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INCREASE BUSINESS AGILITY WITH NETWORK FUNCTION VIRTUALIZATION

Red Hat, Intel, and 6WIND's virtual network functions foundation for the communications industry

TECHNOLOGY OVERVIEW

80%

of communications service provider technology executives consider accelerating application delivery to be a critical priority[1]

71%

of communications service provider technology executives are concerned about unpredictable demands and growth in the industry[1]

Virtualizing network functions gives communications companies unprecedented business agility

VIRTUALIZING COMMUNICATIONS INFRASTRUCTURE

As communications companies expand their product offerings to cross traditional service segments, it is essential to stay ahead of the curve with innovative new services. Conventional communications infrastructures rely on dedicated proprietary hardware to implement each network function, which increases cost and complexity. This hardware-centric, siloed infrastructure approach can impede business agility and innovation. Scalability is limited, and deployment is often sluggish, as expensive new servers must be acquired and provisioned. Staffing costs escalate as increased expertise is needed to design, integrate, operate, and maintain the various network function appliances. All of these issues make it difficult to innovate and compete.

Network function virtualization (NFV) can provide the infrastructure flexibility and agility needed to successfully compete in today's evolving communications landscape. NFV implements network functions in software running on shared commodity servers instead of using dedicated proprietary hardware. This virtualized approach decouples the network hardware from the network functions and results in increased infrastructure flexibility and reduced hardware costs. Because the infrastructure is simplified and streamlined, new and expanded services can be created quickly and with less expense. Red Hat, Intel, and 6WIND collaborate to provide an NFV foundation that rivals the performance of physical implementations at a fraction of the cost.

VIRTUAL FUNCTIONS WITH PHYSICAL FUNCTION PERFORMANCE

Performance and cost are critical to a successful NFV implementation. In order for NFV to be of value, it must be designed to be cost-effective and provide virtual network performance comparable to that of physical network function implementations. NFV implementations reduce costs by using inexpensive, commonly available hardware, but many NFV solutions fail to provide the required performance due to the overhead of the virtual infrastructure and virtualized data planes. Simply put, network packets are delayed by unnecessary routing through the operating system, hypervisor, and processor, reducing virtual network function performance.

Unlike other NFV solutions, the Red Hat®, Intel, and 6WIND NFV foundation eliminates the data plane overheads to provide comparable performance to physical network function implementations—in addition to cost savings from commodity hardware. At the hardware level are the extreme processing power and network and virtualization capabilities of Intel Xeon processors and 10 gigabit Ethernet technology. Red Hat Enterprise Linux® and Red Hat Enterprise Virtualization provide the secure, reliable operating environment and flexible, high-performance, cost-effective virtualization needed to decouple network functions from the hardware they run on. 6WIND's 6WINDGate software uses the Intel Data Plane Development Kit (Intel DPDK) library within the 6WINDGate networking stack to process network packets outside the Linux kernel, for a tenfold improvement in data plane performance. Finally, Red Hat Enterprise Linux OpenStack® Platform controls the overall foundation solution and provides an interface for a wide variety of network orchestration software tools.

1 *Gatepoint Research, "Communications Industry Technology Survey," September 2012*

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All of this adds up to unprecedented NFV performance with a cost structure that overcomes the challenges of virtualizing network functions. With the Red Hat, Intel, and 6WIND NFV foundation, communications providers can dynamically launch, configure, and scale network functions to meet shifting traffic patterns and demands for innovative new services, all while reducing infrastructure costs and improving overall subscriber experience.

VIRTUALIZE YOUR NETWORK WITH AN OPEN FOUNDATION

As shown in Figure 1, each component of the Red Hat, Intel, and 6WIND NFV foundation provides a key element to help create a high-performance, cost-effective NFV solution.

Red Hat Enterprise Linux lays the open source groundwork for the foundation, allowing secure and reliable operation for virtualized network functions.

Red Hat Enterprise Virtualization provides high-performance virtual network switching and virtual machines for network applications.

Red Hat Enterprise Linux OpenStack Platform controls the foundation infrastructure and provides an interface to network functionality and services.

Intel's multi-core processors provide the advanced performance, workload, and power management needed to contain operating costs without compromising network performance.

The Intel DPDK provides the 6WINDGate software with high-performance network drivers and an optimized run-time environment to maximize packet processing performance on Intel Xeon processors.

Intel's 10 Gigabit Ethernet controllers and converged network adapters provide fast network connections throughout the NFV infrastructure.

6WINDGate uses fast path packet processing technology, which takes advantage of the Intel DPDK, to process network packets outside the Linux kernel, accelerating data plane performance tenfold. 6WINDGate improves the performance of both the virtual switch and the virtual network functions and supports physical and virtual environments.

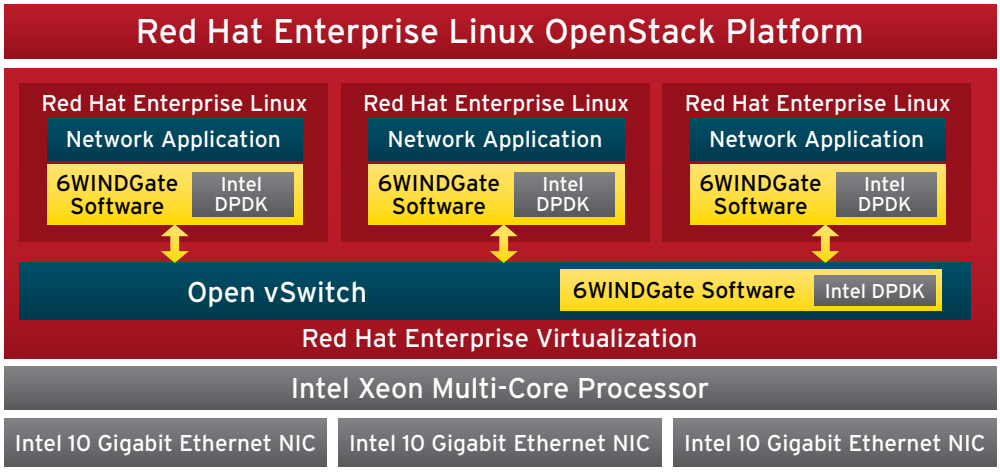


Figure 1. The components of the Red Hat, Intel, and 6WIND NFV foundation work together to overcome the challenges of virtualizing network functions.

A smaller, virtualized infrastructure can provide the same service capabilities and performance as a larger hardware-centric infrastructure at a fraction of the cost.

The Red Hat, Intel, and 6WIND NFV foundation is just that—an open foundation for a cost-effective, high-performance NFV environment. Intel's Open Network Platform Reference Design provides the above technologies in an integrated, easy-to-deploy package. Communications providers can then choose the network orchestration tools they need to differentiate their service offerings knowing that they will be compatible with their NFV foundation. Below are some use cases and examples of what you can accomplish with a cost-effective, high-performance NFV foundation.

REDUCE YOUR COSTS WITH INFRASTRUCTURE SIMPLICITY

Complex infrastructures are expensive to maintain and operate, and high infrastructure costs detract from the bottom line. With the Red Hat, Intel, and 6WIND NFV foundation, network infrastructure is greatly simplified by converging network functions onto a single, shared architecture. Commodity hardware replaces proprietary appliances, significantly reducing capital expenditures. Decoupling the hardware infrastructure from the software network functions also allows hardware to be replaced less frequently, further increasing hardware return on investment (ROI). Operating expenditures are contained through advanced server power management features and streamlined administration and management. With improved, dynamic scalability, service providers can easily add and move resources between virtual network functions to meet shifting peaks in network traffic without maintaining fleets of extra dedicated network appliances that remain idle much of the time. A smaller virtualized infrastructure can provide the same service capabilities and performance as a larger hardware-centric infrastructure at a fraction of the cost.

VIRTUAL CUSTOMER-PREMISES EQUIPMENT

Communications subscribers use various customer-premises equipment (CPE) devices, such as routers, switches, and set-top boxes, at their sites to connect to services. In many cases, each device controls a single network service such as Internet access or cable service, and one customer will have many devices, each of which must be kept up-to-date. With the Red Hat, Intel, and 6WIND NFV foundation, multiple CPE devices can be consolidated onto a single virtual CPE setup consisting of a programmable modem, switch, and antenna, reducing CPE costs and complexity. Software updates and service configurations are managed centrally, decreasing operational expenses. New services can be added faster, more easily, and without the need for new CPE devices, significantly improving the customer experience.

CLOUD RADIO ACCESS NETWORK

Traditional mobile network architecture uses geographically-distributed cellular base stations to provide mobile services to subscribers. Building new base stations to expand services introduces additional expenses from the physical equipment itself and from ongoing operational costs, such as power, security, and real-estate fees. Building a cloud radio access network (C-RAN) with the Red Hat, Intel, and 6WIND NFV foundation allows you to place the active electronics needed to process cellular signals in a central, secure, and easy-to-manage location. Cellular signals are then received by a multitude of inexpensive, remote radio heads that transmit information back to the central location over fiber. This cloud-like topology reduces equipment, installation, and operating costs while allowing faster, easier network scaling as demand increases.

BOOST YOUR PROFITS WITH INFRASTRUCTURE AGILITY

Infrastructure flexibility allows communications providers to dynamically modify their service offerings to meet changing market needs. The Red Hat, Intel, and 6WIND NFV foundation gives service providers the business agility they need to succeed in an increasingly competitive industry. Elastic infrastructure scalability allows virtual functions to be automatically migrated across shared

infrastructure resources to accelerate service delivery and ensure growing peak demand levels are met. The risk of innovation is greatly reduced as new revenue-boosting services can be created quickly without the purchase of new hardware, and retired just as fast if market acceptance isn't realized. This allows communications providers to pioneer creative new service offerings that can move them ahead of the competition.

PROVIDE SERVICES ON DEMAND

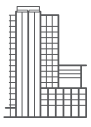
In today's on-demand world, communications subscribers expect services to be available whenever and wherever they want to use them. With the Red Hat, Intel, and 6WIND NFV foundation, shared resources can be dynamically allocated to provide any service at any time, from Internet bandwidth to video-on-demand. With improved access to all services, customers are more likely to take advantage of both existing and new services.

CONTENT-AWARE SECURITY

While using communication services, subscribers access a wide variety of content, from enterprise data to web pages. A flexible network infrastructure based on the Red Hat, Intel, and 6WIND NFV foundation allows network security settings to be automatically configured according to the type of content being transmitted. Sensitive content remains secure without overwhelming network security systems with non-sensitive data. This content-aware functionality allows service providers to increase operational efficiency and offer improved security services to their subscribers.

CONCLUSION

Network function virtualization has the potential to revolutionize the way communications providers bring services to their subscribers. The Red Hat, Intel, and 6WIND NFV foundation combines the performance of physical network implementations with the cost benefits of virtualized, commodity-based environments for increased infrastructure agility and real business value. Contact your Red Hat sales representative today to learn more about the Red Hat, Intel, and 6WIND NFV foundation and take your network profitability to the next level.



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