# The Big Switch

## *OTN switching is the key enabler for converged packet-optical network strategies*

*By Ron Kline*

*Ron Kline is Ovum's research director for optical networks in North America. For more information, visit www.ovum.com.*

***New technologies usually require a decade to take hold, and OTN is no exception.*** Although the technology is widely adopted in WDM transmission gear, new OTN switching and automated multi-layer networking applications will increase both network efficiency and market investment over the next several years.

Defined in ITU G.872, "Architecture for the Optical Transport Network," OTN was first approved in October 2001—just before the infamous Internet/telecom bubble burst—but it dates back to 1998. Since 2001, the ITU has released numerous OTN recommendations covering framing and interfaces, equipment functions, network management, protection, OA&M and control plane.

The convergence of Ethernet, IP MPLS and traditional TDM services over a common platform is a clear industry trend. OTN plays a critical role by providing the agnostic mapping of legacy and next-gen protocols to a common WDM layer for transport.

### Broad Industry Support

Over the past year, several developments indicate that OTN is maturing and that operators are poised to expand applications past universal transport and into switching. As network demand grows and operators deploy more 40G — and soon 100G — both WDM fiber capacity and related switching requirements will swell.

***With OTN, operators now can switch payloads that contain embedded SONET/SDH, Ethernet and IP MPLS within a unified transport layer.***

OTN switching is replacing SONET/SDH-based optical core switching applications. It provides both a gateway between the access and metro core domains and an on-ramp for the long-haul backbone network. With OTN, operators now can switch payloads that contain embedded SONET/SDH, Ethernet and IP MPLS within a unified transport layer.

Router and switch vendors have accepted OTN as the technology of choice for transport across the WAN. Meanwhile, the IETF, ITU-T and IEEE are working together toward common approaches based on MPLS, OTN and Ethernet. Cooperation aimed at making MPLS comparable to SONET/SDH and OTN is moving the market forward.

One example of cooperation between standards bodies is IETF and ITU-T efforts to develop a standard for a new transport profile: MPLS-TP. This will provide OA&M capabilities similar to what is widely deployed in today's SONET/SDH and OTN networks. Ensuring compatibility between high-capacity Ethernet and OTN is another key initiative.

Although the standards process is slow, the industry is coalescing around MPLS-TP to provide carrier-grade packet transport, and vendors are developing technologies to switch LSPs using low-order ODU0 and ODUflex OTN switching. This would enable operators to offload express traffic from their routers — sometimes called "router bypass" — to improve network efficiency.

A second example is the IEEE and the ITU-T collaboration to ensure — as part of the nearly 4-year effort to ratify the IEEE 802.3ba standard for 40GE and 100GE — that 40GE and 100GE flows can be mapped and transported over OTN. This cooperation is a huge step forward from earlier efforts at 10G, where lack of coordination between the ITU and IEEE made it difficult to transparently carry 10GE across telecom networks.

Network operators are seeking ways to reduce the cost and complexity of their networks, and increased datacom-telecom convergence is big step in the right direction. OTN complements those trends by enabling the efficient convergence of next-generation and legacy optical infrastructures, and of packet and optical network layers. ■

**IP:** Internet Protocol
**IEEE:** Institute of Electrical and Electronics Engineers
**IETF:** Internet Engineering Taskforce
**ITU:** International Telecommunications Union
**LSP:** Label Switched Paths
**MPLS:** Multiprotocol Label Switching
**OA&M:** Operations, Administration and Maintenance
**ODU:** Optical Data Unit
**OTN:** Optical Transport Network
**SDH:** Synchronous Digital Hierarchy
**SONET:** Synchronous Optical Networking
**TDM:** Time Division Multiplexing
**WAN:** Wide-Area Network
**WDM:** Wavelength Division Multiplexing