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CISCO

Service Provider Core Label Switch Routing

Improve performance and remove complexity

According to the Cisco Virtual Networking Index (VNI) for 2017–2022, global IP traffic is predicted to have a 26 percent compounded annual growth rate (CAGR) and total will be predominately mobile with smartphone traffic exceeding PC traffic 44 percent to 29 percent. To keep up with the dynamic consumption model in the mobile device market, service provider networks need to be able to expand with demand. The network needs to meet demand now, not months after a demand spike. To stay ahead of the demand curve, your engineers need access to hardware and software that is designed to improve network performance and remove complexity for operating the network.

The current environment of using manual processes to design the network and implement changes, results in long deployment timeframes. By introducing automation into your operations, you can reduce implementation timeframes for new hardware and software, and you can automate operational responses to network events so that network performance standards are maintained with minimal impact to client experiences.

Benefits

- Satisfy bandwidth and traffic prioritization demands from 5G and IoT proliferation and meet stringent customer and application SLAs

- Evolve network operations and policies to include automation so the network can handle increased bandwidth and new service requirements

- Integrate network telemetry data and real–time performance statistics to enable automated responses to congestion, route failures, and other events to maintain acceptable network performance

New demands require new solutions

Increasing bandwidth demands from the advent of 5G, the proliferation of IoT devices, and the consumption of cloud-based services by enterprises are straining service provider networks. Supporting this growth requires new approach to router architecture and operation. Routers shouldn't be considered a single, monolithic high-density platform that simply supports MPLS label flows and passes packets along predefined paths. New routers should be designed to support fabric-based architectures with the ability to digest multiple use case requirements and automatically adjust path usages based on network conditions. This type of architectural design would add agility and dynamic performance across the network, from traditional core sites to emerging sites found in regional or metro locations.

Traditional solutions to these challenges involve manual workflows to create label switch paths (LSPs) through the network to support alternate pathways around congestion or failures. These traditional solutions are costly in both time and money. They can't keep up with today's bandwidth levels or the performance needs. To meet the scalability and flexibility needed to support 5G services and enterprise consumption of cloud applications, modern networks require a new approach to traffic engineering. The router needs to have the network visibility and telemetry data to automatically make near real-time path updates based on-demand fluctuations.

Scale the network to meet demand

The combination of the Cisco 8000 Series Router, IOS XR7, and the Cisco Crosswork Suite will enhance service provider MPLS core networks with market leading port density, a single network operating system for the entire network, and automation tools that offer new levels of orchestration. With this combination, service providers can scale their network with demand and improve operational efficiencies through automated network changes.

The Cisco 8000 Series Router is a new class of router built with cloud-enhanced operations and a modern chassis design that has been optimized for space and power efficiency. With the Cisco 8000 Series Routers, service providers can lower their infrastructure costs. The 8000 Series Router units have line-card ports that are capable of 100G or 400G connections and support capacities from 10 Tbps up to 259 Tbps. As service providers transition from 100 GbE designs to 400 GbE MacSec based designs, the 8000 Series Router will help service providers offer greater performance in a smaller footprint.

To keep up with today's more flexible network infrastructure, Cisco has improved the operational structure of IOS XR7 (XR7), the newest release of the Cisco network operating system (OS). With IOS XR7, you can load and operate only the features you need for a specific use case, whether it's for access, edge, aggregation, or core. The OS image on a device can be anything from a full OS version load on a multipetabit core router to a scaled-back OS version that runs on a multigigabit access router.

Learn more

The Cisco 8000 Series Router is designed to meet the deployment flexibility and bandwidth requirements of service providers. By bringing performance, and cloud-enhanced automation to the forefront of operations, service providers can expand the compute power of their MPLS network and create flexible label switching paths within the network. This design will improve operational efficiency and lower capital expenditures while maintaining an excellent client experience.

- Cisco support for segment routing
- Cisco 8000 Series Router

The Cisco Crosswork Suite has automation tools that can help speed innovation, improve customer experiences, and simplify operations of the MPLS core design. Service providers can now plan, implement, operate, and optimize the network to help gain mass awareness, augmented intelligence, and proactive control. Using the Crosswork Suite helps service provider engineers move from a reaction-based workflow to a planning-oriented workflow that lets them control service implementations.

Benefits for today's distributed architectures

Many service providers are interested in new network topology designs that consist of smaller, high-performance nodes woven into a network fabric architecture. This distributed architecture offers inherent scalability, resiliency, and operational simplicity. Using the Cisco 8000 Series Routers with IOS-XR7 and the Crosswork Suite in these networks offers multiple benefits. You can:

- Improve operational efficiency by proactively managing the network with the cloud-based Crosswork Suite.
- Use machine learning, intent-based decision tools and closed loop automation to reduce remediation times.
- Increase return on capital equipment deployed because the overall investment needed to address bandwidth demands is lowered.
- Reduce the overall routing footprint with units that are optimized for power consumption, rack space, and cooling needs.
- Improve the customer experience by ensuring network reliability with network validation and network insights.