



## Acceleration of VMware ESX and Oracle Data Warehouse

“GridIron helped us achieve three key goals: improve application performance, reduce data center costs and footprint, and extend the life of existing storage infrastructure.”

Dave Zavatson, Data Center Manager at UC Davis

### Challenge

Achieve denser VMware server consolidation while both increasing application performance and lowering costs

### Environment

- ▶ EMC Clariion CX4-240 with 117 TB capacity
- ▶ Oracle 11g on Sun Sparc T5220
- ▶ VMware vSphere 4.1 on eight Dell 710s and VDI on two Dell M710HD
- ▶ Brocade 5100, 5000, 3900

### Solution

- ▶ Two GridIron GT-1100A TurboCharger™ appliances in an active-active HA cluster

### Benefits

- ▶ Cost-effectively scaled the virtualized environment to handle twice the number of applications without compromising customer SLAs
- ▶ Flexible storage architecture that enables use of higher capacity, lower cost SATA drives while increasing overall application performance
- ▶ Over \$400,000 savings compared to alternatives

### Customer Background

The University of California, Davis is a public teaching and research university located in Davis, California. With over 32,000 enrolled students, UC Davis is ranked as one of the top 10 public universities in the nation. It offers more than 100 academic majors and 86 graduate programs and is a national leader in biological science education.

### Customer Challenge

While well-managed IT organizations are always looking for ways to lower IT costs, the significant cuts in state funding to the University of California system has compelled the UC Davis IT team to cut costs while enhancing the services they provide to their students and staff. The IT team took on the challenge of creating a flexible and scalable IT infrastructure that if realized, could result in lower overall operating costs without negatively impacting customer SLAs. The IT team had already implemented VMware server consolidation in some areas with an eye towards cost-savings and flexibility. However, I/O bottlenecks got in the way of scaling the virtualized environment and achieving greater server consolidation. Upgrading to bigger and faster storage arrays proved cost-prohibitive and counter to their cost-cutting objective. The team also had an immediate mandate to improve the performance of their Oracle data warehouse to comply with a customer SLA. Finally, the new architecture needed to accommodate future Oracle applications and handle greater server consolidation under VMware to take full advantage of the cost savings virtualization offers. UC Davis established that overcoming these issues and meeting their future IT needs required the implementation of a performance tier in their environment.

### GridIron Solution

After evaluating various alternatives, UC Davis determined that the GridIron TurboCharger was the best solution to address their needs. Within hours after installing two GT-1100A appliances in an active-active high-availability cluster, the queries to the virtualized Oracle data warehouse system completed in less than half their original time.

*“GridIron’s innovative I/O acceleration enabled far denser server consolidation and allowed us to realize the full potential of virtualization.”*

Dave Zavatson, Data Center Manager at UC Davis

The GridIron TurboCharger boosts application performance up to 10 times by providing RAM-like access speeds to application data. The TurboCharger is a SAN-attached appliance deployed between the server and storage. It continuously records the data access behavior of applications using Bayesian net analytics and predictively caches the data that is critical to application performance. The I/O requests from applications are fulfilled from the TurboCharger's fast RAM and flash caches with extremely low latencies thus boosting application performance.

The TurboCharger allows you to fully leverage your current storage, servers, databases, applications, processes and personnel resulting in massive cost savings, unlike alternatives that are expensive and often require forklift upgrades.

By implementing a tier 0 storage performance layer in their environment, UC Davis overcame the I/O bottlenecks in their VMware environment. With a pair of TurboChargers serving up to 200,000 concurrent IOPS and 3.2GBps sustained bandwidth with an average latency of under 1 ms, the IT team could significantly increase the server consolidation ratio and realize the full cost-savings potential of virtualization.

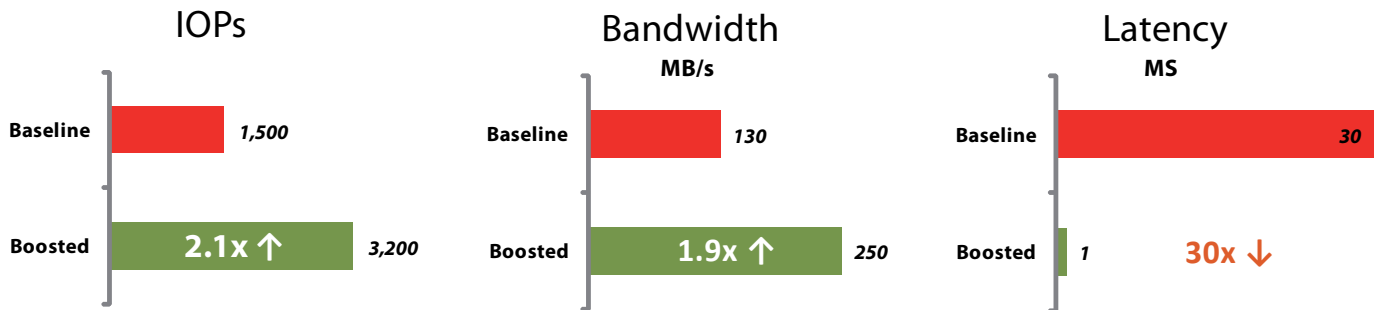
The performance improvements realized by UC Davis included:

- ▶ 30x reduction in application I/O latency
- ▶ 2.1x increase in IOPS
- ▶ 1.9x increase in bandwidth

### Customer Business Impact

The GridIron solution delivered multiple benefits to the virtualized mission-critical application environment at UC Davis:

- ▶ Significantly increased the server consolidation ratio to handle more applications
- ▶ Extended the life of existing storage arrays by increasing the storage utilization AND overall system performance
- ▶ Ability to cost-effectively increase storage capacity using lower cost SATA drives without negatively impacting application performance or customer SLAs
- ▶ Reduced backup windows providing greater user access to applications
- ▶ Savings of over \$400,000 compared to alternatives



**UC Davis Results Measurement—Before and After GridIron**

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