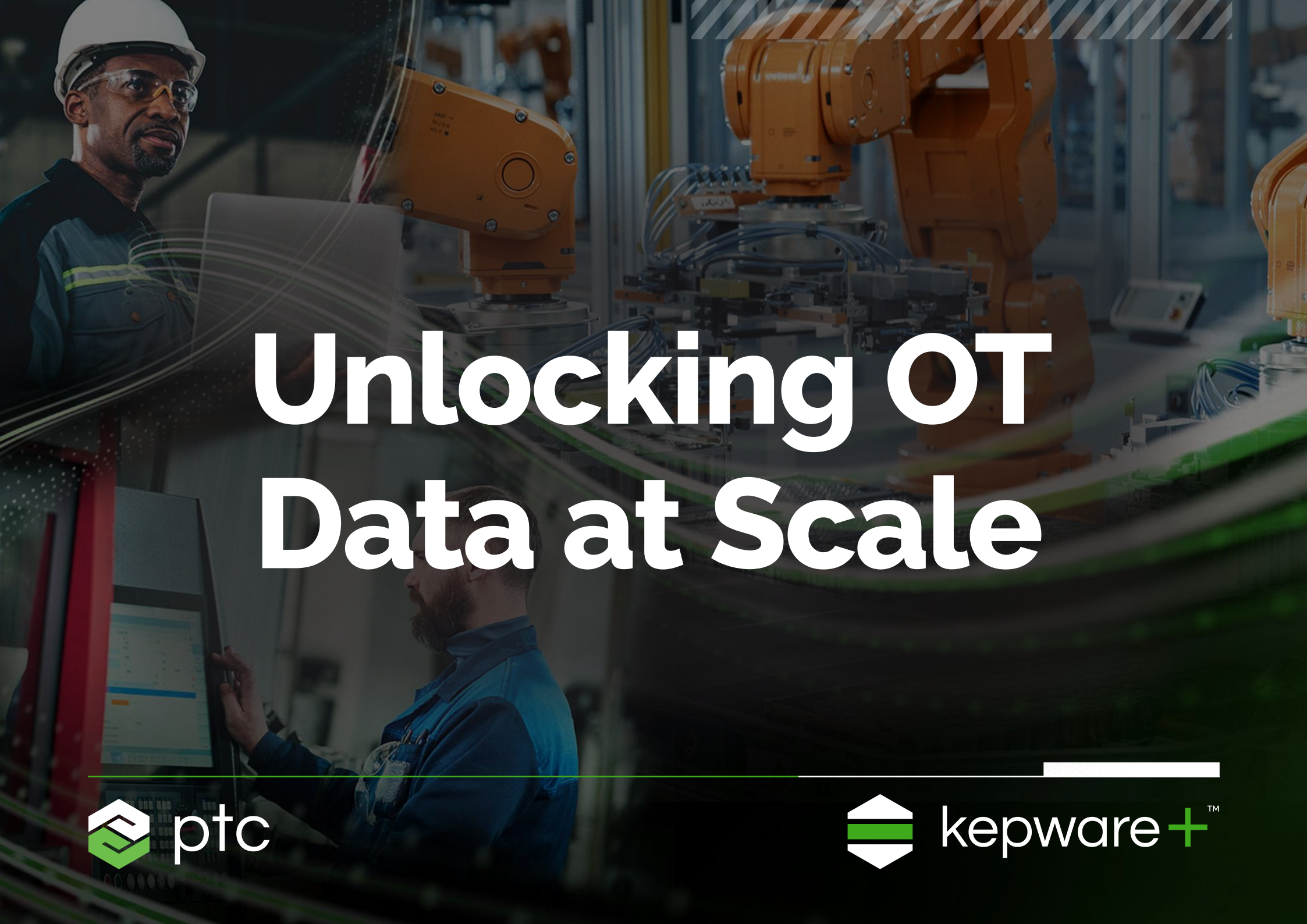

Unlocking OT Data at Scale

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How to Quickly Access Data from Legacy and Modern Machines

Increasingly, manufacturers are turning to artificial intelligence (AI), the industrial Internet of Things (IIoT), and automation to drive digital transformation and remain competitive. However, for these technologies to drive value, they all require access to quality, reliable operational technology (OT) data. How you source, contextualize, and handle the data determines the fidelity of insights derived from the data, the security of your OT networks, and ultimately how well you compete in the market. Yet, most manufacturers fail to have an OT data strategy. With heterogeneous assets deployed across manufacturing, secure, scalable industrial connectivity has never been more critical.

What is Industrial Connectivity?

Industrial connectivity serves as a data abstraction or communications layer between OT devices and assets and the IT and OT systems that make use of data from the shop floor. Industrial connectivity helps organizations connect to both legacy and modern assets (devices, machines, and systems) and share data where it's needed (such as MES, ERP, SCADA, IIoT, HMI, the cloud, and more). This seamless information exchange between assets and systems equips users with the ability to automate processes, increase visibility into manufacturing performance, and derive insights for data-driven decisions.

The standardization of industrial connectivity across lines, plants, and the broader enterprise ensures that teams—IT and OT—have seamless and secure access to the data they need while mitigating cybersecurity risks.

Benefits of Industrial Connectivity:

Increased Automation

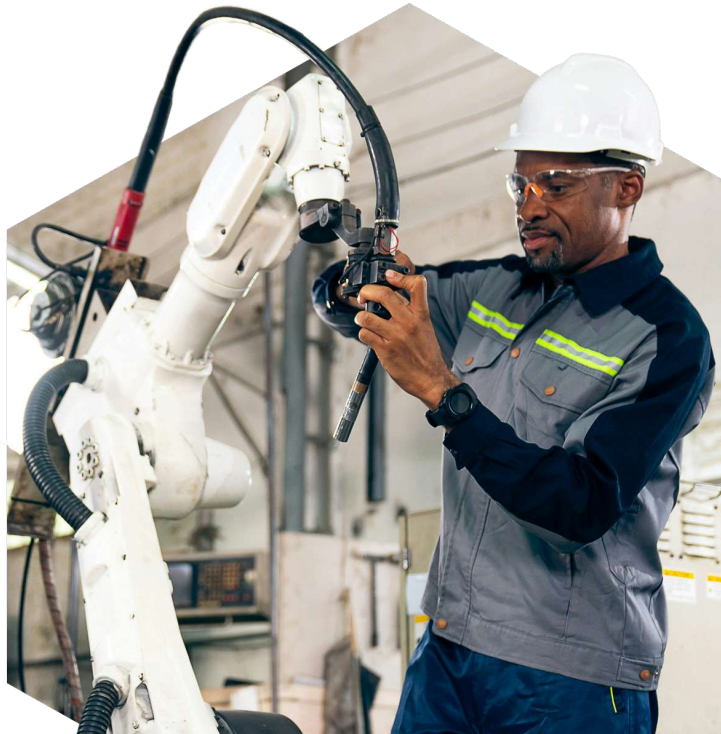
- Reduce labor costs
- Improve quality
- Ensure compliance

Improved Analytics & AI

- Improve visibility
- Reduce downtime
- Increase efficiency

Reduced Cybersecurity Risks

- Better adherence to regulations
- Mitigate threats & risks



Common OT Data Challenges

Missing & Incomplete Datasets

- Accessing data from assets and systems—all from various vendors
- Connecting disparate systems and data silos

Data Without Context

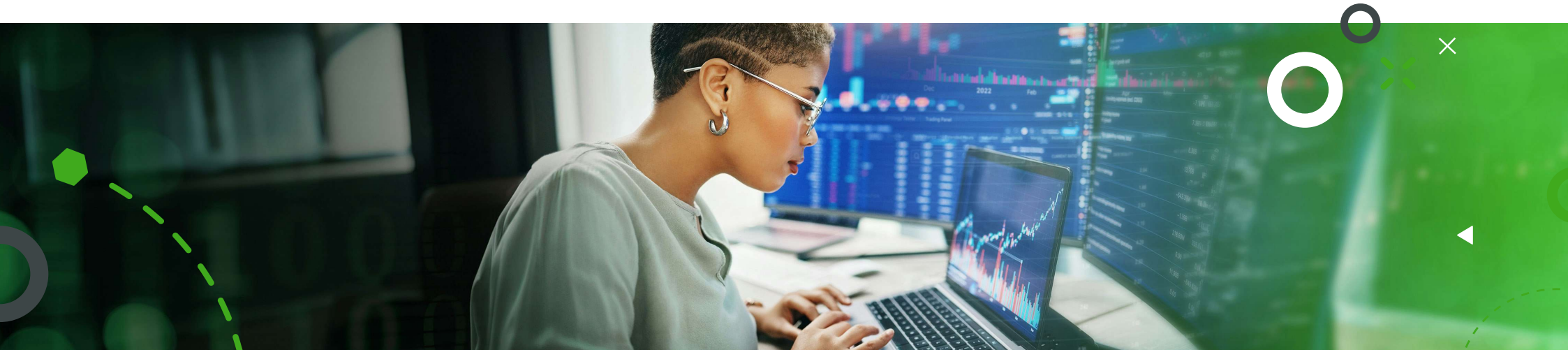
- Inconsistent, disordered data types and protocols
- Lack of common naming schemes
- Varied units of measure
- Unstructured or flat data sets

Insecure Data Transmission

- Rise of connectivity to industrial systems, including IIoT
- Insecure, legacy protocols

Insecure Remote Access Procedures

- Remote teams require OT data only accessible on-site
- Vulnerable remote desktop workarounds
- Inability to control user access or capture audit logs



Device Connectivity

Device connectivity is a key capability for all industrial connectivity solutions, but not all solutions are equal. Industrial connectivity platforms should offer a wide range of pre-built drivers to connect to various devices and protocols commonly used in OT environments. The ability of industrial connectivity solutions to connect to devices from different vendors is critical to achieving a standardized, abstracted connectivity layer at scale, as no two machines, lines, or factories are the same. Also consider the broad range of device drivers and the varied performance and reliability of each one.

Types of Devices:

- PLCs
- OPC Servers
- RTU/Flow Computers
- Sensors & Actuators
- CNC Machines
- Robots & Cobots
- Building Automation controls
- Legacy and smart tools

If manufacturers have gaps in their ability to connect and standardize all relevant OT data, they risk data blindspots and quality, minimizing the role that OT can play in improving efficiency and quality.

Data Aggregation & Processing

Generating trustworthy insights from data requires data to be standardized, normalized, and effectively aggregated. The capabilities of your OT connectivity solution can be critical drivers for operational efficiency without sacrificing security.

Data Aggregation: industrial connectivity aggregates data from multiple sensors or machines before transmitting it to other OT and IT systems, reducing network load and improving efficiency.

Normalization and Standardization: Aggregating data from diverse sources requires normalizing it into a consistent format. This involves converting data from proprietary formats to industry standards.

Time Synchronization: Accurate timestamps are crucial for correlating events across different devices. Synchronized clocks ensure data consistency.

Data Translation: Data from almost any industrial automation device must be put into normalized formats so it can be ingested by other open-standard applications (cloud, MES, SCADA, etc.). This includes industrial protocols (ControlLogix, BACnet, Modbus, Siemens TCP, OPC DA), IoT Messaging protocols (MQTT, OPC UA), and machine-to-machine data exchange.

Data Transformation: The wide variety of raw data outputs must be transformed into readable units. For example, converting a sensor signal to a temperature or pressure or converting a proprietary data type to a normalized format. Data transformation also includes performing calculations or applying conditional logic to generate new data outputs. For more complex data transformations, advanced scripting can be used to execute custom logic, event-based triggers, or pre-defined conditions.

Examples of Advanced Processing

- Automate data exchange between machines and systems
- Start the cooling process if the temperature goes too high
- Conduct engineering math functions and derivations
- Calculate power from existing voltage or measured resistance
- Increase counter by 1 every time cycleComplete is set to True
- Initiate a cool-down period and notify machine readiness after 5-minute rest

Seamless IT & OT Integrations

Manufacturers produce enormous volumes of OT data, which can be processed and standardized. But without a robust integration passing data between IT and OT systems, this OT data is of limited value to the enterprise. Seamless integrations with IT systems enable end-to-end visibility and support business processes by translating data to open standards (MQTT, OPC-UA, XML, plaintext, and more). Preferred solutions enable bidirectional data flow to ensure that insights from OT data can inform IT systems and vice versa. It's also important to have strong data mapping and transformation capabilities to support consistent data representation across IT and OT domains. As for security, implementing gateways between IT and OT networks are critical safeguards for controlling access, monitoring traffic, and preventing unauthorized communication.

Seamless IT & OT Integrations

Systems:	Use Cases:
Historians	Historians archive SCADA and automation system data, offering insights into equipment trends and performance and logging data for quality and compliance. Kepware+ from PTC provides a streamlined integration to collect and transfer data from various OT devices to Historian systems.
MES	MES provides information to optimize production output by managing and monitoring production processes in real time. It can operate across various functional areas, such as product lifecycle management and quality management. Kepware+ allows for the rapid collection and normalization of data from a wide range of OT assets, making it ready for use by MES, including for automation.
SCADA	SCADA controls industrial processes locally or at remote locations. It monitors, gathers, and processes real-time data, and is often used in infrastructure and facility-based processes. With Kepware+, SCADA systems can access industrial data from machines securely via horizontal communication within network layers.
ERP	ERP is a suite of applications that manage and integrate financials, supply chain, operations, reporting, manufacturing, and human resource activities. It centralizes data to improve decision-making and resource management. The movement of OT data between industrial devices and OT & IT systems, including ERPs, can be standardized and secured through Kepware+.

Seamless IT & OT Integrations

Systems:	Use Cases:
QMS	QMS documents processes, procedures, and responsibilities for achieving quality policies and objectives. It focuses on meeting customer requirements and enhancing workflows through continuous improvement. Kepware+ offers a reliable and secure pathway for data flow from industrial devices to IT systems through its simplified integration and management of quality data – an essential requirement for effective QMS solutions.
IoT Platforms	IoT Platforms facilitate the connection of IoT devices and provide value-added functionality like data analytics and application development. They support local storage and computing at the edge and can integrate with cloud services for further processing. Kepware+ easily integrates and manages data for IoT platforms and is widely compatible with modern and legacy OT devices.
Cloud & AI	Cloud platforms, including Microsoft Azure and Amazon Web Services, offer advanced data contextualization and analytics capabilities. Kepware+ sends data to these cloud platforms via secure, modern protocols including MQTT and OPC UA to enable analytics and insights.
Business Intelligence (BI) tools	BI tools interpret structured data sets (insights, trends, etc.) to support business decision-making. Kepware+ provides standardized, contextualized data for use with BI tools to enable the visualization and trending of OT data for real-time insights.

Enterprise Management

Given the complexity of machines and equipment generating OT data, combined with the far-reaching footprint of global operations, enterprise-class manufacturers require enterprise-class tools. Without these tools, it is nearly impossible to implement, provision, manage, secure, and leverage this data. Aggregating all OPC servers to a single endpoint allows users to monitor and manage their connectivity from one central location, regardless of where the data originates from. This centralization not only simplifies management but also enhances the visibility of operations.

Remote Configuration Management: Remote configuration ensures consistency and simplifies updates. IT and OT teams can configure devices, set communication parameters, and manage security settings from anywhere, eliminating the need to go on site.

Secure Remote Access: To maintain and monitor systems from a distance, especially in large-scale or distributed environments, it is crucial to have secure remote access that allows a unified view and control over the OT network. This enables quick issue response times and efficient network-wide updates.

Active Directory Integration: By using a centralized management approach for user credentials and access rights, organizations can ensure that only authorized personnel can access sensitive OT data and devices. Active Directory integration can further enhance security and reduce the administrative burden of access for a large number of devices.

Global Dashboards: Gain global visibility into industrial connectivity, including the ability to monitor server status and software versions.

Electrolux

Electrolux found itself in need of standardized connectivity to support its global manufacturing network—responsible for delivering over 60 million products a year. Faced with replacing manual data collection processes, the manufacturer turned to Kepware to optimize its operations at scale.

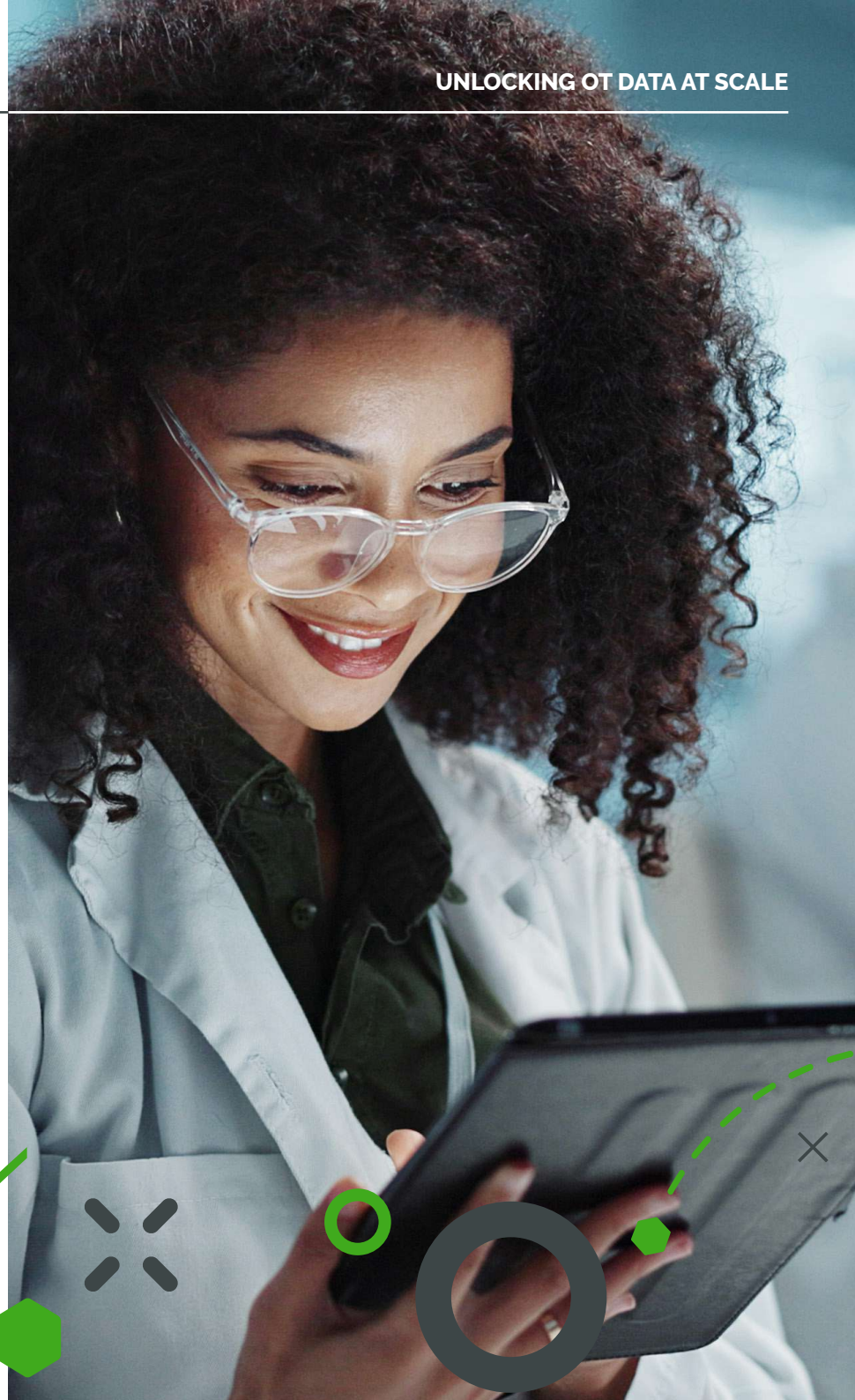
Read More

Secure and Scalable OT Connectivity with Kepware+

Kepware+ supports both legacy and modern assets, ensuring secure and standardized industrial connectivity across the enterprise. It enhances OT asset connectivity at scale by providing a data abstraction layer that facilitates seamless information exchange between OT devices and IT/OT systems. This approach enables automation, increased visibility into manufacturing performance, and data-driven decision-making, all managed from a single interface for global OT data connectivity. Additionally, Kepware+ offers pre-built integrations to cloud and enterprise applications, flexible deployment options, and centralized management capabilities, which are crucial for scaling industrial connectivity and reducing cybersecurity risks.

From quality improvements to increased efficiency, digital transformation begins with connectivity; transformation investments are only as good as the OT connectivity foundation they are built on. Secure and scalable OT connectivity is no small feat, and selecting the right enterprise connectivity platform is critical to success. Examine other unique use cases and confer with OT connectivity experts at PTC for actionable insights into your OT data potential.

Learn More >



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121 Seaport Blvd, Boston, MA 02210 : ptc.com

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