Grow with Intelligence

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Exploring the Cloud 2.0 Era and Transplanting the Technology Gene
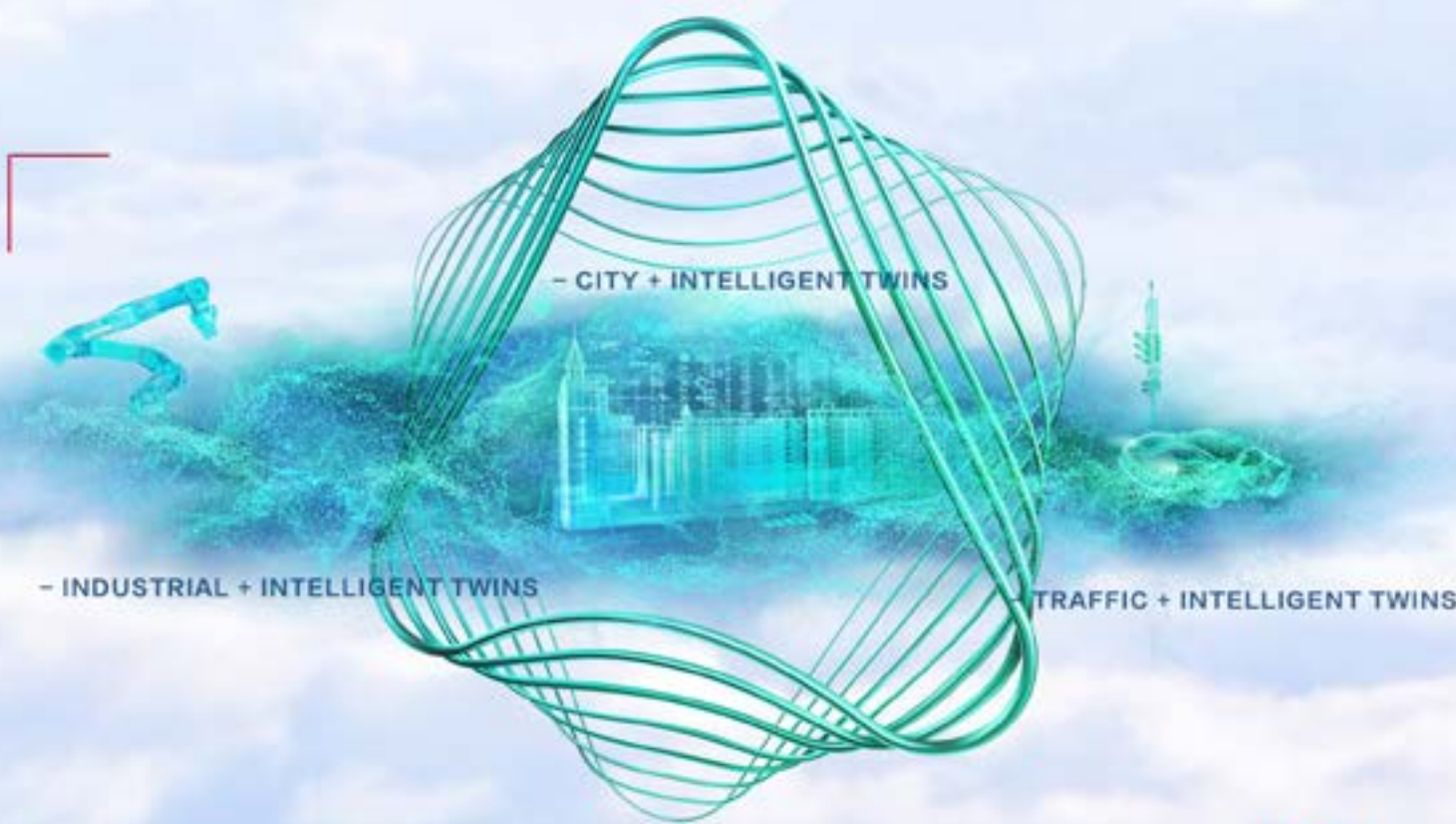
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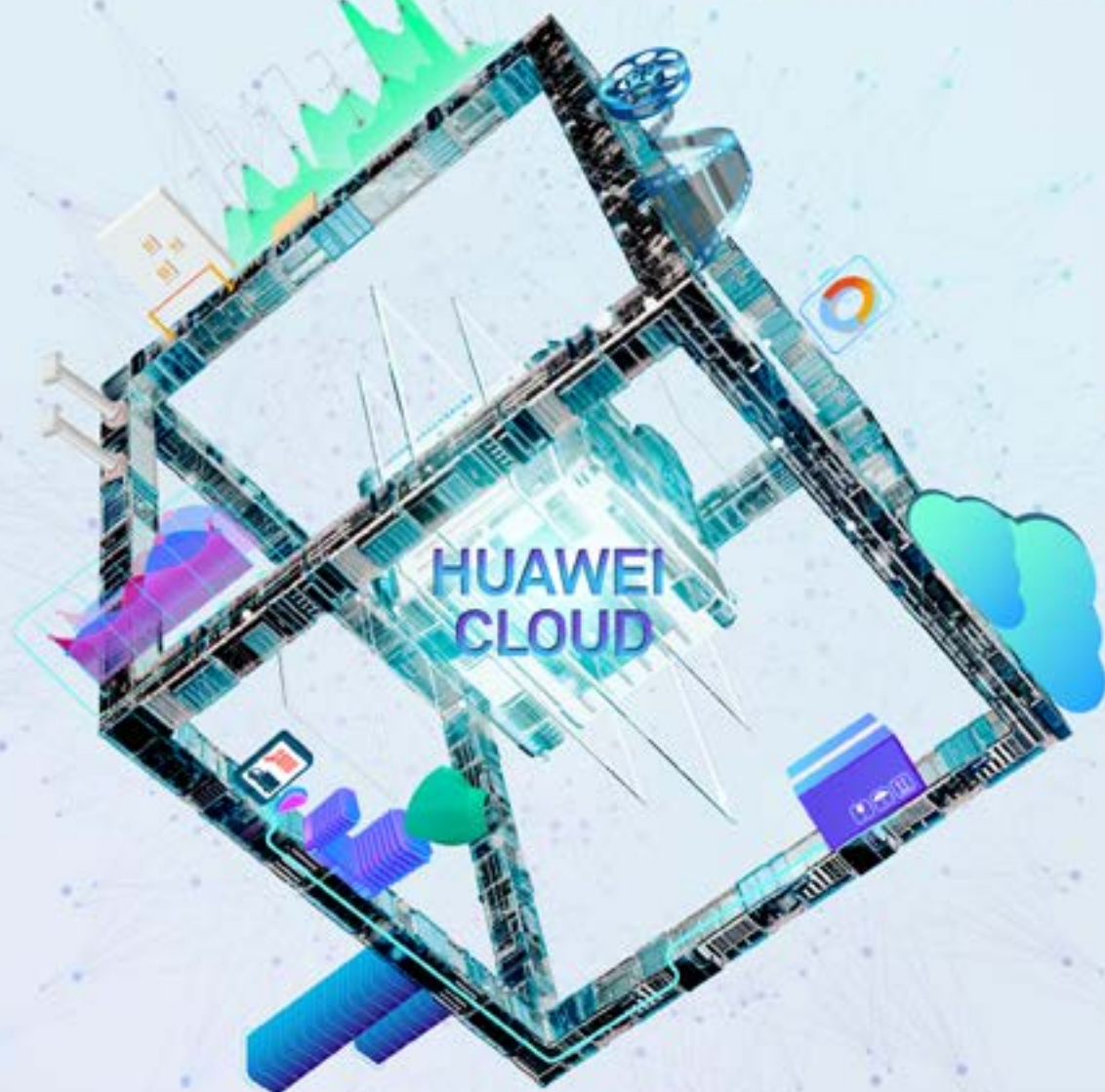
HUAWEI CLOUD

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HUAWEI CLOUD EI

AFFORDABLE, EFFECTIVE, AND RELIABLE ENTERPRISE INTELLIGENCE FOR YOUR BUSINESS NEEDS

HUAWEI CLOUD EI PROVIDES SCENARIO-SPECIFIC AI SERVICES

INDUSTRY WISDOM + SMART BRAIN + SMART EDGE + DEVICE AWARENESS

- CITY + INTELLIGENT TWINS

- INDUSTRIAL + INTELLIGENT TWINS

TRAFFIC + INTELLIGENT TWINS

HUAWEI

HUAWEI CLOUD: The Culmination of 30 Years of Technological Accumulation and Continuous Innovation
— Accelerating Enterprise Digital Transformation

Bruno Zhang – CTO of Huawei Cloud BU

The major revenue category of new Internet services for operators has shifted from traffic to data in the Cloud 2.0 era in which enterprises everywhere are making the move to the cloud. This move entails AI and big data capabilities in the application mix, which has brought about changes in technologies and system architecture. Applications running in the new layout require distributed computing and storage, high levels of elasticity, and largely automated processes, which were not as evident in Cloud 1.0. Reliability and security top the concerns in selection of a cloud service provider for organizations running key applications on the cloud. Cloud service providers need to deliver on both fronts while finding ways to accelerate the digitalization process if they hope to have any kind of success in the Cloud 2.0 era.

Benefiting from the more than 30 years of technology accumulation of the parent company, HUAWEI CLOUD is best positioned to help organizations in their transformations. The cloud service brand has inherited the three precepts of Huawei's R&D system: remaining focused in innovation efforts, confident investment into the future, and customer centricity as the guiding point from start to finish. Huawei goes much farther than just trying to build an architecture to suit this and that need, it adopts more of a "top layer" approach — a global approach in tech able to lay on top of any profile — then drills down into specificity with vertical integrations in software and hardware systems while accumulating what is necessary to make breakthroughs in specific applications along the way. Huawei continues to spare no effort in building up the basic technology layers because even the smallest of improvements contribute to the innovations for the future. This commitment further solidifies Huawei's longevity with its innovations in the tech able to fully satisfy the profile - specific requirements of customers.

Hardware capabilities are largely determined by the architectural design in addition to the processing speeds of the chips. In the past, Huawei catered to the needs of carriers by focusing on large network builds and core algorithms. This expertise has contributed to Huawei's success in cloud with the end - to - end enhancements available with the ability to home grow data center infrastructures, chips, software, and many of the other elements that go into the mashups. No other vendor can make this claim. HUAWEI CLOUD is continuously innovating in everything that goes into making the cloud service offerings the best. Everything from software, hardware, data center management, basic cloud services, and application development platforms (including deployment and O&M platforming, tooling, and architectures) all the way to the basic model algorithms in AI utilities and domain - oriented modeling. Dedicated Huawei engineers have made breakthroughs in the whole vertical axis; built a full - stack technology system with home - grown accelerations in chip, software, and hardware; and placed it all into an easy - to - operate online format. Huawei has launched one impressive product after another in such segments as AI, container, IoT, blockchain, and big data to help enterprises and developers rise to the challenges of the new era.

Thousands of customers can attest to the benefits they have achieved with HUAWEI CLOUD, including Xinhua News Agency, Shenzhen Traffic Police Bureau, Deppon, European Organization for Nuclear Research (CERN), Santander Bank, Copernicus Program of the European Environment Agency, and PSA Group. HUAWEI CLOUD is going all in with cloud to provide top stability in delivery of each service in the portfolio through continuous innovation. Find out how HUAWEI CLOUD can help you accelerate your digital transformation — We make IT possible, and affordable!

CLOUD +

P16 Cover Story

Development

Insight

New Business

Development Trends in Cloud Computing (Q4 2018)

Commercialization of Blockchain in Full Swing Outstanding Performance of Chinese Tech Companies

According to a blockchain srvey report released from Forrester Research, commercialization of blockchain is accelerating. The report shows that technology decision - makers from around the world are working with partners to promote blockchain across all sectors. In the report, Forrester Research pointed out that in this global trend, the Chinese market has demonstrated outstanding performance in promotion of blockchain.

Anticipated Release of Blockchain Security Standards

In November of 2018, drafting of *Security and Technology Requirements for Blockchain Platforms* started to form up industry standards. This standard clarifies the major threats and security system architecture requirements of blockchain platforms and provides technical requirements for key modules, helping form the basis for ensuring stability and security in operation of blockchain platforms.

2018 HUAWEI CLOUD Global Blockchain Developer Competition

On October 9, the global developer contest jointly hosted by HUAWEI CLOUD and Trusted Cloud opened in Beijing. HUAWEI CLOUD, Trusted Cloud, CAICT, Hyperledger, Blockchain Committee of CCF, and many other organizations meet to accelerate technological innovation and product incubation in platforming for enterprises and build up the developer ecosystem.

Five Ways in Which Cloud Computing Will Change in the Following Year

The maturity of the tech is helping add momentum to the digital transformations at enterprises, especially when it comes to migrating data from data centers. Forrester's five predictions in how cloud computing will develop in 2019: Enterprise spending will increase; container, Kubernetes (K8s), and serverless will continue to transform the makeup of core enterprise applications; new methods in private cloud operation will emerge; the strategies in Platform - as - a - Service (PaaS) delivery will place more consideration on long - term UX; and Software - as - a - Service (SaaS) will continue to grow in popularity.

Huawei Releases Full - Process AI Development Platform

HUAWEI CLOUD released the accelerated, full - process AI development platform and tooling, named ModelArts, involving data labeling and preparation; model training, tuning, and deployment; and other AI development processes in a one - stop service profile.

Cloud Computing Will Integrate Innovative Technologies

According to a survey conducted by Forrester, cloud computing is no longer a new technology as many analysts perceive it to have entered the early stages of maturation. Cloud computing is no longer looked at as just a temporary server. It integrates innovative analysis, machine learning, messaging, IoT, and database services.

London Leads Annual Increase in Investments in AI at 43%

London has the highest increase in investment in AI of anywhere in the world. The sector grew 43% last year in the megacity, ranking in the pole position followed by Paris at 33% and Berlin at 19%. Investments in AI declined in other places, including Beijing, Bangalore, and Tel Aviv between 2017 and 2018.

HUAWEI CLOUD: Geared Up for the AI Era Release of the EI City Intelligent Twins on HUAWEI CLOUD

On October 11, during HUAWEI CONNECT 2018, the cloud arm of the company announced the exciting upgrades to the Enterprise Intelligent (EI) suite on its service platform powered on Huawei's latest AI chip. The new capabilities were showcased in release of the EI City Intelligent Twins offering on HUAWEI CLOUD.

Six Major Trends in Enterprise in 2019

In November, Moshe Kranc, CTO of Ness Digital Engineering, and his team predicted their macro development trends for some specific technologies in 2019. They anticipate that these technologies will change the rules in the market. New technologies, such as blockchain and machine learning, will continue to grow. Now familiar pillars like cloud computing and big data will consolidate their market positions, and network threats will continue to plague users.

HUAWEI CLOUD Releases Miranda AI - Enabled Cloud Security Platform, Venturing into Uncharted Areas

On October 11, 2018, HUAWEI CLOUD released its AI - enabled Miranda platform featuring many advancements in efficiency of traditional rule matching models. Miranda yielded a 53% improvement in lowering the missed report rate in Web Application Firewall (WAF) and 47% in Database Security Service (DBSS). The blocking rate in Situation Awareness (SA) improved to 99%. The missed report rate in Advanced Anti - DDoS (AAD) decreased by 49% and the detection rate in Host Security Service (HSS) reached 90%. Six other security products were also released, to bring the number of new releases up to seven and giving Huawei the most complete, cutting - edge security portfolio in the business.

Data Center Operations Consume 2% of the World's Energy

Data center build out has led to an increase in power consumption, necessitating the need for improved green credentials while improving the uptime for the centers. This means the reliability of the power supply must be improved to keep servers up at all times because any downtime can be extremely costly. Global data centers consume more than 416 TW of electricity each year, which is equivalent to about 2% of world energy production.

HUAWEI CLOUD First to Launch Gene Container New Service Launch Injects New Capabilities in Gene Sequencing Field

On October 11, 2018 during HUAWEI CONNECT, the world's first Kubernetes - based gene container service was launched. Powered on lightweight container technologies and big data and deep learning algorithms, Huawei Gene Container Service (GCS) provides customizable sequencing processes, high reliability resources that can be scaled up in seconds, and the conveniences of a one - stop experience for sequencing vendors. The new service makes computing for the sector more efficient and faster while streamlining usage.

HUAWEI CLOUD Milestones 2018

Jul 2018 | Forrester reports Huawei as a leader in public cloud services.

Aug 2018 | Launch of GPU-shared AI container as part of the new Inclusive AI strategy; release of Istio service grid, leading the direction in cloud native technology.

Jun 2018 | Release of network-enhanced C3ne ECS, yielding networking forwarding capabilities into the tens of thousands range.

Jun-Aug 2018 | Rollout of ImageSearch, DLS, intelligent video analysis services, and a long list of other services in promotion of AI utility adoption in a wide-range of industries.

Jun 2018 | Release of HUAWEI CLOUD EI Intelligent Twins, offering an all-scenario AI service portfolio for enterprise customers that combines corpuses of industry knowledge with the accelerations of intelligent edges while delivering a uniform UX across the entire profile.

Sep 2018 | Release of end-to-cloud Application Performance Management (APM), Exclusive Microservice Engine (CSE), and Application Orchestration Service (AOS) graphic designer, making it easier to move applications to the cloud; release of IPv6 solution, simplifying connections for massive quantities of instances.

May 2018 | Launch of intelligent Data Lake for AI operations, simplifying data management and facilitating data sharing.

Sep 2018 | Official opening of Thailand Region, accelerating service response in the area.

Apr 2018 | Release of the blockchain technology and publishing of *Huawei Blockchain Whitepaper* in promotion of digitalized evolution.

Sep 2018 | Release of intelligent video solution in HUAWEI CLOUD EI suite at World Artificial Intelligence Conference 2018; *Industrial AI Development Whitepaper* jointly released with Forrester.

Mar 2018 | Opening of Hong Kong Region, accelerating service response for the Asia-Pacific market; opening of Russia Region, becoming the only public cloud deployed in the country; HUAWEI CLOUD becomes China's first cloud provider to have all platforms, nodes, and services in scope with PCI-DSS.

Oct 2018 | Release of full-stack AI solution and a full range of products and solutions powered on the world's first AI chips (Ascend) able to at suit all scenarios at HUAWEI CONNECT.

Feb 2018 | Release of first versions of Deep Learning Service (DLS) and Blockchain Service (BCS).

Nov 2018 | Official opening of South Africa Region, establishing the first data center in Africa to provide cloud services for local enterprises.

Highlights from HUAWEI CONNECT 2018

- Release of E2E AI platforming and tooling, including ModelArts able to accelerate AI adoptions, HiLens that helps developers supercharge their efficiency, and HiQ purpose built for quantum computing simulators and programming frameworks.
- Official release of City Intelligent Twins in the HUAWEI CLOUD EI suite, helping solve many of the difficult issues in urban management and operation.
- Launch of Developer Enablement Plan, which provides multi-level support for developers, partners, experts, and research institutions in the form of AI resources, platform support, enablement through courseware, collaboration on solution development, and many other supports to make AI more affordable, easy-to-use, and secure across the ecosystem.

- Joint release of WhitePaper for HUAWEI CLOUD Data Security with China Electronics Standardization Institute (CESI), which shares the rich expertise of HUAWEI CLOUD in data security with customers and the industry, forming discussion on how to move forward collectively in enhancing security practices.
- Release of the Miranda platform, an AI-based security platform that enhances traditional rule-matching models with AI, adding even higher levels of safety for the entire scope of services in the HUAWEI CLOUD brand.
- Release of the world's first serverless Kubernetes-based container service named Cloud Container Instance (CCI) that provides CPU container instances for general-purpose scenarios and AI container instances for more intensive cases – both options deliver much improved O&M efficiency and compute performance/affordability while enabling all new levels of portability.
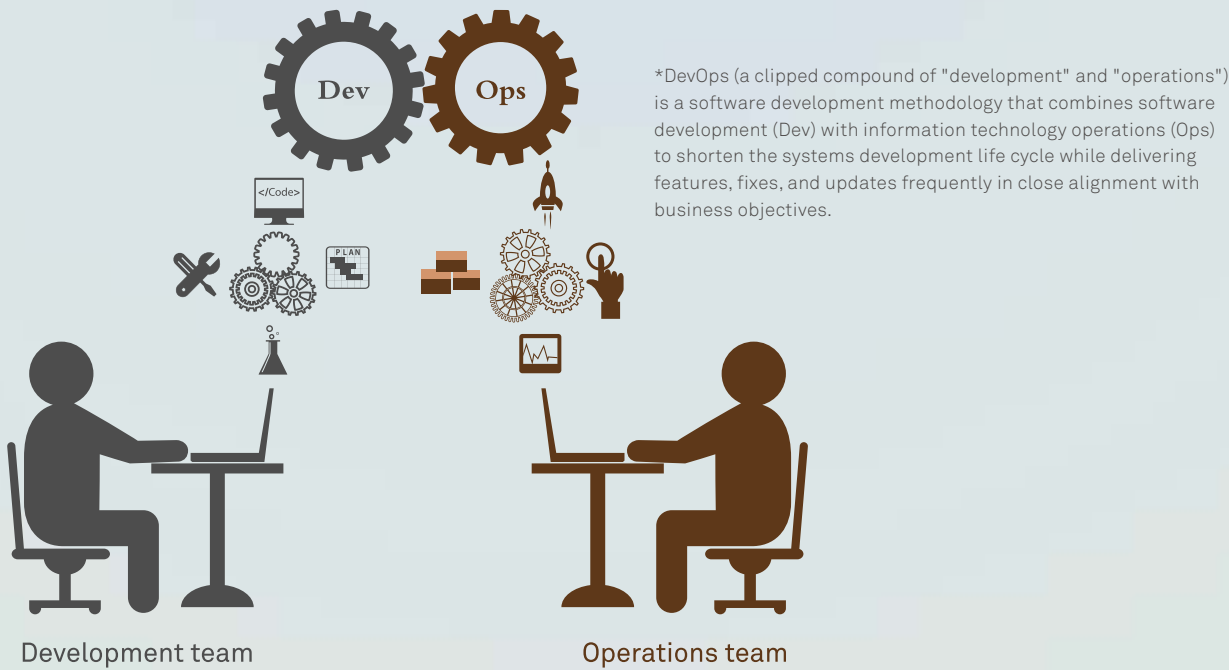
Redefining DevOps in the AI Era

■ By Chris Pereira and Xu Shengla

Jez Humble started his career as a programmer and later wrote several books sharing his expertise in product development. He is best known as the co-founder and CTO of DORA (DevOps Research and Assessment). Humble recently stated that DevOps will gradually eliminate the traditional development models adopted in the past decade because such models cannot meet the frequent updates in applications of today. Although many developers may find the whole DevOps contraption difficult to wield in the beginning, the new model is able to greatly improve efficiency, security, and scalability of system developments.

DevOps: the New Normal

According to the latest survey released by O'Reilly Media, the median salary of DevOps engineers worldwide is $90,000 USD a year. This information is corroborated by the *2018 Accelerate State of DevOps Report* released by DORA. The penetration rate of DevOps in the industry is on the rise and enterprises demonstrating high efficiency, quality, and stability in software deliveries have made constructing and optimizing their DevOps model the priority, leaving those adopting moderate to low priorities in the wake to sway with the waves.

*DevOps (a clipped compound of "development" and "operations") is a software development methodology that combines software development (Dev) with information technology operations (Ops) to shorten the systems development life cycle while delivering features, fixes, and updates frequently in close alignment with business objectives.

Development team   Operations team

All the research and reports point to the fact that investing in DevOps capabilities brings undeniable benefits to adopters. General estimates for development teams using the DevOps principles yields a 46 - fold improvement in code deployment while accelerating code change turnarounds by 2500 times. From the perspective of stability, the code change failure rate is seven times lower than that in the past, and the fault recovery speed is 2600 times faster when compared to legacy models. Those numbers are not typos, they are the reality!

These are not new things to Humble. He has been promoting open collaboration and DevOps for years. He expressed that development models must be able to easily pick up the latest data and react quickly. Old models cannot do this, and in this day and age, organizations must be able to quickly collect and use the latest data. As the industry enters the AI era, this will become explicitly more important.

Management Challenges and the Remedies

Despite all the benefits, integrating a DevOps regime into existing processes is no easy task. Humble says it this way (paraphrasing):

Adopters have to make some tough choices. Over the past five years, we have been studying factors contributing to high - quality software delivery and their impact on business and we also looked at how those capabilities or lack thereof affect business performance and what capabilities will be affected by software delivery. Understanding these factors is a prerequisite for improving enterprise development capabilities. That being said, we must also acknowledge that each organization is different, what works for one may not work well in the other. So, how should enterprises take the first step? Teams must have a sense of urgency to solve problems and must continuously invest in resources and capabilities to improve team work. Once the DevOps mode is used, the team can provide users with the latest and most reliable software through continuous testing and version updates, thereby accelerating service rollout.

### Wide - open Collaboration in Developing Full - stack Capabilities

The design and manufacturing cycle of the telecom industry in the traditional context was rather protracted even before factoring in the time needed for network deployments and software deliveries to dealers and end users. There were many restrictions in the entire process. The Huawei DevOps model breaks free from the constraints of traditional models and provides the much - coveted openness and agility in the software development processes.

Huawei has amassed the collective talents of vertical industries. Humble noted that Huawei's solutions cover the entire value chain, including hardware, basic stack components, network infrastructure, and developer tooling. Huawei DevOps solution is constructed based on HUAWEI CLOUD and provides full - stack, end - to - end coverage and features huge advantages in openness and collaboration.

Humble believes that enterprise development teams must learn how to create and manage systems that meet production standards and then instill methods to continuously improve on deliveries, stating that this approach requires the use of a powerful, comprehensive, automated testing platform with a variety of available production methods from which to choose.
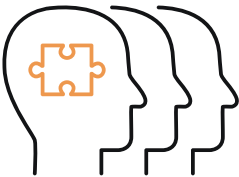
Capability Development and Performance Measurement

To successfully implement the DevOps development process in the artificial intelligence era, enterprises must embrace new thinking and working models. Some software developers may think that accelerations equate to greater risks, but in fact there is no additional risk if the processes are properly handled. Development teams able to implement DevOps have seen excellent performance in terms of throughput, stability, and availability. How did they accomplish all that? Through careful measurement, automation, and analysis. DevOps - enabled teams can deploy, update, and roll back multiple times within one day and recover from service interruptions within one hour. The failure rates of these development teams are very low – they are able to produce quick iterations without compromising stability. Humble once again comments that teams must invoke the latest data for model verification to ensure that software can be deployed smoothly in support of industry solutions featuring higher reliability. Development teams must be able to improve skillsets, measure performance, and adapt to new mindsets. Only by tracking software delivery performance can enterprises truly leverage the value of DevOps.
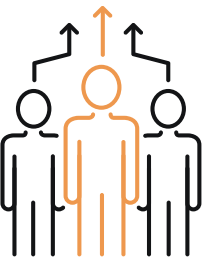
The four Metrics by Which DevOps Teams Are Measured

The following four major metrics are used to measure the efficiency of DevOps teams: time needed in change cycle from code check - in to final release; deployment frequency of production (throughput) changes; time needed to recover services after a fault occurs; change failure rate after the production change is committed.

Tracing these metrics allows us to understand the performance of the DevOps process and lay a solid foundation for at - scale application deployments. Properly configuring multiple metrics allows enterprises to have a more complete picture of which tools and processes are running properly and which parts need to be readjusted or rebuilt. Adopting a DevOps process is not enough, however, enterprises must also understand the impact of the implementation process with the actionable insights of data.

Automation in DevOps and the Value of AI

AI is changing the face of DevOps as investments in artificial intelligence infrastructures (such as tool chains and platforms) continue to enlarge. Developers are increasingly concerned with training and verification models, data pipelines, cloud and edge deployments, and how to measure the effectiveness of it all, which in turn elevates the requirements on data governance and tuning of configurations. Humble illuminates that the key issue is the delivery cycle. It takes a lot of time to train models, get feedback, and complete model training and verification. He believes that the focus of attention will move to improving reliability and shortening the delivery cycle, commenting that good configuration management, automation, and end - to - end solution control are very important. Through automatic testing and deployment, we can predict the capabilities of the continuous delivery apparatus, which can in turn have a positive impact on software delivery and the entire makeup of the enterprise culture. Developers require a simplified solution – this is paramount to improving all - around efficiency. After all, the results of automating a complex, unreliable manual process amounts to nothing more than a complex, unreliable automated process.

The application of DevOps in traditional software development processes means industrialization of production change processes and improving reliability. Humble points out that what we actually see is how many processes are pieced together. It is difficult to replicate the work of development personnel, complicating the adoptions. Huawei is working on the situation by systematizing the processes and promoting industrialization. Automation delivers unique value in enhancing IT operations. Automation and artificial intelligence improve efficiency and stability, ensure high - quality IT operations, and yield enhanced management over unified configuration and release mechanisms.

Tooling with AI - enabled analysis capabilities has emerged, which can better predict and solve problems in IT operations. For example, monitoring tools help measure application performance to ensure requirements are being met. The real value, however, comes from the embedded analysis capabilities that not only detect whether the requirements are being met, but go further to analyze the reasons for the failure. The information is then sent to the development and testing teams so they can solve the problems with improved speed.

Grow with Intelligence DevOps

The word DevOps was coined by Patrick Debois in 2009, and its connotation has undergone numerous interpretations. DevOps creates new standards in software development, from basic systems to enhanced feedback loops, forming a continuously experimenting and learning team culture. With the addition of AI, DevOps will gain greater influence and momentum.

DevOps and AI are a perfect match. As we enter the AI era, the focus of all industries is moving towards provisioning of end - to - end solutions that are more intelligent, faster, and efficient. Humble has repeatedly stated that DevOps can help enterprises accelerate delivery while providing higher levels of reliability in end - to - end solutions.

As the system development cycle in DevOps continues to shorten, more breakthroughs in automation and event monitoring will be made in software development processes. Developers can develop more secure, tenacious software systems at scale, further unleashing the potential for openness and collaboration. Find out more about the unique value that Huawei DevOps can deliver in activating intelligence in your organization!
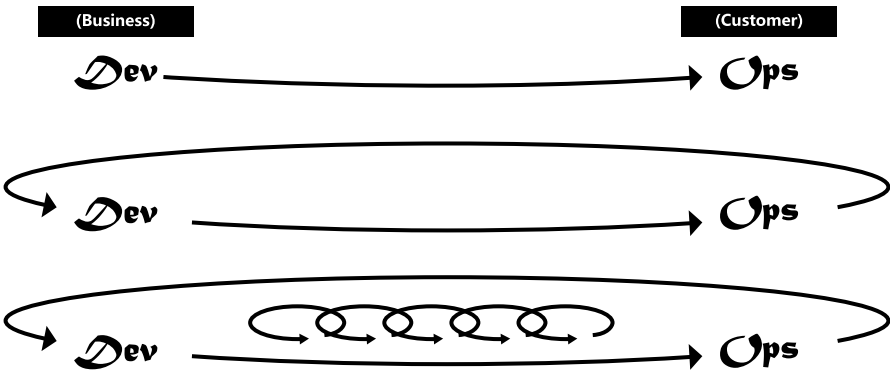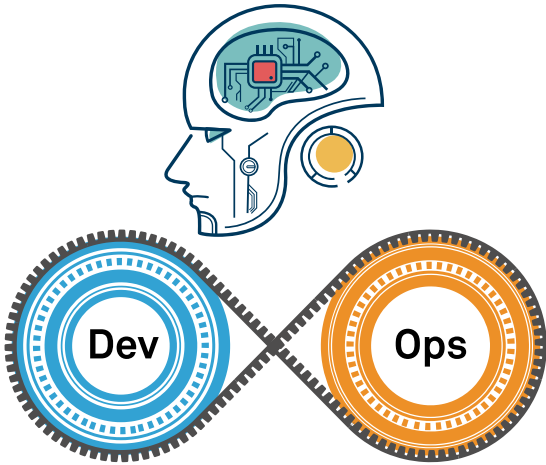
Founder of Jenkins
discusses continuous delivery pipelines

■ by Kohsuke Kawaguchi, CTO of CloudBees

The popularization of all excellent ideas requires advanced technologies and the creation of corresponding tools to bring the new methods to the masses. The concept of DevOps and the continuous delivery capabilities therein are no exception to the rule. Software development is the most complex and uncontrollable engineering technology mankind has come up with to date. Once a code is submitted to the system, dozens, hundreds, or even thousands of steps, commands, services, applications, and environments stand to be involved. If delivery pipeline capabilities are lacking, efficiencies cannot be improved by replacing the repeatable, tedious operations with automation. Enterprises that have not adopted DevOps are displaying low efficiency and high error rates from reliance on manual operations for the development and toolchain apparatus.

▌ Kohsuke Kawaguchi discusses continuous delivery concepts and methods in DevOps

Kohsuke Kawaguchi, often referred to as KK, is the founder of Jenkins and the CTO of CloudBees. He is also the first to put DevOps into practice and a champion of large-scale popularization. Jenkins users total into the two-million-plus range. In the professional tooling area of the continuous delivery pipeline, market share exceeds 90%, making it the standard-bearer.

At HUAWEI CONNECT 2018, KK delivered a speech titled "Super Powers Coming to Your Jenkins", covering DevOps continuous innovation/continuous delivery concepts and methodologies, as well as product solutions and key technologies for different scenarios, such as Blue Ocean, Cloud Native Jenkins, Jenkins Evergreen, and Jenkins X.

He explained, if Cloud Native Jenkins is deployed, users will not receive calls informing them services are down on a Friday night because the service runs on elastic cloud resources able to withstand multiple and simultaneous points of failure (POFs). No resource reservation, O&M costs are reduced, and customers get all the performance they need on a moment''s notice.

Jenkins Evergreen provides preset templates. Clicking on a template generates a sustainable pipeline in a just a few minutes. This greatly simplifies the configuration procedure of the pipeline and reduces the

configuration threshold. All configurations for Evergreen are managed by Jenkins and can be upgraded online at any time. Users can focus on their own service development and delivery, and do not need to pay attention to complex pipeline configuration and component management.

Jenkins Configuration as Code allows users to compile YAML scripts to interconnect plug-ins, security tools, check tools, document services, and the like. All tools and services can be interconnected using scripts. Users can trace and view version controls, code audits, and rolling deployments, and accurately trace the plug-in set and its version, enabling users to have more confidence in frequent change commits and iteration.

Jenkins X provides best practices for continuous delivery of cloud native applications, covering various phases, such as build, test, review, change, and collaboration. With the emergence of kubernetes, users must study the new knowledge, tools, and services and such topics as how to migrate to containers, how to install and implement the new cloud operating system in addition the reverse in installing containers to the k8s ecosystem and comparing and selecting which toolchains best for their scenario. Adapting to kubernetes is no easy task – Jenkins X makes the process smooth.

▌ HUAWEI CLOUD shares practices in DevCloud pipeline builds

Also during Huawei Connect 2018, Huawei experts introduced the practices in the DevCloud of its cloud service brand. Huawei experts shared on now the R&D model has evolved from the largely manual-based operations of the past into the IPD phase and later evolved even more completely by taking on the CI/CD, and DevOps frameworks. These adoptions have transformed the organizational and process matrixes. With the continuous transformation of R&D models, organizations, processes, and tools, efficiencies in product delivery have greatly improved while TTM has been shortened from 1-1.5 years to 2-6 weeks for many efforts. For some Internet-based products, the iteration period is shortened to one week, and updates to multiple microservices can be released every day.

The automated and continuous delivery pipeline platform/service is the core engineering practice. With the pipeline, the time needed for E2E delivery (from code submission to go - live) is significantly reduced. The automation and concurrency capabilities vastly improve the efficiency of each service, turning manual operations into elements with high levels of automation. Container builds, infrastructure as code, containerized deployment, and gray release services ensure that products can be repeatedly and reliably released with fast iteration.

Huawei's 80,000 R&D employees originally used commercially - development tools, which were incapable of meeting agile delivery requirements. After all, agile and fast iteration capabilities in tooling ultimately depend on the agility and speed of the tool platform. As a result, Huawei switched to open source and ensures that 100% of its software development tools are compatible with native open source systems. In addition, cloud adoption capabilities, the extension of the x - as - a - service portfolio, and everything from utilities like single sign-on (SSO) and multi-region management to the stalwarts of high concurrency, high reliability, and high security are continuously being improved upon, building core competitiveness in all products.

Huawei is well aware of the pain points in building the toolchains in software delivery and O&M so it knows exactly what developers need. The automatic continuous delivery pipeline and DevOps toolchain are visualized and flexibly orchestrated to allow hitless upgrade for services and products releases executable in minutes. Many enterprises are benefiting in significant ways from the greatly shortened delivery periods and improvements in delivery efficiency and product quality.

Huawei's product teams and coding scale are both commendable. Some products can have tens - of - millions of lines of code and over 1000 people working on the offering. Each component and team member relies on the quality of all the others. Making matters even more intertwined, Huawei's big platform strategy means its different arms must also rely on the products from the independent business groups (BGs), each with their own product line and platforming. As a result, many products depend on different platforms delivered by several teams. The large scale of products, thousands of service features, and tens of hundreds of modules also means that different departments use different environments and networks.

In this complex environment, Huawei has built a hierarchical and continuous delivery pipeline. The pipeline is divided into the following levels: individual, project, subsystem, product (version), and solution level. The pipeline orchestrates workflows and triggers execution of the next-level pipeline. In this process, the L1 - L4 test model is used. Different automatic test policies are executed at different levels of pipelines. The quality access control corresponding to each task is set to determine whether to allow the pipeline to continue. Multi - layer pipeline protection moves defect discovery forward and ensures product quality.

Pipeline templates for continuous microservice delivery are provided that conform to the current flavors. Different from the continuous delivery pipeline of traditional products, the microservice pipeline matches the role permission model of full-function teams and full-stack engineers in the permission governance layout. SDEs can submit codes and operate the pipeline until the microservice is released, after which construct images, container-based deployment, gray release policies, and automatic rollback policies are implemented. Microservices can be released online every day/hour – or even within minutes!

A continuous deployment pipeline is also provided for static resources. The pipeline starts from software package changes and is deployed across multiple regions to implement automatic update of static resource packages for multiple servers in multiple regions.

In related technologies and services, gray release capabilities, fast build, infrastructure as code, configuration as code, Docker, K8s, automatic deployment, automated testing, and CloudPipeline Continuous Deliver Domain Language (CDDL) description files are particularly critical. Gray release and blue and green deployment policies ensure service upgrade without interrupting services. Incremental build, parallel construction, dependent pre - read and cache, and container slave all help accelerate builds, even yielding results in hours or even minutes. Container technology is used to standardize the environment, effectively eliminate the differences between the four environments of the DTAP, and reduce the cost associated with configuring, deploying, and maintaining the environment. CDDL describes the pipeline orchestration and service access standards. Manual review options allow for improved control over delivery quality when such reviews are needed to ensure absolute quality.

It is the basic direction of the pipeline and DevOps platform to automate everything, turn everything into code, and place it all in the x - as - a - service framework while visualizing the entire versioning and data management processes. Intelligence is also being added into each element with the developments in AI. DevCloud - based pipelines are able to support millions of concurrent scheduling tasks and provide visualized dashboards, task health (execution success rate), and overall pipeline views with drill-down capabilities in phase and task execution events.

Huawei is in the practice of using its own products in testing on its own systems to ensure DevCloud and other offerings are market - ready for its customers. New methods, concepts, and practices in online testing are table to further shorten TTM and improve product quality.

At the end of the speech, Huawei experts demonstrated how to quickly rollout changes online after a change is completed. The on - site demonstration running on a live network demonstrated the high level of confidence the team places on the quality and reliability of the DevCloud service.

Huawei is working on to provide a localized version of the Jenkins website for the China market and has been exploring deeper cooperation in various areas in the community. The industry is looking forward to seeing what new ideas Jenkins and Huawei DevCloud can put together in providing improved continuous delivery pipeline services.

Kohsuke Kawaguchi said something that serves to sum up the whole DevOps discussion: "The more you build quality into systems - through automation & shorter cycle times -the more you increase throughput & stability". HUAWEI CLOUD – ready to accelerate your continuous delivery pipeline with the mission-critical reliability and stability you need to stay up and running around the clock, every day of the year.

Exploring the Cloud 2.0 Era and Transplanting the Technology Gene

■ by Zheng Kai

The mastery is in handler, not the implement.

These eight words are engraved on Jin Yong's novel *The Return of the Condor Heroes* in which Yang Guo, after having broken his arm to get it, finally obtains to the heavy sword technique. Yang uses his newfound enlightenment and masterly - crafted heavy sword to finally defeat Jinlun Guoshi to become a legendary warrior - king.

Unwieldy to the onlooker, the heavy sword in this story resembles the fabled Excalibur of Western legends, with Yang Guo assuming the role of King Arthur – the contemporary hero king whom all kings looked up to. The sword never changed, it was just waiting for the right person to harness its powers. Its properties didn't change. It was crafted for a reason – the sword was waiting for the right vehicle with the right qualities to unleash its capabilities.

Swordplay takes decades to master. At the end of the first decade, the sword is sharp and the user nimble. Advancing into next decade, swordplay becomes highly controlled, and a master with 30 years of skill accumulation is nearly impossible to defeat. This process is the sculpting that heroes must go through as they keep with their passion and learn complete control over their craft. Investments on the frontend forge the rewards on the backend.

Some people may be asking why HUAWEI CLOUD has already made the top five in cloud service providers after being placed online not long ago and how it can position itself as a leader in the cloud computing market. The rise is similar to the story, in which years of preparation, accumulation, and dedication presented the perfect combination to wield a new pillar in tech: cloud. Enter the hero of the cloud era: HUAWEI CLOUD with its 'broad sword' of innovation.

HUAWEI CLOUD has plenty of talent stacking up behind it, benefiting from the 30 - plus years of technical accumulation of the parent company. The cloud service is set to blossom as it takes the stage with many new innovations.

Zhang Yuxin, CTO of HUAWEI CLOUD BU

▌ The Tech that Makes HUAWEI CLOUD

Zhang Yuxin joined Huawei in 1999 when he started to work in the frontlines of R&D. In the 20 years, Zhang says it is still the same in essence as it was decades ago: dedicated to customer success and daring to invest. Mr. Zhang, now CTO of the HUAWEI CLOUD BU, states, "In fact, more than a decade ago, Huawei established a comprehensive R&D system. At that time, we established the belief – the way of serving customers and our business boundaries and principles." This belief means the company abides by business boundaries, focuses on performing well in its core competencies, manages technologies and R&D processes through a complete technical management system, and stays in tune with the market to quickly respond to customer requirements.

Zhang explained: What does Huawei mean by business boundaries and invest boldly in R&D? It means we focus on R&D efforts and achieve a leading position in our established directions. So, at the time years ago, we didn't give into the temptation to explore the Personal Handy - phone System (PHS), and focused our priorities on achieving 3G viability and becoming number one in the world. This focus is what made us what we are today.

Zhang then continued to explain the 'dare to invest in the future' slogan commonly used at Huawei. He said that the R&D system has a three - stage strategy: collect, develop, plan for the future. This sets the tone for the long - term mentality in investing and accumulating technologies. In one example of this commitment, way back in 1996, Huawei started to research and develop its own chips as part of its long - term investment strategy. Towards the end of the 90s and into the new millennium, Huawei also took up long - term investments in operating systems, databases, and many other underlying elements that go into the end - to - end mix. These moves are what give HUAWEI CLOUD the unique capability to provide full - stack cloud services, starting from chips and working all the way up to higher - order equipment.

Zhang continued:

Huawei has always stuck to its strategy in R&D. We refer to it loosely as our big platform, small products strategy. This means we need to build up basic technologies that can be shared across our business groups to the greatest extent possible because the time needed to build basic competencies is long and involves copious amounts of professional inputs. If these basic technologies are built and shared within the company, all this energy will not be wasted and the capabilities of all products can be brought up quickly. Looking back, albeit somewhat inadvertently, we set ourselves up with the perfect positioning to enter the cloud arena. We were focused on developing broad - reaching tech, and that is what the cloud market is all about.

Huawei has always adhered to these principles and success has always followed its focused commitments. The research and development of these basic technologies are treasures that may stay in the storehouse until called upon, but once these technologies come into use, their value comes into play. Huawei invests and develops first then finds a way to tap the basic tech with post - developments to suit the product/technical field. Understanding how much Huawei puts into each effort and how it accumulates what is necessary to make breakthroughs will help you know how it got to where it is in cloud services.

In 2008, Huawei started to invest heavily in computing, storage, and network to form its systematic approach to R&D. The company did not make this move in preparation for entry into the enterprise business three years later, it did so because it was daring to invest in the future in line with its basic guiding principles. Happenstance or was it because everything comes into place when you got the right core values and policies? Zhang Yuxin gave his perception:

Amazon and Google had already formed the concept of public cloud back in 2008. Huawei, conditioned to thinking about the future for customers, started to think about how to apply this concept to the carrier market as that was the then lion share of the focus. Huawei realized it did not have the complete capabilities to deliver the concept, thus it embarked into the basic research of the IT needed to make it happen.

According to the three - stage strategy in R&D, Huawei invests in the technical reserves first to collect what is needed for the entire interoperable portfolio. For example, *Huawei Symantec Technologies* was established in 2007 to focus on the storage industry. Huawei dived into servers even earlier than that.

Therefore, the logic is clear. Although Huawei decided to enter the enterprise business in 2011, Huawei's reserve for IT infrastructure can be traced back to before 2007. HUAWEI CLOUD benefits from these long - term investments into basic technology with the thirty - years of expertise in ICT of its parent company.

Everything Changed in 2011

Su Liqing, Director of
Infrastructure Engineering Dept.

2011 was a year to be remembered for Huawei.

In 2011, Huawei expanded its offerings, extending into the enterprise business and establishing the Enterprise BG.

There is a backstory to all this though. That is, there were plenty of preparation and builds to get ready for this move, which would also ultimately fuel the cloud transformation of 2012. At that time, Su Liqing just took over as head of the IT department at Huawei. The transformation was both pain and joy for Su Liqing, who is now the Director of the Infrastructure Engineering Department under Cloud BU.

Because Huawei's business layout is a global one, the core of Huawei is R&D assets. However, the global lab layout was plagued by information silo after information silo. Therefore, for Huawei IT, the first challenge was enacting a cloud adoption to break free from the originally constricting architecture of the lab operations. Su Liqing said, "This process was very painful because it meant that the overall IT architecture of Huawei needed to be changed, including the security isolation architecture, which had to be resolved with each business department and for each use case."

What metrics can be used to measure the effectiveness that a cloud profile has on R&D operations? The biggest and most obvious is the ability to reduce costs. The cloud powering Huawei's business applications is one of the world's largest enterprise - class applications. In 2012, among Huawei's employees, about 80,000 were R&D personnel working in more than 1,500 labs around the world. These labs built some computing capabilities, including simulation, compilation, and antivirus, but these resources were scattered, bogged down with low utilization efficiency, and were difficult to manage. Therefore, Huawei decided to cloudify its internal IT capabilities.

Su Liqing commented: "The budget for building the global IT infrastructure for one of those years of build out exceeded $200 million USD. After we completed the cloudification of global resources, only half of the budget was spent. We called the build the R&D Cloud, which improved resource utilization by more than 2.5 times. Generally, the CPU usage of enterprise IT servers is less than 20%, while Huawei's CPU usage can reach 70%."

In fact, we can see that Huawei uses internal IT to save resources. However, the greater benefits brought by cloud are the improvement of Huawei's business efficiency. After resources are concentrated, the computing capability is greatly improved. The original R&D efficiency is doubled. Using a platform project with more than one - hundred million lines of code is used as an example, the iteration period for these types of big projects was nine months. After going to the cloud, it soon turned into six months, and now it has been shortened to three months. Take the product R&D of the consumer business as an example. The launch time has been determined at the beginning of the project, but improved R&D efficiencies means increased frequency in mobile phone iterations is possible, which reduces bugs and improves the quality.

Su Liqing remembers clearly all the affirmations received from business departments. He recalls that after the Huawei Chengdu Lab went live on the cloud, Sun Cheng, the then - director of Chengdu Research Center, ceremoniously cut the ribbon to the lab, saying, "The labs in the past were closed off. To ensure security, personnel must use access cards to enter and exit the labs. After the labs are moved to the cloud, the lab becomes open. Because data is on the cloud, security and efficiency are greatly improved."

Construction on Songshan Lake Data Center in Dongguan completed in July of 2016.
The success of the EDC migration demonstrated Huawei's all - cloud distributed data center
blueprint was ready for customer adoption.

The Cloud BU is Born
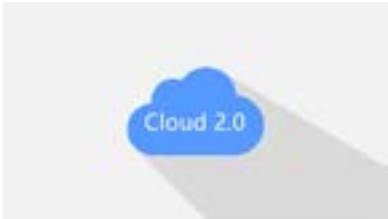
Cloud 2.0 dominated by enterprise applications

Release party for the
Cloud Ecosystem Changsha Declaration
In March 2017, Huawei partnered with Taiji, SinoSoft, Digital China, YonYou, iFLYTEK, and ChinaSoft International to jointly release the Cloud Ecosystem Changsha Declaration, and announced the establishment of the Cloud BU.

Huawei was a relative latecomer to public cloud. The birth of HUAWEI CLOUD BU came about from a redefinition of Huawei's business boundaries.

Huawei has always held to the principle that it will not enter the telecom service field because Huawei will not compete with its customers. Therefore, while Huawei has mature tech in private cloud, it has kept a certain distance from the public cloud. Huawei entered the public cloud market only after carriers requested the offering be made available so they could then offer such services to their own customers.

At the same time, carriers also needed to cloudify their networks. They needed to implement agile service provisioning and fast iteration of applications to compete with Internet - based vendors. To help them achieve these goals, Huawei introduced cloud technologies to transform the telecom network architecture.

Another important reason was the attraction of the cloud market for enterprises. Yet, public cloud was mainly oriented to Internet applications in the beginning, which are not Huawei's expertise and beyond the company's service boundaries. However, in 2016, Huawei picked up on the trends in enterprise cloudification and made it an important target market.

More and more industries, enterprises, and public agencies are migrating to the cloud. This is precisely why Huawei distinguishes between Cloud 1.0 and Cloud 2.0. Huawei's definition of Cloud 1.0 is dominated by native cloud applications and Internet companies. Cloud 2.0 is dominated by enterprise applications. More and more industries, enterprises, and public agencies are migrating to the cloud.

Huawei was also facing many problems in its own global operations. It became engaged in the consumer business in 2011, requiring a cloud platform like iCloud. In another aspect, Huawei's global data center architecture also needed to rent other public clouds. So, we had to ask why we were not running these operations on our own cloud.

In fact, Huawei did not embark on public cloud in 2017. Zhang Yuxin said that Huawei and Deutsche Telekom (DT) had piloted Open Telekom Cloud in 2015 before the Cloud BU was set up. This model is called 'partner cloud', which is operated by DT as a whole set of cloud products and solutions. This build is considered Huawei's first trial in the public cloud.

Huawei did not expect that the partner cloud would attract so much attention from its carrier customer around the world. Zhang Yuxin commented, "If Huawei didn't support the efforts, then who would serve our carrier customers? So, we set up the HUAWEI CLOUD BU in 2017."

30+ Years of Accumulation Yields Most Complete Tech/Cloud Profile

HUAWEI CLOUD has accelerated its global cloud layout with centers opening around the world – outpacing other public cloud vendors in scale of build. For example, Huawei opened its South Africa region in 2018, which is the first node in the region to be opened by any provider. This is different from the global layout of many public clouds. Each node added to the HUAWEI CLOUD layout outside China helps to solidify its position. Su Liqing had the following to say:

HUAWEI CLOUD has developed rapidly. This year alone, we opened centers in Thailand, Russia, South Africa, and Hong Kong. Huawei had plenty of practice when it comes to building data centers with accumulation in business processes and IT. Huawei has developed a global network featuring impressive reliability backed by decades of proven expertise in builds and into day - two operations and maintenance.

These high - value accumulations have been wrapped into the services HUAWEI CLOUD offers. HUAWEI CLOUD has inherited all the capabilities in global data center operation, network operation, management capabilities accumulated in processes and IT systems, and system operations. Mr. Su added:

2000 was an important year in data center build - out for Huawei, when its globalization strategy came into swing. Huawei had already achieved a rather strong presence worldwide by that time, with operations in more than 170 countries and regions. We had a sort of slogan everyone would

On November 15, HUAWEI CLOUD announced opening of its South Africa Region during Africa Com 2018

say, which as 'Wherever Huawei employees go, we build IT'.

In this global data center layout, Huawei boasts eight cloud service centers able to keep response down to the 100 - millisecond range and featuring fast application deployment capabilities – delivering a uniform experience across the scope of the global system. HUAWEI CLOUD is the only provider that can claim global coverage. It has achieved this because it has continuously invested in builds.

At HUAWEI CONNECT 2018 held in Shanghai on October 12 of 2018, journalists asked about the impressive global presence of HUAWEI CLOUD. Zheng Yelai, Huawei VP and President of the Cloud BU, answered with some humor, "We navigate the 'seven - seas' all day, every day. We are everywhere, thanks to the decades of development that Huawei underwent and the established presence in 170 countries and regions around the world. More than half of the To B business revenue comes from markets outside China. The advantages of the globalized Huawei are naturally inherited by HUAWEI CLOUD."

In an interview from the People's Daily, Zheng Yelai added, "The cloud service itself has no boundaries. The key to the deployment of cloud services outside China is to achieve both globalization and localization. Globalization means establishment of a global network to provide customers with various low - latency and high - reliability cloud services. Localization means compliance with local laws and regulations and regulatory requirements to adapt to the market environment." Huawei has a full understanding of the China and international market.

Zheng Yelai, Vice President of Huawei and President of HUAWEI CLOUD BU delivering a speech at HUAWEI CONNECT 2018

Enterprises Benefit from the 30+ Years of IT Accumulation

Enterprise customers get more than just the resources and services they need when choosing HUAWEI CLOUD, they can also avail themselves of the rich experience in implementing IT architecture changes and IT evolutions.

In the three phases of Huawei's R&D, the initial model is a software - driven IT product architecture running ERP and CRM software. The infrastructure must comply with the constraints of the software package architecture to implement evolutions. The second stage is the concept of private cloud, which was able to significantly improve resource efficiency with the decoupling of IT and applications.

The third phase is the public cloud phase, or the multi - cloud architecture. This phase means that the IT infrastructure is mainly provided by public cloud service providers. The focus of enterprise IT is to improve service efficiency and focus on the digital transformation efforts at the enterprise.

These three phases now co - exist. Enterprise can choose what they want. If they want equipment, we give it to them. If they want their own cloud, we can do that too. If they want a mix, we got that too. We are constantly improving on each offering as we frequently think about what we are doing right and what we are doing wrong and continue to invest into technological accumulation. We integrate all this into HUAWEI CLOUD. We are fully confident of our future as we continue to grow with our customers.

Huawei's global supply chain has built a visualized microservice - based platform featuring high levels of automation. Huawei delivers about one million base stations every year and has grafted in AI to improve acceptance processes. Su Liqing said: "Huawei's businesses are complex, but everything runs on HUAWEI CLOUD, including consumer, R&D, supply chain, and manufacturing services. This means we

can draw on our own experience in running all these aspects of our business and showcase that for enterprises in their own digital transformations. We demonstrate the viability of our offerings in our own global operations."

In another example, Huawei designed a ROMA platform for enterprise data integration, application integration, and message integration that runs in the enterprise service bus (ESB). Huawei has transformed it into an automated integration platform. For IoT that must integrate different vendors, designs, and technologies, the ROMA platform produces the best results. Mr. Su commented: "This is a typical solution that Huawei can tune to the needs of enterprises. The capabilities of the ROMA platform have been added to the HUAWEI CLOUD."

Enterprise services are diversified, which means they have different requirements when it comes to the cloud. HUAWEI CLOUD not only provides resource - based services, but also enables enterprises to apply and implement services in complex environments.

What Makes the Full - Stack of HUAWEI CLOUD Different?

Huawei launched its Ascend 310 and 910 artificial intelligence chips at HUAWEI CONNECT 2018. These chips can be used across the entire scope of cloud, edge, and device. Huawei, usually keeping pretty quiet in terms of its chip development, suddenly burst into the spotlight with its AI chips. Zhang Yuxin had this to say:

Release of Ascend 310 chip at HUAWEI CONNECT 2018

Huawei's launch was big news for the industry. We started to invest in the AI chip in 2016, but we had been investing heavily in chips for years before that. For example, the SD100 iNIC released during HUAWEI CONNECT 2018 took five years from design to mass production. This is one difference between the full stack of HUAWEI CLOUD and those of other cloud computing companies. As the underlying support of the 'full stack', the chip technology is one of the key points and Huawei is the only one able to home grow its own chips, systems, software, and everything else.

The full stack of HUAWEI CLOUD includes chips, chip enablement, training and reasoning frameworks, and application enablement.

Release of ModelArts at HUAWEI CONNECT 2018

HUAWEI CLOUD released the AI full - process development platform ModelArts in its Enterprise Intelligence suite. ModelArts provide users with a faster AI development experience. Recently, Stanford University released the latest DAWNBench test results for the Huawei platform with parameters set to ResNet50 - on - ImageNet; 93% or above. HUAWEI CLOUD EI ModelArts ranked No. 1 in the world.

Through HUAWEI CLOUD, enterprises can find all the required services they need and not limit themselves to piecing together this and that hardware, software, and algorithm. Huawei masks all the underlying tech and provides everything customers need in as - a - service packaging, including a full catalog of AI.

In Zhang Yuxin's view: "Huawei's full stack includes the complete technical accumulation amassed over the past 30 years. We accumulated capabilities in software and hardware integration with our focus on the carrier business in the past. We always held to the reasoning that software capabilities will focus on architecture and algorithm, while hardware capabilities will focus on architecture and chips. In this sense, the essence of our business has not changed – we just added a cloud arm. Huawei has grasped the most basic core values of architecture, algorithms, and chips, and the cloud service platform is the vehicle that carries it all."

This understanding is impressive. In Internet, the full stack does not mean much to end users because they cannot perceive it nor do they need to. However, in the enterprise cloud, customers need to see the tangibles, such as the data centers and compute, storage, and network resources. They also need to know the soft resources are there, things like O&M and security assurance. Full - stack capabilities become meaningful to enterprises because they have these concerns. Customers need to see the capabilities of each service provider, including product capabilities, solution capabilities, and O&M capabilities.

In addition to the technical line providing the industry unique full - stack capabilities starting from chips, the horizontal capabilities are also impressive. Zhang explained that the full - stack service runs through the entire enterprise business process. The value is dispersed throughout the entire enterprise with the capability to help them solve any unexpected problems in the entire life cycle of their enterprise applications.

Huawei has invested in basic technologies, future - oriented technologies, and customer - centric technologies over the long haul. It has been able to integrate computing, storage, and network technologies while accumulating a large number of algorithms, chips, and software and hardware capabilities. All these capabilities have sharpened the benchmark services and products of HUAWEI CLOUD, including high - performance cloud infrastructure services, the enterprise intelligence suite, and developer - oriented DevCloud services. Huawei has accrued years of practice in compliance and global top security authentication services in addition to database services.

The above details of HUAWEI CLOUD coming into being embody the idea of mastering the sword and the years of need accumulation as mentioned at the start of this piece. HUAWEI CLOUD does not seek to viciously competing with peers because it is focused on keeping its efforts directed on what customers need and not on what the competition is doing.

HUAWEI CLOUD solves customer requirements in the simplest and most direct way possible, inheriting the 30+ years of expertise. Find out how your organization can rise with HUAWEI CLOUD and Grow with Intelligence.

The Smart Future Is Here:
Winning the Next Decade on HUAWEI CLOUD AI

■ by Cai Fangfang

On October 10, 2018 at the HUAWEI CONNECT summit, Huawei launched its Full-Stack, All-Scenario AI Solution as Huawei's formal introduction to the AI scene. Huawei's Rotating CEO Eric Xu described Huawei's business strategies in the development and adoption of AI technology.

Huawei's AI strategy is based on continuous investment in cutting - edge research and finding the newest talent to help develop the newest technologies. The Full - Stack, Al l- Scenario AI Solution utilizes state of the art resources to provide a reliable, groundbreaking solution, helping to develop a global ecosystem and allowing customers to harness the power of AI.

Full - stack is designed to improve efficiency vertically throughout the profile, and comprises chips, their enablement, and training and inference framework. All - scenario refers to horizontal frameworks, meaning this solution is perfect to improve deployment environments such as public cloud, private cloud, edge computing, IoT devices, and so on.

The Full - Stack All - Scenario AI solution is powered on HUAWEI CLOUD. Although the cloud service brand was established just a couple of years prior, it inherits the most complete tech portfolio in the industry forged from 30+ years of accumulated expertise in serving carrier, enterprise, and consumer customers by its parent company. Providing key services in software, hardware, and solutions, has caused Huawei to become a key industry pillar, and HUAWEI CLOUD BU one of its star players.

The general manager of EI service products at HUAWEI CLOUD, Jia Yongli said, "From day one HUAWEI CLOUD has brought the advantages of full-stack to everyone". With full - stack technology at its core, this past year alone HUAWEI CLOUD served 8 major industries in over 200 enterprise projects software and hardware integration and for all infrastructure layers. It combines industry knowledge with cutting - edge AI technologies to help such industries as transport, logistics, and manufacturing gain the competitive advantages they need to stay at the top of their game.

▌ All - Around Improvements in AI Capabilities on HUAWEI CLOUD

Based on the new Ascend chip, HUAWEI CLOUD upgrades the performance of the infrastructure at all layers, from the bottom layer to software framework to networks, creating a solid foundation on which to run AI services.

First tier evolution: bottom-layer compute enhancements

Computing power, algorithms, and data are the three cornerstones of AI. Currently enterprises produce vast amounts of data from cleaning, marking, and training, all of which cause a long delay. In most cases, computing resources are scarce for such tasks.

The foundation of computing power is chip. At the HUAWEI CONNECT 2018 summit, Huawei introduced two AI chips, the Ascend 910 and 310, which created quite a stir. These two chips leverage Huawei's unique "Da Vinci" architecture.

Ascend 910 belongs to the Max series and features ultra-high computing power for cloud scenarios. It is the world's largest AI chip to run on 7 nm technology, with its half-precision computing capability reaches 256 TFLOPS (tera floating - point operations per second), double that of the 125 TFLOPS rating of NVIDIA V100, and has a maximum power consumption of 350 W. The Ascend 910 chip will be launched in the second quarter.

Ascend 310 is a Mini series chip that uses 12 nm technology and provides efficient computing and low power consumption. It features 16 TFLOPS computing power, a maximum power consumption of only 8 W, and an integrated 16 - channel HD video decoder. The system on a chip (SoC) is the industry's most powerful SoC in edge computing.

It is widely known that Chinese cloud vendors do not produce their own quality chip, instead buying from third - parties. Some vendors are in development, but it is still way too early for such chips to enter service. Huawei is already using its Ascend 310 chips in its delivery of cloud services, becoming the standard configuration in its high - end VMs, benefiting users with 16 times the inference power.

High - Performance Computing H6 ECSs now come standard with 16 TFLOPS AI inference capabilities. For those requiring even higher levels of technological firepower, HUAWEI CLOUD also provides 512 TFLOPS computing services in AI - enhanced VMs and containers. In training scenarios, HUAWEI CLOUD provides bare - metal versions of VMs. A single node can provide a maximum of 2 PFLOPS of computing capability.

In addition to the H6 service, HUAWEI CLOUD also provides Ai1, At1, and Physical.At1 services, all of which are powered on the new Ascend AI chip technology. With the groundbreaking series of cutting - edge cloud services leveraging these chips, HUAWEI CLOUD has made its strong presence known, leaving vendors in the race to catch up.

Jia Yongli noted, "Computing power has become a significant business focus for Huawei. It is definitely not the only competitive advantage of HUAWEI CLOUD for artificial intelligence, but rather one of countless advantages."
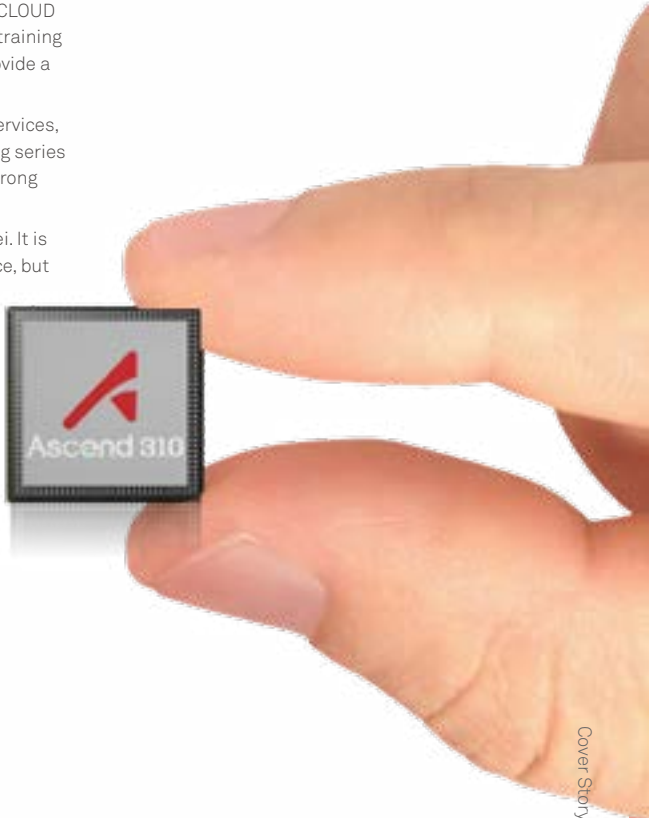
Second tier evolution: full platform training and inference framework

On top of the compute/operator advantages, Huawei also released a complete software stack to yield the unique end - to - end optimizations that come from a truly full - stack portfolio.

Most AI computing algorithms need to be trained on the cloud end before being deployed at the terminals. However, many vendors do not provide chips for terminals, and likewise chip vendors do not provide such cloud computing services. Most AI application data needs to be migrated between training and deployment. For enterprises, this puts them in a precarious position, but more often than not, it is a waste of time, money, and effort.

The conversion of underlying layers covers many algorithms and operators, meaning that despite its initial appearances that the system is running smoothly, the efficiency is low. Huawei hopes to make this easier by implementing a single framework covering public cloud, private cloud, edge computing, and remote devices that can run in a variety of AI environments. It ensures AI can be set once and run without further configuration, making life easier for the developers.

CANN and MindSpore constitute the core basic framework of the Full - Stack All - Scenario solution.

The operator library CANN provides optimal development and operator performance, including the Tensor Engine, which uses uniform DSL interfaces, as well as automatic operator tuning, generation, and optimization. In the Tensor Engine, Huawei uses the TVM concept proposed by Chen Tianqi and others. Take the Reduce sum development case as an example, using CANN improves the development efficiency by three times.

MindSpore is an AI framework proposed by Huawei for unified training and inference that supports deep, reinforced, and enhanced learning. It can flexibly adapt to different resource budget deployment environments, provide consistent development experience at the device, edge, and cloud ends, and support all mainstream machine learning and deep learning frameworks (including TensorFlow, PyTorch, PaddlePaddle, Keras, ONNX, and MXNet). It is due to be released in the second quarter of 2020, at which time Huawei will also introduce the device's deep learning framework. The size of the framework is only 2 MB, and the memory usage is less than 50 MB when MindSpore is running.

Together, CANN and MindSpore form the core framework for the Full - Stack All - Scenario solution.

Third tier evolution: one - stop AI application development platform

In addition to the scarce and expensive computing power, the AI industry's large-scale development is hindered by low development efficiency. The entire process of marking, training, and deploying an application is both time - consuming and labor - intensive. To solve this problem, Huawei launched the ModelArts platform.

ModelArts is a one-stop development platform for AI developers. It provides data preprocessing and semi-automatic marking for massive volumes of data, large-scale distributed training, automatic model generation, model optimization, and on - demand deployment of device - e - cloud models.

In addition, ModelArts can provide visualized management of the entire lifecycle of AI development, covering original data, annotation data, training jobs, algorithms, models, and reasoning services. It manages tens of millions of models, data sets, and services, generates source tracing diagrams without manual intervention, and selects any model to find the corresponding data sets, parameters, and models. In particular, the training comparison result function is highly acclaimed, even among Huawei internal developers.

MindSpore architecture
MindSpore 架构

ModelArts: A Faster Inclusive AI Development Platform

ModelArts Yields Four Main Areas of Acceleration

Fast data preparation

Data annotation and preparation are the most painful tasks for AI developers. 70% of the overall development time using conventional methods was occupied by data preparation. ModelArts has a built - in AI data framework, which uses a groundbreaking AI mechanism and iterative training platform to manage data and solve the problem of data volume. For scenarios with a large amount of data, ModelArts improves data annotation and preparation efficiency 100 - fold.
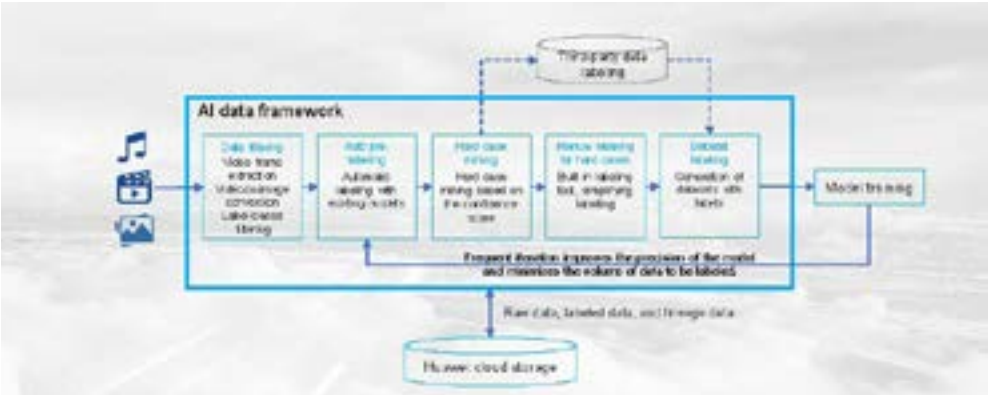

Fast learning

ModelArts provides an automatic learning function, supports automatic model design and parameter adjustment, and allows developers to quickly roll-out their applications.

Another key component is MoXing SDK, which supports rich model libraries, optimization algorithms, and various tool libraries, allowing developers to compile and import algorithm code. ModelArts supports automatic parameter optimization as well as training, verification, prediction, and model export. Developers only need to write a set of code and ModelArts can automatically implement its roll - out to single, multiple, and distributed nodes.

Perfect even for AI beginners who want to quickly generate models, ModelArts also provides algorithm models such as RestNet_50, Faster_RCNN, and SegNet_VGG_16 that cover most common application scenarios. All preconfigured models are trained using open source data sets and have a leading model precision. Training algorithms can be implemented with just one - click, where you only need to configure the data path, log output path, and Hyper Parameter automatic selection to start the training. In the future, more algorithm models will be launched to suit a variety of demanding scenarios.
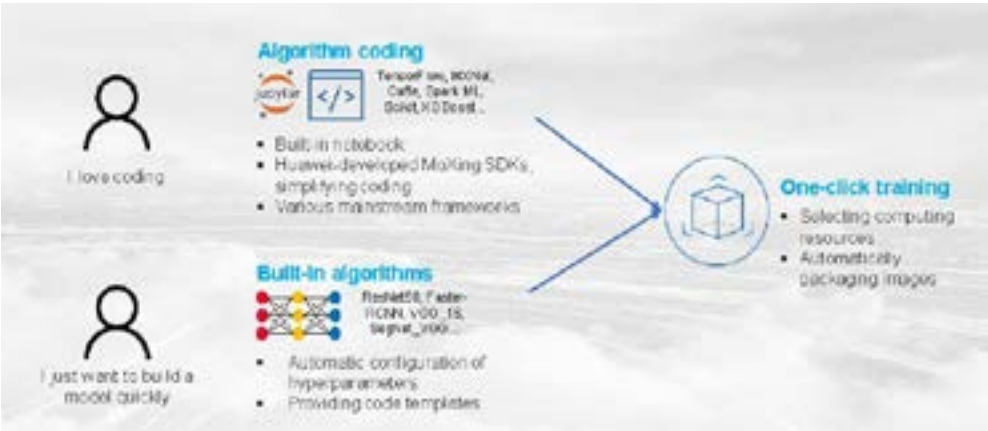
Fast training

To tackle the challenge of time - consuming model training, ModelArts uses the same model, data set, and equivalent hardware resources with its state of the art optimization technologies, including cascading hybrid parallel technologies, to reduce the model training time by half.

For many carriers, large - scale cluster deployment where large amounts of data needs to be synchronized is a big issue. Currently, the best achievements of the distributed training of big data sets have been that of the Fast.ai team operating on Amazon's cloud service, who completed training within 18 minutes using 128 GPU instances simultaneously. However, lab results show HUAWEI CLOUD EI can use the same type of node to complete the same tasks within 12 minutes.
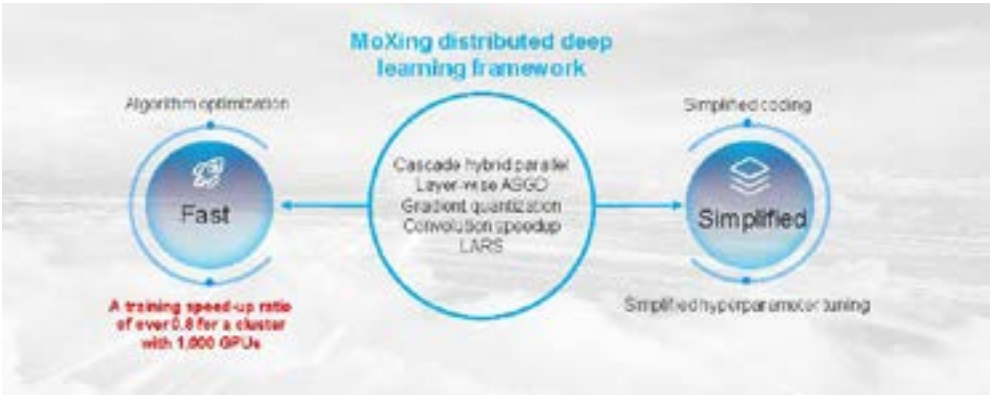
Fast rollout

For scenarios where AI is largely adopted, model deployment is very complicated, time - consuming, and labor - intensive. For example, in the Smart Transportation field, updated models need to be rolled out to cameras of different specifications and vendors simultaneously.

Using this example, ModelArts can push models and updates to all edge and end devices with just one - click. Cloud deployment also supports online and batch inference to meet requirements of multiple scenarios, such as large concurrency and distributed scenarios.
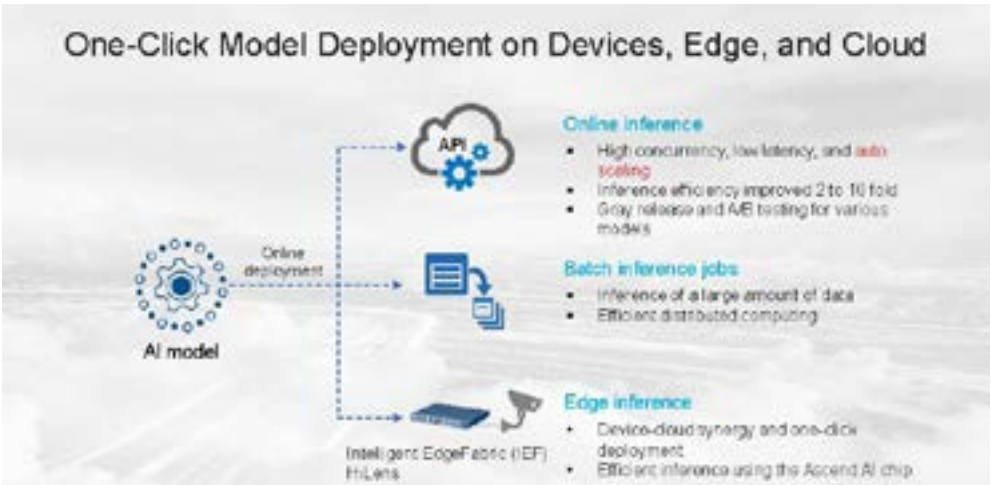
Huawei HiLens, a Development Tool Purpose Built for Visual Intelligence

HiLens is composed of an AI capability camera and a cloud development platform that provides powerful computing and storage space. It can implement 100 - frame processing capability and millisecond - level face detection, meeting the requirements of large image processing.

In addition, HiLens is a lightweight container that features low resource usage, low network bandwidth, and fast download, which reduces the difficulty of real - time system processing.

HiLens provides a complete set of secure and reliable one - stop skill development, deployment, and management services for individual developers, enterprises, and device manufacturers. It can seamlessly connect to customers' industry devices and improve development efficiency and productivity.

HiLens provides rich models and skills for control codes and models. ModelArts can first train any AI models, which then is implemented as the basic development component for AI functions, which in turn are then directly deployed on any device using the Ascend chip. HiLens is compatible with other mainstream framework training models. When deployed on the device side, these third - party models are automatically converted into the MindSpore model to provide optimal performance and interoperability.

For conventional AI implementations in visual intelligence use cases, different processing methods are advantageous for research and development than other scenarios. However, problems occur in complex and demanding application environments. For example, the recognition rate of the face recognition system for machine vision detection can reach as high as 95% in ideal environments, but when tested in the field, the recognition rate of visual detection is greatly reduced. HiLens provides online training device - specific models online based on the unique deployment data of each device, improving model precision and enhancing user experience.

ModelArts and HiLens went live on HUAWEI CLOUD EI platform on the opening day of the HUAWEI CONNECT 2018 summit.

In addition to the groundbreaking developer-oriented tools listed above, HUAWEI CLOUD EI's entire bucket is much more comprehensive than it was last year.

Currently, HUAWEI CLOUD EI has launched 142 functions from 45 services. For solutions, HUAWEI CLOUD EI provides three types of services: General API, high-level API, and pre - integrated. Customers from wide - ranging technical backgrounds can find something suitable to them and their demanding service environments. Data scientists, data algorithm engineers, IT developers, and even business personnel without AI background can find easy - to - use solutions covering most cloud scenarios.

HUAWEI CLOUD aims to build an all-around AI ecosystem that streamlines underlying hardware and upper-layer software applications, developers, and industries. Further it does not focus solely on ideas, strategies, or slogans. This is the foundation of what HUAWEI CLOUD has done and continues to do.
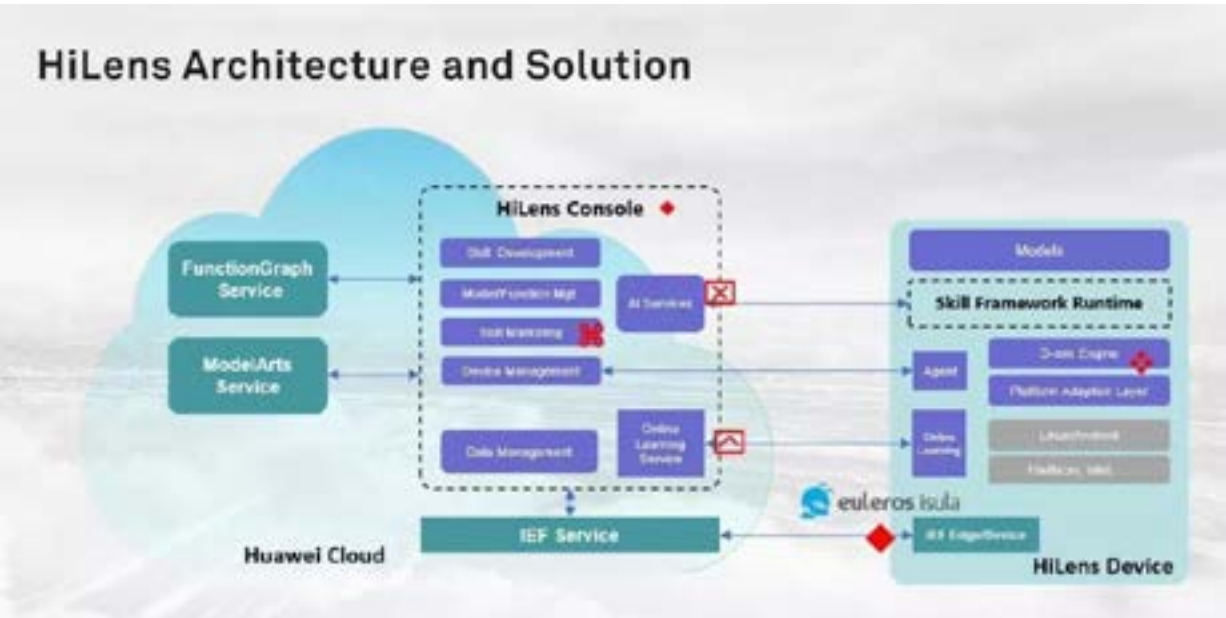
Intelligent Twins for Urban Management Applications in Huawei EI Suite

The Huawei AI Full-Stack All-Scenario Solution was launched at HUAWEI CONNECT 2018 and is generally available for commercial use. ModelArts, HiLens, and other developers from the full - stack dimension were also exhibited, attracting large interest from developers. Based on Huawei Ascend series chips and mainstream heterogeneous computing components, the Atlas intelligent computing platform has implemented AI capabilities in cloud, edge, and device through various product forms, such as modules, boards, small cell, and all - in - one machines.

At the same time, HUAWEI CLOUD EI industry solutions were released and on display. These solutions cover many industries such as public utilities, transportation, finance, logistics, education, and retail. HUAWEI CLOUD EI has successfully completed projects with major carriers, including Microsoft and Intel, and many enterprises specializing in industry intelligence have demonstrated the intelligent transformation to their services thanks to HUAWEI CLOUD EI.

In September last year, HUAWEI CLOUD launched their Enterprise Intelligence (EI) services, including basic platform, general services (big data, visual cognition, and voice semantics), and industry - specific solutions. Later in 2018, HUAWEI CLOUD EI Enterprise quickly launched its Smart Water, Smart Manufacturing, Smart Electricity, Smart Transport, Smart Finance, and Smart Retail solutions, making them available for commercial use.

By integrating industry know - how with AI, HUAWEI CLOUD AI acts as the catalyst for industrial upgrades in three main scenarios: repetitive and high - volume work, high-value work, and multi - domain collaboration. By specializing in these domains, HUAWEI CLOUD AI can break through barriers to help improve efficiency across industries, transfer expertise from experts to common users, and break the limits of human intelligence.

For repetitive or high - volume workloads, HUAWEI CLOUD EI services help identify massive sets of frequently-used data in enterprise practices. For example, two HUAWEI CLOUD EI services – DLS and Image Search – have helped TukuChina automatically import and cross-check hundreds of thousands of copyrighted images and tens of millions of images from the Internet every day, with an accuracy of 99%.

For high-value workloads, AI that is loaded with expert experience or industry insights can act as assistants to experts. The HUAWEI CLOUD EI team has been working closely with KingMed Diagnostics, a company that provides medical diagnostic testing. By leveraging AI technologies, KingMed Diagnostics made breakthroughs in the pathological examination of cervical cancer, improving the reliability of in - house diagnosis with a sensitivity (true positive rate) of over 99% and a specificity (true negative rate) of over 80%.

For tasks that require multi - domain collaboration and involve many parameters, complex dependencies, and high dimensions, such as industrial production and urban governance, AI brings with it new ideas and methods. HUAWEI CLOUD AI works as a passageway to a new world of groundbreaking technologies that are, for most carriers

and small - scale businesses, unattainable due to the prices.

The HUAWEI CLOUD EI City Intelligent Twins project is a typical example of the multi - domain collaboration scenario. Based on digital twins, AI collaborates with multiple technologies, such as cloud, big data, edge computing, and Internet of Things (IoT), to achieve a complete closed - loop system covering data generation and analysis. Through the powerful computing power of the digital world, the physical world is more intelligent.

At present, City Intelligent Twins continuously explores efficient resource scheduling and configuration in transportation, emergency services, environmental protection, water conservation, and energy to solve more urban problems. When put into practice, this solution improves efficiency, reduces city - wide energy consumption, and improves environmental protection.

Li Qiang, the director of the traffic police department of Shenzhen Municipal Public Security Bureau, shared several figures of real data that demonstrates the significant changes brought by HUAWEI CLOUD EI City Intelligent Twins.

- Since its adoption in the first half of 2018, HUAWEI CLOUD EI City Intelligent Twins helped Shenzhen traffic police deploy AI applications that monitor traffic violations, such as using mobile phones when driving and not wearing safety belts, as well ensure that those accused successfully face law enforcement. The traffic police law enforcement volume in Shenzhen increased by 15%.

- Shenzhen traffic police are deploying the EI traffic intelligent TrafficGo solution at 43 intersections in the Bantian and Longgang districts in Shenzhen. This solution has shortened the average waiting time of cars at key intersections by 17.7% when the online signal configuration is piloted.

- Since the construction of a new operation command center, the emergency response time of Shenzhen Traffic Police is shortened by 67%.

Another case of HUAWEI CLOUD AI technologies being deployed in demanding situations is that of Shenzhen Airport. This airport has a record over 1,000 flights a day, foot traffic of over 120,000 passengers, and a direct boarding rate from terminal (bridge rate) of approximately 70%. Comprehensive technology was needed to keep up with the demands, and +AI is used to implement intelligent reconstruction of the airport's legacy infrastructure. Using Gantt charts and AI automation, the bridge rate is increased to 80%, an increase of 10%, which means that there will be 4 million people who do not need to take a bus to get to their seat. At the same time, Shenzhen Airport is working with facial recognition to achieve one-stop customs clearance, aiming to reduce the queuing time of passengers by 15%.

All Eyes on HUAWEI CLOUD

In the future, migration to the cloud will become the norm. Because AI requires massive computing resources and storage space, cloud will be the only environment for most enterprises to explore artificial intelligence. "Cloud + AI" is the driving force behind industry transformation.

CTO of the HUAWEI CLOUD BU, Zhang Yuxin, believes that the advent of the Cloud 2.0 era is significantly different from the Internet development of the past decade.

First, he points the trend of how enterprises are actively moving to the cloud, especially when migrating key applications. Whereas in the past, cloud has been used only in personal entertainment and consumption fields, in the Cloud 2.0 era, cloud has entered the production field.
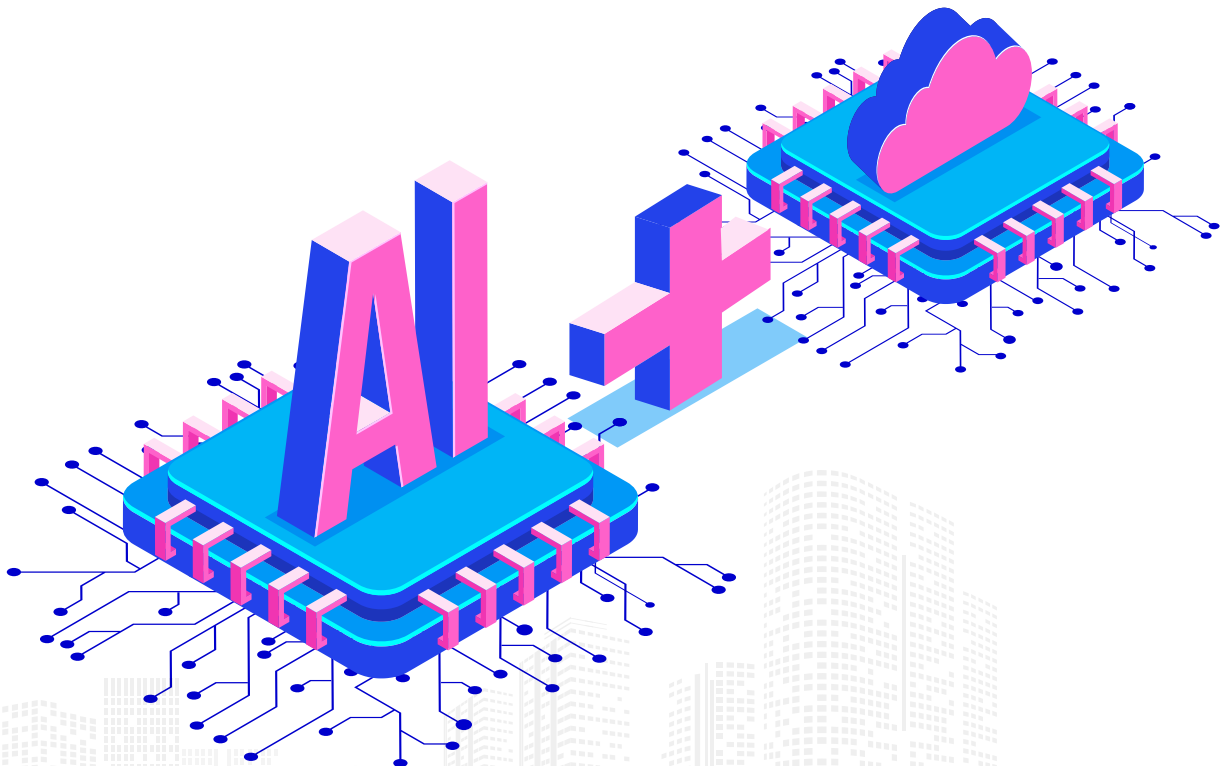
Second, he notes how the frequency and severity of bottlenecks that occur in traditional Internet applications are no longer acceptable for large enterprises.

Previously, internet applications mainly relied on traffic dividends, meaning that business growth correlated to the amount of traffic. However, the traffic dividend will eventually have a ceiling, and the traffic dividend model is easy to copy, something other businesses are likely to adopt. In the Cloud 2.0 era, the core of new Internet services has caused a movement from traffic dividends to data dividends.

Zhang Yuxin believes that in the Cloud 1.0 era, technical keywords, such as distributed, automated, and large - scale resilience, were used to resolve customer problems, meaning that problems were categorized into one of these three pockets and customers were relatively naïve to any alternatives. However, this is not the case in the new era because such troubleshooting is far from enough. In addition to security and reliability, enterprise applications and Internet applications require intelligent intelligence, big data, and technology and system architecture. Cloud 2.0 is the time for AI, for intelligent industries and carriers to find value in their vast volumes of data.

At HUAWEI CONNECT 2018, many technologies and their applications were demonstrated. The O&M platform and tool framework of the chip, hardware, data center, basic cloud service, and application development platform were developed and put on display for the whole world to see. Similarly, innovative basic AI model algorithms together with industry-oriented industry solutions quickly became the talk of the industry, and will no doubt continue as Huawei keeps it foot on the accelerator. HUAWEI CLOUD has made many technical breakthroughs to cope with the challenges of enterprise intelligence of today, and tomorrow.

In the Cloud 2.0 era, many surprises await us. HUAWEI CLOUD is here to guide you through the wilderness.

Adopting IaaS in Cloud Service Profiles

■ By Sun Haofeng

IaaS – What You Need to Know

Before we look into the advantages of IaaS from the customer's perspective, it is necessary to define the ins and outs of IaaS. Cloud providers leverage IaaS products to provide users with all aspects of IT infrastructure, including computing, storage, networks and other IT essentials, allowing users to effortlessly run and deploy software, OSs, and whatever they may need. By their very nature, any IaaS product means users do not need to purchase equipment or manage data facilities, but simply need to decide on the IT design, storage method, and application deployment types. What's more, IaaS allows users to choose and implement between multiple network applications, such as firewalls, routers, and load balancers, making deployment and installation cheaper than ever before.

IaaS provides users with much - needed computing, storage and network resources, as well as OSs and databases, providing a reliable infrastructure that supports current and future business needs and applications. IaaS provides services from the following aspects: reliability and performance, full-stack capabilities, and enterprise services.

Reliability and Performance

If you look at companies who have successfully deployed cloud services in the form of IaaS or Software as a Service (SaaS), the underlying factor for customer attrition is solid user experience and service uptime. The cost and scalability of one product can be discussed, but ultimately, if said product cannot provide consistent performance, then the user is going to choose a different provider. This is particularly applicable to enterprise users, who will wander if basic availability and quick response of key applications cannot be ensured.

For most products, general-purpose application systems, such as OSs and databases, provide more - or - less the same capabilities and functions. Needless to say it can be frustrating for customers trying to assess the differences between products. The key to finding the product that really stands out in terms of performance and reliability stems from the provider's computing, storage, and network capabilities and the interoperability between software and hardware. To produce a service that comprises these strong features, cloud providers must have a deep understanding of the cloud, pipe, and device. That being said, the accumulation of such knowledge does not happen overnight.

Full - Stack Capabilities

The rise of interconnected terminals, mobility, Big Data, Internet of Everything, and AI means traditional enterprises are faced with the challenge of transforming digitally. Enterprises need to consider migrating their conventional business to the cloud, and also develop innovative distributed applications on the cloud through emerging technologies. The top IaaS service provides flexible full - stack cloud platforms featuring long-lasting performance that support chips, hardware, software, and other solutions at all layers. The full-stack cloud platform will act as a catalyst for future business, helping users leapfrog their competitors whose infrastructure cannot keep up.

Enterprise Services

One of the most overlooked services provided by IaaS, enterprise services provide a wide range of cloud services to users who want to gain access and support to the cloud. Enterprise services using IaaS products are different from conventional products sold from a vendor, because the provider is selling the full - range of services, not just a product. That is to say with a vendor, it is a one-time purchase only each time, but with a provider, it's a longer process involving solutions tailored to the individual customer. This aspect is especially relevant to enterprise users whose high requirements are more likely to need the support found within the cloud.

One important requirement of enterprise users with cloud access is access to industry know - how from Huawei and other industry experts that can help facilitate current and future business. Equipped with powerful online and offline services, these services allow users the ability to share their own experience and business insights and offer a reliable support platform for customers worldwide, providing a strong online presence.

Finding a product that excels in all of these aspects is difficult for most enterprises, but it is a walk in the park for HUAWEI CLOUD. With its impressive back catalogue of successful deployments and industry partnerships across the globe, HUAWEI CLOUD is the obvious go - to for any and all enterprises looking to scale out digitally at a competitive price.

Ever since Amazon's successful release of Infrastructure as a Service (IaaS), more and more competitors have followed suit and invested in the IaaS field. Such is the current competition among cloud providers that, if a customer is not happy with one provider, they can simply pick - and - choose between countless others until they find a more suitable option. For these cloud providers in a world where the customer is in the driving seat, providing high - quality IaaS services carries the problems of time costs and missed opportunities; for the customer, they simply want an appropriate solution for today and tomorrow. Likewise, they want an answer to the question: Which IaaS is best suited to me and my business environment?

HUAWEI CLOUD and IaaS

Huawei has leveraged its 30+ years of accumulated technology, innovation, and expertise in the IT infrastructure field to offer a most reliable product portfolio in the industry. Specializing in communication field comprising intelligent terminals and storage, networks, and computing fields, HUAWEI CLOUD has been the go - to cloud provider for many consumers, operators, and enterprises alike. Now, Huawei is

transferring its technical insights to HUAWEI CLOUD, providing a one - stop platform to help promote the technical innovation of its customers.

Below lists a detailed history of Huawei's achievements in computing, storage, and networks.
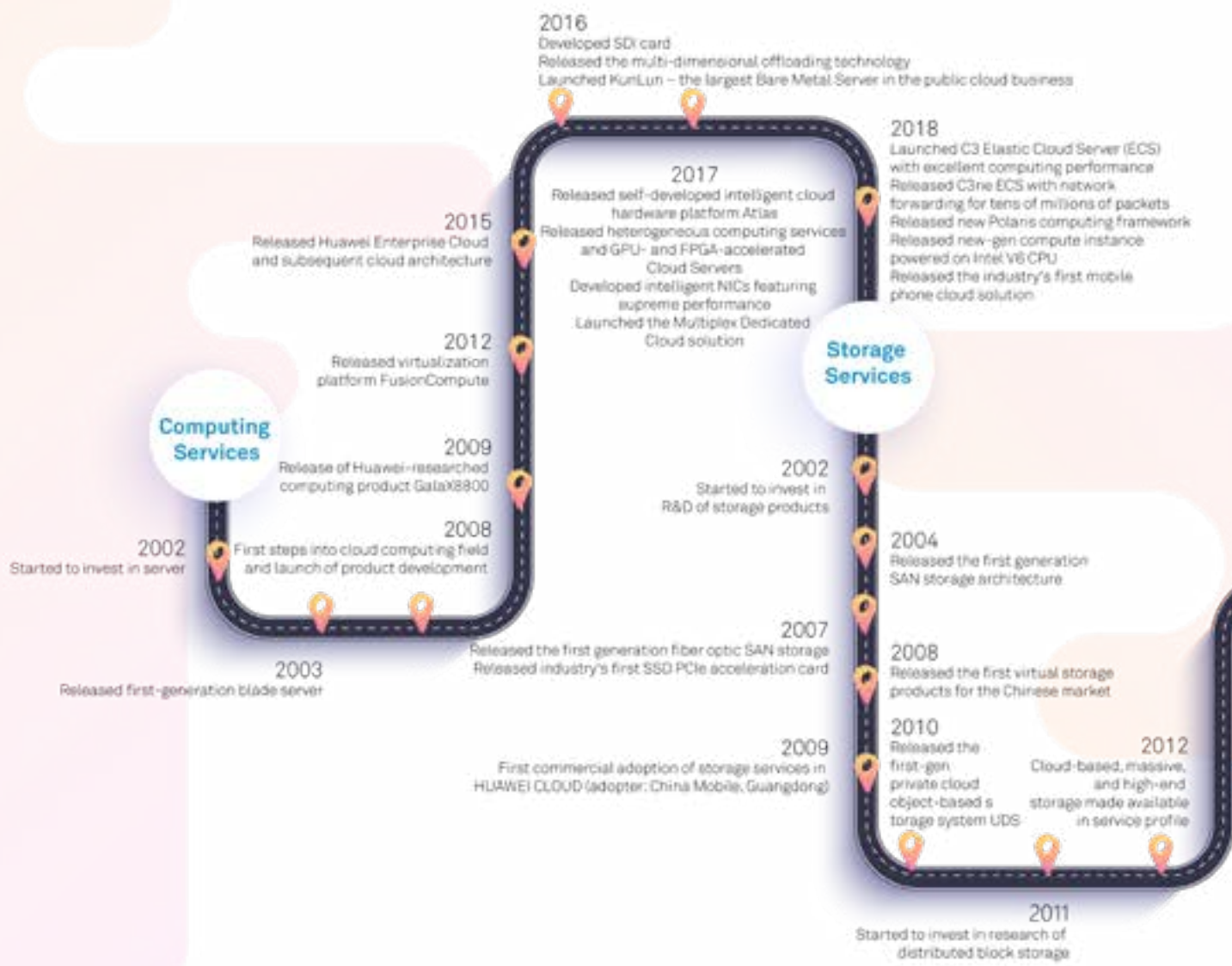
Rising from the Strong Performer to Leader Quadrant

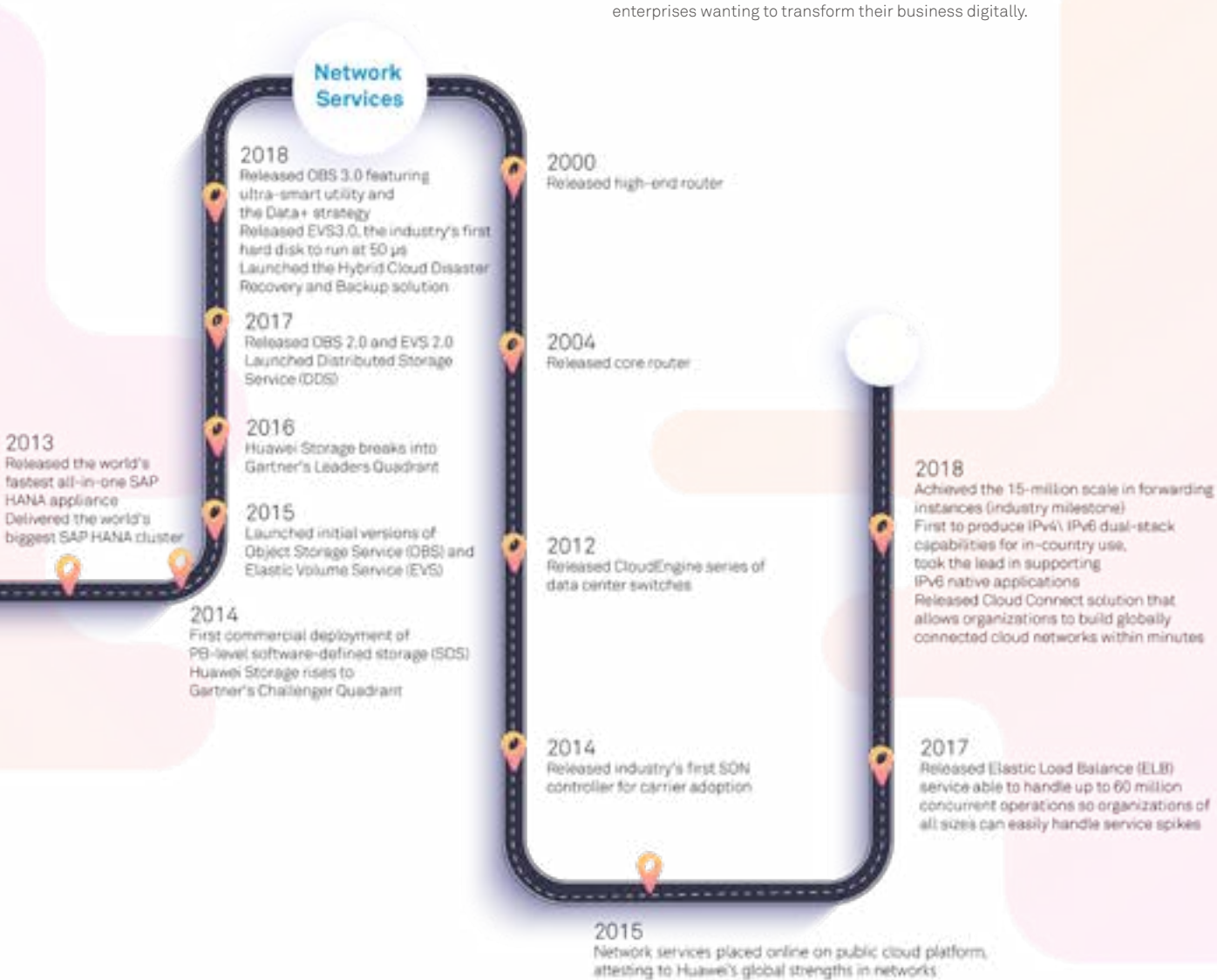Forrester, the global research authority, recently published a report titled The Forrester Wave™: Full - Stack Public Cloud Development Platforms In China, Q3 2018, which evaluated the business, product, and market strategies of public cloud companies operating in China. It reported HUAWEI CLOUD is an industry leader in terms of technical and full-stack product capabilities covering all IT layers, in particular the localization services and ecosystem. This is a big step up from the 2016, where HUAWEI CLOUD was reported as a strong performer. Huawei has stepped into the spotlight with its achievements in the marketplace and recognition from internationally renowned research firms.

Since 2016, HUAWEI CLOUD has released 120 services covering 16 key fields, as well as over 60 solutions, and as of 2018, it has released 872 applications. What's more, high efficiency in product development and application roll-out has caused the market revenue to increase at a year - on - year rate of 700%. All of which is evidence that, after 30 years of striving to be the best in the IT industry, Huawei is reaching its goals.

Reliable. This word is most associated with Huawei and its products. Being a leader in chips, hardware and software integration, operating systems, security, and database development means customers can place their full confidence in the full - stack capabilities of the Huawei portfolio. With a comprehensive back catalogue of innovative products and successful use cases, Huawei is the obvious choice for enterprises wanting to transform their business digitally.


2016
Developed SDI card
Released the multi-dimensional offloading technology
Launched KunLun – the largest Bare Metal Server in the public cloud business

2018
Launched C3 Elastic Cloud Server (ECS) with excellent computing performance
Released C3ne ECS with network forwarding for tens of millions of packets
Released new Polaris computing framework
Released new-gen compute instance powered on Intel V6 CPU
Released the industry's first mobile phone cloud solution

2017
Released self-developed intelligent cloud hardware platform Atlas
Released heterogeneous computing services and GPU- and FPGA-accelerated Cloud Servers
Developed intelligent NICs featuring supreme performance
Launched the Multiplex Dedicated Cloud solution

2015
Released Huawei Enterprise Cloud and subsequent cloud architecture

2012
Released virtualization platform FusionCompute

Computing Services

2009
Release of Huawei-researched computing product Galax8800

2008
First steps into cloud computing field and launch of product development

2002
Started to invest in server

2003
Released first-generation blade server

Storage Services

2002
Started to invest in R&D of storage products

2004
Released the first generation SAN storage architecture

2007
Released the first generation fiber optic SAN storage
Released industry's first SSD PCIe acceleration card

2008
Released the first virtual storage products for the Chinese market

2009
First commercial adoption of storage services in HUAWEI CLOUD (adopter: China Mobile, Guangdong)

2010
Released the first-gen private cloud object-based storage system UDS

2012
Cloud-based, massive, and high-end storage made available in service profile

2011
Started to invest in research of distributed block storage

2013
Released the world's fastest all-in-one SAP HANA appliance
Delivered the world's biggest SAP HANA cluster

Network Services

2018
Released OBS 3.0 featuring ultra-smart utility and the Data+ strategy
Released EVS3.0, the industry's first hard disk to run at 50 µs
Launched the Hybrid Cloud Disaster Recovery and Backup solution

2017
Released OBS 2.0 and EVS 2.0
Launched Distributed Storage Service (DDS)

2016
Huawei Storage breaks into Gartner's Leaders Quadrant

2015
Launched initial versions of Object Storage Service (OBS) and Elastic Volume Service (EVS)

2014
First commercial deployment of PB-level software-defined storage (SDS)
Huawei Storage rises to Gartner's Challenger Quadrant

2000
Released high-end router

2004
Released core router

2012
Released CloudEngine series of data center switches

2014
Released industry's first SDN controller for carrier adoption

2018
Achieved the 15-million scale in forwarding instances (industry milestone)
First to produce IPv4\ IPv6 dual-stack capabilities for in-country use, took the lead in supporting IPv6 native applications
Released Cloud Connect solution that allows organizations to build globally connected cloud networks within minutes

2017
Released Elastic Load Balance (ELB) service able to handle up to 60 million concurrent operations so organizations of all sizes can easily handle service spikes

2015
Network services placed online on public cloud platform, attesting to Huawei's global strengths in networks

The achievements listed above demonstrate the unique position that HUAWEI CLOUD holds in the industry.

Future - Ready, Full - Stack Container Services Accelerate Cloud Adoptions

■ By Li Feng, Zhang Miaomiao

Kubernetes has been building momentum for the last three years and is about to hit the cloud with hurricane - like force. The new PaaS platforms running on container +Kubernetes will become the popular form of cloud computing. In the Cloud 2.0 era, cloud computing and public cloud services are undergoing qualitative change as increasingly more enterprises want to do more than store their data and run apps on the cloud, they want to be able to use the stores of data to smooth out their businesses. Intelligence - enabled services grafted into the new infrastructure, represented by the container technology, brings revolutionary conveniences and incredible new levels of freedom with avoidance of vendor lock - in, allowing a mix of technologies and other elements to enter the profile. The agility from the new models available in the overarching cloud iteration helps enterprises solve digital transformation problems, break through technical barriers, and implement more innovations.
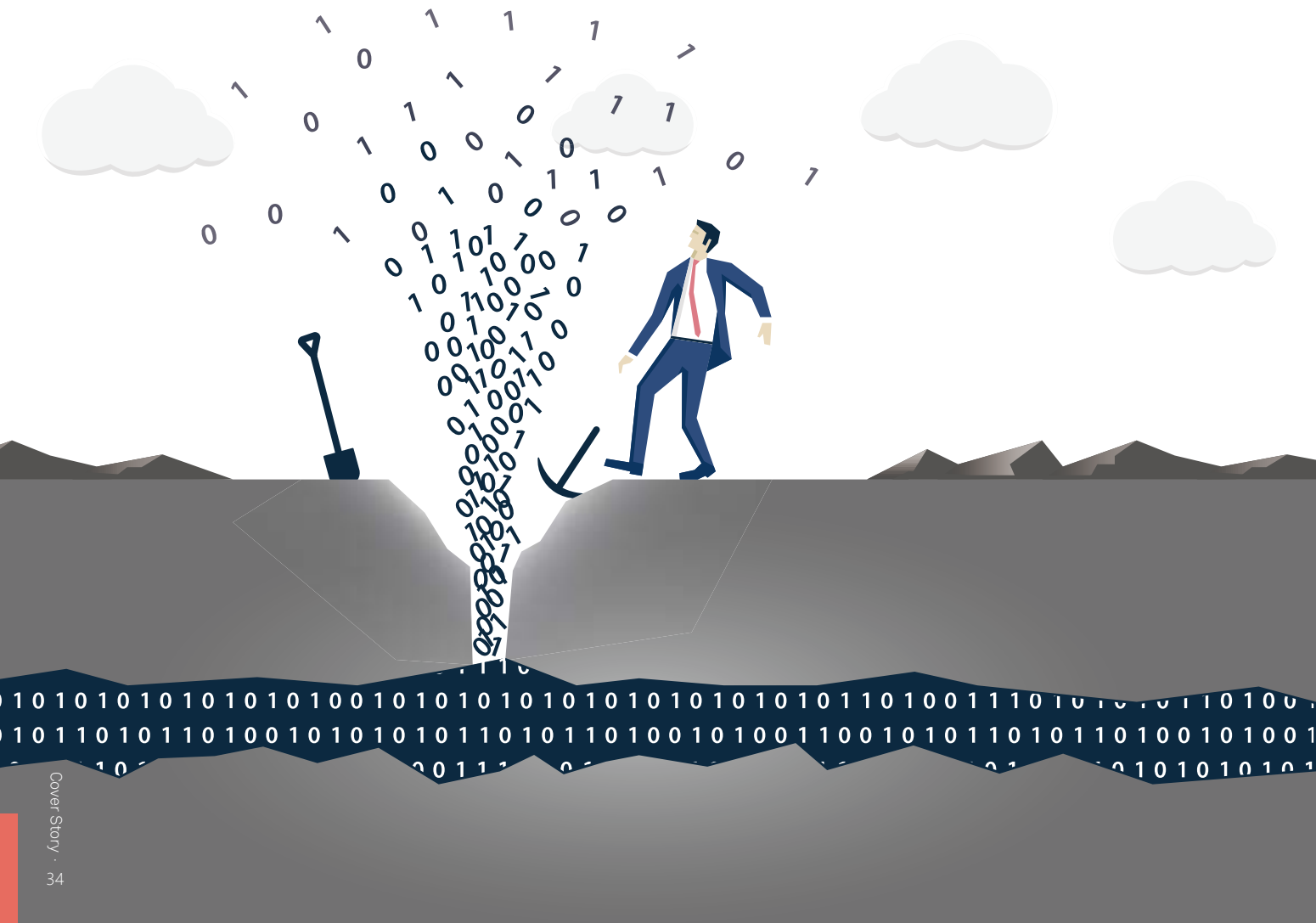
Docker and Kubernetes Storm the Market

Container technology has become an application deployment and O&M standard of Internet companies. Now, more and more traditional enterprises are also favoring the tech. Containerized applications enable IT application deployment and O&M to become more agile with the efficiency improvements from cloudifying multiple dimensions and the resulting resource throttling and long list of other capabilities from the adoptions.

Kubernetes comes from Google and in 2015 became the first incubation project of the Cloud Native Computing Foundation (CFCN). As an open source container automation orchestration management platform, it provides extended support for deployment, scheduling, and container clusters. Kubernetes has quickly become one of the most followed open source container orchestrators in the entire cloud industry. After three years of market demonstration,

Kubernetes is now recognized as the commanding management platform for container orchestration.

With the maturity and development of the Docker+Kubernetes technology, more and more traditional fields have begun to accelerate their adoptions. The PaaS technology represented by containers and microservices is helping enterprises accelerate innovation in different phases such as application development, testing, and deployment on the cloud. The tech also provides middleware services such as message queuing, caching, and database that match the production environment with deployments ready in hours. The microservice components can easily be split up for easy management and the container orchestration utilities allow applications to be deployed in minutes or even seconds, bringing great value to the ICT industry.

No. 1 in China in Community Contributions

As a founding and platinum member of CNCF, Huawei joined in the early stage of the Kubernetes project. Optimistic about the development prospect, it took the lead in implementing the container management system and reconstructing its own business to suit the advantages of running the environment.

Huawei, the world's largest telecom equipment manufacturer, has eight data centers spread around the world dedicated to O&M, running over 800 applications in over 100,000 virtual machines (VMs). Huawei uses the Kubernetes technology to transform its IT system into a containerized one within a short time. Based on the globalization attributes of its own services, Huawei offers hybrid cloud, cross - region, and multi - DC deployment options. Huawei continuously contributes to solving the issues the community faces and works with other members to promote the development and accumulate knowledge in running Kubernetes.

Huawei has contributed over and over again to the community, living up to its number

one ranking amongst Chinese tech firms for many years straight. Currently, Huawei has five maintainers to its credit. Huawei ranks No. 1 in China and third in the world in terms of commits (data source: cncf.biterg.io). Huawei is highly engaged in tuning, cluster federation, architecture design, security, and other contributions. Huawei is also one of the first vendors to obtain the Kubernetes Certified Service Provider qualification.

In 2017, HUAWEI CLOUD earned a seat on the Kubernetes Community Steering Committee (13 spots in the world; Huawei is the sole China - based company). In April 2018, HUAWEI CLOUD won a top seat in CNCF's Technical Supervisory Committee, with a total of 9 seats. Huawei was the first company from Asia to get such a seat. Huawei participates in the highest technical decision - making level in the cloud native domain.

To further promote container technologies at home and abroad, HUAWEI CLOUD and CNCF Foundation brought the cloud computing event KubeCon + CloudNativeCon to China for the first time in 2018. As a leader practitioner

of container technologies, Huawei announced the open source gene container framework KubeGene and intelligent edge framework KubeEdge at the conference. At the conference, Liao Zhenqin, general manager of the PaaS Product Dept at HUAWEI CLOUD, said: "The two pieces of tech are helping enable new levels of performance for the Kubernetes ecosystem in the gene and intelligent edge fields." This enables industry developers to build and try Kubernetes technologies and lower the threshold for industry customers to use these new technologies. In the future, HUAWEI CLOUD will continue to innovate based on cloud native technologies and help build a prosperous ecosystem. It is committed to providing enterprises with more secure, convenient, and efficient services and enabling more industries to accelerate their businesses.

Full - stack Container Services Lead the Domestic Cloud Container Market

Being one of the earliest adopters, Huawei has implemented K8s in many of its products for internal use since 2013. In this process, Huawei has accumulated rich practical experience and provides fully vetted, full - stack container services for enterprise users so they can easily cope with the challenges of the Cloud 2.0 era and smooth out their cloud adoptions.

Components in HUAWEI CLOUD Container Services

1.Containerized infrastructure

HUAWEI CLOUD provides two types of K8s services, including Cloud Container Engine (CCE) and Cloud Container Instance (CCI), which are certified by CNCF. The CCE service is a dedicated service. Users can control the K8s cluster and manage infrastructure resources and container services running in the environment. CCI is a serverless service. Users only need to manage the containerized services running on K8s. Clusters are automatically managed by HUAWEI CLOUD, further reducing the adoption threshold.

2.Container - based delivery process

HUAWEI CLOUD Software Repository for Container (SWR) provides an enterprise - class private image repository featuring high performance, capacity, and security. It also provides the image build and release pipeline ContainerOps to support automatic service delivery. In addition, ContainerOps allows enterprise personnel to continue to use existing tooling, minimizing the impact on the original delivery process and enabling a smooth migration. HUAWEI CLOUD Application Orchestration Service (AOS) provides an automatic cloud facility management tool, which enables enterprises to automate container development, testing, production environment preparation, and routine configuration and change with the convenience of preset templates, freeing enterprises from complex infrastructure management work so they can focus on their own business.

3.Containerized O&M processes

HUAWEI CLOUD provides the AOM (Application Operations Management) and Application Performance Management (APM) services to assist containerized service O&M, including various O&M tools in addition to basic monitoring, logging, and alerting. In addition, it provides advanced features such as global application topology display and call chain tracing for fault locating and analysis scenarios so that O&M personnel have a clear and comprehensive view of application health.

4.Containerized architecture transformation

Cloud Container Engine (CCE) and Cloud Service Engine (CSE) provide two microservice frameworks: Istio and Apache ServiceComb that run on K8s. The two frameworks help enterprises implement the needed transformations to their microservice architectures. For Java - based enterprise - class applications, CSE provides a microservice framework with complete service governance capabilities such as upgrade, downgrade, and fault tolerance utilities that run on ServiceComb. CSE is compatible with open source interfaces such as Spring Cloud and features excellent throughput performance. CCE is also in scope with the Istio project, provides a high - performance service mesh data plane, and provides Kubernetes - native microservice governance capabilities for scenarios requiring non - intrusive outcomes.

Since the rollout of CCE in 2017, HUAWEI CLOUD's container services have been continuously innovating and leading the market. At the end of that year, Bare Metal Service (BMS) was launched, allowing users to run their containers on their very own servers, delivering significant advantages. Migu Interactive Entertainment uses CCE in the containerization of its services to improve system performance by 100%.

In 2018, Huawei CCE became the first container service in China able to run on Windows, allowing vast numbers of Windows Server users to enjoy the benefits of containerization just as Linux users were already doing. HUAWEI CLOUD then collaborated with the ERP software vendor Guanjiaopo to help them transform traditional .NET applications into containers. In September, HUAWEI CLOUD launched the Istio service mesh feature on the basis of the original CCE service to simplify microservice - based reconstruction.

In terms of industry applications, HUAWEI CLOUD container services are being applied to a long list of industries. Based on Huawei's profound technical accumulation in the software and hardware field, Huawei launched a GPU container featuring AI capabilities for significantly improved performance. In gene sequencing, the K8s - based Gene Container Service (GCS) is introduced to provide a more economical, faster, and easier - to - use cloud computing platform for sequencing vendors. In edge computing, the Intelligent Edge Platform (IEF) based on Kubernetes can collaborate with the computing resources and applications at the device, edge, and cloud sides to meet real - time service requirements and optimize computing resources.

Dual - wheel Drive of Continuous Innovation

Piggybacking on Huawei's accumulation in tech over the past 30 years, HUAWEI CLOUD is leading developments with its end - to - end technical strengths. Adhering to the two - wheel drive concept of "meeting customer requirements and continuous innovation", we continuously innovate technologies and make breakthroughs to exceed even the most stringent of demands. The investment in the open source market not only shows Huawei's forward - looking technical insight, but also highlights Huawei's determination and strength in promoting the development of the software industry.

In terms of influence in open source, Huawei's contribution to the Apaches Community's CarbonData became the first top - level project in the community. The microservice framework ServiceComb also entered the Apache incubation project in November 2017 and became a top Apache project in October 2018.

Huawei began participating in Hyperledger project under the Linux Foundation in 2016. This project is the most influential open source project in the blockchain technology field. In addition, Huawei continuously made technical and code contributions in the two hottest sub - projects Hyperledger Fabric and Sawtooth Lake, and was granted the Maintainer position in the community (the only China - based vendor to earn the title). When Hyperledger established the China Region Technical Work Team, Huawei won the chairman position and continues to invest big with such substantial contributions as the Caliper project, a blockchain performance evaluation tool it donated to the community.

HUAWEI CLOUD launched ServiceStage, a one - stop cloud platform for applications, which provides full - stack solutions for enterprises to develop AI, blockchains, microservices, mobile, and web applications. The platform helps users quickly create enterprise-class cloud applications and accelerate service innovation.

Buyers of public cloud services are benefiting from the direction in full - stack platforming. Find out how the most complete service catalog in the industry can help you grow your business — Rise with HUAWEI CLOUD!

Continuous Innovation in Cloud Offerings to Suit Customer Requirements

■ By Sun Haofeng

HUAWEI CLOUD won three awards at the Trusted Cloud Summit 2018, including the Technology Innovation Award for the new network - enhanced C3ne ECSs released in June. At the first China HPC Innovation Contest, HUAWEI CLOUD C3 ECS won the Performance Excellence Award and Huawei Bare Metal Server (BMS) won the 2017 - 2018 Most Influential Product in Cloud Market of the Year Award at the annual IT Market China conference

HUAWEI CLOUD has won award after award in everything from C3 ECS to C3ne ECS and from P1 ECS to Bare Metal Server in recognition of its strong technical strengths. Backed by the tens of thousands of R&D personnel across the globe and investments into the tens of billions of dollars each year in the ICT field, Huawei has accumulated powerful service capabilities to offer the most comprehensive portfolio and exclusive end-to-end performance enhancements in home-growing its own chips, hardware, systems, and other elements. HUAWEI CLOUD is winning over customers in all industries with its hallmarked stability, award-winning security, rock-solid reliability, and long-term sustainability to innovate the cloud-based infrastructure and solutions for organizations of all sizes in the Cloud 2.0 era.

Customer Success the Start and Finish in Innovation

Cloud computing has become the new utility (to the order of electricity, water, and gas) that enables enterprises to turn on the tap or flick the switch and get whatever they need in terms of IT resources. Customers do not need to concern themselves with the back-end comprised of the compute, storage, and network resources because all these underlying elements are managed by the cloud service provider. With the development of new Internet services, customers are raising their requirements for cloud computing services, such as AI, big data, and DevOps. HUAWEI CLOUD benefits from the 30+ years of technical accumulation and has launched a series of powerful cloud servers, GPU+FPGA heterogeneous computing services, high-performance HPC solutions, and Dedicated Cloud (DeC) products and solutions.
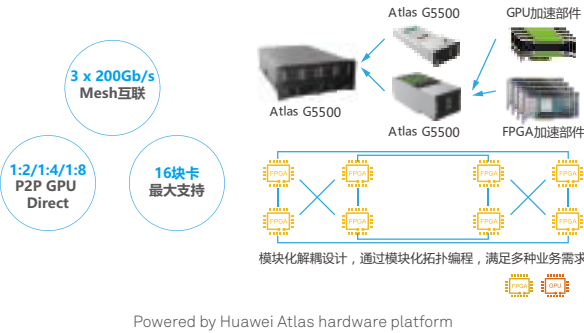
Concurrency requirements run high in AI utility adoption, gaming, live streaming video services, social networking, short video, and e-commerce. To meet these requirements, HUAWEI CLOUD launched C3 ECS, which became an immediate hot seller. The network - enhanced C3ne ECSs now use customized Intel Skylake CPUs, Huawei - developed dual 25GE intelligent high-speed network interface cards, and software technologies such as the integrated flow offload infrastructure, Virtio-Direct, and seamless hot upgrade, breaking through the performance bottleneck. C3ne ECSs inherit the computing capability of C3 ECSs, which is 15% higher than the average level in the industry, and improve the network packet forwarding capability of a single server to the tens - of - millions range, providing excellent performance in high - concurrency application scenarios.

Huge amounts of compute power are needed to handle video, graphics rendering, scientific computing, genetic engineering, and biopharmaceutical application scenarios. Combining the Huawei Atlas hardware platform and NVIDIA P100 GPU computing P1 ECSs provide up to 74.4T FLOPS for massive parallel computing resources and high-performance storage systems. Atlas, a smart cloud hardware platform featuring impressive advantages in resource pooling, heterogeneous computing, and second - level deployment, is used to maximize performance of heterogeneous computing capabilities such as GPU and FPGA compute resources. AI performance is improved by 10 times compared with traditional x86 servers.

Powered by Huawei Atlas hardware platform

Governments and financial enterprises attach great importance to the protection of sensitive data and have escalated their requirements on traceability and governance. The BMS and DeC services in HUAWEI CLOUD provide users with exclusive space, dedicated computing and storage resources, and full isolation through physical and VPC networks. Customers can choose the precise services they need for the specifics of the profile and requirements on performance, applications, and security compliance. Huawei BMS is the only cloud service in the industry that can enable automatic mount of shared volumes. Customers can apply for Elastic Volume Service (EVS) disks of up to 320 TB. The shared volume capability supports cluster deployments of enterprise core database systems. The BMS service uses Huawei - developed intelligent network interface card SDIs. Users can obtain BMSs they need within five minutes by selecting a proper configuration on the BMS console.

Data is the lifeline of enterprises. Traditional data center disaster recovery (DR) solutions are notorious for their high costs, complex data synchronization policies, and limited efficacy. Even if DR and backup are implemented on a single cloud, faults cannot be fully prevented. To ensure service continuity and data reliability, HUAWEI CLOUD launched the Hybrid Cloud Disaster Recovery and Backup solution that covers cross - cloud backup, cross - cloud DR, and cloud - based DR. This solution is the first complete public cloud DR and backup solution launched in China, which meets comprehensive requirements for enterprise service deployment, data protection, and management and provides enterprise services with multiple-level protection.

HUAWEI CLOUD offers a complete service catalog able to suit the requirements of any profile. Data can be quickly migrated to the HUAWEI CLOUD platform with the industrial - grade Teleport transmission service. Teleport performs well in all weather conditions and logistics scenarios. The container is equipped with GPS tracking and encryption locking. The 2*10GE high - speed interfaces achieve up to 120 TB of data importation in a single day. Huawei storage devices support many functions such as data encryption, deduplication, and compression to ensure complete data security throughout migration to the cloud.

Expanding Boundaries

In Limited and Infinite Games, author James Carse compares the differences between limited games, which have space, time, and psychological boundaries, and infinite games that allow participants to expand the boundaries of the games as they approach them. The infinite games are like the horizon, always in front of the user, keeping the game going. HUAWEI CLOUD is adopting the "infinite gaming" approach in the cloud computing market. Mr. Zheng Yelai, Vice - President of Huawei and President of the HUAWEI CLOUD BU, raised the following requirements to the team: "Keep your eyes on the customer and the trends, don't stare at your opponents." Competing with peers limits the boundaries and restricts the possibilities. Meeting user requirements is an infinite game, which Huawei knows well with its customer - centric approach. With this guiding principle firmly instilled in the whole operation, HUAWEI CLOUD is set to become the big winner as it continuously innovates to meet the evolving needs of the customer.

Data - focused Security Agenda of the Cloud Era

■ By Zhou Xue and Liu Hongshan

Security mishaps in delivery of cloud services occur frequently. Leakage and loss of data produces huge losses to users, sometimes even devastating impacts. Naturally, data security is a top concern for adopters who want the conveniences and economies that the cloud offers yet are reserved about the associated risks. Providers of cloud services must be able to ensure the security and stability of their offerings if they hope to stay in the game because any incident can severely tarnish brand reputation.

Supported by its impeccable record in providing ICT solutions prior to entering the cloud domain, Huawei is setting the bar in security. Huawei has been providing carrier - class security services for organizations of all sizes for years, and has earned the full confidence of those using the products and solutions in the most complete portfolio the industry has to offer. HUAWEI CLOUD is committed to providing secure, reliable, and sustainable cloud services. It ensures platform security with full-scope cloud security products able to meet the diverse needs of customers.

▌ Wide Recognition

In July of 2018, Huawei's CEO Ren Zhengfei said in a speech to employees, "In the cloud era, cyber security and privacy protection issues will become increasingly more important. Cyber security and privacy protection are certainly at the top of Huawei's agenda." Incorporating Huawei's 30+ years of proven security practices, HUAWEI CLOUD has built a full - stack security service offering more than ten popular products across five main categories, including everything from application security to security management.

In the network security field, Advanced Anti - DDoS provides 5 Tbit/s defense bandwidth and achieves collaborative defense capabilities across the entire network with the response time down to seconds. Large - traffic attacks are thwarted and services remain online, helping enterprises rest assured that their business can continue with the strong and proactive defenses of HUAWEI CLOUD.

Overall host security is improved with such functions as asset management, vulnerability management, intrusion detection, and baseline inspection functions to intercept intrusion attempts and keep sites protected around the clock.

Web Application Firewall (WAF) and Vulnerability Scan Service (VSS) provide easy-to-use general purpose security extensions able to detect and protect website traffic in real time, frustrating any would - be attempt to tamper with content. Vulnerability scanning provides full - lifecycle security detection from the coding phase to the online operation phase.

Database Security Service (DBSS) is an intelligence-enabled database protection service that runs reverse proxy and machine learning technologies. The service is able to provide such functions as sensitive data discovery, data masking, database auditing, and injection prevention. Data Encryption Workshop (DEW) covers Dedicated Hardware Security Module (Dedicated HSM), key management, key pair management, and several other available functions to keep data secure.

In the security management field, SSL Certificate Manager (SCM) ensures data remains completely secure in transit. Cloud Bastion Host (CBH) ensures channel security for at - scale deployments. The Situation Awareness (SA) service provides insights into known and potential on-cloud security threats.

After more than three years of research and more than one year in development, HUAWEI CLOUD launched the AI - enabled Miranda security platform during Huawei Connect 2018. The new platform provides the intelligence - endowed advancements in efficiency of traditional rule matching models for improved network - wide defense with the inline AI capabilities. The following are just a few of the accomplishments of the Miranda platform:

53% lowering of the missed alarm rate in Web Application Firewall Web.

47% lowering of the missed alarm rate in the Database Security Service (DBSS).

Interception rate in Situation Awareness (SA) improved to 99%.

49% reduction in the false alarm rate for Advanced Anti - DDoS.

Achieved 90% detection rate in Host Security Service (HSS).

HUAWEI CLOUD works ceaselessly to improve security of all environments to ensure complete security and compliance for the full range of cloud platforms and services. In one example of industry recognition, HUAWEI CLOUD earned CSA - STAR gold medal certification in 2017. Many more certificates were added to the bin in 2018.

In February, Huawei passed the BSIMM security assessment with high scores, and its software security capability ranked top 3 in the world. HUAWEI CLOUD became the first in - country cloud service provider to earn the certification.

In March, Huawei became China's first vendor to pass the PCI - DSS certification with all platforms, nodes, and services in scope. PCI - DSS is the strictest and most authoritative security certification standard for financial institutions in the world.

In June, HUAWEI CLOUD passed the graded security protection level 4 certification of China's Ministry of Public Security with high scores, signifying the brand's lead in meeting the compliance requirements of Graded Security Protection V2.0 and the ability to provide users with more secure and reliable cloud services.

In July, HUAWEI CLOUD was awarded the ISO 27018 certification for all platforms, nodes, and services in the portfolio. This award shows that completeness of the personal data protection management system of the cloud arm and its leading position in data security management. That same month, Huawei also released the first complete public cloud backup and DR solution in China: the Multi Cloud DR solution covering cross-cloud backup, cross-cloud DR, and on - cloud DR scenarios. The solution effectively improves enterprise business continuity and ensures the security and reliability of critical data.

In August, HUAWEI CLOUD e - government platform passed the cyber security review of the Cyberspace Administration of China in recognition of the brand's enhanced security capabilities. It also won three awards at the 2018 Trusted Cloud Services (TRUCS) Conference hosted by the China Academy of Information and Communications Technology. HUAWEI CLOUD later won the Excellent Performance Award from the British Standards Institution (BSI) for its outstanding achievements in security and contributions to the industry.

In November, HUAWEI CLOUD passed the SOC1/2 audit on security control measures. The third - party audit adds to the long list of assurances that the internal control management practices of the Huawei brand top world standards.

In November 5, all nodes and services passed ISO20000 certification. HUAWEI CLOUD has been recognized by one international authority after the other for its service management practices – customer can rest assured that the offerings have been fully vetted in testing, live networks, and third - party audits.

HUAWEI CLOUD has always been proactive in responding to changes in the global compliance system and it quick to take on the corresponding actions. In May, the EU released the General Data Protection Regulation (GDPR), which is a new law on privacy protection. It is the most important data privacy protection change in the past 20 years, also the largest and most punitive privacy protection law in history. HUAWEI CLOUD is responsive and ready with systems and technologies, and has carried out a series of work to fulfill GDPR requirements.

Endless Pursuit in Building Security Capabilities

Huawei has been investing big in security technologies from the start. The history can be traced back to the establishment of Huawei Security Test Lab in 2000. In 2003, Huawei launched the industry's first network processer - based firewall. In 2008, Huawei set up a joint venture with Symantec to establish the Huawei Symantec security product line. The company later set up a security competence center in 2011. In 2012, Huawei ranked No. 1 in the domestic market for cyber security products. Huawei launched a series of cloud security solutions and services in 2015, each making full avail of the accumulated tech and know - how from the decades of investment. In 2016, the Key Management Service (KMS), and Anti - DDoS attack service were launched in Germany and Spain. In 2017, Advanced Anti - DDoS, Database Firewall Service, and a series of value - added security services were added to the catalog. In 2018, Huawei launched AI - enabled platforms, including Miranda, Cloud Bastion Host, Container Guard Service (CGS), and a series of other intelligence-enabled services with more slated for release soon.

Huawei has continuously built up its security capabilities over the last 30 years. These capabilities have penetrated into each capillary of R&D processes and systems at HUAWEI CLOUD, building multi-dimensional and full-stack security assurances.

Demonstrated Full Tech Arsenal – Continuous, Piggybacked Innovations

Focus, Persevere, Breakthrough, Reapply – this is the basic concept Huawei applies to its technical accumulations, with each R&D effort feeding off the collective. HUAWEI CLOUD integrates industry-leading cloud security concepts and practices to forge its robust security defenses. Huawei shares and learns from others to develop an overarching set of security strategies with continuous improvement at the baseline. The multi - dimensional extensive defense systems cover all sorts of architectures like IaaS, PaaS, SaaS, and dozens of cloud services.

With 30+ years of technical accumulation in security at its back, HUAWEI CLOUD commands a strong position. Taking Huawei's internal DR drilling as an example, a single switchover involves more than 500 systems with complex relationships. The volume of data switched during a drilling event totals up to 100 PB for a single system. No data has ever been lost or become inconsistent. Some events even involve up to 2,500 people who are able to continue to use the ERP and other related systems without any perception that a drill is taking place. During one drill event, more than 2,000 lines of revenue data were added and nearly 130,000 people visited the official Enterprise BG website.

Huawei's HyperMetro data synchronization technology has gone through eight years of R&D iteration. The data center DR solution has served more than 3000 enterprise private clouds. Huawei now opens its technical capabilities to the public cloud, the industry's first storage disaster recovery service able to handle multiple cross - regional AZs. In addition, Huawei is the first to provide on - cloud cross - AZ storage DR services. It cooperates with partners like Veritas and Information2 in the DR and backup field to build a comprehensive DR ecosystem covering all imaginable customer scenarios.

Great things are built over time. Huawei has painstakingly carved out its masterpieces in security technology over decades of accumulation. Huawei sticks to strict service boundaries, never monetizes customer data, and pledges not to invest in any applications or service partners, or contend for benefits with partners. Huawei works intently with its ecosystem partners to ensure security of its cloud service offerings and that everyone can win with HUAWEI CLOUD.

HUAWEI CLOUD
Grow with Intelligence

48 Global 100 companies have chosen Huawei for digital transformation
Over 1 million companies and developers are using HUAWEI CLOUD

Building a Fully Connected, Intelligent World

HUAWEI CLOUD

*Global 100 refers to the top 100 in the Fortune Global 500.

HUAWEI CLOUD and its partners provide services for firms in more than 23 countries and regions around the world: Mainland China, Hong Kong (China), Thailand, Singapore, South Africa, Russia, Germany, France, Mexico, Argentina, Peru, Brazil, and Chile...

OFFICIAL WEBSITE

HUAWEI CLOUD DevCloud – Helping You Realize Your Potential

■ By Chen Dongfang and Hu Derong

Every innovation and development in technology has, in some form or another, scaled the limits of human imagination. For example, the Industrial Revolution revolutionized the human economy and way of life. Now, under the guise of cloud computing, all industries are undergoing subtle transformations - be it business models, industry patterns, or technology applications and product forms. Similar to the story of shepherd boy and Goliath, in this transformation we have witnessed the collapse of some giants, whose business runs on conventional infrastructure, and the growth of many new emerging technologies, who have adopted digital transformation.

In the past, we used to say "its as easy as turning on the tap or flicking on the switch" to describe cloud computing's on - demand use and pay - as - you - go characteristics. However, the benefits of using cloud computing instead of traditional data centers are the decisive motivation. More than providing underlying resources, cloud computing enables enterprises to quickly, efficiently, and flexibly develop their services in the Internet world.

However, if it were easy, everyone would be doing it. In the 5G era, enterprises' cloud requirements are continuously changing, such as the concern to ensure quick iterations or the efficiency of product development. To cope with the demanding needs, more and more users are searching for a low-cost way to digitize their business and, as a result, are trying out cloud services. Enter, DevOps.

The Chemistry Behind DevOps and Cloud

Given the quality and quantity of emerging technologies and the fierce industry competition, enterprise customers are coming to the conclusion that conventional infrastructure and storage methods are not suitable for the 5G era, and are seeking more efficient ways for their iterations, upgrades, and applications to go online faster.

First made in 2009, DevOps is designed to help enterprises design and release their in-house applications to the cloud. Designed for the collaboration between software developers, test personnel, and O&M personnel, DevOps automatically orchestrates links in the construction, testing, and release of software, improving efficiency and reliability of applications.

Such is its success, DevOps is considered to be a near - perfect product by the majority of enterprises. The quality of DevOps speaks volumes, as more and more enterprises have used it as a basis for developing their own in - house versions of the software. DevOps is perfect for forward - looking enterprises looking to transform their business.

For scenarios where enterprises need cloud computing to migrate resource configuration to the cloud, DevOps has the answer. A complete set of tool chains that support development, testing, and O&M process automation, DevOps helps enterprises build an automated software production line, removing complex development processes and migrating additional services to the cloud. With DevOps, enterprises can focus more resources on developing their core services.

DevOps at Huawei

Since the 1980s, Huawei's R&D has evolved from a workshop-based model to a focus on agility, lean, and DevOps. DevOps is more than an R&D model; it is a driver of business model transformation, influencing many other industries. For example, equipment manufacturers will transform from selling equipment to selling services, following the path led by cloud service providers. This changes the relationship between supplier and customers.

Based on in-depth understanding of DevOps, Huawei extends its R&D experience to software enterprises through the HUAWEI CLOUD DevCloud platform. DevCloud is a one-stop, cloud-based DevOps platform built with Huawei's R&D experience, cutting-edge ideas, and advanced R&D tools. It provides tool services for developers to create microservices, mobile apps, and gaming applications more easily and efficiently.

Getting to Know Your HUAWEI CLOUD DevCloud

While many enterprises are well along their way in using DevOps, they are still perplexed about what to do in terms of tool selection and capability building. Selecting appropriate tools to adapt to the legacy services or products can improve the quality and efficiency. Nowadays, the increase of cloud - based service delivery has caused a trend of enterprises adopting all cloud - based R&D tools.

The unique DevOps tool platform features complex construction. The concept and methodology are considered the "soul" of the tool platform, and likewise the tools carry advanced concepts and methodologies on which it runs, which solidifies processes, experience, and best practices as part of the infrastructure.

Huawei keeps the needs of developers in mind, and continuously tries to smash through boundaries and glass ceilings. While success is a milestone, Huawei knows it's how you respond to failure that's important. Huawei develops and practices its own development needs by learning from experience, a characteristic that is part of the company's DNA.

HUAWEI CLOUD DevCloud enables development teams to use cloud services to perform project management, code hosting and checks, compilation and building, testing, and deployment, allowing enterprises to release services on the cloud anytime, anywhere. With DevCloud, software development is more simple and efficient, allowing developers more time and money to focus on innovation and cope with ever - changing demand. The DevCloud platform interoperates with DevOps, providing a sophisticated foundation for enterprises to improve the delivery and efficiency of individuals and teams, as well as their brand image.

HUAWEI CLOUD DevCloud went live in 2015. Since then its popularity has exploded with over 100,000 users, and software innovation centers in 16 cities such as Qingdao, Xi'an, Hangzhou, and Chengdu, and has established joint software training courses with 15 universities, including Peking University.

"The development cycle is shortened from six months to two months."

"Provides all the required services for software development and slashes software construction time from 5 hours to just 30 minutes."

"The overall project delivery period is slashed by 50%."

Customer after customer are choosing the demonstrated success of Huawei's DevOps platform.

Culmination of 30 years of technological accumulation – Bringing AI to Everyone

Making the technology universal, ready for the future!

Huawei leverages 30 years of knowledge in the R&D field to provide a solid base of DevOps practices designed for large-scale development departments.

One of Huawei's star - studded products, HUAWEI CLOUD DevCloud worked with experts to begin the discussion and preparation of DevOps standards, and continues to share Huawei's understanding of DevOps and its frontline practices with the industry.

HUAWEI CLOUD DevCloud is committed to becoming the fertile soil from which software industry development will grow, helping software service enterprises seize opportunities and build future - oriented competitiveness.

By 2025, it is estimated that 100% of applications will be developed, tested, deployed, or maintained on the cloud in one way or another, and 80% of all enterprise applications will run solely on the cloud.

Needless to say there is the inevitable trend of software service cloudification, and in particular developers worldwide need a professional platform that supports software development, testing, and management on the cloud.

HUAWEI CLOUD DevCloud is the crystallization of R&D practices and cutting - edge concepts accumulated by Huawei over 30 years at the top. DevCloud provides a one-stop and lightweight DevOps service for developers to help enterprises improve their internal functions and speed up high - quality iterations.

In the future, HUAWEI CLOUD DevCloud will work with all enterprises to provide stable and reliable DevOps tools for development teams across various industries, and help software enterprises focus on service innovation.

Dare to Invest in the Future and Continuously Build Up Strengths

■ by Zhang Guilin

In the early years of cloud computing, many did not think of it as new tech, instead considering it to be an economical way of delivering IT. However, after ten years of development, cloud computing is now a pillar that carries an assortment of advanced technologies. Vendors able to offer this category of tech demonstrate high technical strengths because the threshold is high.

At Huawei Connect 2018, CTO of HUAWEI CLOUD BU, Mr. Zhang Yuxin, shared his interpretations on the technical features of the Cloud 2.0 era and the unique technological offerings of Huawei's cloud service brand.

▌ Cloud No Longer Just About General - Purpose Hardware

Significant changes have taken place in industries and technologies in the Cloud 2.0 era.

From the perspective of development trends in cloud architecture, hybrid-cloud and multi-cloud architectures will become the main choice for large - and medium - sized enterprises. According to a report from Gartner, 90% of organizations will use hybrid-cloud management infrastructures by 2020. Enterprises are even placing their production centers on the cloud with the new levels of assurance the tech is able to ensure. Key enterprise services are being cloudified, and enterprise applications are grafting in higher levels of intelligent utilities.

In this change, benchmark cloud computing technology of the Cloud 1.0 era needs to evolve for the Cloud 2.0 era.

In his speech, Zhang Yuxin pointed out that: "Cloud technologies in the Cloud 1.0 era are described as distributed, automated, large - scale, and elastic. In the Cloud 2.0 era, just having cloud is far from enough. The platforming must be able to support higher levels of reliability and security so enterprise can confidently place their core services on the cloud. At the same time, enterprise and Internet applications are becoming more intelligent. The cloud needs to support the new features while simplifying transformations and making the catalog more cost-effective."

Therefore, in the Cloud 2.0 era, the cloud computing offering will no longer be a contest over general - purpose hardware + software innovation. Instead, it needs to be further oriented towards vertical integrations and optimized designs, including chips, hardware, and software. Cloud service providers able to innovate in both chips and hardware have the advantage in terms of end - to - end efficiency and collaboration.

In recent years, large cloud service providers have been researching their own chips and hardware to enhance their capabilities in AI and IoT.

The Ascend 910 and 310 AI - enabled chips were released at Huawei Connect 2018 in October. The 910 features the highest single - chip computing density in the industry. Ascend 310 features the strongest compute power in edge computing for SoC AI chips. Based on the newly released AI chips, Huawei has built a full - stack, all - scenario AI portfolio. The chips have also become a powerful support for the Enterprise Intelligence (EI) suite on HUAWEI CLOUD.
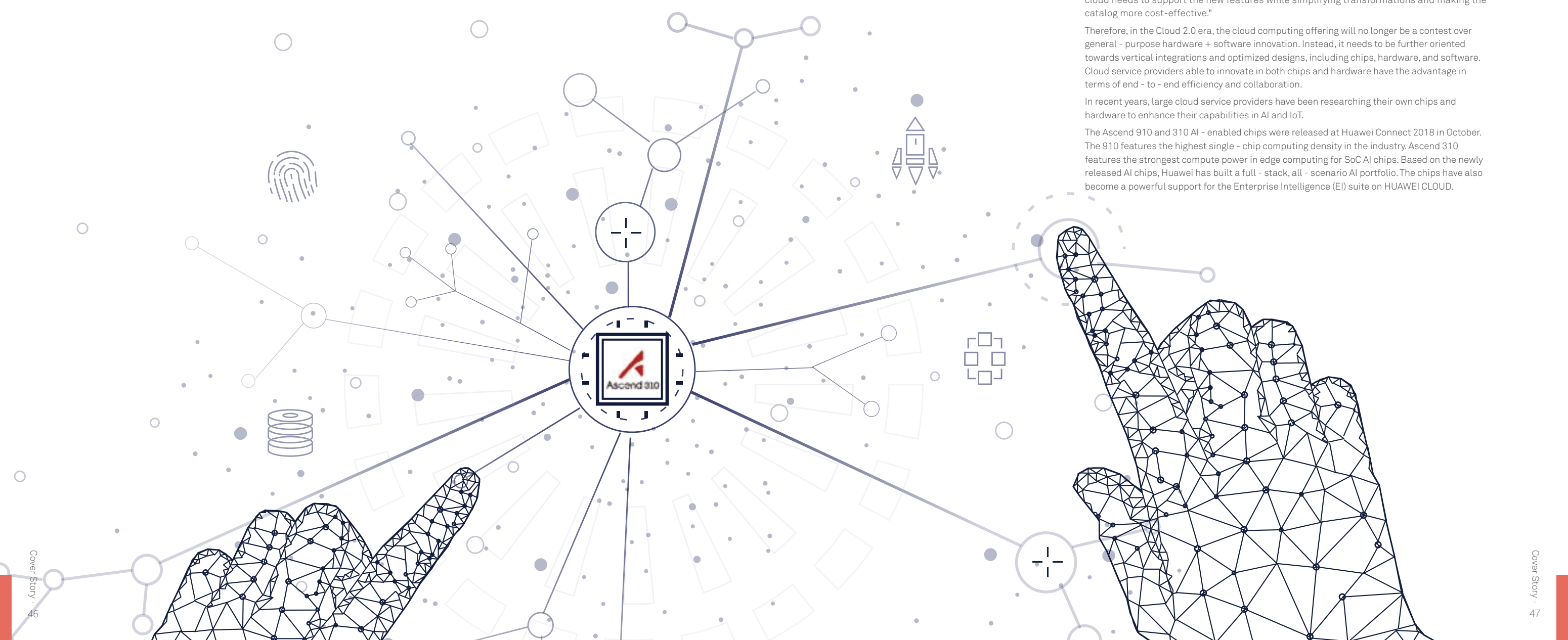
HUAWEI CLOUD – Standing on the Shoulder's of Giants

At Huawei Connect 2018, HUAWEI CLOUD showcased a series of technological innovations to help smooth out digital transformations for organizations. The innovations are all geared to the Cloud 2.0 era and include everything from chips and hardware for key enterprise services and AI optimization to intelligence - endowed cloud services including compute, storage, network, smart enterprise cloud application platforming, and a long list of others.

In terms of chip innovation, Huawei has grown its own AI chip and was the first in the industry to produce a 100 Gbit/s intelligent network interface card (NIC), fourth-generation solid - state drive (SSD) controller, chip-based roots of trust (RoT), and plenty of other innovations. Starting from the chip core, HUAWEI CLOUD delivers higher performance, lower latency, and stronger AI capabilities.

Zhang Yuxin pointed out the huge buildup of HUAWEI CLOUD in software and hardware has benefited from the 30+ years of technological accumulations derived from Huawei's expertise in serving carrier, enterprise, and consumer customers. This is what is meant by the expression that executives at Huawei are always saying: 'HUAWEI CLOUD, though new to the game, is standing on the shoulders of giants'.

Zhang Yuxin also mentioned that Huawei has achieved many exciting innovations in full - stack technology for the cloud data center, including chips, hardware, data center management, basic cloud services, and application development platforms (including O&M platforms and tooling frameworks). Huawei has a large number of technical breakthroughs in the vertical axis of basic model algorithms for AI and domain - oriented modeling and algorithm application.

Since inception, HUAWEI CLOUD has been committed to technological innovation and released a series of industry-leading new products covering cloud security, DevOps, cloud container engine, microservice engine, service mesh, computing, cloud storage, network, cloud DR, and the full range of other services in the catalog. The cloud arm is always updating its offerings to ensure the products remain at the edge of technology.

HUAWEI CLOUD continuously integrates various advanced technologies accrued by Huawei over the past 30 years. Huawei continuously improves its capabilities and places all the advanced technologies into the cloud service model, now complete with AI utilities for the wide spectrum of use cases.

On October 11, 2018, Jia Yongli, General Manager of HUAWEI CLOUD BU EI Service Product Dept, announced that EI suite available on HUAWEI CLOUD now runs on the supercharged performance of the newly released AI chips. The High - Performance Computing H6 ECSs now come standard with 16 TOPS AI reasoning capabilities. For those requiring even higher levels of technological firepower, HUAWEI CLOUD also provides 512 TOPS computing services in AI - enhanced VMs and containers. In training scenarios, HUAWEI CLOUD provides bare-metal versions of VMs. A single node can provide a maximum of 2 PFLOPS of computing capability.

Jia Yongli added, "With this series of cloud services, HUAWEI CLOUD will enter the new AI era." The offerings in the EI suite will increase to 45 categories providing 142 functions with the improvements in basic computing capabilities, covering various application scenarios of AI. Senior data scientists, data engineers, entry - level IT engineers, and business personnel can all benefit from the affordability of the Inclusive AI strategy from Huawei.

By the end of Sept 2018, HUAWEI CLOUD had rolled out over 128 cloud services in 18 categories. Over 60 solutions, such as SAP on Cloud, HPC Cloud, IoT, and DevOps have been launched. Over 80 industry - specific solutions for such sectors as manufacturing, e - commerce, gaming, finance, and IoV have been launched. The cloud service brand also recently launched the IPv6 solution.

HUAWEI CLOUD booth at Huawei Connect 2018

Long - term Technological Innovation and Continuous Building Up of Strengths

Zhang Yuxin said innovations at HUAWEI CLOUD are driven by two main elements: customers and technologies.

Technological innovation is the core element of HUAWEI CLOUD and precisely what has fueled Huawei's high - speed growth over the decades. Zhang Yuxin classifies Huawei's technological innovations into three types: innovation in basic technologies, long-term technological innovation, and customer-oriented innovation.

First, innovations in basic technologies are basically industry agnostic, including such general-purpose tech like chips, operating systems, databases, virtualization, distributed storage, and the newer accumulation in big data and AI capabilities. Huawei already possessed these capabilities before it set up its HUAWEI CLOUD BU because Huawei also needed to have these capabilities to serve its existing customer bases.

Second, long - term technical innovation refers to technologies that may not have entered the production and R&D domains. Huawei calls it a "three - generation strategy" including application, development, and research phases. Zhang Yuxin commented, "In the market, products and services sold by Huawei are in the application phase. We don't talk about some of the products we are developing. The research phase we keep even more secretive, many of the other departments might not even know what is coming next."

Huawei's investment in R&D is amongst the highest in the world. Since 2009, Huawei has invested more than CNY 400 billion in R&D. In 2017 alone, Huawei invested nearly CNY 90 billion in R&D. Mr. Zhang jokingly asked, "Where did all this investment go?" The technology on the market is just the tip of the iceberg; the part laying below the iceberg is much bigger, which is Huawei's preparation for the future.

Huawei has 80,000 R&D personnel located around the world. The company also has what it calls the "Noah's Ark Laboratory" that serves as the AI research center for Huawei Technologies, with teams spread around the world as well. The tech conglomerate has 16 research centers, 6 joint innovation centers, and 45 training centers and is highly engaged with research institutes, schools, and enterprises to innovate the tech that industry, education, and society need.

Mr. Zhang said it this way: "The norm for researching before product adoption is 3-5 years. In many cases, we are investing for 5 - 10 before we see the product actually make it to the market. Huawei dares to invest in the future. We are willing to make such bold moves and predict what the future needs. HUAWEI CLOUD BU stands on the shoulders of giants, benefiting from all this investment in its packaging of the accumulated tech into cloud services."

The third type is customer - oriented innovation, including some engineering solutions for specific use cases and service - oriented enabling technologies. In 2011, Huawei set up its enterprise business group. It has accumulated extensive expertise in major industries for several years now and that knowledge has gone into the corpus of the Huawei platforms.

Zhang further commented: "Many Internet customers have come to HUAWEI CLOUD. Why do they use the service brand? The performance of the computing instances powered on Intel Xeon Skylake CPU tops the industry, helping customers sail through peak traffic events while supercharging normal operation. This is also a sort of accumulation in experience from gearing solutions to customer requirements."

HUAWEI CLOUD BU also has many of its own impressive innovation capabilities. Zhang Yuxin commented "HUAWEI CLOUD runs two main planes on its backbone network: a Multiprotocol Label Switching (MPLS) private line network on the physical layer, and uses software - defined networking (SDN) technology to manage it all. It also uses SDN - based technologies to form a virtual WAN on the Internet, achieving dual - plane collaboration. For customers, in the unlikely event one of the planes fail, the other can be used as the emergency channel.

Huawei's huge R&D team, global R&D center layout, and continuous investment in basic technologies, customer - oriented technologies, and future - oriented technologies all contribute to the services advantages of the HUAWEI CLOUD brand. The comparatively new arm of the company continues to build up its storehouses and implement frequent iterations to ensure its tech capabilities remain at the forefront and that its products are able to maintain a leading position in the industry. Learn more about how the unique competitive advantages HUAWEI CLOUD can empower your organization in the Cloud 2.0 era.

Technological innovation is the core element of HUAWEI CLOUD and precisely what has fueled Huawei's high-speed growth over the decades. Zhang Yuxin classifies Huawei's technological innovations into three types: innovation in basic technologies, long-term technological innovation, and customer-oriented innovation.

HUAWEI CLOUD Enables More Intelligence with Its AI Chips

■ by Wang Haifeng

Since 1956, progress in Artificial Intelligence (AI) has ebbed and flowed, but recently, advances in big data and computing power have transformed AI into a technology with increasingly profound effects on our lives. Never before has AI impacted our everyday lives as it does today, but we can only effectively apply a technology after it is correctly understood and positioned. How, then, should we go about positioning AI?

HUAWEI CONNECT's theme in 2018 was "Activate Intelligence." It emphasized the technical innovations that are chiefly driving the growth in AI and its application throughout industry.

Xu Zhijun, Huawei's Rotating Chairperson, released Huawei's AI strategy, which focused on the current problems that AI can solve and the areas where AI can add the most value.

For AI, Huawei is investing in technology, talent, basic research, and industry applications, effectively building a full-stack solution, with an open ecosystem and talent cultivation to enhance solutions and improve internal efficiency.

In the past year, HUAWEI CLOUD has been integrating industry wisdom with AI in eight industries and over 200 projects by leveraging its technical innovations. With its Ascend series chips, Huawei can now deliver full-stack solutions that include chips, chip enablement, training and inference frameworks, and application enablement. Huawei offers deployment environments for a variety of scenarios, including the public cloud, private cloud, various edge computing scenarios, IoT industry terminals, and consumer terminals.

Intelligence Demanded by the Cloud 2.0 Era

In the future, the cloud will be the principal environment for most enterprises to explore AI solutions due to the requirements for massive computing and storage resources.

Zhang Yuxin, CTO of the Huawei Cloud Business Unit, believed that the arrival of Cloud 2.0 leads to several business scenario changes, as compared with Internet development in past decades.

Initially, in Cloud 1.0, enterprises migrated their key applications to the cloud. The customer entity, entity demands, and service modes also changed with the advent of cloud computing. Government and enterprise markets were the first targets. According to Zhang, with the advent of Cloud 2.0, "the main cloud applications are now switching from personal entertainment and consumption fields to the production field."

Second, traditional Internet applications have encountered bottlenecks. In the past, Internet applications mainly relied on traffic dividends. In the Cloud 2.0 era, the core of new Internet business changes from traffic dividends to data dividends.

Huawei Vmall is one of the largest e-commerce companies in China, serving 400–500 million users worldwide. Its services are carried on HUAWEI CLOUD, which has become the choice for multiple Internet customers. The technical platform of HUAWEI CLOUD helps Internet customers improve performance and guarantee smooth processing, even during peak traffic periods. According to Zhang, "the Cloud 1.0 era had distributed, automatic, large-scale, and elastic features, while the Cloud 2.0 era now requires AI, big data, and computing power, as well as a comprehensive system architecture for enterprise applications and Internet applications besides the basic demands for security and reliability."

Bruno Zhang ~ CTO of Huawei Cloud BU

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Unique, Full - Stack Technology Innovation

Zhang believes that HUAWEI CLOUD offers many innovative and full - stack basic technologies, which continuously add AI value and overcome bottlenecks from traffic dividends to data dividends.

The majority of Chinese cloud vendors are not currently able to make chips. Huawei has released AI chips, and one Ascend chip is configured for high-specification H - series VMs. The Ascend 310 chip delivers computing performance that is 16 times faster than other chips.

For a range of AI computing scenarios, Huawei offers a variety of services covering VMs, containers, and bare metal servers. You can configure services with the highest 512 TOPS inference performance as required by using ECS and CCI. For training scenarios, Huawei provides ECSs and BMS with the computing capability of up to 2 PFLOPS.

Also at HUAWEI CONNECT 2018, Jia Yongli, the general manager of the EI Service Product Department of Huawei Cloud BU, announced that HUAWEI CLOUD EI will provide 45 services and 142 functions targeted toward improving basic computing capabilities to achieve inclusive AI covering all of the scenarios available for AI senior data scientists, data engineers, common IT engineers, service personnel, and others.

Huawei has developed the Hi1822 chip and launched the industry's first intelligent NIC with the single-chip rate of 100 Gbit/s, enabling Huawei's network rate to be the first to enter the 100G era. The 100 Gbit/s intelligent NIC also achieves a breakthrough in network forwarding. In addition, network connections among millions of nodes in data centers is enabled through reconstruction of the control-plane architecture.

For Huawei's cloud storage support of key enterprise applications, Huawei has adopted an innovative EC Turbo technology based on years of investment in mathematics and algorithms, effectively making Huawei the leader in both disk usage and valid capacity. Now, Huawei applies these HUAWEI CLOUD technologies to meet customers' requirements for data intelligence.

Huawei has made significant technical breakthroughs in vertical sectors to react to the challenges of providing enterprise intelligence. These advances include chips, hardware, data center management, basic cloud services, application development platforms, application deployment and O&M platforms, tool frameworks, basic AI models and algorithms, and domain - specific models and algorithms.
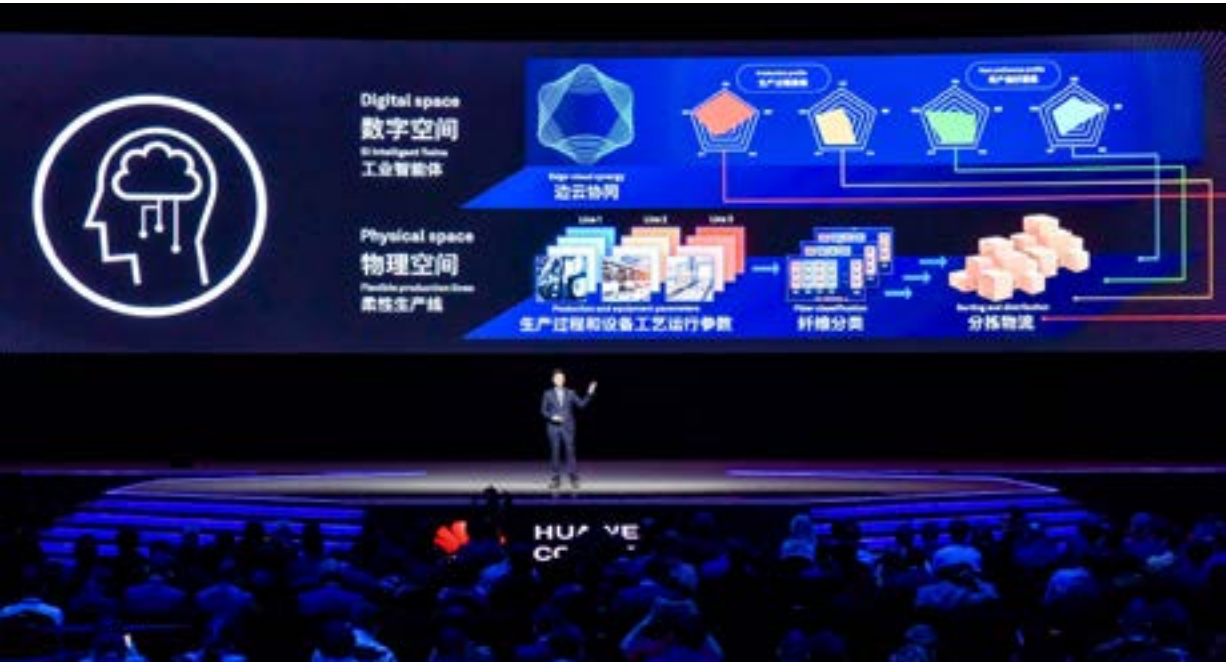
Driven by Technologies and Customer Requirements

Huawei has a three - stage strategy: collect, develop, plan for the future. The cloud field requires long-term investment in underlying technologies. Multiple technologies in research have not yet moved to the production environment.

Huawei always begins technical preparations 3 – 5 years, or even 5 – 10 years in advance, so they have invested nearly 400 billion RMB in R&D in the past eight years, with nearly 90 billion RMB in this past year alone.

Customer requirements and technologies drive continuous innovations in HUAWEI CLOUD. Today's rapid pace of development demands innovations in different areas. HUAWEI CLOUD employs a new method to continuously innovate with customers interactively through multiple iterations. Huawei provides customers with professional data engineers and scientists to aid them in abstracting business models, classifying and labeling data, and training models for trial use in their systems. Based on trials, engineers then tune and retrain the model to the necessary level of precision before integrating it into the customer's system.

At the keynotes on the second day of HUAWEI CONNECT 2018, HUAWEI CLOUD officially released the EI City Intelligent Twins solution, which is built on a digital twin and leverages multiple technologies such as AI, big data, edge computing, and IoT to deliver a complete system covering data generation, data analysis, and data closed - loop. The solution demonstrates how to control and manage aspects of the physical world more intelligently through digital computing power.

Li Qiang, technology division chief of the Shenzhen Traffic Police Bureau, said, "We are building a city traffic brain incorporating video cloud, big data, and AI core technologies and then constructing traffic intelligence through those technologies and policing to enable more intelligent cities. The Huawei cloud platform provides logical servers and complete deployment within seconds, significantly accelerating service deployment. With comprehensive traffic awareness and AI-assisted law enforcement, HUAWEI CLOUD supports high - quality, efficient transportation services for citizens."

A new era of AI has arrived. With powerful computing power and service upgrades brought by Huawei's latest AI chips, HUAWEI CLOUD remains at the cutting edge of innovation, accelerating value creation.

Huawei and Bosch
– Making the Connected World a Reality

■ By Wang Jianguo, Bosch Software Innovations General Manager, China

At Huawei Connect 2018, Bosch Software Innovations and Huawei Cloud announced a partnership to accelerate the development of the Internet of Things (IoT) in China. According to this agreement, Bosch IoT Suite services will be delivered to Chinese customers by Huawei Cloud. The first service was made available in October this year: the Bosch IoT Remote Manager, a service for managing and controlling gateways, sensors, and devices, which is now listed on the Huawei Cloud website. Other Bosch IoT platform services will follow in 2019.

Technological excellence and shared values

Bosch has chosen Huawei as its cloud partner in China because our companies have a lot in common.

Firstly, Huawei and Bosch Software Innovations both deliver cutting - edge technological solutions in their respective domains.

Huawei Cloud is investing heavily in cloud computing and big data development, and has set up numerous R&D and innovation centers. Huawei collaborates with top scientific research institutions to enhance its innovation capabilities and core competitiveness in public cloud computing, artificial intelligence (AI), big data, algorithms, and architecture. All of these have enabled Huawei to build an innovative and highly reliable cloud platform. For its part, Bosch Software Innovations has been active in the Internet of Things for ten years and accumulated solid expertise in this area. With our domain-specific software architectures and organizational know - how,

Bosch Software Innovations has become the go - to source of inspiration for companies embarking on their digital transformation. The Bosch IoT Suite, an award - winning IoT platform ("Top Industrial IoT Platform in APAC", Frost & Sullivan, 2016/2017), offers all the functions necessary to connect devices, users, and businesses, serving as the brain of the connected world.

Alongside recognized technological excellence, another important thing our companies have in common is the shared vision that IoT technology needs to be built on industry standards and open source software.

Huawei is a strong believer in openness and co - innovation and actively participates in and contributes to open source communities. Moreover, it has built more than 10 OpenLab centers around the world. Huawei actively cooperates with customers and partners to build an open ecosystem. Likewise, Bosch Software Innovations follows the motto "Nobody can do IoT alone" and is firmly

convinced that only those companies that are able to collaborate in ecosystems will succeed in the IoT. A prime example is the Bosch IoT Suite, which builds on open source and open standards to provide users with greater flexibility and maximum compatibility. Both companies are members of the Eclipse IoT open source community and leading players in the OSGi Alliance, a standardization body that defines globally accepted IoT standards.

In addition, our companies are both focused on building strong IoT ecosystems in the automotive, home, city, and agricultural domains.

Altogether, the above examples made this cooperation a logical step in the further development of our respective companies' plans for their activities in the Chinese market. We are happy that, by joining forces, Huawei Cloud and Bosch Software Innovations are now able to provide top - grade IoT solutions to customers in China.

Out on the roads: first cases of Bosch and Huawei IoT cooperation

Bosch considers China as a key IoT market and Huawei as a strong local partner with a proven ability to support our market entry into the IoT platform segment.

One of the first examples of our successful teamwork belongs to the automotive domain. A leading Chinese automotive manufacturer has chosen to deploy the Bosch IoT Suite on Huawei Cloud for updating its vehicles' firmware over the air (FOTA). The solution is expected to be rolled out to millions of connected cars in China over the coming years.

Most significantly for consumers in China, the world's largest automotive market, the Bosch IoT Suite enables vital services such as the Vehicle Management Solution, which is available locally on Huawei Cloud. This solution connects vehicles throughout their service life, providing the technological foundation for such cloud - based services as predictive diagnostics and over - the - air software updates. The software is the secure communication interface between the vehicle, the cloud, and the services. Data management allows vehicle manufacturers or fleet managers to organize vehicle data, analyze it, and keep the vehicle software continuously updated.

Bosch's best-in-class device management on Huawei Cloud

IoT is about two things, managing applications driven by the data coming from "things" and managing the "things" themselves. Still, IoT application management is much more talked about than IoT device management, while, in fact, device management is a foundation of any IoT deployment.

Overlooking the device side of an IoT deployment may have serious repercussions for an IoT project as a whole, affecting its efficiency and life span. Focusing mostly on IoT data collection and analysis is a common mistake many companies make, forgetting that if no data is flowing because of malfunctioning edge devices, the whole project is compromised. To provide IoT data steadily and securely, IoT devices require configuration, monitoring and updates. Moreover, these functions must be realized remotely due to the sheer number of edge devices in an IoT project and their geographic distribution.

With this in mind, Bosch and Huawei have chosen device management as the first service out of the set of Bosch IoT Suite services to be provided on Huawei Cloud.

The Bosch IoT Remote Manager provides full functionality for connecting, managing, controlling, and updating devices easily without the need for manual intervention. Yet what makes Bosch IoT Remote Manager so unique is not only its comprehensive set of device management features but also its proven capability to scale in different use cases ranging from smart homes and buildings to connected vehicles. The device management capabilities of the Bosch IoT Suite are not limited to a single industry and are being used by diverse customers worldwide. Thus Bosch can provide strong proof points from already realized client projects. This demonstrates that the Bosch IoT Remote Manager can serve the heterogeneous device management needs of many different use cases.

Industry experts recognize Bosch's device management as best - in - class among IoT platforms available on the market. In its report "I4.0 / IoT Vendor Benchmark 2017", the Experton Group, a market intelligence and research company, states "The USP of the Bosch IoT Suite is its comprehensive device management functionality that is unrivalled by that of other vendors."

In 2018, PAC analyst agency, part of the CXP Group, analyzed 18 companies in the field of IoT platforms for device management in the European market. Four companies were rated "Best in Class," with the Bosch IoT Suite's device management being selected as benchmark for the second consecutive year.

Thanks to the cooperation between Bosch and Huawei, the Bosch IoT Remote Manager is now available to all Chinese customers as a service operated by Huawei Cloud. You can give it a try on the Huawei Cloud website: https://www.huaweicloud.com/en-us/solution/bosch-iot-suite/ .

About Bosch Software Innovations

Bosch Software Innovations has been active in the Internet of Things for ten years. The team of IoT consultants, software developers, solution architects, project managers, UX designers, business model innovators, and trainers brings IoT ideas from strategy to implementation. The company has designed, developed, and operated hundreds of international IoT projects in mobility, smart city, energy, manufacturing, agriculture, health, as well as smart homes and buildings. Its cloud - based Bosch IoT Suite currently connects more than 8.5 million sensors, devices, and machines with their users and enterprise systems. With over 600 IoT experts worldwide, Bosch Software Innovations has locations in Germany, Bulgaria, Singapore, Japan and China.

Bosch Software Innovations opened its first office in China, Shanghai, in 2012. In 2018, the company also established an IoT services delivery center in Nanjing that provides local consultancy and solution development for IoT projects.

More information can be found at www.boschsi.cn and our official WeChat account: Bosch - si.

Deppon Logistics Supercharges Express Delivery Operations with HUAWEI CLOUD

With the rapid development of e - commerce in China, the demand for express delivery has increased rapidly. On November 11, 2018, China's major e - commerce enterprises generated 1.352 billion express orders, with a year - on - year increase of 25.12%. On that day, in-country postal and express enterprises reached a record high by handling a total of 416 million orders. With the increases each year from the sales-spree event, the express shipping industry is having to find new ways to keep up with the spiked volumes.

Major Problem: Decreasing Labor Force, Increasing Demand

The pressure is immense and only mounting! The labor force population in China has declined for five consecutive years now. The portion of couriers to the total amount of logistics workers exceeds the 50% range. The shortages in the labor force is being felt expressly in the courier job because few are attracted to the 16-hour workdays and irregular opportunities to eat. Delivery outfits need to correct this situation, but how?

In the next three years, the daily delivery volume from courier devices will increase from 114 million to 200 million. Extrapolating the current numbers, the shortage of couriers will be about 1 million in three years, which means the delivery end of the operations will face even greater pressure.

In addition to the delivery end, the infrastructure on the backend also show series lag if the operations are going to keep up with demand. Lack of unified management capability and idle resources stagnate efficiencies and increase costs for delivery service providers. These enterprises need viable solutions to reduce the burdens on delivery personnel and improve the entire layout if they hope to remain competitive. They need to automate and graft higher levels of intelligence into their processes to supercharge their operational efficiency and save on manpower.

Deppon Express Partners with HUAWEI CLOUD

Deppon has been continuously leveraging cutting - edge technologies such as cloud services and AI to improve competitiveness in the express delivery industry. It has implemented AR, unmanned vehicles, intelligent customer services, logistics cloud, and more to achieve the rapid growth of its business. In June 2018, Deppon and HUAWEI CLOUD signed a strategic cooperation agreement in Shanghai,

announcing in-depth cooperation in such fields as cloud computing and AI to explore the role that AI plays in the whole industry chain industry, aiming to comprehensively upgrade user experience. Deppon choose to accelerate and innovate to keep its status as one of the timeliest and accurate providers, making HUAWEI CLOUD with its continuous commitments to improve core competitiveness with technology the perfect match.

The integration with HUAWEI COUD resources strengthens the reliability of cloud data services of Deppon and accelerates the entire cloud adoption process. Deppon Express is enlarging its promotion of automatic recognition, backup, big data, and cloud - based network transmission capabilities with the rich tech powerhouse of HUAWEI CLOUD.

Deppon also announced that it is now working with Huawei to build a smart logistics campus and explore the application of AI in the industry chain with the advantages available from the energy resource management, security convergence, and facial recognition features of the Huawei platforming. Huawei is working intently to integrate technologies into express delivery service platforms geared to the particular concerns of the operations. By providing HUAWEI CLOUD services such as OCR, identity verification, and behavior detection, Huawei is building smart logistics solutions ranging from campus to delivery to help enterprises improve efficiency with streamlined processes.

HUAWEI CLOUD OCR Increases Efficiency While Decreasing Costs with Fast -scan and Pick - up Capabilities

HUAWEI CLOUD OCR constructs the data repository by efficiently and accurately extracting key information of images. Currently, HUAWEI CLOUD OCR has reached accuracy greater than 99% and can recognize one image per second. Deppon has applied OCR, instead of manual recording, to identify waybills. During pick-up, delivery personnel take a photo or screenshot of the waybill, and OCR automatically identifies and then records the information about the sender and receiver on the image into the system. OCR delivers high-precision recognition and can handle various problems, such as complex backgrounds, uneven illumination, blurring, and missing corners, which reduces manual processing time of exceptions and greatly improves service efficiency and user experience. OCR helps reduce management cost by about 25%.

Labor Cost Saving Through Automated Operations, Accurate Information Extraction, and Auto - sorting

Deppon uses HUAWEI CLOUD OCR to implement intelligent and efficient destination - based automatic package management. After a package is retrieved and uploaded to the pipeline, the system automatically takes photos of and identifies information related to the package, including the sender of the package, goods information, whether the package is covered with inspection seal, and more.

Automatic Detection of Violent Sorting

Violent sorting behaviors in the express industry have been widely criticized, which not only hurt consumers' rights and interests, but also leads to huge amounts in compensation from damages. The intelligent analysis service of HUAWEI CLOUD EI enables real - time behavior analysis of surveillance videos and automatically recognizes the pickers' behavior such as throwing, pushing, and kicking packages. It automatically generates the video segments of violent sorting, including its occurrence time and location. The solution reduces manual monitoring costs and effectively reduces violent sorting behavior. With more secured operations, goods and packages can be delivered to all recipients intact.

By means of technical enablement and practice, HUAWEI CLOUD has given Deppon the accelerations it needs to stay at the top both now and well into the future with a partner it can trust. Enabling AI technologies in the delivery services of Deppon, HUAWEI CLOUD has helped the enterprise achieve the complete upgrades needed for the new era. Huawei's vision is to bring digital to every person, home and organization for a fully connected, intelligent world. In practicing this vision, HUAWEI CLOUD is creating benefits for more enterprises.

Come grow with HUAWEI CLOUD, seize the future of enterprise intelligence!
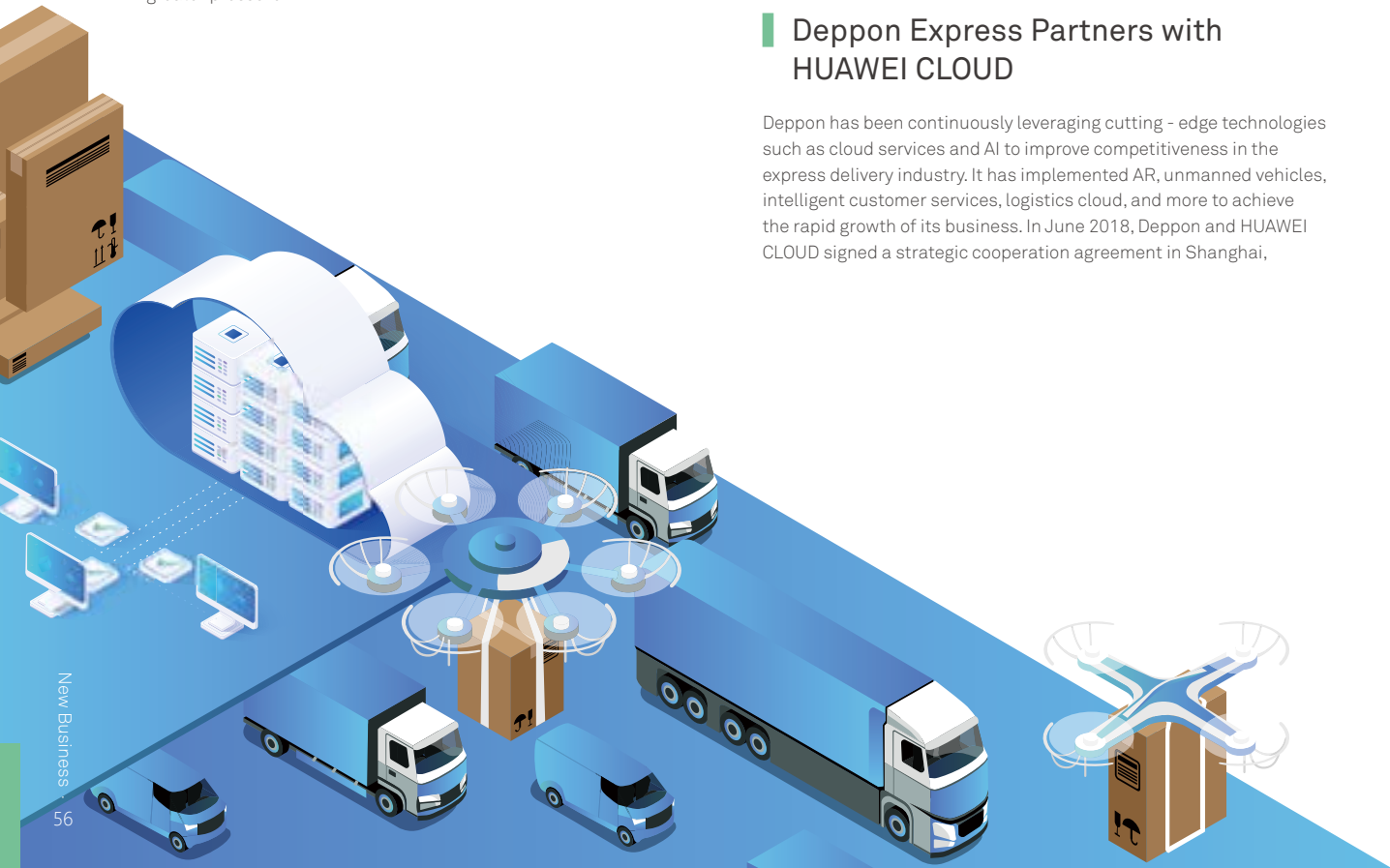
HUAWEI CLOUD + Xinhua News Agency
Cloud Technologies Empowering News Agency

By Kang Xiang

November 8, 2018 was China's 19th Journalists' Day.

A great success story between the Xinhua News Agency and HUAWEI CLOUD was widely broadcasted and forwarded on social media on this day as a salute to journalists.

Xinhua News Agency, China's official state - run news agency and the country's principal and most influential agency, is the largest news agency in the world in terms of correspondents worldwide. Xinhua is the sole channel for the distribution of important news related to the Communist Party and Chinese central government. Despite its size and importance, overseas branches of Xinhua have often suffered from slow download speeds and frequent disconnections. Inefficient maintenance and troubleshooting make matters even worse. In addition, the agency had to simultaneously ensure compliance with the laws and regulations of numerous countries.

HUAWEI CLOUD now provides stable cloud services to support the news distribution system of Xinhua and has won high acclaim from the agency for its cutting - edge technologies and future - oriented approach. This success story takes on even greater significance with HUAWEI CLOUD now expanding globally.

Pain Points and Requirements of the News Distribution System

Xinhua News Agency's news distribution platform connects to global news agencies and forwards news to its partner companies. For example, Sina, China's leading multi - platform digital media company, downloads up - to - date news from Xinhua's news distribution platform.

Xinhua employs their news distribution system in both their headquarters and branches. Headquarters has a large equipment room and a professional technical team, making it relatively easy to purchase and set up servers. This is not, however, an easy task for global branches due to their locations and resource limitations.

Previously, each branch of Xinhua built their own mini news distribution system in a small equipment room with several servers. In spite of the small size, maintaining these systems required two or three full - time engineers, resulting in high costs. Partner companies often encountered problems downloading news reports from the news distribution system, compromising the timeliness of breaking news.

Upgrading the branches' news distribution systems did not efficiently solve these problems because the branches are located globally. Equipment installation, deployment, and O&M for all branches required extensive IT workload and resulted in high costs. If many branches require a future upgrade, the news agency would have no choice but to start over by purchasing new equipment, planning new lines, and building new systems, and no one knows when the next upgrade will be necessary.

The cloud computing business model revolutionizes Xinhua's construction and O&M on news distribution systems at their branches. With cloud services, the news agency no longer needs to purchase, install, or deploy devices. What's more, they won't need full-time maintenance personnel, allowing them to focus on customer development for their branches.

To deal with these issues, Xinhua established the public cloud service procurement project, which includes an omnimedia distribution and e-commerce platform, and is one of the key projects in the media convergence development of Xinhua. Ultimately, Xinhua hopes to provide the most up - to - date news for branches by improving the speed of their sites.

Escorting Enterprises' Expansion Outside of China

Xinhua was not initially optimistic towards the low - profile HUAWEI CLOUD, but after several rounds of evaluation on the products, technologies, and services, Xinhua ultimately gave the bid to HUAWEI CLOUD, citing its leading technologies and professional support services.

HUAWEI CLOUD has more cloud nodes outside of China than other Chinese cloud service providers and fully meets all requirements. Additionally, while Huawei is a global business, it also provides unrivaled local services. Beyond this, Huawei's extensive experience as a telecommunications device vendor provides HUAWEI CLOUD with a competitive edge that enhances the news broadcasting of Xinhua.

Xinhua News Agency has three core systems: collection, editing, and distribution systems. The first two systems are used by journalists and editors. The distribution system connects to global media and its performance defines the external response speed, and ultimately the experience of news consumers.

In the first phase of establishing the omnichannel distribution platform, HUAWEI CLOUD focused on optimizing the news distribution lines and building an integrated, intelligent, and interactive omnichannel distribution platform to meet changing market requirements and improve the customer experience.

The global news distribution system of Xinhua now consists of the primary node in Beijing and public cloud service nodes at branches outside China. HUAWEI CLOUD provides a full portfolio of products, including private lines between the primary node and the branch nodes.

Chinese enterprises and their global institutions face several issues in their global expansion. Network resources often cannot be quickly obtained due to long distances between nodes. The bandwidth cannot be allocated on demand, resulting in high and wasteful expenditures. Network resources are particularly difficult to obtain in Asia, Africa, and Latin America, and enterprises also find it difficult to meet the laws and regulations in each country they operate in.

HUAWEI CLOUD provides the Cloud Connect service to help enterprises flexibly expand their global business. The Cloud Connect service ensures one - stop compliance globally, allowing users to focus on their own service innovation. In addition, the service includes an intelligent 'brain' (named Galaxy), providing scheduling capabilities. It enables millions of users to easily interconnect with each other at more than tripling speed.

Around - the - Clock Online Services

Of course, the cutting - edge technologies and professional services of HUAWEI CLOUD are important, but security is a vital issue for Xinhua's news distribution platform. Special measures must be taken to prevent tampering with or stealing news reports. Stolen news reports result in profit losses, and news report tampering leads to serious consequences.

As a leading public cloud service provider, HUAWEI CLOUD provides full-stack security protection for Xinhua's news distribution platform. HUAWEI CLOUD is the only cloud service provider in China that has passed the PCI - DSS security certification, and has obtained the Building Security In Maturity Model (BSIMM) certification, Information Technology Service Standards (ITSS) service enhancement certification, IDC/ISP license, and Trusted Cloud certification (TUV).

Adhering to the principles of never developing apps, never touching customer data, and never taking equity stakes in partners, HUAWEI CLOUD makes its business boundaries clear and will not intercept customers' private information, fully protecting customers' rights and interests.

HUAWEI has local service teams in more than 170 countries and regions that can provide 24/7 response to address the requirements of Xinhua, exactly what the global news agency requires.

Switching from the original business model to public cloud is considered the core part of the upgrade of the news distribution platform. With the help of HUAWEI CLOUD, the news distribution system of the headquarters and branches were migrated to run on HUAWEI CLOUD within one month. Previously, the migrations took at least one or two years.

Data migration is complex and successful migration speaks to the close collaboration between Xinhua and HUAWEI CLOUD. The technical team of Xinhua transferred the application data and applications to HUAWEI CLOUD, which then installed and deployed the apps. During the migration of the Singapore node (the most important node of Xinhua), HUAWEI CLOUD dispatched a database expert to work with the technical team of Xinhua specifically on optimization and data transmission. Xinhua was impressed with the professional services of HUAWEI CLOUD.

Which cloud services provider dedicates itself to your future? HUAWEI CLOUD answers that question with the way it does business.

HUAWEI CLOUD Rendering Service Brings Museums to Life

■ Liu Min/Tang Yuxiang

Two years ago, a documentary titled *Master in the Forbidden City* [1] revealed the restoration processes and technologies involved in restoring relics to their past glory, demystifying the practice for many viewers. New tech is also revamping the way museums do business. Many people are no longer satisfied with the dimly lit, still cultural relics, and cold exhibit descriptions that confined the model in the past. Visitors want to experience the items, immerse into the past and see the context that the relics fit into, and how the evidentiary pieces helped progress civilization. As such, many museums are innovating in restoration of artifacts and blending tech into how the pieces are presented to the public.

It has become common to see tour guides ready with their speakers and head - set microphones outside of historical and culturally significant sites to take visitors around and expand on the backdrops. While this improves the experience and educates the visitor, the visual impact is missing and viewing cultural relics for far off is not as exciting as getting an immersive experience. Xi'an, once the capital

of China, is the site of several of the most important dynasties in Chinese history. The Qin Render Cloud presents the story behind the female dancer figurine in the Han Dynasty and major historical events in and around Xi'an, and it does it all powered on the HUAWEI CLOUD. Relics are brought to life, and visitors can become literal eye witnesses to the 360 - degree backdrop of the times, almost as if they were transported back to sites thousands of years ago.[2]

Xi'an, as the birthplace of the ancient Chinese civilization and nation, has rich history and many museums. In 2018, Digital Qinhan Silk Road Museum solution was initiated based on tech from HUAWEI CLOUD. Cultural relics now come to life with the click of button.

Cloud rendering technology animates the relics in projections above the displays. Cold statues are given movement in the renderings, as tech and history dance to give visitors an unforgettable experience every time. Legendary events, historical dances, and even figures are anthropomorphized right in front of tourists. New levels of fun and learning are now built into the museum visits.

With the interactive 3D, AR, and VR technologies of Qin Render Cloud, tourists no longer feel unengaged from being segregated to a distant view. They can tap on the screen to zoom in or out and rotate the images.

Huawei's contributions to this transformation are extensive. Object Storage Service (OBS) on HUAWEI CLOUD adopts advanced technology to improve the upload bandwidth utilization rate to 95% or more for Qin Render Cloud – 300% higher than previous transmission speed.

A great number of computing resources are required to reproduce the historical scenes and likenesses of the items ranging from bronze lamps from the Han Dynasty to the colored pottery of the Yangshao Culture. With the auto scaling capabilities of HUAWEI CLOUD, Qin Render Cloud can schedule tens of thousands of cloud servers across the country and even across the globe, minimizing the usage cost and improving the CPU usage. Classic culture is being revived with the support of modern technologies.

HUAWEI CLOUD partners with Qin Render Cloud to lead to a new era with the conveniences and affordability of its public cloud offerings. With the massive cloud resources available on the cloud services arm of the tech conglomerate, Qin Render Cloud improves the resource layout, rendering scale and rendering efficiency of its entire profile.

With the AI-powered cloud computing and big data solutions on HUAWEI CLOUD, time - consuming and costly rendering services for massive content is now placed well within budgets while delivering ultimate UX.

In addition to cooperation in the cloud rendering industry, HUAWEI CLOUD has built up its services and relationships with many other industries. The cloud service brand is connecting the physical and virtual worlds with impressive smart utilities to power any profile, no matter the scale. With the 30 years of technical accumulation in ICT tech of the parent company, HUAWEI CLOUD is upping its investments in the cloud field to demonstrate its long-term staying power, welcoming users of all types to take advantage of its Inclusive AI strategy featuring affordability, ramped - up utilities, and hallmarked stability. Organizations of all sizes are accelerating their digital transformations and cloud adoptions.

Huawei's AI strategy and full - stack, all - scenario AI portfolio was first released at Huawei Connect 2018. More and more adopters, like Qin Render Cloud, are banding together with HUAWEI CLOUD to innovate and completely rethink traditional models as the Activate Intelligence with the AI, cloud, big data, 5G, IoT, rendering, and long list of other services and utilities available with the service brand. Find out what HUAWEI CLOUD can do for your organization!

1. This documentary shines light on the unsung life stories of restorers of cultural relics working inside the Forbidden City, together with the history of the antiques and the palace, the procedures of restoration and the development of cultural protection.

2. The Han Dynasty, the second imperial dynasty of China (206 BC to 220 AD).

HUAWEI CLOUD Powers Special Effects Rendering in Macrograph's Post - Production of Operation Red Sea

■ by Chen Guangcheng

Operation Red Sea, a 2018 Chinese action film, has 2200 special effects scenes and 1000 3D - rendering shots. The special effects took two years to complete, and the latter more than 25,000 hours. This blockbuster was highly acclaimed nationally and internationally, and left viewers with spectacular scenes and an immersive - like experience. Yet, few consider the effort that goes into the thousands of elaborately rendered shots that make it feel real.

Macrograph, a famous film and television post-production company based in Seoul, South Korea, has taken on several films in recent years, including *Operation Red Sea* and *The Mermaid*. These films are noteworthy because they have captivated audiences everywhere with sophisticated production and extravagant special effects.

Viewers these days are expecting to be thrilled in their movie - going experience. Intense special effects have become the norm, and new tech is helping improve film production. The special effects in the 2016 movie *The Mermaid* accounted for 37.5% of the total budget. While making the movie, Macrograph and dIFFERENT dIGITAL dESIGN lTD, a studio in Hong Kong specializing in visual effects (VFX) and animation, produced a total of 1000 special effects shots. Qin Render Cloud, a leading cloud-based rendering platform, completed 600 3D - rendering shots taking more than 10,000 hours. Think that's impressive? Think again. These figures doubled in *Operation Red Sea*.

Special effects in movies, TV shows, and online series are improving dramatically. In addition to satisfying the VFX requirements of audiences, studios face problems in the production cycle with all the work that needs to go into the post-production. During film production, rendering takes a relatively long time, and this bottleneck is becoming increasingly more apparent.

Cloud - based Rendering Dramatically Improves Special Effects Production

For the average scene in a film, if a single frame takes half an hour to render, and there are at least 24 frames per second, rendering a one-minute video clip would take a month. The rendering time has a direct impact on the standby time of special effects personnel — the longer the rendering time, the lower the overall production efficiency. To improve turnaround, many producers elect to place this process in the hands of rendering farms (centers specifically dedicated to rendering that have a certain number of servers depending on the needs). Large special effects companies typically purchase large - capacity rendering farms.

Macrograph's annual project production volume and use of rendering farm capacity are often hard to predict, frequently encountering large fluctuations. The dynamics of production leave some rendering farm devices idle in certain phases of each project. For example, many movies are released during the Chinese New Year holiday. The actual filming starts at the beginning of the year, leaving post - production for the second half of the year, which is when rendering farm device use significantly increases. In contrast, rough estimates put the average utilization rate of rendering farms in China during the first half of the year at generally less than 25%, a situation that requires remedy as idle devices are unable to produce revenue.

With massive computing and elastic scaling capabilities, cloud rendering is becoming the solution to improve the utilization of rendering farm devices while reducing the number of idle resources, space taken up by devices, and depreciation costs. Cloud rendering has become the future direction of special effects in post-production.

HUAWEI CLOUD Delivers Unlimited Computing Firepower for Macrograph

Cloud computing provides virtually unlimited computing power for visual effects, bringing creativity to life. To explore the potential of cloud computing in film - making, Macrograph has partnered with HUAWEI CLOUD to benefit from cloud - based rendering. On the Xi'an leg of the HUAWEI CLOUD China Tour in 2018 (a series of activities held in eight cities), Lee In - ho, CEO of Macrograph, described plans to build a cloud - based rendering and special effects production platform supported by Huawei's leading ICT infrastructure and global service capabilities. With these platforms, the best film and TV special effects artists worldwide can participate in project production anytime, anywhere – revolutionizing work methods.

HUAWEI CLOUD provides high - performance, reliable, and secure computing, storage, and network services to fully satisfy even the highest of requirements in rendering, yielding the much sought - after reductions in the production cycle while increasing the bottom line for studios. Lee In - ho added that Huawei has strong O&M and industry - leading infrastructure capabilities and resources worldwide.

How does HUAWEI CLOUD integrate with Macrograph's businesses? Mr. Lee says HUAWEI CLOUD's high - performance cloud services allow their rendering work to be carried out quickly and smoothly. HUAWEI CLOUD provides diverse, cutting - edge technologies, such as Elastic Cloud Server (ECS), Image Management Service (IMS), Auto Scaling (AS), Elastic Load Balance (ELB), Virtual Private Cloud (VPC), and NAT Gateway (NAT). These technologies enable Macrograph to customize the rendering environment to suit their in - the - moment requirements.

In addition, with the strong manageability of ECS, Macrograph can effectively manage multiple rendering nodes using Queenbee (a Macrograph - developed special effects process management software) and apply these ECSs to their automatic management system. Based on HUAWEI CLOUD's excellent ECS performance and AS and ELB functions, Macrograph has developed a rendering farm management software (RMS) that can scale up or down the number of rendering nodes on demand and automatically analyze and render shots without any additional programing or operation, adding in all new conveniences to special effects processes.

Macrograph knows HUAWEI CLOUD is investing heavily in and in it for the long run, finding ways to combine VFX and cloud technologies to improve rendering while reducing overall production and operation costs. CEO Lee commented, "We agree that future investment in the VFX field is very important. Therefore, we plan to conduct joint research and development with HUAWEI CLOUD to explore the future of special effects technology."

Macrograph is able to run a stable production environment on the HUAWEI CLOUD. The build not only serves the development of the film industry in China and South Korea, but also extends the global stage for Macrograph to produce top creative digital content.

HUAWEI CLOUD Accelerates Innovation

The innovation binding HUAWEI CLOUD and Macrograph is technology - driven. HUAWEI CLOUD dedication to technological development is echoed in its new slogan, "HUAWEI CLOUD: Leading Edge, Future Ready, Trustworthy". HUAWEI CLOUD continues to open up its capabilities so companies can upgrade their services and innovate with intelligent utilities.

In 2018, Zheng Yelai, President of Huawei's Cloud BU, shared the brand's general approach to technical development and project experience in a series of speeches on accelerating innovation. He often spoke to the new tech graft - ins and how HUAWEI CLOUD is committed to building inclusive, affordable, effective, and reliable AI - enabled platforms. HUAWEI CLOUD has released a series of AI - related services, such as Deep Learning Service (DLS), ImageSearch, Enterprise Intelligence, and Video to promote commercialization with the affordability of mature - tech pricing.

HUAWEI CLOUD helps smooth out transformation, supports growth, and provides the tools organizations of all sizes need to overcome business challenges. HUAWEI CLOUD is fostering a robust ecosystem supporting application, content, and cloud - based developments for customers and partners.

HUAWEI CLOUD provides advanced platforms and the latest technologies tunable to the specifics of industries and individual customer requirements, becoming a solid base for enterprise innovation. Customers, partners, developers, and a long list of others are all benefiting from the power, convenience, and innovation capabilities of the HUAWEI CLOUD — find out what the cloud brand can do for your organization!

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Leading Technology, Future-oriented, Trustworthy

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