

RELATIONAL DATABASE MANAGEMENT SYSTEMS

AMD EPYC™ 7002 SERIES PROCESSORS AND SQL Server®: ENTERPRISE-GRADE RELATIONAL DATABASE MANAGEMENT SYSTEM

AMD
EPYC

AUGUST 2019

AMD EPYC for Relational Database Management Systems

Utilizing the x86-architecture and built on 7nm technology, the AMD EPYC™ 7002 Series of processors bring together targeted core counts, large memory capacity, extreme memory bandwidth, and massive I/O, all with the right ratios to bring best-in-class features for enterprise grade database workloads¹.

Standards Based Architecture

Continuing AMD's commitment to industry standards, AMD EPYC™ 7002 Series processors offer you a choice in x86 architecture. x86 compatibility means you can run most x86 based applications on AMD EPYC processors.

Flexibility to Right Size Compute Power to Workload

AMD EPYC™ 7002 Series processors gives you the freedom to right-size the server configuration for your workload. Optimize costs by choosing one socket or two sockets and optimal core count needed to run your database without compromising on processor features.

Fully Tested and Validated

AMD's broad partner ecosystem and collaborative engineering provide tested and validated solutions that help lower your risk and total cost of ownership.

SQL Server

SQL Server is an enterprise-grade RDBMS that supports a wide variety of transaction processing, business intelligence, decision support and analytics applications in corporate environments.

AMD EPYC™ 7002 Processors: Architectural Innovations Deliver Exceptional Performance

Relational Database Management Systems (RDBMS) rank among the most significant applications used in business today. They provide a well-organized mechanism for executing transactions, for data manipulation, and business analytics. As a result of their ubiquitous nature, RDBMS performance is critical to an organization's success in competitive environments.

7 nm	PCIe® Gen 4	DDR4 3200
64 Cores per socket	128 PCIe® Gen 4 lanes per socket	8 Memory channels per socket
World's first 7 nm x86 server CPU Highest available core count ¹ to maximize parallelism	World's first PCIe® Gen 4 ready x86 server CPU ² Doubles the bandwidth of the previous generation	World's first x86 architecture with DDR4 3200 ² Up to 4 TB of memory capacity per socket

The AMD EPYC™ 7002 Series processor extends AMD's innovation leadership for optimizing RDBMS performance, both for On-line Transaction Processing (OLTP) and Decision Support Systems (DSS). 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 4² and 8 memory channels with access to up to 4 TB in single socket systems and up to 8 TB of in dual socket systems, with DDR4-3200².

SQL Server: Enterprise-Grade Relational Database

Microsoft® SQL Server® is a relational database management system (RDBMS) that supports a wide variety of transaction processing, business intelligence and analytics applications in corporate environments.

SQL Server is built on top of SQL, with an added set of proprietary programming constructs. SQL Server is used to create and maintain databases, analyze data, generate reports, and to carry out ETL operations either on the same computer or on a different computer across a network.



AMD EPYC™ 7002 Series Processors for Database Servers

AMD EPYC is a flexible processor that brings highly durable I/O performance including exceptional read speed, write speed and I/O latency. AMD EPYC SoC’s architecture provides massive I/O to directly attach NVMe solid state drives (SSDs), and 128 PCIe Gen4 lanes to enable truly exceptional I/O bandwidth with very low latency. The high performance NVMe drives can be directly attached to the physical server providing the benefit of higher throughput and IOPS (SEQ / RND (R/W)). AMD EPYC processors support various DRAM capacity DIMM modules and speeds (up to 4 TB per socket, up to DDR4-3200²) to help the customer to choose the optimal memory configuration for their database environments.

Reference Architecture for AMD EPYC and Databases

The following reference architectures for AMD EPYC™ 7002 Series of processors and supported databases provide options for different types of scalable Decision Support Systems and OLTP databases.

Decision Support Systems (DSS)

The information from Table 1 can be used as the foundation for creating custom DSS configurations that meet unique database demands with various storage and connectivity options to choose from our leading server OEM partners.

Decision Support Systems (DSS)					
System Type	#CPUs	Cores	Processor	Minimum Memory (GB)	Minimum I/O Bandwidth (GBytes/Sec)
Small, Starter	1	16	EPYC™ 7302P	256	1.56
	1	24	EPYC™ 7402P	256	2.34
Performance Optimized	1	32	EPYC™ 7502P	512	3.13
	1	48	EPYC™ 7552	512	4.69
	1	64	EPYC™ 7702P	512	6.25
Memory Optimized	2	2x24	EPYC™ 7402	1024	4.69
	2	2x32	EPYC™ 7502	1024	6.25
High Performance	2	2x48	EPYC™ 7642	2048	9.38
	2	2x64	EPYC™ 7742	2048	12.50

Table 1: Reference Architecture for Decision Support Systems

Online Transaction Processing (OLTP)

The information from Table 2 can be used as the foundation for creating custom OLTP configurations that meet unique database demands with various storage and connectivity options to choose from our leading server OEM partners.

On-line Transaction Processing (OLTP)					
System Type	#CPUs	Cores	Processor	Minimum Memory (GB)	Minimum I/O Bandwidth (GBytes/Sec)
Small, Starter	1	16	EPYC™ 7302P	256	1.60
	1	24	EPYC™ 7402P	256	2.40
Performance Optimized	1	32	EPYC™ 7502P	512	3.20
	1	48	EPYC™ 7552	512	4.80
	1	64	EPYC™ 7702P	512	6.40
Memory Optimized	2	2x24	EPYC™ 7402	1024	4.80
	2	2x32	EPYC™ 7502	1024	6.40
High Performance	2	2x48	EPYC™ 7642	2048, 4096	9.60
	2	2x64	EPYC™ 7742	2048, 4096	12.80

Table 2: Reference Architecture for Online Transaction Processing

Note: These reference architectures are provided for informational use only. Contact your server vendor to evaluate your specific requirements.

Summary

The AMD EPYC™ 7002 Series processors provide powerful options to optimize RDBMS performance, both for On-line Transaction Processing (OLTP) and Decision Support Systems (DSS). The capability to directly attach NVMe solid state drives (SSDs) and 128 PCIe Gen4 lanes bring exceptional I/O bandwidth with very low latency for higher throughput and IOPS. With the flexibility to right size the compute power to match your workload, combined with exceptional performance, the AMD EPYC SoC is the right choice for your enterprise level database workload needs.

FOOTNOTES

1. Best-in-class based on industry-standard pin-based (LGA) X86 processors. NAP-166.
2. Some supported features and functionality of second-generation AMD EPYC™ processors (codenamed “Rome”) require a BIOS update from your server manufacturer when used with a motherboard designed for the first-generation AMD EPYC 7000 series processor. A motherboard designed for “Rome” processors is required to enable all available functionality. ROM-06.

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