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iSCSI HBA PRODUCT Brief

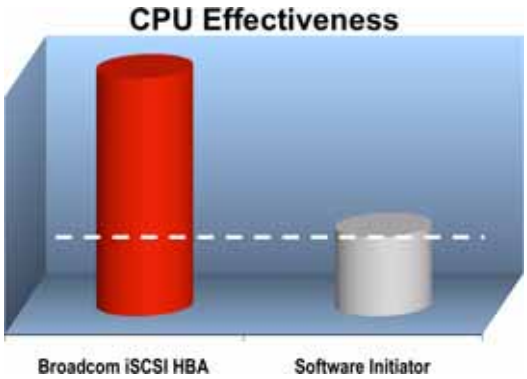
FEATURES

- **Hardware iSCSI HBA**
  - iSCSI HBA offload including header and data digest
- **Common iSCSI driver stack**
  - NXII 1 GbE controllers (5709C/S, 5708C/S)
  - NXII 10 GbE controllers (57710, 57711, 57712)
- **iSCSI HBA features**
  - iSCSI initiator IPv4 and IPv6
  - iSCSI boot IPv4 and IPv6 HBA offload
  - iSCSI boot IPv4 and IPv6 host software stack
- **Ethernet features**
  - Jumbo frame support (9600 bytes)
  - Flow control support (IEEE 802.3x)
  - Priority service IEEE 802.1™
  - RX/TX multiqueue
  - Receive-side scaling (RSS) for IPv4 and IPv6
  - TCP/IP checksum offload for IPv4 and IPv6
  - UDP/IP checksum offload for IPv4 and IPv6
  - Message signal interrupt (MSI, MSI-X) support
  - Storage failover support with native O/S failover
  - Management
    - Broadcom BACS, BACS CLI
    - WMI, BMAPI
- **Operating systems support**
  - Windows® 2003, 2008, 2008R2
  - Red Hat® Enterprise Linux® 4.x, 5.x, and SLES 10SPx, 11SPx

SUMMARY OF BENEFITS

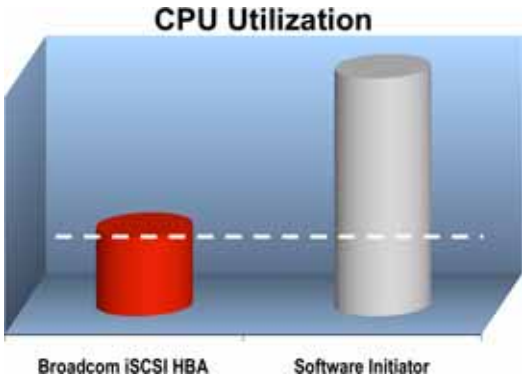
- **Dependable, performance-focused, optimized for high throughput, high I/O per second, and low CPU utilization**
  - Offloaded and accelerated iSCSI for block storage with high I/O per second and high bandwidth
  - Frees host CPU to run application code
  - No need to compete with host applications for host resources
  - Minimal load on host memory subsystem with zero copy
  - Adaptive interrupt coalescing
  - Avoids bottlenecks by using RSS (distributing network processing across multiple CPUs)
  - Interrupt distribution in a multi-CPU system using MSI/MSI-X
- **Significant power savings (up to 60 watts per 10 GbE port) over software initiator through iSCSI HBA deployment**
- **Simplified administration of iSCSI-enabled controllers across the data center and reduced complexity by using a common driver**
- **Robust, highly manageable, seamless management using management application software**
- **High IOPS performance:**
  - Over 1 million IOPS for 10 GbE (BCM57712) and 240K IOPS for 1 GbE (BCM5709 dual-port)

Highest CPU Efficiency and Lowest CPU Utilization



Relative CPU effectiveness: Broadcom 10 GbE iSCSI HBA delivers 3x higher CPU efficiency.

Relative CPU utilization: Broadcom 1 GbE and 10 GbE iSCSI HBA consumes only a third of the CPU cycles.



These figures show the relative CPU effectiveness (IOPS per CPU%) and CPU percent utilization of Broadcom's iSCSI HBA versus iSCSI software initiator (in a dual-quad core Intel XEON® 5500 server, running the Microsoft® Windows® 2008 operating system at 4K read block size).

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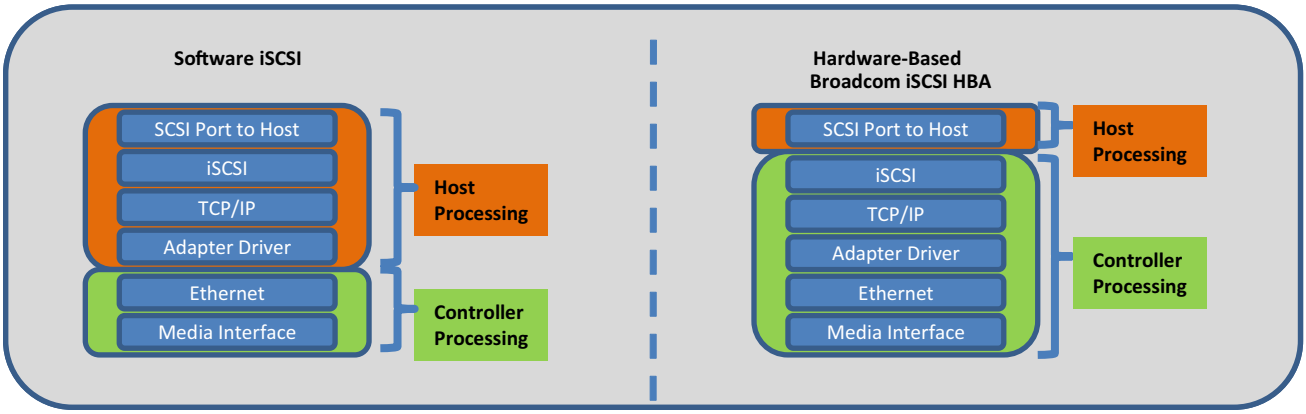
OVERVIEW



Broadcom's iSCSI offering is based on Broadcom's hardware offload architecture designed to deliver dependable performance, low CPU utilization, reliability, and unified NIC and storage management using the Broadcom Advanced Control Suite (BACS) management application for both 1 GbE and 10 GbE networks. Benefits include:

- Dependable performance: By fully offloading the iSCSI and TCP/IP stacks, the Broadcom iSCSI HBA does not need to compete with upper layer applications, such as e-mail or Web applications, for CPU processing cycles. The iSCSI performance is unaffected by application workload.
- Low CPU utilization: Software-based iSCSI initiators consume considerable CPU cycles when handling I/O-intensive workloads leaving little headroom for growing user application requirements. Broadcom's iSCSI HBA architecture minimizes the CPU overhead so that valuable CPU cycles are allocated to process user applications.
- Highest reliability: The iSCSI header/data digest computation of Broadcom's iSCSI HBA prevents data corruption that can occur in large networks with multiple switch hops so that iSCSI HBA can be used in a wide variety of IP network topologies.
- Unified NIC and storage management: The BACS management application provides a single management platform for your network and storage I/O management.

Unified Management Application

The BACS management application provides a single management platform for your network and iSCSI HBA I/O management. The BACS feature set for iSCSI management includes:

- Vital Signs: At-a-glance status reports of all LAN adapters/controllers in your systems
- Network Test: Confirms network connectivity to a remote station
- Cable Analysis: In-depth analysis on CAT5 cable characterization performed by the Broadcom NetXtreme II® Gigabit Ethernet controller
- Statistics: Detailed performance statistics on each selected adapter/controller

Dell® has tested and certified the Broadcom iSCSI for use with specific Dell PowerEdge® Servers. Dell specifically disclaims knowledge of the accuracy, completeness, or substantiation for all statements and claims made in this document regarding the properties, capabilities, speeds, or qualifications of the iSCSI.

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