



Continuent™ Tungsten Enterprise Solutions

Robust Solutions for
Continuous Data Availability and
Performance Scaling

Tungsten Products White Paper

June 18, 2009

Enterprise Continuous Data Availability

Continuous data availability means having your data available when and where you need with consistently fast response times. This is the key requirement for databases operating in today's 24/7 environments.

Swift changes in database technology and data processing as a whole have made ensuring continuous data availability quite challenging. Large data volumes, high number of users, and nonstop operation raise the bar for application developers as well as database administrators. The emergence of disruptive but highly economical open source technologies is both an opportunity as well as another potential headache. There is a universal need to cut costs and process data more efficiently.

Continuent Tungsten harnesses the power of advanced open source and commercial technologies to deliver economical and efficient continuous data availability for enterprises. Tungsten solutions are based on the Tungsten Suite, a unique collection of solutions for database scale-out. All solutions include support delivered by database experts.

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.

Easy Solutions for Real Problems

Tungsten solves enterprise data availability and performance scalability problems

Tungsten solutions integrate scale-out technologies with open source and low cost commercial databases to provide drop-in answers for the big data availability problems that keep IT departments awake at night.

- **Avoid Data Loss.** Tungsten integrates advanced replication and backups to ensure complete protection from the DBA's worst nightmare: losing data. 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.
- **Ensure Constant Availability.** Tungsten provides simple, automated failover procedures to allow applications to switch to replicas quickly, seamlessly, and without risk of data loss. This helps address not just failures but also maintenance, which is the main source of downtime in modern IT environments.
- **Performance Scaling.** 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.

- **Open source/commercial data integration.** 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.

Tungsten solutions help users solve these problems with easy and intuitive management so that complex operations like failover are reduced to a single command. Our solutions minimize or entirely eliminate application changes and are simple to deploy.

Tungsten Solutions

Tungsten commercial solutions are divided into four packages designed to solve particular types of continuous data availability problems. All solutions have the following common features:

- Integrated builds including all Tungsten components in a single download
- Commercial extensions to improve management and security, replicate from commercial databases, and add other features required for enterprise use
- Auto configuration procedures for local, as well as, cloud environments
- Professional-quality documentation
- Regular releases and patches with extended support options for guaranteed turn-around on fixes
- Expert product support available in 8/5 as well as 24/7 versions

Tungsten solutions are licensed on a subscription basis with prices that vary according to the features included. Subscriptions are based on the number of databases and range from simple “1+1” (one master, one slave) high availability configurations, to site licenses that permit unlimited numbers of databases in a single location.

Tungsten Easy HA

Tungsten Easy HA provides drop-in data availability and protection for small sites for whom a single database host provides sufficient performance. The product features include:

- “1+1” master with replica standby database for quick failover from the master
- Fail-safe data application on slaves to ensure correct data copies even when there are hardware crashes or software failures

- Seamless slave promotion and master failover with zero data loss for planned failovers
- Master recovery and failback after a master failure
- Easy management procedures, including integrated backups and data consistency checks

Tungsten Easy HA deploys quickly for existing databases and does not require changes to applications. For extra security the slave replica may reside on another site.

Tungsten Easy HA Plus

Tungsten Easy HA Plus extends the features of the Tungsten Easy HA product to provide extra data protection.

Tungsten Easy HA Plus is for users who place especially high value on their data but do not need performance scaling beyond the capacity of a single database host.

- All features of Tungsten Easy HA
- Multiple replica data bases for additional protection (for example, local as well as off-site replicas)
- Automated failure detection with the option to promote a slave immediately to take over from the master
- Synchronous data protection to ensure committed transactions are safely replicated to at least one additional host
- Time-delay and managed point-in-time recovery to ensure quick recovery of data lost by administrative errors
- Low, and zero-downtime upgrade support

Tungsten Easy HA Plus deploys quickly on existing databases. Users can upgrade to Easy Tungsten HA Plus features from Easy HA. As with Tungsten Easy HA, it is not necessary to alter applications in any way with Tungsten Easy HA Plus.

Tungsten Easy Scale

Tungsten Easy Scale helps users scale database capacity quickly and efficiently to handle increased or highly variable loads.

Tungsten Easy Scale is optimized for the most common scaling scenario, namely high levels of read traffic. Easy Scale features include the following:

- 1+N replication from a single master to multiple slaves
- Sophisticated load-balancing algorithms including latency management, read/write splitting, and advanced techniques that allow applications to trade off availability against data consistency

- Automatic detection of new slaves as well as slaves that are removed from operation
- Automatic tracking of slave latency with configurable policies for acceptable latency levels for applications
- Options for routing SQL using Java libraries, intelligent proxies, or load balancers

Tungsten Easy Scale offers a unique ease of deployment through features that minimize or completely eliminate application changes required to scale performance using extra database replicas.

These features are unique among industry solutions to the problem of scaling databases using multiple replicas.

Tungsten Enterprise

Tungsten Enterprise combines the features of other Tungsten solutions, Tungsten Easy HA Plus and Tungsten Easy Scale, with additional capabilities to support applications with the most demanding requirements for high availability, data protection, performance, and integration between different databases.

These include the following:

- Unlimited numbers of replicas with automated failover to any replica
- Parallel replication to support sites with high write rates and/or sharded data sets
- Multi-master replication features to permit updates against multiple live master databases
- Replication between open source and commercial databases, as well as replication to/from non-database targets and sources such as message queues, applications, and files
- Secure transport and data encryption

Tungsten Enterprise gives you these tricks and more to allow databases to support the most demanding application imaginable.

- Integrated builds including all Tungsten components in a single download
- Commercial extensions to improve management and security, replicate from commercial databases, and add other features required for enterprise use
- Auto configuration procedures for local as well as cloud environments
- Professional-quality documentation
- Regular releases and patches with extended support options for guaranteed turn-around on fixes
- Expert product support available in 8/5 as well as 24/7 versions

Support for Multiple Databases and Platforms

Multi-platforms, multi-environment support

Tungsten provides a unified technology base designed from scratch to operate across multiple operating systems, databases, and operating environments. Tungsten technology supports the following popular databases and versions.

- MySQL 5.0 and 5.1, including new variants like MariaDB
- Oracle 9i and 10g, including all editions from Enterprise Edition down to Oracle Express
- PostgreSQL 8.x with full support available by the end of Q3 2009

Tungsten operating system support varies by database. Linux and popular Unix variants are supported for all databases with new operating system platforms being added rapidly.

Finally, Tungsten supports cloud-computing environments through integration with leading management vendors like RightScale as well as individual cloud vendors.

Commercial Support from Database Experts

Enterprise-level 24/7 support and direct access to key engineers

Technical support is a major concern for companies who value their data, need constant uptime, or have to react efficiently to different levels of loads on their systems. Continuent, Inc. offers commercial support and services that cover all Tungsten technologies. Our offerings preserve the openness and flexibility of the open source approach but add the security and convenience of knowing that experts are close at hand in case you run into difficulties.

Enterprise support includes not only phone and email contact but also options for regular meetings with Continuent engineering staff, guaranteed turnaround times for solutions, and custom consulting packages.

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.

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.

Exhibit A: Tungsten Product Features

Number of Servers	Easy HA 1+1	Easy HA Plus 1+1	Easy Scale 1+N	Enterprise 1+N	Site License 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				●	●