Executive Summary

Two news stories caught my eye while I was writing this summary on December 8, 2020. The first noted that a year has now passed since the first COVID-19 case was detected in Wuhan, China. The second was that COVID-19 vaccinations were to commence in the UK from today (December 8). The year 2020 has been synonymous with COVID-19, and finally at this late date, we have some news inspiring hope that the situation may eventually ease off.

Peoples' views and values seem to have changed significantly over this past year. It also feels like several years' worth of changes have happened in the space of a single year. Amid the new, radically different way of thinking, our ability to enjoy the conveniences we have always known without too much trouble obviously owes much to information and communications technology (ICT) including networking, security, and AI. On the other hand, COVID-19 has seriously affected the lives and health of many people. And many healthcare professionals continue to do their jobs on the front line in the face of the dangers. As members of the ICT industry, we hope to continue doing our part to bring ICT to bear in alleviating some of this hardship.

The IIR introduces the wide range of technology that IIJ researches and develops, comprising periodic observation reports that provide an outline of various data IIJ obtains through the daily operation of services, as well as focused research examining specific areas of technology.

Our periodic observation report in Chapter 1 is the 2020 edition of our look at Internet trends as seen from IIJ's infrastructure. The report covers IPv4 and IPv6 routes on the Internet, an analysis of DNS queries obtained from the full resolver provided by IIJ, IPv6 and mobile traffic, and the deployment of BGP ROV, which uses RPKI. We also discussed the impact of COVID-19 on Internet traffic in IIR Vol. 47 (https://www.iij.ad.jp/en/dev/iir/047.html) and Vol. 48 (https://www.iij.ad.jp/en/dev/iir/048.html), but our analysis here reveals some trends that differ from what we previously observed.

The focused research report in Chapter 2 looks at the latest developments in post-quantum cryptography. We previously covered post-quantum cryptography in our focused research report in IIR Vol. 31 (https://www.iij.ad.jp/en/dev/iir/031.html), and this issue provides an update. The report discusses the post-quantum cryptography competition that US-based organization NIST has been running since 2016, looks at the security of post-quantum cryptography, and explains the difference between quantum cryptography and post-quantum cryptography. As a CRYPTREC member, the report's author also relates key insights and episodes from the cryptography scene. This report should be an engaging read for anyone interested in the cryptographic technology that underpins the modern Internet.

In the focused research report in Chapter 3, the author describes his journey developing a query service that originated from his own ideas. While applications are able to use virtual infrastructure in containers to solve long-standing problems, this is not really an optimal solution for databases given the issues of data persistence, availability, and performance. To address this, the author designed and implemented a query service that provides the characteristic flexibility of containerized infrastructure while also ensuring data persistence and availability. Although it is still in the prototype phase, we are looking at turning it into a commercial service.

Through activities such as these, IIJ strives to improve and develop its services on a daily basis while maintaining the stability of the Internet. We will continue to provide a variety of services and solutions that our customers can take full advantage of as infrastructure for their corporate activities.

Junichi Shimagami

Mr. Shimagami is a Senior Executive Officer and the CTO of IIJ. His interest in the Internet led to him joining IIJ in September 1996. After engaging in the design and construction of the A-Bone Asia region network spearheaded by IIJ, as well as IIJ's backbone network, he was put in charge of IIJ network services. Since 2015, he has been responsible for network, cloud, and security technology across the board as CTO. In April 2017, he became chairman of the Telecom Services Association of Japan MVNO Council.