



Intel® Open Network Platform Release 2.0 Hardware and Software Specifications Application Note

SDN/NFV Solutions with Intel® Open Network Platform

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Revision History

Date	Revision	Comments
January 22, 2016	1.0	Initial release of Intel® Open Network Platform Release 2.0
April 6, 2016	1.1	Minor clarifications and typo corrections in hardware and software specifications



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1.0 Introduction

Intel® Open Network Platform (ONP) Reference Architecture Release 2.0 includes the following key documents:

- Intel® ONP Release 2.0 Reference Architecture Guide, which describes integration of the open-source ingredients into Intel® ONP Reference Architecture
- Intel® ONP Release 2.0 Performance Test Report, which describes:
 - Packet processing performance and test procedures for Intel® ONP 2.0 software on the Intel® Xeon® processor E5-2600 v3 product family platforms.
 - Packet processing performance and test procedures for Intel® ONP 1.5 software on the Intel® Xeon® processor D-1500 product family System-on-Chip (SoC) platforms.
- Intel® ONP Release 2.0 vE-CPE Performance Test Report, which describes packet processing performance and test procedures for a vE-CPE use-case for Intel® ONP 2.0 software on Intel® Atom™ processor C2750 SoC platform.

Ideally, Intel® ONP integration and benchmarking activities should use identical hardware platform specifications and software versions. Differences however do sometimes occur due to software issues, timing of software version and patch revisions and other factors due to parallel engineering activities. This application note contains information on these differences.

1.1 Reference documents

Following table references the documents relevant to this application note.

Table 1-1 Reference documents

Document	Location
Intel® ONP Release 2.0 Reference Architecture Guide	01.org
Intel® ONP Release 2.0 Performance Test Report	01.org
Intel® ONP Release 2.0 vE-CPE Performance Test Report	01.org
Intel® ONP Server Release 1.5 Reference Architecture Guide	https://download.01.org/packet-processing/ONPS1.5/Intel_ONP_Server_Release_1.5_Reference_Architecture_Guide_Rev1.2.pdf
Intel® ONP Server Release 1.5 Performance Test Report	https://download.01.org/packet-processing/ONPS1.5/Intel_ONP_Server_Release_1.5_Performance_Test_Report_Rev1.2.pdf
Intel® ONP Server Release 1.5 Application Note	https://download.01.org/packet-processing/ONPS1.5/Intel_ONP_Server_Release_1.5_Application_Note_Rev1.0.pdf



2.0 Hardware Specifications

This section lists hardware specifications used for the Intel® ONP Release 2.0 Reference Architecture Guide and Intel® ONP Release 2.0 Performance Test Report.

Table 2-1 lists the differences between hardware specifications for Intel® ONP 2.0 Reference Architecture Guide and Intel® ONP 2.0 Performance Test Report for platforms with Intel® Xeon® processor E5-2600 v3 product family.

Table 2-1 Intel® Xeon® processor E5-2600 v3 product family-based platforms – differences in hardware specifications for Intel® ONP 2.0 Reference Architecture Guide and Intel® ONP 2.0 Performance Test Report

Item	Intel® ONP 2.0 Reference Architecture Guide	Intel® ONP 2.0 Performance Test Report	Notes
Platform	Intel® Server Board S2600WTT	Intel® Server Board S2600WT2	TT model has two integrated 10GbE ports. T2 model has two integrated 1GbE ports. LAN on motherboard was not used in Integration and Performance tests. http://ark.intel.com/compare/82156,82155
Processors	Dual Intel® Xeon® processor E5-2697 v3	Dual Intel® Xeon® processor E5-2697 v3	Integration testing was done with two types of processors.
	Dual Intel® Xeon® processor E5-2699 v3		
Memory	64 GB total; Crucial CT8G4RFS4213	128 GB Total; Micron 16 GB 1Rx4 PC4-2133MHz, 16 GB per channel, 8 Channels	For current tests, memory capacity is not expected to limit performance.
NICs	Intel® Ethernet Converged Network Adapter X710-DA4	2 x Intel® Ethernet Converged Network Adapter X710-DA2 Adapter total: 4 x 10GE Ports	Intel® Ethernet Converged Network Adapters X710 DA4, XL710 QDA2 and X710 DA2 belong to the same controller family (formerly Fortville). http://ark.intel.com/compare/83967,83965,83964
	Intel® Ethernet Converged Network Adapter XL710-QDA2		
BIOS	SE5C610.86B.01.01.000 9.060120151350 Release Date: 03/19/2015	SE5C610.86B.01.01.0008. 021120151325 Release Date: 02/11/2015	Generally, the latest BIOS versions are used on all platforms. Changes can result, if there are known issues or BIOS versions change during integration and benchmarking activities.
Intel® QuickAssist Technology	Intel® QuickAssist Adapter 8950	QAT acceleration was not used for benchmarking purposes.	Integration testing includes Intel® QAT adapter in the hardware specification, however Intel® QAT functionality was not used. Intel® QAT hardware was not present in performance test setup.
Local Storage	120 GB SSD 2.5in SATA 6GB/s Intel® Wolfville SSDSC2BB120G4	500 GB HDD Seagate SATA Barracuda 7200.12 (SN:9VMKQZMT)	For current tests, disk drive/SSD is not expected to limit performance.



Table 2-2 lists the differences between hardware specifications for Intel® ONP 2.0 Reference Architecture Guide and Intel® ONP 2.0 Performance Test Report for platforms with Intel® Xeon® processor D-1500 family-based SoC platforms.

Table 2-2 Intel® Xeon® processor D-1500 family-based SoC platforms - differences in hardware specifications for Intel® ONP 2.0 Reference Architecture Guide and Intel® ONP 2.0 Performance Test Report

Item	Intel® ONP 2.0 Reference Architecture Guide	Intel® ONP 2.0 Performance Test Report	Notes
Platform	SuperMicro SuperServer 5018D-FN4T	SuperMicro SuperServer 5018D-FN4T	Intel® Xeon® processor-based SOC server Motherboard: SuperMicro X10SDV-8C-TLN4F Dual LAN via Intel® i350-AM2 Gigabit Ethernet Dual LAN via SoC 10GBase-T 500 GB HDD 3.5in SATA 6GB/s 7200RPM 16MB Seagate Barracuda ST500DM002 Both integration testing and performance testing used the same platform.
Processors	Intel® Xeon® processor D-1540	Intel® Xeon® processor D-1540	Integration testing was done with two processor SKUs. Performance testing only used a single SKU. http://ark.intel.com/compare/87039,87038
	Intel® Xeon® processor D-1520		
Memory	32 GB total; Kingston KVR21R15S4/8	32GB Total; Micron 8GB 1Rx4 PC4-2133MHz, 16GB per channel, 2 Channels,	For current tests, different memory modules are not expected to limit performance.
NICs	Dual LAN via Intel® i350-AM2 Gigabit Ethernet Dual LAN via SoC 10GBase-T	1 x Intel® Ethernet Converged Network Adapter X710-DA4, total: 4 Ports (formerly Fortville)	Integration testing used integrated Ethernet controller in SoC, supporting 2x10GbE ports on the motherboard. Performance tests were conducted on Intel® Ethernet X710-DA4 Converged Network Adapter supporting 4x10GbE ports.

Intel® ONP 2.0 integration tests and performance tests of vE-CPE use case were conducted on Intel® Atom™ processor C2758-based SoC platform with identical hardware specifications. For this reason, comparison table with hardware specifications is not provided in this document. For details, please follow Intel® ONP Release 2.0 Reference Architecture Guide document.



3.0 Software Versions

This section lists software versions used for Intel® ONP Release 2.0 Performance Test Report and corresponding releases of Intel® ONP Reference Architecture Guide. Specifically, software versions and rationale for differences compare:

- Intel® ONP Release 2.0 Reference Architecture Guide and Intel® ONP Release 2.0 Performance Test Report using Intel® Xeon® processor E5-2600 v3 product family-based platform.
- Intel® ONP Server Release 1.5 Reference Architecture Guide and Intel® ONP Release 2.0 Performance Test Report for Intel® Xeon® processor D-1500 family-based SoC platform.

For reference, software versions used in performance testing of Intel® ONP Server 1.5 are included.

Table 3-1 lists software versions used with Intel® Xeon® processor E5-2600 v3 product family-based platforms. The table provides a comparison of Intel® ONP 2.0 Reference Architecture Guide and software versions used in Performance Test Reports for Intel® ONP 1.5 and Intel® ONP 2.0 releases.

When performance testing with the Intel® Xeon® processor E5-2697 v3 platform started, software versions from the previous Intel® ONP release (i.e. Intel® ONP 1.5) were used for reasons of availability and known stability. Open vSwitch was subsequently updated from version 2.4.0 to the version 2.4.9 (the same version used in Intel® ONP 2.0 Reference Architecture Guide).

Please also note that performance tests were conducted with Fedora 21 operating system and integration tests were done with both Fedora 22 and CentOS-7.1.

Table 3-1 Intel® Xeon® processor E5-2600 v3 product family-based platforms – software versions for Intel® ONP 2.0 Reference Architecture Guide and versions used in Performance Test Reports for Intel® ONP 1.5 and Intel® ONP 2.0 releases

Item	Intel® ONP 2.0 Reference Architecture Guide	Intel® ONP 1.5 Performance Test Report	Intel® ONP 2.0 Performance Test Report
Operating System	Fedora 22 Server x86_64 Kernel version: 4.1.10-200.fc22.x86_64	Fedora 21 x86_64 (Server version) Kernel version: 3.17.4-301.fc21.x86_64	Fedora 21 x86_64 (Server version) Kernel version: 3.17.4-301.fc21.x86_64
	CentOS-7 (1503) x86_64 DVD ISO Kernel version: 3.10.0-229.el7.x86_64		
QEMU-KVM	QEMU-KVM version: 2.3.1-7.fc22.x86_64 libvirt version: 1.2.13.1-3.fc22.x86_64	QEMU-KVM version 2.2.1 libvirt-1.2.9.3-2.fc21.x86_64	QEMU-KVM version 2.2.1 libvirt-1.2.9.3-2.fc21.x86_64
DPDK	2.1.0	2.0.0	2.0.0
Open vSwitch with DPDK	Open vSwitch 2.4.9 Commit ID 88058f19ed9aadb1b22d26d93e46b3fd5eb1ad32	2.4.0	OvS Release 2.4.9 Commit ID 2a33a3c20f56b8ac09abebc8b14fca9314abfacb



Table 3-2 lists software versions used with Intel® Xeon® processor D-1500 family-based SoC platforms. The table provides a comparison of Intel® ONP 1.5 Reference Architecture Guide and software versions used in Performance Test Reports for Intel® ONP 1.5 and Intel® ONP 2.0 releases.

When performance testing with Intel® Xeon® processor D-1500 family –based SoC platform started, software versions from Intel® ONP 1.5 release were used for reasons of availability and known stability. The software versions for this platform are common with software versions of Intel® Xeon® processor E5-2697 v3 platform used in performance testing of Intel® ONP 1.5. Thus, information on these exceptions is applicable and already provided in the [Intel® ONP Server Release 1.5 Application Note](#) available on [01.org](#).

Table 3-2 Intel® Xeon® processor D-1500 family-based SoC platforms – software versions for Intel® ONP 1.5 Reference Architecture Guide and versions used in Performance Test Reports for Intel® ONP 1.5 and Intel® ONP 2.0 releases

Item	Intel® ONP 1.5 Reference Architecture Guide	Intel® ONP 1.5 Performance Test Report	Intel® ONP 2.0 Performance Test Report
Operating System	Fedora 21 x86_64	Fedora 21 x86_64	Fedora 21 x86_64
Kernel	3.18.8-201.fc21.x86_64	3.17.4-301.fc21.x86_64	3.17.4-301.fc21.x86_64
QEMU-KVM	2.3.0.5.fc21.x86_64	2.2.1	2.2.1
libvirt	libvirt-1.2.9.3-2.fc21.x86_64 (non-DPDK nodes) libvirt-1.2.13.1-2.fc21.x86_64 (DPDK nodes)	libvirt-1.2.9.3-2.fc21.x86_64	libvirt-1.2.9.3-2.fc21.x86_64
DPDK	2.0.0	2.0.0	2.0.0
Open vSwitch	2.3.2 (non-DPDK nodes) 2.4.90 (OvS with DPDK)	2.4.0	2.4.0

Intel® ONP 2.0 integration tests and performance tests of vE-CPE use case were done with the same software ingredients versions. Please also note that vE-CPE performance tests were conducted with Fedora 22 operating system and integration tests were done with both Fedora 22 and CentOS-7.1. For this reason, comparison table with software versions is not provided in this document. For details, please follow Intel® ONP Release 2.0 Reference Architecture Guide document.



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