

# A New Way Forward for Mission Critical Enterprise Databases: Dell EMC™ VxFlex Family

## Executive Summary

### Insistent Innovation: Introduction

Today's mission-critical enterprise databases support essential applications for large organizations. Platforms have to deliver the highest performance, address exponential growth, and must be easy to use so SLAs are met. Without the right platform, growth and responsiveness aren't what they should be.

Many organizations find that Hyperconverged infrastructure is a great solution for enterprise database requirements. In particular, the Dell EMC VxFlex Family with 12Gb/s enterprise SAS SSDs from Toshiba Memory solves performance, SLA, and growth issues other platforms can't. In this executive summary, you'll see that Dell EMC VxFlex solutions unlock new IT transformation possibilities for organizations that demand the best.

### Exploring the Dell EMC VxFlex Family

The VxFlex Family of Hyperconverged infrastructure combines clustered compute, storage, and networking nodes that deliver flexible and scalable performance with capacity on demand, powered by high-performance drives, including Toshiba Memory PM5 Series 12Gb/s enterprise SAS SSDs.

VxFlex offers many advantages over traditional IT infrastructure, including:

- **Massive Scale** VxFlex OS can scale from three to 1024 nodes to handle exponential growth or consolidate multiple databases.
- **Extreme Performance** Every device in a VxFlex OS storage pool is used to process I/O operations with minimal system overhead.
- **Supreme Elasticity** Storage and compute resources can be increased or decreased whenever the need arises – and capacity/performance is added non-disruptively.
- **Incredible Density** Since each node delivers compute, storage, and added bandwidth, it achieves incredible density, with operating efficiencies to match.

The VxFlex Family is ideal for high-performance, latency sensitive, mission-critical databases and is a powerful way to support new and existing workloads.

### Powered by Toshiba Memory PM5 Series 12Gb/s Enterprise SAS SSDs

Online transaction processing (OLTP) workloads need high transactional performance and low consistent latency for an optimal user experience, and Toshiba Memory PM5 Series 12Gb/s enterprise SAS SSDs are the right

**TOSHIBA** **DELL**EMC

choice for these applications. These drives offer the rich feature set needed by organizations that rely on very large OLTP databases for critical business functions.

1. **Performance:** The PM5 Series provides the highest levels of reliability and performance - up to 82% higher performance over the previous generation.
2. **Reliability:** Providing data protection, data integrity, and availability, PM5 Series SSDs features include power loss protection, end-to-end data protection, and dual-port support. These drives keep applications running, protecting systems from downtime, drive failures, and data loss.
3. **Quality of Service:** Toshiba Memory's PM5 Series delivers superior performance, consistency, and Quality of Service through Multi-Stream Write technology.
4. **Data security:** PM5 Series SSDs offer a broad range of security options, from no encryption to full FIPS 140-2 certification, without any performance impact.

In short, Toshiba Memory drives are an essential part of our tested VxFlex solution. They support the critical requirements of performance, reliability, and scalability needed for enterprise databases.



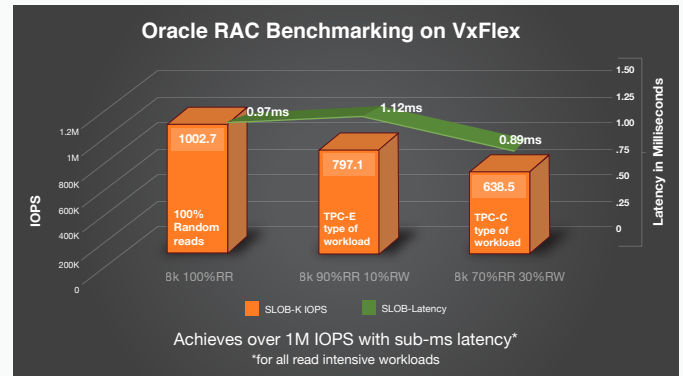
## Proving the Value: Testing Overview

Cloud Evolutions, commissioned by Dell EMC and Toshiba Memory America, conducted a series of tests on a VxFlex Ready Node cluster. We simulated the demands of very large OLTP workloads, IO characterization using SLOB Oracle RAC database benchmarking, examining both latency and IOPS, to prove that VxFlex could handle the most demanding workloads.

## Proving the Value: Exploring the Results

### Oracle RAC benchmarking: Smaller footprint exceptional performance

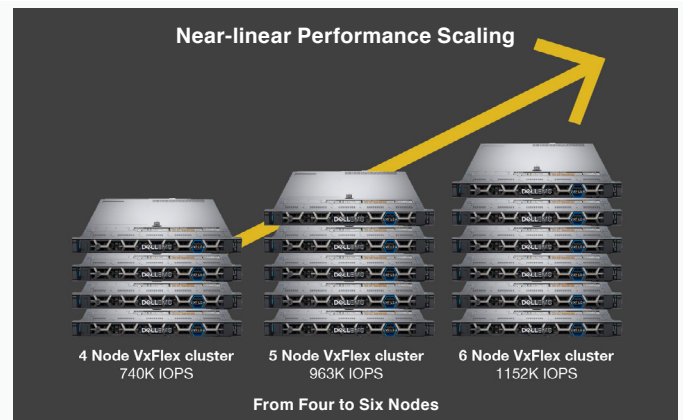
We conducted performance benchmarking of Oracle RAC database using industry standard tool, SLOB. We ran real Oracle RAC database transactions and observed that Dell EMC VxFlex with Toshiba Memory PM5 Series 12Gb/s enterprise SAS SSDs could sustain over 1 million IOPS\* with sub-millisecond latency\* on a 6-node cluster. These results demonstrate how the VxFlex platform, with a small 6U footprint, delivers exceptional performance while consuming just 41% of the combined CPU resources per node. This throughput performance is visibly seen even when we ran TPC-C/TPC-E type of workloads as shown in the chart. This is the value that customers will gain from this platform and can be confident that the platform has the ability to perform and has the headroom to let organizations grow with the demand.



### VxFlex Near-Linear Performance Scalability

We executed the baseline performance tests on a 4-Node configuration, then continued performance testing while adding additional nodes. Results from this test showed almost linear performance scaling, which delivers more than enough headroom for unpredictable workload demands, giving organizations added versatility.

Organizations also want to avoid bottlenecks and diminishing returns as they expand their platforms over time. Our testing showed that the VxFlex HCI architecture, supported by Toshiba Memory PM5 Series SAS SSDs, scales performance near-linearly as nodes are added, leveraging drive performance without architectural bottlenecks.



## Proving the Value: Why the Results Matter

**Solving Performance:** To put it simply, a 6U VxFlex cluster delivers high levels of performance at 1M IOPS, very low latency, and still has responsiveness even under massive load due to the advantages of the Toshiba Memory PM5 Series SSDs. Can your existing platform do this in 6U? Would your DBA be happy with this combination of high performance and low latency? Of course they would.

**Addressing SLAs:** This solution also helps you to meet SLAs. It's easier to deploy, monitor, manage, and maintain. Also updates and patches to VxFlex components are streamlined and completely automated. Adding a new node is non-disruptive, giving you closer to just in time provisioning. Meeting SLAs is easy.

**Dealing with Growth:** VxFlex low latency, high IOPS, and low CPU utilization translate into excellent headroom, giving your administrator

room to grow as needed for database expansion or consolidation. The family architecture also delivers near-linear scale, providing organizations new ways to cope with data growth, demands of new workloads, or workload consolidation.

## Conclusion

Enterprise database applications support essential business operations, and without the right platform, database growth and responsiveness aren't what they should be. With VxFlex, coping with massive databases is easy, and dealing with exponentially increasing data, the need to scale without administrative complexity, and hardware or software bottlenecks are no longer concerns. VxFlex HCI, supported by the Toshiba Memory PM5 Series 12Gb/s enterprise SAS SSDs, offers the highest levels of performance and scale to help you meet SLAs for one of the most challenging workloads\*.

To learn more, visit Dell EMC at [dell.com/vxflex](http://dell.com/vxflex)

[cloud-evolutions.com](http://cloud-evolutions.com)

\*Testing conducted under laboratory conditions using synthetic benchmark tools, real-world performance may vary.

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