

NTT-AT's "Optical Switch" has continued to be employed as a key component for actualizing to improve network reliability and maintenance work efficiency. How and why has the optical switch been introduced?



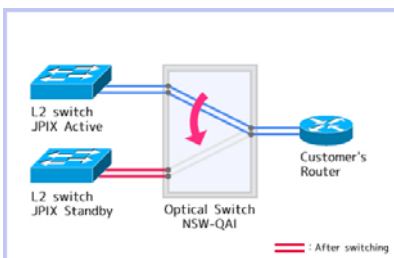
Japan Internet Exchange Co., Ltd. (hereafter: JPIX) performs "IX (Internet Exchange) service business" which provides a connection points for Japan's ISP (Internet Service Providers) to exchange traffic with among themselves. This service boasts Japan's highest level of achievement both in traffic handled and number of connected users. JPIX approached NTT Advanced Technology Corp. (hereafter: NTT-AT) regarding development, and in 2009 installed the optical switch "NSW-QAI", which has contributed to improving reliability and maintenance efficiency in its backbone network. This company's President and CEO, Yoshiaki Ishida, is speaking about the background of this development, for the original consideration to introduction up to the development and operation of the optical switch.



**Yoshiaki Ishida**  
CEO  
Japan Internet Exchange Co., Ltd.

### ●The Background Behind Considering the Optical Switch

Looking back, Company President and CEO, Dr. Ishida commented, "JPIX was founded in 1997 with the purpose of providing an environment from a neutral standpoint to enable Internet Service Providers (ISP) to exchange traffic with each other. Exchange facility was set up in Otemachi, Tokyo, and in November of the same year our IX (Internet Exchange) Services were begun. Currently, our customer's number is about 140 companies, and at peak times we handle about 300Gbps of traffic, making us one of the largest IXs in Japan where we serve an important role as the heart of Japan's internet. Also, in recent years, to eliminate the one-location concentration in Otemachi, Tokyo only, along with moving ahead with distributing and establishing multiple data center sites for the "Capital Area IX Redistribution", we have also responded to the rapid increase in traffic in regions away from Tokyo by opening up two "Regional IX" centers, JPIX Nagoya and JPIX Osaka. In the midst of these efforts, **along with the increase in the number of sites and in the number of customers, we began to have concern for issues such as failure countermeasure to ensure the reliability and stability of the services we provide.**"



●"NSW-QAI" installed as an optical switch between opposing router and L2 switch

"If we were to speak in extreme terms, the IX is a giant Ethernet switch. Actually, Ethernet technology itself is basically a very primitive technology, and increasing reliability and stabil-

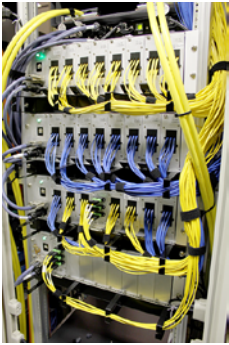
ity became a very difficult problem. At that time, in order to increase reliability, **we set up active/standby redundancy device configurations, and when failure trouble occurred we were switching connected devices manually. As the number of sites and ports became very large, switching to standby system devices became to take a lot of time, resulting in a decrease in the total network operating time. Thinking that there must be some good method to solve this problem we began to search for a solution, and just at this time we discovered that using the optical switch device would be exactly suited to our purposes. So we began considering installing it.**"

### ●The Background of Developing the "NSW-QAI" Optical Switch

In this way, consideration of installing optical switch devices began, but they could not find a product that would match their requirements.

"Among the existing optical switch products there was none that could match our needs 100%. Particularly, our company thinking was that we should offer an optical switch service that could provide the same conditions to all of our customers. At that time, our customers already numbered more than 100 companies, yet **there was no optical switch device on the market which could handle a total of 200 ports or more. So we began to inquire inside Japan and overseas, and finally we decided to request NTT-AT to develop a product together as a partner.**"

We began development, and as discussions



●"NSW-QAI" optical switch device, realizing up to 256ch simultaneous switching.



●Optical switch module.  
This improvement changes the connection method, simplifying the optical fiber distribution.

between both companies were carried out, we went on to incorporate a variety of ideas, such as high-density mounting to effectively utilize a limited rack space and a wiring method for eliminating an increase in the optical connection loss. Among these, scalability for device installation was of high importance. Dr. Ishida commented on this point.

**"We were assuming having up to 256 ports. However, as there were 5 locations in the Capital, as well as in Nagoya and Osaka, site distribution was already progressing and among them there were some sites where a maximum number of ports was not really necessary. So, we needed to modularize the optical switch to some extent, while still having a mechanism for expandability."**

In this way, we decided on a device configuration, consisting of a control unit, base unit, and optical switch module, which could provide flexible management responding to the number of optical switch channels as needed.

"Also, at that time maximum effort was put into developing management functions to increase operation efficiency, and even after installation, regular work on improving operation processes is being done.

"Although we weren't really worried, as a foundational optical switch device, the upper control function part has various requirements and specifications and I think that this required a lot of hard work. **Even after installation, we had discussions and made improvements, and even now we are consulting about new topics and finding solutions to problems. We are very thankful for this."**

In this way, **by the end of 2008, the "NSW-QAI" Optical Switch was born. From 2009 full operation began, and there was success in improving network reliability and increasing efficiency in maintenance operations, achieving its original concept.**

"For us, we are aiming for concentrating resources in network design and making operating more lightweight, and in these points **we are greatly helped by the optical switch devices. We tried to avoid relying on operation as much as possible, and we really feel that this works very well for that."**

### ●Regarding the Outlook for the Future

Regarding the future business development of the company and the positioning of the optical switch devices in the development, Dr. Ishida had this to say.

**"I think that there will be a lot of global competition among IX services. As for us, we want to increase the number of our customers and the number of ports, and also increase port speed by 100Gbps, to move ahead even more. In this process, a large part in maintaining network reliability, and also our customers' feeling of security will be played by the optical switch devices and they will continue to be used as a key component in our work. Also, we plan to expand globally as an IX known for reliability and customer's security. We hope that these optical switch devices will be used by operators worldwide, not only by us."**

"Additionally, I believe that wavelength multiplexing will be a keyword from now. Even now, 100Gbps interface is using 4 wave lengths, and I think more and more wave-lengths will be used. I am hoping to see optical switch devices also have a configuration compatible with wavelength multiplexing with a deepening of functions. If that can be done, optical switches can be used as SDN and NFV agents, and the fields of applications will greatly expand."

"We want to work on expanding our services by also working on SDN, NFV etc. We want to partner with NTT-AT in the future as well, working together, not just in a primitive part such as the optical switch device, but in various technologies to create products that will "scratch where people itch."



Japan Internet Exchange Co., Ltd.

#### Customer Profile

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