Nortel Networks

OPTera Connect DX optical switch

Delivering unprecedented efficiencies and end-to-end service solutions

Nortel Networks OPTera* Connect DX optical switch—a pivotal part of Nortel Networks OPTera Connect portfolio—is a multi-service global platform that cost-effectively addresses service providers’ requirements for carrier-class delivery of optical and data services in today’s complex service provider environments. OPTera Connect DX supports a variety of configurations with capacity ranging from tens to hundreds of gigabits per second and mixed SONET/SDH services at speeds of 155 Mbps to 10 Gbps, including Gigabit Ethernet. Increased scalability can be achieved by interfacing to Nortel Networks OPTera Connect HDX optical switch.

The OPTera Connect DX optical switch provides bandwidth and connection management capabilities with grooming capability down to the STS-1/VC4 level. This flexible platform also supports termination of multiple four-fiber and two-fiber BLSR/MS-SPRing rings or UPSR/SNCP rings. With advanced capabilities such as integrated DWDM interfaces, enhanced interface density, and Head-End-Ring-Switching (HERS), OPTera Connect DX optical switch continues to offer unprecedented value and network-wide cost savings to service provider networks.
Today’s networks are experiencing unprecedented competitive pressures, resulting in the need to manage traffic end-to-end through multiple systems. Junction sites and points of presence (POPs) are becoming increasingly complex as more systems and operating companies are interconnected. As a result, carriers are being challenged to simplify the management of these increasingly complex sites in a reliable and cost-effective way, while rapidly deploying new revenue-generating services to differentiate themselves in competitive environments and boost top line revenues.

Nortel Networks OPTera Connect DX optical switch is an intelligent, powerful, and versatile platform that effectively meets this challenge—it provides key network demarcation points at medium and large long haul or metro POPs and junction sites, enables operational simplicity, provides in/out of territory boundary management (including at international gateways), allows network consolidation, and creates new revenue-generating opportunities such as gigabit Ethernet services. Quite simply, the OPTera Connect DX optical switch raises the bar for optical switches by meeting these challenges better than any other platform on the market.

**What sets the OPTera Connect DX optical switch apart?**

The OPTera Connect DX optical switch product sets itself apart from the competition by its extensive list of supported features and capabilities. Among these, there are several that stand out and are worth examining in more detail.

**The OPTera Connect DX can be readily and easily scaled without service disruption to address growing bandwidth demand and future requirements.**
Service delivery through Gigabit Ethernet support

The emergence of optical Ethernet as a cost-effective and flexible service offering throughout the network has driven demand for optical switching platforms to support native gigabit Ethernet interfaces. To meet this demand, the OPTera Connect DX optical switch supports optical Ethernet interfaces directly on the platform. Sixteen slots are available for dual gigabit Ethernet interfaces providing a total of 32 optical Ethernet channels—the highest in the industry for this type of platform. This allows customers to support new optical Ethernet services on the same platform they carry regular SONET/SDH traffic. This application results in real savings on capital expenditures, space, power, interconnections, and management.

Highest OC-3/STM-1 density

With the introduction of the hex OC-3/STM-1 interfaces, the OPTera Connect DX can support up to 256 OC-3/STM-1 channels, vastly greater than the majority of the competitive offerings. The OPTera Connect DX optical switch accomplishes this in a single NEBS compliant frame. The high OC-3/STM-1 channel count on the OPTera Connect DX optical switch combined with 10-Gbps transport capability makes this platform ideal for use in metro and small regional offices.

Dual OC-48/STM-16 short/intermediate/long reach interfaces

New dual OC-48/STM-16 interfaces allow the OPTera Connect DX optical switch to increase its 2.5-Gbps service density by 50 percent without introducing new network elements. With its short reach, intermediate reach or long reach versions, OPTera Connect DX cost-effectively meets the needs of the metro office and inter-office service requirements. The new dual OC-48/STM-16 interfaces provide simple platform scalability, simplified management, and increased service revenues.

Extensive UPSR/SNCP and BLSR/MS-SPRing support

The OPTera Connect DX optical switch distinguishes itself with its extensive UPSR/SNCP and BLSR/MS-SPRing support. From a simple capacity standpoint, the OPTera Connect DX provides capacity for up to:

- 128 UPSR/SNCP rings
- 12 BLSR/MS-SPRing rings

Mixed BLSR/MS-SPRing, UPSR/SNCP, 1+1, and 0:1 configurations are also supported. No other platform in the market can support such a wide variety of multiple speed rings and topologies. Furthermore, the TL-1 gateway feature available on the OPTera Connect DX optical switch allows subtending network elements, including non-Nortel Networks equipment, to be remotely managed through the OPTera Connect DX which greatly simplifies network management.

Integration with OPTera Connect HDX Optical Switch

A combined OPTera Connect DX/HDX solution provides the flexibility to tailor optical switching capabilities for the specific office application—from the largest major hub site to a smaller regional office.

Guaranteed 50 msec protection

The OPTera Connect DX optical switch, along with all Nortel Networks optical products, provides the highest level of traffic protection. With support for UPSR/SNCP, two-fiber BLSR/MS-SPRing and—the ultimate in ring protection—four-fiber BLSR/MS-SPRing, the OPTera Connect DX optical switch provides 50msec protection times or better. This guarantees that any network fault will be immediately restored with negligible impact to customer traffic. Nortel Networks BLSR/MS-SPRing implementation is a proven technology that has been deployed for over seven years on tens of thousands of network elements across global networks.

Operational flexibility

The OPTera Connect DX optical switch provides numerous operational flexibility features allowing the service provider to adapt to changing network demands. Some of these features include:

- Mixed SONET and SDH traffic on the same network element
- Over 16 supported network element and topology reconfigurations
- In-service hardware upgrades from lower density interfaces to new higher density interfaces including:
  - Quad OC-3/STM-1 to Hex OC-3/STM-1
  - Dual OC-12/STM-4 to Quad OC-12/STM-4
  - Single OC-48/STM-16 to Dual OC-48/STM-16

Network security

The OPTera Connect DX optical switch has an extensive list of security features to meet service providers’ need to protect their networks against unauthorized entry. The OPTera Connect DX optical switch can customize the access levels for operators who access the network for provisioning, maintenance, and monitoring purposes. Especially noteworthy, the OPTera Connect DX optical switch provides secure DCC functionality. This prevents unauthorized access to and from the DCC network by operations controllers, and network elements connected to the DCC network.

Management and operational fit

The OPTera Connect portfolio is designed to ensure an optimal fit with your existing operations. For OSS integration, Nortel Networks provides standard OSS interfaces such as XML, CORBA, TL1, SNMP, ASCII, and TMF814. In particular, the OPTera Connect DX has completed the OSMINE process and is interoperable with several Telcordia OSS solutions such as NMA, TIRKS, and TEMS. Additionally, Preside* Optical Management ensures
service providers can introduce new technology into their network with continuity of their existing management infrastructure, paradigms, and processes.

**OPTera Connect DX key customer advantages**

Numerous network studies performed by Nortel Networks renowned optical planning group have proven the business case for deploying the OPTera Connect DX. From a savings perspective, Nortel Networks business cases demonstrate up to 50 percent equipment savings, 69 percent space savings, and 62 percent power savings by combining nodal consolidation and digital cross connect integration into one platform. Details on other key contributing benefits are outlined below:

**Capital cost reduction**
Consolidation of multiple network elements in a single node—ADMs and digital cross-connects—reduces costs of deploying networks. Integrated DWDM interfaces eliminate the need for external wavelength adaptation equipment.

**Operational efficiency**
Operational efficiency is derived from the OPTera Connect DX optical switch node consolidation capabilities, which integrates multiple head-end equipment and supports GbE interfaces on the same platform. Preside Optical Management offers a centralized platform, which allows rapid diagnosis and troubleshooting.

**Scalable office**
OPTera Connect DX optical switch has a narrow footprint that can be readily and easily scaled without service disruption, from tens of Gbps to 140 Gbps as needed, to meet future capacity requirements. Integrated connection management is available across the fully scaled footprint to ensure efficient and managed STS-1/VC4 grooming and add/drop functionality. Migration to terabits per second optical switching capability is achieved via interfacing to the OPTera Connect HDX optical switch.

**Non-blocking switch fabric**
A non-blocking switch fabric offering STS-1/VC4 bandwidth management granularity optimizes optical networking flexibility and reduces requirements for external cross-connect systems.

**Flexible networking and service delivery**
OPTera Connect DX optical switch acts as a network aware optical switch, supporting multiple two/four/fiber BLSR/MS-SPRing rings, UPSR/SNCP rings, point-to-point, and transoceanic configurations. This results in a rich set of network functionalities that benefit service providers through operational simplification and efficient traffic grooming without the need for traditional external cross-connection facilities.

**Direct DWDM support**
OPTera Connect DX optical switch, with integrated DWDM 2.5 Gbps and 10 Gbps interfaces, provides direct access to Nortel Networks OPTera Long Haul 1600/MOR+ Optical Line System backbone, having up to 1.6 Tbps aggregate span capacity and to OPTera Metro 3500 Multi-service Platform. These optical interfaces offer OPTera Long Haul-compatible power budgets and eliminate unnecessary wavelength adaptation on the OPTera Long Haul bay and the OPTera Metro platform.

**Transcontinental and transoceanic networks**
For international gateway/office applications, the OPTera Connect DX optical switch supports mixed SONET and SDH services from the same network element—providing significantly lower life cycle costs and many operational efficiencies for today’s global carriers. In addition, OPTera Connect DX optical switch supports the Head-End Ring Switching (HERS) feature for transcontinental and transoceanic applications, enabling the integration of BLSR/MS-SPRing bandwidth efficiency with significantly improved service delay performance—resulting in optimized global network applications.

**Graceful network evolution**
The OPTera Connect portfolio of optical switches integrates seamlessly with the Nortel Networks portfolio, including OPTera Long Haul Optical Line Systems, OPTera Metro Multi-service Platform, and S/DMS TransportNode OC-192/TN-64X which represents a global installed base of over 100,000 network elements. From a customer perspective, integrating the OPTera Connect DX into their network helps protects prior investments in existing network infrastructure and makes the OPTera Connect portfolio an excellent choice for new network builds or expanding existing networks.

**Preside Optical Management**
With a rich tradition and expertise in delivering network management solutions, Preside Optical Management delivers tools that ensure operational simplicity and efficiency. Simplicity is achieved with tools offering single-screen provisioning, software upgrades, and troubleshooting across an OPTera network. Efficiency is delivered through topology mapping and browsing, which save time and effort in essential operational processes such as service activation and network troubleshooting.
Delivering operational accelerations for OPTera Connect DX

To offer profitable services, it is essential to deploy network management solutions that deliver operational acceleration—increasing the speed of common business processes. Nortel Networks accelerates customer operations by solving critical network management challenges, thereby reducing operational complexity, improving the speed of service delivery, and ensuring optimal fit into existing processes.

Operational fit—network management

The Nortel Networks Preside Optical portfolio offers a common platform for managing OPTera networks which provides a consolidated network view. The OPTera Connect DX benefits from the powerful and comprehensive management capabilities of the Preside Optical platform, which allows service providers to lower their overall cost of ownership.

Preside Optical also offers standard OSS interfaces such as TL-1 and TMF814 (CORBA) to simplify OSS integration. This can support several applications including flow-through provisioning applications, inventory retrieval, performance monitoring reporting, and fault notifications.

Operational efficiency—tools and automation

A simplified deployment and operational strategy is also part of the value proposition for the OPTera Connect DX platform. A few examples of the management efficiency of this platform include:

Optical Manager—Provides a Graphical User Interface (GUI) to facilitate network and nodal management. It allows remote login to network elements, provides shelf level graphics for ease of troubleshooting, comprehensive performance monitoring reports and more.

Centralized, in-service software downloads and upgrades—Reduce projects costs and timeframes as well as ensure minimal site visits for new feature deployments.

OPTera Planner—A powerful graphical user interface for streamlining the design of OPTera-based networks.

These and other tools form the foundation that ensures the service quality, availability, and velocity required by customers.

The global, intelligent multi-service platform

The OPTera Connect DX optical switch is a global, multi-service platform with capacity from tens to hundreds of gigabits per second. The advanced software capabilities on the OPTera Connect DX optical switch allow new revenue-generation capabilities, services creation, deployment velocity, optimized connection, and network management at a dramatically lower cost-per-managed-bit. The OPTera Connect DX’s mixed interfaces—155 Mbps, 622 Mbps, 2.5 Gbps, Gigabit Ethernet, and 10 Gbps—offer a flexible alternative to service providers. The multiple configurations supported by OPTera Connect DX optical switch—including ring, point-to-point, and transoceanic—allow service providers to maximize the OPTera Connect DX investment as their networks evolve.

Additional features include full non-blocking bandwidth management at the STS-1/VC4 level to reduce external cross-connect requirements. Nortel Networks OPTera Connect DX allows service providers to differentiate their service offerings in today’s competitive environments and manage their network resources more efficiently and cost-effectively.

OPTera Connect DX: Building block for the next-generation optical network

Nortel Networks Next-generation Optical solution is underpinned by the OPTera Connect and OPTera Long Haul portfolios. The OPTera Connect DX optical switch provides a key building block to the success of these solutions by acting as an integral component working seamlessly with Nortel Networks optical line systems, optical switches, and extending itself to metro multi-service platforms. Nortel Networks provides a complete solution of next-generation optical switching platforms, including the OPTera Connect HDX optical switch. This innovative optical switch provides optimized optical switching capabilities for core long haul and metro offices by introducing a unique value proposition based on optimizing initial first cost, application flexibility, future proof scalability, intelligence, and nodal efficiencies.
Nortel Networks is an industry leader and innovator focused on transforming how the world communicates and exchanges information. The company is supplying its service provider and enterprise customers with communications technology and infrastructure to enable value-added IP data, voice and multimedia services spanning Wireless Networks, Wireline Networks, Enterprise Networks, and Optical Networks. As a global company, Nortel Networks does business in more than 150 countries. More information about Nortel Networks can be found on the Web at:

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