Guided By Our Expertise: Enabling Predictive Maintenance Through Industrial Connectivity

Find out more: siemens.com/senseye-predictive-maintenance

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A strategic guide for industrial organizations building data-driven maintenance capabilities through connectivity services.

1. Introduction: Why Connectivity Is Foundational to Predictive Maintenance

The pressure to improve uptime and efficiency means that flexibility, speed, and traceability are more critical than ever. Digitalization and IIoT unlock powerful insights—but only when data is accessible and connected.

Industrial Connectivity Services provide the foundation for this transformation. By connecting machines, components, and systems—regardless of age or manufacturer—they enable seamless data exchange across the shop floor and enterprise systems.

The Meaning of Industrial Connectivity:

Connectivity enables machines to deliver the operational data needed to:

- Optimize **Overall Equipment Effectiveness (OEE)**

- Prevent **failures and downtime**

- Increase **productivity and transparency**

Industrial Connectivity Services use modular approaches to create the right connections and move your digital transformation forward—making industrial environments more responsive and resilient.

2. Why Connectivity is a Strategic Priority

Preventing Unscheduled Downtime:

Unscheduled downtimes cost manufacturers an average of $250,000 per hour, lasting about four hours per event (REWO). Connectivity enables proactive monitoring, helping to detect and prevent issues before they escalate.

Unlocking Digital Transformation:

A McKinsey study shows that only 16% of managers believe their digital transformation efforts are successful. A major barrier? Poor access to operational data.

Enabling IT-OT Integration:

By integrating machines with systems like Opcenter EX DS, Brownfield Connectivity and Industrial Edge , organizations can automate order transfers, boost throughput, and enhance visibility. Connectivity Services also allow you to:

- Optimize IT resource usage

- Close the IT/OT gap

- Tailor data usage to your business needs

Bottom Line:

Before investing in analytics, AI, or software, audit your current machine data access. Connectivity is not an afterthought—it's the prerequisite for predictive maintenance success.

3. Understanding Industrial Connectivity: What It Is and Why It Matters

Industrial connectivity refers to the technologies and infrastructure that enable systems to share and process data—securely and efficiently

A complete connectivity stack includes:

- **Sensors:** Capture temperature, vibration, pressure, etc.

- **Communication protocols:** Open Platform Communications Unified Architecture, MQTT, Modbus, and more

- **Edge gateways:** Process and transmit data from machines

- **Enterprise/cloud platforms:** Analyze and act on data insights

- **Think long term:** Choose open, vendor-neutral solutions that scale with your operations.

4. Assessing Your Current Connectivity Landscape

Begin by mapping your machines and systems.

Identify:

- What data is available?

- What's missing?

- What devices need to be connected

Bottom Line:

Before investing in analytics, AI, or software, audit your current machine data access. Connectivity is not an afterthought—it's the prerequisite for predictive maintenance success

Common Triggers for Connectivity Investment:

- No existing data from machines

- Need for specific sensor data

- Lack of access or trust in current data

- Legacy systems with proprietary protocols
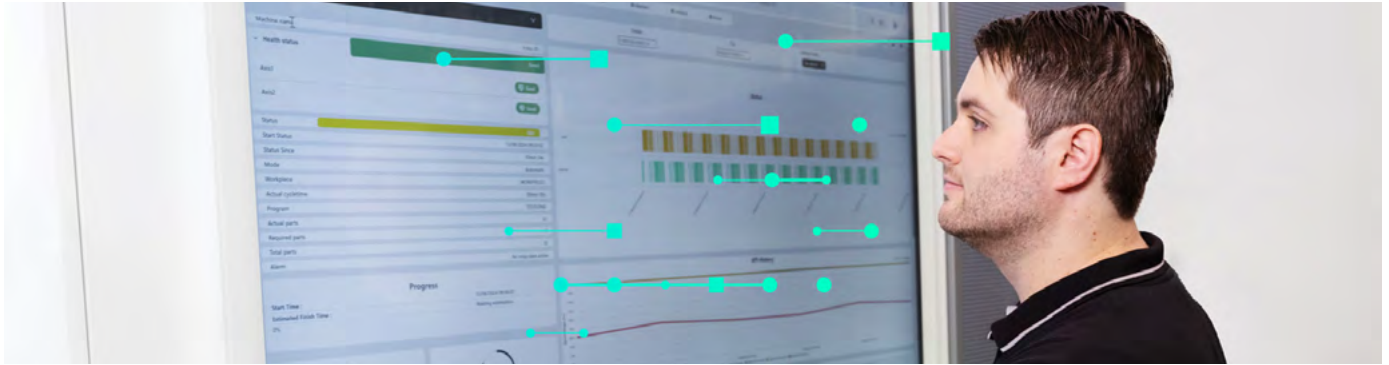
- Desire for wireless/simplified installations

Advice:

Run a connectivity readiness assessment. Define how data will be collected, transmitted, secured, and used. Identify champions in both IT and OT early—they'll be key to driving progress.

5. Building the Right Connectivity Layer with Siemens Solutions

A. Brownfield Connectivity Gateway (BFC Gateway)

Purpose: Bridge legacy and modern equipment on a unified platform.

The BFC Gateway is a hub for collecting and transmitting machine data—supporting over 60 industrial protocols, parallel connections, and local data transformation via ScriptLogic.

Benefits:

• Works with any machine, regardless of age or vendor

• Integrates OT (PLCs, CNCs) and IT (Docker, Kubernetes) systems

• Preconfigured BFC Starter Kit accelerates deployment

Start small: Use BFC Gateway with critical assets first—then scale.

Contact us to assess your connectivity readiness

B. Industrial Edge

Purpose: Enable real-time, local data processing at the machine level.

Industrial Edge allows analytics applications to run directly on machines, enabling fast decision-making and reducing reliance on cloud infrastructure.

Key Advantages:

• **Data Control:** Keep data on-premises or decide what goes to the cloud

• **Reduced Costs:** Analyze and filter data locally to reduce transmission/storage needs

• **Speed & Autonomy:** Real-time insights where data is generated

With Industrial Edge, it's not **cloud vs. edge** - you can use both depending on the application.

Contact us to begin your connectivity journey

6. Scalable Predictive Maintenance with Senseye Predictive Maintenance

With connectivity in place, the next step is transforming data into foresight. Siemens enables this through Senseye Predictive Maintenance, an AI-powered software solution that allows you to scale predictive maintenance without the need for new hardware or on-site installations.

Key Connectivity Features of Senseye Predictive Maintenance:

- **Seamless Data Integration:** Connects to factory historians, IoT middleware, and databases—ensuring smooth ingestion of operational and contextual data

- **Sensor & Operational Data Utilization:** Gathers and contextualizes machine inputs such as vibration, temperature, speed, pressure, and runtime conditions

- **Maintenance Activity Detection:** Detects and logs maintenance activities—planned or unplanned—and correlates them with asset performance metrics

- **AI-Driven Analysis:** Learns normal machine behavior over time and applies machine learning to detect anomalies, predict failures, and identify emerging issues

- **Smart Notifications:** Issues intelligent alerts prioritized by failure risk, urgency, and business impact—so you can act on what matters most

Business Benefits:

- **Improved Maintenance Planning:** Shift from reactive work orders to predictive scheduling

- **Reduced Downtime:** Predict and prevent failures, avoiding costly production interruptions

- **Increased Efficiency:** Focus maintenance resources on the right assets at the right time

- **Cross-site Knowledge Sharing:** Aggregate and compare insights across multiple plants, sites, and geographies

- **Enterprise Asset Intelligence:** Create a unified view of asset health and performance across the organization

With Senseye Predictive Maintenance working in tandem with Siemens' connectivity infrastructure, you gain full-circle asset intelligence—from raw data acquisition to smart, scalable decision-making.

Get in touch to discover how connectivity can transform your operations

7. Implementing a Scalable Connectivity Strategy – an example deployment
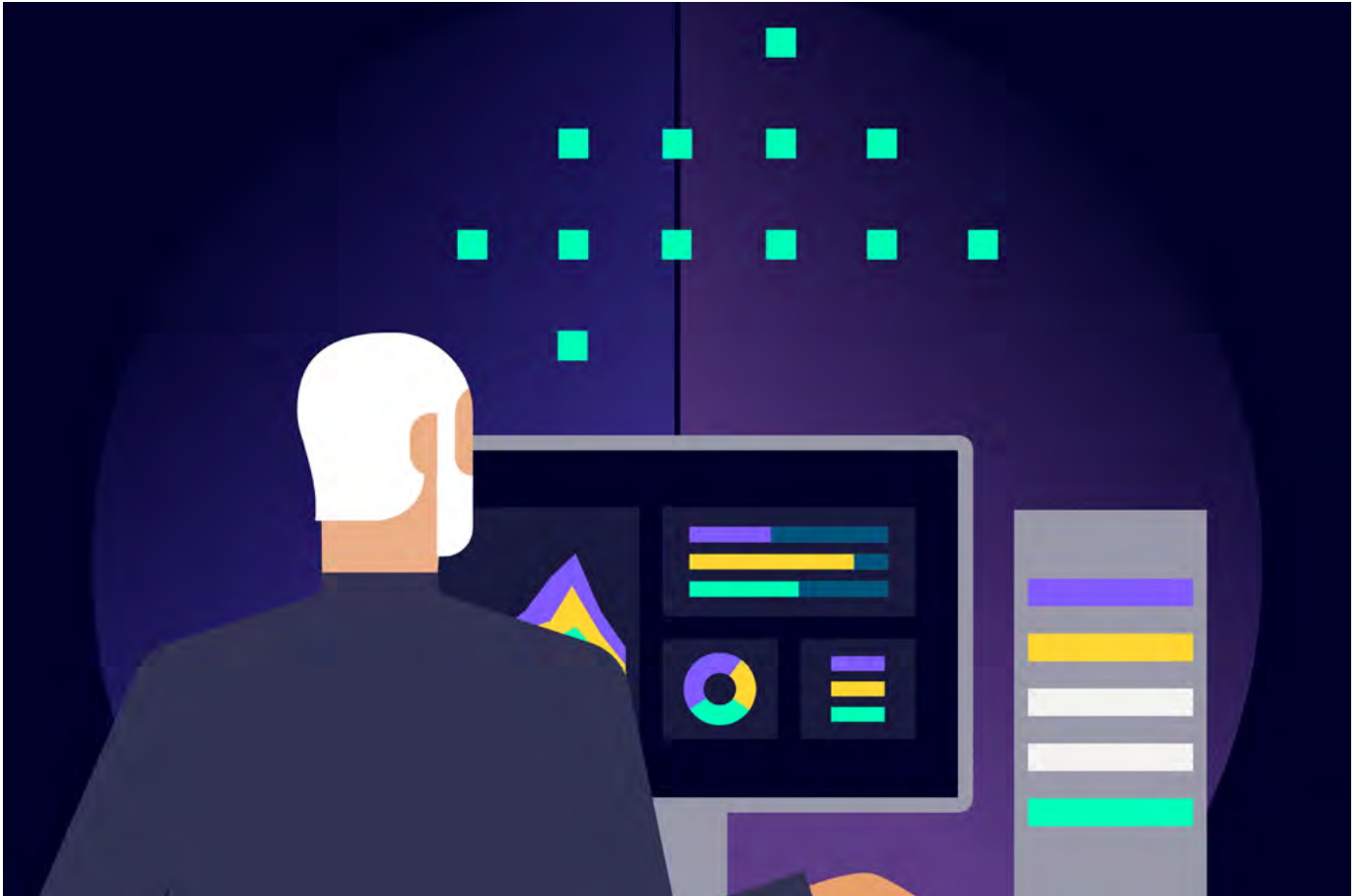
Phase 1: Pilot a Focused Use Case

Start with a high-value machine or line using the BFC Starter Kit. Validate early results with maintenance teams and begin integrating with Senseye Predictive Maintenance.

Phase 2: Integrate with Business Systems

Connect to your CMMS or MES to embed connectivity data and Senseye insights into daily maintenance planning and operations.

Phase 3: Standardize & Document

Create templates and standards for rollout—covering naming conventions, protocol mappings, device lists, security policies, and data flows from edge to analysis.

Phase 4: Expand Securely

Scale confidently using Siemens' security-hardened platforms. Continue feeding high-quality data into Senseye Predictive Maintenance for consistent value across all assets and locations.

Avoid "pilot purgatory." Quantify success, align it with KPIs, and secure long-term sponsorship to scale.

8. Common Pitfalls and How to Avoid Them

- **Underestimating integration complexity:** Bring IT, OT, maintenance, and analytics teams into the project early.

- **Jumping to AI without solid data access:** Build clean, structured, and trustworthy connectivity foundations first—before launching predictive tools like Senseye Predictive Maintenance.

- **Lack of governance:** Treat connectivity and predictive maintenance as core to digital and overall business strategy - not just another tool.

9. From Connected Machines to Continuous Improvement

Connectivity is the cornerstone of predictive maintenance. With Siemens' **BFC Gateway, Brownfield Analytics, Industrial Edge,** and **Senseye Predictive Maintenance**, your organization can:

- Connect any asset, regardless of age, protocol, or location

- Gain real-time and historical visibility into machine behavior

- Analyze data on-premise or in the cloud

- Predict failures and prevent unplanned downtime

- Track the real impact of maintenance actions

- Scale from pilot to global enterprise with security and efficiency

Industrial Connectivity Services use modular approaches to create the right connections and move your digital transformation forward—making industrial environments more responsive and resilient.

Next Steps

Contact our team for a discovery session, site assessment, or tailored architecture recommendations:

Get in touch

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