

CYAN Z-Series

CYAN Z-Series Product Family Overview

Cyan Z-Series

The Cyan Z-Series of multi-layer transport systems provide a compelling and economically efficient approach to scaling network capacity. Creating a framework to support long term services scale, the Z-Series introduces entirely new levels of multi-layer network visibility and control for network efficiency and operational simplicity.

Providing a modular approach to services and scale, the Z-Series multi-layer transport platforms support a range of transport services including:

- GbE and 10GbE switching and transport
- OC-192/STM-64 MSPP functionality
- Muxponding and Transponding
- OTN (digital wrapper) functionality
- 10G DWDM transport
- Multi-layer optimization and management

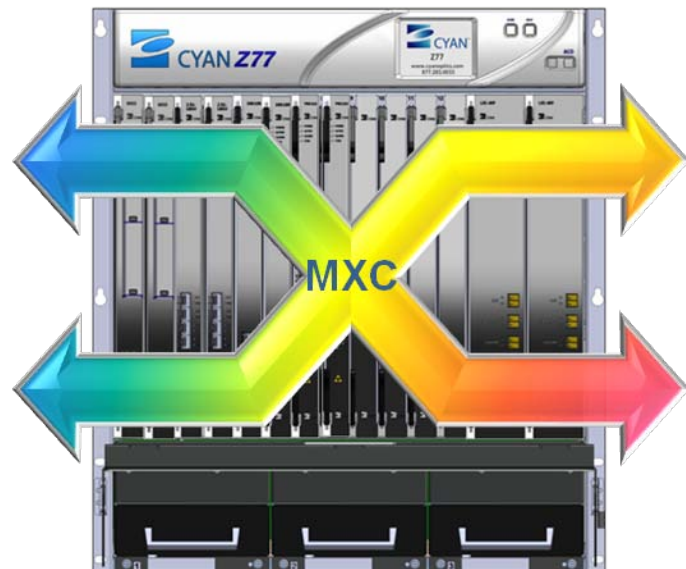
The Z-Series is designed to support transport requirements across the network. Models range from 5RU to 13RU in height and functionality ranges from transport network termination to multi-layer add/drop multiplexing (MADM) and multi-layer cross-connect (MXC) grooming.

Scalable Form, Fit and Function

CYAN Z33™



CYAN Z77™

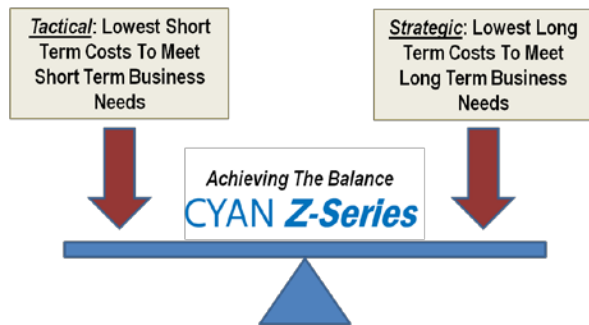


Description

Application Specific Modularity

Optimized for low entry costs, the Cyan Z-Series can be cost-effectively introduced into any network for a range of incremental transport applications. The modular ability to add services and functionally as required allows for pay as you grow economics.

Unlike alternative point products, the Cyan Z-Series offers the ability to support long term capacity scale. The ability to expand functionality and capacity allows service providers to strike a balance between tactical and strategic network investments.

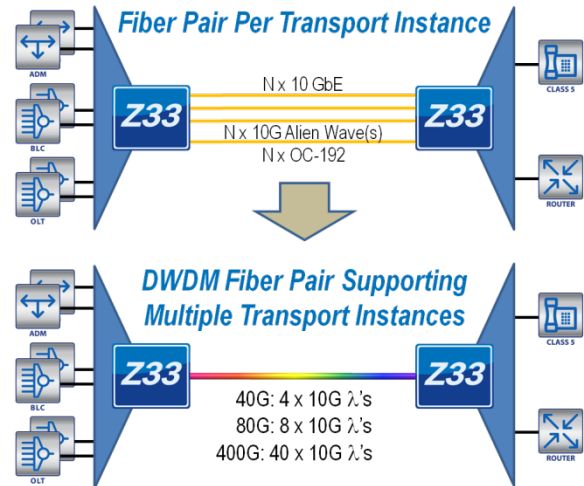


Setting New Scalability Standards

Cyan's Z-Series modules support high-capacity, non-blocking Ethernet switching and MSPP capabilities. Functionality formerly requiring multi-slot, dedicated platforms is now provided on a single slot module – shattering historic paradigms of cost and complexity.

Z-Series chassis' support over 100 Gbps of protected packet service capacity per-slot. Modules can be paired for equipment redundancy, and doubling the number of interfaces and switching capacity for further scale. As requirements scale, an optional multi-technology switch fabric can be added, interconnecting all Z77 module slots to create a massively scalable packet, TDM or optical cross-connect supporting multiple terabits of capacity per second.

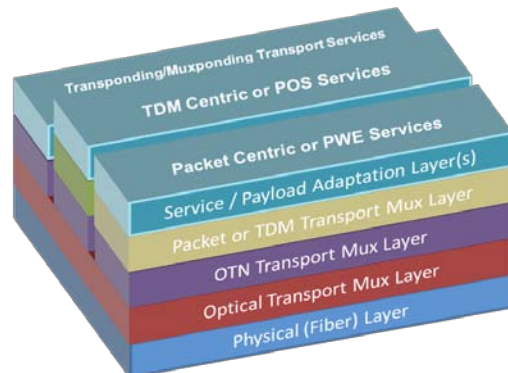
As services scale, availability of fibers can become the limiting resource. In these cases, optional Z-Series DWDM modules can be added to combine up to 4, 8 or 40 10G wavelengths, for up to 400 Gbps of transport capacity per fiber.



Optional wavelength selectable switching (WSS) can be added to provide OOO wavelength grooming as wavelengths scale. This modular, scalability enables the Z-Series to provide cost-effective transport from the network edge to the core.

Multi-layer Service Optimization

Multiple layers exist in virtually all networks. Each optical network has a service layer, and some form of packet or TDM transport multiplexer which is then transponded onto an optical waveform. This waveform operates over a fiber, which is part of a cable bundle and often placed in a duct. As fiber constraints dictate, DWDM and OTN layers are added.



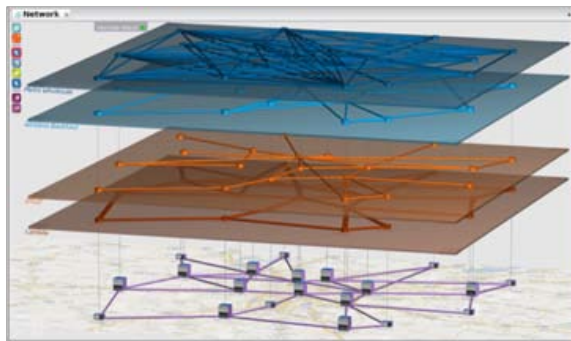
Description

Historically, these layers have been distributed across separate platforms, planned and managed by separate resources, requiring each layer to be slightly over-engineered to assure resource availability to satisfy changing requirements of the above layers.

Cyan's Z-Series integrate support for all of these layers in a family of multi-layer transport platforms. Service capabilities and layers are added as needed, but more importantly the system was designed for multi-layer visibility and control or a simplified flat network perspective. The Z-Series working in harmony with CyMS provides revolutionary visibility and control of multi-layer networks, putting service providers in control.

Optimizing Multi-layer Management

Cyan's Z-Series collapses multiple discrete functions into one platform to reduce cost and complexity. With visibility at all layers, Z-Series systems and the CyMS™ multi-layer management system provide end to end, multi-layer visibility for unified planning, implementation and control.

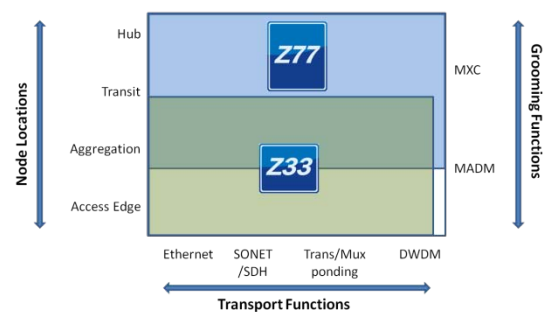


Going beyond conventional OAM&P, CyMS introduces revolutionary 3-dimensional multi-layer network visualization and resource optimization tools. CyMS with new Path Computational Element (PCE) functionality enhances multi-layer network modeling and evaluation for resource optimization within each network layer. CyMS will also work in conjunction with Cyan's Virtual Network Topology Management (VNTM) services to provide inter-layer network modeling and optimization in combination

with PCE to identify the lowest cost paths across all layers to satisfy the requirements of all services. The result is improved network resource utilization and streamlined operations for the lowest total cost.

Network-Wide Application

The Cyan Z-Series family of products is designed for network-wide deployment. The platforms can be deployed in central offices, collocation spaces, equipment rooms, and environmentally controlled outside plant huts. With a scalable form factors and modular functionality, Z-Series platforms can be optimally configured for applications ranging from the access edge to the hub nodes serving core networks.



Simply select a platform to match grooming and transport functions with the needs of each node!

Robust Carrier Grade Availability

The Cyan Z-Series chassis' are fully redundant and demonstrate Cyan's commitment to continuous, reliable operation, achieving six "9s" of reliability. With operational simplicity and low operational costs in mind, the Cyan Z-Series is designed to allow for hitless upgrades, simplifying ongoing maintenance.

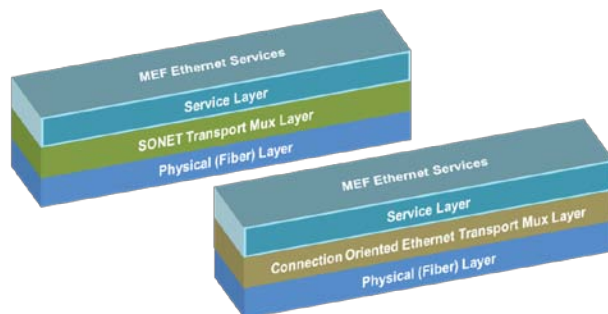
Description

Optimizing Packet with Packet Transport

Broadband fiber to the premises (FTTP), digital subscriber line (DSL), WiMax and 2/3/4G wireless services have combined with compelling interactive content to create global cultures addicted to bandwidth intensive services on demand.

- Applications have rapidly moved from content rich static web pages to streaming videos
- Increasingly pervasive HDTV requires 4x the bandwidth of standard definition video
- Video on demand (VOD) is driving a shift from multicast to unicast
- Ethernet has evolved from a best effort service to ultra-high capacity SLA based business services

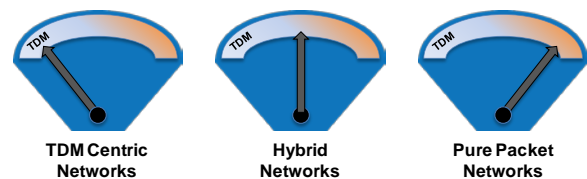
Cyan's Z-Series transports these applications with MEF compliant Ethernet services such as EPL, EVPL, E-LAN and E-TREE. Carrier Grade Ethernet services are flexibly supported over SONET/SDH or with new Connection Oriented Ethernet standards such as 802.1Qay Provider Backbone Bridging - Transmission Engineered (PBB-TE).



Achieving the best of both worlds, Connection Oriented Ethernet technologies deliver SONET/SDH-like performance, with the packet aggregation and transport efficiency of Ethernet.

Seamless Transition to Packet

Service providers no longer need to build and operate segregated networks running in parallel. With the Cyan Z-Series, legacy SONET/SDH services, new packet services, and when required DWDM transport, can efficiently and cost effectively operate as one multi-layer network. As the services mix shifts increasingly toward packet, Z-Series networks offer unmatched capital and operational efficiency, providing a seamless transition to pure packet networks.



Support for Ethernet over SONET/SDH makes it easy to support a moderate mix of packet with TDM transport. As packet services scale, the ability to add Ethernet modules, which natively groom and transport Ethernet services over connection oriented Ethernet transports provide scalability and economy with carrier grade performance.

The Cyan Z77's support of multi-technology switch fabrics provide the ability to terminate Ethernet over SONET/SDH and groom the Ethernet services with other Ethernet services for a unified integration of services across diverse transport networks.

As legacy TDM based services retire, service modules can be redeployed and valuable chassis slots re-provisioned with packet optimized service modules to satisfy continuing demand.

The result is a cost-optimized, scalable and flexible transition from pure TDM, to a mix of packet and TDM, to pure packet networks.

Description

MSPP Upgrade Alternatives

Many service providers have substantial investments in existing SONET/SDH MSPPs. While most of these systems support Ethernet over SONET/SDH, many are also capacity challenged and require upgrades from OC-12/STM-4 or OC-48/STM-16 to OC-192/STM-64. For less than the cost of adding a single 10G transport to most platforms, the Cyan Z-Series can support high density OC-192/STM-64 MSPP functionality with a single slot module.

A cap and grow strategy yielding greater port and service capacity, this approach reduces CAPEX, and provides material operational benefits.

Multi-Layer Wholesale Transport

Many service providers offer wholesale transport as a portion or even their primary business. With the Z-Series, wholesale services can be provided at multiple layers:

- SONET/SDH transport from OC-3/STM-1 to OC-192/STM-64
- PBB-TE connection oriented Ethernet transport with 64 Kbps increment granularity from 1 Mbps to 10 Gbps
- OTN encapsulated services
- 10G Wavelength transport (1 to 40 λ 's) and alien wavelengths support

The modular Z-Series supports the full range of potential wholesale transport service requirements with full add / drop capability at all layers.

The Z-Series employs advanced OTN technology to deliver span by span visibility and control with 15 minute and 24 hour performance monitoring statistics for detailed SLA reporting. The combination of traffic transparency and OTN management yields an optimal balance for wholesale services.

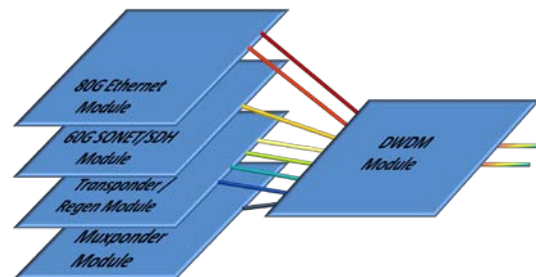
Ethernet Switch Upgrade Alternatives

Many service providers have been deploying Ethernet switching and access platforms in their networks for the past few years. As traffic scales and services migrate to advanced new functionality, service providers are faced with a choice of either investing further in legacy platforms or capping those systems and growing new capacity and service capabilities as part of the Z-Series multi-layer transport network.

By employing the very latest in Ethernet technologies, Cyan has been able to integrate high performance, non-blocking Ethernet switching with advanced features. Integrating this function into the Z-Series transport infrastructure instead of introducing another dedicated Ethernet platform eliminates the cost and recurring maintenance as well as minimizing costly interconnections.

Fiber Relief Via Optical Convergence

As services scale, TDM and packet services compete for scarce fiber resources. 10G aggregation is the logical first step. However, as service capacities scale, multiple wavelengths are inevitable and fiber can be the limiting resource.



By integrating optional OTN support on primary service modules, Z-Series services are DWDM ready. Simple addition of a 4, 8 or 40 channel DWDM module provides a simple and cost effective alternative to pulling additional fiber.

Scale, Extend, Simplify

Features and Benefits

The Cyan Z-Series multi-layer transport systems provide a range of features and benefits:

- Modular architecture enables pay as you grow functionality for easy and affordable network introduction
 - Deploy as standalone Ethernet switch, or MSPP
 - Selectively add basic DWDM when and where required
 - Selectively add wavelength selectable switching ROADM functionality for scalable OOO grooming
 - Advanced OTN architecture provides the ability to support packet and TDM without complexity or sub-optimization
- Advanced technology modules yield greater functionality with lower costs
 - Ethernet switch modules support advanced connection oriented Ethernet for less than the cost of adding 10GbE to existing platforms
 - MSPP modules provide non-blocking cross-connect and 10G transport for less than the cost of adding upgrading existing MSPPs
- Flexible platform architecture supports scalability for investment protection, common sparing / inventory, operational consistency and pay as you grow capacity
 - Low getting started cost
 - Add modules and SFP/XFPs as needed
 - Pair switch modules to increase switch capacity
- >100 Gbps per slot capacity enables support of future 40G and 100G modules
- Redeploy modules between Z33 and Z77
- Add Z77 MXC (multi-layer cross-connect) as needed
 - Any to any STS-1/VC4 cross connect
 - Any to any packet cross-connect
 - 7 degree wavelength selectable cross-connect
- Multi-layer transport and networking integration provide unprecedented multi-layer network efficiencies with single layer simplicity
 - Integration across Ethernet, SONET/SDH, PBB-TE, OTN and DWDM provides multi-layer transport network visibility
 - CyMS with Path Computational Elements (PCE) provides intra-layer network modeling and evaluation for optimization within each network layer
 - CyMS with advanced network modeling and 3-Dimensional visualization capabilities simplify network planning, resource planning, utilization and assuring service path diversity for maximum availability
 - CyMS interworking with Cyan's virtual network topology manager services enable inter-layer network modeling and resource optimization for ultimate efficiency in network planning, design and operation
 - Resulting network visibility enables multi-layer A-Z provisioning for fast, reliable service activation per modeled network plans



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OVERVIEW
Z-Series

V10G