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SETTING STANDARDS

creactives

INNOVATIVE SEMANTIC APPLICATIONS

The GeoSemantic Approach in Material Master data Governance

Giulia Garibotto
Luca Borghi

CADENAS Industry Forum 2015
Augsburg February 04-05th 2015

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Company Profile

CADENAS
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- Italian ICT company (Verona)
- Founded in 2000
- Certified UNI EN ISO 9001:2008
- Included by Gartner in the Cool Vendors' report in Advanced Data Maturity 2012
- Present in Germany since 2012, and now as Creactives GmbH
- Participated by AlAdInn Ventures fund
- Focus: Implementation of a continuous and permanent semantic data cleansing process

bsi. ISO 9001 Quality Management

ANAB ACCREDITED

IAF MEMBER OF MULTILATERAL RECOGNITION ARRANGEMENT

Gartner 2012 CoolVendor

Semantic Vertical Solutions

Spend Analysis, MDM & more …

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MASTER DATA MANAGEMENT

TECHNICAL SHEET ENRICHMENT

TAM

HC

WEB SERVICE ERP MATERIAL GROUP SUGGESTER

MG PROMPT

ONTO LOGY

3SPC

PROCUREMENT CATALOG

PLA

TSV

SPENDING ANALYSIS

SEMANTIC PRICE LIST ANALYSIS

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Why GeoSemantic?

Material Master Data Quality enhancement

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Material Master Data Quality

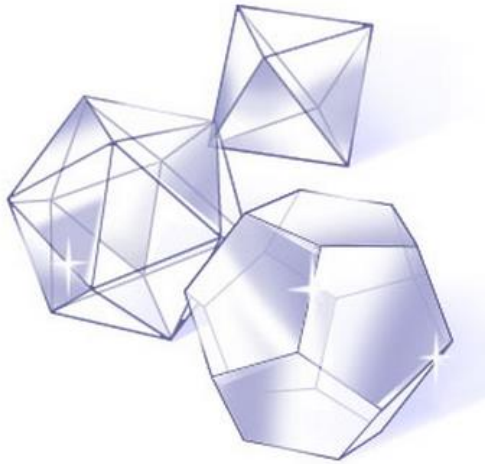
- efficient business processes
- effective management decisions

Classification

Normalization

Enrichment

Geo



Semantic

The GeoSemantic Approach

The Definitive Search Solution

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- The combination of the capabilities of Creactives and Cadenas supplies a 360° visibility on the Materials and easily enables the duplicate material detection

Cadenas
PARTdataManager
Technical Search
Engine

PART SOLUTIONS | THE STRATEGIC PARTS MANAGEMENT

+

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TAM
Technical Attribute Management

GeoSemantic
Parts
Management
solution

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GeoSemantic solution fulfill Gartner's definition

(based on Master Data Management Report)

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- Support the global identification, de-duplication, linking and synchronization of material information across heterogeneous data sources through GeoSemantic reconciliation of master data
- Create and manage a central, persisted system of record or index of record for Material Master data
- Enable delivery of a single Material view to all stakeholders, in support of various business benefits
- Support ongoing Master data stewardship and governance requirements through workflow- based monitoring and corrective action techniques

Material Master data definition

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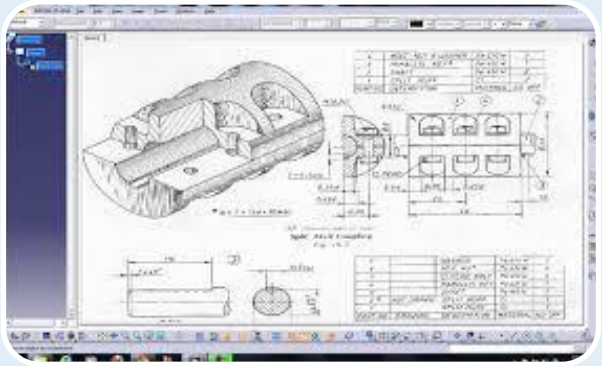

Native Parts:

- Resident in different CAD Systems
- Specific part number codification
- Separated approval workflow

Standard Parts:

- Purchase Parts:
  - International: ANSI, BS, CSN/STN, DIN, EN, GB Standards, GOST, IS, ISO, JB/T, JIS, KS,NF,UNI
  - Specific Standard (Aerospace, Military…): AN, AS, ASNA, LN, MS, NAS, NASM, NSA, VG
- Company Standards

Supplier Parts:

- With 3D/2D Models:
  - Mechanicals
  - Fluidics & Pneumatics
  - …
- Without Models:
  - Electricals
  - Chemicals
  - Tools
  - Safety
  - …

Why companies should care about GeoSemantic?

Multiple data sources: common barriers to Data Governance

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Multi-language textual data

Native Parts

Standard parts

Supplier Parts

SAP ORACLE Microsoft Dynamics NAV ...

Multiple ERPs

Geometrical data (3D)

Native Parts

Standard parts with 3D

Supplier Parts with 3D

ENOVIA TEAMCENTER PTC ...

Multiple CAD/PLMs

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CAD ENAS

AS AG

GEOSEMANTIC SOLUTION

A layer on top of the existing systems

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Engineering

Industrialization

Standardization

Purchasing

Existing Master Data (3D included)
Native, Standard, Supplier

Cadenas-Creatives GeoSemantic Search & Reuse Engine

Customer Data Management Tools SAP/VPM/FileSystem

GeoSemantic Solution

Data quality enhancement process

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TAM
Technical Attribute Management

Complete Materials

Data Owners

Uncomplete Materials

Data Steward

New Materials

End Users

Semantic Classification

Ontology Customization

Attribute extraction

Deduplication Workflow
- Duplicates detection
- Duplicates validation by Data owners

Manual Enrichment Workflow
- Missing information detection
- Data enrichement by data stewards

Smart Material Creation Workflow
- Automatic classification
- Missing information detection
- Potential duplicates detection thanks to the real time similarity analysis

PART SOLUTIONS — THE STRATEGIC PARTS MANAGEMENT

Updated MD

Inventory/ Consumption values

"AS-IS" Master Data

3D Data

ERPs/PLM/ PDM

SAP
ORACLE
Microsoft Dynamics NAV
PTC
DS ENOVIA TEAMCENTER
...

GEOSEMANTIC SOLUTION

Data Cleansing and Enrichment

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Engineering

Industrialization

Standardization

Purchasing

Existing Master Data (3D included)
Native, Standard, Supplier

Cadenas-Creatives GeoSemantic Search & Reuse Engine

Customer Data Management Tools SAP/VPM/FileSystem

Cleansed, Classified and Enriched Data & 3D models
(Multiline, New, Standard, Obsolete Part Numbers)

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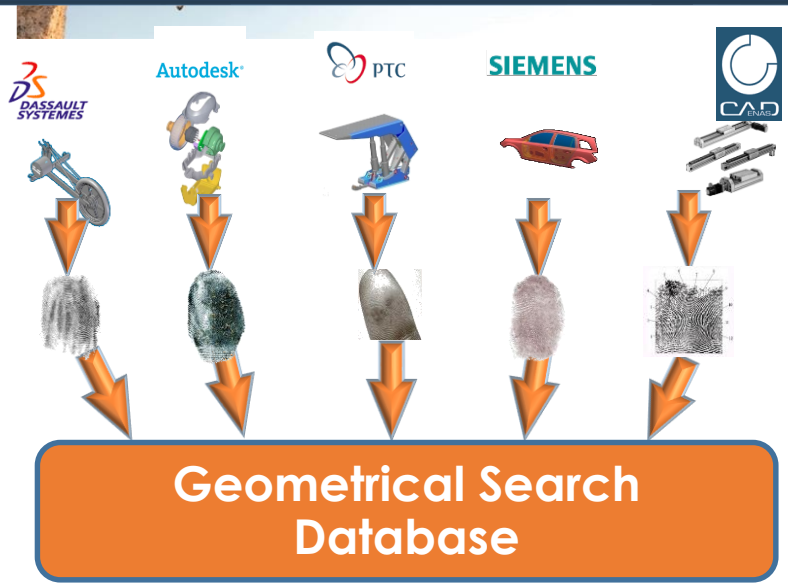
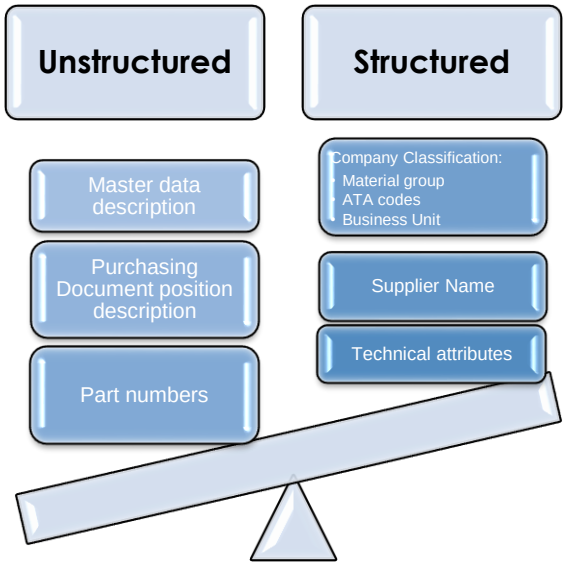
Geometrical

Textual

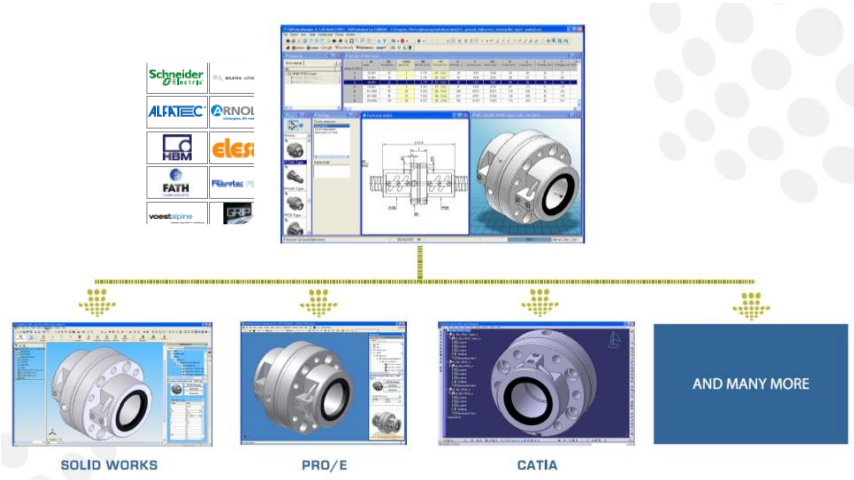
Native Parts



Semi structured



Standard/Purchase Parts



Domain specific

Creactives Knowledge base

Classification and normalization starting point

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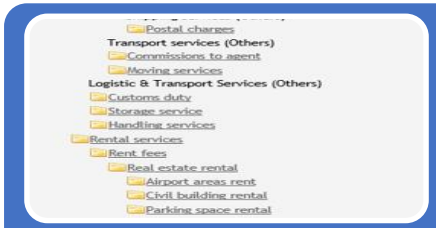
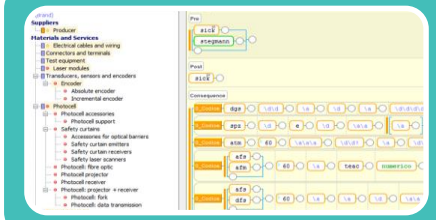
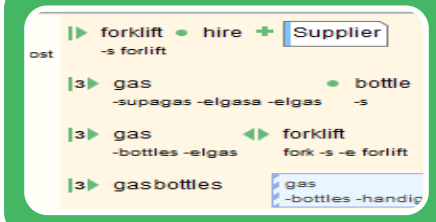


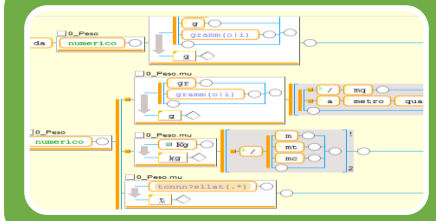
Taxonomy
>39.000 categories harmonized with eCl@ss standard



Suppliers Knowledge base
>30.000 suppliers
>3.000 Brands



Semantic classification rule
>4.000.000



Attribute extraction rules
>4.000 attributes

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More than 150 company data analyzed

Semantic Matching and duplicate discovery

Identification

- Classification
- Attribute extraction

Quality

- Classification granularity
- Score of existing attributes

Similarity

- Classification comparison
- Attribute comparison
- Score of common attributes evaluation

PARTSolutions Dashboard

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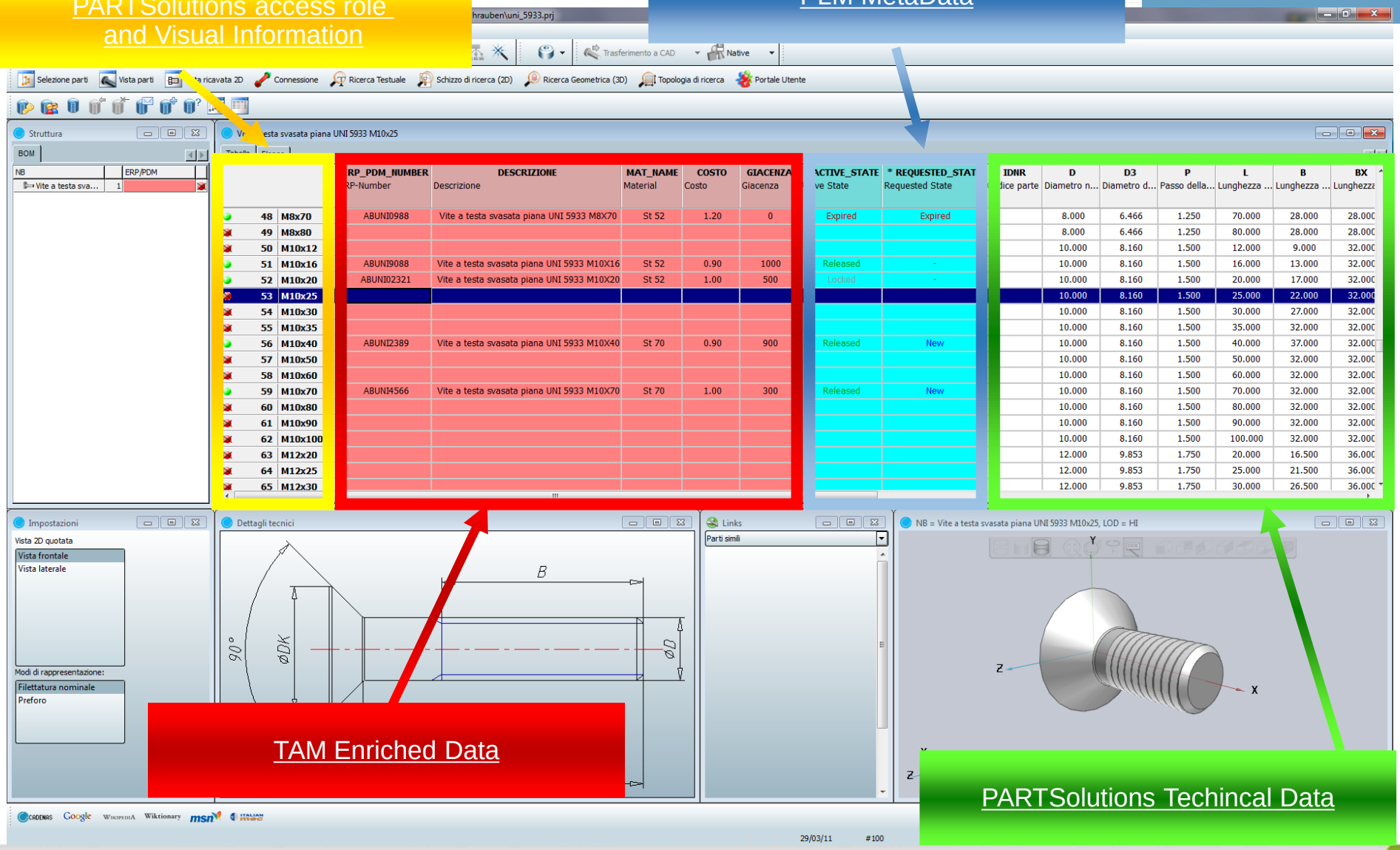
PARTSolutions access role and Visual Information

PLM MetaData



TAM Enriched Data

PARTSolutions Techincal Data

PARTSolutions Technical Search Engine

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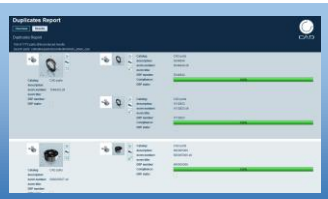
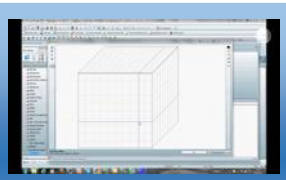
3D GeoSearch



Report Analysis

- Duplicate Reports
- Purchineering
- Semi-Finished
- ....



2D Sketch Search

FullText Search

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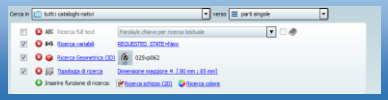
Geometrical & Metadata
Search Database

Topology Search



Combined Search

Compare Tool

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TAM single point of truth

Semantic classification and ERP infos available and browsable

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PATH: Root / Materials and Services / Commercial components / Mechanical / Bearings and accessories

Classification Path

Category 4	Rows	Cons 12months	Val# stk#	Master			
				Master	No master	Slave	Complete items
Rolling bearing	473	2.208.186,45	2.009.051,7	112	361	0	424
Ball bearing	282	581.644,55	741.452,2	46	236	0	265
Deep groove ball bearings	195	251.258,48	464.755,6	26	169	0	192
Single row deep groove ball bearing	184	251.137,32	454.426,0	25	159	0	181
Double row deep groove ball bearings	11	121,16	10.329,5	1	10	0	11
Angular contact ball bearings	43	314.086,29	258.529,2	18	25	0	41
Single row angular contact ball bearings	21	269.297,31	126.325,6	9	12	0	21
Four-point contact ball bearings	14	43.375,04	125.436,9	9	5	0	13
Double row angular contact ball bearings	7	1.413,94	6.260,2	0	7	0	7
Angular contact ball bearings (Others)	1	0,00	506	0	1	0	0
Thrust ball bearings	17	1.553,40	3.677,7	0	17	0	17
Single direction thrust ball bearings	16	1.553,40	3.677,7	0	16	0	16
Single acting thrust ball bearings with outer spherical ring	1	0,00		0	1	0	1
Ball bearing (Others)	13	10.725,54	10.499,3	2	11	0	2
Self-aligning ball bearings	13	2.277,84	3.676,5	0	13	0	12
Track roller	1	1.743,00	313,7	0	1	0	1
Roller bearing	180	1.619.328,90	1.242.111,2	63	117	0	150
Cylindrical roller bearings	110	1.194.561,50	984.403,4	53	57	0	106
Single row cylindrical roller bearings	105	1.031.489,50	973.874,9	50	55	0	105
Cylindrical roller bearings (Others)	4	163.072,00	10.19	3	1	0	0
Double row full complement cylindrical roller bearings	1	0,00	336,4	0	1	0	1
Needle bearing	36	65.302,43	52.234,3	7	29	0	23
Drawn cup needle roller bearings	15	17.908,57	7.765,6	2	13	0	10
Needle bearing (Others)	10	33.724,85	29.072,4	5	5	0	3
Combined roller bearings	5	9.455,00	4.184,0	0	5	0	5
Needle roller bearings with ribs	4	4.214,01	10.493,0	0	4	0	4
Aligning needle roller bearings	1	0,00	331,7	0	1	0	0
Needle roller and cage assemblies	1	0,00	387	0	1	0	1
Tapered roller bearings	18	487,27	5.023,5	0	18	0	17
Roller bearing (Others)							

Browsable classification assigned semantically

ERP info

TAM KPIs

TAM single point of truth

Semantic classification and ERP infos available and browsable

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PATH: Root / Materials and Services / Comm

Category 4

- Rolling bearing
  - Ball bearing
    - Deep groove ball bearings
      - Single row deep groove ball bea
      - Double row deep groove ball bea
    - Angular contact ball bearings
      - Single row angular contact ball b
      - Four-point contact ball bearings
      - Double row angular contact ball
      - Angular contact ball bearings (Othe
    - Thrust ball bearings
      - Single direction thrust ball beari
      - Single acting thrust ball bearings
    - Ball bearing (Others)
    - Self-aligning ball bearings
    - Track roller
  - Roller bearing
    - Cylindrical roller bearings
      - Single row cylindrical roller bear
      - Cylindrical roller bearings (Others)
      - Double row full complement cyli
    - Needle bearing
      - Drawn cup needle roller bearing
      - Needle bearing (Others)
      - Combined roller bearings
      - Needle roller bearings with ribs
      - Aligning needle roller bearings
      - Needle roller and cage assembli
    - Tapered roller bearings
    - Roller bearing (Others)

Dynamic Analysis

Rows | Columns | Values

Select Attributes

All
Searched attributes
Brand-Codice
Catalog
ERP INFO
Input
Normalized Description
Numeric
Order Value Dimension
Organization Dimension
Part Number

Input

eid-	A
A listino	A1
A2	AA
AA1	AA2
AB	AB1
ABG	ABN
ACMAX	ACMIN
ACQ	ACT
ACUS	ADM

Column attributes

Row attributes

Values

Row number
Master

Ok | Clear | Options | Reset

ave	Complete items
0	424
0	265
0	192
0	181
0	11
0	41
0	21
0	13
0	7
0	0
0	17
0	16
0	1
0	2
0	12
0	1
0	150
0	106
0	105
0	0
0	1
0	23
0	10
0	3
0	5
0	4
0	0
0	1
0	17

Browsable cla

KPIs

Real Time repeatable custom report

GeoSemantic Benefits

Preliminary duplicates Estimation

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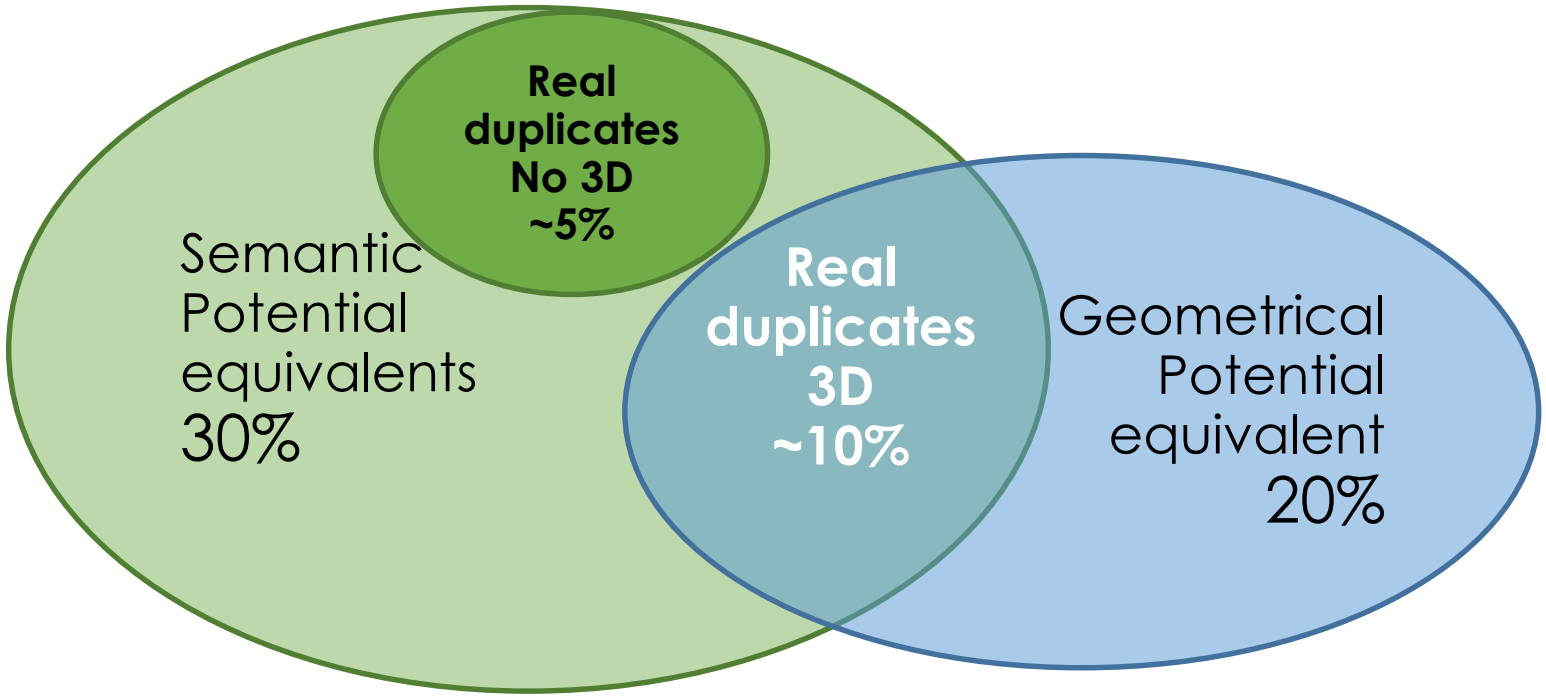
- Millions of part numbers in ERPs
- Thousands of new part numbers every year
- The GeoSemantic ensure:
  - Potential duplicates detection in existing Master data
  - Relevant reduction in new Part number entry



Use Cases

Semantic Duplicate verified geometrically

From TAM to PSOL

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Home | Services | Help | Giulia Garibotto - TAM DEMO | Choose your language: English | Log o

Dynamic Analysis | Find | Technical attributes | Master report | Save view | Save favourite | Load favourites | Reset analysis | Remove filters

Filters

Taxonomy: Materials and Services | Master: | Export: | PocFocus: YES | Organization Name: TAM

PATH: Root / Materials and Services / Commercial components / Mechanical material / Bearings and accessories / Rolling bearings / Ball bearing / Thrust ball bearings / Double acting thrust ball bearings

Category 2	Rows	No master	No export	Complete items
Double acting thrust ball bearings (Others)	102	102	102	0
Double acting thrust ball bearings with outer spherical ring	70	70	70	0
Double direction angular contact thrust ball bearings	44	44	44	0
Double acting thrust ball bearings	**216**	**216**	**216**	**0**

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Semantic Duplicate verified geometrically

From TAM to PSOL

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Semantic Duplicate verified geometrically

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Technical attributes

Current category: **Double acting thrust ball bearings** Items showed (with subcategories): **102** Item count (with subcategory):

Category clustering

Clustering with subcategories

Include subcategories (enabled)

Filter nonempty

Generate Candidate

Show price

Core attributes

Attribute	Frequency
Producer Code	194 - 89,81%
Type	0 - 0,00%

Technical attributes

Attribute	Frequency
Brand	216 - 100,00%
DIN Standard	98 - 45,37%
Execution Type	22 - 10,19%

Selected attributies

Producer Code

Save as default settings

Delete default settings

OK RESET

M DEMO Choose your language: English Log o

ourite Load favourites Reset analysis

Focus:

Organization Name: TAM

d accessories / Rolling bearings / Ball bearing / Thrust ball

ws	No master	No export	Complete items
102	102	102	0
70	70	70	0
44	44	44	0
216	216	216	0

Double acting thrust ball bearings

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Double acting thrust ball bearings

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Producer Code Not empty

Items per page: 25 Page 1 of 1

	Producer Code	Row number	# Master
⊞	52210	2	0
⊞	52213	2	0
⊞	52212	2	0
⊞	52211	2	0
⊞	52216	2	0
⊞	52215	2	0
⊞	52202	2	0
⊞	52205	2	0
⊞	52204	2	0
⊞	52207	2	0
⊞	52206	2	0
⊞	52209	2	0
⊞	52208	2	0

Items per page: 25 Page 1 of 1

Double acting thrust ball bearings	**216**	**216**	**216**	**0**

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Items per page: 25 Page 1 of 1

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⊞	52210	2	0
⊞	52213	2	0
⊞	52212	2	0
⊞	52211	2	0
⊞	52216	2	0
⊞	52215	2	0
⊞	52202	2	0
⊞	52205	2	0
⊞	52204	2	0
⊞	52207	2	0
⊞	52206	2	0
⊞	52209	2	0
⊞	52208	2	0

Items per page: 25 Page 1 of 1

Double acting thrust ball bearings	**216**	**216**	**216**	**0**

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Home | Services | Help | Giulia Garibotto - TAM DEMO | Choose your language: English | Log o

Producer Code Not empty

Items per page: 25 | Page 1 of 1

	Producer Code	Row number	# Master
⊞	52210	2	0
⊞	52213	2	0
⊞	52212	2	0
⊞	52211	2	0
⊞	52216	2	0

Detail

Export data (Excel) | Data report | Item master | Normalize all items

Item number: 2

Filters on rows:

Description Not contains fag

Producer Code Not empty

Items per

		Master	Material	Description	Input code	Sup
			14227023960	52212-Double acting thrust ball bearings	52212	Italcuscinetti
			14227023310	Thrust Ball Bearings-WD BEARINGS 52212	WD BEARINGS 52212	WD Bearings

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INNOVATIVE SEMANTIC APPLICATIONS

CADENAS

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Producer Code Not empty

Items per page: 25 | Page 1 of 1

	Producer Code	Row number	# Master
⊞	52210	2	0
⊞	52213	2	0
⊞	52212	2	0
⊞	52211	2	0
⊞	52216	2	0
⊞	52215	2	0
⊞	52202	2	0

Detail

Export data (Excel) | Data report | Item master | Normalize all items

Item number: 2

Filters on rows:

Description Not contains fag

Producer Code Not empty

Items per page: 25 | Page 1 of

		Master	Material	Description	Input code	Supplier Name
🔍	📝		14227023960	52212-Double acting thrust ball bearings	52212	Italcuscinetti
🔍	📝		14227023310	Thrust Ball Bearings-WD BEARINGS 52212	WD BEARINGS 52212	WD Bearings

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Semantic Duplicate verified geometrically

From TAM to PSOL

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- Before to proceed with the substitution, it is possible to launch the geometrical comparison in Cadenas
- The integration will automatically select the corresponding 3D models with a single click:

Item master definition

Please click on ☆ in order to define one of the following materials as a Master. Afterwards please flag one or more items that will become “Slaves" and click on "Next"

Eligible master items

Filter selected | Restore item

		Description	Consumption 12 month	Inventory value
☐	☆	52212-Double acting thrust ball bearings	15.000	56.000
☐	☆	Thrust Ball Bearings-WD BEARINGS 52212	400	0

Semantic Duplicate verified geometrically

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Transfer to CAD | PS3-V2 3D

Search and Part Selection | Part view | 2D derivation | Connection | User portal

Project selection

Search in all catalogs for parts

ABC Full-text search 52212

Add search function: A=3 Variables search

Geometric search (3D) | Sketch search (2D)

Color search | Topology search

Catalogs | Classes | Favorites | History

Catalogs

Filter: Manufacturer

Catalogs

My Parts

ABB

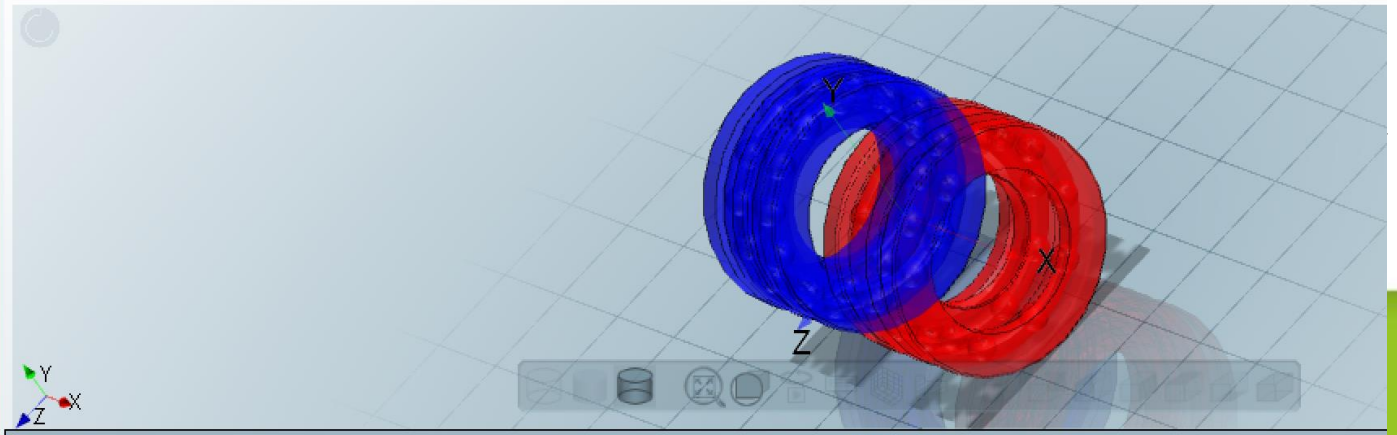
Part comparison

Tabular Compare

Symbol	Description	WD BEARINGS 52212	52212
ERP data			
ERP_PDM_NUMBER	ERP number	14227023310	14227023960
ACTIVE_STATE	Active status	Released	Released
REQUESTED_STATE	Requested status	New	New
LAGER	Lagerplatz	In time delivery	In time delivery
PRICE	Price	0.00	0.00
LOC1	USA	0	0
LOCERP1	USA ERP number	-	-
LOC2	Germany	0	0

Select project line

3D comparison



Semantic Duplicate verified geometrically

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Item master definition

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Eligible master items

Filter selected | Restore item

		Description	Consumption 12 month	Inventory value
		52212-Double acting thrust ball bearings	15.000	56.000
☑	★	Thrust Ball Bearings-WD BEARINGS 52212	400	0

Next | Remove candidature

Update master | Classification preview

Classification preview

[Materials and Services]
[Commercial components]
[Mechanical material]
[Bearings and accessories]
[Rolling bearings]
[Ball bearing]
[Thrust ball bearings]
[Double acting thrust ball bearings]

Core attributes

Producer Code (89,81%):	52212	Type (0,00%):	

Technical attributes

Brand (100,00%):	Italcuscinetti	DIN Standard (45,37%):	
Execution Type (10,19%):			

Semantic Duplicate verified geometrically

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Master Report

Page 1 of 1

Export data (Excel)

	Description	Consumption 12 month	Inventory value
52212-Double acting thrust ball bearings		15.000	56.000

Replaced items

	Description	Consumption 12 month	Inventory value
Thrust Ball Bearings-WD BEARINGS 52212	400	0	

Comparison table

Attributies	Item master	Replaced items
Consumption 12 month	15.000	400
Inventory value	56.000	0
PocFocus	YES	YES
Esportabile	yes	yes
Excluded	no	no

- GeoSematic Solution will launch the substitution chain in the ERPs:
  - Slave marked as obsolete
  - Master defined as substitute material
  - New purchase orders redirected to the Master
  - BOM updated
  - Existing inventory of slaves used up

Geometrical Duplicate verified semantically

From PSOL to TAM

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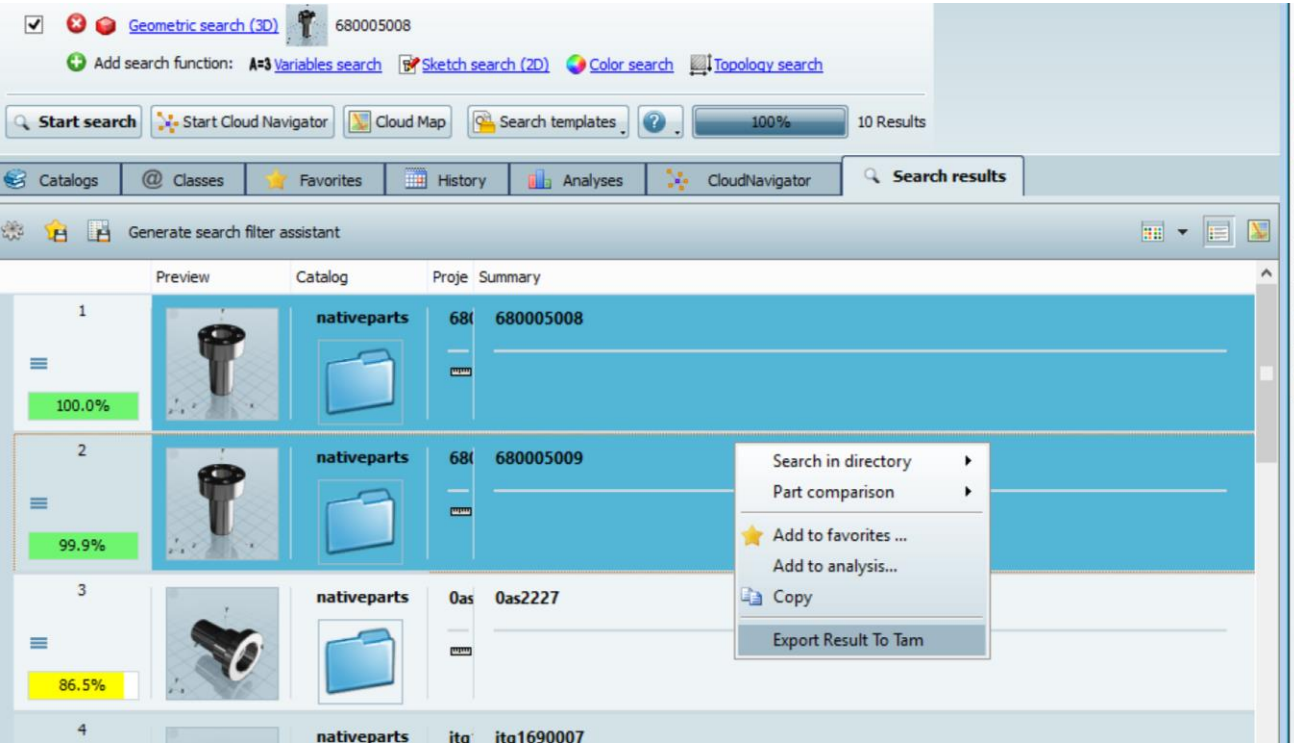
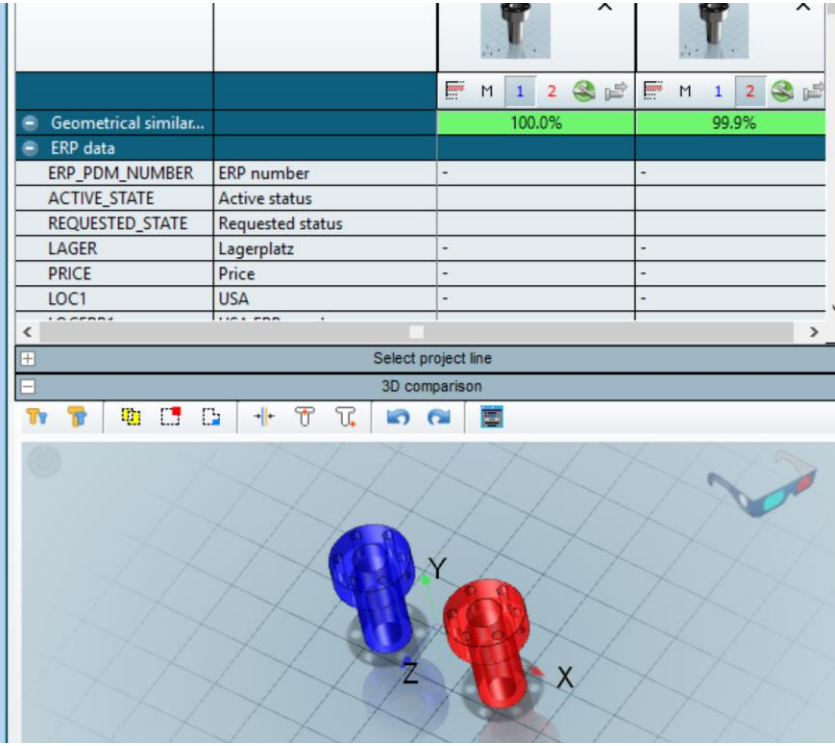
- The geometrical search identify a potential duplicate
- It is possible to check in TAM the semantic point of view and launch the substitution chain:





Geometrical Duplicate verified semantically

From PSOL to TAM

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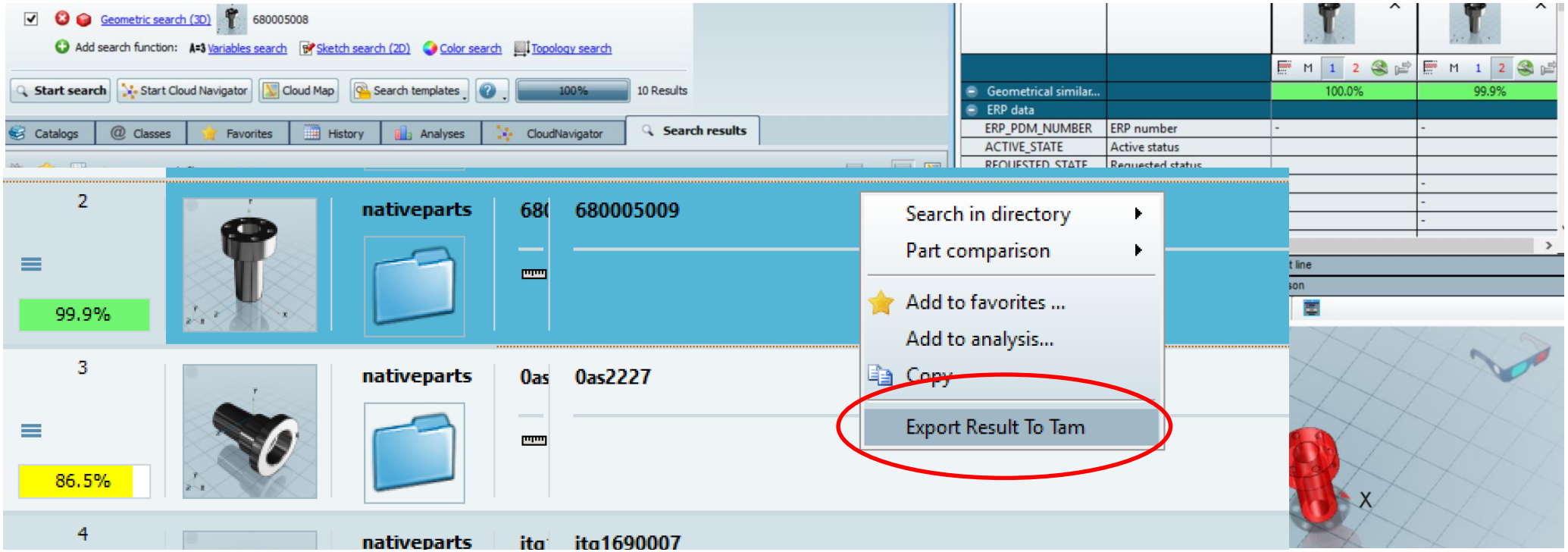

Geometrical Duplicate verified semantically

From PSOL to TAM

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Item master definition

Please click on ★ in order to define one of the following materials as a Master. Afterwards please flag one or more items that will become "Slaves" and click on "Next"

Eligible master items

Filter selected | Restore item

		Description	Consumption 12 month	Inventory value
☐	★	edelstahl b23 DRW55	0	500
		native part A30029 stainless steel	30	1.000

Next | Remove candidature

Update master | Classification preview

Classification preview

[Materials and Services]
[Carpentry and drawing elements]

Core attributes

Material Type (50,00%): INOX

- The items have the same material, and can be considered duplicates

Geometrical Duplicate verified semantically

From PSOL to TAM

Master Report

Page 1 of 1

Export data (Excel)

	Description	Consumption 12 month	Inventory value
native part A30029 stainless steel		30	1.000

Replaced items

	Description	Consumption 12 month	Inventory value
edelstahl b23 DRW55	0	500	

Comparison table

		cadenas-tam.corpus
Total	0,00000	
eid-	32	32
Description	native part A30029 stainless steel	edelstahl b23 DRW55
Material	680005009	0as2227

- GeoSematic Solution will launch the substitution chain in the ERPs:
  - Slave marked as obsolete
  - Master defined as substitute material
  - New purchase orders redirected to the Master
  - BOM updated
  - Existing inventory of slaves used up

Smart Creation

Avoid additional duplication

- The user writes in his natural language a description

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Material creation

Description (*): OR 21,95 x 1,78

Organizzazione: TAM

Metadata with (*) are required

Part Number

Material:

Master:

OK | Classification preview | Clear

Smart Creation

Avoid additional duplication

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[Materials and Services]
[Commercial components]
[Mechanical material]
[Seal rings and gaskets]
[Seal rings]
[O-ring]

The system real time classifies the description and extract the attributes

OR 21,95 x 1,78

Core attributes

Extl Diameter (69,91%):	25,51	Intl Diameter (75,02%):	21,95
Material Type (21,39%):		Thickness (74,75%):	1,78

calculated

extracted

Technical attributes

Article Code (0,06%):	Brand (13,99%):
Material Standard (0,33%):	Producer Code (45,37%):
Shore Hardness (6,40%):	

Similarity search

The system real time perform a similarity analysis in the actual Material Master data and shows similar items

Export data (Excel)

Item number: 5

Master	Material	Description	Input code	Supplier Name
	75168358	JOINT TORIQUE 21,95X1,78 OR2087 OR2-020		
	9900033499	JOINT TORIQUE VITON 21,95X1,78 VERT - 21,95X1,78		
	723142107	O-RING ORAR00020 E85 21,95X1,78		
	723138193	USZCZELNIENIE O-RING 21,95X1,78 70EPDM		
	723138194	USZCZELNIENIE O-RING 21,95X1,78 70NBR		

Geosemantic solution

Unique application multiple results

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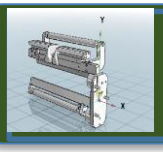

NATIVE PARTS

STANDARD PARTS

STANDARD PARTS

SUPPLIER PARTS

SUPPLIER PARTS WITHOUT MODELS

Full Text & ERP field search

Semantic classification & attribute extraction

Multi taxonomy data navigation

ENGINEERING

Geometrical Search

Standard & supplier part catalogs

Semantically driven part number definition – similarity analysis

STANDARDIZATION

Duplicates Report & On demand geometrical search

Duplicates Discovery

Tools for standardization – part number unification

Semantically driven part number definition – similarity analysis

PURCHASING

Fast Cost Management

Geometrical Search

In Memory data navigation, aggregation and reporting

IT

CAD & PLM integration

ERP integration

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INNOVATIVE SEMANTIC APPLICATIONS

CAD ENAS

GEOSEMANTIC SOLUTION

Make your knowledge one step forward

CADENAS

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INNOVATIVE SEMANTIC APPLICATIONS

Existing Master Data (3D included)
Native, Standard, Supplier

Cadenas-Creatives GeoSemantic Search & Reuse Engine

Customer Data Management Tools SAP/VPM/FileSystem

Cleansed, Classified and Enriched Data & 3D models
(Multiline, New, Standard, Obsolete Part Numbers)

Thanks

Any Question ?