

# Wine.com Case Study

## Wine.com Uses Fusion-io to Make an Elegant, Robust Data Center

*For half the cost of a NetApp upgrade, resource constrained e-Retailer gets a simpler, more powerful, and more reliable system.*

### The Challenge

Wine.com's NetApp system was running at capacity and plagued with poor performance and high latency. They estimated the poor performance of their system resulted in an estimated loss of 15% of sales in 2007. Backups and data mining queries were also incredibly slow, as were data operations, such as order processing. In 2008, they expected a significant number of new customers, which would drastically compound their problem.

They had evaluated a proposed upgrade of their NetApp system that fit their limited budget, but only addressed performance of the backend Enterprise Resource Planning (ERP) system. Also, it would improve order processing performance by a marginal 30%, while doing nothing to help a poorly performing Storefront system that impacted the customer experience. Consequently, adopting the NetApp solution would mean additional upgrade expenditures in the near future.

Additionally, Wine.com did not have in-house expertise to manage the complex NetApp system, so it had to depend on its hosting management company, which in turn had to depend on NetApp for deeper support. Wine.com never felt very comfortable and confident in putting their core databases (their life-blood) into the hands of third party vendors. However, neither did they want to invest in hiring full-time NetApp proficient resources.



### SUMMARY OF BENEFITS

- 4x transaction performance improvement
- 12x improvement to backup / restore and batch processing times
- Simplified system enough to move off-site data center in-house
- Saved enough on hardware to implement full system redundancy
- Slashed system power and cooling costs

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*"Our holiday season went very well and without any problems. In fact, due to the Fusion-io product, we did not have many of the problems that we normally have had this time of the year."*

*Geoffrey Smalling  
CTO of Wine.com*

**FUSION-io®**

## The Solution

Wine.com's Vice President of IT, Sumeet Bansal, saw a video of Fusion-io's presentation taken at Demo Fall 2007 on the Internet. Sumeet felt that, for a web retailer like Wine.com, performance was key to providing a speedy and smooth customer experience and that Fusion-io storage was the holy grail of e-commerce performance and scalability. He checked the Fusion-io web site daily and purchased a test ioDrive as soon as the first devices began to ship. He purchased and deployed additional ioDrives in Wine.com's production system as soon as they completed testing.

Wine.com realized significant benefits, including:

- ***Dramatically Improved Performance.*** Fusion-io resolved both the front-end and backend performance issues completely (see below for details).
- ***Improved Reliability and Availability.*** With the money Wine.com saved over the NetApp upgrade, it purchased four new HP database servers to implement full redundancy for the Storefront and the ERP databases rather than share a single standby. This was a huge bonus in an ecommerce channel where any down-time translated into lost sales.
- ***Simplified the IT Architecture.*** Upgrading the NetApp system would have involved purchasing a great deal more equipment, including disks, cables, switches, and so forth, that would have greatly increased the system's complexity and maintenance workload. The Fusion-io solution greatly decreased their system's complexity.
- ***Reduced Future Capital and Operating Costs.*** As if the performance gains, improved reliability, and reduced complexity weren't enough, the move to ioDrives made it possible for Wine.com to reduce its hosting fees by eliminating complex and bulky NetApp hardware, as well as its power-circuit requirements and monthly power fees.

## DRAMATIC PERFORMANCE AND CAPACITY IMPROVEMENTS

After installing the ioDrives, database testing showed the following improvements:

- 12x improvement on the average WRITE operations
- 14x improvement on the average READ operations
- 12x improvement on the average latency on READs — *from 12ms down to just 1ms*
- 4x improvement of the average latency on WRITEs — *from 4ms down to 1ms*
- Storage capacity for up to three years projected growth

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## PROOF IN PRACTICE

While the database testing clearly shows the databases are running faster, the proof, as they say, is in the pudding. Wine.com recorded metrics of its actual use during the 2008 Christmas Season. The results speak for themselves.

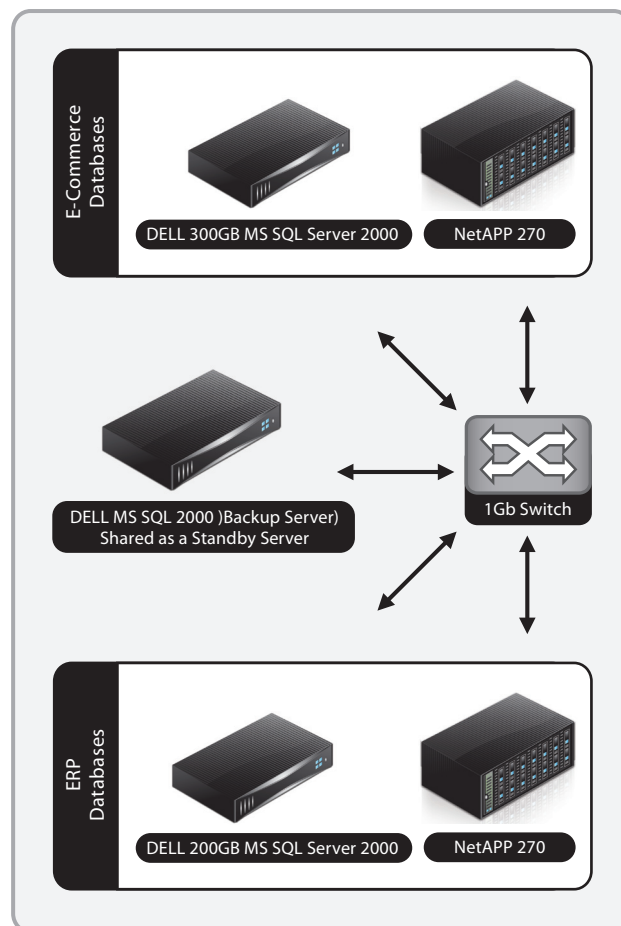
METRIC	LEGACY	POST ioDRIVE	IMPROVEMENT FACTOR	CUSTOMER IMPACT
Average duration of an SQL transaction	345ms	88ms	4 times	Web pages load faster, improving the customer experience, which leads to higher sales conversion rates.
Time for full backup of the largest database	2 hours	6 minutes	20 times	There is no perceived impact of competition for I/O resources during backup procedures. The window in which this competition occurs in is much smaller.
Time to restore a full backup of the largest database	3 hours	15 minutes	12 times	Faster recovery time means less loss exposure in the event of a major outage.
Average number of read/write operations waiting in a queue to complete	0.4	0.008	50 times	Customers compete with other customers for resources much less frequently.
Number of transactions in one hour window that took more than 500 milliseconds	3011	163	18 times	Web pages load faster, improving the customer experience, which leads to higher sales conversion rates. Also, the system can support more cart transactions per second.
Time taken to post a batch of 100 invoices	120 seconds	10 seconds	12 times	Financial team could work through the holidays, allowing for faster analysis of the year's performance and the health of the company (inventory, AP, and AR).

## Changes to the System

### SYSTEM BEFORE

Wine.com's previous infrastructure consisted of:

- 1 Dell 300GB MS SQL Server 2000 Storefront database, storing data on a NetApp 270 disk array
- 1 Dell 200GB MS SQL Server 2000 ERP database, storing data on a NetApp 270 disk array
- 1 Dell MS SQL Server 2000 Standby database, shared by the E-Commerce and ERP databases
- All appliances communicated through a 1Gb Ethernet switch





## SYSTEM AFTER

The new system changed as follows:

- All databases communicating through a 1Gb Ethernet switch
- Moved the databases from Dell to HP DL380G5 servers
- Added redundant HP DL380G5 database servers for the Storefront and ERP systems
- Added four 320GB ioDrive® devices as RAID 1 to the primary Storefront database server and two 320GB devices to the redundant, secondary database server
- Added four 160GB ioDrive® devices as RAID 1 to the primary ERP database server and two 160GB devices to the redundant, secondary server

## About the Customer

Wine.com is an online wine retailer based in San Francisco, California. The company reaped an estimated \$45 million dollars in sales in 2008 to become Internet Retailer Magazine's top online wine store in terms of revenue, a title it has held for four years. It also celebrates its ranking as the world's most visited wine website by comScore Media Metrix. Its mission is to be the ultimate resource for the wine enthusiast.

