

Veritas Storage Foundation™ for Oracle Graphical User Interface Guide

AIX, HP-UX, Linux, Solaris

5.0

Veritas Storage Foundation™ for Oracle Graphical User Interface Guide

The software described in this book is furnished under a license agreement and may be used only in accordance with the terms of the agreement.

Documentation version 5.0

PN: N18467C

Legal Notice

Copyright © 2006 Symantec Corporation.

All rights reserved.

Federal acquisitions: Commercial Software - Government Users Subject to Standard License Terms and Conditions.

Symantec, the Symantec Logo, Veritas, and Veritas Storage Foundation are trademarks or registered trademarks of Symantec Corporation or its affiliates in the U.S. and other countries. Other names may be trademarks of their respective owners.

Third-party software may be recommended, distributed, embedded, or bundled with this Symantec product. Such third-party software is licensed separately by its copyright holder. All third-party copyrights associated with this product are listed in the accompanying release notes.

Oracle is a registered trademark of Oracle Corporation.

Windows is a registered trademark of Microsoft Corporation.

Veritas Storage Foundation™ is a licensed product. See the Veritas Storage Foundation™ Installation Guide for license installation instructions.

The product described in this document is distributed under licenses restricting its use, copying, distribution, and decompilation/reverse engineering. No part of this document may be reproduced in any form by any means without prior written authorization of Symantec Corporation and its licensors, if any.

THE DOCUMENTATION IS PROVIDED "AS IS" AND ALL EXPRESS OR IMPLIED CONDITIONS, REPRESENTATIONS AND WARRANTIES, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR NON-INFRINGEMENT, ARE DISCLAIMED, EXCEPT TO THE EXTENT THAT SUCH DISCLAIMERS ARE HELD TO BE LEGALLY INVALID. SYMANTEC CORPORATION SHALL NOT BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES IN CONNECTION WITH THE FURNISHING PERFORMANCE, OR USE OF THIS DOCUMENTATION. THE INFORMATION CONTAINED IN THIS DOCUMENTATION IS SUBJECT TO CHANGE WITHOUT NOTICE.

The Licensed Software and Documentation are deemed to be "commercial computer software" and "commercial computer software documentation" as defined in FAR Sections 12.212 and DFARS Section 227.7202.

Symantec Corporation 20330 Stevens Creek Blvd. Cupertino, CA 95014 USA

<http://www.symantec.com>

Technical Support

For technical assistance, visit <http://support.veritas.com> and select phone or email support. Use the Knowledge Base search feature to access resources such as TechNotes, product alerts, software downloads, hardware compatibility lists, and our customer email notification service.

Contents

Chapter 1	Using the VERITAS Storage Foundation for Oracle graphical user interface	
	About GUI components	9
	About GUI functions	13
	Using Veritas Enterprise Administrator Service	14
	Adding users to the Veritas Enterprise Administrator	15
	Removing users from the Veritas Enterprise Administrator	19
	Starting the Veritas Enterprise Administrator Service	21
	Shutting down the Veritas Enterprise Administrator Service	22
	Starting the DBED agent	23
	Stopping the DBED agent	23
	Opening and closing the Veritas Storage Foundation for Oracle GUI	23
	Opening the Veritas Storage Foundation for Oracle Java GUI from a UNIX client	24
	Opening the Veritas Storage Foundation for Oracle Java GUI from a Windows client	25
	Opening the Veritas Storage Foundation for Oracle Web GUI	25
	Closing the Veritas Storage Foundation for Oracle Java GUI	25
	Closing the Veritas Storage Foundation for Oracle Web GUI	25
	Performing tasks in the Veritas Storage Foundation for Oracle Java GUI	26
	Accessing database management tasks in the Java GUI	26
	Accessing clone database tasks in the Java GUI	27
	Accessing Storage Checkpoint tasks in the Java GUI	27
	Accessing FlashSnap tasks in the Java GUI	28
	Accessing tiered storage tasks in the Java GUI	29
	Accessing scheduled tasks in the Java GUI	31
	Accessing system maintenance tasks in the Java GUI	32
	Performing tasks in the Storage Foundation for Oracle Web GUI	34
	Accessing database management tasks in the Web GUI	34
	Accessing database tasks in the Web GUI	35
	Accessing system maintenance tasks in the Web GUI	36

Chapter 2 Managing your database

Database management tasks in the Veritas Storage Foundation for Oracle GUI	39
About setting up a disk group	41
Disk group configuration guidelines	41
About selecting a volume layout	42
How to choose appropriate stripe unit sizes	42
How to choose between mirroring and RAID-5	43
Volume configuration guidelines	43
File system creation guidelines	44
Controlling fragmentation	45
Fragmentation utilities in VxFS	45
Types of fragmentation	45
Starting an Oracle database instance	46
Starting an Oracle snapshot database instance	46
Shutting down an Oracle database instance	47
Restarting an Oracle database instance	49

Chapter 3 Using a clone database

Creating a clone database	51
Creating a clone database using Checkpoints	51
Creating a clone database using Database FlashSnap	52
Creating a new snapplan for a clone database	53
Validating or modifying a snapplan for a clone database	54
Creating snapshot for a clone database	55
Start up snapshot for a clone database	57
Create snapshot for clone database	58
Removing a clone database	59
Removing a Storage Checkpoint clone database	60
Removing a database snapshot clone database	60

Chapter 4 Managing Storage Checkpoints

About Storage Checkpoints	63
Creating a Storage Checkpoint	64
Viewing Storage Checkpoint details	65
Mounting a Storage Checkpoint	65
Unmounting a Storage Checkpoint	66
Removing a Storage Checkpoint	67
Rolling back to a Storage Checkpoint	68
Rolling back the database to a Storage Checkpoint	68
Rolling back a tablespace to a Storage Checkpoint	70

	Rolling back datafiles to a Storage Checkpoint	71
Chapter 5	Managing snapshots using Database FlashSnap	
	Database FlashSnap in the GUI	73
	Creating a snapplan	74
	Validating or modifying a snapplan	76
	Removing a snapplan	78
	Creating a snapshot	78
	Creating a clone database with a snapshot	81
	Resynchronizing a snapshot to a database	82
	Resynchronizing a database to a snapshot	83
	Aborting the reverse resynchronization operation	84
	Viewing the snapplan log	85
Chapter 6	Tiering storage for databases	
	About Database Dynamic Storage Tiering in the GUI	87
	Setting up Database Dynamic Storage Tiering parameters	88
	Setting up Database Dynamic Storage Tiering parameters	88
	Identifying tiered storage directories	90
	Classifying volumes	91
	Setting automatic policies for Database Dynamic Storage Tiering	91
	Listing policies	97
	Presetting policy	92
	Setting archive log policy	93
	Setting flashback policy	93
	Setting external files policy	94
	Moving volumes and files	95
	Moving tablespaces	95
	Moving datafiles	95
	Moving table partitions	96
	Getting reports for Database Dynamic Storage Tiering	96
	Listing policies	97
	Showing activities	97
	Showing volume usage	97
	Starting and stopping datafile statistics collection	98
	Showing statistics chart	99
Chapter 7	Automating database tasks	
	About automating tasks using the Java GUI scheduler	101
	Adding a scheduled task	102
	Viewing scheduled jobs	102

Modifying a scheduled job task	103
Automating creation of a database checkpoint	104
Automating creation of a database snapshot	104
Automating cloning of a database using a checkpoint	105
Automating cloning of a database using FlashSnap	105
Set the schedule parameters for an automated task	106

Chapter 8 Maintaining your system configuration

System configuration maintenance	109
Resynchronizing the SFDB repository	110
Rescanning the database instance	110
Displaying and rescanning tablespace information	110
Viewing Storage Mapping	111
Viewing I/O statistics	111
Determining the datafile file type	112
Converting regular datafiles to Quick I/O Files	112
Converting Quick I/O files to regular datafiles	113
Updating rescan intervals	113
Checking your system configuration	114
Saving the system configuration	116

Appendix A Veritas Database FlashSnap status information

Obtaining database FlashSnap snapshot status and database status	
from the GUI	117
Database FlashSnap snapshot status details	117
Snapshot database status details	122

Appendix B Accessibility and Veritas Storage Foundation for Oracle

About Veritas Storage Foundation for Oracle accessibility	123
Keyboard conventions	124
Keyboard navigation in the GUI	125
Keyboard navigation and shortcuts in Veritas Storage foundation for	
Oracle	127
General keyboard navigation within the GUI	129
Keyboard shortcuts	131
Keyboard navigation	132
Menu hot keys	132
Support for accessibility settings and assistive technologies	136

Index

Using the VERITAS Storage Foundation for Oracle graphical user interface

This chapter includes the following topics:

- [About GUI components](#)
- [About GUI functions](#)
- [Using Veritas Enterprise Administrator Service](#)
- [Starting the DBED agent](#)
- [Stopping the DBED agent](#)
- [Opening and closing the Veritas Storage Foundation for Oracle GUI](#)
- [Performing tasks in the Veritas Storage Foundation for Oracle Java GUI](#)
- [Performing tasks in the Storage Foundation for Oracle Web GUI](#)

About GUI components

You can access Veritas Storage Foundation for Oracle, Veritas Volume Manager, and Veritas File System functions through the Veritas Storage Foundation for Oracle graphical user interface (GUI). Veritas Storage Foundation for Oracle, supports a Java GUI and Web version of the Veritas Enterprise Administrator.

The graphical user interfaces (GUI) enable you to perform storage management duties for Oracle, such as monitoring the database, using Storage Checkpoints and Storage Rollback, and file system space planning.

The GUI runs in a client-server environment. The server is located on a host that runs Veritas Storage Foundation for Oracle. The client can run on any UNIX platform, Windows NT, Windows 98, Windows 2000, Windows Me, and Windows XP machine that supports the Java Runtime Environment.

Within the Java GUI, you can perform tasks from the main menu bar or you can right-click an object in the navigational pane on the left side of the screen.

Within the Web GUI, you can perform tasks from the main menu bar or you can select an option in the task lists on the left side of the screen.

Figure 1-1 Veritas Storage Foundation for Databases Java GUI

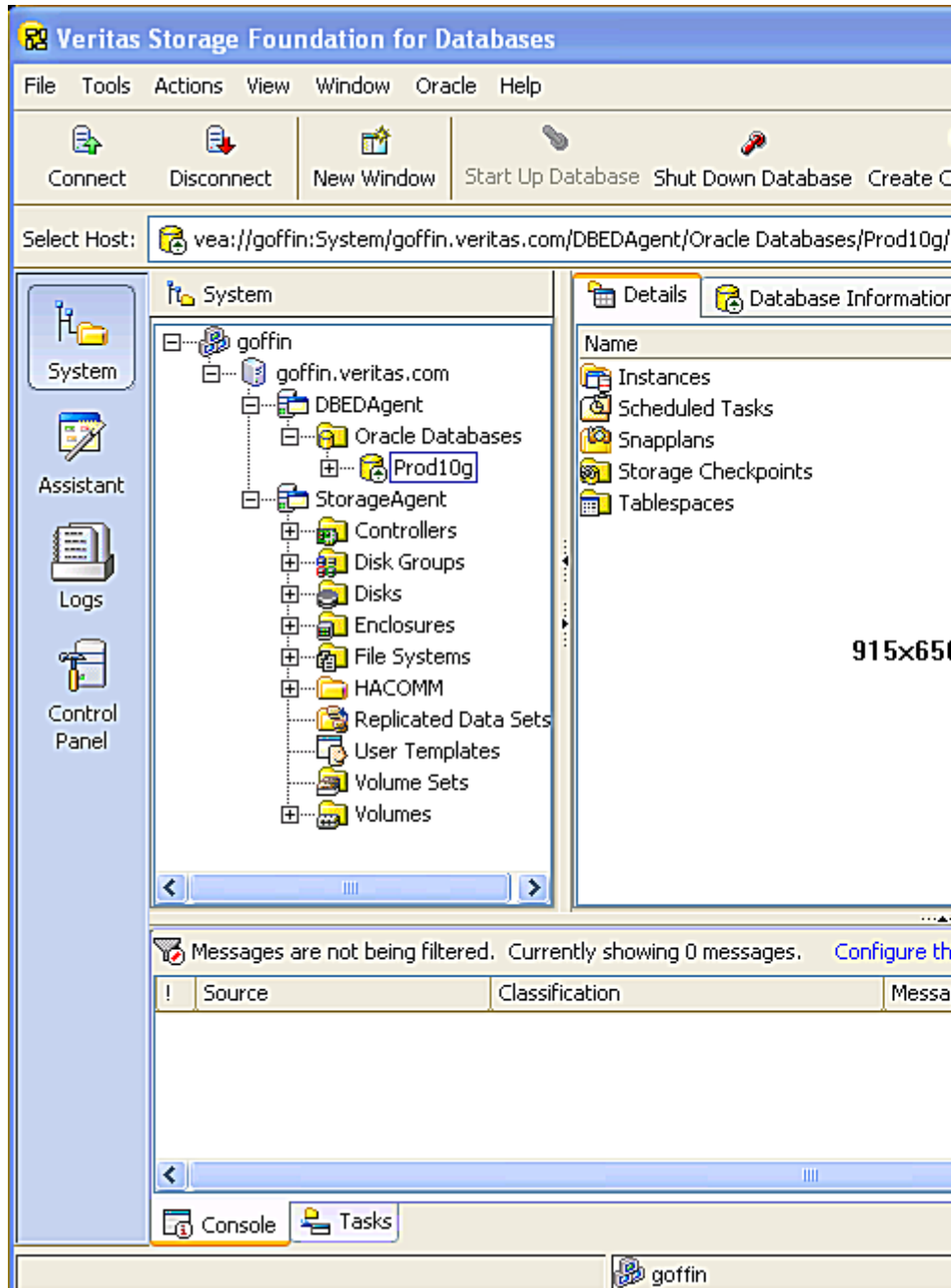
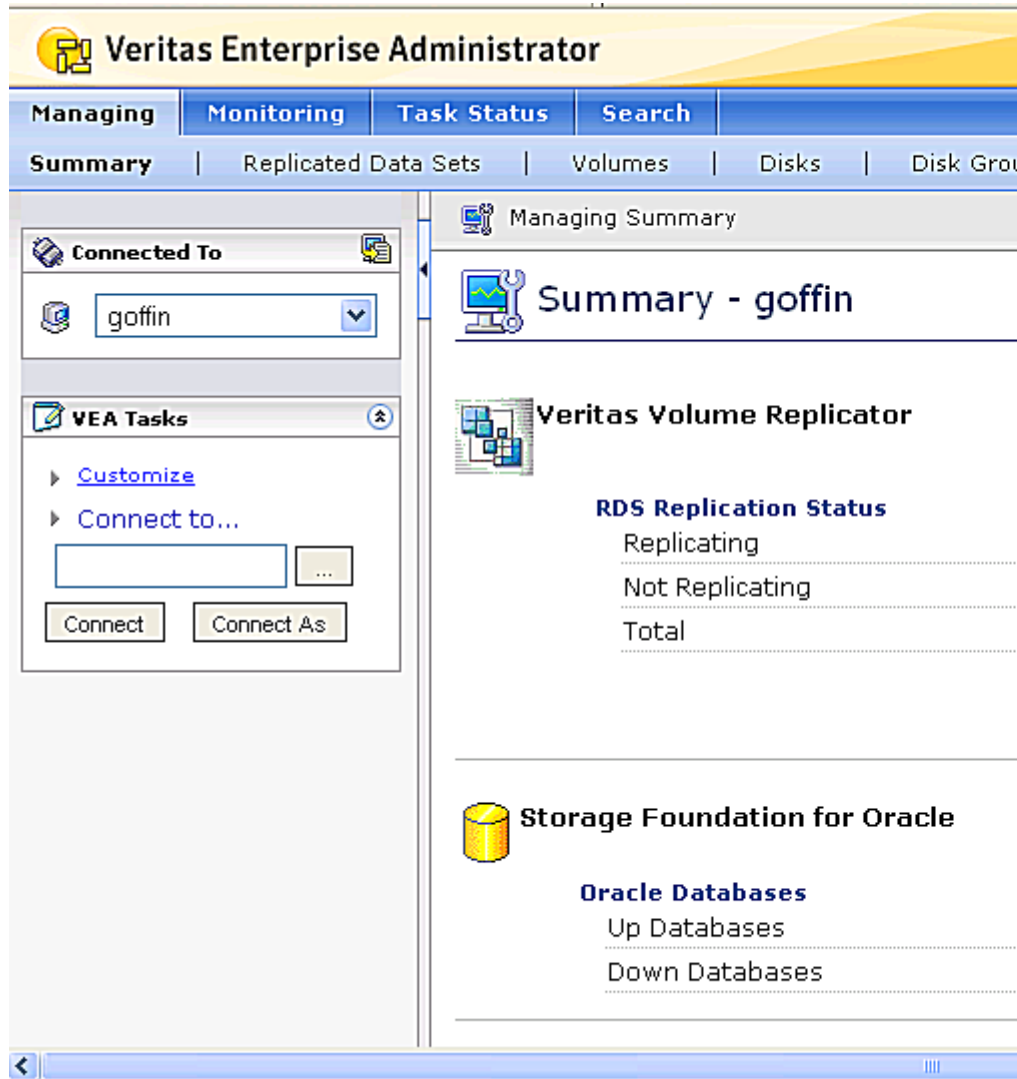


Figure 1-2 Veritas Storage Foundation for Databases Web GUI



Sections of the main window for the Java GUI:

- **Menu bar:** enables you to perform various SFDB operations. The options in the Menu Bar vary according to the object in the object tree that you have selected. To access online help from the Menu Bar, click **Help > Contents**.
- **Tool bar:** provides shortcuts to various operations available in the Menu Bar. The Tool Bar is icon-based and dynamically changes when you select something

from the Object Tree. When you use your mouse to point at an icon, a description of the icon appears.

- **Information tabs:** enable you to view different information about the same object in the Object Tree. For example, if you are viewing details about a database, you can click a different tab to view different information about that database.
- **Object tree:** is a dynamic hierarchical display of Veritas Storage Foundation for Oracle DBED agent, Veritas Volume Manager, and Veritas File System objects, Storage agent, and other objects on the system.
- **Status fields:** indicate the status of the object you are viewing. To change your view, click one of the Information Tabs at the top of the window.
- **GUI status area:** displays GUI status, which is provided through Veritas Enterprise Administrator. See the Veritas Enterprise Administrator documentation for more information.
- **Host Information bar:** enables you to toggle between different server connections.

Within the GUI, options that are not available are display the same as other options. When you click a task that is not available to you, an "Access denied" error displays. Pointing to an object on the screen displays a description of the object in a pop-up field.

Sections of the Summary page for the Web GUI:

- **Managing menu bar:** provides shortcuts to various operations available.
- **Summary menu bar:** provides shortcuts to various summary pages available.
- **Task lists:** provide drop down lists of task options available in each page. Generally these are located in the left pane of summary pages.
- **Connected to:** enables you to toggle between different server connections.

About GUI functions

The Java GUI enables you to perform many storage management tasks for Oracle. The tasks that you can perform dynamically from the main menu bar and pop-up menu depend on what is highlighted on the object tree. For example, if you have the instance or database highlighted in the tree, you can open it from the Oracle menu.

The Web GUI provides summary pages enabling you to perform tasks from the drop down lists.

To access the GUI functions:

- Your user or group name must be added to the Veritas Enterprise Administrator (VEA) Authorization Database (AZDB). To make the necessary changes:
- Some operations require that you must be logged in as `root`. Please read all “Prerequisites” and “Usage notes” before starting a procedure.

GUI functionality includes:

- **Storage Checkpoint Management**
You can create and roll back to Storage Checkpoints. You can also mount, unmount, and remove Storage Checkpoints. Storage Checkpoints can be used to clone the database.
- **Database FlashSnap**
Database FlashSnap functionality is available through the GUI. With Database FlashSnap, you can create online or offline snapshots of your database, which can be used as backups. You can also use these snapshots to recover your database if it becomes corrupt.
- **Database Dynamic Tiered Storage**
You can set up tiered storage parameters and policy using the GUI. With tiered storage set up, you can move files and volumes, set policy for automated movement, and get reports on storage.
- **Automatic scheduling**
The automated scheduler functions can be set up using the GUI. You can schedule automated checkpoints and snapshots.
- **System configuration and maintenance**
You can view storage topology and storage statistic information. You can also check and save your system configuration to a file. In a Solaris, AIX, or HP-UX environment, you can convert datafiles to or from Quick I/O files. The Quick I/O feature is not available on Linux.
- **Rescan System Information**
You can rescan, or refresh, your system information, such as instances, databases, and tablespaces. You can also determine the rescan intervals so that automatic rescans happen as regularly as you determine.

Using Veritas Enterprise Administrator Service

To use the Veritas Storage Foundation for Oracle GUI, the DBED agent must be running on the server. The Veritas Enterprise Administrator (VEA) Service is started when you install the software.

- Prerequisites
- Use the `/opt/VRTS/bin/vxdbedusr` utility to create login names for any user, other than `root`, who needs to run the GUI. To run `/opt/VRTS/bin/vxdbedusr`, you must have superuser (`root`) privileges. For more information: See [“Adding users to the Veritas Enterprise Administrator”](#) on page 15.
 - You must have superuser (`root`) privileges to execute the `vxsvctrl` command.
 - Before you can manage the database(s) through the GUI, you must update the database at least once on each database. To update the database, use the `dbed_update` command.
 - You must have superuser (`root`) privileges to run the `startup.sh` command.

Adding users to the Veritas Enterprise Administrator

You may want to add users to the VEA authorization Database (AZDB) to allow access to the interface to users other than `root`. You also have the option to give database administrators `root` privileges.

Having `root` privileges means that you can access the operations for volume, disk, and file system objects in the system. Use the commands in the table to add users.

Web GUI users must have a user account on the VEA authorization Database (AZDB) as well as a user profile on the Web server to access the Web GUI version of the Veritas Enterprise Services.

<code>-a</code>	Adds a user or group to the registry.
<code>user -n user_name</code>	Specifies the user to be added.
<code>group -n group_name</code>	Specifies the group to be added.
<code>-A</code>	Grants the user <code>root</code> access, making all SF Oracle, Veritas File System, and Veritas Volume Manager objects accessible. If the <code>-A</code> is not specified, the user or group will not be able to perform any Veritas Volume Manager or Veritas File System functions, and will not be able to access Storage Foundation for Oracle.
<code>-f</code>	Allows the user access to the GUI if the user's primary group is different than the <code>/opt/VRTSdbedgroup</code> owner.

<code>-h fully_qualified_host_name</code>	Specifies a fully qualified host name on which you want to add a user. For a stand alone installation, the command is run on the local host and the host name is optional. For a centrally managed server installation, you must be logged in as <code>root</code> and specify the host name.
<code>-d domain_name</code>	Specifies the domain to which the user belongs. By default the domain is the host name specified with <code>-h</code> .
<code>-t domain_type</code>	Specifies the type of domain to which the user belongs. Valid values are <code>nis</code> , <code>nisplus</code> , <code>ldap</code> , <code>unixpwd</code> , and <code>gssapi</code> . By default the domain type is assumed to be a UNIX login.

To add users other than root to the Veritas Enterprise Administrator AZDB

- 1 If you installed packages manually, make sure that the GUI package was installed.

OS	Command
AIX	<code>lspp -L VRTSorgui</code>
HP-UX	<code>swlist grep VRTSorgui</code>
Linux	<code>rpm -qi VRTSorgui -common</code>
Solaris	<code>pkginfo -l VRTSorgui</code>

- 2 Check if VxSVC is online. Bring it online if it is offline.

```
# /opt/VRTSob/bin/vxsvcctl status  
# /opt/VRTSob/bin/vxsvcctl start
```


- 3** To give `root` privileges within the GUI to the database administrator, use the `vxdbedusr` command:

```
# /opt/VRTS/bin/vxdbedusr -a user [-A] [-f] -n user_name  
[-h fully_qualified_host_name -d domain_name -t domain_type]
```

See the table for command usage details. For example:

To add a database administrator with the name “oracle” as a user with `root` privileges, enter:

```
# /opt/VRTS/bin/vxdbedusr -a user -A -f -n oracle
```

To add a UNIX user with the name “oracle” into a stand alone installation:

```
# /opt/VRTS/bin/vxdbedusr -a user -n oracle -h test.example.com
```

To add an NIS user with the name “oracle” in `example.com` domain with a centrally managed server installation of VEA:

```
# /opt/VRTS/bin/vxdbedusr -a user -n oracle -h test.example.com  
-d test.example.com -t nis
```

- 4 To add a user without `root` privileges, use the `vxdbedusr` command:

```
# /opt/VRTS/bin/vxdbedusr -a user -n user_name
```

See the table for command usage details. For example:

To add "oracle" as a user, enter:

```
# /opt/VRTS/bin/vxdbedusr -a user -n oracle
```

- 5 To add a group to the AZDB, use the `vxdbedusr` command:

```
# /opt/VRTS/bin/vxdbedusr -a group [-A] [-f] -n group_name  
[-h fully_qualified_host_name -d domain_name -t domain_type]
```

See the table for command usage details. For example:

To add group "dba" to the AZDB on the local host:

```
# /opt/VRTS/bin/vxdbedusr -a group -A -f -n dba
```

To add UNIX group "dba" to the AZDB on the local host:

```
# /opt/VRTS/bin/vxdbedusr -a group -A -f -n dba -h test.example.com
```

To add NIS group "dba" to the centrally managed server installation of VEA:

```
# /opt/VRTS/bin/vxdbedusr -a group -A -f -n dba -h test.example.com -d exam
```

To add a user profile to the Web server

- 1 Create the user name and password on the Veritas Enterprise Administrator AZDB.
See ["To add users other than root to the Veritas Enterprise Administrator AZDB"](#) on page 16.
- 2 Use your browser to connect to the Web server at `https://host:8443/VEAWeb/Login`.
See ["Opening and closing the Veritas Storage Foundation for Oracle GUI"](#) on page 23.
- 3 Select the **Create Profile** option.
- 4 Enter the user name and password. Confirm the password.
- 5 Click **Create Profile**.

Removing users from the Veritas Enterprise Administrator

You may need to restrict access to the VEA authorization database (AZDB). You can remove users or user groups from the AZDB if they have been previously added. Use the commands in the table to remove users.

<code>-r</code>	Removes a user or group to the registry.
<code>user -n user_name</code>	Specifies the user to be added.
<code>group -n group_name</code>	Specifies the group to be added.
<code>-A</code>	Grants the user <code>root</code> access, making all SF Oracle, Veritas File System, and Veritas Volume Manager objects accessible. If the <code>-A</code> is not specified, the user or group will not be able to perform any Veritas Volume Manager or Veritas File System functions, and will not be able to access Storage Foundation for Oracle.
<code>-f</code>	Allows the user access to the GUI if the user's primary group is different than the <code>/opt/VRTSdbedgroup</code> owner.
<code>-h fully_qualified_host_name</code>	Specifies a fully qualified host name on which you want to add a user. For a stand alone installation, the command is run on the local host and the host name is optional. For a centrally managed server installation, you must be logged in as <code>root</code> and specify the host name.
<code>-d domain_name</code>	Specifies the domain to which the user belongs. By default the domain is the host name specified with <code>-h</code> .
<code>-t domain_type</code>	Specifies the type of domain to which the user belongs. Valid values are <code>nis</code> , <code>nisplus</code> , <code>Idap</code> , <code>unixpwd</code> , and <code>gssapi</code> . By default the domain type is assumed to be a UNIX login.

You cannot remove `root` from the VEA Service console registry.

To remove users other than root from the Veritas Enterprise Administrator AZDB

- 1** Make sure that the optional GUI package was installed.

OS	Command
AIX	lspp -L VRTSorgui
HP-UX	swlist grep VRTSorgui
Linux	rpm -qi VRTSorgui -common
Solaris	pkginfo -l VRTSorgui

- 2** Check if VxSVC is online. Bring it online if it is offline.

3 To remove a user, use the `vxdbedusr` command as follows.

```
# /opt/VRTS/bin/vxdbedusr -r user -n user_name  
[-h fully_qualified_host_namee -d domain_name -t domain_type]
```

See the table for command usage details. For example:

To remove the user “oracle” from the local host, enter:

```
# /opt/VRTS/bin/vxdbedusr -r user -n oracle
```

To remove a UNIX login “oracle” from the local host, enter:

```
# /opt/VRTS/bin/vxdbedusr -r user -n oracle -h test.example.com
```

To remove a NIS login “oracle” in domain example.com into the centrally managed server install of VEA enter:

```
# /opt/VRTS/bin/vxdbedusr -r user -n oracle -h test.example.com -d exampl
```

4 To remove a group use the `vxdbedusr` command.

```
# /opt/VRTS/bin/vxdbedusr -r group -n group_name
```

See the table for command usage details. For example:

To remove the group “dba” from the local host, enter:

```
# /opt/VRTS/bin/vxdbedusr -r group -n dba
```

To remove UNIX group "dba" from the local host,;

```
# /opt/VRTS/bin/vxdbedusr -r group -A -f -n dba -h test.example.com
```

To remove NIS group "dba" from the centrally managed server installation of VEA:

```
# /opt/VRTS/bin/vxdbedusr -r group -A -f -n dba -h test.example.com -d e
```

Starting the Veritas Enterprise Administrator Service

The DBED agent and VEA Service must be running before you access the Veritas Storage Foundation for Oracle GUI. You may need to start VEA manually.

To manually start Veritas Enterprise Administrator Service

1 Verify the status of the VEA Service:

```
# /opt/VRTSob/bin/vxsvcctl status  
  
Current state of server : NOT RUNNING
```

2 Start the VEA Service:

```
# /opt/VRTSob/bin/vxsvcctl start  
  
Initializing Storage Foundation Provider 5.0 for Oracle
```

If you are using AIX, press to continue after the output is displayed.

3 Again verify the status of the VEA Service:

```
# /opt/VRTSob/bin/vxsvcctl status  
  
Current state of server : RUNNING
```

4 To use the Web GUI, start the Web Console: for the

```
/opt/VRTSob/webgui/veaw start
```

Shutting down the Veritas Enterprise Administrator Service

Although the VEA Service should remain running, you may need to shut it down manually.

To manually shut down Veritas Enterprise administrator Service

1 Verify the status of the VEA Service:

```
# /opt/VRTSob/bin/vxsvcctl status  
  
Current state of server : RUNNING
```

2 Stop the VEA Service:

```
# /opt/VRTSob/bin/vxsvcctl stop  
  
Successfully unloaded the Storage Foundation Provider 5.0 for Oracle
```

3 Again verify the status of the VEA Service:

```
# /opt/VRTSob/bin/VxSVCctrl status  
  
Current state of server : NOT RUNNING
```

4 To stop the Web Console: for the

```
/opt/VRTSob/webgui/veaw stop
```

Starting the DBED agent

The DBED agent should be running before you access the Veritas Storage Foundation for Oracle GUI. You may need to start the DBED agent manually.

To start the DBED agent**1** Verify if the DBED Agent is running:

```
/opt/VRTSobc/pal33/bin/vxpal -a DBEDAgent -c status  
  
Agent State: RUNNING
```

2 Start the DBED Agent

```
/etc/rc2.d/S75vxpal.DBEDAgent /opt/VRTS/orgui/config/startup.sh start
```

Stopping the DBED agent

Although the DBED agent should remain running, you may need to shut it down manually.

To stop the DBED agent

◆ Stop the DBED Agent:

```
/etc/rc2.d/S75vxpal.DBEDAgent /opt/VRTS/orgui/config/startup.sh stop
```

Opening and closing the Veritas Storage Foundation for Oracle GUI

You can run the GUI from a Windows or UNIX client machine.

For the Java GUI, you must have the client software installed before you can use the Java GUI.

For the Web GUI, supported browsers are:

Solaris	Mozilla 1.6
HP-UX	Mozilla 1.6
AIX	Mozilla 1.6
Linux	Netscape 7.2 or greater, Firefox 1.07 or greater, Mozilla 1.6
Windows	Internet Explorer 5.5, Netscape 7.2 or greater, Firefox 1.07 or greater, Mozilla 1.6

- Prerequisites
- Use the `/opt/VRTS/bin/vxdbedusr` utility to create login names for anyone (other than `root`) who needs to run the GUI. To run `/opt/VRTS/bin/vxdbedusr`, you must have superuser (`root`) privileges.
 - The `dbed_update` command must be run at least once before you can manage a database through the GUI.

Opening the Veritas Storage Foundation for Oracle Java GUI from a UNIX client

The VEA Service and DBED agent must be running on the server. If you need to start the VEA Service or DBED agent:

See [“Starting the Veritas Enterprise Administrator Service”](#) on page 21.

See [“Starting the DBED agent”](#) on page 23.

To start the Veritas Storage Foundation for Oracle Java GUI from a UNIX client

- 1 From an open terminal window, type `/opt/VRTSob/bin/vea` and press **Enter**.
- 2 In the VEA window, select **Connect to a Host or Domain**.
- 3 In the Connection pop-up window, enter the host name for the server to which you are connecting and click **Connect to Host or Domain**.
- 4 Enter your login name and password. Then click **OK**.

Opening the Veritas Storage Foundation for Oracle Java GUI from a Windows client

The VEA Service and DBED agent must be running on the server. If you need to start the VEA Service or DBED agent:

See “[Starting the Veritas Enterprise Administrator Service](#)” on page 21.

See “[Starting the DBED agent](#)” on page 23.

To start the Veritas Storage Foundation for Oracle Java GUI from a Windows client

- 1 Click **Start**, then select **Programs > Symantec > Veritas Enterprise Administrator**.
- 2 In the VEA window, select **Connect to a Host or Domain**.
- 3 In the Connection pop-up window, enter the host name for the server to which you are connecting and click **Connect**.
- 4 Enter your login name and password. Then click **OK**.

Opening the Veritas Storage Foundation for Oracle Web GUI

Starting the Web GUI is the same for a Windows or UNIX client.

To start the Veritas Storage Foundation for Oracle Web GUI

- ◆ In a supported browser, navigate to the host where the Web Console is online:

```
http://<host_name>:8181/VEAWeb/Login
```

Closing the Veritas Storage Foundation for Oracle Java GUI

Stopping the Java GUI is the same for a Windows or UNIX client.

To close the Veritas Storage Foundation for Oracle Java GUI

- 1 From the menu bar, select **File > Exit**.
- 2 The GUI displays a message indicating that you will be disconnected from the host if you continue. Click **Yes** to continue or, click **No** to keep the GUI running.

Closing the Veritas Storage Foundation for Oracle Web GUI

Stopping the Java GUI is the same for a Windows or UNIX client.

To start the Veritas Storage Foundation for Oracle Web GUI

- ◆ In the Web GUI upper right corner, click **Logout**.

Performing tasks in the Veritas Storage Foundation for Oracle Java GUI

You can perform the following tasks in the Veritas Storage Foundation for Oracle Java GUI.

- Managing your database
- Using a clone database
- Managing Storage Checkpoints
- Managing snapshots
- Using tiered storage
- Automating tasks
- Maintaining your configuration

Accessing database management tasks in the Java GUI

You can use the Veritas Storage Foundation for Oracle Java GUI for setting up a database.

- Starting an Oracle database instance
- Starting an Oracle snapshot database instance
- Shutting down and Oracle database instance
- Restarting an Oracle instance

To access Oracle database wizards in the Java GUI

- 1 Click the **Oracle databases** icon in the object tree. (You may need to expand the tree view to find the icon.)
- 2 Select one of the following methods to start the database.
 - From the menu bar, select **Oracle**.
 - Right click the **Oracle databases** icon to display a pop-up menu.

Select the appropriate wizard from the list presented.

See [“Starting an Oracle database instance”](#) on page 46.

See [“Starting an Oracle snapshot database instance”](#) on page 46.

See [“Shutting down an Oracle database instance”](#) on page 47.

See [“Restarting an Oracle database instance”](#) on page 49.

Accessing clone database tasks in the Java GUI

You can use the Veritas Storage Foundation for Oracle Java GUI for:

- Creating a clone database
- Removing a clone database

To access the Create Clone Database wizard in the Java GUI

- 1 Click the database in the object tree.
- 2 Select one of the following methods to access the Create Clone Database wizard:
 - In the menu bar, click **Oracle > Create Clone Database**.
 - Right click the database object to display a pop-up menu. Then, click **Create Clone Database**.
In the Create Clone Database wizard, click **Next**.
- 3 Information about the current database instance displays for verification. Select Storage Checkpoint or Database FlashSnap for creating a clone database and click **Next**

See [“Creating a clone database”](#) on page 51.

To access the Remove Clone Database wizard in the Java GUI

- 1 In the object tree, click a clone database that was created using a Storage Checkpoint. You may need to expand the object tree to find the clone database.
- 2 Select one of the following methods to remove the clone database:
 - From the menu bar, click **Oracle > Remove Clone Database**.
 - Right click the database object to display a pop-up menu. Then, click **Remove Clone Database**.

See [“Removing a clone database”](#) on page 59.

Accessing Storage Checkpoint tasks in the Java GUI

You can use the Veritas Storage Foundation for Oracle Java GUI for:

- Creating a Storage Checkpoint
- Viewing a Storage Checkpoint
- Mounting a Storage Checkpoint
- Unmounting a Storage Checkpoint
- Removing a Storage Checkpoint

- Rolling back a Storage Checkpoint

To access the Storage Checkpoint wizards in the Java GUI

- 1 Click the **Storage Checkpoints** icon in the object tree. (You may need to expand the tree view to find the icon.)
- 2 Select one of the following methods to access the Create Storage Checkpoint wizard.
 - From the menu bar, select **Storage Checkpoints**.
or
 - Right-click the **Storage Checkpoints** icon to display a pop-up menu.
- 3 Select the appropriate Storage Checkpoint wizard.
 - See [“Creating a Storage Checkpoint”](#) on page 64.
 - See [“Viewing Storage Checkpoint details”](#) on page 65.
 - See [“Mounting a Storage Checkpoint”](#) on page 65.
 - See [“Unmounting a Storage Checkpoint”](#) on page 66.
 - See [“Removing a Storage Checkpoint”](#) on page 67.
 - See [“Rolling back to a Storage Checkpoint”](#) on page 68.

Accessing FlashSnap tasks in the Java GUI

You can use the Veritas Storage Foundation for Oracle Java GUI for:

- Creating a snapplan
- Modifying or validating a snapplan
- Removing a snapplan
- Creating a snapshot
- Creating a clone using a snapshot
- Resynchronizing a snapshot to a database
- Resynchronizing a database to a snapshot
- Aborting a reverse resynchronization
- viewing a snapplan log

To access the snapplan wizards in the Java GUI

- 1 Click the **Snapplans** icon in the object tree. (You may need to expand the tree view to find the icon.)
- 2 Select one of the following methods to access the Create Snapshot wizard.
 - From the menu bar, select **Snapplans**.
 - Right click the Snapshot Plans icon to display a pop-up menu.
- 3 Select a wizard option.
 - See [“Creating a snapplan”](#) on page 74.
 - See [“Validating or modifying a snapplan”](#) on page 76.
 - See [“Removing a snapplan”](#) on page 78.
 - See [“Resynchronizing a snapshot to a database”](#) on page 82.

To access the snapshot wizards in the Java GUI

- 1 Click a snapplan in the object tree. (You may need to expand the tree view to find the icon.)
- 2 Select one of the following methods to access the snapshot wizards:
 - From the menu bar, select **Oracle**.
 - Right click the **Oracle instances** icon to display a pop-up menu.
The Start Up Snapshot Database wizard screen is then displayed.
- 3 Select the appropriate wizard option.

Accessing tiered storage tasks in the Java GUI

You can use the Veritas Storage Foundation for Oracle Java GUI for:

- Setting up parameters
- Setting policy for automated movement
- Managing file and volume movement
- Getting reports

To access tiered storage parameters wizards in the Java GUI

- 1 In the object tree, select the database object. You may need to expand the tree view to find the database object.
- 2 Select one of the following methods to access the Database Dynamic Storage Tiering parameters wizards:

- In the menu bar, click **Oracle > Database Dynamic Storage Tiering Management**.
- Right click the database object to display a pop-up menu. Then, click **Database Dynamic Storage Tiering Management**.

Select the appropriate wizard from the list presented. The wizard displays.

See [“To set up Database Dynamic Storage Tiering parameters”](#) on page 88.

See [“To modify Database Dynamic Storage Tiering parameters”](#) on page 89.

See [“To classify volumes”](#) on page 91.

To access the tiered storage policy wizards in the Java GUI

- 1 In the object tree, select the database object. You may need to expand the tree view to find the database object.
- 2 Select one of the following methods to access the Database Dynamic Storage Tiering policy wizard:

- In the menu bar, click **Oracle > Database Dynamic Storage Tiering Management**.
- Right click the database object to display a pop-up menu. Then, click **Database Dynamic Storage Tiering Management**.

Select the appropriate wizard from the list presented. The wizard displays.

See [“Listing policies”](#) on page 97.

See [“Presetting policy”](#) on page 92.

See [“To set policy for moving archive logs”](#) on page 93.

See [“To access tiered storage parameters wizards in the Java GUI”](#) on page 29.

See [“To set policy for moving external files”](#) on page 94.

To access the tiered storage movement wizards in the Java GUI

- 1 In the object tree, select the database object. You may need to expand the tree view to find the database object.
- 2 Select one of the following methods to access the Database Dynamic Storage Tiering move wizards:

- In the menu bar, click **Oracle > Database Dynamic Storage Tiering Management**.
- Right click the database object to display a pop-up menu. Then, click **Database Dynamic Storage Tiering Management**.

Select the appropriate wizard from the list presented. The wizard displays.

See [“To move tablespaces”](#) on page 95.

See [“To move datafiles”](#) on page 96.

See [“To move table partitions”](#) on page 96.

To access the tiered storage report wizards in the Java GUI

- 1 In the object tree, select the database object. You may need to expand the tree view to find the database object.
- 2 Select one of the following methods to access the Database Dynamic Storage Tiering report wizards:
 - In the menu bar, click **Oracle > Database Dynamic Storage Tiering Management**.
 - Right click the database object to display a pop-up menu. Then, click **Database Dynamic Storage Tiering Management**.

Select the appropriate wizard from the list presented. The wizard displays.

See [“To show activities”](#) on page 97.

See [“To show volume usage”](#) on page 98.

Accessing scheduled tasks in the Java GUI

You can use the Veritas Storage Foundation for Oracle Java GUI to automate tasks for:

- Adding a task to the scheduler
- Modifying a scheduled task
- Deleting a scheduled task
- Viewing scheduled tasks
- Automating creation of clone database using checkpoint
- Automating creation of a clone database using FlashSnap
- Setting up scheduling parameters

To access the scheduler wizard in the Java GUI

- 1 In the object tree, select the database object. You may need to expand the tree view to find the database object.
- 2 To add an automated task using the scheduler, open the database object folder, right-click **Scheduled Tasks**, and select **Add Task**.

The scheduler wizard displays.

See [“To add a task to the scheduler”](#) on page 102.

- 3 Existing tasks are listed in the scheduler directory. Select the task in the scheduler directory to display it in the right pane or right-click it to display additional options.
- 4 To access modification options for existing tasks, select the task in the scheduler directory and right-click it. Select the appropriate option.
See [“To modify a task to the scheduler”](#) on page 103.
See [“Viewing scheduled jobs”](#) on page 102.
See [“Automating creation of a database checkpoint”](#) on page 104.
See [“Automating creation of a database snapshot”](#) on page 104.
See [“Automating cloning of a database using a checkpoint”](#) on page 105.

Accessing system maintenance tasks in the Java GUI

You can use the Veritas Storage Foundation for Oracle Java GUI for:

- Resynchronizing the SFDB repository
- Rescanning the database instance
- Displaying and rescanning tablespace information
- Viewing Storage Mapping
- Viewing I/O statistics
- Determining the datafile file type
- Converting regular datafiles to Quick I/O Files
- Converting Quick I/O files to regular datafiles
- Updating rescan intervals
- Checking your system configuration
- Saving the system configuration

Note: Quick I/O is not supported on Linux.

To access the maintenance options in the Java GUI

- 1 Click the Oracle database icon in the object tree. (You may need to expand the tree view to find the icon.)
- 2 Select one of the following methods.
 - From the menu bar, select **Oracle**.

- Right click the Oracle database icon to display a pop-up menu.
- 3 Select the appropriate maintenance option.
 - See “Resynchronizing the SFDB repository” on page 110.
 - See “Rescanning the database instance” on page 110.
 - See “Displaying and rescanning tablespace information” on page 110.
 - See “Viewing Storage Mapping” on page 111.
 - See “Viewing I/O statistics” on page 111.
 - See “Determining the datafile file type” on page 112.
 - See “Converting regular datafiles to Quick I/O Files” on page 112.
 - See “Converting Quick I/O files to regular datafiles” on page 113.
 - See “Updating rescan intervals” on page 113.
 - See “Checking your system configuration” on page 114.
 - See “Saving the system configuration” on page 116.

To access the Storage Mapping topology in the Java GUI

- 1 Start the GUI and connect to the desired host.
- 2 Expand the Oracle Databases icon in the object tree and then expand the desired database.
- 3 Select one of the following methods to generate datafile statistics:
 - From the menu bar, select **Datafiles > Topology**.
 - Right click the datafile to display a pop-up menu. Then click **Topology**. The storage Topology displays.

To access the I/O statistics wizard in the Java GUI

- 1 Start the GUI and connect to the desired host.
- 2 Expand the Oracle Databases icon in the object tree and then expand the desired database.
- 3 Select one of the following methods to generate datafile statistics:
 - From the menu bar, select **Datafiles > Statistics**.
 - Right click the datafile to display a pop-up menu. Then click **Statistics**.

Performing tasks in the Storage Foundation for Oracle Web GUI

You can perform the following tasks in the Veritas Storage Foundation for Oracle Web GUI.

- Managing your database
- Using Storage Mapping
- Using a clone database
- Managing Storage Checkpoints
- Managing snapshots
- Maintaining your configuration

Tasks are accessible through drop down lists in the right pane, or under the database objects on the summary pages.

Accessing database management tasks in the Web GUI

You can use the Veritas Storage Foundation for Oracle Web GUI for setting up a database.

- Starting an Oracle database instance
- Starting an Oracle snapshot database instance
- Shutting down and Oracle database instance
- Restarting an Oracle instance

To access Oracle database wizards in the Web GUI

- 1 Start the Web GUI and connect to the desired host.
- 2 In the Summary View, select Storage Foundation for Oracle.
- 3 Click the Oracle database.
- 4 Select the database task in the drop down list in the left pane to display the corresponding wizard.

See [“To start an Oracle database instance or a cloned Oracle database instance”](#) on page 46.

See [“To start an Oracle snapshot database instance”](#) on page 47.

See [“To shut down an Oracle database instance”](#) on page 48.

See [“To restart an Oracle database or a duplicated Oracle database instance”](#) on page 49.

Accessing database tasks in the Web GUI

You can use the Veritas Storage Foundation for Oracle Web GUI for:

Clone tasks:

- Creating a clone database
- Removing a clone database

Storage Checkpoint tasks:

- Creating a Storage Checkpoint
- Viewing a Storage Checkpoint
- Mounting a Storage Checkpoint
- Unmounting a Storage Checkpoint
- removing a Storage Checkpoint
- Rolling back a Storage Checkpoint

Flashsnap tasks:

- Creating a snapplan
- Modifying or validating a snapplan
- Removing a snapplan
- Creating a snapshot
- Creating a clone using a snapshot
- Resynchronizing a snapshot to a database
- Resynchronizing a database to a snapshot
- Aborting a reverse resynchronization
- viewing a snapplan log

To access the wizards in the Web GUI

- 1 Start the Web GUI and connect to the desired host.
- 2 In the Summary View, select Storage Foundation for Oracle.
- 3 Click the Oracle database.

- 4 Select a database task in the clone drop down list to display the corresponding wizard.
 - See [“To create a clone database using a Storage Checkpoint”](#) on page 52.
 - See [“Creating a clone database using Database FlashSnap”](#) on page 52.
 - See [“To remove a Storage Checkpoint clone database”](#) on page 60.
 - See [“To remove a Storage Checkpoint clone database”](#) on page 60.
- 5 Select a database task in the Storage Checkpoint drop down list to display the corresponding wizard.
 - See [“Creating a Storage Checkpoint”](#) on page 64.
 - See [“Viewing Storage Checkpoint details”](#) on page 65.
 - See [“Mounting a Storage Checkpoint”](#) on page 65.
 - See [“Unmounting a Storage Checkpoint”](#) on page 66.
 - See [“Removing a Storage Checkpoint”](#) on page 67.
 - See [“Rolling back to a Storage Checkpoint”](#) on page 68.
- 6 Select a database task in the FlashSnap drop down list to display the corresponding wizard.
 - See [“Creating a snapplan”](#) on page 74.
 - See [“Validating or modifying a snapplan”](#) on page 76.
 - See [“Removing a snapplan”](#) on page 78.
 - See [“Creating a snapshot”](#) on page 78.
 - See [“Creating a clone database with a snapshot”](#) on page 81.
 - See [“Resynchronizing a snapshot to a database”](#) on page 82.
 - See [“Resynchronizing a database to a snapshot”](#) on page 83.
 - See [“Aborting the reverse resynchronization operation”](#) on page 84.
 - See [“Viewing the snapplan log”](#) on page 85.

Accessing system maintenance tasks in the Web GUI

You can use the Veritas Storage Foundation for Oracle Web GUI for:

- Resynchronizing the SFDB repository
- Rescanning the database instance
- Displaying and rescanning tablespace information

- Viewing Storage Mapping
- Viewing I/O statistics
- Viewing Oracle datafile topology or statistics
- Determining the datafile file type
- Converting regular datafiles to Quick I/O Files
- Converting Quick I/O files to regular datafiles
- Updating rescan intervals
- Checking your system configuration
- Saving the system configuration

Note: Quick I/O is not supported on Linux.

To access the system maintenance tasks in the Web GUI

- 1 Start the Web GUI and connect to the desired host.
- 2 In the Summary View, select Storage Foundation for Oracle.
- 3 Click the Oracle database.
- 4 Select a database task in the drop down list to display the corresponding wizard.
 - See [“Resynchronizing the SFDB repository”](#) on page 110.
 - See [“Rescanning the database instance”](#) on page 110.
 - See [“Displaying and rescanning tablespace information”](#) on page 110.
 - See [“Viewing Storage Mapping”](#) on page 111.
 - See [“Viewing I/O statistics”](#) on page 111.
 - See [“Determining the datafile file type”](#) on page 112.
 - See [“Converting regular datafiles to Quick I/O Files”](#) on page 112.
 - See [“Converting Quick I/O files to regular datafiles”](#) on page 113.
 - See [“Updating rescan intervals”](#) on page 113.
 - See [“Checking your system configuration”](#) on page 114.
 - See [“Saving the system configuration”](#) on page 116.

Managing your database

This chapter includes the following topics:

- [Database management tasks in the Veritas Storage Foundation for Oracle GUI](#)
- [About setting up a disk group](#)
- [About selecting a volume layout](#)
- [File system creation guidelines](#)
- [Controlling fragmentation](#)
- [Starting an Oracle database instance](#)
- [Starting an Oracle snapshot database instance](#)
- [Shutting down an Oracle database instance](#)
- [Restarting an Oracle database instance](#)

Database management tasks in the Veritas Storage Foundation for Oracle GUI

If you are using Veritas Storage Foundation for Oracle to set up a new database, complete these tasks in the order listed below:

- | | |
|---|--|
| Determine the number and sizes of file systems you need for the database you want to create. | See the <i>Veritas File System Administrator's Guide</i> . |
| Create volumes to meet your file system needs. You can use disk mirroring as a safeguard against disk failures and striping for better performance. | See “About selecting a volume layout” on page 42.
See “Tuning for Performance” in the |

- If you plan to create volume snapshots for the database and use them on either the same host or a secondary one, ensure that your volume layout is consistent with Database FlashSnap requirements. See [“Database FlashSnap in the GUI”](#) on page 73.
- Create the VxFS file systems you need on the volumes. See [“File system creation guidelines”](#) on page 44.
- Install and configure your database. For best OLTP performance, use Quick I/O. See the *Veritas Storage Foundation for DB2 Administrator's Guide*.
- You must create Quick I/O files before creating the tablespaces.
- Note:** The Quick I/O feature is not available on the Linux operating system.
- If you would like the ability to view detailed storage stack topology information to ensure your storage stack configuration is optimized for the database, configure and use Storage Mapping. See [“Viewing Storage Mapping”](#) on page 111.
- If you are using Quick I/O, convert all database files to Quick I/O files. See [“Converting regular datafiles to Quick I/O Files”](#) on page 112.
- If using ODM, link the ODM library. See the *Veritas Storage Foundation for Oracle Administrator's Guide*.
- If you are not currently running on VxVM and VxFS, make sure Veritas Storage Foundation for Oracle is installed and convert your existing database configuration. See the *Veritas Storage Foundation for Oracle Oracle Installation Guide*.
See the *Veritas Storage Foundation for Oracle Administrator's Guide*.
- For backup and recovery on the same host, you can use the Storage Checkpoint facility to create file system snapshots of the database. A Storage Checkpoint creates an exact image of a database instantly and provides a consistent image of the database from the point in time the Storage Checkpoint was created. See [“Creating a Storage Checkpoint”](#) on page 64.

For off-host processing or backup, you can use the Database FlashSnap feature to create a volume snapshot for the database. See [“Database FlashSnap in the GUI”](#) on page 73.

Database FlashSnap lets you capture an online image of an actively changing database at a given instant, known as a snapshot. You can perform backups and off-host processing tasks on snapshots while providing continuous availability of your critical data.

About setting up a disk group

Before creating file systems for a database, set up a disk group for each database.

A disk group lets you group disks, volumes, file systems, and files that are relevant to a single database into a logical collection for easy administration. Because you can move a disk group and its components as a unit from one machine to another, you can move an entire database when all the configuration objects of the database are in one disk group. This capability is useful in a failover situation.

Disk group configuration guidelines

Follow these guidelines when setting up disk groups:

- Only disks that are online and do not already belong to a disk group can be used to create a new disk group.
- Create one disk group for each database.
- The disk group name must be unique. Name each disk group using the Oracle database instance name specified by the environment variable `$ORACLE_SID` and a `dg` suffix. The `dg` suffix helps identify the object as a disk group. Also, each disk name must be unique within the disk group.
- Never create database files using file systems or volumes that are not in the same disk group.

In earlier releases of Veritas Volume Manager, a system installed with VxVM was configured with a default disk group, `rootdg`, that had to contain at least one disk. VxVM can now function without any disk group having been configured. Only when the first disk is placed under VxVM control must a disk group be configured.

Note: Most VxVM commands require superuser or equivalent privileges.

See the “Tuning for Performance” chapter of the *Veritas Storage Foundation for Oracle Administrator's Guide*.

For more about disk groups and disk group procedures, see the *Veritas Enterprise Administrator Guide*.

For more about disk groups and disk group procedures, see the *Volume Manager Web GUI Online Help*.

About selecting a volume layout

Veritas Volume Manager offers a variety of layouts that allow you to configure your database to meet performance and availability requirements. The proper selection of volume layouts provides optimal performance for the database workload.

An important factor in database performance is the tablespace placement on the disks.

Disk I/O is one of the most important determining factors of your database's performance. Having a balanced I/O load usually means optimal performance. Designing a disk layout for the database objects to achieve balanced I/O is a crucial step in configuring a database.

When deciding where to place tablespaces, it is often difficult to anticipate future usage patterns. VxVM provides flexibility in configuring storage for the initial database set up and for continual database performance improvement as needs change. VxVM can split volumes across multiple drives to provide a finer level of granularity in data placement. By using striped volumes, I/O can be balanced across multiple disk drives. For most databases, ensuring that different containers or tablespaces, depending on your database, are distributed across the available disks may be sufficient.

Striping also helps sequential table scan performance. When a table is striped across multiple devices, a high transfer bandwidth can be achieved by setting the Oracle parameter `DB_FILE_MULTIBLOCK_READ_COUNT` to a multiple of full stripe size divided by `DB_BLOCK_SIZE`.

See “Tuning for Performance” in the *Veritas Storage Foundation for Oracle Administrator's Guide*.

How to choose appropriate stripe unit sizes

When creating a striped volume, you need to decide the number of columns to form a striped volume and the stripe unit size. You also need to decide how to stripe the volume. You may stripe a volume across multiple disk drives on the

same controller or across multiple disks on multiple controllers. By striping across multiple controllers, disk I/O can be balanced across multiple I/O channels. The decision is based on the disk and controller bandwidth and the database workload. In general, for most OLTP databases, use the default stripe unit size of 64 K or smaller for striped volumes and 16 K for RAID-5 volumes.

How to choose between mirroring and RAID-5

VxVM provides two volume configuration strategies for data redundancy: mirroring and RAID-5. Both strategies allow continuous access to data in the event of disk failure. For most database configurations, we recommend using mirrored, striped volumes. If hardware cost is a significant concern, but having higher data availability is still important, use RAID-5 volumes.

RAID-5 configurations have certain performance implications you must consider. Writes to RAID-5 volumes require parity-bit recalculation, which adds significant I/O and CPU overhead. This overhead can cause considerable performance penalties in online transaction processing (OLTP) workloads. If the database has a high read ratio, however, RAID-5 performance is similar to that of a striped volume.

Volume configuration guidelines

Follow these guidelines when selecting volume layouts:

- Put the database log files on a file system created on a striped and mirrored (RAID-0+1) volume separate from the index or data tablespaces. Stripe multiple devices to create larger volumes if needed. Use mirroring to improve reliability. Do not use VxVM RAID-5 for redo logs.
- When normal system availability is acceptable, put the tablespaces on file systems created on striped volumes for most OLTP workloads.
- Create striped volumes across at least four disks. Try to stripe across disk controllers. For sequential scans, do not stripe across too many disks or controllers. The single thread that processes sequential scans may not be able to keep up with the disk speed.
- For most workloads, use the default 64 K stripe-unit size for striped volumes and 16 K for RAID-5 volumes.
- When system availability is critical, use mirroring for most write-intensive OLTP workloads. Turn on Dirty Region Logging (DRL) to allow fast volume resynchronization in the event of a system crash.

- When system availability is critical, use RAID-5 for read-intensive OLTP workloads to improve database performance and availability. Use RAID-5 logs to allow fast volume resynchronization in the event of a system crash.
- For most decision support system (DSS) workloads, where sequential scans are common, experiment with different striping strategies and stripe-unit sizes. Put the most frequently accessed tables or tables that are accessed together on separate striped volumes to improve the bandwidth of data transfer.

See “Tuning for Performance” in the *Veritas Storage Foundation for Oracle Administrator's Guide*.

For more about volumes and volume procedures, see the *Veritas Enterprise Administrator Guide*.

For more about volumes and volume procedures, see the *Volume Manager Web GUI Online Help*.

File system creation guidelines

Follow these guidelines when creating VxFS file systems:

- Specify the maximum log size when creating file systems for databases. In a Solaris environment, also specify the maximum block size.
- Except for specifying the maximum log size and support for large files as required, use the VxFS defaults when creating file systems for databases.
- Never disable the intent logging feature of the file system.
- For redo logs, create a single file system using a simple (and mirrored, if necessary) volume. Put the other tablespaces and database files on separate file systems created on striped, striped and mirrored, or RAID-5 volumes.
- When using the command line, use the mount points to name the underlying volumes. For example, if a file system named `/db01` is to be created on a mirrored volume, name the volume `db01` and the mirrors `db01-01` and `db01-02` to relate to the configuration objects. If you are using the `vxassist` command or the GUI, this is transparent.

Choose a file system block size that matches or is a multiple of the block size of your Oracle database (`db_block_size`).

It is possible to have a file system block size that is smaller than the database block size because the database block-size limit can be bigger than the file system block size. It is fine if the file system block size is smaller than the database block size because VxFS will not perform multiple I/O operations for each database I/O operation. VxFS is capable of performing I/Os with multiple blocks. For example,

if your database block size is 32K and your file system block size is 8k, VxFS can put four 8K blocks together to perform one 32K database I/O operation.

When creating the file system, set the number of file system blocks in the intent log so that the log size is 16MB. For example, if the file system block size is 8K (that is, 8192), it will take 2000 blocks to make a 16MB log (2000 x 8192 = ~16MB). If the file system block size is 4K (that is, 4096), then twice as many blocks as in the 8K case would need to be allocated (4000 in this example).

For more about file systems and file system procedures, see the *Veritas Enterprise Administrator Guide*.

For more about file systems and file system procedures, see the *Volume Manager Web GUI Online Help*.

Controlling fragmentation

When free resources are initially allocated to files in a Veritas file system, they are aligned in the most efficient order possible to provide optimal performance. On an active file system, the original order is lost over time as files are created, removed, or resized. As space is allocated and deallocated from files, the available free space becomes broken into fragments. This means that space must be assigned to files in smaller and smaller extents. This process is known as fragmentation. Fragmentation leads to degraded performance and availability. The degree of fragmentation depends on file system usage and activity.

Fragmentation utilities in VxFS

Allocation units in VxFS are designed to help minimize and control fragmentation. Over time, however, file systems eventually become fragmented.

VxFS provides online reporting and optimization utilities to enable you to monitor and defragment a mounted file system. These utilities are accessible through the file system administration command, `fsadm`. Using the `fsadm` command, you can track and eliminate fragmentation without interrupting user access to the file system.

Types of fragmentation

VxFS addresses two types of fragmentation:

- Directory fragmentation

As files are created and removed, gaps are left in directory inodes. This is known as directory fragmentation. Directory fragmentation causes directory lookups to become slower.

- Extent fragmentation

As files are created and removed, the free extent map for an allocation unit changes from having one large free area to having many smaller free areas. Extent fragmentation occurs when files cannot be allocated in contiguous chunks and more extents must be referenced to access a file. In a case of extreme fragmentation, a file system may have free space that cannot be allocated.

Starting an Oracle database instance

You can start an Oracle database instance or a cloned Oracle database from the GUI. You must know the password of the database owner. The steps to restart an Oracle database instance are the same.

To start an Oracle database instance or a cloned Oracle database instance

- 1 Access the Oracle Start Up Database wizard.

See [“To access Oracle database wizards in the Java GUI”](#) on page 26.

See [“Accessing database management tasks in the Web GUI”](#) on page 34.

- 2 Enter the Oracle SID, Oracle home, and Owner information. Click **Next** to continue.

- 3 Enter your password and optionally enter Oracle pfile information, then click **Start Database**. The UNIX user name field is populated automatically and the other fields on this screen are read-only.

- 4 At the confirmation prompt, click **Yes** to confirm that you want to start the database.

If the Oracle database was successfully started, you will receive a confirmation message. Click **OK** to continue.

Starting an Oracle snapshot database instance

If you created a snapshot using the Database FlashSnap feature, you can start an Oracle snapshot database from the secondary host. This is the equivalent of cloning the database from the primary host. You must know the password of the instance owner and there must be an existing snapshot.

See [“Database FlashSnap in the GUI”](#) on page 73.

Prerequisites

- Make sure you have enough space to create a clone database on your system.
- You must have an existing snapshot.

To start an Oracle snapshot database instance

- 1 Access the Oracle Start Instance Start Up Snapshot Database wizard.
See [“To access Oracle database wizards in the Java GUI”](#) on page 26.
See [“Accessing database management tasks in the Web GUI”](#) on page 34.
- 2 In the “connect as” section, enter the local Oracle home information. Then, enter your UNIX user name and password.
- 3 For the primary database information section, enter the Oracle SID information.
- 4 Create or restart the database by clicking the appropriate radio button:
 - Select **Startup database** to start a new snapshot database based on a snapshot.
 - Select **Restart database** to restart an existing snapshot database.
- 5 Enter the snapshot database information in the appropriate fields:
 - The new Oracle SID
 - Snapplan file
 - The volume name is required to start an off-host snapshot database.
 - Snapshot disk group name
 - The Relocate path is required to start an on-host snapshot database.
 - You can obtain this information by viewing the details after you create a snapshot. If you did not retain the information from the snapshot creation, you can use the `dbed_vmchecksnap` command or use View Log via the GUI to retrieve the information.
See [“Creating a snapplan”](#) on page 74..
- 6 Click **Start Database**.
- 7 At the confirmation prompt, click **Yes** to confirm that you want to start the database.

If the snapshot database was successfully started, you will receive a confirmation message. Click **OK** to continue.

Shutting down an Oracle database instance

The GUI enables you to shut down an Oracle database instance. For example, you must shut down the database to perform a Storage Rollback of an entire database.

To shut down an Oracle database instance

- 1 Access the Oracle Shutdown Database wizard.
See [“To access Oracle database wizards in the Java GUI”](#) on page 26.
See [“Accessing database management tasks in the Web GUI”](#) on page 34.
- 2 Verify the database information, such as the Oracle SID and Oracle Home.
Then, click **Next** to continue.
- 3 Verify your UNIX user name, then enter your password in the **Password** field.
- 4 In the dialog box, select the type of shutdown:
 - **Normal**
Use this option to shut down the Oracle database instance in normal situations. If you shut down using this option, no new database connections are allowed. Oracle waits for all currently connected users to disconnect from the database, and then closes and dismounts the database before shutting down the instance. The next database start up does not require an instance recovery.
 - **Transactional**
Use this option to shut down the Oracle database instance immediately upon completion of all transactions in progress. If you shut down using this option, no client can start a new transaction on this instance, and a client is disconnected when the transaction in progress ends. The next database start up does not require an instance recovery.
 - **Immediate**
Use this option to shut down the Oracle database instance immediately. Use this option in situations where the database, or some application, is running irregularly or a power shutdown is about to occur. If you shut down using this option, all current client SQL statements are terminated immediately, any uncommitted transactions are rolled back, and all connected users are disconnected. Oracle closes and dismounts the database before shutting down the instance. The next database start up does not require an instance recovery.
 - **Abort**
Use this option to shut down the Oracle database instance instantaneously by aborting the database's instance. Use this option with extreme caution and only when normal or immediate shutdown does not work, you experience problems when starting the instance, or you need to shut down the instance instantaneously. If you shut down using this option, all connected users are disconnected, current client SQL statements are terminated immediately, uncommitted transactions are not rolled back,

and the instance is terminated without closing the files. The next database start up requires an instance recovery.

In this release, the option to shutdown or unmount the FlashSnap clone database has been removed. Use the **Remove Clone Database** option to shutdown or unmount the FlashSnap clone database.

See cloning a database in the *Storage Foundation for Oracle Administrator's Guide*.

- 5 Click **Shutdown instance** at the bottom of the screen.
- 6 At the confirmation prompt, click **Yes** to confirm that you want to shut down the database.

If the database instance was successfully shut down, you will receive a confirmation message. Click **OK** to continue.

Restarting an Oracle database instance

You can restart an Oracle database instance or a duplicated (cloned) Oracle database from the GUI. You must have a UNIX user name and password.

The steps to restart an Oracle database instance are the same as those to restart a duplicated Oracle database instance.

To restart an Oracle database or a duplicated Oracle database instance

- 1 Access the Oracle Start Up Database wizard.
See [“To access Oracle database wizards in the Java GUI”](#) on page 26.
See [“Accessing database management tasks in the Web GUI”](#) on page 34.
- 2 Verify the database information, such as the Oracle SID and Oracle Home. Then, click **Next** to continue.
- 3 Enter the Oracle SID, Oracle home, and Owner information. Then, click **Next** to continue.
- 4 Enter your password and optionally enter Oracle pfile information, then click **Start Database**.
- 5 At the confirmation prompt, click **Yes** to confirm that you want to start the database.

If the Oracle database was successfully restarted, you will receive a confirmation message. Click **OK** to continue.

Using a clone database

This chapter includes the following topics:

- [Creating a clone database](#)
- [Removing a clone database](#)

Creating a clone database

Cloning a database enables you to perform operations without affecting your production database. The Storage Foundation for Oracle GUI provides the Create Clone Database wizard to enable you to create a clone of your database. Choose the method to create the clone database:

- Storage Checkpoint
- Database FlashSnap

If storage is more important than performance, use Storage Checkpoint to create a clone database. A clone database created with Storage Checkpoint requires half as much storage as a clone database created with Database FlashSnap. However, over a longer period of time, the storage will slowly increase for a clone created with Storage Checkpoint.

If performance is important, use Database FlashSnap to create a clone database. A clone database created with Storage Checkpoint will slow the performance of the database.

Creating a clone database using Checkpoints

Use the Create Clone Database wizard to create a clone of your database using Storage Checkpoints for optimal storage.

Prerequisite The Oracle database must have at least one mandatory archive destination.

See Using Database FlashSnap for Backup and Off-Host Processing in the *Veritas Storage Foundation for Oracle Administrator's Guide*.

To create a clone database using a Storage Checkpoint

- 1 Access the Create Clone Database wizard and select Storage Checkpoint as the method for creating a clone.

See [“Accessing clone database tasks in the Java GUI”](#) on page 27.

See [“Accessing database tasks in the Web GUI”](#) on page 35.

- 2 In the **New Database Information** dialog, enter the New Oracle SID and the Mount Point.

- 3 Select whether you would want to clone the database using a new Storage Checkpoint or use an existing Storage Checkpoint.

If you choose to clone the database using an existing Storage Checkpoint, you must select a Storage Checkpoint from the drop-down list.

Click **Create Clone Database** and click **Next**.

- 4 When restarting a Storage Checkpoint clone database that is already created, make sure you check the **Restart Database** option or you would be starting a new Storage Checkpoint clone database.

For restarting a Storage Checkpoint clone database, you may select an existing Storage Checkpoint. You are not required to enter the mount point.

If the database was successfully cloned, a confirmation message displays. Click **OK** to continue.

Creating a clone database using Database FlashSnap

Use the Create Clone Database wizard to create a clone of your database using Database FlashSnap for optimal performance.

The Create Clone Database wizard for using Database FlashSnap goes through the following dialogs:

- Create Snapplan
- Validate/Modify Snapplan
- Create Snapshot
- Startup Clone Database

Choose to create a clone database from a new or existing snapplan.

If you create a clone database using an existing snapplan, you use a portion of the Create Clone Database wizard depending on the status of the snapplan you select:

- `SNAPSHOT_END` status: picks up at Create Snapshot point in the process. This status uses the default snapplan settings.
- `INIT_FULL` status: picks up at Validate/Modify Snapplan. This status enables selection of forced snapshot creation, authentication settings, and primary database settings.
- `INIT_DB` status: picks up at Create Snapplan. This status enables the review and selection of all settings.

Creating a new snapplan for a clone database

If you are creating a clone database from a new snapplan, you must create the new snapplan.

To create a clone database with a new snapplan

- 1 Access the Create Clone Database wizard.
See [“Accessing clone database tasks in the Java GUI”](#) on page 27.
See [“Accessing database tasks in the Web GUI”](#) on page 35.
- 2 Choose **Database FlashSnap**.
- 3 In the **Database FlashSnap Clone Database** dialog, select **New Snapplan**. Click **Next**.
The **Create Snapplan** dialog is displayed.
- 4 Confirm the Oracle SID. This is a read-only field.
- 5 Enter the following values:
 - Full path of the snapplan file
 - Name of the secondary host
 - Snapshot plex tag
- 6 Click **Next** to continue. The **Validate/Modify Snapplan** screen displays with default values set.
See [“To validate or modify a snapplan using the Create Clone Database wizard”](#) on page 54.
- 7 After the **Validate/Modify Snapplan** dialog, use the following dialog procedures to complete the clone database:
 - See [“To create a snapshot using the Create Clone Database wizard”](#) on page 55.

- See [“To start up a snapshot using the Create Clone Database wizard”](#) on page 57.

Validating or modifying a snapplan for a clone database

After creating a new snapplan or selecting an existing snapplan, validate or modify it before proceeding to create a snapshot.

To validate or modify a snapplan using the Create Clone Database wizard

- 1 Access the Validate/Modify dialog of the Create Clone Database wizard.
See [“Accessing clone database tasks in the Java GUI”](#) on page 27.
See [“Accessing database tasks in the Web GUI”](#) on page 35.
- 2 In the Validate/Modify screen, modify any incorrect settings. Click **Next** to validate the snapplan.

For more information regarding the snapplan parameters:

See *Creating and working with Snapplans using dbed_vmchecksnap* in the *Veritas Storage Foundation for Oracle Administrator's Guide*.

If the snapplan was successfully validated, a confirmation message displays.

- 3 To see the snapplan details, click the **Show details** checkbox. The snapplan details are displayed in the pop-up window.

When you have finished reviewing them, click **OK**.

The **Create Snapshot** screen appears.

See [“To create a snapshot using the Create Clone Database wizard”](#) on page 55.

A sample of the snapplan details:

```
PRIMARY_HOST is host1
```

```
SECONDARY_HOST is host2
```

```
The version of PRIMARY_DG-PRODdg is 120.
```

```
SNAPSHOT_DG is SNAP_PRODdg
```

```
SNAPSHOT_MODE is online
```

```
The database is running in archivelog mode.
```

```
ARCHIVELOG_DEST is /prod_db
```

```
SNAPSHOT_PLAN_FOR is database
```

```
SNAPSHOT_ARCHIVE_LOG is yes
```

```
ARCHIVELOG_DEST=/prod_db is mount on /dev/vx/dsk/PRODdg/ORACLE1.
```

```
Examining Oracle volume and disk layout for snapshot.
```

```
Volume ORACLE1 on PRODdg is ready for snapshot.
```

```
Original plex and DCO log for ORACLE1 is on PRODDg02.  
Snapshot plex and DCO log for ORACLE1 is on PRODDg01.  
Volume oracon on PRODDg is ready for snapshot.  
Original plex and DCO log for oracon is on PRODDg02.  
Snapshot plex and DCO log for oracon is on PRODDg01.  
SNAP_PRODDg for snapshot will include: PRODDg01  
ALLOW_REVERSE_RESYNC is yes  
The snapplan sp3 has been created.
```

Creating snapshot for a clone database

After your snapplan is validated, you can create a snapshot for your clone database.

To create a snapshot using the Create Clone Database wizard

- 1 Access the Create Snapshot dialog of the Create Clone Database wizard.
See [“Accessing clone database tasks in the Java GUI”](#) on page 27.
See [“Accessing database tasks in the Web GUI”](#) on page 35.
- 2 In the **Create Snapshot** dialog, verify the snapplan name.
- 3 Click **Next** to continue.
- 4 If the snapshot creation was successful, a confirmation message appears.

5 Click the **Show details checkbox to view the actions taken.**

A sample of the snapplan details:

```
dbed_vmsnap started at 2004-05-13 17:09:40
SFDB repository is up to date.
The database is running in archivelog mode.
A snapshot of ORACLE_SID PROD is in DG SNAP_PRODDg.
Snapplan sp2 is used for the snapshot.
SFDB repository volume is SNAP_ORACLE1.
If -r <relocate_path> is used in dbed_vmclonedb,
    make sure <relocate_path> is created and owned by
    Oracle DBA. Otherwise, the following mount points
    need to be created and owned by Oracle DBA:
    /prod_db.
    /oracon.
```

```
dbed_vmsnap ended at 2003-05-13 17:10:29
```

```
db2ed_vmsnap started at 2004-06-08 11:41:39
DB20000I The SET WRITE command completed successfully.
DB20000I The SET WRITE command completed successfully.
A snapshot of DB2DATABASE UDB is in DG SNAP_DB2dg.
Snapplan sp1 is used for the snapshot.
```

```
If -r <relocate_path> is used in db2ed_vmclonedb,
make sure <relocate_path> is created and owned by DB2 Instance Owner.
Otherwise, the following mount points need to be
created and owned by DB2 Instance Owner:
```

```
/db2/testvol01.
/db2/testvol02.
/db2/testvol03.
/db2/testvol04.
/db2/testvol05.
/db2/udb_home.
```

```
db2ed_vmsnap ended at 2004-06-08 11:42:14
```


- 6 Click **OK** to continue. You can now use the snapshot as a database backup. Save this information for when you start your snapshot database.
- 7 The Startup Snapshot dialog displays. proceed to the procedure for starting up a snapshot.
See [“To start up a snapshot using the Create Clone Database wizard”](#) on page 57.

Start up snapshot for a clone database

You can start up the clone after creating a clone snapshot.

To start up a snapshot using the Create Clone Database wizard

- 1 Access the Startup Clone Database wizard.
See [“Accessing clone database tasks in the Java GUI”](#) on page 27.
See [“Accessing database tasks in the Web GUI”](#) on page 35.
- 2 In the **Startup Snapshot Database** dialog "connect as" section, confirm the secondary host name and enter the Oracle home in the secondary host information. Then, enter your Oracle owner UNIX user name and password in the secondary host.

In the **Startup Snapshot Database** Authentication section, enter the instance owner name and password for the UNIX user name. The user name is a read-only field.

Warning: Make sure that the VEA service is running on the secondary host and the database owner of the secondary host is registered on the VEA Service Console Registry.

See [“Starting the Veritas Enterprise Administrator Service”](#) on page 21.

See [“Adding users to the Veritas Enterprise Administrator”](#) on page 15.

- 3 For the primary database information section, confirm the Oracle SID and host name. It is a read-only field.
- 4 Select a startup option by clicking the appropriate radio button:
 - **Startup database** to start a new snapshot database.
 - **Restart database** to restart an existing snapshot database.

- 5 For the snapshot database information section, verify the snapplan file and Snapshot disk group name. These are read-only fields. Enter the new Oracle SID and Relocate path in the appropriate fields.

To start an on-host snapshot database, the Relocate path is required. Make sure the Relocate path has the database owner's permission.

- 6 See creating and working with snapplans using `dbed_vmchecksnap` in the *Veritas Storage Foundation for Oracle Administrator's Guide*.
- 7 Click **Create Clone Database**.

If the snapshot database was successfully started, you will receive a confirmation message. Click **OK** to continue.

Create snapshot for clone database

If you are using an existing snapplan to create the clone database, some parameters are required.

To create a clone database with an existing snapplan using default settings

- 1 Access the Create Clone Database wizard.
See [“Accessing clone database tasks in the Java GUI”](#) on page 27.
See [“Accessing database tasks in the Web GUI”](#) on page 35.
- 2 In the **Create Clone Database** dialog, select create a clone database using Database FlashSnap. Click **Next**.
- 3 In the **Database FlashSnap Clone Database** dialog, select **Existing Snapplan**. The snapplan displays its status. For example, `sp00 [init_db]`
`/ora_home/snapplan/sp00`, where `INIT_DB` is the status of the snapplan.
- 4 Select a snapplan from the drop-down list `SNAPSHOT_END` status. The **Startup Snapshot Database** dialog displays.
- 5 Use the dialog procedure for Startup Clone Database:
See [“To start up a snapshot using the Create Clone Database wizard”](#) on page 57.

To create a clone database with an existing snapplan using `INIT_FULL`

- 1 Access the Create Clone Database wizard.
See [“Accessing clone database tasks in the Java GUI”](#) on page 27.
See [“Accessing database tasks in the Web GUI”](#) on page 35.
- 2 In the **Create Clone Database** dialog, select **Existing Snapplan**. The snapplan displays its status. For example, `sp00 [init_full]`
`/ora_home/snapplan/sp00`, where `INIT_FULL` is the status of the snapplan.

- 3 Select a snapplan from the drop-down list with `INIT_FULL` status. The **Create Snapshot** dialog displays.
- 4 Use the following dialog procedures in order:
 - See [“To create a snapshot using the Create Clone Database wizard”](#) on page 55.
 - See [“To start up a snapshot using the Create Clone Database wizard”](#) on page 57.

To create a clone database with an existing snapplan using `INIT_DB`

- 1 Access the Create Clone Database wizard.
See [“Accessing clone database tasks in the Java GUI”](#) on page 27.
See [“Accessing database tasks in the Web GUI”](#) on page 35.
- 2 In the **Create Clone Database** dialog, select **Existing Snapplan**. The snapplan displays its status. For example, `sp00 [init_db] /ora_home/snapplan/sp00`, where `INIT_DB` is the status of the snapplan.
- 3 Select a snapplan from the drop-down list with `INIT_DB` status. The **Validate/Modify Snapplan** dialog displays with default values set.
- 4 Use the following dialog procedures in order:
 - See [“To validate or modify a snapplan using the Create Clone Database wizard”](#) on page 54.
 - See [“To create a snapshot using the Create Clone Database wizard”](#) on page 55.
 - See [“To start up a snapshot using the Create Clone Database wizard”](#) on page 57.

Removing a clone database

The Veritas Storage Foundation for Oracle provides the Remove Clone Database wizard, enabling you to:

- shut down the clone database
- unmount the clone database
- remove the Storage Checkpoint
- resynchronize the snapshot

Removing a Storage Checkpoint clone database

Removing a Storage Checkpoint clone database enables you to unmount the clone database with the option of removing the checkpoint.

To remove a Storage Checkpoint clone database

- 1 Access the Remove Clone Database wizard.
See [“Accessing clone database tasks in the Java GUI”](#) on page 27.
See [“Accessing database tasks in the Web GUI”](#) on page 35.
- 2 Check the **Remove Storage Checkpoint** option if you want to remove the Storage Checkpoint along with removing the cloned database.
- 3 Click the **Remove Clone Database** button.
- 4 In the **Confirmation** dialog, click **Yes** to proceed.

Removing a database snapshot clone database

Removing a Database FlashSnap clone database unmounts the FlashSnap database with the option of resynchronizing the snapshot.

Caution: Make sure that the VEA service is running on the secondary host. Also, make sure that the database owner of the secondary host is registered on the VEA Service Console Registry.

See [“Adding users to the Veritas Enterprise Administrator”](#) on page 15.

To remove a Database FlashSnap clone database

- 1 Access the Remove Clone Database wizard.
See [“Accessing clone database tasks in the Java GUI”](#) on page 27.
See [“Accessing database tasks in the Web GUI”](#) on page 35.
- 2 The **Remove Clone Database** dialog displays. In the Authentication section, verify the UNIX user name and enter the password.
Verify the Snapplan File name and the Relocate path.
You may check the **Resync Snapshot** option to resynchronize the snapshot. If you check the **Resync Snapshot** option, you must enter a password.
In the **Primary Database Information** section, verify the following information:
 - Primary Host Name
 - UNIX User Name

- 3 Click the **Remove Clone Database** button.
- 4 In the **Confirmation** dialog, click **Yes** to proceed with removing the clone database.

Managing Storage Checkpoints

This chapter includes the following topics:

- [About Storage Checkpoints](#)
- [Creating a Storage Checkpoint](#)
- [Viewing Storage Checkpoint details](#)
- [Mounting a Storage Checkpoint](#)
- [Unmounting a Storage Checkpoint](#)
- [Removing a Storage Checkpoint](#)
- [Rolling back to a Storage Checkpoint](#)

About Storage Checkpoints

A Storage Checkpoint is like an online backup of a database that contains a point-in-time database image. Storage Checkpoints can later be used to restore the image of a datafile, a tablespace, or the entire database to any earlier state recorded by the Storage Checkpoints.

Veritas Storage Foundation for Oracle uses the SFDB repository to determine the list of tablespaces, datafiles, and file systems for Storage Checkpoint creation and removal.

For more information about Storage Checkpoints:

See the chapter on using Storage Checkpoints and Storage Rollback in the *Veritas Storage Foundation for Oracle Administrator's Guide*.

Creating a Storage Checkpoint

You can create a Storage Checkpoint that is:

- offline
- online
- instant

If the database is online when the Storage Checkpoint is created, Storage Foundation for Oracle switches the database to online backup mode before creating the Storage Checkpoint. Once the Storage Checkpoint is created, Storage Foundation for Oracle switches the database back to its normal operation mode.

For the instant option, the database should be online and it can be running in either ARCHIVELOG or NOARCHIVELOG mode. You can only roll back the entire database to an instant Storage Checkpoint. After the rollback is complete, you need to perform Oracle database instance recovery. Rolling the database forward is not supported; that is, you cannot apply archived redo logs.

In addition to creating a Storage Checkpoint, the GUI automatically backs up the associated control files, initialization file, and log information. For example, you have made a structural change to your database, and then you need to roll back the database to a Storage Checkpoint that was created before the structural change. The Storage Rollback would only be successful if you could also reconstruct the database to the same structure that it was when the Storage Checkpoint was created. You can recreate the previous database structure using the control files, initialization file, and log information that were backed up when the Storage Checkpoint was created.

Prerequisites

- Enable ARCHIVELOG mode before taking online Storage Checkpoints.
See the chapter on using Storage Checkpoints and Storage Rollback in the *Veritas Storage Foundation for Oracle Administrator's Guide*.

To create a Storage Checkpoint

- 1 Access the Create a Storage Checkpoint wizard.
See [“Accessing Storage Checkpoint tasks in the Java GUI”](#) on page 27.
See [“Accessing database tasks in the Web GUI”](#) on page 35.
- 2 Verify the Oracle SID, which is the Oracle System Identifier, for which you are creating the Storage Checkpoint. This is a read-only field.
- 3 Select one of the following options:
 - To create an online Storage Checkpoint, click the **Online** button.

- To create an offline Storage Checkpoint, click the **Offline** button.
 - To create an instant Storage Checkpoint, click the **Instant** button.
- 4 If you want to remove the Storage Checkpoint when the file system becomes full, click the **Remove This Storage Checkpoint** button.
If you want to retain the Storage Checkpoint when the file system becomes full, click the **Retain This Storage Checkpoint** button.
 - 5 Click **Create** to continue.
 - 6 At the prompt, click **Yes** to proceed with creating the Storage Checkpoint.
If the Storage Checkpoint is successfully created, a confirmation message displays. To see details, click the **Show Details** checkbox. The details are displayed in a pop-up window.
Click **OK** to continue.

Viewing Storage Checkpoint details

You can view the details of a Storage Checkpoint.

To view the details of a Storage Checkpoint

- 1 Click a specific **Storage Checkpoint** in the object tree. (You may need to expand the tree view to find the Storage Checkpoint.) The Storage Checkpoint information is displayed on the right side of the window.
- 2 To view file system quota information for the Storage Checkpoint, click the **File System Quota** tab at the top of the window, just above the Storage Checkpoint details.

The file system quota information is only available for disk layout version 6.

Mounting a Storage Checkpoint

You can mount and write to Storage Checkpoints just as you can do with any file system.

See “Using Storage Checkpoints and Storage Rollback” in the *Veritas Storage Foundation for Oracle Administrator’s Guide*.

- Prerequisites
- The directory containing the mount point must be writable by the database administrator group. You should have created this group during installation. If not, create the group before mounting the Storage Checkpoint.

To mount a Storage Checkpoint

- 1 Access the Mount a Storage Checkpoint wizard.
See “[Accessing Storage Checkpoint tasks in the Java GUI](#)” on page 27.
See “[Accessing database tasks in the Web GUI](#)” on page 35.
- 2 Verify that you are mounting the correct Storage Checkpoint and click **Next** to continue. If you selected the wrong Storage Checkpoint, click **Cancel**. The information on this screen is read-only.
- 3 On the second screen, enter the mount point (absolute path) where the Storage Checkpoint should be mounted.
- 4 To mount the Storage Checkpoint as read-only, click **Read Only**.
or
To mount the Storage Checkpoint as read-write, click **Read/Write**. This will allow you to make changes to the Storage Checkpoint.
When you select the **Read/Write** option, the GUI creates an identical Storage Checkpoint with the same name plus a `wr <001>` suffix, where `<001>` is a sequential number. The GUI mounts the new Storage Checkpoint and leaves the original Storage Checkpoint unmounted. This allows you to roll back to the original Storage Checkpoint.
- 5 Click **Mount** to mount the Storage Checkpoint.
- 6 At the prompt, click **Yes** to proceed with mounting the Storage Checkpoint.
When you have finished viewing the details in the Confirmation dialog, click **OK** to continue.

Unmounting a Storage Checkpoint

You can unmount a Storage Checkpoint just as you can do with any file system.

To unmount a Storage Checkpoint

- 1 Click a specific Storage Checkpoint in the object tree. (You may need to expand the tree view to find the Storage Checkpoint.)

If you want to unmount a Storage Checkpoint that was originally mounted with the **Read/Write** option, you should unmount the new Storage Checkpoint that was automatically created by the GUI, which is the Storage Checkpoint that contains the `wr<001>` suffix, where `<001>` is a sequential number, at the end of the name.

- 2 Access the Unmount a Storage Checkpoint wizard.
See [“Accessing Storage Checkpoint tasks in the Java GUI”](#) on page 27.
See [“Accessing database tasks in the Web GUI”](#) on page 35.
- 3 Verify that you are unmounting the correct Storage Checkpoint and click **Unmount** to continue. If you selected the wrong Storage Checkpoint, click **Cancel**. The information on this screen is read-only.
- 4 At the prompt, click **Yes** to proceed with unmounting the Storage Checkpoint.
- 5 A confirmation dialog is displayed. Click **OK** to continue.

Removing a Storage Checkpoint

Occasionally, you may need to manually remove Storage Checkpoints that are no longer needed. For example, you can remove a Storage Checkpoint on a file system to free up needed space.

- Prerequisites
- Before you can remove a mounted Storage Checkpoint, you must first unmount it.

To remove a Storage Checkpoint

- 1 Click a specific Storage Checkpoint in the object tree. (You may need to expand the tree view to find the Storage Checkpoint.)
- 2 Access the Unmount a Storage Checkpoint wizard.
See [“Accessing Storage Checkpoint tasks in the Java GUI”](#) on page 27.
See [“Accessing database tasks in the Web GUI”](#) on page 35.
- 3 At the prompt, click **Yes** to remove the Storage Checkpoint.

If the Storage Checkpoint was successfully removed, a confirmation message displays. Click **OK** to continue.

Rolling back to a Storage Checkpoint

You can roll back a database file, a list of database files, a single tablespace, or the entire database to a Storage Checkpoint. To perform a Storage Rollback, you must have a valid Storage Checkpoint. This option is not available with an instant Storage Checkpoint.

The GUI does not automatically roll back the control file associated with a Storage Checkpoint.

See “Guidelines for Oracle Recovery” in the *Veritas Storage Foundation for Oracle Administrator’s Guide*.

You must be the Database Administrator to perform Storage Rollback operations. You must shut down the instance to perform full Storage Rollback of the database, or you can choose to leave the database up to roll back a datafile or tablespace. In this situation, Veritas Storage Foundation for Oracle checks to see if the target database objects are offline before proceeding.

Storage Checkpoints can only be used to roll back files that are damaged due to a software error or a human error (for example, accidental deletion of a table). Because Storage Checkpoints reside on the same physical disks as the primary file system, when a file is corrupted due to a media failure, the file on the Storage Checkpoints will not be available either. In this case, you need to restore files from a tape backup.

After the files are rolled back, you may need to follow the recovery procedure described in your Oracle manuals to recover the database before the database can be used.

Some database changes, made after a Storage Checkpoint was taken, may make it impossible to run Storage Rollback successfully. For example, you cannot successfully run Storage Rollback if the control files for the database have recorded the addition or removal of datafiles. To provide recovery options, a backup copy of the control file for the database is saved under the `/etc/vx/<ORACLE_SID>/checkpoint_dir/<CKPT_NAME>` directory just after a Storage Checkpoint is created. You can use this file to assist with database recovery, if necessary. If possible, both an ASCII and binary version of the control file will be left under the `/etc/vx/<ORACLE_SID>/checkpoint_dir/<CKPT_NAME>` directory, with the binary version being compressed to conserve space. Use extreme caution when recovering your database using alternate control files.

Rolling back the database to a Storage Checkpoint

Rolling back the entire database rolls back all the datafiles used by the database, except the redo logs and control files, to a Storage Checkpoint.

While the Storage Rollback process is running, it creates a temporary file, `/filesystem/.VRTSstrb.lock`, in each file system. Do not remove these temporary lock files.

To rollback the database to a Storage Checkpoint

- 1 Shut down the Oracle database from the GUI.
- 2 Click the a specific Storage Checkpoint in the object tree. (You may need to expand the tree view to find the Storage Checkpoint.)
- 3 Access the Roll Back a Storage Checkpoint wizard.
 See [“Accessing Storage Checkpoint tasks in the Java GUI”](#) on page 27.
 See [“Accessing database tasks in the Web GUI”](#) on page 35.
- 4 Verify that you are rolling back to the correct Storage Checkpoint and click **Next** to continue. If you selected the wrong Storage Checkpoint, click **Cancel**. The information on this screen is read-only.
- 5 On the second screen, use the drop-down menu to select the appropriate buffer size in the Rollback Buffer Size field. The default buffer size is 128K.
 The buffer size configured for reads and writes when performing a Storage Rollback can affect performance. Vary the size to determine the optimal setting for your system.
- 6 Use the drop-down menu to select the appropriate number of threads in the Number of Threads field. The default number of threads is four.
 Depending on the number of CPUs available on your system and the type of volume on which the file system is located, this default setting may specify too few or too many threads.
- 7 Click the **Roll back a database** button to indicate that you are rolling back the entire database to the Storage Checkpoint.
- 8 Click **Next** to continue. Click **Roll Back** to continue.
 If the Storage Rollback was successful, a confirmation message is displayed.
- 9 To see the Storage Rollback details, click the **Show details** checkbox. The details are displayed in the pop-up window.
 When you have finished viewing the details, click **OK**.
- 10 Click **Yes** to roll back the tablespace or tablespaces. Perform any necessary Oracle recovery. (You cannot recover your database through the GUI.)
- 11 Restart the database from the GUI.

Rolling back a tablespace to a Storage Checkpoint

If a tablespace is corrupted or removed due to a software error or a human mistake, this operation rolls back all of the files of the corrupted or removed tablespace to a Storage Checkpoint.

This option is only available for offline and online Storage Checkpoints. You cannot roll back a tablespace to an instant Storage Checkpoint.

Rolling back a tablespace is used for complete recovery of the tablespace. It is not designed for point-in-time (incomplete) tablespace recovery, which is more complicated and requires interaction with Oracle Customer Support. The tablespace point-in-time recovery requires using a clone database. For more information:

See [“Creating a clone database”](#) on page 51.

Prerequisites ■ You can perform this operation while the database is online as long as the tablespace is offline.

To roll back a tablespace to a Storage Checkpoint

- 1 Verify that the tablespace to which you want to roll back is offline.
- 2 Access the Rollback a Storage Checkpoint wizard.
See [“Accessing Storage Checkpoint tasks in the Java GUI”](#) on page 27.
See [“Accessing database tasks in the Web GUI”](#) on page 35.
- 3 If the database is online, you will receive a prompt asking you if you want to continue. Click **Yes** to continue the Storage Rollback.
- 4 In the Rollback a Storage Checkpoint wizard, verify that you are rolling back to the correct Storage Checkpoint and click **Next** to continue. If you selected the wrong Storage Checkpoint, click **Cancel**. The information on this screen is read-only.
- 5 On the second screen, use the drop-down menu to select the appropriate buffer size in the Rollback Buffer Size field. The default buffer size is 128K.
The buffer size configured for reads and writes when performing a Storage Rollback can affect performance. Vary the size to determine the optimal setting for your system.
- 6 Use the drop-down menu to select the appropriate number of threads in the Number of Threads field. The default number of threads is four.
Depending on the number of CPUs available on your system and the type of volume on which the file system is located, this default setting may specify too few or too many threads.

- 7 Click the **Rollback a Tablespace** button to indicate that you are rolling back the tablespace to the Storage Checkpoint.
- 8 Click **Next** to continue. Select the tablespace, or tablespaces, you would like to roll back by clicking the appropriate checkbox in the Tablespace list.
- 9 Click **Roll Back** to continue.
- 10 If the Storage Rollback was successful, a confirmation message displays. Click **OK** to continue.
- 11 Click **Yes** to rollback the datafile or datafiles. Perform any necessary Oracle media recovery. (You cannot recover database information through the GUI.)
- 12 Put the recovered tablespace back online.

Rolling back datafiles to a Storage Checkpoint

Rolling back datafiles rolls back database files to a Storage Checkpoint. You can also use this operation to roll back more than one datafile.

This option is only available for offline and online Storage Checkpoints. You cannot roll back a datafile to an instant Storage Checkpoint.

Prerequisites ■ You can perform this operation while the database is online as long as the tablespace is offline.

To roll back datafiles to a Storage Checkpoint

- 1 Verify that the datafile to which you want to roll back is offline.
- 2 Access the Rollback a Storage Checkpoint wizard.
See [“Accessing Storage Checkpoint tasks in the Java GUI”](#) on page 27.
See [“Accessing database tasks in the Web GUI”](#) on page 35.
- 3 If the database is online, you will receive a prompt asking you if you want to continue. Click **Yes** to continue the Storage Rollback.
- 4 In the Rollback a Storage Checkpoint wizard, verify that you are rolling back to the correct Storage Checkpoint and click **Next** to continue. If you selected the wrong Storage Checkpoint, click **Cancel**. The information on this screen is read-only.
- 5 On the second screen, use the drop-down menu to select the appropriate buffer size in the Rollback Buffer Size field. The default buffer size is 128K.
The buffer size configured for reads and writes when performing a Storage Rollback can affect performance. Vary the size to determine the optimal setting for your system.

- 6 Use the drop-down menu to select the appropriate number of threads in the Number of Threads field. The default number of threads is four.

Depending on the number of CPUs available on your system and the type of volume on which the file system is located, this default setting may specify too few or too many threads.
- 7 Click the **Roll back a Datafile** button to indicate that you are rolling back the datafile to the Storage Checkpoint.
- 8 Click **Next** to continue.
- 9 Select the datafile, or datafiles, you would like to roll back by clicking on the appropriate checkbox in the Datafile list.
- 10 Click **Roll Back** to continue.
- 11 If the Storage Rollback was successful, a confirmation message displays. Click **OK** to continue. You are then returned to the rollback window.
- 12 Perform any necessary Oracle media recovery.
- 13 Put the recovered datafile back online.

Managing snapshots using Database FlashSnap

This chapter includes the following topics:

- [Database FlashSnap in the GUI](#)
- [Creating a snapplan](#)
- [Validating or modifying a snapplan](#)
- [Removing a snapplan](#)
- [Creating a snapshot](#)
- [Creating a clone database with a snapshot](#)
- [Resynchronizing a snapshot to a database](#)
- [Resynchronizing a database to a snapshot](#)
- [Aborting the reverse resynchronization operation](#)
- [Viewing the snapplan log](#)

Database FlashSnap in the GUI

With Veritas Database FlashSnap, you can create a point-in-time copy of a database for backup and off-host processing. For more information:

See [Using Database FlashSnap for Backup and Off-Host Processing in the Veritas Storage Foundation for Oracle Administrator's Guide](#).

From the GUI, you can:

- Create snapshots of your database using snapplans.

- Resynchronize snapshots to your database.
- Resynchronize your database to a snapshot.

Database FlashSnap functionality is not supported on duplicated (cloned) databases.

Creating a snapplan

A snapplan specifies snapshot scenarios for the Oracle database (such as online, offline, and instant). The snapplan is used as a basis for creating a snapshot. You must either create or validate a snapplan before you can create the snapshot image.

- | | |
|---------------|---|
| Prerequisites | <ul style="list-style-type: none">■ You must be logged in as the Oracle database administrator.■ The disk group must be version 110 or higher.■ Persistent FastResync must be enabled.■ To set up your snapplan for online snapshots, the database must be in archive log mode. |
| Usage notes | <ul style="list-style-type: none">■ Database FlashSnap functionality is not supported on cloned (duplicated) databases.■ The snapplan name is user-defined.■ Each entry in the snapplan is a line in <code>parameter=argument format</code>.
See the <code>dbed_vmsnapplan(1M)</code> and <code>dbed_vmchecksnap(1M)</code> manual page for more information. |

To create a snapplan

- 1 Access the Create Snapplan wizard.
See [“Accessing FlashSnap tasks in the Java GUI”](#) on page 28.
See [“Accessing database tasks in the Web GUI”](#) on page 35.
- 2 Confirm the Oracle SID. This is a read-only field.
- 3 Enter the full path of the snapplan file.
- 4 Enter the name of the secondary host.
- 5 Enter the snapshot plex tag.
- 6 Click **Next** to continue.

The Validate/Modify Snapplan screen is displayed with default values set.

- 7 If needed, modify any incorrect settings. Then, click **Validate** to ensure that the settings have been configured correctly.

For more information regarding the snapplan parameters:

See “Creating and Working with Snapplans Using dbed_vmchecksnap” in the *Veritas Storage Foundation for Oracle Administrator's Guide*.

- 8 At the confirmation prompt, click **Yes** to confirm that you want to validate the snapplan.

If the snapplan was successfully validated, you will receive a confirmation message.

- 9 To see the snapplan details, click the **Show details** checkbox. The snapplan details are displayed in the pop-up window.

When you have finished reviewing them, click **OK**.

Snapplan details:

PRIMARY_HOST is host1

SECONDARY_HOST is host2

The version of PRIMARY_DG-PRODdg is 110.

SNAPSHOT_DG is SNAP_PRODdg

SNAPSHOT_MODE is online

The database is running in archive log mode.

ARCHIVELOG_DEST is /prod_db

SNAPSHOT_PLAN_FOR is database

SNAPSHOT_ARCHIVE_LOG is yes

ARCHIVELOG_DEST=/prod_db is mount on /dev/vx/dsk/PRODdg/ORACLE1.

Examining Oracle volume and disk layout for snapshot.

Volume ORACLE1 on PRODdg is ready for snapshot.

Original plex and DCO log for ORACLE1 is on PRODdg02.

Snapshot plex and DCO log for ORACLE1 is on PRODdg01.

```
Volume oracon on PRODDg is ready for snapshot.  
Original plex and DCO log for oracon is on PRODDg02.  
Snapshot plex and DCO log for oracon is on PRODDg01.  
  
SNAP_PRODDg for snapshot will include: PRODDg01  
  
ALLOW_REVERSE_RESYNC is yes  
  
The snapplan sp3 has been created.
```

Validating or modifying a snapplan

Before creating a snapshot, it is necessary to validate your snapplan to make sure the information is correct and that the snapshot will succeed. Occasionally, you may also need to modify a snapplan. For example, you would need to modify your snapplan if you wanted to change the primary disk group that is included in the snapshot.

- | | |
|---------------|--|
| Prerequisites | <ul style="list-style-type: none">■ You must be logged in as the Oracle database administrator.■ A DCO log must be attached to the snapshot plex. |
| Usage notes | <ul style="list-style-type: none">■ Each entry in the snapplan is a line in <code>parameter=argument</code> format. |

To validate or modify a snapplan

- 1 Click a specific snapplan in the object tree. (You may need to expand the tree view to find the icon.)
- 2 Access the Validate/Modify Snapplan wizard.
See [“Accessing FlashSnap tasks in the Java GUI”](#) on page 28.
See [“Accessing database tasks in the Web GUI”](#) on page 35.
- 3 In the Modify/Validate Snapplan wizard, correct the path and file name of the snapplan in the **Snapplan file** field. Then, click **Next** to continue.
- 4 If you are modifying your snapplan, enter any new parameters that should be updated. You are not required to do anything if no changes are required.
For more information regarding the snapplan parameters:
See *“Creating and Working with Snapplans Using dbed_vmchecksnap”* in the *Veritas Storage Foundation for Oracle Administrator’s Guide*.
- 5 Click **Validate** to check that the settings have been configured correctly.

- 6 At the confirmation prompt, click **Yes** to confirm that you want to validate the snapplan.

If the snapplan was successfully validated, you will receive a confirmation message.

- 7 To see the snapplan details, click the **Show details** checkbox. The snapplan details are displayed in the pop-up window.

When you have finished reviewing them, click **OK**.

Snapplan details:

PRIMARY_HOST is host1

SECONDARY_HOST is host2

The version of PRIMARY_DG-PRODdg is 110.

SNAPSHOT_DG is SNAP_PRODdg

SNAPSHOT_MODE is online

The database is running in archivelog mode.

ARCHIVELOG_DEST is /prod_db

SNAPSHOT_PLAN_FOR is database

SNAPSHOT_ARCHIVE_LOG is yes

ARCHIVELOG_DEST=/prod_db is mount on /dev/vx/dsk/PRODdg/ORACLE1.

Examining Oracle volume and disk layout for snapshot.

Volume ORACLE1 on PRODdg is ready for snapshot.

Original plex and DCO log for ORACLE1 is on PRODdg02.

Snapshot plex and DCO log for ORACLE1 is on PRODdg01.

Volume oracon on PRODdg is ready for snapshot.

Original plex and DCO log for oracon is on PRODdg02.

Snapshot plex and DCO log for oracon is on PRODdg01.

SNAP_PRODdg for snapshot will include: PRODdg01

ALLOW_REVERSE_RESYNC is yes

The snapplan sp3 has been created.

Removing a snapplan

You may need to remove a snapplan that is no longer necessary. However, you cannot create a snapshot if you do not have a snapplan.

Prerequisites ■ You must be logged in as the Oracle database administrator.

To remove a snapplan

- 1 Click the snapplan you want to remove in the object tree. (You may need to expand the tree view to find the icon.)
- 2 Access the Remove Snapplan dialog:
See [“Accessing FlashSnap tasks in the Java GUI”](#) on page 28.
See [“Accessing database tasks in the Web GUI”](#) on page 35.
- 3 At the prompt, click **Yes** to continue with removing the snapplan.
If the snapplan was successfully removed, you will receive a confirmation message similar to the following:
- 4 Click the **Show details** checkbox to view the actions taken. You should see information similar to the following:

```
The snapplan <filename> has been removed.
```

Click **OK** to continue.

Creating a snapshot

After having created and validated a snapplan, you can create a snapshot of your database. You can use the snapshot as a database backup or as a test database to perform operations without affecting your production database.

Prerequisites ■ Before you can create a snapshot, a snapshot mirror of a volume must exist.
■ You must have a validated snapplan before creating a snapshot image.
■ You must be logged in as the Oracle database administrator.

- Usage notes
- See the `dbed_vmsnap(1M)` manual page for more information.
 - If you are creating an offhost snapshot, perform these steps on the secondary host.

To create a snapshot

- 1 Access the Create Snapshot wizard.
See [“Accessing FlashSnap tasks in the Java GUI”](#) on page 28.
See [“Accessing database tasks in the Web GUI”](#) on page 35.
- 2 Verify the snapplan location. (This is a read-only field.)
- 3 If you need to force the snapshot creation, click the **Force snapshot creation** checkbox.

Force snapshot creation can be used after a snapshot operation has failed and the problem was fixed without using Veritas Storage Foundation for Oracle commands. (That is, the volumes were synchronized without using Veritas Storage Foundation for Oracle commands.)

In this situation, the status of the snapplan will appear as unavailable for creating a snapshot. The **Force snapshot creation** option ignores the unavailable status, checks for the availability of volumes, and creates the snapshot after the volumes pass the availability check.

- 4 Click **Finish** to continue.

- 5 If the snapshot creation was successful, you will receive a confirmation message.

Click the **Show details** checkbox to view the actions taken. You should see information similar to the following:

```
dbed_vmsnap started at 2004-05-13 17:09:40
repository is up to date.
The database is running in archive log mode.
A snapshot of ORACLE_SID PROD is in DG SNAP_PRODDg.
Snapplan sp2 is used for the snapshot.
repository volume is SNAP_ORACLE1.
If -r <relocate_path> is used in dbed_vmclonedb,
make sure <relocate_path> is created and owned by
Oracle DBA. Otherwise, the following mount points
need to be created and owned by Oracle DBA:
/prod_db.
/oracon.
dbed_vmsnap ended at 2003-05-13 17:10:29
db2ed_vmsnap started at 2004-06-08 11:41:39
DB20000I The SET WRITE command completed successfully.
DB20000I The SET WRITE command completed successfully.
A snapshot of DB2DATABASE UDB is in DG SNAP_DB2dg.
Snapplan spl is used for the snapshot.
If -r <relocate_path> is used in db2ed_vmclonedb,
make sure <relocate_path> is created and owned by DB2 Instance Owner.
Otherwise, the following mount points need to be
created and owned by DB2 Instance Owner:
/db2/testvol01.
/db2/testvol02.
/db2/testvol03.
/db2/testvol04.
/db2/testvol05.
/db2/udb_home.
db2ed_vmsnap ended at 2004-06-08 11:42:14
```

- 6 Click **OK** to continue.

You can now use the snapshot as a database backup.

You will need this information when you start your snapshot database.

Creating a clone database with a snapshot

After having created a snapshot, you can use the snapshot to create a clone database. The cloned database can be used for decision-making and testing that cannot be done on your production database.

- Prerequisites
- Make sure you have enough disk space to create a clone database on your system.
 - You must have an existing snapshot.

To create a clone database with a snapshot

- 1 Click the database object Oracle icon in the object tree. (You may need to expand the tree view to find the icon.)
- 2 Access the Create Snapshot Database wizard.
 See [“Accessing FlashSnap tasks in the Java GUI”](#) on page 28.
 See [“Accessing database tasks in the Web GUI”](#) on page 35.
- 3 In the “connect as” section of the Create Snapshot Database wizard, enter the local path to Oracle home. Then, enter your Unix user name, password.
- 4 For the primary database, enter the Oracle SID information.
- 5 Select whether you are recovering the database or restarting the database by clicking the appropriate radio button.

Select **Startup database** if you are restarting a new snapshot database based on a snapshot.

Select **Restart database** if you are restarting a snapshot database that has already been created.

- 6 For the snapshot database, enter the new Oracle SID, Snapplan file, volume name, Snapshot disk group name, and Relocate path in the appropriate fields.

To start an on-host snapshot database, the Relocate path is required. To start an off-host snapshot database, the volume name field is required. You can obtain this information by viewing the details after you create a snapshot. If you did not retain the information from the snapshot creation, you can use the `dbed_vmchecksnap` command or use Viewlog via the GUI to retrieve the information.

See “Creating and Working with Snapplans Using `dbed_vmchecksnap`” in the *Veritas Storage Foundation for Oracle Administrator’s Guide*.

- 7 Click **Start Database**.
- 8 At the confirmation prompt, click **Yes** to confirm that you want to start the database.

If the snapshot database was successfully started, confirmation message displays. Click **OK** to continue.

Resynchronizing a snapshot to a database

Resynchronizing a snapshot to a database will refresh the snapshot so that it contains the most recent changes made to your production database.

Prerequisites

- You must be logged in as the Oracle database administrator.
- You must shut down the clone database and unmount the file systems.

Usage notes

- See the `dbed_vmsnap(1M)` manual page for more information.

- 1 Click a snapplan, located under the **Snapplans** icon, in the object tree. (You may need to expand the tree view to find the icon.)
- 2 Access the Resync Snapshot wizard.
See [“Accessing FlashSnap tasks in the Java GUI”](#) on page 28.
See [“Accessing database tasks in the Web GUI”](#) on page 35.
- 3 At the confirmation prompt, click **OK** to continue resynchronizing the snapshot to the database.
- 4 If the resynchronization is successful, you a confirmation message displays. Click **OK** to continue.
- 5 Status information similar to the following example is displayed. Click **OK** when you have finished viewing the information.

```
dbed_vmsnap started at 2005-05-13 17:20:05
```

```
The option resync has been completed.
```

```
dbeddbed_vmsnap ended at 2005-05-13 17:20:41
```

To see the details, click the **Show details** checkbox. The details are displayed in a pop-up window.

Resynchronizing a database to a snapshot

Resynchronizing your database to a snapshot, also known as reverse resynchronization, reverts your database to a snapshot. Use this option if your database becomes corrupted and you need to restore your database to a previous point-in-time.

- Prerequisites
- You must be logged in as the Oracle database administrator.
 - You must shut down the primary database and the clone database; also, unmount the file systems.
- Usage notes
- See the `dbed_vmsnap(1M)` manual page for more information.

To resynchronize a database to a snapshot

- 1 Click a snapplan, located under the **Snapplans** icon, in the object tree. (You may need to expand the tree view to find the icon.)
- 2 Access the Reverse Resync wizard.
See [“Accessing FlashSnap tasks in the Java GUI”](#) on page 28.
See [“Accessing database tasks in the Web GUI”](#) on page 35.
- 3 Verify the Oracle SID and snapplan information. These are read-only fields.
- 4 Click the **Begin** button, then click **Finish** to start the reverse resynchronization process. To view details, click the **Show details** checkbox. The details are displayed in a pop-up window.
- 5 At the confirmation prompt, click **Yes** to continue.
The **Begin** option performs the following actions:
 - Imports the disk group that was deported from the secondary host and joins it back to the original disk group.
 - Mounts the snapshot volumes.
 - Mounts the file systems that are configured for the primary database.
 - Brings up the database snapshot image as the primary database.The primary database must be offline to perform this action.
- 6 If the begin action was successful, a confirmation message displays. Click **Show details** to see the actions completed. When you are through, click **OK** to continue.
- 7 Again, click the snapplan on which you want to perform the reverse resynchronization.

- 8 Select one of the following methods to access the Reverse Resync wizard:
 - From the menu bar, select **Snapplan > Reverse Resync Snapshot**.
 - Right-click the snapplan to bring up a pop-up menu. Then click **Reverse Resync Snapshot**.
The Reverse Resync wizard displays.
- 9 Click the **Commit** button, then click **Finish** to commit the reverse resynchronization process.
- 10 At the confirmation prompt, click **Yes** to continue.
The Commit option performs the following actions:
 - Commits the reverse resynchronization changes.
 - Resynchronizes the original volume from the data in the snapshot and then discards the content of the original database.

Warning: This action cannot be undone.

- 11 If the commit action was successful, a confirmation message displays. Click **Show details** to see the actions completed. When you are through, click **OK** to continue.

Aborting the reverse resynchronization operation

Occasionally, you may need to stop the reverse resynchronization process after you have begun. You can only abort the reverse resynchronization process after you have completed the Begin operation and before performing a Commit operation.

To abort the reverse resynchronization operation

- 1 Click the snapplan for which the reverse resynchronization was begun.
- 2 Select one of the following methods to access the Reverse Resync wizard.
Access the Reverse Resync Snapshot wizard.
See [“Accessing FlashSnap tasks in the Java GUI”](#) on page 28.
See [“Accessing database tasks in the Web GUI”](#) on page 35.
- 3 Verify the Oracle SID and snapplan information. These are read-only fields.
- 4 Click **Abort**, then click **Finish** to abort the reverse resynchronization process.
- 5 At the confirmation prompt, click **Yes** to continue.

The Abort option performs the following actions:

- Unmounts the snapshot volumes.
- Mounts the original volumes back with the file systems that are configured to use the volume.

This action can only be performed after a “begin” action has been completed and cannot be used after a reverse resynchronization has been committed.

- 6 If the abort action was successful, you will receive a confirmation message. Click

Show details to see the actions completed. When you are through, click **OK** to continue.

Viewing the snapplan log

The snapplan log displays information about the snapplan, disk group, snapshot Plex tag. It also displays the volume name and the snapshot status.

To view a snapplan log

- 1 In the object tree, click the snapplan whose log you wish to see. (You may need to expand the tree view to find the icon.)
- 2 Access the View Log wizard.

See [“Accessing FlashSnap tasks in the Java GUI”](#) on page 28.

See [“Accessing database tasks in the Web GUI”](#) on page 35.

A pop-up window appears displaying the path of the Snapplan and the Log. The information displayed is similar to the following output:

```
SNAPSHOT_VERSION=4.0
PRIMARY_HOST=exmoor
SECONDARY_HOST=exmoor
PRIMARY_DG=oradg
SNAPSHOT_DG=SNAP_oradg
ORACLE_SID=PROD
ARCHIVELOG_DEST=/prod_ar
SNAPSHOT_ARCHIVE_LOG=yes
SNAPSHOT_MODE=online
SNAPSHOT_PLAN_FOR=database
SNAPSHOT_PLEX_TAG=dbed_flashsnap
SNAPSHOT_VOL_PREFIX=SNAP_
ALLOW_REVERSE_RESYNC=yes
STORAGE_INFO
oradg03
SNAP_PLEX=prod_db-02 prod_ar-02
VOLUME_INFO
SNAP_prod_ar
STATUS_INFO
SNAP_STATUS=resync_start
DB_STATUS=init
LOCAL_SNAPPLAN=/oracle9i/snapplan/sp0
```

- 3 Click **OK** to continue.

Tiering storage for databases

This chapter includes the following topics:

- [About Database Dynamic Storage Tiering in the GUI](#)
- [Setting up Database Dynamic Storage Tiering parameters](#)
- [Setting automatic policies for Database Dynamic Storage Tiering](#)
- [Moving volumes and files](#)
- [Getting reports for Database Dynamic Storage Tiering](#)

About Database Dynamic Storage Tiering in the GUI

The Veritas Storage Foundation for Oracle GUI enables you to set up automated policies for Database Dynamic Storage Tiering as well as perform manual operations. The Veritas Storage Foundation for Oracle GUI enables you to:

- Set up Database Dynamic Storage Tiering parameters
- Manage volume and file movement by setting automatic policy
- Operate Database Dynamic Storage Tiering by moving volumes and files manually
- Get reports on Database Dynamic Storage Tiering
- Get reports on file system statistics across MVS file system

Note: Tiering storage is supported in the Java GUI only for Storage Foundation for Oracle 5.0.

Setting up Database Dynamic Storage Tiering parameters

Setting up Database Dynamic Storage Tiering requires some planning in advance. You will need to determine and specify:

- Directories where storage tiering policies will apply
- Frequency of sweeping and purging
- Storage class options

Setting up Database Dynamic Storage Tiering parameters

You must set up the Database Dynamic Storage Tiering parameters before you can apply automatic management policies.

To set up Database Dynamic Storage Tiering parameters

- 1 Access the Database Dynamic Storage Tiering Parameters wizard.
See [“To access tiered storage parameters wizards in the Java GUI”](#) on page 29.
- 2 Set up the parameters for the Database Dynamic Storage Tiering object or the GUI fills in default values. Set:
 - Minimum number of storage classes for file systems. The range is 2 to 99.
 - Maximum number of storage classes for file systems. The range is 2 to 99.
 - Statistic gathering interval (minutes).
 - Sweep interval (days). The range is 1 to 10.
 - Sweep time (hours, minutes, am/pm). You can enter one sweep time by specifying hour, minute, and AM or PM. Specify time according to the server time, not local time.
 - Purge interval (days). The range is 1 to 120.
 - Purge time (hours, minutes, am/pm). You can enter one purge time by specifying hour, minute, and AM or PM. Specify time according to the server time, not local time.

After setting the parameters click **Next**.

- 3 Set the storage classes or the GUI fills in default values. Click **Add Class** to specify each storage class in a separate row of the table.
 To sort table rows by Storage Class or Description, click the column headers. Empty classes are sorted to the bottom of the table.
 Pre-defined Storage Classes can not be modified or removed.
- 4 Click **Finish** when all storage classes are entered.
- 5 If the parameter updates are successfully implemented, a confirmation message displays. Click **OK** to continue.

To modify Database Dynamic Storage Tiering parameters

- 1 Access the Database Dynamic Storage Tiering wizard.
 See “[To access tiered storage parameters wizards in the Java GUI](#)” on page 29.
- 2 Modify the parameters for the Database Dynamic Storage Tiering object. Set:
 - Minimum number of storage classes for file systems. The range is 2 to 99.
 - Maximum number of storage classes for file systems. The range is 2 to 99.
 - Statistic gathering interval (minutes).
 - Sweep interval (days). The range is 1 to 10.
 - Sweep time (hours, minutes, am/pm). You can enter one sweep time by specifying hour, minute, and AM or PM. Specify time according to the server time, not local time.
 - Purge interval (days). The range is 1 to 120.
 - Purge time (hours, minutes, am/pm). You can enter one sweep time by specifying hour, minute, and AM or PM. Specify time according to the server time, not local time.

After setting the parameters click **Next**.

- 3 Set the storage classes or the GUI fills in default values. Click **Add** to specify each storage class in a separate row of the table.
 To sort table rows by Storage Class or Description, click the column headers. Empty classes are sorted to the bottom of the table.
 To modify the description of a class, click the class name and modify appropriately.
 To remove a class, select the class and click **Remove**.
 Pre-defined Storage Classes can not be modified or removed.

- 4 Click **Finish** when all storage classes are entered.
- 5 If the parameter updates are successfully implemented, a confirmation message displays. Click **OK** to continue.

Identifying tiered storage directories

Set the Database Dynamic Storage Tiering parameters before identifying the directories to which they apply, or the action will fail. Once you have set the tiered storage parameters, you can access the Database Dynamic Storage Tiering Convert/Add/Remove wizard.

To identify directories covered by tiered storage policies

- 1 Access the Database Dynamic Storage Tiering Convert/Add/Remove wizard.
See [“To access tiered storage parameters wizards in the Java GUI”](#) on page 29.
- 2 At the prompt, enter the directory name and click **Next**.
- 3 You are prompted to convert the mount device or add a new mount point.
To convert the mount device:
 - Right-click the volume name.
 - Click **Convert Mount Device**.
 - Enter the volume name.
 - Click **OK**.To add a new mount point:
 - In the Mount point field, enter the mount point.
 - Click **Get Information**.
- 4 To add volumes:
 - Right-click the volume set's name.
 - Select **Add Volumes**.
 - Enter the volume name.
 - Set the storage class.
 - Click **OK**.
- 5 To delete volumes:
 - Right-click the volume name.
 - Select **Remove Volumes**.

- Click **Yes** in confirmation dialog.
- 6 Click **Close**.
 - 7 If the directory is successfully converted, a confirmation message displays. Click **OK** to continue.

Classifying volumes

Classifying volumes enables you to set specific policies for them. You must define Database Dynamic Storage Tiering parameters before you can classify a volume.

To classify volumes

- 1 Access the Database Dynamic Storage Tiering Classify Volumes wizard.
See [“To access tiered storage parameters wizards in the Java GUI”](#) on page 29.
- 2 At the prompt, enter the directory name and click **Next**.
- 3 Select a storage class and click **Set Class**.
To leave volumes unclassified, select **None** as the storage class.
- 4 Click **Finish**.
- 5 If the directory is successfully classified, a confirmation message displays. Click **OK** to continue.

Setting automatic policies for Database Dynamic Storage Tiering

You can manage volume and file movement by setting automatic policies. Policies for automatically moving data from one storage tier to another can be set based on:

- Directory
- Archive log
- Flashback file
- External files

Listing policies

You can display a list of all the policies that have been set for Database Dynamic Storage Tiering.

To list policies

- 1 In the object tree, select the database object. You may need to expand the tree view to find the database object.
- 2 Select one of the following methods to access the Database Dynamic Storage Tiering List Policy wizard:
 - In the menu bar, click **Oracle > Database Dynamic Storage Tiering Management > List Policy**.
 - Right click the database object to bring up a pop-up menu. Then, click **Database Dynamic Storage Tiering Management > List Policy**.
- 3 Click **Yes** in the confirmation dialog.
All policies are displayed.
- 4 When finished, click **OK**.

Presetting policy

You can preset movement policy based on directories.

To preset policy

- 1 Access the Database Dynamic Storage Tiering Preset Policy wizard.
See [“To access the tiered storage policy wizards in the Java GUI”](#) on page 30.
- 2 In the **Preset Policy** page, enter the directory name.
- 3 To create or modify a policy, select **Create or modify a policy**.
- 4 Click **Next**. The file name patterns and storage classes display for the selected directory.
- 5 To add a file pattern to a storage class, double-click the cell in the **File Pattern** column, and enter a file pattern such as *.log, or *.dbf. Use commas to separate each file pattern.
- 6 To modify a file pattern for a storage class, double-click the cell corresponding to the file pattern and edit the file pattern.
- 7 To remove a file pattern for a storage class, double-click the cell corresponding to the file pattern and click **Remove File Pattern**.
- 8 To remove the policy, select **Remove Policy**.
- 9 To set the policy, click **Finish**.
- 10 Click **Yes** to confirm.

Setting archive log policy

You can set policy for moving archive logs. You must define Database Dynamic Storage Tiering parameters before you can set movement policies for archive logs.

Prerequisites

- Enable Oracle's archive log mode.
- Mount the archive log device on Veritas File System.

To set policy for moving archive logs

- 1 Access the Database Dynamic Storage Tiering Archive Log Policy wizard.
See [“To access the tiered storage policy wizards in the Java GUI”](#) on page 30.
- 2 Enter the archive log destination number.
- 3 Select **Create or modify** policy.
- 4 Click **Next**.
- 5 For each storage class, enter the number of days the archive is not accessed before it will be moved to that storage class. You can leave the Days field blank if you do not want to set policy for a storage class.
- 6 To set the policy, click **Finish**.
- 7 To remove the archive policy:
 - Select **Remove Policy**.
 - Click **Next**.
 - Click **Finish**.
 - Click **Yes** to confirm.

Setting flashback policy

You can set policy for moving flashback files. You must define Database Dynamic Storage Tiering parameters before you can set movement policies for flashback files.

Prerequisites

- Enable Oracle's archive log mode.
- Turn on flashback.
- Flashback destination is on Veritas File System.

To set policy for moving flashback files

- 1 Access the Database Dynamic Storage Tiering Flashback File Policy wizard.
See [“To access the tiered storage policy wizards in the Java GUI”](#) on page 30.
- 2 Select **Create or modify** policy.
- 3 Click **Next**.
- 4 For each storage class, select the number of days the file is not accessed before it will be moved to that storage class. You can leave the Days field blank if you do not want to set policy for a storage class.
- 5 To set the policy, click **Finish**.
- 6 To remove the flashback policy:
 - Select **Remove Policy**.
 - Click **Next**.
 - Click **Finish**.
 - Click **Yes** to confirm.

Setting external files policy

You can set policy for moving external files. You must define Database Dynamic Storage Tiering parameters before you can set movement policies for external files.

To set policy for moving external files

- 1 Access the Database Dynamic Storage Tiering External Files Policy wizard.
See [“To access the tiered storage policy wizards in the Java GUI”](#) on page 30.
- 2 Select **Create or modify** policy.
- 3 Enter the mount point.
- 4 Click **Next**.
- 5 Enter the directory/file names, separated by a new line.
- 6 For each storage class, select the number of days the file is not accessed before it will be moved to that storage class. You can leave the Days field blank if you do not want to set policy for a storage class.
- 7 To set the policy, click **Finish**.
- 8 To remove the external files policy:
 - Select **Remove Policy**.

- Click **Next**.
- Click **Finish**.
- Click **Yes** to confirm.

Moving volumes and files

You can operate Database Dynamic Storage Tiering by moving volumes and files manually as needed from one storage class to another. You can move:

- Tablespaces
- Datafiles
- Table partitions

Moving tablespaces

You can move tablespaces from one storage class to another. You must define Database Dynamic Storage Tiering parameters before you can move tablespaces.

To move tablespaces

- 1 Access the Database Dynamic Storage Tiering Move Tablespaces wizard. See [“To access tiered storage parameters wizards in the Java GUI”](#) on page 29. The tablespaces and their assigned storage classes display in the Move Tablespaces wizard. To sort, click on column headings.
- 2 Select the tablespaces to move.
- 3 Select the storage class to which the tablespaces will be moved.
- 4 To assign the selected tablespaces to the selected storage class, click **Set class**.
- 5 Repeat as needed for each class of storage until all tablespaces are assigned correctly. A blank storage class indicates the tablespace is not moved.
- 6 To move the tablespaces, click **Finish**.

Moving datafiles

You can move datafiles from one storage class to another. You must define Database Dynamic Storage Tiering parameters before you can set movement policies for external files.

To move datafiles

- 1 Access the Database Dynamic Storage Tiering Move Datafiles wizard.

See “[To access the tiered storage movement wizards in the Java GUI](#)” on page 30.

The datafiles and their assigned storage classes display in the Move Datafiles wizard. To sort, click on column headings.

- 2 Select the datafiles to move.
- 3 Select the storage class to which the datafiles will be moved.
- 4 To assign the selected datafiles to the selected storage class, click **Set class**.
- 5 Repeat as needed for each class of storage until all datafiles are assigned correctly. A blank storage class indicates the tablespace is not moved.
- 6 To move the datafiles, click **Finish**.

Moving table partitions

You can move table partitions from one storage class to another. You must define Database Dynamic Storage Tiering parameters before you can move tablespaces.

To move table partitions

- 1 Access the Database Dynamic Storage Tiering Move Tables Partitions wizard.
See “[To access tiered storage parameters wizards in the Java GUI](#)” on page 29.
- 2 Set the correct owner of the table. SYS is the default Schema Owner which must be defined to generate a correct table.
- 3 Enter a table name.
- 4 To get a list of partitions, click **Get partition**.
- 5 Select the table partition to move. When a table partition is selected, the tablespace displays.
- 6 Select the storage class to which the table partition will be moved.
- 7 To assign the selected tables partition to the selected storage class, click **Apply**.
- 8 Repeat as needed for until all tables partitions are assigned correctly.
- 9 To move the table partitions, click **Close**.

Getting reports for Database Dynamic Storage Tiering

Reports available in the GUI for Database Dynamic Storage Tiering include:

- Show activities
- Show volume usage
- Show datafile statistics chart

Listing policies

You can display a list of all the policies that have been set for Database Dynamic Storage Tiering.

To list policies

- 1 In the object tree, select the database object. You may need to expand the tree view to find the database object.
- 2 Select one of the following methods to access the Database Dynamic Storage Tiering List Policy wizard:
 - In the menu bar, click **Oracle > Database Dynamic Storage Tiering Management > List Policy**.
 - Right click the database object to bring up a pop-up menu. Then, click **Database Dynamic Storage Tiering Management > List Policy**.
- 3 Click **Yes** in the confirmation dialog.

All policies are displayed.
- 4 When finished, click **OK**.

Showing activities

You can display activities for selected date parameters.

To show activities

- 1 Access the Database Dynamic Storage Show Activities wizard.

See [“To access the tiered storage report wizards in the Java GUI”](#) on page 31.
- 2 Select the time period.
- 3 Click **Next**. All Database Dynamic Storage Tiering activities are displayed for the period of time selected.
- 4 To close the page when finished, click **Close**.

Showing volume usage

You can show volume usage for the selected mount point.

To show volume usage

- 1 Access the Database Dynamic Storage Tiering Show Volume Usage wizard.
See [“To access tiered storage parameters wizards in the Java GUI”](#) on page 29.
- 2 Enter the mount point.
- 3 Click **Get Volume Usage**. Volume usage displays for the mount point entered.
- 4 Enter additional mount points as required.
- 5 To close the page when finished, click **Close**.

Starting and stopping datafile statistics collection

Starting statistics collection for a datafile means the datafile is included when generating statistics charts. Stopping statistics collection for a datafile means the datafile will be excluded when generating statistics charts.

Collecting statistics on all datafiles could cause the repository to grow very fast for large numbers of datafiles, since collection is daily. To monitor important datafiles, use the Start/Stop Datafile Statistics Collection wizard to select the appropriate datafiles.

See [“Showing statistics chart”](#) on page 99.

Starting datafiles statistics collection

- 1 Access the Database Dynamic Storage Tiering Start/Stop Datafile Statistics Collection wizard.
See [“To access tiered storage parameters wizards in the Java GUI”](#) on page 29.
- 2 Select a datafile for which statistics will be collected.
- 3 Click **Start**.
- 4 Click **Finish** when all datafiles are set appropriately.

Stopping datafiles statistics collection

- 1 Access the Database Dynamic Storage Tiering Start/Stop Datafile Statistics Collection wizard.
See [“To access tiered storage parameters wizards in the Java GUI”](#) on page 29.
- 2 Select the datafiles for which statistics will no longer be collected.
- 3 Click **Stop**.
- 4 Click **Finish** when all datafiles are set appropriately.

Showing statistics chart

Before creating datafile statistics charts, you must enable the collection of datafiles statistics by using the Start/Stop Datafile Statistics Collection wizard.

See [“Starting and stopping datafile statistics collection”](#) on page 98.

You can create datafile statistics charts based on:

- Read/write statistics
- Time period
- Sorting parameters
- Datafiles

The statistics display in a bar chart.

To create a datafiles Statistics chart

- 1 Access the Database Dynamic Storage Tiering Show Datafiles Statistics Chart wizard.
See [“To access tiered storage parameters wizards in the Java GUI”](#) on page 29.
- 2 Select the report statistic:
 - Total read/write operations
 - Total read/write blocks
 - Total read/write bytes
 - Average read/write response time
- 3 Select the time period.
- 4 Select the sorting parameters.
- 5 Select the datafiles.
- 6 Click **Next**. The statistics are displayed in a bar chart.
- 7 To display the statistical trend, click **Show Statistic Trend**. The Show Statistic Trend line chart displays.
- 8 To move the containers to different storage classes, click **Move Container Classes**.
- 9 To close the chart pages when finished, click **Close**.

Automating database tasks

This chapter includes the following topics:

- [About automating tasks using the Java GUI scheduler](#)
- [Adding a scheduled task](#)
- [Viewing scheduled jobs](#)
- [Modifying a scheduled job task](#)
- [Automating creation of a database checkpoint](#)
- [Automating creation of a database snapshot](#)
- [Automating cloning of a database using a checkpoint](#)
- [Automating cloning of a database using FlashSnap](#)
- [Set the schedule parameters for an automated task](#)

About automating tasks using the Java GUI scheduler

Tasks that can be automated by using the Java GUI scheduler:

- Creating a database using checkpoint
- Creating a database using snapshot
- Cloning a database using checkpoint
- Cloning a database using snapshot

Note: Automating database tasks is supported in the Java GUI only for Storage Foundation for Oracle 5.0.

Adding a scheduled task

To automate a database task, you must add it to the scheduler.

To add a task to the scheduler

- 1 Access the scheduler wizard in GUI.
See [“Accessing scheduled tasks in the Java GUI”](#) on page 31.
- 2 Enter the required authorization information for the host on which you want to run the schedule:
 - User name
 - PasswordBy default, authorization is set to the database owner. If you are logged in as the database owner, you do not need to specify a password.
- 3 Enter the task information:
 - Task name
 - Task status: Normal, Hold, or Invalid
 - Host name
- 4 Select a task:
 - Create a new database checkpoint
 - Create a database snapshot
 - Clone a database using checkpoint
 - Clone a database using snapshot
- 5 Click **Next** to add the appropriate task.
See [“To create a database checkpoint”](#) on page 104.
See [“To create a database snapshot”](#) on page 104.
See [“To clone a database using checkpoint”](#) on page 105.
See [“To clone a database using snapshot”](#) on page 105.

Viewing scheduled jobs

You can view all existing automated tasks.

To view a sortable summary of scheduled jobs

- 1 Access a scheduled job in the GUI.
See [“Accessing scheduled tasks in the Java GUI”](#) on page 31.
- 2 Right-click the scheduled job and select **View Jobs**. The View Jobs page displays.
- 3 Select jobs to view by status, name, and date. Click **Refresh** to get the jobs that meet the conditions.
- 4 To view additional details, click **Details**. By default, the Job Details tab is collapsed. To display job attributes and values, expand the **Detail** tab.
- 5 To view command line interface output for a job, click the **CLI Output** tab in the Detail view.
- 6 Click **Close** when finished.

Modifying a scheduled job task

You can modify an automated database task using the scheduler wizard.

To modify a task to the scheduler

- 1 Access the scheduler wizard in GUI.
See [“Accessing scheduled tasks in the Java GUI”](#) on page 31.
- 2 Enter the required authorization information:
 - User name
 - Password
- 3 Modify the task information:
 - Task name
 - Task status: Normal, Hold, or Invalid
 - Host name
- 4 Select a task:
 - Create a database using checkpoint
 - Create a database using snapshot
 - Clone a database using checkpoint

- Clone a database using snapshot
- 5 Click **Next** to modify the appropriate task.
See [“To create a database checkpoint”](#) on page 104.
See [“To create a database snapshot”](#) on page 104.
See [“To clone a database using checkpoint”](#) on page 105.
See [“To clone a database using snapshot”](#) on page 105.

Automating creation of a database checkpoint

You can automate the creation of a database checkpoint using the scheduler.

To create a database checkpoint

- 1 Access the scheduler wizard in GUI.
See [“Accessing scheduled tasks in the Java GUI”](#) on page 31.
- 2 Select the Create database checkpoint option.
- 3 Click **Next**.
- 4 Select the Checkpoint type:
 - Online
 - Offline
 - Instant
- 5 Choose the appropriate action if the file system is full:
 - Remove this Storage Checkpoint
 - Retain this Storage Checkpoint
- 6 Click **Next** to set the schedule parameters.
See [“Set the schedule parameters for an automated task”](#) on page 106.

Automating creation of a database snapshot

You can automate the creation of a database snapshot using the scheduler.

To create a database snapshot

- 1 Access the scheduler wizard in GUI.
See [“Accessing scheduled tasks in the Java GUI”](#) on page 31.
- 2 Select the Create database snapshot option.

- 3 Select the name of the snapplan that will be used for creating the snapshot.
- 4 Click **Next** to set the schedule parameters.
See [“Set the schedule parameters for an automated task”](#) on page 106.

Automating cloning of a database using a checkpoint

You can automate the cloning of a database from a checkpoint using the scheduler.

To clone a database using checkpoint

- 1 Access the scheduler wizard in GUI.
See [“Accessing scheduled tasks in the Java GUI”](#) on page 31.
- 2 Select the Clone database checkpoint option.
- 3 Click **Next**.
- 4 To restart the database, check the Restart database checkbox.
- 5 Enter the target database information:
 - New Oracle SID
 - Mount Point
- 6 Enter the source database information:
 - Database name
- 7 Click **Next** to set the schedule parameters.
See [“Set the schedule parameters for an automated task”](#) on page 106.

Automating cloning of a database using FlashSnap

You can automate the creation of a database from a snapshot using the scheduler.

To clone a database using snapshot

- 1 Access the scheduler wizard in GUI.
See [“Accessing scheduled tasks in the Java GUI”](#) on page 31.
- 2 Select the Clone database snapshot option.
- 3 Click **Next**.
- 4 Select an existing snapplan to use for creating the clone database.
- 5 Click **Next**.
- 6 Specify whether the snapshot database will be created or restarted.

- 7 In the Create Snapshot Database page, set Oracle home.
- 8 Enter the target database information:
 - New Oracle SID
 - Relocate path
- 9 Click **Next** to set the schedule parameters.
See [“Set the schedule parameters for an automated task”](#) on page 106.

Set the schedule parameters for an automated task

- Specific routine
- Week days
- Days of the month
- Specific dates

The scheduler enables you to set or modify schedule parameters for automated tasks based on:

To set schedule parameters

- 1 Select and configure a task.
 - See [“To create a database checkpoint”](#) on page 104.
 - See [“To create a database snapshot”](#) on page 104.
 - See [“To clone a database using checkpoint”](#) on page 105.
 - See [“To clone a database using snapshot”](#) on page 105.

After you configure the task, you must set the schedule parameters.
- 2 To set a specific routine, click **Specific Routine** and set the parameters as required:
 - Start time
 - End time
 - Date for scheduled effects
 - Restart task option for run day
 - Days before repeating task
 - Start date
- 3 To set weeks days, click **Week Days** and check the days you want the automated task to run.

- 4 To set days of the month, click **Days of Month** and check the days you want the automated task to run.
- 5 To include or exclude specific days, click **Specific Dates** and select the dates you want to include or exclude running the automated task. Use the right and left arrows as needed to adjust the Include dates and Exclude dates.
- 6 When the scheduling information is complete, click **Finish**. The automated task is created.

Maintaining your system configuration

This chapter includes the following topics:

- [System configuration maintenance](#)
- [Resynchronizing the SFDB repository](#)
- [Rescanning the database instance](#)
- [Displaying and rescanning tablespace information](#)
- [Viewing Storage Mapping](#)
- [Viewing I/O statistics](#)
- [Determining the datafile file type](#)
- [Converting regular datafiles to Quick I/O Files](#)
- [Converting Quick I/O files to regular datafiles](#)
- [Updating rescan intervals](#)
- [Checking your system configuration](#)
- [Saving the system configuration](#)

System configuration maintenance

VERITAS Storage Foundation for Oracle maintains a repository that stores the pertinent information needed to display configuration information. This repository is located at `/etc/vx/$ORACLE_SID`. When the database configuration changes, the information stored in the repository may not be up-to-date. You can rescan,

or refresh, database instances, datafiles, and tablespaces to make sure system information is up-to-date.

The GUI also allows you to check and save the configuration of each Oracle database instance on your system. Information on all volumes, file systems and their types, and disk groups can be displayed.

Resynchronizing the SFDB repository

You can resynchronize the SFDB repository to make sure system information is up-to-date.

To resynchronize the SFDB repository

- 1 Access the wizard for this task.
See [“Accessing system maintenance tasks in the Java GUI”](#) on page 32.
See [“Accessing system maintenance tasks in the Web GUI”](#) on page 36.
- 2 Select option to resynchronize the repository.
- 3 In the confirmation dialog, click **OK** to continue.

Rescanning the database instance

You can rescan database instances to make sure system information is up-to-date.

To rescan the database instance

- 1 Access the wizard for this task.
See [“Accessing system maintenance tasks in the Java GUI”](#) on page 32.
See [“Accessing system maintenance tasks in the Web GUI”](#) on page 36.
- 2 Select the rescan option.
- 3 In the confirmation dialog, click **OK** to continue.

Displaying and rescanning tablespace information

You can rescan, or refresh, tablespaces to make sure system information is up-to-date.

To display tablespace information

- 1 Access the wizard for this task.
See [“Accessing system maintenance tasks in the Java GUI”](#) on page 32.
See [“Accessing system maintenance tasks in the Web GUI”](#) on page 36.
- 2 Expand your view to display the tablespace information.
- 3 Select the rescan option.
- 4 Click **OK** to continue.

Viewing Storage Mapping

The Storage Foundation for Oracle GUI enables you to view Storage Mapping topology. For a more detailed description of the Topology page:

See using Storage Mapping in the Veritas Storage Foundation for Oracle Administrator's Guide.

To view Oracle datafile Storage Mapping topology

- 1 Access the Oracle datafile Storage Mapping topology wizard.
See [“Accessing system maintenance tasks in the Java GUI”](#) on page 32.
See [“Accessing system maintenance tasks in the Web GUI”](#) on page 36.
- 2 When you are through, click **Close** to quit.

Viewing I/O statistics

The Storage Foundation for Oracle GUI enables you to view Storage Mapping I/O statistics.

Note: Quick I/O is not supported on Linux.

To view Oracle datafile I/O statistics

- 1 Access the Oracle datafile I/O statistics wizard.
See [“Accessing system maintenance tasks in the Java GUI”](#) on page 32.
See [“Accessing system maintenance tasks in the Web GUI”](#) on page 36.
- 2 To enable the **Get Statistics** button, enter the sampling information:
 - The number of times you wish to sample the data. You can enter a value from 0 to 9999.

- The interval, in minutes, between sampling points. You can enter a value from 0 to 9999.

The **Total Sampling Period (in hours)** displays the time used to perform the sampling of the data.

The **Display accumulated data** checkbox is checked by default.

The **Time Elapsed (in minutes)** displays the amount of time it took to sample the data. The progress status bar displays the percentage of sampling that is being completed.

- 3 After successful completion, a Confirmation dialog is displayed, indicating that the data was successfully collected for the specified time. Click **OK**, to continue.
- 4 When you are finished, click **Close**.

Determining the datafile file type

You can view the datafile properties to determine if the datafile is a Quick I/O file, an Oracle Disk Manager file, or a regular VxFS file.

To determine the datafile file type

- 1 Access the wizard for this task.
See [“Accessing system maintenance tasks in the Java GUI”](#) on page 32.
See [“Accessing system maintenance tasks in the Web GUI”](#) on page 36.
- 2 Click OK when you have finished viewing the datafile properties.

Converting regular datafiles to Quick I/O Files

VERITAS Storage Foundation for Oracle provides an option to convert your regular datafiles to Quick I/O files to improve performance.

Prerequisites

Files you want to convert must be regular datafiles on VxFS file systems or links that point to regular VxFS files.

Usage notes

Converting existing datafiles to be Quick I/O files may not be the optimal thing to do if these files are fragmented.

Note: Quick I/O is not supported on Linux.

To convert Oracle datafiles to Quick I/O files

- 1 Shut down the database from the GUI.
- 2 Select the datafile in the GUI.
- 3 Select the conversion option in the GUI to generate datafile statistics.
- 4 At the prompt, click **Yes** to convert to a Quick I/O file.
- 5 In the confirmation dialog, click **OK** to view the information.

Converting Quick I/O files to regular datafiles

VERITAS Storage Foundation for Oracle provides an option to convert your Quick I/O files to regular Oracle datafiles. Use this option only if you are running Oracle9i and VERITAS Extension for Oracle Disk Manager.

Prerequisites:

Files you want to convert must be Quick I/O files on VxFS file systems or links that point to Quick I/O files.

Note: Quick I/O is not supported on Linux.

To convert Quick I/O files to regular datafiles

- 1 Shut down the database from the GUI.
- 2 Select the datafile in the GUI.
- 3 Select the conversion option in the GUI to generate datafile statistics.
- 4 At the prompt, click **Yes** to convert to a regular datafile.
- 5 In the confirmation dialog, click **OK** to view the information.

Updating rescan intervals

VERITAS Storage Foundation for Oracle periodically scans the system for updated information. You can modify the rescan intervals to be faster or slower. A partial scan is a scan of existing known objects and a full scan is a scan of known and unknown objects, meaning that a search for new information is performed.

To update a rescan interval

- 1 Select the database icon in the GUI.
- 2 Select the **Update Rescan Intervals** option in the GUI to update the rescan interval times.
- 3 To update a partial rescan interval, enter a new time (in seconds) in the appropriate field. To update a full rescan interval, enter a new time (in seconds) in the appropriate field.
- 4 Click **Save** to save your changes. A confirmation dialog displays.
- 5 Click **OK** to continue.

Checking your system configuration

You can rescan, or refresh, database instances, datafiles, and tablespaces to make sure system information is up-to-date.

To scan the system configuration of a database

- 1 Select the database icon in the GUI.
- 2 Select the **Check System Configuration** option in the GUI to scan the database.
- 3 In the confirmation dialog, click **Yes** or **No** to continue.
- 4 Click **OK** to return to the main window.

Sample rescan output:

```
Examining file system attributes.
```

```
NOTICE: All file systems are VxFS.
```

```
NOTICE: All file systems are VxFS Version 4 layout.
```

```
Examining Quick I/O settings.
```

```
NOTICE: All datafiles are Quick I/O files.
```

```
NOTICE: It appears that your system is ODM enabled.
```

```
NOTICE: All Quick I/O files should be converted to regular  
files to use the ODM features.
```

```
Examining Cached Quick I/O settings.
```

```
NOTICE: No file systems have Cached Quick I/O enabled.
```

```
Examining datafiles fragmentation.
```

NOTICE: 0 files are fragmented.

Examining File System tunable settings.

NOTICE: Parameters for all VxFS file systems used by TEST9i.

Filesystem i/o parameters for /oracle9i

```
read_pref_io = 65536
read_nstream = 2
read_unit_io = 65536
write_pref_io = 65536
write_nstream = 2
write_unit_io = 65536
pref_strength = 20
buf_breakup_size = 262144
discovered_direct_iosz = 262144
max_direct_iosz = 2097152
default_indir_size = 8192
qio_cache_enable = 0
write_throttle = 127232
max_diskq = 2097152
initial_extent_size = 8
max_seqio_extent_size = 2048
max_buf_data_size = 8192
hsm_write_prealloc = 0
```

Examining Oracle volume and file system layout.

NOTICE: Data for database TEST9i is contained in one volume group.

Examining Oracle internal information.

Oracle Version is 9.0.0.0.0.

Control file /oracle9i/control1 is on file system /oracle9i.

WARNING: Control file is not mirrored using VxVM.

Control file /oracle9i/control2 is on file system /oracle9i.

WARNING: Control file is not mirrored using VxVM.

Total of 2 control files over 1 file systems.

WARNING: Control files are not spread over multiple file systems. Spread control files over multiple file systems for better redundancy.

Examining Oracle automatic extension of datafiles.

Total of 0 datafiles are configured to autoextend.
Total of 2 datafiles are defined to the database.

Examining Oracle log modes.

The database is running in archivelog mode.

The database is running in automatic log archiving mode.

Saving the system configuration

You can rescan, or refresh, database instances, datafiles, and tablespaces to make sure system information is up-to-date.

To save the system configuration of a database

- 1 Select the database icon in the GUI.
- 2 Select the **Save System Configuration** option in the GUI to view the database configuration information.
- 3 In the System Configuration wizard, enter a path name, or directory, in the Path field to indicate where you would like to save the system configuration information.
- 4 Click **Save** to save the configuration information.
- 5 In the confirmation dialog, click **OK** to continue.

Veritas Database FlashSnap status information

This appendix includes the following topics:

- [Obtaining database FlashSnap snapshot status and database status from the GUI](#)

Obtaining database FlashSnap snapshot status and database status from the GUI

You can obtain both the snapshot status and the snapshot database status from the GUI. The tables in this section provide detailed information regarding the various status values.

Database FlashSnap snapshot status details

To view snapshot status information from the GUI, click on a specific snapplan in the object tree. The snapshot status can be seen on the right side of the window in the **Snapplan State** field. For information regarding the various status values, see the following table:

Table A-1

Snapshot status (as seen in the Snapplan State field)	Completed Operations	Allowed Operations
init_full	<ul style="list-style-type: none"> ■ Modify/Validate Snapplan (successful) ■ Resync Snapshot (successful) ■ Reverse Resync Snapshot with the commit option (successful) 	<ul style="list-style-type: none"> ■ Create Snapshot
snapshot_start	<ul style="list-style-type: none"> ■ Create Snapshot (failed) 	<ul style="list-style-type: none"> ■ If the Create Snapshot operation failed, contact your system administrator for help. You can use the VxVM utilities to create a snapshot and resynchronize the snapshot volumes, then use the Create Snapshot operation with the Force snapshot creation option for the subsequent snapshot.
snapshot_end	<ul style="list-style-type: none"> ■ Create Snapshot (successful) 	<ul style="list-style-type: none"> ■ Resync Snapshot ■ Reverse Resync Snapshot with the begin option ■ Create Snapshot Database with the Create database option

Table A-1 (continued)

Snapshot status (as seen in the Snapplan State field)	Completed Operations	Allowed Operations
resync_start	<ul style="list-style-type: none"> ■ Resync Snapshot (failed) 	<ul style="list-style-type: none"> ■ If the Resync Snapshot operation failed, contact your system administrator for help. You can use the VxVM utilities to resynchronize the snapshot volumes, then use the Create Snapshot operation with the Force snapshot creation option for the subsequent snapshot.
reverse_resync_begin_start	<ul style="list-style-type: none"> ■ Reverse Resync Snapshot with the begin option (failed) 	<ul style="list-style-type: none"> ■ Contact VERITAS support.
reverse_resync_begin_end	<ul style="list-style-type: none"> ■ Reverse Resync Snapshot with the begin option (successful) 	<ul style="list-style-type: none"> ■ Reverse Resync with the commit option ■ Reverse Resync with the abort option
reverse_resync_abort_start	<ul style="list-style-type: none"> ■ Reverse Resync Snapshot with the abort option (failed) 	<ul style="list-style-type: none"> ■ Contact VERITAS support.
reverse_resync_abort_end	<ul style="list-style-type: none"> ■ Reverse Resync Snapshot with the abort option (successful) 	<ul style="list-style-type: none"> ■ Reverse Resync Snapshot with the begin option ■ Resync Snapshot ■ Create Snapshot Database with the Restart database option
reverse_resync_commit_start	<ul style="list-style-type: none"> ■ Reverse Resync Snapshot with the commit option (failed) 	<ul style="list-style-type: none"> ■ Contact VERITAS support.
restartdb_start	<ul style="list-style-type: none"> ■ Start Up Snapshot Database with the Restart database option (failed) 	<ul style="list-style-type: none"> ■ Try to start the snapshot database manually.

Table A-1 (continued)

Snapshot status (as seen in the Snapplan State field)	Completed Operations	Allowed Operations
restartdb_end	<ul style="list-style-type: none"> ■ Create Snapshot Database with the Restart database option (successful) 	<ul style="list-style-type: none"> ■ Shut Down Database with the unmount option
restartdb_end	<ul style="list-style-type: none"> ■ Create Snapshot Database with the Restart database option (successful) 	<ul style="list-style-type: none"> ■ Unmount Snapshot Database with the unmount option
mountdb_start	<ul style="list-style-type: none"> ■ <code>dbed_vmclonedb -o mountdb</code> command failed from the CLI Note: This option is not supported in the GUI. 	<ul style="list-style-type: none"> ■ Recover the snapshot database manually, then run the <code>dbed_vmclonedb -o update_status</code> command from the CLI Note: This option is not supported in the GUI.
mountdb_end	<ul style="list-style-type: none"> ■ <code>dbed_vmclonedb -o mountdb</code> command from the CLI was successful Note: This option is not supported in the GUI. 	<ul style="list-style-type: none"> ■ Unmount Database FlashSnap ■ <code>dbed_vmclonedb -o update_status</code> command from the CLI Note: This option is not supported in the GUI.
recoverdb_start	<ul style="list-style-type: none"> ■ Create Snapshot Database with the Restart database option (failed) 	<ul style="list-style-type: none"> ■ Recover the snapshot database manually, then run the <code>dbed_vmclonedb -o update_status</code> command from the CLI Note: This option is not supported in the GUI.

Table A-1 (continued)

Snapshot status (as seen in the Snapplan State field)	Completed Operations	Allowed Operations
recoverdb_start	<ul style="list-style-type: none"> ■ Create Snapshot Database with the Restart database option (failed) 	<ul style="list-style-type: none"> ■ Recover the snapshot database manually, then run the <code>db2ed_vmclonedb -o update_status</code> command from the CLI Note: This option is not supported in the GUI.
recoverdb_end	<ul style="list-style-type: none"> ■ Create Snapshot Database with the Restart database option (successful) 	<ul style="list-style-type: none"> ■ Shut Down Database with the umount option
recoverdb_end	<ul style="list-style-type: none"> ■ Create Snapshot Database with the Restart database option (successful) 	<ul style="list-style-type: none"> ■ Unmount Snapshot Database with the umount option
umount_start	<ul style="list-style-type: none"> ■ <code>dbed_vmclonedb -o umount</code> command failed from the CLI 	<ul style="list-style-type: none"> ■ Verify that your file system(s) are not busy and retry the command.
umount_start	<ul style="list-style-type: none"> ■ <code>db2ed_vmclonedb -o umount</code> command failed from the CLI Note: This option is not supported in the GUI. 	<ul style="list-style-type: none"> ■ Verify that your file system(s) are not busy and retry the command.
umount_end	<ul style="list-style-type: none"> ■ <code>dbed_vmclonedb -o umount</code> command from the CLI was successful Note: This option is not supported in the GUI. 	<ul style="list-style-type: none"> ■ Start Up Snapshot Database with the restart database option ■ Resync Snapshot ■ Reverse Resync Snapshot with the begin option

Table A-1 (continued)

Snapshot status (as seen in the Snapplan State field)	Completed Operations	Allowed Operations
umount_end	<ul style="list-style-type: none"> ■ db2ed_vmclonedb -o umount command from the CLI was successful <p>Note: This option is not supported in the GUI.</p>	<ul style="list-style-type: none"> ■ Restart Snapshot Database with the restart database option ■ Resync Snapshot ■ Reverse Resync Snapshot with the begin option

Snapshot database status details

To view snapshot database status information from the GUI, click on a specific snapplan in the object tree. The database status can be seen on the right side of the window in the **Database Status** field. For information regarding the various status values, see the following table:

Table A-2

Database status (as seen in the Database State field)	Completed operations
init	<ul style="list-style-type: none"> ■ Modify/Validate Snapplan (successful) ■ Create Snapshot (successful) ■ Reverse Resync Snapshot (successful)
	<ul style="list-style-type: none"> ■ Modify/Validate Snapplan (successful) ■ Create Snapshot (successful) ■ Reverse Resync Snapshot (successful)
database_recovered	<ul style="list-style-type: none"> ■ Start Up Snapshot Database with the startup database option (successful)
database_recovered	<ul style="list-style-type: none"> ■ Create Snapshot Database with the Create database option (successful)

Accessibility and Veritas Storage Foundation for Oracle

This appendix includes the following topics:

- [About Veritas Storage Foundation for Oracle accessibility](#)
- [Keyboard conventions](#)
- [Keyboard navigation and shortcuts in Veritas Storage foundation for Oracle](#)
- [Keyboard shortcuts](#)
- [Menu hot keys](#)
- [Support for accessibility settings and assistive technologies](#)

About Veritas Storage Foundation for Oracle accessibility

Veritas products meet federal accessibility requirements for software as defined in Section 508 of the Rehabilitation Act:

<http://www.access-board.gov/508.htm>

Veritas Storage Foundation for Oracle Graphical User Interface (GUI) inherits the font size and color settings from the operating system it is running on.

Keyboard shortcuts are available for all major GUI operations and menu items. Veritas products are compatible with operating system accessibility settings as well as a variety of assistive technologies. All manuals also are provided as

accessible PDF files, and the online help is provided as HTML displayed in a compliant viewer.

The following topics detail accessibility features and compliance in Veritas Storage Foundation for Oracle:

- [Keyboard conventions](#)
- [Keyboard shortcuts](#)
- [Menu hot keys](#)
- [Support for accessibility settings and assistive technologies](#)

Keyboard conventions

All program functions and menu items are accessible using the keyboard exclusively. Veritas Storage Foundation for Oracle uses standard operating system navigation keys and keyboard shortcuts.

To see a table of the standard Microsoft navigation keys and keyboard shortcuts, select your version of Microsoft Windows from the drop-down listbox at:

<http://www.microsoft.com/enable/products/keyboardassist.aspx>

Veritas Enterprise Administrator (VEA) has the following exceptions and additions to the Microsoft Keyboard standard:

Table B-1 VEA exceptions to Microsoft keyboard conventions

Convention	Mnemonic	Accelerator
Cancel	C	ALT+C
OK	O	ALT+O
Refresh	e	None
Yes	Y	ALT+Y
No	N	ALT+N
New	N	ALT+N

Table B-2 VEA additions to Microsoft keyboard conventions

Convention	Mnemonic	Accelerator
Connect	C	None
Contents	C	None

Table B-2 VEA additions to Microsoft keyboard conventions (*continued*)

Convention	Mnemonic	Accelerator
Delete Now	D	ALT+ D
Delete Temporary Files on Exit	e	ALT+ E
Disconnect	D	None
Help	H	ALT+ H
Number of Items in History	N	ALT+ N
Rescan	R	None
Set to defaults	S	ALT+ S
Remember Password	R	ALT+ R
Password	P	ALT+P
Username	U	ALT+ U

Table B-3 VEA Help additions to Microsoft keyboard conventions

Convention	Mnemonic	Accelerator
Find in Topic..	F	Ctrl + F
Find Next	n	F3
Find Previous	P	None
Hide Navigation Tabs	H	None
Index	I	None
Print	P	None
Search	S	None
Synchronize	n	None
Close	o	ALT+o

Keyboard navigation in the GUI

You can navigate and use Veritas Storage Foundation for Oracle with only the keyboard. In the GUI, the current active tree or table has a dark blue highlight, and the current active tab, radio button, or checkbox is enclosed within a rectangle

formed by dotted lines. These areas are said to have focus and will respond to commands.

All Veritas GUIs use the following keyboard navigation standards:

- Tab moves the focus to the next active area, field, or control, following a preset sequence. Shift+Tab moves the focus in the reverse direction through the sequence.
- Ctrl+Tab exits any Console area that you internally navigate with Tab.
- Up and Down arrow keys move focus up and down the items of a list.
- ALT in combination with the underlined mnemonic letter for a field or command button shifts the focus to that field or button.
- Enter activates your selection. For example, after pressing Tab to select the **Next** button in a wizard panel, press Enter to display the next screen.

Navigation in dialog boxes

Dialog boxes contain groups of controls necessary to set options or settings for programs.

Here are some general rules about dialog box navigation:

- Tab moves focus between controls within the dialog box along a preset sequence.
- Controls displaying a mnemonic (an underlined letter) can be selected regardless of focus by typing ALT and the underlined letter.
- A dark border indicates the default command button. Press Enter at any time to choose the button with a dark border.
- ALT C chooses the **Cancel** button if one exists.
- Spacebar chooses a control you select with Tab.
- Spacebar changes the state of a checkbox or radio button that has focus. Typing a mnemonic (if one is available) will move the focus to the checkbox or radio button and change its state.
- Arrow keys move focus within listboxes, sliders, groups of option controls, or groups of page tabs.
- Items that cannot be changed are not visited by the Tab key sequence. Options that are unavailable are grayed-out and can neither be selected nor given focus.

While the controls described here are typically found in dialog boxes, they also can occur in other contexts. The same navigation standards will apply.

Tabbed dialog boxes

Some dialog boxes use tabbed pages to subcategorize groups of many options. Each tabbed page contains different groups of controls. Use Tab to move the focus between tabs within a dialog box. Typing the mnemonic for a tab also moves the focus to the tab and displays its page of controls.

The following table lists keyboard navigation rules within tabbed dialog boxes:

Table B-4 Keyboard navigation in tabbed dialog boxes

Keyboard input	Result
Ctrl+Page Down	Switches to the next tab and displays the page
Ctrl+Page Up	Switches to the previous tab and displays the page
Right arrow or Left arrow	When the focus is on a tab selector, chooses the next or previous tab in the current row and displays the page

Listboxes

Listboxes display a column of available choices.

There are different kinds of listboxes with additional navigation conventions:

- Drop-down listboxes by default show only the selected item. A small button to the right of the control shows a downward-pointing arrow. Select the arrow to display more items from the listbox. If there are more choices than can fit in the preset listbox area, a slider appears along the side of the listbox. Show or hide the list using F4. Enter selects or deselects an item.
- Extended selection listboxes support selecting single items, blocks of items, or combinations of the two. After selecting an item, hold down Shift+ or Ctrl+navigation keys to select or deselect additional items or blocks of items.

Keyboard navigation and shortcuts in Veritas Storage foundation for Oracle

All program functions and menu items are accessible using the keyboard exclusively. Veritas Storage Foundation for Oracle Adaptive Server Enterprise (ASE) uses standard operating system navigation keys and keyboard shortcuts.

To see a table of the standard Microsoft navigation keys and keyboard shortcuts, select your version of Microsoft Windows from the drop-down listbox at:

<http://www.microsoft.com/enable/products/keyboard.aspx>

Veritas Enterprise Administrator (VEA) has the following exceptions and additions to the Microsoft Keyboard standard:

Table B-5 VEA additions to Microsoft keyboard conventions

Convention	Mnemonic	Accelerator
Connect	C	None
Contents	C	None
Delete Now	D	ALT+ D
Delete Temporary Files on Exit	e	ALT+ E
Disconnect	D	None
Help	H	ALT+ H
Number of Items in History	N	ALT+ N
Rescan	s	None
Set to defaults	S	ALT+ S
Remember Password	R	ALT+ R
Username	U	ALT+ U

Table B-6 VEA exceptions to Microsoft keyboard conventions

Convention	Mnemonic	Accelerator
Cancel	C	ALT+C
OK	O	ALT+O
Refresh	e	None
Yes	Y	ALT+Y
No	N	ALT+N
Shift+F10	None	None

Table B-7 VEA Help additions to Microsoft keyboard conventions

Convention	Mnemonic	Accelerator
Find in Topic..	F	Ctrl + F

Table B-7 VEA Help additions to Microsoft keyboard conventions (*continued*)

Convention	Mnemonic	Accelerator
Find Next	n	F3
Find Previous	P	None
Hide Navigation Tabs	H	None
Index	I	None
Print	P	None
Search	S	None
Synchronize	n	None

General keyboard navigation within the GUI

You can navigate and use Veritas Storage Foundation for Oracle with only the keyboard. In the GUI, the active tree or table node has a highlight, and the current active tab, radio button, or checkbox is enclosed within a rectangle formed by dotted lines. These areas are said to have focus and will respond to commands.

All Veritas GUIs use the following keyboard navigation standards:

- Tab moves the focus to the next active area, field, or control, following a preset sequence. Shift+Tab moves the focus in the reverse direction through the sequence.
- Ctrl+Tab exits any Console area that you internally navigate with Tab.
- Up and Down arrow keys move focus up and down the items of a list.
- ALT in combination with the underlined mnemonic letter for a field or command button shifts the focus to that field or button.
- Enter activates the default push button. For any other other button, tab to it and press Enter. For example, after pressing Tab to select the **N**ext button in a wizard panel, press Enter to display the next screen. Press Enter will activate the default push button. For the other button, tab to it and press Enter.

Keyboard navigation within dialog boxes

Dialog boxes contain groups of controls necessary to set options or settings for programs.

Here are some general rules about dialog box navigation:

- Tab moves focus between controls within the dialog box along a preset sequence.
- Controls displaying a mnemonic (an underlined letter) can be selected regardless of focus by typing ALT and the underlined letter.
- A dark border indicates the default command button. Press Enter at any time to choose the button with a dark border.
- ALT C chooses the **Cancel** button if one exists. The ESC key also cancels an action. You can press ESC any time even if there is no **Cancel** button.
- Spacebar chooses a control you select with Tab.
- Spacebar changes the state of a checkbox or radio button that has focus. Typing a mnemonic (if one is available) will move the focus to the checkbox or radio button and change its state.
- Arrow keys move focus within listboxes, sliders, groups of option controls, or groups of page tabs.
- Items that cannot be changed are not visited by the Tab key sequence. Options that are unavailable are grayed-out and can neither be selected nor given focus.

While the controls described here are typically found in dialog boxes, they also can occur in other contexts. The same navigation standards will apply.

Tabbed dialog boxes

Some dialog boxes use tabbed pages to subcategorize groups of many options. Each tabbed page contains different groups of controls. Use Tab to move the focus between tabs within a dialog box. Typing the mnemonic for a tab also moves the focus to the tab and displays its page of controls.

Table B-8 Keyboard navigation within tabbed dialog boxes

Keyboard input	Result
Ctrl+Page Down	Switches to the next tab and displays the page
Ctrl+Page Up	Switches to the previous tab and displays the page
Right arrow or Left arrow	When the focus is on a tab selector, chooses the next or previous tab in the current row and displays the page

Listboxes

Listboxes display a column of available choices.

There are different kinds of listboxes with additional navigation conventions:

- Drop-down listboxes by default show only the selected item. A small button to the right of the control shows a downward-pointing arrow. Select the arrow to display more items from the listbox. If there are more choices than can fit in the preset listbox area, a slider appears along the side of the listbox. Show or hide the list using F4. Enter selects or deselects an item.
- Extended selection listboxes support selecting single items, blocks of items, or combinations of the two. After selecting an item, hold down Shift+ or Ctrl+navigation keys to select or deselect additional items or blocks of items.

Keyboard shortcuts

All menu items can be selected by using accelerator or mnemonic keyboard shortcuts. An accelerator is a key combination that provides shortcut access to a GUI function. A mnemonic (sometimes referred to as a “hot key”) is a single-key equivalent (used in combination with the ALT key) for selecting GUI components such as menu items. The mnemonic “hot key” letter is underlined in the GUI.

For example:

- ALT to go into menu pull-down mode
- F key to access the **F**ile menu
- O key to activate the open command

Mnemonics are case-insensitive. Keys can be pressed sequentially instead of simultaneously.

Table B-9 Keyboard shortcuts

Keyboard input	Action
Tab, Shift-Tab (for reversing the action)	Navigates between main components of the user-interface
Shift-F10	Display Context-sensitive menu
Ctrl-A	Selects all items in list
F3	Find Next
Enter, Return	Activates default button (does not require keyboard focus)

Routine functions such as opening, saving, and printing files can be performed using the standard Microsoft keyboard shortcuts.

Keyboard shortcuts are not case-sensitive. Mnemonic keystrokes may be pressed either sequentially or simultaneously. All menu items have mnemonics, but not all menu items have accelerators.

Keyboard navigation

The following table lists some of the keys frequently used to navigate with the keyboard:

Table B-10 Keyboard navigation

Keyboard input	Result
TAB	Move forward between panes in the active Console window.
SHIFT+TAB	Move backwards between panes in the active Console window.
SHIFT+ UP ARROW	Move up one item in the tree view.
SHIFT+DOWN ARROW	Move down one item in the tree view.
SHIFT+PAGE UP	Move to the top item visible in the tree view.
HOME	Move to the first item in the tree view.
END	Move to the last item in the tree view.
RIGHT ARROW	Expands the highlighted item. If the highlighted item does not contain hidden items, behaves like DOWN ARROW.
LEFT ARROW	Collapses the highlighted item. If the highlighted item does not contain expanded items, behaves like UP ARROW.

Menu hot keys

The following table lists the hot keys associated with the different menus. In some cases, the options available depend upon the object selected.

Table B-11 Menu hot keys

Action	Keyboard Input
File	ALT+F to open the menu, then: <ul style="list-style-type: none"> ■ C- Display the connection dialog window ■ D-Display the disconnection dialog window ■ n-Create new window ■ r-Display the properties of the connected host ■ u-Page setup for print ■ w-Print preview ■ P-Print the page ■ x -Exit
ToolsTools	ALT+T to open the menu, then: <ul style="list-style-type: none"> ■ P-Set the display preferences ■ M-Manage user profiles ■ E-Display the error console ■ S-Search for storage devices
Actions	ALT+ A to open the menu, then: <ul style="list-style-type: none"> ■ e-Refresh ■ s-rescan
View	ALT+ V to open the menu, then: <ul style="list-style-type: none"> ■ c-Select host connection view ■ g-View alert logs ■ o-View control panel ■ s-Return to summary page view
Window	ALT+ W to open the menu, then: <ul style="list-style-type: none"> ■ T-Tear off a component from being shown ■ 1-To tear off details ■ 2-To tear off the system details
Help	ALT+H to open the menu, then: <ul style="list-style-type: none"> ■ C-Display the contents ■ b-Display information about the Help viewer

Table B-11 Menu hot keys (*continued*)

Action	Keyboard Input
DB2 Instances	ALT+D to open the menu, then: <ul style="list-style-type: none"> ■ S-Start the DB2 instance ■ U-Update the rescan intervals to be faster or slower ■ E-Rescan system information ■ R-View properties
DB2 Instance	ALT+D to open the menu, then: <ul style="list-style-type: none"> ■ C-Create Snapshot Database ■ D-Shut down the DB2 Instance ■ E-Rescan system information ■ S-Start the DB2 instance ■ R-View properties
DB2 Database	ALT+D to open the menu, then: <ul style="list-style-type: none"> ■ o-Resync the database repository ■ h-Check system configuration ■ a-Save system Configuration ■ E-Rescan system information ■ C-Create Clone Database ■ R-View properties
Tablespaces	<ul style="list-style-type: none"> ■ R-Rescan all tablespaces ■ R-View properties
Container	Alt+C to open the menu, then: <ul style="list-style-type: none"> ■ C-Conversion, to convert oracle datafiles to Quick I/O files. ■ T-Topology, display mapping of the topology tree ■ S-Statistics, generates sampling data statistics ■ R-View properties
Oracle Databases	ALT+O to open the menu, then: <ul style="list-style-type: none"> ■ S- Start the Oracle Database ■ D-Start the Snapshot Database ■ v-Reverse resync a snapshot ■ U- Update the rescan intervals ■ R-Rescan the databases

Table B-11 Menu hot keys (*continued*)

Action	Keyboard Input
Oracle Instance	ALT+ O to open the menu, then: <ul style="list-style-type: none"> ■ S- Startup the database instance ■ D- Shut down the database ■ C-Create Clone Database ■ o-Resync Repository ■ h- Check System configuration ■ a- Save system configuration ■ R-Rescan Oracle instance
Monitoring Agent	ALT+M to open the menu, then: <ul style="list-style-type: none"> ■ S-Start the monitoring agent ■ o-Stop the monitoring agent ■ E-Enable the agent at boot time ■ D-Disable the agent at boot time
Snapplans	ALT+ S to open menu, then: <ul style="list-style-type: none"> ■ C-Create a snapplan ■ M-Modify/Validate a snapplan ■ R-Rescan Snapplans
Snapplan	ALT+ S to open menu, then: <ul style="list-style-type: none"> ■ M-Modify/Validate a snapplan ■ R-Remove a Snapplan ■ C-Create a snapshot using snapplan ■ y-Resync a snapshot ■ v-Reverse Resync a snapshot ■ L-View log for the Snapplan
Storage Checkpoints	ALT+S to open menu, then: <ul style="list-style-type: none"> ■ C-Create a Storage Checkpoint ■ P-Create a Storage Checkpoint policy ■ R- Rescan system information

Table B-11 Menu hot keys (*continued*)

Action	Keyboard Input
Storage Checkpoint	ALT+S to open menu, then: <ul style="list-style-type: none"> ■ B-Rollback a storage checkpoint ■ M-Mount a storage checkpoint ■ U-Unmount a storage checkpoint ■ R-Remove a storage checkpoint ■ C-Create a Clone Database
Tablespaces	ALT+ S to open the menu, then: <ul style="list-style-type: none"> ■ R-Rescan tablespaces
Datafile	ALT+D to open the menu, then: <ul style="list-style-type: none"> ■ T- Topology/Statistics to generate datafile statistics ■ C-Conversion (convert Oracle datafiles to Quick I/O files)

Support for accessibility settings and assistive technologies

Veritas software responds to operating system accessibility settings.

Veritas products are compatible with Microsoft's accessibility utilities. In Windows 2000, accessibility options involving keyboard responsiveness, display contrast, alert sounds, and mouse operation can be set through the Control Panel (**Start > Settings > Control Panel > Accessibility Options**) and through the Accessibility Wizard (**Start > Programs > Accessories > Accessibility > Accessibility Wizard**).

Note: Though all graphics in Veritas documentation can be read by screen readers, setting your screen reader to ignore graphics may improve performance.

Index

A

- accessibility
 - assistive technology support 136
 - dialog boxes 126, 129
 - keyboard navigation 125, 129
 - keyboard shortcuts 131
- ARCHIVELOG mode 64
- assistive technology support 136
- automating tasks
 - adding a scheduled task 102
 - creating checkpoint database 104
 - creating clone database using checkpoint 105
 - creating clone database using FlashSnap 105
 - creating FlashSnap database 104
 - modifying a scheduled task 103
 - set schedule parameters 106
 - viewing scheduled tasks 102

B

- browsers, supported for Web GUI 23

C

- clone database
 - creating 51
 - creating a clone with a snapshot 81
 - creating a new snapplan for clone 53
 - creating a snapshot for clone 55, 58
 - creating with Database FlashSnap 52
 - creating with Storage Checkpoints 51
 - removing a clone 59
 - removing a clone database 60
 - removing a snapshot database clone 60
 - startup clone snapshot 57
 - validating a snapplan 54
- configuration maintenance
 - checking your system configuration 114
 - converting Quick I/O files to regular datafiles 113
 - converting regular datafiles to Quick I/O 112
 - determining the datafile file type 112

- configuration maintenance (*continued*)
 - displaying tablespace information 110
 - maintaining system configurations 109
 - rescanning tablespace information 110
 - rescanning the database instance 110
 - resynchronizing the SFDB repository 110
 - saving the system configuration 116
 - updating rescan intervals 113
 - viewing I/O statistics 111
 - viewing storage mapping 111

D

- Database FlashSnap
 - aborting reverse resynchronization 84
 - creating a clone 52
 - creating a clone snapshot clone 55
 - creating a clone snapshot for clone 58
 - creating a clone with a snapshot 81
 - creating a new snapplan for clone 53
 - creating a snapplan 74
 - creating a snapshot 78
 - modifying a snapplan 76
 - prerequisites 73
 - removing a snapplan 78
 - removing a snapshot clone database 60
 - resynchronizing a database to a snapshot 83
 - resynchronizing a snapshot to a database 82
 - startup clone snapshot 57
 - validating a clone snapplan 54
 - validating a snapplan 76
 - viewing the snapplan 85
- database information
 - determining the datafile file type 112
 - displaying tablespace information 110
 - rescanning 110
 - rescanning tablespace information 110
- databases
 - restoring using Storage Checkpoints 68
 - setting up 39
- dirty region logging 43

- disk group
 - naming a disk group 41
- disk groups
 - configuration guidelines 41
- DRL 43
- DSS workloads
 - guidelines 44
- Dynamic Database Storage Tiering
 - getting reports 96
 - moving files and volumes 95
 - setting automatic policy 91
 - setting up parameters 88

F

- fast recovery 43–44
- file locks
 - during Storage Rollback 69
- file systems
 - configuration guidelines 44
- fragmentation 45
 - controlling 45
 - types 45
- free space 67

G

- guidelines
 - creating file systems 44
 - disk groups 41
 - for DSS workloads 44
 - for OLTP workloads 43
 - striped volumes 43
 - volumes 43

H

- hot backup mode 64

L

- lock files
 - during Storage Rollback 69

M

- maintaining your configuration
 - about configuration maintenance 109
 - checking your system configuration 114
 - converting Quick I/O files to regular datafiles 113
 - converting regular datafiles to Quick I/O 112

- maintaining your configuration (*continued*)
 - determining the datafile file type 112
 - displaying tablespace information 110
 - rescanning tablespace information 110
 - rescanning the database instance 110
 - resynchronizing the SFDB repository 110
 - saving the system configuration 116
 - updating rescan intervals 113
 - viewing I/O statistics 111
 - viewing storage mapping 111
- menus
 - Storage Rollback Administration 68
- mirroring
 - choosing 43

O

- OLTP workloads
 - guidelines 43
- online backup mode 64
- Oracle
 - restarting an Oracle database instance 49
 - shutting down a database instance 47
 - starting an Oracle database instance 46
 - starting up a snapshot database instance 46

Q

- Quick I/O Files
 - converting Quick I/O files to regular datafiles 113
 - converting regular datafiles to Quick I/O 112

R

- RAID-5 43
 - choosing 43
 - performance 43
- RAID-5 log 44
- redo logs
 - configuration guidelines 44
 - creating a file system 44
- restoring
 - databases 68
 - files 68
 - tablespaces 68
- resynchronization
 - using DRL logs 43
 - using RAID-5 logs 44
- rolling back
 - databases to a Storage Checkpoint 68

S

- scheduling tasks
 - adding a scheduled task 102
 - creating checkpoint database 104
 - creating clone database using checkpoint 105
 - creating clone database using FlashSnap 105
 - creating FlashSnap database 104
 - modifying a scheduled task 103
 - set schedule parameters 106
 - viewing scheduled tasks 102
- selecting volume layouts 42
- SFDB repository
 - resynchronizing 110
- snapplan
 - abort reverse resync 84
 - creating 74
 - modifying 76
 - removing 78
 - validating 76
 - view the snapplan log 85
- snapshot
 - creating 78
 - creating a clone with a snapshot 81
 - resynchronizing a snapshot to a database 82
 - reverse resync 83
- Storage Checkpoint
 - removing a clone Storage Checkpoint clone 60
- Storage Checkpoints
 - concepts 63
 - creating 64
 - creating a clone 51
 - databases 68
 - mounting 65
 - removing 67
 - restoring files 68
 - rolling back 68
 - tablespaces 68
 - unmounting 66
 - viewing details 65
- Storage Mapping
 - viewing I/O statistics 111
 - viewing topology 111
- Storage Rollback
 - databases 68
 - restoring files 68
 - tablespaces 68
- Storage Rollback Administration menu 68
- Storage_agent 39

- stripe unit sizes
 - choosing 42
- striped volumes 43
 - configuration guidelines 43

T

- tiered storage
 - getting reports 96
 - moving files and volumes 95
 - setting automatic policy 91
 - setting up parameters 88

V

- Veritas Storage Foundation for Oracle
 - accessibility
 - assistive technology support 136
 - dialog boxes 126, 129
 - keyboard navigation 125, 129
 - keyboard shortcuts 131
 - adding VEA users 15
 - closing the Java GUI 25
 - GUI components 9
 - GUI functions 13
 - Java GUI prerequisites 23
 - Java GUI supported tasks 26
 - opening the Java GUI (UNIX) 24
 - opening the Java GUI (Windows) 25
 - removing VEA users 19
 - shutting down the DBED agent 23
 - shutting down VEA 22
 - starting the DBED agent 23
 - starting VEA 21
 - VEA prerequisites 14
 - Web GUI supported tasks 34
- volume layouts
 - selecting 42
- volumes
 - configuration guidelines 43

W

- workloads
 - write-intensive 43