

Lucent Announces Further Breakthrough in 100 Gigabit per Second Ethernet-Over-Optical

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In a paper presented to the Optical Fiber Communication Conference & Exposition (OFC) in Anaheim today, Bell Labs, the research and development arm of Lucent Technologies, announced the first reported optical transport of electronically multiplexed 107 Gigabit per second (Gbps) data. This result represents another significant milestone in the industry's march towards being able to offer transport speeds of 100 Gbps Ethernet data networking in metro area networks.

"We are very excited about this latest test result and innovation which, when combined with our recently announced breakthrough in the first recorded transmission of 100 Gbps, provides the foundation for the next generation of broadband networking," said Martin Zirngibl, director, Bell Labs. "We see this as a critical area of Bell Labs' research as carriers look to deploy architectures that are optimized to respond to the dramatic increase in the amount of IP/data traffic produced by their enterprise customers and consumers. We feel 100 Gigabit Ethernet is a particularly important technology as carriers look to deploy multimedia IP services, such as IPTV, which requires networks that efficiently multiplex and transmit high amounts of IP-based data in its native Ethernet format."

Today data signals such as the information carried over the Internet are transported at rates of about 10Gbps and occasionally 40Gbps over SONET connections. This Bell Labs research is aimed at developing the

technologies and architectures to transmit, transport and switch 107 Gb/s Ethernet-over-optical data stream (representing 100 Gb/s of data transmission plus a standard 7 percent overhead for error correction).

107 Gbps Transport Breakthrough:

Until now there has been no reported case of a high-speed electronically multiplexed optical signal transmitted at speeds greater than 85.4 Gb/s. Furthermore, no fiber transmission of signals faster than 42.7 Gbps in a spectrally compact non-RZ format have ever been reported. In a paper presented at OFC today Bell Labs researchers were able to transmit 10 channels of 107-Gbps traffic, optically modulated using electrical multiplexing, over a distance of 400 kilometers. Key to this breakthrough was the use of an integrated optical equalizer, built as a single-chip photonic integrated circuit.

To achieve the high spectral efficiency of 0.7 bits/s/Hz and total capacity of 1 terabit per second (Tbps) the researchers used nonzero dispersion fiber and a non-return-to-zero (NRZ) format, enabling the researchers to closely space the wavelength channels thus enhancing the efficiency and total capacity.

To address the need to carefully manage signal dispersion at high bit rates, Bell Labs used a dispersion compensating fiber (DCF) that was slope matched to the transmission fiber, reducing the average residual dispersion per span to +21 ps at 1550 nm. The Bell Labs scientists used hybrid EDFA/Raman amplification with counter-propagating Raman pumps to maintain signal quality.

Source: Lucent Technologies

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