A study of the scheme on the promotion of IPv4/IPv6 dual-stack universal

Abstract

The digital economy is the focus of National policy development. Aligning with the national policy directory "Digital Nation, Smart Island," the Taiwanese government has promoted the "Digital Nation & Innovative Economic Development Program (DIGI⁺)" which is intend to accelerate Industrial Innovation and create Smart Taiwan.One of the development priorities of the 〝Digital Innovation & Governance Initiative Committee〞 is to construct a beneficial infrastructure for digital innovation. Promoting the use of IPv4/IPv6 dual-track is an important part of the current digital infrastructure.

IPv4 address resources are gradually exhausted, and the IPv6 communications protocol allows room for the internet to scale with simplicity. As the prevalence of IPv6 increases globally, the evolution of the network to IPv6 has become an international consensus. After years of development, IPv6 has gradually matured in technical capabilities, and major telecommunications operators in various countries have started IPv6 commercial operations. The introduction of IPv6 services is required for the following reasons:

1. The IPv4 address has been exhausted and it is difficult for the IASP to obtain a new IPv4 address. In order to maintain existing services, the introduction of IPv6 is an inevitable choice.

2. The introduction of IPv6 can reduce the investment of NAT devices and reduce the performance and maintenance barriers caused by the use of NAT technology.

3. Mobile operators have increased demand for IP addresses.

4. Internet of Things (IoT) innovative business needs.

5. The proportion of content sites delivered via IPv6 has increased year by year. This information reflects that support for IPv6 has become a worldwide trend.

6. The IETF has reached a consensus to accept IPv6 as the new future standard (RFC). IPv6 has become the foundation of future technology mainstreams and networks.

Responding to the international development trend of IPv6, the program is intent to promote the development of IPv6 and targets on three goals: construct IPv6 network environment, enhance IPv6 network security, and explore IPv6 network applications.

1. Construct IPv6 network environment

The following are the tasks that the project will focus on:

Based on the results of last year's survey, the project will investigate and test the needs of the most popular CPE equipment on the market and whether it meets the main IASP connection network environment specifications. Help industry manufacturers develop compliance specifications and encourage manufacturers to produce the IPv6-capable CPE devices by default.

Survey the IASP industry's support for IPv4/IPv6 dual-stack services to make the network a connection service that supports IPv6. Work with network service providers in the cable industry to advance IP6-capable network connectivity trials to prepare for commercial projects.

Investigate the reasons and experience of international IASP and ICP to promote IPv6. Reference as a national policy to continue to promote the establishment of an IPv6-enabled network environment

2. Enhance IPv6 network security

   Due to the lack of relevant technologies and talents, ICP are not willing to invest in upgrading to support IPv6. In order to improve the ICP industry's willingness to provide IPv6 network services, the project will study the technologies required by ICP to support the upgrade of IPv4/IPv6 dual-stack protocols, including software and hardware upgrade settings and information security upgrades. The project also runs some practical cases to help ICP upgrade the site. It validates the functionality of the technical documentation and encourages more ICP to participate in IPv6-enabled connection upgrades.

   In addition, the project will host some training courses on the ICP upgrade website to support the IPv4 / IPv6 dual-stack protocol connection network. The goal is to help ICP quickly understand the differences between IPv4 and IPv6 website architectures and to form an IPv6 technology development team.

3. Explore IPv6 network applications

   In addition to improving the network infrastructure to support IPv6 connectivity, the project will also examine technologies and standards related to the Internet of Things, 5G and IPv6 to understand the needs of domestic industrial development and further enhance innovation capabilities.

   It will collect and analyze the Internet of Things, 5G and IPv6 related international technical standards (RFC) to grasp the direction and progress of international standards. It also collects innovative application cases based on the world's top three IoT platforms and investigates whether they support IPv6 connectivity.

This year, we surveyed 20 Cable operators to check if they have the ability to support IPv6 network services. Among them, TBC is the most active, and has completed support for IPv6 back-end network devices. In June of this year, TBC invited users to apply for trials and became the first MSO to support IPv6 network connections. Currently, users are required to apply for IPv6 network services for a small number of users to try, and TBC still needs more trials and evaluations to enter the commercial stage to provide a large number of users to obtain IPv6 connectivity services.

Last year, Chunghwa Telecom, Taiwan Mobile and FETnet have supported IPv6 network services. Since the beginning of this year, Asia Pacific Telecom has also begun to support IPv6, and TStar Telecom is expected to support IPv6 network connectivity by March 2020. It is expected that by next year, five mobile telecom operators will complete the IPv6 enablement plan and complete the comprehensive upgrade of the mobile communication network.

Due to the shortage of IPv4, some mobile operators have adopted an IP address sharing ratio of 1:64, which increases the complexity of cybercrime investigation.

The fixed network usage of end users or enterprise users with IPv6 functionality is still low, especially for enterprise users.If your network service provider still has some devices or services that are not yet supported, you will not be able to obtain an IPv6 network connection for end users or enterprise services.

The network services provided by IASP are diverse, and most operators have not completed all services to fully support IPv6. There is still a long way to go to fully support IPv6 in basic services.

A survey of IPv6 by Verizon found that introducing IPv6 when building a new system can reduce the capital and labor costs of subsequent updates. Google's experience points out that supporting IPv6 requires a lot

of time to implement the construction plan, and early investment can have more time to prepare. Comcast has the same comment and experience as Google. As to Facebook, when it was founded, the shortage of IPv4 became more serious and IPv6 was steadily developing. Therefore, Facebook had no choice but adopting IPv6. Enterprises adopting new technologies need to consider productivity、investment、competitiveness and user experience. From the experiences of Verizon、Comcast、Google and Facebook, IPv6 is obviously very helpful to them and it supports the Networking industry well.