

INTELLIGENT ANALYTICS FOR SMART MACHINES



ABSTRACT

SAS® Analytics for IoT makes the flood of Industrial Internet of Things (IIoT) data work for you. This end-to-end analytics platform combines SAS analytics expertise with Intel's leading data center technology to:

- Process millions of events per second
- Identify problems in near real time
- Filter data to reduce bandwidth and storage costs
- Enable deep analysis to produce business intelligence

When sensors, data analytics, and cloud infrastructure are all humming along together, manufacturers can better monitor, manage, and control their machines.

The data deluge

The Industrial Internet of Things (IIoT) promises major benefits like better factory efficiency and uptime. But to fulfill this promise, manufacturers need a way to sift through the noise and identify the patterns that matter.

The solution lies in analyzing streaming data (i.e., data in motion) before it reaches storage (i.e., data at rest). By doing so, you can detect patterns as

they unfold. It is also important to extend analytics to on-site edge devices to reduce data center workload and enable low-latency responses.

SAS® Analytics for IoT is a prime example of this approach. SAS is already used in applications like wind farms where it has proven its ability to draw valuable insights from high-velocity data. Let's examine how it works and how the technology can benefit your operations.

Rethinking where analytics happens

As shown in Figure 1, SAS Analytics for IoT starts processing at the edge, where it aggregates and filters data to determine what is important. Local analytics take quick actions as needed, such as shutting down a machine to avoid damage.

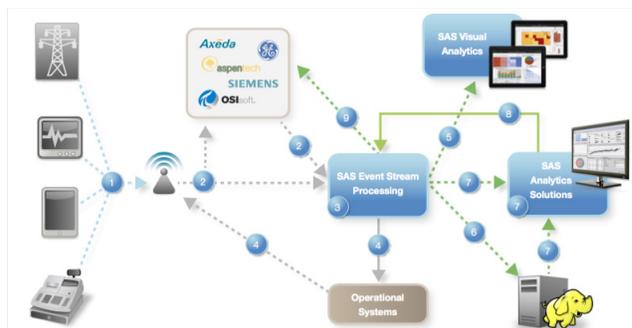


Figure 1. SAS Analytics for IoT stretches from the edge to the data center.

In the data center, SAS Event Stream Processing applies further filtration to determine what data should be retained. Big data analytics detect patterns across the plant as well as long-term trends, leading to deeper business intelligence.

Data center integrations allow further value to be extracted from the data stream. For example, SAS Event Stream Processing integrates with SAS Visual Analytics, which enables you to identify patterns and relationships in data that weren't initially evident.

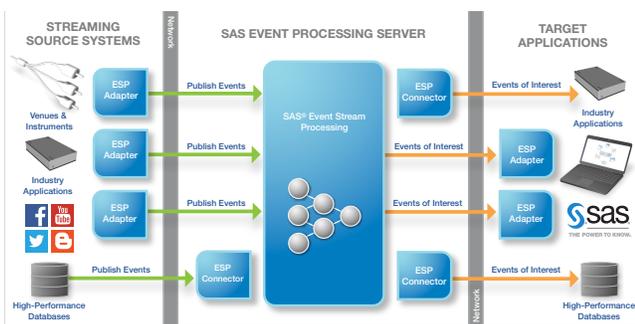


Figure 2. SAS Event Stream Processing connects streaming sources and applications

Build intelligence into the network

SAS Event Stream Processing analyzes millions of events per second. As shown in Figure 2, it filters, aggregates, and correlates data to delineate patterns of interest. The results show what alerts to issue, what actions to take, which data to store, and which events to ignore.

Key elements of the platform include:

- Adapters and connectors to pull data from industrial assets
- A SAS event processing server
- Adapters and connectors that feed analyzed data to operational and business applications

Data is analyzed continually as it's received, updating the situational intelligence as new events take place. This allows you to:

- Stay on top of your data. No matter how fast your data moves or how many sources you're connecting to, it's all under your control from a single, intuitive interface. Streamed data instructions ensure smoothly governed pattern detection, which makes it easier to evolve with changing data conditions.
- Make sound decisions. Having accurate data means you can take the right action. SAS Event Stream Processing provides in-stream, prebuilt data quality operators, natural language text-processing functions, and a wealth of advanced analytic algorithms to detect complex event stream patterns.
- Store the right data. Faster, better, and more powerful stream processing ensures data corrections are made before high-volume throughput data is stored—reducing big data management processing costs.

Visualize your data

SAS Event Stream Processing is designed to integrate with a wide range of software from SAS and other industry leaders. One important example is SAS Visual Analytics.

SAS Visual Analytics provides a complete platform for analytics visualization, enabling you to identify patterns and relationships in data that weren't initially evident—see Figure 3. Interactive, self-service business intelligence and reporting capabilities are combined with out-of-the-box advanced analytics so everyone can discover insights from any type of data.

SAS Visual Analytics also offers:

- A single, streamlined interface for implementing dashboards, reporting, and analytics
- Microsoft Office integration that allows you to share business intelligence through live, dynamic visualizations in applications like Excel and PowerPoint
- Native mobile apps that enable you to view and interact with dynamic reports and dashboards from your smartphone or tablet (see Figure 4)



Figure 3. SAS Visual Analytics enables you to identify patterns and relationships in data that weren't initially evident.

Built on powerful hardware

The SAS and Intel partnership provides an innovative processing and memory architecture uniquely designed to make full use of SAS Analytics. The result is an in-memory analysis engine for real-time and predictive analytics that can bring out the best in your business.

On the processor side, the platform uses the Intel® Xeon® processor E7 v3 product family. Benefits of this architecture include:

- Up to 72 cores per server, minimizing the number of servers needed for a given workload (see Figure 5)
- Up to 6TB of memory, supporting fast in-memory processing
- World-class reliability with a platform designed for 99.999 percent uptime

Storage is provided via the Intel® SSD DC P3700 Series with NVMe, which offers low latency and up to five times the throughput of previous-generation SATA drives. The Intel SSD DC P3700 Series also boasts high endurance and strong data protection for reliable, secure operation.

Intel hardware also plays an important role at the edge. Gateways and other edge devices powered by Intel® processors provide the performance needed for edge analytics as well as the rugged reliability and extensive I/O needed in the field.

A quick start

Because it is based on widely-used, proven SAS technology, it is easy to develop and deploy secure, trusted analytics with SAS Analytics for IoT. Plus, the flexibility of the platform means you can quickly deploy new analytics as needed to optimize assets and processes.

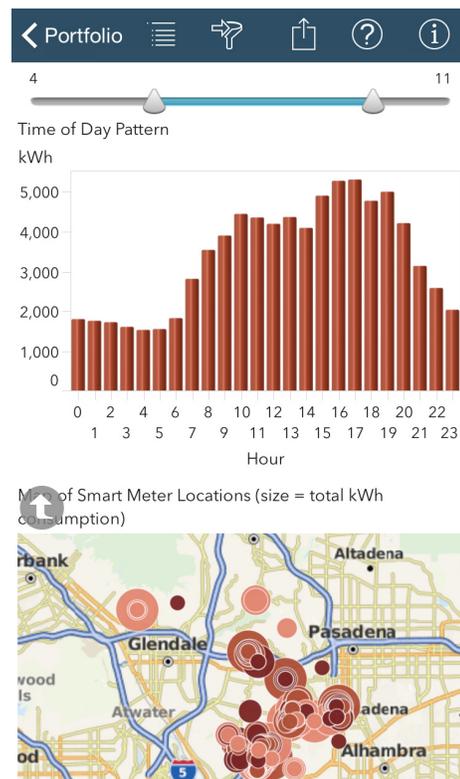


Figure 4. Native mobile apps enable viewing and interacting with dynamic reports and dashboards from a smartphone or tablet.

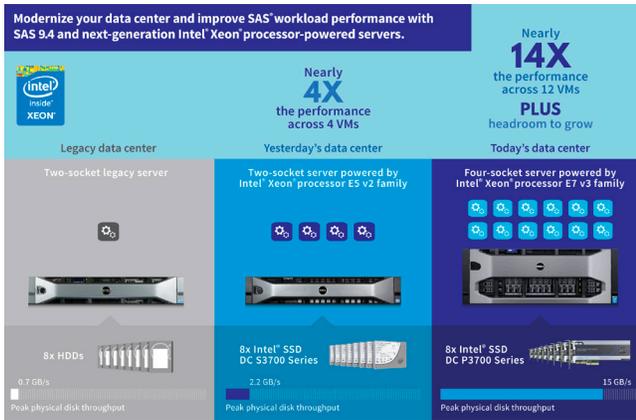


Figure 5. The latest Intel® Xeon® processors and SSDs minimize the number of servers needed for a given workload.

Results from Principled Technologies hands-on testing.¹

1. "Consolidate SAS(r) 9.4 Workloads with Intel(r) Xeon(r) Processor E7 v3 Family and Intel(r) SSD Data Center Family," a Principled Technologies report commissioned by SAS, April 2015. Retrieved from http://www.principledtechnologies.com/SAS/SAS_Intel_E5_E7v3_0415.pdf

If your organization is new to analytics, Intel and SAS offer a special program to help you on your way. The Analytics Fast Track for SAS helps your company harness the power of business analytics quickly.

The Analytics Fast Track for SAS provides businesses with hands-on access to the latest SAS capabilities. It lowers your initial analytics investment and allows for the rapid deployment of new solutions, so you can get started prototyping and improving your analytics capabilities right away.

The Analytics Fast Track for SAS requires minimal setup and configuration, as it's already configured with the necessary SAS analytical capabilities. This will allow you to begin exploiting SAS analytics in days, not months, and empower you to focus on your use cases and realizing business value.

Get a handle on your data

When sensors, data analytics, and cloud infrastructure are all working smoothly together, manufacturers can better monitor, manage, and control their machines. This leads to increased productivity and machine availability to process a near-constant stream of data; much of which needs to be analyzed instantly to make critical control decisions.

SAS Analytics for IoT processes millions of events per second while also identifying and assessing problems that would otherwise go unnoticed. By forecasting impending failures and generating real-time notifications, issues can be addressed proactively. What can this power do for you?

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