



Siemens' MindSphere on AWS Accelerates Customers' Time to Value from IIoT

Siemens built MindSphere, an IIoT operating system that can easily connect to as many as 80 percent of worldwide industrial automation devices to accelerate customer time to value from IIoT, on an AWS-native architecture. The global company provides systems for power generation and distribution, intelligent infrastructure for buildings and distributed energy systems, and automation and digitalization solutions for process and manufacturing industries. MindSphere uses many AWS services, including AWS Lambda for orchestration and Amazon Kinesis to decouple data and devices.

For the industrial sector, digital transformation offers powerful benefits. Manufacturers and other industrial enterprises that successfully transform can learn more from every stage of their product lifecycle, from design to production to ongoing management and maintenance. The resulting insights enable faster decision making, stronger products, and better customer service than ever before.

Industrial companies that don't embrace digital transformation, on the other hand, "risk becoming dinosaurs and being left behind by their competition," according to Kathleen deValk, chief architect and head of global architecture for [MindSphere](#) at [Siemens Digital Industries Software](#).

To achieve successful transformations, however, industrial enterprises must overcome a challenge that may not be unique to their sector but is especially pronounced there. They need to unify and make use of Industrial Internet of Things (IIoT) data from thousands or even millions of devices and sensors in plants, systems, machinery, and products dispersed throughout worldwide production processes and supply chains.

"Unfortunately, there are no universal data formats or connection standards across IIoT devices," says deValk. "For individual companies to go it alone, aggregating and making sense of data from those devices would be a huge undertaking—much less doing it reliably and in anywhere close to real time. There would be connectivity challenges, data-format challenges, and performance and scale challenges."

MindSphere: IIoT at the Speed of Business

Industrial enterprises can now break through these roadblocks by using MindSphere, the cloud-based, open IIoT operating system that Siemens built on native Amazon Web Services (AWS) technologies. MindSphere is a complex platform with many different features and capabilities, but its core value proposition is the ability to ingest and process data from almost any physical, web, or on-premises system—agnostic of device type, protocol, or communication standard—to accelerate customer time to value from IIoT. According to Siemens, as many as 80 percent of industrial automation devices deployed worldwide in the last 10 years can be easily connected to MindSphere-based solutions.

"MindSphere accelerates time to value by freeing our customers to focus on business challenges without having to worry about stitching together the underlying technologies," says deValk. "MindSphere on AWS is the key to helping our customers understand and take

Easily connects to 80% of industrial automation devices deployed worldwide in the last 10 years.

SIEMENS

Company: Siemens AG
Industry: Manufacturing
Country: Germany
Employees: 377,000
Website: www.siemens.com

About Siemens AG

Siemens AG is a global electrification, automation and digitalization leader. The company provides systems for power generation and distribution, intelligent infrastructure for buildings and distributed energy systems, and automation and digitalization solutions for process and manufacturing industries.

Benefits

- Empowers digital transformation for any industrial enterprise
- Accelerates business value for Siemens and its customers
- Easily connects to up to 80% of worldwide industrial automation devices
- Enables high uptime and SLAs that customers demand
- Enables Siemens to avoid building commodity services

AWS Services Used

- [AWS Lambda](#)
- [Amazon Kinesis](#)
- [Amazon CloudWatch](#)
- [Amazon DynamoDB](#)

"By saving our customers so much time and effort in implementing their IIoT solutions, MindSphere on AWS puts digital enterprise transformation within the reach of any company in the industrial space."

Kathleen deValk, Chief Architect and Head of Global Architecture for MindSphere, Siemens

effective action on data from product design and engineering, manufacturing, quality, and automation."

AWS Offers a "Perfect Blend of Simplicity and Control"

MindSphere is built on a federated architecture consisting of three tiers. The first is an ever-growing catalog of industry-specific and cross-industry MindSphere applications developed by Siemens and its ecosystem partners. The second tier provides complete MindSphere production, operation, and developer environments in a platform-as-a-service (PaaS) solution hosted in secure data centers worldwide. The third tier, MindConnect, is a highly secure connectivity layer that can link to almost any Siemens or non-Siemens physical, web, or enterprise IT asset or system.

In pursuit of continuous innovation and after a successful proof of concept on AWS, Siemens decided to re-architect MindSphere as an AWS-native solution. "Running on AWS gives us a perfect blend of simplicity and control," says deValk. "On AWS, we have all the tools we need for auto-scaling, performance, and monitoring, so we don't have to build these commodity services from scratch. At the same time, we have all the control and flexibility we need to manage the platform, provide high-quality services, and deliver the high uptime and performance SLAs our customers demand."

Cloud-Native Architecture Eliminates Undifferentiated Heavy Lifting

MindSphere makes use of dozens of AWS services. One of the most central is [AWS Lambda](#), a serverless service that executes code in response to events—even in offline edge devices. MindSphere relies on AWS Lambda for coordinating and orchestrating central processes such as provisioning, configuration management, and monitoring. The platform also makes heavy use of [Amazon Kinesis](#) to decouple data and devices, an essential step for unifying and finding value in streams from so many disparate, non-standardized sources. MindSphere also takes advantage of [Amazon CloudWatch](#) and [AWS CloudTrail](#) for monitoring and logging, [Amazon Simple Notification Service](#) (Amazon SNS) for push notifications, and [Amazon DynamoDB](#) for storing time-series data.

"By relying on AWS for infrastructure and all the other undifferentiated heavy lifting AWS does so well, the scope of requirements my team has to support is much smaller," says deValk. "The shared responsibility model on AWS helps us accelerate application development and speed the delivery of features and functions to our customers."

In other words, Siemens offers its customers not only the strength and flexibility of AWS services and capabilities, but also the reduced effort, consolidated operations, incremental industrial offerings, and shortened time to value from IIoT devices that MindSphere enables. "AWS is an accelerator to business value for us, and that enables MindSphere to be an accelerator to business value for our customers," says deValk. "Like us, our customers don't have to worry about where the software is running or issues like uptime, monitoring, or backup and recovery."

The result for Siemens customers is an unimpeded ability to dive into solving business problems as soon as they present themselves. "By running on AWS, we can give MindSphere users a rich development experience, an extensive set of available applications, and access to an ecosystem that is generating new applications all the time," says deValk. "MindSphere on AWS provides both a low-code, rapid-application development environment and APIs that help our customers move quickly to tackle new business challenges and opportunities."

MindSphere is constantly evolving. Right now, deValk's team is working to integrate even more data from existing Siemens software products supporting digital twins for product design, production operation, and in-field performance. "The more integrations we can support, the closer we can get our customers to true closed-loop product lifecycles," deValk says. "By saving our customers so much time and effort in implementing their IIoT solutions, MindSphere on AWS puts digital enterprise transformation within the reach of any company in the industrial space."

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