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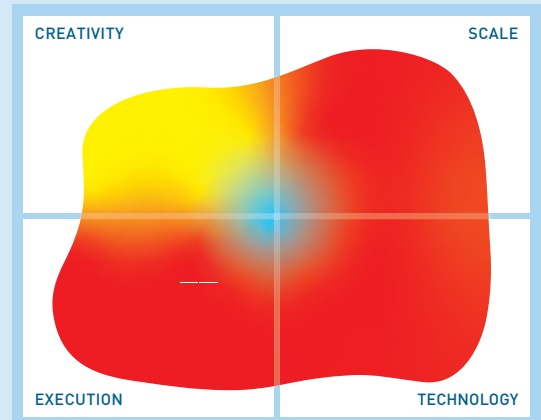
100 SAS Campus Drive
Cary, NC 27513-2414, USA
Tel: +1 800 727 0025

SAS Event Stream Processing (ESP)

The company

SAS is headquartered in North Carolina and was founded in 1976. The company started life by offering a 4GL-based statistical package for financial and economic analysis but has expanded to offer a multi-faceted product set, providing organisations with an information delivery system that spans all aspects of analytics and associated technologies. This includes business analysis, analytics and data science as well as practical applications thereof (customer intelligence and so forth). In addition, complementary capabilities such as data quality and data integration are also offered.

“ Our engineers can now see issues before they impact customer operations and change the truck’s design, so we have the best product on the road. ”
Volvo Trucks North America



The image in this Mutable Quadrant is derived from 13 high level metrics, the more the image covers a section the better. Execution metrics relate to the company, Technology to the product, Creativity to both technical and business innovation and Scale covers the potential business and market impact.

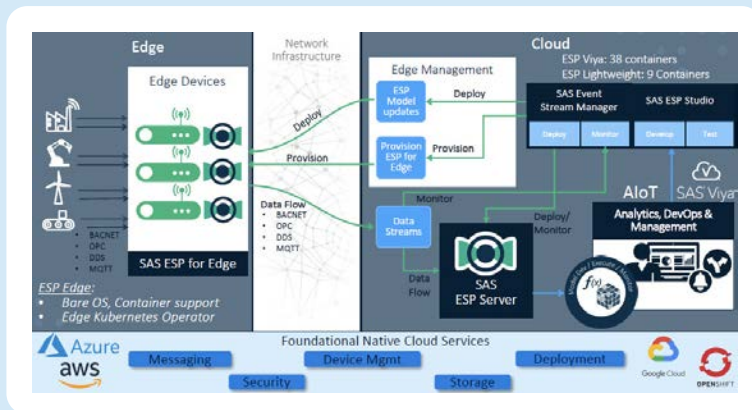


Figure 1 – SAS ESP architecture

Since its foundation SAS has expanded primarily in an organic manner and is now a multi-billion-dollar company that has offices and partners worldwide. It remains privately owned. A notable point is that SAS consistently invests a significant proportion of its revenues into R&D, typically at around 25%. This emphasis on R&D, plus the company’s refusal to listen to the blandishments of the stock market (where short-term trends are more important than long-term profits), has meant that SAS is, by some margin, the largest pure-play vendor in the analytics market.

What is it?

SAS Event Stream Processing (ESP) is an event stream processing platform that enables sophisticated streaming analytics by applying SAS’s existing, and very substantial, analytics capabilities to data in motion. It can either be deployed with Viya (“ESP Viya”) or without it (“ESP Lightweight”). The major difference is in the latter’s significantly smaller footprint; it also misses some functionality, most notably integration with SAS Model Manager. Regardless, ESP can be deployed on-premises or in the cloud, including public, private, and hybrid cloud deployments. Its architecture is shown in **Figure 1**.

ESP is available on AWS, GCP and Microsoft Azure, and it can leverage a number of cloud services – including native cloud analytics – provided by each of these. Vice versa, SAS offers various Azure applications that have been built off of ESP, including Intelligent Monitoring, Physical Distance Monitoring, and more. Container-based deployment is supported via Kubernetes, complete with automated cluster monitoring and optimisation, and additionally, the ESP edge offering is designed to run on the edge as a lightweight runtime with no functional compromises

On a final note, cloud pricing is based on either event consumption or total revenue. Edge support

Analytics and modelling	★★★★★
Development	★★★★★
Architecture	★★★★★
Deployment	★★★★★

Connectivity	★★★★★
Integration	★★★★★
Self-service	★★★★★
Non-analytics streaming functionality	★★★★★

//
 With SAS, we're working smarter – we're seeing things that exist in our information that we couldn't find before, so we can do things more efficiently and effectively, and drive better results for our customers. //
 Mack Trucks

is purchased with an additional (but perpetual) access fee.

What does it do?

Perhaps the biggest differentiator for SAS is its analytic capabilities, though it's also notable for its performance. A key feature is the continuous improvement of in-stream models using machine learning. To this end, ESP Viya (though not ESP Lightweight) integrates with SAS Model Manager, a separate product that supports PMML (Predictive Modelling Mark-up Language) and will convert supported model types into SAS code for deployment on ESP. There is also support for RESTful APIs to run other models. Python notebooks can be used to drive the ESP engine, publish events to ESP, and display results, and models written in Python, R, C and Java are also supported. In addition, the product supports ONNX models, which in turn permits the use of PyTorch, Tensorflow, and so on, as well as providing native support for (open

that lets you combine real-time and historic data. Event Stream Manager is used to update or deploy analytic algorithms without requiring any downtime on the server, and similarly, to add new ESP servers as required. Moreover, ESP Studio, Streamviewer and Event Stream Manager are all integrated into the ESP server Kubernetes environment, thereby supporting ESP deployment, monitoring and updating in that context.

Via built-in ESP Connectors, SAS provides connectivity to over 300 end points, and supports a variety of standard protocols including MQTT, BACNet publisher connector and adaptor (for smart homes), OPC-UA connector and adaptor (for machine-to-machine communications), a UVC connector (Video4Linux), a WebSocket publisher connector, and a URL publisher connector (for RSS news feeds, JSON from a weather service or News from an HTML page). There are also facilities provided so that you can write your own connectors. In this context it is worth mentioning the SAS ESP Community (communities.sas.com/IOT), which is moderated by SAS but user-driven.

Why should you care?

SAS is the world's largest business intelligence and analytics company. It should therefore not come as any great surprise that the company is exceptionally strong when it comes to the breadth of analytic capabilities it provides, regardless of whether it is for data at rest or data in motion. Simply put, SAS has very highly regarded analytics capabilities in general, and via ESP those capabilities can be applied to streaming data just as well as historic data. The company's expertise when it comes to machine learning and the Internet of Things is a significant draw as well, considering their popularity within, and relevance to, the streaming analytics space.

The Bottom Line

We've said it before, and doubtless we'll say it again: SAS has a reputation for providing enterprise-level quality, and is long-established as a leading light in the analytics market. In our view, this makes the company a major contender within streaming analytics.

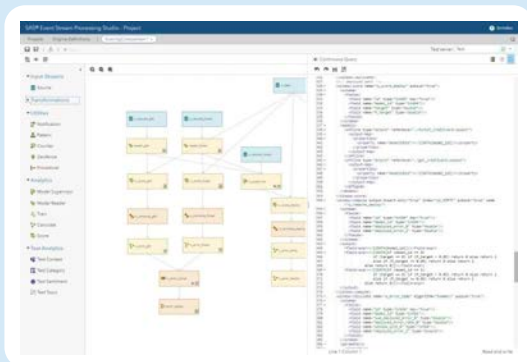


Figure 2 – SAS ESP Studio

source) deep learning. Universal inferencing is also available.

Additional facilities that are worth mentioning include in-stream geofencing, text analytics, in-stream time pattern recognition (including time-series similarity analysis and time-series clustering), and the ability to build data quality rules into the streaming process. Both event-based and window-based (time sliced) processing options are available, and the product boasts full lifecycle support, including health monitoring and high availability. The platform operates in-memory, and a built-in event load manager enables optimised and distributed processing.

Of the other elements within the ESP platform, ESP Studio (see [Figure 2](#)) provides an environment for constructing visual models, designed for use by non-technical personnel, while Streamviewer provides a visual analytic dashboard environment

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