Service Automation Made Easy

Networks that know how to customize the network experience for every subscriber

Challenge

Service providers want to quickly develop and deliver personalized services their subscribers want. Today's inflexible infrastructures, however, are so rigid and complex, their ability to make moves, additions, or changes is measured in weeks and months—not exactly the immediate response users expect.

Solution

NFV promises a dynamic, agile environment for lowering costs and creating subscriber value. Juniper's NFV solution offers an intelligent services platform that can adapt, grow, and change in minutes or hours, driving new service creation, greater revenue streams, and lower operational costs.

Benefits

By combining deep packet inspection (DPI) knowledge, understanding (policy), and execution (traffic steering) with dynamic NFV cloud orchestration, Juniper helps service providers create and deliver dynamic, policy-driven service offerings by automating service paths through physical and virtualized network elements.

The Challenge

Service providers today are embracing NFV solutions in the Telco cloud—the virtualization and distribution of functionality throughout the network to achieve faster delivery models with lower complexity and to establish a platform for new service innovation.

With NFV technologies like software-defined networking (SDN) and Virtualized Network Functions (VNF), service providers have the unprecedented ability to adapt network resources in near real time, making it possible to deliver customized networking experiences based on factors such as device, location, appliances, and subscriber type.

Today, many service providers employ a "service delivery complex"—a static collection of appliances that provide a specific set of capabilities to optimize the network and enable services. While this collection of appliances typically resides north of the subscriber termination function [broadband network gateway (BNG), evolved packet core (EPC), cable model termination system (CMTS), or some other access], the need for the service delivery complex is universal and independent of access network type.

Since all traffic—regardless of type, subscriber, location, or device—typically passes through this single, monolithic "service chain" making it impossible to route appropriately, service providers must resort to overprovisioning to guarantee sufficient capacity.

For instance, if a service is only used by 10% of the traffic but that traffic is impossible to isolate from the rest, the provider must secure enough capacity for 100% of the traffic just to ensure that the 10% is processed—not an efficient or cost-effective use of resources.
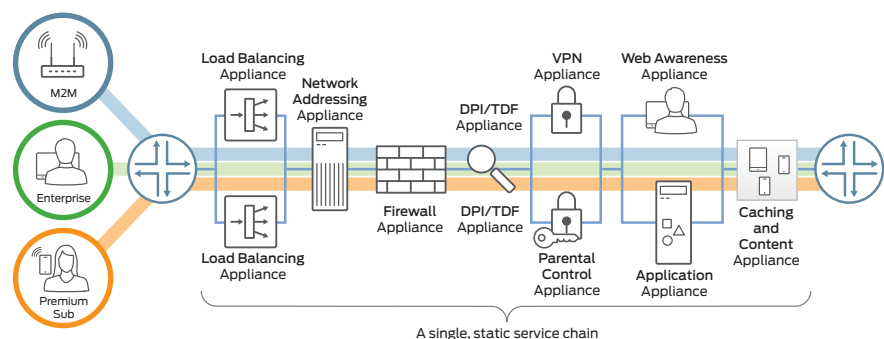

Figure 1. The single, static service chain

Architecturally, each element in the service chain needs to determine if processing is required on the traffic type. For example, all traffic is routed through a video optimization system, which determines if the traffic is, in fact, video. Ideally, only video traffic would be sent, thus optimizing the system and enabling variable, deterministic paths through the services complex.

This arrangement also makes it operationally difficult to move, add, or change applications. Implementing personalized functionality is complex and prone to errors. As a result, this rigid structure is preventing service providers from experimenting with or innovating new service elements.

The Juniper Networks Service Delivery Complex

Imagine detecting all Android traffic and steering it to an advanced traffic scrubbing service for added protection; or routing all Facebook traffic to an optimization engine to improve responsiveness while reducing bandwidth usage; or developing an advanced secure service plan specifically for enterprise customers based on dynamic VPN connectivity with customized security features. An intelligent, dynamic service delivery complex makes this all possible.

Juniper's vision is a fully automated service edge that facilitates dynamic, policy-based traffic routing, enabling service providers to personalize the service delivery experience. By combining traffic detection, policy, and traffic steering, Juniper can ensure precise, deterministic service control and create a solution that exceeds customer expectations.

Service Selection Made Easy

As traffic enters the service edge, a DPI function identifies and classifies the traffic based on four central properties: subscriber type, device type, application, and location. With knowledge of the traffic flow in place, the policy engine selects the appropriate service path into or through the service delivery complex. Once these policies are published, traffic is quickly routed to a unique service tunnel based on the defined characteristics.

Juniper is simplifying service selection by combining network functions such as DPI, policy interface, and traffic steering, enabling service providers to create unique service chains based on any combination of these properties.

For example, due to potential security vulnerabilities, a service provider may wish to target all traffic from early versions of

Android and route it through a secondary level of security on Juniper's vSRX virtual firewall to make sure it is clean. Or, at the request of a large customer, a service provider may create a set of specific capabilities designed to add value to the service offering, or drop a new Facebook optimization engine into the service chain as a virtual machine and establish a policy to route traffic through it.

Freedom of Choice

As service providers look to grow and invest in the service delivery complex, they are discovering that one size—and one vendor—does not fit all. Fundamental to Juniper's approach to NFV is the freedom to choose best-in-class network functions and components that deliver maximum value to subscribers.

Juniper's solution seamlessly supports service paths between existing physical network appliances and new virtualized network elements, enabling companies to invest in VNF applications and quickly incorporate them with existing elements. This approach embraces third-party virtualized (and physical) applications, and Juniper's robust partnership program has validated many different VNFs in service chaining configurations.

Driving Operational Savings

Using SDN and NFV orchestration systems to automate the instantiation of network and application functions, as well as the scale up/scale out of capacity to self-adjust based on demands, produces an agile and intelligent service delivery complex.

Network and application functions are created, scaled, and adapted as virtualized objects. Service providers can grow capacity quickly on generic hardware, ensuring more efficient use of capital and dramatically reducing time to service.

Meanwhile, inserting new virtual functionality is an easy operation delivered with self-management portals, establishing new virtual routes between objects instantly. As a result, network support and operations become far more responsive, adapting quickly to changing requirements across the organization as well as to subscriber demand.
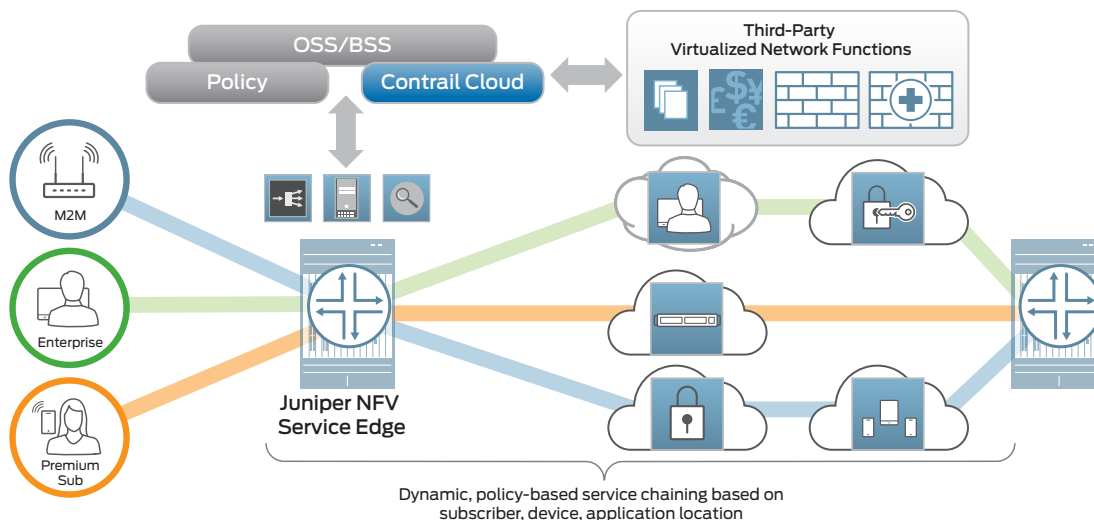

Figure 2: The service delivery complex

Platform for Service Creation

While there are tremendous operational benefits to be derived from intelligent traffic detection and steering, the real value in the NFV service edge is the ability to drive new revenue. Classifying traffic and routing it to the appropriate VNF helps right-size VNF elements to deliver value while enabling service providers to charge based on the capabilities or services delivered.

An integrated billing or policy interface lets the system report what traffic is routed through which service chain, establishing an end-to-end accounting of the subscriber, device, application, and location of all traffic that has passed through each service chain. Centralizing the control point lets service providers establish different rates for traffic based on the service chains it runs through.

The agility that comes from a virtualized Telco cloud turns the generic service delivery complex into a platform for innovation. Whereas before it was complex, costly, and time-consuming to insert new applications and appliances into the service chain, a virtualized object can now be added in a matter of minutes, simplified by automation. Service providers can literally establish new policies that route traffic through the new service chain and begin experimenting with new revenue-generating functions by the end of the day.

"The integration of Juniper Networks high-performance technology as a 'service hub' brings increased flexibility to introduce new service features to our customers. We leverage Juniper's expertise to make SDN/NFV technologies the key to shortening time to market and improve cost effectiveness."

Paolo Fasano, Data Networks Innovation, Telecom Italia, June, 2014

Benefits of Juniper's Service Delivery Complex

Whether service providers offer residential (cable, DSL), business (VPN), or mobile access, Juniper's NFV solution for the Telco cloud provides a platform for simplifying NFV deployments by offering the following features:

- **Service consolidation:** Juniper's solution brings together three critical elements: understanding who or what is using the network; anticipating and knowing what to do; and automating and executing the requirements. Consolidating these capabilities creates an anchor for a truly intelligent Telco cloud.

- **Access network agnostic:** Service providers can consolidate and normalize service delivery for their customers, regardless of access type (LTE, Wi-Fi, cable, or DSL). By centralizing the services complex, policies can be implemented and enforced uniformly, regardless of device (smartphone, tablet) or access network.

- **Deployment flexibility:** Juniper believes in a pragmatic, evolutionary approach to NFV, supporting a range of deployment options that not only include existing physical network elements but also add new virtualized network functions (VNFs), distribute NFV service pools throughout the network, or consolidate them into large data centers.

- **Simplified billing:** Rather than having each network element handle separate accounting and billing, Juniper tracks usage through specific service chains on a per-user and per-device basis, simplifying the billing of services as well as accounting for software usage.
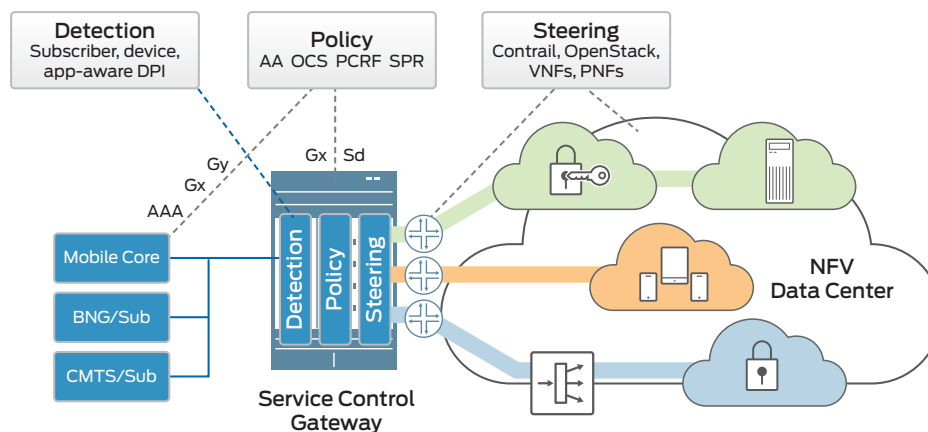

Figure 3. Service control gateway architecture

Solution Components

Service Control Gateway

Juniper Networks® MX Series 5G Universal Routing Platforms act as the service control gateway and intelligent anchor point for delivering dynamic service selection in a Telco cloud, enabling faster service creation, new revenue streams, and lower operating costs. An MX Series router/service control gateway, which includes integrated L4-L7 DPI/traffic detection and granular traffic steering functionality with policy interfaces, gives service providers maximum visibility into and control over their customers' network usage. The service control gateway can also be combined with other embedded networking functions (such as carrier-grade NAT and firewall/load balancer) to consolidate components of the service delivery complex into a single network element.

The service control gateway has several key capabilities which give service providers precise control over traffic, as well as the ability to create a differentiated experience for their subscribers:

- **Deep Packet Inspection:** DPI capabilities have been available for years, but traditional approaches have been missing two key components, namely traffic steering and network routing. By combining DPI with a full-featured routing platform, Juniper provides extremely granular control over how traffic is routed, ensuring a favorable user experience.

- **Policy Interfaces:** The MX Series supports interfaces to existing policy management systems such as policy and charging rules function (PCRF), and authentication, authorization, and accounting (AAA), enabling networking policies to be made once, initiated and enforced directly on the gateway.

- **Traffic Steering:** Based on DPI results and driven by requirements from the policy engine, the service control gateway provides line-rate traffic routing and steering into dynamic service chaining, supporting physical and virtualized network objects.

Contrail Cloud

Juniper Networks Contrail Cloud is an integrated Telco cloud platform built to run high-performance NFV with always-on reliability, enabling service providers to deliver innovative services with greater agility. Utilizing Juniper's trusted industry expertise to build and operate the cloud, the platform eliminates the complexity of running a Telco cloud.

Featuring industry-leading Red Hat OpenStack combined with Juniper Contrail Networking, the platform bridges dynamic cloud orchestration with highly scalable connectivity. Furthermore, Contrail Cloud features a built-in automation capability powered by machine learning to run cloud infrastructure and VNFs in the most optimal manner, remediating any potential failures to ensure SLA compliance.

Contrail Cloud offers complete cloud orchestration software along with a reference architecture, professional services, and partner support to deliver an integrated, turnkey solution that makes Telco cloud deployment and operations easier than ever.

Service providers of all sizes—whether telecom or mobile providers, cable operators, or converged—can use this integrated solution to easily navigate the complexities of cloud deployments and operations with improved performance, scale, and service SLAs.

Virtual SRX (vSRX)

The Juniper Networks virtual SRX (vSRX) extends the proven capabilities of the SRX Series Services Gateways into a VNF service chain for a specific customer set. This platform delivers robust routing features, including IPsec VPN and NAT, and offers a complete virtual security solution including firewall, advanced security services at L4-7, and unified threat management (UTM).

These services can be customized on a virtual platform for specific user groups and orchestrated through Contrail Cloud for rapid speed to delivery.

Deployment and Operational Services

A broad range of services, available from Juniper and selected partners, accelerate and optimize the use of these solution components. Juniper offers a wide range of professional services to help achieve a complete service automation solution. Customers can leverage planning services to assess and design a cloud that eases their transition to NFV. Moving from plan to implementation, Juniper Professional Services and Education Services will help users plan, build, and operate their Telco cloud architecture.

Summary—Juniper Redefines Service Selection and Service Delivery

Technologies such as SDN and NFV make it possible for service providers to tune and modify network resources in real time, providing unique and customized networking experiences for their subscribers. Juniper Networks offers an intelligent anchor point for the Telco cloud evolution that allows service providers to optimize network resources and deliver customized service experiences.

The service control gateway, built on Juniper Networks MX Series 5G Universal Routing Platforms and service control gateways, gives service providers unparalleled visibility into, and control over, their customer's network usage. By combining high-performance routing, L4-L7 traffic detection, and steering with policy control and enforcement, the Juniper service control gateway solution tells service providers who is using their network and how, providing a level of detail never before available. This application-aware networking ensures that resources can then be tuned and adjusted in near real time to create a customized experience that customers can be billed for with unprecedented accuracy.

Next Steps

Create a network that knows how to deliver a unique experience for subscribers, and create new value for service providers. For more information about Juniper's service control gateway, or Juniper's offer towards NFV solutions, please visit us at www.juniper.net/us/en/solutions/nfv/.

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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3510528-005-EN May 2018