



5 steps
to accelerate value
from your industrial
IoT data





step 1

Define your IIoT business goals

step 2

Create a holistic IIoT analytics strategy

step 3

Assess the need for edge analytics

step 4

Choose a proven solution and trusted partners

step 5

Focus on continuous improvement

No one doubts the value of the diverse data that's flooding in from the Industrial Internet of Things (IIoT). And the industrial sector is well-positioned to take advantage of it, given its range of controlled and monitored data sources: production line equipment, sensors in products being used in the market, sales data and more. But it's a challenge to manage this massive volume and variety of data - from generation and collection through aggregation, analysis, implementation and storage - and then connect these capabilities under an advanced IIoT strategy. Along the way, many questions arise:

- **How do you know what data to collect, and what data to act on or store versus ignore?**
- **How do you filter out noise in the raw data to capture valuable intelligence in a timely manner?**
- **What's the value of the analytical life cycle and how do you capitalize on its potential?**
- **How do you use newfound intelligence to make decisions that drive better business performance and lead to competitive advantage?**

As organizations adopt new models for agile IT, edge analytics and platform-based security, IIoT forces a fundamental rethinking of business and operational strategies. To be successful, industrial leaders need an edge-to-enterprise IoT analytics platform and a strategy that generates intelligence in lockstep with business needs.

This e-book highlights five steps that can help you turn IIoT data into competitive advantage. Along the way, it discusses how to craft a comprehensive IIoT strategy, what to look for in an edge-to-enterprise analytics solution and how to evaluate IIoT solutions. It also shows how SAS' expertise in analytics and artificial intelligence (AI) - combined with Intel's leadership in IIoT information architecture - can turn raw data into rich insights and position you for astonishing results.

**step 1**

Define your IIoT business goals

The connected world of IIoT generates petabyte-scale data in real time, from cars to factories to farms. It's essential to have the technology to capture, monitor and rapidly process this information. But while IIoT capitalizes on digital innovation and analytics, success doesn't start with technology decisions. Business and technology leaders should collaborate to identify IIoT business cases that have the most potential to deliver fast, tangible benefits to their organizations.

What opportunities exist? Early adopters are using IIoT to develop new products and services, and create differentiated customer experiences. Others eye the chance to mitigate risks by reducing errors in production systems or avoiding machine downtime.

Once managers create a short list of business cases, determining the data sources and processes required for each can help refine them and establish high-level requirements. For example, project leaders can determine which data sources and processes are required for each business case.

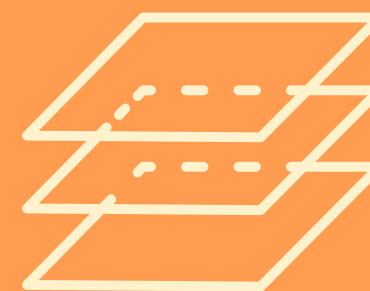
By 2025, IDC says worldwide data will grow 61 percent to 175 zettabytes, with as much of the data residing in the cloud as in data centers.

- 90ZB of data will be created on IoT devices by 2025.
- Nearly 30 percent of the data generated will be consumed in real time by 2025.

IDC. *Data Age 2025. The Digitization of the World From Edge to Core.* David Reinsel, John Gantz and John Rydning. Sponsored by Seagate. US44413318. November 2018.

This upfront planning enables the project team to quantify the potential impact on the organization - whether that's product innovation, risk reduction or some other benefit. It also indicates what new investments and change-management efforts will be required to achieve results. Analyses like these provide a foundation for estimating the overall return on investment of the projects being considered. The IIoT development team can then prioritize funding requests to senior executives for projects that demonstrate significant ROI potential without requiring massive changes.

Three layers of an IoT ecosystem



- **Data collection layer:** The point at which the sensors, controllers and other systems gather information.
- **Networking and security layer:** The physical network the data collection devices connect to so that they can aggregate and transmit data. To protect data, security is typically applied across the layer.
- **Analytics layer:** The point at which the data is run through analytics engines to extract usable information.



step 2

Create a holistic IIoT analytics strategy

Once you've established a clear business case for high-priority data sources and processes, you can scope out the next step. But legacy systems may not be able to support the volume and variety of IIoT data streaming from sensors on systems. And simply collecting the data is not enough. To get full value from the data, you'll need to scope out the project's analytics requirements and create a broader IIoT analytics strategy.

Focus on choosing an analytics platform that has proven capabilities for turning large amounts of data into insights that support your business case. Many platforms focus on a narrow aspect of analytics, such as basic statistics, while overlooking the critical role of efficient data preparation and storage. When evaluating platforms, assess candidates for how well they accommodate the analytics life cycle. Look for solutions that:

- Efficiently prepare, store and transform data for analytics.
- Drive discovery from a range of diagnostic, predictive and prescriptive analytics techniques.
- Deploy at scale, manage and monitor analytics in the cloud, the fog and on the edge.

IIoT data with artificial intelligence reduces downtime, helps truckers keep on trucking

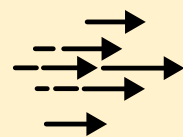


Read the story or watch the video to learn how Volvo Trucks and Mack Trucks are using remote diagnostic and preventative maintenance services based on IIoT technologies from SAS to slash diagnostic and repair times, and help prevent breakdowns.



175,000

trucks supported with remote diagnostics



Millions

of records processed in real time



25%
reduction in repair time

Don't overlook the need to select a system that sets you up for future success with emerging technologies. For example, AI capabilities like machine learning, deep learning, computer vision and cognitive computing use self-learning algorithms to model new trends and identify potential problems before their impact is felt.

SAS works with an ecosystem of partners - including Intel - to help you choose and implement the most appropriate applications, infrastructure and strategy for your IIoT environment and goals.

**step 3****Assess the need for edge analytics**

In the past, operations teams have been frustrated that the most powerful analytics were locked in the data center, far away from the operations that are most important to them. But times have changed. Now it's possible to shift certain analytics processes from data centers to devices on the edge of the network. Moving analytics to the devices reduces latency and load on the network and data center, while increasing the opportunity to quickly capture competitive advantage from high-frequency data.

Because edge analytics with embedded AI captures value in real time, it deserves special consideration by IIoT planners. Edge analytics processes the data stream close to the source of the data. This allows the analytics system to stem impending problems by shutting down machinery, triggering alerts or taking other actions to improve top-and bottom-line performance. If analysis has to wait until data reaches back-end storage systems, immediate, automated responses aren't possible.

Edge analytics offers another important benefit - it filters data at the source so that only relevant data is sent to the cloud. This keeps irrelevant information from overloading networks and storage systems, and it helps managers focus on what's most important to the business.

IIoT gateways are another important underlying technology that supports edge analytics. An IIoT gateway provides a bridge between industrial sensors and the existing IT infrastructure. In turn, the system can communicate status

and performance information to management systems that monitor the industrial environment for predictive maintenance and other activities.

Intelligent gateways enable predictive analytics at the edge for fast responses to potential production failures or other events. For example, if such a gateway detects excess vibration in a piece of equipment, the machinery can be idled or slowed, and operators can be alerted to address the problem before an equipment failure occurs.

While valuable in many IIoT applications, edge analytics is not required for all business cases. Edge analytics will most likely be needed if project managers answer yes to any of these questions:

- **Is the latency resulting from an edge-to-cloud round trip unacceptable?**
- **Are there times when your assets are not connected to the network?**
- **Are there barriers (cost, technology, other) to transmitting all the required data to the data center?**
- **Are there lost opportunities when you can't capture insights at the edge?**

Timely, scalable outcomes from your IIoT data

Edge-to-enterprise enabled, SAS® Analytics for IoT uses an industry-leading streaming execution engine with artificial intelligence to perform real-time analytics and drive timely, accurate decision making. Users can perform ad hoc analysis and analytics system development in a self-service environment - no coding or specialized skills required.

**step 4**

Choose a proven solution and trusted partners

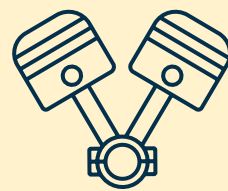
Analytics is at the heart of successful IIoT deployments - yet most organizations have more engineers than data scientists. Setting up multiphase analytics - which processes (or analyzes) data at various times and locations - is often one of the biggest hurdles for new IIoT efforts. For this reason, it's important to evaluate IIoT analytics technologies as much for their ease of deployment and ability to minimize project risk as for the sophistication of their business analytics and visualization tools.

To do this, work closely with those in business and operations units who will benefit most from IIoT intelligence. Not all organizations employ data scientists, so it's important to choose analytics tools designed to let nontechnical users slice and dice data on their own and get easy-to-understand, visual results.

When choosing IIoT analytics, you should also look for solutions with a track record for minimizing long-term risk. For example, SAS Analytics for IoT is built on Intel and SAS technology; it provides a trusted environment that IT and operations technology teams can depend on for long-term IIoT requirements.

Consider the Intel IIoT gateway architecture used by SAS Analytics for IoT. Built on Intel's expertise in manageability, this architecture simplifies integration with your IT infrastructure and allows you to scale across a multitude of factory assets.

Performance



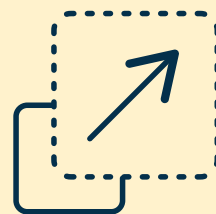
Many organizations need high-performance servers and storage systems to efficiently collect and analyze massive data volumes within specified performance parameters. Together, SAS and Intel can help you select the best platforms for each of your applications, including high-performance solutions expressly designed to handle and store big data.

Security



While speed is essential, performance isn't the only consideration when choosing IoT analytics platforms. To avoid malicious access, IIoT demands enterprise-class security across all data gathering, communications and analytics components. You can avoid complexity and costly manual maintenance by establishing a centralized environment to manage all your IIoT devices. Intel and SAS work closely together to provide the highest levels of protection and manageability - starting with the gateway and extending into the cloud.

Scalability



Finally, the IIoT environment should provide a scalable platform. As IIoT matures and business goals evolve, industrial organizations may need to use analytics in new ways. Be sure the analytics platform and architecture you choose can scale to support expanding data and computing requirements. With solutions designed by technology leaders like Intel and SAS, you can deploy new technology solutions when needed and continue to capture intelligence from IIoT data.



step 5

Focus on continuous improvement

Because IIoT continues to evolve, industrial organizations should regularly assess their business cases and analytics performance. In turn, these areas should be updated as new capabilities and business opportunities arise. Organizations should also reexamine existing deployments to ensure their business-case goals are still being met.

There's no doubt that IIoT has the potential to transform industrial organizations. But to fully realize IIoT's potential, organizations may require simultaneous changes in thinking and culture. The process of gaining insight from data, including IIoT data, is iterative by nature. It takes a mixture of analytics capability and domain expertise, combined with vision and imagination, to achieve success.

When this happens, organizations can operate more efficiently, serve their customers better and establish true competitive differentiation in their markets.

Experience proves that moving to IIoT by chasing the biggest, most impressive business case often results in failure. Most organizations do better by starting with smaller goals. Consider starting with an easy, quickly deployed business case, or think about dividing larger projects into multiple parts so you can work toward larger goals over time. These approaches let you build on success, gain confidence, develop internal skills and cultivate wider organizational support for IIoT.



IoT is everywhere. SAS and Intel can help.

With Intel technology powering SAS Analytics for IoT, organizations get the intelligence they need to make smart business decisions at the speed of light.

An IIoT Checklist

01 DEFINE YOUR IIOT BUSINESS GOALS



02 CREATE A HOLISTIC ANALYTICS STRATEGY



03 ASSESS THE NEED FOR EDGE ANALYTICS



04 CHOOSE A PROVEN SOLUTION AND TRUSTED PARTNERS



05 FOCUS ON CONTINUOUS IMPROVEMENT



SAS and Intel: Accelerating your path to success

Intel's partnership with SAS is bringing transformational change to industries worldwide. For example, these partners offer best-of-breed solutions that help manufacturers improve quality, productivity and reliability by applying analytics - including AI and machine learning - to their shop floors and IoT data.

Learn more about how to uncover new insights and transform your business by visiting: sas.com/loTSolutions.

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