JUNIPER NETWORKS CLOUD CPE SOLUTION

Greater choice to dynamically deliver virtualized managed services

Challenge

The ability to innovate managed CPE services using existing methods is inhibited by closed proprietary platforms that restrict service creativity and require large up-front investments. Deployment, a time-consuming, manual process, does not align with the agile market requirements of today's enterprises.

Solution

Juniper automates service delivery with the only truly scalable, carrier-grade Cloud CPE solution. Based on Juniper's end-to-end NFV capabilities, the Cloud CPE solution enables flexible, accelerated service creation and delivery across multi-deployment models that incorporate Juniper and third-party network services.

Benefits

- *Enables high-demand enterprise network services such as SD-WAN, VPN, next-generation firewall, and advanced security*
- *Automation reduces manual intervention and replaces time-consuming truck rolls with a simple mouse roll*
- *Simplified service creation transforms service delivery and increases user satisfaction*
- *End-to-end NFV platform enables multi-deployment models that effectively address dynamic market requirements*
- *Open framework supports open standards, protocols, APIs, and third-party VNF and OSS integration, creating an ecosystem that unlocks possibilities*

More than ever, enterprises—ranging from multinational enterprises (MNEs) to small and midsize businesses (SMBs)— rely on the network to support their communications, operations, and transactions.

Network virtualization has transformed the managed network services market. Not only has it dramatically improved returns on service providers' capital investments, it drastically augments operational efficiency, enhances revenue growth with new business models, and increases service agility—all while providing a personalized experience for enterprise customers.

The Challenge

Traditionally, customer premises equipment (CPE) is essential to most managed service delivery models that service providers use to serve their business customers. While the CPE and appliance service delivery model has served the market well for years, there are a number of challenges associated with deploying, managing, and evolving these network and security services. The ability to innovate managed services is dependent on the hardware and software platforms deployed with the CPE device. Service providers typically employ diverse proprietary and closed systems that inhibit service agility and innovation that require large up-front investments. As new services and locations are added or extended, proprietary hardware costs continue to mount.

Existing CPE deployment is also a time-consuming process. Hardware must be shipped to each location and configured manually, resulting in long activation cycles. Each CPE device must experience this inefficient procedure—a complex and costly process that requires highly specialized skills—while ongoing maintenance and operations contribute their own unique challenges. In short, the process to order, fulfill, and activate is not compatible with the speed at which businesses must operate in today's competitive environment.

Network Functions Virtualization (NFV) technologies have broken down many of these barriers and revolutionized the managed service delivery and life cycle operation. Enterprise customers can choose from a wide variety of innovative and customized services, delivered on demand. Thanks to NFV, service providers are less dependent on rigid, physical-only network infrastructure, manual workflows, and service silos, allowing them to exceed customer expectations. NFV empowers service providers with a more software-centric approach, accelerating service innovation that ultimately increases their competitiveness, revenue, and profitability.

The Juniper Networks Cloud CPE Solution

Juniper Networks® Cloud CPE is the industry's most dynamic service creation platform. Juniper's Cloud CPE combines critical enterprise services, software-defined WAN (SD-WAN), enterprise vCPE for routing and VPN, and security services with the industry's most advanced Telco Cloud for centralized management and orchestration to automate the entire service lifecycle. Combined with the highest performing NFV Infrastructure (NFVI) to offer virtualized managed services across multiple deployment models, Cloud CPE gives service providers the platform to differentiate and to capture business opportunities today.

The Cloud CPE solution utilizes Contrail Service Orchestration, a modular service orchestration and service assurance layer, with a robust resource management and control layer on an open framework to ease integrations. Automated service creation simplifies the service life cycle, enabling service providers to quickly conceive and create highly customizable services in minutes. Services and capacities can be dynamically updated and enabled with multi-tenancy, improving the scalability and flexibility of managed CPE services. Subsequent service additions, changes, and expansions can be fully automated, replacing traditional manual processes; this not only reduces the risk of human error, it virtually eliminates network interruptions.

The Cloud CPE solution supports foundational VNF capabilities built on Juniper Networks vSRX Virtual Firewall platform that unlocks some critical services, including managed router, SD-WAN, and a wide range of security capabilities. Leveraging an advanced set of routing features, customers have the choice of meeting their routing requirements for VPN, MPLS, IPSec, and more. SD-WAN functionality unlocks advanced application visibility combined with policy-driven profiles to dynamically route traffic that best aligns with the customer's business metrics. Integrated security offers a range of services, including next-generation firewall, UTM, and much more, to meet the security needs of any enterprise.

Juniper Networks Cloud CPE is the only multidimensional solution to support flexible deployment models simultaneously, allowing service providers to provide centralized, distributed, and hybrid deployments supported with multi-tenancy. Juniper's Cloud CPE solution offers a personalized, transformative experience that aligns with the business requirements for both MNEs and SMBs while increasing business competitiveness and, ultimately, enabling real profits.

Centralized Cloud CPE Deployment Model

Juniper's centralized Cloud CPE deployment model abstracts network services from the on-premise equipment and automates service delivery in the telco cloud. New services can be ordered through a customer portal or triggered by existing business support systems (BSS) on demand. Contrail performs complex virtual network service chaining and life cycle management, where it automatically instantiates VNFs and service chaining with network resources to deliver scalable multitenant services.

Centralized Cloud CPE drastically simplifies the deployment of managed services, allowing service providers to offer on-demand availability, low-risk procurement, personalized marketplace options, and highly differentiated services. Centralizing capital asset investments helps service providers quickly improve efficiency and ROI metrics.
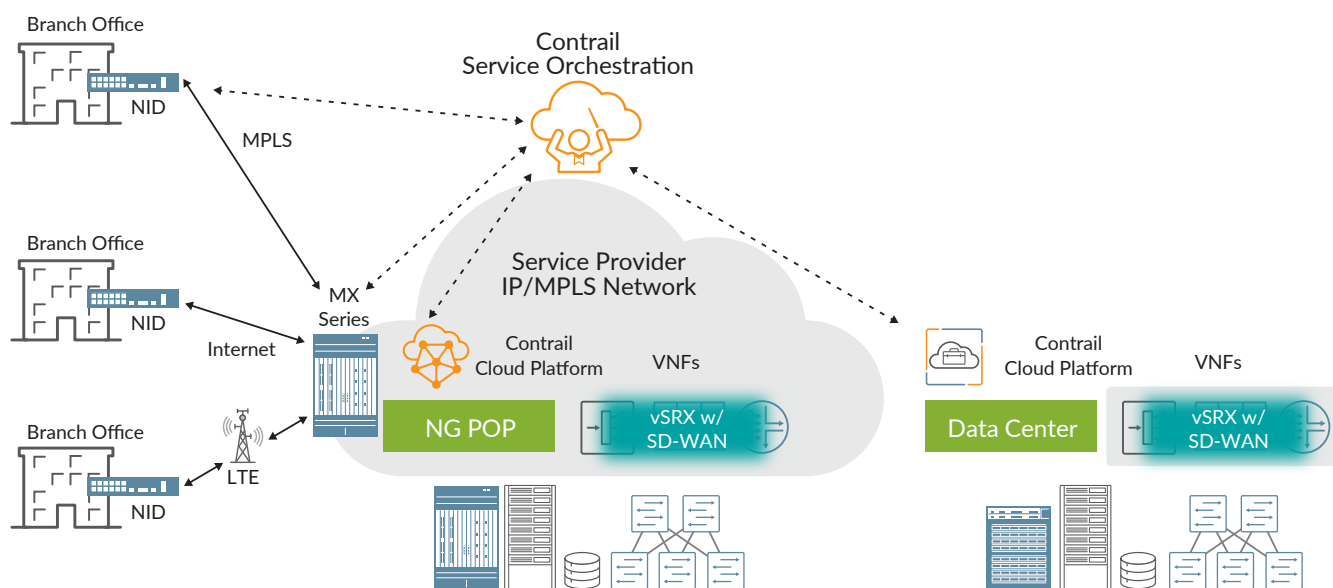

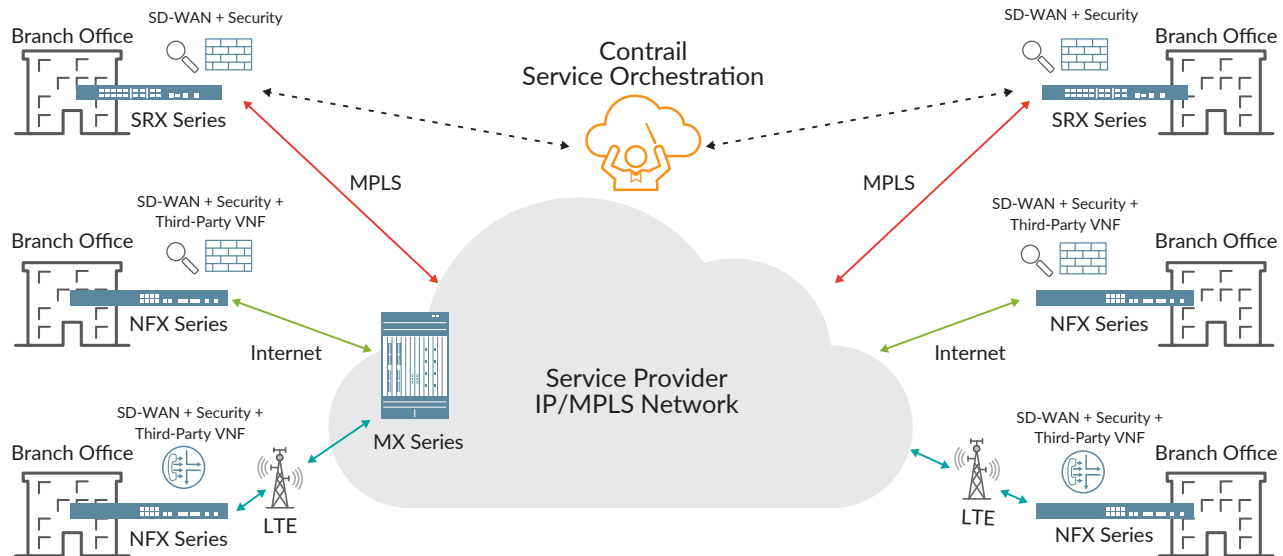*Figure 1: Centralized Cloud CPE deployment model*

Figure 2: Distributed Cloud CPE deployment model

Distributed Cloud CPE Deployment Model

Distributed Cloud CPE includes Juniper Networks NFX250 Network Services Platform, a high-performance, highly secure, software-driven CPE product designed for managed service delivery. The NFX250 provides similar functionality to the physical CPE devices, with the flexibility of dynamic service creation in an open environment to create a near instantaneous experience.

The NFX250 embeds Juniper's most efficient and full-function virtualized security appliance, the vSRX, to provide the perimeter security required for the business environment and IPSec tunnel capabilities for secure SD-WAN and a full routing suite. Working together, the NFX250 and vSRX simultaneously virtualize IP routing for site survivability, meeting the stringent demands of always-on application availability.

Eliminating operational complexities and automating service deployment, a single NFX250 device can support multiple VNFs. This flexibility eliminates traditional service silos and enables enterprise customers to scale their network services while addressing market seasonality and business requirements with a virtualized, software-driven approach.

Juniper Networks SRX Series Services Gateways can be used in a distributed Cloud CPE model, leveraging all the same benefits with centralized orchestration similar to the NFX250 case. In this model, SRX Series software is native to the gateway and, when additional workloads are required, VNFs can be service chained through the cloud, creating a hybrid Cloud CPE model.

Hybrid Cloud CPE Deployment Model

Juniper's Cloud CPE simultaneously supports both centralized and distributed deployment models. Contrail Service Orchestration centrally manages network applications, enabling service providers and enterprise customers alike to deploy applications either centrally or in a distributed fashion out in the customers' premises and branch offices.

Hybrid Cloud CPE deployment drastically increases the number of virtual instances and enables flexible provisioning of multi-tenant clouds and VNFs without requiring manual configuration of the underlying network infrastructure. With hybrid Cloud CPE, network services can be dynamically provisioned based on network conditions, application policies, and business requirements to support the extensive private and public cloud hosted environments demanded by today's enterprises.

Juniper's End-to-End NFV Solution

The building block for Juniper Networks Cloud CPE solution are based on Juniper's automated, programmable, end-to-end NFV solution, which combines carrier-grade reliability and security bundled with intelligent automation and scalability to simplify service providers' transition to NFV. Juniper's market-leading NFV solution consists of three components:

- **Management and Orchestration (MANO):** Juniper's MANO layer consists of Juniper Networks Contrail Service Orchestration, which orchestrates the design and implementation of custom service creation and delivery through an open framework and multi-tenant scale.
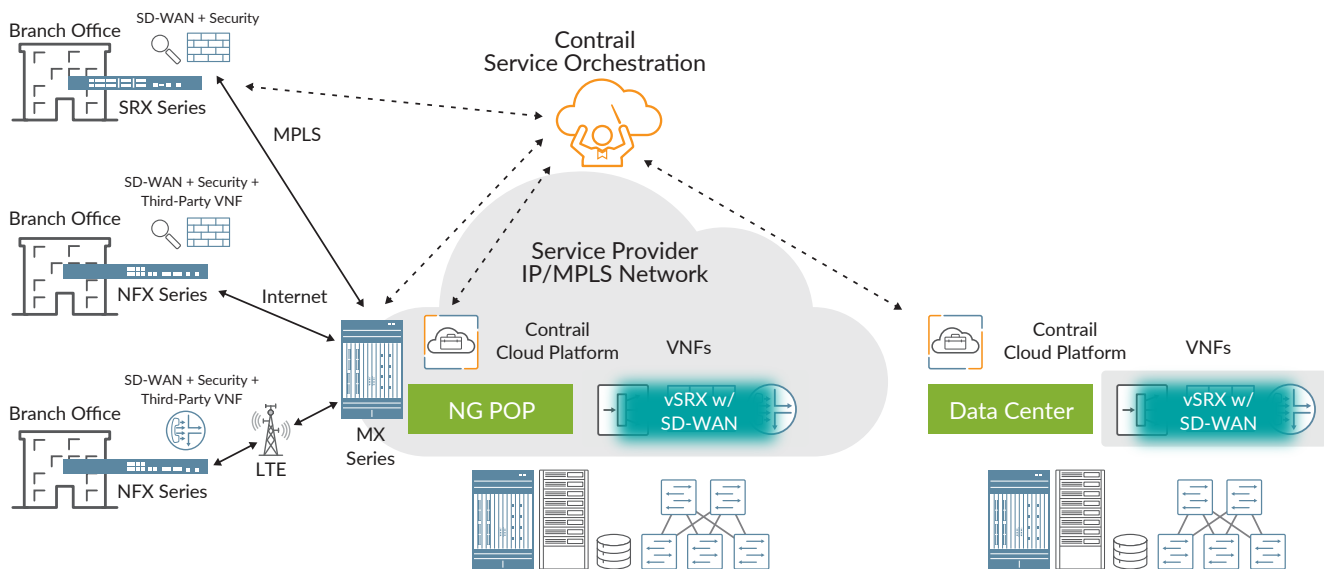
Figure 3: Hybrid Cloud CPE Deployment Model

Additionally, Juniper Networks Contrail Cloud Platform combines Contrail Networking with Juniper's OpenStack implementation to provide a turnkey cloud orchestration and automation platform.

- **Network Functions Virtualization Infrastructure (NFVI):** The NFVI consists of the NFX250's secure onsite software-driven CPE supporting Juniper and third-party VNFs; SRX Series firewalls to support network functions on the customer premise; Juniper Networks MX Series Universal Routing Platforms that serve as edge routing platforms for enterprise and service provider applications; Juniper Networks Service Control Gateway, which performs traffic analysis and policy enforcement; data center and cloud networks built on the Juniper solutions; and core PTX Series Packet Transport Routers for high-performance bandwidth connectivity.

- **VNFs:** Juniper is one of the first vendors to introduce VNFs for rapid deployment and scale-out environments. Juniper's VNFs include the vSRX Virtual Firewall, the industry's most efficient virtual platform to bundle SD-WAN, VPN, and security, and vMX, a full-featured carrier-grade virtual router with complete control, forwarding, and management planes.

Juniper Networks NFV solution is based on an open, standard framework that is easily integrated into existing operations and business support systems (OSS/BSS). This ubiquitous and open framework provides service providers with a third-party ecosystem that allows them to select best-in-class technologies in storage and compute, for example, helping them avoid expensive vendor lock-in while allowing them to incorporate third-party VNFs to accelerate innovation.

Juniper's NFV solution is backed by Juniper's Professional Services, starting with the **Cloud CPE Assessment** service to determine gaps between the current and future state. With deployments in the world's top 100 service providers, Juniper Professional Services offer extensive experience in planning, building, and migrating to NFV cloud architectures while minimizing risk and delivering results.

Features

End-to-End Scalable Solution

Juniper Networks Cloud CPE is the only scalable virtualized CPE solution to support multi-deployment models, delivering the scalability service providers need to expand throughout the cloud with consistent service coherency and feature parity. Enterprise customers benefit from an affordable, centralized pay-as-you-go deployment model that can swiftly expand into a distributed model for high availability, performance, and compliance. The Cloud CPE solution is also extensible as a hybrid deployment model, enabling enterprise customers to rapidly deploy applications centrally or distribute them to branch offices. Multi-deployment models allow service providers to offer differentiated and tiered services that effectively address the seasonal and dynamic market requirements of their enterprise customers.

Open Framework

The Cloud CPE solution is based on a modular framework that supports open standards, protocols, and seamless API integration. Leveraging OpenContrail and OpenStack, the solution accelerates innovation by enabling collaboration with the open source community, significantly enhancing its

effectiveness. Cloud CPE is also compliant with the European Telecommunications Standards Institute (ETSI) NFV architecture standard and is extensible to third-party VNFs, enabling a robust and open ecosystem that encourages innovation. Third-party VNFs can run on servers in a centralized model and on distributed uCPE devices such as the NFX250, giving Cloud CPE customers even greater choice.

Simplified Service Creation

The Cloud CPE solution simplifies service creation and supports highly customized service delivery. A simple GUI service design portal offering built-in, functional drag-and-drop network designer tools lets service providers quickly create and deliver new and personalized services to their customers. The network service designer provides the flexibility to choose appropriate VNFs, design functional service chains, specify interface data paths, and implement policies and quality-of-service (QoS) rules designed to meet overall performance goals. Newly created, customized services—supported by rich security features provided by the vSRX virtual firewall—transform the traditional rigid service delivery model, elevating user satisfaction and forging a stronger partnership between service providers and their enterprise customers.

Automated Service Delivery

Cloud CPE is highly automated. The Contrail Cloud Platform intelligently automates service chaining and manages the service life cycle, including provisioning, maintenance, and delivery across both virtual and physical networks. Any subsequent service updates, expansion, or policy changes can be dynamically inserted into existing services. Automation eliminates complex manual intervention and replaces truck rolls with a simple mouse roll for enterprise customers, enabling service providers to improve overall operational efficiency and service agility.

Secure SD-WAN

Cloud CPE efficiently utilizes secure SD-WAN links across the enterprise WAN, blending traditional MPLS with other connectivity options such as broadband Internet, 4G, LTE, and more. Application-based forwarding capabilities enforce business policies through centralized orchestration set by the enterprise for overall network traffic paths across all end-to-end locations. Visualization of the application traffic statistics provides real-time feedback to ensure SLAs align with an assured class of service. Security is fully integrated for easy and consistent deployments to secure every SD-WAN path. Cloud CPE supports full OAM stack, full L2/L3 VPN functionalities, full MPLS support, and a full routing stack to easily integrate into any existing networking environment.

Integrated Security

Juniper's vSRX Virtual Firewall serves as an advanced programmatic platform in a single VNF instance for scale-up and scale-out growth as a bundle for SD-WAN, VPN, routing, and security services. The vSRX, the industry's highest-performance virtual security platform (up to 100 Gbps), provides scalable, secure protection across all places of the network. With the built-in service design capabilities of Contrail Service Orchestration, vSRX can be easily configured to support a myriad of security applications including NG Firewall, NAT, path performance monitoring, dynamic application-based routing, application detection, IPS, content filtering, antivirus, and unified threat management (UTM). With security management integrated with Contrail Service Orchestration, it is easy for the customer to deploy and manage security, SD-WAN, and VPN.

Features and Benefits

Revenue Growth

Unlike traditional managed CPE, where service deployment is a lengthy and manual process, Cloud CPE drastically reduces the new service delivery process from months to just minutes. This frees service providers to adopt a fast-fail approach toward service creation with little risk, introducing customized services and a potentially rapid path to revenue for innovative new services, target segments, and multiple geographies.

Improved Capital Efficiency

The Cloud CPE solution improves CapEx efficiency for managed services. Derived by reducing dedicated on-premise equipment and service silos with a single CPE device, or VNFs at the service provider network, cost efficiency lets service providers effectively launch innovative new services while protecting margins for existing services.

Reduced Operational Expenditure

Cloud CPE reduces OpEx by adopting automation along with a centralized service management and orchestration system. Automation improves all facets of the service life cycle, simplifies operations, and eliminates a number of manual processes such as provisioning, configuration, equipment installation, service delivery, and back-end database administration.

Service Agility

Customer business requirements often change to reflect market dynamics. The Cloud CPE solution lets service providers react and respond to these changes in near real time, quickly moving from a one-size-fits-all model to a highly personalized reactive model that transforms providers into a trusted partner. This leads to greater customer satisfaction, creating an opportunity to sell additional value-added services for expanded revenue growth.

Reliability

Cloud CPE enables highly dynamic multi-deployment models with zero-touch provisioning and centralized device management that simplifies and accelerates remote and branch office deployments. End-to-end visibility into network performance enables proactive detection and maintenance of application performance on the premises or in the cloud.

Summary—Juniper Automates Service Delivery with the Only Scalable Cloud CPE Solution

Juniper Networks Cloud CPE revolutionizes traditional managed services, overcoming the challenges associated with service deployment, management, and evolution by simplifying and automating the creation and delivery of customizable services from a comprehensive, vertically integrated, open NFV solution. The Cloud CPE multi-deployment solution supports flexible deployment models with unprecedented scale for expanding out onsite and scaling up in the cloud, with integrated SD-WAN functionality, advanced routing, comprehensive security capabilities, and an open ecosystem for additional third-party VNFs. By focusing on simplified service creation, automated service delivery, and an open framework supported by a highly scalable end-to-end NFV solution, the Cloud CPE solution enhances network performance, lowers costs, and delivers differentiated services that elevate customer satisfaction and ultimately lead to increased profitability.

Next Steps

For more information about Juniper Networks Cloud CPE, please contact your Juniper representative, or go to www.juniper.net/us/en/solutions/nfv/cloudcpe/.

About Juniper Networks

Juniper Networks brings simplicity to networking with products, solutions and services that connect the world. Through engineering innovation, we remove the constraints and complexities of networking in the cloud era to solve the toughest challenges our customers and partners face daily. At Juniper Networks, we believe that the network is a resource for sharing knowledge and human advancement that changes the world. We are committed to imagining groundbreaking ways to deliver automated, scalable and secure networks to move at the speed of business.

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