JUNIPER NETWORKS-AFFIRMED NETWORKS JOINT VIRTUALIZED MOBILE SERVICES SOLUTION

Virtual mobile services solution automates deployment and customization of wireless services

Challenges

Mobile service providers increasingly face new competitive pressures from nimble startups and OTT providers. This requires a faster pace of innovation and agility than what traditional networks permit.

Solution

Juniper Networks and Affirmed Networks joint solution for virtualized mobile networking, which combines Affirmed's Mobile Content Cloud (MCC) virtualized EPC with Juniper's Contrail Provider Cloud, Contrail Insights, and vSRX Virtual Firewall, helps wireless providers deploy new services faster and at significantly lower cost than legacy solutions.

Benefits

- *Automate new mobile service introduction through policy and business logic-based orchestration*
- *Dynamically scale resources to right-size capacity in the network*
- *Effectively manage virtual environments and services*
- *Leverage new customer insights through analytics to quickly launch and scale targeted offerings*
- *Realize the scale and security benefits of the mobile cloud with truly carrier-grade NFV infrastructure*

Together, Juniper Networks and Affirmed Networks combine a best-in-class virtualized mobile services solution with best-in-class SDN and Network Functions Virtualization (NFV) technology. This joint solution enables wireless service providers to deploy new services faster, innovating and differentiating through advanced service chaining, dynamic policies, and simplified provisioning. The speed and agility of this solution also allows operators to build profitable new services through finely tiered offerings catered to selected customer groups.

The Challenge

Growth in smartphones and connected devices accessing cloud-based services pressures mobile service provider revenue growth and profitability. The emergence of over-the-top (OTT) providers has resulted in more pressure on operators to create, provision, and launch new services at an accelerated pace. Meeting customer needs requires a faster pace of innovation and agility than what traditional networks permit. Many operators, however, are still using legacy networks and systems that are costly and slow to provision, leading to market delays and missed opportunities.

Mobile operators require a service creation platform that goes beyond legacy service orchestration, automation, and flow-through provisioning tools requiring complex coding. Operators need an SDN-enabled virtualized solution that offers automation and complete configuration management across multivendor virtual and physical network elements and network-wide service instances.

The Juniper Networks Mobile Cloud with Affirmed Networks Virtualized EPC Solution

Juniper and Affirmed have partnered to develop an integrated, virtualized solution to drive transformation and innovation for mobile service creation. By combining the Affirmed Mobile Content Cloud™ with Juniper Networks® Contrail® Provider Cloud, Contrail Insights, and vSRX Virtual Firewall, operators can truly leverage the mobile cloud to create, provision, and launch new subscriber services in minutes, enabling them to capitalize on new market opportunities, while staving off OTT competition.

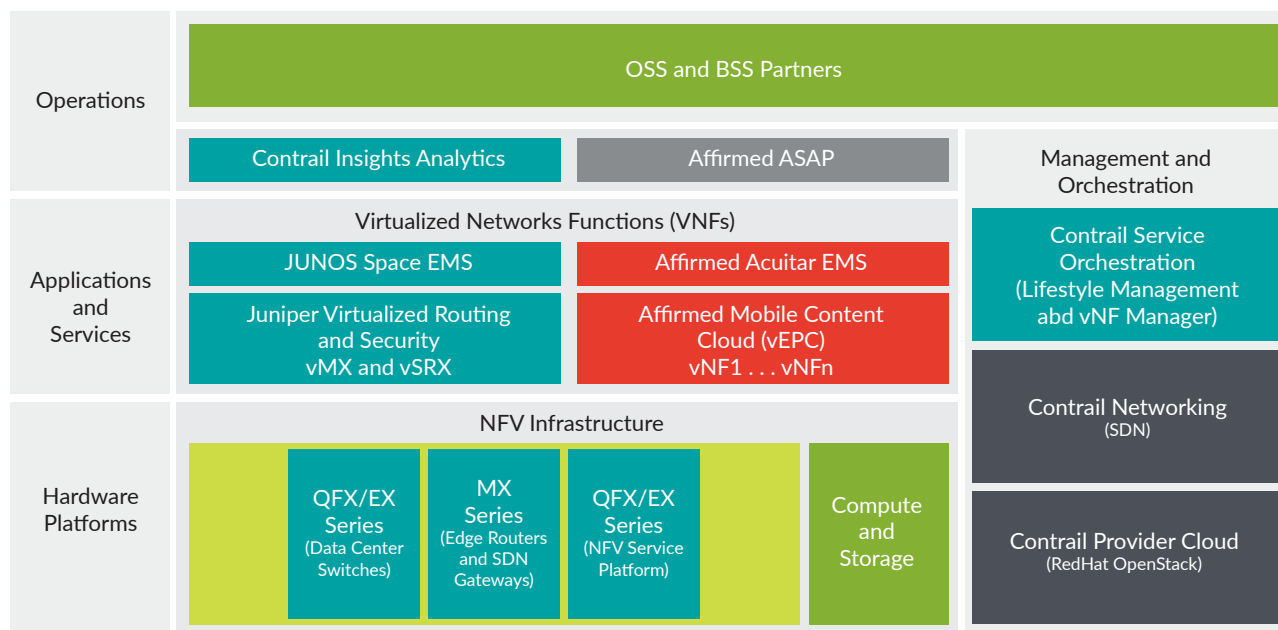| Operations	OSS and BSS Partners		
	Contrail Insights Analytics	Affirmed ASAP	Management and Orchestration
Applications and Services	Virtualized Networks Functions (VNFs)		Contrail Service Orchestration (Lifestyle Management abd vNF Manager)
	JUNOS Space EMS	Affirmed Acuitar EMS	
	Juniper Virtualized Routing and Security vMX and vSRX	Affirmed Mobile Content Cloud (vEPC) vNF1 . . . vNFn	
Hardware Platforms	NFV Infrastructure		Contrail Networking (SDN)
	QFX/EX Series (Data Center Switches) — MX Series (Edge Routers and SDN Gateways) — QFX/EX Series (NFV Service Platform) — Compute and Storage		Contrail Provider Cloud (RedHat OpenStack)

Figure 1: Juniper Networks-Affirmed Networks joint virtualized mobile services solution

The Juniper and Affirmed joint mobile cloud solution is well aligned with the inflection points we are seeing in the market:

- Mobile providers investing now in dedicated IoT, MVNO and Enterprise vEPC

- Current trend is to cap legacy physical EPC/Gi-LAN and grow virtual EPC (vEPC)/ vGi-LAN

- Mobile providers are preparing today for 5G with virtualized solutions that provide investment protection

- Heightened focus on TCO: OPEX reduction, Time to revenue reduction, and new value add revenue streams

This joint solution empowers operators to create and implement new service definitions faster with no complex coding. It also liberates operations and business support systems (OSS/BSS) teams from the tiresome task of provisioning each element or virtual instance in the network to support those services. By extending the benefits of SDN-enabled service automation across the entire network, this solution enables operators to reap the full benefits of NFV sooner.

The speed and agility of this virtualized service creation solution means that operators can now rapidly build profitable services around selected groups of customers for more finely tiered offerings. Combined with Affirmed's subscriber segmentation and Juniper Contrail Insights analytics tools, mobile operators can leverage new customer insights to quickly launch and scale targeted offerings across their entire subscriber base.

Juniper Networks Contrail Provider Cloud simplifies building open, elastic, and resilient mobile service networks. Contrail's virtual router provides dynamic networking that automates the reliable and secure connection of networking functions within the mobile services environment. Contrail also enables the operator to create service chains between the Affirmed Mobile Content Cloud and the Juniper Networks vSRX Virtual Firewall as well as additional third-party virtualized network functions (VNFs), to create rich end-to-end mobility services. In addition, SDN features, including managed network resource allocation, programmatic provisioning, policy-based resource scaling and session prioritization capabilities, accelerate service rollout, enable automated capacity scaling, and help manage better service quality for the end user.

Figure 1 provides an overview of this joint solution.

Features and Benefits

Service Creation

- Support mobile services on a single virtualized infrastructure (consumer/fixed LTE, IoT, and carrier Wi-Fi)

- Provide ETSI Management and Orchestration (MANO)-based life cycle management of VNFs and end-to-end services

- Quickly create new service definitions without complex coding

- Eliminate provisioning and configuration errors that result from manual processes

- Provide rapid onboarding of new customer services instances

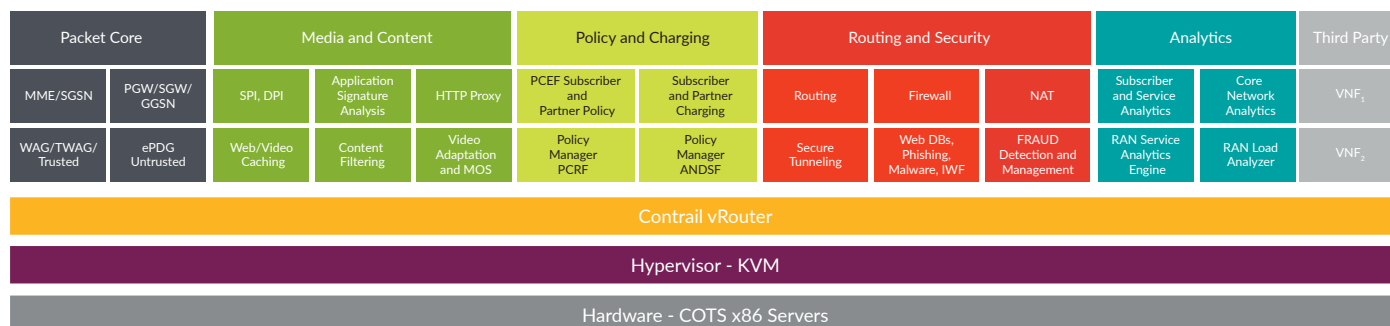- Support end-to-end testing and validation of services before and after production deployment

Packet Core		Media and Content			Policy and Charging		Routing and Security			Analytics		Third Party
MME/SGSN	PGW/SGW/GGSN	SPI, DPI	Application Signature Analysis	HTTP Proxy	PCEF Subscriber and Partner Policy	Subscriber and Partner Charging	Routing	Firewall	NAT	Subscriber and Service Analytics	Core Network Analytics	VNF_1
WAG/TWAG/Trusted	ePDG Untrusted	Web/Video Caching	Content Filtering	Video Adaptation and MOS	Policy Manager PCRF	Policy Manager ANDSF	Secure Tunneling	Web DBs, Phishing, Malware, IWF	FRAUD Detection and Management	RAN Service Analytics Engine	RAN Load Analyzer	VNF_2
Contrail vRouter												
Hypervisor - KVM												
Hardware - COTS x86 Servers												

Figure 2: Affirmed and Juniper VNF overview

Network Automation

- Monitor virtualized infrastructure and apply policies to dynamically scale up (or down) virtual service functions and right-size capacity with subscriber growth
- Gain insight through flow and subscriber analytics for service and infrastructure planning
- Simplify service deployment in new regions

Resiliency

- Deploy a high-performance and high availability SDN and NFV infrastructure
- Secure mobile cloud environment, RAN-facing and Internet-facing interfaces
- Provide inter-chassis scaling and high-availability for traffic between virtualized service functions

Solution Components

Juniper Networks Contrail Networking is a simple, open, and agile SDN solution that automates and orchestrates the creation of highly scalable virtual networks. These virtual networks let you harness the power of the cloud—for new services, increased business agility, and revenue growth. Contrail Networking creates virtual networks that integrate seamlessly with physical networks.

Juniper Networks Contrail Provider Cloud is an integrated turnkey cloud management platform that is hardened from open-source technologies including OpenStack. It simplifies building open, elastic, and extremely optimized cloud infrastructures. Contrail Provider Cloud combines the automation capabilities of Contrail Networking with Juniper's OpenStack distribution for SDN/NFV and cloud network automation, enabling the creation and management of secure, scalable, and high availability virtualized mobile service networks.

Contrail Insights is a new breed of optimization and management software platform for public, private, and hybrid clouds. This intent-driven software manages automated operations, visibility, and reporting in cloud and Network Functions Virtualization (NFV) use cases for Kubernetes and OpenStack, as well as Amazon Web Services. It features machine learning-based policy and smart monitors, application

and software-defined infrastructure analytics, alarms, and chargeback accounting. With Contrail Insights, you can track and automate the operations of your applications and software-defined infrastructure. Its smart-monitoring features detect issues and automatically manage remedial action based on predefined SLAs. Contrail Insights is an integral component of Contrail Provider Cloud, providing comprehensive visualization, smart analytics, and the ability to manage automatic remediation for service assurance.

Juniper Networks vSRX Virtual Firewall running on commercial off-the-shelf (COTS) hardware can be deployed in the Gi-LAN service complex providing firewall, Network Address Translation (NAT), and VPN functions which can run standalone or as a part of the same VNF. Additionally, the vSRX can be deployed as a security gateway handling IPsec tunnels from the macro/small cell network protecting user traffic within the access network.

Juniper Networks QFX IP fabric architectures delivers a simple, open, and smart blueprint for building high-performance, highly reliable data center environments and next-generation central offices. The QFX IP fabric architectures' ability to deliver high availability features, such as in-service software upgrades within a distributed model, make it an ideal framework for supporting a distributed mobile cloud environment.

The Affirmed Mobile Content Cloud is a virtual evolved packet core (vEPC) solution featuring fully virtualized instances of each key mobile core function and select value-added services. The flexible deployment model supports single or multiple packet core and Gi-LAN elements. For example, a virtualized network element may contain multiple service instances such as the gateway GPRS support node (GGSN), Packet Data Network Gateway (PGW), and Serving Gateway (SGW), or each network function might be deployed in its own virtualized network element. This approach provides the mobile network operator with greater flexibility in terms of deploying and elastically scaling individual or combined network elements. In each scenario, the Affirmed Networks architecture enables scale in and out, based on the demand of a function and the required capacity.

Figure 2 provides an overview of the Affirmed-Juniper virtualized network functions (VNFs).

Summary—Juniper and Affirmed Deliver a Highly Automated, Scalable, and Reliable Virtualized Solution for Wireless Services

Mobile service providers are constantly striving to find new ways to rapidly create and implement new services at lower cost. Together, Juniper and Affirmed deliver a highly automated, scalable, and reliable virtualized solution which allows wireless service providers to deploy new services faster, innovating and differentiating through advanced service chaining, dynamic policies, and simplified provisioning. With this joint solution, mobile service providers can transition quickly and efficiently to a virtualized mobile architecture; automate new mobile service introduction through policy and business logic-based orchestration; dynamically scale resources to right-size capacity in the network; effectively manage virtual environments and services; leverage new customer insights through analytics to quickly launch and scale targeted offerings; and realize the scale and security benefits of the mobile cloud with truly carrier-grade NFV infrastructure.

Next Steps

For more information about how your organization can benefit from the Juniper Networks-Affirmed Networks joint virtualized mobile services solution, or to schedule a demo, please contact your authorized Juniper Networks or Affirmed Networks representative. To learn more about Juniper NFV solutions please visit **www.juniper.net/us/en/solutions/mobile-provider/**

About Affirmed Networks

Affirmed Networks has emerged as the leader in the network virtualization domain with more than 60 live deployments with Tier 1 and Tier 2 operators globally. Affirmed's virtualized mobile core solutions provide a complete, consolidated virtual evolved packet core (vEPC) solution that runs together on a single, virtual hardware instance for better performance, scalability, and cost. The vEPC solution features fully virtualized instances of each key mobile core function. Additional information can be found at **www.affirmednetworks.com**.

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.

JUNIPER NETWORKS® | Engineering Simplicity