

Overcoming the Capital Project Information Handover Conundrum

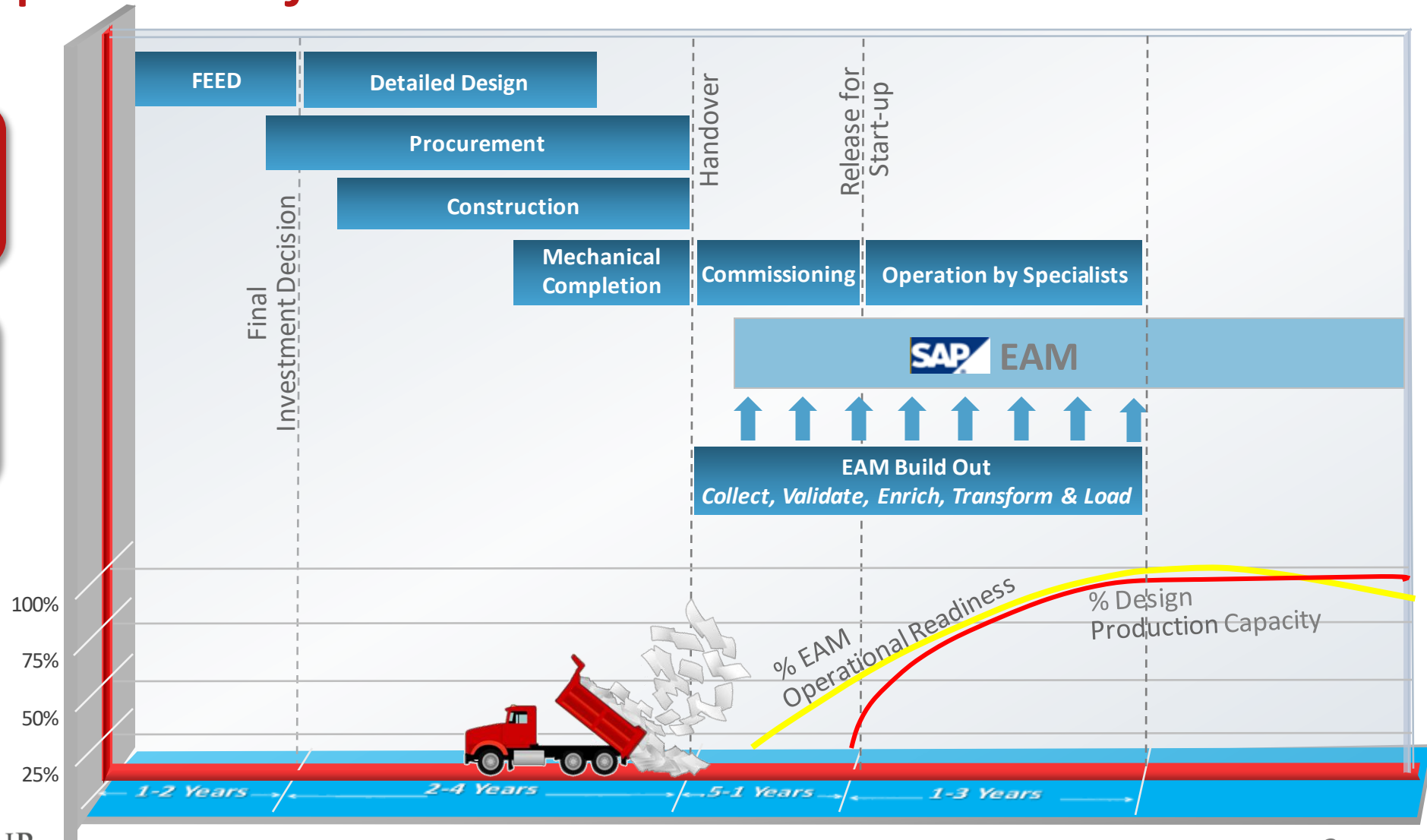
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Traditional Capital Projects Processes

Many analysts agree that the average loss due to poorly managed information handover can equal over 1.5% of total CAPEX expenditures

Potential Impacts

- Reduced Asset Availability
- Extended Start-up Costs
- Increased EH&S Risks
- Increased Maintenance Costs

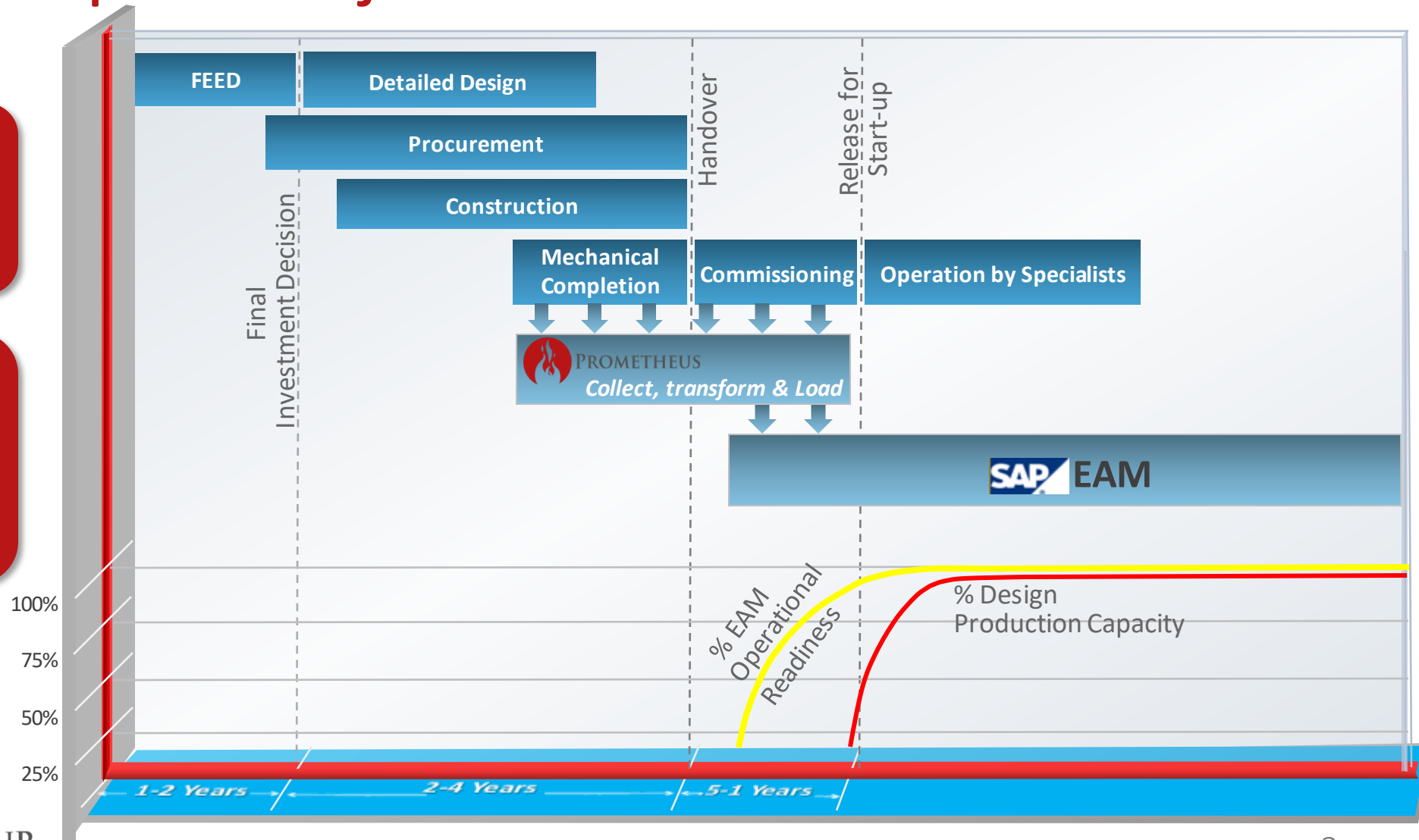


Best Practice Capital Projects Processes

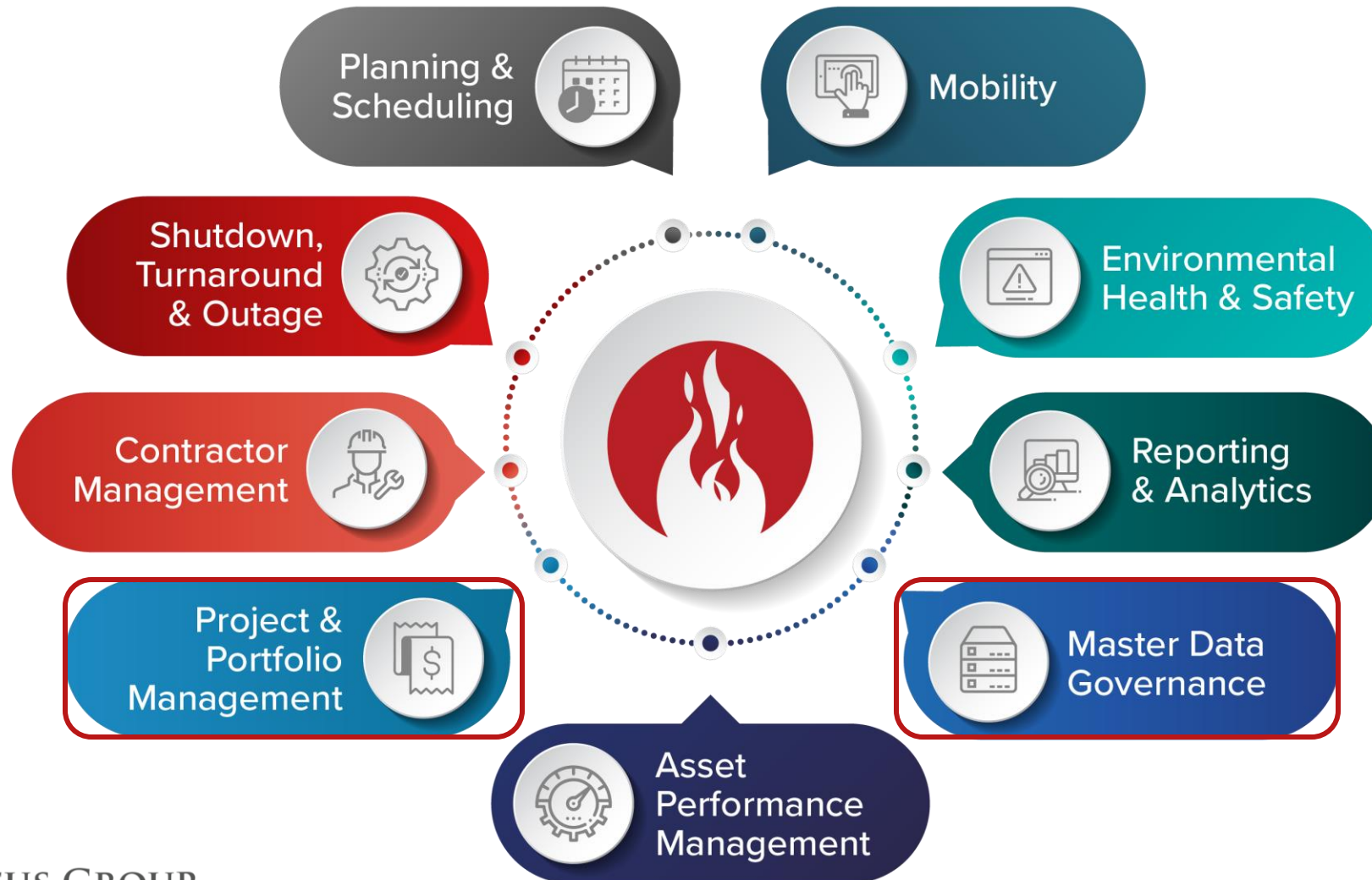
Phased, progressive handover of vendor & design documentation with business process management and auditable MoC enables optimized facility lifecycle information management

Benefits

- Increased production
- Reduced EH&S Risks
- Reduced extended start-up ops costs
- Improved Maintenance productivity
- Reduced MRO spares costs
- Improved warranty management



The Prometheus Platform

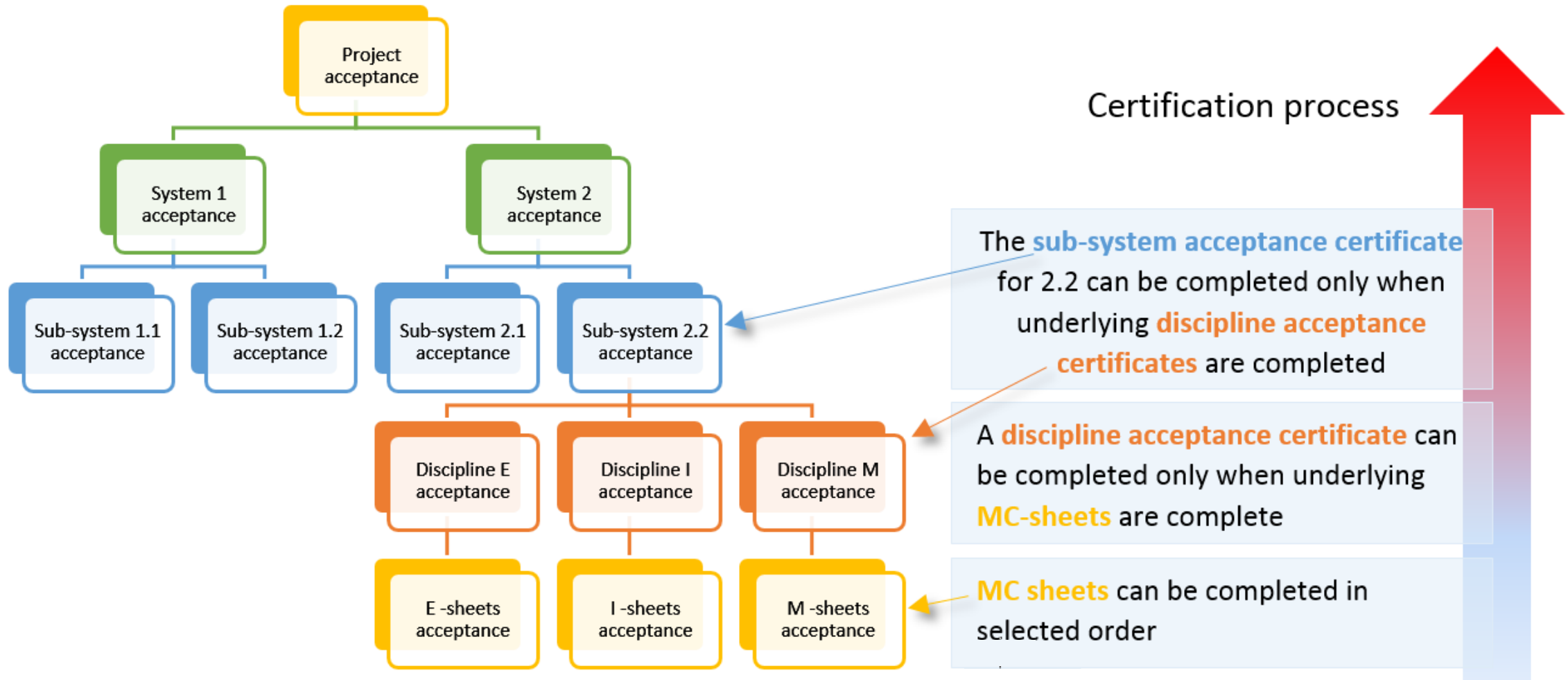


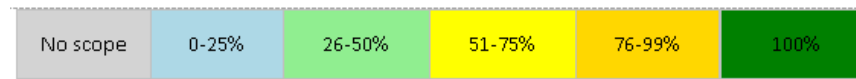
What is Co-Console?

- A **single point of truth** providing a **multi-discipline status** of technical and contractual project completion
- Methodologically prepare, complete and transition **FAT, receipt, installation, function testing, energization**
- Monitors **individual equipment** based on **critical steps**, keeping the process relatively simple
- Collection, version control and archival of **project documentation**

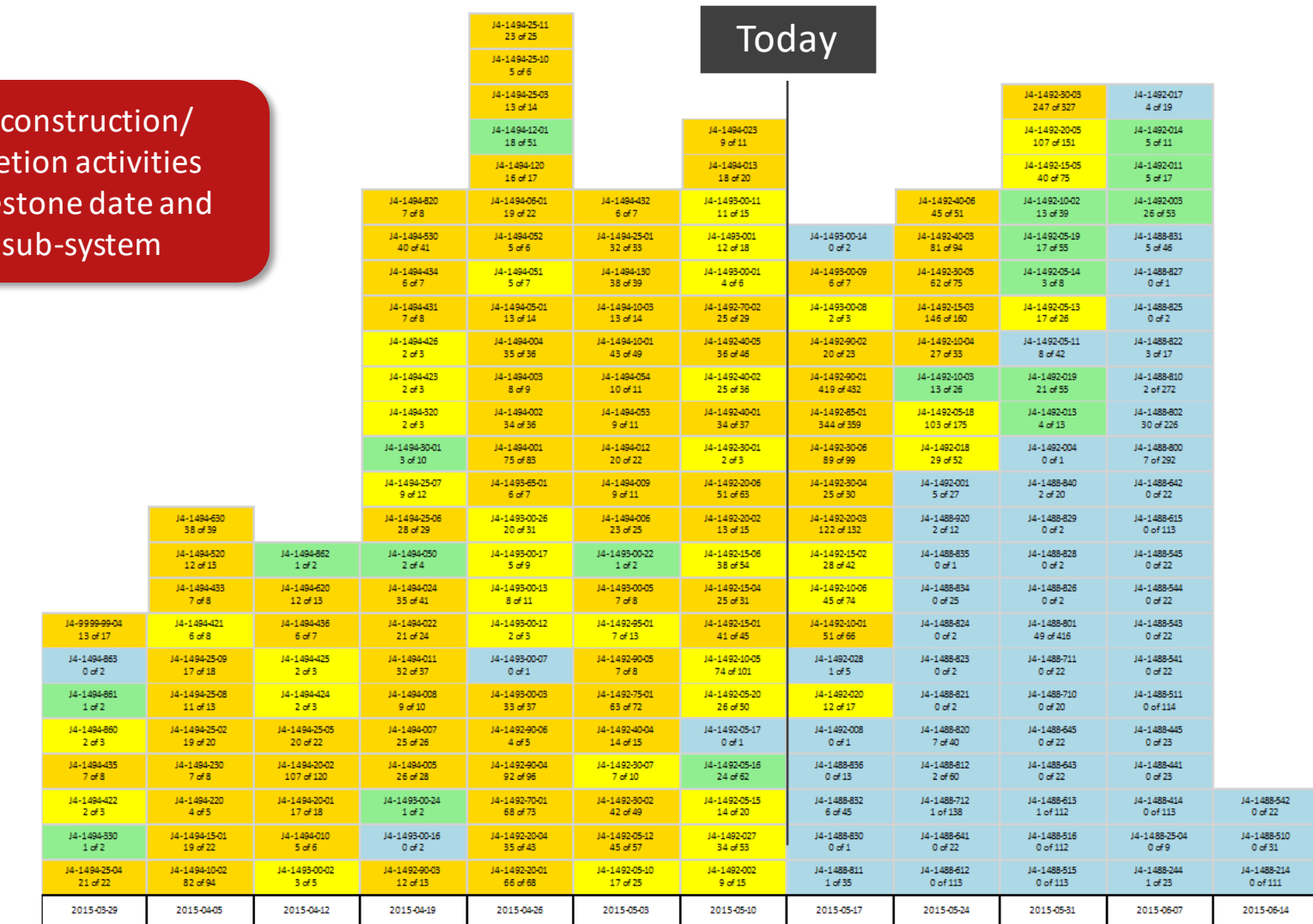
Certification Process

- Ensure the right steps are taken





Shows number of construction/
mechanical completion activities
completed per milestone date and
sub-milestone/ sub-system



Asset Information Staging: Collect

Project	Service / Description
Project1	Co-Console Project
[-] OOB-1	Chilled Water System
[-] B11	Chilled Water Unit Subsystem
+ Mech.Equipment	
+ Instruments	
+ Lines	
+ Handover Letters	
+ Punch items	
+ Priorities	
+ 3 Commissioning Sheets	
+ Archived Scanned Files	
+ Turnover Dossier	
+ B22	Chilled Water Support Piping S
+ B33	Chilled Water Production Subs
+ 010	HCl 15% Grade I System
+ 011	Cell Room
	Bus Bars / Polarization Rectifier
	HCl 15% Grade II System
	Chlorine System
	Demin Water System
	Demin Water System CCU
	Catholyte System

Stage project data in reportable WBS

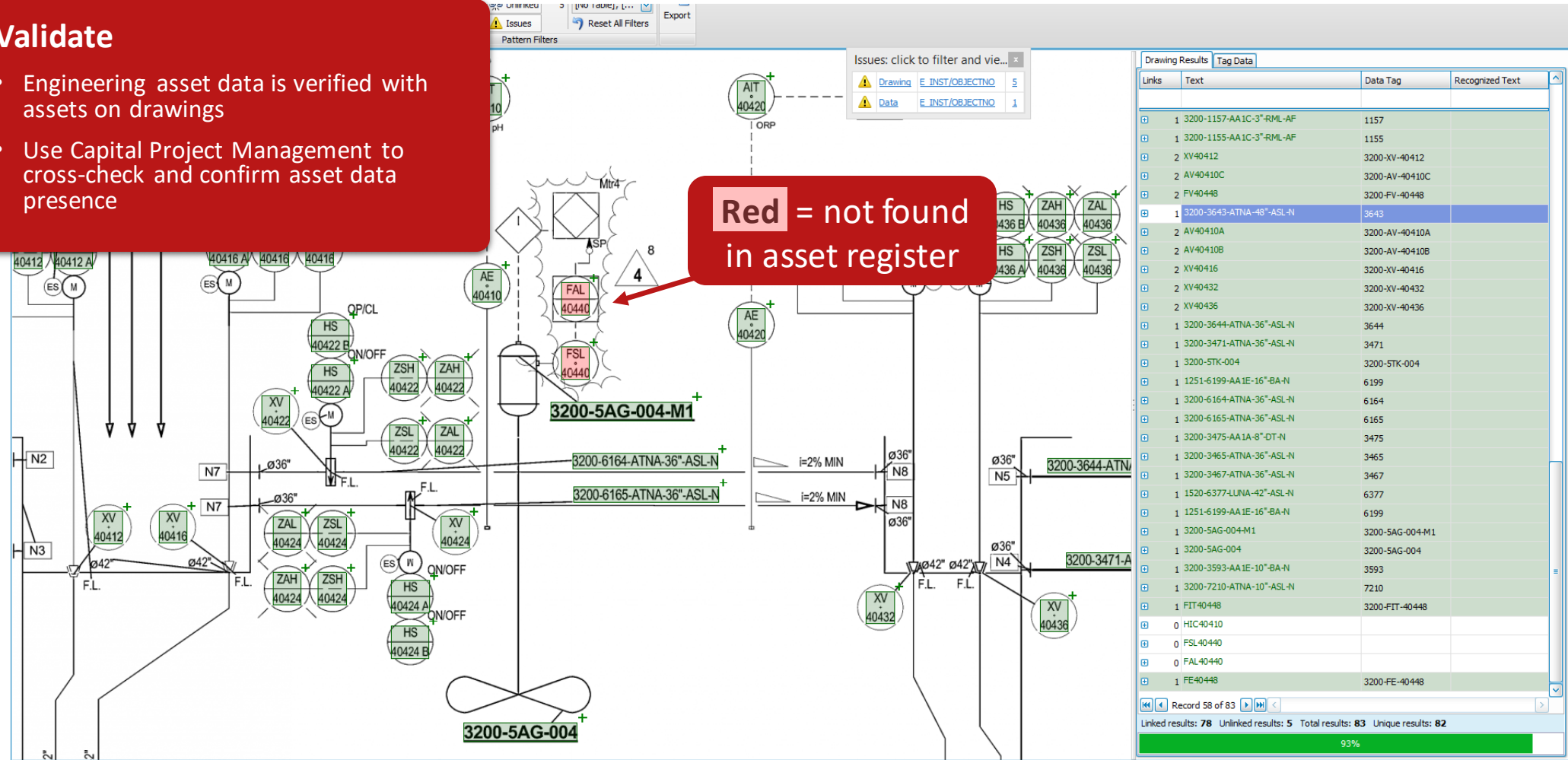
Collect and stage all relevant asset data, including field data obtained during construction and testing

[18] Table: Mech.Equipment	
Matrix View Sheet View	
Eqp.Tag No	P-1801A
Service / Description	RGP Transfer Pump
PID	1801
Equipment Type	Centrifugal Pump
Manufacturer	Goulds
Vendor	Shin Nippon
Method of Alignment	1
Length of Coupling Spacer (mm)	3.2
Serial No	37772837-A
Layout Drawing	1801LD
Datasheet	1587DS-01
PO No	110110-02
Oper Press	16.4(S)/22.1 (D)
Oper Temp	27.8

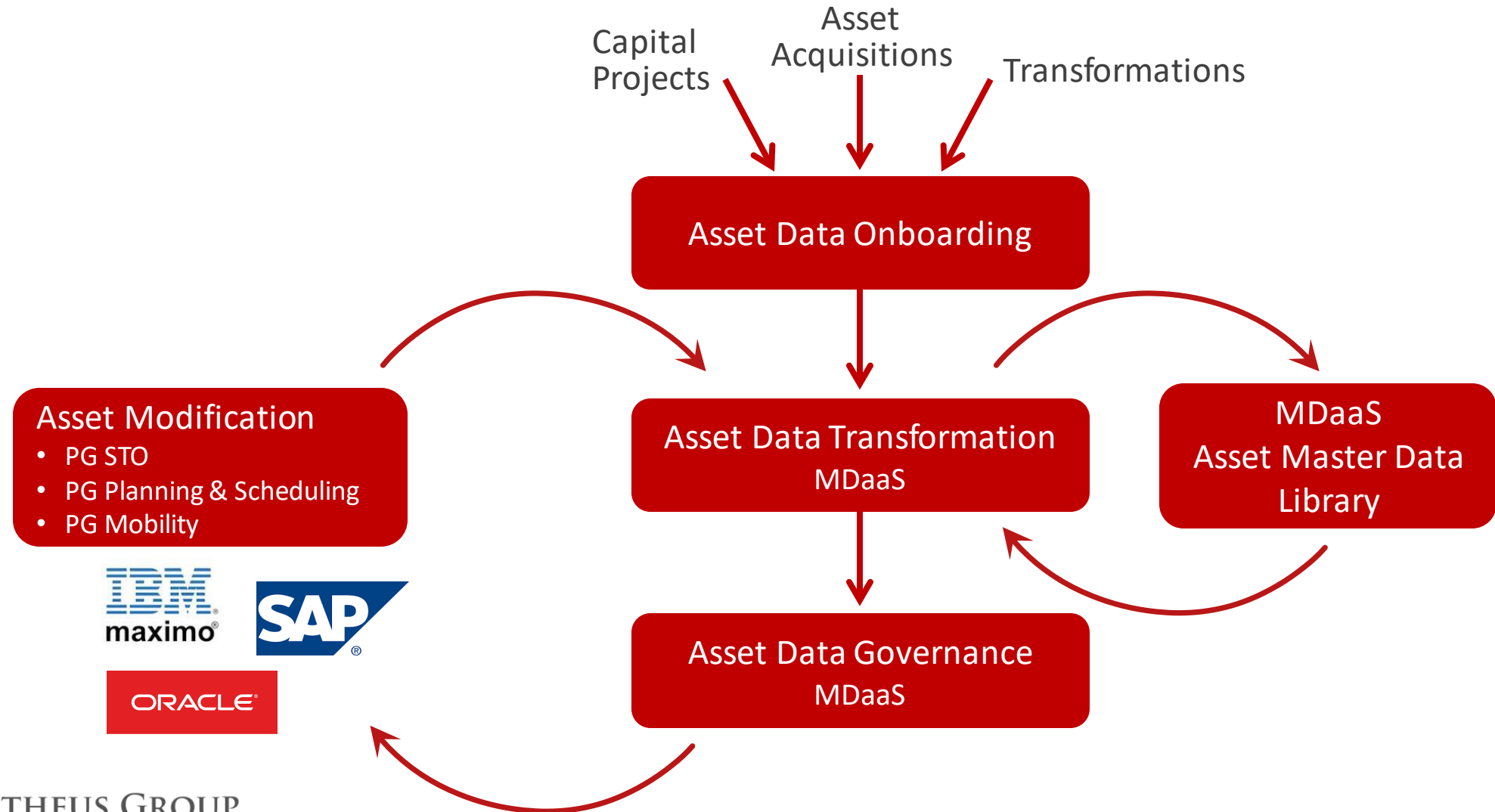
Asset Information Staging: Validate

Validate

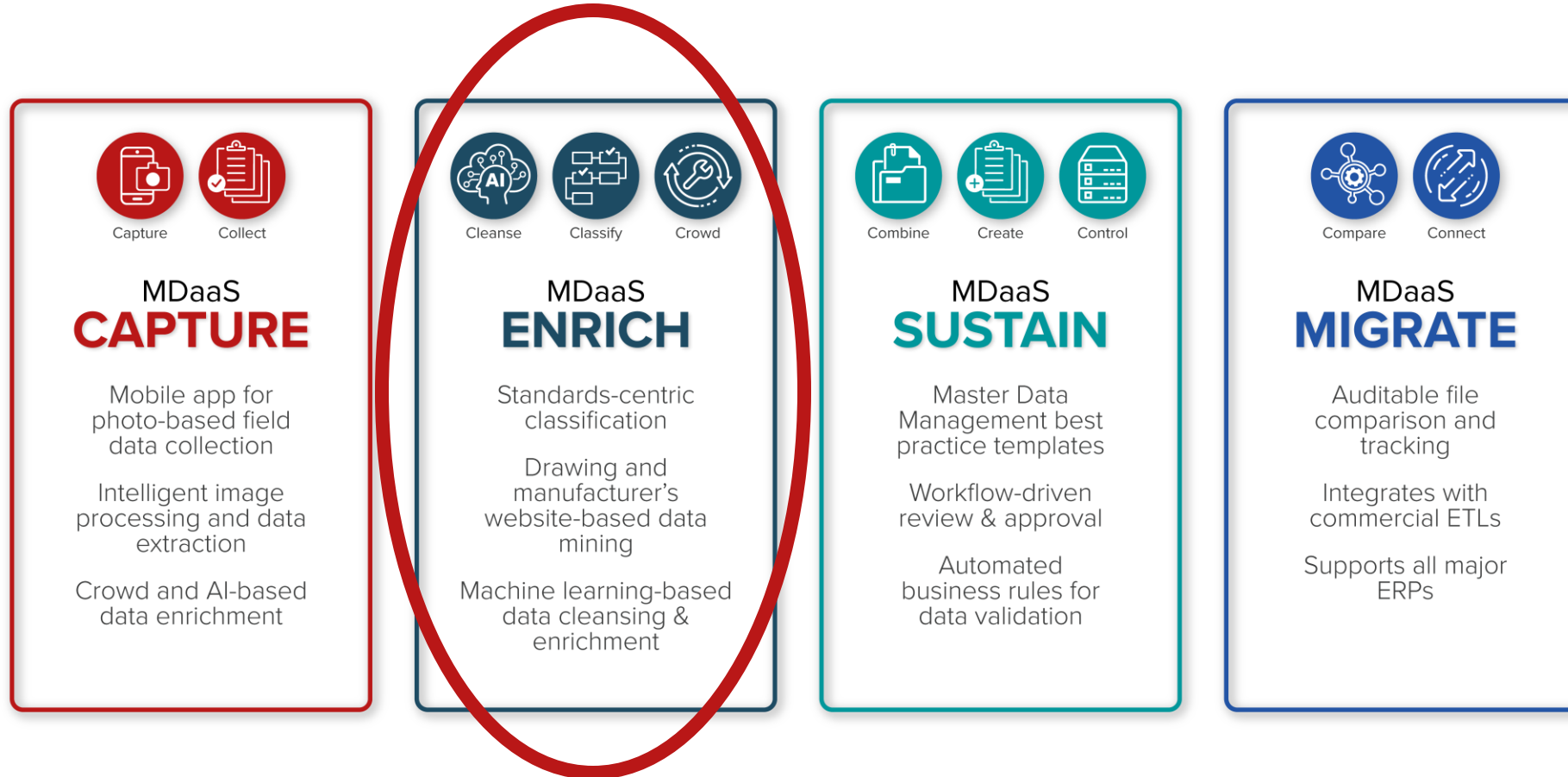
- Engineering asset data is verified with assets on drawings
- Use Capital Project Management to cross-check and confirm asset data presence



Master Data as a Service (MDaaS)

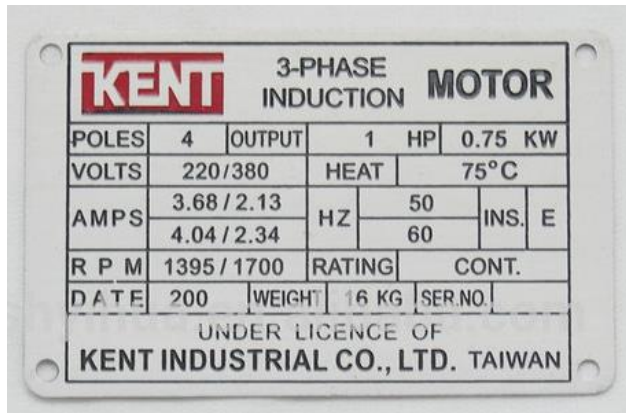


Master Data as a Service (MDaaS)

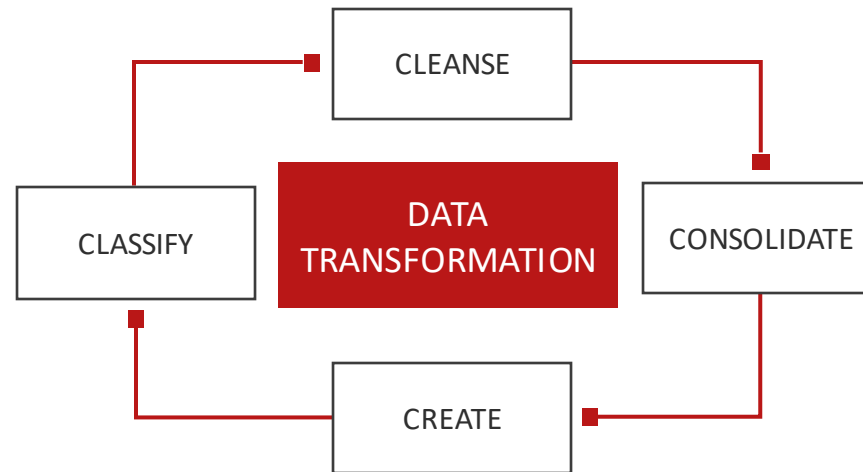


As-built Equipment Manufacturer/Model Information

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")

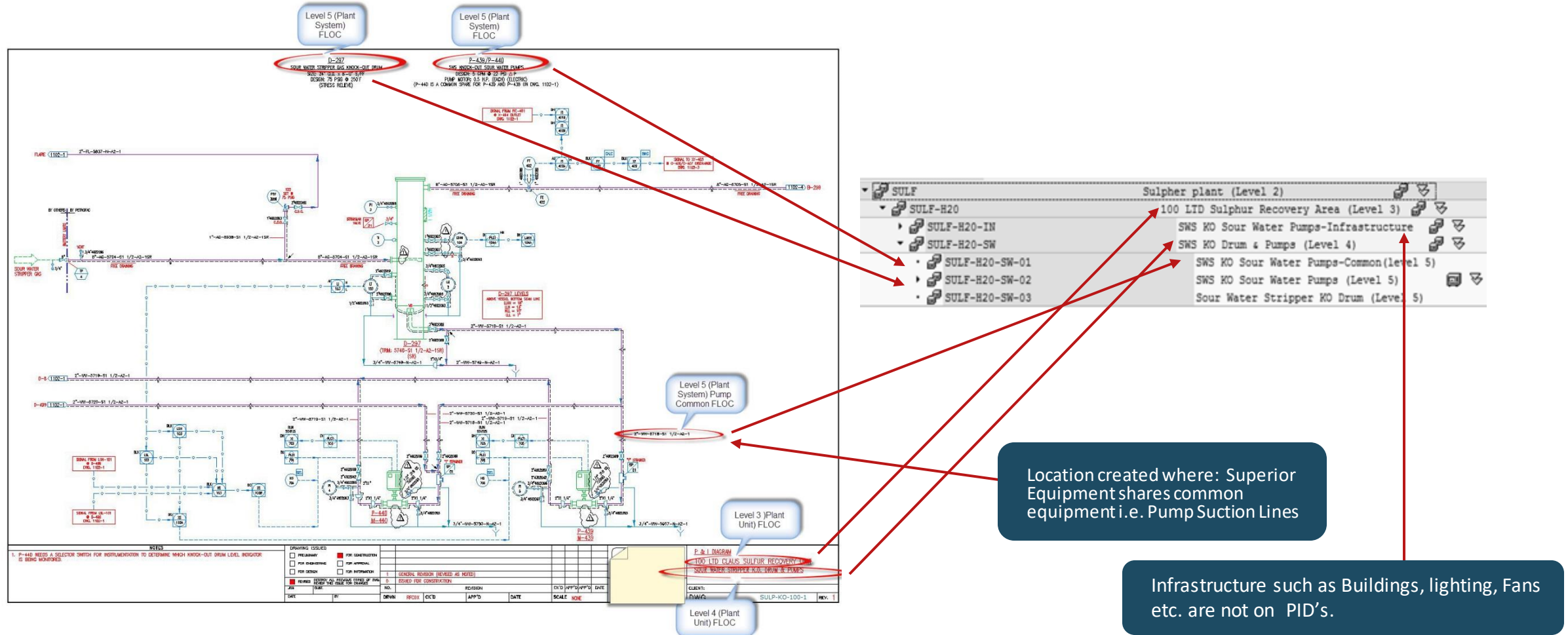
Consolidate (De-Dupe)

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

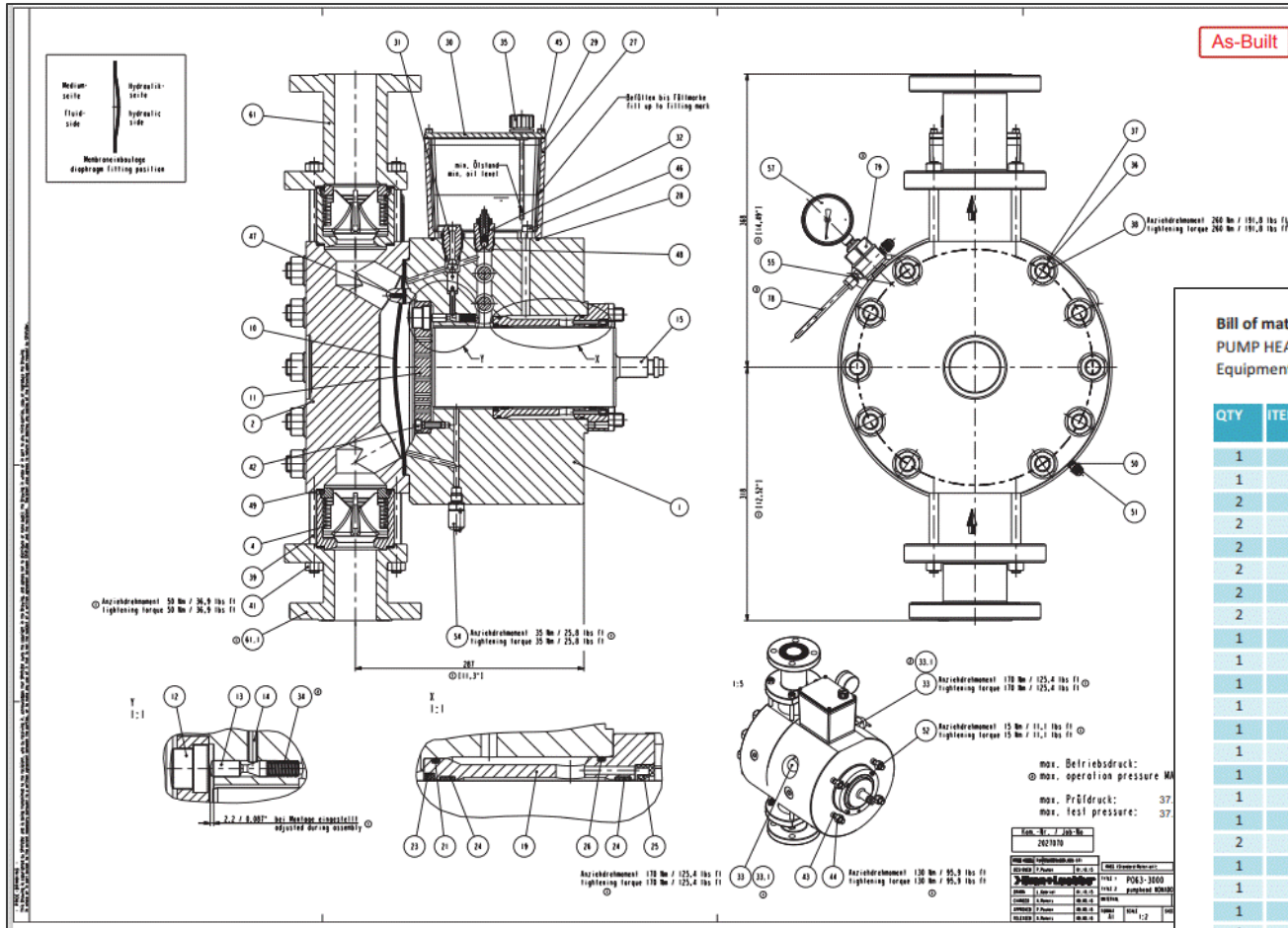
Classify

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

Developing Asset Hierarchy from Engineering Drawings



Establishing Bills of Materials from Manufacturer's Recommended Spare Parts Lists

BL380235V0007S

QTY	ITEM	Description	Material Number	ASTM code
1	1	HYDRAULIC HOUSING 100 x 60	BL322811	ASTM A 633 Gr. C
1	2	COVER 100 60HUB (H5+H6)/PMI	BL072072V	ASTM A240 316Ti
2	4	VALVE 0,2 BAR/PMI GEH.	BL075036V	ASTM A240 316Ti
2	part of 4	housing	BL075035V	ASTM A240 316Ti
2	part of 4	cone	BL341547	G-X5CrNiMoNb1810 (Not corresponding with ASTM)
2	part of 4	cover	BL341577	ASTM A240 316Ti
2	part of 4	spring ring	BL101631	ASTM A240 316Ti
2	part of 4	spring	BL190062	ASTM A240 316Ti
1	10	DIAPHRAGM, MEMBRANE MEHRL-	BL380219S	PTFE
1	11	WASHER, DISC	BL303147	ASTM A48-76 (Grade 40B)
1	12	Plate	BL303149	ASTM A576 1045
1	13	PIN 10 X 36 design B	BL322229	115CrV3 (Not corresponding with ASTM)
1	14	ASSEMBLY STOESSEL design D	BL051631	STEEL
1	15	PISTON, PLUNGER 100 60HUB (H5)	BL322839	ASTM A276 420 (X46Cr13)
1	19	LANTERN RING 100	BL322815	ASTM A240 316Ti
1	21	O-RING 120,25X 3,53	BL322853	NBR, 70 Shore A
1	23	GROOVED RING, SLOTRING 100 X109,46X 5,95	BL369628	Perbunan
2	24	GUIDE BAND 100 X105 X 9,7	BL369629	(Not corresponding with ASTM) modified PTFE
1	25	SEAL RING A 100 X 120 X 12	BL369672	Viton
1	26	O-RING 123,42X 3,53	BL152250	NBR, 70 Shore A
1	27	RESERVOIR	BL320131	ASTM A276 316L
1	28	O-RING 142 X 3	BL152323	NBR, 70 Shore A
1	29	GASKET, SEALING	BL150440	Paper
1	30	COVER 152 X 114 STANDARD M.BO.G3/8 (F.GN552)	BL073774	ASTM A240 316Ti
1	31	REPLENISHING VALVE	BL051456	other
1	32	VENT VALVE M24X1,5	BL542513	ASTM A240 316Ti
2	33	OVERFLOW VALVE	BL545004	STEEL

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

Accurate Asset Information Aligned with ISO 14224 Standards

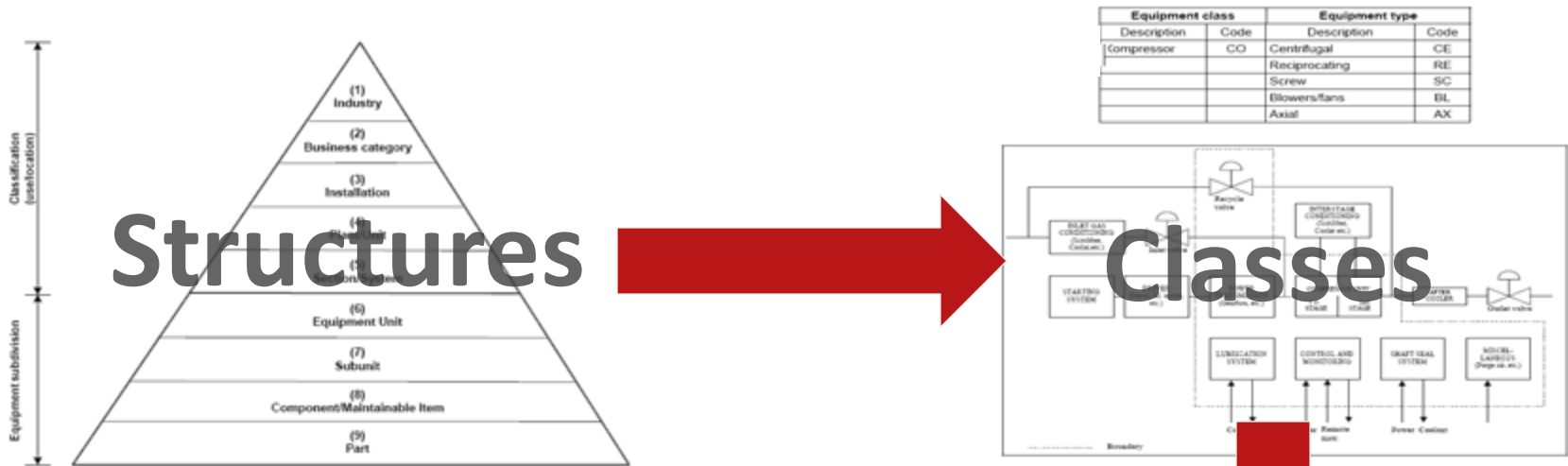


Figure 4 — Taxonomy classification

No.	Notation	Description
1.0	Design-related causes - general	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	Fabrication or installation-related causes - general	Failure related to fabrication or installation, but no further details known
2.1	Fabrication error	Manufacturing or processing failure
2.2	Installation error	Installation or assembly failure (e.g. assembly, maintenance not included)
3.0	Failure related to operation/maintenance - general	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, temperature, etc.
3.2	Operating error	Mistake, misuses, negligence, oversight, etc. during operation
3.3	Maintenance error	Mistake, misuses, negligence, oversight, etc. during maintenance
3.4	Selection and use	Failure caused by wear after long-term operation of the equipment unit
4.0	Failure related to management - general	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	Miscellaneous - general *	Causes that do not fall into one of the categories listed above
5.1	Unknown *	No information available related to the failure cause

* 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 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

Questions?



PROMETHEUS GROUP