

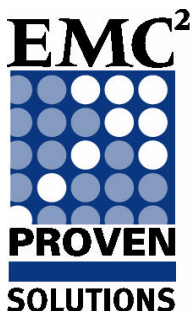


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EMC Intelligent Cloning for SAP Replication of Java Stack-based SAP Systems with Oracle

Enabled by EMC Symmetrix DMX-4 and
EMC Replication Manager

Reference Architecture



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About this Document

Purpose

This document describes the reference architecture of the EMC Intelligent Cloning for SAP Replication of Java Stack-based SAP Systems with Oracle solution. The solution was tested with EMC Symmetrix DMX-4 and EMC Replication Manager and validated by EMC Global Solutions Operations (GSO).

This document was produced as part of the EMC Total Customer Experience (TCE) program by the GSO TCE Customer Integration Labs working in collaboration with the EMC SAP Global Practice and Center of Excellence, EMC Engineering, and EMC technical field consultants.

Audience

This document is intended for technical staff interested in evaluating or implementing a replication solution for an SAP production database by leveraging EMC hardware and software in an enterprise environment. Executives evaluating such a solution will also find this document useful.

Scope

This document provides an overview of a solution that incorporates current requirements for SAP / HP-UX / Oracle deployments with EMC technologies. An architectural overview and descriptions of the hardware and software components used in the solution are also included.

Note: This document describes the features and methods that are unique to this integrated solution. For comprehensive information on individual components of this solution, or other EMC solutions, consult the appropriate EMC and third-party documentation.

The business challenge

Creating full copies of SAP production data for testing and training and reducing the risk of production system unavailability during cloning are important for any business using SAP. SAP and its partners have conquered the challenge of cloning SAP ABAP stack-based systems from live (running) production systems; however, newer SAP Java stack-based products have made live system cloning more challenging.

With SAP Java stack-based application components, information is split between the Java file system and the SAP database. During production, many of the Java files are held open. Therefore, any replication scheme must keep the Java file system and the SAP database synchronized.

With the introduction of the EMC Intelligent Cloning for SAP Replication of Java Stack-based SAP Systems with Oracle solution, EMC offers a way of cloning a Java stack-based SAP system without first stopping the production system.

The technology solution

Using a combination of EMC technologies and SAP tools, the EMC Intelligent Cloning for SAP Replication of Java Stack-based SAP Systems with Oracle solution now makes it possible to clone a Java stack-based SAP system from a live production system without requiring SAP production downtime.

The solution enables SAP project teams to duplicate either a dual-stack (ABAP and Java) or a single-stack (Java) SAP database environment so that special projects, such as SAP upgrade or Unicode conversion, can be tested without

affecting the production environment. The solution provides SAP system replication processes that enable on-demand replicas to be generated in an SAP environment. For BASIS administrators and DBAs, this results in a streamlined, faster, and safer SAP database copy process.

The solution uses Replication Manager and SAP tools (SAPInst). These tools are certified by EMC and SAP and are typically used in enterprise SAP environments.

Solution components

The EMC Intelligent Cloning for SAP Replication of Java Stack-based SAP Systems with Oracle solution includes components from EMC, SAP, and HP. This section briefly describes the EMC and SAP components. For details about all of the components that make up the solution, see [“Hardware and software resources” on page 11](#).

EMC Symmetrix DMX-4 Series

EMC® Symmetrix® DMX-4 enables you to manage and protect all of your data—more than 1 petabyte of storage—and keep it available at all times. Symmetrix DMX-4 provides customized Flash drives that break the performance barriers of traditional disk technology because they are optimized to meet high-end storage requirements. DMX-4 also delivers built-in RSA security technology to keep your critical data safe, as well as high availability to ensure constant data access. Best of all, the DMX-4 is energy efficient and easy to manage.

EMC Replication Manager

EMC Replication Manager® automates and simplifies management of disk-based replicas. It orchestrates critical business applications, middleware, and underlying EMC replication technologies to create and manage replicas at the application level for a variety of purposes, including operational recovery, backup, restore, development, simulation, and repurposing. Customers interested in reducing manual scripting efforts, improving recovery, and creating parallel access to information can implement Replication Manager to put the right data in the right place at the right time. Replication Manager supports consistency group technology replication, which enables SAP DMX environments running multiple SAP systems to achieve consistent copies of the entire SAP landscape.

EMC TimeFinder

The TimeFinder® Family of software is the most powerful suite of local storage replication solutions available. Fully leveraging the industry-leading, high-end Symmetrix DMX™ hardware architecture, it offers unmatched deployment flexibility and massive scalability to deliver a wide range of in-the-box data copying capabilities to meet mixed service-level requirements with minimal operational impact. The TimeFinder family provides customers with options such

as full volume clones and mirrors, space-saving snapshots, cross-volume and storage system consistency, tight integration with industry-leading applications, and simplified usage through automated management.

SAP ECC6 SAP ECC6 (ERP 2005) is a world-class, fully integrated solution that fulfills the core business needs of midsize and large organizations across all industries and market sectors. Powered by the SAP NetWeaver technology platform, SAP ECC6 helps enterprises perform financial analysis, human capital management, procurement and logistics, product development and manufacturing, and sales and service, supported by functionality for analysis, corporate services, and end-user service delivery. Together with SAP NetWeaver and a repository of enterprise services, SAP ECC6 can serve as a solid business process platform that supports continued growth, innovation, and operational excellence.

SAP NetWeaver SAP introduced SAP NetWeaver in 2002 in an effort to integrate people, information, and processes into one common application platform. SAP NetWeaver works with existing IT infrastructures and provides the ability to flexibly and rapidly design, build, implement, and execute new business strategies and processes.

Physical architecture

The solution supports online cloning of two types of live (running) SAP systems:

- Dual-stack (ABAP and Java) SAP ECC 6 (ERP05) systems
- Single-stack (Java) SAP NetWeaver Enterprise Portal systems

Figure 1 illustrates the overall physical architecture of the solution as validated.

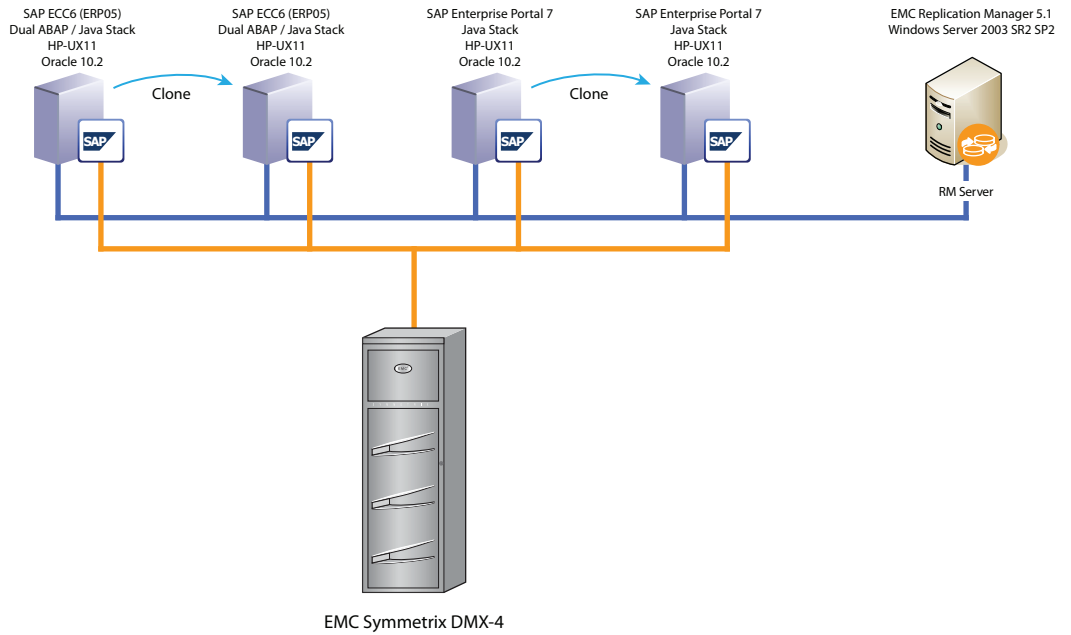


Figure 1 Overall physical architecture as validated

Hardware and software resources

Table 1 and Table 2 present the hardware and software resources used to validate the solution.

Table 1 Hardware resources

Equipment	Quantity	Configuration
Storage array	1	EMC Symmetrix DMX-4 1500 146 GB 15k drives
SAP servers	4	HP Integrity Four Itanium dual-core CPUs 16 GB RAM HP-UX 11i v2
Replication Manager server	1	Dell PowerEdge 2650 Two dual-core CPUs 4 GB RAM Two 72 GB disks Microsoft Windows Server 2003 R2

Table 2 Software resources

Software	Version	Configuration/comments
HP-UX 11i v2	HP-UX 11.23/IA64	Installed on all SAP servers
Oracle Database 10g Release 2	10.2.0.1 64-bit	Installed on all SAP servers
SAP Applications	ECC6 (ERP 2005): Dual-stack ABAP and Java NetWeaver Enterprise Portal 7: Java stack only	Installed on one source/target pair of SAP servers Installed on the other source/target pair of SAP servers
Microsoft Windows Server 2003	Enterprise Edition R2	32-bit; installed on Replication Manager server
EMC Replication Manager	5.1	32-bit; installed on Replication Manager server
EMC PowerPath®	5.0.1	32-bit; installed on Replication Manager server
EMC Solutions Enabler	6.4.1.0	32-bit; installed on Replication Manager server
Java JDK	1.4.2	Installed on all four SAP servers and the Replication Manager server

Design and operation overview

The EMC Intelligent Cloning for SAP Replication of Java Stack-based SAP Systems with Oracle solution uses a combination of EMC and SAP technology, including EMC Symmetrix DMX-4 storage, EMC Replication Manager, and SAP tools (SAPInst). All solution processes were validated with HP-UX for use within a UNIX operating environment.

With SAP Java stack-based application components, information is split between the Java file system and the SAP database. During production, many of the Java files are held open. Therefore, any replication scheme must keep the Java file system and the SAP database synchronized. This differs significantly from traditional ABAP stack-based environments, where it is not necessary to keep the database and file system in synchronization because all of the information required for replication resides in the SAP database.

An entire dual-stack (ABAP / Java) or Java stack-based SAP database is replicated from source to target, including a specific file system mount point. Both the database and the file system mount point replication are carried out in a single Replication Manager job to keep the Java stack consistent.

During replication, Replication Manager triggers a consistent split of both the database and file system LUNs. This enables the production system to remain operational while consistent replicas of both the database and file system are generated on the target.

Cloning process

Prior to cloning, a Replication Manager job is set up to replicate both the database and a specific file system mount point from the source system to the target system and the SAP administrator records some specific information about the source system's configuration.

With the source system running, the administrator initiates a Replication Manager job to replicate both the database and a specific file system mount point from the source system to the target system. Following replication, the administrator calls SAPInst on the target system to export the Java stack database. The administrator then calls SAPInst to import the Java stack database that was previously exported. The cloning process is complete. The administrator can then perform any necessary post-cloning tasks, which can be automated with scripts.

At various points in the process, the administrator must manually adjust some minor configuration parameters on the target system.

[Figure 2 on page 15](#) illustrates the cloning process.

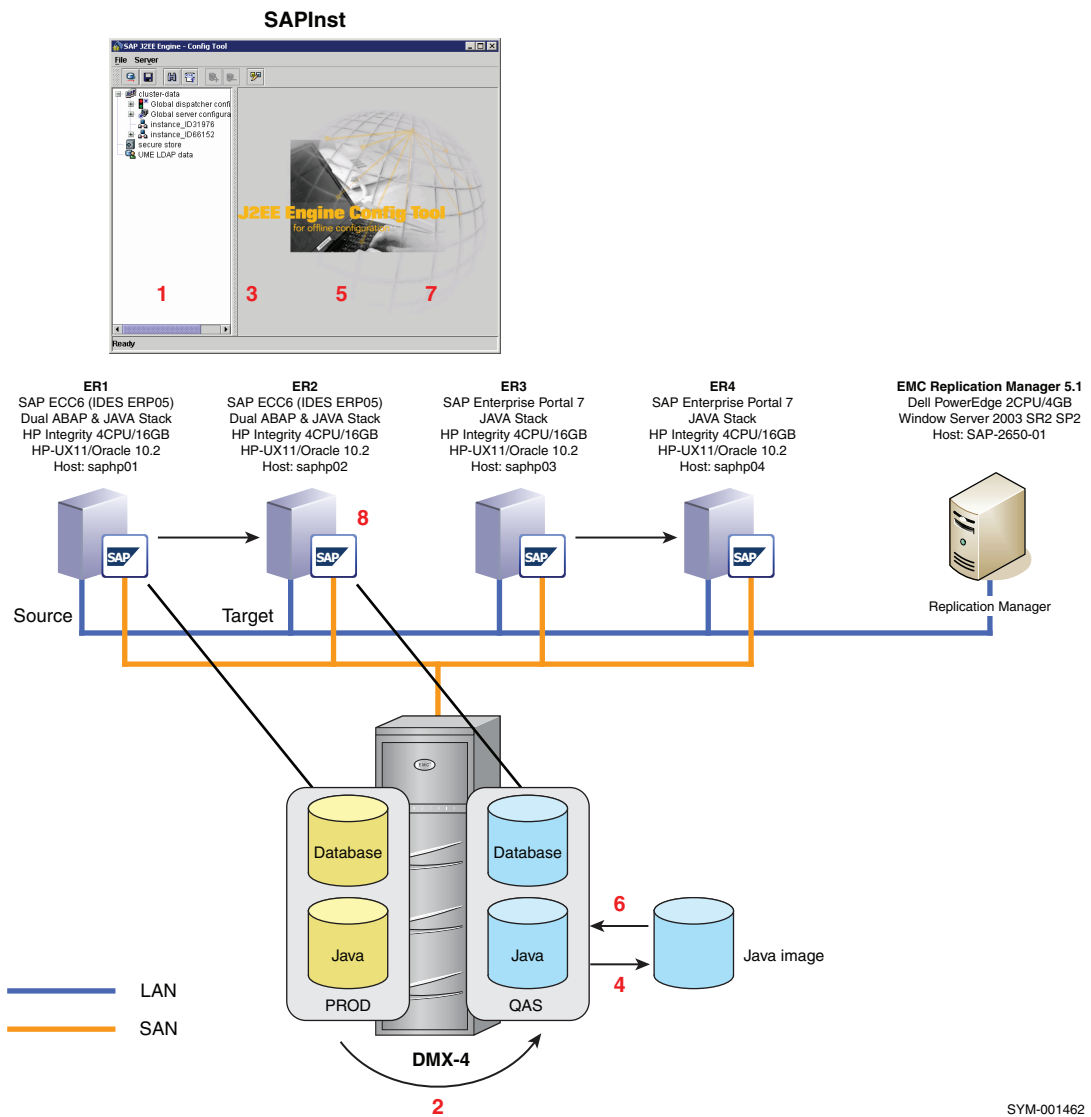


Figure 2 Cloning process

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The step-by-step process, illustrated in [Figure 2 on page 15](#), is described below.

Note: As a prerequisite for this process, a Replication Manager job must be set up to replicate both the database and a specific file system mount point from the source system to the target system.

1. Pre-clone task: Prior to replication, the SAP administrator records some information about the source system's configuration.
2. Clone task: With the source system running, the administrator initiates a Replication Manager job to replicate both the database and a specific file system mount point from the source system to the target system.
3. Post-clone task: Following replication, the administrator adjusts some configuration parameters on the target system.
4. Export task: The administrator calls SAPIInst on the target system to export the Java stack database.
5. Post-export task: The administrator adjusts some additional, minor configuration parameters on the target system.
6. Import task: The administrator calls SAPIInst to import the Java stack database exported in step 4.
7. Post-import task: The administrator adjusts some additional, minor configuration parameters on the target system.
8. Post-processing tasks: The cloning process is complete. The administrator performs any necessary post-processing tasks (which can be automated using Replication Manager scripts) and starts the SAP Java instance.

Conclusion

Building a replication solution for SAP systems with Oracle is a complicated endeavor. This reference architecture depicts a validated design using EMC Symmetrix DMX-4 and EMC Replication Manager. The solution provides effective cloning of live SAP dual-stack (ABAP / Java) or single-stack (Java) systems without requiring production system downtime.

The solution provides the following benefits:

- EMC Replication Manager eliminates manual scripting of replica creation and management, keeps the Java file system and SAP database synchronized for replication, and eliminates the problem of files being open on the production system during replication
- Eliminates downtime caused by a homogeneous system copy using the SAP procedure; increases the availability of the production environment; all production systems remain online during the cloning process
- Refresh of a quality assurance or test system can be done during business hours without affecting production users

EMC can help accelerate assessment, design, implementation, and management while lowering the implementation risks and cost of SAP system copies.

To learn more about this and other solutions contact an EMC representative or visit www.EMC.com/solutions/sap.

