Brocade is a Storage Networking company

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Agenda

- Update
- Application Platform 7420 and Storage Service Layer
- Multi-protocol Routing Services
  - FC-to-FC Routing (Design example)
  - iSCSI-to-FC Bridging
  - FC-to-FCIP for Distance Extension
- FAP Applications OEM & ISV Solution

Upcoming Brocade Offerings

Extended Price-Performance, Increased Fabric Intelligence

SilkWorm 24000 as a Single 128 port Switch "Meteor"

- 128 ports with single domain
- Blade upgrade for existing 12000s
- Full HA capabilities
  - Hot code activation
  - Dual CP with non-disruptive failover
  - All 4.1 RAS features
- New Bloom II Asic
  - refresh from Asic
  - 30% less power

Brocade 4.x SAN Switching Platforms

Intelligent Fabric Switches, Core Directors and Application Platforms

- Product & Technology refresh
- Unified Code Stream from 8 to128 port
  - simplifies SW maintenance/upgrades
- Hot Code Activation across product line

SilkWorm 12000
Core Director
64/128-port configurations

SilkWorm 3900
32-port Fabric Switch

But for me (JM) No Fabric Design Change
Dual Fabric !!!

SilkWorm 3850
16-port Fabric Switch

SilkWorm 3250
8-port Fabric Switch

Single 4.x Code Stream

Brocade AP7420

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Application Platform (AP7420) "Per Port Application"

- 2 U rack mount enclosure
- 16 ports 1Gbit/2Gbit or GigE
- Dual redundant hot-swap power supplies
- Dual 10/100 management ports
- Serial management port

Fabric Application Platform Blade You Can Configure per Port (FC-Routing, ISCSI ,FCIP ,Applications..)

Blade with 16 Fabric AP ports
- Fabric-based storage applications
- FC-FC routing - LSANs
- FCIP and iSCSI bridging

Meets need for high port-count

Cost effective mix of port types

Flexibility and Expandability
- 16 x 2Gb/s FC ports per blade
- Up to 8 AP Blades per chassis

SilkWorm 24000

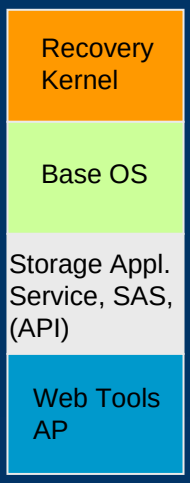
AP Software Packages

Recovery Kernel Package

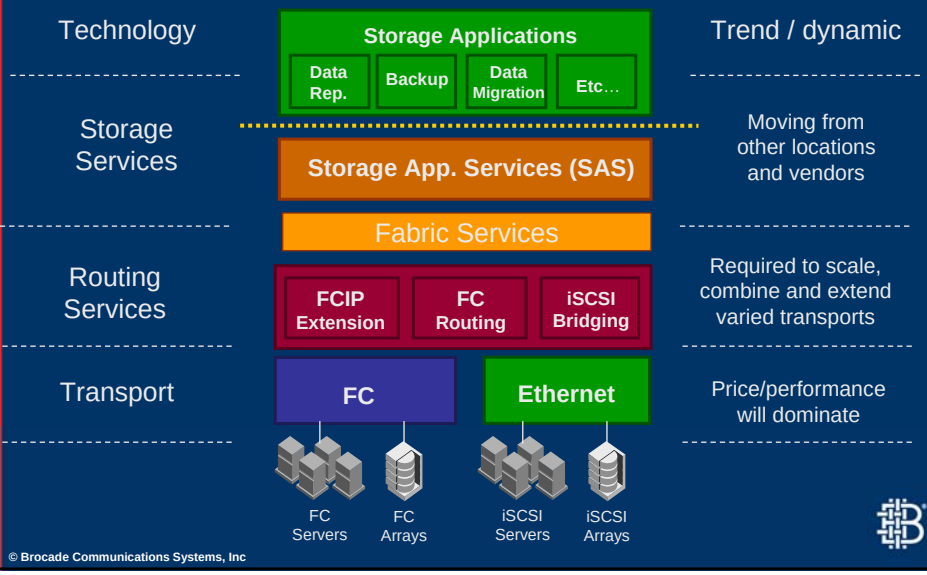
BaseOS - XPath OS with L2 functionality (FC-IP, iSCSI and FC Router)

SAS - Storage Application Services feature (API) – Appls. Sit on top

WebServices - Component required for Web Tools-AP



Brocade – An Intelligent Platform for Networking Storage

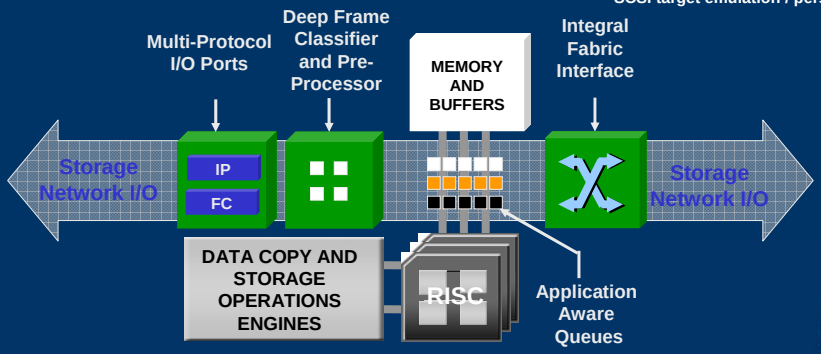


XPath Storage Processor (XSP)
All is done on Port Level

- Multi-protocol transport engines
- Software processing per I/O port
- Highly optimized frame processing - “Appliance Plus” per port

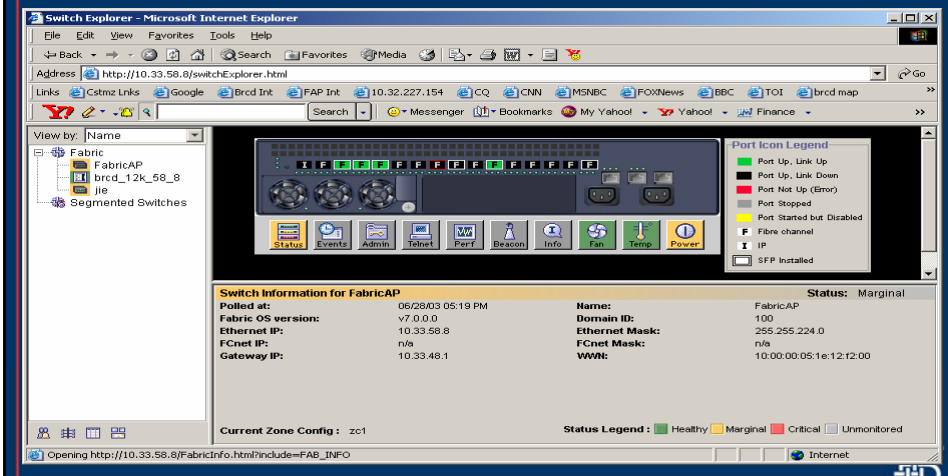
•Per-port ASIC acceleration of storage primitives:

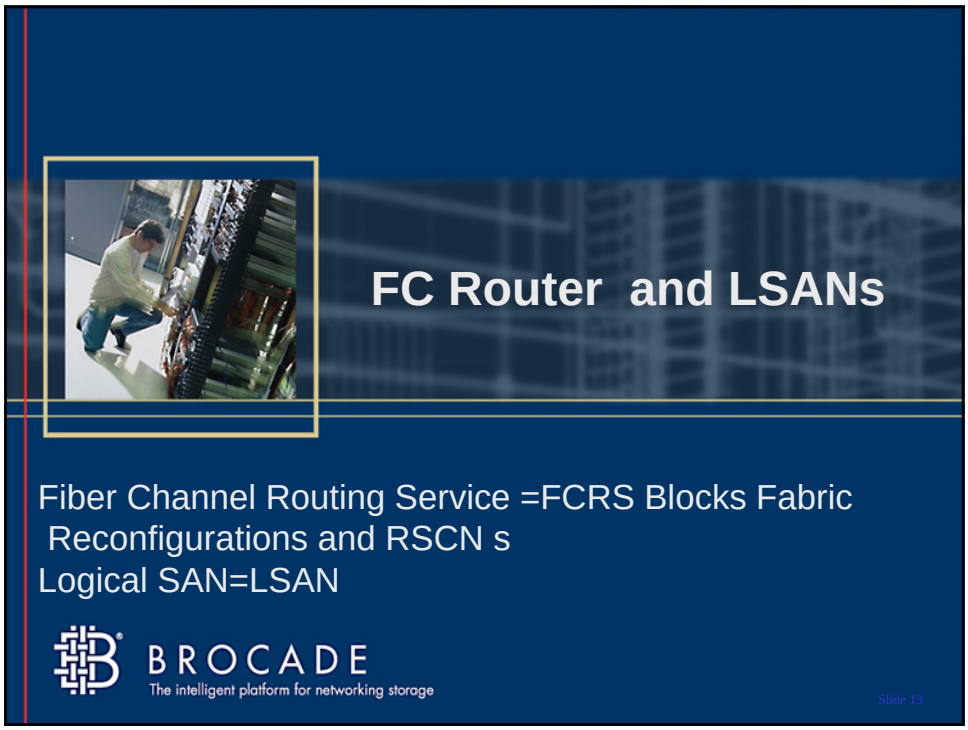
- •Mirroring and Striping
- •Snapshot and Copy-on-Write
- •Data movers
- •Write journaling
- •SCSI target emulation / personality



WEB TOOLS AP Edition

- Initial Screen like FOS Web tools; same actions




FC Router and LSANs
Fiber Channel Routing Service =FCRS Blocks Fabric Reconfigurations and RSCN s
Logical SAN=LSAN
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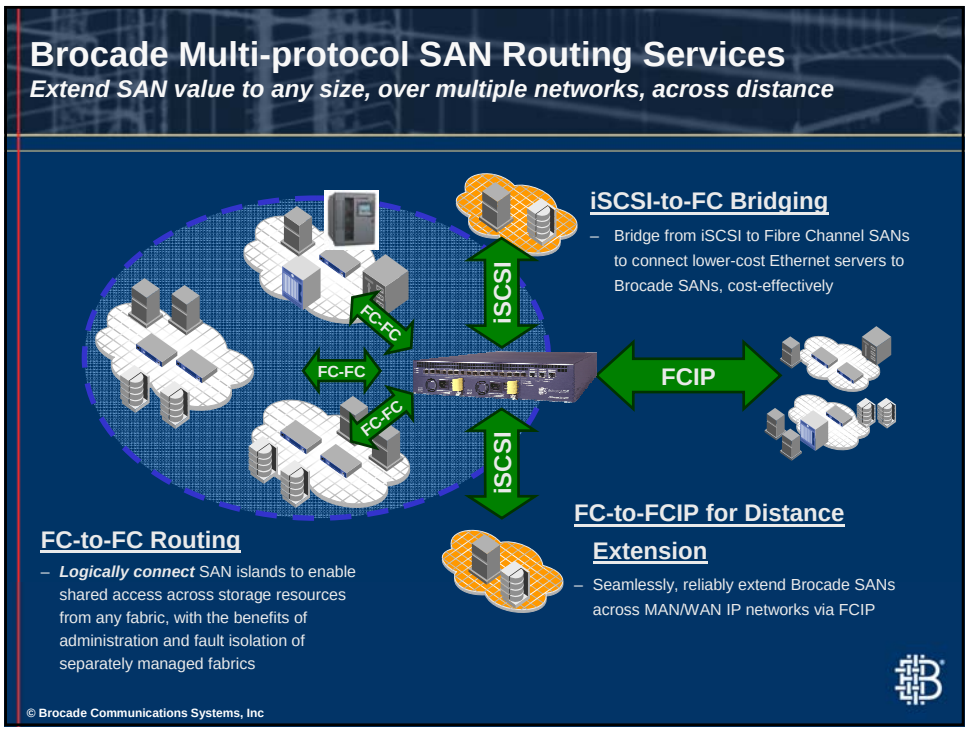
Brocade Multi-protocol SAN Routing Services
Extend SAN value to any size, over multiple networks, across distance
iSCSI-to-FC Bridging
– Bridge from iSCSI to Fibre Channel SANs to connect lower-cost Ethernet servers to Brocade SANs, cost-effectively
FC-FC
FC-FC
FC-FC
iSCSI
iSCSI
FCIP
FC-to-FC Routing
– Logically connect SAN islands to enable shared access across storage resources from any fabric, with the benefits of administration and fault isolation of separately managed fabrics
FC-to-FCIP for Distance Extension
– Seamlessly, reliably extend Brocade SANs across MAN/WAN IP networks via FCIP
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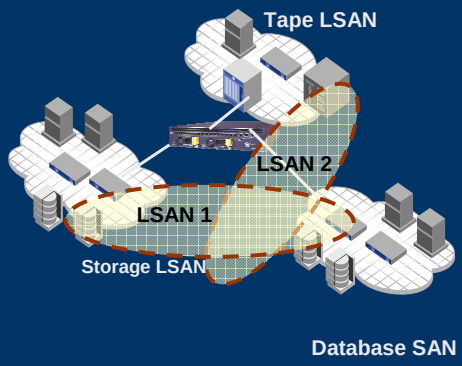
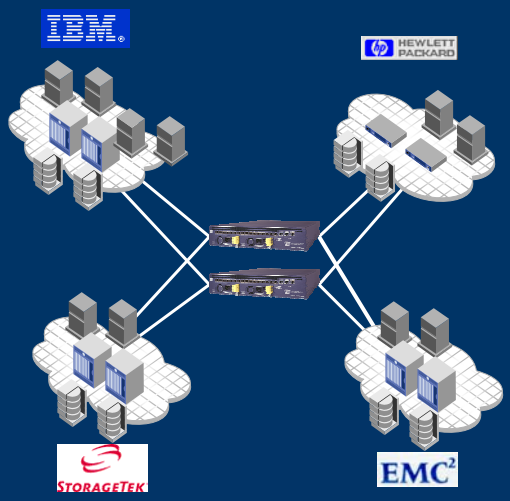
FC-to-FC Routing Enables Logical Private SANs *(LSANs)*

- Easy Config the same as Zoning only Syntax "LSAN_"

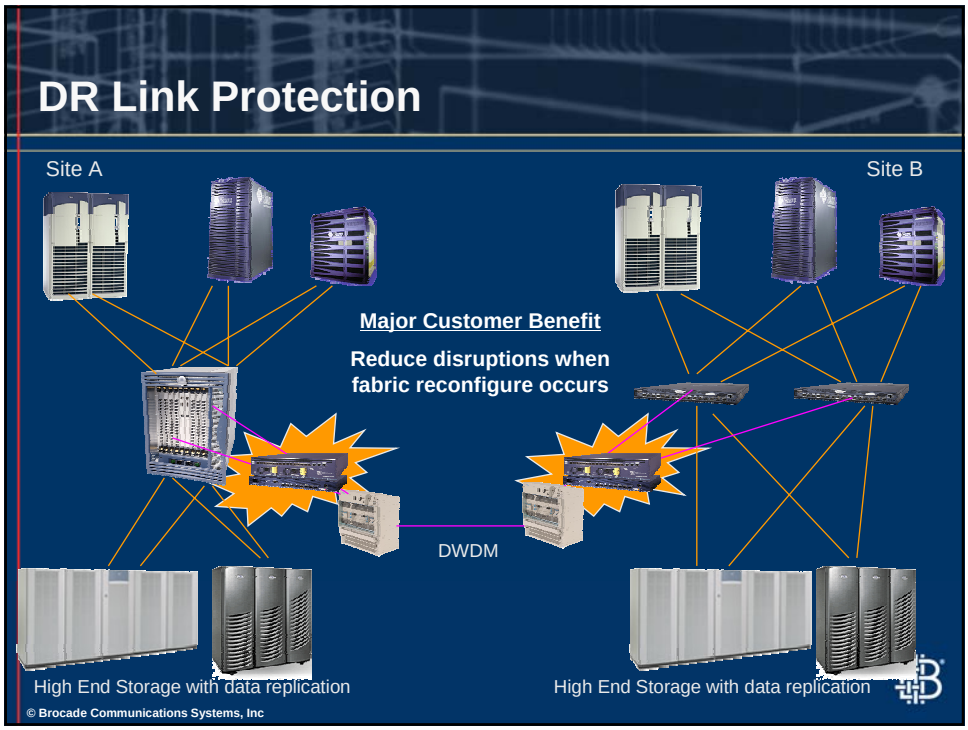


- *Optimize utilization* by consolidating and combining resources from separate SAN islands
- *Share resources across fabrics* with the management, isolation and stability of existing SAN environments
- *Scale SANs* while minimizing risk and complexity of large fabrics
- *Protect and Extend Investment* – requires no changes to existing switches or edge devices
- Configuration and provisioning are *extensions of well-understood zoning techniques*

FC-to-FC Routing Applications - Scale



- *Scale SAN by interconnecting islands*
- *Connect heterogeneous fabrics*
- *NO RSCNs*
- *Device Resource Sharing between FABRICs*


DR Link Protection
Site A
Site B
Major Customer Benefit
Reduce disruptions when fabric reconfigure occurs
DWDM
High End Storage with data replication
High End Storage with data replication
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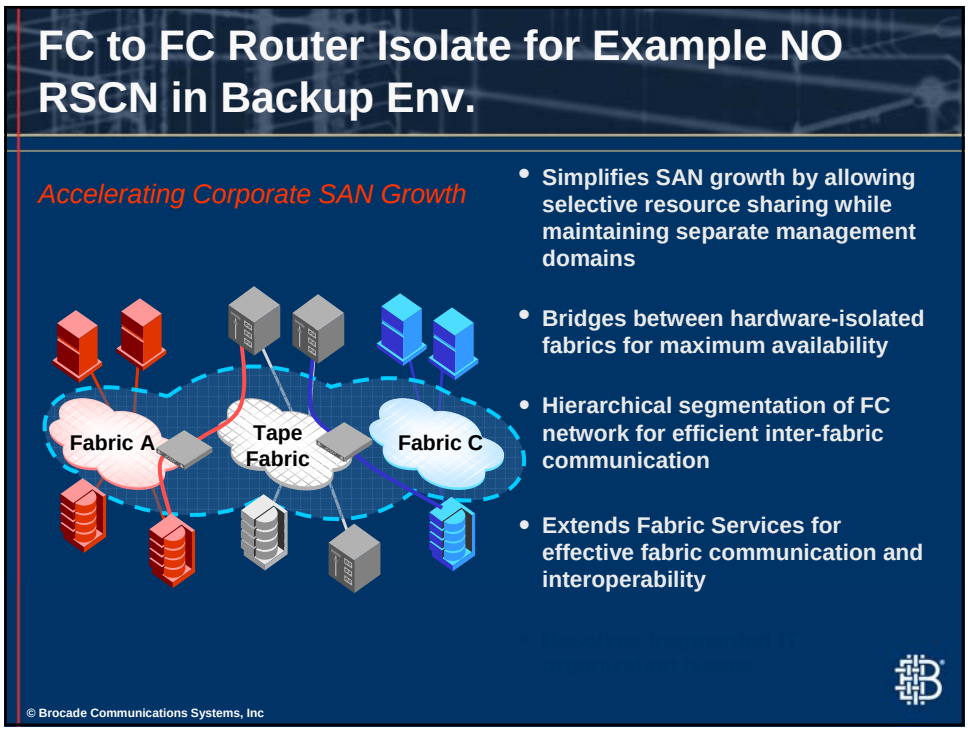
FC to FC Router Isolate for Example NO RSCN in Backup Env.
Accelerating Corporate SAN Growth
Fabric A
Tape Fabric
Fabric C
Simplifies SAN growth by allowing selective resource sharing while maintaining separate management domains
Bridges between hardware-isolated fabrics for maximum availability
Hierarchical segmentation of FC network for efficient inter-fabric communication
Extends Fabric Services for effective fabric communication and interoperability
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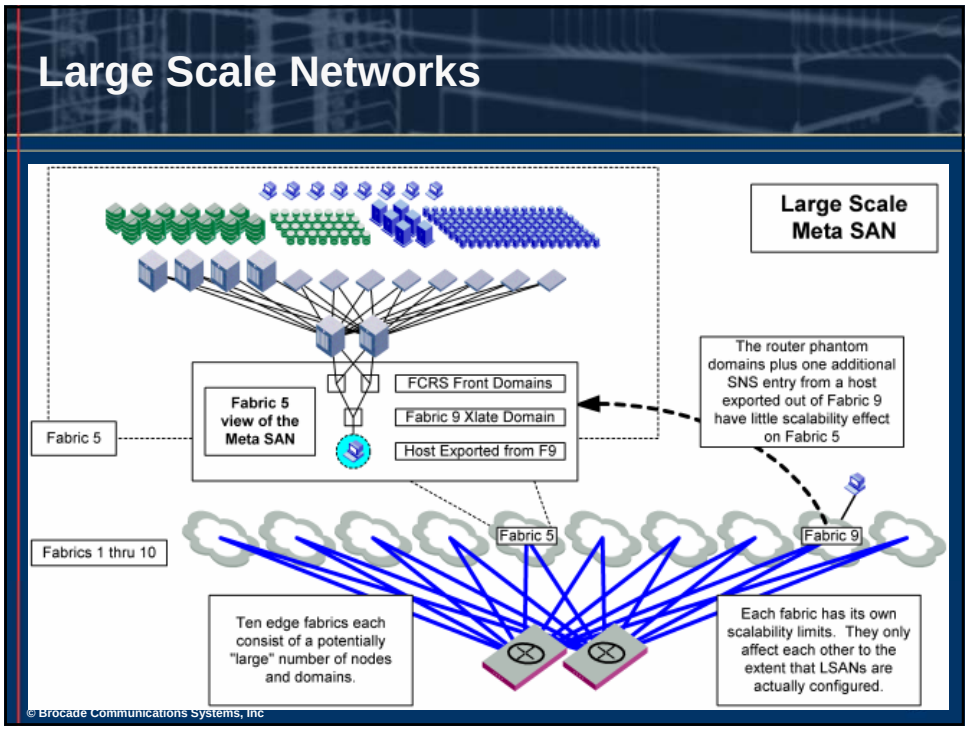
Large Scale Networks
Large Scale Meta SAN
Fabric 5 view of the Meta SAN
FCRS Front Domains
Fabric 9 Xlate Domain
Host Exported from F9
Fabric 5
The router phantom domains plus one additional SNS entry from a host exported out of Fabric 9 have little scalability effect on Fabric 5
Fabrics 1 thru 10
Fabric 5
Fabric 9
Ten edge fabrics each consist of a potentially "large" number of nodes and domains.
Each fabric has its own scalability limits. They only affect each other to the extent that LSANs are actually configured.
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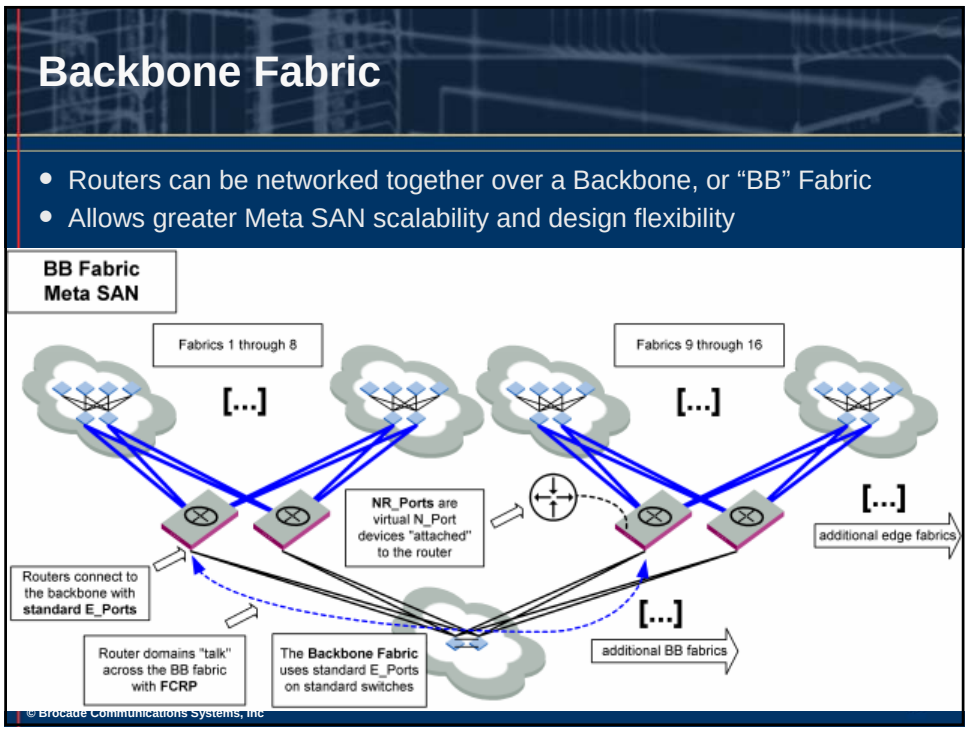
Backbone Fabric
Routers can be networked together over a Backbone, or “BB” Fabric
Allows greater Meta SAN scalability and design flexibility
BB Fabric Meta SAN
Fabrics 1 through 8
[...]
Fabrics 9 through 16
[...]
NR_Ports are virtual N_Port devices "attached" to the router
[...]
additional edge fabrics
Routers connect to the backbone with standard E_Ports
[...]
additional BB fabrics
Router domains "talk" across the BB fabric with FCRP
The Backbone Fabric uses standard E_Ports on standard switches
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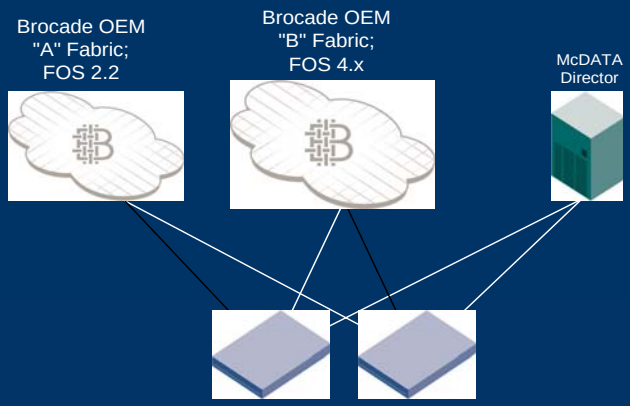
Shared Resources / Separate Support Domains

Interoperability Value-Add:

- **Switch-to-switch**
- **Device vendor compatibility**



Storage Applications from OEM & ISV

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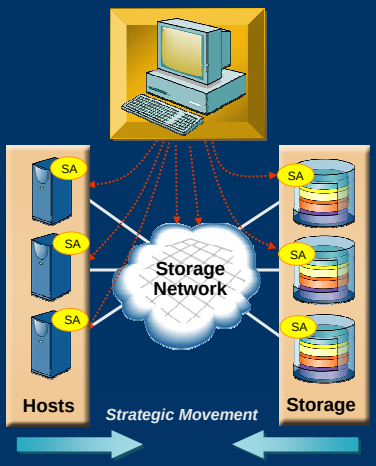
Storage Applications in the Network

Customer Benefits

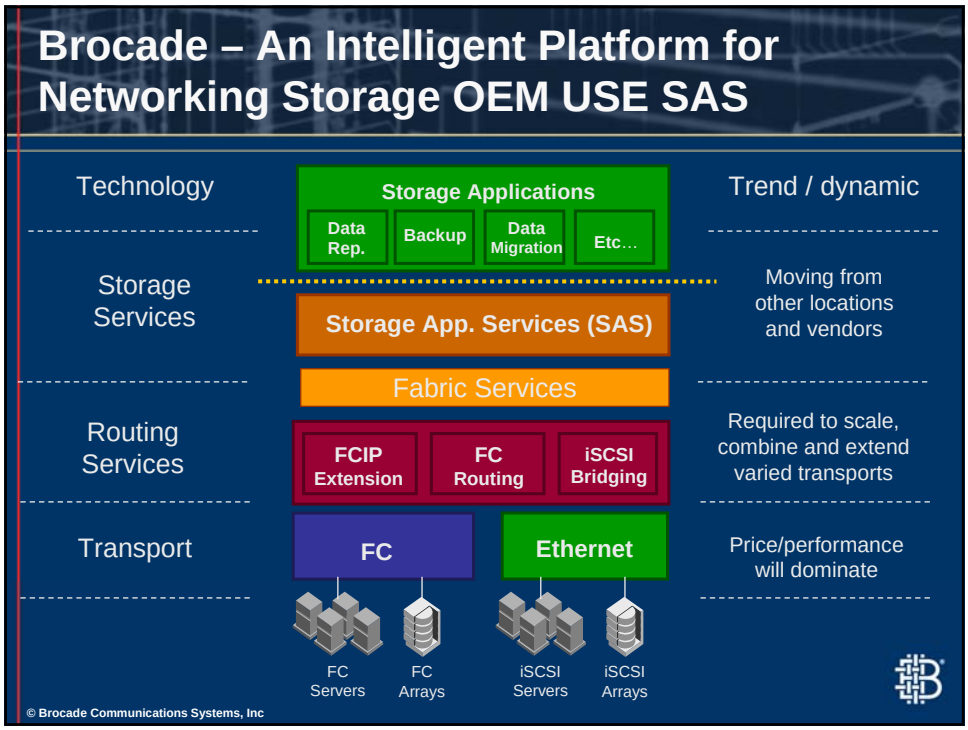
- ✓ Simplified resource and management consolidation
- ✓ Scalable application deployment spanning storage and servers
- ✓ Mixed storage cost and procurement benefits
- ✓ *Future-proof* – application-ready and multi-protocol flexibility

SA = Storage Application



Architectural Comparison

	Intelligent Switch	Storage Controller
IOPS	~50K per port, scalable	~50K per port, limited by the memory bus
Bandwidth	Up to 2 GB per port Scalable	Limited by memory bus
Ports	Up to 256 per Switch	4 - 16 total
Hosts	30-600	6 - 40
Storage	35-100 TB	4 – 20 TB
Management	Centralized	Distributed
Scalability	Add ports Add switch	Cluster
Potential Bottleneck	Control Path Processor Can Scale 16x Or 128x per Switch Port	Memory Bus
Fit	Enterprise	Department or SMB


Brocade – An Intelligent Platform for Networking Storage OEM USE SAS
Technology
Storage Services
Routing Services
Transport
Storage Applications
Data Rep.
Backup
Data Migration
Etc…
Storage App. Services (SAS)
Fabric Services
FCIP Extension
FC Routing
iSCSI Bridging
FC
Ethernet
FC Servers
FC Arrays
iSCSI Servers
iSCSI Arrays
Trend / dynamic
Moving from other locations and vendors
Required to scale, combine and extend varied transports
Price/performance will dominate
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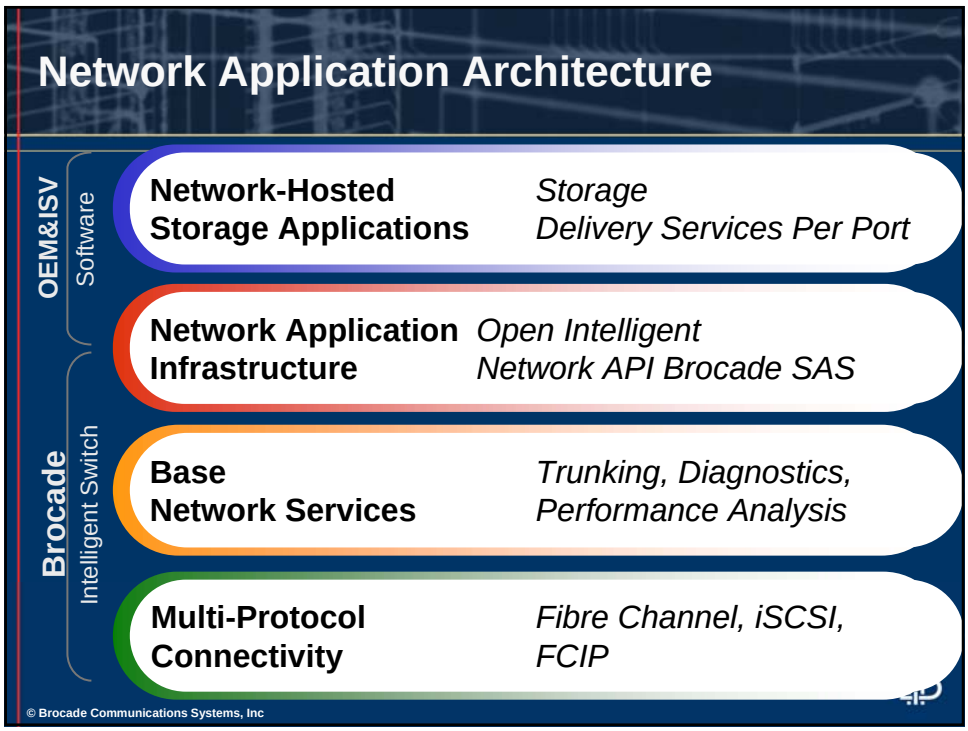
Network Application Architecture
OEM&ISV
Software
Brocade
Intelligent Switch
Network-Hosted Storage Applications
Storage Delivery Services Per Port
Network Application Infrastructure
Open Intelligent Network API Brocade SAS
Base Network Services
Trunking, Diagnostics, Performance Analysis
Multi-Protocol Connectivity
Fibre Channel, iSCSI, FCIP
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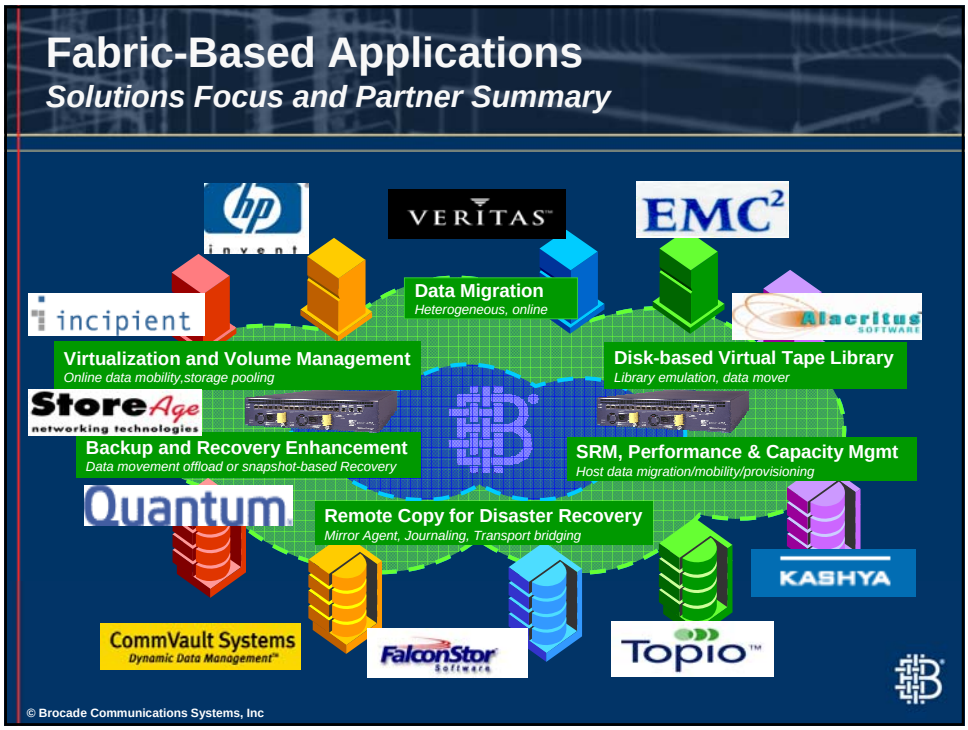
Fabric-Based Applications
Solutions Focus and Partner Summary
VERITAS
EMC²
incipient
Alacritus
Data Migration
Heterogeneous, online
Virtualization and Volume Management
Online data mobility,storage pooling
Disk-based Virtual Tape Library
Library emulation, data mover
StoreAge
networking technologies
Backup and Recovery Enhancement
Data movement offload or snapshot-based Recovery
SRM, Performance & Capacity Mgmt
Host data migration/mobility/provisioning
Quantum
Remote Copy for Disaster Recovery
Mirror Agent, Journaling, Transport bridging
KASHYA
CommVault Systems
Dynamic Data Management
FalconStor
Software
Topio
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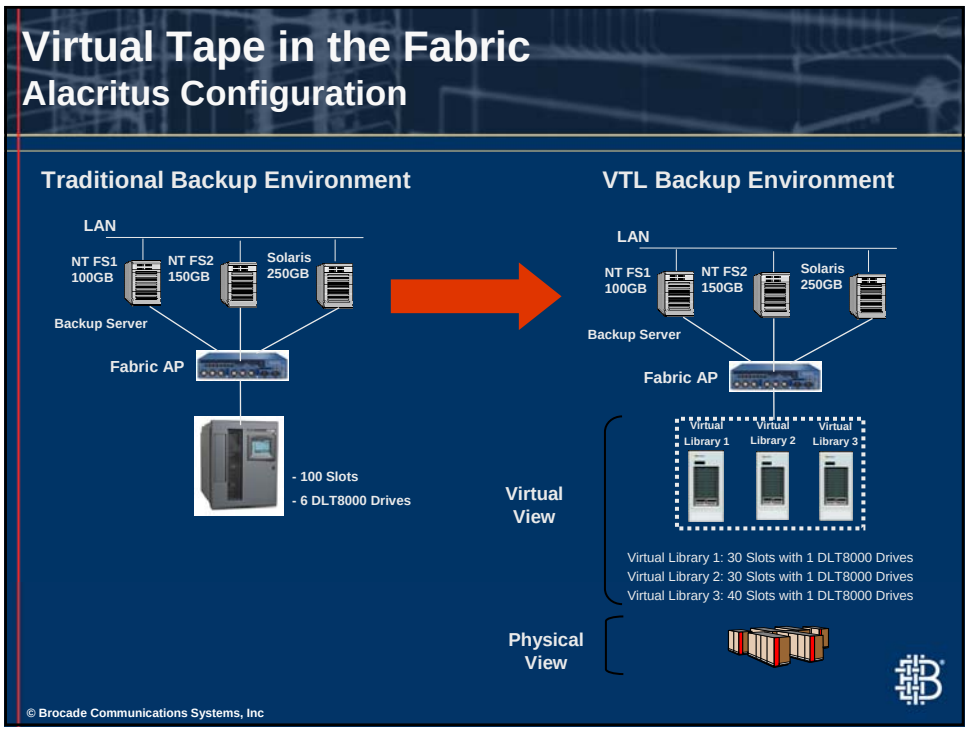
Virtual Tape in the Fabric
Alacritus Configuration
Traditional Backup Environment
VTL Backup Environment
LAN
NT FS1
100GB
NT FS2
150GB
Solaris
250GB
Backup Server
Fabric AP
- 100 Slots
- 6 DLT8000 Drives
Virtual
Library 1
Virtual
Library 2
Virtual
Library 3
Virtual
View
Virtual Library 1: 30 Slots with 1 DLT8000 Drives
Virtual Library 2: 30 Slots with 1 DLT8000 Drives
Virtual Library 3: 40 Slots with 1 DLT8000 Drives
Physical
View
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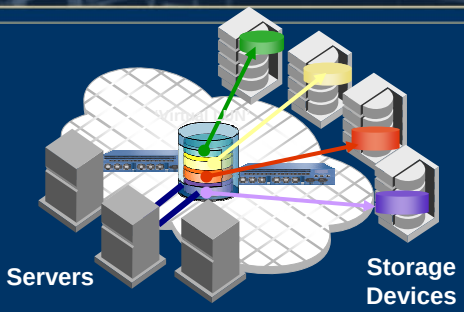
Fabric Application Building Blocks

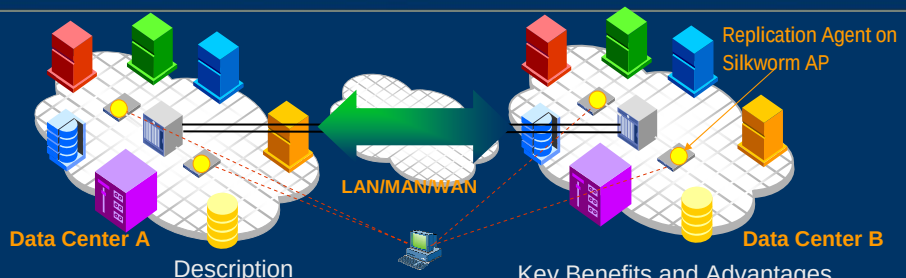
Fabric-Based Storage Virtualization



- Virtualization is a building block functionality for translating physical storage devices into logical storage devices
- Virtualization on the Silkworm Application Platform scales SAN-wide without performance impacts
- Existing alternatives are difficult to scale or are disruptive to servers

Fabric-Based Data Replication

Broader DR coverage



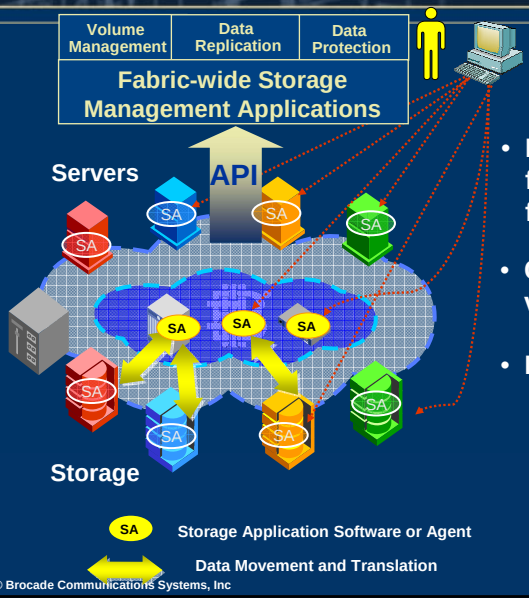
Description

- Distributed copy agents hosted on Silkworm AP
- Centralized control server monitors and manages overall operations and policies
- Many implementation options
  - –Sync or async, PIT or write-ordered copies
  - –Optional use of built-in FC to IP bridging

Key Benefits and Advantages

- Centralized, site-wide method for data replication
- Application-, storage-, and OS- independent
- Cost optimized via any-to-any storage topology
- Data integrity across servers and storage
  - – difficult to achieve with server and storage-based

Enabling the World's First Fabric-based Storage Management Applications



- Data path, data movement functions consolidated in fabric platform
- Consolidation of management via centralized console
- New category of applications
  - Function spans mix of storage and servers
  - Economic benefits, consolidation, new functionality

Thank You

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