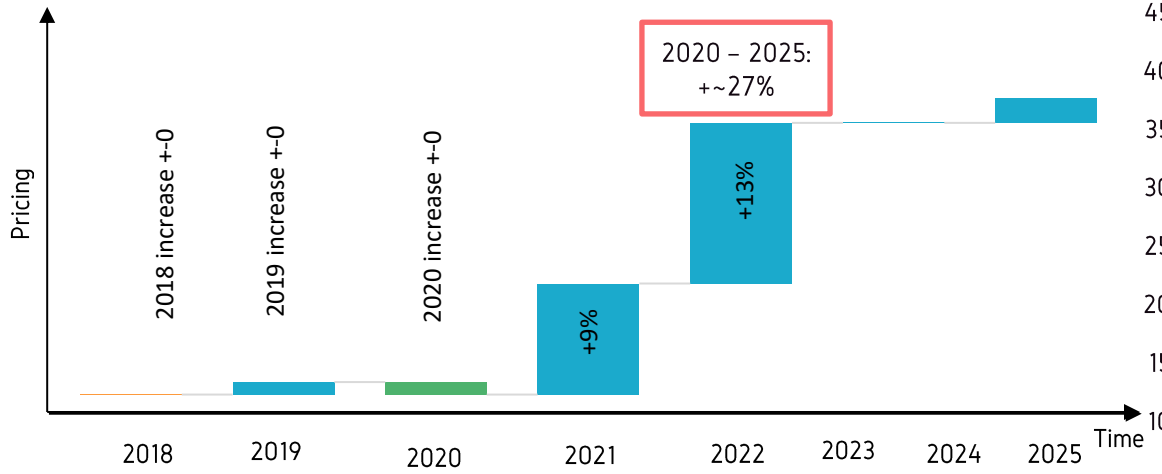
Smart Equipment Passport (SEP)

Analysics + AI for Engineering Management

The process industry needs Advanced Analytics & Artificial Intelligence to manage changing environments and increase efficiency

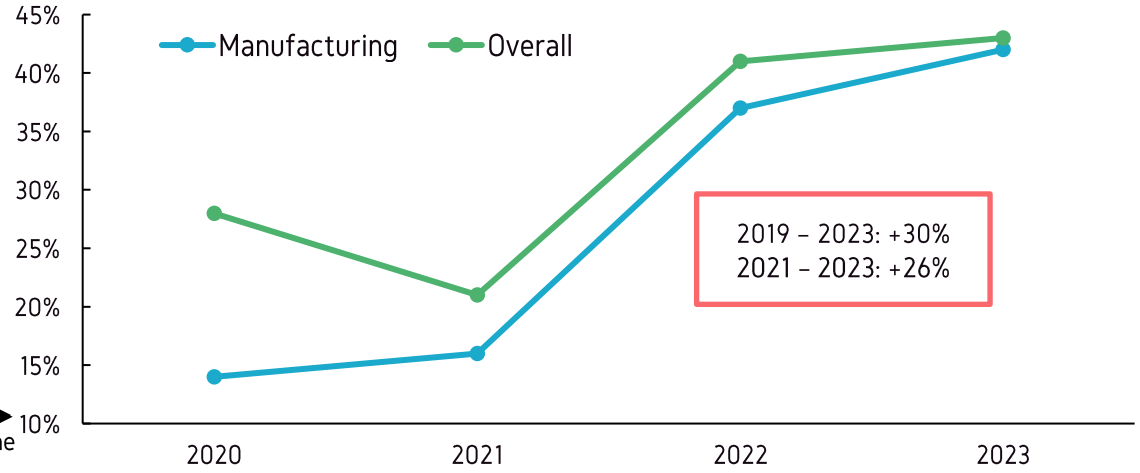
Production is becoming more expensive in Europe

*Germany Manufacturing Producer Price Index (Europstat) (I:GMPPI) (ref)



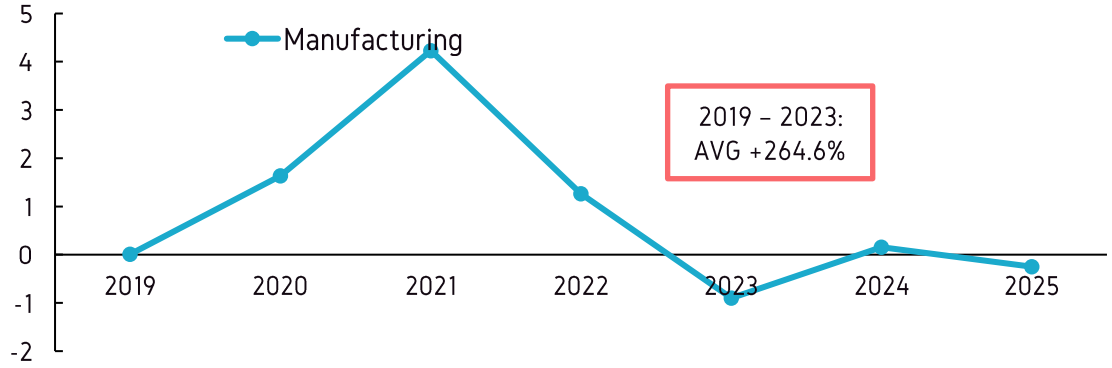
Constant growth in shortage of skilled employees in Germany

*Based on the Business Survey of the ifo institute, January 2023 (ref)



Industry is struggeling with high pressure inside the supply chain

*Global Supply Chain Pressure Index (FED) (ref)



The overall demand to reduce cost and digitalize is becoming more relvant

SEP provides key technologies to manage the demand and support the workforce

SEP provides a digital platform and advanced analytics to create transparency and trust in data.

SEP provides AI to support the workforce and different disciplines.

Production Cost	+~25%
Shortage of skilled employees	+30%
Supply Chain issues	+265%

SEP is the Data Analytics and AI extension for the EAM tool landscape, integrated to the BTP and SAC or On-premises

Challenge

- Information Quality Assessments & Risk Management
- Automation for Project to Asset hand-over
- Access to engineering information

Solution

Engineering

Data Platform
Central platform to exchange specification, document with externals

Federated System
Exchange information inside a trusted environment

Construction

Material Tracking
Intelligent passports for equipment from the beginning onwards

Advanced Analytics
Collect information and create a single-point-of-truth

Production, Maintenance and Turn Around

Digitalization P&ID
Turn PDF based drawings into digital enriched information

AI & Advanced Analytics
Enrich PDF documents with passport data

Data Governance
Improve Master Data and Inspection schedules

Advanced Analytics
Improve Master Data quality constantly

2D Code
Link your equipment to digital information

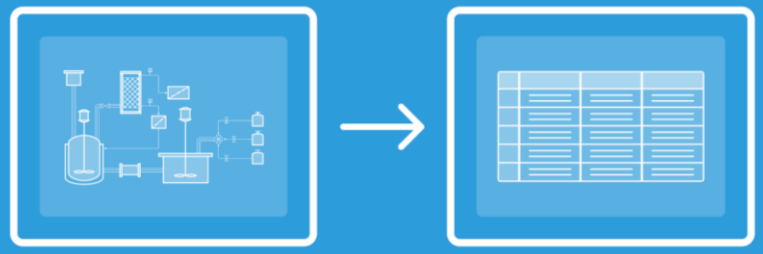
Tagging
Link information to equipment

Benefits

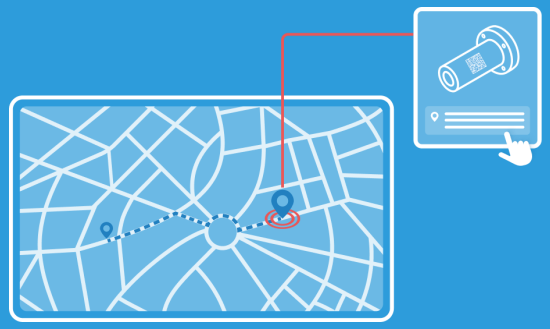
Financial	Reduce cost for equipment procurement for projects and maintenance by ~11%.	Equipment cost can be reduced by ~6%.	SEP reduces the effort to transform P&IDs by at least 60%.	Data Quality assessments can be executed ~70% faster	Information lookup time is reduced by ~80% in operations.
Qualitative	Specifications and status can be exchanged faster, more reliable. Tracking through the supply chain is enabled.	Passports and Augmented Reality allow internal and external workforce to always identify and find equipment on the shop floor.	SEP contextualizes information from documents/drawings with Master Data to highlight issues.	SEP can especially support during improvements and Digital Twin rollouts.	Internal and external workforce can access information anytime.

Artificial Intelligence can do what until today was not possible to do without massive investments

Collect all data from various sources to create trustful digital identities for equipment



Transform old technical drawings into digital engineering and documentation



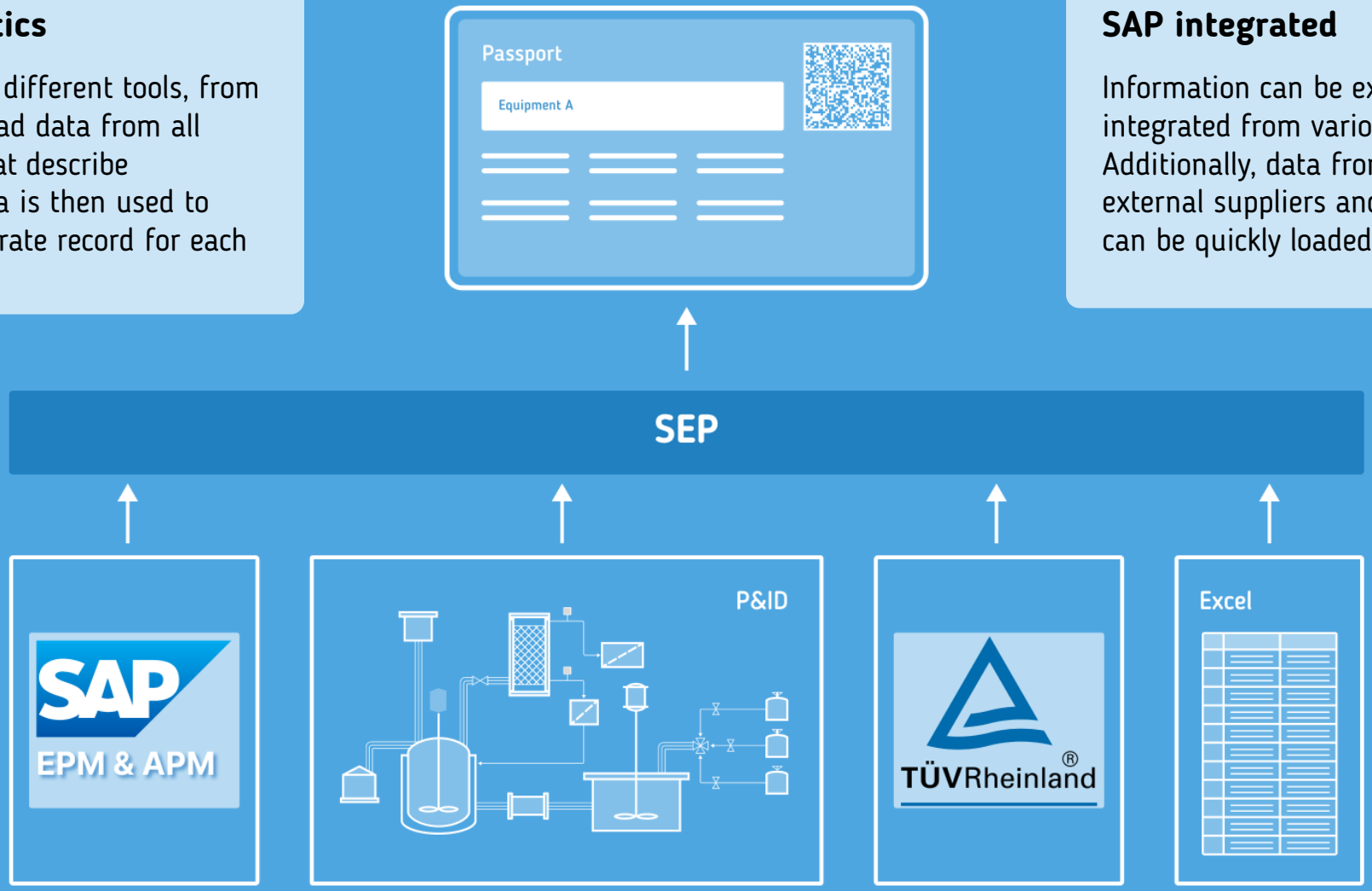
Detect issues during engineering and project phases

Semi-automate data hand-over between engineering, construction and maintenance

SEP has been built to harmonize Master Data for equipment and create a single-point-of-truth in brownfield

Advanced Analytics

SEP is using several different tools, from analytics to AI, to load data from all available sources that describe equipment. This data is then used to create a single, accurate record for each piece of equipment.



SAP integrated

Information can be extracted and integrated from various SAP systems. Additionally, data from engineering, external suppliers and other internal apps can be quickly loaded and integrated.

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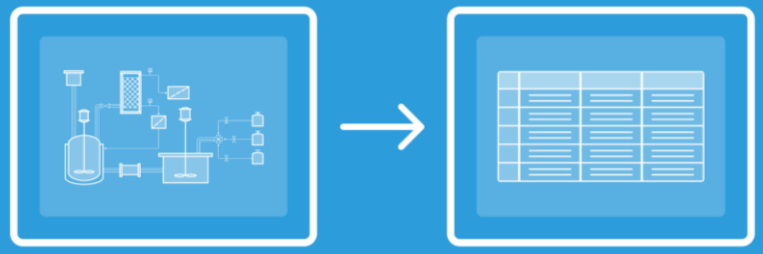

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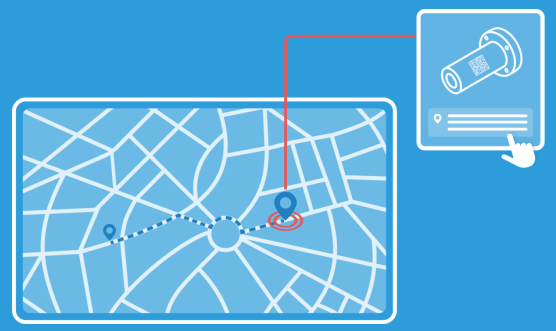


Detect issues during engineering and project phases

Semi-automate data hand-over between engineering, construction and maintenance

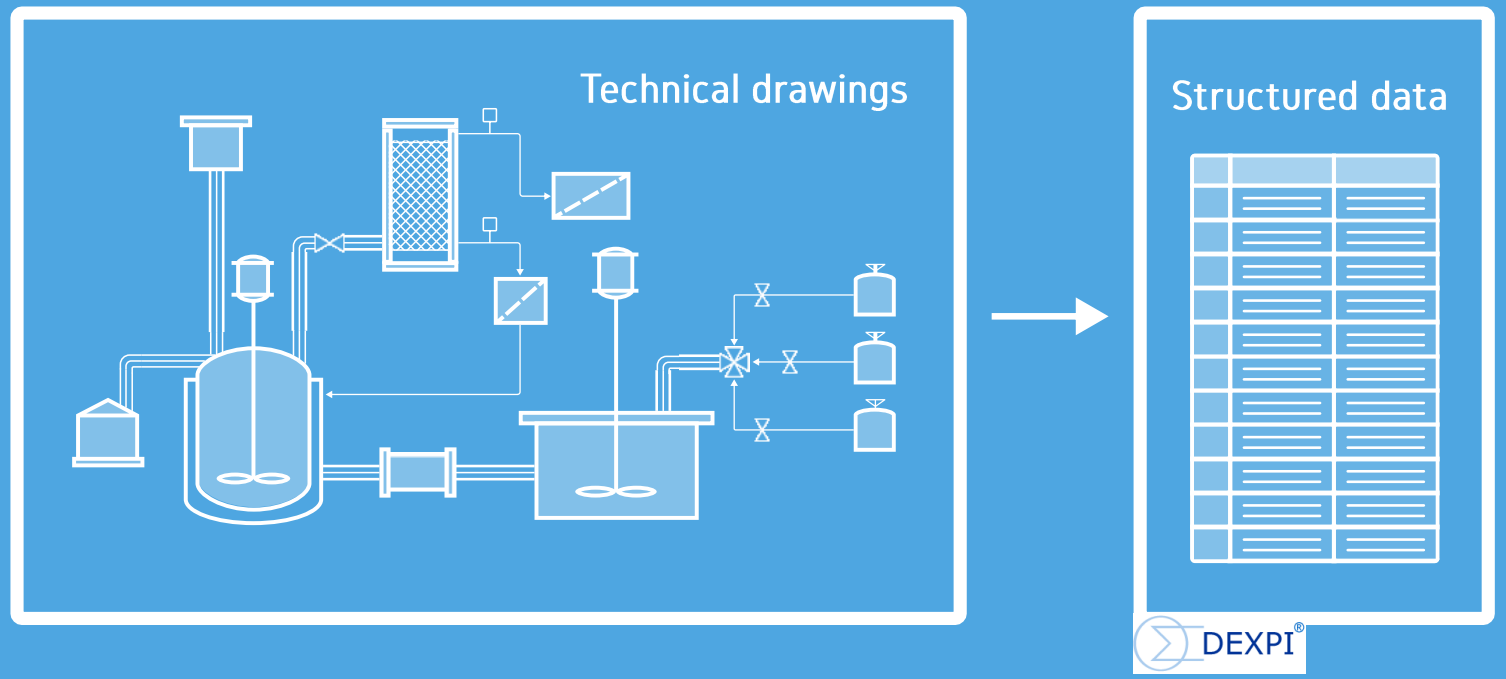
Machine Learning to generate a Digital Identity

SEP can use several different data sources to automatically generate a single data record for an equipment with a precision of >97%, using internal and external information on FLOC, equipment and inspection schedule granularity.

Digital Platform for internal and external access

SEP is a digital platform that can be used by internal and external stakeholders. Access and rights management can be managed inside the existing authentication providers and configured in SEP. The validation tool allows human-machine interaction to validate master data and inspection schedules.

Artificial Intelligence can read data from technical drawings and transforms it into structured data



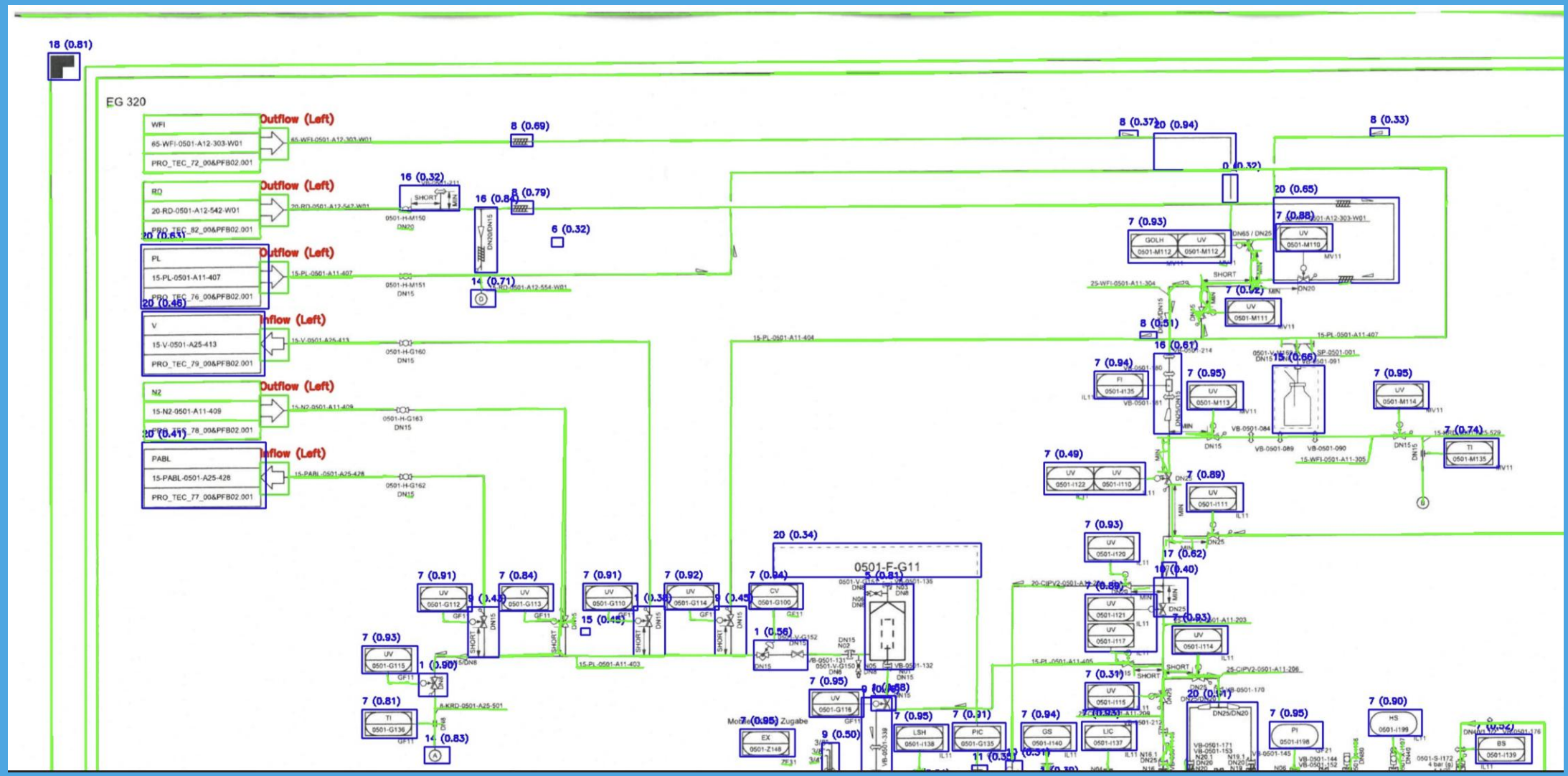
Machine Learning to transform technical drawings into data

SEP can understand technical drawings like P&IDs and extracts different equipment types and their naming. Based on this information, tags can be mapped to FLOCs with a precision of ~99%. SEP generates powerful spreadsheets and DEXPI XML files, containing all relevant master data and issues.

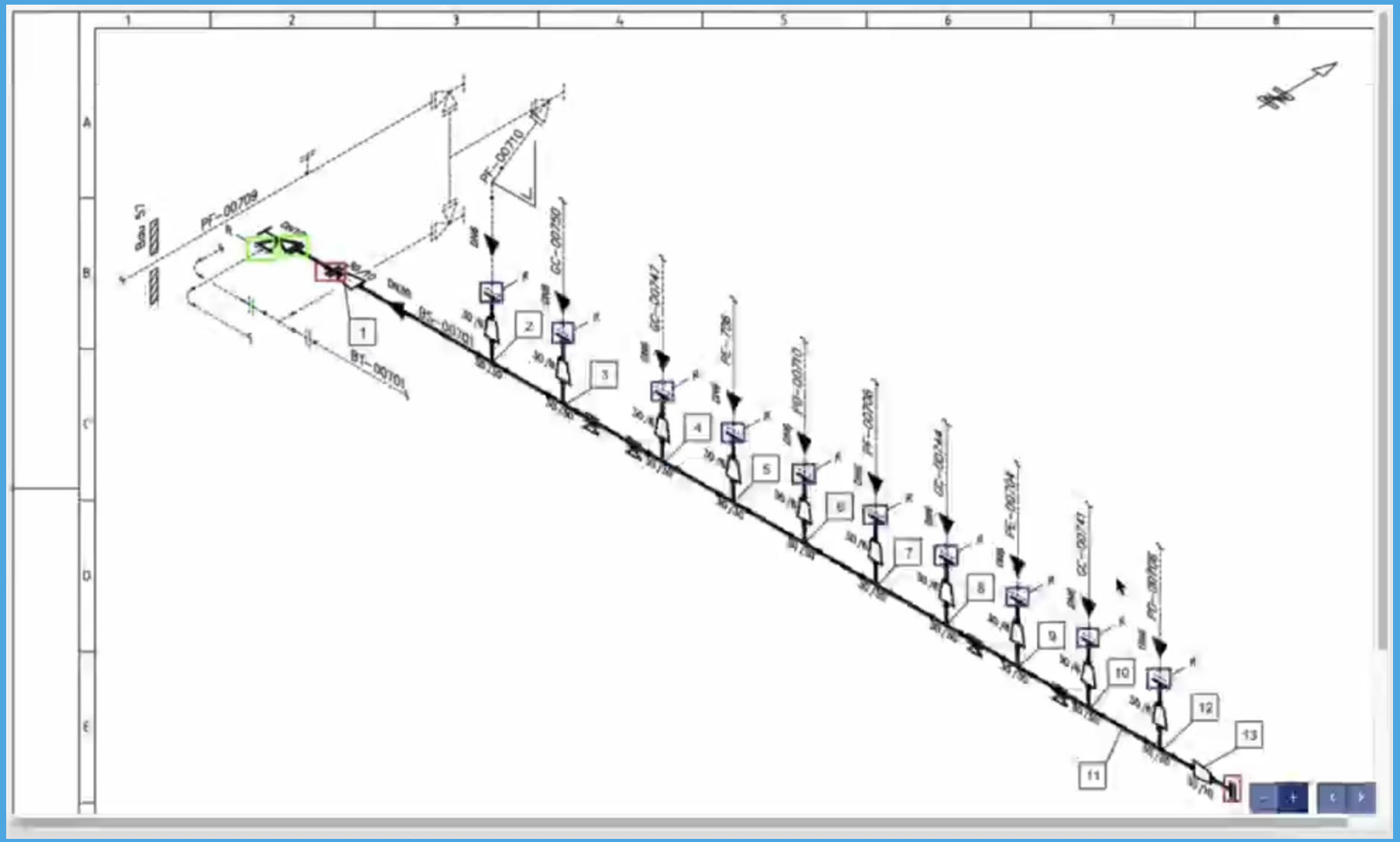
Data Governance for SAP master data, technical drawings and COMOS and AVEVA

SEP can contextualize all relevant data sources to create a single-point-of-truth. This information can be used to generate missing data, correct existing data and enable the setup of Digital Twins.

AI models can be trained to detect objects and structure to understand existing engineering using prepared training data



Even more complex structures can be detected from scans or PDF files and transformed into digital information



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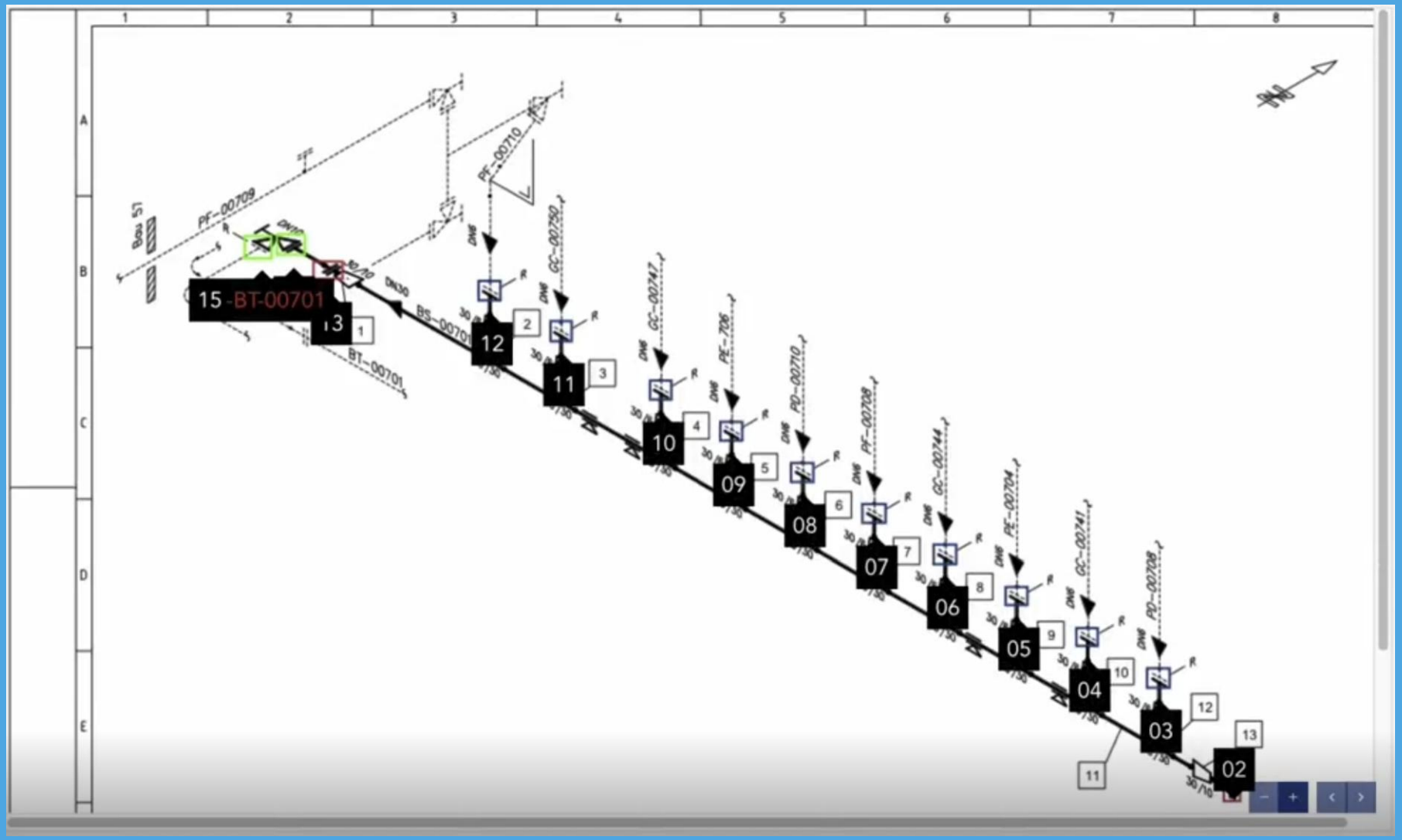
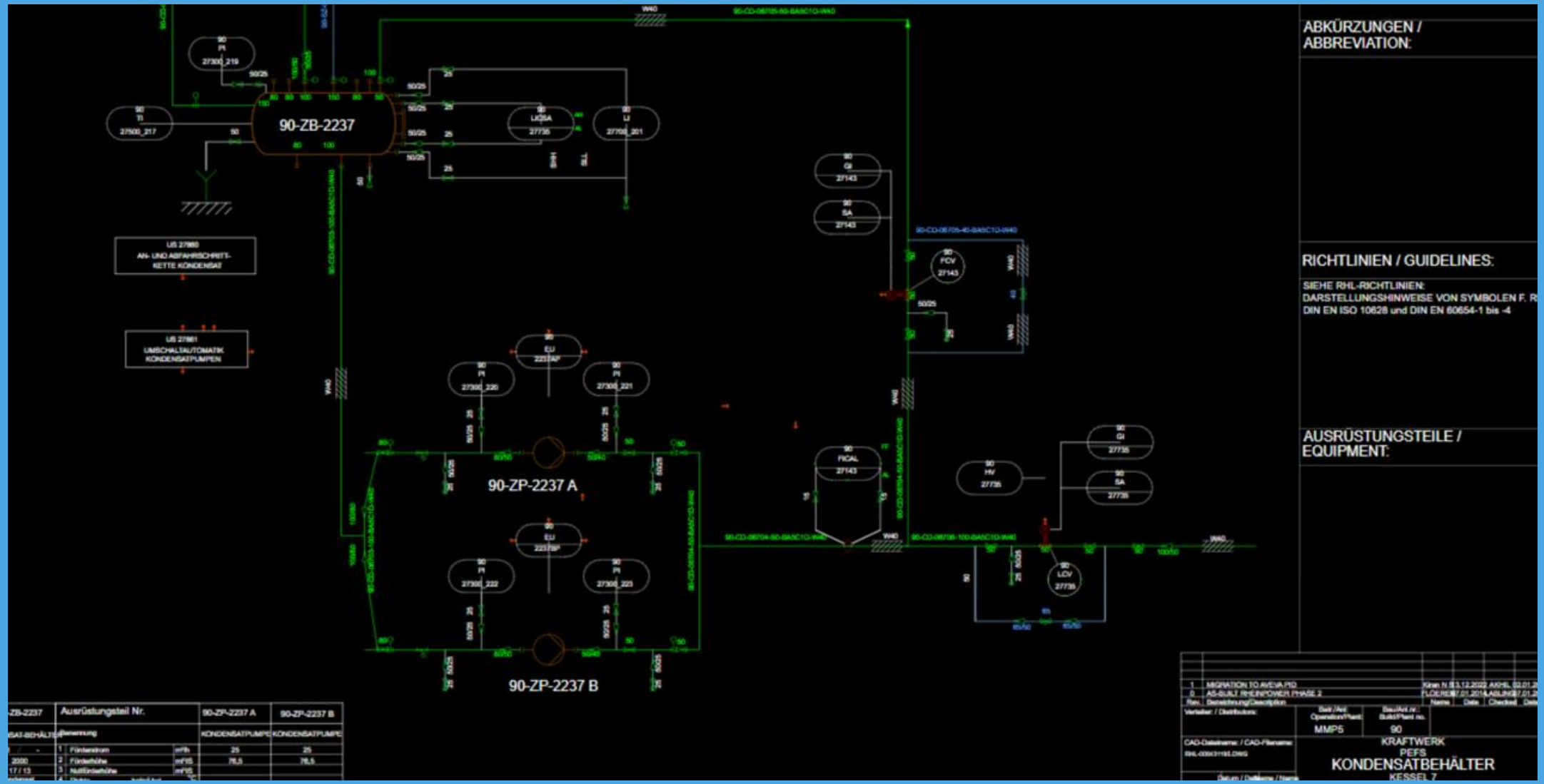


The extracted information can be contextualized with more information and used to semi-automatically build drawings or twins



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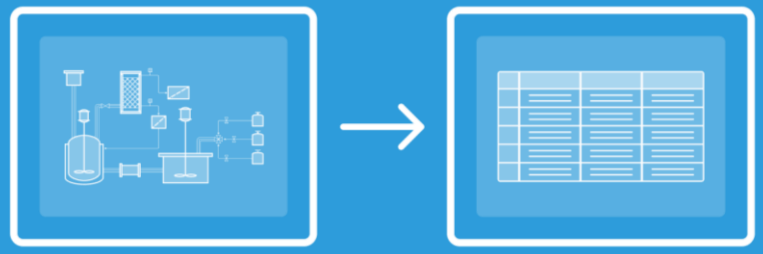

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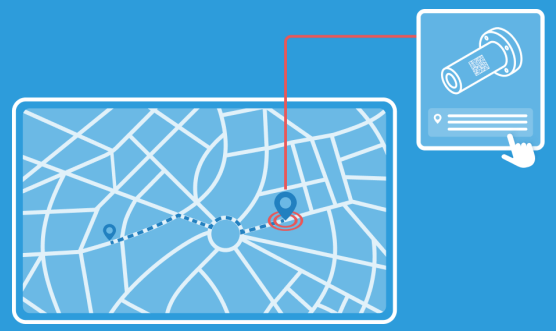


Detect issues during engineering and project phases

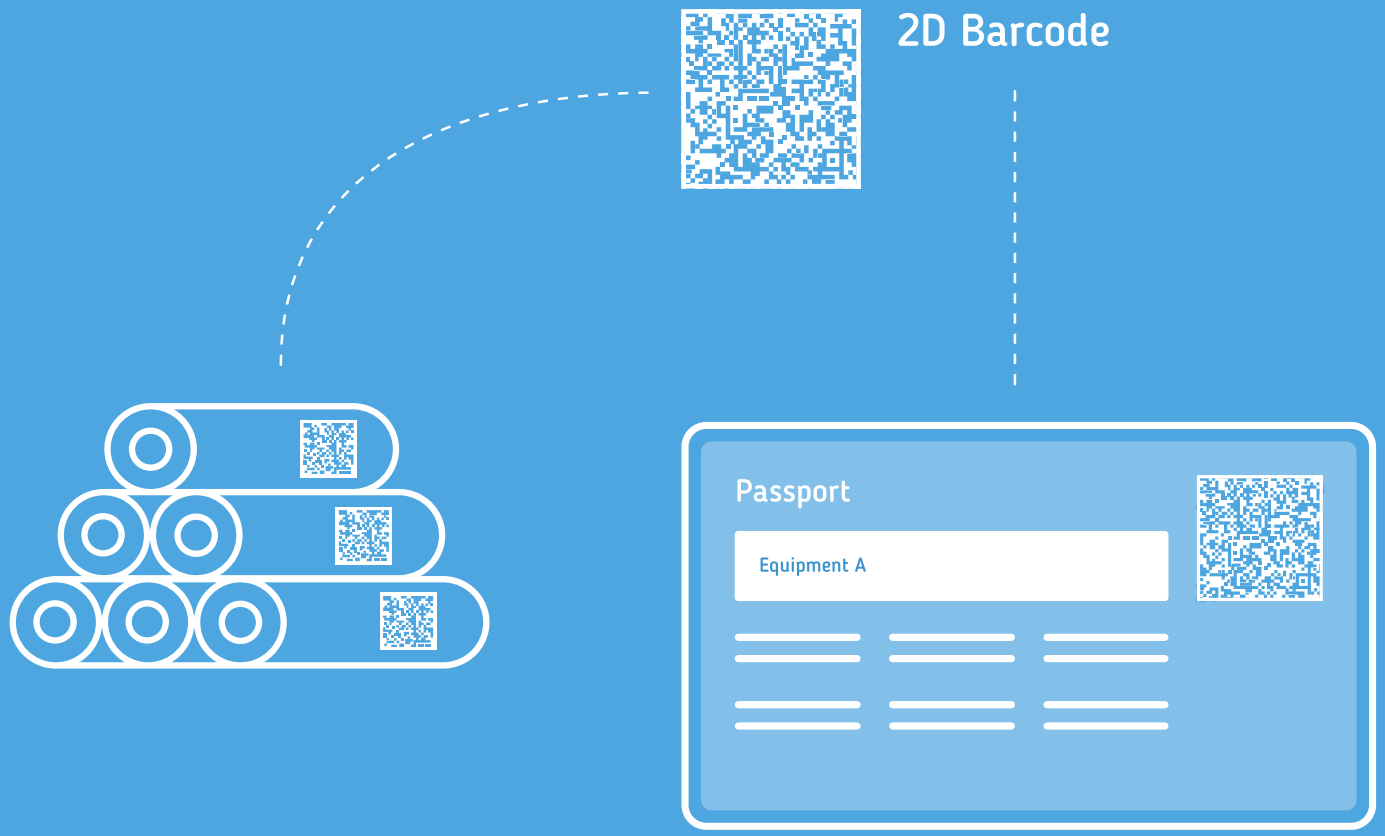
Semi-automate data hand-over between engineering, construction and maintenance

Digital Platform for internal and external access, barcode enabled

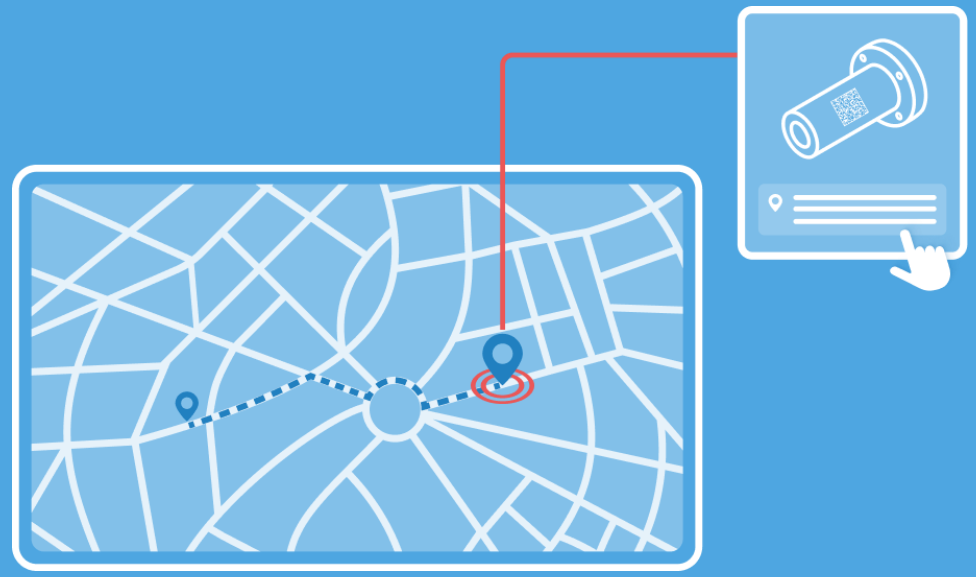
SEP is a digital platform that can be used by internal and external stakeholders. Access and rights management can be managed inside the existing authentication providers and configured in SEP.
2D barcodes can be used to link the equipment to the equipment passport.

Workflow tracking

SEP allows users to track status and position of equipment during a Turn Around. In the same time, inspection and maintenance during daily business is supported and transformed into a process management environment.



SEP is establishing a ecosystem for inspection management that is AI enabled



Material tracking for greater transparency throughout the lifecycle

SEP helps you find your equipment faster and more reliably, all based on 2D barcodes. SEP also supports the use of LoRaWAN GPS trackers and RFID for even more accurate tracking.

Workflow tracking

SEP allows users to track the status and position of equipment during all activities. The Status can be customized to your needs.
Ensuring a more efficient communication.

Turnaround Tracking

SEP helps reduce your turnaround time by providing easy to use advanced status tracking. Users can access the data from anywhere.

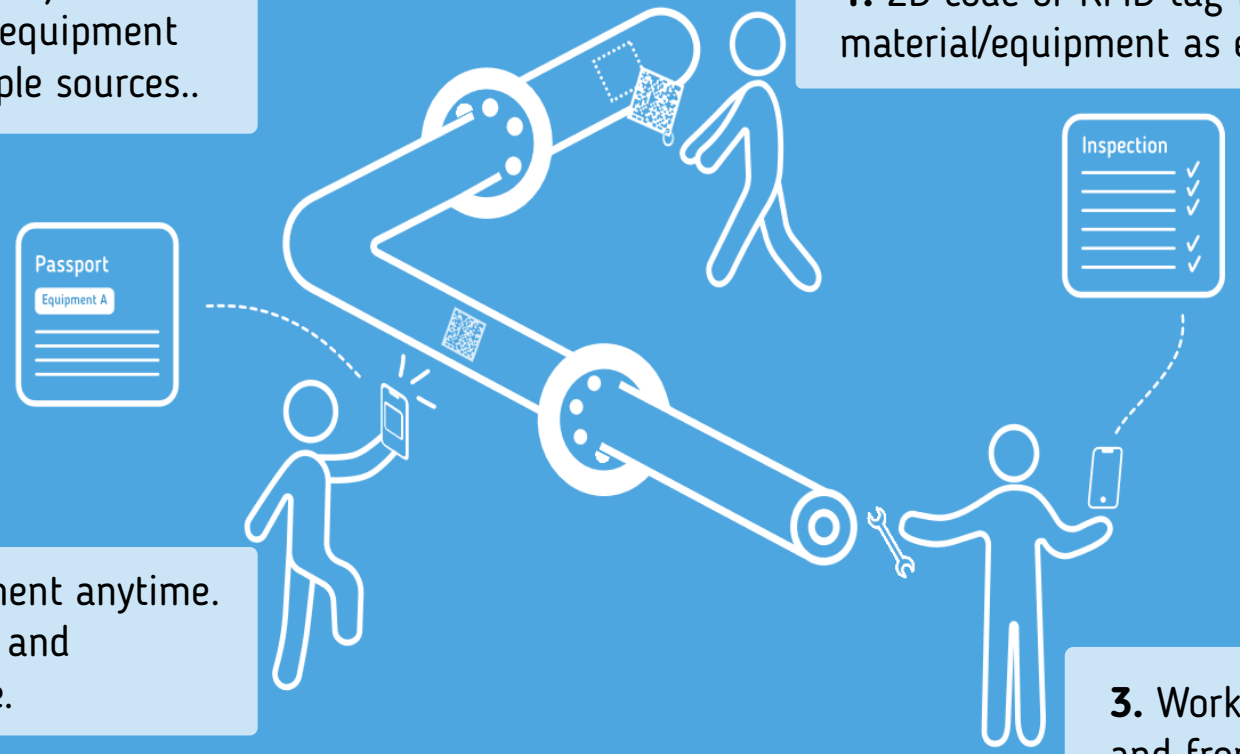
Compatibility of the Turnaround Tracking

The tool is fully compatible with Roser and other formats, allowing data to be imported and exported quickly and easily.

How does the Material Tracking work (simplified)?

Smart Equipment Passport (SEP) creates digital identities for material & equipment by aggregating data from multiple sources..

1. 2D code or RFID tag is attached to the material/equipment as early as possible.



2. Everyone can identify equipment anytime. Location and status are tracked and information is always accessible.

3. Work can be documented inside SEP and from here to integrated to any software. Instructions can be used.

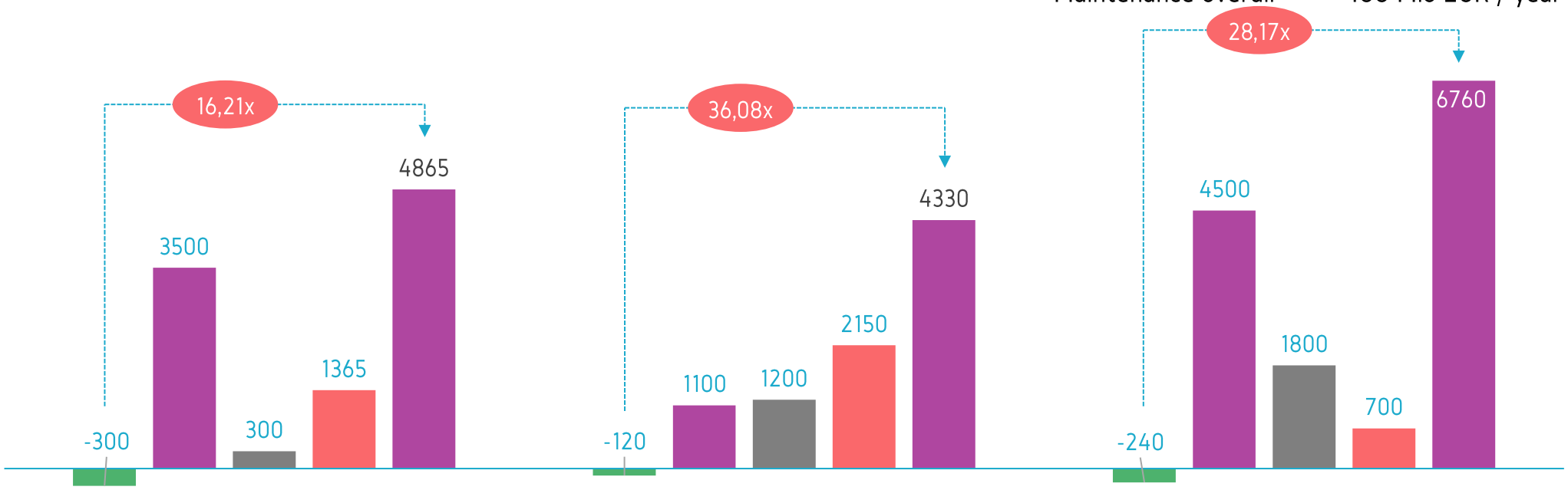
How does the Material Tracking work (simplified)?

Artificial Intelligence can today be used to enable more efficient production and digital production processes

Three key use cases for action in context with SEP
Net present value in k EUR of investment for the first year

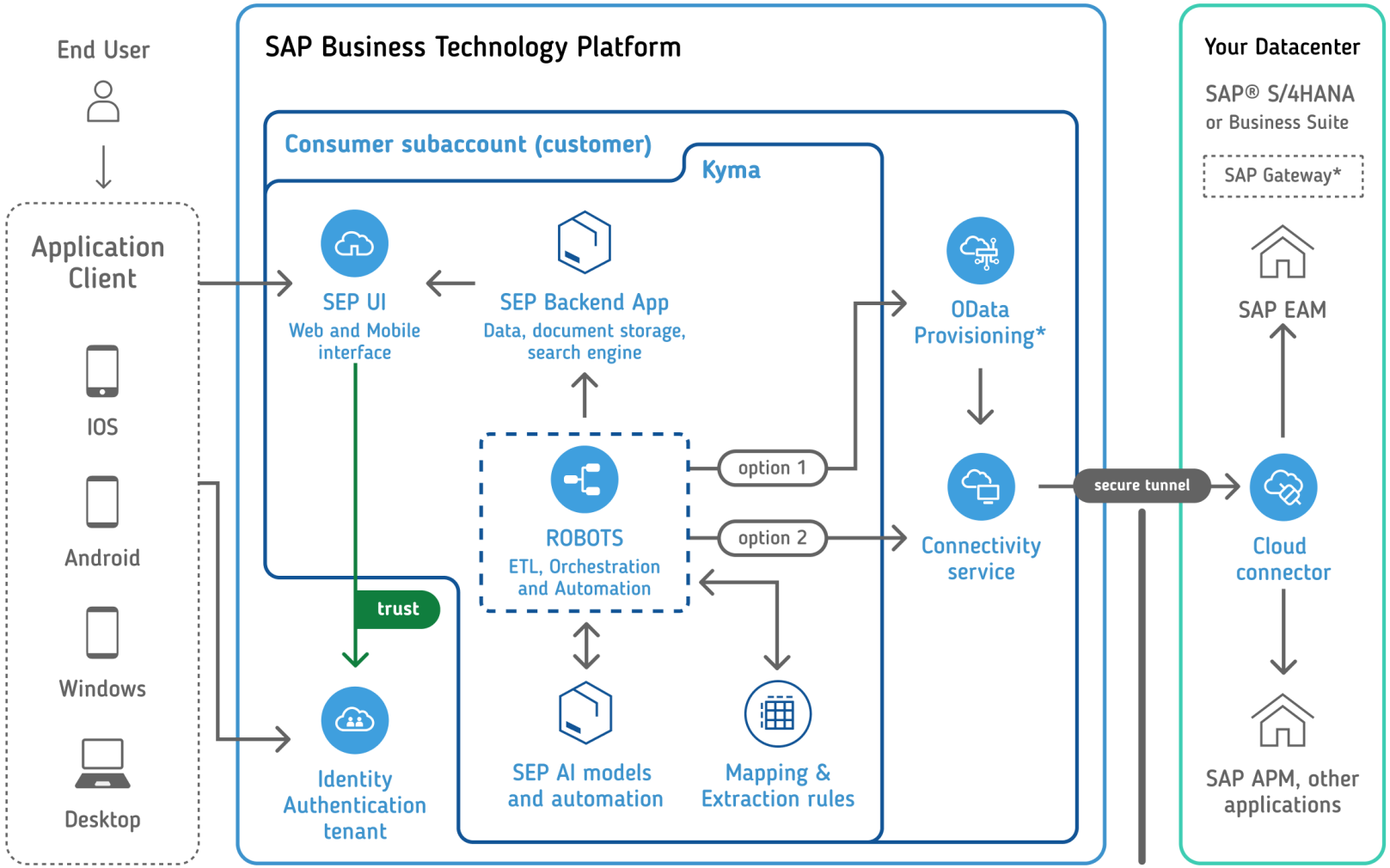
Normalized numbers to compare:

Cost item	Value
Project material	100 Mio EUR
Maintenance overall	100 Mio EUR / year



	Equipment identification	Process optimization	Digitalization initiative
Investment	-300	-120	-240
General Units	3500	1100	4500
Maintenance & TA	300	1200	1800
Project	1365	2150	700
SUM	4865	4330	6760

SEP is perfectly integrate into the SAP BTP and can be installed within a few hours



* OData services via SAP Business Technology Platform OData provisioning or SAP Gateway (see details about deployment options in SAP Note 1830712)