Introduction

The Z77 is Cyan’s flagship packet-optical transport platform (P-OTP), optimized for high-capacity aggregation and metro/regional core network deployments. Cyan Z-Series systems, combined with the Blue Planet™ Software-Defined Network (SDN) Platform, provide a compelling and economically efficient solution for network transformation.

The Z77 is a fully integrated P-OTP that provides transformational scale by supporting up to 200 Gbps of capacity per slot and 2.8 Tbps per chassis. The modular, carrier-grade Z77 architecture supports the full suite of Z-Series Ethernet, wavelength, OTN, and SONET/SDH modules, plus an optional unified packet and Optical Transport Network (OTN) switch-fabric.

At just 13RU in height, the Z77 combines massive capacity with modular functionality at a fraction of the cost of prior-generation systems. It complements the Z22 and Z33 for a complete solution from the edge to the regional core.

Benefits

- **Scalable, cost-effective operation**
  Flexible platform architecture supports scalability for investment protection, common sparing and inventory, operational consistency, and pay-as-you-grow capacity and functionality

- **Software-defined networking**
  Supported by Cyan’s Blue Planet Software-Defined Network (SDN) Platform to simplify multi-layer network design, operations, SLA assurance, and service orchestration

- **Flexible, multi-layer transport**
  Advanced technology modules support a range of applications and services

- **Energy efficiency**
  Integrated approach reduces power consumption and truck rolls, saving energy and the environment
Flexible, Multi-Layer Transport

The Z77 integrates a wide range of optional packet and optical capabilities to meet transport requirements across aggregation, transit, and hub locations.

Cyan’s Z-Series family was among the first products to achieve Carrier Ethernet 2.0 (CE2.0) certification from the Metro Ethernet Forum (MEF), ensuring that the platform enables cost-effective Ethernet service delivery with carrier-grade capabilities such as QoS, scalability, reliability, and service management. Beyond CE2.0, the Z-Series also implements connection-oriented Ethernet (COE) to provide more resilient and predictable Ethernet transport for E-Line, E-LAN, E-Tree, and E-Access services at interface rates up to 100 GbE.

A multi-layer transport solution, the Z-Series provides simultaneous support for native transponding and muxponding of G.709 OTN and SONET/SDH, in addition to SONET/SDH multiplexing and cross-connect functionality. Rounding out support for wholesale wavelength services, the Z77 also supports a complete range of dense wave division multiplexing (DWDM) options.

The Z77 provides the option to transport 8, 40, or 96 DWDM channels per fiber (10G and/or 100G) to scale traffic aggregates. Optional WSS-based optical switching further expands functionality and scale with 2- and 4-degree ROADM modules supporting highly automated network configuration.

Applications

The Z77 introduces packet-optical transport functions in one fully integrated system capable of supporting a diverse mix of applications:

- MEF Carrier Ethernet 2.0 (CE2.0) service aggregation and transport to reduce the need for expensive and complex switch/router platforms
- SONET/SDH multiplexing and cross-connect functionality to cap and transition from legacy MSPPs
- OTN multiplexing, transponding, and framing to efficiently converge multiple service types over a single wavelength
- 10G and/or 100G wavelength multiplexing and switching to scale service transport capacity

Massively Scalable, Modular Architecture

The 13RU-high Cyan Z77 chassis provides remarkable scale in a compact footprint. All 14 service slots are available to support either optical or electrical modules, reducing slot restrictions and engineering rules.

When equipped with the optional multi-technology XC-2800 switching fabric, the Z77 architecture supports more than 200 Gbps of non-blocking packet switch capacity per slot and up to 2.8 Tbps per chassis. The Z77 XC-2800 ensures unprecedented packet services performance by delivering any-to-any connectivity between a new generation of interface modules with full line-rate switching across all ports concurrently. The scalability provided by the Z77 XC-2800 enables a simple and cost-effective migration to high-density 1/10 Gigabit Ethernet (GbE) as well as 100 GbE and ODU-4 services.
Key Features

- Scalability for investment protection, common sparing and inventory, operational consistency, and pay-as-you-go capacity and functionality
  - Get started at a low cost
  - Add cards as needed
  - Add SFP/SFP+/XFP/CFPs as needed
  - Option to add multi-technology switch fabric and compatible cards as needed – supporting switching across all card slots
    - 200 Gbps per slot capacity
    - Up to 2.8 Tbps packet capacity, with any-to-any packet cross-connect (switching) for point-to-multipoint services, grooming, and transport efficiency
  - Option to add up to 4 degrees of WSS optical switching, supporting fully dynamic optical grooming with automatic optical tuning and adjustment
    - Fixed wavelength 8- or 40-channel DWDM for economic efficiency
    - 2- and 4-degree (future 8-degree), 96-channel ROADMs for simplified operations and maximum operational efficiency
  - Multi-layer transport integration
  - OTN on all trunk connections for enhanced performance and management on all services
  - Integration across Ethernet, SDH/SONET, COE, OTN, and DWDM for true multi-layer network visibility
  - Integrated approach reduces power consumption and truck rolls, saves energy and expense, and lessens environmental impact

Technical Specifications

System Overview

- Chassis (front)
  - Service module slots: 14
  - Common control module slots: 2
  - All modules are hot-swappable
- Chassis (rear)
  - XC-2800 multi-technology switch fabric modules: 4 per chassis
- Chassis capacity
  - Up to 2.8 Tbps of packet services
  - Up to 2.8 Tbps of OTN services
  - Up to 140 Gbps of SDH/SONET
- Optical
  - 2- and 4-degree 96-channel ROADMs
  - Integrated pre-amp and booster amplifiers and OSC
  - 8- or 40-channel, C-band terminal mux
  - Tunable or fixed-wavelength transceivers
- Physical interfaces
  - A wide-range of pluggable optical modules (with different reach) with the choice to match the desired application
- Maximum port densities:

<table>
<thead>
<tr>
<th>Interface Type</th>
<th>Ports/Chassis</th>
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<tbody>
<tr>
<td>FE/GbE</td>
<td>252</td>
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<tr>
<td>10GbE</td>
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<td>100GbE</td>
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<td>OC-3/12, STM-1/4</td>
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<tr>
<td>100G/OTU4</td>
<td>14</td>
</tr>
</tbody>
</table>
Technical Specifications (cont.)

System Overview (cont.)

- Redundancy and protection
  - Redundant fans
  - Redundant power connections
- Equipment protection
  - 1:1 for all common cards and service modules
  - 1:3 for multi-technology switch fabric modules
- Carrier Ethernet protection
  - IEEE 802.3 ad Link Aggregation
  - IEEE 802.3Qay Path Protection
- SDH/SONET protection
  - 1+1 APS/MSP
  - UPSR/SNCP
- Synchronization
  - Stratum 3 compliant timing subsystem
  - Redundant DS1 and 2MHz timing inputs
  - Derived DS1 timing outputs
  - Line-timed SDH/SONET and Sync-E Ethernet support
- Power connectors: quad-feed quick-connect terminal block
- Alarm connectors: quick-connect terminal block

Management

- LED panel for local monitoring and provisioning
- 4x10/100/1000Base-T DCN interfaces
- System alarm outputs: CRITICAL MAJOR, MINOR, AUDIBLE, FAILSAFE

- System alarm inputs: ACO
- Provisionable environmental alarm outputs: 2
- Provisionable environmental alarm inputs: 5
- SNMP v2, CLI, TL1

Physical

- Shelf dimensions
  - Width: 21" (534 mm)
  - Depth: 21" (534 mm)
  - Height: 22.75" (578 mm)
  - Compatible with 21" and 23" racks
- Weight: 98 lbs (44.5 kg); includes fan tray

Power

- Dual -48 VDC nominal (-40 VDC to -60 VDC)
- Maximum power consumption – 4000 watts (typically < 1500 watts)

Environmental

- 0° to 50° C operating temperature
- 5% to 85% operating relative humidity (non-condensing)
- 13,000 ft (4,000 m) altitude

Compliance / Safety

- NEBS 3 Certified (GR-63 CORE, GR-1089)
- UL/CSA Listed
- UE/CE-Marked: EN 60950, EN 55022, EN 61000, ETSI EN 300 386 V.1.3.3
- CB Scheme Certified 60950
- FCC, Part 15, Subpart B, Class A
- RoHS compliant