Enterprise Strategy Group | Getting to the bigger truth.™

High Performance for HCI Workloads with Dell EMC VxRail & Intel Optane Persistent Memory

Dell EMC VxRail hyperconverged infrastructure (HCI) configured with Intel Optane persistent memory (PMem) enables high performance for HCI workloads. With Intel Optane PMem, performance-intensive workloads gain the benefits of memory-like performance, persistent storage, and scalability. ESG validated performance testing with VxRail using Intel Optane PMem in App Direct Mode.

The Current State

HCI offers efficiency, management, flexibility, and TCO benefits.

However, organizations have avoided putting applications that need consistent high performance on HCI because of performance concerns.

Real-time analytics, online transactions, content delivery, in-memory databases, and high-performance computing cannot afford to suffer the "I/O blender effect" in which consolidated, virtualized workloads suffer performance degradation.

The Solution

Dell EMC VxRail models E560, E560F, E560N and P570, P570F, P580N now support Intel Optane PMem for performance-intensive workloads.

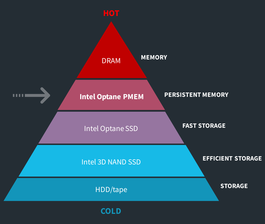
- Second Generation Intel Xeon Processors
- RAM
- Intel Optane persistent memory
- Redundant power and cooling
- Network Connectivity 1/10/25Gbps
- Hybrid or All-flash disk packs

How It Works

PMem is installed in the memory channel and provides a new performance tier that sits between memory and storage.

KEY FEATURES:

- **High performance and low latency.**
- **Data persistence, so data is retained during power loss or restart.**
- **More affordable than DRAM.**



ESG Validation Results

ESG validated App Direct mode performance and scalability testing using FIO, with a single VxRail host, starting with a single 128GB PMem card.

We validated raw "four corners" performance that showed high IOPS and throughput for small and large block I/O, including more than 1.3M IOPS and more than 5 GB/s throughput.

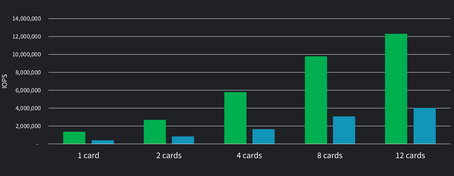
We also validated near-linear IOPS and throughput scalability as the amount of PMem increased from 1 card to 12.

With 12 PMem cards, VxRail achieved 12.3M random read IOPS and 4M random write IOPS, plus more than 69 GB/s read throughput and more than 22 GB/s write throughput.

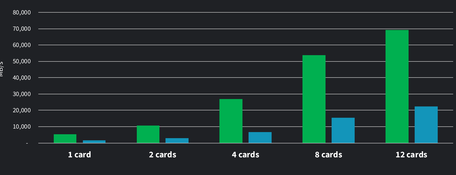
VxRail with Intel Optane PMEM
1 x 128GB PMEM, PMEM-aware NVDIMM

1.37 M 4K IOPS 100% Random Read	**5.2 GB/s** 64K Thoughput 100% Random Read
414 K 4K IOPS 100% Random Write	**1.5 GB/s** 64K Thoughput 100% Random Write

IOPS Scalability
FIO, 1 to 12 128GB PMem Cards



Throughput Scalability
FIO, 1 to 12 128GB PMem Cards



Comparing VxRail with PMem versus VxRail using all-flash VSAN, using a simulated OLTP workload:

93% faster response time

5.3x more IOPS

Comparing VxRail with PMem versus VxRail using all-flash VSAN using with a database workload:

45% faster database log acceleration

This is important because when log writes are slow, they become a choke point that drags down the entire database process, delaying transactions and analysis. The ability to accelerate that process at low cost with a small amount of PMem capacity delivers significant benefit.

The Bigger Truth

Dell EMC VxRail with Intel Optane PMem enables organizations to consolidate more applications, even those with high-performance needs, to gain the deployment and management efficiency benefits that HCI offers. It also expands the range of VxRail-applicable workloads at the core, edge, and cloud. In addition, the ability to start with a small amount of PMem and grow with scalable performance fits with the HCI profile of flexibility and agility. VxRail with Intel Optane PMem offers organizations more transactions, faster insight, and better business decisions while gaining infrastructure and management cost efficiency.

LEARN MORE

Source: ESG Technical Validation, *Dell EMC VxRail and Intel Optane Persistent Memory: Enabling High Performance for HCI Workloads*, July 2020.