



SOLUTION BRIEF

What do the Latest TPC-H World Record Benchmarks from Cisco, HPE, and Lenovo have in Common? **SanDisk Flash**


Server vendors often promote TPC benchmark world records that have been set using their server hardware. Transaction Processing Performance Council (TPC) is a non-profit organization founded in 1988 to define transaction processing and database benchmarks and to disseminate objective, verifiable TPC performance data to the industry. TPC benchmarks are used in evaluating the performance of computer systems; the results are published on the TPC web site (tpc.org).

The TPC Benchmark™ H (TPC-H) is a decision support benchmark. It consists of a suite of business-oriented, ad-hoc queries and concurrent data modifications. The queries and the data populating the database have been chosen to have broad, industry-wide relevance. This benchmark illustrates decision support systems that examine large volumes of data, execute queries with a high degree of complexity, and give answers to critical business questions. TPC-H is a common benchmark used to compare systems that are used for data warehouse and business analytics solutions. And this now becomes relevant for enterprises looking at systems to power their SQL Server-based data platforms.

SQL Server® 2016 Benchmarks from Cisco and Lenovo

When SanDisk Server partners prepared their high performing, non-clustered systems for TPC-H benchmark testing, they turned to SanDisk and its Data Propulsion Labs (DPL). Focusing on SQL Server 2016, Lenovo and Cisco, working with SanDisk, provided best-in-class storage solutions to help them take top honors in the TPC-H benchmark. The leaders in the 3,000GB category and in the 30,000 GB Category all utilized Fusion ioMemory™ flash to achieve record-setting results.


These partners were able to increase the performance while reducing the Query-per-Hour (QphH) cost by up to one-third. They were able to do this, in many cases, by moving to and utilizing the dramatically improved performance of SQL Server 2016 on flash.

3,000 GB Results								
Company	System	QphH	Price/QphH	Watts/KQphH	System Availability	Database	Operating System	Data Submitted
	Lenovo System x 3850 x 6	969,504	.72 USD	NR	07/31/16	Microsoft SQL Server 2016 Enterprise Edition	Microsoft Windows Server 2012 R2 Standard Edition	03/09/16

In March 2016, Lenovo crushed the previous 3,000 GB, non-clustered record, achieving:

- 35% higher QphH performance
- 33% lower Price/QphH

Lenovo accomplished this utilizing their System x3850 data-center-focused server and **six (6) 3.2TB Fusion ioMemory cards**.


3,000 GB Results								
Company	System	QphH	Price/QphH	Watts/KQphH	System Availability	Database	Operating System	Data Submitted
	Cisco UCS C460 M4 Server	1,071,018	.60 USD	NR	06/01/16	Microsoft SQL Server 2016 Enterprise Edition	Microsoft Windows Server 2012 R2 Standard Edition	05/14/16

Two months later, Cisco took the non-clustered performance lead while reducing the overall cost in the 3,000 GB category. Compared to the previous leader, their system achieved:

- 10%+ higher QphH performance
- 17% lower Price/QphH

The Cisco UCS C460 M4 Server utilized **four (4) 1.6TB Fusion ioMemory cards** in the configuration.

Don't forget about HPE®


3,000 GB Results								
Company	System	QphH	Price/QphH	Watts/KQphH	System Availability	Database	Operating System	Data Submitted
	HPE ProLiant DL580 Gen9 Action Vector 5.0	2,140,307	.38 USD	NR	07/31/16	Actain Vector 5.0	Red Hat Enterprise Linux Server 7.2	06/02/16

Using a Linux offering, Actian Vector 5.0, HPE significantly increased performance and further reduced costs in the 3,000GB category. While hard to compare to Microsoft SQL Server in features and overall enterprise data platform value, it did allow HPE to set a new TPC-H record. Compared to the previous leader, HPE achieved:

- Double the QphH performance
- 37% lower query cost (Price/QphH)

HPE relied on their rock-solid ProLiant DL580 Gen9 server with **six (6) 3.2TB Fusion ioMemory cards from SanDisk**

Blowing Away Big Data

3,000 GB Results								
Company	System	QphH	Price/QphH	Watts/KQphH	System Availability	Database	Operating System	Data Submitted
	Lenovo System x 3850 x 6	969,504	.72 USD	NR	07/31/16	Microsoft SQL Server 2016 Enterprise Edition	Microsoft Windows Server 2012 R2 Standard Edition	03/09/16

Working with SanDisk's DPL team, Lenovo built a single-server system with their high performing System x3950 and the Fusion ioMemory SX350 flash from SanDisk. The single-server system delivered a record-breaking 1 million QphH, the first time a database of this size (30TB) was able to perform at this level.

Performance You Can Rely On

Server vendors turn to SanDisk to deliver the highest-performing data warehouse and business intelligence systems in the industry. And you can see the results. If your SQL Server data platform is critical in powering your business, don't settle. SanDisk flash solutions are proven and relied upon by the industry's best. To learn more, visit www.sandisk.com.

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