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CISCO

The bridge to possible

# Purpose-Built Convergence for Essential Networks

Benefits

In 2020, "normal life" was suddenly upended, and, seemingly overnight, our businesses, educational institutions, and communities were transformed into remote operations. Broadband connectivity became essential for disaster planning and operational continuity, and Communications Service Providers (CSPs) became critical entities supporting the infrastructure. Over the span of a few weeks, the average internet traffic spiked, with major increases in demand, and pushed existing networks to nearly their breaking points. Since then, traffic levels have dissipated, but we learned that high-speed connectivity is critical and not everyone has access or the ability to equally participate. As businesses, education, and governments prepare for the next global event, it's imperative to bridge the digital divide so that underserved areas are equally represented.

While connectivity did not break under this traffic surge, the digital divide exposed a major serviceability gap that limits opportunity in underserved areas. From the CSP perspective, simply expanding network capacity and increasing coverage areas wasn't practical given the current economics and complexity of network operations. Years of layering on new technologies resulted in a cumbersome operational model. Using the Cisco® Converged Software-Defined Network Transport (Converged SDN Transport) architecture, CSPs can reduce the overall cost and complexity of their network while allowing them to satisfy the stringent performance needs of today's advanced services.

A Converged SDN Transport architecture allows you to:

- Evolve to a unified protocol and service with Segment Routing and Ethernet Virtual Private Networking (EVPN)

- Converge wireline and wireless services onto common network elements for resource-efficient, software-defined network slicing with scalable traffic engineering, a simplified protocol stack, and low-latency failover rerouting

- Converge optics and routing with 100G/200G/400G coherent optics plugged directly in the router, helping to simplify the network infrastructure and lower Total Cost of Ownership (TCO)

Figure 1.   Simplify your network with IP end to end
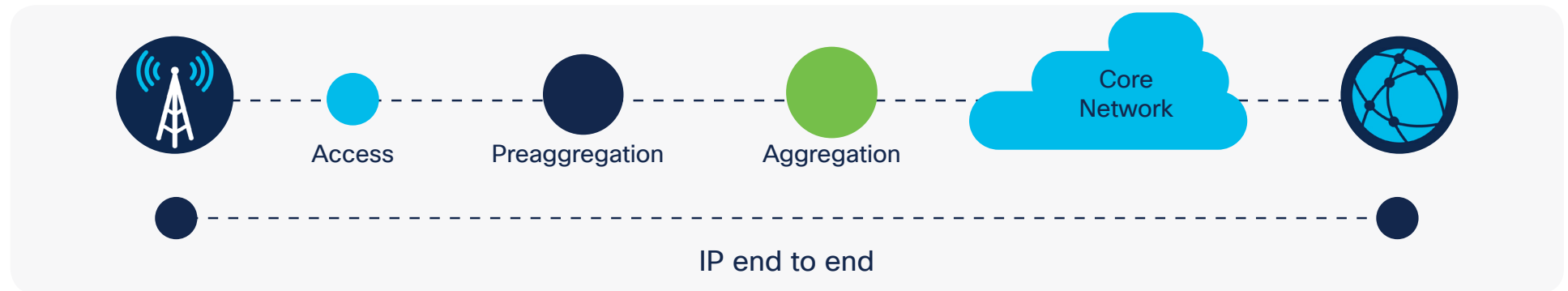
Product overview

The Converged SDN Transport architecture uses advanced features and technology to help CSPs design and migrate to a network prepared to scale to meet the stringent bandwidth and performance demands of their customers. At the fundamental level, the Converged SDN Transport architecture drives simplification into the CSP's network and operations.

Implementing the Converged SDN Transport architecture will allow CSPs to realize the following business benefits:

- Reduced operational complexity for network management
- Increased revenue with a service-focused, service-centric network
- Improved time to market for new value-added services
- Optimized utilization of fiber capacity
- Decreased operational and capital expenditures associated with the network

Building a network that utilizes end-to-end IP simplifies operations by reducing the amount of equipment needed from operating multiple networks. With coherent optics plugged directly into routers, CSPs can remove redundant devices in the network and build a converged hop-to-hop IP and optical network. This simplification reduces the planning complexity for any upgrades, expansions, or changes to the network.

With end-to-end IP in the network, automation tools can be used to test configurations and model the impact of traffic prior to activation. These tools can be integrated into all areas of the IP network and consume real-time telemetry data to provide actionable intelligence to engineers. Network engineers can minimize service-impacting configuration and implementation errors before they impact customers.

Efficient utilization of fiber capacity helps CSPs get more out of their bandwidth investment. With increased spectral efficiency, a higher bit-rate wavelength can be run over the same fiber. Segment Routing Path Computation Elements (SR-PCEs) and other network orchestration or path optimization tools can be used to ensure higher utilization on existing capacity and minimize overprovisioning of the network. They can also be used to improve network resiliency with automated rerouting of traffic during outages or congestion events.

Conclusion

Attempting to meet the bandwidth and performance demands of customers with constant upgrades will erode margins and significantly increase the complexity of the transport network. This strategy won't help CSPs change their operational economics to allow them to close the digital divide. Building a Converged SDN Transport network architecture will enable CSPs to meet these challenges with an integrated fabric that improves the resiliency and flexibility of the network while helping to control cost. Implementing the Converged SDN Transport solution could lower capital expenditures by as much as 60 percent and provide 66 percent better utilization of operating expenses.[1]

With a simplified network architecture and reduced cost structure, CSPs can turn to strategic network expansions that will bring new services and capacity to underserved areas. For more details, read the solution overview. To discover additional benefits, read the Converged Network Design for Flexibility and Service Evolution white paper or check out how a simplified architecture can help generate new revenue with advanced services like 5G deployments.

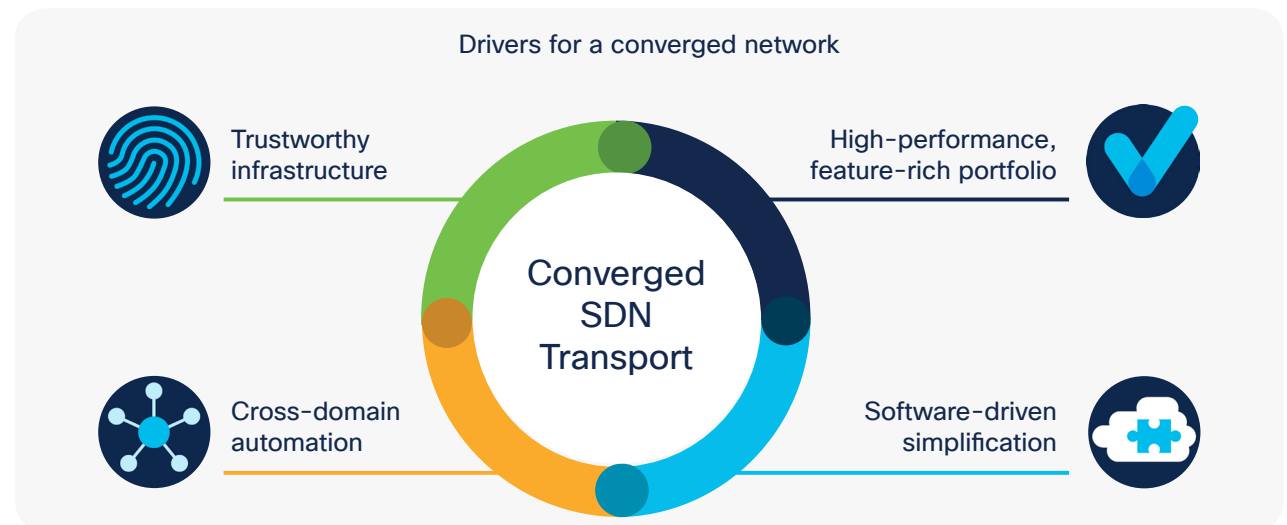C45-744218-03   07/21

What it does

Your network will be built to support SLA performance-based services, and your engineers can partition your network and position functions and services exactly where you need them. You can use this architecture to generate new revenue streams and offer a personalized network experience for your clients.

Using a Converged SDN Transport architecture can improve your control of the network through software tools and simplification of network layers and protocols. Better overall control can result in simplification of management and operations, which will lead to savings and a reduction in TCO.[1]

With a Converged SDN Transport design, your network can experience:

- Efficient service-aware and application-aware traffic engineering with Segment Routing (SR)
- Software-based network slicing for end-to-end performance guarantees
- Simplified operations with one network to manage for all service offerings
- Automatic route failover for network resiliency to improve customer experience and reduce mean time to repair
- Streamlined network topology by collapsing optics into infrastructure routers

Figure 2.   Drivers for a converged network

Drivers for a converged network

Trustworthy infrastructure

High-performance, feature-rich portfolio

Converged SDN Transport

Cross-domain automation

Software-driven simplification

[1] ACG Research Paper: TCO Benefits of Converged 5G Ready IP Transport, April 2019