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Vice President and Dual Digital Officer, CPIC

"We decided to build an enterprise private cloud platform and use cloud infrastructure to support our core business systems such as ERP and CRM. Huawei has provided us with a series of ICT infrastructure solutions, such as FusionCube, that fully meet our business development needs and conform to our ICT transformation strategy. We are looking forward to further cooperation with Huawei."

Li Zhehong
Information Management Department, COPED Coca-Cola Beverages Ltd.

"In terms of products and solutions, Huawei responds to customer requirements very fast and is highly efficient in terms of product optimization. After the feedback is sent to R&D, measures are quickly taken to create an optimized version. At the same time, in the cooperation process, Dongfeng also acquired valuable management experience from many of Huawei’s outstanding projects. We now use this knowledge in our own internal project processes. That’s why we believe the benefits we reaped from cooperating with Huawei are huge."

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197 of the Fortune Global 500 companies choose Huawei as digital transformation partner.

Reshape your business with Leading New ICT

Explore e.huawei.com for more information
Digital Transformation in the New ICT Era: What’s Going on and What Will Happen Next

Today’s leading enterprises’ exploration and adoption of best practices for digital transformation are reaching new heights.

For example, the elevator industry has been in existence for over 100 years and is now embracing significant digital transformation, evidenced by the dramatic increase in elevator sensors—from 12 or so in past designs to over 700 in today’s modern elevators. These sensors collect vast amounts of information, such as the number of times elevator doors open and close, their location, environmental readings, and Closed-Circuit Television (CCTV) data. Once this data is collected, it is uploaded in real time to the cloud in order to implement ‘smart management’ using Big Data analytics. This is just one example of the advances in elevator design and management, enabled via joint innovation between Schindler, a 100-year-old elevator giant, and Huawei.

There are many other examples of digital transformation best practices taking place today. In particular, logistics giant DHL is also working on solutions in close cooperation with Huawei, using industrial-grade IoT hardware and infrastructure. These jointly developed solutions provide important data and ensure added visibility to warehouse operations, transportation of goods, and last-mile delivery, creating a more integrated logistics value chain.

Today, many enterprises are at the beginning of their digital transformation, and are hoping to use digital features to create new business models and roadmaps for their future. Today’s enterprises can greatly benefit from the valuable expertise and knowledge gained from the experiences of forward-thinking companies such as Schindler Group and DHL.

Huawei’s position as a world leader in digital transformation has been recognized by many major enterprises who have selected Huawei as their partner for digital transformation, including 197 companies in Fortune Global 500—45 of which are in the top 100.

ICT Insights Magazine is constantly searching for the best digital transformation practices from around the world. In this collection of Enterprise Digital Transformation Stories, over 20 Fortune Global 500, as well as other pioneering digital transformation enterprises, such as DHL, China Construction Bank, and China Pacific Insurance (Group) Co., Ltd. are featured. This compilation showcases leading digital transformation practices and insights into cloud computing, Big Data, the IoT, AI, and other emerging technologies. These technologies are being adopted in Utilities, Finance, Power, Transportation, Manufacturing, and other industries. We hope that the sharing of these experiences in the exploration of digital transformation can deliver insights and guidance for enterprises in every industry, as well as provide inspiration from digital transformation’s many benefits.

We hope that all our friends, old and new, will enjoy reading the compilation of case studies presented in this special issue, and hope it helps you discover your best path to digital transformation. Thanks for reading, we wish you the very best for your future success.
[Comment]
P1  Digital Transformation in the New ICT Era: What’s Going on and What Will Happen Next
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The Five Clouds
Enabling an Intelligent World

By Guo Ping, Huawei Rotating CEO
Cloud services are becoming the primary model for the IT industry and, because of the economies of scale in investments, successful clouds will undoubtedly become more centralized. In the future, Huawei will continue to work with our partners to build a cloud alliance, and deliver one of the world’s five largest clouds.

IBM founder Thomas J. Watson famously said there was a world market for about five computers. Frequently cited as grossly inaccurate, that prediction could be characterized as prescient if one interprets ‘five computers’ to mean ‘five clouds.’

Cloud services are becoming the primary model for the IT industry. Thanks to economies of scale in investments combined with the so-called ‘Matthew Effect’ (whereby the rich get richer), successful clouds will undoubtedly become more centralized.

But data sovereignty makes it impossible for the world to have just one cloud, or even two. We expect Huawei to become one of ‘the five clouds,’ simply because cloud computing is part of our Cloud DNA.

It has become commonplace to observe that, in a digital world, everything becomes more closely connected. And Huawei is one of the few companies with the capacity to connect ‘everything.’ We are a technology company that connects people to people, people to things, and things to things. Only a handful of other companies have this capacity.

About half of the world’s population uses Huawei’s network equipment, mainly because we continuously invest in technology. Huawei has invested heavily in building cloud platforms and continuously developing new capabilities to meet the needs of our customers. That’s the first element of Huawei’s Cloud DNA.

The second element is security. When it comes to the cloud, our customers are most concerned about the security of services and data.

The Huawei Cloud has a robust system in place to ensure the security of our customers’ services and data from two perspectives: Technology and processes.

In terms of technology, Huawei provides integrated chip and service solutions to ensure both physical security and network security. For example, our cloud security chips effectively address the problems affecting the security of the cloud. Our security mechanisms far exceed the level of security available on any current independent IT systems.

We have also embedded security into our business processes, so that security cannot be ignored during any stage of product development. We consistently invest 5 percent of our total Research and Development (R&D) budget in cyber security, and we collaborate with industry experts and academia to promote the development of cloud security architecture.

The third element of Huawei’s Cloud DNA is cloud-based services. To many people in the industry, cloud services ‘hang in the air;’ however, Huawei believes the cloud needs services at the ground level as well.

Different from Over-The-Top, or OTT, cloud companies, Huawei is a perfect example of growing with the cloud. Our own IT architecture is extremely complex and always changing. We therefore understand the needs and challenges of governments and large global companies, and have figured out a path of multi-cloud management. With our strong
By building an ecosystem, Huawei does not want to own data, content, or turn our partners into processing factories. Instead, we want to provide a technology platform.>

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Without well-targeted ground services, it is difficult for organizations to launch services by themselves. For example, in 2015, to ensure the safety of the Pope during his visit to Nairobi, Kenya, the government asked Huawei to quickly deploy a Safe City cloud. It took us only five months to pass preliminary acceptance, and the safe city cloud was soon put into operation. Without strong ground services, such a rapid delivery would have been simply impossible.

The fourth and final element of Huawei’s Cloud DNA is shared success. Last year, I remarked that Huawei aims to cultivate an ecosystem like that of Costa Rica: Open, dynamic, diverse, symbiotic, and thriving. We collaborate with partners who are able to innovate, regardless of size, in order to create value for customers and help resolve their business challenges.

By building an ecosystem, Huawei does not want to own data, content, or turn our partners into information processing factories. Instead, we want to provide a technology platform.

With the technology we offer, our partners can turn their expertise into machine intelligence. To put it another way, we are leveraging the strengths of all parties to build an ecosystem where all parties coexist and thrive together.

Today, executives face a choice between active transformation and passive change. As Huawei sees it, shells broken from the outside in, get fried; those broken from the inside out, bring life. For traditional companies seeking to control their own destiny, the prudent course of action is to break out of one’s own shell by proactively embracing digital transformation – including the cloud. In the future, we will continue to work with our partners to build a cloud alliance, and deliver one of the world’s five largest clouds.
How Do Digital High Performers Win and Stand Out in the Digital Economy?

By Yu Yi, PhD, Managing Director, Accenture Digital Lead for Greater China, Yu Hongbiao, Managing Director, Electronics and High Technology Industry, Accenture Greater China, and Serena Qiu, Thought Leadership Research Senior Principal, Accenture Research
Digital Performance Index (DPI) Comprehensively Assesses the Digital Level of Enterprises

Constant investment is imperative for enterprises that expect to use digital technologies to achieve excellent performance. They can finally leap forward in business performance only when they dive deep into digital and have every aspect of their business practices immersed in it.

China is experiencing the transformation from the traditional economy into the digital economy, bringing in new ideas and business models, such as mass customization of products, the sharing economy, crowdsourcing, and crowdfunding. These new growth drivers are opening up new opportunities for the traditional economy, which has long been plagued by sluggish demand and excess capacity.

Accenture has developed the Digital Performance Index, or DPI, to quantitatively assess the level of digital investment and progress of global enterprises across four business domains: Plan, Make, Sell, and Manage.

Accenture selected enterprises from six industries on the Forbes Global 2000 list, all leading enterprises in their countries, and used DPI to assess their digital levels. Of the selected enterprises, Chinese enterprises are compared with those in three developed countries (the US, Japan, and Germany) in terms of the above four functions (Plan, Make, Sell, and Manage).

The analysis shows that enterprises in the four countries are all exploring the road to digitalization. In terms of digital level, all the leading enterprises scored less than 3 out of 4, and they all suffer similar weaknesses in digitizing internal management.

It is also indicated that the digitalization of leading enterprises in China is as developed as in most of the developed countries. Overall, China is on a par with the US and even slightly outperforms Japan; however, compared to Germany, China still has much room for improvement, especially in the Plan and Make functions.

How to Drive Business Performance: The Ultimate Question to answer through Enterprise Digitalization

Enterprises make digital investments in order to improve their competitiveness and to secure a leading position in the digital age. But, in fact, there is still a lack of convincing proof as to whether digitalization can bring benefits to enterprises. Enterprises are now facing core questions about whether, when, and how digitalization can help them.

To answer these core questions, we have introduced another tool: Accenture's High Performance Business (HPB) framework is used to thoroughly study the relationship between enterprise digitalization and business performance. Leveraging Accenture's DPI and HPB, each enterprise surveyed gets two scores: One for its digital level and the other for its business performance. The comprehensive analysis on the two scores helps us peep into the relationship between an enterprise's digital level and its business performance.

In China, Accenture joined forces with National Industrial Information Security Development Research Center and China Service Alliance for Integration of Informatization and Industrialization to survey 170 Chinese manufacturing enter-
prises. The results show that leaders in these enterprises are all aware of the huge power of digitalization to some extent, but most of them have not yet taken actions to make digital investments to improve business performance.

Only four percent of those enterprises studied are able to couple broad levels of digital investment with a broad level of business success – the enterprises we call the Digital High Performers. Their digital investment has brought tangible benefits. They have secured a leading position in terms of digital technologies and key financial KPIs.

These digital high performers strive to develop and execute business strategies based on digital technologies, which are the enablers and transformative drivers for legacy organizations. They can consolidate and reinvent core businesses and help enterprises tap into new business areas.

Business leaders lag far behind digital high performers in terms of their digital level, with a gap of up to 28%. Ignorance of the power of digital will cost a fortune. A comparison of business performance between business leaders and digital high performers shows that digital high performers have more sustainable and quality growth than business leaders, especially in the four HPB dimensions: Profitability, Longevity, Positioning for the Future, and Consistency.

The differences between digital high performers and other enterprises are quite visible. It is worth learning from their experiences in building advantages in terms of digital level and business performance.

Digital High Performers: Secret Sauce for Standing Out?
To figure out the secrets of how digital high performers achieve their success, we have thoroughly analyzed digital high performers by comparing them with others. First of all, we compared digital high performers with business leaders to explore the value of digitalization for business leaders. Then, we compared digital high performers with digital leaders to analyze why digital high performers can obtain higher financial returns from digital investment. Findings include the following:

Digital high performers have seized the megatrend of the digital economy and quickly adapted themselves to the market dynamics. They have achieved more healthy and sustainable growth by leveraging digital technologies. Investors firmly believe that digital high performers can continuously enhance their values, and their market-leading advantages can be constantly solidified and even taken to new levels.

Digital high performers are good at translating digital investments into financial returns. Their business performance is dramatically better than that of digital leaders, with a 94% higher performance score. When digital leaders are using digital technologies to optimize processes and improve efficiencies, digital high performers have already taken a step further by adding digitalization to their corporate strategies and paying continuous attention to creating more value with digital technologies.

- **Plan: Enterprise-Wide Transformation Rather Than Individual Process Fixes**

How far can enterprise digitalization go? How many returns can enter-
prise digitalization yield? This heavily relies on a clear and appropriate
digital strategy. Digital high performers focus on leveraging digital tech-
nologies to accelerate enterprise-wide transformation and stay ahead of
the competition in the market.

Digitalization has already changed the entire value-creation chain. En-
terprises should shift their focus from the individual organization to the
entire ecosystem and try to leverage the power of digitalization to mine
maximum value from the ecosystem. Digital high performers consider
digitalization as the core of their strategies. They also constantly improve
their irreplaceable position in the entire ecosystem by interacting and
sharing information with other industry players and join forces with
them to shape the future of the industry.

**Make: Open Innovation to Build Digitized Operation Modes**
In the new economic environment, customers and consumers have
increasingly demanding requirements for products and service experi-
ences. The ‘All by Me’ internal innovation approach is not only costly
but makes it impossible to quickly adapt to fast changing markets
and to withstand fierce market competition. Digital high performers
excel in identifying the best resources in the innovation ecosystem
and consolidating a variety of resources, such as consumers, suppliers,
partners, and experts, into their own innovation systems. In doing so,
they can provide the optimal experiences in a more innovative way and
at greater speed.

**Sell: Enhance Value Proposition Based on Improved Customer
Experience**
In the digital era, customer experience is vital to the success of any
enterprise. Customers today have increasingly higher expectations and
requirements. Every customer in the B2B or B2C environment is expect-
ing personalized experience. To meet their fast-changing demands,
enterprises must develop a new customer-oriented service experience
and maintain ongoing close contact with them. To be able to do this,
enterprises need to continuously collect customer requirements while
doing proof-of-concept, developing new products and services, and
promoting them, in order to respond to customers’ changing needs and
provide products and services that never let them down.

Digitalization allows enterprises to interact with customers continu-
ously. Customer services do not stop at the completion of product sales.
Based on Big Data analytics, enterprises can continuously deepen their
insights into customers, laying a solid foundation for constant improve-
ment of customer experience. This is exactly where the digital high
performers outperform their peers. Statistics show that digital high per-
formers still keep in touch with their consumers in the after-sales phase.
They continuously collect consumer feedback using digital technologies
and feed such feedback to the R&D operation phase.

**Manage: Comprehensively Improve Enterprises’ Flexibility and
Adaptability with Continuous Assessment and Improvement**
Digital technologies have great potential, but unleashing this potential
heavily depends on other capabilities of the enterprises. Using digital
technologies to dramatically change an enterprise would be a pipe
dream if the enterprise leaders still have an old-fashioned mindset,
the management system is not optimized, and the corporate culture of
embracing transformation is not there yet. In the past, many enterprises
valued only advanced technologies but ignored other capabilities that
can give full play to such technologies, leading to a disappointing return
on their investment.

For digital enterprises to succeed, a flexible organizational structure,
data-driven corporate culture, and a systematic digital talent develop-
ment mechanism are needed. Digitalization cannot be completed over-
night but requires continuous assessment, adjustment, and evolvement
based on the enterprises’ status and capabilities. A high level of flexibil-
ity and strong adaptability will be two important features of a successful
digital enterprise in the future.
Constant Investment and Long-term Accumulation are Pre-requisites for Enterprises to Make Business Performance Breakthroughs Using Digital Technologies

Digital technologies are driving business changes, and the digital economy has bright prospects; however, the digitalization of enterprises is more than a technical thing; it is about the whole enterprise’s transformation. Enterprises who turn a blind eye to digitalization will lose competitive advantages in the long run. Huge investments without truly understanding digitalization cannot ensure any competitive advantages or significant improvement of business performance.

Digital transformation is not ‘the icing on the cake’; instead, it should go beyond the IT department. It needs to be launched and promoted by enterprises’ top decision-makers, making it a development consensus. Besides, digital transformation needs to penetrate into the entire organization across all functions. Manufacturing enterprises can transform and ‘Lead in The New’ by promoting core business transformation and developing new businesses enabled by digital.

Digitalization is not a single project, a one-off task, or a project within a limited period of time. It is unrealistic if enterprises expect to produce an immediate effect with low investment. As shown in the figure above, after we group the sample enterprises by digital level and sort them in ascending order, the business performance of each group fluctuates around the average bar; however, when the digital level exceeds the upper threshold, business performances is improved significantly, 54 percent higher than the average. This shows that constant investment and long-term accumulation are required if enterprises expect to achieve excellent performance leveraging on digital. Enterprise can finally harvest benefits in business performance only when digitalization has penetrated into every aspect of their business practices.

Financial Performance

Average financial performance = 2.01

Data Source: Accenture

Digital Performance

Features
Behind-the-Scenes Big Data Solves a Series of Theft Cases in Shenzhen’s Longgang District

By Xi Wei, Leader of the Video Surveillance Police Brigade, Longgang District Public Security Bureau, Shenzhen, China
Since 2014, Huawei and Shenzhen's Longgang district police department have been working together closely to start the construction of smart policing services in Longgang. How can the power of Big Data be used against cunning suspects and in complex cases?

Behind-the-Scenes Big Data Solves a Series of Theft Cases

1. A middle-aged man carrying a backpack was wandering around an office building. He took laptops and mobile phones as if it were his own office.

2. Huawei brought 'New ICT' to Shenzhen's Longgang police department.

3. Upholding the concept of 'data as king' and 'content as king,' we began to widely deploy automated data collection equipment and an IT cloud platform.

4. We input the suspect’s photograph from the site into the facial recognition system and got several hits.

5. This picture of the thief gallivanting outside a mall is very flattering.

6. We search the surrounding HD monitoring videos based on the precise time and geographical locations from the image to see where he came from. "So you drove a car to come shopping, and we have already collected your license plate automatically."
In early 2016, a middle-aged man carrying a backpack was wandering around an office building in Shenzhen’s Longgang district. He acted composed and was calmly walking, as if it were his own office. He took laptops and high-end mobile phones with him. After six consecutive theft incidents, my colleagues and I did not know what to do. The video of the scene was quickly transferred to our desks, and we could clearly see the man’s face, but who was he? Where did he come from? How could I get the man in the video to come to the police station and stand trial? Every time he walked into an office building, he walked right out and disappeared. This was a cunning opponent. Was there nothing we could do about it?

In 2014, Huawei brought ‘New ICT’ to Shenzhen’s Longgang police department and entered into deep cooperation with them to begin the construction of Longgang smart police services. In keeping with the upsurge of Big Data, we worked hand-in-hand to uphold the concept of ‘data as king’ and began to widely deploy automated data collection equipment. This included full HD video surveillance cameras, license plate snapshot devices, virtual checkpoints, and facial snapshot devices, among other things. Huawei built a cloud computing platform and configured 20 high-performance servers and a 1.5 PB capacity OceanStor cloud storage system so data could be efficiently aggregated and Big Data could show its power.

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7. The car owner is a woman, so we directly check the people related to her, but there is no sign of the thief. The ‘Big Data License Plate System’ quickly shows the car’s movements. This car often goes through a plate capture device location on a road it takes on its way back to Longgang. We input the plate into the License Plate Real-Time Surveillance and Warning Platform and wait for the right opportunity.

8. On the second day, the License Plate Real-Time Surveillance and Warning Platform sends an alarm saying the car appeared in Yantian district and that the driver is confirmed to be the thief. We plan to go catch him, but the platform turns to the second image where it shows the car heading back home. “Let’s head out; we’ll wait at the road he will pass through.”

9. After 10 minutes, we intercept the car for examination and capture the thief.

10. We also find a surprise in the backseat: A ‘fruit brand’ laptop computer. “And you don’t even know the password!”

11. There is no suspense. The computer was stolen an hour ago from an office building in Yantian district. The stolen goods were returned, the thief was put into prison, and everyone called it a day.

12. The story above is just one of many examples of how we use Big Data to crack a case. In the future, we will continue to work with Huawei to extend the application and move forward in preventing and combating crime.
We input the suspect's photograph from the site into the facial system to search. Instantly, several photographs come up. "Hey, this picture of the thief gallivanting outside a mall is very flattering," we say. "We did not catch your route to and from the crime scene, but the facial system has fully recorded your daily routine." Currently, our facial recognition system can automatically capture and transmit 400,000 pictures of people's faces. It has taken 70 million photographs in the six months since it has been rolled out. This system makes tracking across time and space a reality.

"Let's see how long this thief can keep up with his act," the Big Data 'encircle and annihilate' campaign began:

We use the license plate number to find the car owner. "Who is he?" The car owner is a woman, so we directly check the people related to her, but there is no sign of the thief. In the past, we had to go directly to the car owner in search of clues, but the suspect was likely to find out and run away, making it difficult to capture him. But now we have license plate Big Data. Every day, license plate capture devices and virtual checkpoints continuously send us 2.5 million records of license plate data. Since the system came online half a year ago, we already have license plate data from 450 million cars. "So all we need to do is enter the license plate number and we can see where you're hanging out."

The system quickly sends a reminder that this car often goes through a plate capture device location. Using dynamic time backtracking, we clearly see that he takes this road to go back to a residence in Shenzhen's Longgang district.

Now that we have Big Data, you could say that everything is under control. Of course, sometimes there are unexpected surprises. As we search the car, we find a laptop computer (the kind with the fruit brand) in the back seat of the car. As we check the computer, we tell the suspect, "You still want to try to find a way to say that it's yours? You don't even know the password to unlock it!" There is no suspense. The computer was stolen an hour ago from an office building in the Yantian district. The stolen goods were returned, the thief was put into prison, and everyone called it a day.

The story above is just one of many examples where we use Big Data to crack a case. In the future, we will continue to work with Huawei to deepen the application and move forward in preventing and combating crime. I believe that in the near future, the ‘Sky Eye’ will eventually be applied to actual modern policing.
Wujiang Police: Advanced Technology Improves Law Enforcement

By Xu Longfei, Lead of the IT Department, Wujiang District Public Security Bureau, Suzhou, China
In 2015, three schoolmates who graduated in the same year started to work for the Public Security Bureau in Suzhou’s Wujiang district. One is a community police officer, the second a traffic officer, and the third is a patrol officer. They have different tasks and the regions under their jurisdiction are far apart. And, due to their heavy workloads, they are usually overworked and don’t have many opportunities to get together.

Can New Technologies Make Ideas Come True?
In August 2016, they met at a training session with new, dedicated network terminals that use broadband trunking. They exchanged greetings and chatted excitedly, but also complained about their work.

“I have to move around the community every day,” said the first friend. “After returning to the office, I need to import endless records into the system platform. Community policing is so complex.”

“I direct traffic on the road and punish various violations every day,” said the second friend. “In case of a large-scale security task, I need to divert traffic. Working outside all day can be very hot, but at least I’ve got a great tan.”

“Me, too,” said the third friend. “I have to stand outside for over 10 hours every day and check uncountable passengers and vehicles. The most difficult job is taking people to the office to compare their identities on the computer. The people concerned are usually resistant and then disputes occur. I can’t complain about it; I just have to accept the situation.”

The training session soon started; the trainer described the dedicated broadband trunking network system project that was being built based on Huawei’s new ICT technologies. After extensive surveys and verification based on the requirements of police practices, project plans included a dedicated 4G-LTE wireless broadband network system for 114 base stations that would cover 1,176 square kilometers of Wujiang district. What’s more, a converged command platform would be developed to integrate video, audio, and data with GIS. Transmission speeds would be higher, and wider bandwidth would accommodate more communications traffic. More than 1,000 multimedia terminals would be configured to integrate multiple practical policing applications and improve the convenience and practicability of the devices.

Devices would include mobile policing terminals, walkie-talkies, law enforcement recorders, terminals for locating people, and identity card readers. The goal was to help resolve many problems with frontline police service equipment, such as various types of single-function terminals that required complex management.

After the session, the three friends were excited about using the new technology and hoped it would improve their efficiency.

Advanced Technology Creates Dividends for Police
Since the training session, the dedicated broadband trunking network based on Huawei’s new ICT technologies has been used by the police for nearly one year; its applications work well and are considered irreplaceable — and provide major dividends for the police. After the project was completed, frontline police officers in Wujiang used the Huawei 820 mobile policing terminals to inspect over 450,000 people and more than 80,000 vehicles. The command center handled many security events through
visualized command and dispatch. The police officers also maintained security for large-scale events, including the 2016 G20 Summit in Hangzhou, China, an international energy conference in 2016, and a bicycle race around Taihu Lake.

One day in September 2016, our patrol police officer was inspecting people and vehicles entering a checkpoint, with sweat streaming down his back.

“Sir, please show me your ID card,” he said. Saluting with one hand, the officer held the newly distributed Huawei 820 mobile policing terminal in the other. When he put the ID card on the 820 terminal, the ID card number, name, and personal information were displayed and automatically compared with people in the database. After several seconds, an ‘all clear’ report popped up on the terminal screen.

The entire process took less than 30 seconds. Previously, at least 5 minutes were needed when patrol officers used indoor computers. Soon afterwards, the patrol officer and another officer in a mobile command vehicle noticed that traffic at the checkpoint was quite light. The emergency command vehicle can accommodate 17 people for a meeting and wirelessly receive video conferencing and on-site videos, meeting the requirements of command, dispatching, patrolling, and mobile incident reception and handling.

To discover the reasons for the less-than-normal vehicle flow, the officer in the command vehicle ordered that drones be released to check the situation on the road. The drones quickly transmitted on-site video images back to the command vehicle. The images indicated that two vehicles had collided at a spot two kilometers from the checkpoint and blocked the road. The officer then dispatched nearby patrol and traffic police to the scene of the accident.

The officers received information about the accident on their 820 terminals. The police cleared the cars to the side of the road and alleviated the traffic jam, while transmitting live video to the command center. Tickets were issued through their terminals. It took only 20 minutes to handle the traffic accident on site.

These cases were examples in miniature of Wujiang police officers’ more efficient policing, using Huawei’s new ICT technologies, including the dedicated broadband trunking network and mobile terminals.

Implementing Cutting-edge Technologies for Policing Applications

As Wujiang and Huawei have continued their collaboration, the latest ICT technologies have been implemented in a series of Safe City and Smart City solutions. But more is needed. Wujiang district and its Public Security Bureau are looking forward to building an interconnected, instrumented, and intelligent new policing model, implementing integrated policing operations and, finally, establishing a new police ecosystem that carries out intelligent forecasting, warnings, and prevention. Huawei’s Joint Innovation Laboratory has become a sound platform for in-depth cooperation in order to provide more new, cutting-edge ICT technologies.
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Brisbane Skytower in Australia Opens a New Chapter in Smart Skyscraper Life
Enjoying a Pleasant Day in Brisbane Skytower

Brisbane Skytower is a landmark building under construction in the city’s central business skyline. The skyscraper, in Brisbane, Queensland, Australia, is expected to be the best residential tower among all the tall buildings built recently. This iconic, 270-meter, 90-story residential tower will become Brisbane’s tallest building when completed. What will it be like to live in the Brisbane Skytower?

At dawn, when sunlight spills over the Brisbane River, various types of sensors installed in the Skytower will transmit data over an agile network to a building automation system. The building automation system will then trigger equipment to take action according to the preset rules. For example, lights will automatically dim in response to the sensed indoor illumination data; and the system will automatically reduce the air ventilation frequency that shows the indoor air quality has reached the best condition.

In the morning, you can go to the gym and start the day with healthy exercise. At noon, you may go downstairs with your family to have lunch, and then go shopping in the building. At dusk, infinity pools at the tower’s crown will let you swim to the edge of the building, savoring long, spectacular vistas over the whole of Moreton Bay and Brisbane. You can share these memorable moments through a live streaming or social platform to people around the world. At the same time, the building management staff will guard you and the entire Skytower around the clock by using a state-of-the-art video surveillance system.

Brisbane Skytower will become a role model for smart buildings that Huawei and Honeywell — two Fortune Global 500 companies — have collaborated to make possible.

‘Network First’ for Smart Buildings

Today, the new generation of information technologies represented by the Internet of Things (IoT), cloud computing, and Big Data are growing quickly around the globe. This megatrend has a profound impact on the construction industry, with ‘sustainable, secure, and energy efficient’ becoming the three key characteristics of smart buildings.

The new Internet economy has also greatly changed people’s mindsets and behaviors. As buildings become popular places for people to eat and live, they are also rapidly evolving to become more networked, human-centric, and intelligent. The growing use of the IoT, cloud computing, and Big Data enables seamless interoperability between building intelligence systems and information systems. The IoT and social platform technologies are increasingly applied to daily property management and equipment room operations, taking building intelligence to a new level.

The network for buildings is also being transformed from providing...
simple telephone and television services to delivering all-round services such as video surveillance, Wi-Fi, and environmental awareness. The network is taking on a new look that features service diversity, intelligence, and mobility, which creates higher network requirements.

Wider bandwidths also are needed. Compared to the declining use of traditional PCs, a growing number of smart devices such as smartphones, 4K Internet TV, home surveillance appliances, and even home robots are being used in buildings. Additionally, buildings are making use of more building control, energy management, sensing, and surveillance equipment. All these additions call for a dramatic increase in network bandwidths.

Ubiquitous network access is also required in order to deliver anytime, anywhere access experience in rooms, elevators, lobbies, underground parking garages, and property management office areas. Property management owners also expect a simpler, faster-to-deploy, and easier-to-manage network that reduces labor costs while improving efficiency.

Bill McGarry, Development Manager of Billbergia Group, the management company, considered all these technology advancements when he approved Honeywell’s technology proposal. Bill also understood the importance of being able to “ready the building for the next wave of technology upgrades” and was more than confident Skytower technology was going to deliver the best outcome for its residents for years to come.

The Billbergia Group manages the entire property investment, development, construction, marketing and sales process, ensuring an integrated approach and delivery. The Huawei POL Solution complimented Billbergia’s structure as it delivers complete technology integration.

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Huawei and Honeywell will jointly pursue large-scale smart city projects to help city administrators build intelligent urban infrastructures that enable them to control costs while providing a more favorable living environment for their residents. >>

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Huawei POL network diagram
Huawei Provides POL Solution

In the Skytower project, Honeywell will provide the Enterprise Buildings Integrator, a building automation system, and take charge of system integration that includes Heating, Ventilation, and Air Conditioning (HVAC), security protection, and firefighting facilities. Additionally, Honeywell will centrally manage various building subsystems and provide a visualized management portal as well as alarm management and work order management services, aiming to implement efficient facility management, fast response, and predictive maintenance.

Huawei, as one of the vendors, will provide a Passive Optical LAN (POL) solution to build a network inside the Skytower. As part of the POL solution, Huawei’s network management system U2000, OLT (MA5608T), ONU (MA5626, M5671, and MA5620), and ONT (HG8242H) will be deployed, unleashing the full potential of the passive network.

POL also can be viewed as a PON for enterprise applications. By using POL technology, an enterprise can combine data, voice, video, and other weak-current systems into one optical network. Huawei’s POL solution has prominent features such as high bandwidth, high reliability, comprehensive security authentication, easy deployment, and holistic video surveillance and Wi-Fi coverage.

Huawei’s POL solution makes the following possible:

- The building automation system shares the same network with triple-play services, eliminating the need to build another standalone network
- One single fiber transmits all services, which simplifies cabling and dramatically reduces capital expenditures
- Passive splitters replace switches in the middle layer. They do not need power or cooling, greatly saving riser space and eliminating noise.
- It is easy to smoothly evolve to 10G PON while reusing existing cables for maximum investment protection
- The U2000 centrally monitors the faults and alarms of all network equipment and provides added visibility to end-to-end service rollouts

Huawei and Honeywell Collaborate for a Better Quality of Life

At the 2017 Huawei Partners Summit held in Sydney, Huawei issued Honeywell the 2017 Award for Solution Breakthroughs for its excellent work on the Skytower project.

“We’re glad to cooperate with Huawei in the Skytower project,” said Mark Dunn, General Manager, Automation & Control Solutions, Honeywell Building Solutions. “This project will build a gigabit network for the 270-meter, 90-story residential tower. It is the first ever installation to utilize one common fiber for telephony/data and building services – made possible by partnering with TPG. The network utilizes over 34 kilometers of fiber optic cables and 1,144 Huawei ONTs.”

Huawei and Honeywell have collaborated elsewhere in smart buildings. Using Huawei’s global channel system and unmatched strengths in communications, the two companies have agreed to jointly explore opportunities in education and enterprise campuses, business buildings, branch offices, and industrial parks in high-growth regions, such as China, Southeast Asia, the South Pacific, Western Europe, the Middle East, and India.

In March 2017, Huawei announced its collaboration with Honeywell to bring to market smart building offerings that take advantage of the latest IoT technologies in order to help make buildings sustainable, secure, and energy efficient. The two companies will also jointly pursue global large-scale smart city projects to help city administrators build intelligent urban infrastructures that enable them to control costs while providing a more favorable living environment for their residents.
Accelerating FinTech Innovation Facilitates ICBC’s Transformation and Development
— An interview with Lv Zhongtao, General Manager of the IT Department of ICBC
In August 2016, financial technology (FinTech) was included in the 13th Five-year Plan on National Scientific and Technological Innovation by China’s State Council. Driven by this plan, a number of commercial banks announced FinTech innovation strategies based on new IT technologies, such as Big Data, cloud computing, blockchain, Artificial Intelligence (AI), and mobile Internet, in an aim to build a financial ecosystem that integrates various financial instruments and tools. With the impact of new financial regulations, negative interest rates, penalties, and unstable markets, the global banking community is experiencing a severe winter at present. A slowdown in net profit growth and downsizing are common across the industry. How can China’s banks deal with this complicated and volatile situation and grasp the opportunity to achieve steady growth through digital transformation? We interviewed Lv Zhongtao, General Manager of the IT Department of Industrial and Commercial Bank of China Limited (ICBC), to learn how he would answer this question. We hope that his ideas can provide insights into the technical progress and current trends of China’s banking industry.

Strengthen Transformation and Innovation, Speed Up Banks’ Steady Growth

As one of the largest banks in the world, ICBC has many branches in China and has become one of the largest Internet banks. As such, each of ICBC’s key initiatives attracts attention from the industry.

Huawei: From Internet finance to FinTech, the financial industry has been deeply integrating the Internet and high-tech with their services in recent years. Some people even assert that FinTech will play an important role in disrupting and changing traditional banking. Do you agree with this idea? In your opinion, how does the rise of FinTech affect the banking industry?

Lv Zhongtao: The essence of Internet finance and FinTech is finance. They represent the extension and innovation of finance in concepts, processes, and business with the aid of the Internet, Big Data, and other technologies. According to the current development status, Internet finance enterprises and FinTech are making innovations only in some segmented financial domains. Currently, those enterprises cannot overturn or replace traditional financial institutions. The integration and innovation of the financial industry and FinTech is a process of symbiotic development. FinTech has grown rapidly in recent years. Although its applications in multiple financial domains are still at the exploration or start stage, their new business models and technical methods are impacting and changing the banking industry, which is worth attention. The banking industry should pay high attention to those impacts and changes and conduct continuous innovation to reduce operating costs and improve financial service efficiency and customer experience.

New technologies can be applied to various enterprises, including emerging FinTech enterprises and traditional commercial banks. At present, traditional commercial banks are increasing the use of new technologies and striving to capitalize on those technologies to innovate services and improve customer service quality and efficiency. In the future, traditional commercial banks will use their longstanding expertise and advantages in banking service logic to actively apply new technologies to FinTech business innovation. Financial services for customers will be mainly provided by traditional financial enterprises and supplemented by

CBC realized the importance of digital transformation early and initiated IT-based bank construction in 2013. The core of digital transformation is improving the integration of business and technology, studying business scenarios and innovations based on the features of new technologies, and promoting the transformation of business operation concepts and management paradigms based on digital transformation.
At present, emerging FinTech enterprises are gradually shaking up the banking industry’s well-established operational models. What users require of traditional financial services has dramatically changed. They now hope to obtain personal financial services anytime and anywhere along with customized financial products. Facing such pressure, many banks are embracing digital transformation as a viable solution. What do you think of the digital transformation of the banking industry? In your opinion, what are the key elements and difficulties? How can banks overcome these difficulties?

Lv Zhongtao: The application of new technologies, such as the Internet and Big Data, has changed customers’ lives and consumption patterns. Customers’ behavior and requirements of financial services are more diverse and personalized. Obtaining financial services through digital channels has become a megatrend. The banking industry should follow the latest business and customer development trends; improve research and application of new technologies, such as Big Data, AI, blockchain, the Internet of Things (IoT), and cloud computing; and actively accelerate digital transformation. In doing so, they can provide customers with intelligent, comprehensive, and differentiated services that can be accessed anywhere and anytime.

ICBC realized the importance of digital transformation early and initiated IT-based bank construction in 2013. We have focused on the research and application of new technologies, such as mobile Internet, Big Data, cloud computing, AI, blockchain, the IoT, and biometric recognition, and achieved significant progress in some fields.

Huawei: For advocates of traditional banking, FinTech has yet to generate success stories that can be referenced. What improvements has ICBC achieved? How can those improvements facilitate banks’ business, product, and service innovation?

Lv Zhongtao: In the past two years, we have been focusing on our e-ICBC strategy. Specifically, we have fully explored customer requirements and increased research and application innovation in various banking business domains with FinTech. We have achieved significant innovation results in the following fields:

- **Big Data**: In 2006, ICBC started construction of a data warehouse. After years of development, a Big Data system covers multiple technologies, such as TD, Hadoop, MPP DB, and streaming data processing, and supports quasi-real-time and batch processing of structured and unstructured data. In regards to business application, we have applied Big Data systematically in multiple domains, such as customer precision marketing, risk prevention and control, performance appraisal, and operations management, and achieved remarkable results.

- **Cloud Computing**: In the second half of 2014, ICBC began planning the construction of a cloud platform based on open industry standards and ICBC’s actual R&D and O&M requirements. Currently, IaaS has been used in the R&D test environment and successfully supported the flexible supply of computing, storage, and network resources. PaaS has been trialed in some popular services, such as commemorative coin reservation and quick payment, improving elastic scalability of the system.
In terms of SaaS, ICBC provided e-Security, an external risk information service platform, for other commercial banks through an API. ICBC has also worked with cities to build Smart Wuxi and other Smart City services by offering financial services for paying daily bills.

- **Artificial Intelligence:** ICBC has applied AI in the following domains. In the anti-fraud domain, ICBC used a neural network model to prevent fraud in 2015. This model could determine the fraud risk of each e-Banking transaction in real time, effectively avoiding customers’ capital loss. In the customer service domain, in 2016, ICBC released ‘ICBC Smart,’ a next-generation smart robot. This robot supports intelligent context-based interaction and flexible transfer to manual services, relieving agents’ workloads. In addition, in 2016, ICBC also set up an AI research team which focused on studying the theoretical system related to AI and verified the application of AI in credit risk control and other domains.

- **Blockchain:** ICBC has paid close attention to the technology tracking and study of blockchain. In early 2016, ICBC set up a blockchain research team and conducted technical exchanges with a number of universities and companies in the industry to better understand the latest blockchain technology. At present, ICBC has constructed the prototype of a financial product transaction platform based on blockchain and tested this system inside a bank. The prototype uses the alliance chain mode to provide customers with point-to-point financial asset transfer and transaction services based on the traditional market making model.

- **Biometric Recognition:** ICBC implemented biometric recognition early. As early as 2013, ICBC branches were supporting fingerprint authorization and identity authentication for bank tellers. Individual mobile banking will support fingerprint log in soon. Facial recognition was piloted in the auxiliary review process of smart branches in 2016.

- **The IoT:** ICBC has applied the IoT in business operations and intelligent equipment. In 2014, ICBC developed a physical goods and cash operations management system which used RFID to achieve batch processing and accurate control of cash boxes entering and exiting a bank’s vault. In 2016, ICBC explored the application of the IoT in intelligent equipment. ATMs were equipped with electronic password locks to support intelligent perception of unlocking and locking status, achieving remote network control and management.

- **Quantum Communications:** In 2015, ICBC achieved encrypted transmission of backup data between local equipment rooms in the Beijing and Shanghai branches. ICBC will complete construction of the Beijing-Shanghai backbone network for quantum communications, which will enable encrypted transmission of backup data across regions. ICBC will become the first financial institution in China to build an encrypted channel for quantum communications and transmission of production data. This event marks the first application of quantum encryption technology in the financial services industry.

**Reshape the Leading Technology Platform and Accelerate Business Innovation**

On July 15, 2016, China Banking Regulatory Commission (CBRC) published *Guiding Opinions on Regulating the 13th Five-year Plan for the Development of Information Technology in the Banking Sector in China (Exposure Draft)* on their official website. This document specified that the banking industry and financial institutions should follow the State Council’s *Opinions on Promoting the Innovation and Development of Cloud Computing and Fostering New Types of Operation in the Information Industry*, conduct cloud computing architecture planning, set cloud computing standards, jointly build an industry cloud platform, and actively transform architectures. To support enterprises in business innovation, banks are gradually migrating service systems from the traditional closed architecture to an open cloud computing architecture. Cloud computing has even been applied to key services. ICBC will
promote research on technologies related to cloud computing and the construction of cloud computing data centers, and migrating banking service applications to the cloud.

**Huawei:** The IT system and architecture of the traditional banking industry are complicated. To support banks’ digital transformation, we will need to adjust the traditional architecture and build a new IT architecture. Would you like to share any experience about this process?

**Lv Zhongtao:** After years of continuous technical innovation, ICBC has built a centralized and unified IT architecture across the world. This new architecture is a result of our rich experience in multiple architecture optimization projects, such as Project 9991, Project 1031, and the Three Data Centers in Two Cities project. This new IT architecture can meet ICBC’s requirements for product innovation and operations management development. Facing changes because of digital transformation and other new situations and development trends, ICBC initiated an IT architecture transformation in 2014. ICBC aimed to build a future-proof new technical framework by fully leveraging a distributed framework, cloud computing, and other new technologies, and integrating the open platform cluster system with mainframes. This new framework features openness, large capacity, high scalability, controllable costs, security, stability, and easy R&D, facilitating the digital transformation of banking services. We believe that, after years of development, each financial institution has their own business model and system architecture, and therefore they face different challenges. The application of new technologies cannot be simply copied or imitated. Instead, enterprises should apply technologies based on their specific needs to maximize the value of the technologies.

**Huawei:** What changes does cloud computing bring to ICBC? What is the plan for ICBC in the future?

**Lv Zhongtao:** ICBC is promoting a ‘centralized + distributed’ architecture as the core of its IT architecture transformation. Cloud computing provides key support for the construction and O&M of the distributed system. At present, we have tested cloud computing in services with a large elasticity in volume, such as commemorative coin reservation and quick payment, improving the elastic scalability capabilities of the system. In the future, we will expand the use of the cloud platform and promote IaaS and PaaS in Internet finance services with a large elasticity in volume, such as e-Commerce, e-Connection, and e-Bank. The application can unlock the potential of cloud computing in fast resource supply, fast software deployment, flexible scalability of process capabilities, and highly automated O&M management.

**Improve Data Processing Capabilities**
In September 2015, China released Action Outline for Promoting Big Data Development and offered a top-layer design and overall plan for fully promoting Big Data development and application in China. Banks’ capabilities to grasp, mine, analyze, and apply Big Data are key to accurate customer recognition, value acquisition, and risk prevention and control.

**Huawei:** Data has long been regarded as the most valuable asset of a bank. The application of Big Data can help the banking industry provide the core capability of risk control and assist banks in optimizing service processes, innovating business models, and improving service capabilities. What is your opinion? What plan does ICBC have for Big Data construction?

**Lv Zhongtao:** The banking industry is a typical data-driven industry. ICBC studied and applied Big Data early. In 2006, we started constructing our data warehouse. After years of construction, we have developed a comprehensive Big Data processing system which supports quasi-real-time and batch processing of structured and unstructured data. This system has been applied in multiple domains, such as customer precision marketing, risk prevention and control, and operations management, and achieved remarkable results.
In the customer marketing domain, we have built a precision marketing model to target customers based on various analysis, mining tools, and Big Data. This model distributes target customer lists to various channels, such as e-Connection, which achieves closed-loop management of marketing processes and meets the service needs of customer precision marketing.

In the risk management domain, we have built a comprehensive system based on our data warehouse, corporate information database, and other systems, that covers credit risk management, market risk management, operations risk management, and country risk management. We have also applied related risk quantification results to the entire service process and risk control domains, such as credit approval and risk warning. In the operations management domain, we have built a performance appraisal indicator library based on Big Data information assets, covering all aspects of bank-wide operations management and reflecting our management concepts and orientation. We have a full picture of each branch's performance, each department’s resource consumption, each employee’s value output, each product’s cost, and each customer’s business contribution. As such, we have found a new way to generate benefits from precision management and to speed up growth driven by management innovation.

In the future, ICBC will continue to study and apply Big Data. First, we will build an efficient, open, heterogeneous, and elastic Big Data platform based on a distributed database, Hadoop, and streaming technologies to achieve comprehensive analysis and quick sharing of information. This will further improve our Big Data processing capability. Second, we will introduce external data based on internal data. By cooperating with government functional departments, banks across the world, international organizations, and information service providers, we will obtain external data about market, risk, credit, tax, and court decisions to improve our Big Data analytics and application accuracy in the service domains. Third, we will strengthen Big Data service applications centering on enterprise-level data application system construction to fully utilize information.

Implement the e-ICBC Strategy and Explore Cross-Industry Innovation

In the future, banks will face severe challenges brought by highly competitive FinTech companies and Internet giants. FinTech will become the major aspect of banks’ technical work. What impacts does the development of blockchain and AI have on commercial banks?

Huawei: It is reported that FED has set up a working group to fully analyze the benefits of FinTech innovation, especially blockchain technology. A research report will be published later this year. Many foreign banks are actively participating in blockchain application innovation through various means. Some banks in China are also exploring this topic. What do you think of the changes blockchain has brought to the banking industry? Have ICBC conducted research into blockchain technology?

Lv Zhongtao: Recently, blockchain has attracted increasing attention from various parties. Financial institutions across the world are actively exploring blockchain. Internationally, R3 works with more than 60 financial institutions, such as Credit Suisse, Citibank, and HSBC, on the application of blockchain in the financial services industry. In China, blockchain alliances have sprung up. China’s banking industry is paying close attention to blockchain and increasing R&D and testing of blockchain. The People’s Bank of China has taken the lead in studying the issuance and organizational operations of digital currency. Some financial institutions, such as Sunshine Insurance, have trialed blockchain in a number of services.

ICBC has paid close attention to the technology tracking and study of blockchain. In early 2016, ICBC set up a blockchain research team and conducted technical exchanges with a number of universities and companies in the industry to better understand the latest blockchain technology. At present, ICBC has constructed the prototype of a financial product transaction platform based on blockchain and trialed this system inside a bank. The prototype plans to use the alliance chain mode...
to provide customers with point-to-point financial asset transfer and transaction services based on the traditional market making model.

**Huawei:** *Intelligence is one of the main features of the future banking developments. New business models are emerging, such as intelligent consulting and robo-advisor. In your opinion, what is the future of applying AI in the banking industry? What will future smart banks be like?*

**Lv Zhongtao:** AI has gone through three waves since the concept was coined in 1956. In recent years, with the maturing of Big Data and the breakthrough in distributed computing capability, AI has come to the third wave and has been used in more domains. The financial services industry is testing the applications of technologies related to AI in different ways.

In the future, AI will be widely used in the banking industry. AI can bring a new revolution to customer marketing services, financial product design, risk management and control, and operations decision-making management. In the customer marketing services domain, AI can enable intelligent product recommendations and precision marketing by simulating customers’ behavior. Some account managers may be replaced with intelligent machines and response systems, providing friendly, comprehensive, and efficient customer services. In the financial product design domain, we use machine learning technology to design differentiated financial products that can meet customers’ expectations based on numerous structured and unstructured data and tens of thousands of tag-based customer profiles. We can also optimize products by improving learning technology. For example, according to customers’ differentiated requirements of risks and benefits, we can build quantitative models with self-extraction of features and classification algorithm, providing intelligent support for investment decision-making and creating a robo-advisor. In the risk control domain, we use deep learning to improve the anti-fraud system for the entire process, including financial product application and transaction. For instance, to fight against telecommunications fraud, we can accurately intercept the transfer and remittance transactions of fraudulent accounts through intelligent anti-fraud monitoring systems to guarantee capital security. For credit risk prevention, we can detect the complicated, associated network of customers’ credit relationships in a multi-dimensional manner and construct a transmission model of default risks to identify the risk transmission path in advance. In the operation decision-making domain, we use semantic analysis, dynamic probability graphs, and game theory tools to predict the probability and time of incidents. This provides comprehensive, intelligent, and rational decision-making support for management. As an example, for the impact of political, economic, and social incidents on banking services, we can provide the basis for related analysis and propose measures or suggestions based on intelligent recognition and reasoning.

**Conduct Joint Innovation for Mutual Benefits**

**Huawei:** *In which areas does ICBC cooperate with Huawei? What is your expectation of Huawei? What does joint innovation bring to ICBC from a strategic perspective?*

**Lv Zhongtao:** At present, ICBC and Huawei are conducting joint innovations in multiple areas, such as cloud computing and distributed database. Joint innovation is a win-win process for both parties. ICBC can further apply advanced technologies in its IT system to support business innovation and Huawei can obtain a better understanding of the financial services industry to accelerate product maturity and improve product competitiveness.

I hope that both parties will increase cooperation and joint innovation, and make the best use of each party’s advantages to achieve mutual benefits. In addition, I hope that Huawei can invest more in new technologies, open more technologies to ICBC, and improve knowledge transfer. ▲
197 of the Fortune Global 500 companies choose Huawei as digital transformation partner.

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IT Transformation at China Construction Bank Helps Usher in a New Technology and Finance Ecosystem

By Jin Panshi, General Manager, IT Management Department, China Construction Bank
China Construction Bank (CCB) has successfully set up and put into operation next-generation IT systems that meet the bank’s business growth and strategic transformation needs and underpin the operations of the bank’s key financial services such as financial management, financial markets, and risk control services. This move by CCB is crucial to shifting from a traditional management model to a digital, enterprise-class management model. It’s also a key initiative in reforming financial systems and represents a worldwide role model for Banking 4.0.

Strategies Come First: Five Strategic Transformations Pay Off

China Construction Bank reported a fruitful year in 2016. According to its annual results, CCB’s total assets amounted to around USD 3.15 trillion (CNY 21 trillion), net profit reached approximately USD 34.18 billion (CNY 232.4 billion), and returns on average assets and average equity were 1.18 percent and 15.44 percent, respectively. The bank outperformed most of its rivals in terms of market value and key indicators. CCB also won over 100 industry awards from well-known organizations both at home and abroad in 2016, including the ‘Best Bank in China 2016’ award from Euromoney. In 2016, the bank placed second in the ‘Top 1,000 World Banks’ in terms of tier-one capital by The Banker, and 22nd in the ‘Fortune Global 500.’

The global economic situation has changed dramatically in recent years; interest rate liberalization, new financial regulations, external environments, financial innovation, and other emerging factors have had a huge impact on the entire finance industry. Despite a complex economic environment, CCB achievements have been impressive. The reason is that, in 2010, CCB started to change and transform itself to adapt to the fast-changing market. For example, the bank announced initiatives to build next-generation IT systems and create a new technology and finance ecosystem.

Driven by technical innovations, CCB has coordinated and united bank-wide resources to first clarify the ‘as-is’ and ‘to-be’ services, then adopt an enterprise-class methodology to streamline all services, products, and data and, finally, reinvent systems with new architectures and standards. CCB is dedicated to becoming one of the most valuable and creative banks in the world. To this end, CCB has accelerated its transformation in the following five ways:

- **Integration**

  CCB has integrated a variety of processes, including customer informa-
CCB has introduced a smart online robot. The robot has handled more than 1.2 billion service requests, with over 5 million daily interactions. The robot's response accuracy rate is 93 percent—a great improvement in efficiency that significantly reduces costs.

- **Multi-Functional Services**
  CCB has built a multi-functional platform that revolves around a finance ecosystem, and has reshaped dozens of key service systems (such as custody, financial markets, payment, and settlement systems). By doing so, CCB can provide customers with a holistic set of improved financial services characterized by flexible combinations and customizations. The bank also streamlined the entire transaction chain, which contributed to the building of a better finance ecosystem. Big Data technology has been applied in the bank to facilitate operations and management decision-making. Typical applications have been 'pushed' to customers by means of precision-marketing approaches. An in-depth analysis of customers' behavioral dynamics helps generate marketing data. We can then push differentiated advertisements to them, enabling the bank to achieve the best marketing outcomes.

- **Intensive Development**
  CCB has transitioned to an intensive production paradigm for counter services at bank branches by separating the foreground and background systems. This new paradigm has transformed the production model from siloed, serial, one-by-one service processing to parallel and streamlined service processing. As a result, the period of each corporate settlement handling is shortened from 5 minutes to 2 minutes, the acquisition of personal credit cards is accelerated from the industry average of 15 days to 7 days, the identity review and approval efficiency is increased by 20 times, and labor costs are reduced by over 5 times. This transformation improves service-handling efficiency, reduces operating costs, improves user experience, and mitigates the transaction processing pressure faced by bank branches.

- **Innovative Bank**
  CCB constructed a product assembly factory with relevant, agile R&D mechanisms. These implementations are used in CCB's 14 product lines and 136 basic products and help to quickly launch customized, salable products that support fast service innovation and growth.
  
  CCB also introduced 'DragonPay,' its flagship payment product. The DragonPay product is convenient, simple, and extremely popular. This innovative payment product covers all online and offline scenarios and integrates near-field communication, QR codes, and other technologies for the first time. Its major functions include 'CCB Wallet,' QR code payment, all-card payment, cloud-based quick payment, free withdrawals, payment by friends, AA payment, and Dragon Business Owner.

- **Intelligent Bank**
  CCB has removed bank-wide channel barriers and set up a holistic, collaborative, and intelligent channel system. This new system provides anytime, anywhere, and on-demand financial services and delivers consistent user experience in multiple scenarios, paving the way for an intelligent bank system. As part of the system, Intelligent Teller Machines (ITMs) provide customers with one-stop, self-service, intelligent, diversified service experience. About 60,000 ITMs have been installed to support approximately 200 non-cash services. Up to 67 percent of counter services are diverted to ITMs. Benefits include reduction of labor costs, improved productivity, and new channels for product sales and customer service support. In the near future, the new model of 'customer self-service as the major way; bank teller service as a supplementary way' will gain momentum. CCB has also introduced...
a smart online robot. The robot has handled more than 1.2 billion service requests, with over 5 million daily interactions (equivalent to the workload of 10,000 agents/attendants). The robot’s response accuracy rate is 93 percent – a great improvement in efficiency that significantly reduces costs.

**Bold Transformation and Innovation: Enterprise-Class IT Construction Plays a Pivotal Role**

CCB adopted a bold, far-sighted, coordinated, and global approach to implement mission-critical strategies. CCB’s achievements would have been impossible without the strong support of next-generation digital IT systems that include service, technology, and implementation transformation. Two keywords – ‘enterprise-class’ and ‘model-based’ – best describe CCB’s transformation.

- **Service Transformation**
  CCB adopted an industry-leading enterprise-class methodology to conduct service transformation. First, CCB carried out strategic planning by sorting out bank-wide services, data, and products. In doing so, CCB built a service value chain that involved all operations and management. Based on its transformation strategies and five-year plan, CCB finalized 26 service priorities and over 100 service components that established a bank-wide service framework. Then, CCB conducted enterprise-class modeling and enriched the service framework. This standardized, structured approach streamlined service processes, data, and products to accommodate both current and future needs. Finally, CCB designed and developed an IT architecture based on the modeling results.

- **Technology Transformation**
  Technology transformation established a holistic IT architecture based on service modeling results. Composed of 12 platforms in 7 layers, the IT service-oriented architecture features components, platforms, and loose coupling. It is stable, flexible, parameterized, and scalable. A distributed structure is adopted for the overall system, while a centralized structured is used for key applications. This ‘centralized and distributed’ converged architecture provides advantages such as strong security, stability, reliability, simple management, high cost-effectiveness, massive concurrency, and powerful processing capabilities. Moreover, CCB built the largest private cloud in the finance industry in China and constructed an economical, reliable, elastic, and universal cloud infrastructure that adapted to the Internet’s tidal business model in order to rapidly roll out bank products.

- **Implementation Transformation**
  Implementation transformation indicates that strict, full-lifecycle implementation techniques for IT system construction have been developed to regulate the input, output, references, and roles in all stages by each project team. A next-generation enterprise-class implementation management system has been established. The biggest benefit of the IT full-lifecycle management system includes central management of data during the entire process, from project feasibility studies and initiation, to requirement, analysis, design, encoding, test, migration, production, and O&M.

A comprehensive transformation of a huge banking group like China Construction Bank is as difficult as replacing the engine of an airplane in flight. Thanks to the unremitting efforts of all CCB staff in the last six years and the support of leading ICT vendors inside and outside of China, including Huawei, CCB has built next-generation, industry-leading IT systems. In the future, CCB will continuously improve its omnichannel technology and finance ecosystem that not only are ‘smart,’ but also beneficial to all. Through this ecosystem, CCB can provide customers with on-demand financial services anytime, anywhere, offer all bank branches convenient, considerate, professional, and reliable marketing tools, and pave the way for rapid development of the entire banking group.
China Insurance Giant CPIC Steps into the Digital Era
Like the garages where many tech startups got off the ground, a London cafe may be considered as the cradle of the modern insurance industry. Lloyd's Coffee House, near the River Thames, was a gathering place for mariners, merchants, and ship owners to discuss matters of interest to the community, including ship brokering, foreign trade, and the establishment of an auction market for the insurance market that later became Lloyd's of London.

In recent years, higher levels of income have improved the standard of living for many people. One result of this phenomenon is the decision to buy insurance as a means to manage risk. However, the complex nature of insurance products can easily put new customers off. Furthermore, traditional insurance marketing methods like cold calling, telemarketing, and face-to-face promotions are not keeping up with the fast-pace of Internet-era business relationships. People are no longer concerned just with insurance clauses – they are more willing to pay for their ideal way of life. Therefore, the insurance industry of the future will have more long-tail customers and need to deal with more scenario-based personalization and customization needs. Driven by a variety of factors in the current market, traditional insurance companies need to restructure their operating paradigms based on current customer behaviors and update their business models to encourage innovation. By doing so, they will be positioned to provide customers with smart, one-stop insurance services through all marketing channels, from consultancy to purchase and insurance claims to renewal.

The challenges confronting the legacy insurance industry are rising due to pressure from Internet start-ups that are opening new sales and marketing channels. Rising operating costs and increased efficiency are ongoing topics against the backdrop of an overall growth in business volumes. Traditional insurers are looking for a way to survive.

Exploration and Breakthrough: CPIC Joins Huawei in Move towards Digitalization

China Pacific Insurance Company (CPIC) and Huawei are expanding their cooperation to multiple fields, including data center and enterprise cloud construction, Big Data, artificial intelligence, and digital security. All of these efforts are helping to accelerate the completion of CPIC’s digital transformation.

Unlike food, clothing, or housing, insurance isn’t a basic necessity. Thus, the insurance

Omni-Channel Digital Services: Digital CPIC

Unlike food, clothing, or housing, insurance isn’t a basic necessity. Thus, the insurance
industry will always face challenges in marketing. Traditional marketing tactics relied upon personal referrals and door-to-door promotional approaches – neither of which scale efficiently and are better suited to one-time purchases. However, in today’s cloud computing and Big Data era, the insurance industry has innate data advantages. It’s now possible to deeply mine and analyze business data, customer information, and media information to create 360-degree customer profiles. The result is the ability to more accurately target potential customers and discover a wider range of opportunities by market segment or channel to innovate new products and gain better insights into the dynamics of the insurance market. Markets become more competitive when insurance companies are willing to reshape their business models and service patterns.

In 2016, CPIC and Huawei launched a finance and insurance solution that was built on an IT infrastructure and Big Data platform. CPIC quickly set up a Customer Data ATM processing system to mine and analyze hundreds of millions of customer-level data points, including age, education, income, family, and insurance purchase history. Based on the results, front-end business applications are fine-tuned to deliver individualized customer insights with a single click. The system supports 4,000 nodes.

In the past, when services for targeted insurance customers needed to be put on hold, the target customer groups had to be selected and extracted from the database manually. This approach was inefficient, time-consuming, and constrained by the minimal concurrency capabilities of systems. Customer service personnel were often unable to fulfill the potential needs of affected customers within a shortened time period. Today, CPIC is making a difference by using open-source Solr and Spark database technologies that provide real-time batch data processing for applications with an average query response time of three seconds. CPIC’s customer service system is built on this platform to support multi-level, multi-dimensional keyword searches that achieve instant results and second-level rendering. These new database technologies are paving the way for transitioning to more intelligent insurance services.

CPIC deployed Huawei’s Enterprise Cloud solution to optimize and upgrade its enterprise cloud. A new hyper-converged architecture that implements Software-Defined Storage (SDS) has greatly improved the response time for CPIC application systems. And to accommodate an expected increase in concurrent access by future customers, CPIC and Huawei have designed and verified a Software-Defined Networking (SDN) solution for its data center network with good results.

CPIC and Huawei are deepening cooperation in multiple fields, including data center and enterprise cloud construction, Big Data, artificial intelligence, and digital security. The partners are constructing CPIC’s cloud data center infrastructure, creating innovative industry applications, and improving digital security. They plan to explore and research further innovations for the CPIC cloud, smart customer services, and digital risk control.

In recent years, Huawei has reported fast growth of sales revenue in China’s financial services markets, with a CAGR of over 90 percent. Huawei’s products and solutions are utilized by many customers in the insurance industry to help them reach their digital transformation goals, which Huawei hopes to promote industry-wide.
197 of the Fortune Global 500 companies choose Huawei as digital transformation partner.

Partnersing for success in digital transformation

Huawei is working with partners, to reinvent integrated platform for business growth with Leading New ICT.

Explore e.huawei.com for more information
Huawei AgilePOL Helps Enel Push Forward Sustainability and Digitization
H

Innovation and Open Power

On July 7, 2017, an electric single-seat Formula E racing car was in the heart of Rome, the Eternal City, just behind the statue of Marcus Aurelius. This special exhibition was related to the conference titled ‘Projects for Sustainable Mobility. Formula E, a successful experience,’ which was supported by Enel and was to present initiatives for the promotion of sustainable mobility in Rome.

Enel is a global power partner of Formula E, the global championship for single-seat electric racing cars that also serves as a cutting-edge laboratory for electric transport of the future. For Formula E, Enel provides digital intelligent technology such as smart meter, energy storage, solar panels, and charging stations, that enables the monitoring of energy consumption within the racetrack area, while using renewable energy to power the racing cars, the technical areas, and other spaces at the race venues.

This is a symbol of innovation by Enel. For more than 50 years, Enel has powered innovation and progress around the world, changing the way people consume energy.

Enel now ranks 84th in the Fortune Global 500 list. As a multinational company, Enel has grown its business to more than 30 countries, and owns the largest global distribution grid network. As the world is facing greater challenges than ever before, Enel has the power and responsibility to change the world in a new, sustainable way. Innovation and sustainability are at the heart of Enel’s business strategy, in line with Enel’s ‘Open Power’ vision. Open Power means opening energy access to more people; opening the world of energy to new technologies; opening new ways for people to manage energy; opening new uses of energy; and opening more partnerships.

There is another company that has been placing innovation and openness at the heart of business strategies through its New ICT solutions. The company is Huawei, a leader on the road to digital transformation with its partners and customers.

Innovation and openness brought Enel and Huawei together. The two companies decided to do something innovative, starting at Enel’s headquarters building.

Growing Challenges in the Headquarters Building

To accelerate its global presence and improve office efficiency, Enel had introduced bandwidth-consuming services such as desktop cloud, mobile office, and video conferencing; however, its original network failed to support these new services due to complex network structure, high latency, and low network speeds. This affected employees’ office efficiency.

Additionally, traditional networks had some issues in cabling, costs, energy consumption, space occupation, and upgrade/capacity expansion. For example, expensive, separate cabling for audio, video, and data services costs took up about 80 percent of the total campus network investments. A large number of access switches were used, consuming much electricity and requiring an air-conditioning system for cooling. This not only resulted in large energy consumption but occupied much valuable physical space.
Enel decided to find new ways to deliver smarter, faster, and more economical OA services, with simpler deployment, and less space and energy. Enel teamed up with Huawei for network analysis and renovation of the old network system. To tackle the problem, Huawei proposed a Passive Optical LAN (POL) solution based on GPON technology.

**AgilePOL Helps Enel Push Forward Sustainability and Digitization**

A POL solution can deliver gigabit speeds over 20 miles and provide video, data, and voice all in one fiber cable with security and durability, enabling a smarter network.

Huawei’s AgilePOL solution has a flat network architecture and is composed of converged OLT, passive Optical Distribution Network (ODN), and Optical Network Units (ONUs). The solution uses a dual-home mechanism to ensure high network reliability in case of network failure. The switchover time is not more than 50 milliseconds, ensuring a good user experience. Additionally, the ODN network is future-proof to support smooth evolution of 10G PON/40G PON.

Now, Huawei’s AgilePOL network is running stably to support Enel headquarters services and provides positive experiences.

- **Network performance improved greatly**: With the new network, Enel increased network speed from 100 Mbit/s to 700 Mbit/s. The resulting benefits include better user experience with cloud and mobile services and higher OA efficiency

- **Power savings**: Estimates show that this network renovation can save energy by over 60 percent

- **Space savings of 80 percent**: Enel’s headquarters is an eight-story building and accommodates over 1,000 employees. According to the original network solution, each story occupied one equipment room, meaning that a total of eight equipment rooms were needed. After network renovation, however, the entire building only needs one equipment room. The remaining equipment rooms can be reused as meeting rooms

- **50 percent higher deployment efficiency with over 50 percent lower OPEX**

  Renzo Valente, Head of Global Telecommunications, Enel, said, “Digitization is, in fact, an enabler of sustainable growth, and it is a key factor to achieve an open power approach in the energy business. We are trying to digitize both the processes through which we offer services to our end customers and our internal processes, focusing on the use of cybersecurity, the optimization of applications, data center transformation, a massive use of cloud technology, and smart and mobile working. Huawei POL provides what we need in digitization within the company and makes our network more reliable, efficient, and energy-saving. Huawei is a reliable partner, and I’m looking forward to more cooperation with Huawei in digitization and sustainability.”

**Embracing New Technologies for the Energy Industry**

Digital transformation is a train not to be missed, offering an invaluable
opportunity to innovate and to increase the competitiveness of production systems worldwide.

Based on Enel’s 2017-2019 enhanced strategic plan, it will focus on digitization and customers. Enel thinks that digitization would help people become more environmentally conscious in everyday activities: live streaming of meetings and conventions, mobile work, GPS tracking tools for operational teams, and drones to monitor networks and systems – a series of innovations that allows users to cut down on CO₂ emissions. For example, 421 telepresence meetings were held in Enel during the first nine months of 2015, avoiding the emission of 4,815 tons of CO₂.

Digital transformation also supports Enel’s business in the development of network technologies, from smart grids to digital meters, to the collection and analysis of data in order to optimize electricity generation from renewable sources.

All these innovations and transformations are inseparable from ICT, and this is why ICT can make business more sustainable. As a global leading ICT solutions provider, Huawei has developed fully connected power grid solutions that cover every aspect of the electric power industry. These solutions utilize a wide array of access and communications technologies that enable comprehensive sensing of electricity terminals, either wired or wireless. Huawei cloud data centers consolidate and share grid-wide data to support intelligent analytics and management, offering the outstanding support that a smarter grid needs.

Since the day Enel was founded in 1962, it has worked hard to enable businesses, nations, and individuals to thrive by connecting them to electricity, gas, and the right services for their needs. To this end, Enel is interacting with key players of the digital world and has constantly embraced new technologies, including cloud computing, Big Data, and the IoT, to make energy reliable, affordable, and sustainable, from the introduction of the first smart meter to becoming the world’s largest producer of renewable energy.

With their respective advantages in innovation and openness, Enel and Huawei are looking forward to more cooperation in the energy industry, aiming to make this world more sustainable. Imagine a world where your mobility is electric and your home lighting is intelligent. Everybody is a beneficiary of smart energy.
Smart Grids Open Up New Opportunities

By Liu Jianming, Deputy Director of the Power Informatization Study Committee, China Society for Electrical Engineering
Digital transformation is disrupting and reshaping the electric power system. As Information and Communications Technology (ICT) and smart grids gain momentum and grow faster over the next decade, unparalleled opportunities will be created for enterprises and the entire electric power industry.

Chinese Government Recognizes Importance of Smart Grid Development

Traditionally, the electric power system is structured in a chain of distinct, sequential phases from generation, transmission, transformation, distribution, to consumption. Comparatively, the ring structure of an ICT-based, integrated smart grid allows the functions of each phase to be changed as directed by transmitted information and service flows.

In August 2016, China’s State Council issued the 13th Five-Year National Science and Technology Innovation Plan (2016-2020). The Plan calls for the accelerated implementation of major national scientific and technological projects to meet goals set for 2030. The Plan states that China should lead in making strategic breakthroughs in fields, such as: Aircraft engines and gas turbines; deep-sea stations; quantum communications and computing; brain science; cyberspace security; deep space explorations and spacecraft maintenance systems; seed industry innovation; clean and efficient coal use; smart grids; integrated space-terrestrial information networks; Big Data; smart manufacturing and robotics; healthcare; new materials research, development, and application; and environmental governance in the Beijing-Tianjin-Hebei region.

In July 2015, the Guiding Opinions on Actively Promoting the ‘Internet Plus’ Action Plan, promoted by the State Council in China, put forward specific ‘Internet Plus’ smart energy actions. Key initiatives included smart energy production, distributed energy networks, new energy consumption modes, and new communications facilities for smart power grids. Guided by this action plan, China would set up green electricity transaction service areas, advocate intelligent energy use among consumers, promote Power Fiber-To-The-Home (PFTTH), optimize the information communications system for Energy Internet, and encourage new businesses such as household energy efficiency management that rely on smart power grids. A specific priority is the development of green energy networks that integrate energy storage facilities, the Internet of Things (IoT), and intelligent electricity consumption facilities as well as derivative services such as carbon trading and Internet finance.

China has two major power grid companies: State Grid Corporation of China (SGCC) and China Southern Power Grid Co., Ltd. (CSG). SGCC has a customer base of over 1.1 billion, while CSG serves a population of over 230 million. SGCC and CSG ranked No. 2 and No. 100, respectively, in the 2017 Fortune Global 500. Leading ICT vendors such as Huawei have played a vital role in making power grids smarter and more digital, and made great contributions to the thriving smart grids.

Modernizing the electric power system constantly reinvents the traditional electric power system using ICT technologies. In China, power grids are endlessly evolving from the earliest manual dispatching, to automated dispatching, to the current smart grids, and even to the future Energy Internet.

SGCC’s Practice for Smart Grids

Over the past decade, a new era of ICT technologies represented by
cloud computing have played a key role in China’s transformation to smart grids. Proof of this can be illustrated by how SGCC has experienced dramatic changes from 2006 to 2016 (see figure below). By using ICT technologies and smart grids, SGCC reports a decrease in line loss rates from more than 8 percent in 2006 to less than 6.3 percent in 2016.

SGCC’s investments in grid digitization also keep increasing year after year. From 2016 to 2020, SGCC plans to invest USD 54 billion in grid digitization, accounting for 18 percent of the total power grid investments. An important portion of these ICT investments is expected to cover smart meters, the Internet of Things (IoT), and Internet infrastructure.

As of June 2017, approximately 430 million smart meters were deployed in SGCC’s Advanced Metering Infrastructure (AMI). A hybrid network architecture, including optical fiber, wireless, and wired connectivity, was installed to centrally manage and collect data from these smart meters. SGCC is now the world’s largest user of smart meters. Nationwide, SGCC can easily understand the consumption details of enterprises and residents and properly arrange electricity loads for stable power supply. For the coming Energy Internet, consumers will monitor and control each household appliance in real time, as well as understanding the history of household electricity consumption.

In China, the ‘Internet Plus’ Action Plan as well as cloud computing and Big Data strategies are being implemented at an accelerated pace – and ICT technologies are a core driving force to upgrade traditional industries and propel emerging industries.

In April 2017, SGCC officially launched an ‘SGCC Cloud’ that is built on an SGCC Cloud platform (or cloud platform) with various supporting applications. The SGCC Cloud consists of the Enterprise Management Cloud, Public Service Cloud, and Production Control Cloud (called ‘three clouds’).

The Enterprise Management Cloud targets resources and services such as analytics, decision-making, and general management. The Public Service Cloud deals with extranet resources and services, including marketing, customer service, and eCommerce. The Production Control Cloud handles resources and services for operational control and management.

The cloud platform behind the three clouds centrally manages IT resources, including facilities, data, services, and applications. Benefits include better information storage, transmission, integration and sharing, higher levels of service integration, faster application rollouts, better user experience, and more reliable system operation.

The SGCC Cloud is deployed in the 3-city central data center and 27 provincial (municipal) data centers. In 2016, SGCC started the trial use of the Enterprise Management Cloud and the Public Service Cloud in its headquarters and nine local power companies. During the trial use, the cloud platform components were deployed, and as many as 12 types of applications such as line loss and integrated team management were migrated to the cloud.

During the duration of 13th Five-Year Plan (2016-2020), SGCC will finish building the SGCC Cloud. Specifically, SGCC will train an expert team to master the core technologies of cloud computing to accelerate new service innovation, flexible resource allocation, smarter use of data, more efficient service integration, and accelerated application development, taking SGCC’s IT usage to new levels.

Embracing the Energy Internet of the Future

According to the Guiding Opinions on Actively Promoting the ‘Internet Plus’ Action Plan issued by China’s State of Council, Energy Internet will
be a hot topic over the next decade by using an Internet mindset to make energy networks open, equal, shareable, and interactive as the Internet. Analogous to Local Area Networks (LANs), Wide Area Networks (WANs), and backbone networks, the Energy Internet has three levels: Home Energy Internet, City-wide Energy Internet, and Global Energy Internet.

Home Energy Internet — specifically Home Energy Management Systems (HEMS) — help to easily understand the electricity use of household appliances, and properly monitor and utilize various energy resources such as water, electricity, gas, and heat. City-wide Energy Internet efficiently and appropriately allocates various energy resources across entire cities for maximum emission reduction and energy conservation. Global Energy Internet connects energy networks around the globe. All the three levels of Energy Internet are impossible without advanced ICT technology support.

- **Home Energy Internet**: In accordance with files such as *Guiding Opinions on Promoting the Development of ‘Internet Plus’ Smart Energy and the Notice on Organizing and Implementing Pilot Projects of ‘Internet Plus’ Smart Energy (Energy Internet)*, the National Energy Administration in China takes charge of the application, review, and approval of pilot projects related to ‘Internet Plus’ Smart Energy (Energy Internet). The first batch of pilot projects is now underway. Centralized data collection from water, electricity, gas, and heat meters was implemented for approximately 2.6 million users by the end of June 2017. At present, many companies in China have begun pilot projects for Home Energy Internet. Examples include a fiber optic network based on the existing power distribution network,
and routing the Optical Fiber Composite Low-voltage Cable (OPLC) from the distribution room in the community to the in-building distribution box, and then to the household. All these pilot projects pave the way for deeper use of ICT technologies on power grids. As of June 2017, these pilot projects had covered approximately 20 million users and created high-speed communications channels for better home energy management and Internet usage. In particular, Liaoning Electric Power Company of SGCC has undertaken China’s key project to research and try key technologies for Power Fiber-To-The-Home (PFTTH). Currently the project is running smoothly. Upon completion, home users will benefit from a transmission speed of up to 1 Gbit/s.

• **City-wide Energy Internet:** With the growing popularity of smart cities, City-wide Energy Internet is starting to gain momentum. In the pilot City-wide Energy Internet project in Tianjin City, electricity generated from enterprises rather than traditional power plants is incorporated into the electric power grid along with photovoltaic, solar, and geothermal heat. These enterprises have deployed a special system to monitor power generation, allocate electricity among office buildings and other areas, and understand the operating details of different power generation modes and energy storage. Electric power flow, service streams, and information flows are converged to achieve the desired interconnection results. For example, Jiangsu Electric Power Company of SGCC has been selected to research a friendly, interactive supply-and-demand system between urban users and power grid. Upon completion of this project, the overall energy consumption of urban users will go down by over 5.5 percent, and the peak-valley load difference of electricity usage will be decreased by over 5.8 percent.

• **Global Energy Internet:** In September 2015, President Xi Jinping delivered a speech titled “Seek Common and Sustainable Development and Forge a Partnership of Win-Win Cooperation” at the UN Sustainable Development Summit, in which he stressed that China’s proposed global energy network would meet the global power demand with clean and green alternatives. In May 2017, President Xi delivered another speech titled “Work Together to Build the Silk Road Economic Belt and The 21st Century Maritime Silk Road” at the opening ceremony of the Belt and Road Forum (BRF) for International Cooperation in Beijing in which he urged his audience to capture opportunities presented by changes in the energy mix and the advancements of energy technologies to develop global interconnections and achieve green and low-carbon footprints. The scope for Global Energy Internet lies in the fields such as wind power, photovoltaic, and thermal power generation. Countries along ‘One Belt, One Road’ often experience energy shortages, which seriously constrain their further growth. If China’s advanced technologies and equipment can be exported to these countries, this will help accelerate energy transportation between countries, building a solid basis to boost economic growth. The Global Energy Interconnection Development and Cooperation Organization (GEIDCO) initiated by SGCC has been set up in China. Of GEIDCO’s first 17 board members, Huawei is the only ICT solutions provider. With its leading expertise, Huawei is dedicated to providing strong ICT support for global energy management characterized by better connected global energy backbone networks and space-air-ground integrated networks.

Digital transformation has started to disrupt and change electric power systems. ICT technologies have become the ‘nervous system’ of power networks. New energy sources and energy storage technologies (for coal, oil, gas, water, and nuclear) are developing; and new-generation ICT technologies such as cloud computing, Big Data, the IoT, and mobility are helping to increase energy utilization. The electric power system will transform to smart grids and Energy Internet in the future, and the convergence of ICT and smart grids will grow faster over the next decade to create unparalleled opportunities for enterprises and the entire electric power industry. A better future is awaiting us.
Thailand PEA’s Digital Transformation to a Smart Grid Starts from Its IP-based Evolution
Huawei’s unified, customized transmission solution for PEA uses technologies such as PCM and Smart 40G. The solution transmits electrical power and office services to support the smooth evolution towards an all-IP network. It also ensures highly reliable transmission of mission-critical services.

Bringing the Light from Chiang Mai to Phuket Island
With its unique charm, Thailand attracts tens of millions of tourists from around the world every year. In Chiang Mai, the Rose of the North, tourists can walk in the ancient city, visit old temples, and pray to the Buddhist deity Phra Phrom for world peace. On Phuket Island, the Pearl of the Andaman Sea, visitors can enjoy sunshine on beautiful beaches or swim in the sea. Although Phuket Island is 1,200 km away from Chiang Mai, and both cities boast of different scenery, they are decorated by beautiful lights at night.

The Provincial Electricity Authority (PEA), Thailand’s largest electric power company, plays an important role in supplying power for those lights. PEA aims to provide affordable and reliable electric power services for consumers. It serves 17 million customers in 99.98 percent of the area of Thailand. With 512 substations and 914 offices, PEA offers power transmission of up to 10,173 circuit kilometers and 24,000 kilometers of optical fibers. PEA not only brings a colorful experience to local residents and international tourists, but also promotes Thailand’s economic growth.

Urgent Need to Upgrade Power Transmission and Provide Consumer Services
The digital transformation of traditional electrical power companies is the only road to fast development of smart grids. With the rapid growth of IP-based services, PEA’s early communications network for power transmission could not meet the needs of service development. For example, its legacy grid is old and vendors of some equipment have stopped providing boards and chips, making it difficult to buy spare parts. This situation has multiplied O&M costs. What’s more, legacy Synchronous Digital Hierarchy (SDH) devices cannot provide sufficient bandwidth for new services such as video surveillance. Some existing services, like SCADA, were able to take advantage of IP networks, but PEA’s network could not accommodate the evolution. All these problems prompted PEA to upgrade its power transmission networks.

Unified Transmission Solution Helps PEA Evolve Services to IP
As one of the most important electric power companies in Southeast Asia, PEA has been exploring how to apply advanced ICT to upgrade its power grid. One of PEA’s major projects is the study of the evolution of key technologies that can transform power backbone and distribution transmission networks into a smart grid.

Huawei began discussions with PEA in 2014 about ways to upgrade its power grid. Many critical production services and Pulse-Code Modulation (PCM) services of the existing network needed to be smoothly moved to a new network without affecting service quality or security.
PEA also has been launching new services. The new network required flexible access and capacity expansion for those services.

After thoroughly analyzing PEA’s demands, Huawei conducted many experiments and tests to develop a unified transmission solution customized for PEA. The solution completed the upgrade of PEA’s power transmission by adopting several methods, such as customized network migration tools, dual-domain bridging technology, and reused network management and equipment. With this solution, PEA’s transmission network entered a new stage.

- **Seamless, secure, and reliable interconnection of old and new networks with smooth network evolution:** The electric power industry is the fundamental engine of a country’s economic development. A public power grid is an indispensable part of modern life and affects the national economy. Therefore, any upgrade must ensure reliable, secure service cutovers. Huawei’s customized migration tools ensured that existing services were not adversely affected. What’s more, the tools can access new services and provide spare parts service for up to 10 years as the network continues to evolve.

- **Soft and hard pipes for unified transport of production and office services satisfy future development needs:** TDM services, such as dispatch telephone and relay protection, are carried by mature and reliable SDH hard pipes to ensure low latency and jitter. Bandwidth-hungry services, such as video surveillance and office automation, are carried by MPLS-TP soft pipes to fully utilize network resources and ensure flexible and efficient transmission. This combination of hard and soft pipes supports PEA’s strategic choice to evolve towards all-IP networking.

- **Built-in WDM and ultra-long-haul transmission technology simplify the network and reduce investment:** To solve the existing network’s problem of insufficient optical fiber resources, the built-in WDM solution enables high-bandwidth transmission and conserves fiber resources by using one pair of fibers to uniformly carry multiple services. Furthermore, to deal with many ultra-long-distance network spans (80 km to 200 km), Huawei applied built-in optical amplifiers to reduce the number of regeneration sites and minimize overall network investment costs.

Huawei’s unified, customized transmission solution for PEA uses technologies such as PCM and Smart 40G. The solution transmits electrical power and office services to support the smooth evolution towards an all-IP network. It also ensures highly reliable transmission of mission-critical services.

Huawei’s professional technical teams planned a unified network, ensuring stable network operations. Unique technologies, such as built-in WDM and ultra-long-haul transmission, simplify the network and reduce overall network investment. Huawei also committed to providing spare parts for 10 years. In addition, ultra-high bandwidth and flexible scalability will satisfy the PEAs development needs over the next three to five years. This solution will serve as an important example for power companies’ upgrades to smart grids around the world.

With the rise of the Internet of Energy and large-scale growth of new energy sources, building a better connected smart grid has become a general trend. Huawei aims to achieve further mutual benefits with PEA. In 2016, Huawei and PEA initiated strategic cooperation in innovation centers so that the two companies can collaborate on the development of innovative and competitive solutions.

“Huawei’s innovation center for the electric power industry is the first of its kind in the world,” said Wang Yifan, manager of Huawei’s Thailand office. “It’s also part of our engagement in Thailand’s Smart City program. We will continue to strengthen our cooperation with the Thai government and PEA to promote best practices for R&D and quickly produce innovative results to achieve win-win solutions.”

So, the next time you travel to Thailand, you can quietly admire local night views and think about PEA and Huawei’s efforts that generated the bright lights. ▲

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**Customer Testimony**

“The reconstructed power grid carries production and office services in a unified manner, enables electric power services to be migrated to an all-IP network in the future, and ensures reliable transmission of key services. It delivers powerful performance and flexible scalability to meet service development requirements for the next three to five years.”

— SUPATAT INKHOW, Regional Manager, Network Communication Department, PEA
Huawei Partners with Dubai Airports to Build a Smart Airport
Dubai Airlines partnered with Huawei to build the world’s first MDCC to receive Tier III certification for design and construction, providing reliable information infrastructure for their smooth airport business operations and making Dubai International Airport the most popular smart airport in the world.

The Giant along the Maritime Silk Road
A cargo vessel loaded with commodities manufactured in China departed from Shenzhen for Dubai, a city on the southeast coast of the Arabian Gulf and an important stop on the 21st Century Maritime Silk Road. The commodities were mainly sci-tech products including computers and mobile phones, instead of the silk, chinaware, and tea exported to countries and regions along the ancient Silk Road thousands of years ago. There were also several containers with the Huawei logo loaded on the vessel. They carried Huawei’s prefabricated modular data centre inside. After a month-and-a-half-long voyage, the vessel arrived at Jebel Ali Port in Dubai, the world’s seventh largest container port. Very early the next morning, the cargoes and containers were unloaded and shipped to the final destination – the data centre construction site near Dubai International (DXB) Terminal 2. Technicians and engineers from Dubai Airlines, Huawei, and Huawei’s partner ALEC, had long been expecting the prefabricated modular data centre and had been making preparations over the past four months.

This was, in fact, a very challenging data centre project. In recent years, driven by the rapid business growth, the eternal pursuit of a better passenger experience, as well as the increasing social responsibility of eco-friendliness and energy conservation, data centres have become an important part of Dubai Airlines’ digital transformation. Dubai Airlines had several data centres, with devices provided by many vendors, complicated management, and limited cooling capacity. A new data centre, therefore, needed to be built to further expand airport services and consolidate services of the legacy data centres. The new data centre was designed to have 100 service cabinets, with up to 10 kW/rack in a single cabinet. To ensure high reliability, Dubai Airlines expected to build the world’s first Modular Data Centre Complex (MDCC) within a year that will be certified by the Uptime Institute to Tier III for design and construction. The 10 kW/rack power density requirement, plus the extremely high temperatures in Dubai, posed a greater challenge to heat dissipation; however, an appropriate building to house such a large MDCC wasn’t readily available. After thoroughly considering quick deployment, easy capacity expansion, energy conservation, and other important features, Dubai Airlines chose Huawei’s prefabricated modular data centre solution.

Prefabri cated Modular Data Centre
Huawei’s FusionModule1000B prefabricated modular data centre solution was adopted to build the new data centre for Dubai Airlines. The solution consists of 23 container-sized prefabricated modules, equipped with in-row precision air conditioners and highly efficient modular UPS products. The total power is up to 1 MW. To obtain full Tier III certificates from the Uptime Institute for both design and construction, the data centre must ensure an availability of 99.98 percent and an annual downtime within 1.6 hours. The project was estimated to be completed in 10 months, meeting Dubai Airlines’ requirement for quick delivery and addressing the problem of lack of space for building a traditional data centre. The modular data centre solution saves nearly a half of the time and construction costs it takes to erect a traditional facility.

Huawei FusionModule1000B adopts a wide range of cutting-edge data centre technologies to improve energy efficiency. The variable-frequency in-row
air conditioner, highly efficient modular UPS, and aisle containment can reduce the designed Power Usage Effectiveness (PUE) to less than 1.6, which is 30 percent lower than that of a traditional data centre. The design is also more adaptable to the intense hot weather in the Middle East. In addition, Huawei equipped the new data centre with the NetEco intelligent management system to simplify O&M and reduce management costs. The size of the prefabricated modules complies with ISO standards. Therefore, the capacity can be easily expanded by adding required modules. Compared with traditional data centres, this implements flexible expansion and saves the engineering costs and floor area.

DXB Plus Program

Dubai Airports has made sound plans and preparations to build such a large-scale data centre. Since 1960, DXB has grown into the world’s number one airport for international passenger traffic and the one of world’s largest logistics transfer hub. However, with the Expo Dubai 2020 approaching, the airport faces increasing pressure to provide more efficient and smooth operations. The annual passenger traffic of the airport is estimated to increase from 83.6 million in 2016 to 118 million in 2025. To meet rising customer expectations and accommodate ongoing growth in traffic, Dubai Airports has launched the DXB Plus program which aims to use innovation and technology to increase the hub’s capacity.

Peter R Moore, Director of Development (Design) at Dubai Airports commented: “With little room for any further major infrastructure on the airport, Dubai Airports is joining forces with its key stakeholders to design product innovation and operational improvements that will deliver on the sector’s ambition and ensure ongoing contributions to Dubai’s economy. The focus of DXB Plus is to integrate the sector’s efforts to meet airline demand and ensure a world-class customer experience from ‘cloud to curb’ — vital for delivering unconstrained sector growth.”

The MDCC at DXB represents an innovative masterpiece jointly created by Dubai Airports, Huawei, and other players in the ecosystem. The MDCC meets the information infrastructure requirements specified DXB Plus, helping Dubai Airports to achieve stable and efficient operations, as well as digital and cloud-based business over the next ten years.

Customer Experience Matters Most

One of the world’s most popular airports provides not only upgraded hardware infrastructure, but also an optimal customer experience. The International Air Transport Association (IATA) conducted a worldwide survey in 2016 to provide some references and suggestions for airports. The survey results show that 64 percent of the respondents prefer to board aircraft using electronic boarding passes on their mobile phones, 39 percent prefer electronic bag tags, and 61 percent expect to track their baggage throughout their journey, similar to the way courier companies allow them to track parcels. Also, 47 percent of the respondents hope the time for baggage drop-off can be limited to within one to three minutes, and 52 percent said their acceptable queuing time at immigration is between 5 to 10 minutes.

Dubai Airports always puts customer experience first. The company attempts to optimize customer experience with a three-pronged approach: products, operations, and airport infrastructure. Products, based on a deep insight into future trends, behaviors, and expectations of customers, Dubai Airports integrates products and services to deliver a consistent customer experience, and lead the innovation of future products and services that enhance hospitality and meaningful connections. As for operations, Dubai Airports aims to enhance the predictability of airport operations, ensure cost-effective use of existing assets, provide a reliable, resilient, and streamlined process for each customer touch point, and ensure a stress-free journey for the varying customer types. Last, but not least, Dubai Airports will conduct customer-centric design and development of infrastructure and ecosystem, providing sufficient...
capacity to accommodate sustained airline and operator growth while maintaining the integrity of existing infrastructure.

Dubai Airports is proactively continuing to optimize customer experience in a wide range of aspects, including customer service and processing, baggage and cargo processing, operations, airspace and runways, stands, and infrastructure. Great efforts have been made to enable free Wi-Fi, Smart Gates, data collection and sharing, airport Apps, requirement forecasts, asset management and maintenance, and flight punctuality rate management, among others.

Smart Gates are deployed at DXB to speed up passport control procedures, facilitating smooth and swift entry and exit at the airport. A passenger holding an Emirates ID card or a biometric passport can bypass long queues and complete immigration process within seconds. The Smart Gate service saves passengers’ time and helps the airport maintain smoother passenger flow.

New ICT Helps Build a Smart Airport
According to the Société Internationale de Télécommunications Aéronautiques (SITA), cutting-edge technologies are needed to optimize Information and Communications Technology (ICT) systems, thus building a dynamic, efficient, collaborative, and innovative smart airport to accommodate future needs. How can we use new ICT technologies to support smart airport construction? For example, cloud computing and Big Data make airports more intelligent. Advanced network technologies ensure ubiquitous connections. LTE technologies help provide network coverage over the airports’ airspace. The Internet of Things (IoT) supports interconnected and intelligent devices. With these new ICT technologies, all businesses will become digitalized while service levels rise. All these achievements are inseparable from data storage, transmission, and computing. In other words, all these cannot happen without data centres.

After being officially rolled out, the MDCC constructed by Huawei at DXB will carry services that cover almost every aspect of the airport, including flight information and airport operations, passenger transportation and baggage services, connectivity and Internet services, video surveillance, enterprise business operations, and maintenance. Featuring resilience, quick deployment, reliability, energy-conservation, easy maintenance, and cost effectiveness, the MDCC provides powerful support to carry out highly efficient business operations in Dubai Airports.

The CIO at Dubai Airports said “Technology is the key to enhancing our ability to grow, innovate and, ultimately, enhance the customer experience. At the same time we will improve system reliability across both airports and cut operational costs.”

With all these efforts, Dubai Airports will present an optimal customer experience and the highest levels of mobility, sustainability, and opportunities to visitors coming from around the globe to the Expo Dubai 2020, and show them what the world’s best smart airport can offer.
A Shared Journey: Customer-Centric Innovation

By Matthias Heutger, Senior Vice President, DHL Customer Solutions & Innovation
Logistics is a competitive business. On the surface, it seems straightforward—moving something from here to there—but the truth is that, in many cases, the relative success of a company’s supply chain is a ‘make or break’ proposition. Lean manufacturing has more or less become the standard approach among the world’s largest companies across nearly every sector, which is why many businesses are now turning to logistics providers for ways to help maintain a competitive edge.

This is our specialty within the Customer Solutions & Innovation (CSI) organization at DHL where we provide a single point of contact for DHL’s largest customers at a global and regional level as well as driving innovation and sector leadership on behalf of the group. There are many benefits to this arrangement, one of which has been the opportunity to work closely with our customers to develop innovative industry-tailored solutions.

‘Innovation’ is another term that seems simple at first glance, but as we refined our innovation efforts over several years, we realized that the word carries vastly different meanings. For many, it was essential for innovation to be incremental and evolutionary, but there were others who welcomed disruptive innovation. It became clear that we’d need to closely analyze each customer’s needs to satisfy the full range of innovation demands.

Once we came to this realization, we increased our investment in proactive customer engagement and embarked on a more ‘customer-centric’ innovation approach, a direction that has proven quite rewarding for us and, more importantly, for our customers. These efforts were even recognized on a global stage when we received the SAMA Excellence Award™, which honors best-in-class practices in the area of strategic account management, for our customer-centric account management and innovation approach.

Putting Innovation into Practice

Implementing our new approach wasn’t only a matter of changing mindsets. We also had to ensure we had the right foundation in place—literally, to allow us to put innovation into practice. We already had an Innovation Center established near our global headquarters in Bonn, Germany, but, after seven years, it needed an overhaul and it also no longer reflected our innovation philosophy. Therefore, we fully committed ourselves to further developing a stronger link to our customers by completely rebuilding the Center, which we reopened in 2015 with a completely new look and a new customer-centric approach.

Additionally, we decided to open a second Innovation Center in Singapore to better accommodate our Asia-Pacific-based customers, which opened later that year in December 2015. Building upon that success, we are now preparing the third addition to our network and will open our Americas Innovation Center close to Chicago, Illinois, in the USA in 2018. Our global state-of-the-art Innovation Centers serve as the nucleus to engage with our customers, in an environment where they can discover and experience the latest trends and innovative logistics...
solutions and, furthermore, connect with subject-matter experts from our industry and beyond. These creative and inspirational surroundings enable us to dive even more deeply into the challenges of our customers in DHL-led workshops. Each customer visit helps both sides to generate ideas to help resolve immediate concerns, while also strategically preparing the customer for the future.

Adding Customer Value with Thought Leadership
To further embed innovation into our DNA, the DHL CSI team launched a new and structured Trend Research approach that focuses on insight generation, new concept development, prototyping, and proof of concepts.

The team leverages the industry expertise of our customers and global partner network, including institutes such as Fraunhofer and MIT, in order to jointly produce their annually updated flagship publication — the Logistics Trend Radar. This dynamic tool identifies and assesses the impact of social, business, and technology trends in the logistics industry and acts as the basis for all trend research projects.

The DHL trend research team also publishes multiple deep-dive Trend Reports. Recent reports include The Sharing Economy, Omni-Channel Logistics, Robotics, and 3D Printing. These publications examine trend developments and emerging best practices, identify potential sector-specific applications, and consider logistics implications.

To further inspire customers and position the organization as a Thought Leader on innovation, the Trend Research team actively involves customers and industry partners in developing ‘logistics use cases’ through prototyping and proof-of-concept analysis. This process provides an ideal starting point for new solution development, led by Deutsche Post DHL or DPDHL Group business divisions. A typical outcome is an enrichment of the solution and service portfolio.

Huawei and DHL will collaborate on innovation projects focusing on cellular-based IoT technology. Its greater connectivity will deliver a more integrated logistics value chain by providing critical data and visibility into warehousing operations, freight transportation, and last-mile delivery.

One good example is our latest project in the area of robotics and automation, in which the team worked closely together with our customer Wärtsilä to jointly test the potential of using self-driving robots from ‘Fetch Robotics’ in order to streamline warehousing operations. We planned the proof-of-concept closely with our customer and deployed the prototype directly in their warehouse. The first pilot showed good results, and we will continue to explore the applicability of this and other
robotics technologies in various types of operations.

Another example of a trend turned into an innovative new solution is our risk management solution ‘Resilience360’ which brought ‘Big Data’ to life at DHL. Resilience360 helps our customers to better deal with real-time and future challenges in increasingly complex global supply chains. The tool combines internal and external data sources to monitor different events along key trade lanes and operations in order to identify potential risks. Analytics are applied to match events to a customer’s supply chain which will then trigger mitigation strategies that minimize the impact on their supply chains.

Reaping the Rewards of Collaborative Innovation with Customers and Partners

As one customer-driven innovation is achieved, it raises the possibility of the next one, and each innovation is likely to have impact today and tomorrow. Our team has seen first-hand how the learnings from one initiative can be applied to help refine and improve the process for next time.

When the benefits of engaging in this way become apparent, customers typically commit to a long-term innovation journey. And, with a customer-centric approach to innovation, the DHL CSI team is equally committed to this long-term journey with each strategic account.

Our innovation partnership with Huawei is one example of this. In February 2017, DHL Supply Chain and Huawei signed a Memorandum Of Understanding (MOU), to develop a range of supply chain solutions for customers using industrial-grade Internet of Things (IoT) hardware and infrastructure. Huawei and DHL will collaborate on innovation projects focusing on cellular-based IoT technology, which can connect large volumes of devices across long distances with minimal power consumption. The greater connectivity will deliver a more integrated logistics value chain by providing critical data and visibility into warehousing operations, freight transportation, and last-mile delivery.

This customer-driven approach to innovation has already created many great opportunities for DHL to strategically engage with customers, and involve subject-matter experts from relevant DPDHL business divisions, industry partners, and research institutions. Looking ahead, the DHL CSI team is committed to further refining, deepening, and sharpening innovation initiatives to amplify their impact.
Huawei Joins Hands with PCITC to Embrace Smart Factory 2.0
Leading New ICT Contributes to Energy Conservation and Emission Reduction

Our Earth faces increasingly grave environmental problems every day. Although more people have realized the significance of environmental protection and have chosen shared bicycles and electric cars as part of their low-carbon lifestyles, yet we still rely heavily on non-renewable energy such as petroleum. How much oil is left and how long will it last? According to estimates from conservative experts, the sustained oil reserves left may last only 30 to 40 years at present rates of consumption, and the next oil crisis may happen much sooner than expected. Governments and socially responsible companies worldwide are intensifying efforts to develop new energy and optimize technologies in order to improve the exploration, production, and utilization of energy such as oil.

Traditional technologies no longer meet the needs of enterprises. However, the advent of the Industry 4.0 era and the rise of smart manufacturing are bringing great hopes for energy conservation and emission reduction for the Earth.

Manufacturing is a traditional industry, and it covers oil refining, automobile manufacturing, appliance manufacturing, power grids, steel mills, chemical plants, and others. ICT systems in the manufacturing industry used to function as support systems, but now they are shifting to work as production systems. Smart manufacturing, which comprises smart factories, smart logistics, and smart services, has become a new direction for digital transformation of the manufacturing industry. The successful implementation of smart manufacturing is impossible without the support of leading new ICT technologies such as cloud computing, Big Data, the Internet of Things (IoT), and Artificial Intelligence (AI).

China Petrochemical Corporation (Sinopec Group) is China’s largest integrated energy and chemical enterprise. It ranked No. 3 on the 2017 Fortune Global 500 list. In 2013, Sinopec Group started its smart plant initiatives and selected its Yanshan, Maoming, Zhenhai, and Jiujiang companies as pilot smart factories.

Petro-CyberWorks Information Technology Company Limited (PCITC), a joint venture of Sinopec Group and Pacific Century CyberWorks Limited (PCCW), is the contractor for building these pilot smart factories. PCITC chose Huawei to make smart factories a reality. Big Data and machine learning technologies are used in smart factories. By facilitating the gathering of refining and production information, these technologies help streamline the chemical reaction processes during refining and production, and dynamically adjust the volumes of crude oil, fuels, and catalysts necessary for the refining process. The resulting benefits include optimal productivity at the lowest energy consumption, without compromising the oil quality. Additionally, experiential models for running equipment as well as Operations and Maintenance (O&M) are set up. These models help monitor equipment in real-time and anticipate the abnormal status of equipment to implement predictive maintenance, reduce O&M costs, and mitigate the risks of unplanned downtime.

P CITC and Huawei jointly embraced a smart manufacturing platform, which is also the core part of Smart Factory 2.0 within the Sinopec Group. This platform also has integrated new ICT technologies such as cloud computing, the IoT, Big Data, VR, and machine learning.
At present, these four pilot smart factories report remarkable results, and constitute Smart Factory 1.0 in Sinopec Group. In the four pilot smart factories, the utilization rate of advanced control technology increases to over 90 percent; the automated production data collection rate reaches over 90 percent; and all pollution sources are automatically monitored. Production optimization used to be performed on a few processes and in offline mode, but now it is extended to all processes and conducted in online (in-service) mode. All these improvements increase labor productivity by over 10 percent and contribute to better quality and higher efficiency.

ICT has brought tangible benefits to companies in the petroleum and petrochemical industry and helps them maximize Return On Investment (ROI). Key benefits include better production-to-consumption ratios, higher oil recovery rates, lower operating costs, higher labor productivity, and long-time stable running of equipment.

Huawei Solutions Power Up Smart Factories

Huawei, a leading global ICT solutions provider, offers a portfolio of market-proven solutions for the oil and gas sector, including digital oilfield, offshore oilfield communications, digital pipeline, smart refining, and intelligent sales solutions. These solutions are built upon Huawei's extensive range of products such as wireless eLTE, IoT, KunLun servers, OceanStor 9000 high-end storage systems, High-Performance Computing (HPC), cloud data centers, public clouds, and cloud-enabled enterprise communications products. As of now, Huawei serves 60 percent of global Top 20 oil and gas companies, and has worked on more than 38,000 kilometers of oil and gas pipelines, which cover 41 percent of leading energy countries and regions.

With regard to Sinopec Group's smart factory initiatives, Huawei joined hands with PCITC to provide real-time communications and computing capabilities as well as architecture-wide security capabilities. Sinopec Jiujiang Company, a subsidiary of Sinopec Group, is used as an example. Sinopec Jiujiang Company is located on the northern bank of the Yangtze River and to the south of Mount Lushan. Every year, the company processes 10 million tons of crude oil and produces 300,000 tons of synthetic ammonia, 520,000 tons of urea, and 100,000 tons of polypropylene. The company has a total of 48 production units, most of which have industry-leading economic and technical specifications and outperform similar appliances in the industry.

Sinopec Jiujiang Company deployed Huawei's eLTE Broadband Trunking solution to meet the company's need for larger communications capacity and a multimedia trunking dispatch system. This solution helps the company easily deploy an audible and visual dispatch system. Additionally, this solution requires no wired transmission, greatly reducing the company's investments.

Sinopec Jiujiang Company also chose Huawei's OceanStor high-end storage system, ensuring that core business systems such as O&M and Enterprise Resource Planning (ERP) are stable. This new storage system is designed to be future-proof to support data center resource consolidation and service migration to the cloud in the future, which previously were impossible for original storage systems due to their limited scalability. Huawei's high-end storage system also enables Sinopec Jiujiang Company to build a unified Office Automation (OA) platform that involves email, office applications, and portal subsystems, and also centrally stores data. Sinopec Jiujiang Company uses Huawei's TE30 All-in-One HD Videoconferencing Endpoint system to enable video-assisted shift handover at work as well as internal and external communications—all greatly improve communication efficiency. With TE30 video conferencing, users can easily hold meetings through calls.

Sinopec Jiujiang Company adopted a series of advanced technologies and techniques, such as 4G wireless network applications, IoT-based smart warehouse, and a whole-process integrated optimization...
The Smart Factory 2.0 Era Is Fast Approaching

In April 2017, PCITC and Huawei jointly announced a smart manufacturing platform, which is not only the two parties’ first significant joint innovation since they inked strategic partnerships, but also the core part of Smart Factory 2.0 within the Sinopec Group. This platform has eight major capabilities: Centralized integration, IoT access, IT management and control, optimization, shared services, data processing and analysis, and AI. The platform will become a ‘benchmarking operating system’ for smart manufacturing. This smart manufacturing platform also has integrated new ICT technologies such as cloud computing, the IoT, Big Data, Virtual Reality (VR), and machine learning. It is expected to become an industry-leading smart manufacturing platform in the process-centric industry. The eight capabilities of this platform are highlighted as follows:

- **Centralized integration**: This platform consolidates smart factory data and information, enables centralized management and control of data assets, and allows effective integration with application systems.

- **IoT access**: This platform provides ubiquitous, interoperable, smart converged communications services necessary for smart factories, and supports a wide range of service applications such as digital warehouse, tracking of hazardous chemicals, vibration and corrosion monitoring for key equipment, and environment monitoring.

- **IT management and control**: This platform implements cloud management, security management, O&M management, and unified development; and allows for centralized management, monitoring, and resource allocation of cloud nodes.

- **Optimization**: This platform comes with optimization tools and engines to streamline the entire production process, facilitate device operations, and improve energy efficiency.

- **Shared services**: This platform centrally manages and controls business and technology service components, and provides shared cloud services to facilitate unified development.

- **Data processing and analysis**: This platform unleashes the potential of Big Data and enables production exception analysis, equipment fault diagnosis, and product quality analysis.

- **Artificial intelligence**: This AI-capable platform helps institutionalize rules, models, and knowledge, and creates a ‘smart brain’ for petrochemical plants using deeply learning and reasoning data.

Why Huawei Smart Manufacturing Solutions?

Huawei and global partners join hands to launch a FusionCloud Smart Manufacturing solution which features efficient management, agile dispatching, and open architecture. This solution is a good choice for customers in the production and manufacturing industries, meeting their needs of industrial automation, information convergence, service-centric manufacturing, and flexible production.

This solution is the result of the collaborative efforts of Huawei and a group of industry partners such as SAP, Accenture, PCITC, Halliburton, and Forcon. By enabling end-to-end management of the manufacturing processes that cover design, production, supply, logistics, and marketing, this full-stack cloud solution makes smart cloud-based and service-oriented manufacturing a reality. Big Data analytics and mining helps manufacturing companies resolve deep-rooted problems and pain points. All these benefits pave the way for building a cloud-enabled manufacturing platform characterized by intelligent management and unified architecture.

The day when we run out of oil will come sooner or later. However, we believe that leading new ICT technologies such as cloud computing and Big Data can play an active role for petrochemical enterprises as they help utilize energy in more efficient and environmentally friendly ways and continue to explore more green new energy sources.
197 of the Fortune Global 500 companies choose Huawei as digital transformation partner.

SINOPEC
Reshaping manufacturing in smart new ways

Huawei’s Leading New ICT is assisting Sinopec in building intelligent factories.
Explore e.huawei.com for more information
PHILIPS
Caring for life and health

Huawei's Leading New ICT is supporting Philips in creating an optimal digitized healthcare system.
Explore e.huawei.com for more information.
ICT Supports Digital Transformation to Smart Cars

By Li Jun, Director, R&D Center, FAW Group Corporation
Making cars smart enough to drive themselves takes a lot of technology, and the ICT industry can look forward to big opportunities in providing it. From processors to an infrastructure for the Internet of Things (IoT), ICT firms will need to supply the technology that companies such as FAW Group Corporation (FAW) require to bring about the digital transformation of driving.

Today, the automotive world is accelerating the development of truly smart cars. However, digitalized smart car technology is still rather new and immature, and we need to ask, ‘What does it mean for the future of the automotive industry?’ As China’s first automotive enterprise to conduct R&D on smart cars, FAW recognizes that we must design our own road to digital transformation.

What is a smart car? The Society of Automotive Engineers (SAE) in the United States offers the most widely accepted definitions. The immediate goal for the majority of automakers is to reach SAE’s Level 3 for smart cars, or Conditional Automation, where automobiles control speed and steering programmatically and rely on the human driver to take over in dynamic situations, like when bad weather interferes with the car’s sensors. Level 3 cars may become widely available by 2020. To get there, smart cars will need more than their own real-time monitoring and braking capabilities; they will need Artificial Intelligence (AI), Big Data, cloud computing, and other ICT technologies to achieve the deep integration of smart hardware and software for the necessary levels of safety and autonomy.

While driving can be a great pleasure, it is also troublesome. For example, in the United States, deaths caused by traffic accidents average about 20,000 a year and are not declining. The U.S. Department of Transportation believes that the collision-avoidance aspects of smart cars will help solve this difficult problem – and so the government is encouraging high-tech enterprises such as Google to use their technology to mobilize smart car development. The goal is to position the United States as a leader in the smart car industry, along with the European Union and Japan. A strategic goal in Japan is to lead the world in automated driving/Vehicle-to-Everything (V2X) standards.

The Three Areas of Smart Car Digitalization

FAW must choose the technologies that will be developed in-house versus acquiring others that will enable the transition from cars to ‘smart’ cars. By equipping cars with more sensors, processors, and software, passenger vehicles will become integrated carriers of digital transformation. FAW understands that an increasing amount of the technology for intelligent systems will be in the cloud, especially as it is required to work in the Big Data environment. Here is FAW’s summary for smart car digitalization:

- **Car + IoT** – The result of ‘Car + IoT’ and ‘Car + Internet’ will expand the scope functions that cars are equipped to handle, with the catch that this expanded scope also demands a transformation of the car companies themselves. Traditional, manufacturing-dominant enterprises must adapt to become service-oriented. Quite simply, future automotive enterprises must deliver customer benefits through services, or they will not succeed.

- **Car + AI** – Three important domains require integration with AI in
order to create smart cars. The first is sensor fusion, the second is route planning, and the third is using AI and Big Data for multiple levels of data classification and delivery of results. Currently, China is working on AI 2.0 under the guidance of the Chinese Academy of Engineering. In the immediate future, smart cars will mainly use onboard AI capabilities, with supplementary support by cloud-based AI services. As cloud and ICT technologies develop further, cloud-based AI support will become the primary director of smart cars. For example, cars will need a basic level of onboard intelligence. They must be able to determine if objects in the environment are people, cars, or a barrier. On the road, cars must determine the speed and direction at which cars and people are moving. To do this, the widest possible spectrum of data must be integrated and available to the AI support system.

• Car + smart manufacturing – For smart manufacturing, cars are the most important and most promising industry. Traditional car manufacturing is serial: Starting with product planning and engineering design, then to experimentation and trial production, and from full-scale production to marketing and post-sales services. The emergence of enterprise cloud capabilities from advanced ICT infrastructures is pushing the entire car production effort into many concurrent processes using virtual platforms. Major components within the automotive enterprise cloud include digital design, manufacturing, and service platforms, that together greatly improve the efficiency and cost effectiveness of the entire organization. For example, when the Hongqi car was being developed for the Chinese market in the 1950s, achieving Europe’s 5-star collision safety level required 42 rounds of collision tests. Today, cloud-based virtual collision technologies based on innovations demonstrated by Huawei greatly reduce the number of physical tests required to meet modern crash-safety standards.

Going forward, we expect to have access to the transportation infrastructure technology supplied by the ICT industry for enabling the transformation of automobile routes. In addition to cloud platforms, AI, and Big Data, among the most important of these new technologies are 5G and V2X. This is the future, and these are the new economic growth points of the supply-side revolution that the traditional manufacturing industry does not possess.

FAW’s Digital Transformation Thinking

FAW’s product development plan has three main directions. The first are semi-autonomous smart, safe cars. The second will be networks of smart cars that work together to alleviate traffic congestion in densely populated cities. The third will be fully automated smart cars that will be certified to operate in smart cities and other specially designated areas.

Additionally, FAW aims to build a cloud platform for Big Data analytics. In the past, automotive enterprises only cared about cars, but now we have to care about roadways, the environment, and an expanding universe of interactions. This digital transformation is an important test for FAW’s R&D capabilities as it will require that our R&D personnel master many new practices and operating regimes that include environmental
assessment and AI-based decision-making control, among others.

In contrast, the underlying base of traditional automotive enterprises is mechanical, from the engine and transmission to the integrated electrical components, such as electronic engine control. In the future, the support architecture for the automotive industry will change. A new core platform will emerge that is independent of the traditional engine, transmission, braking, and steering systems. It will include sensors and software intelligence that connect with GPS mapping, sensor fusion, AI, and an increasing variety of supercomputing platforms. This ICT-based architecture will bring a revolutionary change in transportation.

The onboard network architecture for smart cars is equally important. Every car has an electrical system, but traditional wiring is far from meeting smart cars’ requirements. In addition to a sophisticated internal connectivity, smart cars require an outside connection to the cloud. Consequently, a new interconnection architecture needs to be designed that will enable functions such as monitoring the health and attention of the human drivers. For example, if a driver is too tired to continue driving (since most traffic accidents occur because the driver has become distracted briefly), control of the vehicle will be taken automatically and immediately, guaranteeing the safety of people inside and outside the car, as well as the car itself and surrounding physical property.

Another important core technology is dynamic mapping and the many new technologies and services that will be derived from it. Today, all smart car companies are trying to construct new navigation technologies based on maps. One of the bigger engineering challenges is that fixed maps are not able to meet the early list of functional requirements. What is required is the ability to generate real-time maps that are dynamic and responsive to current conditions. In response to the need, FAW has introduced the concept of AllwayEye, whose core function is the ability of each car to capture data related to its immediate environment and upload that information to the cloud. Then all similarly equipped cars in the immediate vicinity will be uploading and downloading situational information with the cloud. If two cars collide, the connected car can upload information about the accident to the cloud for other cars to use their smart planning resources to route themselves around the event location to avoid traffic congestion, as well as having a data record to reconstruct the accident for future reference.

The automotive industry has reached an important crossroads in their digital transformation, one where every manufacturer faces a series of new challenges. How do we choose the best core technologies? How do we transform our traditional R&D models? How do we construct a massive, innovative architecture that is able to respond to an increasingly complex technological revolution?

No single car enterprise can answer these questions based on its own capabilities, and that is why FAW is collaborating closely within the ecosystem of Huawei partners. Our goal is to discuss how to cooperate more and further, as FAW upholds the ideals of collaborating hand-in-hand with partners from all industries to build a car digitalization universe that fulfills our collective vision for the coming smart car era.

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**Huawei’s Key Solutions**

- **FAW Qiming IoV platform**
  High scalability and flexible choices of T-Box vendors and upper-layer application vendors, and a decoupled architecture provide standard APIs for upper-layer applications. This shields differences of data and commands of different vehicle models, makes it simpler to develop upper-layer applications, simplifies the access of T-Box from different vendors, and accelerates new service rollouts.

- **FAW-Volkswagen OpenStack development and testing cloud**
  Open-source Kernel Based Virtual Machine (KVM) at the core, elastically scaling and automatically provisioning IT resources for agile service rollouts. Compatible with other heterogeneous platforms, facilitating the management and O&M of distributed data centers across platforms and geographies and setting up a distributed disaster recovery system across geographies for lowered management and O&M costs.
Fonterra Tackles Long-Term Business Evolution with Ease
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.

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 co-operatives. 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 external centralized storage that limits real-time processing capability, and is highly susceptible to performance bottlenecks. It’s increasingly difficult to meet Fonterra’s business development requirements. On the other hand, in 2015, SAP has released its next-generation enterprise business suite SAP S/4HANA completely 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 the 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 to service development assurance.
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 is jointly developed by Huawei and SAP. Its advantages are as follows:

• Shatters performance bottlenecks: SAP S/4HANA is an industry-leading in-memory database platform, which requires high performance of the 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 three times, 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 changing service environment, and implement agile production for customers, greatly improving the 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 the industry standard server components, avoiding the high purchase and maintenance costs that would arise with enclosed-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 helps 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 proved the Huawei SAP HANA Appliance the best solution for Fonterra.

Driving Greater Value for the Customer
Huawei and SAP have teamed up with Datacom New Zealand to help Fonterra implement 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 current service requirements. In addition, the solution supports Fonterra's business optimization in the future, matching its long-term business evolution requirements. After the live network is migrated to the SAP HANA Appliance, Fonterra will save USD 1 million in costs each month as estimated.

After the stringent 3-month PoC test, the system officially went live in Q4 2016. All indicators have perfectly met the customer's requirements. Therefore, Fonterra has decided to continue the cooperation 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. The new solution will support critical decision making through agile analytics for aggregating dynamic business data from multiple clouds and non-traditional sources,” explained Andrew Faid, Technical Lead of SAP Projects, Global Information and Solutions Group, Fonterra.

This project has helped Huawei receive an Honorable Mention in the Special Award category of the SAP HANA® Innovation Awards 2017 at SAPPHIRE NOW, the world’s premier business technology event and largest SAP customer-run conference. 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.
Huawei Helps COFCO Coca-Cola Build an Enterprise Private Cloud Platform
You probably didn’t know that in China, when you drink Coca-Cola, Sprite, Fanta, or any drink produced by COFCO Coca-Cola Beverages Ltd., a joint venture of China National Cereals, Oils and Foodstuffs Corporation (COFCO) and Coca-Cola, Huawei’s ICT is standing behind their production, sales, and distribution.

Consolidated Network Infrastructure Urgently Needed
In 2000, COFCO and Coca-Cola, both Fortune Global 500 companies, set up COFCO Coca-Cola Beverage Co., Ltd. (COFCO Coca-Cola), in which COFCO holds 65 percent of shares while Coca-Cola owns the remaining 35 percent. COFCO Coca-Cola is the only Coca-Cola bottling group controlled by a Chinese-funded enterprise in China. One of the fastest-growing Coca-Cola bottling companies, COFCO Coca-Cola is among the Top 10 Coca-Cola bottling companies worldwide. Currently, drinks produced by COFCO Coca-Cola are available in 81 percent of China’s territories and to 51 percent of China’s population.

COFCO Coca-Cola’s business systems consist of the following three parts:

- Front-end application systems, including sales data, logistics, Office Automation (OA), and external communication management systems. These systems support daily beverage sales, retail store visits, logistics, dispatch, and other businesses. After customers place orders, freight drivers use a warehouse application system to easily prioritize orders and work out the most appropriate freight routes. With the system’s built-in mapping and navigation functions, beverages can be quickly and accurately delivered to distributors and retail stores.
- Enterprise Resource Planning (ERP). COFCO Coca-Cola uses the SAP ERP Central Component (ECC). The core components of SAP ECC include financial management, sales management, production planning, material management, plant maintenance, human resources management, and Customer Relationship Management (CRM). With its front-end application systems, CRM enables a series of activities such as order placing and pricing, partner management, and service management.
- Portals, reporting systems, and data warehouses.

Although COFCO Coca-Cola’s business systems are state-of-the-art, its legacy network infrastructure was siloed, with a number of core business systems deployed separately. As business types and their scope continued to grow, it became clear these traditional architectures were not enough. COFCO Coca-Cola faced complex Operations and Maintenance (O&M) and difficult upgrades and scalability, which hindered new service rollouts in response to fast-changing service needs. COFCO Coca-Cola urgently needed to consolidate its network infrastructure.

“Our original network infrastructure was unable to support our ICT transformation strategy,” said Li Zhihong of COFCO Coca-Cola’s Information Management Department. “After about one year of research, we decided to build an enterprise private cloud platform and use cloud infrastructure to support our core business systems such as ERP and CRM.”

Building a Private Cloud Platform with a Hyper-Converged Architecture
In the past, COFCO Coca-Cola used midrange computers. Currently, x86-based appliances have improved their CPU performance, and the latest appliances, such as those from Huawei, are highly integrated: They incorporate a computing unit, a storage unit, a network unit, and virtualization software.

After considering multiple factors such as CPU performance, integration level, cost-effectiveness, and appliances’ Return On Investment (ROI), COFCO Coca-Cola ultimately chose Huawei’s FusionCube converged appliance solution. In addition, COFCO Coca-Cola selected Huawei’s FusionServer server, OceanStor 5500 V3 storage system, and FusionSphere cloud operating system.

“Many market researchers show that Huawei is increasing its share in the appliance, storage, and server markets,” Li said. “I strongly agree that Huawei has strong capabilities in these areas.”

Huawei’s FusionCube is a hyper-converged infrastructure that provides elastic private cloud platform capabilities. With Huawei’s FusionCube, COFCO Coca-Cola can set up a uni-
FusionCube uses an innovative architecture that converges computing, storage, and networking resources. It pre-integrates a high-performance computing platform, a high-speed switching network, a distributed parallel storage system, and virtualization cloud software. As a result, it implements elastic IT service deployment, expansion, and migration.

FusionCube is the key to achieving high cost-effectiveness of data centers. Huawei's OceanStor 5500 V3 storage system enables the integration of multiple controllers and active-active storage area network and network-attached storage nodes. These converged functions make COFCO Coca-Cola's pursuit of a storage system that features higher performance, lower latency, and better elasticity a reality.

Huawei's FusionSphere is an OpenStack-based cloud operating system designed for customers from a wide range of industries. It offers powerful virtualization and resource pool management, rich cloud infrastructure components and tools, and open Application Programming Interfaces (APIs). FusionSphere helps COFCO Coca-Cola horizontally consolidate physical and virtual resources in the data center and vertically optimize business platforms.

Stable, Efficient Business Operations

Players in the Fast-Moving Consumer Goods (FMCG) industry need to be responsive to fast business expansion. As a leading FMCG player, COFCO Coca-Cola requires that its business systems and office systems go live quickly, run efficiently, and have a high price-performance ratio. Additionally, these systems must be stable, meeting the strict system stability requirements of the manufacturing industry.

Huawei's FusionCube is characterized by a hyper-converged infrastructure and high level of integration that bring great benefits to COFCO Coca-Cola. For example, FusionCube:

- Shortens service deployment by over 60 percent, ensuring rapid new service rollout
- Saves equipment room space by over 70 percent
- Reduces data center management expenses by 30 percent
- Enables a nearly 10-fold performance improvement of key services by optimizing database read/write operations (read/write time slashed from 4.5 ms to 0.42 ms)

Huawei's FusionServer helped COFCO Coca-Cola reduce server response time from 900 ms to 600 ms and decreased ERP report response time from 4,100 ms to 1,700 ms. Huawei's FusionSphere not only met COFCO Coca-Cola's virtualization deployment needs, but made cloud computing installations and usage more convenient.

Since the deployment and go-live of Huawei's ICT products, COFCO Coca-Cola has reported more than 99.9 percent reliability of its core business systems, with a yearly downtime of less than 8 hours. This impressive result meets the core business systems stability requirements of COFCO Coca-Cola and enables efficient business operations.

Building a private cloud platform was just the first step in COFCO Coca-Cola's digital transformation journey. The company has additional plans for its digital transformation. For example, the company plans to integrate production line equipment with core business systems through sensor and Internet of Things (IoT) technologies. It will also capitalize on Big Data to achieve predictive maintenance and improve production and sales forecasts.
Huawei’s Partnership with Dongfeng Motors Drives Connected Cars-ICT Integration Forward
Dongfeng Motor Group was established in 1969 and is one of China’s dominant mainstay enterprises in the car industry. The company’s business is distributed in four base cities: Shiyang, Xiangyang, Wuhan, and Guangzhou. This forms the base in Hubei, influencing the whole country, facing the world business layout. Dongfeng ranked 68 on the 2017 Fortune Global 500.

Supporting All Services with Cloud
Affected by the recent macroeconomic downturn and other factors, China’s manufacturing sector is generally down. Dongfeng Motors faces a lot of pressure to increase business during slow growth and structural adjustments.

As a result, Dongfeng Group also set up their own corresponding 13th Five-Year Plan. In terms of informatization, the group proposes to use cloud computing technology to implement a Software-Defined Data Center (SDDC) to support all of the group’s range of services.

The group controls the entire service digitization strategy, from setting up the group’s entire digital warehouse to implementing Big Data analysis to gain insights from all data, and finally providing corresponding support services for each entity.

In terms of digitization for all of the strategic chain services, solid support is provided for the development of traditional services such as production, marketing, purchasing, and finance for all of Dongfeng Motors Group’s domains. Informatization support enables fast responses to up-to-the-minute changes in smart cars and network-connected cars for the next waves of technology.

Migrating Traditional Data Centers to the Cloud
To continually enhance service transformation, Dongfeng Motors Group constantly innovates their business models in order to promote the deep integration of the Internet of Vehicles (IoV) and connected cars. In order to meet the individual needs of the group’s more than 300 subsidiaries and migrate traditional data centers over to the cloud, Dongfeng joined hands with Huawei in 2015 and built the first internal private cloud pilot. To date, initial results are represented by four aspects:

- **The private cloud quickly responds to service requirements:**
  First of all, the group requires their secure private cloud to perform high-performance operations, allowing services to run more smoothly, applications to be more flexible, and faster responses when changes occur in terms of user numbers and service requirements. The Huawei Cloud Data Center solution provides a service-centric Virtual Data Center (VDC) system that matches the existing structure. The logical isolation of different VDCs ensures highly efficient independence of tier-2 departments. Through the efforts of the IT operations team, there are already over 10 subsidiaries that utilize cloud computing services through VDC operations, further promoting a solid foundation for expanding cloud computing services.
Visual automatic and integrated management platform: Prior, data center operational management required investing large amounts of manpower, yet maintenance work is still not really in place. The Huawei cloud data center provides a visualized automatic and integrated management platform, greatly improving Operations and Maintenance (O&M) efficiency and quality. At the same time, the benefits of centralized infrastructure include increasing resource utilization and simpler O&M. Preliminary estimations indicate that the group’s overall IT costs decreased by 30 percent. As the work on later stages further develops, continuous improvement is expected.

End-to-End (E2E) security assurance: One of Dongfeng Group’s biggest concerns is cloud security. Huawei’s cloud data center provides comprehensive E2E security assurance in terms of user, network, data, and the cloud platform, ensuring secure protection of the entire architecture, enterprise data, and services.

Converged and open architecture: Finally, Huawei FusionSphere cloud operating system is developed based on OpenStack open architecture. The entire system delivers powerful virtualization functions and resource pool management, a diverse range of cloud-based service components and tools, and open Application Programming Interfaces (APIs) dedicated to cloud computing and optimization. FusionSphere widely supports heterogeneous hypervisor and hardware device access. This infrastructure complies with the converged and open architecture requirements that are so important to Dongfeng Group, achieving protection of the enterprise’s existing investment and ensuring compatibility for future development.

Enabling Opportunities Brought about by Emerging Industries
Dongfeng Motor Group recognizes that, by working with Huawei, solutions offer innovative, open technologies that enable the next generation of intelligence, Big Data, autonomous driving, and other strategic opportunities brought about by emerging industries, including the initiatives in the industrial revolution’s next wave of smart technologies. For Huawei, collaborating with Dongfeng helps to deepen Huawei’s position in the IoV and autonomous car connectivity fields while continuing to broaden the use of Huawei products and technology with automotive and transportation industries.

As a leading global ICT solutions provider, Huawei has a clear visions for key industries, with strong Research and Development (R&D) advantages, wide brand influence – especially with Fortune Global 500 enterprises – and comprehensive professional service capabilities. In the areas in the IoV, connected cars, and intelligent transportation, Huawei works with partners and customers to develop an ecosystem of powerful solutions across industries.

Customer Testimony
“Looking back at my work this past year, most of my time was spent with the Huawei team. In terms of products and solutions, Huawei responds to customer requirements very fast and is highly efficient in terms of product optimization. After the feedback is sent to R&D, measures are quickly taken to create an optimized version. With personnel’s cooperation, Huawei staff handles differences in opinion very well, resulting in high work efficiency. At the same time, in the cooperation process, Dongfeng also acquired valuable management experience from many of Huawei’s outstanding projects. We now use this knowledge in our own internal project processes. That’s why we believe the benefits we reaped from cooperating with Huawei are huge.”

— Qi Wei, IT Planning Director, Organization Information Department, Dongfeng Motor Group
Huawei Data Center Network Solution Assists Ikoula in Developing Cloud Hosting Services
Huawei Data Center Network solution reduces service deployment complexity, improves system reliability, and provides the functions of monitoring and managing resources, meeting Ikoula’s quick cloud service development requirements.

Founded in 1998, Ikoula, the French cloud hosting expert and winner of the EuroCloud award for ‘Best Cloud Infrastructure Service,’ runs services in fields such as domain names, virtual servers (VPSs), and dedicated servers. Ikoula started its business in equipment room and rack leasing and later engaged in dedicated server hosting and cloud services, enriching its services and transforming it into a cloud service provider. Traditional data centers, however, could not meet its service development requirements so the company needed to evolve them into cloud data centers.

Evolving Traditional Data Centers into Cloud
Ikoula has six points of presence located on three continents. Based in France, it launched cloud services in the United States, Germany, and Singapore, and opened its first subsidiary in the Netherlands in the spring of 2016. With 65 employees, Ikoula hosts more than 37,000 websites and maintains more than 8,000 virtual servers, serving more than 25,000 customers. Ikoula is working to substantially expand services and finds that legacy network issues become barriers to fulfill their vision of providing managed services up to a 99.999 percent SLA to customers as a cloud service provider. To meet cloud service requirements and achieve objectives of high performance, high reliability, elastic scaling, and simple O&M, Ikoula wanted to construct data center networks that:

• Break through limitations of the original STP network, make full use of network resources, and elastically scale out over rapid customer and service growth.
• Resolve the network congestion issue caused due to the small cache of the original network, maintain compatibility with subsequent evolution, and can support 40 GE, 100 GE, or a higher bandwidth.
• Feature simple O&M without requiring additional network maintenance employees.

Huawei Solution: Meeting both Present and Future Service Requirements
Huawei Data Center Network solution reduces service deployment complexity, improves system reliability, and provides the functions of monitoring and managing resources, meeting Ikoula’s quick service development requirements.

• **Scalable network architecture:** NE routers and CloudEngine data center switches were used to build a data center network that can supports 100 GE interconnection, 10 GE access, and end-to-end large cache. Using an architecture that supports 10 GE, 25 GE, 40 GE, and 100 GE physical servers, the network can be elastically scaled out, relieving Ikoula from worries about bandwidth and network speed over quick cloud service development.

• **Simple and convenient network O&M:** Huawei Data Center Network solution uses virtualization technologies to establish loop-free high-reliability networks, simplifying O&M management for network devices and improving O&M efficiency.

• **Evolution into a SDN ready network:** All devices support VxLAN and EVPN, and the data center network can smoothly evolve towards the SDN network, meeting both present and future service requirements. Huawei Data Center SDN solution can be subsequently deployed without reconstructing the network, facilitating network automation and reducing CAPEX and OPEX.

Enhancing Ikoula’s User Experience and Loyalty
Ikoula used Huawei Data Center Network solution to reconstruct the data center network and resolve the issues of low bandwidth and complex O&M faced by Ikoula. After reconstruction, Ikoula enables public cloud customers to deploy VMs within 30 seconds in one-click mode. The significant growth in access performance enhances user experience and loyalty and will yield more benefits for Ikoula. ▲
Criteo Expands Capacity for Big Data Services
Founded in 2005, global technology company Criteo helps advertisers generate more sales through personalized performance advertising on a global scale. As of December 31, 2015, Criteo had 2,000 employees in 28 offices across the Americas, EMEA, and Asia-Pacific, serving over 11,000 advertisers worldwide and with direct relationships with 16,000 publishers. Its proprietary predictive algorithms are able to deliver an advertisement with the right product, to the right user, at the right time. And, by measuring return on post-click sales, Criteo helps to make ROI transparent and easy to measure.

Challenges: Existing Hadoop Cluster Is Becoming too Small
At the core of Criteo’s operation, is the largest privately owned Hadoop platform in the world. This is an open-source software framework for storing so called ‘Big Data’ and running applications on clusters of commodity hardware. It provides massive storage for any kind of data, enormous processing power and the ability to handle virtually limitless concurrent tasks or jobs. For Criteo, it enables up to 85,000 jobs to be processed every day. It’s a highly data-intensive business supported by a network of nearly seventeen thousand servers.

As on-line retailing continues to grow in popularity, Criteo has seen a huge growth in demand for its solutions. The resulting increase in the data it handles meant that, by January 2015, it needed to look at building a new Hadoop cluster. Matthieu Blumberg, Engineering Director for Infrastructure Operations at Criteo explains: “What we discovered with Big Data is that the more data you have, the more you want and the more you need. For us, it meant that our existing Hadoop cluster was becoming too small for our needs so we decided to build a new one. It also gave us the opportunity to challenge the whole infrastructure stack and look at alternative hardware vendors.”

FusionServer: A Very Efficient Solution
A Request For Proposal (RFP) for the additional servers was sent to six companies, including Huawei and the existing incumbent. Based on their responses a list of three potential solutions was selected. This was the point when Huawei started to stand out as a serious contender.

Matthieu Blumberg continues: “We were very impressed with Huawei’s response to our RFP. It had clearly done its homework and demonstrated a deep understanding of what we were doing with Hadoop. Not only were all the answers given very relevant, alternative suggestions were made for the server’s power supply, which clearly showed that its people fully understood how a Hadoop cluster runs.”

The solution offered by Huawei was based on its FusionServer, a new generation 2U dual-socket rack-mounted server. It provides flexible resource expansion capabilities as well as high computing performance and is an ideal choice for Internet, Big Data, cloud computing, and key enterprise applications.

As part of the evaluation process, Criteo purchased a batch of ten servers from each of the three vendors and built a small Hadoop cluster on each group, so that the performance could be compared. This bench-
Customer Testimony

"Huawei had clearly done its homework and demonstrated a deep understanding of what we were doing with Hadoop. Not only were all the answers given very relevant, alternative suggestions were made for the server's power supply, which clearly showed that its people fully understood how a Hadoop cluster runs. Huawei provides the whole range of products needed to build a powerful data center," Blumberg said. "You can buy the modular container, the servers and the network switches all from one single vendor. That's definitely a very compelling proposition."

— Matthieu Blumberg, Engineering Director for Infrastructure Operations, Criteo

Criteo: Delivering All Services at the Right Price

FusionServer compared well with its competitors. It offered the highest hard-drive density supporting sixteen per server, one more than its nearest rival. And at 20 percent less, its power consumption also proved to be significantly better. Crucially for Criteo, it delivered everything it was looking for at the right price.

"After a few months experience," Blumberg said, "We decided that Huawei's FusionServer should be made available as part of our worldwide catalogue alongside the hardware offered by our main supplier. So since the start of 2016 we have been buying Huawei servers for our U.S., Europe, and Asia-Pacific sites."

Looking to the future, Criteo sees Huawei as a potential major vendor for the many things needed to support a modern data centre and has already purchased additional networking equipment.

"Huawei provides the whole range of products needed to build a powerful data center," Blumberg said. "You can buy the modular container, the servers and the network switches all from one single vendor. That's definitely a very compelling proposition."

marking exercise assessed performance, Linux capability, power usage, and driver support. Criteo selected Huawei, which scored highly across the range.

Matthieu Blumberg adds: "FusionServer more than met all the criteria we had set. But what really impressed us about the company was its willingness to help and answer our questions. For example, we wanted to access the hard drive at a level other vendors were not prepared to allow. Within days it readily provided the tools we needed to do this."
TF1: Leading TV News Channel Works in a Cloud

By Guillaume Lemoine, Broadcast Engineering Manager, TF1 Group
France’s TF1 television channel gains cost-effective performance by editing video content in a modern ICT infrastructure.

Moving to a cloud architecture may seem a daring choice for a news organization. After all, media companies are the second most-hacked enterprises after banks. Nonetheless, France’s TF1 television channel has taken advantage of cloud technology and gained security advantages and significant cost savings.

TF1’s progression to cloud technology has been a natural one given the requirements of television news and competition in the news business. To contain costs while expanding capabilities, TF1 has made technology choices that may be of interest to any media company.

**TV to Multimedia**

Rebranded from *Télévision Française 1* in January 1975, TF1 started as a simple channel and has evolved into a multimedia, multi-channel, and multi-platform TV network. TF1 has always led French TV in audience share and intends to maintain that leadership. However, we all know that traditional TV channels face strong competition from digital services, particularly among younger viewers. TF1 thus placed strong emphasis on diversifying activities to improve content creation and monetize capabilities. While enhancing its position as a producer of original content for news, TF1 is also selling content to other TV channels.

How can cloud technology help? The answer comes out of the long-term trends in TV operations. Like any other TV news group, TF1 sends crews into the field with more than 88 pounds’ (40 kilograms) of equipment to gather content for news stories. In the not-too-distant future, we could shoot the same kind of video with a pocket-size smartphone that can transmit content across the planet thanks to the 3G and 4G networks. There is only one condition – you must shoot in landscape mode because TV screens are horizontal.

Software is replacing a great deal of hardware. The processing applied by the smartphone to improve picture quality replaces the big lenses and big image sensors used in broadcast cameras. What’s more, stabilization algorithms are replacing the strength of the cameraman’s weary shoulder.

Another trend has affected video editing equipment. In the 1990s and early 2000s, an entire bank of equipment was required. Today, PC-based systems are easily powerful enough to handle HD video editing. Consequently, videotape has become obsolete. Giving up workflows based on tape and tape recorders was the biggest transformation for TF1. Digital media and servers have dramatically improved the ability to work in groups and collaborate in content sharing.

Now, with software-based solutions, all the elements are in place for an even greater transformation. The adoption of cloud technology in broadcasting infrastructures.

**Secure Way to the Cloud**

Security presents a serious cloud infrastructure challenge for the media and broadcasting industry. Having safe infrastructure is an absolute necessity for the second most-frequently attacked industry. It is difficult to make a safer infrastructure than the closed system used years ago.

Other cloud challenges are not so much barriers to use as they are issues of scaling resources to meet TF1’s requirements. For example, TF1 typically stores approximately 200,000 hours of content – in the
range of a few petabytes. The company has to manage a reasonable number of files, but each file is huge. And remember – these figures are for HD resolution. 4K video quadruples the number of pixels and increases the number of frames per second, making it necessary to quadruple the number of pixels again because Japanese broadcasters intend to launch 8K technology for the 2020 Olympics in Tokyo.

Another important specification for TF1’s media cloud is compute resources, which are needed for audio and video processing as well as running the databases used to manage the company’s media. TF1 therefore needs solid general-purpose computing capability as well as graphics capabilities. Some of the company’s video editors have been using high-end laptop computers for this task, which is a cost concern for TF1.

Additionally, the company has rolled out a major upgrade of the technical and editorial system for the 24/7 LCI news channel. LCI (La Chaîne Info) was previously a pay TV channel but earlier this year went free-to-air and is now facing new competition in the free-to-air market. The technical upgrade will make the channel more competitive but requires the use of high-end workstations.

LCI has a team of 150 journalists, and TF1 wanted to avoid investing in 150 high-end workstations when their utilization is not very high over a 24-hour news cycle. At any given time, around 60 journalists are simultaneously working on a video-editing task. Using standard workstations would have been costly and also would have constrained each journalist to a fixed location.

For a long time, TF1 thought that the only solution was to move to an architecture based on Web clients. Unfortunately, significant features of audio/visual applications are still unavailable in such an architecture.

The Cloud Solution
Over the past couple of years, TF1 has performed numerous trials of virtualized infrastructures, which achieved higher density and ease of maintenance. Next, TF1 wanted to innovate in a different way to cost-effectively support the LCI journalists.

With the help of Huawei, TF1 set up a cloud architecture using Huawei’s FusionCloud desktop, which enables end users to access ‘virtual PCs’ using thin clients. This solution encompasses terminals, other hardware, software, network resources, security resources, and consulting services to help adapt the solution to specific requirements.

The solution freed TF1 from depending on both a powerful client machine and a strong back-office capability with a high-performance network to bring high-resolution video streams to the client. The cloud architecture concentrates the computing power in the data center as a set of shared resources.

TF1 limited its shared-resource investment to 60 host computers that are accessible to 150 thin clients, which cost much less than high-end workstations, soft clients via Wi-Fi, and even smartphones. For performance, Huawei’s Virtual Desktop Infrastructure (VDI) solution offered the best qualities for video playback and other crucial functions, including very smooth video playback and perfect picture and sound synchronization.

Finally, the cloud setup improved TF1’s security. The VDI provides audio/visual tools and office tools on the same user screen that run on separate virtual machines. This setup allows TF1 to separate the office tools and broadcast video tools in the back office, which improved security.

Future plans for TF1 include partnering with Huawei, possibly in the short term, to implement a huge storage solution or extend the VDI solution into other areas of TF1. With the emergence of cloud-compatible TV applications and software-defined infrastructure, TF1 may soon be able to create a complete TV system as easily as a Web system can be created today. ▲
Huawei Partners with Intel to Build a Supercomputing Cluster for DTU
For almost two centuries, DTU, Technical University of Denmark, has been dedicated to fulfilling the vision of H.C. Ørsted – the father of electromagnetism – who founded the university in 1829 to develop and create value using the natural sciences and the technical sciences to benefit society. Today, DTU is ranked as one of the foremost technical universities in Europe.

**High-Performance Computing Propels Materials Research**

DTU promote promising fields of research within the technical and the natural sciences, especially based on usefulness to society, relevance to business and sustainability. DTU focuses on basic science that has significant challenges and clear application prospects, from atomic-scale materials analysis to quantum physics and renewable energy. As the material application environment becomes increasingly complex, laboratory research for materials performance analysis has become even more challenging.

DTU aims to understand the nature of materials by developing electron structural theory, and design new functional nanostructures through new-found insights. These studies require the analysis of the structure, strength, and characteristics of new materials, involving intensive, complex numerical computation and simulation tests on material and energy. This will produce a vast number of computational data. Therefore, High-Performance Computing (HPC) resources that can accelerate performance modeling and solving are particularly important to research in this field.

In order to speed up the process from discovery to application of new materials and maintain a leading edge in research, DTU plans to expand and upgrade its supercomputing cluster, ‘Niflheim,’ which is deployed at the Computational Atomic-scale Materials Design (CAMD) Center.

DTU wanted to deploy a new supercomputing system to give the Niflheim cluster a boost in computing resources and performance, and meanwhile also prepare the cluster for future technology evolution as well as cluster-scale expansion. After carefully studying various solutions, DTU found that Huawei’s X6800 High-Density Server and Intel’s OPA Network were the best choices.
Combining the Best of Both Worlds: Huawei X6800 High-Density Server and Intel OPA Network

The existing Niflheim cluster at DTU was built from 2009 to 2015, and was capable of a peak computing capability of only 73 TFLOPS. The cluster was equipped with previous generation and even earlier computing product hardware. The oldest products had limited processor performance, small memory capacity, with low-bandwidth but high-latency computing network. The old cluster was failing to meet the growing demands of computing-intensive simulation tests. As a result, the cluster became a bottleneck since the CAMD center needed research efficiency improvements.

DTU wanted to deploy a new supercomputing system to give the Niflheim cluster a boost in computing resources and performance, and meanwhile also prepare the cluster for future technology evolution as well as cluster-scale expansion. DTU has carefully studied various solutions in terms of overall performance, product quality, and service capabilities, and through an EU tender finally selected Huawei and Intel as the vendors to help the university build a new-generation computing cluster with their innovative technologies and computing products.

Huawei and Intel have long been partnering in the field of HPC. This time, the two partners bring together Intel’s latest computing and networking technology and Huawei’s X6800 high-density servers, and build a solution according to the needs of DTU. The solution will empower DTU with a high-performance, efficient, and easy-to-expand supercomputing cluster, meeting the current and future requirements of DTU for large-scale scientific research.

Solution highlights:

**Supreme Performance, Leading Computing Efficiency**

- Nodes configured with Intel® Xeon® E5-2600 v4 series processors, up to 845 GFLOPS compute power per node
- Nodes configured with 256 GB DIMMs and 240 GB SSDs, eliminates I/O bottlenecks, and improves data processing efficiency with high-speed data caching
- Leverages the Intel® Omni-Path Architecture (OPA) to build a two-layer fat-tree fabric, delivers bandwidth of up to 100 Gbit/s, and end-to-end latency as low as 910 ns
- Power Supply Units (PSUs) and fan modules shared by multiple nodes, enhanced with Huawei’s Dynamic Energy Management Technology (DEMT) to lower system energy consumption by over 10 percent

**High-Density Deployment, Easy to Manage and Expand**

- 4U chassis configured with eight 2-socket compute nodes, delivers computing density twice that of traditional 1U rack servers, significantly improves rack space utilization
- Supports aggregated management network port for unified management, meanwhile reduces cable connections
- Adopts a modular design, and supports hot swap for all key components, greatly improves Operations and Maintenance (O&M) efficiency

New-Generation Niflheim Cluster Expedites New Material Discovery and Application

The new-generation Niflheim cluster went live in December 2016. The new cluster helps more researchers carry out research and analysis on new materials and new energy, but also provides a great leap in feedback speeds of test results. It has enabled new levels of scientific research progress and strength, helping DTU generate new innovation capabilities in the field of material analysis.

- The Niflheim cluster delivers a computing power of up to 225 TFLOPS, which is three times the level of the original system
- Substantially shorten the materials’ analysis time, enabling researchers to discover and apply new materials more quickly
- With flexible expandability, the cluster can seamlessly expand up to 112 nodes without requiring additional new cabinets ▲
Philips and Huawei: Just What the Doctor Ordered
Taking Healthcare to the Cloud with Philips

Rapid disruption is happening in the healthcare space, with cloud, AI, and biosensors poised to form your personal health team. Find out what Philips and Huawei are doing to get you there.

In 4Q 2016, Huawei and Philips signed an MOU on a cloud-based healthcare solution for deployment in China. With testing already completed, the project is opening up a future where cloud and machine-learning will digitalize and disrupt the healthcare vertical with unprecedented speed and reach.

Targeting China’s smaller urban centers, the Philips-Huawei partnership is keen to expand high quality, cloud-driven healthcare to communities that lack advanced healthcare solutions or physicians with specialist skills.

Cloud AI is able to process vast amounts of data in a much shorter time and with far greater accuracy than a human physician. Ludwig Liang, Head of Population Health Management for Philips in China, points out that this is especially important in China’s tier-2 cities, because many physicians “don’t necessarily have the skills to read image diagnostics like MRI scans and CT scans. If you ask a doctor to process thousands of images a day, he may miss something.” In contrast, AI is adept at spotting patterns in big datasets. For terminal illnesses like cancer, machine learning solutions hosted in the cloud can make a real difference in a patient’s prognosis.

Helping You Help Yourself

Mobile technology and Apps put personal healthcare management in the hands of the individual, moving away from a reactive and sporadic model to one that’s proactive and always-on. According to Liang, “Using an App, people get objective data from a cognitive device, rather than just the word of someone they might not trust.”

Patients can approach consultation with healthcare professionals on a more informed level, with personal healthcare expanding into predictive monitoring, preemptive action, and even remote diagnostics and treatment. For example, data from a life-logging App that records your habits can work in tandem with wearables that monitor your physiology. Data can be sent to your physician in real time if, for example, your heart rate indicates a possible problem, “We can set a threshold that will alert your doctor so they become aware of something you may not notice,” says Liang.

With tech advancing at such an impressive rate, is there a risk of the elderly and less affluent being left behind? After all, they’re generally more vulnerable when it comes to health and also slower adopters of technology. Liang takes a pragmatic view, “We have to admit that we’re heading into new areas, how healthcare can be extended from hospitals to homes and leveraging Apps and connected devices.” And, for Liang,
the concept of extended healthcare is very important — treatment will no longer start and stop in a hospital or doctor’s office after someone becomes sick. Apps, sensors, smart devices, and the cloud will, in effect, mean “you have your own health team on call 24/7.”

Wearing Your Heart on Your Sleeve
Wearable tech isn’t quite there yet, but it’s only a matter of time. “We’re seeing some wearables going through FDA certification right now. So this is happening,” says Liang. In the future, we can expect biosensing functionality to offer a broader overall picture of one’s health, with advances in machine learning promising much greater predictive power. For example, your smartphone might employ voice analysis technology to identify stress, heart disease, or Alzheimer’s based on your vocal patterns; your steering wheel may be able to pick up on the onset of Parkinson’s disease from small tremors in your hands; or your shower or bath might be scanning you for tumors on a daily basis.

He’s also confident that any skills gap can be bridged: “The generations already accustomed to computers and mobile Apps are getting older. Many people in their 50s and 60s already use social media like WeChat. They’re picking up new technologies quickly.” Liang also believes that younger generations will also play a key role in this regard, “They’ll be thinking ‘Oh, how’s my dad doing today?’ They’ll want to actively monitor their parents or grandparents and ensure they know how to use new technology.”

Apps that log behaviors and sensors that monitor health are not only predictive; they can also help ensure compliance with medication and treatment plans, giving notifications and alerts to optimize treatment efficacy.

A Helping Hand for Doctors
Cloud AI can eliminate a lot of the grunt work for physicians and deliver two major benefits for them. The first is in the area of clinical processing. Doctors will be able to offload part of their work tasks, like diagnostics, to computers, which are far superior at observing patterns than humans. For example, strokes are caused by blockages or bleeds, but there’s just a 45-minute window to make a diagnosis and begin treatment to dissolve a clot when the first signs appear. However, it can take hours — or even days — for a shadow to appear on a scan that’s recognizable to a doctor.

The second is that it will allow doctors to more efficiently share information and conduct research using massive datasets that can be instantly mined. “[Doctors] collectively can record a huge amount of data from different cases over a long time period,” says Liang. “So, they have a better chance of understanding different diseases and identifying how they can provide more effective treatment for patients.”

Cloud AI and the analysis of huge datasets will mean healthier overall populations, where trends can identify potential epidemics, implement constant monitoring, and facilitate AI-enabled research into rare diseases and sub-populations or geographies that are too fine-grained for humans to analyze.

Local Issues
In China’s case, Liang identifies three areas that tech solutions need to address; “The first is the aging population. People are living longer and so they require healthcare for longer, which stretches resources. The second is the increasing cost of managing chronic diseases, which places a burden on society. The third is the uneven distribution of healthcare resources.”

The Philips-Huawei solution will go some way to leveling the playing field by cutting costs and increasing the efficiency, speed, and accuracy of diagnostics and treatments. “Our collaboration basically covers a cloud platform, but it also includes IoT connectivity and solutions,” says Liang. “We’ve tested our solutions on Huawei’s cloud and we’re very satisfied with the results. Now it’s about both companies working together to go to market.” ▲
"Digital transformation paves the way for more robust Smart Grids, making our life better. Huawei is willing and expected to play a bigger role in digital transformation of electric power systems in all countries and regions across the globe."

Liu Jianming
Deputy Director of the Power Informatization Study Committee, China Society for Electrical Engineering

"Clouds are converging, becoming more centralized. But it’s unlikely that the world will end up with only one or two. We will work with our partners to build a competitive cloud and, by connecting to it, our customers will reach all four corners of the earth."

Guo Ping
Huawei Rotating CEO

"The CPC digital strategy aims to innovate business models by leveraging technical advantages. CPIC is walking the road to digital transformation, and we will continue working with Huawei to provide customers with convenient, high-quality insurance services."

Yang Xiaoling
Vice President and Dual Digital Officer, CPIC

"We decided to build an enterprise private cloud platform and use cloud infrastructure to support our core business systems such as ERP and CRM. Huawei has provided us with a series of ICT infrastructure solutions, such as FusionCube, that fully meet our business development needs and conform to our ICT transformation strategy. We are looking forward to further cooperation with Huawei."

Li Zhaohang
Information Management Department, COFCO Coca-Cola Beverages Ltd.

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