



# SAP System Copy with NetApp Storage

NetApp-SAP Competency Center  
December 2006 | TR-3540

## Executive Summary

An overview of the NetApp solution for SAP system copies



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## Business Challenges

A typical SAP customer environment today consists of multiple mySAP Business Suite and SAP NetWeaver components. In order to be able to test application patches, to run performance and data integrity tests, or to provide user training environments, copies of SAP components are required. A typical SAP customer on average needs about 10 copies of different SAP components. Often, these copies need to be refreshed on a weekly or monthly basis.

The creation of a SAP system copy normally takes several days and negatively affects the production environment. In addition, numerous manual steps must be performed, consuming the valuable time of IT staff.

The source database must be exported using SAP tools and imported at the target system, or an offline backup of the source database will be restored at the target system. Depending on the database size, these steps have a significant impact on the application availability. It takes many hours to replicate a 1TB database from the source to the target system. Preparing the cloned system so that it can be used in the new environment takes several additional hours. This preparation is often done manually, consuming SAP Basis administrators' time.

Being able to create a SAP system copy on demand very quickly becomes more and more important.

- Quality Assurance systems need to be refreshed on a weekly basis.

- Additional test systems need to be set up quickly to perform specific integration tests.

- A test system with current production data needs to be set up quickly during a SAP upgrade project.

- Training systems need to be set up or resynchronized.

The traditional approach to create the system copies is not suitable to address these demands.

SAP copies also consume a significant amount of storage, which needs to be provisioned. Since these copies are typically clones of the production system, the amount of needed storage can be huge.

## NetApp Solution for SAP System Copies

The NetApp<sup>®</sup> solution for ABAP SAP system cloning addresses these issues by providing an automated process to create a SAP system copy on demand, in a few minutes and without any impact on the source production system. In addition, NetApp cloning functionality allows efficient management of storage by storing only data changes between the source and the clone.

SAP system copies are accomplished using the NetApp LUN clone feature. A LUN clone copy is a writeable point-in-time image of a NetApp FlexVol<sup>®</sup> volume. A LUN clone copy is based on a Snapshot<sup>™</sup> copy of the source FlexVol volume and is created in a few seconds without interrupting the operation on the source system. LUN clone copies store only changed blocks between the source FlexVol volume and the LUN clone image and therefore significantly decrease the amount of disk space needed for SAP system copies.

Figure 1 shows the basic concept of the system copy solution. Creating a SAP system copy consists of several steps on the source system and several steps on the destination system.

On the source system, a database-consistent Snapshot copy of the Oracle<sup>®</sup> data files is created. This is done during online operation and has no performance impact on the source system.

On the target system, this Snapshot copy is the base for the LUN clone image. The creation of the LUN clone image takes only a few seconds. The image is then connected at the target system. The subsequent steps at the target system are necessary to change the database and the SAP SID. In addition, SAP-specific postprocessing tasks must be accomplished.

All of these steps can be automated and do not need any manual interaction. A SAP system copy can be accomplished in a few minutes using the NetApp solution.

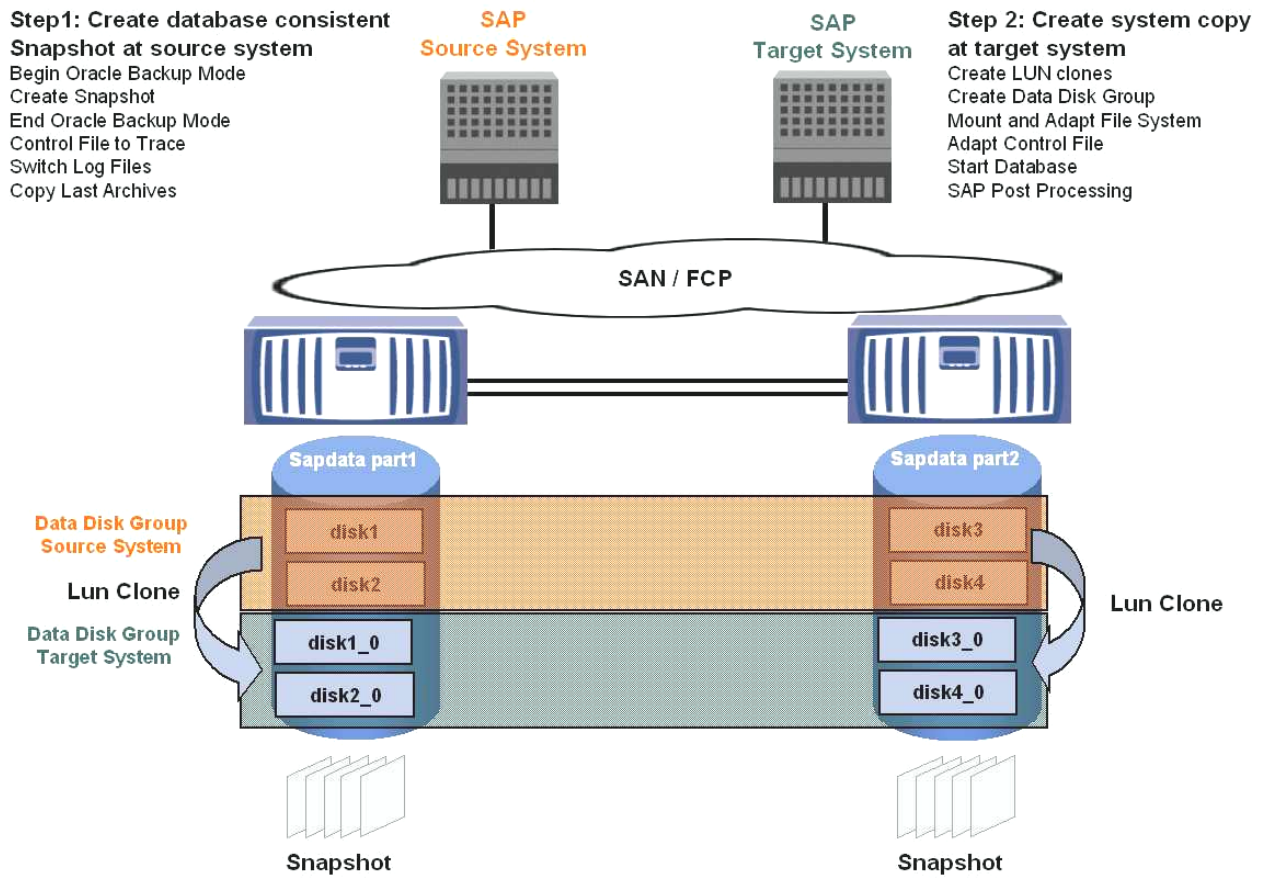


Figure 1) SAP system cloning overview.

Necessary steps at the source system:

With the traditional approach, it is necessary to create an online or offline backup of the source database. A backup typically has a significant performance impact on the source system and therefore must be scheduled carefully. Depending on the database size, the backup of the database can take several hours. The subsequent steps are typically carried out manually, consuming IT staff time.

With the NetApp approach, the backup is taken using Snapshot functionality. Creating a Snapshot copy takes only a few seconds and has no performance impact on the source system. Therefore this step can be scheduled at any time during online operation. The creation of the Snapshot copy and all the subsequent steps are automated.

Necessary steps at the target system:

If a new SAP test system needs to be set up, the SAP and Oracle software need to be installed once. This step is required with both approaches. With all subsequent refreshes of this system, this step is not necessary.

With the traditional approach, the next step is to restore the offline or online tape backup from the source system. Depending on the database size, this step can take several hours. Scheduling the restore might also be difficult, because the restore blocks the backup infrastructure. The following steps to adapt the file system, change the database to the new SID, and the SAP postprocessing tasks are typically carried out manually, consuming IT staff time.

With the NetApp approach, a LUN clone image is created based on the consistent Snapshot database backup that was created at the source system. The creation of the LUN clone image takes only a few seconds and can be scheduled at any time. The subsequent steps to adapt the file system and the database to the new SID and the SAP postprocessing tasks are automated.

The following table compares the traditional tape backup approach to the NetApp approach to perform a SAP system copy.

Traditional Tape Backup Approach	NetApp Approach	Netapp Advantages
<b>Necessary steps at the source system</b>		
Offline or online backup	Snapshot backup during online operation	No impact on operation with NetApp solution; can be scheduled at any time
Control file to trace	Control file to trace	Automated process with NetApp solution
Switch log files and copy archived logs to shared location (with online backup)	Switch log files and copy archived logs to shared location	Automated process with NetApp solution
<b>Necessary steps at the target system</b>		
Install SAP system (if not already existing)	Install SAP system (if not already existing)	Same approach
Restore offline backup from source system	Create LUN clone image based on Snapshot backup;	Restore takes only seconds with NetApp LUN clone technology;

<p>Adapt directory names to new SID</p> <p>Create new control file with new SID based on control file trace from source system</p> <p>Adjust Oracle security</p> <p>SAP-specific postprocessing tasks</p>	<p>connect the LUN clone image at the target system</p> <p>Adapt the file system names to the new SID</p> <p>Create new control file with new SID based on control file trace from source system</p> <p>Adjust Oracle security</p> <p>SAP-specific postprocessing tasks</p>	<p>automated process with NetApp solution</p> <p>Automated process with NetApp solution</p> <p>Automated process with NetApp solution</p> <p>Automated process with NetApp solution</p> <p>Automated process with NetApp solution</p>
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**Conclusion: The NetApp system copy solution significantly improves the process to create SAP system copies.**

A system copy can be accomplished in several minutes compared to several days with the traditional approach.

System copies can be scheduled at any time because there is no impact on the online operation of the source system (performance, backup infrastructure).

Snapshot and LUN clone functionality reduces the time necessary to copy the data from the source system to the target system from several hours to several seconds.

All storage, operating system, database, and SAP-specific tasks are automated, minimizing the interaction of IT staff.

Snapshot and LUN clone functionality significantly reduces the disk space necessary for a SAP system copy by storing only data changes between the source and the target system.

## NetApp System Copy Implementation

The NetApp system copy solution is implemented using operating system level shell scripts. These scripts are based on the NetApp best practices for SAP and do not work properly if these best practices are not followed when installing SAP systems on NetApp storage. The scripts can be used to clone ABAP, Java™, and ABAP/Java systems. However, only ABAP systems can be cloned using the online mode. Because of system state information, ABAP/Java and Java systems must be shut down before the snapshot can be taken. Otherwise the system state becomes inconsistent and the Java instance cannot be started after the copy procedure.

There are two scripts that work together to provide the complete system copy functionality. The first script performs the snapshot backup of the source database, the creation of the backup control file, and the rolling and copying of the database logs. The second script runs on the target server and performs the import of the LUN clone volumes, the mounting and modification of the file systems, the creation of the new control file, the startup and recovery of the database, and the postprocessing steps.

The scripts have configurable parameter files that must be configured once for each source-target pair. Once the parameter files are configured and the scripts tested, no additional work is required to make copies unless the storage or server infrastructure changes. Copies can be made routinely by simply running the scripts.

The scripts are not currently available directly to customers, but they can be obtained through NetApp Professional Services, sales engineers, and partners. The NetApp-SAP Competency Centers that developed the scripts have also written implementation guides to assist with installing and configuring the scripts in customer environments.

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