Future-Proofing Railway Infrastructure Asset Management with SAP

Run Simple and Intelligent

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SBB CFF FFS

THE BEST RUN SAP

Complexity of Rail Infrastructure Asset Lifecycle Management Today

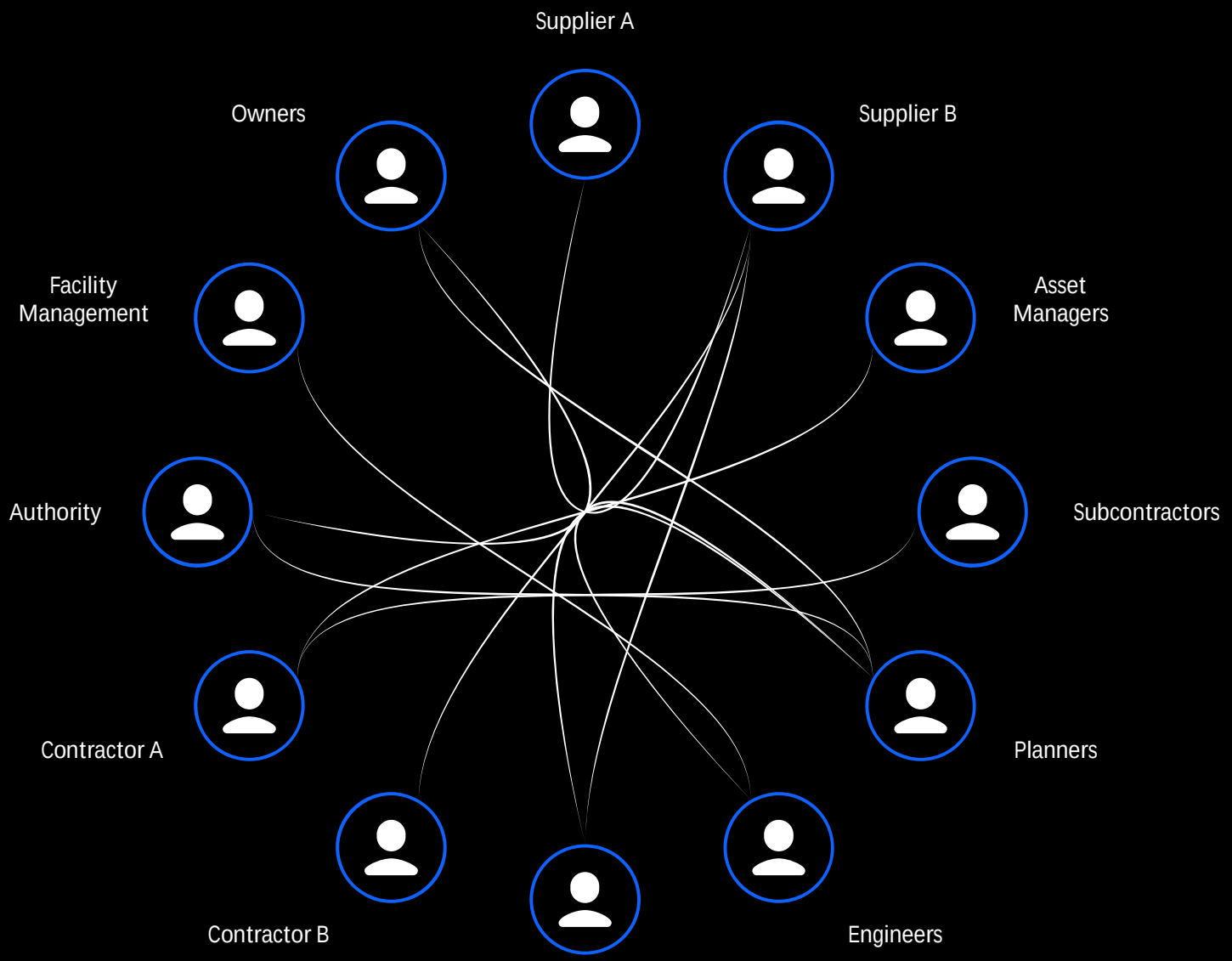
The need for change

Hard to control documents, data, workflows and processes

Different systems

Different file formats

Multiple data schemas

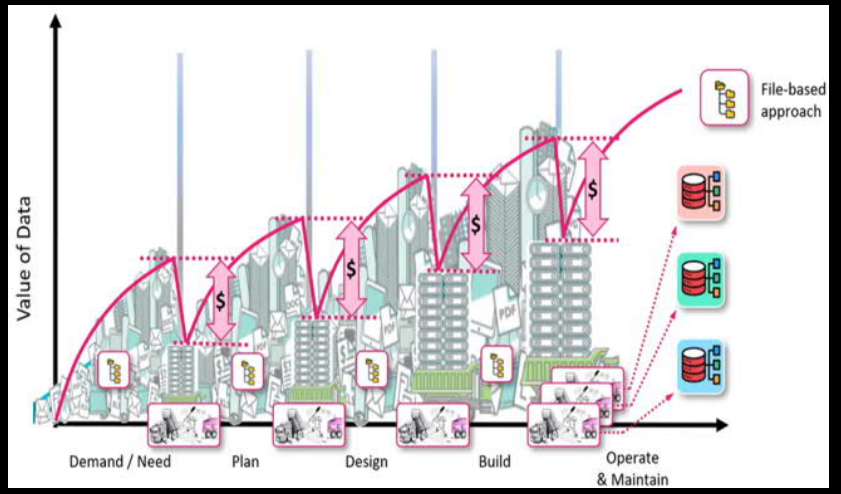


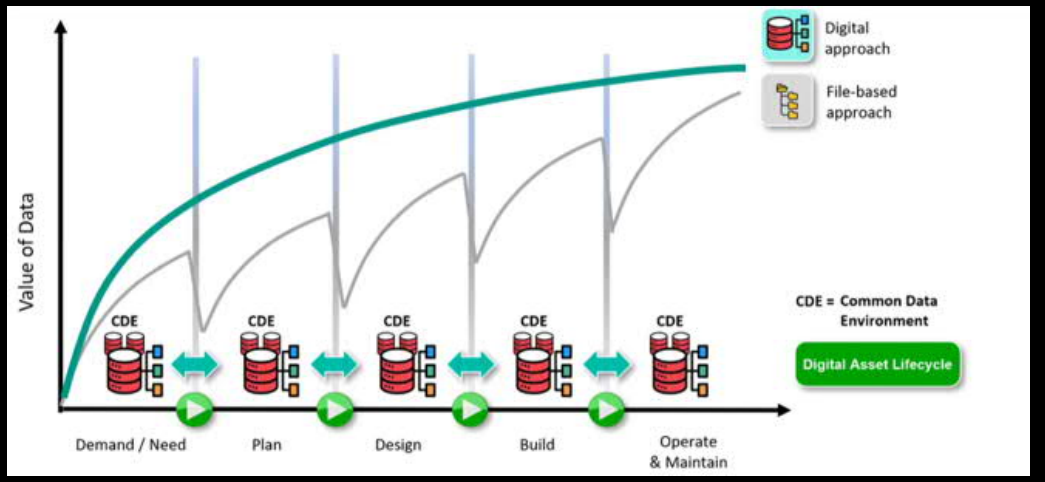
Complexity of Rail Infrastructure Asset Lifecycle Management Today

The need for a Digital Asset Lifecycle

Data loss at the transition at each phase of the asset lifecycle significantly impacts costs

Multiple systems storing asset information, often outdated and not integrated

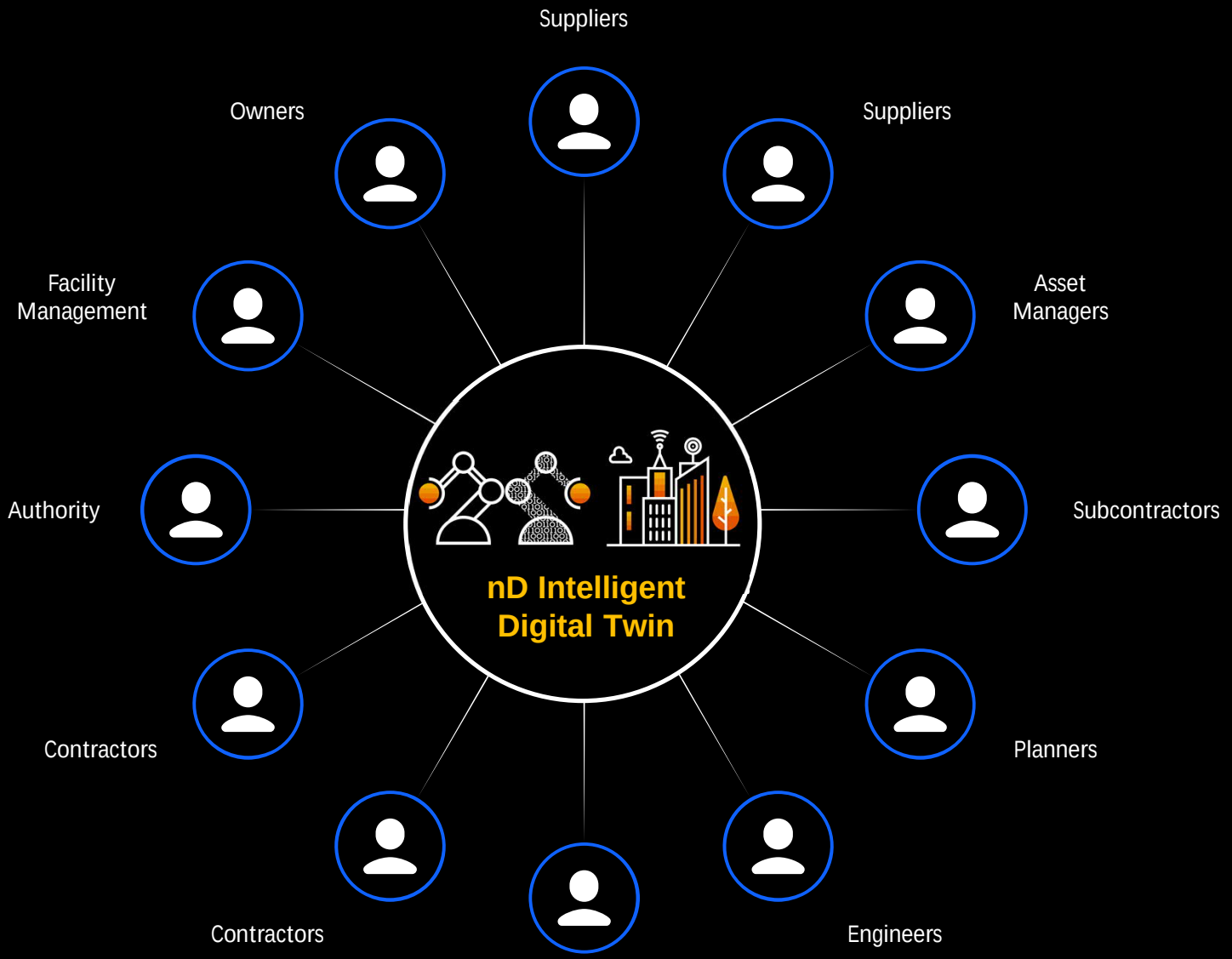




Source: DEOS Digital

A Better Future

Collaborative Rail Infrastructure Asset Management Digital Platform



DIGITALISED RAILWAY INFRASTRUCTURE

..and how SAP technology can improve the way we manage these critical assets

RAILWAY INFRASTRUCTURE

TRACKS

STATIONS

CARGO HUBS

ELECTRICAL

Critical for transportation of people and goods

SIGNALING

TUNNELS

BRIDGES

EQUIPMENT

SAFETY is a priority

BUILDING AND RENEWING RAIL INFRASTRUCTURE

SAP's digitalisation approach is based on three core pillars:
COLLABORATION, DIGITAL TWIN and **DIGITAL THREAD**

BEFORE

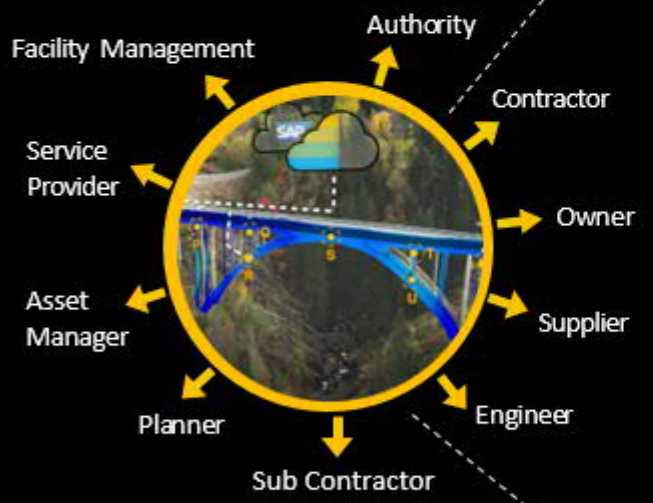
20% longer to finish than scheduled

80% over budget

1 **Asset Collaboration Platform** connects different parties through intelligent business networks where partners collaborate the common projects, each of them sharing relevant data/documents as part of a business process flow.

2 Build a live geographically enabled **Digital Twin** with key data inputs from the project brief. **Enhance the digital twin progressively** with detailed design data relating time, cost, schedule and design attributes.

3 Weave a **Digital Thread** that spans all the asset lifecycle stages from Plan to Retire. Enabling this digital thread takes more than collaboration between teams, it requires end-to-end integration of business processes and the systems involved, covering Engineering and Enterprise data sets.



Portfolio and Project Management; Design, Build and Construction; Resource Planning; Enables Digital Engineering (Technologies, Digital Twin, Ways of Working, Procurement, Skills and Resourcing); BIM integrated with GIS and geotechnical data; BIM integrated with virtual and augmented reality; nD BIM capability

Digital leaders achieve earnings growth 1.8x higher than digital laggards

Source: BCG, Flipping the Odds of Digital Transformation Success, 2020

MAINTAINING RAIL INFRASTRUCTURE

SAP's digitalisation approach is still based on the same pillars:
COLLABORATION, DIGITAL TWIN and DIGITAL THREAD,
but adding capabilities for **Intelligent Asset Management**

BEFORE

Multiple systems storing asset information, often outdated and not integrated

Intelligent Asset Management supports transportation infrastructure maintenance and operations in a number of key focus areas

- A central repository of information to have complete knowledge about each of your assets including a cloud based architecture to grow the digital twin and enable collaboration.

ASSET REGISTER

ASSET PERFORMANCE MANAGEMENT

Know the importance of every asset, define the maintenance strategy and measure its performance through Embedded methodologies such Risk and Criticality Analysis, RCM, FMEA. Closes the loop between maintenance strategy definition and maintenance execution.

Enable Condition Based Maintenance and Predictive/Prescriptive Maintenance. Perform AI based Visual Inspections.

GENERATE DYNAMIC DEMAND

PLAN, APPROVE AND ORCHESTRATE

Long, medium and short term maintenance planning. Single backlog for all work types, orchestrated with supply chain, procurement and finance. Inventory Optimization.

SCHEDULE AND DISPATCH

Intelligent optimization and prioritization of work with capacity management and resource assignment.

MOBILE EXECUTION

Provides maintenance applications on mobile device to keep technician close to the maintenance activity with all information needed at hand.

Closed-loop maintenance strategy, planning and execution processes to optimize asset performance; Adopt new collaborative processes and across networks; Manage asset health with condition-based and predictive maintenance; AI based visual intelligence; Optimize maintenance and service with intelligent scheduling and crowd sourced resource management

Significant cost and risk reduction by adopting condition-based and predictive maintenance, digital inspection and simulation and AI based visual intelligence

SUPPORT SUSTAINABLE OPERATIONS

SAP supports the **circularity** in infrastructure management, **efficient operations** of transportation hubs and infrastructure and associated **social** responsibilities

Real Estate Management

Energy Management

Facilities Management

Environment, Health and Safety

Incident Management

Equipment repair and refurbishment

Integrated inflow/outflow of recycled / waste materials in the infrastructure site

CEOs are making sustainability a strategic priority

Our **vision** is to promote **intra industry collaboration** by bringing together **people, processes and technologies** to deliver a **single digital source of truth** and **transparency** across the **entire asset lifecycle**

SAP Technology

SAP S/4HANA
SAP Business Network
SAP Intelligent Asset and Field Service Management
SAP Enterprise Product Development
SAP Cloud for Real Estate
SAP Business Technology Platform

Software Partners

Cogniac
Evolution Energy
Honeywell
Nextspace
Rizing
Trinov

Engineering and Consultant Partners

ARUP
DBM Vircon
DEOS Digital

THE BEST RUN

What are rail infrastructure customers doing with SAP and partners?

A journey begins with a single step….be it big or small

Digital Transformation Pillars

Renovating Core Solutions

Industrialise Innovation

Activity Examples

Improving internal enterprise capability

- Integrated business planning
- Integrate asset design, estimation and build with portfolio and project management
- Unify the GIS and Enterprise Asset Management worlds
- Deploy AI based visual intelligence

Enable cross-company collaboration

- Collaborative workorder processing
- Establish common data environment
- Establish asset collaboration platform

Large scale digital transformation projects

Customer Examples

Swiss Federal Railways

Next part of the presentation

Norfolk Southern

Norfolk Southern and Accenture at ASUG, March 2020

Reshaping Service- and Asset Management for Swiss Federal Railways.

Urs Gehrig
Principal Consultant Business Development
Swiss Federal Railways SBB
Bern, September 6th 2022

Agenda.

- Current status of the **S/4 SBB transformation** and impact on the Asset Management in **Rail infrastructure networks**.
- Fully **integrated, end-to-end approach** based on a «Close-loop» configruation in Maintenance-Management.
- Templating with **Building Blocks** to tightly **bind business processes** with **IT solutions**.
- **Condition based** maintenance example with a tight link to failure-mode to trigger the relevant **business process**.
- **Collaborative scenarios** with thrid party service providers using network solutions.
- Summary and outlook.

Main focus areas of the SBB 2030 Strategy.

More customer-focused and flexible. Integrate different forms of mobility.

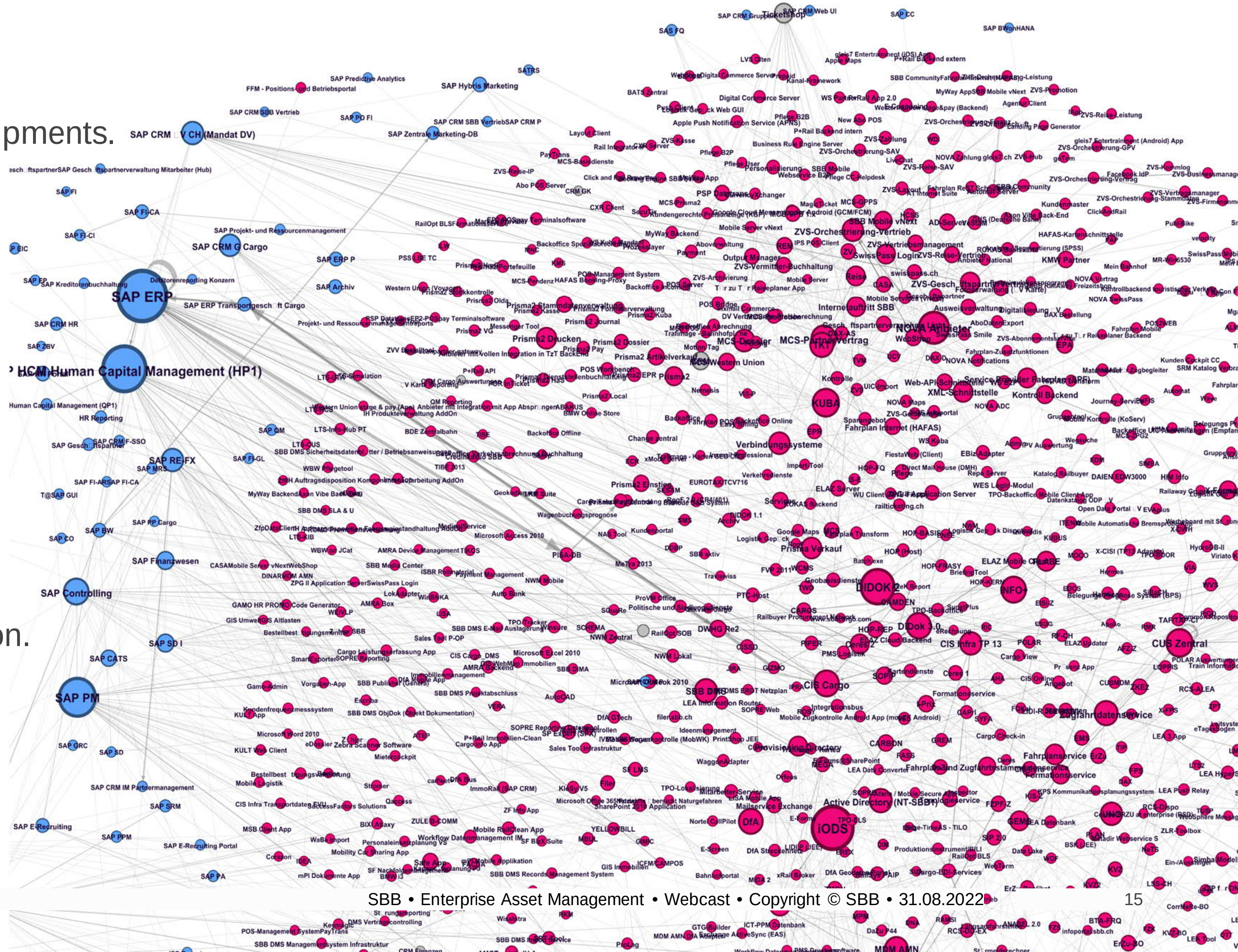
Smart growth in our core business. Increase modal split.

Sustainable, by people, for people. For customers, employees and society.

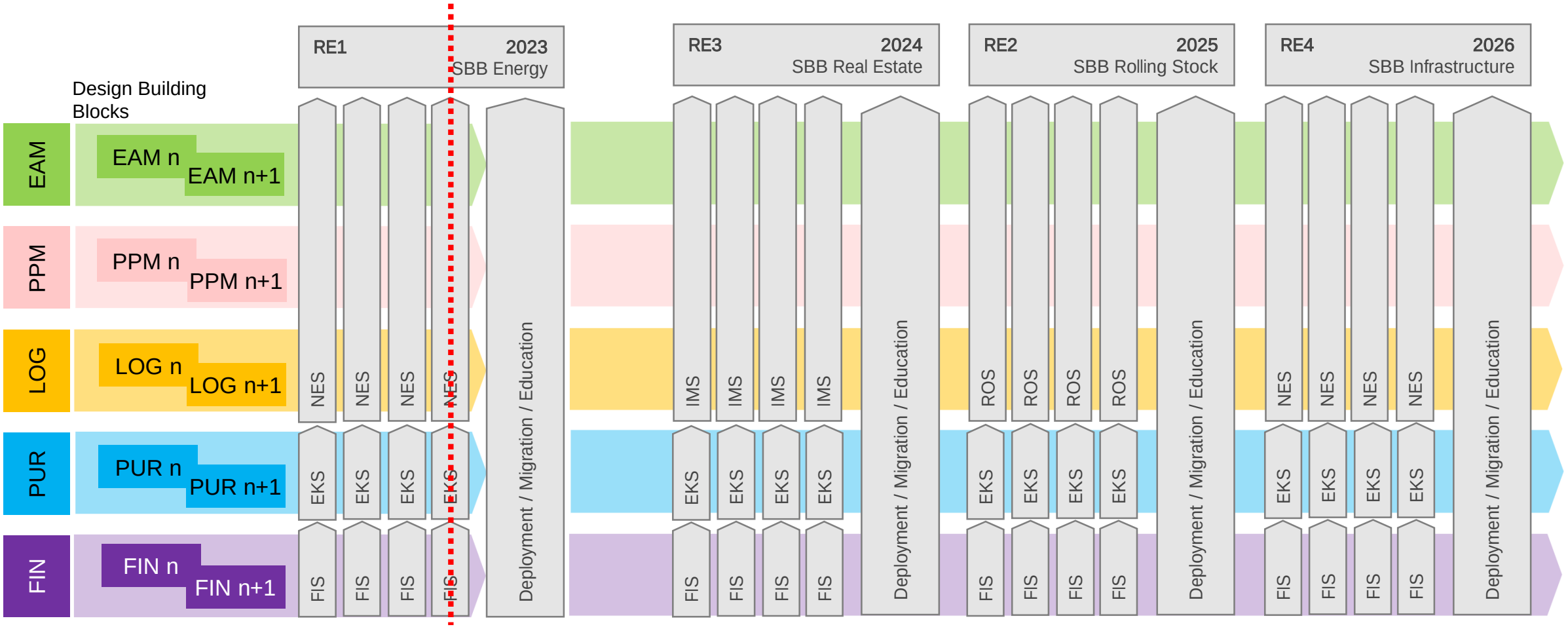
More efficient and economical. Added value for public services.

Facts and figures of Swiss Federal Railways SBB.

41’000 RFID-Tags on Rolling stock equipments.
34‘000 GSM mobile phones.
32’535 staff.
10’991 trains run daily.
6’000 km telecom network.
3‘236 km rail network.
2’833 application interfaces.
1‘200 applications.
564 km water network.
450 IT projects at Infra Division.
299 tunnels.
160 business projects at Infra Division.
90 percent renewable energy.
7 hydroelectric power stations.
4 networks.
3 water sources.
1.32 million passengers a day.

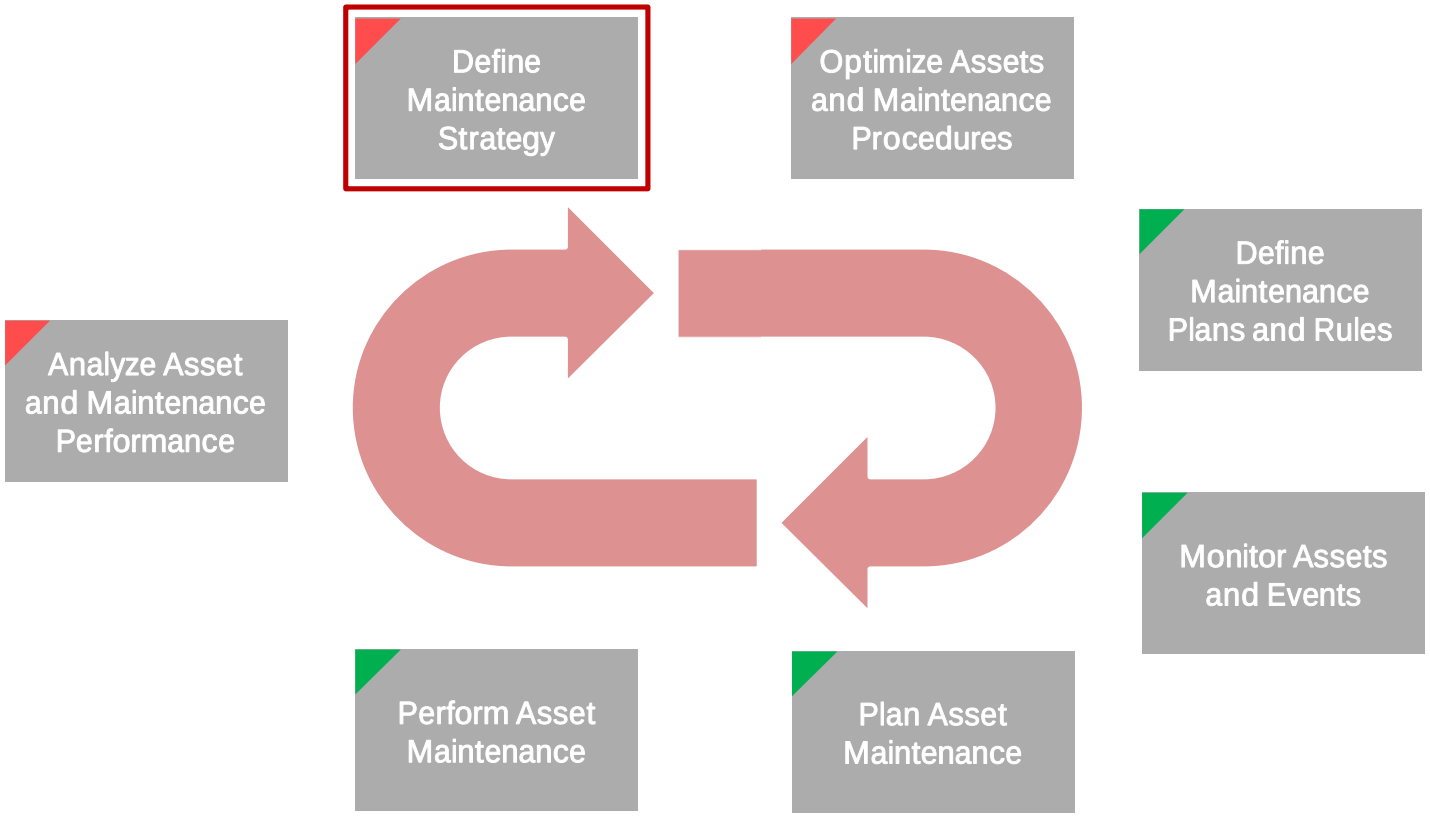


Transformation into S/4HANA is based on five main scope streams and organisation-specific realisation stages (REx).



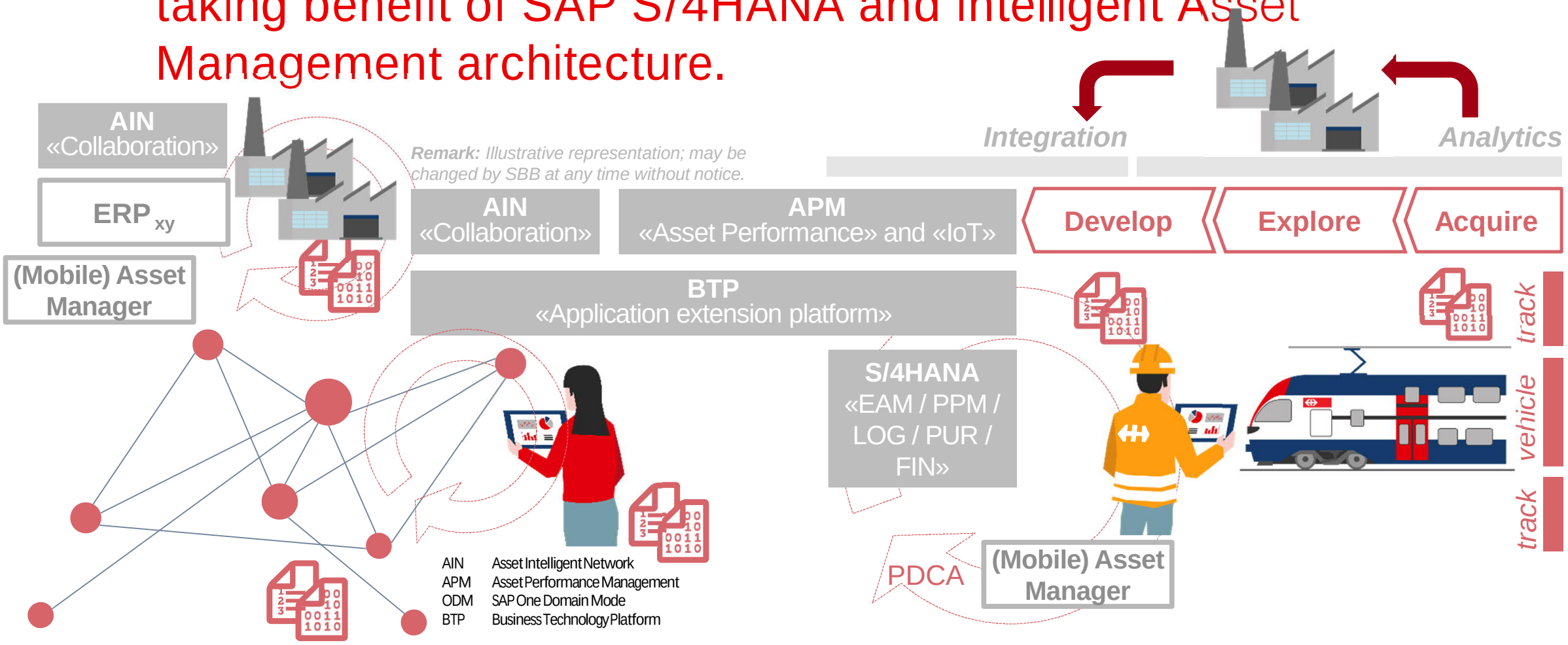
Conceptually combining «SAP Activate», «Focused Build» with «Scaled Agile Framework» (SAFe) to design, build, test and run the solutions for all the divisions and corporate services at SBB.

Paradigm shift in asset performance and maintenance management by closing a gap in the feedback loop.

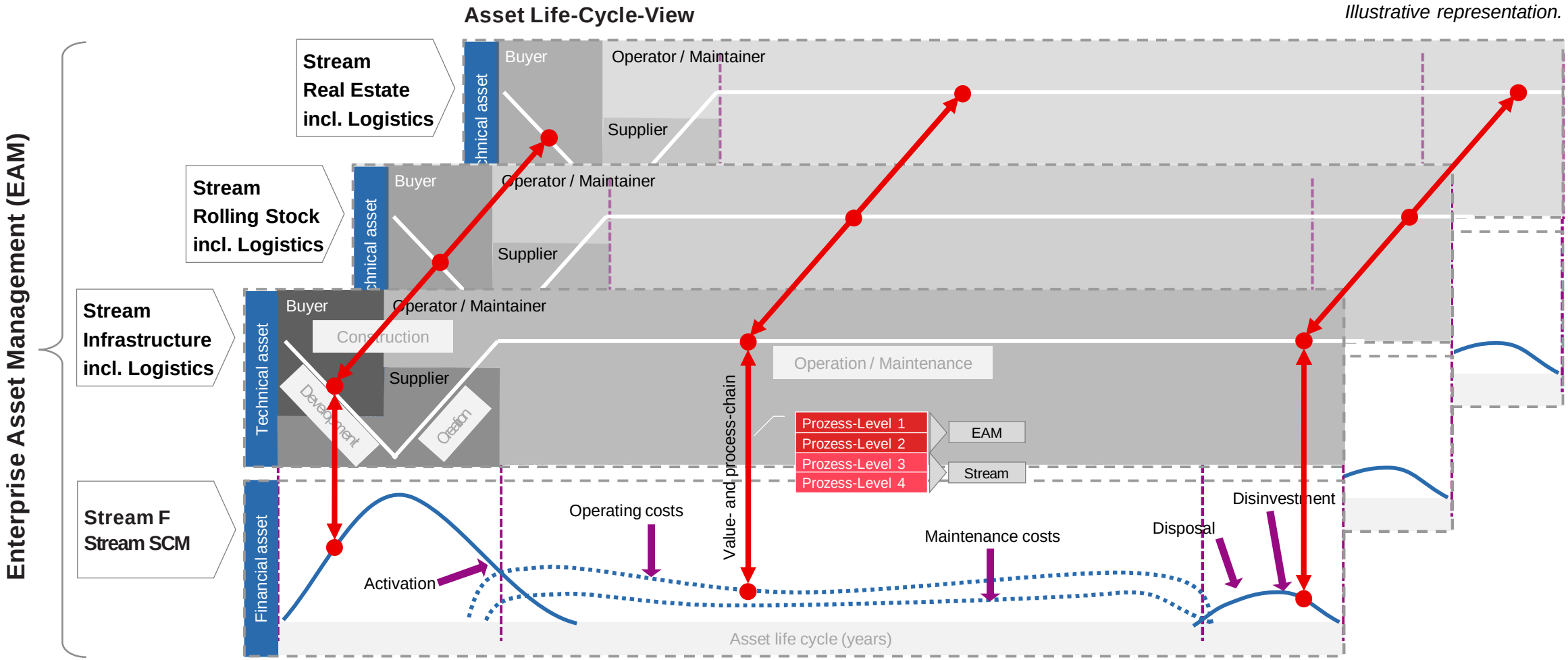


- Considering the **Asset life-cycle** as a **closed loop**.
- **Value-chain** orientation in a **process-oriented organization**.
- Solution **Building Blocks** (BuB) from «Organisational structure» to «Asset master data» include the BuB in the «Loop».
- Systematic **management of causes-effect** relationships.
- **Implementation** of **use cases** along value-chain stages («process-chains»).
- Enabling and developing **business capabilities** in the sense of ISO 55000.

Establishing an Enterprise Asset Management at SBB taking benefit of SAP S/4HANA and Intelligent Asset Management architecture.

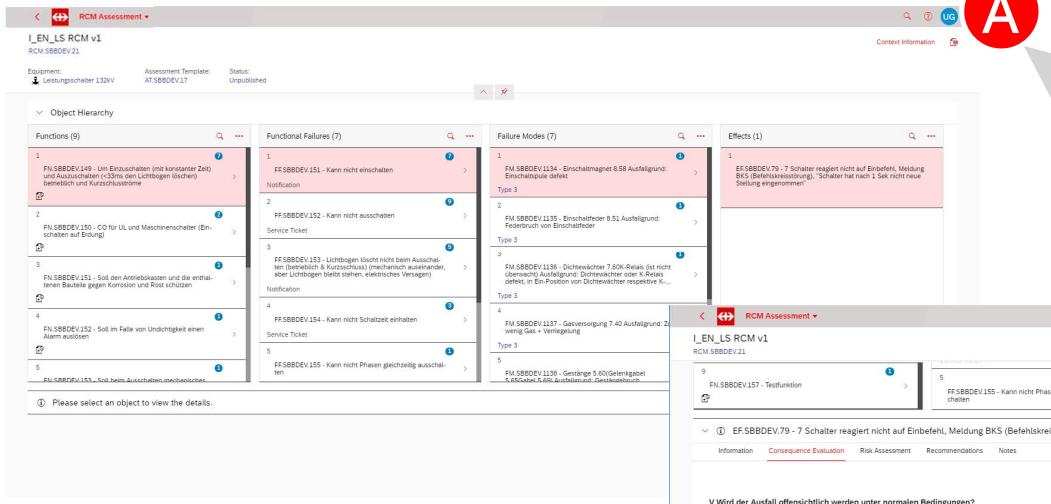


A common understanding of asset life-cycle and relevant value chains are at the heart of the Digital Transformation.



Show Case

Condition based maintenance with standard solutions.



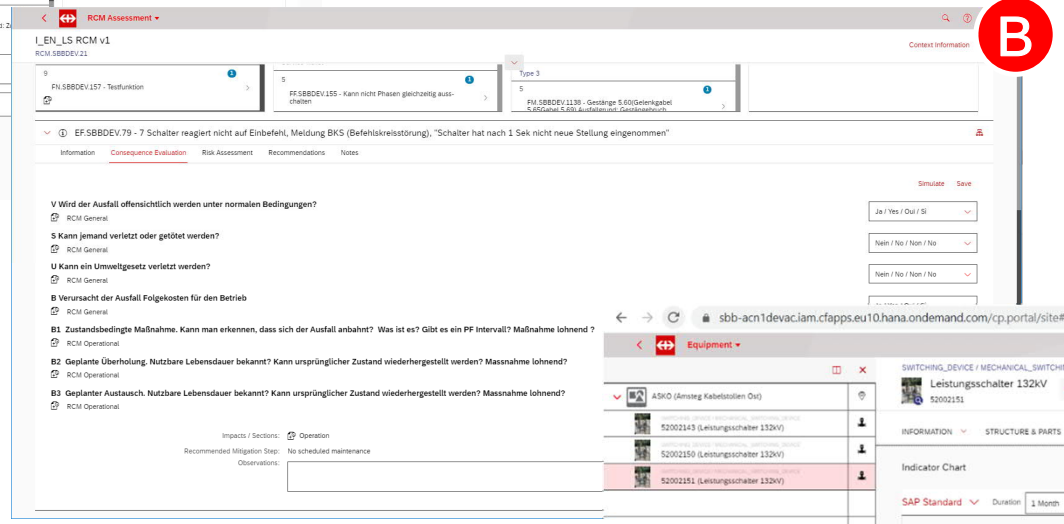
A

Full RCM Assessment:

- Failure-mode and effect analysis of the circuit breaker is being managed using RCM capability in SAP ASPM.

Consequence evalution:

- Consequences of the cause of a failure is captured by the assessment team using a structured questionnaire.



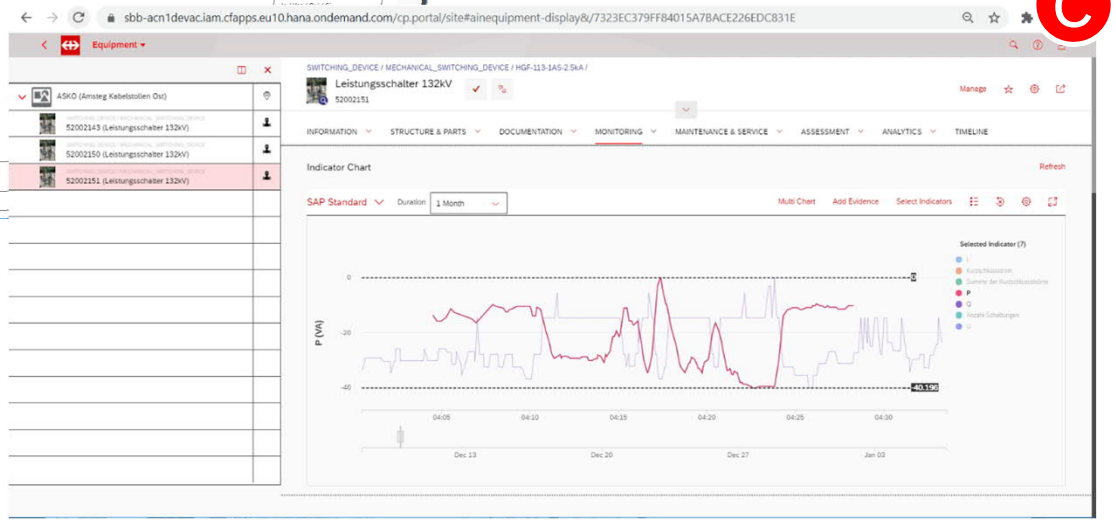
B

Condition monitoring:

- Multiple indicators are being monitored using SAP PAI.
- Thereshold violation will trigger e.g. a maintenance notification.

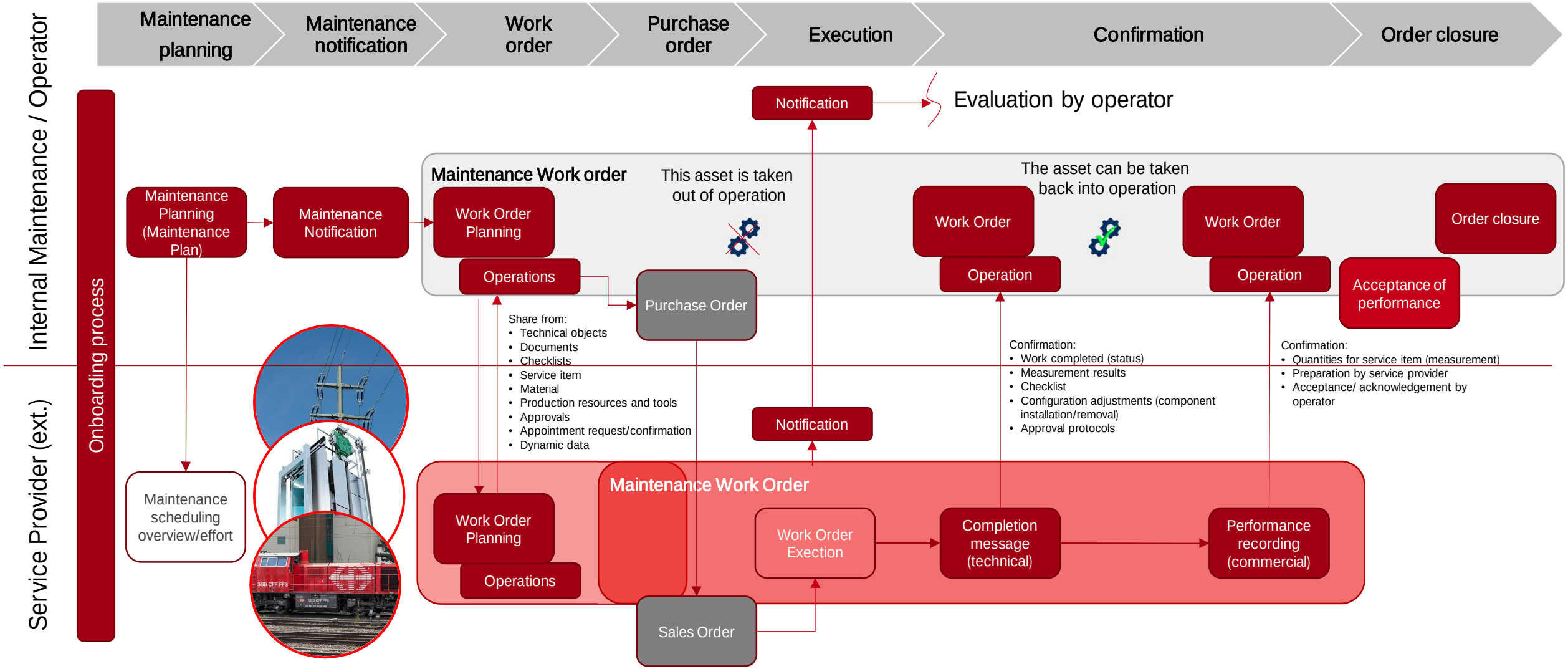
Circuit breaker «use-case»:

- GE HGF-113 High Voltage circuit breaker in a real-life scenario, e.g. with failure mode EF.SBBDEV.79: Switch does not respond to «switch on» command.



C

Collaboration between Asset Operator and Maintenance Service Provider.



Key Takeaways, lessons learned and next steps.

1. Initiation of an **Enterprise Asset Management approach**, which was triggered by the availability of standardized SAP solutions, esp. offering a Live-Cycle delivery loop.
2. Paradigm shift in the scalability of Asset Management solutions by SAP by allowing **Maintenance to be managed** on **failure-mode level**.
3. Implementation **examples** and **use-cases** heavily based on failure-data gives the **organization a chance to learn** to deal with the new features.
4. **Example** on building a reliable **«Collaboration Workorder»** management process.
5. **Step-by-step**, **use-case by use-case** the capabilities of S/4HANA and SAP IAM will be explored and will become an important element of the Digital Transformation, in-house, as well as with our service providers and suppliers.

Key Takeaways

1) “Pockets of solution excellence” with “sub-optimal connectivity” hampers future ready infrastructure management practices

2) “Weaving a digital thread” across solution areas and infrastructure stakeholders will drive high performing infrastructure assets

3) SAP provides a future ready Digital Rail Infrastructure Management Platform to help enable the Intelligent Rail Enterprise

4) World class rail operators like SBB is using SAP to help transform infrastructure maintenance practices

5) Learn more about Intelligent Asset Management with SAP here / register for the free SAP hosted Rail Infrastructure webinar scheduled for 13 September 2022 here

Thank You

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