

ACCELERATING ORACLE DATABASE WITH SMART FLASH CACHE AND VEXATA VX-100



Vexata VX-100F Scalable NVMe Flash Array Accelerates Oracle Database Environments

- **Breakthrough Economics**

Vexata delivers more throughput and I/O performance for Oracle at lower prices and complexity compared to traditional all-flash arrays (AFAs).

- **Performance at Scale**

Vexata offers a resilient and high-performance enterprise storage solution. Vexata enables the consolidation of multiple simultaneous workloads to one array without sacrificing capacity or performance.

- **Expandable**

Oracle is provided with a NVMe-based storage that scales to PB's and unlocks the full potential of modern solid-state media.

Oracle database drives enterprise digital commerce and as a result, the volume and velocity of these databases has increased by a factor of 10. As data sets grow, the ability to transact and analyze data in real-time becomes limited by the underlying storage environment.

Many customers find that even with all-flash arrays, the storage systems cannot sustain sufficient IOPS and throughput performance as the system capacity scales. Moving to an in-memory application many times is not feasible because of the cost, scaling limits and volatile nature of DRAM based systems. Many customers have discovered Oracle Database Smart Flash Cache as an alternative method to improve performance without re-architecting their database platforms. Unfortunately, many all-flash arrays do not deliver the performance and scale to support Flash Cache across multiple databases.

Vexata VX-100 Scalable NVMe Systems

The VX-100 family of Scalable NVMe Flash Arrays are purpose-built to support large-scale block and file deployments, ideal for high-performance Oracle database applications. Vexata unleashes the performance of NVMe storage to provide applications with storage infrastructure that can be deployed across Gigabit Ethernet or Fibre Channel networks. Vexata's next-generation architecture enables a **dramatic increase in performance at substantially less cost while greatly simplifying the data infrastructure.**

Oracle Flash Cache

In order to meet the growing needs of larger data sets supported with Oracle database environments, infrastructure architects need to deliver consistent performance without keeping all hot objects in buffer cache. For transaction-based workloads, Oracle database blocks are normally loaded into a dedicated shared memory area in main memory called the System Global Area (SGA). Database Smart Flash Cache allows the database buffer cache to be expanded beyond the SGA in main memory to a second level cache on flash memory. In this case, the Vexata VX-100F is used as the second level cache, using scalable NVMe Flash for OLTP I/O intensive workloads.

'Vexata's improved our payroll processing time from over 4 days down to 6 hours using our existing servers.'

VP of IT – Tata Business Systems

Configuring Vexata VX-100 for Smart Flash Cache

Smart Flash Cache offers the ability to non-disruptively accelerate performance for Oracle database environments without having to make configuration changes to the production compute and storage infrastructure. This eliminates the need to add expensive DRAM to the server hosts or having to completely replace the existing production storage array. Flash Cache is very straight-forward to deploy and offers Oracle administrators a simplified method to configure Oracle database systems to deliver higher performance and get the most from their Oracle investments.

Configuration of the Vexata VX-100F for Oracle Flash Cache:

- (1) As shown in figure 1, when Flash Cache is disabled, the Oracle RAC workload is delivered only by the existing array.
- (2) Vexata VX-100F array is non-disruptively configured, then restart the Oracle instances to enable the Flash Cache parameters.
- (3) Flash Cache warms up and I/O transitions to the high performance Vexata array, primary array maintains production repository.
- (4) As shown in Figure 2, the performance of the Vexata array increases RAC performance to more than 21GB/s of throughput.



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Oracle Flash Cache Performance Configurations

The Oracle 4 node Real Application Cluster (RAC) configuration is connected via 32Gbps Fibre Channel to the existing primary storage system. The Oracle RAC host configuration consists of Intel Xeon (Skylake) CPUs with 28 cores per socket and 512GB RAM equipped.

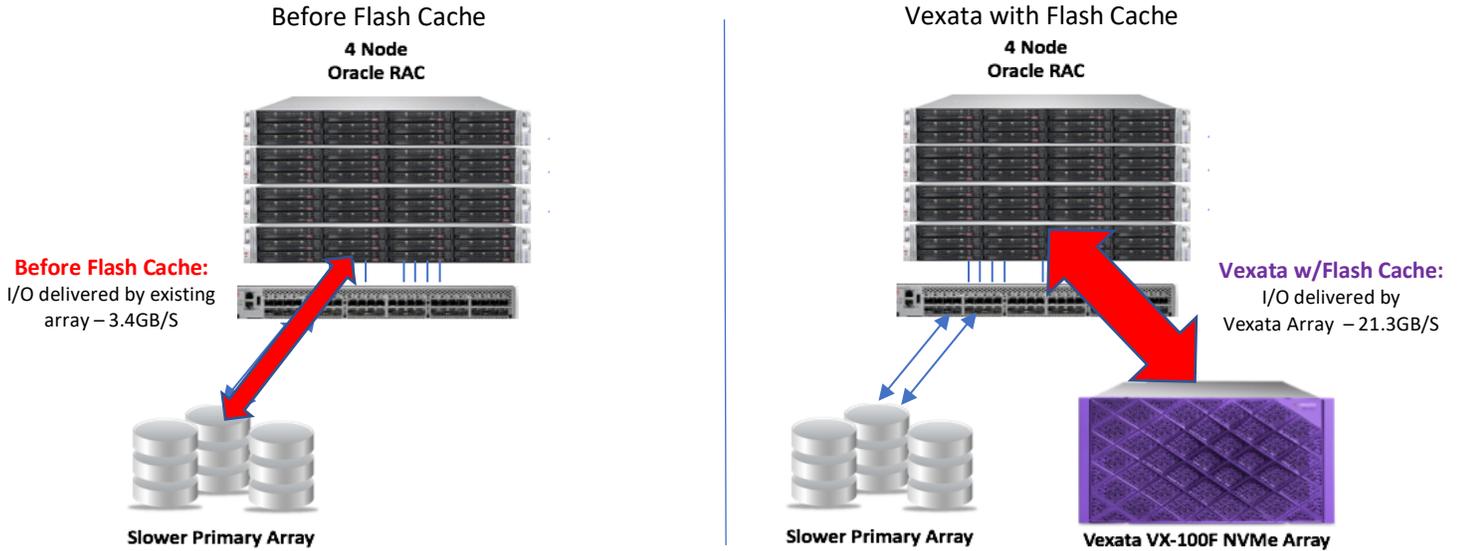


Figure 1: Configuration of Vexata Array for Smart Flash Cache

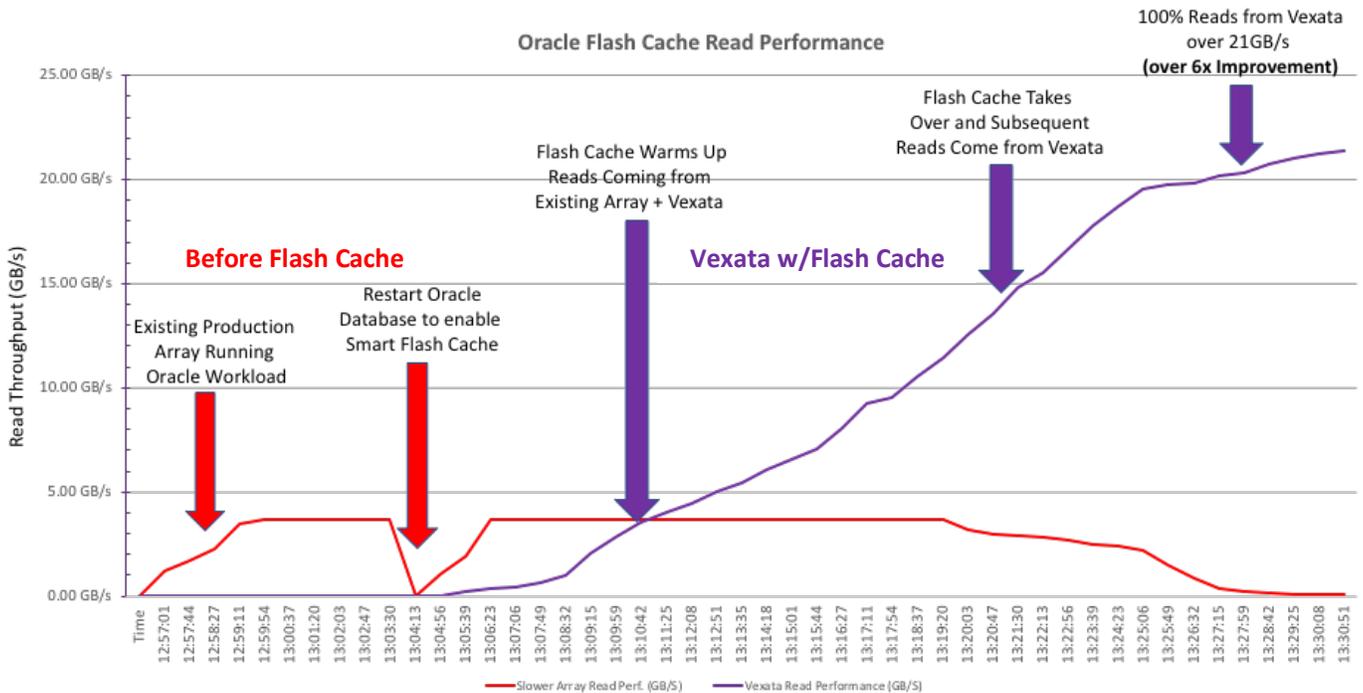


Figure 2: Oracle RAC Read Throughput Performance with Smart Flash Cache and Vexata VX-100F

With seamless addition of Vexata into the SAN, data is evicted from the buffer cache, I/O is now cached onto the Vexata array, providing risk-free performance acceleration to Oracle database environments. The primary array remains as the production repository, with the cache being transparent to the database and primary storage operations. For the test cases documented here, the throughput increased from 3.4GB/s to over 21.3 GB/s (over 6x improvement!).

About Vexata: Founded on the premise that every business is challenged to deliver cognitive, data-intensive applications, Vexata delivers 10x performance AND efficiency improvements at a fraction of the cost of existing all-flash storage solutions.