



hp storage

march 2002

SAN  
business blueprint

## open storage management

### executive summary

Effective storage management is recognized as one of the most important tasks for IT managers today. Data is growing exponentially, IT headcount cannot keep up, and higher levels of service are expected. IT managers seek a framework which enables them to harness today's disparate storage pool, and allows for future expansion without tying them to one hardware vendor.

A Storage Area Network (SAN) is widely accepted as being the architectural solution to these storage needs. A successful SAN implementation takes a solutions approach, recognizing that storage hardware, interconnecting fabric, management software, and services all play a role. Increasingly, the management software is seen as a key part of an effective SAN, transforming users from a centrally plumbed storage architecture, to a fully manageable and exploitable storage pool.

As a core part of HP's Federated Storage Area Management or FSAM strategy, HP offers the OpenView Storage Area Manager (OV-SAM) suite – a fully integrated storage resource management and data management package that functions with HP's industry leading OpenView enterprise management software.

This blueprint defines the need for effective storage management, and describes how and when to deploy OV-SAM as a SAN Management Station.

### summary

This document is one of a series of SAN Solution Blueprints from HP. Storage Solution Blueprinting is HP's concept of defining a configuration for a specific storage problem, and providing all the information necessary to implement. A blueprint represents a fully tested and supportable configuration, orderable as a set of individual components from HP's standard price list. Recognizing that one size does not fit all, guidance on flexibility and scalability is given – ranging from minor changes listed in the blueprint itself, through to referenced design & consultancy services for total flexibility. Standard product support is provided for each component in a blueprint configuration, although custom implementation and support services are also available. Overall, the blueprint customer experience offers a quicker time to solution, without the limits of a fixed product bundle.

The blueprints are split into two levels – business and technical. This business blueprint is intended as a first-level guide that defines a storage problem, demonstrates how a SAN can solve that problem, and recommends an HP SAN configuration. The technical blueprint provides the next step by giving detailed schematics and parts-lists to enable the recommended configuration to be implemented, and gives design rules which allow scale-up and scale-out on the base configuration.

The blueprints will reduce the risks associated with a major infrastructure investment by spelling out the return on investment (ROI) benefits that can be expected, and by providing a clearly defined SAN implementation that an HP sales representative, or channel partner, can use to quickly configure the desired SAN solution. The goal is to provide a fast ROI and reduce the entry costs associated with the adoption of a storage area networks.

## the storage management problem

It is a generally accepted fact that managing storage is much more expensive than the storage hardware itself. According to current industry estimates, for every \$1 spent on storage hardware, \$2 to \$7 is spent on managing that storage.

The acute problem that IT departments are suffering from is the fact that the quantity of information stored is growing at a far higher rate than staffing levels – so IT administrators are required to manage increasingly more storage. Add to this the fact that information – whether in the back-office ERP/CRM/Messaging systems, or in on-line transaction databases – is increasingly critical to the profitability and ongoing operation of the business. IT Managers are saying:

“I don’t know what my storage environment looks like.”

“I need to assign SAN storage automatically, quickly and efficiently without interruptions.”

“I need to know ahead of time if I am going to run out of space.”

“I don’t know if I’m efficiently using the storage I already have.”

“I want to identify where my bottlenecks are in order to remove them.”

The widely acknowledged solution to today’s storage growth, management, and availability needs, is to implement a Storage Area Network (SAN). A SAN can bring centralized management of all storage resources, more efficient usage of capacity, and enable a high availability infrastructure to be built more easily. See our Storage Efficiency and High Availability SAN blueprints for more details (<http://www.hp.com/products1/storage/san/solutions/infolibrary/index.html>)

A SAN comprises many components, storage devices, interconnecting fabric, management software, and services. Each component is important and users really need to think about the complete solution when considering a SAN. Increasingly the management software is being seen as the differentiator between SAN offerings. Gartner Group<sup>1</sup> states that the software component should be the focus of SAN projects, and defined the term Storage Area Management (SAM) to emphasize this view:

*“SAM is the centralized management of resources and data across a storage domain(s), providing shared services to a group of servers and their applications.”*

HP has adopted the term “SAM” in its FSAM storage strategy.

Beyond providing a central point of control for the storage pool, the software can provide more sophisticated functionality. Merrill Lynch<sup>2</sup> describes storage management software as having an enabling, disrupting, and commoditizing influence on storage. The point being that the management software simplifies overall storage management, whilst simultaneously introducing greater levels of functionality. And, truly heterogeneous storage management software, which operates across multiple vendors’ hardware, can liberate IT buyers from single vendor networks.

DH Brown<sup>3</sup> summarize the key goals for effective storage management as:

- Keeping data on-line and accessible for 24 hours a day
- Connecting increasingly dispersed global and/or Internet-based user populations
- Establishing a single point from which to manage growing complexity and heterogeneity
- Ensuring data mobility and data sharing
- Non-disruptively growing the number of applications, users, data, and infrastructure.

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<sup>1</sup> Gartner Group Sept 2000: SAM: Management More Important Than Networks

<sup>2</sup> Merrill Lynch: Storage Futures, May 2000

<sup>3</sup> D H Brown Associates: The New Storage Infrastructure, April 2001

## the solutions approach

HP has developed a fully integrated storage area management suite that addresses these key problems. The remainder of this blueprint discusses the benefits of HP's storage management software, and describes how it can be deployed as a SAN management station.

The instantly recognizable ROI benefits that the software can bring to a SAN environment are:

manage more storage per administrator

- A "single pane of glass" for configuring, monitoring and troubleshooting all connected storage devices
- Automated reporting and planning tools which reduce the need for reactive management

increased return on existing assets

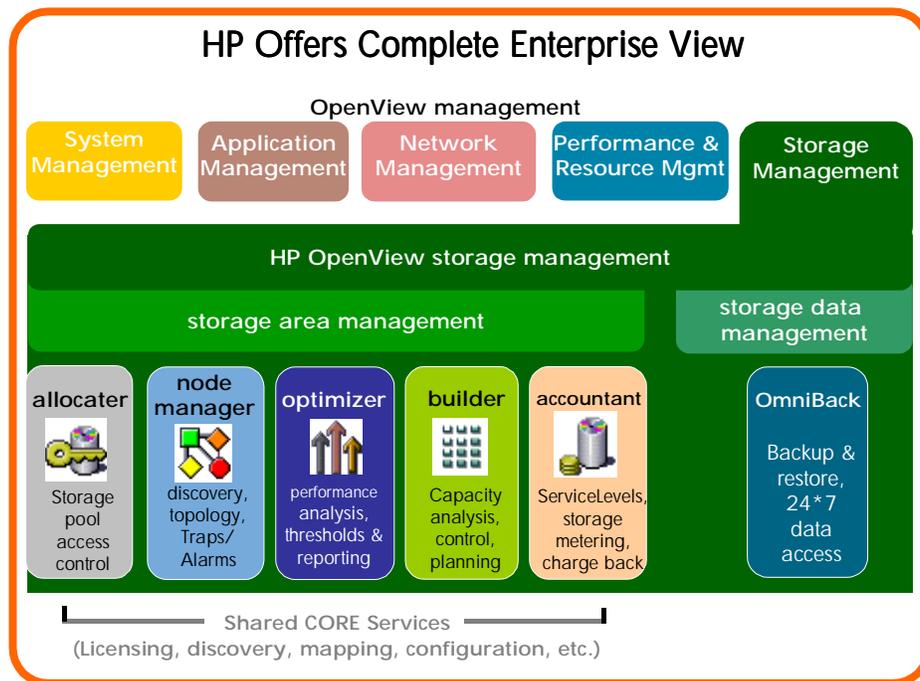
- Identify underutilized disk and tape resources and assign this spare capacity to where it's needed.
- Identify which applications/departments/users are consuming the most storage.

the ability to set and comply to Service Level Agreements (SLAs)

- A wide range of metrics measured end-to-end, triggering responses which enable SLA compliance
- Identify capacity and performance issues before they cause downtime.

## hp storage management software

The chart below outlines HP's storage management software offering. HP OpenView Storage Area Manager (SAM) software offers an integrated toolset that spans both SAN and data management, each of which integrate into HP's enterprise-wide OpenView network management software for a consolidated IT services management view.



## hp OpenView storage area manager

*The business issue: storage needs to be managed at the same level as you manage your applications, systems, and network performance. Storage Area Manager provides true single pane of glass storage event management, for a heterogeneous storage pool, and integrates into the enterprise-wide OpenView management framework.*

The Storage Area Manager software centrally manages multi-vendor storage as a virtual pool of resources across distributed networked storage environments.

Storage Area Manager represents a suite of five integrated software applications, each of which delivers a specific value. Each application manages and collects data and metrics, which are reported to Storage Area Manager's centralized data repository and reporting system.

- **hp OpenView storage node manager** – device discovery, topology and mapping
- **hp OpenView storage allocator** – storage pool access control
- **hp OpenView storage optimizer** – performance analysis, thresholds, and reporting
- **hp OpenView storage builder** – capacity analysis, control, and planning
- **hp OpenView storage accountant** – service-levels, storage-metering, and charge-back

## hp OpenView storage node manager

*The business issue: -to provide reliable access to business critical information the storage administrator has to be able to centrally monitor, manage, and troubleshoot the storage network.*

Storage Node Manager helps you understand, control, plan, and manage storage. Acting as a central management console, it provides storage network status and event monitoring through an easy-to-read topology map that displays devices, the physical connections between those devices, and redundant connections between devices, including server-based Fiber Channel host bus adapters, hubs, switches and storage devices. Storage Node Manager automatically maps and displays new components as they are added.

The key ROI benefit of Storage Node Manager is more efficient hardware identification and management – instead of having IT administrators wandering through the data center pulling on cables, Storage Node Manager enables:

- Automatic device discovery and mapping.
- Tracking and isolation of problems through topology maps and event monitoring.
- Simplified and automated storage asset management.

## hp OpenView storage allocator

*The business issue –storage downtime is actually more often a result of a scheduled event, such as adding or reconfiguring storage, than the consequence of an equipment failure or disaster.*

Storage Allocator provides the means to centrally assign storage to one or more hosts, with security that allows only specified hosts have access. Furthermore it allows you to add, remove, and assign storage without having to reboot the host – providing dynamic storage allocation without downtime.

If a particular host does not need all the storage capacity available on an array, additional capacity can be assigned to another host, maximizing storage utilization.

The key ROI benefit of Storage Allocator is an increase in data availability while maintaining data security:

- Provides a uniform, centralized method to dynamically assign and control storage access
- Enables storage to be added, removed, or reassigned, without rebooting
- Protects data and unauthorized access by controlling host access to storage devices

#### hp OpenView storage optimizer

*The business issue: -storage performance bottlenecks cost time and money – performance variability can now be controlled.*

Storage Optimizer monitors the performance of your storage network – including hosts, infrastructure, and storage. You can receive automatic notification of impending performance problems before they become serious, and track performance over time, so a spike in demand will never catch you unaware.

After installation Storage Optimizer begins collecting data and providing reports, and as more data is collected, historical trends of performance metrics become available. Storage Optimizer provides a complete reporting structure for evaluating, monitoring and managing the quality and cost of your IT services. This information helps you validate purchasing recommendations and substantiate changes to storage reconfigurations.

The key ROI benefit of Storage Optimizer is that it provides the critical information you need to make informed decisions about your storage environment.

- Centralizes and simplifies storage performance management and monitoring
- Helps to identify and fix potential problems to avoid performance slowdowns
- Provides historical trend information to pro-actively plan for upgrades and maintenance

#### hp OpenView storage builder

*The business issue: storage is growing faster than your ability to manage it – now utilization rates can be maximized for existing storage resources across the network.*

Storage Builder is a resource-planning tool, which provides a detailed analysis of your existing storage resources. Storage Builder displays storage allocation and utilization by host, storage device, LUN, partition, volume, directory, and user. It also stores historical information to graph trends and extrapolate future usage rates. There is a threshold-based early warning system that automatically warns you of a capacity shortfall. You can set thresholds for hosts, partitions, volumes, directories, and users.

Storage Builder shows the percentage of storage allocated to a host or LUN, and the actual percentage used thus identifying under-utilized assets. Experience shows that users generally overestimate their efficiency and have the tendency to buy more storage even though they're not effectively utilizing existing resources.

Storage Builder allows you to search throughout the storage network for files that may not be core to your business – whether junk files (games, multimedia files etc) or stale files (those that have not been accessed for a long period).

Storage Builder also enables you to monitor the largest users, directories or files on the network. Find out who the super-users are and plan accordingly.

The key ROI benefit delivered by Storage Builder is a higher return on existing storage assets:

- Increased asset utilization – get more out of your existing storage before investing in new capacity
- Identify stale and junk files to free up storage space.
- Identify the 20% of users who consume 80% of your capacity.

#### hp OpenView storage accountant

*The business issue: Providing storage services to your customers/lines of businesses has associated costs. Charge-back mechanisms enable you to achieve savings in excess of your costs. More than that, they help you to generate visibility for storage costs and to justify funding requests.*

Storage Accountant automatically meters and monitors storage usage and consumption, calculates charges for storage usage and generates bills for charge-back.

Storage Accountant makes it easy to create and manage customer accounts. It also allows you to assign different organizations to each account – you can also classify your services offering in different levels based on the category of storage and the cost to provide these services.

The key ROI benefit delivered by Storage Accountant is the ability to recover cost associated with storage provisioning.

- Centralizes and automates storage metering for budgeting, analysis and charge-back
- Produces usages and billing views to administrate relationships and answer billing queries
- Assigns LUNs to service tiers for pricing and to departments for metering
- Calculates storage charges and bills based on storage consumption and service usage
- Creates CSV, HTML, and XML output to integrate with billing and financial applications

hp OpenView omniback II

*The business issue: Your storage network and the data that resides on it are growing with every transaction and becoming more critical to your business with each passing day. Staff, bandwidth and backup windows are overwhelmed or disappearing as new applications, new storage devices and new users are added.*

Omniback II software automates data protection and media management across the broadest range of server environments and storage configurations in the industry. From a small workgroup, to a multi-site heterogeneous SAN and NAS environment with thousands of servers, Omniback II software provides a single, consistent interface to automate and monitor backup and recovery processes.

It is designed to deliver centralized backup and speedy recovery, without downtime. Its broad data protection alternatives enable you to eliminate backup and recovery windows to ensure your data is always available.

From online and open-file backups, to online incremental backups, to clustered backups and server-less backups, all the way to zero-downtime, zero-impact backups, Omniback II meets your application needs. Using innovative split-mirror techniques, Omniback II enables fully integrated solutions for automated, non-disruptive, point-in-time backup covering the broadest set of storage configurations, operating environments and applications.

The key ROI benefit delivered by Omniback II is the ability to effectively protect data and more easily enable critical business applications to remain online.

- Online backups of industry-leading databases and applications
- Open-file backups for file-based applications
- Online block-level incremental backups (Oracle)
- Serverless backups of selected storage configurations
- Split-mirror integrated backup solutions with zero application downtime and zero application performance impact

## device management software

Device management software adds the final touches in terms of functionality and control to individual disk arrays. HP offers a wide range of specific software for the XP and VA disk array families.

- **command view** provides the common user interface for disk array management applications, web based monitoring, and problem resolution.
- **auto path** ensures that links to your array are efficiently utilized so that no single point becomes a bottleneck. An automatic error detection feature identifies and re-routes read and write I/Os around failures associated with host bus adapters, cabling, SAN fabric and array port problems.

For a complete list of our disk array device management software, please go to

[http://www.hp.com/products1/storage/disk\\_arrays/index.html](http://www.hp.com/products1/storage/disk_arrays/index.html)

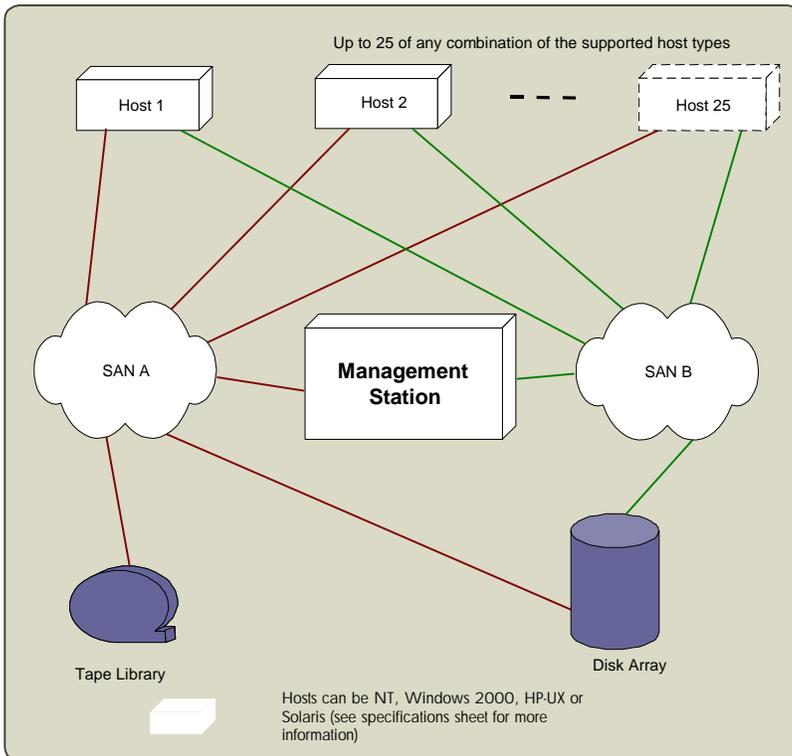
## summary of hp storage management software

HP delivers the “single pane of glass” storage management solution that delivers on the key needs as outlined at the beginning of this document. Our software ensures the availability, efficiency, and flexibility of your storage environment. This is packaged as a fully integrated software suite, which in turn interfaces with an enterprise-wide management package. Add to this the wide operating system and third party storage device interoperability that HP storage area manager offers, and you have truly open storage management.

## the solution

To deploy HP's SAN management software, the following SAN Management Station configuration can be used. This configuration comprises a server and Ethernet switch for running the software, and the OpenView Storage Area Management software as outlined above. For full details please look at the accompanying Open Storage Management technical blueprint (see additional info section below).

The diagram shows the SAN Management Station running two SAN fabrics and 25 hosts. This is for illustrative purposes only, see the following section to gain an understanding of the full level of usage scenarios.



## usage scenarios

The SAN management station, described above, is most commonly deployed in one of three different scenarios:

1. As a complete SAN purchase, along with necessary SAN fabric & storage infrastructure.
2. As an add-on to a low/mid-range SAN that is growing – capacity and nodes – and now needs full SAN management software.
3. As an add-on to existing SAN island(s) to unite multiple pools of storage.

### scenario 1: a complete SAN

As demonstrated by this paper, SAN management software provides the true intelligence to a SAN installation. So it would make sense to buy and install the SAN management software at the same time as getting the SAN hardware. HP offers 4a series pre-specified SAN configurations: [\(links to\)](#)

Entry Level SAN  
Entry Level HA SAN  
Enterprise SAN  
Enterprise HA SAN

#### scenario 2: a growing SAN

Many users have adopted simple SAN configurations – possibly a single switch and array – as a first SAN installation, and a way to experience the benefits of a SAN without a major investment. Over time they become more reliant on the SAN and wish to scale capacity and the number of nodes (hosts and storage devices) that share the SAN. Clearly there comes a time when investing in a full SAN management package makes sense.

#### scenario 3: a unified SAN

Many IT departments will have existing pools of SAN storage – “SAN-islands” – probably multiple homogeneous SAN deployments. SAN management software can be used to unite these independent storage islands, allowing central management of the complete storage pool.

#### important note:

For scenario 1 implementations, users are recommended to refer to our existing SAN solution blueprints.

For scenarios 2 & 3, users need to refer to the SAM SAN technical blueprint, and liaise with their HP technical consultant.

## additional information

For full technical information on configuring and deploying our SAN Management Station, please refer to the following technical blueprint -

Open Storage Management (<http://www.hp.com/products1/storage/san/solutions/infolibrary/index.html>)

#### additional hp SAN solution blueprints

All available at the same URL as listed above.

#### business elements

- Storage Efficiency
- High Availability
- Starter SAN

#### technical elements

- Entry level SAN
- Entry-level HA SAN
- Enterprise SAN
- Enterprise HA SAN
- Open Storage Management

To get answers on further SAN implementation questions contact your HP sales representative who will be able to consult our regularly updated SAN interoperability matrices and provide guidance on additional OS, fabric topology and 3<sup>rd</sup> party/legacy device interoperability.

## hp SAN components

To get further information on the individual components in an HP SAN, go to [www.hp.com/go/storage](http://www.hp.com/go/storage)

## hp services

HP offers a complete lifecycle of SAN support and consultancy services, go to [www.hp.com/hps/storage](http://www.hp.com/hps/storage) for full details. Specific SAN services, which may be of interest to customers looking into our Open Storage Management blueprints are:

### OpenView SAM implementation service

Installation, configuration, documentation, and demonstration of this SAN management solution.

### storage/SAN integration services

HP also offers Storage/SAN integration services, which provide a trouble-free and quick on-site installation of your SAN solution. For full details see [www.hp.com/hps/gds](http://www.hp.com/hps/gds).

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