



# Effective Value Engineering Depends on Having the Right Data

***DMSMS Conference  
August 2011***

**Richard Turner**  
**rturner@convergedata.com**  
**<http://www.convergedata.com/>**

# Abstract

---

- Information needed for supporting decisions regarding cost savings and/or quality improvements not readily available
  - Cost-driving Product Information buried in Specification Documents, Drawings, CAD files, etc.
  - Cost data itself lodged in other enterprise information silos
  
- Window of opportunity for VE Cost Improvements associated with Redesigns to New Specifications closes quickly
  - Agility is required to capture the highest value for the lowest cost before the window closes
  - Without accurate and up-to-date information decisions may be made based on incorrect assumptions
  
- Presenting a Process for more effective Value Engineering / Cost Savings Decision Support based on Information that is Accurate, Complete and Up-to-date

**Avoid long lead times collecting data prior to your VE event**

# Value Engineering

- “**Value engineering** (VE) is a systematic method to improve the "value" of goods or products and services by using an examination of function.”
- Value = Function / Cost
- Value can therefore be increased by either improving the function or reducing the cost....

Wikipedia

**Function = Important Functions**

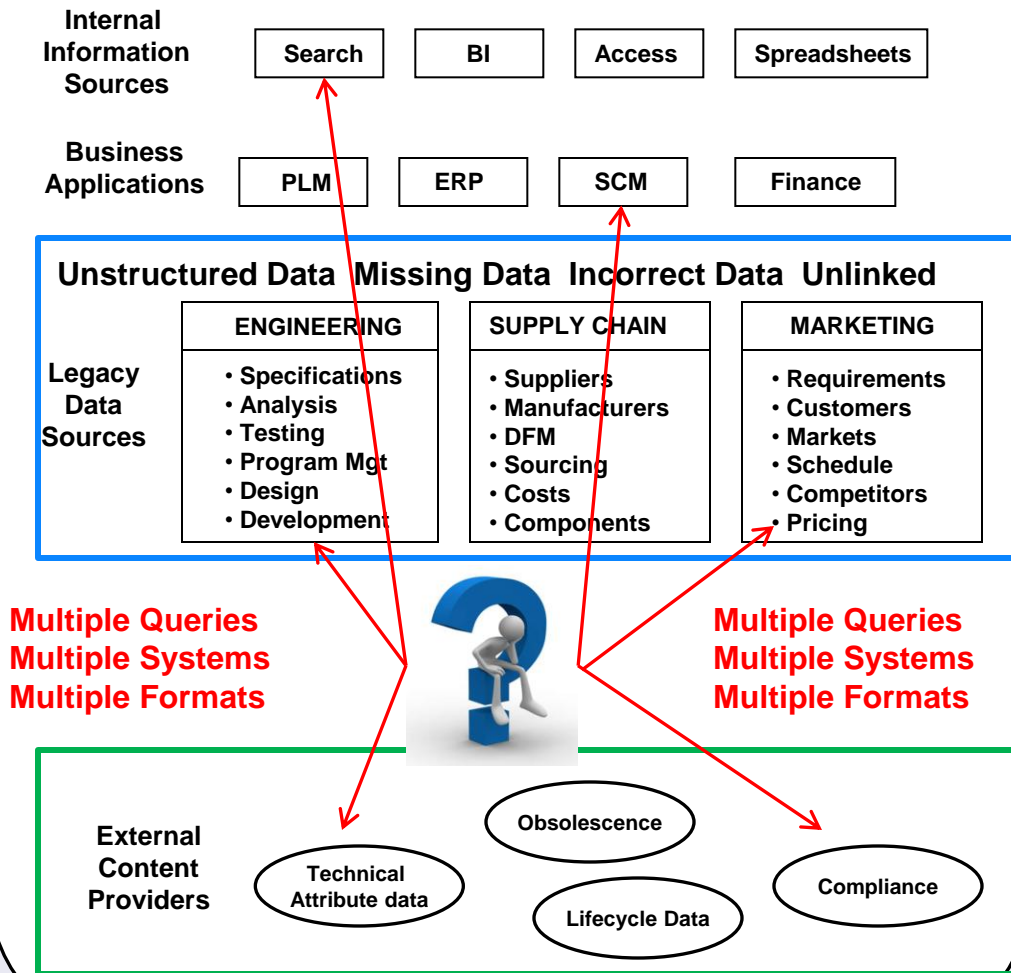
## Effective cost management in Value Engineering requires accurate, complete and up-to-date information.

---

- Typical Cost Reduction Levers
  - Dictate new terms to existing suppliers?
  - Leverage larger buys with fewer “strategic” suppliers?
- Greatest Value Engineering opportunities come from replacing systems or components with functionally equivalent but lower cost items while retaining adherence to specifications
- How to Find Functional Equivalents?
  - Need to somehow “classify” components based on form, fit and function independent of usage
  - Identify functionally equivalent components of lower cost that can be substituted
- Detailed, readily available part information is required to follow this path

# The typical corporate information management infrastructure lacks a complete, integrated digital representation of part data.

## Typical Corporate Data Architecture



## Roadblocks

- **Unstructured Data** – missing data, erroneous data and unlinked data elements
- **Decentralized** – data within and outside the enterprise resides in multiple databases
- **Ineffective Aggregation** – vital sources of information are not effectively aggregated, including information existing outside the firewall
- **Compounding Issue** - organizations are constantly acquiring new data sources, compounding the data issues
- **Data Governance** – lack of guidelines for creating information drives incompleteness, data quality issues and data inconsistencies.

**How do you find the best component – when finding parts is difficult and cost data resides in another system?**

# Most companies load existing components into their PLM which results in inadequate search and find.

In most PLM implementations, try finding a bearing that meets specific requirements: outside diameter, race, material, etc.

Search:

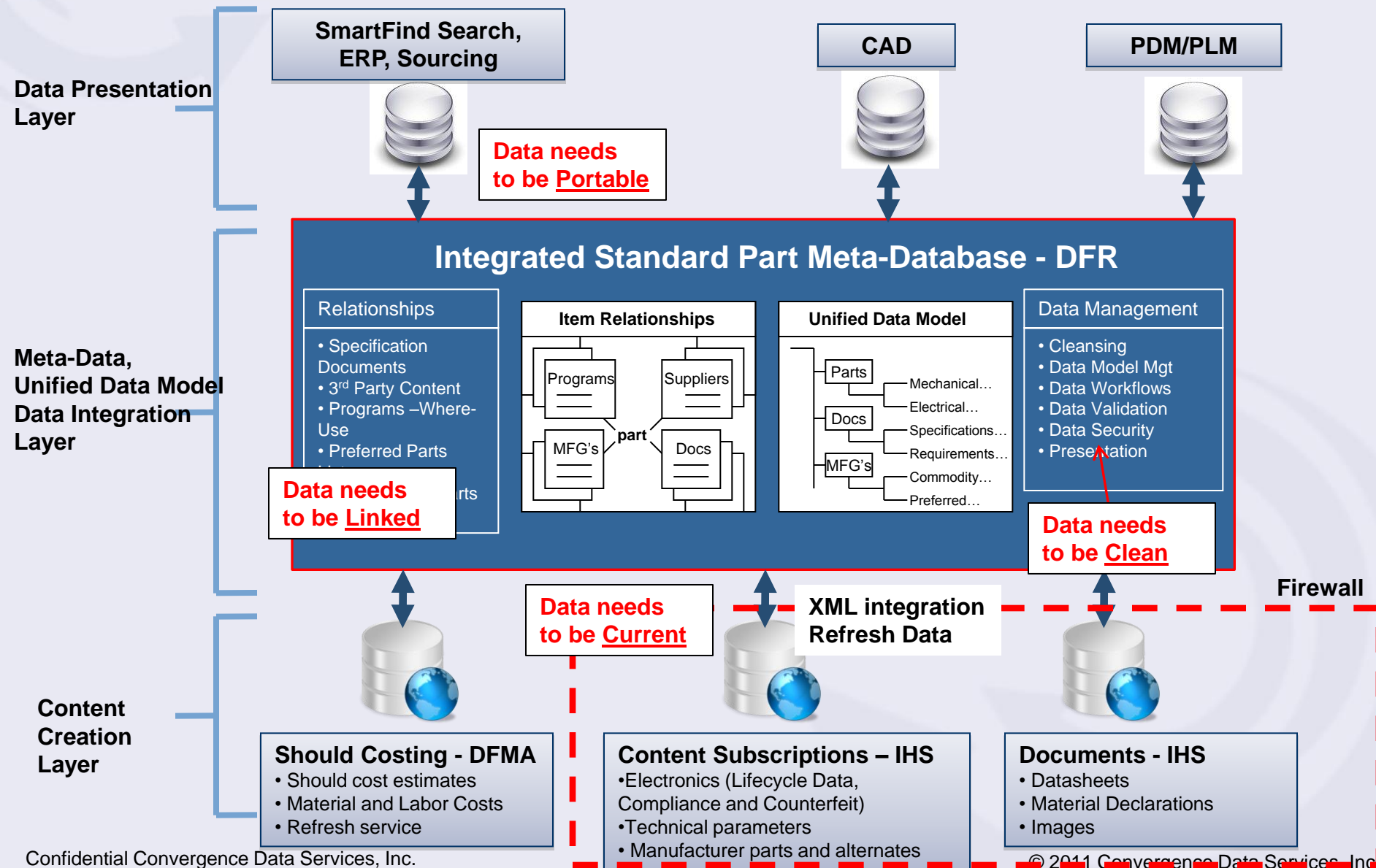
Part Number	Type	Status	Description
4619-640-39641	part	released	FC BALL BEARING ASSY JET CHEF
4619-640-49541	drawing	released	BEARING SUPT&THERMO ASSY(SERVI
4619-640-49541	assembly	released	BEARING SUPT&THERMO ASSY(SERVI
4619-641-89271	part	released	TT BEARING
4619-641-89272	part	released	TT BEARING A6
4619-644-174	drawing	released	BEARING SUPPORT
4619-644-17481	drawing	released	BEARING SUPPORT
4619-644-17481	part	released	BEARING SUPPORT
4619-644-17482	part	released	BEARING SUPPORT
4619-656-98011	drawing	released	BALL BEARING
4619-656-98011	part	released	BALL BEARING
4619-670-03651	part	obsolete	BALL BEARING HOLDER
4619-670-03652	drawing	released	BALL BEARING HOLDER
4619-670-03652	part	released	BALL BEARING HOLDER
4619-670-03741	part	obsolete	BALL BEARING HOLDER 1
4619-670-03741	drawing	released	BALL BEARING HOLDER
4619-670-04821	drawing	released	BEARING HOLDER
4619-670-04821	part	released	BEARING HOLDER
4619-677-40381	drawing	released	TT BEARING PF
4619-677-40381	part	obsolete	TT BEARING PF
4619-677-40391	drawing	released	TT-BEARING PF
4619-677-40391	part	obsolete	TT-BEARING PF
4619-677-41671	drawing	released	TT-BEARING PF
4619-677-41671	part	obsolete	TT-BEARING PF
4619-677-50061	part	released	BEARING
4619-677-50061	drawing	released	BEARING

People can't reuse what they can't find!

- So what do you do?
- Design a new component
- Source a component from a different supplier
- Too much effort to find what you need

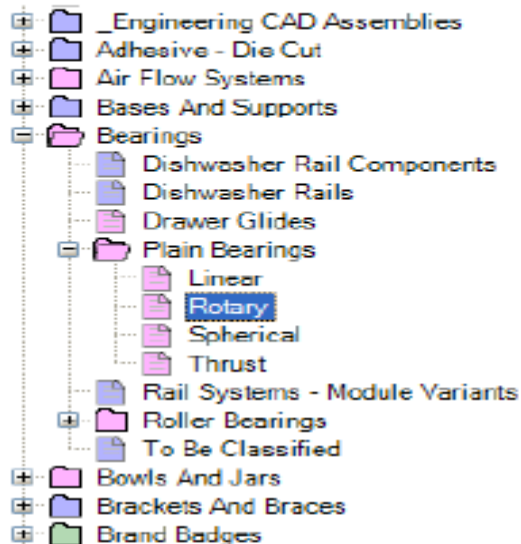
# The CDS Design for Retrieval solution provides an Integrated Standard Electronic Component Data Architecture

Data Hub = Success in Value Engineering

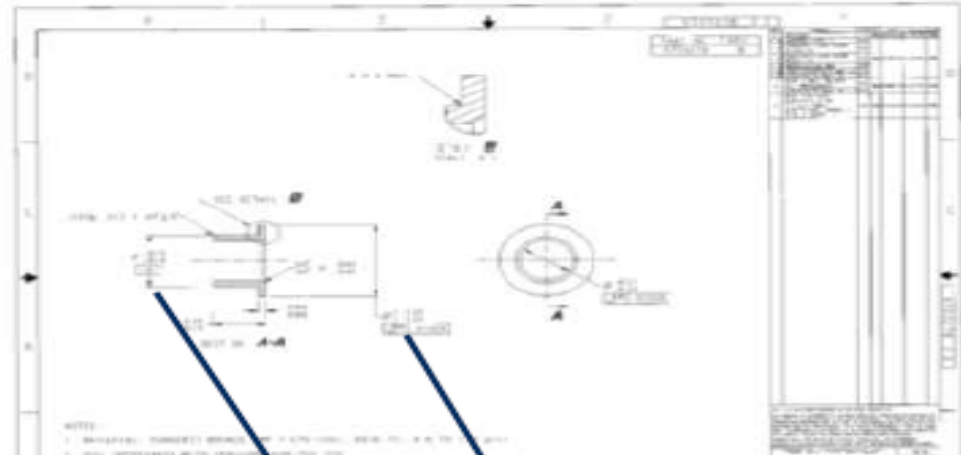


# A data development process with classification and attribute management is required for complete component identification and analysis.

## Classification Structure



Data is extract from drawings and entered into the database



Item Description	Status	Create User	Create Date	Update User	Diameter - Inside	Diameter - Outside	Drawing Number	Drawing URL	Height
BUSHING-HINGE	In Work	Admin	6/13/2008	dfr_api_p	6.4540 mm	9.4565 mm	8557878	<a href="http://lidesr">http://lidesr</a>	14.6850 mm
BEARING - SLEEVE	In Work	Admin	6/13/2008	dfr_api_p	6.2550 mm	12.7150 mm	8558877	<a href="http://lidesr">http://lidesr</a>	32.2500 mm
BEARING - SLEEVE BRONZE	In Work	stratpd	6/1/2009	dfr_api_p	6.2700 mm	12.7300 mm	8559101	<a href="http://lidesr">http://lidesr</a>	32.2500 mm
BUSHING - HINGE	In Work	Admin	6/13/2008	dfr_api_p	8.2620 mm	12.4940 mm	8577253	<a href="http://lidesr">http://lidesr</a>	14.6750 mm
PLASTIC BUSHING	In Work	Admin	6/13/2008	dfr_api_p	6.4000 mm	15.4000 mm	92211117	<a href="http://lidesr">http://lidesr</a>	15.7000 mm
BUSHING AGITATOR SHAFT	In Work	Admin	6/13/2008	dfr_api_p	19.1150 mm	25.4400 mm	92312913	<a href="http://lidesr">http://lidesr</a>	33.3200 mm
SLEEVE BEARING - FGA	In Work	Admin	6/13/2008	dfr_api_p	0.6305 in	0.8145 in	9703278	<a href="http://lidesr">http://lidesr</a>	0.6230 in
BEARING - UPPER, CENTER	In Work	stratpd	6/1/2009	dfr_api_p	0.5020 in	0.6905 in	9703368	<a href="http://lidesr">http://lidesr</a>	0.5700 in



Identifying similar items according to their detailed characteristics affords the opportunity to assess for potential substitution.

## Similar Component Cluster Analysis

☐ Automatic Calculation  
 9:23:32 AM  
 Batch  
 Bearings Plain Bearing   
 Neighbor Distance  
 1.00   
  
  
  
 Recent Selections  
 8557878

Attribute	Critical	Weight Factor	Weight Null	Weight Neg	Occurrences	Minimum	Maximum
Diameter - Hole, Mounting	<input type="checkbox"/>	0	1	0	1	0.00645	
Diameter - Inside	<input checked="" type="checkbox"/>	1	1	1	100	0.003	0.0325
Diameter - Outside	<input checked="" type="checkbox"/>	1	1	1	104	0.0038...	0.052832
Drawing Number	<input type="checkbox"/>	0	1	0	133	000002...	W1029...
Drawing Unavailable	<input type="checkbox"/>	0	0	0	126	False	False
Drawing URL	<input type="checkbox"/>	0	1	0	126	http://1...	http://1...
Features - Special	<input type="checkbox"/>	0	0	0	1	Alternat...	Alternat...
Finish - Generic	<input type="checkbox"/>	0	1	0	20	3103 W...	Zinc pla...
Finish - Generic, Secondary	<input type="checkbox"/>	0	0	0	26	Unfinish...	Unfinish...
Form - Bearing Surface	<input type="checkbox"/>	1	1	0	87	Full Dia...	Partial ...
Grade - Material	<input type="checkbox"/>	1	1	0	0	MS100	W10215

Item Number	Qualifier	Neighbors	Distance	Diameter - Inside	Diameter - Outside	Height	Form - Bearing Surface
356426	Part.0	0	16.134	0.008640	0.013720	0.010920	Full Diameter
8557878	Part.0	0	13.000	0.006454	0.009457	0.014685	Full Diameter
8519359	Part.0	0	16.000	0.006454	0.009457	0.014685	Full Diameter
92211117	Part.0	0	17.706	0.006400	0.015400	0.015700	Full Diameter
9703560	Part.0	0	19.011	0.009040	0.014923	0.014224	Full Diameter
9703570	Part.0	0	19.224	0.009040	0.014923	0.018288	Full Diameter
2316760	Part.0	0	20.361	0.009530	0.012700	0.009530	Full Diameter
9703278	Part.0	0	20.747	0.016015	0.020688	0.015824	Full Diameter
2207471	Part.0	0	19.689	0.008305			

**Part Analytics = Identifying similar groups of parts that may have different pricing or expose differentiators that drives pricing and standardization guidelines**

# Convergence Data Services – What we do

## Build Better Data

Phase I

- Tools and services that help companies **create, organize, augment, cleanse and validate data**



DFR – Data Developer

- Custom, hierarchical taxonomy** of products and services



DFR – Classification Mgr

- Unified Data Model** that comprises a variety of information sources including item relationships



DFR – Item Loader

## Integrate and Sustain Data (Sustain = Governance)

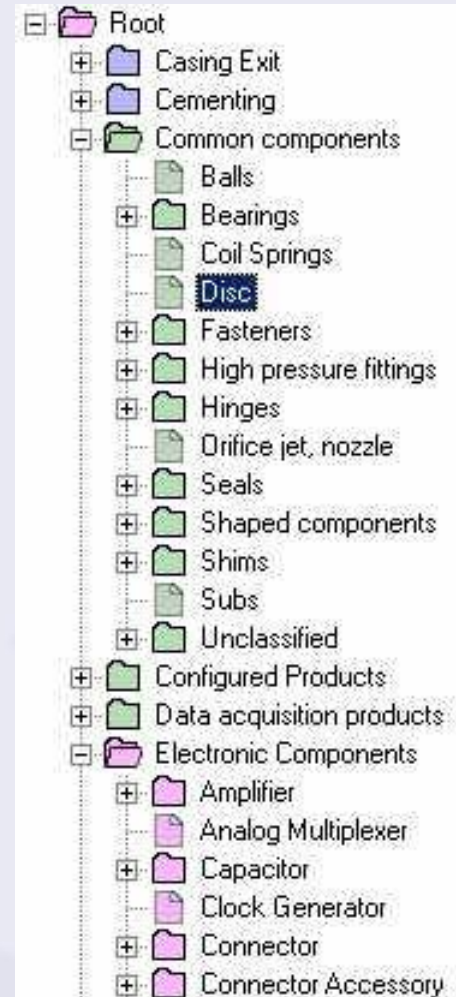
Phase II

- Application and **data integration** capabilities e.g. direct material sourcing applications, engineering tools (DFM, CAD, PDM, etc.)
- NPI – New Part Introduction Workflow**
- Data analysis** tools supporting cluster identification for sourcing or product standardization
- 3<sup>rd</sup> party content integration** including lifecycle analysis services; material compliance
- Data migration** services for part catalogs, PLM, ERP and other enterprise systems (i2, PTC, JDE, etc.)

# Classification 101 Summary

- Why classify: To be able to search and find items - based on form, fit and function - independent of usage.
- Classification process: defines the new structure down to the Terminal Node  
Category level – the level where item data is stored.
- Attributes: and their properties refine categories and items to the point of item differentiation.
- Attribute Properties: add additional characteristics to attributes to the point of item uniqueness.

## Classification - Customized to your Business



# DFR manages the creation and maintenance of the Standard / Part Data Model including the cleansing of parametric attribute data.

Design For Retrieval - [Data Developer]

File Edit View Reports Format Tools Window Help

Batch: --ALL BATCHES-- User: --ALL USERS-- Status: --ALL STATUSES--

☐ Browse mode ☐ ValidationMode ☒ Auto Retrieve After Filtering

Home Item Number / Description Where Used Relationship

Retrieve Reset Columns Selected Column Link Part to Document

Recover undo Save for undo Clear All Filters

Views... ☐ Restrict to Allowed Values

## Beyond Categories – Attributes and Relationships

## Data Model Taxonomy

Root (1547299)

- DFR Administration (51828)
- Non-Parts (7)
- Organization Information (10590)
- Part Information (1401756)
  - Electrical (248827)
    - #Test (6)
    - #Test2 (15)
    - Assembly, Purchased (1362)
    - Battery (56)
    - Capacitor (29249)
      - Capacitor, Fixed (29155)
      - Capacitor, Variable (94)
    - Circuit Breaker (1718)
    - Coil Form (including Bobbin) (1285)
    - Connector (75109)
    - Core (4290)
    - Crystal/Oscillator (509)
    - Display (6)
    - Fan/Blower (174)
    - Filter (349)
    - Focal Plane Array (4)
    - Fuse (1223)
    - Heater (144)
    - Indicator/Light Source (446)
    - Inductor (1084)
    - Integrated Circuit (IC) (12463)
    - Magnet (17)
    - Magnetics, Miscellaneous (0)
    - Meter (445)
    - Other, Electrical (2672)
    - Power Supply (232)
    - Relay (2047)
    - Resistor (101980)
    - Semiconductor (8608)
    - Surge Suppressor (2)
    - Switch (2923)
    - Transducer (128)
    - Transformer (281)
    - IHS Reference Item (133522)
    - Interconnect, Electrical (18582)
    - Mechanical (266314)
    - Raw Material (18463)
    - Unassigned Data (715648)

## Critical Parametric Attribute Data

Item Number	Description	Where Used	Relationship	ESD Sensitive	ESD Sensitivity Level	FSC	Generic Identifier	Handbook H6 Name	Item Images	Link GIDEP Information to Part	Link Internal Part to Manufacturer Part	Link Part to Attachments	Link Part to Document	Link Part to IHS Reference Part	Link Part to List/Program	Link Part to Related Part	Link Part to Site Part Data	Material, Body	Material, Body
71	DS446	No		No		5910			<count=0>	<count=0>	<count=0>	<count=0>	<count=0>	<count=0>	<count=0>	<count=0>	<count=1>	GLASS	CAP
72	DS466	No		No		5910			<count=0>	<count=0>	<count=0>	<count=0>	<count=0>	<count=0>	<count=0>	<count=0>	<count=1>	GLASS	CAP
73	GME11501	No		No	4	5910			<count=0>	<count=0>	<count=0>	<count=0>	<count=0>	<count=1>	<count=0>	<count=0>	<count=1>	GLASS	CAP
74	GMG10601	No		No		5910			<count=0>	<count=0>	<count=0>	<count=0>	<count=0>	<count=1>	<count=0>	<count=0>	<count=1>	GLASS	CAP
75	GMG11501	No		No		5910			<count=0>	<count=0>	<count=0>	<count=0>	<count=0>	<count=1>	<count=0>	<count=0>	<count=1>	GLASS	CAP
76	L303	No		No		5910			<count=0>	<count=0>	<count=0>	<count=0>	<count=0>	<count=0>	<count=0>	<count=0>	<count=1>	GLASS	CAP
77	L304	No		No		5910			<count=0>	<count=0>	<count=0>	<count=0>	<count=0>	<count=0>	<count=0>	<count=0>	<count=1>	GLASS	CAP
78	L309	No		No		5910			<count=0>	<count=0>	<count=0>	<count=0>	<count=0>	<count=0>	<count=0>	<count=0>	<count=1>	GLASS	CAP
79	M39003/06-2049R	No		No		5910			<count=0>	<count=0>	<count=0>	<count=0>	<count=0>	<count=0>	<count=0>	<count=0>	<count=0>	GLASS	CAP
80	PC2232R5	NULL		NULL		5910	PC22		<count=0>	<count=0>	<count=0>	<count=0>	<count=2>	<count=1>	<count=0>	<count=0>	<count=1>	GLASS	CAP
81	PC22K080	NULL		NULL		5910	PC22		<count=0>	<count=0>	<count=0>	<count=0>	<count=2>	<count=1>	<count=0>	<count=0>	<count=1>	GLASS	CAP
82	PC26J100	No		No	4	5910			<count=0>	<count=0>	<count=0>	<count=0>	<count=2>	<count=0>	<count=0>	<count=0>	<count=1>	CERAMIC	CAP
83	PC26J140	No		No	4	5910			<count=0>	<count=0>	<count=0>	<count=0>	<count=2>	<count=0>	<count=0>	<count=0>	<count=1>	CERAMIC	CAP
84	PC26J200	No		No	4	5910			<count=0>	<count=1>	<count=0>	<count=0>	<count=2>	<count=0>	<count=0>	<count=0>	<count=1>	CERAMIC	CAP
85	PC26T100	No		No	4	5910			<count=0>	<count=0>	<count=0>	<count=0>	<count=2>	<count=0>	<count=0>	<count=0>	<count=1>	CERAMIC	CAP

UnSelect All Select All Save to DB Selected: 0 of 94

## Critical Relationships Specification Documents

Detail Items

Collection Link Part to Document Item Number PC26J100

Part Number	Part Number Owner	Qualifier	Item Description	Assigned User	Status	Category Path	Purpose of the Reference
1	MIL-PRF-14409	81349	Document.CAGE... CAPACITORS, VARIABLE (PISTON TYPE, TUBULAR TRIMM...		Approved	Root\Reference Data\Document Info...	GENERAL SPECIFICATION
2	MIL-PRF-14409/13	81349	Document.CAGE... CAPACITORS, VARIABLE (PISTON TYPE, TUBULAR TRIMM...		In Work	Root\Reference Data\Document Info...	PRIMARY DEFINITION DOC

UnSelect All Select All Commit

Logged in at 4/27/2011 10:49:43 AM / -/- admin / DEMO\_BOEING

3.6.896.0 MSSQL

## Links to Customer Requirements...helps Engineers prioritize design input

# DFR's Integration Tools ensure extended enterprise integration of your standard part architecture.

## ■ Application Integration

- PDM and ERP data integration
- New part request process integration



## ■ 3rd Party Content Integration

- Multi-dimensional mapping; part number, mfg number and content ref number
- Enabling lifecycle data and Hazmat data services



## ■ Search Integration

- Custom exporting creating search index's
- Updates for baseline and incremental changes
- UI to configure search tool and access control for users



# WebDFR – supporting the new part creation process, classifying parts and entering the correct attribute data.

Item Classification

rtturner | Logout

ValveFind CategoryClear ResultsClone Item...CancelContinue -->

Item Number: 242342134Raytheon

Available Classifications (filtered by: "Valve")

Unapproved terminal categories are not available.

ROOT

Parts

Oil and Gas

Wellhead and Flowcontrol Products

Actuators

Assembly

Valves

Parts and Components

Valve, Other

Ball Valves

Actuated

Manual

Gate, Dual Cavity

Actuated

Manual

Gate, Single Cavity

Actuated

Manual

Flow control

Surface equipment

Pressure control

Check valve union

Manual

Approvers: AdminF AdminL, Matt Ditrolio

The operation of a valve by means of a handwheel.

Attributes:

- ALTERNATE DESCRIPTION
- ALTERNATE METRIC DESCRIPTION
- API MONOGRAMMED
- API SPECIFICATION
- API WELLHEAD MATERIAL CLASS
- Business Unit
- CONNECTION SIZE
- CONNECTION SIZE FRACTIONAL
- CONNECTION TYPE
- DEFAULT UNITS
- DESCRIPTION - CLEAN 60
- EQUIPMENT CONDITION
- GROSS WEIGHT
- INSIDE DIAMETER, NOMINAL
- INVENTORY TYPE
- ITEM REVISION
- LEGACY DESCRIPTION
- LEGACY REVISION LEVEL
- LIFECYCLE STATE
- LONG DESCRIPTION
- Make-Buy
- MANUFACTURER NAME
- MANUFACTURER PART NUMBER
- MFG SERIAL NUMBER
- MODE OF OPERATION
- MODEL DESIGNATION

Engineers enter required attribute data for new part

Item Classification

rtturner | Logout

Restart ClassificationValidateCancelSave to Database

Item Number: 242342134Raytheon

Category: Root\Parts\Oil and Gas\Wellhead and Flowcontrol Products\Valves\Gate, Single Cavity\Manual

Catg. Approvers: AdminF AdminL, Matt Ditrolio

Item Description: Valve, 1/4 ID, Stainless, WS202, Chrome

Legend:  
Required \*  
Recommended +  
Optional

ALTERNATE DESCRIPTION \*

Required

ALTERNATE METRIC DESCRIPTION \*

Required

API MONOGRAMMED \*

Required

API SPECIFICATION \*

Required

API WELLHEAD MATERIAL CLASS \*

Required

Business Unit \*

Required

CONNECTION SIZE \*

12.34

in

CONNECTION SIZE FRACTIONAL \*

45.5

mm

CONNECTION TYPE \*

Required

DEFAULT UNITS \*

Required

DESCRIPTION - CLEAN 60 \*

cp

Required

EQUIPMENT CONDITION \*

ft

Required

GROSS WEIGHT \*

gl

ft

lbs-mass

Required

INSIDE DIAMETER, NOMINAL \*

gm

in

INVENTORY TYPE \*

in

Required

ITEM REVISION \*

kg

Required

Engineers find the category for a new part

Edit items  
EVV lists  
Validations



# Cluster of Duplicate Casters from different suppliers, used by different business units that have different prices

☐ Automatic Calculation  
 4:24:29 PM

Batch  
HNI Item Cluster

Neighbor Distance  
2.00

Recent Selections  
F-FM00115296

Attribute	Critical	Weight Factor	Weight Null	Weight Neg	Occurrences	Minimum	Maximum	Base UOM
Cluster Name	<input type="checkbox"/>	1000	0	0	0			
Stem Length	<input type="checkbox"/>	10	1	1	18	1	1.375	in
Stem Size	<input type="checkbox"/>	10	1	1	18	0.3125	0.4375	in
Item Height	<input type="checkbox"/>	1	1	1	24	2.625	6.25	in
Wheel Width	<input type="checkbox"/>	1	1	1	24	0.8125	1.25	in
Attaching Bolt Size	<input type="checkbox"/>	0	0	0	6	0.25	0.25	in
BALL DIAMETER	<input type="checkbox"/>	0	0	0	18	2	2	in
Bar Code Number	<input type="checkbox"/>	0	0	0	0			
BEARING STYLE	<input type="checkbox"/>	0	0	0	24	Delrin	Delrin	
Bolt Hole Spacing	<input type="checkbox"/>	0	0	0	6	13/16 x...	13/16 x...	
Color 1	<input type="checkbox"/>				24	Black	Chrome	

Attribute Data Grid is used to set weighting factors critical to the cluster analysis

Results are displayed in the lower grid. This cluster analysis returned items with similar / same technical characteristics.

Small Neighbor Distance will find close duplicates

Item Number	Qualifier	Neig			Item Unit Cost	Vendor Item Number	Vendor Name	Cluster Name	Item Height	Stem Length	Stem Size	Wheel Width
F-FM00115296	Part.0	5	0.000	HBF	9.70...	9FM00115296	E. R. Wagner	9FM00115296	2.625000	1.375000	0.437500	0.812500
H-115296	Part.0	5	0.000	HON Company	3.51...	9FM00115296	E. R. Wagner	9FM00115296	2.625000	1.375000	0.437500	0.812500
A-5296	Part.0	5	0.000	Allsteel Inc	6.95...	9FM00115296	E. R. Wagner	9FM00115296	2.625000	1.375000	0.437500	0.812500
G-4836	Part.0	5	0.000	Gunlocke Co...	5.45...	9FM00115296	E. R. Wagner	9FM00115296	2.625000	1.375000	0.437500	0.812500
L-FM115296	Part.0	5	0.000	Lamex	4.95...	9FM00115296	E. R. Wagner	9FM00115296	2.625000	1.375000	0.437500	0.812500
M-504836	Part.0	5	0.000	Maxon Furniture	8.72...	9FM00115296	E. R. Wagner	9FM00115296	2.625000	1.375000	0.437500	0.812500

- Technical Attributes are same for clustered items – Friction Ring Stem caster
- Internal Item Numbers for same caster are different among 6 business units
- Supplier Part numbers are same from all 6 variations of the item number
- Item Unit Cost varies from \$3.51 to \$9.70 for the same item



Part / item data are collected, technical attributes are extracted and exposed, and are managed in a common database.

## Typical ERP Domain Item Master Data

Item Number	Qualifier	Item Description	UNSPSC	ECCMA SCD
<a href="#">DDXB30US16-36</a>	Part.CAGE-Code.08742	Screw 12 pt	31161614	0161-1#01-076683#1
<a href="#">DDXB30US16-47</a>	Part.CAGE-Code.08742	Bolt nickel	31161614	0161-1#01-076683#1
<a href="#">DDXB30US16-51</a>	Part.CAGE-Code.08742	Bolt 12 pt Nickel	31161614	0161-1#01-076683#1
<a href="#">DDXB30US16-52</a>	Part.CAGE-Code.08742	Bolt	31161614	0161-1#01-076683#1
<a href="#">DDXB30US16-83</a>	Part.CAGE-Code.08742	Screw 12 pt	31161614	0161-1#01-076683#1
<a href="#">DDXB30US16K116</a>	Part.CAGE-Code.08742	Bolt nickel 220KSI	31161614	0161-1#01-076683#1
<a href="#">DDXB30US16K118</a>	Part.CAGE-Code.08742	Bolt 12 pt Nickel	31161614	0161-1#01-076683#1
<a href="#">DDXB30US16K147</a>	Part.CAGE-Code.08742	Bolt	31161614	0161-1#01-076683#1
<a href="#">DDXB30US16K14X</a>	Part.CAGE-Code.08742	Bolt 1/64 oversized	31161614	0161-1#01-076683#1
<a href="#">DDXB30US16K18X</a>	Part.CAGE-Code.08742			
<a href="#">DDXB30US16K19</a>	Part.CAGE-Code.08742			
<a href="#">DDXB30US16K20</a>	Part.CAGE-Code.08742			

**Before**  
Ambiguous Descriptions  
No Attributes

**Attributes + Cost = Value**

Item Number	Qualifier	Item Description	Component Length(in)	Grip Length(in)	Shank Length(in)	Thread Length(in)	Unit Cost	YTD Cost
<a href="#">DDXB30US16-36</a>	Part.CAGE-Code.08742	BOLT, 12 POINT HEAD, 220 KSI MIN TENSILE, 125 KSI MIN SHEAR, NICKEL ALLOY 718 (NOMINAL)	4.573	2.25	3.773	1.523	5.25895	694.1814
<a href="#">DDXB30US16-47</a>	Part.CAGE-Code.08742	BOLT, 12 POINT HEAD, 220 KSI MIN TENSILE, 125 KSI MIN SHEAR, NICKEL ALLOY 718 (NOMINAL)	5.2605	2.9375	4.4605	1.523	6.049575	623.106225
<a href="#">DDXB30US16-51</a>	Part.CAGE-Code.08742	BOLT, 12 POINT HEAD, 220 KSI MIN TENSILE, 125 KSI MIN SHEAR, NICKEL ALLOY 718 (NOMINAL)	5.5105	3.1875	4.7105	1.523	6.337075	716.089475
<a href="#">DDXB30US16-52</a>	Part.CAGE-Code.08742	BOLT, 12 POINT HEAD, 220 KSI MIN TENSILE, 125 KSI MIN SHEAR, NICKEL ALLOY 718 (NOMINAL)	5.573	3.25	4.773	1.523	6.40895	1371.5153
<a href="#">DDXB30US16-83</a>	Part.CAGE-Code.08742	BOLT, 12 POINT HEAD, 220 KSI MIN TENSILE, 125 KSI MIN SHEAR, NICKEL ALLOY 718 (NOMINAL)	7.5105	5.1875	6.7105	1.523	10.139175	1024.056675
<a href="#">DDXB30US16K116</a>	Part.CAGE-Code.08742	BOLT, 12 POINT HEAD, 220 KSI MIN TENSILE, 125 KSI MIN SHEAR, NICKEL ALLOY 718 (NOMINAL)	9.573	7.25	8.773	1.523	12.92355	180.9297
<a href="#">DDXB30US16K118</a>	Part.CAGE-Code.08742	BOLT, 12 POINT HEAD, 220 KSI MIN TENSILE, 125 KSI MIN SHEAR, NICKEL ALLOY 718 (NOMINAL)	9.698	7.375	8.898	1.523	13.0923	392.769
<a href="#">DDXB30US16K147</a>	Part.CAGE-Code.08742	BOLT, 12 POINT HEAD, 220 KSI MIN TENSILE, 125 KSI MIN SHEAR, NICKEL ALLOY 718 (NOMINAL)	11.5105	9.1875	10.7105	1.523	15.539175	1849.161825

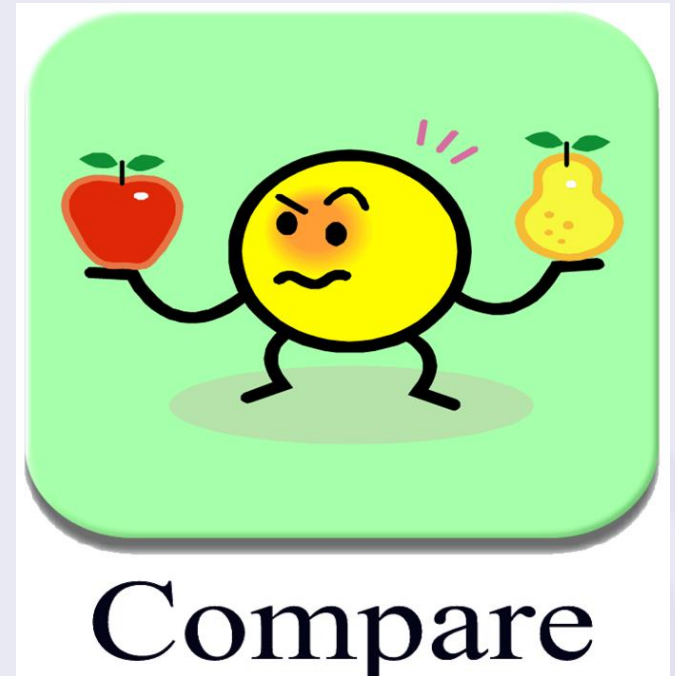
**After**  
New Descriptions  
Technical Attributes  
Cost Data

*“Part identification is no longer limited to description and part number...To uniquely identify/differentiate some of our equipment takes more than 40 attributes per part.”*



# DFMA<sup>®</sup> – Design for Manufacture and Assembly – Should Cost Modeling

- More widely distributed DFMA<sup>®</sup> should cost data and promote re-use of cost models
- Make it easier to find should cost data, run comparisons, and create custom reports
- Create a database of should cost benchmark data, both internal and external design comparisons
- Batch refresh of should cost data to do apple to apple comparisons based on today's material/labor costs
- Do what if analysis – understand the impact of increased material or labor cost to your company



*Its like comparing “apples to oranges”  
if your library inputs are different*

## Component Level Details – Both Technical and DFMA<sup>®</sup> Cost Data

- Compare products by technical data or by DFMA<sup>®</sup> data
- Filter comparisons to obtain different views

**SmartFind** Cost Information Management System

Home View Configuration Release Notes Help

Logged in as: dtaraboletti Logout

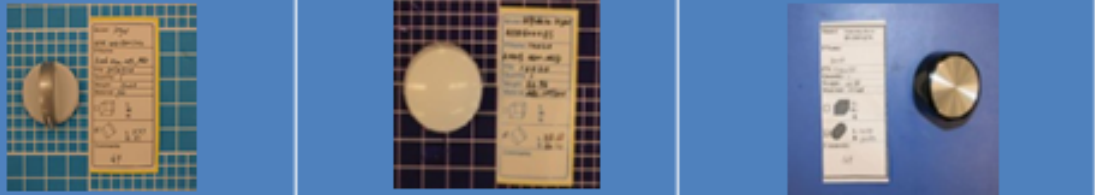
Filter Comparison by Attribute Groupings in DFR

Google Parts Universe

New Search Find Similar XML Export for Clone

Comparison View – Part Detail Settings

Part Detail (CCA Analysis Data) ▼



Material & Surface Finish	Nylon 6/6 (Polyamide)	Nylon 6/6 (Polyamide)	Nylon 6/6 (Polyamide)
Process	Injection	Injection	Injection
Material Cost (\$/kg)	\$4	\$4	\$4
Avg T (mm)	1.5	1.2	1.8
Make (M) or Buy (B)	N/A	N/A	N/A
Weight (g)	403.7	353.7	524.7
Designed Cost (Material)	\$0.24	\$0.18	\$0.28
Designed Cost (Labor)	\$0.00	\$0.00	\$0.01
Designed Cost (Total)	\$0.24	\$0.18	\$0.29

# Summary: Benefits Data can Bring to Value Engineering

---

## Finding the right component

- Finding parts via categorization structure and attribute values

## Critical data in a single view

- Technical Attribute Data + Cost = Value

## Access to Data – Window of Opportunity

- To take advantage of value engineering, you need the data now

## Analytics

- Identify groups of parts “Clusters” with similar characteristics but different pricing
- Identify what features are driving differentiation and cost – opportunities to standardize

## Apples to Apples comparisons

- Comparing different parts based on the same cost structure e.g. labor rates and material cost