

Homogeneous vs Heterogeneous Storage: Assessing What the Market and Users Say

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Abstract

A project researching management issues and policy making in adopting and implementing homogeneous versus heterogeneous storage is presented. The project addresses the views of end users in evaluating the costs and benefits of homogeneous versus heterogeneous storage architectures. The project will be conducted in concert with the implementation of an online, virtual market by Storage Markets Inc. (www.storagemarkets.com), a predictive markets data provider and ISIC sponsor. ISIC and Storage Markets are collaborating on the analysis of trading behavior in the virtual market. ISIC will also conduct surveys of data center managers, storage and IT professionals, and complete case studies. The project kicks off in January 2007 and will run one year. Project updates will be posted quarterly on the ISIC website. We invite ISIC sponsors and other interested companies to participate in this research.

Homogeneous vs Heterogeneous Storage

Enterprise IT and data center architecture managers have long grappled with the costs and benefits of purchasing homogeneous versus heterogeneous IT products and services. In the storage field, much has been made of the value of heterogeneous storage architectures where storage elements from different vendors can be installed that will interoperate to meet customer storage demands. The benefits cited are common to any best of breed IT purchase argument: lower product acquisition costs due to price competition, potential decreases in total storage

costs, and avoidance of vendor lock in. Allied with these benefits is the perceived, slow progress in the storage industry towards a more unified storage management environment, from emerging storage management standards to the consolidation of storage management tools, as suggested by industry observers.

However, heterogeneous IT architectures and heterogeneous storage can present significant problems for users. For every example of a data center operation that has gained cost savings through selective, best of breed product acquisitions, there is a counter example where the move to a more heterogeneous storage architecture has increased, not decreased costs. In storage, the complexity of using storage elements from different vendors where compatibility matrices have to be matched and adhered to for supported operational performance can grow exponentially with increases in the number of vendors. Too, managing the different versions of embedded code, software and driver interfaces can be complex. And in management terms, dealing with multiple vendors for acquisition, support and problem resolution can be time consuming and expensive. In short, the potential economic savings in capital expenditures for implementing heterogeneous storage may be consumed by higher operational expenditures in acquiring and managing heterogeneous storage solutions.

Will End User Purchase Behavior Change Over 2006 Levels?

The project's focal question is: will current purchases of homogeneous storage systems increase or decrease over 2006 levels? A secondary question is: have proposed solutions addressing problems created by heterogeneous storage, such as storage virtualization, been

deployed extensively enough for users to assess their effectiveness?

The project will work with Storage Markets Inc to define and analyze trading behavior in a virtual markets trading game evaluating the question of user trends towards homogeneous versus heterogeneous storage. A second phase of the project will define and implement data center and storage manager surveys and case studies.

Storage Market's IPO: Buying Homogeneous Storage

Storage Markets IPO'd a new security on 21 December 2006. The predictive market allows traders to buy or sell a virtual security based on whether they expect users to purchase more homogeneous or heterogeneous storage over 2006 levels. The new security's IPO price of Bit\$50 reflects an initial, equal likelihood for users to purchase either environment. Changes in the price of the security tracks the consensus of opinion of industry professionals as to whether they believe homogeneous purchases will increase or decrease over 2006 levels.

What constitutes a homogeneous storage system for the purposes of the virtual market is where the majority of the storage solution comes from the same source, including:

- Storage system – including primary and secondary storage
- Storage management software – software for managing the resources for all the storage systems
- Switches, interfaces and adapters required for the storage systems infrastructure

For the purposes of the virtual stock market, Storage Markets has defined a relative measure based on storage elements and user purchase behavior of storage systems in 2005 and 2006. Traders believing that the relative market share of the three leading storage vendors, EMC, HP and IBM, in homogeneous storage platform sales will increase in 2007 are instructed to buy the stock; traders believing that the relative market share in homogeneous platform sales will decline in 2007, should short the stock.

Project Timeline and Deliverables

The project kicks off in January 2007. The first phase focuses on the analysis of the virtual stock market implemented by Storage Markets. The virtual market is planned to run through first quarter 2008. Phase One project deliverables include two quarterly briefings and an interim report on homogeneous storage trends.

Phase Two includes surveys of data center and storage managers, IT professionals and senior IT management. Two detailed case studies are also planned for in the second half of the year. Quarterly project updates will be posted on the ISIC website.

Appendix: Predictive Markets

Business forecasting grapples with the problem of predicting future market developments. The problem with predicting trends is dependence on the past, which can either be the best predictor or the worst, depending on whether an important change has occurred. For example, in new product introductions, consumer surveys are routinely conducted to ask consumers their views. It is often difficult, however, to ask consumers about new products, as consumer utility is not often so easily assessed. Surveys of experts face difficulties in defining who are the experts and weighing the relative importance of the views expressed.

Predictive markets, or virtual stock markets, is another approach that can be used to predict short and medium term market developments. Its basic idea is to bring together a group of traders via the Internet, and facilitate their trading of virtual stocks. These virtual stocks represent a bet on the outcome of future market situations, and their relative value depends on the realization of these market situations. Once the outcome of a specific market situation is known, each share of virtual stock receives a cash dividend (payoff) according to that specific market outcome (e.g., \$1 for each unit sold).¹

¹ Spann, Martin and Skiera, Bernd, "Internet-Based Virtual Stock Markets for Business Forecasting", *Management Science* Vol.49, No.10, October 2003, pp. 1310–1326.

Virtual stock markets have been applied in a wide range of situations, ranging from predicting election outcomes to predicting the success of entertainment shows (television shows and movies). In corporate practice, companies including Google and Intel have been associated with the use of predictive markets for different policy situations. The results of early predictive markets have been encouraging. Predictions derived from political stock markets have outperformed opinion polls in terms of forecast accuracy, and their experimentation and use in corporate practice continues to be assessed.

Invitation to Participate

We invite all interested companies and individuals to participate in this research project. Please contact the Principal Investigator, James Short, at jshort@ucsd.edu, for details.

ABOUT ISIC

The Information Storage Industry Center (ISIC) at the University of California, San Diego is a management research program studying the business applications and economics of advanced storage technologies in the corporation. ISIC's program areas include industry studies (competitive dynamics, product innovation & manufacturing, industry structure), business innovation and advanced storage applications (data mining, storage area networks), and the management of storage as an integral part of the firm's IT resource. ISIC works with the Center's StorageNetworking.org community of practice in conducting industry facing, direct observation research.

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