TECHNICAL REPORT

90TB DWFT FOR MICROSOFT SQL SERVER 2016 USING 8-WAY SYS-7088B-TR4FT WITH 16 NVME

EXECUTIVE SUMMARY

Supermicro® has collaborated with Microsoft® to develop the first 8-way DWFT Reference Architecture in the industry.

With 16x 2TB NVMe SSD drives, the Reference Architecture based on Supermicro SuperServer® 7U SYS-7088B-TR4FT 8-way system has achieved excellent scores in the DWFT benchmarks, and is certified to be sufficient to host a 90TB data warehouse instance.

Some of the key results are highlighted below:

- Rated User Data Capacity: 90 TB

- Row Store Measured I/O Throughput: 15,393 MB/s

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Supermicro Recommends Windows.

KEY FEATURES

- Eight sockets R1 (LGA 2011) supports Intel® Xeon® processor E7-8800 v4/v3 family (up to 192 cores)

- 192 DDR4 DIMM slots (up to 24TB)

- Configurable for up to 15 PCI-E 3.0 FH-FL slots for 8 GPUs, or optionally up to 16 U.2 NVMe SSD drives and 7 PCI-E slots

- 1 SIOM slot for Ethernet, FC or IB networking options, 1 dedicated RJ45 LAN port for IPMI, 1 KVM port provides 1 VGA port, 2 USB 2.0 ports and 1 COM port

- 12x 2.5" hot-swap SAS3/SATA3 drives via RAID card, 20x 2.5" or 6x 3.5" internal SAS3/SATA3 drives via RAID card

- 8x 9cm hot-swap counter-rotating fans

- 5x 1600W Redundant Titanium Level (96%+) Digital Power Supplies
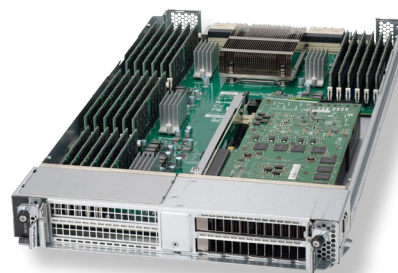
INTRODUCTION TO SUPERMICRO 8-WAY 7088B-TR4FT

Microsoft Data Warehouse Fast Track (DWFT) for SQL Server® 2016 is designed to provide customers optimized and validated system architectures for addressing data warehouse workload challenges including exponential growth of data, demands of lower data latency and faster query response times.

Supermicro has partnered with Microsoft to deliver industry's best performing certified Reference Architecture (RA) for DWFT based on the Supermicro 7U SuperServer SYS-7088B-TR4FT 8-way system, which is the only certified 8-way DWFT solution on the market today.

The Reference Architecture features 8 Intel® Xeon® processor E7-8890 v4 (formerly Broadwell) CPUs with 192 cores, 4TB system memory, and 16 NVMe SSDs totaling 32TB of storage capacity, and is certified to be sufficient to host a 90TB data warehouse instance with the fastest row store measured I/O throughput ever certified.

Figure 1. Supermicro 7U 8-way Reference Architecture for DWFT 2016

Figure 2. 1 of 8 Compute Modules of the 8-way Reference Architecture

DWFT Certification #2016-011	Supermicro 7088B-TR4FT		Report Date: 12/8/2016
DWFT Rev. 5.4	DWFT Reference Architecture		

System Provider	System Name	Processor Type	Memory
SUPERMICRO	Supermicro 7088B-TR4FT	Intel Xeon E7-8890 v4 2.2 GHz (8S/192C/384T)	4096 GB

Operating System	SQL Server Edition
Windows Server 2016	SQL Server 2016 Enterprise Edition

Storage Provider	Storage Information
SUPERMICRO	16x 2TB NVMe for data and tempdb 2x 400 GB SATA-3 SSD for OS (RAID 1) 4x 2 TB SAS3 SSD for log (RAID 10)

Primary Metrics			
Rated User Data Capacity[1] (TB)	Row Store Relative Throughput[2]	Column Store Relative Throughput[3]	Maximum User Data Capacity[1] (TB)
90	522	448	103

Row Store					
Relative Throughput[2] (Queries/Hr/TB)	Measured Throughput (MB/Sec)	Measured Scan Rate Physical (MB/Sec)	Measured Scan Rate Logical (MB/Sec)	Measured I/O Throughput (MB/Sec)	Measured CPU (Avg.) (%)
522	208	6,965	23,821	15,393	76

Column Store					
Relative Throughput[2] (Queries/Hr/TB)	Measured Throughput (MB/Sec)	Measured Scan Rate Physical (MB/Sec)	Measured Scan Rate Logical (MB/Sec)	Measured I/O Throughput (MB/Sec)	Measured CPU (Avg.) (%)
448	2,911	288	N/A	N/A	91

The reference configuration is a 2 socket system rated for 25TB using SQL Server 2014 and the DWFT V4 methodology
[1] Assumes a data compression ratio of 5:1
[2] Percent ratio of the throughput to the row store throughput of the reference configuration.
[3] Percent ratio of the throughput to the column store throughput of the reference configuration.
[*] Reported metrics are based on the qualification configuration which specifies database size and SQL Server memory.

Figure 3. 2U Ultra 90TB DWFT Reference Architecture Certification Results.

FOR MORE INFORMATION

- Supermicro SuperServer
  SYS-7088B-TR4FT Datasheet
  **www.supermicro.com/products/
  system/7U/7088/SYS-7088B-TR4FT.cfm**

- Microsoft Data Warehouse FastTrack
  **www.microsoft.com/en-us/cloud-
  platform/data-warehouse-fast-track**

- Microsoft SQL Server 2016
  **www.microsoft.com/en-us/cloud-
  platform/sql-server**

- Microsoft Windows Server 2016
  **www.microsoft.com/en-us/cloud-
  platform/windows-server**

- Intel® Xeon® Processor E5-2600 v4 Product
  Family
  **www.intel.com/content/www/us/en/
  processors/xeon/xeon-e5-solutions.html**

- Intel® NVMe SSDs
  **www.intel.com/content/www/us/en/
  solid-state-drives/solid-state-drives-ssd.
  html**

SUPERMICRO MICROSOFT CERTIFIED SOLUTIONS

Supermicro and Microsoft have partnered together to deliver industry leading "fully certified solutions" on highly optimized and flexible Supermicro server and storage Systems. Supermicro systems are designed to provide significant advantage in the areas of power efficiency, performance and overall system optimization. These design principles coupled with bringing innovative technologies at an accelerated pace drives time to market value for Microsoft Solutions. In case of some of these disruptive technologies like NVMe, Supermicro is an established leader with the broadest range of products that customers can choose from.

Microsoft Certified Solutions running on Supermicro hardware include Windows Server, SQL Server Data Warehouse, Exchange Server, Hyper converged solutions like Storage Spaces Direct, Storage Server and Azure Stack. These solutions are optimized for Enterprise, Hybrid Cloud, Private and Public Cloud markets. We also deliver the Windows operating system software preloaded for fast growing SMB and Enterprise customers.

Supermicro has consistently innovated in the areas of designing server boards, chassis, highly efficient power supplies, networking equipments and storage systems. The building block approach is one of the key innovations to server system architecture. This vertically integrated design approach accelerates the delivery of application optimized Microsoft Solutions based on customer requirements.

SUPERMICRO SQL DWFT CERTIFIED REFERENCE ARCHITECTURES

Drive impact in your business using the power of a robust, cloud-enabled SQL Server 2016 database solution that offers enhanced performance, robust security, cloud enablement, and deeper insights across multiple types of data.

- 90TB DWFT For Microsoft SQL Server 2016 Using 8-Way SYS-7088B-TR4FT
  with 16 NVMe
  www.supermicro.com/white_paper/90TB_DWFT.pdf

- 70TB DWFT For Microsoft SQL Server 2016 Using 2U Ultra 2028U All NVMe
  www.supermicro.com/white_paper/70TB_DWFT.pdf

- 40TB DWFT For Microsoft SQL Server 2014 Using 2U Ultra 2028U All NVMe
  www.supermicro.com/white_paper/40TB_DWFT.pdf

- 22TB DWFT For Microsoft SQL Server 2014 Using 2U Ultra 2028U Hybrid
  NVMe/SAS
  www.supermicro.com/white_paper/22TB_DWFT.pdf

About Super Micro Computer, Inc.

Supermicro® (NASDAQ: SMCI), the leading innovator in high-performance, high-efficiency server technology is a premier provider of advanced server Building Block Solutions® for Data Center, Cloud Computing, Enterprise IT, Hadoop/Big Data, HPC and Embedded Systems worldwide. Supermicro is committed to protecting the environment through its "We Keep IT Green®" initiative and provides customers with the most energy-efficient, environmentally-friendly solutions available on the market.

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