



Continuent™ Tungsten Enterprise Solutions

Robust Solutions for
Continuous Data Availability and
Performance Scaling

Value Proposition White Paper

June 18, 2009

Overview

Data is the heart of the modern enterprise. Continuous Data Availability means having your data when you need it, where you need it, 24/7/365.

Continuent offers a wide range of data availability and performance scaling solutions for problems ranging from basic database availability to high performance database clustering.

Our solutions are designed to be both economical as well as effective--combining the economy of open source with the advanced capabilities of commercial database offerings.

Continuent offers a wealth of solutions for MySQL, PostgreSQL and Oracle users proving high value on the following main areas:

- Low TCO, High ROI
- Database Performance Scaling
- Continuous Data Availability
- Avoid Data Loss
- Oracle Integration
- Simple Management

Continuent's offerings represent the most complete coverage of Database Continuous Data Availability solutions you can find.

Tungsten Enterprise solutions and services are available from Continuent, a Continuous Data Availability Company. Our website is www.continuent.com, and you may download an evaluation version of Tungsten Enterprise at www.continuent.com/software.

Tungsten Open Source components are available at the Continuent Community web site www.continuent.com/community.

Low TCO, High ROI

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Continuent accomplishes this in five specific ways:

- **Open Source and Affordable Commercial Solutions.** Continuent provides Tungsten technology to the open source community where companies of all sizes can download it, integrate it, and use it to address their own database application high availability and scalability requirements. In addition to open source components, Continuent also offers low cost commercial solutions, that are fully supported, thoroughly tested, enhanced with powerful new features, and is affordable to companies of all sizes.
- **Protection From Expensive Cost of Downtime (Planned and Unplanned)** The cost of downtime within a company can vary greatly. Each company can easily determine the cost of 1 hour, 4 hours, 1 day, or perhaps 1 week or more of downtime in case a database should crash or become inaccessible. With many companies, all it takes is just 1 instance of downtime to exceed the cost of a Continuent Tungsten license that is designed and built to prevent such outages 24/7 – including the ability to do online database maintenance.
- **Oracle Replication - Replication between lower cost Oracle Editions.** Continuent Tungsten Enterprise has been designed to replicate to/from all Editions of Oracle, including the lower cost editions of Standard Edition, Standard Edition One, and Express. No longer is the user forced to pay the high license fees of Oracle Enterprise Edition, unless their application requires it.
- **Heterogeneous Replication - Replication to lower cost open source databases.** Tungsten Enterprise can replicate data from Oracle to MySQL or PostgreSQL, and also to any other (lower cost) JDBC-compliant database. This is a rapidly growing requirement due to corporate budgets that are under pressure to be reduced, while at the same time being able to deliver business critical replication solutions for Disaster Recovery, Data Warehousing, important Web-based and decision support applications, and database upgrades and migrations, just to name a few.
- **Avoiding the Cost of Creating, Maintaining and Supporting your own Solutions.** Continuent has done all of the design, architecture, development, integration, and testing of a comprehensive suite of solutions built to address the Continuous Data Availability and Scalability requirements of businesses. To create an equivalent set of solutions and features to what Tungsten provides would take several man-years of development effort, coupled with ongoing support costs to keep it current. These “do it yourself” costs can be prohibitive when compared to the affordable price of the Tungsten solutions.

Database Performance Scaling

Tungsten provides database performance scaling with easy provisioning and management, intelligent load balancing, fast proxying, automatic slave detection and latency management.

Continuent Tungsten allows users to set up replica databases easily. Tungsten offers sophisticated SQL routing that directs application requests transparently to replicas based on availability and latency.

Tungsten SQL routing greatly reduces the changes applications require to take advantage of read-only database copies.

Tungsten achieves Database Performance Scaling using advanced features such as:

- **Easy provisioning and management.** Tungsten allows users to set up new slaves easily and remove them when no longer needed. We also provide integrated management for the entire cluster.
- **Intelligent load balancing** (Tungsten exclusive). Tungsten SQL Router allows Java applications to load balance and route SQL requests efficiently with no performance overhead across multiple data replicas in master/slave clusters. The load balancing is based on an innovative algorithm that allows users to trade availability versus data consistency requirements to increase performance.
- **Fast proxying** (Tungsten exclusive). Tungsten proxies are very fast, as they use efficient thread scheduling across multi-core hosts. Your proxies will use all the horsepower available to avoid becoming an application bottleneck.
- **Automatic slave detection** (Tungsten exclusive). Tungsten automatically detects new slaves added to the cluster and adds them to the load-balancing pool. Inactive or off-line slaves are automatically removed. No management action is necessary to make this work.
- **Automatic latency management** (Tungsten exclusive). Tungsten allows users to specify acceptable latency levels on slaves and then monitors them automatically. Connections are only load-balanced to up-to-date slaves.

Continuous Data Availability

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This helps address not just failures but also maintenance, which is the main source of downtime in modern IT environments.

Tungsten achieves Continuous Data Availability by using advanced features such as:

- **Automated failover** (Tungsten exclusive). Tungsten failover is a one-step procedure that automatically switches masters and reconfigures the

rest of the cluster, including directing other slaves to the new master and updating load-balancing.

- **Seamless slave promotion** (Tungsten exclusive). Tungsten can promote any slave to be master without data loss or requiring other slaves to be stopped or re-provisioned.
- **Integrated, transferable backups** (Tungsten exclusive). Backup and restore procedures are built into the Tungsten Replicator, making it easy to take data snapshots required for provisioning.
- **Seamless Failovers without proxies for Java-based Applications** (Tungsten exclusive). Java applications can use the Tungsten SQL Router for seamless failover without an intermediate proxy. Tungsten gives the benefits of middleware without the performance hit.
- **Upgrade across versions and database types** (Tungsten exclusive). Tungsten can replicate data between database versions and even database types, thereby allowing applications to minimize or even eliminate downtime for server upgrades.

Avoid Data Loss

Tungsten's advanced replication and backups ensure complete protection from the DBA's worst nightmare: losing data.

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Tungsten makes it easy to set up live copies that protect from failures as well as administrative data deletion. Built-in consistency checks ensure data integrity so users can be confident that replicas are ready for use and correct.

Tungsten achieves No Data Loss using advanced features such as:

- **Zero-data loss for planned and unplanned failovers** (Tungsten exclusive). Tungsten has multiple options to eliminate loss of data when failing over from an old master to a promoted slave. These include flush events that clear transactions from the master and extended features like DRBD integration.
- **Fail-safe data application on slaves** (Tungsten exclusive). Slaves remain consistent even following crashes thanks to transactional data replication, which ensures that SQL updates are neither dropped nor repeated.
- **Time-delay replication** (Tungsten exclusive). Tungsten can delay replication to offer a "window of opportunity" to recover data lost through administrative mistakes on the master such as deleting application tables.
- **Integrated backups** (Tungsten exclusive). Tungsten integrates backups using file system snapshots and also through database dumps.
- **Continuous consistency checks** (Tungsten exclusive). Tungsten allows users to perform incremental checks of consistency between master and slave databases without stopping the cluster and without causing a performance hit on applications.
- **Upgrade on slaves.** Users can run upgrade and maintenance processes on slaves, then switch masters after the upgrade has finished

successfully. This eliminates the risk of data loss due to upgrade mistakes.

Oracle Integration

Tungsten provides efficient data replication between commercial and open source databases.

Tungsten enables the use of open source database technology in enterprise IT environments by providing efficient data replication between commercial and open source databases.

Tungsten thus removes one of the main obstacles to adopting open source technologies while maintaining existing applications based on Oracle and other commercial databases.

- **Low-Cost Oracle Replication to Open Source Databases.** Tungsten can replicate data from more expensive commercial databases (Oracle) to less expensive open source databases (MySQL and PostgreSQL). This is key to using open source solutions in an enterprise that already stores substantial amounts of data in Oracle.
- **SQL Filtering** (Tungsten exclusive). Tungsten integrated filtering technology can change SQL “on the fly” from the source dialect to the target. This enables a much wider range of SQL to be replicated across database platforms such as Oracle to MySQL.
- **Replication to and from applications, message queues, and files** (Tungsten exclusive). Tungsten is not just limited to databases. The Tungsten Replicator can be extended to generate XML, put database changes in message queues, and write to applications. This is not just better than MySQL replication; it is better than most replicators available on the market. Tungsten Replicator allows you to integrate databases with anything that produces or consumes data.

Simple Management

Master-slave replication that goes well beyond the capabilities of database native replication.

Continuent solutions offer master-slave replication that goes well beyond the capabilities of database native replication. Tungsten Enterprise replication is designed from the bottom up to ensure maximum reliability and flexibility.

- **One-step failover** (Tungsten exclusive). Failover is a complex operation in master/slave clusters that may involve applications, proxies, replication tools, and of course databases. Tungsten reduces failover to a single command that takes databases safely on- and offline (without losing data) and reconfigures the rest of the system accordingly.
- **Auto-configuration** (Tungsten exclusive). Tungsten group communication eliminates administration tasks by auto-configuring system components to adjust load balancing as servers become available, disappear, or exceed latency requirements of client applications. MySQL and other solutions are single components, not full solutions.
- **Centralized API** (Tungsten exclusive). We will provide a central API for cluster management. This allows users to tie in additional automation to offer still more flexibility in management.
- **Multiple technologies.** Tungsten allows management of multiple technologies, not just databases.

Summary And More Information

Tungsten commercial solutions help users harness innovative open source technologies to provide continuous data availability that meets the needs of enterprises from small to large. Tungsten offers features that are critical to ensuring that databases operate efficiently and economically under a wide range of conditions.

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Exhibit A: Tungsten Features

	Easy HA	Easy HA Plus	Easy Scale	Enterprise	Site License
Number of Servers	1+1	1+1	1+N	1+N	N*(1+N)
High Availability					
1+1 database replication	●	●	●	●	●
Seamless slave promotion and master failover	●	●	●	●	●
Zero data-loss with planned failover	●	●	●	●	●
Master recovery and fallback	●	●	●	●	●
Fail-safe data application on slave	●	●	●	●	●
Automated consistency checks	●	●	●	●	●
Integrated backup/restore	●	●	●	●	●
Simple management	●	●	●	●	●
Admin security	●	●	●	●	●
Advanced High Availability					
Zero data-loss with emergency failover		●		●	●
Recovery from admin data deletion		●		●	●
Automated failover		●		●	●
Zero downtime upgrade		●		●	●
Database Performance Scaling					
1+N database replication			●	●	●
Load balancing of reads			●	●	●
Automatic detection of new slaves			●	●	●
Automatic tracking of slave latency			●	●	●
Enterprise Clustering and Replication					
High performance parallel replication				●	●
Data partitioning/sharding support				●	●
Session consistency model load balancing				●	●
Scheduled backups				●	●
Bi-directional replication with conflict resolution				●	●
Secure transport and data encryption				●	●
Cloud Operation					
RightScale scripts and server templates	●	●	●	●	●
Amazon EC2 enabled	●	●	●	●	●
GoGrid enabled	●	●	●	●	●
Rackspace/Mosso enabled	●	●	●	●	●
Data Integration					
Extend to new data sources	●	●	●	●	●
Hooks for data transformation	●	●	●	●	●
Replication to/from applications				●	●
Replication to/from message bus software				●	●
Replication to any JDBC-enabled database				●	●
Documentation, Deployment & Support					
Professional documentation	●	●	●	●	●
Quick installation and certified builds	●	●	●	●	●
8x5 email support	●	●	●	●	●
24x7 enterprise support		●		●	●
Custom bug fixes				●	●
Guaranteed response time				●	●