

Intel® Open Network Platform Server Release 1.2: Driving Network Transformation

The Intel® Open Network Platform Server (Intel® ONP Server) r1.2 offers a complete application-ready solution to spur adoption of software-defined networking (SDN) and network function virtualization (NFV) in telecom carrier networks, cloud data centers, and enterprise environments.

As an active, long-term member of the open-source community, Intel contributes to a number of open-source projects and participates in industry consortiums' work to help increase SDN and NFV market visibility and strengthen the supporting ecosystem. Intel's engineering work on individual projects also improves the use of processor, memory, and I/O resources in SDN and NFV deployments—optimizing performance and enhancing efficiency.

Intel ONP Server is a reference architecture that provides engineering guidance and ecosystem support to enable widespread adoption of SDN and NFV solutions across telecommunications, cloud, and enterprise sectors. The reference architecture is based on cost-effective, standard high-volume servers (SHVS) and an open-source software stack. This collection of open source software ingredients is based on contributions made by Intel and the work done in community projects, including: Data Plane Development Kit (DPDK), Open vSwitch*, OpenDaylight*, OpenStack*, and KVM*. It is a “better together” software stack tuned for use in SDN and NFV implementations. Having such a strong foundation enables an open ecosystem based on Intel® architecture that delivers industry-leading performance, power, cost, and security-optimized solutions. Intel ONP Server simplifies the development process and makes it easier to establish solutions within an NFV/SDN environment.

As shown in Figure 1, Intel and the Intel® Network Builders community of partners collaborate with cloud-service providers and telecommunication firms on trial deployments and solution implementations. These collaborations have helped Intel shape and refine the Intel ONP server reference architecture so that it adapts well to a wide range of telecommunication, enterprise, and cloud deployment use cases.

New Features Added to Intel® Open Network Platform Server Release 1.2

The latest version of the Intel ONP Server, v1.2 includes extensive integration with open-source software releases to which Intel provided contributions.

- First release to include OpenStack* Juno
- First release to include OpenDaylight* Helium
- Data Plane Development Kit (DPDK) release 1.7.1
- Open vSwitch* release 2.3 with DPDK-netdev
- Intel ONP Server was validated with a new-generation server platform that incorporates the Intel® Xeon® processor E5-2600 v3 (code-named Haswell).

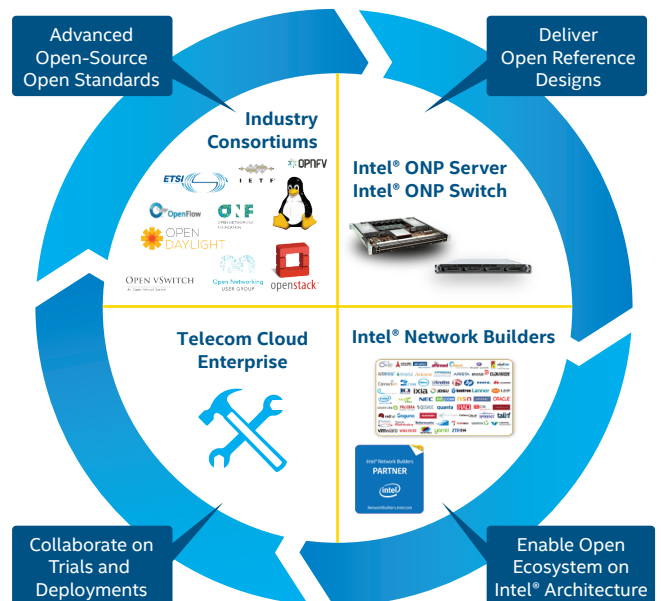


Figure 1. Market enablement with Intel® Open Network Platform Server reference architecture.

Intel Open Network Platform Server Overview

Intel ONP Server is a comprehensive reference architecture available on O1.org and composed of three elements: the compute node, OpenDaylight controller, and OpenStack platform. This reference architecture is aligned with the architecture defined by ETSI for NFV and with the goals of the Open Platform for NFV* (OPNFV*) project.

The key characteristics of the Intel ONP Server reference architecture are as follows:

- Based on Intel architecture, industry-standard servers. Ongoing advances in Intel® processors—including new microarchitectures and smaller-scale process technologies—enable Intel ONP Server to keep pace with the capabilities of future generations of platforms to deliver amazing performance and energy efficiency in SDN and NFV networks.
- The Intel ONP Server software stack includes only open-source software, sourced from open standard community projects. Contributions to projects and standards such as Open vSwitch, the DPDK, OpenStack, and OpenDaylight have played a key role in the development of the Intel ONP Server reference architecture; open-source code developed as part of the Intel ONP Server initiative is communicated through the communities, as well as O1.org. A view of the Intel ONP Server as a single node in the network appears in Figure 2.
- The Intel ONP Server reference architecture defines a test environment composed of the server, a control layer, and an OpenStack layer. Figure 3 illustrates the key ingredients of this test environment. OpenStack and OpenDaylight provide the management and controller platform. Toward the bottom of the figure are the compute nodes, which consist of network interface control cards, the Open vSwitch functionality, DPDK, and supplier-specific applications executing in virtual machines.

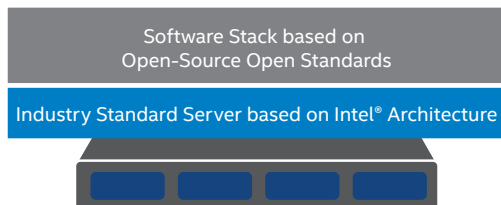


Figure 2. Intel® Open Network Platform Server node view.

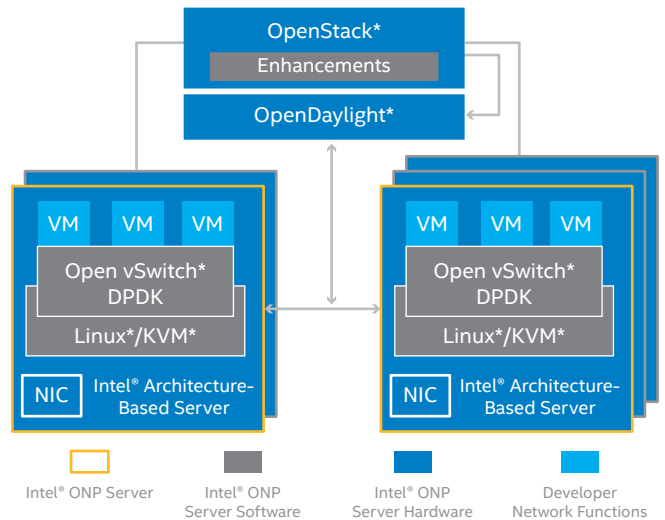


Figure 3. Key hardware and software ingredients in an Intel® Open Network Platform Server test environment.

Intel Open Network Platform Server Release Deliverables

Intel ONP Server is released quarterly through O1.org. Two main documents are offered:

- **Intel® ONP Server Reference Architecture Guide**
 - Documentation for building and validating an SDN test environment based on Intel ONP Server software stack. All network elements are running on a cost-effective, standard high-volume server (SHVS) based on Intel architecture.
- **Intel® ONP Server Benchmark test results**
 - Benchmark criteria are based on use cases informed by customers and market requirements.

Capitalizing on the Benefits of Intel Open Network Platform Server

Intel ONP Server offers these distinct benefits:

- **Service providers**, data center operators, and enterprises can use Intel ONP Server to create proof-of-concept designs to validate performance and operational objectives, collaboratively develop industry standards, and test equipment and software prior to commercial deployment.
- **Hardware producers**, including telecomm equipment manufacturers (TEMs) and original equipment manufacturers (OEMs), gain an edge in the market by being able to accelerate development projects and take advantage of the latest Intel processor-based server platforms.

- **Software producers**, including independent software vendors (ISVs) and operating-system vendors (OSVs), can capitalize on an optimized, pre-validated development platform, providing access to the latest Intel processor-based server platforms.

Industry-wide, Intel ONP Server is enabling wide-scale network transformation—using SDN and NFV simply and cost-effectively on Intel architecture. The flexible reference architecture helps organizations accelerate their network virtualization initiatives, harnessing the rich functionality of current and future open platforms.

Intel Open Network Platform Server Release 1.2 - Software and Hardware Components

The following four tables detail the hardware and software for the Intel ONP Server, as specified for release 1.2.

Table 1. Software components included in Intel® Open Network Platform Server compute node software.

SOFTWARE COMPONENT	DESCRIPTION
Fedora* 20 x86_64	Underlying system-level OS, based on the 3.15.6-200 kernel
Data Plane Development Kit (DPDK) 1.7.1	Software libraries used to dramatically accelerate packet processing, increasing throughput and scalability
Intel® DPDK Accelerated vSwitch 1.2-0	Modified version of Open vSwitch, accelerated using Intel DPDK; includes a modified version of QEMU-KVM 1.6.2
Open vSwitch* 2.3	Open vSwitch* 2.3 with DPDK-netdev
Intel® QuickAssist Technology (QATmux.L.1.1.0-60.tar.gz and icp_qat_netkey.L.0.4.2-10.tar.gz)	Hardware-based acceleration and communication mechanisms for services such as encryption and compression
Libvirt 1.1.3.6-2	Toolkit and API used by QEMU-KVM to manage virtual machines and by OpenStack* Juno to communicate with hosts
QEMU 1.6.2-10	Open-source machine emulator and virtualizer. Includes KVM* that is used for the Intel ONP Server

Table 2. Software components included in Intel® Open Network Platform Server controller node software.

SOFTWARE	DESCRIPTION
Fedora* 20 x86_64	Underlying system-level OS, based on the 3.15.6-200 kernel
OpenStack* Juno	OpenStack, related tools, and Intel patches for building and managing clouds; includes DevStack shell script for automating development-environment builds
OpenDaylight* Helium	OpenDaylight's second software release, Helium, which provides deeper integration with OpenStack

Table 3. Example of Intel® Open Network Platform Server hardware (other hardware configurations available).

ITEM	DESCRIPTION	NOTES
Platform	Intel® Server Board S2600WTT 1100 W power supply	Intel® Xeon® processor-based DP server (2 CPU sockets) 120 GB SSD 2.5-in SATA 6 GB/s SSDSC2BB120G4
Processor	Intel® Xeon® processor E5-2697 v3	14 core, 2.60 GHz, 145 W, 35 M total cache per processor, 9.6 GT/s Intel® QuickPath Interconnect, DDR4-1600/1866/2133
Cores	14 physical cores per CPU	28 Hyper-threaded cores per CPU for 56 total
Memory	8 GB, DDR4, RDIMM, Crucial	64 GB RAM (8x 8GB); tested with 32 GB memory
NICs (Niantic)	Dual port Intel® 82599 10 Gigabit Ethernet controller	NICs are on socket zero
BIOS	BIOS revision: GRNDSDP1.86B.0038.R01.1409040644	Intel® Virtualization Technology for Directed I/O (Intel® VT-d) enabled. IOMMU enabled for single root I/O virtualization (SR-IOV) PCI pass-through and PF PCI* passthrough tests Hyper-Threading disabled
Intel® QuickAssist Technology	Intel® Communications Chipset 8950	PCIe server add-in card with 8950 chipset

Table 4. Example of Intel® Open Network Platform Server hardware (other hardware configurations available).

ITEM	DESCRIPTION	NOTES
Platform	Intel® Server Board 2U 8x3.5 SATA 2x750 W 2xHS Rails Intel R2308GZ4GC	Intel® Xeon® processor-based DP server (2 CPU sockets) 240 GB SSD 2.5-in SATA 6 GB/s SSDSC2BB240G401 DC S3500 Series Supports SR-IOV
Processors	Intel® Xeon® processor Series E5-2680 v2 LGA2011 2.8 GHz 25 MB 115 W 10 cores	Socket-R (EP), 10 Core, 2.8 GHz, 115 W 2.5 M per core LLC, 8.0 GT/s Intel® QuickPath Interconnect, DDR-3-1867, HT, turbo Long product availability
Cores	10 physical cores per CPU	20 Hyper-threaded cores per CPU for 40 total cores
Memory	8 GB, 1600 Reg ECC 1.5 V DDR3 Kingston KVR16R11S4/8I	64 GB RAM (8 x 8 GB)
NICs (Niantic)	Dual port Intel® 82599 10 Gigabit Ethernet controller	NICs are on socket zero (3 PCIe slots available on socket 0) Supports SR-IOV
BIOS	SE5C600.86B.02.01.0002.082220131453 Release Date: 08/22/2013 BIOS Revision: 4.6	Intel® Virtualization Technology for Directed I/O (Intel® VT-d) enabled only for QAT tests Hyper-Threading disabled
Intel® Quick Assist Technology	Intel® Communication Chipset 8950	PCIe server add-in card with 8950 chipset. Supports SR-IOV

Learn more about the Intel Open Network Platform: www.intel.com/ONP

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