



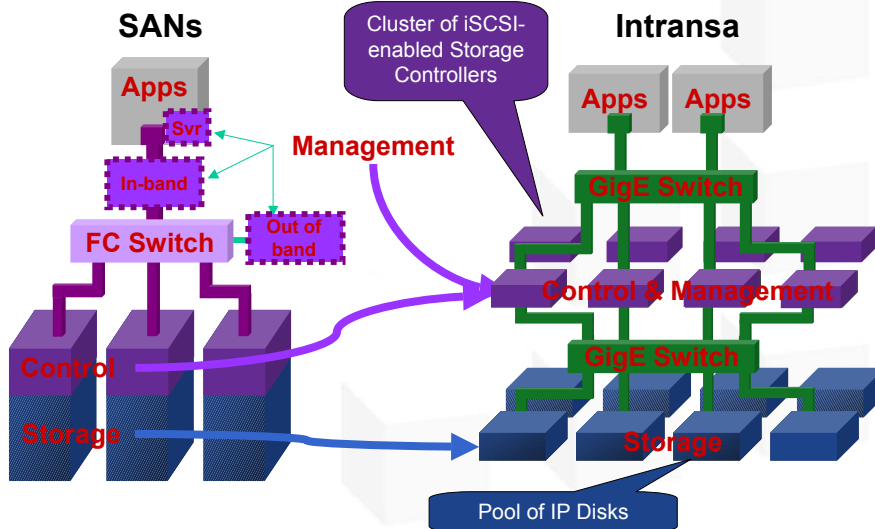
intransa
simply smarter™

IP SAN – From iSCSI to IP Disks

A Storage Area Network Should be

- › Simple to install
- › Easy to manage
- › Fully interoperable
- › Based on mature technology
- › Provide the right features
- › Available to everyone
- › Affordable

IP SAN – Moving Intelligence into the Network

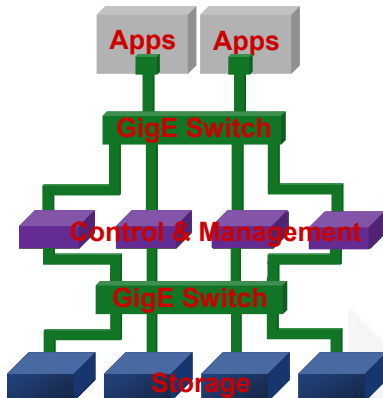


3

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IntraStor™ Architecture – Basis of Intelligent IP SAN

**Commodity Ethernet +
Low Cost Disks +
Enterprise Class SW +
Breakthrough Architecture**



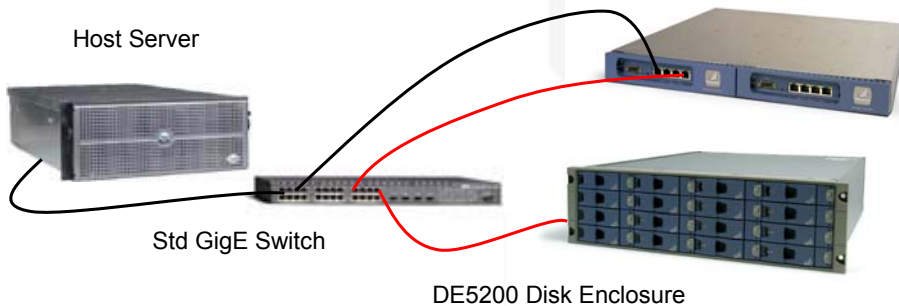
- Virtually Infinite, incremental scalability
 - › Enabled by IP addressing to the disk drive level
- Independently scales on capacity, performance and connectivity
- Single, virtual storage pool
 - › 2x greater utilization
 - › Higher availability
 - › Easy to administer
- Automatic load balancing
- TCO dramatically lower
 - › Policy management
 - › Simple to use GUI

4

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Leveraging Familiar Technology

- Host to switch to Controller is iSCSI
 - › SCSI over IP - uses standard GigE
 - › Host uses Standard NIC with Software iSCSI driver
 - Or
 - › HBA with driver
- Controller to Drive - ATA over IP



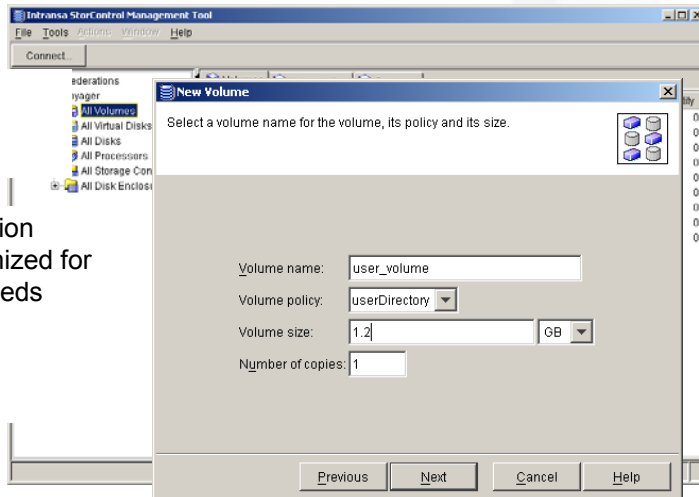
5

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StorControl™ Simplifies Storage Management

- Easy to use Graphical User Interface

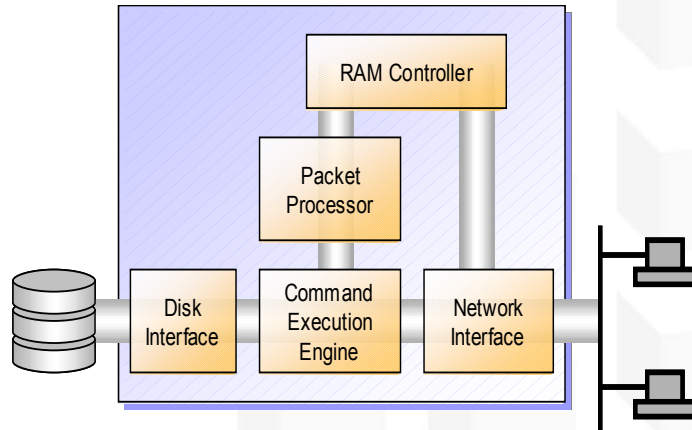
- Policy-based Management
- Volume Creation policies, optimized for application needs (availability & performance)



6

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IP Disk Controller Architecture



7

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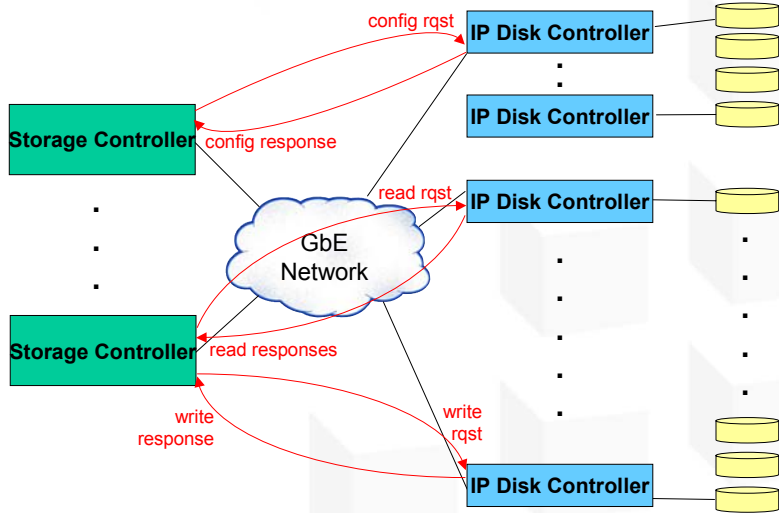
xBlock: ATA-over-IP Protocol

- Protocol design constraint
 - › Easily implementable in hardware state machines
- Datagram transport protocol over IP
 - › Initiator-target model
 - › Optimized for fixed-sized payloads
 - › Control and data transfer
 - › Request-response
 - Except for streaming reads (single request, multiple responses)
 - › Multiple outstanding requests w/ credit-based flow control
 - › Retransmission of timed out requests
 - › Protection of order-dependent operations during retransmission

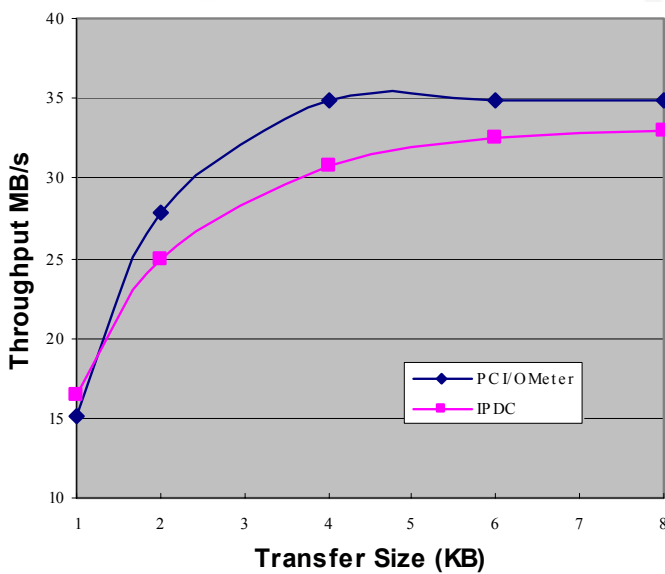
8

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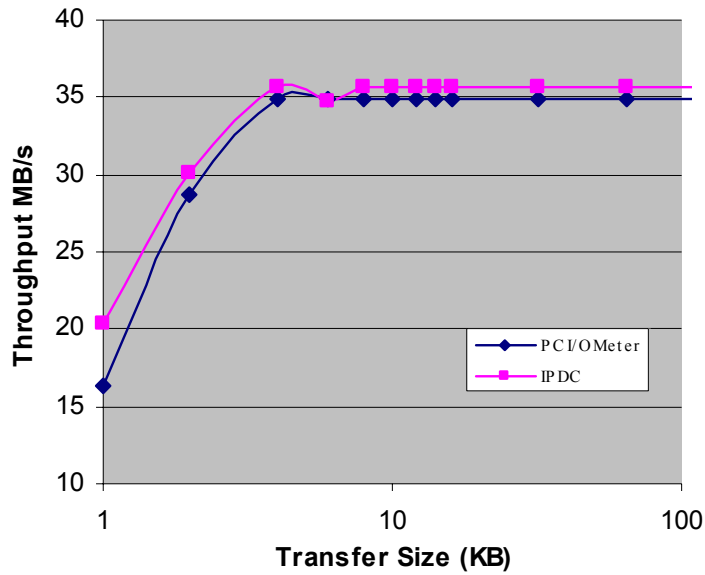
xBlock Operation



IPDC vs. PC – Write Throughput



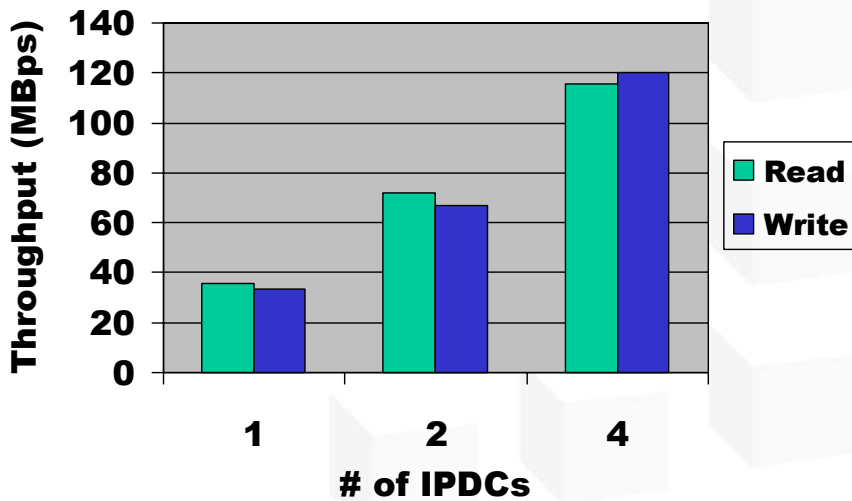
IPDC vs. PC – Read Throughput



11

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Multiple IPDCs Throughput Scaling



12

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