On the path to 1 terabit-per-second networks

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As IP traffic continues to increase and the router interface rate extends beyond 100 gigabits-per-second (Gb/s), future optical networks—ones that would achieve unprecedented speeds of 1 terabit-per-second (Tb/s)—will be required to support the rapid growth of data services with different capacities and patterns on the same optical platform.

To address this issue, researchers at NTT Network Innovation Laboratories in Japan created and demonstrated a spectrally efficient, scalable elastic optical transport network architecture. The team will report on their findings at the Optical Fiber Communication Conference and Exhibition/National Fiber Optic Engineers Conference (OFC/NFOEC) taking place next week in Los Angeles.

Conventional optical networks allocate fixed bandwidth to every optical path—regardless of the actual traffic volume and path length on the basis of the "worst-case design policy."

In stark contrast, the NTT researchers' spectrum-sliced elastic optical path network, known as "SLICE," is flexible and relies on adaptive spectrum allocation to an optical path based on the traffic volume and path length. It essentially enables allocation of only the necessary minimum bandwidth corresponding to individual requests—providing significant savings of network resources.

The bit rate per distance adaptive feature leads to significant spectral savings and increased network capacity. Elastic optical path networks make it possible to offload IP traffic to an elastic optical layer by using

multi-flow optical transponders combined with elastic optical networking technology.

This reduces the number of router interfaces, while keeping router-to-wavelength cross-connect interconnections simple.

The technologies and functionality of elastic optical path networks will become a viable way to achieve highly efficient, cost-effective IP optical networks, according to the NTT researchers.

More information: NTT's Hidehiko Takara will present the paper, "Spectrally Efficient Elastic Optical Path Networks Toward 1 Tbps Era," Thursday, March 8 at 1:30 p.m. in the Los Angeles Convention Center.

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