The Juniper Networks Platform for Agile Service Delivery

Delivering cloud-based managed services

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Executive Summary

It is no secret that, worldwide, service providers' wireline IP data revenues have been relatively flat for the last few years, and most forecasts predict that trend to continue. Despite flat revenues, underlying traffic demand continues to grow at nearly exponential rates, squeezing service providers with rising costs. Service providers and enterprises alike are now looking to the combination of SDN and Network Functions Virtualization (NFV) to disconnect rising data demand from costs while increasing service agility and flexibility. The adoption of SDN/NFV also creates new revenue opportunities for service providers through rapid delivery of new, virtualized services.

This white paper is for product managers and marketing professionals at service providers who wish to use SDN/NFV trends and technologies to deliver new business services faster; to profitably reach new customer segments and geographies that used to be unreachable; and to keep pace with more nimble, younger competitors. The paper examines the market opportunity for cloud-based managed services and reveals how Juniper helps service providers transform product development cycles and service delivery and, ultimately, increase revenues.

Introduction

The Juniper Networks vision for service creation is clear and its goals for service provider customers are aggressive. According to the Harvard Business Review, Amazon releases a new software change every 11 seconds, or 8,000 per day[1]. Comparing a Web services company to a traditional telco has its limitations, but Juniper is helping service providers around the world achieve their own kind of service agility.

Juniper's vision is to use an NFV service delivery platform to help telco product development evolve from a capital-intensive buildout process based on long-term business planning and forecasting to a continuous activity based on rapid experimentation and real-time adaptation to the dynamics of the marketplace. Service development cycles that once took 12 to 18 months can now be completed in just weeks, while service provisioning tasks that previously took weeks are now accomplished in minutes. Hyper-fast new feature release schedules once imaginable only from Web services companies are now within reach for traditional telcos. And self-service portals for network services are dramatically reducing costs, increasing customer satisfaction, and reducing churn. A key element to realizing these benefits is the end-to-end automation of service deployment, operation, and testing. Automation speeds time to revenue, reduces errors, and eliminates at least some OpEx from the network.

The overall idea is to match service delivery investments to the speed of the market and the on-demand expectations of today's consumer and enterprise customers. Furthermore, service providers can maintain and solidify their relevance and trusted advisor positions with their customers.

Managed Services with Cloud CPE

Incorporating NFV solutions such as virtual customer premises equipment (vCPE) into their business product portfolios enables service providers to offer new services, including virtual router and virtual firewall, which can increase overall revenues, reduce churn, reduce service and capital costs, and increase service agility. Virtual CPE lets service providers and businesses replace multiple, complex, and expensive single-purpose network appliances with software applications, while benefiting from the same service agility and hardware commoditization trends in service provider and enterprise data centers.

This new software-based environment reduces product planning and development cycles by enabling new products and features to be developed once and rolled out across a service provider's customer base. By implementing network functions in software, service providers can benefit from continuous product update cycles, similar to the way Web companies release changes. This approach means that the service provider's network and customers run the latest software, allowing the service provider to quickly release and iterate new, revenue-generating services while harnessing the economics of the cloud to keep fixed overhead-per-customer costs low. The virtual infrastructure also maintains backward compatibility, enabling service providers to easily maintain versions of products for customers, further reducing cost, complexity, and time to market. Ultimately, virtual network functions (VNFs) will be routinely updated in a relatively autonomous fashion, just as many mobile consumer applications are today.

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[1] "How the Software Industry Redefines Product Management": https://hbr.org/2014/06/how-the-software-industry-redefines-product-management
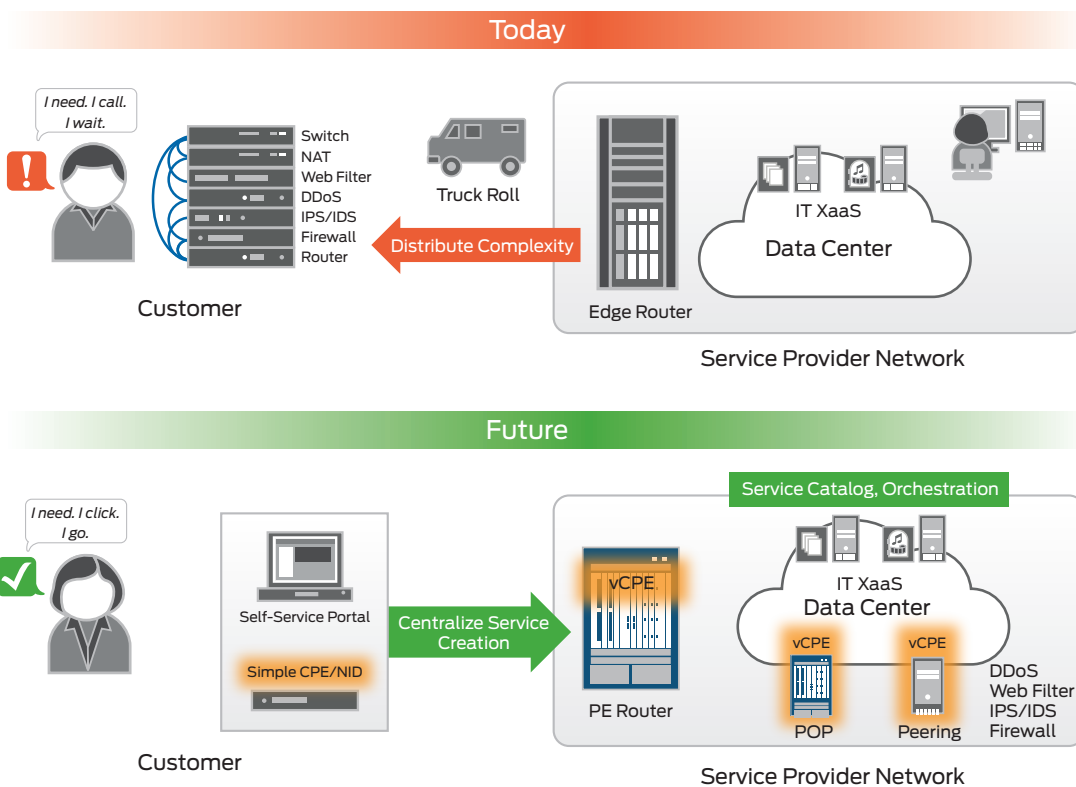
Figure 1: Traditional CPE-based managed services vs. cloud-based services

Based on customer engagements worldwide, Juniper defines "cloud CPE" to include centralized and distributed deployment models. In a centralized deployment, the network function resides in the service provider network or elsewhere in the cloud, while in a distributed deployment, the function remains at the customer's premises, but in virtualized form. Juniper refers to a centralized deployment as "vCPE" and a distributed deployment as "uCPE."[2]

Note that Juniper's cloud CPE definition puts no restrictions on which network functions are moved off premises. It may include Layer 3 connectivity features (hence replacing branch routing functions) or additional services (such as security, optimization, reporting), or it could include both. In other words, a "virtual branch router" and a "virtual antivirus" are both considered cloud CPE.

Evolution of Virtual Services

The market is moving and the industry is in full-scale disruption. Moving to this new service paradigm can seem overwhelming, but it's important to chart a path with a phased approach based on business objectives. Juniper expects most service providers' virtual services portfolios to evolve, beginning with the "on-ramp" to cloud services. This might start with a virtual managed router service, or a managed firewall, or some other type of security service. Next, since Juniper offers an open platform for ecosystem innovation, users can smoothly extend these initial routing and security services to other virtual, Layer 4 through 7 services such as content delivery network (CDN), unified communications (UC), and so on.
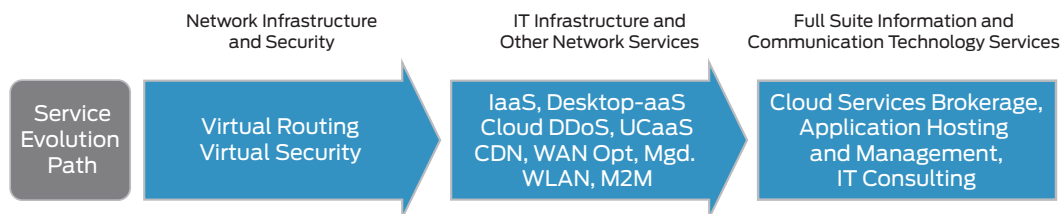

Figure 2: Service evolution path

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[2] Some in the industry may use "vCPE" as an umbrella term that includes all deployment models, including "uCPE."

Finally, service providers can build out cloud brokerage models where they aggregate all kinds of cloud services (IaaS, PaaS, SaaS) and provide them to their customers through a secure, reliable VPN rather than the public Internet many businesses are using today. Cloud services can also be added to out-of-market locations via the service provider offering "on VPN" over the top (OTT) cloud capabilities to remote customer endpoints. Becoming a broker of IT infrastructure and other information and communications technology (ICT) services in effect converts many OTT Web services players from peripheral competitors to possible sources of revenue for the service provider. From their position in the value chain, service providers are ideally positioned to deliver enhancements, including managing access to these services, providing greater security, or even creating completely new services.

The Business Case

The business case for cloud-based managed services is positive over a range of different service provider deployment situations and market scenarios. Juniper works closely with service providers worldwide to develop customized business cases as part of its "Service Creation Program" described later in this paper.

While some of the elements of the cloud CPE business case are defined here, please see the "Building Your Business Case for Network Virtualization" white paper for additional details. While distributed deployments (uCPE) generally do not offer as many economic advantages as centralized deployments (vCPE), distributed deployments may be attractive due to regulatory/compliance or performance issues. Furthermore, distributed deployments often represent easier migration paths for both service providers and enterprises.

Revenue benefits include:

- **Faster time to market.** Reducing the provisioning time for a new service from time of order from several weeks to just minutes immediately results in weeks of extra revenue. Service providers will also realize large revenue benefits by shrinking new service development cycles from months or even years to weeks.
- **Lower customer churn.** Offering better overall service and easier try-before-you-buy options with cloud CPE will result in greater customer retention.
- **Service growth.** Reducing friction in the buying process increases the take rate of new services.

Additional revenue potential comes from the expanded addressable market for services. For service providers, the service evolution path typically begins with introducing new services to upsell existing customers and segments. However, the improved economics of vCPE service delivery allows service providers to target and serve segments that may have been previously unprofitable—for instance, small and midsized businesses (SMBs), remote locations of large enterprises, and off-net geographies. Virtualization improves margins, and the cloud enables global reach.

vCPE and uCPE also serve an important role in the evolution of today's premise-based managed services. As customers order new capabilities and features, it is possible to replace component sprawl with a high-performance, secure, multi-function device or cloud connection that allows customers to layer new services via virtual network functions. This greatly reduces capital-intensive inventory requirements and deployment operating costs, while taking advantage of automation benefits for ordering and delivery.
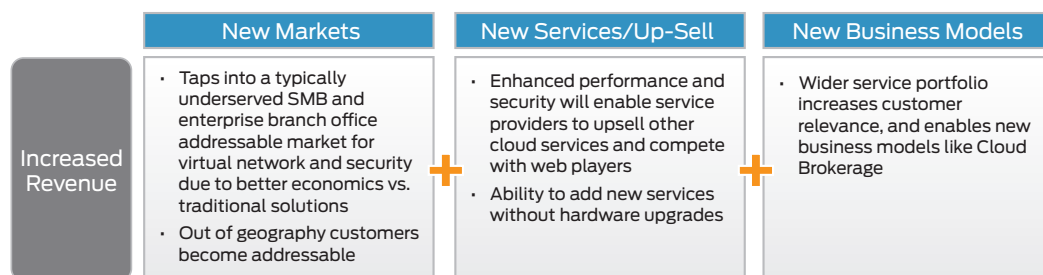
Increased Revenue	New Markets	New Services/Up-Sell	New Business Models
	• Taps into a typically underserved SMB and enterprise branch office addressable market for virtual network and security due to better economics vs. traditional solutions • Out of geography customers become addressable	• Enhanced performance and security will enable service providers to upsell other cloud services and compete with web players • Ability to add new services without hardware upgrades	• Wider service portfolio increases customer relevance, and enables new business models like Cloud Brokerage

Figure 3: New revenue opportunities from NFV

The expanded service catalog enabled by Juniper's NFV platform facilitates new service and customer growth, while automation allows service providers to manage this catalog efficiently. Finally, new business models are possible for service providers to deliver a compelling cloud experience to their business customers. Cloud brokerage models allow service providers to compete in the cloud services space using their core strengths in network security and reliability without directly offering cloud services themselves. Connecting, aggregating, and managing the enterprise cloud sprawl, which may consist of on-premise, private cloud, and public cloud components, is a daunting challenge involving a series of complex tasks. However, if many of the manual, offline processes can be fully automated, these cloud connect business models can become economically viable for a service provider.

While the revenue benefits of cloud-based managed services are potentially large, so are the cost benefits, including:

- **CPE hardware**. Eliminating equipment at the customer site reduces installation and testing costs.
- **Asset utilization**. Virtualization is fundamentally about creating elastic pools of resources that can be moved around dynamically.
- **Customer support and maintenance**. Functions now performed remotely streamline the workflow. Related automation benefits are detailed in two Juniper white papers: Transforming Service Life Cycle through Automation with SDN and NFV and Customer Benefits Through Automation with SDN and NFV.
- **General management**. Less inventory and fewer SKUs to manage, fewer spare parts, and less training and certification results in lower costs.

Migration and the Hybrid Environment

The market migration from physical to virtual services is already upon us as service providers around the world, both large and small, are ramping up their offerings. While none of the major, traditional service providers have completely adopted virtualization throughout their entire network, the fact is that the biggest names in telecom are moving to NFV and vCPE. AT&T, for instance, has publicly stated a goal of having at least 75% of its network virtualized by 2020.

Despite the momentum virtualized managed services are enjoying, it is not expected that physical boxes will completely go away at customer locations or within service provider networks, at least not any time soon. It takes a lot of trust and considerable market momentum to convince businesses to change what already works for them, and service providers will take a long time to migrate their internal network infrastructure as well. Furthermore, many customers will continue to prefer traditional managed services based on dedicated boxes due to compliance, performance, and other requirements. In these situations, Juniper's distributed uCPE solution is particularly applicable.

NFV and SDN can transform the carrier business model, but only in concert with purpose-built infrastructure. Ideally, carriers employ flexible virtualized platforms to experiment with new services, new partners, new geographies, or changing customer tastes. Carriers can then shift traffic to dedicated infrastructure better suited to handle the capacity demands of a "successful" service. Virtualized infrastructure can be scaled in and out and moved around within the network to handle peak loads. Carriers can dynamically shift back and forth between low-risk, variable-cost business models and the legacy model based on high margins and operating leverage. New services are quickly spun up at low cost and, just as importantly, easily and cheaply retired as necessary. Proven services continue to be the engine of cash flow, but the ability to rapidly deploy new services ensures survival.

Cloud-based managed services can create quick wins for product managers while their service provider's network infrastructure is migrating to SDN/NFV. By adopting the continuum of vCPE and uCPE (xCPE) delivery options, a service provider can position itself to win business as customers' existing routers, firewalls, WAN optimizers, VoIP PBXs, and other network appliances go to RFP in their replacement cycles. Additionally, service providers are also well positioned to rapidly innovate and iterate new products and services for their customers.

The Juniper Solution: Cloud CPE

Juniper helps service providers reach and retain a position of innovation leadership in the industry while ensuring excellent service development and delivery execution. While service providers have the direct customer connection and the brand through which to deliver the improved, NFV-enabled experience, partnering with Juniper enables them to bring this virtualized network vision to life using Juniper's NFV solution architecture.

Juniper automates service creation and delivery with the first commercially scalable cloud CPE solution. At a high level, Juniper Networks® Cloud CPE solution involves three main components (see Figure 4; green blocks indicate components delivered by Juniper partners or other third parties):

- **Management and orchestration (MANO):** Juniper Networks Contrail Networking and Contrail Cloud Platform
- **VNFs:** Juniper Networks vSRX virtual firewall and vMX virtual router, which deliver a wide range of routing and security VNFs
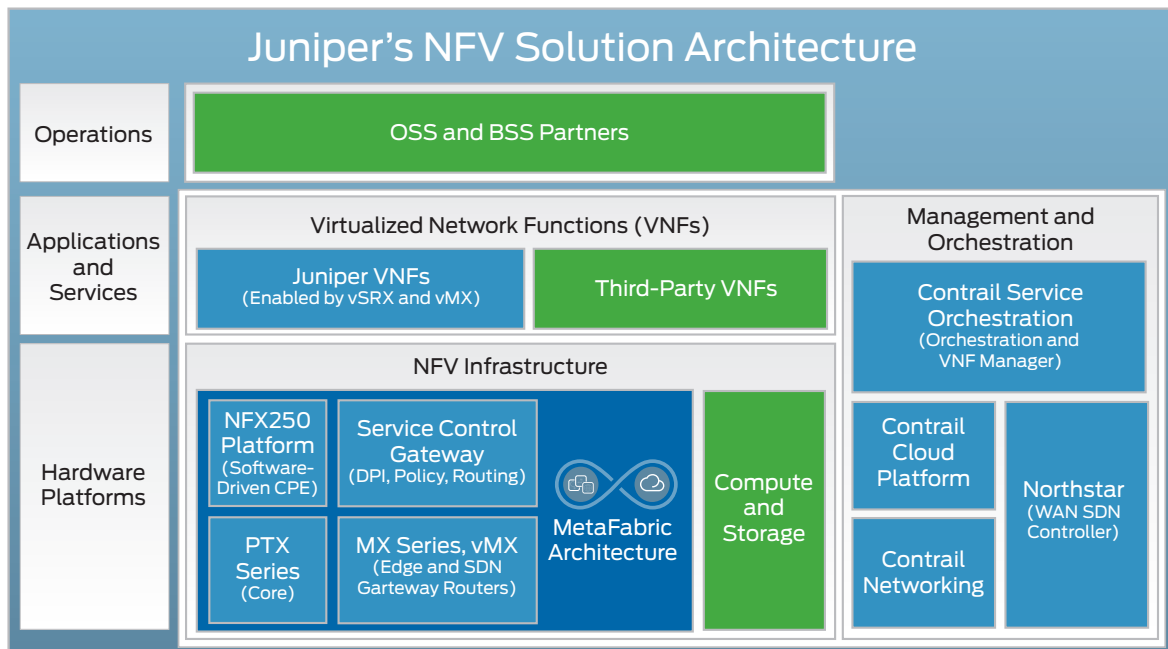- **NFV infrastructure (NFVI):** Compute, storage, and networking

Figure 4: Juniper Networks Cloud CPE solution

Juniper Cloud CPE Deployment Models

Juniper's Cloud CPE solution consists of two flexible deployment models: distributed (uCPE) and centralized (vCPE).

Distributed CPE

The uCPE model consists of an off-the-shelf x86 appliance that is installed at the customer site. The appliance supports VNFs on demand from an existing service catalog. Enterprise IT staff has substantial visibility into and control over the service, including the ability to set policies, role-based access, security, and quality of service (QoS).

Distributed CPE optimizes service deployment. A single device can support multiple VNFs; this flexibility eliminates traditional service silos and enables enterprise customers to evolve their network services without new appliances while addressing business requirements.
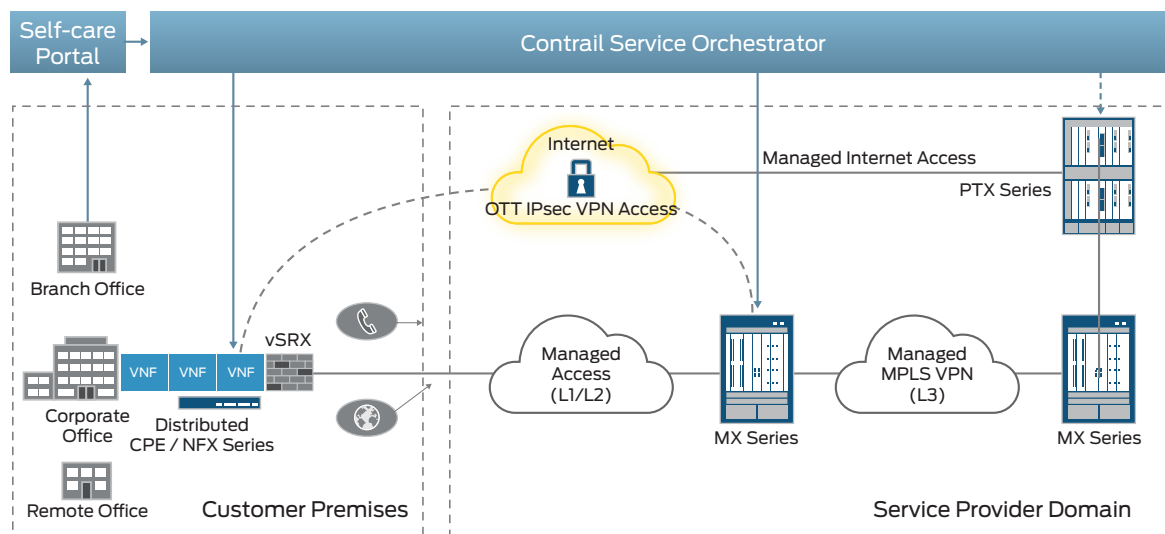

Figure 5: Distributed CPE deployment model

For additional information, please refer to the NFV solution page at www.juniper.net/us/en/solutions/nfv/.

Centralized CPE

Centralized CPE abstracts network services from the on-premise equipment and automates the entire service delivery chain in the service provider's network. New services can be ordered through a self-care portal or triggered on demand. vCPE dramatically simplifies the deployment of managed services, allowing service providers to rapidly offer differentiated, scalable, and tiered services.
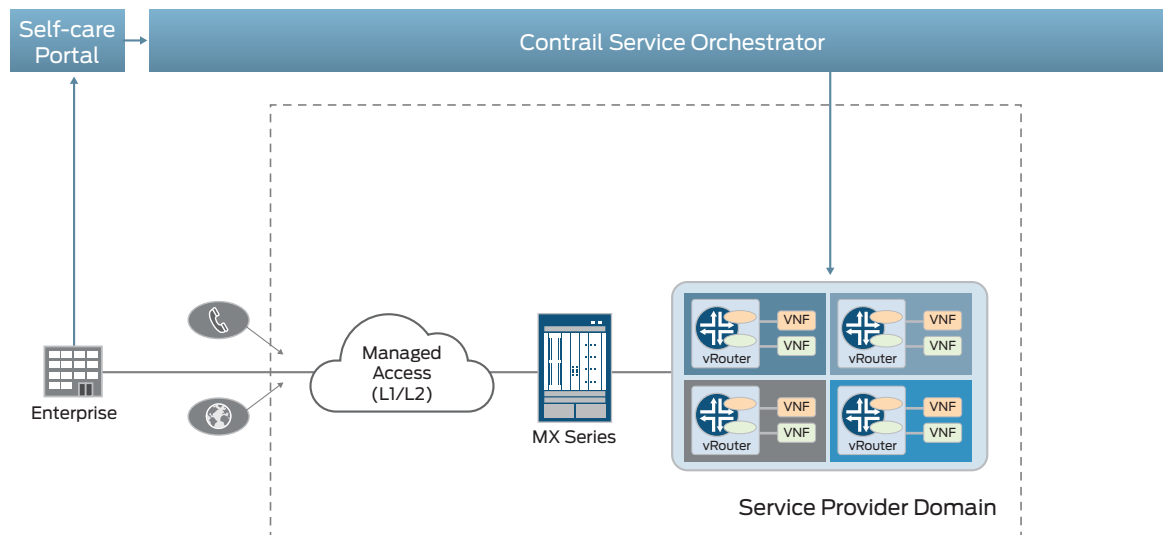

Figure 6: Centralized CPE deployment model

The Juniper Difference

Juniper focuses on creating solutions for the benefit of service providers and has the deep network and routing track record to prove it. Juniper is well positioned to deliver a commercially scalable portfolio of products and services, both virtual and physical, and knows how to deliver it within a complicated environment. Understanding that not every service provider is ready to jump head-first into a virtual world, Juniper can also help execute hybrid solutions.

While Juniper understands the current world of physical/dedicated boxes, BGP, MPLS, and so on, it also appreciates all that can be realized within the virtual world and is committed to building a bridge between the two. Juniper offers carrier-grade virtual platforms and proven, dedicated architectures to handle the elasticity needed for uncertain, moderate throughput applications, as well as the scale and performance needed for high-volume applications. Juniper also offers a comprehensive automation solution, including automated network operations with automation tools such as Juniper Networks Junos® operating system APIs and Junos Extension Toolkit; and automated service creation with Contrail Networking, Contrail Cloud, and Contrail Service Orchestrator.

Juniper eases the migration by running a common operating system—Junos OS—across all of its infrastructure, ensuring that the feature sets of its virtual routers and firewalls are consistent with the corresponding hardware-based products. Additionally, with the Cloud CPE solution, users can virtualize functions both at the customer premise and inside the carrier cloud. The continuum of vCPE and uCPE ("xCPE") will drive service provider growth and competitive success; users can leverage a common design philosophy and a common set of tools, processes, and policies across the entire Juniper brand, enabling them to "learn once, integrate once, qualify once."

From its overall corporate philosophy to its product strategy, Juniper believes in an open and interoperable ecosystem—an approach that has always been a key part of its challenger mentality. The Contrail SDN controller shares the same source code as the open-source Open Contrail product, with significant contributions from the open source community, and Juniper's Contrail Cloud offering is built around OpenStack. Furthermore, Juniper prides itself on belonging to and actively participating in all of the relevant open standards organizations. For example, while the NETCONF and YANG protocols were standardized by the IETF, Juniper was largely responsible for their development.

Juniper's consultative approach to the entire migration effort ensures that the transition is painless, efficient, and as productive as possible, as quickly as possible. Juniper's Professional Services teams can assess customers' current situations, identify key integration issues, provide guidance and solution recommendations, and support them through the entire deployment and operation, making the most of user investments in both time and money.

Since virtualizing network functions is new and relatively unproven, users need a vendor with experience guiding service providers through other industry transformations such as the move to IP. Juniper believes that while NFV will be a disruptive force in the industry, it should not disrupt network evolution. Juniper can help users identify the best path forward, justify the change to internal stakeholders, develop a migration plan that works across the board, and then launch the solution to enable the future of networking.

The Juniper Service Creation Program

The service provider industry is in the midst of an exciting and promising transformation. As with any market disruption, there will be winners and losers, but Juniper is taking a leadership position to push the adoption of NFV-enabled networks and allow its customers to make business decisions from a position of strength. Juniper has developed what it calls its "Service Creation Program" to help customers navigate these difficult and complex service creation issues.

Establish a Vision
- Build a common vision for service creation

Ideation of New Services
- Identify the best new service opportunities
- Most attractive customer segments to target

Business Case
- Cash flow analysis - Go/NoGo
- Understand key economic levers
- Scenario analysis
- Mitigate risk

Go-to-Market
- Service descriptions
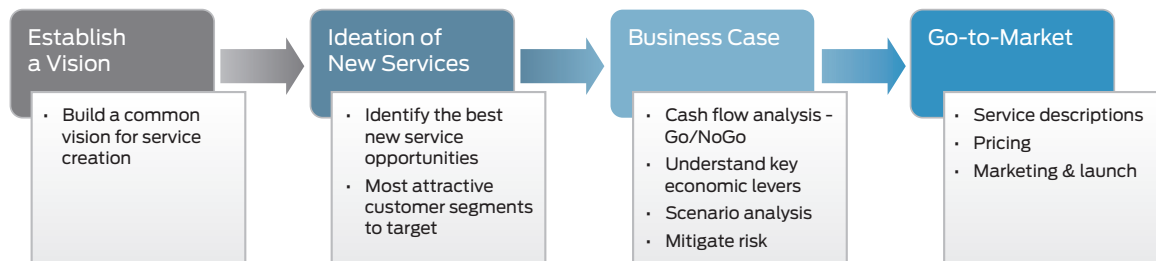- Pricing
- Marketing & launch

Figure 7: Juniper Networks service creation program

The Service Creation Program begins by evaluating and sizing the market opportunity and determining the best new service opportunities, as well as identifying the most attractive market segments for the service provider customer. Next, Juniper develops the business case for the new service; this generally includes a comprehensive cash flow model to help the customer understand the key economic levers, to think through different scenarios, to minimize deployment risks, and to consider the economics of virtualization at different points in the network at different times during the service life cycle.

Next, Juniper develops the service with the customer, including detailed service definitions, pricing, bundling, support, and SLA options. Next comes launching the new service, which involves sales enablement and training, channel partners (when appropriate), marcom, analyst relations, press relations, and so on. The final stage is demand generation, including the creation of customer-facing materials and the development of marketing campaigns.

Juniper involvement is typically heavier in the earlier stages; as the launch approaches, the service provider's internal marketing teams take over most of the work. Although intended as a sequential process, steps can and do overlap at times or may even be completed out of sequence. Regardless of the order, Juniper drives the process forward, working with the customer's internal schedules and navigating organizational hurdles as the situation requires.

While the Service Creation Program is centered on business strategy and marketing, Juniper also works with service providers on parallel technology and integration tracks to ensure an architecture evolution and migration strategy that best prepares your infrastructure for the future. Juniper allows service providers to become very comfortable and convinced of their strategy, to "try before you buy," making the transition obviously advantageous as it proceeds.

Conclusion—Get Ready to Launch Platform for Agile Service Delivery

Virtualization and software-defined networks are at the forefront of customers' minds. Vendors such as Juniper are called on to ensure that these new strategies deliver on their promises. NFV-enabled networks are ushering in a new era of technical capabilities which benefit both network operators and their customers of all sizes. Juniper is perfectly positioned to make the transition to the virtual, NFV-enabled network as seamless and profitable as possible. Look forward to the opportunities, and let Juniper help you realize them.

Contact your account manager today to learn more about the Service Creation Program, to schedule an NFV demo, or to set up a proof of concept (PoC) trial.

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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