

AMD EPYC™ 7F_x2 Processors: Performance and Scaling for Oracle® Database 19c



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Expanded Portfolio with High Frequency Processors

Built on 7nm technology, the latest addition to the AMD EPYC 7002 Series of processors are optimal for both per core performance and system level performance.

Innovative Architecture

The AMD EPYC™ 7F_x2 high frequency processors feature the 2nd Gen EPYC series' highest base and boost frequencies², along with industry leading L3 cache per core enabling exceptional performance.

Cost effective for Critical Workloads

The 2nd Gen AMD EPYC™ 7F_x2 Processors can enable low TCO for software licensed per core – such as relational databases, hyperconverged infrastructures, commercial HPC and others

Leadership Security Features

Based on AMD Infinity Guard, the 2nd Gen AMD EPYC™ Processors feature advanced security features including Secure Memory Encryption and Secure Encrypted Virtualization.

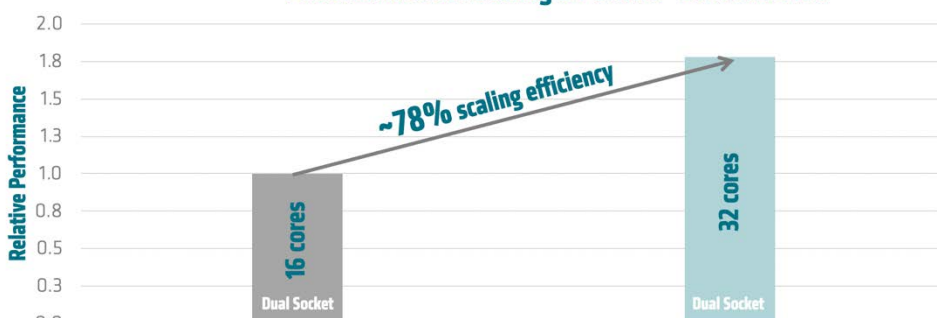
No Compromise on Features

Continuing AMD's philosophy of choice without restriction, all processor features, including up to 4 TB of memory per socket and 128 PCIe® 4 lanes, are enabled on all high-frequency processors.

AMD EPYC™ 7F_x2 Processors Demonstrate Superior Performance on Transaction Processing Workloads with Oracle Database 19c

Oracle® Database delivers leading-edge innovations in relational database management systems (RDBMS) for on-premise, cloud and hybrid workloads with exceptional performance and ease-of-use. AMD's internal test results show that AMD EPYC™ 7F_x2 processor-based systems deliver high performance and exceptional scaling for Online Transaction Processing (OLTP) performance with Oracle Database 19c.

AMD EPYC™ 7002 Series High Frequency Processors Online Transaction Processing (OLTP) Performance and Scaling on Oracle® Database 19c¹



8-core AMD EPYC 7F32 **16-core AMD EPYC 7F52**
The OLTP workload is derived from the TPC-C Benchmark, and as such is not comparable to published TPC-C Benchmark results, as the OLTP workload results do not comply with the TPC-C Benchmark

Figure 1: OLTP Relative Performance and Scaling:
8-Core AMD EPYC 7F32 vs. 16-core AMD EPYC 7F52

The tested configuration is shown Table 2. The AMD EPYC 7F_x2 Series of high frequency processors are specifically designed to optimize per-core performance for frequency sensitive workloads and core-based software licensing models. Table 1 lists all the AMD EPYC 7F_x2 Series processors and features.

Processor	Base Frequency	Boost Frequency ² (up to)	Cores / Processor	Memory Channels	Maximum Memory / Socket (DDR4-3200)	PCIe® Gen4 Lanes / System
AMD EPYC™ 7F32	3.7 GHz	3.9 GHz	8	8	4 TB	128
AMD EPYC™ 7F52	3.5 GHz	3.9 GHz	16	8	4 TB	128
AMD EPYC™ 7F72	3.2 GHz	3.7 GHz	24	8	4 TB	128

Table 1: AMD EPYC 7F_x2 Processor Family

Benchmarking Oracle Database 19c with AMD EPYC 7Fx2 Processors

AMD engineers ran benchmarks derived from industry standard benchmarks on an internal reference platform using 8-core AMD EPYC 7F32 and 16-core AMD EPYC 7F52 processors. See Table 2 for the benchmark configuration.

Processor	Base Frequency	Memory (8 channels / processor)	Storage (NVMe)	Cores / Processor	Total Cores
AMD EPYC 7F52	3.5 GHz	2 TB (DDR4-3200)	5x 1.6 TB	16	32
AMD EPYC 7F32	3.7 GHz	2 TB (DDR4-3200)	5x 1.6 TB	8	16

Table 2: Benchmark Configuration

For each benchmark result, a total of five benchmark runs were completed; the high and low values were removed and the average of the remaining three runs was calculated to obtain the final result. These results, shown in Figure 1, demonstrate the performance of the 8-core and 16-core AMD EPYC 7Fx2 Series processors. These high frequency processors are optimized for per-core performance, yet also demonstrate excellent scalability for the most demanding workloads.

Figure 1 shows an online transaction processing (OLTP) benchmark workload derived from the TPC-C® Benchmark. The OLTP workload is derived from the TPC-C Benchmark, and as such is not comparable to published TPC-C Benchmark results, as the OLTP workload results do not comply with the TPC-C benchmark.

The workload models 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 results show sustained transaction throughput and linear scaling across 8-core and 16-core processors allowing one to right-size the compute power to the application needs and help lower total cost of ownership by only paying for cores actually needed in order to optimize core-based software licensing model costs.

Innovation Drives Advancement

The AMD EPYC processor represents a completely new approach to supporting the massive processing requirements of the modern datacenter. The second generation of the AMD EPYC™ processor extends AMD's innovation leadership while continuing the philosophy of choice without restriction.

Unmatched Flexibility

Match core count with application needs without compromising processor features. Built with leading-edge 7nm technology, the 2nd Gen AMD EPYC™ SoC offers a consistent set of features across a range of choices from 8 to 64 cores, including 128 lanes of PCIe 4 and 8 memory channels with access to up to 4 TB of high-speed memory. EPYC processors' balanced set of resources means more freedom to right-size the server configuration to the workload.

Innovation, Joint Engineering and a Commitment to Open Standards

AMD is proud to continue its long tradition of innovation and commitment to open standards. Coupled with joint engineering with our OEM and software partners, we're proud to demonstrate outstanding performance often at significant cost savings.

LEARN MORE at amd.com/epyc

2nd Gen AMD EPYC Processors: Built with leading-edge 7nm technology, the AMD EPYC™ SoC offers a consistent set of features across a range of choices from 8 to 64 cores, including 128 lanes of PCIe® Gen 4⁴ and 8 memory channels with access to up to 4 TB of high-speed memory.

FOOTNOTES

1. Performance measured with Oracle Database 19c on RHEL 7.7 (3.10.0-1061) using HammerDB version 3.1.
AMD EPYC Processor-based System - CPUs: 2x 7F32, 2x 7F52, 32x 64GB DDR4-3200 DR 2DPC, 5x 3.2 TB NVMe™.
2. Max boost for AMD EPYC processors is the maximum frequency achievable by any single core on the processor under normal operating conditions for server systems. EPYC-18

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