PostgreSQL vs. Oracle

Total Cost of Ownership Comparison Between Oracle and ScaleGrid Enterprise for PostgreSQL

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PostgreSQL is an open source object-relational database system with over 30 years of active development. Recognized as the fastest growing database by popularity, PostgreSQL was named the DBMS of the year in both 2018 and 2017 by [DB-Engines](#), and continues to grow in popularity in 2019.

Oracle Database is a commercial, proprietary multi-model database management system produced by Oracle Corporation. First released in 1979, it is currently the number one database used in the world, though it has steadily decreased in popularity by over 18% since 2013.

Before adopting a relational database management system, organizations must consider the Total Cost of Ownership (TCO) associated with developing, deploying, and maintaining the production deployments that power their applications. As an open source database, the PostgreSQL community version is free to use with zero licensing costs, which offers considerable savings for organizations over the commercial Oracle database.

This white paper outlines the TCO for deploying Oracle Enterprise Database vs. PostgreSQL using ScaleGrid Enterprise for management in an on-premise, private cloud environment. We compare all aspects of these deployment scenarios, including both the initial and ongoing development effort, administrative effort, licensing, software, hardware, and support costs. The comparison outlines two example scenarios, one for a smaller enterprise project, and one for a larger enterprise project:

TCO Project Overview	Server Hardware	Storage Hardware
PostgreSQL Small Project	3 Servers (8 Cores/Server)	3TB SSD
Oracle Small Project	3 Servers (8 Cores/Server)	3TB SAN
PostgreSQL Large Project	30 Servers (8 Cores/Server)	30TB SSD
Oracle Large Project	30 Servers (8 Cores/Server)	30TB SAN

Cost Categories

In this white paper, we break down the Total Cost of Ownership (TCO) into two segments, the upfront costs and ongoing costs for deploying PostgreSQL vs. Oracle in the private cloud.

Cost Categories	Description
Upfront Costs	
Initial Developer Effort	**Personnel cost**: Development effort required to integrate the application and data store.
Initial Administrator Effort	**Personnel cost**: Database Administrator (DBA) effort to install, configure, replicate, etc. the database clusters.
Software Licenses	The licensing costs associated with deploying the database, along with any advanced licenses required for maintaining a healthy production deployment (Ex. monitoring, replication, etc.).
Server Hardware	The physical server hardware required to run the database in the on-premise private cloud environment, calculated by the number of required servers and RAM.
Storage Hardware	The physical storage hardware required to store the data in the on-premise private cloud environment, calculated by the SAN or SSD used.
Ongoing Costs	
Ongoing Developer Effort	**Personnel cost**: Development effort required to maintain and adapt the application and data store as business needs evolve.
Ongoing Administrator Effort	**Personnel cost**: Database Administrator (DBA) effort required to maintain a healthy production deployment.
Software Support and Maintenance	**Support**: 24/7 support assistance for troubleshooting and resolving software issues. **Maintenance**: On-going support for upgrades, log rotations, OS patching, etc.
Hardware Support and Maintenance	**Support**: 24/7 support assistance for troubleshooting and resolving hardware issues. **Maintenance**: On-going support for upgrades and hardware-related software issues.
Miscellaneous Deployment Costs	The other costs associated with maintaining a production deployment, such as electricity fees, bandwidth charges, etc. not to be considered due to the low-relation of the database costs.

Upfront Costs

Initial Developer Effort

< 25%

The initial developer effort costs account for the time it takes to integrate your PostgreSQL or Oracle database with your application. This includes several different tasks:

- Create the data model and stored procedures

- Integrate with an object-relational model (ORM)

- Integrate business logic with the data layer

- Implement support for high availability and disaster recovery at the data layer

- Conduct performance testing

We assume a developer salary of $150,000 per year, or $12,500 per developer month for calculating the total cost of the initial developer effort in our comparison.

Initial Dev. Costs	Postgres	Oracle
Small	$225,000	$300,000
Large	$675,000	$900,000

Standard Relational Model

PostgreSQL supports relational models which are standard and widely used around the world. This makes it very easy for developers to build their data model in PostgreSQL with minimal effort. PostgreSQL PL/pgsql is also compatible with other relational databases like Oracle which makes it relatively easy to move to PostgreSQL.

Variety of Tools

PostgreSQL community is one of the most active open source communities. There are a wide range of tools and extensions for every conceivable scenario, like performance profiling, auditing, etc. This reduces the amount of time development teams need to put together custom tooling to address their scenarios. Oracle also offers many tools, but they are all available as add-on solutions with additional processor license and software update license costs and support fees. Postgres experts and consultants are widely available across the globe at more reasonable rates than Oracle services.

25%

PostgreSQL initial developer effort is 25% less than Oracle due to the variety of community tools and extensions available.

Cloud Deployments

If you wish to deploy in the public cloud or a hybrid cloud environment, there are multiple Database-as-a-Service (DBaaS) options available from a variety of cloud providers (including ScaleGrid). This makes it relatively easy to deploy and manage PostgreSQL in the cloud. While Oracle Database is able to deploy in the public cloud, it can only deploy on the Oracle Cloud Infrastructure where they are able to maintain their high cost of service and vendor lock-in to discourage migrations away from Oracle.

No Licensing

PostgreSQL is an open source database and has no licensing cost. This saves developer time over Oracle where developers need to be involved in licensing discussions with the DBA to understand and help with all the implications of the complicated Oracle licensing model.

Initial Administrative Effort   <50%

Installing PostgreSQL and configuring your clusters is a simple undertaking with ScaleGrid's Enterprise database management software. The install is highly automated with through a wizard-based install module, and the high availability primary-standby setup is configured with a few clicks during the cluster creation process.

Once you've provisioned your PostgreSQL clusters, DBA's are able to configure a backup schedule, customizable by both the frequency of backups and maximum number to retain. From there, DBA's can configure custom alerts and monitoring for their PostgreSQL deployments to validate the performance, and ensure continuous monitoring for production.
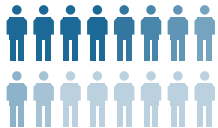
1. Easy wizard based install

2. High availability setup with automated failover

3. Backups and restores

4. Monitoring and alerts

5. Query and query plan analysis

Oracle requires significantly more effort from the DBA team to install and configure due to the hundreds of tuning variables and complex system requirements. Common tasks such as creating a new database also involves many more steps, and enabling replication between sites requires

substantial administrative effort.

We assume the DBA salary of $120,000 per year, or $10,000 per month for calculating the total cost of the initial administrative effort in our comparison.

50%

PostgreSQL initial administrative effort is 50% less than Oracle with ScaleGrid Enterprise's easy configuration tools.

Initial DBA Costs	Postgres	Oracle
Small	$10,000	$20,000
Large	$30,000	$60,000

Software Licenses

< 100%

ScaleGrid Enterprise is priced on a per node annual basis, and the costs are highlighted in the Software Support and Maintenance category. The open source community version of PostgreSQL has zero licensing costs, which offers a significant cost-saving opportunity for a high-performing SQL database over Oracle.

Oracle Database licenses are priced on a per core basis, which costs $47,500 per core for the Oracle

Enterprise Edition. Oracle Standard Edition is a cheaper alternative at $17,500 per core, but does not include essential capabilities such as automatic failover, sharding, and clustering that are necessary for an enterprise production deployment. The Oracle deployment also requires Real Application Clusters (RAC) which costs $23,000 per core, or $70,500 total per core for RAC and Oracle Enterprise Edition. To conservatively estimate the Oracle costs, we assume a 50% discount on list prices, with an additional 50% discount on top of that per Oracles core processor licensing factor, for a total of $17,625 per core. The small enterprise project uses 3 servers, while the large enterprise project uses 30 servers, and both projects use 8 cores per server.

Software Licenses	Postgres	Oracle
Small	$0	$423,000
Large	$0	$4,230,000

Ex. Oracle Small Project Licensing Costs

Oracle Enterprise Edition	$47,500
+ Oracle RAC	$23,000
Discount on List Price	50%
Discount (Licensing Factor)	50%
Cost Per Core	$17,625
Number of Cores/Server	x 8
Cost Per Server	$141,000
Number of Servers	x 3
Small Project License Cost	**$423,000**

Server Hardware

0%

PostgreSQL is designed to work on low-cost, commodity servers. Oracle, in contrast, typically requires large specialized hardware from particular vendors. Oracle also offers a clustering add on - Oracle Real Application Clusters (RAC) which is included in the Software License costs highlighted above, and considered here for our Oracle servers using RAC to match the PostgreSQL high availability setup.

In this document we use the same hardware examples for both PostgreSQL and Oracle. We leverage 3 servers for the small deployment, and 30 servers for the large deployment, all with 8 cores and 32 GB of RAM per server.

Server Hardware	Postgres	Oracle
Small	$12,000	$12,000
Large	$120,000	$120,000

Storage Hardware

< 81%

Just as PostgreSQL is designed to work with inexpensive commodity servers, we are also able to leverage off-the-shelf solid state drives (SSDs), dramatically reducing our storage hardware costs compared to Oracle. While Oracle may be able to reduce storage costs with compression, the required storage is considerably more expensive. Storage Area Network (SAN) is typically used for Oracle to ensure availability and performance, which can range from $25,000 to over $500,000 based on your requirements which significantly increases the cost of storage.

In this document, both Oracle and PostgreSQL leverage two disks per server. PostgreSQL leverages 3TB SSD (mirrored) for the small project and 30TB SSD (mirrored) for the large project, while Oracle uses 3TB SAN for the small project and 30TB SAN for the large project. For PostgreSQL, we leverage 1.92TB SSD SATA Mix Use 6Gbps 512 2.5in Hot-plug AG Drive, 3.5in HYB CARR, 3 DWPD, 10512 TBW from Dell that are best suited to support our server hardware.

Storage Hardware	Postgres	Oracle
Small	$9,264	$125,000
Large	$92,637	$500,000

Ongoing Costs

Ongoing Developer Effort

< 25%

Similar to the initial effort, PostgreSQL allows organizations to reduce their ongoing developer effort by 25% over Oracle with the variety of tools and consultants available through the open source community. The standard relational model and built-on object relational mapping are developer-friendly and help save hundreds of developer hours over Oracle.

Implementing schema changes in an Oracle production deployment is more difficult and time-consuming, resulting in a significantly higher ongoing developer cost over PostgreSQL. This added complexity also prohibits an organization's ability to implement changes on a regular basis which can also impact the schedule of new innovation releases.

Ongoing Dev. Costs	Postgres	Oracle
Small	$112,500	$150,000
Large	$337,500	$450,000

25%

PostgreSQL ongoing developer effort is 25% less than Oracle due to the extensions available and its standard relational model.

Ongoing Administrative Effort

< 50%

PostgreSQL ongoing administration is highly automated with ScaleGrid's Enterprise Database Management software, as a majority of the daily time-consuming tasks are handled for you through the management suite of tools. This includes scheduled and on-demand backups, one-click restores, on-demand scaling, monitoring, query analyzer, upgrades, OS patching, configuration management, and tuning. Instead of manually performing these operations on a regular basis, ScaleGrid allows you to trigger these jobs in a few simple clicks, and the management software handles all the updates necessary to configure and update these tasks.

Oracle database requires more complex ongoing administration, as all database configurations must evolve in conjunction with the data schemas and custom code. The extreme complexity also increases the risk of error which can lead to critical mistakes

that cost more time and money to resolve, which is why it is a common best practice in Oracle to limit changes to only a couple times each year.

50%

PostgreSQL ongoing administrative effort is 50% less than Oracle with ScaleGrid Enterprise's automated management tools.

Ongoing DBA Costs	Postgres	Oracle
Small	$30,000	$60,000
Large	$90,000	$180,000

Maintenance & Support for Software & Hardware

< 62%

ScaleGrid Enterprise for PostgreSQL costs $12,000 per server per year, with no RAM limit per server. The Enterprise platform includes the database management automation software for provisioning, deploying, monitoring, securing, replicating, and backing up your PostgreSQL deployments. In addition, the PostgreSQL service includes 24/7 expert support from ScaleGrid's database engineers.

Oracle database support and maintenance is priced on an annual basis, at 22% of the Software License fees.

Software Support	Postgres	Oracle
Small	$36,000	$93,060
Large	$360,000	$930,6000

Hardware support costs (server and storage maintenance and support) are typically 10% of the hardware purchase price for both Oracle and PostgreSQL.

Hardware Support	Postgres	Oracle
Small	$2,126	$13,700
Large	$21,264	$62,000

TCO Analysis

Compare the Total Cost of Ownership for PostgreSQL using ScaleGrid Enterprise vs. Oracle for both a small and large enterprise project over a three-year period.

Upfront Costs	Small Project		Large Project		
	PostgreSQL	Oracle	PostgreSQL	Oracle	
Software	PostgreSQL & ScaleGrid Enterprise	Oracle Database Enterprise Edition & Oracle RAC	PostgreSQL & ScaleGrid Enterprise	Oracle Database Enterprise Edition & Oracle RAC	
Server Hardware	3 Servers 8 Cores/Server	3 Servers 8 Cores/Server	03 Servers 8 Cores/Server	30 Servers 8 Cores/Server	
Storage Hardware	3TB SSD (mirrored)	3TB SAN	30TB SSD (mirrored)	30TB SAN	
Initial Developer Effort	$225,000	$300,000	$675,000	$900,000	**PostgreSQL:** Ease of use, tooling and community support decreases dev time by 25%. **Oracle:** 24 man-months for small project and 72 man-months for large. Assume fully-loaded developer salary of $150,000/yr.
Initial Administrator Effort	$10,000	$20,000	$30,000	$60,000	**PostgreSQL:** ScaleGrid Enterprise decreases admin time by 50%. **Oracle:** 2 man-months for small project and 6 man-months for large project. Assume fully-loaded DBA salary of $120,000/year.
Software Licenses	$0	$423,000	$0	$4,230,000	**PostgreSQL:** Zero licensing cost for community version (cost for ScaleGrid Enterprise captured in Software Support & Maintenance below). **Oracle:** $70,500/RAC core ($47,500 for Oracle DB Enterprise Edition + $23,000 for Oracle RAC), 0.5 Xeon Core License Factor, 50% discount off list price.
Server Hardware	$12,000	$12,000	$120,000	$120,000	**PostgreSQL and Oracle:** 8-core servers with 32 GB RAM (costs vary by database server requirements).
Storage Hardware	$9,264	$125,000	$92,637	$500,000	**PostgreSQL:** 2, 1TB SSDs/server (mirrored), 6 SSDs for small project, 60 SSDs for large project. **Oracle:** 3 TB SAN (usable) for small project; 30 TB SAN (usable) for large project.
Total Upfront Costs	$256,264	$880,000	$917,637	$5,810,000	

Ongoing Costs	Small Project		Large Project		
	PostgreSQL	Oracle	PostgreSQL	Oracle	
Software	PostgreSQL & ScaleGrid Enterprise	Oracle Database Enterprise Edition & Oracle RAC	PostgreSQL & ScaleGrid Enterprise	Oracle Database Enterprise Edition & Oracle RAC	
Server Hardware	3 Servers 8 Cores/Server	3 Servers 8 Cores/Server	03 Servers 8 Cores/Server	30 Servers 8 Cores/Server	
Storage Hardware	3TB SSD (mirrored)	3TB SAN	30TB SSD (mirrored)	30TB SAN	
Ongoing Developer Effort	$112,500	$150,000	$337,500	$450,000	**PostgreSQL**: Increased dev. agility and ease of use decreases dev time by 25%. **Oracle**: 12 man-months for small project and 36 man-months for large. Assume fully-loaded developer salary of $150,000/yr.
Ongoing Administrative Effort	$30,000	$60,000	$90,000	$180,000	**PostgreSQL**: ScaleGrid Enterprise decreases admin time by 50%. **Oracle**: Small project requires 0.5 full-time DBAs, and large project requires 1.5 full-time DBAs. Assume fully-loaded DBA salary of $120,000/year.
Software Maint. & Support	$36,000	$93,060	$360,000	$930,600	**PostgreSQL:** $12,000/server/year for ScaleGrid Enterprise. **Oracle:** 22% of licensing fees.
Server Maint. & Support	$1,200	$1,200	$12,000	$12,000	10% of hardware purchase price.
Storage Maint. & Support	$926	$12,500	$9,264	$50,000	10% of hardware purchase price.
Misc. Costs	Not considered	Not considered	Not considered	Not considered	Not considered as assumed comparable between database types.
Total Ongoing Costs	**$180,626**	**$316,760**	**$808,764**	**$1,622,600**	
Total Ongoing Costs Over 3 Years	**$541,879**	**$950,280**	**$2,426,291**	**$4,867,800**	
3-Year TCO	**$798,143**	**$1,830,280**	**$3,343,928**	**$10,677,800**	
Savings vs. Oracle	**56%**		**69%**		

TCO Summary

Based on our upfront and ongoing cost assumptions over a three-year period, PostgreSQL using ScaleGrid Enterprise saves organizations 56% for the small project and 69% for the large project over Oracle Enterprise Edition with RAC.

The most significant savings PostgreSQL offers is in it's free and open source model, where Oracle licensing costs amount to 73% of the upfront costs and 40% of the three-year TCO for the large project, and 48% of the upfront costs and 23% of the total costs for the small project. Thousands of organizations are choosing to migrate from Oracle to PostgreSQL to eliminate these costs alone so they can be reinvested in new product innovations.

PostgreSQL's total upfront costs are also 84% lower for the large project, and 71% lower for the small project, making it a much more attractive solution for up-and-coming businesses and new application developments. Additionally, PostgreSQL's ease of use allows developers and DBA's to implement the open source database 27% faster than Oracle, enabling organizations to introduce new products to the market faster with greater agility. The ongoing costs for PostgreSQL are also less than 50% of Oracle's costs for the large project, and 43% less for the small project, allowing organizations to cut their database-related operating expenses in half.

How We Help

At ScaleGrid, we work with thousands of deployments across the world to help their DBA's optimize database performance, improve security, and reduce their time-consuming database management tasks so they can focus on product.

Multiple Database Support

Deploy PostgreSQL, MySQL, MongoDB, and Redis from a single management console to reduce database sprawl and administrative time.

On-Premise, Private Cloud Deployments

Install ScaleGrid Enterprise's management software on your own private servers, and automate your time-consuming management tasks in your on-premise environment.

Hybrid Cloud Deployments

Customize a hybrid cloud setup for PostgreSQL across both public and private clouds to improve the security and performance of your deployments.

Cloud Deployments

Deploy PostgreSQL in minutes on popular cloud providers AWS and Azure with dedicated servers, high availability, and advanced monitoring.

Enterprise Support

Get 24/7/365 support from our PostgreSQL engineers to help your DBA's maintain and optimize security, performance and availability on-premise.

ScaleGrid

Learn More

Get in touch with us at sales@scalegrid.io to learn more about our advanced PostgreSQL management solutions and discuss modernizing your infrastructure off of Oracle.

Website: scalegrid.io

Enterprise Solutions: scalegrid.io/platforms/enterprise-on-premise.html

PostgreSQL Solutions: scalegrid.io/postgresql.html

Free 30-Day Trial: console.scalegrid.io/users/register

Documentation: help.scalegrid.io

Blog: scalegrid.io/blog