



# Total Cost of Ownership: Database Software and Support

WHITE PAPER

MariaDB TX vs. Oracle Database Enterprise Edition

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# Executive Summary

## MariaDB TX

MariaDB TX is an enterprise database built on 20+ years of open source engineering and production use – becoming the default database on Red Hat Enterprise Linux and SUSE Enterprise Linux as well as public and private cloud infrastructure platforms, including OpenStack – and deployed by everyone from Disney and The Home Depot to Verizon and Google. It is a trusted, proven and reliable replacement for proprietary databases.

## Market

The market for database management systems (DBMSs) is maturing – emerging technologies are being introduced, aging products are being discarded – and with a focus on reducing total cost of ownership (TCO), enterprise organizations have an opportunity to replace and consolidate DBMS infrastructure.

In particular, open source relational databases have matured, leading to increased use in business-critical, mission-critical applications – providing the stability and reliability required by enterprise organizations. In fact, when proprietary relational databases are consolidated and replaced with open source relational databases, total cost of ownership is reduced.

## Analysis

This TCO analysis does not include labor and hardware costs, rather it focuses on DBMS software and support costs. It compares the three-year TCO of MariaDB TX to Oracle Database Enterprise Edition. In doing so, it compares the value of an enterprise, open source subscription to a commercial, proprietary license with maintenance fees.

The costs of each database are calculated, using published list prices, based on a minimal configuration capable of meeting standard enterprise requirements for a database.

Based on the hardware in this TCO analysis:

- In a data center, Oracle is 84x more expensive than MariaDB
- In a data center, organizations can save up to \$9 million overall by choosing MariaDB
- In a data center, organizations can save up to \$1.1 million a year by replacing Oracle
- In the cloud (AWS), Oracle is 151x more expensive than MariaDB
- In the cloud (Oracle), Oracle is 72x more expensive than MariaDB

## Enterprise Requirements

An enterprise database must meet a minimal set of requirements in order to support both business and technical objectives – whether it’s maintaining around-the-clock availability, handling peak workloads, protecting customer data or making the most out of existing hardware. To that end, an enterprise database must meet availability, security, efficiency and scalability requirements – ensuring both business and technical objectives are met.

### High Availability

An enterprise database must ensure availability via fault tolerance – continuing to operate in the presence of a failure (hardware or otherwise) – in order to support business-critical, mission-critical applications where downtime, no matter how short, is not only disruptive, but costly – resulting in lost revenue, a damaged reputation, or both. MariaDB and Oracle provide high availability via multi-master clustering with MariaDB Cluster and Oracle Real Application Clusters (RAC).

### Scalability

The hardware resources of a single server may not be enough for terabytes of data and/or thousands of users. Thus, an enterprise database must scale – increasing throughput and/or storage with multiple servers. MariaDB and Oracle scale reads via replication. However, while it is included with MariaDB TX, Oracle requires licenses for Active Data Guard. In addition, MariaDB and Oracle scale reads, writes and storage via sharding with MariaDB Spider and Oracle Sharding.

### Performance & Efficiency

With more data, more customers, and more applications and services, database workloads are becoming more demanding. In order to meet customer experience expectations while continuing to control costs, an enterprise database must be able to utilize existing resources more efficiently. MariaDB and Oracle improve resource efficiency with table partitioning and compression. They are included with MariaDB. Oracle requires licenses for Partitioning and Advanced Compression.

### Security

In 2016, several high-profile security breaches resulted in the theft of personal, financial and political data, underscoring why an enterprise database must secure and protect the data from bad actors, internal and external. MariaDB and Oracle use transparent encryption, authentication, role-based access control, auditing and firewalls to secure and protect data. They are included with MariaDB. Oracle requires licenses for Advanced Security and Database Firewall.

	MariaDB	Oracle
High Availability	MariaDB Cluster	Oracle RAC
Scalability	MariaDB Spider	Oracle Sharding
Performance & Efficiency	Built-in	Oracle Advanced Compression
Security	Built-in	Oracle Advanced Security

## Total Cost of Ownership (on premise)

In this analysis, the database software and support costs are calculated for a three-node cluster running on commodity hardware. MariaDB TX , with the clustering option, includes all of the features necessary to meet enterprise requirements – including MariaDB MaxScale, a database proxy for improved high availability, security and scalability. However, Oracle requires licenses for multiple features in order to meet enterprise requirements.

	MariaDB	Oracle <sup>1</sup>
Database	\$9,600	\$47,500
Clustering	\$2,400	\$23,000
Partitioning	Included	\$11,500
Compression	Included	\$11,500
Security	Included	\$15,000
Firewall	Included	\$6,000
<b>Total</b>	<b>\$12,000 (Server)</b>	<b>\$114,500 (Core)</b>

MariaDB		Oracle	
Database Servers	3	Database Servers	3
		Processors/Server	2
		Cores/Processor	16
		Total Cores	96
		Core Factor	0.5
		Adjusted Cores	48
<b>Total</b>	<b>\$36,000</b>	<b>Total</b>	<b>\$5,496,000</b>

	Year 1		Year 2		Year 3	
	MariaDB	Oracle	MariaDB	Oracle	MariaDB	Oracle
Subscription	\$36,000	-	\$36,000	-	\$36,000	-
License	-	\$5,496,000	-	\$0	-	\$0
Maintenance	-	\$1,209,120	-	\$1,209,120	-	\$1,209,120
<b>Total</b>	<b>\$36,000</b>	<b>\$6,705,120</b>	<b>\$72,000</b>	<b>\$7,914,240</b>	<b>\$108,000</b>	<b>\$9,123,360</b>

<sup>1</sup> See [Oracle Technology Global Price List](#) for details.

## Total Cost of Ownership (cloud)

The AWS configuration for Oracle Database includes one active server and two standby servers. Oracle RAC is not supported. The Oracle Cloud configuration includes two active servers and one standby server (not cost). Oracle RAC is supported, but it is limited to two servers. In both configurations, Oracle Active Data Guard enables reads on the standby servers.

	MariaDB (AWS)	Oracle (Oracle)	Oracle (AWS)
Database/Proxy	\$9,600	Included	\$47,500
Clustering	\$2,400	Limited	N/A
Replication	Included	Included	\$11,500
Partitioning	Included	Included	\$11,500
Compression	Included	Included	\$11,500
Security	Included	Included	\$15,000
Firewall	Included	Included	\$6,000
<b>Total</b>	<b>\$12,000 (Server)</b>	<b>\$27,000 (Core)</b>	<b>\$103,000 (Core)</b>

MariaDB (AWS)		Oracle (Oracle)		Oracle (AWS)	
Database Servers	3 Active	Database Servers	2 Active 1 Standby	Database Servers	1 Active 2 Standby
		Cores/Server	32	vCPU/Server	64
		Total Cores	96	Total vCPU	192
				HT Adjustment	0.5
				Total Cores	96
<b>Total</b>	<b>\$36,000</b>	<b>Total</b>	<b>\$2,592,000</b>	<b>Total</b>	<b>\$9,888,000</b>

	MariaDB (AWS)	Oracle (Oracle)	Oracle (AWS)
Year 1	\$36,000	\$2,592,000	\$12,063,360
Year 2	\$36,000	\$2,592,000	\$2,175,360
Year 3	\$36,000	\$2,592,000	\$2,175,360
<b>Total</b>	<b>\$108,000</b>	<b>\$7,776,000</b>	<b>\$16,414,080</b>

**NOTE** Oracle updated its cloud license. It counts two AWS vCPUs as one core, but removed the core factor – it is no longer applied when calculating the number of processor licenses required to run on AWS. As a result, it now costs twice as much to run on AWS than it does on premise.

	vCPU	Cores	Core Factor	License	Total
On premise	-	96	0.5	\$47,500	\$2,280,000
AWS	192	96 (192/2)	-	\$47,500	\$4,560,000

## Conclusion

MariaDB, with its enterprise open source subscription, not only meets standard enterprise requirements, but is a far more cost-effective solution than Oracle with its commercial proprietary license and maintenance fees. Whether deploying on premise or on public cloud infrastructure, on entry-level servers or high-end servers, to support existing applications or new services, enterprise organizations are saving millions of dollars by choosing MariaDB.

After three years, running on three on-premise servers, each with two, 16-core processors:

- The total cost of Oracle is 84x higher than MariaDB
- The annual cost of Oracle is 33x higher than MariaDB
- Organizations can save over \$9 million after three years by choosing MariaDB
- Organizations can save \$1.1 million annually by replacing Oracle

After three years, running on three cloud instances, each with 16 cores (32 hyperthreads):

- The total cost of Oracle is 72-151x higher than MariaDB
- The annual cost of Oracle is 60-72x higher than MariaDB
- Organizations can save \$7.6-16.3 million after three years by choosing MariaDB
- Organizations can save \$2.1-2.5 million annually by replacing Oracle

While the cost of commodity hardware and cloud infrastructure continues to drop, computing and resource capacity continues to increase – AWS instances with 128 virtual CPUs, 2TB of memory, and 6.4TB of storage, HPE servers with 192 cores, 12TB of memory and 6.4TB of storage.

The processing capacity of physical servers and cloud instances will continue to increase, and last year's high-end servers will become this year's mid to entry-level servers. When running on Intel processors, as many enterprises do, Oracle Database Enterprise Edition is \$47,000 per two physical cores. What will it cost to run on a server with 192 cores?

*MariaDB, with its open source innovation, enterprise-grade reliability and subscription-based pricing, provides organizations with a smart alternative to legacy, proprietary databases.*