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What is VMware Continuent?

VMware Continuent® allows enterprises running business-critical database applications to affordably achieve commercial-grade high availability (HA), globally redundant disaster recovery (DR) and performance scaling. VMware Continuent makes it simple to create database clusters in the cloud or in your private data center, to keep the data available even when systems fail.

In addition, VMware Continuent provides data replication from relational databases to high-performance NoSQL and data analytics engines to derive insight from big data for better business decisions.

The key benefits include:

- **Deployment Flexibility** – Build database clusters in any bare-metal, private cloud (VMware, Open Stack) and public cloud (VMware vCloud® Air™, Amazon AWS, Red Hat OpenShift) environments.
- **Zero-Downtime Maintenance** – Perform database maintenance, such as schema changes, upgrades to a new version of MySQL or adding new hardware, without application or service interruptions.
- **High Availability** – Replace a failed master DBMS server within seconds while maintaining continuous availability and without losing any transactions.
- **Improved Performance** – Increase replication performance 5x over native MySQL and increase transaction volumes using intelligent parallel methods.¹
- **Geo-Clustering** – Implement multi-master, cross-site database clusters that span sites and are ready for immediate failover.
- **Disaster Recovery** – Switch to a hot-standby disaster recovery site running a VMware Continuent cluster with a single command without losing application connectivity.
- **Affordable Oracle Replication** – Replicate data from Oracle to MySQL, from MySQL to Oracle, and from Oracle to Oracle. Think “Oracle GoldenGate without the price tag!”
- **Real-Time Integration Between RDBMS and Analytics** – Replicate quickly and efficiently to high-performance NoSQL and data analytics engines to derive insight from big data for better business decisions.
- **Supports off-the-shelf MySQL, MariaDB and Percona Server** – No software upgrade, data migration, application or DDL changes are required.

Functionality is provided across four primary products:

- **VMware Continuent for Clustering** – Provides full clustering support, including load balancing, failover, and multi-master, multi-site deployments.
- **VMware Continuent for Disaster Recovery** – Enables replication to another server or site to handle disaster recovery scenarios.
- **VMware Continuent for Replication** – Provides core replication between MySQL, MariaDB and Percona servers and replication to and from Oracle.
- **VMware Continuent for Analytics and Big Data** – Provides replication from MySQL to various Hadoop distributions (including Pivotal HD, MapR, HortonWorks, and Cloudera), HP Vertica, and Amazon Redshift.

¹ VMware internal testing using 130GB/30 database sysbench test, April 2013
## Key benefits

### High availability (HA), disaster recovery (DR), and continuous operations

- VMware Continuent handles data access from existing applications transparently for various cluster configurations, and maintains continuous connectivity during database maintenance or failover.
- VMware Continuent provides automatic failover that can replace a failed local master within seconds.
- VMware Continuent manages seamless integration of failed nodes when corrected and available.
- VMware Continuent protects against a site failure with easy-to-manage DR configuration and failover capabilities.
- VMware Continuent offers a true multi-master distributed solution supporting clusters across multiple data centers or cloud-computing regions with real-time updates and failure handling.

### Ease of use and zero downtime operations

- Setup in minutes in cloud or on-premises environments.
- Perform database maintenance and application upgrades without service interruptions.
- Reduce ongoing DBA operations. Run large deployments with fewer DBA resources, resulting in significant cost savings.

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<table>
<thead>
<tr>
<th>FEATURE</th>
<th>VMware Continuent for Clustering</th>
<th>VMware Continuent for Disaster Recovery</th>
<th>VMware Continuent for Replication</th>
<th>VMware Continuent for Analytics and Big Data</th>
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<td>Disaster Recovery</td>
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<td>Oracle Replication</td>
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<tr>
<td>Replication To Real-Time Analytics And Big Data</td>
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<td></td>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td>Improved Performance</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
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<tr>
<td>Supports MySQL, MariaDB and Percona Server</td>
<td>Yes</td>
<td>Yes</td>
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<td>Yes</td>
</tr>
</tbody>
</table>

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Load balancing
- VMware Continuent increases throughput by automatically and transparently load balancing read operations across multiple slaves.
- Read/Write splitting supported through packet inspection, and explicit port, host and connection string configuration.

Improved performance
- VMware Continuent improves database performance by transparently splitting reads to the slaves and writes to master, thus reducing master load.
- VMware Continuent can increase replication performance by five (5) times over native MySQL and increases transaction volumes using intelligent parallel methods.¹

Supporting cloud operations
- Deploy VMware Continuent clusters in the cloud with a single command.
- Augment your existing individual or clustered DBMS, in your local data center or at a managed hosting facility, with a failover disaster recovery VMware Continuent cluster in the cloud.
- Create multi-site, multi-master VMware Continuent clusters reaching over multiple regions and availability zones.

No migration deployments
- VMware Continuent works with off-the-shelf MySQL, MySQL Community and Enterprise versions (5.0 to 5.6), MariaDB (5.5) and Percona Server (5.5 and 5.6).
- VMware Continuent does not require any application changes for a default implementation. It may be beneficial to consider application changes to leverage all VMware Continuent clustering features.

Advanced replication features

Multi-master replication
- VMware Continuent and Tungsten Replicator enable global real-time transaction processing with flexible multi-master replication configurations between clusters.
- VMware Continuent and Tungsten Replicator make real-time data aggregation of reporting data simple by replicating from multiple locations into a single database server without the need for data transformation.

Parallel replication
- VMware Continuent and Tungsten Replicator increase replication performance by 5X over native MySQL and increases transaction volumes using parallel slave apply.²

Oracle replication
- VMware Continuent and Tungsten Replicator can replicate MySQL transactions to and from Oracle databases.
- VMware Continuent and Tungsten Replicator can also replicate from Oracle to Oracle.

Real-time analytics and Big Data
- VMware Continuent and Tungsten Replicator support real-time analytics replicating data quickly and efficiently to high-performance analytics engines, such as Vertica.
- VMware Continuent and Tungsten Replicator can publishing data in real-time from SQL to NoSQL implementations, such as MongoDB.
- VMware Continuent scales manageable data volumes to 50TB and more through arrays of database clusters.

¹ VMware internal testing using 130GB/30 database sysbench test, April 2013
VMware Continuent configurations

VMware Continuent configuration examples below highlight typical installations and typologies.

Color codes and roles

- **Master: Write/Read**
  VMware Continuent software subscription, including 24/7 support with a guaranteed maximum 1-hour response time to an urgent support request.

- **Failover Slave: Read, Failover-Ready**
  VMware Continuent software subscription, including 24/7 support with a guaranteed maximum 1-hour response time to an urgent support request.

- **Hot standby Master: Write/No Read**
  VMware Continuent DR software subscription, including 24/7 support with a guaranteed maximum 1-hour response time to an urgent support request.

- **Hot standby Slave: No Read**
  VMware Continuent DR software subscription, including 24/7 support with a guaranteed maximum 1-hour response time to an urgent support request.

High availability (HA) configurations and topologies

**VMware Continuent Basic HA**

1 master + 1 failover slave

The VMware Continuent Basic HA configuration is for smaller sites that wish to eliminate a single point of failure for the DBMS server. This configuration protects from a master failure and enables zero-downtime maintenance of nodes, with the caveat that failover is not possible during a maintenance period, since the slave is not available. Clusters with two database servers must have a passive or active witness server. There is no license fee for witness servers. We do not recommend this setup. Always consider adding a third node in your cluster.

**VMware Continuent HA**

1 master + 2 failover and read slaves

The VMware Continuent HA configuration is designed for any site that strives to ensure constant HA. This configuration ensures the ability to perform maintenance on any DBMS server and still maintain a HA environment capable to support failover at any time. This is the preferred configuration for large transaction processing applications.

**VMware Continuent HA with Read Scale**

1 master + n failover slaves and read slaves

The VMware Continuent HA with Read Scale configuration is ideal for sites that require HA and also need to scale read performance. Media and consumer web sites should consider this option. VMware Continuent enables additional read slaves at no performance impact to a HA cluster.
High availability (HA) and disaster recovery (DR) configurations and topologies

VMware Continuent Basic HA with Hot Standby DR
1 master + 1 failover slave and 1 passive master
The VMware Continuent Basic HA with DR configuration extends the HA protection to include failures of the main site. It is ideal for small to medium operations with a constrained budget. Clusters with two database servers must have a passive or active witness server. There is no license fee for witness servers.

VMware Continuent HA with Hot Standby DR
1 master + 2 failover slaves and 1 passive master + 1 passive slave
This configuration extends the HA offered by the VMware Continuent Basic HA with DR configuration by adding an extra slave for read scaling, and more protection through an additional DR slave. It is suitable for larger application that need maximum HA but without a full copy of primary site resources on the DR site.

VMware Continuent HA and Hot Standby DR Site
1 master + 2 failover slaves plus 1 passive relay master + 2 passive slaves
The VMware Continuent HA with Read Scale and DR Site offers high local availability and performance scaling with the additional protection of a full replacement DR site. This option is suitable for customers with active sites that need the highest levels of HA protection.

Multi-site configurations and topologies

VMware Continuent Basic HA and Active DR Site
1 master + 1 failover slave plus 2 active slaves
The VMware Continuent Basic HA with active failover clustering offers HA suitable for small to medium-sized applications that need HA and business continuity. It permits reads on the failover site, which maximizes utilization of hardware resources on both sites. Clusters with two database servers must have a passive or active witness server. There is no license fee for witness servers.

VMware Continuent HA and Active DR Site (aka System of Record)
1 master + 2 failover slave and 1 active relay master + 2 active slaves
The VMware Continuent System of Record configurations provide highly available local operation plus an active failover site that is also available for reads. They are well suited for customers who seek the highest level of HA protection without altering applications, with the ability to operate applications on both sites.

VMware Continuent Multi-Master
1 master + 2 failover slaves and 1 master + 2 failover slaves
The VMware Continuent Multi-Master 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 applications like credit card payment gateways or online testing services that must always be available for business.
Advanced replication topologies

VMware Continuent for Replication for Oracle to Oracle

*Oracle master + Oracle slave or Oracle RAC + Oracle RAC or Oracle slave*

The VMware Continuent real-time Oracle-to-Oracle replication is ideal for customers seeking an efficient, low-cost HA solution for Oracle databases. It works with individual Oracle instances as well as Oracle RAC.

Think “Oracle GoldenGate without the price tag!”

Typically requires three to five (3-5) days of production deployment consulting and training.

VMware Continuent for Replication between MySQL and Oracle

*MySQL master + Oracle slave, Oracle master + MySQL slave*

The MySQL-Oracle configurations are ideally suited for integrating systems that contain both MySQL as well as Oracle applications. Examples include MySQL sales apps that transfer transactions to Oracle for order fulfillment or reporting, and MySQL applications that publish legacy Oracle application data on the web.

Typically requires three to five (3-5) days of production deployment consulting and training.

VMware Continuent for Replication from Cluster to Oracle

*MySQL master with 2 failover slaves plus an Oracle slave*

The VMware Continuent cluster-to-Oracle replication ensures proper availability of the MySQL source data. For example, it is recommended for servers that aggregate data on the way to Oracle to avoid loss of a critical link in business processing should the aggregation server fail or need to go offline for maintenance.

Typically requires three to five (3-5) days of production deployment consulting and training.

VMware Continuent for Analytics and Big Data

*MySQL/Oracle to Hadoop, MySQL/Oracle to MongoDB, MySQL/Oracle to Vertica (others upon request)*

MySQL/Oracle to analytics and NoSQL replication enables users to publish transactions from MySQL and Oracle systems in real-time to Hadoop, MongoDB and Vertica. This deployment model is recommended for businesses that need to deliver complex analytics quickly on rapidly changing data.

Typically requires five to ten (5-10) days of production deployment consulting and training.
Consulting
For information on available services, including custom development, contact continuent-sales@vmware.com.

Next Steps

Additional Documentation
For more information about VMware Continuent, please visit the product pages at http://vcloud.vmware.com/service-offering/continuent.

VMware Contact Information
For additional information or to purchase VMware Continuent, you can reach a sales representative at 1- (877) 486-9273) or email sales@vmware.com. When emailing, please include the state, country, and company name from which you are inquiring.

“By leveraging the VMware Continuent platform, we have increased our ability to provide higher levels of availability and uptime, including complex database upgrades and operations in production. VMware Continuent can help us at least in two ways to lower op-ex: enables more customers on each pod (database cluster) and allows us to use replication between our current hosting provider and another, more cost effective hosting provider to augment pods or completely switch over to save significant money.”

— Nick Bonfiglio, VP Operations, Marketo

“VMware Continuent is in use for over 40-50 systems and has allowed us to quickly switch from master to slave in several situations with no service interruption.”

— Heidi E. Schmidt, Sr. Database Administrator, Constant Contact

“Having tried traditional ETL tools and slow data-scraping techniques that put a heavy load on operational systems, we found that we were unable to meet the low latency required by our business as well as capture a complete record of transactions. Hadoop has clearly changed the landscape of data management by providing a central data backbone hub that receives data from across the enterprise business; however, there is now a wide range of services that need to move transaction OLTP data efficiently into Hadoop. With VMware Continuent we can quickly and flexibly move data out of operational databases into Hadoop where we run analytics that answer important business questions on timelines matching the needs of our users.”

— Chris Schneider, Database Architect, Groupon
Providing Feedback

VMware appreciates your feedback on the material included in this guide, and in particular, would be grateful for any guidance on the following topics:

1. How useful was the information in this guide?
2. What other specific topics would you like to see covered?

Please send your feedback to tmfeedback@vmware.com, with “What’s New with VMware Continuent” in the subject line. Thank you for your help in making this guide a valuable resource.

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