Controlling TCO with HP StorageWorks Enterprise Virtual Array white paper

Introduction: It is the TCO

No manager wants to spend more for anything than is absolutely necessary. This is especially true when it comes to buying IT infrastructure: servers, networks, and storage. The cost of these kinds of products—at least the cost of their basic components—is constantly being driven lower and lower to commodity levels. So, it makes sense to shop for the lowest possible cost.

But is the lowest price, the acquisition price, actually the lowest cost? Since these products are intended to provide useful service for three years or more, the acquisition price is only part of the overall cost equation. What really matters is how much the product costs the organization over its intended period of use, its total cost of ownership (TCO). That is the price the organization ultimately pays.

It is not only possible but surprisingly common that managers will opt for the product with the lowest acquisition price over a product with a somewhat higher acquisition price only to wind up paying much more over the period of intended use. In the end, what the organization actually spends for a product is the TCO, not just the acquisition price. Managers who jump at the lowest acquisition price without considering the overall TCO may, in fact, find their organizations actually overpaying for the product.

TCO consists of a number of value components. Certainly a low acquisition price is important, but it is just one component in the overall TCO. Other components include the labor involved in deploying the product and maintaining it over time; the cost of integrating it with other systems; and its flexibility, reliability, availability, and performance. Studies by leading industry analysts regularly suggest that the ongoing labor alone involved in maintaining a storage product can cost many times the acquisition price depending on the attributes and characteristics of the product being purchased.

Therefore, it pays for managers to evaluate technology products in terms of those features, capabilities, and attributes that enable the organization to lower the TCO. Otherwise, buying a product based solely on a low acquisition price could prove to be a costly mistake.

This paper is intended to help managers understand the TCO of storage products. It:

- Identifies the elements of a product that contribute to lowering the TCO
- Describes TCO-lowering capabilities of HP StorageWorks Enterprise Virtual Array (EVA) storage products
- Introduces the HP ITCentrix TCO/ROI model
- Presents sample TCO analysis that readers can use as a guide

Understanding storage TCO

The key to understanding storage TCO revolves around the difference between acquisition cost and people costs.

The acquisition cost is the cost of the initial hardware and software. These costs are known at the outset and do not change, although changes in configuration or usage may impact subsequent understanding of TCO.

The cost of the people is more difficult to pin down, yet it is often the largest factor in the overall TCO, typically surpassing the cost of the storage product itself, by as much as a factor of 2–3 times. People costs specifically include the cost of the time and labor required to deploy and maintain the product over time. People costs can vary greatly based on skills, availability, seniority, and other factors, especially when it comes to storage, where skilled people may be costly to find or retain. How well a manager can control people costs greatly impacts the TCO for a storage product. Products that can be deployed and maintained, for example, by fewer people or by people with lower levels of skill and training will provide a distinct advantage in terms of reducing TCO.

When assessing the TCO of a storage product, two key metrics come into play: (1) the amount of storage capacity a staff person can manage, usually expressed as the number of gigabytes/terabytes managed per person, and (2) the skill level required to manage the storage. The amount of storage capacity a person can manage determines how many people are required to maintain the storage over time. The required skill level determines how costly those people will be. In general, products that require advanced storage knowledge and skills available only in the most senior people or require extensive training will be more costly in terms of TCO.

Storage products can be designed and engineered in ways that reduce the TCO. At the same time, storage is acquired to achieve specific technical and business objectives, such as improved performance or high availability. Such design considerations impact the TCO. Therefore, TCO must be understood in the context of the objectives and tradeoffs made to meet those objectives. To achieve the lowest possible TCO but at the expense of not meeting storage objectives will not help the organization in the long run. With that in mind, specific product features and capabilities that enable organizations to reduce the TCO include:

- Management automation—Enables storage administrators to manage more storage capacity while reducing the skill and experience level required of administrators
- Storage aggregation—Allows administrators to organize, configure, visualize, monitor, and provision storage from any point on the network to any host at anytime
- Availability—Provides the necessary firmware and component redundancy to ensure high levels of availability, thereby reducing downtime
- Performance—Includes components that enhance performance, which can be documented through industry benchmarks, thereby ensuring the ability to meet service level commitments
- Copy, replication, migration (ability to move data)—Offers capabilities to facilitate and expedite the movement of data within the storage system and between storage systems, which reduces the amount of time and effort administrators must spend moving data
- Engineering, product quality—Provides increased reliability, availability, flexibility, and performance as engineered into the storage product, which reduces the amount of effort required by the administrators
- Heterogeneity—Ensures the storage system can work with systems from other vendors, thereby reducing the time, effort, and cost of systems integration

Managers must understand the business value that storage delivers as part of the organization's IT infrastructure. When they have identified the business value in terms of availability or performance or flexibility, they can prioritize their requirements and assign a relative value for each of the capabilities that contribute to this business value. Storage products that deliver their highest priority capabilities to the greatest degree often will offer among the lowest TCO and typically the greatest business value.

For example, a storage product with robust management capabilities and availability features will require less administrator time and effort. Fewer administrators and less skilled administrators will be required to manage the system and deliver the expected level of service, which directly translates into lower TCO. A storage product that supports heterogeneous environments similarly eases the integration of the storage with other components in the environment, which can significantly reduce the TCO. From a business value standpoint, a storage product that delivers higher application availability will mean that users are more productive because lost productivity due to system downtime will be reduced.

HP StorageWorks EVA—A powerfully simple way to lower TCO

The HP StorageWorks EVA family of storage products has been designed and engineered to enable midrange and enterprise-scale organizations to lower their TCO. It provides enterprise-class capabilities at a more cost-effective price than conventional enterprise storage products. In addition it helps the organization reduce its already low TCO through management automation and a host of other features (described later).

To begin, EVA storage products are simple to use and highly automated. Typically, EVA products require fewer storage administrators per gigabyte of capacity when compared to other array subsystems. This ensures that EVA products deliver the best TCO. In short, HP EVA is an enterprise-class array that is powerfully simple.

In general, all EVA storage products deliver the high performance, high capacity, and high availability required for business-critical solutions. The product family offers up to 72 TB of capacity when equipped with 300-GB Fibre Channel disk drives. The products achieve high availability through a design that eliminates any single point of failure. In addition, EVA storage products provide full operating system heterogeneity, compatible with all major operating systems and a wide range of HP servers, as well as servers from Sun, IBM, and Dell.

The EVA product family consists of three models—the HP StorageWorks 4000/6000/8000 Enterprise Virtual Array—differentiated mainly by capacity. The EVA4000 scales to a maximum of 56 drives. The EVA6000 scales to 112 drives. The EVA8000 scales to 240 drives—with 168 drives in one cabinet and additional drives in an expansion cabinet. When the cabinets are populated with 300-GB drives, the EVA family offers capacities ranging from 16.8 TB through 33.6 TB all the way to 72 TB, respectively.

While the EVA4000 and EVA6000 have the same number of host and device ports—four host ports and four device ports—the EVA8000 has twice as many host and device ports—eight host ports and eight device ports. Similarly, the EVA4000 has no Fibre Channel switches behind the controllers, while the EVA6000 has two Fibre Channel switches and the EVA8000 has four.

However, all EVA models are designed for the lowest possible TCO. All EVA products have the following features and capabilities that reduce TCO:

- Virtualization—Simplifies the management, administration, and operation of the storage and makes it possible to use more of the array's capacity.
- Management automation—Reduces the number of tasks required to administer an EVA array and reduces the number of actions or clicks required to perform specific tasks thereby enabling fewer administrators to manage more storage capacity.
- Deep, multi-level array aggregation—Reduces the number of LUNs and RAID groups that must be managed, which simplifies the administration of the array and enables fewer administrators to manage more storage. In addition, administrators can grow the partition using any available storage within the enterprise rather than adding more partitions to the host.
- Multiple copy and snapshot options—HP virtually capacity-free snapshot replication capability, Vsnaps, simplify and speed the data movement process, which improves storage performance and availability while reducing capacity requirements.
- Single integrated operating system—Simplifies operations, streamlines administrative actions, and reduces the likelihood of failure, thereby enabling higher availability.

Combined with its highly competitive pricing, these features allow the organization to lower TCO by increasing the amount of storage an administrator can handle and by making it possible for less skilled (less costly) administrators to handle the work. These features also improve the performance and availability of the storage.

HP-ITCentrix TCO model

HP uses a TCO/ROI model developed by ITCentrix that combines the acquisition price negotiated by the customer with standard business and technology financial data in an analytical model to produce a TCO analysis that reflects the customer's specific situation. The model also projects the business value of implementing the storage solution. Data from the model is calibrated using real-world studies of Global 2000 and smaller corporations. As such, the HP-ITCentrix TCO model provides a tested methodology that accurately portrays the full cost of acquiring and running the storage system for a period of time specified by the buyer.

The power of this model comes from the use of industry-accepted data in an analytical model that has been reviewed and validated by leading research firms and proved in hundreds of customer situations.

The final output of the HP TCO model provides a clear and simple statement of the TCO for the storage over the specified timeframe. It provides the following information:

- Specific storage configuration being analyzed and its acquisition cost
- Total storage capacity (in gigabytes)
- Total storage infrastructure cost (in dollars)
- Amount of storage staff required to administer the product
- Storage staff per gigabyte
- Total staff cost
- TCO for the specified period (three years in the following example)
- Storage management efficiency (GBs managed per administrator)

Of course, prudent managers do not base their storage acquisition decisions completely on TCO analysis. In practice, TCO should be one of several key factors in selecting a storage product. Other factors might include the vendor's service and support or the availability of unique features and capabilities, such as management automation, high availability, and data migration especially important to the organization.

TCO model in action

The following is a simplified example of the HP TCO model in action with typical values culled from the experience of HP with a wide range of organizations that purchase midrange storage. This example illustrates the typical TCO a small, midsize, and large midrange storage user might experience. The example is aligned with the three EVA models: EVA4000, EVA6000, and EVA8000.

Use this model to plan your next storage acquisition or storage consolidation. In the right column, "Your baseline," put the values for your existing storage configuration. The columns to the left currently contain values for typical small, midsize, and large midrange storage users. Your HP representative can give you the values for your proposed HP storage and run the full HP TCO model for you. This will enable you to make a TCO comparison between your existing environment and the new EVA environment.

Of course, when you upgrade to EVA storage, most likely you will not only be adding more storage but gaining a number of advanced capabilities. Examples of such capabilities are: management automation, storage aggregation; high availability, performance, copy/replication/data movement, and heterogeneity. These capabilities deliver better storage and, most importantly, help you better achieve the business objectives you set in terms of availability, performance, efficiency, quality of service, and more. In this case, when evaluating a product like EVA that incorporates these capabilities, a straight TCO comparison alone is not sufficient.

When your HP representative runs the full HP TCO model using values you have provided, it incorporates factors that reflect the additional capabilities of the EVA alongside the factors that reflect your needs, such as consolidation or high availability. The following sample model provides only an approximation of the TCO revealed by running the full HP model with your HP representative.

The following table shows three consolidation examples (EVA4000, EVA6000, and EVA8000) and demonstrates the difference between storage acquisition cost and TCO.

Table 1: HP sample TCO model*

Storage metric	EVA4000 value	EVA6000 value	EVA8000 value	Your baseline
Storage array type	EVA4000	EVA6000	EVA8000	
Total storage (TB)	3.5	9.36	24.5	
Storage purchase cost	35,082	83,890	182,439	
Storage IT staff (FTE)	0.5	1	1.63	
IT staff efficiency (TB/person)	7	10	15	
Storage acquisition cost (hardware, software, installation, training, switching, $)	58,594	131,890	247,475	
Storage staff cost (per year,$)	45,000	90,000	146,700	
TCO (3-year, $)	193,594	401,890	687,575	

*An approximation of the TCO. Results may differ when running the full HP TCO model.

Notes:
Storage staffing is calculated in terms for full time equivalents (FTE). Often storage is a responsibility shared by several people, some or none of whom work at storage full time.

The three-year TCO reflects the amortization of the acquisition cost over three years. During that same period, staffing costs may increase or storage capacity may increase, either of which could alter the result.

Table 2 shows the projected savings that can be achieved when comparing the three-year TCO of the HP storage approach from Table 1 with the three-year TCO of a collocated storage approach. The collocated storage approach would represent a datacenter environment with direct attached storage.

Table 2: TCO comparison: HP EVA vs. collocated storage

	EVA4000	EVA6000	EVA8000	Your baseline
TCO (3-year, $)	193,594	401,890	687,575	
Baseline TCO of collocated storage approach ($)	328,000	712,000	1,134,000	
Savings ($)	134,406	310,110	446,425	

Overall business value proposition

When it comes to business value, the lowest acquisition price does not always represent the best value. This is particularly true with storage products where the cost of operating the storage product over time can greatly add to the cost of the storage. From a cost standpoint, what is important is the TCO of the storage product, not the acquisition price.

The HP EVA product family not only is priced competitively but consistently delivers low TCO and strong storage management and operations efficiency. In addition, EVA products include features and capabilities that enable managers to further reduce the TCO. Managers should use the HP TCO model with their HP representative when evaluating HP EVA products and competing products to identify those that deliver the best overall business value.

For more information

For more information about the HP StorageWorks Enterprise Virtual Array, visit:

- http://welcome.hp.com/country/us/en/prodserv/storage.html
- http://h18006.www1.hp.com/storage/index.html
- http://h18006.www1.hp.com/storage/arraysystems.html

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