

NATIONAL INSTRUMENTS

Edge computing meets analog data.

How National Instruments is jumpstarting the
Industrial IoT.

CHALLENGE SOLUTION RESULTS

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CHALLENGE

Analog sensor data is very big

Industrial companies need to analyze IoT sensor data in real time. But when data volumes are huge, traditional IT doesn't cut it.

25

petabytes of data per year generated by one customer's research device

90%

of power generation assets are not monitored in real time

More than 35,000 companies worldwide use sensors from National Instruments. Energy companies deploy them to monitor power grids. Manufacturers embed them in testing environments and factory production systems. Scientists use National Instruments' devices to manage and fine-tune research equipment.

National Instruments' devices measure physical-world phenomena like temperature, audio signals, and voltage. Much of this data is analog rather than digital. As a result, the volume of data captured is limited only by the sensitivity of the device and the number of sensors. In some instances, equipment monitored by National Instruments' sensors generates multiple petabytes of data per year.

This data deluge creates IT architecture challenges for National Instruments' customers. Industrial equipment is often used in remote locations where conventional IT hardware can be difficult or costly to install.

The alternative is to transmit large volumes of data from the equipment to centralized data centers. That requires a high-bandwidth network, which can be expensive or impractical to operate.

Transmitting high volumes of data also raises latency issues, which can diminish the value of industrial sensor data. For example, manufacturers often program factory production systems to read sensor output, analyze it, and make automated adjustments or detect issues before they impact throughput or quality. That doesn't work if the data must be transmitted off-site for analysis.

National Instruments needed to eliminate latency but avoid burdening industrial sites with complex IT infrastructure.

“Streaming machine-based data to cloud-based central repositories requires too much bandwidth and time. Our customers want to make decisions based on data from the edge of IoT within microseconds of capture.”

Eric Starkloff, Executive VP, Global Sales and Marketing, National Instruments



SOLUTION

Bridging OT and IT

National Instruments paired analog measuring devices with real-time analytics.

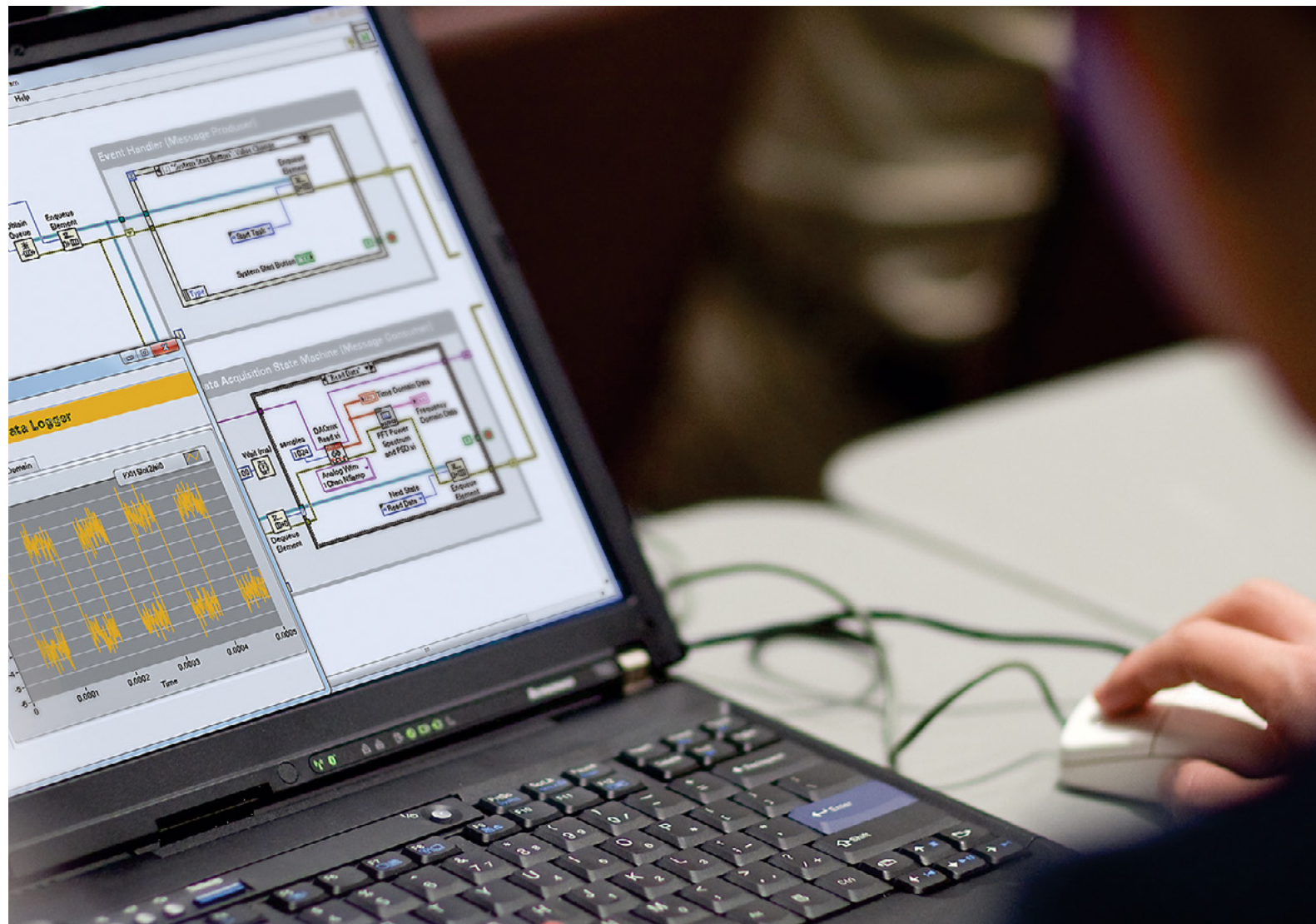
PXI, or Peripheral Component Interconnect eXtensions for Instrumentation, is an industry standard that supports interoperability of testing, measurement, and automation systems. The standard was originally introduced by National Instruments in 1997; today it guides the design of many Industrial Internet of Things (IIoT) systems.

To meet its customers' needs for IIoT capacity, National Instruments partnered with HPE to create a version of the HPE Edgeline server that is equipped with PXI slots.

HPE Edgeline servers provide the processing power and capacity needed to support big data analytics. With PXI-enabled versions available, National Instruments can integrate its sensors with the servers and deliver on-site analytics functionality to its industrial customers.

“If a vibration signal from a machine starts to get out of control, you can rapidly take action—for example, shut down the machine if it’s posing a hazard.”

Eric Starkloff, Executive VP, Global Sales and Marketing, National Instruments



RESULTS

Analysis at the edge

Less latency. Reduced complexity. And IIoT data that works harder.

Integrating National Instruments sensors with HPE Edgeline compute represents an IIoT architecture that eliminates latency associated with data transmission.

This allows engineers, scientists, and operations managers to design industrial systems that:

- Use real-time data insights to support machine-controlled processes and machine learning, improving process optimization and quality of output
- Automate troubleshooting
- Mitigate equipment issues remotely, which lowers costs and improves safety

The solution also simplifies the IT architecture associated with IIoT equipment. This reduces IT capital and maintenance costs as well as management overhead.

As the IIoT scales to billions of machines, the volume of data generated will balloon to unprecedented levels. Companies know there's value in that data. By performing analytics at the IIoT edge, they can get to that value more easily and cost-effectively.

USEFUL TIP

“It’s a mistake to believe that all data analysis can or should be done in the cloud. In the Industrial IoT, much of the analysis needs to happen at the edge.”

Eric Starkloff, Executive VP, Global Sales and Marketing, National Instruments



FORMULA FOR SUCCESS

Here are the technologies that National Instruments uses to analyze vast volumes of analog sensor data.

The heart of the National Instruments solution was **HPE Edgeline EL1000** and **EL4000** converged IoT Systems equipped with open-standard PXI slots to support direct connection of the company's sensors.

HPE iLO (Integrated Lights Out) management software adds functionality to support remote, automated IT equipment management and maintenance.

HPE Aruba and **HPE Aruba ClearPass** can be paired with the servers to support mobile access to industrial systems and protect those systems from unauthorized activity. The **HPE Vertica Analytics Platform** provides real-time data and insights to support machine learning, anomaly detection, augmented reality, predictive analysis, and remote failure notifications.

 [Learn more at hpe.com](https://www.hpe.com)