One Net: Connect Everyone, Connect as One
Efficient Data Network Ensures China Energy Safety
Backbone Network Project for CNPC

Smart Pipeline, Effective Communication
The Project of Communication and SCADA System for the Long Distance Gas Pipeline in Kazakhstan

Huawei Helps Qinghai Oilfield Develop an Optimal OTN

Make IT Simple, Make Business Agile
Huawei Container Data Center Helps HATCH Strike Gold
Huawei Helps Codelco Build a Mobile and Reliable Data Center
Petrobras Brings in a Gusher with Huawei Containerized Data Centers
Sinopec Group Builds a Cloud Resource Pool with Huawei's Servers
Huawei Data Backup Solution Helps CNOOC Quickly Back Up Massive Amounts of Data
Huawei Helps China Shenhua Group Build an Efficient Cloud Data Center
Shenhua Group Builds a Centralized OA System with Huawei’s Servers
Bringing Multi-modal Enterprise Collaboration to Your Fingertips

Huawei Telepresence Solution Provides Immersive Service Experience for CCSJCC
CCSJCC Telepresence Project

Boundless, Professional Wireless Broadband

World's First CDMA2000 Digital Mine
Underground Communications Project for Xinwen Mining Group

Latest Trend in Oilfield Automation
Sinkiang Oilfield LTE Wireless IoT Project

World's First Offshore LTE Based Wireless Broadband Network
Norwegian North Sea LTE Wireless Coverage Case
 Huawei provides a full series of network infrastructure products and solutions such as routers, switches, Wi-Fi, WLAN, network security, optical transmission, microwave, PON, and network management. Through the collaboration between different technologies, such as network and security, wired and wireless networks, datacom and access, DCN and storage, Huawei can help enterprise customers build their network infrastructure platforms covering campus, branch offices, wide area connections, and data centers, to provide comprehensive enterprise network solutions.

One Net: Connect Everyone, Connect as One
One Net: Connect Everyone, Connect as One
Efficient Data Network Ensures China Energy Safety

Backbone Network Project for CNPC

Background
China National Petroleum Corporation (CNPC) is an integrated international energy company with businesses and operations covering six main sectors: oil and gas operations, engineering technical services, petroleum engineering, petroleum equipment manufacturing, finance, and new energy development. CNPC is the main oil and gas producer and supplier in China. In 2011, it ranked 5th in the world's Top 50 petroleum companies and 6th in Fortune Magazine's Global 500.

Key Challenges
CNPC's Wide Area Network (WAN) throughout the country is an important part of its IT-enabled network infrastructure construction. The nationwide WAN ensures that CNPC's professional application systems run stably and reliably, and with reliable end-to-end data transmission. It shall adopt future oriented technologies to ensure technical advantages, meet service requirements, and better support CNPC's operations. The WAN, as the most important part of CNPC's IT-based development initiatives, must meet the following requirements:

- Proper network design, which meets service requirements and ensures technical advantages
  This project covered many areas and entailed complex technologies, as well as topology restructuring, device replacement, and link expansion for existing equipment all over China. As a result, CNPC needed to select an ICT supplier with rich experiences of building largescale networks to ensure proper and advanced network design that could meet current and future service demands.
- Reliable and secure multi-service support
  CNPC required a secure, stable, and efficient data bearer network that stays connected under a variety of complex environments. In addition, the data bearer network must support a broad range of services, such as production, Office Automation (OA), video conference and voice services.

Solution
After analyzing CNPC’s service development requirements and live network conditions, Huawei offered CNPC an efficient, unified IP-based solution
To ensure end-to-end data transmission reliability, Huawei offered CNPC an efficient, unified IP-based solution with a hierarchical tree structure. With its comprehensive information security and management functions, this solution would help CNPC create a secure, stable, and efficient IT-based platform, supporting all CNPC information application systems.

Customer Benefits
With Huawei's solution, CNPC builds a secure, stable, reliable, and efficient IT-enabled platform, which accommodates future service growth. This platform satisfies reliable network transmission for CNPC's wide range of services, such as Enterprise Resource Planning (ERP), OA, financial management, production, video conference, and procurement. The benefits include the following:

• The reliable network infrastructure interconnects networks at three different levels: CNPC headquarters, regional centers and local centers. After completion of the project, 12 regions, more than 150 branches and the headquarters will be reliably connected. Network capacity and network bandwidth can grow tens of times, fully meeting CNPC's service demands for the next five to ten years.

• Unified service supports facilitates cross-departmental collaboration and accelerates decision-making: The new WAN centrally bears both production and OA services, facilitating office collaboration between CNPC departments and organizations, and laying a solid information network basis for CNPC's corporate management. Upon the completion of the WAN project, CNPC can:
  • Centrally manage services and business
  • Improve management with IT technologies
  • Increase production efficiency while achieving business growth
  • Drive the cooperation to make more techno-logical and management innovations
All of these benefits can help CNPC achieve the goal of becoming a first-class global energy enterprise by the end of 2020.
Smart Pipeline, Effective Communication

The Project of Communication and SCADA System for the Long Distance Gas Pipeline in Kazakhstan

Background
With a total length of ten thousands kilometers, the Central Asia–China gas pipeline bestrides Turkmenistan, Uzbekistan, Kazakhstan and China. As the longest gas pipeline in the world, it plays a very important role in the national energy strategy of countries along. As a joint venture of the China National Petroleum Corporation (CNPC) and the Kazakhstan Oil (KTO), Asia Gas Pipeline (AGP) is responsible for the construction, operation and maintenance of the Central Asia–China gas pipeline in the Kazakhstan segment (1304 kilometers).

Key Challenges
Kazakhstan segment of Central Asia–China gas pipeline has more than 60 valve chambers, five compressor stations, and two metering stations. These sites are mostly distributed in deserted areas, therefore, safe operation and intelligent management is very important. The major challenges are as follows:

• High-safety equipment
  The high-risk and harsh environment faced by long-distance gas pipeline required strict enclosure protection class (IP65) and explosion-proof grade (II B T4) of the communication and SCADA equipment.

• Real-time communication
  The various parameters of the gas pipeline should be monitored in real time via fiber optic cables and satellites to ensure 100% uninterrupted transmission.

• Integration of multiple vendors' systems
  In addition to legacy devices used in transmission and data communication, AGP also needed to consider the laying of fiber optic cable, wireless cluster and shortwave as well as civil work of green fields, mobile communication vehicles, IP-PBX, earth stations for satellites and systems including management system (transnational satellites transmission), VC, IT server systems, video surveillance, Intrusion Detection Systems (IDS), Supervisory Control and Data Acquisition (SCADA) and so on.
• Harsh operating environment
Most stations and valve chambers are located in the desolate areas or even desert. To ensure pipeline safety, it is critical to protect the normal collection and real-time transmission of the pressure, flow, temperature, and other important signals.

• Complex transnational coordination
This pipeline bestrode four countries: Turkmenistan, Uzbekistan, Kazakhstan, and China. AGP needed to ensure the smooth interconnection between Central Asia–China gas pipeline and the West-to-East Gas Pipeline in Chinese territory. The accuracy of information exchange and transnational measurement, seamless connection between Uzbekistan segment and Chinese segment, and real-time communication between Beijing and Astana control center must be guaranteed.

• Other challenges
The project must deal with the wireless environmental assessment, licenses applying of satellites, clusters, short waves, and applications of a large number of fire-fighting systems.

Solution
In order to ensure the real-time and uninterrupted transmission of SCADA data, Huawei proposed a solution using optical transmission as the primary channel, and satellite transmission as the auxiliary channel.

To guarantee the communication coverage along the pipeline for patrol, Huawei provided wireless-cluster and shortwave system solutions, which established wireless and shortwave stations in each major stations (gas compression and metering stations). Furthermore, three Emergency Communications Vehicles (ECVs) were used to ensure uninterrupted communication along the whole line on standby.

To keep pipeline safe, CCTV & IDS solution was also provided by Huawei. CCTV system was installed in each valve chamber and CCTV with laser intrusion detection systems were installed in major stations, to enable realtime monitoring.

For the system communication, Huawei provided a unified solution that integrates voice over IP, IT server and high-definition video for IP-PBX voice system, video conferencing system and office collaboration software to support daily office operations. Meanwhile, the cluster communication system was utilized in producing scheduling which made the communication lower latency, faster and higher quality.

For the energy supply, this solution provided CCVT generators which took natural gas as fuel, and the electricity demand could be satisfied due to 4000W power when the dual generators were running.

Customer Benefits
After the completion of the project, 33 RTU valve chambers operated properly even when left unattended. The number of officers in the five compressor and two metering stations was reduced by 50 percent. Especially, the timeliness and accuracy of the transnational measurement data was improved greatly. In the past, transnational natural gas metering was operated manually. The difference among different countries for gas measurement brought disagreements among owners, customs and commodity inspectors from Uzbekistan, Kazakhstan and China, even the subtle differences. But after this project, the unified access to SCADA system made the data consistent and timely.

It was worth mentioning that the run-through of last 4.5 km fiber optic cable on the border of China and Kazakhstan mean the physical connectivity between Central Asia–China gas pipeline and China Westto-East gas pipeline for the first time on December 25th, 2011. Moreover, the fiber optic cable along the pipeline laid a physical foundation for unified control and management.

Jin Qingguo, the chief representative of AGP, says that: during the whole project, the effort from Huawei project management team is worthy of praise in the entire delivery, and the results proved to be excellent. Generally speaking, this project is one of the most successful projects of oil communication and SCADA overseas!
Huawei Helps Qinghai Oilfield Develop an Optimal OTN

Background
Qinghai Oilfield is located in the northwest corner of Qinghai Province. It is one of China's key areas for onshore oil and gas exploration. Presently, Qinghai Oilfield provides oil and gas resources for multiple major cities, including Xining, Lanzhou, Yinchuan, and Beijing, using six gas pipelines and one oil pipeline. China National Petroleum Corporation (CNPC, Qinghai Oilfield's parent company) plans to increase Qinghai Oilfield's annual oil and gas output to tens of millions of tons by the end of 2015. Production growth brings higher ICT requirements to operation sites, offices, and living areas.

Key Challenges
The popularity of Internet technologies and ICT-based oilfield development bring increasing requirements on Qinghai Oilfield's backbone network bandwidth. The legacy backbone network had a total of 10G bandwidth, which could not meet the oilfield's service increasing requirements. Qinghai Oilfield faced the following challenges:

- Fiber resource shortage

The legacy Multi-Service Transport Platform (MSTP) networks consumed huge amounts of fiber resources during network expansion. The harsh environments imposed additional workloads and costs to fiber deployment.

- Limited network scalability
Qinghai Oilfield enjoyed rapid development in recent years. System expansion alone could not meet the service increasing requirements in the next five to eight years. The oilfield required a large-capacity OTN network to support its service development initiatives.

- Lack of end-to-end security
CNPC's backbone network will soon be extended to China's Northwest region. Qinghai Oilfield's OTN network will be connected to CNPC's backbone network by the end of 2015. Therefore, a new OTN network is required to support end-to-end security.

Solution
Huawei uses the OSN8800 intelligent Wavelength Division Multiplexer devices to develop a large-capacity bandwidth resource pool. This future-proof resource pool helps Qinghai Oilfield address
As one of China’s first group of onshore oilfields, Qinghai Oilfield plays an important role in the development of China’s energy industry. The oilfield is located in the Qaidam Basin. The harsh environment brings forth a lot of challenges, including high consumption of fiber resources, difficulties in system expansion, and requirements for end-to-end security. Huawei uses the OSN8800 intelligent Wavelength-Division Multiplexing devices to develop the highly reliable optical transport network (OTN) solution. >>

the above-mentioned challenges. The solution consists of the following parts:

• **System**

Huawei deploys the advanced OTN transmission system to support Long-Term Evolution (LTE) into 40G and 100G networks. In the Phase-1 project, the system uses the OTN electrical cross-connection function to converge small-granularity STM-N and GE services to 10G wavelength for unified data transmission control, greatly improving the usage of wavelength resources. OSN8000 series devices support the smooth evolution from 80 x 10G to 80 x 100G. The network bandwidth can be expanded up to 8 Tbit/s in the future.

• **Network**

The network uses ODUk Sub-Network Connection Protection (SNCP) scheme, the one of most reliable OTN protection technologies, to enable service switchover within 50 ms. The system supports the installation of the Automatic Switch Optical Network (ASON) intelligent control plane. This plane can effectively prevent multi-point failure and protect network reliability in harsh environments.

• **Boards**

Boards used in client side support access speeds ranging from 100 Mbit/s to 2.5 Gbit/s. These boards can meet the access requirements of all services configured in the Phase-1 project. All modules support plug-and-play, allowing backups of multiple services and modules, and significantly reducing the requirements for spare part storage.

• **NMS**

The solution uses Huawei’s iManager U2000 network management system (NMS) to dispatch services and manage network elements (NEs). U2000 supports both new and legacy networks, allowing for unified management of all transmission devices and simplifying network maintenance.

**Customer Benefits**

The OTN solution provides the following customer benefits:

• **Sufficient bandwidth resources**

Featuring advanced technologies, higher scalability, and larger bandwidth, this large-scale OTN can effectively support the development of Qinghai Oilfield’s services, including digital oilfield, in the next five to ten years.

• **Higher reliability**

This solution enhances the network reliability, laying a solid foundation for Qinghai Oilfield’s ICT-based development. The OTN shares the traffic of large-granularity services in legacy SDH and MSTP networks to lower the risk of network congestion. The OTN also supports the smooth evolution into the Mesh network and direct upgrade to the ASON, allowing the OTN to provide diamond-level protection for key production services, such as supervisory control and data acquisition (SCADA).

• **Simplified maintenance**

The OTN features quick deployment. The system provides sufficient bandwidth resources for operation sites, offices, and living areas without service configuration adjustments. The iManager U2000 NMS provides a graphical user interface (GUI) to simplify system management and maintenance. U2000 enables unified management of all NEs used in Qinghai Oilfield’s OTN, MSTP networks, significantly reducing the system maintenance workloads and improving the system’s operational efficiency.
With the development of cloud computing, Huawei offers customers storage, servers, cloud computing and data centers, and ICT products and solutions. Huawei also cooperates with more than 400 partners such as Intel, SAP, and CA, to provide IT industry solutions. These solutions enable customers to build advanced, efficient IT platforms which help them adapt to changes in enterprise business.

Make IT Simple, Make Business Agile
Make IT Simple,
Make Business Agile
Huawei Container Data Center Helps HATCH Strike Gold

Background
HATCH is an employee-owned, multidisciplinary professional services firm headquartered in Canada. HATCH delivers a comprehensive array of technical and strategic services, including consulting, information technology, engineering, process development, and project and construction management to the mining, metallurgical, energy, and infrastructure sectors. HATCH has served clients for over 80 years, with project experience in more than 150 countries and more than US$35 billion in projects under management.

Key Challenges
As an industry-leading consulting firm, HATCH provides dedicated services, such as geological prospecting, mining project design, system data management, technical information processing, and mineral dressing for enterprises in mining, mineral dressing, and metallurgy industries. In 2011, HATCH began a mining project solution for Canada-based Kinross, one of the world’s biggest gold mining companies, to help improve operations at their mine in Tasiast, a desert area in Mauritania. The Tasiast gold mine is one of the world’s largest.

In 2010, Kinross purchased 91% of Australia’s Red Back Mining, Inc., the owner of the Tasiast gold mine, for US$7.1 billion. As part of the purchase, Kinross planned to improve exploration efficiency at the Tasiast mine. To achieve this goal, Kinross needed to increase the efficiency of the already-in-place exploration points or look for new ones. In any case, Kinross sought to reduce production costs and improve Return on Investment (ROI). An expert from HATCH said, "As a consulting firm that has decades of experience in mining and mineral dressing, HATCH knows how to tailor a mining project solution to facilitate Kinross’ desert mining exploration, lower operation costs, and maximize the project ROI."

The development of a secure and reliable data center would play a major role in HATCH’s comprehensive mining project solution. Since the 1960s, computing technologies have been widely used in all aspects of the mining industry, including exploration, design, construction, production, and management. These technologies cover multiple fields, such as scientific computing, data processing, automatic control, operation, and management. In the last few years, information technologies have become increasingly important in improving mining resource usage, protecting mining operation security, and lowering enterprise production costs. Mineral companies need a
Huawei's all-in-one container data center solution has an impressive design, applying to HATCH's onsite operation environments. This cost-effective solution fully meets HATCH's data center service requirements in the Tasiast gold mining project.

According to the expert from HATCH:

"We carefully assessed the data center of the Tasiast gold mine and found that the equipment room was already at full capacity and no more free space was available for new devices."

As such, HATCH planned to build a new data center to cope with service expansion requirements.

The expert from HATCH further explained:

"Traditionally, we need to construct a new data center equipment room. The construction involves civil engineering, power supply, air conditioning, fire control, and cabling. These systems and operations will not only significantly raise the investment costs, but also require a longer data center construction period. In most mining projects, HATCH needs to frequently relocate devices and personnel to support exploration in different sites; however, the desert environment is quite different. If we construct permanent and semi-permanent data center facilitates, we will face challenges not only in site selection at present, but also device relocation in the future."

HATCH needed a new data center solution to solve all the preceding challenges and required that the data center meet Tier 3 requirements to eliminate the risk of a single point of failure, thereby ensuring service continuity.

Solution

At the beginning of 2012, Huawei designed a complete solution for Hatch based on the Huawei all-in-one IDS1000-A container data center. The IDS1000-A complies with Tier 3 standards. By integrating all required components in a single container, the IDS1000-A solution can be quickly deployed, relocated to any environment, and expanded based on service requirements. The container has a built-in power supply and distribution system, cooling system, cabinets, cables, fire control module, and security protection system, providing communication and collaboration services for onsite personnel.

The design of the all-in-one IDS1000-A solution impressed HATCH:

"First, HATCH no longer needs to worry about the design and operation of the data center equipment room because Huawei has already solved these problems ahead of time for us. Second, this mobile container data center can be easily deployed at any location where a power supply and a network connection are available."

HATCH was also satisfied with IDS1000-A’s environment adaptation capability, saying:

"The Tasiast gold mine is located in a desert that features harsh natural environments, large temperature differences, and frequent sand storms. Huawei's IDS1000-A meets the IP55 protection standards and has a working temperature range from –40°C to +55°C, meeting the Tasiast gold mine's operation requirements."

The IDS1000-A accommodates a maximum of eight 19-inch IT cabinets, which is anticipated to meet the Tasiast gold mine data center service requirements for the next five years. HATCH plans to migrate the existing data center devices to the IDS1000-A system. In the next few years, the IDS1000-A system will become HATCH’s mobile data center, allowing the firm to easily relocate IT system devices to new operation sites.

Customer Benefits

The IDS1000-A container data center solution delivers the following benefits for HATCH:

- All-in-one design, minimal civil engineering, one-week installation period, and 40% reduction in initial investment costs.
- Tailored, natural-cooling design, reducing the Power Usage Efficiency (PUE) to less than 1.5, and an intelligent Operation and Maintenance (O&M) and management platform, allowing 24/7 unattended operation and reducing system O&M costs by 30%.
- Adaptable to a variety of environments and simplified device migration, meeting mobile operation requirements in the mining area.
Huawei Helps Codelco Build a Mobile and Reliable Data Center

Background
Codelco is the largest state-owned enterprise in Chile and the largest copper mining company in the world, owning 20% of the world’s known copper reserves. The company and its subsidiaries have a total workforce of about 20,000 internal employees and 40,000 outsourced employees. It boasts over US$20.835 billion in assets and produces 1.78 million tons of refined copper (including its interest in the El Abra Mine), 11% of the world total.

In order to improve mining efficiency and production security, Codelco attaches great importance to information and automation technologies. Over the past years, the company has invested billions of dollars in transmission, network, data center, software, and automation fields. Its investment continues to increase annually.

Key Challenges
Codelco required a data center to monitor environment indicators and control the operation of unmanned trucks in mining areas. The new data center had to meet the following requirements:
• To automatically control mining operations, the data center must be as close to mining wells as possible to ensure high security and reliability of device operation.
• The data center must support high mobility, so that it can be migrated to another mine when mineral resources in a mine are exhausted.
• The data center must adapt to harsh environments in mining areas, including sparse population, inconvenient transportation, unstable power and water supply, and heavy dust.

Solution
After meticulous analysis of customer requirements, Huawei offered Codelco a green, secure, and reliable mobile data center solution to automate mining operations and promote IT-led transformation.
Huawei's all-in-one container data center solution uses a single cabinet to neatly integrate a wide assortment of modules, including IT cabinet, power supply, cooling, fire control, generic cabling, monitoring, and surge protection. The solution also deploys a variety of IT devices, including servers as well as storage, network, and security devices for:

- Information-led production scheduling
- Production automation
- Production monitoring
- Positioning and attendance check of underground workers
- Office automation

In addition to features offered by a traditional data center, the solution supports outdoor deployment and flexible migration. The efficient, eco-friendly, and high-density solution poses low requirements on infrastructure and adapts to a variety of environments, dramatically reducing the customer's capital and operating expenditures.

**Customer Benefits**

Huawei's solution brought the following compelling benefits for the customer:

- **Quick deployment:** Completed onsite deployment and commissioning within a week.
- **High mobility:** Supported data center migration from exhausted mines to new mines, greatly reducing investment costs.
- **Strong adaptation:** Perfectly adapted to harsh environments.
- **Low power usage effectiveness (PUE) and high integration:** Reduced about 40% heat dissipation, 25% power consumption, 35% CAPEX, and 30% operations and maintenance (O&M) costs.
- **High efficiency:** Dramatically enhanced protection automation and promoted IT-led transformation.
Petrobras Brings in a Gusher with Huawei Containerized Data Centers

Background
Petrobras Distribuidora, a subsidiary of Petroleo Brasileiro SA (Petrobras) markets and distributes throughout Brazil the petroleum products produced by its parent company. Petrobras Distribuidora delivers gas to about 7,000 service stations, which comprises the largest single network of stations in Brazil. The company also has more than 10,000 large customers in a variety of industries, power plants, airlines, and fleets of light and heavy vehicles. Today, Petrobras Distribuidora centralizes all its applications in a data center with high-end storage, data replication, and security.

Key Challenges
The centralized data center approach has advantages related to control and simplicity, but in the environment faced by Distribuidora, it also presented significant problems. These problems related to the cost of high-speed remote data communication lines and the overall response time needed by its customers.

Solution
After looking at a range of solutions, the company decided to keep mission-critical applications centralized in the data center while decentralizing non-mission-critical applications, based on the best cost/benefit for each environment. The best way to implement this strategy was to deploy mobile data centers close to end users. In most cases, end customers are located in refineries, where data centers need to be mobile in case of accidents. Because of the physical environment related to the locations, Distribuidora developed rigorous standards regarding data center construction and use.

Huawei provided a containerized data center which met all the requirements:
- Supported Petrobras data center standards.
- Modules included an internal Uninterruptible Power Supply (UPS) and a power generator. These provided the mobility requested by Petrobras.
Low data center construction costs made the decentralization project viable. All data center modules include a fire-fighting system, monitoring system, precision air cooling, UPS and batteries, video cameras, access control, and other elements. The systems can be installed in a unified manner and be monitored by Petrobras on a central monitoring station.

Customer Benefits

Petrobras is now able to decentralize non-mission-critical applications in cost-effective and flexible containerized data centers, while leaving mission-critical applications running in a replicated and nonstop environment. Running applications in the correct environment saves Petrobras money and focuses attention on mission-critical applications. The containerized level-3 data centers met Petrobras data center standards and provided the necessary mobility and security. In addition, because of the high energy efficiency: power usage effectiveness (PUE) of the containerized data center is less than 1.25, which saves 40 percent on electricity costs. Based on the success of the initial installation, Petrobras is ready to replicate the same solution in other refineries.
Sinopec Group Builds a Cloud Resource Pool with Huawei's Servers

**Background**

China Petrochemical Corporation (Sinopec Group) is a super-large, state-owned petroleum and petrochemical enterprise group established in July 1998. Sinopec Group's key business activities include: the exploration, production, storage and transportation, marketing, and comprehensive utilization of oil and natural gas; oil refining; the wholesale of gasoline, kerosene, and diesel; and the production, marketing, storage, and transportation of petrochemicals and other chemical products.

**Key Challenges**

In face of the increasing needs for motor fuels, Sinopec Group wanted to flexibly allocate fuel resources and ensure sufficient fuel supply without additional inventory costs. To achieve this goal, Sinopec Group had to address the following challenges:

- **Low IT resource utilization**
  Although, Sinopec Group had deployed various IT systems to accommodate continuous business growth, these IT systems were unable to play their role due to lack of unified planning and management, resulting in low IT resource utilization.

To improve resource utilization, Sinopec Group planned to centrally purchase IT infrastructures, primarily servers, to build a cloud resource pool at its headquarters and perform capacity expansion for existing IT systems used by its subordinates.

- **High O&M costs**
  Sinopec Group incurred substantial annual labor costs in device O&M. Therefore, it required a new resource pool to support unified resource scheduling, centralized device O&M, and deliver high reliability, manageability, and scalability.

- **Inefficient localization services**
  Sinopec Group's IT systems were dispersed geographically and usually did not receive efficient localization services in a timely manner when a fault occurred. In this context, Sinopec Group wanted the server vendor to provide "24/7 4H" localization services, meaning "24 hours a day, 7 days a week, and able to arrive at the scene within 4 hours."

**Solution**

In response to Sinopec Group's challenges, Huawei provided a holistic solution consisting of RH5885 V2 and RH1288 V2 rack servers as well as remote maintenance tools and software.
Thanks to their reliability comparable to midrange computers, high performance, and efficient operation and maintenance (O&M), Huawei's servers have been well recognized by Sinopec Group.

 RH5885 V2
Huawei deployed RH5885 V2 to build Sinopec Group's resource pool and deliver cloud-based computing resources. RH5885 V2 has the following features:
• Leverages the Peripheral Component Interconnect Express (PCIe) hot swap feature to effectuate efficient business operations and flexible resource scheduling.
• Supports smooth upgrade from 4 sockets to 8 sockets, ensuring worry-free business upgrade.
• Delivers high performance, large memory, and flexible input/output (I/O) interface expansion to meet capacity expansion requirements.
• Dramatically shortens maintenance time and minimizes server fault risks.

 RH1288 V2
Huawei also deployed RH1288 V2 to build Sinopec Group's resource pool and perform capacity expansion for existing IT systems used by the customer's subordinates. RH1288 V2 delivers high computing performance, large storage capacity, low energy consumption, flexible scalability, and simplified management and maintenance.

• Remote maintenance tools and software
Huawei deployed a wide range of remote maintenance tools, including iMedia (virtual media), keyboard, video and mouse (KVM) over IP, and Serial over LAN (SOL), allowing users to remotely manage servers regardless of whether an operating system is installed or functional.
Huawei's servers also comply with a lineup of standard management interfaces, including Intelligent Platform Management Interface 2.0 (IPMI2.0), Simple Network Management Protocol version 3 (SNMPv3), and Common Information Model (CIM). Such flexibility allows users to use either Huawei's management software eSight or third-party management software, facilitating remote and unified network management.

Customer Benefits
Huawei's server solution has brought the following benefits to the customer:
• High system reliability and IT resource utilization
Huawei's servers leverage fault-tolerant and hot-swappable architecture to deliver high reliability and maximize IT resource utilization.
• Reduced TCO
Huawei's servers have dramatically simplified network management, minimized fault risks, and reduced the total cost of ownership (TCO).
Smooth capacity expansion
Huawei's servers support smooth capacity expansion and can accommodate the customer's future business growth.
• "24/7 4H" localization services
With a wide range of remote maintenance tools, the customer can perform 24/7 remote network maintenance. With Huawei's global presence, Huawei's technical support engineers are able to arrive at the scene within four hours, helping the customer to locate and rectify faults in a timely manner.
Huawei Data Backup Solution Helps CNOOC Quickly Back Up Massive Amounts of Data

Background

China National Offshore Oil Corporation (CNOOC) is the largest offshore oil and gas producer in China. Founded in 1982 and headquartered in Beijing, CNOOC currently has a total workforce of 98,750, with a registered capital of CNY94.9 billion (about US$15.3 billion). The company has six main business divisions: oil & gas exploration and development; professional technical services; refining, sales, and fertilizers; natural gas and power generation; financial services; and alternative energy resources.

Key Challenges

CNOOC's information center in Beijing is the primary data center for administration and production operations. By implementing more IT technologies in the information center, CNOOC has been continuously optimizing its enterprise resource planning (ERP), finance, HR, and budgeting systems, streamlining organizational processes, and consolidating diverse resources. As a result, offshore oil production data can be collected, transmitted, and saved in real time; personnel at the onshore control center can remotely monitor and control offshore oilfields.

As production becomes increasingly automated, production data generated from services such as supervisory control and data acquisition (SCADA) grows quickly. Such production data is business-critical and it must be promptly backed up to ensure data security. However, CNOOC’s original data backup approaches had several shortcomings, including:

• Low data backup efficiency and long backup periods, negatively affecting ongoing services

Large amounts production data are generated every day, and the total data volume increases daily. Consequently, data backup was increasingly prolonged. Data was still being backed up even during peak service hours, which affected ongoing services.

To accelerate backup speeds using the existing data backup system structure, adding drives or tape libraries seemed to be the only way, but this
We are very concerned whether our IT systems are running as efficiently as they can. Of particular concern to us are effective data management and strong data security. Huawei's equipment was instrumental in helping us resolve data backup issues and meeting our requirements for system scalability.

Solution

After a meticulous selection process, CNOOC chose Huawei's data backup solution featuring quick data backup, large capacity, strong compatibility and scalability, and ease-of-management.

This solution uses the OceanStor VTL6900, Huawei's flagship virtual tape library (VTL) product, and incorporates IBM TSM and Symantec NBU backup software. By deploying Huawei's solution, CNOOC has greatly improved the data backup performance of its production systems and optimized data backup environments, preparing for future demands and capacity expansion.

Huawei's solution has many features:

- **High-performance data backup**
  Data backup performance reaches up to 2.5 GB/s, 10 times that of the original tape libraries. Such high efficiency dramatically reduces the impact of data backup on ongoing services.

- **Energy conservation and ease-of-management, considerably reducing maintenance costs**
  This solution reduces purchase costs and occupies less space in the equipment room. It also supports disk spin-down technology to power down idle disks, thereby reducing power consumption and extending disk lifespan.

- **High compatibility to protect investments**
  Huawei's OceanStor VTL6900 can be seamlessly incorporated into live backup networks to virtualize physical tape library systems, without requiring any changes to legacy production systems or backup policies. Such high compatibility protects investments.

- **Large capacity and easy scalability, fully adapting to future service demands**
  Huawei's OceanStor VTL6900 can easily scale to 384 TB, preparing CNOOC for future service demands.

Customer Benefits

- **The performance of CNOOC's data backup systems has grown more than 5-fold, with higher system speeds.** Even when multiple hosts need to back up data simultaneously, the data backup systems can quickly complete data backup within the specified time period. This ensures user data is safely protected and can be reliably accessed.

- **VTLs provided in the OceanStor VTL6900 seamlessly work with existing physical tape libraries.** They combine to implement hierarchical data storage and facilitate smooth upgrades. In the future, if the number of data backup clients and the volume of backup data increases, the data backup systems can smoothly scale up to accommodate the increased demand. This approach is more cost-effective and protects investments, without having to change existing data backup environments.

- **By using unified management methods, CNOOC can monitor system performance and status more effectively and easily complete system configurations.** As a result, management efficiency is increased by more than 50% and the management workload is greatly reduced.
Huawei Helps China Shenhua Group Build an Efficient Cloud Data Center

Background
Founded in October 1995, Shenhua Group Corporation Limited (Shenhua Group) is a leading state-owned mining and energy company in China and the largest coal-producing company in the world. Its main business includes coal production and sales, railway and port transportation of coal-related materials, as well as power generation and sales. Shenhua Group was ranked 178th on the Fortune 500 list in 2013.

Key Challenges
In recent years, Shenhua Group has been attaching great importance to information-led transformation. As a subsidiary of Shenhua Group, Yulin Shenhua Energy Co., Ltd. planned to build a high-level digital mine. However, the existing IT system and its architecture could not meet business growth any more.

- Low performance and resource utilization, unable to support new service requirements
In terms of performance and reliability, Shenhua Group's existing IT system could not meet resource requirements for the forthcoming office or production system, or continuous business growth in the next few years. The stovepipe architecture utilized only 10% to 30% of IT resources.
- High O&M workload and costs
Shenhua Group gradually introduced mutually separated management systems to manage the infrastructure, IT and network devices, and upper-layer applications. Maintenance personnel had to perform operation and maintenance (O&M) and fault location among these management systems, resulting in high O&M workload and costs.
- Low data reliability and security
The customer was also greatly concerned about low data reliability and security of the existing IT system.

Solution
In response, Huawei proposed a holistic cloud data center solution consisting of the cloud computing architecture, unified O&M platform, servers, 10GE
We singled out Huawei because its solution would integrate software and hardware and meet our performance requirements. The solution has helped us dramatically reduce IT maintenance workload while safeguarding data security.

networks, storage systems, security systems, and backup systems.

The cloud computing architecture integrates physical machines and virtual machines (VMs) to meet immediate and future business needs and support differentiated service features of production and office networks.

The solution offers clustered RH5885 servers to bear key database applications and deliver 99.9999% reliability. The solution also provides four-socket high-density computing blade servers E6000 (BH640) and the FusionSphere VM software to bear web, middleware, and VM applications, supporting multi-service resource sharing and on-demand resource allocation.

To effectuate multi-service and high-load data storage and expand performance, capacity, and bandwidth in the future, the solution uses Huawei's high-end storage system OceanStor 18500. OceanStor 18500 intelligently and efficiently manages massive data, including Automated Tiered Storage (ATS), Information Lifecycle Management (ILM), hot data access acceleration, and automatic load balancing. To accommodate multi-service differentiation, OceanStor 18500 leverages cache partition and intelligent quality of service (QoS) technologies to provide exclusive or priority storage resources for key services. In addition, OceanStor 18500 uses two-node clusters and dual arrays to deliver high availability and ensure service continuity, and works with an integrated backup system to provide periodic data backup.

The new data center bears the customer's production and office networks. It reinvents terminals in the office network through Huawei's FusionAccess virtual desktop and centrally stores IT resources. This simplifies routine terminal O&M without compromising data security.

Huawei incorporates the concepts of agile data center and agile IT into the management system ManageOne that provides unified data center O&M for the customer's maintenance personnel. The ManageOne allows maintenance personnel to perform active O&M over data center facilities, IT infrastructures, and application systems; centrally allocate physical and virtual resources; and maximize legacy devices and comply with third-party software and hardware resources. By doing so, the ManageOne significantly reduces O&M costs while improving O&M efficiency.

**Customer Benefits**

Huawei's solution has brought remarkable benefits to the customer. In addition to high performance and support for new services, the solution leverages virtualization technology to improve IT resource utilization to 60%; uses ManageOne to reduce maintenance workload by 50% and O&M costs by 30%; and centrally stores IT resources to enhance data security.

The new data center powerfully implements Yulin Shenhua's digital mine strategy and provides a highly scalable platform for the customer to achieve greater business success in the future.
Shenhua Group Builds a Centralized OA System with Huawei's Servers

Background
Founded in October 1995, Shenhua Group Corporation Limited (Shenhua Group) is a leading state-owned mining and energy company in China and the largest coal-producing company in the world. Its main business includes coal production and sales, railway and port transportation of coal-related materials, as well as power generation and sales. Shenhua Group was ranked 178th on the Fortune 500 list in 2013.

Key Challenges
To build a world-class mining and energy company, Shenhua Group has been attaching great importance to information-led transformation. One of the key measures is to build a centralized office automation (OA) system. When building the OA system, Shenhua Group faced the following challenges:

• Requiring a compatible platform and high-availability architecture

In its production center, Shenhua Group deployed two types of servers to provide basic platform services for application systems. High-performance rack servers ran key applications, including enterprise resource planning (ERP) and SAP. Other rack servers and blade servers were virtualized to run other application systems. A high-availability architecture was required in virtualized environments.

To ensure production data security and reliable system operation, Shenhua Group required a disaster recovery (DR) center. The DR center would be built on the server platform of the existing production center to enable intra-city DR and deliver high compatibility, scalability, and return on investment.

• Various service types and complex management

Shenhua Group has a variety of cross-organizational management processes, including ERP, customer relationship management (CRM), supplier relationship management (SRM), legal affairs, mechanisms, unified identification systems, and portal systems. These management processes must integrate with the new OA system. To safeguard data storage security and high Input/Output Operations Per Second (IOPS) for storage devices, the storage network would be separated from service networks, avoiding mutual interference between storage and...
In this OA project, Shenhua Group cooperated with Huawei because Huawei was able to deliver high-performance E9000 blade servers, robust R&D capabilities, and convenient after-sales service. Huawei’s end-to-end IDC solution and hardware portfolio have resolved various challenges for Shenhua Group. Huawei is a trustworthy IT supplier.

Service data. First, service networks in the DR center would be logically isolated. Then, a proper architecture would be designed for the core network in the DR center, accommodating massive service data among servers and dynamically migrating VMs.

To cover several subsidiaries and branches of Shenhua Group, the centralized OA system must remove organizational and geographical restrictions, implement knowledge and experience sharing, and remotely manage infrastructures, including servers.

Solution

In response to Shenhua Group’s challenges, Huawei proposed the blade server E9000 seamlessly integrating computing, network, and storage modules to deliver high performance, reliability, scalability, and manageability. Meanwhile, E9000 supports the evolution of switching technologies and three generations of CPUs in the next ten years, accommodating capacity expansion requirements.

The centralized OA system uses the 4-socket compute node CH240 to support four Intel E5-4600 v2 CPUs and 48 memory slots, delivering a capacity of 1.5 TB. Such a large capacity supports virtualization, multi-core, and high-memory computing capabilities. The OA system also complies with Citrix XenServer and VMWare ESX virtualization operating systems to support OA applications.

The E9000 switching module leverages the industry-leading data center switching technology to offer 32 uplink ports, 128 x 10GE interfaces, and multi-plane networking. The switching module provides rich data center features and high-performance stacking. It can be independently used or work with external large-capacity switches to build an elastic, virtualized, and converged data center network, meeting the data center’s network requirements in the cloud era. The OA system uses a network architecture consisting of regions and planes. The data center network is divided into management, service, and storage planes. To isolate service functions, the network is also divided into different service regions that are logically isolated with each other. This division ensures service security and reliability. In addition, the OA system uses the unified management software eSight to centrally manage all devices.

Customer Benefits

The centralized OA system contains Shenhua Group’s production data. Any mistake may cause severe outcomes. A reliable DR solution ensures high system reliability and service continuity. Huawei’s servers have brought the following benefits to the customer:

• Uses high-density blade servers to reduce the equipment footprint and cable connections, and simplify deployment, operation, and maintenance.
• Centrally manages computing, storage, and network modules and easily isolates management and service planes to ensure network service quality and security.
• Schedules resources in a unified manner to improve hardware resource utilization by 20% and reduce the total cost of ownership (TCO) by 30%. 

"
Huawei’s five core products – unified communications, contact centers, converged conference, telepresence, and video surveillance – provide solutions that free industrial customers from geographical and space limitations and help to build unified and efficient teams. Familiar applications include remote education, banking, offices, consultation, court sessions, and transportation monitoring.

Bringing Multi-modal Enterprise Collaboration to Your Fingertips
Huawei Telepresence Solution Provides Immersive Service Experience for CCSJCC

CCSJCC Telepresence Project

Background
Founded on August 28, 2009, CCSJCC (China Coal, Shanxi Jinhaiyang Clean Coal Co., Ltd.) now owns a total of US$1.36 billion assets which include 18 affiliated agencies, 8 coal mines, and 10 ground subsidiaries. CCSJCC’s business covers multiple industries, such as mining (including producing, transporting, selecting, and distributing coals), power generation, metallurgy, construction materials, and modern services.

Key Challenges
As a large company with offices spread across multiple locations, CCSJCC has frequent internal conferences. Its legacy SD conferencing system was unable to meet service requirements due to its limited video resolution and connection stability. The system has the following shortages:

- Limited stability
  The legacy video conferencing system suffered frequent connection failures. Devices used in the legacy system are aged SD ones.
- Low video resolution
  The SD video quality of the legacy system failed to meet customer requirements in video conferencing.
- Difficult operation and maintenance
  Maintenance was difficult because vendors no longer produced spare parts for the legacy devices and with its limited availability of IT technicians, CCSJCC required a system that was easy to operate and maintain.
- Unfavorable experience
  Unsatisfied with its low-experience legacy system, CCSJCC needed an advanced video conferencing system that featured reliable operation and optimal experience.
Huawei provides a panoramic telepresence solution that features large capacity and high reliability for China Coal, Shanxi Jinhaiyang Clean Coal Co., Ltd. (CCSJCC). The advanced conferencing solution significantly improves the company's internal communications efficiency.

Solution
Huawei provides a new panoramic telepresence solution that features enhanced security, high reliability, optimal experience, and simplified deployment to meet CCSJCC's service requirements.
Huawei deployed the telepresence 2.0 system in CCSJCC's Shuozhou and Beijing branches. These systems use diverse features, such as life-size images, face-to-face communication, and sound localization, to provide stable, HD, and immersive video conferencing experience.
For other small- and middle-sized branches, Huawei deploys the multi-functional RP200-55 to offer video conferencing services. These devices feature an integrated design, stylish appearance, easy installation, and simplified maintenance. Users on business trips can use software terminals to easily join video conferences.

Customer Benefits
The solution provides customers with the following benefits:
• High stability
  Huawei deployed the telepresence system to effectively support CCSJCC's service operation. The system has never encountered any connection failure or service interruption since its deployment. This earned high appraisal from CCSJCC citing its incredible performance and stability.
• Optimal experience
  The solution uses life-size images, face-to-face communication, and sound localization to provide immersive audio and video experience for CCSJCC's two major branches in Shuozhou and Beijing.
• Flexible access
  The system supports access from a variety of terminals. Users can utilize PCs, tables, and smart phones to join video conferences anytime, anywhere. This meets the service requirements of mobile office.
Utilizing its solid background in LTE, CDMA, and GSM mobile communication technologies, Huawei offers enterprise customers broadband trunking, video surveillance, long-distance coverage, E2E encryption, Location-Based Service (LBS), SMB solution LitePTT, GSM-R railway wireless dispatch, and high-speed train control infrastructure solutions.

Boundless, Professional Wireless Broadband
World's First CDMA2000 Digital Mine

Underground Communications Project for Xinwen Mining Group

Background

Founded in 1956, Xinwen Mining Group is a subsidiary of Shandong Energy Group which has an annual turnover of more than a hundred billion RMB and ranks 75th in the top 500 enterprises in China. In 2010, Xinwen Mining Group produced 37.23 million tons of raw coal, acquired CNY46.8 billion of sales revenues and ranked 14th in total strength and 9th in technological innovation capability among China's top 100 coal enterprises.

As PHS is gradually quitting from market, Safety Supervision Bureau, National Coal Association and major coal groups are actively exploring new ideas about the construction of underground communication.

Shandong Xinwen Mining Group, with state-of-the-art information technology concepts and ideas has begun to explore the TD-SCDMA technology used underground as early as in 2009. Now Xinwen Mining Group is exploring CDMA2000 technology to be used underground and it has succeeded. Through the services verification of its own, Xinwen Mining Group has developed many underground services based on 3G platform.

The rapid development of information technology of Xinwen Mining Group has great effect and important significance to other coal enterprises such as Shandong Energy Group, Pingdingshan Coal Group, Yanzhou Mining Group, ands Shendong Coal Group.

Key Challenges

To deploy the first digital mining field as soon as possible and complete the 3G pilot application task assigned by Shandong Energy Group, Xinwen Mining Group focused on combining 3G communications technologies with mining applications. Because of the unsuccessful TDSCDMA pilot project before, Xinwen Mining Group is urged to find a new technology which is more suitable for underground communication when PHS is quitting from market.

- How to find a technology which is more suitable for underground applications after TDSCDMA has been tried

The TD-SCDMA solution was tried in 2010, but...
Focusing on the direction of infrastructure solution providing and in-depth solution cooperation, Huawei constructs a high speed data channel based on 3G (CDMA2000) within the range of digital mine to realize the unified data transportation of voice, underground measuring, environment monitoring, vehicle information collection, and personnel positioning.

its volume, coverage, capacity and stability could not reach the same level as PHS's and its data capability could not meet the service requirements of digital. The customer is now looking for other better technology. After deeply researching and studying, the customer has decided to choose Huawei to provide the 3G (CDMA2000) solution for verification and this solution can meet the key requirements such as small volume, wide coverage and high capacity for underground applications and it is the best solution for underground communications.

- **How to deploy more services based on 3G platform**
  3G is the mainstream technology in the industry but it lacks enough services and applications. So, how to deploy more services on 3G and how to converge the underground applications such as measuring, positioning, and video surveillance on 3G in order to make full use of 3G network become an important problem that needs to be considered.

**Solution**

Focusing on the direction of infrastructure solution providing and depth solution cooperation, Huawei constructs a high speed data channel based on 3G (CDMA2000) within the range of digital mine to realize the unified data transportation of voice, underground measuring, environment monitoring, vehicle information collection, and personnel positioning.

Based on Xinwen Mining Group's deep understanding and extensive experience in mining informationization and providing interconnection to the systems of distinguished service providers such as DongHua and XiuPai etc, Huawei has enriched the services of digital mine and made the 3G technology to have been really applied underground.

- **Infrastructure solution providing**
  To leverage 3G (CDMA2000) platform's technological advantages to provide basic communications services such as voice, data, SMS, dispatching, and trunking.

- **Voice service**: to provide more seamless and higher quality voice service than PHS.
- **Data service**: Based on the 3.1 Mbps (downlink) and 1.8 Mbps (uplink) data channels of 3G (CDMA2000) to realize unified data transportation of monitoring, surveillance, and mobile information underground.
- **SMS**: to release and collect audible and visual alarm information via SMS.
- **Dispatching**: to realize unified interconnecting with existing wired dispatching system in the mine.

- **In-depth solution cooperation**
  Under the guidance of Xinwen Mining Group's information-based development strategy, 3G platform services are enriched through integrating small-sized core networks, video surveillance systems, and individual positioning modules.
  With in-depth solution cooperation, all services such as mobile data transportation, mobile voice and personnel positioning unification, sound and light alarm in dangerous positions, emergency escape instructions and real-time monitoring for production and device operation can be provided on one 3G platform. The in-depth cooperation facilitated the solution's promotion in other coal enterprises in China.

**Customer Benefits**

The solution provided the following customer benefits:

- **Digital mine for safer production and higher production efficiency**
  Huawei's 3G (CDMA2000) solution orients to mining service and can meet the requirements of underground applications for now and the future. Basing on large-capacity 3G channels, utilizing under-mine RFID and industrial devices and with the production and security management system as control, the solution indeed realizes the applications and values of 'digital mine.'

- **Service improvement for ensuring the customer's industry-leading position**
  Huawei's solution has initiated 3G underground communication era and has enabled Xinwen Mining Group to hold its leading position in the digital mining industry, which also makes a good example for other coal enterprises in China.
Latest Trend in Oilfield Automation
Sinkiang Oilfield LTE Wireless IOT Project

Background
The rapid development of ICT and automation technologies brings an increasing number of automatic applications to the oilfield. These applications significantly facilitate Sinkiang Oilfield's security protection and onsite operations. As one of China's largest and most innovative oilfields, Sinkiang Oilfield has a good tradition of utilizing disruptive technologies to improve production efficiency.

Key Challenges
Sinkiang Oilfield faced the following challenges:
• Inefficient incident response
Sinkiang Oilfield has a large number of heavy oil wells. These oil wells suffered from operational difficulties, frequent mechanical faults, and slow incident responses.
• Inefficient data collection
The oilfield used manual operation to copy data, schedule shifts, and draft reports. When a fault was detected during inspection, onsite personnel reported the fault to the management center for analysis and troubleshooting. This data collection mode was inaccurate and inefficient, disabling the management center to receive real-time information about oil wells' status.
• Lack of security protection for onsite personnel
The manual operation mode relies heavily on inspection. In certain occasions, onsite personnel were required to inspect pipelines, drills and other equipments in remote areas during late-night time periods, bringing considerable security risks.

Solution
Huawei provides the wireless LTE based for Sinkiang Oilfield. The solution has the following advantages:
• Large-scale coverage
Huawei provides pro-level network design services based on Sinkiang Oilfield's oil well distribution. The LTE network covers a radius of 10 km or more, allowing edge areas to enjoy video transmission services.
• High throughput
The network provides high throughput to:
• Enable data collection, supervisory control and data acquisition (SCADA) signaling control, and video surveillance.
Huawei provides the wireless LTE based IOT solution for China National Petroleum Corporation (CNPC) Sinkiang Oilfield to enable efficient data collection and wireless video surveillance. This solution features large coverage, high throughput, and quality services and helps the oilfield improve the automation level while providing security protection for onsite personnel and facilities. >>

- Monitor and visually display real-time device status, allowing linked control for key nodes.
- Provide 50Mbps uplink and 100Mbps throughput per sector by 20MHz bandwidth wireless network.
- Support flexible adjustment of the LTE downlink and uplink configuration based on service requirements, improving video surveillance efficiency.
- Q services
  - The LTE system has a maximum end-to-end transmission delay of 50 ms. This effectively supports key services, such as SCADA.
  - The system has rich end-to-end QoS mechanisms to ensure the communication quality of key services.
  - A single base station supports the concurrent access of and real-time management for up to 1200 terminals.

Customer Benefits
The solution brings the following customer benefits:
- High return on investment (ROI)
The solution helps Sinkiang Oilfield locate system faults in a timely manner, reducing casualties and economic loss. The wireless network, featuring low deployment and maintenance costs, facilitates the oilfield's ICT-based development.
- Low security risks
The solution provides diverse advanced applications, such as live video surveillance, automatic meter reading, periodic operation monitoring, and intelligent warning, lowering the oilfield's requirements on manual inspection, improving employees' work efficiency, minimizing security risks, reducing the device fault rate, and ensuring safe onsite operations.
- Less pollution
The system monitors the process of exploring, processing, and transmitting oil and gas resources in real time, allowing the oilfield to efficiently detect leak incidents. This helps the oilfield to lower maintenance costs and to prevent environmental pollution incidents.
World's First Offshore LTE Based Wireless Broadband Network

Norwegian North Sea LTE Wireless Coverage Case

Background
Tampnet is an authorized telecommunications operator in Norway to provide high-bandwidth communications service in the oil and gas exploration industry in Norway's North Sea area. The company owns most of the submarine optical cables and microwave networks in the area and leases bandwidth resources to oil drilling platforms. Headquartered in Stavanger, Tampnet provides services for a large number of customers, including such oil giants as Shell, BP, ExxonMobil, and Statoil. Tampnet has extended its presence to Norway, UK, and Australia. Nearly 68 percent of the oil drilling platforms in the North Sea area connects to Tampnet's communications networks.

Key Challenges
In recent years, offshore oil exploration has grown in popularity worldwide. Most offshore oil exploration work is completed using research and exploration vessels, with exploration usually taking three to four months. To cut labor costs, oil companies increasingly encourage "Integrated Operation" practices, which are based on more offshore personnel completing their work onshore. In addition, oil companies need to improve Operation and Maintenance (O&M) efficiency. Data transmission and voice communications between oil drilling platforms and Float Production Storage and Offloading (FPSO), and those between FPSO and oil tankers, are offshore communications services bottlenecks. Tampnet used microwave for communications between oil drilling platforms and FPSO in the North Sea area and installed expensive antenna stabilization systems on the swinging FPSOs to ensure normal communications. Voice communications and data transmission between FPSO and oil tankers are still Tampnet's pain points. Traditional communications systems use satellite for remote voice communications and helicopters to transport data on hard disks — which
is both inefficient and costly. To meet sustainable service development requirements and to reduce communication system O&M costs Tampnet began development of a wireless communication system which can cover all oil drilling platforms in the North Sea area. Tampnet used its onshore technical advantages experience in developing broadband applications to create an end-to-end, high-speed data transmission system. The seamless system cover oil drilling platforms, FPSOs, oil tankers, and onshore communications stations to provide voice communications, data transmission, and video services. The system was also designed to provide voice communications and data transmission services for passing vessels, bringing new service growth points. The wireless offshore communications services, once successfully put into commercial use, will become Tampnet's new profit mode that can be copied to other sea areas.

To ensure normal operation, the system must meet high requirements in the following areas:

- **Device security**
  Offshore oil exploration has certain risks, which bring significant requirements for device security (for example, devices must be authenticated by Atmosphere Explosive (ATEX) standards).

- **Coverage area**
  The project covered a large area, with harsh environments (such as strong winds) and longdistance transmission. Tampnet needed an advanced wireless communications system, which could support signal transmission distances of 20 to 50 km, to cover all platforms, oil tankers, and FPSOs within the North Sea area.

- **Data transmission quality**
  Production data transmission and service-associated voice communications required high system reliability and minimal transmission delay.

The project, in addition to its high technical requirements, presented the following challenges:

- Insufficient device installation space on oil drilling platforms
- Extreme weather and strong sea waves
- Outdoor Customer Premises Equipment (CPE)
- Limited radio frequency resources
- Radio interference
- Short construction period
- Large-scale custom services

**Solution**

To meet Tampnet's service requirements, Huawei provided a state-of-the-art offshore Long Term Evolution (LTE) wireless communications solution with the following features:

- **Technical advantages**
  Macro, micro, and distributed base-stations for Tampnet simplified device transportation and installation. The solution installed Huawei's feature-rich product, DBS3900, in BBU+RRU mode, adopting advanced wireless communications technologies, such as Mobile International Network Operator (MINO), and employed high-gain antennas and Customer Premises Equipment (CPE) terminals with external
antennas to maximize Maximum Allowable Path Loss (MAPL) and enlarge the coverage area.

- **Explosion-proof design**
  Oil exploration and exploitation require expensive explosion-proof devices. Huawei, after meticulous analysis, developed an advanced explosion-proof mechanism to fully meet Tampnet's requirements. Oil drilling platforms typically use a Zone2 explosion-proof partition, which is designed based on coverage area, wind speed, resource type, and pressure. The solution deployed Remote Radio Units (RRUs) in the explosion-proof room, and installed outdoor CPEs and satellite communications system Outdoor Units (ODUs) under fairings.

- **Dedicated radio frequency**
  The project is now in the pilot phase and is using the 900 and 1800 MHz radio frequencies. Tampnet is applying for the 800 MHz frequency, which enables DD800M high-speed data transmission within 40 kilometers.

The figure above shows the system network architecture:

To maximize Tampnet's Return On Investment (ROI), the solution was structured as follows: CNs were deployed on the shore and wireless communications base-stations were installed on oil drilling platforms in BBU+RRU mode. Huawei used CPEs to enhance the signal coverage and adopted microwave as the back-up transmission system.

**Customer Benefits**

This project is the world's first application of offshore LTE communications technologies, laying a solid foundation for Tampnet's future service expansion in offshore energy exploration. Huawei's solution provides a network that enjoys 1 Mbit/s upstream data transmission and 2 Mbit/s downstream. The system enables voice communications and data transmission between oil drilling platforms and FPSOs, oil tankers, and onshore stations within 37 kilometers. The advanced network design supports service expansion, including video surveillance data uploading and wireless cluster services.

Tampnet CEO Per-Helge Svensson says, "This is a milestone for us, involving one of the most innovative providers in the telecommunications industry in our business. The co-operation with a market leader such as Huawei is very exciting, and we are impressed by their professional attitude and ability to support us on the deployment of their technology into such extreme conditions."
Huawei Enterprise Business Group ("Huawei Enterprise") is one of the three business groups of Huawei, a leading global information and communications technology (ICT) solutions provider. By leveraging our strong R&D capabilities and comprehensive technical expertise, Huawei’s strategy in the enterprise domain focuses on close cooperation and integration with partners to deliver a wide range of highly efficient customer-centric ICT solutions and services that are based on a deep understanding of customer needs. In line with our strategy, we offer a broad portfolio of innovative ICT solutions that cater to global vertical industry and enterprise customers across government and public sector, finance, transportation, energy, large enterprises, communications and multiservice operators (MSOs), and small and midsize enterprises (SMEs). Our portfolio covers enterprise networking, unified communications & collaboration (UC&C), cloud computing & data center, enterprise wireless, network energy and infrastructure services.

When ICT experts share their views on technological trends, you get the information you need to move forward with crucial choices. This is ICT Insights. This is a new window into ICT that reveals a deep understanding of today's challenges, with accurate analysis and forecasts of changes in the information and communications industry. Join us as we converge on practical technology - a better way.