



# Migrate Your Oracle Production Database With Minimal Downtime

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Database migration is often seen as risky to the business. With most approaches, migrating large Oracle® database can require downtime and can result in production loss and even data loss. However, by setting up a disaster recovery system, you can minimize downtime, protect data and help maintain application availability.

Traditionally, migrating large Oracle databases required significant downtime that could generate production losses. It also required significant amount of time to ensure that the target database was consistent with the source. Today, downtime and consistency can be addressed by setting up a Disaster Recovery System using a Physical Standby Database based on Oracle Data Guard and Oracle Recovery Manager (RMAN).

3. Create a target database and restore the backup using RMAN Restore.
4. Configure the target database as physical standby database using Oracle Data Guard. Oracle Data Guard can automatically transmit and apply primary database redo logs (files that store transaction changes) to the physical standby database. As the redo logs apply process occur frequently than primary database transactions, administrators should verify that the physical standby database is in sync with the source database.
5. Switch the standby database role to primary and move the application database connection (require database downtime) to the target database. This completes the migration process.

## ViSolve Business Lines

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This article summarizes a recent implementation of this approach by a leading manufacturer in the US. It also covers the challenges faced, resolutions, and the next steps.

## Oracle Data Guard

Oracle Data Guard helps enterprises implement disaster recovery systems for Oracle Database by maintaining copies (called standby databases) of production databases (called primary databases).

## The Migration Process Using Oracle Data Guard

As a process, administrators can create a physical standby database using Oracle Data Guard from a backup of the primary database. Oracle Data Guard automatically updates and maintains the physical standby database with the latest transaction copy from the primary database. The key steps are:

In Disaster Recovery environments, during a system failure, the physical standby database can take over as primary database with the last transaction intact before failure. In normal circumstances, the physical standby database system can be used for read only queries and reporting to offload the primary database.

## Case Study Detail

### Project Overview

The client planned to migrate from Linux Itanium (IA-64) platform to Linux (x86-64). Disaster Recovery was to be deployed in a separate data center. ViSolve assisted the IT staff to evaluate alternatives and then selected the Data Guard approach. ViSolve then executed the first stage, migrating the test and development environment.

## Setting up a Disaster Recovery Environment

1. Configure the production database as primary database (would require few minutes of downtime).
2. Create a backup from the primary database using RMAN Backup.

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## Client System Environment

The source and target hardware was setup as per client preference.

	Source (IA-64)	Target (x86-64)
<b>Servers</b>	Two HP Integrity servers (rx2660, rx6600)	One HP ProLiant DL980 G7
<b>Processors</b>	rx26600 – 2x2 cores, rx6600 – 4x2 cores	Two Quad-Core Intel Xeon X5687 at 3.60
<b>Memory</b>	rx26600 – 32GB, rx6600 – 64GB	96GB Memory
<b>Storage</b>	EVA Storage	EVA Storage
<b>Database Size</b>	~200GB	~200GB
<b>OS</b>	RHEL 5.5	RHEL 5.5
<b>Database</b>	Oracle Database 10.2.0.4	Oracle Database 10.2.0.4
<b>IO Cards:</b>	AD300A IO Cards 4GB throughput	4 x 1GbE - embedded

## Project Execution

A physical standby database, which is an exact replica of the primary database, was created on the target x86-64 server from the backup of primary database using Oracle Data Guard. Oracle Data Guard can maintain the transactional consistency between the primary and the standby databases during and post migration. The physical standby database is now available in case of a planned or an unplanned outage.

## Implementation Challenges

As is often the case, the purely database elements were straightforward. Issues arose in setting up the supporting infrastructure.

### Challenge 1 – Problem in restoring backup data

HP Data Protector was in place for backup and recovery of the primary database. It had been integrated with Oracle's RMAN backup utility via a Media Management Library (MML). However, backups from media failed. An alternate restore source was needed.

### Resolution

ViSolve contacted HP on behalf of the client and determined the issue was with the backup configuration in Data Protector. To meet the project deadline, ViSolve recommended an alternate approach, which was accepted by the client. A disk-based backup of the primary database was performed using RMAN and data

was transferred and restored to the physical standby server successfully.

### Challenge 2 – Defect in firewall configuration

During the log apply process, the log shipping from primary database to physical standby database failed with network timeout errors. This caused transaction consistency errors.

### Resolution

ViSolve analysis determined that the CISCO ASA offsite firewall in the datacenter had been configured with a sqlnet packet inspection rule. A defect in the ASA firewall product/sql inspection module caused the connection to drop. To address this issue, ViSolve modified the TNS listener port (a service which establishes and maintains connections with Oracle database services) to by-pass the sqlnet packet inspection on Cisco Firewall. This sped up log shipment from primary database to physical standby database enabling data synchronization between both nodes.

## Project Completion and Verification

Data was migrated from the primary database to the physical standby database successfully within the stipulated project period with minimal downtime. The client verified and confirmed the successful completion of the project. This approach will be used on subsequent larger production databases.

## Additional Capabilities

The physical standby database can also be used for read-only queries and reporting. This reduced the load on the primary database and can assist with business decision-making.

## For more information

ViSolve has 15 years of experience in transforming legacy IT infrastructure into high efficient, flexible, cost optimized IT environments. We can help you to cost effectively and safely migrate your legacy RISC application environment to Linux and private cloud. ViSolve offers planning, evaluation, migration execution, and testing services for enterprise IT infrastructure.

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