Boost Next-Gen CommSP Infrastructure with NSA 7146, a Verified Intel® Select Solutions for NFVI Forwarding Platform

Background: 5G is driving the expansion of entire network infrastructures

There is now an urgency to expand and strengthen network infrastructure to support the increase in 5G service deployments,. Communication service providers (CommSPs) face great challenges to meet these demands but know that meeting demands will have a net positive effect on their businesses.

1. Data growth

First, 5G networks have greatly improved data throughput. This is not only relevant to mobile networks but also fixed networks, where it creates a bigger challenge. We expect that 5G networks will drive the market to develop a variety of IoT and video-related applications and increase the number of network-connected terminals. These data flows will eventually flood every corner of networks, requiring CommSPs to significantly expand network infrastructures to support such traffic.

2. Rapidly changing services

Secondly, 5G provides network slicing capabilities. The purpose is to provide customized services for different application requirements. However, the rapid evolution of applications has also forced CommSPs to quickly adapt and alter the network services they provide. In the past, CommSP-built network infrastructure was usually based on ASIC architecture and purpose-built hardware. Such an architecture provides efficient network operations and is undoubtedly advantageous in a stable network environment. But in the 5G era where a network must be agile, it may be a completely different story.

Challenges: Cost, maintenance, efficiency, and flexibility

1. Investment and maintenance of infrastructure

5G emphasizes flexible services and making customized service adjustments for separate applications. Although purpose-built solutions can provide high-efficiency network operations, they are not flexible enough. 5G networks need larger capacities to carry traffic. Yet investment in infrastructure always involves huge capital and, thus, usually takes years to break even. When service levels exceed the range that the purpose-built solution can handle, it may face depreciation losses before investment is even returned. Excess purpose-built equipment will also increase operating costs (OpEx). Furthermore, equipment may have dissimilar hardware and operating interfaces or independent management software, which altogether increase maintenance complexity.

2. Time to market and rapid service deployment

Network slicing is a principal feature of 5G networks. In short, it provides a range of customized network services for different needs, such as high bandwidth, low latency, large numbers of connections, and high reliability. A terminal may run a variety of applications which all require these network services. For example, a vehicle network system may simultaneously run applications such as low-latency and high-reliability self-driving, high-bandwidth entertainment, and a large number of fault prediction sensors. Network infrastructure ordinarily needs to provide different network services for each of these applications. Moreover, when network services and specific applications are so closely linked, if applications suddenly change, they not only affect updates and upgrades but also usage scenarios. No matter the time or place, CommSPs need to have flexible responses to all scenarios using the same network infrastructure.

3. Hardware resource aligned and arranged for vertical applications

For the aforementioned two challenges, adopting network infrastructure virtualization is generally an option. We can expect CommSPs to continue to transform purpose-built solutions to fully virtualized and cloud native networks. Leveraging general purpose hardware and network services but deployed in NFVI form, which is low-cost, fast and flexible, and decreases time to market, makes expansion and maintenance easier. Although the consensus is that NFVI is critical to building 5G network infrastructure, there are still many deployment issues. Examples include misaligned server resources, lack of access to interfaces, and incompatible versions of drivers or accelerators. The following Intel® Select Solutions for NFVI Forwarding Platform addresses these challenges.

What Are Intel Select Solutions?

Intel Select Solutions are pre-defined, workload optimized solutions designed to minimize the challenges of infrastructure evaluation and deployment. Solutions are validated by OEMs/original design manufacturers (ODMs), certified by ISVs, and verified by Intel. Intel develops these solutions in extensive collaboration with hardware, software, and operating system vendor partners and with the world's leading data center and service providers. Every Intel Select Solution is a tailored combination of Intel technologies intended to deliver predictable, trusted, and compelling performance. To be verified as an Intel Select Solution, a vendor must:

1. Meet the software and hardware stack requirements outlined by the solution's reference-design specifications.
2. Replicate or exceed established reference-benchmark test results.
3. Publish a solution brief to facilitate customer deployment. Solution providers can also develop their own optimizations in order to give end customers a simpler, more consistent deployment experience.

Solution: an NFVI forwarding platform that aligns hardware and virtual applications

NSA7146 is a verified Intel® Select Solutions for NFVI Forwarding Platform. It features a vertical stack of all critical software elements, including BIOS configuration, host operating system, and network and acceleration drivers. We verify all components in providing a system with outstanding performance and optimized capabilities that meets the demands of CommSPs' operational network workloads.

Additionally, as an Intel® Select Solutions for NFVI Forwarding Platform, NSA 7146 is designed with a scalable architecture to maximize network I/O capacity and packet processing throughput per node for deployment across various types of network sites. It supports the Control and User Plane Separation (CUPS) strategy, which allows user-plane functions to be scaled out across multiple systems. The resulting topology allows for many-to-one relationships between node types for more efficient hardware resource usage and lower TCO. Table 1 lists the components of cloud node (user plane) and controller node configurations.

Table 1: NSA7146 Hardware Configuration for Intel® Select Solutions for NFVI Forwarding Platform

Component	Cloud Node Base Configuration	Controller Node Configuration
Server Name	NSA7146	NSA7146
Processor	2x Intel® Xeon® Gold 6252 CPU	2x Intel® Xeon® Gold 5128 CPU
DRAM	384 GB (12 x 32 GB DDR4 2666 MHz)	192 GB (12 x 16 GB DDR4 2666 MHz)
Network Controllers	4x Dual port 25 GbE Intel® Ethernet	2x Dual port 25 GbE Intel® Ethernet

The NSA 7146 includes a comprehensive, workload-optimized software and firmware stack, as shown in Table 2. While the solution is focused on Red Hat® Enterprise Linux® and OpenStack® Platform, it can accommodate other OSs and Virtualization Infrastructure Managers (VIMs) as well.

Table 2: Software Configurations for Intel® Select Solutions for NFVI Forwarding Platform

Topic	Component	SW Version Details	
Firmware	BIOS MCU	SE5C620.86B.02.01.0009.092820190230 Release Date: Sept 28, 2019 0x5000026	
	Intel® Ethernet Converged Network Adapter XXV710 DA-2	v6.80 or later	
Host	OS	Red Hat Enterprise Linux	RHEL7.7-kernel 3.10-1062.12.1.el7.x86_64
	Hypervisor	KVM/QEMU	2.12.0
	Libvirt	Libvirt	4.5.0
	Docker	docker	Version 18.09.7, build 2d0083d
	APPs	DPDK	19.02, 19.11
	APPs	SPDK	20.02
	APPs	CollectD	5.8.0
	Drivers	I40e	2.8.10-k
		NVMe	1.0
Guest	APPs	DPDK	18.11, 19.02
		Ubuntu	18.04LTS
	OS	Red Hat* Enterprise Linux	7.7
		CentOS	7.7
	Drivers	I40evf	3.2.3-k

Intel verifies all Intel® Select Solutions, including NSA 7146, to meet specified minimum levels of workload-optimized performance capabilities. Our solution meets or exceeds vBNG design and testing standards, as shown in Table 3.

Table 3: Minimum vBNG Performance Standards for Intel® Select Solutions for NFVI Forwarding Platform

Benchmark Type	Target for Base Configuration
Overall Throughput	150 Gbps per server
Latency	50 µs at 256 B packets
Overall Server Power	<430W

Per-CPU power	<100W per socket

Conclusion:

In committing to being customers' long-term supplier, NEXCOM focuses on powerful computing and network technology and helps CommSPs build superior infrastructure to face the rapid changes of the near-future 5G world.

NSA7146 is a verified Intel® Select Solutions for NFVI Forwarding Platform that provides high-performance computing for virtualization applications. By deploying on network infrastructure, it also delivers flexibility and high reliability. The NSA7146 is your best choice as your network's building block to meet the challenges of the 5G future.

For more information, please click the following link:

http://www.nexcom.com/Products/network-and-communication-solutions/edge-cloud-solutions/datacenter-appliance/datacenter-appliance-nsa-7146

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