# Engineering Change Management Partner process reengineering based on VDA 4965-1

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#### ECM: Partner process reengineering based on VDA 4965-1

# **1. Basic Understanding of ECM**

- In Mercedes Car Group the Engineering Change Management (ECM) system contains all information, the evaluation and the approvals about a Engineering Change Request (ECR) as well as the necessary controlling for the engineering and manufacturing implementation.
- ECM does <u>not</u> include versions of changes in a product (basic system: SMARAGD) or changes in the maturity level of a product (basic system: DIALOG).



#### **One Standard Process for all Engineering Changes**

•Phase [1]: Initiation Description of the current status that has to be changed.

•Phase [2]: Detailing detailed solution description, affected part numbers.

•Phase [3]: Evaluation expert evaluation about cost, weight, dates, packaging etc.

•Phase [4]: Approval final recommendation (optional).

 Phase [5]: Approval decision of approval or rejection.

•Phase [6]: Design Implementation complete design; initialize release workflow

•Phase [7]: Productive Implementation productive deployment in car lines



### DAIMLERCHRYSLER



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# 2. As-Is Situation at Mercedes Car Group



Starting with the first functional product prototypes along the entire life cycle of a product, engineering changes are managed based on one standard process in one basic system for all product lines (vehicles and components).



- First version of New Product Change Management (NCM) deployed at MCG in March, 26<sup>th</sup> 2001
- With version 4.2 (11/2004), NCM was established MCG-wide
- 6.600 active users
- Basic system for all kind of engineering change domains (new product projects, series product lines, model year)

#### **Benefits**

- Process reliability One transparent and integrated change management process
- Personalized responsibility Supported by standardized, automated and paperless workflows
- 分 Reduction of processing time (for series phase)

# 2. As-Is Situation at Mercedes Car Group



After the organisation of the internal ECM process is completed, the focus has to be extended to the supplier community. First solutions are available but not deployed yet.

- ☑ NCM-supplier modul available based on the DC-Engineering Portal:
  - ➔Initiation of ECRs
  - →status information about process progress

Fokus: Part Suppliers





#### NCM-gateway available based on XML and SWAN

- Efficient Change Management through an interface between the Change Management Systems of two partners
- Explicit and cross-system responsibilities for change requests regarding the entire Change Process
- ➔ Avoidance of redundant data input and administration within consolidated systems
- Synchronous data exchange by using existing technologies (XML, SWAN)

Fokus: General contractors, system and component suppliers

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PróSTEF

# 3. VDA Recommendation 4965 (ECM): The Motivation

Why an ECM Recommendation? - The daily business at an OEM

- More than 1.000 change orders per month
- S With about 7.000 internal and external users to be involved with comments
- Which have to be managed not alone by purchase *but also* by engineering and planning

# Mastering of the ECM processes becomes more and more mission critical for the Engineering Collaboration between OEM <-> 1.Tier and their x.Tier partners!

Harmonization and standardization is emergently required for integration of ECM processes to achieve:

- Efficient integration of each supplier with several OEMs and vice versa by reducing the existing variants in ECM processes
- Decrease of process time for both sites
- Increase of process quality and process safety
- **I** Transparency of process status for OEM and suppliers

ProSTEP

iViP

# 3. VDA Recommendation 4965 (ECM): The Leading Vision

#### Step 1: The Reference Process enables Harmonized Synchronisation



Step 2: Harmonized Synchronisation based on Reference Processes enables ECM Networks

> Based on the reference process each participant is able to connect to each ECM-Server of a coordinator either with his ECM-Server or with any ECM-Client.



ProSTEF

# 3. VDA Recommendation 4965 (ECM): Expected Benefits

Based on harmonized ECM processes inside a future ECM network, cost reduction based on the expected benefits can be realized.

#### **Expected Benefits:**

- Reduce the existing variants of ECM communication for coordinator and participant
- 分 Reduce the manual primary data entry
- $\Rightarrow$  Decrease the process time

- $\Rightarrow$  Advantage of a re-use of
  - Process definitions
  - agreements of partner
  - Interfaces, tools



ProSTEP

iViP

# 3. VDA Recommendation 4965 (ECM): **Processes in Collaboration Networks**



# 3. VDA Recommendation 4965 (ECM): Available Standards

ProSTEP

12

The Project Group "Engineering Change Management" of ProSTEP iViP and VDA has developed interaction scenarios, defined messages and data model to support ECM processes between customer and supplier using existing standards like PLM Services, STEP and XML.

- VDA recommendation 4965-1 and PLM-Services 1.0 finished, published and available for use, PLM-Services 2.0 will be available by end of 2006.
- First projects of implementation started by using the new standard (ECM-Client, XML-converter)
- Process for international standardization started within the organization of SASIG



# 3. VDA Recommendation 4965 (ECM): Status of Commercialization

ProSTEP

# 3.1. in-GmbH

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	이 notifyInitialEcrApprova	al2 Acceptor Development

# Process-orientierted integration for suppliers

- Send and receive ECM messages according to VDA 4965
- View and Modify ECM data like, parts list, comments, ... according to VDA 4965
- Suppliers were enabled to
  - connect to OEMs CM-System by Weblet ECM-Client
  - Start Engineering Change Request
  - Track Status of ECR
  - Set comments
- With no need of seperate Change Management System
- According to the needs of the OEM

VDA

ProSTEP

iViP

# 3. VDA Recommendation 4965 (ECM): Status of Commercialization

Message

gen.de.projektman Notify\_intial\_ECR\_rejected

en.de.projektman Notify\_inital\_ECR\_accepted

fen.de.projektman Respond initial\_ECR

fen.de.projektman Request initial ECR

en.de.projektman Respond initial ECR

jen.de.projektman Request\_initial\_ECR

volkswagen.de.projektman Notify\_intial\_ECR\_Approval volkswagen.de.projektman Notify\_intial\_ECR\_accepted

volkswagen.de.projektman Respond\_initial\_ECR

volkswagen.de.projektman Request\_initial\_ECR

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3.2. PartMaster GmbH

**Product: ECM.Cockpit** 

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Respond

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Approve Open

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# 3. VDA Recommendation 4965 (ECM): Status of Commercialization

ProSTEP

# 3.3. PDTec: SAM4ECM



- Based on the SAM (STEP Assembly Manager) tool
- Sending and receiving ECM messages in compliance to VDA4965
  - synchronous using PLM web-services
  - asynchronous data transfer using ENGDAT
- Display and modification of ECM data
  - header information, part information, comments, ...
  - in compliance with VDA 4965
- Visualization and modification of the effected parts
  - integration of jt-Viewer
  - integration of CATIA V4 und CATIA V5
- Suppliers are enabled to connect to the CM system of different OEM to
  - initiate new and trace existing changes, provide comments on them, ...
  - ... according to the guidelines of the OEM
  - own in-house CM system not required

VDA

ProSTEP

iViP

# 3. VDA Recommendation 4965 (ECM): Status of Commercialization

3.4. ProSTEP AG:



ProSTEP

iViP

# 3. VDA Recommendation 4965 (ECM): Status of Commercialization

# 3.5. T-Systems: PDM WebConnector

### PDM WebConnector

- flexible conntection to internal systems
- Convertion of data to PLM Servcies



### PLM Services Client



- Secured communication crossover companies
- server or client solution



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# 4. ECM Partner Integration: Strategic Targets MCG



Based on the ECM-Standard VDA 4965-1 and PLM-Services 2.0 in the future the integration of all partners of DaimlerChrysler AG (MCG, CCG, CVD) into the Change Management Process should be through the Communication Data Base (CDB).

The CDB already covers the synchronized management of ECRs on parts which are shared between the DaimlerChrysler business units.

- Dataexchange with external partners will be based on STEP AP214 (ISO 10303-214), using PLM-Services
- First step: Integration of MCG part suppliers based on VDA 4965-1 in realization
- first productive use in Dec. 2006 (casting part supplier), rollout scheduled for July 2007





# 4. ECM Partner Integration: DCx "Step 1 Collaboration Process Scenario







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## 5. ECM Partner Integration: Investment for Realisation



Implementing the new ECM partner integration process requires investment for process reengineering and IT implementation.

#### Tasks:

- Analysis of the as-is process between coordinator and participant
- Definition of the target process based on the ECM definitions (incl. mapping to ECM data model)
- Implementation of an ECM server based on PLM-Services 2.0 and VDA 4965-1 on top of the company specific CM system
- Either: Adaption of business unit specific CM systems to the ECM reference process, messages and data model.
- ☑ <u>Or:</u> Installation and configuration of ECM client in companies without CM system

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# 6. ECM-Standardization: The next step



SASIG strategic automotive product data standards industry group

The realization of a global ECM collaboration network requires the availability of an global standard. Therefore the SASIG ECM workgroup has been established in April 2006.

### The Vision

A joint OEM and Supplier effort leading to a more efficient Engineering Change Management collaboration throughout the Global Automotive Supply Chain.

### The Mission

Within the next 3 years we provide an agreed standard which enables global ECM collaboration

An intermediate step will be an agreed standard focused on the ECR process by first quarter of 2008

- The key OEM and supplier community is represented in the SASIG ECM workgroup and agree on a common set of issues.
- Based on an agreed common ECM Reference Process the automotive companies are able to perform a harmonized synchronization for ECM collaboration.
- Encourage the development of ECM solutions based on open standards.

# 6. ECM-Standardization: The next step



SASIG strategic automotive product data standards industry group

#### In Scope

- cross company ECM processes
- engineering changes to the product definition information from the technical point of view.

#### **Out of Scope**

- change of existing internal company processes
- internal quotation and purchasing process

### **ECM Reference Process**

Identification of Potential for Change

Development of Alternative Solutions Specification and Decision of Change

Engineering Implementation of Change

Manufacturing Implementation of Change

#### The SASIG ECM Workgroup will ...

- take the existing VDA4965 & review it in detail inside the national organizations
- □ define and agree on the complete ECM process with common terminology
- define technical issues on VDA4965 coming out of application examples from ECM collaboration projects out of the participating key OEMs and suppliers
- Concurrently review and improve the VDA4965 recommendation.
  This will lead to a 1st release of the SASIG standard by 1st quarter of 2008

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# 7. Summary

- 1. With the VDA 4965-1 and PLM-Services 2.0 the general conditions are available to realize the expected benefits of partner integration into the ECM process.
- 2. The implementation of an global ECM network requires a strong alignment of the involved companies (OEMs and Suppliers) to the existing standard.
- 3. The ROI of the resources which have to be invested for IT developments as well as for ECM process reengineering can only be reached if the global ECM network is realized based on a international ECM standard which is supported by standardized ECM-IT-solutions.
- 4. Precondition of a fast standardization of an international ECM standard on SASIG level is the commercialization of the existing VDA 4965-1 (ECR) in Client and Server solutions as well as the deployment to harmonized ECM processes inside the national OEM and supplier community.

# **ECM Client Presentation**



# Thank you for your Attention!



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