

Simplify the Choice of NFV Hardware with Intel® Select Solutions

With so many options available, it can be hard to choose the right standard hardware for Network Functions Virtualization (NFV). Intel can help make it easier by publishing validated specifications

Executive Summary

Communications Service Providers (CoSPs) are adopting Network Functions Virtualization (NFV) strategies to meet the scalability and performance requirements of the network. Using standard hardware makes it easier to scale by allocating resources dynamically or adding new servers to the resource pool, but choosing the right hardware can remain a challenge. There are many options available for each aspect of the technology stack, and network workloads can be demanding in the performance they require.

Intel® Select Solutions for NFV Infrastructure (NFVI) provide validated specifications for servers that meet the performance requirements of NFV. Vendors including Lenovo, Quanta Cloud Technology (QCT) and Advantech offer servers that comply with the specifications and that have been tested to deliver the necessary performance.

For CoSPs, acquiring an Intel Select Solution for NFVI simplifies the choice of hardware, and streamlines the testing and integration required, so they can deploy servers faster and free up more time to focus on innovation.

Choosing the Right Hardware for NFV

To meet the network's scalability and performance requirements, leading CoSPs are utilizing NFV. In an NFVI, virtualized appliances run on general purpose hardware. The CoSP benefits from the flexibility to allocate resources to the network functions as required, and the ability to easily scale up by adding standard servers to the resource pool. Additionally, using standard hardware means the CoSP can benefit from reduced cost and breadth of choice, due to a strong ecosystem.

However, using standard hardware presents a significant new challenge: specifying and selecting the right hardware. It can be difficult for a CoSP to navigate the huge range of options available, and to choose hardware with confidence it will deliver the performance they require. Significant time and resources might be invested in assessing and testing the hardware options, and in validating their performance post-acquisition. If the CoSP has resources tied up in routine activities such as these, it will have fewer resources available to support innovation and differentiation.

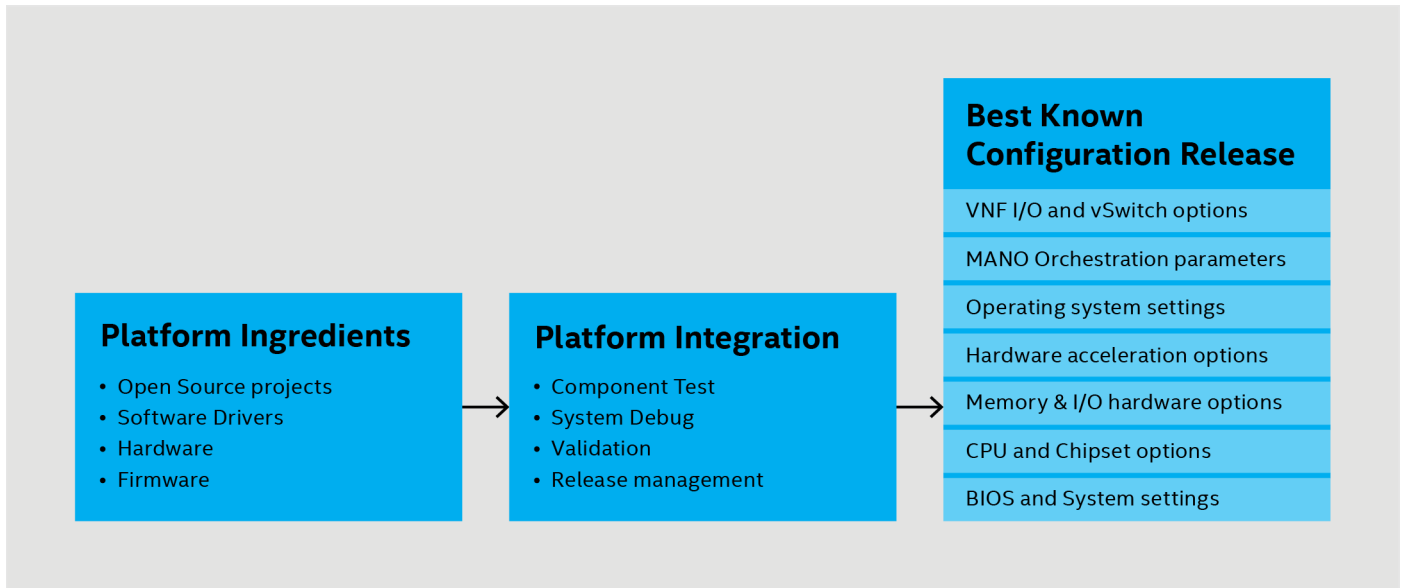


Figure 1. Intel® Select Solutions for Network Functions Virtualization Infrastructure (NFVI) integration process.

Intel® Select Solutions Simplify Choice

Intel has engaged with hardware and software vendors to develop best-known configurations of hardware and software for NFV workloads and has proven these with production deployments. The resulting configurations are published as Intel Select Solutions for NFVI. With ever-evolving software, this is an ongoing process and frequent updates are handled in Intel's platform test and validation labs, using the process shown in Figure 1.

The use of hardware based on Intel Select Solutions for NFVI brings several advantages to CoSPs:

- The pre-integration of the platforms reduces the total cost of ownership by eliminating some initial testing activities and also enabling an open, competitive procurement market.
- The removal of testing and optimization tasks means that systems are brought into production faster, both initially and also in the event that the CoSP subsequently wants to change their platform supplier.
- Better performance is available for workloads as system optimization is undertaken continuously by hardware and software experts integrating a standardized software stack based on field experience, rather than the CoSP attempting the complex customization of their own system. The resulting performance can be checked by the CoSP with open source tools, which also allow comparison between vendors.

Equipment vendors can use Intel's regular releases of the best-known configuration to develop their own products. Verification as an Intel Select Solution requires testing to ensure that the product meets or exceeds the minimum performance specifications and provisioning of support resources.

In addition to availability from multiple hardware vendors, Intel Select Solutions are also available with support for various operating system software stacks. These can be used directly or incorporated in offerings from systems integrators (SIs) or network equipment providers (NEPs), which can benefit from reduced integration time and the ability to focus on higher-value activities.

CoSPs can also benefit from pre-integration of virtualized applications by the application developers, reducing the complexity and accelerating deployment time.

Solution Benefits

- **Simplified sourcing.** With a vast array of standard server hardware available, it can be hard for Communications Service Providers (CoSPs) to choose the right configuration. The Intel® Select Solutions for Network Functions Virtualization Infrastructure (NFVI) use a specification that meets the performance and workload-specific requirements of virtual network functions.
- **Proven performance.** Solutions under the Intel Select Solutions for NFVI umbrella have been validated to deliver the performance required, so CoSPs can procure them with confidence and reduce their testing and integration time.
- **Pre-integrated stacks.** The Intel Select Solutions for NFVI can be offered by vendors with operating systems pre-integrated, and with additional hardware and software elements, such as Ethernet switches and systems management software.

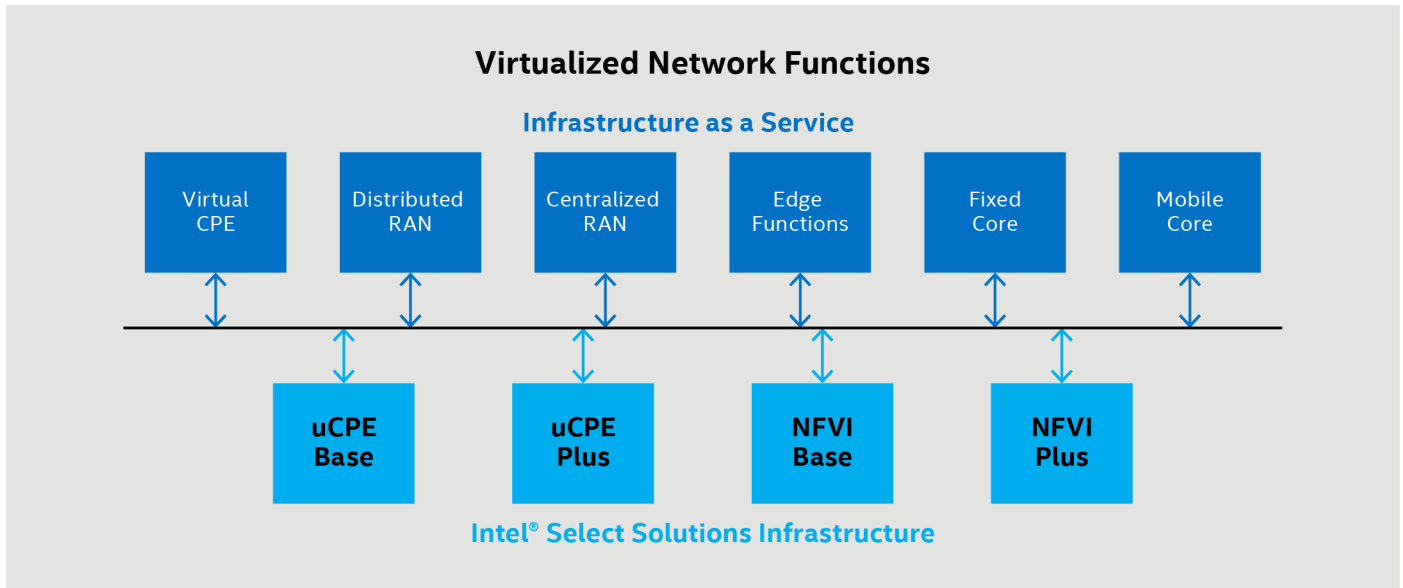


Figure 2. Intel® Select Solutions can be managed using a consistent interface.

Specifications for Intel® Select Solutions for NFVI

Intel has created two Intel Select Solutions designed for the NFV market:

- **NFVI:** The Intel Select Solutions for NFVI portfolio covers a range of standard dual-socket rack-mount servers packaged for use in central office and data center equipment rooms. Using Intel® Xeon® Scalable processors, these are suitable for a wide range of CoSP requirements, including fixed and mobile cores as well as radio access network (RAN) workloads.
- **Universal Customer Premises Equipment (uCPE):** Additionally the Intel® Select Solutions for uCPE portfolio provides footprint servers suitable for access network node or customer sites. These universal CPE servers have a single Intel® Xeon® D processor, with configurations to suit enterprise network requirements, such as software-defined wide area network (SD-WAN) applications.

Two standard hardware configurations are available for each type, with the base option being optimized for mainstream price/performance characteristics and the plus option optimized for the highest workload density and performance. The different configurations are supported by a consistent application interface enabling flexible deployment of virtualized network functions, as shown in Figure 2.

Intel® QuickAssist Technology (Intel® QAT) helps to achieve the performance required for NFV by accelerating compression/decompression, encryption, and security for VPN traffic. The open source Data Plane Development Kit (DPDK) is also a required component of the solution, used for accelerating packet processing.

Lenovo offers an Intel Select Solution for NFVI that complies with the base configuration reference design. It is based on the Lenovo ThinkSystem® SR650 server, powered by the Intel®

Xeon® Platinum 8176 processor. The Intel® Ethernet Network Adapter XXV710-DA2 is used for networking, and a PCIe add-in card is used to add Intel QAT capabilities. Storage is provided by Intel® SSDs. Lenovo offers additional hardware and software components pre-integrated for a rack-level NFVI solution, including Ethernet switches, the Red Hat® Enterprise Linux 7.4 operating system, and Lenovo XClarity® Administrator software for systems management.

QCT also offers an Intel Select Solution for NFVI, called QxStack®, based on the Intel® Xeon® Gold 6152 processor. Intel SSDs are used for storage, and the Intel Ethernet Network Adapter XXV710-DA2 is used for networking. The Intel® QuickAssist Adapter 8970 is used to add Intel QAT capabilities to achieve the required performance. QCT's solution is based on the Ubuntu® 16.04.3 Linux operating system.

Advantech has verified its FWA-6170* workload-optimized network appliance and SKY-8201* carrier grade servers as Intel Select Solutions for NFVI. Both platforms have passed the configuration tests for the plus option, using the Intel® Xeon® Platinum 8160T processor and the Intel® Xeon® Gold 6154 processor. The server boards use two dual 40GbE Advantech Ethernet Cards based on the Intel® Ethernet Controller XL710-BM2. Together with two 1TB Advantech SATA SSDs, four 2TB Intel® SSD Data Center P4500 Series are used for storage. Intel® SSD Data Center Family for NVMe® helps to accelerate applications across a wide range of NFVI workloads. Intel QAT acceleration is used to improve performance and efficiency by offloading encryption and compression operations. The solutions have been tested with Red Hat Enterprise Linux (RHEL).

These solutions can be used by CoSPs when procuring general purpose hardware, to give them confidence that their server has been tested to meet the demanding performance requirements of the network.

Conclusion

These solutions from Advantech, QCT and Lenovo, and other Intel Select Solutions for NFVI that may be available, can accelerate a CoSP's NFV initiatives by providing validated hardware platforms with proven software stack performance. Simplifying the acquisition and deployment of NFV-ready hardware helps the CoSP to focus on creating innovative and differentiating new services.

Find the solution that is right for your organization. Contact your Intel representative or visit <https://networkbuilders.intel.com/>

Learn More

- [Intel® Select Solutions for NFVI](#)
- [Solution brief: Lenovo's Intel Select Solution for NFVI](#)
- [Solution brief: QxStack* for NFVI on Ubuntu from QCT](#)
- [Solution brief: Intel® Select Solution for NFVI with Advantech Servers and Appliances](#)
- [Intel® Select Solutions for uCPE](#)
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