

Juniper Networks Cloud CPE Solution

Simplifying, Automating, and Accelerating Service Delivery in the Cloud

Challenge

The ability to innovate managed CPE services is inhibited by a closed proprietary platform that restricts scalability and requires up-front CapEx. Deployment is a time-consuming and manual process that does not align with the dynamic market requirements of today's enterprises.

Solution

Juniper automates service delivery with the only scalable Cloud CPE solution. Based on Juniper's end-to-end scalable NFV capabilities, the Cloud CPE solution enables flexible service creation with a multi-deployment model that incorporates an open framework for third-party VNFs to accelerate service delivery.

Benefits

- Automation eliminates 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 enables multi-deployment models that effectively address dynamic market requirements.
- Open framework supports open standards, protocols, APIs, and third-party VNF integration, creating an ecosystem that accelerates innovation.

The Internet and cloud services have become mission-critical requirements for today's highly dynamic market. More than ever, enterprises—ranging from multinational enterprises (MNEs) to small and midsize businesses (SMBs)—rely on cloud-based applications to support their communications, operations, and transactions.

Network virtualization has transformed communication service delivery. 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 managed service agility—all while providing a personalized experience for enterprise customers.

The Challenge

Customer premises equipment (CPE) is one of the most important service delivery models that service providers use to serve their business customers. While the CPE 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 platforms that inhibit scalability and require large up-front investments. As new services and locations are added or extended, proprietary hardware costs continue to mount.

CPE deployment is also a time-consuming and manual process. Hardware must be shipped to each location requiring service, resulting in long lead times. Each CPE device needs to be configured and provisioned—a complex and costly process that requires highly specialized skills, while ongoing maintenance and operations contribute their own unique challenges. In short, the order and fulfillment process is not compatible with the speed at which businesses must operate.

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, available on demand. Thanks to NFV, service providers are less dependent on rigid, physical-only network infrastructure, manual workflows, and service silos, making them more relevant to their customers. 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 only scalable virtualized CPE solution that automates service delivery consistently and coherently across all deployment models. Built on Juniper's NFV architecture, Cloud CPE replaces dedicated CPE hardware with a range of routing and security virtualized network functions (VNFs), delivered by the Juniper Networks vSRX virtual firewall, into a highly scalable end-to-end solution.

The Cloud CPE solution incorporates a modular service orchestration and service assurance layer with a robust resource management and control layer on an open framework. 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, 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.

Cloud CPE also supports industry-leading security applications, including IP VPN, firewall, content filtering, antivirus, and unified threat management (UTM), as well as the integration of third-party VNF applications.

Juniper Networks Cloud CPE is the only multidimensional solution to support flexible deployment models, allowing service providers to provide centralized, distributed, and overlay deployments that address business requirements for both MNEs and SMBs.

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. A management and orchestration layer 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, letting service providers 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.

Distributed Cloud CPE Deployment Model

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

The NFX Series embeds Juniper’s most efficient and full-function virtualized security appliance, the vSRX, to provide the perimeter security required to protect the business-sensitive environment. Working together, the NFX Series 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 NFX Series 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.

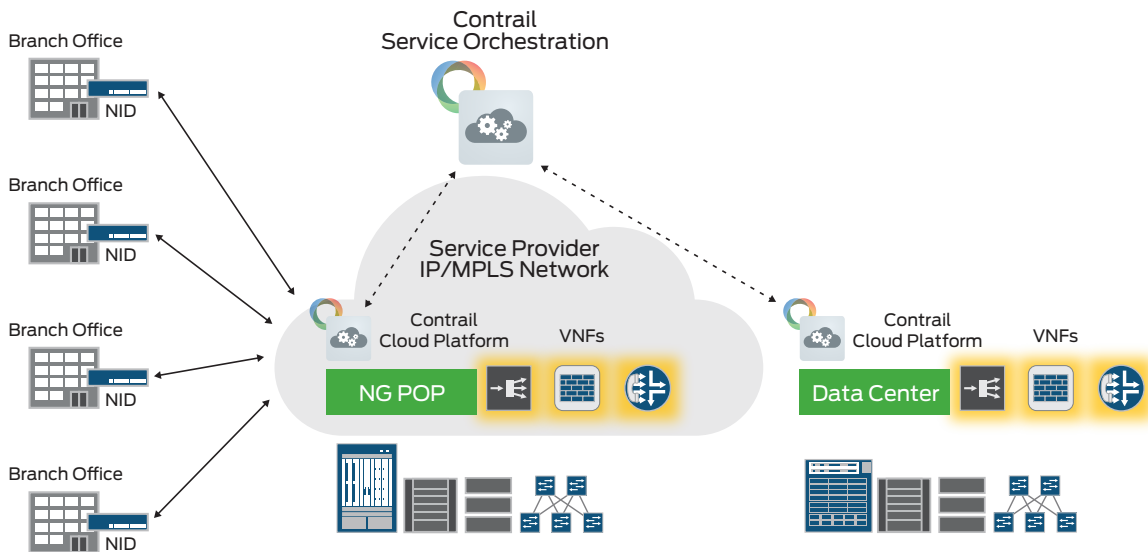


Figure 1: Centralized Cloud CPE deployment model

Juniper's End-to-End NFV Solution

The building block for Juniper Networks Cloud CPE solution is 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. 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 NFX Series secure onsite software-driven CPE supporting Juniper and third-party VNFs; Juniper Networks MX Series 3D Universal Edge Routers 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 Juniper's MetaFabric™ architecture; 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 VNF solution includes the vSRX virtual firewall, the industry's most efficient virtual security appliance, and carrier-grade IP VPN routing.

Juniper's 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 such as storage and compute, not only helping them avoid expensive vendor lock-in, but also allowing them to incorporate third-party VNFs to accelerate innovation.

Juniper Networks NFV solution is backed by Juniper's Services and Support organization which, with deployments in the world's top 100 service providers, offers 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 an overlay between sites, enabling enterprise customers to virtualize internal services and increase service velocity to satisfy ever-growing business requirements. 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.

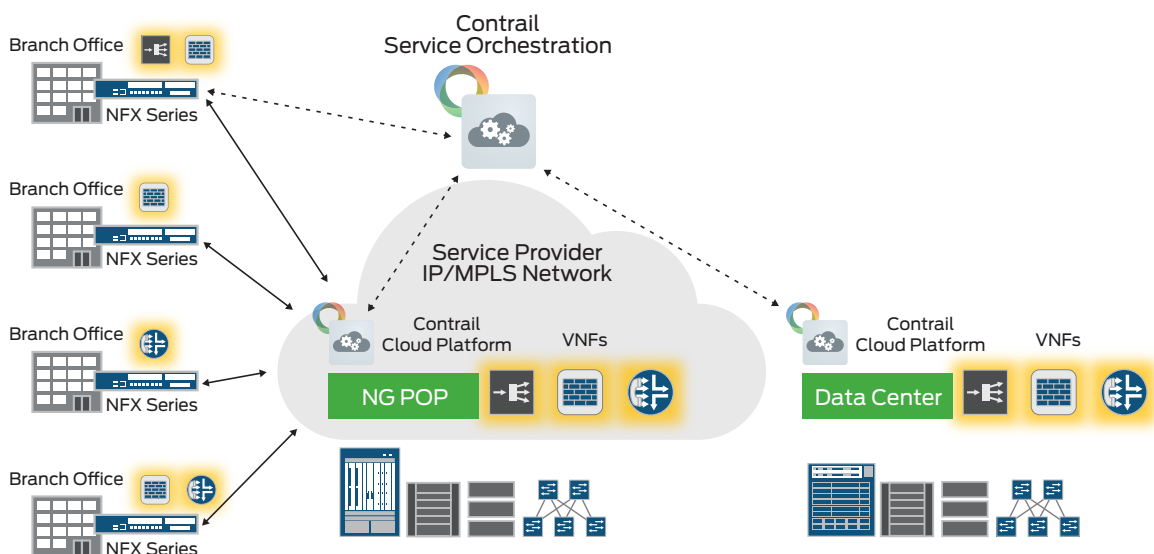


Figure 2: Distributed Cloud CPE deployment model

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 Standardization Institute (ETSI) NFV architecture standard and is extensible to third-party VNFs, enabling a robust and open ecosystem that encourages innovation.

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.

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 differentiated services and a potentially rapid path to revenue for innovative new services and target segments.

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.

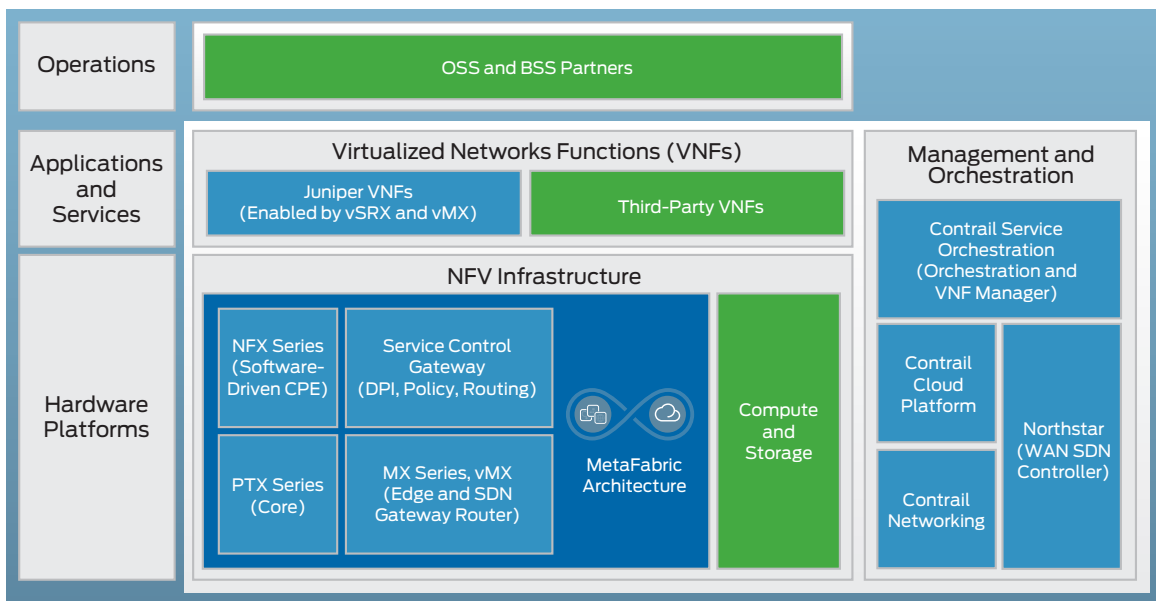


Figure 3: Juniper NFV solution architecture

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.

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 an integrated vSRX virtual routing and security solution and an open ecosystem for 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 is in the business of network innovation. From devices to data centers, from consumers to cloud providers, Juniper Networks delivers the software, silicon and systems that transform the experience and economics of networking. The company serves customers and partners worldwide. Additional information can be found at www.juniper.net.

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