

## BRIEFING SHEET

Network Transformation

# Building virtualized, cloud-optimized, 5G-ready networks

### What's the challenge?

- To remain competitive, communications service providers (CoSPs) must be able to cost-effectively launch 5G services in minutes, rather than days or weeks
- For this, they need virtualized, cloud-optimized, 5G-ready networks, with a low total cost of ownership (TCO)
- Finding high-performing, optimized hardware to support network functions virtualization (NFV) – the cornerstone of the agile, scalable and responsive network – is crucial

### What's the solution?

- Optimized for network-centric workloads, 2nd generation Intel® Xeon® Scalable processors improve the performance of NFV workloads by up to 1.25 - 1.58x<sup>1</sup>
- Additional processing headroom delivers enhanced virtual machine (VM) and virtual network function (VNF) capacity and density, enabling CoSPs to handle greater subscriber capacity and mobile services and reduce bottlenecks for fixed and mobile 5G networks
- Networking and NFV SKUs define the base frequency of the 2nd generation Intel Xeon Scalable Processors for networking and NFV workloads, and allow CoSPs to direct more frequency to higher priority workloads to boost VNF performance when they need to enable the best performance per watt solution
- Intel® Optane™ DC persistent memory provides a bigger memory footprint and access to faster storage closer to the CPU for memory-intensive network applications such as content delivery networks (CDNs), in-memory databases (IMDBs) and enhanced NFV infrastructure
- And, integrated Intel® QuickAssist Technology (Intel® QAT) supports bulk encryption and decryption, public key exchange and compress and verify hardware acceleration

## Learn More

Intel® Xeon® Scalable processor -

<https://www.intel.com/content/www/us/en/products/processors/xeon/scalable.html>

Intel® Optane™ DC Persistent Memory -

<https://www.intel.com/content/www/us/en/architecture-and-technology/optane-dc-persistent-memory.html>

Intel® QuickAssist Technology -

<https://www.intel.com/content/www/us/en/architecture-and-technology/intel-quick-assist-technology-overview.html>

<sup>1</sup>Software and workloads used in performance tests may have been optimized for performance only on Intel microprocessors.

Performance tests, such as SYSmark and MobileMark, are measured using specific computer systems, components, software, operations and functions. Any change to any of those factors may cause the results to vary. You should consult other information and performance tests to assist you in fully evaluating your contemplated purchases, including the performance of that product when combined with other products. For more complete information visit [www.intel.com/benchmarks](http://www.intel.com/benchmarks)

Configurations: Up to 1.25 to 1.58X NFV Workload Performance Improvement comparing Intel® Xeon® Gold 6230N processor to Intel® Xeon® Gold 6130 processor.

VPP IP Security: Tested by Intel on 1/17/2019 1-Node, 2x Intel® Xeon® Gold 6130 processor on Neon City platform with 12x 16GB DDR4 2666MHz (384GB total memory), Storage: 1x Intel® 240GB SSD, Network: 6x Intel XXV710-DA2, Bios: PLYDCRB1.86B.0155.R08.1806130538, ucode: 0x200004d (HT= ON, Turbo= OFF), OS: Ubuntu\* 18.04 with kernel: 4.15.0-42-generic, Benchmark: VPP IPsec w/AESNI (AES-GCM-128) (Max Gbits/s (1420B)), Workload version: VPP v17.10, Compiler: gcc7.3.0, Results: 179. Tested by Intel on 1/17/2019 1-Node, 2x Intel® Xeon® Gold 6230N processor on Neon City platform with 12x 16GB DDR4 2999MHz (384GB total memory), Storage: 1x Intel® 240GB SSD, Network: 6x Intel XXV710-DA2, Bios: PLYXCRB1.PFT.0569.D08.1901141837, ucode: 0x4000019 (HT= ON, Turbo= OFF), OS: Ubuntu\* 18.04 with kernel: 4.20.0-042000rc6-generic, Benchmark: VPP IPsec w/AESNI (AES-GCM-128) (Max Gbits/s (1420B)), Workload version: VPP v17.10, Compiler: gcc7.3.0, Results: 225.

VPP FIB: Tested by Intel on 1/17/2019 1-Node, 2x Intel® Xeon® Gold 6130 processor on Neon City platform with 12x 16GB DDR4 2666MHz (384GB total memory), Storage: 1x Intel® 240GB SSD, Network: 6x Intel XXV710-DA2, Bios: PLYDCRB1.86B.0155.R08.1806130538, ucode: 0x200004d (HT= ON, Turbo= OFF), OS: Ubuntu\* 18.04 with kernel: 4.15.0-42-generic, Benchmark: VPP FIB (Max Mpackets/s (64B)), Workload version: VPP v17.10 in ipv4fib configuration, Compiler: gcc7.3.0, Results: 160. Tested by Intel on 1/17/2019 1-Node, 2x Intel® Xeon® Gold 6230N processor on Neon City platform with 12x 16GB DDR4 2999MHz (384GB total memory), Storage: 1x Intel® 240GB SSD, Network: 6x Intel XXV710-DA2, Bios: PLYXCRB1.PFT.0569.D08.1901141837, ucode: 0x4000019 (HT= ON, Turbo= OFF), OS: Ubuntu\* 18.04 with kernel: 4.20.0-042000rc6-generic, Benchmark: VPP FIB (Max Mpackets/s (64B)), Workload version: VPP v17.10 in ipv4fib configuration, Compiler: gcc7.3.0, Results: 212.9.

Virtual Firewall: Tested by Intel on 10/26/2018 1-Node, 2x Intel® Xeon® Gold 6130 processor on Neon City platform with 12x 16GB DDR4 2666MHz (384GB total memory), Storage: 1x Intel® 240GB SSD, Network: 4x Intel X710-DA4, Bios: PLYDCRB1.86B.0155.R08.1806130538, ucode: 0x200004d (HT= ON, Turbo= OFF), OS: Ubuntu\* 18.04 with kernel: 4.15.0-42-generic, Benchmark: Virtual Firewall (64B Mpps), Workload version: Opnfv 6.2.0, Compiler: gcc7.3.0, Results: 38.9. Tested by Intel on 2/04/2019 1-Node, 2x Intel® Xeon® Gold 6230N processor on Neon City platform with 12x 16GB DDR4 2999MHz (384GB total memory), Storage: 1x Intel® 240GB SSD, Network: 6x Intel XXV710-DA2, Bios: PLYXCRB1.PFT.0569.D08.1901141837, ucode: 0x4000019 (HT= ON, Turbo= OFF), OS: Ubuntu\* 18.04 with kernel: 4.20.0-042000rc6-generic, Benchmark: Virtual Firewall (64B Mpps), Workload version: Opnfv 6.2.0, Compiler: gcc7.3.0, Results: 52.3.

Virtual Broadband Network Gateway: Tested by Intel on 11/06/2018 1-Node, 2x Intel® Xeon® Gold 6130 processor on Neon City platform with 12x 16GB DDR4 2666MHz (384GB total memory), Storage: 1x Intel® 240GB SSD, Network: 6x Intel XXV710-DA2, Bios: PLYDCRB1.86B.0155.R08.1806130538, ucode: 0x200004d (HT= ON, Turbo= OFF), OS: Ubuntu\* 18.04 with kernel: 4.15.0-42-generic, Benchmark: Virtual Broadband Network Gateway (88B Mpps), Workload version: DPDK v18.08 ip\_pipeline application, Compiler: gcc7.3.0, Results: 56.5. Tested by Intel on 1/2/2019 1-Node, 2x Intel® Xeon® Gold 6230N processor on Neon City platform with 12x 16GB DDR4 2999MHz (384GB total memory), Storage: 1x Intel® 240GB SSD, Network: 6x Intel XXV710-DA2, Bios: PLYXCRB1.PFT.0569.D08.1901141837, ucode: 0x4000019 (HT= ON, Turbo= OFF), OS: Ubuntu\* 18.04 with kernel: 4.20.0-042000rc6-generic, Benchmark: Virtual Broadband Network Gateway (88B Mpps), Workload version: DPDK v18.08 ip\_pipeline application, Compiler: gcc7.3.0, Results: 78.7.

VCMTS: Tested by Intel on 1/22/2019 1-Node, 2x Intel® Xeon® Gold 6130 processor on Supermicro\* X11DPH-Tq platform with 12x 16GB DDR4 2666MHz (384GB total memory), Storage: 1x Intel® 240GB SSD, Network: 4x Intel XXV710-DA2, Bios: American Megatrends Inc.\* version: '2.1', ucode: 0x200004d (HT= ON, Turbo= OFF), OS: Ubuntu\* 18.04 with kernel: 4.20.0-042000rc6-generic, Benchmark: Virtual Converged Cable Access Platform (iMIX Gbps), Workload version: vcmts 18.10, Compiler: gcc7.3.0, Other software: Kubernetes\* 1.11, Docker\* 18.06, DPDK 18.11, Results: 54.8. Tested by Intel on 1/22/2019 1-Node, 2x Intel® Xeon® Gold 6230N processor on Neon City platform with 12x 16GB DDR4 2999MHz (384GB total memory), Storage: 1x Intel® 240GB SSD, Network: 6x Intel XXV710-DA2, Bios: PLYXCRB1.PFT.0569.D08.1901141837, ucode: 0x4000019 (HT= ON, Turbo= OFF), OS: Ubuntu\* 18.04 with kernel: 4.20.0-042000rc6-generic, Benchmark: Virtual Converged Cable Access Platform (iMIX Gbps), Workload version: vcmts 18.10, Compiler: gcc7.3.0, Other software: Kubernetes\* 1.11, Docker\* 18.06, DPDK 18.11, Results: 83.7.

OVS DPDK: Tested by Intel on 1/21/2019 1-Node, 2x Intel® Xeon® Gold 6130 processor on Neon City platform with 12x 16GB DDR4 2666MHz (384GB total memory), Storage: 1x Intel® 240GB SSD, Network: 4x Intel XXV710-DA2, Bios: PLYXCRB1.86B.0568.D10.1901032132, ucode: 0x200004d (HT= ON, Turbo= OFF), OS: Ubuntu\* 18.04 with kernel: 4.15.0-42-generic, Benchmark: Open Virtual Switch (on 4C/4P/8T 64B Mpacket/s), Workload version: OVS 2.10.1, DPDK-17.11.4, Compiler: gcc7.3.0, Other software: QEMU-2.12.1, VPP v18.10, Results: 9.6. Tested by Intel on 1/18/2019 1-Node, 2x Intel® Xeon® Gold 6230N processor on Neon City platform with 12x 16GB DDR4 2999MHz (384GB total memory), Storage: 1x Intel® 240GB SSD, Network: 6x Intel XXV710-DA2, Bios: PLYXCRB1.86B.0568.D10.1901032132, ucode: 0x4000019 (HT= ON, Turbo= OFF), OS: Ubuntu\* 18.04 with kernel: 4.20.0-042000rc6-generic, Benchmark: Open Virtual Switch (on 6P/6C/12T 64B Mpacket/s), Workload version: OVS 2.10.1, DPDK-17.11.4, Compiler: gcc7.3.0, Other software: QEMU-2.12.1, VPP v18.10, Results: 15.2. Tested by Intel on 1/18/2019 1-Node, 2x Intel® Xeon® Gold 6230N processor with SST-BF enabled on Neon City platform with 12x 16GB DDR4 2999MHz (384GB total memory), Storage: 1x Intel® 240GB SSD, Network: 6x Intel XXV710-DA2, Bios: PLYXCRB1.86B.0568.D10.1901032132, ucode: 0x4000019 (HT= ON, Turbo= ON (SST-BF)), OS: Ubuntu\* 18.04 with kernel: 4.20.0-042000rc6-generic, Benchmark: Open Virtual Switch (on 6P/6C/12T 64B Mpacket/s), Workload version: OVS 2.10.1, DPDK-17.11.4, Compiler: gcc7.3.0, Other software: QEMU-2.12.1, VPP v18.10, Results: 16.9.

Performance results are based on testing as of the date set forth in the configurations and may not reflect all publicly available security updates. See configuration disclosure for details. No product or component can be absolutely secure.

Intel technologies' features and benefits depend on system configuration and may require enabled hardware, software, or service activation.

Performance varies depending on system configuration. No computer system can be absolutely secure. Check with your system manufacturer or retailer or learn more at <https://www.intel.com/content/www/us/en/products/processors/xeon.html>

Intel, the Intel logo, Xeon, and Optane are trademarks of Intel Corporation in the U.S. and/or other countries.

\*Other names and brands may be claimed as the property of others.

© Intel Corporation

0519/RM/CAT/PDF

340563-001EN