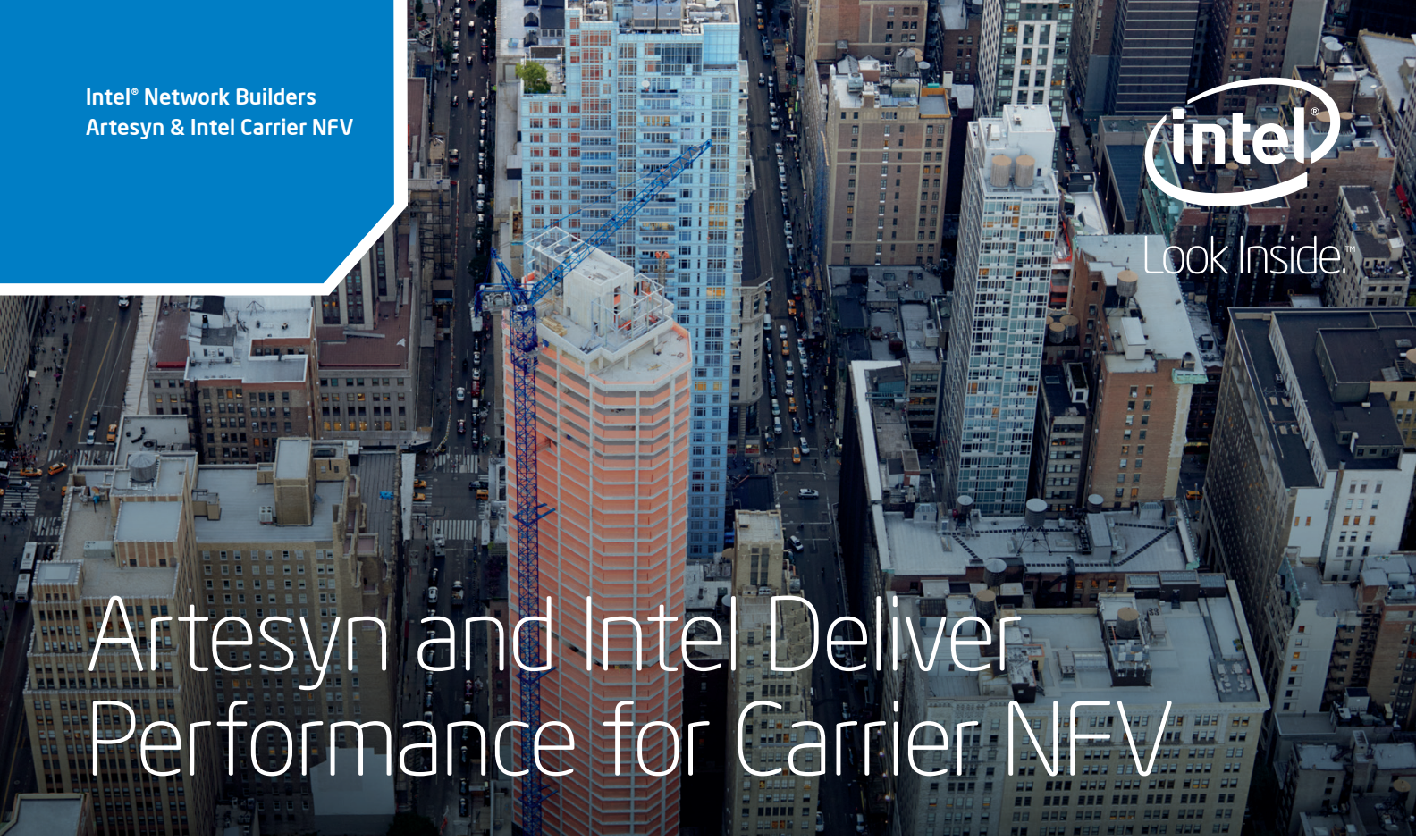
Intel® Network Builders
Artesyn & Intel Carrier NFV



Artesyn and Intel Deliver Performance for Carrier NFV

Network functions virtualization (NVF) was devised to use application virtualization to help telecom operators to dramatically lower the cost of network services. But carrier-class network applications demand a high level of data plane performance, network throughput, and service chaining to fully match the performance of standalone network appliances.

A new breed of virtualization platform is now available that delivers a computing infrastructure with advanced virtualization and management functionality, high-speed load balancing and virtual switching, support for software defined networking and high-performance network connectivity. These systems can be managed to deliver scalable virtual network functions (VNFs) and for rapid VNF set up and tear down; all of this designed to speed application roll out and reduce the time to revenue for operators.

Artesyn Embedded Technologies and Intel® have teamed up to develop the Centellis® Virtualization Platform (VP) to provide operators with a feature-rich and performance leading system in this emerging virtualization platform category.

Challenge

As the NFV industry grows, more is known about the ideal infrastructure needed for running virtual network functions (VNFs) – the telecommunications applications that carriers use to deliver services. The European Telecommunications Standards Institute (ETSI) and other standards bodies are defining the software infrastructure in a project known as the NFV Infrastructure (NFVI) group specification. This will drive the performance needed from the hardware virtualization platform.

There are three main domains that are specified in NFVI:

Compute Domain: this includes the compute node, or CPU, the storage node and any additional computing elements, which could be the network interface card, acceleration hardware (for encryption, etc.) or accelerated packet-forwarding capabilities.

Hypervisor Domain: According to ETSI, the hypervisor domain "mediates the resources of the compute domain to the virtual machines of the software appliances." This means that hypervisors in these applications must be designed with an emphasis on the abstract they provide from the actual hardware in order to provide very high levels of virtual machine portability.

Infrastructure Network Domain: This domain is designed to provide a large number of connectivity services both within the compute domain (virtual switching, load balancing) and also out to the carrier network. This includes communications channels between the components of a distributed VNF (VNFCs), between two or more VNFs, between VNFs and orchestration or management functions and between components of the other two NFVI domains and their orchestration and management.

This infrastructure definition is one key to the success of an NFV deployment because the hardware platforms can now be developed to deliver the uniformly high performance, high reliability, openness to all VNF providers and dynamic VNF reconfigurability needed for NFV to deliver on its cost and performance promises.

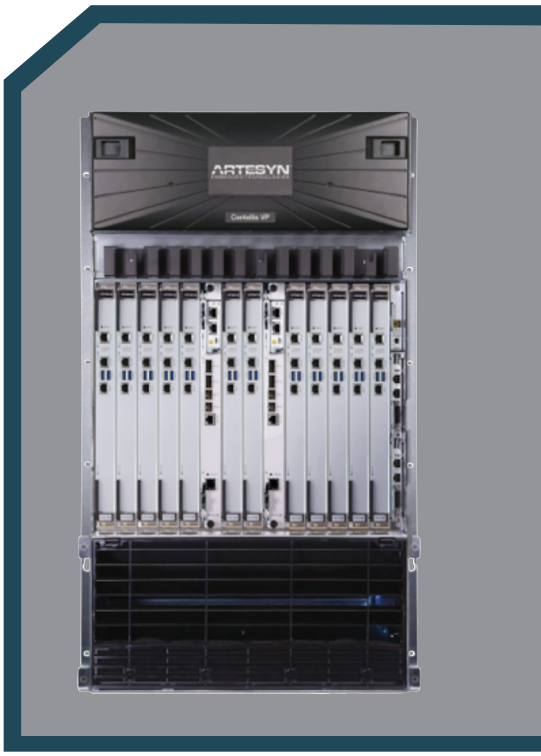
Solution

To address the requirements of NFVI domains, Artesyn has worked closely with Intel to develop the Artesyn Centellis Virtualization Platform (VP), a carrier-class virtualization platform optimized with server, hypervisor and networking technology to provide a complete NFVI solution and become a true, high-performance NFV node in a telecom environment.

The Centellis VP is NEBS-compliant and leverages open hardware and software architectures including the open Advanced TCA (ATCA) standard for chassis and blades.

Intel-powered Compute Blades

The Centellis VP chassis and can support up to 12 payload server blades each with dual Intel® Xeon® E5-2600 V2 processors and with up to 512GB of memory. The chassis backplane is based on Artesyn's QuadStar™ 40G backplane fabric technology that provides configurable bandwidth from 40Gbps to 160Gbps with a variety of link redundancy options for each module to maximize reliability.



Leveraging the open-standard ATCA chassis means the Centellis VP can support third-party blades dedicated to a particular application. For example, a DSP-based media transcoding blade can be integrated alongside compute blades to deliver a complete service. This flexible chassis and high performance payload server blade architecture allows the system to be designed for peak traffic loads, and then to be scaled up by adding more blades to keep up with increasing data traffic loads.

160Gbps Ethernet Networking

Networking options include up to four 40Gbps Ethernet blades for a total of 160Gbps of data connectivity to the carrier network. For connection to the carrier network, the Centellis VP uses Intel's XL710 network interface controller (NIC) based on the Fortville 40GbE Ethernet controller chip. Fortville offers excellent small packet performance for NFV as well as a wide range of hardware optimizations and offloads for rapid network provisioning. The NIC offers superior bi-directional performance using 40Gb Ethernet with full bandwidth on both transmit and receive channels. The device offers network virtualization, providing flow separation for each VM.

Virtualization Platform For SDN and Multivendor VNF Support

Centellis VP features virtualization framework software based on industry standard NFV stacks including a built-in KVM hypervisor. This gives the carrier the widest support for virtual network functions (VNFs) from multiple software vendors.

The virtualization platform is augmented by a comprehensive support for OpenFlow and OpenStack for software-defined networking (SDN) management. Centellis VP's physical and virtual switching functions have integrated support for OpenFlow and OpenStack so they can be managed by a software-defined network (SDN) management system.

This allows VNFs and other resources to be automatically recognized as available by an SDN controller. Carriers can use OpenFlow, or built-in NETCONF protocol, to connect to an SDN controller to configure flows within both the physical switch and Open vSwitch on every blade. The SDN controller can also deploy and destroy applications on the compute blades for very efficient control over network service deployments.

Load balancing and virtual switching for efficient and flexible data flow

To provide the most efficient path for incoming data to reach its designated VNF, the Centellis VP ships with Artesyn's FlowPilot™ load balancing software. FlowPilot supports load-balanced switching across the 480Gbit/ internal packet processing capability and 160Gbit Ethernet interface to the carrier network.

This makes virtual application deployment even more efficient by directing traffic flows to the appropriate virtualized application, freeing up processor-intensive virtual switching (vSwitch) for internal data traffic. The software maintains flow context and packet sequence and is fully transparent to external network elements.

Even with load balancing, virtual switching is important for application scalability and performance. The Centellis VP leverages the Intel Data Plane Development Kit (DPDK), a public-domain software library that provides extra data plane performance for vSwitching by routing network packets around the OS kernel and virtual switch. This high performance virtual switching provides the throughput for inter-VNF data flows as well as for supporting a distributed application across multiple servers.

The high-performance vSwitching is also a key component in the Centellis VP's service chaining functionality. Many network functions need to utilize multiple applications in sequence. For example a data flow might need to first be routed to a firewall/security gateway function before it is passed to its serving application, such as a Session Border Controller.

With its dynamic service chaining, the Centellis VP delivers the data flow that supports these new services to be deployed on multiple servers without installing new appliances existing service chains to be re-configured automatically to respond to changing network conditions.

Conclusion

Finding the right combination of computing, hypervisor and networking performance is critical to rapid service rollout in an NFV environment. While the standards bodies finalize the NFVI specifications, operators can leverage the Artesyn Centellis VP to build a foundation for successful NFV service deployment.

For more information about telecom solutions from Artesyn Embedded Technologies, visit **www.artesyn.com/telecom**

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