

# Oracle database replication – SharePlex for Oracle

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This presentation will look at an improved solution to the traditional way of migration. Hardware migrations are a major availability challenge, simply because they usually require a significant amount of downtime. Whether a company is looking to change hardware platforms, physically move a data center or consolidate servers to save costs, they will almost certainly require a lengthy outage to make the switch. To help minimize the downtime required for a migration, Quest Software offers SharePlex®, a revolutionary log-based replication solution. SharePlex features patent-pending technology that creates a near-real time copy of your critical data and enables the original system to function normally until the migration is complete.

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## Avoid Business Interruption

### 1. HIGH AVAILABILITY SOLUTIONS

Today's businesses are increasingly dependent on database and application technology that provides enhanced productivity and competitive advantage. However, this increased reliance on technology introduces new challenges. If availability is compromised, the entire business is vulnerable. Bad press, loss of customer loyalty and loss of revenue can have an extremely damaging effect on a company's future. For these reasons, businesses today require continuous, reliable data availability.

Quest Software recognizes this need. We have developed industry-leading solutions that address the top IT challenges affecting availability and business interruption. With Quest's high availability solutions, you will be able to:

- Dramatically reduce downtime and eliminate risk from migrations
- Reduce downtime from planned outages for routine maintenance
- Enhance your organization's disaster recovery plan
- Increase performance through report offloading
- Facilitate data distribution and warehousing

### 2. Reduce Downtime and Eliminate Risk from Migrations

Hardware migrations are a major availability challenge simply because they usually require a significant amount of downtime. Whether a company is looking to change hardware platforms, physically move a data center or consolidate servers to save costs, they will almost certainly require a lengthy outage to make the switch.

To help minimize the downtime required for a migration, Quest Software offers SharePlex®, a revolutionary log-based replication solution.

SharePlex features patent-pending technology that creates a near-real time copy of your critical data and enables the original system to function normally until the migration is complete. This way, daily business operations are not affected.

### 3. Reduce Downtime from Planned Outages for Routine Maintenance

Most businesses require planned downtime to perform routine maintenance on critical applications. SharePlex will nearly eliminate downtime for planned maintenance events on Oracle databases, including any and all work on the database, hardware and/or operating system through database replication.

The explosive growth of data in today's businesses makes data reorganization a necessity for maintaining application response time and maximizing current storage capacity. However, traditional reorganization methods require taking the application offline to perform this maintenance, imposing unacceptable downtime — especially for 24x7 environments.

*With Quest Software's LiveReorg®, downtime is a thing of the past.*

LiveReorg allows businesses the unprecedented ability to perform necessary database reorganizations with continued access to the application, so routine maintenance no longer requires business interruption.

## 4. Provide Disaster Recovery for the Database

Now more than ever, companies realize the importance of protecting the business in the event of an unforeseen disaster. By creating and maintaining up-to-the-minute copies of important production databases and file systems in geographically distant locations, Quest Software's high availability products can be vital to any organization's disaster recovery plan and will reduce the time it takes to fail over in the event of a disaster.

Also, once SharePlex is in place to protect your business from disaster, the same hardware can be used to reduce downtime from planned maintenance. SharePlex continuously tests your disaster recovery solution to ensure successful operation in the event of a disaster.

## 5. Increase Performance Through Report Offloading

Running high volumes of reports from a live production database is often seen as a necessary evil — it will degrade application performance, but users need up-to-date data. With SharePlex, you can run these reports from a copy of your database — so reporting activity no longer competes with transaction processing. This means that even during busy reporting times such as month- or quarter-end, application response time will not suffer from heavy reporting. With SharePlex, the reporting database can be optimized to provide the fastest possible response times for decision support activities.

Quest also offers Vista Plus®, a powerful information delivery solution that offloads expensive ERP systems by diverting requests and redundant queries that would otherwise tax your OLTP systems. Vista Plus can be a valuable component of an organization's high availability strategy. By providing a secure electronic repository for business-critical output, reports and files are available in Vista Plus even if the application crashes or is brought down for maintenance.

## 6. Facilitate Data Distribution and Warehousing

One of the challenges being faced today is to have direct access to the right information when needed. Quest Software's high availability suite offers the ability to facilitate data distribution and warehousing — while collecting and distributing information, improving performance and even reducing network traffic. SharePlex provides an unparalleled level of granularity in the data you replicate, enabling you to populate your data warehouse with the specific, timely information you need for better business decisions. Full transformation capability in a streaming near real time fashion provide the most current information in your data warehouse. No longer do loads to data marts or data warehouses need to be done on a batch basis, so you can provide this important decision support system without delays.

## 7. SharePlex® - THE COMPLETE REPLICATION SOLUTION

- Improves OLTP performance by enabling queries and analytical reports to be offloaded from the production environment to an up-to-date replica
- Creates and maintains a live standby replica that increases application availability and disaster resilience
- Revolutionary design supports most stringent ERP and e-commerce environments
- Supports Oracle 8i objects

Today's corporations are struggling with the recent explosion of online users taxing e-commerce and ERP environments. The increased number and complexity of inquiries and reports overload

the production instance and bring mission-critical systems to a crawl. Furthermore, increased reliance on these applications to run essential processes makes downtime more expensive than ever. To protect these vital computing environments, leading e-commerce corporations and organizations with large ERP implementations are turning to Quest Software for solutions that guarantee application availability.

## 8. Ensuring High Data Availability with Replication

To increase availability and performance in today's application environments, companies require a redundant, live and up-to-the-minute replica of production data. SharePlex® is a revolutionary, patent pending, log-based replication solution that successfully meets these conflicting demands. With minimal overhead, SharePlex provides real-time data replication to one or more databases to ensure constant availability. These target databases can be used as up-to-the-minute reporting instances as well as backup systems in case of failure.

## 9. Improving ERP System Performance

The combination of online transactions and query processing against the same ERP database causes performance problems — especially at peak times, such as a month-end close. The resource contention between OLTP and query processing creates serious performance bottlenecks. By enabling reports and queries to be relocated to run against a fully accessible, current replica, SharePlex resolves this conflict and improves end-user response time.

## 10. Enabling High Availability for E-Commerce

For e-commerce business, downtime affects market capitalization and the bottom line. Today's consumers won't wait for online vendors to revive a stalled system, and business-to-business transactions delayed by system downtime could result in damaged relationships and terminated contracts. SharePlex supports the 24x7 e-commerce enterprise with peer-to-peer replication, thereby enabling load balancing activity and increasing availability.

Regardless of the type of enterprise, SharePlex ensures transparent Oracle database replication to improve performance and offer disaster resilience.

## 11. Flexible Configurations for Complete, Low-Impact Replication

The optimal replication solution for any enterprise can be configured to support the current system architecture and grow with future requirements. With its flexible, multitiered architecture, SharePlex provides an optimum replication solution for any configuration. Perhaps a distributed ERP environment would perform better with a copy of data for relief from local queries, or an e-commerce enterprise requires a high availability solution for a transparent transition to a backup database in the event of system failure. SharePlex is the all-inclusive software replication system that facilitates better performance and resilience against system failure — regardless of topology.

## 12. Flexible Configurations

### Unidirectional Replication

In this replication scenario, the production database is the source of changes being replicated to a target database. If the target database is being maintained only for reports and queries, it can be a

subset of the production database, containing only the tables necessary for reports and queries, rather than copies of all of the production tables. SharePlex allows the source and target schemas to vary, so the target instance can have indices and keys that are designed for optimal query access, while the production database has a different set of keys and indices. ERP implementations in need of a reporting instance profit most from this simple, effective replication solution.

### **Bi-directional Replication**

When high availability is the primary goal for data replication, bi-directional replication is the typical topology. This configuration expects update activity to be performed on the primary system during normal operations and then replicated to the secondary system. The secondary system is configured to replicate the same data backward to the primary system in case user activity must be switched to it in the event of a primary system failure. In this event, the target instance is open and viable, ready to enable business to continue with only a minor interruption rather than requiring a lengthy process of opening and recovering the database.

### **Peer-to-Peer Replication**

E-commerce has its own set of replication challenges — primarily load balancing and high availability.

The peer-to-peer replication scenario offers solutions to both. Web-users can be distributed to a series of servers based on their current usage so that the load throughout the enterprise is balanced. Similarly, if a server within the configuration is down, users can be routed to alternative servers so that access — in essence, business — can continue, even if a system has failed. Peer-to-peer replication requires conflict resolution routines on each system. Based on these routines, SharePlex is able to resolve conflicts resulting from users on multiple systems simultaneously updating the same data. These routines, while based on templates provided by Quest Software, are created and customized by each corporation to reflect their business rules and priorities.

### **Broadcast Replication**

This set-up features one source instance that replicates to many target instances. Since SharePlex supports both LAN and WAN replication, one of the resulting benefits is that remote users are able to run local queries.

### **Consolidated Replication**

For enterprise-wide reporting, SharePlex provides consolidated reporting replication. In this situation, any number of sources can replicate to a single target instance against which corporate reports and queries may be run.

### **Cascading Replication**

This scenario, also called “hierarchical” or “multitier” allows a source system to replicate to target systems, which can also replicate to other systems. With SharePlex, the pass-through system does not require an Oracle database. This configuration allows replication between systems that cannot directly communicate, and it allows the networking overhead associated with replicating to many systems to be offloaded from the production server to a secondary replicating server.

## **13. Main Features**

### **Uses Redo Logs as Source of Change Information**

Log-based replication enables SharePlex to capture every modification to selected objects immediately — as soon as they are written to the Oracle log, even before the transaction is committed.

Speed is not at the expense of accuracy; instead, SharePlex completely respects the Read Consistency Model so that the target instances are accurate representations of the source database.

### **Low Network Impact**

SharePlex does not use the Oracle database engine for the capture and propagation of changes. Rather, it intelligently reads the Oracle logs and determines what data needs to be sent to the target systems. SharePlex replicates only the changes, so it minimizes its network bandwidth needs. Sending a small, steady stream of data to the target systems, SharePlex is able to replicate business volumes of changes without spikes in the network's performance.

### **Converts to SQL at the Target**

SharePlex supports replication between dissimilar platforms, OS and Oracle versions. On the target system, standard SQL transactions are composed from the condensed, replicated changes, and then the transactions are applied via standard SQL to the target instance.

### **SharePlex Reconcile Option**

SharePlex is the only replication solution able to meet the stringent high availability requirements in 24x7 environments. SharePlex uses transactional replication that can be coordinated with the results of a physical refresh from a hot backup. As a result, production is not interrupted while SharePlex establishes activation or the target system is resynchronized.

### **How SharePlex Works**

On the source system, Oracle records its changes in the redo logs. The SharePlex capture process monitors the redo logs for changes to objects selected for replication. The read process then addresses the transaction with the target system and instance names. With that information, the export process knows where to send the data, which ships it over TCP/IP — to the target system(s). On the target system, an import process receives the data and carries it to the posting process, which constructs a SQL statement and applies the transaction to the target instance.

### **Related Solutions**

Traditional file transfer methods of copying entire files manually or in batch process are too slow and resource-intensive for today's business requirements. Additionally, modifications to the file transfer process are often error prone and difficult to manage. Administrators of both local and wide area networks seek a failover solution to avoid downtime and its resulting impact on revenue, operations, and customer satisfaction. Quest Software provides IT professionals with SharePlex® FS, a flexible, robust and easy-to-manage solution to ensure application and data availability. Use SharePlex FS for application failover, Web server caching, change automation, rolling upgrades, and more.

## **14. SharePlex® FS**

### **IP-BASED FILE SYSTEM REPLICATION**

- Replicates changes to initialization files, data files, log files, archived files, compressed files, FTP servers, applications, Web servers, mirror sites and more.
- Replaces file transfer for continuous replication over a LAN or WAN
- Facilitates failover of both applications and data
- Continuously caches Web servers on a file-by-file or directory-by-directory basis
- Supports change distribution to any number of targets for installation, patches and upgrades
- Supports rolling upgrades of operating systems and hardware

Traditional file transfer methods of copying entire files manually or in a batch process are too slow and resource-intensive for today's business requirements. Additionally, modifications to the file transfer process are often error-prone and difficult to manage. Administrators seek LAN and WAN failover solutions to avoid downtime and its resulting impact on revenue, operations and customer satisfaction. Quest Software provides IT professionals with SharePlex® FS, a flexible, robust and easy-to-manage solution to ensure application and data availability.

### **Efficient File System Replication**

SharePlex FS is a powerful, patent-pending software replication solution that delivers file changes to multiple servers on any IP-based network. SharePlex FS can replace FTP to propagate changes immediately for any file type, including: text, data, log, archive, compressed, multimedia, graphics, HTML, XML, scripts, applications and more. SharePlex FS is a cost-effective solution, requiring minimal network and hardware resources and nominal staff management during and after implementation.

### **Asynchronous Replication for Optimal Performance**

Synchronous disk mirroring requires verification processes at both the target and the source servers before the next operation can begin, resulting in slower application performance.

SharePlex FS uses asynchronous replication that verifies transactions without postponing the next operation. Furthermore, SharePlex FS distributes the changes byte by byte at the data block level, reducing CPU usage and lowering network and disk overhead. The result is a faster, more efficient propagation of your information to the targets.

### **Easy to Use and Manage**

SharePlex FS installs in minutes. With configuration files optimized for ease of use, you decide the exact information replicated to the target servers. And with a variety of replication scenarios, you can establish the best source-target design to meet your particular needs.

### **Application Failover**

Replication is done continuously, so when the primary server goes down, the target server is ready for failover with the current data. Even in a geographically distributed computing environment, you can rely on SharePlex FS to maintain an available secondary system for your applications and data.

### **Web Server Caching**

SharePlex FS provides continuous updates to Web site caching. Caching is a proven strategy to improve response time by keeping content closer to the people who access it. With every change you make HTML, graphics, multimedia, Perl scripts etc., SharePlex FS send the modifications immediately to all your Web servers. In addition, SharePlex FS supports read access of the files being replicated so access to data is never interrupted.

### **Change Automation**

Configuration management of servers is a never-ending challenge. SharePlex FS replicates installations, patches, upgrades and modifications for any application, thus keeping your computing environment consistent with minimal effort.

### **Rolling Upgrades**

Increased system availability requirements force upgrades to be accomplished in narrowing time windows. SharePlex FS supports rolling upgrades by allowing the source server to queue the production activity and then release the updates to the target server after the upgrade is completed.

The production process can switch from the existing source server to the upgraded target server without disrupting business operations.

### **Related Solutions**

Quest Software offers application monitoring, information management and database replication solutions that complement SharePlex FS, including Foglight®, Vista Plus® and SharePlex for Oracle. Foglight provides enterprise monitoring, and SharePlex FS replicates the Foglight server to ensure it is always available. Combine SharePlex FS with Vista Plus for consistently available report distribution, document management and archiving. Finally, SharePlex FS replicates the related applications and information such as XML data, forms and scripts.

### **Environment Support**

UNIX Servers

- HP-UX 10.20 and up; Sun Solaris 5.6 and up
- Both 32-bit and 64-bit operating system versions are supported
- Cross platform replication between HP and Sun

### **File Systems Supported**

UFS, VxFS, HFS, JFS, NFS (server only), Raw devices

## **15. LiveReorg®**

### **REORGANIZATION FOR THE 24X7 DATABASE**

- Performs database reorganization and restructuring with virtually no application downtime
- Provides complete space management, including capacity planning and fault prediction
- Designed for Oracle E-Business Suite, PeopleSoft, SAP and 24x7 e-commerce applications

### **The 24x7 Performance Challenge**

Reorganizing and relocating database objects are critical database administration tasks. Without them, application performance can deteriorate to unacceptable levels and objects may run out of space. Unfortunately, traditional reorganization methods require all or part of the application to be down while the database reorganizations are being performed.

To compound the problem, reorganizing or relocating large, key tables can take many hours.

Thus, many of the systems most in need of reorganization — heavily accessed OLTP systems, such as Oracle E-Business Suite, SAP, PeopleSoft and e-commerce applications — are also those that can least afford it. Since many of these systems run 24x7 or have very small maintenance windows, database reorganization and restructuring imposes unacceptable downtime on the users.

### **The LiveReorg® Solution**

Quest Software's LiveReorg frees users from the downtime issues imposed by traditional reorganization methods. This patent-pending technology allows you to reorganize a 24x7 database with virtually no downtime. Large, heavily used tables and their associated indexes can be reorganized with end users working online. During the LiveReorg process, the table data remains fully available to application users for both read and write access.

### Controlling the Switchover

Although Oracle's architecture necessitates a brief period of controlled, read-only downtime during the switchover, it can be delayed to occur during off-peak hours. LiveReorg provides three options that give the DBA flexible control of the switchover process.

**Automatic:** As soon as the two tables are synchronized, LiveReorg automatically performs the switchover.

**User-defined time:** The table switchover is delayed until a user-defined time (e.g., Sunday morning between 12:00 a.m. and 2:00 a.m.) In the interim, between reorganization and switchover, LiveReorg keeps the two tables synchronized.

**Manual:** Once LiveReorg is ready to switch the tables, it notifies the DBA via a status monitor and awaits user input. During the waiting period, LiveReorg continues to keep the two tables synchronized. This option offers the most control of when the switchover occurs.

### How LiveReorg Works

LiveReorg leverages the Quest SharePlex® proven, log-based data replication technology to provide online reorganizations with little or no downtime. Using this technology, LiveReorg reads the Oracle redo logs to track all user activity that occurs during the reorganization.

First, LiveReorg reorganizes the table data, copying it from the Original Table to a newly created Reorganized Table. During the reorganization process, the Original Table is not locked; it remains fully available to the application users for both read and write access.

The reorganization phase is complete. However, the data in the Reorganized Table is missing changes (inserts, updates and deletes) posted to the Original Table while the reorganization occurred. In the second phase of the process, LiveReorg's redo log parser reads these changes directly from Oracle's redo logs and applies them to the Reorganized Table, synchronizing the two tables.

In the final stage, LiveReorg then "switches" the two tables. The Reorganized Table replaces the Original Table. (The Original Table itself is saved to a backup name.) During the switchover, a very brief period of controlled, read-only downtime is required. The live reorganization is now complete.

### A Complete Management Solution

In addition to online reorganizations, LiveReorg offers complete database layout management. For example, graphical tablespace maps provide immediate discovery of how database objects are distributed on disk. Intuitive reports drill deeper to uncover areas requiring attention, such as tables and indexes in need of reorganization. Once the objects in need of reorganization have been identified, LiveReorg can initiate live — as well as traditional — reorganizations to fix the underlying problems. Live reorganization capability is offered for tables and their associated indexes. Fast traditional reorganizations are provided for entire tablespaces, selected tables and indexes, and chained rows. For optimal space management and performance, DBAs can implement and maintain a sophisticated extent allocation scheme with LiveReorg's comprehensive object resizing capabilities.

To support database restructuring, tables and indexes can be relocated easily to different tablespaces for improved I/O distribution. LiveReorg's online reorganization capabilities allow the DBA to move a table or index to a different tablespace or physical device, while the data remains continuously available to the application users.

LiveReorg goes beyond problem detection and reorganization with capacity planning graphs to track database growth trends and estimate future disk requirements.

The sophisticated Tablespace Failure Prediction module correlates complex database growth patterns to predict when tablespaces will run out of space. Proactive management — weeks or even months before problems occur — can dramatically reduce space-related downtime.

### **Fast, Flexible Data Movement**

LiveReorg provides a range of fast, flexible data movement options to support both live and traditional reorganization processes. Reorganizations can be performed entirely inside the database using SQL to drive the data movement. Advanced Oracle options are used to achieve the fastest possible reorganizations. Alternatively, LiveReorg can call on its FastCopy option to reorganize the data via the file system. When using FastCopy, LiveReorg “unloads” the data to the file system and “reloads” it using Oracle direct path technology. FastCopy also provides excellent support for very large Long and Long Raw data types. Either option — SQL-based data movement or FastCopy — may be invoked for both live and traditional reorganizations.

### **Main Features**

- Live (online) reorganizations for tables and their associated indexes
- Database restructuring via online object relocation and resizing
- Traditional reorganizations for tablespaces, tables, indexes
- Detection and repair of chained rows
- FastCopy option for fast reorganizations via the file system, including data “unload” and “reload”
- SQL-based reorganization scripts for fast reorganizations inside the database
- Pre-audit checks to ensure successful reorganization
- Support for very large Long and Long Raw data types during reorganization
- Graphical tablespace map
- Tablespace Failure Predictions based on Oracle’s extent allocation scheme
- Trend Analysis report for tracking and forecasting database growth
- Problem detection reports, including:
  - Tables requiring reorganization
  - Indexes requiring reorganization
  - Missing indexes
  - Over-extended objects
  - Tables with chained rows
  - Non-selective indexes
  - Table/index contention
- Support for fixed and uniform extent allocation schemes recommended by Oracle
- Historical repository of object growth statistics
- Automated collection of Analyze statistics
- Flexible, agent-based scheduler for managing reorganization jobs
- Graphical status monitor for reorganization jobs
- Built-in SQL script editor

### **Environment Support**

Databases: Oracle 7.3.4 —9i

Server Operating Systems: Sun Solaris, HP-UX, IBM AIX, Compaq Tru64 Unix, Windows 2K  
Client: Windows 95/98/NT/2000/XP