THE NETWORK MATTERS FOR STORAGE
The Network Matters for Solid State Storage

Performance
Unleash application performance

Scalability
Built for application and workload scalability

Availability
Increase availability for high-density and critical workloads

Scaled virtualization requires purpose-built network storage solutions
Brocade Solid State Ready Program

Seamless interoperability and optimum performance within Brocade SAN for leading Storage Vendors

Maximizes performance of tested mission critical solutions – VMware, Microsoft, Oracle

Delivers the highest levels of support across multiple vendors
Brocade Solid State Ready Benefits
Purpose-built solid state storage solutions

- **50%** INCREASE IN APPLICATION PERFORMANCE
- **2x** GREATER NETWORK UTILIZATION
- WORLD RECORDS
- **50%** LOWER OPERATING EXPENSE
- AND MORE ........
Purpose-Built Networks for Storage

- Storage requires purpose-built fabric architectures
  - Customers have built their mission-critical infrastructure on a SAN
  - Technology evolution in the data center can introduce significant risk to uptime

Brocade SAN and VCS fabrics enable advanced data center technologies
The Network Matters for Solid State Storage
Brocade Gen 5 Fibre Channel

<table>
<thead>
<tr>
<th>Performance</th>
<th>Scalability</th>
<th>Availability</th>
</tr>
</thead>
<tbody>
<tr>
<td>▪ 100% of top 20 VMmark benchmarks use Fibre Channel</td>
<td>▪ 83% of VM workloads run on Fibre Channel</td>
<td>▪ Automatically detect and recover from errors</td>
</tr>
<tr>
<td>▪ Empowering 50% application performance increase</td>
<td>▪ 8.2 Tbps of bandwidth for intensive applications</td>
<td>▪ Validate infrastructure prior to deployment</td>
</tr>
<tr>
<td>▪ 420 million frames per second</td>
<td>▪ Enables hyper-scale OLTP deployments</td>
<td>▪ Minimize downtime with faster troubleshooting</td>
</tr>
<tr>
<td>Gen 5 unleashed 4 million IOPS</td>
<td></td>
<td>Over five nines of availability</td>
</tr>
</tbody>
</table>

4,032 VDI sessions, at the lowest cost
# The Network Matters for Solid State Storage

**Brocade VCS Ethernet fabric**

## Automated
- Zero-touch provisioning
- Zero-touch VM discovery, configuration, and mobility
- Self-forming trunks
- Manage many switches as a single logical device

![50% lower OpEx]

## Efficient
- All links fully active, none on standby
- Multi-pathing at all layers of the network: L1/L2/L3
- IP storage-aware

2x greater network utilization

## Agile
- Network virtualization with VCS Virtual Fabric feature or VMware NSX
- Scale-out non-disruptively
- Orchestration through OpenStack

![Quicker to deploy]
Dedicated IP Storage Network
IP Storage and the Network

**Key Problem:** Achieve performance and availability SLAs running mixed workloads on shared, legacy networks

- IP storage workloads becoming mission-critical
- Explosive unstructured data growth
- Accelerating growth of scale-out storage

— IDC, 2014

IP Storage Capacity to Grow at a CAGR of 40%
Dedicated IP Storage Network

Why?

• Performance
• Service level agreements
• Contained failure domain
• Isolated change control

Decision maker = Storage buyer
Shared Network Application Impact

20% Improvement in Operations per minute moving to a dedicated network.

368,000 Operations

309,000 Operations

Who pays for the lost revenue?
Shared Network Application Impact

10X improvement in latency by avoiding burst congestion on shared network.

Individual transfers subject to unacceptable latency

18% longer to transfer all data

WHO PAYS??
Dedicated IP Storage Networking

Drivers for Adoption
- Predictable performance
- Maximum uptime
- Contained failure domain
- Isolated change control

Why Brocade VCS Fabrics?
- Automation reduces cost
- Storage network management with Brocade Fabric Vision™ technology
- Unique partnerships with storage vendors
## Best Practices = Dedicated IP Storage Network

<table>
<thead>
<tr>
<th>VMware</th>
<th>Hortonworks</th>
<th>EMC²</th>
<th>Dell</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use NFS storage on trusted networks only and isolate the traffic on separate physical switches...</td>
<td>Machines should be on an isolated network from the rest of the data center...</td>
<td>The use of a dedicated backup network is preferred...</td>
<td>Use a physically separated network dedicated to iSCSI traffic...</td>
</tr>
</tbody>
</table>

---

*— Best Practices for VMware vSphere on Network-Attached Storage*

*— Best Practices for Cluster Network Configuration*

*— EMC Data Domain Boost for Symantec NetBackup Open Storage Best Practices Planning*

*— Dell EqualLogic Configuration Guide*
Brocade Fabric Vision Technology: Extending Storage Networks

- Automation that simplifies policy-based monitoring and alerting
- Cable and optic diagnostics that simplify the deployment and support of large fabrics
- Customizable health and performance dashboard, with all critical information in one screen
- Identify, monitor, and analyze performance of specific flows or frame types

- MAPS
- ClearLink Diagnostics
- Dashboards
- Flow Vision

- Quickly detects and clearly alerts high levels of latency, to help identify slow drain devices
- Automatically detects and recovers from bit errors, negating need for retransmission
- Automatically recovers flow control buffer credit loss at the VC level, improving availability

- Fabric Performance Impact Monitoring
- Forward Error Correction
- Buffer Credit Recovery

© 2014 Brocade Communications Systems, Inc. Company Proprietary Information
THANK YOU!