

QxStack vSAN ReadyNode -Solution Brief for MySQL



QxStack vSAN ReadyNode Series- Solution Brief for MySQL

Challenges that enterprises face

In a highly competitive business environment, data collection and data analysis play significant roles in business management and strategy forming. More and more companies use database management systems like MySQL to manage their data. MySQL is one of the popular open source database management systems which offers flexible deployment, on-demand scalability, high performance, and cost-effectiveness open source database solutions. However, establishing and maintaining an infrastructure is not an easy task. Enterprises have to invest lots of time and resources in it. Besides, the database need to be flexible enough to face diverse market situations. With all these challenges, enterprises may wonder: how can I utilize a database management system in a most efficient way? how can I effectively design the datacenter infrastructure to fulfill the diverse business scenarios?

QxStack VMware Edition-vSAN ReadyNode Series

QxStack VMware Edition vSAN ReadyNode Series - a software-defined datacenter solution can address the challenges and provide the benefits below:

- **Hyper-converged infrastructure (HCI):** QxStack VMware Edition-vSAN ReadyNode Series is a solution of hyper-converged infrastructure with the benefits below for customer to greatly save their total cost ownership (TCO).

Management simplification:

In this structure, compute and storage resources are all allocated and managed in x86-commoditized servers which can tremendously simplify the efforts in infrastructure management.

Scalability and efficiency

In software-defined structure, compute and storage resources can be abstracted in one resource pool, greatly enhancing the utility efficiency. With hyper-converged infrastructure, resources can be easily scaled-up and scaled-out by merely adding more drivers or servers. Customers can thus address the changes of marketing environment and business demands.

- **Diverse appliance choice:**

QxStack VMware Edition- vSAN ReadyNode Series provide multiple server options for different scenarios such as production environment, lab environment, file storage use case, etc.

- **All-flash configuration:**

In this solution brief, QCT adopted all-flash configuration in your datacenter because of the following benefits:

With QxStack VMware Edition- vSAN ReadyNode Series, you can

- *simplify your datacenter management and receive great scalability to fulfill diverse business demands.*
 - *increase storage utilization and get better cost performance ratio under all flash configuration.*
 - *save total ownership cost (TCO).*
-

Increased storage utilization

Customers can enable deduplication and compression functions in vSAN, which can reduce up to 7 times of storage space usage. Besides, with single/double parity protection functions in vSAN, customers can protect single/simultaneous point of failure and increase up to 2 times of storage utilization. Both of these two functions and benefits are only available in all-flash configuration.

Attractive cost-performance ratio

SSD can deliver high transactional performance with low power consumption, vigorous endurance, and high reliability. On top of these benefits, the price of SSD has greatly reduced recently and brought better cost-performance ratio.

Testing overview and key results

- Test overview:

Two test items including vSAN scalability test and vSAN SPBM-based test are performed to showcase the benefit of QuantaPlex T41S-2U with all-flash vSAN. In vSAN scalability test, the baseline test and scale-out test are included. In the vSAN SPBM-based test, the performance impact over MySQL virtual machines is evaluated when the deduplication and compression on all-flash vSAN is enabled.

- Test configuration:

Table 1. Hardware Configuration.

Server Model Name		QuantaPlex T41S-2U
Server Nodes		4 Nodes
Property	CPU	(8) Intel® Xeon® processor E5-2690 v3
	Cache	(4) Intel S4600 SATA 960GB 2.5"
	Capacity	(20) Intel S4500 SATA 3840GB 2.5"
	RAM	(64) 16GB DDR4 RDIMM
	NIC	(4) Intel® 82599 dual-port 10G Mezz card
	SATADOM	(4) 32G SATADOM

Table 2. Software Configuration.

Software	Version	Purpose
VMware vCenter Server and ESXi	6.7	VMware vCenter provides a centralized platform to manage ESXi host.
VMware vSAN	6.7	Software-defined storage solution for hyper-converged infrastructure.
Linux operating system	Oracle Linux 7 Update 4	Operation system for MySQL database and load generation virtual machine.
MySQL	MySQL Community Server 5.7.21	Database software
Sysbench Benchmark	0.4.12	Complex OLTP load generator tool

- Testing Result

MySQL on vSAN Scalability Test:

The purpose of this test is to demonstrate the performance scalability in QuantaPlex T41S-2U with all-flash vSAN running MySQL mixed workload.

Scenario 1: Baseline Test - Single VM with Multi Threads

The test thread is scaled from 1 to 32 within one MySQL virtual machine to measure the average transaction per second (TPS) and average transaction response time (ms).

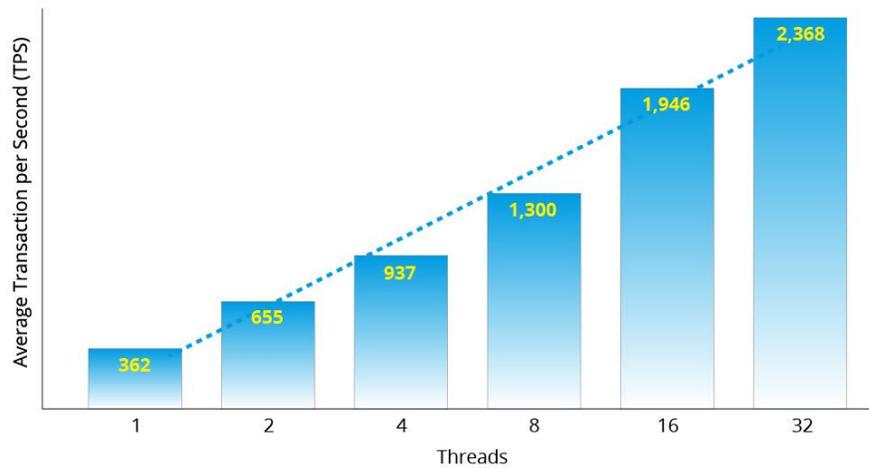


Figure 1. Test Result of SysBench Baseline with Multi-Threads – TPS.

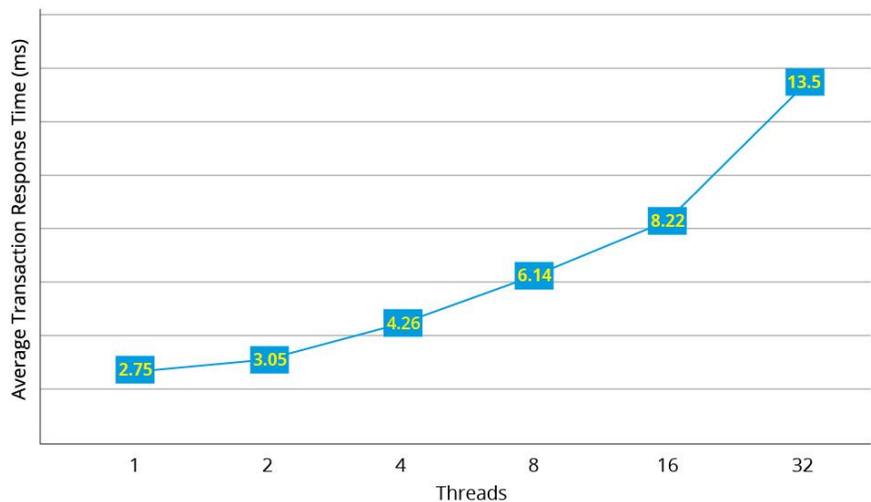


Figure 2. Test Result of SysBench Baseline with Multi-Threads – Average Transaction Response Time in Milliseconds.

Figure 1 and 2 show the scalability performance with the threads scaled from 1 to 32 for running SysBench mixed OLTP workloads on vSAN. As the workload demand increases (thread counts) in a single VM, the average TPS boosts 8 times to 2,368 TPS with the average transaction response time in 13.5 milliseconds.

“As the **workload demands increase** (thread counts) in a single VM, the **average TPS boosts 8 times to 2,368 TPS** with the **average transaction response time in 13.5 milliseconds.**”

Scenario 2: Scale-out Test - Four VMs with Multi Threads

The test thread is scaled from 1 to 32 respectively on four MySQL virtual machines in which the average Transaction Per Second (TPS) is cumulated across different virtual machines and the average transaction response time is measured in each virtual machine.

“ In a single vSAN cluster, as the number of provisioned MySQL virtual machines is increased from one to four, vSAN could deliver up to 6,609 average TPS and the average response time is around 19 milliseconds. ”

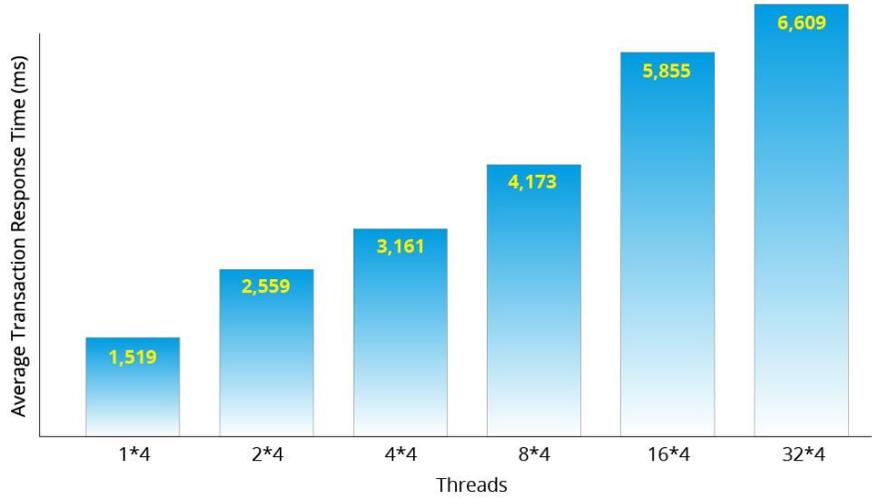


Figure 3. Result with 4VMs Running on SysBench Scale-out Test – TPS.

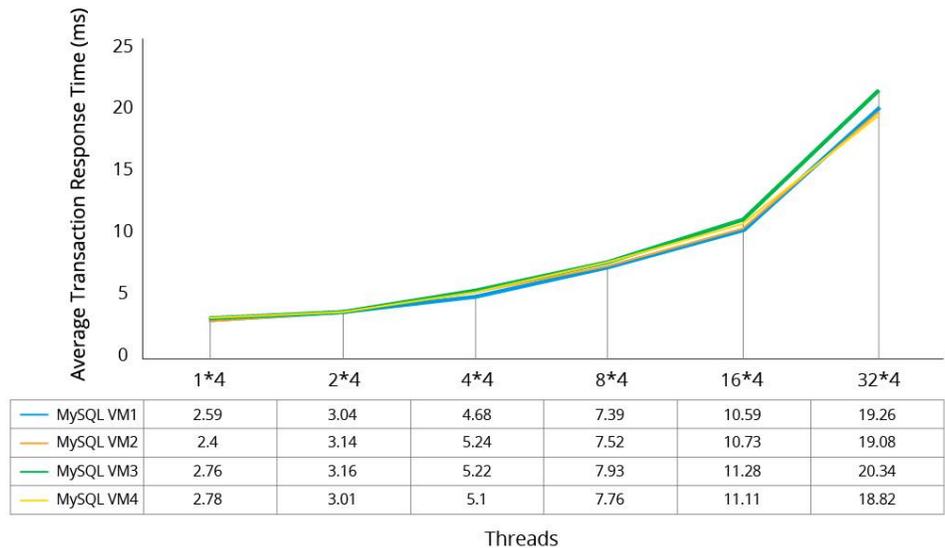


Figure 4. Result with 4VMs Running on SysBench Scale-out Test – Average Transaction Response Time in Milliseconds.

In a single vSAN cluster, as the number of provisioned MySQL virtual machines is increased from one to four, vSAN could deliver up to 6,609 average TPS and the average response time is around 19 milliseconds.

vSAN SPBM Based Test

This test is designed to showcase the vSAN SPBM effect on MySQL performance and capacity.

Deduplication and compression test:

The performance impact over MySQL virtual machines is evaluated when deduplication and compression on all-flash vSAN are enabled. Average Transaction Per Second (TPS), average transaction response time, and the space savings are measured before and after deduplication and compression are enabled.

“The *all-flash vSAN* deduplication and compression can *effectively reduce vSAN capacity consumption* with negligible performance impact for MySQL workload.”

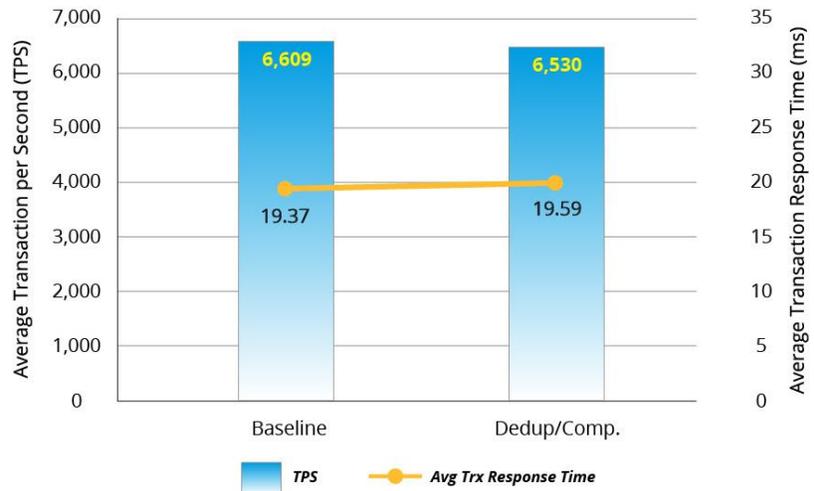


Figure 5. Test Result of Deduplication and Compression.

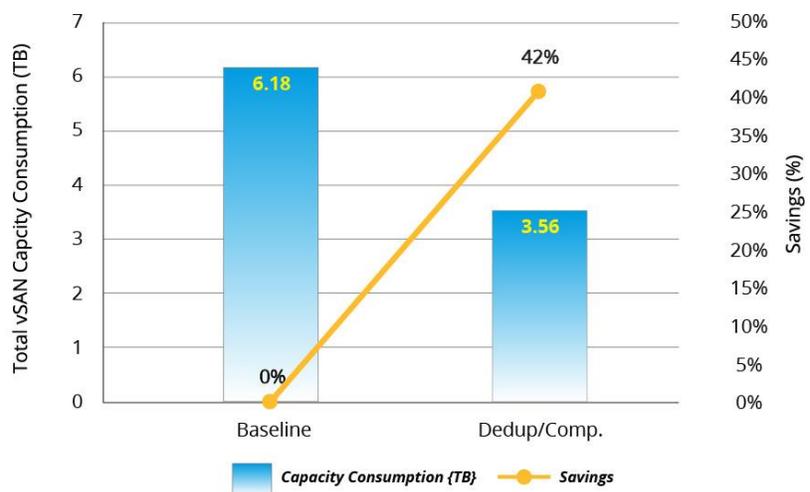


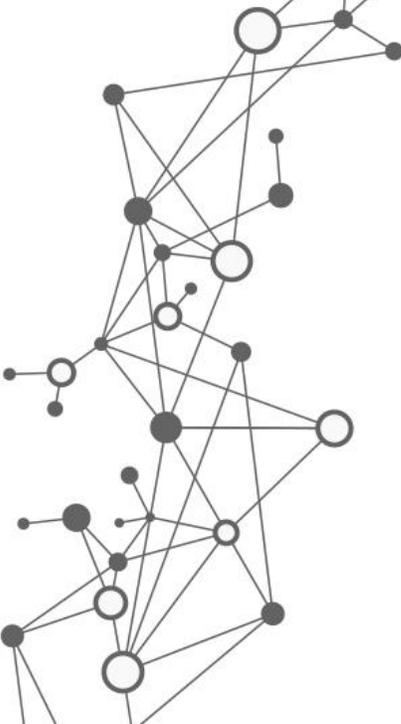
Figure 6. Summary of Space Efficiency.

In baseline test, four MySQL virtual machines running SysBench with 32 threads achieved 6,609 TPS and kept the average transaction response time in about 19 milliseconds. The total space consumption was 6.18 TB with default fault tolerance level.

In Fig. 5, as deduplication and compression on vSAN cluster with the same workload are enabled, similar TPS was observed compared to the baseline. The aggregated TPS reached 6,530 while the average transaction response time is still kept in about 19 milliseconds.

In Fig. 6, significant space savings was observed on the vSAN with deduplication and compression enabled. The capacity consumption is 3.56 TB and reached 42% of saving.

In conclusion, the all-flash vSAN deduplication and compression can effectively reduce vSAN capacity consumption with negligible performance impact for MySQL workload.



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ABOUT VMware

VMware software powers the world's most complex digital infrastructure. The company's compute, cloud, mobility, networking and security offerings provide a dynamic and efficient digital foundation to over 500,000 customers globally, aided by an ecosystem of 75,000 partners. Headquartered in Palo Alto, California, this year VMware celebrates twenty years of breakthrough innovation benefiting business and society.





ABOUT QCT

QCT (Quanta Cloud Technology) is a global datacenter solution provider extending the power of hyper scale data center design in standard and open SKUs to all datacenter customers.

Product lines include servers, storage, network switches, integrated rack systems and cloud solutions, all delivering hyper scale efficiency, scalability, reliability, manageability, serviceability and optimized performance for each workload.

QCT offers a full spectrum of datacenter products and services from engineering, integration and optimization to global supply chain support, all under one roof.

The parent of QCT is Quanta Computer Inc., a Fortune Global 500 technology engineering and manufacturing company.

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