INTEL NEWS FACT SHEET

Intel's Expands Product Portfolio for Networking, Storage and Internet of Things

Nov. 9, 2015 — Faced with the rising tide of data-heavy digital services and billions of connected devices, communications networks are becoming overwhelmed. In order to handle today's and tomorrow's devices, data and services, networks must transform to become more agile and cloud-ready. Applying server, cloud, storage and virtualization technologies and building more intelligence throughout the network offer a path to this transformation. Intel is announcing three new products that help increase network intelligence and bandwidth for a more flexible and responsive network.

Intel® Xeon® Processor D-1500 Product Family

The Intel Xeon processor D-1500 product family is Intel's third generation 64-bit SoC and the first based on Intel Xeon processor technology. Intel is expanding the family with eight new processors, ranging from 4 cores to 8 cores, that bring increased intelligence and reliability to various networking devices and allow designs to scale depending on the performance requirements. The new processors are well suited for a range of networking, cloud and enterprise storage and Internet of Things (IoT) applications that require low power and high performance, providing the foundation for extending intelligence from the core of the data center to the edge of the network. This allows certain data-intensive, remotely isolated users and devices to be serviced with routing and firewalls closer to the edge of the network. The result is improved performance and lower latency, while still enabling services to be delivered with high reliability, availability and serviceability. The new processors can also be used in storage devices at the edge of the network to provide content, such as video on demand, closer to the user to reduce latency and improve performance. In addition, system designers can use similar development tools and processes that they utilize for other Intel® Atom™, Intel® Core™ and Intel® Xeon® processors, enabling broad application compatibility and software consistency from the data center to the edge. Additional processors in the Intel Xeon processor D-1500 product family, with 12 cores and 16 cores and support for extended temperature, will be available in the first quarter of 2016.

- **Networking Use Case:** The Intel Xeon processor D-1500 product family offers up to a 5.4x[1] performance improvement over the Intel® Atom™ processor C2000 for IPsec, a key benchmark for measuring the performance of firewall and intrusion protection appliances. The performance benefits, combined with the product's large memory footprint, low power and built-in hardware-assisted virtualization technology, mean that an appliance could be deployed at a remote site and have the ability to handle a larger number of users locally without the need to process all of the users in a centralized data center, leading to much faster response times. Additionally, because the appliance is virtualized, service providers would be able to perform remote upgrades of the appliance without having to physically visit the customer's site. The use of the Intel Xeon processor D-1500 product family also provides the network with the intelligence and bandwidth required to define traffic flows separately and apply a unique set of resources to each traffic flow. For example, if a consumer had both a self-driving car and a connected refrigerator, an intelligent network would consider the needs of the self-driving car as a higher priority than an alert from the refrigerator that the ice tray is empty.
- **Storage Use Case:** Cloud service providers and enterprise data centers are offering new services that handle the exponential growth in the amount of data stored, accessed and analyzed by their customers. To continue scaling their service offerings, it is essential for them

to optimize their datacenters for both density and cost. The Intel Xeon processor D-1500 product family offers expanded choices for data center optimization by bringing the performance and advanced intelligence of Intel Xeon processors into a dense, lower-power system-on-chip (SoC) form factor. The processors are designed for a variety of workloads, including warm and cold storage, mid-range block and object storage, and distributed file storage. In addition, they offer close to 2x[2] performance improvement over the Intel Atom processor C2000 for video-on-demand applications and greater than 3x[3] performance improvement for storing videos and other data.

- **IoT Use Case:** The Intel Xeon processor D-1500 product family are well-suited for industrial, military and aerospace applications that require dense, thermally constrained, high-performance system designs. For example, system makers can use the performance and built-in virtualization technology in the processor to consolidate multiple industrial applications into a single device versus having dedicated devices for each individual task. This helps to greatly reduce floor space in a factory environment and also decreases engineering and development costs.

Intel® Ethernet Multi-host Controller FM10000 Family

This multi-host controller is well-suited for use in next-generation cloud data center and communications network architectures. It removes performance bottlenecks by delivering processing speeds of up to 960 million packets per second with the advanced features needed to enable software-defined virtualized environments. The controller can aggregate high volumes of network traffic by providing 200 Gbps of bandwidth and up to eight hosts while also providing multiple 100 GbE ports. It also supports a new set of network protocols that enables service providers to separate the network functions virtualization (NFV) network from the physical network in order to provide agile services. By supporting encapsulation and de-encapsulation of network service chaining traffic in the controller, along with enabling other advanced data plane development kit (DPDK) acceleration enhancements, the FM10000 family can help improve data center efficiency. For example, video traffic can be given high bandwidth and priority than standard email traffic by tagging the traffic from each source and applying unique resources to each traffic flow.

Intel® Ethernet Controller X550 Family

This second generation 10GBASE-T Ethernet controller provides a low-power and cost-effective 10 Gigabit Ethernet connectivity for next-generation cloud data center and network architectures, including high-performance storage, network appliance, storage attached network (SAN), network firewall, and virtual private network solutions. The controller offers two 10 Gigabit Ethernet ports in a single controller and provides flexible I/O virtualization for port partitioning and quality of service (QoS). It also supports network virtualization overlay accelerations such as stateless offloads for tunneled VXLAN and NVGRE traffic to preserve application performance and reduce CPU overhead, with LAN, Fibre Channel over Ethernet (FCoE), and Internet Small Computer System Interface (iSCSI) data traffic for broad network and storage support.

[1] Up to 5.4x on IPsec. New configuration: Intel® Xeon processor D-based reference platform with one Intel Xeon processor D-1548 (8C, 2.0GHz), Turbo Boost disabled, Hyper-Threading enabled, 16GB memory (2x8GB DDR4-2133 RDIMM ECC), 2x Quad port X520 (8x10GbE), Intel® QuickAssist Adapter 8950-SCCP, Fedora* Core 16 (Verne) x86_64, Wind River INP-3.4, QuickAssist L1.3.0_90, DPDK Revision L.1.4.0-30. IPsec forwarding rate (1024B Ethernet clear text packet size)= 37.4 Gbits/s. Base Configuration: Intel Atom Processor C2000-reference platform based platform with one Intel Atom processor C2758 (8C, 2.4GHz), 4GB memory (2x2GB DDR3-1600 DIMM), 1x Dual port X520 (4x10GbE), Fedora* Core 16 (Verne) x86_64, Wind River INP-3.4, QuickAssist L1.3.0_90, DPDK Revision L.1.4.0-30. B IPsec forwarding rate (1024B Ethernet clear text packet size) =6.975 Gbits/s.

[2] Up to 1.94x on video on demand. New configuration: Intel platform with Intel Xeon processor D-1541 (8C, 2.1GHz), Turbo Boost Disabled, Hyper-Threading Enabled, 32GB memory (2x16GB DDR4-2133 RDIMM ECC), 20x 4TB WD SATA 64MB cache, 2x LSI 9207 HBA, 2x 10GbE Bonded, Ubuntu 14.04.2 (3.16.0-30-generic x86_64), Swift 2.2.x, COSBench 4.2.x, 512 Workers- 4 Drivers- 1000C- 1000 Objects per container, 32MB 90 percent reads 10 percent writes= 943 MB/s. Base configuration: Intel platform with one Intel Atom processor C2750 (8C, 2.4GHz,20W), Turbo Boost Disabled, Hyper-Threading Disabled, 16GB memory (2x8GB DDR3-1600 RDIMM ECC), 10x 3TB WD SATA 64MB cache, 1x LSI 9207 HBA, 1x 10GbE, Ubuntu 14.04.2 (3.16.0-30-generic x86_64), Swift 2.2.x, COSBench 4.2.x, 512 Workers- 4 Drivers- 1000C- 1000 Objects per container, 32MB 90 percent reads, 10 percent writes= 484 MB/s.

[3] Up to 3.44x (small I/O) and up to 3.75x (large I/O) on Cloud Backup. New configuration: Intel platform with Intel Xeon processor D-1541 (8C, 2.1GHz), Turbo Boost Disabled, Hyper-Threading Enabled, 32GB memory (2x16GB DDR4-2133 RDIMM ECC), 20x 4TB WD SATA 64MB cache, 2x LSI 9207 HBA, 2x 10GbE Bonded, Ubuntu 14.04.2 (3.16.0-30-generic x86_64). Large I/O: Swift 2.2.x, COSBench 4.2.x, 512 Workers- 4 Drivers- 1000C- 1000 Objects per container, 32MB 10 percent reads 90 percent writes= 1480 MB/s. Small I/O: Ceph hammer , FIO 2.2.9, FIO- 40 RBDs- 4 Clients- 32 Queue Depth per RBD- 1 worker per RBD volume, 1MB Sequential 10 percent reads 90 percent writes = 1359 MB/s. Base configuration: Intel platform with one Intel Atom processor C2750 (8C, 2.4GHz,20W), Turbo Boost Enabled, Hyper-Threading Disabled, 16GB memory (2x8GB DDR3-1600 RDIMM ECC), 10x 3TB WD SATA 64MB cache, 1x LSI 9207 HBA, 1x 10GbE, Ubuntu 14.04.2 (3.16.0-30-generic x86_64). Large I/O: Swift 2.2.x, COSBench 4.2.x, 512 Workers- 4 Drivers- 1000C- 1000 Objects per container) 32MB 10 percent reads 90 percent writes)= 430 MB/s. Small I/O: Ceph hammer , FIO 2.2.9, FIO- 40 RBDs- 4 Clients- 32 Queue Depth per RBD- 1 worker per RBD volume, 1MB Sequential 10 percent reads 90 percent writes = 361 MB/s.