



**Can Live Uncompressed 8K Video be
Transmitted over WDM/OTN
Networks?**

Sapporo Snow Festival Success Story

AT A GLANCE

Company: Project of NICT Japan

Location: Sapporo, Japan

Industry: Broadcast

Challenge:

Transmission of full-resolution live 8K video without compression over long distance, to an audience.

Solution:

PacketLight's solution was deployed to build 2 x 200G links between 4 regional data centers, using the 200G DWDM Single Wavelength Muxponder.

Success:

Remote transmission of full-resolution 8K video without compression was successfully achieved, emphasizing the need for separate fiber optical WDM/OTN networks for the high bandwidth applications of the broadcast industry.

Background

PacketLight participated in an international experiment of video distribution, led by the National Institute of Information and Communications Technology (NICT) Integrated Testbed R&D Promotion Center.

Under the sponsorship of NICT, companies, universities, and research organizations participated in this experiment with the common purpose of testing the latest technical advances. Participating organizations brought their own equipment, products, software, etc. and were deeply involved from the design stage. Since January 2020, members of the participating organizations have been working on construction and dismantling of the experiment system at each site location. This was a valuable space to share technical knowledge among researchers, engineers, and students through practical implementation and operation.

The experiment was conducted on a nationwide scale, in several locations, including Sapporo, Tokyo, Osaka, and Okinawa, with NICT and 57 international industry-academia-government organizations bringing their own technology, engineering teams, and equipment.

The Challenge

In the past, it was necessary to reduce the quality of video so as not to create a bottleneck. Today it is widely understood that high quality video is a must, and the broadcasting industry must build separate fiber optical WDM/OTN networks to offload their video content and enable transmission of high, uncompressed video quality.

In recent years, the development of 8K video technology has shifted its focus to higher value-added products and higher immersion. Remote transmission of full-resolution 8K video without compression was achieved, and 3D video reproduction was projected to the audience on a large screen successfully. 8K video has 16 times the spatial resolution (7680x4320) of high-definition video, and the full-resolution 8K video used in this experiment was replaced with the conventional dual green system (8K-DG).

The rate of uncompressed 8K IP video in the Sapporo Snow Festival demonstration site was 51 Gbps including 3 Gbps overhead. This raised the need for high capacity WDM/OTN links for error-free transmission while utilizing and maximizing fiber capacity.

The Solution

Two 100 Gbps circuits were deployed between 4 regional data centers using PacketLight PL-2000M 200G capacity per single wavelength muxponders.

NICT's JGN testbed of ultra-high-speed R&D network and the academic information network SINET5 maintained and operated by the National Institute of Informatics, linked two independent 100Gbps lines between Sapporo and Osaka. This

made it possible to reproduce super-high-precision stereoscopic images. Public demonstrations at each site were realized in cooperation with the regional network, where PacketLight connected two 200G links using the PL-2000M Single Wavelength Muxponder

Success

The experiment included video broadcast of the Sapporo Snow Festival and professional baseball camp on the testbed of JGN ultra-high-speed R&D network. A public demonstration was held of 8K ultra-high-definition stereoscopic video and 8K video transmission using a large projector at The Lab in Grand Front Osaka. In addition, 8K video was released at Nago City, Okinawa Prefecture, and at HTB (Hokkaido Television) Headquarters in Sapporo.

Video is one of the main consumers of bandwidth services in today's fiber networks, with growing worldwide long-distance transmission, and unprecedented high quality broadcasting. The NICT experiment shows that future high bandwidth demand in fiber networks is inevitable, especially in the broadcast industry and the rise of Netflix and emergence of Apple and Amazon into broadcast.

