CASE STUDY

MODERNIZED SERVER LANDSCAPE SUPPORTS MASSIVE CENTRALIZED DATA STORAGE AND IN-MEMORY DATA PROCESSING

Siemens AG chooses Accenture and Intel® Optane™ DC persistent memory to support its digital strategy

PREPARING FOR THE FUTURE

Intel® Optane™ DC persistent memory is a new in-memory technology that delivers a unique combination of affordable, large capacity and support for data persistence, which helps businesses gain faster insights from their data-intensive applications. In addition, Intel Optane DC persistent memory delivers the benefits of consistently improved service scalability with higher virtual machine (VM) and container density.

For Siemens AG, Intel Optane DC persistent memory seems the perfect solution for their technology needs. Europe's largest industrial manufacturing company is not only due to upgrade its data center infrastructure, but is also preparing for the next phase of smarter management of its ever-increasing data stores. Siemens wants a future-focused solution that will enable:

- Operational excellence
- Deeper business insights
- More data to be stored in their complex environment
- Enhanced operational efficiency

Compared to direct random-access memory (DRAM), Intel Optane DC persistent memory, has significantly greater capacity, is affordable, includes 256 AEP hardware encryption, and the data within is persistent (non-volatile). Similar to DRAM, Intel Optane DC persistent memory data is byte-addressable, so the CPU has much quicker access to the persistent memory module—than it would have with flash memory.

"Intel Optane DC persistent memory offers new infrastructure sizing, security, scalability, and landscape simplification with lower total cost of ownership (TCO). Digitalization and innovation across Siemens requires faster processing of the huge and ever-growing data volumes," said Mamun Natour, responsible for technology and security for application and digitalization platforms at Siemens AG.

ACCENTURE — HELPING SIEMENS AG REACH ITS FUTURE GOALS IN TODAY'S DATA-CENTRIC WORLD

Objective
Explore how Siemens can accelerate insights and boost operational efficiency by getting more data into its complex SAP HANA database via a non-traditional approach that increases data density, while also lowering costs.

Benefits
Capitalize on the large memory capacity, near-DRAM performance, and enhanced cost efficiency of Intel® Optane™ DC persistent memory, running on 2nd Generation Intel® Xeon® Scalable processors, backed by Accenture expertise.

Business Result

- Lowers the total cost of ownership (TCO) by reducing system and management complexity of a complex SAP-based business environment
- Speeds data loading, allowing Siemens to reach operational excellence
- Increases business success through internal transparency on comprehensive enterprise data
- Gains real-time access to all corporate data
- Provides deeper business insight using broader data analytics
- Works in a highly complex enterprise environment, including connectivity with:
  - A high double-digit number of disparate SAP/source systems
  - One of the largest scale-out in-memory solutions in the world, growing organically every day
  - An unprecedented number of updates made every day
- Enables not only SAP HANA database analytics, but also provides insights gained from the testing of enterprise resource planning (ERP), big data analysis, data analysis mining, classical data warehousing, and other large systems
- Puts the data center to work for the business

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DELIVERING WHAT PEOPLE NEED

Siemens AG is active around the globe, focusing on the areas of power generation and distribution, intelligent infrastructure for buildings and distributed energy systems, and automation and digitalization in the process and manufacturing industries. Through the separately managed company Siemens Mobility, a leading supplier of smart mobility solutions for rail and road transport, Siemens is shaping the world market for passenger and freight services. Due to its majority stakes in the publicly listed companies Siemens Healthineers AG and Siemens Gamesa Renewable Energy, Siemens is also a world-leading supplier of medical technology and digital healthcare services, as well as environmentally friendly solutions for onshore and offshore wind power generation. In fiscal 2018, which ended on September 30, 2018, Siemens generated revenue of €83.0 billion and net income of €6.1 billion and had around 379,000 employees worldwide (www.siemens.com).

Looking to the future, Siemens AG wants to accelerate a broader digitalization in their business, combining any source of data (ERP, IoT, etc.) gaining deeper insights on business.

- Designing, developing, and delivering innovative new products for medical diagnosis, infrastructure, and power generation and transmission
- Process optimization at every step in the entire value chain, which requires analysis of immense amounts of data
- Production planning and scheduling in manufacturing environments
- Collecting data on how machines are performing to enable quality improvements, predictive maintenance, and tailored service offerings.

The key success factor in designing, building, and delivering new high-quality products is faster, highly efficient data processing—including transactional data processing and analytics, such as predictive analytics, machine learning, and artificial intelligence.

THE CHALLENGE

Faster data processing is critical for ultimately delivering results to consumers, but faster data processing can only sustain improvement with efficient and secure data storage that overcomes traditional infrastructure limitations. This is why Siemens AG sought a solution that promised lower TCO through infrastructure bundling, which would lead to lower operating costs over the long term.

Focusing on Siemens' current data insights landscape, generating continuous efficient analytics in real time creates a pressing need to address growing data volumes within multiple sources (SAP HANA, SAP ERP, IoT, etc.).

One of the challenges with real-time data replication across all Siemens' systems is an unprecedented number of updates completed each day. Due to sizing limitations, the data replication service cannot pull all the desired data.

Part of the data insights landscape is based on a scale-out SAP HANA database—which is one of the largest, and most complex HANA databases in the world running on a double-digit number of servers. Traditionally, the solution for getting huge amounts of additional data in this database was by adding more servers. Siemens' underlying problem stemmed from the velocity and volume of data, compounded by the complexity of user/data requirements. But in this instance, the current solution had limitations.

Resolving this challenge Siemens decided the time was right to investigate upgrading its servers to 2nd Generation Intel Xeon Scalable processors and Intel Optane DC persistent memory technology.

THE SOLUTION

Before Intel's launch of Intel Optane DC persistent memory, the German conglomerate seized the opportunity to evaluate the features of this new technology. This evaluation was jointly completed by Siemens, Intel, SAP, and Accenture. These three industry leaders were chosen to drive Siemens' test efforts because of their:

- Reputations for innovation
- Close, collaborative partnership
- Complementary technologies
- Extensive industry expertise

SAP HANA database solutions (e.g., the platform/foundation for analytics and transactional applications) are designed to run efficiently on Intel Optane DC persistent memory technology. They also have the potential to become the ideal solution for Siemens AG by:

- Offering greater data density than DRAM-only systems, improving efficiency while data processing
- Enabling unprecedented scale by simplifying the overall landscape
- Utilizing the calculation power of the in-memory landscape by executing highly complex database operations
- Lowering overall TCO

In addition to Intel, SAP, and Accenture, FUJITSU also supported Siemens' test efforts by providing its latest-generation servers—designed to boost productivity, efficiency, and flexibility, while also delivering confidence and reliability.

Proven Benefits	Details
Business benefits	• Comprehensive insights and processing on any data source • Improved system availability and stability • Faster data processing • Lower TCO
Operational efficiency/ excellence	• Reduced infrastructure complexity • Increased data volumes in direct access • Reduced interconnect traffic and faster data processing • Faster OS upgrades due to a reduced number of servers
Performance comparable to DRAM	• Immediate table reloads when servers were restarted, both hot and cold • Accelerated database data load on startup by >15X with Intel Optane DC persistent memory • Comparable to DRAM performance, enabling more capacity per investment.
Enhanced stability	• Intel Optane DC persistent memory and DRAM supported a stable environment with a large amount of data (above 5TB per node); stress-testing was performed in the following areas: o Running out of Intel Optane DC persistent memory o Running out of DRAM o Running out of CPU o Massive parallel forced merges o Massive forced compression o Massive interconnect traffic and data ingestion o Massive parallel consistency checks • System remained stable in all circumstances mentioned above
Enhanced system security	• Embedded data encryption

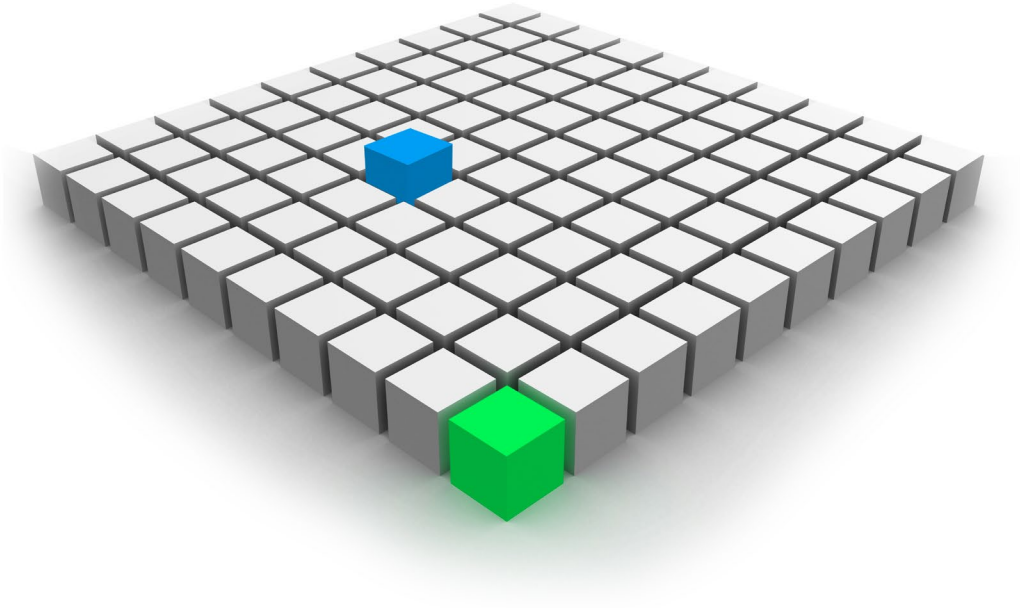
Figure 1. ***Proof of concept testing summary***

CONCLUSION

Intel Optane DC persistent memory—together with 2nd Generation Intel Xeon Scalable processors—delivers the massive memory capacity Siemens AG needs to support its digital strategy and expanding use cases, while also lowering TCO by way of enhanced operational efficiency. Greater efficiency today translates to lower operational expenses over the long-term—coupled with reduced data center complexity in today's data-centric world.

LEARN MORE

Contact your Accenture or Intel representative today. Find out how your organization can benefit by modernizing your server landscape with Intel Optane DC persistent in-memory computing and 2nd Generation Intel Xeon Scalable processors.



Performance results are based on testing as of April 2019 and may not reflect all publicly available security updates. See configuration disclosure for details. No product or component can be absolutely secure

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