

Be green with the HP StorageWorks Enterprise Virtual Array white paper



Introduction.....	2
Be green with the EVA.....	2
What is new—HP StorageWorks EVA4100/6100/8100.....	2
EVA Capacity Management reduces carbon footprint.....	3
EVA Dynamic Capacity Management software.....	3
Vsnaps.....	4
FATA disks.....	5
Smart packaging reduces waste.....	6
Keeping the EVA “cool”.....	8
A strategic commitment to a better environment.....	8
Meeting and exceeding the requirements.....	8
For more information.....	9

Introduction

This white paper discusses the decade-long commitment of HP to a cleaner environment as well as providing an example of how one product family, HP StorageWorks Enterprise Virtual Array (EVA), demonstrates this commitment.

Be green with the EVA

As businesses increase their global reach, require accessibility 24 x 7, and worry about data vulnerability, “storage-hungry” applications dominate the data center. These increased storage prerequisites complicate power, cooling, and space requirements by creating a need for:

- Greater array performance
- Higher density arrays
- Storage consolidation
- Better utilization of the purchased capacity
- Seamlessly upgrading storage capacity on the fly

The question becomes how to continue to provide uncompromising quality to a customer and balance those needs with maintaining a commitment to creating environmentally friendly products. HP has answered that question through the EVA product family by enabling customers to:

- Eliminate wasted capacity by rightsizing storage needs through increased disk utilization (HP Dynamic Capacity Management EVA software)
- Use less capacity with a space-efficient local replication solution
- Host non-disruptive, real data for testing, data mining, and training rather than using full copy clones
- Save power and reduce costs by moving less used data to low-cost, high-capacity Fibre Attached Technology Adapted (FATA) drives
- Save on resources, time, and money through a consolidated, standardized, simpler management interface
- Meet and exceed global environmental standards such as these two European Union directives: Waste Electrical and Electronic Equipment (WEEE) and the Restriction of Hazardous Substances (RoHS)
- Conserve power for cost savings and lower emissions by taking advantage of the HP Dynamic Smart Cooling energy management system

What is new—HP StorageWorks EVA4100/6100/8100

The EVA product family offers mid-range to enterprise size customers leading performance, high capacity, and high-availability storage solutions for reducing IT costs and complexity.

The new HP StorageWorks 4100/6100/8100 Enterprise Virtual Array (EVA4100/6100/8100) models:

- Aggregate and automate tasks for better capacity management and automatic provision storage with new LUN shrink and grow capabilities.
- Reduce costs associated with downtime. HP data shows that most customers are achieving 99.999% availability with the EVA4x00/6x00/8x00. Following HP EVA Availability Best Practices can help customers achieve this result.
- Increase performance—24% better with the new controller.

- Enable a smaller data center footprint by consolidating storage, servers, and backups on the same rack (at the factory level).
- Drive better ROI/TCO through IT support savings.
- Provide better data availability through multiple redundant paths.
- Improve disaster recovery and business continuity through a rich set of software capabilities.

EVA Capacity Management reduces carbon footprint

The EVA provides storage virtualization that enables capacity pooling, simplified management, automatic performance load balancing, dynamic configuration, and re-configuration. Capacity pooling optimizes available hard disk drive space. Load balancing allows servicing to more applications within a single array. The combination of improved capacity utilization and better, uniform performance across all spindles permits customers to service more applications with fewer arrays and fewer disks.

To optimize the EVA for best performance and fuller disk utilization, the HP EVA best practice is to create one or a few large disk groups, allowing data across more spindles (or disk drives) than in a traditional array. The EVA spreads the workload more evenly across all the spindles, enhancing system performance and allowing a single array to service more applications. By making all drives perform uniformly, the EVA saves power substantially and enables more inputs/outputs (IOPs). Customers can achieve sizable savings by populating a data center with fewer arrays and fewer disks as each array and disk is utilized more fully.

The EVA product family uses advanced hardware and software technologies such as Dynamic Capacity Management (DCM), Vsnaps, and FATA drives to help customers:

- Optimize available hard disk drive capacity
- Eliminate unnecessary storage disk purchases
- Shrink their carbon footprint by decreasing overall power use
- Reduce utility and data center space costs
- Effectively and efficiently manage IT resources and time required to perform storage provisioning tasks

EVA Dynamic Capacity Management software

EVA Dynamic Capacity Management software is an enterprise class storage provisioning solution that enables administrators to "set and forget." The solution builds on the existing ease of storage configuration and provisioning of the HP XP and EVA by reducing the necessity for ongoing storage administration. The result is optimized capacity, improved disk utilization, and minimal administrative interaction. DCM software user policies automate LUN/File system grow and shrink, eliminating stranded storage. This capability helps customers decrease the data center carbon footprint by reducing wasted capacity and lowering energy needs.

Following is an example that illustrates how DCM software helps customers improve their bottom line and the environment simultaneously.

Example:

Without DCM, stranded storage is a business and technical reality, resulting in up to 60% of provisioned storage being useable.¹

¹ In a 2005 study, the Enterprise Storage Group, now known as the Enterprise Strategy Group (ESG), noted that 60% of array storage is stranded and unusable. ESG is an analyst group focused on the IT industry (www.enterprisestrategygroup.com).

Assumptions: Customer application requires 7 TB of storage this year.

Array 1	Array 2 (DCM advantage)
No DCM deployed	Uses DCM
Configuration: EVA8100 2C8D with 16.4-TB storage (112 146-GB 15K HDDs). Application is over provisioned at 10 TB	Configuration: EVA8100 2C4D with 8.2-TB storage (56 146-GB 15K HDDs)
50% stranded storage, 5 TB in this example	No stranded storage
Stranded storage requires customer to purchase: <ul style="list-style-type: none"> • Additional HDDs and extra disk shelves • More power and cooling KWHs (\$3K/year)² 	<ul style="list-style-type: none"> • No additional purchases or power/cooling expenses because there is no stranded storage • Buy only capacity needed

Environmental and business impact of DCM:

- Lower initial acquisition costs
- Improved disk utilization
- Reduced cooling, power, and space operating expenses
- Less administration overhead (management costs)
- Better consolidation through more servers per storage system

Vsnaps

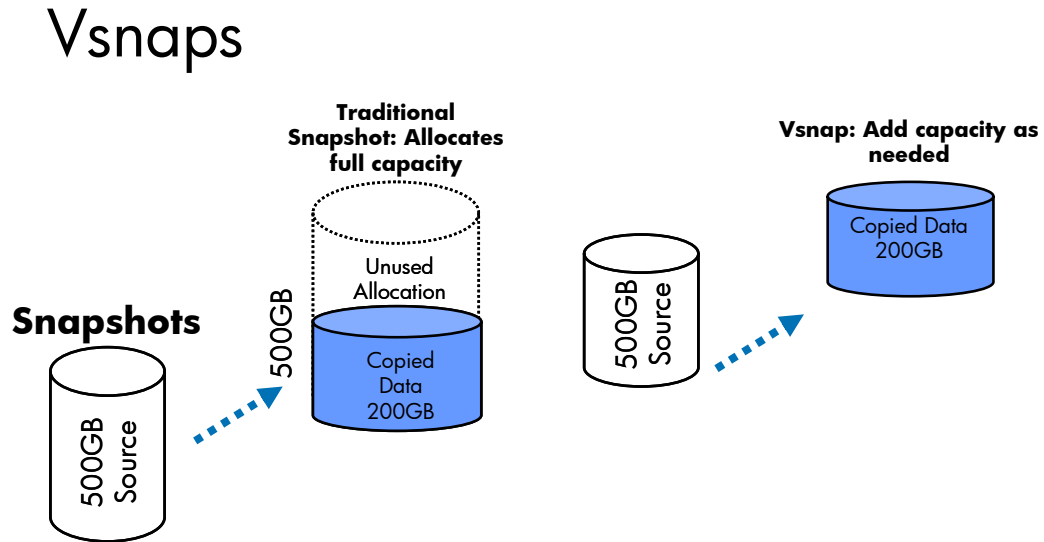
Vsnaps deliver virtually capacity free snapshots (demand allocated) that allow a user to create a point-in-time copy or a demand allocated snapshot of a virtual disk (LUN). Unlike a standard snapshot (fully allocated), or arrays that require a dedicated save, Vsnaps do not reserve the same amount of disk capacity as the production volume that is copied.

As the amount of disk capacity used by the copy volume grows, the data in the production volume changes over time. By setting the Vsnap to read/write, IT managers can write the data directly to it. This process saves valuable capacity and reduces the workload by automatically using space as needed.

² Savings of approximately 33000 KW-hrs at 9.28 cents/year

As Figure 1 illustrates, Vsnapshots do not require customers to purchase a large amount of storage for replication space, reducing the data center's carbon footprint. Saving space lowers costs and energy consumption, helping customers improve their ROI while helping the environment.

Figure 1.



Example:

Assumption: Typical storage array: 7 1-TB LUNs locally replicated for a backup application.

EVA advantage: EVA Vsnapshots do not require any pre-allocated or dedicated space. Other array implementations require a 20% LUN pre-allocation.

Result: By not requiring the additional capacity, the EVA saves the customer 1.4 TB (approximately five 300-GB drives).

Environmental and business impact: Saving space lowers costs and energy consumption, helping customers improve their ROI while helping the environment.

FATA disks

FATA disks consume less energy because they spin slower and are an excellent choice for low-performance applications such as backup and recovery solutions. This hybrid disk drive technology easily moves data between lower cost per gigabyte drives and high-performance drives within a single storage system. Customers have the best of both disk drive worlds.

Example:

Assumption: 12-TB array with 146-GB 15K HDD (30% of the data is a candidate for FATA drives resulting in 4 TB of FATA HDDs or eight 500-GB FATA drives).

FATA drive advantages:

- 181 W (FATA) versus 757 W
 - 4 TB of FATA HDDs (eight 500-GB FATA drives), including the power for the drive shelf uses 181 W
 - 27 146-GB 15K drives, with the shelf, uses 757 W
- 14 W per FATA drive versus 19.4 W for the 146-GB 15K Fibre Channel drive (a FATA drive consumes 28% less power)
- Lower cost per megabyte

Environmental and business impact of FATA drives:

- Consume less power
- Reduce operational costs
- Provide low-cost storage solution for lower performance applications
- Snapclones assigned to FATA disk groups provide the lowest cost solution for zero-downtime backup and fast recovery storage

Smart packaging reduces waste

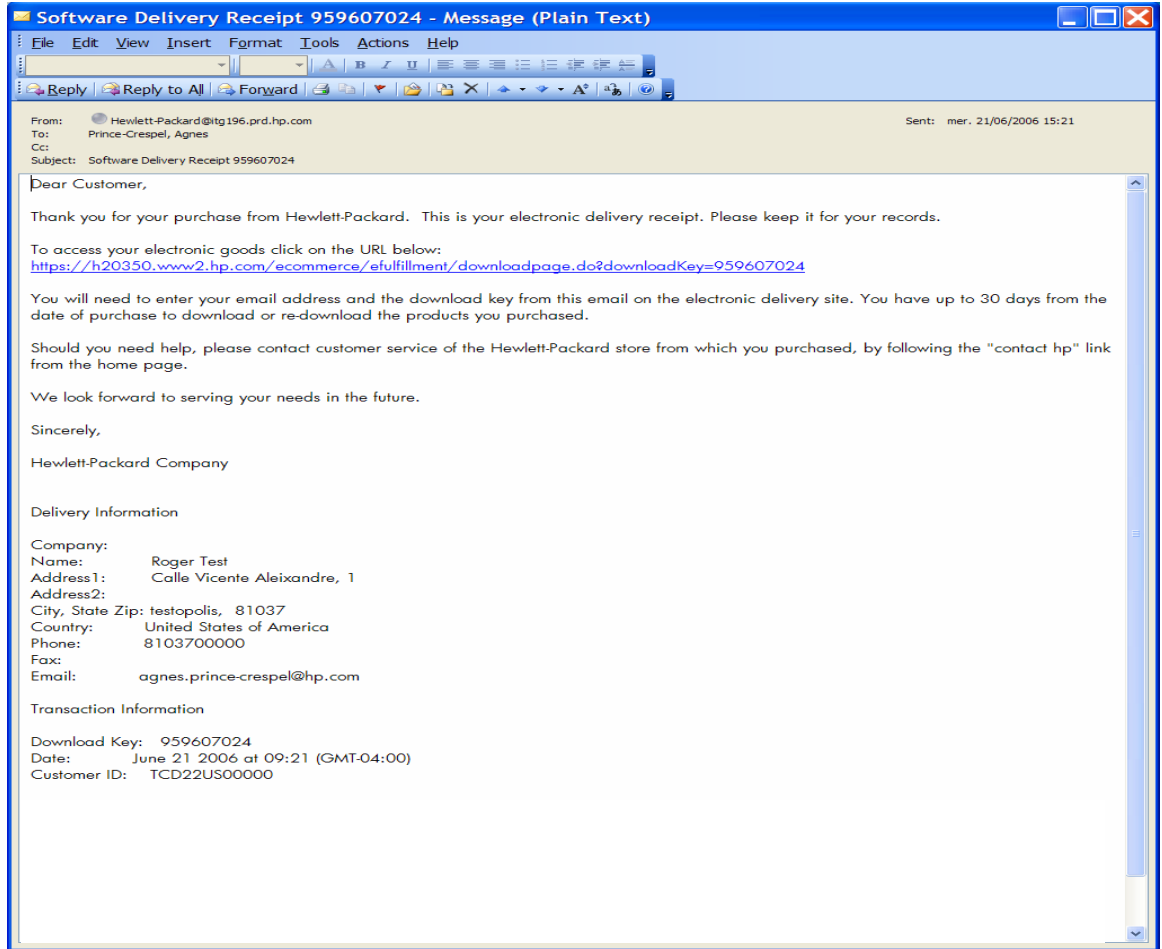
Worldwide, governments are regulating packaging materials in an attempt to cut down on growing concerns regarding waste disposal costs and landfill availability. Many countries require the manufacturer, such as HP, to take back the packaging from the customer. Concerned about the impact to the environment and the customer, HP has initiated new shipping methodologies and packaging requirements that meet sound environmental practices, improve response time to the customer, and deliver the hardware ready to deploy.

HP Software Depot enables customers to download (buy or free trial) firmware/software from the home page, receiving their order within an hour not weeks. Customers browse by categories using simple keyword searches. The online method eliminates the physical CD, packaging, and time-consuming postal delivery. With an HP support and maintenance contract, customers receive updates electronically and automatically.

EVA customers in particular may choose to download HP StorageWorks EVA XCS firmware and HP StorageWorks Command View EVA from the Software Depot. The link for obtaining the free download of EVA XCS is available at the home page (www.software.hp.com). At the home page, click **Storage and NAS**. This link takes customers to a list of free downloads, including the HP EVA XCS 6.1000 Electronic Download.

Customers who choose to purchase software from the Software Depot receive an electronic delivery receipt that enables future electronic goods purchases online.

Figure 2.



HP Factory Express delivers the hardware, including storage and servers, pre-built, tested, and ready to deploy at the customer's site. This optional customization at the "factory" eliminates the need for many boxes filled with various components of the customer's order. Less packaging decreases waste, lowers postal costs, and saves the customer time and money.

Environmental and business impact: Software Depot enables customers to receive their order online within an hour on an ISO-standard cross-platform image. Factory Express delivers the hardware pre-configured and ready to deploy, using only limited packaging.

For customers who want it, **eDelivery** provides simplified software licensing using email. This method eliminates all logistics associated with delivering the software (entitlement certificates and media) by way of physical mail. There are no packaging materials, postal costs, or slow-downs associated with customs.

Some customers still prefer hard copy and in those cases, HP has simplified the physical delivery by placing all the materials in one box. For example, if a customer orders 100 Command View licenses, the purchaser will receive one box, one envelope, and one piece of paper.

Keeping the EVA “cool”

HP has the technology and the business expertise to provide solutions that enhance our customers’ storage capabilities and environmental needs. For example, HP Dynamic Smart Cooling energy management solutions help customers effectively decrease their carbon footprint by configuring their data centers to reduce energy costs and CO₂ emissions.

Helping the EVA to “keep cool” is a component of the Dynamic Smart Cooling solution, the HP Modular Cooling System (MCS). MCS is an effective cooling system for high-density deployments of up to 30 KW per rack. It complements existing conventional data center cooling by adding computing power without increasing the heat load.

A strategic commitment to a better environment

HP delivers products and services that are environmentally sound and developed in a responsible manner, reflecting our commitment to sustainable solutions for the common good. We meet this commitment with comprehensive, global environmental, health, and safety policies that ensure conformance with our Electronic Industry Code of Conduct (EICC) and General Specification for the Environment (GSE). Our internal practices meet and often exceed regulations mandated by governments globally. In addition, we strive to ensure that our overall supply base adheres to world-class social and environmental practices.

Some highlights of the HP environmentally friendly tradition:

- “Design-for-Environment (DfE)” program since 1992
- 10+ years focus and investment in energy efficiency–related programs
- Numerous patents on power and cooling technologies
- Dedicated team in HP Labs working on power and cooling issues

Through its DfE program, HP strives to improve on these priorities:

- Reduce the energy needed to manufacture and use our products
- Decrease the amount of materials used in our products
- Develop materials that have less environmental impact and more value at end-of-life
- Design equipment that is easier to upgrade and/or recycle

Meeting and exceeding the requirements

Governments, customers, and the public are increasingly interested in ensuring that the manufacture and disposal of electronic equipment follows environmentally sound practices. The European Union initiated two directives that affected electrical and electronic equipment disposal. RoHS restricts the use of certain hazardous substances while WEEE increases recycling. RoHS complements WEEE by banning the presence of specific hazardous substances in the product design phase.

The HP proactive environmental stance had banned substances similar to some listed in RoHS in 1998. The company created a team to address RoHS formally in 2001 and by 2003, a global team was in place. HP participated in the development of the WEEE Directive at all stages of the legislative process both at EU and member state level. We contribute to the implementation process in each member state where the company has a presence. HP has met its internal goal of eliminating or reducing RoHS substances to the EU specified levels for virtually all HP brand electronic products worldwide, except where it is widely recognized that there is no technically feasible alternative.

In addition, HP meets the requirements for RoHS-like regulations in Japan, China, and California.

For more information

- Design-for-Environment Program
www.hp.com/environment
- Sustainability
<http://www.hp.com/hpinfo/globalcitizenship/environment/index.html>
- Commitment and policies
<http://www.hp.com/hpinfo/globalcitizenship/environment/envprogram/index.html>
- Product return
<http://www.hp.com/hpinfo/globalcitizenship/environment/return/index.html>
- HP standard for recycling
<http://standards.inet.cpqcorp.net/smc/hpstd/html/F-HP0000701.htm>
- Dynamic Smart Cooling
http://h71028.www7.hp.com/enterprise/cache/temp-438048-3-0-0-121.html?jumpid=reg_R1002_USEN
- Energy report
<http://www.hp.com/hpinfo/globalcitizenship/gcreport/energy.html>
- EVA family
www.hp.com/go/eva
- EVA Best Practices
http://h71028.www7.hp.com/ERC/downloads/4AA0-2787ENW.pdf?jumpid=reg_R1002_USEN

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