ScaleArc

Application Note

Achieving Zero Downtime and Accelerating Performance for Magento

Executive Summary

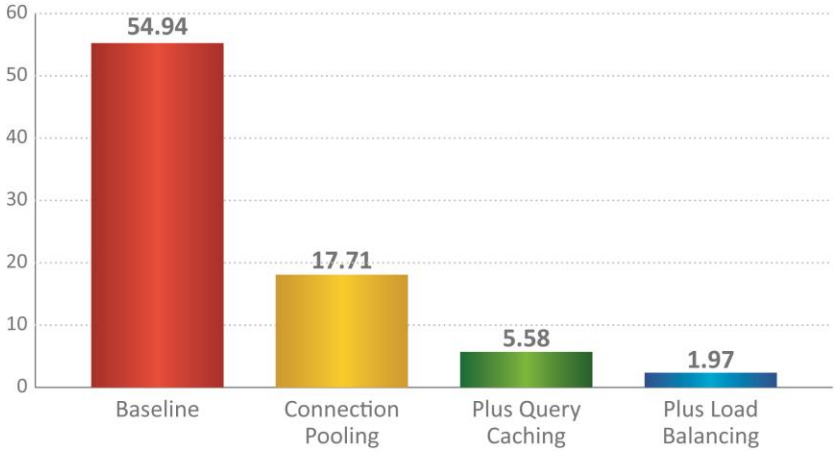
Magento is the world's most popular electronic commerce (e-commerce) engine. It incorporates an on-line catalog, real-time inventory, and a fully featured shopping cart, and many organizations rely on Magento for their retail operations. Since e-commerce usage fluctuates seasonally, running Magento and its underlying MySQL database server with 100% uptime becomes crucial to maintaining revenue.

Traditionally, when organizations need to improve database uptime and performance, they adjust database infrastructure, such as adding secondaries for read-only capacity, and then modify applications to take advantage of the improved infrastructure. For organizations using Magento, that approach is challenging for many reasons, including keeping up with frequent security-critical platform updates. Code-level application tuning consumes considerable resources: for every new security update, one needs to re-certify these custom tunings.

Database load balancing software from ScaleArc provides a compelling alternative. ScaleArc deploys transparently between Magento and MySQL to improve availability and performance. The software breaks the 1:1 tie between the application and the database, providing an abstraction layer that enables an agile data tier. One of the biggest advantages of building this agile data tier is that ScaleArc supports auto failover of database servers that's transparent to the app. This capability eliminates not just unplanned downtime but also planned downtime – system administrators can take a database offline to patch it and then put it back online to rejoin the server group and the customers never see any interruption. The storefront simply keeps operating.

This ability to support zero downtime maintenance is one of the leading use cases for the ScaleArc software, and tied to Magento this functionality is all the more critical. ScaleArc offers these capabilities for MySQL, SQL Server, and Oracle database servers. Deployed in conjunction with MySQL, the ScaleArc software instantly improves Magento uptime and performance, allowing scaling to support millions of customers without any changes to the platform.

Table 1: Query response time



This table illustrates how query response time, measured in milliseconds, decreases as more ScaleArc features are enabled.

ScaleArc performed extensive throughput testing on Magento, with more ScaleArc functionality enabled for each test. This testing shows a reduction of average query response time from nearly 55 milliseconds (ms) to under 2 ms as successively more ScaleArc features are enabled. Without ScaleArc, providing such functionality and gaining these improvements in response time would require modifying Magento. But ScaleArc software enables these features without such changes, allowing organizations to use Magento "out of the box" and gain more than an order-of-magnitude improvement in application database performance – all in a few hours.

This application note details how organizations can leverage the ScaleArc software to quickly and easily improve Magento performance.

Magento Overview

Magento is one of the world's most popular e-commerce applications. With an installed base of more than 200,000 customers[1] and 26% of the e-commerce server market share,[2] Magento is the de facto standard for e-commerce website design, development, and delivery. Magento is written in PHP to run on MySQL database servers. This combination provides a capable, expandable, and feature-rich platform for hosting storefronts responsive to the needs of end customers and site administrators.

Magento Challenges

Although Magento presents a simple interface that shields users from its details, optimizing it for improved application performance is difficult. Among the challenges:

- **Architectural complexity**: The web server, MySQL database, and Magento engine all work together to deliver an e-commerce experience to the end customer. Each server has its own nuances and presents its own optimization opportunity.
- **Lack of performance insights**: With more than 340 tables in the database, architects and developers must be aware of dozens of factors affecting performance and often lack the tools needed to determine the performance bottlenecks for a given Magento website.
- **Resources needed for database tuning**: At the database layer, optimizing MySQL requires specialized development. Improving performance via database replication requires patching Magento to selectively issue read and write requests to different servers depending on the replication architecture,[3] diverting valuable engineering resources.

1 Keren Amina, Magento Director of Business Operations, as quoted in AheadWorks, January 2014.

2 Tom Robertshaw, February 2013 ECommerce Survey, based on actual Alexa Top 1 Million traffic.

3 Using Replication for Scale-Out, Section 16.3.3, MySQL 5.6 Reference Manual.

Database Load Balancing Software – The Simple Alternative

Just as web load balancing software abstracts applications from web servers to optimize HTTP performance, database load balancing software improves SQL application availability and performance without changing the application accessing the database. This software inserts transparently between applications and SQL databases and enables zero downtime for applications including both planned and unplanned outages, increases application response time, and provides real-time SQL traffic analytics.

ScaleArc offers SQL load balancing software for MySQL, SQL Server, and Oracle databases. Leveraging this software in Magento and MySQL environments offers an ideal solution for improving Magento performance.

Among its capabilities, the ScaleArc software provides functionality such as:

- **Automatic failover that's transparent to the app:** ScaleArc can automatically detect server failures and either redirect load to a secondary master or promote a standby slave to the master role. It does so in a transactionally consistent manner, keeping your data safe.

- **Read/write split:** ScaleArc automatically directs read requests to replication slaves and write requests to replication masters. Some tables within Magento are not suitable for read/write split and have to be routed to the primary database server. As a result, you can use your hot spare slave to serve read traffic, letting you benefit from what would have been idle redundant capacity and improving performance.

- **Load balancing:** ScaleArc automatically balances SQL traffic among a pool of database servers using a dynamic load balancing algorithm that sends more requests to the server that is most likely to respond the fastest. Magento does not need to track how busy (or free) various servers are within the pool.

- **Connection pooling and management:** ScaleArc automatically pools requests from multiple Magento sites such that database connections are used in the most efficient manner possible. So you can add many more web servers without having to worry about running out of database connections.

- **Auto Cache Invalidation:** Complementing its Transparent SQL query caching technology, ScaleArc has introduced a new approach for cache invalidation to the industry – a method for automatically invalidating cache entries that enables true ACID-compliant caching. When the data cached has been changed, ScaleArc automatically flush it from the cache. This innovation means customers can cache dynamic data that's never been safe to cache before. In addition to auto cache invalidation, users can choose among Time-to-Live (TTL) invalidation and API or query comment/hint-based invalidation on incoming writes or updates.

- **Activity logs:** ScaleArc automatically logs all activity between Magento and a collection of MySQL servers to offer a single point for data collection.

- **Real-time analytics:** The ScaleArc software includes visual graphing tools to help administrators and developers analyze site operations dynamically in real time.

Benefits of ScaleArc Software

The ScaleArc software offers site administrators and developers the following benefits:

- **Immediate performance gains**. The combination of read/write split, load balancing, pooling, and caching between Magento and MySQL offers an immediate improvement in availability and performance, well beyond that available with a single point optimization approach.
- **Application transparency**. Implementing the ScaleArc software requires only administrative changes. No code change is required. Once MySQL server replication is configured, optimizing another Magento site requires only a connection reference change.
- **Development and operations de-coupling**. Administrators may determine which database servers are masters without involving Magento. Administrators may allocate servers based on seasonal performance load. Developers can use the simpler single-threaded design pattern, even if administrators find a more complex architecture is needed.
- **High availability**. ScaleArc offers a fault-tolerant, high-availability mode that can provide zero downtime for apps. Continuous application availability is critically important for 24x7 e-commerce websites.
- **Reduced cost**. Since ScaleArc optimizes performance at the SQL query level, it is effective across the entire database infrastructure with all storage engines simultaneously. Site administrators also save money because they don't need to invest in versions of MySQL that perform thread pooling.
- **Analytics and logging**. Detailed reporting provides up-to-the-minute problem and status metrics, going well beyond simple "go/no go" testing. This real-time data provides proactive insight for avoiding congestion problems before they happen.

For more information about how ScaleArc enhances your Magento powered eCommerce site, visit **www.scalearc.com/eCommerce**.

ScaleArc

2901 Tasman Drive, Suite 205
Santa Clara, CA 95054
Phone: 1-408-780-2040
Fax: 1-408-427-3748
www.scalearc.com

ScaleArc is the leading provider of database load balancing software. The ScaleArc software inserts transparently between applications and databases, creating an agile data tier that provides continuous availability and increased performance for all apps. With ScaleArc, enterprises also gain instant database scalability and a new level of real-time visibility for their application environments, both on prem and in the cloud. Learn more about ScaleArc, our customers, and our partners at **www.ScaleArc.com**.

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