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Covington Internet of Things Update: China Strengthens IPv6 Deployment

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At the end of 2017, China's Communist Party Central Committee and the State Council jointly circulated an *Action Plan for Promoting Scale Deployment of Internet Protocol Version 6(IPv6)("Plan")*, and set detailed targets and steps for the next few years, aiming full transition to IPv6 by 2025.

According to the *Plan*, China is aiming to establish the world's largest commercial network deploying IPv6, and formulate a next generation internet technical system and industrial ecosystem with independent intellectual property rights, within five to ten years. The target numbers of active users for the proposed IPv6 are 200 million by the end of 2018 and 500 million by the end of 2020, accounting for more than 20% and 50% of internet users in China, respectively. Finally, China is aiming to have the largest IPv6 network in the world by the end of 2025, in terms of network scale, quantity of users, and network traffic scale.

China is in urgent need of a more developed IPv6 network because IP addresses originating from the existing IPv4 network are nearly exhausted, and will be unable to meet the fast development of internet industry, including mobile internet, IoT, big data, cloud computing, and artificial intelligence. According to publicly available statistics, each Chinese internet user was allocated only 0.45 IPv4 address, which is not only insufficient for actual needs, but also leads to cybersecurity problems. By generating IP addresses consisting of 128 bits (instead of 32 bits under IPv4), the number of IPv6 addresses enormously expanded, allowing for an almost unlimited number of appliances in China being connected to the internet.

A lot is required to implement this ambitious *Plan*. The Asia-Pacific Network Information Center's report dated March 14, 2018 indicates that only 0.35% of China's internet users rely on IPv6, ranking it 71st in the world. Globally at present the top four countries are Belgium, India, Germany and the U.S. with 57.85%, 50.66%, 42.42% and 39.92% usage respectively.

The *Plan* sets out a number of significant tasks, including:

- *Accelerating the upgrade of internet application services.* This involves promoting full support

for IPv6 in portal websites, social media, video websites, e-commerce platforms, search engines, games, APP stores, and APPs, and upgrading websites of the government, central media, and central enterprises. This also involves promoting the use of IPv6 in innovative applications, such as “Internet+” , Smart City, industrial internet, cloud computing, IoT, and artificial intelligence.

- *Upgrading internet infrastructure.* This includes deploying internet interfaces supporting IPv6, encouraging use of mobile terminal devices fully supporting IPv6, interconnecting backbone networks, enlarging international interfaces for efficient connection with the world’s next generation internet, upgrading radio and television networks, and promoting terminal devices thereof supporting IPv6.
- *Modifying and upgrading application infrastructure.* This involves upgrading internet data centers, cloud service centers, and domain name systems to provide IPv6 access or support for IPv6, and establishing a supervising platform to monitor the development of IPv6.
- *Strengthening network security.* This includes upgrading security systems, strengthening IP address management, enhancing security prevention, and establishing safety capabilities in emerging fields such as industrial internet, IoT, Internet of Vehicles, cloud computing, big data, and artificial intelligence.
- *Encouraging break through cutting-edge technologies.* This involves enhancing development in key IPv6 related technologies, balancing development of IPv6 with other internet innovations, and focusing more on basic and frontier technologies of internet, etc.

The *Plan* further provides detailed working plans for 2018, and 2019-2020.

In view of the imminent exhaustion of IPv4 addresses and rapid development of the internet industry, the Chinese central government in recent years already urged the upgrade and deployment of IPv6 in several documents, such as *Guiding Opinions on Actively Promoting the “Internet Plus” Action Plan* (July 4, 2015), *Guidelines on Deepening Integration of Manufacturing Industry and Internet* (May 20, 2016), *Development Plan of National Strategic Emerging Industries for the “Thirteenth Five Year”* (December 19, 2016), etc.

There is no doubt that the next generation internet based on IPv6 is the most logical and strategic basis for development of IoT, and also will encourage the development in other emerging technology fields. In the *Guidelines on Deepening “Internet+Advanced Manufacturing” and Developing Industrial Internet*, publically circulated on November 27, 2017, the State Council urged to develop IPv6 to serve internet+ advanced manufacturing industry.

To promote the deployment of IPv6, China endeavored to set up four IPv6 root name servers as of November 28, 2017, thereby changing China’s position which has not to date had any root name server. As a result, China will have more opportunities to improve the operating rules of next generation root servers.

By implementing the *Plan*, the next few years will witness China’s full transition to IPv6 from IPv4, strengthening capabilities to serve the increasing needs of China as a society, and bringing more opportunities for the IoT industry, among other emerging internet related industries.

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