



Education

An Introduction to Storage Management

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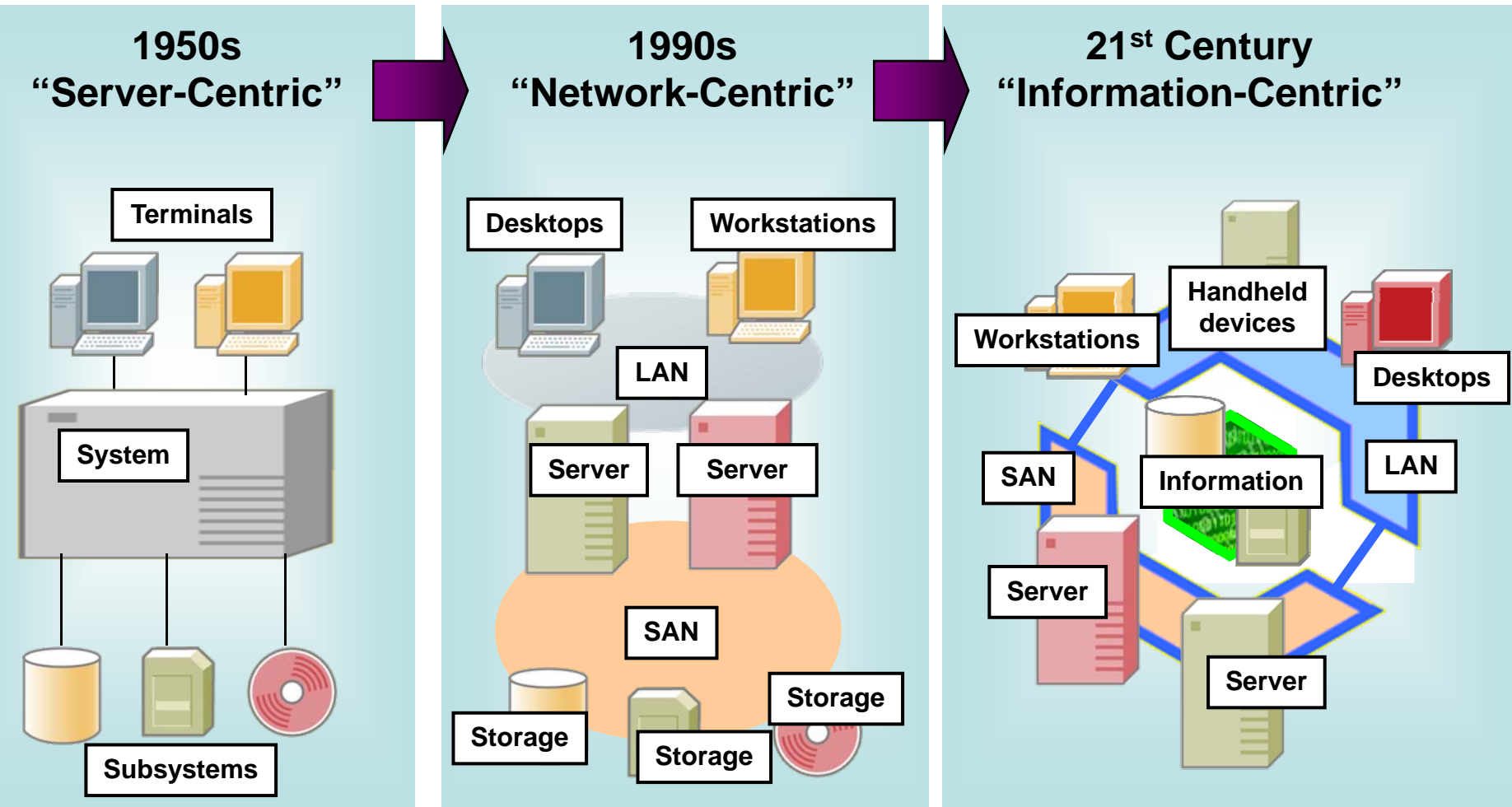
- This session will discuss managing the storage infrastructure. It will describe the basic of storage management, describe how SMI-S helps with managing diverse storage networks, and provides approaches that can be undertaken to get answers to many storage questions.
- This presentation will explain ways to get started, where you can get some help, and outlines goals and objectives that can assist you in obtaining sponsorship from your storage management project.
- Learning Objectives:
 - ◆ Review basics of managing a storage environment and how SMI-S fits with providing better management.
 - ◆ Describe approaches that can be taken and define the goals and objectives that will help you achieve improved management of your storage infrastructure.
 - ◆ Tie storage management to enterprise management, including automation, service management and links to your enterprise management solutions

Presentation Topics

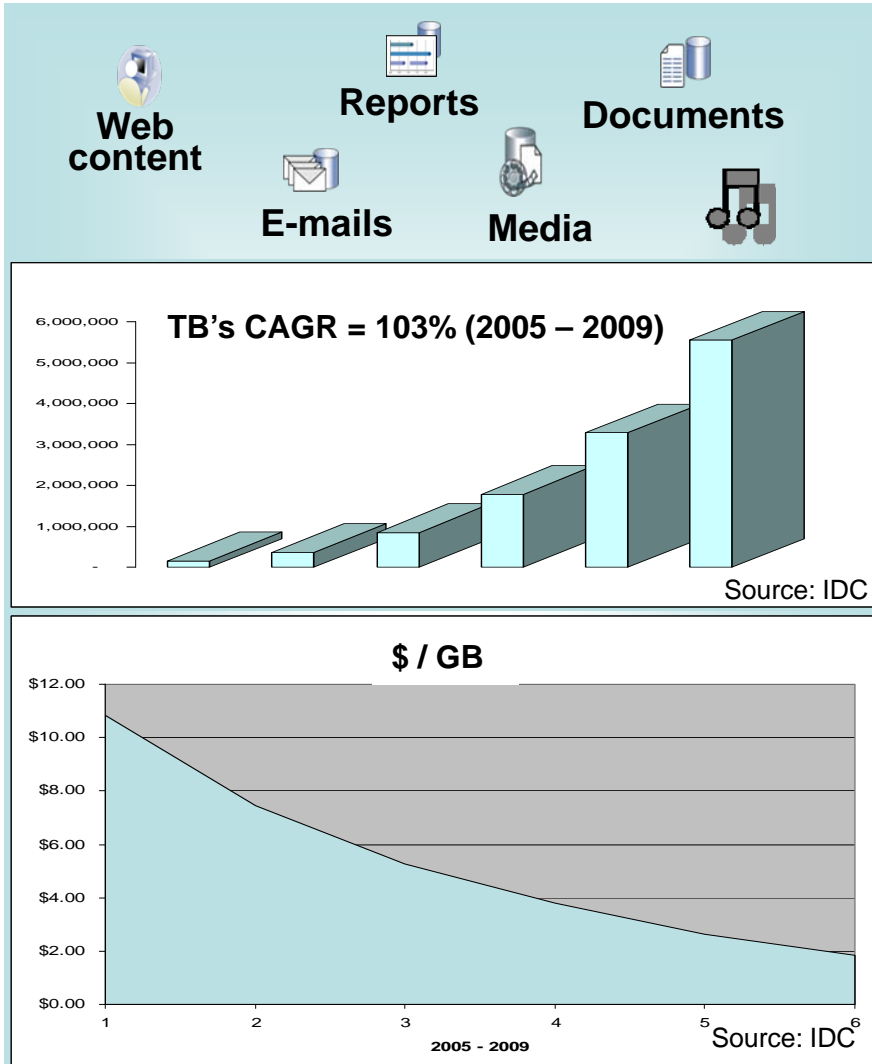
- The evolution of our storage networks
- Storage management challenges
- Why is management important? What needs to be managed?
- What does managing storage mean?
- What is a Storage Resource Manager and how does it help?
- How can you get started?
- How does SNIA and SMI-S help you manage your storage network?

The Evolution of Storage Networks

Managing Information in Silos has become Obsolete



Storage Management Challenges



➤ Variety of Information

- Information Technology holds the promise of bringing a variety of new types of information to the people who need it

➤ Volume of Data

- Data continues to grow exponentially

➤ Velocity of Change

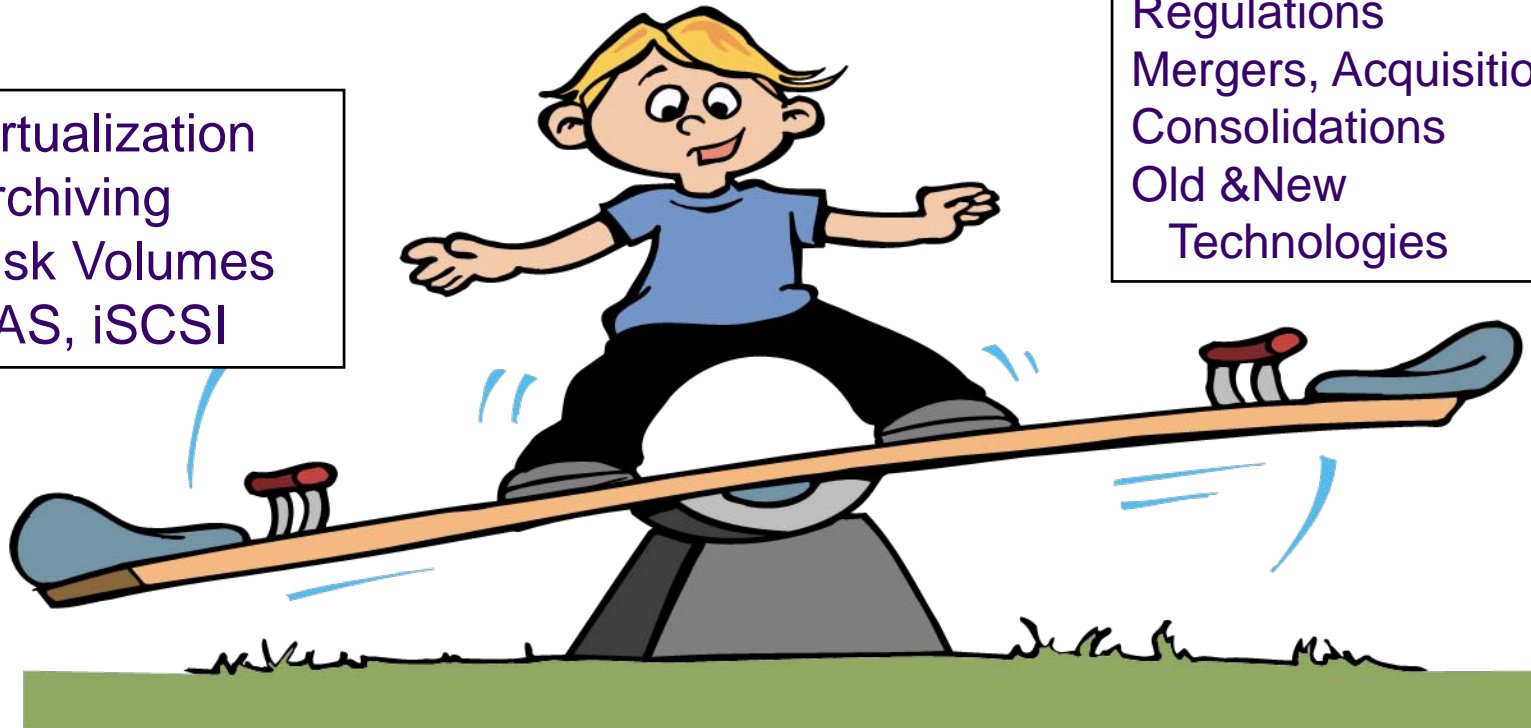
- IT Organizations are under tremendous pressure to deliver the right IT services.
- 85% of problems are caused by IT staff changing something.
- 80% of problems not detected by IT staff until reported by end user

Why is Management Important?

IT staff size the same?

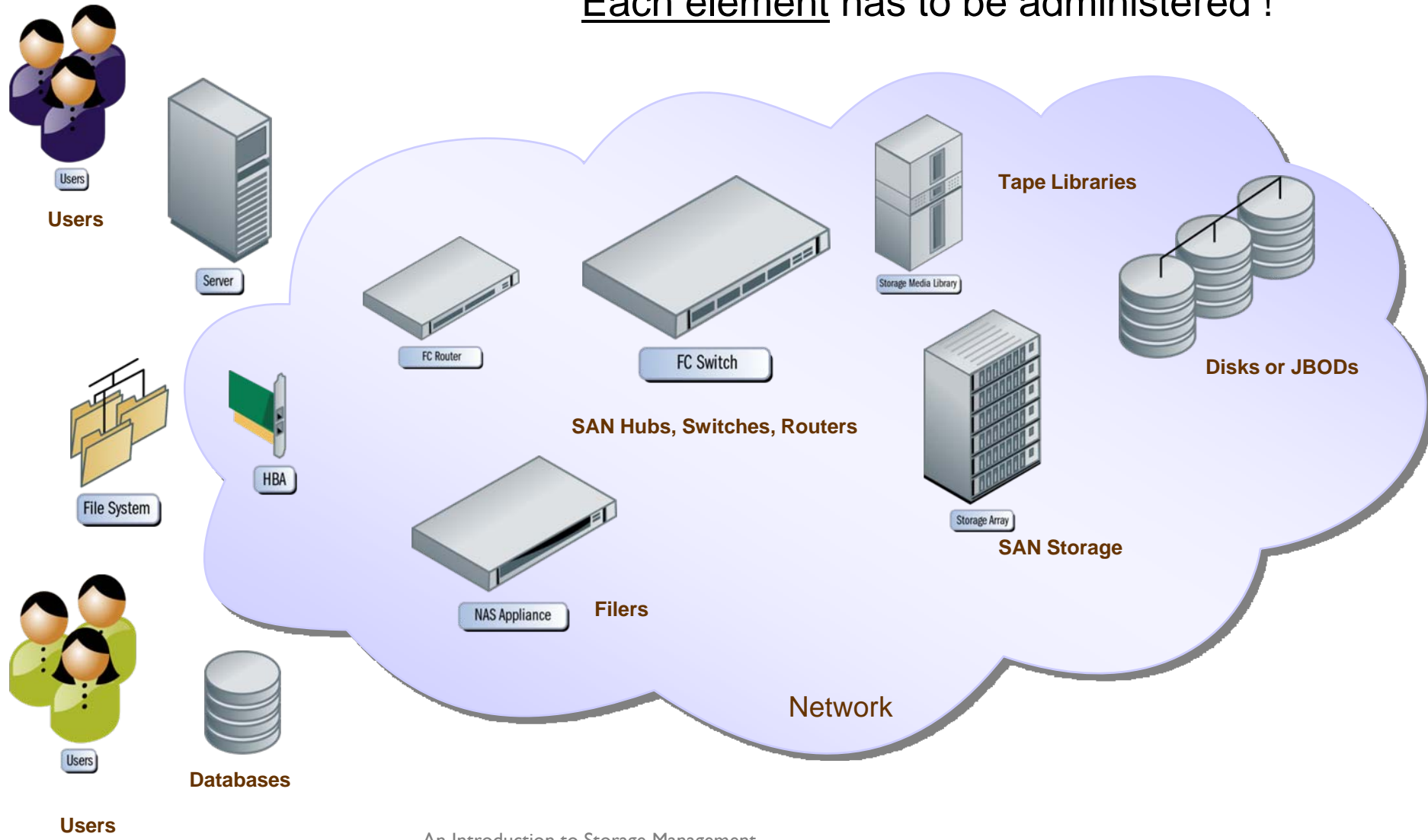
- Virtualization
- Archiving
- Disk Volumes
- NAS, iSCSI

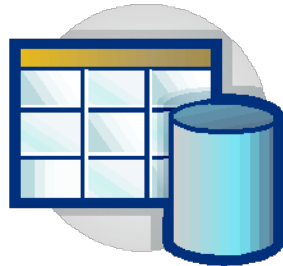
- Compliance
- Regulations
- Mergers, Acquisitions
- Consolidations
- Old & New Technologies



Administration of a Storage Network **SNIA**

Each element has to be administered !





**Check out SNIA Tutorial:
Help! My User base Eats
Storage for Lunch!**

*How much storage do I have available
for my applications?*

*Which applications, users and
databases are the primary consumers
of my storage?*

When do I need to buy more storage?

*How can I quickly find some
available storage for a new
project?*

How is my storage being used?

How does a SRM help?

➤ Reports on storage infrastructure

- ◆ Assets/Capacity
- ◆ Applications and Database awareness

➤ Chargeback for storage usage

- ◆ Control storage costs

➤ Data Classification

- ◆ Managing storage and data based on level of criticality of information
- ◆ Manage compliance





**Check out SNIA Tutorial:
Storage Virtualization I and II**

*How do I simplify
and centralize
the management of my storage
infrastructure?*

*How do I know the storage is not the
bottleneck for user response time
issues?*

How reliable is my SAN?

*Is the storage infrastructure
available and performing as
needed?*

How does a SRM help?

➤ Centralization

- ◆ End to end visibility
- ◆ Storage provisioning
- ◆ Event management
- ◆ Performance Management
- ◆ Configuration Management

➤ Tiered Storage

- ◆ Manage storage tiers and tier based service levels

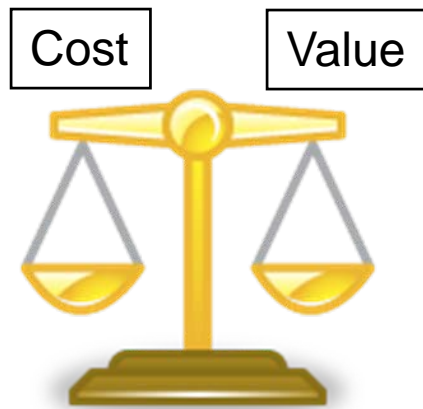
➤ Storage Virtualization

- ◆ Storage Virtualization can provide non-disruptive



Check out SNIA Tutorial:

SRM: Can You Get What You Want?



How do I monitor and centrally manage my replication services?

How do I maintain storage service levels?

Which files must be backed up, archived and retained for compliance?

How can I ensure all my storage is being used effectively, balancing value versus cost?

How does a SRM help?



- Disaster Recovery
 - ◆ Manage storage copy services (configuration, performance, reporting)
- Drive Backup via File Reports
 - ◆ Automate backup ups via file scans
- Archiving and Compliance
 - Identify files that can/should be archived

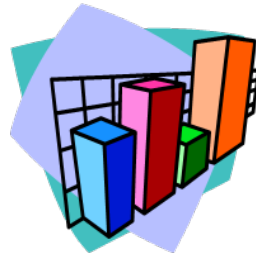


How can I automate the provisioning of my storage systems, databases, file systems and SAN?

How can I quickly determine the relationships between my applications, servers, and storage resources?

How can I more quickly configure and deploy my storage resources?

How does a SRM help?



➤ Analytics and Trending

- ◆ Historical configuration changes
- ◆ Workload based provisioning
- ◆ Performance analysis
- ◆ Configuration analysis

➤ Service Management

- ◆ Align your storage and data management policies with your business goals
- ◆ Automation/workflow based management

How can you get started?

➤ If you want to

- ◆ Provide Regular Asset and Capacity Reports to management
- ◆ Forecast and Track storage usage
- ◆ Establish a chargeback process
- ◆ Provide a tiered storage approach



Start by deploying the reporting capabilities

➤ If you want to

- ◆ Centralize your storage administration across the SAN and manage the storage SAN end to end
- ◆ Automate the configuration of your storage resources
- ◆ Optimize your storage configuration
- ◆ Provide a service-based approach



Start by deploying the operational capabilities

Starting with Reporting

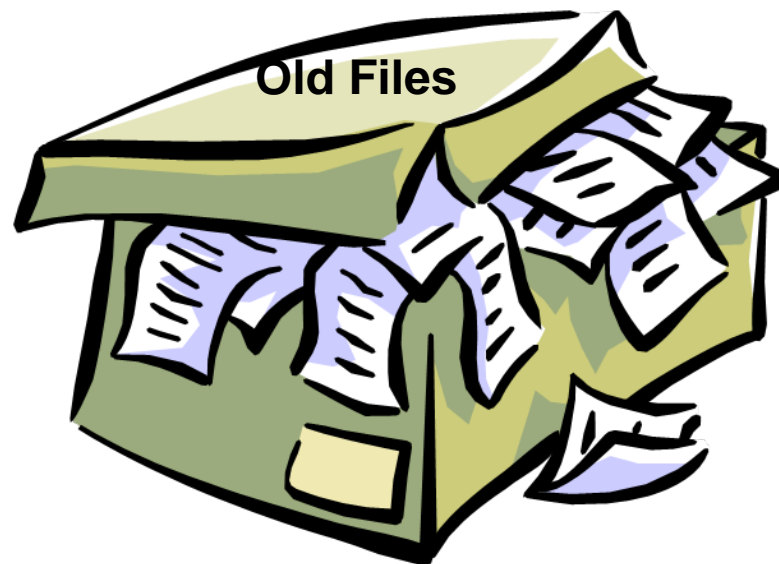
Find unused storage

Applications

Databases

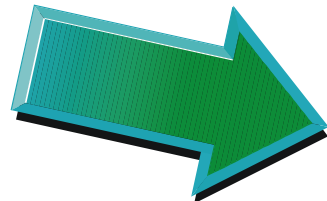
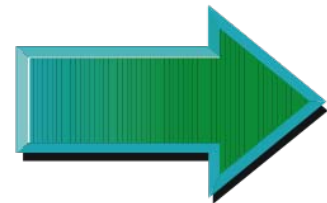
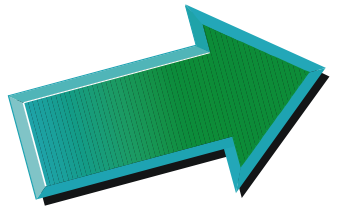
File Systems

Users

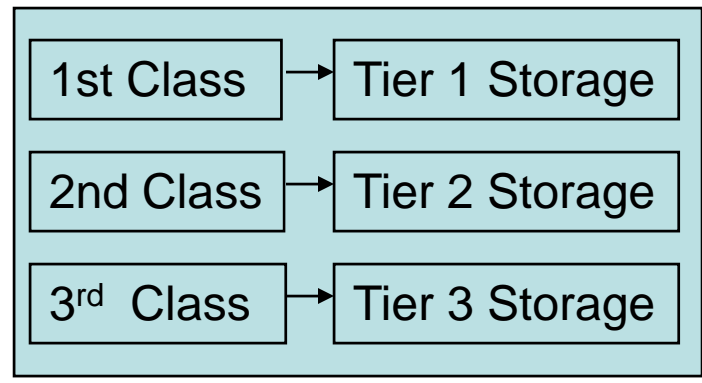


Temporary Files
Old Files
Unused Databases
Free space allocated to databases
Unused file shares and directories
Unallocated disks

Starting with Reporting



Armed with storage reports, storage utilization can be managed



Tiered Storage



Chargeback



Consolidation

Starting with Operational

Storage Resource Managers provide a centralized approach to managing storage



Topology Viewer

Overview | L0:Storage Resource Groups | L2:Storage Resource Groups-Tier... | L2:Storage Resource Groups

Storage [10]

DS6000-1750-6847412-IBM [9]

Pools (All) [1] | Disks (n/a) [8]

Extent Po... | U175051... U175051... U175051...
 U175051... U175051... U175051...
 U175051... U175051...

Action: Expand All Groups | Locate: []

Pool	Subsystem	Switch	Tape Drive	Tape Library	VM Disk	Volume	
Storage Resource Group			Computer	Alert	Disk	Fabric	Media Changer
Group	Label	Operational...	Vendor	Model	Serial#		
n/a							
n/a	U1750511.6847412-P1-...	ok	Unknown	22R1559300	8000486B5		
n/a	U1750511.6847412-P1-...	ok	Unknown	22R1559300	8000486C...		
n/a	U1750511.6847412-P1-...	ok	Unknown	22R1559300	8000486C...		

Discover the Storage Network

Central Operations for SAN Management

End-to-End Topology Views

Availability and Performance Management

Track SAN Configuration Changes

Apply Best Practices

Pinpoint SAN Bottlenecks

Actively Monitor Storage Service Levels



Gaining operational control
of your storage network,
advanced approaches can
now be adopted

Automated and
Workflow Based
Provisioning

Advanced Analytics
to Identify
and Avoid
Bottlenecks

Proactive
Management

Evolve to
Service-Based
IT management

SNIA and SMI-S Basics

➤ What is SNIA?

- ◆ The Storage Networking Industry Association

- Made up of some 400 member companies and nearly 7000 individuals Refer to www.snia.org/home for more information

➤ What is SMI-S?

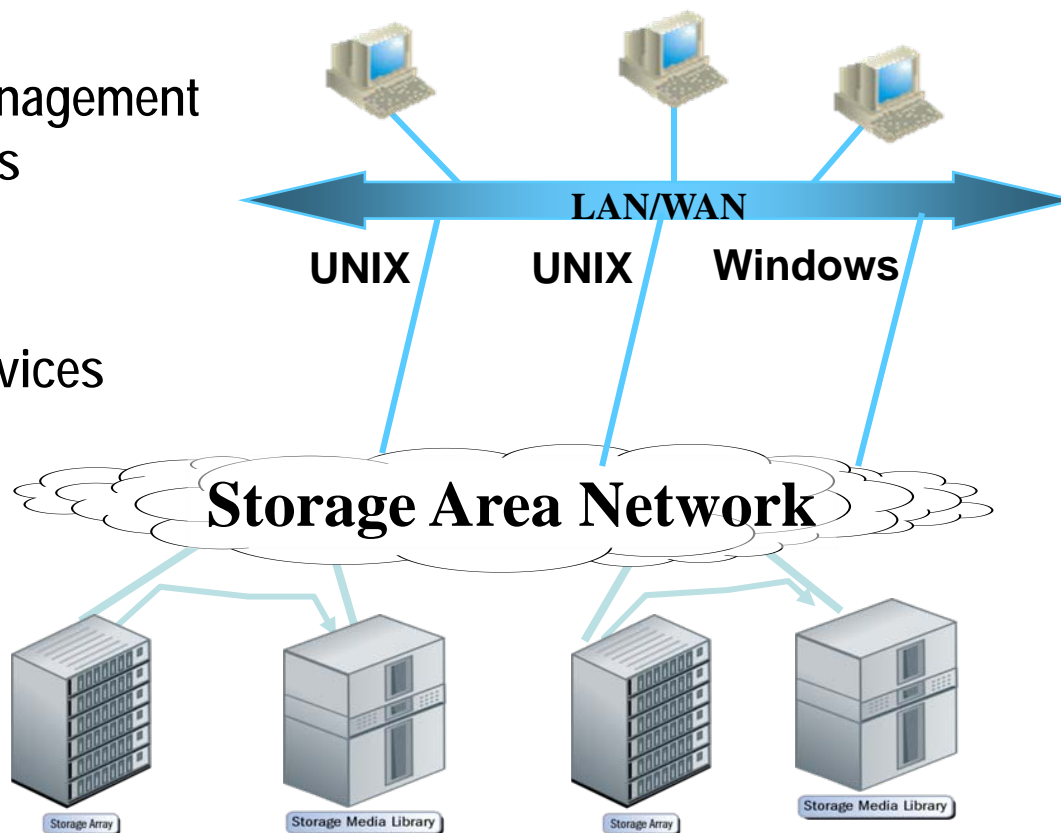
- ◆ Storage Management Initiative Specification

- The specification was designed with the purpose of standardizing and streamlining storage management functions and features into a common set of tools that address the day-to-day tasks of the IT environment.
- Refer to www.snia.org/forums/smi/tech_programs/smis_home

SMI-S Based Storage Management

Storage Management
Applications

Storage Devices



‘Clients’

TCP/IP connection
(CIM/WEBM)

‘Providers’

Providers can be
located on the
storage device
or via Proxy

Management agents are typically required to be installed on hosts for file system and database scans

What can SMI-S Cover?

- Fabric
 - ◆ Discovery and Topology
 - ◆ Zoning Discovery
 - ◆ Zoning Config and Control
 - ◆ Fabric Device Management Interface (FDMI)
- Switches
 - ◆ Asset information
 - ◆ Status and Statistics
 - ◆ Blades
- Arrays
 - ◆ Asset information
 - ◆ Storage allocation.
 - ◆ LUNs: creation, masking & mapping
- Libraries
 - ◆ Media management and Library virtualization
- Routers
 - ◆ Masking and Mapping
- Virtualization
 - ◆ In Band and Out of band
- Host attachment
 - ◆ iSCSI/SATA ..
 - ◆ Mount/dismount volumes
 - ◆ Multi-pathing
- Volume Management
- NAS

SMI-S Capabilities

➤ Automated Discovery

- ◆ Allows new devices to be configured, monitored and deployed automatically
- ◆ Discovery of what the device is capable of and the interface for managing that capability
- ◆ Storage Managers can discover and show a topology of the SAN and the status of each device
- ◆ The topology can be used as a launch point for device and vendor specific user interfaces

SMI-S Capabilities

➤ Monitoring

- ◆ SMI-S Provides basic status for each device
- ◆ Changes in status can be sent as indications

➤ Indications

- ◆ Events are signaled asynchronously and delivered to any application that needs to know
- ◆ Indications can also be fed into event managers and correlated

SMI-S Capabilities

➤ Active Management

- ◆ SMI-S enables control over storage devices in the SAN
 - › LUN Masking and Mapping
 - › Ability to manipulate the access control to array volumes (LUNs) from host FC ports
 - › LUN Creation and Pool Management
 - › Carve volumes from undifferentiated storage specifying Quality of Service - like parameters
 - › Active Zone Management

➤ Performance Management

- ◆ Array Support
 - › Block Server Performance
 - › Extent Composition Mapping (enables composite Volumes)
- ◆ Switch Support
 - › Fabric Path Performance (Source and Destination of packets)

View classes have been created to improve SRM applications performance

- Please send any questions or comments on this presentation to SNIA: trackstoragemgmt@snia.org

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