JT Validation – Panel Session

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Siemens

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VISUALIZING THE FUTURE

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JT Validation – Panel Session

Sept 2010

Andy Attfield

Product Manager, Open Tools
Siemens PLM Software

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Introducing the Panel....

Practitioners:

- **Brad Whitmore – P&G**
- **Dan Mason - CAT**
- **Jeff Stevens - GM**
- **Ilan Weitzer – Ford**
- **Reinhold Klass - Daimler**

JT Validation Working Group Members

- Surveying workflows, practices and tools
- Recommend process and tool requirements
- Developing best practices

Jeff Jensen	Boeing
Kai Schwebke/Reinhold Klass	Daimler
Jeff Stevens	GM
Ilan Weitzer	Ford
Dale Nicholls	Bosch
Vikal Sachdeva	Chrysler
Vern Tranel/Kevin Kulak	Caterpillar
Mark Stowe	Theorem Solutions
Damir Ratkovic	Siemens CT
Brad Whitmore/Guido Gomoll	Procter & Gamble
Parviz Rushenas	Autodesk
Nate Hartman	Purdue University
Andy Attfield	Siemens PLM Software

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Agenda

- Andy - Introduction: The case for JT Validation
- Panel - JT Validation current practices
- Andy - JT Validation Resources from Vendor Members
- All - Questions for the Panel

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JT Trend - broad adoption and process maturity

JT - 3D interoperability asset feeds PLM processes

- PLM application interoperability
- NX MultiCAD solution, Tecnomatix data acquisition
- Increased Reliance on JT data
- Broad use as **CAD independent** visual BOM
- Scalable content and multiple workflows

"3d4All"
- Bosch

"Everyone talks about the same car"
- BMW

"3D for everyone, everything in 3D"
- TML

"JT enabled visualization and Interoperability"
- Ford

"3D annotated model based solution"
- Honda

"Powerful, affordable standard evolving from Digital Engineering Visualization to Process Data Format"
- *Daimler*

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The case for Validation – JT is no exception

Data Processes

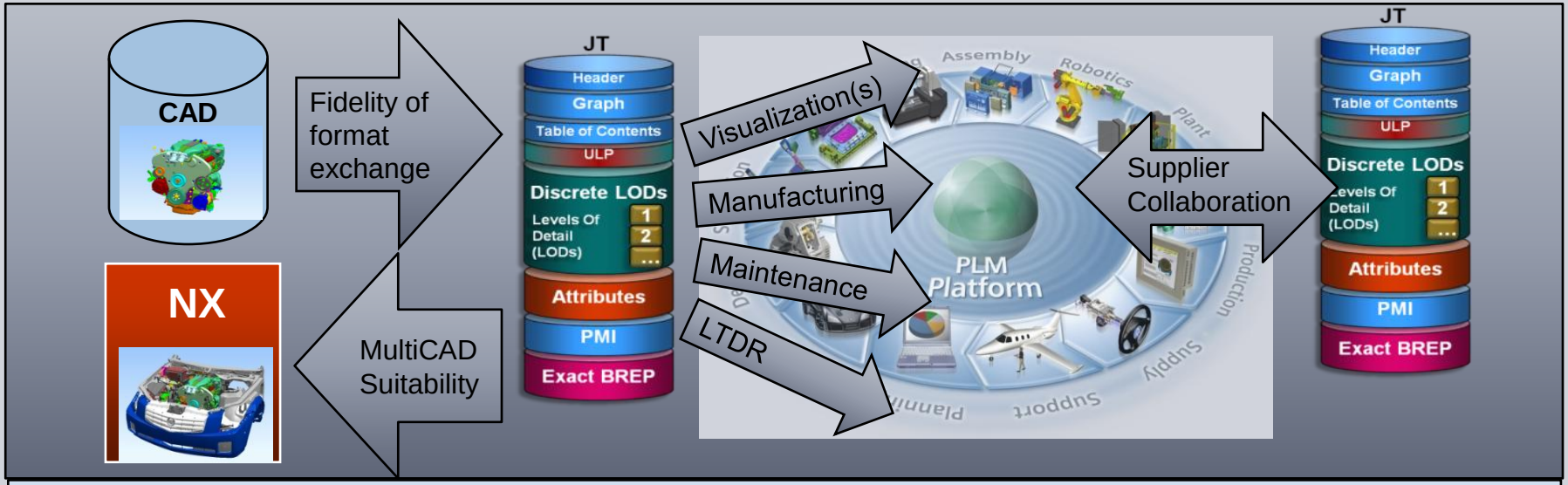
- Publishing the completed revision of a design
  - Correct JT content representing the completed design entering PLM processes
- Checking fidelity after format exchange
  - For non-Parasolid based systems, JT becomes *source geometry* derived to a measurable fidelity
- Interoperability workflows
  - Meeting paired systems' combined workflow/data requirements
  - **MultiCAD** *Open to the tools of choice* (CAD, CAM, CAE etc)
- Supplier collaboration
  - Meeting the recipients corporate data standards
  - Meets security IP protection needs.
- Archival (LTDR)
  - Ensuring JT information can be re-interpreted and re-used

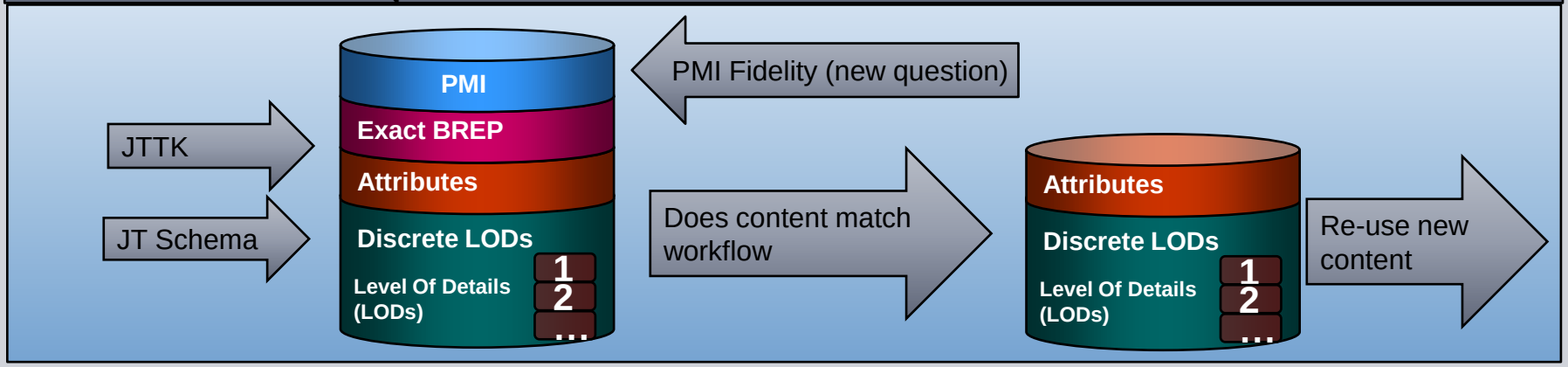
JT Business Processes

- Mock-up
- Geometric Analysis
- Reference Design
- Geometric Edit
- Styling
- Manufacturing
- Tolerance Analysis
- Manufacturing Layout
- Component inspection
- Bid
- Maintenance Schedule
- Catalogue of parts
- Contractual Signoff

“Unique” Characteristics of JT validation

- Solving diverse business processes from a single JT source
- Creates a unique combination of validation requirements





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JT Open TRB - JT Validation Working Group

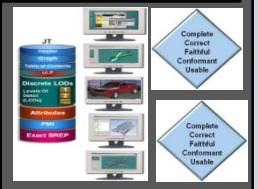
- Workflows, practices and tools
- Process and tool requirements
- Developing best practices
- White Paper

WHITE PAPER

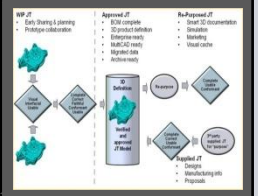
https://mycommunity.ugs.com/coi/JTOpen/TRB/JT%20Validation/White%20Paper/JTValidation%20whitepaper.docx

Framework

JT Fit for Purpose



Validation Process Checkpoints



Validation Management

JT Validation Framework:- JT Fit for Purpose

Per segment
Per workflow

Contents:- Valid JT file can be read by JT Toolkit
JT has suitable content for the intended workflow(s)

Graph:- Fidelity and Usability of Product Structure
Correct components for workflow

LODs:- Usability of tessellation
From photo realistic, to assembly browsing, to factory layout

Attributes:- Complete, MultiCAD
Semantics for intelligent import, Identifiers persist associativity

PMI:-
semantically correct for CAM automation or tolerance stack-up
Visual fidelity meaningful to manufacturing engineer

Precise Geometry:-
Valid Parasolid with suitable fidelity
Measurement, analysis, reference geometry, synchronous edit

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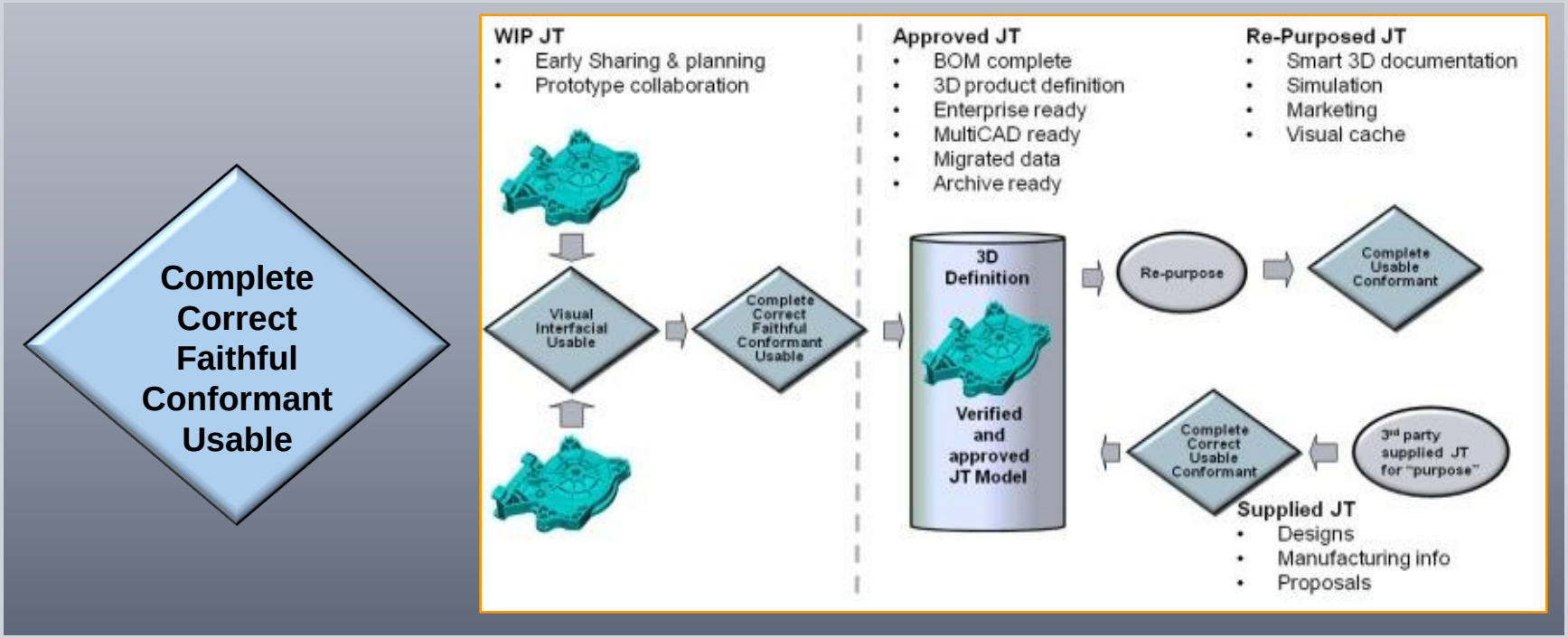
JT Validation Framework:- Process Checkpoints

Identifies 4 validation points and their characteristics in the JT life-cycle

1. **WIP JT** *"Early usability across Process interfaces"*
2. **Approved JT** "*Fit for purpose and Faithful to source data*"
3. **Re-purposed JT** *"Content change is fit for new purpose*"
4. **Supplied JT** "*Single source data – standalone checks – multi-usage*"



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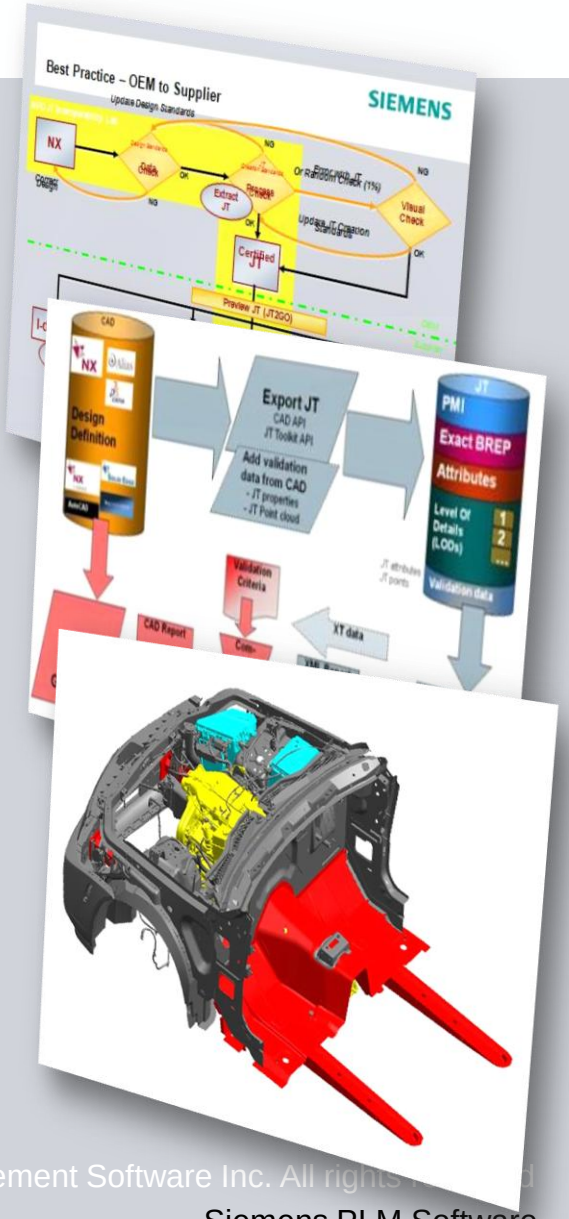
JT Validation Framework:- Management

- **Validation is managed and takes place in a business workflow**
  - Triggered, Scheduled and PDM managed
  - Starts with CAD data quality
  - Translation process
  - Fidelity check
- **The process provides valuable metrics**
  - Indicates BOM completion
- **JT files can have Conformance levels associated with their intended use**
  - Content and quality
- **Exceptions must be marked and managed**
  - Rework
  - Continue with constrained use



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Resources

CAD best practices:

- Specifying Original CAD Quality
  - Product Data Quality (e.g. NX Check-Mate)
  - Using well defined Design standards and processes
    - Check original CAD data is good quality
    - Check appropriate data for translation
    - Correct CAD data at source
- Specifying JT configuration file to match workflow standards
  - Fit for purpose
  - Correct and usable JT content
- Review Translation logs and output

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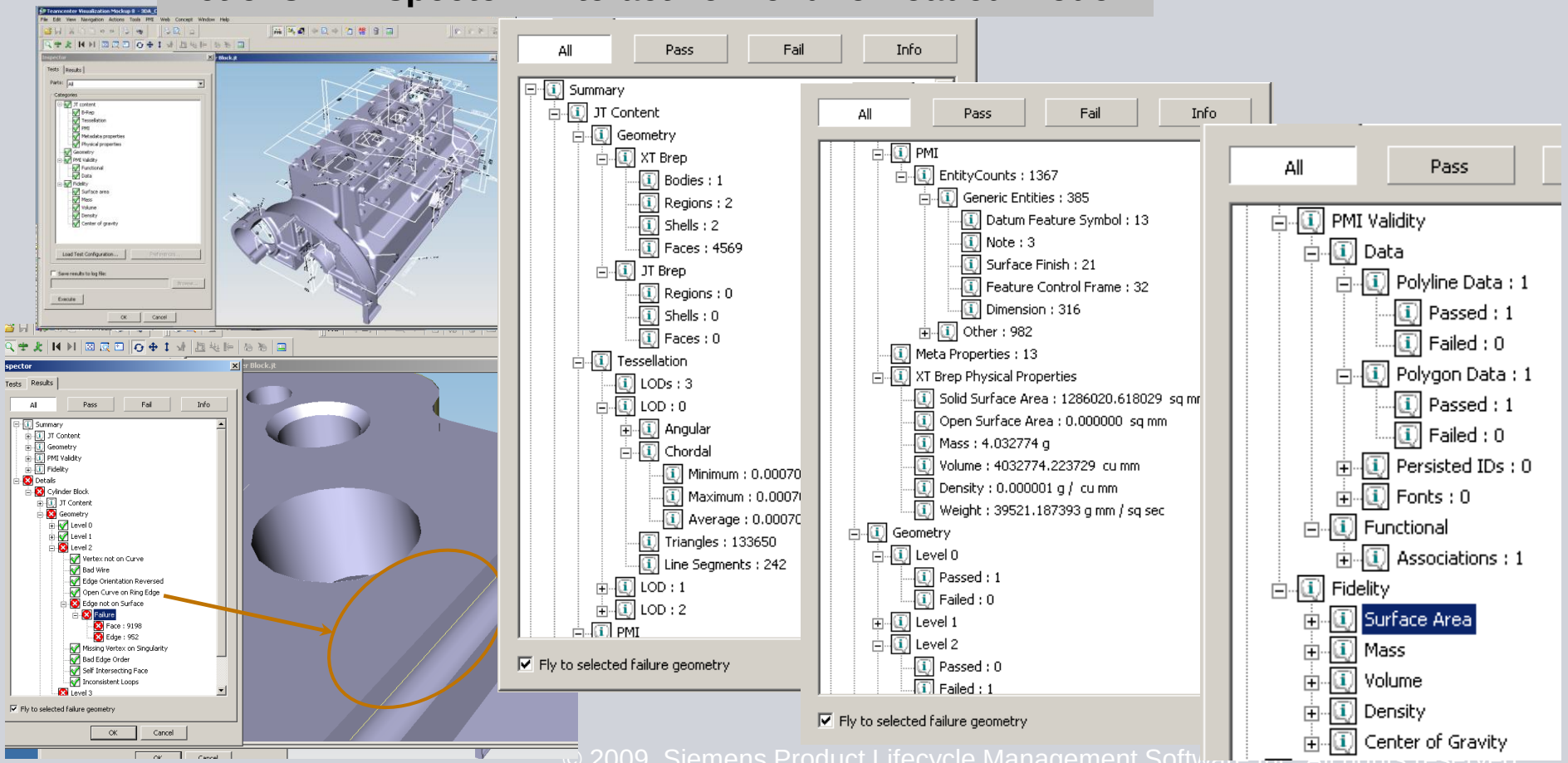
Resources:- JT Inspector

Ships as part of Teamcenter Lifecycle Viewer

Actions -> Inspector Interactive menu for loaded model



JT Inspector

JT Segment	Content	Validity	Fidelity
Structure	Summary and per node display of results		
B-rep	Type, Bodies, regions, shells, faces count	Ordered series of Parasolid validity checks on XT	
Tessellation	Number of LODS Resultant LOD parameters, triangles, line segments		
PMI	PMI types and quantities of each	Data structures correctly defined and associations resolvable	
Metadata	Quantity of properties		
Mass Properties	Parasolid Computed Properties		Compares computed with CAD reported against user tolerance

JT Inspector

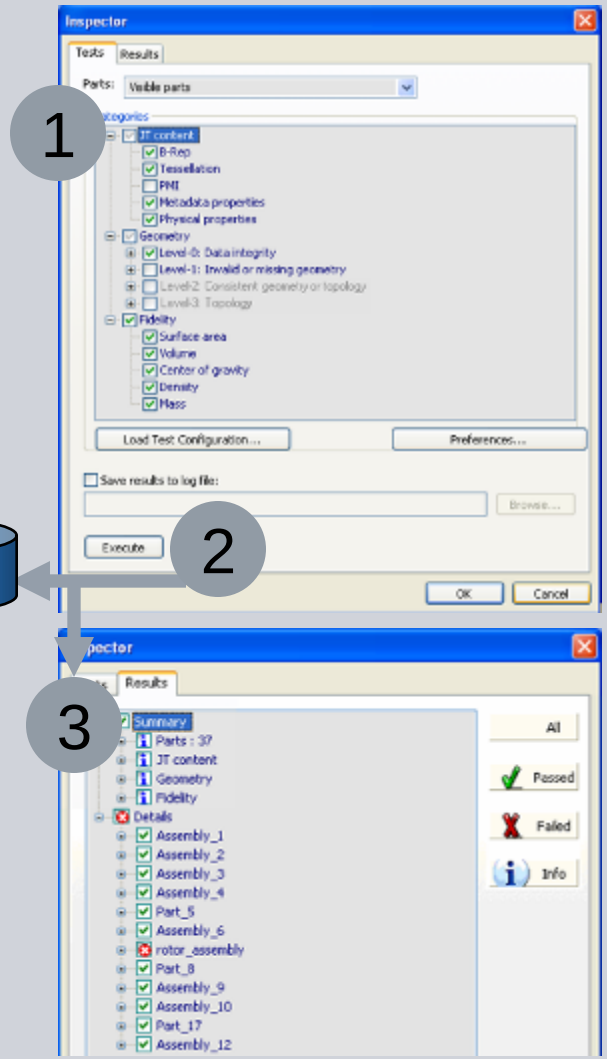
Command line utility for Automation

```
JTInspector H1-Assembly.jt –output h1.xml –config /mydir/myconfig.cfg
```

```
Configuration File "JT Inspector"
JTInspector {
      reportOn = "ENTIRE_FILE";
      reportSummary = false;

}
JTContent {
      preciseGeometry = true;
      tessellation = true;
      pmi = true;
      properties = true;

}
Geometry {
      checkValidParasolid = true;
      checkFaceFace = false;
}
Fidelity {
      checkSurfaceArea = false;
}
```



Viewer Action for detailed inspection

1. Check tests to be performed
2. Execute
3. Examine Results

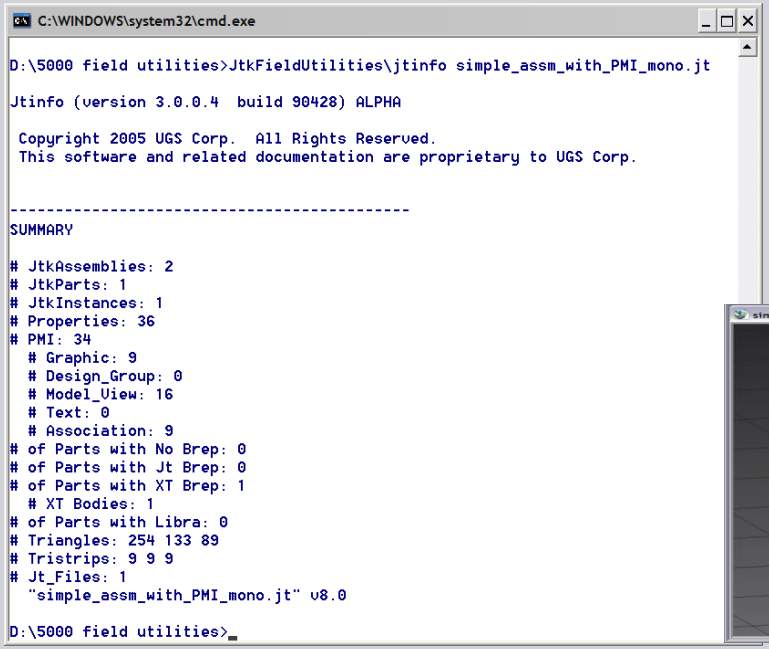
Resources:- Part Edit

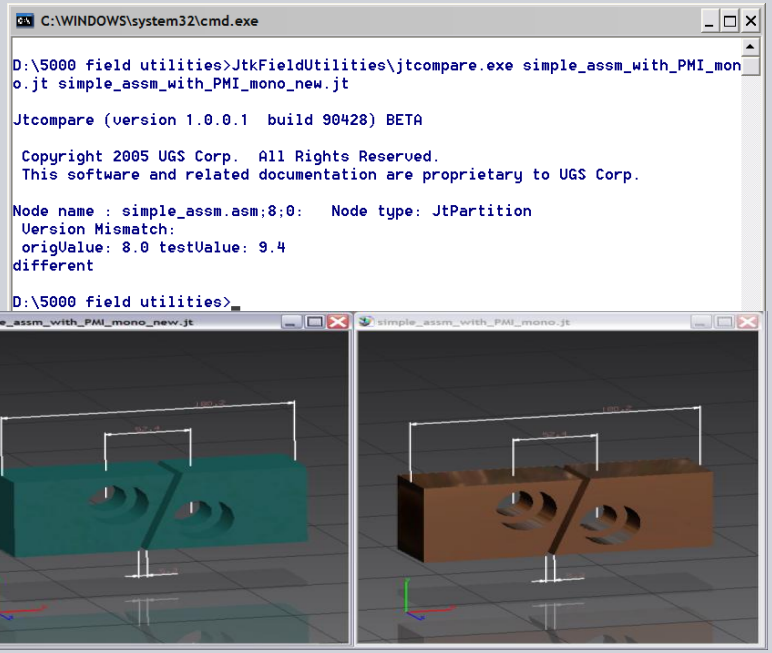
Teamcenter Lifecycle Viewer **Tools->Part Edit**

JT Field Utilities

Available to JT Open Members as examples built from JT Toolkit

- ***JTInfo*** – Information at varying levels of granularity
- ***JTCompare*** – Compare specified elements of two JT files
- ***XTfromJT*** – Extracts the XT b-rep to a file.





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May 2010 JT Open TRB – Vendor Presentations

Elysium
- healing
- PDQ check & comparison
- validation customer projects
- version shape comparison
- assembly comparison
- pmi semantic comparison
- pmi fidelity check points

Theorem
- Processing framework
- management and audit
- previous implementation

Ideas to JT
- cloud of points, mass props

T-Systems
- in-line PDQ, geometry and topology checks
- pmi report and compare

Core Technologie
- healing
- PDQ check & compare
- 2 way geometry comparison
- PMI comparison
- batch processing

ITI
- face sampling points
- ambiguous geometry
- graphics comparison
- dimension comparison

Questions for the Panel?