



Accelerating Cassandra with Cavium™ ThunderX2® and Micron® NVMe™ SSD Solutions

*Workload results of Apache Cassandra using Cavium ThunderX2
and Micron NVMe SSDs showcase high-performance solution*

Modern web architectures designed for social media, gaming, analytics combined with the growth in mobility demand a database that can handle large amounts and velocities of unstructured data – the database must be flexible, scalable, highly performant and available. Cassandra, an open source distributed database management system, has proven to be the solution to this problem. With a modular architecture that can scale to thousands of nodes and performance that scales linearly, Cassandra is deployed by many of the world's largest web companies and enterprises for a variety of use cases. Some of these include:

- Social media analytics
- Product catalogs/playlist
- Retail applications
- In-app activity tracking and monitoring
- Messaging
- Sensor data (IoT)
- Fraud detection

With Cassandra being deployed at scale, hardware component selection becomes a significant question. To address this, Cavium and Micron recently collaborated to showcase a preconfigured, scalable storage solution that is designed to boost the performance of Cassandra-based databases.

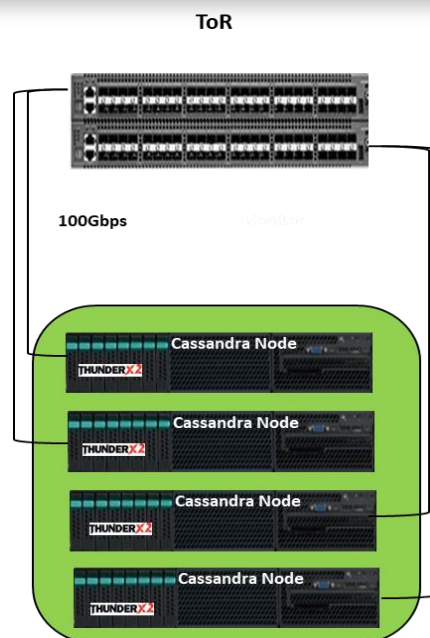
Built using ThunderX2® server platforms from Gigabyte™ and Micron 9200 enterprise NVMe SSDs, the solution workload tests demonstrate an opportunity for organizations to accelerate their Cassandra performance while being cost effective. The cluster configuration comprised of four Cassandra nodes with a 100GbE network between them for data traffic.

ThunderX2®:

Second generation of Cavium's Arm®v8 based server processors supporting dual socket configurations and optimized to deliver the highest computational performance along with outstanding IO connectivity, memory bandwidth and capacity. The ThunderX2 processor family is fully compliant with Arm®v8–A architecture specifications as well as Arm's SBSA and SBBR standards and is widely supported by industry leading OS, Hypervisor and SW tool and application vendors.

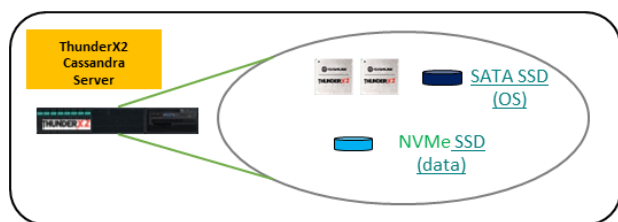
Micron® 9200 NVMe SSDs:

The Micron 9200® NVMe SSD Series is Micron's flagship performance product line. These products utilize a Gen3 PCIe interface, the innovative Non-Volatile Memory Express protocol and Micron's own high-speed NAND to provide high throughput and IOPS, low latency, and consistent quality of service. The 9200-product line has Micron's FlexPro™ firmware architecture which allows you to actively tune capacity to optimize drive performance and endurance and is available in high capacities up to 11 TB.



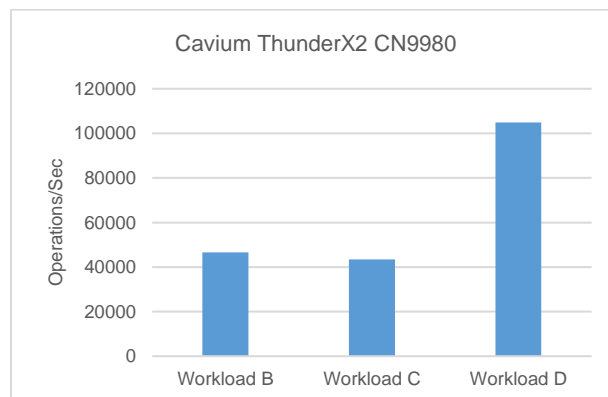
The diagram above shows the cluster setup.

Each Cassandra node uses 1 x Micron 9200 3.2TB NVMe drive and a dual ThunderX2 processors.



For performance demonstration, we ran the popular Yahoo! Cloud Service Benchmark (YCSB) suite, and the results are very compelling. For example, for workload D (read 95%/insert 5%) the benchmark exceeds 100,000 operations/second while the other read intensive benchmarks such as workload B (read 95%/update5%) and workload C

(read 100%) exceed 40,000 operations/second. These results indicate that running Cassandra on the hardware solution has real benefits for customers seeking top performance at scale for applications such as photo tagging, profile caches or status updates



Summary:

Using cost efficient hardware that provides uncompromising performance is a priority for all the internet companies deploying Cassandra at scale. The Cavium ThunderX2 and Micron 9200 NVMe SSD based hardware solution easily satisfies these requirements and should be a top choice for these organizations



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Corporate Headquarters: Cavium, Inc. | 2315 N. First Street San Jose, CA 95131 | 408-943-7100

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