# Scaling and Optimizing Oracle MySQL with Citrix NetScaler

## Challenges posed by explosion of web data

Data demand is growing exponentially due to the increasing utilization of web, mobile and social networking applications. The interactive nature of today's applications requires that data be highly available and accessible. Enterprises and service providers have implemented Oracle® MySQL™ Server to help manage this data explosion; however, the rapid growth in data and increasing rate of data access is placing significantly higher demands on MySQL scalability, availability, performance and security.

**Scalability** – Database servers do not scale linearly as connection counts increase. SQL connections are highly memory and CPU-intensive, causing increased latency and poor application performance. In addition, a spike in SQL queries can overwhelm a database server's connection limits.

**Availability** – Balancing Oracle MySQL queries among database servers is complex because each SQL query can have widely varying runtimes rendering a simple load balancing solution ineffective. TCP load balancers do not have the SQL transaction intelligence to divide the workload efficiently or accurately monitor the health of the database servers. Automatic failover is not a standard MySQL capability and requires complex, open-source solutions.

**Security** – Regulatory and compliance requirements, such as SOX, PCI, DSS, HIPAA and other privacy laws require extensive logging and real-time monitoring of users and data. Security is also needed to protect against unauthorized data access and prevent sensitive data from being leaked or compromised.

## Optimizing Oracle MySQL

Citrix® NetScaler® is an industry-leading application delivery controller (ADC) that is typically deployed at the web/application tier in the datacenter. NetScaler has extended its expertise and technologies for HTTP to SQL, enabling full native intelligence of the SQL protocol. This enables NetScaler to provide an intelligent load balancing, connection multiplexing, health monitoring and database protection solution to increase the scalability, availability and security of the data tier.

**Connection multiplexing** – NetScaler's Oracle MySQL transaction intelligence allows for SQL requests initiated from multiple clients to be sent over significantly fewer long-lived SQL connections to the database server, drastically reducing the ratio of client-to-server connections.

www.citrix.com

CITRIX®

## Key Benefits

Use Citrix NetScaler Database Load Balancing with Oracle MySQL Server to address growing data demand in web, mobile and social networking applications to:

- Simplify database applications with SQL content switching

- Optimize Oracle MySQL server scale out with SQL aware load balancing

- Increase availability with extensive MySQL server health monitoring

- Satisfy regulatory and compliance requirements with database security

**Load balancing** – Armed with SQL transaction awareness, NetScaler can route one client's many SQL transactions in a single connection to several different servers allowing for more optimal load balancing of MySQL traffic.

**Content switching (e.g. read/write split)** - NetScaler can read into Oracle MySQL transactions and decipher between "select", "drop", "insert", "update" and other SQL statements splitting SQL read and write queries and offloading the decision making and policy enforcement from the application servers to NetScaler.

**Health monitoring** – NetScaler intelligently load balances Oracle MySQL server requests by selecting the database server that will return up-to-date data the fastest at the time of the request and sending the read request to only that server. In the event of database server failure, NetScaler automatically and transparently reroutes outstanding SQL requests from the failed server to another available server without terminating client-side SQL connections.

**Data security and threat control** – Polices can be applied at the user level to control access to back-end database servers. NetScaler inspects all SQL transactions and can perform SQL protocol validation and data access control. Data access events can be audited and logged to meet compliance requirements.

## Oracle MySQL High Availability with NetScaler

With increased demand for online and mobile applications, the potential for database failure increases. Expectations for reliable data access are high and downtime is not desirable whether it affects the end-user or the data provider. High availability, rapid recovery, minimal or no downtime is expected for mission-critical applications. NetScaler provides a solution to help enterprises meet strict SLAs (service level agreements) in several ways.

**Increased Availability** – NetScaler's virtual IP-based failover mechanism simplifies high-availability for both master-master and master-slave deployments.

**Improved Response Time** – SQL connection management reduces the amount of server memory and CPU cycles consumed, accelerating database response times and increasing server availability. SQL intelligent load balancing distributes requests evenly across MySQL database server pools.

**Replication Aware Monitoring** – Advanced health monitoring provides a replication aware monitor that can estimate the slave server lag from the master, which enables NetScaler to redirect MySQL queries to other active servers in the pool while allowing existing queries to complete without aborting SQL connections.

## Scaling-out MySQL with NetScaler

Scaling out with commoditized hardware is the preferred option by enterprises when high-speed data access is required. By intelligently distributing database queries across multiple servers, NetScaler can deliver the data reliably and with lower latency. NetScaler's database load balancing feature simplifies MySQL scale-out by:

**Optimizing Load Balancing of MySQL Queries** – Native MySQL aware load balancing distributes SQL requests based on query parameters and routes the request to the most appropriate SQL database for best performance and availability.

**Performing Accurate Health Monitoring** – MySQL server health monitors can measure server performance based on a variety of factors including replication backlog and response time, detect server failures and seamlessly failover to back-up databases.

# Conclusion

With Citrix NetScaler's database load balancing feature, enterprises can tackle the challenges of an ever-growing sprawl of database servers. NetScaler's native SQL intelligence addresses the connection management, load distribution and high-availability pain points of scaling Oracle MySQL server deployments. NetScaler simplifies database management and scaling resulting in greater availability, performance and security.

**CİTRİX®**

**Worldwide Headquarters**
Citrix Systems, Inc.
851 West Cypress Creek Road
Fort Lauderdale, FL 33309, USA
T +1 800 393 1888
T +1 954 267 3000

**www.citrix.com**

**Americas**
Citrix Silicon Valley
4988 Great America Parkway
Santa Clara, CA 95054, USA
T +1 408 790 8000

**Europe**
Citrix Systems International GmbH
Rheinweg 9
8200 Schaffhausen, Switzerland
T +41 52 635 7700

**Asia Pacific**
Citrix Systems Hong Kong Ltd.
Suite 6301-10, 63rd Floor
One Island East
18 Westlands Road
Island East, Hong Kong, China
T +852 2100 5000

**Citrix Online Division**
6500 Hollister Avenue
Goleta, CA 93117, USA
T +1 805 690 6400