

# Take Costs out of the Business and Ensure Critical Parts Availability with **MRO Supply Chain Optimization**

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# Our Unique Supply Chain Business Challenges



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# Primary Concerns as a Plant Manager

- Maintaining the **operational effectiveness of our production assets** has never been more important.
- The **availability of critical spare parts** is an essential ingredient for keeping our assets running.
- In our current business climate, our traditional **spare parts suppliers may not remain in business**, or remain capable of providing essential MRO spares.



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## Pain Points for the MRO Supply Chain Manager

- How can I eliminate obsolete spare parts in purchasing and inventory?
- What spare parts will we most likely need to ensure uninterrupted operations?
- Do we have these spare parts on hand?

# Challenges Faced by Chief Procurement Officer

- I need to cut costs. We are purchasing the same part at different prices. How can I quickly identify wasteful spending?
- If a plant does not have a needed spare part can we find it, or a functional equivalent, in a nearby facility?
- Where are in-region suppliers of my needed spare part or a functional equivalent, if my local vendor is unable to deliver?





# Questions the Chief Financial Officer Asks

- Where can we cut costs to survive a downturn and remain competitive without damaging our ability to operate?



# Our Current MRO Supply Chain Reality



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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



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# Statistics

- **ONLY 20%** of equipment records contain manufacturer name and model info
- **ONLY 15%** of existing equipment have a maintenance bill of material
- **ONLY 10%** of required spare parts are available as a material record



# Bad Data Inhibits Spare Parts Availability

- Lack of consistently applied taxonomy and naming conventions on MRO spare parts, results in duplicate material records, incomplete material records, and unrecognized obsolete inventory.
- Missing or incomplete bills of material for process-critical and safety-critical equipment has negative impact on maintenance productivity and asset availability.

*Stock Analysis Report*

The screenshot shows a software interface for a 'Stock Analysis Report'. It features a toolbar with various icons for search, filters, and data manipulation. Below the toolbar is a table with 13 columns: Material, Material description, BUn, Typ, Safet, Total, Tot., IvAvg, OEM part no., OEM, OCM name, OCM model, and PDT. The table contains 8 rows of data for different bearing materials. Two red circles are drawn on the table to highlight data inconsistencies. The first circle is around the 'Material description' column for the first four rows, which all list 'BEARING,BALL,25X52X15MM,6205/2ZC3,SKF' despite having different 'Material' IDs. The second circle is around the 'OEM name' column for the last four rows, which list 'BROOK HANSEN', 'HOLZHAUER', 'NAT-OILWELL', and 'BROOK HANSEN' for different 'OEM part no.'s.

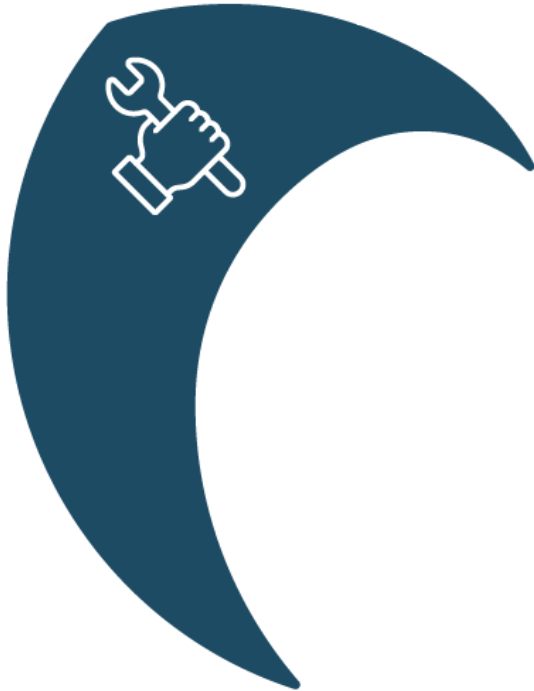
Material	Material description	BUn	Typ	Safet	Total	Tot.	IvAvg	OEM part no.	OEM	OCM name	OCM model	PDT
1000002	BEARING,BALL,25X52X15MM,6205/C3,SKF	PC	PD	3	3	3	2.54	6205-C3	SKF	BROOK HANSEN	AD100LA-4P1...	61
1001433	BEARING,BALL,25X52X15MM,6205/2ZC3,SKF	PC	PD	4	0	23	5.15	6205-2ZC3	SKF	HOLZHAUER	NTA85563	15
1008170	BEARING,BALL,25X52X15MM,6205/2RS1C3,SKF	EA	PD	6	6	3	9.13	6205-2RS1C3	SKF	NAT-OILWELL	3306DIT	13
1010498	BEARING,BALL,25X52X15MM,6205/2Z,SKF	PC	PD	4	4	30	4.67	6205-2Z	SKF	BROOK HANSEN	AD90LND	52
1011525	BEARING,BALL,25X52X15MM,6205/RS1,SKF	PC	PD	4	4	0	19.09	6205-RS1	SKF	BEST EQUIPM...	KL1.25	31
1121257	BEARING,BALL,25X52X15MM,6205-2RSH,SKF	EA	PD	1	1	0	5.49	6205-2RSH	SKF	SIEMENS P6I	D-6ZE1011	84
1512945	BEARING,BALL,25X52X15MM,6205/2C3,SKF	EA	PD	8	4	0	3.09	6205Z-C3	SKF			32
1537552	BEARING,BALL,25X52X15MM,6205,SKF	EA	PD	0	0	0	4.98	6205	SKF	TALKRANE	2891-P	30

# The Prometheus Master Data as a Service (MDaaS) Solution



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# Prometheus Methodology: “Get it Clean, and Keep it Clean”



1

## BUILD

- Internationally
- Recognized
- Standards
- Business Rules
- Enterprise Taxonomy
- Data Quality Culture

# Establishing the Foundation with a Sound Taxonomy



## EQUIPMENT AND SPARES TAXONOMY

Version 1.0



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Version 1.0



## EQUIPMENT AND SPARES TAXONOMY

Version 1.0



## EQUIPMENT AND SPARES TAXONOMY

Version 1.0



## EQUIPMENT AND SPARES TAXONOMY CENTRIFUGAL PUMP

Version 1.0

Release Date 05-02-2013



### Failure Modes

Applicable for Pump	Description	Examples	Code	Type
X	Failure to start on demand	Doesn't start on demand	FTS	1
X	Spurious stop	Unexpected shutdown	UST	2
X	Breakdown	Serious damage (seizure, breakage)	BRD	1
X	Low output	Delivery/output below acceptance	LOO	2
X	Erratic output	Oscillating, hunting, instability	ERO	2
X	External leakage – process medium	Oil, gas, condensate, water	ELP	2
X	Internal leakage	Leakage internally of process or utility fluids	INL	2
X	Vibration	Abnormal vibration	VIB	3
X	Noise	Abnormal noise	NOI	3
X	Overheating	Machine parts, exhaust, cooling water	OHE	3
X	Plugged/choked	Flow restriction(s)	PLU	3 (2)
X	Parameter deviation	Monitored parameter exceeding limits, e.g. high/low alarm	PDE	2 (3)
X	Structural deficiency	Material damages (cracks, wear, fracture, corrosion)	STD	3
X	Minor in-service problems	Loose items, discoloration, dirt	SER	3
X	Other	Failure modes not covered above	OTH	-
X	Unknown	Too little information to define a failure mode	UNK	-

## EQUIPMENT AND SPARES TAXONOMY

Version 1.0

Release Date 05-02-2013



ISO 14224

PUCE

...a rotating element with a vane or blade assembly known as an impeller, in an ... another.



# Accurate Asset Information Aligned with ISO 14224 Standards

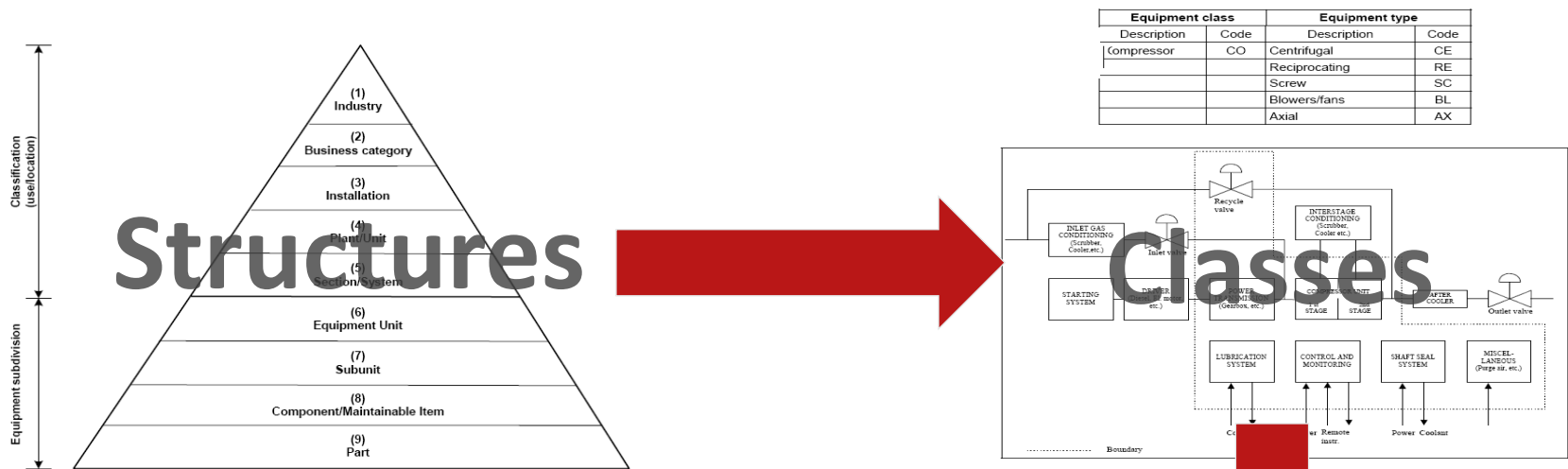


Figure 4 — Taxonomy classification

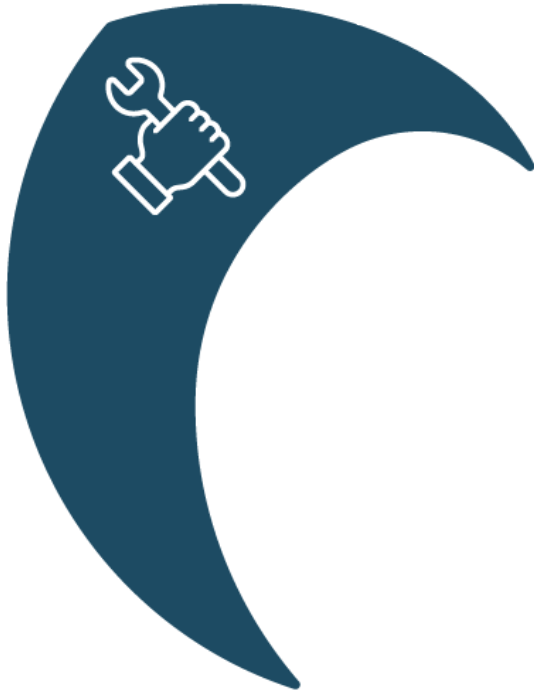
No.	Notation	Description
1.0	<b>Design-related causes - general</b>	Failure related to inadequate design for operation and/or maintenance, but no further details known
1.1	Improper capacity	Inadequate dimension/capacity
1.2	Improper material	Improper material selection
1.3	Improper design	Inadequate equipment design or configuration (shape, size, technology, configuration, operability, maintainability, etc.)
2.0	<b>Fabrication, installation and assembly-related causes - general</b>	Failure related to fabrication, installation or assembly, but no further details known
2.1	Fabrication error	Manufacturing or processing failure
2.2	Installation error	Installation or assembly failure (assembly after maintenance not included)
3.0	<b>Failure related to operation/maintenance - general</b>	Failure related to operation/use or maintenance of the equipment, but no further details known
3.1	Off-design service	Off-design or unintended service conditions, e.g. compressor operation outside envelope, pressure, over-temperature, etc.
3.2	Operating error	Mistake, misuse, negligence, oversight, etc. during operation
3.3	Maintenance error	Mistake, misuse, negligence, oversight, etc. during maintenance
3.4	Incorrect use and wear	Failure caused by wear and tear resulting from normal operation of the equipment unit
4.0	<b>Failure related to management - general</b>	Failure related to management issues, but no further details known
4.1	Documentation error	Failure related to procedures, specifications, drawings, reporting, etc.
4.2	Management error	Failure related to planning, organization, quality assurance, etc.
5.0	<b>Miscellaneous - general</b> <sup>a</sup>	Causes that do not fall into one of the categories listed above
5.1	Unknown	No information available related to the failure cause

<sup>a</sup> The data acquirer should judge which is the most important cause if more than one exist, and try to avoid the 5.0 and 5.1 codes.

Equipment class	Components					
Subunit	Power transmission	Compressor	Control and monitoring	Lubrication system	Shaft seal system	Miscellaneous
Maintainable item / Part	Gearbox/variable drive Bearings Coupling to the driver Lubrication Seals Coupling to the driven unit	Casing Rotor with impellers Balance piston Interstage seals Radial bearing Thrust bearing Shaft seals Internal piping Valves Antisurge system including recycle valve and controllers Piston Cylinder liner Packing	Control Actuating device Monitoring Valves Internal power supply	Oil tank with heating system Pump with motor Check valves Coolers Filters Piping Valves Lube oil	Oil tank with heating Reservoir Pump with motor/gear Filters Valves Buffer gas Seal oil Dry gas seal Seal gas Scrubber	Base frame Piping, pipe support and bellows Control-isolation and check valves Coolers Silencers Purge air Magnetic bearing control system Flange joints Others



# Prometheus Methodology: “Get it Clean, and Keep it Clean”



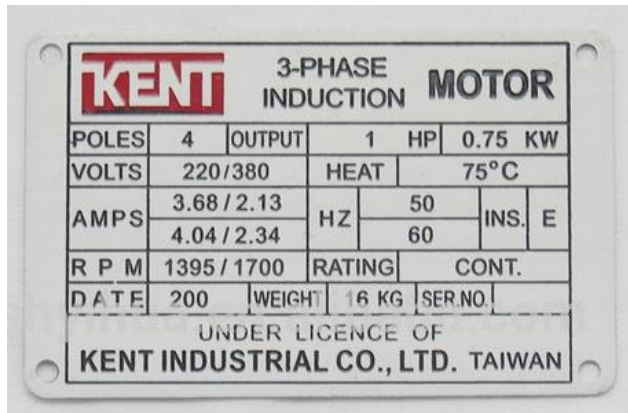
1

## BUILD

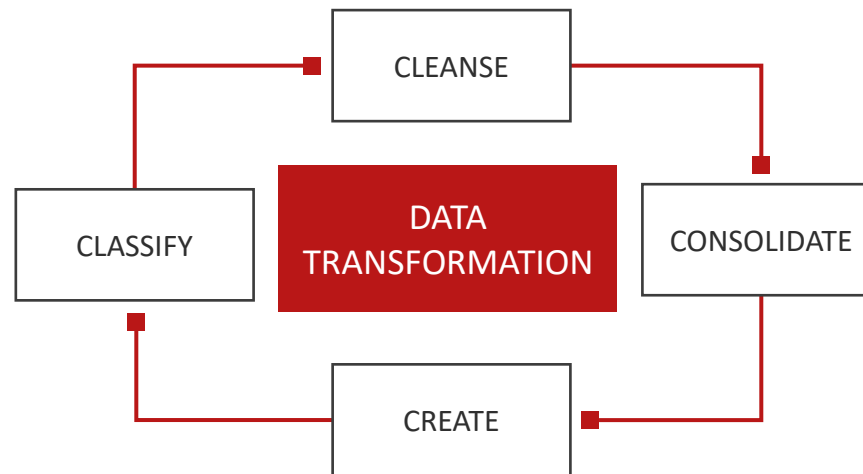
- Internationally
- Recognized
- Standards
- Business Rules
- Enterprise Taxonomy
- Data Quality Culture

# As-built Equipment Manufacturer/Model Information

Asset Master Data Enrichment via Prometheus' 4Cs Methodology



Equipment 'brass tag' information collected from plant walkdowns, engineering documents or other systems of record



## Cleanse

- NMA identification (Noun, Modifier, Attribute) or Equipment Class identification
- Parse data into appropriate attributes
- Normalize and standardize

## Create (Enrich)

- Create and/or enrich attributes (databases, web scraping, catalogs, contact with data source)
- Physical verification (onsite "boots on the ground")

## Consolidate (De-Dupe)

- De-duplicate data within a database, |or among multiple databases
- Transfer history

## Classify

- Industry standards (UNSPSC, PIDX, eClass, eOTD)
- ISO14224 and Prometheus Customized
- Customized smart numbering

# Master Data as a Service (MDaaS)

Sustainable Data Quality from Capture to Control

Capture Collate Compare Crowd



## MDaaS Capture

- Mobile App for Image Capture
- Cloud-based Image Management
- Intelligent Image Processing
- Unstructured to Structured Data Extraction
- Crowd and AI-based Data Enrichment

Combine Classify Cleanse Create



## MDaaS Enrich

- Standards-centric Classification
- Drawing-based and Manufacturer Website-based Data Mining
- Machine Learning-based Data Cleansing & Enrichment

Connect Control

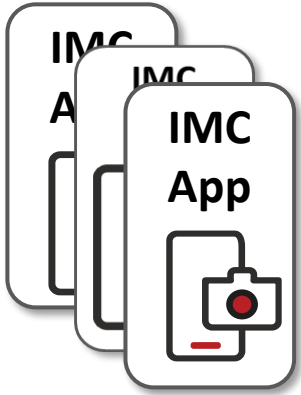


## MDaaS Connect

- Comprehensive Connector Suite
- Data Governance Accelerators
- Migration-as-a-Service
- Cross-System Integration and Control
- Sustained Data Governance

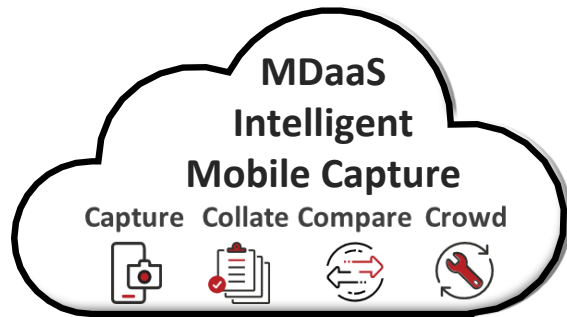
# MDaaS Intelligent Mobile Capture

Automated Field Data Collection: When your asset data is missing or untrustworthy



## IMC Mobile App

- Operates on any iOS (Apple) or Android device
- Runs in connected or disconnected mode
- Can be used by anyone (minimal training)
- Captures, classifies & catalogs large volumes of asset photos



## IMC Cloud-based Data Extraction

- Utilizes machine learning to orchestrate image recognition, optical character recognition & crowd sourcing to extract, standardize & organize equipment & spare parts data

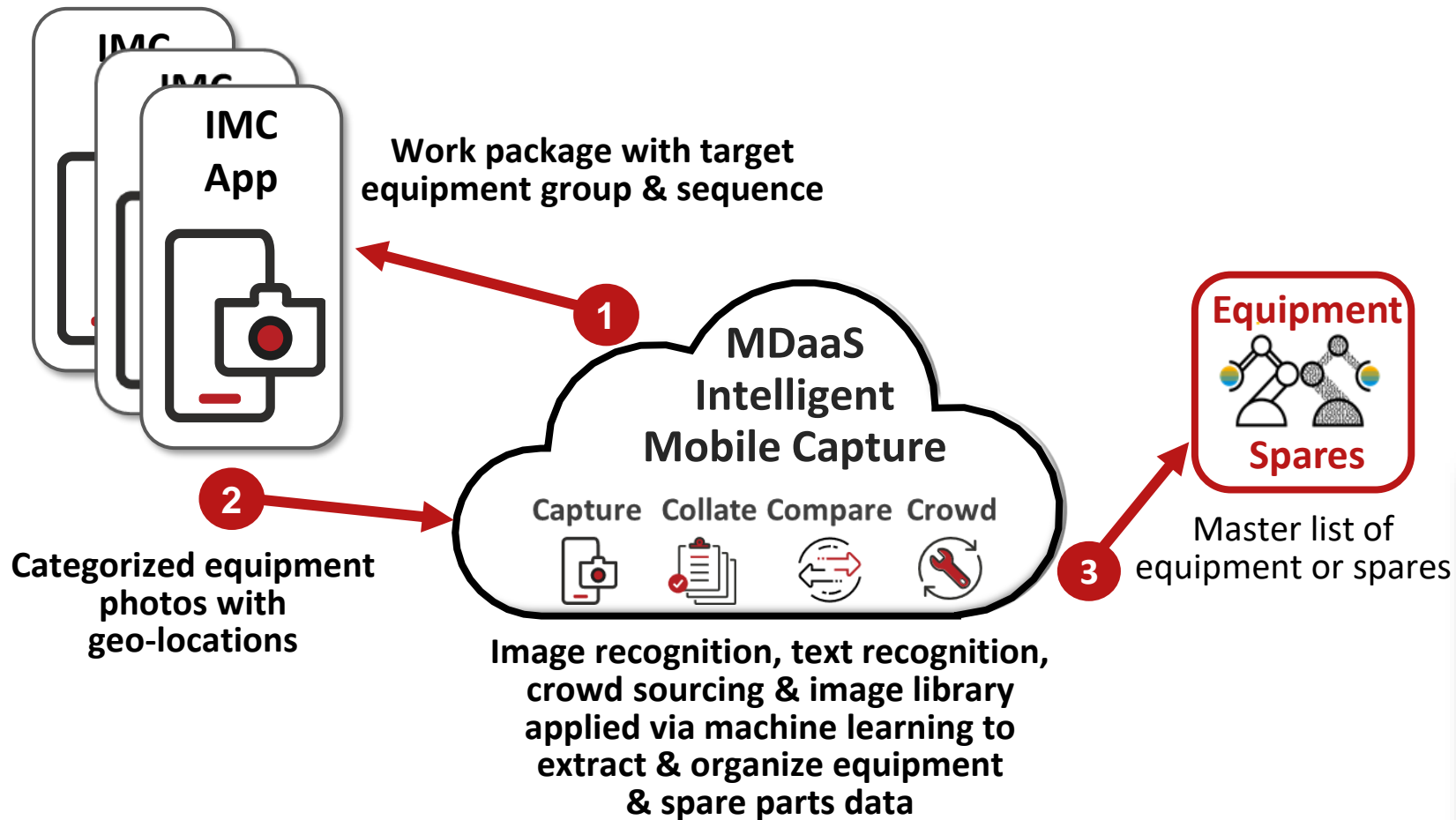


## Enables Field Data Collection via photo capture and classification only

- No interpretation requiring extra time or specialized knowledge
- No transcription or manual annotation
- Streamlined process enables capture of 200-300 asset records per day

# MDaaS Intelligent Mobile Capture

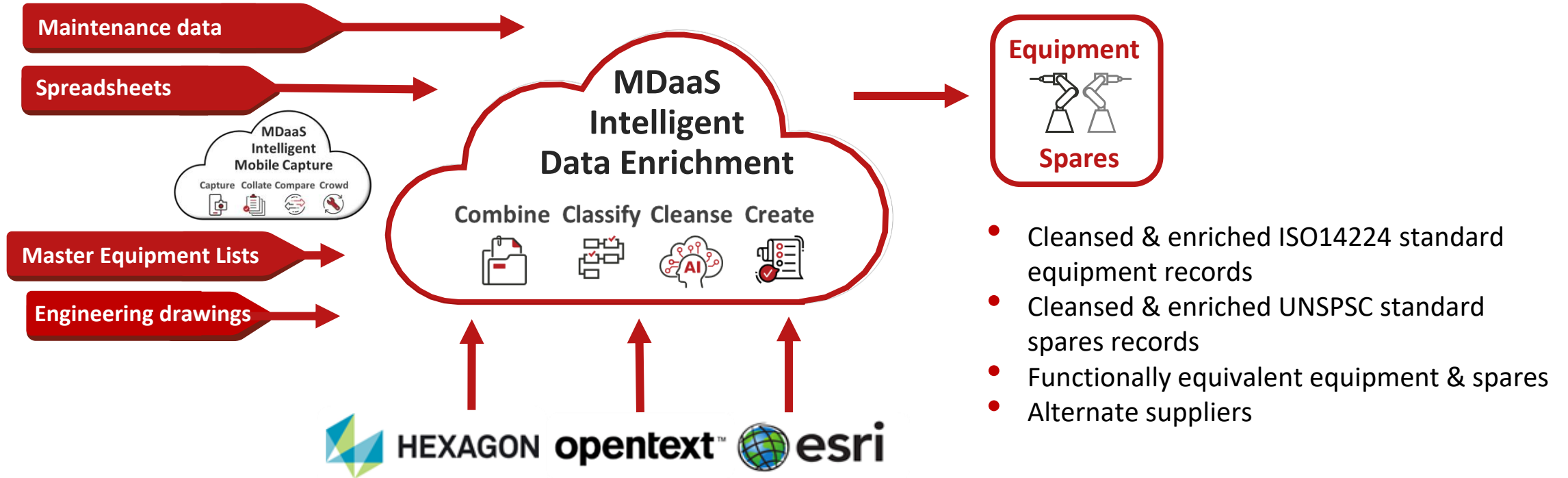
Automated Field Data Collection: When your asset data is missing or untrustworthy



**Manufacturer:** ASCO  
**Product Family:** 8320, Series EF8320  
**Actuation:** Solenoid  
**Body Style:** 3-Way  
**End 1 Size:** 1/4 in.  
**Fluid:** Gas, Water, Air  
**Function:** Normally Closed  
**Max. Pressure:** 115 PSIG  
**Max. Temperature:** 150°F  
**Port Connection:** FNPT  
**Port Size:** 1/4 in.  
**Seal Material:** Buna-N, NBR  
**Valve Type:** 3-Way

# MDaaS Intelligent Data Enrichment

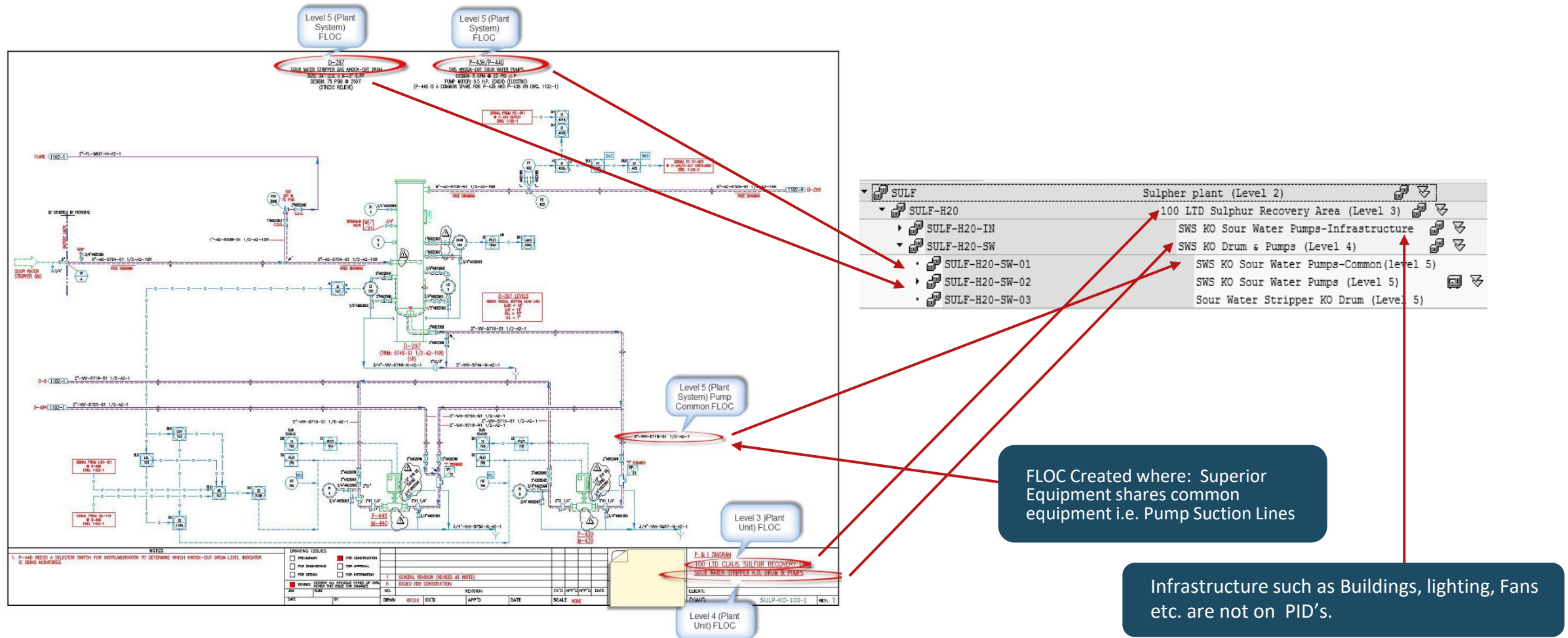
Validating, Transforming & Enriching Asset Master Data





# Data Enrichment Begins with the Most Trusted Information

- Engineering Drawing take-off to ISO 14224-based Functional Location Creation



# MDaaS Intelligent Data Enrichment

Machine learning based asset master data enrichment

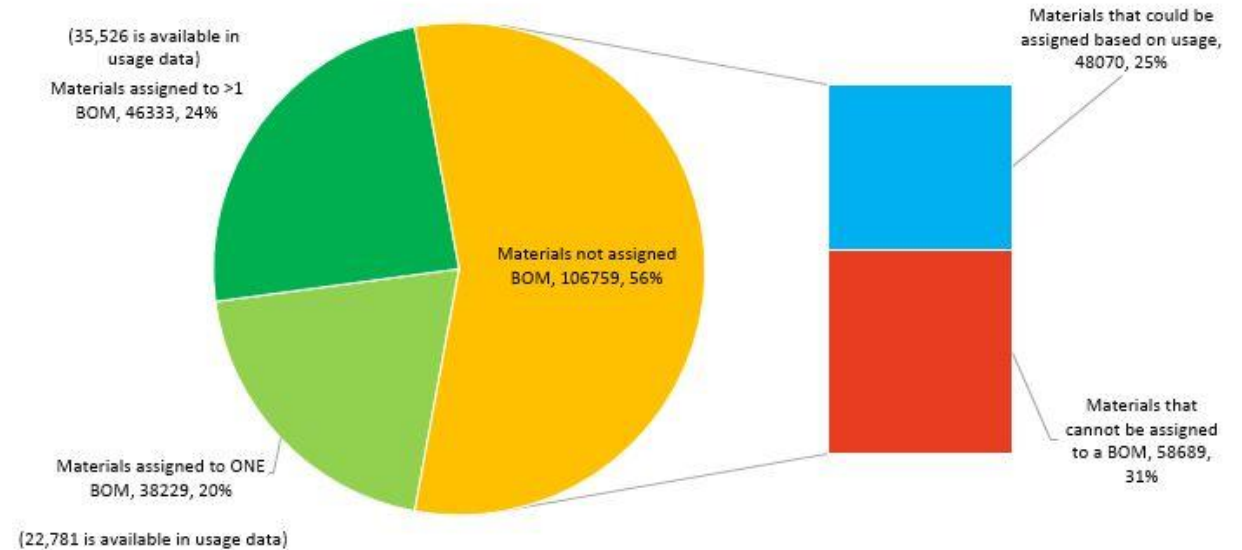
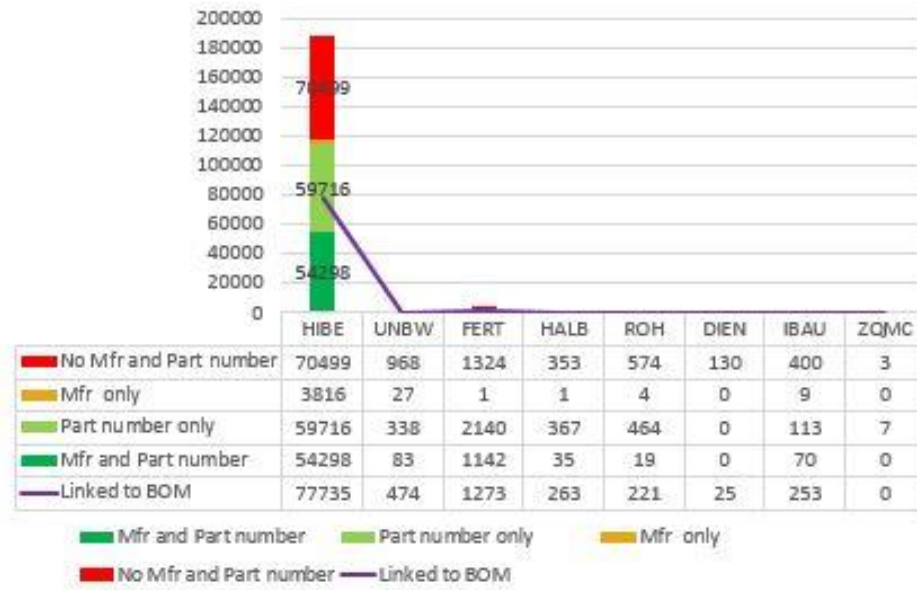
MANUFACT. NAME	MANUFACT. PART NO	SHORT DESCRIPTION	LONG DESCRIPTION	UNSPSC CODE	CLASS	CHARACTERISTIC NAME	CHARACTERISTIC VALUE
PARKER	16F24C616 4AAFE05	VALVE:SOL;1 IN,2-WAY,NC,1 IN,NPT	VALVE:SOLENOID;NOMINAL SIZE:1 IN,CONFIGURATION:2-WAY,NC,ORIFICE SIZE:1 IN,PORT CONNECTION:NPT,COIL RATING:120 V AT 60 HZ,110 V AT 50 HZ,BODY MATERIAL:316 STAINLESS STEEL,ENCLOSURE:NEMA 7/9,PRESSURE RANGE:100 PSI FOR OIL,150 PSI FOR AIR/WATER,SOFTGOODS:BU NA-N SEAL,ADDITIONAL FEATURES:PILOT-OPERATED,OFFSET DIAPHRAGM	Solenoid valves	VALVE_ SOLENOID	NOMINAL SIZE	1 IN
						CONFIGURATION	2-WAY,NC
						ORIFICE SIZE	1 IN
						PORT CONNECTION	NPT
						COIL RATING	120 V AT 60 HZ,110 V AT 50 HZ
						BODY MATERIAL	316 STAINLESS STEEL
						MATERIAL SPECIFICATION	
						ENCLOSURE	NEMA 7/9
						PRESSURE RANGE	100 PSI FOR OIL,150 PSI FOR AIR/WATER
						SOFTGOODS	BUNA-N SEAL
						CERTIFICATION/STANDARD	
						ADDITIONAL FEATURES	PILOT-OPERATED,OFFSET DIAPHRAGM

# MRO Spares Data Transformation

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, FAST ACTING, 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, FAST ACTING, 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,1-5/8 IN,4300 LB-IN TORQUE	BUSHING,TAPER LOCK;1-5/8 IN BORE,1-1/2 IN L,3/8 X 1/8 IN KEYWAY,2-1/8 IN BOLT CIRCLE,3/8 X 5/8 IN LOCK SCREW,2 SCREW,STEEL,4300 LB-IN TORQUE
BUSHG 1-5/8 TAPER LCK	BUSHING, 1-5/8 IN, TAPER LOCK		
1-5/8" TAPER LOCK BUSHING	1-5/8 IN, TAPER LOCK BUSHING		
TORQUE 4300 LB-IN TAPER BUSHING LOCK	TORQUE 4300 LB-IN, TAPER BUSHING, LOCK		

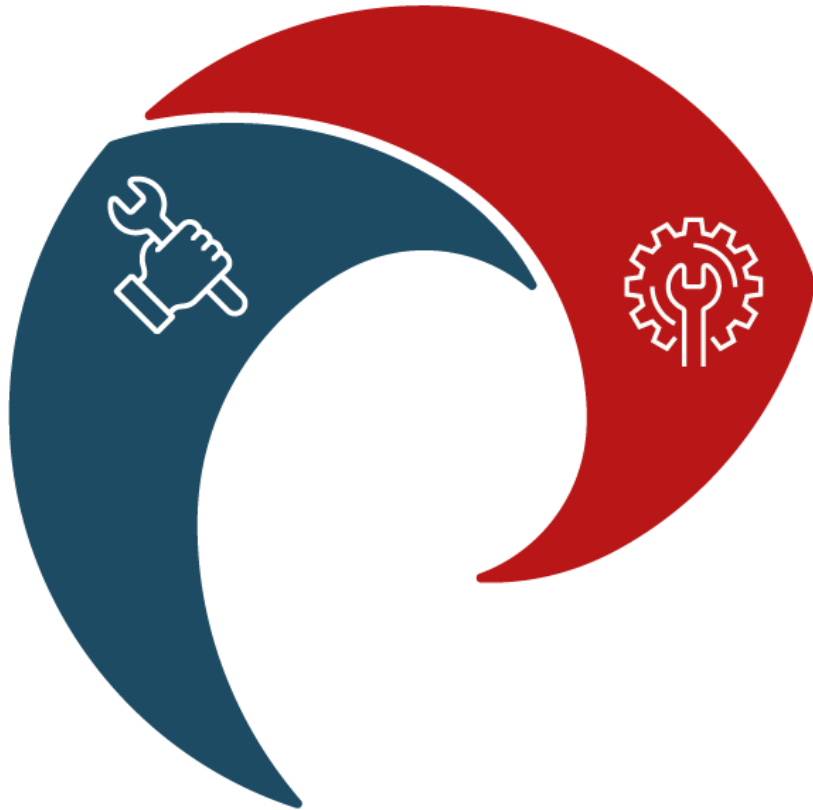
# Profiling Maintenance Data Quality

Impacting inventory and replenishment (MRO) / wrench-time



Noun	Description
MOTOR	60HP, 1780 RPM, 364T FRAME 460V COOLING TOWER MOTOR
MOTOR	LESSON – 1.5 H.P. – 1140 RPM – HS5C FRAME – MODEL – C6T11FC18G
MOTOR 1 143TC	1800RPM 230/4 60/3/60 TEFC W/BASE MOTOR BALDOR CM3546T
MOTOR 1 184	1200RPM 184FR 3/208-230-460V TEFC
MOTOR 1/12	1550 RPM 115V 1 SPEED STUD MOUNT3 7/8 INCH X 2 1/2 INCH SHADED POLE

# Prometheus Methodology: “Get it Clean, and Keep it Clean”



1

## BUILD

- Internationally
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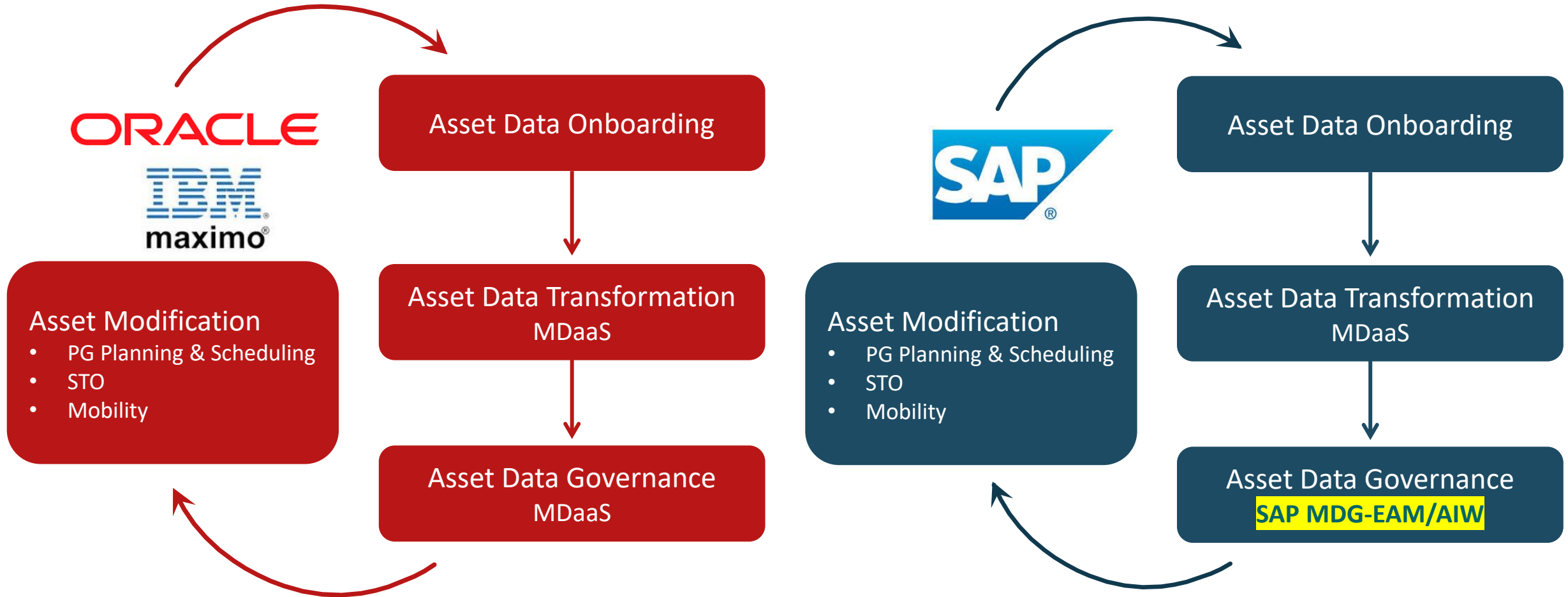
2

## FIX

- Data Quality
- Improvement
- Data Quality Monitoring
- Control Data Process
- De-Duplication
- Unstructured Data



# Prometheus Methodology: “Get it Clean, and Keep it Clean”





# A Real-World Example



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# A Real-World Test Case

## MFR/VENDOR NAME 1

SICK

P/N 1

A3M60A-BEPB014x17



Here is the data  
we were given



# The Prometheus Response within 24 hours

(from automated enrichment)



Search item		
		MFR/VENDOR_NAME_1
		SICK
		P/N_1
		A3M60A-BEPB014x17
		MFR/VENDOR_NAME_2
		SICK
		P/N_2
		1053332
		UNILEVER
		PORT SUNLIGHT
CLASS	CHARACTERISTICS NAME	CHARACTERISTIC VALUE
ENCODER	TYPE	ABSOLUTE
ENCODER	INPUT RATING	10 TO 32 VDC
ENCODER	OUTPUT RATING	
ENCODER	PULSE PER REVOLUTION	16384 PPR
ENCODER	ACTUATION TYPE	
ENCODER	TORQUE	1 NM
ENCODER	ROTATION LIFE CYCLE	
ENCODER	TERMINAL TYPE	5-PIN M12 MALE X FEMALE
ENCODER	OUTPUT CONFIGURATION	
ENCODER	SIZE	12 MM SHAFT
ENCODER	MATERIAL	STAINLESS STEEL SHAFT,ALUMINUM HOUS
ENCODER	IP RATING	IP64,IP67 SHAFT,IP67 HOUSING
ENCODER	TEMPERATURE RATING	-30 TO 80 DEG C
ENCODER	MOUNTING TYPE	FLANGE
ENCODER	CERTIFICATION/STANDARD	CE,CULUS
ENCODER	ADDITIONAL FEATURES	A3M60 PROFIBUS,RS485 PROFIBUS INTE
ENCODER	URL	<a href="https://www.sick.com/ag/en/encoders/a">https://www.sick.com/ag/en/encoders/a</a>
ENCODER	COMMENTS	ACTIVE



Here is a better description of the spare part that you need

# The Prometheus Response within 24 hours







(from automated search of data previously enriched by Prometheus)

		P/N_2	P/N_2	P/N_2	P/N_2
		1053332			
CLASS	CHARACTERISTIC NAME	CHARACTERISTIC VALUE	CHARACTERISTIC VALUE	CHARACTERISTIC VALUE	CHARACTERISTIC VALUE
ENCODER	TYPE	ABSOLUTE	ABSOLUTE	ABSOLUTE	ABSOLUTE
ENCODER	INPUT RATING	10 TO 32 VDC	10 TO 32 VDC	10 TO 32 VDC	10 TO 32 VDC
ENCODER	OUTPUT RATING				
ENCODER	PULSE PER REVOLUTION	16384 PPR	16384 PPR	8192 PPR	16384 PPR
ENCODER	ACTUATION TYPE				
ENCODER	TORQUE				
ENCODER	ROTATION LIFE CYCLE				
ENCODER	TERMINAL TYPE	5-PIN M12 MALE X FEMALE			
ENCODER	OUTPUT CONFIGURATION				
ENCODER	SIZE	12 MM SHAFT	12 MM	12 MM	12 MM
ENCODER	MATERIAL	STAINLESS STEEL SHAFT,ALUMIN	STAINLESS STEEL SHAFT,ALUMIN	STAINLESS STEEL SHAFT,ALUMIN	STAINLESS STEEL SHAFT,ALUMIN
ENCODER	IP RATING	IP64,IP67 SHAFT,IP67 HOUSING	IP67	IP67	IP67
ENCODER	TEMPERATURE RATING	-30 TO 80 DEG C	-40 °C TO +80 °C	-40 °C TO +80 °C	-40 °C TO +80 °C
ENCODER	MOUNTING TYPE	FLANGE	HOLLOW SHAFT FLANGE	HOLLOW SHAFT FLANGE	HOLLOW SHAFT FLANGE
ENCODER	CERTIFICATION/STANDARD	CE,CULUS			
ENCODER	ADDITIONAL FEATURES	A3M60 PROFIBUS,RS485 PROFIBUS	IBUS INTERFACE		
ENCODER	AVAILABLE_UK_REGION_WEBLINK		<a href="https://uk.rs-online.com/web/">https://uk.rs-online.com/web/</a>	<a href="https://uk.rs-online.com/web/">https://uk.rs-online.com/web/</a>	<a href="https://uk.rs-online.com/web/">https://uk.rs-online.com/web/</a>
ENCODER	AVAILABLE_UK_REGION_VENDOR		RS Components	RS Components	RS Components
ENCODER			03457 201 201	03457 201 201	03457 201 201
ENCODER					
ENCODER					

Here are the potential functionally equivalent parts that you have in other regional facilities

# The Prometheus Response within 24 hours

(from automated search of Prometheus and OEM AIN repositories)

Search item			Potential Functional Equivalent				
		MFR/VENDOR_NAME_1	MFR/VENDOR_NAME_1	MFR/VENDOR_NAME_1	MFR/VENDOR_NAME_1	MFR/VENDOR_NAME_1	MFR/VENDOR_NAME_1
		SICK	PEPPERL+FUCHS	ADVANCED MICRO CONTROLS	IFM EFECTOR	IMS SYSTEMS	SENSICK
			P/N_1	P/N_1	P/N_1	P/N_1	P/N_1
			EVM58N-011IZR0BN-1213	DC25F-C1S3BE	RO6341	63811	1030017
		MFR/VENDOR_NAME_2	MFR/VENDOR_NAME_2	MFR/VENDOR_NAME_2	MFR/VENDOR_NAME_2	MFR/VENDOR_NAME_2	MFR/VENDOR_NAME_2
		FOCKE				TWK-ELEKTRONIK	SAN CASSIANO
		P/N_2	P/N_2	P/N_2	P/N_2	P/N_2	P/N_2
		12788154		RO-0360-I24		TRK58-KA4096R4096C1MK04	10.1923
		UNILEVER	UNILEVER	UNILEVER	UNILEVER	UTOPIA REPOSITORY	UTOPIA REPOSITORY
		HAMMOND	SIMCOE	JEFFERSON CITY	-	-	-
CLASS	CHARACTERISTICS NAME	CHARACTERISTIC VALUE	CHARACTERISTIC VALUE	CHARACTERISTIC VALUE	CHARACTERISTIC VALUE	CHARACTERISTIC VALUE	CHARACTERISTIC VALUE
ENCODER	TYPE	ABSOLUTE	MULTI-TURN ABSOLUTE	ABSOLUTE	INCREMENTAL	ABSOLUTE	ABSOLUTE
ENCODER	INPUT RATING	10 TO 32 VDC	10 TO 30 VDC	4.75 TO 26.4 VDC	10 TO 30 VDC	9 TO 36 VDC	10 TO 32 VDC
ENCODER	OUTPUT RATING						
ENCODER	PULSE PER REVOLUTION	16384 PPR	65536 PPR	4096 PPR	360 PPR	4096 PPR	8192 PPR
ENCODER	ACTUATION TYPE						
ENCODER	TORQUE	1 NM	1 NM		1NM AT 20 DEG C	1 NM	
ENCODER	ROTATION LIFE CYCLE						
ENCODER	TERMINAL TYPE	5-PIN M12 MALE X FEMALE	M12 SOCKET X PLUG	M12 CONNECTOR	M18 CONNECTOR	M12 CONNECTOR	M12 CONNECTOR
ENCODER	OUTPUT CONFIGURATION						
ENCODER	SIZE	12 MM SHAFT	10 X 20 MM SHAFT	3/8 IN SHAFT	12 MM SHAFT	58 DIA X 83 LG MM	12 MM SHAFT
ENCODER	MATERIAL	STAINLESS STEEL SHAFT,ALUMINUM HOUSING	STAINLESS STEEL SHAFT,HOUSING P	STAINLESS STEEL SHAFT	ALUMINUM HOUSING	ALUMINUM HOUSING	DIE-CAST ALUMINUM HOUSIN
ENCODER	IP RATING	IP64,IP67 SHAFT,IP67 HOUSING	IP64,IP67 SHAFT,IP67 HOUSING	IP67 HOUSING	IP64 SHAFT,IP67 HOUSING	IP66/IP67/IP69K HOUSING	IP67 HOUSING
ENCODER	TEMPERATURE RATING	-30 TO 80 DEG C	-40 TO 85 DEG C	-40 TO 85 DEG C	-40 TO 100 DEG C	-40 TO 85 DEG C	-20 TO 80 DEG C
ENCODER	MOUNTING TYPE	FLANGE	CLAMPED FLANGE	SERVO/SQUARE FLANGE		CLAMPED FLANGE	FACE MOUNT
ENCODER	CERTIFICATION/STANDARD	CE,CULUS					CE,CULUS
ENCODER	ADDITIONAL FEATURES	A3M60 PROFIBUS,RS485 PROFIBUS INT	RF RADIAL EXIT POSITION,BINARY OUT	VITON SEAL,DURACODER,SSI MULTITURN,BINARY END CONNEC	+/-0.2%,2-BYTE CONTROL,BINA	ATM60-D4H13X13,26 BIT	
ENCODER	URL	<a href="https://www.sick.com/ag/en/encoders/ab">https://www.sick.com/ag/en/encoders/ab</a>	<a href="https://files.pepperl-fuchs.com/w">https://files.pepperl-fuchs.com/w</a>	<a href="https://www.amci.com/files/f">https://www.amci.com/files/f</a>	<a href="https://www.ifm.com/restserv">https://www.ifm.com/restserv</a>	<a href="http://www.twk.de/data/pdf/1">http://www.twk.de/data/pdf/1</a>	<a href="https://www.mysick.com/sag">https://www.mysick.com/sag</a>
ENCODER	COMMENTS	ACTIVE	ACTIVE	ACTIVE-MODEL AVAILABLE NOT	NO LONGER AVAILABLE - ARCHI	ACTIVE	ACTIVE
						Delivery time approx. 8 weeks	
						€832.24 *	\$931.00
	Image						

# The Prometheus Response within 24 hours

(from automated search of Prometheus and OEM AIN repositories)

AVAILABLE_UK_REGION_WEBLINK	<a href="https://www.kempstoncontrols.co.uk/A3M60A-BEPB014X17/Sick/sku/884937">https://www.kempstoncontrols.co.uk/A3M60A-BEPB014X17/Sick/sku/884937</a>	<a href="https://uk.vision-supplies.com/sick-a3m60a-bepb014x17">https://uk.vision-supplies.com/sick-a3m60a-bepb014x17</a>	<a href="https://www.ebay.co.uk/itm/1053331-A3M60A-BDPB014X171053332-A3M60A-BEPB014X17-/233426168717">https://www.ebay.co.uk/itm/1053331-A3M60A-BDPB014X171053332-A3M60A-BEPB014X17-/233426168717</a>	<a href="https://eltra-trade.com/products/sick-a3m60a-bepb014x17">https://eltra-trade.com/products/sick-a3m60a-bepb014x17</a>
AVAILABLE_UK_REGION_VENDOR	Kempston Controls	VISION-SUPPLIES	eBay	ELTRA TRADE
TELEPHONE	01933 656290	+44 (0) 1926 611745		+421 552 601 099
LEAD_TIME_TO_DELIVER	STANDARD DELIVERY WITH IN 1 - 2 DAYS			

Here are other potential sources of spares in your region



# The Enduring Prometheus Solution



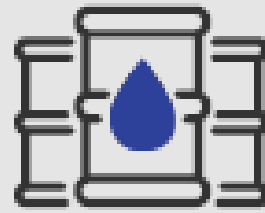
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# Year 1 Savings from MRO Supply Chain Optimization



**\$15M**

Savings per plant at a  
global paper manufacturer



**\$100M**

Year 1 savings at a super-major,  
fully-integrated oil & gas company

- Analysis of historical work orders
- Data cleansing and enrichment
- Alignment of functional locations, BoMs, maintenance plans and task lists
- Sustained data quality

# Questions?



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