



Presentation title:

Good data quality is a key to
successful digital transformation

Presentation date:

2019-10-08 16:30

Room name:

St. Tropez

Presenter name:

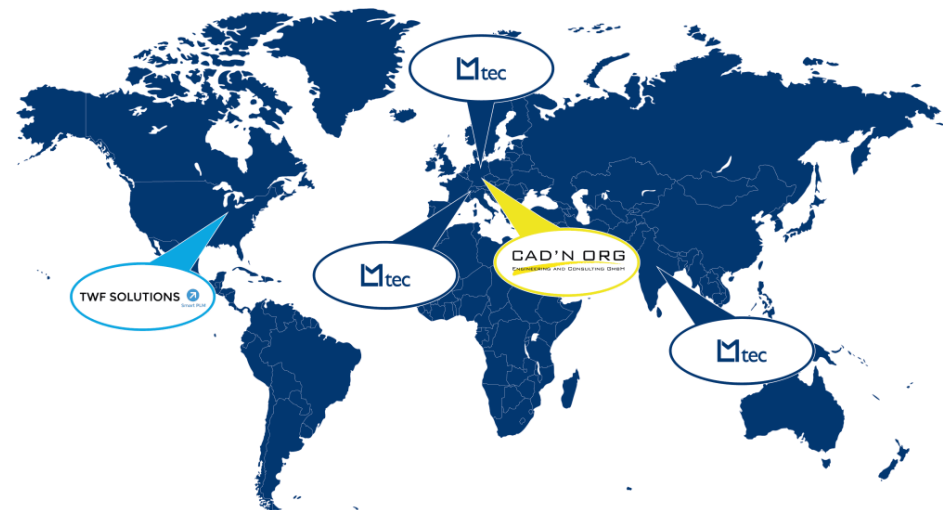
Stéphane Langlade
Oliver Yalcintepe

Our Company

- Focus: PLM Consulting, Administration and Helpdesk
- Founded 1998 in Rüsselsheim
- Own software development to optimize Teamcenter
- Partner of Siemens Industry Software GmbH



Member of the worldwide LMtec Group with locations in Germany, Switzerland, India and America



Teamcenter – Data Validation

Goal: Good data quality for a successful digital transformation

Additional Benefits:

- Higher value in data usage
- Clear and transparent processes
- Better business decisions
- Improved user acceptance
- Achieve higher product quality



Agenda

Part 1: Key points

- Impact of poor data quality
- Causes of data leaks in the PLM system
- Why automated data validation
- How to ensure data consistency

Part 2: Case studies

- Validation during data creation
- Simplification of release processes
- Changes and Validation Reports

Impact of poor data quality on your business

- Expensive corrections in later development phases
- Problem in the supply chain
- Unprecise manufacturing data
- Corrupted archive data
- Missing product information
- Use of wrong or obsolete parts
- Incomplete orders
- Outdated part catalog data
- ...

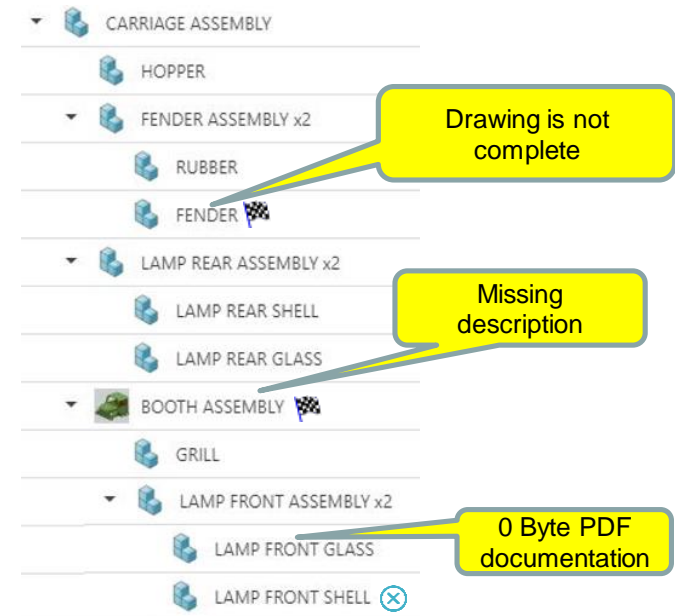
The screenshot displays a CAD software interface for a '00050000/001:1-TRUCK ASSEMBLY'. The main window shows a BOM table with columns for Element Name, ID, Revision, Sequence, Quantity, and Release Status. The table lists various components like CARRIAGE ASSEMBLY, HOPPER, FENDER ASSEMBLY x2, RUBBER, FENDER, LAMP REAR ASSEMBLY x2, LAMP REAR SHELL, LAMP REAR GLASS, BOOTH ASSEMBLY, GRILL, ENGINE HOOD, DOOR x2, CHAIR x2, STEP RIGHT, STEP LEFT, LAMP FRONT ASSEMBLY, LAMP FRONT GLASS, LAMP FRONT SHELL, BUMPER, and a final entry with ID 00050022. The release status for most items is 'Approved'.

Yellow callouts highlight specific data quality issues:

- Mismatch of release status on sub assemblies:** Points to the 'FENDER' item (ID 00050037) which is 'Approved' while its parent 'FENDER ASSEMBLY x2' (ID 00050036) is also 'Approved', but the callout suggests a discrepancy in the context of the assembly hierarchy.
- Missing data for ERP transfer:** Points to the 'BOOTH ASSEMBLY' item (ID 00050021) which has a missing 'Quantity' field.
- Use of obsolete Vendor parts:** Points to the 'BUMPER' item (ID 00050022) which has a 'Quantity' of 140.
- 0 Byte PDF for Archiving:** Points to a PDF icon in the 'Attachments' panel on the right, indicating a corrupted or empty file.
- Missing description for documentation:** Points to the 'BOOTH ASSEMBLY' item, which has a missing 'Description' field.

Causes of data leaks in the PLM system

- Incomplete work instructions / guidelines
- No use of naming conventions
- Insufficient automation
- Incorrect use of object types
(complex structures)
- Different templates for documents
- Migrated data
- Lack of input and output management
- Missing integration with other systems
- Software errors
- ...



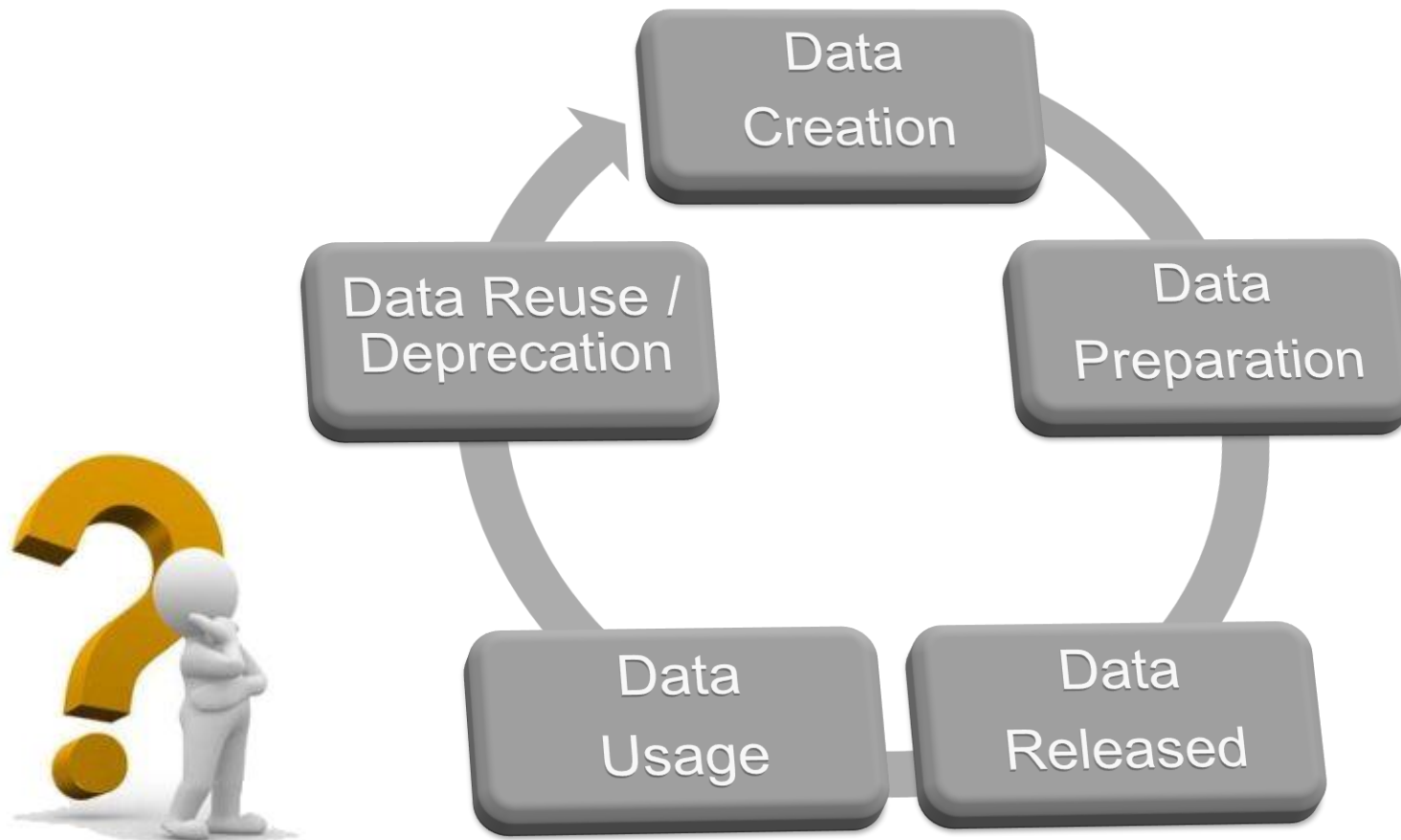
Why automated data validation?

Enabler for better performance and better business decisions:

- **100% reliable data**
 - consistent quality & not depending on user
 - no human error
- **Avoid costly mistakes**
 - identify an error soon is the best: less complexity and no correction required
- **Higher user acceptance**
 - Ramp-up of user knowledge of company standards
 - Smooth usage of data in every next step
 - Help user to achieve desired level of quality
- **Speed up release processes**
 - check existing product structures
 - **faster** quality checks
 - **faster** on new data creation
- **Reduce administrative effort**
 - include validation checks in every step
 - simplified integration of new processes
 - several sources: rules & methods
- **Faster evolution of configuration**
 - Flexibility/**Agility** & ability to evolve
 - User needs **no** specific knowledge
 - User needs **no** intensive training

How to ensure data consistency: **Data Lifecycle**

Support the user/system in every step of the data processing.



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- Why automated data validation
- How to ensure data consistency

Part 2: Case studies

- Validation during data creation and preparation
- Simplification of a release process
- Changes and Validation Reports





User Stories: Overview

User Story: Create a new Product

Tasks:

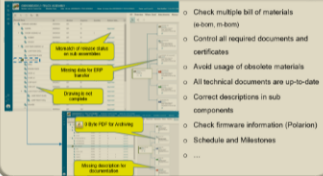
- Search to avoid duplicates
- Fill a lot of required attributes
- Check dependencies to other product lines
- Trigger the process for other departments



Data Creation / Preparation

- Input Validation
- Create BOM and Relations

User Story: Release an Assembly for manufacturing



Data Release

- Assembly ready for manufacturing

User Story: Data Analysis and Validation Reports

Analysis and reporting to improve the data quality:

- Reports on the base of simple defined check conditions
- Validation on all existing data in your PLM-System and connected Systems
- Query-Engine for a direct integration in existing Reporting-Services
- Report for the data quality of newly migrated data
- Clean-up feature for pre-active data correction



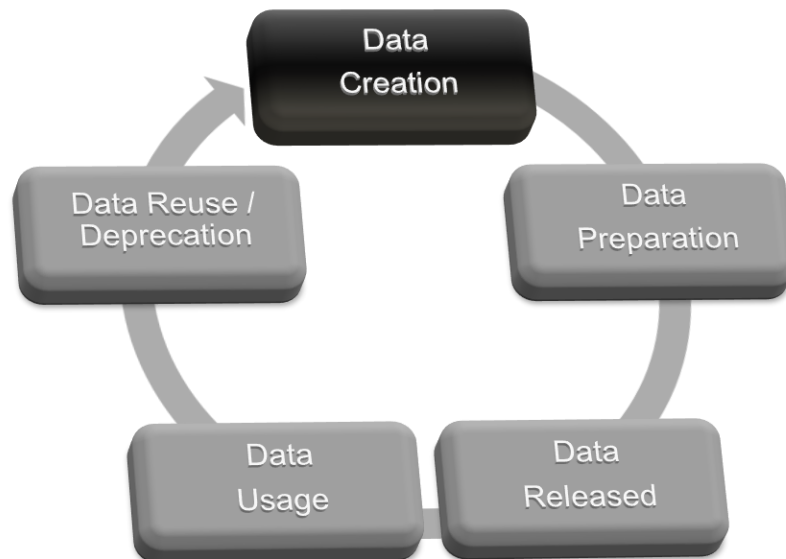
Data Usage

- Bill of Material Changes
- Analysis and Reports

How to ensure data consistency: Options

Data Creation / Preparation: Avoid incorrect entries

- Automation of data checks (for example, during create, revise, classify, ...)
- Automatically fill forms based on existing data
- Guide on relation creation or on BOM modifications
- Data validation in every application (Teamcenter RAC, Active Workspace, NX,...)



User Story: Create a new Part

User actions:

- Search to avoid duplicates
- Fill a lot of required attributes
- Check dependencies to other product lines
- Trigger the process for other departments

...

Advanced Search

Quick Advanced

Item Revision...

Name: Customized Clear All

Alias: Assembly

Add

New Palette Search

CNO_SLE_DETAIL_ITEM

PROPERTIES

ID: * ("DETAIL-AA"-nnn)
DETAIL-AB-680

Revision: * (A)
A

Name: *
Customized

Description:
Any

INFORMATION

Sub Type:
Material Type:
Material Manufacturing type:
Manufacturing precision:
MFD X:
MFD Y:
MFD Z:

User Story: Create a new Part

Simplified Object Creation:

- Prevent inconsistent data in the creation process
- Fix errors as soon as possible
- Ramp-up of user knowledge to company standards
- Smooth usage of data in every step
- Avoid invalid data with deeply integrated check conditions

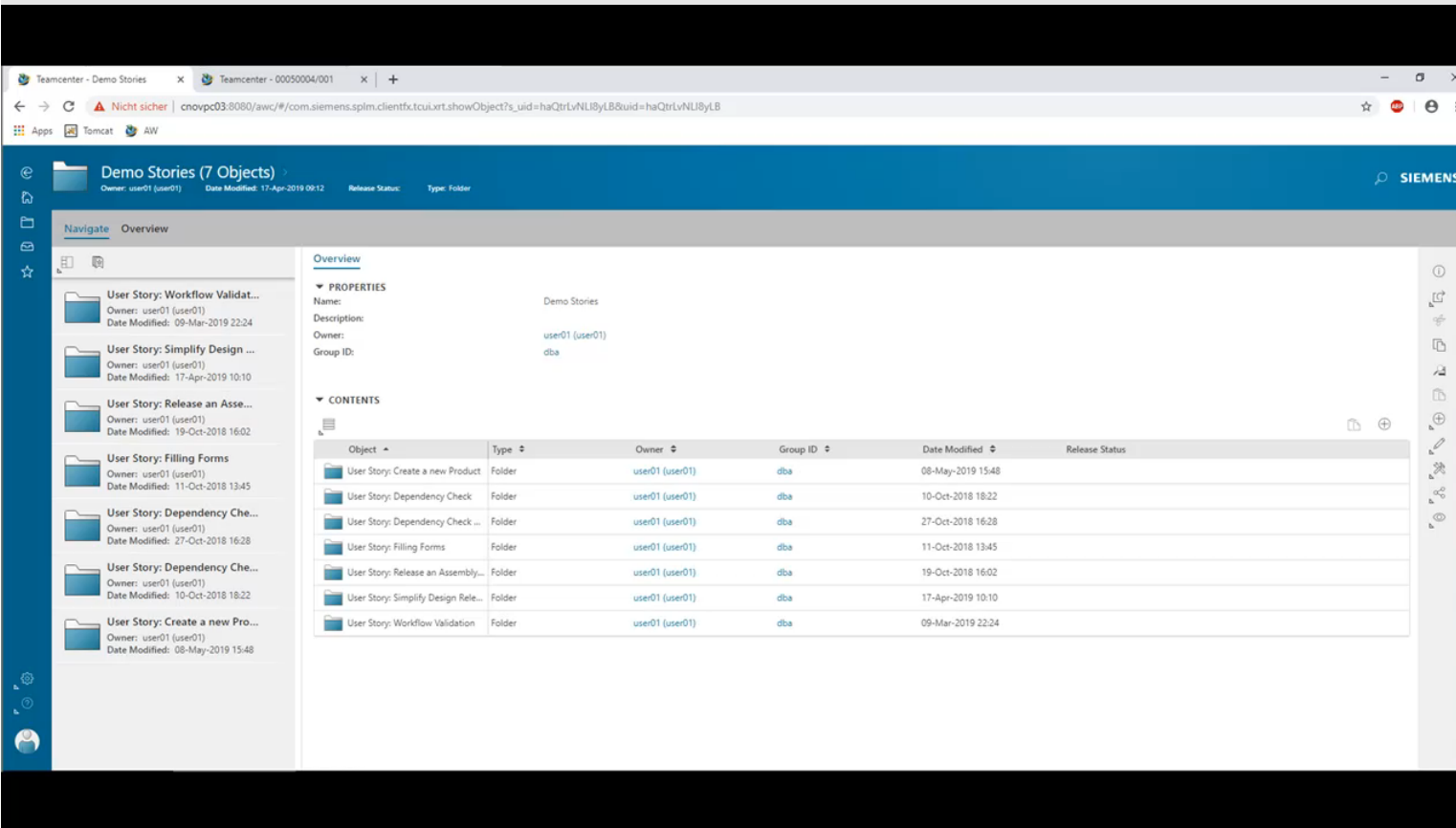
Check for
duplicates during
object creation
with user hints

The screenshot shows a software interface for creating a new part. It features a 'Summary' tab and an 'Attachments' tab. The 'Summary' tab contains several input fields and error messages:

- ID:** A text field with the value 'DETAIL-AB-463 - AA'. Above it, a hint shows the pattern ('DETAIL'-'AA'-'nnn').
- Error Message:** A grey box states 'This name is already used by another Item. Combination must be unique'.
- Customized:** A red dropdown menu with the value 'Customized'.
- Description:** A yellow text area with a hint 'The description is optional'.
- Unit of Measure:** A dropdown menu with the value 'each'.
- Sub Type:** A grey box at the bottom states 'Sub Type is required. Assembly, Detail, Standard_Collector, Flexible_Collector are valid'.

On the right side of the interface, there is a vertical toolbar with various icons for information, navigation, and editing.

User Story: Create a new Part



The screenshot shows the Siemens Teamcenter web interface. The browser address bar indicates a URL from cnovpc03.0080. The main content area is titled 'Demo Stories (7 Objects)' and shows a list of user stories. The 'CONTENTS' tab is active, displaying a table of user stories.

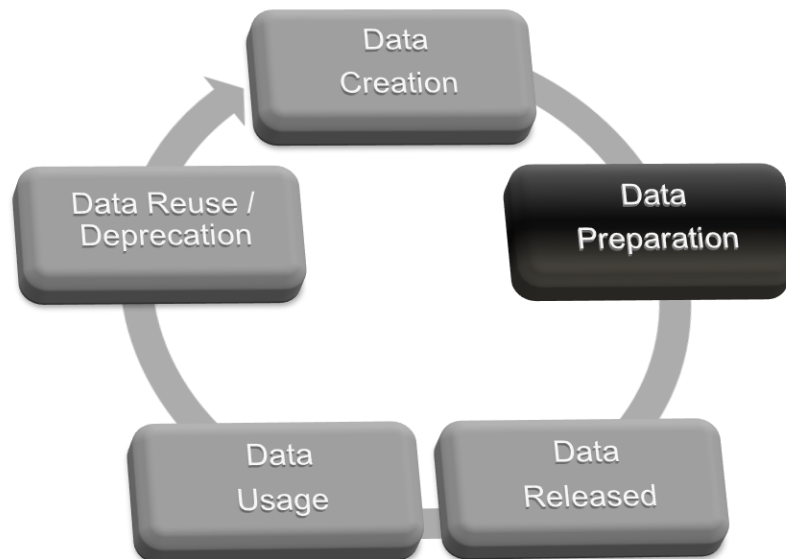
Object	Type	Owner	Group ID	Date Modified	Release Status
User Story: Create a new Product	Folder	user01 (user01)	dba	08-May-2019 15:48	
User Story: Dependency Check	Folder	user01 (user01)	dba	10-Oct-2018 18:22	
User Story: Dependency Check ...	Folder	user01 (user01)	dba	27-Oct-2018 16:28	
User Story: Filling Forms	Folder	user01 (user01)	dba	11-Oct-2018 13:45	
User Story: Release an Assembly...	Folder	user01 (user01)	dba	19-Oct-2018 16:02	
User Story: Simplify Design Rele...	Folder	user01 (user01)	dba	17-Apr-2019 10:10	
User Story: Workflow Validation	Folder	user01 (user01)	dba	09-Mar-2019 22:24	

Demo:
Item Creation
with input
validation

How to ensure data consistency: Options

Data Creation / Preparation: Avoid incorrect entries

- Automation of data checks (for example, on display, on copy/paste, on demand, ...)
- Automatically fill forms based on existing data
- Guide users on review and/or changes
- Data validation in every application (Teamcenter RAC, Active Workspace, NX,...)



User Story: Changes and Dependencies

Extension: Stylesheet Check

Summary Attachments

ID: ("DETAIL-"AA"-nnn")

DETAIL-AB-463 - AA

This name is already used by another Item.
Combination must be unique

Customized

The description is optional

Unit of Measure:
each

Sub Type is required
Assembly, Detail, Standard_Collector,
Flexible_Collector are valid

Extension: Checking Dependencies

Overview

PROPERTIES

Name: User Story: Dependency Check BIS

CONTENTS

Object	Type	Owner
DETAIL-AA-201/A;1-test	DETAIL-AA-201/A;1-test	user01 (user01)
Objects to copy BIS	Objects to copy BIS	user01 (user01)

Paste failed:
The supplier of the frame is not fitting.
The frame can not be used in this combination.

User Story: Data Creation / Preparation



CNO Validation Framework

=> Benefits :

- Reliability: **100%**
- Availability, continuity & resilience
- Usability: **all in one**
- Performance: **5 time faster**

- Quality level is consistent
- Quality level is reliable
- Avoid missing or invalid data
- + agility to evolve

Manual creation & checks

- Quality level depends on user
- Quality level subjects to human error
- Several source: rules, Teamcenter, methods
- Data must be manually entered



User Stories: Overview

User Story: Create a new Product

Tasks:

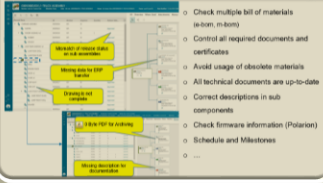
- Search to avoid duplicates
- Fill a lot of required attributes
- Check dependencies to other product lines
- Trigger the process for other departments



Data Creation / Preparation

- Input Validation
- Create BOM and Relations

User Story: Release an Assembly for manufacturing



Data Release

- **Assembly ready for manufacturing**

User Story: Data Analysis and Validation Reports

Analysis and reporting to improve the data quality:

- Reports on the base of simple defined check conditions
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- Report for the data quality of newly migrated data
- Clean-up feature for pre-active data correction



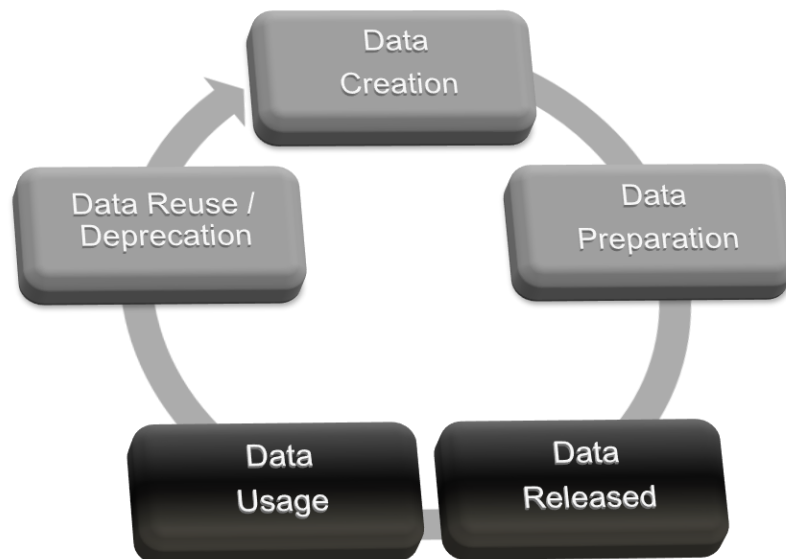
Data Usage

- Bill of Material Changes
- Analysis and Reports

How to ensure data consistency: Options

Data Release / Usage: Reduction of complexity

- Readable error messages
- Work instructions directly available (for example, wrong assignment of a component)
- Pre check (complete display of errors with work instructions)
- Validate each component (assembly specific conditions, dependency checks)



User Story: Release an Assembly for manufacturing

00050000/001:1-TRUCK ASSEMBLY

Revision: Latest by Creation Date Effectivity: Today Units: All Units (00050000/001:1-TRUCK ASSEMBLY) Variant: No Variant Rule (00050000/001:1-TRUCK ASSEMBLY) Owner: user01 (user01) Date Modified: 11-Oct-2018 16:46

Element Name	ID	Revision	Sequence	Quantity	Release Status
CARRIAGE ASSEMBLY	00050004	001	30		
HOPPER	00050032	001	10		Approved
FENDER ASSEMBLY x2	00050036	001	80	2	
RUBBER	00050038	001	30		Approved
FENDER	00050037	001	40		Approved
LAMP REAR ASSEMBLY x2					
LAMP REAR SHELL					
LAMP REAR GLASS					
BOOTH ASSEMBLY					
GRILL					
ENGINE HOOD					
DOOR x2					
CHAIR x2					
STEP RIGHT	00050027	001	80		Approved
STEP LEFT	00050026	001	90		Approved
LAMP FRONT ASSEMBLY					
LAMP FRONT GLASS					Approved
LAMP FRONT SHELL					Approved
BUMPER	00050022	001	140		Approved

Issues identified:

- Mismatch of release status on sub assemblies
- Missing data for ERP transfer
- Drawing is not complete
- 0 Byte PDF for Manufacturing
- Missing description for documentation

- Check multiple bill of materials (e-bom, m-bom)
- Control all required documents and certificates
- Avoid usage of obsolete materials
- All technical documents are up-to-date
- Correct descriptions in sub components
- Check firmware information (Polarion)
- Schedule and Milestones
- ...

User Story: Release an Assembly for manufacturing

Manual checks (costly / time consuming)

- Quality level depends on user (project pressure)
- Quality level subjects to human error
- Several sources: rules, documentation, methods
- Several applications: Teamcenter, ERP-System, ...



Requirement: Automated "Check BOM"

- Check a complete bill of material (expansion on all level)
- Check attributes based on other attributes
- Check for dependent fields and objects on BOM components
- On demand validation without workflow complexity

User Story: Release an Assembly for manufacturing

Ad-Hoc Validation

- Pre-Validation before starting the release process
- Direct integration and validation in any processing step
- Optional post processing based on the result of the verification

Open your assembly in Active Workspace

Element Name	ID	Revision	Sequence	Quantity	Release Status	Last By
CARRIAGE ASSEMBLY	00050004	001	30			user01
HOPPER	00050032	001	10		Approved	user01
FENDER ASSEMBLY x2	00050036	001	80	2		user01
RUBBER	00050038	001	30		Approved	user01
FENDER	00050037	001	40		Approved	user01
LAMP REAR ASSEMBLY x2	00050040	001	100	2		user01
LAMP REAR SHELL	00050041	001	10		Approved	user01
LAMP REAR GLASS	00050042	001	20		Approved	user01
BOOTH ASSEMBLY	00050021	001	120		Approved	user01
GRILL	00050024	001	20		Approved	user01
ENGINE HOOD	00050023	001	30		Approved	user01
DOOR x2	00050028	001	40	2		user01
CHAIR x2	00050029	001	50	2		user01
STEP RIGHT	00050027	001	80		Approved	user01
STEP LEFT	00050026	001	90		Approved	user01
LAMP FRONT ASSEMBLY x2	00050030	001				user01
LAMP FRONT GLASS	00050034					
LAMP FRONT SHELL	00050033					
BUMPER	00050025					

Recursive: Components will be checked too

PROPERTIES
ID: 00050000
Revision: 001
Revision Name: TRUCK ASSEMBLY
Description:
Occurrence Name:
Reference Designator:
Sequence:
Quantity:
Unit Of Measure:
Release Status:
Date Released:
Release Effectivity:
Element Effectivity ID:
Element Effectivity:
Owner: user01 (user01)
Group ID: Engineering
Last Modifying User: user01 (user01)
Precision: False

GLOBAL ALTERNATES

PREVIEW

Demo: Assembly validation

- Check a complete bill of material (all levels)
- Checks dependent attributes or related objects
- Check properties of sub components

[Video](https://youtu.be/rT028Gk61PE)

<https://youtu.be/rT028Gk61PE>

User Story: Release an Assembly for manufacturing

Enablers of better performances and competitiveness:

- **5x faster**
- **100%** reliable quality checks
- **Much better** usability
- **More** validation capacity
- User needs **no** intensive training
- Flexibility and agility to adapt to new needs
- Every information in **one location**
- Every thing in **one application**
- **Avoid** costly mistakes
- **Data quality:**





User Stories: Overview

User Story: Create a new Product

Tasks:

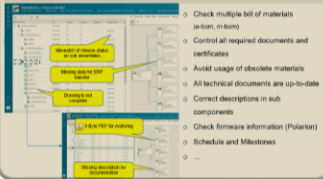
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Data Creation / Preparation

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User Story: Release an Assembly for manufacturing



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User Story: Data Analysis and Validation Reports

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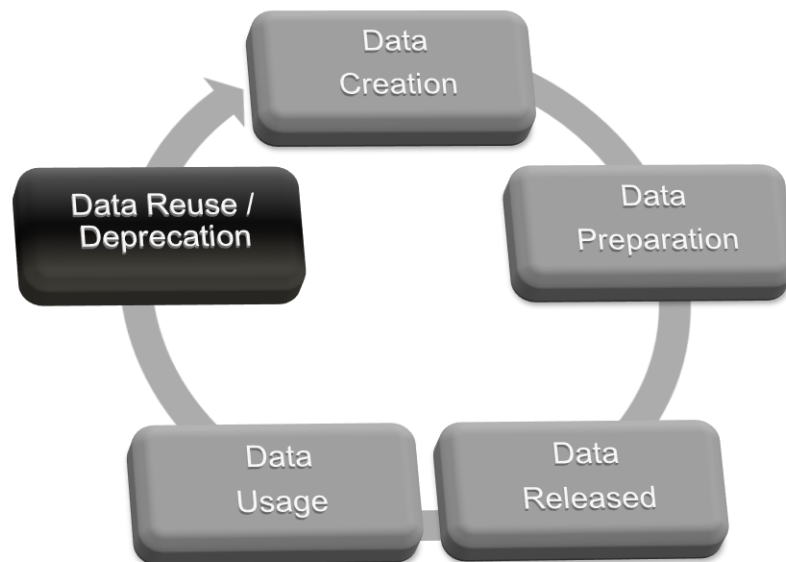
Data Usage

- Bill of Material Changes
- Analysis and Reports

How to ensure data consistency: Options

Data Deprecation: Validation of existing and old data

- Cyclic review of data in Teamcenter (reports)
- Use same procedure / rules for all validations
- Compare options with previous Revisions or different BOM



Even small changes in assemblies become increasingly complex and require an accurate examination and traceability.



User Story: Track changes

- Easy identification of changes on the item revision
- Fast way to compare different bill of materials
- Generation of change lists and delta comparison

The screenshot displays the CAD'N ORG software interface with the 'CNO Compare' window open. The window shows a table with two revisions of 'LKW ZUSAMMENBAU' (001 and 002). Below the table, a dropdown menu for 'Rule' is set to 'Compare other Revision Structure'. To the right, a context menu is visible with options like 'CNO Compare', 'Briefcase', and 'Cut'. In the foreground, an Excel spreadsheet is open, showing a detailed comparison of BOM lines between two revisions. The spreadsheet has columns for Level, BOM Line, and Revision. The data shows changes in revision numbers for several BOM lines, with some cells highlighted in red and green to indicate differences.

ID	Revision	Name	Type
000157100	001	LKW ZUSAMMENBAU	Item Revision
000157100	002	LKW ZUSAMMENBAU	Item Revision

Rule: Compare other Revision Structure

Info: Compare other Revision Structure, Compare different Product Structures

Revision Structure compare:

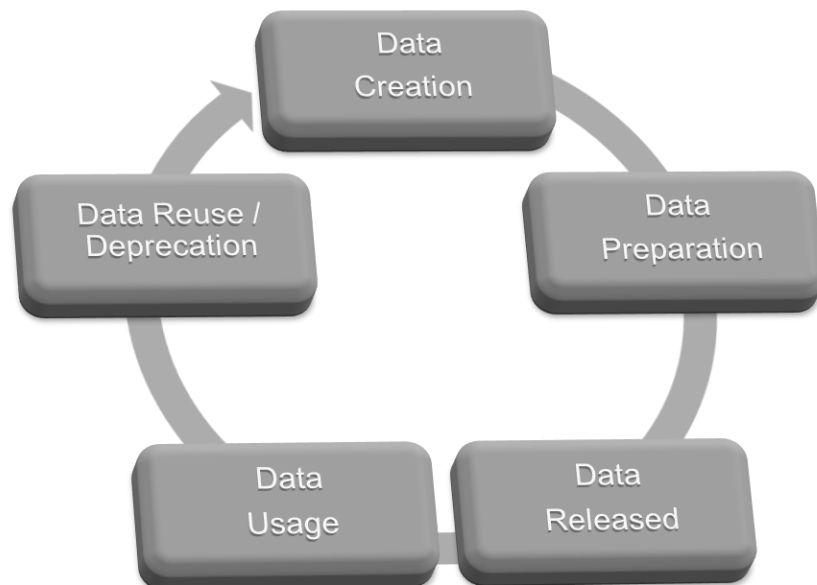
- Run the Compare
- Excel Report is generated
- Use the delta report

Level	BOM Line	Level	BOM Line	REVISION	REVISION
1	000005200/001;1-LKW ZUSAMMENBAU	1	000005200/001;1-LKW ZUSAMMENBAU	001	002
3	000005204/003;1-KAROSSERIE ZUSAMMENBAU	2	000005204/003;1-KAROSSERIE ZUSAMMENBAU	003	004
4	000005232/003;1-LADERAUM	3	000005232/003;1-LADERAUM	003	003
5	000005236/003;1-KOTFLUEGEL ZUSAMMENBAU	3	000005236/003;1-KOTFLUEGEL ZUSAMMENBAU	003	003
6	000005238/002;1-FLUEGEL	4	000005238/002;1-FLUEGEL	002	002
7	000005237/002;1-GUMMI	4	000005237/002;1-GUMMI	002	002

How to ensure data consistency: Options

On demand: Validation of existing and old data

- Review of all data in Teamcenter (reports)
- Use same procedure / rules for all validations
- Analysis overview



- **Any life cycle step**
 - **Any time**
 - **Any data**

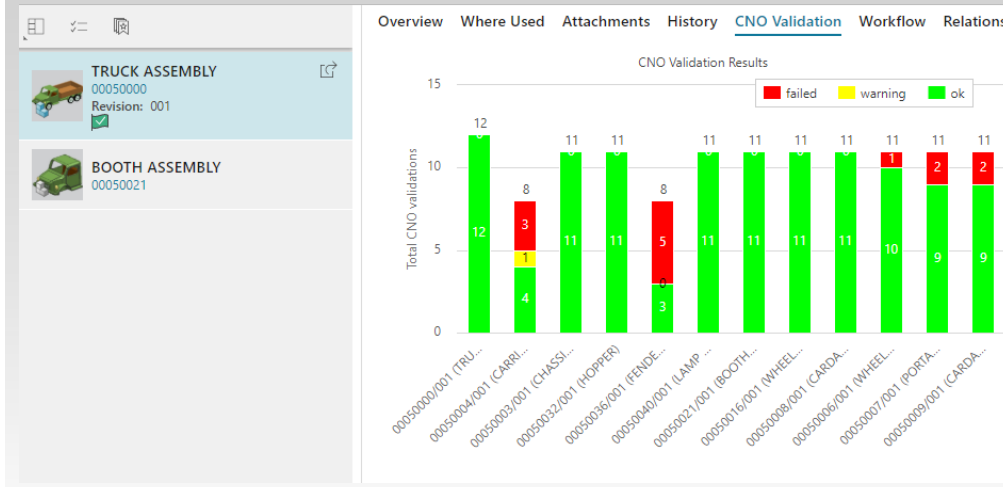
User Story: Data Analysis and Validation Reports

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Sample: Batch Validation (Report)





CNO Validation Framework: Data Lifecycle Support

✓ Creation...

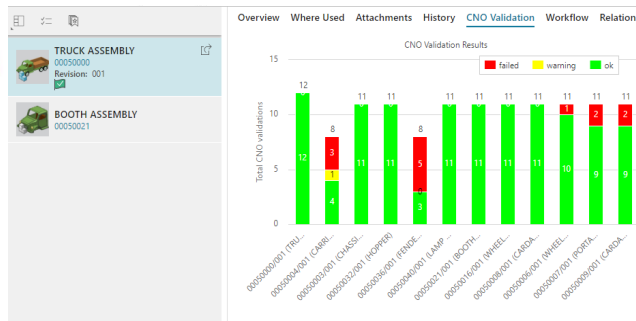
Validate input data for objects and relations in any application

✓ Ad-hoc...

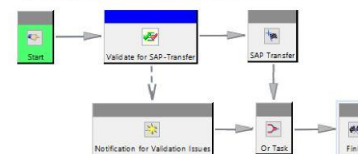
Validation during design and release activities

✓ Reports...

Data analysis and reporting of incomplete or missing data



✓ Workflows...



Extend existing workflows with validation functionality



CNO Validation Framework: Customer Use Cases

International Automotive Supplier: Use validation to simplify their product development process, with more than 3,000 users, 100,000 assemblies and a million tasks

Electronic industry company (Europe): Use assembly checks and input validation to improve the data quality and provide a better usability to more than 3,500 users.

Medical components: Uses input validation and workflow validation to reduce the support- and training effort of 800 users.

Global Consumer Products company (Europe): Use Validation Framework on Active Workspace and reduced the time to release parts to 50%.

Machine manufacturer (Germany): Uses Rich Client with AutoFill to guide the users in the part creation process. Data validation is used for complete projects for a better quality to make better business decisions.

... and many more!

Teamcenter: Data Validation – Questions?

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...and answers also here on
our **booth 28/29**



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