SOLUTION BRIEF

Cloud and Content Providers

Open and cost-efficient hyperscale transport

cyan

Optimizing for Efficiency and Scale

Dramatic growth in cloud services and over-the-top (OTT) content, combined with the use of virtualization and compute-intensive applications, has led to significant innovations in data center infrastructure design in recent years. Leading cloud and Internet content providers are now building and/or expanding "hyperscale" data centers – typically housing servers by the tens of thousands – using open technologies wherever possible to optimize efficiency and reduce costs while eliminating vendor lock-in.

As these hyperscale operators continue to grow and expand, having the ability to efficiently scale network capacity between data centers is a major priority. For this reason, a growing number are deploying private data center interconnect (DCI) networks over dark fiber rather than leasing optical wavelengths from carriers. Beyond reducing operational costs, this approach provides better control over the network from end-to-end, allowing the hyperscale operator to manage increasing WAN bandwidth requirements more quickly and efficiently.

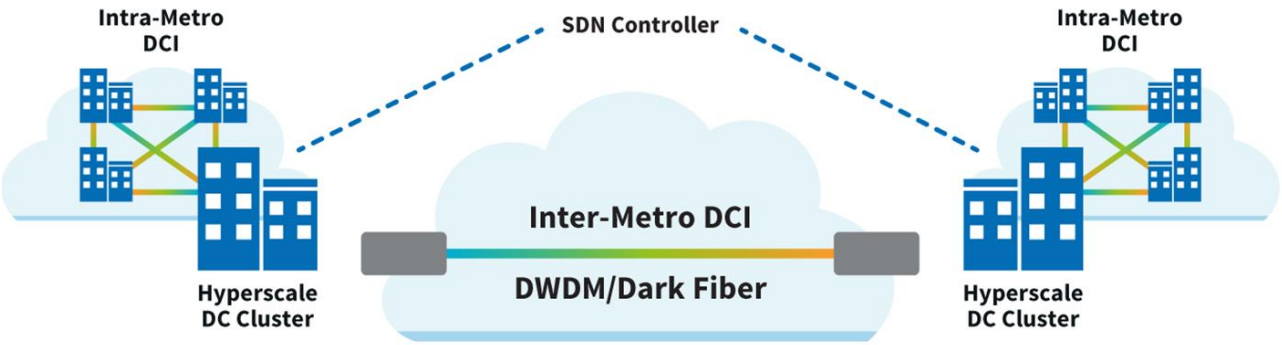


Figure 1: Hyperscale Data Center Interconnect Network

As shown by their founding roles with initiatives such as the Open Compute Project (OCP), OpenStack, and OpenFlow, cloud and Internet content providers have also pioneered the use of open technologies to scale their data center infrastructure in the most efficient and economical way possible. While the open approach has been successfully extended to include cloud software, servers, and top-of-rack Ethernet switches, the market-leading optical transport solutions still utilize a combination of proprietary photonic components, custom silicon, and closed software. Hyperscale operators require a new solution designed to significantly reduce the cost of high-capacity optical transport while eliminating the vendor lock-in and complexity associated with proprietary, vertically-integrated solutions.

Introducing the Cyan N-Series

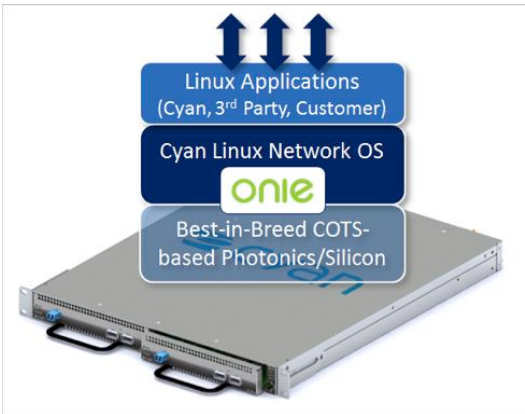
Cyan's N-Series is the industry's first open hyperscale transport platform (OHTP). The N-Series provides a fundamentally new model for scaling and operating data center interconnect (DCI) networks. The first member of the N-Series family is the N11, an ultra-compact platform that that offers industry-leading 100G port density, space and power-efficiency.

© 2015, Cyan, Inc.

What Makes Cyan Different

An Open Hardware and Software Approach

Unlike proprietary optical transport solutions, the N-Series introduces a disaggregated design approach that combines a Linux network operating system with state-of-the-art commercial off-the-shelf (COTS) silicon and photonic components. By utilizing open software and hardware capable of leveraging advances in best-in-breed optical networking technologies as they emerge, the N-Series architecture enables hyperscale operators to scale their interconnect networks more cost-effectively to meet rapidly growing traffic demands.



Capitalizing on Rapid Innovations in Network Technology

Designed as a modular shelf, the N11 offers industry-leading 100G client port densities with 200G coherent line interfaces upon introduction; with upgradeability to more than twice the capacity and density, as well as additional transport functionality, in the future. The N11 can be "racked & stacked" to support up to 34 Tbps per rack – 60% greater capacity than the closest competitor. In addition to space savings, the N11 achieves industry-leading energy efficiency by consuming approximately 100 Watts of power per 100G port.

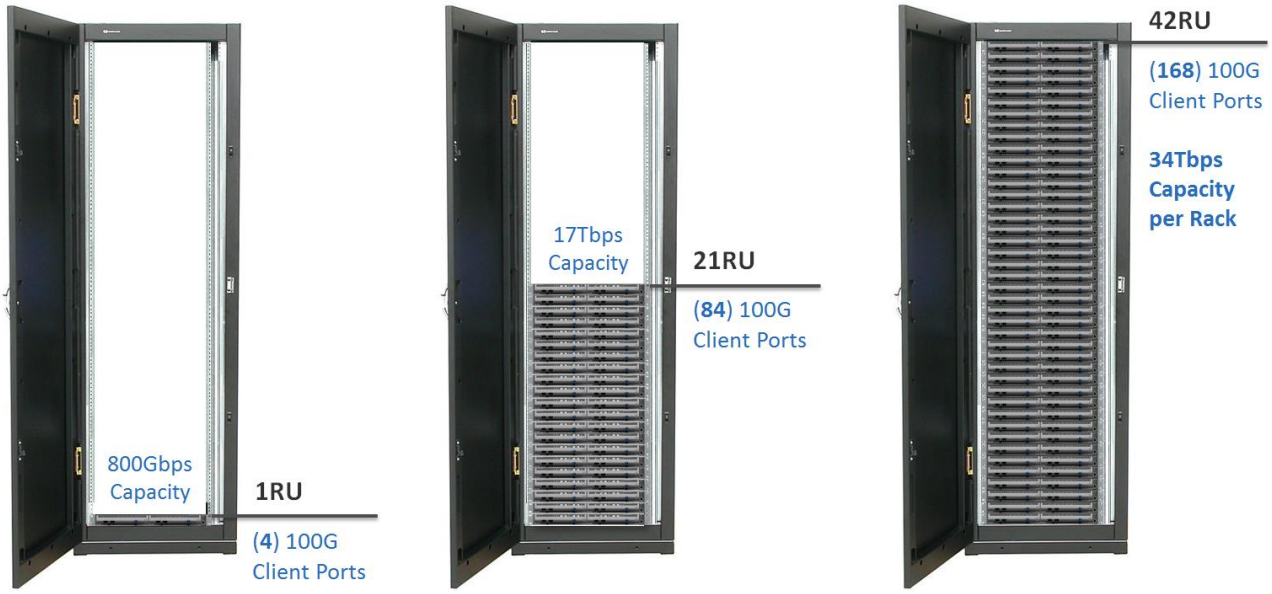


Figure 2: The N-Series provides rack & stack transport scalability from 800Gbps in 1RU to 34Tbps in a full 7' rack

Software Makes the Difference

Cyan Linux provides a carrier-grade and SDN-enabled Linux network operating system (NOS) built to run on top of the N-Series hardware. Cyan Linux is based on a standard open source Linux distribution running side-by-side with Cyan provided applications to provide the extensible and programmable OS functionality of the N-Series. Cyan Linux simplifies operations for cloud and content providers by enabling them to use the DevOps tools and systems currently in place for managing compute and network resources to automate and scale the DCI network. In addition, the N-Series supports key OCP specifications such as Open Network Install Environment (ONIE) to enable zero-touch OS installation and automated deployment at scale.

Cyan, Inc.
1383 North McDowell Blvd., Suite 300
Petaluma, CA, USA, 94954
+1 707 735 2300

© 2015, Cyan, Inc.

Cyan, the Cyan logo and Blue Planet are trademarks of Cyan, Inc. and may be registered in the U.S. Patent and Trademark Office and in other countries. All other trademarks are the property of their respective owner/s.

DATA SHEET

N-Series N11

Open Hyperscale Transport Platform

Introduction

Cyan's **N-Series N11** is the industry's first open hyperscale transport platform (OHTP) designed to enable the deployment of simple and scalable data center interconnect (DCI) networks. The N11 significantly reduces the cost of high-capacity optical transport while eliminating the vendor lock-in and complexity associated with proprietary, vertically-integrated solutions.

The N11 design leverages best-in-breed commercial off-the-shelf (COTS) silicon and photonic components combined with an open, and carrier-grade Linux network operating system. The space and power-efficient N11 is a modular 1RU shelf that offers industry-leading 100G port densities with upgradeability to higher capacity and density, as well as added functionality, in the future. Beyond the scalable hardware design, the N-Series implements Cyan Linux, an open and SDN-enabled network operating system that enables a server-like operational experience and programmatic control of the network.

Highlights

Ultra-compact, high-capacity transport

Compact "rack & stack" design efficiently packs 800 Gbps of total capacity (client + line bandwidth) in 1RU to optimize space and power efficiency

Open software architecture

Cyan Linux provides an open network operating system (NOS) to reduce the cost and complexity of operating the transport network and eliminate vendor lock-in

Purpose-built for hyperscale DCI

High-bandwidth, low-latency optical transport optimized for cloud and data center interconnect networks

Modularity and industry-leading density

Interchangeable modules support high-density 100G transponding today and enable future capacity and density upgrades

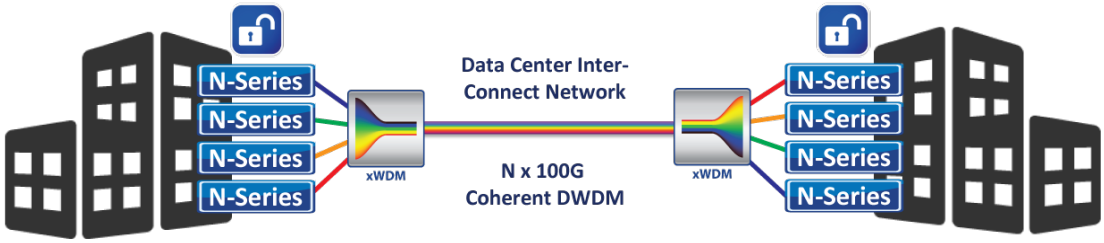
Enhanced by the Blue Planet SDN Platform

Blue Planet simplifies multi-vendor management, end-to-end service orchestration, and ongoing network operations

Complements Cyan's Z-Series

Complemented by Cyan's Z-Series for scalable metro and regional DWDM, ROADM and packet transport

cyan



Application: The N-Series is optimized for efficient and high-capacity interconnects between hyperscale cloud and data center locations. The "rack & stack" N-Series design supports high-density and cost-effective 100G client connectivity over fiber or DWDM, while the open software architecture simplifies configuration and overall operations.

Performance and Efficiency

Commercial off-the-shelf network technologies are advancing at unprecedented rates. Cyan's N-Series OHTP provides a modular architecture capable of fully leveraging advances in best-in-breed merchant silicon and photonic components as they emerge, to offer significantly reduced costs compared to proprietary optical transport solutions.

The first member of the N-Series family is the ultra-compact N11. Delivering 800 Gbps of total capacity (client + line) in a 1RU shelf, the high-performance N11 can be "racked & stacked" to support up to 34 Tbps per rack – 60% greater capacity than the closest competitor. The N11 supports unmatched densities, supporting up to four 100G client ports in the initial release. In addition to space savings, the N11 achieves industry-leading energy efficiency by consuming approximately 100 Watts of power per 100G of transport.

Further, the modular N-Series design integrates optical transponding on interchangeable transport line-cards. This approach enables upgradeability to more than twice the capacity and density, as well as additional transport functionality such as muxponding, in the future.

Operational Simplicity

Internet content and cloud service providers are leaders in the movement to open technologies for improving efficiency, lowering cost per Gbps, and eliminating vendor lock-in. This is exemplified by their broad adoption of standards-based, off-the-shelf hardware such as servers and white-box top-of-rack switches, as well as in their founding roles with initiatives such as the Open Compute Project (OCP), OpenStack, and OpenFlow/SDN.

Cyan also embraced the open networking concept from its inception, first with the Blue Planet platform for multi-vendor network management and orchestration, and now with Cyan Linux, a carrier-grade and disaggregated network OS that supports open interfaces such as REST APIs and NETCONF. Cyan Linux simplifies operations by ensuring compatibility with existing SDN frameworks, and by providing a consistent experience for configuring and managing both compute and network resources. In addition, the N-Series supports key OCP specifications such as Open Network Install Environment (ONIE) to enable zero-touch OS installation and automated deployment. Collectively, these capabilities eliminate vendor lock-in and reduce costs while providing new levels of automation and control in the operation of the network.

© 2015, Cyan, Inc.

Technical Specifications

System

System Configuration	Modular chassis supporting two transport modules
System Capacity	800 Gbps total capacity (400 Gbps client-side, 400 Gbps line-side)

Optical Line

Line Ports	Two Coherent 200 Gbps or Coherent 100 Gbps ports
Optical Interface	C-band tunables with 50GHz spacing, ITU channels 13.5 to 61 (191.35 to 196.10 THz)
Modulation	DP-16QAM and DP-QPSK
Rate per Line Interface	200 Gbps with DP-16QAM, 100 Gbps with DP-QPSK
Nominal Reach	600 km with DP-16QAM, 2000 km with DP-QPSK

Optical Client

Client Ports	Four 100 Gbps ports
Optical Interface	QSFP28

Physical and Environmental

Dimensions	1RU: 1.75” H x 19” W x 23.4” D (44.5 mm x 482.6 mm x 594 mm)
Weight	17.5 lbs. (7.9 kg) fully configured
Operating Temperature	0° to 40° C
Operating Humidity	5% to 85% operating relative humidity (non-condensing)

Power and Electrical

Power Consumption	400 watts typical
AC System Voltage Range	100-240VAC 50/60Hz
DC System Voltage Range	-40 to -60 VDC

Software and Management

Cyan Linux Network Operating System
OCP-compliant Open Network Install Environment (ONIE) to enable zero-touch OS installation
Blue Planet for end-to-end management (FCAPS) including point & click provisioning and visualization
SNMP
REST APIs

Compliance and Safety

UL/CSA Listed
CE-Marked: EN 60950, EN 55022, EN 61000, ETSI EN 300 386 V.1.3.3
CB Scheme Certified 60950
FCC, Subpart B, Part 15, Class A, GR-1089
RoHS Compliant

Features and specifications are subject to change.

Cyan, Inc.
1383 North McDowell Blvd., Suite 300
Petaluma, CA, USA, 94954
+1 707 735 2300

© 2015, Cyan, Inc.

Cyan, the Cyan logo and Blue Planet are trademarks of Cyan, Inc. and may be registered in the U.S. Patent and Trademark Office and in other countries. All other trademarks are the property of their respective owner/s.