



**Nortel Networks**

**Product Brief**

# **OPTera Metro 1000 Series Ethernet Service Modules**

## ***OPTera Metro 1000 series of Ethernet Service Modules benefits***

- *Cost-effective and scalable delivery point for Ethernet services in the MxU, enterprise, and point-of-presence*
- *Varying access options to meet service demands and range of transport alternatives to leverage existing infrastructure*
- *Secure and scalable separation of customer traffic—transparent and mapped VLAN support*
- *Simple End Point Provisioning for faster service uptime and lower cost to implement*
- *QoS features to enable tiered services and profitable SLAs*

## **Business advantage**

Service providers, seeking to extend their networks to the customer premises and to deliver differentiated Ethernet-based services cost-effectively to multiple customers, can leverage a new class of Optical Ethernet edge device—the OPTera Metro 1000 series of Ethernet Service Modules.

The OPTera Metro 1000 series serves as the Layer 2 VPN demarcation point in the service provider network, offering an innovative and industry-first consistent Ethernet user-to-network interface (UNI) that enables:

- Increased scalability of services
- Quicker provisioning of services
- Lower operational costs
- Secure separation of multiple customers' traffic

These Ethernet Service Modules may be located in the customer's premises—whether that be an enterprise, multi-tenant/multi-dwelling units (MxUs), or the service provider's point-of-presence.

The OPTera Metro 1000 series is comprised of the OPTera Metro 1200, OPTera Metro 1400, and OPTera Metro 1450. Each of these Ethernet Service Modules can be deployed to support an array of service-delivery scenarios, including point-to-point, point-to-multipoint, and any-to-any network configurations. Their ability to provide secure separation of customer traffic, scale to meet growing customer demand, and maintain customer priorities enables the delivery of profitable differentiated services.

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OPTera Metro 1200



OPTera Metro 1400



OPTera Metro 1450



To take full advantage of merging the simplicity, ubiquity, and cost-effectiveness of Ethernet with the reliability, speed, and reach of optics, service providers can combine the OPTera Metro 1000 series with the OPTera Metro 3500 Multiservice Platform (with OPTera Packet Edge System), OPTera Metro 4000, the Passport 8600, and/or the OPTera Metro 8000 Services Switch. In so doing, they may broaden or extend the delivery of Ethernet services to MxUs and enterprises in a point-to-point, point-to-multipoint, or any-to-any service scenario to support the delivery of high-value services such as VoIP, storage networking, disaster recovery, and applications hosting.

### Architecture designed for optimal service delivery

Successfully delivering services to enterprises means maximum availability, appropriate performance,

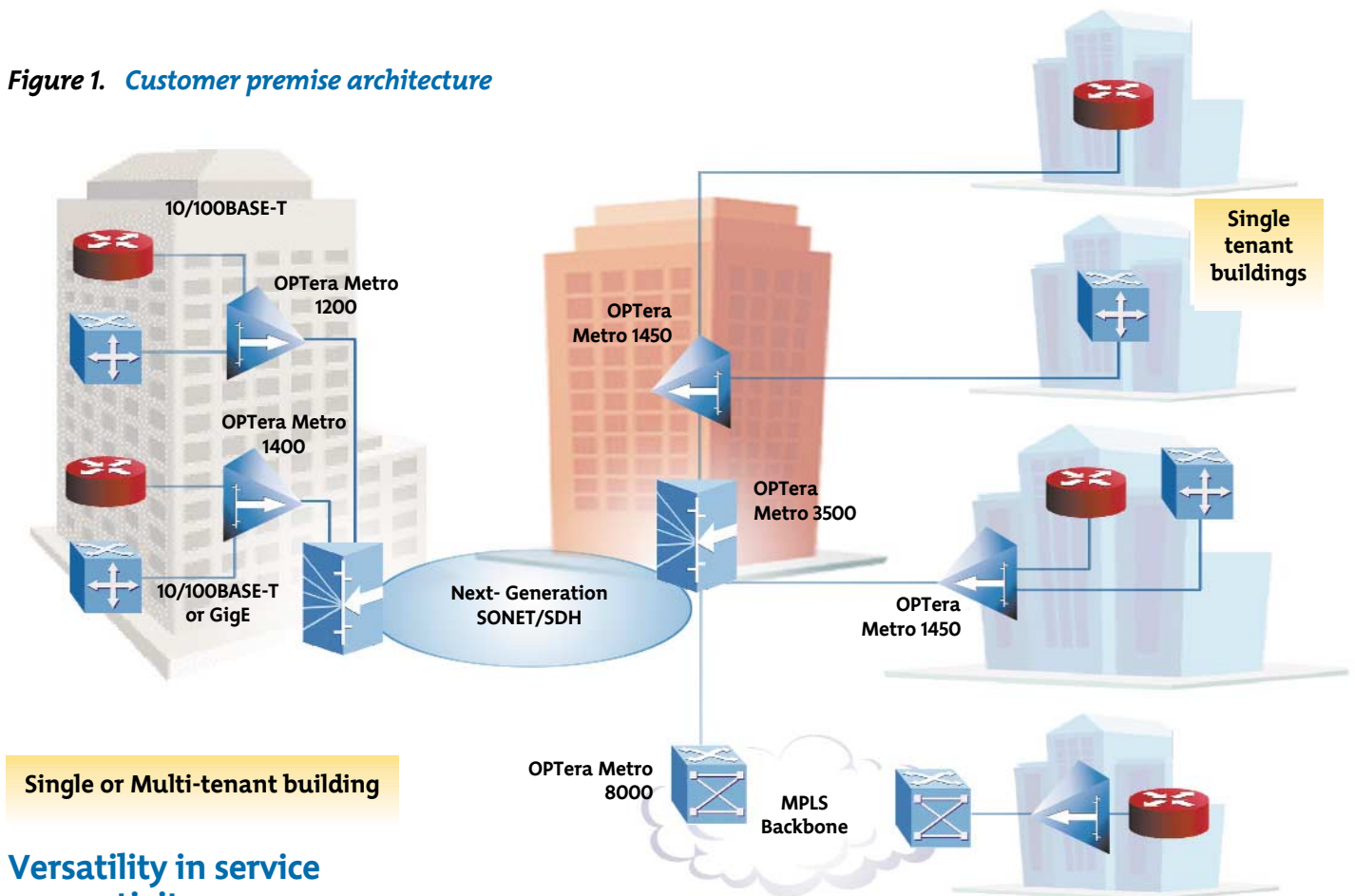
and the ability to cost-effectively support new users/customers as demand increases. To ensure resiliency of services and optimal performance, these purpose-built Ethernet Service Modules provide:

- Carrier-class NEBS Level 3 compliance—meeting the most rigorous electrical, environmental, temperature, and vibration standards for reliability
- Varying access or UNI options—to meet service demands and transport alternatives (10/100 Mbps, 100 Mbps, GE, copper, fiber). See the table below for UNIs on each of the OPTera Metro 1000 series modules
- Support for up to 500 Transparent Domain Identifiers (TDIs) or VPN Identifiers (VPN-IDs) for customer separation per OPTera Metro 1000 device

- Two Gigabit Ethernet uplink options—one or two 1000BASE-TX uplink ports or a dual-port Small Form Factor Pluggable (SFP) Gigabit Interface Connectors (GBICs)—to ensure cost-effective transport over fiber, SONET/SDH, and WDM. These Gigabit Ethernet ports utilize provisionable Multi-Link Trunking (MLT) load sharing between the two ports to ensure availability of service with sub-second failover.
- Effective utilization of bandwidth through features such as bandwidth tuning from 1 Mbps to line rate in increments of 1 Mbps per port per TDI/VPN-ID, and a mapped NNI feature that uses a VLAN tag within the service provider Ethernet encapsulation header to enhance security or direct traffic within the service provider network.

OPTera Metro 1200	OPTera Metro 1400	OPTera Metro 1450
<b>Role</b> In-building aggregation supports up to 100 Mbps	Adds GigE customer connectivity	Aggregation in a point-of-presence
<b>Service (customer) ports</b> 12 10/100BASE-T ports	<ul style="list-style-type: none"> <li>• 12 10/100BASE-T ports</li> <li>• 2-port SFP GBIC slots</li> </ul>	<ul style="list-style-type: none"> <li>• 12 100BASE-FX (Single Mode Fiber) ports—a media converter may be used to connect 10/100BASE-T ports to the 100BASE-FX SMF ports</li> <li>• 2-port SFP GBIC slots</li> </ul>
<b>Network ports</b> <ul style="list-style-type: none"> <li>• 2-port SFP GBIC slots</li> <li>• 1- or 2-port 1000BASE-T</li> </ul>	<ul style="list-style-type: none"> <li>• 2-port SFP GBIC slots</li> <li>• 1- or 2-port 1000BASE-T</li> </ul>	<ul style="list-style-type: none"> <li>• 2-port SFP GBIC slots</li> <li>• 1- or 2-port 1000BASE-T</li> </ul>

Figure 1. Customer premise architecture



Single or Multi-tenant building

### Versatility in service connectivity

Whether for an incumbent provider, alternate provider, or new entrant, the OPTera Metro 1000 series supports the delivery of industry-leading connectivity services that can be rate limited and that adhere to comprehensive SLAs in point-to-point, point-to-multipoint, and any-to-any configurations:

- Point-to-point (or “one-to-one”):** In this scenario, the network provides a “virtual leased line” across a shared infrastructure. Service offerings include LAN extension service (connecting two LAN services) and simple video conferencing. Ideal for customers that require a large number of point-to-point connections. OPTera Metro 1000 enables efficient point-to-point Ethernet service that uses dynamic provisioning/learning of end-points after end-points are initially provisioned.

POP or CO

- Point-to-multipoint (or “one-to-many”):** In this scenario, multiple locations each connect to a central point. These locations may be branch offices connecting to a data center or schools receiving an interactive video broadcast for remote distance learning. Again, dynamic provisioning and learning of end-points allow for simplified provisioning and bandwidth efficiency.
- Multipoint-to-multipoint (or “any-to any”):** This connectivity is the key to realizing the vision of making MAN/WAN networking as simple as today’s in-building network. Services include managed Ethernet services and transparent LAN services to enterprises with many sites in a metro or multiple metros. This service reduces the number of connections and associated costs.

Multi-tenant building

The OPTera Metro 1000 series can be deployed to aggregate traffic in front of an Ethernet over SONET/SDH network and support Gigabit Ethernet connectivity to an enterprise or MxU. It removes the need for expensive SONET/SDH nodes at the customer premises and conserves valuable SONET/SDH ports while offering increased port density to support the delivery of more services to more customers. The OPTera Metro 1000 can also be deployed in an Ethernet over Fiber scenario, where several OPTera Metro 1000s are aggregated into a Passport 8600 in the MxU site.

To offer an enhanced and extremely scalable Virtual Private LAN Service (VPLS), the OPTera Metro 1000 may be deployed with the OPTera Metro 8000 to leverage the innovative VPLS using Distributed MPLS model.

This model eliminates the scalability and bandwidth constraints of point-to-point, fully meshed, or VLAN-based network models.

Acting as the Services Edge element in the VPLS framework, the OPTera Metro 1000 family helps service providers:

- Increase the scalability of their service (up to tens of thousands of customers per metro), while simplifying the network
- Speed provisioning utilizing LPE Discovery feature (up to 10 times faster than a comparable RFC 2547 solution), and thus time-to-revenue
- Reduce operational complexity (operational expense savings up to 60 percent can be achieved, as compared with RFC 2547 implementations)\*
- Ensure VPLS service resiliency using dual homing OPTera Metro 8000s to provide a distributed solution with no single point of failure.

## Ensuring secure customer separation

To ensure secure customer separation of customer traffic, the OPTera Metro 1000 series uses a unique and industry-leading approach to defining an Ethernet UNI. This same Ethernet UNI is used by the OPTera Metro 8000 and OPTera Metro 3500.

\* For more information, be sure to read Nortel Networks VPLS Using Distributed MPLS Positioning Paper ([http://www.nortelnetworks.com/solutions/opt\\_ethernet/collateral/nn-100541-031903.pdf](http://www.nortelnetworks.com/solutions/opt_ethernet/collateral/nn-100541-031903.pdf)) and Optical Ethernet Service Provider Business Case (<http://www.nortelnetworks.com/products/library/collateral/NN-100122-04-02.pdf>).

## Key industry firsts

**Consistent Ethernet UNI**—ensures secure customer separation, supports differentiated services and SLAs, and relieves scaling limitations and end-user addressing complexity.

**Simple End Point Provisioning**—leveraging an autodiscovery capability and Preside Service Provisioning to speed service activation and lower operational costs.

**Virtual Private LAN Services (VPLS) solution model**—when combined with the OPTera Metro 8000, uses an innovative, functionally distributed model that eliminates the scalability and bandwidth constraints of point-to-point, fully-meshed, or VLAN-based network models to offer virtual private Ethernet services.

Simply put, service providers are able to leverage a lower-cost shared network infrastructure across multiple customers and offer consistent services and SLAs. This is accomplished by the OPTera Metro 1000 series' Ethernet UNI immediately encapsulating end-users' Ethernet frames and prepending a customer-specific header known as OE/L2 header containing UNI MAC address, UNI port ID, and TDI or VPN-ID which may be mapped from the IEEE 802.1Q VLAN.

Using the OE/L2 header, frame-forwarding decisions are made by intermediate devices such as the OPTera Metro 8000 or OPTera Metro 3500. The end-user address space and routing schemes are masked to the provider network and never flood to the Optical Ethernet network. This enables the number of individual TDIs/VPN-IDs and customers supported per device to scale substantially and eliminate two significant scaling issues: the problem of MAC address explosion and VLAN identifier explosion. Up to 24,000 MAC addresses are supported per OPTera Metro 1000 device.

With the consistent Ethernet UNI, providers can now cost-effectively deliver the Ethernet services their

customers demand across Layer 1-3 technologies while ensuring end-to-end SLA support.

## Enabling tiered services with profitable SLAs

Using the industry-leading Ethernet UNI and QoS mechanisms, customers can have one SLA for all traffic or different SLAs may be applied to each VLAN. This is achieved in several steps:

**Transparent and Mapped Ethernet Services**—In Transparent Service, the UNI port assigns all incoming traffic to one associated transparent domain using the TDI/VPN-ID. In Mapped Service, the UNI port assigns incoming traffic from different VLANs to associated transparent domains using TDIs/VPN-IDs. There is a 1:1 mapping between VLAN/Qtag and TDI/VPN-ID. Up to 60 TDI/VPN-ID per port (500 per OPTera Metro 1000) are supported in Mapped Service. The combination of dynamic tunneling allowing greater scalability of VLANs than traditional approaches and Auto Discovery of provisioning information enables a true any-to-any service.

**Packet classification**—Customer traffic is encapsulated with the OE/L2 header at which time the customer traffic priorities are mapped to the service provider priorities on a per port per TDI/VPN-ID basis or honored, as the service provider chooses. Up to eight priority levels may be assigned. To provide differentiated service while maintaining customer-specific priorities, the service provider's 802.1p markings can be mapped based on the DiffServ Code Point. The original customer priority is preserved throughout the network.

**Policing**—The OPTera Metro 1000 series supports QoS policing where packets can be policed in user-configurable 1 Mbps increments from 1 Mbps

to line rate. Policing parameters can be set on a per port per Class of Service (Service provider 802.1p) for transparent ports and per port per TD/VPN-ID per Class of Services for mapped ports. Policing parameters can be set on a per port for transparent ports and per port per TDI/VPN-ID for mapped ports. Optional bursting allows traffic to burst beyond the permitted line rate for a brief amount of time. Policing may also be based on group of UNI ports (transparent ports). Policing ports can be disabled on a per UNI port for transparent ports. Mapped ports always have policing enabled on a per port per TDI/VPN-ID. Additionally, traffic statistics can be obtained for each port and for each VPN-ID per port for customer billing.

**Congestion Management**—To avoid congestion and manage traffic effectively, the OPTera Metro 1000 series has 4 egress queues per UNI port and 8 egress queues per uplink port. They allow the network administrator to ensure varieties of customer traffic receive the appropriate priority.

**Scheduling**—At each egress port, scheduling is performed by the OPTera Metro 1000 series to determine the order in which queues are processed. The OPTera Metro 1000 series supports strict priority scheduling and Weighted Round-Robin Queuing (WRR) to ensure queues get serviced according to service provider priorities and customer SLAs.

**Flat-rate and tiered billing to support comprehensive SLAs**—With the ability to classify, police, and prioritize packets as per end customer-designated priorities, Ethernet services can be differentiated and billed for using flat-rate or tiered billing. Flat-rate and tiered billing are supported with per port per VPN statistics.

## Provisioning and ease of management

To enable true any-to-any networking and ensure operational costs are contained as user demand increases, the OPTera Metro 1000 series provides administrative separation, utilizes Simple End Point Provisioning and an array of management tools.

**Administrative separation**—The Ethernet UNI of the OPTera Metro 1000 series provides a strict demarcation point between the service provider and the attached customer. Service providers do not need to know what routing protocol the customer is running, nor does the service provider have to define which VLANs the customer can use. These capabilities simplify the management of virtual Ethernet services to many customers.

**Simple End Point Provisioning**—The OPTera Metro 1000 series is provisioned with the relevant service SLA metrics and VPN-ID information. Using the Auto Discovery feature, it automatically learns of other sites in the customer network, thus avoiding the need to provision existing network devices. When adding or deleting a new site to an existing customer network, the service provider needs to only provision the site, enabling Simple End Point Provisioning.

**Preside Service Provisioning (PSP)**—PSP enables service providers to easily deploy and provision Ethernet services. PSP securely provisions new customers and services across an integrated network consisting of the OPTera Metro 1000 series, Baystack Business Policy Switch, Passport 8600, OPTera Metro 8000, and OPTera Metro 3000. PSP tracks the availability of network resources required to provision services or to diagnose troubles with provisioned services. In addition, PSP provides an automated work-order system and integrated database to maintain accurate relationships with customers.

By integrating all of the functions to provision an end-to-end connection, PSP further reduces the ongoing expenses of network operations.

**TD Continuity Tool**—This powerful debugging tool can be used to ensure availability service and measurement of SLAs. It may be used to validate all VPN end-points, test connectivity, and determine round trip delay measurements for SLA purposes. The tool may be invoked from the central CO site using the command line interface or Preside Site Manager, thus removing the need for costly customer site specific trips.

**Ease of management**—The OPTera Metro 1000 series may be managed by a variety of management tools to adapt to a specific operating environment. These include Command Line Interface (CLI), Java-based Device Manager, Web-based management, SNMP management software (SNMPv1, v2 and v3), Nortel Networks Preside Service Provisioning (PSP) network software, and Nortel Networks Multiservice Device Manager (MDM) for fault detection and performance monitoring.

## Summary

The OPTera Metro 1000 series of Ethernet Service Modules provides a cost-effective means for service providers to offer an array of Ethernet-based services to a variety of customers. Its industry-leading Ethernet UNI ensures scalable and secure customer separation, provides robust QoS and bandwidth limiting features, and enables service providers to establish a line of demarcation and a point at which to collect statistics and information to meet SLAs.

In combining the intelligence of the Ethernet Service Modules with the OPTera Metro 1000 series, the OPTera Metro 3500 Multiservice Platform (with OPTera Packet Edge System), OPTera Metro 4000, the Passport 8600, and/or the OPTera Metro 8000, service providers can offer profitable virtual private Ethernet services over Fiber, SONET/SDH, and DWDM.

## Technical specifications

Table 1: OPTera Metro 1000 Series Ethernet Service Module technical specifications

<b>Performance specifications</b>	
Frame Forward Rate (64-byte packets)	Up to 2.2 million packets per second (pps) maximum,
Port Forwarding/Filtering Performance (64-byte packets)	
For 10 Mbps	14,880 pps maximum
For 100 Mbps	148,810 pps maximum
For 1000 Mbps	1,488,100 pps maximum
Addressing	24,000 MAC addresses
<b>Data rate</b>	
OPTera Metro 1200 ESM	
For 10/100BASE-T Mbps front-panel UNI ports	10 Mbps Manchester encoded or 100 Mbps 4B/5B encoded
OPTera Metro 1400 ESM	
For 10/100BASE-T Mbps front-panel UNI ports	10 Mbps Manchester encoded or 100 Mbps 4B/5B encoded
For 1000 Mbps front-panel UNI ports	1000 Mbps 8B/10B encoded
OPTera Metro 1450 ESM	
For 100BASE-FX front-panel UNI ports	10 Mbps Manchester encoded or 100 Mbps 4B/5B encoded
For 1000 Mbps front-panel UNI ports	1000 Mbps 8B/10B encoded
<b>Reliability</b>	<ul style="list-style-type: none"><li>• Carrier-class NEBS Level 3 compliant</li><li>• Dual gigabit Ethernet uplink ports utilizing provisionable Multi-Link Trunking (MLT)</li></ul>
<b>Interfaces</b> (see page 2 for access and uplink combinations)	
Access:	<ul style="list-style-type: none"><li>• 12-port 10/100BASE-T auto-speed sensing (support for up to 100 meters)</li><li>• 12-port 100BASE-FX (SMF) (support for up to 15 Km)</li><li>• 2-port SFP GBIC slots using:<ul style="list-style-type: none"><li>- 1 port 1000BASE-SX SFP GBIC (mini-GBIC connector types: LC, MT-RJ ) (2 Km)</li><li>- 1 port 1000BASE-LX SFP GBIC (mini-GBIC connector type: LC) (5 Km)</li><li>- 1 port 1000BASE CWDM SFP GBIC (mini-GBIC, connector type : LC ; 1470nm~1610nm, 40 Km or 70 Km)</li></ul></li></ul>
Uplink options:	<ul style="list-style-type: none"><li>• 1 1000BASE-Tx port (RJ-45 connector) (100 meters)</li><li>• 2 1000BASE-Tx ports (RJ-45 connector) (100 meters)</li><li>• 2-port SFP GBIC slots using:<ul style="list-style-type: none"><li>- 1 port 1000 BASE-SX SFP GBIC (mini-GBIC connector types: LC, MT-RJ ) (2 Km)</li><li>- 1 port 1000BASE-LX SFP GBIC (mini-GBIC connector type: LC) (5 Km)</li><li>- 1 port 1000BASE CWDM SFP GBIC (mini-GBIC, connector type : LC ; 1470nm~1610nm, 40 Km or 70 Km)</li></ul></li></ul>
<b>Network protocols and standards compatibility</b>	<ul style="list-style-type: none"><li>• IEEE 802.3 (Ethernet)</li><li>• IEEE 802.1p (Prioritizing)</li><li>• IEEE 802.3u (Auto negotiating)</li><li>• IEEE 802.1Q (VLAN tagging)</li></ul>
<b>Physical specifications</b>	
Weight:	4.8kg (10.60 lbs)
Height:	7.04 cm (2.77 in.)
Width:	43.82 cm (15.1 in)
Depth:	38.35 cm (15.1)

## Electrical specifications

	<i>OPTera Metro 1200</i>	<i>OPTera Metro 1400</i>	<i>OPTera Metro 1450</i>
Input voltage	100 to 240 VAC @ 47 to 63 Hz	100 to 240 VAC @ 47 to 63 Hz	100 to 240 VAC @ 47 to 63 Hz
Input power consumption	70 W	60 W	65W
Input current	0.75 A @ 100 VAC; 0.4 A @ 240 VAC	60 A @ 100 VAC; 0.3 A @ 240 VAC	.65 A @ 100 VAC; 0.35 A @ 240 VAC
Maximum thermal output	240 BTU/hr	215 BTU/hr	230 BTU/hr

## RFCs

- RFC 1155 (SMIv1)
- RFC 2578, 2579, 2580 (SMIv2)
- RFC 951 (BootP); RFC 1350 (TFTP); RFC 1213 (MIB-II); RFC 2737 (Entity MIBv2)
- RFC 2863 (Interfaces Group MIB); RFC 2665 (Ethernet MIB)
- RFC 2819 (RMON MIB); RFC 2570 (SNMPv3); RFC 2571 (SNMP Frameworks)
- RFC 2573 (SNMPv3 Applications); RFC 2574 (SNMPv3 USM);
- RFC 2575 (SNMPv3 VACM); RFC 2572 (SNMP Message Processing)
- RFC 1157 (SNMPv1); RFC 1901 (SNMPv2c); RFC 2576 (Coexistence between SNMPv1, SNMPv2c, and SNMPv3)

## Environmental specifications

Operating temperature:	0° to 40° C ( 32° to 104° F)
Storage temperature:	-25° to +70° C (-13° to 158°F)
Operating humidity:	85% maximum relative humidity, non-condensing
Storage humidity:	95% maximum relative humidity
Operating altitude:	Up to 3024 m (10,000 ft.)
Storage altitude:	Up to 12,096 m (40,000 ft.)

## Safety agency approvals

- UL Listed (UL1950)
- IEC 950/EN60950
- C22.2 No. 950 (CUL) with all national deviations
- UL-94-V1 Flamability requirements for PC board
- NOM (NOM-019)

## Electromagnetic emissions summary

Meets the following standards:

- US, CFR47, Part 15 Subpart B, Class A
- Canada, ICES-003, Issue 2, Class A
- Australia/New Zealand, NZS 3548:1995, Class A
- Japan, V-3/97.04:1997, Class A
- Taiwan, CNS 13438, Class A
- Europe, EN 55022-1998/A1: 2000 Class A  
EMC Directive: Directly published in the EMC Directive of 89/336/EEC with Modification 92/31/EED, 93/13/EC  
EN 61000-3-2: 2000  
EN 61000-3-3: 1995/A1: 2001
- Global, CISPR 22-1997/A1: 2000 Class A

## Electromagnetic immunity

- Global, CISPR 24:1997/A1: 2001
- Europe, EN55024: 1998/A1: 2001

**Table 2: OPTera Metro 1000 Ethernet Service Module ordering information**

Order No.	Product description
AL2001A19†	OPTera Metro 1000 Ethernet Service Module
AL2001A21†	OPTera Metro 1450 Ethernet Service Module
AL2001A22†	OPTera Metro 1400 Ethernet Service Module
AL2011006	Rack Mount Kit
AL2033014	1-port 1000BASE-T MDA
AL2033015	2-port 1000BASE-T MDA
AL2033016	2-port Small Form Factor Pluggable GBIC MDA
AA1419013	1-port 1000BASE-SX Small Form Factor Pluggable GBIC (mini-GBIC, connector type: LC)
AA1419014	1-port 1000BASE-SX Small Form Factor Pluggable GBIC (mini-GBIC, connector type: MT-RJ)
AA1419015	1-port 1000BASE-LX Small Form Factor Pluggable GBIC
AA1419025	1-port 1000BaseCWDM Small Form Factor Pluggable GBIC (mini-GBIC, connector type: LC) - 1470nm Wavelength, 40km
AA1419026	1-port 1000BaseCWDM Small Form Factor Pluggable GBIC (mini-GBIC, connector type: LC) - 1490nm Wavelength, 40km
AA1419027	1-port 1000BaseCWDM Small Form Factor Pluggable GBIC (mini-GBIC, connector type: LC) - 1510nm Wavelength, 40km
AA1419028	1-port 1000BaseCWDM Small Form Factor Pluggable GBIC (mini-GBIC, connector type: LC) - 1530nm Wavelength, 40km
AA1419029	1-port 1000BaseCWDM Small Form Factor Pluggable GBIC (mini-GBIC, connector type: LC) - 1550nm Wavelength, 40km
AA1419030	1-port 1000BaseCWDM Small Form Factor Pluggable GBIC (mini-GBIC, connector type: LC) - 1570nm Wavelength, 40km
AA1419031	1-port 1000BaseCWDM Small Form Factor Pluggable GBIC (mini-GBIC, connector type: LC) - 1590nm Wavelength, 40km
AA1419032	1-port 1000BaseCWDM Small Form Factor Pluggable GBIC (mini-GBIC, connector type: LC) - 1610nm Wavelength, 40km
AA1419033	1-port 1000BaseCWDM Small Form Factor Pluggable GBIC (mini-GBIC, connector type: LC) - 1470nm Wavelength, 70km
AA1419034	1-port 1000BaseCWDM Small Form Factor Pluggable GBIC (mini-GBIC, connector type: LC) - 1490nm Wavelength, 70km
AA1419035	1-port 1000BaseCWDM Small Form Factor Pluggable GBIC (mini-GBIC, connector type: LC) - 1510nm Wavelength, 70km
AA1419036	1-port 1000BaseCWDM Small Form Factor Pluggable GBIC (mini-GBIC, connector type: LC) - 1530nm Wavelength, 70km
AA1419037	1-port 1000BaseCWDM Small Form Factor Pluggable GBIC (mini-GBIC, connector type: LC) - 1550nm Wavelength, 70k
AA1419038	1-port 1000BaseCWDM Small Form Factor Pluggable GBIC (mini-GBIC, connector type: LC) - 1570nm Wavelength, 70km
AA1419039	1-port 1000BaseCWDM Small Form Factor Pluggable GBIC (mini-GBIC, connector type: LC) - 1590nm Wavelength, 70km
AA1419040	1-port 1000BaseCWDM Small Form Factor Pluggable GBIC (mini-GBIC, connector type: LC) - 1610nm Wavelength, 70km
AA0005A08†	BayStack 10 Power Supply Unit. Modular power supply chassis, accepting 136 W and 200 W Redundant Power Supply modules, and 1400 VA UPS module.
AA0005011	BayStack 10 1400 VAC UPS/SNMP Controller Module, 110V North American version (Japan not supported). To be used in place of AA0005014 when UPS functionality is desired.
AA0005012	BayStack 10 1400 VAC UPS/SNMP Controller Module, 230V International version (Japan not supported). To be used in place of AA0005014 when UPS functionality is desired.
AA000501	BayStack 10 SNMP Controller Module. One required per BayStack 10 system, if UPS/SNMP Controller Module (AA0005011 or AA0005012) will not be used.
AA0005010	BayStack 10 200 W Redundant Power Supply module. -48 V DC output for use with products with modular DC to DC converter
AL1904004	-48 V DC-to-DC converter, for installation in the OPTera Metro 1200 ESM, for use with the BayStack 10 Power Supply Unit

† The seventh character (A) of the switch order number must be replaced with the proper code to indicate desired product nationalization:

"A"—No power cord included; "B"—Includes European "Schuko" power cord common in Austria, Belgium, Finland, France, Germany, The Netherlands, Norway, and Sweden;

"C"—Includes power cord commonly used in the United Kingdom and Ireland; "D"—Includes power cord commonly used in Japan; "E"—Includes North American power cord;

"F"—Includes Australian power cord, also commonly used in New Zealand and the People's Republic of China.

**In the United States:**

Nortel Networks  
35 Davis Drive  
Research Triangle Park, NC 27709  
USA

**In Canada:**

Nortel Networks  
8200 Dixie Road, Suite 100  
Brampton, Ontario L6T 5P6  
Canada

**In Caribbean and Latin America:**

Nortel Networks  
1500 Concorde Terrace  
Sunrise, FL 33323  
USA

**In Europe:**

Nortel Networks  
Maidenhead Office Park  
Westacott Way  
Maidenhead Berkshire SL6 3QH  
UK

**In Asia:**

Nortel Networks  
6/F Cityplaza 4,  
Taikooshing,  
12 Taikoo Wan Road,  
Hong Kong



[www.nortelnetworks.com](http://www.nortelnetworks.com)

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