Tungsten Clustering

Benefits & Configurations

A Technical Overview

COMMERCIAL-GRADE HIGH AVAILABILITY

GLOBALLY REDUNDANT DISASTER RECOVERY

PERFORMANCE SCALING

GEOGRAPHICALLY DISTRIBUTED MULTI-MASTER

Continuent.
Address: 535 Mission St, 14th floor, San Francisco CA 94105
P: (800) 270-9035 E: sales@continuent.com

Continuent, the MySQL High Availability Company, provides solutions for continuous operations enabling business-critical MySQL & MariaDB database applications to run on a global scale with zero downtime.

Established in 2004, we provide geo-distributed high availability on-premises, hybrid-cloud, and multi-cloud environments with our Tungsten Clustering and Tungsten Replicator products. We also offer industry-leading, 24/7 MySQL & MariaDB support services to ensure continuous client operations.

Our customers are leading SaaS, e-commerce, financial services, gaming and telco companies who rely on us to cost-effectively safeguard billions of dollars in annual revenue, including Adobe, Carfax, F-Secure, Garmin, Marketo, Modernizing Medicine, NewVoiceMedia, Samsung, Riot Games, Stitcher and VMware.

For more information on our products and services, please visit www.continuent.com, email us at sales@continuent.com or call us at (800) 270-9035, and follow us on Twitter @Continuent.

OVERVIEW

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Section 1 Tungsten Clustering

What Is It?

Tungsten Clustering is a one-of-a-kind software solution that provides clustering, disaster recovery and high availability for MySQL, MariaDB & Percona Server databases.

What Does it Do?

Tungsten Clustering allows enterprises running business-critical MySQL, MariaDB & Percona Server database applications to cost-effectively achieve continuous operations on a global scale with:

- Commercial-grade high availability (HA),
- Geographically redundant disaster recovery (DR)
- Global operations scaling with geographically distributed multi-master

It makes it simple to:

- Create database clusters in the cloud or in your private data center
- Keep the data available even when systems fail
- Free you up to focus on your business and applications

A Tungsten cluster also provides full clustering support, including:

- Intelligent load balancing
- Rapid, automated local failover
- Multi-master, multi-site deployments

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Section 2

Tungsten Clustering Benefits

Continuous Operations

- Redundancy within and across data centers
- Immediate failover for maximum availability
- Data protection of business-critical applications
- Reduce recovery time from hours or days to mere seconds
- Graphical view and management of all globally distributed clusters

Zero Downtime

- Site-level and cross-site failover ensures application availability
- Upgrade hardware, software and data without taking applications offline
- Database compatibility means seamless migration of your data and applications

Multi-Master

- Multiple, geographically-distributed write masters can provide higher availability because no failover is required between sites
- Lower-latency read response times for co-located application servers

Geo-Scale

- Load-balance read operations across multiple slaves, locally and globally
- Geo-distributed clusters bring read data close to your application users for faster response times
- Easily add more clusters as needed for unlimited scaling, both locally or across the globe

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Section 2

Tungsten Clustering Benefits

Hybrid-Cloud and Multi-Cloud

- Deploy in the cloud, VM and bare metal environments
- Mix-and-match on-premises, private and public clouds (incl. Amazon AWS, Google Cloud and Microsoft Azure)
- Easy, seamless migration from cloud to cloud to avoid vendor lock-in in any specific cloud provider
- Withstand node, data center, zone or region failures or outages

Intelligent Proxy

- Provides intelligent traffic routing to a valid master, locally and globally
- Load balancing - scale read queries via query inspection and other methods
- Application and active users do not disconnect during master failover events

Most Advanced Replication

- Filter and transform your data in-flight
- No more ETL, get real-time data feeds into your analytics
- Replicate directly into popular analytic repositories: AWS RedShift, Cassandra, ClickHouse, Elasticsearch, HDFS, Kafka and Vertica
- Unlimited real-time transactional data transfer to eliminate escalating replication cost of ETL-based alternatives

Section 2

Tungsten Clustering Benefits

Full Support, No Application Changes

- Deploy and configure clusters in minutes
- Not 'MySQL-compatible" solution. Use any of your off-the-shelf MySQL,
- MariaDB and Percona Server versions
- Support for all modern MySQL (5.x through 8.x) and MariaDB (5.x and 10.x) versions and features
- SSL support for all in-flight traffic
- Native MySQL support means easy and complete migration of your data and applications

Industry-Best 24/7 Customer Service for MySQL, MariaDB & Percona Server

- Highly Qualified 24/7 support
- All support team members have 15 or more years of MySQL DBA and Site Reliability Experience
- 24/7 support comes with 1-hour SLA, with response times for urgent requests averaging less than 5 minutes
- Database uptime measured in months or years

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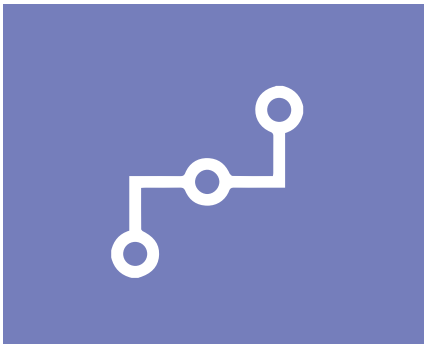
Section 3 Tungsten Clustering Components



Tungsten Connector

The Tungsten Connector™ is a service that sits between your application server and your MySQL database. The connector routes connections from your application servers to the data sources within the cluster, automatically distributing and redirecting queries to each data source according to load balancing and availability requirements.

Tungsten Manager

The Tungsten Manager™ is responsible for monitoring and managing a Continuent Tungsten data service. The manager acts as both a controller and as a central information source for the status and health of the data service as a whole.

Tungsten Replicator

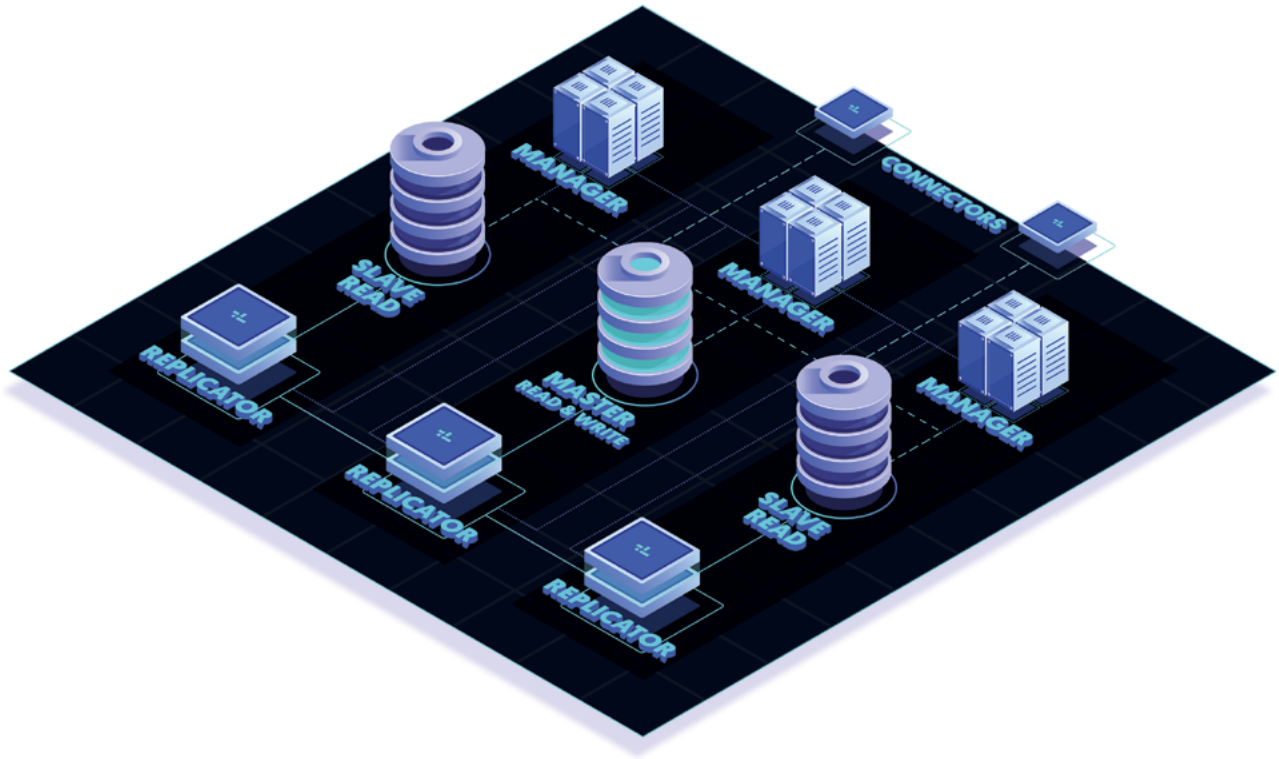
Tungsten Replicator™ is a replication engine for MySQL, MariaDB & Percona Server, including Amazon RDS MySQL and Amazon Aurora, that provides high-performance and improved replication functionality over the native solution and into a range of target databases, such as MySQL (all versions), Oracle, PostgreSQL, AWS RedShift, Cassandra, ClickHouse, Elasticsearch, Hadoop, MongoDB, Kafka and Vertica.

Tungsten Dashboard

In addition to the command-line user interfaces, we provide our Tungsten Dashboard™ for easy monitoring and management of your clusters.

Section 3

Tungsten Clustering Components



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Section 4 Primary/DR Composite Clustering

1 master + 2 failover/read slaves and 1 relay/read node + 2 failover/read slave

In the Composite Primary/DR Cluster topology (Active/Passive), there is a single writeable master node across all sites, and all writes are directed to that master. The Connectors are multi-site aware and will automatically react to a site failover. Replication flows in one direction only, from the current Primary cluster to the DR cluster(s).

This topology provides a highly-available local operations and an active failover site that is also available for reads. It is well-suited for customers who seek the highest level of HA, with the ability to operate applications on both sites, without application changes.

Section 5

Multi-Site Multi-Master Composite Clustering

Two or more clusters each consisting of 1 master + 2 failover/read slaves

In the Composite Multi-Master Cluster topology (Active/Active), there is one writeable master node per cluster, and all writes are directed to that master by the local Connectors. The Connectors are able to use any other site in the event of a local outage; all sites are write-able at all times, and each cluster replicates from all other member clusters.

This topology links highly-available clusters across sites to enable constant availability for updates in two or more locations separated by high-latency networks. It is recommended for SaaS applications, credit card payment gateways, or online services that must always be available for business.

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Section 6 Single Site Solutions

Standalone HA Clusters - 1 master + 2 failover/read slaves

The Tungsten Clustering HA configuration is designed for sites that strive to ensure constant availability. This topology ensures the ability to perform maintenance on any database server and still maintain an environment capable of HA failover at all times. This is the preferred basic configuration for all applications.

HA with Read Scaling - 1 master + 4 or more failover/read slaves

Tungsten Clustering HA with Read Scaling is ideal for sites that require HA and read-scaling for enhanced performance under peak loads. Tungsten Clustering enables the use of additional read slaves with minimal performance impact to the HA cluster. Media and consumer web sites should consider this option.

Additional Information:

The best practice is to have three (3) database nodes minimum per cluster.

Tungsten Clustering requires an odd number of nodes to establish a voting quorum. A proper voting quorum is essential for proper cluster operation in the event of a network partition. In order to be able to avoid the existence of two active masters in the same cluster (otherwise known as a split-brain scenario), there must be a majority of the voting nodes in one of the network partitions. Once a majority is established, a new master is selected from that majority group. In network partitions with a minority, any master is shunned to prevent a split-brain.

Tungsten Clustering supports an “Active Witness” node, which is not a database node, but does run the Manager, and is an active, voting member of the cluster. This allows for a hardware savings as compared to a full database node. The cost for a Witness node is the same as for a full database node.