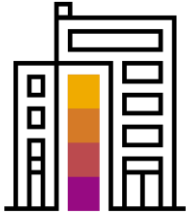




SAP® Innovation Awards 2020 Entry Pitch Deck

SIEMENS AG CHOOSES ACCENTURE AND INTEL® OPTANE™ DC
PERSISTENT MEMORY TO SUPPORT ITS DIGITAL STRATEGY
Siemens AG



Company Information

Headquarters	Munich, Germany
Industry	Multinational Conglomerate Company
Web site	www.siemens.com

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.

Siemens AG Chooses Accenture and Intel to Support its Digital Strategy

Siemens AG



“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.

Challenge

Siemens AG is preparing for the next phase of smarter management of its ever-increasing data stores. Siemens wants a future-focused solution enabling operational excellence and deeper business insights for their SAP HANA database, which is one of the largest and most complex SAP HANA installations in the world.

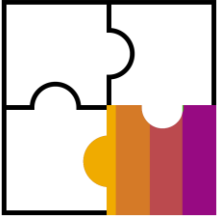
Solution

Intel® Optane™ DC persistent memory is the 1st new revolutionary memory technology in over 25 years designed to run on SAP HANA 2.0 using groundbreaking memory cells. Accenture ran the global Intel PoC prior to the market launch together with Siemens, Intel, SAP and Fujitsu to prove that this innovative Intel technology will become the ideal solution for Siemens AG.

Outcome

Siemens chose to upgrade its SAP HANA datalake servers to 2nd Generation Intel Xeon Scalable processors and Intel Optane DC persistent memory technology upon successful completion of the PoC. Siemens gained access to the massive memory capacity they required to support its digital strategy and expanding use cases, while also lowering TCO and improving operational efficiency.





Participating Partner Information



Accenture | Intel Alliance

Management of the PoC within the Accenture and Intel partnership program

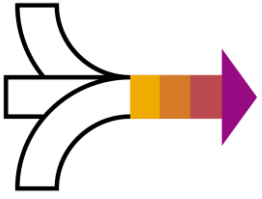


Accenture is a leading global professional services company, providing a broad range of services and solutions in strategy, consulting, digital, technology and operations. Combining unmatched experience and specialized skills across more than 40 industries and all business functions — underpinned by the world's largest delivery network — Accenture works at the intersection of business and technology to help clients improve their performance and create sustainable value for their stakeholders. With 492,000 people serving clients in more than 120 countries, Accenture drives innovation to improve the way the world works and lives.

Intel being one of the largest technology R&D organizations in the world, and Accenture being the largest systems integrator in the world, together they are finding ways to accelerate the adoption of new technology and defining how it benefits clients. In doing so, they are creating innovative joint solutions that solve their clients' toughest challenges and help advance the high-tech industry.

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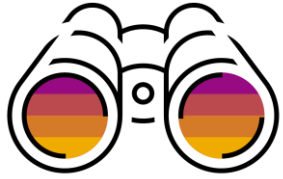


Business Challenges and Objectives

- 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.

- Explore how Siemens can accelerate insights and boost operational efficiency by getting more data into its complex SAP HANA database via a nontraditional approach that increases data density, while also lowering costs.
- Get proven record that Intel® Optane™ DC persistent memory on SAP HANA 2.0 SPS 3.0 ensures
 - enhanced system performance
 - enhanced system stability and security
 - enhanced operational excellence
- Support the go to market campaign of the new Intel® Optane™ DC persistent memory technology





Project or Use Case Details

The challenge: For companies using the SAP HANA business data platform as their foundation for SAP and non-SAP applications, the rapid increase in database size creates a significant challenge because it:

- Drives up infrastructure costs—large-capacity systems with DRAM are expensive
- Hinders the migration of very large SAP environments into SAP HANA in-memory databases
- Forces enterprises to compromise by tiering their databases, which prevents the analytics engine from access to the full breadth and depth of data collected
- Restricts companies from keeping all working data sets in their SAP HANA in-memory database platform.

The solution: To overcome today's memory/storage challenge, greater capacity must be delivered at a lower cost. This is the objective of Intel® Optane™ DC persistent memory (DCPMM). By combining the positive features of memory and storage, Intel OptaneDC persistent memory creates a new flexible tier in the memory/storage hierarchy.

Putting the solution to the test: The Accenture team, scattered across several countries and continents, collaborated for with Siemens AG, Intel, SAP, and Fujitsu to prove Intel's new DCPMM architecture. As Siemens prepared for a hardware refresh, the proof-of-concept (PoC) was the ideal opportunity to gain experience with this new technology. During the PoC, intensive testing in all aspects of running large scale out HANA systems have been collectively performed by Siemens, Accenture and SAP. The PoC gave Siemens AG valuable insights that Intel Optane DCPMM-based servers are the solution to move forward. Based on the result Siemens decided to modernize its large productive SAP HANA datalake cluster with that new Intel® Optane™ DC persistent memory. The PoC effort also placed Accenture in a unique position in working with this disruptive technology, giving Accenture an understanding of how to manage the database in a multi server environment.



Benefits and Outcomes

Business or Social

- Comprehensive business insights with in-depth real time analysis enabling new business models
- Increases business success through internal transparency on comprehensive enterprise data
- Lowers the total cost of ownership (TCO) by reducing system and management complexity of a complex SAP-based business environment
- Works in a highly complex enterprise environment

IT

- Operational efficiency/ excellence – offering greater capacity closer to the processor at lower costs enabling:
 - faster database startups by >15X
 - faster table loads
 - faster query processing
 - massive capacity
- Enhanced system security via embedded data encryption
- Improved system availability and stability

Human Empowerment

- Gain real-time access to all corporate data enabling faster and more reliable decision making
- Faster time-to-insights giving greater ability for making decisions based on real-time data
- Customer centric solutions closer to the customer/business data
- Enables SAP HANA database analytics
- Provides insights gained from the testing of enterprise resource planning (ERP), big data analysis, data analysis mining, classical data warehousing, and other large systems



Architecture

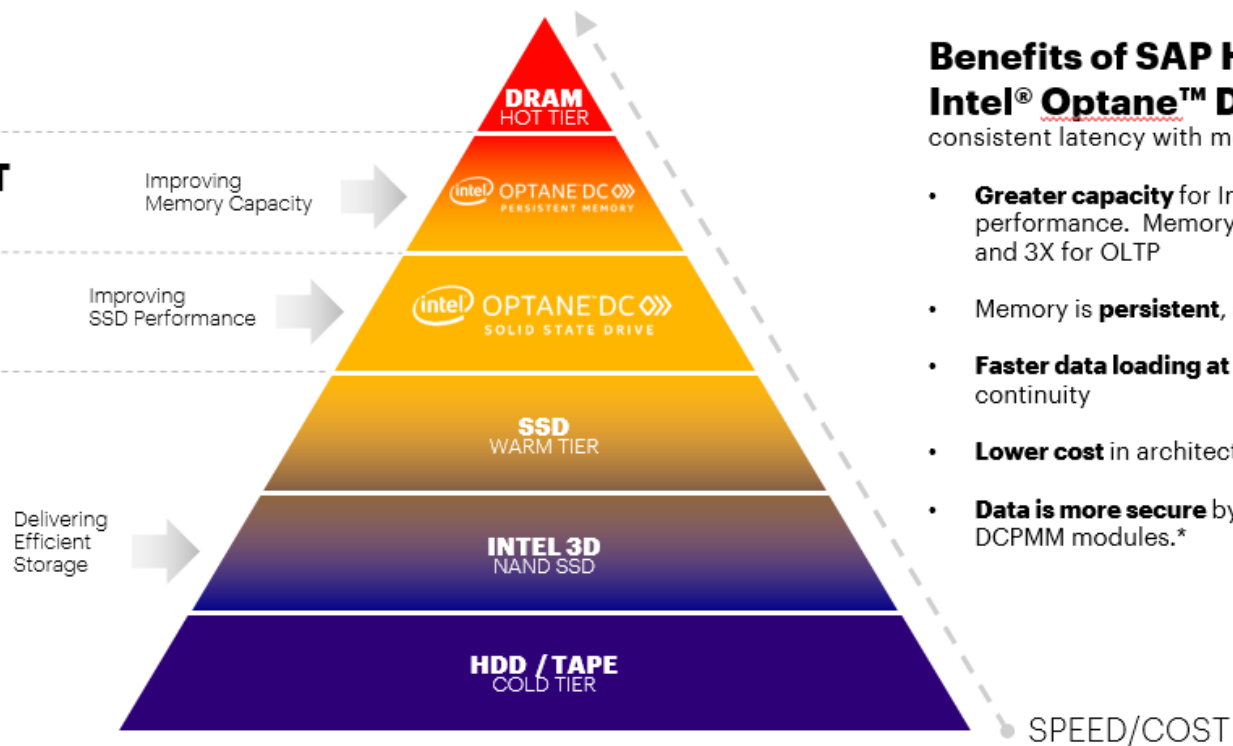
INTEL® OPTANE™ DC PERSISTENT MEMORY

Having created the 1st new memory category in >25 years, Intel is leading the future of in-memory database computing

MEMORY

PERSISTENT MEMORY

STORAGE



Benefits of SAP HANA on Intel® Optane™ DC Persistent Memory

consistent latency with more capacity per dollar than DRAM

- **Greater capacity** for In-Memory DB at near-DRAM performance. Memory support increase by 6X for OLAP and 3X for OLTP
- Memory is **persistent**, available during power cycles
- **Faster data loading at startup** (>15X) for business continuity
- **Lower cost** in architectural simplicity, and time savings
- **Data is more secure** by way of hardware encryption on DCPMM modules.*

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*System configuration requires mix of DDR and DCPMM
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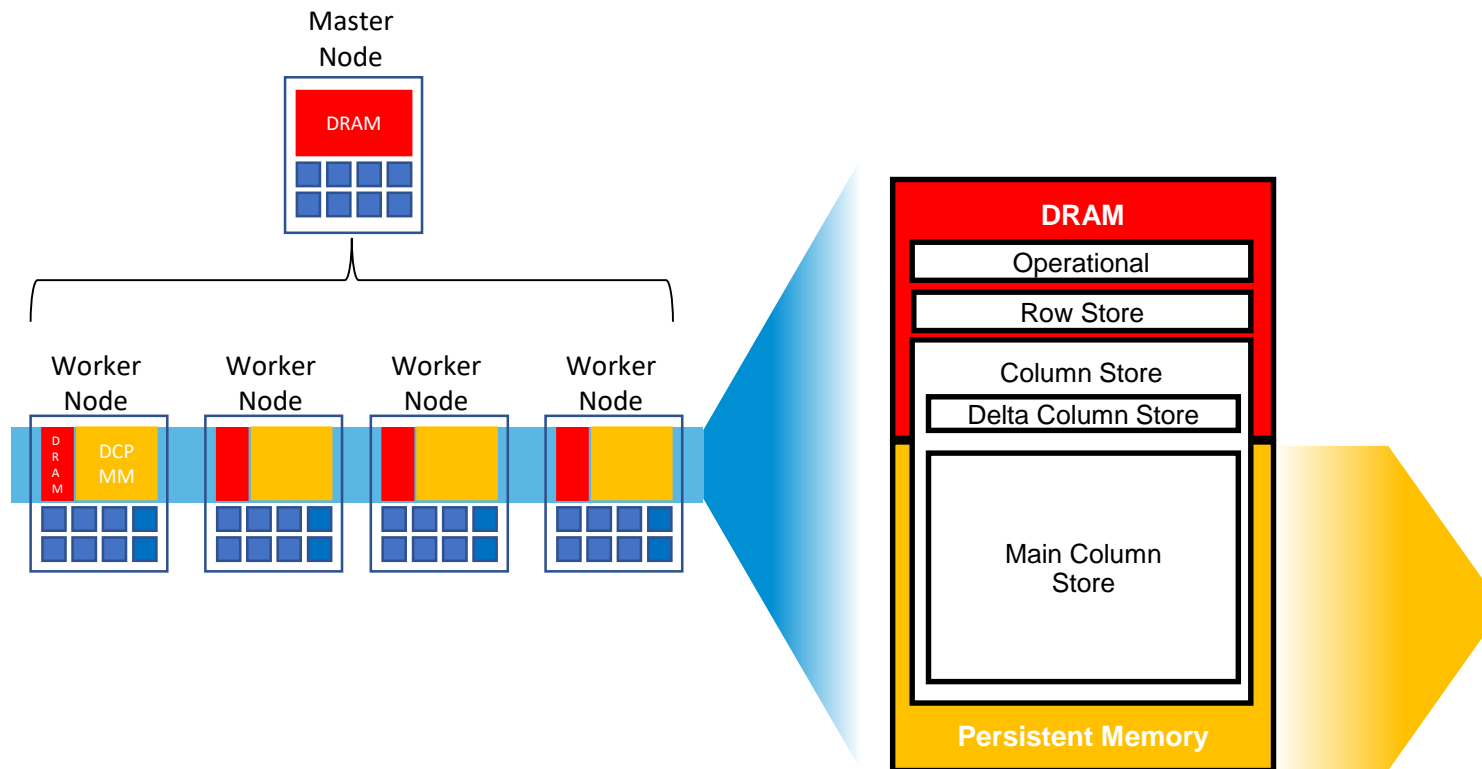
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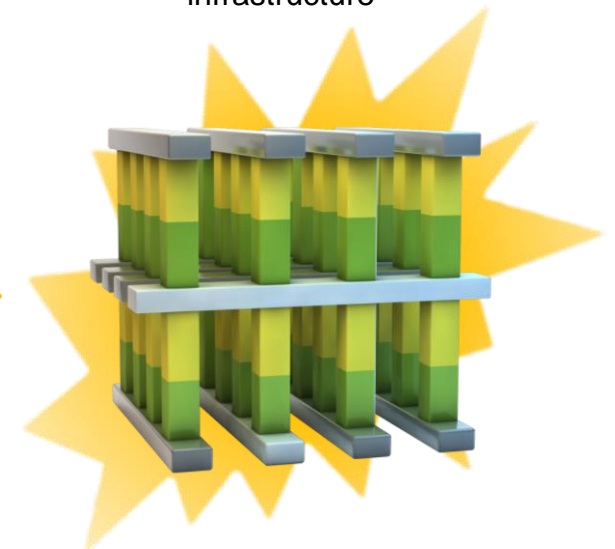
Architecture

Using Intel Optane DC persistent memory, we were able to consolidate Siemen's EH1 Data Lake from **twelve** server to **five** server, being prepared for further data volume growth.



Intel Optane DC persistent memory is an entirely new media technology called 3DxPoint™. It has the persistency and lower cost similar to NAND with the near performance and compatibility of DRAM.

Optane DCPMM addresses the memory / storage gap in today's current infrastructure





Deployment



Deployment status PoC

Date 03.05. 2019

Number of users Test Team Siemens, Accenture and SAP

SAP technologies used:		Deployment status	
SAP product		(live or proof of concept [POC])	Contribution to project
1	SAP HANA 2.0 SPS 3.0/4.0	PoC	Tested Intel® Optane™ DC persistent memory on SAP HANA 2.0 SPS 3.0/4.0 Testing was done on a 3 Server scale out environment with the following setup similar to the Siemens productive 12 Server scale out landscape: 1 Master Node: 768GB D RAM 3TB DCPMM 2 Worker Nodes: 1,5TB D RAM 6TB DCPMM With multi tenant environment and asymmetric system sizing, ratio 1:4 and 11,5TB of business data

If you have used one of the services or support offerings from SAP Digital Business Services during the implementation or deployment phase, please select with ☒ one or more of the following offerings:

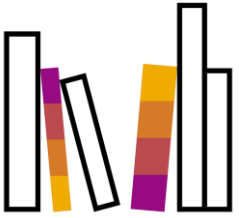
- ☒ SAP MaxAttention™
- ☐ SAP ActiveAttention™
- ☐ SAP Advanced Deployment
- ☐ SAP Value Assurance
- ☐ SAP Model Company
- ☒ Others: Collaboration with SAP Product Development Team and SAP Intel Optane PoC Team
- ☐ SAP Innovation Services
- ☐ SAP Innovative Business Solutions



Advanced Technologies

The following **advanced technologies** were part of the project.

Technology or use case		Yes or No	Contribution to project
1	3D printing		
2	Blockchain		Enabled by Intel® Optane™ DC persistent memory
3	Internet of Things (IoT)		Enabled by Intel® Optane™ DC persistent memory
4	Machine learning or AI		Enabled by Intel® Optane™ DC persistent memory
5	Conversational AI		Enabled by Intel® Optane™ DC persistent memory
6	Robotic process automation		Enabled by Intel® Optane™ DC persistent memory
7	Data anonymization	Yes	Extensively used during PoC
8	Augmented analytics		Enabled by Intel® Optane™ DC persistent memory



Additional Information

- Intel Optane DC Persistent Memory Video:

<https://www.intel.com/content/www/us/en/products/docs/memory-storage/optane-persistent-memory/accenture-partner-video.html>

- Official Whitepaper – Intel Optane DC Persistent Memory Partner: Accenture

<https://www.intel.com/content/www/us/en/products/docs/memory-storage/optane-persistent-memory/accenture-partner-whitepaper.html>

- SAP Intro

<https://sap.com/persistent-memory>

- Intel Optane DC Persistent Memory Siemens Case Study

<https://www.sap.com/documents/2019/10/d431ed6e-6b7d-0010-87a3-c30de2ffd8ff.html>

- Intel Optane DC Persistent Memory Launch Blog

<https://www.linkedin.com/pulse/intel-optane-dc-persistent-memory-enables-centralized-zeier>