

Convergence Data Service DVA Case Example (Data Value Analysis)



DVA process

- Customer provides a parts list and associated supplier cost data for 12 months purchasing history
- Parts list is classified and cleansed in DFR database
- CDS provides attribute data for matched parts which is loaded into the DFR database
- Additional data cleansing is done on remaining parts – descriptions, attribute value lists, parsing, etc.
- Parts are analyzed in the analytics tools for cost savings – clusters/duplicates
- Search uses cases created in SmartFind – demonstrate simplified part selection process
- Graphs created to highlight opportunities
- Initial value opportunity is determined

A list of purchased parts is provided by a customer (e.g. bolts)

Parts list should contain:

- Part Numbers
- Descriptions
- Part Attributes
- Supplier Data
- Pricing data

An example data set

- 12 month history of ERP data for ~ 50,794 bolt purchase orders
- There were multiple duplicates, 5,169 were unique bolts
- A limited number, approximately 330 had attribute data
- Some descriptions with limited information was provided
- Cost, Supplier, and Business Unit data was provided

CDR PART NUMBER	PART REVISION	PART DESCRIPTION	ERP SUPPLIER ID	INVOICE QUANTITY	SPEND USD (\$)	PO UNIT PRICE
4502074	4502074	NUT, TIE BOLT	0000016202	400	572	\$ 1,430,000
AS3236-10	AS3236-10	BOLT, MACHINE	0000016202	1100	99	\$ 89,693
AS3237-16	AS3237-16	BOLT, MACHINE-DOUBLE HEX EXTEND	0000028202	37600	1,382	\$ 36,765
AS3238-14	AS3238-14	BOLT, MACHINED-DOUBLE HEX SPEC	0000016202	8200	330	\$ 40,250
AS3238-14	AS3238-14	BOLT, MACHINED-DOUBLE HEX SPEC	0000016202	35100	1,413	\$ 40,250
AS3238-14	AS3238-14	BOLT, MACHINED-DOUBLE HEX SPEC	0000016202	100	4	\$ 40,250
43390-1	43390-1	BOLT	0000016202	700	279	\$ 399,000
4950237-7	4950237-7	BOLT, MACHINE, DOUBLE HEXEGON-	0000016202	227400	8,054	\$ 35,419
4951422	4951422	NUT TIE BOLT	0000016202	300	508	\$ 1,693,800
162418-1	162418-1	BOLT-COMPRESSOR WHEEL	0000016202	2100	446	\$ 212,557
AS3238-16	AS3238-16	BOLT, MACHINED-DOUBLE HEX SPEC	0000016202	14800	1,387	\$ 93,730
NAS1160-4-10	NAS1160-4-10	BOLT, SHOULDER	0000016202	400	97	\$ 243,480
7000513	7000513	LOCKNUT, TIE BOLT	0000016202	1400	2,105	\$ 1,503,846
4950237-9	4950237-9	BOLT, MACHINE, DOUBLE HEXEGON-	0000016202	254100	9,000	\$ 35,419
162418-1	162418-1	BOLT-COMPRESSOR WHEEL	0000016202	2400	510	\$ 212,557
MS9725-26	MS9725-26	BOLT, MA	0000016202	800	96	\$ 119,953
AS3238-16	AS3238-16	BOLT, MA	0000016202	2500	234	\$ 93,730
43390-2	43390-2	BOLT	0000016202	800	340	\$ 425,500
160652-1	160652-1	BOLT, RE	0000016202	4800	548	\$ 114,267
4950237-12	4950237-12	BOLT, MA	0000016202	900	122	\$ 135,400

Typical Customer Part Data

- Incomplete descriptions
- No attribute data

The data is loaded into Design for Retrieval for cleansing

- Part numbers, Business Unit, Suppliers, and Pricing data is loaded
- Of the 5,169 bolts, 2,130 were cleansed using CDS data for industry standard bolts
- Approximately 1,050 descriptions were parsed to obtain **some** technical attributes: thread diameter, length, head type, etc...

- Roughly 3,000 bolts require additional cleansing

- About 1,000 can be sourced via the web
- About 2,000 need to be extracted from company drawings

- About 80,000 attribute values were created

- Roughly 6,000 descriptions were generated

Item Number	Qualifier	Item Description	NEW SHORT DESCRIPTION	HEAD STYLE	THREAD SIZE	THREAD DIA(in)	PITCH	LENGTH (in)	MATERIAL	AVG WEIGHTED PRICE \$
NAS1973C10T	Part.0	BOLT	BLT, FL100, #10-32 UNJF X 0.96 in, SS, PSV	FLAT, 100°	#10	0.19	32	0.963	CORROSION RESISTANT STEEL	11.75
NAS1973C11T	Part.0	BOLT	BLT, FL100, #10-32 UNJF X 1.03 in, SS, PSV	FLAT, 100°	#10	0.19	32	1.026	CORROSION RESISTANT STEEL	22
NAS1973C18T	Part.0	BOLT	BLT, FL100, #10-32 UNJF X 1.46 in, SS, PSV	FLAT, 100°	#10	0.19	32	1.463	CORROSION RESISTANT STEEL	14
NAS1973C19T	Part.0	BOLT	BLT, FL100, #10-32 UNJF X 1.53 in, SS, PSV	FLAT, 100°	#10	0.19	32	1.526	CORROSION RESISTANT STEEL	29
NAS1973C1T	Part.0	BOLT	BLT, FL100, #10-32 UNJF X 0.40 in, SS, PSV	FLAT, 100°	#10	0.19	32	0.4	CORROSION RESISTANT STEEL	1.43
NAS1973C20T	Part.0	BOLT	BLT, FL100, #10-32 UNJF X 1.59 in, SS, PSV	FLAT, 100°	#10	0.19	32	1.588	CORROSION RESISTANT STEEL	36.77
NAS1973C21T	Part.0	BOLT	BLT, FL100, #10-32 UNJF X 1.65 in, SS, PSV	FLAT, 100°	#10	0.19	32	1.65	CORROSION RESISTANT STEEL	42.32
NAS1973C22T	Part.0	BOLT	BLT, FL100, #10-32 UNJF X 1.71 in, SS, PSV	FLAT, 100°	#10	0.19	32	1.713	CORROSION RESISTANT STEEL	54.97
NAS1973C23T					#10					
NAS1973C24T					#10					

• New Descriptions
• Format, abbreviations
• Units of measure

• ~80k plus attributes values
• Normalized string data
• Multiple Relationships

Analysis is performed on the data using Cluster Analysis – similar bolts but different pricing and suppliers

☐ Automatic Calculation
Calculate 2:17:50 PM

Batch
JRD Screws with Pricin

Neighbor Distance
1.00

Save cluster as Batch

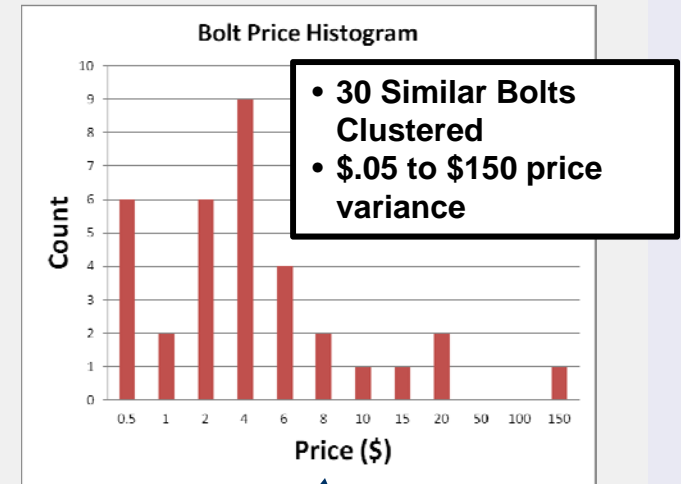
Save

Export

Recent Selections
MS9147-12

Weighted Attributes

Attribute	Critical	Weight Factor	Weight Null	Weight Neg	Occurrences	Minimum	Maximum
LENGTH	<input checked="" type="checkbox"/>	10	5	0	1597	0.19	7.12
HEAD TYPE	<input checked="" type="checkbox"/>	1	5	0	1616	CAP	WASH...
MATERIAL	<input checked="" type="checkbox"/>	1	5	0	1644	ALUMI...	WASP...
PITCH	<input checked="" type="checkbox"/>	1	5	0	1648	6	40
THREAD SIZE	<input checked="" type="checkbox"/>	1	5	0	1648	0.073	1
AVG WEIGHTED PRICED	<input checked="" type="checkbox"/>	0	0	0	1630	0	95
DESCRIPTION	<input type="checkbox"/>	0	0	0	1648	BLT, #...	SCW, ...
Drilled Head	<input type="checkbox"/>	0	0	0	1552	FALSE	TRUE
Drive Type/Recess	<input type="checkbox"/>	0	0	0	386	CROSS	TRI-WI...
FINISH	<input type="checkbox"/>	0	0	0	1616	ALUMI...	SILVER...
FINISH SPECIFICATION	<input type="checkbox"/>	0	0	0	1447	AMSO	REDOO

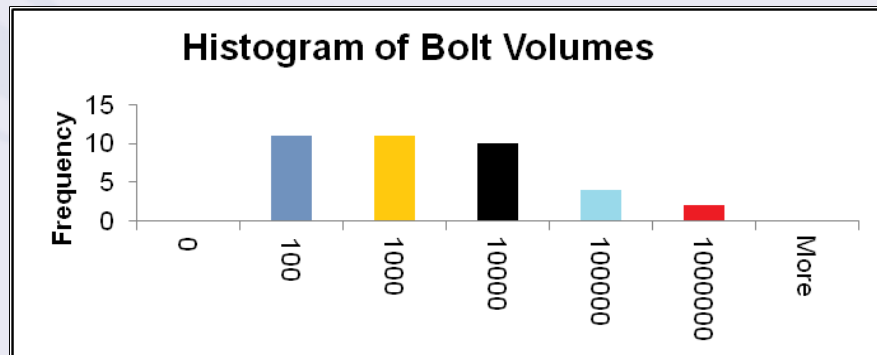


Item Number	Qualifier	Neighbors	Distance	HEAD TYPE	LENGTH	MATERIAL	PITCH	THREAD SIZE	AVG WEIGHTED PRICED	QTY SUM	SPEND SUM \$
MS9147-12	Part.0	30	0.000	DOUBLE HEX...	0.880000	CARBON STE...	28.000000	0.250000	0.01	2000	16.000000
MS9209-12	Part.0	30	0.000	DOUBLE HEX...	0.880000	CARBON STE...	28.000000	0.250000	1.69	6874	11648.00000
MS9218-13	Part.0	19	0.600	DOUBLE HEX...	0.940000	CARBON STE...	28.000000	0.250000	6	4	24.000000
MS9915-13	Part.0	19	0.600	DOUBLE HEX...	0.940000	CARBON STE...	28.000000	0.250000	1.96	25	49.000000
MS9089-13	Part.0	19	0.600	DOUBLE HEX...	0.940000	CARBON STE...	28.000000	0.250000	1.4	112	157.000000
MS9209-13	Part.0	19	0.600	DOUBLE HEX...	0.940000	CARBON STE...	28.000000	0.250000	3.97	2096	8330.000000
MS9218-11	Part.0	16	0.700	DOUBLE HEX...	0.810000	CARBON STE...	28.000000	0.250000	9.16	51	467.000000
MS9089-11	Part.0	16	0.700	DOUBLE HEX...	0.810000	CARBON STE...	28.000000	0.250000	1.17	6	7.000000
MS9209-11	Part.0	16	0.700	DOUBLE HEX...	0.810000	CARBON STE...	28.000000	0.250000	1.49	4794	7146.000000
MS9557-12	Part.0	34	1.000	DOUBLE HEX...	0.880000	CRESAPOLY	28.000000	0.250000	0.04	924585	33592.00000
MS9557-27	Part.0	34	1.000	DOUBLE HEX...	0.880000	CRESAPOLY	28.000000	0.250000	3	118	354.000000
				DOUBLE HEX...	0.880000	CRESAPOLY	28.000000				1000

Similar Parts

Different Pricing

Identifying clusters around high volume bolts – consolidate similar bolts around the high volume bolts

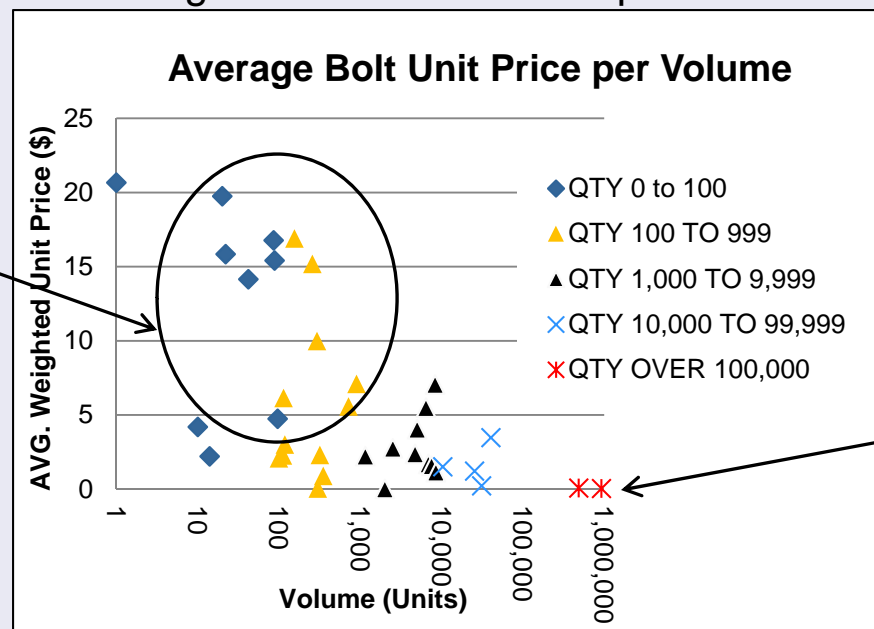


As parts order volume increases, the per part price goes down.

- When purchasing low volume parts, check if a similar high volume part can be used instead
- If possible use high volume bolts, such as MS9557-12, as a substitute

Higher volumes ~ Lower price

Lower volume bolts have a price between 5 and 20 dollars



Bolt MS9557-12

- 924,585 units
- Avg. price \$0.04

Duplicate finder identifies possible substitutes

Duplicate analysis with 7 attributes

Identified
Substitute

The Substitute component can be defined as a preferred component improving search and reuse

Duplicate Finder

Found: 11 FINISH: NONE LENGTH: 0.88 MATERIAL: CRESAPOLY HEAD TYPE: DOUBLE HEXAGON PITCH: 28 THREAD SIZE: 0.25 Thread Class: UNF

Found: 8 FINISH: NONE LENGTH: 1 MATERIAL: CRESAPOLY HEAD TYPE: DOUBLE HEXAGON PITCH: 28 THREAD SIZE: 0.25 Thread Class: UNF

Item Number	Item Detail	Category	DESCRIPTION	MATERIAL SPECIFICATION	Locking Element	SPEND SUM \$	QTY SUM	AVG
MS9557-14	BOLT-MA,DH EWSH HD,,250-28X1.000	Standard Screws	BLT, DBL HEX, 1/4-28 UNJF X 1.00 in, CRSP, NONE	A-286 / AMS5731-85	N/A	22804	369,234	0.06
ST1315-14	BOLT-MACHINE,,250-28X1.000,DH	Standard Screws	BLT, DBL HEX, 1/4-28 UNJF X 1.00 in, CRSP, NONE	INCONEL 718 / PWA96	N/A	9934	13,072	0.76
ST1420-14	BOLT-MACHINE,,250-28X1.000,DH	Standard Screws	BLT, DBL HEX, 1/4-28 UNJF X 1.00 in, CRSP, NONE	A-286 / AMS7477	N/A	6120	976	6.27
ST2601-14	BOLT-MACHINE,,250-28X1.000,DH	Standard Screws	BLT, DBL HEX, 1/4-28 UNJF X 1.00 in, CRSP, NONE	INCONEL 718 / PWA96	N/A	2721	2,168	1.26
AS21516	BOLT,MACHINE DOUBLE HEX	Standard Screws	BLT, DBL HEX, 1/4-28 UNJF X 1.00 in, CRSP, NONE	A-286 / DTD 5026	N/A	1123	591	1.9
AS23016	BOLT,CLOSE TOL DOUBLE HEX	Standard Screws	BLT, DBL HEX, 1/4-28 UNJF X 1.00 in, CRSP, NONE	A-286 / BS HR 650	N/A	63	30	2.1
AS48116	BOLT,MACHINE DOUBLE HEX	Standard Screws	BLT, DBL HEX, 1/4-28 UNJF X 1.00 in, CRSP, NONE	A-286 / BS HR 650	N/A	858	284	3.02
PRT6245	BOLT, MACHINE-12 POINT	Standard Screws	BLT, DBL HEX, 1/4-28 UNJF X 1.00 in, CRSP, NONE	A-286 / AMS5731	N/A	6917	101,000	0.07

Found: 7 FINISH: NONE LENGTH: 0.69 MATERIAL: CRESAPOLY HEAD TYPE: DOUBLE HEXAGON PITCH: 28 THREAD SIZE: 0.25 Thread Class: UNF

Found: 7 FINISH: NONE LENGTH: 0.63 MATERIAL: CRESAPOLY HEAD TYPE: DOUBLE HEXAGON PITCH: 28 THREAD SIZE: 0.25 Thread Class: UNF

Found: 6 FINISH: NONE LENGTH: 0.75 MATERIAL: CRESAPOLY HEAD TYPE: DOUBLE HEXAGON PITCH: 28 THREAD SIZE: 0.25 Thread Class: UNF

Found: 5 FINISH: NONE LENGTH: 1.5 MATERIAL: CRESAPOLY HEAD TYPE: DOUBLE HEXAGON PITCH: 28 THREAD SIZE: 0.25 Thread Class: UNF

Found: 5 FINISH: PASSIVATE LENGTH: 1.43 MATERIAL: STAINLESS STEEL HEAD TYPE: HEXAGON PITCH: 28 THREAD SIZE: 0.25 Thread Class: UNF

Found: 4 FINISH: NONE LENGTH: 0.56 MATERIAL: CRESAPOLY HEAD TYPE: DOUBLE HEXAGON PITCH: 28 THREAD SIZE: 0.25 Thread Class: UNF

Found: 4 FINISH: NONE LENGTH: 0.94 MATERIAL: CRESAPOLY HEAD TYPE: DOUBLE HEXAGON PITCH: 28 THREAD SIZE: 0.25 Thread Class: UNF

Found: 4 FINISH: CADMIUM PLATE LENGTH: 0.5 MATERIAL: STEEL HEAD TYPE: DOUBLE HEXAGON PITCH: 28 THREAD SIZE: 0.25 Thread Class: UNF

Additional duplicate groupings

- Identifies bolts with the same values
- Different attribute values can be selected

Searching for a part - SmartFind

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[IHS Specs and Standards](#) [CAPS Universe](#) [Haystack](#) [Related Links](#)

[Add To Cart](#) [New Search](#) [Find Similar](#) [XML Export for Clone](#)

Item Summary Information

Item Number	MS9111-16
Qualifier	Part.0
Item Description	BOLT-MA,DH EWSH HD,,250-28X1.438
Legacy Part Number	
Update	12/8/2014 10:29:31 AM
Category	Root\Parts\Mechanical\Fastener\Bolt\Screw\Standard Screws
Status	NEW
Release Date	

Attribute display can be tailored – the attribute order, unit of measure, additional tabs, can be changed

SmartFind, a web based search tool, leverages the parametric data in DFR to efficiently locate parts

Link to the Drawing of the Part

Item Information

[Item Details](#) [Relationships](#)

DESCRIPTION *	BLT, DBL HEX, 1/4-28 UNJF X 1.50 in, CRSP	MATERIAL SPECIFICATION *	A-286 / PERAMS5731
HEAD TYPE *	DOUBLE HEXAGON	GRIP *	0.875
THREAD CALLOUT *	1/4	Drilled Head *	FALSE
THREAD SIZE (in) *	0.25	AVG WEIGHTED PRICED *	17.57
PITCH (in) *	28	QTY SUM *	131
Thread Class *	UNF	SPEND SUM \$ *	2302
LENGTH (in) *	1.5	IHS OBJECT ID *	2122207400
MATERIAL *	CRESAPOLY		

Viewing the Relationships in SmartFind – One to Many

Item Summary Information

Item Number

MS9111-06

Qualifier

Part.0

Revision

Item Description

BOLT-MA,DH EWSH HD,,250-28X.875

Legacy Part Number

Update

11/10/2014 10:27:04 AM

Category

Root\Parts\MECHANICAL FASTENERS\Screws

Status

NEW

Release Date

SPEND SUM \$ *

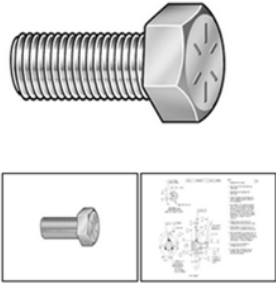
9626.00

QTY SUM *

8477

AVG WEIGHTED PRICE \$ *

1.14



Legend

Item Information

Item Details

Relationships

Other Revisions

LINK PARTS TO BUSINESS UNITS

LINK PARTS TO SUPPLIERS

ITEM IMAGES

LINK PARTS TO SUBSTITUTES

Item Number	Qualifier	Description	SPEND SUM \$	QTY SUM	AVG WEIGHTED PRICE \$
US22:CEC2	Part.0	Simon Manufacturing	4677	2827	1.05
US01:COR1	Part.0	Acme Advance Manufacture	2649	5500	1.25
00007:SD	Part.0	Santori Quick Turn	2300	150	10.97

BUSINESS UNITS


LINK PARTS TO BUSINESS UNITS LINK PARTS TO SUPPLIERS ITEM IMAGES LINK PARTS TO SUBSTITUTES						
Item Number	Qualifier	Description	SPEND SUM \$	QTY SUM	AVG WEIGHTED PRICE \$	STATUS OF RELATIONSHIP
0000041132	Part.0	DRECKS INDUSTRIAL	3626	5977	1.00	PREFERRED
0000025783	Part.0	QUICK MANUFACTURING	4500	1500	4.25	NOT PREFERRED
0000016209	Part.0	QUICK TURN	1500	1000	1.50	PREFERRED

SUPPLIERS

LINK PARTS TO BUSINESS UNITS LINK PARTS TO SUPPLIERS ITEM IMAGES LINK PARTS TO SUBSTITUTES		
Item Number	Qualifier	Description
MS9566-12	Part.0	BOLT-MACHINE DOUBLE HEX EXT WASHER HEAD

SUBSTITUTES

With cleansed attribute data it is easy to compare parts

		Home View Configuration Release Notes Help		
		Logged in as: rdonovan Logout		
		IHS Specs and Standards	CAPS Universe	Haystack
		Related Links		
Item Number	MS9111-06 ✓	MS9566-12 ✓	MS9575-12 ✓	MS9697-12 ✓
ItemID	385	454	467	478
Qualifier	Part.0	Part.0	Part.0	Part.0
Revision				
Item Description	BOLT-MA,DH EWSH HD,,250-28X.875	BOLT-MACHINE DOUBLE HEX EXT WASHER HEAD	BOLT-MA,DH EWSH,DR,,250-28X.875	BOLT-MACHINE,,250-28X.875,EXTENDEDWASH
Legacy Part Number				
Update	11/10/2014 10:27:04 AM	11/10/2014 10:27:04 AM	11/8/2014 10:53:41 AM	11/8/2014 10:53:41 AM
Category	Root\Parts\MECHANICAL FASTENERS\Screws	Root\Parts\MECHANICAL FASTENERS\Screws	Root\Parts\MECHANICAL FASTENERS\Screws	Root\Parts\MECHANICAL FASTENERS\Screws
Status	NEW	NEW	NEW	NEW
Release Date				
URL	http://cds.collaborationhost.net/UTC/NOV%20Internal/Images/content_1074%20Bolt%20Drwg.jpg	http://cds.collaborationhost.net/UTC/NOV%20Internal/Images/content_1074%20Bolt%20Drwg.jpg	http://cds.collaborationhost.net/UTC/NOV%20Internal/Images/content_1074%20Bolt%20Drwg.jpg	http://cds.collaborationhost.net/UTC/NOV%20Internal/Images/content_1074%20Bolt%20Drwg.jpg
MATERIAL	CORROSION RESISTANT STEEL	CORROSION RESISTANT STEEL	CORROSION RESISTANT STEEL	CORROSION RESISTANT STEEL
MATL SPEC	PERAMS5731	PERAMS5731	(UNSS66286)PERAMS5731	AMS5708,UNSN07001
GENERIC MATL	A-286	A-286	A-286	WASPALLOY
ANTI-GALL	N/A	N/A	N/A	N/A
MARKING	AS478 CL A	AS478 CL A	AS478 CL A	AS478-79-A
SURF TEXTURE	AS291-125	B46.1-125	B46.1-125	B46.1-125
THREAD CATEGORY	FINE	FINE	FINE	FINE
HEAT TREATMENT	N/A	N/A	N/A	
SPEND SUM \$	9626.00	730.00	20117.00	
SHANK HOLES	False	N	N	
HEAD STYLE	DOUBLE HEXAGON	DOUBLE HEXAGON	DOUBLE HEX	
THREAD DIA (in)	0.25	0.25	0.25	
THREAD SIZE	1/4	1/4	1/4	
PITCH	28	28	28	

- Simplify part selection
- Easily compare parts
- Highlight differences and similarities

Once Substitutes are defined it is easy to find them

Advance Search ☐ **Item Number Search**

Search Text:

Search Type:

Sort Field:

Special Instructions:

List Filter: [Upload File](#)

Attribute Filters: [Add Filter\(s\)](#) [Clear Filter\(s\)](#)

Attribute	Operation	Filter	UOM	
<input type="checkbox"/> HEAD TYPE	Equal	DOUBLE HEXAGON		×
<input type="checkbox"/> THREAD CALLOUT	Equal	1/4		×
<input type="checkbox"/> PITCH	Equal	28.00	in	×
<input type="checkbox"/> Thread Class	Equal	UNF		×
<input type="checkbox"/> LENGTH	Range	.86-.88	in	×
<input type="checkbox"/> MATERIAL	Exists			×

[Check All](#) [UnCheck All](#)

**Preferred
Parts Search**

Root\Parts\Mechanical\Fastener\Bolt\Screw\Standard Sc

Search Results [Show Categories](#)

[Search Results](#) [Item Cart](#)

Showing items 1-6 of 6

	Item Number
Add to Cart	MS21280-12
Add to Cart	MS9111-06
Add to Cart	MS9566-12
Add to Cart	MS9575-12
Add to Cart	PRT6244
Add to Cart	ST1315-12

Showing items 1-6 of 6

**6 parts
returned**

**34 parts
returned**

Advance Search ☐ **Item Number Search**

Search Text:

Search Type:

Sort Field:

Special Instructions:

List Filter: [Upload File](#)

Attribute Filters: [Add Filter\(s\)](#) [Clear Filter\(s\)](#)

Attribute	Operation	Filter	UOM	
<input type="checkbox"/> HEAD TYPE	Equal	DOUBLE HEXAGON		×
<input type="checkbox"/> THREAD CALLOUT	Equal	1/4		×
<input type="checkbox"/> PITCH	Equal	28.00	in	×
<input type="checkbox"/> Thread Class	Equal	UNF		×
<input type="checkbox"/> LENGTH	Range	.86-.88	in	×
<input type="checkbox"/> MATERIAL	Exists			×

[Check All](#) [UnCheck All](#)

[Search](#) [Reset](#)

Root\Parts\Mechanical\Fastener\Bolt\Screw\Standard Screws

Search Results [Show Categories](#)

[Search Results](#) [Item Cart](#)

Showing items 1-25 of 34

	Item Number	Qualifier	Item Description
Add to Cart	AS21514	Part.0	BOLT,MACHINE DOUBLE HEX
Add to Cart	AS3237-12	Part.0	BOLT, MACHINE
Add to Cart	AS3251-12	Part.0	BOLT
Add to Cart	AS3580-4-14	Part.0	BOLT-MACHINE,DOUBLE HEX
Add to Cart	AS48814	Part.0	BOLT-MACHINE DOUBLE HEX HD 250 DIA X .8

[Export](#)

Analysis of the bolt data

Savings Opportunities

- There was a proliferation of similar bolts - sample of 2,200 bolts – 1,800 bolts could be clustered with a similar bolt, assuming 25% (450) could be eliminated and at \$10,000/part* that is ~ \$4.5 M in potential saving with different part numbers
- Different suppliers, pricing, and business units – consolidating purchase orders and inventories could reduce average price per part and conservatively save 10% (of \$45 M) or \$4.5 M (Boeing approach)

Improved Search Times

- Cleansed attributes makes it easy to search and identify trends in the data
- Consistent detailed Descriptions makes it easier to understand its purpose
- Preferred Search/Substitutes
 - From the parsed bolts (proprietary bolts) there were many bolts with non-standard lengths
 - Standardize bolt lengths to 1/16th of an inch
 - Use preferred bolts from qualified suppliers when possible
 - Non-standard components are easily located and can be reviewed for justification
 - Many of the populated bolts are industry standard, however approximately 1/3 of the bolts are proprietary and as they are cleansed, the duplicates will be easily identified

*** Average Price for mechanical parts provided from the
Parts Standardization and Management Committee**