

# HPE Cloudline CL3150 Gen10 Servers Power High-Performance Cloud Solutions

Powerful 100Gb Ethernet networking combined with Excelerio NVMe management provides performance and application availability for cloud environments.



## Executive Summary

The HPE Cloudline CL3150 Gen10 server is a 1U **open standards-based** ultra-dense storage server, **ideal for performance demanding cloud applications**. This server supports up to 24 NVMe solid state drives (SSDs) providing very high-performance and plenty of capacity to meet ever-growing needs. This server is also designed for the AMD EPYC™ 7000 series processor, offering strong performance at a competitive price.

These servers are powered by AMD EPYC processors that provide up to 32 cores, 64 threads, and 8 memory channels per socket. These processors also provide 128 PCIe 3.0 lanes, providing cloud environments with direct support for many high performance NVMe storage devices and eliminating performance bottlenecks found in other architectures.

This cloud data center solution provided by a combination of hardware and software from HPE, Mellanox, and Excelerio is an **easy-to-manage, scalable solution** designed to provide high performance at a competitive price point. Using the building block approach with an open design specification and off-the-shelf standard components, customers can integrate the latest technology and features into their systems to maximize productivity.

**Latency-sensitive, mission-critical applications will benefit from this solution.**

## Key Findings

### Low Latency Provides Competitive Advantages

- > Minimum write latencies for all YCSB runs were below 100 microseconds ( $\mu$ s) and minimum read latencies were below 50 microseconds.
- > The average latencies for workloads A & B for a database size of 500,000,000 records was less than 250 microseconds ( $\mu$ s).
- > The 99<sup>th</sup> percentile latency for workloads A & B for all database sizes was less than 500 microseconds ( $\mu$ s).
- > The 99<sup>th</sup> percentile latency for workload F (read-modify-write) for all database sizes was less than 750 microseconds ( $\mu$ s).

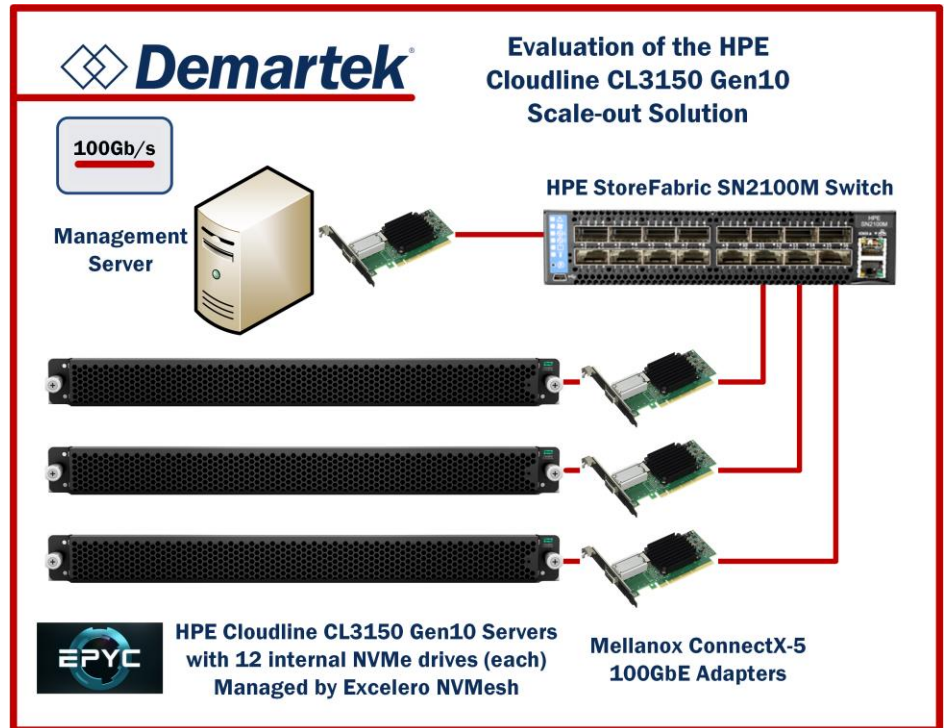
### CPU Architecture Has Plenty of Headroom

- > Single-socket AMD EPYC CPU utilization was less than 50% for 500,000,000-record database for YCSB operations on compute node.
- > For the database of 700,000 records, the workloads completed in less than one minute.
- > One AMD EPYC processor supports 128 PCIe 3.0 lanes which means that 24 NVMe devices have direct access to the processor. This results in maximum performance without an internal PCIe switch or oversubscription of the PCIe lanes.

## Easy Recovery from Compute Node Failure

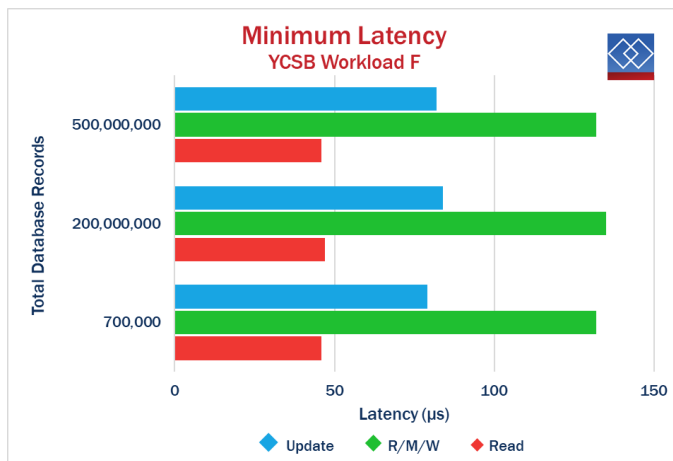
For these tests, the YCSB benchmark was run on node 1 and the data it accessed was on nodes 2 and 3, separating the compute node from the storage nodes. **In the event of a compute node failure** with this type of configuration, the work can be started on a different node without having to move databases.

All the storage traffic from the twelve NVMe drives in each of the storage nodes flowed over our 100GbE network. Based on our measurements, we believe that our results would have been higher with additional network bandwidth available in each server.



## Minimum Latency

Minimum latencies were lower than we have seen for the YCSB benchmarks, below 150 microseconds even for the demanding read/modify/write workload.



## Conclusion

The solution we tested using the HPE Cloudline CL3150 powered by AMD EPYC processors provided very high performance and very low latency, better than we have seen with other implementations of the Yahoo Cloud Serving Benchmark. We believe that this solution would work well in many other cloud data center applications that require clustered server nodes. This solution ensures minimal disruption from node failures by providing very high-speed networking and separating the compute nodes from the storage nodes.

***The AMD EPYC processor in general and the HPE Cloudline CL3150 specifically seem particularly suited for building high performance and resilient Cloud solutions.***

The most current version of this report is available at [http://www.demartek.com/Demartek\\_HPE\\_CL3150\\_Gen10\\_Evaluation\\_2018-02.html](http://www.demartek.com/Demartek_HPE_CL3150_Gen10_Evaluation_2018-02.html) on the Demartek website.

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