



STORAGETEK

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Protecting Oracle Database Appliance – Tape Backup with CommVault Simpana

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Introduction

The Oracle Database Appliance is an engineered system consisting of hardware, software, and storage that saves customers time and money by simplifying deployment, maintenance, and support of high availability database solutions. The Oracle Database Appliance provides double or triple mirrored redundancy using Automatic Storage Management software. The Database Appliance is comprised of two nodes, each having its own dedicated power, memory, CPU, RAID control, etc. to allow for maximum redundancy. It allows for single instance, Real Application Clusters (RAC) One Node or full Oracle RAC configurations. Additionally, the Database Appliance supports virtualization using Oracle Virtual Machine (OVM). With the high level of redundancy, the chances of a physical failure are remote but still possible (ex. natural disaster or fire). There is also the possibility of logical corruption such as inadvertently deleted records or errors in programming. Due to the possibility of a disaster and/or logical corruption, it is still necessary to backup up the database to provide an extra layer of data protection, along with offsite storage capabilities. Oracle StorageTek (STK) Tape Libraries and Oracle StorageTek Tape Drives offer cost effective solutions for meeting Recovery Point Objectives (RPO) and Recovery Time Objectives (RTO) for the Oracle Database Appliance. The information in this document details how to setup CommVault Simpana to backup the Oracle Database Appliance using Oracle StorageTek tape products. The information in this document is intended to detail basic configuration of CommVault Simpana on the Oracle Database Appliance to allow for RMAN backups directly to tape. A restore example, private network example, and performance tuning example are also included to assist with providing additional knowledge on using Simpana with the Oracle Database Appliance, and to assist with optimizing your backup environment.

Hardware and Software

Below is a summary of the hardware and software utilized for Oracle Database Appliance tape tests.

Note: The below table only lists the combinations of hardware/software that were tested. There are newer generations of hardware/software available. The Oracle Database Appliance has the x4-2 version available and the Simpana Media Server could be an x4-2. Based on the results of testing two generations it is not expected that performance will differ appreciably (especially in a two to four tape drive setup) as resources on the lowest versions of the Oracle Database Appliance (V1) and Simpana Media Server (x4170 M2) were not being consumed. Until a major component on the transfer bus is upgraded (Faster SAS card or newer LTO drive) the performance characteristics should remain similar across generations of servers, Oracle Database Appliances and Simpana software.

TABLE1.TEST ENVIRONMENT

HARDWARE/SOFTWARE	VERSION	PURPOSE
Oracle Database Appliance	V1, Appliance Manager 2.1.0.3.0 X3-2, Appliance Manager 2.6.0.0.0	Database Appliance
Oracle Linux	5.5 (Oracle Database Appliance V1) 5.8 (Oracle Database Appliance X3-2)	OS on Database Servers
Microsoft Windows Server 2008 R2 Enterprise	R2-SP1	OS on Backup Server
Oracle Linux Kernel	Oracle Linux 5.5 Kernel= kernel-2.6.18-194.32.1.0.1.el5 (V1) Oracle Linux 5.8 Kernel = 2.6.32-300.32.5.el5uek (X3-2)	Kernel on Database Servers
CommVault Simpana	9.0 SP6 (Used for Oracle Database Appliance V1 testing) 9.0 SP10a (Used for Oracle Database Appliance X3-2 testing)	Backup Software
Oracle Sun x4170 M2	Base Hardware (Used for Oracle Database Appliance V1 testing)	CommVault Simpana CommServe/Media Server
Oracle Sun X3-2	Base Hardware (Used for Oracle Database Appliance X3-2 testing)	
Oracle StorageTek SL150 (or Oracle StorageTek SL500 or SL24/48)	Latest Firmware	Tape Library for Backup
LTO-5 Half Height Tape Drives (2)	Latest Firmware (Used for Oracle Database Appliance V1 testing)	Tape Drives for Backup
LTO-6 Half Height Tape Drives (2)	Latest Firmware (Used for Oracle Database Appliance X3-2 testing)	
6Gb SAS HBA	SGX-SAS6-EXT-Z	Tape Connectivity to Media Server

Simpana CommServe/Media Server

To manage the backup and recovery operations on the Oracle Database Appliance, a 1u single processor machine has plenty of resources as the CommServe/Media Server for Simpana. Refer to the Simpana documentation link in the Additional Resources for information.

Oracle StorageTek Library and Tape Drives

Oracle StorageTek SL150 with two LTO-6 tape drives. An Oracle StorageTek SL500 or Oracle StorageTek SL24/48 can also be used as the tape library.

OS

The CommVault Simpana CommServe/Media Server has Windows Server 2008 R2 Enterprise installed.

Backup Software

Simpana 9.0 SP6 or above and associated licensing.

Connectivity

This section explains the different interfaces that will be utilized in this environment.

Ethernet

The Simpana CommServe/Media Server requires a GbE or 10GbE connection to the Oracle Database Appliance depending on which interface will be used for backup.

Serial Attached SCSI (SAS)

A single SAS HBA card in the Simpana CommServe/Media Server is used to attach each tape drive directly to the backup server.

Diagram of Configuration

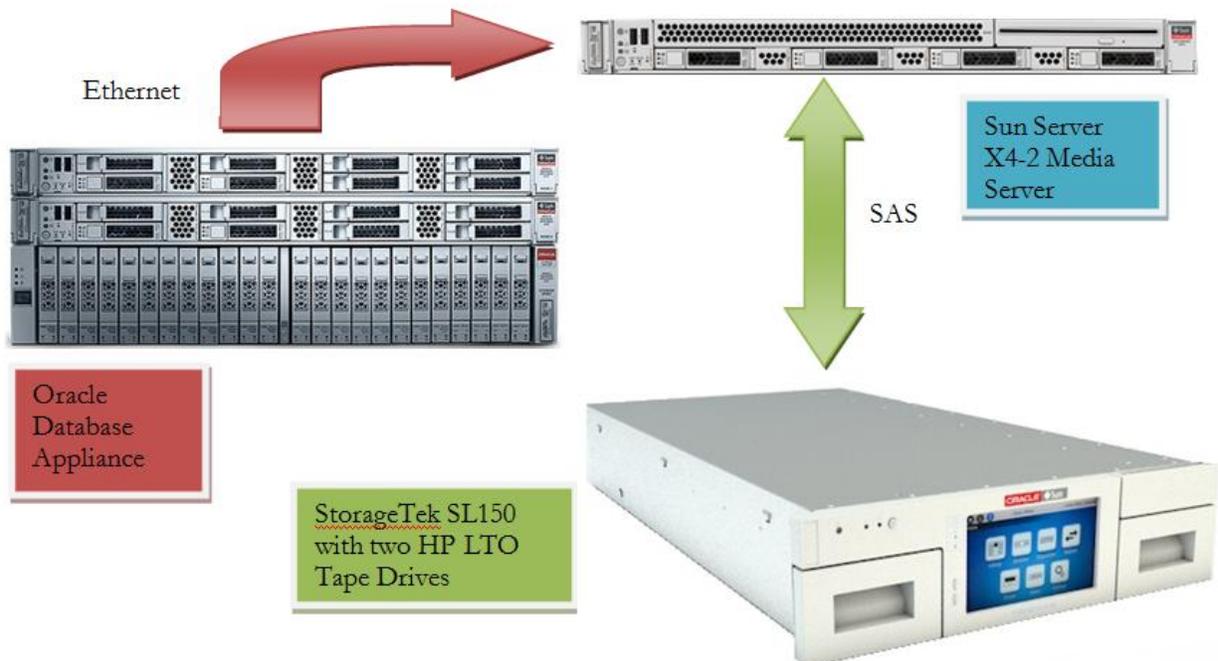


Figure 1: Physical components and connections for Oracle Database Appliance tape solution.

Date Synchronization

Ensure you are using Network Time Protocol (NTP) or have all the dates/times between all servers involved in this configuration in sync.

Oracle StorageTek Tape Configuration

The Oracle StorageTek (STK) SL150 is a modular library system with high capacity and high reliability which can be attached to a host via fiber channel or SAS. This configuration will utilize a SAS connection. The SL150 is a bridged library which means robot control commands are channeled through one of the tape drives (no separate connection for the robot). If this is a new library, follow the instructions in the SL150 documentation to setup the library. Following the initial setup of the SL150; connect the tape drives to the Simpana CommServe/Media Server. To connect the SL150 to the Sun X3-2 Simpana CommServe/Media Server use SAS cables to hook each tape drive to the SAS ports on the Sun X3-2 HBA card. (See figures 2 & 3):

Physical Attachments



Figure 2: Rear of Oracle StorageTek SL150 tape library with two LTO SAS attached drives.



Figure 3: Rear of Oracle Sun Server X3-2 with multi-pronged SAS cable connected to SAS HBA card.

Note: An STK SL150 is featured in this paper. The STK SL500 or STK SL24/48 Library can also be used in Oracle Database Appliance backup configurations. The physical attachment of a SAS SL500 or SAS SL24/48 will be identical to using a SAS connected SL150 as all are bridged libraries, meaning robot control is achieved over the physical tape drive connection.

Library Monitoring

After initial library configuration, the Oracle StorageTek Library Browser User Interface (BUI) can be used to monitor, re-configure and operate the SL150 library. SL150 BUI is pictured in figure 4.

Note: The BUI is not available on STK SL500 or STK SL24/48 as the SL500 is managed using the StorageTek Library Console (SLC) and the SL24/48 is managed using a built-in web GUI.

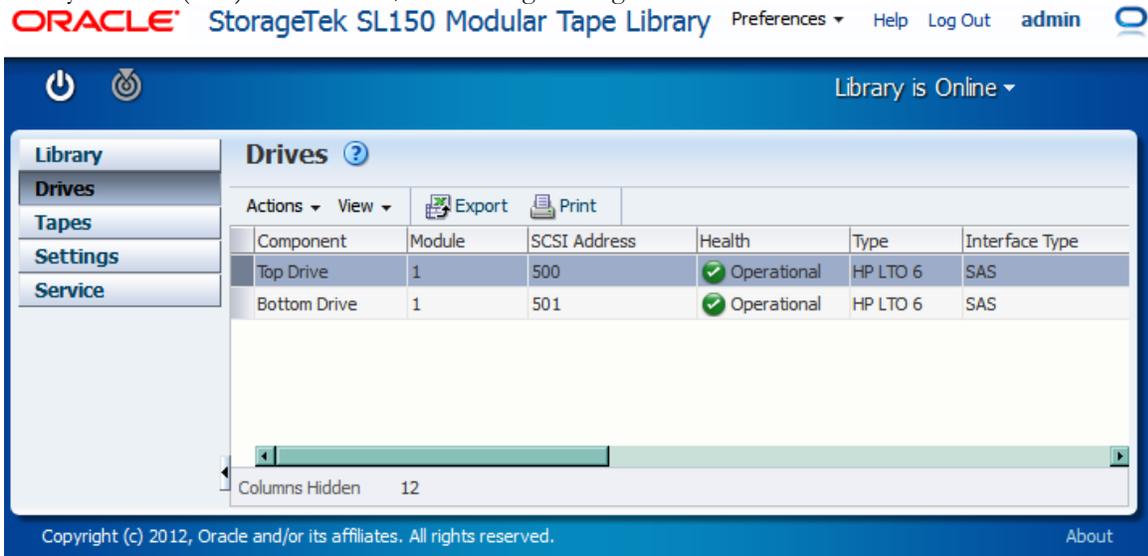


Figure 4: Oracle StorageTek SL150 Modular Tape Library BUI.

Library Drive OS Verification

Use the Windows Device Manager to verify you can see the tape library and LTO-6 tape drives on the Simpana CommServe/Media Server: (See figure 5):

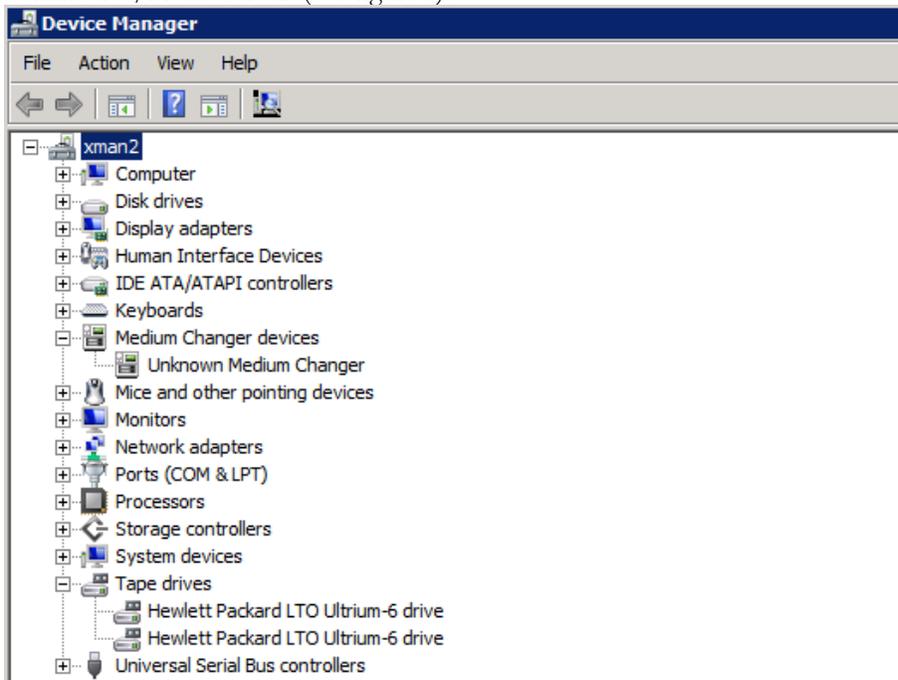


Figure 5: Windows Device manager showing tape library and two tape drives.

From the above output the tape library and two LTO-6 (Ultrium 6) drives are present.

Required tnsnames.ora Changes

In order to evenly spread the backup load across the database servers, each database server must be able to open RMAN channels on the other database server. This requires modifications to the tnsnames.ora file on each database server.

- 1) Modify the /u01/app/oracle/product/11.2.0.3/dbhome_1/network/admin/tnsnames.ora file with a text editor. Original file appears below:

```
# tnsnames.ora Network Configuration File:
/u01/app/oracle/product/11.2.0.3/dbhome_1/network/admin/tnsnames.ora
# Generated by Oracle configuration tools.
```

```
ISR =
(DESCRIPTION =
  (ADDRESS = (PROTOCOL = TCP)(HOST = hamms-scan)(PORT = 1521))
  (CONNECT_DATA =
    (SERVER = DEDICATED)
    (SERVICE_NAME = isr)
  )
)
```

- 2) Modify the file to look as follows:

```
# tnsnames.ora Network Configuration File:
/u01/app/oracle/product/11.2.0.3/dbhome_1/network/admin/tnsnames.ora
# Generated by Oracle configuration tools.
```

```
ISR =
(DESCRIPTION =
  (ADDRESS = (PROTOCOL = TCP)(HOST = hamms-scan)(PORT = 1521))
  (CONNECT_DATA =
    (SERVER = DEDICATED)
    (SERVICE_NAME = isr)
  )
)
```

```
ISR1 =
(DESCRIPTION =
  (ADDRESS = (PROTOCOL = TCP)(HOST = hamms1)(PORT = 1521))
  (CONNECT_DATA =
    (SERVER = DEDICATED)
    (SERVICE_NAME = isr)
    (SID = isr1)
  )
)
```

```
ISR2 =
(DESCRIPTION =
  (ADDRESS = (PROTOCOL = TCP)(HOST = hamms2)(PORT = 1521))
  (CONNECT_DATA =
    (SERVER = DEDICATED)
    (SERVICE_NAME = isr)
    (SID = isr2)
  )
)
```

- 3) After modifying tnsnames.ora verify ownership/permissions on the file to ensure they are correct:
 - Owner should be oracle
 - Group should be oinstall
 - Permissions should be rw-r----- or 640 octal

Initial Simpana Configuration

CommVault Simpana configuration for tape backup with the Oracle Database Appliance is comprised of several tasks including setup at the OS level, installation of the CommVault Simpana software, tape library configuration, tape drive configuration, storage policy setup and client setup.

Modify /etc/hosts files

Modification of the /etc/hosts files on the Simpana CommServe/Media Server and database nodes depends on which network interface will be used for backup, and the DNS setup in the environment. If the primary network is used for backup, and all hosts are in DNS, no changes to /etc/hosts files are required. If DNS, or another naming service, is not available, then the CommServe/Media Server needs to be added to /etc/hosts on each database node and each database node needs to be added to hosts file on the CommServe/Media Server. The example and screen shots in this paper detail setup of a backup using the primary public network interface. If you plan to use one of the additional interfaces available on the Oracle Database Appliance for backups over a private network, please see the Private Network Configuration section near the end of this document for details on that configuration.

Install Simpana

Install Simpana on the CommServe/Media Server and database servers. For full installation details on Simpana please refer to the Simpana Documentation link under Additional Resources.

- 1) Install the Simpana CommServe software on the Sun server designated as the CommServe (host xman2 in this example). Select the CommServe, CommCell Console, Java Runtime Environment, and Media Agent options as the minimum for the base installation.
- 2) Install the Simpana UNIX File System iData Agent and Oracle iData Agent on each of the machines designated as Simpana Clients (hosts hamms1 and hamms2 in this configuration). Specify oinstall as the group when prompted by the installation software during the Oracle iData Agent installation portion.

Configure Simpana Tape Library and Tape Drives

The next step in the Simpana configuration process is to configure the tape library and tape drives.

- 1) From the CommCell Console, navigate to **Storage-Resources**.
- 2) Highlight **Libraries** from the navigation tree in the left hand pane, right click, and choose **Library & Drive Configuration**.
- 3) Add the host(s) (xman2) to the **Selected MediaAgents** section of the window: (See figure6):

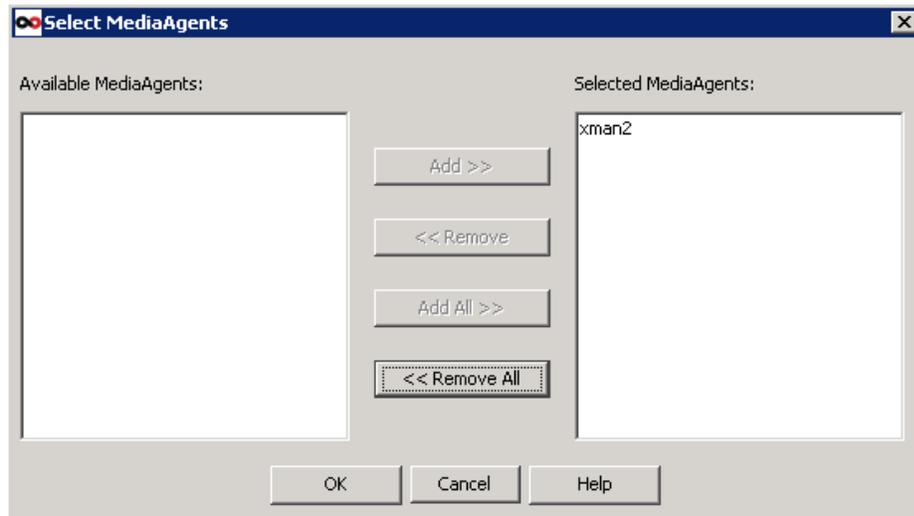


Figure 6: Simpana Library and Drive Configuration Select MediaAgents window.

- 4) Click **OK** to proceed.
- 5) The **Library and Drive Configuration** window will appear listing the selected servers in the top pane and **Libraries** in the bottom pane. The **Libraries** window will be empty until a device scan is executed. Highlight **Libraries**, right click , choose **Detect/Configure Devices**, and then click the **OK** button in the following window to execute the scan: (See figure 7):

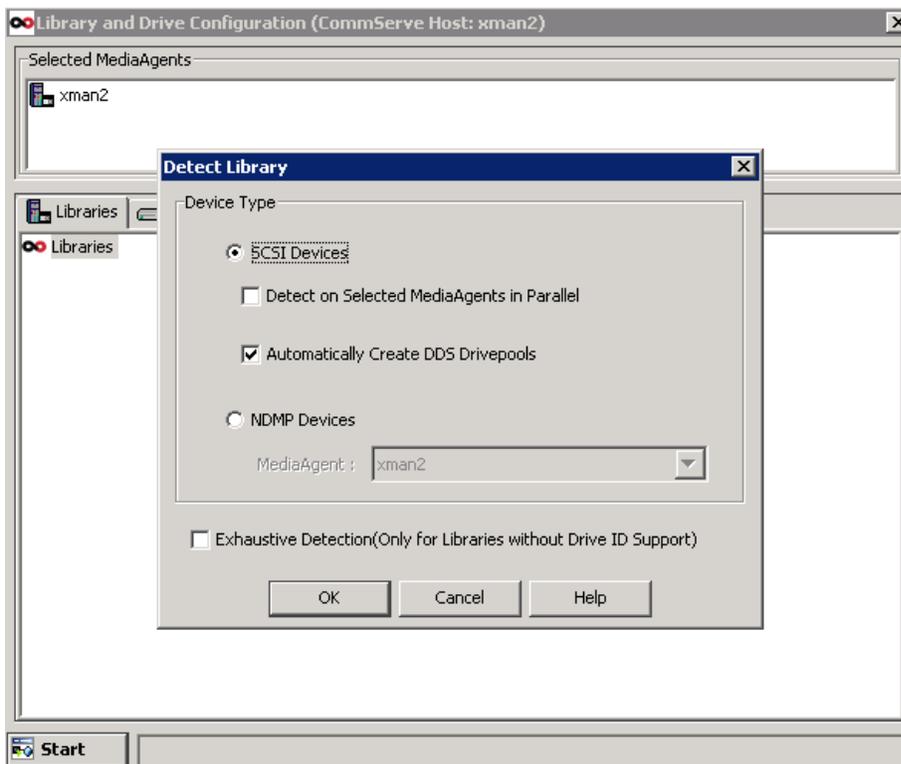


Figure 7: Simpana Detect Library window.

After the scan is complete the **Library and Drive Configuration** window will look similar to the following: (See figure 8):

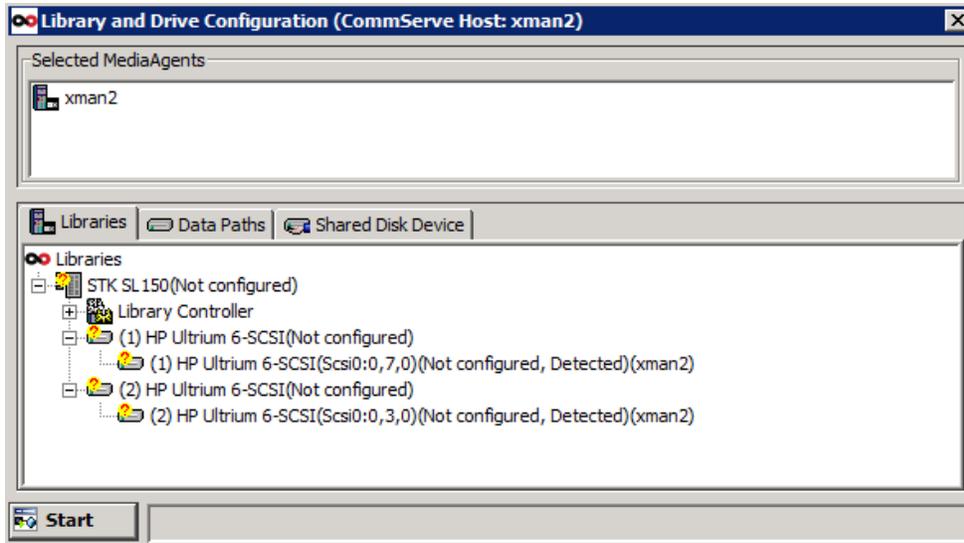


Figure 8: Simpana Library and Drive Configuration window results from scan.

- 6) Right click on the SL150 library (STK SL150) at the top of the tree, select **Configure**, and choose to configure **Library and all drives**: (See figure 9):

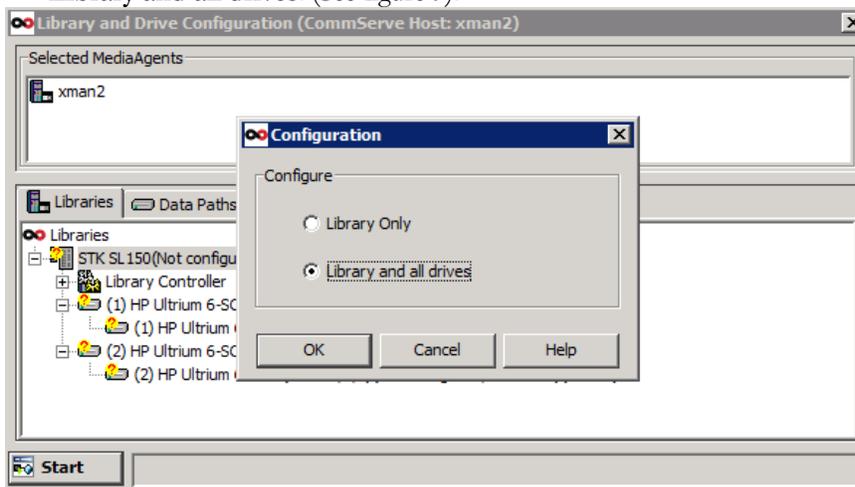


Figure 9: Simpana Library and Drive Configuration, Configuration window.

If the software prompts for **Discover Media Options**, select the media type and click **Yes** to scan the devices. After the devices are configured they will look similar to the following: (See figure 10):

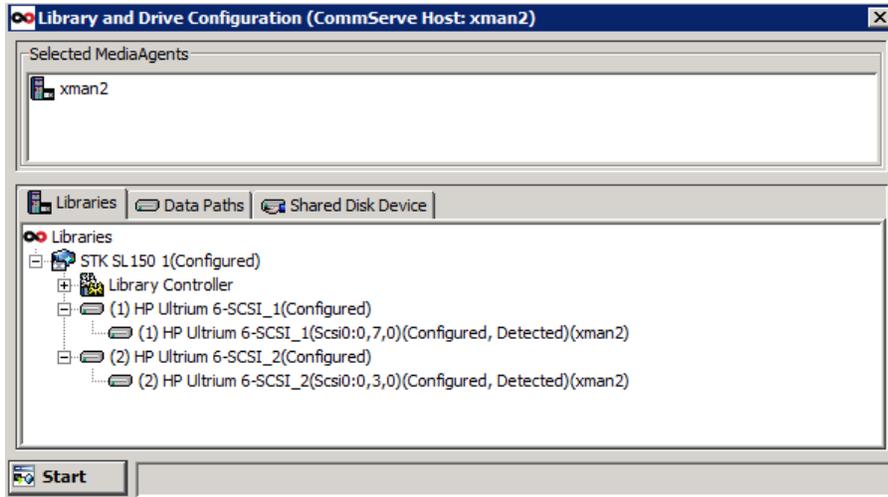


Figure 10: Simpana Library and Drive Configuration window after device configuration is completed.

- 7) Once the library and tape drives are configured, inventory of the robot will happen automatically and the tapes will show up in the Default Scratch pool under **Storage Resources->Media By Groups->Default Scratch**.

Configure Simpana Storage Policy

Storage policies in Simpana determine what resources (tape drives, tape libraries, media, data paths, etc.) will be used to protect client machines. To create a **Storage Policy** for the Oracle Database Appliance follow these steps:

- 1) Navigate to **Policies** from the left hand pane in the CommCell Console.
- 2) Highlight **Storage Policies**, right click, and choose **New Storage Policy**.
- 3) Follow the wizard prompts to add the policy.
 - a. Select **Data Protection and Archiving** as the **Storage Policy Type**, click **Next**.
 - b. Provide a name for the policy (ODA in this configuration), click **Next**.
 - c. Select the **Library** from the drop down menu for the policy, click **Next**.
 - d. Select the default **Media Agent** and **Drive Pool** from the drop down menus, click **Next**.
 - e. Select the **Default Scratch Pool** from the drop down menu, click **Next**.
 - f. Select the **Number of Device Streams** to use for the policy based on the number of tape drives in the configuration (2 in this configuration). Also set retention per your organization's policies, click **Next**.
 - g. Ensure **Hardware Compression** is enabled (this is default) as compression will be done at the tape drive level, click **Next**.
 - h. Click **Finish** to create the **Storage Policy**.

Modify Simpana Storage Policy

After the initial creation of the **Storage Policy**, settings need to be modified to accommodate this configuration.

- 1) Highlight the **Storage Policy** (named ODA in this configuration) from the left hand pane in the CommCell Console.
- 2) With the ODA policy still highlighted navigate to the top right hand pane where the copies are listed (should only be a **Primary** copy) and highlight the **Primary** copy: (See figure 11):

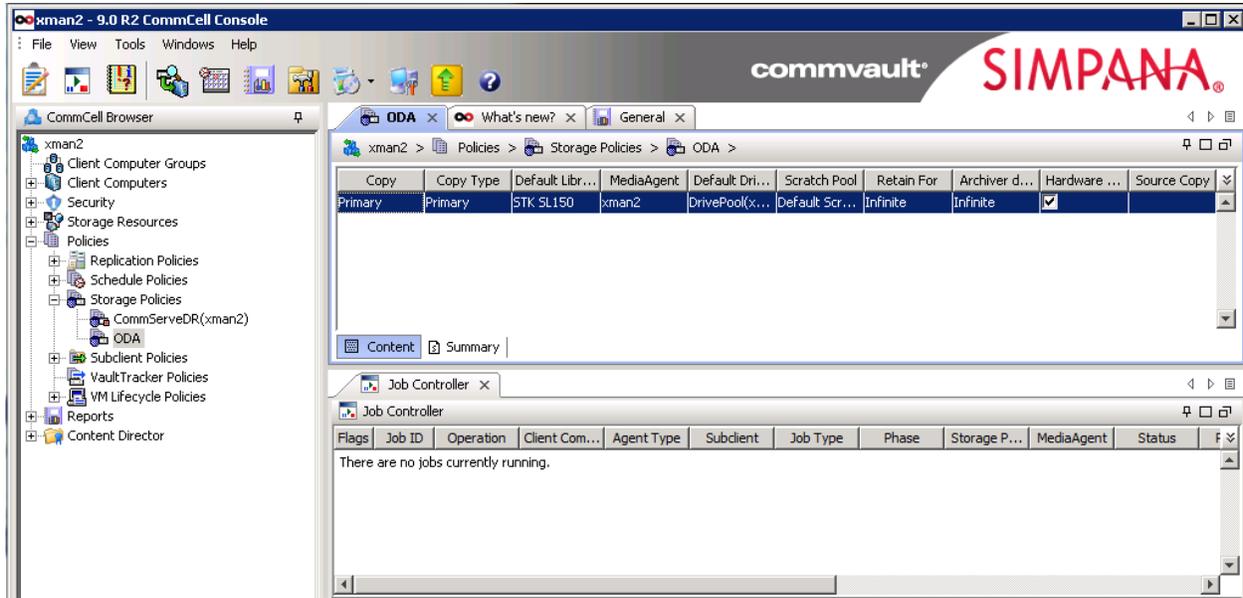


Figure 11: Simpana CommCell Console with Storage Policies selected on the ODA Primary Copy.

- 3) Right click on the **Primary** copy and choose **Properties**.
- 4) Navigate to the **Data Paths** tab and highlight the MediaAgent (xman2 in this configuration) (See figure 12):

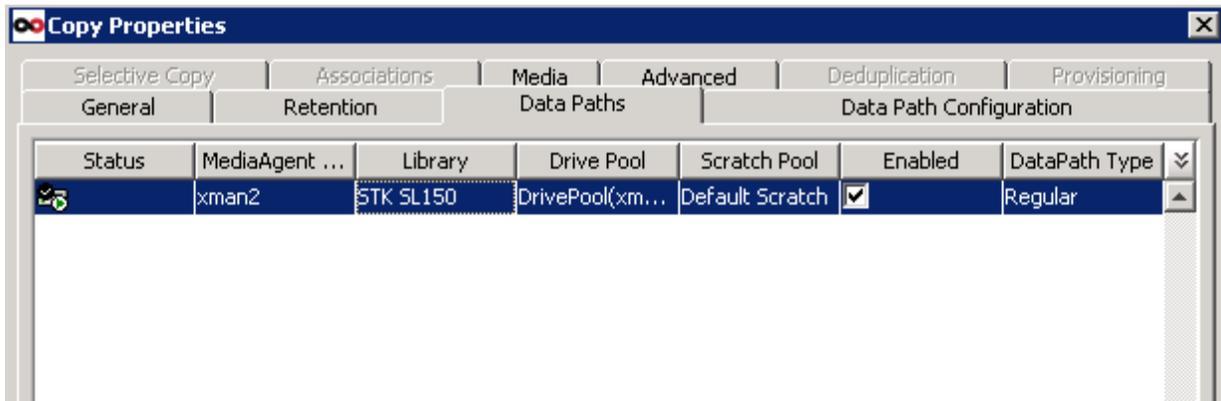


Figure 12: Simpana Storage Policy Copy Properties window.

- 5) Click **Properties** at the bottom of the page.
- 6) The **Data Path Properties** window will appear and near the bottom is a setting for **Block Size**. Select the appropriate block size for your tape device (1024 in this example): (See figure 13):



Figure13: Simpana Storage Policy Data Path Properties window block size modification.

- 7) Click **OK** to save the block size setting.
- 8) Click **OK** to save and exit the **Copy Properties** window.

Client Configuration

The client setup in Simpana involves adding an Oracle RAC to the configuration and then discovering the database instances. When the left hand tree under **Client Computers** in the CommCell Console is expanded you will see the database server clients and the CommServe/Media Server with the various options you chose during installation (File system and Oracle in this configuration): (See Figure 14):



Figure 14: Simpana CommCell Console Client Computers.

Note: It may be necessary to re-launch the CommCell Console after installing clients and/or Media Agents before everything displays properly.

Add and Configure Oracle RAC Client

- 1) Highlight **Client Computers** from the left hand tree in the CommCell Console, right click and choose **New Client**.
- 2) Select **RAC Client** as the client type.
- 3) On the **General** tab populate a **Pseudo-client Name** (this can be any name), your **Database Name** (isr in this configuration) and select the **Storage Policy** created earlier in the process (ODA in this configuration): (See figure 15):

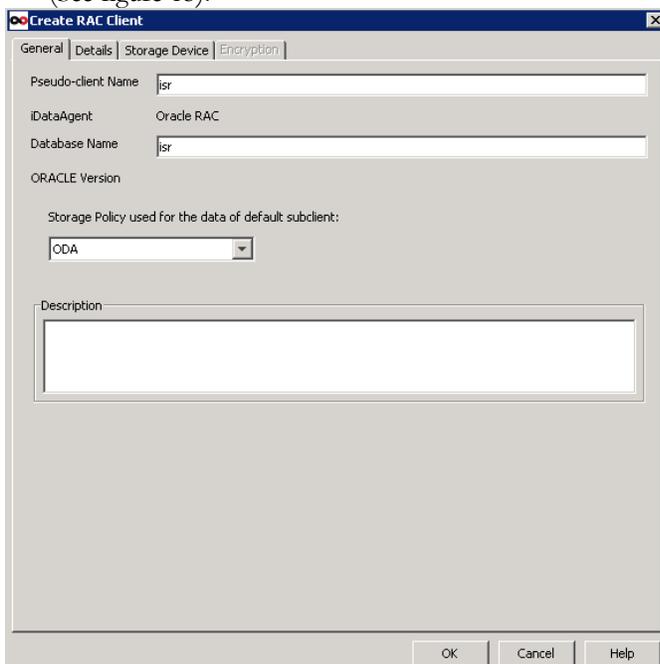


Figure 15: Simpana Create RAC Client window General tab.

- 4) Click on the **Details** tab in the **Create RAC Client** window and select the **Add** button to add a new client.
- 5) The **Add Instance** window will appear. Select an **Instance Physical Client** from the drop-down menu and populate the remaining fields with the credentials for your Oracle database: (See figure 16):

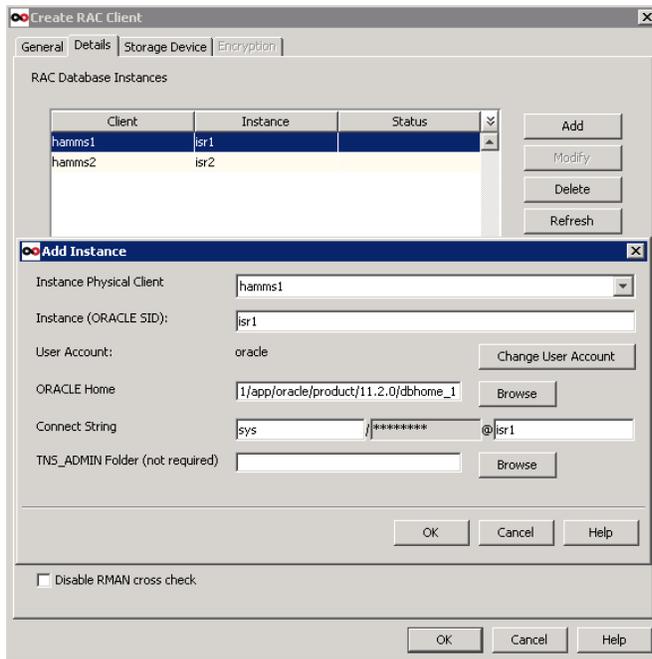


Figure 16: Simpana Create RAC Client Add Instance window.

- 6) Repeat steps four and five for any additional RAC clients that need to be added to the configuration.
- 7) Once you have completed adding each physical client to the RAC setup, you will be back on the **Details** tab of the **Create RAC** client window. Set **Ctrl File Autobackup to Configure On**.
- 8) Next, set the **Block Size** field to the optimal size for the data characteristics of your database. This field modifies the block size reads from the RAC client (set to 1MB in this configuration). (See figure 17):

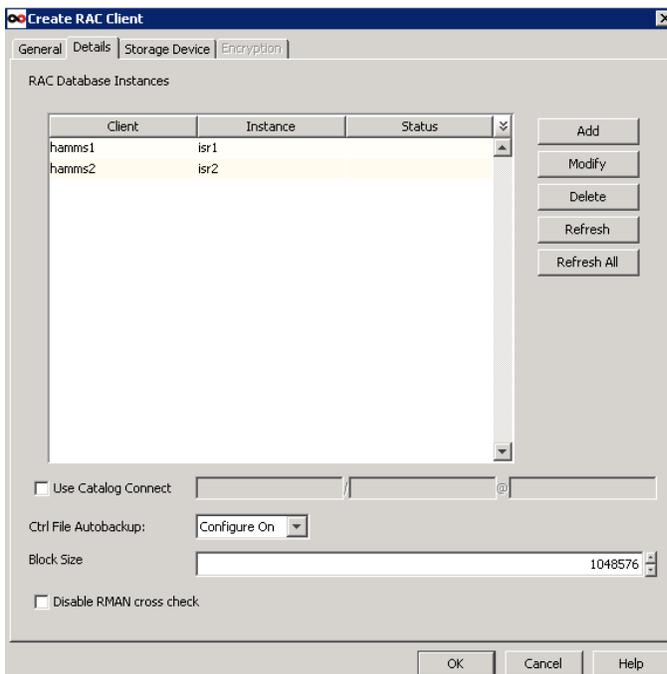


Figure 17: Simpana Create RAC Client window Details tab with Ctrl File Autobackup and Block Size set.

- 9) Then, navigate to the **Storage Device** tab of the **Create RAC** client window. There are four sub tabs on this window (**Command Line Backup**, **Log Backup**, **Data Transfer Option**, and **Deduplication**). Select the **Storage Policy** setup earlier (ODA) from the drop-down menu on the **Command Line Backup** tab and the **Log Backup** tab. (See figures 18 and 19):

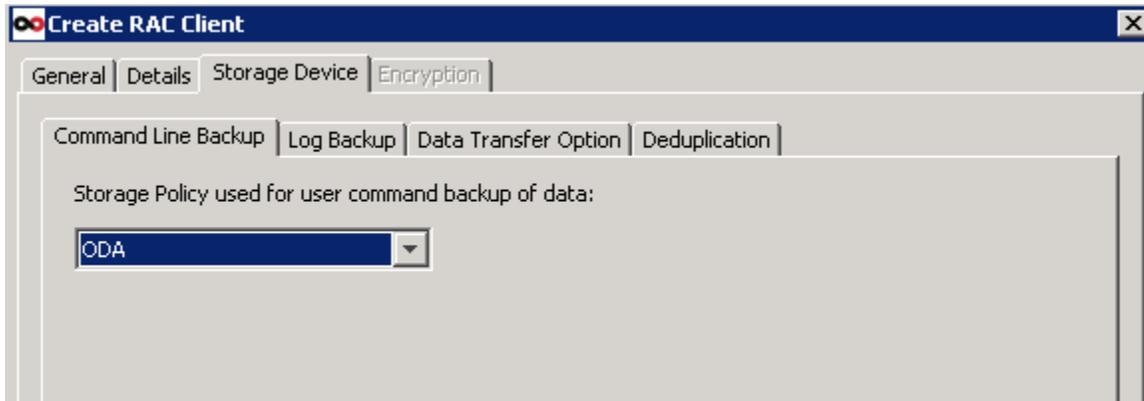


Figure 18: Simpana Create RAC Client window Storage Device tab on Command Line Backup sub tab.

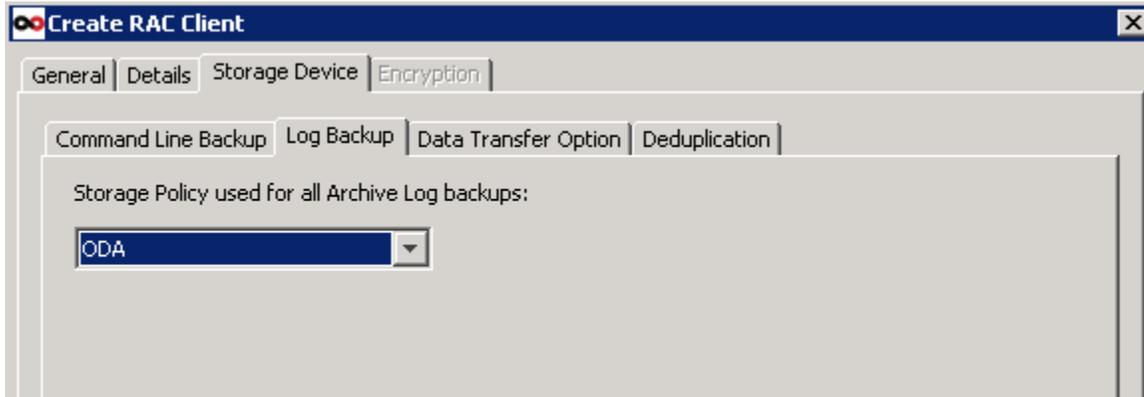


Figure 19: Simpana Create RAC Client window Storage Device tab on Log Backup sub tab.

- 10) Click **OK** to create the RAC Client.

Discover Instances

Now that the RAC Client is added you can discover the database instance on each client (hamms1 & hamms2 in this configuration). Expand the left hand tree in the CommCell Console under each client you will see a **File System** agent and an **Oracle** agent. The **Oracle** agent will not have a plus sign to expand until database instances are discovered.

- 1) Highlight the **Oracle** agent under the client name.
- 2) Right click and choose **All Tasks->Discover Instance**.
- 3) Repeat for each database instance.
- 4) Once an instance is discovered you will see a plus sign under the **Oracle** agent on the client and, when expanded, it will show the ASM instance name and database instance name: (See figure 20):

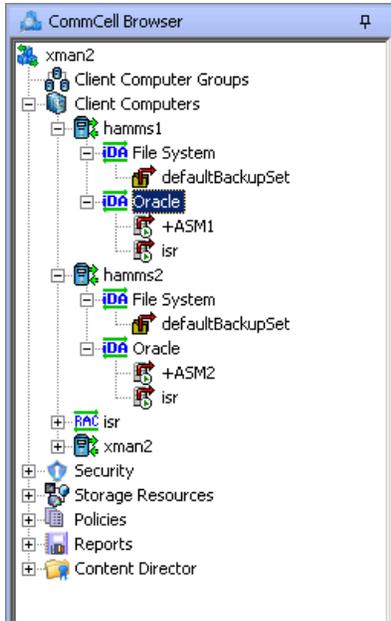


Figure 20: Simpana CommCell Console Client Computers with Oracle agent expanded.

Modify Client Properties

The next step in the Simpana configuration is to add **Registry** settings.

- 1) Highlight the database server you are editing settings for on the list under **Client Computers** in the left hand navigation tree of the CommCell Console (hamms1 in this configuration).
- 2) Right click and choose **Properties**.
- 3) Navigate to the **Registry Key Settings** tab.
- 4) Click **Add** at the bottom of the window, and add each of the following **Registry Key Settings**: (See table 2):

TABLE 2. Registry Key Settings

NAME	LOCATION	TYPE	VALUE
sORASBTPERFSTAT	OracleAgent	VALUE	Y
nNumPipelineBuffers	Cvd	VALUE	60
nPipelineBufferSize	Cvd	VALUE	1048576

- 5) When completed the **Registry Key Settings** should look as follows: (See figure 21):

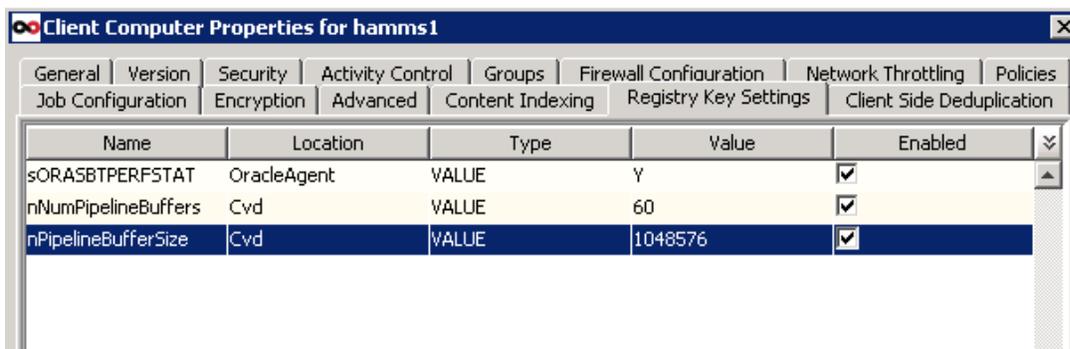


Figure 21: Simpana Client Computer Properties for hamms1 with completed Registry Key Settings.

- 6) Click **OK** to save changes to **Client Computer Properties**.
- 7) Repeat steps 1 - 6 for the second database server.

Create New Subclient for the RAC Client

Simpana Subclients determine what data is backed up and also allow for more granular settings in addition to the settings being inherited from the **Storage Policy**. Each client computer in the configuration includes one default Subclient for each Simpana module (**Filesystem** or **Oracle** agent in this configuration) installed. The default Subclient backs up everything (root filesystem for **Filesystem** agent or all database objects for **Oracle** agent). In this configuration the whole database is being backed up. An additional Subclient is created to illustrate the process. Since this is an Oracle RAC configuration the Subclient should be setup at the RAC level instead of the physical node level.

- 1) Expand the left hand navigation tree in the CommCell Console under the **RAC (isr)** listing and select the database instance (isr in this configuration).
- 2) Once selected the **default** Subclient will display in the right upper hand pane of the CommCell Console.
- 3) Right click the database instance in the left panel, choose **All Tasks** and select **New Subclient**.
- 4) Provide a name for the Subclient on the **General** tab of the **Create New Subclient** window (ODA in this configuration).
- 5) Navigate to the **Storage Device** tab of the **Create New Subclient** window.
- 6) Select a **Data Storage Policy** from the drop down menu (ODA in this configuration).
- 7) Update each client and add one or more **Streams** (This configuration uses one stream per client - two drives across one Media Server is 1 stream per server). Also navigate to the **Logs Backup** tab, select the check box for **Backup Archive Log** and set the **Streams** (See figure 22):

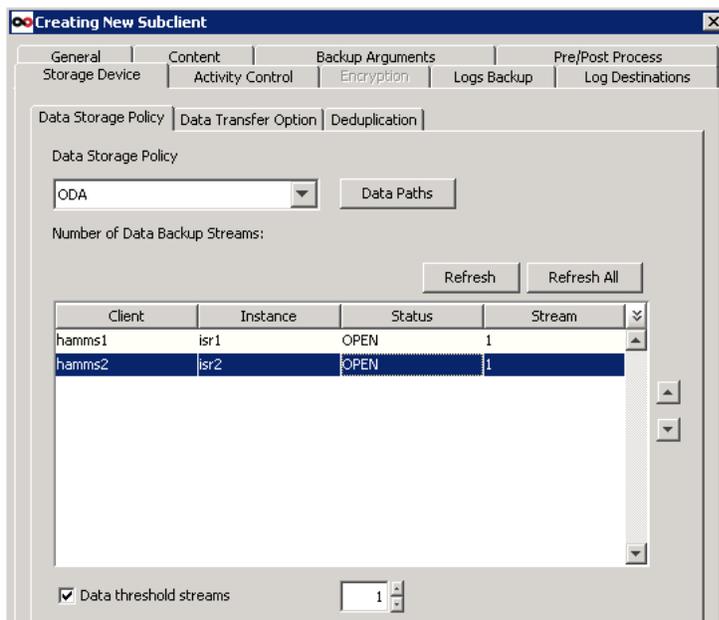


Figure 22: Simpana Creating New Subclient window Storage Device tab on Data Storage Policy sub tab.

- 8) Navigate to the **Content** tab and select the radio button for **Online Subset**.
- 9) Choose the objects that need to be backed up.
- 10) Near the bottom also select **Backup Control File**, **Protect backup recovery area**, and **Backup SP File**: (See figure 23):

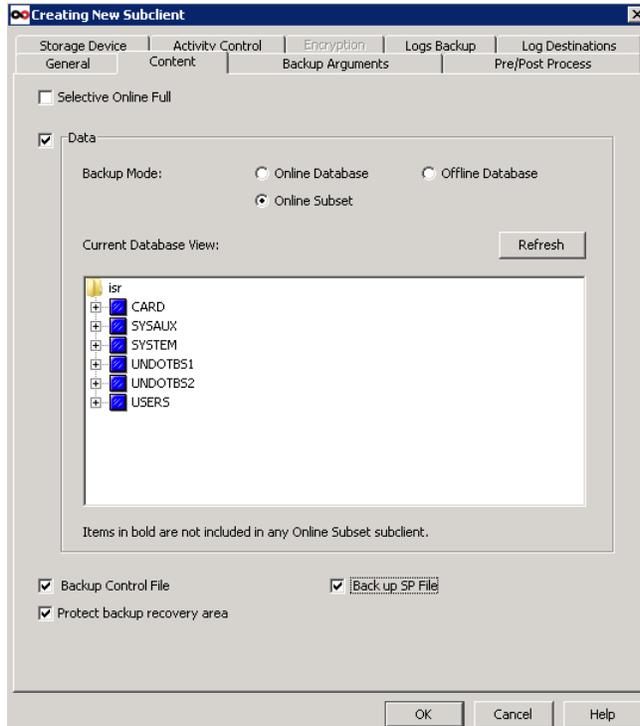


Figure 23: Simpana Creating New Subclient window Content tab.

Simpana setup is now complete.

Backup and Restore of Database

There are multiple methods available to execute database backups and restores with CommVault Simpana (RMAN prompt, Simpana CommCell Console, & RMAN script). For this example we are executing the backup and restore from the Simpana CommCell Console.

Backup Database

- 1) From the CommCell Console expand **Client Computers** and then **RAC (isr)**.
- 2) Highlight **isr** under **RAC** in **Client Computers** from the left pane in the CommCell Console and in the top right hand pane you will see two Subclient names, **default** and **isr**.
- 3) Right click on the Subclient **isr** and select **Backup**:
- 4) Under **Select Backup Type**, choose the radio button for **Full**.
- 5) Simpana generates the RMAN script automatically when the Subclient is executed or scheduled. Click **Script Preview** to view the script. Below is a sample of the RMAN script generated by Simpana for a two client, two tape drive scenario:

```
*****DATA/CONTROL FILE/SPFILE BACKUP SCRIPT*****
CONFIGURE CONTROLFILE AUTOBACKUP ON;
run {
allocate channel ch1 type 'sbt_tape' connect
sys/2AAQQAABoAAB9AABGAAB4AABfAABoAAGeAA@isr1
PARMS="SBT_LIBRARY=/opt/simpana/Base/libobk.so,BLKSIZE=1048576,ENV=(CV_mmsApiVsn=2,
CV_channelPar=ch1)"
TRACE 0;
allocate channel ch2 type 'sbt_tape' connect sys/2GoZZaaSFaaSXaaSTaaSIaaS7aaSFaaTmaa@isr2
PARMS="SBT_LIBRARY=/opt/simpana/Base/libobk.so,BLKSIZE=1048576,ENV=(CV_mmsApiVsn=2,
CV_channelPar=ch2)"
TRACE 0;
setlimit channel ch1 maxopenfiles 8;
```

```

setlimit channel ch2 maxopenfiles 8;
backup
incremental level = 0
filesperset = 32
tablespace 'CARD','SYSAUX','SYSTEM','UNDOTBS1','UNDOTBS2','USERS'
include current controlfile spfile ;
}
exit;

```

- 6) Click **OK** to start the backup.
- 7) From the CommCell Console you can view the progress of the job in the **Job Controller** pane in the middle of the right hand panes.

Restoring the Database

In the event of a logical database corruption, or a complete disaster, restoration of the database from tape can be executed. The DBA (or backup administrator) will use the CommCell Console and RMAN to request the needed backup pieces from the Media Management Layer. The RMAN backup pieces are cataloged in the controlfile, or RMAN Catalog if using Recovery Manager with catalog, and Simpana also knows about the pieces in its own catalog. If a complete disaster has occurred and the Oracle Database Appliance has been re-imaged, you will also require the DBID of your database to perform the restore. There are many different restore scenarios available with Simpana and RMAN, depending on the type of problem encountered in the database (consult RMAN documentation for complete information). For this example, assume that one or more controlfiles is damaged and so are some of the datafiles that underlie the database. Also assume all archive logs are intact in the Fast Recovery Area (FRA). The basic steps in the RMAN restore process are to restore the controlfile, restore the database, and then recover the database. After the controlfile is restored, the database will know which backup pieces are needed based on data contained in the restored controlfile. If the archive logs are still available in the FRA you can use them to recover up to present or to a specific point in time (they are available in this example). If the archive logs have to be recovered you can only recover up until the point in time of the last archive log. This is known as an incomplete recovery.

Restoring the Controlfile

- 1) From hamms1 execute the following:

```

[root@hamms1 /]# su - oracle
[oracle@hamms1 ~]$ rman target /

```

Recovery Manager: Release 11.2.0.3.0 - Production on Tue May 25 13:19:28 2013

Copyright (c) 1982, 2011, Oracle and/or its affiliates. All rights reserved.

connected to target database: ISR (DBID=2637695581)

```

RMAN> shutdown immediate;

```

```

using target database control file instead of recovery catalog
database closed
database dismounted
Oracle instance shut down

```

- 2) Also login to hamms2 with SQL Plus and execute a shutdown immediate;

```

[root@hamms2 /]# su - oracle
[oracle@hamms2 ~]$ sqlplus / as sysdba
SQL> shutdown immediate;

```

- 3) From hamms1 execute:

```

RMAN> startup nomount;

```

connected to target database (not started)
Oracle instance started

Total System Global Area 25654751232 bytes

Fixed Size	2238472 bytes
Variable Size	3087009784 bytes
Database Buffers	22481469440 bytes
Redo Buffers	84033536 bytes

- 4) From the CommCell Console expand **Client Computers** and then **RAC (isr)**.
- 5) Highlight **isr** under **RAC** in **Client Computers** from the left pane and in the top right hand pane you will see two Subclient names, **default** and **isr**.
- 6) Right click on the Subclient **isr** and select **Browse Backup Data**.
- 7) The **Browse Options** window will appear - select **Browse the Latest Data**.
- 8) Click **OK**.
- 9) On the top of the right pane of the CommCell Console you will see **Current Selected: SID: isr (Subclient: isr)**. Click **isr** to select everything below it: (See figure 24):

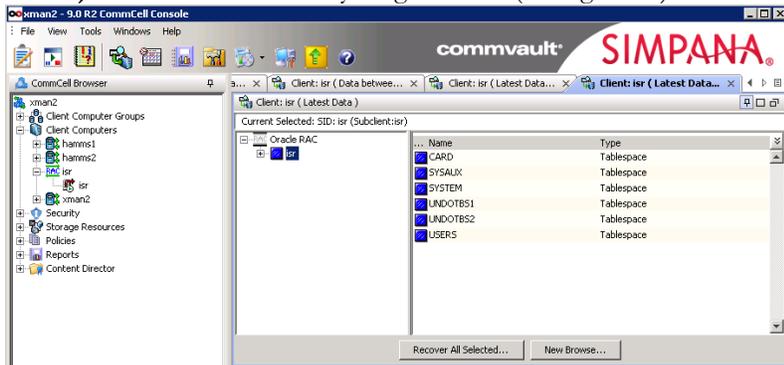


Figure 24: Simpana CommCell Console Browse client backup data.

- 10) Click **Recover All Selected** to advance to the next screen.
- 11) Check **Restore Control File**.
- 12) Un-check **Restore Data** and **Recover**: (See figure 25):

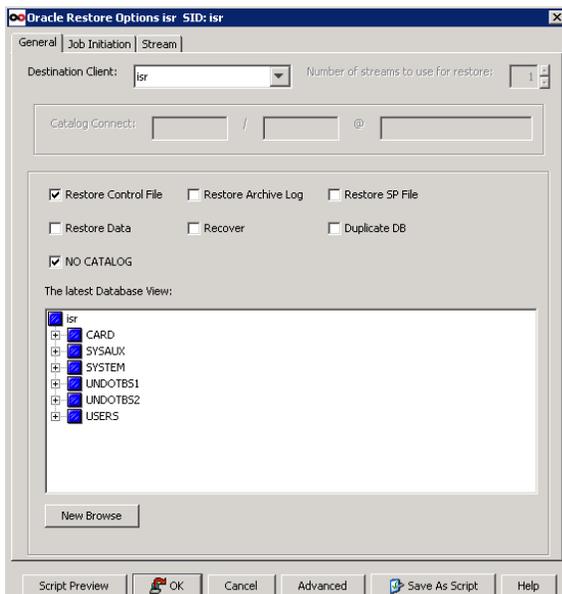


Figure 25: Simpana Oracle Restore Options isr SID: isr window General tab.

- 13) Click on the **Stream** tab.
- 14) Set the **Stream** to 1 for hamms1: (See figure 26):

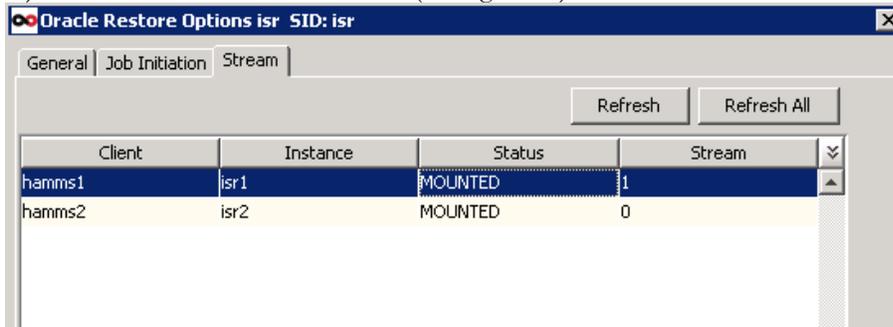


Figure 26: Simpana Oracle Restore Options isr SID: isr window Stream tab.

- 15) Click the **Advanced** button and select the **Options** tab.
- 16) Check **Set DBID**.
- 17) Click on the **Ctrl & SP Files** tab.
- 18) Check **Restore From** and select the radio button **From auto Backup**.
- 19) Check **To Point In Time** and make sure the correct day is selected – usually current day: (See figure 27):

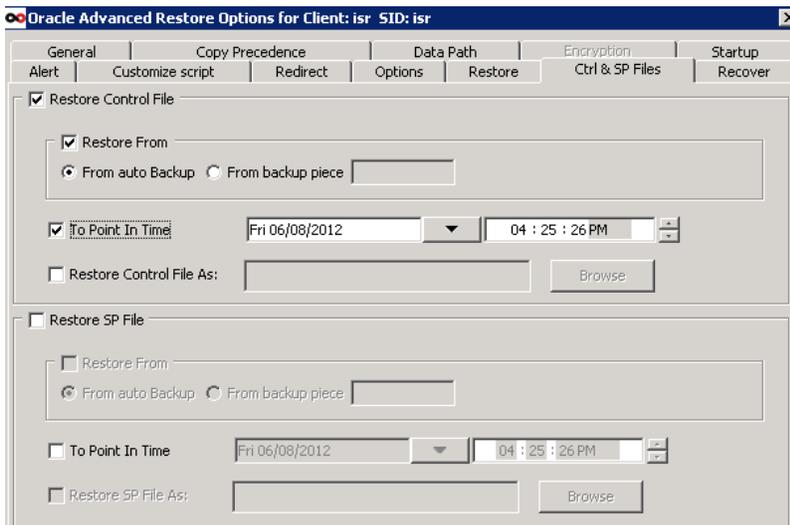


Figure 27: Simpana Oracle Advanced Restore Options for Client: isr SID: isr window Ctrl & SP Files tab.

- 20) Click **OK** and then click **OK** again to start the restore of the controlfile. Monitor the progress of the controlfile restore in the **Job Controller** window.

Restoring the Database

Once the controlfile is restored, the database can be restored.

- 1) Following the restore of the controlfile, Simpana will mount the database on hamms1 which is the node used for the controlfile restore.
- 2) Login to hamms2 with SQL Plus and execute startup mount; so you can open a channel on hamms2 for a parallel restore.


```
[root@hamms2 /]# su - oracle
[oracle@hamms2 ~]$ sqlplus / as sysdba
SQL> startup mount;
```
- 3) From the CommCell Console expand **Client Computers** and then **RAC (isr)**.
- 4) Highlight Subclient **isr** and in the top right hand pane and you will see two Subclient names, **default** and **isr**.
- 5) Right click on the Subclient **isr** and select **Browse Backup Data**.
- 6) The **Browse Options** window will appear. Select **Browse the latest Data**.
- 7) Click **OK**.

- 8) On the top right pane of the CommCell Console you will see **Current Selected: SID: isr (Subclient: isr)**, click **isr** to select everything below it, and then click **Recover All Selected:** (See figure 28):

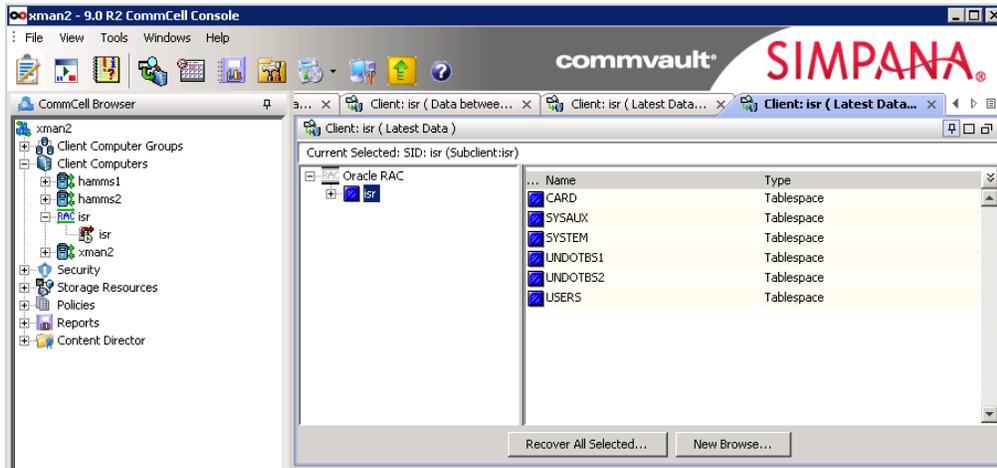


Figure 28: Simpana CommCell Console Browse client backup data.

- 9) Check **Restore Data** and **Recover:** (See figure 29):

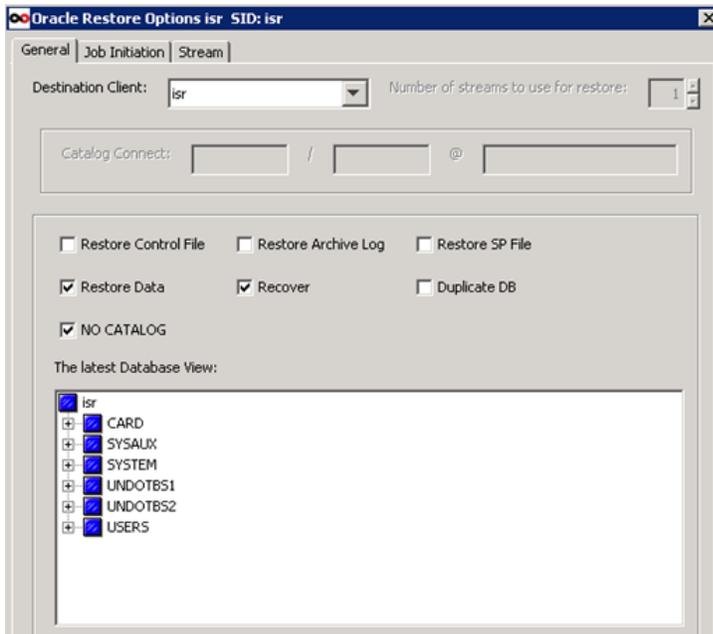


Figure 29: Simpana Oracle Restore Options isr SID: isr window General tab.

- 10) Click on the **Stream** tab.
- 11) Set the **Stream** to 1 for hamms1 and 1 hamms2: (See figure 30):

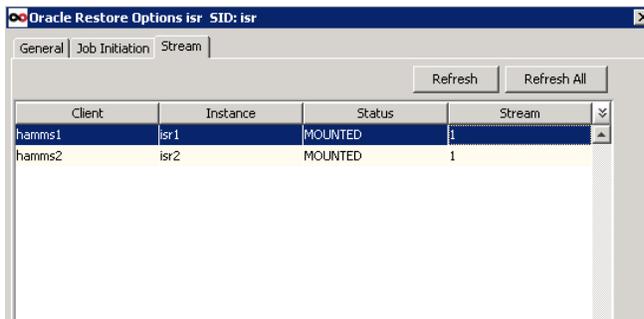


Figure 30: Simpana Oracle Restore Options isr SID: isr window Stream tab.

- 12) Click the **Advanced** button, and then select the **Options** tab.
- 13) Un-check **Open DB**: (See figure 31):

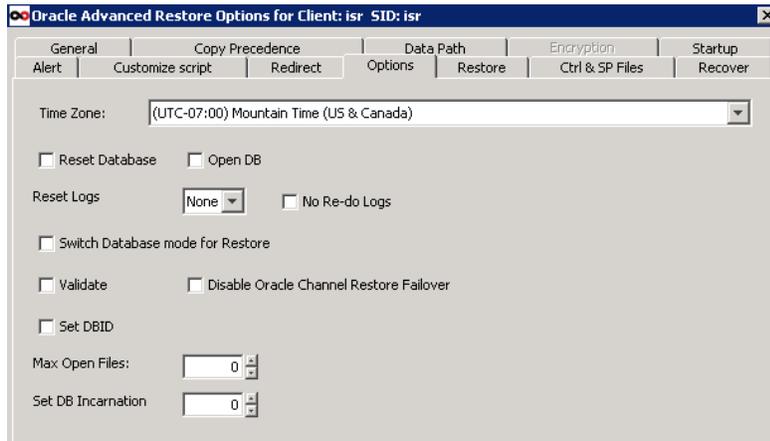


Figure 31: Simpana Oracle Advanced Restore Options for Client: isr SID: isr window Options tab.

- 14) Click **OK** and then click **OK** again to start the restore of the database. Monitor the restore in the **Job Controller** window.
- 15) Once the restore has completed run the following RMAN command on hamms1:


```
RMAN> alter database open resetlogs;
```
- 16) On hamms2 run the following command SQL command to bring the 2nd instance back online:


```
SQL> alter database open;
```

 The restore process is now complete.

Private Network Configuration

The Simpana configuration in this paper utilized the public network interface for the database backup traffic. It is a perfectly valid configuration as you may have idle time overnight to execute a database backup. However, depending on your organization's backup requirements, it may also be necessary to offload backup traffic to one of the other interfaces on the Oracle Database Appliance (Ex. alleviate traffic on the public network, faster backup time required, etc.). The following example details how to setup Simpana to use a 10GbE bonded interface for database backups.

OS Setup

First you must configure the 10GbE HBA interfaces on the Simpana CommServe/Media Server, and each of the database nodes. For this example, assume you have configured the following host names and IP addresses for the Simpana CommServe/Media Server and the database nodes:

```
192.168.20.100 hamms1-xbond0
192.168.20.101 hamms2-xbond0
192.168.20.102 xman2-xbond0
```

If the hostnames are not in the DNS map, or other naming service map, they must be in the local hosts file on each of the servers in the configuration (xman2, hamms1, and hamms2).

Configure Private Network Interface in Simpana

For this configuration the goal is to route database server traffic across the 10GbE network. Data Interface Pairs must be setup for each database server in the configuration to achieve this goal (hamms1 & hamms2):

- 1) Highlight the database server you are editing settings for on the list under **Client Computers** in the left hand navigation tree of the CommCell Console (hamms1 in this example).
- 2) Right click and choose **Properties**.
- 3) Navigate to the **Job Configuration** tab within the **Client Computer Properties** window.

- 4) Select the **Add** button in the **Data Interface Pairs** section of the configuration and follow the wizard to configure the network interface of the path that will transfer the data:
 - a. **1st Computer** defaults to the machine you are modifying properties on (hamms1 in this configuration). Set the **2nd Computer** to the Media Server (xman2 in this configuration) and click **Next** to continue.
 - b. Click the **Add** button to select the interfaces and then use the drop-down menus to select the 10Gbe interface of each client (hamms1-xbond0 for hamms1 and xman2-xbond0 for xman2). Use either the name or the IP address. Click **Next** to continue.
 - c. Click **Next** to get to the summary screen:
 - d. Click **Finish**.
 - e. Click **OK** to exit the **Properties** window.
- 5) Repeat steps 1 – 4 for the other database Server (hamms2).

Simpana Tuning

The Simpana default settings for transferring data to tape are set generically and must be tuned to match your environment, in order to achieve maximum transfer rates. Simpana tuning consists of modifying the block size that gets written to tape and the block size for RMAN reads of the database. See the Simpana documentation link for detailed information under Additional Resources.

Set Simpana Storage Policy Block Size

The Simpana block size setting must be tuned to achieve optimal transfer rates. The setting can be modified as follows:

- 1) From the CommCell Console expand **Policies**, expand **Storage Policies** and highlight the policy to be changed (ODA in this example).
- 2) In the top right hand pane right click the **Primary Copy** and select **Properties**.
- 3) A **Copy Properties** window will appear, select the **Data Paths** tab.
- 4) Highlight the **Data Path** and click **Properties** at the bottom of the window.
- 5) The **Data Path Properties** window will appear and at the bottom under **Block Size** select **Use Specified Value** and set it to 1024 (1MB being set in this example): (See figure 32):

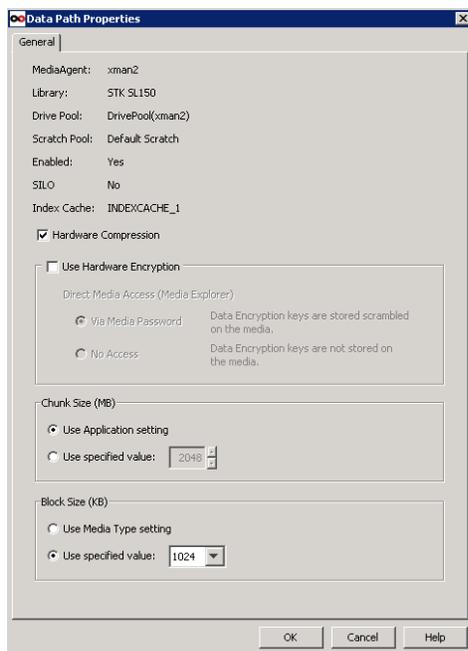


Figure 32: Simpana Data Path Properties windows General tab showing Block Size setting.

- 6) Click **OK** until you return to the CommCell Console.

Set Simpana RAC Client Block Size

- 1) From the CommCell Console expand **Client Computers**, expand the RAC Client, right click on the database name (isr for this example) and select **Properties**.
- 2) The **Modify Instance Property** window will appear. Select the **Details** tab.
- 3) At the bottom of the window set the **Block Size** best suited for your environment. (1048576 (1MB) for this example): (See figure 33):

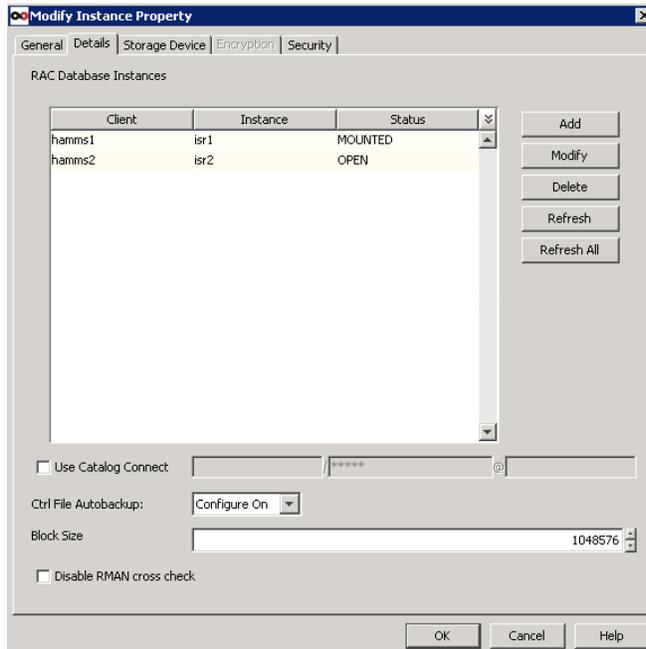


Figure 33: Simpana Modify Instance Property window Details tab.

- 4) Click **OK** until you return to the CommCell Console. At this point tuning is complete. Experiment with the settings to find the optimal transfer rate.

Conclusion

In conclusion, Oracle StorageTek tape products offer cost effective data protection for the Oracle Database Appliance and, when coupled with CommVault Simpana, they provide an end to end data protection solution.

Additional Resources

- [Simpana Documentation](#)
- [Simpana Tuning](#)
- [Database Appliance Collateral](#)
- [RMAN Documentation](#)



Protecting Oracle Database Appliance -Tape Backup with CommVault Simpana
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Hardware and Software, Engineered to Work Together