

4-port {10GbE} iSCSI
8-port {1GbE} iSCSI

RAVEN II

Raven II High Performance iSCSI Storage Solution

RAID Incorporated's Raven II iSCSI solution is the industry's first high-performance based iSCSI solution available in a 4 or 8-port 1GbE storage system powered by a '10GbE core technology' with enterprise virtualization features and 4Gb of cache in a 12-bay chassis with triple redundant power supplies. This solution addresses the needs of customers that are looking to utilize their existing network infrastructure to consolidate information into an affordable, performance-based storage infrastructure that hasn't been available until today.

This solution extends the benefits of existing NAS solutions, provides a low-cost entry into an IP-based SAN and is ideal for existing server consolidation initiatives, HPC environments and disk backups. The 8 iSCSI ports allow for up to 870MB/sec and rivals performance levels of current Fibre Channel SAN solutions. With the link aggregation feature, users have the ability to aggregate ports and preset the quality of service for any distinct application. The Volume Virtualization feature improves performance and disk utilization by dynamically spreading multiple RAID sets across all spindles in the solution. In addition, this technology allows for true dynamic capacity expansion.

Product Features

RAID levels: 0, 1, 5, 10, 50
Dual Active/Passive Controllers
Enclosure: 2U, 12 removable bays with redundant power supplies
Capacity: 36TB maximum capacity
VLAN Support: Up to 8

Volume Virtualization: Volumes can be created from drives of dissimilar capacity and technology. Growth can occur without migration or reconstruction. Automated single drives can contain multiple and divergent RAID technologies. As part of volume protection, the controller is protected via the enabling option of disk line which provides location protection, content protection and forced error support.

Performance: Link aggregation support which provides users the ability to scale host connectivity for performance across any combination of iSCSI ports which can sustain transfer rates at wire speeds of up to 120MB/s full duplex per port with the added benefit of predefining priority service of each target server.

IP San Manager creates storage pools, allocates storage resources to servers and directs storage network traffic through the creation of zones. Rich management features allow users to manage their online network storage with uncommon ease and flexibility.

Cache Management supports up to 4GB of cache, write-back, write through, write-coalescing and multi-stream read ahead on a volume basis, which optimizes cache utilization and performance in an application-dependent manner. Cache and its metadata will persist through sudden power loss via an on board battery for over 72 hours.

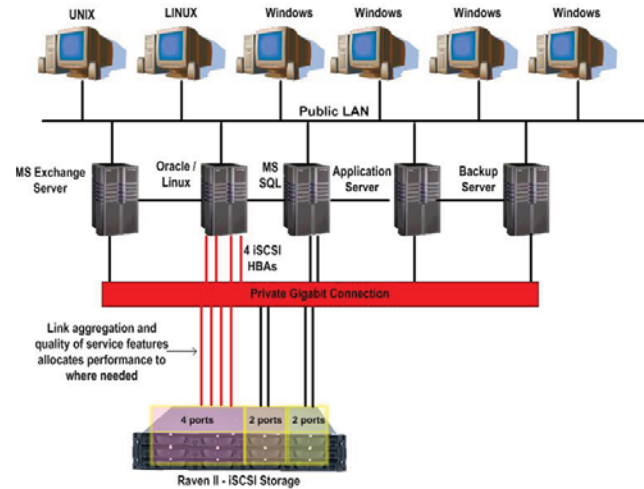
Benefits

- Affordable IP-based SAN that uses existing network infrastructure.
- Simple to set up and manage. Virtual RAID sets and LUNS can be created with just a few mouse clicks - no expertise in storage management needed.
- Link aggregation support provides the system administrator the ability to map ports in order of priority to maximize the performance of any individual server with the added feature of predefining the priority service for each server.
- Since the core of the technology is 10GbE there exists more than sufficient performance to satisfy the most demanding iSCSI applications.
- Volume Virtualization improves performance, disk usage, and allows for easy dynamic storage expansion. This technology allows maximum performance of the disks by automatically spreading the load. No need to have even number of drives in any RAID level.
- There is no longer a need to over-provision RAID sets due to the fear of expansion complications. The solution allows for LUN expansion on the fly.
- Multiple RAID levels can be incorporated within a single solution. Each RAID level utilizes all the drives within the solution thus maximizing performance of each RAID level.
- The spare space for disk failure protection is spread across the virtual disk, which provides instant availability to transfer data from an ailing drive.

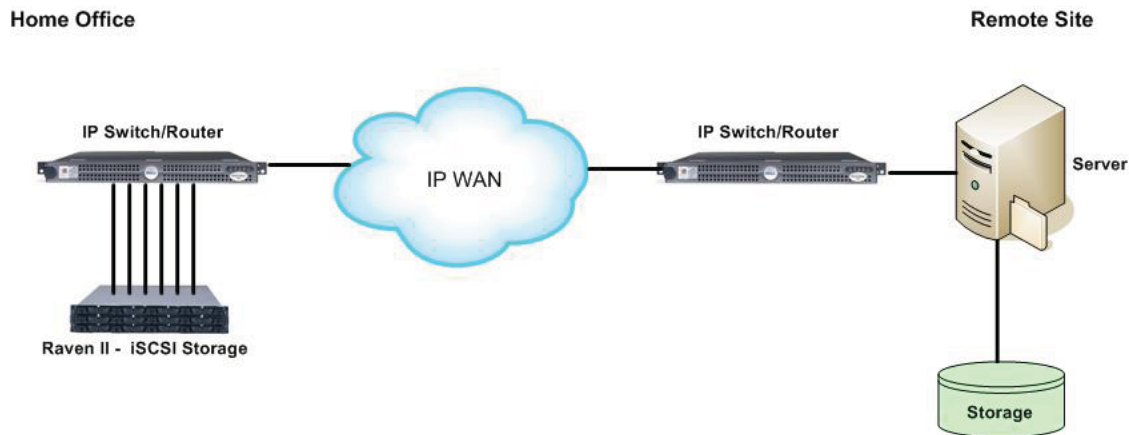
Advantages of iSCSI SAN

- **Connectivity over long distances.** SANs have delivered on the promise to centralize storage resources—at least for organizations with resources that are limited to a metropolitan area. Organizations with divisions distributed over wide areas have a series of unlinked “SAN islands” that the current Fibre Channel (FC) connectivity limitation of 10km cannot bridge. iSCSI over wide area networks (WANs) provides a cost-effective long distance connection that can be used as a bridge to existing Fibre Channel SANs (FC SANs)—or between native iSCSI SANs—using in-place metropolitan area networks (MANs) and WANs.
- **Lower costs.** Unlike an FC SAN solution, which requires the deployment of a completely new network infrastructure and usually requires specialized technical expertise and specialized hardware for troubleshooting, iSCSI SAN solutions capitalize on the preexisting LAN infrastructure and make use of the much more ubiquitous IP expertise available in most organizations.
- **Simpler implementation and management.** iSCSI solutions require little more than the installation of the iSCSI initiator on the host server, a target iSCSI storage device, and a Gigabit Ethernet switch in order to deliver block storage over IP. Managing iSCSI devices for such operations as storage configuration, provisioning, and backup can be handled by the system administrator in the same way that such operations for direct attached storage are handled. Solutions, such as clustering, are simpler with iSCSI than with Fibre Channel configurations.

iSCSI Server Deployment Using Raven II iSCSI



Backup From Remote Location



Storage Configurations: Scalability and Performance Considerations

Depending on how storage resources are accessed, different considerations prevail, ranging from controlling escalating management costs to controlling security.

- **DAS.** What types of servers are currently deployed? What are their scalability and performance needs? Are any of the servers single points of failure? Mail servers, backup servers, database servers, transaction servers, and many application servers commonly require access to large or increasing amounts of disk space and high performance disk input/output. For these reasons, and to eliminate single points of failure, these servers can directly benefit from connecting to an IP SAN by using the existing local area network (LAN) infrastructure. If clustering for high availability is being considered, the shared storage of SANs is a prerequisite.
- **NAS.** Organizations heavily reliant on sharing a high volume of files will most likely already have network attached storage (NAS) servers on the LAN. These servers provide good scalability (typically up to several terabytes); however, scalability, performance, and centralization of resources can all be enhanced through attachment to an IP SAN.
- **SAN.** Many organizations already have FC SANs in place, but the SANs themselves are usually restricted to centralized data centers, separate from other storage resources in the organization and from other SANs. MAN and WAN IP connections between FC SANs can provide a low cost means of linking isolated SANs over campus or metropolitan-wide distances, or over even longer distances.
- **Shrinking Backup Windows.** An IP SAN enables customers to do server backup with no LAN impact and no server downtime at block level transfer rates. Data can be backed up to a shared storage resource. Because iSCSI is an Ethernet-based storage protocol it enables backup resources to be geographically dispersed.

GENERAL

- iSNP ASIC: iSCSI/TCP/IP full offload, SCSI3, cache management, volume virtualization, and Serial ATA
- Management Processor: XPC8241 Motorola PowerPC®
- Cache Memory: ECC, 512 MB - 4 GB (Battery protected)
- System Memory: ECC, 512 MB
- Flash: 64 MB
- RAID Levels 0, 1, 5, 10
- iSCSI: Up to eight 1 GbE with full offload or 1, 10 GbE
- Maximum Storage Devices: Up to 16 removable drives (Serial ATA)
- Power: 3 x 350 Watts N+1
- Fans: 2, 85 CFM

VLAN

- QoS Support
 - Egress packet prioritization based on IETF DiffServ and IEEE 802.1P tag
- 1024 Connections
- TCP/IP Support
 - RFC 1122 compliant
 - TCP: Congestion management and flow control based on RFC 2581; Options: Maximum Segment Size (MS); Round Trip Time Measurement (RTTM); Window Scale
 - IP: Path MTU Discovery and IP Reassembly

VOLUME VIRTUALIZATION FEATURES

- JBOD, Striped sets, Mirrored sets, Striped Mirrored sets, and Parity sets
- 1024 Virtual Volumes (256 accessible per initiator)
- 1024 Target Nodes
- MC/S multiple connections/session
- iSCSI error recovery levels 0
- RAID level migration
- Free space defragmentation
- Online capacity expansion
- Write-through, write-back, write-coalescing, and read-ahead
- Battery-backed cache
- Automatic detection of failed drives
- Automatic rebuild of spare drive
- Hot-swapping of drives (enclosure dependent)
- Drive roaming during power off
- Micro rebuilds
- Instant volume accessibility
- Disklines

iSCSI NETWORK INTERFACE

- iSCSI/TCP/IP full hardware offload
- Network Interfaces: two, four, or eight ports of copper GbE OR 1, 10 GbE
- Supports standard Ethernet switching fabric
- Jumbo Frames support
- Transfer rate: Up to 220 MB/s full duplex per port
- iSCSI digest (CRC) supported on header and data
- LAG (IEEE 802.3ad Link Aggregation Group) Support for up to eight LAGs
- VLAN (IEEE 802.1Q Tag) Support
 - Up to eight VLANs
 - One to one mapping between IP Subnet and VLAN
 - Multiple VLANs per physical port with VLAN tag
 - All physical ports in an LAG belong to the same

STORAGE NETWORK MANAGEMENT

- IP-SAN Device Manager (IDM)
 - Create, manage, expand, and monitor programs
 - Error statistics and performance information
- Embedded HTTPS server supporting
- CIM/SMIS standard
- Event Manager to view and persist events
- Firmware field upgradeable

ELECTRICAL AND MECHANICAL

- Power: 66.5 Watts (maximum battery charging rate)
- Temperature, Operating: 0 to 50° C
- Temperature, Non-Operating: -20 to 70° C
- Operating Humidity: 10% to 90% Non-condensing
- Storage Humidity: 5% to 95% Non-condensing
- ATX Form Factor 9.6" x 12"