HP Adapts StorageWorks
for Multi-Tiered, ILM Storage Environment

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Management Summary

Marketing strategists around the globe are continually on the prowl for technologies they can reproduce at a lower cost while maintaining or improving the quality and performance. How can we maintain the functionality of a product while lowering its price? Normally, we would expect something to suffer: quality, reliability, or perhaps, performance. The classic example of this is on display during any evening on the streets in and surrounding Times Square in New York City. *Psst, hey buddy, do you need a watch?*

Merchants sell imitation designer watches on the streets of New York, and they have for decades. We know that we are not buying a real *Rolex* for $20 or $25, but it looks like the real thing, and if you need a watch, it will keep time. After all, isn't that what we buy a watch for, to tell time. We accept the fact that the reliability is not the same as the real thing. This watch may lose a minute here or there. However, this is a leap year, and we may have to reset the watch anyway. We accept the fact that this imitation Rolex will not last as long as a real one. The real Rolex, however, would cost 100 times as much. At this price, we can buy two or more, put the spares in a drawer, and pull one out only when the first one fails, kind of like "on-demand".

In the world of Information Technology (IT), we are constantly on the lookout for a less expensive means of storing data. The introduction of Information Lifecycle Management (ILM) has turned every Storage Area Network into a multi-tiered array of storage blocks, some disk, some tape, with different capacity and performance metrics. Moreover, each tier comes with a different cost associated to it. **The job of the CIO is to maximize the performance, while minimizing the cost per gigabyte for each tier**.

All vendors have their own idea as to how to maximize throughput, while retaining reliability and lowering the cost of acquisition for storage. Hewlett-Packard (HP) believes that the best way to accomplish this for the *StorageWorks Enterprise Virtual Array (EVA)* is to continue to use the native Fibre Channel interface on a hybrid disk drive. This way it can interact with the existing HP StorageWorks disk array family. They believe that they can provide multiple tiers of storage within an ILM environment within a single StorageWorks frame. To see how HP has implemented ATA for the *Enterprise Virtual Array (EVA)*, please read on.

ATA in the Data Center

ATA is not a new standard. It is a derivation of the IDE interface from the 1980's. Originally designed to emulate the ST506 interface on the Wren II drive, IDE became the dominant interface for 3.5" drives. Because of its primary usage within the IBM *PC AT* environment, the interface became known by its ability to attach standard devices to an AT Personal Computer or AT Attachment or ATA. Due to differences in the design of peripherals between vendors, the ANSI standards committee decided to standardize around a common access method, or device driver, for interoperability. Adoption as an ANSI standard commenced around 1989 with the publication of a completed specification under the aegis of ANSI committee X3T9.2. The ANSI committee finally published the approved standard in 1994 as ANSI X3.221-1994.

ATA remains the standard PC disk drive interface over a decade later, especially where the duty-cycle permits limiting reads and writes to around 15% of the time. ATA, also known as Parallel ATA (PATA) transmits data in parallel at "acceptable" speed and "sufficient" capacity given the low cost of the media. That low price is achieved through the economy of scale available through the significant quantity of devices installed every year, as well as the economies achieved by using less expensive mechanical and electrical components.

CIO's and Information Technology (IT) managers have raised significant interest in the past few years to reduce the overall costs of data center operations. They intend to accomplish this by replacing some of the more expensive server-class devices, such as Fibre Channel and SCSI disks, within their enterprise production storage environment with ATA drives with less functionality, but significantly lower cost. ATA drives have been used for several years in light duty-cycle operations. A new generation of ATA drives has been shipping since 2003, Serial ATA (SATA) drives. Designed with similar speeds and low cost to fill a mass-market need, SATA sends data serially. This

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Exhibit 1 – ATA Implementations

ATA – The original Desktop PC interface, has a 400K-500K hour MTBF with a 3-year warranty, and below average performance and reliability.

PATA – With characteristics similar to ATA, PATA has a maximum transfer rate of 133MBps with a proprietary hot pluggable interface.

SATA – An entry level interface for enterprise storage, it has a 500K-1M hour MTBF when used in computing environments where the I/O duty cycle is low. SATA has a 1-3-year warranty, a transfer rate of 150MBps, and a standard hot-pluggable interface. With new to market, high capacity drives not yet available, there is a perceived problem with reliability.

Fibre Attached Technology Adapted – With a dual FC interface and a maximum transfer rate of 200MBps, this hybrid disk has solved the interconnect, performance and availability issues of ATA, while maintaining high capacity and low cost.

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enables the use of a slimmer cable that supports distances of up to one meter, as would be required in server and disk array cabinets. SATA also allows performance and capacity to continue to grow without additional costs. SATA, however, needs to overcome the perception of lower reliability. The availability of RAID arrays and hot-swappable drives helps to overcome that perception. A second iteration of SATA, SATA-2, will appear in 2005 and support environmental monitoring within the disk enclosure.

Applications that are suitable for these drives take advantage of high-disk capacity with low read/write activity, such as file servers, archiving, and business intelligence programs, where the highest reliability is not a requirement. Improvements in technology indicate that even mission-critical applications can benefit from the cost savings of

SATA, when combined with RAID architecture to improve the reliability of the data through mirroring or striping in case of a disk failure.

However, when the data center is dealing with their most sensitive mission-critical applications, "good-enough" may not be good enough. In these instances, the requirement for performance and reliability leads the IT staff to install Fibre Channel arrays and augment them with SATA arrays within a single SAN. This is done to take advantage of the speed and reliability of the former in those mission-critical environments, while taking advantage of the cost and capacity of the latter, where performance and the highest reliability are not mandatory. As the burden of implementing architectures to satisfy governmental and industry regulations grows, the need to develop storage architectures that control the growth of costs becomes even more critical.

HP StorageWorks EVA Overview

The *StorageWorks Enterprise Virtual Array 3000 (EVA3000)* and *Enterprise Virtual Array 5000 (EVA5000)* are Hewlett-Packard's mid-range, departmental to enterprise, heterogeneous storage solutions within the StorageWorks disk array family. These products are high-performance, highly-available RAID arrays, serving the storage needs of departmental and enterprise users. The EVA supports all of the leading Operating Systems, including:

- *HP-UX,*
- *HP TRU64 UNIX,*
- *HP OpenVMS,*
- Microsoft's *Windows NT,*
- Microsoft's *Windows 2000 (Advanced Server),*
- Microsoft's *Windows Server 2003 (Enterprise Edition),*
- Sun's *Solaris,*
- *Linux,*
- Novell's *NetWare,* and

- *IBM's AIX.*

The EVA3000 and EVA5000 complement both the *Enterprise Modular Array (EMA) 16000* and the *StorageWorks MA8000/EMA 12000*. The EVA3000 supports from 8 to 56 drives and the EVA5000 supports from 8 to 240 drives with Fibre Channel interfaces for both the front-end connections to a SAN and the back-end connections to the Fibre Channel drives. The maximum capacity of the EVA5000 is 35TB. The only tiering in these cabinets, however, is through the use of different speed drives, with both 10K and 15K RPM drives available, not a complete standalone ILM solution.

Introducing Fibre Attached Technology Adapted Disks

Hewlett-Packard's solution to the price-performance-capacity-reliability dilemma appears to be the introduction of a new Fibre Channel attached disk drive that is designed to support **business-critical** information that has a lower access rate than **mission-critical** data. The low-cost hybrid drive allows the data center to access it through a dual-ported, native Fibre Channel interface, unlike the competition that uses shelf logic to convert the Fibre Channel signals to connect to a single port ATA connection. This dual ported interface increases the resiliency of the hybrid drives by providing high-availability failover capability. The new disk drive will hot plug directly into an existing EVA enclosure. With the ame 2Gbps interface as Fibre Channel drives, these hybrid drives operate at a slightly lower performance rate, but at a significantly lower price, one comparable to existing PATA and SATA solutions. With a capacity of 250GB per drive, the hybrid disk extends the capacity of the EVA3000 from 8.2TB to 14TB.

Available in July, Fibre Attached Technology Adapted drives will be ideal for applications involved in the accessing of a new level of enterprise data mandated by federal legislation such as Sarbanes-Oxley and HIPPA. Examples of typical application solutions are available in Exhibit 2 on p. 4.

**Exhibit 2 –
FATA Drive Target Solutions**

- Fixed content
- Snapshots and Clones
- Instant archive
- Two-stage backup
- Data Migration
- E-mail archiving
- Medical imaging
- Web serving
- File and Print

Mission-critical solutions such as OLTP, ERP, CRM, and banking and financial applications will still require the higher performance and higher reliability of SCSI and Fibre Channel. **This makes the StorageWorks EVA an even better solution, with the capability of supporting multiple tiers of storage within a single management frame.** The EVA is configurable with all Fibre Channel drives, all hybrid drives or any combination of the two. There is no requirement for a bank of Fibre Channel devices that exists in some competitive products. 10K RPM drives provide yet another lower cost alternative for meeting the demands that ILM has put on the data center's IT budget, lowering the total cost of ownership and protecting the investment made in HP hardware.

The StorageWorks EVA with Fibre Attached Technology Adapted drives, as well as the *StorageWorks Modular Smart Array* (MSA) with SATA at the entry level, complement the MSA, EVA and *XP* products when used in a pure SCSI or Fibre Channel mode. They provide an economical secondary storage for any ILM environment.

Combined with HP's nearline, offline, and archive tape solutions, HP can provide any enterprise with a value storage proposition to match the evolving value of the data that it protects.

Conclusion

Information Lifecycle Management has forced all of the major storage providers to modify their product offerings to include multi-tier storage access. ILM requires that there be high-capacity, low-cost secondary storage available. ILM does not insist that the secondary storage have nearly the same performance and data availability characteristics as enterprise storage. **Hewlett Packard does.**

With a product clearly designed to stem the possibility of losing sales to the competition, HP has stepped to the fore with an innovative solution for the problems caused by government regulations. By forcing enterprises from all market segments to increase their storage by double, triple, and, at times, even more, the federal government has stimulated the storage business. It would appear that HP intends to grab their share. **Interestingly, the reliability and availability of HP's Fibre Attached Technology Adapted solution may stimulate the move of even more data from enterprise storage to secondary storage**.

Moreover, by using the StorageWorks EVA platform as the base, HP has protected the investment of their base while deploying this new strategy. The data center can make the choice between traditional enterprise level SCSI and Fibre Channel drives and the new hybrid drives within their existing architecture and storage management framework.

Whether your enterprise has a StorageWorks EVA platform or not, HP deserves your consideration. The EVA with Fibre Attached Technology Adapted drives appear to be an ILM infrastructure solution that can protect your budget while at the same time trying to protect the reliability and performance of your enterprise storage solution.

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