Content providers, colocation providers, and hosted service providers across the globe are building out new data centers and expanding network capacity to keep pace with growing business demands. Skyrocketing video, social media, and distributed application traffic poses significant capacity planning and network engineering challenges for data center operators. These operators must upgrade network infrastructure and expand bandwidth between data centers, as well as to points of presence (POPs) and peering points, to support this rapid traffic growth and enable workload mobility, business continuity, and disaster recovery.

Juniper Networks packet optical Data Center Interconnect (DCI) solution lets operators turn up and extend inter-data center capacity quickly and cost effectively. It’s a simple, open, and smart solution that delivers Web scale, agility, and economics while dramatically simplifying operations.

The Challenge

Businesses and consumers are flocking to the cloud for a wide range of services. The cloud, however, fundamentally transforms the way applications are built and delivered, creating complex capacity planning and design challenges for network operators. Today’s mobile-first, cloud-first application traffic increasingly flows into and out of the data center to peering points, partners, and other data centers.

Legacy networks designed to support traditional traffic flows and data transport services are too costly, complex, and inflexible for today’s dynamic cloud environments. Conventional networks are typically built on separate layers of switching, routing, and optical networking elements with distinct administrative interfaces and limited APIs. Most are statically configured to support peak traffic demands—an inefficient and expensive approach that squanders bandwidth. Expanding capacity means adding more switches and routers, which increases operational expense and complexity.

Juniper Networks Packet Optical Data Center Interconnect Solution

Juniper’s packet optical DCI solution delivers flexible, high-capacity, low-latency connectivity between data centers as well as to POPs and peering points. A collapsed architecture eliminates excessive equipment expense and complexity, while end-to-end provisioning, monitoring, and control capabilities and open APIs improve operations and accelerate service agility. The fully integrated portfolio includes Juniper Networks® MX Series 3D Universal Edge Routers, QFX Series switches, BTI7800 and BTI7000 Packet Optical Transport Systems, NorthStar Controller, and proNX software for management and control.
Features and Benefits

Simple

Juniper’s packet optical DCI solution delivers flexible, high-density, 10/100/200 Gbps wavelengths in a tiny footprint, creating a simple, pay-as-you-grow architecture that enables incremental scalability with low first-in costs. High density in a compact footprint conserves precious rack space, which reduces the number of cables and transponders required as well as the number of network elements to manage. This simplifies wiring, eliminates configuration errors, and improves operational efficiencies.

Open

Juniper’s packet optical DCI solution is an open optical line system allowing best-of-breed network element choices. The traditionally deployed fixed, single-vendor optical layer provides scalability but requires operationally intensive procedures—and significant preplanning—for the network to scale and operate effectively. Juniper’s converged packet optical platforms support both overlay tunnel technology such as Ethernet VPN (EVPN) and MPLS, optical underlay technology such as 100/200 Gbps coherent dense wavelength-division multiplexing (DWDM) interfaces, and ROADM functionality as well as a unified management and control plane. Depending on the desired configuration, Juniper packet optical systems can be used either as an integrated optical line system or as disaggregated transponders to a network element with DWDM interfaces. This is a highly flexible approach that allows the speedy delivery of new service offerings, and increases competitiveness by providing plug-and-play interoperability with other standards-based third-party solutions.

Smart

Juniper’s packet optical DCI solution lets users create a programmable pool of high-performance network resources, while a dynamic optical layer and RESTful APIs make it easy for external applications and operations/business support systems (OSS/BSS) to interactively provision resources and orchestrate services across data centers and network elements. The intelligence provided in the optical layer accelerates time to market and enhances service agility by streamlining automation, ensuring that infrastructure capital is optimized for peak efficiency.
Solution Components

MX Series 3D Universal Edge Routers
The MX Series 3D Universal Edge Routers are true carrier-grade edge routing platforms that ensure high network and service availability with a broad set of multilayered physical, logical, and protocol-level resiliency features. Used to connect data centers, peering points, and POP sites, the software-controlled platforms provide a comprehensive set of switching, routing, and security capabilities.

QFX Series Switches
QFX Series switches deliver industry-leading performance and density. Offering throughput up to 6 Tbps per slot, QFX Series switches provide sustained wire-speed switching with low latency and can be deployed as 10GbE, 40GbE, or 100GbE access, spine, core, or aggregation devices.

BTI7800 Packet Optical Transport Systems
The BTI7800 line of packet optical transport systems supports large-scale 10 Gbps, 100 Gbps, and 200 Gbps wavelength capacities in a programmable platform. Featuring a rich set of optical capabilities, including coherent modules with integrated ROADM, the BTI7800 line increases network capacity, reduces space/power/cooling costs, improves network utilization, and simplifies the deployment of DCIs.

BTI7000 Packet Optical Transport Systems
The BTI7000 line of packet optical transport systems delivers highly scalable, carrier-grade networking for metro inter-data center networks. The BTI7000 line provides high densities and capacities in a compact, modular platform, helping operators consolidate equipment, conserve rack space, and streamline operations.

NorthStar Controller
Juniper Networks NorthStar Controller is a flexible traffic engineering solution that delivers granular visibility and control over IP/MPLS and optical layer flows. It streamlines capacity planning, enables proactive monitoring, and lets service providers dynamically route traffic and balance loads based on administratively defined policies.

proNX Software
The proNX management and control software streamlines end-to-end administration of packet optical networks. The proNX software suite includes provisioning templates, configuration wizards, and one-click service activation features that eliminate manually intensive and error-prone tasks, accelerating bandwidth turn-up and capacity expansion. RESTful APIs simplify integration with external management applications, including controllers such as NorthStar, service orchestration solutions, and OSS/BSS platforms.

Use Cases

Data Center to Data Center
The Juniper DCI solution establishes resilient, high-capacity, low-latenacy packet optical connectivity between two or more data centers, enabling workload mobility, business continuity, disaster recovery, and tenant-to-tenant connectivity across sites. Point-to-point connections between data centers or mesh networks interconnecting several data centers can also be implemented.

Peering/Colocation
With the Juniper packet optical DCI solution, users can establish 10 Gbps, 100 Gbps, or 200 Gbps connections to POPs and peering points, giving tenants high-capacity cross-connects to content providers, business partners, and service providers to move up the value chain.

Cloud/Metro Connect
The Juniper packet optical DCI solution offers enterprise customers high-bandwidth, low-latency cloud connections that bypass the public Internet for superior throughput, reliability, and security. Direct connectivity to multiple cloud providers over a private IP service enhances revenues and margins with value-added connectivity services backed by SLAs.

Summary—Simple, Open, and Smart Data Center Interconnect Solution
Juniper Networks DCI solution delivers Web scalability, agility, and economics for the cloud era. It efficiently expands capacity between data centers, POPs, and peering points to accommodate skyrocketing traffic growth and enable value-added services. Juniper’s DCI solution eliminates excessive equipment costs and operational complexity with a collapsed network architecture with high-density, high-performance switching and routing platforms. This integrated DCI solution ensure continuous availability with reliable platforms and a resilient networking infrastructure, while accelerating service agility and streamlining operations with automation, end-to-end provisioning, and management—significantly improving bottom line business results.

Next Steps
To learn more about how Juniper packet optical Data Center Interconnect solution can help your company gain a competitive edge, contact your Juniper sales representative or visit www.juniper.net.
About Juniper Networks

Juniper Networks challenges the status quo with products, solutions and services that transform the economics of networking. Our team co-innovates with customers and partners to deliver automated, scalable and secure networks with agility, performance and value. Additional information can be found at Juniper Networks or connect with Juniper on Twitter and Facebook.