SingleFAN Pro
Creating gigabit full-fiber cities with intelligent full-fiber access

As part of promoting the construction of gigabit full-fiber cities, Huawei encourages innovation in technologies and business models across the entire industry, which in turn helps operators to develop new blue-ocean services, maximize network value, and build a positive business cycle.
Huawei’s Global Connectivity Index report predicts that if countries increase their investment in ICT infrastructure by an average of 8 percent per year (CAGR), the digital economy will produce US$23 trillion in new growth potential by 2025.

Improving ICT infrastructure’s level of intelligent connectivity is vital for achieving sustainable growth goals in all countries. Intelligent connectivity refers to adding AI capabilities to ICT infrastructure like broadband, cloud, and IoT to make connectivity smart and significantly improve ICT infrastructure synergy and performance.

The dynamic integration of AI and fiber-optic broadband will form a cornerstone of connectivity for all industries, stimulate innovation in the fiber-optic broadband industry, accelerate it into the F5G gigabit era, and drive global economic growth.

According to a World Bank report, a 10-percent increase in broadband penetration increases GDP growth by 1.38 percent, and each doubling in bandwidth results in 0.3 percent GDP growth. Over the past decade, countries around the world have been designating broadband as key information infrastructure to promote the construction and popularization of broadband networks. Fiber-optic broadband is now a dominant trend.

In the Asia-Pacific region, fiber optic penetration exceeds 92 percent in China, 76 percent in Japan and South Korea, and more than 55 percent in Spain. Other countries, including France, the UK, Saudi Arabia, and the UAE, are also accelerating fiber optic broadband rollout. Building fiber optic and 5G networks has become a top priority for nations to gain a strategic advantage.

**Gigabit full-fiber cities underpin a smart world**

Large-scale fiber-optic broadband networks are being built around the world, but a number of leading nations have become the first to build full-fiber cities. And with the rise of intelligent connectivity, the fiber-optic broadband industry has entered a new generation. The gigabit full-fiber city will become a global trend in fiber-optic broadband construction over the next 10 years. It will serve as a foundation for the smart world and support the development of emerging economic entities such as digital cities and smart cities.

Building a gigabit full-fiber city requires efforts in the following three main areas:

**Vertically deploying ubiquitous full-fiber infrastructure networks:** Broadband fiber optics is the core feature of a full-fiber city. In the intelligent era, we will see connectivity develop from people-to-people to include people-to-things and things-to-things connections. These connections will enter vertical application scenarios in different industries. The type of connections will also grow from basic Internet connections to video connections and VR/AR connections. Extending the fiber-optic network to the user side will ensure that all individuals, wherever they are, will be able to obtain a full-service, high-quality connection. Connectivity will be as readily available as
water or electricity.

**Horizontally meeting the needs of full-service integrated access through gigabit networks:** At the network planning level, this means building a comprehensive service access area that allows 2H/2B/2C full-service, all-region access and supports gigabit government and enterprise, gigabit home, and gigabit 5G business innovation on a unified fiber-optic network. Gigabit Wi-Fi access in home scenarios will be needed to enable users to enjoy immersive cloud VR services. In the 2B field, promoting enterprise cloud computing and providing highly reliable, secure, and flexible private line access services will be required. The popularity of 5G will bring a 10-fold increase in network traffic. Harnessing ubiquitous gigabit fiber network for mobile backhaul will be a more economical and efficient choice.

**Constructing an end-to-end visible, manageable, and controllable three-dimensional fiber-optic network to ensure user experience and O&M efficiency:** Introducing an intelligent network management and control system will reduce the overall O&M complexity of the whole fiber-optic network (FON). Leveraging a visible, manageable, and controllable three-dimensional fiber-optic network can meet the need for flexible service provision and guarantee the fiber access experience for all people, homes, and businesses.

Leading countries such as China are already accelerating the construction of gigabit full-fiber cities. Ovum forecasts that the number of gigabit users will exceed 36 million globally in 2020, with a CAGR of more than 40 percent over the next five years. We’ve already entered the commercial fast lane of the F5G gigabit era. The global fiber access industry is set to embark on a period of explosive growth. Upstream/downstream industries need to be fully prepared.

**SingleFAN Pro enables intelligent full-fiber access networks**

Huawei is committed to working with upstream and downstream industries to jointly promote the sustainable development of the global fiber access industry. Through our world-leading, end-to-end solution for optical access coupled with our innovations and partnerships in network planning, construction, and O&M, we enable business success for operators. To leverage the strategic opportunity of gigabit full-fiber cities, Huawei has released the SingleFAN Pro intelligent, full-fiber access solution, which will help operators build a smart, simplified, and ultra-broadband full-fiber access network so they can meet the full-service access needs of the next 10 years. The solution has three key capabilities: full-fiber connectivity, ultra-high bandwidth, and ultimate experience.

**Full-fiber connectivity:** Fiber connections continue to expand into different sectors and areas. As connections reach every home, room, desktop, and even machine, the number of connections will grow by over 100-fold. Huawei provides industry-leading intelligent network planning tools to help operators optimize embedded costs in the early stages of optical fiber network construction, achieve strong coverage and short-distance access, and complete home and enterprise coverage in one construction, increasing network planning efficiency tenfold. Huawei has also launched a full-scenario fiber access solution for diverse access scenarios. The solution includes AirPON, which helps mobile operators quickly build fixed networks and enhance network construction efficiency by 70 percent; BusinessPON, which helps operators rapidly expand enterprise private line services and supports flexible cloud migration for enterprises; and CurbPON, which helps operators maximize the use of existing network resources and accelerate migration from copper/cable to full-fiber access networks at optimal cost. For complex fiber optic network deployment scenarios, Huawei’s DQ ODN solution supports full pre-connection and optical splitting with unequal ratios, slashing TTM by 30 percent.

**Ultra-high bandwidth:** Comprehensive adoption of innovative 10G PON and Wi-Fi 6 guarantees gigabit access capability for the 2H/2B user.
side. It also supports gigabit-to-the-desktop for campus services. Huawei’s OptiXaccess series MA5800 optical access platform offers unified access capabilities for a variety of service scenarios, including home networks, government/enterprise leased lines, enterprise campuses, and mobile backhaul. It supports multiple modes, like GPON, 10G PON, and 10G PON Combo with Flex-PON technology, to help operators realize smooth evolution to 10G PON and cut TCO by a third. Huawei’s OptiXstar V800 series ONT product enables VR/gaming services with zero stuttering. The unique “penetrating an extra wall” Wi-Fi signal capability ensures gigabit for all rooms and its energy-saving design provides an eco-friendly performance equivalent to planting an extra tree a year.

**Ultimate experience:** A full-lifecycle automated network management platform would support unified management and control for the optical access network, helping operators build an intelligent access network with user experience at the core. Huawei’s smart network management and control system, iMaster NCE-FAN, harnesses technologies like network automation, AI, and digital twin to intelligently identify the ODN network, allow network topology visibility, and cut down the time for provisioning new services from hours to minutes. It can accurately identify optical fiber network faults and perform intelligent diagnosis for rapid fault repairs. It offers visualized management on Wi-Fi access devices and performs automatic Wi-Fi signal tuning, which can reduce operators’ O&M visits by 30 percent, significantly improving home user experience and slashing OPEX.

As part of promoting gigabit full-fiber city construction, Huawei encourages technological, business, and business model innovation across the entire industry, helping operators continue to develop new blue-ocean services, maximize network value, and build a positive business cycle. To date, more than 30 operators worldwide have opted for Huawei’s SingleFAN Pro solution to deploy gigabit full-fiber networks, and Huawei has shipped over 2 million 10G PON central-office nodes.

**Powering the gigabit full-fiber era**

As a global leader in the fiber access industry, Huawei has continually innovated and invested in key technologies such as 10G PON and Wi-Fi 6, providing leading end-to-end solutions for 2H/2B/2C services to meet business needs in the F5G era. Huawei also contributes proposals to major international standards organizations like ITU and ETSI and is still the top contributor in the world. We have also released the industry’s first 50G PON prototype as it continues to steer the direction of industry development.

Looking to the future, Huawei will meet the key needs of gigabit full-fiber cities with its two end-to-end innovative solutions for product solutions and network planning, construction, and O&M. At the same time, Huawei will work with operators to innovate and explore new service scenarios and new business models, and partner with upstream/downstream enterprises to promote the prosperity of the industry and enable the whole industry to march into the gigabit full-fiber era.