FOGHORN

ADLINK
Leading EDGE COMPUTING

RTInsights.com
Accelerate Your Business with Real-Time Insights

SPECIAL REPORT

MAXIMIZING YOUR INVESTMENT IN OSISOFT® PI SYSTEM™ WITH REAL-TIME EDGE INTELLIGENCE

Industrial organizations are experiencing significant benefits from augmenting operational data infrastructure, including historians, with real-time analytics and edge-based machine learning. This nondisruptive approach enables data ingestion from new sensor types such as audio and video, delivers faster and more predictive actionable insights for greater operating efficiencies, maximizes asset performance, and enhances process improvements.

Catalyzing Business Performance and Competitive Advantage

The Value of Historical and Real-Time Operational Data

For industrial companies, digital knowledge is not just power—it is the foundation for better decision-making, competitive advantage, and improved business outcomes. Enterprises use solutions such as OSIsoft's PI System to:

- Improve factory productivity measures such as uptime, yield, quality, and energy savings
- Maximize internal resource utilization with automation and other modern tools
- Deliver actionable insight that helps run the business more efficiently and predictably

Yet these systems have traditionally collected only static data about past events. Today's industrial enterprises rely on networks with a growing number of connected devices. What's more, a variety of new data types—such as streaming digital, audio, visual, and 3D image sensor data—offers untapped and often unrecognized opportunity.

Think about the new insights that might be derived by correlating real-time, high-fidelity streaming data with historical information. What value could you realize by bringing machine learning to the same location as your historian installation, at the network's edge? By tapping vast stores of historical data, engaging real-time streaming data, and employing analytics at the edge, you can unlock unprecedented value while maximizing your investment in your historian solution.

With faster processing speed that offers near-real-time data analysis, Edge IoT is well-suited to address critical challenges of maximizing industrial data.

How Edge IoT Enables Instant Insights, Improved Predictability

Edge IoT solutions process IoT data at the network's edge, where data is created. Instead of sending data to a centralized data warehouse or the cloud, Edge IoT technologies analyze the data and perform machine learning within an edge device, close to a wide range of existing and emerging sensors. With faster processing speed that offers near-real-time data analysis, Edge IoT is well-suited to address critical challenges of maximizing industrial data.

Edge IoT can turn your historical database into a real-time analytics engine. It can feed all types of data to your historian and gather it from the historian, simultaneously. For industrial organizations, edge computing can improve the following operational aspects of your business:

- **Ingests data from the latest sensor technologies:** A broad range of new sensor types—including video, audio, and 3D imaging—enables significant operational insights, especially when fused or correlated to provide a more holistic view of a machine or process.
- **Lowers latency:** Edge computing reduces latency for faster, actionable insights than all-cloud or all-edge processing alone.
- **Simplifies data handling:** Processing live, high-frequency data at the source reduces data networking and storage resources.
- **Improves reliability and operational consistency:** Edge IoT devices operate even if Internet connectivity is disrupted or a reliable connection is unavailable, maximizing uptime.
- **Enhances security and regulatory compliance:** Edge processing eliminates the need to transmit critical IoT data across the network, reducing security infrastructure requirements, risk mitigation efforts, and regulatory compliance costs.
- **Leverages existing compute power:** Edge IoT solutions can deliver real-time streaming analytics and machine learning using just tens of megabytes of processing capacity, often reducing or eliminating the need for new computing investment.

Choosing the Right Edge IoT Solution for Historian Connectivity

Key Functionality and First Steps

To successfully augment your historian with intuitive Edge IoT technologies, choose a solution built to maximize your existing historian information. The right solution can generate, ingest, compute, and share real-time data simultaneously from all sources—including visual, audio, 3D imaging analytics, and machine learning—as well as data stored in historians or other databases. It should also seamlessly integrate with existing data protocols.

The ideal solution will help you keep track of vast amounts of data and share data in real time. It will deliver actionable insights to users, when and where they are needed. And it will use the power of the edge to process data quickly, with minimal latency. Any solutions should be cloud-agnostic, facilitating multi/hybrid cloud strategies. You should be able to scale the solution easily and cost effectively based on factors such as location, device, and new sensors, without disturbing the rest of the solution environment.

As you begin to use these solutions, find ways to experiment at low cost and with low risk. For example, digital experiments (a new, innovative approach compared with traditional time-consuming, potentially costly, proof-of-concept exercises) can help you try out new approaches without a significant time or cost commitment. And look for ways to monetize your data. The longer your data sits doing nothing, the less value it can deliver to your company.

Finally, don't hesitate to take advantage of strong partner ecosystems. No one vendor has an entire perfect solution, but a good ecosystem can help you create exactly what you need.

Powerful Benefits

The appropriate Edge IoT solution can help you quickly realize significant value, including:

- **Faster industrial insights** by marrying operational system data with real-time sensor data for greater operating efficiencies such as uptime, yield, and energy savings
- **Higher-quality predictive information** by correlating real-time streaming data with rich historical data
- **Enhanced asset performance and processes** through improved predictive insights
- **Reduced data transport and bandwidth requirements, improved security, and lower costs,** thanks to processing and analysis at the edge
- **Reduced communications, cloud processing, and storage costs,** with savings of 110X to 1000X[1]
- **Enhanced ability to tap into tribal operational technology knowledge** by translating operator domain expertise into analytic expressions and machine learning models, faster and cheaper than programmable logic controller reprogramming
- **Deeper enterprise understanding** and better business outcomes, thanks to knowledge gained from edge-based machine learning and deep learning combined with historical operational data

Understanding How Industrial Firms Use Edge IoT

Power Generation Manufacturing

Serving energy providers and utilities, gas turbine manufacturers face lengthy lead times and a finite number of production contracts. To help boost their revenues, these companies are increasingly looking for ways to broaden their offerings.

For example, in countries where open-cycle gas turbines are used to quickly meet peaks in power demand, turbine manufacturers have a unique opportunity to use Edge IoT technologies. To help these "peakers" meet their power commitments, manufacturers can suggest premium offerings such as data-driven diagnostics services.

Imagine that a turbine fails to start or operate. To deliver power as promised, a peaker would want to immediately diagnose the problem. One source of information is the historian solution that resides on the turbine, which captures a batch extract of data about the equipment. Typically, operators would assess this data using manual modeling and analysis tools. But completing this diagnosis could take anywhere from hours to weeks—too slow to meet peak demand.

Using Edge IoT solutions with real-time historian connectivity, turbine manufacturers can transform historical data into a real-time data source that supports powerful analytics and enables real-time decision-making.

Using Edge IoT solutions with real-time historian connectivity, turbine manufacturers can transform historical data into a real-time data source that supports powerful analytics and enables real-time decision-making. The Edge IoT solution, which sits between the historical database and the turbine, collects streaming data from the turbine and publishes it to an analytic engine and a data visualization engine. Thanks to predictive modeling applications that use machine learning technologies, the Edge IoT solution can automate the diagnosis and pinpoint the root cause of the problem. With this insight, a peaker can solve the problem. More advanced Edge IoT solutions might even anticipate when conditions are likely to deteriorate so the customer can perform preventative maintenance.

The insight gained from Edge IoT solutions can help turbine manufacturers generate valuable insight for customers. By making this insight available as a service, energy equipment providers can transform themselves into data-enabled intelligence companies.

[1] Source: FogHorn client use cases

Energy Production

Energy providers such as gas manufacturers use flare stacks in their operations to manage emissions, monitor pressure surges, and track product burn-off. To improve monitoring of flare activity, most companies have installed video and audio sensors. Oversight of the video monitors and audio recordings is typically a manual process, in which workers watch or listen for signs of adverse events.

Operational systems measure elements such as temperature, pressure, and velocity and store related data in historian solutions. These systems also can track events, such as times when a pilot light was restarted or a flare was shut down.

Yet typically, operational systems cannot ingest video or audio data streams. This prevents companies from providing real-time video analytics on flare stacks, for example, or collecting vital audio information from capacitors in production. Nor can they combine these sensor data streams from multiple sources into a single flow for analysis. Information collected is historical and not available for real-time analysis. As a result, gas manufacturers can find it difficult to quickly optimize emissions, safety, and production based on flare activity.

Edge IoT solutions can help companies use flare data with historical operational data to make real-time decisions that support desired business outcomes. Because they reside near the sensor inputs, these technologies collect and combine the data into a single flow for analysis, which can be conducted in real time. This analysis also supports instant decision-making, unlike the historian solutions alone.

Deep learning models, which also run at the edge, are part of these solutions. Using years of contextual and time-series data sets from historian systems as well as event and sensor data, Edge IoT solutions can train models to automatically assess flares. The Edge IoT technologies also provide cumulative insights back to the historian to better inform that system on event root causes and other production issues.

By enabling these new sensor inputs and supporting real-time analysis, Edge IoT solutions can help gas manufacturers improve safety, increase product yield, and improve regulatory compliance.

By enabling these new sensor inputs and supporting real-time analysis, Edge IoT solutions can help gas manufacturers improve safety, increase product yield, and improve regulatory compliance.

Sample Edge Computing Uses for Energy and Materials Companies

The use of Edge IoT to maximize investment in historian systems is as varied as the companies that use these technologies. Here are just a few examples:

- ✓ Using sensor data to increase the operational efficiency of manufacturing equipment
- ✓ Predicting machine malfunction or failure
- ✓ Checking temperature and other health measures for improved worker safety
- ✓ Monitoring and measuring pressure data in centrifugal pumps and alerting personnel before damage occurs
- ✓ Reducing false positives in semiconductor manufacturing for improved yield rate
- ✓ Collecting, monitoring, and processing of weather and environmental data for offshore oil rigs
- ✓ Optimizing drilling processes with sensor data from wells
- ✓ Using real-time asset data to enhance decisions by field foremen

Bridging the Gap with Intelligence at the Edge

Benefits of a Purpose-Built Edge IoT Solution for Your Historian

You want to maximize the value of existing historian data, integrate new sensor data with existing asset data, generate powerful real-time analytics, and benefit from the power of machine learning and deep learning. To meet these goals, look for a solution that can be used in two ways:

1. As an Edge IoT solution for real-time analytics and machine learning, delivered in a low-code approach that minimizes computing requirements
2. As an edge analytics and machine learning solution for real-time data streaming

The right solution will be preconfigured to combine historical and contextual operational data from PI System with real-time sensor data on any edge device.

The right solution will be preconfigured to combine historical and contextual operational data from PI System with real-time sensor data on any edge device. It should be able to use all sensor types, including audio, visual, and 3D imaging sensors in both hybrid and multi-cloud deployments. And you should be able to easily integrate it with your existing IT and operational technology systems.

Solutions that integrate analytics at the edge and that integrate well with historian solutions can help you:

- Make better-informed decisions using real-time actionable analytics from streaming industrial data
- Create new sources of revenue by supporting innovative services
- Generate predictive insights by performing machine learning at the edge
- Lower costs and network bandwidth consumption by leveraging Edge IoT computing
- Reduce maintenance costs and repairs
- Boost product throughput and yield
- Improve worker safety and working conditions
- Get started quickly with preconfigured edge hardware and software
- Maintain a single version of the truth by streaming data to and from your OSIsoft PI System

FogHorn Systems and ADLINK Technology offer a joint solution that delivers this value. The solution combines ADLINK's IoT-ready edge hardware and software with Foghorn's real-time analytics and machine learning platform (see Figure 1). It helps manufacturers maximize their OSIsoft PI System investments via preconfigured edge hardware and software that allows real-time data ingestion, compute, and publishing from all sensor types. Data can move to or from any PI System or cloud without impacting PI System servers or configurations.

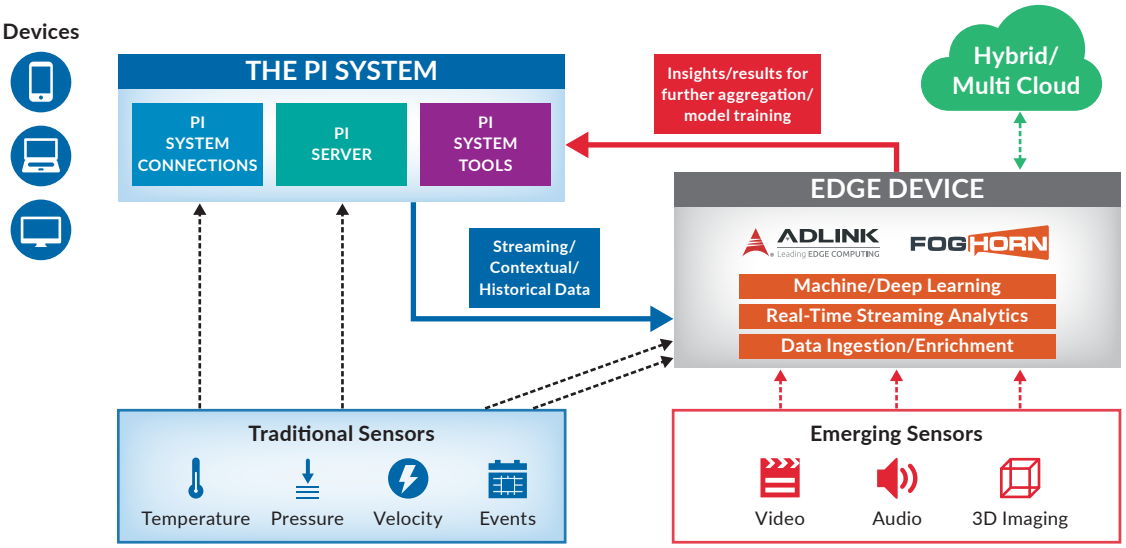

Figure 1 Real-Time Edge Intelligence Solution from FogHorn Systems and ADLINK Technology

Learn More

Discover how you can connect your operational systems with sensors and conduct digital experiments that will improve business outcomes with solutions from FogHorn and ADLINK. To determine the most effective, valuable use cases for Edge IoT in your business, visit http://foghorn.io/OSI.

RTInsights.com
Accelerate Your Business with Real-Time Insights

RTInsights is an independent, expert-driven web resource for senior business and IT enterprise professionals in vertical industries. We help our readers understand how they can transform their businesses to higher-value outcomes and new business models with IoT real-time analytics. We provide clarity and direction amid the often confusing array of approaches and vendor solutions. We provide our partners with a unique combination of services and deep domain expertise to improve their product marketing, lead generation, and thought leadership activity.

FOGHORN

FogHorn Systems is a leading developer of "edge intelligence" software for industrial and commercial IoT application solutions. FogHorn's software platform brings the power of advanced analytics and machine learning to the on-premises edge environment enabling a new class of applications for advanced monitoring and diagnostics, machine performance optimization, proactive maintenance and operational intelligence use cases. FogHorn's technology is ideally suited for OEMs, systems integrators and end customers in manufacturing, power and water, oil and gas, renewable energy, mining, transportation, healthcare, retail, as well as Smart Grid, Smart City, Smart Building and connected vehicle applications. For more information, visit www.foghorn.io.

ADLINK
Leading EDGE COMPUTING

ADLINK Technology is a global leader of Edge Computing with a mission to reduce the complexity of building IoT systems. ADLINK provides Edge IoT solutions across industries that can include embedded building blocks, intelligent computing platforms, fully featured edge platforms, connectivity and extraction devices, secure software for data movement, and Edge IoT applications to monitor, manage, and analyze data-streaming assets. ADLINK is a Premier Member of the Intel® IoT Solutions Alliance, a strategic partner to NVIDIA and Google bringing AI to the Edge, and active in several standards organizations. ADLINK products are available in over 40 countries across five continents. For more information, visit www.adlinktech.com.