Leading New ICT The Road to Digital Transformation

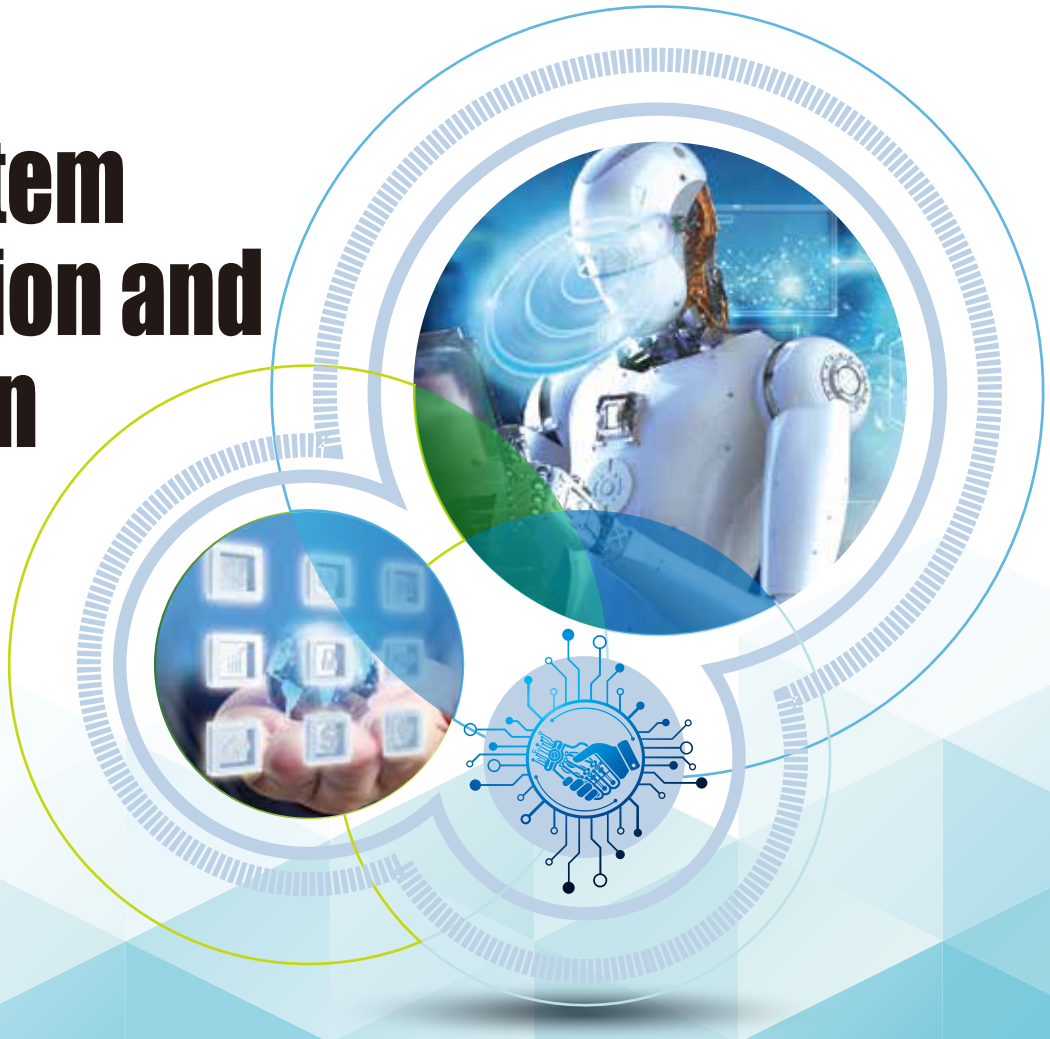
ICT INSIGHTS

e.huawei.com

Huawei Enterprise

04/2019
ISSUE 25
LEADING NEW ICT

IT Ecosystem Cooperation and innovation



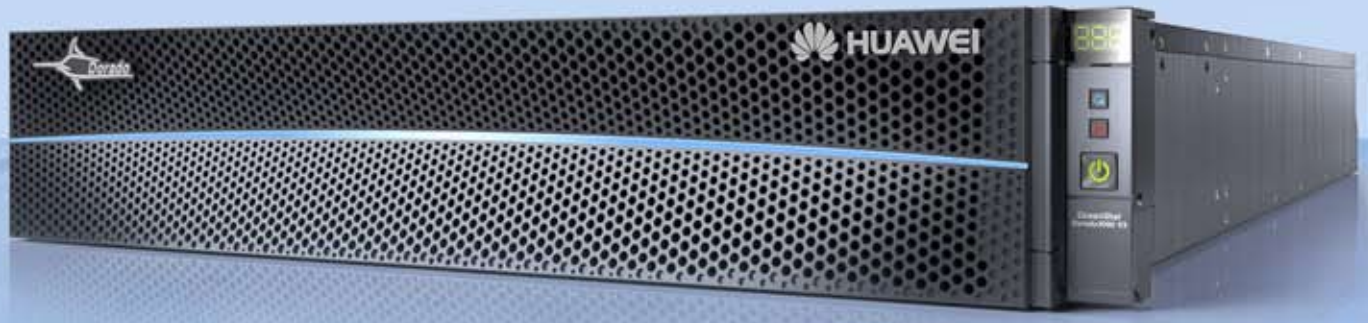
Scan for mobile reading

Huawei and Global InfoTech: Building a New Financial Cloud Ecosystem Together

Huawei Works with Industry Partners to Build an Intelligent World

Guotai Epoint: Digital Government Efficiency with Cloud DC + e-Government Cloud Platform

HUAWEI



OceanStor Dorado3000 V3 All-Flash Storage
Lightning Fast, Rock Solid

- Fully-featured: Comprehensive enterprise-class features and all-inclusive software design
- Fast: Stable response even during peak time, 3x better business experience
- Affordable: Replace legacy HDD storage and enjoy the power of flash ahead of time

Scan QR
code for more information
e.huawei.com

Building an Ecosystem for an **Intelligent, Full-Stack Cloud**

By *Hou Jinlong, President, Cloud & AI Products & Services, Huawei Technologies Co., Ltd.*

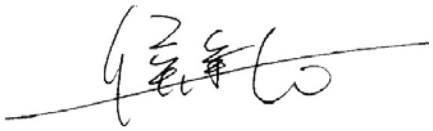
After 60 years of groundwork, cloud and Artificial Intelligence (AI) technology are finally mature enough for large-scale deployment. Industry innovations that once sounded like science fiction are no longer mere concepts. Behind digital government, safe city, Internet finance, autonomous driving, and unmanned retail are countless application providers, developers, and infrastructure vendors that are continually reaching for higher intelligence.

At Huawei, we have built on our core competencies in chips, algorithms, and architecture to develop a 'Platform + Ecosystem' strategy. Our comprehensive platform, exhaustive selection of products, and end-to-end solutions support and empower partner innovations from every industry. We are committed to creating more value for customers by infusing intelligence into our infrastructure and building a solid foundation for the digital world.

By leveraging our collaborative 'Connectivity + Computing + Cloud' synergy, we are able to provide an intelligent, automated, and information-driven platform for partners' content, applications, and algorithms. Together, we will build a thriving ecosystem and usher in a fully connected, intelligent world.

This new era brings unprecedented opportunities for everyone. We will continue to work with partners to make even greater contributions.

Let's reshape the future with AI and full-stack clouds.



Publisher:

ICT Insights Editorial Board,
Huawei Enterprise

To subscribe to *ICT Insights*, contact the Editorial Board.
Email: ICT@huawei.com
Address: H2, Huawei Industrial Base, Bantian, Longgang, Shenzhen 518129, China
Tel: +86 (755) 28780808
+86 (010) 82882758

ICT Insights

ICT Podcasts

Inside

To be an informative and inspiring magazine, ICT Insights needs your continual contributions and feedback. Please feel free to submit articles for publication. The editors greatly value your input.

We look forward to hearing from you.

Facebook Twitter Youtube

Publishers: Heng Qiu
Advisors: Jeff Peng, Alice Li
Editors in Chief: Lorra Liu
Guest Editors: Liu Cuiqin
Editors: Wu Zhan, Tony Sun, Wang Zhibo, Li Ke, Deng Xing, Ou Guangping, Wang Xin, Zane Wei
Circulation: Jing Chen

YITU and Huawei Collaborate to **Usher in an Intelligent, Digital Future**

By *Lin Chenxi, Co-Founder, YITU*

YITU Technology and Huawei jointly launched an intelligent speech recognition solution based on YITU's open speech recognition platform; Huawei's full-stack, all-scenario Ascend-series chipsets; and Huawei's Atlas 300 Artificial Intelligence (AI) accelerator cards for data centers. The integrated software and hardware solution has combined the Research and Development (R&D) and ecosystem service capabilities of both companies. The resulting speech recognition platform is designed to support the efficient development of third-party applications.

From Smart Cities to speech recognition, the partnership between YITU and Huawei continues to produce technological breakthroughs.

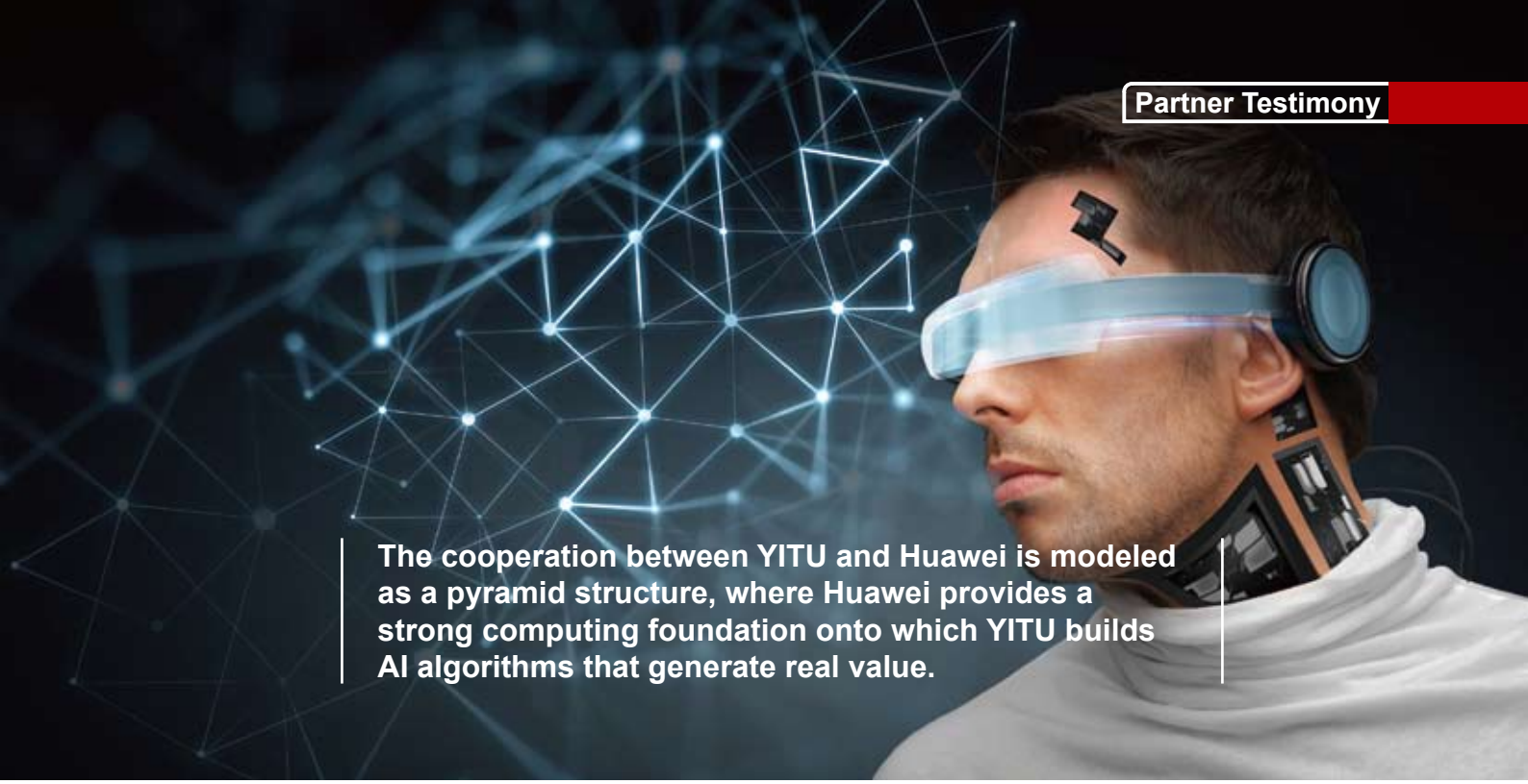
Smart Cities Around the World

In the future, competitive cities will depend on advanced data-processing capabilities. Where in the past, it may have been difficult for city managers to gain a comprehensive understanding of a particular department or territory. In the digital era, big data can be organized and visualized to reveal deep insights in a glance. Because big data is a valuable municipal asset, the result is ability for managers to make better decisions more quickly. Cloud computing technology and AI applications are two key tools for leveraging this data. Huawei and YITU work together closely to combine cloud computing, AI, and big data to build intelligent products and services for Smart Cities around the world.

Huawei is a leading global Information and Communications Technology (ICT) solutions provider that supplies open, flexible, and secure platforms to support device-management-cloud synergies. Huawei is active in many vertical industries, including public security, intelligent transportation, and campus safety.

YITU is a leading AI company in China. It serves customers in nearly 30 provinces, more than 150 cities, and hundreds of campuses around the country. The company has a deep understanding of AI technology development and Smart City construction. YITU was the first Chinese company to win the Face Recognition Vendor Tests (FRVTs) held by the National Institute of Standards and Technology (NIST) under the U.S. Department of Commerce. The company won the top prize three years in a row. In the latest FRVT test, YITU's algorithm delivered an industry-leading recognition accuracy of over 99 percent, with a False Match

YITU and Huawei jointly launch the Policing Cloud and Smart Campus Solutions



The cooperation between YITU and Huawei is modeled as a pyramid structure, where Huawei provides a strong computing foundation onto which YITU builds AI algorithms that generate real value.

Rate (FMR) of less than 0.0000001. As the YITU-Huawei partnership deepens, the two companies will continue to spread China's best AI and cloud technology around the globe, promoting the deployment of Smart Cities and driving industry-wide innovation and transformation.

The YITU-Huawei partnership began in early 2016. In 2018, the companies released multiple video cloud and big data solutions and they signed a memorandum of cooperation in the intelligent computing field to jointly explore markets outside of China.

At *Huawei Connect 2018*, Huawei and YITU launched two joint initiatives. First was a Policing Cloud Solution for the public security market that leverages Huawei's network-wide intelligent video capabilities with YITU's big data platform to create a powerful system that allows police officers to better protect public safety. Second, the two companies launched a Smart Campus Solution for the enterprise market based on Huawei's Atlas intelligent computing platform and YITU's facial recognition and integrated campus management software to construct a smart security system that helps enterprises improve the efficiency of campus management.

The YITU-Huawei partnership has also delivered benefits to Huawei's own digital transformation. Beginning in early 2017, Huawei turned part of its Shenzhen headquarters into a pilot campus that incorporated YITU's AI-based facial recognition technology. The software was configured to work in conjunction with 1,000 video cameras to implement 24/7 campus security. The result saved USD 17,900 (CNY 120,000) per entry gate by eliminating the need for manned security positions and also enabled Huawei employees to walk through the campus gates at the rate of one-per-second without having to swipe their ID badges, improving the flow of workers and creating a better employee experience.

The cooperation between YITU and Huawei is modeled as a pyramid structure, where Huawei provides a strong computing foundation onto which YITU builds AI algorithms that generate real value.

AI Spreads to More Industries

With the rapid development of the digital economy, AI is improving the efficiency of many industries. YITU has been using technology to advance industry efficiency and benefit society. YITU's work fits within Huawei's vision of 'universal AI.'

According to Dong Libin, Vice President of Data Center Marketing & Solution Sales for Huawei, "YITU is a very important partner of Huawei. As a leading global ICT solutions provider, Huawei provides open, flexible, and secure ICT infrastructure platforms that support device-management-cloud synergy. The company has extensive investments and applications in fields that are important to people's livelihood, such as Smart City and traffic management. YITU has world-class leading algorithms that are of great significance to our comprehensive policing, governance, and services solutions. We are committed to building intelligent and integrated public security solutions to serve global customers."

Today's AI is not only driving the development of machine intelligence, but it is also helping humans extend their own natural abilities. The commercial practice of combining AI technology with industry applications reveals just how much machine intelligence has grown in recent years. This is an unparalleled era for AI, wherein companies like YITU cooperate with partners to create even more possibilities for the use of AI. From protecting people and the environment to working more efficiently while spending less money, intelligent image recognition technology is helping to create better lives for everyone. Further gains will require industry leaders who continue to work closely with partners to drive innovation. ▲

Huawei and Global InfoTech: Building a New Financial Cloud Ecosystem Together

By *Zheng Youping, General Manager of Technical Service Center, Global InfoTech Company*

In the current cloud era, cloud platforms built on infrastructure resources like computing, storage, and networking are gaining popularity. Due to the co-existence of multiple cloud platform technologies, the Cloud Management Platform (CMP) has found a niche in the enterprise Information Technology (IT) market. The need for unified management of large heterogeneous enterprise infrastructures is growing, and has contributed to the rapid rise of CMPs throughout the enterprise-class cloud market.

In a cloud service system, the CMP is responsible for unifying the scheduling of traditional IT, cloud-native resources, and applications. The platform also supports rapid service iteration and innovation. Enterprises are increasingly motivated to adopt CMPs as they begin to fully comprehend the role of cloud computing in digital transformation, and as cloud computing increases its enterprise IT market share.

According to Gartner's definition of the CMP market, the basic core functions of a CMP include: multi-cloud management, service requests, metering/billing, and process orchestration. These functions need to be implemented in hybrid IT environments (virtualization, private cloud, and public cloud) to ensure optimal outcomes.

Meeting the Challenges of the Cloud Era

• **Operation model transformation:** Core enterprise applications are being digitized, enabling them to provide users with improved, real-time services over the Internet. Digitization has become the focus of many enterprises that are undergoing strategic transformation.

• **Distributed high availability:** Enterprises sometimes need to cope with short-term load surges. However, most traditional architectures are not equipped to provide the new cloud-era services needed to meet this demand, such as clustering, redundancy, backup, remote Disaster Recovery (DR), and auto scaling.

• **Agile service delivery:** An ideal IT infrastructure must allow business innovation while ensuring stability for legacy applications. It must allow cross-platform, flexible, timely, batch, and standardized delivery for IT services.

• **Hybrid multi-cloud management:** Enterprises must be capable of managing multiple types of clouds — private, public, and hybrid — within multi-center structures and numerous environments, like development, testing, and production. They must be able to manage heterogeneous resources — both traditionally centralized, as well as open-source distributed ones.

Dual-State IT Hybrid Cloud Management

'Dual-state IT' will become mainstream in the near future.

The steady-state system runs legacy applications requiring business continuity and contains massive amounts of data and transactions. This system works to maintain high reliability and stability while handling a relatively low level of concurrency.

The agile-state system runs exploratory and non-linear innovative applications. It must be easy to use and able to handle high concurrency while still delivering excellent performance. This system must quickly adapt to ever-changing customer needs and market conditions.

At the beginning of 2017, Huawei and Global InfoTech devoted extensive resources to studying financial industry trends and evolution, with the purpose of pinpointing the most suitable cloud

After studying financial industry trends, and a long period of functionality and security verification, Huawei and Global InfoTech jointly launched their private financial cloud solution, FinCMP2.0, which provides holistic services for cloud planning, integration, management, and operations.

solution for the financial sector.

After long periods of functionality and security verification and testing, Huawei and Global InfoTech jointly launched their private financial cloud solution, FinCMP2.0, which provides holistic services for cloud planning, integration, management, and operations. FinCMP2.0 combines the strengths of Global InfoTech's intelligent dual-state cloud management platform and Huawei's FusionSphere OpenStack cloud OS solution.

FinCMP2.0 builds a cloud-based IT operation management console to help various customers digitally transform. Heterogeneous cloud platforms help enterprise customers transform siloed IT systems into self-service ones, facilitating approval, metering, and billing based on IT resource usage.

With the unified management of cloud resources within a group, along with unified operation management and metering/billing, corporate groups can transition from traditional IT software and hardware procurement to the pay-per-use model of cloud services. Traditional integrators and cloud service providers create an integrated cloud service catalog on top of a multi-cloud management platform, providing customers with flexible and agile cloud services.

FinCMP2.0 Functions

- **Heterogeneous resource management:** Supports centralized management of virtualization software and manages VMware, OpenStack, and PowerVC resource pools, as well as physical servers.
- **Multi-DC management:** Unifies management for heterogeneous resource pools across multiple data centers in different geo-locations.
- **Cloud service management:** Supports global resource policy management; resource pool and cluster-level scheduling policy management; and data dictionary-based settings management.
- **Visual process engine:** Orchestrates job scheduling; DR; reference and release; resource delivery; and request and approval processes.
- **Multi-tenant management:** Offers resource abstraction, provisions standard cloud services, and supports multiple authentication methods.
- **Superior extensibility:** Allows secondary development on pre-existing products. New products can seamlessly integrate with pre-existing ones.

Cloud Ecosystem Prospects

As market needs mature, general-purpose cloud platforms will gradually evolve to serve specific domains and provide specialized services. Using a CMP to manage heterogeneous hardware and virtualized resources will be the logical choice for many enterprises.

In the meantime, as Infrastructure-as-a-Service (IaaS) continues to extend its management reach and Platform-as-a-Service (PaaS) grows its scheduling capabilities, a new software runtime environment is finally coming into existence. Software-Defined Everything (SDE) will soon be the new normal. Additionally, private clouds will coexist with public clouds in enterprises of all sizes. The hybrid cloud market is projected to grow at a fast pace.

Based on years of experience in cloud Data Center (DC) operation and maintenance, expertise with both financial and public clouds, as well as the work of remarkable technical teams from both Huawei and Global InfoTech, FinCMP2.0 will provide highly tailored cloud solutions while developing a thriving financial cloud ecosystem.▲

Commvault and Huawei: **A Partnership Made in Data**

By *Andreas My, VP, Commvault*

The acceleration of data growth is framed by the uptake of global digital transformation programs; and the ongoing proliferation of cloud computing, big data, and artificial intelligence technologies, and an increasingly crowded competitive landscape. In this changing environment, data has become the strategic asset for all enterprises.

Commvault is the recognized industry leader in data backup and recovery, and its latest range of converged, HyperScale, data management solutions redefine backup by allowing enterprises to better protect, manage, and use their most-critical of assets — their data. Huawei, the world's leading Information and Communications Technology (ICT) infrastructure solution provider, recognizes its customer's growing requirements to manage data across all environments.

Based on the expanding market demand for cloud-focused data management and protection solutions, Commvault and Huawei formed a partnership back in 2013. Over the last six years, this partnership has expanded it and now includes the Huawei All-in-One Backup Appliance (Commvault license embedded) for cloud-based data protection technologies & solution, and more recently, certified HyperScale reference architecture.

The initial collaboration combined Commvault software and Huawei's OceanStor data storage system, and at the *2015 Huawei Cloud Computing Conference*, both parties entered into a Global Cooperation Alliance Agreement to design an integrated data protection solution that used Commvault software and Huawei hardware.

In 2016, the partnership extended its cooperation by establishing a joint laboratory in Chengdu to engage in research and development of data backup, recovery, archiving, and cloud solutions based on their respective hardware and software technologies.

2017 saw the joint laboratory venture release the Hybrid Cloud Backup Solution that enabled enterprises to back up core data from private data centers to Huawei's public cloud platform in an efficient and secure manner, allowing users to reduce the time investment traditionally associated with data backup and recovery.

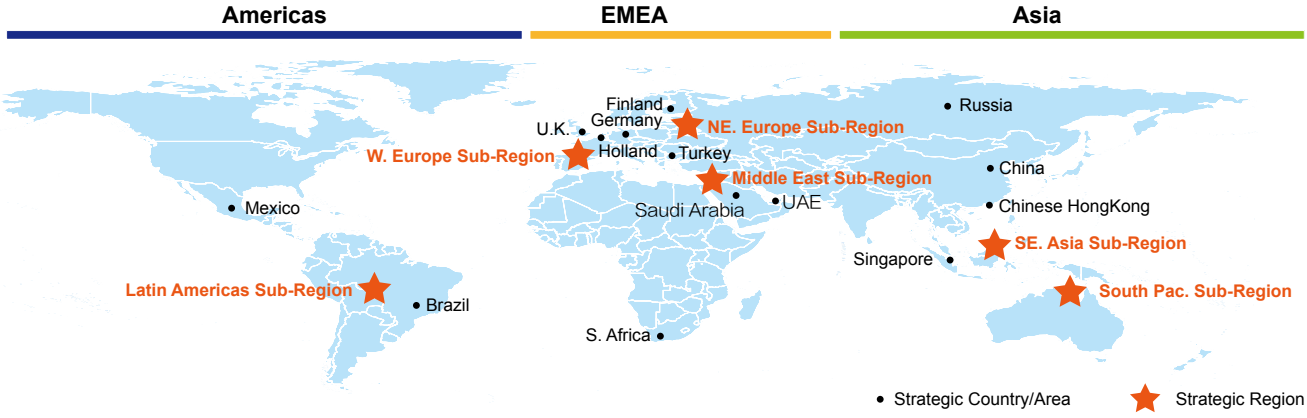
At *Huawei Connect 2018*, Commvault and Huawei announced Huawei Data Protection with Commvault HyperScale, offering customers an integrated approach to hyper-converged data management and protection. Tightly integrating computing,

Huawei and Commvault's partnership has further enlarged the two companies' joint ecosystem, not just expanding the range of the market coverage, but allowing the two sides to more clearly see users' requirements and turn them into solutions, leading to extremely positive interaction.

storage, networking, virtualization, data backup and recovery, the solution provides full lifecycle data management, for hybrid environments, and helps customers achieve seamless data migration in a hybrid cloud environment — it also significantly reduces complexity, cost, and improves scalability and agility too.

From a product and technology perspective, Huawei provides the hardware while Commvault supplies the software. From the market coverage perspective, Huawei has clear advantages in the service provider space while Commvault has proven capabilities in enterprise data protection space, meaning the partnership delivers mutual benefits for both parties and their customers.

As a trusted global partner, Huawei is committed to collaborating with leading technology partners like Commvault to build and deliver end-to-end solutions for customers. This commitment is key to Huawei and Commvault's continued partnership over the last six years, and as the true value and importance of data is now being recognized by organisations across the globe, our partnership with Commvault will only become more relevant and continue to grow from strength-to-strength. ▲



Alliance Milestones between Huawei & Commvault

- **Milestone 1** — **WW Reselling**: WW Reselling Model Started in Feb. 2013
- **Milestone 2** — **Solution Integration**: Huawei All-in-One Backup Appliance (CV BET license embedded) Launched in Oct. 2015
- **Milestone 3** — **Technical Alliance**: Commvault-Huawei Joint Lab Launched in Aug. 2016 for cloud-based data protection technologies & solutions
- **Milestone 4** — **Joint Cloud Ecosystem**: DpaaS Over Huawei Hybrid Cloud Launched in Sept. 2017
- **Milestone 5** — **Certified HyperScale Reference Architecture**: Commvault and Huawei HyperScale Appliance Released in Sept. 30, 2018

e-Government: Contributing to a Digital China

By *Wang Xin, Senior Alliance Manager, Strategy & Business Development Department, Huawei IT Product Line*

There are many incentives for governments to undergo digital transformation. Digital governments can utilize data-driven decision-making and modern governance. They can provide stakeholder-centric services that cater to the needs of citizens and businesses alike, plus they can more easily drive mass innovation and contribute to the eco-friendly, sustainable growth of cities. By working with a wide range of partners and leveraging a comprehensive portfolio of Information and Communications Technology (ICT) solutions, Huawei is a driving force behind this digital transformation.

To begin, Huawei plans to develop smart cities and a digital economy by working with customers on the following fronts:

- Laying the foundation for a digital economy by building a modern ICT infrastructure
- Facilitating data sharing to allow a free flow of information and fuel economic growth
- Enabling the digital transformation of various industries to kick start industrial innovation
- Improving city management by building an 'intelligent brain' for each city, which benefits the general public and businesses at large

Future-Ready e-Government Clouds and Big Data Analytics

Huawei leverages innovative products and technologies to drive the digitization of governments at all levels, helping solve problems and create value.

In China, the government is behind over 60 percent of IT investments. Huawei helps government customers make the shift from procuring IT products, such as servers and storage, to using cloud services on a subscription basis. Huawei also helps customers migrate all legacy Information Technology (IT) applications to the cloud, run core applications, and analyze data on an e-Government Cloud Solution. This enables them to reap the benefits of cloud computing.

Over the course of government digitization, Huawei not only provides technical support for the operations and management of an e-Government cloud, but it also continues to drive the transformations of organizational structures, budgeting, and investment policies, creating extra value for all its government customers.

So far, Huawei has successfully delivered 350+ e-Government cloud projects in China, including 22 national e-Government clouds, 18 provincial clouds, and 310+ county-level clouds. According to the *2017 IDC MarketScape report*, Huawei ranked number one in both the e-Government cloud and big data markets of China. Huawei also appeared in the Leaders quadrant as an e-Government big data provider in China. In the future, adhering to its 'Platform + Ecosystem' strategy, Huawei will enable a digital future for the entire industry by continuing to work with thousands of partners to create an open, win-win e-Government cloud ecosystem.

'One Cloud + One Lake + One Platform' Drives Government Transformation

Throughout China, Huawei is driving the development of e-Government clouds and big data analytics by collaborating with ecosystem partners and leveraging its 'One Cloud + One Lake + One Platform' strategy. This strategy is helping accelerate data integration and sharing across various government information systems. Huawei aims to provide a platform where partners and Independent Software

Huawei's e-Government Cloud Solution offers a collaborative, resource-sharing platform to agencies, service providers, integrators, and other players in the government industry chain. This rich ecosystem is encouraging the development of digital governments.

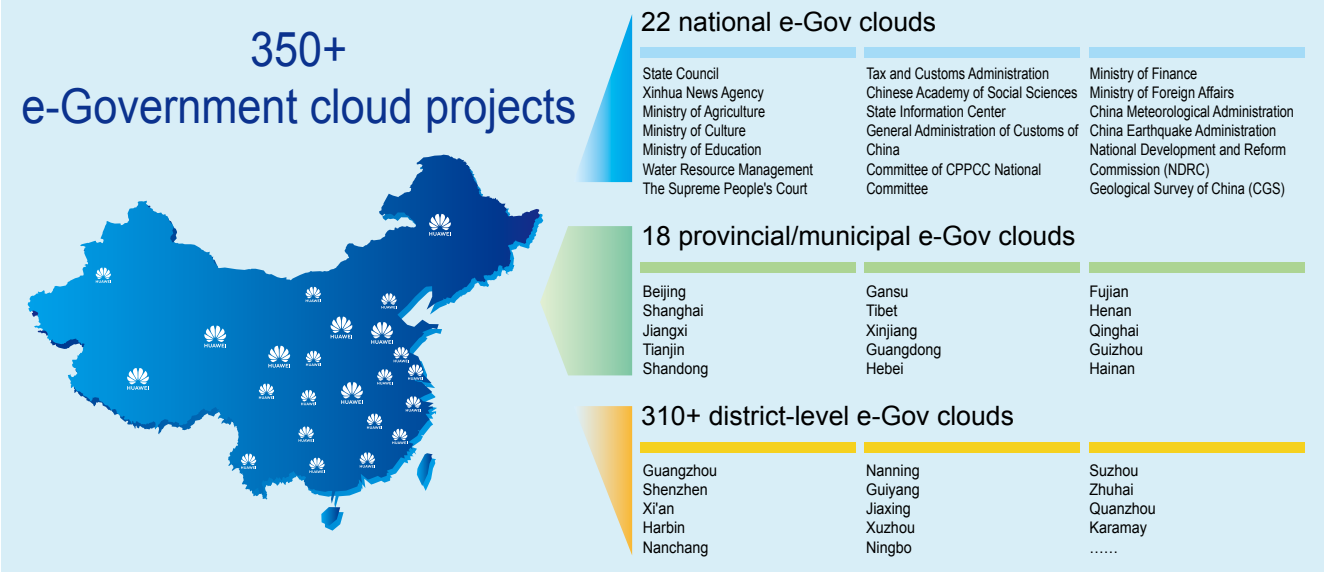
Vendors (ISVs) can all contribute their expertise to a thriving e-Government ecosystem, driving their digital transformation.

- **'One Cloud' is a converged computing cloud** with unified delivery, management, and IT infrastructure services.
- **'One Lake' is an e-Government data lake** that aggregates data from all sources and helps customers effectively manage it, turning data resources into data assets. The application data is drawn directly from the lake and does not need to be repeatedly collected. This e-Government data lake manages the data lifecycle, which includes data collection, storage, computing, management, and use. It also supports on-demand data acquisition and usage.
- **'One Platform' is an application enablement platform** that provides a unified service portal by integrating basic data services, general-purpose middleware, and middleware unique to government services. This simplifies middleware management for government offices and bureaus. It also implements application-centric hybrid encapsulation services. 'One Platform' solves typical government IT problems, such as small platforms versus heavyweight applications, repetitive and wasteful investments, and overly complex Operations and Maintenance (O&M). It allows unified development and deployment of applications, facilitating the genuine convergence of government services.

Growing a Full-Stack e-Government Ecosystem

Going forward, Huawei will continue to provide digital government solutions by cooperating with ecosystem partners. Huawei's open partner platform will serve as the 'fertile soil' where applications can grow and thrive.

HUAWEI CLOUD Stack (HCS), Huawei's full-stack hybrid cloud solution, offers end-to-end solutions for government customers, and it provides a solid technical foundation for ecosystem partners. With this foundation, partners can focus on application innovation without the burden of excessive technical and administrative details. This collaborative effort will create a thriving ecosystem with state-of-the-art digital government solutions. ▲



Banking Digital Transformation **Based on 'Cloud + Ecosystem'**

By *Deng Xing, Senior Alliance Manager, Strategy & Business Development Department, Huawei IT Product Line*

Signs in China and around the world show that banks are in urgent need of digital transformation to help boost their next round of development. Due to continuous global economic downturn, the international banking industry has recently found itself in a rut, with an average annual revenue growth of just 5 percent since 2014.

In China specifically, the industry is facing three major challenges. First of all, liberalization has reduced the interest rate differentials and net interest incomes of financial institutions. Secondly, disintermediation has increased deposit costs which has, in turn, incurred elevated operating expenses, because corporate and private banking services now contain more investment and wealth management services. Last, but not least, established banks face increased competition from new areas, such as Internet banking companies. As a result, bank profits continue to shrink. In 2016, the year-on-year profit growth of listed banks in China was a mere 1.2 percent.

In the next decade, most banks will focus strategically on digital transformation. According to recent statistics, banks in China invest 17 to 20 percent of their pre-tax profits in digital transformation and innovation.

Deloitte's *2019 Banking Industry Outlook* describes the proactive preparation banks have made for digital transformation — more than 20 percent have invested in new technologies like big data, cloud computing, block chain, and Artificial Intelligence (AI), and over 30 percent have set up pilot sites.

To better serve industries and help the Chinese economy grow as a whole, Huawei is shifting the focus of its financial ecosystem construction from cloud infrastructure interoperability to affordable full-stack, all-scenario AI solutions.

Three Digital Transformation Strategies Based on 'Cloud + Ecosystem'

As a world-leading Information and Communications Technology (ICT) solution provider, Huawei has been closely monitoring the transformation of China's banking industry. Based on insights gleaned from observing its customers and partners, Huawei has identified three broad strategies by which banks can complete their transformation.

- **Reform channels to improve customer experiences:** Wide application of new technologies, like Internet and mobile banking, cloud computing, and big data, have given rise to more diversified customer behavior and service requirements. In China, most people now choose to get financial services through digital channels, which has made upgrading Automatic Teller Machines (ATMs) essential. Banks are advised to incorporate mobile marketing, video collaboration, and all-media contact capabilities into existing channels to provide safe and consistent service experiences across multiple channels.
- **Overhaul the platform to better support service innovation:** Banks face two major challenges during digital transformation — legacy platforms cannot support the service innovation and development needed in the new era, and current banking systems are incompatible with new technologies. However, banks can replace the closed architecture with open, distributed cloud platforms that provide higher system agility and scalability. Then they can leverage big data platforms to achieve precise marketing and real-time risk management. Banks can apply innovative AI-based services that enable more informed decision-making, deeper insights, and optimized banking processes.
- **Cooperate with partners from other industries for mutually beneficial outcomes:** Through acquisitions, investments, or strategic cooperation, banks can use technical innovations to better serve their customers. Many financial institutions and technical firms have mutually benefited from deep cooperation in fields like cloud computing, big data, block chain, and AI. Cooperation simultaneously serves the interests of banks, technology companies, and consumers.

Huawei's Success Stories

In recent years, Huawei has helped many banks transform successfully based on the aforementioned strategies.

Huawei rebuilds Information Technology (IT) architecture for financial institutions with an open, cloud-based digital platform. Huawei offers a full range of products, boasts global service capabilities, and plays an important role in formulating international standards for the ICT industry.

Huawei leads the world in new technologies like cloud computing, big data, and AI, and provides strong support for customers and partners. In addition to conventional infrastructure like network equipment, servers, storage systems, mobile devices, security devices, and data center equipment, Huawei provides products and solutions for cloud-based distributed data centers, host migration, and big data platforms. Thanks to long-term, sustained Research and Development (R&D) investments, Huawei boasts significant proprietary chip and source code technologies that help guarantee security and reliability for its infrastructure products and solutions.

Huawei is working with its financial customers to constantly improve finance-oriented solutions, build a healthy ecosystem, and help banks transform. To date, Huawei's products and solutions have been used by more than 300 financial institutions worldwide. In China, Huawei has also been chosen as the strategic partner for

digital transformation by major banks and insurance companies. Together they are creating next-generation architecture that is set to propel the country's finance industry to new heights.

Examples of Huawei's cloud platform joint innovation partnerships include the Industrial and Commercial Bank of China (ICBC) along with the Agricultural Bank of China (ABC); big data joint innovation with China Merchants Bank (CMB) and the China Pacific Insurance Company (CPIC); and core banking and credit card system solutions developed in cooperation with industry-leading solution providers.

Through its partnerships, Huawei strives to build a mutually beneficial finance technology ecosystem. Systems co-developed by Huawei and partners, such as Chinasoft International, Yusys Technologies, and Nantian Technologies, have been widely used by many major financial institutions, including China's Big Four state-owned establishments; national joint stock banks such as CMB, China Minsheng Banking Corporation (CMBC), and China CITIC Bank; as well as the Shenzhen and Shanghai stock exchanges.

The real-time decision-making platform co-developed with Chinasoft International and CreditX supports the rapid development of credit card business at CMB, and the platform has made the institution China's leader in consumer finance.

CMB's push conversion rates for Internet credit card promotions have improved by five times. The bank attributes this success to the powerful performance of its new platform.

Working with ADTEC and ShineTech, Huawei has also developed an intermediary service cloud for Guangdong Rural Credit (GDRC). The cloud provides intermediary business development and deployment services for more than 90 legal persons, simplifies code management by more than 80 percent, and shortens application Time-To-Market (TTM) from months to just one day.

> ***Huawei will work closely with industrial partners to develop advanced finance solutions that focus on improving and outputting core data and technological capabilities to further expand the applications and modes of digital technologies and platform services.***
> **>>**

Exploring Long-Term Reciprocal Cooperation

Three trends are expected to characterize the evolution of digital financial technologies. First, the significance of data will continue to grow. Second, digital technologies will combine more closely with financial services. And third, monitoring and management technologies will gradually emerge.

Huawei is shifting the focus of its financial ecosystem construction from cloud infrastructure interoperability to affordable full-stack AI solutions that cover every scenario, paying particular attention to those involving massive volumes of repeated data, expert experiences, and multi-domain collaboration. Huawei will work closely with industrial partners to develop advanced finance solutions that focus on improving and outputting core data and technological capabilities to further expand the applications and modes of digital technologies and platform services.

In this endeavor, Huawei will provide stable and efficient hardware, in addition to database and middleware infrastructure. Constantly improving AI capabilities like data acceleration, data cleaning, and machine learning will help Independent Software Vendor (ISV) partners develop applications and innovate services on the Huawei platform in a secure and convenient manner.

In the meantime, financial institutions can clarify their thoughts on digital banking, and tend to the accumulation and use of data assets from services and users. In the future, Huawei and its partners will build a reciprocal digital financial ecosystem to better serve industries. Huawei will continue its exploration of long-term partnership and development in the industrial cloud sphere, seeking modes of cooperation that benefit both parties throughout the entire process.▲

Ecosystem-based Cooperation **Fuels the Next Phase of Carrier Development**

By *Klein Chen, Senior Alliance Manager, Strategy & Business Development Department, Huawei IT Product Line*

Full-scale cloud or digital transformation of carriers is inevitable. Carriers face stagnant revenue growth in spite of the rapidly growing volume of data on their networks. Transformation is the only way for these companies to upgrade network architectures, improve operational efficiency and cost structures, and, most importantly, reduce their persistently high Operating Expenses (OPEX) — which can account for over 60 percent of business expenditures. They also need new cloud-based Information Technology (IT) infrastructure to support the development of new cloud-enabled services, like video and the Internet of Things (IoT). Carriers hope to leverage the new services to spur revenue growth. In addition, Over-The-Top (OTT) and other Internet-based service providers are cutting into carriers' traditional businesses. Carriers rely on a cloud-based approach to strengthen their technical capabilities, organizational structures, and business models, and to weather increasingly fierce inter-industry competition.

The biggest challenge for carriers during cloud transformation is the need to support the co-existence of various business scenarios (IT, CT, and application), deployment modes (private cloud, public cloud, and hybrid cloud), and a variety of resources (physical machines, virtual machines, and containers). To overcome such a challenge, they need an Information and Communications Technology (ICT) partner with a solid technical background, a comprehensive product portfolio, and a mature ecosystem.

Carriers' Ideal Digital Transformation Partner

Through three decades of stable operation, constant innovation, and open cooperation, Huawei has grown into a leading global provider of ICT solutions, with a considerable competitive edge in terms of product line and end-to-end technology. By 2016, Huawei's carrier products and solutions had been used in more than 170 countries to serve one third of the global population. Of the 50 largest carriers in the world, 45 are Huawei customers; and over 100 carriers have chosen to partner with Huawei during their digital transformation. In addition, Huawei's market dominance has given it a significant voice in the formulation of international telecommunication and interconnection standards. Huawei is involved in over 360 standardization organizations, industry associations, and open-source

As a leader in the carrier infrastructure market, Huawei serves as a bridge between ISVs or SIs and carriers. Through joint marketing, Huawei and its partners can complement each other and expand their respective market shares.

communities, including IEEE-SA, ETSI, TMF, WFA, WWRF, OPNFV, and CCSA, holding key positions in over 300 of these organizations.

Huawei's IT solutions have earned very favorable rankings in publications issued by IDC, Gartner, and GlobalData. For example, its government cloud solution, FusionInsight big data solution, and FusionAccess desktop cloud solution all rank first in China in their respective categories; the FusionSphere virtualization solution ranks higher than all comparable solutions from other Chinese vendors; Gartner includes FusionInsight in its Magic Quadrant for Data Management Solutions for Analytics (DMSAs); and GlobalData names Huawei's Network Functions Virtualization infrastructure (NFVi) solution as the global leader for NFVi solutions.

Huawei makes a strong case that it is the optimal partner for carriers. It offers a full range of IT and 'Leading New ICT' products covering cloud, big data, and Artificial Intelligence (AI). HUAWEI CLOUD Stack (HCS) — Huawei's full-stack hybrid cloud solution — provides unified services, management capabilities, and Application Programming Interfaces (APIs) across public and private clouds, which facilitates the digital transformation of carriers. HCS doesn't just consist of hardware equipment like servers, storage systems, and switches; it also includes powerful software components, such as the ManageOne cloud management platform, FusionStage Platform-as-a-Service (PaaS) platform, FusionSphere OpenStack Infrastructure-as-a-Service (IaaS) platform, FusionCompute compute virtualization software, FusionStorage storage virtualization software, and FusionNetwork Software-Defined Networking (SDN) software. Huawei also provides professional services, such as planning, integration, and migration, to better facilitate carriers' evolution toward a cloud-empowered future. At *Huawei Connect 2018*, Huawei debuted its AI strategy and full-stack, all-scenario AI solution. Huawei is dedicated to advancing the AI sector by working with partners from many different industries and building an intelligent world where everything is interconnected.

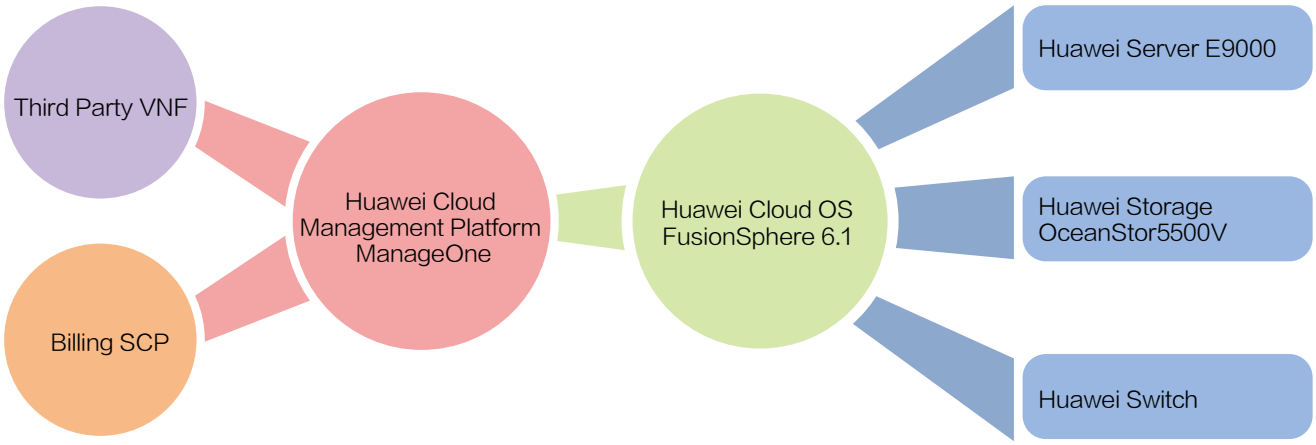


Figure 1. BSS Joint Solution

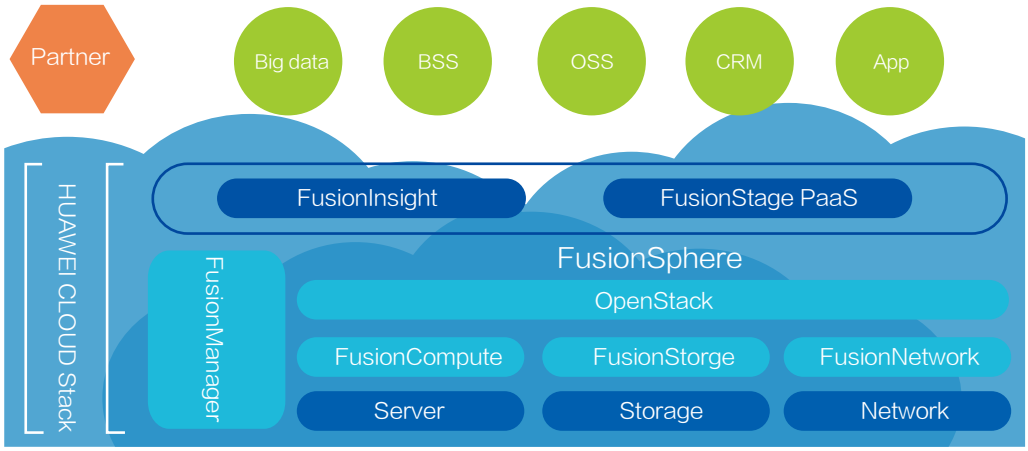


Figure 2. CRM Cloud Migration Joint Solution

Joint Solution Development for Win-Win Outcomes

Huawei's leading position in the carrier infrastructure market means that Huawei is often the bridge by which Independent Software Vendors (ISVs) and Service Integrators (SIs) reach carriers. Through joint marketing, ISVs or SIs and Huawei can complement each other and expand their respective market shares. In the TMF and NFV fields specifically, joint marketing enhances the reputation of both parties, and sharing resources facilitates the development of a healthy ecosystem. To Huawei, cooperation with ISVs and SIs facilitates IT Outsourcing (ITO) projects and helps solve compatibility issues in projects where hardware and upper-layer applications are tightly coupled.

Huawei is enthusiastic about cross-domain cooperation. It has collaborated with market leaders to jointly develop solutions for specific sub-fields. For instance, it is co-developing a billing system cloudification solution and a FusionStage-based CRM solution with partners in the Business Support System (BSS) domain. Similarly, in the video processing domain, video cloud and video coding and decoding solutions are under joint development.

- **BSS Solution**

Partner A lacked underlying hardware and management platform software. Huawei was able to provide Partner A with FusionSphere 6.1, ManageOne, E9000 servers, and OceanStor 5500 V3 storage systems. Together they launched a joint solution comprised of a Huawei NFVi platform, third-party Virtualized Network Functions (VNFs), and a billing system developed by Partner A. This solution eliminates carrier pain points when moving multiple services to the cloud and reduces their CAPEX and OPEX. Since its release, the solution has been adopted by many carriers.

- **CRM Cloud Migration Solution**

Verified by many carriers in China and around the world, Partner B's products are well-regarded by customers such as Telenor, China Mobile, and CITIC Bank. The solution that Huawei and Partner B developed together expanded both parties' influence and competitiveness in their respective industries. Because HCS is fully compatible with Partner B's Veris CRM, the jointly developed solution utilizes a micro-service architecture and supports container-based deployment to rapidly respond to market demands. In addition, its 'PaaS + IaaS' architecture is capable of elastic scaling, a feature that improves the resource utilization efficiency of carriers.

Collaborative Partnerships Enable Carriers

Huawei will deepen its cooperation with partners to develop tailored solutions for carriers. It will also build telecom cloud and big data ecosystems to help make carrier digital transformation as smooth as possible. ▲

Huawei will deepen its cooperation with partners to develop tailored solutions for carriers. It will also build telecom cloud and big data ecosystems to help make carrier digital transformation as smooth as possible. >>

Partnerships Grow a Multi-Billion Dollar Industry

By *Zane Wei, Director of Business Development Department, Huawei Intelligent Computing BU*

Huawei's intelligent computing business began in 2002 with the launch of its first line of telecom servers. At the time, Huawei was focused on core network, wireless, and software products that were all relatively isolated systems. The larger application ecosystem was still primarily inward-facing. In 2006, Huawei began to produce customized rack servers for specific industries, such as Internet customers. Over the following years, these products were rolled out to ecosystem partners. However, applications continued to be developed by customers. Huawei's ecosystem efforts focused on the bottom-layer components, such as the Basic Input/Output Systems (BIOSs) and Operating Systems (OSs), and did not involve upper-layer applications.

As the company entered the enterprise market, Huawei servers were adopted throughout the telecom, finance, and energy industries. This required close collaboration with Independent Software Vendors (ISVs) and System Integrators (SIs) to sell products, as well as compatibility with various applications. Therefore, building a robust ecosystem not only enabled Huawei to serve customers better, but also to drive the development of server products more generally.

Today, Huawei's server business has transformed into an intelligent computing business, with a dedicated business department and a goal to help intelligent computing become a USD 10 billion (CNY 67.7 billion) industry. This objective will require Huawei's continuous investment in ecosystem collaboration. A strong ecosystem not only positions the industry to achieve its multi-billion dollar goals, but helps Huawei cultivate differentiated advantages to compete in the marketplace.

Build High-Quality Products

From the beginning, Huawei has set clear targets in the server market. One target was to build high-quality and broadly compatible server products. The company has achieved these goals by leveraging its strengths in chip and reliability design, its engineering expertise, as well as its peerless test capabilities in the telecom field.

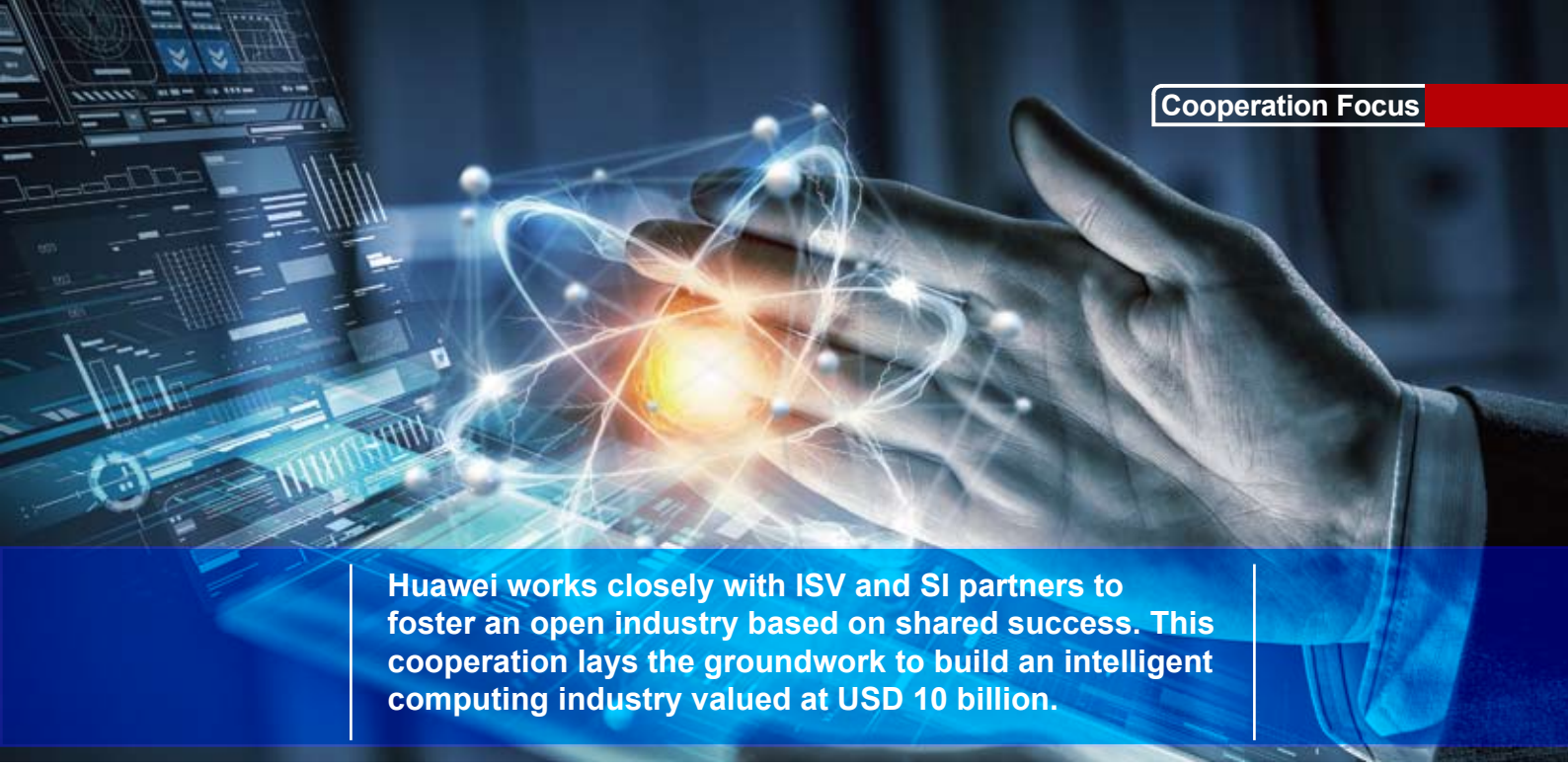
For horizontal and vertical ecosystem partners, integration with Huawei products requires secondary investments so Huawei must prove its value before durable bonds can be formed between the cooperating parties. Such bonds will lead to products that are more competitive and more satisfying to customers. In such a context, products of outstanding quality are the prerequisite. For example, Japanese customers place a premium on stable and reliable servers as they are a business necessity in the earthquake-prone country. Huawei server products undergo thousands of simulated vibration tests in the lab to ensure their continued operation during the roughest quakes. This uncompromising quality is the basis of Huawei's business success throughout East Asia.

Higher quality also equals proportionally great investments, often at the expense of price advantages. Can a price reduction be justified if it compromises product quality? This was the predicament faced by Huawei's server management team; and their answer was "No." Huawei goes to exceptional lengths to hone product quality, despite the loss of some orders. In this way, Huawei has built high-quality products its partners can always count on."Never compromise on product quality" is the motto of Huawei's intelligent computing business. It is also the guiding premise behind the collaboration between Huawei and its ISV and SI partners to build intelligent computing products. Superior quality has become one of Huawei's hallmarks.

Value Chain Integration Makes 1 + 1 Greater than 2

Huawei's intelligent computing business focuses on innovations created by the implementation of open-source interfaces for third-party access to the underlying hardware and basic software layers. In keeping with its commitment to build servers with customers' requirements in mind, Huawei works with partners in various industries to integrate the value chain and launch combined products for customers. This achieves '1 + 1 > 2' results and creates more value for customers.

- **Huawei and Microsoft launch the Huawei-Microsoft Azure Stack Hybrid Cloud solution.** After the Azure cloud solution's



Huawei works closely with ISV and SI partners to foster an open industry based on shared success. This cooperation lays the groundwork to build an intelligent computing industry valued at USD 10 billion.

successful launch, Microsoft quickly became the world's third largest cloud service provider, and began to extend its public cloud capabilities to the private cloud market. The private cloud market was also a focus of Huawei's server business. Therefore, after high-level interaction between the two companies, Huawei and Microsoft decided to launch a joint Huawei hybrid cloud solution for Azure Stack. The solution was quickly recognized as a new choice for customers to access cloud services upon its release in April 2018, and the orders have kept coming in ever since.

• **Huawei and Red Hat sell bundled OS on Huawei servers with special quotation.** In the early days, Huawei sold server-related hardware, but no OSs. OS vendors such as Red Hat were aware that, despite high sales, very few of Huawei's servers shipped with a bundled OS. After several rounds of discussions, Red Hat and Huawei reached an agreement and decided to launch the OS sales Special Pricing Quotation (SPQ) model. This sales model pairs Huawei servers with Red Hat OS for some key accounts (for example, China Mobile). Under this arrangement, Red Hat provides Huawei with SPQ products to increase the sales volume of Red Hat OS products; Huawei sells the servers with a built-in OS to increase server profits; and customers buy packaged products at lower prices. This solution is a win for all parties.

Joint Innovation Benefits Customers

Huawei collaborates with partners to leverage both parties' existing advantages when building server products, which creates new value points for customers.

Based on years of experience in technological innovation, and refined insights into future technology trends, Huawei predicted that big data and Artificial Intelligence (AI) would become mainstream server applications. Back when Huawei made this prediction, servers were still focused on traditional applications, and server architectures did not support big data processes. Therefore, Huawei's Research and Development (R&D) team worked with Solid-State Drive (SSD) component suppliers to develop the industry's first Peripheral Component Interconnect Express (PCIe) SSD accelerator card with a focus on big data applications. Soon after its market entrance, the PCIe SSD card became a significant selling point for Huawei servers; it not only helps customers boost their big data processing capabilities and deliver new value to clients, but it also significantly improves the profitability of Huawei servers. Looking ahead, Huawei will continue to work with suppliers, partners, and ISVs to create greater value for customers and build a robust industry.

Laying the Groundwork for a Multi-Billion Dollar Industry

Huawei has launched a series of server products based on the x86 architecture. Because the intelligent computing industry has built a mature ecosystem on the x86 system, the industry chain is complete. In keeping with Huawei's business development plan for intelligent computing, the company also released a line of server products based on the Advanced Reduced Instruction Set Computer (RISC) Machine (ARM) architecture and AI-processor design. The ARM ecosystem will continue to grow and meet customers' requirements for new application scenarios.

The construction of a complete ecosystem is a very difficult undertaking; and Huawei has made the long-term investment and collaborative agreements with partners needed to achieve this goal. Huawei's long-term strategy is based on ecosystem development. Through strategic investments, Huawei works closely with ISV and SI partners to foster an open industry based on shared success. This cooperation lays the groundwork to build an intelligent computing industry valued at USD 10 billion (CNY 67.7 billion). ▲

Seamless Interoperation and Fast Rollout: **A Thriving Storage Ecosystem Co-built with Partners**

By *Ou Guangping, Senior Alliance Manager, Strategy & Business Development Department, and Jia Sheng, Manager, Storage Technology Alliance, Huawei IT Product Line*

Enterprise data centers are complex environments made up of a variety of products from different vendors. There are two reasons for this: the abundant selection of Information Technology (IT) products and vendors in the market, and the phased nature of data center construction. As a result, compatibility is a major consideration when CIOs purchase new data center equipment. It must be compatible with existing production systems, as well as with any new equipment introduced during future service expansion. For vendors, product compatibility is also crucial for surviving fierce competition.

Huawei places great importance on developing a smooth ecosystem for its storage products. With an industry-leading interoperability lab, Huawei provides end-to-end compatibility services throughout the product lifecycle. In addition, it works with mainstream IT partners to build an open, mutually beneficial ecosystem that provides reliable IT infrastructure solutions for customers.

To date, the Huawei OceanStor supports over 1 million IT application compatibility entries and has been certified by thousands of leading vendors. It covers the vast majority of compatibility scenarios encountered by enterprises. Huawei products, therefore, can be rapidly and seamlessly integrated into customers' existing IT environments. This broad interoperability ensures the value of customers' hardware investments. It also shortens the Time-To-Market (TTM) for new services, and enables customers to quickly respond to changes.

The OceanStor Ecosystem

• **Extensibility: Smooth integration with software and hardware.** Thanks to its decade-long research of storage technologies, Huawei is the industry leader in terms of equipment supported by its OceanStor storage systems, including other storage systems, network devices, servers, virtualization products, operating systems, and upper-layer applications from various vendors. In addition, Huawei has conducted extensive mutual certification with mainstream IT vendors and built its own technical certification system to provide partners with a world-class certification platform.

• **Depth: Integration delivers better solutions.** Huawei has worked closely with industry-leading database, virtualization, backup, and network management vendors including Oracle, SAP, VMware, Veeam, Commvault, Microsoft, and IBM. By using standard interfaces and customizing plug-ins, Huawei provides vertically consolidated, deeply integrated IT solutions for data centers. The company configures optimal product combinations focused on functionality, performance, reliability, and manageability. For example, the in-depth integration of OceanStor Dorado V3 with Commvault Simpana uses the high-performance lossless snapshot feature of the storage to back up and protect up to 1,000 Virtual Machines (VMs) within minutes, restoring data within seconds with

Huawei's prioritization of interoperability for its OceanStor products ensures the devices seamlessly connect to any data center environment. Enterprises can adopt the Huawei storage technologies without changing their existing system architecture.

zero service impact. This integration empowers enterprises with better data-protection capabilities than those offered by traditional backup solutions.

• **Focus: Targeting the requirements of typical cases.** OceanStor provides optimized solutions for customers' high-priority IT issues. For instance, our virtual desktop solution supports VMware Virtual Desktop Infrastructure (VDI) environments. Huawei provides rapid deployment and concurrent operation of thousands of desktops based on OceanStor Dorado V3 all-flash arrays. Not only does the solution offer a stable and smooth service experience, it also simplifies the Operations and Maintenance (O&M) of VDI systems and lowers Operating Expenses (OPEX). For core service systems, OceanStor Dorado V3 storage forms part of an active-active High Availability (HA) solution. OceanStor Dorado V3 storage provides data centers with complete HA capabilities covering the host, network, and storage, thereby ensuring the continuity of core applications and reliability of critical data. This applies to database, cluster, or VM software on hosts working with the HyperMetro active-active storage feature.

Continuously Expanding Interoperability

The IT industry is always on the change. To meet the requirements of ever-evolving data center ecosystems, Huawei has continued to invest heavily in its interoperability lab to ensure ecosystem interoperability.

• **Sustainable growth:** More than 30 dedicated engineers regularly update the compatibility information in the Huawei interoperability lab. Over 10,000 new entries are added each month.

• **Rapid response:** The interoperability lab responds quickly — typically within two weeks — to customer requests for interconnection capabilities not currently supported.

• **One step ahead:** Keeping track of software and hardware vendors' movements at all times, Huawei is always able to support product and solution updates in step with vendors, or even ahead of time. These include VMware Virtual Volumes (VVols) and Windows Server 2019, giving Huawei an edge in maintaining competitiveness.

• **Open cooperation:** Huawei has conducted extensive, in-depth mutual certification with mainstream IT vendors. Through its technical certification platform, which is open to partners, Huawei nurtures an IT ecosystem centered on its storage products and based on customers' data center service scenarios.

Since its inception, Huawei's OceanStor ecosystem has undergone continuous expansion and rapid growth. It not only focuses on technical analysis and scenario verification of basic compatibility capabilities, but also proactively participates in the standards formulation hosted by the Storage Networking Industry Association (SNIA) and the Fibre Channel Industry Association (FCIA). Huawei contributes to the OpenStack community, and cooperates with established and emerging IT vendors. In 2018, the company completed Veeam snapshot integration and backup certification, and conducted mutual certification with NetApp OCI NMS, SolarWinds SRM NMS, and HDS VSP storage gateway. Gartner, various industry organizations, and customers continually recognize Huawei's ecosystem capabilities. In both 2017 and 2018, Gartner placed Huawei in the Leaders quadrant for storage ecosystem rankings.

Building an ecosystem involves continuous and painstaking efforts. Huawei is fully aware of this, and its continuous interoperability investments for OceanStor ensure seamless integration and rapid rollout in data centers. Without changing existing IT system architectures, enterprises can deploy the latest Huawei storage technology.

Moving forward, Huawei will work with IT partners in an open, cooperative, and mutually beneficial manner to ensure ongoing investments in ecosystem development. It will continue to enhance OceanStor's competitive edge by helping customers resolve compatibility problems and protect their deep investments in storage systems.▲

Huawei Works with Industry Partners to Build an Intelligent World

By *Tim Shi, AI Chip Director, Strategy & Business Development Department, Huawei IT Product Line*

As a General-Purpose Technology (GPT), Artificial Intelligence (AI) has multiple uses and creates huge ripples across society. AI will be the new engine that drives human society forward, just as the invention of the wheel was for human civilization so long ago. For example, AI is widely used in many industries today, such as the Internet, public security, education, healthcare, and transportation. Stakeholders are also looking to make AI-driven breakthroughs in industries such as finance, manufacturing, energy, materials, and retail.

However, the wheel was not invented in a single day, which is also true of AI. Although AI has made many breakthroughs, and will continue to do so, there are still some obstacles to overcome. We need to make material changes in model algorithms, compute power, data security, talent cultivation, and more to make AI universally accessible to every aspect of society. The 10 changes listed below (Figure 1) are the basis for future AI development.

Huawei understands these changes as both the future development trends for the AI industry and a strong basis for its own AI strategy. Huawei's strategy consists of five key aspects: Invest in basic research, build full-stack solutions, invest in an open ecosystem to cultivate talent, enhance existing solutions, and improve internal efficiency.

Huawei's All-Scenario AI Chipset and Intelligent Computing Platform

We are entering a thrilling era of intelligence where things can sense and connect to one other. Breakthroughs in Information and Communications Technology (ICT) make our society more intelligent but require increased computing power. This poses a great challenge for current AI computing capabilities. In view of this, Huawei has launched the Ascend series of chips — the world's first all-scenario AI chipset — and the Atlas intelligent computing platform powered by Ascend.

The Ascend 310 chipset is a heterogeneous AI System on a Chip (SoC) that is designed on Huawei's proprietary Da Vinci architecture. It boasts unrivaled energy efficiency, with 16 TeraOPS (TOPS) @ INT8 computing on a single chip. It comes with a 16-channel HD video decoder and consumes less than 8 watts. The Ascend 310 is perfectly suited for devices deployed on the terminal and the edge.

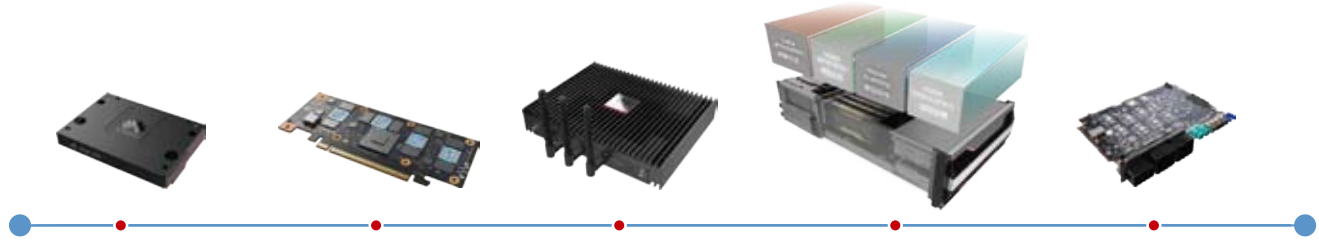
Huawei has launched a series of AI hardware platforms based on the powerful Ascend 310 chip for terminal-side and edge computing scenarios (Figure 2). Available in various product form factors, such as accelerator modules, cards, AI edge stations, and appliances, the company's all-scenario AI infrastructure solution can be widely used in various fields for Device-Edge-Cloud scenarios.

Huawei has launched the world's first all-scenario AI chipset and the Atlas intelligent computing platform. Building on this AI-centered work, Huawei will continue to join with industry partners to build an open ecosystem, spread intelligence, and lead the way into a fully connected, intelligent world.

As an integral part of Huawei's Full-Stack AI Solution, the Atlas intelligent computing platform provides supreme compute power to help customers embrace an AI-fueled future. It is backed by a full-stack software layer and supports most mainstream frameworks. It also provides easy-to-use code porting and model conversion tools to facilitate application development and deployment.

- **Atlas 200 AI accelerator module:** Packaged in a form factor half the size of a credit card, the Atlas 200 supports 16-channel, real-time HD video analytics. When deployed on devices such as cameras and drones, it consumes only about 10 watts of power.
- **Atlas 300 AI accelerator card:** The size of a standard half-height, half-length Peripheral Component Interconnect Express (PCIe) card, the Atlas 300 is designed for data center and edge server scenarios. It supports multiple data precisions. A single card provides 64 TOPS @ INT8 computing performance, which infuses superb compute power into deep learning and inference applications.
- **Atlas 500 AI Edge Station:** An industry-leading edge product for AI processing, the Atlas 500 processes up to 16 channels of HD video while taking up no more room than a Set-Top-Box (STB). The AI edge station is well suited for a broad range of applications, such as transportation, healthcare, unattended retail, and smart manufacturing.

Figure 1. 10 changes required to make AI more accessible



AI Acceleration Module	AI Acceleration Card	AI Edge Station	AI Appliance	Mobile Data Center
Atlas 200	Atlas 300	Atlas 500	Atlas 800	MDC 600

Figure 2. Atlas product portfolio

Open Ecosystem Investment Cultivates Talent

At *Huawei Connect 2018*, Rotating and Acting CEO of Huawei Eric Xu unveiled Huawei's AI strategy and a full-stack, all-scenario AI solution. Building on its leading-edge AI platform, Huawei will continue to join with various industries to tap into new opportunities and to drive industry transformation through ubiquitous intelligence, leading the way toward a fully connected, intelligent world.

To make this vision a reality, Huawei plans to leverage its full-stack intelligent computing platform and build an industry ecosystem with the end customers in mind. Huawei will pursue a strategy of pairing AI applications with Independent Software Vendors (ISVs) to improve industry efficiency. Huawei is dedicated to building an open AI ecosystem based on the following four aspects:

- **ISV ecosystem:** Develop complete, efficient, easy-to-use, and low-cost solutions for various scenarios in different industries.
- **College ecosystem:** Train future developers and enrich the industry talent pool. By developing AI courses, building laboratories, publishing books, training teachers, and holding student contests with universities, Huawei's AI technology has become the starting point for many future developers. Many universities in China have collaborated with Huawei to develop courses and to write text books. The industry, academy, and research communities have celebrated these efforts and achievements. In December 2018, Huawei joined the School of Electronics Engineering and Computer Science of Peking University to hold a *100-School Teacher AI Summit* at the Yingjie Exchange Center of Peking University. More than 340 teachers from 157 universities and research institutes attended this event. The summit explored colleges' and universities' efforts to cultivate AI researchers and pioneers.
- **Entrepreneur ecosystem:** China has four of the top 10 cities in terms of global venture capital investment. Most notably, Beijing has surpassed California's Silicon Valley and New York as the world's top venture capital hub. Over the next few years, China's environment of innovation is expected to produce the next generation of startups that will reshape the world. In view of this, Huawei will strive to help future ISV partners accelerate their growth.
- **Open-source ecosystem:** For the ICT industry, the significance of open source cannot be overstated. In terms of AI development, Huawei will embrace open source, including support for mainstream open-source AI frameworks, and proactively open up its AI technologies to the community for secondary development.

> *For the ICT industry, the significance of open source cannot be overstated. In terms of AI development, Huawei will embrace open source, including support for mainstream open-source AI frameworks, and proactively open up its AI technologies to the community for secondary development. >>*

An Open Ecosystem for an Intelligent World

Huawei will work with customers in an inclusive, sustainable, and future-facing spirit to drive intelligent enterprise digital transformation by leveraging the power of the open ecosystem. Currently, dozens of industry partners have discussed collaborating with Huawei to use the Atlas intelligent computing platform. Related solutions and application scenarios cover various industries, such as public utilities, the Internet, smart transportation, energy, and retail. Huawei looks forward to building an open and robust ecosystem with more partners in the future. ▲

A Brief Introduction to Huawei's IT OpenLab: Build a Rich IT Ecosystem Together

The Huawei IT OpenLab

About Us

We are a leading and trusted interoperability testing lab and technology innovation center dedicated to the cultivation of new technologies and solutions through comprehensive integration into the IT industry value chain.

Our Mission

Create an open and productive IT ecosystem through collaboration and innovation with industry partners to provide customers with reliable and efficient solutions.

Our Focus

- Industry chain integration and interoperability
- Huawei certification program
- Joint solution incubation and verification
- Open platform and innovation experience

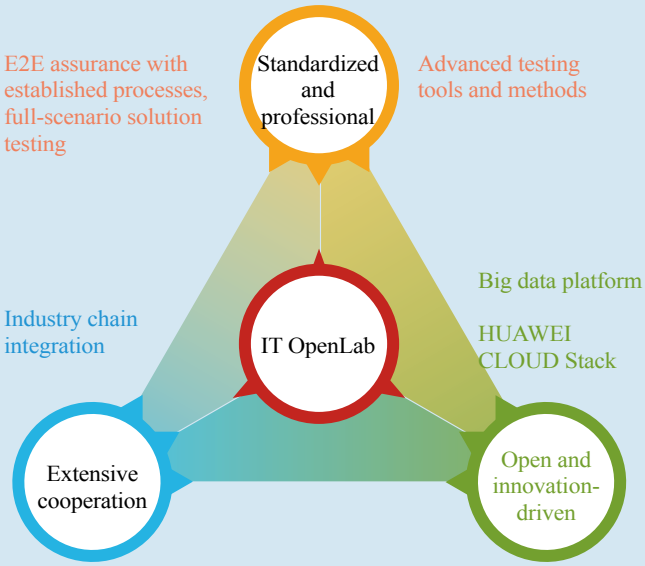
- Comprehensive hardware
- Professional engineers
- End-to-end assurance
- Advanced testing tools and methods
- Customer-centric approach

Our Value

Comprehensive compatibility, trusted solutions, quick response to changes, and customer investment protection.

Core Competitiveness

Over the past ten years, we have enhanced core competitiveness throughout the IT industry value chain



Huawei IT OpenLab's Core Beliefs: Openness, Collaboration, and Innovation

Customer-Centric

Our tests are based on our customer's real-world business scenarios

- Our tests are designed using typical applications and business models from relevant industries.
- Our tests fully verify the connectivity, performance, and reliability of customer applications.

We provide proven solutions for customers

- We supply tailored solutions, optimization approaches, and best-practice configurations.

We provide tailored verification, consulting, and evaluation services for customers

- We help customers address the challenges of traditional DC transformation.
- We provide verification services tailored to individual customer application scenarios and environment configurations.

Introduction to Huawei Technical Certification Program

The IT OpenLab provides Huawei Technical Certification (formerly Huawei Ready Certification) covering partner products and solutions, ensuring that Huawei and its partners can deliver trusted products and solutions to customers.

Collaboration

Huawei's IT infrastructure products and partner products complement one another as competitive joint solutions.

Development and Testing

- Remote lab resources
- Technical support services
- Test tools and development SDKs
- Documents and APIs
- Products and licenses

Certification Release

- Certification logo and letter
- Technical white papers for joint solutions
- Huawei's product compatibility list
- Huawei Marketplace

Huawei Technical Certification's Value and Benefits

Technical Support:
Obtain the technical support required to become certified, including, but not limited to, solution design, development, and testing.

Platform Support:
Huawei provides remote lab resources to improve certification efficiency and lower costs.

Tools and Documents:
Obtain technical documents, API documents, and development and testing tools for Huawei products.

Marketing Support:
If eligible, certified products or solutions may be released in the Huawei Marketplace and included in Huawei's product compatibility list.

ShineTech Decision-Making Platform **Boosts Rural Financial Services**

By *Xuan Gangwei, CTO and General Manager of Data Department, ShineTech Company*

Interest rate liberalization and the rise of Internet finance have resulted in fierce competition with and between banks. Small banks, such as rural commercial banks, rural cooperative banks, and rural credit cooperatives, are less able to manage and reduce new risks than the 'Big Four' state-owned banks or various joint-stock banks. In addition, these small financial institutions face fierce competition for customers, competition that has been driving them to move their places of business closer to rural areas. This type of relocation is risky, and it introduces new challenges.

However, wherever there is risk, there is also opportunity. By the end of 2017, of the USD 4.62 trillion (CNY 31 trillion) in rural loans issued by Chinese banks, only 20 percent came from rural commercial banks. Opening up the rural financial market will create new business opportunities for rural banks struggling against fierce competition.

Faced with both risks and opportunities, small rural banks and credit unions must explore innovative ways to mitigate risk and new business models. They need to deploy advanced information technologies to improve efficiency and customer experience.

ShineTech worked with Huawei to create a decision-making platform that provides rural banks and credit unions with professional financial system implementation and consulting services to grow the rural credit sector.

Technology Improves Competitiveness

ShineTech has a deep pool of respected technical and business experts from across the banking, finance, and technology industries. The company's real-time decision-making platform, which is based on the Huawei FusionInsight RTD engine, provides user-friendly interfaces, a wealth of policy management functions, high concurrent big data processing capabilities, and millisecond-level responsiveness. With this platform and years of experience in the financial field, ShineTech can improve the competitiveness of financial institutions by strengthening their risk management and marketing capabilities.

- Technologically, the decision-making platform complies with distributed big data architecture, enables real-time processing of massive quantities of data, and supports horizontal platform expansion. The event-based pipe model and service load-based dynamic scheduling ensure high concurrency and low latency. Memory query and incremental computing accelerates event flow processing, making it possible to invoke hundreds of models or computing rules. A rule compiler compatible with the SQL syntax allows service and technical personnel to use SQL for application development.
- Functionally, this platform provides a graphical user interface, comprehensive operations, and management functions. This greatly simplifies technical requirements for service users, and frees service personnel from policy code development.

A Full-Featured Decision-Making Platform

The lack of a formal credit reporting system for rural residents is a major obstacle for rural financial institutions. If small banks use the traditional methods adopted by large banks, they may lose potential customers or take on uncontrollable risks. To compete effectively, they must provide precisely targeted services. Services that are precisely targeted at local markets are difficult to replicate on a large scale. Small, rural commercial banks, cooperative banks, and credit unions are far better positioned to innovate the rural credit industry, as their services are widely available in urban areas and they are well aware of the details specific to local markets.

The real-time decision-making platform can maximize this advantage, allowing rural credit organizations to improve their customer profiles and risk control models by adapting to changes in data and service in real time. Take the lack of a robust credit reporting system for rural areas as an example. To handle this problem, financial organizations can explain financial details to local residents on site and collect farmers' financial requirements, basic details about them and their family members, agricultural acreage, as well as assets and liabilities. They can obtain additional details from local agricultural and trade organizations, and collect farmers' mobile communications data and online behavior data. Then, a linked archive of rural economic details can be established, which can be mined for additional details. If a local resident lacks sufficient collateral, their creditworthiness can be evaluated based on associated partners, guarantors, and various enterprises. What's more, agriculture is greatly affected by market fluctuations and natural disasters. Relevant data about national policies, the state of various markets, and meteorological events can be introduced to improve the risk control model.

Data, models, and business rules determined during service improvement can be directly exported to the ShineTech platform

and configured immediately. Data is modified and maintained on the platform, and the latest data is used by specific services in real time. As massive numbers of account transactions, transfers, and payments are processed, historical data association analysis, event flow association analysis, time series analysis, in-depth learning model calculation, consumption group analysis for consumers of the same type, and transaction network relationship analysis can all be performed in real time, using various analytical methods, to determine whether to allow each current transaction. When users file a loan application or payment, or scan a QR code, the real-time decision-making platform leverages powerful computing capabilities, ultra-low latency, and ultra-high concurrency to serve financial institutions and consumers alike.

As the risk control system is improved, businesses will continue to grow. As businesses grow, more and more customer data will become available, which can then, in turn, be used to further improve the risk control model and better capitalize on marketing opportunities. As marketing policies are adjusted in real time based on customer behavior, preferences, and habits, services can be better tailored. What's more, real-time and precision marketing is achieved when customers participate in marketing events. The real-time decision-making platform provides a Graphical User Interface (GUI) for quick modification and rollout of marketing policies without code development. In addition, it provides auxiliary functions, such as virtual testing, version management, operational monitoring, and data analysis, all of which support better iterative development. With big data-related technologies, response can be achieved on the platform within just milliseconds.

Driven by big data, cloud computing, and artificial intelligence, rural banks need to develop online technologies, set up a real-time decision-making platform, and build intelligent big data risk control or marketing models and strategies to achieve the breakthroughs they need to thrive. >>

Customer information is obtained the moment customers enter the marketing scenarios, preventing valuable marketing opportunities from being wasted. Based on long-term cooperative projects with various banks, the conversion rate can be increased by 20 percent just by converting legacy batch precision marketing into real-time marketing. If you can allow the customer to purchase something the moment they want it, conversion will increase. It's that simple. Scenario-based, real-time precision marketing is the key to a significantly improved conversion rate.

Rural Credit Financial Institutions Grow with Huawei

Rural commercial banks, cooperative banks, and credit unions are expensive to operate and manage. These rural institutions must support numerous local branches and employees, yet offer no real advantages in regards to loan terms. Driven by big data, cloud computing, and artificial intelligence, rural banks need to develop online technologies, set up a real-time decision-making platform, and build intelligent big data risk control or marketing models and strategies to achieve the breakthroughs they need to thrive.

Using Southern China as a reference, ShineTech has been looking to rural credit providers throughout China. The company promotes advanced science, technology, and business models. Working together with Huawei, ShineTech has built a decision-making platform solution based on the FusionInsight big data platform. The ShineTech platform offers small, rural banks and credit unions professional financial system implementation and consulting services to drive growth in the rural credit sector. ▲

Intelligent Traffic Management System Drives Collaboration for **Shenzhen Traffic Police**

By *Frank Su, Senior Alliance Manager, Strategy & Business Development Department, Huawei IT Product Line*

On November 15, 2017, the Shenzhen 'Traffic Brain' project, a collaboration between Huawei and the Shenzhen Traffic Police Bureau, was announced at the *Smart City Expo World Congress*. The project stood out from more than 300 leading smart city projects from around the world and won the only *Safe City Special Award* at the global event.

This prestigious award is the result of the Shenzhen Traffic Police's continuous innovation and proactive police-enterprise collaborative efforts. The 'Traffic Brain' relies on a large number of technologically advanced applications, including facial recognition for traffic violation detection, traffic signal timing optimization (TrafficGo), and secondary image-based traffic violation identification.

Shenzhen's 'Traffic Brain' is just the latest example of the bureau's long history with digitally-assisted law enforcement. Historically, the Shenzhen Traffic Police have been early adopters of new technologies:

- In 1997, an electronic police (e-Police) device was integrated, which marked a distinct shift from manual to intelligent traffic law enforcement.
- In 1998, a video-based law enforcement application was launched. This technology enabled teams to work together, instead of relying on individual police officers on the street.
- In 2001, a license plate recognition system was built. This helped contribute to their ongoing, comprehensive, multi-level traffic security protection system, which maintained the security, order, and flow of the city's traffic.
- In 2017, they collaborated with Huawei to create an Artificial Intelligence (AI)-based traffic management solution called TrafficGo for automatic signal timing optimization. This has redefined the way traffic is managed, shifting the focus towards a more-efficient vehicle flow.
- In 2018, they officially implemented facial recognition-based law enforcement, eliminating the need to detain and interrogate drivers and pedestrians.

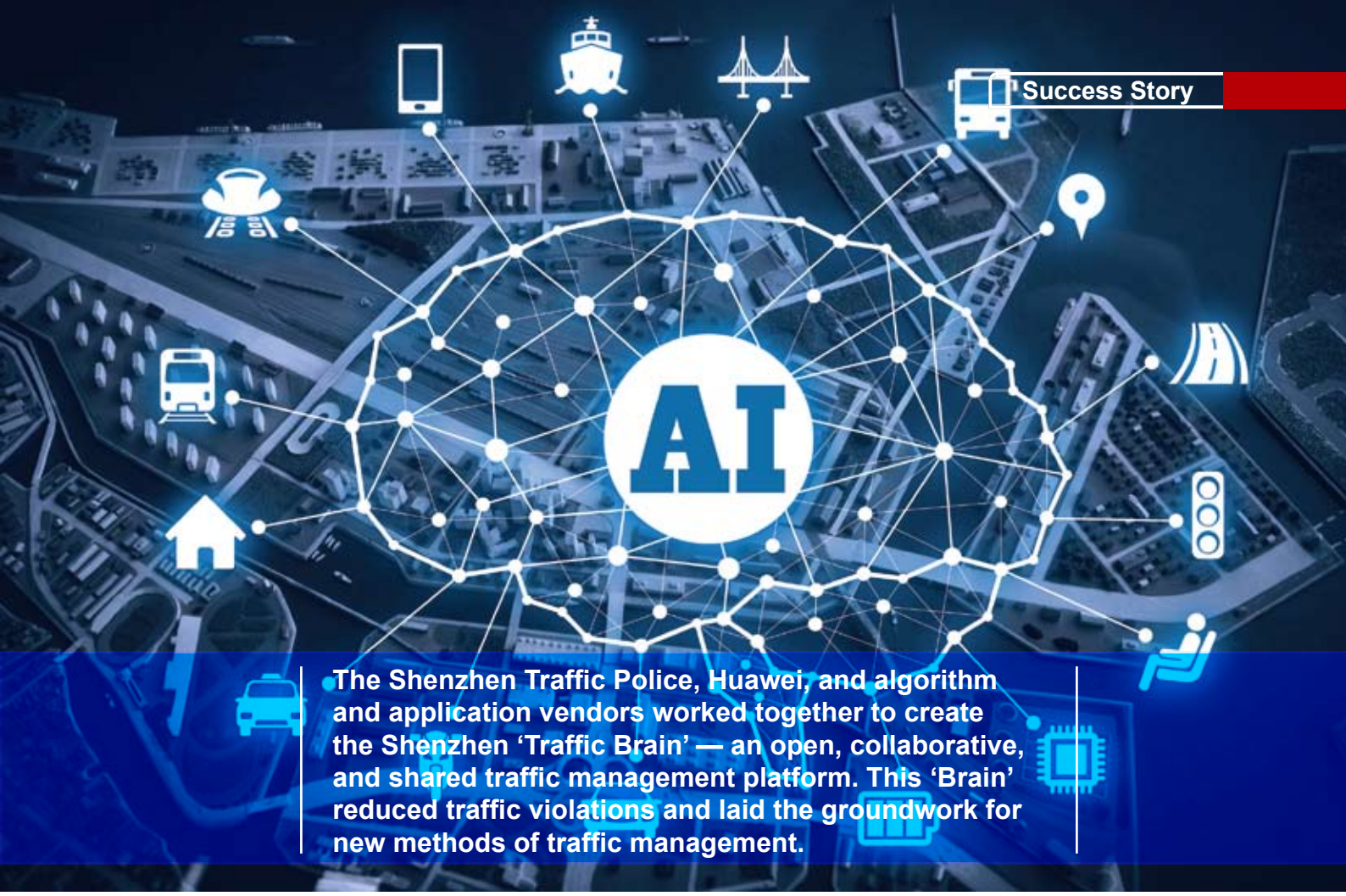
These technological advancements are the direct result of the innovative spirit of the Shenzhen Traffic Police, combined with the continuous efforts of platform and application vendors.

ICT Enhances Three Levels of Intelligence

When the Shenzhen Traffic Police started working with Huawei and other vendors (including Intellifusion, SEEMMO, and Harzone) in 2017, layer decoupling and open innovation were the guiding principles of their collaboration. The solution leveraged video cloud, big data, and AI to enhance three levels of intelligence — computing, perceptual, and cognitive — building a unified, open, and intelligent traffic management system.

- **Computing intelligence:** The dynamic resource pooling solution used in the Shenzhen 'Traffic Brain' is based on Huawei's open Atlas intelligent computing platform. With this solution, the Shenzhen Traffic Police are able to pool resources, including Field Programmable Gate Arrays (FPGAs), Graphics Processing Units (GPUs) which are currently in the spotlight, and future-oriented Neural Processing Units (NPUs).

Huawei's platform helps facilitate law enforcement with its AI-optimized system computing. The platform allows Shenzhen's



The Shenzhen Traffic Police, Huawei, and algorithm and application vendors worked together to create the Shenzhen 'Traffic Brain' — an open, collaborative, and shared traffic management platform. This 'Brain' reduced traffic violations and laid the groundwork for new methods of traffic management.

traffic management system to intelligently adjust its services according to the dynamic changes to pedestrian, vehicle, and logistics flows on the streets. Compared with traditional platforms that allocate resources based on individual experience, Huawei's platform enables more-accurate computing and efficient resource allocation.

- **Perceptual intelligence:** Based on the Enterprise Intelligence (EI) deep learning platform and open algorithm warehouse, the Shenzhen 'Traffic Brain' supports a broad range of algorithms from multiple vendors, including those for traffic volume, incident, and violation information collection, as well as secondary image-based traffic violation identification.

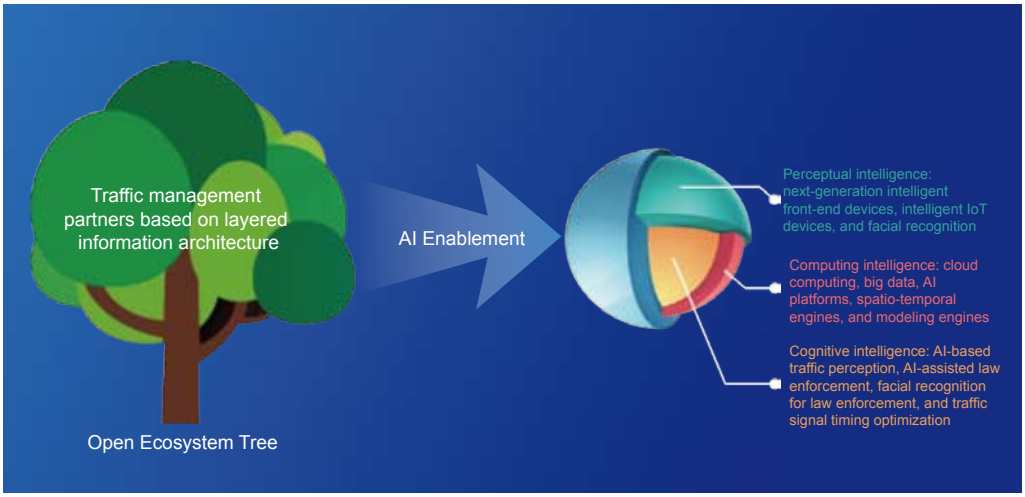
The open algorithm warehouse increases perceptual intelligence. For example, the algorithm for collecting traffic violation information can identify objects violating the law, including motor vehicle types (buses, trucks, vehicles transporting hazardous chemicals, and small passenger cars), non-motor vehicle types (personal bicycles, shared bicycles, electric cars, and tricycles), and pedestrian types (students, commuters, delivery personnel, and elderly people).

- **Cognitive intelligence:** Upper-level applications enhance the already-powerful cognitive capabilities of the 'Traffic Brain.' By leveraging EI-based intelligent traffic management, big data, and special databases for typical types of personnel and vehicles, the 'Traffic Brain' platform performs data analytics, makes comparisons, and ultimately learns how to facilitate safer and more-efficient traffic flows. Cognitive intelligence enhances when the platform analyzes traffic accidents caused by impaired drivers, vehicles transporting hazardous chemicals, and vehicles driving at night. This information helps law enforcement better understand the risks posed by these specific types of situations and come up with special solutions, and possibly regulatory measures.

The continued success of the 'Traffic Brain' solution emerges from the collaboration between the Shenzhen Traffic Police, Huawei, and many other ecosystem partners, including China Electronics Technology, Harzone, Ping An Technology, Intellifusion, SEEMMO, SenseTime, 1000video, and the Shenzhen City Traffic Planning Design Research Center.

The joint innovation team formed by these partners proactively met evolving development requirements; in fact, deployment of 40 e-Police devices using the world's first facial recognition-based law enforcement application

The continued success of the 'Traffic Brain' solution emerges from the collaboration between the Shenzhen Traffic Police, Huawei, and many other ecosystem partners, including China Electronics Technology, Harzone, Ping An Technology, Intellifusion, SEEMMO, SenseTime, 1000video, and the Shenzhen City Traffic Planning Design Research Center. >>



throughout Shenzhen occurred within 40 days. These devices were connected to the Shenzhen 'Traffic Brain' through optical transport networks, and Huawei's Atlas computing platform and AI platform algorithm warehouse were adopted to enable these devices to intelligently perceive traffic objects and detect traffic violations.

Joint Innovation Drives Advanced Development

In order to implement facial recognition-based law enforcement, the Shenzhen Traffic Police built a platform to integrate algorithms from many vendors based on Huawei's AI platform; created traffic-oriented facial image databases based on Huawei's big data platform; and integrated the platform and databases into its unified application portal. In this way, layer decoupling ensures the accuracy of facial recognition. The results of the facial recognition are then delivered to the Shenzhen Traffic Police through a unified interface. This transformation, from vehicle-based to person-based traffic violation management, represents the innovative development of this project.

Another illustrative example is the Jaywalking Regulation System. The Shenzhen Traffic Police discovered that traffic violations are common among delivery drivers in non-motor and non-standard electric vehicles, often resulting in serious accidents. In response to this situation, Intellifusion, a Shenzhen-based innovative application vendor, developed the Jaywalking Regulation System to help the Shenzhen Traffic Police better monitor, detect, and fine jaywalkers by using facial recognition technology. Ultimately, the system also reduces accidents and prevents repeat offenses.

This system proved to be very effective. The first case involved a courier who ran a red light in the city's Futian district while driving an electric vehicle to deliver goods. The facial-recognition e-Police device installed at the intersection captured a photo of the courier on the spot, which was sent to the backend system for analysis. The system scanned the database and identified the courier in seconds. The Shenzhen Traffic Police then sent the courier a fine in accordance with the city's traffic regulations.

With the development and widespread use of AI technology in the transportation field, the Shenzhen 'Traffic Brain' will continue to evolve as an intelligent traffic management system. With an open, collaborative, and shared platform, Huawei, as well as many algorithm and application vendors, will continue to work with the Shenzhen Traffic Police to explore new concepts, models, and methods to safely and intelligently manage city traffic. ▲

HUAWEI

HUAWEI OceanStor Dorado

THE WORLD'S *FASTEST* ALL-FLASH STORAGE

nvm express

Guotai Epoint: Digital Government Efficiency with **Cloud DC + e-Government Cloud Platform**

By Yin Liming, General Manager of Consulting Department, Jiangsu Guotai Epoint Software

Anyang is a prefecture-level city in China's Henan province and is considered one of the eight ancient capitals of China, and a cultural birthplace of Chinese civilization. Today, the city is an important industrial and food production base in the province. Bordering the Taihang Mountains to the west and a vast plain to its east, Anyang sits on major inter-provincial highways connecting four provinces. As a regional modern transportation hub and popular tourist city, it is also home to one of the largest and fastest prefecture city-level e-Government cloud data centers — the first in China to comply with L3 security specifications.

New Demands for Government Information Services

With the rapid advancement of information technologies, such as cloud computing and big data, the focus of digitization in cities has shifted from digitizing government services, to digitizing various industries and upgrading already digitized services. Government services, city governance, and people's livelihoods all pose new demands for government information services. Government digitization faces the following four challenges: 1) how to further consolidate government resources; 2) how to uniformly manage basic data; 3) how to improve public services in cities; and 4) how to improve government efficiency.

Originally, Anyang faced the following challenges during its digitization efforts: 1) repetitive and wasteful investments, 2) low resource utilization, 3) inconsistent standards, 4) ineffective system integration, 5) inability to uniformly manage data resources, and 6) substandard public services in cities. From the outset, the Anyang Municipal Government recognized the importance of addressing these challenges. Having established digitization as a top-level strategy to drive modernization, the Anyang government reached out to leading providers for digitization solutions. In 2016, the work report delivered by Anyang's Municipal Government, together with the 13th Five Year Plan for Economic and Social Development of Anyang, established a plan to build a unified cloud Data Center (DC) and various cloud platforms, and to develop a number of necessary cloud services.

Huawei-Guotai Epoint Joint Innovation Solution

Huawei and Jiangsu Guotai Epoint Software Co., Ltd. (Guotai Epoint) built an e-Government cloud platform for Anyang, with the goal of centralizing service resources and driving service innovation with big data. The cloud platform implements a six-layer architecture based on the typical needs of government services, including high stability, high performance, high security, and large-capacity storage. The six layers are: user, service, application, application support, information resource, and infrastructure. To ensure the overall security and data standardization of Anyang's e-Government services, both an information security management system and data standardization system have been established for each layer. The e-Government cloud interconnects with the application systems of different governmental units, bureaus, and departments through standard Application Programming Interfaces (APIs).

Huawei leveraged its extensive experience in building cloud infrastructure when it provided both the software and hardware for the solution's underlying cloud infrastructure. In 2015, Huawei delivered the cloud infrastructure for Anyang's Big Data Center and Cloud Command Center. Together, these centers won the *Cloud DC Outstanding Solution Award* and *Cloud DC Outstanding Innovation Award* at the *7th China Cloud Computing Summit*.

Guotai Epoint provided the upper-layer applications for this project. Guotai Epoint has long been dedicated to providing e-Government

Huawei and Guotai Epoint built a joint solution that supports the public and social services provided by the Anyang Municipal Government. This solution lays the digital foundation for local governments to rapidly expand their public-serving application platforms.

and comprehensive digitization solutions for government services, as well as developing new government service models as needs evolve. Highlights of this project include:

• **Data integration and sharing between governmental bureaus, offices, and departments in Anyang.** Guotai Epoint and Huawei built a basic public database and public information platform, re-categorized Anyang's government information resources, and established city-wide technical standards and management regulations for information assets.

• **Unified management of basic data.** Guotai Epoint and Huawei built a public database to systematically collect, store, and manage basic data from various governmental bureaus, offices, and departments.

• **Improved public services in cities.** Guotai Epoint and Huawei built a uniform information disclosure platform and service portal. The city service platform on WeChat and the e-Government portal are the most direct ways to view the results of application, data, and resource integration. The platform and portal allow the public and other governmental units to access city applications. They also upgrade the public services provided by the government and other social organizations.

• **Improved government efficiency.** Guotai Epoint and Huawei built a basic public database, government resource catalog, and data interface system to drive data integration and sharing, which further promotes interdepartmental collaboration. The unified portal improves interactions between the government and the public. Feedback from the public about governmental services also helps improve these services.

Joint Innovations Serve More Industries

By deploying the right Huawei products and solutions during different phases of the Anyang e-Government cloud project, the Huawei and Guotai Epoint joint solution delivers a remarkable user experience, with high availability and simplified management. Anyang's e-Government big data platform was officially launched in July 2017. By the end of December 2018, this platform had collected 43.5 million data records for 3,109 categories across 73 departments. Four basic databases — population, legal person, economy, and geography — have already been established, providing key support for both the public and social services of the Anyang government. This joint solution also provides big data support for various innovative government application systems used in Anyang city, laying a digital foundation for local governments to rapidly expand their public-serving application platforms.

This joint solution provides the following data support for Anyang's digital government and social services:

• **Support for online service platforms serving citizens and businesses.** These online service platforms provide services customized by the government information resource center. Their benefits include: citizens and businesses do not need to fill out any forms; their certificates and electronic photos can be used across all platforms; when registering a company, the system sends messages telling users about nearby businesses in the same industry, which helps to foster a favorable 'soft' environment for economic growth.

• **Support for a converged citizen service platform.** This platform serves as a portal to various public services, such as housing fund query, traffic violation query and payment, social insurance query and payment, and personal credit query. Overall public satisfaction is improved by providing comprehensive life services.

• **Support for grid-based services and management platform.** This basic public database provides geographic data used to divide the city into cells on a gridded map. This database also provides demographic data related to public security, civil affairs, family planning, and real estate. By associating this data with target grid cells, civil workers now work more efficiently.

The Huawei and Guotai Epoint joint solution for the Anyang e-Government cloud is the result of the deep integration of both companies' technologies. The collaboration proves the exceptional innovative capabilities of these two providers in both the technology and business realms. Looking forward, Huawei and Guotai Epoint will continue to iterate, upgrade, and optimize this joint solution by leveraging the latest technologies. The two providers are laser-focused on customer needs, and plan to use this solution to serve more industry customers. ▲

Sonatrach Transforms Its Oilfields in Algeria

By *Shen Hongyuan, Cloud Computing Senior Marketing Manager, Huawei Enterprise BG*

Sonatrach is a State-Owned Enterprise (SOE) that is dominant in the Algerian energy sector. It is the largest company in Africa and the 11th largest oil consortium in the world. In addition to oil exploration and production, Sonatrach is well known for fertilizer production and sales, construction and engineering, seawater desalination, air transportation, and shipping.

In 2017, with the help of its 120,000 employees and over 200 subsidiaries, Sonatrach generated more than USD 40 billion in revenue — over 95 percent of Algeria's foreign exchange. The company's goal is to become one of the five largest National Oil Companies (NOCs) in the world by 2030. This will require Sonatrach to strengthen its production, create upstream and downstream value chains, and develop new energy solutions. It also necessitates the digital transformation of Sonatrach's business and enterprise operations.

Legacy IT Systems Cannot Support Business Growth

As the global demand for oil continues to decline, and as nations impose new environmental protections, the world's energy markets are gradually shifting toward clean energy. This shift is driving the oil industry to promote clean energy production and development. Such a transformation depends on efficient Information Technology (IT) systems with robust data management and analysis capabilities.

Sonatrach is committed to climate protection and new energy development. In the face of inevitable industry-wide structural changes, Sonatrach knew that it had to adopt advanced IT technologies to further improve its production efficiency. The company's legacy Information and Communications Technology (ICT) infrastructure supports various workloads but responds only to service requirements across the upstream, middle, and downstream phases of the oil and gas industry and the functional departments of each subsidiary. The legacy ICT system lacks unified planning, which leads to problems. For example:

- **Resource silos:** Sonatrach has five data centers that are discrete and operate independently of one another. Because of this, they lack unified management and scheduling. If one data center becomes overloaded, services cannot be distributed to other data centers. The physical machine + virtualization architecture creates a silo-like system that complicates the rollout of new services. Core services are deployed in a single data center and lack Disaster Recovery (DR) measures, which makes it difficult to ensure service continuity.
- **Information silos:** Sonatrach has more than 200 subsidiaries and more than 10 horizontal functional departments. However, the IT hardware is provided by different vendors, which can cause

Huawei is helping Algeria's Sonatrach deploy cloud-based data centers and SAP ERP S/4 HANA systems, which implement unified management and on-demand allocation of IT resources, support rapid service rollout, and accelerate Sonatrach's digital transformation.

compatibility issues. Information has to be manually transferred through Excel spreadsheets or other electronic reports, limiting mobile access and resulting in data silos between departments and subsidiaries. Operating data from subsidiaries and departments cannot be extracted and compiled in a unified manner. This makes it difficult for the management team to monitor the data, leading to low operational efficiency.

By implementing new ICT technologies, Sonatrach hopes to boost its oil and gas production efficiency and increase revenue. The company's digital transformation has already helped motivate management to improve its operational efficiency. Going forward, Sonatrach wants to promote a corporate culture of technical innovation, using its digital transformation to provide strong organizational support for future development.

Sonatrach's Three-Phase Digital Transformation Strategy

Digital transformation is a process of continuous evolution. After studying Sonatrach's approach to ICT and the company's future business development requirements, Huawei proposed a three-phase digital transformation strategy:

- **The HUAWEI CLOUD Stack (HCS)** — the first enterprise-grade, full-stack hybrid cloud solution — is introduced. Existing IT resources are integrated, which eliminates resource silos. This approach achieves unified resource management and on-demand resource provisioning for multiple data centers, and it enables a quick service rollout.
- **The SAP Enterprise Resource Planning (ERP) system** is deployed on the cloud platform. This facilitates unified management of group-level resources and business modules, including finance, HR, asset management, budget management, and logistics. The system promotes comprehensive collaboration and data sharing between upstream and downstream business, which greatly improves the daily work efficiency of management personnel at all levels, and it enhances the effectiveness of the group's operation management.
- **Innovative service platforms and big data services** are implemented. These services can be rapidly developed and tested. Data-value mining helps lay a foundation for the evolution of digitally-enhanced oil fields.

Phase 1 is currently under way. Once it is completed, Huawei and Sonatrach will continue to the second and third phases. Let's take a look at some features that distinguish each of the phases in greater detail.

• HCS Solution

- The HSC uses a 'One Cloud, One Lake, and One Platform' architecture to help customers across various industries accelerate the migration of their business to the cloud.
- Intensive construction enables unified delivery, management, and provisioning of infrastructure.
- Technology stacking based on software and hardware collaboration provides high-performance cloud service capabilities. The HCS full-stack hybrid cloud provides the largest number of Infrastructure-as-a-Service (IaaS) offerings, with more than 60 cloud services.
- This solution takes advantage of innovative technologies, such as bare-metal-as-a-service, Graphics Processing Unit (GPU) enhancement, and SAP HANA cloud-host services, to move core enterprise applications to the cloud.
- The HCS is the only solution in the world that supports a wide variety of tenant-level DR services, such as local, intra-city, and cross-region DR, Cloud Server High Availability (CSHA) service, and cross-cloud backup, to ensure service continuity.

• SAP on the Cloud System

- A range of deployment specifications are able to meet differentiated

Digital transformation is a process of continuous evolution. After studying Sonatrach's approach to ICT and the company's future business development requirements, Huawei proposed a three-phase digital transformation strategy. >>

high-performance requirements. SAP databases and applications can be deployed on Elastic Cloud Servers (ECSs) and Bare Metal Servers (BMSs). With these two deployment modes, Huawei offers more than 10 options for memory specifications — from 128 GB to 16 TB — that meet the varying requirements of different customers adopting the SAP service system.

• Self-service, self-Operations and Maintenance (self-O&M), and complete SAP lifecycle management: Based on the shared and elastic infrastructure resources of the cloud platform, users can apply for, allocate, and complete self-service operations on demand, without assistance from system administrators. Because the service rollout time is shortened from several weeks to mere hours, it can quickly meet customers' SAP-environment requirements.

• High Availability (HA) solution: If the active SAP node is faulty, the HA feature automatically starts a new standby node. The SAP HA solution and the active-active storage solution provide dual support for SAP services, ensuring continuous and reliable service performance.

• Big Data Applications and an Innovative Service Platform

• Based on the HCS full-stack hybrid cloud, Huawei provides the full-lifecycle processing capability of 'collection, storage, computing, management, and use' to help enterprises transform data resources into data assets.

• Huawei integrates basic data services, general middleware, and industry middleware using the HCS. This enables developers to quickly innovate services based on multiple types of middleware.

• Hybrid orchestration of containers and Virtual Machines (VMs) allows complex services to be automatically provisioned.

To resolve Sonatrach's concerns about deploying and maintaining an SAP HANA system, Huawei enlisted the services of an industry-leading ICT construction company, CNPC RICHFIT. The construction company previously helped China National Petroleum Corporation (CNPC) build the world's largest SAP HANA cluster, so it had extensive experience in ERP system planning, design, integration, and implementation. With the combined strengths of Huawei and CNPC RICHFIT, Sonatrach is confident in its SAP system deployment solution on HUAWEI CLOUD.

At *Huawei Connect 2018*, the Sonatrach project won the *'Best Digital Enterprise Transformation of the Year'* award. This award recognizes the project as a sterling example of future-proof digital transformation. Huawei will continue to invest in SAP innovations and work with partners to launch more high-performance solutions for customers. ▲


HUAWEI
Huawei Intelligent Computing
Empower Servers and Beyond
Ignite Computing for a New AI Era
Building a Fully Connected Intelligent World