

Information On Demand

Storage Consolidation and Virtualization

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INTEROP[®]

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ON DEMAND BUSINESS[™]

Requirements and Technologies for Consolidation

■ Goals for storage consolidation

- Simplify management
- Improve utilization
- Reduce costs
- Improve availability

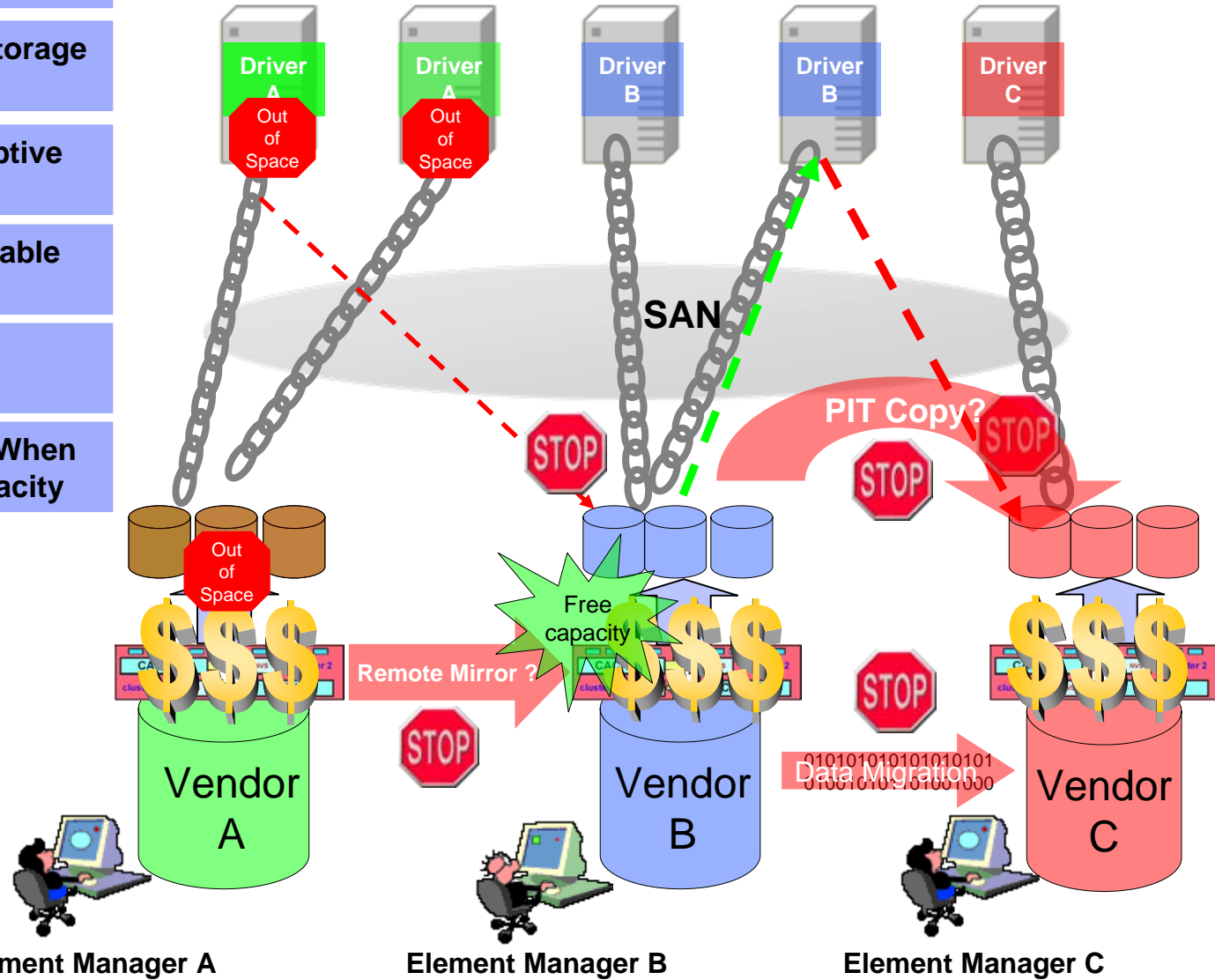
■ Key IBM technologies

- Tape system virtualization
 - IBM VTS and TS7510
- Physical consolidation with storage system virtualization
 - IBM DS8000 series
- Network-based storage virtualization
 - IBM SAN Volume Controller
- Simplify Management
 - IBM TotalStorage Productivity Center



Storage Limitations Today

- ➔ Static “Links“ Between Servers and Storage.
- ➔ In-efficient Utilization of Storage Capacity
- ➔ Migration of Data IS Disruptive and Time Consuming
- ➔ Proprietary, Non-interoperable Copy Services
- ➔ No Common Storage Management Interface
- ➔ Paying for Functionality - When You Really Just Need Capacity



What is Virtualization?

Logical representation of resources not constrained by physical limitations

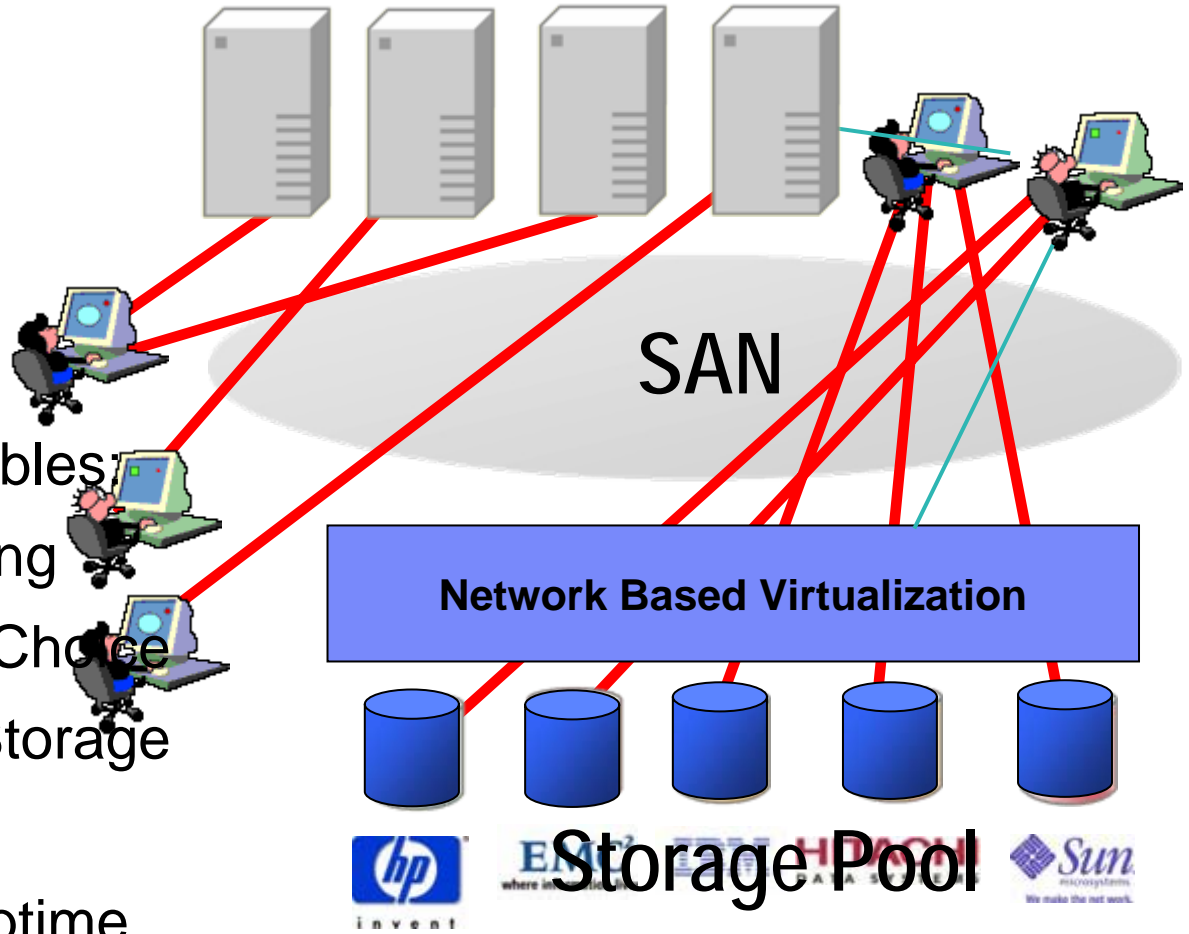
- Create many virtual resources within single physical device
- Reach beyond the box – see and manage many virtual resources as one
- Dynamically change and adjust across the infrastructure



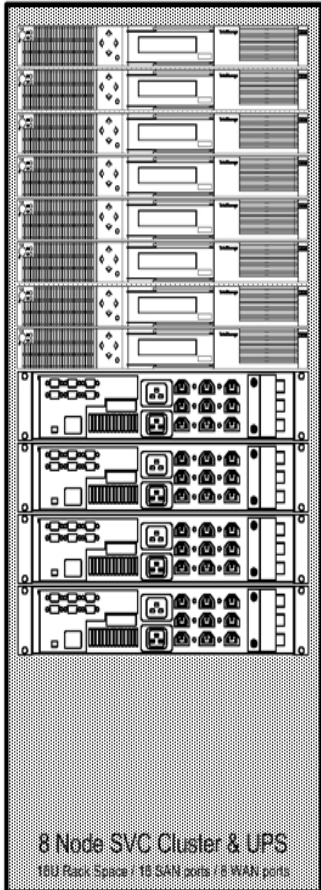
Virtualization = Openness

Physical IT
Environment,
Structure
Environment is

- **Complex**
- Virtualization Enables
- **Inefficient**
 - Storage Pooling
- **Insufficient**
 - Vendor Choice
 - Tiered Storage
 - Migration
 - Application Uptime



Storage Virtualization changes the open storage paradigm



- **Reduces overall cost for storage services**
 - ▶ Eliminate software licensing fees
 - ▶ Usage (not Capacity) based model for Advanced Functions
 - ▶ Improve storage capacity utilization
 - ▶ Align storage cost with business value

- **Improves application availability**
 - ▶ Eliminate downtime during migrations
 - ▶ Business Continuance copies on separate Storage Controllers
 - ▶ No data migration required to get started

- **Increases flexibility**
 - ▶ Vendor independence on future disk acquisitions
 - ▶ Enables more Business Continuity options
 - ▶ Support any to any point in time copies or mirroring

- **Maintains or improves current performance levels**
 - ▶ Improved performance via caching and striping

- **Simplifies operations (reduced complexity)**
 - ▶ One set of management tools and procedures regardless of underlying storage

Network-Based Storage Virtualization IBM System Storage SAN Volume Controller

Make changes to the storage without disrupting host applications



SAN

SAN Volume Controller

Advanced Copy Services

Apply copy services across the storage pool



Storage Pool

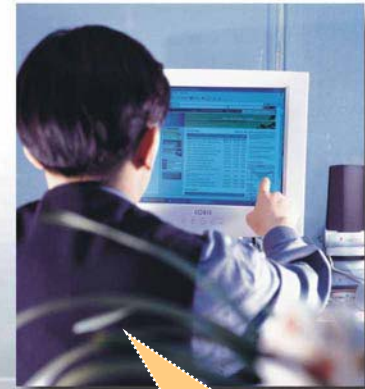
DS8000

HDS

DS4000

EMC

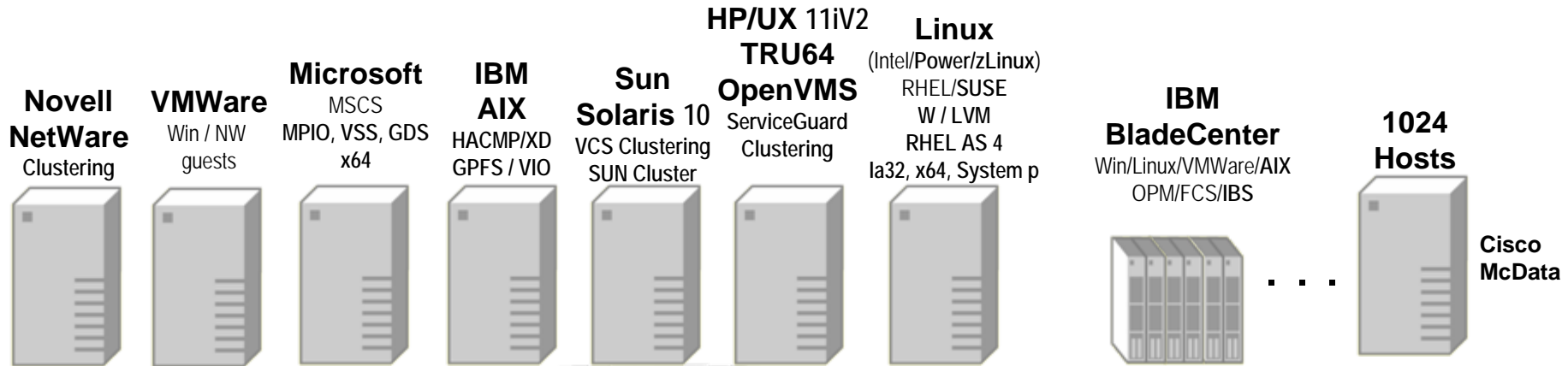
HP



Manage the storage pool from a central point

Combine the capacity from multiple arrays into a single pool of storage

System Storage SAN Volume Controller Version 4.1 Supported Environments



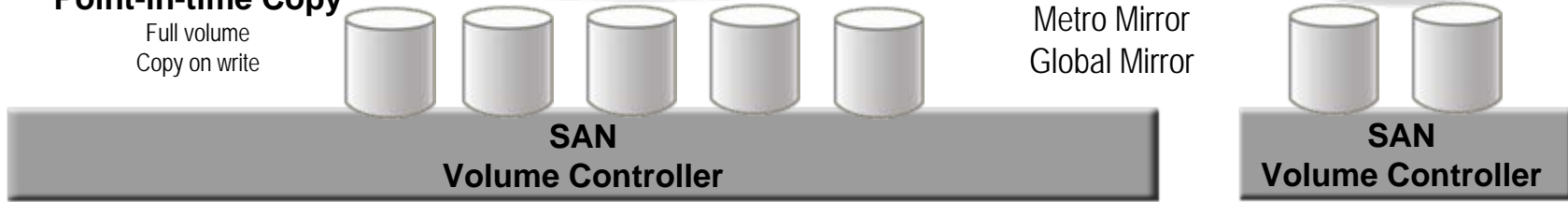
iSCSI to hosts
Via Cisco IPS

SAN with 4Gbps fabric

Continuous Copy
Metro Mirror
Global Mirror

SAN

Point-in-time Copy
Full volume
Copy on write



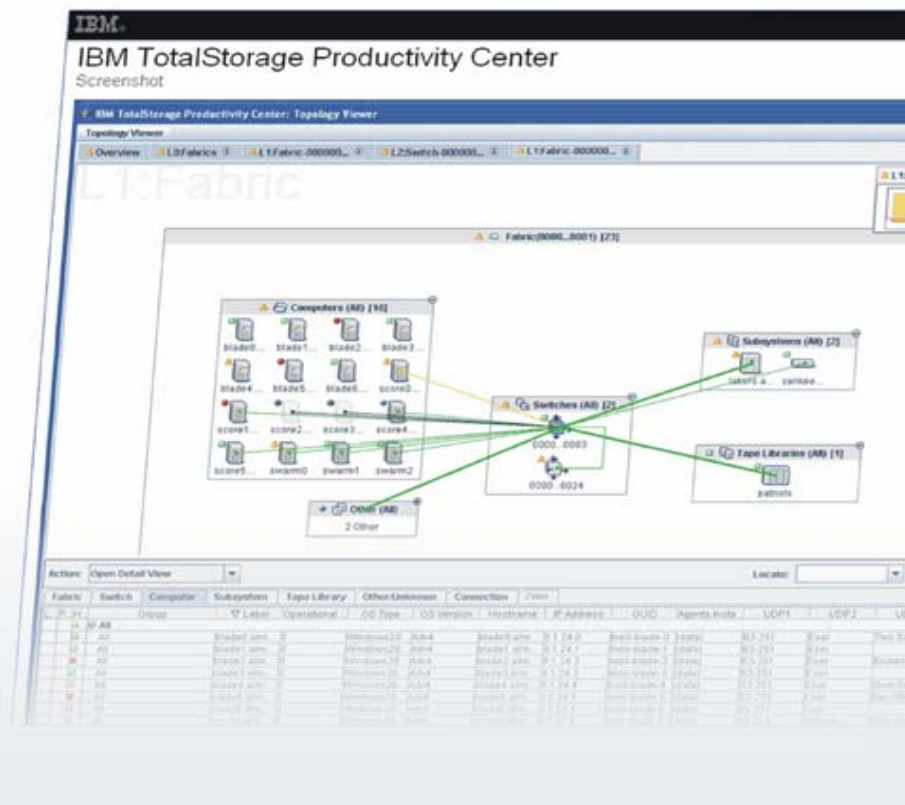
IBM ESS, FASTT	IBM DS DS4K / 6K DS8000 DS4800	IBM N series 5200, 5500	Hitachi Lightning 9980V 9970V 9910/9960	Hitachi Thunder 9200 95xxV 9520V	Hitachi Tagma Store USP, NSC55	HP EVA 3000/5000 4000/6000 8000	HP MA/EMA 8000 12000 16000	HP XP 48, 128 512, 1024	EMC Symm 8000 DMX	EMC/Dell CLARiiON FC4700 CX2/3/4/5/6/700	Sun 9910/9960 9970/9980	NetApp FAS 3020, 3050
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Array-based
copy services

Value of IBM TotalStorage Productivity Center

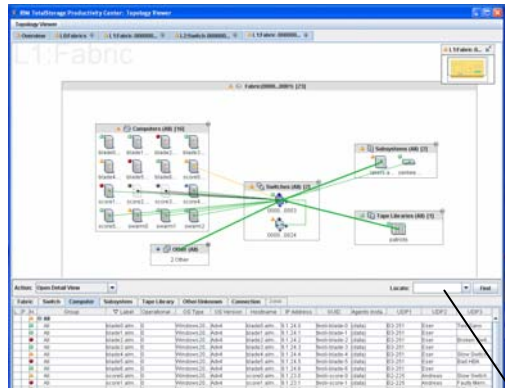
Single Console to manage physical and virtualized resources

- **Simplify** storage infrastructure management for better availability
- **Automate** planning, management and provisioning of storage
- **Optimize** storage personnel productivity and storage ROI

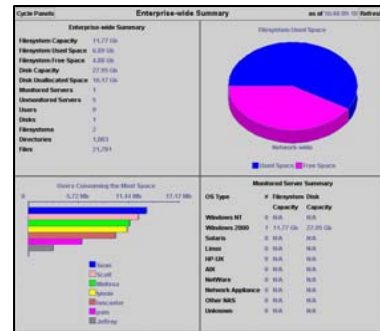


IBM TotalStorage Productivity Center

End to End Storage Management



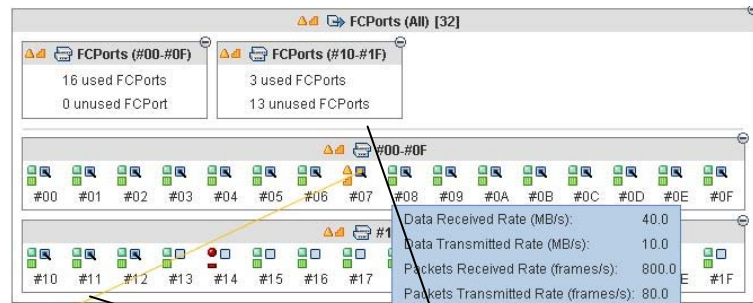
Automated identification of the storage resources in an infrastructure and **analysis** of how effectively those resources are being used.



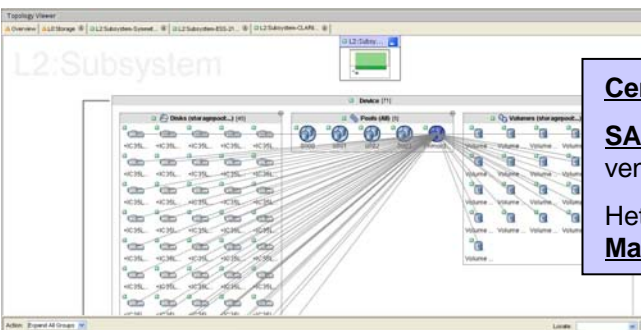
Volume Advisor based on performance workload profiles

Synchronized graphical and tabular views. Allows user to manipulate view by enlarging/reducing a view or closing one of the views

Locate function to search and find entities. Synchronized with graphical view



Overlays allow user to turn on/off aggregated status (e.g., health, performance) and membership (e.g., zone, zone set) information

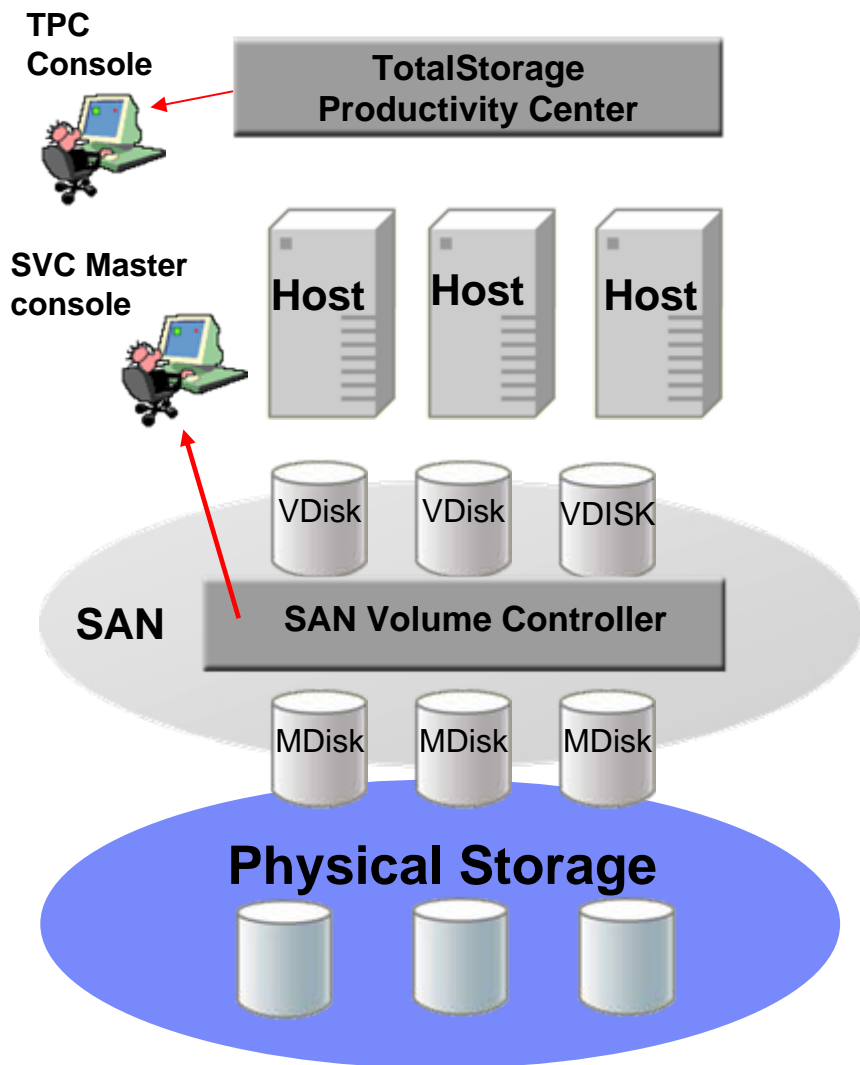


Centralized Management
SAN Management multi-vendor support
 Heterogeneous **Disk Management**

Physical and Logical views of Fabric and Disk

Automated control through policies that are customizable with actions that can include centralized alerting, distributed responsibility and fully automated response.

TPC Enhances SVC Management



- **Asset and capacity reporting**
 - ▶ Physical characteristics of devices on the SAN
 - ▶ Show allocated and free capacity of SVC and hosts
- **Configuration reporting and management**
 - ▶ Discover SVC, arrays and LUNs, switches
 - ▶ Reports on VDisk storage allocated to hosts
 - ▶ Display MDisks behind what the host sees as VDisks
 - ▶ List volumes which have been allocated but aren't in use
 - ▶ Show which hosts have access to a given VDisk
- **Performance management**
 - ▶ IO/s and MB/s per VDisk and MDisk
 - ▶ MDisk latency
 - ▶ Average block size
 - ▶ IO/s and MB/s per IO Group
 - ▶ IO/s and MB/s per MDG
- **Basic and automated provisioning**

Value of a Virtualized Infrastructure



- **Improve TCO**
 - Decrease management cost
 - Increase asset utilization
 - Link infrastructure performance to business goals
- **Access Through Shared Infrastructure**
 - Leverage common tools across many systems
 - Improve business resilience and security
 - Establish Service Oriented Infrastructure Foundation
- **Increase Flexibility**
 - Create pools of system resources
 - Maintain freedom of choice with open standards
 - Simplify by masking complexity

Virtualization Leadership

- IBM can virtualize up to 80% of a client's infrastructure
- Over 30,000 UNIX, mainframe, and System i customers exploiting systems-level virtualization
- System x customers deploy over 1,000 virtual servers a day
- IBM is the leading reseller of VMware
- 2,200 storage virtualization customers, +5 every day
- Over 3,400 Virtual Tape Systems supporting 1 Exabyte of data
- Over 500 grid implementations
- Hundreds of in-depth TCO studies



IBM has had the privilege of working with thousands of clients over the past four decades to help them exploit our industry leading capabilities

Virtualization is Real

- Storage help a
- Sim
- Better
- Lower costs



Storage talk turns

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TECHNOLOGY ANALYSTS

From our vantage point, we see three crucial keys to IBM's success - a comprehensive product capability designed for the enterprise, a **device support matrix that is second to none**, and the backing of IBM Global Services and a large army of IBM Business Partners. (Aug 06)

Users warm up to Virtualized Storage

Improved availability
I'm getting 70% - 80%

Four years of experience with deploying network-based virtualization systems using IBM's SVC Controller

- Perlstein

Rapid adoption demonstrates attractiveness of solutions

- 2,200 SVC systems world-wide managing over 15PB of data



First National Bank
Omaha

"We've seen huge benefits in staffing."

- Michael O'Neill,

First National Bank of Omaha



innovation that matters

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