



SUPERMICRO'S X14 SERVERS DEMONSTRATE REMARKABLE PERFORMANCE GAINS OVER 3 GENERATIONS OF SERVERS

Supermicro Servers with Intel® Xeon® 6700 Series Processors with E-cores Show Remarkable Performance and Performance/Watt Improvement Running SPEC Benchmarks



Supermicro Hyper Server

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Executive Summary

Data center operators constantly evaluate new server hardware to give employees and customers a faster and better experience at lower costs. The recent release of the latest Supermicro X14 server product families with the Intel Xeon 6700 series processors with E-cores (Efficient cores) enables enterprises and cloud providers to upgrade their existing infrastructure to new servers and quickly realize performance gains. In these benchmarks, an older

Supermicro X11 system performance (with 2nd Gen Intel Xeon processors – circa 2019) was compared to the new Supermicro X14 servers with the Intel Xeon 6 processors with E-cores. The comparison encompasses many aspects of the system design, including the CPU and memory performance upgrades. Data center refresh cycles are about five years, which means that when comparing performance, the latest systems should be compared to those in a current data center. Performance gains from new system capabilities can be significant in the cases discussed below and the performance per watt. The case for upgrading to the latest generation of Supermicro's Intel-based servers has never been stronger.



Supermicro servers continue to give customers leading-edge performance for a wide range of workloads. Supermicro's application-optimized product families are designed to maximize performance and reduce energy usage through shared components and advanced design.

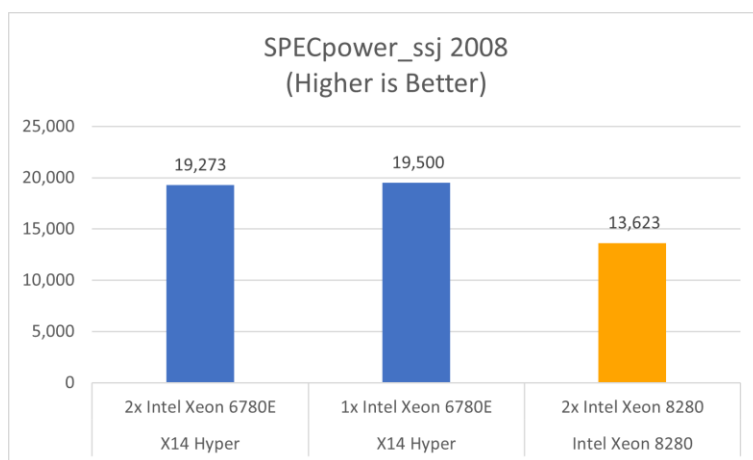
SPEC Benchmarks

Several different benchmarks from www.spec.org were tested, and the results were compared with similar systems available from the 2019 to 2020 timeframe. The new system tested is the Supermicro X14 Hyper, which is available in single and dual socket configurations. The Standard Performance Evaluation Corporation (SPEC) was founded in 1988 by a few workstation vendors who realized that the marketplace desperately needed realistic, standardized performance tests. The key realization was that an ounce of honest data was worth more than a pound of marketing hype. SPEC has grown to become one of the more successful performance standardization bodies with more than 60 member companies. SPEC publishes many performance results each quarter, spanning various system performance disciplines.

- **SPECpower_ssj2008 score:**

SPECpower_ssj2008 is a valuable tool for understanding the power consumption characteristics of servers. A series of server-side Java workloads are run at different load levels, and the power used at each level is measured. The final result is the average power consumption per performance unit, which is reported as a single value. The higher the performance per unit of power, the better. The new Supermicro X14 systems are based on the Intel Xeon 6780E processors with E-cores and deliver more than 42% higher performance than Supermicro X11 systems with the 2nd Gen Intel Xeon Platinum 8280 processor. A single socket Supermicro Hyper system outperforms a dual socket Supermicro X11 system with the 2nd Gen Intel Platinum 8280 processor by a similar margin.

- 1 socket Intel Xeon 6780E - https://spec.org/power_ssj2008/results/res2024q3/power_ssj2008-20240729-01422.html SYS-212H-TN (Hyper)
- 2 socket Intel Xeon 6780E - https://spec.org/power_ssj2008/results/res2024q3/power_ssj2008-20240729-01423.html SYS-222H-TN (Hyper)
- 2 socket 2nd Gen Intel Xeon Platinum 8280 - https://spec.org/power_ssj2008/results/res2019q3/power_ssj2008-20190424-00960.html SuperServer SYS-6029P-WTR (WIO)

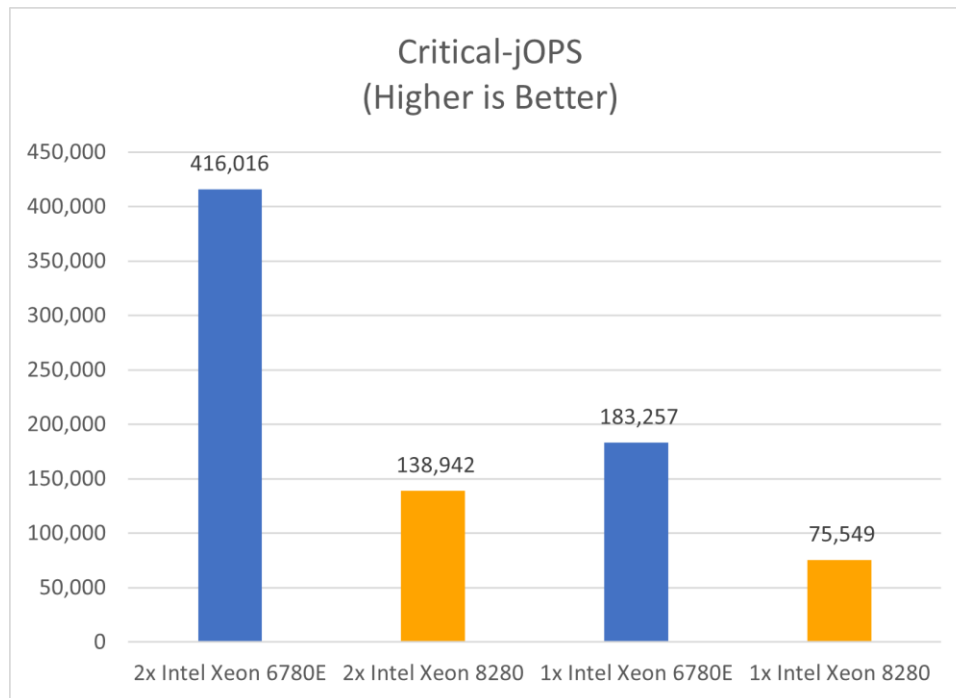


- **SPECjbb® 2015**

The SPECjbb® 2015 benchmark was developed to measure performance based on Java application features. It is relevant to all audiences interested in Java server performance, including JVM vendors, hardware developers, Java application developers, researchers, and academic community members.

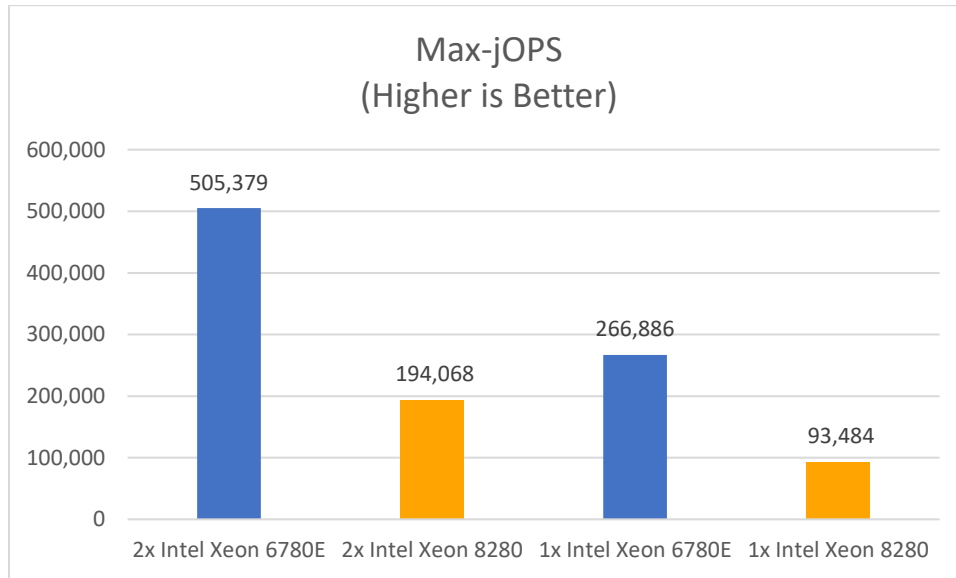
As shown below, a dual socket X14 system with 2 Intel Xeon 6780E CPUs is 3 times faster than a dual socket system with the Intel Xeon Platinum 8280 processors. In addition, when looking at single socket systems, the Supermicro system using the Intel Xeon 6780E is almost 2.4 times faster than a system using the Intel Xeon Platinum 8280 processor. A single socket Supermicro system with the Intel Xeon 6780E processor is faster than a dual socket system with dual 2nd Gen Intel Xeon Platinum 8280 processors.

- 2 socket Intel Xeon 6780E - <https://spec.org/jbb2015/results/res2024q3/jbb2015-20240724-01303.html> (Hyper) SYS-222H-TN
- 1 socket Intel Xeon 6780E - <https://spec.org/jbb2015/results/res2024q3/jbb2015-20240725-01309.html> (Hyper) SYS-212H-TN
- 2 socket Intel Xeon Platinum 8280 <https://spec.org/jbb2015/results/res2019q2/jbb2015-20190314-00428.html> (non Supermicro)
- 1 socket 2nd Gen Intel Xeon Platinum 8280 - <https://spec.org/jbb2015/results/res2019q2/jbb2015-20190314-00423.html> (non Supermicro)



In a similar test, looking at Max-jOPS, comparing dual socket systems, the Supermicro X14, with the Intel Xeon 6780E processor based system, is 2.6x faster than the Supermicro X11 system. Looking at the single socket systems, the Supermicro X14 system is 2.7x faster than the single socket Intel Xeon Platinum 8280 based system:

- 2 socket Intel Xeon 6780E - <https://spec.org/jbb2015/results/res2024q3/jbb2015-20240724-01304.html> (Hyper) SYS-222H-TN
- 1 socket Intel Xeon 6780E - <https://spec.org/jbb2015/results/res2024q3/jbb2015-20240725-01309.html> (IoT) SYS-212B-FN4TP
- 2 socket 2nd Gen Intel Xeon Platinum 8280 - <https://spec.org/jbb2015/results/res2019q3/jbb2015-20190731-00488.html> (non Supermicro)
- 1 socket 2nd Gen Intel Xeon Platinum 8280 - <https://spec.org/jbb2015/results/res2019q2/jbb2015-20190313-00372.html> (non Supermicro)



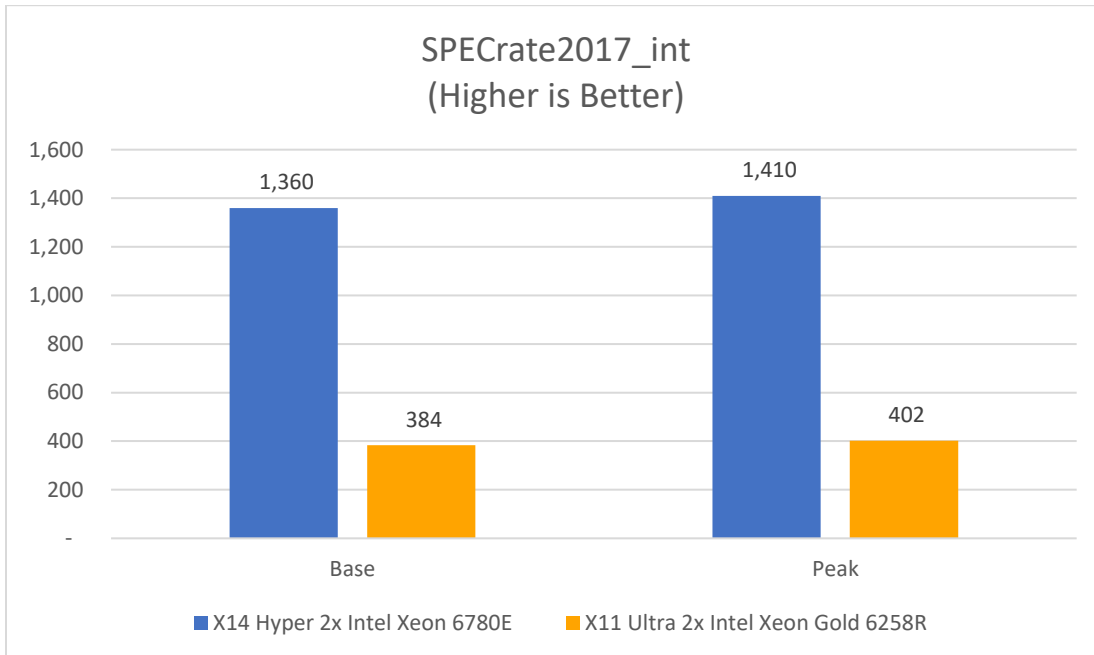
- **SPECrate2017_int:**

The SPECrate2017_int benchmark primarily uses integer calculations to measure a system's throughput on workloads. A higher score indicates more throughput per unit of time. Ten separate applications are used to calculate the score.

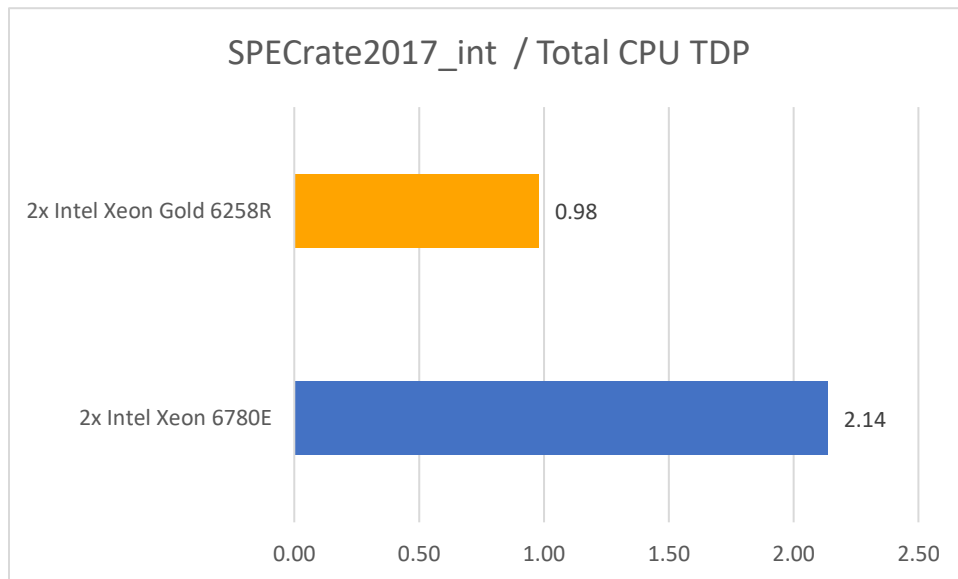
The SPECrate2017_int benchmark was run on the Supermicro X11 Ultra dual socket system and the new Supermicro dual socket X14 Hyper systems with Intel Xeon 6 processors with E-cores. Looking at the Base results, there is a 3.5x performance using a dual socket Supermicro X14 system compared to the dual socket Supermicro X11 Ultra system. The Peak results also show a 3.5x performance improvement, comparing a Supermicro X14 Hyper system and a Supermicro X11 Ultra system.

2 socket Intel Xeon 6780E - <https://spec.org/cpu2017/results/res2024q3/cpu2017-20240729-44337.html> (Hyper) SYS-222H-TN

2 socket Intel Xeon 6258R - <https://spec.org/cpu2017/results/res2020q2/cpu2017-20200608-22736.html> (Ultra) SYS-6029U-TR4



A relative efficiency measure can be estimated by performance divided by the CPU TDP wattage. For example, using the SPECrate2017_int and the TDP of the dual CPUs, it is easy to see that the new Intel Xeon 6780E is over twice as efficient as the Intel Xeon Gold 6285R CPU.



Summary

These SPEC.org benchmarks show that the Supermicro servers with the Intel Xeon 6 processors with E-cores significantly outperform Supermicro X11 servers, which were released in the 2019 timeframe. The combination of system architecture, more cores, and more efficient cores leads to significant gains in application performance. The performance gains over multiple generations of servers and CPUs lead to more efficient computing, saving OPEX for similar workloads. Alternatively, significantly more work can be done in defined time frames, leading to better business outcomes.

For More Information

Supermicro X14 Systems – www.supermicro.com/x14

For more SPEC information, visit www.spec.org

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