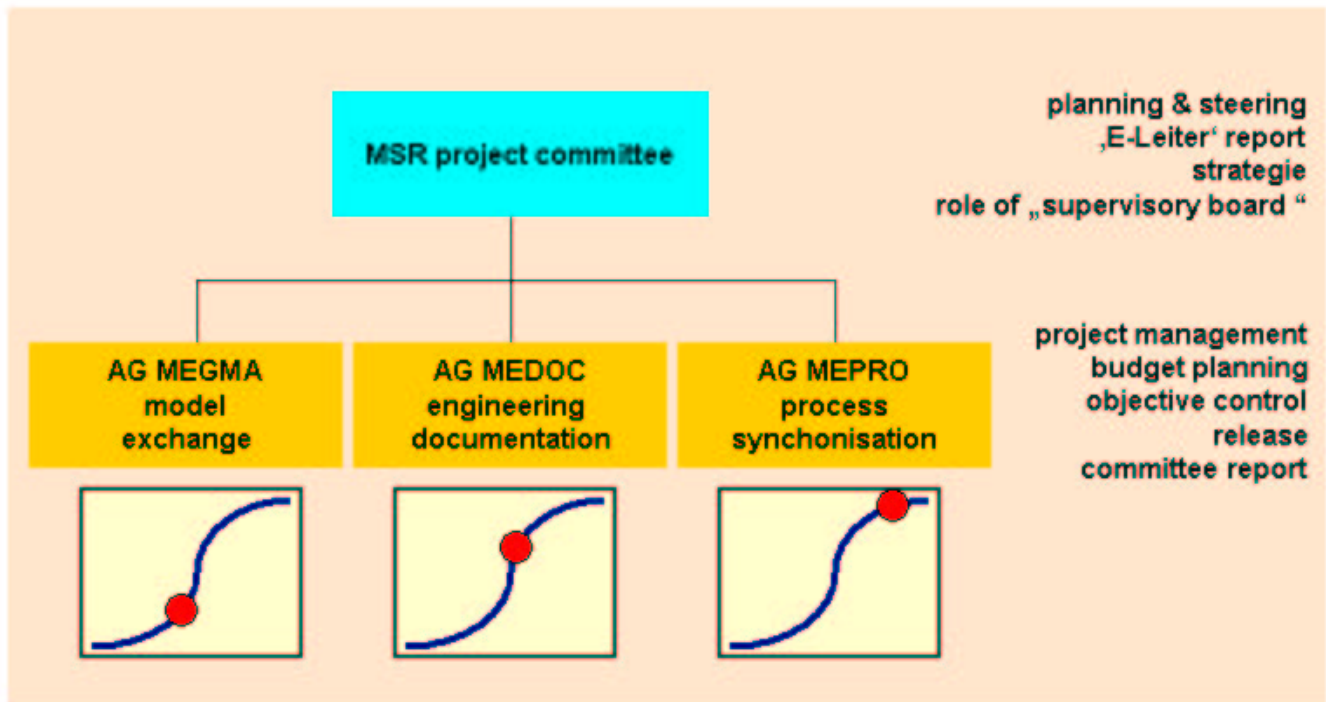


Abbildung 6: MSR Organisation

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MSR Roadmap ASAM merger



4./5.7.00	MSR Workshop	Need for a change
21.11.00	MSR Consortium	MEDOC assigned to plan an ASAM merger
12.12.00	MEDOC SC	Concepts for the merger
6.2.01	MEDOC SC	First draft for set of MEDOC slides
8.3.01	MSR Consortium	OK for slides, review criteria for merger
21.3.01	MSR & ASAM MB meeting	First 'real' contact with ASAM MB
22.3.01	ASAM management board	ASAM MB decides
3.4.01	MEDOC SC	first reactions to ASAM decisions
17.4.01	ASAM membership meeting	approval by ASAM members
24.4.01	MSR Consortium	MSR reviews the ASAM results

Abbildung 7: Merger Roadmap

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Presentation of MEDOC



MEDOC

MEDOC stands for **M**SR **e**ngineering **d**ata **o**bjects and **c**ontents

MSR stands for **M**anufacturer **S**upplier **R**elationship

Abbildung 8: MEDOC

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MSR-MEDOC

MEDOC MSR engineering documentation



objectives:

seamless, continuous and consistently structured product documentation for electric/electronic components and systems over their whole lifecycle e.g. for requirements specification

Implementation platform and tool independant

Exchange of information between car manufacturer and supplier without data conversion

Integration in heterogenous IT environments (PDM/TDM)

benefits:

support of views (e.g. requirements specification vs. Functional specification)

structural unification, but no access mechanisms

document comprehensive mechanisms (reference concepts)

Abbildung 9: MEDOC Objectives

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MSR-MEDOC Results



<i>developed structures (DTDs)</i>	<i>processed domains</i>
MSRSYS	electric HW-system and components
MSRSW	ECU software functions
MSRNET	system network
MSRDIA	diagnosis specification
MSRFMEA	failure mode and effect analysis
MSRCC	container for code, SW-configuration and their documentation based on SW-Modules
MSRREP	general documentation and change management structure

Abbildung 10: MEDOC-Results

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MSR-MEDOC

Organisation MEDOC

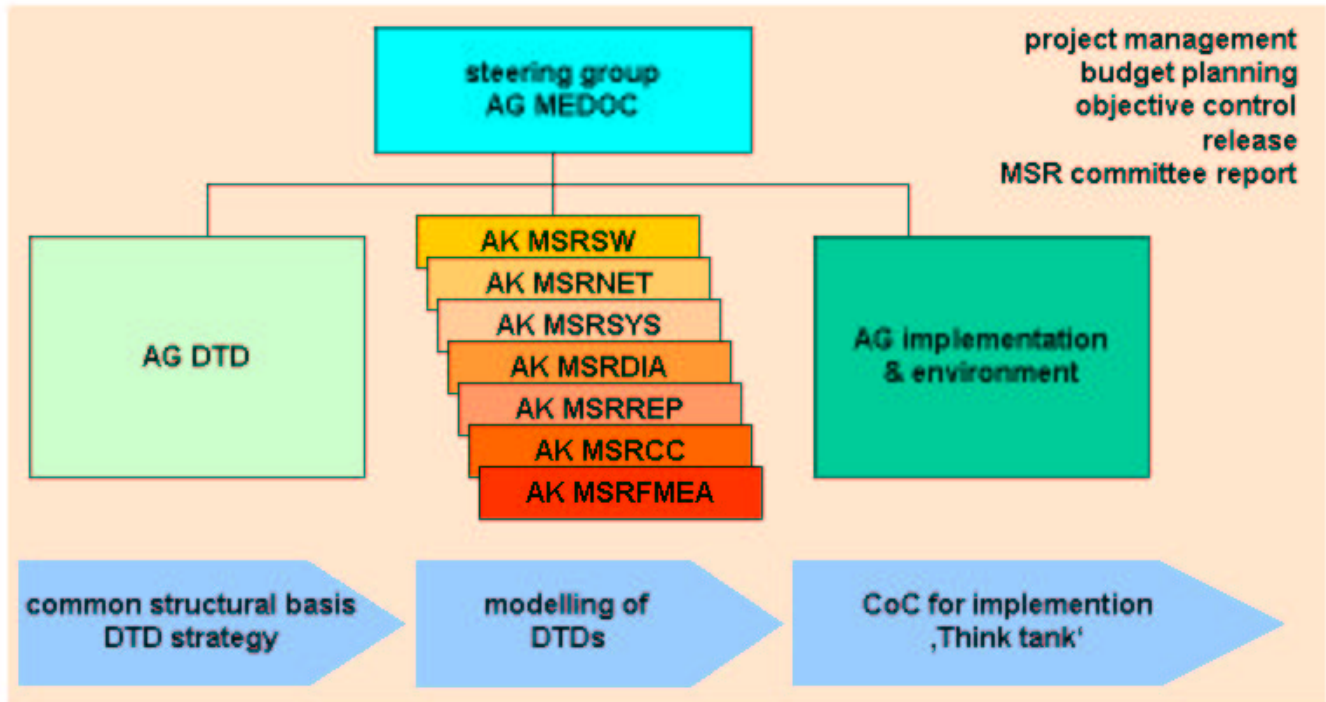


Abbildung 11: MEDOC Organisation

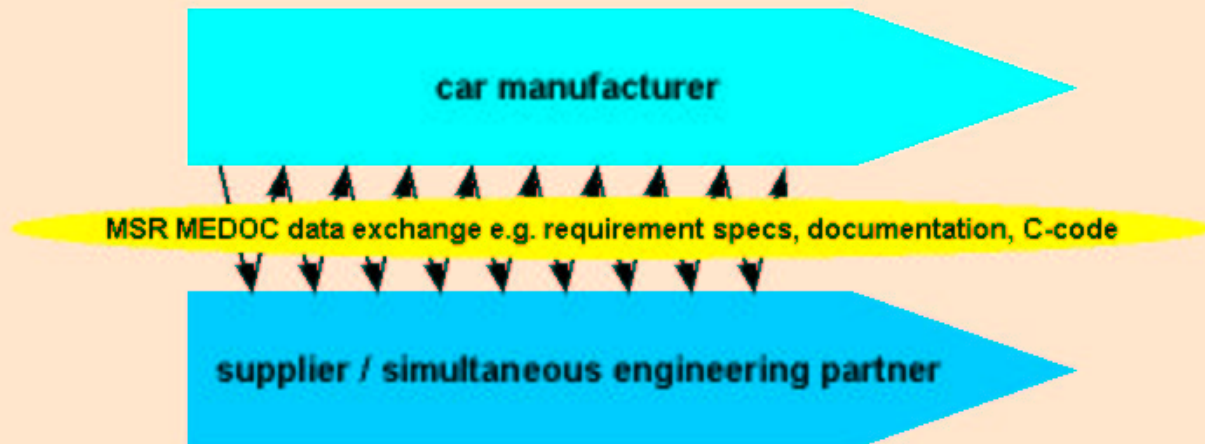
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MSR-MEDOC

MEDOC MSR development documentation



considered process (simplified):



MEDOC stands for **MSR** engineering **d**ata **o**bjects and **c**ontents

Abbildung 12: MEDOC Data Exchange

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Positioning in the level model for structured content

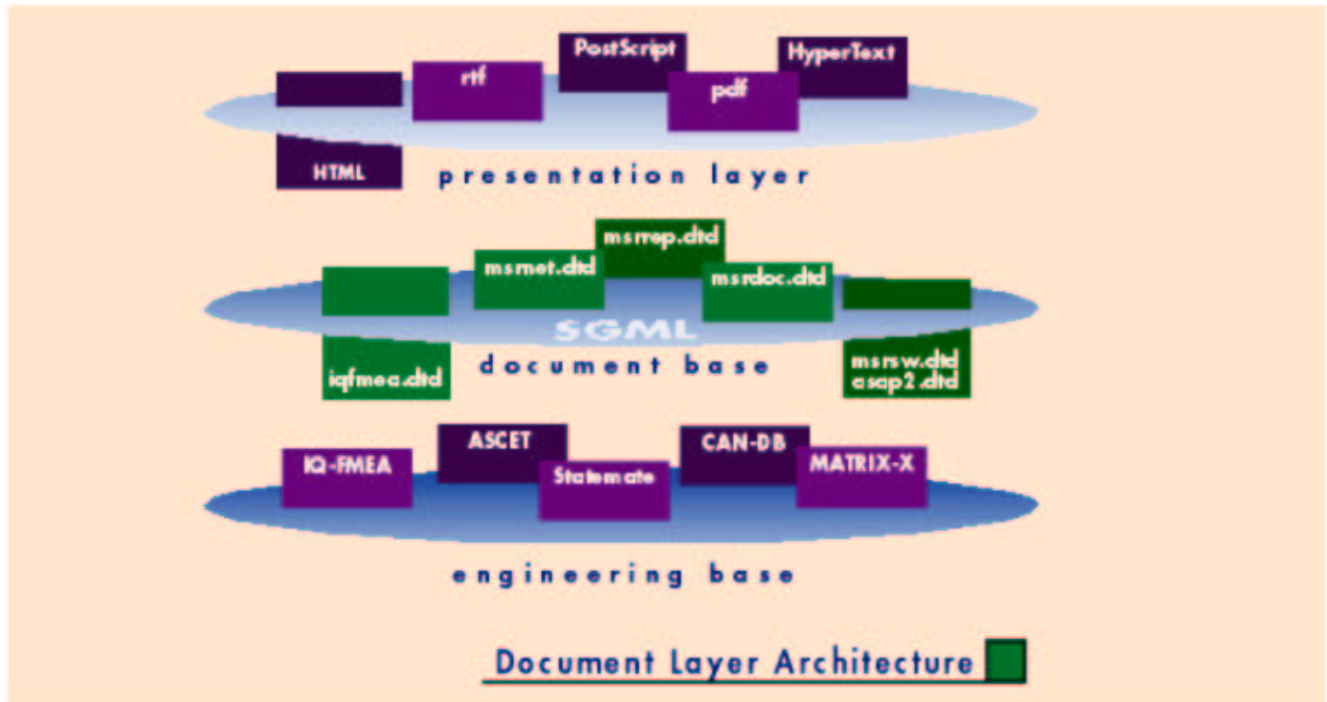


Abbildung 13: Level Model

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MEDOC : lessons learned



POSITIVE

- business model determines to act in different roles (e.g. as architect, mason, resident)
- impulsive power by use of technology within (car-) series projects
- voluntary liaison that means voluntariness of attendance AND bound by contract
- small is beautiful
- torch relay: not all partners are in all times in a leading role by the use in series project, solidarity in the group as a compensative power
- basic mental attitude is 'open minded' not 'let's fight'
- formal, document based (MSRREP / SGML) change management process

NEGATIVE

- low market penetration
- focused on technology
- (still) too weak feedback from widely implementations
- individual rollout processes within the partner companies
- lack of integration of the tool suppliers

Abbildung 14: MEDOC : Lessons Learned

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Expectations from MSR for an ASAM e.V. merger



organisation	❖ stable organisation ❖ international members ❖ quick decision processes ❖ international members
strategy	❖ focus on embedded-systems development not only for vehicles ❖ market penetration by integration of the tool suppliers ❖ transparent business processes
content	❖ common XML architectur for ASAM and MSR information models ❖ further development of the released methods
persistence	❖ long term goal planning ❖ stable financing basis

Abbildung 15: MEDOC Expectations

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desirable scenario,

MSR integration into ASAM on the human basis

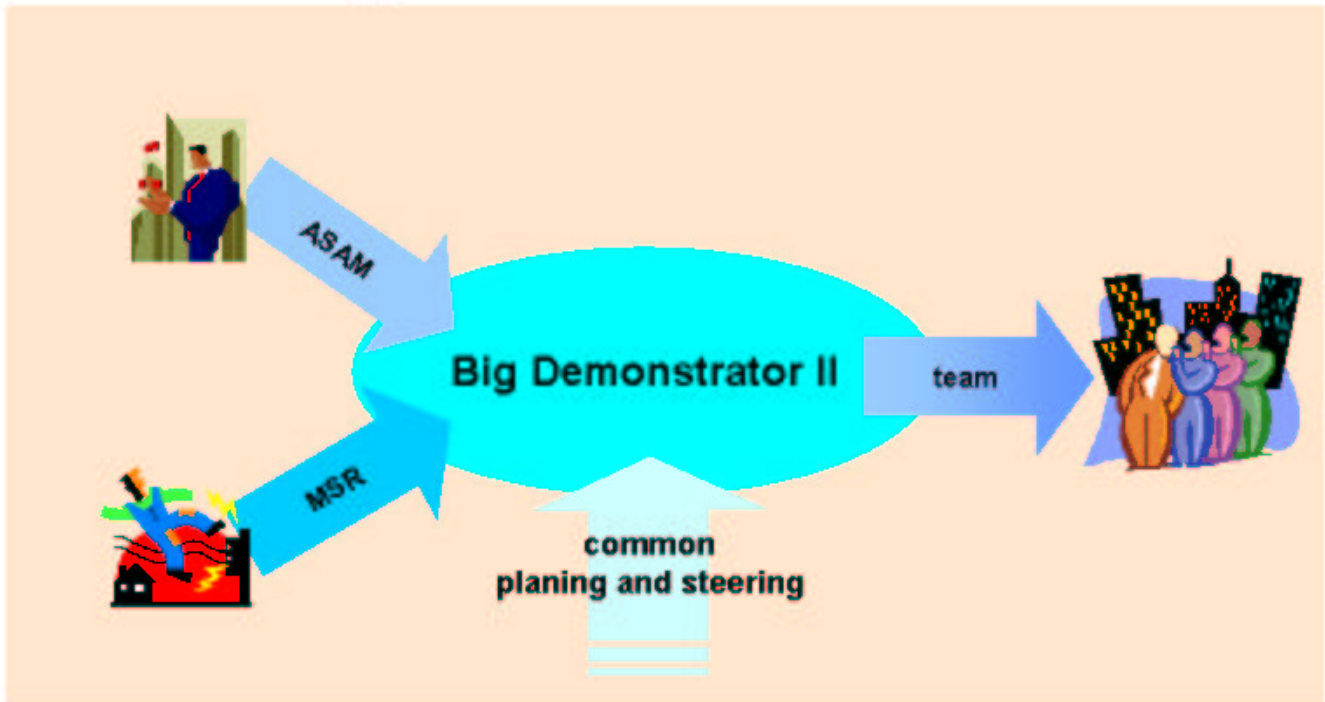


Abbildung 16: MEDOC Integration Scenario

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Examples and practical demonstration



- **selected short examples for the use of**

- a) **MSRSYS** **electric component design**
- b) **MSRSW** **ECU SW specification**
- c) **MSRCC** **SW module exchange**

- **practical demonstration of an authoring system for electric components using the MEDOC MSRSYS structure (BMW project eCIS)**

Abbildung 17: Examples and Demos

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Example 1: implementation MSRSYS

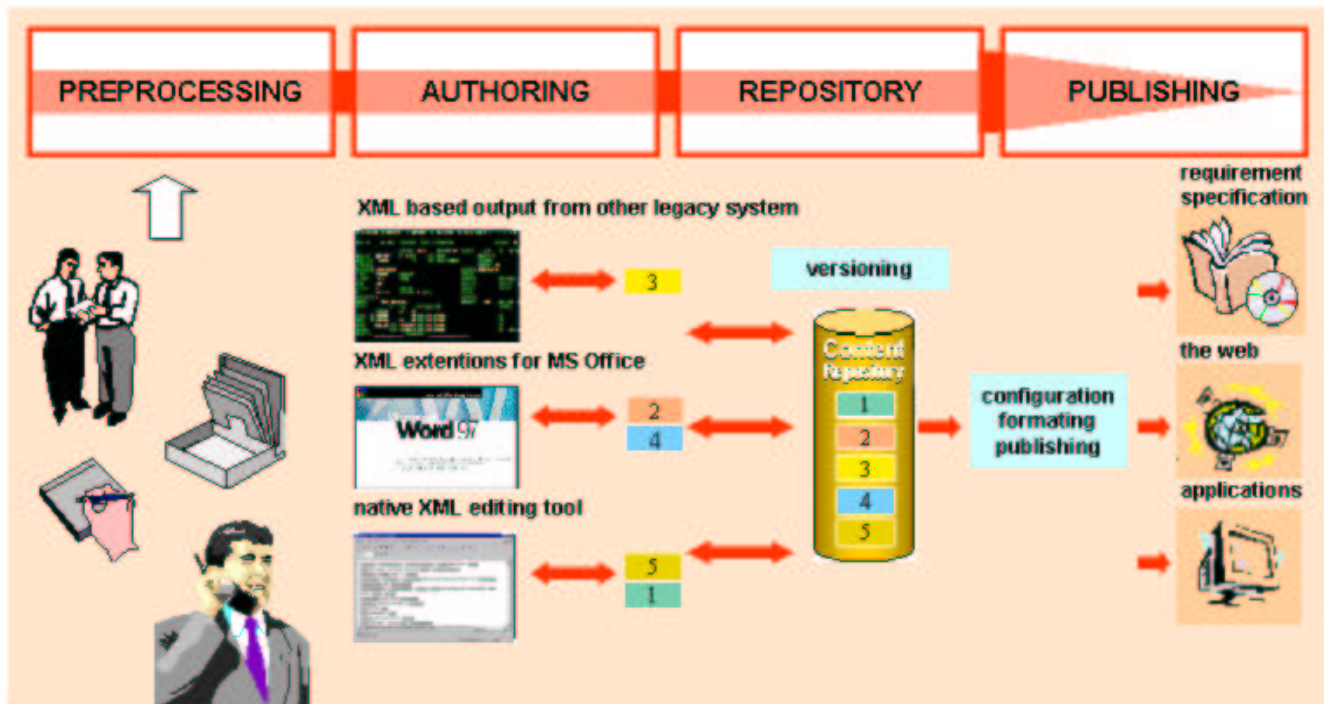


Abbildung 18: MSRSYS

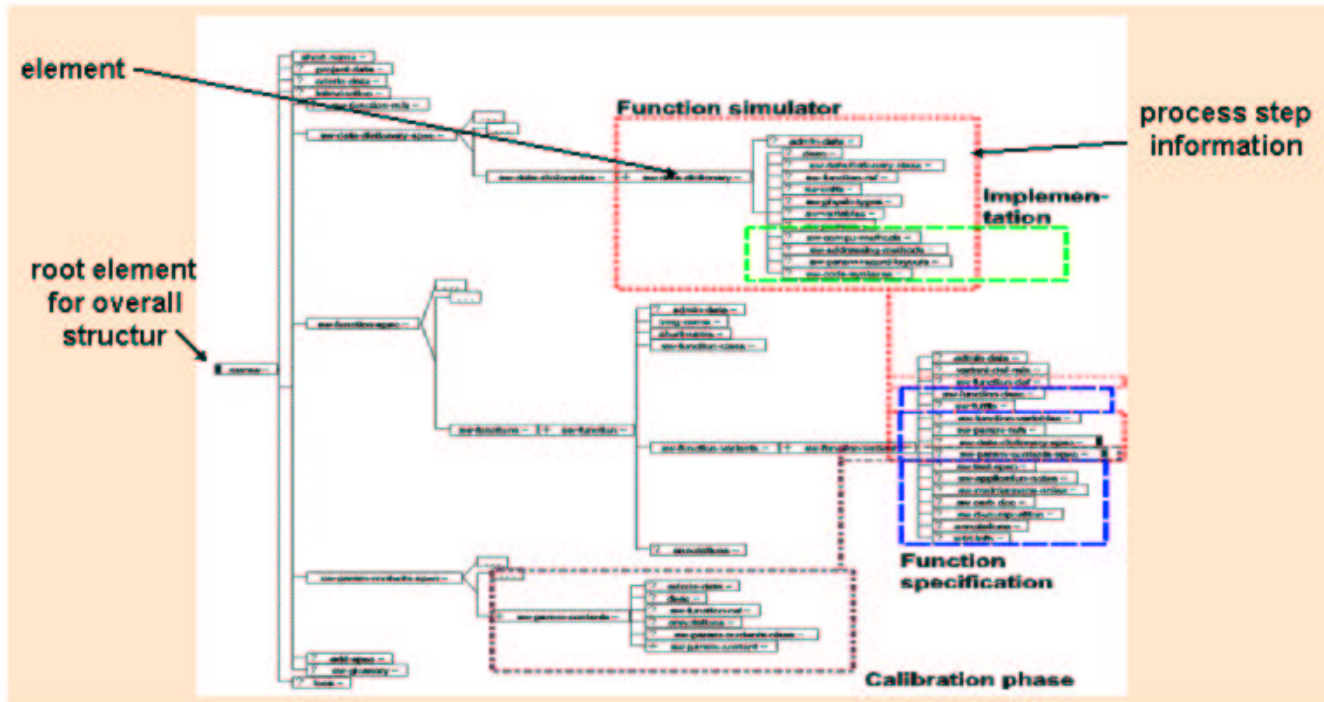


Abbildung 19: MSRSW

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Using the overall structure in a process
orientated tool environment

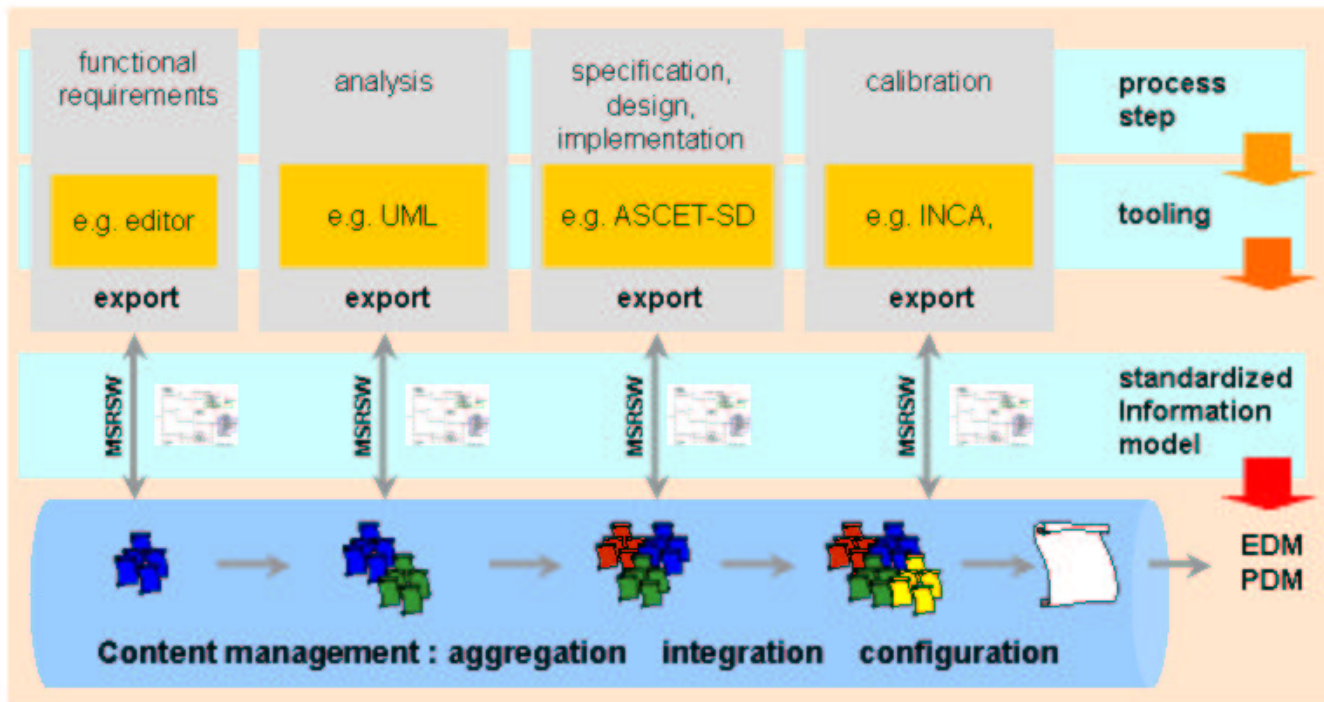


Abbildung 20: MSRSW-Process

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documentation with MSRSW
example case tool ASCET-SD (1)

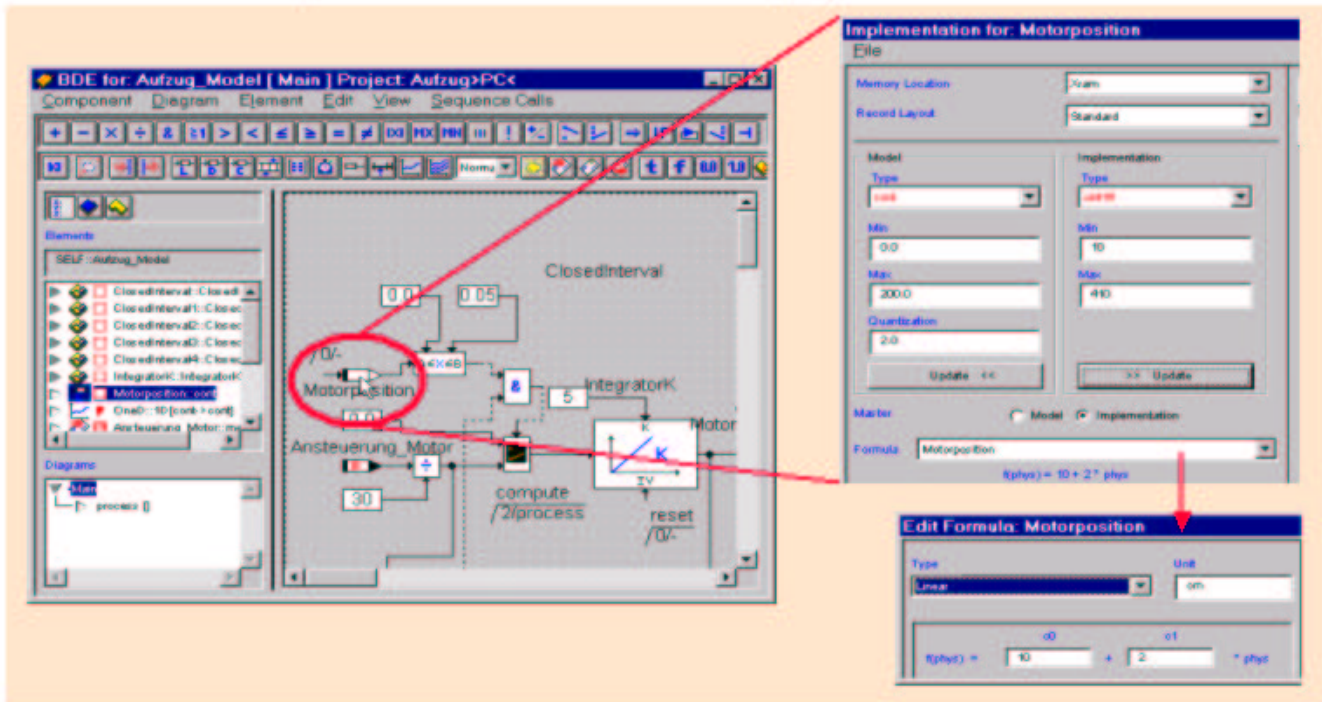


Abbildung 21: MSRSW: System Design Tool

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documentation with MSRSW

example case tool ASCET-SD (2)



Implementation for: Motorposition

File

Memory Location:

Record Layout:

Model Type:

Implementation Type:

Min:

Max:

Quantization:

Update << >> Update

Master: ☐ Model ☒ Implementation

Formula:

$f(\text{phys}) = 10 + 2 * \text{phys}$

Sample sequence of the exported MSRSW structur

```
<SW-VARIABLE CALIBRATION="calibration">
<LONG-NAME></LONG-NAME>
<SHORT-NAME>Motorposition</SHORT-NAME>
<DESC></DESC>
<SW-VARIABLE-IMPLEMENTATION>
<SW-BASE-TYPE>UWORD</SW-BASE-TYPE>
<SW-LIMITS>
<PHYS>
<PHYS-MIN>0.0</PHYS-MIN>
<PHYS-MAX>200.0</PHYS-MAX>
</PHYS>
</SW-LIMITS>
<SW-VAR-INIT-VALUE>0.0</SW-VAR-INIT-VALUE>
<SW-ADDRESSING-METHOD-REF>XramI16</SW-ADDRESSING-METHOD-REF>
<SW-COMPU-METHOD-REF>Motorposition</SW-COMPU-METHOD-REF>
<SW-CODE-SYNTAX-REF>XramU16</SW-CODE-SYNTAX-REF>
</SW-VARIABLE-IMPLEMENTATION>
</SW-VARIABLE>

<SW-COMPU-METHOD>
<SW-COMPU-METHOD>
<LONG-NAME></LONG-NAME>
<SHORT-NAME>Motorposition</SHORT-NAME>
<SW-UNIT-REF>cm</SW-UNIT-REF>
<SW-ASAP-6-PPM-METHOD>0 2 10 0 0 1</SW-ASAP-6-PPM-METHOD>
</SW-COMPU-METHOD>
</SW-COMPU-METHOD>
```

Edit Formula: Motorposition

Type: Unit:

$f(\text{phys}) =$ $+$ $*$

Abbildung 22: MSRSW Data Mapping

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documentation with MSRSW

example formater postprocessing

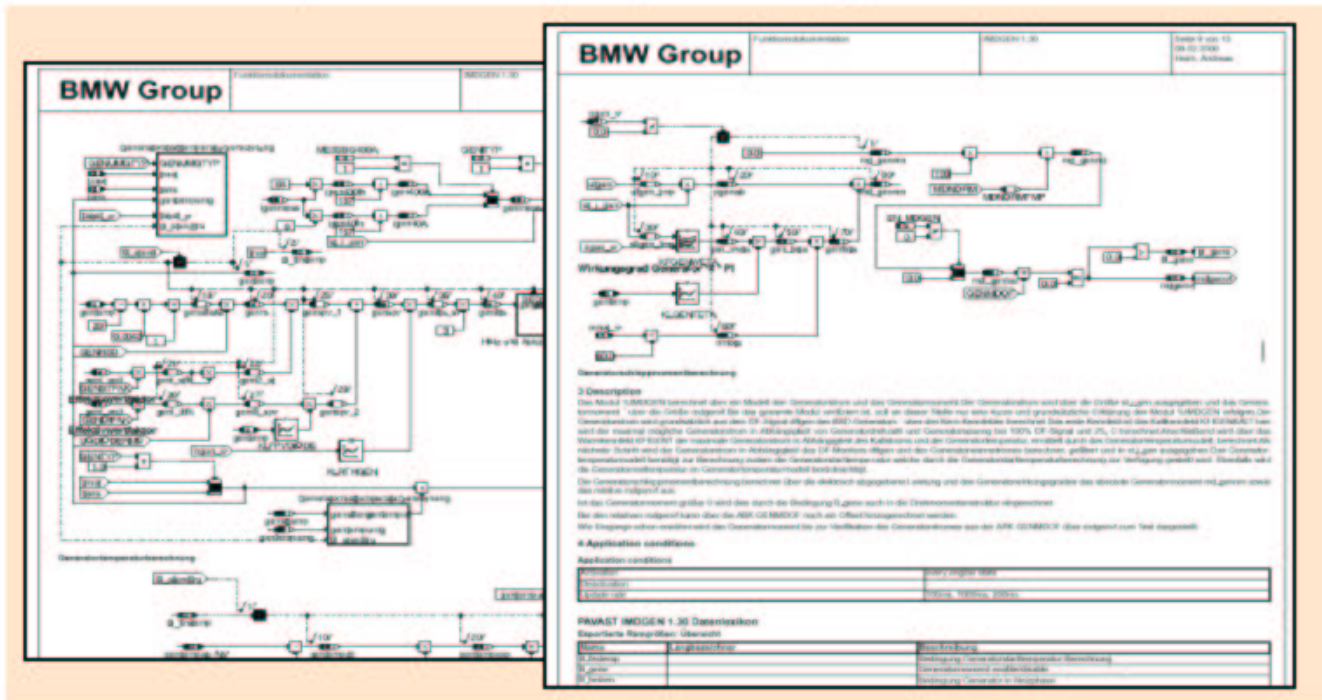


Abbildung 23: MSRSW: Formater

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coupling of TDMs using MSRCC

example engine control unit SW development

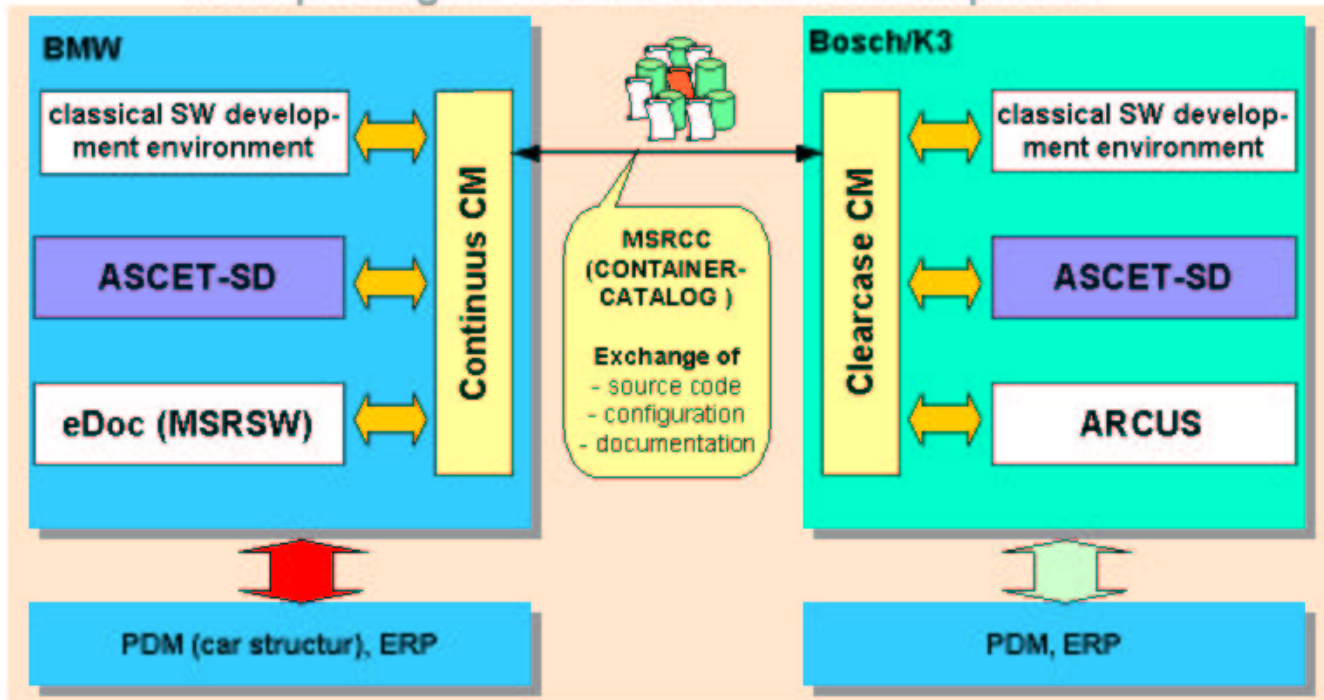


Abbildung 24: MSRCC

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MSR Strategic proposal

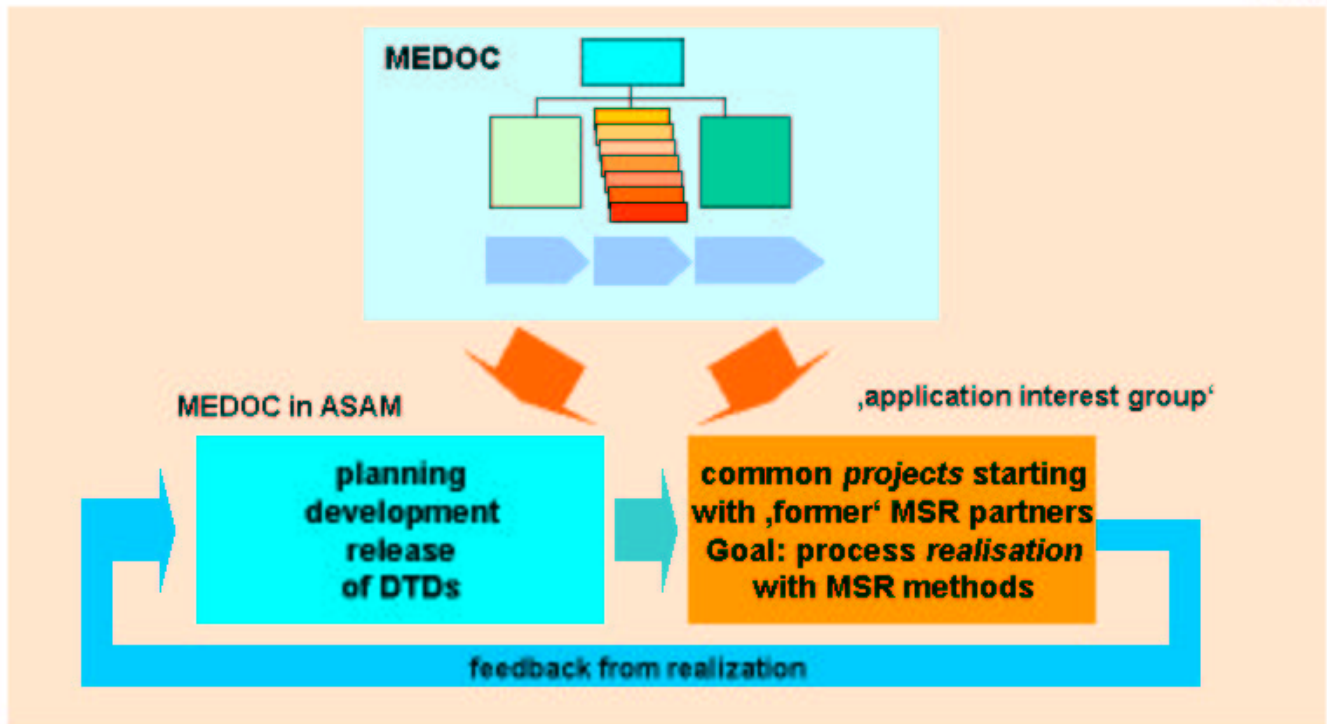


Abbildung 25: Strategic Proposal

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MSR Presentation of MEGMA



MEGMA

MEGMA stands for **M**SR **e**ngineering **g**raphic **m**odel **e**xchange

MSR stands for **M**anufacturer **S**upplier **R**elationship

Abbildung 26: MEGMA

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MSR-MEGMA Organisation

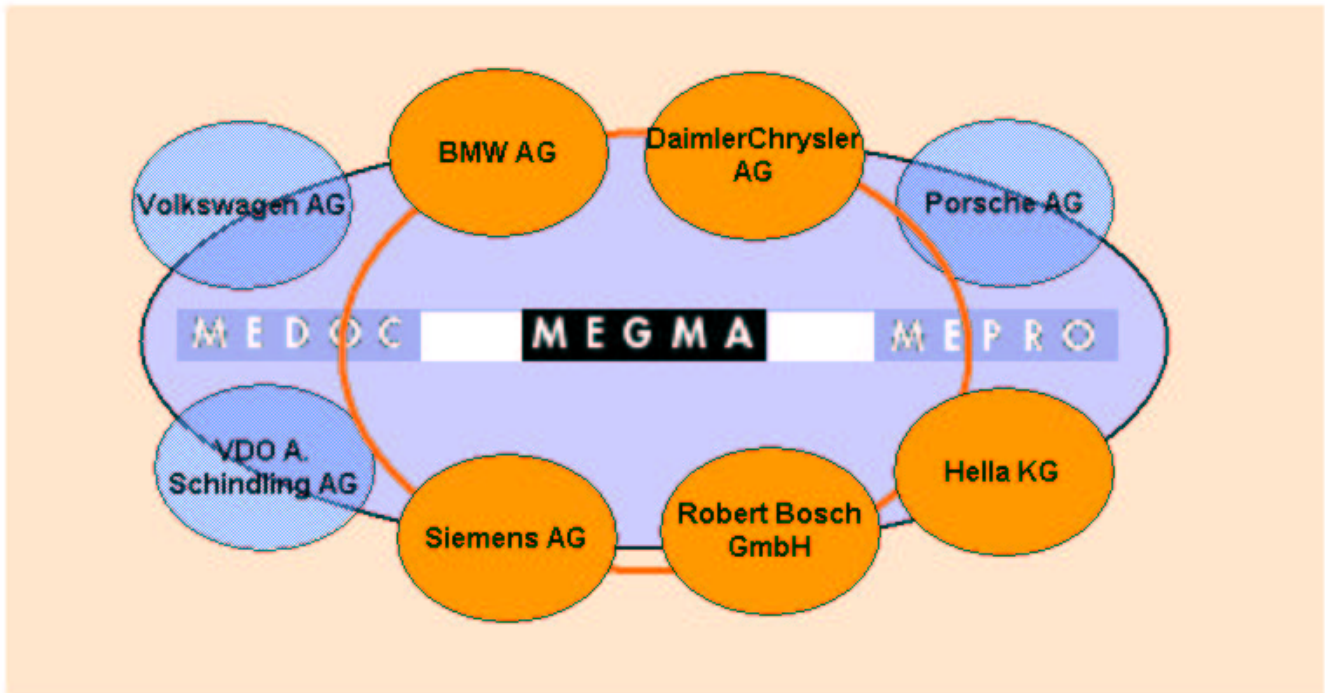


Abbildung 27: MEGMA Organisation

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MSR-MEGMA History

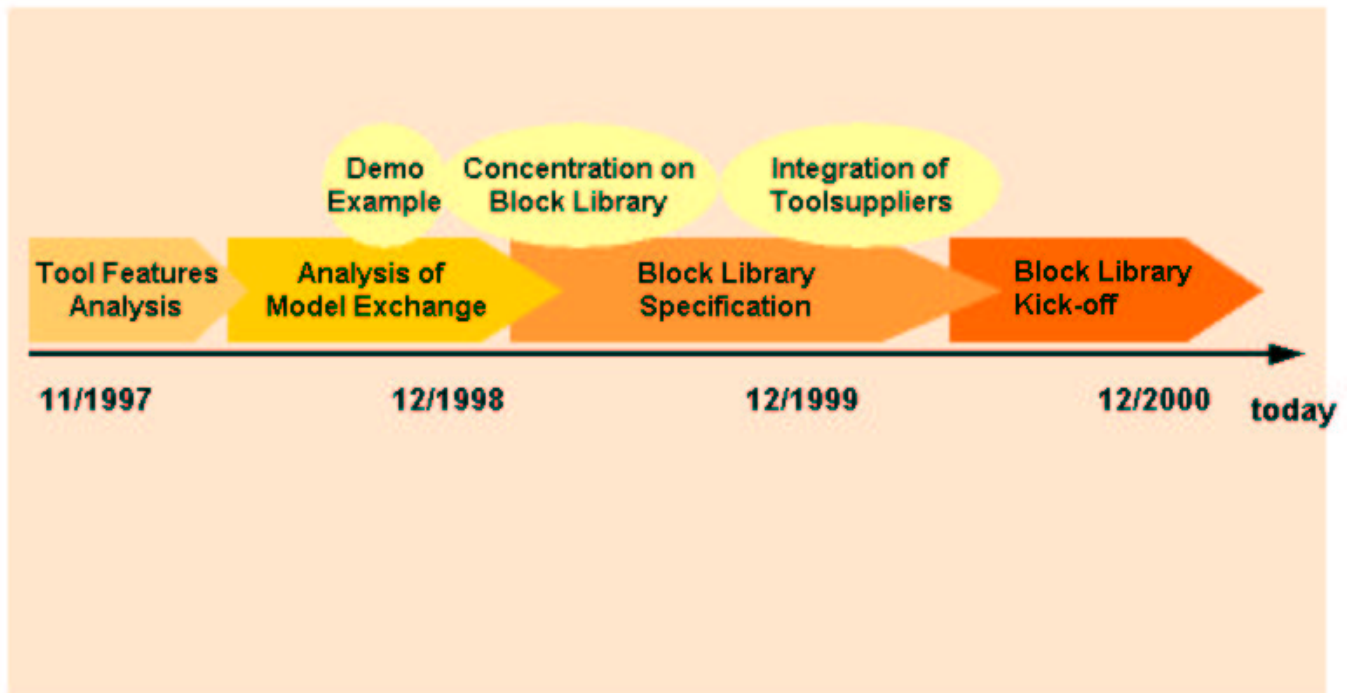


Abbildung 28: MEGMA History

Model based function specification and development.

- Standardization of modelling
- Enhancement of Modelling Tools
- Interfacing for Specification and Documentation
- Model Exchange between Tools

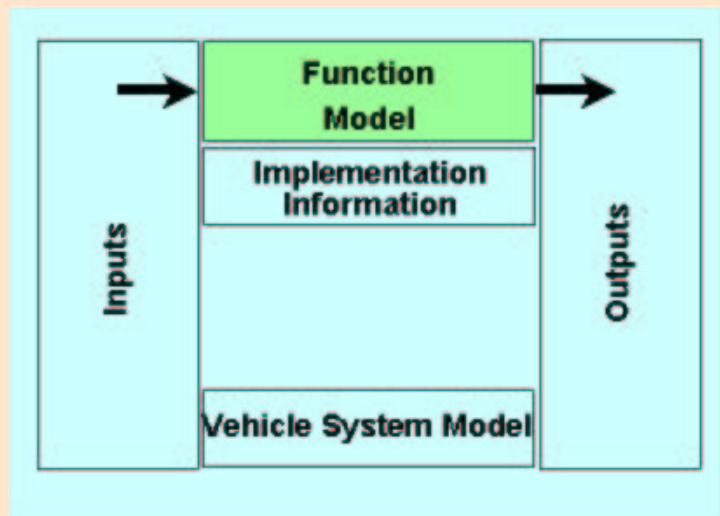


Abbildung 29: MEGMA Goals

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MSR-MEGMA

Technical Focus: Model Exchange



**MEGMA goal:
Conversion Process for
Standardized Block Library**

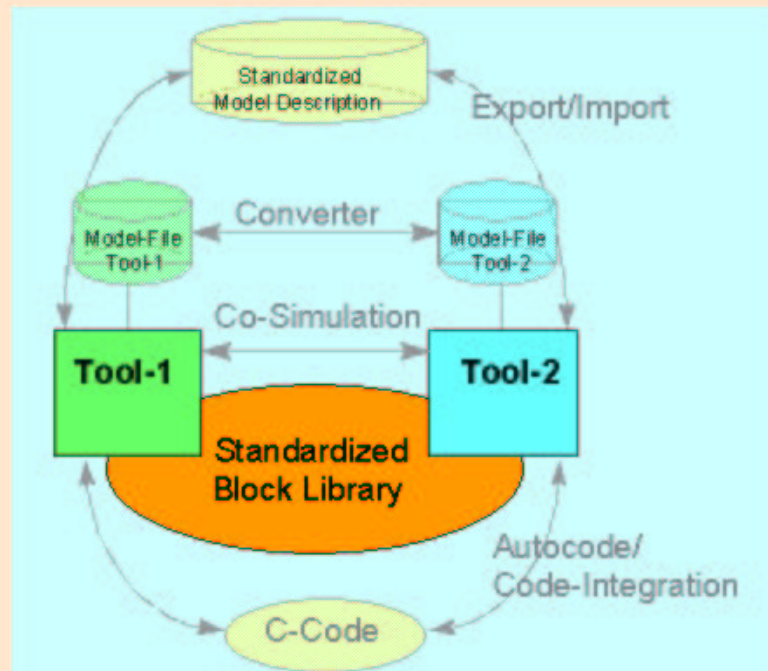


Abbildung 30: Technical Focus

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Integration of Tool Suppliers

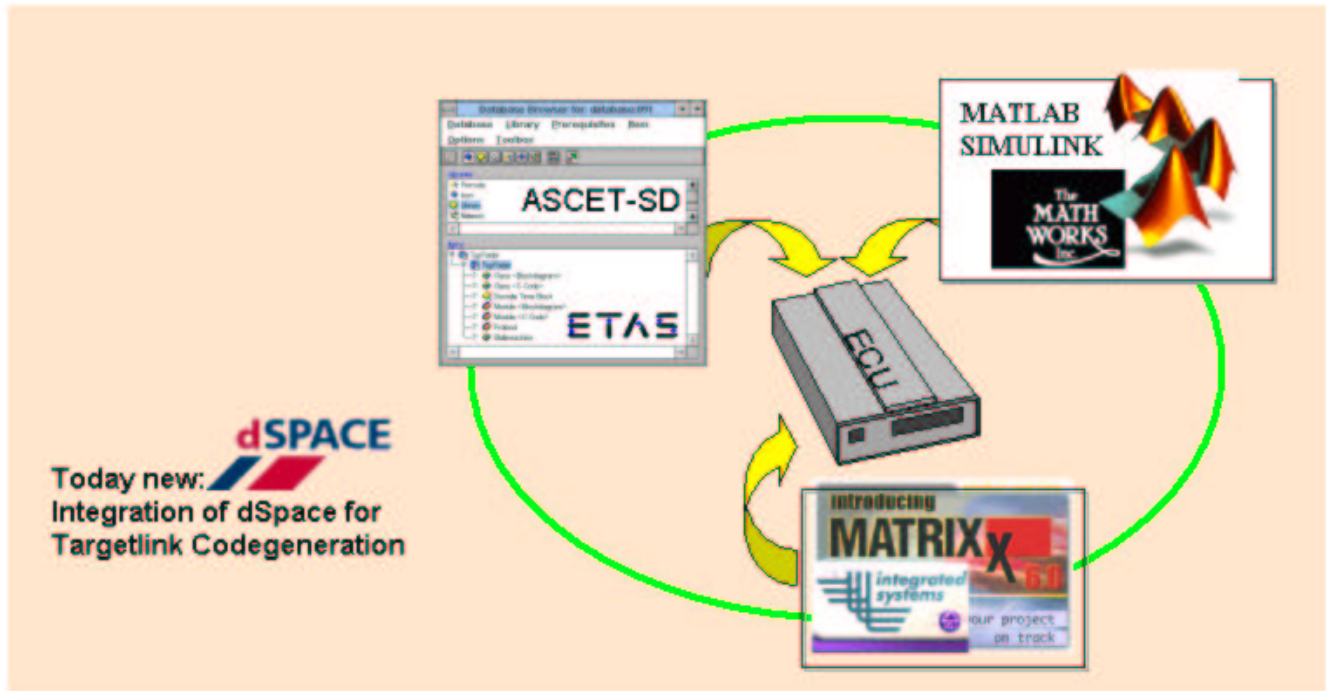


Abbildung 31: Tool-Suppliers

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MSR Automotive Block Library Benefits



The MSR Automotive Block Library

- **Standardizes model based function development.**
- **Furnishes a full set of blocks for discrete modelling.**
- **Provides blocks with identically verified behaviour.**
- **Results in homogenous models in structure, hierarchy and function.**
- **Improves the reuse of models.**
- **Improves documentation and requirements engineering process. (i.e. automatic content for MSRSW.DTD)**
- **Provides the basics for additional guidelines for autocode.**
- **Is the foundation for possible future automatic model exchange.**

Abbildung 32: Automotive Block Library Benefits

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Demo Example: Engine Idle Control

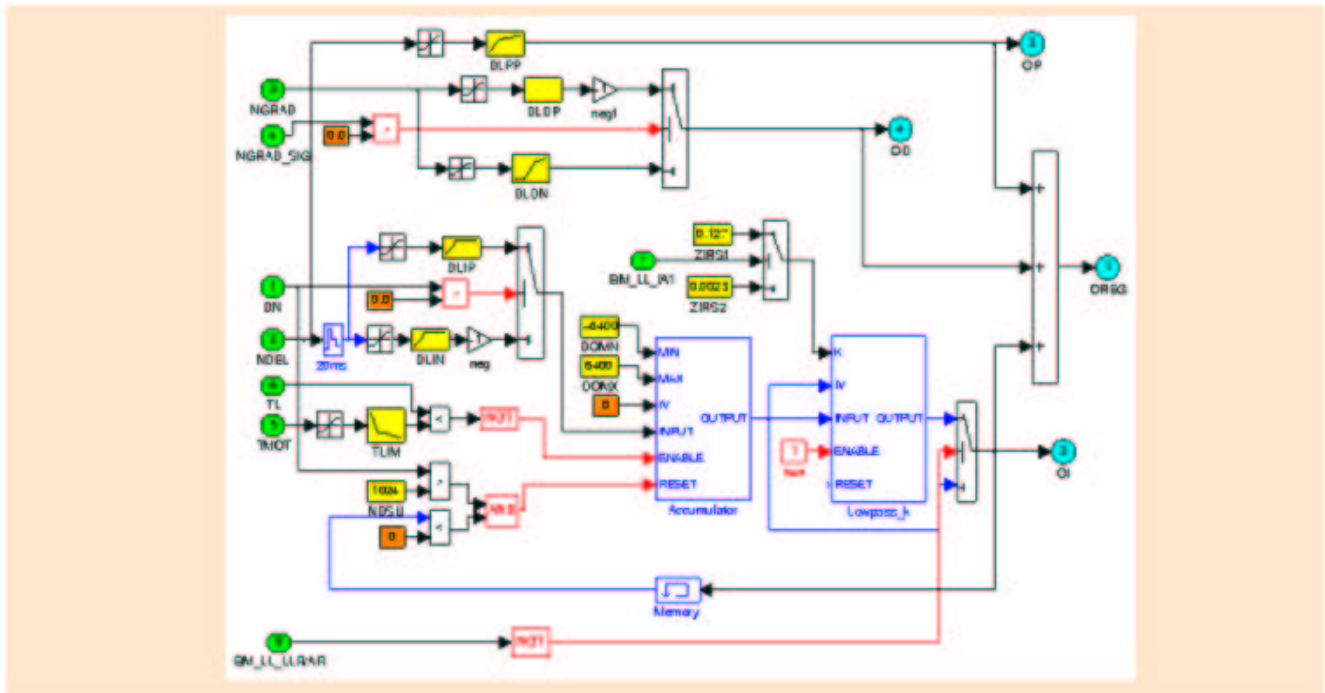


Abbildung 33: MEGMA Example

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MSR-MEGMA

Result: MSR Block Library Specification



Arithmetic (5)
Logic (4)
Comparisons (7)
Mathematic Functions (11)
Counter/Timer (10)
Delay/Memory (6/2)
Nonlinear (8)
Integrators (2)
Low/Highpass (5)
Parameter and Constants (8)
Miscellaneous (12)

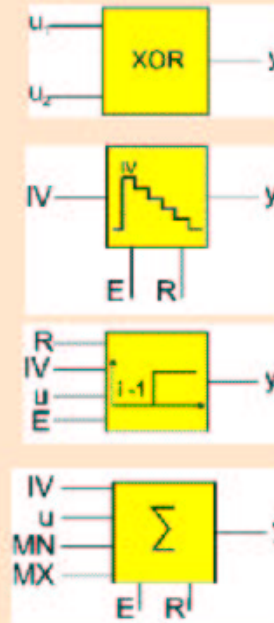


Abbildung 34: MSR Block Library

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MSR-MEGMA
MEGMA-MEDOC-ASAM



Standards for the automotive systems development process

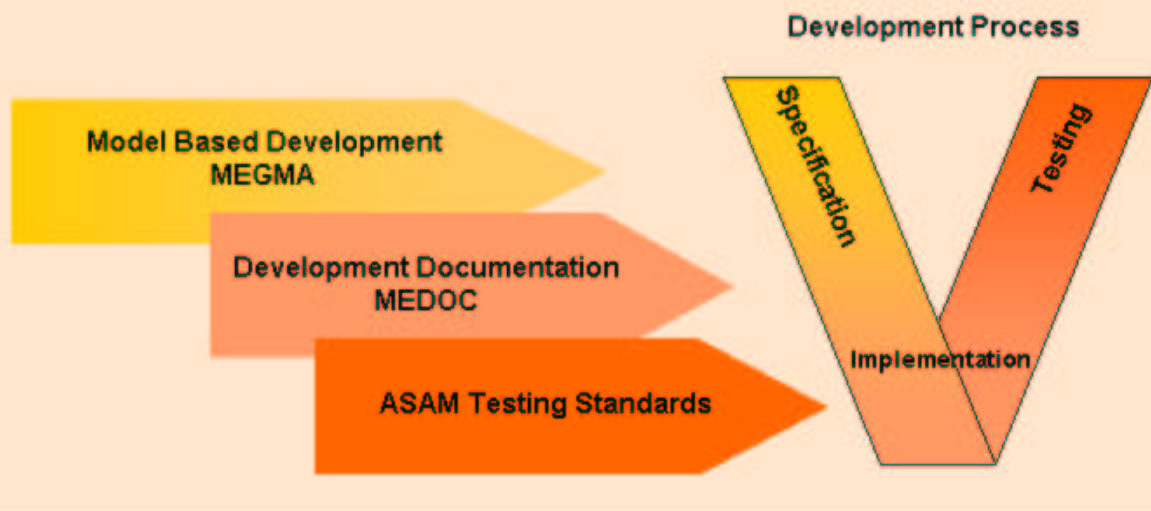


Abbildung 35: MEGMA Integration Scenario

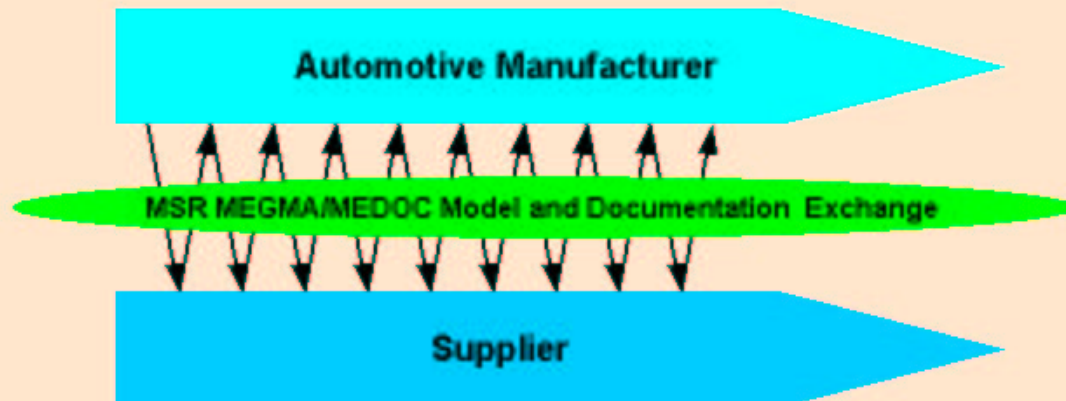
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MSR-MEGMA/MEDOC

MEGMA as Manufacturer - Supplier Linkage



Process MEGMA/MEDOC (idealized):



MSR stands for: „**M**anufacturer **S**upplier **R**elationship“

Abbildung 36: MEGMA Data Exchange

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MSR-MEGMA/MEDOC

Outlook: Interface MEGMA-Model - Documentation



The MEGMA Automotive Block Library standardizes modeling and can be in future enhanced with respect to implementation information for automatic linkage with structured documentation (MSRSW.DTD and ASAP2)!

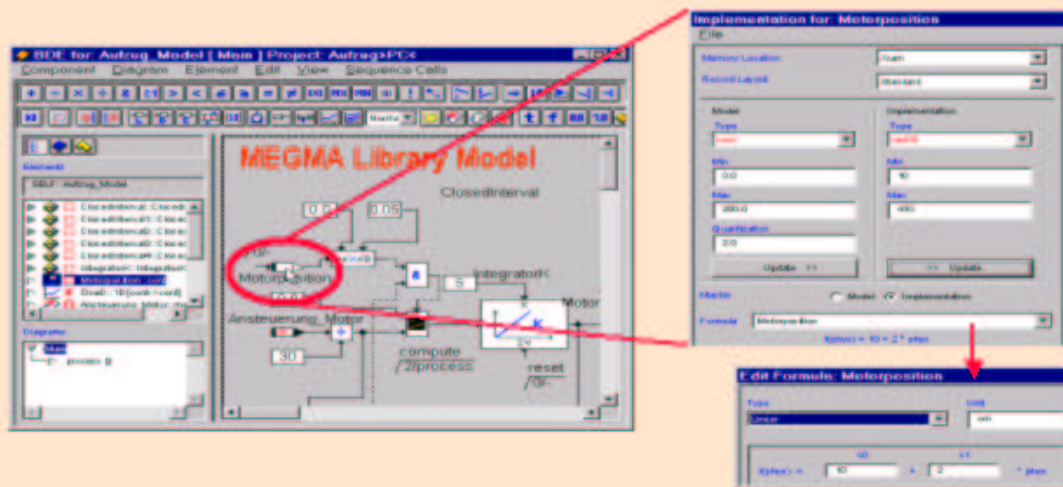


Abbildung 37: Interface MEGMA-Model Documentation

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MSR-MEGMA/MEDOC

Outlook: Manufacturer - Supplier Model Exchange

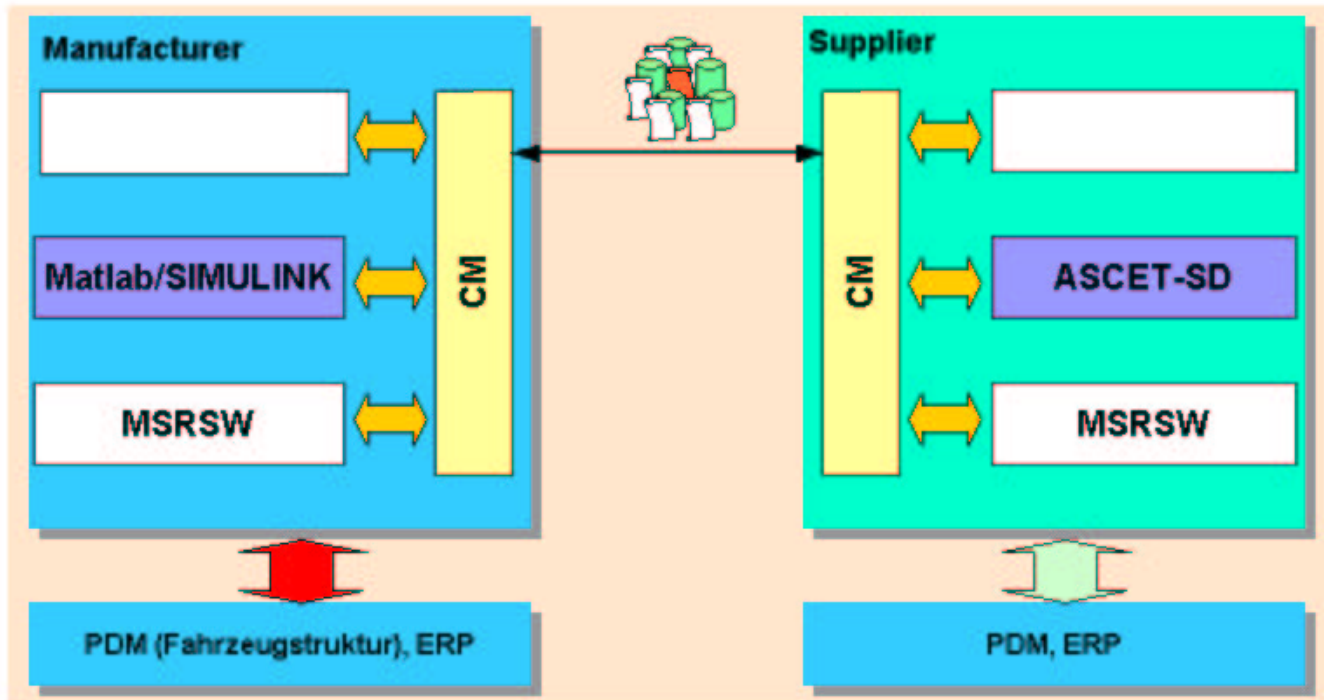


Abbildung 38: Model Exchange

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MSR-MEGMA

Next Steps to Go



Short Term

- Bring the MSR automotive block library from paper to work.
- Set defacto standard for model based function development.
- Develop a demonstrator system.
- Finish test specification and (automatic) test procedures.
- Integrate tool suppliers in further development.
- Support the implementation of tool suppliers.
- Provide verification testing and MSR/ASAM certification of the tool specific implementations.

Long Term

- Establish defacto Standard.
- Continue development of the automotive block library - new features are multirate blocks, code generation and state charts.
- Establish a formal certification procedure.

Abbildung 39: MEGMA: Next Steps

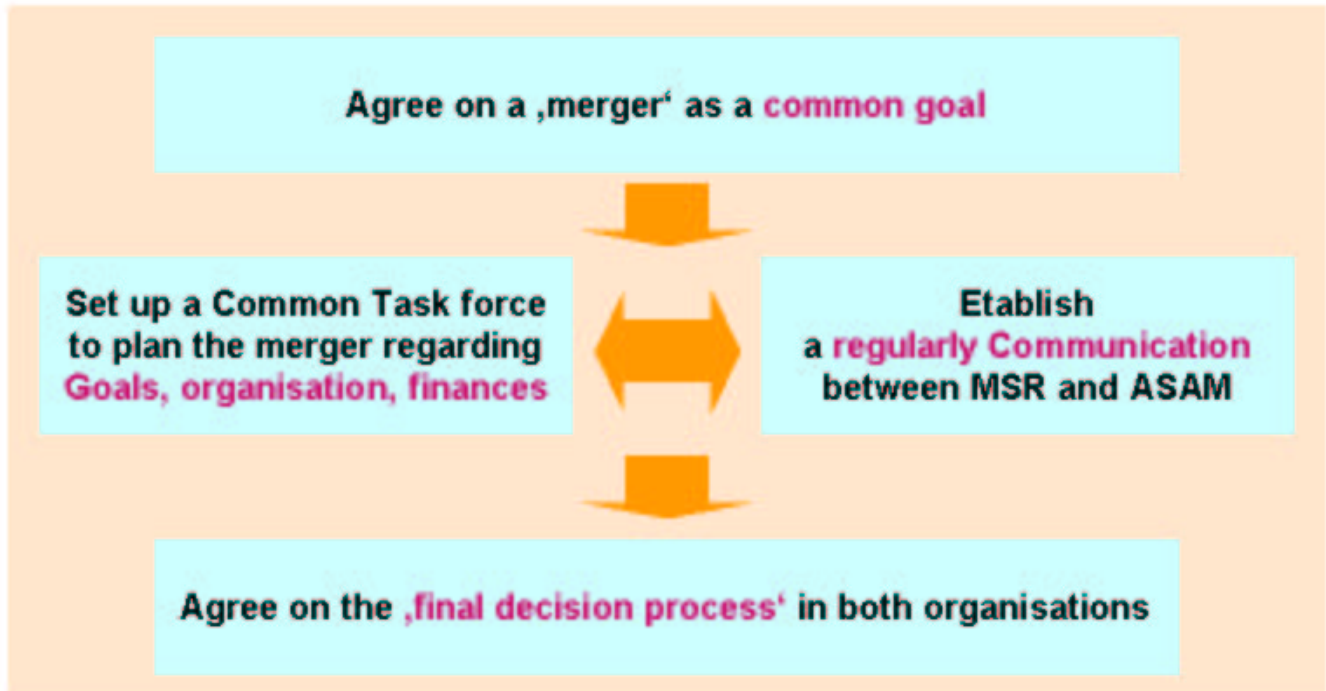


Abbildung 40: MEGMA Proposed Proceeding



Dokumentverwaltung

Tabelle : Beteiligte Personen

Name	Firma	
Ulrich Vogel	MSR-MEDOC	Abteilung: BMW Group

Tabelle : Versionsübersicht

Version	Datum	Status
1	2001-03-21	RD