

BUILD PRIVATE CLOUD AND PLATFORM-ON-DEMAND SOLUTIONS

- Increase consolidation ratios while reducing the RAM allocated to Oracle by up to 50% without significant performance impact
- Deliver virtualized databases with performance in the range of 90% of a comparable physical environment running on VIOLIN
- Achieve a massive performance increase over physical or virtual environments running on disk

PERFORMANCE AT SCALE

- Consistent low latency at any scale with any mix of workloads
- Enable private cloud architectures to efficiently use all resources
- Independently scale compute and storage resources as required
- Pay-as-you-grow pricing for non-disruptive capacity upgrades

LOWER TCO

- Decrease power, cooling, and space expense by up to 80%
- Reduce cost per transaction by reducing cores thus a reduction in licensing
- Reduce or eliminate required Oracle Real Application Clusters (RAC) licenses

Virtualize Oracle Databases with VIOLIN All Flash Arrays

Implement successful private cloud and platform-on-demand solutions while increasing performance and reducing total cost of ownership with the VIOLIN All Flash Arrays.

Increasing Demands on Enterprise IT Organizations

In the past, enterprises have relied on IT organizations to implement and support business critical applications such as CRM and ERP, which allow the business to streamline performance and enforce business processes. As the number and importance of these applications have increased over the years, IT effectiveness has grown to be critical to the organization's overall success.

In recent years, a new set of applications has become equally critical. Described as decision support, analytics or business intelligence systems, these applications enable enterprises to predict opportunities and enhance performance by deriving value from the wealth of data stored in their databases. As a result, the number of applications supported by a typical IT organization has grown exponentially, along with the volume of data stored and the number of users requiring access to it.

The Dilemma of Legacy Applications

The inevitable consequence of this exponential growth in application data is an abundance of legacy systems running on disparate architectures. Despite most IT managers striving to implement standards and conformity across their companies, these legacy systems are too expensive to modify and therefore require constant exception to operational guidelines. As a result, operations staff spends excessive time and effort supporting non-standard systems while data center costs spiral out of control. Application performance suffers as data volumes and users grow. The complexity brought about by supporting such diverse environments poses a significant risk to service availability; yet investment in such ailing legacy systems is impossible to justify.

Many CIOs believe the solution is a platform-on-demand or private cloud approach, where each system runs on a consolidated, coordinated infrastructure. Applications and their associated databases are virtualized, bringing huge benefits in terms of agility and manageability, while new opportunities emerge for automation (such as self-service deployment). The enforced standardization of applications entering this platform results in a reduction in complexity and management overhead as well as increasing availability. Most importantly, a reduction in the overall number of physical servers offers massive scope for cost reduction and nowhere is this reduction more obviously seen than in the case of CPU-based software licensing such as Oracle databases.

Technical Challenges

Virtualizing Oracle databases incurs some significant technical challenges. The addition of a hypervisor into the technology stack can have implications for application latency, particularly with regard to I/O operations. Furthermore, by effectively overlaying many different (virtualized) application workloads onto the same physical infrastructure, I/O workloads become increasingly random. Legacy storage systems simply cannot provide the consistent level of performance necessary to deliver value for money in these circumstances given the preponderance of disk seek time. Caching and SSD tiers only serve to make performance less predictable, particularly as the environment scales. CPU utilization falls as processes spend more time waiting on I/O and less time working on CPU. In extreme cases an entire corporate application portfolio can be affected by one application's (or even one user's) demands for data from physical storage.

Another significant challenge is the need to derive measurable cost savings from the private cloud solution. The simplest way to increase the overall return on investment is to increase the density of virtualized applications and databases on the underlying physical infrastructure. Yet, in the case of Oracle databases, there is a major blocker: physical memory. Each Oracle database has a set of memory structures used to store, manipulate and cache data; reducing the size of these structures results in less data being stored in cache, causing a resultant increase in I/O. Some customers attempt to overcome this issue by placing large amounts of DRAM in their servers, but this increases cost and power consumption while offering minimal benefit, as many servers and operating systems are limited in the total amount of memory they can address.

The VIOLIN Difference

VIOLIN addresses the I/O limitations of legacy storage by providing predictable, sustained performance even under peak load. VIOLIN's architecture and patented vRAID technologies ensure that users experience ultra-low, spike-free latency at all times. This enables users to increase productivity and customers to experience better service levels. Decision support and business intelligence systems can process larger amounts of data in shorter spaces of time while analyzing greater levels of detail. The move to a silicon-based storage architecture enables performance to scale on the same level as compute performance.

As a result, you can have extreme performance at a lower \$/TB than disk with the ability to support a mix of workloads with higher concurrency. In addition, VIOLIN's pay-as-you-

grow pricing lets you scale capacity without having to order and install it in advance, which more closely aligns CAPEX with the benefit received. You can non-disruptively grow in scalable capacities from 15 TB to 480 TB capacity.

Through extensive testing with our customers, VIOLIN has demonstrated that Oracle memory components can be reduced by up to 50% without significant performance impact. Additionally, the move from disparate physical architectures to a consolidated virtualized solution results in substantial cost reduction benefits as well as increased agility as customers enable automatic deployment and self-service functionality. After virtualization, customer testing showed that performance remained at no less than 90% of baseline tests conducted on the same VIOLIN solution. As a result, the density of virtual to physical environments was doubled in comparison to tests performed on non-VIOLIN storage infrastructure.

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