

## NFV for Carrier WiFi Brings in a Managed WiFi Service Revolution

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The concept of virtualizing network services decouples applications from the underlying network hardware and in doing so evolves networks from proprietary hardware/software platforms to commercial servers. There are several benefits:

- **Rapid service innovation:** virtualizing network functions into software running on commercial servers in a “virtual machine” or VM under a hypervisor streamlines the delivery of customer-specific managed services
- **Improved operational efficiencies:** NFV drives a shift in the network management model away from one that is device-driven and toward one that orchestrates service provisioning across legacy network components and virtual resources
- **Reduced power usage with shared workloads:** another efficiency of utilizing NFV-based architecture is the reduction of power consumption as less equipment is required at the data center
- **Standard and open APIs:** becoming an increasing trend in Web 2.0 applications to interconnect services in a more fluid user-friendly manner
- **Greater flexibility:** in terms of where, when, and how to deploy and scale-up services
- **Improved capital efficiencies:** NFV enables operators to leverage commercial, off-the-shelf (COTS) servers and so reduce hardware-based capital expenditure

To date, much of the early development of network function virtualization (NFV) has focused on mobile and fixed broadband access and core networks, covering areas such as CDN, mobile core and base stations, CPE/STBs, and firewalls.

But now WiFi equipment specialist Ruckus Wireless has introduced its NFV solution for carrier-class WiFi, the virtual SmartCell Gateway (vSCG). It virtualizes the functionality of the WLAN controller, the device within the control plane that typically handles such processes as authentication, interference detection and avoidance, RF power and channel assignment, coverage hole detection and correction, and load balancing.

Ruckus’s vSCG product is designed specifically for this market (rather than being a reworking of an enterprise-class solution, for example); if it is to be successful, such a platform needs to not only support the scale of current and future carrier WiFi deployment but also help enable the potential service models that could shape this environment.

For instance, it is critical that it supports service providers in their efforts to derive new WiFi revenue from such offerings as:

- 3G/4G integration
- Location-based services
- Hotspot 2.0-based roaming
- Data analytics services

## **CONTINUOUS RESEARCH SERVICE**

### **NFV FOR CARRIER WIFI BRINGS IN A MANAGED WIFI SERVICE REVOLUTION**

This research note looks at the concept of NFV in the carrier WiFi arena in more detail and at how it will help new providers come into the WiFi managed services market.

#### **THE RUCKUS VSCG: NFV FOR THE CARRIER WIFI MARKET**

Ruckus's existing SmartCell Gateway, the SCG-200, is already widely deployed, supporting tens of thousands of APs and hundreds of thousands of users. Its functions include access point management and radio resource management, authentication, Hotspot 2.0-based roaming, fast handoff, and redundancy.

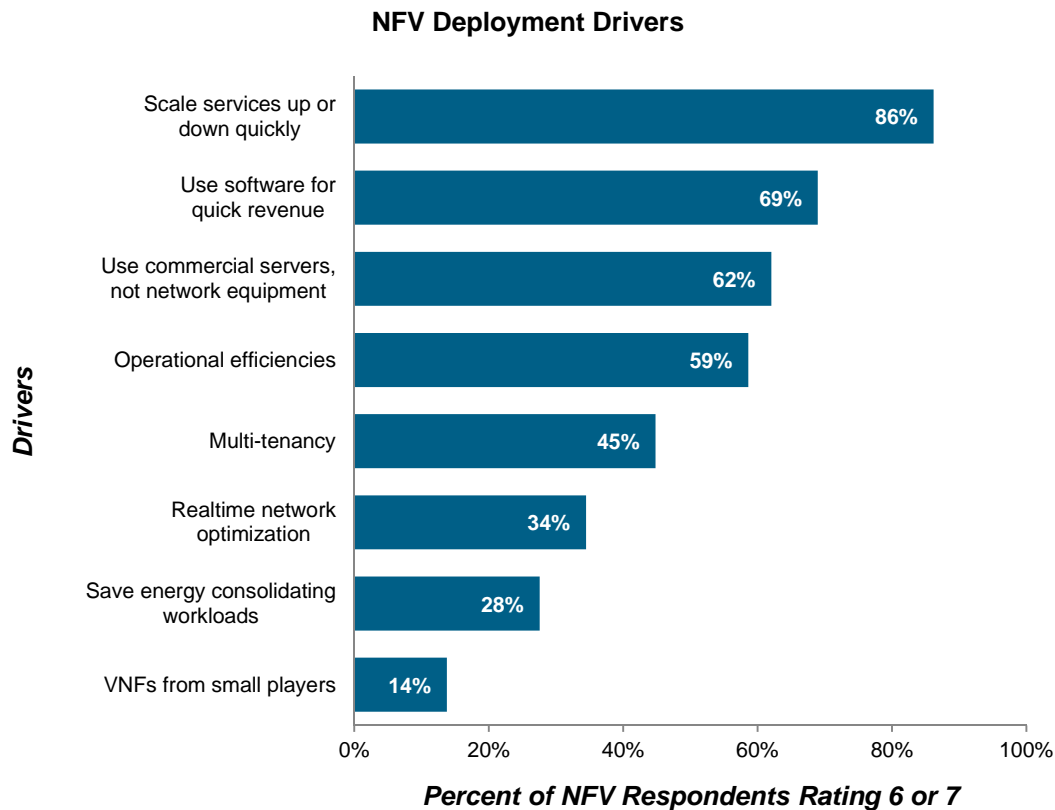
Within the vSCG architecture, the hypervisor creates multiple virtual instances of all of this functionality and can be based upon either KVM (Kernel-based Virtual Machine) or VMWare's vSphere ESX as its cloud computing virtualization operating system. It runs as a virtual appliance on these hypervisor platforms in the service provider's data center to enable a scalable managed WLAN service; of course the point is, as with all moves to NFV, to replace purpose built hardware with commodity hardware (in this case x86 gear), leveraging standardized, high-volume cloud data center equipment.

But moving to commodity hardware is not the primary driver of NFV. Though running on commercial servers is an essential ingredient to save capex, the principle is to make service provisioning more flexible with the agility to scale up and down services.

In our March 2014 *SDN and NFV Strategies: Global Service Provider Survey*, respondents represent 51% of world telecom capex. We asked them to identify NFV deployment drivers; the top 2 are service agility and time-to-revenue (rated 6 or 7 on a scale of 1 to 7, where 1 is "not a driver" and 7 is "a strong driver").

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The SmartCell Gateway separates out the data plane from the control plane, allowing Ruckus's SmartCell control and management planes to be rapidly deployed and scaled as a virtual appliance. While this maintains the overall benefits of SmartCell architecture such as supporting massively scalable controller clustering, carrier-class protocols, flexible data plane forwarding, and so on, having a separated data plane, with data plane traffic being either offloaded locally or tunneled for additional processing (e.g., policy, DPI), enables a great deal of deployment flexibility and operational efficiency—because the service provider can provide only those services that are required in the deployment architecture, which also prevents the controller from becoming overwhelming with service provisioning activity.

In a managed service context, there is also a dedicated option that assigns a virtual instance of the SCG to each customer or, in a multi-tenant deployment model in which WiFi infrastructure is shared, it allows multiple customers to share a virtual instance of the SCG, potentially lowering deployment costs further.

In addition to enabling usage of commodity servers, vSCG uses the standard Open Virtualization Format (OVF) for distribution and deployment of the service, interfaces with industry-standard deployment orchestration tools, and supports automatic hardware validation prior to installation of the virtual appliance.

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#### SCALED DEMAND

Arguably one of the primary values of a wireless service is the number of places it is available. Service providers offering WiFi managed services are likely to want to offer them in a uniform fashion across multiple, geographically disparate locations, so the ability to scale up the offering in phases, lighting up new locations, is vital; not only that, but the cost needs to remain uniform too so virtualizing the SCG function, rather than replicating the hardware for each new deployment, means scaling up remains cost-effective. Supporting scale goes beyond that though:

- The vSCG automatically detects the resources allocated within its operating environment and determines the number of access points it can support; a single instance can support up to 10,000 access points.
- Operators can increase their control plane capacity simply by allocating additional vCPU and memory resources and ordering additional access point licenses as needed.
- The vSCG also supports SmartCell Gateway clustering in either 1+1 or 3+1 configurations—which also helps reliability; so, in a 3+1 clustered configuration a single vSCG can support 30,000 access points; in terms of users, the platform can scale to support around 300,000 simultaneous users; this far out-scales other solutions when benchmarked against their metrics.

#### OPENING UP THE WIFI MANAGED SERVICES OPPORTUNITY

Ruckus claims that by having a virtualized SCG (WLAN controller) platform, the potential to offer managed WiFi services becomes feasible for a greater number of potential service providers—not just the MNOs and MSOs that have been long established in this market but also VARs, WISPs, public venues and facilities, and even Enterprises, many of which have extensive (typically private, employee-focused) WLAN deployments that could be leveraged for public-facing services.

Arguably this is vital for the development of the carrier WiFi market as it creates new opportunities for service providers (or parties seeking to operate as service providers) going forward. Offering managed WiFi services addresses a whole host of strategic and tactical issues; from a technology perspective, virtualization of functionality that would ordinarily reside in hardware with either cost-points or complexity that would be unworkable for such parties now becomes attainable.

But let's consider the opportunity from the business perspective: what are the benefits for someone like a VAR, venue, or enterprise to develop their business into managed WiFi services?

- **Incremental revenue:** In many cases, WiFi service revenue is likely to be entirely new revenue; adding value-added services will add to the revenue streams. For VARs supplying WiFi/WLAN APs into a channel, a managed service offering creates a recurring service revenue in addition to simply supplying hardware units (which might only be a one-time deal).
- **Strategic supplier status:** For a supplier of WiFi gear, offering a managed service with equipment creates a tactical partnership with the venue/enterprise—WiFi is often a strategic service at public venues and enterprise/SMBs locations, so having that service managed means it is more responsive to the end user's needs and provides a sustainable competitive advantage.

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- **Greatly increases data capacity:** In high-density locations, boosting service throughput is vital: a managed WiFi service also provides an option for cellular offload.
- **Addresses the site acquisition challenge:** In many locations—particularly indoor environments—acquiring appropriate sites for access radios can be challenging due to the layout of the building or permission-related issues; if WiFi access points are already deployed, they can now be incorporated into the managed service environment rather than new sites being needed. This also paves the way for the future deployment of indoor LTE small cells and could potentially pull through other services such as small cell backhaul.

So the opportunity could make a lot of sense for many players and addresses some of the key challenges for resellers seeking to bring a vertical-specific service to market on top of simply supplying access points, such as rollout cost, time-to-market, scalability, complexity, and of course, indoor site acquisition.

### BOTTOM LINE

As well as delivering the typical benefits of virtualizing network functionality, such as reducing time-to-market, improving data center efficiencies, reducing capital and operational expenditures, and supporting utilization of commodity hardware, virtualizing the SCG could herald the shift to 2 key carrier WiFi market dynamics:

- **The rapid deployment and scaling up of innovative managed WiFi services:** Existing WiFi service providers could take advantage by accelerating and expanding their plans to bring new services such as Hotspot 2.0-based Roaming, Location Based Services, Data Analytics, and Mobile Offload into their portfolios. Virtualization of the SCG means they can do so quicker and cheaper than with proprietary hardware, supporting their need to derive revenue from WiFi investment, augment fixed and mobile broadband services, and ensure that their branded (or wholesale) WiFi services are genuinely carrier class.
- **The opportunity for new players to enter the WiFi managed services market:** Bringing the economics and efficiencies of virtualization to bear in the WiFi space will open up this market, potentially making it a viable environment for WISPs, value-added resellers, and even enterprises to try their hand in. Many have been hoping for just such a chance to either exploit existing infrastructure to offer more than “plain vanilla” WiFi coverage or to leverage existing customer relationships to become a strategic supplier and derive recurring service revenue.

Through the launch of the vSCG, Ruckus Wireless has introduced a platform specifically tailored to the demands of this market for managed services. In so doing, the vendor is following on from other announcements in 2014, including its cloud-based SmartAccess Management service, which takes all the typically DIY aspects of hotspot services (i.e., Radius server, database, content engine, policy engine, analytics, as well as IT expertise and marketing support) and put it into the cloud, bundled as a service sold through its channel program.

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NFV is already reshaping the telecoms landscape, and the carrier WiFi arena will be no different. Vendors other than Ruckus Wireless are also active in this area, which will help drive adoption and grow the market. Initially, service providers will see the benefits as they glean efficiencies and create savings; as they look to generate incremental revenue from WiFi, the benefits of new and better services will be felt by the end-user.

As always, I welcome your thoughts.

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