



/// Kundentag 2024

CLASSIFICATION

AI

F. Wallner | 24.10.2024 | 14:00 Uhr



DR. WALLNER ENGINEERING



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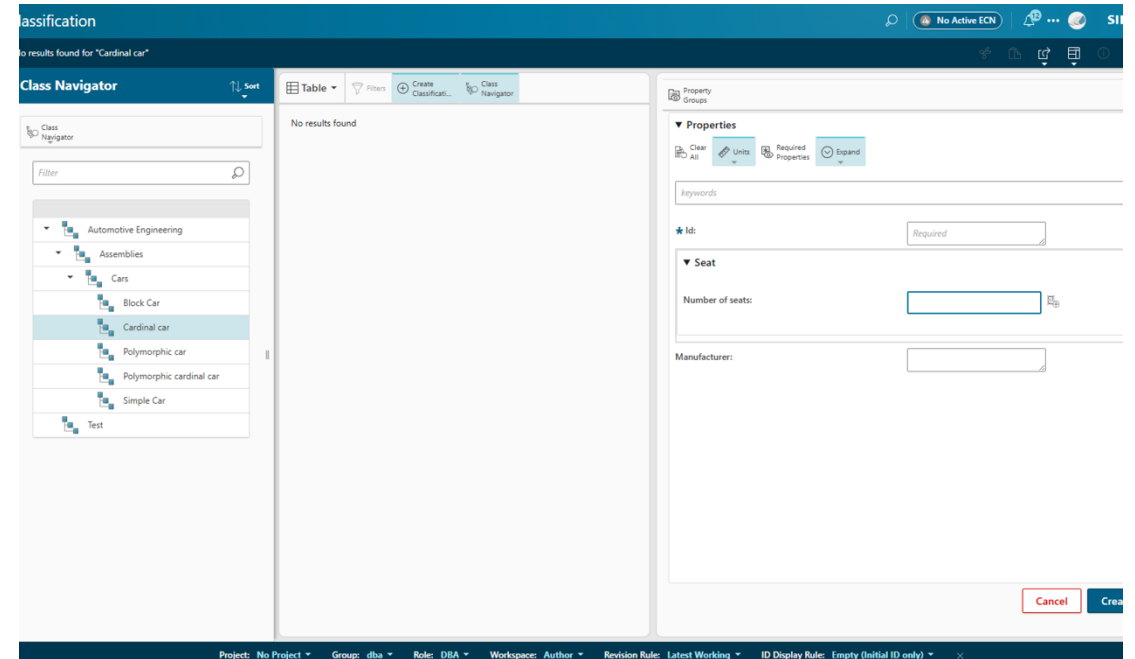
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/// Was ist zu erwarten?

AGENDA

- Classification
 - Basic vs. Advanced
 - Features
 - Import
- AI
 - Funktion
 - Training
 - Demo
- Anwendung?



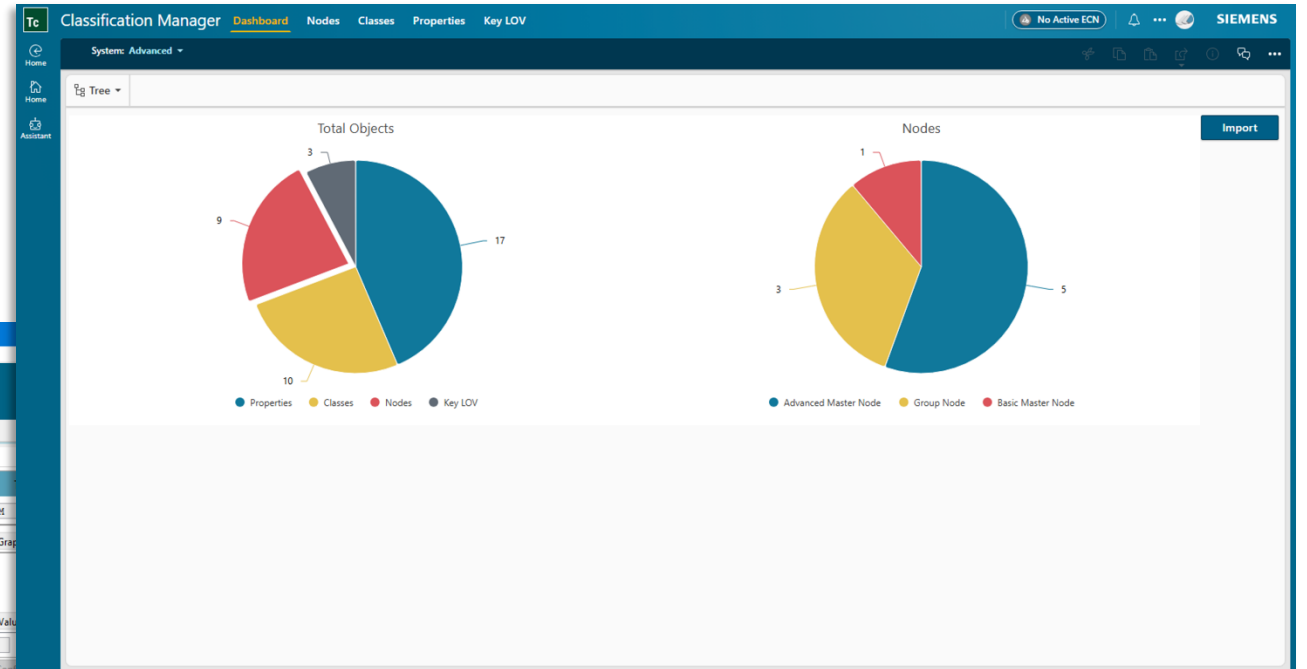
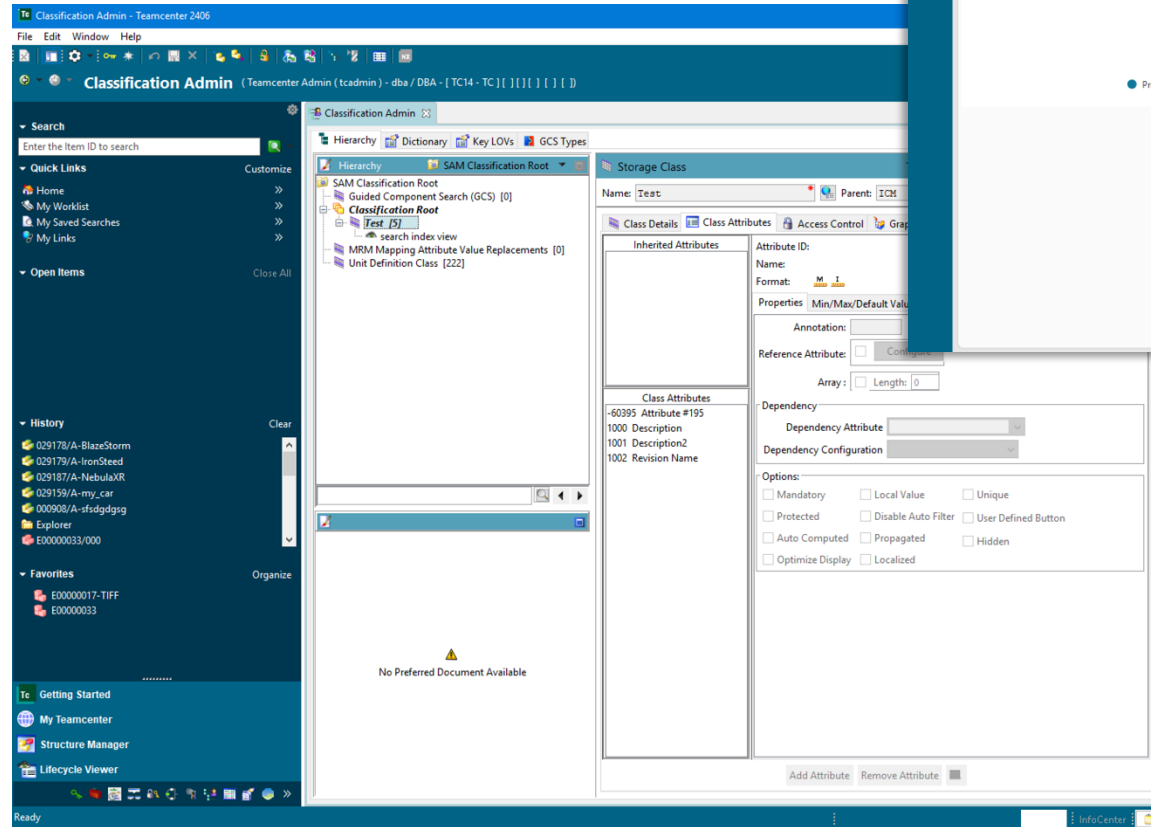
/// Classification

BASIC VS. ADVANCED

- Oder Old vs. New?
- Warum sollte ich wechseln?



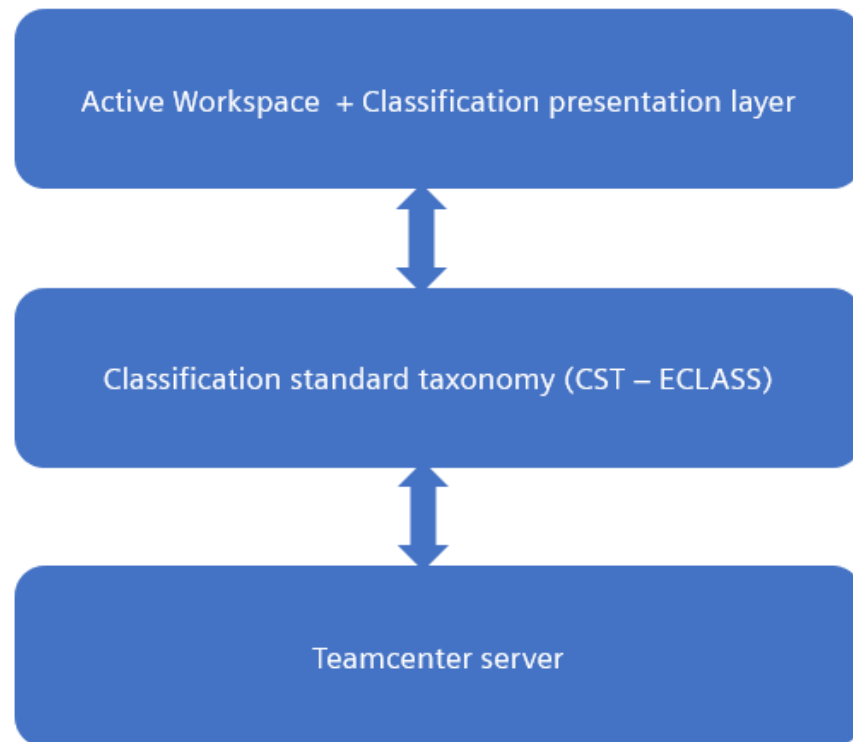
Old vs. New



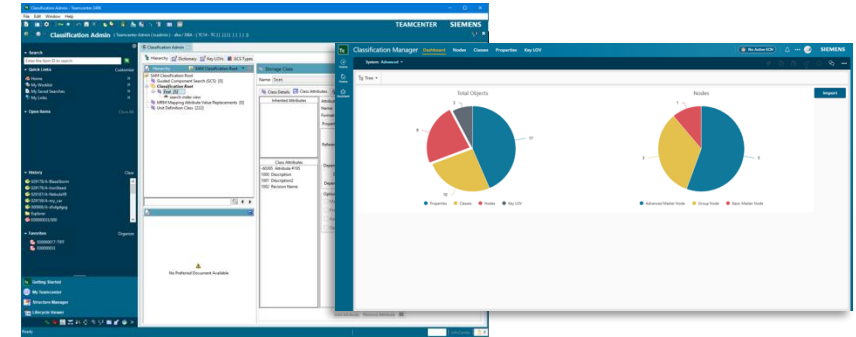
- Warum überhaupt klassifizieren?
- Welche Voraussetzungen?

Basic vs. Advanced

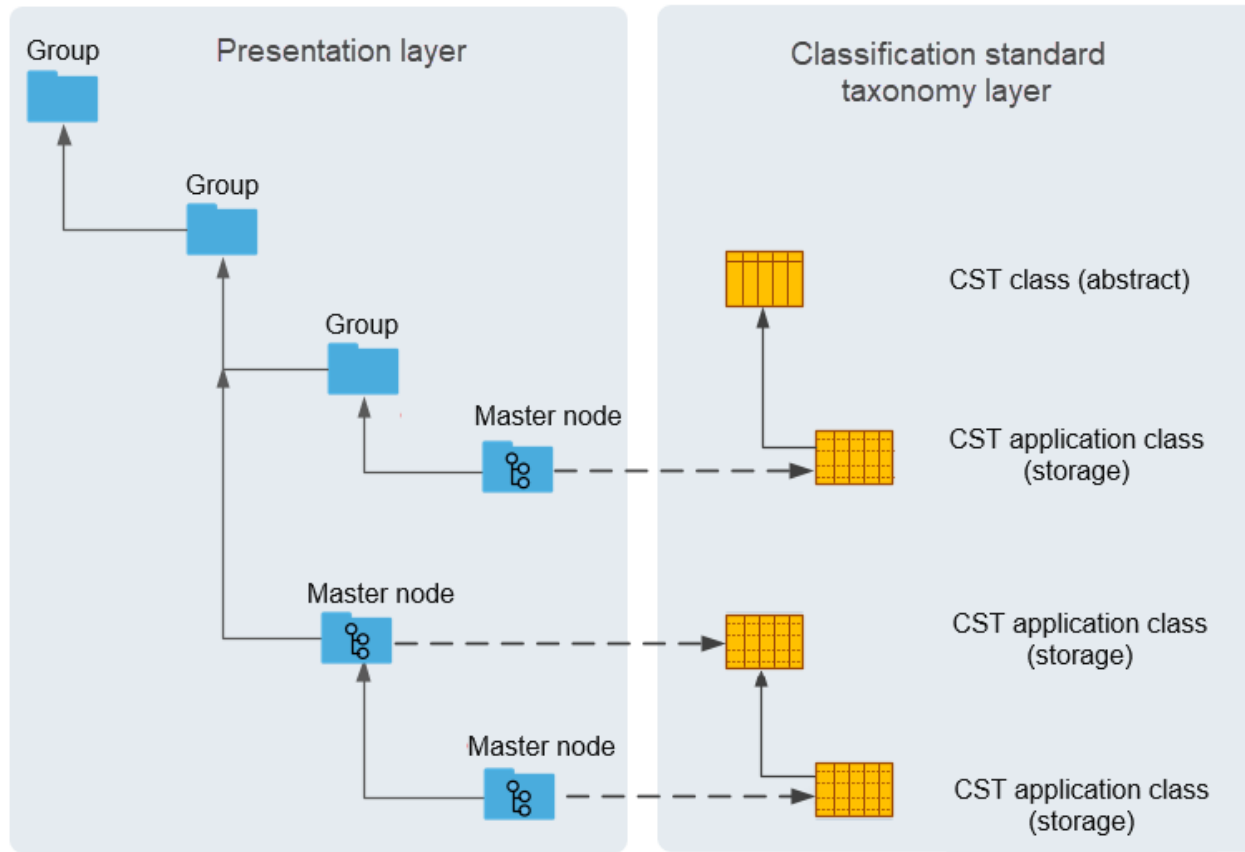
- Schlüssel ist der Presentation Layer (CLS0) um von Alt nach Neu zu kommen



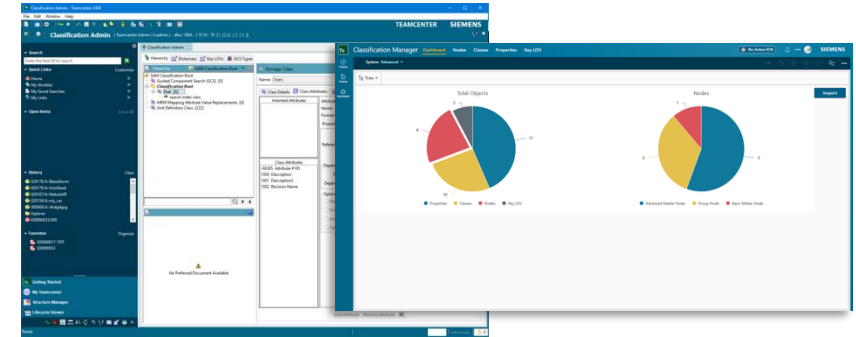
Quelle: https://docs.sw.siemens.com/en-US/do/c/282219420/PL20231129261301184.class_a_w/x_id1567127



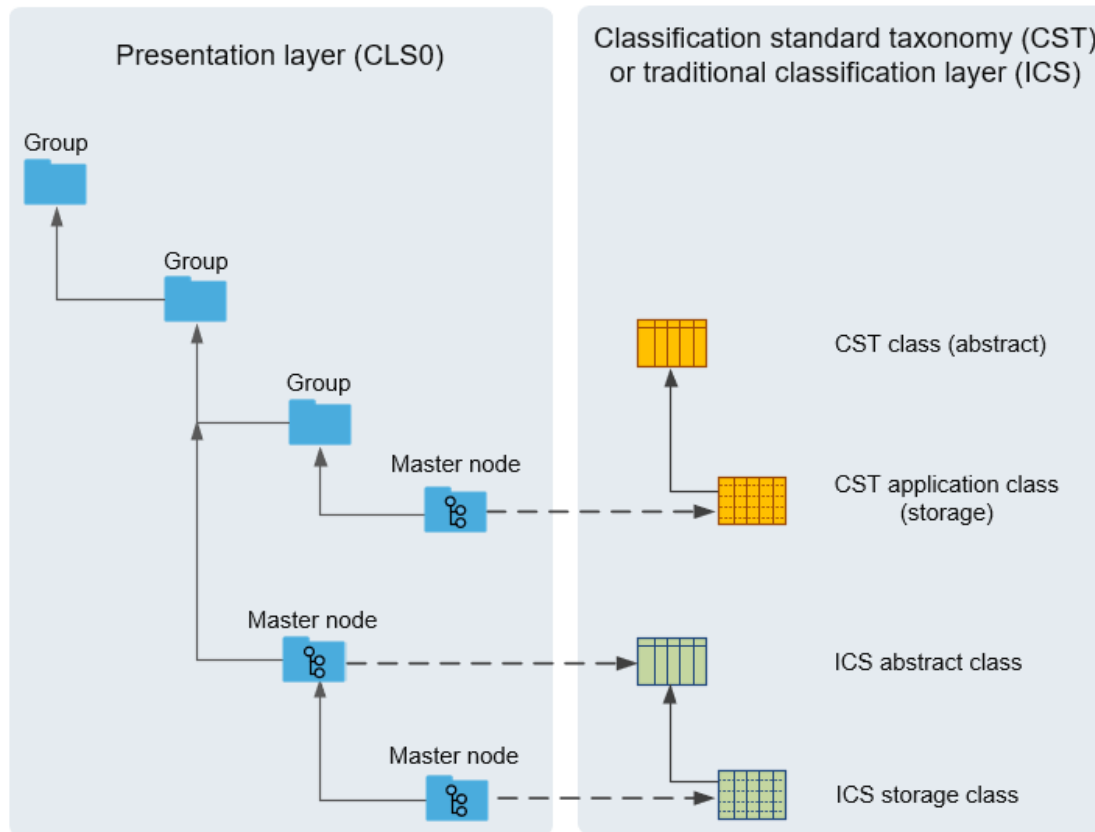
Basic vs. Advanced Der Presentation Layer



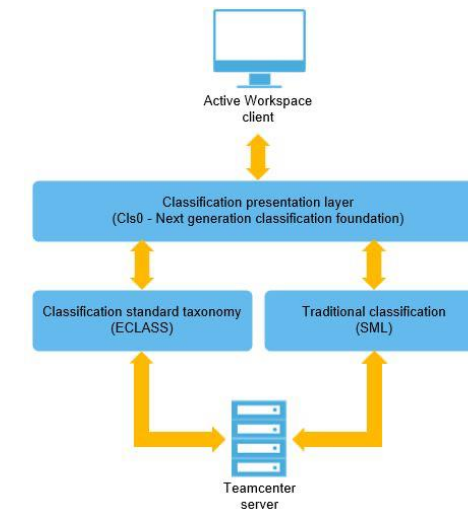
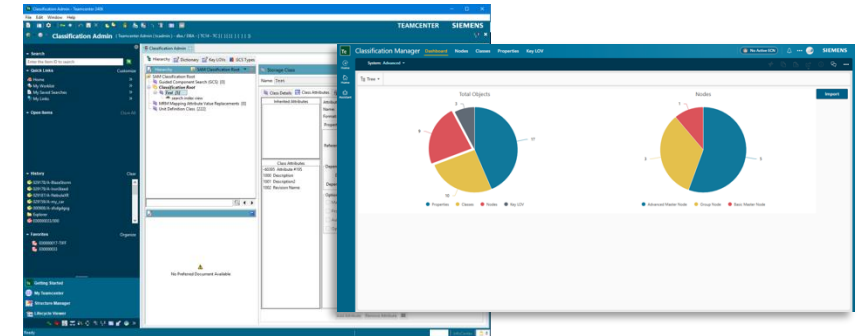
Quelle: https://do.cs.sw.siemens.com/en-US/do/c/282219420/PL20231129261301184.class_a_w/x/id1567127



Basic vs. Advanced Der Presentation Layer



Quelle: https://do.cs.sw.siemens.com/en-US/do/c/282219420/PL20231129261301184.class_a_w/xid1567127



Basic nach Advanced Migration?

```
clsutility -migrate -classification2cst -cid=class-ID [-recursive | -confirm| -include_icos]
```

```
Migration summary for traditional objects
```

TYPE	SML ID	CST ID	Status	Note
NodeDefinition	AD	SMPL1#AD#001	UNPROCESSED	
PropertyDefinition	-80001	SMPL1#02-f6f89w#001	UNPROCESSED	
PropertyDefinition	-80002	SMPL1#02-fsf89w#001	UNPROCESSED	
PropertyDefinition	-80005	SMPL1#02-e6f89w#001	UNPROCESSED	
PropertyDefinition	-80015	SMPL1#02-ccf89w#001	UNPROCESSED	
PropertyDefinition	-80018	SMPL1#02-bsf89w#001	UNPROCESSED	
KeyLOVDefinition	-80051	SMPL1#09-Tcf89w#001	UNPROCESSED	
PropertyDefinition	-80020	SMPL1#02-bmf89w#001	UNPROCESSED	
ClassDefinition	ADT-CONNECTION	SMPL1#01-ADT-CONNECTION#001	UNPROCESSED	
NodeDefinition	ADT-CONNECTION	SMPL1#ADT-CONNECTION#001	UNPROCESSED	
PropertyDefinition	-82005	SMPL1#02-q5989w#001	UNPROCESSED	
KeyLOVDefinition	-80040	SMPL1#09-WMf89w#001	UNPROCESSED	
PropertyDefinition	-86123	SMPL1#02-la989w#001	UNPROCESSED	
ClassDefinition	ADT-CONN-BUND	SMPL1#01-ADT-CONN-BUND#001	UNPROCESSED	
NodeDefinition	ADT-CONN-BUND	SMPL1#ADT-CONN-BUND#001	UNPROCESSED	

```
JSON input for KeyLOVDefinitions: C:\Users\ny6wyo\AppData\Local\Temp\KeyLOVDefinitions.json
JSON input for PropertyDefinitions: C:\Users\ny6wyo\AppData\Local\Temp\PropertyDefinitions.json
JSON input for ClassDefinitions: C:\Users\ny6wyo\AppData\Local\Temp\ClassDefinitions.json
JSON input for NodeDefinitions: C:\Users\ny6wyo\AppData\Local\Temp\NodeDefinitions.json

Operation completed successfully.
```

Quelle: https://do.cs.sw.siemens.com/en-US/do/c/282219420/PL20231129261301184.class_a_w/x/1567127

Warum?

- CST bietet mehr Features
- Wird in Zukunft erweitert (analog ECLASS)

Basic vs Advanced

Was ist CST?

- Basierend auf dem classification standard taxonomy framework
 - Standardisierter Aufbau von Klassen und Daten zum leichten Austausch von Kunden und Zulieferern
 - Unterstützt den ECLASS Standard
- Advanced Classification kann aber auch genutzt werden um eigene Hierarchien und Definitionen aufzubauen

ECLASS	CST	Traditional classification (ICS)
Value list	Key-LOV definition	Key-LOV
Property	Property definition	Dictionary attribute
Classification class	Node definition	--
Application class	Class definition	Group/class
IRDI	IRDI	ID
Property block	Property block	--
Application data	Classification object	ICO
Aspect	Aspect	--

Quelle: https://do.cs.siemens.com/en-US/do/c/282219420/PL20231129261301184.class_a_w/xid1567127

Basic vs Advanced Übersicht

	Basic classification	Advanced classification
Availability	Available on the rich client and Active Workspace.	Available Active Workspace.
Effectiveness	Effective in defining objects uniquely with properties for reuse.	Effective in capturing overall product information for PIM and MDM systems with support for ECLASS standard class hierarchy and definitions.
Standard Features	<ul style="list-style-type: none"> • Classification hierarchical representation • Flat list of properties • List of values • Unit of measure • Support for views • Limited to 200 Properties in a class 	<ul style="list-style-type: none"> • Class definition versioning • Flexible data modeling with attribute blocks, aspects, cardinality, and polymorphism. • Complex data type attributes • Native data storage • Support for namespaces • Unlimited number of properties • No Array limitations
Data model standards	Supports DIN-4000 standard and confirms to underlying specifications of ISO/TS-13399 standard.	Supports ECLASS standard and conforms to DIN 4002, ISO 13584-32, ISO 13584-42, IEC 61360 standards.
Hierarchy and class definitions	Define custom hierarchy and class definitions.	<p>Define custom hierarchy and class definitions.</p> <p>Additionally supports standard based ECLASS hierarchy spanning more than 48 domains.</p>
Data exchange support	Supports PLMXML, TCXML, and multisite.	Supports JSON, OntoML, BMEcat.

Quelle: https://docs.sw.siemens.com/en-US/doc/282219420/PL20231129261301184.class_a_w/xid2022380

/// Classification

FEATURES

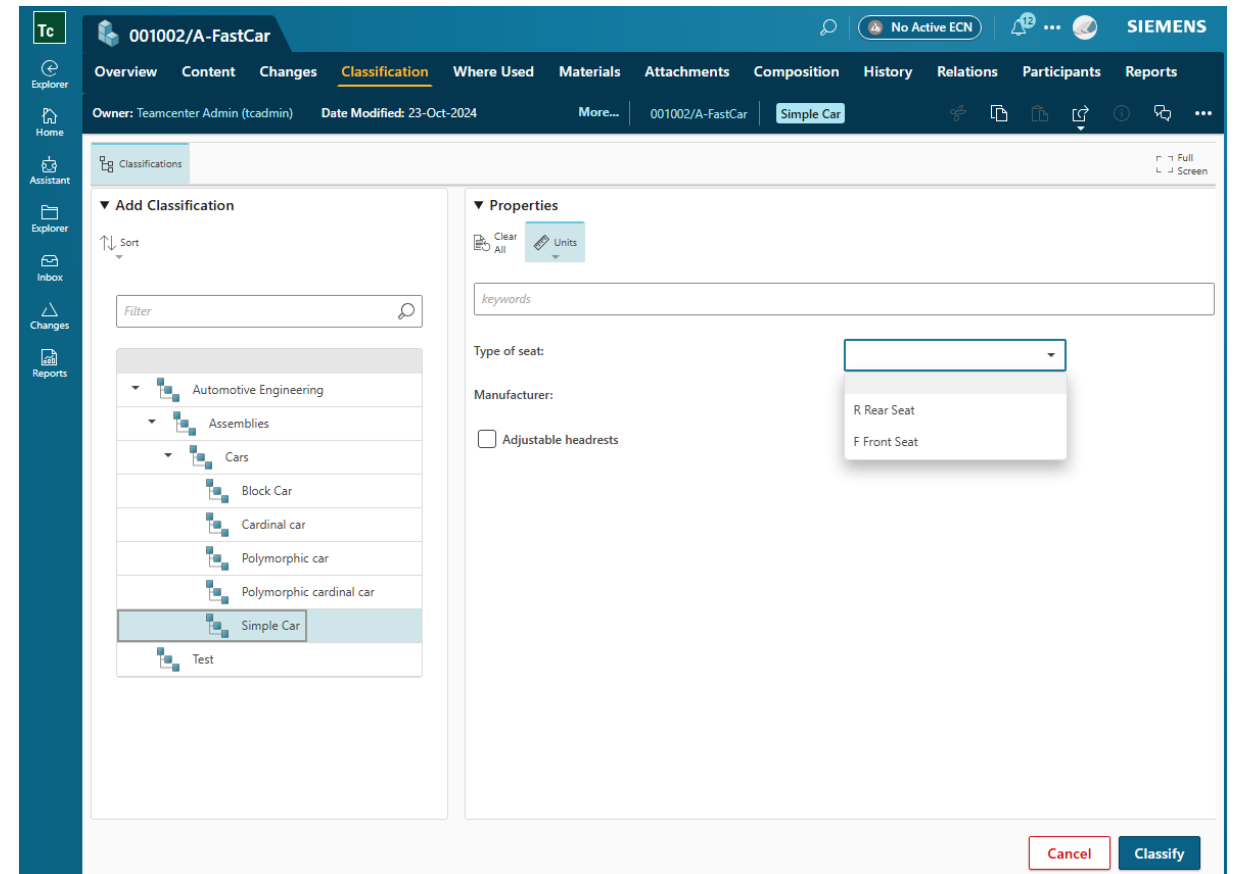
- Basics
- Neuerungen



Features

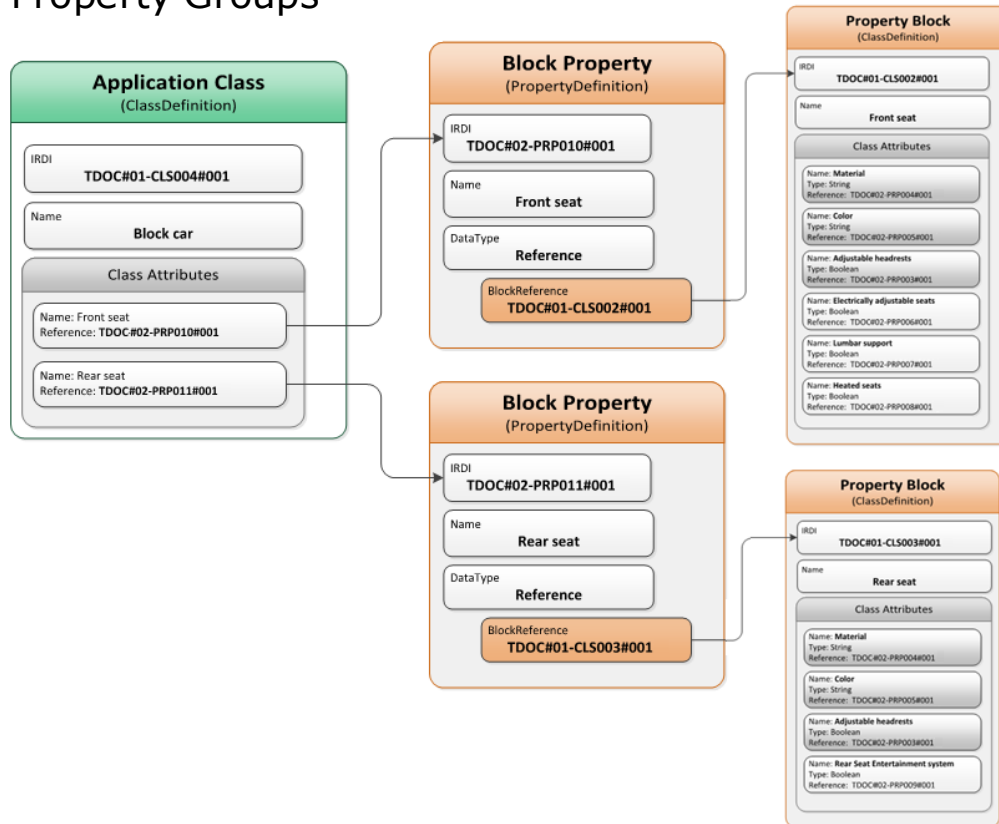
Die Basics...

- KeyLov
 - Listen können verschachtelt sein
 - Referenzieren immer auf ein Property
- Properties
 - Beschreiben Attribute einer Klasse
 - String, Integer, Double, Bool,...
- Classes
 - Anwendungsklasse wird von Knoten referenziert und kann zum Speichern von Daten verwendet werden. Sie enthalten die Eigenschaften, die zur Definition der Klasse verwendet werden
 - Eigenschaftsblockklasse fasst Gruppen von Eigenschaften zusammen. Sie können häufig verwendete Eigenschaften gruppieren, um zu vermeiden, dass jede Eigenschaft wiederholt einer Klasse zugewiesen werden muss
- Nodes
 - Ein Gruppenknoten dient der Organisation und kann keine Daten enthalten.
 - Ein Masterknoten verweist auf eine Anwendungsklasse, die Daten enthält. Stammknoten können andere Stammknoten als Kinder haben.

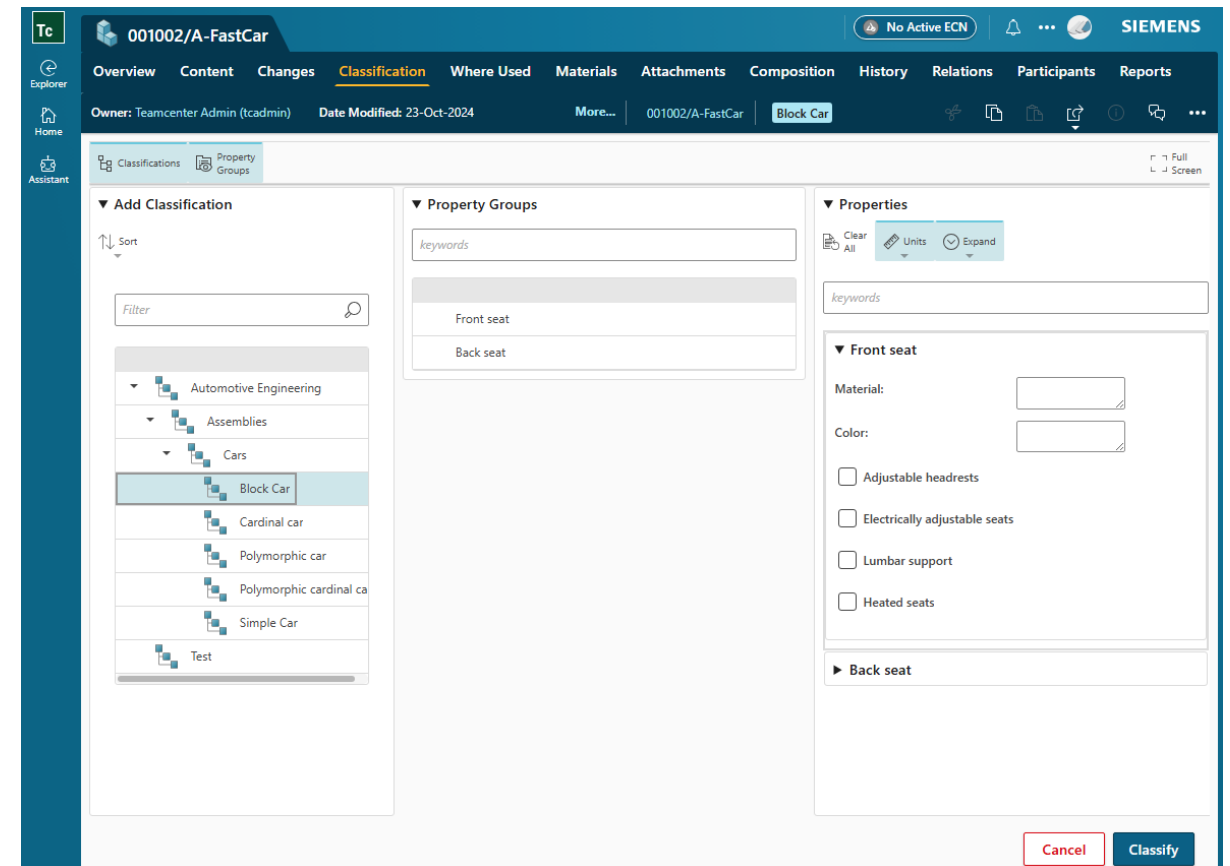


Features Die Neuerungen...

Property Groups

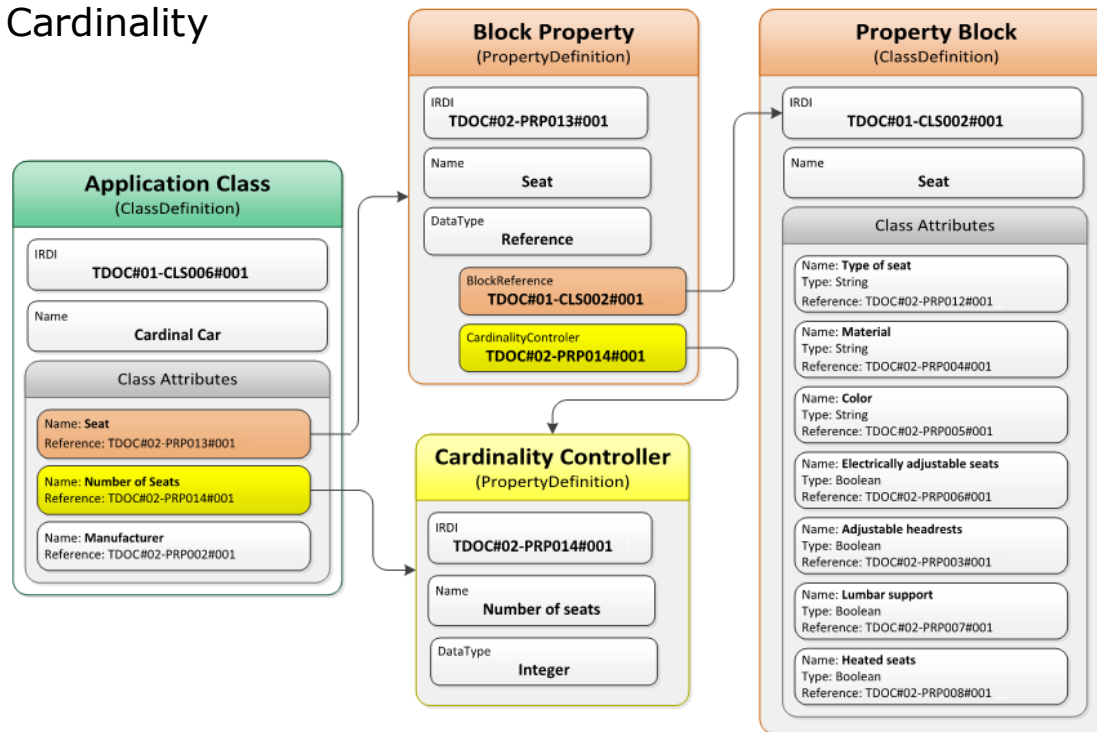


Quelle: https://docs.sw.siemens.com/a/a-US/doc/28219420/PL20231129261301184.class_a_w/x/d1567127

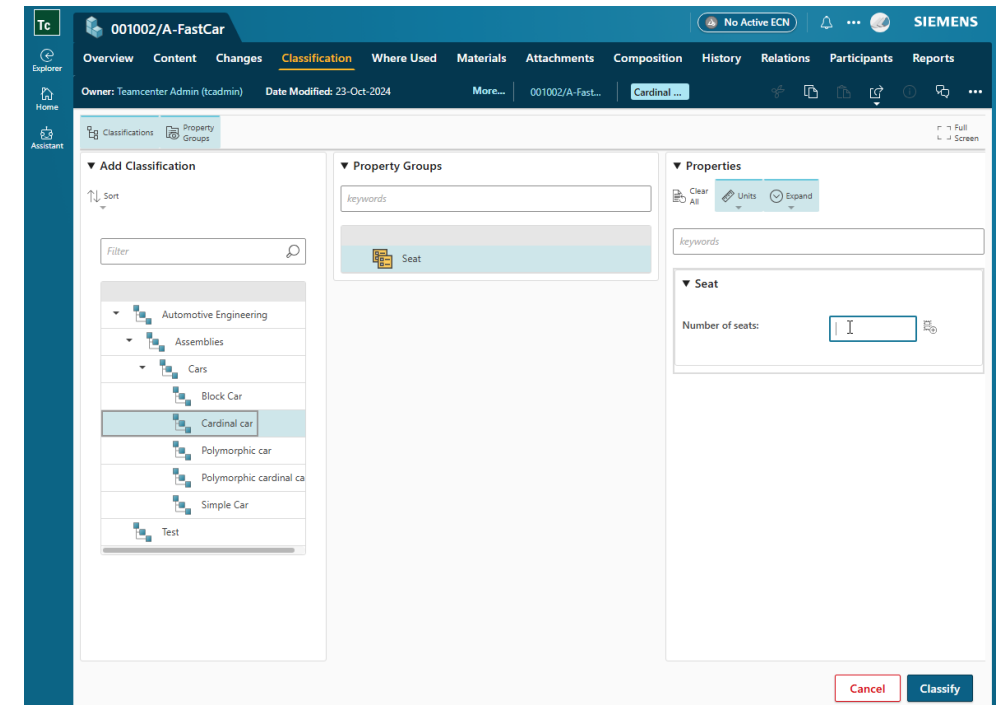


Features Die Neuerungen...

Cardinality

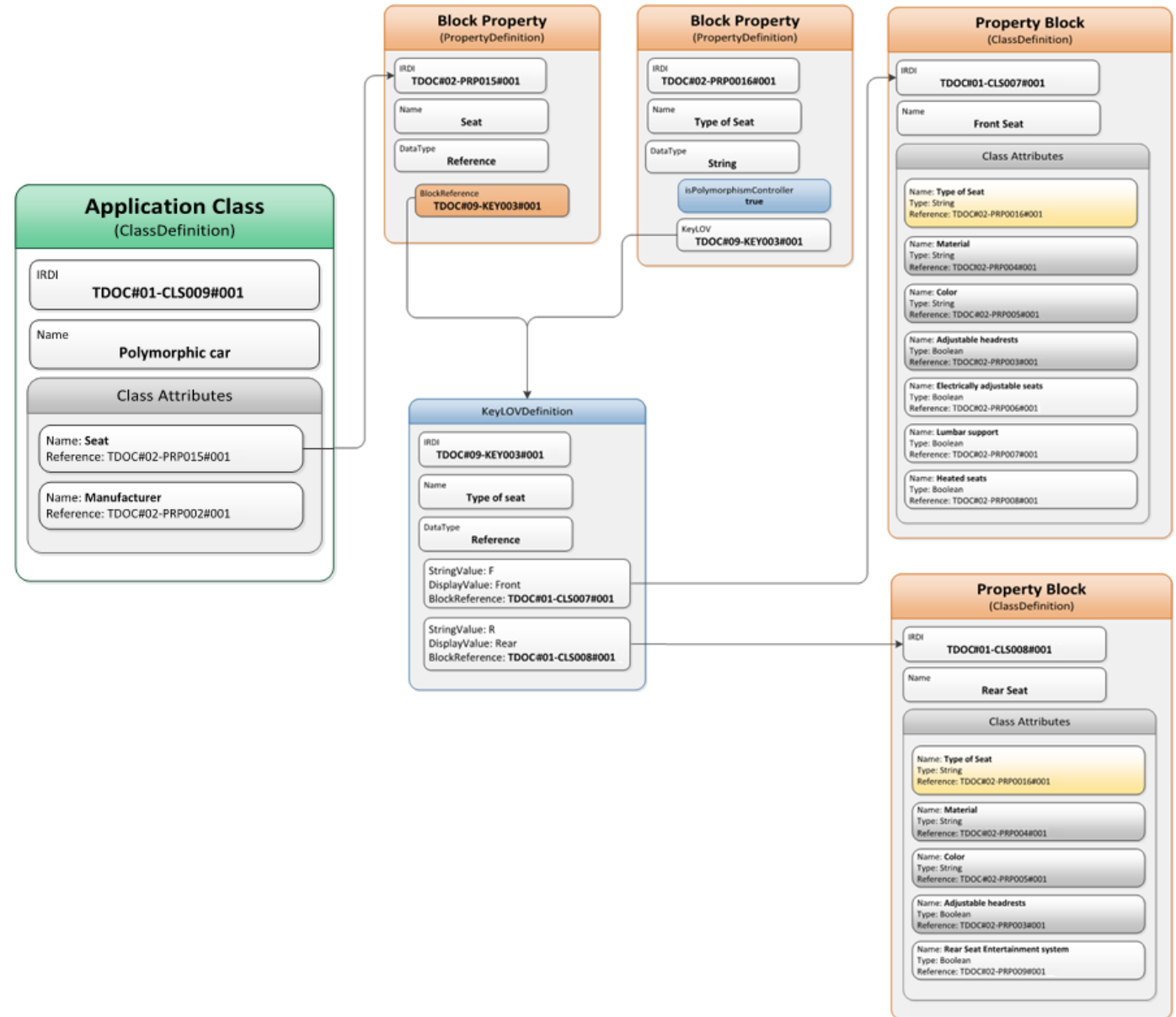
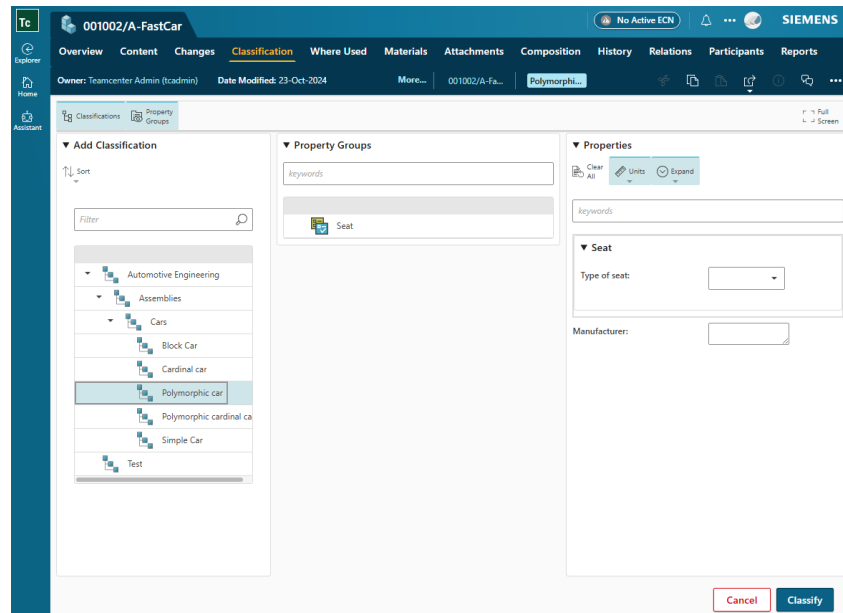


Quelle: https://do.cs.sw.siemens.com/en-US/doc/282219420/PL20231129261301184.class_a_w/xid1567127



Features Die Neuerungen...

Polymorphism



Quelle: https://docs.sw.siemens.com/en-US/ido/c/282.219.420/PL2.023.112.926.130.118.4.class_a_w/x/kl1567.127

/// Classification

IMPORT

- JSON
- Classification Manager



Import JSON-Files

Generelle Struktur von JSON-Files

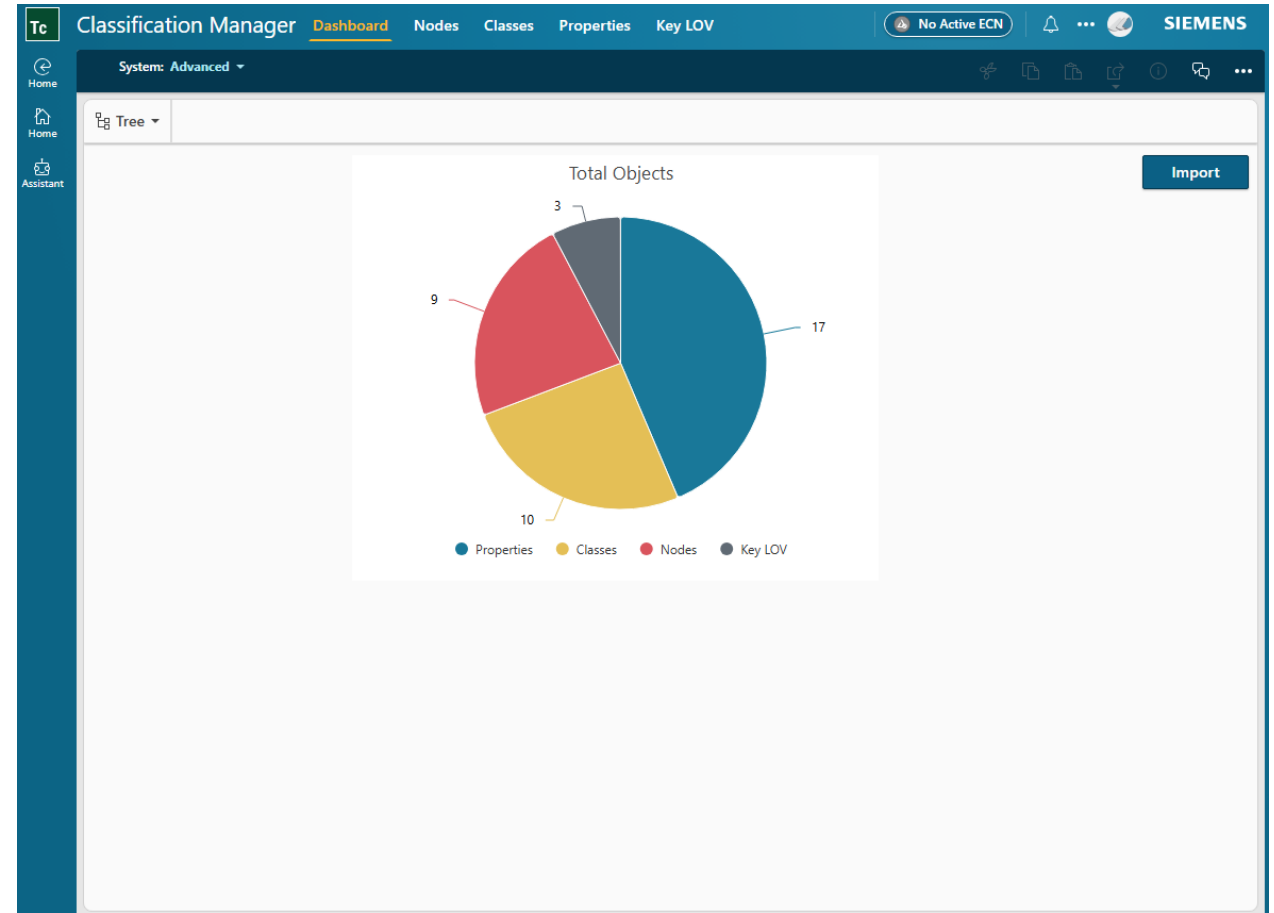
Zusatzinfo:

- Auch nützlich für das Anlegen von neuen Objekten
- `clsutility -create -classification_objects -request=itemCSTExample.json`

```
{
  "SchemaVersion": "1.0.0",
  "Locale": "en_US",
  "KeyLOVDefinitions": [
    {
      "ObjectType": "09",
      "Namespace": "DRWE",
      "ID": "KEY001",
      "Revision": "001",
      "Name": "Type of seat",
      "Status": "Develop",
      "LOVItems": {
        "DataType": "String",
        "LOVStringItems": [
          {
            "StringValue": "R",
            "DisplayValue": "Rear Seat"
          },
          {
            "StringValue": "F",
            "DisplayValue": "Front Seat"
          }
        ]
      }
    }
  ]
}
```

Import Classification Manager

- Reihenfolge beachten
- Im- / Export in AWC möglich



/// Classification

AI

- Funktion
- Training



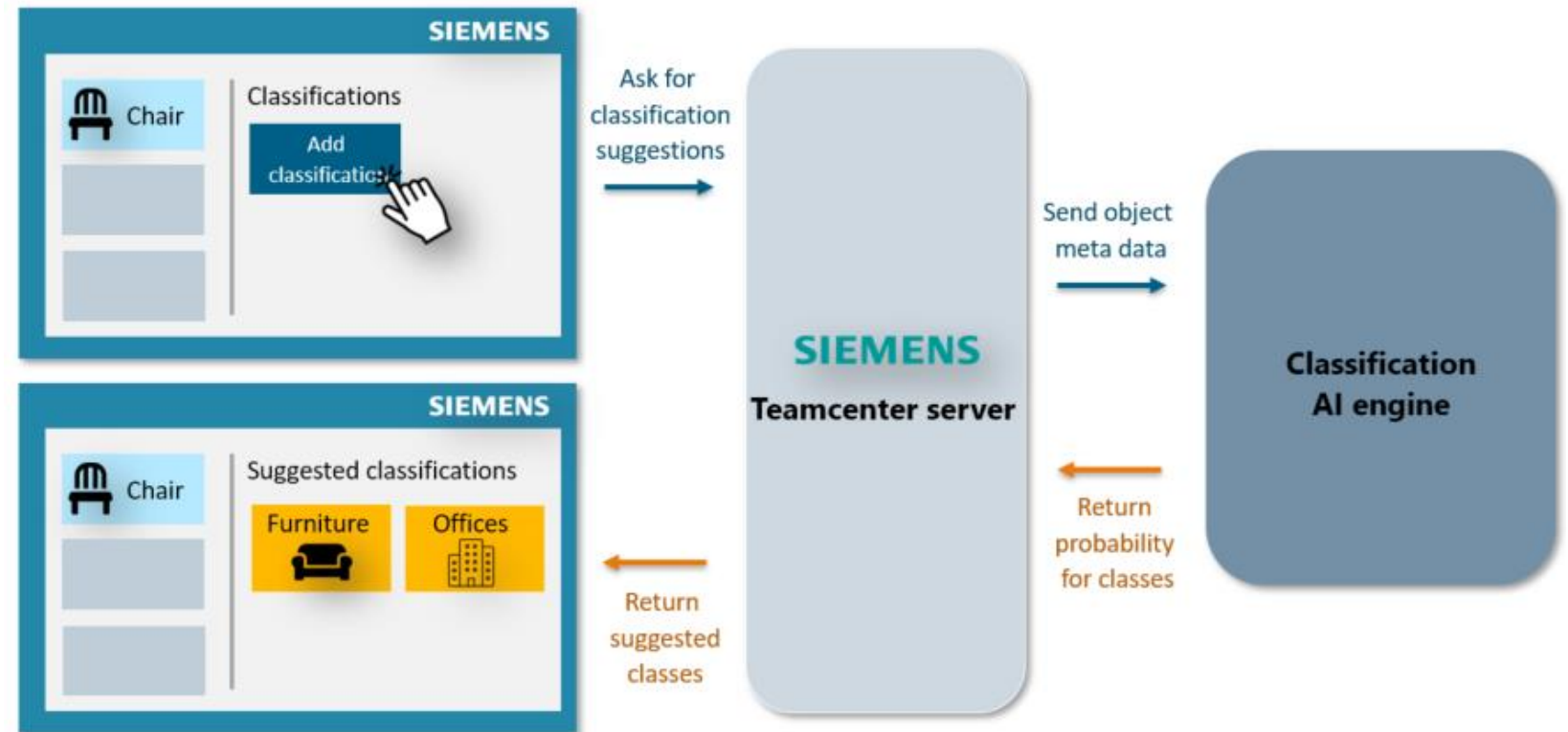
AI Funktion?

Vorschlag von Klassen auf Basis von definierten Metadaten

- Basiert auf Tensorflow ML
- Kann auch mit Geolus Shape Search verknüpft werden

Achtung:

Nur bei großen Hierarchien und viele Daten sinnvoll.



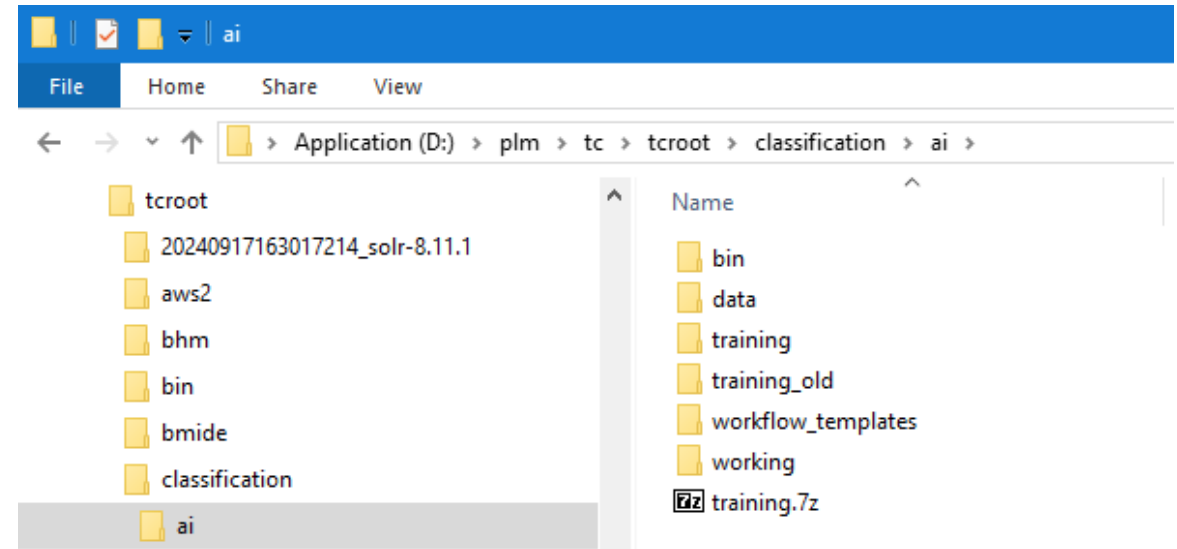
Quelle: https://do.cs.sw.siemens.com/en-US/doc/282219420/PL20231129261301184.class_a_w/xid1567127

AI Installation?

Installation laut Doku:

- Feature: Classification AI
- Feature: Classification AI Serving MS

Setzen von diversen Präferenzen nötig.



AI Training?

- Skript runClsAITraining ausführen
- CSV Files monitoren per:
 - cls_AI_data_generation
- CSV Files landen automatisch im Filerepo und sind verfügbar

```
Tc Command Prompt - runClsAITraining.bat
[17:39:49] info: >>> out\siteDev.zip uploaded to http://columbia:3000 (10 s)
[17:39:49] info: >>> out\darsi.zip uploaded to http://columbia:3000 (7.12 s)
[17:40:07] info: >>> out\site.zip uploaded to http://columbia:3000 (28 s)

d:\plm\tc\tcroot\aws2\stage>cd D:\plm\tc\tcroot\classification\ai\bin

D:\plm\tc\tcroot\classification\ai\bin>runClsAITraining.bat
Running Data Generation Utility...
Utility arguments can be inputted via Teamcenter Preference. run 'd:\plm\tc\tcroot\bin\cls_AI_data_generation -h' for more details...
Run this script with -h to show optional command-line arguments
CLS_AI_Query_Start_Date preference undefined. Proceeding with default.
CLS_AI_Query_End_Date preference undefined. Proceeding with default.
CLS_AI_Query_Object_Type preference undefined. Proceeding with default.
TC_Microservices_Base_URL Value: http://172.16.164.228:9090
Searching database for Next Generation Classification Objects...
done.
Running training...
d:\plm\tc\tcroot\classification\ai\working\cai-data\6719725a000039d09a063a36 http://172.16.164.228:9090
2024-10-24 00:02:06.815749: I tensorflow/core/platform/cpu_feature_guard.cc:142] Your CPU supports instructions that this TensorFlow binary was not compiled to use: AVX2
{"hostname":"Columbia","level":"INFO","eventTime":"2024-10-23T22:02:06.954Z","message":"TrainOutput_1729720926950 - Training triggered..."}
{"hostname":"Columbia","level":"INFO","eventTime":"2024-10-23T22:02:06.982Z","message":"TrainOutput_1729720926950 - Training ID added to train data file."}
{"hostname":"Columbia","level":"INFO","eventTime":"2024-10-23T22:02:06.983Z","message":"TrainOutput_1729720926950 - [1/6] Starting preprocessing..."}
{"hostname":"Columbia","level":"INFO","eventTime":"2024-10-23T22:02:07.044Z","message":"TrainOutput_1729720926950 - [2/6] Starting training..."}
```

AI Demo

The screenshot displays the Siemens NX software interface. The left sidebar contains navigation icons for Home, Assistant, Discussions, Folders, Active Folders, Inbox, Changes, Schedules, Schedule Tasks, Reports, Favorites, Quick Access, Settings, Alerts, Help, and No Active Change. The main workspace shows a list of objects under the 'Home (9 Objects)' folder. The selected object is 'FaceMill' (nxc_mill_01_00002, Revision: A). The 'Classification' tab is active, showing a message 'This object has not been classified' and an 'Add' button. The top bar indicates the path 'Home (9 Objects) > nxc_mill_01_00002/A:1-FaceMill' and the Siemens logo.

Quelle: <https://www.youtube.com/watch?v=Qc1Z0XMeuWo>

AI Demo

The screenshot displays the Siemens Teamcenter AI Demo interface. The top navigation bar includes 'Home (9 Objects)', 'Owner: CIs, Nodeuser (cIsnodeuser)', 'Date Modified: 19-Oct-2021', 'Release Status', and 'Type: Home Folder'. The left sidebar contains navigation icons for Home, Assistant, Discussions, Folders, Active Folders, Inbox, Changes, Schedules, Schedule Tasks, Reports, Favorites, Quick Access, Settings, Alerts, Help, and No Active Change.

The main content area is divided into several sections:

- Navigation:** Includes 'Navigate', 'Overview', and 'Audit Logs' tabs.
- Left Panel:** Lists objects such as 'Square Insert', 'Rhombic Insert', 'Newstuff', 'Milling Cutter', 'Mailbox', 'Insert', 'FaceMill' (selected), and 'Edge Insert'.
- Classification Section:**
 - ADD CLASSIFICATION:** Features a 'Release' dropdown set to 'eCI@ss 9.0, eCI@ss 9.1, eCI@ss 10.0.1, eCL...' and a 'Filter' input.
 - SUGGESTED CLASSIFICATIONS:** Displays two suggestions:
 - (O) - Face Milling Cutter:** Manufacturing Resource Library > Tools > Co... with an 84% match.
 - (O) - Disc Milling Cutter, three sid...:** Manufacturing Resource Library > Tools > Co... with a 12% match.
 - Classification Hierarchy:** A grid of boxes representing different classification categories, including GB_SOA_TEST, ICS_Library_Test_Group, Manufacturing Resource Library, Material Families, Miscellaneous, eCI@ss ADVANCED 4711-A1, Node 01, Node 01 Release, Automotive Engineering, CST Test Group, CST Test Group Release, Node With Unit in ID format, Root Node for Complex Data Hierarchy, and SimpleNode01-name_value.

AI Demo

The screenshot displays the Siemens NX software interface, specifically the 'Classification' tab for a 'Face Mill' tool. The interface is divided into three main sections:

- Left Sidebar:** Contains a file tree with various tool types and folders. The 'Face Mill' tool is highlighted.
- Central Pane:** Shows the 'Classification' tree with a search bar and a list of tool types. The 'Face Mill' tool is selected, and its sub-items are visible.
- Right Pane:** Contains the 'PROPERTY GROUPS' and 'MASTER DATA' sections. The 'MASTER DATA' section includes fields for Tool Description, Comments, Tool Style Code, ISO Tolerance Class Shank Diameter, Mill Tool Type ISO, Milling Cutter Style, Standard Number of Properties Layout, Standard Number, Company Code, Identifying Order Number, and Status.

The 'MASTER DATA' section is further divided into 'MASTER DATA' and 'SITE SPECIFIC DATA'.

MASTER DATA:

- Tool Description: [DES]:
- Comments: [REM]:
- Tool Style Code: [TSYC]:
- ISO Tolerance Class Shank Diameter: [TCDDMM]:
- Mill Tool Type ISO: [MILTTY]: A Face Mills, cutting sid...
- Milling Cutter Style: [MCSY]: A DIN 8030 - cutters wil...
- Standard Number of Properties Layout: [NSM]:
- Standard Number: [STDNO]:
- Company Code: [COMPC]: IS
- Identifying Order Number: [IDNR]: 3105675
- Status: [STATUS]:

SITE SPECIFIC DATA:

- Minimal Amount: [MINAM]:
- Weight of Item: [WT]: kg
- Product Designation: [PRODD]: SOF45 8/16-D100-08-31.75R
- Vendor Reference Package: [VENPID]:

AI Demo

Home (9 Objects) nxc_mill_01_00002/A:1-FaceMill
Owner: Cls, Nodeuser (clsnodeuser) Date Modified: 19-Oct-2021 Release Status: Type: Home Folder

Navigation: Navigate Overview Audit Logs

Classification Tab: Overview Finishes Classification Made From 3D Where Used Attachments History Parameters Relations Collaboration Participants Simulation Reports Audit Logs

CLASSIFICATIONS

- (O) - Face Milling Cutter

ADD

IMAGES

Expand

3D Model: A 3D model of a face mill tool.

PROPERTIES

MASTER DATA

Tool Description	[DES]: Facemill
Mill Tool Type ISO	[MILTTY]: A Face Mills, cutting sideways
Milling Cutter Style	[MCSY]: A DIN 8030 - cutters with countersink screw
Company Code	[COMP]: IS
Identifying Order Number	[IDNR]: 3105675

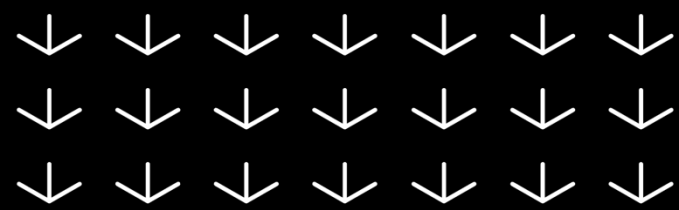
SITE SPECIFIC DATA

Product Designation	[PRODD]: SOF45 8/16-D100-08-31.75R
Master Insert Identification, Position A	[MIIDA]: SN1306ANXN

GEOMETRY DATA

Shank Diameter/Connection Bore Diameter	[DMM]: 35	mm
Cutting Diameter	[DC]: 96	mm
Cutting Diameter Maximum	[DCX]: 109.63	mm
Body Diameter	[BD]: 110.4	mm
Hub Diameter	[DHUB]: 70	mm
Counterbore Diameter	[DCCB]: 60	mm
Cutting Depth Maximum	[CDX]: 6	mm
Countersunk Depth of Connection Bore	[LCCB]: 21.2	mm
Overall Height	[OAH]: 52.2	mm
Tool Cutting Edge Angle	[KAPR]: 45	°

Notification: "nxc_mill_01_00002/A:1-FaceMill" was classified to "(O) - Face Milling Cutter".



VIELEN DANK!





DR. WALLNER ENGINEERING

