

ZX4600 with OpenArchitect Switch Management

**Gigabit Ethernet
Switch/Router
for CompactPCI**



The ZX4600 with OpenArchitect is the combination of a powerful hardware platform and a sophisticated management software environment, providing Layer 2 switching and Layer 3 IP routing, plus Layer 4-7 packet classification and filtering at line-rate.

Line-Rate GigE Hardware Platform

The hardware platform -- a 6U CompactPCI switch blade -- provides a complete Gigabit Ethernet switching subsystem that performs all switching on silicon with line-rate throughput of up to 12 million packets-per-second. All eight Gigabit Ethernet ports are routed to the front panel through Fiber LC type connectors making the ZX4600 ideal for concentrating Gigabit Ethernet uplinks. An embedded Motorola MPC8245 PowerPC microprocessor @250Mhz with 64MB of SDRAM provides the environment for

OpenArchitect Switch Management to operate independently of the host systems OS.

High Availability

The ZX4600 was designed with High Availability in mind providing full support for the PICMG 2.1 HotSwap specification which ensures there is no electrical operation side effects when inserting or extracting the ZX4600 from a PICMG 2.1 compliant system.

OpenArchitect Switch Management

The OpenArchitect management software component -- Linux, IP protocol stack, control applications and the OA Engine -- runs on the embedded microprocessor. OpenArchitect provides access to extensive routing policies (RIP, OSPF, BGP, etc.), link management protocols such as Spanning tree, IGMP Snooping, traffic management protocols (VLAN,

QoS, etc.) and high availability functionality (VRRP, fast fail-over, etc.). OpenArchitect enables rapid porting of other UNIX/Linux-based protocols, that conform to industry standard RFCs. It also enables the development of application-specific routing programs.

Softswitch Flexibility with Silicon Speeds

The OA Engine is the bridge between the software environment and high performance switch fabric. The engine transparently moves routing policies established by software to the switch fabric's forwarding table. This bridge enables line rate packet switching, executed on a silicon switch fabric chip, that is managed by open source routing protocols -- a quick time-to-market, feature-rich protocol set.

Features

- ▶ Line-Rate 12 Million Packets per Second throughput
- ▶ Low Power Consumption
- ▶ SFP connectors provide single or multi-mode fiber connections
- ▶ PICMG 2.9 IPMI
- ▶ May be stacked for large port count applications
- ▶ Upgradable OpenArchitect

Rack Concentration

Extending the High Availability Environment

Telecommunication OEMs and integrators use the ZX4600 to create an embedded high-availability Ethernet network within a chassis or to concentrate multiple Gigabit Ethernet links within a rack.

Modular Expansion

With eight fiber-optic ports, the ZX4600's prime mission is to terminate and concentrate nearly any number of Gigabit Ethernet data sources. Multiple ZX4600s may be chained together to create larger switch fabrics, with capacity limited only by the number of slots that are available.

The versatile OpenArchitect control plane software allows fully managed and redundant networks of ZX4600s and other Gigabit Ethernet switch devices to be configured. Any desired routing protocols may be installed, giving the network architect a wide range of configuration options to choose from.

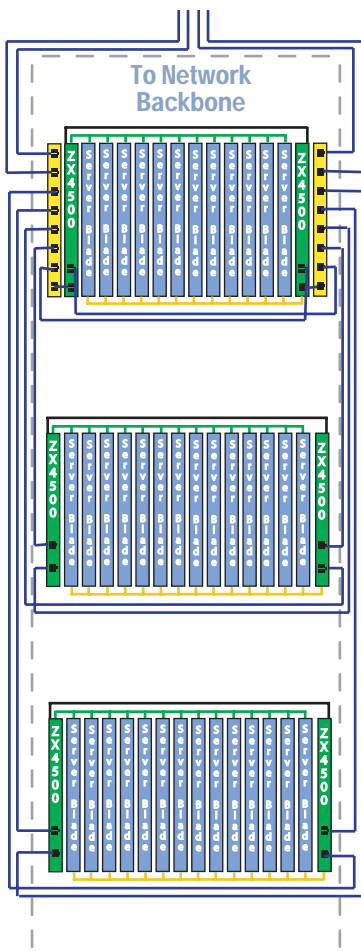
Embedded Ethernet

Using the ZX4600 eliminates the need for separate, rack mount switches, saving rack space and enabling better cable management, while at the same time providing Carrier Class Hardware features such as Hot-Swap.

Extending the HA environment

Gigabit Ethernet has increasingly become the standard for network backbones. In the event that one of the backbone switches fail, multiple connections beneath the backbone are affected.

Replacing a traditional rack-mounted Gigabit Ethernet switch with the ZX4600 extends the High Availability environment from Embedded Ethernet (intra-chassis communications) to the network backbone. OpenArchitect will detect failures, and reroute traffic for optimal network performance.



Application

Concentration Shelf (PICMG 2.16 Packet Switching Backplane)

The ZX4600 terminates all of the GigE Links from the surrounding chassis and places the traffic on the high-speed network backbone. Additional ZX4600's may be added to increase the number of available Gigabit Ethernet ports. The ZX4600 eliminates the need for a rackmount GigE switch!

(A ZX4600 may be hosted in any PICMG 2.16 node slot or any PICMG 2.0 slot, and will not interfere with any PCI bus signals on J1/J2, or H.110 signals on J4. No RPIO pins are required.)

Node Shelf (PICMG 2.16 CompactPCI Packet Switching Backplane)

VoIP equipment typically includes large numbers of processor boards that generate and receive Ethernet traffic. PICMG 2.16 switches such as the ZX4500P multiplex these links from the backplane into faster links, most commonly Gigabit Ethernet. These Gigabit Ethernet links may be terminated in a ZX4600 to create larger, fault tolerant, soft switch installations.

Node Shelf (CompactPCI)

CompactPCI chassis typically include large numbers of processor and codec boards with Ethernet on the rear panel being used as the primary means of communication with other devices. Redundant Embedded Ethernet Switches such as ZX4500s would multiplex these links into faster links, most commonly Gigabit Ethernet. These Gigabit Ethernet links may be terminated in a ZX4600 to create a large, fault tolerant, soft switch installation.

Intelligent Platform Management Interface

The ZX4600 with OpenArchitect supports the Intelligent Platform Management Interface (IPMI) manageability standard, which defines message-based interfaces for monitoring the physical health characteristics of devices. The switch will provide operational status information to an IPMI management application. End customers benefit with advanced notice of potential problems.

Single and Multi-Mode Fiber

Each port on the ZX4600 may be independently field configured for multi-mode (1000Base-SX) or single-mode (1000Base-LX) media to accommodate short-haul and long-haul links as desired. This makes the ZX4600 ideal for connecting campus and MAN networks, using any of the suite of OpenArchitect-based routing and management protocols.

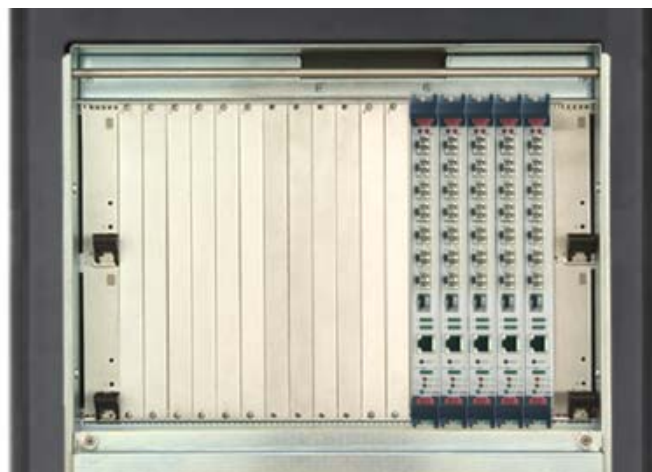
Satellite ZX4600s may be used in 1U or 3U rackmount enclosures to break out network connections for local sites, and to daisy-chain connections to additional sites. Central sites may use larger racks which include an array of local-area and wide-area gear. OpenArchitect management protocols may be used throughout the network.

Link Aggregation Options

The ZX4600 supports IEEE 802.3ad at a hardware level. This allows Link Aggregation configurations with 1 Gigabit, 2 Gigabit or more bandwidth between blades. This gives the architect complete control of network provisioning.



Long Mode Fiber for Campus Networks
or Short Mode for rack concentration



Link Aggregation Options for Increased point-to-point bandwidth

Software Upgrades

Extending the Value of Hardware



OpenArchitect Switch Management Switching Platform

OpenArchitect is an extensible open software platform for the routing, control and management of embedded Ethernet switches. The platform includes the Linux operating system, IP protocol stack, control applications and the OA Engine. OpenArchitect powers IP packet transport in embedded switches such as line-rate CompactPCI Packet Switching Backplane blades from ZNYX Networks, or in proprietary form factors.

OpenArchitect/HA Suite End-to-End High Availability Solution

OpenArchitect/HA Suite is the only product to provide software at each end of every embedded Ethernet link – each switch-to-node link and the switch-to-switch link – within an embedded environment. This complete solution, with total control of the sending and receiving Ethernet components, delivers unparalleled HA and Service Continuity functionality.

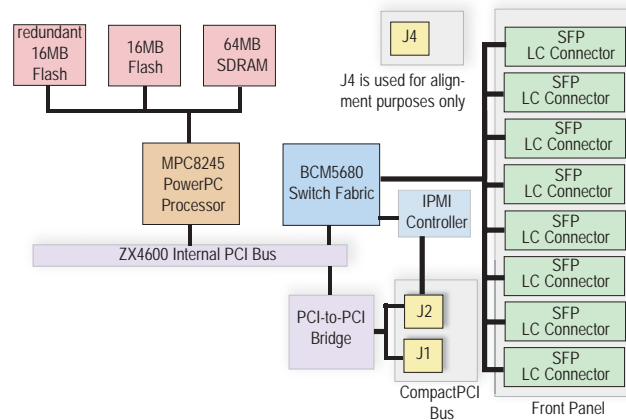
OpenArchitect/VSLB Network Load Balancing

OpenArchitect Virtual Server Load Balancing is an OA software application that uses the advanced capabilities of the OpenArchitect series of switches to perform load balancing for any array of servers. All servers may be accessed from the Internet via one virtual IP address, with traffic load distributed to the servers using one of several available algorithms. Data traffic is handled via switch silicon, so system throughput is limited only by the media speed.



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ZX4600 Hardware Logic Diagram



ZX4600 Specifications

Connectors	Gigabit - 8 Fiber LC connectors on front panel Management - RJ-45 Serial Port
Media	1000BaseSX
Compliance	PICMG 2.0 R3.0 - PCI Specification PICMG 2.1 R2.0 - Hot Swap Specification PICMG 2.9 R1.0 - IPMI Specification
Mac Addresses	8K MAC address Table 2K IP Routing Table
VLANs	up to 63 concurrent IEEE 802.1q VLANs
Maximum Channels	8 Gigabit Ethernet ports per board. Stacking support up to 30 boards
Packet Switch Rate	12 million packets per second
Memory	Main: 64 MB SDRAM Buffer: 512kbytes integrated into switch fabric Application: 32 MB Flash ROM Boot: 512 KB Flash ROM
Power	Idle = 21.8W Full Switching = 24.2W
Firmware	OpenArchitect™ Switch Management v2.2.1
Certifications	pending
Safety (Pending)	pending
EMC/EMI (Pending)	pending
Dimensions	160mm x 233.35mm (6U formfactor)
LEDs	Link LEDs, OK to Pull, Power, Clock, HotSwap, Internal/External Fault
Manufacture	Designed and manufactured in the USA

ZX4600 Hardware Features at-a-glance

- 6U PICMG 2.1 CompactPCI compliant
- Eight Gigabit Ethernet ports (LC Connector)
- SFP connectors for single or multi-mode fiber
- 12 million packets-per-second throughput
- IPMI (Intelligent Platform Management Interface)
- 8K L2 Ethernet switch table
- 2K L3 IP switch table
- 127 filtering rules per port
- Layer 2-7 packet classification
- OpenArchitect open-systems protocol and management
- PowerPC 603e RISC 250MHz with 64MB SDRAM
- 32MB FlashROM
- 512KB Boot FlashROM
- PCI-PCI bridge to host
- Full PICMG 2.1 HotSwap compliant (Blue HotSwap LED)
- CORE-2914 LED (Pull)
- INT Fault LED
- EXT Fault LED
- CLK LED
- Link/Status LED per channel
- Power OK LED
- Temperature LED

OpenArchitect Software Features at-a-glance

- FTP
- DHCP Server
- Web Server: HTTP/1.1 (RFC2616)
- VRRP (Virtual Router Redundancy Protocol) (RFC 2338)
- RIP (Routing Information Protocol) v1(RFC1058) v2(RFC1388)
- OSPF (Open Shortest Path First): v2 (RFC1583)
- BGP (Border Gateway Protocol):EGP(RFC904) BGP-3(RFC1267)
- IP Multicast: IGMP Snooping, IGMPv2 (RFC2236)
- Class of Service/Quality of Service
 - 4 service queues on switch fabric
 - scheduling options
- COPS (Common Open Policy Service)
- * Network Time Protocol
- * Network Address Translation (RFC1631)
- Packet Header Filtering
- Powerful Rules Tool - iptables
- Compatibility with existing Unix/Linux applications

ZNYX Networks, Inc.

48421 Milmont Drive

Fremont, CA 94538 USA

Tel: (510) 249-0800

Fax: (510) 656-2460

Web: www.znyx.com

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