

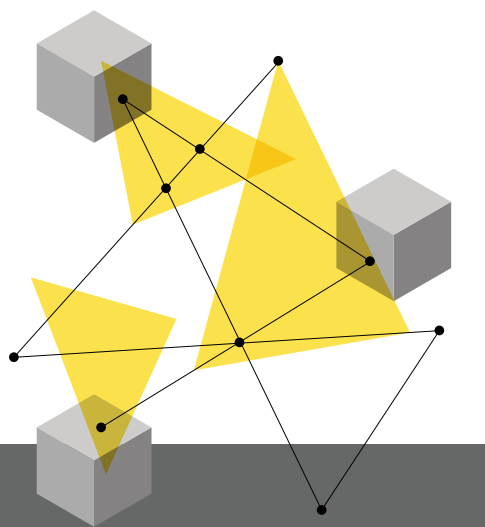
Manage the Multiple Database Journey

Ensuring efficient and effective operations across multiple databases is critical to maintaining business continuity and performance.



The database is the backbone

The database is the backbone of the enterprise. Data is the currency of modern business, and organizations need to ensure consistent, optimal database performance to keep their business running smoothly. The consequences of compromised or even suboptimal database performance can be significant; including delays in responses to customer inquiries, sales processes, and transaction processing.



Many enterprises use multiple databases as a back end to separate different applications and data.

To ensure adequate transactional capacity, most enterprises have adopted a multi-database strategy—using several different database platforms to store different classes or categories of data. So, there's been a surge in the number of databases in use at most organizations, with database managers increasingly responsible for numerous instances. A survey by Unisphere Research revealed:

- 72 percent of database managers are responsible for an increasing number of databases
- 69 percent of database managers consider performance their most important responsibility
- 64 percent say the cloud is having a major impact on their role

Business Benefits of a Multi-Database Strategy

There are many direct benefits to business operations conveyed by operating multiple databases. Some of these benefits include:

- Redundancy and backup
- High availability and fault tolerance
- Flexible scheduling (for queries and backup routines)
- Reduce the impact of downtime
- Ensure sufficient capacity
- Simplify compliance efforts
- Scalability to ensure optimal performance

Redundancy and transactional capacity seem to be two of the most significant business benefits to a multi-database strategy. There can be technological benefits as well, which translate directly into business benefits. Many enterprises use multiple databases as a back end to separate different applications and data. This also facilitates distributed deadlock detection, as a transaction may access data from more than one database. If a transaction request is blocked at any one instance, that lock is often easier to detect and mitigate, which can ultimately help expedite transaction processing.

Challenges of a Multi-Database Strategy

Even as the number and variety of databases running within an enterprise grows, database managers still need to ensure they're getting the best performance and consistent uptime. There are many challenges with managing multiple databases, including:

A monitoring solution with broad-based support across multiple databases can be a strong ally.

- Managing and monitoring multiple database platforms
- Migrating between enterprise databases
- Data formatting and integrity
- Ensuring consistent optimal performance

When managing multiple database platforms, database managers find they don't always operate the same way. They must therefore gain expertise on multiple platforms. They also have to continue to conduct performance tuning, maintain high availability, and ensure data security—again for multiple platforms. Not only does this require significant broadening of database managers' expertise, but also reduces the amount of time available to provide attention to each one. This is especially true if the different database platforms are in different physical locations or cloud platforms. A monitoring solution with broad-based support across multiple databases can be a strong ally.

Open-Source Makes a Stand

The surge in volume of databases has been accompanied by a surge in the variety of databases. Industry stalwarts like Oracle® and Microsoft® SQL Server® remain prominent, and a handful of open-source options have gained significant traction in enterprise environments. This leads to another factor in evolving enterprise database strategy—the continued adoption of open-source databases, including MySQL® and PostgreSQL®. These are often brought in to augment database capacity and function and compete at a fairly even level with the top traditional databases.

There are myriad different rankings, and likely slightly differing results, but there are clearly several strong players in both the traditional and open-source space. According to a recent and regularly updated survey conducted by DB-Engines ranking database platforms—both traditional and open-source—the top five databases are:

1. Oracle
2. MySQL
3. Microsoft SQL Server
4. PostgreSQL
5. MongoDB®



PostgreSQL can efficiently manage large amounts of data and follows SQL standards more closely than MySQL.

A Closer Look at the Players

While Oracle and Microsoft SQL Server are far and away the leading traditional database platforms and perform at a high level, each has its pros and cons. Oracle ranks highly for its stability and security. It also works well across on-premises and cloud-based instances. While it can scale sufficiently to handle large datasets, performance issues have been reported when managing massive amounts of data. Overall performance stacks up well against its primary competitor Microsoft SQL Server, but Oracle can be significantly more expensive. And hiring Oracle specialists and consultants can also come with a hefty price tag.

One of the greatest advantages of Microsoft SQL Server is the multiple editions in which it's available. This helps organizations carefully tailor their database strategy. Like Oracle, it also provides sufficient features and performance for enterprise applications, support for on-premises and cloud-based instances, comprehensive security, and support for Linux. While often price-competitive with Oracle (depending on the edition), Microsoft licensing practices can be a challenge to navigate.

Looking at the leading open-source contenders reveals a similar one-two punch. The open-source database world is clearly dominated by MySQL and PostgreSQL. Both have a strong position in the modern enterprise and convey significant advantages. According to a recent survey conducted by Database Trends, MySQL leads the open-source field with 31.7% of respondents reporting it as their primary choice. PostgreSQL follows in second at 13.4%, and MongoDB in third at 12.2%. More than 50% of open-source database usage is attributed to those top three. And, in fact, according to recent surveys by Percona, DB-Engines, and Stack Overflow, MySQL and PostgreSQL are both holding steady as the number-one and -two open-source databases.

While MySQL is a pure relational database, PostgreSQL is an object-relational database. Consequently, PostgreSQL supports objects, classes, inheritance, and other aspects of the object-oriented model in its database schemas and query language. It has a comprehensive feature set, is fully extendable, and compliant with regulatory standards. PostgreSQL can efficiently manage large amounts of data and follows SQL standards more closely than MySQL.



As a defining factor of database performance, optimization begins with monitoring and analysis.

Many experts feel PostgreSQL conveys greater advantages right out of the gate. It comes equipped with more standard SQL features. As an organization's needs grow more complex, however, they may find MySQL a stronger contender thanks to simpler design, less-complex source code, and increased performance. Either way, there's clearly a place for both in the open-source enterprise database world, and MySQL and PostgreSQL are likely to remain the strongest contenders for the foreseeable future.

Optimize All Databases

In the multi-database environment, ensuring each individual database operates at its optimal level is critical. Several factors can affect database performance; including the size and volume of workloads, throughput capacity and other resources, and database configuration optimization. As a defining factor of database performance, optimization begins with monitoring and analysis. Only then, can database administrators work on query optimization and other parameters during the process of optimizing database performance.

Since many enterprise applications are supported by more than one database, rapidly identifying the source of any performance issue is critical to ensure business continuity. That's where SolarWinds® Database Performance Analyzer (DPA) can be of assistance. DPA is built specifically for SQL query performance monitoring, analysis, and tuning. It supports not only the leading open-source databases like MySQL and PostgreSQL, but also industry stalwarts Oracle, Azure® SQL Database, and Microsoft SQL Server. It fits in well with the multi-database strategy employed by most enterprises. DPA provides:

- Cross-platform database support—both in the cloud and on-premises
- Anomaly detection powered by machine learning
- Performance tuning advisors
- Intuitive, web-based interface
- Scalable, agentless architecture
- Down-to-the-second data collection
- Real-time and historical data feeds

The most optimal performance analysis requires monitoring response time and correlating database activity to most accurately determine the cause of performance issues.

- Integration with SolarWinds system and network monitoring products

Working in concert with database platform's native monitoring and management tools, both DPA and the native analytical tools can deliver best practices to database managers to help optimize performance and eliminate security vulnerabilities. The most optimal performance analysis requires monitoring response time and correlating database activity to most accurately determine the cause of performance issues. This level of multi-dimensional database performance analysis can help organizations manage their multiple databases, tune for optimal performance, and provide database managers with accurate and actionable information.

Data-Driven Business

Data continues to fuel modern enterprise operations. And with multiple databases continuing to play an increasingly critical part of any organizations' strategy, it's essential to ensure they're all operating at peak efficiency. Operating under the watchful eye of a performance monitoring solution like DPA, organizations can be certain they are following the most efficient and effective database strategy.

To learn about how SolarWinds DPA can help your organization ensure consistent optimal performance, check out solarwinds.com.



We're Geekbuilt.®

Developed by network and systems engineers who know what it takes to manage today's dynamic IT environments, SolarWinds has a deep connection to the IT community.

The result? IT management products that are effective, accessible, and easy to use.

References

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