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DATA BRIEF

CONNECTIVITY

BladeEngine 3 Dual-Port 10 Gigabit or Quad-Port 1 Gigabit Converged Network Controller with I/O Virtualization

Key Benefits

- Reduce server cost and I/O cabling by more than 50%
- Reduce SAN management costs by more than 50%
- Stateless server deployment with any OS using boot-from-SAN
- Maximize application performance through bandwidth provisioning and management
- Unified provisioning of physical and virtual servers
- Greener data centers with fewer HBAs and switches

Key Features

- Integrated 10GBase-KR and 1000Base-KX PHY interfaces for LOM and backplane
- Converged NIC, TOE, iSCSI and FCoE offload support in hardware
- 40 Gigabit full duplex throughput for network (LAN) and storage (SAN) traffic
- 8 physical functions configurable across both 10G ports for managing multiple networking and/or storage devices
- SR-IOV compliant interfaces for hypervisors
- Small form-factor suitable for LOM and embedded storage applications
- Less than 7 watts power consumption (dual port configuration)

Creates Converged Universal LOM

BladeEngine 3 provides a low-cost, single-chip dual-port 10G Ethernet Controller with integrated 10GBASE-KR and 1000BASE-KX PHYs and I/O Virtualization. BladeEngine 3 leverages Ethernet, iSCSI and FCoE industry standards to dramatically reduce costs and operating expenses by converging network and storage I/O interconnects into a single unified Ethernet fabric. The BladeEngine 3 Ethernet Controller features an innovative purpose-built hardware architecture to carry network and storage traffic over two full-duplex 10 Gigabit Ethernet ports or four Gigabit Ethernet ports, or a mix of two 10 Gigabit Ethernet and two Gigabit Ethernet ports.

Extensible Protocol Offload Architecture

The BladeEngine 3 Ethernet Controller uses an innovative combination of high-performance hardware-based data path elements for protocol data movement and industry- standard embedded processors for protocol control path. Hardware-based isolation between offloaded protocols ensures precise control over bandwidth allocation and sharing between network and storage traffic. Protocol offload features are field upgradeable through a simple software update; bandwidth allocation and management features are exposed through industry standard APIs.

Policy-based I/O Virtualization

I/O virtualization technology allows the network and storage resources on the controller to be carved up into multiple hardware-isolated and protected virtual network and virtual storage interfaces. One or more virtual network and virtual storage interfaces can be assigned to virtual machines to realize near-native performance for virtualized performance sensitive workloads. Fine-grain QoS management features allow precise bandwidth allocation and management for individual virtual network and storage interfaces through centralized policies and industry-standard management APIs.

Target Applications

- Single-chip solution for LAN on Motherboard (LOM)
- Embedded storage devices supporting NIC, iSCSI and FCoE initiator and target

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SPECIFICATIONS

Ethernet Interface Standards

- Dual 802.3ae 10GBASE Ethernet ports (10GBASE-KR/10GBASE-KX4/XAUI)
- 20Gb/s uni-directional, 40Gb/s bi-directional across both ports
- Quad 802.3az 1000BASE Ethernet ports (1000BASE-KX/SGMII)
- IEEE 802.3ap 10GBASE-KR, 1000GBASE-KX auto negotiation
- IEEE 802.1q virtual LANs (VLAN) with 128 VLAN IDs and QinQ tagging
- IEEE 802.1qau Ethernet congestion management
- IEEE 802.3x Flow control with pause frames
- IEEE 802.1p QoS tagging
- IEEE 802.3ad/LACP

Ethernet NIC and TCP/IP

- NDIS 5.2, 6.0 and 6.2 compliant Ethernet functionality
- Microsoft TCP chimney compliant
- IPv4/IPv6 TCP, UDP checksum offload
- IPv4/IPv6 Receive Side Scaling (RSS)
- IPv4/IPv6 Large Receive Offload (LRO)
- IPv4/IPv6 Large Send Offload (LSO)
- 64 Tx and 64 Rx queues
- 128 unicast MAC addresses per port
- Wire speed on-chip CAM for packet filtering and steering
- Multicast MAC address filtering
- Broadcast frame filtering per port
- VLAN insertion and extraction
- Support for nested VLANs (Q-in-Q)
- Jumbo frame support up to 9000 Bytes
- Wake-On LAN (WOL): D3 cold support
- Support for 6 Magic Packets

I/O Virtualization and QoS

- PCI-SIG SR-IOV compliant
- Supports 56 Virtual Functions (VF):
  - Up to 32 VFs per PF
- Traffic Shaping and QoS across each VF and PF:
  - NIC fine-grain QoS 10 Mb/s to 10Gb/s in steps of 10Mb/s
  - HBA fine-grain QoS 1000 IOPS to 500,000 IOPS in steps of 1000 IOPS
- On-chip VM-VM switching
- Traffic steering and isolation
- Protection against denial-of-service attacks and malfunctioning VMs

This product may not be available in the U.S. Please contact your supplier for more information.

iSCSI Offload

- Full iSCSI protocol offload
- Header, data digest (CRC) and PDU
- Direct data placement of SCSI data
- Upto 4096 outstanding commands
- Upto 1024 offloaded iSCSI connections
- Supports iSNS
- Support for multipath I/O
- iSCSI to SCSI Virtualization
- OS-agnostic INT13 based iSCSI boot and iSCSI crash dump support
- RFC 3720 iSCSI
- RFC 4171 Internet Storage Name Service (iSNS)
- RFC 4544 definitions of managed objects for iSCSI
- RFC 4545 definitions of managed objects for IP storage user identity
- T10-DIF support for end-to-end data integrity

DCE/CEE Support

- Simultaneous operation of Ethernet TCP/IP and iSCSI or FCoE modes
- IEEE 802.1Qbb Priority Flow Control (PFC)
- IEEE 802.1Qaz Enhanced Transmission Selection (ETS)
- IEEE 802.1Qaz Data Center Bridging Exchange (DCBX)
- Multi-level congestion management
  - Per-priority pause, programmable per-priority flow and per-priority rate control
  - Xon and Xoff timer support

FCoE Offload

- Supports up to 255 NPIV interfaces
- Support FIP and FCoE Ether Type
- Generation and verification of FCoE CRC
- On-chip data segmentation and framing
- Direct data placement
- 2048 simultaneous logins per port
- 2048 active exchanges per port
- Support 64 SR-IOV compliant FCoE interfaces for VMs

PCI Express Interface

- PCI Express 2.0 x8 host interface (5 Gb/s / lane)
- 20 Gb/s uni-directional, 40 Gb/s bi-directional
- PCI-e single root I/O virtualization (SR-IOV) compliant
- Supports 8 physical functions (PF) configurable across both 10G ports:
  - Configurable through VPD, by BIOS, and/or class code per PF
- Advanced Error Reporting (AER)
- Message Signal Interrupt (MSI-X) support:
  - 320 MSI-X vectors
  - INTA#, INTB#
- Supports D0, D3 (hot & cold) power management modes
- PCI Express Base Spec 2.0
- PCI Express Card Electromechanical Spec 1.0a

Robust Management

- UEFI and x86 remote boot support including PXE v2.1, iSCSI and FCoE
- MAC statistics gathering (SNMP, Ethernet MIB, MIB2, RMON, RMON2)
- Diagnostic and configuration driver suite
- ACPI v2.0 compliant power management
- RMII NCSI management interface
- IPMI pass-though allows board management controller (BMC) access to the network

Driver Support

- Windows Server
- Red Hat Enterprise Linux
- SuSE Linux Enterprise Server
- VMware ESX
- Oracle Solaris

System Level Design

- IEEE 1149-1 compliant JTAG support
- Network Controller Sideband Interface (NC-SI) support
- Single 25.00 MHz clock crystal for 10Gb/s operation
- Glueless interconnect for 10GBASE-KR 10Gb/s serial backplanes

Mechanical Specifications

- 562-pin FCBGA package
- 27 mm x 27 mm package size
- RoHS compliant

Electrical Specifications

- Power supply 2.5V, 1.8V, 1.0V
- 9W maximum power consumption

Environmental

- Operating temperature: 0° to 70°C

Ordering Information

- SE-BE4310-P01

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