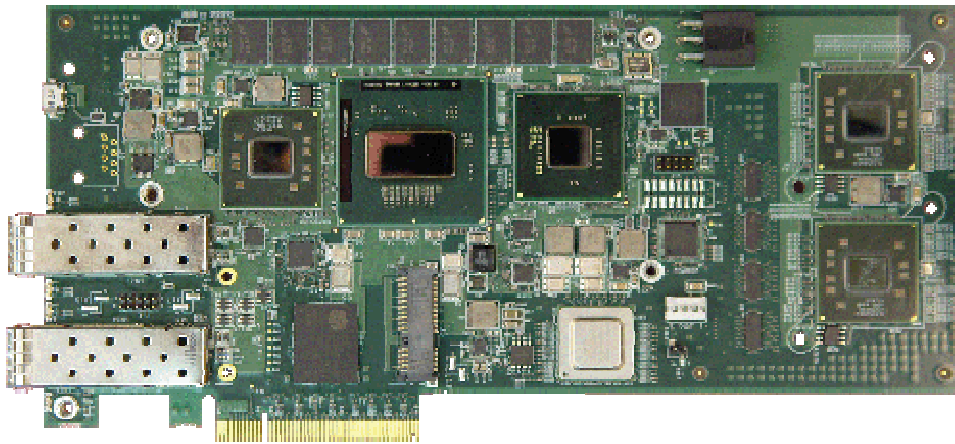# WIN Enterprises Instantiates the Next Generation Communications Platform from Intel®

WIN Enterprises is an Affiliate Member of the Intel® Intelligent Systems Alliance, a community of communications and embedded developers and solution providers.

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WIN SoNIC…an Instantiation of the Next Generation Communications Platform from Intel®

By Chiman L. Patel, CEO/CTO, WIN Enterprises

Today's Networking Problem

Data, like the universe, just keeps expanding at an every greater rate, pushing out from the Enterprise and rushing in tsunami-like from customers, plus other businesses and non-business entities. User expectations are that compute resources are limitless. At the same time, the quality and richness of information has increased as broadband data has become more the everyday norm.

The good news is that if we are able to continually scale our networks to deal with the broadband onslaught we should soon see a world of holograms, streaming genetic code, and automated highways capable of giving us a better tomorrow.

Scaling networks to meet these challenges is a daunting task. The major reason is that networks are built on complex, heterogeneous microarchitectures. This is in order to accommodate the combination of generalized and specialized networking processes, such as encryption/decryption acceleration, packet scanning, etc. In addition, individual processes typically have their own set of tools and knowledge bases making overall maintenance efforts unwieldy. The benefits of a unified, easily scalable platform that can handle multiple workload types become obvious.

The Next-generation Intel® Platform for Communications Infrastructure

Intel® platform for communications infrastructure (formerly codenamed "Crystal Forest") leverages the strong presence of Intel within the communications infrastructure, plus the power of multi-core Xeon processors (i.e., Intel® Xeon processor E5-2600), additional new technologies, and existing industry standards, such as PCI Express and 10GbE fiber-based Ethernet. The platform integrates these technologies to enable the consolidation of three processing workloads – Application, Control and Packet/Content.

This communications platform provides highly efficient content processing and deep security scanning to provide secure network traffic across a variety of environments from cloud computing down to more modest SMB networks.

Three things make Intel® platform for communications infrastructure especially significant:

1) It's a thoroughly backed Intel strategy for future-proofing data center networks
2) It provides a platform for high-level security capable of deep packet inspection
3) It provides a unified platform for the consolidation of network workloads

WIN SoNIC

WIN SoNIC (System on Network Interface Card) is a board-level instantiation of the Intel® platform for communications infrastructure from WIN Enterprises. It is a networking expansion board made available to OEMs for the development of next generation network security products and 3G/4G back-haul networking systems. The board combines with new and existing servers through a PCIe slot to deliver server-class preprocessing, dual 10 GbE LAN, crypto acceleration, deep-packet inspection, and the efficient disposition of data types.

WIN SoNIC's ability to preprocess high-speed data streams opens up new network design possibilities for the data center. This simple, plug-and-play hardware can eliminate today's processing bottleneck, better secure the data center from threats, and de-duplicate and compress data for greater networking efficiency.

Features	Benefits
Intel® Xeon® Processor E3-1125C or E3-1105C featuring 2 or 4 processing cores and HyperThreading	- Scalable path provided for Intel® multi core processors - Integrated Dual-channel DDR3 Memory Controller - Power Efficient SpeedStep Technology
Next Generation Intel® Communications chipset 8920 with Intel® QuickAssist Technology (codename Cave Creek)	- QuickAssist 1.5 Technology accelerates cryptographic functions, high-speed data compression
Intel® 82599 Dual 10GbE Controller (code name Niantic)	- Supports advanced technologies, including Intel Virtualization Technology for Connectivity (VT-c); FCoE, NFS, iSCSI; IEEE 1588 time sync and Intel® Direct I/O technology
PCIe x8 Generation 2.0 I/F	- Allows WIN SoNIC to be easily connected to existing platforms

WIN SoNIC utilizes the components of the Intel® platform for communications infrastructure including the Intel® 82599 Family 10 Gigabit Ethernet Controller that supports dual 10G Ethernet ports; a Xeon® Processor E3-1125C (formerly code name Gladden); and next generation Intel® Communications Chipset 8920(formerly code name Cave Creek). the Intel® communications chipset 8920 is significant to network security because it features Intel QuickAssist Technology. Intel QuickAssist Technology accelerates cryptography processes and compression.

The WIN SoNIC board is easy to integrate with any server that has an existing PCIe 2.0 slot. Implementation is low-risk and economical because the board can be used with existing products to create higher performance networking solutions. However, like all higher-level hardware it requires software to fulfill its mission.

Software

To speed a developer's or OEM's time-to-market, Intel® offers the Data Plane Development Kit (DPDK). The Intel DPDK is important to manufacturers who are developing mid-ware or layered software for Intel® platform for communications infrastructure like the WIN SoNIC or who are porting existing deep-packet inspection solutions to IA-based platforms like WIN SoNIC.

The DPDK is a set of NIC drivers and libraries designed to optimize processor core usage and throughput performance. This important tool is downloadable from Intel, and has already been implemented by members of the Intel® Intelligent Systems Alliance, including Wind River, 6WIND, Radisys and Tieto Corporation. These Intel Intelligent Systems Alliance members have integrated the Intel DPDK into software solutions that provide an OEM solutions provider with faster time-to-market. These and other members of the Intel® Intelligent Systems Alliance can also provide application-level development to OEMs wishing these services.

Under the Hood
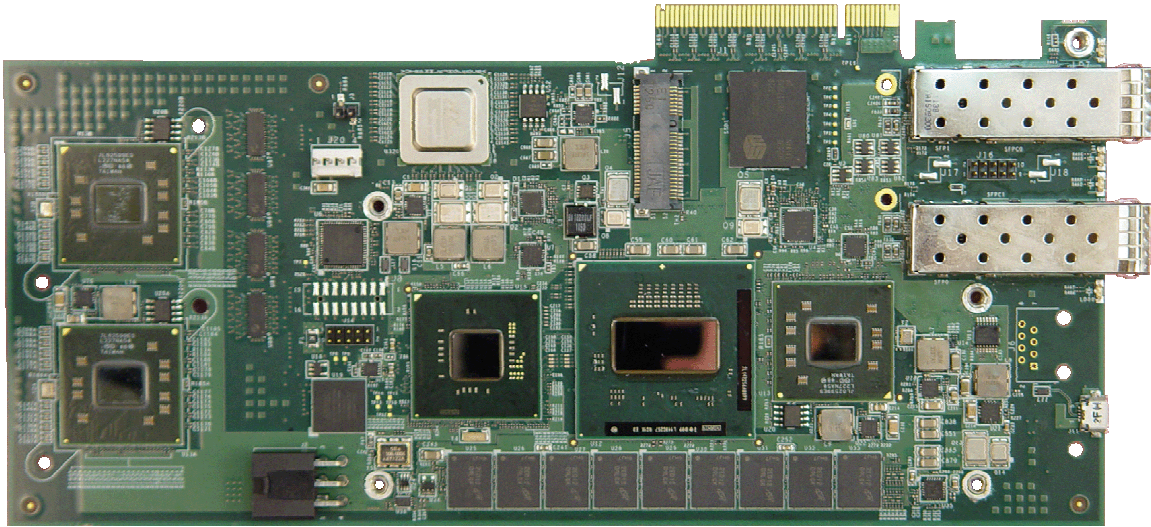
WIN SoNIC supports 8x PCI-Express Gen2.0 connectivity. The form factor is the half-length PCIe card. Three Intel® 82599ES chips (code name Niantic) support dual 10Gbps capability. The preprocessor is the Intel® Xeon® processor E3-1125 based on the Sandy Bridge microarchitecture. . The Intel® Communications Chipset 8920 (codename Cave Creek) features Intel Quick Assist Technology.

-- 8 GB --

10G QSFP

10G QSFP

Niantic

8x G2

Gladden

DMI

4x G2

Cave Creek

USB 4x

SATA NAND

mSATA

SPI

8x G2

CLK GEN

Niantic Option B

8x G3/2 Option B

Signal Pop option

Pop options could be PCIe Gen 3 signal switch parts from Pericom, IDT, or PLX this will allow a fully populated board to swap its mode in bios or by jumper.

CPLD

PSON#

10G   10G

8x G2 OptionA

3.3V_DUAL

Niantic Option B

8x G3/2

PEX 8717, 8725 16/24 port dual layout

NTB SW EN/DIS

Power supplies

External 12V @ 75W

STBY

3.3V

25W*

8x G3

8X PCIE

3.3V

12V

3.3V_STBY

* Specification for PCIe delineates power based on the assumed application/card size, but makes no change to the number of power pins available. If host system can support 75W, external power may not be required in some configurations.

WIN SoNIC Block Diagram

System Components

10 Gigabit Ethernet Controller

WIN SoNIC delivers dual, 10 Gigabit LAN capabilities through the use of the Intel® 82599ES Controller chip (code-named Niantic). Future Ethernet performance will be scalable to support 20, 40 and 100 Gbps. The forward compatibility of Ethernet enables easy upgrade of networks based on Intel® platform for communications infrastructure technology.

The Intel® Xeon® processor E3-1125 Preprocessor

The WIN SoNIC card utilizes the Intel® Xeon® processor E3-1125 processor (codename Gladden) with 8MB L3 Cache. Although the standard WIN SoNIC boards have preprocessors of two and four cores, the design offers forward compatibility to support even more powerful processors as they become available. This means intense communications applications such as security and busy data center operations are supported with even more capability to come. The Intel® Xeon® processor E3-1125 support HyperThreading, Trusted Execution and Virtualization technologies.

Next Generation Communications Chipset from Intel

the Intel® Communications Chipset 8920 serves as the platform controller hub to the Xeon® processor E3-1125 on the WIN SoNIC board. A major feature of the next-generation communications chipset is Intel QuickAssist 1.5. QuickAssist provides an array of impressive security features. These include encryption/decryption using AES, 3DES or (A)RC4 algorithms, hashing using MD5, SHA-1/2 or HMAC algorithms, Deflate and LZS high-speed data compression. According to Intel, the packet forwarding performance of the Intel® Xeon® processor E3-1125 processor is about 40Gbps.

In addition, Intel QuickAssist Technology provides support for wireless security protocol and pattern matching to identify malicious code and anomalies. It supports VT-d and VT-c virtualization to enable flexible configuration with downstream devices and databases. QuickAssist Technology enables high-speed, secure data compression, storage and data loss prevention.

Intel® QuickAssist supports a range of preprocessing services that include SSL Acceleration and Flow Classification. In Secure Socket Layer (SSL) communications the processing budget weighs towards the initialization and termination of crypto services. These are initialized through public and private security keys. These processor-intensive tasks are now offloaded to the Intel® Communications Chipset 8920 to unburden the system.

Flow Classification examines aggregated data flows at the packet level to determine their best handling and disposition. After data is classified it may be routed to storage or other network segments, reviewed for access-control, flagged for differentiated qualities of service (QoS) or monitored for automated billing. For instance, customers with more expensive payment schedules can be given throughput privileges for video downloads or similar services.

Usage Examples

Despite a general perception to the contrary, financial services are subject to considerable regulation. For instance, the Gramm-Leach-Bliley (Federal Modernization Act of 1999) requires the use of authentication and encryption to protect Nonpublic Personal Information found in email. In addition, email solutions are required to provide policy-based filtering and blocking, logging, and reporting. These and similar tasks can be automated by implementing WIN SoNIC and layered software from a member of the Intel® Intelligent Systems Alliance or developed in-house using the Intel® DPDK.

In other examples, a National Association of Securities Dealers regulation states that communications with the public may not predict security performance; and yet another regulation requires email messages to be filtered based on header information such as sender and recipient fields, as well as message content. Regulations like these and others cause system bottlenecks and reductions in organizational efficiency. These processing speed bumps can be flattened out through preprocessing using the WIN SoNIC card.

Specific vertical applications can be designed for the WIN SoNIC platform by one of the software ecosystem members of the Intel® Intelligent Systems Alliance. The WIN SoNIC card is available from WIN Enterprises.

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