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HP StorageWorks Storage Area Network (SAN) Solutions

Delivering the storage fabric for the
HP Adaptive Enterprise Vision



The adaptive enterprise

HP Adaptive Enterprise Offerings help your business flourish in the Information Age, giving you an agility advantage.

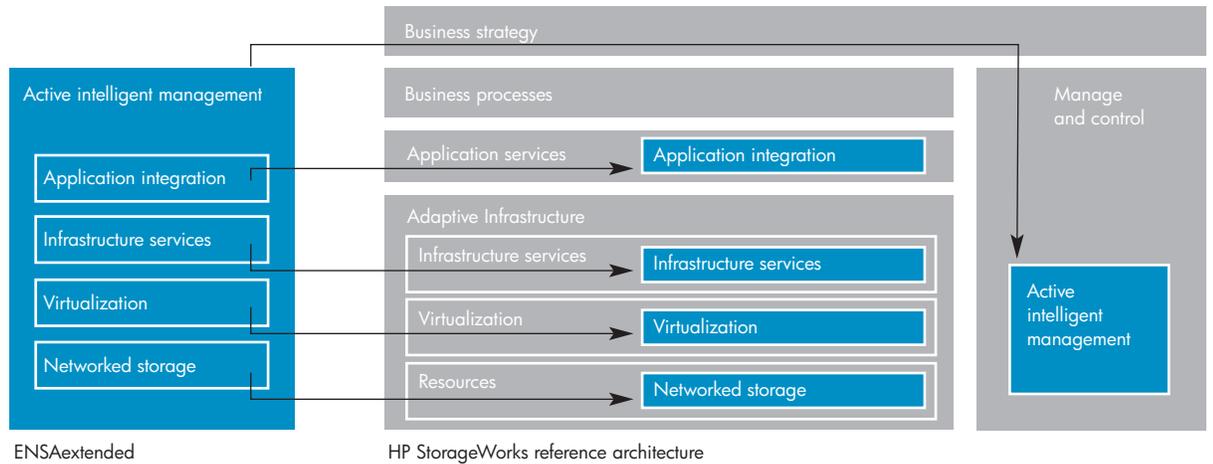
Today's extremely competitive business environment is increasingly global, increasingly fierce. The Information Age is no longer a hypothetical term, it is a reality. Information is now the primary material businesses develop and manage to stay ahead of their competition. For corporations to take advantage of opportunities and thrive in rapidly evolving market conditions, they require a proactive approach to manage information effectively. They must make sound business decisions while confronting extremely volatile economic conditions that threaten their viability.



An agile business meets these challenges and thrives by anticipating and responding to change with speed and flexibility, while still meeting cost, quality of service, and risk management objectives. The adaptive enterprise is one that quickly responds to and capitalizes on change for business advantage. It's the ultimate state of fitness: business and IT perfectly synchronized.

HP Adaptive Enterprise Offerings help your business flourish in the Information Age. HP has created an architecture that can take you to a more responsive, agile environment. This architecture reduces risk and complexity, while providing real world return on investment and the flexibility to continually meet your evolving business needs. Plus, HP partners work with you to ensure accountability and continuous performance of your IT investment.

HP innovative technology and architecture are the key elements for creating and implementing a truly adaptive enterprise. The resulting IT infrastructure possesses a set of core capabilities to make IT more agile, efficient and responsive. Now you can harness the unprecedented wealth of information available in the enterprise and transform it into competitive advantage.



HP ENSAextended: Storage solutions for the HP StorageWorks reference architecture

Storage is a key component in the HP StorageWorks reference architecture. The HP storage strategy to build the adaptive enterprise is ENSAextended (Enterprise Network Storage Architecture Extended). ENSAextended addresses the storage infrastructure in the context of the business environment and leverages this storage to build an adaptive enterprise.

There are three key attributes of storage for the adaptive enterprise — it must be controllable, resilient, and extensible.

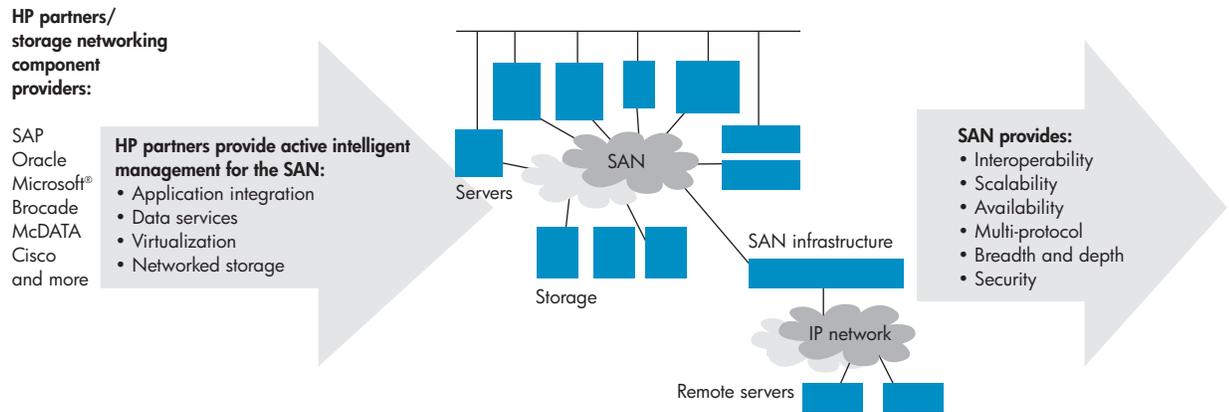
Controllable — automated and intelligent management capabilities enable managed storage services to deliver applications invisibly and with minimum administrative effort. ENSAextended enables the implementation of storage policies in the context of business rules, linking storage behavior and capabilities with the policies and practices that govern the business unit they serve.

Resilient — HP storage architectures create unmatched levels of resiliency by providing a redundant infrastructure, built with high availability components that deliver automatic failover. Such an environment has the ability to monitor and automatically heal itself, and provides the basis to deliver data to applications based on policy-driven quality of service attributes.

Extensible — networked storage is fully utilized and modularly expands for dynamic resource optimization. HP delivers network storage that is scalable in multiple dimensions including capacity, performance, availability, and management scope.

The bottom line is your storage environment must adjust quickly to your business rules and application environment. HP StorageWorks solutions provide these attributes and deliver on the advantages of an adaptive enterprise.

HP continues to be the leader in open Storage Area Networks (SANs). Source: IDC, Worldwide Quarterly Storage Systems Tracker, June 2003.



HP StorageWorks SAN — today

The HP StorageWorks SAN is an essential element in delivering the HP Adaptive Enterprise Vision; it is the foundation of the entire storage architecture. The HP StorageWorks SAN provides the network platform or fabric needed to deliver end-to-end network storage solutions. In the fabric space, HP partners with “best in class” storage networking component providers to offer comprehensive, integrated, end-to-end network storage solutions.

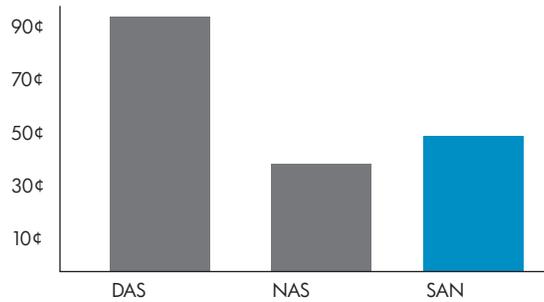
HP StorageWorks SANs lead the industry and are distinguished by their unmatched levels of:

- **Interoperability** — extensive HP testing ensures seamless, robust performance with most operating systems and third-party devices. And, HP enhances its industry-leading levels of connectivity with award-winning after-sales support.
- **Scalability** — SAN architectures scale in connectivity, performance and distance. HP SANs support extension to IP networks including Local Area Network (LAN), Municipal Area Network (MAN), and Wide Area Network (WAN).
- **Availability** — SANs meet the requirements of mission critical applications and environments, including HP StorageWorks Directors and Core switches, dual fabrics and multi-pathing software.
- **Multi-protocol connectivity** — this connectivity is aimed at delivering the storage resources of the SAN to computing resources in the IP network. Customers utilize existing SAN storage resources to support non-mission critical, stranded, and low end servers through iSCSI routers that bridge the IP network to Fibre Channel. Storage utilization can be improved by deploying enterprise NAS heads that use the SAN for storage (NAS/SAN fusion). Finally, SAN infrastructures are extended over distances (LAN, MAN, WAN) with FCIP extenders for selective data migration and/or disaster recovery solutions.
- **Breadth and depth** — three interconnect product lines deliver connectivity solutions throughout the entire enterprise. Referred to as the B-Series (Brocade), the C-Series (Cisco), and the M-Series (McDATA), these product lines promise a full set of both hardware and software features meeting the needs of all customer regardless of size.
- **Security** — exceptional levels of protection through well-documented best practices and security features, minimize SAN exposure to security risks and boost the protection of knowledge assets.



“Our performance for financial reporting improved across the board since installing the HP StorageWorks SAN. In some cases, jobs that took three hours to run now finish in 90 minutes. Our HP SAN is well worth the investment”
 —Stan McCreight, Senior Technical Specialist, The Dow Chemical Company

3-year total cost of ownership (cents per MB) for 2 TB



Source: *The Storage Report*, Merrill Lynch, McKinsey & Company, June 2001.

Delivering business value

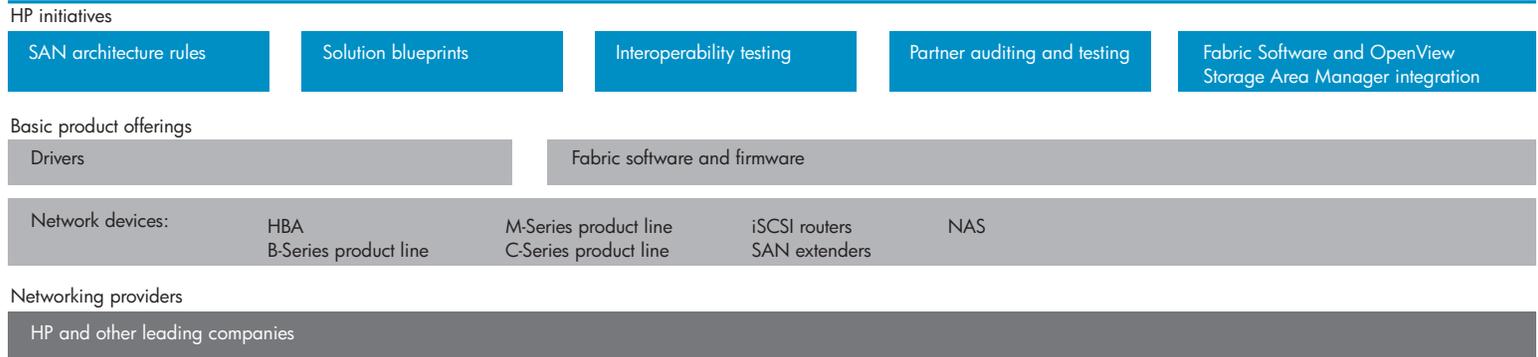
The benefits of SANs are well established in the global market. HP StorageWorks SANs provide higher availability, true scalability, and simplified management at lower total cost of ownership (TCO). Typical case studies on customer implementations report ROIs in the range of 100% to 500%, with payback periods within two to nine months.*

HP StorageWorks SANs create extraordinary value:

- HP StorageWorks SANs successfully address business challenges by offering a flexible storage infrastructure that delivers seamless scalability in performance, capacity and distance, while maintaining greater connectivity. This supports superior business agility, a critical requirement in today's dynamic business environment.
- Another key benefit of a HP StorageWorks SAN environment is improved efficiency. By increasing asset utilization in an integrated environment, you will manage more with fewer resources resulting in streamlined operation and improved management.
- Higher service levels translate into increased data and application availability, and greater access. But, HP StorageWorks SANs go even further delivering sustained performance; ultimately putting you in the driver's seat.

* Case Studies on the Business Impact and Strategic Value of Storage Area Networks, KPMG Consulting, June, 2001

HP StorageWorks SAN: fabric infrastructure components



The chart above presents the basic structure of the HP StorageWorks SAN solution. The foundation consists of a premium selection of “best in-class” storage networking component providers and valued partners. The next level represents HP basic product offerings of devices, drivers and software products that deliver the basic functionality. The top level illustrates the group of specific HP initiatives and programs designed to give our customers additional information, services and supporting tools to get the most from their HP StorageWorks SAN.

Empowering IT

An important customer experience of SAN deployments is the confirmation that SANs are having an even greater impact on the overall business than direct ROI. Companies are using the increased availability, connectivity, and scalability features of SANs to create and improve their competitive advantage. For instance, companies use HP StorageWorks SAN capabilities to:

- Deliver key business initiatives more quickly, increasing business agility
- Bring new products to market faster
- Improve customer retention and loyalty in e-business implementations
- Leverage knowledge capital through expanded consistency and access in the organization

HP StorageWorks SANs empower IT divisions to contribute more to the overall business goals and success of the organization and deliver on the strategic value of the IT.

HP StorageWorks Fabric Infrastructure for HP Adaptive Enterprise Vision

As illustrated above, components of the HP StorageWorks SAN infrastructure solutions work together delivering agility, the highest ROI available, and a SAN infrastructure that meets your business needs.

Product offerings — Maximizing performance throughout your infrastructure

HP StorageWorks SANs provide a range of choices users need to customize the fabric environment to their unique needs and preferences. The HP StorageWorks SAN currently supports three switch product lines giving you alternatives that cover the entire enterprise.

HP StorageWorks SAN switch product lines

Enterprise class	Core 2/64	Director 2/140 Director 2/64	MDS 9509
Mid-range	SAN Switch 2/32	Edge 2/32	MDS 9216
Entry level	SAN Switch 2/16 SAN Switch 2/8 EL MSA SAN Switch 2/8	Edge 2/24	
	B-Series (Brocade)	M-Series (McData)	C-Series (Cisco)

For additional information on specific product offerings, please visit our web site at: www.hp.com/go/san

HP StorageWorks initiatives — delivering more

In addition to the basic product offering, HP delivers a series of initiatives and programs that enable customers to

realize more value out of their investments on HP SANs that include:

- **SAN architecture rules** published in the comprehensive HP StorageWorks SAN Design Guide. Intended to help customers design and build SANs, it illustrates how HP StorageWorks systems, storage management tools, and Fibre Channel products function in open heterogeneous SANs. To view the HP StorageWorks

As we advance into the future, the HP StorageWorks SAN will continue to support the vision for the HP Adaptive Enterprise.

SAN Design Guide visit: <http://h18006.www1.hp.com/products/storageworks/san/documentation.html>

- **Solution blueprints** are a diverse portfolio of plans designed to help you optimize current resources, manage multi-vendor environments and evolve into open architectures, thus allowing you to improve performance, efficiency and business continuity. HP solution blueprints address business continuity including data protection and disaster recovery, and IT consolidation through NAS/SAN fusion. In addition, it presents open storage management, and industry solutions including business intelligence, finance, healthcare, life sciences, public sector, and telecom.
- **Extensive interoperability testing** is an imperative element in supporting the typical corporate infrastructure's heterogeneous computing environment. In addition to interoperability testing of components across the storage environment, HP is committed to supporting open storage configurations through the SNIA's Open SAN Supported Solutions Forum and its documented configurations.
- **Partner auditing and testing** allows HP to leverage the expertise offered by key fabric hardware and software providers. Through collaborative efforts, we help partners make product decisions that support the current and future functionality of the HP StorageWorks SAN.
- **Fabric software and HP OpenView Storage Area Manager integration** efforts are designed to ensure StorageWorks SANs are fully functional with HP OpenView storage management tools and storage applications such as HP StorageWorks EBS and Data Protector for total management solutions.

The HP StorageWorks difference

The basic solution structure provides a series of targeted initiatives designed to optimizing customer value, HP delivers on the promise by:

Eliminating guesswork:

- Proven solutions — continuous interoperability testing; extensive partnering and testing with vendors

Removing complexity:

- "Right fit" storage design
- SAN architecture rules and Design Guide
- Solution blueprints for immediate deployment

Decreasing costs:

- Enable maximum SAN utilization — NAS/SAN fusion; iSCSI bridging support



HP StorageWorks SAN — tomorrow

As we advance into the future, the HP StorageWorks SAN will continue to support the vision for the HP Adaptive Enterprise. The attributes that characterize the ENSAextended vision will continue to be a key element of the HP Adaptive Enterprise Vision. These attributes will grow in dimension to generate greater depth and capability as the full power of the vision unfolds. More implicitly, HP StorageWorks SAN technology developments will continue to give you a controllable, resilient and extensible adaptive enterprise platform that facilitates an automated, policy driven storage utility.

For a copy of the HP StorageWorks SAN Design Guide visit:
[http://h18006.www1.hp.com/products/storageworks/san/
documentation.html](http://h18006.www1.hp.com/products/storageworks/san/documentation.html)

For HP StorageWorks solution blueprints visit:
www.hp.com/go/storage

For more information on HP StorageWorks SANs visit:
www.hp.com/go/san

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