Nortel Networks

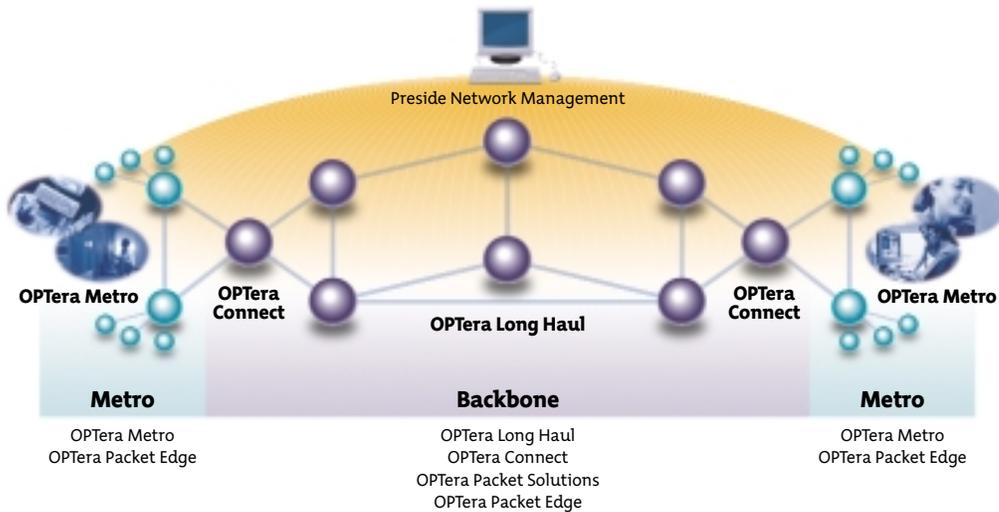# Building the Optical Internet
## A new era in optical networking

**The Internet is introducing a social discontinuity as profound as the printing press or electricity, changing the way people communicate, educate, entertain, and conduct business. To realize its full potential, the Internet requires significant improvements in reliability, speed, and flexibility. That is why Nortel Networks is creating the Optical Internet, a vision of massive bandwidth that is totally reliable, completely flexible to support new applications and services, and extremely affordable.**

**Nortel Networks is creating the Optical Internet based on real life experience of delivering over 75 percent of the optical connectivity for today's Internet backbone traffic.**

End-to-end optical network solutions can be achieved with the massive bandwidth and optical economics of the OPTera family of solutions. The OPTera family includes:

- **OPTera Packet Solution**— provides intelligent interworking between OPTera Connect and the OPTera Packet Core switch/router to deliver dynamic bandwidth management, integrated packet and optical networking, and coordinated fault recovery through a unified network solution.

**NORTEL NETWORKS**™

Preside Network Management

**OPTera Metro** — **OPTera Connect** — **OPTera Long Haul** — **OPTera Connect** — **OPTera Metro**

| Metro | Backbone | Metro |
|---|---|---|
| OPTera Metro<br>OPTera Packet Edge | OPTera Long Haul<br>OPTera Connect<br>OPTera Packet Solutions<br>OPTera Packet Edge | OPTera Metro<br>OPTera Packet Edge |

For instance, today's OPTera Long Haul 1600 Optical Line System deployment can provide an initial capacity from 2.5 Gbps, growing to beyond 1 Tbps per fiber. An initial OPTera Connect DX Connection Manager node will scale to multi-terabit levels as the office needs dictate, seamlessly integrating with the OPTera Connect HDX Connection Manager. Nortel Networks has leveraged their leadership and experience in high capacity long haul optical networking and revolutionized metropolitan networks delivering 10-Gbps solutions optimized for metropolitan networks with the OPTera Metro Family of multi-service platforms.

- **OPTera Connect Connection Managers**—provide highly scalable, service enabling, multi-terabit connection management solutions including network-aware provisioning and restoration capabilities. The OPTera Connect DX/HDX provides aggregation and grooming for wavelength and sub-wavelength services as well as flexible restoration schemes to meet service needs. The OPTera Connect PX provides efficient wavelength and multi-wavelength switching.

- **OPTera Long Haul Optical Line Systems**—build upon Nortel Networks leadership in 10-Gbps Dense Wavelength Division Multiplexing (DWDM), delivering open optical networks that can be optimized to meet any backbone application. The OPTera Long Haul 1600 offers multi-service, ultra high-capacity transport solutions that cost-effectively scale up to 1.6 Tbps on a single fiber. The OPTera Long Haul 4000 is the first 10-Gbps solution to provide ultra-long reach of 4000 km without opto-electronic regeneration.

- **OPTera Metro Multi-service Platforms**—enable flexible, powerful, and cost-effective deployment of Internet services in metro locations. Creative technologies including advanced DWDM and open air laser systems support new business models in the emerging Internet-driven market.

- **OPTera Packet Edge System**—brings the cost/performance benefits of optics to the data world with integrated multi-service access capabilities including native 10/100/1000BaseT Ethernet, ATM, frame relay, Circuit Emulation Services, as well as TDM services.

## Massive bandwidth

OPTera Long Haul Optical Line Systems and OPTera Connect Connection Managers provide not only industry-leading system capacities but also scalable architectures which align infrastructure deployment with service revenue.

## Totally reliable

Reliability [such as 99.999 percent availability and bit error rates of better than $10^{(-15)}$] is no longer a service differentiator—customers demand it. Building on the success of Nortel Networks 10-Gbps platform, which accounts for greater than 90 percent of the survivable 10-Gbps systems in the world, Nortel Networks is also creating optical layer protection and restoration methods for increasingly fast data connections. Moreover, OPTera Packet Solution delivers a coordinated fault recovery methodology across the optical and packet layers to provide more robust and intelligent treatment of network degradations based upon their root cause.

## Completely flexible

The modular design approach of the OPTera family ensures maximum flexibility in the face of ever-changing service requirements. A complete portfolio of "on-ramps" (protocol and bit rate independent) is available to provide the appropriate level of service granularity (up to 40 Gbps and beyond) and protection (from best effort to mission-critical data). Finally, because geographic traffic patterns may change over time, wavelengths may be accessed via Optical-ADMs which provide access at intermediate offices throughout the network.

## Extremely affordable

Nortel Networks leadership in optical networking is built upon the simple tenet of delivering the lowest cost per managed bit in metro, regional, and backbone networks.

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