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Hyperscalers-Dynavisor Cloud Appliance

HYPER SCALERS Pty Ltd. Conducted at HYPER SCALERS Proof of Concept (PoC) Lab 14th May, 2018



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About HYPER SCALERS

Hyperscalers is a next-generation OEM infrastructure provider **Solving** Information Technology's problem, of **Complexity**, simply through **standardization** of best practices, **automation** and **economies of scale**.





1. Executive Summary

The objective of this proof of concept was to build a record breaking Data Center Accelerator Appliance using Dynavisor TorrentPro™.

The Dynavisor appliance uses both the <u>S2S T1</u>, a Tier 1, 4 Node Hyper-Converged server and the <u>S2P</u> <u>T2</u>, a Tier 2, 2-Node Hyper-Converged server. The Dynavisor Appliance was tested and benchmarked using Sysbench to prove storage acceleration capabilities.

TorrentPro[™], from <u>Dynavisor Inc</u>., is a software platform architecture for transparently accelerating storage and network operations and thereby boosting the efficiency of data centers and the cloud.

The appliance utilises the <u>S2P T2</u> storage server running Dynavisor TorrentPro[™] DIOVFS (Dynavisor I/O Virtualization File System) Server and the <u>S2S T1</u> a 4-Node Hyperconverged Compute Appliance running DIOVFS Client. <u>S2P T2</u> is a 4U Storage Server hosting up to 78 3.5" HDD's. <u>S2S T1</u> 2U is a 2U 4-node Cluster-in-a-Box server - four server nodes being clustered via a PCIe interconnection and sharing up to 24 disk drives in a 2U chassis.

The objectives to be achieved using this appliance are to demonstrate:

- Storage and compute Performance measurement of benchmark applications like Sysbench.
- Improvement in DevOps efficiency resulting from higher performance
- Higher ROI resulting from consolidation of compute infrastructure.



Results 8,000 MB /s Read Write Speeds 64GB Data Size

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2. Test Environment

The test environment consists of following hardware and software components:

S2S T1 = 4 Nodes Per Chassis 1.92TB SAS 12Gk QTY -QTY - 32 QTY = 16 QTY - 8 32GB 2400Mhz 50GB OS SSD E5 2630V4 Core SS200 SSD 0000000000000 0000 ******** 1

80 Cores 1024GB RAM | 31TB SSD 12Gb\s | 16 * =25G QSP28+

S2S T1 QuantaPlex T41S-2U

- **4-Node (Only 2 Used)** 2 x E5-2630 v4 CPU
- 256 GB RAM: 8 x 32 GB
- DDR4 DIMM
 150GB Intel SATA SSD (OS)
- 5 x 1.93 TB 2.5" SAS SSD
- LSI SAS 3008 HBA

10G dual port SFP+ Mezzanine

S2P T2 = 2 Nodes per chassis

40 Cores 512GB RAM | 560TB HDD 12Gb\s | 4 * 25G QSP28+

S2P T2 QuantaPlex T21P-4U

- 2 x E5-2630 v4 CPU
- 512 GB RAM: 16 x 32 GB DDR4 DIMM
- 150GB Intel SATA SSD (OS)
- 14 x 8TB 3.5" SAS HDD
- LSI SAS 3008 HBA
- 10G dual port SFP+ Mezzanine

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Figure 1 Appliance Block Diagram

The block diagram in Figure 1 depicts appliance architecture. The DIOVFS Server executes on the T21P server, on top of Ubuntu Server 16.04 operating system. The data path is configured on the 10G Mezz SFP+. Two nodes of the T21S server are configured with DIOVFS Client running on Ubuntu Server 16.04 operating system to measure infrastructure performance through Sysbench fileio benchmark.

3. Appliance use cases

The section details different use-cases which are verified in the Hyperscalers-Dynavisor appliance.

3.1 TorrentPro[™] DIOVFS

TorrentPro[™] is a collection of services that forms a compute fabric across the data centers bringing data closer to applications. DIOVFS, an embodiment of TorrentPro[™], is a storage accelerator, and manifests itself as a distributed network filesystem and is architecturally very similar to popular filesystems like NFS, lustre, gluster, etc. Once DIOVFS is mounted on a directory on the compute node, all storage accesses to that directory get transparently accelerated – the screenshot in Figure 2 shows DIOVFS mounted and ready to use on two directories "/diov1" and "/diov2" on a compute node.

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Figure 2 DIOVFS mounted on a directory in the compute node

3.2 TorrentPro[™] Performance And Benefits

TorrentPro[™] transparently accelerate diverse real-world applications up to 10x without any modification to the applications or operating systems. It primarily relies on a safe data tiering solution which ensures coherency and consistency of data across the data center – while balancing the latency, throughput, capacity and scalability of storage required by high efficiency data centers. It is a hardware agnostic Software Defined Storage architecture and works with storage media of all types.

Higher efficiency compute infrastructures resulting from the deployment of TorrentPro[™] results in data centers with smaller footprint bringing in significant savings on CapEx and OpEx (power, cooling, networking, labor, and real estate). It can help build huge petascale storage out of HDD's while delivering faster-than-flash performance.

TorrentPro[™] facilitates geospatial distribution of data across data centers around the world ensuring high speed, efficiency, and manageability of data.

4. Performance and Accessibility

4.1 Accessibility

The appliance can be accessible to the customers from Hyperscalers Virtual Laboratory using WAP DDNS <u>"http://hyperscalers.asuscomm.com/"</u>. Depending on the customer requirements; the administrator can open a port accessible via DDNS VPN.

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4.2 Performance

Storage throughput on the Hyperscalers-Dynavisor appliance was measured using Sysbench fileio. The following screenshots illustrate the performance delivered on random read/write tests on two data sizes – 64 GB where the data primarily resided in memory, and 512 GB where data accesses is primarily network bound.



Figure 3 Random read/write performance on 64 GB data size

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Figure 4 Random read/write performance on 512 GB data size

With the 64 GB data set, TorrentPro[™] delivered 8 GB/sec storage throughput compared to 62 MB/sec on NFS. TorrentPro[™] transferred a total of 2.4 TB of data (1.92 TB of read, and 0.48 TB of write) over 5 minutes, while NFS transferred a total of 18.6 GB of data (14.88 GB of read, and 3.72 GB of write) in the same time duration. Also, worth noting are the facts that the latencies of each operations are typically 10-20x lower for TorrentPro[™].

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With the 512 GB data set, TorrentPro[™] delivered 3.2 GB/sec storage throughput compared to 51 MB/sec on NFS. TorrentPro[™] transferred a total of 960 GB of data (768 GB of read, and 192 GB of write) over 5 minutes, while NFS transferred a total of 15 GB of data (12 GB of read, and 3 GB of write) in the dame time duration. As in the case of the 64 GB data set, there is marked lowering of latency of storage operations which leads to sustained application throughput even in the presence of networked data.

5. Conclusion

The objective of this PoC was to showcase Hyperscalers-Dynavisor Cloud Appliance as an efficient data center platform based on QCT servers. The appliance delivers high storage and network throughput resulting in transparent acceleration of applications by 10x or more - bringing about significant consolidation of the data center infrastructure, higher efficiency, and significant savings in CapEx and OpEx.