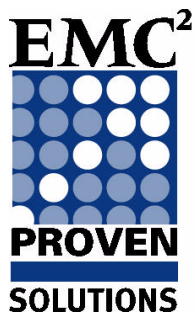


**EMC Solutions for Enterprises**  
**EMC Symmetrix DMX-4**  
**EMC Replication Accelerator for Oracle E-Business Suite**

**Reference Architecture**



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# About this Solution

## Purpose

The purpose of this solution is to demonstrate the high-speed replication capabilities of EMC hardware and software for an enterprise-class, Oracle 12 E-Business Suite environment. Specifically, this solution provides customers with the best practices for cloning the entire Oracle 12 E-Business Suite environment using EMC® Replication Manager on an EMC Symmetrix® DMX-4.

To help enterprises reduce cost and mitigate risk in their Oracle environments while meeting customer SLAs, EMC has developed fully validated, and documented proven solution architectures for Oracle applications and databases.

## The business challenge

Today's IT is being challenged by the business to solve the following pain points to keep business critical environments available 24x7:

- Eliminate production downtime by ensuring production applications are kept online.
- Automate cloning process by keeping manual operations (copying data, software, config files, etc.) to a minimum.
- Eliminate the impact on network performance of application cloning.
- Clone an entire Oracle 12 E-Business environment while maintaining SLAs.
- Create identical environments that can be used for test and development purposes.
- Efficiently use both infrastructure and people to support the business.

- Reduce business risk - restore data quickly and accurately with built-in hardware redundancy and RAID protection.
- Reduce costs - match infrastructure costs with changing information value via efficient, cost-effective tiered storage or low-cost monthly subscription services.

Due to the typically mission-critical nature and high performance and availability requirements of Oracle Applications and database technologies, it is essential that robust, reliable, and tested cloning processes are in place. To meet these IT business challenges, enterprise customers need proven solution architectures that encompass the best of what Oracle, EMC, and other third-party software can offer.

## The technology solution

The Oracle 12 Apps cloning process can be greatly enhanced by the integrated use of EMC Replication Manager, by offering a cost-effective, easy-to-use solution that is backed by rigorous validation and testing in real-world conditions and workloads.

For Oracle Applications an important principle to note is that the data is cloned rather than the topology.

The solution addresses the business need for high-speed data replication using EMC TimeFinder® replication tools in conjunction with Oracle 12 E-Business Suite cloning procedures. The environment consists of a multi-tier Oracle 12 E-Business Suite with a back-end two-node Oracle 10g RAC cluster. The solution includes information on:

- Creating a well-performing storage design for an Oracle 12 E-Business Suite application infrastructure running on a Symmetrix DMX-4.
- High speed replication - minimize impact to production while maintaining consistency throughout.
- Improving IT efficiency and responsiveness - allow key Oracle resources to focus on critical tasks and projects while dramatically improving their SLA times for business request response.

- Approved Oracle/EMC cloning methodology - using the best product cloning features from both companies.
- Patching and upgrading - delivering new versions of Applications components, and providing a mechanism for creating rolling environments to minimize downtime. EMC cloning and snapshot technologies can be leveraged to allow "instant rollback" minimizing contingency rollback times for maintenance windows and change control processes, and supporting faster response to security patch issues while minimizing risk.

## Environment profile

This document provides a specification for the customer environment (storage configurations, design, sizing, software, and hardware, etc.) that constitutes a two-tier Oracle 12 E-Business Suite deployed on the DMX-4 utilizing EMC Replication Manager to locally replicate the entire environment.

### Hardware resources

Table 1 lists the hardware resources used in the EMC Replication Accelerator for Oracle E-Business Suite environment.

**Table 1 Hardware resources**

Equipment	Quantity	Configuration
Storage	1	EMC Symmetrix DMX-4 2500: <ul style="list-style-type: none"> <li>• 128 GB MEM</li> <li>• 16 DAEs</li> <li>• 146 GB 15k</li> <li>• 300 GB 15k</li> </ul>
SAN	2	Brocade 4900, 64 port
Oracle database servers		Dell 6850
Production	2	Four Dual-Core Intel Xeon 3.4 GHz CPUs
Target/clone server	1	16 GB RAM Two 146 GB 10k internal RAID disks Two dual-port NICs Two 4 Gb Emulex LPe11002-E HBA
Oracle application server		Dell 2950
Production	1	Quad-Core 2.66 GHz / 13333 MHz FSB
Target/clone server	1	16 GB RAM One 4 Gb Emulex LPe11002-E HBA
Replication Manager server	1	Dell 2950 Quad-Core 2.66 GHz / 13333 MHz FSB 8 GB RAM One 4 Gb Emulex LPe11002-E HBA

## Software resources

Table 2 lists the software resources used in the solution.

**Table 2 Software resources**

Title	Version	Comment
Red Hat	V4.5 (64-bit)	OS for database server
Microsoft Windows	2003 SP2	32-bit
Oracle Database/Cluster/ASM	10.2.0.3	Database server software
Oracle E-Business Suite	12.0.4	Oracle suite of integrated business applications
Enginuity™	5773.123.83	Symmetrix storage array OS microcode
EMC Replication Manager	5.1 SP1	Automate SAN disk-based replication procedures
EMC PowerPath®	5.1	HBA load balancing and redundancy
Solutions Enabler	6.4.2.20	Symmetrix Command Line Interface host-based utility

## Physical architecture

Figure 1 illustrates the overall physical architecture of the solution.

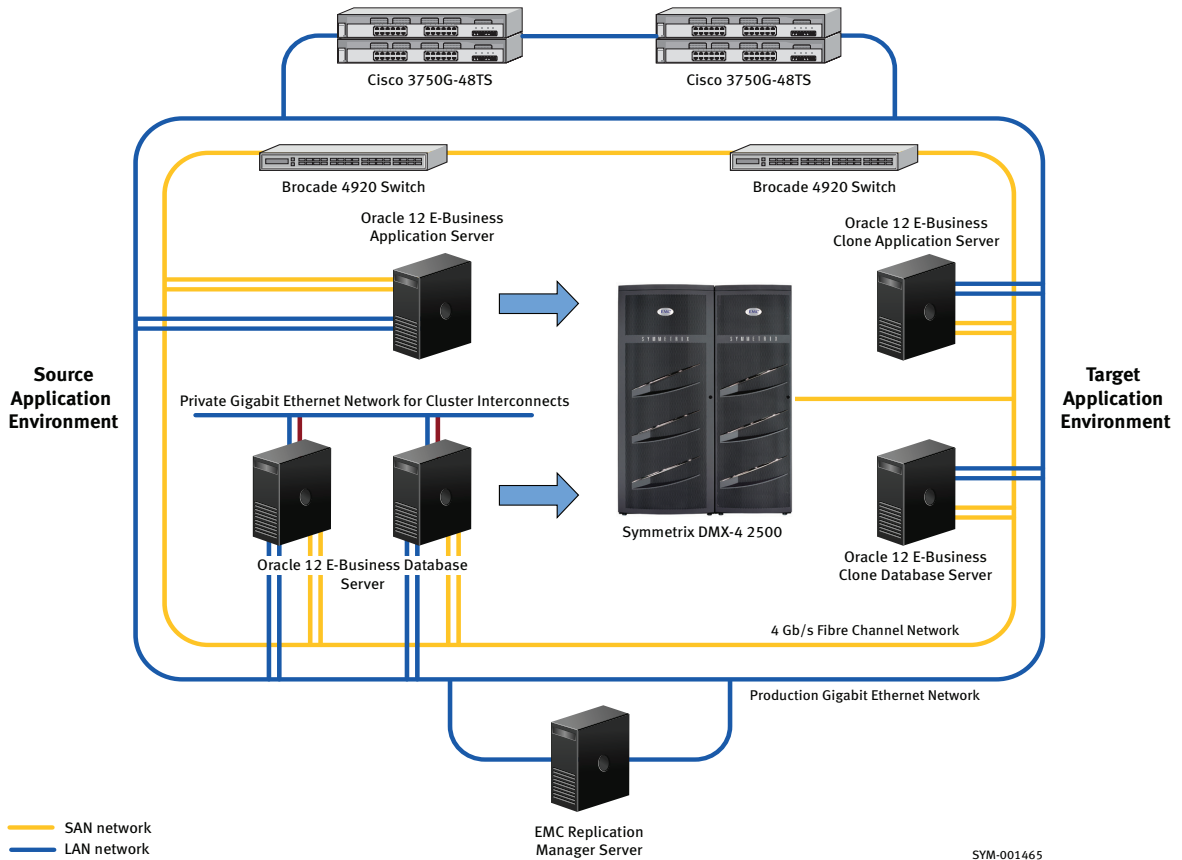


Figure 1 Overall physical architecture

## Solution details

The EMC Replication Accelerator for Oracle E-Business Suite solution was developed to show how EMC can add value for Oracle E-Business Suite high-speed cloning.

The Oracle Apps methodology for cloning applications is to put the application and database tiers into a consistent state prior to replication. This feature, however, does not involve the transfer of data. This process can be complex and time consuming. An operation of this scale can sometimes take days, if not weeks, to complete.

Replication Manager (RM) provides high-speed replication of data through the use of TimeFinder disk-based replication.

By combining both Oracle Applications Release 12 RapidClone technologies and EMC Replication Manager, cloning jobs can be configured within Replication Manager to call Oracle RapidClone scripts to put the applications and database tiers into a state prior to replication. Replication Manager then creates an image copy of the data. The data is presented to backup hosts and mounted automatically using Replication Manager. Once the data has been presented and mounted to the backup hosts Replication Manager calls Oracle 12 Apps RapidClone postscripts to make the data available for repurposing.

**EMC Symmetrix DMX™** — The new Symmetrix DMX-4 system is the next generation in the DMX series and extends EMC's leadership in the high-end enterprise and storage market. The DMX-4 delivers immediate support for the latest generation of disk drive technologies, Flash drives for superior performance, 4 Gb/s Fibre Channel for high performance, and SATA II for high capacity.

The DMX-4 is based on Enginuity 5773, which provides investment protection that delivers performance gains along with information-centric security advancements via integration with RSA enVision®. With the DMX-4 and Enginuity 5773 all replication and security activities are easy to manage with the Symmetrix Management Console (SMC).

**EMC Replication Manager** — EMC Replication Manager manages EMC point-in-time replication technologies through a centralized management console. Replication Manager coordinates the entire data replication process—from discovery and configuration to the management of multiple application consistent disk-based replicas. Auto-discover the replication environment and enable streamlined management by scheduling, recording, and cataloging replica information including auto-expiration.

With Replication Manager, the right data can be put in the right place at the right time—on-demand or based on schedules and policies that the customer defines. This application-centric product allows simplification of replica management with application consistency.

**EMC TimeFinder** — The TimeFinder family of local replication allows users to non-disruptively create and manage point-in-time copies of data. This allows operational processes, such as backup, reporting, and application testing, to be performed independently of the source application to maximize service levels, without impacting performance or availability. The following TimeFinder product was used in this use case:

- TimeFinder/Clone: Creates highly functional, high-performance, pointer-based, full-volume copies of Symmetrix DMX volumes that can be used as point-in-time copies for data warehouse refreshes, backups, online restores, and even volume migrations.

**EMC PowerPath** — PowerPath works with the storage system to intelligently manage I/O paths, and supports multiple paths to a logical device. In this solution PowerPath manages four I/O paths and provides:

- Automatic failover in the event of a hardware failure. PowerPath automatically detects path failure and redirects I/O to another path.
- Dynamic multipath load balancing. PowerPath distributes I/O requests to a logical device across all available paths, thus improving I/O performance and reducing management time and downtime by eliminating the need to configure paths statically across logical devices.

## Oracle

**Oracle Applications Release 12:** An Oracle Applications Release 12 system utilizes components from many Oracle products. Oracle E-Business Suite is a complete set of business applications for managing and automating processes across an enterprise. Oracle E-Business Suite applications are either forms-based or HTML-based.

The Oracle Rapid Clone utility allows creation of a standalone copy of an existing Oracle Applications system.

**Oracle Database 10g RAC:** Oracle Real Application Clusters (RAC) is an optional feature of Oracle Database 10g Enterprise Edition. Oracle RAC supports the transparent deployment of a single database across a cluster of servers, providing fault tolerance from hardware failures or planned outages. Oracle RAC supports mainstream business applications of all kinds. This includes Online Transaction Processing (OLTP) and Decision Support System (DSS).

**Oracle Automatic Storage Management (ASM):** Oracle ASM is an integrated database filesystem and disk manager. With ASM, filesystem and volume management capabilities are built into the Oracle database kernel. This reduces the complexity of managing the storage for the database.

## Cloning Oracle Applications Release 12 with RapidClone

*Cloning* is the process used to create a copy of an existing Oracle Applications system. There are various rationales for cloning an Oracle Applications system, including:

- Standard cloning - Making a copy of an existing Oracle Applications system, for example a copy of a production system to test updates.
- System scale-up - Adding new machines to a system to provide the capacity for processing an increased workload.
- System transformations - Altering system data or file systems, including actions such as platform migration, data scrambling, and provisioning of high availability architectures.
- Patching and upgrading - Delivering new versions of Applications components, and providing a mechanism for creating rolling environments to minimize downtime.

An important principle in Applications cloning is that the *system* is cloned, rather than the *topology*. Producing an exact copy of the patch level and data is much more important than creating an exact copy of the topology, as a cloned system must be able to provide the same output to the end user as the source system. Additionally, while a cloned system need not have the full topology of its source, it must have available to it all the topology components that are available to the source.

Oracle provides a methodology by which to manually clone Oracle Applications Release 12. There are two useful Oracle Metalink reference notes that can be reviewed prior to starting the EMC-enabled cloning process:

Note: 406982.1: Cloning Oracle Applications Release 12 with Rapid Clone

Note: 559518.1: Cloning Oracle E-Business Suite Release 12 RAC-Enabled Systems with Rapid Clone

The cloning that is detailed in this document shows a RAC to single instance scale-down with Rapid Clone. Oracle currently does not provide the complete detail of manually cloning this environment (see bug 7189633); however using these two Oracle Metalink notes EMC is able to provide a methodology by which to accomplish the cloning.

## Validated solution benefits

A number of tests were conducted against this reference architecture to show the key benefits of the solution. The testing included:

- Replicating the entire Oracle Apps environment through Replication Manager using TimeFinder clones, Replication Manager reduces cloning times.
- Efficient refreshing capabilities of the Oracle Apps environment using Replication Manager and TimeFinder clones.
- Taking point-in-time copies of the Oracle Apps environment through Replication Manager, TimeFinder/Snaps provide incremental point-in-time replicas.

## Key results

Some of the key results and solution benefits found during the testing were:

- There was minimal impact to production throughout the cloning process.
- The entire cloning process, including application and database tiers, completed in less than two hours, compared to days, if not weeks, for non-disk-based replication methods
- Seamless replication of customer's application and database environments.

## Conclusion

This reference architecture depicts a validated design using an EMC Symmetrix DMX-4 storage system for consolidation.

Throughout the testing we identified a number of conclusions that show the benefit of EMC Replication Manager integration with Oracle Applications Release 12 cloning utilities. The need was identified to offload long running queries and batch jobs to a cloned environment. This was achieved by creating identical test/development environments while ensuring there was no impact to production, and applications remained online.

It is also important to note that through disk-based replication technologies, manual operations were eliminated, such as copying large amounts of data, software, and individual configuration files. All of these operations were performed through automated tasks using Replication Manager. It is worth noting also that through the use of Replication Manager any performance impact to the network was eliminated.

Another key benefit is that once Replication Manager jobs have been defined and configured they are automatically repeatable for future cloning operations. This provides an efficient cloning solution for Oracle 12 Apps, which is repeatable, saving on resources, time, and money.

To conclude, the EMC Replication Manager integration with Oracle Application Release 12 RapidClone utility provides a much needed process to offload time-consuming host-based bulk copying utilities to the storage area network. The EMC Replication Accelerator for Oracle E-Business Suite solution is an efficient, and repeatable solution while maintaining customer SLAs.

Since 1995, EMC and Oracle have invested to jointly engineer and integrate their technologies. The combination of Oracle and EMC software and best practices used in an integrated fashion can greatly reduce the cost of designing, implementing, and operating your IT infrastructure.

To learn more about this and other solutions contact an EMC representative or visit:

<http://www.emc.com/solutions/application-environment/oracle/index.htm>.