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Xedge PCX-2

Xedge Packet Cell Switch

INTRODUCTION

The explosive growth of Ethernet LANs and the proliferation of packet-based application services have accelerated the demand for extending Ethernet LANs and emerging applications across the WAN. Network operators need to cost-effectively provision new services, like real-time VoIP and IP Video Conferencing over WAN, while maximizing resource utilization and minimizing delay and packet loss.

Xedge PCx-2 allows network operators to converge hybrid circuit, cell, and packet traffic in a cost-effective strategy with unmatched QoS performance guarantees for user flows across a multiple technology WAN. Rather than incurring the cost of parallel networks, PCx-2 allows the simultaneous transport of native interfaces for TDM, ATM and Ethernet/IP across a packet network using Pseudowire Emulation (PWE3).

Xedge Reliability & Scalability

The Xedge PCx-2 is an integral part of GDC's next generation Xedge MultiService Packet xChange (MSPx) platform. The dual-slot PCx-2 module plugs into two adjacent front slots of an Xedge AC- or DC-powered chassis: Xedge 6002 (2 slots), Xedge 6160 (4 slots), Xedge 6280 (7 slots) and 16-slot Xedge 6640/6645 shelves. One or two Xedge LIMs can plug in PCx-2 midplane connectors from the rear panel.

PCx-2 and other devices in the Xedge MSPx family support high-speed Ethernet, IP and legacy TDM/ATM, allowing operators to migrate legacy services over a secure, resilient Ethernet, MPLS, IP or ATM backbone. This seamless integration enables simplified, scalable, cost-effective network maintenance, sparing and operation. *Figure 2* shows PCx-2 devices deployed in the compact 1RU Xedge 6002 chassis.

FEATURE HIGHLIGHTS

- Standards-based Pseudowire (PWE3) transport of Ethernet, TDM, ATM, VLAN over packet
- Complies with Metro Ethernet Forum (MEF) compliant Ethernet, including Private Line (E-Line)
- Enables high speed, high capacity packet switching
- Offers MPLS, IP, ATM and Ethernet transport
- Powerful traffic shaping for optimal bandwidth utilization
- Reduces OPEX and CAPEX
- Supports DS1/E1, DS3/E3, OC3/STM1, OC12/STM4, Serial and HSSI and DS1/E1 IMA plug-in interfaces: two modules per PCx-2.
- Secure configuration and management via SNMP or MIB editor over Telnet/craft connection, or via GDC's ProSphere Network Management System.
- Provides circuit emulation (T1/E1, DS3/E3, Serial) with clock recovery over Ethernet.
- Conforms to IEEE 1588 Precision Time Protocol as an IEEE 1588 Client over Ethernet.

Multiple Service Interfaces

Xedge PCx-2 employs advanced dual-control plane architecture and traffic management schemes for flexible, resilient, and flow-sensitive services, maximizing bandwidth efficiency without sacrificing service quality for delay-sensitive applications.

PCx-2 supports both MPLS as well as ATM technology transport with a highly granular quality of service (QoS) that supports "any-to-any" services. Planners can take advantage of a wealth of service interfaces to build converged voice, video, and data solutions.

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Ethernet Services for WAN

Xedge PCx-2 provides support for flexible provisioning of Ethernet services with contracted performance. The PCx-2 offers resilient traffic management and quality of service mechanisms to assure successful real time operations in the deployment of Ethernet services and applications. Xedge PCx-2 meets the Metro Ethernet Forum standards including E-Line services.

MPLS Support

MPLS allows the creation of well-characterized tunnels over different transport technologies. GDC's MPLS solution offers flexible control of connections across a packet network. This includes circuit emulation services over Ethernet and other native services.

GDC's implementation of MPLS provides a unified approach to managing the construction of accurately characterized tunnels, independent of the underlying transport type. Once constructed, a single tunnel can be given granularity using Pseudowires, thereby delivering a rich set of services that can be signaled end-to-end. Services include: Ethernet, ATM, TDM and IP over MPLS with dynamic signaling, e.g., RSVP-TE and CSPF.

Converged Services with Pseudowires

The PCx-2 uses Pseudowire emulation to integrate TDM, ATM, and Ethernet services over an MPLS or ATM network *(Figure 2)*. Onboard interfaces include Fast Ethernet and Gigagbit Ethernet, and variety of interfaces plug into the PCx-2 such as DS1/E1, DS3/E3, DS1/E1 IMA, OC-N/STM-N, HSSI, and other serial interface modules *(Figure 3)*.

Traffic Management & QoS

The PCx-2 offers packet- and cell-based (MPLS, IP, ATM and Ethernet) switching transport with the best QoS available for services through tunnels. Ethernet Service VPN (or TDM service) can be assigned a QoS as a pseudowire flow within a MPLS tunnel, or in the case of ATM, a specific VC tunnel any given bandwidth within a VP through ATM cloud.

Figure 2 shows how network operators planning VoIP, Video and other services across the WAN can proceed confidently with an edge/backbone technology that will guarantee the priority of discrete flows or connections as part of a technology independent hybrid WAN network.

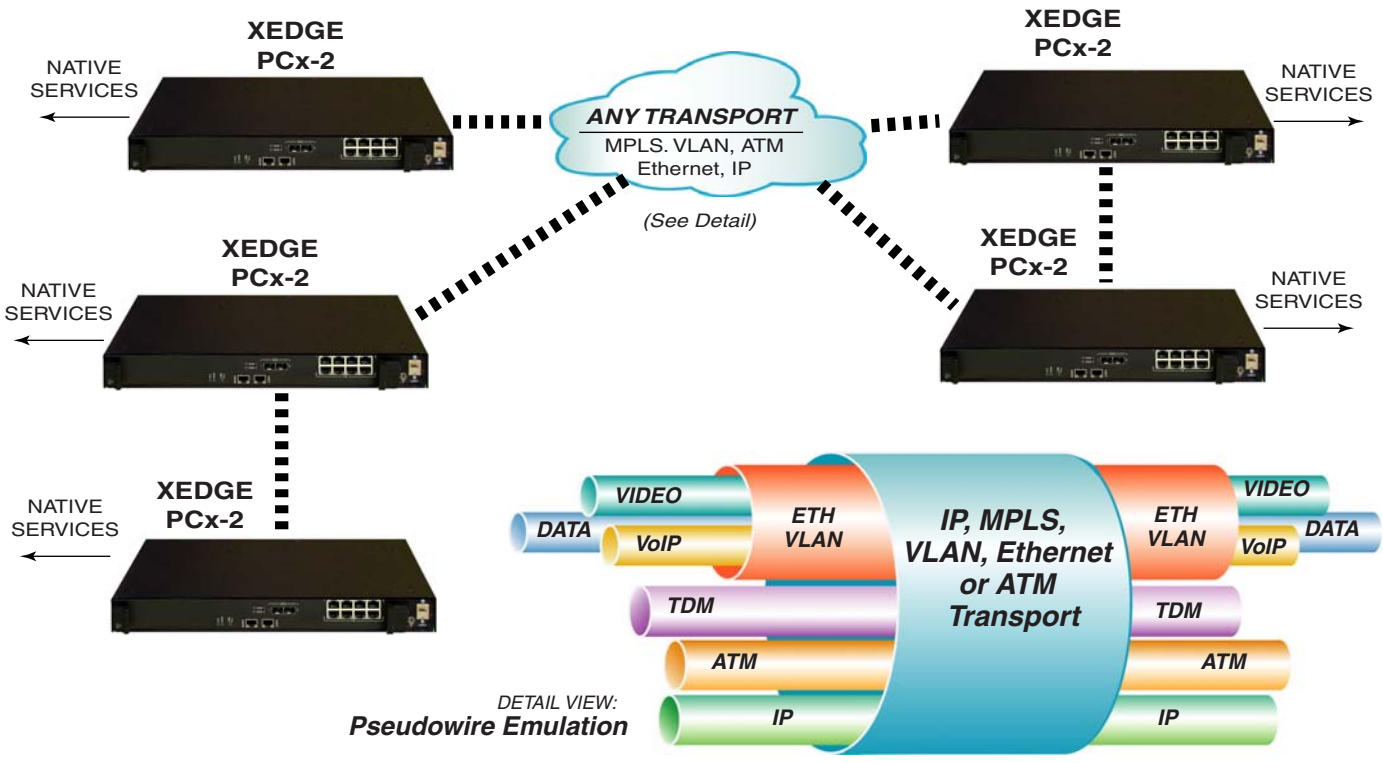

Figure 1: Xedge PCx-2 Integrates Multiservice and Ethernet UNI with IP, MPLS, ATM or Ethernet Transport

IP Support

The Xedge PCx-2 supports line speed Gigabit IP packet forwarding, routing and IP Pseudowires. The L2TP and UDP protocols are supported, as well as OSPF, BGP, IP V4 and IP V6 capability. The traffic management features of the PCx-2 provides for CoS/QoS implementation.

ATM Support

The Xedge MultiService platform has built-in ATM scalable switching and transport capabilities ideally suited for bandwidth constrained WAN transport environments. Xedge PCx-2 can provide ATM transport of various services as required, including Ethernet Pseudowire, with advanced traffic management capabilities. Xedge PCx-2 with GDC-pioneered Multi-Tier Traffic Shaping, a traffic management technology, represent the next generation of ATM traffic management performance.

Secure & Flexible Management

Xedge PCx-2 is securely configured and monitored via SNMP or GDC's ProSphere NMS. The SNMP interface provides password-protected access to the Xedge PCx-2 via a craft, Telnet or SSH protected connection. The PCx-2 communicates with GDC's ProSphere Network Management System (NMS) via SNMP, as well as a fast Ethernet (FE) management port on the PCx-2 front panel.

ProSphere NMS

ProSphere Network Management System (NMS) is GDC's Java-based management software that allows multiple clients to access a ProSphere Server located on a remote PC or SUN workstation. ProSphere facilitates the configuration and monitoring of users, communications and Xedge MultiService devices via an intuitive graphical user interface.

The ProSphere NMS helps to reduce the operations burden associated with the management of evolving multiservice WANs. ProSphere applications include fault, element, performance and service provisioning.

Xedge Line Interface Modules

PCx-2 supports a variety of plug-in line interface modules (LIMs) such as DS1/E1, DS3/E3, DS1/E1 IMA, HSSI, Serial, and low speed circuit emulation modules. Up to two LIMs can plug into the midplane connector for each PCx-2.

Figure 3 shows the Xedge OC-N/STM-N optical line interface module. This LIM is intended for use with PCx-2 for high speed ATM connections and Packet over SDH/SONET (future).

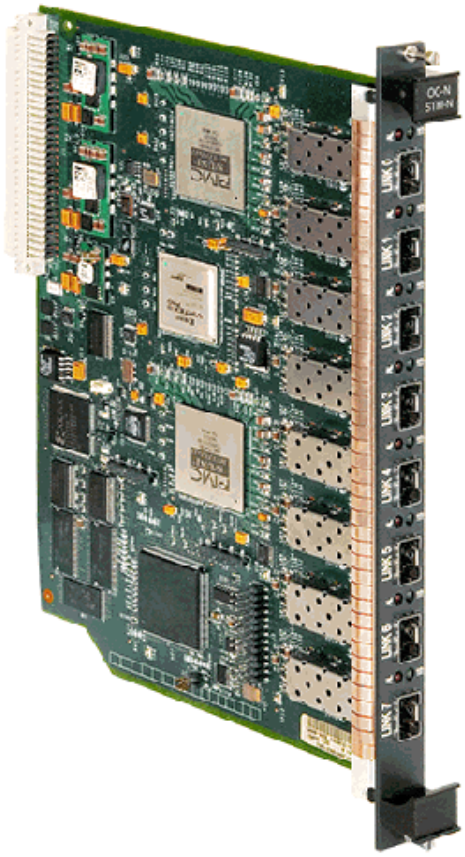

Figure 2: Xedge OC-N/STM-N LIM

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Xedge PCx-2 Physical Specifications

Xedge PCx-2 Slot Controller only (Dual-slot Module)

(Horizontally installed)
Dual-slot Height: 40.13 mm (1.58 in.)
Width: 395.73 mm (15.58 in.)
Depth: 240.53 mm (9.47 in.)
Weight: TBD

Line Interface Module

Width: 19.81 mm (0.78 in.)
Height: 261.62 mm (10.3 in.)
Depth: 198.12 mm (7.80 in.)
Weight: TBD

Xedge PCx-2 and LIM in Xedge 6002 Chassis

Width: 482.61 mm (19.0 in.)
Height: 40.38 mm (1.59 in.)
Depth: 482.6 mm (19.0 in.)
Weight: TBD

Environmental Specifications

Non-Operating

Temperature: -40 to 70 degrees C (-40 to 158 degrees F)
Relative Humidity: Up to 95%
Altitude: up to 12,191 m (40,000 ft)

Operating

Temperature: 0 to 50 degrees C (32 to 122 degrees F)
Relative Humidity: Up to 95% non-condensing
Altitude: -60 to 4,0000 m (-197 to 13,123 ft)

Electrical Specifications

Dependent on Xedge Chassis used:
Xedge 6645 Switch Chassis (16 I/O slots, DC Power)
Xedge 6640 Switch Chassis (16 I/O slots, AC Power)
Xedge 6280 Switch Chassis (7 I/O slots, AC or DC Power)
Xedge 6160 Switch Chassis (4 I/O slots, AC or DC Power)
Xedge 6002 Switch Chassis (2 I/O slots, AC or DC Power)

Timing and Synchronization

Node Timing Options:
Derived from BITS clock or any port of an Xedge chassis

Port Timing Options:
Xedge-supplied clock or Adaptive clock recovery
(independent in each direction)

Conforms to IEEE 1588 Precision Time Protocol as an IEEE 1588 Client over Ethernet.

Management Interfaces

SNMP, standard and GDC MIB management, and GDC's ProSphere Network Management System

Certifications & Acceptances

USDA RUS Accepted

Xedge PCx-2 Functional Specifications

Physical Interfaces

10 x Fast Ethernet user ports (10/100 Mbps)
2 Gigabit Ethernet optical ports
Interfaces of supported Line Interface Modules (LIMs):
- STM-N/OC-N LIM
- DS3-2C LIM
- DS1-2CS LIM
- DS1-4CS LIM
- E1-2CS LIM
- E1-4CS LIM
- E3-2C LIM
- ASIO LIM
- ASIO-HSSI (DCE) LIM
- LCE-16 LIM
- DSX1-IMA+ LIM
- E1-IMA+ LIM
- AVM LIM
- T1/E1 MP LIM
- T1/E1 HDCC LIM

Multiservice Support

Packet Services

Layer 2,VPNs: MEF Ethernet Service Types; E-Line, MPLS
Layer 3,VPNs

Routing Services

RIP-1, RIP-2, OSPF (Full mandatory OSPF protocol support)
IP V4; IP V6 capable, BGP
Conforms to RFC 1884 IPV6 addressing schemes

Flow Management Services

IP and Ethernet flows
VLAN, CoS, ToS, PoS
ProSphere Pseuduowire configuration

ProSphere Service Provisioning

Pseudowire support for provisioning

Pseudowires

ATM over MPLS, Ethernet over MPLS, Ethernet over ATM, TDM over Packet, IP over MPLS

Transport Services

IP
ATM PVCs, SVCs
Ethernet
Flow triggered tunnels (MPLS/ATM)
MPLS
IP/MPLS
VLAN
PWE3 - Pseudowires

Signaling Protocols

Signaling PNNI, RSVP-TE, CSPF, OSPF

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