

Executive Summary

IT news has been brimming with stories about AI in recent years, with the awarding of the 2024 Nobel Prizes in Physics and Chemistry to AI researchers, in particular, being quite a remarkable development.

Nobel Prizes have previously been awarded for IT-related themes, such as semiconductor devices, but the 2024 Physics Prize was awarded for research on artificial neural networks, which lie at the foundations of modern AI. The Chemistry Prize, meanwhile, was awarded for research on AI-based protein structure prediction. Using AI, the researchers were able to predict complex protein structures that were previously difficult to determine. This is an example of innovations made possible by the real-world use of AI.

Although both prizes were AI-related, one recognized achievements in AI development itself, while the other recognized achievements made using AI in a non-IT field. This news serves as a stark reminder of AI's profound impact on our society.

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

Our periodic observation report in Chapter 1 presents our look at Internet trends as seen from IJ's infrastructure. Every year, we present analyses based on data related to BGP and routes, DNS query analysis, and IPv6 traffic obtained from IJ's servers and other equipment. Through this periodic analysis, we can identify trends in usage and changes in implementations. The data provide fascinating insights into changes in the Internet that might otherwise go unnoticed.

Our focused research report in Chapter 2 is titled "IJ's LPWA Initiatives—Current State of LoRaWAN® and Outlook for Wi-Fi HaLow™". LPWA technologies for IoT communications are something IJ has long been focused on and an area in which it has provided numerous solutions based on LoRaWAN®, an unlicensed-band protocol that is easy to deploy. The 2022 revision of Japan's Radio Act also made it possible to use Wi-Fi HaLow™ in Japan. The report discusses our work with LoRaWAN® to date, describes the features of the new Wi-Fi HaLow™ technology, presents results from our performance evaluations in the field, and discusses future prospects.

Through activities such as these, IJ continues striving 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 Director and Senior Managing Executive Officer and the CTO of IJ. His interest in the Internet led to him joining IJ in September 1996. After engaging in the design and construction of the A-Bone Asia region network spearheaded by IJ, as well as IJ's backbone network, he was put in charge of IJ 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's MVNO Council, stepping down from that post in May 2023. In June 2021, he also became a vice-chairman of the association.