

## Xedge Packet Cell Switch



**Xedge PCx-2**  
Figure 1: Xedge Packet Cell Switch  
(Shown in Xedge 6002 Chassis)

### Introduction to Xedge PCx-2

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, Frame Relay, 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 1](#) shows the PCx-2 deployed in the compact 1RU Xedge 6002 chassis.

### Xedge PCx-2 Highlights

- Standards-based Pseudowire (PWE3) transport of Ethernet, TDM, ATM/Frame Relay 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.
- When deployed with Xedge PCE or CE technology, Xedge PCx-2 provides circuit emulation (T1/E1, DS3/E3, Serial) with clock recovery 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.

## 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, Frame Relay, 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 Gigabit 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, Frame Relay 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.

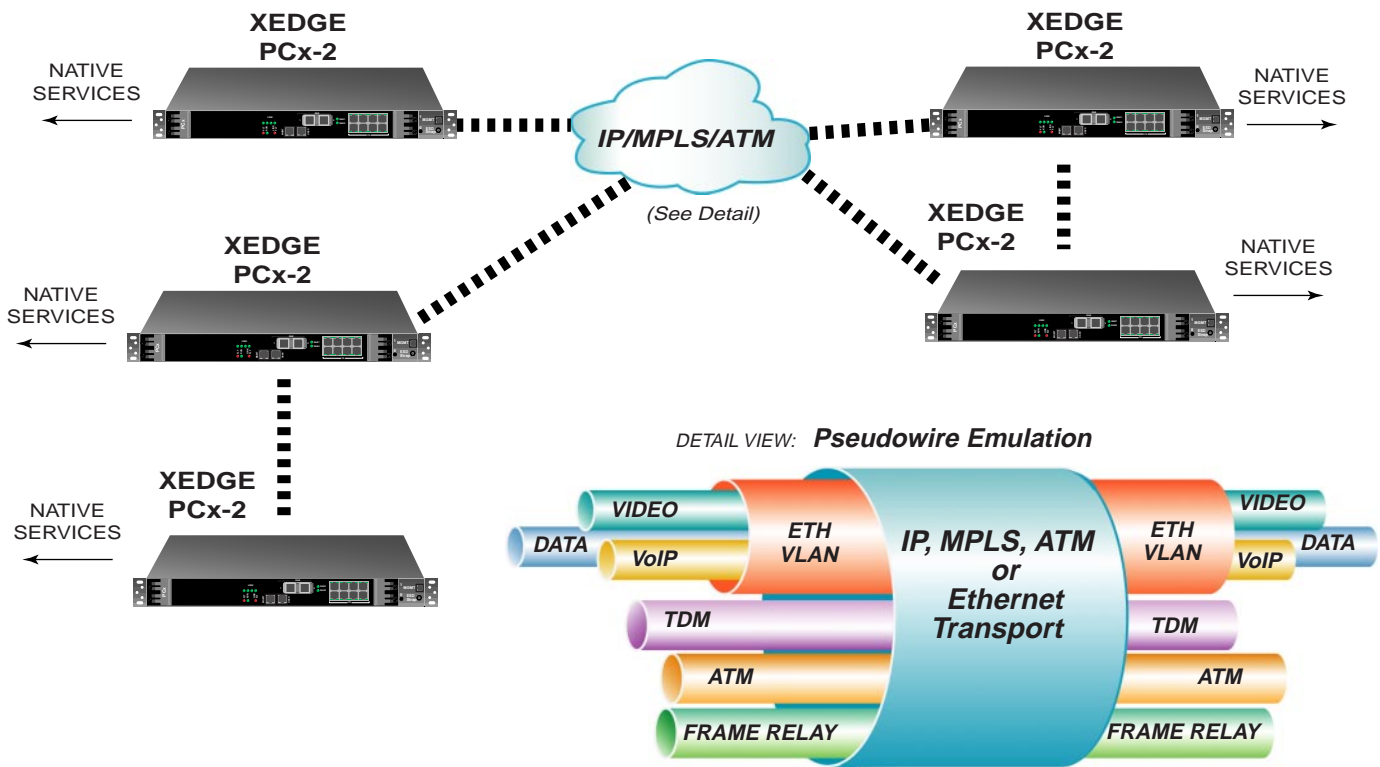


Figure 2: Xedge PCx-2 Integrates Multiservice and Ethernet UNI with IP, MPLS, ATM or Ethernet Transport

## IP Support

The Xedge PCx-2 supports line speed IP packet forwarding and IP Pseudowires. This allows the Xedge PCx-2 to switch on IP addresses in addition to supporting Layer 2 protocol switching of VLANs, MPLS LSPs and ATM VPI/VCIs. The PCx-2 also includes IP V4 and IP V6 capability.

## 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

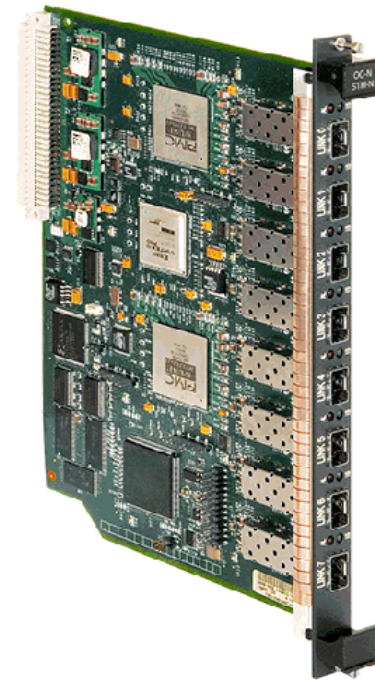
ProSphere Network Management System (NMS) is GDC's Java-based management software that allows multiple clients to access a ProSphere Server located on a remote PC or SUN workstation. ProSphere facilitates the configuration and monitoring of users, communications and Xedge MultiService devices via an 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 3: Xedge OC-N/STM-N Line Interface*

## 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 4,000 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)

## Management Interfaces

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

## Xedge PCx-2 Functional Specifications

### Physical Interfaces

- 10 x Fast Ethernet user ports (10/100 Mbps)
- 2 Gigabit Ethernet optical ports
- Line Interface (LIM) support:
  - Up to 8 STM-1/OC3 or 4 x STM-4/OC-12
  - 2 x SFP-Based Gigabit Ethernet Ports
  - 16 to 32 DS1/E1 IMA per PCx-2
  - 2 to 4 DS3/E3 ports per PCx-2
  - 4 to 8 DS1/E1 ports
  - 2 to 4 HSSI ports
  - 4 to 8 Serial I/O ports
  - 16 to 32 low speed circuit emulation ports
  - 16 to 32 DS1/E1 CES, or ML-PPP

## 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

### Flow Management Services

IP and Ethernet flows  
VLAN, CoS, ToS  
ProSphere Pseudowire 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

ATM PVCs, SVCs  
AAL5 Encapsulation  
Flow triggered tunnels (MPLS/ATM)  
MPLS - ATM Interworking  
IP/MPLS  
Ethernet/MPLS  
PWE3 - Pseudowires

### Signaling Protocols

Signaling PNNI, RSVP-TE, CSPF, OSPF



**Xedge PCx-2**  
Figure 4: Xedge Packet Cell Switch Module