Data Analytics

Mellanox Enables Record Setting Real-time Analytics to Gain Faster Insights From Large Volumes of Data

Mellanox and IBM Integrate OpenPOWER Server and Networking Technology to:

Achieve More Than 1TB/sec Of TeraSort Performance

Attain 33X Faster Per Node Results Than Previous Winner

Deliver 5.8X Greater Performance with 85% Fewer Servers

Sort 100 Terabytes of Data in 99 Seconds

Record Setting Performance Achieved by:

TENCENT

Executive Summary

The landscape is changing for the next generation of data analytics as the capabilities to manage and process large volumes of unstructured data (Big Data) are starting to inundate modern enterprises. Data analytics empower organizations with more accurate and relevant information that helps them make better business decisions, faster. Access to unprecedented volumes of data, coupled with the need to analyze this data quickly brings about new infrastructure challenges. To do it efficiently, a solution must scale to great speeds. The larger the data volumes are, increases requirements for unparalleled high-speed networking and storage performance. This solution brief describes the performance available when configuring advanced analytics platform with OpenPOWER-based servers and networking technology including Mellanox 100Gbps Ethernet Spectrum™ switches, ConnectX®-4 network interface cards and LinkX® cables.

Setting a New TeraSort Record

The TeraSort benchmark is a common technique used to benchmark the performance of the Hadoop cluster environments. It measures the time it takes to sort at least 100TB of data. It is touted as the gold standard of sort benchmarks and since 1987 there has been a sort contest to identify a yearly benchmark record. Tencent, along with Mellanox and IBM, announced that they had set the 2016 Sort Benchmark's annual global computing competition world record. Tencent broke records in the GraySort and MinuteSort categories, improving over last year's results with up to 5.8 times greater performance while achieving more than 1 Terabyte/second of sort performance. In addition, the results were obtained with 85% fewer servers, resulting in a 33 times per node improvement.

Configuration Overview

TencentCloud's record setting environment was architected around high performance OpenPOWER-based servers and networking, featuring high performance storage components. This architecture offers a balanced configuration to manage the compute, storage and networking demands of enterprise scale, advanced analytic clusters. Utilizing 512 servers, each with NVMe-based storage and Mellanox ConnectX®-4 100Gbps
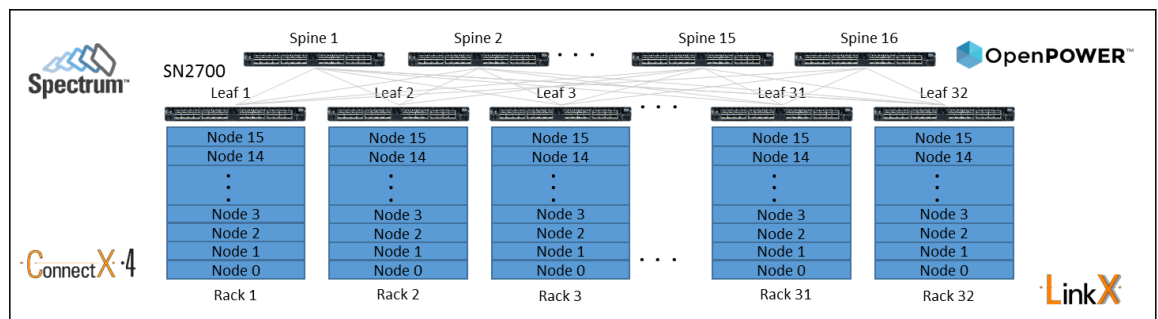

Figure 1. Tencent's TeraSort record breaking configuration utilizes OpenPower servers with 100GbE-based SN2700 switch, ConnectX-4 adapters and LinkX cables

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Ethernet adapters. Tencent has developed its own highly-optimized sort application that is capable of pushing analytic boundaries and reducing the latency and bandwidth of the network, playing a crucial part in setting the record.

Advantages of a Mellanox 100GbE Network

With an increasing need to access data faster to keep pace with IOPS intensive big data workloads, a faster, higher bandwidth network becomes paramount. Network latency becomes crucial for transactional-centric workload to deliver consistently low query latency. With a 100GbE-based network including Spectrum™ switches, ConnectX®-4 adapters and LinkX® cables, Mellanox was able to provide the highest bandwidth and lowest latency to deliver the fastest end-to-end network required for Tencent to achieve the record setting performance.

Spectrum™ switches resolve any bandwidth concern that might arise through the use of NVMe drives, in which a single drive can easily exceed the capacity of a 10GbE network. Capable of moving 6.4Tb/s, and non-blocking, Spectrum switches easily scale and provide unprecedented performance at 100GbE speeds.

While the Mellanox's ConnectX®-4 adapter reduces the CPU overhead in packet processing through advanced hardware-based stateless offloads and flow steering engine to provide efficiencies for analytic workloads and OpenPower-based servers to achieve new performance capabilities.

Conclusion

Achieving more than 1TB/sec of TeraSort performance is an achievement no other company has been able to demonstrate. Leveraging recent advances in CPU, memory, storage and networking through industry leaders like IBM and Mellanox, Tencent was not only able to attain this years record breaking results, but they were able to improve data center space and energy efficiency while handling a demanding workload.

While few enterprise customers require the need for a 100GbE network, many should investigate a move to 25/50GbE which can offer a more efficient and cost-effective network and allows for businesses to future-proof their data center fabrics. After all, it won't be long before more companies have the demands for a 100GbE based network to solve their challenging data analytic problems.

EXPLORE FURTHER

Download the Tencent test result whitepaper:
http://sortbenchmark.org/TencentSort2016.pdf

Read the IBM press release:
http://www-03.ibm.com/press/us/en/pressrelease/51042.wss

View the TeraSort world record results:
http://sortbenchmark.org/

Read the Mellanox blogs:
https://goo.gl/IGfIho

https://goo.gl/ntzH3s

View the Mellanox infographic:
https://goo.gl/vHveYq

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