



HP P2000 G3 Modular Smart Array

Storage Growth

Small to medium businesses (SMB) are struggling with many storage related problems as their individual servers' internal capacity is maxing out. For many, they are faced with a need for shared stored or clustered servers requiring shared storage or remote storage. Historically, the SMB customers or remote office locations often lack technical expertise to install and manage such a storage solution. Others are faced with regulatory requirements to store everything in a protected environment.

HP P2000 G3 Modular Smart Array Systems

The HP 2000 Family of storage arrays features P2000 G3 Modular Smart Array (MSA) arrays with the latest 8 Gb Fibre Channel (FC), 6 Gb Serial Attached SCSI (SAS), and 1 Gigabit Ethernet (GbE) and 10 GbE iSCSI connected models.

The arrays are designed for entry-level customers and feature the latest in functionality and host-connect technology while offering excellent price/performance. They are ideal for companies with small budgets or limited IT expertise, and also larger companies with departmental or remote requirements. Each solution is designed to be easy to deploy, to be secure, and offer low management costs, while driving rapid return on investment (ROI) through efficient storage consolidation.

The P2000 G3 arrays are 2U storage area network (SAN) or direct connect solutions (OS operating system and dependent) offering you a choice of five controllers:

- First is a high-performance, FC 8 Gb dual port model
- Second is a unique dual-purpose combo controller with two 8 Gb Fibre Channel ports with the addition of two 1 GbE iSCSI ports
- Third controller choice is a 6 Gb SAS with four ports per controller
- The fourth features two 10 GbE iSCSI ports per controller
- The fifth features four 1 GbE iSCSI ports per controller

Whatever the situation calls for, the P2000 G3 line-up has the right solution.

P2000 G3 MSA FC/iSCSI Combo Controller

The dual-protocol P2000 G3 MSA FC/iSCSI combo controller offers exceptional flexibility. The 8 Gb FC ports support a full FC SAN while the two 1 GbE iSCSI ports can serve two purposes:

- Economically share the array storage resource with a smaller department accessing it over iSCSI
- Enable the new optional Remote Snap functionality over iSCSI protocol (also available over FC)

P2000 G3 MSA SAS Controller

The P2000 G3 SAS controller is the follow-on product to the HP MSA2000sa G2, adding the latest 6 Gb SAS technology to the four host ports per controller. It also features the same new scalability as the P2000 G3 FC model, offering 6 Gb SAS back-end transmission speed to drives and drive enclosures. The new P2000 G3 SAS array is





designed for directly attaching up to four dual-path or eight single-path servers. SAS array support for BladeSystems continues to come from the MSA2000sa G2.

P2000 G3 10 GbE iSCSI Controller

The P2000 G3 10 GbE iSCSI brings the very latest in high-performance host connection with technology generally found only in higher priced arrays. The bandwidth it provides in conjunction with server consolidation is highly advantageous in shared storage configurations. Array connection to 10 GbE switches that are in turn connected to 1 GbE NICs in attached servers is commonplace. Directly attached server support requires the units to have 10 GbE NICs.

P2000 G3 1 GbE iSCSI Controller

The most recent addition is the P2000 G3 1 GbE iSCSI controller featuring four 1 GbE iSCSI Ethernet ports, double the number of the G2 model. This allows an array that keeps the price of the components, particularly the interconnects, low while markedly increasing the performance capabilities.

All P2000 Models

All P2000 G3 models can be equipped with single or dual controllers, feature the same scalability, and offer 6 Gb SAS back-end transmission speed to drives and JBODs. Significant data protection advances are delivered by the all P2000 G3 arrays. All G3 units come standard with 64 snapshot capability at no extra cost and there is an option for the G3 series of 512 snapshots. Volume Copy (clone) also comes standard. In a further move to protect the user's data, optional Remote Snap (replication) capability is offered on the FC or FC/iSCSI versions (only).

P2000 Chassis

The controller-less P2000 chassis is offered in two models:

- Model one comes standard with 12 Large Form Factor (LFF) 3.5-inch drive bays
- Model two can accommodate 24 Small Form Factor (SFF) 2.5-inch drives

Both models are able to simultaneously support enterprise-class SAS drives and archival-class Serial Advanced Technology Attachment (SATA) Midline drives. Either chassis can have one or two matching P2000 G3 controllers (same protocol) and are available with AC or DC power supplies.

Modular Design

The HP modular approach to entry level SAN solutions enables incremental customer purchases, allowing the array to grow as your needs grow, thus allowing a maximum return on investment. Choose a single controller unit for low initial cost with the ability to upgrade later; or decide on a model with dual controllers for the most demanding entry-level situations. There are no unexpected additional charges, licenses, or fees as you add enclosures or hosts and users.



The HP P2000 G3 Modular Smart Array Controllers

FC		<p>P2000 G3 8 Gb FC MSA</p> <p>When to use: Latest 8 Gb FC, high performance with a mature topology. Compatible w/ huge installed base</p>
FC COMBO		<p>P2000 G3 8 Gb FC/iSCSI Combo MSA</p> <p>When to use: Latest 8 Gb FC AND 1 GbE iSCSI enabling shared storage between departments needing high performance, and small budget constrained entities. Also perfect enabler for snap replication over Ethernet</p>
iSCSI		<p>P2000 G3 10 GbE iSCSI MSA</p> <p>When to use: Latest 10 GbE iSCSI, high performance with a heretofore high-end enterprise class topology, now available in the entry-level</p>
iSCSI		<p>P2000 G3 1 GbE iSCSI MSA</p> <p>When to use: Bringing the cost efficiencies and ease-of-use advantages of 1GbE iSCSI shared storage to the entry-level SAN segment with a powerful new 4-port iSCSI controller</p>
SAS		<p>P2000 G3 6 Gb SAS MSA</p> <p>When to use: Latest 6 Gb SAS host connect for blazingly fast transmission rates with low cost connections. Four ports per controller support a highly efficient direct connect configuration</p>



Capacity can easily be added as the need develops by attaching additional drive enclosures. Maximum capacity ranges with LFF drives up to 134 TB SAS or 288 TB SAS Midline or 192 TB SATA Midline with the addition of the maximum number of drive enclosures. Configurations utilizing the SFF drive chassis and the maximum number of drive enclosures can grow to 134 TB of SAS or 149 TB of SAS Midline or 74.5 TB SATA Midline with a total of 96 LFF or 149 SFF drives.

Significant data protection advances are delivered by the new P2000 G3 arrays. First, all G3 units come standard with 64 snapshot-capabilities at no extra cost. There is also a new option for the G3 series of 512 snapshots. In a further move to protect your data, optional Remote Snap capability is offered on the FC or FC/iSCSI versions only. Remote Snap capabilities include:

- Many to one Replication (up to four nodes)
- Mixed controller replication (P2000 G3 FC controller to P2000 G3 FC/iSCSI Combo Controller)
- Single controller to single controller replication

Choice of Drive Technology

you has the choice of which drive technology best meets your requirements. you can select or mix standard SAS or 6 G SAS MDL enterprise-class drives or SATA drives. SAS drives are designed for high volume, 24x7 usage. SATA drives are usually reserved for archival data as they are relatively inexpensive and are available in very large capacities. The P2000 G3 FC can accommodate both SAS and SATA drives within the same



enclosure making it ideal to have both business-critical, high activity files on SAS drives while using snapshot or clone capability to keep back-up data on the less expensive drives.

SAS drive performance can be approximately 30% greater than SATA performance on sequential host IO. SAS performance excels in sequential lower latency response time and random IO per second transaction performance due to higher rpm disk speeds yielding lower seek times. SAS random performance is greater than 2x SATA.

Key Features

The HP P2000 G3 Modular Smart Array family encompasses four controllers, each featuring different protocols or combination of protocols to match the exact needs of the user.

- P2000 G3 FC/iSCSI Combo MSA controller—This unique controller offers both 8 Gb Fibre Channel and 1 GbE iSCSI functionalities built into a single array controller. This will allow you to enable storage needing high performance thru the FC ports while leveraging your SAN investment by sharing the array resources with smaller departments through low-cost iSCSI. It also enables optional Remote Snap for data protection.
- P2000 G3 FC MSA controller—Dual 8 Gb Fibre Channel host ports per controller can provide you high performance with a mature topology and is compatible with the largest installed base of SAN users.
- P2000 G3 10 GbE iSCSI MSA controller—HP is the first of the major modular array manufacturers that brings a high performance dual-ported 10 GbE iSCSI solution to the entry level segment. Ideal for those who want to utilize cost-effective Ethernet as their infrastructure without sacrificing access time to their data.
- P2000 G3 SAS MSA controller—The P2000 G3 SAS model gives fast 6 Gb transmission rates with low cost SAS connections. Four host ports per controller support a highly efficient direct connect configuration.
- P2000 G3 iSCSI MSA controller offers four 1 GbE iSCSI ports utilizes the popular Ethernet infrastructure with its low cost and ease of management, while the additional ports assure increased performance over the previous generation.

All P2000 G3 models offer a common set of valuable features:

- Ease of management featuring browser-based out-of-band access. This allows a department or small company to effectively handle growing storage requirements, with the aid of an intuitive GUI to administer the unit with a minimum of complexity. Ideal for local or remote installations.
- All G3 models come standard with 64 controller-based snapshots and clone capability. The G3 arrays also support an optional 512 snaps.
- Choose either a low-cost single controller array or start with a configured dual controller array model to fit the budget, providing high availability and performance needs.
- All models feature a wide variety of drives: enterprise-class SAS, SAS Midline, and archival-class SATA Midline in either P2000 LFF 3.5-inch or HP ProLiant SFF 2.5-inch drives.





- P2000 G3 models can have a maximum number of P2000 LFF drive enclosures (7), a maximum number of D2700 SFF enclosures (5), or mix both sizes. The array can grow incrementally from a few drives to 134 TB SAS or 288 TB of SAS MDL or 192 TB SATA MDL.
- 2 GB transportable read/write cache per controller. Battery-free cache backup with super capacitors and compact flash
- Vdisks can be spanned across multiple enclosures
- RAID levels 0, 1, 3, 5, 6, 10, and 50
- Maximum of 2 drives for RAID level 1, 16 drives for RAID levels 0, 3, 5, 6, and 10, 32 drives for RAID level 50
- 512 LUNs with LUN size up to 16 TB
- Non-disruptive on-line controller code upgrade (requires dual controllers w/ multi-pathing software)
- Upgradable by design. Owners of an original MSA2000 G1 or G2 array are able to do data-in-place controller upgrades to the P2000 G3 FC, Combo FC/iSCSI, 1 GbE or 10 GbE iSCSI, or P2000 G3 SAS. Cross protocol upgrades are also supported between the protocols. This unique ability protects the earlier investments in chassis, drives, and JBODs

HP P2000 G3 Array Bundles

HP offers you bundles with different types of P2000 G3 Array controllers for different storage capacity needs.

Protocol	Raw Capacity	Bundle Description
FC Bundles	3.5 TB	HP P2000 G3 FC DC w/24 146GB SAS 15K SFF HDD 3.5TB Bundle
	7.2 TB	HP P2000 G3 FC DC w/24 300GB SAS 10K SFF HDD 7.2TB Bundle
	14.4 TB	HP P2000 G3 FC DC w/24 600GB SAS 10K SFF HDD 14.4TB Bundle
FC/iSCSI Combo Bundles	3.5 TB	HP P2000 G3 FC/iSCSI DC w/24 146GB SAS 15K SFF HDD 3.5TB Bundle
	7.2 TB	HP P2000 G3 FC/iSCSI DC w/24 300GB SAS 10K SFF HDD 7.2TB Bundle
	14.4 TB	HP P2000 G3 FC/iSCSI DC w/24 600GB SAS 10K SFF HDD 14.4TB Bundle
SAS Bundles	3.5 TB	HP P2000 SAS DC w/24 146GB SAS 15K SFF HDD 3.5TB Bundle
	7.2 TB	HP P2000 SAS DC w/24 300GB SAS 10K SFF HDD 7.2TB Bundle
	14.4 TB	HP P2000 SAS DC w/24 600GB SAS 10K SFF HDD 14.4TB Bundle
1G iSCSI Bundles	3.5 TB	HP P2000 G3 iSCSI DC w/24 146GB SAS 15K SFF HDD 3.5TB Bundle
	7.2 TB	HP P2000 G3 iSCSI DC w/24 300GB SAS 10K SFF HDD 7.2TB Bundle
	14.4 TB	HP P2000 G3 iSCSI DC w/24 600GB SAS 10K SFF HDD 14.4TB Bundle
FC Bundles	3.6 TB	HP P2000 G3 FC DC w/12 300GB SAS 10K SFF HDD 3.6TB Bundle
	7.2 TB	HP P2000 G3 FC DC w/12 600GB SAS 10K SFF HDD 7.2TB Bundle





FC/iSCSI Combo Bundles	3.6 TB	HP P2000 G3 FC/iSCSI DC w/12 300GB SAS 10K SFF HDD 3.6TB Bundle
	7.2 TB	HP P2000 G3 FC/iSCSI DC w/12 600GB SAS 10K SFF HDD 7.2TB Bundle
SAS Bundles	3.6 TB	HP P2000 G3 SAS DC w/12 300GB SAS 10K SFF HDD 3.6TB Bundle
	7.2 TB	HP P2000 G3 SAS DC w/12 600GB SAS 10K SFF HDD 7.2TB Bundle
1G iSCSI G3 Bundles	3.6 TB	HP P2000 G3 iSCSI DC w/12 300GB SAS 10K SFF HDD 3.6TB Bundle
	7.2 TB	HP P2000 G3 iSCSI DC w/12 600GB SAS 10K SFF HDD 7.2TB Bundle

HP P2000 G3 FC MSA SAN Starter Kits

The new P2000 G3 FC MSA SAN Starter kits are offered to simplify ordering and implementation of your SAN. HP includes all the necessary hardware components to build your own SAN solution in one package, just add the drives of your choice. These kits are offered at very affordable prices, which reflect a savings over purchasing each SAN component separately.

Virtualization SAN Starter Kit

The HP P2000 G3 FC MSA Dual Controller Virtualization SAN Starter Kit addresses the growing need for server and storage administrators to deliver end-to-end storage, virtualization, and management capabilities across their network infrastructure.

The hardware bundle consists of six Host Bus Adapters (HBA), two FC switches, a P2000 G3 FC MSA Dual Controller Array (SFF Chassis) as well as two licenses per switch enabling Server Application Optimization (SAO) and Adaptive Networking (AN). SAO is an adapter technology that offers Quality of Service (QoS) capabilities that can be used in conjunction with fabric wide QoS and to enable a high performing, virtualized infrastructure. With SAO deployed, administrators can protect a Virtual Machine (VM) and its application by assigning its IO flow to a specific priority level. The QoS priorities are enforced at the hardware level, thereby providing adequate bandwidth during periods of high congestion. Applications such as email and databases achieve better performance when deployed in specific SAO and MSA configurations.

Small Business SAN Starter Kit

The HP P2000 G3 FC MSA Dual Controller Small Business SAN Starter Kit is a unique end-to-end 8 Gb SAN Solution, just add disks and power. This kit includes one 8 Gb P2000 G3 FC MSA Dual Controller Array (LFF Chassis), four 8 Gb FC HBAs, two HP SN6000 Stackable 8 Gb 8-port FC switches and HP unique Simple SAN Connection Manager (SSCM) SAN management software, cables, rails and optics. SSCM is the only SAN management software that can manage the FC switch, HBA and provision HP storage from a single pane of glass.

Application Solutions

The HP P2000 SAN is the ideal solution for organizations running Oracle, Microsoft, SAP environments and those who are deploying virtual server technologies like VMware, Hyper-V, and Oracle Virtual Machine. The HP P2000 SAN delivers enterprise functionality that





enhances virtual environments, simplifies management, and reduces costs. Easy to deploy, scale and maintain, HP P2000 SANs make sure crucial business data remains available. This innovative approach to storage provides unique double fault protection across the entire SAN, reducing vulnerability without driving up costs the way traditional SANs can.

One of the greatest concerns is always database performance. With storage clustering, network RAID data availability, thin provisioning, data protection, and disaster recovery capabilities built into the HP P2000 SAN, you get industry leading, super fast performance along with the scalability, availability, and ease of management capabilities they have come to expect from HP Storage Solutions.

HP has developed best-in-class expertise in Oracle, Microsoft, SAP, and Virtualization Hypervisor technology through extensive testing with the HP P2000 SAN, HP servers, and management software that offer high availability and disaster recovery solutions; and backup and recovery. As a result, you can expect a wide range of operational and business benefits where they can:

- Deploy IT assets across multiple locations
- Incrementally grow storage without interruption
- Enable high availability and disaster recovery capabilities for critical applications
- Deploy a remote disaster recovery site

Built to Scale with Flexible Configurations

you can start small and as future demands exceed current capacity, the P2000 G3 FC can scale up dramatically. In addition, the P2000 G3 FC is extremely flexible, offering you a wide variety of configuration options to meet specific storage requirements.

The Best RAID Levels Available

The P2000 G3 FC offer you a wide choice of RAID levels to meet very specific needs. The P2000 G3 FC supports RAID 0, 1, 3, 5, 6, 10, 50.

In addition to the usual RAID levels, the P2000 G3 FC features several important additional levels. RAID 6 is the highest level of RAID protection by allocating two sets of parity data across drives and allows simultaneous write operations. It can withstand two simultaneous drive failures without downtime or data loss. RAID 10 is mirroring and striping without parity. It is the most popular of the multiple RAID levels, allowing large arrays with high performance in most cases and superior fault tolerance. RAID 50 combines the block striping and parity of RAID 5 with the straight block striping of RAID 0, yielding higher performance than RAID 5 through the addition of RAID 0, particularly during writes.

Easy to Configure and Manage

HP MSA Storage Management Utility (SMU) is built in and allows you to configure and manage the P2000 G3 FC. It supports out-of-band control via WEB, GUI and CLI. Interface types include mini DB9 RS232 and 10/100 Ethernet. Protocols supported include SNMP, SSL, SSH, SMTP, HTTP, and Telnet.

HP P2000 G3 FC Snapshot Software

HP P2000 G3 FC Snapshot Software can increase data protection by creating recovery points for your data. A snapshot takes a 'picture' of what your data was at the time of the snapshot. The snapshots are maintained even as data continues to change. In the event of





a failure, you can recover data to any previous snapshot. Snapshots are a great complement to a tape or disk backup strategy.

HP P2000 G3 FC Snapshot software functionality is controller based, meaning no host resources are used and they are space-efficient and provide copy-on-write capability with no server performance impact.

HP P2000 G3 FC Remote Snap Software

HP P2000 Remote Snap Software (Remote Snap) is an array-based software that can provide you remote replication. HP Remote Snap is a form of asynchronous replication which consists of replication of block-level data from a volume on a local system to a volume that may be on the same system or on a second independent system. This second system may be co-located with the first system or may be located at a remote site.

HP Remote Snap uses snapshots as the underlying technology to create multiple local recovery points that you can use as to complement daily backups. Most importantly, Remote Snap offers you business continuance in the event of a failure on the primary site.

HP Remote Snap features:

- Storage based asynchronous snapshot replication
- Initial copy of data can be performed locally, reducing burden on wide area networks
- Support of both Ethernet and FC interconnects provides flexible options to the application environments.
- Snapshot based replication technology means only changed data will be replicated to alternate site
- Many to 1 replication (up to 4 nodes) - primary use case is to replicate from "many" branch offices to the home office for the purpose of backing up data from the branches
- Single controller to single controller replication
- Mixed controller replication—Replication between P2000 G3 Fibre Channel and P2000 G3 FC/iSCSI Combo arrays
- Advanced scheduler provides several options to IT administrators for business continuance
- Flexible architecture allows remote replication between P2000 G3 FC and/or P2000 G3 FC/iSCSI Combo arrays. Protects existing investments and enhances business continuity planning objectives.
- Replication Wizard simplifies the task of setting up and establishing replication pairs from one unified, easy to use GUI.
- Snapshot based replication enables both local and remote recovery depending on the need. Snapshot replication isolates problems to a specific point in time which can be selected by the administrator. Additionally, snapshot replication supports longer distance replication.
- Multiple relationships provide greater storage flexibility and utilization.
- Bundled 64 Snapshots and Volume Copy integration provides better efficiencies by combining the management and array technologies to create local copies.
- Fast application recovery with minimal or no transaction loss
- Creation of disaster tolerant copies of your critical business data
- No-single-point-of-failure solution to increase the availability

HP P2000 G3 FC Volume Copy Software

HP P2000 G3 FC Volume Copy Software (Volume Copy Software) is similar to the snapshot software but with one important difference—the Volume Copy Software makes a physical copy of the data to another set of disks within the same array. One of the





additional benefits of snapshot and volume copy software is the ability to mount a snap or volume copy to another server for backup, application testing or data mining.

Volume Copy Software is also controller based and provides a physical copy of data from one LUN to another with no server performance impact.

HP Storage Mirroring Software

HP Storage Mirroring Software (Storage Mirroring Software) provides host-based, continuous replication for customers seeking a low-cost alternative to fabric or array-based replication. Patented replication and failover technology continuously captures byte-level data changes as they happen and replicates those changes to one or more target servers at any location without geographic limitations.

By replicating only the bytes that change, Storage Mirroring Software uses the absolute minimum bandwidth on your existing LAN or WAN to replicate data. Storage Mirroring Software also provides server failover where a production server can automatically be replaced by the storage mirroring server in the event of failure. you can couple Storage Mirroring Software with P2000 G3 FC Snapshot Software and/or Volume Copy Software to achieve an enterprise-class data protection strategy.

Warranty and Support

The P2000 G3 FC array come with a warranty of three years parts exchange with a next-day delivery. The P2000 G3 FC has been designed with customer self repairable parts to minimize repair time and provide greater flexibility in performing defective parts replacement. It should be noted, the P2000 G3 FC supports hot plug expansion and replacement of redundant controllers, fans, power supplies, and I/O modules for simple, fast installation and maintenance.

HP can offer you a variety of support levels based on specific needs.

Configuration Assistance, Storage Network Visio's & Ordering

For P2000 configuration assistance and discount pricing, contact Storage Networks, a leading HP Authorized Business Partner. Certified Integration Engineers assist small and large organizations in product selection, customization, integration, and support.

Visit storagenetworks.com or contact Storage Networks directly to obtain detailed Visio network diagrams depicting how the HP P2000 products can be integrated into your infrastructure.

Dial 855-NET-STOR, then Press 1

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