

Evolving Master Data Management with MDaaS

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While good data can be your most strategic asset...

Bad Data Can Be Catastrophic!



Data you don't **trust** isn't data.



56%

of CEOs are concerned about the quality of their data.



8%

of organizations have reached “transformational” levels of maturity in data and analytics.



3%

of company data meets a minimum threshold for data quality.

Sources:

KPMG, 2017 Global CEO Outlook

Gartner, Survey Analysis: Traditional Approaches Dominate Data and Analytics Initiatives, Feb 5, 2018,

Harvard Business Review, Only 3% of Companies' Data Meets Basic Quality Standards, Sept 11, 2017

The Business Impact

Improved Maintenance Productivity



- Increase maintenance 'wrench-time'
- Added cycles for deferred maintenance
- Improved asset information context for informed troubleshooting & repair

Increased Operational Efficiency



- Reduce downtime from equipment failure
- Lower mean-time-to-repair
- Increase asset availability

Reduced MRO Supply Chain Costs



- Enables accurate prediction of spares needs
- Facilitates identification of obsolete inventory
- Minimizes expedited procurement

Decreased EH&S Risks



- Accurate, complete information enables informed decisions, reduces risks for maintenance staff and operators

Improved Auditability



- Improved financial accountability
- Ensures regulatory compliance
- Reduces product liability risks from quality

Achievement of Operational Excellence



- Enables achievement of top quartile performance through advanced maintenance techniques such as reliability-centered-maintenance, risk-based inspection, performance analytics

Ensuring accurate, complete asset master data can have a direct impact on reducing environmental, health & safety risks, improving operational performance and maintaining regulatory compliance.

What Does Having 'Dirty Data' Mean for You?

Data Year 1

- Don't clean your room for a day



Data Year 2

- Don't clean your room for a month



Data Year 3

- Don't clean your room for half a year



Master Data as a Service (MDaaS)

Master Data as a Service (MDaaS)

- Revolutionizes the way companies cleanse/maintain master data
- **Shift strategy from “a project” to “a solution”**
 - Focus on industry standards and best practices
 - Standard taxonomies and associated values
- Sustainment and governance is part of the solution
 - Prometheus shares the ownership with our customers

Master Data as a Service (MDaaS)



Capture

Collect

MDaaS **CAPTURE**

Mobile app for photo-based field data collection

Intelligent image processing and data extraction

Crowd and AI-based data enrichment



Cleanse

Classify

Crowd

MDaaS **ENRICH**

Standards-centric classification

Drawing and manufacturer's website-based data mining

Machine learning-based data cleansing & enrichment



Combine

Create

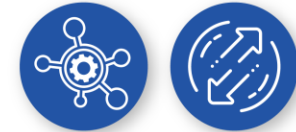
Control

MDaaS **SUSTAIN**

Master Data Management best practice templates

Workflow-driven review & approval

Automated business rules for data validation



Compare

Connect

MDaaS **MIGRATE**

Auditable file comparison and tracking

Integrates with commercial ETLs

Supports all major ERPs

How does MDaaS Work?

- MDaaS is a combination of:
 - Technology
 - Data governing standards (ISO 14224, UNSPSC, etc.)
 - Standardized data libraries

MDaaS Governing Standards

- Leverage governing standards per data type
 - Equipment – ISO 14224
 - Materials – UNSPC
- MDaaS Enrich standardizes:
 - Long and short descriptions, abbreviations
 - Translations
 - Materials: Noun/modifier dictionary
 - Equipment: Catalog profiles
 - Object Parts, Damage, Cause, Activity Codes
 - Bill of Materials based on manufacturer and part number

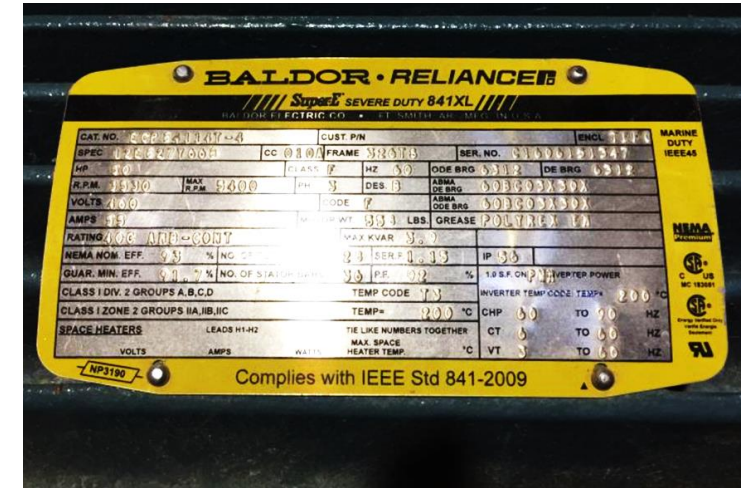
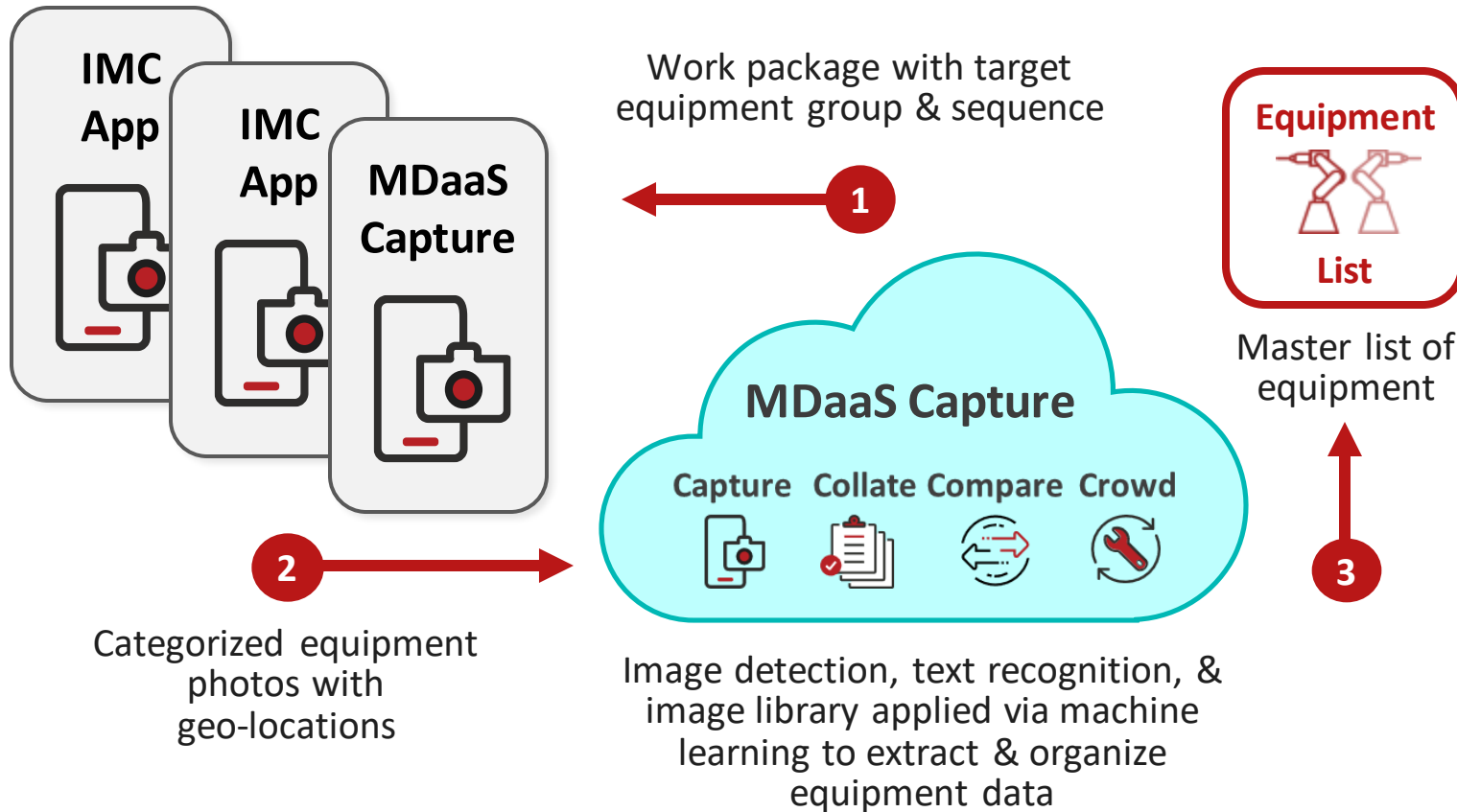
What does this Mean?

- No more master data cleansing projects
 - Cleansed data is part of the MDaaS subscription
- Data governance handled in the cloud
 - All new requests go through Prometheus
 - Fully populated records applied and seamlessly integrated into SAP
 - Workflow included for organizational approvals

Focus on what you do best!

MDaaS Capture

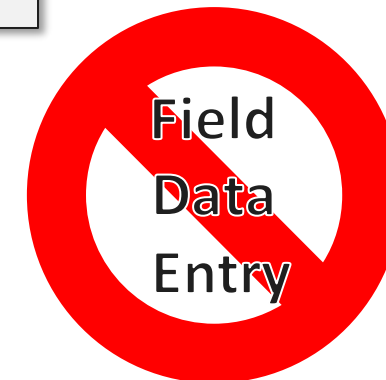
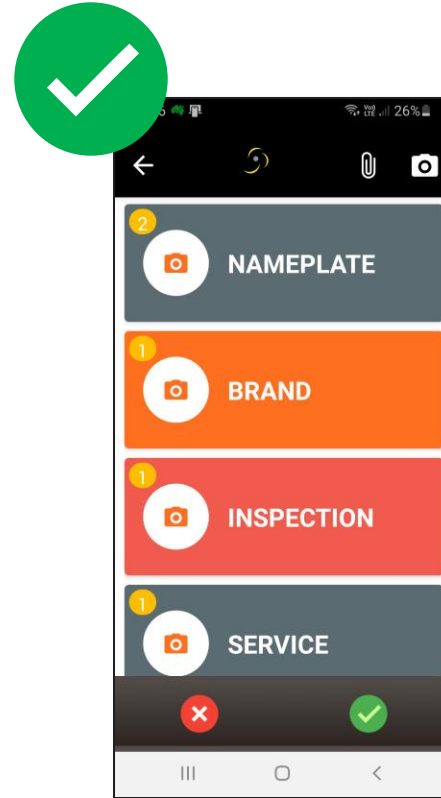
MDaaS Capture



ATTRIBUTE	VALUE
Make	Baldor Reliance
Series	Super E Severe Duty 841 XL
Part Number	ECP84114T-4
Serial Number	C1505141347
Specification	12E626Y668
Power	50 HP
Speed	3,530 RPM
Frame	326TS
Voltage	460 V
Amps	55 A

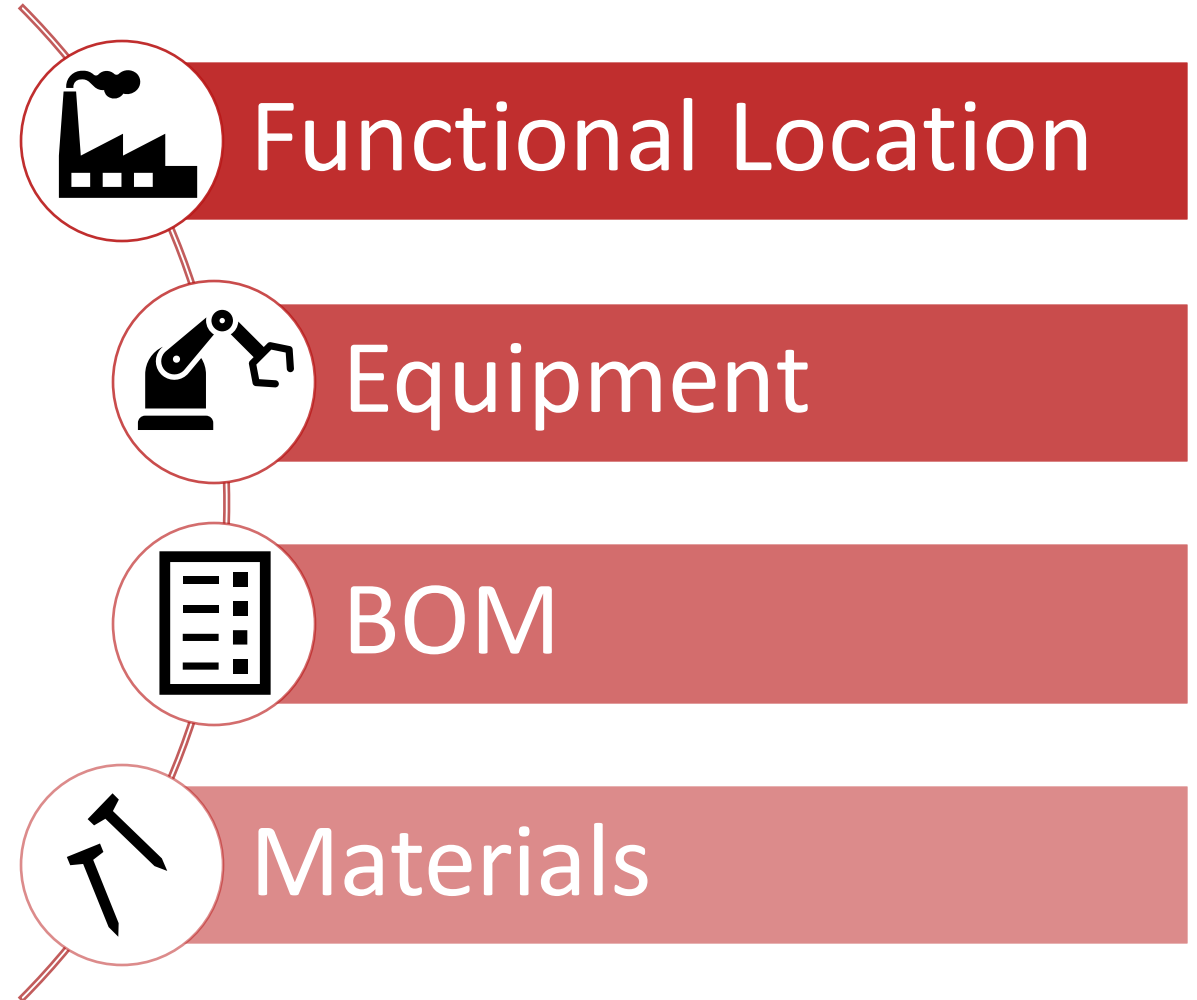
MDaaS Capture

- **Simplicity**
 - Empowers contractors and staff
 - “Anyone” can take photos
- **Speed**
 - Just take the photo – no back-office work
- **Accuracy**
 - Multiple independent results required
- **Governance**
 - Take photos when you are at the asset
 - Capture any updates

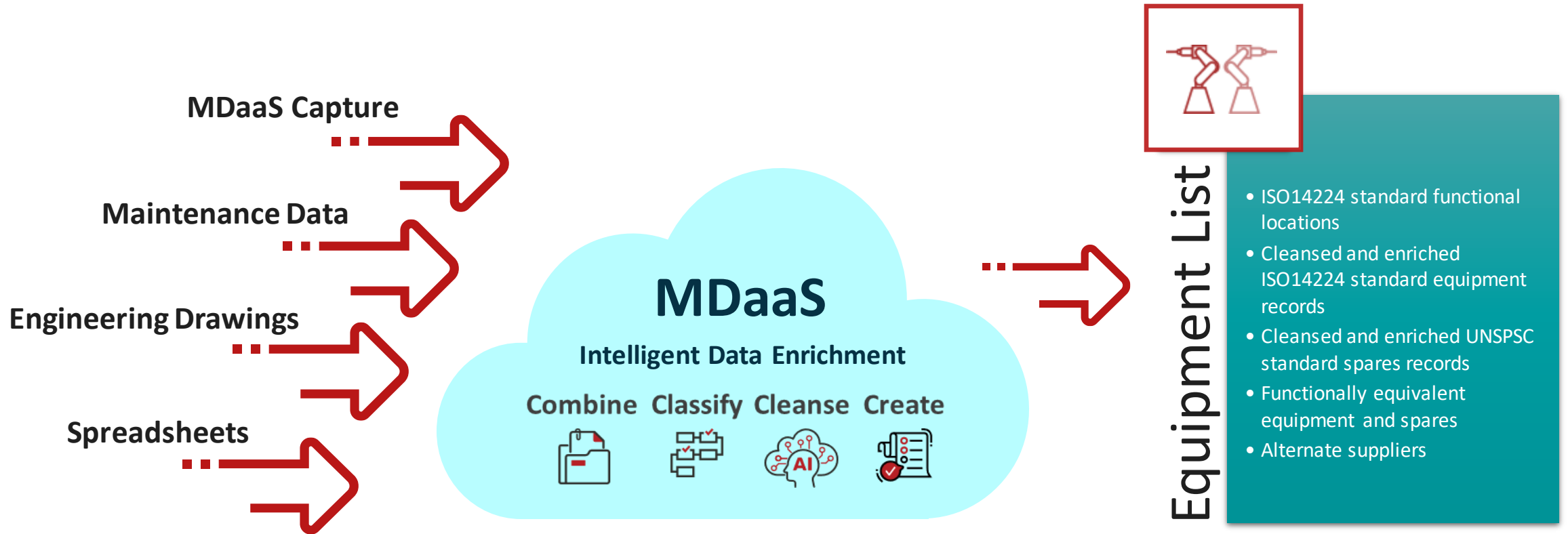


Enrichment

Going Top to Bottom

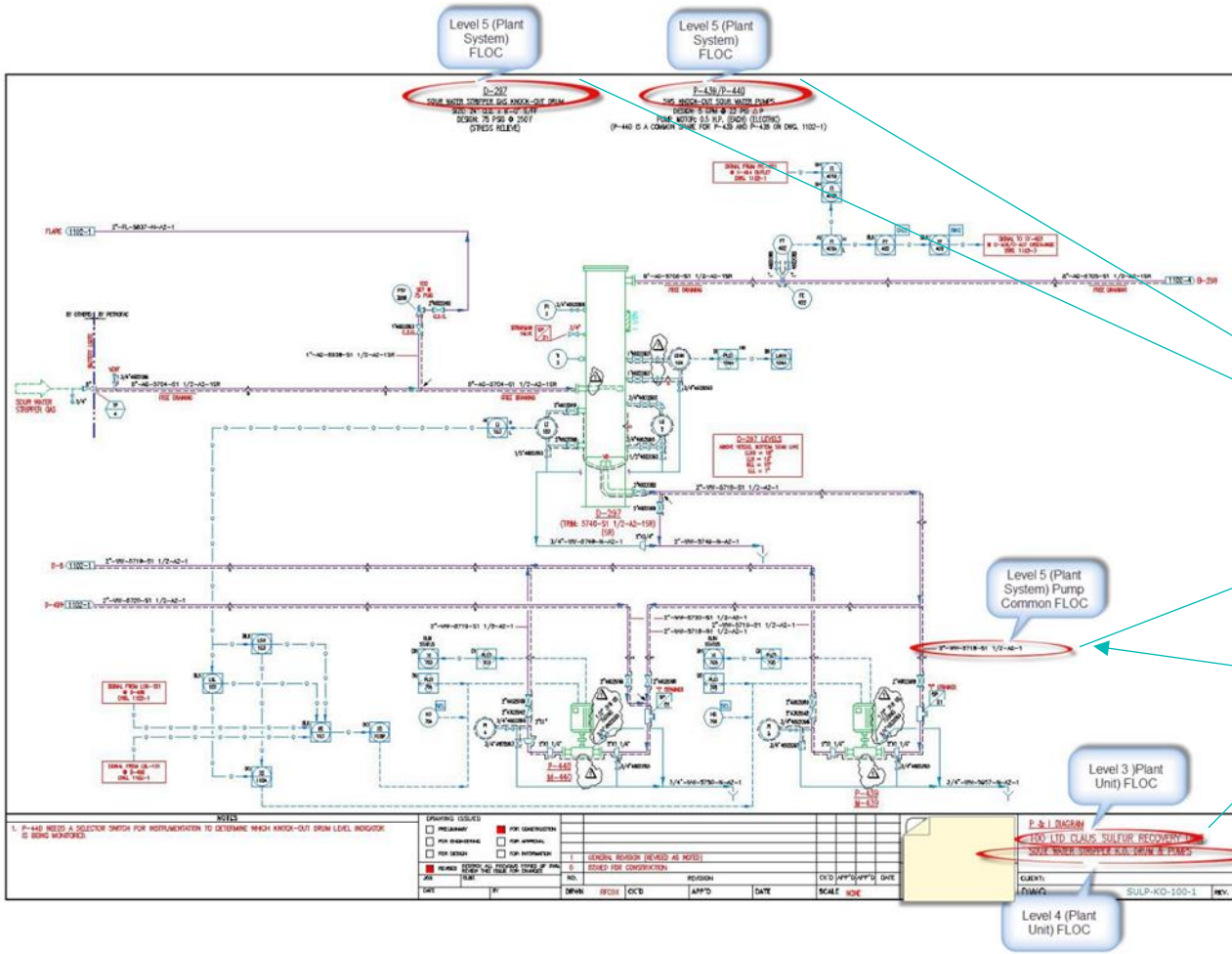


MDaaS Enrich



Validate, Transform, and Enrich Asset Master Data

P&ID to FLOC Hierarchy

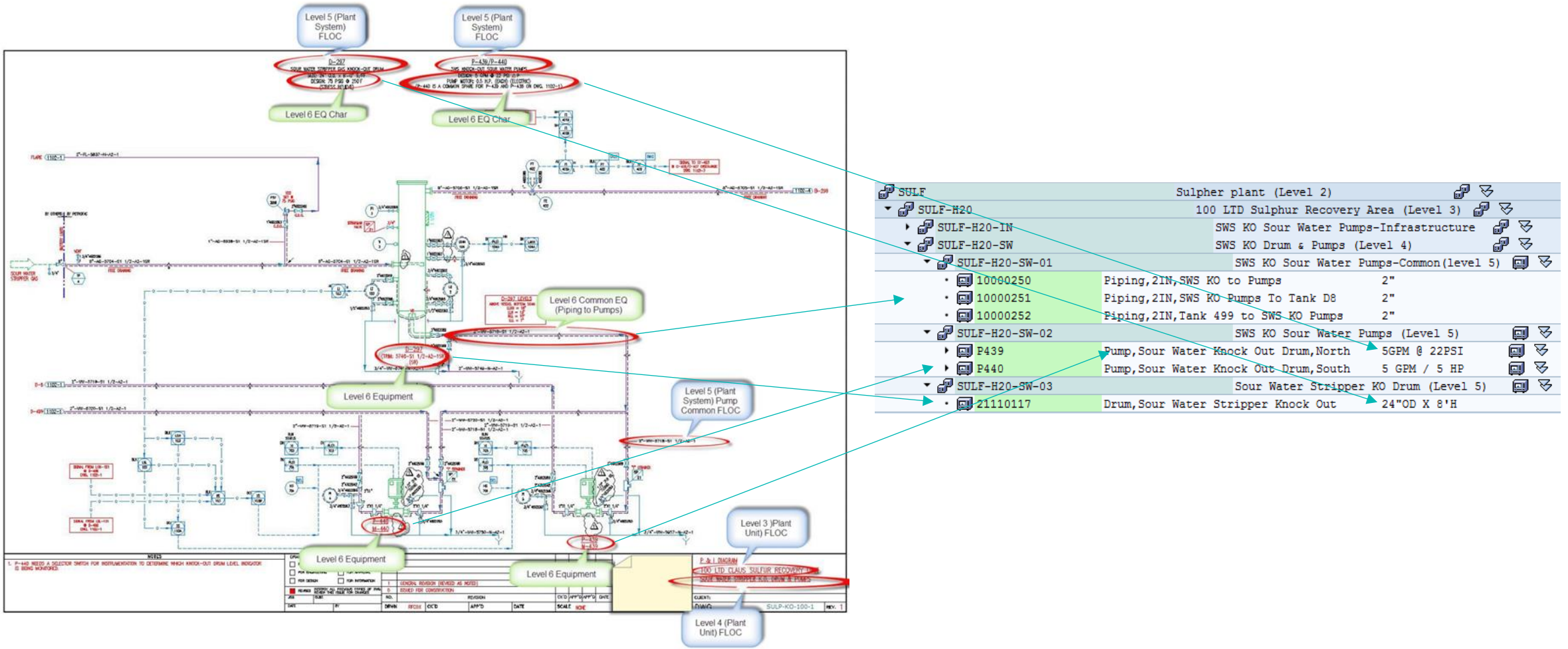


Sulphur plant (Level 2)	
SULF	Sulphur plant (Level 2)
SULF-H20	100 LTD Sulphur Recovery Area (Level 3)
SULF-H20-IN	SWS KO Sour Water Pumps-Infrastructure
SULF-H20-SW	SWS KO Drum & Pumps (Level 4)
SULF-H20-SW-01	SWS KO Sour Water Pumps-Common (Level 5)
SULF-H20-SW-02	SWS KO Sour Water Pumps (Level 5)
SULF-H20-SW-03	Sour Water Stripper KO Drum (Level 5)

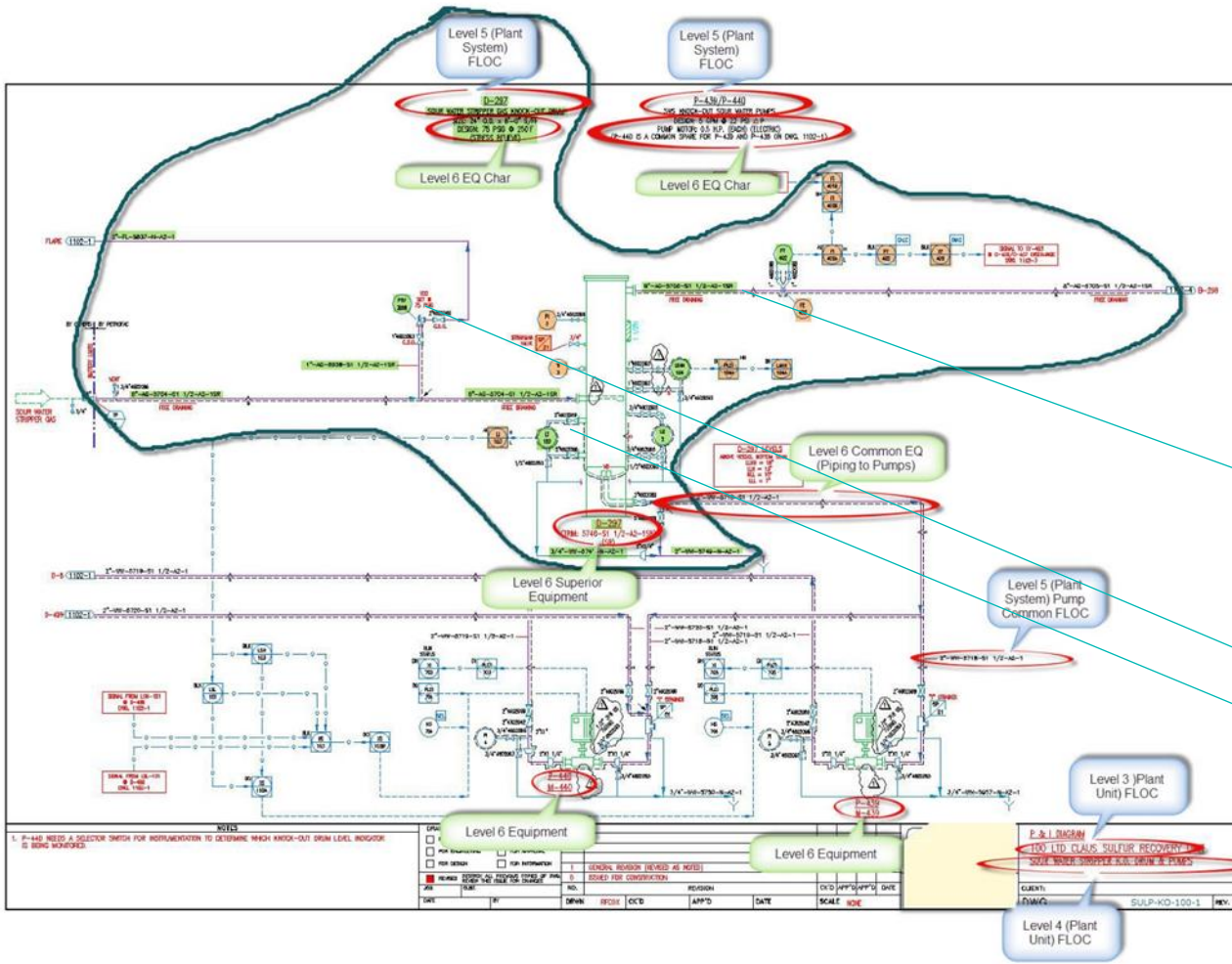
FLOC Created where:
Superior Equipment shares
common equipment
i.e. Pump Suction Lines

Infrastructure such as Buildings,
lighting, Fans etc. are not on PID's.

P&ID to FLOC Hierarchy

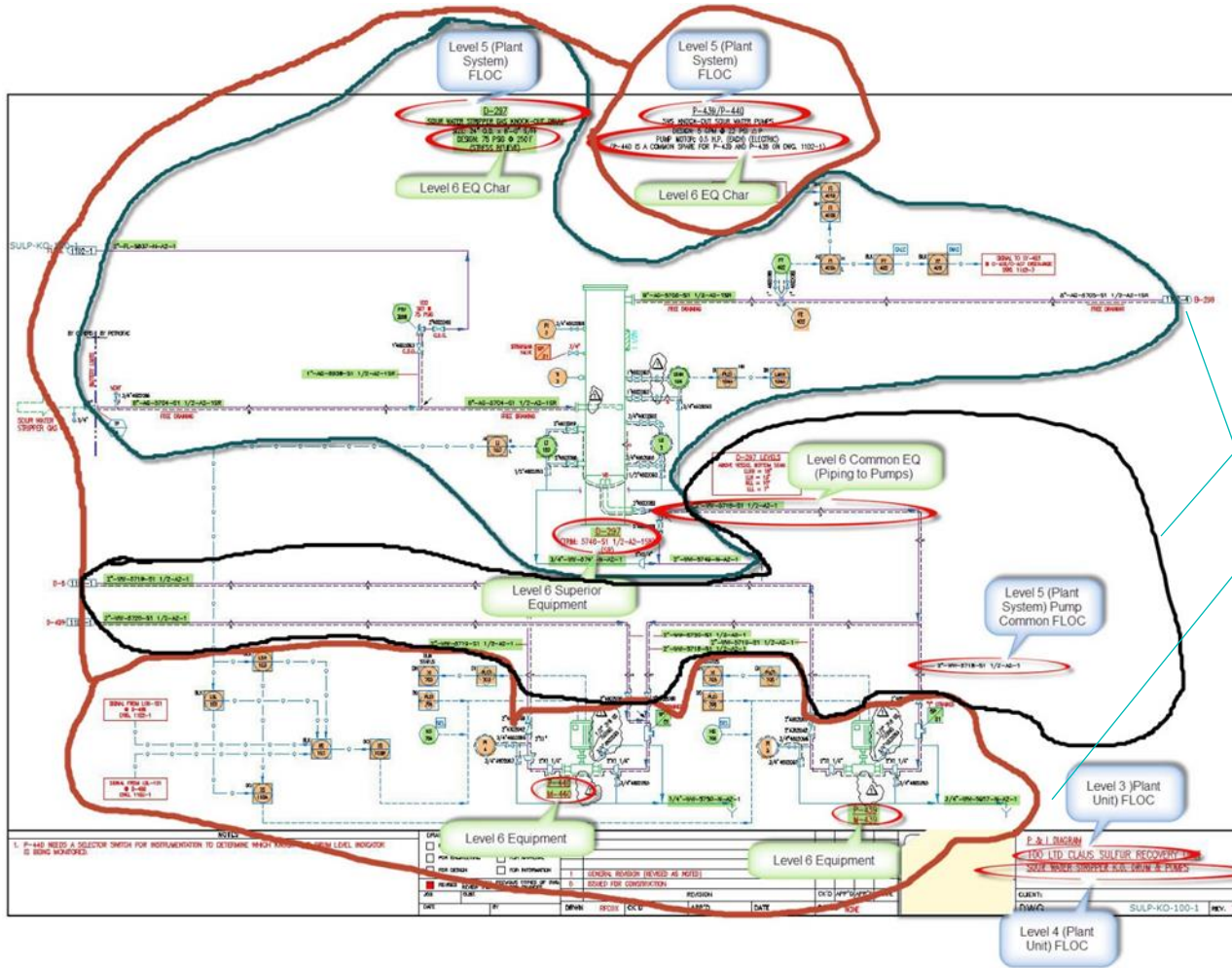


P&ID to FLOC Hierarchy



Sulphur plant (Level 2)			
▼	SULF	Sulphur plant (Level 2)	
▼	SULF-H20	100 LTD Sulphur Recovery Area (Level 3)	
▼	SULF-H20-IN	SWS KO Sour Water Pumps-Infrastructure	
▶	SULF-H20-IN-01	Sour Water Stripper Building	
▼	SULF-H20-SW	SWS KO Drum & Pumps (Level 4)	
▶	SULF-H20-SW-01	SWS KO Sour Water Pumps-Common(level 5)	
▶	SULF-H20-SW-02	SWS KO Sour Water Pumps (Level 5)	
▶	SULF-H20-SW-03	Sour Water Stripper KO Drum (Level 5)	
▼	21110117	Drum, Sour Water Stripper Knock Out	U VESE 24"OD X 8'H
•	10000257	Piping, 8IN, SWS KO Drum Out to D298 Still	U_PICA 8"
•	10000258	Piping, 8IN, SWS Gas Inlet to SWS KO Drum	U_PICA 8"
•	10000259	Piping, 1IN, SWS Gas Inlet to PSV3004	U_PICA 1"
•	10000260	Piping, 2IN, PSV3004 to Flare	U_PICA 2"
•	10000261	Piping, 3/4IN, SWS KO Instruments to Drain	U_PICA 3/4"
•	10000262	Piping, 2IN, SWS KO Drum to Drain	U_PICA 2"
•	10000263	Valve, Press, Sfty, SWS KO Drum Inlet	U_VASC 1" X 2"
•	FT402	Transmitter, Flow, SWS KO Drum Out	U_IPFT
•	LG1	Gauge, Level, Glass, SWS KO Drum	4000
•	LSHH104	Switch, Level, HI HI, SWS KO Drum	U_IPLT
•	LT103	Transmitter, Level, SWS KO Drum	U_IPLT

P&ID to FLOC Hierarchy



Sulphur plant (Level 2)			
100 LTD Sulphur Recovery Area (Level 3)			
SWS KO Sour Water Pumps-Infrastructure			
Sour Water Stripper Building			
10000248	Fan,Exhaust		U_BLFA
10000249	Lighting,General		U_LILP
SWS KO Drum & Pumps (Level 4)			
SWS KO Sour Water Pumps-Common(level 5)			
10000250	Piping,2IN,SWS KO to Pumps		U_PIST 2"
10000251	Piping,2IN,SWS KO Pumps To Tank D8		U_PIST 2"
10000252	Piping,2IN,Tank 499 to SWS KO Pumps		U_PIST 2"
SWS KO Sour Water Pumps (Level 5)			
P439	Pump,Sour Water Knock Out Drum,North	3000	5GPM @ 22PSI
10000253	Strainer,Suction,SWS KO Drum,North		U_FLSC 2"
10000255	Piping,3/4" Drain SWS KO Pump,North		U_PICA 3/4"
HS439	Switch,Sour Water Knock Out Pump,North		U_IPPB
M439	Motor,Sour Water Knock Out Pump,North		U_EMAS 0.5 HP
P440	Pump,Sour Water Knock Out Drum,South	1000	5 GPM / 5 HP
10000254	Strainer,Suction,SWS KO Drum,South		U_FLSC 2"
10000256	Piping,3/4" Drain SWS KO Pump,South		U_PICA 3/4"
HS440	Switch,Sour Water Knock Out Pump,South		U_IPPB
M440	Motor,Sour Water Knock Out Pump,South		U_EMAS 0.5 HP
Sour Water Stripper KO Drum (Level 5)			
21110117	Drum,Sour Water Stripper Knock Out		U_VESE 24"OD X 8'H
10000257	Piping,8IN,SWS KO Drum Out to D298 Still		U_PICA 8"
10000258	Piping,8IN,SWS Gas Inlet to SWS KO Drum		U_PICA 8"
10000259	Piping,1IN,SWS Gas Inlet to PSV3004		U_PICA 1"
10000260	Piping,2IN,PSV3004 to Flare		U_PICA 2"

Equipment Data Transformation Sample

OEM Data Sheet

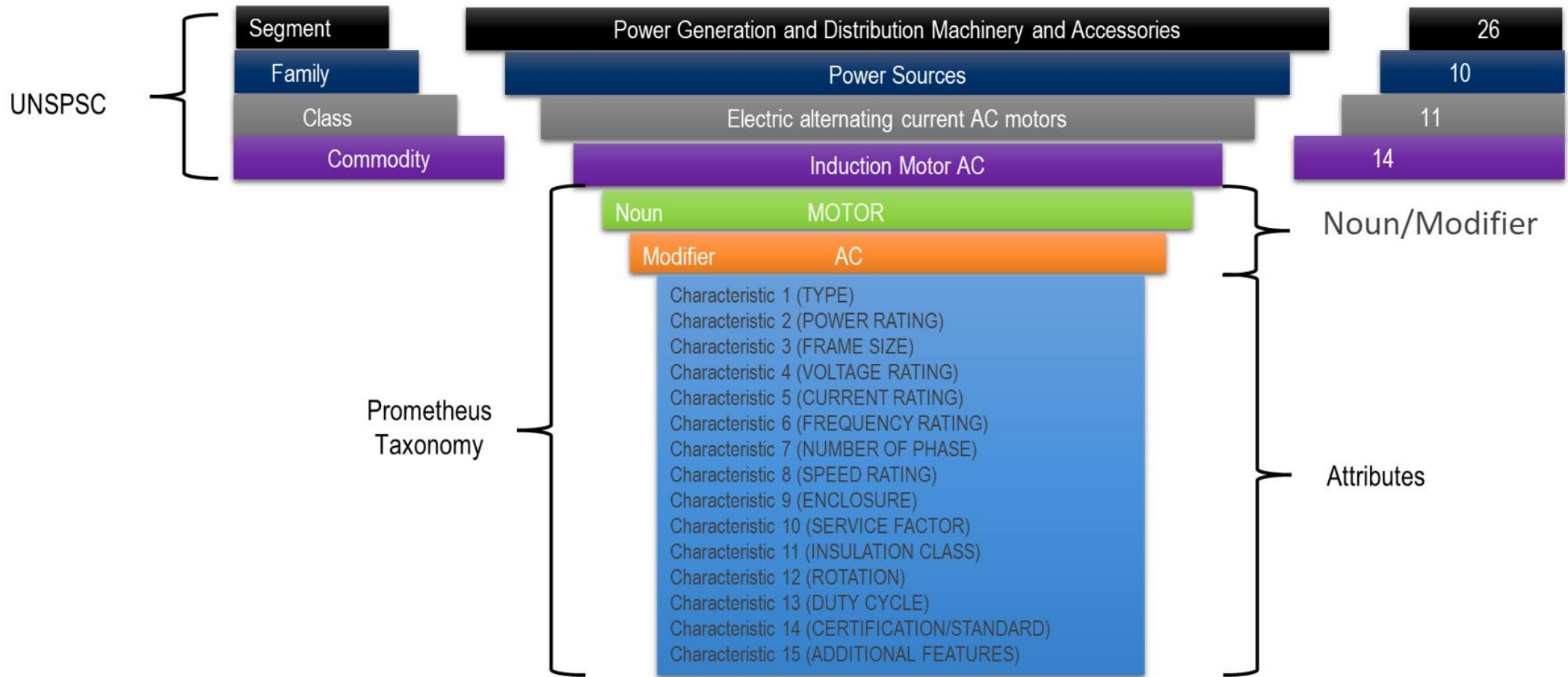
ASSETNUM	DESCRIPTION	LOCATION	ASSETTAG	CUSTCODE	MANUFACTURER	MODEL
99073	AIR CONDITIONING, SPLIT UNIT	13871	BUH-SPLITUNIT10149	LCV000	CARRIER	42QHA024VS

SHORT_DESCRIPTION	LONG_DESCRIPTION	UNSPSC	UNSPSC DESCRIPTION	CATLOG PROFILE
AIR CONDITIONER;INDR SPLT UNIT	AIR CONDITIONER;TYPE:INDOOR SPLIT UNIT,CAPACITY:22000 BTU/HR,COMPRESSOR TYPE:DC INVERTER ROTARY,DESIGN AIR FLOW:485 TO 685 CFM,REFRIGERANT TYPE:R410A,ELECTRICAL RATING:220 TO 240 V, 50/60 HZ,1 PH,OVERALL SIZE:1080 LG X 335 DP X 226 HT MM	40101701	AIR CONDITIONER	PMHVAC

ID	CLASS	ATTRIBUTE_NAME	ATTRIBUTE_STANDARDIZED_VALUE	SEQ
		TYPE	INDOOR SPLIT UNIT	1
		CAPACITY	22000 BTU/HR	2
		COMPRESSOR TYPE	DC INVERTER ROTARY	3
		DESIGN AIR FLOW	485 TO 685 CFM	4
		REFRIGERANT TYPE	R410A	5
		VENTILATION SYSTEM		6
99073	AIR CONDITIONER	ELECTRICAL RATING	220 TO 240 V, 50/60 HZ,1 PH	7
		CONDENSER EFFICIENCY		8
		DESIGN TOTAL HEAT LOSS		9
		PROTECTION CLASS		10
		OVERALL SIZE	1080 LG X 335 DP X 226 HT MM	11
		ADDITIONAL FEATURES		12

Indoor Unit		Unit	HEAT PUMP			
			42QHA018VS	42QHA018VS	42QHA024VS	42QHA030VS
Unit Size		TR	1.0	1.5	2.0	2.5
Rated Capacity at T1	Cooling	BTU/h	12000	18,000	22,000	27000
		kW	3.51	5.25	6.45	7.90
Rated Capacity at T3	Cooling	BTU/h	10600	16,400	19,200	23,200
		kW	3.09	4.80	5.61	6.80
Rated Capacity	Heating	Watts	3,500	5,450	7,600	8,300
Power Supply		V-Ph-Hz	220-240V- 50/60Hz, 1Ph			
Total System Power Input at T1	Cooling	Watts	870	1,300	1,570	2160
Total System Power Input at T3	Cooling	Watts	1,080	1,630	1,970	2605
Total System Power Input	Heating	Watts	950	1,390	2,100	2100
EER at T1	Cooling	Btu/W-h	13.75	13.85	14.00	12.50
EER at T3	Cooling	Btu/W-h	9.80	10.05	9.75	8.85
COP	Heating	w/w	3.65	3.90	3.60	3.95
Air Filter Type			Washable air filter			
Air Flow Rate (High/ Medium/ Low Speed)		CFM	356 / 280 / 230	685 / 535 / 485	685 / 540 / 485	765 / 645 / 575
Indoor Noise Level (High/ Medium/ Low Speed)		dBA	41 / 37 / 33	49 / 43 / 41	49 / 45 / 41	51 / 48 / 45
Net / Gross Weight		Kg	8.7 / 11.1	13.5 / 17.1	13.8 / 17.4	20 / 25.9
Dimensions (W x D x H)		mm	802 x 189 x 297	1080 x 226 x 335	1080 x 226 x 335	1259 x282 x362
Pipe Connection Size		Liquid	1/4"		3/8"	
		Suction	1/2"		5/8"	
		Drain	5/8"			
Outdoor Unit		Unit	HEAT PUMP			
			38QHA012VS	38QHA018VS	38QHA024VS	38QHA030VS
Power Supply		V-Ph-Hz	220-240V- 50/60Hz, 1Ph			
Compressor Type			DC Inverter Rotary			
Refrigerant			R410a			

Prometheus Material Taxonomy



Prometheus industry expertise mapped Standard Noun Modifiers to UNSPSC to build a data dictionary to enhance Material Descriptions, attribution for search capability, standardized reporting and material management

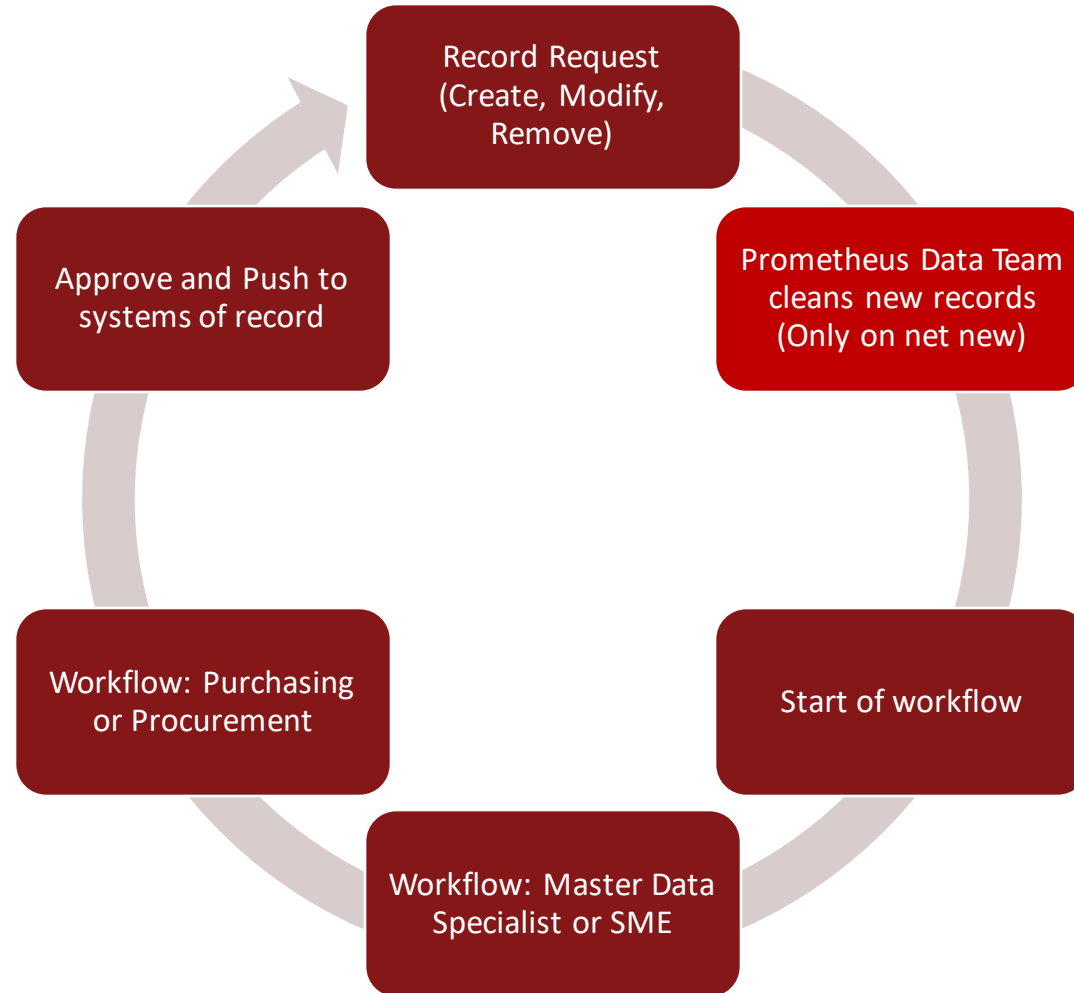


Sustain

PROMETHEUS GROUP | **USER**
EUROPEAN
CONFERENCE

MDaaS Sustainment

- Configurable workflows
 - Role specific actions
- Process is on rails
 - Required fields
 - Business rules
- Increase visibility across teams
 - Improve communication and quality by bringing the right teams into the room
 - Dashboards



MDaaS Demonstration

INPUT DATA	CLEANSED DATA	CLEANSED, STANDARDIZED AND CONSOLIDATED DATA	ENRICHED DATA
BALL BEARING 15x35x11	BALL BEARING, 15MM,35MM,11MM	BEARING,BALL, 15 MM,35 MM,11 MM	BEARING,BALL;DEEP GROOVE,15 MM ID,35 MM OD,11 MM W,6200 SERIES,1 ROW,1 SHIELD, STEEL,PRESSED CAGE,2 DEG MISALIGNMENT,8.06 KN DYNAMIC,3.75 KN STATIC
BALL BRG 15 X35 X11 MM	BALL BEARING, 15MM,35MM,11MM		
BALL BEARING Ø15X11X35 MM	BALL BEARING, 15MM,35MM,11MM		
15X11X35 BEARING BALL	15MM,35MM,11MM,BEARING BALL		
CARTRIDGE FUSE FAST ACTING 600 VAC 30 A	CARTRIDGE FUSE, FASTACTING, 600 VAC, 30 A	FUSE,CARTRIDGE, FAST ACTING,600 VAC,30 A	FUSE,CARTRIDGE;FAST ACTING,600 VAC,30 A,200 KA,END CAP,NICKEL PLATED BRASS,MELAMINE TUBE,CSA
CARTRIDGE FUSES FAST ACTING 600 VAC 30 AMPERE	CARTRIDGE FUSE, FASTACTING, 600 VAC, 30 A		
FAST ACTING CARTRIDGE FUSES 600 VAC 30 AMP	FAST ACTING CARTRIDGE FUSE, 600 VAC, 30 A		
CARTRIDGE FUSES 600 VAC 30 AMPERE, FAST ACTING	CARTRIDGE FUSE, 600 VAC, 30 A, FAST ACTING		
45 DEG ELBOW PIPE ADTPTR	45 DEG, ELBOW, PIPE, ADAPTER	ELBOW,PIPE,ADAPTER,45 DEG,1-1/2 IN	ELBOW,PIPE;ADAPTER,45 DEG,1-1/2 IN,SCH 40,200 PSI,CARBON STEEL,BLACK OXIDE,ASTM A106,1-1/2 IN NPS X 1-1/2 IN NPS,1.94 IN CENTER TO END DISTANCE
1-1/2 INCH X 45 DEGREE PIPE ELBOW	1-1/2 IN, 45 DEG, PIPE, ELBOW		
pipe elbow 45° 1 1/2" n° 45	PIPE, ELBOW, 45 DEG, 1-1/2 IN		
45° 1 1/2" pipe elb	45 DEG, 1-1/2 IN, PIPE, ELBOW		
BUSH TAPER 4300 LB-IN TORQUE	BUSH,TAPER, 4300 LB-IN TORQUE	BUSHING,TAPER LOCK W/ KEYWAY 2-1/8 IN DIA X 1-1/8 IN X 1/8 IN KEYWAY 2-1/8 IN DIA X 1/8 IN LOCK	BUSHING,TAPER LOCK W/ KEYWAY 2-1/8 IN DIA X 1-1/8 IN X 1/8 IN LOCK
BUSHING	BUSHING		
TORQUE LOCK	TORQUE LOCK		
TORQUE	TORQUE		





Example of Enrichment

Material Given to MDaaS	
Equipment Number	14979648
Make	Fisher
Series	Control Valve
Model	ED / 667
Tag Number	FV-050002

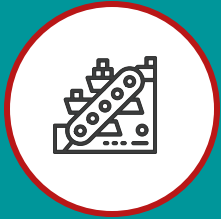


Equipment Number	14979648
Description	Fisher Control Valve TAG: FV-050002
Material Treatment Status	Enriched
Short Description	Valve: Globe 100MM; 2 Way: Standard
Long Description	Class: Valve; Sub-Class: Globe; Type: Diaphragm 2 Way; Nominal Size: 100 MM; End Connection: Split Block Stem; Port Type: Standard; End to End Distance: 230MM; Configuration: 2-WAY; Pressure Class / Rating: 0.4 – 2.0 BAR; Design Pressure Range: 0.2 – 1.0 BAR; Actuation Type: Spring-return, Linear; Body Material: 316/316L ASTM A276; Trim Material: NPT Internal Bushing; Softgoods: Graphite ULF Packing Temperature Rating: -40C; Certifications/Standard: SIL Capable, ATEX, CUTR, PED;
UNSPSC	40141611
UNSCPSC Description	Distribution and Conditioning Systems and Equipment and Components
Noun	Globe Valve
Modifier	Valve
Class	Globe
Type	Diaphragm 2 Way
Nominal Size	100 MM
End Connection	Split Block Stem
Port Type	Standard
End to End Distance	230MM
Configuration	2-WAY
Pressure Class / Rating	0.4 – 2.0 BAR
Design Pressure Range	0.2 – 1.0 BAR
Actuation Type	Spring-return, Linear
Body Material	316/316L ASTM A276
Trim Material	NPT Internal Bushing
Softgoods	Graphite ULF Packing
Temperature Rating	-40C
Certifications/Standard	SIL Capable, ATEX, CUTR, PED
Additional Features	Stainless and Cast Materials

End Result: Fully Cleansed/Enriched record

Source Manufacturer	Emerson Fisher
Source_PartNumber	D100087X012
VENDOR_NAME_1	CMS Engineered Products
VENDOR_PARTNUMBER_1	2E791902202
VENDOR_NAME_2	Haygor
VENDOR_PARTNUMBER_2	D100087X012
VENDOR_NAME_3	Intergral Elektronik
VENDOR_PARTNUMBER_3	Fisher 657
VENDOR_NAME_4	VSI
VENDOR_PARTNUMBER_4	F657
DRAWING_NO	AU3910-A
MANUFACTURER_URL	https://www.emerson.com/en-ca/catalog/fisher-657-and-667
VENDOR_URL	https://www.transmittershop.com/products/fisher-657-and-667-diaphragm-actuators/
THIRD_PARTY_URL	https://www.emerson.com/documents/automation/product-bulletin-fisher-657-667-diaphragm-actuators-en-122352.pdf
UNUSED TEXT	Operating Temperature: Cryogenic, Low Temperature, Standard Temperature, High
REPLACED_TEXT	Valve Type: Angle Valve, Globe Valve
FILL RATE	100%
PG_COMMENTS	For 657 and 667

Business Case



Manufacturing Industry Client

- \$21B USD Revenue
- 54,000 Employees
- Benchmark data from 2 typical facilities

Obsolete Inventory Analysis

MRO Spares Balance Sheet	\$600,000,000.00
Annual Carrying Cost (25%)	\$150,000,000.00
MRO Spares Annual Spend	\$1,500,000,000.00

MRO Material Count	58,393
Materials on a BOM	29,914
Potential Obsolete Materials	28,479
% of Total	48.77%
Legitimate due to critical spares or lack of inventory	75.00%
Potential Impact	12.19%

Potential for All Locations	\$73,156,885.25
Annual Carrying Cost (25%)	\$18,289,221.31

First Call Resolution (Work Orders)

Total Equipment Master Records	65,200
Totally Criticality 9's and 5's	34,500
Criticality 9's and 5's with BOM	10,400
Current First Time Call Resolutions %	30.14%

Impact of Prometheus BOM Initiative	
New BOM's added to Equipment	11,500
Criticality 9's and 5's with BOM	21,900
Future First Time Call Resolution %	30.14%
Prometheus Impact	110.58%

Wrench Time/ Asset Availability Analysis

Total Equipment Master Records	65,200
Total Criticality 9's and 5's	34,500
Criticality 9's and 5's with BOM	10,400
Current First Time Call Resolution %	30.14%
Equipment missing BOM's	21,100
Industry Average Wrench Time	40%

Impact of Prometheus BOM Initiative	
New BOM's added to Equipment	11,500
Criticality 9's and 5's with BOM	21,900
New First Time Call Resolution %	63.48%
Equipment Missing BOM's	12,600
Potential Wrench Time Improvement	47.74%
Potential Wrench Time	59.09%

Break time!