

JT in the Application

Report from the ProSTEP iViP / VDA JT Activities

ProSTEP iViP Symposium
28.04.2010, Berlin

Rudolf Dotzauer
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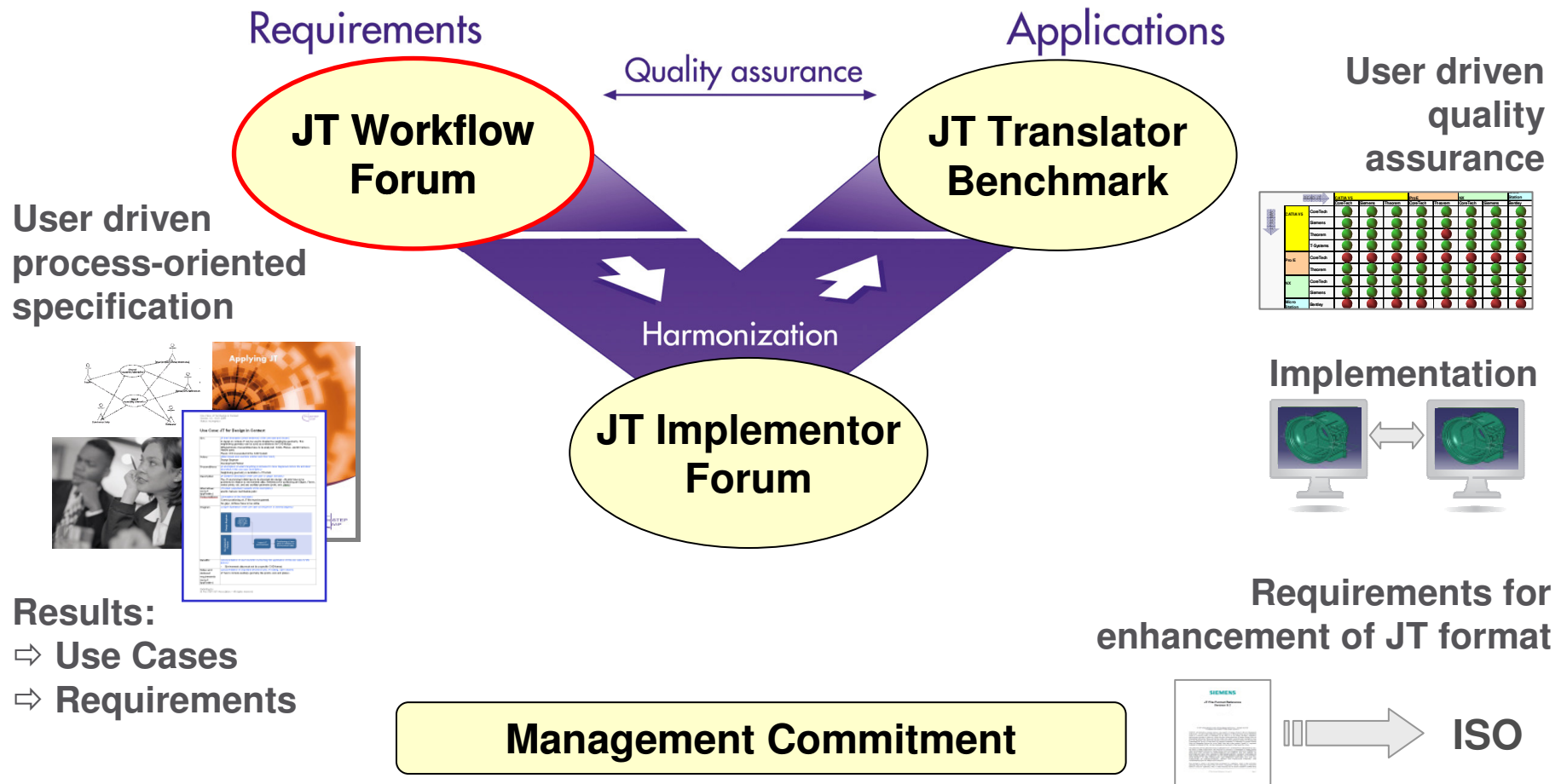
Hans-Peter Martin
Daimler AG

Motivation for activities of ProSTEP iViP / VDA

- JT becomes widely used in day-to-day business
 - Demands for applying JT in downstream and long-term archiving processes rise
- Precondition (following requirements from industry) satisfied:
 - Publication of JT specification by ISO (ISO PAS 14306)
- Various JT translators are available on the market
- Necessary steps for assuring JT application in industry
 - Specification of use cases and derive consolidated requirements
 - Enabling of cross-company downstream processes
 - Assuring data exchange with different implementationson a neutral platform, accepted by the user & vendor communities

>> Establishing JT as a binding process format <<

Agenda



JT Workflow Forum

Goal

- Users specify their requirements for the usage of JT
 - Based on documented use cases
 - Aligned and prioritized user requirements
 - Requirements for JT enhancement

Participants

- Airbus, Audi, Behr, BMW, Bosch, Continental*, Daimler*, :em, Johnson Controls, MAN Nutzfahrzeuge, PROSTEP, Renault, RLE, Siemens, TU Kaiserslautern, Volkswagen, ZF; Siemens PLM (as advisor)

Support

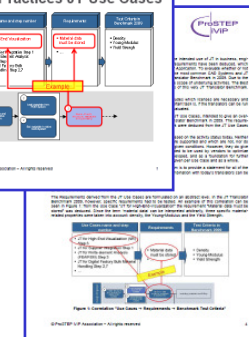
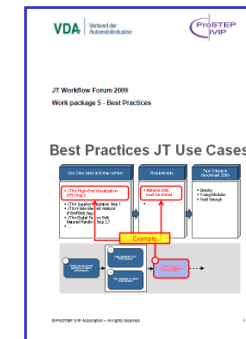
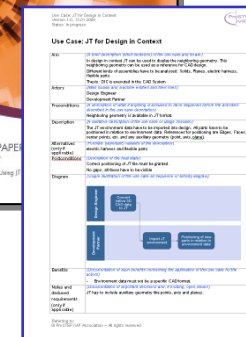
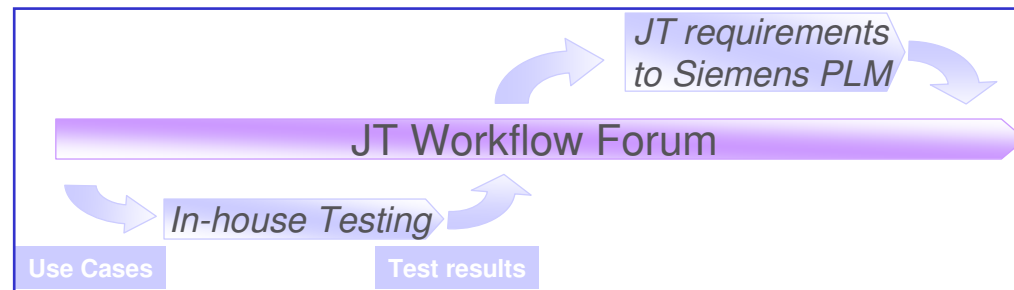
- In cooperation with VDA
- Advocated by German Automotive CIO's
- Ensured by MoU with Siemens PLM

*: Chairman

JT Workflow Forum

Working results 2009/2010

- White Paper “Applying JT” & Best Practices
- Documentation of 22 Use Cases (DMU, Simulation, Digital Manuf. etc.)
- Verification of use cases by in-house tests (real-world IT environments)
- ~80 Requirements derived in regard to format, translator and application
- Test criteria for 1st/2nd JT Translator Benchmark
- Requirements regarding further development of JT specification



Review/Definition of 22 JT Use Cases (Status 04/10)

JT for Supplier Integration (OEM to Supplier)

JT for Supplier Integration (Supplier to OEM)

JT for Digital Factory Process Planning

JT for Facility & -Robot Simulation

JT for material flow simulation

JT for Factory DMU

JT for Drawingless Manufacturing

JT for high-end Visualization

JT for Material Specification

JT for Archiving

JT for Bidding / Inquiry

JT for DMU-Analysis

JT for Finite Element Analysis (FEA/FEM)

JT for hybrid Design in Context

JT for Multibody Simulation

JT for non-hybrid Design in Context *

JT for Tolerance Studies

JT for Viewing

JT for Simulation of flexible elements

JT for Digital Factory Building Planning

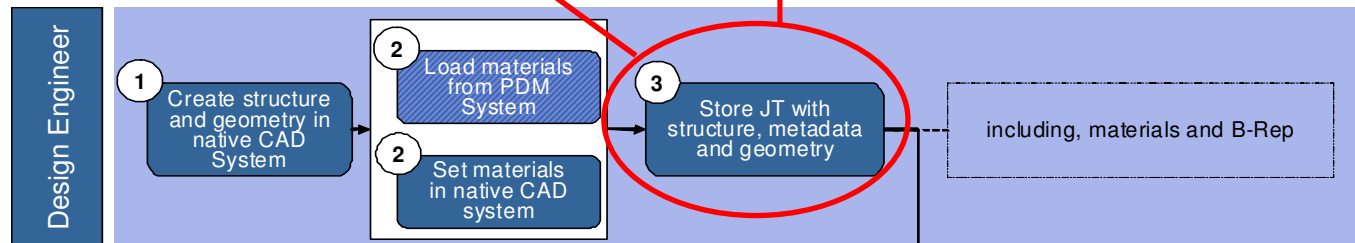
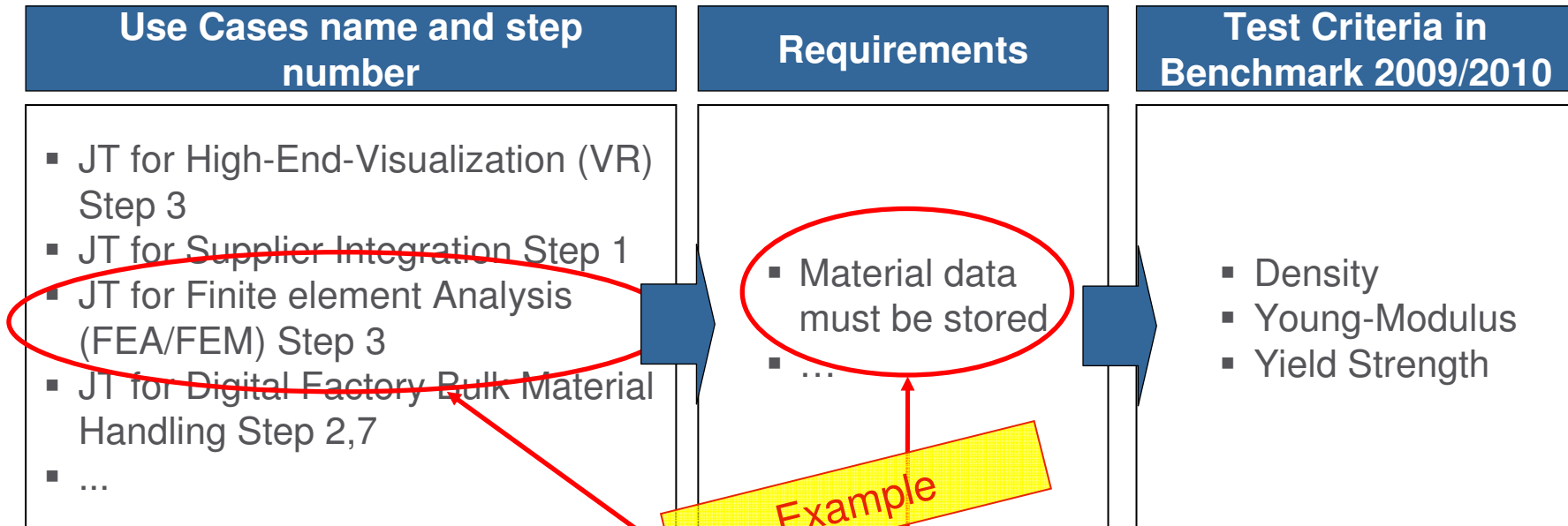
JT for Digital Factory Plant Development

JT for Digital Fact. Bulk Material Planning

All use cases based on CAD → JT conversion except *

Correlation

"Use Cases → Requirements → Test Criteria"



Verify Use Cases by in-house tests

Example JT for Supplier Integration (Supplier to OEM)

JT for Supplier Integration (OEM to Supplier)

Use Case: JT for Supplier Integration (Supplier to OEM)

Use Case: JT for Supplier Integration (OEM to Supplier)

JT for DMU-Analysis

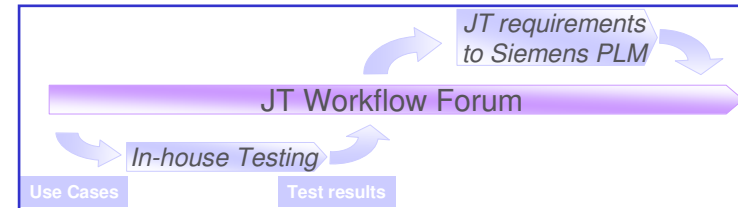
Simulation Analysis (FEA/FEM)

Design in Context

Simulation

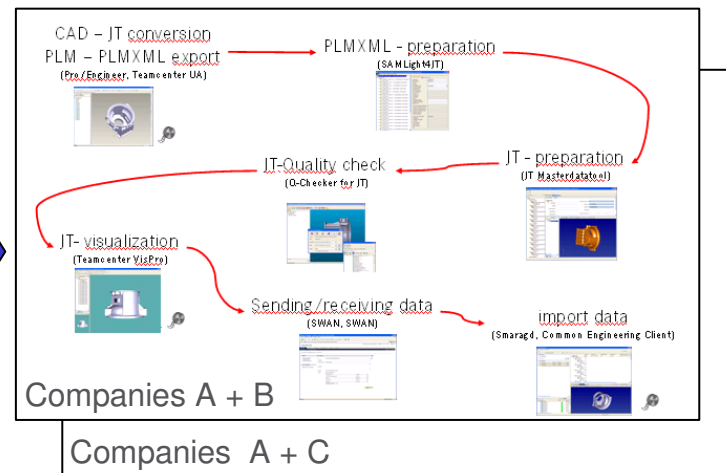
Design in Context*

Studies



Review Use Case & Requirements

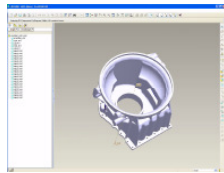
Use Case Number	Use Case Name	Use Case Number	Use Case Name	Use Case Number	Comments	Deduced Requirements				Test Results			
						Format (incl. Translation)	Translators	Applications (Out of Scope for Benchmark)	Other	Relevant Modules	Passed (s) / Not passed (s)	Quality of Result	Comment
UC 1	JT for High-End Visualization (VR)	1	JT for High-End Visualization (VR)	1									
UC 1	JT for High-End Visualization (VR)	2	JT for High-End Visualization (VR)	2	Color information must be stored for entire part and single geometrical features.	Color information from native CAD has to be converted correctly to JT (part but also feature color)							
UC 1	JT for High-End Visualization (VR)	3	JT for High-End Visualization (VR)	3	Only version 8 in scope	A consistent JT version must be applied							
UC 1	JT for High-End Visualization (VR)	4	JT for High-End Visualization (VR)	4		Material data must be stored (name and material properties, density, young modulus, strength)							
UC 1	JT for High-End Visualization (VR)	5	JT for High-End Visualization (VR)	5		Views must be stored, including exploded and section views							
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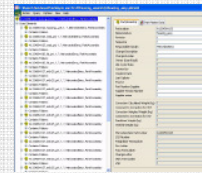
Verify Use Cases by in-house tests

Example *JT for Supplier Integration (Supplier to OEM)*

CAD – JT , PLMXML conversion
(Pro/Engineer, SPLM Converter)

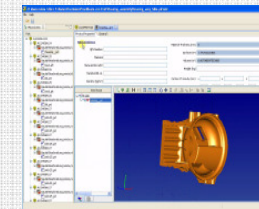


PLMXML - preparation
(SAMLight4JT)

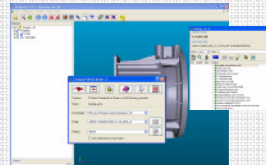


JT Supplier Package

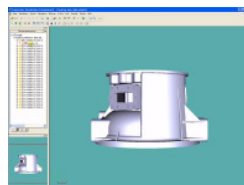
JT - preparation
(JT Masterdatatool)



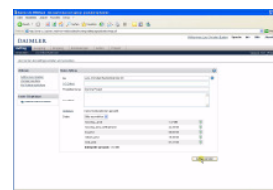
JT - quality check
(Q-Checker for JT)



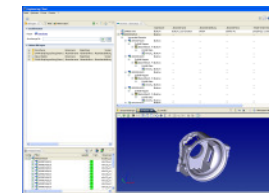
JT- visualization
(Teamcenter VisPro)



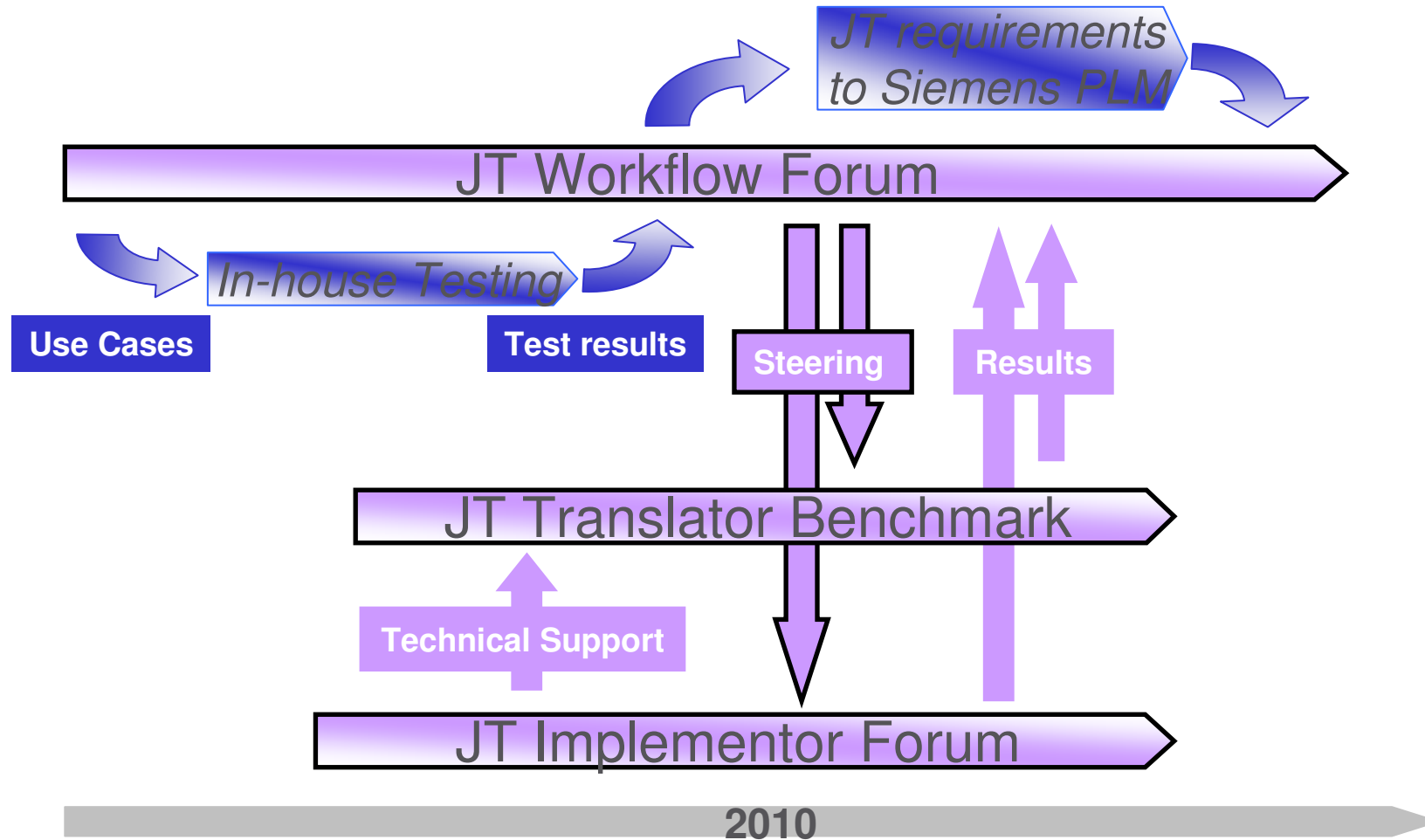
sending/receiving data
(SWAN, SWAN)



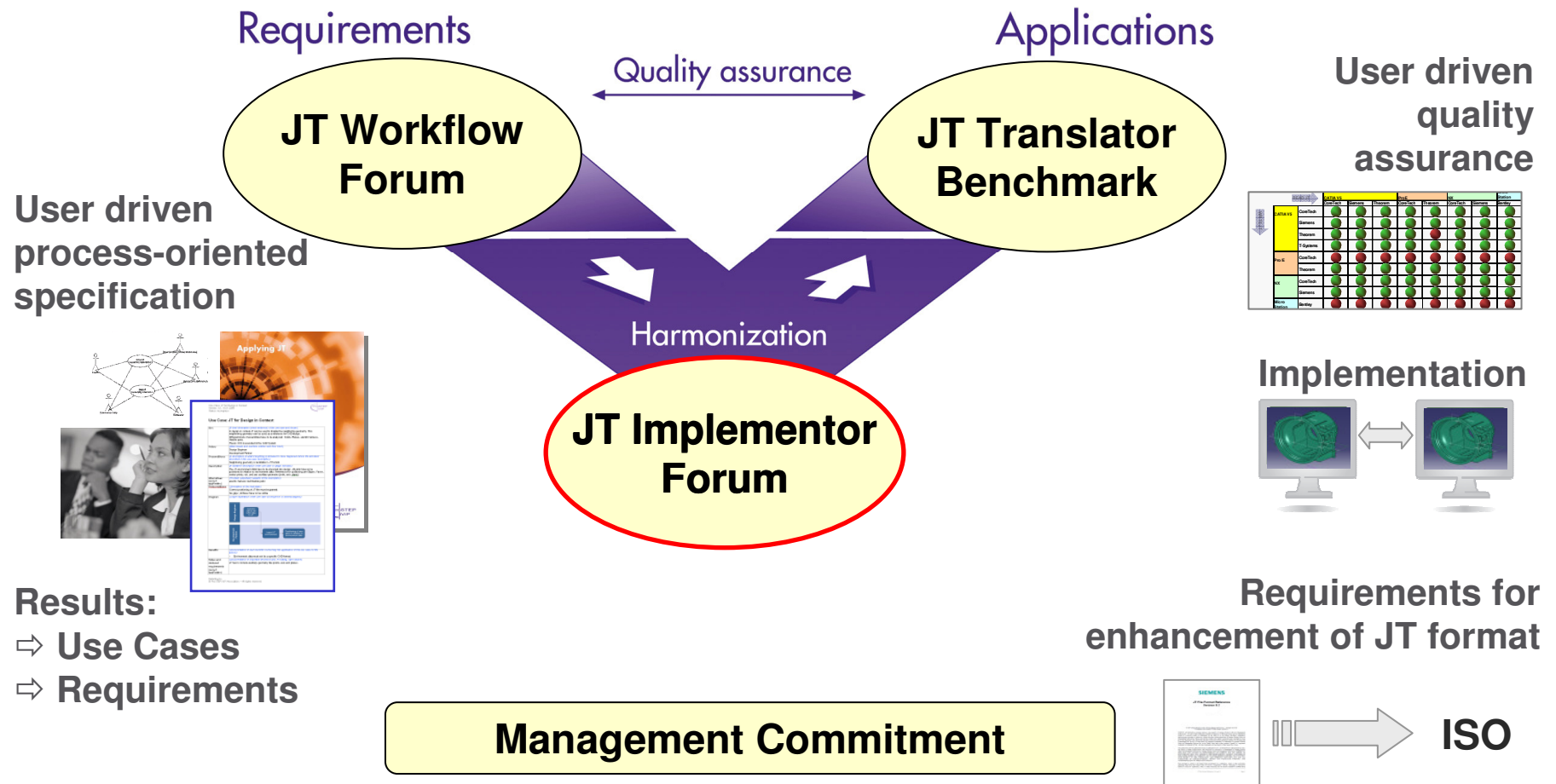
PLM - import data
(Smaragd, Common Engineering Client)



JT Workflow Forum - Steering the JT Translator Benchmark and the JT Implementor Forum



Agenda



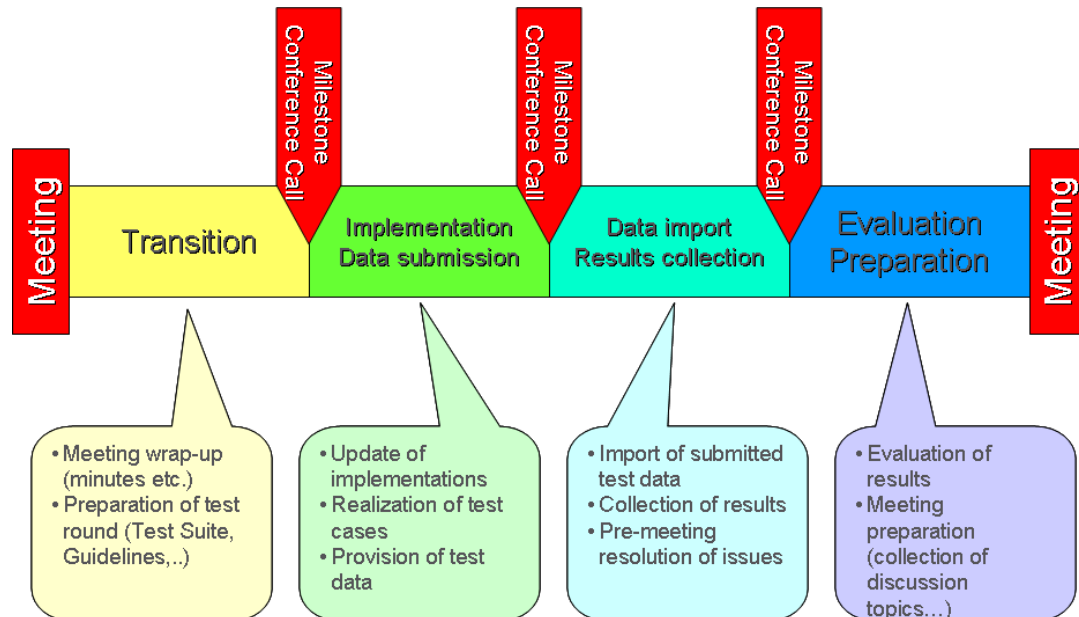
JT Implementor Forum

Goal

- Software vendors assure implementation
- Assurance of interoperability
- Specification of implementation guidelines
- Technological support of the JT Translator Benchmark

Participants

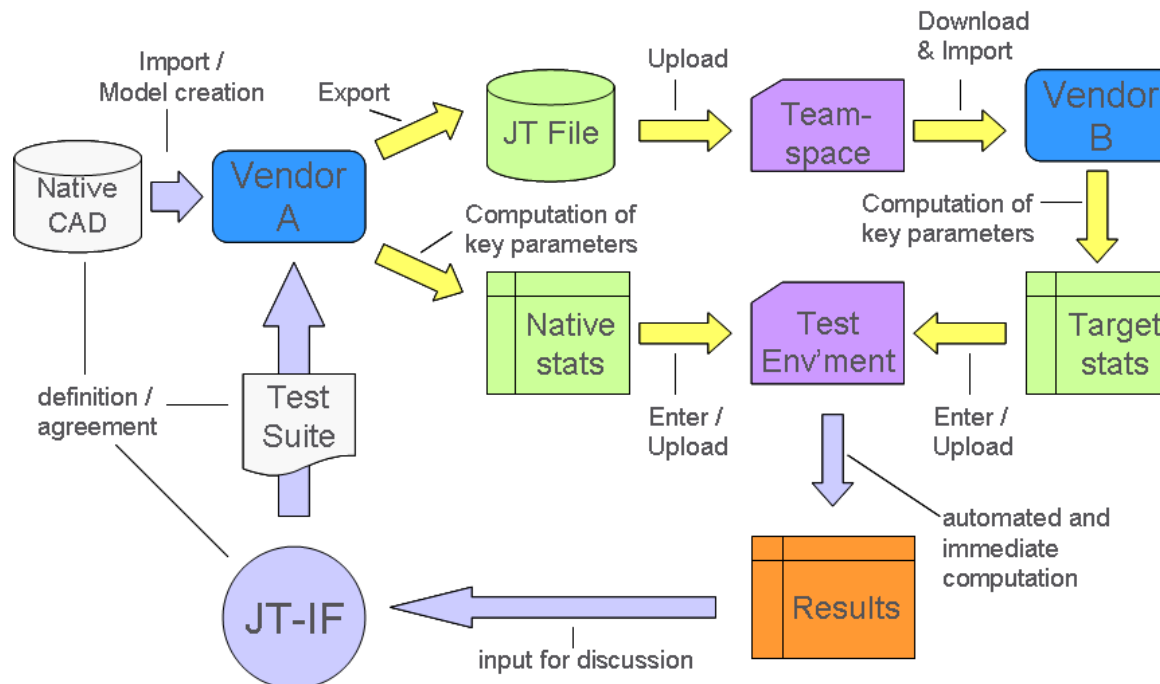
- CT CoreTechnologie
- Siemens PLM
- Transcat PLM
- Theorem Solutions
- T-Systems



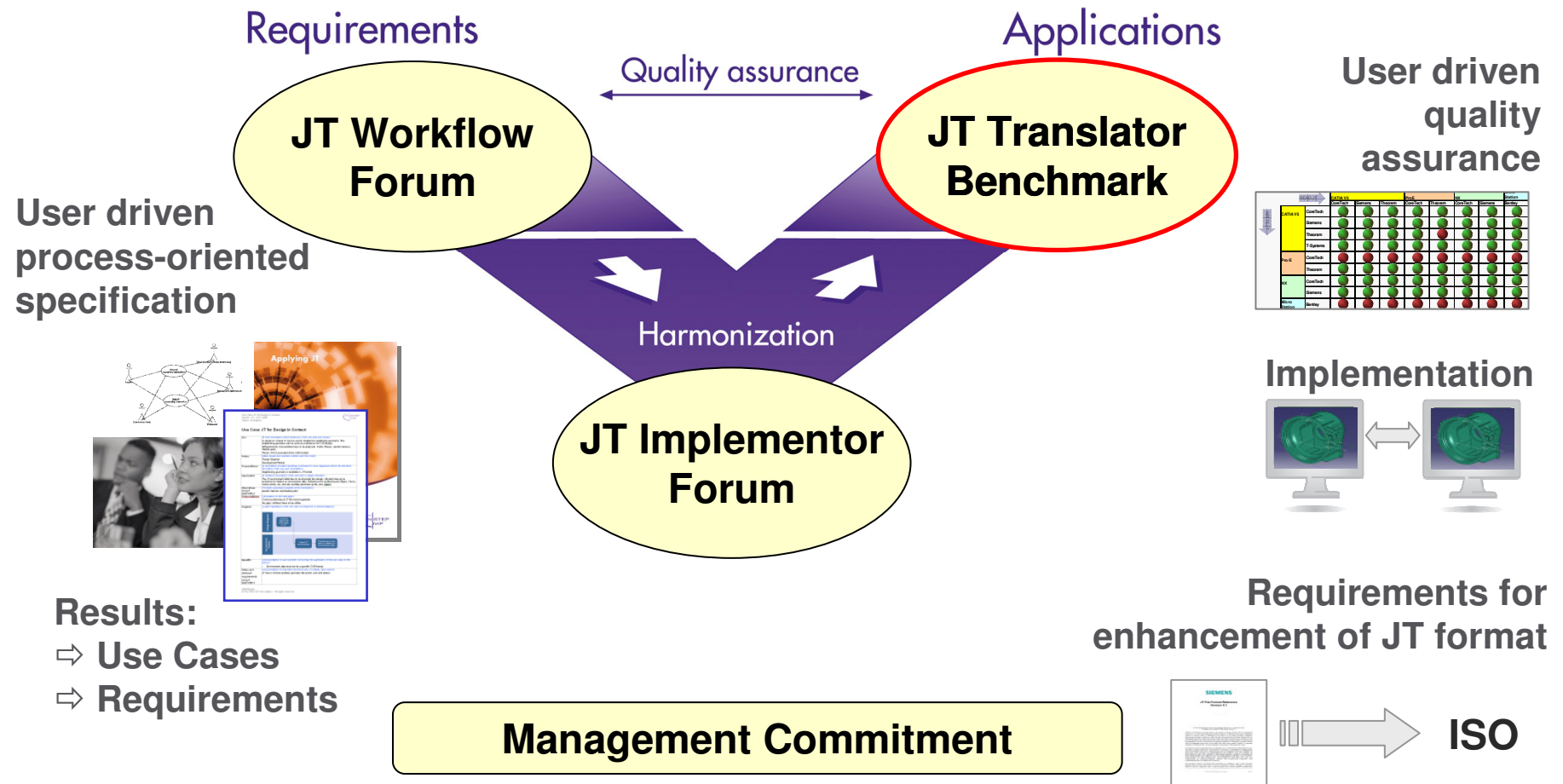
JT Implementor Forum

Focus / Working results 2010

- Focus on “CAD to JT” with productive and synthetic test models
 - JT files will be inspected to reveal differences compared to native models
 - The most "problematic" areas shall be identified and build the basis for the next activities and test rounds



Agenda



JT Translator Benchmark

Goal

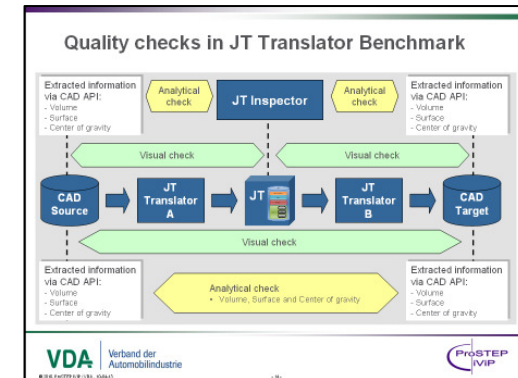
- Provide a neutral and comprehensive evaluation of commercially available JT translators for CAD systems
- Focus on neutral quality assurance: conversion and data exchange quality, special functionality, performance, and handling.

Support

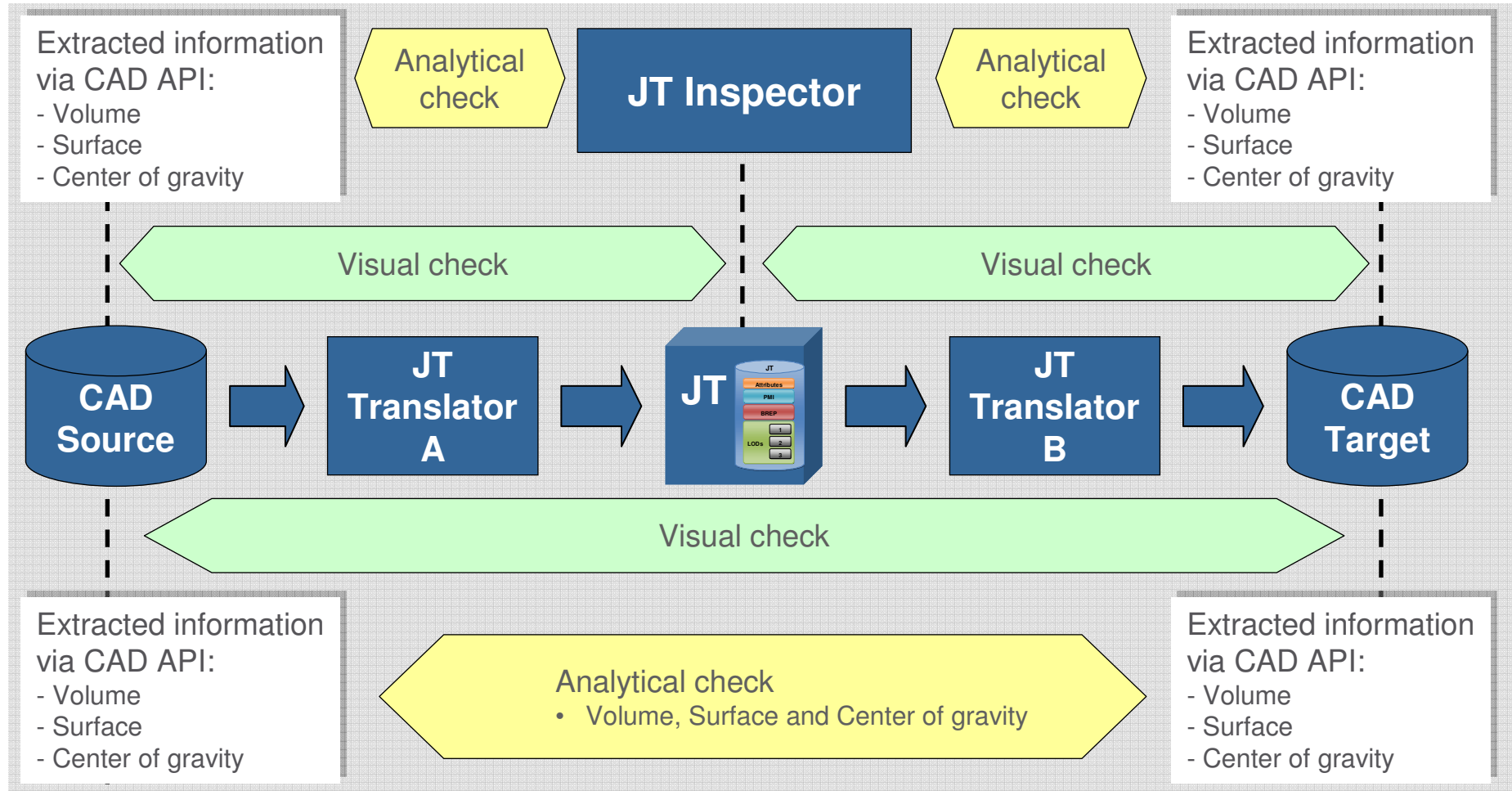
- Planning and steering by JT Workflow Forum
- Technological support by JT Implementor Forum

Focus / Working results

- BM2009: focus on CAD to CAD data exchange
- BM2010: focus on CAD to JT conversion as well as JT to CAD
- Short report: Public summary
- Long report: Detailed report for PSI and VDA members
- Product Data Journal article (planned)

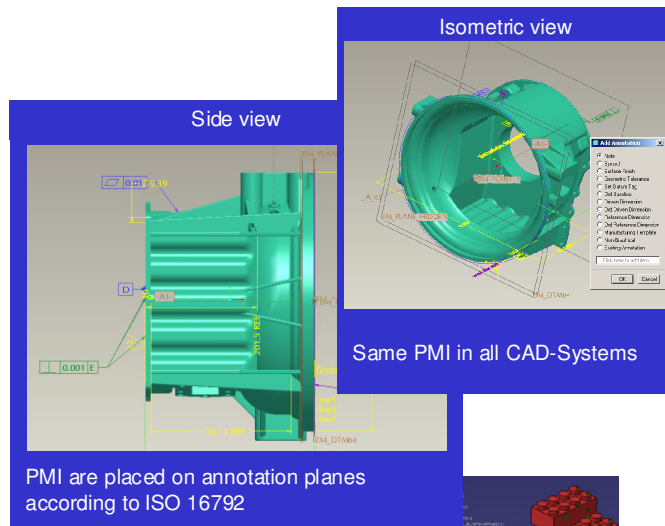


Quality checks in JT Translator Benchmark

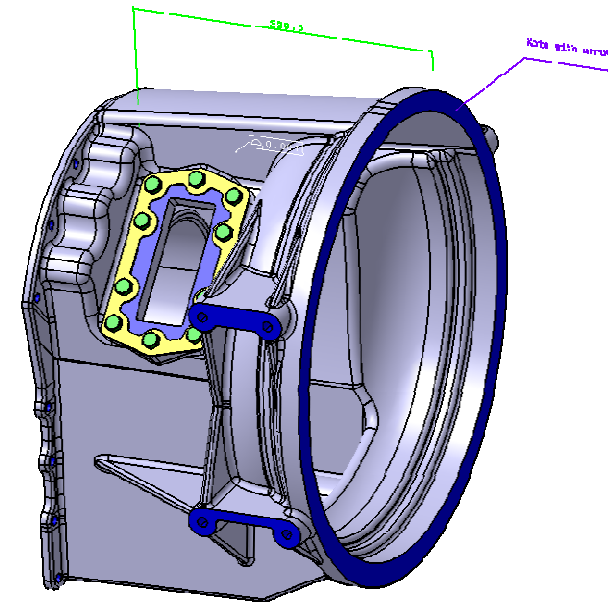
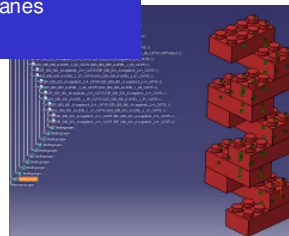


Testing models of JT Translator Benchmark

- Non-productive test models to guarantee comparability



2009
CATIA V5 R19,
Pro/E Wildfire 4.0,
NX 5,
MicroStation V8 XM



2010
CATIA V5 R19,
Pro/E Wildfire 4.0,
NX 6

JT Translator Benchmark 2009 / 2010

Geometry

- Completeness of solid model transfer (focus on XT-BREP) ✓✓
- Volume, surface area and centroid comparison ✓✓

Reference Geometry

- Points, axis, planes ✓

PMI

- Dimensions, Tolerances, Annotations ✓✓

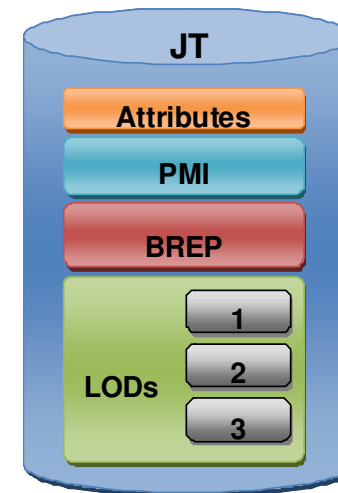
Part Information

- Material data (density, young modulus, strength) ✓✓
- Textures ✓
- Color information ✓

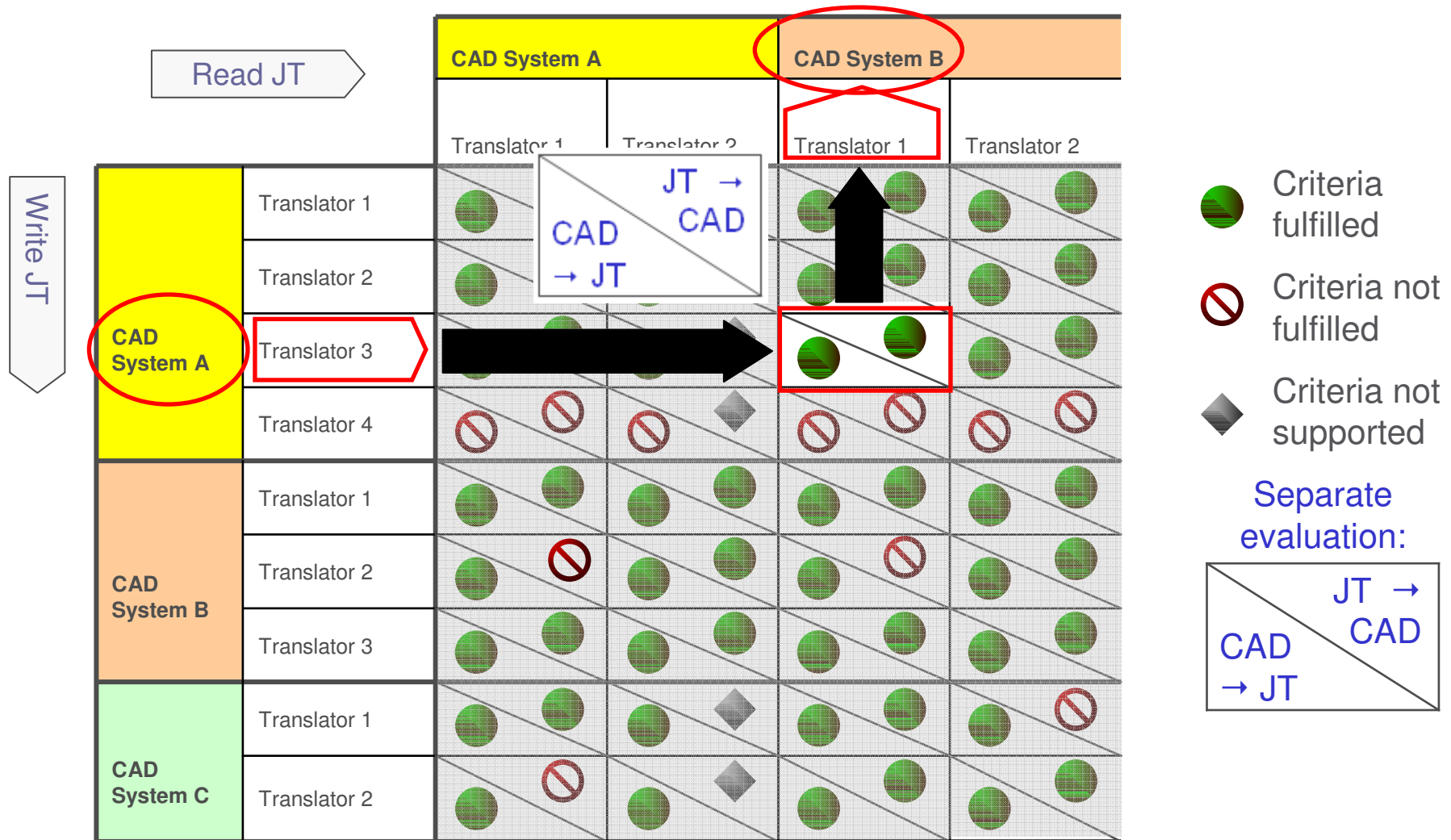
Product Structure

- with both options "monolithic" ✓✓ and "per part" ✓✓
- Correct structure, placement, ✓✓ and file naming ✓✓

Only criteria which conform with JT File Format Reference Version 8.1 (ISO PAS) are considered in Benchmark



Exemplary result matrix for **one** criteria



JT Translator Benchmark 2009

Focus

- on CAD to CAD data exchange

Testing Environment

- CAD-Software
 - CATIA V5 R19, Pro/E Wildfire 4.0, NX 5, MicroStation V8 XM
- Translators
 - CT CoreTechnologie, T-Systems, Theorem, Siemens PLM, Bentley
- Check-tools
 - Provided by Siemens PLM

Results

- Publicly available Short-Report
- Detailed Report for members available



JT Translator Benchmark 2009

Example Geometry (XT-BREP)

- In most test cases, the geometry could be converted correctly

		CATIA V5			Pro/E		NX		Micro Station
		Coretech	Siemens	Theorem	Coretech	Theorem	Coretech	Siemens	Bentley
CATIA V5	Coretech				1)				
	Siemens								
	Theorem								
	T-Systems							2)	
Pro/E	Coretech								
	Theorem								
NX	Coretech								
	Siemens								
Micro Station	Bentley								

- Legend:
- Solid was correctly transferred
 - Solid was not correctly transferred
 - No XT-BREP supported

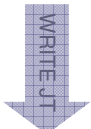








































































1) Healing mechanism within 3D_Evolution can resolve import problems to Pro/E (Source: CT CoreTechnologie)



2) Import problem within NX 5.0.4.1 Fixed within NX 5.0.6 and following NX versions (Source: Siemens PLM)

JT Translator Benchmark 2009

Example Assembly Positioning

- JT option "per Part"

		CATIA V5			Pro/E		NX		Micro Station
		CoreTech	Siemens	Theorem	Core Tech	Theorem	CoreTech	Siemens	Bentley
 CATIA V5	CoreTech								
	Siemens								
	Theorem								
	T-Systems								
Pro/E	CoreTech								
	Theorem								
NX	CoreTech								
	Siemens								
Micro Station	Bentley								

Legend:  Correctly transferred
 Not correctly transferred

JT Translator Benchmark 2010

Focus

- on CAD to JT conversion as well as JT to CAD

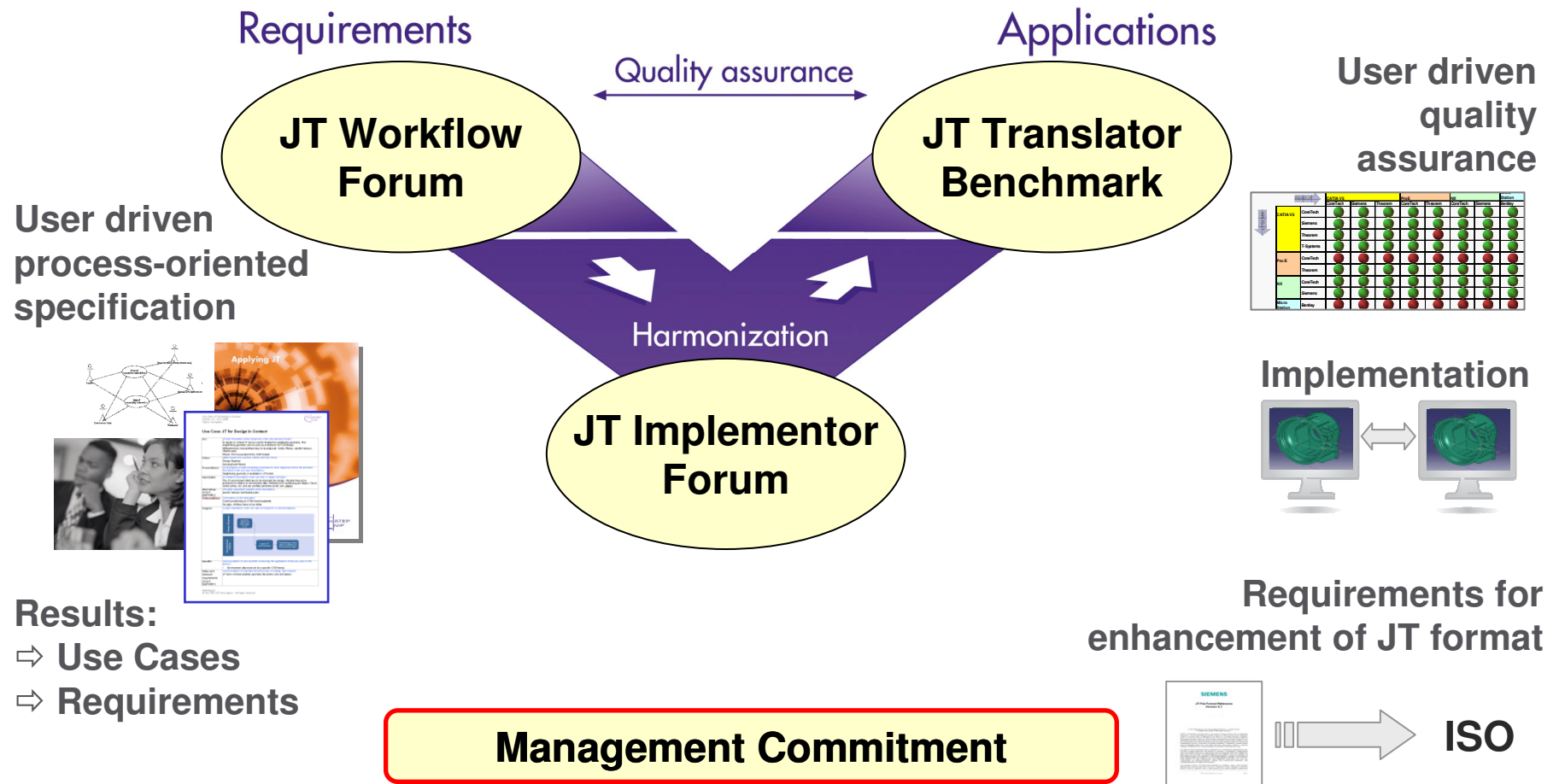
Testing Environment

- CAD-Software
 - CATIA V5 R19, Pro/E Wildfire 4.0, NX 6,
- Translators
 - CT CoreTechnologie, T-Systems, Theorem Solutions, Siemens PLM
- Check-tools
 - Provided by Siemens PLM

Working results (planned)

- JT Translator Benchmark (Short & Detailed Report)
- Product Data Journal article

Agenda



Results:
 ⇒ Use Cases
 ⇒ Requirements

Management Commitment

Memorandum of Understanding (MoU) between Siemens PLM and ProSTEP iViP Association signed in February 2010:

The purpose of this MoU is to provide the basis of further cooperation between both parties in the area of JT, in order to “foster a common understanding of goals and measures to establish JT as binding process format”.

Management Commitment

JT

In the just concluded agreement Siemens PLM Software did commit as developer of JT to passing future versions of JT promptly to ISO.

PLM XML

Siemens PLM seems to be open to also offer PLM XML for standardization, ... to analyze in jointly co-ordinated activities in which way PLM XML in connection with JT best supports industry specific data flows.

→ Workshop *Extracting value from JT*

Jim Mohan, Siemens PLM; Ilan Weitzer, Ford

with the contribution

Automotive PLMXML / JT- first steps towards a guideline

Florian Gerhardt – University of KL (VPE)

Sebastian Handschuh – Daimler AG

Thank you for your attention !



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