# SUPERMICRO A+ SERVER AS -1124US-TNRP EXTENDS OLTP PERFORMANCE LEADERSHIP WITH TPC® BENCHMARK® (TPC-C)

*Supermicro AS -1124US-TNRP Powered by AMD EPYC™ 7003 Series Processors Excel at Database Performance*

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*Supermicro AS -1124US-TNRP Server*

## Introduction

The TPC Benchmark® C (TPC-C®) is a server benchmark that measures online transaction processing (OLTP) performance. TPC-C consists of a set of basic operations that exercise system functionalities in a complex OLTP environment. TPC-C benchmark provides a representative wholesale supplier with several geographically distributed sales districts and associated warehouses to model an order fulfillment system where the database receives requests for data, adds new data, and makes multiple changes to the data from a large number of users. The primary metrics are:

- Transactions per minute (expressed as tpmC).

Supermicro (Nasdaq: SMCI), the leading innovator in high-performance, high-efficiency server and storage technology is a premier provider of advanced server Building Block Solutions® for Enterprise Data Center, Cloud Computing, Artificial Intelligence, and Edge Computing 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.

- The associated price per transaction (expressed as $/tpmC).

The tpmC metric measures how many New-Order transactions per minute a system generates while executing business transactions under specific user response time requirements.

## World Record Performance

Independent testing performed by Telecommunications Technology Association (TTA)[2] yielded a world-record performance of 507,802 tpmC on Supermicro A+ Server 1124US-TNRP servers powered by 3rd Gen AMD EPYC™ processors, which is ~33% faster compared to 2nd Gen AMD EPYC™ processor-based server[1]. Please see Table 2 below for detailed results.
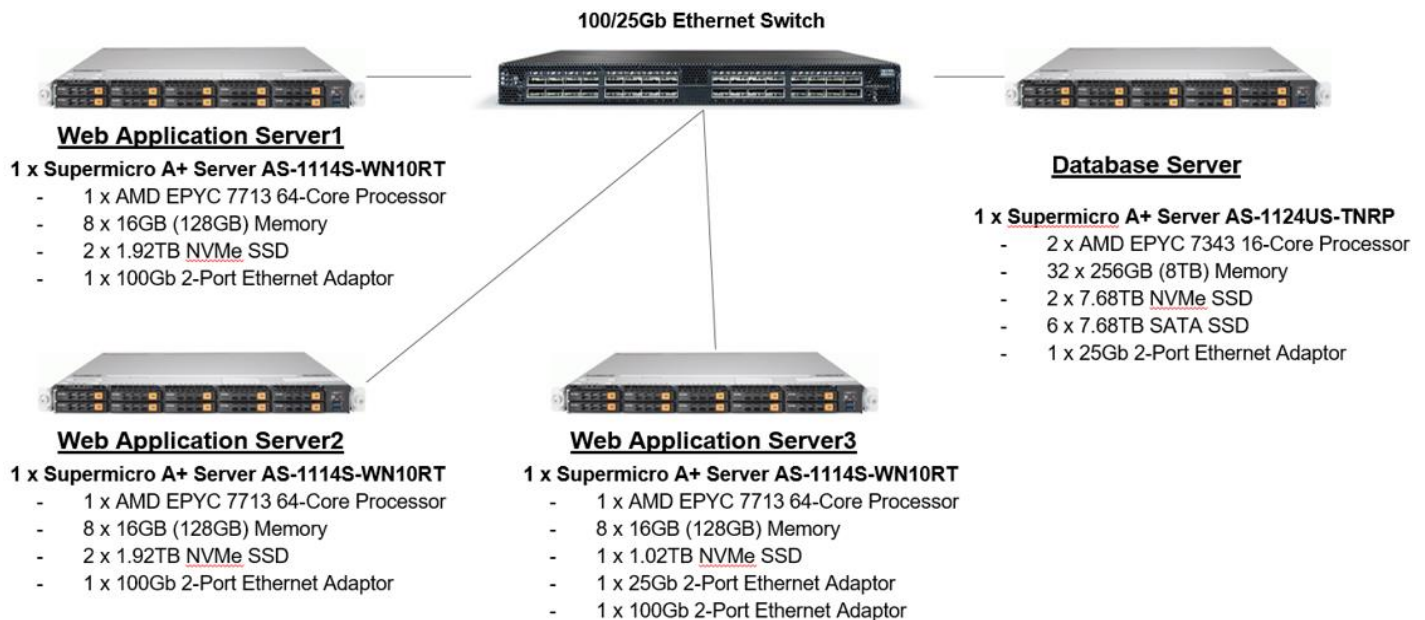
## System Under Test (SUT)



Figure 1: Supermicro TPC-C (SUT)

## Cluster Configuration

| BENCHMARK CONFIGURATION | | |
|---|---|---|
| | **Database Server** | **Web Application Server** |
| **Hardware** | 1 x  Supermicro A+ Server AS -1124US-TNRP<br><br>• 2 x AMD EPYC™ 7343 (2x16 Cores)<br>• 8 TB DDR4-2933 MHz (32 x 256 GB)<br>• 2 x 7.6 TB PCIe® Gen4<br>• LSI LOGIC SAS-3 3108 MEGARAID CONTROLLER<br>• 6 x 7.68 TB SATA connected to LSI 3108<br>• 1x Supermicro  AOC-MCX4121A-ACAT Dual Port 25GbE SFP28 NIC | 2 x  Supermicro A+ AS -1114S-WN10RT Server Each with:<br><br>• 1 x AMD EPYC™ 7713 (64 Cores)<br>• 128 GB DDR4-2667 MHz (8x 16 GB)<br>• 1 x 1.92 TB PCIe Gen4<br>• 1x Supermicro AOC-MCX516A-CDAT Dual Port 25GbE SFP28 NIC |
| **Software** | Goldilocks v3.1  Standard Edition<br>Red Hat® Enterprise Linux® Server Release 8.3<br>Red Hat JBoss Web Server | |
| **Network** | 1 x Mellanox® SN2700 100GbE Open Ethernet Switch | |

Table 1: Hardware and Software Stack

## Benchmark Workload

TPC-C provides verifiable online transaction processing (OLTP) performance, price-performance, and availability metrics for a complex compute OLTP environment where a population of users runs and executes business transactions against a database. Effective OLTP systems require both large memory capacities to support large datasets and high-performance compute and storage resources. Supermicro A+ Server 1124US-TNRP's world record TPC-C result leverages 3rd Gen AMD EPYC™ support for up to 8 TB of high-speed DDR4 memory per socket to demonstrate excellent OLTP performance with a database using large datasets with the support of large memory capacity. TPC-C also allows direct comparison of different software and hardware solutions for complete OLTP environments.

## High Per-Core Performance

Match core count with application needs without compromising processor features. The Supermicro A+ Server 1124US-TNRP powered by 3rd Gen AMD EPYC™ processors built with 7nm technology offers a consistent set of features across a range of choices from 8 to 64 cores, including both 128 lanes of PCIe® Gen 4 and 8 memory channels with access to up to 4 TB of high-speed memory. The balanced set of resources found in 3rd Gen AMD EPYC™ processors allows users to right-size server configurations to their workloads. In addition, 3rd Gen AMD EPYC™ includes models that offer high per-core performance

optimized for frequency-sensitive and single-threaded workloads, which can help optimize TCO for core-based software licenses.

## Results

Table 2 shows the detailed test results.

| Configuration | cores-per-chip / # of sockets | CPU Model | Memory | tmpC |
|---|---|---|---|---|
| Supermicro A+ Server 1124US-TNRP | 24 / 2P | 2$^{nd}$ Gen AMD EPYC™ 7F72 | 16 x 256GB (4TB) | 380,475 |
| Supermicro A+ Server 1124US-TNRP | 16 / 2P | 3$^{rd}$ Gen AMD EPYC™ 7343 | 32 x 256GB (8TB) | 507,802 |
| | | Cross-generational Performance Gain | | ~33% |

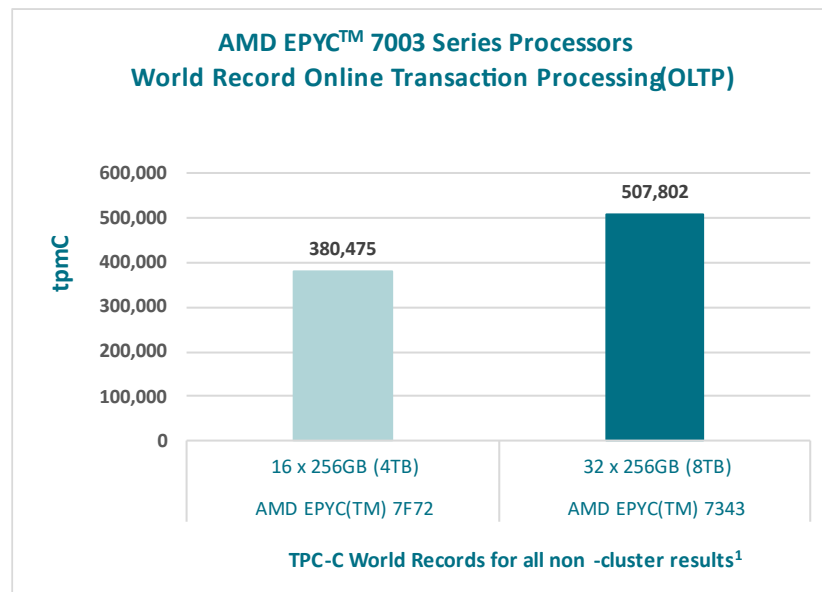Table 2: Supermicro TPC-C results showing leading OLTP performance



Figure 3: Generational TPC-C performance gains (3$^{rd}$ Gen vs. 2$^{nd}$ Gen AMD EPYC™ processors)[1]

## Conclusions

3rd Gen AMD EPYC™ 7343 processors show exceptional per-core and per-node performance for in-memory database applications that require large memory capacity. In addition, servers powered by 3rd Gen AMD EPYC™ processors set a world performance record performance for non-cluster systems with 507,802 tpmC, which is ~33% faster than 2nd Gen AMD EPYC™ processor-based server[1.]  These capabilities make the AMD EPYC™ family of processors an excellent choice for running OLTP applications.

Supermicro Ultra servers powered by AMD EPYC™ 7003 Series Processors help leading enterprises reduce time-to-solution across a wide range of applications, provide enhanced security features, and allow running all workloads either on-premises or in a public or private cloud.

Supermicro offers many certified solutions and reference architectures that empower organizations to create deployments that deliver data insights faster than ever before. These solutions include servers optimized for:

- AI/ML/DL training inference
- Hyperconverged infrastructure (HCI)
- Software-defined infrastructure (SDI)
- Software-defined storage, such as CEPH, VMWare vSAN, and Weka.IO.
- Data management, such as Oracle 19c, Apache Hadoop, and Cassandra.
- HPC application optimization, such as Ansys® Fluent®, OpenFOAM®, and WRF.

## Footnotes

1. Supermicro A+ Server 1124US-TNRP AMD EPYC™ 7343 507,802 tpmc  https://www.tpc.org/1809  Supermicro A+ Server 1124US-TNRP AMD EPYC™ 72F2 380,475  tpmc  https://www.tpc.org/1809

2. Telecommunications Technology Association (TTA) is the leading IT standardization association in Korea and collects, analyzes, researches, and distributes diverse information on cutting-edge domestic and foreign telecommunication technologies and their standardizations.

## Additional Resources

TPC-C is an On-Line Transaction Processing Benchmark

TPC-C Top Performance Results

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