

Agenda

- **Extraordinary Building Blocks**
- **The Making of a Solution**

Storwize V7000



- **Control enclosure:** dual controllers and up to twelve 3.5" or twenty-four 2.5" drives in just 2U
- **Eight 8Gb FC ports plus four 1Gb iSCSI ports per controller pair initially** (10Gb iSCSI and FCoE post-GA)
- **Expansion enclosure:** drives only
- **Up to nine expansion enclosures attach to one control enclosure**

Built-in Software inherited from SVC and DS8000 RAID

- **RAID 0, 1, 5, 6, 10**
- **Storage Virtualization**
(internal disks and external arrays)
- **Non-disruptive Data Migration**

Efficiency

- **Thin Provisioning**
- **Easy Tier**
(dynamic data movement across SSD/HDD)

Manageability

- **New User interface** (easy-to-use, web based)
- **Integrated SAN-wide Management**
(Tivoli Storage Productivity Center)
- **Integrated IBM server and storage mgmt** (Systems Director Storage Control)

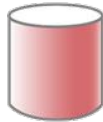
Replication

- **Application integrated**
(Oracle, DB2, SAP, Domino, Exchange, SQL Server)
- **Efficient use of space**
(thin provisioned, incremental, deduplicated)
- **DR automation** (failover/fail back, site switching)
- **IP or Fibre Channel**

Efficiency Features

Thin provisioning

- ✓ More productive use of available storage
- ✓ Across all supported host platforms



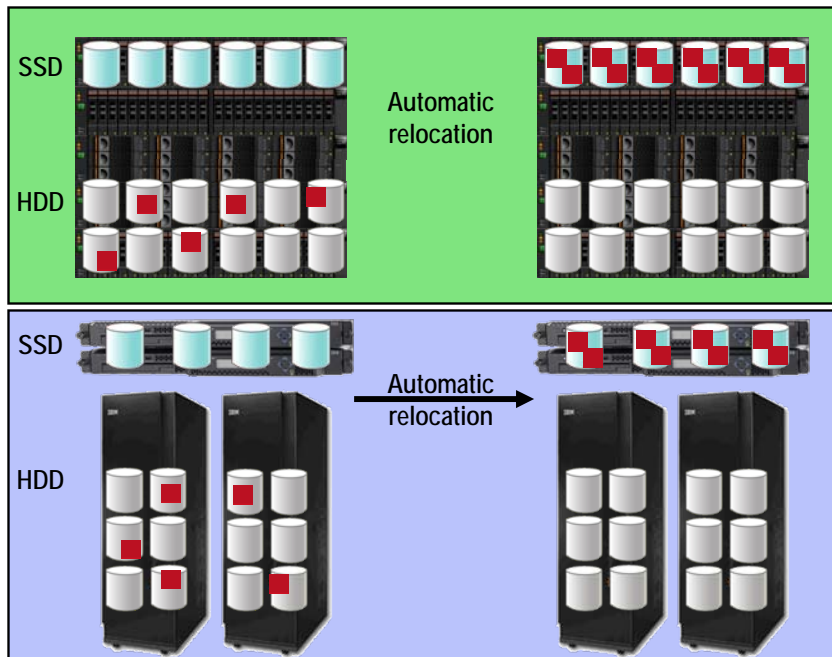
Without thin provisioning, pre-allocated space is reserved whether the application uses it or not.



Dynamic growth

With thin provisioning, applications can grow dynamically, but only consume space they are actually using.

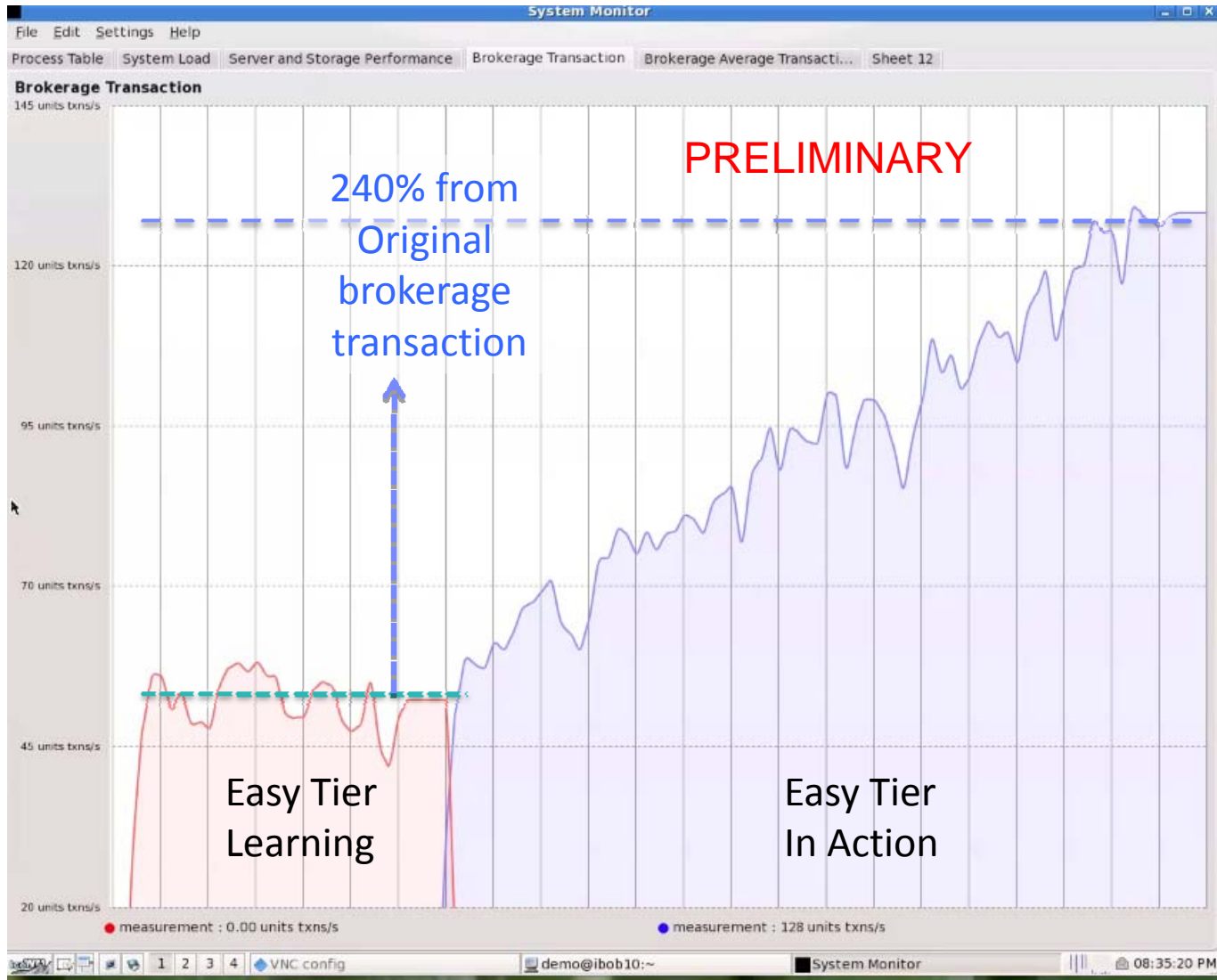
Easy Tier



- ✓ “Easy Tier” pools identify the busiest data extents and automatically relocate them to highest performing Solid-state Disks
- ✓ Remaining data extents can take advantage of higher capacity, price optimized disks

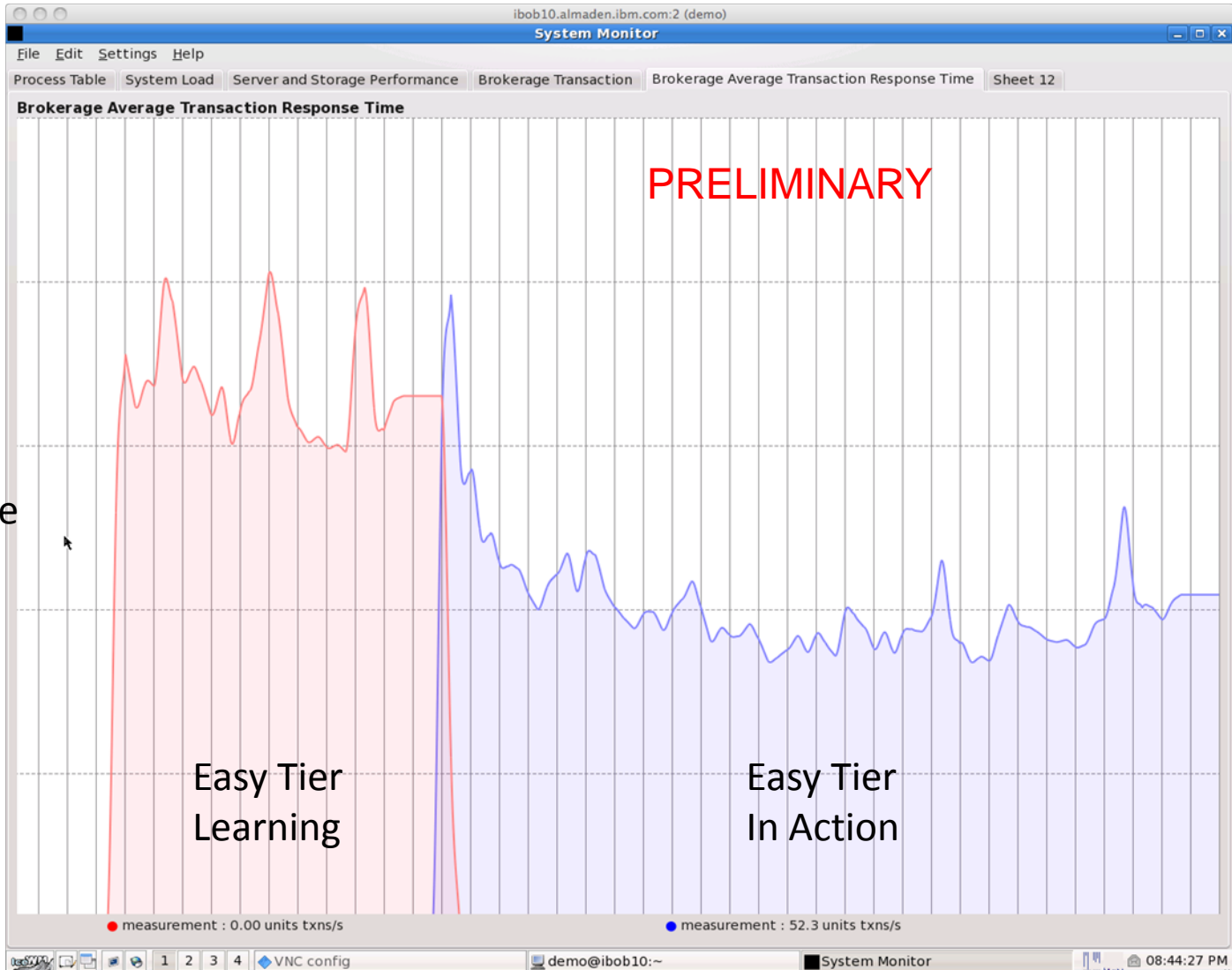
Easy Tier Application Transaction Improvement

Application Transaction Throughput



12 hours (Elapsed Time)

Easy Tier Application Transaction Improvement



Application Transaction Response Time

Easy Tier Learning

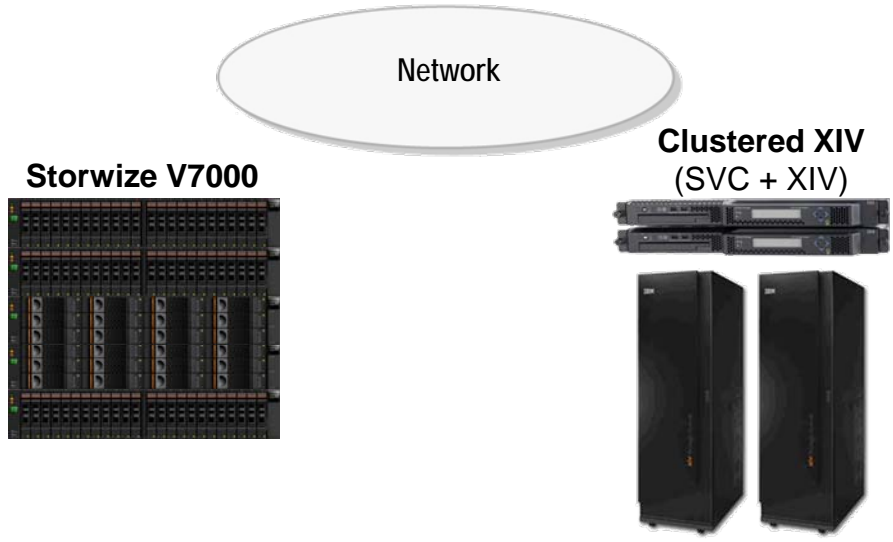
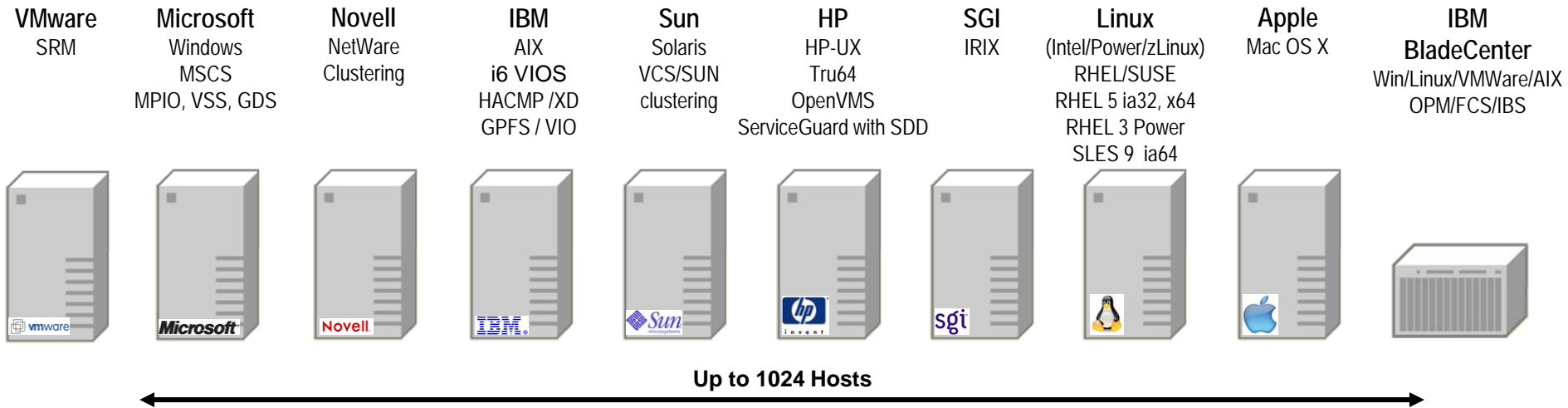
PRELIMINARY

Easy Tier In Action



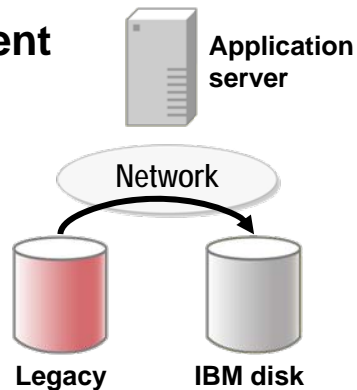
12 hours (Elapsed Time)

Host System Attach



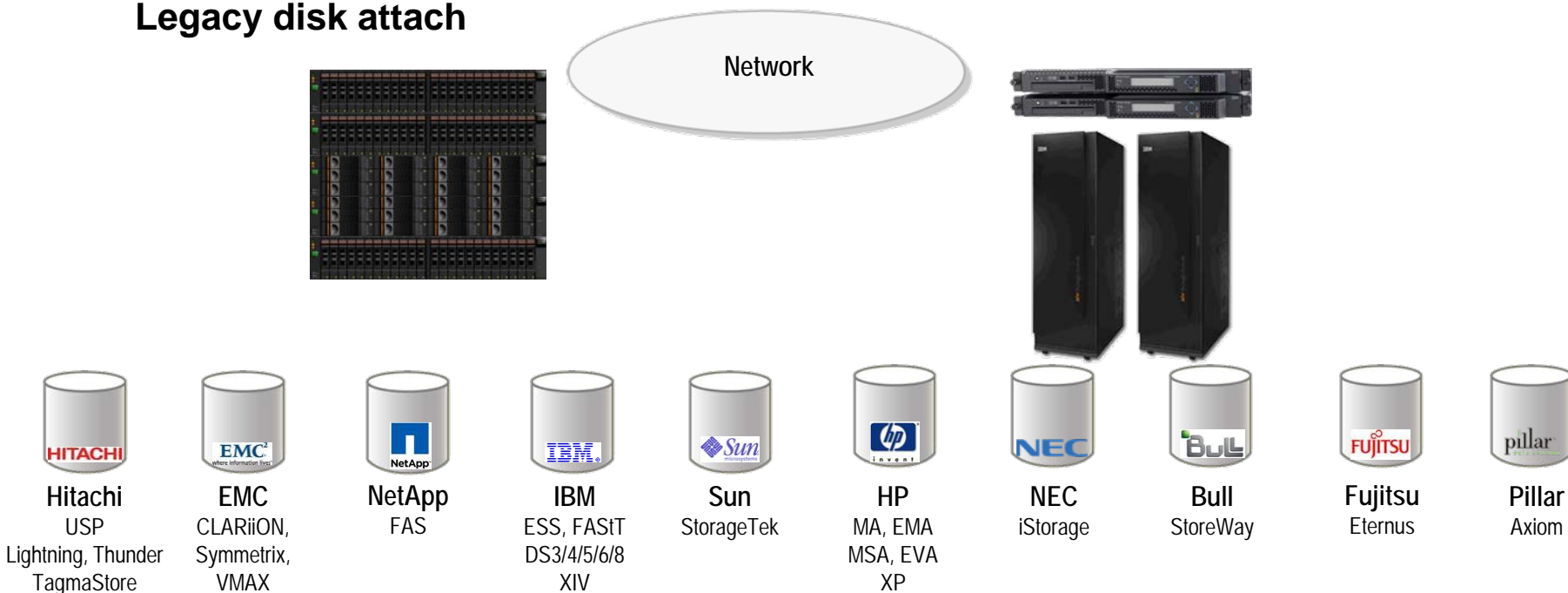
External Virtualization Features

Transparent data movement



✓ Efficiently manage technology upgrades and lease terminations by transparently moving application data from legacy disk arrays to new IBM Virtualized Disk Solutions

Legacy disk attach



Agenda

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Manageability Features

Overview

■ User Interface

- Adopted from the easy-to-use XIV GUI
- For clients where the Storwize V7000 “is” the infrastructure



Easy-to-use management GUI

■ Enterprise Management

- Integrated management with a SAN-wide perspective
- For clients where the Storwize V7000 is connected to a SAN with other, perhaps heterogeneous storage



Tivoli Storage Productivity Center
Integrated SAN-wide management

■ Server / Storage Management

- Integrated management with a Systems and Storage perspective
- For clients with IBM servers and storage



Systems Director Storage Control
Integrated IBM server and storage mgmt

Fresh New User Interface

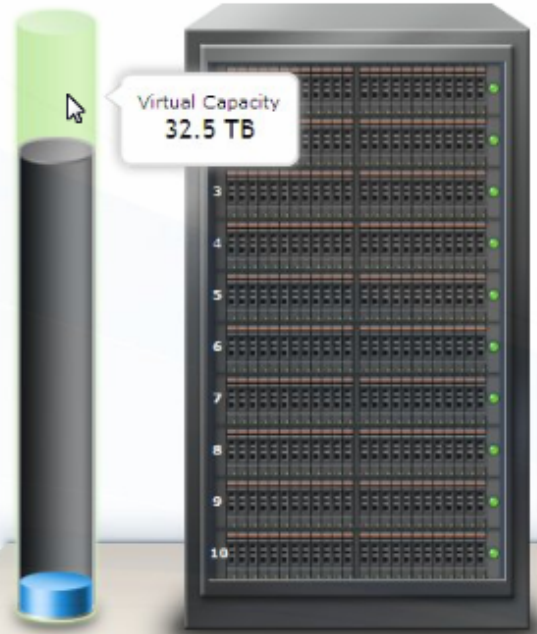
Based on the well-received XIV interface

The screenshot displays the IBM XIV user interface with several callouts highlighting key features:

- System recommendations:** A dropdown menu labeled "Recommended Actions" is shown at the top left.
- Visual task flow guidance:** A central diagram illustrates the workflow: 24 Internal Drives and 2 External Storage Systems lead to 9 MDisks, which are grouped into 4 Pools. These pools are then distributed into 20 Volumes, which are further grouped into 3 Fibre-Channel Hosts and 2 iSCSI Hosts. Green arrows and brackets indicate the flow and grouping of these components.
- Integrated video instruction:** An "Overview" section includes a link to "Watch eLearning: Overview" and a "Welcome!" message explaining the diagram and how to use the interface.
- Link to more information if needed:** A link labeled "Visit the Information Center" is provided below the overview text.
- System status always available:** A status bar at the bottom right shows "1 Running Tasks".

Additional UI elements include a left-hand navigation pane with icons for various storage components and a bottom status bar with "Connectivity" and "0%" indicators.

perf2 > Home > System Status



Virtual Capacity
32.5 TB

perf2 (6.1.0.0)

Connectivity

7%

0 Running Tasks

Done



perf2 > Home > System Status



Physical Capacity
26.0 TB



perf2 (6.1.0.0)

Connectivity

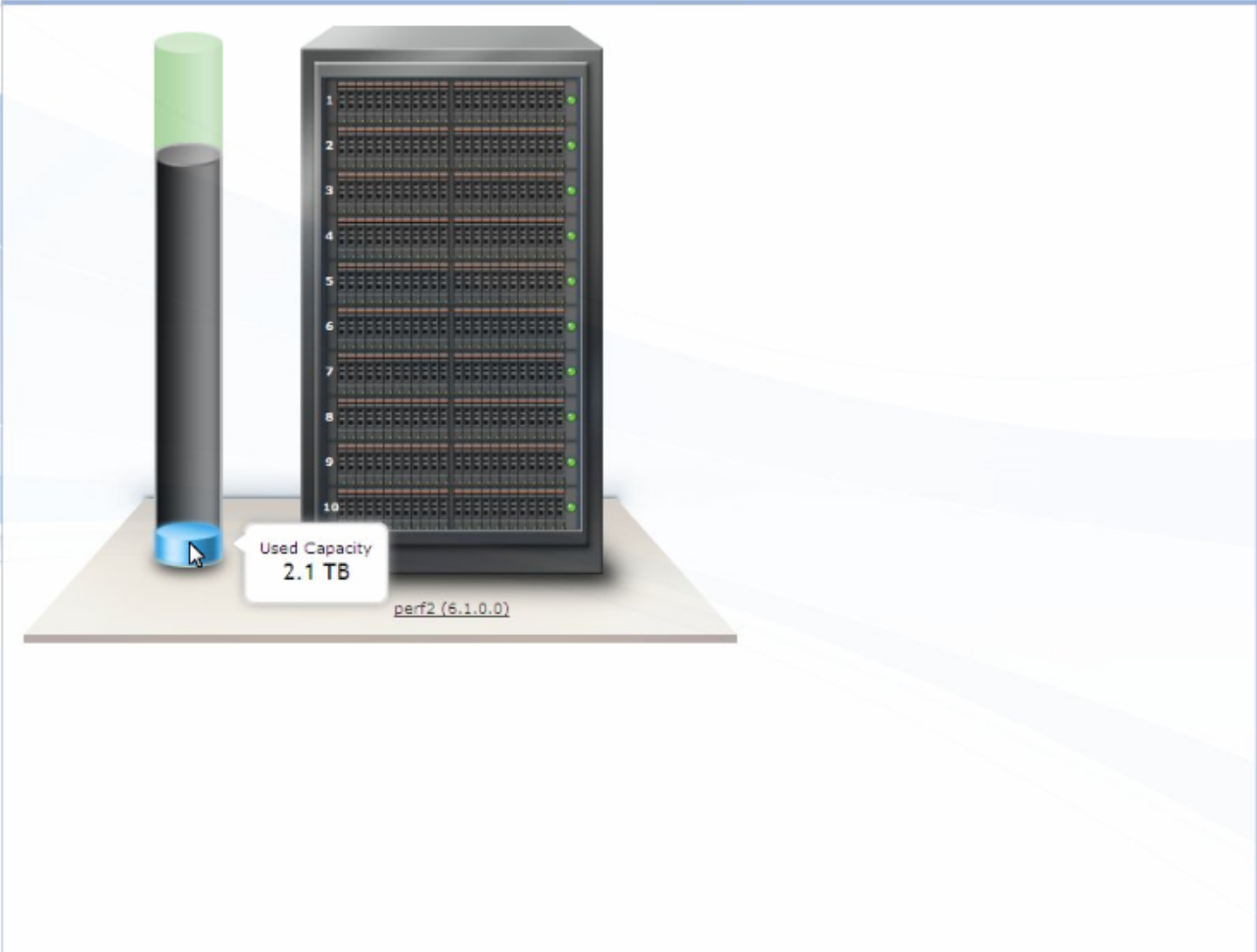
7%

0 Running Tasks

Done

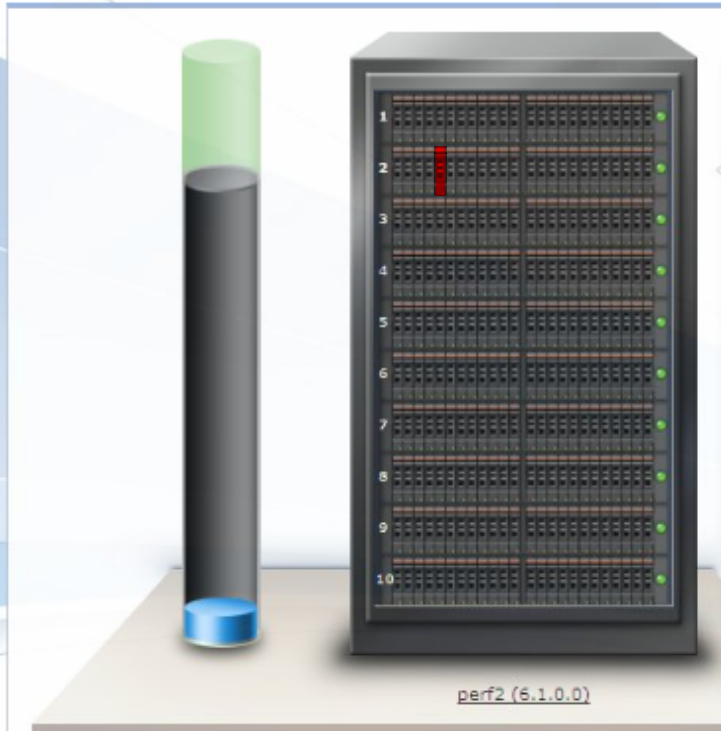


perf2 > Home > System Status



Connectivity 7% 0 Running Tasks

perf2 > Home > System Status



perf2 (6.1.0.0)

Enclosure 2

Online

Identify

Drive 43
Offline
278.9 GB SAS
10,000 RPM



Visually identify hardware areas of concern

Connectivity

7%

0 Running Tasks

Done



Manageability Features

Overview

■ User Interface

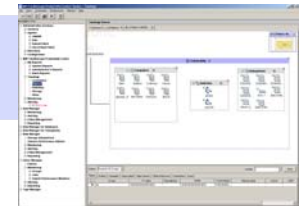
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Easy-to-use management GUI

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Tivoli Storage Productivity Center
Integrated SAN-wide management

■ Server / Storage Management

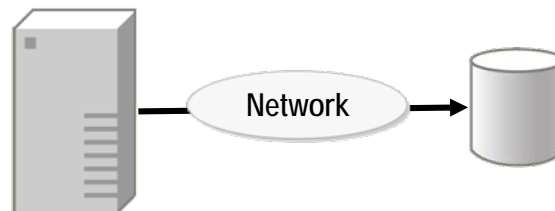
- Integrated management with a Systems and Storage perspective
- For clients with IBM servers and storage



Systems Director Storage Control
Integrated IBM server and storage mgmt

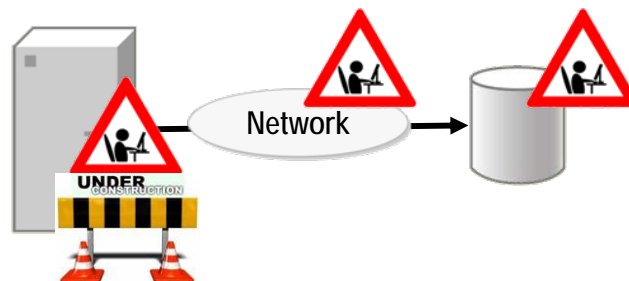
Enterprise Management Features

Visualize the SAN



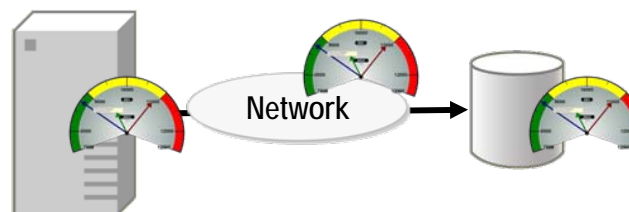
- ✓ From virtual machines to the physical server they reside on, through the SAN, to the disk systems ...
- ✓ Physical topology and logical data path
- ✓ Health/Status Monitoring
- ✓ Event Management
- ✓ Device Capacity Mgmt
- ✓ Policy-based Alerting

Provision storage



- ✓ For new or expanding applications, apply application-centric provisioning policies
- ✓ Provision host multi-pathing, SAN zones, and array capacity in a single action

Analyze performance



- ✓ Isolate application I/O performance problems across the entire data path
- ✓ Report on performance history

Analyzing Storage Performance

The screenshot displays the IBM TotalStorage Productivity Center interface. On the left is a **Navigation Tree** with the following structure:

- Administrative Services
- IBM TotalStorage Productivity Cent
 - Configuration Utility
 - Rollup Reports
 - My Reports
 - Topology
 - Computers** (highlighted)
 - Fabrics
 - Switches
 - Storage
 - Other
 - Monitoring
 - Analytics
 - Alerting
 - External Tools
- Data Manager
 - Data Manager for Databases
 - Data Manager for Chargeback
 - Disk Manager
 - Fabric Manager
 - Tape Manager
 - Element Manager

The main window is titled **Topology Viewer** and shows a view of **L0:Computers**. A context menu is open over a selected computer icon, with the **Open DataPath View** option highlighted by a blue box. The menu items are:

- Open Detail View
- Launch Detail Panel...
- Open DataPath View** (highlighted)
- Pin
- Launch Planner...
- Show Alerts in Tabular View
- Show Computer Alerts
- Reports
- Expand All Groups
- Collapse All Groups
- Close View
- Close All Views
- Refresh View
- Refresh All Views

At the bottom of the window, there is an **Action:** dropdown menu set to **Open Detail View**, and a **Computer** | **Alert** filter bar. A **Locate:** input field is also visible.

A blue callout box with a pointer to the highlighted menu item contains the text: **Highlight the desired computer or storage device**

IBM TotalStorage Productivity Center: john -- Create Storage Subsystem Alert

File View Connection Preferences Window Help

Element Management

Navigation Tree

- Administrative Services
- IBM TotalStorage Productivity Center
- Data Manager
- Data Manager for Databases
- Data Manager for Chargeback
- Disk Manager
 - Storage Subsystems
 - SAH Planner
 - Monitoring
 - Alerting
 - Storage Subsystem Alerts**
 - TPCUser.Default Disk Array Discovery
- Policy Management
- Reporting
- Fabric Manager
- Tape Manager
- Element Manager

Create Storage Subsystem Alert

Creator: administrator Name: unnamed

Description:

Alert Storage Subsystems

Triggering-Condition

Condition: Critical Stress Warning Stress Warning Idle Critical Idle Mill

Suppress alerts when Sequential I/O exceeds %

Triggered-Actions

SNMP Trap

TEC Event

Login Notification Login ID:

Windows Event Log Event Type:

Run Script

Email

Email Recipients:

Manageability Features

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Tivoli Storage Productivity Center
Integrated SAN-wide management

■ Server / Storage Management

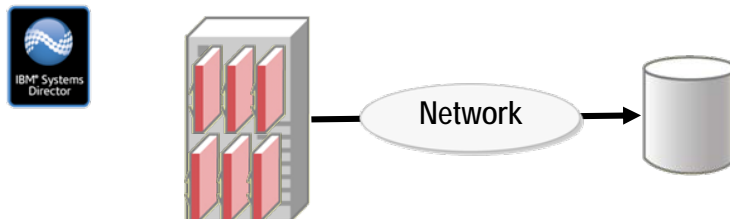
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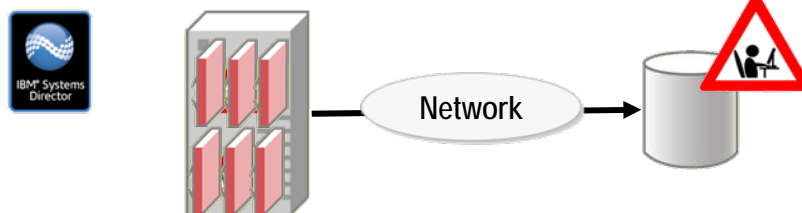
Server / Storage Management Features

Visualize and manage the complete infrastructure




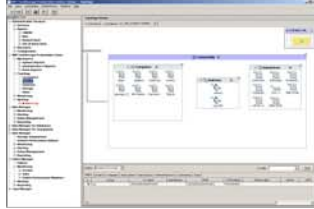

- ✓ From virtual machines to the physical server they reside on, through the SAN, to the disk systems ...
- ✓ Physical and virtual resource relationships and utilization
- ✓ Health/Status Monitoring
- ✓ Event Management
- ✓ Triggered action plans

Provision Virtual Server Images and storage



- ✓ For virtual server environments, dynamically provision virtual server images and array capacity in a single action

Manageability Features Summary

	User Interface	Enterprise Management Tivoli Storage Productivity Center	Server / Storage Management Systems Director Storage Control
			
Perspective			
Device	✓	✓	✓
Device + surrounding SAN		✓	✓
Servers + Storage			✓
Capabilities			
Health	✓	✓	✓
Capacity	✓	✓	✓
File System Utilization Analytics		✓	
Provisioning	✓	✓	✓
Performance Analytics		✓	
Replication Management	✓	✓	
Recovery Automation		✓	

Replication Features

Overview

■ IP Replication

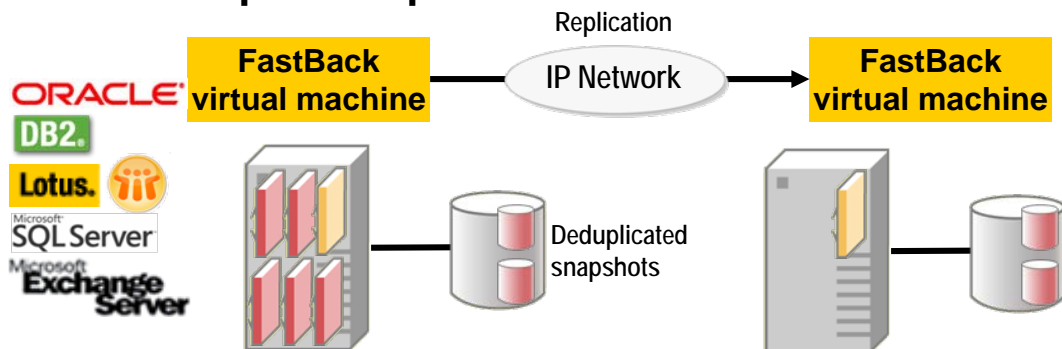
- Application-integrated capabilities for clients needing instant recovery with cost-optimized disaster recovery options

■ Fibre Channel Replication

- Application-integrated capabilities for clients needing instant recovery with full-featured enterprise replication solutions

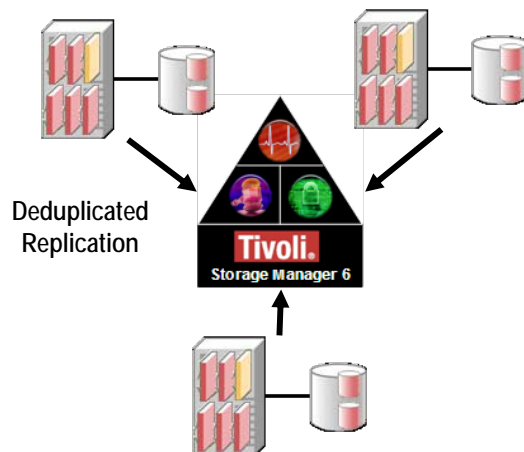
IP Replication Features

Snapshot replication



- ✓ Create instant copies of applications or file systems for backup
- ✓ Make better use of space with incremental (only changed blocks) and deduplicated snapshots
- ✓ Replicate snapshots off-site for disaster recovery

Enterprise snapshot replication



- ✓ For enterprise and branch office configurations
- ✓ Replicate distributed snapshots to a central Tivoli Storage Manager server for Unified Recovery Management and disaster recovery
- ✓ Make better use of network resources by deduplicating data before transmission

Replication Features

Overview

- **IP Replication**

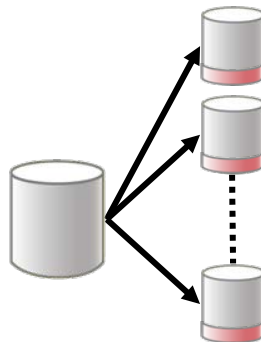
- Application-integrated capabilities for clients needing instant recovery with cost-optimized disaster recovery options

- **Fibre Channel Replication**

- Application-integrated capabilities for clients needing instant recovery with full-featured enterprise replication solutions

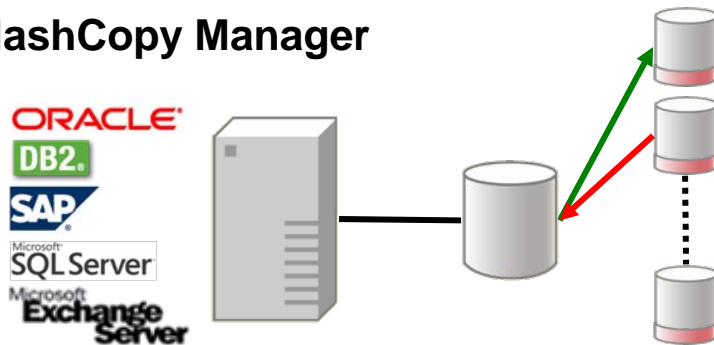
FlashCopy Features

FlashCopy



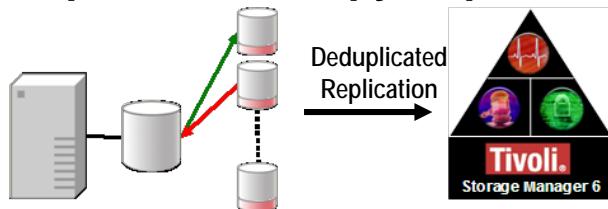
- ✓ Create instant application copies for backup or application testing
- ✓ Make better use of space with incremental (only changed blocks) or space-efficient (thin provisioned) snapshots

FlashCopy Manager



- ✓ Integrated, instant copy for critical applications
- ✓ Virtually eliminate backup windows
- ✓ Rapidly create clones for application testing
- ✓ View inventory of application copies and instantly restore

Enterprise FlashCopy Replication



- ✓ Replicate FlashCopy's to a central Tivoli Storage Manager server for Unified Recovery Management and disaster recovery
- ✓ Make better use of network resources by deduplicating data before transmission

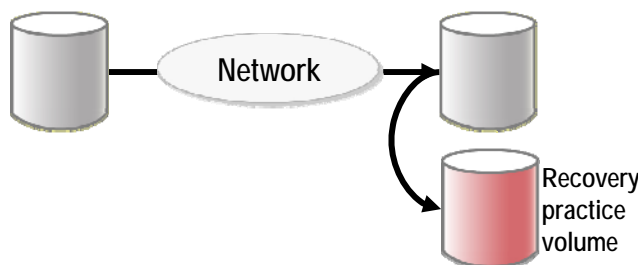
Fibre Channel Mirroring Features

Mirror data off-site



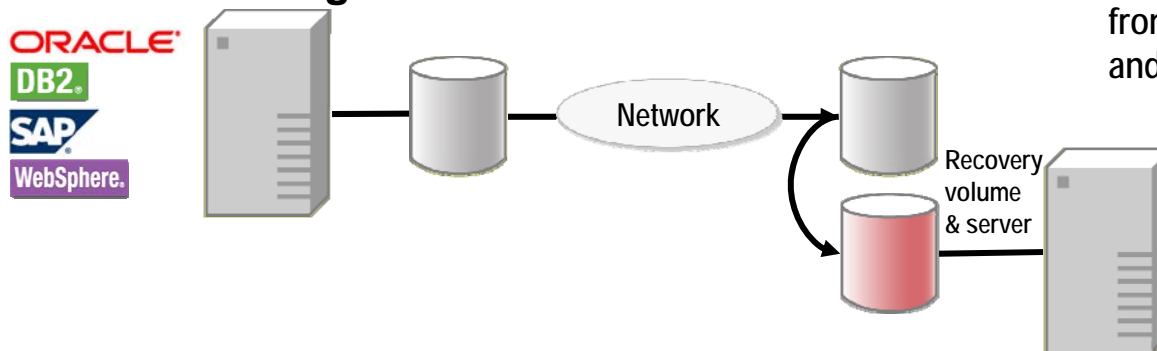
- ✓ Synchronously over Metro distances
- ✓ Asynchronously over Global distances
- ✓ Application-level consistency groups

Practice and Automatically Respond to Disasters



- ✓ For critical application consistency groups, freeze the Mirror and take a consistent FlashCopy
- ✓ Practice application recovery procedures from the FlashCopy
- ✓ Detect mirroring failure and automate failover to Recovery volume
- ✓ Automate fail-back after repair

Site Switching Automation



- ✓ Monitor and manage IT-wide site switching from a single console (Applications, servers, and storage)

Replication Features Summary

Optimal Client Environment Application integrated

Out-of-the-box Applications

Operating Systems

Custom application support

Efficient Use of Space

Incremental snapshot

Thin Provisioned snapshot

Deduplicated snapshot

Focus on Recovery

Instant Restore

Off-site replication

Synchronous mirroring

Asynchronous mirroring

Copy

Site Switching Automatioon





Enterprise Recovery Management

Replicate snapshots to

Tivoli Storage Manager

Deduplicated network traffic to

TSM repository

IP Replication FastBack for Storwize V7000	Fibre Channel Replication FlashCopy and Mirroring
Entry and Lower Midrange	Upper Midrange
	
	
✓	✓
✓	✓
✓	✓
✓	
✓	✓
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