

Collaboration and Innovation

Leading New ICT
The Road to Digital Transformation

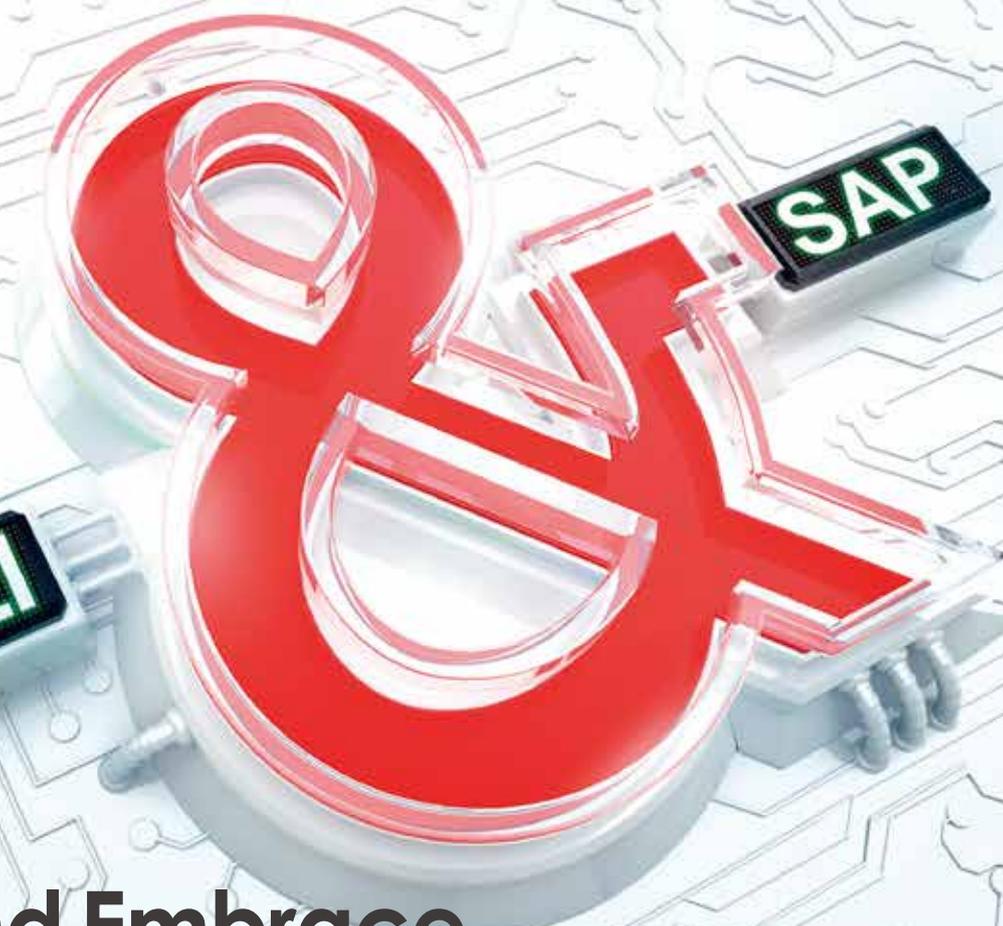
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SAP and Huawei:
A Strong and Growing
Partnership

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Collaborating for Win-Win Digital Transformation

By Zheng Yelai, President, Huawei Cloud Business Unit and IT Product Line

In 2011, Huawei's Enterprise Business Group (EBG) and IT Product Line marked the official start of the ICT leader's journey into the global enterprise business market. Huawei brings extensive prior experience from the carrier market, but the enterprise market is a different playground. The enterprise industry values openness and collaboration between vendors for the mutual benefit of all participants. As the landscape shifts, Huawei has rapidly adapted, forging partnerships with a growing number of industry players. These initiatives have positioned Huawei solidly on the industry eco-chain. Standing out among these success stories is its collaboration with SAP.

At *SAP SAPHIRE* held in China in 2012, the then SAP senior vice president, Alex Atzberger, joined me to announce that Huawei became SAP's first global technology partner from China. Later, we launched our first product — the Huawei FusionCube SAP HANA appliance. Soon after, both our boards of directors held talks and advanced the partnership with the Huawei-SAP global strategic alliance, focusing on six domains that covered cloud, ICT infrastructure, and telecom software. This alliance made SAP Huawei's first company-level strategic partner. In just a few years, our concerted effort blossomed into fruitful results, underscoring the vision and acumen of our executives in establishing this strategic alliance. In addition, our partnership manifests as endorsement in each other's flagship events. In 2017, Huawei was a primary sponsor for the *SAP SAPHIRE NOW* conference, while SAP plans to do the same at *HUAWEI CONNECT 2017*.

Huawei and SAP prioritize customer-centric joint innovation. Huawei's extensive infrastructure experience and expertise is a mutual complement to SAP's specialty in enterprise-grade software products. Our strengths are the cornerstones of further alliance. Our continued investment over the years has led to an array of innovations encompassing ICT infrastructure, cloud computing, and Industry 4.0, and enabling success for hundreds of large- and medium-sized enterprises across the globe.

Today, industries are going through a critical phase in their digital transformation. Cloud, Big Data, IoT, and AI technologies catalyze this digitalization. In turn, digital transformation drives innovations across finance, transportation, manufacturing, energy, and public utilities industries, opening up a wealth of opportunities for business growth. Building on past successes, Huawei and SAP continue to dominate the product and market fronts with more leading products and solutions for global customers. Looking ahead, we are committed to a better connected world, where customers are empowered with the rapidity, convenience, and agility of a digital future. ▲



A handwritten signature in black ink, appearing to be the Chinese characters '郑叶来' (Zheng Yelai).

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SAP and Huawei: A Strong and Growing Partnership

By *Martijn Ras, Vice President and Huawei Global Alliance Manager, SAP*

The SAP-Huawei relationship goes from strength to strength. Each year our two companies work together to deliver greater value to customers of all sizes and in all industries around the world. In this article, we will examine SAP's new messaging focused on Live Business, provide an overview of the SAP-Huawei relationship, discuss some of the many SAP-Huawei customer successes, and brainstorm about the future of the SAP-Huawei relationship.

Live Business

Over the past five years, SAP has built strong solutions based on our revolutionary in-memory technology called SAP HANA. Our aim is to enable our customers on their digital transformation roadmaps. This means we are helping them transition from vulnerable traditional businesses into nimble organizations capable of competing in the fast-moving, digital economy.

SAP's vision of a Live Business is one that predicts the future instead of reporting the past. It means an organization with totally agile business processes — connecting every employee and asset to a single, intelligent digital core system — one that can anticipate, simulate, and innovate new opportunities on the fly.

What this means in practice is enabling businesses to rapidly respond to unexpected shifts in consumer demand, new competitive threats and other



Martijn Ras

Huawei is one of SAP's global technology partners. Our strategic relationship has been successful and fruitful for both organizations and, most importantly, for our joint customers.

potentially disruptive events including things outside their normal span of focus, such as natural disasters that might affect their business.

With an innovative digital core like SAP S/4HANA, a business can be fully connected to its customers, suppliers, and employees. Live Business is more than a new advertising slogan. Live Business represents SAP's vision of a seamless digital business that enables our customers to sense, respond, learn, adapt, and predict to create value in the moment.

The exciting aspect about this when talking about our partnership with Huawei, is that SAP's vision of Live Business is very much in concert with Huawei's vision of a Better Connected World. Together we are transforming organizations into digital businesses.

SAP and Huawei Working Together

Huawei is one of SAP's global technology partners. Our strategic relationship has been successful and fruitful for both organizations and, most importantly, for our joint customers. The SAP and Huawei partnership has brought about many innovative solutions with new hardware choices offering higher reliability and better price/performance.

The exciting aspect of this is SAP and Huawei are also highly compatible and complementary to each other, with SAP as a provider of

enterprise applications and Huawei as a provider of IT infrastructure. Our end-to-end solutions, focused on Industry 4.0, IoT, Big Data, and cloud computing, help accelerate our customers' digital transformation across multiple vertical industries.

A great example of this is that SAP and Huawei have established a Co-innovation Center at the Huawei campus in Shenzhen. Some of the exciting key outcomes include:

- Smart Metering solution (Advanced Metering Infrastructure) for the Utilities industry
- Connected Vehicles solution using SAP Predictive Analytics

Customer Success

There are many excellent SAP-Huawei customer success stories. Here are three.

A leading Fortune 500 oil and gas company is running one of the world's largest data warehouses on SAP HANA and Huawei infrastructure. They were looking for a strong solution provider to enable:

- Effective management of their vast amount of data in their fast-growing business
- High levels of system performance and scalability

With SAP HANA, SAP Business Warehouse, and Huawei infrastructure, they successfully:

- Achieved a 4x to 6x improvement in their system performance
- Optimized their enterprise business flow, giving an uplift in operational efficiency
- Enabled global business data sharing and consolidation, thereby accelerating business decision making

Another interesting customer is a China-based developer, distributor, and retailer of snack foods with 1,800 branded store locations.

At the core of their rollout is SAP CRM, SAP ERP, and the SAP Hybris e-commerce/multi-channel commercial solution all running on Huawei hardware. The highly stable IT platform reduced operational risks, accelerated management reforms within the enterprise, and helped the chain improve its competitive strengths. This helped

“
Huawei is a strong and complementary partner to SAP. We are leveraging top talent from both companies for joint strategic initiatives in key areas. We also perform benchmarks to achieve the best SAP-Huawei performance. >>

them stay on track to achieve their 2018 sales target of 10 billion RMB (USD 1.5 billion).

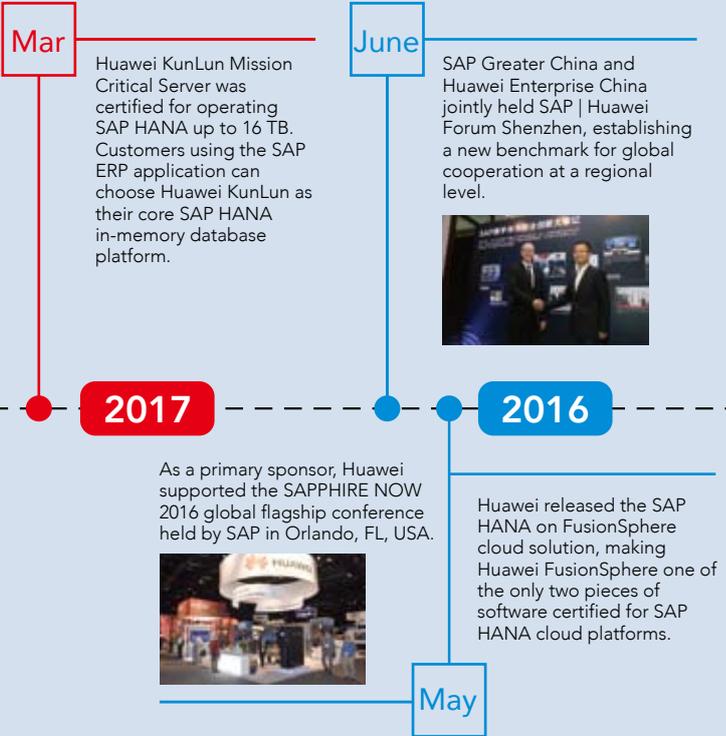
With a highly integrated IT platform built on the results of the Big Data analysis of how customers expect to make their purchases and in which environments, they are able to provide an optimized shopping experience that will continue to improve as the tailored solution is adapted to fit future requirements.

On China’s unofficial ‘Singles Day’ on November 11, 2015, they processed 1.4 million e-commerce orders and handled over 10 million orders in total. The Warehouse Management System (WMS) shipped 300,000 orders in a single day! The SAP CRM system on Huawei hardware now serves 18 million customer members in the omni-channel platform.

But it is not just big customers based in China. The SAP-Huawei relationship is growing rapidly in EMEA.

Milestones in the Huawei & SAP Joint Innovation History

Since the establishment of their global technical partnership, Huawei and SAP have worked closely to combine their technical and marketing strengths. Huawei and SAP have made a series of forward-looking achievements in research to build and present groundbreaking premium services for customers around the world.



Another good example is a mid-sized U.K. company that manufactures and sells window and conservatory blinds. They made the move to SAP HANA. During the process they conducted an intensive assessment of the hardware options on which to run it. There is an excellent case study explaining their decision process and why they chose Huawei above all other solutions.

What impressed them was Huawei's approach to unlocking the business value from their SAP and technology investments. They liked Huawei's approach of looking at the requirements not just from the view of a hardware manufacturer but as vendor that invested the time to truly understand what their business was trying to achieve.

The SAP-Huawei Partnership

Huawei is a strong and complementary partner to SAP. We are leveraging top talent from both companies for joint strategic initiatives in key areas. We also perform benchmarks to achieve the best SAP-Huawei performance.

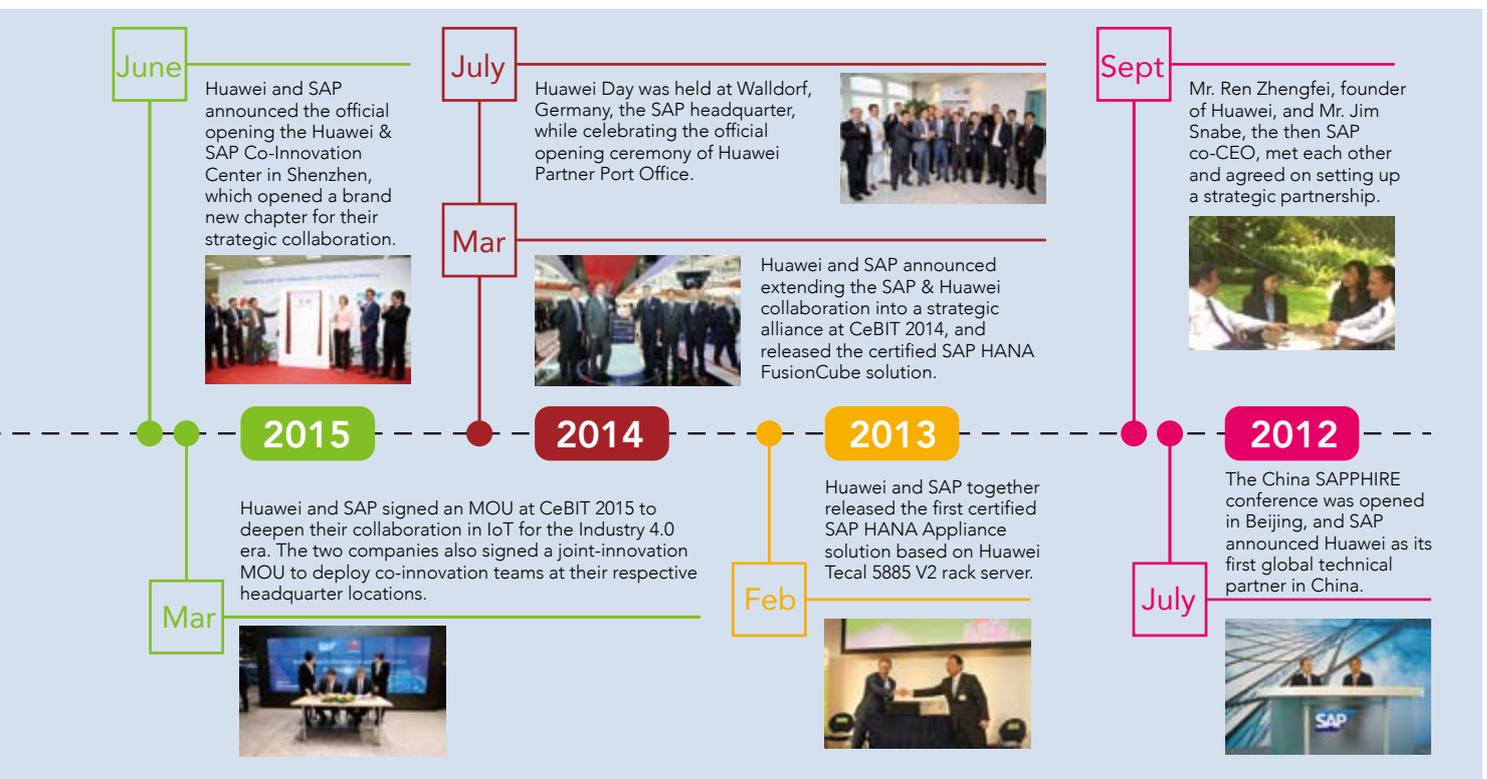
Huawei is a leading cloud solution provider, and especially strong in the

telecommunications industry. In addition to having a strong presence in the enterprise market across Asia Pacific and Japan (APJ), Huawei is growing significantly in EMEA and Latin America. We believe that together we are driving the market and accelerating the cloud innovation to better meet customers' business needs in these regions.

SAP and Huawei are delivering superior customer value and driving simplicity for IoT enablement through Huawei products and solutions certified for the SAP HANA and cloud platforms. The IoT platform is especially suited for global companies, in the areas of smart manufacturing, predictive maintenance, and connected vehicles.

Huawei's SAP HANA Appliance solutions have achieved great success with large-scale applications in industries such as manufacturing, energy, retail, high-tech, and finance, across China, Europe, the Middle East, Africa, and other regions. The solutions have high reliability, great price/performance, and excellent scalability and therefore offer more choices to customers.

We are excited about the future of the SAP-Huawei relationship both for ourselves and more importantly for what it brings to our customers. ▲



Accenture Unlocks Potential of SAP S/4HANA to Drive High Velocity Enterprise

By Lou Weiwei, Business & Integration Architecture Specialist, Shan Yu, Strategy Consultant, and Zhang Mengqiu, Strategy Analyst, Accenture (China) Co., Ltd.

Under the general background of global digital economy tide and China's 'Internet +' initiative, the traditional enterprise digital driver development is unstoppable. Whether it is Big Data, the Internet of Things, cloud computing, or other hot technology trends, or the traditional enterprise transformation with the business of the Internet, all are in urgent need of a speedy, flexible, and open state-of-the-art technology platform. SAP HANA platform uses in-memory computing technology, combines database and application platform functions perfectly, and has redefined transaction processing, analysis, text analysis, prediction analysis, and spatial processing, helping enterprises accomplish their digital transformations. So far, more than 10,000 SAP HANA customers have collaborated with SAP, embarked on the enterprise digitalization journey, and succeeded in their respective domains.

Growing at Speeds Beyond Expectation

SAP HANA is preconfigured in-memory, column-oriented software that users can implement in combination with corresponding server hardware. In the past decade, real-time data processing is playing an increasingly important role in the world of business, and the amounts of data are growing along with it. Luckily, hardware and software technology has also continued to advance in recent years. On the software side, column-oriented storage now offers a new way to compress and partition data. Users can apply this method to reduce large data volumes from 2.75 TB to 600 GB, to name a simplified example. In-memory technology, meanwhile, makes it possible to process data at a speed of 100 GB per second. It does

so by storing information not on conventional, significantly slower hard drives, but in main memory (RAM), where it can be accessed directly on the motherboard. In-memory computing thus enables users to perform analysis and obtain the results almost instantaneously. On the hardware side, blade servers featuring multicore architecture and RAM-based storage support memory of 2 TB or more, which means it is possible to load all data into memory. With these technologies, HANA is thousands of times faster than a traditional database, and is able to process applications and run analysis in real time, with zero latency.

Since the first HANA product was shipped in 2010, SAP HANA is evolving at a faster pace than most of us can keep up with.



More than 10,000 SAP HANA customers have collaborated with SAP, embarked on the enterprise digitalization journey, and succeeded in their respective domains.

- 2010 — First HANA product shipped in late November
- 2011 — SAP Business Warehouse on HANA was available
- 2012 — SAP announced a PaaS offering called the SAP HANA Cloud Platform

Platform

- 2013 — SAP Business Suite on HANA became available by May
- 2015 — S/4HANA on-premises editions were launched, followed by S/4HANA Cloud Edition

S/4HANA Cloud Edition

- 2016 — SAP BW/4HANA — a next-generation data warehouse built entirely on HANA
- 2017 — SAP HANA 2 enables 24/7 management of even larger volumes of data

...

HANA is leading the revolution of SAP product lines.

In addition to the impressive pace of new products, the number of customers also are increasing beyond expectation. S/4HANA, the next generation of SAP ERP software, regarded as the most important product of SAP in the last two decades, with a fast start for 370 customers by first quarter of 2015, has garnered 4,100 customers by the third quarter of 2016.

Applicable to Diversified Scenarios

Presently, SAP HANA can be used widely in multiple use cases including Big Data processing and business warehousing. Concerning future direction, HANA is the foundation for the SAP real-time data management portfolio. This platform will continue to deliver significant new capabilities to drive incremental business and IT value.

- **Big Data & Internet of Things (IoT):** More solutions to help organizations tackle their Big Data challenges including device connectivity, Hadoop optimizations, media (audio/video), MapReduce transformations, native parallel processing for HDFS, and advanced machine learning.
- **Platform capabilities:** Monte Carlo simulation, linear optimization & solver, SAP Infinite Insight optimization, advanced spatial (3D & raster), advanced planning, and developer/modeling extensions.
- **SAP applications:** Simplified & consolidated Business Suite, SAP BW, and applications further enhanced and optimized for SAP HANA.
- **Third-party tools & applications:** Continued development of SAP HANA as an open platform for customer, partner, and ecosystem applications, solutions, and tools.
- **Data center & operations:** Consolidated landscape & deployments,

hybrid cloud/on-premises deployments, advanced security/encryption/privacy controls, extended support for partner cloud deployments, workload management, complex HA/DR scenarios, self-healing, and lifecycle management enhancements.

Helping Customers Tackle Data Challenges

In its short history, SAP HANA has proven itself capable of handling the major data challenges of our times. It is helping thousands of companies store and manage their data, and analyze it for better business insights.

- Client: Huawei

Huawei is a Chinese multinational networking and telecommunications equipment and services company, offering network infrastructure, applications and software, professional services, and devices to telecommunication operators, enterprises, and consumers worldwide. It is one of the largest telecommunications equipment manufacturers in the world, with operations across 170 countries. Huawei's annual sales revenue was CNY 521.6 billion (USD 78.2 billion) in 2016.

Product: HANA Platform

Client's business challenges:

- Need to manage and analyze large volume of business data effectively
- Accelerate integration with key applications like delivery, manufacturing, and financing for the supply chain
- Boost the ability of real-time data analysis to enhance decision-making for business

Benefits of SAP HANA:

- Accomplish visualization and transparency from order to manufacture, boost the ability of processing and decision making
- Faster key reports like financial reports which increase productivity
- Cooperate with SAP, provide all-in-one hardware solution of HANA for customers across the globe

Quantified improvement:

- Maximum performance improved 1,000 times
- Real-time analysis with 10 TB data
- Incremental, real-time synchronization of 400 GB data daily
- Response analysis request of 100M records within 1 second

● Client: Unilever

Unilever is a leading consumer goods company headquartered in London. It has over 175,000 employees and achieved €49.8 billion revenue in 2013. Its personal care products, including Dove, Clear, and Vaseline, accounted for €4.4 billion of a total €12.2 billion in revenue for the first quarter of 2013; food products such as Knorr, Lipton, and Hellmann’s amassed revenues of €3.4 billion. At the time, the company had 2 billion consumers using at least one Unilever product each day.

Product: SAP HANA

Client’s business challenges:

- Double its business by 2020
- Boost the ability of real-time data acquisition and analysis, enhance business decision making
- Converge more than 250 ERP systems into four regionally based SAP ERP systems managed as one global platform, and maximize efficiency of core financial processes and reporting

Benefits of SAP HANA:

- Implementation of core SAP ERP financials and other SAP HANA applications in parallel with the move to a global platform
- Reduction of time spent on month-end financial close process, financial analysis, and product cost forecasting process

Quantified improvement:

- Material ledger was cut by 66 percent
- Cost center assessment time decreased by 39 percent
- Top-down distribution products went down by 32 percent
- Top-down distribution customers were lowered by 40 percent
- Controlling and profitability analysis reporting is now 10 times faster with an improved user experience

● Client: A U.S. Footwear Company

The client is a well-known U.S. footwear company that offers sportswear and lifestyle brand footwear.

Product: SAP HANA and SAP HANA Live

Client’s business challenges:

- Need a new scalable ERP platform to provide appropriate controls for enterprise risk and compliance requirements across its global supply chain and within finance, and to support new businesses as they came online
- Ensure that the complex transition from the old platform to the SAP Apparel and Footwear Solution (AFS) goes smoothly and meets an aggressive time schedule

Benefits of SAP HANA:

- Incorporation of SAP HANA and SAP HANA Live into the platform to provide analytics-driven business intelligence in real time
- Complete control over supply chain
- Real-time and reliable visibility into product cost, upcharges and variances at the component level
- Improve data reporting with both speed and quality to enable better business decision making
- Leverage integrated global information to improve accounts receivable, reduce accounts payable, and achieve more efficient inventory utilization
- Establish the base for near-term expansion goals into additional technology projects such as advanced supply chain planning and omni-channel e-commerce

These are just a few examples of how SAP HANA is enabling digital transformation through increased IT performance, simplification, mobility, and lower Total Cost of Ownership (TCO). SAP HANA will continue to accelerate, innovate, and simplify business across all industries and all applications. With SAP HANA, the future looks bright. ▲

SAP Testimony

SAP products go far beyond our expectations. The innovation cycle of S/4HANA is the shortest in the history of SAP and has become a catalyst for the promotion of all SAP cloud capabilities. SAP is a growing company. Regarding future growth, we have good reasons to feel confident.

— Bill McDermott, SAP CEO

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Make smarter decisions with timely insights

Huawei SAP HANA Scale-out Solution helps you
make smarter decisions with accurate data

Use Huawei's FusionStorage distributed storage software and OceanStor converged storage device to unleash low-latency, high-IOPS processing capabilities. The solution integrates data from an enterprise's various systems, drills down into the data, and mines valuable data to instantly, accurately present high-value information that boosts an enterprise's operation decision making capabilities.





Huawei and SAP Embark on New Chapter of Collaboration

By Pedro Kang, Power to Tech

Founded in 1972, SAP has played an indispensable role in propelling global enterprises toward industrialization and information transformation over the past half a century. Enterprises that collaborate with SAP are all top global companies, most of which are located in the West. In 2012, however, Huawei became SAP's first partner in the East.

- Huawei became the first Chinese company to establish a technical partnership with SAP, just one year after its IT product line was set up.
- Soon the two parties released the FusionCube solution, Huawei's first product certified for operating SAP HANA.
- In early 2014, Huawei and SAP signed a global strategic partnership agreement, which marked the establishment of their strategic alliance.
- Huawei and SAP then announced the official opening of the Huawei & SAP Co-Innovation Center in Shenzhen, which opened a

brand new chapter in their strategic partnership.

- After VMware, Huawei has become the second provider of cloud platform software certified by SAP.

However, these accomplishments were not easy to attain. So, how have Huawei and SAP been able to achieve so much in such a short space of time?

Close Partnership at the Enterprise Level

First and foremost, Huawei and SAP share the same goal: helping



Pedro Kang

Huawei aims to collaborate with industry leaders, such as SAP, to provide efficient cloud computing and Big Data platforms, helping enterprises accomplish digital transformation with more confidence.

companies optimize their business operations.

Today, technology and business transformation are in full swing across the globe. Enterprises need the latest cloud computing and Big Data technologies to optimize their operations while also tapping into new development opportunities, staying ahead of the constantly intensifying competition.

As a top provider of enterprise management software, SAP has helped companies of all sizes in various industries optimize their operations. Huawei, meanwhile, is a leading ICT vendor that aims to help enterprises establish innovative and flexible information architectures, with its motto 'Leading New ICT' always in mind.

Cooperation between SAP and Huawei will therefore enable enterprises to drive business growth and distinguish themselves from the competition.

SAP and Huawei have been working together to run SAP's mission-critical services and applications on Huawei's ICT infrastructure as efficiently as possible. Take the certification between Huawei's FusionSphere and SAP HANA as an example. SAP HANA is an in-memory computing platform where data is stored in memory. This requires the virtual operation environment to have high performance and reliability. Through both parties' close collaboration and joint innovation, Huawei's FusionSphere has pushed beyond the conventional performance limits of cloud platforms, meeting SAP HANA's requirements when it comes to operating environments.

Moreover, FusionSphere's performance is equivalent to a Physical Machine (PM) in terms of running SAP HANA. However, it actually far outstrips PMs in flexibility, resource reuse, reliability, and maintainability.

As for collaboration on the hardware front, Huawei's high-performance hardware platform and SAP's revolutionary OS

enhance companies' real-time operations. With experience on implementing large-scale SAP HANA systems, Huawei provides exceptional infrastructure solutions.

Looking ahead, Huawei and SAP's collaboration will continue to progress, and 2017 will no doubt witness more fruitful cooperation.

Calling for Open OS

Huawei does, however, have more to offer in its partnership with SAP.

UNIX servers played a crucial role in the SAP cycle before SAP HANA launched, but they have been gradually replaced by x86 servers, which are proven to be more competitive in terms of costs, efficiency, flexibility, ease of use, and scalability.

The biggest problem with a UNIX server is its enclosed architecture, which actually brings more harm than help. The world is embracing openness, and so too should OSs. Although enclosed systems maintain internal stability regardless of the outside environment, they are also rigid in a world where new improvements are being made every day.

System migration is paramount to any enterprise, but migrating from UNIX to Linux (U2L) is not easy. While there are many types of x86 servers on the market, none of them can shoulder the task of running mission-critical services.

Huawei had a solution.

The solution involved dividing its x86 servers into three categories: industry-standard servers, enterprise mission-critical servers, and converged-architecture appliances.

Thanks to its tireless efforts in R&D, Huawei has since distinguished itself as a mainstream server provider. Its mission-critical servers have been used across a broad spectrum of

industries, especially in finance, telecom, and government organizations. Huawei servers have also been praised by numerous influential companies including SAP and Intel.

Given the status quo in many Chinese industries, however, there is still a demand for midrange servers, which is an area that Huawei has not given up on.

In March 2016, Huawei released its first 32-socket KunLun Mission Critical Server, running on Intel® Xeon® E7 series processors. To deliver solutions that use this server, Huawei collaborated with mainstream database, middleware, and OS vendors.

At the end of 2016, Huawei announced that a standalone KunLun server can support 12 TB HANA. Soon after, KunLun servers were certified and released to operate SAP HANA with 16 TB of memory. Huawei became one of the only two vendors capable of providing hardware for HANA of 12 TB and above. KunLun not only provides an open hardware platform where SAP HANA can play its performance to the full, but also opens up a new space for the SAP ecosystem.

Consistent Ecosystem & Mutual Benefit

In the past, Huawei and SAP both had large ecosystems with little overlap. However, as they collaborated, the two enterprises began to support each other at the highest levels, especially in terms of business fields and ecosystems.

Mark Gibbs, Global Senior Vice President of SAP and President of SAP Greater China, says he believes that Huawei is one of the most important partners for SAP. The collaboration between the two parties is at the highest levels.

Since they established their technical partnership in 2012, SAP and Huawei's collaboration has only deepened. In 2015, they established a Co-Innovation Center in Shenzhen, China, where Huawei's headquarters is located.

Huawei has not only provided hardware platforms



One driving force behind the deepened Huawei-SAP collaboration is *Made in China 2025*, the Chinese government's strategy to revitalize the manufacturing sector. This effort has fostered the companies' cooperation in various fields, such as cloud computing, IoT, Big Data, smart manufacturing, and smart cities. >>



where SAP HANA can demonstrate its performance, but it also has accelerated SAP's cloud transformation. By implementing SAP HANA in various enterprises, including BESTORE and Sinopec, Huawei has enhanced its brand awareness and expanded its market share in the high-end enterprise server market.

In just a few years, Huawei-SAP solutions have been used in more than 50 countries. Some of these solutions have been applied on a large scale in China, Europe, and the Middle East, and have been recognized by some of the world's largest corporations, including Deutsche Telekom.

One driving force behind the deepened Huawei-SAP collaboration is *Made in China 2025*, the Chinese government's strategy to revitalize the manufacturing sector. This effort has fostered the companies' cooperation in various fields, such as cloud computing, IoT, Big Data, smart manufacturing, and smart cities.

Made in China 2025 and Germany's equivalent, Industry 4.0, both concern manufacturing, which is also SAP's strongest domain. Collaborating with SAP means Huawei can better expand its market share in manufacturing. In contrast, Huawei's strongest domain is telecom. With Huawei's help, SAP can enhance its influence in both the Chinese and global carrier markets. Deutsche Telekom's cloud services provided by Huawei and SAP serve as a good example.

However, SAP's experience is not limited to manufacturing. It is also experienced in retail, consumer goods, healthcare, chemical engineering, and finance. Comprehensive collaboration with SAP can help Huawei deepen its knowledge of different industries and quickly garner industry experience.

As an economic powerhouse, China will undoubtedly take the lead in the next industrial revolution. At the helm, Huawei is willing to collaborate with industry leaders including SAP to provide efficient cloud computing and Big Data platforms, accelerating their digital transformation. ▲

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Control your business processes in real-time

Huawei SAP HANA Scale-up Solution gives you real-time control of your business process with a great leap forward in efficiency

Leverages Huawei's innovative software and hardware acceleration technologies to expedite enterprise data processing and drive real-time data value. The solution enables enterprises to analyze production, machine generated, and event flow data in real time and derive instant insights into business data, thereby presenting analysis results to frontline staffs and enterprise decision makers at very first time.



IoT Drives Digital Transformation

By *Tanja Rueckert, Executive Vice President, IoT & Customer Innovation Unit, SAP SE*

Impact on Business

The Internet of Things (IoT) has been catapulted to the peak spot of ‘inflated expectations’ in the 2015 Gartner Hype cycle.

Leading analysts and consulting firms continue to make substantial estimates about its economic impact. McKinsey & Company, for example, predicts a range between USD 3.9 to 11.1 trillion per year in 2025 and, in the past few years, venture capitalists have invested several billion dollars in the IoT, according to the Boston Consulting Group (BCG).

At the 2016 World Economic Forum in Davos, Switzerland, the IoT was predicted to be the fourth industrial revolution that, following the historical game-changers of water and steam, electricity, and electronics and IT, would lead to a new machine age. Fueled by hyperconnectivity — eventually with tens or hundreds of billions of devices plus new levels of machine intelligence — the IoT is predicted to enable complete digitalization of business processes, unparalleled operational efficiency, and disruptive business model innovation.

Technological advances play a significant part in this vision. The following breakthroughs are the enabling levers:

- Consistent increases in computing power based on Moore’s law

- Advent of cloud technology
- (Predictive) Big Data analytics
- New machine learning capabilities
- Reduction in sensor and storage costs

This futuristic perspective carries a risk to which many businesses fall victim by presuming that the IoT will happen to them as the technology evolves and disruptive startups bring it to market. The advent of the sharing economy that has posed similar threats to traditional business models may have contributed to this passive ‘wait-and-see’ stance but fall short in comparison to the sheer complexity of an IoT-based economy.

This article explores why SAP believes many underestimate the IoT’s relevance today and its impact on the future. Waiting for the IoT to arrive tomorrow will result in missed opportunities to tap into the digital economy and gain competitive advantages now. Underpinning this argument is a case about the value of an end-to-end IoT scenario and some encouragement to IT and business leaders to start small and think big — starting today.

We will also examine the critical importance of strategic partnerships. The Internet of Everything (IoE) is far too big to be led

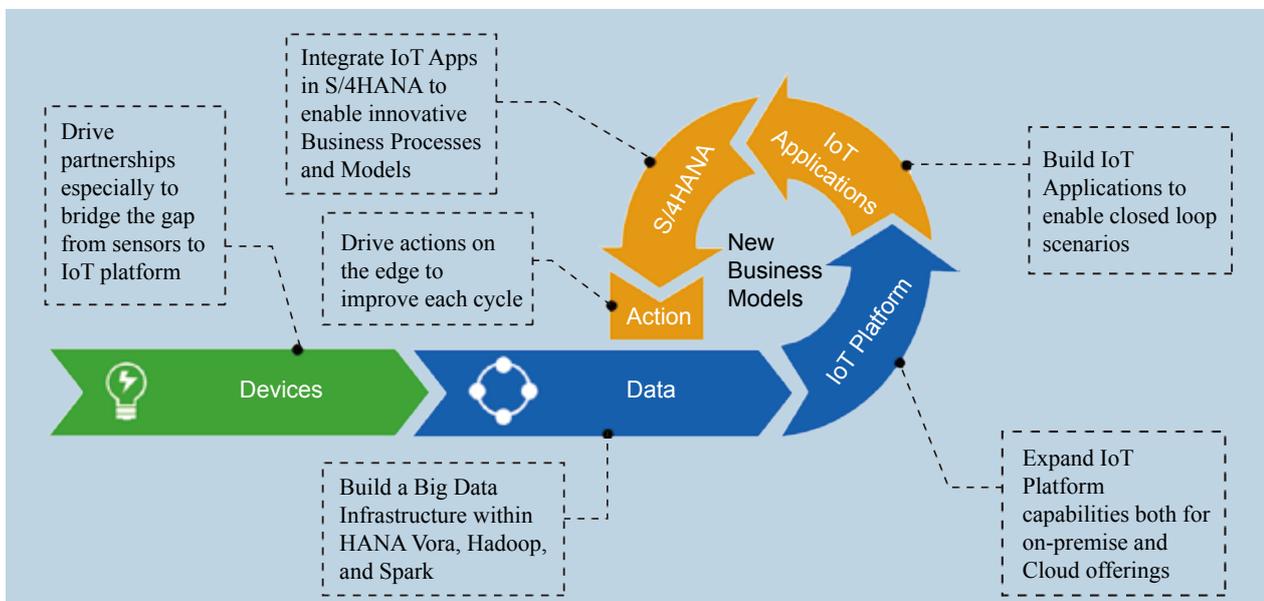


Figure 1: SAP’s Vision of the IoT for Business



Tanja Rueckert

The Internet of Things (IoT) represents a tectonic change that will transform industries across all markets.

by a single company; it is dependent on an integrated ecosystem. This is why SAP is proud of its strategic partnership with Huawei and why a description of our collaboration will form the conclusion of this article.

SAP's IoT Path

With more than 40 years of market leadership in enterprise application software, SAP has set out to realize the IoT for businesses and make it universally connected to close the 'Thing-to-Insight-to-Action' loop. Based on an end-to-end data and process flow, as shown in Figure 1, SAP's solutions create intelligent insight and drive impactful action, from the devices and machines at the edge to the business processes at the digital core of an enterprise. Leveraging advanced machine-learning algorithms, these solutions become more effective over time, as data is accumulated to predict events with increasing accuracy and automate preventive action.

Real customer cases have already delivered proof that these closed loop scenarios not only drive unparalleled operational efficiency but also enable entirely new business models, such as transforming a traditional product into an innovative service with flexible pay-per-use billing options. These early adopters have found in the IoT a means to ensure their survival and gain a competitive advantage in the highly disruptive digital economy.

These end-to-end closed loop scenarios require the full IoT stack, as shown in Figure 2, which SAP enables through key partnerships.

The 'Connected Things' layer is where physical machines and sensors connect and generate data. The 'IoT Backbone' layer refers to the critical link between core business processes and Things. SAP provides a secure, open, and extensible IoT platform based on SAP's HANA Cloud Platform (HCP). It offers common services and standardized interfaces and API, and supports 'reconfigurable,' closed-loop business processes by integration with the digital core. HCP also enables differentiating IoT analytics and applications at the top layer. Customers and partners build, extend, and integrate IoT Apps and benefit from reusable IoT application services.

For SAP, empowering and nurturing a rich ecosystem and offering customers an integrated and interoperable landscape are the key to IoT success.

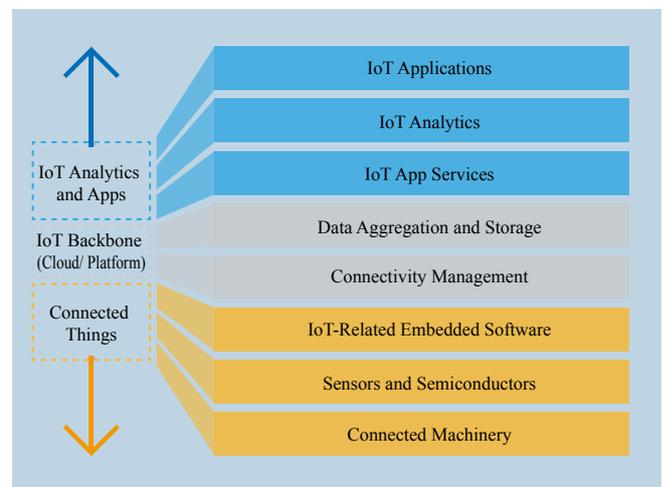


Figure 2: IoT Stack

Along with this ecosystem is the responsibility for end-to-end security across the entire stack. In particular, unprotected distributed Things can be easily compromised via the Internet or can physically expose the integrity of the network and the edge data to a wide array of cyber attacks.

Based on an end-to-end IoT security architecture, SAP is committed to keeping data secure in transit and at rest, and deploying mechanisms that ensure data integrity and appropriate access controls with the use of strong cryptography.

Digital Transformation

Powerful technology stacks that enable end-to-end IoT scenarios are fundamentally changing traditional business models and creating unprecedented value. For example, a busy shipping port is the result of a prosperous economy and favorable location. A terminal management enterprise at a busy port requires efficiency and effectiveness and technologies that increase port throughput, reduce idle time, save energy, and increase revenue. SAP's answer is to provide IoT technologies to connect every Thing in a port in real time.

Port business processes include waiting for ship arrivals, unloading/

loading operations, delivering containers, and transferring them to and from freight forwarders. Required port information is entered into a Terminal Operation System (TOS) days in advance; then, the system schedules all required activities based on this static data. However, in today's world, schedules based on static data do not always meet customer needs, as customers prefer IoT-based dynamic scheduling solutions that can deal with unexpected changes.

For example, when the Automatic Identification System (AIS) discovers a delayed ship arrival, all allocated resources — cranes and vehicles — must be automatically rescheduled, rather than being held offline. If GPS data indicates vehicles are stuck in traffic, pick-up times for the gantry cranes are recalculated in real time to avoid an unnecessary container queue. Real-time Location-Based-Service (LBS) platforms auto-connect with all vehicles that are inside the port perimeter, giving vehicle drivers a full picture of traffic on the port grounds, as well as an optimal route to freight stations, parking areas, and fuel. Major ports like Hamburg, Germany have widely adopted IoT-LBS services delivered by SAP solutions, showing significant improvements in port logistics, as shown in Figure 3.

Apart from increasing the efficiency of job execution, the IoT is also helping ports digitally transform traditional business processes by creating new services.

'Track & Trace' is a most valuable service that enables the logistics life cycle to use IoT technologies, such as RFID, AIS, and GPS.

Traditionally, freight forwarders, purchasing agents, and goods owners must seek out very detailed information from multiple parties, such as which container holds a specific package, current ship locations, and estimated arrival date and time, etcetera, with limited results. Therefore, port management operators can use centralized Track & Trace services to sort all these fragments of information and provide access to the assorted stakeholders. Any port that is newly equipped with the latest in information-services support positively impacts its suppliers and customers. Once the goods are transferred to the freight-forwarding



Shipping ports are at an apex of information flow and logistics in the transportation industry. The vast accumulation of past and current cargo information offers vast opportunities to find business value in patterns mined from the data. >>



carrier, the life cycle enters into the land carriage stage.

Many larger terminal management enterprises own large vehicle fleets; therefore, the land transportation sector must focus on continuous improvements in quality and safety as an essential component of their services. Numerous vehicle networking applications, such as SAP Connected Transportation, address this need. In the commercial market, overland transportation management tools focused on safety-best practices are readily available. Within these applications, telematics data is collected from the vehicle On-Board Diagnostics (OBD) interfaced with other types of sensor data, such as weather, noise levels, CO₂ concentrations, GPS signals, and even wearable devices. The telematics and sensor data is correlated by the central server for output as driver-behavior and driver-fatigue analysis, vehicle health checks, and others. Based on the results, dynamic task planning and mechanical/behavior optimizations are presented to Machine-to-Machine (M2M) or a graphical UI/UX for people and integrated with Enterprise Transportation Management and Human Capital Systems, such as employee care and training programs.

Shipping ports are at an apex of information flow and logistics in the transportation industry. The vast accumulation of past and current cargo information offers vast opportunities to find business value in patterns mined from the data. Port management enterprises can use data mining technologies to provide unique analysis of variations in supply and demand for all categories of goods by using key factors like seasonality, economics, weather, and climate. By performing risk assessment and making use of the results, they can offer business innovations, such as procurement consulting services, that include future demand forecasts based on Things like the upstream supply of raw materials, thus transforming port management enterprises into purchasing agents or even financial service providers.

IoT technologies drive the digital transformation of specialty equipment manufacturers that produce and sell equipment to ports and are anxious to find new opportunities for expanding their businesses. Predictive Maintenance is one example of

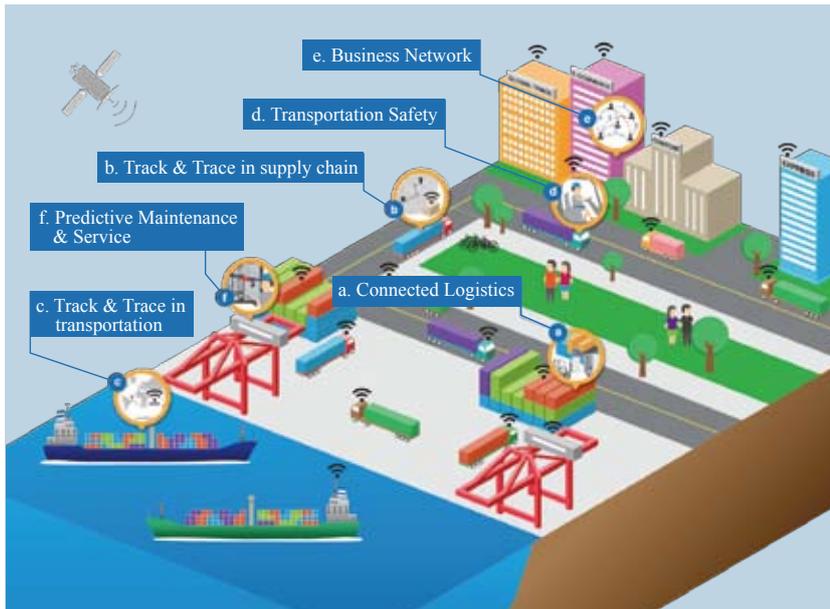


Figure 3: IoT-Enabled Digital Transformation for Shipping Ports

an IoT-based innovation that manufacturers wish to improve upon.

The current market for maintaining port equipment is full of vendors that provide qualified maintenance services at relatively low costs, compared to the prices quoted by the Original Equipment Manufacturers (OEMs) — making it clear that the business model of providing maintenance services is more profitable and sustainable than selling equipment alone. Equipment manufacturers win back the technical services market from independent maintenance vendors with the IoT. Equipment vendors are in the best position to remotely collect operational data, such as temperature and equipment vibration, and return it to the factory. By fusing operational and IT data, the OEMs build reliability models that automatically schedule maintenance tasks, preventing large business losses.

The IoT is a key lever to realizing the smart port, and the core of the IoT is connectivity. Each asset inside and outside a port, including ships, cranes, cargo, etcetera, is well-connected through IoT-enabled smart devices. Individually connected with a powerful data analytics engine that extracts intelligence from the system, each piece of equipment is optimized for its task, with green

Together with SAP's dominant market position in high-performance, in-memory computing, Huawei will provide comprehensive end-to-end IoT solutions to drive IoT adoption to the next level. >>

production and improved work safety levels.

SAP and Huawei Strategy

SAP and Huawei have joined together to more closely explore IoT market opportunities and leverage their respective advantages. As a world-leading communications and network device provider, Huawei, with its IoT smart gateway, is an important edge component for remote data collection. Together with SAP's dominant market position in high-performance, in-memory computing, Huawei will provide comprehensive end-to-end IoT solutions to drive IoT adoption to the next level.

Transportation is a remarkable example. The Traffic Safety Culture Index in the U.S. shows that car crashes rank among the leading causes of death. SAP is developing an IoT-based transportation solution to help guarantee driver and passenger safety by using IoT data collected from public transportation vehicles, such as school buses, coaches, and heavy vehicles.

Huawei plans to install a smart IoT gateway device inside vehicles so that, while a vehicle is on the road, different kinds of sensor data will be collected and saved into SAP SQLAnywhere, which serves as local storage on the IoT gateway. The IoT data will then be uploaded to the SAP HANA database via 3G or Wi-Fi, either in real time or as scheduled. Then, SAP HANA uses its powerful calculation capability to perform analytics, such as driver behavior and fatigue detection, enabling intelligent insights to fleet managers.

A reference case solution has already been successfully presented to large enterprises in various countries. This cooperation is only the beginning for SAP and Huawei in the IoT arena. Soon, this alliance will enable the full IoT stack in unprecedented ways for a broader ecosystem.▲

Huawei SAP HANA Appliance: Your Data Computing Expert

By Tan Xin, Server Marketing Operations Manager, IT Product Line, Huawei Technologies Co., Ltd.

In today's digital economy, data monetization is much sought after. SAP HANA solutions and technologies simplify data processing, derive value from data over time, enable better-informed decision making, and bolster an enterprise's operational efficiency. Furthermore, SAP HANA can transform business modeling, implementation, and interconnection as well as explore new business opportunities. A good business platform needs the support of an exceptional computing platform, which contributes to the rapid monetization of data. The Huawei SAP HANA Appliance solution accelerates a company's operations.

Huawei's SAP HANA Solution

● Scale-Up Solution

The scale-up solution provides various products to meet the requirements of SAP HANA users in terms of hardware platforms. Huawei's 2-socket server is sufficient for B1 on HANA. The large-scale Business Suite on HANA and S/4HANA are supported by 4-, 8-, and 16-socket servers, as well as the industry-leading 32-socket mission-critical server. Huawei offers in-memory computing capacities between 128 GB and 32 TB (Huawei has been certified for operating SAP HANA of 128 GB to 16 TB; specifications larger than 16 TB can be certified on a case-by-case basis). Huawei servers meet these capacity requirements, meaning that enterprises

no longer need to worry about capacity expansion. This helps them simplify their IT architecture, data processing, and management.

● Scale-Out Solution

Huawei also provides flexible scale-out solutions that allow the system to be expanded smoothly if a larger data capacity is needed. Customers can configure two 512 GB nodes to start with, which can be expanded to up to 64 TB (16 nodes, 4 TB per node).

As customers require different things in different scenarios, Huawei provides clusters based on 4- and 8-socket servers, as well as KunLun 9008 Mission Critical Servers. The solutions are also cost-effective, protecting customers' investments throughout the SAP HANA lifecycle.



Huawei's Broad Portfolio of SAP HANA Appliance Products

Engineered for Real-Time Business

Enterprises expect SAP HANA solutions to analyze business implementation in depth, process transactions fast, and respond correctly and in real time. The performance of a hardware platform determines both the efficiency when processing transactions and the speed of the analysis.

Based on the computing features of SAP HANA, Huawei uses multiple technologies to optimize the operational efficiency of SAP HANA software on the Huawei hardware platform.

Comparing the read/write performance of various different storage media shows that the performance of PCIe SSDs is between that of memory and SAS SSDs but a thousand times better than that of SAS HDDs. This means that PCIe SSDs are the best storage medium for SAP HANA log volumes. Huawei's SAP HANA solution uses Huawei's proprietary SSD, the ES3000, to store data in log volumes. Its write synchronization performance has improved 6.5 times compared with traditional HDDs, and adding, deleting,



Tan Xin

Huawei’s SAP HANA Appliance solution comes with a variety of product options. Based on Huawei’s high-performance hardware platform, the solution is ideally suited for developing and deploying real-time applications, remaining economically viable in terms of customers’ investments.

Benchmark Test Results for Huawei’s SAP HANA BW for HANA

Hardware configuration	4-socket	8-socket	16-socket
Phase 1: total runtime of data load/transformation (seconds)	21,379	18,171	22,072
Phase 2: query executions per hour/records selected	4,007	7,927	14,003
Phase 3: total runtime of the complex query phase (seconds)	159	182	208

modifying, extracting, and writing data into databases has accelerated.

The KunLun HANA appliance integrates multiple advanced technologies developed by Huawei, SUSE, and SAP. Huawei’s own NC interconnect chips expand CPU resources and exchange signaling and data in nanoseconds. The SUSE OS improves process scheduling to optimize the hyper-scale computing resources of the KunLun NUMA architecture. This architecture forms the basis for the SAP HANA parallel database that makes use of KunLun’s scale-up capability. SAP HANA senses the location of data in the memory and assigns the closest CPU for the fastest computation. Together, these features improve the performance of KunLun HANA databases exponentially.

Moreover, Huawei’s SAP HANA cluster solution provides 56G InfiniBand networks and distributed block storage solutions. 56G InfiniBand networks deliver ten times the performance of traditional 8G Fibre Channel (FC) networks. The SAP HANA cluster solution is also based on Huawei’s FusionCube, so it can be expanded smoothly. As capacity is increased, the solution’s performance improves accordingly.

SAP Benchmark Program

SAP’s benchmark test results are among the important indexes that measure the size of SAP HANA hardware platforms. The test evaluates the performance and scalability of certain software and hardware combinations in given conditions. The results then help customers and partners find

the most suitable hardware configurations, such as servers and databases that meet different standards for application testing. The SAP Benchmark Council is responsible for monitoring and maintaining standard SAP application benchmarks.

Huawei’s SAP HANA Appliance solution has the following advantages:

- Easy expansion: Large-capacity solutions can be configured flexibly to support business growth.
- Optimal performance: Fully demonstrate the system performance and accelerate data monetization by collaborating with partners such as SAP and SUSE.
- Reliability, Availability, and Serviceability (RAS) 2.0: Maximizes service stability and continuity through fault prediction and isolation as well as support for CPU and memory hot-plugin.

Serving Global Companies

Since Huawei released the first SAP HANA Appliance in 2013, the Huawei SAP HANA Appliance solution has served enterprises in over 50 countries, including more than 500 large corporations, and SAP HANA memory shipments have now exceeded 2,000 TB. Huawei also built the largest SAP HANA cluster for China National Petroleum Corporation (CNPC), with a memory of up to 136 TB. In 2016, the Huawei and SAP HANA partnership was listed as a pilot and showcase project in the *Smart Manufacturing* collaboration between China and Germany. ▲

Huawei and SAP Move Mission-Critical Applications to the Cloud

By Wang Haobai, Senior Marketing Manager, IT Product Line, Huawei Technologies Co., Ltd.

Enterprises using SAP applications are increasingly looking to cloud computing to innovate their services and improve their efficiency. There is a whole host of SAP applications on the cloud (Ariba, SuccessFactors, Fieldglass, Hybris, Concur, SAP HANA Enterprise Cloud, and Business ByDesign) that can help enterprises grow their business in more innovative ways. These applications also propel the development of Big Data analytics and mobile socialization. The cloud computing environment facilitates enterprise innovation by lowering the cost of trial-and-error, which leads to improved customer experience and faster time-to-value. Enterprises can also comprehensively collect, share, and manage a vast amount of operational and customer data in real time. Deep data analytics and faster response will finally put enterprises on the path towards digital transformation.

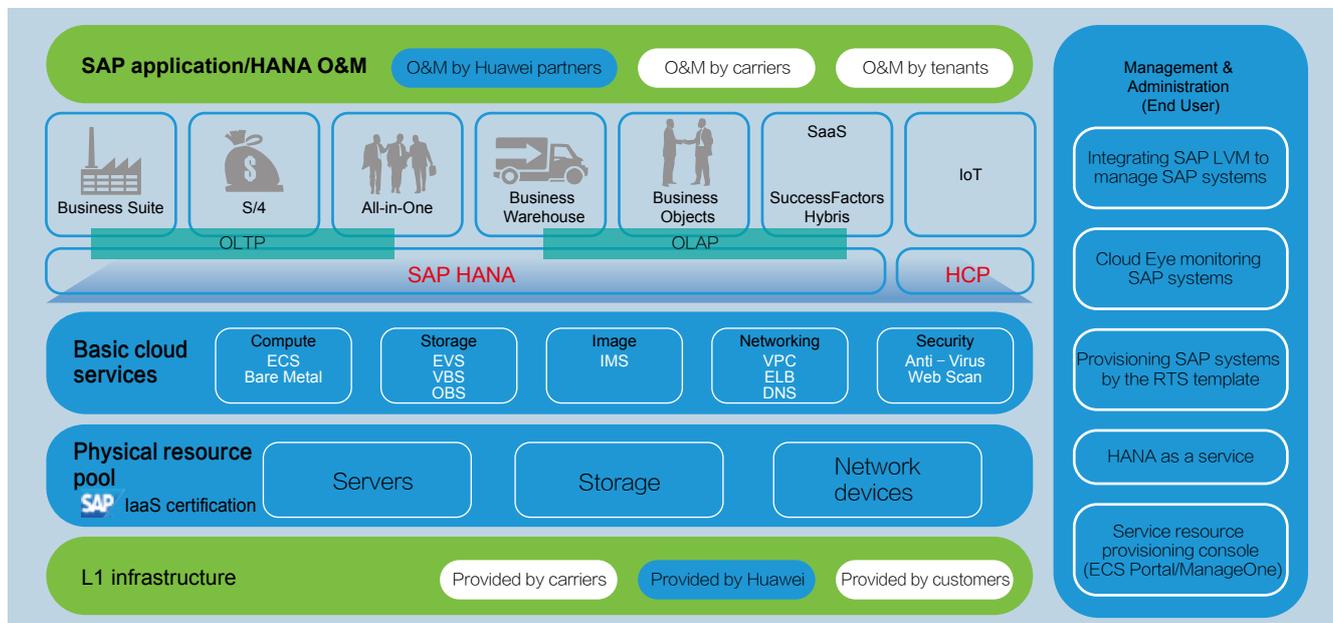
For Huawei, enterprises are of the utmost importance when it comes to cloud transformation, and customer requirements are always met thanks to the use of innovative technologies. Huawei provides deliverable and operable public, private, and hybrid cloud solutions through a unified and open cloud architecture. These solutions are open and secure, and offer an enterprise-grade performance and one-stop operations. Huawei also believes the construction of cloud ecosystems should create value for customers, and that each participant in the process should contribute.

As enterprises continue to move their mission-critical applications to the

cloud, Huawei has chosen SAP services as the starting point to construct SAP application cloud solutions.

Traditional Databases Face Bottlenecks

Although in recent years new IT technologies have been used constantly, the CAPEX on hardware and databases remains high and with a slow ROI. As a result, many customers are opting for OPEX-centric infrastructures. As more enterprises invest in cloud, the migration of mission-critical applications not only involves technological transformation but also embraces business



Overview of Huawei's SAP Application Cloud Solution



Wang Haobai

Huawei's SAP HANA cloud solutions are designed for IaaS and management, moving SAP applications and HANA in-memory databases to the cloud.

evolution. It is actually a process to popularize cloud technologies centered on openness and collaboration, free trials, and business.

In traditional databases, rolling out new SAP services was time-consuming. Preparing to deliver a service took about eight weeks on average (from the ordering of materials). Meanwhile, traditional applications such as CRM and SCM were non-real-time, especially in configuring the overall system and parameters and in scheduling resources. This meant that there tended to be an imbalance in SAP resource allocation between production, development, and testing systems. For instance, more resources were provided for the production system and less for the others. At peak business times, there was resource contention in the production system, but the resources in the development and testing systems were not fully utilized. To add more application servers to the system, they needed to be deployed manually. More nodes would be added to ensure the existing SAP business systems remained highly reliable. All of this led to what is known as 'server sprawl' and resulted in a complex, monolithic system, and the costs of maintaining the UNIX servers were huge. In addition to this, there was a burst of new services, which brought with it tough requirements for HANA in-memory computing, taxing the existing system beyond its capacities. The infrastructure was in urgent need of transformation.

Huawei's SAP Application Cloud Solution

Huawei's SAP application cloud solutions focus on IaaS and management, moving SAP applications and HANA databases to the cloud and integrating public and private cloud architectures. Either Huawei or the carrier provides the infrastructure for Huawei's public and hosted clouds. The infrastructure of the private clouds is built by the enterprises themselves. Huawei provides virtualization and IaaS layers, while SAP supplies applications and HANA databases that are implemented either by SAP's partners or integrators, to match Huawei's OpenStack cloud solutions.

With European industry software vendors and local system integrators, Huawei has built the largest commercial Open Telecom Cloud (OTC) for Deutsche Telekom. Through the OTC, Huawei can provide:

- 10G SRIOV HPC networks
- 56G InfiniBand high-speed bus + SSD high-performance storage
- HANA clusters that support eight nodes
- High reliability (ECS Auto Recovery)
- Snapshots and snapshot backup based on API; a backup recovery performance that reaches 500 GB/hour (intra-AZ)
- Servers with 940 GB memory/64 vCPUs
- HANA service provisioning by the Heat

Huawei and its partners have planned SaaS, which supports SAP and SAP IoT infrastructure based on HCP. SaaS benefits SAP HANA users in several ways. First, they can use Huawei and carriers' networks on public clouds, driving down TCO and CAPEX, as well as shifting from CAPEX to OPEX focus. Second, LVM adapters support SAP HANA, so users can manage all resource lifecycles by accessing standard interfaces. Moreover, SAP HANA can be put into use in the production environment directly after it has been verified in the testing environment. Lastly, multiple access methods (Workspace, IPsec, and MPLS) enable users to run business in real time.

Moving SAP applications to the cloud provides customers with more choices, and this is Huawei's top priority. Many large multi-national corporations have IT cloud architectures built on OpenStack, and Huawei solutions can migrate SAP HANA applications to the public cloud seamlessly. Current IT environments do not need to be rebuilt.

As of now, Huawei has five R&D centers dedicated to cloud computing, with an over 10,000-strong team. Huawei cloud services serve more than 2,500 large companies, and Huawei has built 420 cloud data centers in over 100 countries and regions, deploying over 2 million VMs. As the engine driving the integration of the public cloud infrastructure, Huawei FusionSphere OS is a commercial offering that is based on OpenStack and KVM/Xen, with a more flexible architecture. Its groundbreaking OpenStack cascading solution unifies the management of multiple data centers. OpenStack standard API interfaces can build an open ecosystem. Huawei's experience in cloud computing and SAP solutions has helped Huawei's SAP cloud solutions win the trust of many European customers. ▲

Huawei & Accenture Work Together to Build SAP Enterprise Cloud Solution

By Yu Hongbiao, Managing Director, Electronics and High Technology, Shan Yu, Strategy Consultant, and Kong Hui, Strategy Analyst, Accenture (China) Co., Ltd.

As digitalization technologies develop, traditional business is changing tremendously. Customers now have more access to information about goods and transactions, company strategies, and market competition, allowing them to choose the products and services that most suit their needs. Besides being convenient, digitalization also intensifies industry competition and makes the market more complex. Pressure both from markets and from customers is making companies more agile, so companies can now rapidly adapt to market changes and keep up with changing customer requirements. A combination of enterprise management and cloud computing serves as the strategic foundation of this transformation.

Challenges and Concerns in Enterprise Cloud Transformation

According to the latest Accenture research, CFOs and CIOs face the following challenges during company transformation:

- **How can companies reduce IT TCO and improve ROI?** While there are often tight budgets in IT, IT investments are expected to bring immediate benefits and long-term returns.
- **How should companies simplify complicated IT environments and configure resources efficiently?** Currently, company IT environments, from facilities and software to services, are too complicated and hard to manage and operate. Data centers also need flexible resource allocation to support their performance. Isolated resources and distributed management tools cause inefficient resource configuration and low usage. However, requirements for resources still exist, leading to high allocation levels.
- **How should companies enhance their data analytics, management, innovation, and competitiveness?** Companies need to constantly innovate their products, services, and customer relationship management using data analytics to understand and meet customer requirements.

Moving SAP systems to the cloud is the right answer to the questions above. According to Accenture, most customers plan to move SAP mission-critical applications to the cloud in two to five years. Tasks can be implemented rapidly at scale with ensured cost efficiencies. This will also empower agile companies to transform their IT, so that they adapt to changing markets and business requirements and embrace a digitalized future.

In moving SAP applications to the cloud, Accenture found customers' top concerns were as follows:

- Cloud transformation roadmap with attention to innovation
- Simple purchase mechanism

- Flexible deployment solutions and resulting improvements
- Economic benefit, security, flexibility, and more hosted solution options
- Shared risks, time-proof technologies, as well as value- and result-oriented contracts
- Proper technology tactics and dynamic evolution
- End-to-end solutions for services

Huawei & Accenture Team Up to Build an SAP Enterprise Cloud Solution

To propel SAP cloud transformation and fully utilize the benefits of cloud computing and SAP, Huawei and Accenture have formed a strategic partnership to build enterprise cloud solutions for SAP systems, integrating cloud infrastructure and industry practices. The solutions not only can support the core components and databases of SAP ERP, but they also help companies make the most of in-memory analytics, mobile applications, and other recent SAP technologies. Bringing together cloud computing, SAP technologies, and industry practices enables the Huawei-Accenture partnership to migrate the existing scheduling systems for SAP enterprise resources and deploy new ones as fast as possible, enhancing companies' agility, resource availability, and enterprise performance. The solutions meet various requirements, such as infrastructure upgrades, system migration, environment virtualization, and data protection, helping enterprises improve their performance at a lower cost.

SAP enterprise cloud solutions fully utilize the cloud infrastructure and provide higher availability, performance, and agility for SAP systems. Using Huawei SAP HANA Appliances and Accenture's solution to upgrade to the SAP S/4HANA platform, companies gain real-time business

To propel SAP cloud transformation and fully utilize the benefits of cloud computing and SAP, Huawei and Accenture have formed a strategic partnership to build enterprise cloud solutions for SAP systems, integrating cloud infrastructure and industry practices.

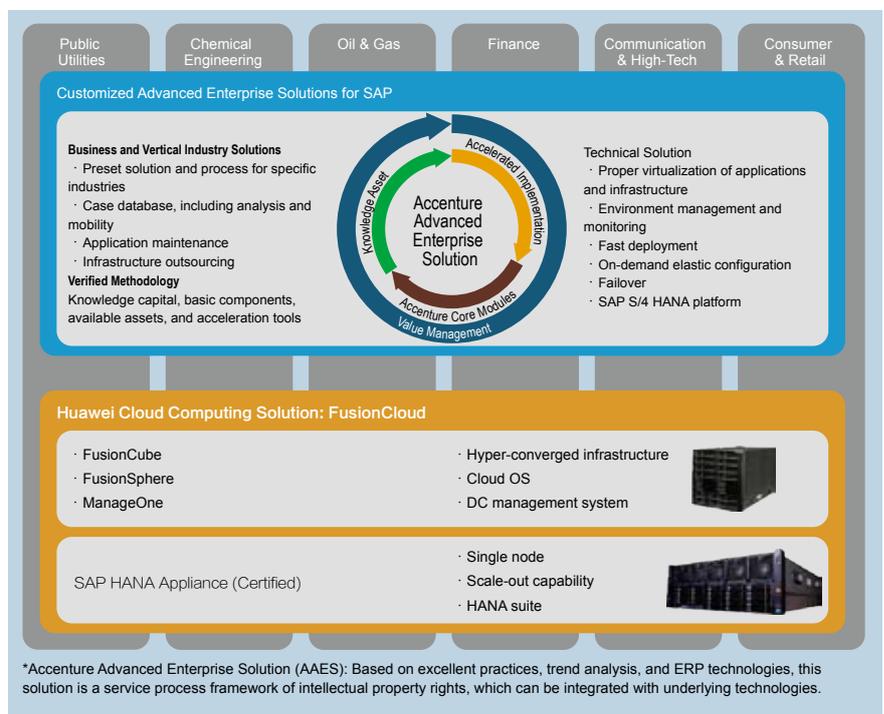
insight and make faster and better business decisions based on data analytics. The solutions also can manage software and infrastructure, simplifying the management of the system and applications. This can then be applied in various industries, including telecommunications, public utilities, oil and gas, finance, and retail.

As SAP's largest partner, Accenture provides various application software services for SAP systems, including consulting, system integration, migration, application maintenance outsourcing, and technical support. Accenture Advanced Enterprise Solutions (AAES) is a suite of pre-configured solutions for specified industries with diagnosis tools, delivery accelerators, on-site testing methods, templates, and assets. It can simplify and accelerate the replacement, migration, and deployment of new functions and modules. Huawei, as a leading infrastructure and SAP solution vendor, provides certified SAP HANA Appliances, including FusionCloud, which supports the SAP HANA platform, the hyper-converged infrastructure solution FusionCube, the E2E datacenter management solution ManageOne, and the cloud computing OS FusionSphere. Thanks to Huawei and Accenture's one-stop E2E services, customers can migrate their systems efficiently and securely with higher ROI from SAP infrastructure.

Creating Value for Customers

In the past two years, Huawei and Accenture's joint SAP solutions have served customers in different industries and countries.

Hunan Tobacco Industrial Company in China



Accenture Advanced Enterprise Solutions and Huawei FusionCloud Solution

has entrusted Huawei and Accenture to build an integrated ERP platform. This platform is based on SAP's latest S/4HANA system. Accenture is in charge of designing the platform, core business processes, and modules, whereas Huawei will provide HANA hardware. The customized SAP solution deals with the growing volumes of data and prepares the company for future business development.

In Indonesia, Huawei and Accenture won Delfi's bid, which requires enabling its SAP private enterprise cloud to support SAP S/4HANA. They built a cross-DC infrastructure platform featuring agility, high availability,

and fault tolerance with Accenture's planning and implementing methodologies for SAP and infrastructure, Huawei's SAP HANA Appliances, FusionServer, FusionSphere, and OceanStor.

Huawei and Accenture will continue to invest in their partnership, bringing their teams together and ensuring optimal customer relationships, delivery capabilities, and service range. By consolidating their experience in SAP, Huawei and Accenture will provide best-suited enterprise cloud solutions and create value for customers based on openness, collaboration, and joint innovation.▲

Huawei and SAP Deliver a Smart Grid Solution

By Yuan Qi, Senior Alliance Manager, Industry Marketing & Solutions Department, Enterprise Business Group, Huawei Technologies Co.,

Electric cars and microgrids have become popular in recent years as new sources of energy are explored to counterbalance our reliance on fossil fuels. The ways we produce and consume energy are also changing. In a grid, the generation, transmission, transformation, distribution, and consumption of power all need to be coordinated more accurately to meet new business requirements. Today, countries are increasingly choosing to develop smart grids to be more environmentally friendly and improve energy efficiency.

Although smart grids around the world are different, the benefits of AMI are well understood. By 2022, China plans to increase the coverage of smart power meters to over 70 percent, and in the U.S. the goal is 91 percent. The European Union requires its member states to improve coverage to over 80 percent by 2020.

Huawei & SAP Help Customers Gear Up for Smart Grids

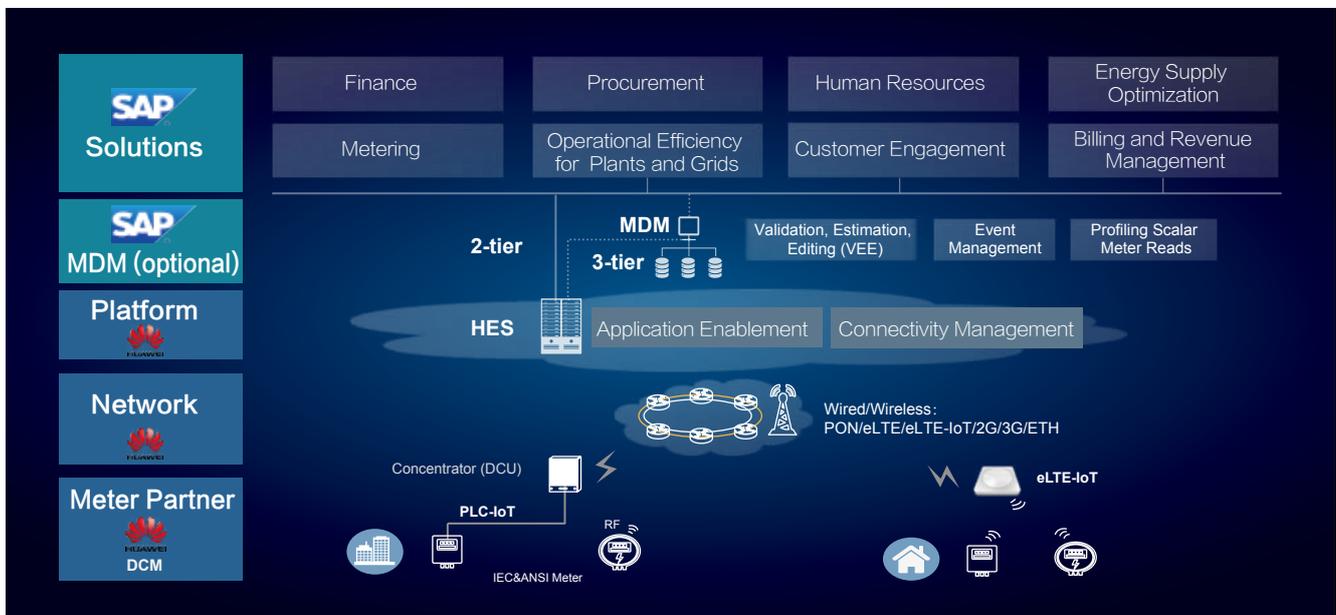
AMI is a key component of smart grids, and consists of smart meters, Measuring Communication Infrastructure (MCI), and a Meter Data Management System (MDMS). Its global market value expanded from USD 1.2 billion in 2010 to more than USD 7.6 billion in 2014, with a compound annual growth rate of 43.9 percent (source: China branch of the ARC consulting firm).

According to a report by GTM Research, *Utility AMI Analytics for*

the Smart Grid 2013-2020: Applications, Markets and Strategies, the cost of AMI analytics software (not including meter and communication architecture) will reach USD 9.7 billion by 2020. As markets develop, vendors who can provide integrated analytics solutions are better positioned for growing their business.

Against this backdrop, SAP, dedicated to business software, and Huawei, to IT infrastructure, have forged a strategic partnership to deliver AMI solutions to the global electric power industry. The AMI solution is divided into four layers according to the system architecture, namely application, platform, network, and terminal layers from top to bottom. An overview of the joint solution is shown in the figure below.

- Huawei Provides Flexible and Reliable ICT Platforms
- **HES platform:** Huawei provides connection management, simple billing, and O&M functions based on SIM/NoN-SIM. The platform collects



Huawei and SAP's End-to-End Joint Solution of AMI



Yuan Qi

Huawei and SAP have been collaborating on AMI solutions, helping customers build smart grids that deliver better energy efficiency at lower costs.

and classifies data from sensors and terminals using Big Data analytics, and then makes the data available to third parties through specified open interfaces. Developing smart grid applications based on the HES platform can tap the full potential of electricity facilities. For example, customers can predict electricity requirements with more accuracy, achieve better resource allocation at peak and off-peak hours, and analyze line loss more precisely.

- **Network layer:** In AMI projects, DCU data backhaul is often retransmitted through existing carriers' GPRS/3G networks or industry switching/PON/eLTE/Wi-Fi networks. To better meet customer requirements in a variety of different scenarios, backhaul methods are chosen according to the customer's region and conditions.

- **Terminal layer:** There can be difficulties when connecting different smart terminals — compatibility, gaining access to massive numbers of terminals, and installation. Huawei's answer is to use PLC-IoT, eLTE-IoT, and LiteOS to access smart terminals in different applications such as distribution automation, AMI, microgrids, and electric cars.

- **Various Applications Provided by SAP**

The application layer is provided by SAP, and consists of applications for CRM/charging, measurement data management, asset management, energy capital management, power interruption management, grid operation management and optimization, real-time applications, and prediction and analysis. SAP AMI integration components and IS-U provide key data management, intelligent meter readings, customer service management, company energy data management, and intelligent data analysis.

- **Time-Of-Use (TOU) pricing based on EDM:** Consumers are encouraged to use electricity more reasonably with different prices depending on whether it is a peak time on the grid. Electricity efficiency is also improved as resource allocation at peak and off-peak hours is now better balanced. For electric companies, TOU transfers overloaded electricity consumption, improves the usage of system devices, and conserves energy. Less money now needs to be invested in grids and operation costs are lower. For consumers, TOU allows them to adjust their electricity usage period and reduces electricity costs.

- **Real Time Pricing (RTP) based on EDM:** Electricity prices are divided into contract price and over-contract price. If electricity consumption does not exceed the planned volume, users are charged the contract price. Otherwise, consumers have to pay the over-contract price. So consumers can plan their electricity consumption more reasonably.

- **Peak load determination:** Reports show peak hours and consumer numbers. Requirement responses and efficiency management activities are triggered, with prices adjusted accordingly.

In addition, the system integrates and analyzes customers' energy consumption in real time based on any dimension or granular level, so that trends and problems can be identified. The system also classifies customers according to consumption behavior, identifies target groups for marketing/sales activities, uses bills and data to locate power theft and other fraud, and reduces line loss.

More Advanced Applications for Smart Grids

AMI technologies will play a key role in the future power distribution systems in smart grids. Information from meters can also be used to create and modify the feeder and load models used by DMS applications.

The AMI system (voltages, currents, device status) measures the strategic location of power distribution networks in minutes, which improves their predictability. Operators can make better decisions during crises and manage the system better. AMI communication infrastructure can also be used to connect the high-voltage devices on feeders. In addition to this, AMI promotes advanced monitoring and controlling applications, which are the foundation of future smart grids.

As AMI develops around the world, electric companies need to take open platforms and healthy ecosystems into consideration. As a world-leading provider of ICT solutions for smart grids, Huawei is building a collaborative ecosystem based on its open ICT infrastructure, combining its experience and collaboration with developers and partners in the electric power industry. Together Huawei and SAP have collaborated on AMI solutions, building smart grids and improving energy efficiency.▲



Huawei & SAP: Fostering a Strong, Healthy Ecosystem

By Charlie Zhang, Senior Director, Enterprise Business Group, Huawei Technologies Co., Ltd.

Although it feels like it was just yesterday, it has been a little over a year since the SAP-Huawei forum in Shenzhen. This was the first time that SAP invited a partner to co-name its forum, which speaks volumes about the intimate partnership between SAP and Huawei.

Since they announced their strategic partnership in 2014, Huawei and SAP have collaborated on joint solution innovation and sharing ecosystems.

Huawei SAP HANA Appliance solutions have evolved into an increasingly advanced portfolio. From the first SAP HANA Appliance solution launched in 2013 to the KunLun-based 12 TB SAP HANA Appliance solution launched at the end of 2016, these solutions have blossomed from blueprints into tangible products.

Great Value Driven by Close Collaboration

Huawei-SAP cooperation is displayed in ultra-large-scale SAP HANA

cluster projects for China Petroleum & Chemical Corporation (Sinopec) and China National Petroleum Corporation (CNPC).

The constantly expanding business of China's two petrochemical industry giants brings with it large increases in the data volume of their financial report systems and places higher requirements on data analytics. Huawei and SAP built SAP HANA Appliance solutions based on Huawei's FusionCube, which improve database loading performance by 60 percent through a more efficient main data warehouse. The two corporations are now able to gain more insight from their sales reports and financial analytics reports, and therefore make better-informed decisions that lead to more efficient operations.



Charlie Zhang

In 2016, Huawei and SAP worked together to build a shared ecosystem. In 2017, the two parties will continue to expand the ecosystem for customers and partners, encourage digital transformation, and empower customers to excel in competition.

Huawei's versatile and open x86 platform frees large companies from the enclosed IOE architecture, while also providing the same level of reliable disaster recovery to ensure stable system operation. Moreover, the platform offers 4x to 6x higher processing speeds, providing immediate support for customers' decision making.

This case highlights Huawei and SAP's exceptional technical capabilities as well as their tireless efforts to overcome difficulties. All these contribute to results that meet and exceed customers' expectations.

Jointly Building Ecosystem-Enabling Platforms

Huawei and SAP's team spirit encourages not only their customers, but also their partners.

"As early as 2003, HAND began to implement information transformation projects for Huawei. Huawei was too large. Huawei and HAND's cooperation with SAP HANA would allow them to be present in both the United States and China. This collaboration opportunity should be treasured," noted He Dengpan, Marketing Director of HAND Enterprise Solutions Company.

As one of SAP's important Chinese partners, HAND is well-known for providing consulting services for ERP implementation. The service department of Huawei's Chinese Enterprise BG in charge of SAP HANA cooperation contacted SAP's global partnership alliance located in the USA, United VARs, whose recommendation led Huawei to get in touch with HAND.

In November 2016, Huawei's Hangzhou Research Center launched the Computing Innovation OpenLab. The lab serves as an open collaboration platform, which connects IaaS solution partners (horizontal partners) and partners focused on industry mission-critical applications (vertical partners). Partners include Intel, SAP, Oracle,

United VARs, HAND, China Postal Savings Bank, and Nantian.

Huawei and HAND established a co-innovation lab and a collaboration framework together with SAP and United VARs.

Currently, HAND has over 20 SAP-certified industry solutions. Its collaboration with Huawei improves its solutions, making them easier for clients to deploy and optimize, and simplifies O&M. Moreover, their collaboration is mutually beneficial: SAP partners can learn more about Huawei's enterprise culture and technologies while Huawei hardware sales can be bolstered. According to industry experience, the costs of consulting service delivery, software, and hardware of a SAP HANA project follow a 3:1:1 ratio. For Huawei's service partners, this is a good opportunity to expand their business.

Huawei and SAP have invested massive resources in customer and partner ecosystems. Huawei's Chinese Enterprise BG set up a specific Huawei SAP joint solution sales team. It also has released an incentive plan for solutions partners to encourage partners to build and sell better joint industry solutions. Regional SAP promotion led by Huawei looks to boost sales, covering core first-tier cities, including Beijing, Shanghai, Guangzhou, Hangzhou, Nanjing, and Shenzhen. It also sponsors marketing activities of SAP partners, including Hartung, Jingtong, HAND, Kintiger, Shenyang Institute of Automation, and China National Building Material Company.

Huawei's Chinese Enterprise BG and SAP have teamed up to build sharing ecosystem through organized sale structures, standard alignment with customers, and joint exploration.

2017 is a critical period for companies to explore new business opportunities and embrace digital transformation. Huawei and SAP, drawing upon their strengths, will continue to support a healthy ecosystem for customers and partners, encourage digital transformation, and empower customers to achieve their goals. ▲

Fonterra Tackles Long-Term Business Evolution with Ease



Fonterra Co-operative Group Limited (Fonterra), based in Auckland, New Zealand, was established in October 2001 following the merger of the country's two largest dairy cooperatives. It has more than 17,000 employees now and is New Zealand's largest local company. The company exports dairy products accounting for approximately 30 percent of the world's dairy markets. With sales revenue exceeding USD 15.6 billion, Fonterra is the world's largest dairy exporter.

Fonterra's Long-Term Business Evolution Requirements

As a world-leading dairy company, one of Fonterra's core advantages is a holistic, fully integrated supply chain. In New Zealand, Fonterra owns over 10,000 suppliers, and a transport fleet consisting of more than 400 milk tankers. Around the world, Fonterra has over 80 dairy factories, producing dairy products sold to more than 100 countries. To support such a large number of suppliers and customers, Fonterra has been dependent on the enterprise IT system.

Currently, Fonterra's entire live network services are hosted in the data center owned by Datacom, the largest local ISP. The two companies have been cooperating closely. Fonterra's core production applications are deployed on SAP R3 products and Oracle database, such as the Supply Chain Management (SCM) system, financial system, and customer and order management systems. However, this set of IT architecture is under tremendous pressure. On the one hand, the bottom layer of Fonterra's live network is deployed on the traditional Oracle-based database, which has high CAPEX. Moreover, the data processing performance of traditional databases is highly dependent on the external centralized storage, providing limited real-time processing capability, and is

highly susceptible to performance bottlenecks. It's increasingly difficult to meet Fonterra's business development requirements. However, in 2015, SAP released its next-generation enterprise business suite, SAP S/4HANA, based on the HANA platform. Therefore, when upgrading the SAP-based enterprise applications and purchasing new IT hardware platforms, Fonterra needs to consider the long-term service evolution and SAP product requirements, to ensure that the new enterprise IT system achieves the optimal balance between performance, reliability, CAPEX, and follow-up O&M.

SAP HANA is a high-performance, real-time data computing platform launched by SAP based on in-memory computing technologies. In the traditional transactional database architecture, programs do not support real-time business applications for massive data processing. SAP HANA puts the data to be processed in dynamic memory and unleashes the enormous power of real-time service applications. Huawei has worked closely with SAP to not only present the SAP HANA Appliance, but also develop a rich array of industry solutions and best practices based on SAP HANA, thereby simplifying the SAP HANA implementation for enterprises and playing an indispensable role in service development assurance.

Huawei helped Fonterra deploy an efficient financial and supply chain management system based on SAP HANA, taking Fonterra to a new level of business agility and productivity.

Advantages of Huawei Solution

Having fully considered Fonterra's existing IT system and future demands, Huawei provides the SAP HANA Appliance solution based on Huawei's 5885H V3 4-socket rack server. The Huawei SAP HANA Appliance has been jointly developed by Huawei and SAP. Its advantages:

- **Shatters performance bottlenecks:** SAP S/4HANA is an industry-leading in-memory database platform that requires a high-performance hardware platform. The 5885H V3 appliance solution is unique in that it uses Huawei's ES3000 PCIe SSD card for SAP HANA database acceleration. The ES3000 boosts the SAP HANA I/O performance by 3x, allowing the SAP HANA to effortlessly address the high-performance requirements.

- **Anticipates future needs:** Huawei SAP HANA Appliance solution has high availability and flexible scalability, which enables it to easily handle any workload, rapidly respond to a changing service environment, and implement agile production for customers, greatly improving production efficiency.

- **Secures services and data:** The highly reliable hardware platform and solution-level reliability design of Huawei SAP HANA Appliance solution ensure the security of system data and services, minimizing downtime caused by platform faults and optimizing the overall system performance.

- **Drives down CAPEX:** Huawei 5885H V3 server is based on the x86 architecture, which is designed and manufactured with industry standard server components, avoiding the high purchase and maintenance costs that arise with closed-architecture UNIX servers.

In addition, Huawei has extensive experience in SAP HANA's system deployment and maintenance. Teaming up with SAP and Datacom New Zealand, Huawei has helped Fonterra build a best-in-class computing platform backed by an optimal service platform and service ecosystem.

The superb performance of SAP HANA Appliance, as well as the synergy of the partners, has proven that the Huawei SAP HANA Appliance is the best-choice solution for Fonterra.

Driving Greater Value for the Customer

Huawei and SAP have teamed up with Datacom New Zealand to help

Fonterra has implemented a simple-to-use, highly scalable and efficient financial and SCM system based on SAP HANA. The solution delivers easy and speedy real-time payment analysis, efficient account checking and insightful decision making, taking Fonterra to a new level of business agility and productivity.

For example, the three companies work together to complete a Proof of Concept (PoC) test to help Fonterra establish a set of enterprise application benchmarks. They also make full use of the performance and reliability advantages of Huawei products, to construct an optimal solution that meets Fonterra's the current service requirements. In addition, the solution supports Fonterra's business optimization in the future, matching its long-term business evolution requirements. After migrating the SAP HANA Appliance to the live network, it

was projected that Fonterra would save USD 1 million in operating costs each month.

After the stringent 3-month PoC test, the system officially went live in Q4, 2016. Since all indicators fully met its requirements, Fonterra decided to continue cooperating with Huawei and its partners to carry out the Phase-2 system upgrade and reconstruction. "Looking forward, Fonterra is planning to implement another joint solution from Huawei and Datacom that runs on SAP HANA," said Andrew Faid, Technical Lead of SAP Projects, Global Information and Solutions Group, Fonterra. "The new solution will support critical decision making through agile analytics for aggregating dynamic business data from multiple clouds and non-traditional sources."

This project helped Huawei receive an Honorable Mention in the Special Award category of the *SAP HANA® Innovation Awards 2017* at SAPHIRE NOW, the world's premier business technology event and largest SAP customer-run conference, held in Orlando, Florida. Huawei was honored with the prestigious award in recognition of its leadership and contribution towards the SAP HANA platform and technology solutions. Looking ahead, Huawei plans to continue investing in innovations for SAP HANA industry-specific solutions, as well as collaborating with the partners, to provide more high-performance solutions for the customers. ▲



Winning the SAP HANA Innovation Awards 2017 at SAPHIRE NOW

Left to Right: Alan Nehemia, Huawei Enterprise Channel Director (NZRO), James Wang, SC, Huawei U.S. R&D Principal Architect, and John Kirkman, Datacom Senior Architect



BYD Auto Builds a Standardized, High-Performing Smart Factory

Governments around the world are advocating the development and usage of EVs and auxiliary facilities. As the lifetime of batteries keeps increasing and electric car charge points grow in popularity, EVs have now become one of the main transportation options. Compared with natural gas-fueled vehicles, the electric/hybrid vehicles' user experience is as good, if not better, especially with its cost advantages brought by the hybrid fuel-electric technology. Therefore, more and more automakers are joining the game, including some household names. However, to name one EV company that has the strongest brand presence and largest market share in China, it has to be BYD Auto.

IT Challenges Become a Barrier on BYD Auto's Path of Growth

With relentless efforts and continuous innovation, Chinese automakers are emerging in the world market in recent years. As a leading EV manufacturing company, BYD Auto insists on building an independent brand, focuses on home-grown products, and adheres to an independent development model. It envisions building a 'world-class Chinese automobile brand.' Now it has grown as the most innovative and cutting-edge automobile brand, leading the world EV market with unique technical strength.

The manufacturing industry is somewhat special, compared to other industries. During the automobile production process, there are hundreds of thousands of procedures and details, from the initial industrial design to parts procurement, assembly, commissioning, and rolling off the assembly line. Therefore, as more and more IT systems are applied in the manufacturing process, BYD Auto's original system faces multiple challenges. The systems run independently of each other, pretty much in a silo fashion. There are countless data sources, and no means are available for real-time information sharing.

Huawei SAP HANA Appliance solution has empowered BYD Auto, a leading Electric Vehicle (EV) maker in China, with the desired speeds and agility in responding to demands.

In addition, most of BYD Auto's customers are world-leading multinational corporations, who implement the strictest manufacturing standards in the industry. They want to effectively control information such as real-time productivity rate, yield rate of the product lines, and stability of the fabrication process. However, the traditional operating model can barely meet the requirements of different customers and different products.

Digital Transformation Empowering Professional Services

BYD Auto is clearly standing at the ICT transformation crossroads. To actively respond to market changes and to support long-term development, BYD Auto finally chose the SAP ME solution and Huawei SAP HANA Appliance solution. Integrated with its existing core system, the SAP Enterprise Resource Planning (ERP) system and the newly deployed SAP Extended Warehousing Management (EWM) system, SAP HANA Appliance solution constructs a standardized, streamlined, and transparent comprehensive production execution management platform with stable, reliable, secure, and efficient performance. The solution ensures the traceability and real-time control during the whole production process, shortens the production time, improves productivity, and reduces the supply chain costs, maximizing the efficiency of the production line. In addition, by integrating and coordinating the business units, the solution connects all business groups within BYD Auto, optimizing the business processes and improving operation efficiency. The enterprise operation and management become more refined, providing a consolidated foundation for BYD Auto's sustainable and healthy development.

Huawei provides two sets of SAP HANA appliance systems. One system is deployed with the 5885H V3 mission-critical server and 2 TB memory, used in BYD Auto's development and test environment. The other system is deployed with the 8100 V3 mission-critical server and 4 TB memory, used in BYD Auto's production environment. Huawei SAP HANA Appliance solution provides outstanding performance and rock-solid reliability, can be used in various application scenarios such as databases, ERP, business intelligence analysis, Big Data, and virtualization. It is positioned for large-sized enterprises with complex service requirements. The outstanding general design of Huawei servers provides sufficient inner space and better heat dissipation capability, ensuring the efficient running of multiple services.

During the project implementation process, Huawei and SAP provided a tailor-made overall plan and step-by-step solution implementation according to BYD Auto's business requirements. First, the solution

upgrades and optimizes BYD Auto's original supply chain platform, upgrading the ERP system with the multi-language function, deploying the enhanced EHP6 package that supports localization, and upgrading the warehouse management system to the SAP EWM 7.02. In addition, with the implementation of SAP ME 6.0, the solution integrates SAP MII (warehouse integration and intelligent management software) with BYD Auto's original ERP system and EWM system, connecting the original warehouse business system, the auto product line equipment system, and the latest warehouse management system.

Paving the Way for BYD Auto's New Business Growth

After adopting the Huawei SAP HANA Appliance solution, the response time of some BYD Auto's important services is slashed from 1 to 2 minutes to 10 seconds, while the integrated production query time is shortened to 1/10. The target of quick response has been achieved. In addition, after analyzing the historical inventory data, material tracing data, and production yield rate, the solution enables real-time sharing of production data. It has empowered BYD Auto with the desired speeds and agility in responding to demands, and addresses BYD Auto's requirements for leveraging high-performance computing to drive down manual intervention and cost and improve supply chain responsiveness. The solution helps BYD Auto stay on the cutting edge amidst the fierce competition. It has achieved following management objectives:

- Optimizing the production processes to seamlessly integrate workshops and warehouses
- Automated production line management, improving the overall production efficiency of production lines
- Traceable production data in the whole process, realizing production process visibility and transparency
- Clear, intuitive presentation of production data analysis in charts and tables, facilitating production data sharing and internal management and tracking

As the competition of Chinese automobile market intensifies, BYD Auto is facing more threats from rising competitors. BYD Auto will press ahead with business transformation by harnessing digitalization measures, deepen the integration of SAP ME system and ERP, promote lean production, and focus on the customer requirements from different industries, thereby responding quickly to market changes and synergizing information with forward-looking business insights. ▲

CEPSA Builds a High-Performance SAP HANA Database System

CEPSA is the second largest petroleum and chemical company in Spain, and one of the top-3 lubricant manufacturers in Europe. As a leader of Spanish industry and trade, CEPSA has long been devoted to finding and drilling for oil and gas in Spain, Algeria, and Argentina.

Urgent Need for Effective Data Analysis Methods

Concerns about climate change, clean energy, and new energy have become the center of industry focus. The United Nations (UN) proposed a global incentive plan to drive sustainable energy development, aiming to popularize clean energy by 2030. This clean energy plan includes three objectives: First, popularize clean energy worldwide; second, double the speed of improving energy efficiency; third, double the percentage of renewable energy around the globe.

As a pioneer in the Spanish and European traditional energy industry, CEPSA is dedicated to addressing climate change and developing new energy. Tasked with the mission of making structural adjustments to better fit into the future of the energy industry, CEPSA identified IT as a key factor to boost productivity. Crude oil intelligent exploration, production, a management control system, and an intelligent financial analysis system are the focus of its information system construction.

Because of Big Data, information has become a main source of enterprise competitiveness. How to analyze Big Data in order to maximize insights and value has become a major concern for the information managers and CIOs of modern enterprises. CEPSA operates at every stage of the petrochemical value chain. During crude oil exploration and production, CEPSA processes massive amounts of data; therefore, it has an urgent need for an effective data analysis solution to improve its exploration and production efficiency.

- **Traditional databases' poor performance:** As CEPSA's business grew rapidly, traditional databases failed to meet ERP system requirements and were holding back business development.

- **High procurement and maintenance costs:** CEPSA's petroleum database system had a traditional IOE structure using another vendor's computers that were expensive and costly to maintain. Take one of its low-end UNIX servers as an example. The price of a single server is higher than that of six x86 2-socket servers, while having only 1/3 of the CPUs. The maintenance costs were also high. CEPSA needed to pay for

warranty services or licenses for UNIX servers, high-end storage, and Oracle databases every year. Maintenance fees for four years were equal to the cost of a new UNIX server. Additionally, traditional UNIX servers and high-end storage architecture require high maintenance skills, which increase the maintenance burden for the IT O&M department.



Tasked with the mission of making structural adjustments to better fit into the future of the energy industry, Compañía Española de Petróleos S.A. (CEPSA) identified IT as a key factor to boost productivity. Intelligent crude oil exploration, production, a management control system, and an intelligent financial analysis system are the focus of its information system reconstruction.

High-Performance and Reliable Solution

CEPSA's IT team talked with multiple vendors to seek a cost-effective solution that met its business requirements and could be expanded flexibly. CEPSA found that Huawei's solution not only has exceptional performance, but is also flexible and reliable. Telefónica, the project integrator, is notoriously strict in choosing hardware providers. Huawei delivered a comprehensive solution in just two weeks. Its quality products and services are highly recognized by both CEPSA and

Telefónica.

As early as 2012, Huawei began strategic collaboration with SAP, the leader of the enterprise applications industry. Together, they have developed and released SAP HANA solutions based on Huawei servers. Huawei has also provided SAP HANA solutions for petrochemical industry giants, such as China Petroleum & Chemical Corporation (Sinopec), China National Petroleum Corporation (CNPC), Turkish National Oil Corporation (TPAO), and Spain's Gas Natural Fenosa.

Based on extensive industry experience, Huawei has provided SAP HANA solutions for CEPSA, including mission-critical 8100 V3 and 5885H V3 servers, S5500T converged storage, enterprise-grade switches, and SAP HANA to build a reliable and stable ERP system.

• High-Performance Devices

The 8100 V3 mission-critical server supports up to eight Intel® Xeon® E7-8800 V2 series processors. It delivers superior computing and scalability capabilities, and it is ideal for large mission-critical applications and server consolidation and virtualization. CEPSA uses two 8100 V3 servers in its production environment. Each server uses eight Intel® Xeon® E7-8880 V2 series processors and a 6 TB-memory Huawei SAP HANA Appliance. These servers support its core business production system and optimize the write performance of SAP HANA log volume with 800 GB ES3000 V2 PCIe SSDs.

The 4-socket 5885H V3 server supports four Intel® Xeon® E7-4800 V2 series processors. Each processor now supports up to 15 cores rather than 10. The maximum cache is increased from 30 MB to 37.5 MB. The processor performance is double that of the Westmere-EX (E7-4800). CEPSA uses one 5885H V3 server in its development and testing environment. The server uses four Intel® Xeon® E7-4880 V2 series processors and a 1 TB-memory Huawei SAP HANA Appliance, greatly improving their development and testing efficiency.

• High-Reliability Design

The 8100 V3 provides chip-level fault-tolerant features, such as automatic recovery for processors and links, and supports 60 RAS features, ensuring stable system operating. Reliability-improving technologies, such as DIMM hot swap, memory mirroring, memory



CEPSA demands a solution which can meet current requirements and anticipate future business growth. Huawei delivered a comprehensive solution in just two weeks. Its quality products and services were highly recognized by the customer and project integrator.

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sparing, and PCIe hot swap are also supported. Key components, such as PSUs, fan modules, and hard disks, are hot-swappable without the need to open the chassis, ensuring continual system operation.

Huawei servers are held to higher manufacture quality standards than the industry average, including standards for production materials acceptance, assembly, and factory testing. In addition, Huawei servers are manufactured based on telecom equipment production platforms to deliver high quality. For example, Huawei performs not only common burn-in tests, but also full disk read/write tests, which are stricter than read or write tests on random sections. Huawei's high standards throughout the entire production process deliver a 15 percent lower failure rate than industry average, ensuring stable service operations for CEPSA.

- Lower TCO

Based on x86 architecture, Huawei 8100 V3 and 5885H V3 servers use industry standard server components, which do not have procurement and maintenance costs that are as high as enclosed UNIX servers.

The modular design of the 8100 V3 supports DIMM hot swap and tool-free maintenance, which streamlines operation and management and ensures faster deployment and lower TCO.

As for expansion capability, the 8100 V3 supports up to 192 DIMMs, 24 x 2.5-inch SAS/SATA/SSDs, 16 PCIe cards, and next-generation 40G/100G Ethernet networks, whose flexible expansion capability can meet changing service requirements. In addition, Huawei 8100 V3 and 5885H V3 SAP HANA Appliances can be scaled out to SAP HANA clusters, improving system performance and capacity by adding servers.

- Extensive Delivery Experience

As a vendor capable of delivering ultra-large-scale SAP HANA clusters, Huawei has deployed 136 TB clusters for China National Petroleum Corp (CNPC) as well as 15 server nodes and 30 TB clusters for the SAP Research Institute in China. Thanks to its close partnership with

SAP and its own strong technical capabilities, Huawei's global service support team can solve technical problems specific to HANA systems, some of which may arise because of SAP HANA clusters' ultra-large scale.

Stable and Reliable New-Generation Database System

In 2015, CEPSA decided to replace its original architecture and build a stable and reliable new-generation database system with Huawei's 8-socket 8100 V3 mission-critical servers and 4-socket 5885H V3 rack servers to run two 6 TB in-memory database systems.

- Database Performance Improvement

Huawei servers greatly enhance CEPSA's ERP system performance, which has led to an improvement in production efficiency. When processing OLAP transactions, CEPSA's financial analysis system has doubled the number of transactions it can process, meeting strict service requirements.

- Highly Reliable System

Leveraging a comprehensive RAS design and rigorous production quality control, Huawei servers achieve a failure rate 15 percent lower than industry average, guaranteeing that the system runs reliably.

- Lower TCO

Based on the x86 architecture, Huawei uses industry standard components, greatly reducing costs for procurement and future capacity expansion.

- All-Around Assurance

Leveraging Huawei's extensive SAP HANA delivery experience and service assurance teams worldwide, Huawei provides comprehensive services for key events, ensuring secure and reliable system operation.

After one year of stable operation, Huawei's SAP HANA Appliance has been recognized by CEPSA. CEPSA named Huawei as the solution provider to help it expand the SAP HANA system from 13 TB to 30 TB in 2016. ▲

Deadlines for submission

Round 1
Now until August 10, 2017

Round 2
September 1, 2017
to December 10, 2017

ICT
INSIGHTS

Tell Us a Story

About Your Success in
Digital Enterprise Transformation

Digital transformation has become industry's engine of change. Enterprises use new ICT to improve efficiency, create innovative products, and provide better customer service. This has resulted in a number of success stories about greater customer satisfaction.

Do you have such stories? Will you share them with us?

We want you, the CIOs,

the practitioners and drivers of digital transformation, to describe how new ICT helped your company:

- 1. Improve operating efficiency:** How did you use digital technology to optimize workflows and improve enterprise agility?
- 2. Drive income growth:** How did digital technology help create new revenue sources by, for example, improving customer experience and setting new pricing models?

Start with business challenges and transformation strategies, or refer to a specific digital transformation project. Tell us about measures you introduced, results and experiences, or your thinking and ideas about digital transformation.

If you have a digital transformation project on which you have collaborated with Huawei, please describe Huawei's role in your company's digital transformation, the value that Huawei brought to the project. Please tell us your opinion of Huawei.



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CNPC Builds the World's Largest SAP HANA Cluster System

CNPCC is a major oil and gas company. Ranked third in Fortune's 2016 Global 500, CNPC is a comprehensive energy business focused on oil and gas exploration and production, oil project construction and services, oil machinery manufacturing, and new energy development. Aiming to become a world-class, integrated energy company, CNPC prioritizes innovation-driven growth and quality productivity. To expedite this transformation and qualify as world-class by 2020, CNPC needed a system overhaul that boosted competitiveness and profitability, as well as position it to be a leading environmental advocate.

Rapid Data Growth Bottlenecks ERP

As competition intensified and the company grew, CNPC Operations and Management (O&M) had to become more efficient. Enterprise Resource Planning (ERP) is critical for strategy and business decisions. With deployed ERP information and other in-house CRM and SCM systems, business intelligence analysis software extracts data and filters it to build models. Such models are the basis for operations reports that help enterprises better manage themselves. However, these traditional data processing models were much too slow for Big Data processing. Enterprises lacked the speed and agility to seize opportunities in a rapidly changing landscape. They had to improve ERP efficiency for faster and better visualization and analysis of the massive volumes of data from various phases of production and operation.

CNPC's BW system comprised sectors including exploration, oil fields, refinery, sales, pipelines, and equipment manufacturing of the entire group. The system also contained the financial report systems of nearly 100 subsidiaries. The ERP system had to accommodate rapid data volume growth while consolidating and coordinating tasks. However, this growth taxed the Oracle-based BW system beyond capacity because of limited read/write speeds. New BW technologies were needed for Big Data analytics in order for the ERP system to run more efficiently and keep up with CNPC's expansion.

To meet this goal, CNPC picked ERP application integration, one of the three major digital transformation projects, as the core component of its general IT plan. By building a new ERP system, CNPC would foster a closed-loop, E2E management environment that covered strategy development, planning, execution, control, and evaluation. This system would facilitate coordination and data sharing between departments, better managerial productivity at all levels, and thus boost O&M efficiency across the entire corporation.

Huawei's Converged Infrastructure Revolutionizes CNPC's Experience

CNPC Beijing Richfit Information Technology Co., Ltd. is a wholly owned subsidiary of CNPC and a key technical support for CNPC's digital transformation. CNPC Richfit prioritizes user experience and long-term engagement in CNPC digitalization, providing services such as ERP consultancy and implementation. Richfit is a major service provider for information demands arising from CNPC's rapid growth.

To remove ERP performance bottlenecks, Richfit took advantage of the latest industry technology and began system migration to the SAP HANA platform. Smooth and stable running at this scale requires high-performance, reliable infrastructure. After multiple rounds of technical discussion with world-class integration solution providers, Richfit finally chose Huawei as the standout in everything from solution reliability, low latency, high bandwidth, to manageability, scalability, integration, and service support. Through in-depth collaboration, Richfit and Huawei presented an ERP and decision making solution featuring Huawei's SAP HANA Appliance.

The Huawei SAP HANA database runs on FusionCube, a converged infrastructure appliance. It leverages Huawei's innovative software and hardware platforms combined with the cutting-edge SAP HANA in-memory database software. This synergy bolsters database loading performance and enables large-scale concurrent access and Big Data analytics. By removing the bottlenecks in Big Data processing, the solution revitalizes CNPC's ERP system. CNPC is now able to tap into valuable data, make better-informed decisions in real time, speed up services, boost operational efficiency, and drive down OPEX.

Tailored to CNPC business demands, the 63-node SAP HANA Appliance solution, composed of 11 chassis, features Huawei FusionStorage. This unique distributed storage engine complements other

Huawei's holistic technical support has been instrumental for the deployment that enabled China National Petroleum Corporation (CNPC) to boost operational efficiency, tackle Big Data challenges, mitigate information security risks, and more.



features that are brought together to form the world's largest SAP HANA cluster, among them:

- Distributed storage improves SAP HANA database loading performance by 60 percent, meeting CNPC requirements for high-performance database writes.
- The Huawei-developed high-performance PCIe SSD card, ES3000, accelerates HANA log volumes for fewer performance bottlenecks. Data persistence latency is slashed to 150 μ s, 50 percent to 75 percent less than the industry average. Appliance I/O performance is improved fivefold, reducing 60 percent of CNPC investment in system hardware.
- The 56 Gbit/s InfiniBand network provides seven times the storage network bandwidth to support over 1,000 concurrent tasks, meeting CNPC's demands for large-scale concurrent access.

This cluster is a powerful infrastructure for migrating the CNPC BW system to the SAP HANA platform. The Huawei SAP HANA Appliance was recognized by CNPC for its high reliability and performance. By June 2017, CNPC expanded its SAP HANA cluster system to 135 TB.

Huawei's Holistic Support Means Greater Value for CNPC

The ERP and decision making platform solution running on Huawei's SAP HANA Appliance now serves CNPC's diverse business sectors. This collective decision support platform supports integrating, analyzing, and visualizing data for all CNPC user decision making. The platform also

summarizes enterprise data and generates analysis reports to facilitate operational efficiency.

Huawei has supported every step of CNPC deployment of the world's largest SAP HANA cluster system. Even before project implementation, Richfit's years of experience with BW and SAP ERP are leveraged to preinstall and integrate its ERP application templates into Huawei's SAP HANA Appliance. This co-innovation dramatically shortened implementation and delivery period of ERP integration projects.

During implementation, Huawei arranged for customer meetings with SAP HANA experts about service scenarios and solutions, and established a collaboration model of solution and delivery assurance teams. The teams comprised product managers, R&D engineers, technical directors, and application service providers. The solution team was in charge of solution planning and training the delivery assurance team, who in turn saw to the successful delivery of the project.

After migration was completed, the new system went live with a complex query time of 3 seconds for 12 billion data entries, down from 17 seconds. Other indicators, such as I/O bandwidth and data warehousing, vastly outperformed the traditional architecture. The solution eliminated performance bottlenecks in CNPC's oil and gas exploration, development, refinery production, and refined oil supply chain management. Thanks to its newfound competitiveness, CNPC now leads the energy industry.▲

Huawei & SAP Co-Innovate Digital Core Systems Based on SAP HANA

Established in 1987, Huawei embraces innovation and collaboration. The leading Information and Communications Technology (ICT) provider is an established Chinese brand whose solutions, products, and services span more than 170 countries and regions, serving over a third of the world's population. As SAP's global strategic partner, Huawei builds robust digital core systems based on the SAP HANA real-time application platform and innovative Huawei SAP HANA Appliance.

Huawei's technology innovations have made waves across enterprise networking, data centers, cloud computing, and high-end storage. Thanks to a balanced global coverage and pipe strategy, Huawei progressed in its main service domains in H1, 2016 for 40 percent annual growth in revenue. Huawei continues to grow its hundreds of millions of revenue dollars by leveraging IT technologies and business growth into digital transformation strategies and a joint operating system. Its mission is to improve customer experience, make joint operations more efficient, and inspire organizational passion with responsiveness. A digitalized Huawei means flattened management and better operations.

Key to Digital Transformation: Big Data Operations

Today's enterprises diversify and go international, and their IT systems

collect exponential volumes of data. The data is generated from production, operations, R&D, and sales and serves as the basis for decision making. However, traditional IT architecture cannot analyze such volumes and is gradually bottlenecked in functionality and performance.

Huawei examined this growing issue, and decided to work with SAP to innovate the service platform based on SAP HANA and Huawei-SAP HANA Appliances. This partnership with the provider of industry-leading high performance Big Data platforms helps enterprise customers:

- Efficiently manage and analyze massive volumes of service data thanks to faster report generation and performance analysis.
- Accelerate mission-critical supply chain, integrated delivery, manufacturing, and finance applications with a display of capital, logistics, and information flows for analysis and real-time decision making.



As SAP's global strategic partner, Huawei builds robust digital core systems based on the SAP HANA real-time application platform and innovative Huawei SAP HANA Appliance.

- Streamline internal systems and leverage IT technologies and business growth for development towards strategic alliances and digital transformation.
- Revitalize the organization for global expansion and explosive growth in revenue.

SAP HANA Best Practices: Joint Innovation

The Huawei SAP HANA project aims to accelerate computing for the supply chain, integrated delivery, manufacturing, and finance. Real-time order tracing and visualization, delivery site visualization, responsive order control center, and faster financial reporting are the key features of the SAP HANA system. Thanks to such a system, Huawei's own E2E operation capabilities have undergone all-round improvement, from high-quality contract signing, rapid and accurate delivery, to fast contract collection.

The project stands out in dealing with complex transaction data in addition to its in-memory database functionality. From the professional implementation relying on third parties to self-implementation by internal business departments, SAP HANA flexibly meets diverse service requirements. Huawei has since used SAP HANA to:

- Increase payment success over 200 times by automating the verification of millions of transactions, for better capital security and payment efficiency.
- Analyze the first pass yield of device manufacturing in real time and 144x faster by refining service scenarios and mining massive amounts of data, for visual monitoring of operations.
- Integrate supply chain data of over 10 systems, visualize E2E orders, and query supply chain reports in seconds, for a real-time supply chain.

During the project, SAP technical experts joined the Huawei team to discuss key technologies and problems. This mutually beneficial collaboration led to a successful demonstration of technical strength and implementation experience.

Digital Transformation Catalyst: Revitalizing Enterprises

SAP HANA's advantages in in-memory computing, real-time data processing, and streamlined architecture complement Huawei's hardware and ICT capabilities. With SAP HANA real-time applications at its core system and the Huawei SAP HANA Appliance as its backbone, the

Huawei-SAP joint solution has inherited a strong pedigree:

- **Innovative O&M and efficient in-memory computing:** The SAP HANA high-performance computing platform overcomes traditional IT bottlenecks, improving system performance 1,000 fold and synchronizing 400 GB of daily data increments in real time. With better development and O&M efficiency, bulk data management, and decision making capabilities, Huawei is the model for innovative SAP HANA applications.

- **Fast, flexible response to diverse service requirements:** The platform provides one-stop services and real-time analysis of 100 million records. It meets every service requirement thanks to visual supply chain management, integrated delivery, manufacturing, and finance across the entire enterprise.

- **Real-time, revitalizing insights:** Digital transformation of services and construction of a five-cloud data mart have made data both integrated and transparent for better real-time decision making. An updated supply chain means faster responsiveness, simplified internal processes, easier service collaboration, and better efficiency, driving industry innovation and evolution.

- **New opportunities from collaboration:** This breakthrough project creates more strategic business opportunities. Huawei-SAP solutions, including the Huawei SAP HANA Appliance, have since been used in more than 30 countries, spanning such industries as manufacturing, energy, retail, high-tech, tobacco, finance, education, and healthcare.

A Better Connected World: Collaborative Integration

The wide application of new technologies presents unprecedented opportunities for corporate digital transformation and operating model transformation. Huawei aims to enrich life and improve efficiency through a better connected world, by acting as a responsible corporate citizen, innovative enabler of the information society, and collaborative contributor to the industry.

Looking ahead, SAP and Huawei will join forces in developing cloud computing, IoT, and Big Data. Their competitive industry solutions will help companies excel in digital transformation, rebuild service operation models, revitalize companies, and improve operations efficiency. This excellence in turn prepares enterprises for long-term development. ▲



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