

BEST PRACTICES GUIDE

Oracle Disaster Recovery on Nimble Storage



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Introduction

The purpose of this technical white paper is to discuss Oracle database Disaster Recovery using the Nimble Replication feature.

Tuning Oracle database performance is beyond the scope of this paper. Please visit www.oracle.com for *Oracle Performance Tuning Guide* for more information in tuning your database.

Audience

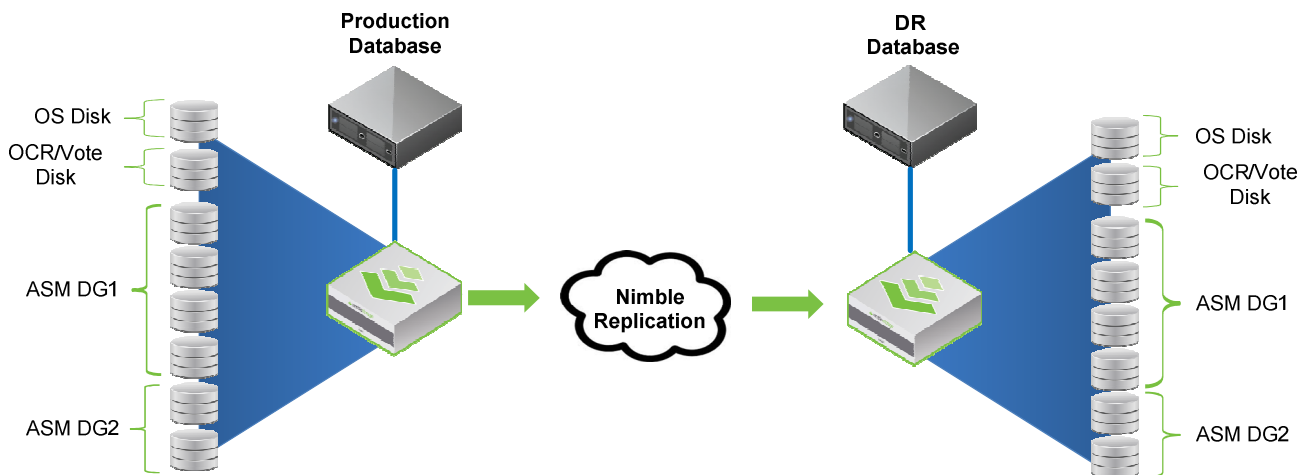
This guide is intended for Oracle database solution architects, storage engineers, system administrators and IT managers who analyze, design and maintain a robust database environment on Nimble Storage. It is assumed that the reader has a working knowledge of network design for iSCSI SAN, and basic Nimble Storage operations. Knowledge of Oracle Linux operating system, Oracle Clusterware, Oracle Data Guard, and Oracle database is also required.

Scope

Business continuity is critical to every CIO in today's informational age. Natural disasters such as earthquakes, hurricanes, or tornadoes could strike without notice. Preserving precious data in case of a disaster is crucial for businesses to stay afloat. This paper discusses how to setup and recover Oracle database using Nimble Storage Replication feature.

Using Nimble Efficient Replication for Oracle Database Disaster Recovery

Nimble Replication feature maintains a copy of data on a secondary system by only replicating compressed changed data on a set schedule. This reduces bandwidth costs for WAN replication and quickly deploys a disaster recovery solution that is affordable and easy to manage. Therefore, disaster recovery testing can be done on a regular basis to ensure a smooth transition in case of a real disaster. Not only the replicated image can be used for disaster recovery but it can also be used for test and development as well.



Configure Nimble Replication

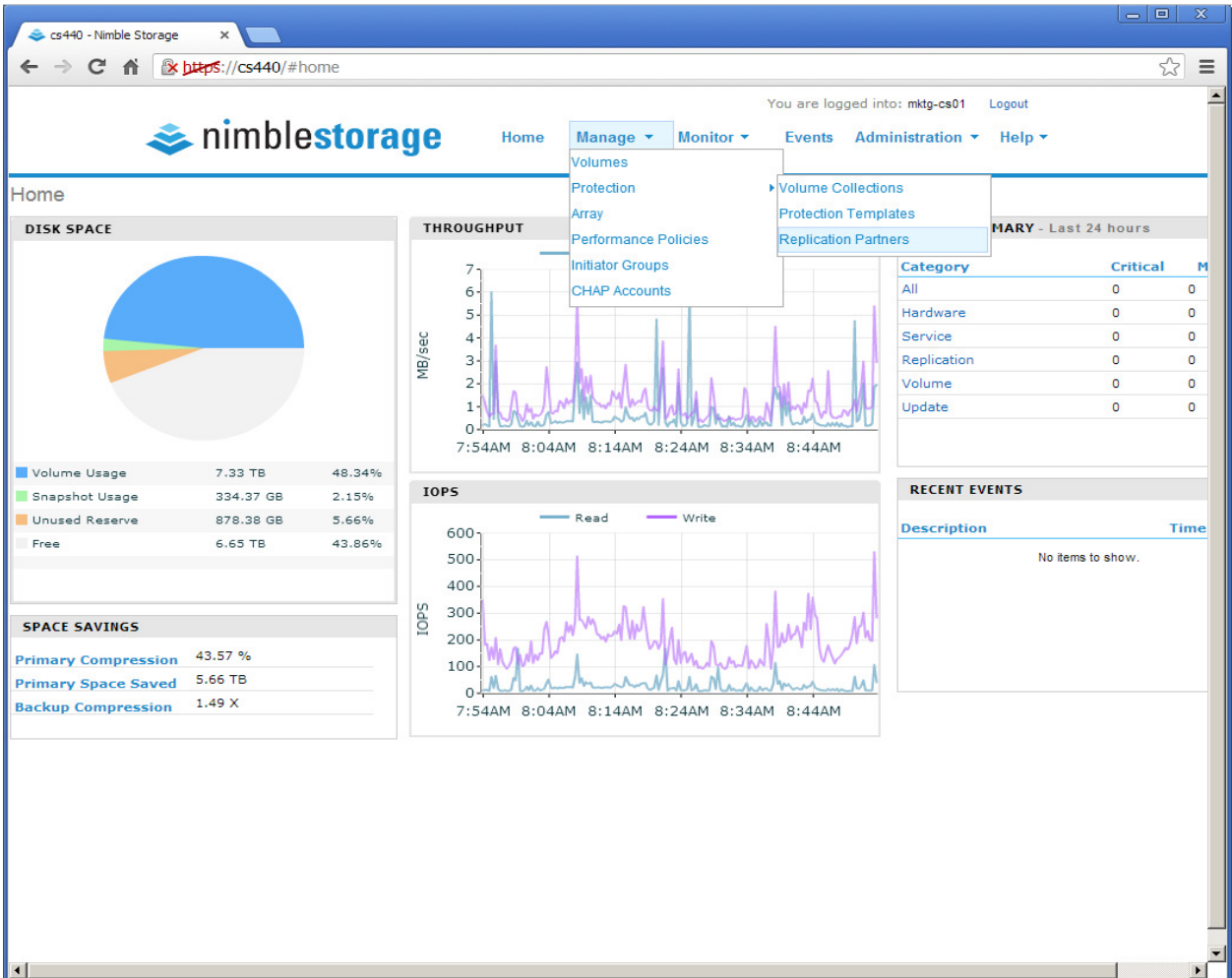
Configuring Nimble Replication is a simple task. The below procedure shows how to setup Nimble replication in an Oracle database environment.

1. Setup replication partner on the source (upstream) array
2. Setup replication partner on the destination (downstream) array
3. Create a replication schedule on the source array

Nimble Replication Partners Configuration

Setup Replication Partner on Source (upstream) Array

- Launch the Nimble GUI on the source array.
- Go to “Manage”, “Protection” and select “Replication Partners” button

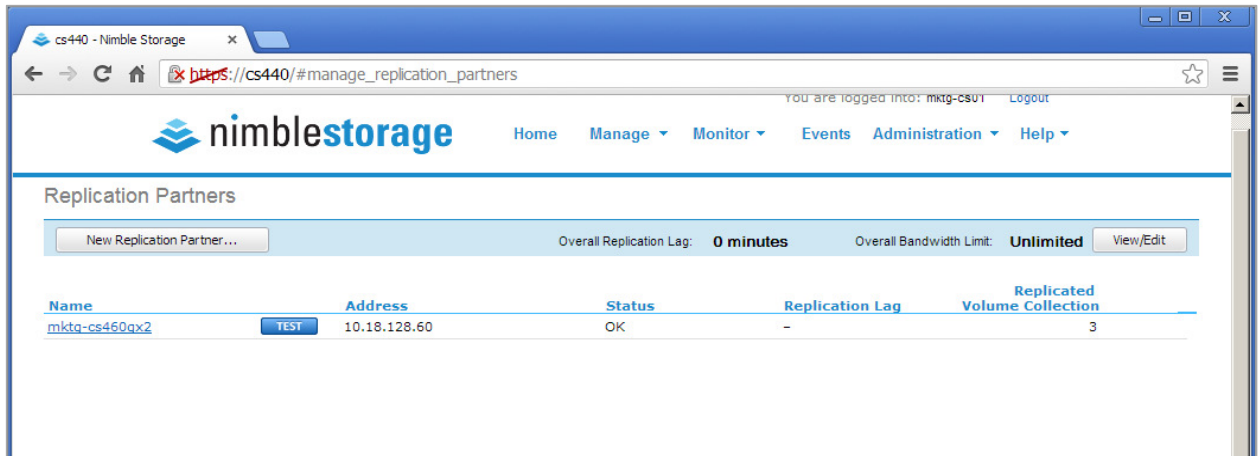


The screenshot displays the Nimble Storage GUI interface. The top navigation bar includes 'Home', 'Manage', 'Monitor', 'Events', 'Administration', and 'Help'. The 'Manage' dropdown menu is open, showing options like 'Volumes', 'Protection', 'Array', 'Performance Policies', 'Initiator Groups', and 'CHAP Accounts'. The 'Protection' option is further expanded to show 'Volume Collections', 'Protection Templates', and 'Replication Partners'. The main dashboard area contains several widgets: 'DISK SPACE' with a pie chart and table, 'THROUGHPUT' with a line graph, 'IOPS' with a line graph, and 'RECENT EVENTS' with a table. The 'RECENT EVENTS' table is currently empty.

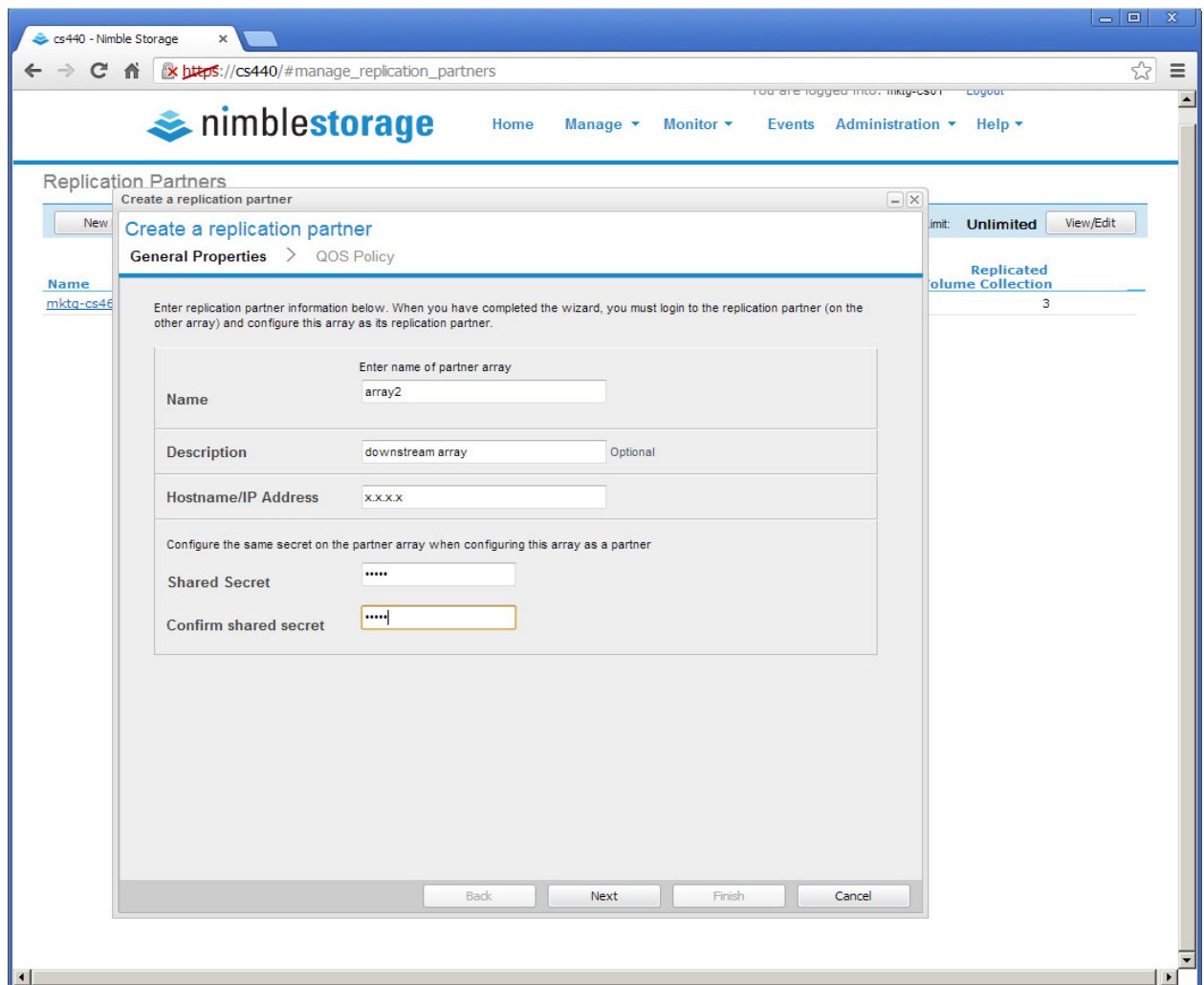
Category	Critical	M
All	0	0
Hardware	0	0
Service	0	0
Replication	0	0
Volume	0	0
Update	0	0

Description	Time
No items to show.	

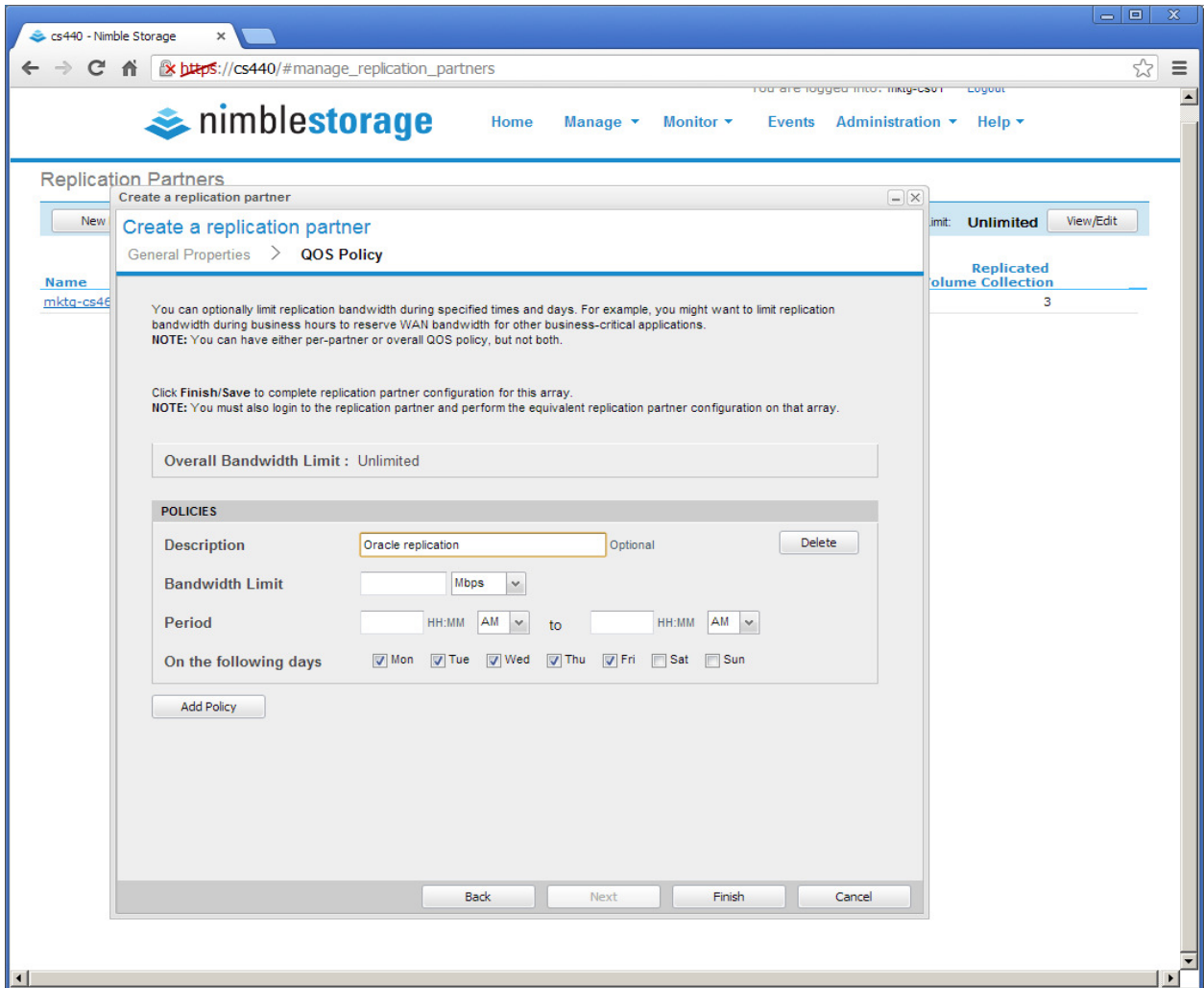
- Click on the “New Replication Partner” button



- The “Create a replication partner” window appears. Fill out the information of the **downstream** partner and click “Next”.



- The QOS Policy window appears. Click on “Add Policy” button and fill out the information and click “Finish” button when completed. If you don’t want to set any QoS for replication then just leave it blank.



- When completed on the **source** array, it should show something similar to this.

Replication Partners

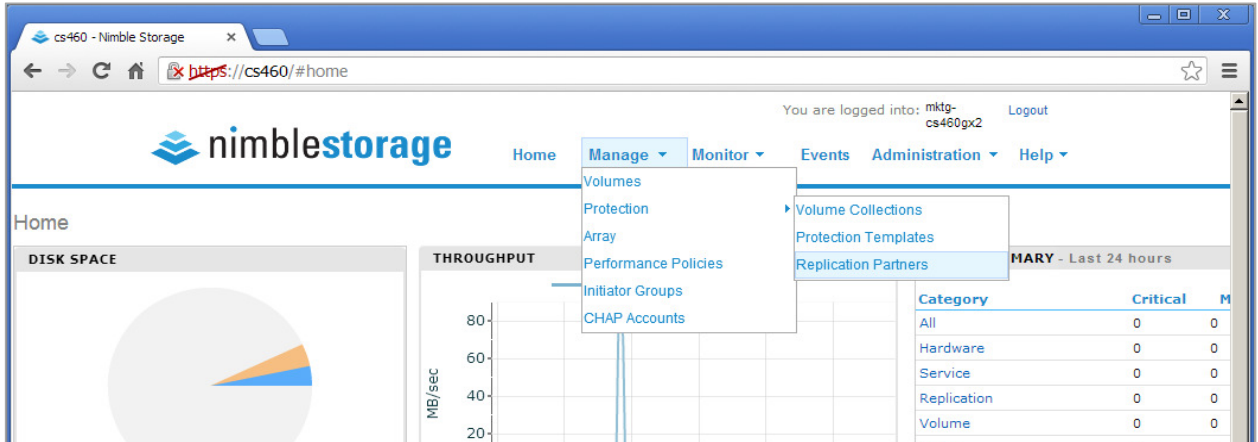
New Replication Partner... Overall Replication Lag: **0 minutes** Overall Bandwidth Limit: **Unlimited** View/Edit

Name	Address	Status	Replication Lag	Replicated Volume Collection
mktg-cs460qx2	10.18.128.60	OK	-	3

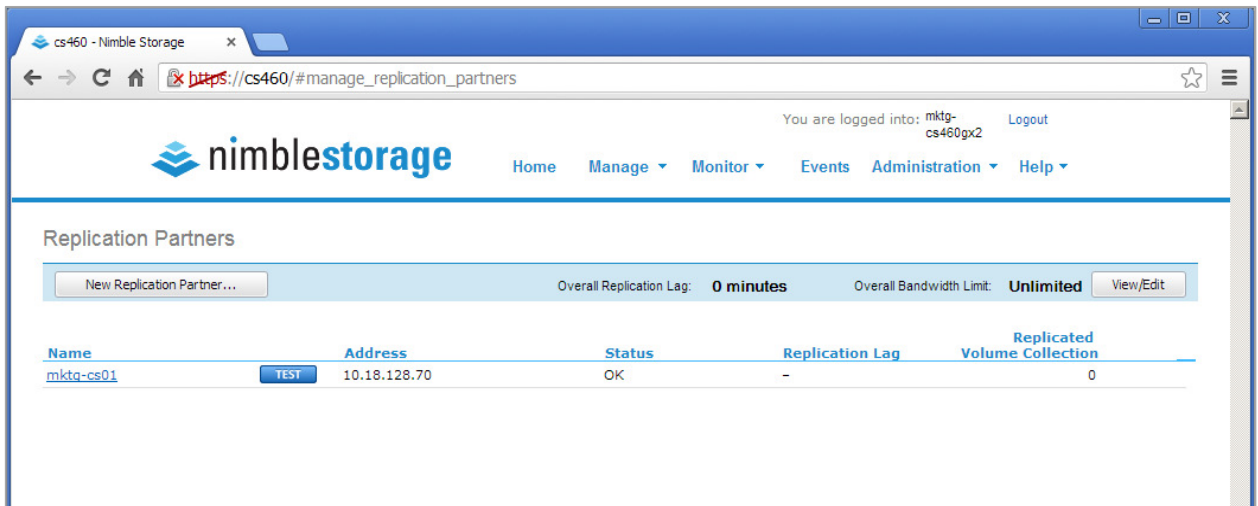
Setup Replication Partner on Destination (downstream) Array

The destination array needs to be setup similar to the source array EXCEPT the information such as array's name and IP address need to be changed.

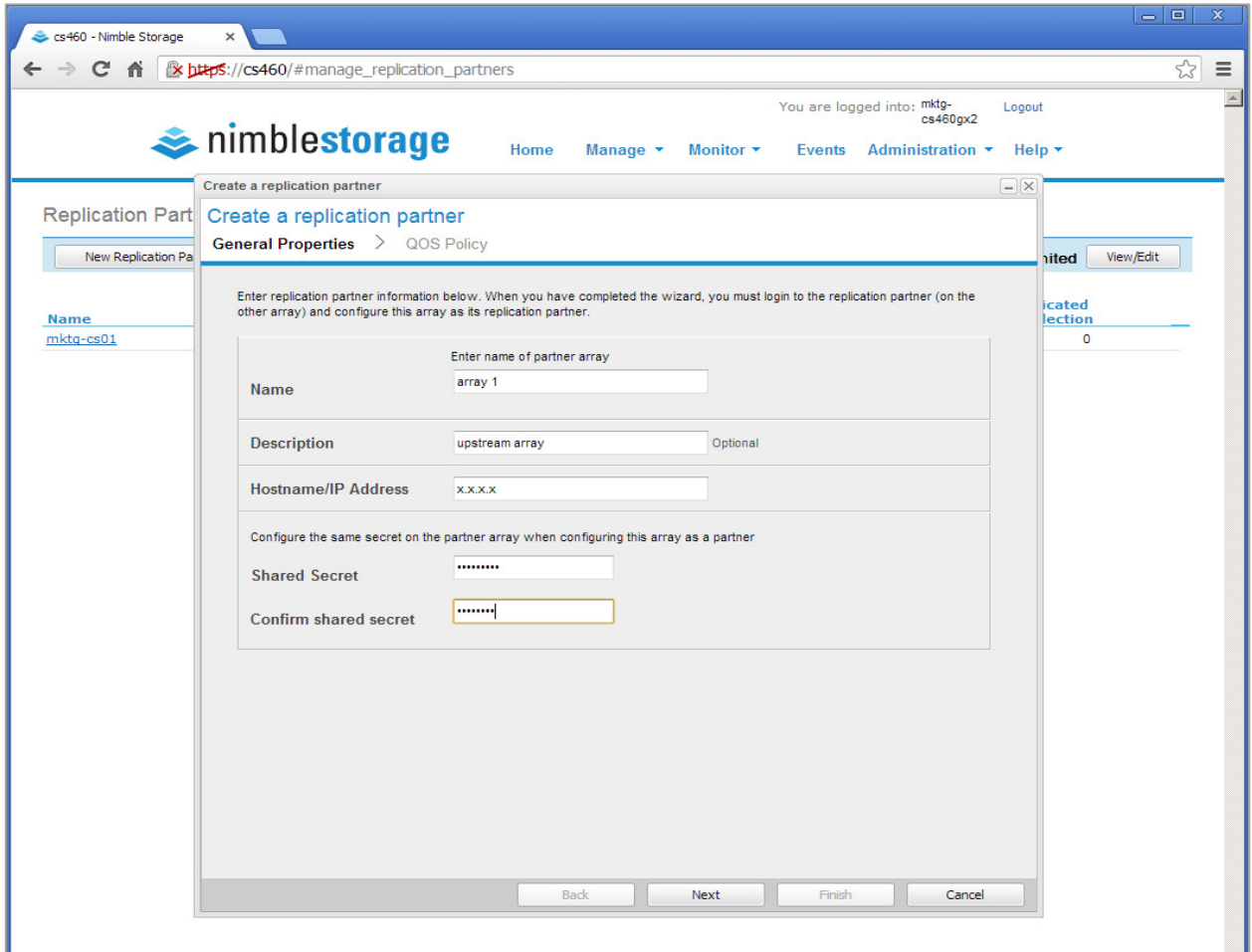
- Launch the Nimble GUI on the destination array
- Go to “Manage”, “Protection” and select “Replication Partners” button



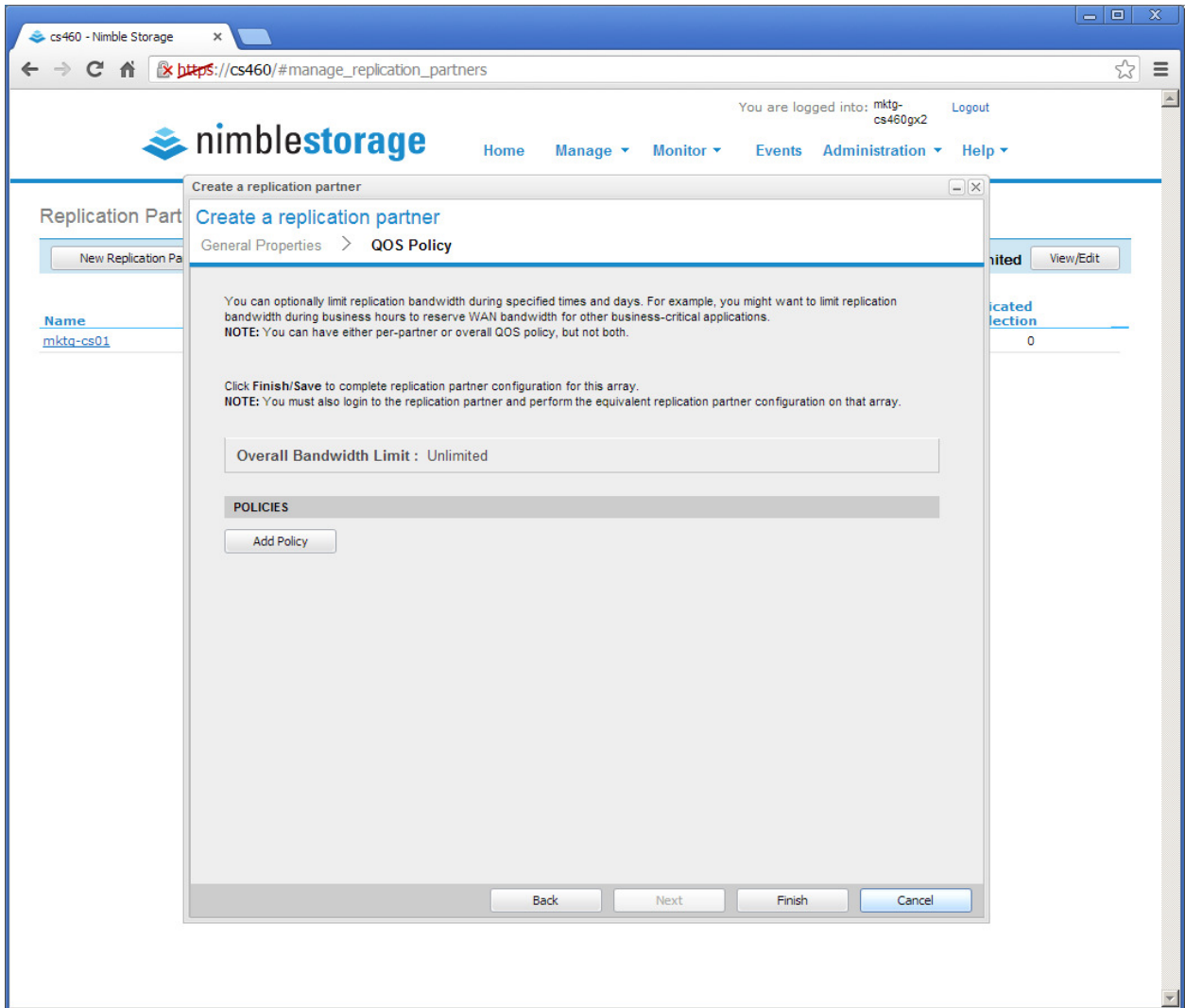
- Click on the “New Replication Partner” button



- The “Create a replication partner” window appears. Fill out the information of the **upstream** partner and click “Next”.



- The QoS Policy window appears. Click on “Add Policy” button and fill out the information and click “Finish” button when completed. If you don’t want to set any QoS for replication then just leave it blank.



- When completed on the **destination** array, it should show something similar to this.

Replication Partners					
New Replication Partner...		Overall Replication Lag: 0 minutes		Overall Bandwidth Limit: Unlimited View/Edit	
Name	Address	Status	Replication Lag	Replicated Volume Collection	
mktg-cs01	TEST 10.18.128.70	OK	-	0	

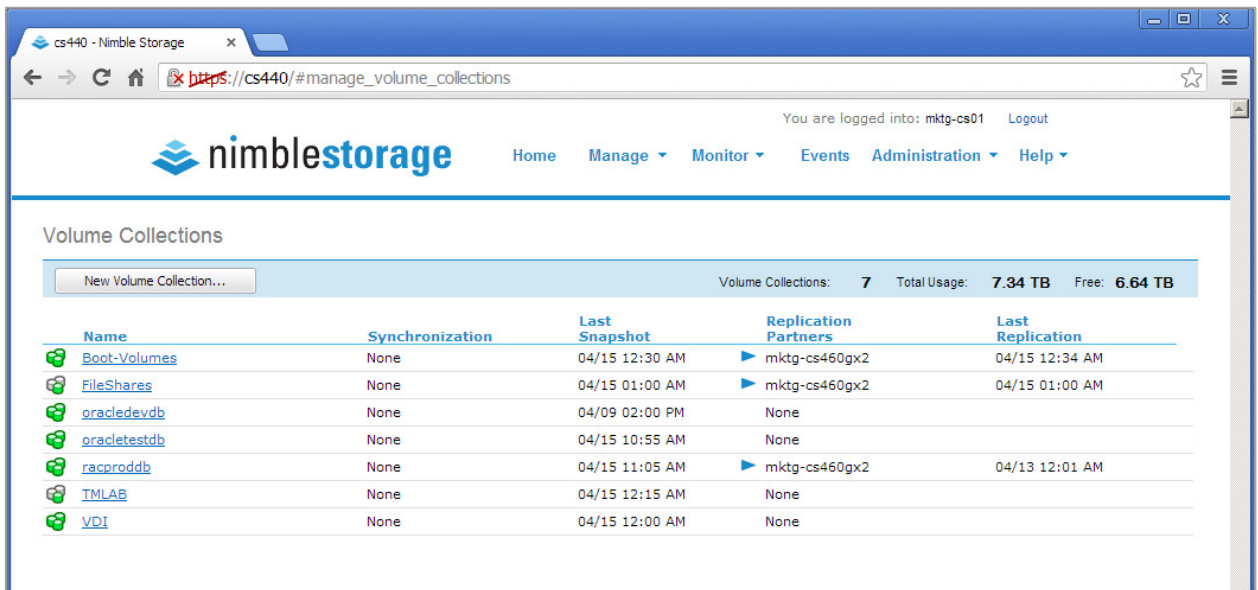
Once the replication partners have been setup, the next step is to setup a replication schedule of a volume collection. A volume collection is a feature that allows a grouping of multiple volumes in a single set that can be snapshot simultaneously. Once a snapshot has been created for these volumes, they will be replicated to the downstream array based on a pre-defined schedule.

Nimble Replication Schedule Configuration

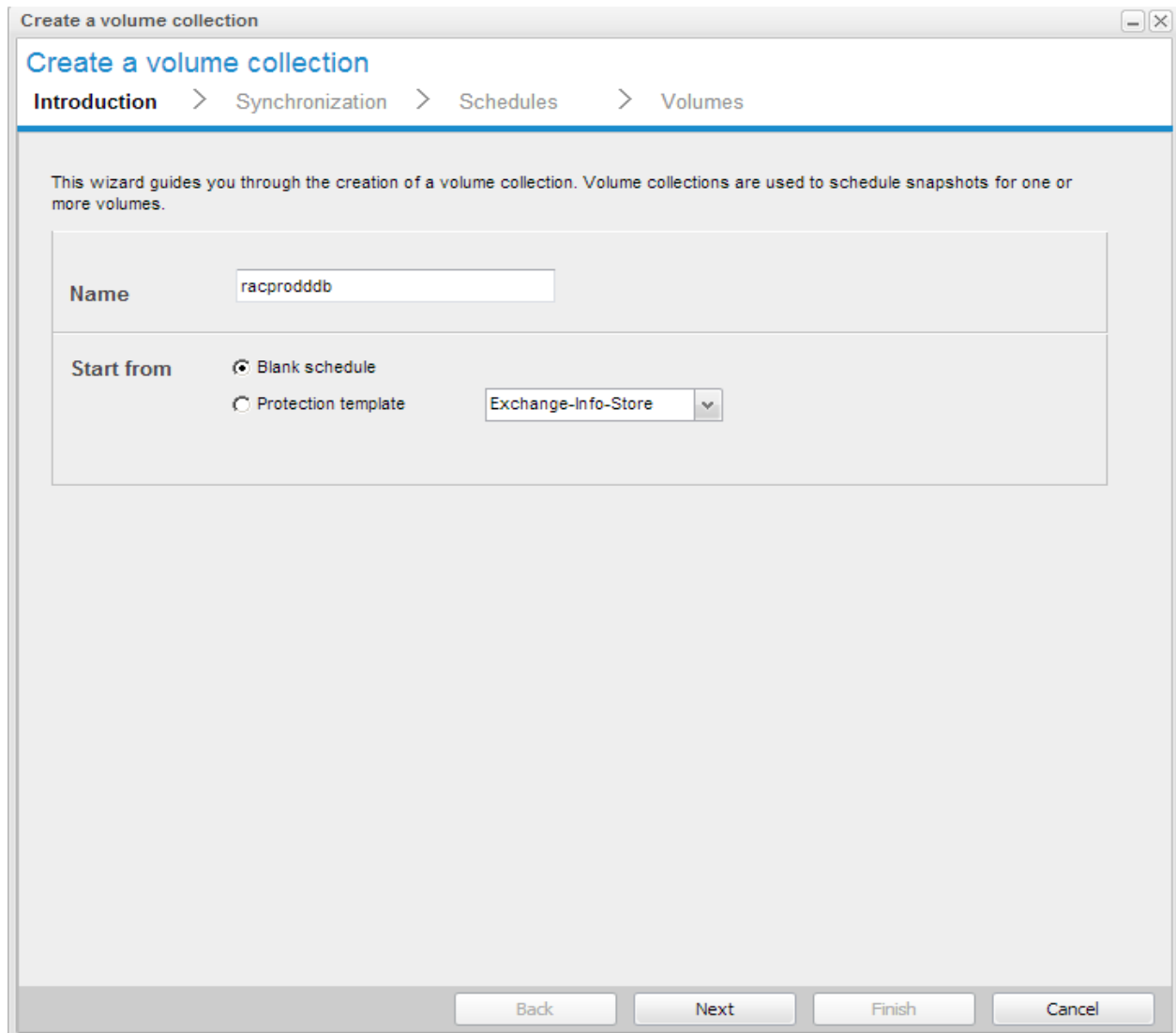
- Launch the Nimble GUI on the source array
- Go to “Manage”, “Protection” and select “Volume Collection” button



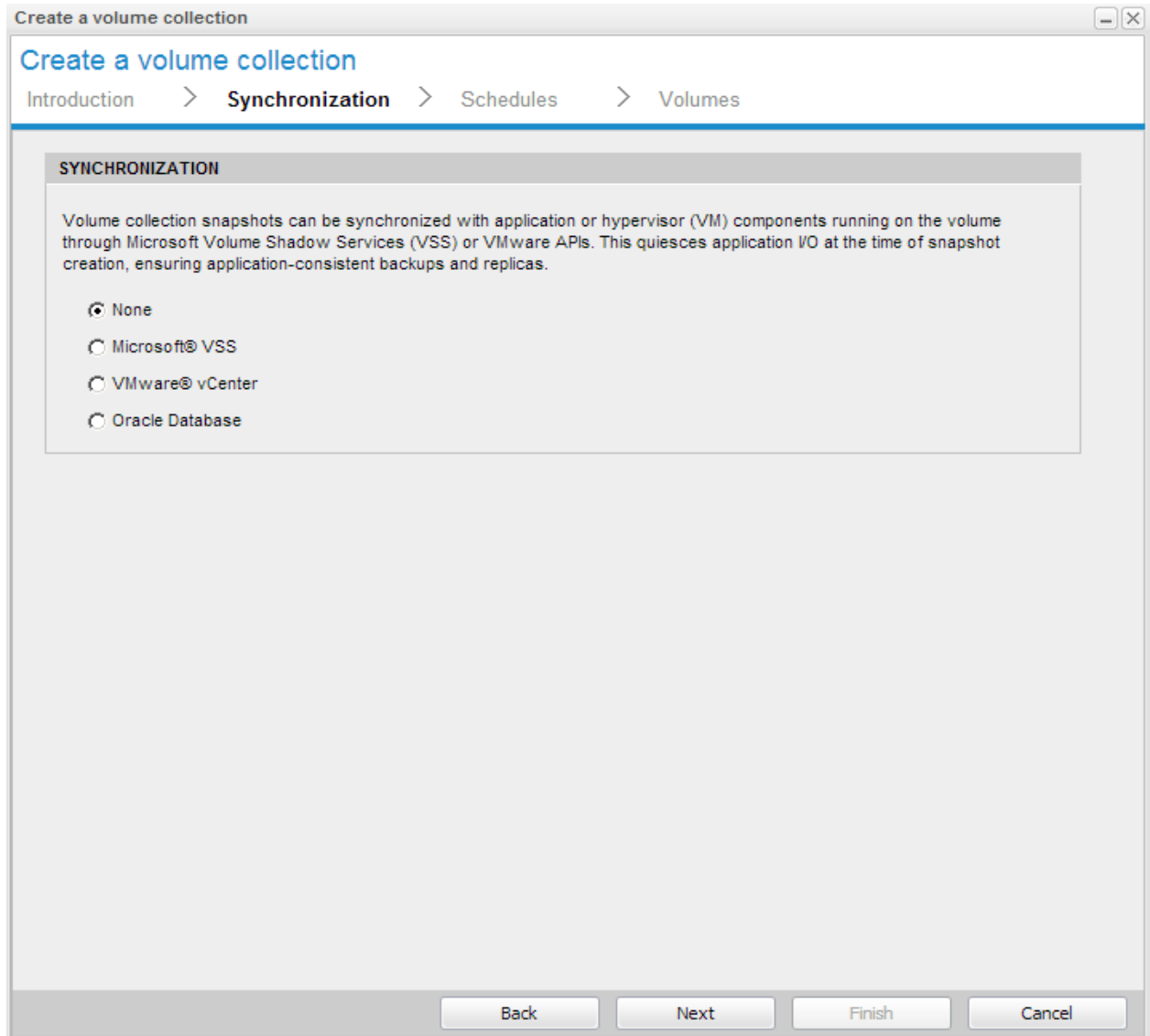
- Click on “New Volume Collection” button.



- The “Create a volume collection” window appears. Enter a name for this volume collection and use the blank schedule and click “Next”. For example, I have used “racproddb” as a name.



- Select the “None” radio button and click “Next”.



- Enter a schedule name, its schedule, snapshot retention, replicate to array, and number of snapshots to retain and click “Next”.

Create a volume collection

Create a volume collection

Introduction > Synchronization > **Schedules** > Volumes

Snapshots are point-in-time copies of volumes that allow you to recover data from the past. Nimble snapshots can be taken with no performance impact and are very space efficient, allowing you to keep weeks or even months of backup copies on the array. Snapshot schedules specify how frequently snapshots will be taken and how many snapshots will be retained for the volumes assigned to this volume collection. Snapshots taken will be set to offline.

"RAC" PROTECTION SCHEDULE

Schedule Name: RAC Delete

Repeat Every: 1 hours

Starting at: 12:00 HH:MM AM

Repeat Until: 11:59 HH:MM PM

On the following days: Mon Tue Wed Thu Fri Sat Sun

Number of snapshots to retain locally: 24

Synchronization: None

Replicate to: mktg-cs460gx2

Replicate every: 1 Snapshots

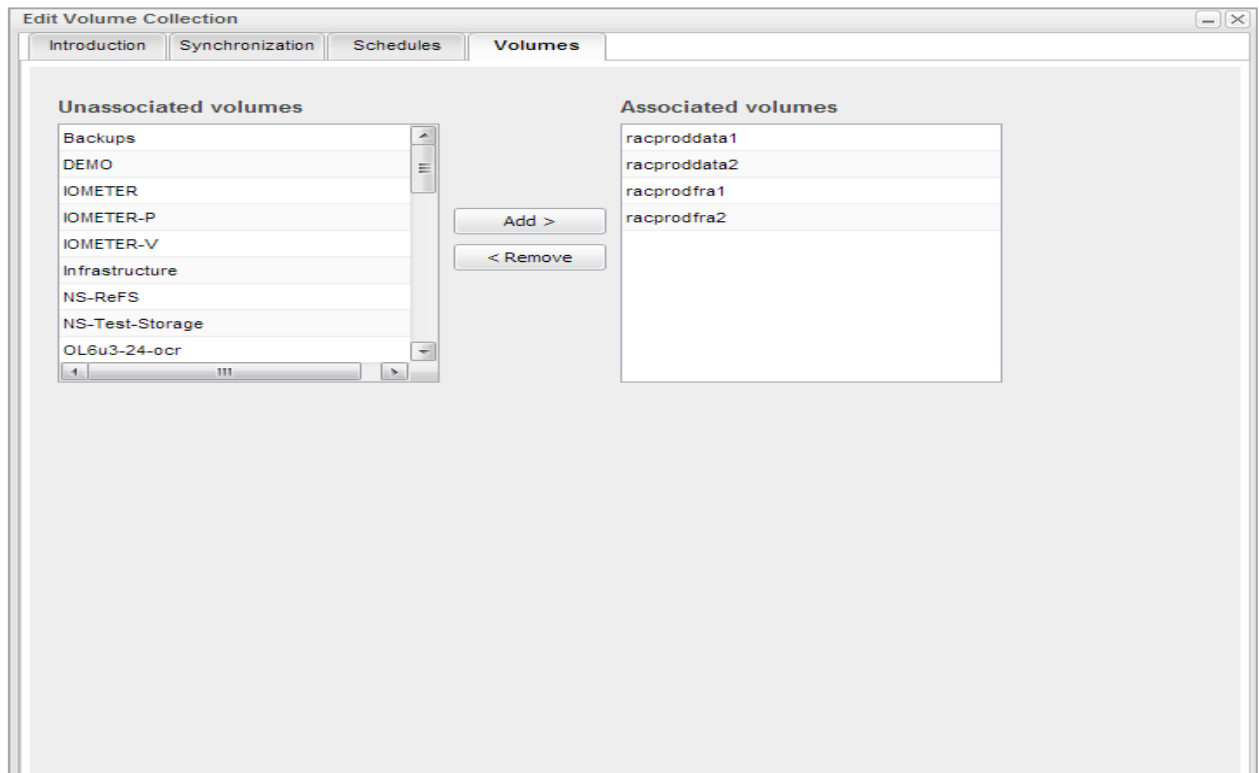
Number of snapshots to retain on the replica: 24

Alert if replication not complete in: 24:00 HH:MM

Add another Schedule

Back Next Finish Cancel

- Select the appropriate Oracle volumes and click on the “Add” button. Click “Finish” when complete. It should look something similar to this.



Testing Disaster Recovery

Once replication has been setup and snapshots have been taken and replicated, proceed to testing Oracle DR by creating zero-copy clones from the snapshots on the destination (downstream) array. The steps below show an example of how to recover an Oracle ASM database on the destination array.

Prerequisite

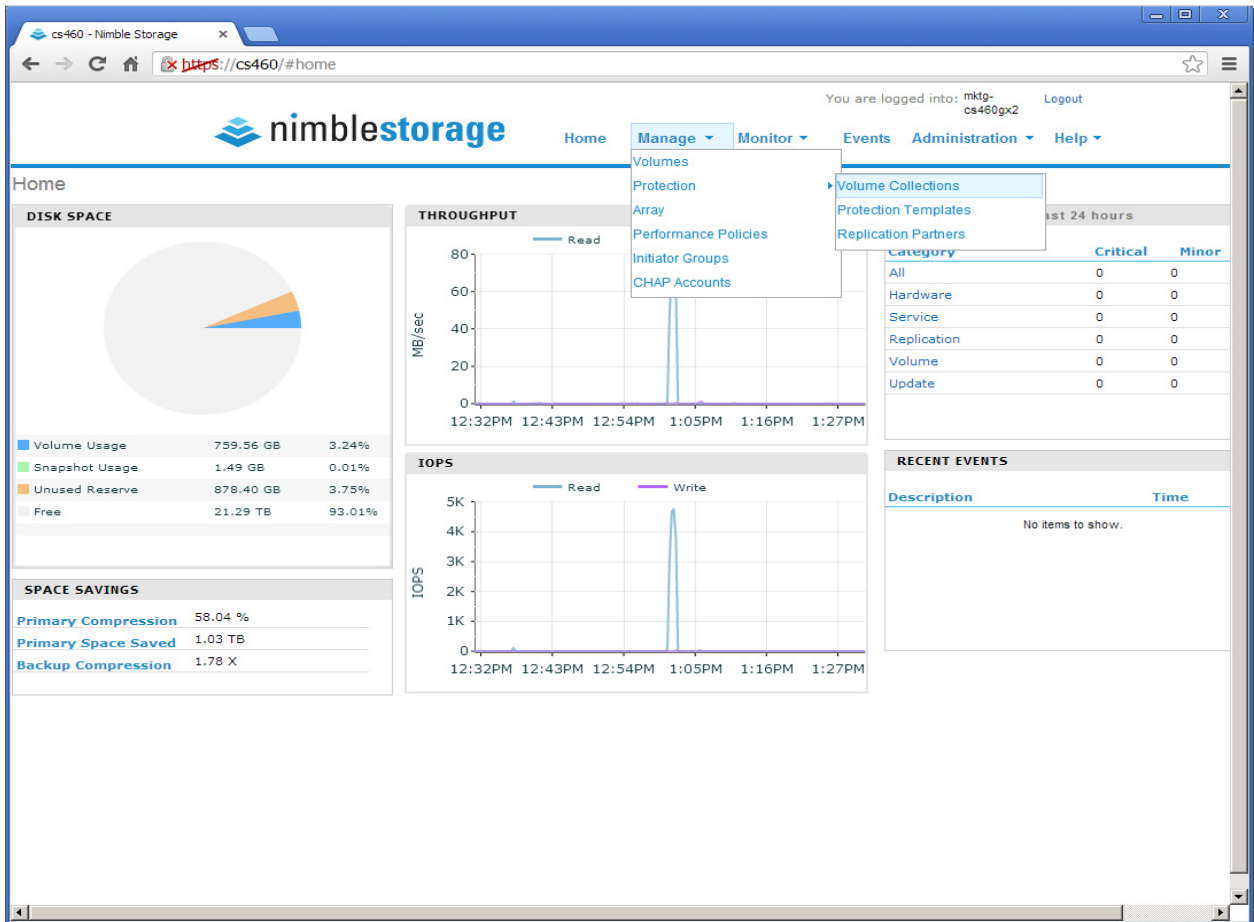


Note: Before creating a zero-copy clone from an available snapshot on the destination array, the DR host must have the following configured:

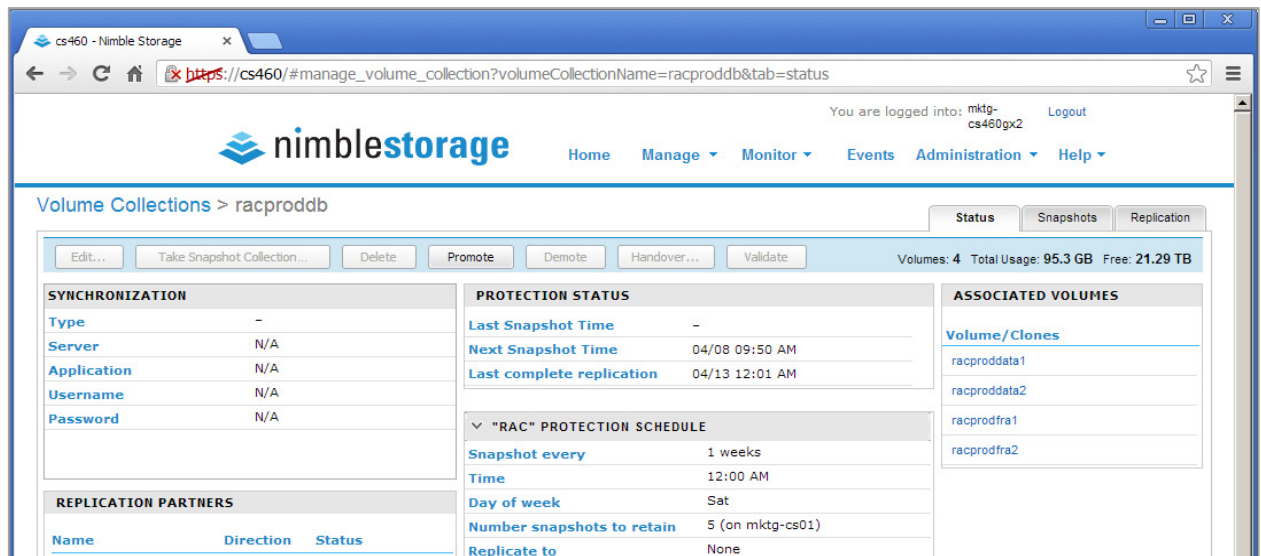
- Operating System installed
- Oracle ASM instance must be running
- Directories such as adump, dpdump, hdump, pfile must be created under \$ORACLE_BASE/admin/\$ORACLE_SID
- Production spfile and Oracle password file along with any other needed files must be copied to the DR host

Create Zero-Copy Clones on the Destination Array

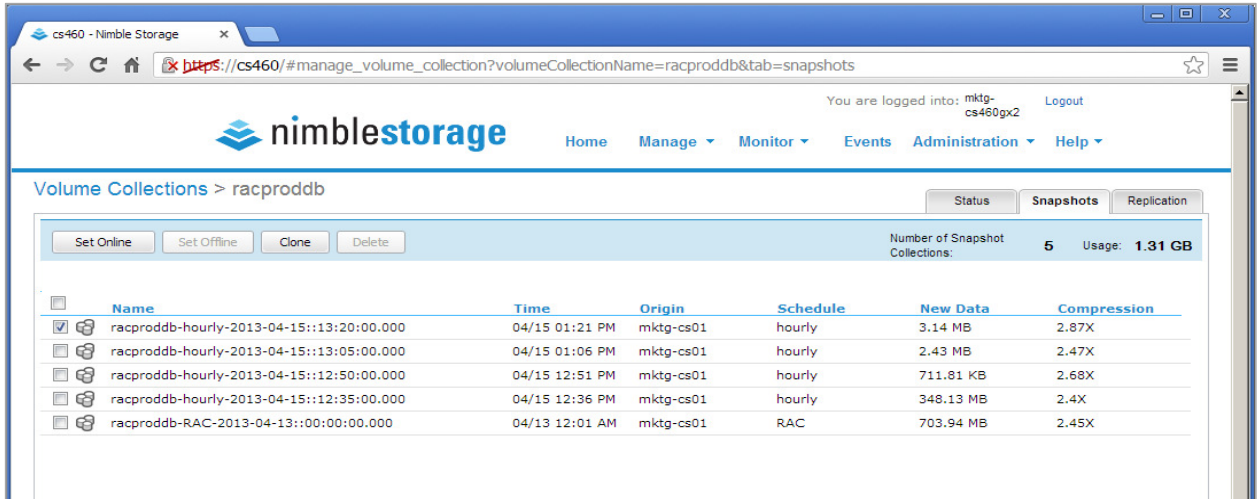
- Launch the Nimble GUI on the destination array
- Go to “Manage”, “Protection” and select “Volume Collection” button



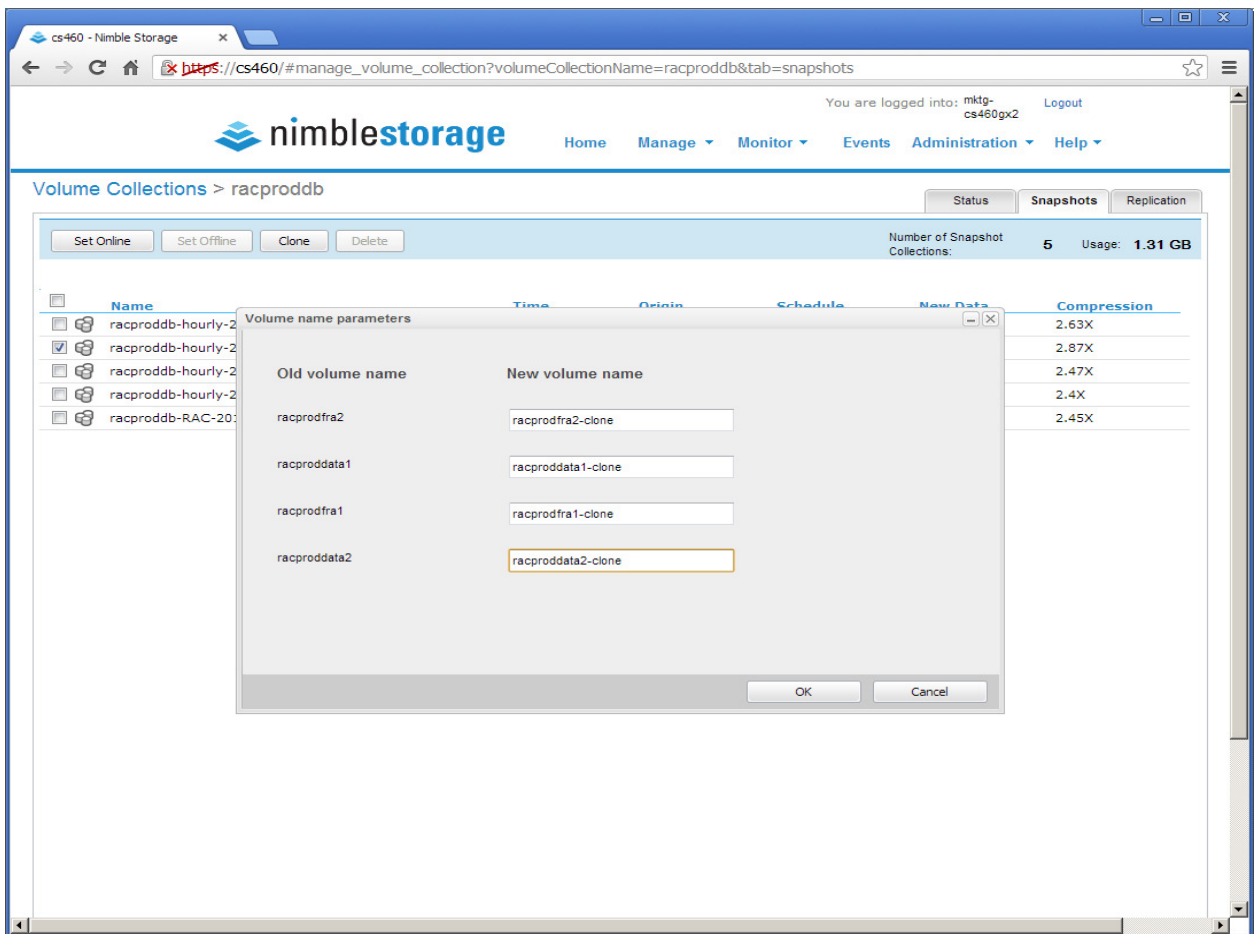
- Click on the “racproddb” volume collection name










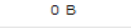



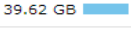



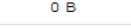



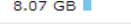



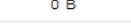



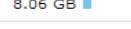



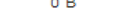
- On the right of the screen, click on the “snapshot” tab and select the appropriate snapshot for your clone.



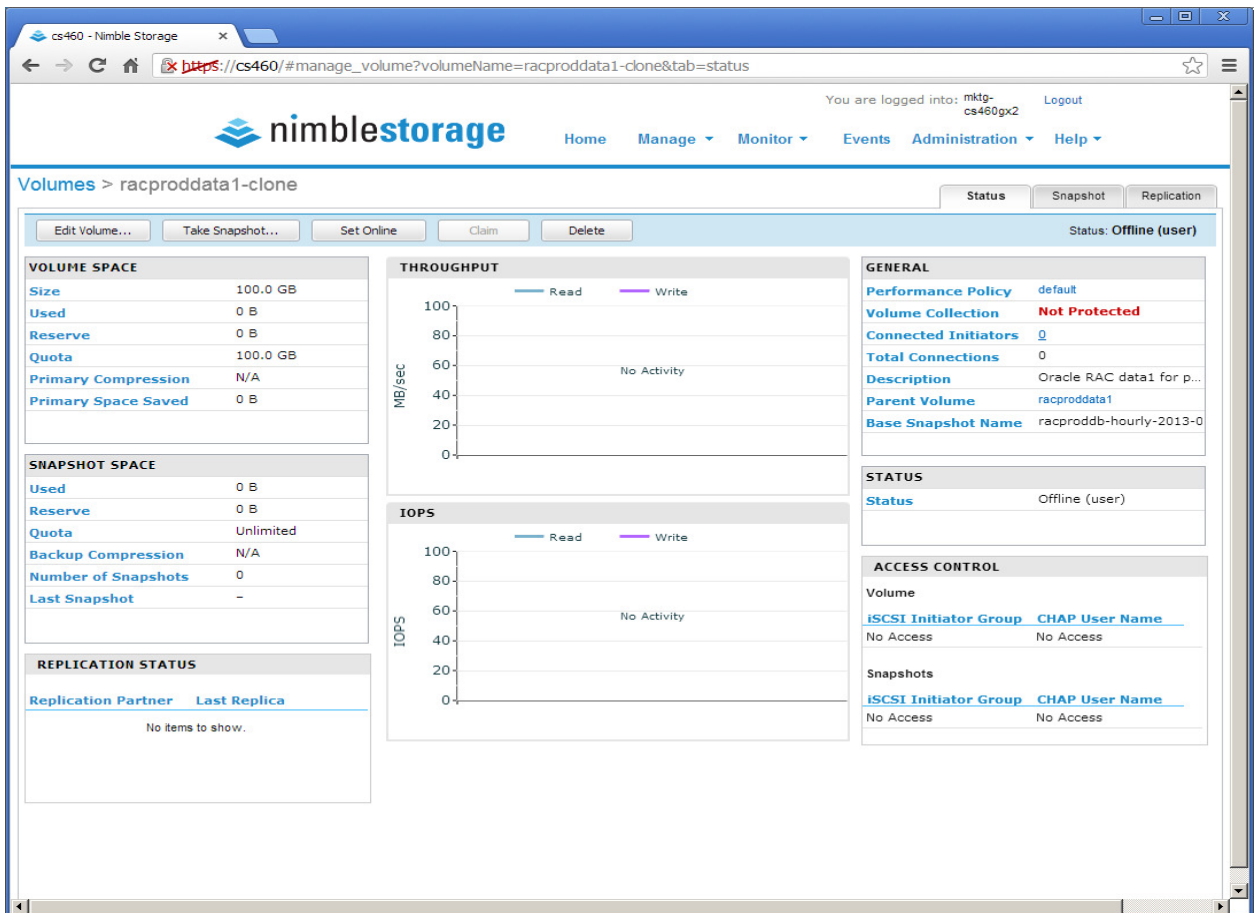
- Click on the “clone” button and a window appears with all the volumes belong to that volume collection. Enter the names for the cloned volumes and click the “OK” button.



- Go back to the “Volumes” screen by clicking on “Manage” then “Volumes”. The cloned volume would look something similar to this.

 racproddata1	100.0 GB	39.34 GB		217.92 MB		39.56 GB	
 racproddata1-clone	100.0 GB	0 B		0 B		0 B	
 racproddata2	100.0 GB	39.42 GB		204.38 MB		39.62 GB	
 racproddata2-clone	100.0 GB	0 B		0 B		0 B	
 racprodfra1	50.0 GB	7.62 GB		462.33 MB		8.07 GB	
 racprodfra1-clone	50.0 GB	0 B		0 B		0 B	
 racprodfra2	50.0 GB	7.61 GB		460.79 MB		8.06 GB	
 racprodfra2-clone	50.0 GB	0 B		0 B		0 B	

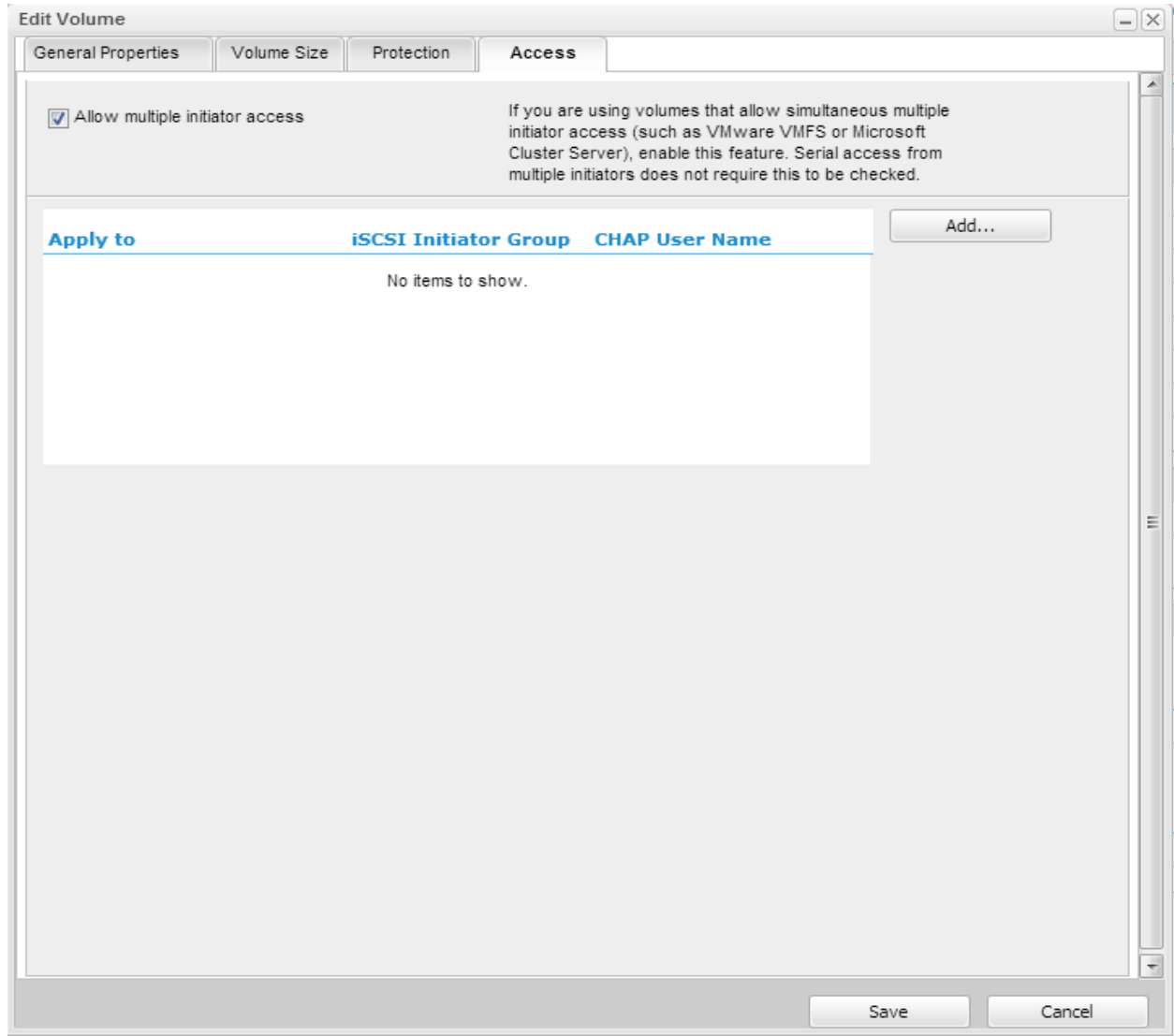
- Present the cloned volumes to the DR server by clicking on each of the cloned volumes.
- For example, click on the first volume “racproddata1-clone”.



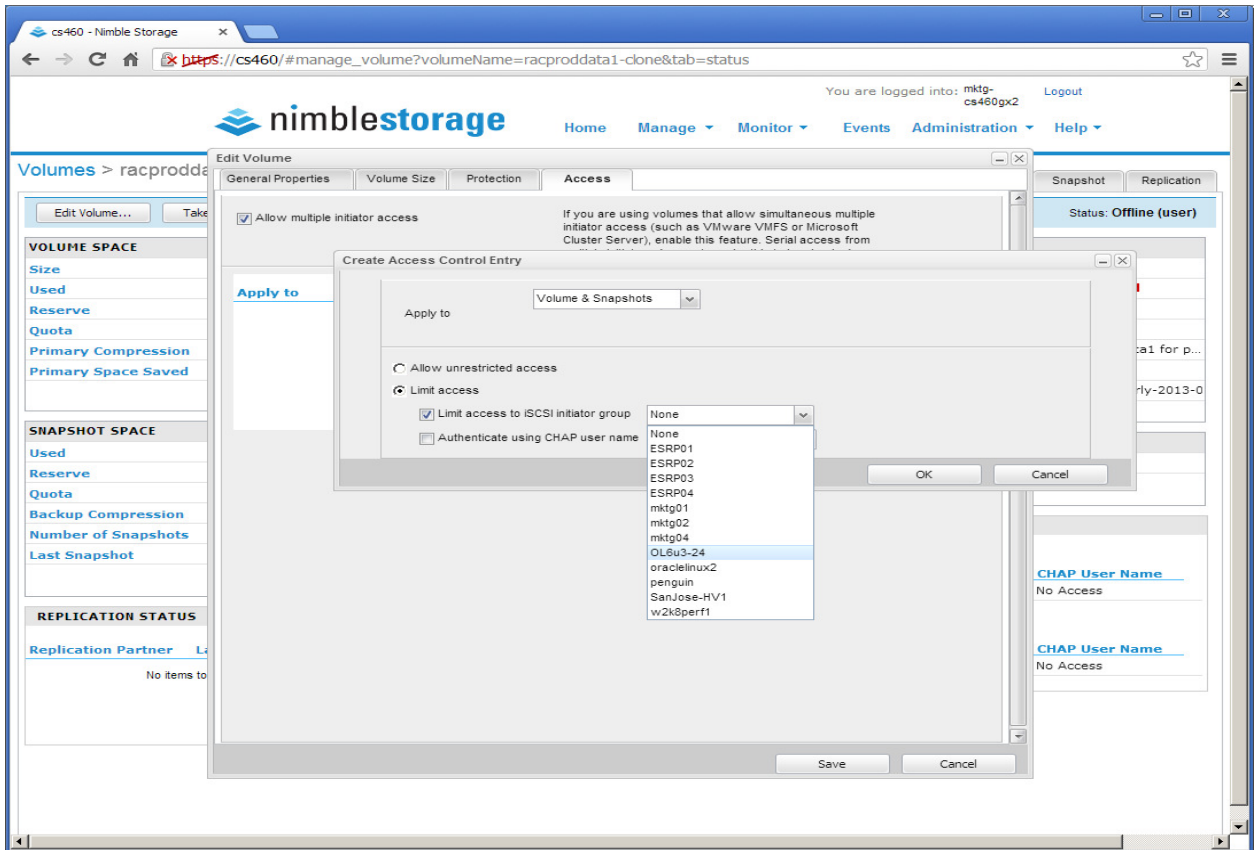
The screenshot shows the Nimble Storage web interface for the volume 'racproddata1-clone'. The interface includes a navigation bar with 'Home', 'Manage', 'Monitor', 'Events', 'Administration', and 'Help'. The main content area displays the volume's status as 'Offline (user)' and provides detailed information across several sections:

- VOLUME SPACE:** Size 100.0 GB, Used 0 B, Reserve 0 B, Quota 100.0 GB, Primary Compression N/A, Primary Space Saved 0 B.
- SNAPSHOT SPACE:** Used 0 B, Reserve 0 B, Quota Unlimited, Backup Compression N/A, Number of Snapshots 0, Last Snapshot -.
- REPLICATION STATUS:** Replication Partner Last Replica, No items to show.
- THROUGHPUT:** Graph showing Read and Write activity in MB/sec, currently at 0.
- IOPS:** Graph showing Read and Write activity in IOPS, currently at 0.
- GENERAL:** Performance Policy default, Volume Collection Not Protected, Connected Initiators 0, Total Connections 0, Description Oracle RAC data1 for p..., Parent Volume racproddata1, Base Snapshot Name racproddb-hourly-2013-0.
- STATUS:** Status Offline (user).
- ACCESS CONTROL:** Volume details, iSCSI Initiator Group CHAP User Name, No Access, No Access.

- Click on the “Edit Volume...” button and select the “Access” tab and click on the “Add...” button.



- The “Create Access Control Entry” window appears. Select the “Limit access to iSCSI initiator group” radio button and click the drop-down box to select the DR server then click “OK”.



- After all cloned volumes have been presented to the DR server, set the cloned volumes online.
- Proceed to scanning the cloned volumes on the DR host and mounting the ASM diskgroups and then start the database.



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