



Doyle**Research**

Delivering Managed Services Using Next Generation Branch Architectures

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Executive Summary

Network architectures for the WAN and branch have remained largely the same for the last 20 years. However, usage and traffic patterns have changed with the adoption of SaaS applications for business and the usage of the Internet for social and video applications. Broadband (Internet) networks have improved and now offer performance similar to MPLS. Communications Service Providers (CSPs) therefore are changing their model for delivering managed services to their business customers. Due to the commoditization of data services, CSPs realize that selling bandwidth alone is not a sustainable business model.

A new branch architecture enabled by technologies such as network function virtualization (NFV) allows CSPs to deliver value-added managed services in a more economical way, avoiding truck-rolls, enabling service automation and self-service activation. With virtual network functions (VNFs) and commodity hardware, CSPs can provide centralized management and provisioning of new connectivity and security services. Bandwidth and services can be elastically turned up or turned down as required by the customer.

Delivering WAN services with VNFs running on white box appliances requires new software and cloud-based functionality to deliver services to branch offices. WAN services should be centrally managed and easily provisioned without truck-rolls or onsite technical expertise. CSPs need modular software that allows flexible service options for customers, including connectivity and service functions. These services should be easily service chained with the ability to quickly, flexibly link a variety of different services customized to customer requirements.

CSP are enhancing their business service offerings using NFV and SD-WAN. The benefits are clear; use of lower cost white box CPE which reduces CAPEX, ease of service delivery, reducing operations costs via centralized management, and the ability to easily add new value-added services. NFV and SD-WAN has the potential to revolutionize the \$40B+ market for WAN business services.

New Branch Architectures Opens New Opportunities for Managed Services

Leading service providers, including AT&T, China Mobile, Colt, NTT, Orange, Telefonica, and Verizon are deploying NFV to rapidly deliver new services and reduce costs. NFV is starting to impact the way leading CSPs deliver managed business services. Cloud-based functionality like vCPE and virtual security gateways can help CSPs lower the cost of delivering services and allow them to incrementally add new services without truck-rolls to customer locations. Many WAN functions can be deployed in the CSP core data center, point of presence (PoP), or in an edge central office. This centralized model combines a set of VNFs and management/orchestration with a shared pool of servers, enabling common – yet isolated – network resources across multiple customers.

Continuing technology transitions, new service launches, security, privacy and metering requirements make service providers incur significant amount of CAPEX and OPEX to purchase or upgrade traditional CPE devices and/or update device software on a regular basis. This causes the margin for delivering managed connectivity and security services to be very low. NFV provides the ability for CSPs to deliver services rapidly from the telco cloud with substantially lower costs than traditional CPE deployments.

Requirements for Next Generation WAN Services

The complexity and cost of hardware deployment at the branch must be reduced. In addition, the significant variance in branch requirements – by size, organization structure, and vertical – requires flexibility in CPE deployment models (e.g. small vs large, simple vs multi-service). The new branch architecture delivers WAN functionality at branch offices (including connectivity and services) in a new way which is agile and cost effective from both CAPEX and OPEX perspective.

Next generation WAN services must be modular, easy to deploy with centralized provisioning, and quickly scale up and scale down. The technology should support a “zero touch” model such that non-technical users at the branch can plug in CPE, get centrally provisioned automatically, and be up in running in minutes. A flexible services

portfolio, including support for 3rd party applications, is critical.

New branch network functionality should include:

- Support for hybrid WAN with policy-based selection across multiple links and secure Internet breakout at the branch.
- Application-aware policy, queueing, scheduling and routing using deep packet and content inspection (DPI/DCI).
- Continuous monitoring of all links for bandwidth, latency, jitter, error rate, and packet loss and continuously analyzing data for smart decision making (e.g. link selection).
- Routing and network address translation (NAT)
- Security – stateful and next generation firewall, anti-virus, IPsec, URL filtering, IPS/IDS, logging

Next generation WAN services should allow CSPs to seamlessly migrate from current model of VPN services to the new software defined WAN service.

Benefits for CSPs

CSPs are challenged to grow their revenues and increase their profitability given the ever increasing demands for more bandwidth at lower costs. Worldwide, CSPs take in over \$40 billion per year by selling managed WAN services to business customers. These customers pay a premium for highly reliable, low latency, secure links.

CSPs are threatened by the commoditization of WAN bandwidth. With software defined WAN (SD-WAN) technologies, business customers can leverage Internet circuits, which cost 1/3 to 1/2 the cost of comparable speed MPLS links, for (some) of their remote branch connectivity. Internet services have the advantage of higher speeds (100MB to 1 GB), wide availability, and rapid provisioning times as compared to MPLS and other traditional managed connectivity services.

CSPs need to adopt new technologies like NFV and SD-WAN to remain competitive in the market for managed business services. CSPs can offer customers managed, secure hybrid WAN services (e.g. SD-WAN + managed security) – a key benefit for organizations

wishing to outsource complex WAN management to a business partner. It brings the cost of turning on branch sites from \$1000s to \$100s – and there is no need for certified branch technicians.

More robust NFV services provide CSPs with the ability to generate more revenue via selling to new customers and upselling to existing customers. NFV can help CSPs to improve their bottom line by reducing the acquisition (CAPEX) costs of CPE using white box offerings, while lowering the operational costs of provisioning and ongoing maintenance/support. According to Doyle Research, virtualized solutions (on average) will cost at least 30% less to acquire (CAPEX) than traditional network equipment.

Versa Solution

Versa Networks was founded in 2012 by Juniper Networks engineering executives. Versa's vision is to leverage the rapid advances in branch architectures using VNFs, programmability, and agile provisioning to create an integrated software solution for managed services.

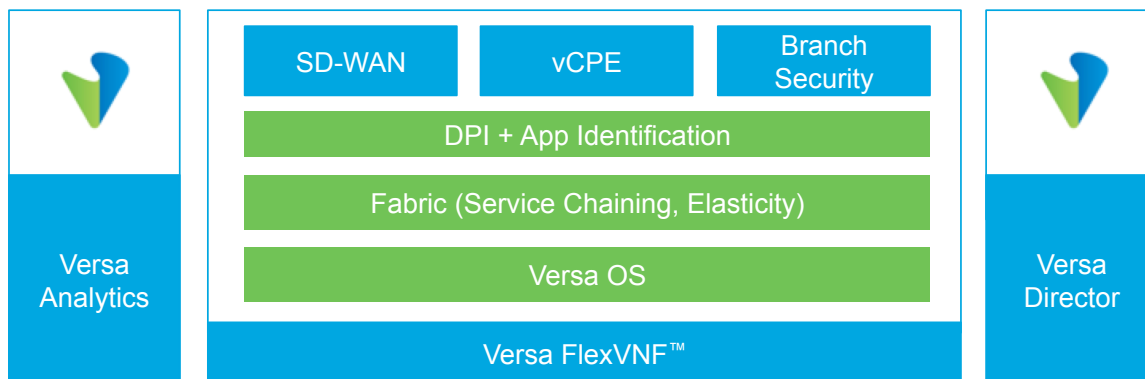
Built with integrated multi-tenancy, Versa FlexVNF allows service providers to achieve economies of scale by leveraging each Versa instance deployed at a PoP, central office or data center to provision a managed service for hundreds of different end customers and tens of thousands of remotes sites. This is in contrast to traditional hardware-based managed services, which require a dedicated aggregation device per each customer. Versa FlexVNF provides a new approach for building large-scale networks that provide the benefits of reduced CAPEX and OPEX, without creating delays in the rollout of new services.

The Versa solution is multi-service and includes a wide range of VNFs that enable the primary use cases for the next generation branch – vCPE, SD-WAN, and branch security. These services are centrally orchestrated and can reside on-premises or in the telco cloud, based on customer choice. It leverages integrated service chaining to enable the creation of rich multi-VNF managed services like managed SD-WAN with

direct Internet access through on-premises firewalls, and managed Internet control and security. Versa FlexVNF provides application assurance by selecting the best route to meet the SLAs of each application. See Figure 1.

The Versa solution provides zero-touch provisioning and configuration through a set of programmable RESTful APIs. Once a service definition is created, customers can utilize Versa Director and deploy a VNF instance onto a branch-based x86 white box hardware (VM-based, container-based and bare metal are also supported) or as a hosted service in the provider's data center. The Versa solution enables centralized enforcement of business logic like traffic engineering, access policies, QoS and service insertion/chaining.

Figure 1
Versa Networks VNF Architecture



Recommendations for CSPs

New branch technologies for vCPE and SD-WAN are scalable, reliable, and rapidly increasing in adoption by leading CSPs in many different geographic regions. Doyle Research believes that vCPE and SD-WAN coupled with security are two leading use cases for NFV deployments due to the agility, cost, and new service benefits they offer to CSPs. By leveraging NFV (and VNFs) running on commodity hardware to deliver new, valuable services to their business customers, CSPs can increase their revenue and

agility, reduce CAPEX and OPEX, and avoid the likely disintermediation to their managed service business via the inevitable increased use of Internet circuits for business traffic.

A new class of VNF software is delivering on the expected benefits of NFV. CSPs should evaluate new branch architecture solutions on their ability to provide the following features, including:

- Centralized provisioning and management with zero touch administration at the branch
- Effective use of public and private WAN with policy-based link selection
- Visibility, prioritization and steering of business-critical and real-time applications
- Rapid scale up / down of resources, include flexible addition of new services
- Ability to secure network traffic through internal and/or 3rd party security functions (e.g. firewalls, URL filtering, AV, IPS, etc.)

Adoption of new branch architectures using NFV technologies will rapidly change the market for managed WAN and security services. Leading CSPs are already seeing the benefits of redesigning the branch network, including rapid service delivery, flexible business models, reduced truck-rolls, and lower CAPEX and OPEX. This trend will continue as the CSP business and operational benefits become increasingly clear.

Meet the Author

Lee Doyle is Principal Analyst at Doyle Research, providing client focused targeted analysis on the Evolution of Intelligent Networks. He has over 25 years' experience analyzing the IT, network, and telecom markets. Lee has written extensively on such topics as SDN, NFV, enterprise adoption of networking technologies, and IT-Telecom convergence. Before founding Doyle Research, Lee was Group VP for Network, Telecom, and Security research at IDC. Lee contributes to such industry periodicals as Network World, Light Reading, and Tech Target. Lee holds a B.A. in Economics from Williams College.