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Drive Train Analytics

SOGIC

May 8, 2018 | Hyatt Regency, Calgary, Alberta

Digitalization – A megatrend that is transforming our world

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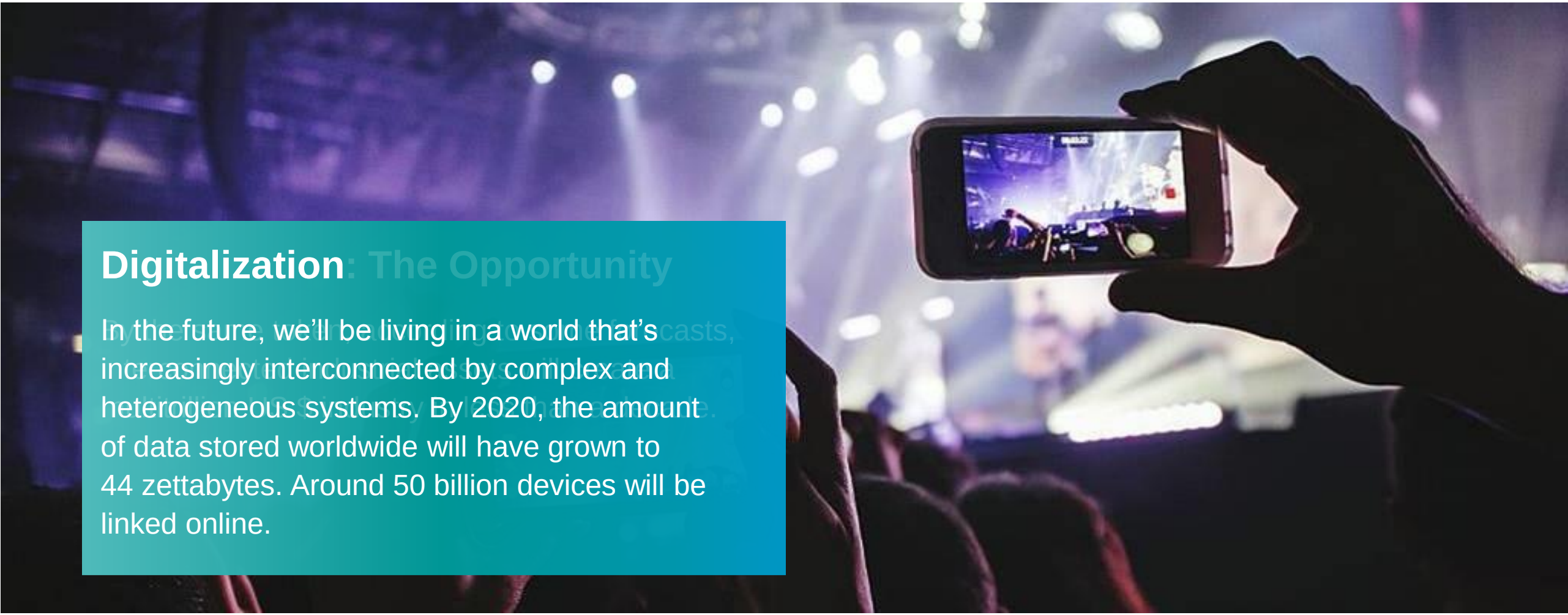

Digitalization: The Opportunity

In the future, we'll be living in a world that's increasingly interconnected by complex and heterogeneous systems. By 2020, the amount of data stored worldwide will have grown to 44 zettabytes. Around 50 billion devices will be linked online.

Source: IDC, The Digital Universe of Opportunities: Rich Data and the Increasing Value of the Internet of Things, April 2014; Dave Evans (Cisco): The Internet of Things, How the Next Evolution of the Internet Is Changing Everything, April 2011

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The Industrial Evolution

Siemens has been at the forefront of every phase

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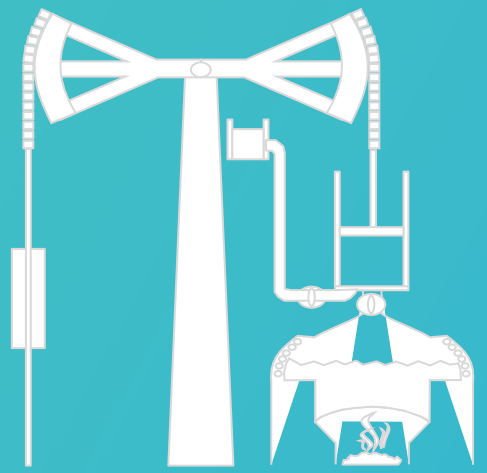
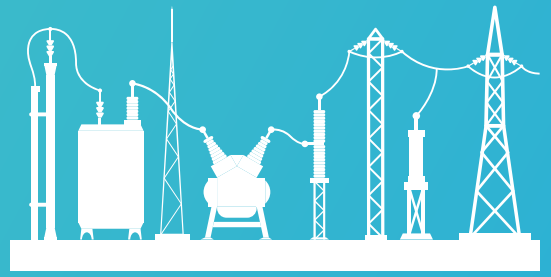
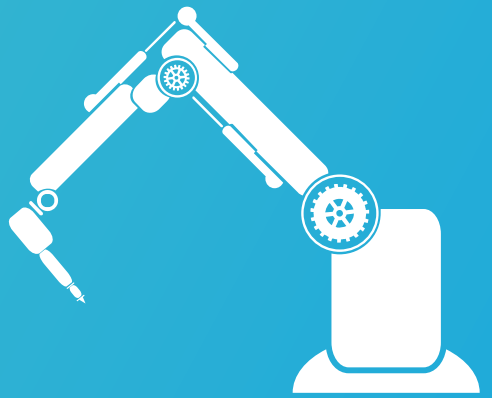
Phase 1
Mechanical Production



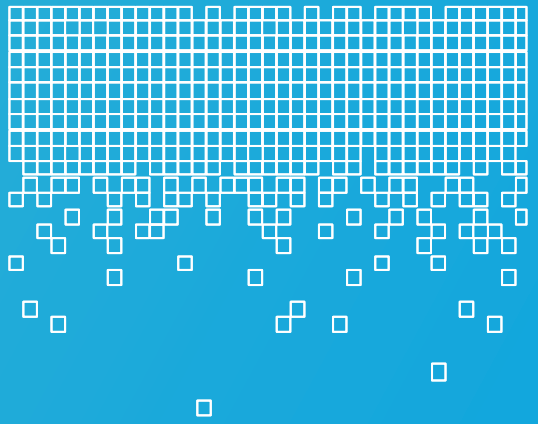
Phase 2
Electrification



Phase 3
Automation



Phase 4
Digitalization



What level of maturity is your company?

Focus on digitalization efforts result in game-changing operational improvements

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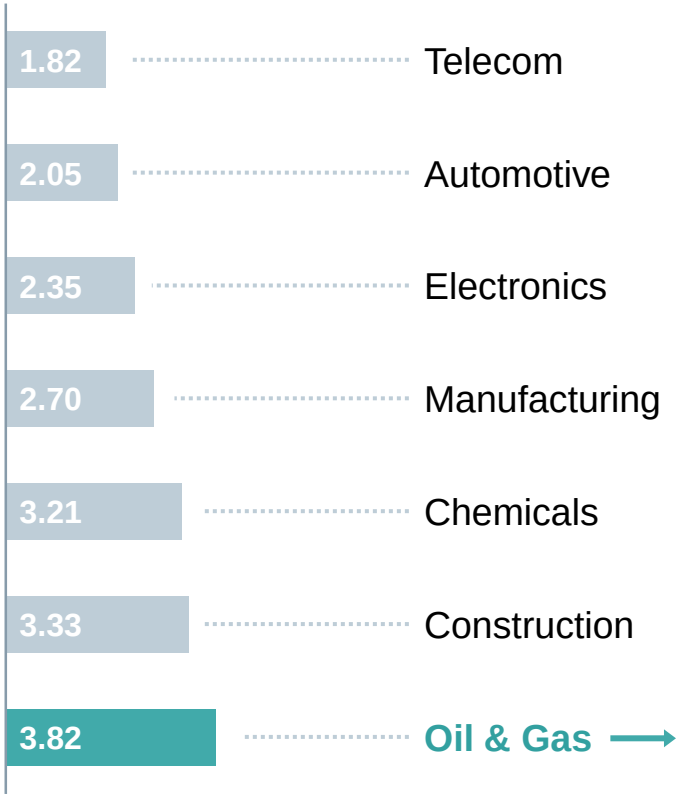
Digitalization by Industry



Digitalization Opportunities and Benefits

- **Asset management and business analytics**
- **Remote Operation**
- **Industrial Internet of Things (Web of Systems)**
- **Cloud applications**
- **Big data analytics**

$80B Will be spent in the next 24 months on **operational efficiency**…

-25% … that could lead to reduction in OPEX **if smartly spent on digital**…

↑8% … and **produce game-changing** field recovery rates …

+11% … resulting **in sustained profit increase**

Source: McKinsey and Co; Accenture; **1** = high, **2** = medium, **3** = low, **4** = rudimentary

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With $10 Billion+ in software acquisitions since 2007, Siemens now provides a seamless Digital Enterprise portfolio

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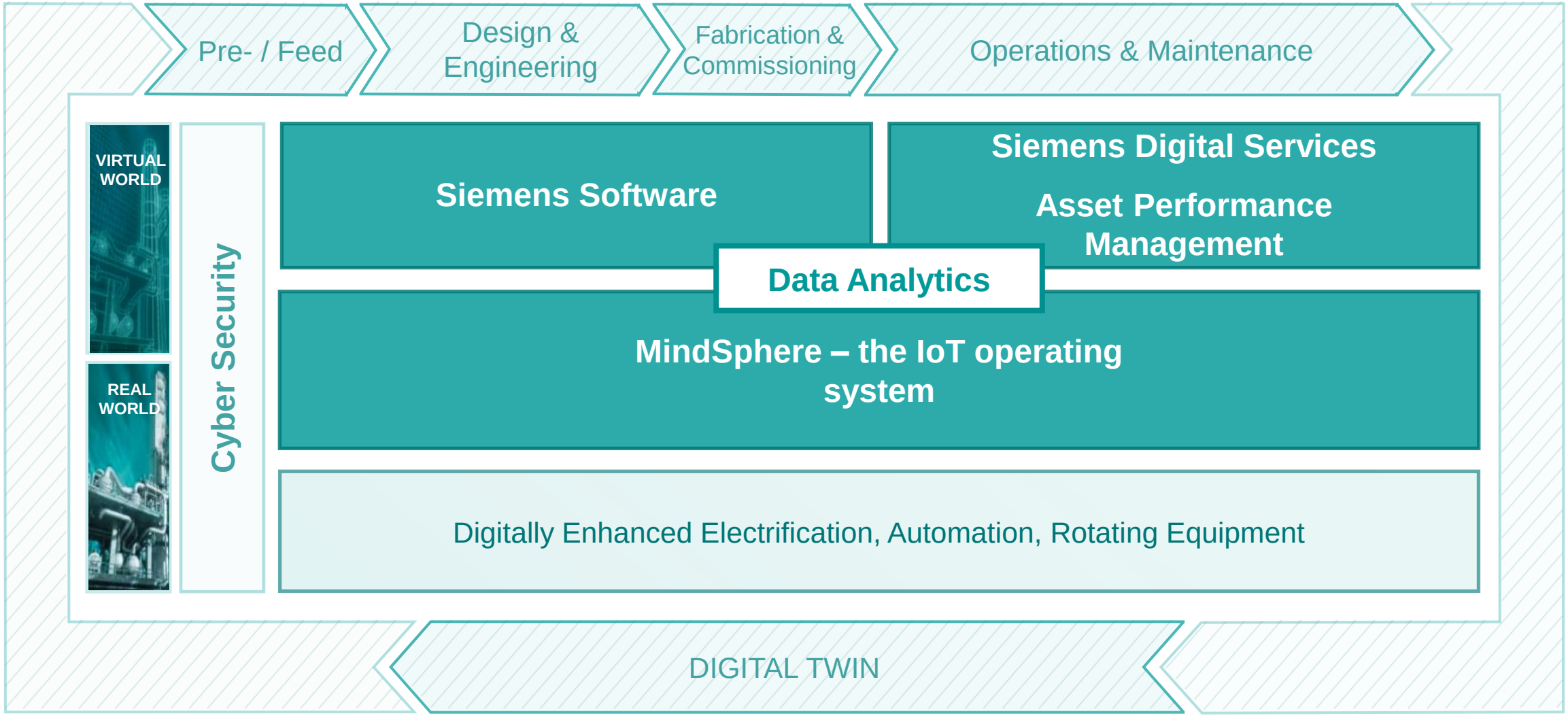

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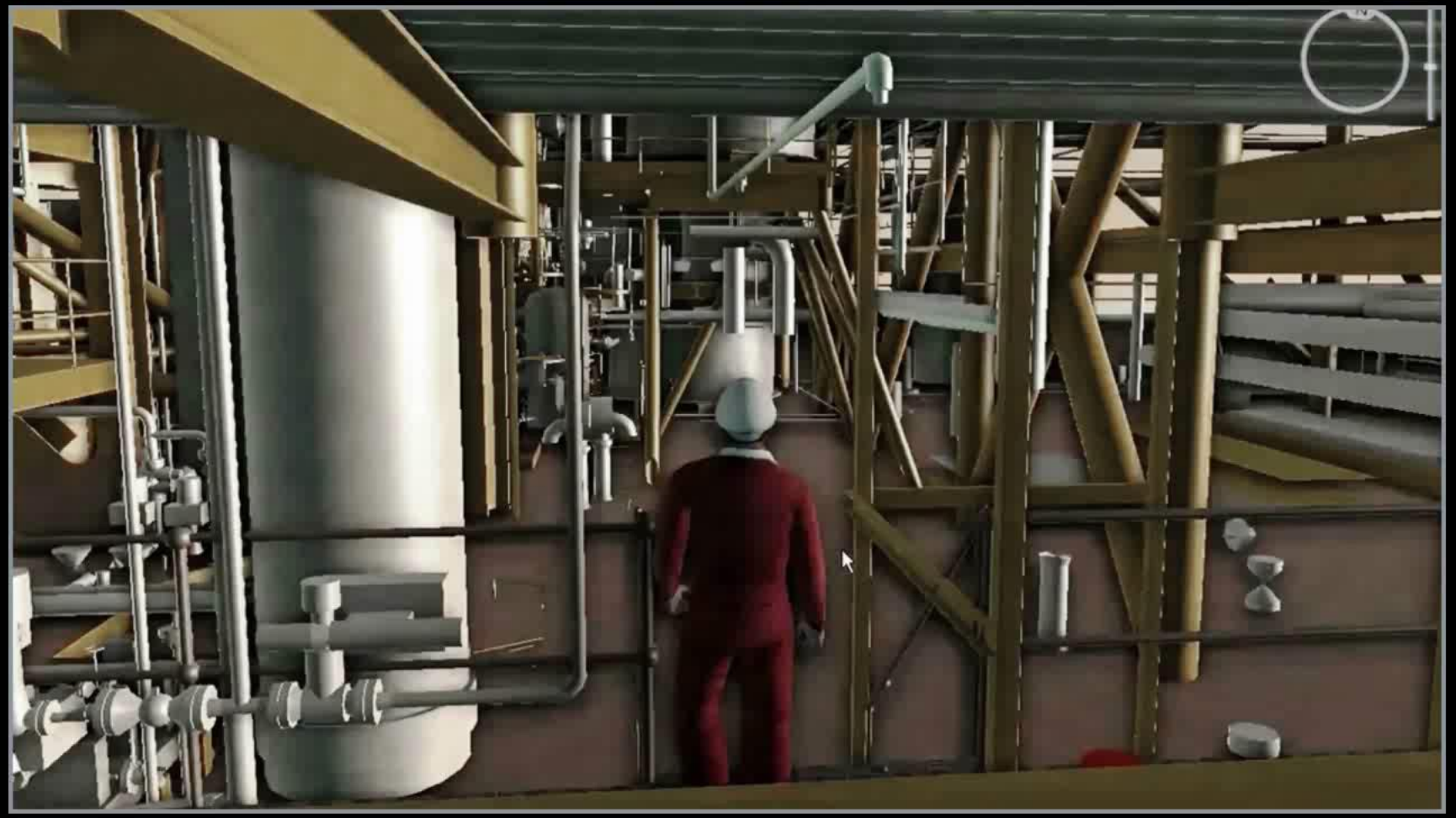

COMOS Walkinside 10.2
File
Edit
View
Options
Scenarios
Windowing
Database
Help
Comos Integration
Given by Scenario
Redlining
status: COMOS integration reactivated
coordinates: {14.81; -95.29; 1.88}

The Digital Twin allows for prediction and optimization of system behavior

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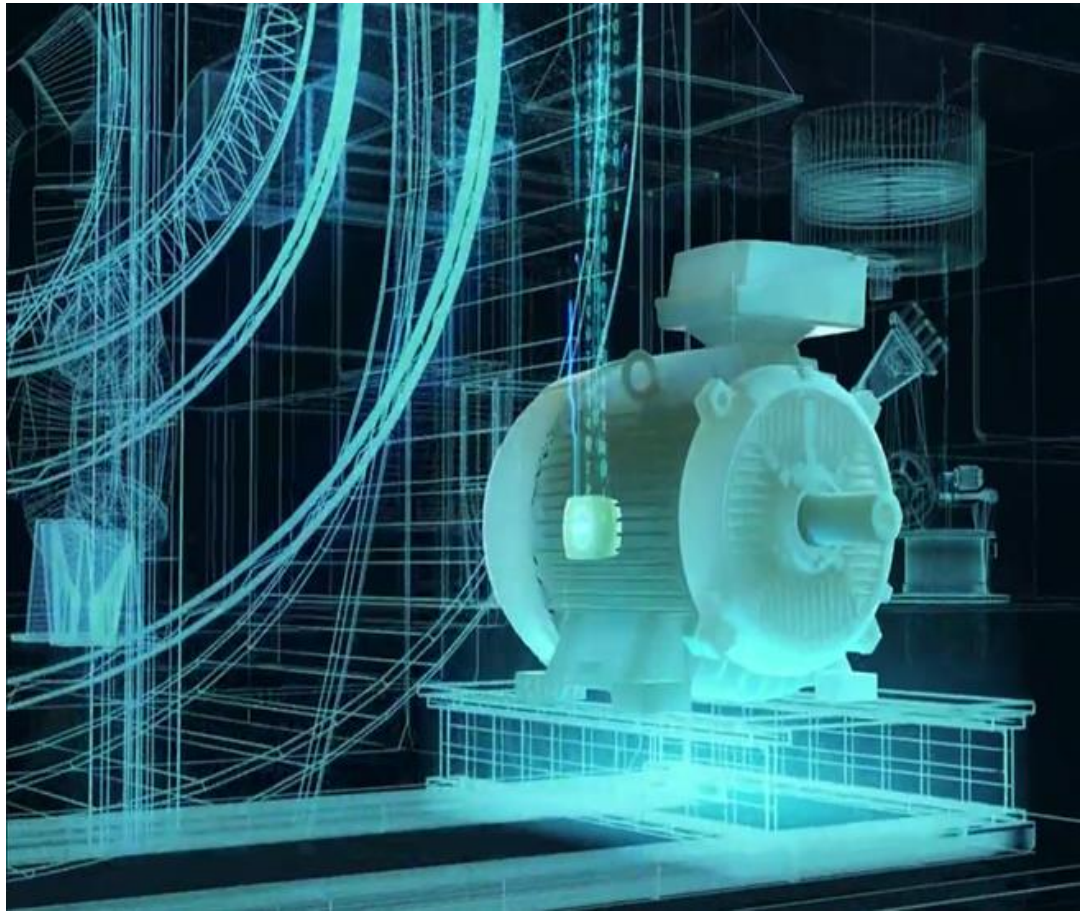

- A **digital twin** is the virtual representation of a real system.
- It consists of models that describe the system's **geometry, properties and functions**.
- It is created during the design stage. Then, once the real system has been constructed, it is **continuously adapted** based on the data that is tracked and recorded.
- The digital twin accompanies a system throughout all phases of its life:
  - At the beginning, to simulate system behavior
  - Later, during operation, to predict system behavior and optimize it

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The Siemens MindSphere Platform

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MindApps

Data Analytics Apps to gain immediate insights and transform insights into actionable results.

Open Ecosystem for customers, partners and developers to create MindApps.

MindSphere

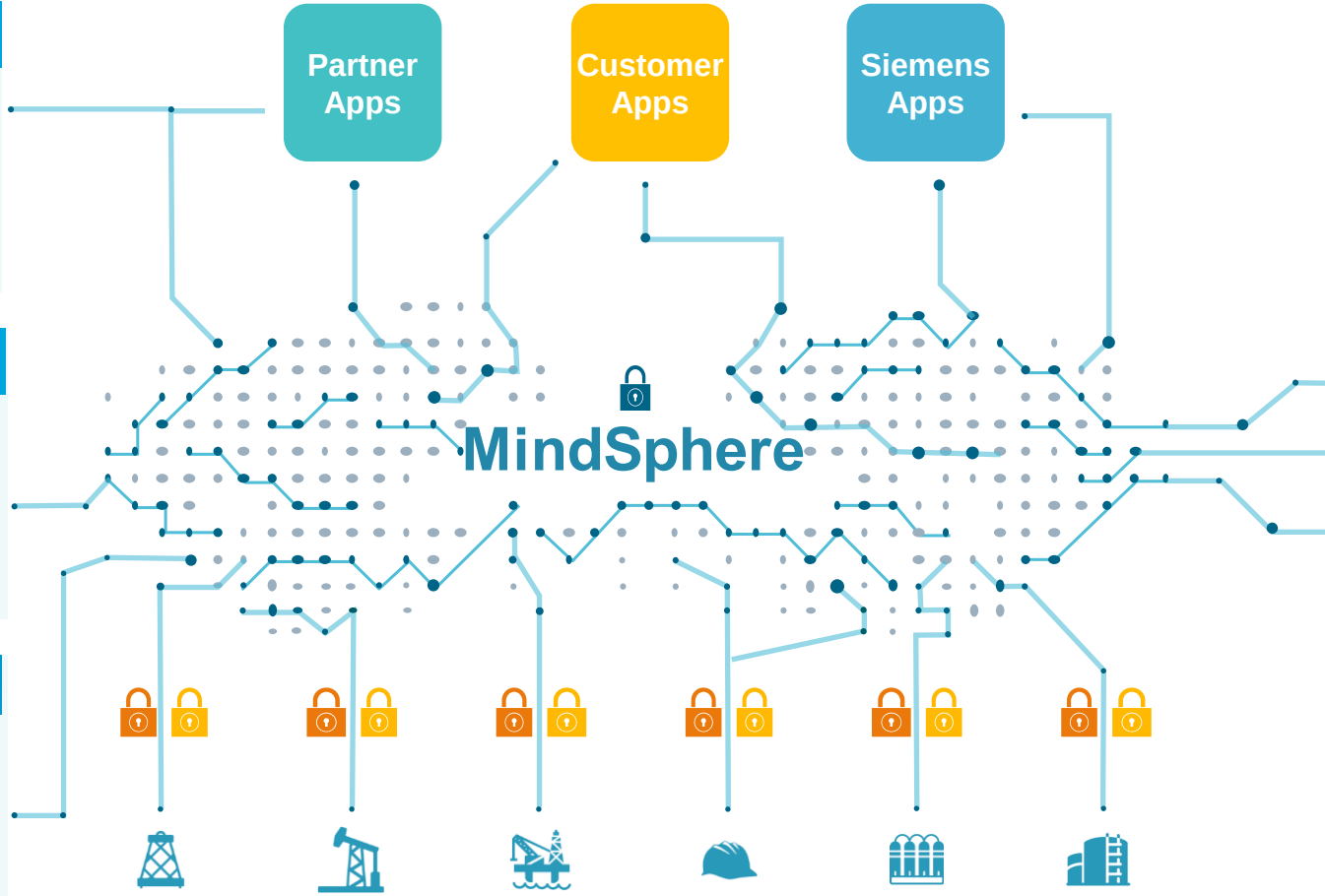
Cloud-based IoT operating system connecting OT to IT environment.

Cloud infrastructure. Public cloud, private cloud, or on-site solution as a closed system.

MindConnect

Plug & play connectivity for quick connection of Siemens assets and **Open standards (**e.g. OPC UA) to other assets.

Secure and encrypted data communication.



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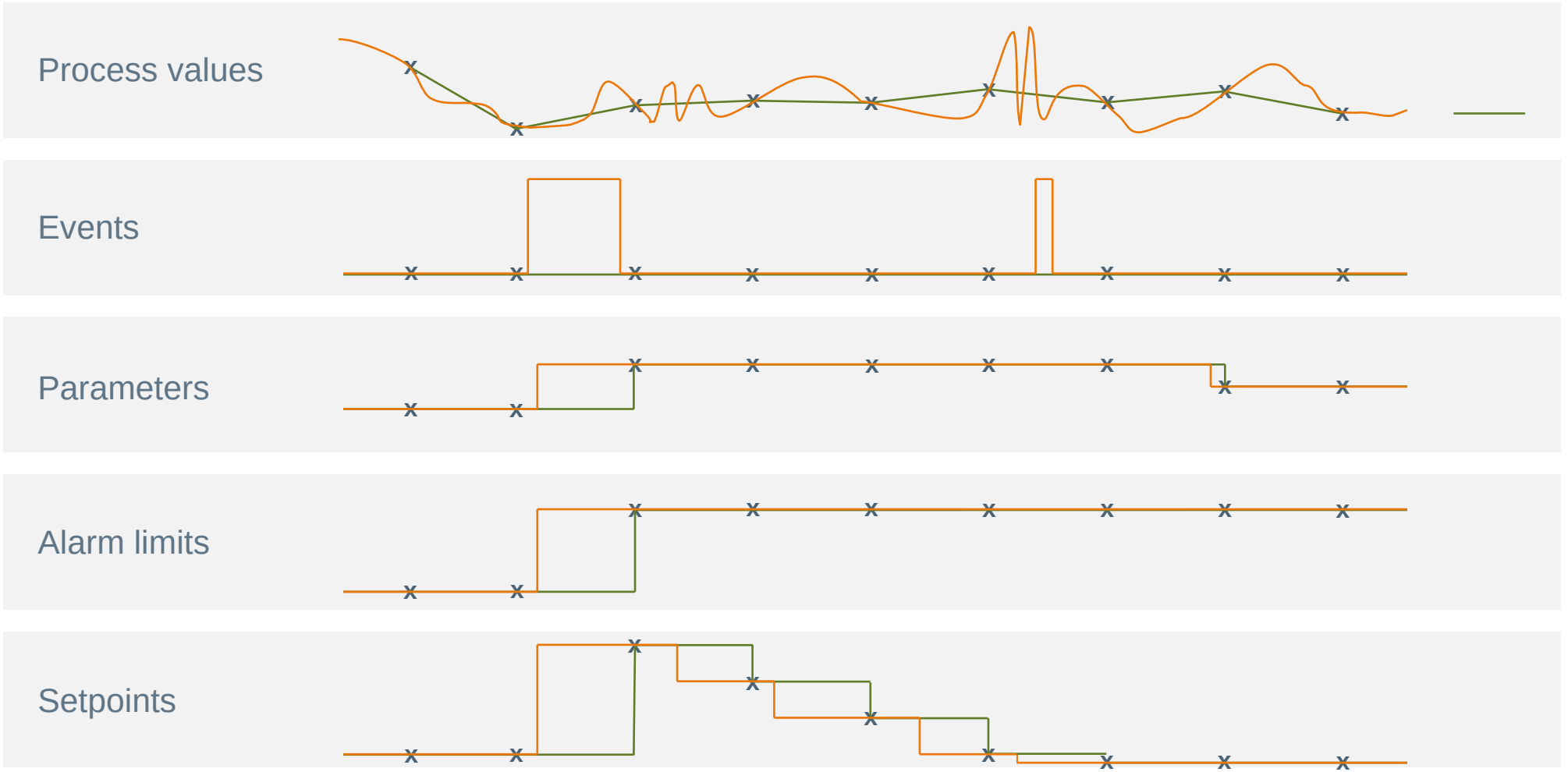
The digital twin must consider an abundance of data to optimize operation and performance



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Simotics Connect can maintain and continuously adapt the digital twin for an electric motor

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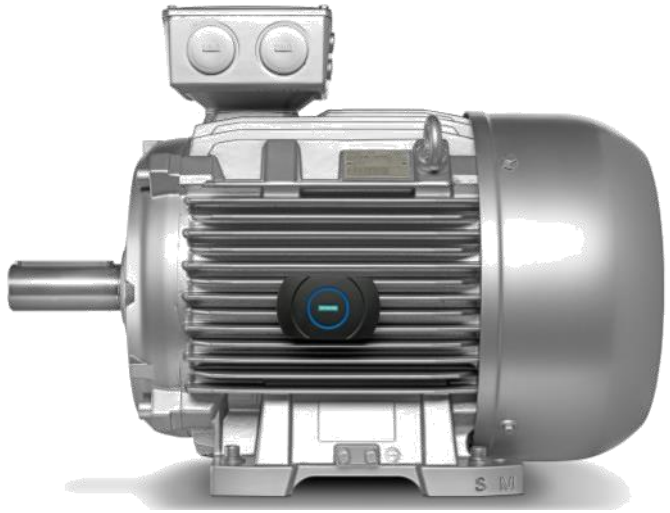

Smart Motors – connected to MindSphere

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Drive Train Analytics for condition monitoring

Support for VFDs, motors, and gear units

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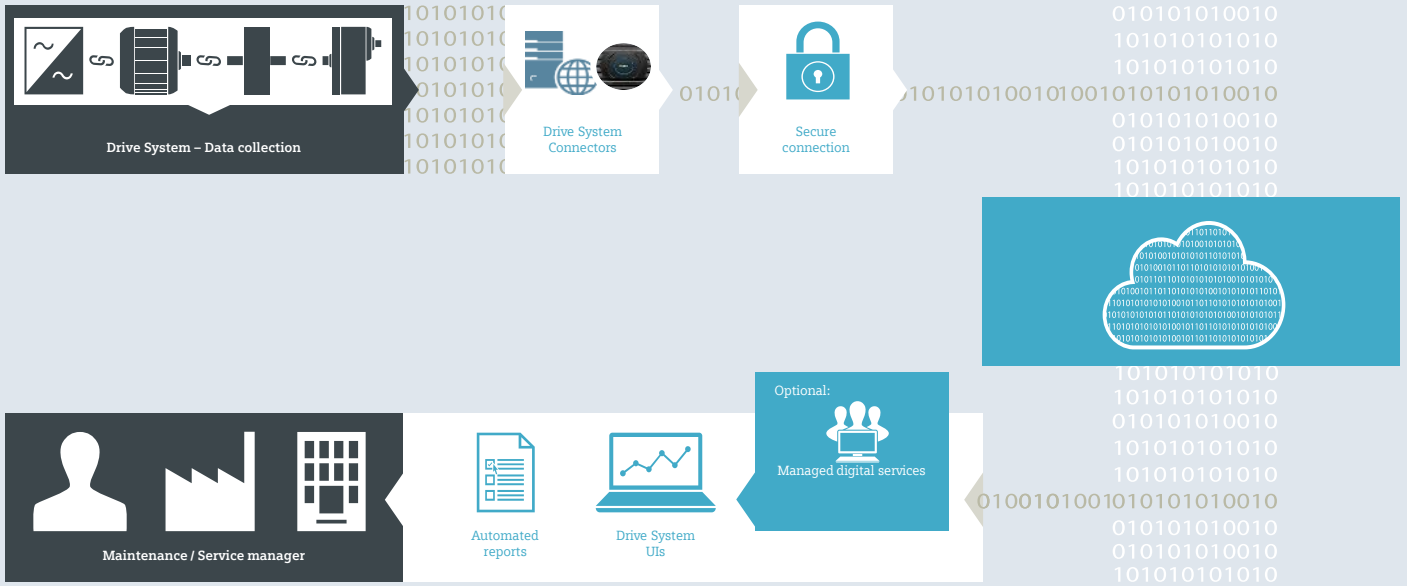
Reduce non-scheduled production downtimes …

Accelerate troubleshooting ...

Improve availability-centered operation and maintenance planning …



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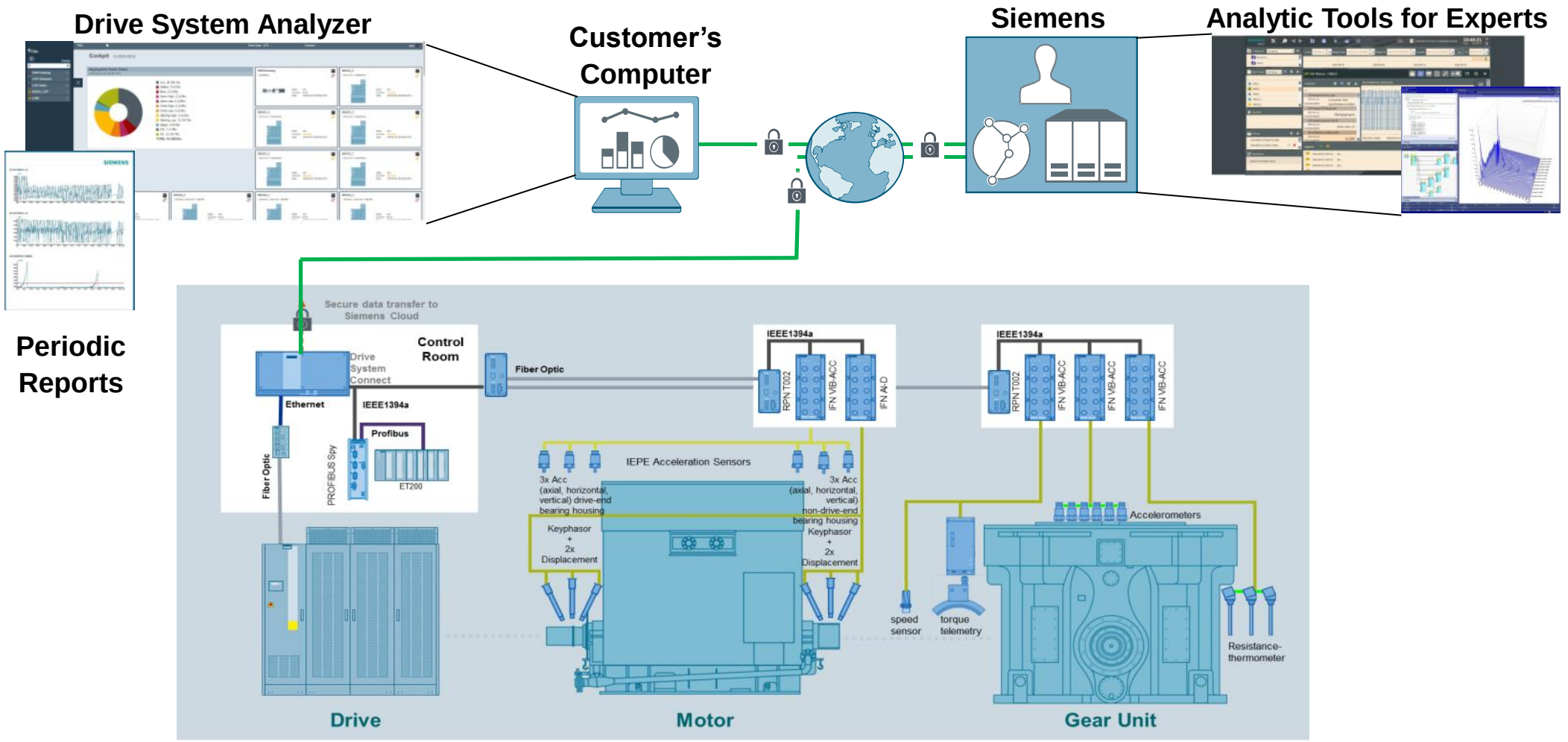
Drive Train Analytics typical architecture



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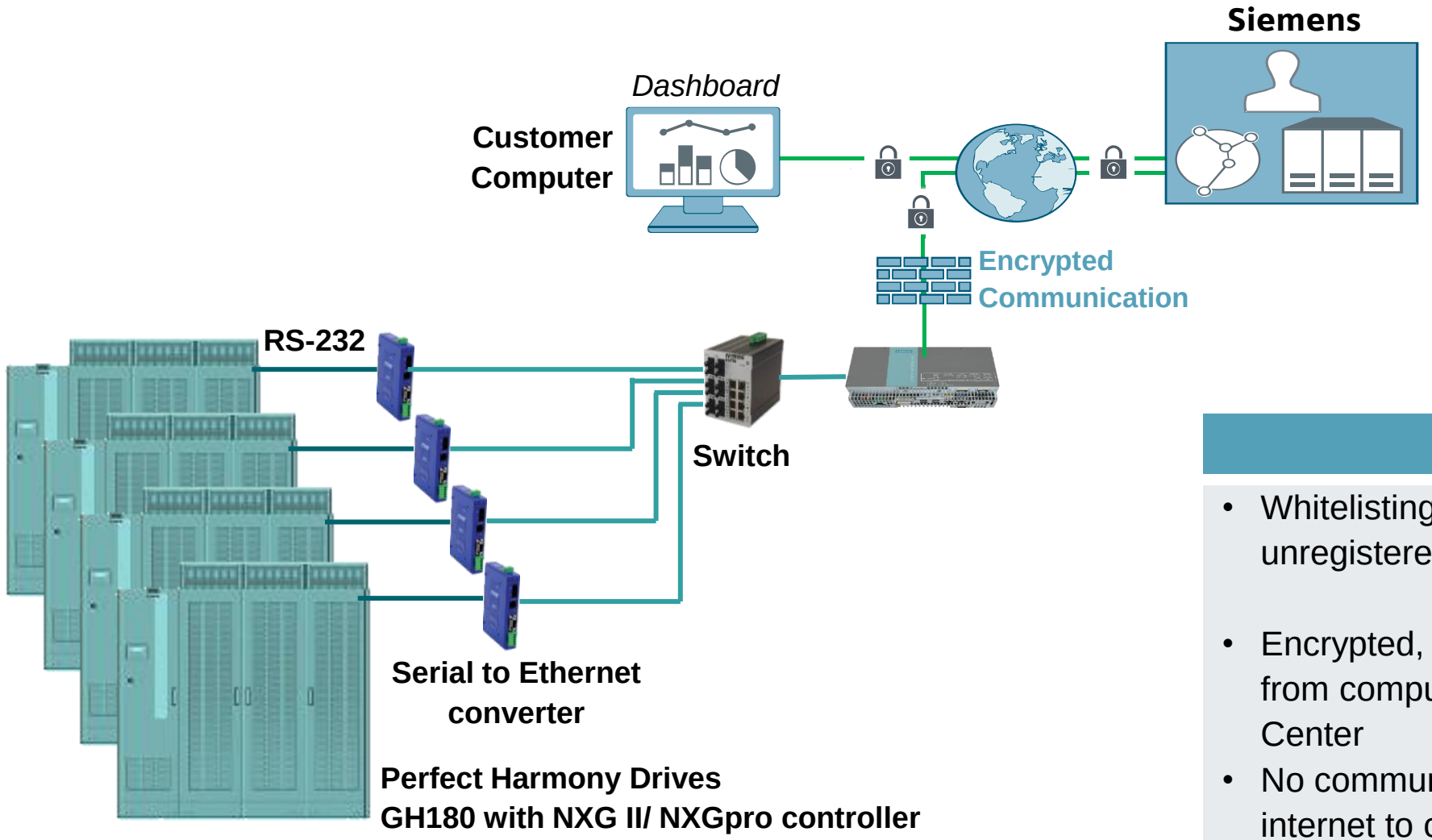
Hardware Setup for Sinamics Perfect Harmony GH180 VFD



Security

- Whitelisting of computer → no unregistered process possible
- Encrypted, one-way communication from computer to Siemens Expert Center
- No communication from outside internet to computer possible

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Overview of DTA Digital Service for GH180

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Drive Train Analytics Digital Service

Rule - Based Automatic Notifications

+

Drive System Analyzer

+

Automatic Reports

+

Accelerated Issue Resolution with Expert Workstation

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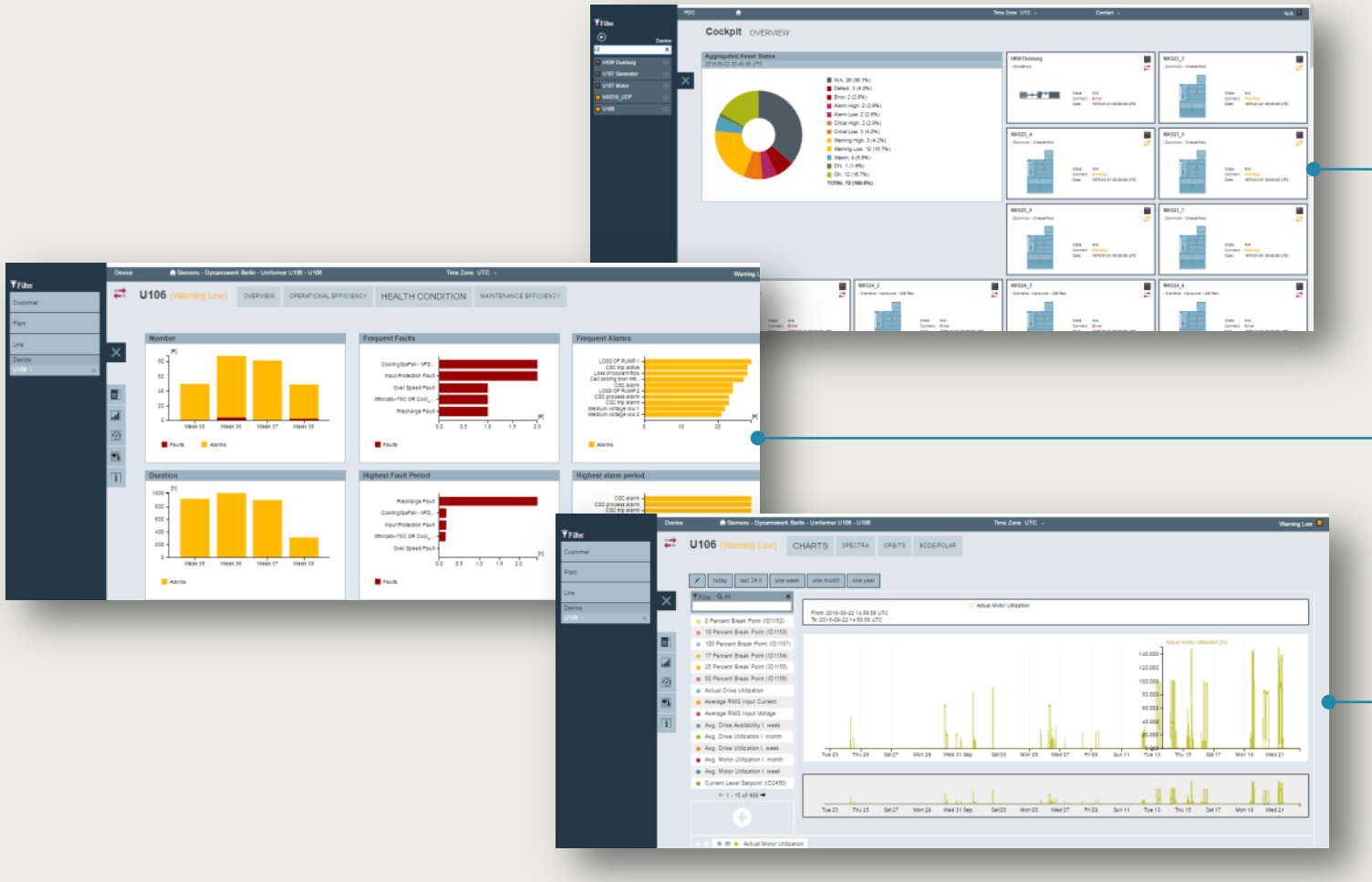
Overview of Information provided on Drive System Analyzer



Operational status of the connected equipment at your site(s)

KPI views of equipment health

Easy and remote access to important historical data and trends

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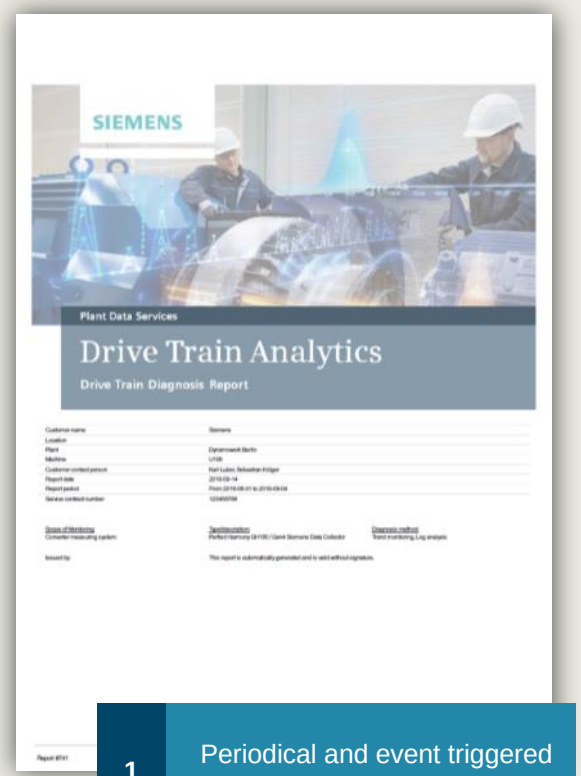
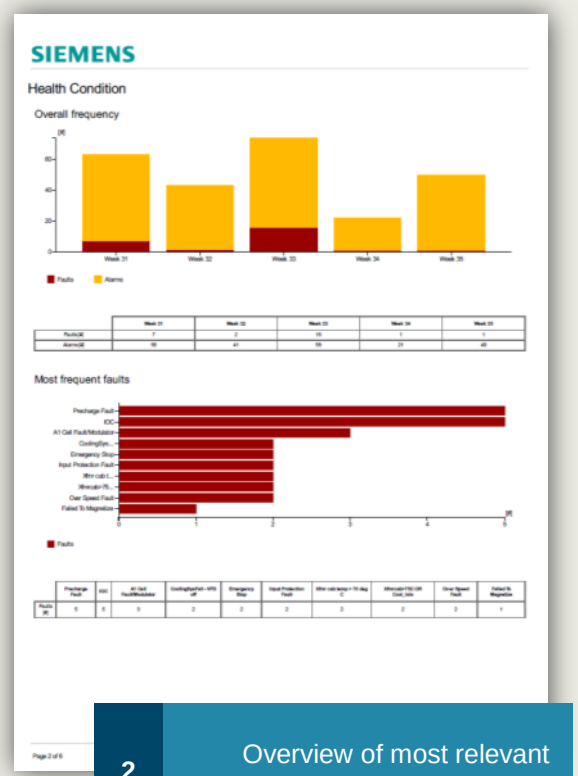
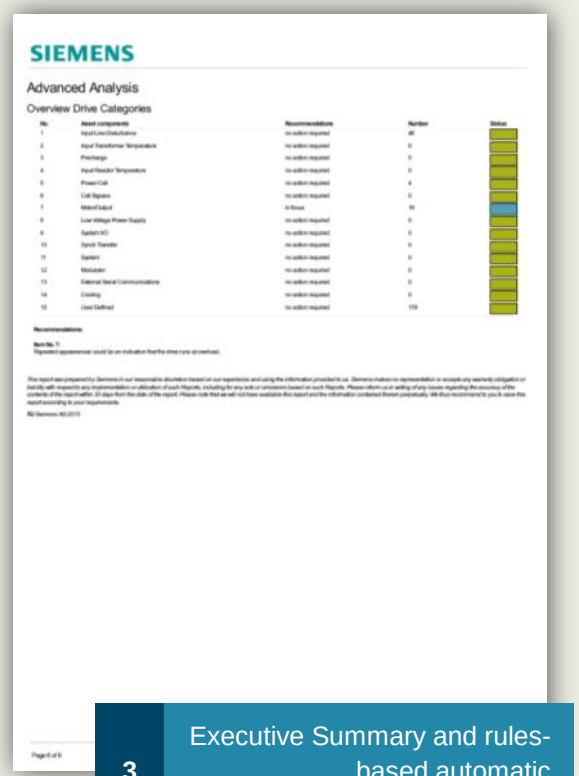
Automatic reports on Drive performance and condition provides rule-based insights



1 Periodical and event triggered report for health of a component



2 Overview of most relevant KPI's and events



3 Executive Summary and rules-based automatic recommendations

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Drive Train Analytics Reference
Large Power Station in the USA

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Initial data analysis shows that Managed Fleet Services are proven to reduce Total Cost of Ownership (TCO) for VFDs and Drive Systems

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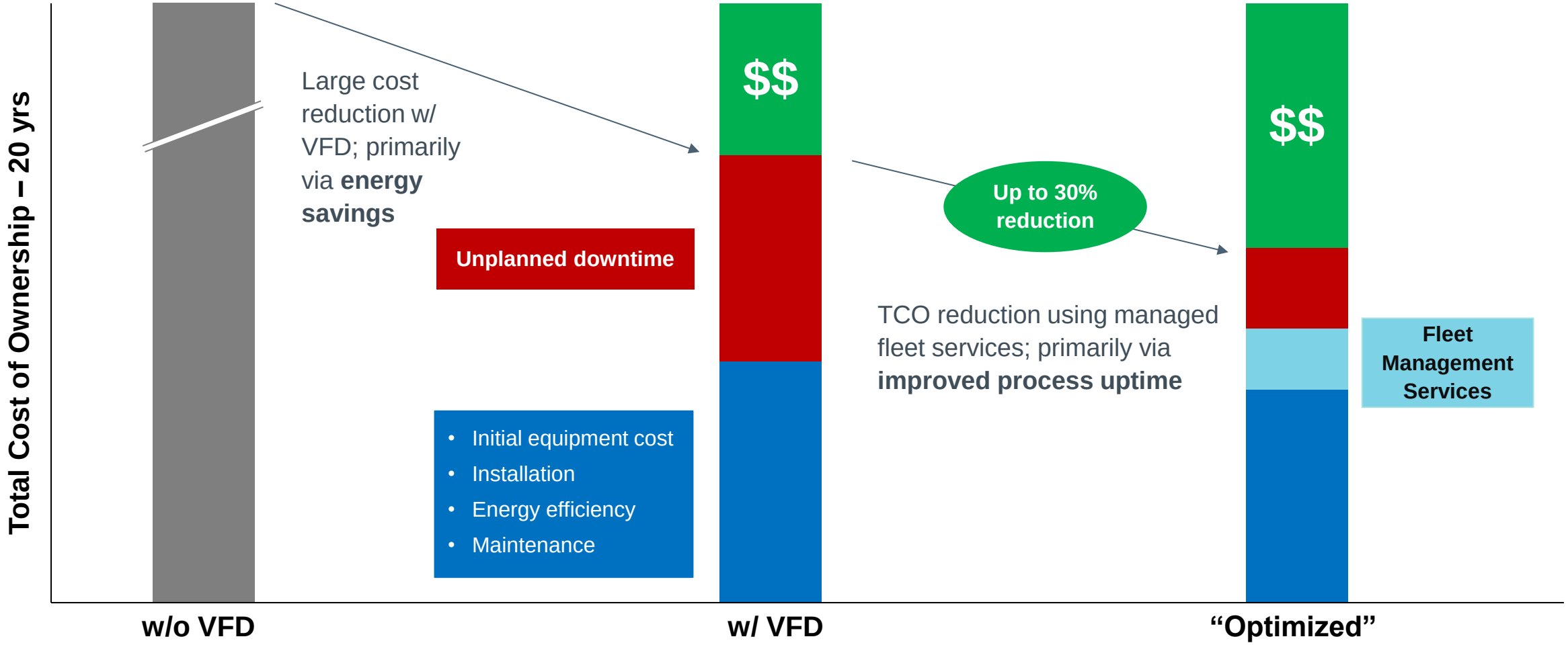

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Pipelines have tremendous opportunity to realize efficiency improvements through digitalization

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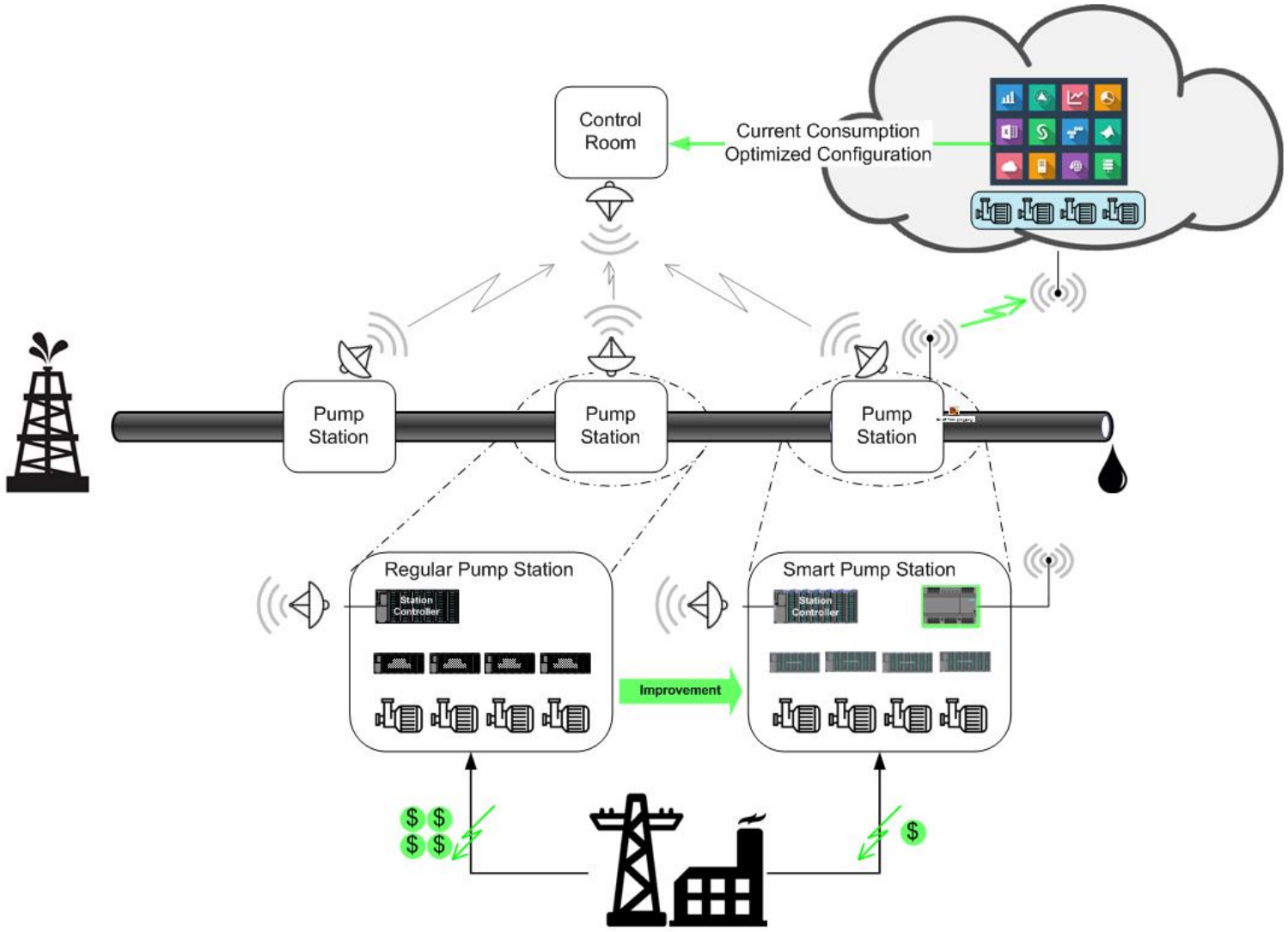
Opportunities

Significantly reduce OPEX by:

- Optimizing per batch at each pump station
- Utilizing energy price differential along pipeline
- Optimizing DRA application
- Enabling ratchet penalty avoidance
- Increasing life span of capital equipment by minimizing vibrations and avoiding pressure surges, mechanical wear, and overheating
- Central storing of pump performance profiles and pump station energy price data
- Continuous real-time energy monitoring
- Intelligent analysis for station to station load balancing and proper handling of transient operations (batch changes)



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Operating a global fleet: a look at a Supermajor
How many assets are in operation where?

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Global Operations

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Constraints, challenges and questions when operating a global fleet

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- Do I know and understand the equipment I own and operate?
- Do I have products and or parts in my fleet that are/will soon become obsolete?
- Do I have the spare parts I need and is the amount appropriate to address my risk of prolonged downtime?
- Do I know what parts, firmware and software are installed in my products?
- Do I spend my maintenance budget on what‘s important and needed to help reduce the risk of equipment failure?
- Do I have a centrally coordinated, globally based, data driven operating methodology?
- How can I determine the health and risk status of my equipment?
- How do I transfer expertise gained on equipment in one production plant to other plants that use/run the same equipment?
- How am I managing the loss of technical expertise within my operating & technical support teams?
- How can I apply world wide lessons learned & field feedback to intelligently optimize my operation?

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Siemens *Fleet Management* aims to combine the valuable static and dynamic data to optimize fleet operation

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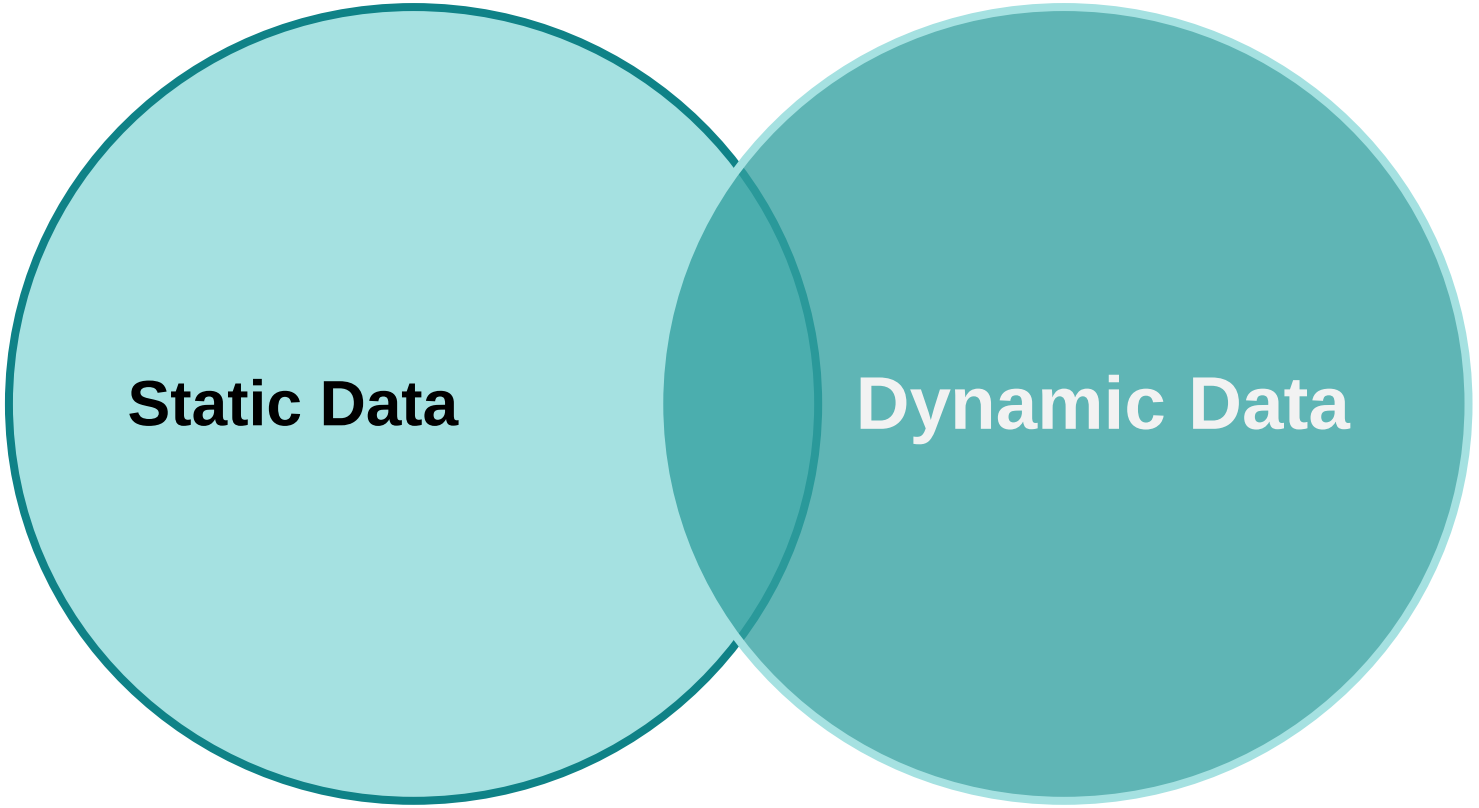

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Our Digital Directive towards Partnership

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Contact Info

Jason Hoover

Director - Digitalization
Siemens Large Drives

500 Hunt Valley Road
New Kensington, PA 15069

Phone: +1 724 472 2680

E-mail:
jason.hoover@siemens.com

siemens.com

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