

SingleStore Delivers 10-100X Performance Improvements to Help Siemens and its Customers Make Smart Decisions at the Speed of Business

10-100x

Speed improvements enabling real-time dashboards

<100ms

Querying billions of rows & PB of Data <100ms

500 to 100,000

Siemens Pulse Analytics auto-scales from 500 to 100,000 concurrent users

5 days

From trial deployment to selection of SingleStore

(With Singlestore, we no longer look at the database as a limiting factor in our business.)



Christoph Malassa

Managing Consultant / Head of Analytics and Intelligence Solutions, Siemens

Data dashboards are ubiquitous today, but they were a technological marvel a decade ago. Having visual dashboards in a browser was a major transformation, improving accessibility to data insights. Back then, it took a long time to get results from the system, but simply having access was a novelty. Expectations are much different today.

[Siemens](#), a Global 50 company, has empowered its customers through technology to transform the everyday since 1847. Siemens purchased dashboarding software 12 years ago to create embedded dashboards, integrating it into the platform. Over time, Siemens realized it wanted to have dashboards outside of this platform, independent of any use case.

Siemens built its Siemens Pulse Analytics platform as an internal Siemens service in response to concrete problems, specific inquiries, individual use cases, and a lack of offers on the market. This has resulted in widely-applicable solutions that enable virtually any company to fully exploit the potential of its data.

“We realized through the projects we were doing that we need surrounding processes around the reporting. What we offer with the Pulse platform is the entire end-to-end process for reporting analytics with surveys included, because we have a long history of running internal and external surveys here at Siemens,” said Christoph Malassa, Managing Consultant / Head of Analytics and Intelligence Solutions, Siemens.

Challenges/Goals

Dashboarding needs to be tailored and flexible at the same time to bring together data from different sources into reports. Once this transparency is available on the dashboard, the question becomes: what do you do with it? How do you make data actionable?

Pulse was capable, but SQL Server made it painfully slow

Pulse offered capabilities for internal and external projects to make data actionable, but the system, based on SQL Server, fell short when it came to performance. Customers were unable to harness the full value of their data because they were frustrated by slow response times that didn't meet modern requirements.

Malassa explained, “Everything we wanted to do, we could do, but it was painfully slow. Integrating data took a half hour. If you're a business person, you would approve a data flow and then wait for 30 minutes for this information to appear in the staging area. Then you needed to make a decision to move to production.”

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“At that point, people just don’t do the analytics.... if you don't analyze, you don’t improve your business.”

Siemens previously had to run advanced analytics offline using IBM SPSS. “Even when everything was done, if you looked at the dashboard and wanted to drill through, the waiting times were longer than 2 seconds. If it's not instant or very close to instant, it becomes painful. At that point, people just don't do the analytics and valuable information is lost. If you don't use it, and if you don't analyze, you can't find these things, you're not going to improve your business.”

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Technology Requirements

Fast, real-time dashboards were a necessity for Pulse to live up to its potential. Siemens' primary business goals included:

- Running the platform in the cloud.
- Improving and increasing it from a capability perspective.
- Helping customers answer their questions using data with any existing business intelligence tools.

Siemens Pulse needed super fast queries and analytics to support these business goals, and their initial database technology choice, Microsoft SQL Server, was not able to deliver on these requirements.

Since the company offers professional services to their customers, every project is different. The data sources could be almost anything, from databases to IoT devices.

“For this to work, we have to have a fantastic database so that anything we do is quick. You want dashboards to be instant instead of waiting five seconds if you change a filter.” — Christoph Malassa, Managing Consultant / Head of Analytics and Intelligence Solutions, Siemens

“If it exists somewhere, it can be a data source. We help customers answer the questions using the data, or other data sources that we can connect to. For this to work, we have to have a fantastic database so that anything we do is quick. You want dashboards to be instant instead of waiting five seconds if you change a filter,” said Malassa.

CASE STUDY

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Why SingleStore

“We gradually became more and more unhappy with our platform’s performance. In the early days the expectations of our customers were pretty low, because the whole concept of dashboarding was so new. But then the amount of data grew because we kept the history and were adding data every day. So the dashboards became slower and users became less happy,” Malassa explained.

Siemens evaluated other database options as managed instances in AWS, including MySQL but also PostgreSQL, but found both were not well-suited for analytics due to a lack of columnstore.

Faced with its growing dilemma and in Malassa’s words, “fed up” with SQL Server, Siemens Google for an answer. “We Googled, ‘what’s the fastest relational database analytics?’ That’s how we found SingleStore. And that’s exactly what we needed to run super-fast analytics,” said Malassa.

“Once we found SingleStore, there really wasn’t a reason to look at anything else. We said, ‘Okay, this is awesome. We need this.’” — *Christoph Malassa, Managing Consultant / Head of Analytics and Intelligence Solutions, Siemens*

“Once we found SingleStore, there really wasn’t a reason to look at anything else. We got the trial version on Thursday and the buying decision was done by Tuesday, because we had huge improvements before we even really understood how tuning worked,” said Malassa. “We said, ‘Okay, this is awesome. We need this.’”

Solution

Siemens Pulse Analytics is now a hybrid containerized app combining SingleStore, Kubernetes, and AWS. Malassa and team store all data on SingleStore and upload it to AWS S3 so Siemens and its customers can run analytics and machine learning operations. “Analytics and all the processes surrounding analytics, such as data preparation, machine learning results, action creation, and anything we report on that users interact with, lives in SingleStore. The system loads data into AWS S3 with the help of SingleStore’s Bottomless Storage, which separates storage and compute,” said Malassa. “And SingleStore is an auto-scaling analytical database. That is HUGE. You don’t see that.”

The foundation of the system is a one SingleStore cluster configuration on a single large machine with 96 cores processing millions or billions of rows of data that it scales vertically as required. Malassa explained, “We originally had four servers across two availability zones, but found that the simplest setup is best for us. With everything on one machine, we gain the best performance because we don’t have network traffic. Our main priority is when we do ingest data we must recalculate the entire dataset because business rules change over time. We also have strict data preparation standards, and reporting must be quick. This all means we must be able to query billions of rows and get results back in less than 100 milliseconds.”

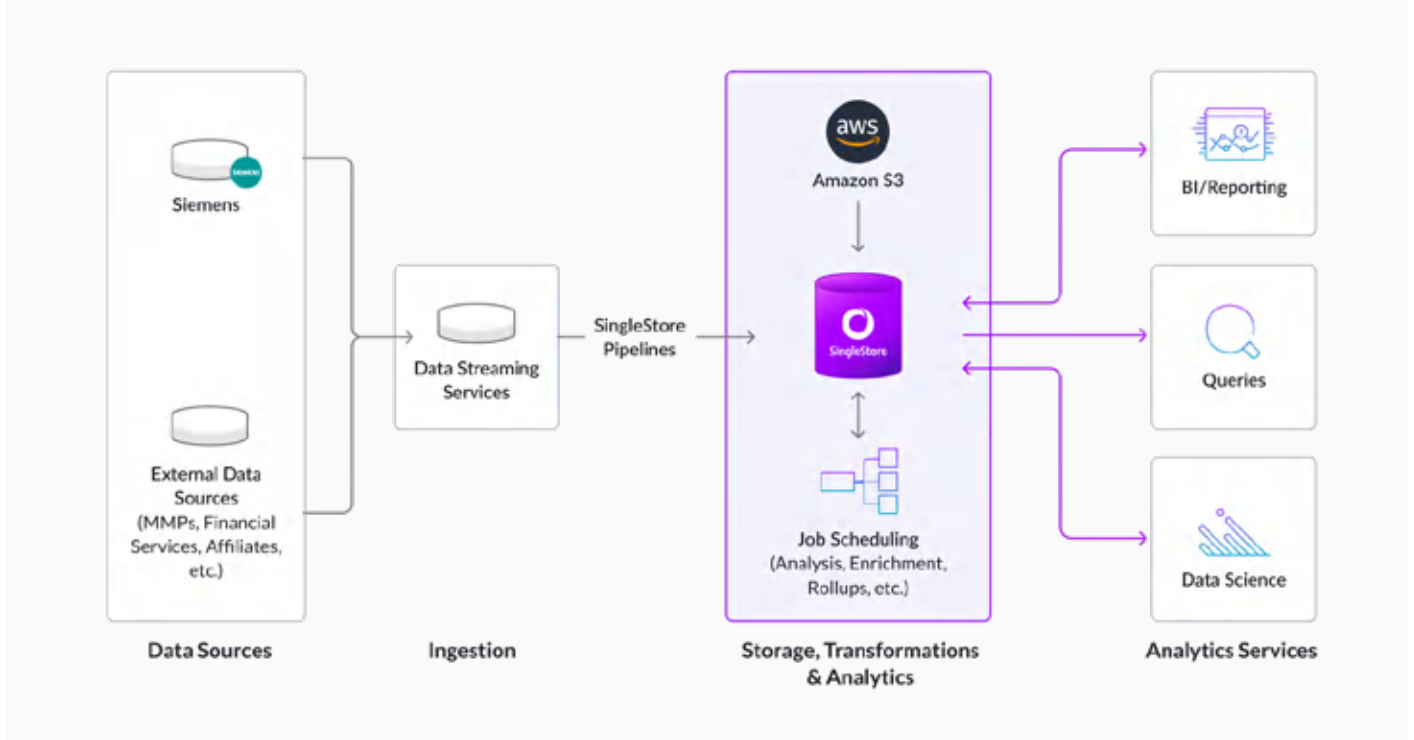
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Siemens with SingleStore

Siemens Pulse Analytics supports upwards of 100 projects. On any given day it is supporting from tens to hundreds to thousands of concurrent users, but since many projects report monthly or quarterly, and Siemens itself has massive projects that run several times per year. “System usage can be super spiky, ranging from 500 to 100,000 users per day, and SingleStore scales linearly to support this,” said Malassa.

“System usage can be super spiky, anywhere from 500 to 100,000 users per day, and SingleStore scales linearly to support this.” — *Christoph Malassa, Managing Consultant / Head of Analytics and Intelligence Solutions, Siemens*

Siemens can now do things such as instantly translating text right on the database through HTTP User-Defined Functions in SingleStore. This allows SingleStore to talk to APIs to bounce data from within the database to machine learning functions, supporting capabilities such as translations instead of having to offload it somewhere else.

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Siemens Pulse Analytics helps even the largest organizations transform complexity into operational excellence

By choosing SingleStore, Siemens was able to meet challenging data requirements while making the system user-friendly for business users. The complexity of the platform is abstracted away and the underlying data sources are handled in the background so its customers can focus on the benefits associated with its two unique selling propositions (USPs):

- **Optimize their businesses by cross-matching survey results at the team and individual level.**

Large organizations quickly encounter data complexity as they support cross-functions such as IT and HR, each of which may have organizational trees 10-12 levels deep and additional dotted-line reporting across multiple teams. With Siemens Pulse Analytics, however, organizations are transforming complexity into operational excellence. “This complexity also means an endless amount of useful combinations for our customers to study as they work to optimize their businesses,” said Malassa. “For example, if they do a survey and want to see results where IT and anyone on any other team in a division are in scope, now they can deduplicate results on the fly and show all applicable data – and only the applicable data, and each insight only once – to each user.”

- **Take it to the next level by validating data correlations.**

Another example of the value Siemens Pulse Analytics delivers is when organizations generate NPS scoring by surveying their customers. ‘On a scale of 1 to 10, how likely are you to recommend our company to others’ is useful, but it does nothing to identify and quantify the underlying factors that contributed to the customer’s assessment. “For example,” explained Malassa, “what impact did various dimensions, such as product quality, support, cost, and more have on their score – and on which dimension do they give your organization the lowest score? With Siemens Pulse Analytics, our customers can now drill down into things like NPS to get at the root cause of a score, drive those insights back into the business, improve their scores, and most importantly, retain their end customers.” In the past, Pulse had to provide these analytic insights by moving data into IBM SPSS, which as noted earlier, was painfully slow. With SingleStore as the underlying data foundation, Siemens and its customers can now slice and dice data in real time, and in the NPS example, instantly understand the validity of a data correlation.

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Siemens is delivering greatly improved customer experiences with SingleStore

“Having a database that makes it possible for dashboards to be instant is huge. It's something that you always wish for. It should be the norm, but it wasn't, at least for us, before we had SingleStore. Everything is still possible, but significantly faster. Data processes run faster. Access to reports is much faster. The whole user experience is just greatly improved.”

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Deploying SingleStore was user-friendly for Malassa and team. “I’m not a Linux administrator, and I was able to deploy SingleStore on my own. It’s pretty straightforward, and when you have questions, support is super helpful,” he said.



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Outcomes

“With SingleStore, we no longer look at the database as a limiting factor in our business,” said Malassa. As a result of choosing SingleStore, Siemens is experiencing a range of advantages that are helping the company and its customers improve their businesses:

Real-time data drives advanced analytics to make smart decisions at the speed of business

“Transaction data works in many databases, but when it comes to analytics, most databases don’t perform at all,” said Malassa. SingleStore’s powerful real-time analytic capabilities accelerate time to insight to help Siemens and its customers make better business decisions faster.

Before SingleStore, Siemens Pulse had limited capabilities due to how painfully slow the system was. Integrating data took 30 minutes. With SingleStore, it is experiencing a 10-100X improvement depending on the use case. Processes that formerly required 10 steps are streamlined down to just one.

With SingleStore, users can now slice and dice the data in real time to determine how valid a correlation is. They can also connect reporting lines in endless useful combinations, with automatic deduplication. “They get high-quality analytics that they can run in real time, and not just aggregations, but statistical analysis as well. It’s all the advantages you get from a really great analytics and reporting platform,” said Malassa.

Ability to have SingleStore instances access the same S3 data delivers HUGE cost-savings

“The ability to have data in AWS S3 and have multiple SingleStore instances accessing that same data means we can quickly scale up more clusters while gaining a HUGE improvement in AWS costs,” said Malassa.

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Processes instant text translation and machine learning functions right on the database

Siemens can now instantly translate text right on the database through HTTP User-Defined Functions in SingleStore, which allows APIs to bounce data from within the database to machine learning functions in S3 and support capabilities such as translations.

Queries billions of rows and petabytes of data in real time to accelerate time to insight

Siemens had strict query result requirements to achieve their goal of real-time reporting. For Pulse, instant results meant responses under 250 milliseconds. The database must execute in 100 milliseconds or less to meet this requirement, and SingleStore’s ultra-fast performance meets the challenge across hundreds of terabytes or petabytes of data.

Elastic scalability accommodates spiky concurrency demands

The ability of SingleStore to auto-scale to accommodate massive usage spikes on the fly enables Siemens to support from as few as 500 to as many as 100,000 concurrent users. Siemens can confidently support its existing customer base and scale as its Siemens Pulse Analytics business grows.



SingleStore is helping companies compete and win across many verticals. [Learn More >](#)