

EMC Management for SAP TDMS Enabled by EMC CLARiiON with Virtual Provisioning and EMC Replication Manager

A Detailed Review

EMC Information Infrastructure Solutions

Abstract

This white paper demonstrates how EMC[®] Replication Manager and EMC storage snapshot/clone and Virtual Provisioning[™] technologies integrate with SAP Test Data Migration Server (SAP TDMS) to allow SAP administrators to easily create and refresh non-production systems, such as QA and training, with a reduced dataset without downtime to the production system.

July 2010

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Part number: H7053

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Executive summary

Business case Every business organization strives to be competitive and differentiate within its market. When the business relies on SAP applications, it is critical for SAP administrators to provide relevant test data to support continuous improvement of the business functional processes.

Multi-terabyte databases are the norm for many SAP customers; and business needs must be met while containing costs. SAP administrators and IT staff must minimize the number of full database copies, and the amount of SAP data maintained throughout their non-production landscapes while continuing to meet the needs of the business. Traditional system copy methods can negatively impact system performance or even lead to downtime. The copied system has exactly the same size as the production system, which increases the storage footprint dramatically. During system export, read operations are placed in the production system disk, and SLA may not be able to meet.

SAP administrators need a simple and reliable solution to refresh non-production systems in cases where a subset of the production data will meet the requirements for business functional testing or user training with minimal or no performance impact to the production system.

Key results This solution has the following benefits:

- Builds a non-production system containing a subset of production data to provide relevant and current SAP data used for testing with no impact to the production system
- Improves storage provisioning and utilization through CLARiiON® Virtual Provisioning™

Product solution SAP administrators use SAP TDMS to create subsets of their production data for use in testing and training systems. While the benefit of this solution is a smaller database than production, the process of creating the subset from the production database can have negative performance impact on the production system.

EMC has published several Proven Solutions regarding intelligent cloning. Based on the existing EMC intelligent cloning technology, the latest version of SAP TDMS is capable of integrating with EMC® Replication Manager and EMC storage snapshot and clone technology to allow SAP administrators to easily create and refresh non-production systems (test, development, training, and so on) with a reduced size SAP client without downtime to the production system.

In addition, administrators can deploy a non-production system on EMC virtual provisioned storage, which further reduces the storage footprint for the SAP landscape. EMC virtual technology increases the efficiency of storage utilization and reduces the storage infrastructure cost.

Introduction

Purpose

The purpose of the solution is to demonstrate how SAP Test Data Migration Server (SAP TDMS) integrates with EMC Replication Manager and the EMC CLARiiON unified storage platform. With this integration, you can create subset non-production SAP clients (test and training) from SAP production data using snapshot or clone technology on CLARiiON storage without production system downtime.

Audience

This white paper is intended for customers, partners, and EMC employees, including IT planners, SAP and storage architects, Basis administrators, and any others involved in evaluating, acquiring, managing, operating, or designing an SAP landscape infrastructure. It's assumed that the audience is familiar with SAP TDMS.

Terminology

This section defines the terms used in this document.

Term	Definition
Sender system (client)	The system from which the data supply for the non-production system is taken.
Receiver system (client)	The non-production system to be filled.
Snapshot/clone system (client)	The system where the sender system's snapshot or clone will be mounted.
TDMS central system (client)	The system that stores the settings and customization for the setup of the non-production system.
TDMS control system (client)	The system that triggers and monitors the activities for SAP TDMS. Note The central system and the control system can be the same SAP system (client).
Project	A compilation of one or more subprojects, which are related from a technical or content point of view.
Subproject	A combination of a sender system, a receiver system, and the Remote Function Call (RFC) connection between them.
Package	An instance of a data transfer with SAP TDMS. The existing packages are listed in the migration server overview. When you select a package from the migration server overview, the process monitor for this package is displayed.

Activity	A step in the process monitor that represents a task in a package. For each activity in the process monitor, there is information that tells you why this particular step is necessary, and what you should do next.
Process monitor	A list of activities to be run in a TDMS project. The activities are listed in chronological order and grouped in a hierarchy of phases and subphases. You cannot run an activity in a later phase until all activities from the preceding phases have been completed successfully. For each activity that is currently running or has already been run, you will see the detailed status information in the process monitor.
Process type	The process type defines the scope and procedure for the data transfer. It also determines what activities are shown in the process monitor for a package. For example, there is a process type for transferring only master data or transaction data, and another process type for transferring data for a specific business object. When you create a package for SAP TDMS, you select the required process type.
System shell	SAP system that contains all table structures (table definitions), but no data (content) for most application tables.

Key components

Introduction

This section briefly describes the key components of this solution. For details on all of the components that make up the architecture, see the “Environment profile” section.

EMC Replication Manager

EMC Replication Manager automates and simplifies management of disk-based and NFS-based replication processes. It orchestrates business-critical 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.

EMC CLARiiON CX4

The EMC CLARiiON CX4 series offers innovative technologies including Flash drives, unique UltraFlex™ technology, CLARiiON Virtual Provisioning, disk-drive Spin Down, 64-bit FLARE®, and multi-core Intel Xeon processors. With expandable Fibre Channel (FC) and iSCSI connectivity and advanced data protection through CLARiiON proven five 9s (99.999 percent) availability, the CLARiiON CX4 series is the optimal midrange storage for virtualized environments.

Virtual Provisioning technology

EMC Virtual Provisioning software runs on an EMC storage system with Virtual Provisioning enabled on the system. Virtual Provisioning is the capacity of presenting more storage capacity to a host than is physically available. This allows customers to provision the storage capacity without actually assigning the same amount of physical storage. Instead, the physical storage is assigned on demand from a shared storage pool (thin pool). The storage administrator monitors and replenishes each thin pool, not each LUN, thus simplifying the creation and allocation of the storage capacity. The basic elements of Virtual Provisioning are thin pools and thin LUNs used to allocate the storage.

Traditional LUNs compared to thin LUNs

It is important to understand your application requirements and select the approach that meets your needs. If conditions change, CLARiiON LUN migration can be used to migrate from thin LUN to traditional LUN or from traditional LUN to thin LUN.

You can use traditional LUN in the following situations:

- When milliseconds of performance are critical
- For the best and most predictable performance
- For precise data placement
- When you want one method for all applications and services
- When you are not as concerned about space efficiency

You can use thin provisioning with thin pools for:

-
- The best space efficiency
 - Easy setup and management
 - Minimal host impact
 - Energy and capital savings
 - Applications where space consumption is difficult to forecast
-

VMware ESX

VMware ESX is the foundation for a dynamic, self-optimizing IT infrastructure. VMware ESX is a robust, production-proven virtualization layer that abstracts processors, memory, storage, and networking resources into multiple virtual machines. VMware ESX allows enterprises to dramatically reduce hardware and operating costs by sharing resources across a virtual environment.

SAP ERP 6.0

SAP ERP 6.0 is a world-class, fully integrated solution that fulfills the core business needs of midsize and large organizations across all industries and market sectors. Together with SAP NetWeaver and a repository of enterprise services, SAP ERP 6.0 can serve as a solid business process platform that supports continued growth, innovation, and operational excellence.

SAP TDMS

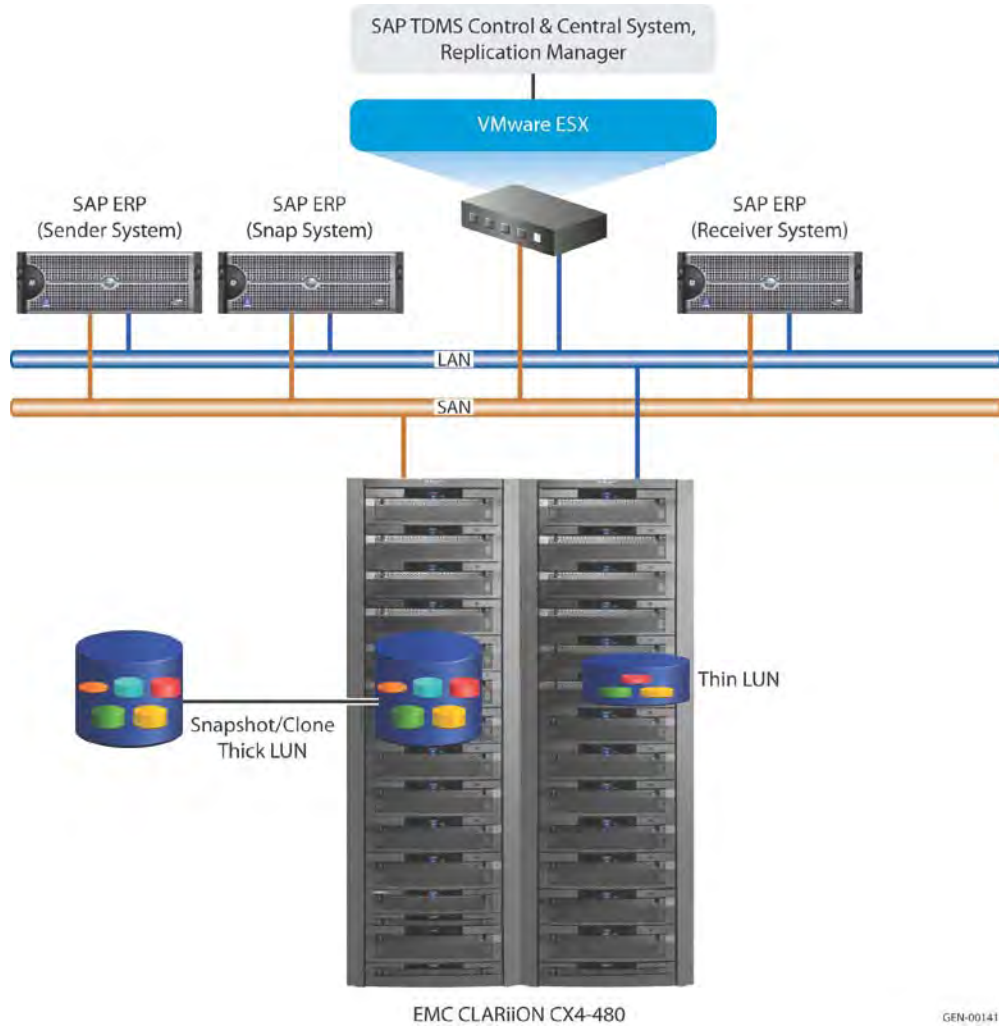
SAP Test Data Migration Server (SAP TDMS) software can create and refresh non-production systems (test and training) with a reduced dataset. It provides many benefits including reducing data volume for non-production systems, offering high quality business-relevant and up-to-date test data for development and training activities, and providing low administrative efforts for maintaining non-production systems.

SAP TDMS now integrates with EMC Replication Manager to create replicas of the production system to eliminate the impact of the sub-setting process on the production system.

Physical architecture

Physical environment diagram

The following diagram illustrates the overall physical architecture of the environment.



Environment profile

Hardware resources

The following table lists the hardware used to validate the solution.

Equipment	Quantity	Configuration
EMC storage array	1	CX4-480 146 GB 15k drives
Fibre Channel switch	1	Cisco MDS 9509 64 ports
Network switch	1	Cisco 3560G 64 ports
SAP servers	3	HP ProLiant DL580 G5 Production (1), clone (1) and receiver (1) SAP installed on Windows 2003
TDMS server and EMC Replication Manager server	1	One virtual machine hosted by Dell R710

Software resources

The following table lists the software used to validate the solution.

Software	Version	Configuration
Microsoft Windows 2003 Enterprise Edition	R2 SP2 64-bits	OS for SAP ERP 6.0 (IDES) installation
SAP Application ERP	6.0 EhP4	ABAP stack only
SAP NetWeaver	7.0 EhP1	ABAP stack only
SAP TDMS	3.0 with SP14	Install all SAP systems
Oracle Database	10.2.0.4	Part of SAP installation
EMC Replication Manager	5.2.2	
EMC FLARE	4.28.000.5.706	
EMC CLARiiON SnapView™	02.28.0.0.4	
EMC Solutions Enabler	7.0.0.4 32-bit	
EMC PowerPath®	5.3.0	
EMC CLARiiON Virtual Provisioning Enabler	1.01.5.001	Enables thin provisioning on CLARiiON for the receiver
EMC Navisphere® Admsnap	02.28.0.0.4	
EMC Navisphere CLI	6.28.20.1.40	

EMC Navisphere Agent	6.28.20.1.40	
VMware ESX	4.0	OS where the virtual machine for Replication Manager and TDMS is running

Installation and configuration

Introduction This section provides procedures and guidelines for installing and configuring the components of this solution.

Installing EMC Replication Manager Installing Replication Manager within the context of this solution involves:

- Installing EMC Replication Manager Server on a Windows server
- Installing EMC Solutions Enabler and EMC Replication Manager Agent on both the sender system and the snapshot/clone system.

For detailed installation instructions, see the *EMC Replication Manager Version 5.2 SP2 Installation Guide*.

Minimum requirements to run TDMS The following are the minimum requirements for running TDMS:

- The sender and receiver systems must have the same SAP release, DDIC, and repository level.
- The central system can be on SAP R/3 4.6, Enterprise 4.7, or SAP NetWeaver 6.40 and later.
- Add-on components DMIS and DMIS_CNT must be installed on sender, receiver, and central systems with the same support package level.

Refer to SAP notes listed below for more information:

SAP Note	Title	Comments
1094395	Installation of DMIS_EXT 2007_1 The add-on called DMIS_EXT 2007_1	This note describes the installation procedure for DMIS_EXT. The add-on component DMIS_EXT contains additional process types (reduction scenarios) for SAP TDMS.
890797	SAP TDMS - required and recommended system settings	This note contains information about suitable system settings for SAP TDMS in different constellations (for example for different databases).
894307	TDMS: Tips, tricks, general problems, error tracing	This note contains a list of known issues and solutions, as well as tips and tricks.
1003051	Collective Note for SAP TDMS 3.0	This note lists the most important notes for SAP TDMS.
916763	TDMS performance composite SAP note	This note lists known performance issues for SAP TDMS and provides information about how to analyze and

		resolve these issues. These performance issues are specific to TDMS and do not reflect the EMC technologies used to augment storage optimization with TDMS.
994106	Release limitations TDMS 3.0	This note informs you about any existing use limitations of certain parts of TDMS in certain system environments.
1423567	Create new cluster in sender and receiver system	This note is used to fix the described symptom during the test.
1232776	Long runtimes for accesses to D010INC or D010TAB	This note is used to fix the data deletion performance issue during the test.
1405597	All relevant notes for TDMS service pack 12 or above	This note provides all relevant notes for TDMS service pack 12 or later information.
1450173	Performance problems in TDMS data transfer Hold CPIC	This note provides a solution for a performance issue in the TDMS data transfer Hold CPIC.

Preparing the system landscape

Follow the steps provided in the table below to prepare the system landscape:

Step	Action
1	<p>Prepare the sender system (production system).</p> <ul style="list-style-type: none"> a. Apply the latest SAP SPAM/SAINT tool. b. Install SAP TDMS add-on packages and support package 14. <p>Note Contact SAP Support to verify that you have applied all required TDMS patches.</p>
2	<p>Prepare the snapshot/clone system (Replication Manager target).</p> <ul style="list-style-type: none"> a. Install SAP ERP ABAP with the same SID. <p>Note Use different system numbers to differentiate from the sender system.</p>
3	<p>Prepare the SAP TDMS systems (control and central systems).</p> <ul style="list-style-type: none"> a. Install NetWeaver 04s EhP1. b. Apply the latest SAP SPAM/SAINT tool. c. Install SAP TDMS add-on packages and support package 14. <p>Note Refer to SAP Note 970531 and 970532 for detailed information.</p>
4	<p>Prepare the receiver system (non-production system).</p> <ul style="list-style-type: none"> a. Configure a system shell to build up the receiver system. b. Copy client 000 with the profile <i>SAP_ALL</i> from the sender system to the receiver system through client export and import technology.

	<ul style="list-style-type: none"> c. Delete all clients except the SAP default clients. d. Create a new client in the receiver system from a copy of client 000 with profile <i>SAP_ALL</i>.
5	<p>Configure the TDMS with a snapshot/clone technology package.</p> <ul style="list-style-type: none"> a. Create a package. For this solution validation, a time-based package was created but other types of packages can be used as well. b. Configure the global parameter for sender system from the central system. c. Create BAT files <i>SAP_Snap_verify.bat</i>, <i>SAP_Snap_start.bat</i>, and <i>SAP_Snap_stop.bat</i> in the sender system to communicate with Replication Manager. d. Create external commands <i>ZEM_TDMS_SNAP</i>, <i>ZEM_TDMS_START</i>, and <i>ZEM_TDMS_STOP</i> in the sender system. <p>Refer to the "SAP TDMS Snapshot integration configuration" section for detailed information.</p>

For detailed information about SAP system installation, refer to the relevant SAP installation guides.

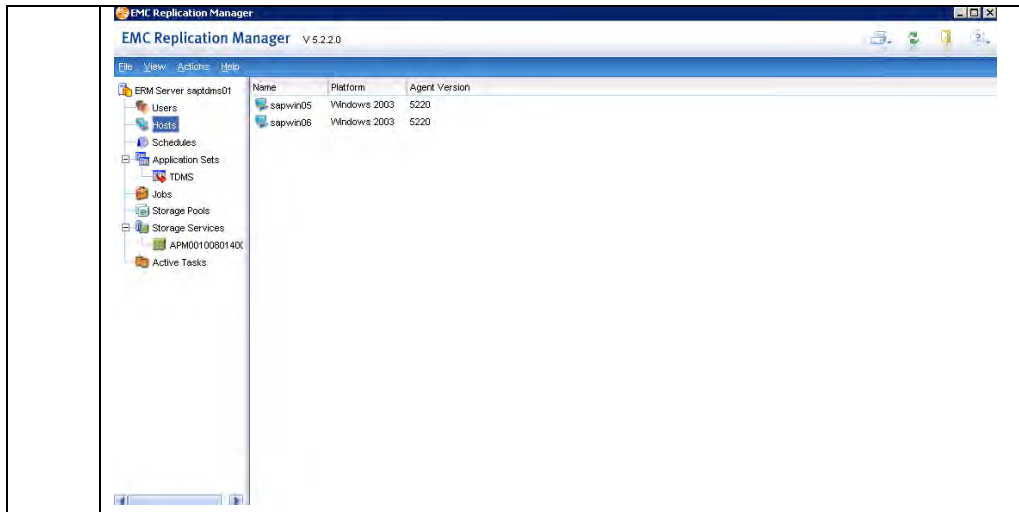
**Configuring
EMC
Replication
Manager**

Follow the steps provided in the table below to configure EMC Replication Manager for this solution.

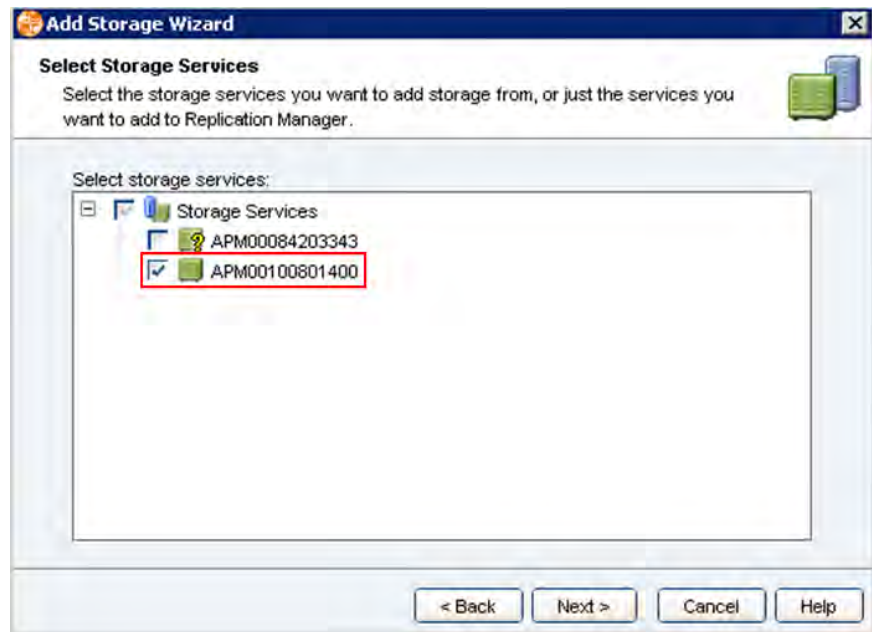
For detailed information about configuring EMC Replication Manager, refer to the *Replication Manager Administrator's Guide*.

For Snapshot:

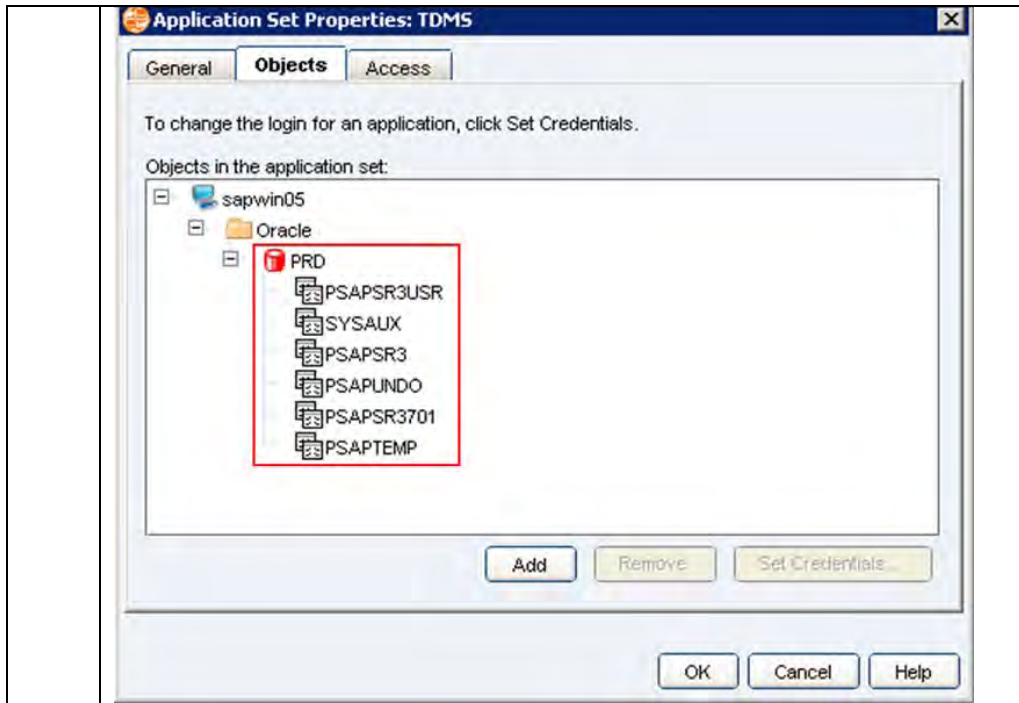
Step	Action
1	Add sender and snapshot/clone hosts to the EMC Replication Manager environment.



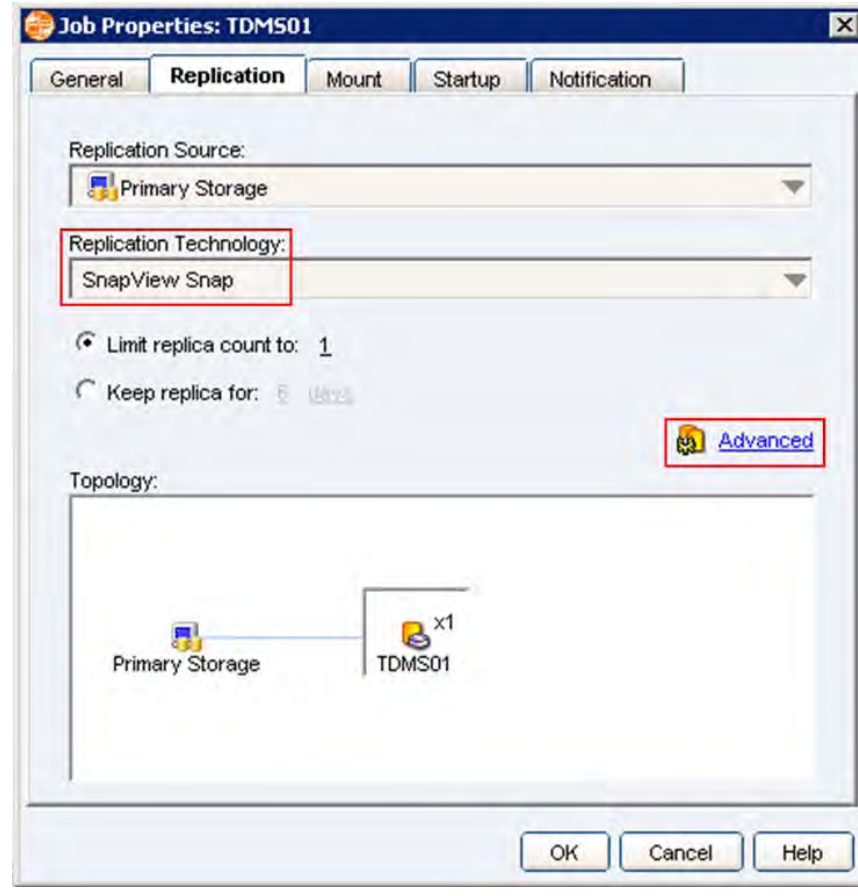
2 Add EMC CLARiiON to the EMC Replication Manager environment.



3 To identify the SAP Oracle database to be replicated, create an application set.

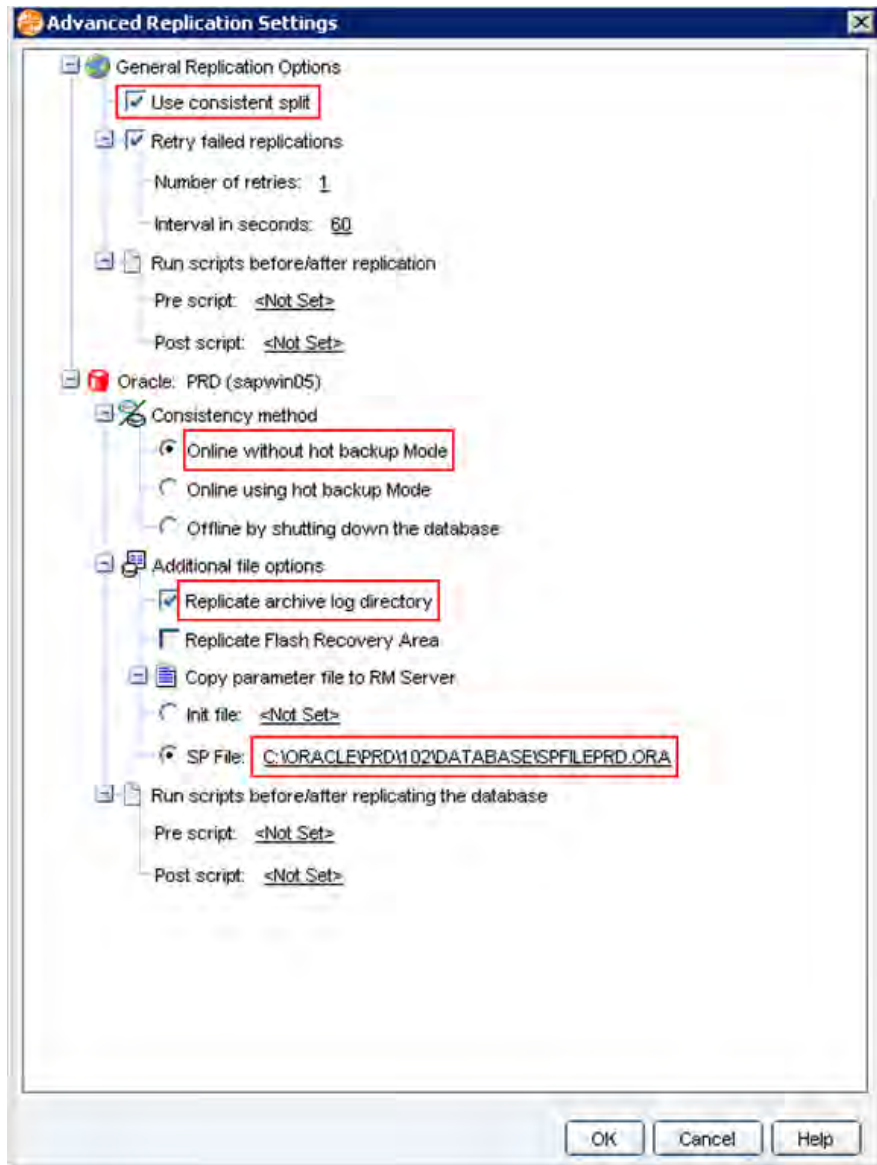


4 Create a job to set the appropriate replication options.



5 In the **Advanced Replication Settings** window, select the appropriate options for the relevant areas, as shown in the following image:

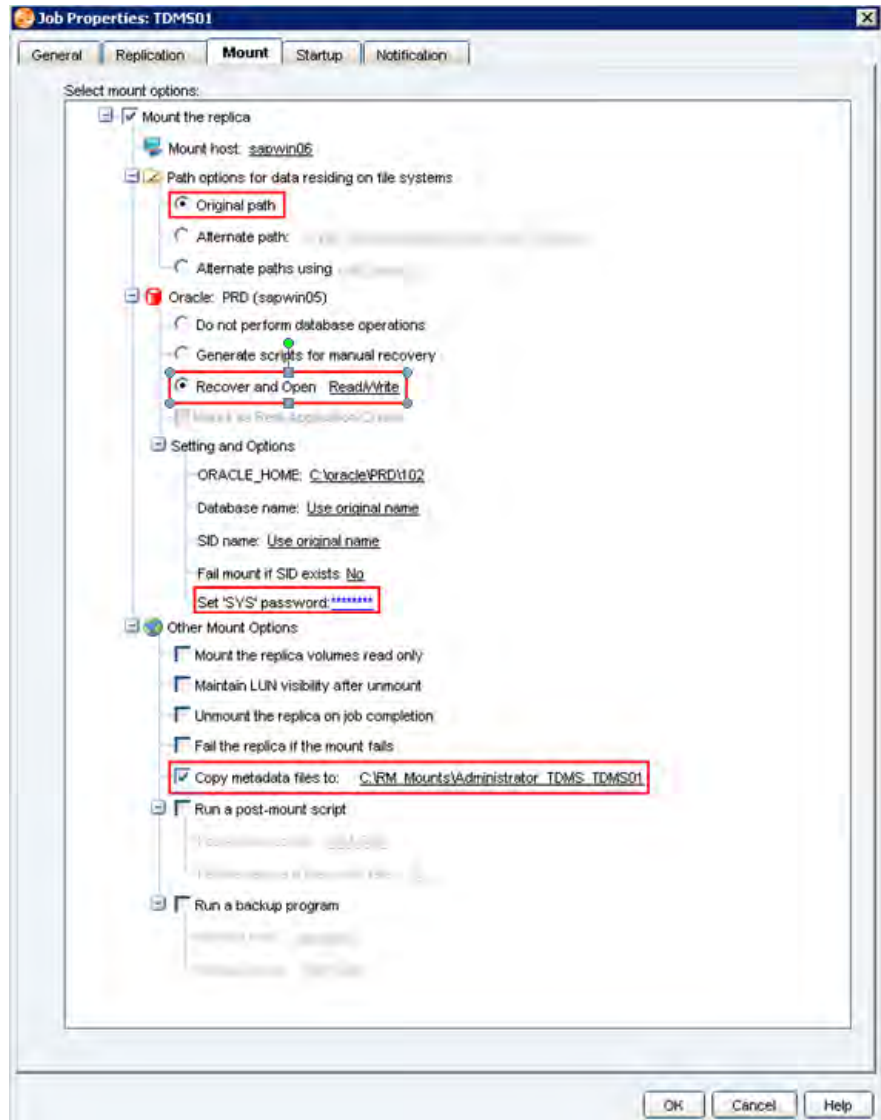
- **General Replication Options:** Select **Use consistent split**.
- **Consistency method:** Select **Online without hot backup Mode**.
- **Additional file options:** Select **Replicate archive log directory**.
- **Copy parameter file to RM Server:** Set the SP File to `$oracle_home\database\SPFILE<SID>.ORA`.



On the **Mount** tab, select appropriate mount options, as shown in the following image:

- **Mount the replica:** The hostname for the mount.
- **Path options for data residing on file systems:** Select **Original path**.

- **Oracle: PRD (sapwin05):** Select **Recover and Open (Read/Write)**.
- **Setting and Options:**
 - **ORACLE_HOME:** Use default Oracle path.
- **Other Mount Options:** Copy metadata files to `C:\IRM_Mounts\Administrator_TDMS_TDMS01`.

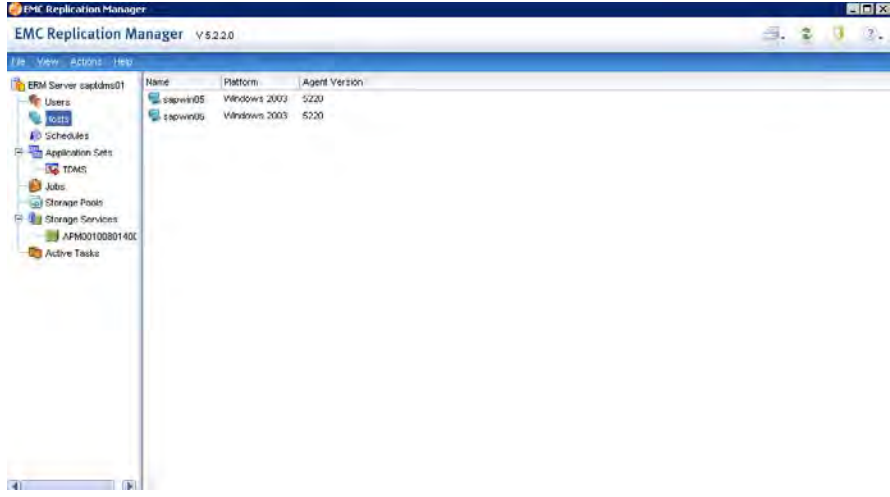
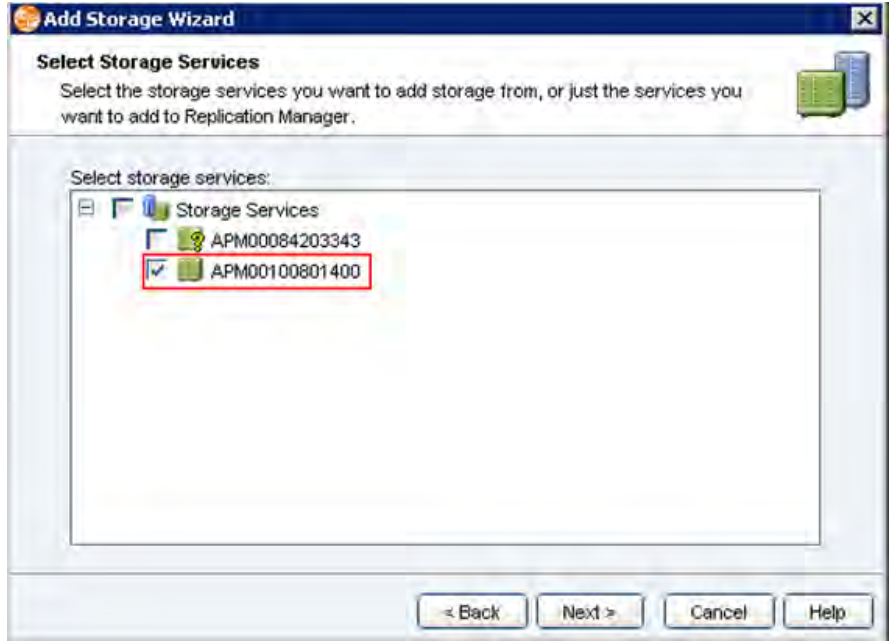


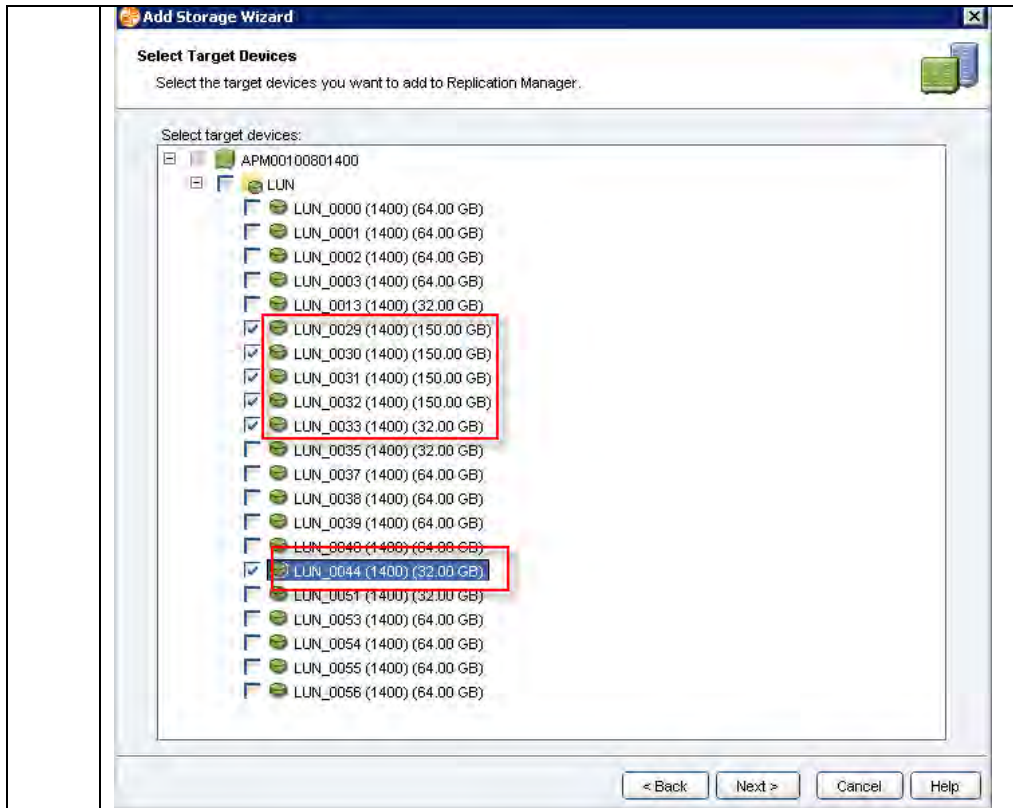
In addition, a post-clone script is configured to start the SAP system on the target host. Replication Manager provides two default scripts located in `C:\Program Files (x86)\emc\rm\client\bin` on the target system:

- `IR_Callout_<application set name>_<Job name>_1300`: for actions before unmount replica.
- `IR_Callout_<application set name>_<job name>_600`: for post actions after mount replica.

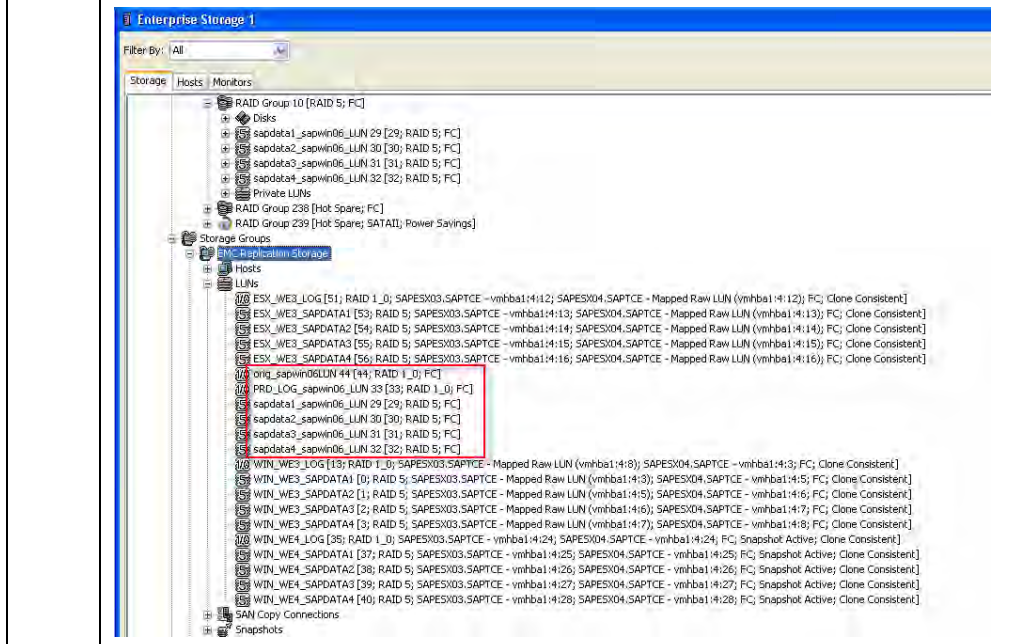
	Refer to the “Additional information” section for more information about the post-clone script.
--	---

For clone:

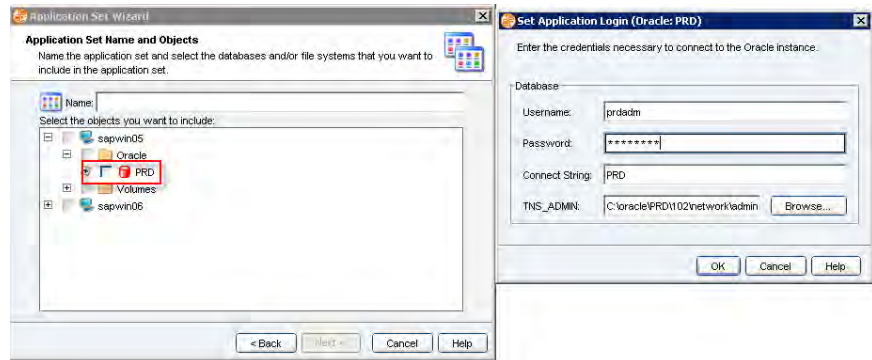
Step	Action
1	<p>Add sender and snap/clone hosts to the EMC Replication Manager environment.</p>  <p>The screenshot shows the EMC Replication Manager console. The main window displays a table with columns for Name, Platform, and Agent Version. The table contains two entries: 'sapwin05' on a Windows 2003 platform with agent version 5220, and 'sapwin06' on a Windows 2003 platform with agent version 5220. The left sidebar shows a tree view with categories like Users, Schedules, Application Sets, Jobs, Storage Pools, Storage Services, and Active Tasks.</p>
2	<p>Add EMC CLARiiON to the EMC Replication Manager environment.</p>  <p>The screenshot shows the 'Add Storage Wizard' dialog box. The title bar reads 'Add Storage Wizard'. The main text says 'Select Storage Services' and 'Select the storage services you want to add storage from, or just the services you want to add to Replication Manager.' Below this is a list of storage services under the heading 'Select storage services:'. Two services are listed: 'APM00084203343' and 'APM00100801400'. The 'APM00100801400' entry is checked and highlighted with a red box. At the bottom of the dialog are buttons for '< Back', 'Next >', 'Cancel', and 'Help'.</p>
3	Select the relevant LUNs for the clone.



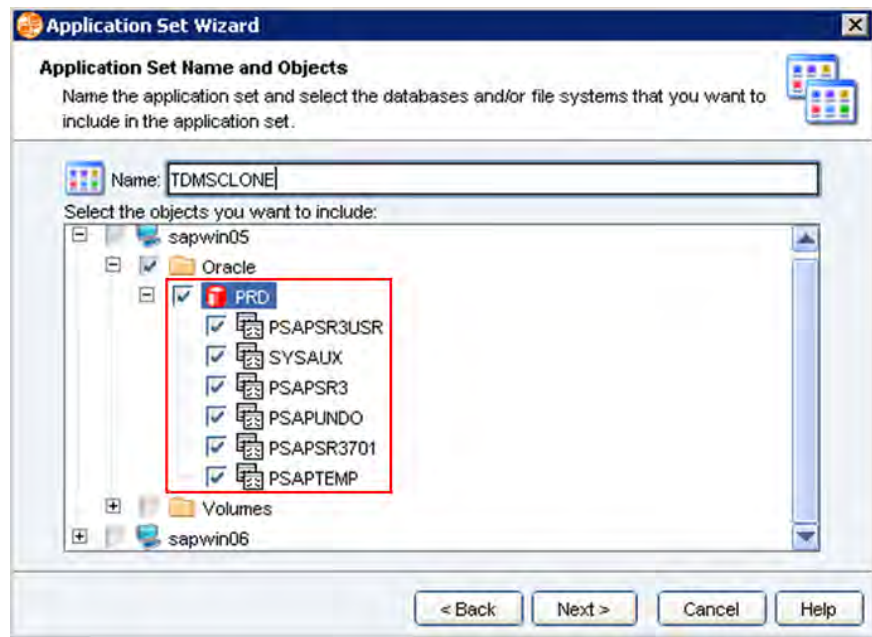
Define the selected LUNs in the Replication Storage group of CLARiiON through Navisphere.



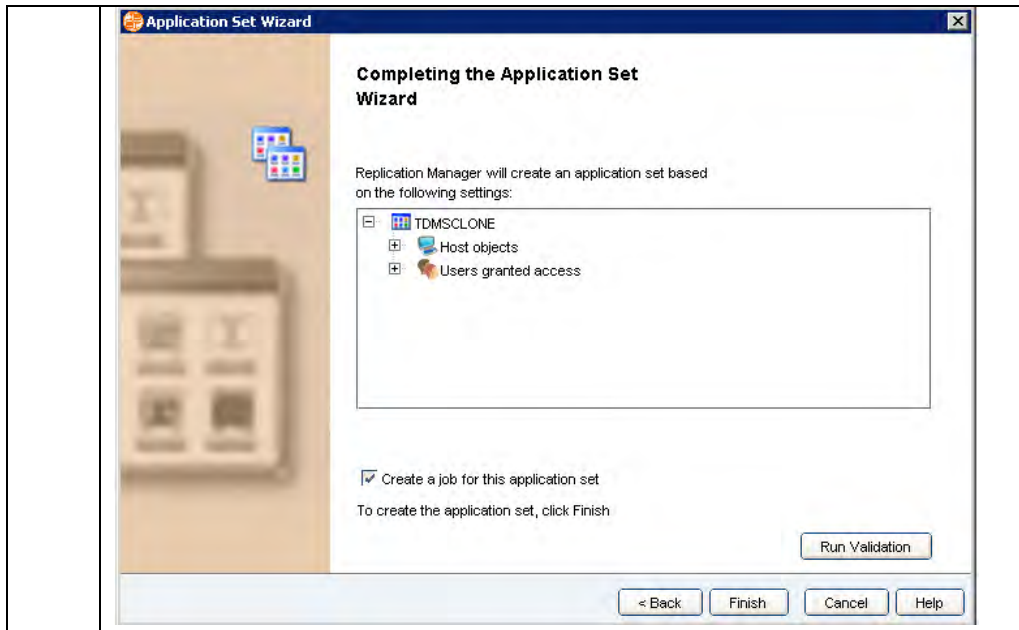
4 Configure the application set.



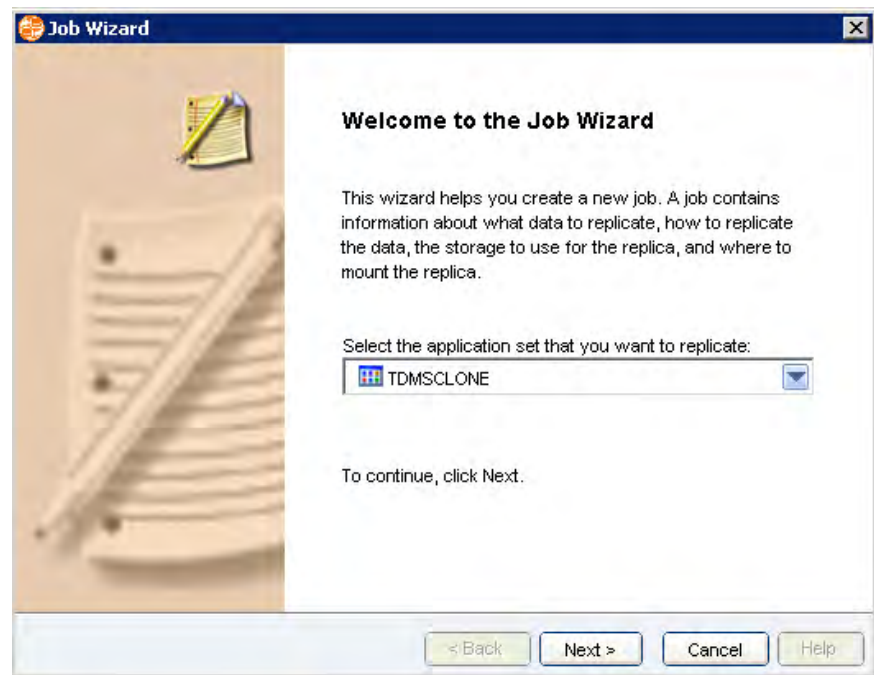
a. Select all tablespaces.



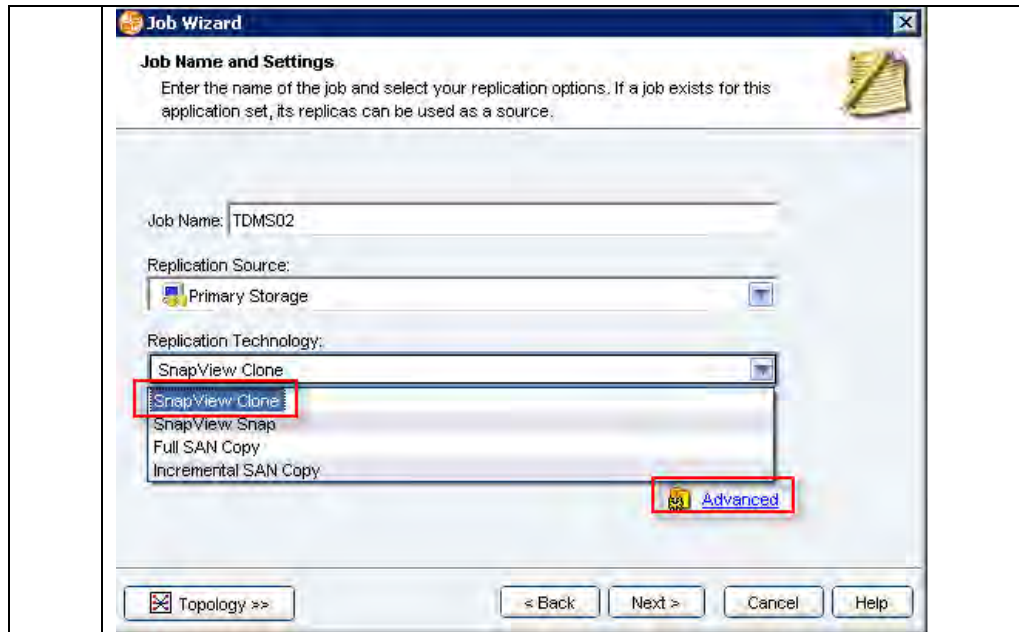
b. Complete the application set.



5 Create a job for the application set.



As you create a job for the replication set, choose **Replication Technology: SnapView Clone**.

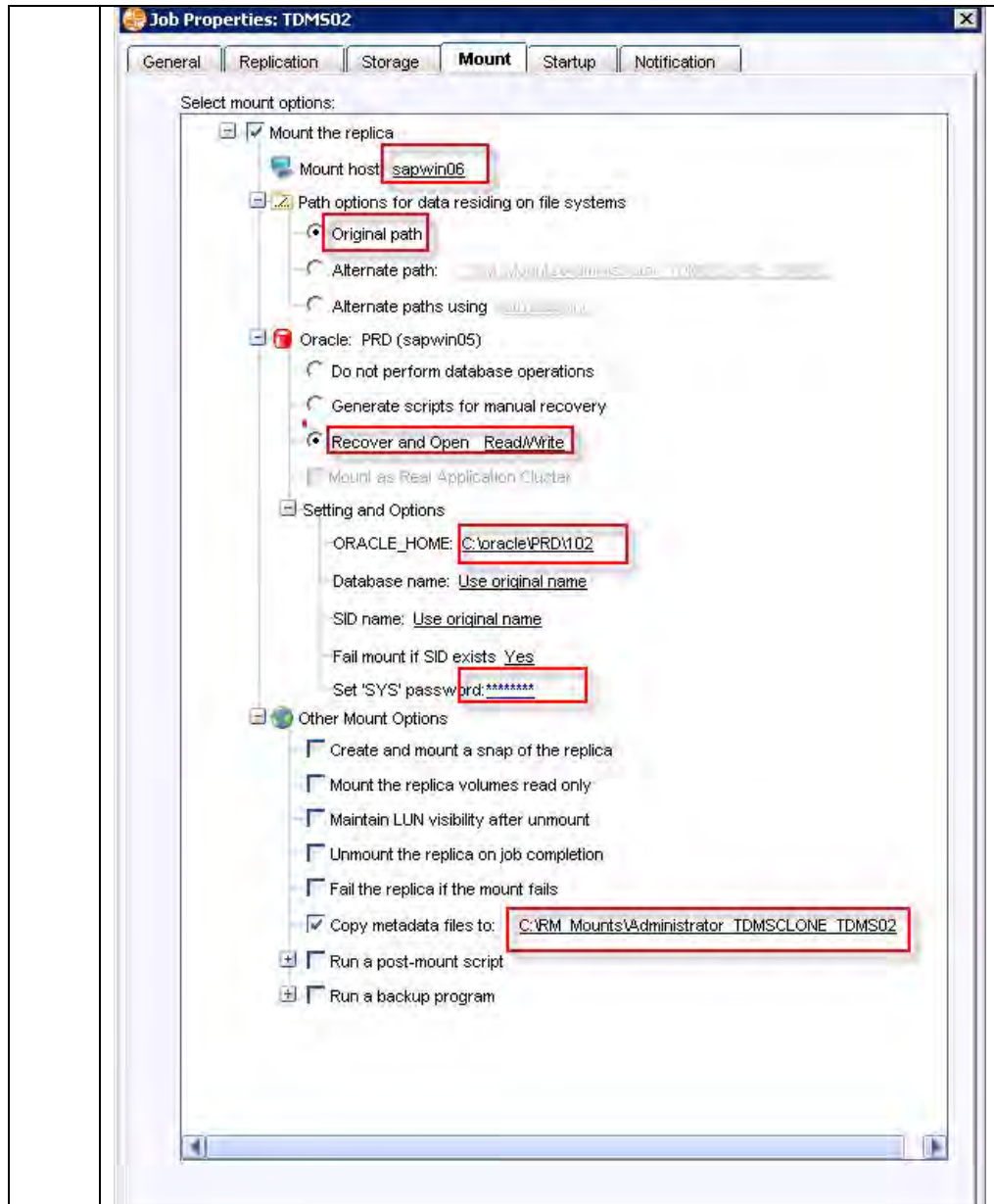


For detailed configuration, click **Advanced**. Select the appropriate options for relevant areas, as shown in the **Advanced Replication Settings** window:

- Select **Use consistent split** as the **General Replication Options**.
- Select **Online without hot backup Mode** as the **Consistency method**.
- Select **Replicate archive log directory** as the **Additional file options**.
- Set the SP file to `$ORACLE_HOME\database\SPFILE<SID>.ORA` for **Copy parameter file to RM server**.

On the **Mount** tab, select the mount options as shown in the following image:

- The host name of the target system is shown at **Mount host**.
- Select **Original path** as **Path options for data residing on file systems**.
- Select **Recover and open (Read/Write)** for **Oracle: PRD(SAPWIN05)**.
- **Setting and Options:**
 - **ORACLE_HOME:** \$ORACLE_HOME
 - **Set 'SYS' password:** xxxxxx
- For **Copy metadata files to**, use the default location.



In addition, a post-clone script is configured to start the SAP system on the target host. Replication Manager provides two default scripts located in *C:\Program Files (x86)\emc\rm\client\bin* on the target system:

- *IR_Callout_<application set name>_<Job name>_1300*: for actions before unmount replica.
- *IR_Callout_<application set name>_<job name>_600*: for post actions after mount replica.

Refer to the “Additional information” section for more information about the post-clone script.

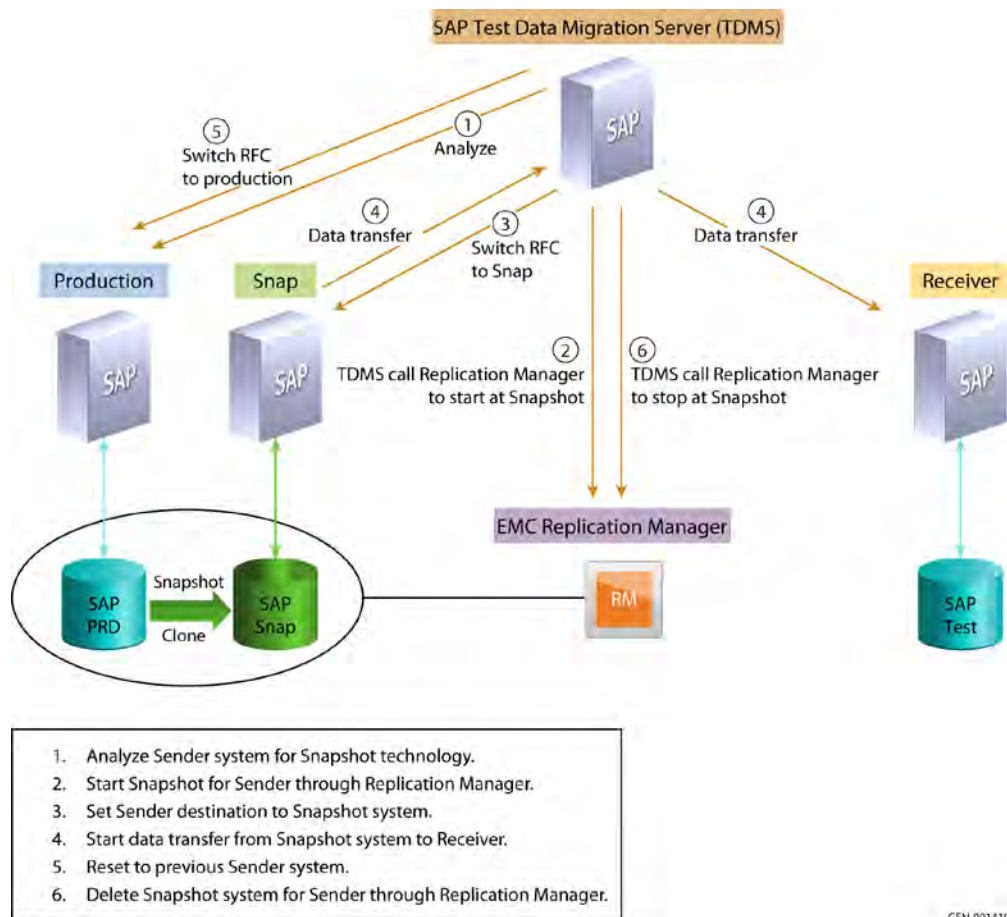
Design and validation

Introduction

This solution uses EMC Replication Manager in conjunction with SAP Test Data Migration Server (TDMS) to help an SAP project team to create a non-production environment with an up-to-date subset of the production database without downtime of the production system. For this solution validation, a time-based reduction was used to create the non-production system, but TDMS allows many other process types.

SAP TDMS snapshot/clone integration architecture

The following diagram depicts the architecture for integrating of EMC snapshot technology with SAP TDMS.



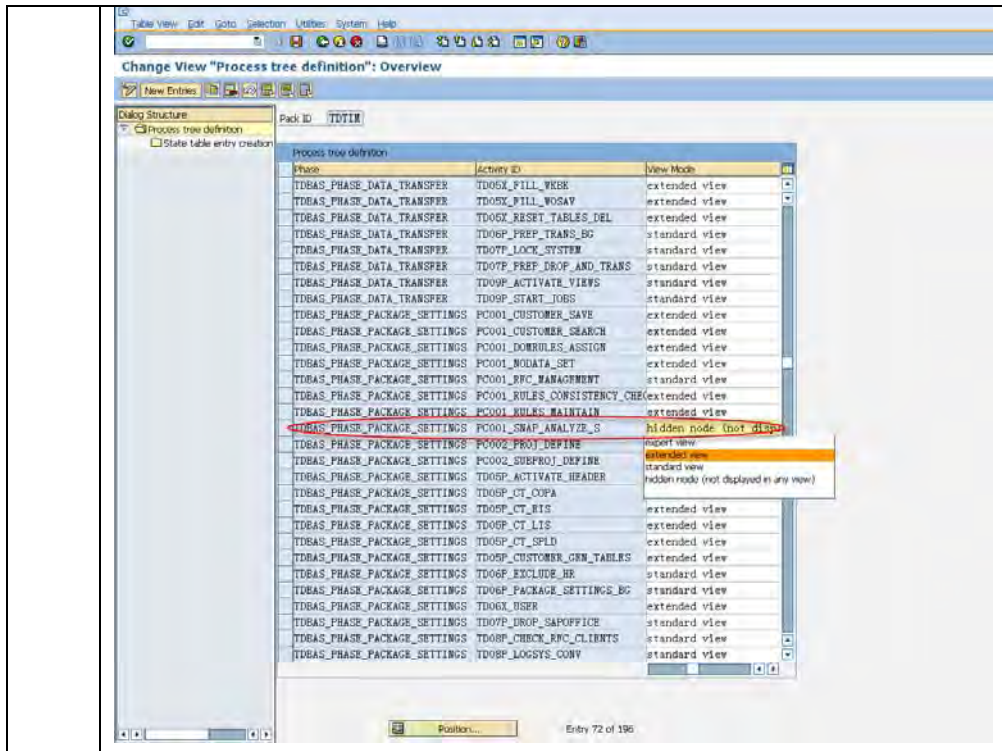
Prerequisites

To configure the SAP TDMS snapshot/clone integration successfully, you need to consider the following items in addition to the prerequisites mentioned in the *SAP Note* and *TDMS Master Guide*:

- If possible, verify that the database statistics in all systems are up-to-date. Outdated database statistics can lead to an inappropriate access path, which results in longer runtime of the activity *Start deletion of data in receiver system*. You can use BR*Tools or run the command `brconnect -u / -f stats -t all` directly in all systems.
- Set the dialog work process maximum runtime parameter `rdisp/max_wprun_time` to an appropriate value in sender, snap, and TDMS control systems. Some activities are expected to run longer than normal dialog transactions. For detailed information, refer to SAP Note 890797.
- Make sure the View Mode is set to *extended view* for Pack ID *TDDIM*, Phase *TDBAS_PHASE_PACKAGE_SETTINGS*, and Activity ID *PC001_SNAP_ANALYZE_S* in client 000 of the TDMS control system through the transaction code `CNVMBTIMG`. Otherwise, the activity *Analyze sender system for snapshot technology (optional)* is not displayed in the extended view.

The following table shows the detailed steps for changing the value:

Step	Action
1	Log in to the central system client 000.
2	Run transaction code <code>CNVMBTIMG</code> .
3	Select pack ID <i>TDTIM</i> .
4	Select the Phase item <i>TDBAS_PHASE_PACKAGE_SETTINGS</i> and the Activity ID <i>PC001_SNAP_ANALYZE_S</i> .
5	Change view mode from <i>hidden mode (not displayed)</i> to <i>extended view</i> .

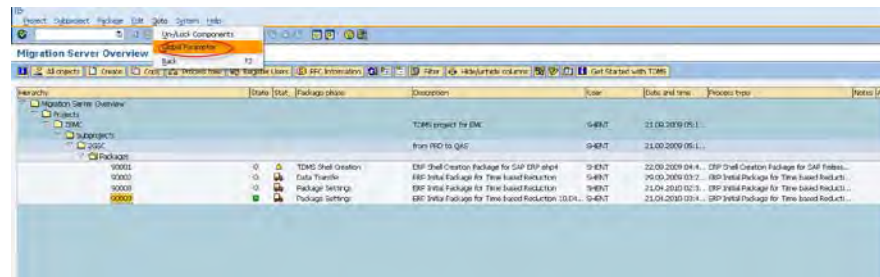


SAP TDMS snapshot integration configuration

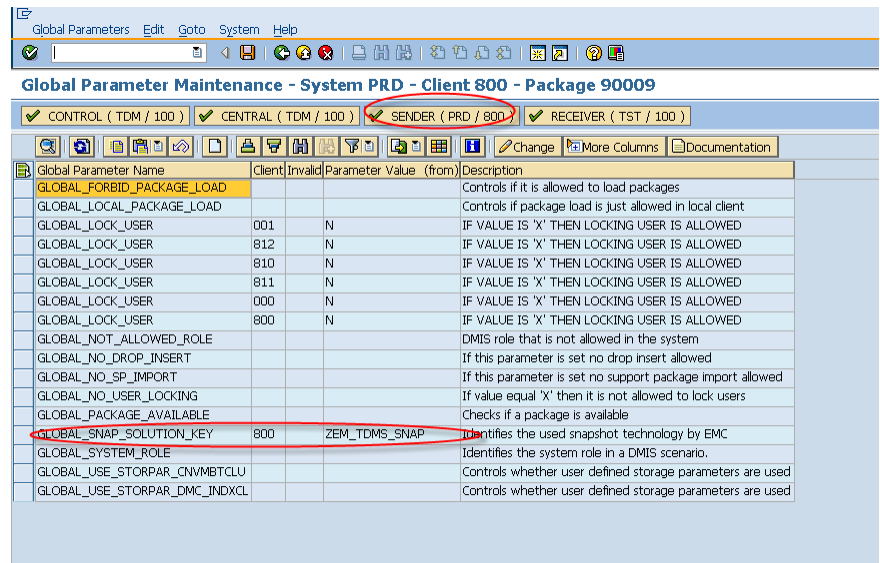
The following table shows how to configure the SAP TDMS snapshot integration.

Step	Action
1	Before configuring the TDMS, complete the configuration mentioned in SAP Note 1450173.
2	<p>Create the project, subproject, and package in the TDMS central system with the transaction code <i>CNV_MBT_TDMS_MY</i>.</p> <p>Migration Server Overview - TDMS</p> <p>My settings Create Copy Process tree Register Users</p> <p>Hierarchy St... St...</p> <ul style="list-style-type: none"> Migration Server Overview <ul style="list-style-type: none"> Projects <ul style="list-style-type: none"> ZEMC <ul style="list-style-type: none"> Subprojects <ul style="list-style-type: none"> ZGSC <ul style="list-style-type: none"> Packages <ul style="list-style-type: none"> 90001 90002
3	<p>Set the global parameter <code>GLOBAL_SNAP_SOLUTION_KEY</code> to <code>ZEM_TDMS_SNAP</code> in the sender system.</p> <p>Log in to the TDMS central system, and run the transaction code <i>CNV_MBT_TDMS_MY</i>. Highlight your own package, and select Goto →</p>

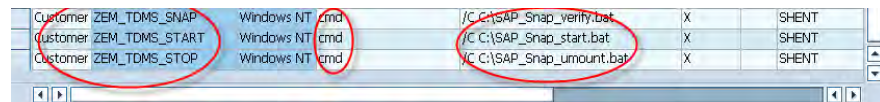
Global Parameter, as shown in the following image.



Select the sender system, and set the parameter GLOBAL_SNAP_SOLUTION_KEY values, as shown in the following image:



4 Use transaction code SM69 to create three external commands in the sender system.



5 Under the C drive of the sender system, create BAT files SAP_Snap_verify.bat, SAP_Snap_start.bat, and SAP_Snap_umount.bat.

For detailed information about these BAT files, refer to the “Additional information” section.

Note Upon completion of the above steps, the activity *Analyze sender system for snapshot technology (optional)* is added to the extended view of the standard process tree under Package Setting phase and Data Transfer phase. The other activities, *Start snapshot for sender (optional)*, *Set sender destination to snapshot system (optional)*, *Reset to previous sender system (optional)*, and *Delete snapshot system for sender (optional)*, will then be added in Data Transfer phase.

6 To achieve a better performance, run the command `brconnect -u / -f stats -t all` to update Oracle statistics in the snapshot/clone

system before running the activity *Start Data Transfer*.

Note Make sure OPS\$XXXX users exist in the snapshot/clone database. If the users do not exist in the database, running the command `brconnect -u /-f stats -t all` will fail due to a user authorization problem. In this case, you need to create the OPS\$XXXX users manually.

Follow the steps below to create OPS\$XXXX users in the snapshot/clone system:

- Download the ORADBUSR.SQL file from SAP Note 50088 to the snapshot system.
- Run the command `sqlplus /nolog @ORADBUSR.SQL SAPSR3 NT COMPANY <SID>`, where COMPANY indicates the domain name or local hostname.

CLARiiON thin LUN validation

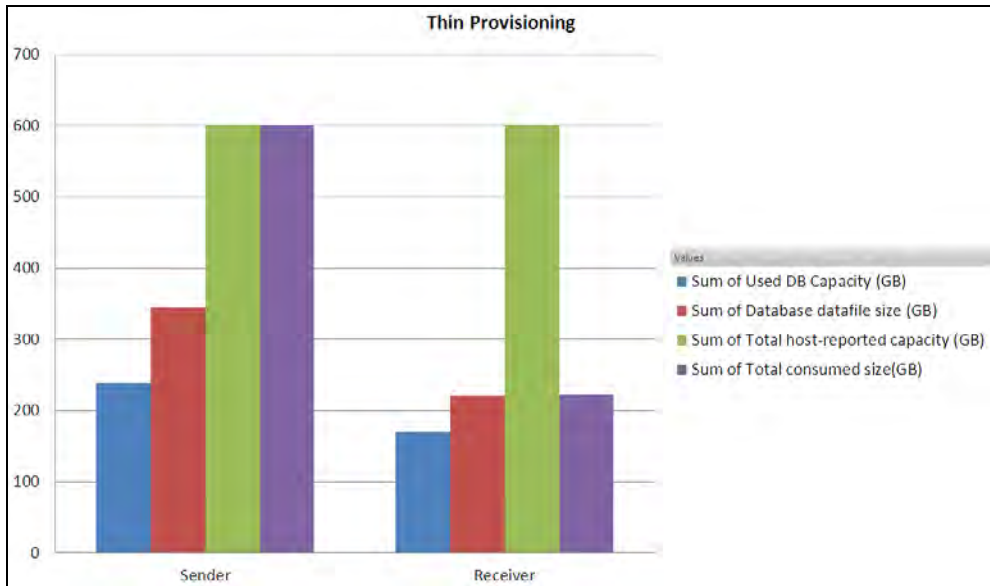
In the test scenario, thin LUNs are only configured for the receiver system. The sender system is built on traditional LUNs.

The following table lists the detailed LUN information of the sender and receiver systems.

System	Used database capacity (GB)	Database datafile size (GB)	Number of datafile LUNs	LUN size (GB)	Total host-reported capacity (GB)	Total consumed size (GB)
Sender	238	345	4	150	600	600
Receiver	170	220	4	150	600	222

The following chart illustrates that:

- The size of the sender system database is 345 GB, while the storage provisioned for this system is 600 GB. Since it is a traditional LUN, this 600 GB capacity is fully allocated and exclusive for this system.
- The size of the receiver system database is 220 GB, while the storage provisioned for this system is 600 GB. Since it is a thin LUN, only 222 GB capacity is actually allocated from the storage.



The test results demonstrate that:

- On top of the TDMS reduction, users can save a greater amount of storage capacity by utilizing Virtual Provisioning.
- With specific database optimization techniques, for example, smaller data file size with the unlimited autoextend option, the actual allocated space is much closer to the database size of the subset. The storage efficiency is further improved.

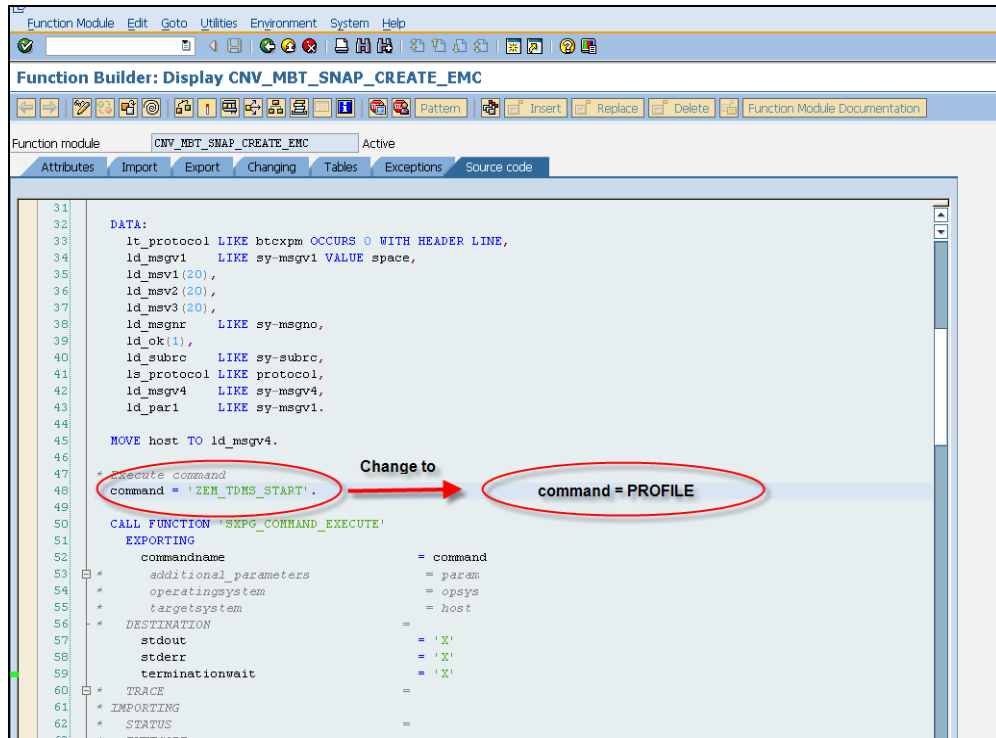
Troubleshooting and solutions

Issue 1

Symptom: The activity *Start Snapshot for sender (optional)* does not kick off the command on Replication Manager, but the TDMS log gives a success status.

Solution: Change the SAP standard program *CNV_MBT_SNAP_START* and function module *CNV_MBT_SNAP_CREATE EMC* in the sender system and the TDMS control system, as shown in the following images:

```
ABAP Editor: Display Report CNV_MBT_SNAP_START
Report CNV_MBT_SNAP_START Active
214 IMPORTING
217   rfc_get_mid           = gd_rfc_get_mid
220   rfc_get_ip           = gd_rfc_get_ip
223   rfc_get_sno         = gd_rfc_get_sno
230   command             = gd_command
231   param               = gd_parameter
232 TABLES
233   protocol            = qt_protocol
234 EXCEPTIONS
235   no_permission       = 1
236   command_not_found  = 2
237   parameters_too_long = 3
238   security_risk      = 4
239   wrong_check_call_interface = 5
240   program_start_error = 6
241   program_termination_error = 7
242   X_error             = 8
243   parameter_expected = 9
244   too_many_parameters = 10
245   illegal_command    = 11
246   system_call_fails  = 12
247   OTHERS             = 13.
248
249
250   gd_subrc = sy-subrc.
251 * Pfc EMC
252
253   WHEN 'EMT_TMS_SNAP' OR 'EMT_TMS_COPY'.
254
255     CALL FUNCTION 'CNV_MBT_SNAP_CREATE EMC'
256       DESTINATION 'gd_dest'
257     EXPORTING
258       profile           = gd_profile
259       partner_id       = gd_partner_id
```



Issue 2

Symptom: The activity *Delete snapshot for sender* does not kick off the command on Replication Manager, but the TDMS log shows a success status.

Solution: Change the SAP standard program `CNV_MBT_SNAP_STOP` in the sender system and the TDMS control system as shown in the following image:

```
304
305     gd_subrc = sy-subrc.
306     ENDIF.
307     ENDCASE.
308 * For EMC
309
310     WHEN 'ZEM_TDMS_SNAP' OR 'ZEM_TDMS_CLON'.
311
312     CALL FUNCTION 'CNV_MBT_SNAP_DELETE EMC'
313     DESTINATION gd_dest
314     EXPORTING
315         rfc_get_sid      = gd_rfc_get_sid
316         rfc_get_ip       = gd_rfc_get_ip
317         rfc_get_sno      = gd_rfc_get_sno
318         partner_id       = gd_partner_id
319         opsys            = gd_opsys
320         host             = gd_host
321     TABLES
322         protocol         = gt_protocol
323     EXCEPTIONS
324         no_permission    = 1
325         command_not_found = 2
326         parameters_too_long = 3
327         security_risk    = 4
328         wrong_check_call_interface = 5
329         program_start_error = 6
330         program_termination_error = 7
331         x_error          = 8
332         parameter_expected = 9
333         too_many_parameters = 10
334         illegal_command  = 11
335         OTHERS           = 12.
336
337     gd_subrc = sy-subrc.
```

Delete the row

Conclusion

Summary

SAP administrators use SAP TDMS to create subsets of their production data for use in testing and training systems. While the benefit is a smaller database than production, the process of creating the subset directly from the production database will negatively impact the production system.

EMC has published several Proven Solutions regarding intelligent cloning. Based on the existing EMC intelligent cloning technology, the latest version of SAP TDMS is capable of integrating with EMC Replication Manager and EMC storage snapshot and clone technology to allow SAP administrators to easily create and refresh non-production systems (test, development, training, and so on) with a reduced size of SAP client without downtime to the production system.

In addition, users can deploy a non-production system on EMC virtual provisioned storage, which further reduces the storage footprint for the SAP landscape. EMC Virtual Provisioning technology increases the efficiency of storage utilization and reduces the storage infrastructure cost.

Key findings

This solution demonstrates the following findings:

- Builds a non-production system with a subset of data from production system to simulate a production environment for testing without stopping the production system
 - Improves storage provisioning and utilization through CLARiiON Virtual Provisioning
-

Next steps

EMC can help accelerate assessment, design, implementation, and management while lowering the implementation risks and cost of creating an SAP replication solution.

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

References

Product documentation

For additional information, see the product document listed below.

- *EMC Replication Manager Administrator's Guide*
-

Other documentation

For additional information, see the documents listed below.

- *SAP TDMS 3.00 Master Guide*
- *SAP TDMS 3.0 Operation Guide*

SAP Note	Title	Comments
1094395	Installation of DMIS_EXT 2007_1 The add-on called DMIS_EXT 2007_1	This note describes the installation procedure for DMIS_EXT. The add-on component DMIS_EXT contains additional process types (reduction scenarios) for SAP TDMS.
890797	SAP TDMS - required and recommended system settings	This note contains information about suitable system settings for SAP TDMS in different constellations (for example for different databases).
894307	TDMS: Tips, tricks, general problems, error tracing	This note contains a list of known issues and solutions, as well as tips and tricks.
1003051	Collective Note for SAP TDMS 3.0	This note lists the most important notes for SAP TDMS.
916763	TDMS performance composite SAP note	This note lists various performance issues for SAP TDMS and provides information about how to analyze and resolve these issues.
994106	Release limitations TDMS 3.0	This note informs you about any existing use limitations of certain parts of TDMS in certain system environments.
1423567	Create new cluster in sender and receiver system	This note is used to fix the described symptom during the test.
1232776	Long runtimes for accesses to D010INC or D010TAB	This note is used to fix a data deletion performance issue during the test.
1405597	All relevant notes for TDMS service pack 12 or above	This note provides all relevant notes for TDMS service pack 12 or later information.
1450173	Performance problems in TDMS data transfer Hold CPIC	This note provides solutions for performance issues in TDMS data transfer Hold CPIC.

Supporting information

Introduction This section describes the sample scripts used in this white paper.

Script Name	Description
IR_Callout_<application set>_<job>_600.bat	The script used for post actions after the mount replica.
IR_Callout<application set>_<job>_1300.bat	The script used for actions before the unmount replica.
SAP_Snap_verfity.bat	The script used to simulate a snapshot/clone job in EMC Replication Manager.
SAP_Snap_start.bat	The script used to start a snapshot/clone job in EMC Replication Manager.
SAP_Snap_umount.bat	The script used to unmount the replica in EMC Replication Manager.

IR_Callout_<application set>_<job>_600.bat

```
REM start SAP on the target system activities:
REM start oracle services

net start Oracle<SID><RELEASE>TNSListener
net start Oracle<SID><RELEASE>iSQL*Plus
REM create a new sap oracle service OracleService<SID>
c:\oracle\<SID>\<RELEASE>\bin\oradim.exe -NEW -SID <SID>
REM Start oracle service and SAP serices
net start OracleService<SID>
net start SAP<SID>_<SYSTEM NUMBER>
net start SAPoscol
REM Start SAP system
E:\usr\sap\<SID>\SYS\exe\uc\NTAMD64\startsap name=<SID>
nr=<SYSTEM NUMBER> SAPDIAHOST=<HOSTNAME>
```

IR_Callout_<application set>_<job>_1300.bat

```
REM stopsap SAP on target system
E:\usr\sap\<SID>\SYS\exe\uc\NTAMD64\stopsap name=<SID>
NR=<SYSTEM NUMBER> SAPDIAHOST=<HOSTNAME>
```

```
REM Stop SAP and oracle service on operating system

net stop SAPoscol

net stop SAP<SID>_<SYSTEM NUMBER>

net stop OracleService<SID>

net stop Oracle<SID><RELEASE>TNSListener
```

SAP_Snap_
verify.bat

```
REM the script describes simulate snapshot job in EMC
Replication manager system

C:\PROGRA~2\emc\rm\gui\rmcli.bat host=<RM_HOSTNAME> port=65432
cmd="login user=Administrator password=<PASSWORD>; if
simulate-job name=<JOB_NAME> appset=<APPLICATION SET NAME>
then exit 0 else exit 1;"
```

SAP_Snap_
start.bat

```
REM the script describes start snap shot job in EMC
replication manager system.

C:\PROGRA~2\emc\rm\gui\rmcli.bat host=<RM_HOSTNAME> port=65432
cmd="login user=Administrator password=<PASSWORD>; if run-job
name=<JOB_NAME> appset=<APPLICATION SET NAME> then exit 0 else
exit 1;"
```

SAP_Snap_
umount.bat

```
REM the script describes unmount the replica in EMC
replication manager system

C:\PROGRA~2\emc\rm\gui\rmcli.bat host=<RM_HOSTNAME> port=65432
cmd="login user=Administrator password=<PASSWORD>; if unmount-
replica position=last appset=<APPLICATION SET NAME> then exit
0 else exit 1;"
```
