Digitalization of Utilities: Roadmaps & Digital Twins

Transforming the Utilities Sector through Advanced Digital Technologies

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Agenda

- Introduction to Digitalization in Utilities
- Why Digitalization is Crucial for Utilities
- Understanding Digitalization Roadmaps
- Steps in Developing a Digitalization Roadmap
- Introduction to Digital Twins
- Digital Twins in Action
- Future Trends in Digitalization of Utilities
- Conclusion & Call to Action

Introduction to Digitalization in Utilities

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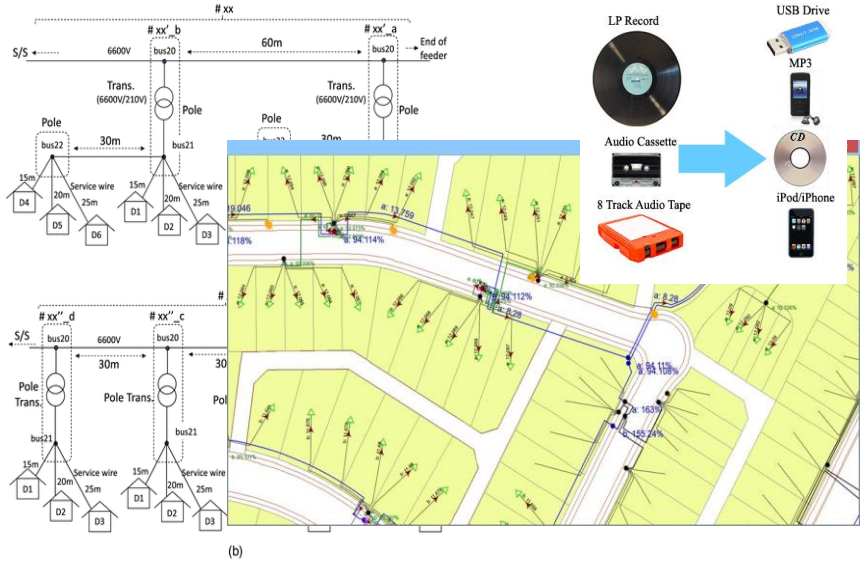
Digitization

- Converting data in physical (paper based) & analogue format into a virtual/digital media.



Digitalization

- Use of digital technologies to change a business model / business operations.
- Provide new revenue and value-producing opportunities.
- It is the process of moving to a digital business.

- Comprehensive integration of Digital technology for Reliability ,Efficiency & Customer service.

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Why Digitalization is Crucial for Utilities

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Challenges

- Aging infrastructure
- Visibility of asset Condition
- Workforce combination
- Pressure for higher reliability and efficiency
- Prioritizing maintenance based on asset health/condition
- Maintenance v/s Replacement
- Converting data to information and decisions
- ISO 55000/PAS55
- Defer or control capital expense
- Flat O&M budgets

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Understanding Digitalization Roadmaps

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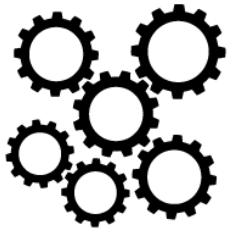
Digital technologies are driving new innovation

Virtual/augmented reality

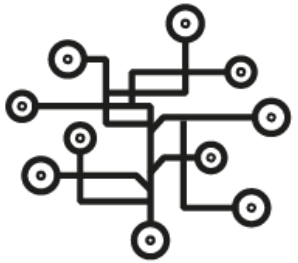
Software-defined machines

Machine learning

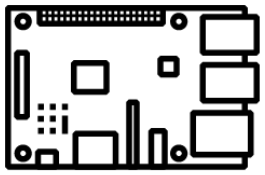
Time-sensitive networking



Big data



Inexpensive computing

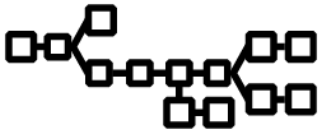


Cloud computing

Cybersecurity

Connectivity

Blockchain



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Steps in Developing a Digitalization Roadmap

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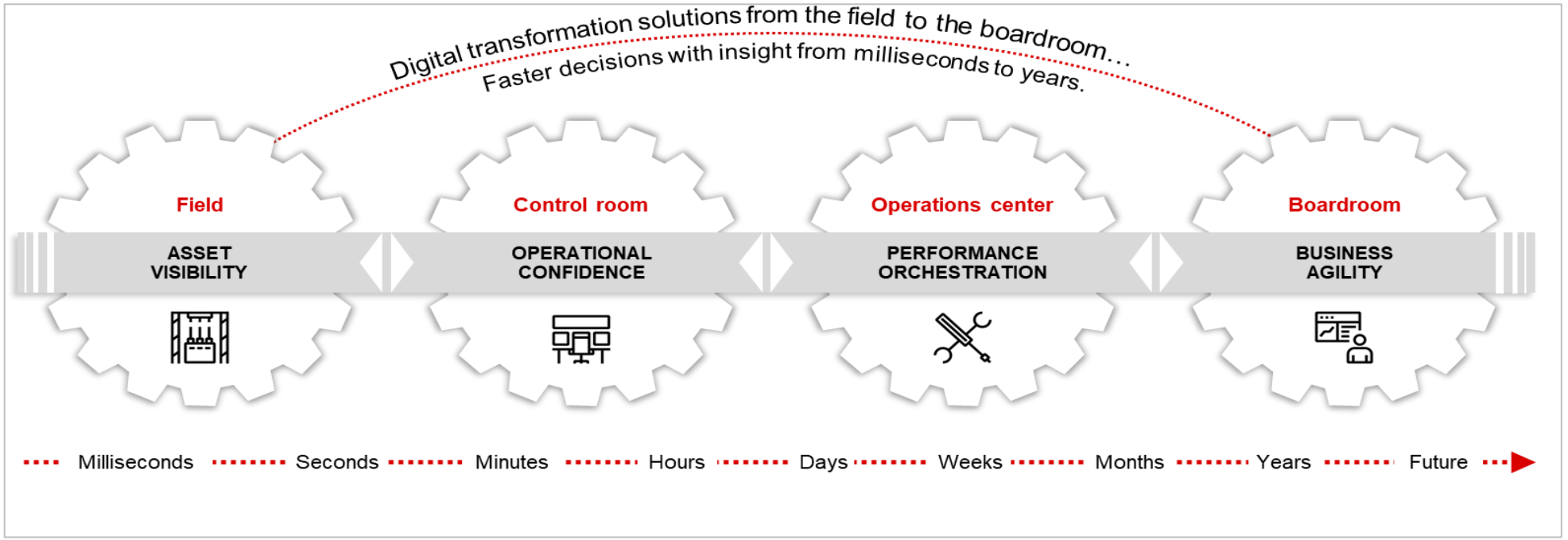
- Digitalization roadmap is about Digital Transformation:
- Digital business transformation is the process of exploiting digital technologies and supporting capabilities to create a robust new digital business model.

Digital transformation initiatives will typically

- include several digitalization projects
- requires the organization to deal better with change overall
- essentially making change a core competency as the enterprise becomes customer-driven end-to-end.



Therefore, we digitize information, we digitalize processes and roles that make up the operations of a business, and we digitally transform the business and its strategy.

The Digitalization roadmap of an organization should be aligned to its business strategy and transform the business processes towards it.

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Understanding Digitalization Roadmaps

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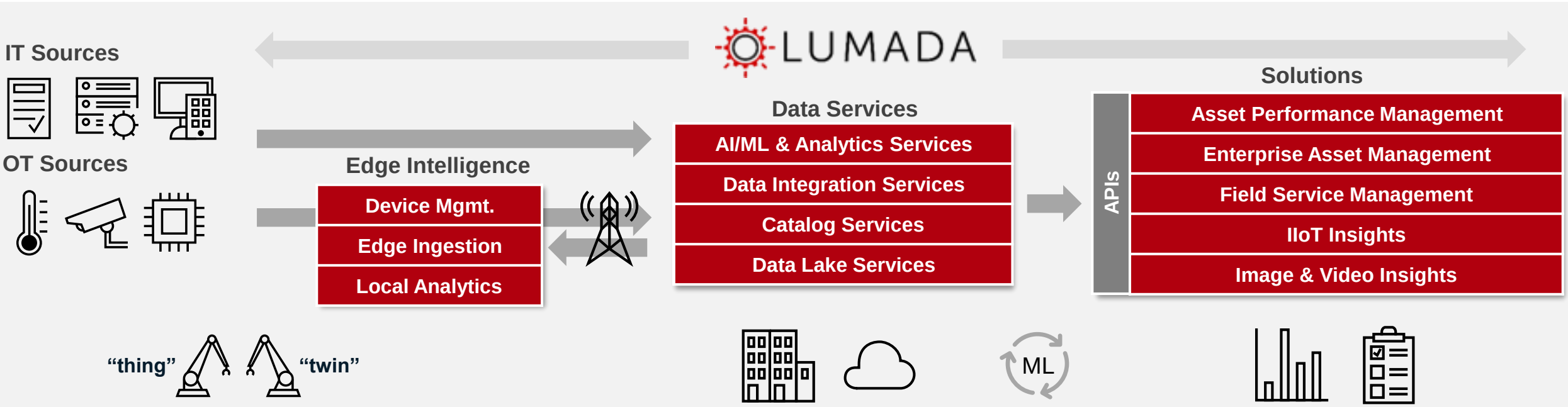
SOURCES | EDGE | DATA | SOLUTIONS



PROFESSIONAL SERVICES | ADVISORY | DIGITAL ENTERPRISE | DIGITAL MODERNIZATION | DIGITAL INSIGHTS

Delivering actionable insights to generate better business outcomes

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Future Trends in Digitalization of Utilities

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Apps

Design
- Digital twins
- Digital blueprints of projects
- Operational data in design of new products

Build
- Virtual and augmented reality
- Digital project management
- Self deployable solutions

Operate
- Analytics assisted operations
- AI driven operations
- Autonomous operations

Maintain
- Predictive maintenance
- Optimized workforce
- Self servicing assets

Analytics

Device Analytics
- Performance, health index, stress factor, prediction

System Wide Analysis
- Plant/process level failure analysis
- Integration of IT & OT processes
- Forecasting

Platform

Cloud

Data management
- Secure Data transfer and storage, Cyber Security
- Data quality management
- Unified information models

Edge Gateways

Digitization

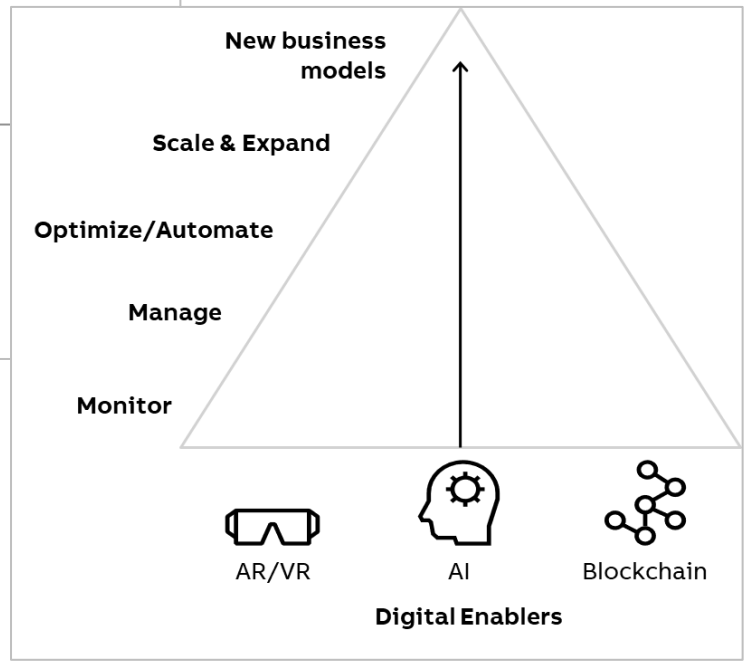
Sensors & gateways
Converter

Circuit breaker

Transformer

Relays

Sensors & gateways
Substation



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Asset Performance Management (APM)

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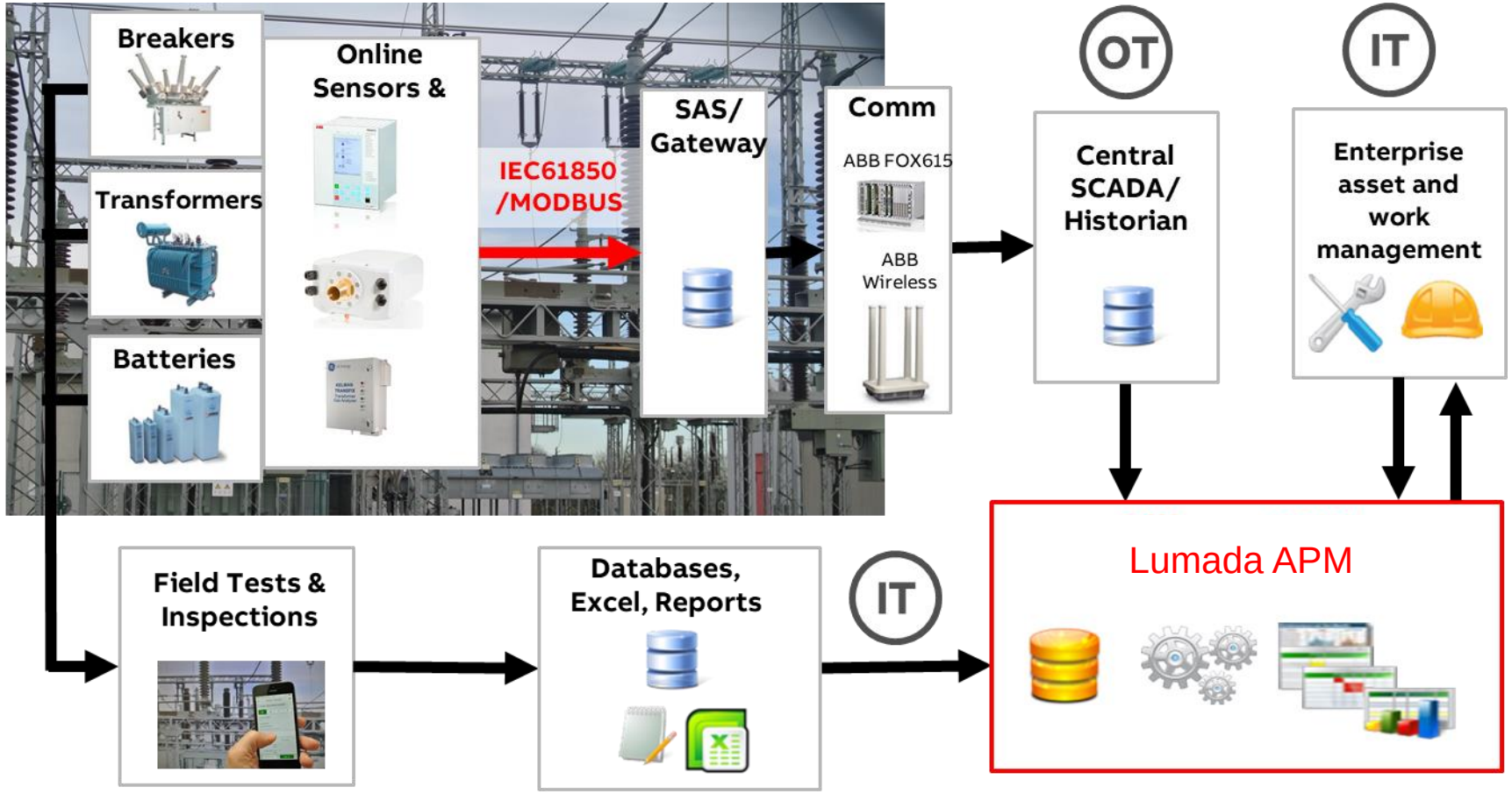
Data flow, typical architecture

APM can be implemented either

- Cloud-Based
- On-Premise



Cloud based

- Easier & Faster implementation
- Scalability
- Easier maintenance

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Vegetation Management

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End-to-end Vegetation Management - Workflows & People

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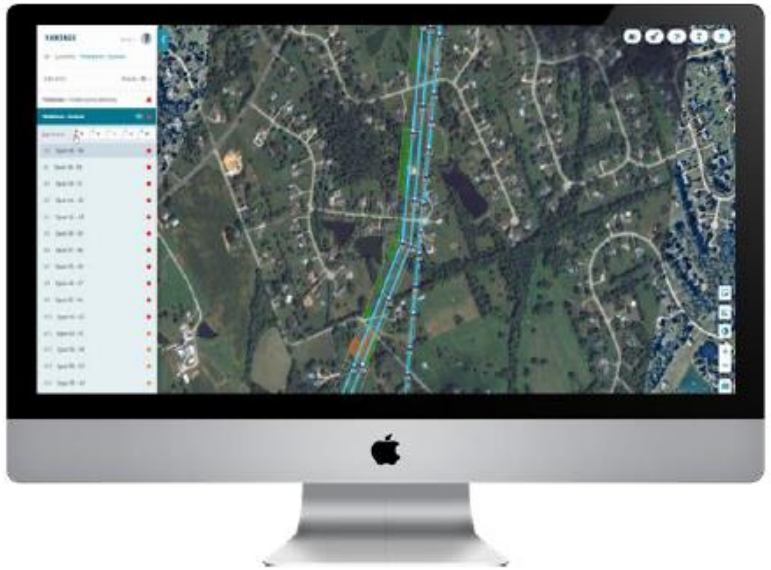
Field Patrol

Mobile application designed for ROW Coordinators, field personnel performing patrols “in the air” or “on the ground” for rapid assessments to inform planning process.

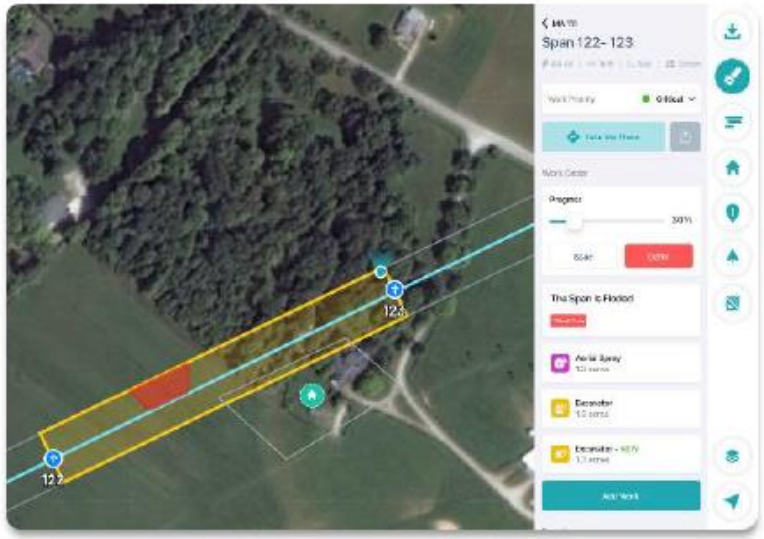
Cut Planner

Back-office application designed for vegetation managers “at HQ” to visualize vegetation risks, estimate and control program costs and create optimal cut plans.



Field Planner

Mobile application designed for arborists, foresters, and foreman “on the ground” to manage parcels, capture job site data, and track crew progress.



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Introduction to Digital Twins

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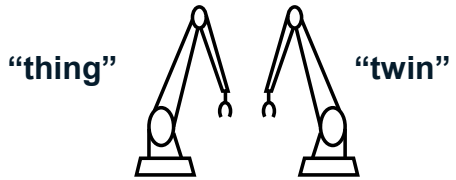
What is a digital twin?

- Digital representation of physical object/equipment contextualized in a digital version of its environment.
- It's designed to monitor and automate the system it replicates, enabling optimization across the entire lifecycle.
- Digital twins can help an organization simulate real situations and their outcomes, ultimately allowing organization to make better decisions.



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Digital Twins in Action (Hitachi Energy's IdentiQ™ for HVDC solution)

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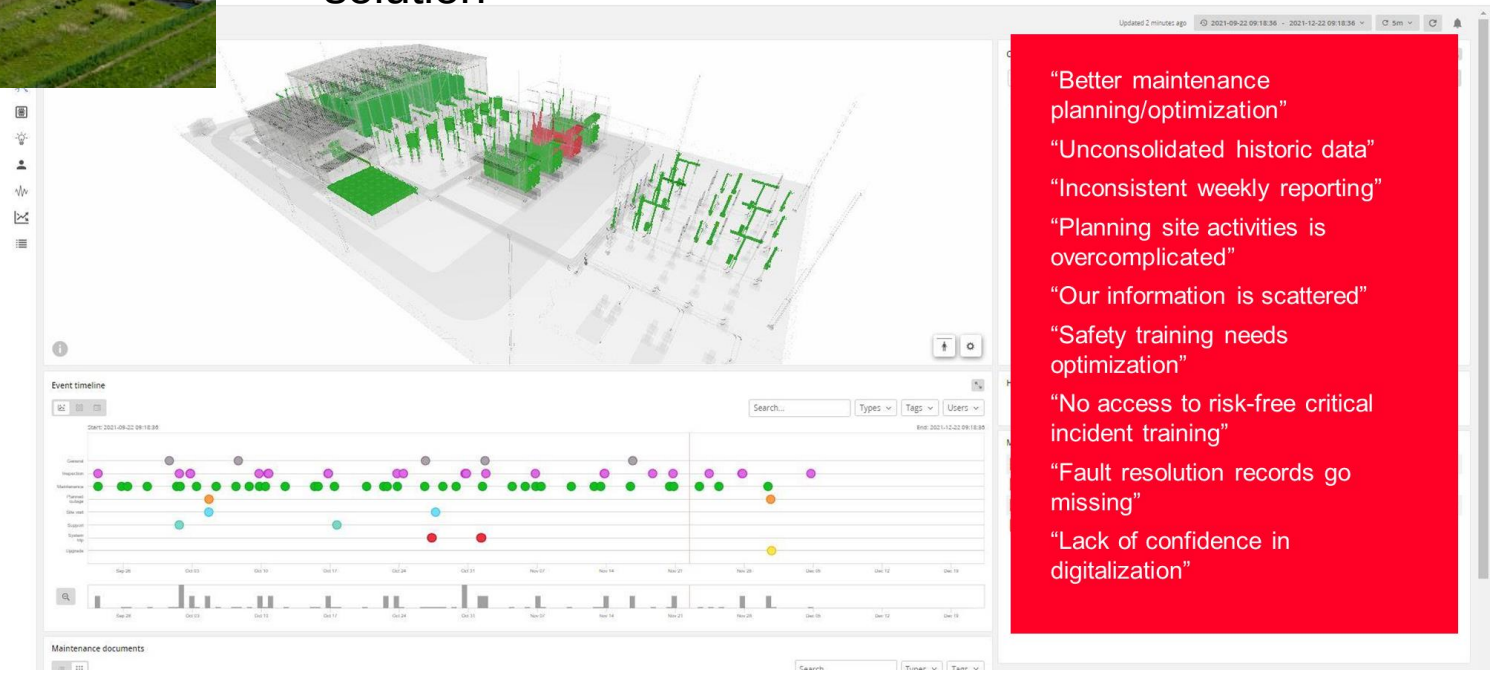
Explore common challenges and IdentiQ™ for HVDC solution



Hitachi Energy launches IdentiQ™ digital twin for sustainable, flexible and secure power grids

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Digital Twin

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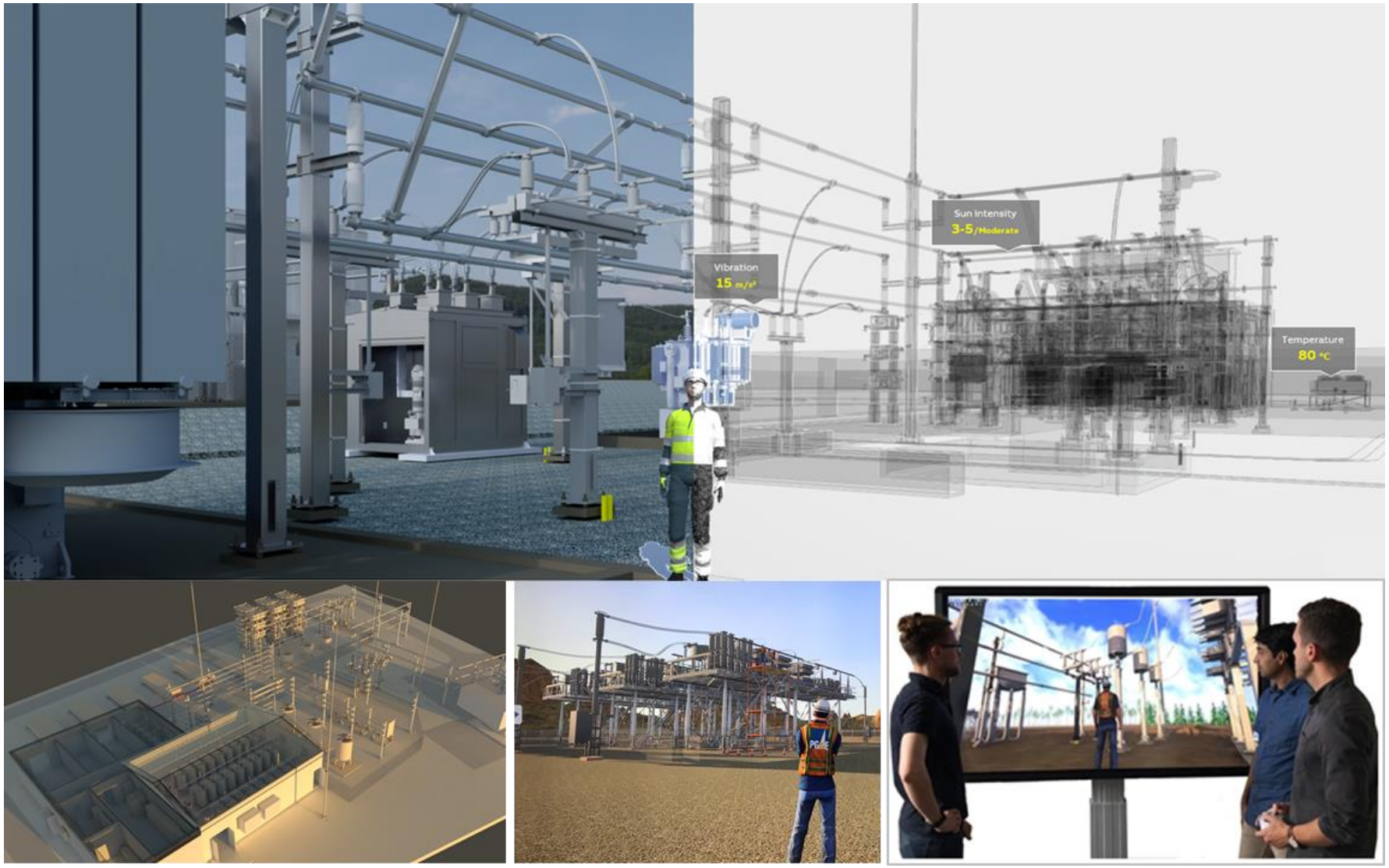
Walk-through electrical/power installation - learning, experiencing, exploring



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Conclusion & Call to Action

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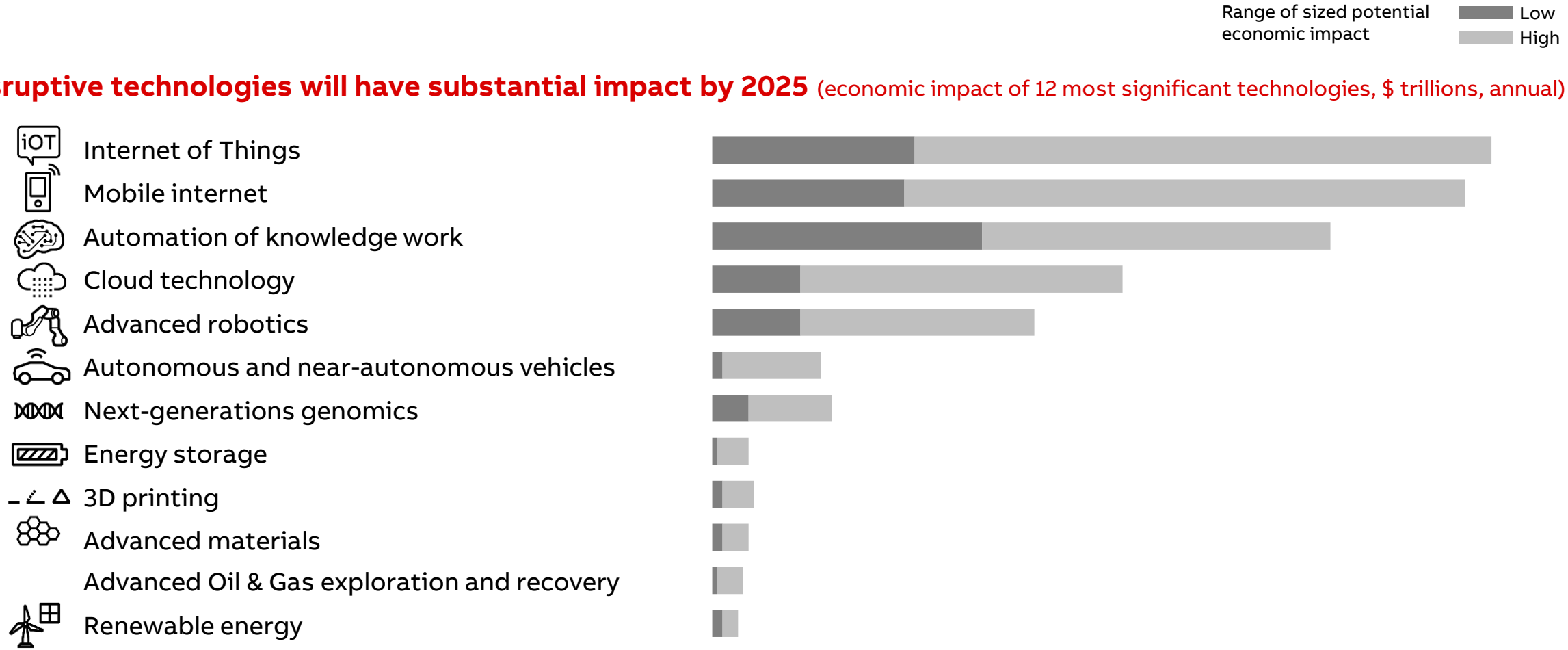

With the changing environment and challenges, there are enormous opportunities to adopt Digitalization for improving the overall business process, efiiciency and proactive decision making.

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Thank You

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