

8.2 Industri 4.0 og digitalisering

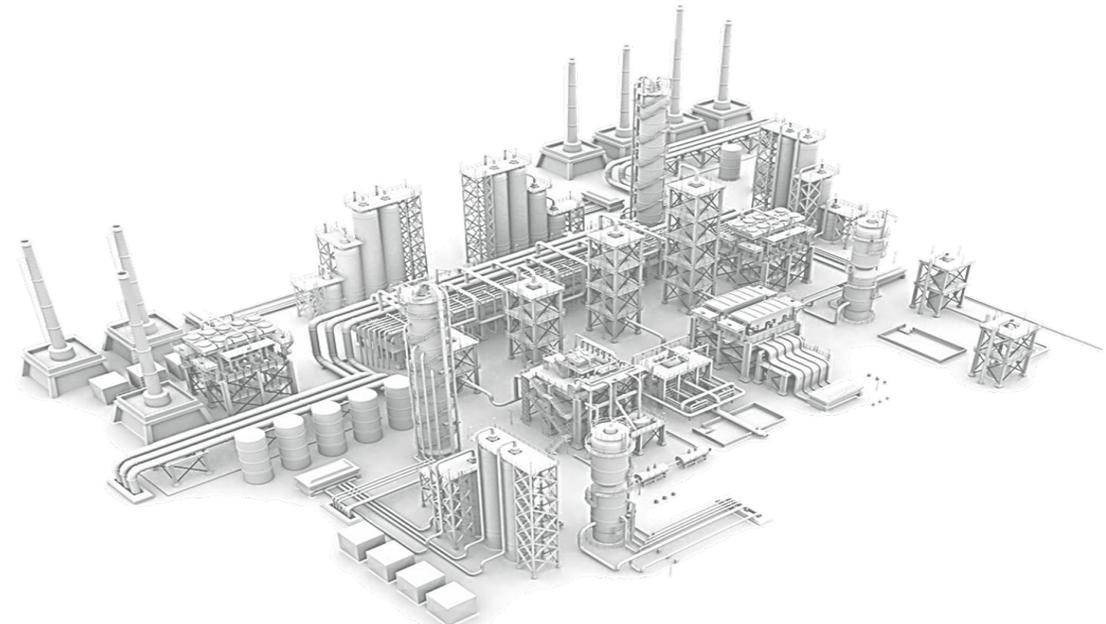
Industry 4.0 in Practice: R&M as
the Driver of Digital Value



Aleksandra Knödseder
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Cognite

Part 1: The Strategic Imperative & The Great Blocker

Part 2: The Solution Framework & The Path Forward



Part 1

The Strategic Imperative & The Great Blocker



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An infographic with a dark blue background and a glowing network of nodes. At the top, it reads "WE SHARE THE SAME MANDATE" and "The Guardians of Uptime & Reliability". A central graphic shows a path from a box on the left to a box on the right. The left box says "My Journey: From Industry Expert to Data-Driven SME". The right box says "PROTECT ASSETS RELIABLE AND SAFE, RELIATIONS OPTIMAL COSTS". Below the path is a white arrow containing logos for KONGSBERG, AkerSolutions, DNV, KONGSBERG, and COGNITE AI FOR INDUSTRY. At the bottom right, a box says "Our Shared Goal: Powering the Future of Industry". Icons of an oil rig, a wind turbine, gears, and a shield are also present.

WE SHARE THE SAME MANDATE
The Guardians of Uptime & Reliability

My Journey: From Industry Expert to Data-Driven SME

PROTECT ASSETS RELIABLE AND SAFE, RELIATIONS OPTIMAL COSTS

Our Shared Goal: Powering the Future of Industry

KONGSBERG AkerSolutions DNV KONGSBERG COGNITE AI FOR INDUSTRY

Challenges and Negative Consequences

Business level

- Lack of real time overview of critical business KPIs
- Lack of easy understanding of what drives negative trends
- Ageing workforce, limited resources
- Failing digital and AI initiatives

Negative Consequences

- Increasing operational risk (HSE)
- Increasing OPEX
- Increasing CAPEX
- Too high Energy

Maintenance org. level

Lack of real-time and holistic insights wrt.:

- 1) Bad Actors and KPIs
 - 2) Condition health of equipment
 - 3) Troubleshooting and diagnostics
 - 4) Predictive Maintenance
 - 5) Planning maintenance (Calendar instead of CBM)
- Data chaos and silos: SAP/IFS/Maximo + PI + Excel
 - Technicians searching instead of solving
 - Data cleaning instead of insights
 - Limited collaboration

Negative consequences

- Unplanned downtime
- Higher maintenance cost
- Poor prioritization
- Repeatable failures
- Hidden operational inefficiency

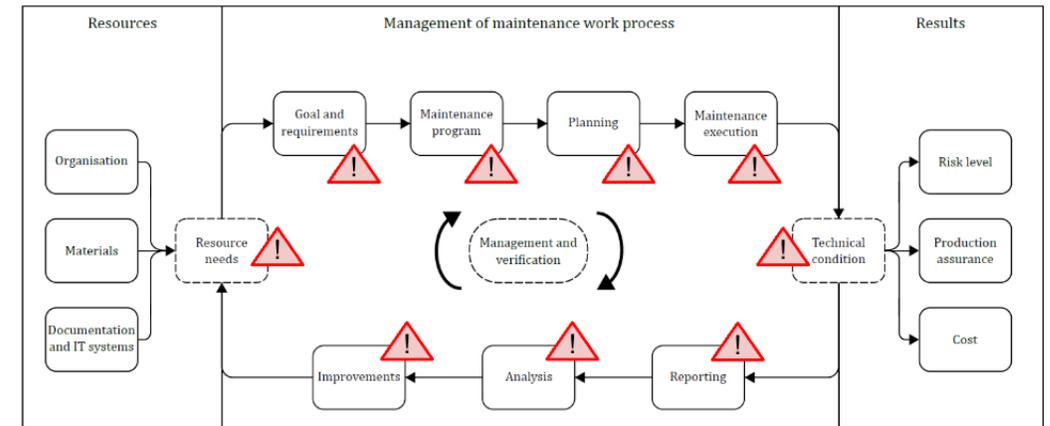


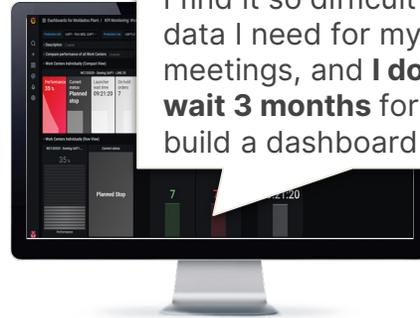
Figure 2 — Maintenance management process

Part 1: BEFORE scenario - Data is a problem, not a solution (yet)



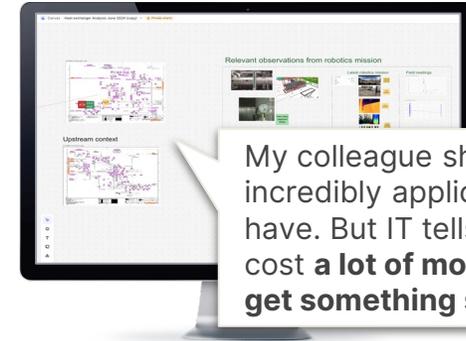
I need to find the latest P&IDs, ISOmetrics, work order history, live sensor data, OEM sheets .. **Where do I even begin..?**

Engineer (SMEs)



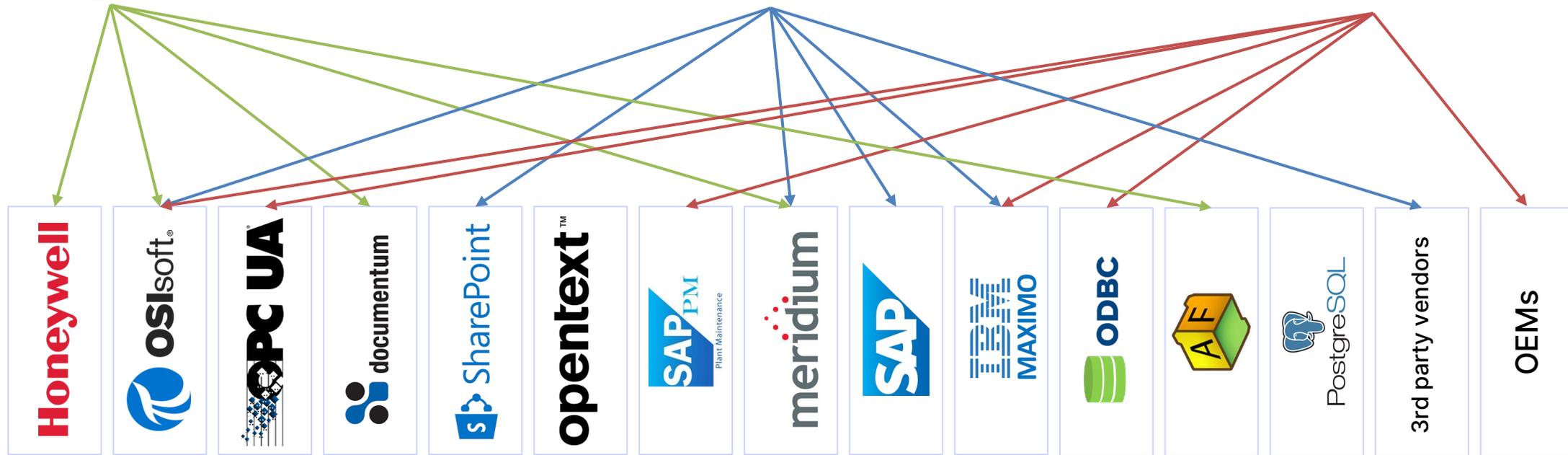
I find it so difficult to get all the data I need for my morning meetings, and **I don't want to wait 3 months** for someone to build a dashboard for me

Dashboards

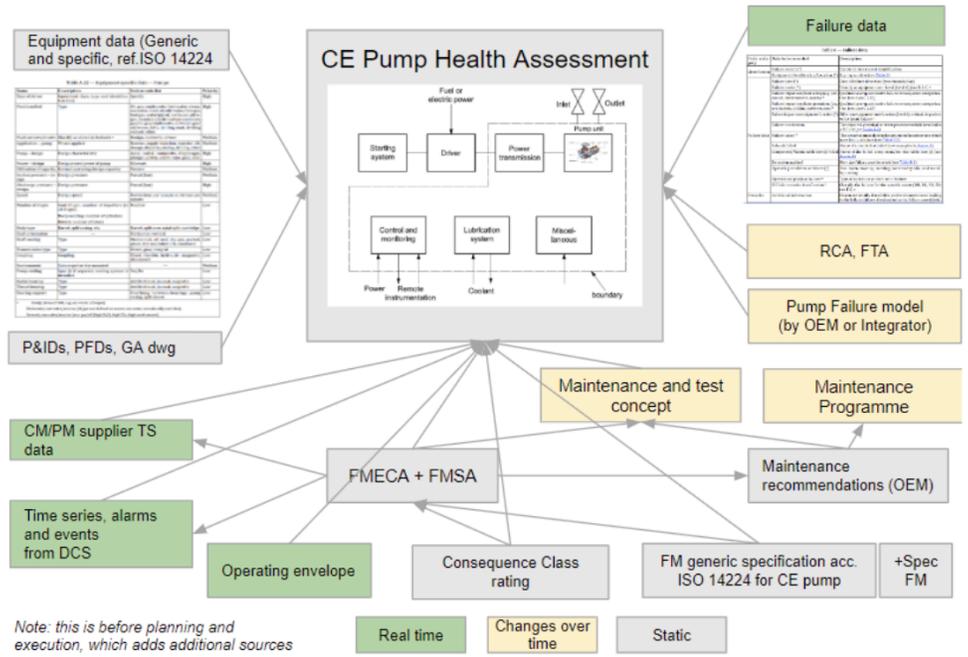


My colleague showed me this incredibly application they have. But IT tells me it would cost a **lot of money** for me to get something similar

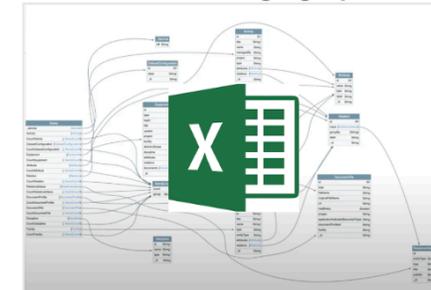
Applications



Real example, to assess the status of a pump it could require more than 15 data sources which today is scattered and unstructured



O&M knowledge graph:



- Applicable standards:**
- ISO 15926 & CFIHOS
 - ISO 14224
 - ISO 17359
 - ISO 13374
 - ISO 13379
 - ISO 13381
 - NORSOK Z-008
 - DNV-RP-A204 and ISO 8000
 - OREDA

Pain Points	<p>Cross-Value Chain</p> <ul style="list-style-type: none"> Not having single source of truth to align across all actors at any given time Multiple handovers Lack of transparency on impact of changed on shared KPIs 	<p>Technological</p> <ul style="list-style-type: none"> Large app portfolios, with wide range of maturity and capability Mix of point-to-point interfaces and data warehouses Inconsistent data preserves reliance on emails, spreadsheet and dashboards 	<p>Execution Model</p> <ul style="list-style-type: none"> Document-centered execution model Current change process drives complexity and efficiencies Cost level
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Part 1: AFTER scenario – How does it look like?



All data available and contextualized in one place

Engineer (SMEs)



Users can easily build their own real-time dashboards

Dashboards



Scale new solutions seamlessly across the enterprise

Applications



Cognite Data Fusion®

- Honeywell**
- osisoft®**
- OPC UA**
- documentum**
- SharePoint**
- opentext™**
- SAP PM**
Plant Maintenance
- meridium**
- SAP**
- IBM**
MAXIMO
- ODBC**
- A F**
- PostgreSQL**
- 3rd party vendors
- OEMs

Ideal State: The "After Scenario" and PBO

Business level

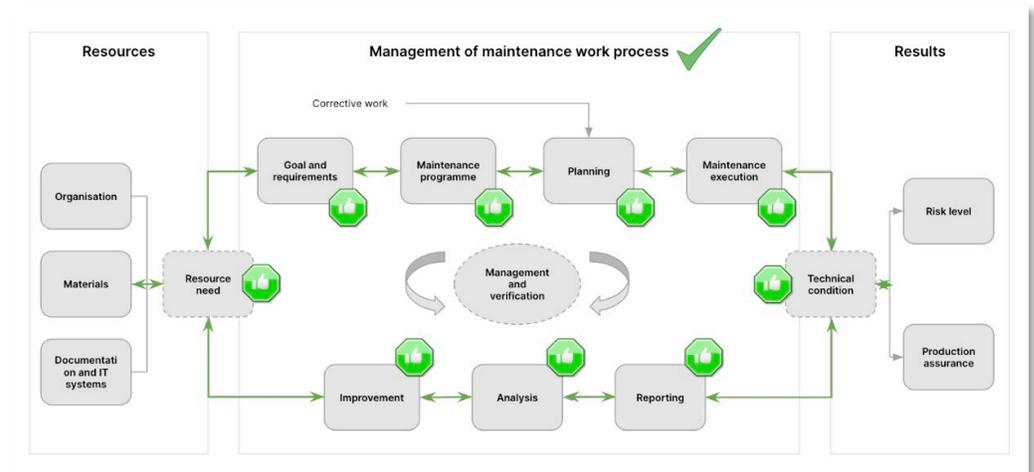
- Optimized workforce capacity due to cross-functional flexibility
- Truly unified operations with no data or application silos
- Fully engaged, informed, and empowered leadership and workforce with cross-functional flexibility
- Quickly build and scale solutions across the organization that enable data-driven decision making
- Flexible and productive use of production capacity (people and machines)
- Empower workforce through data and AI access to production data

Positive Business Outcomes

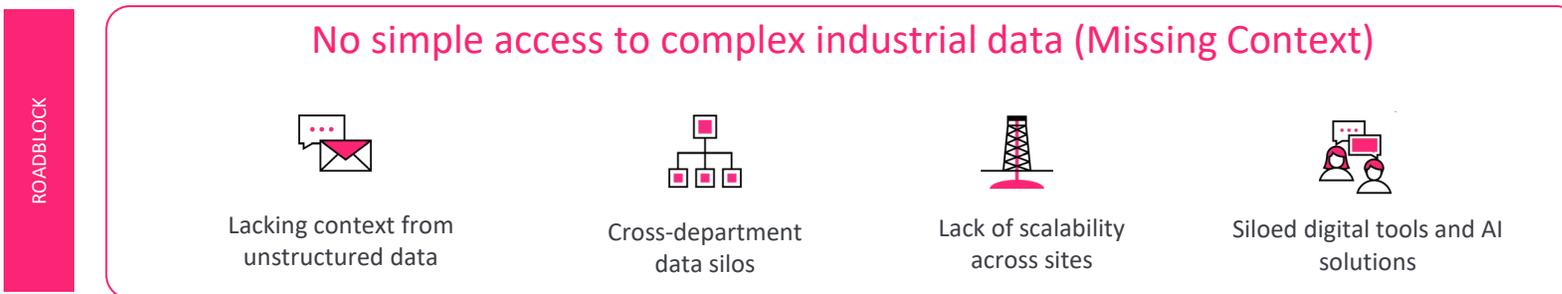
- No HSE events
- Optimal OPEX
- Optimal CAPEX
- Optimized Energy consumption

Positive Business Outcomes

- Reduced downtime
- Smarter, leaner PM programs
- Higher asset availability
- Reliable, data-driven decisions



Part1: **The Great Blocker:** Why Are We Still Firefighting?



Part1: The "Data Tax" on R&M Expertise

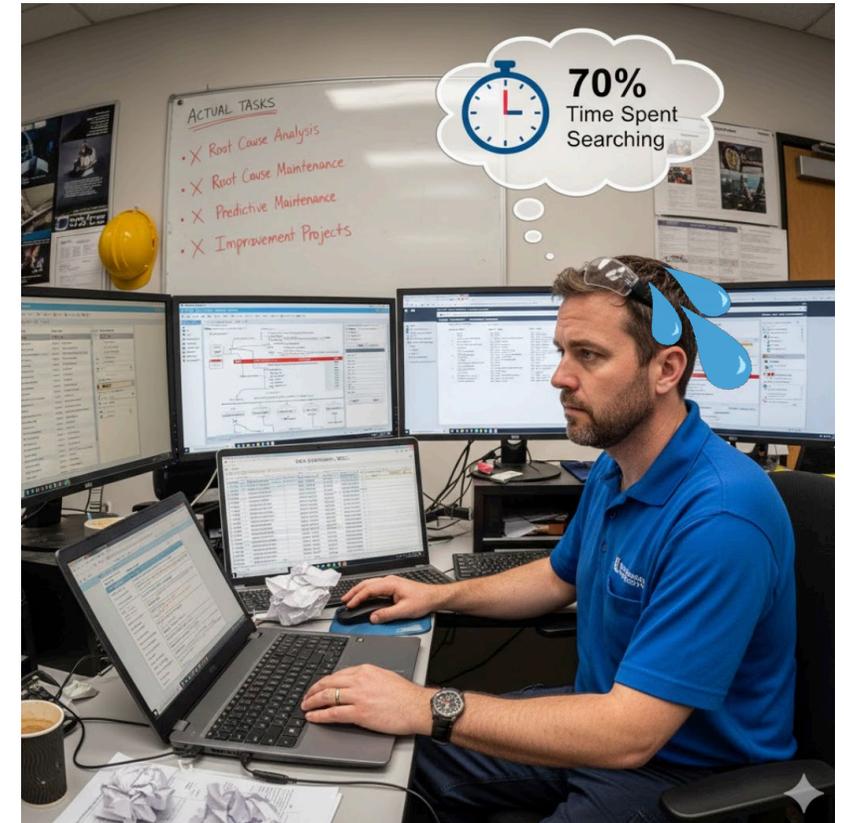


How much time did you spend last week... searching for information before you got all the data - and the insights you need in order to do your task.

- Was it real-time?
- Did it have context available?



All R&M eng. across industries confirm the same problem
→ **it takes ca. 60 – 80% of time to gather data and process it**
Instead of doing the actual tasks, doing more complex tasks, or improving current ways of working to be more data and AI driven.





Part 2

The Solution Framework & The Path Forward

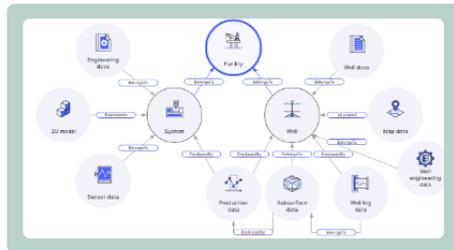
Practical Digital Solutions to Reliability & Maintenance Challenges

Part 2: R&M Path to Realistic Predictive Value

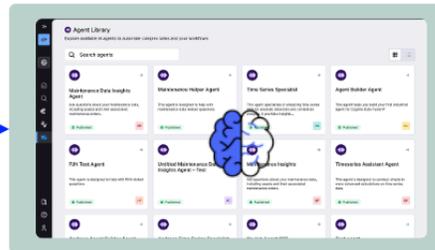


1. Simple Access to Data > 2. Advanced AI Agents > 3. Optimize & Automate

Data Foundation: An Industrial Knowledge



The Intelligence: LLM-Powered Agents



Industrial Tools with AI



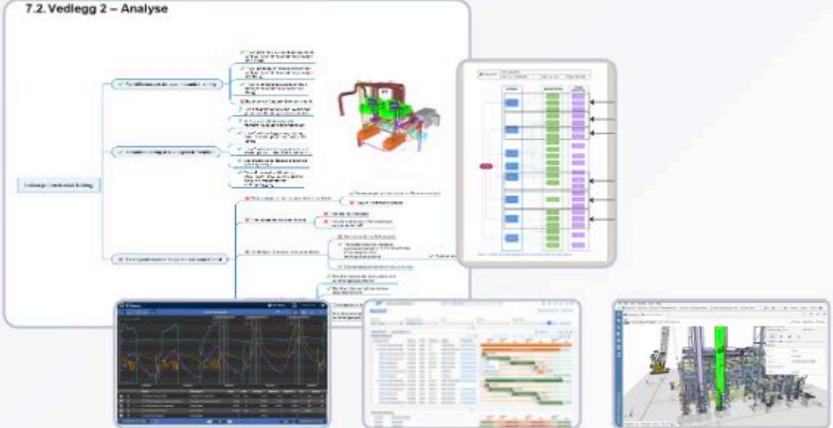
Cross functional teams: DE/DS SMEs



70-97% Efficiency Gain Achieved

BEFORE

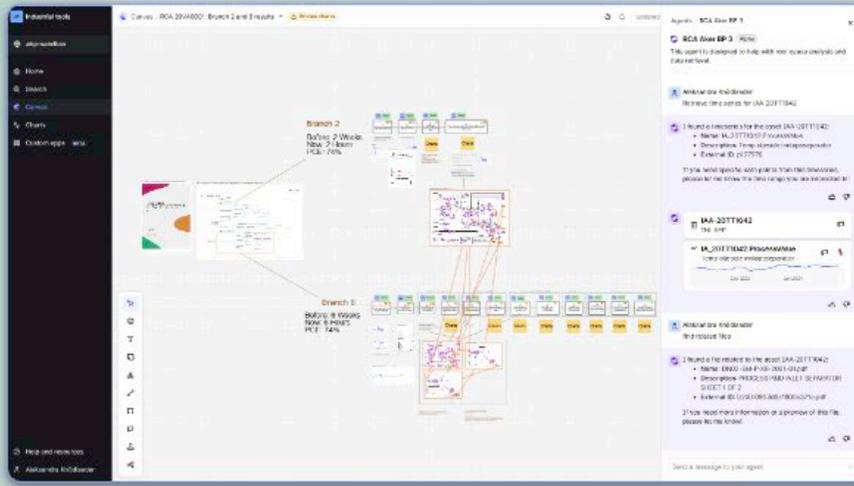
Weeks spent on Data Collection and Months on single RCA



- RCA Duration: Weeks to 9 Months
 - Up to 97% time on data gathering
 - Manual and limited quality of RCAs
- Previous AI Unsatisfactory for Industrial environment

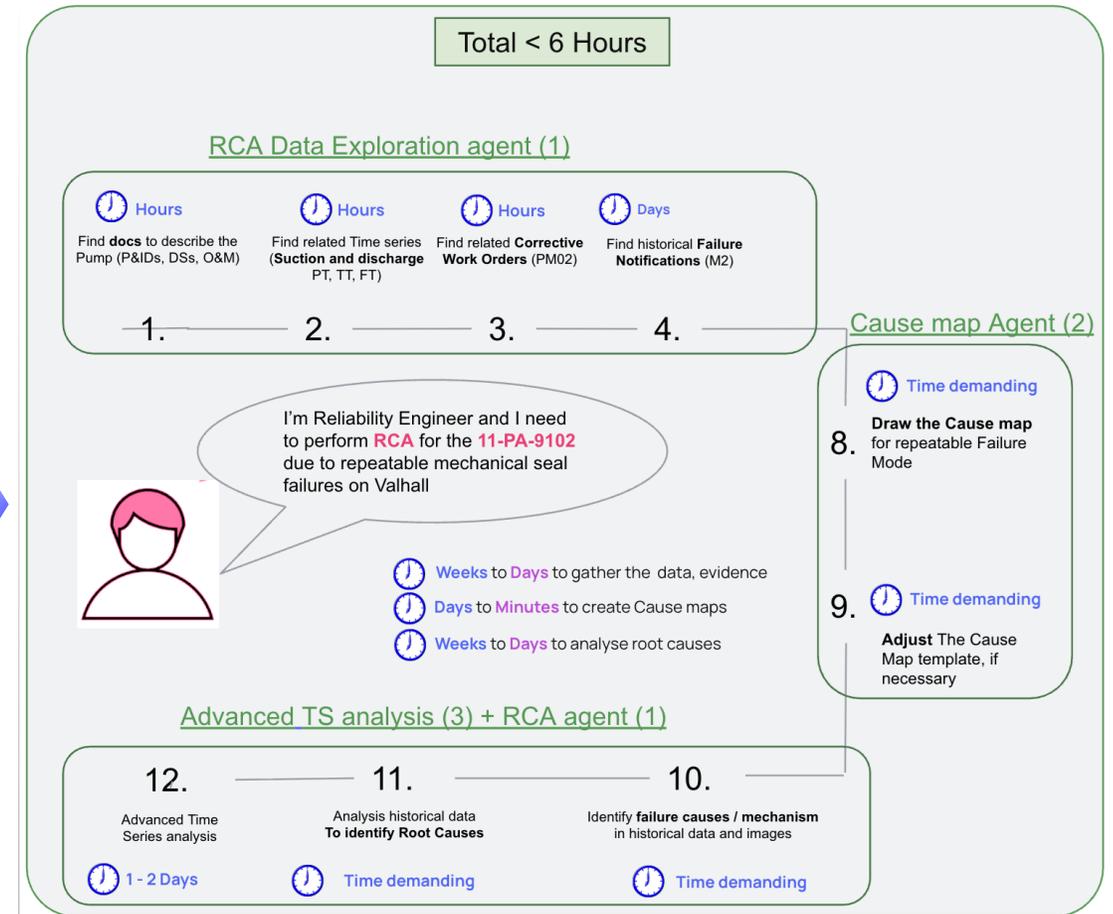
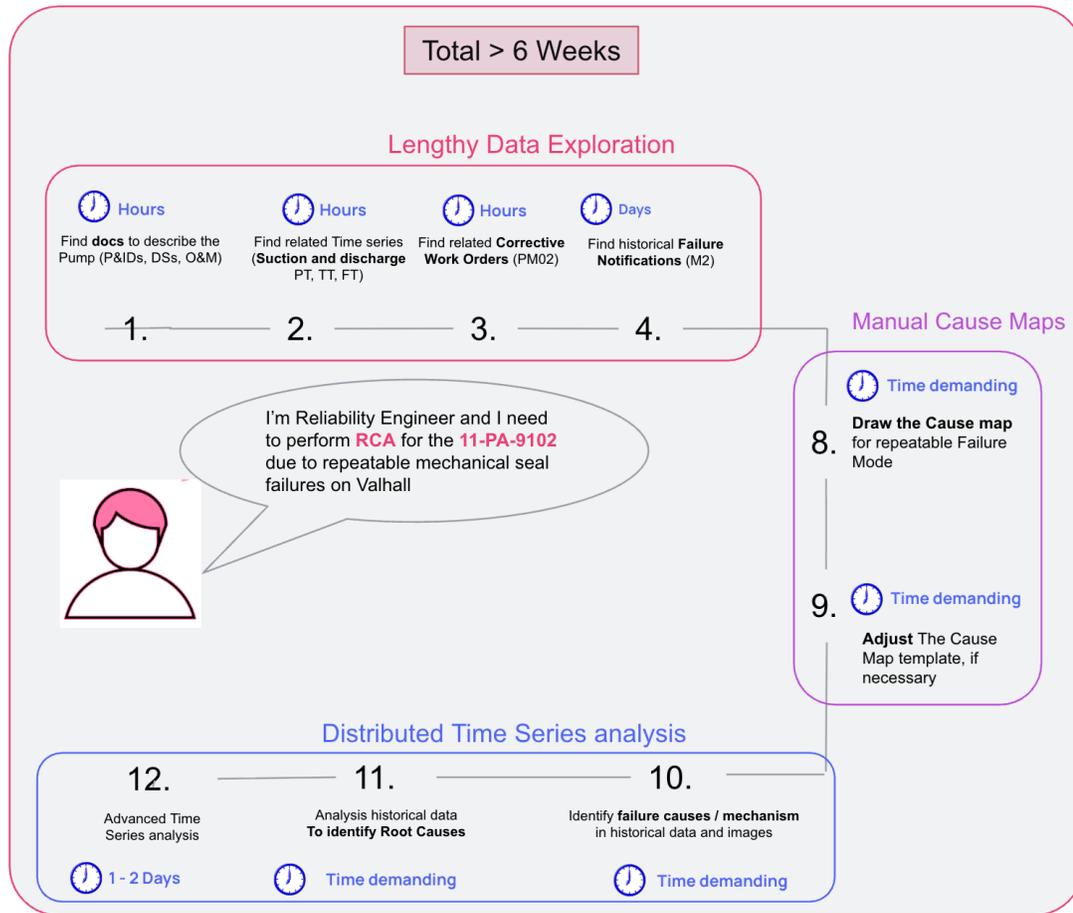
AFTER

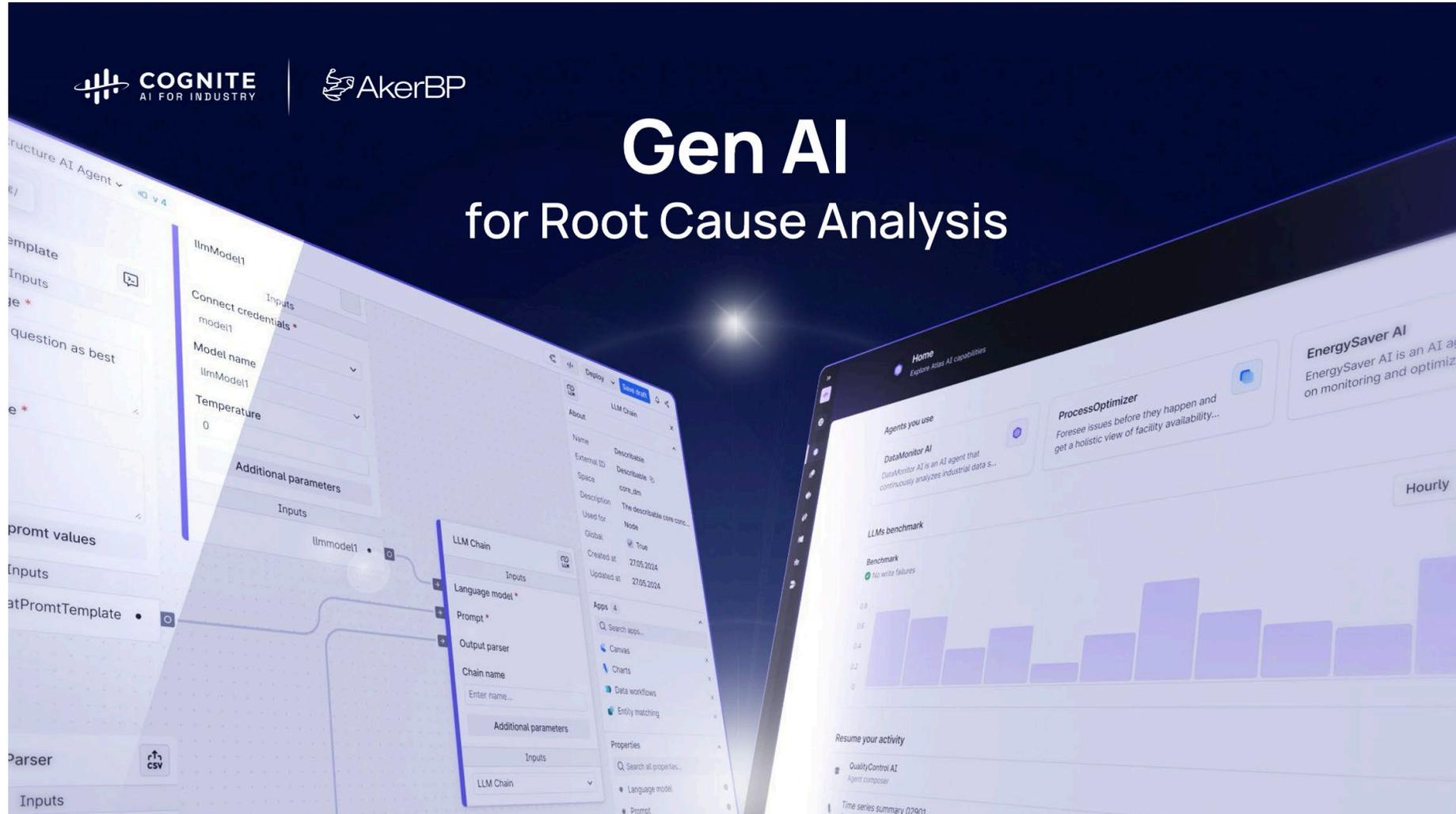
AI-Powered Insights and Automated Workflow



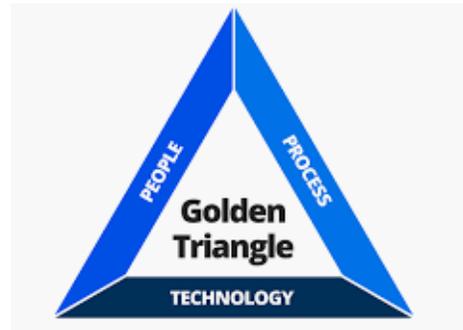
- RCA Duration: Reduced to Hours
 - Eliminated "Data gathering" with CDF and AI Agents)
 - Automated RCA workflow with improved Quality
- Grounded an trustworthy AI agents

Part 2: Aker BP Example: AI driven RCAs -> **BEFORE & AFTER**

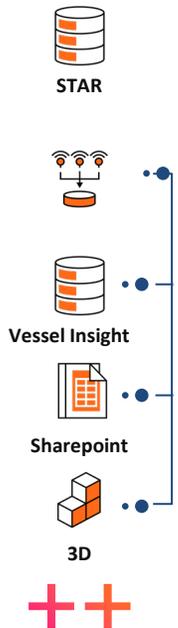








Part 2: Required TECHNOLOGY Capabilities



Part 2: Required Technology Capabilities – **Reach Library of Connectors**

Data Integration

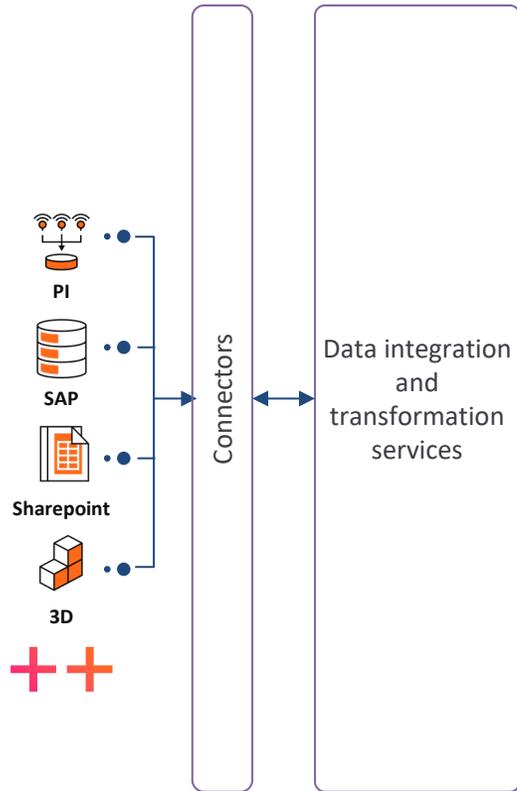
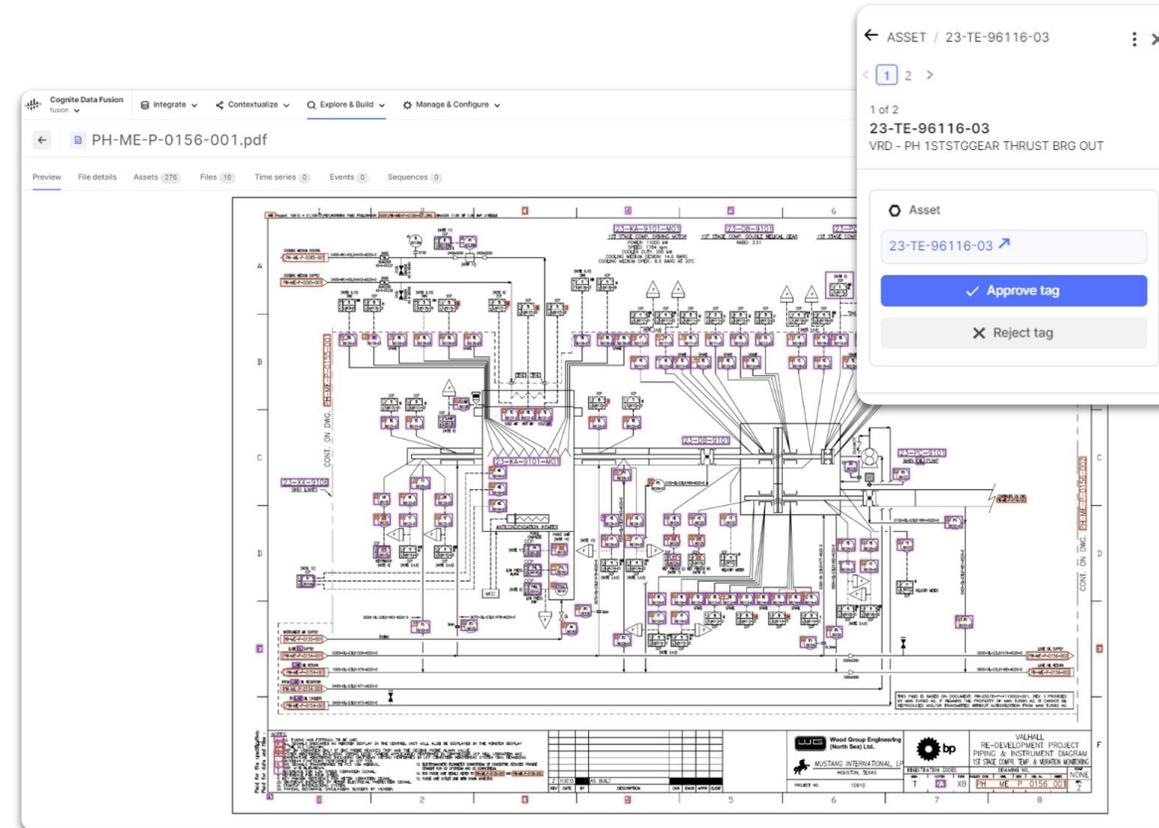
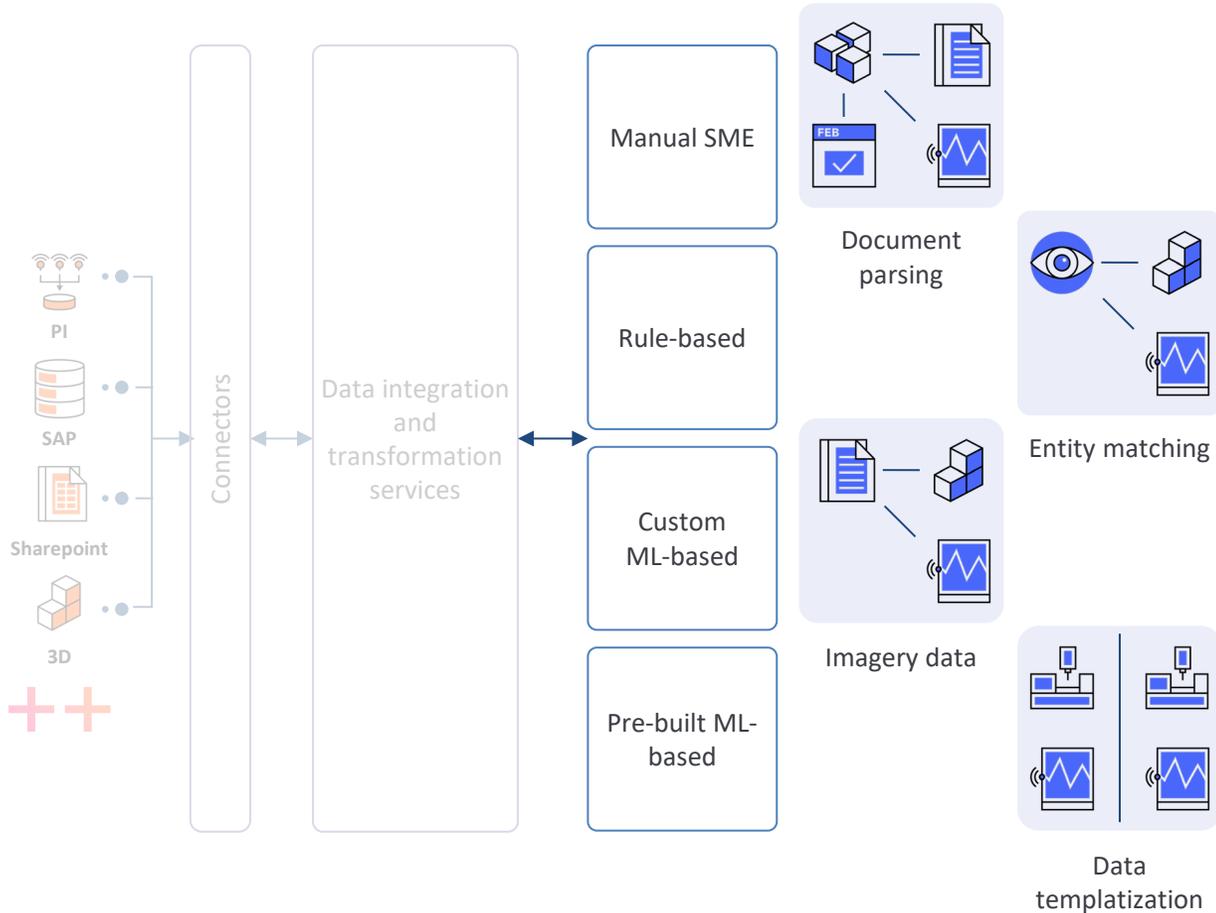


ABB ABB System 800xA Distributed Control System (DCS) from ABB. Source system	ADVANTECH Advantech OPC UA Server OPC UA Server and Gateway. Source system	altus Allus Nexto Series Industrial controller from Altus. Source system	Amazon S3 Online file storage. Source system	Azure Blob Storage Online file storage. Source system	Azure Data Manager for Energy Microsoft managed OSDU installation. Source system	rexroth Bosch Rexroth ctrlX CORE Industrial controller from Bosch Rexroth. Source system	Codesys OPC UA Embedded OPC UA server from Codesys. Source system	Cognite Boston Dynamics Spot Integration Boston Dynamics Spot CORE L1/D extension file. Extractor	Cognite DB Extractor Extracts data from databases that support CDC, such as Oracle, MySQL, or PostgreSQL. Extractor
HALLIBURTON Cognite EDM Extractor Connects to Halliburton Landmark Engineer's Data Model database and exports the data to CDP staging area. Extractor	Cognite File Extractor Extract and upload files from local file systems into CDP platform. Extractor	OPC UA Cognite OPC UA Extractor Extracts time series, events, and assets data via the OPC UA protocol. Extractor	OSDU Cognite OSDU Extractor (Beta) Extracts data from OSDU Data Platform Generic API and Wellbore DDMs. Extractor	OSB Cognite Petrel Studio Extractor Connects to Schlumberger Petrel and extracts the records to CDP as petrel objects. Extractor	OSsoft Cognite PI AF Extractor Extracts metadata from the OSsoft PI Asset Framework. Extractor	OSsoft Cognite PI Extractor Extracts time series from the OSsoft PI server. Extractor	Cognite PROSPER Connector Integrates the PROSPER simulator with CDP. Extractor	SAP Cognite SAP Extractor Extracts records from SAP ERP to CDP file. Extractor	WITSML Cognite WITSML Extractor Connects to WITSML server and exports to Cognite Data Fusion. Extractor
FESTO Festo CPX Automation platform. Source system	FRONTMATEC Frontmtec S2 SCADA system from Frontmtec. Source system	FTP / FTPS File Transfer Protocol. Source system	Google Cloud Storage Online file storage. Source system	HITACHI Hitachi HX-Series Industrial automation product line from Hitachi. Source system	IBM Db2 Relational database system from IBM. Source system	KEPServerEX Connectivity platform from PTC. Source system	HALLIBURTON Landmark Engineer's Data Model Historical and real-time time series data. Source system	Local files A file or directory of files. Source system	MariaDB Open Source RDBMS compatible with MySQL. Source system
Microsoft SQL Server Relational database system from Microsoft. Source system	MySQL Popular open source relational database developed by Oracle. Source system	opentext OpenText Documentum Document management platform. Source system	opentext OpenText Documentum D2 Extension for the Documentum platform. Source system	Oracle Database Relational database system from Oracle. Source system	OSDU OSDU Data Platform OSDU Data Platform. Source system	OSsoft OSsoft PI Historical and real-time time series data. Source system	Parker Parker Automation Controller Automation device from Parker Hannifin. Source system	petrolink Petrolink WITSML/EIP Server Petrolink WITSML/EIP Server. Source system	PostgreSQL Popular and powerful open source relational database. Source system
SAP ERP 6.0 Enterprise resource planning software developed by SAP SE. Source system	SAP HANA SAP HANA In-memory RDBMS developed by SAP SE. Source system	SAP S/4 HANA SAP S/4HANA Cloud Enterprise resource planning software developed by SAP SE. Source system	SAP S/4 HANA SAP S/4HANA OnPremise Enterprise resource planning software developed by SAP SE. Source system	SFTP File Transfer over SSH. Source system	SharePoint Online Online document library. Source system	SIEMENS Siemens Industrial Edge Edge computing platform from Siemens. Source system	SLD Petrel 2020 SLD SLP software platform. Source system	Snowflake Snowflake database storage. Source system	SQLite SQLite Lightweight embedded SQL database engine. Source system

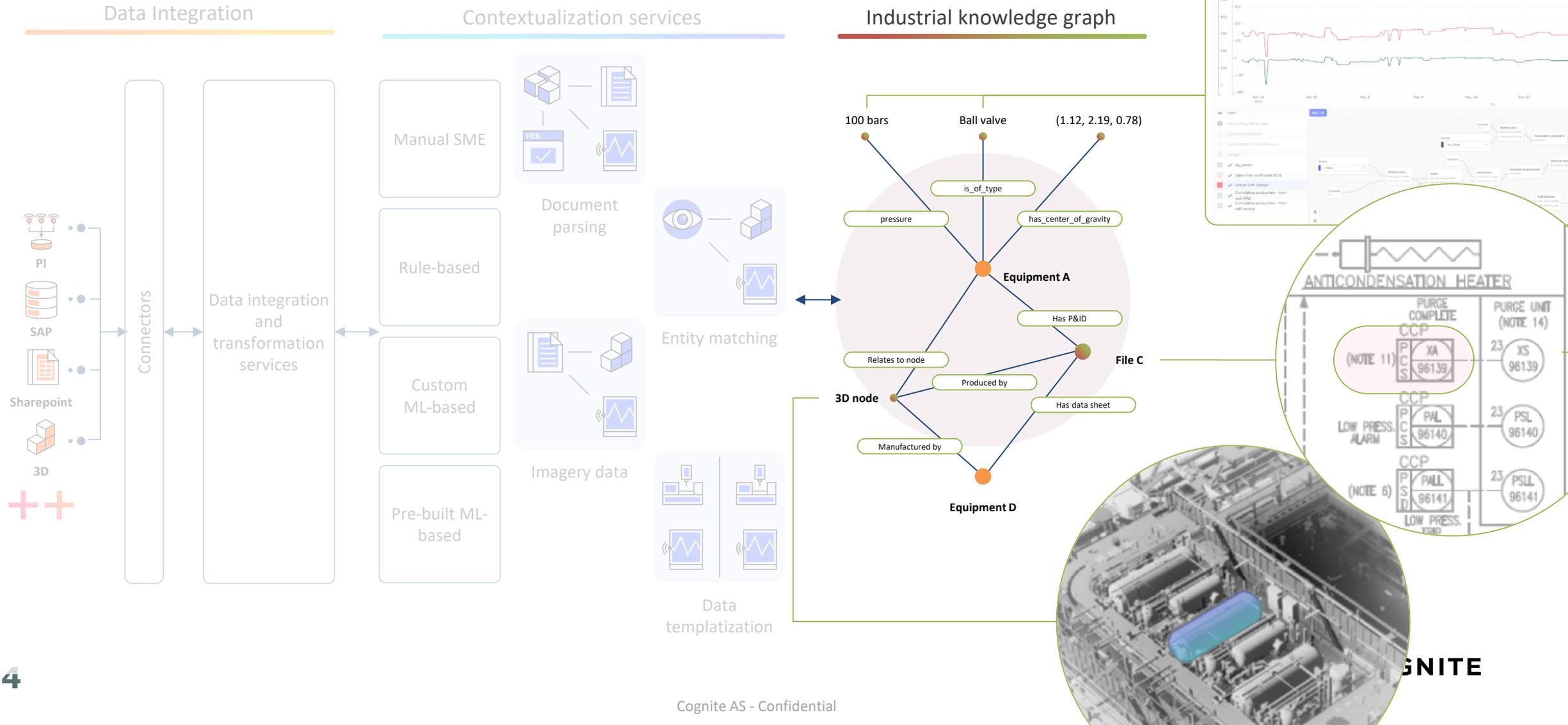
Part 2: Required Technology Capabilities – **Programmatic Contextualization tools**

Data Integration

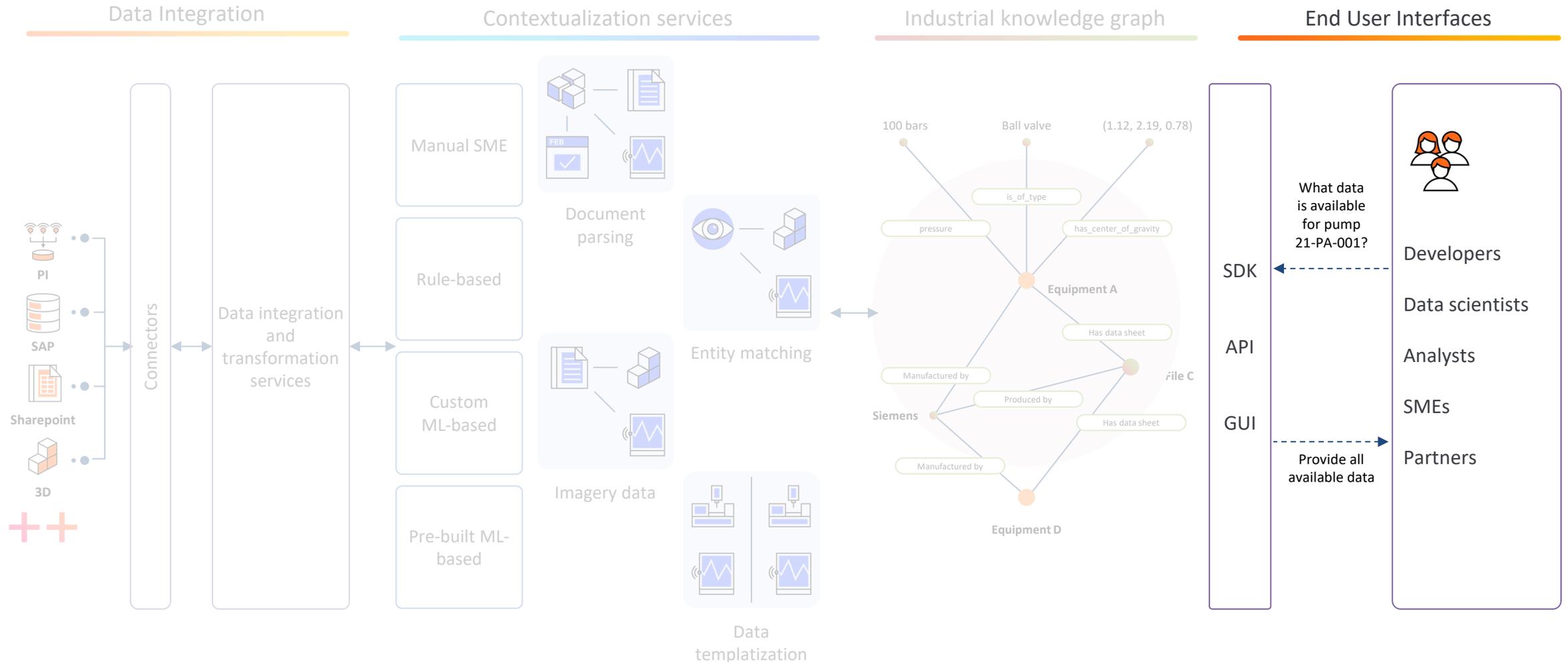
Contextualization services



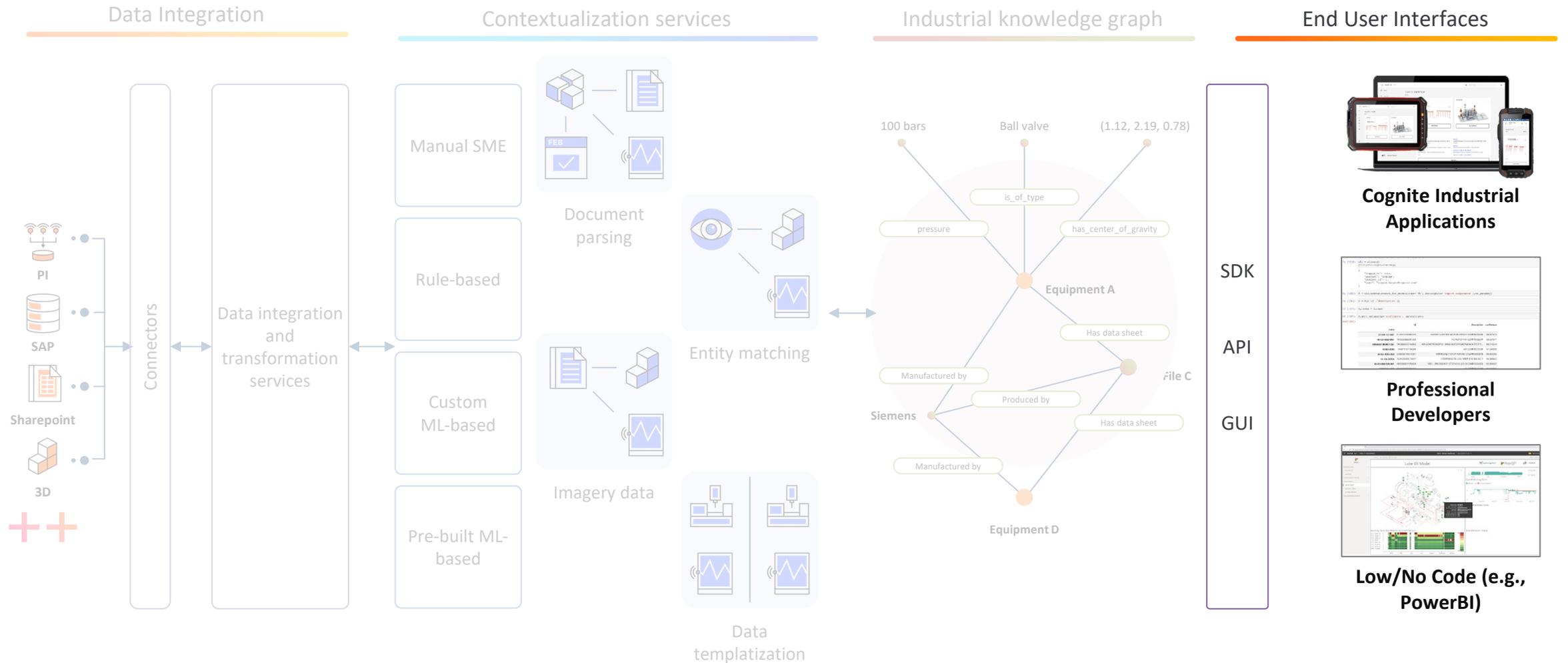
Part 2: Required Technology Capabilities – **Flexible Industrial Knowledge Graph**



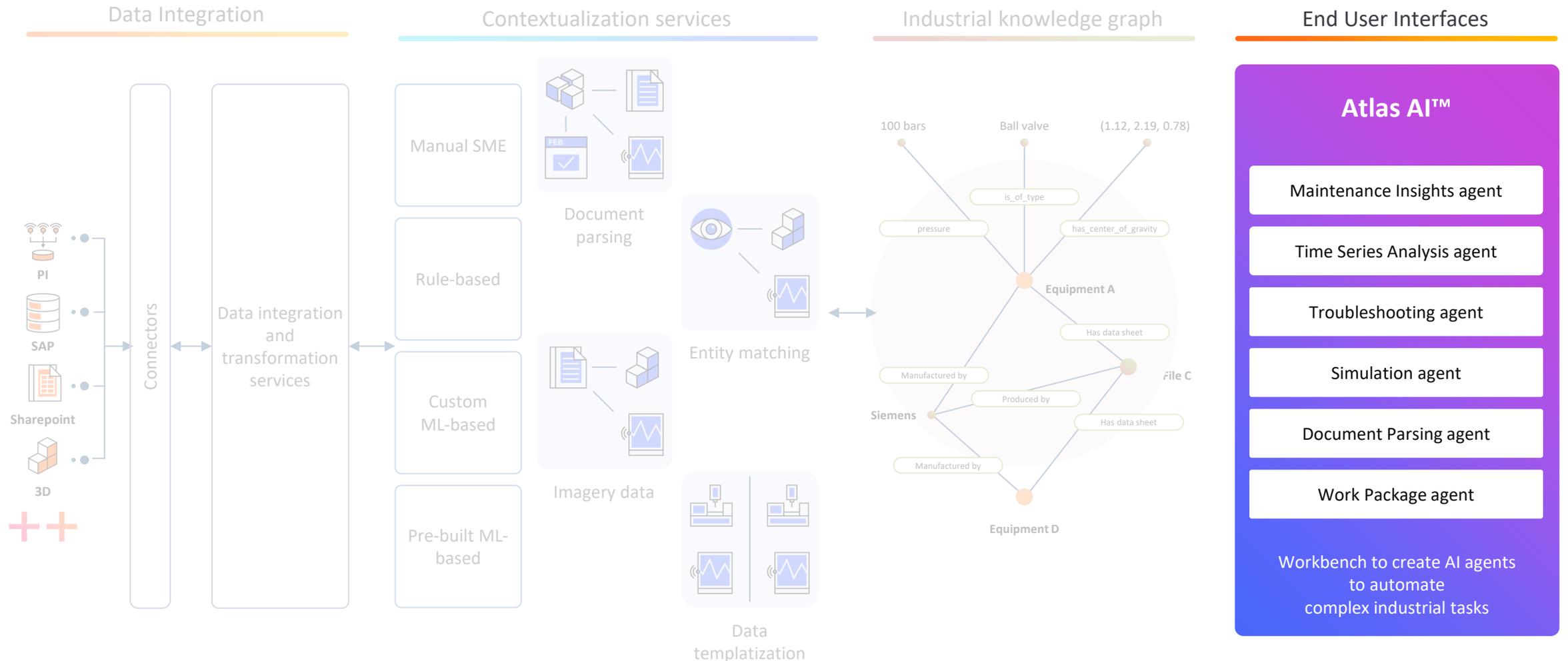
Part 2: Required Technology Capabilities – **Low code** for SMEs and Data Engineers



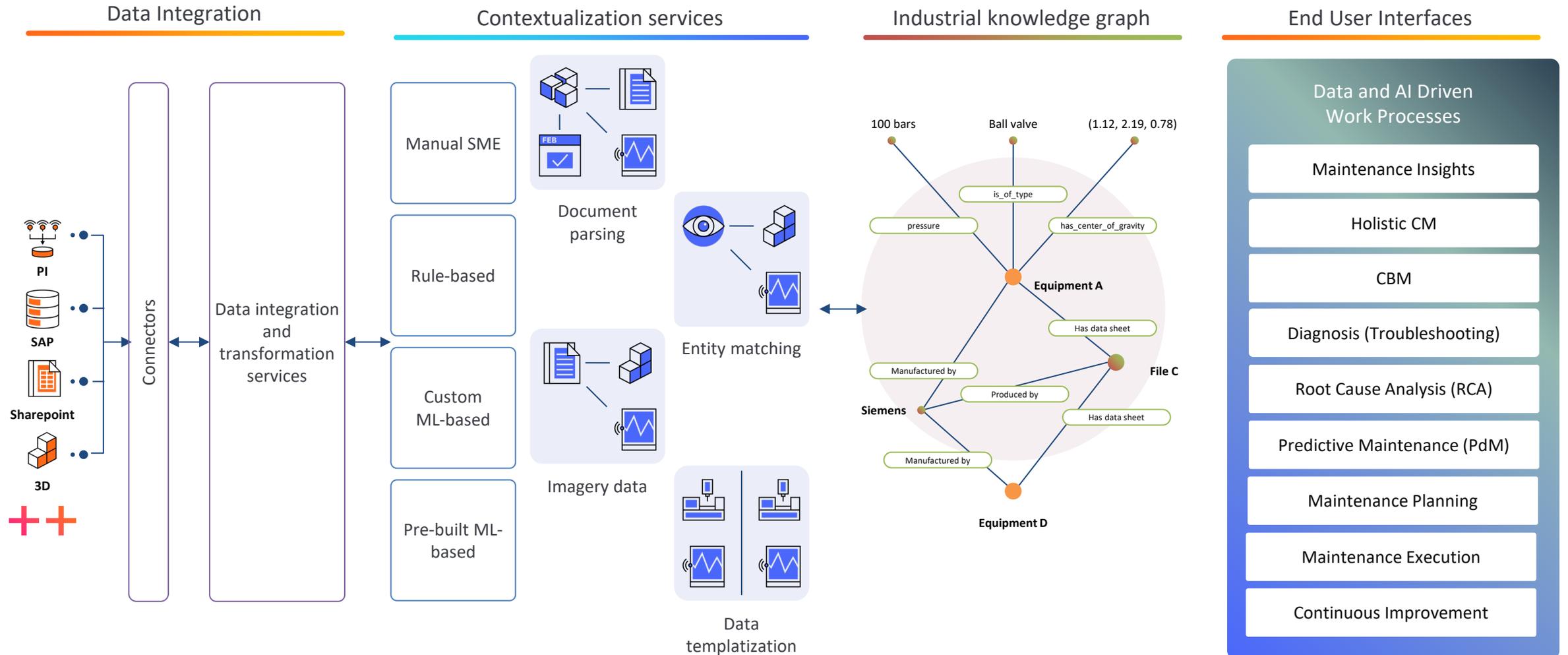
Part 2: Required Technology Capabilities – **Flexible End User Interfaces**

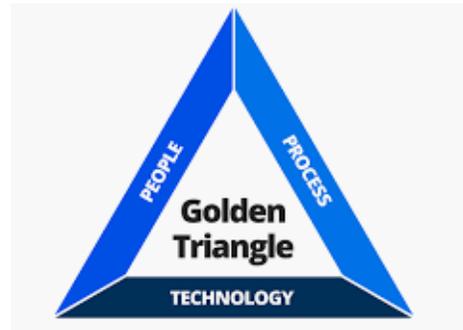


Part 2: Required Technology Capabilities – **Centralized Atlas AI Solutions**

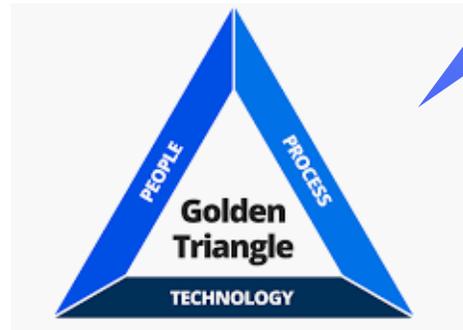


Part 2: Required Technology Capabilities – **Industrial Data OPS (Foundation) for R&M Workflows**

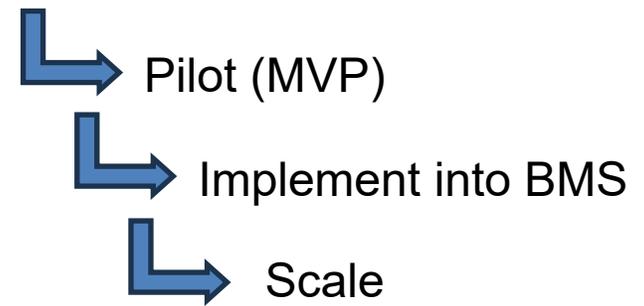
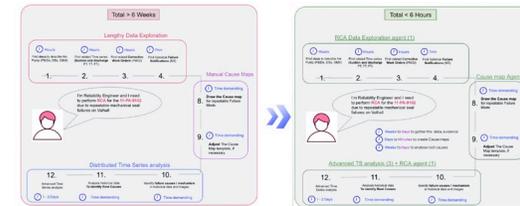




Part 2: HOW to do it? Required **Data and AI driven** PROCESS



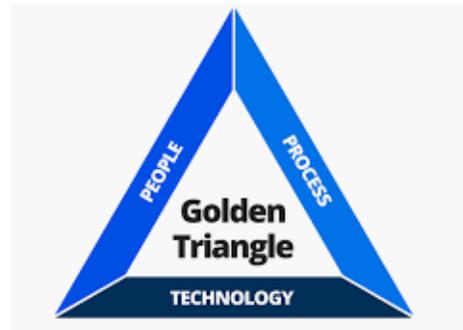
PROCESS:
 Workflow-first approach
 Start from value, not technology
 Focus on reliability outcomes
 Automate what's repetitive
 Build MVP → Scale fast



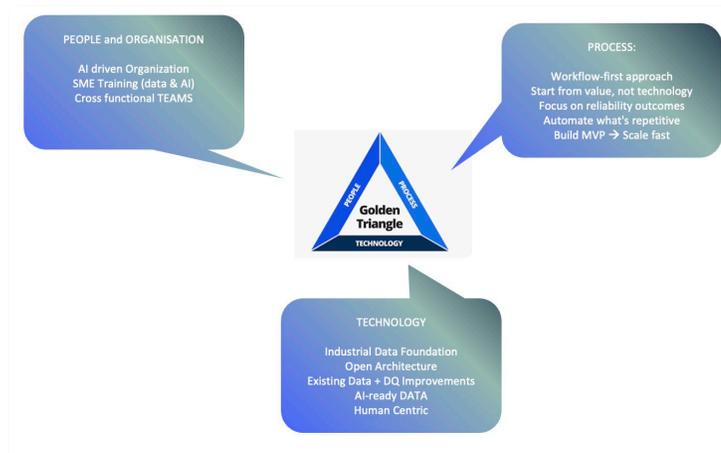
Part 2: HOW to do it? **Data and AI driven Organisation - TODAY**, not Tomorrow

PEOPLE and ORGANISATION

AI driven Organization
SME Training (data & AI)
Cross functional TEAMS



Part 2: Part 2: The Result: R&M as the Driver of Digital Value TODAY!



Conclusion: Stop "Managing" Data. Start *Using* It.

Digital maintenance is about enabling People!
 Better information → better decisions
 Reliability creates value → every day

Q&A

Thank you



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Cognite

Practical Digital Solutions to Reliability & Maintenance Challenges

Part 1 The Strategic Imperative & The Great Blocker



Intro



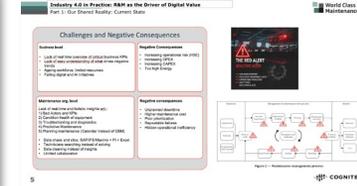
Agenda



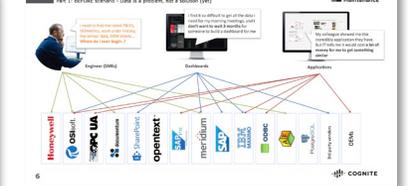
Part 1 Intro



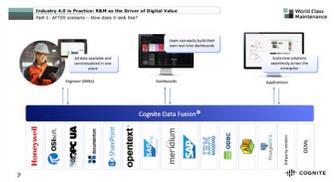
AK Intro: Not here as tech vendor but SME and want to share the experience and the realistic approach on how to rip value for R&M with data and AI



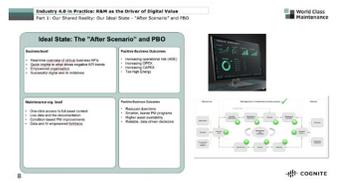
Our shared reality: Lets be honest about BEFORE scenario, hostage to the red alert! With Negative consequences to business and high cost of doing Nothing



Example of BEFORE which we are hostage to



Example of how good should look like



Summary of AFTER and Positive Business Outcomes



So, if we all know where we need to go, why are we still stuck? Why Are We Still Firefighting?



It's a Data chaos = Data Tax



We need a better data foundations! - Intro to part 2.