

Juniper Networks–RAD Joint Cloud CPE Solution

NFV Powered by Juniper Cloud CPE and RAD NiD/vCPE Delivers End-to-End managed Services for Service Providers

Challenge

The ability to spin up and manage innovative CPE services is inhibited by closed proprietary platforms that restrict scalability and require up-front investments. Manual deployment and limited visibility lead to network bottlenecks that negatively affect the user experience and add significantly to bottom-line costs.

Solution

Service providers can quickly introduce new services with the Juniper-RAD scalable Cloud CPE solution, which automates service creation, provides an open framework for third-party VNFs, and offers unparalleled visibility and control via standards-based performance monitoring, traffic management, and troubleshooting tools.

Benefits

- Automation eliminates manual intervention, replacing time-consuming truck rolls.
- End-to-end NFV solution supports multi-deployment models that address dynamic market requirements.
- Open standards, protocols, APIs, and third-party VNF integration accelerate innovation.
- Best-of-breed performance assurance tools enable faster fault detection and isolation to enhance the user experience and simplify operations and repairs.



Your Network's Edge®

Service providers today must deal with rigid service delivery infrastructures and operating costs that seldom align with revenue, hindering their ability to quickly design and deploy new services. Increasingly complex and expensive-to-maintain infrastructure merely compounds these challenges, driving costs ever higher. In order to compete successfully, service providers have to provide secure, high-performance, service-level agreement (SLA)-compliant services that enable the use of hybrid and public cloud infrastructure.

Juniper's and RAD's joint Cloud CPE solution automates service delivery with scalability and carrier-grade reliability. Based on Juniper's end-to-end Network Functions Virtualization (NFV) solution and RAD's state-of-the-art performance assurance network interface devices (NiDs), the joint Juniper-RAD Cloud CPE solution enables agile service creation and flexible service delivery while incorporating an open framework for third-party virtualized network functions (VNFs).

The Challenge

Customer premises equipment (CPE) is essential to most of the managed service delivery models that service providers use to serve their business customers. However, CPE deployment is a time-consuming and manual process that requires devices to be shipped to each location. Each CPE device must be configured and provisioned—a complex and manual process that requires highly specialized skills. 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.

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 with RAD

Juniper Networks® Cloud CPE solution is the industry's most dynamic service creation platform. It automates service creation and simplifies the service life cycle, enabling service providers to quickly conceive and create highly customizable services in minutes. Service performance capacities can be dynamically updated, improving the scalability and flexibility of managed services.

RAD's field-programmable gate array (FPGA)-based MiNiD, meanwhile, is a field-programmable miniature L2/L3 network interface device (NiD), available as a small form-factor pluggable transceiver (SFP) or standalone device for indoor or outdoor installation. It is a revolutionary platform for service providers looking for a simple way to deploy solutions that instantly upgrade their networks to deliver reliable bandwidth with end-to-end SLA



assurance. As part of RAD's Distributed Network Functions Virtualization (D-NFV) offering, MiNID provides comprehensive tools for service activation, performance monitoring, advanced troubleshooting, and ongoing SLA reports for reducing fault detection and isolation.

RAD service assurance complements the Juniper Cloud CPE solution by allowing service providers to deliver centralized, distributed, and hybrid deployments.

Working together, Juniper Networks Contrail Cloud Platform and RAD's management platform, RADview—with standardized APIs and extensive performance monitoring capabilities—ensure quality assured services and uninterrupted customer experience.

Juniper Networks-RAD Centralized Cloud CPE Deployment Model

Juniper's centralized Cloud CPE deployment model abstracts network services from the customer premises 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. Juniper Networks Contrail Service Orchestration performs complex virtual network service chaining and life cycle management, automatically instantiating 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.

In this deployment option, demarcation functions are supported at the customer premises by the cost-effective RAD MiNID. The MiNID complements Juniper services functions such as carrier-grade routing and firewalling, deployed as VNFs at service providers' points of presence (POPs) to provide end-to-end visibility and diagnostic capabilities that optimize network performance.

RAD MiNID Features

The RAD MiNID solution is an FPGA-based programmable device that offers the following features:

- **Service Activation Testing:** Capture birth certificates via CLI or Web GUI
- **SLA Assurance and Performance Assurance:** Y.1731, TWAMP, bandwidth analysis, packet capture
- **Troubleshooting:** Remote packet capture, dying gasp traps, and thresholds
- **Service Demarcation:** MEF CE 2.0 E-Line/E-LAN/E-Access certified with MEF 10.3 policing
- **Provisioning and Full Management:** Auto-responder, loaned IP, zero-touch Dynamic Host Configuration Protocol (DHCP), CLI, HTTP, and more

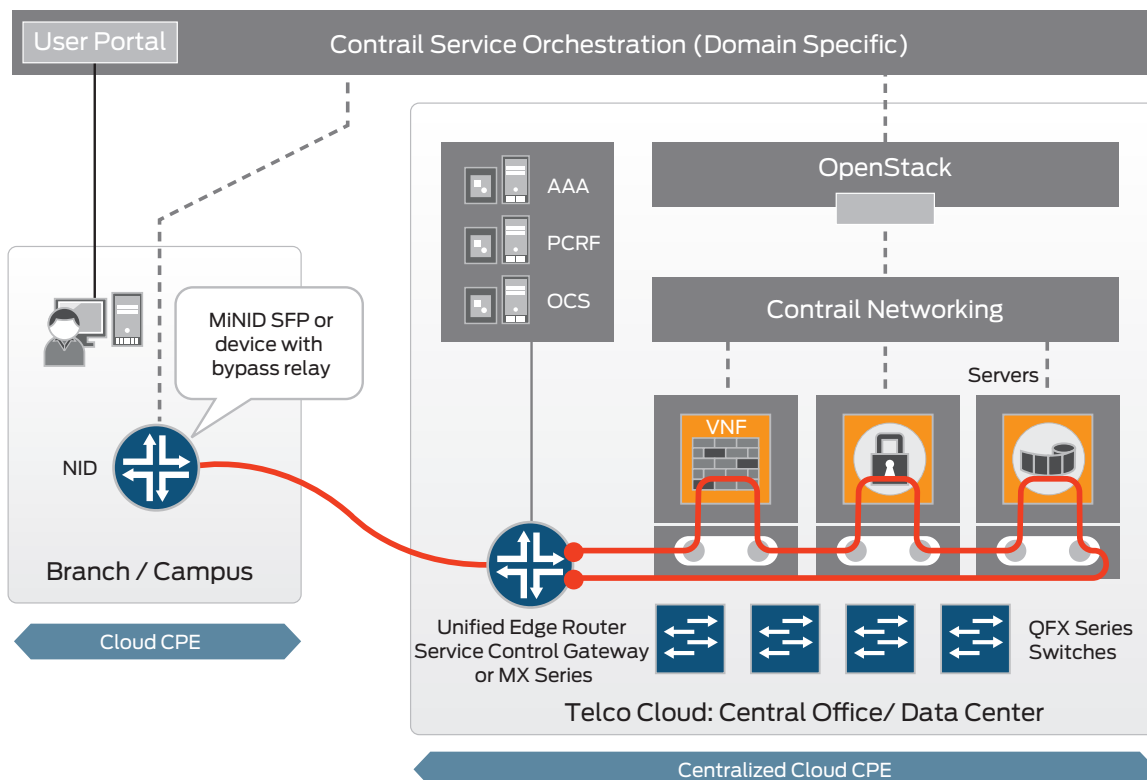


Figure 1: Centralized Cloud CPE end-to-end architecture

Solution Features and Benefits

Revenue Growth

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

Greater Capital Efficiency

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

Lower Operational Expenditures

The centralized service management and orchestration system of Juniper's Cloud CPE combined with RAD's powerful MiNID service demarcation unit reduces OpEx by implementing automation along all facets of the service life cycle. This simplifies operations and eliminates extensive manual processes such as provisioning, configuration, equipment installation, service delivery, and back-end database administration.

Network Optimization

RAD's MiNID enriches the network with software-defined functionalities for enhanced demarcation, remote monitoring, fault isolation, and more. The visibility and control it affords for network performance ensures that trouble spots are quickly and effectively addressed, and network resources are optimally allocated to changing network demands. MiNID programmability is based on a powerful FPGA that enables field updates to the product software and application.

Service Agility

Customer business requirements often change to reflect market dynamics. The Juniper 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 model that transforms providers into trusted partners. 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 management that accelerate remote office and branch office deployments. Integrated with RAD's MiNID, the solution provides end-to-end visibility of network performance, proactive detection, and maintenance of application performance on the premises or in the cloud.

Summary—Joint Juniper-RAD Cloud CPE Solution Helps Service Providers Drive Revenue Growth

Juniper Networks Cloud CPE solution 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.

RAD's MiNID is the ideal complement for centralized deployment models by providing low-cost customer premises demarcation as a standalone device, as well as for distributed deployment models where its SFP optics complement the Juniper Networks NFX250 Network Services Platform. In both cases, RAD MiNID provides accurate performance monitoring with hardware timestamps, as well as diagnostics capabilities such as dying gasp, remote packet capture, granular bandwidth utilization, and microburst monitoring.

Next Steps

For more information about Juniper Networks Cloud CPE and RAD solutions, please contact your Juniper representative. To learn more about Juniper's Cloud CPE solution, please go to www.juniper.net/us/en/solutions/nfv/cloudcpe/.

About RAD

RAD is a global telecom access solutions and products vendor. RAD offers Service Assured Access solutions for mobile, business, and wholesale service providers designed to improve the way they compete with service agility to minimize time to revenue, complete visibility of network performance for greater operational efficiency, and better QoE to reduce churn. For more information, visit www.rad.com.

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](#).

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