VERITAS™

VERITAS Volume Replicator Advisor 4.1

User's Guide

HP-UX

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Preface

The *VERITAS™ Volume Replicator Advisor User's Guide* provides information on using VERITAS Volume Replicator Advisor (VRAdvisor) to evaluate various parameters for optimal installation and configuration of VVR.

This document provides information on installing and using this tool on different platforms. Wherever applicable, the information that is specific to a platform has been appropriately indicated. Note that the VERITAS Volume Manager (VxVM) has been renamed to VERITAS Storage Foundation for Windows (VSFW) from the Release 4.1 onwards.

Audience

This guide is intended for system administrators who are responsible for installing, configuring, and setting up replication using VVR. This guide assumes that the user has:

- A basic understanding of system administration.
- Working knowledge of the VVR product.

This document guides you through the process of installing VRAdvisor and then evaluating various parameters using the data collection and data analysis process. This document describes procedures using both the graphical user interface and the command-line interface, as applicable, on the different platforms.

How This Guide is Organized

Chapter 1, "Introducing Volume Replicator Advisor (VRAdvisor)" on page 1, provides an overview of some of the basic concepts of replication, introduces VVR objects, and discusses the important features of VRAdvisor.

Chapter 2, "Installing Volume Replicator Advisor (VRAdvisor)" on page 5, explains the procedure to install VRAdvisor.

Chapter 3, "Collecting the Sample of Data" on page 9, describes the process to collect the sample data write statistics using the graphical user interface.

Chapter 4, "Analyzing the Sample of Data" on page 29, describes the process to analyze the sample data using the graphical user interface.

Chapter 5, "Command-Line Interface" on page 45, describes the usage of the command line interface to collect the sample data write statistics and analyze it.

Related VERITAS Documents

For more information on any of the topics presented in this guide, refer to the VERITAS Volume Replicator (VVR) or the VERITAS Volume Manager (VxVM) documentation sets. Refer to the *VERITAS Volume Replicator Release Notes* for more information on these documentation sets.

Conventions

Convention	Usage	Example
`monospace`	Used for path names, commands, output, directory and file names, functions, and parameters.	Read tunables from the `/etc/vx/tunefstab` file. See the `ls`(1) manual page for more information.
`monospace` (**`bold`**)	Indicates user input.	# **`ls pubs`** C:\> **`dir pubs`**
italic	Identifies book titles, new terms, emphasized text, and variables replaced with a name or value.	See the *User's Guide* for details. The variable *system_name* indicates the system on which to enter the command.
bold	Depicts GUI objects, such as fields, list boxes, menu selections, etc. Also depicts GUI commands.	Enter your password in the **Password** field. Press **Return.**
blue text	Indicates hypertext links.	See "Getting Help" on page xii.
#	Unix superuser prompt (all shells).	# **`cp /pubs/4.0/user_book /release_mgnt/4.0/archive`**
C:\>	Windows user prompt.	C:\> **`copy \pubs\4.0\user_book c:\release_mgnt\4.0\archive`**

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Introducing Volume Replicator Advisor (VRAdvisor) 1

VERITAS Volume Replicator Advisor (VRAdvisor) is a planning tool that helps you determine an optimum VERITAS™ Volume Replicator (VVR) configuration. This document assumes that you understand the concepts of VVR. For a description of the concepts of VVR, refer to the *VERITAS Volume Replicator Administrator's Guide*. For information about planning and tuning VVR, refer to the *VERITAS Volume Replicator Planning and Tuning Guide*.

Overview of VRAdvisor

Planning is the key to successfully configuring VVR. To set up an optimum configuration, you must understand the components of VVR and their interactions with each other. In addition, you must consider the factors that are specific to your environment while planning your VVR configuration. The important factors to consider while planning include:

- Needs and constraints of the business
- Application characteristics
- Mode of replication
- Network characteristics

These factors are dependent on each other and these dependencies must be considered during planning. For example, if your business requires that the data on the Secondary to be as up to date with the Primary as possible, you must choose synchronous mode and provide enough network bandwidth to handle the peak application write rate on the Primary. Or, if the available network bandwidth is less than the peak write rate of the application, you must choose asynchronous mode of replication. Also, the size of the Storage Replicator Log (SRL) must be able to handle the Secondary outages and network outages for the given application characteristics. VRAdvisor considers these dependencies and enables you to determine the parameters to suit your VVR environment.

VRAdvisor does the following:

- ✔ Collects a sample of data that reflects the application characteristics.
- ✔ Analyzes the sample of the application characteristic and calculates the size of the SRL and the network bandwidth required for replication.
- ✔ Enables you to perform a What-if Analysis by varying the needs and constraints of your business, based on your future requirements.

Note that the replication log of VVR is referred to as SRL (Storage Replicator Log) on UNIX and as Replicator Log on Windows. The terms SRL and Replicator Log are used interchangeably in the document.

How VRAdvisor Works

Using VRAdvisor for planning involves collecting a sample of data that represents the application write rate and analyzing this sample of data based on factors, such as the network bandwidth and network outage. VRAdvisor considers the worst case situations when analyzing data, which results in an optimum configuration for VVR. Working with VRAdvisor involves:

- ✔ Data Collection
- ✔ Data Analysis
- ✔ What-if Analysis

Data Collection

VRAdvisor uses a sample of data for analysis; the sample of data must be available in an appropriate format required by VRAdvisor. To collect a sample of data that represent the application write rate, we recommend that you collect the sample of data for a period of seven to fourteen days. Make sure that the collection period includes times of peak usage for your application, so that the collected data reflects your environment.

In the data collection mode, VRAdvisor collects the sample of data in the appropriate format required by VRAdvisor. You can also collect the sample of data using commands. The commands that can be used to collect the sample of data include `vxstat`, `iostat`, and `lvmstat`. If the data is collected using commands, you may need to use the scripts provided with VRAdvisor to convert the data to the appropriate format required by VRAdvisor. For more information, see "Collecting the Sample of Data" on page 9.

Data Analysis

In the data analysis mode, VRAdvisor analyzes the sample of data that you have collected, based on the following factors specified by you:

- Available network bandwidth
- Maximum expected downtime for the Secondary hosts
- Maximum expected downtime for the network connection
- Frequency of Secondary backups

After analyzing the data, VRAdvisor displays a graphical as well as textual representation of the results in a separate window. For more information, see "Analyzing the Sample of Data" on page 29.

What-if Analysis

The What-if analysis feature enables you to perform additional calculations, to plan for future requirements or alternative scenarios. You can vary the parameters and recalculate the results according to different criteria. For example, you can vary the network bandwidth parameter to see what effect it would have on the SRL size. Or, you can specify a potential SRL size and see how much network bandwidth would be required for that SRL size. For more information, see "Analyzing the Sample of Data" on page 29.

Installing Volume Replicator Advisor (VRAdvisor) 2

This chapter explains how to install VERITAS Volume Replicator Advisor on the Solaris and Windows operating systems.

VRAdvisor is supported on the following operating systems:

- Solaris 5.8 and later
- Windows XP
- Windows 2000 Professional, Windows 2000 Server, Windows 2000 Advanced Server, Windows 2000 Datacenter Server

  Note If Windows 2000 is installed on your system, you must have Service Pack (SP) 4 installed on it.

- Windows Server 2003 (32-bit): Standard Edition, Web Edition, Enterprise Edition, Datacenter Edition

Installing VRAdvisor on Solaris

To install, run the following command:

```
# pkgadd -d volume_replicator/tools/vradvisor/pkgs VRTSvradv
```

where `VRTSvradv` is the package name.

Uninstalling VRAdvisor on Solaris

To uninstall `VRTSvradv`, run the following command:

```
# pkgrm VRTSvradv
```


Installing VRAdvisor on Windows

This section gives instructions on installing `VRAdvisor` on Windows. The procedure to install on Windows 2000 and Windows Server 2003 is the same, except that on a Windows 2000 system, a reboot is required after the installation completes.

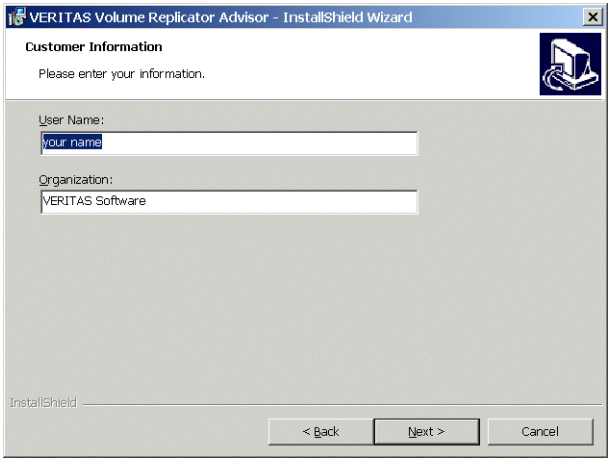
Note VRAdvisor is not installed as a part of the common installation process that uses the product installer. To install VERITAS Volume Replicator Advisor, follow the procedure in this section.

Note Although VRAdvisor is supported in a non-English locale, the wizards are still displayed in English.

▼ To install VRAdvisor

1. Navigate to the `windows` directory on the CD.
2. Run the `VRTSvradv.msi` from the `windows` directory.
3. The installation wizard is launched. A message indicates that the `VRAdvisor` setup file is checking for the necessary parameters before starting the installation process.

   The Welcome page appears.
4. Click **Next**. The **Customer Information** page appears.



5. Enter your user name and organization.

6. Click **Next**. The **Destination Folder** page appears.

   - To install `VRAdvisor` in the default directory `c:\Program Files\VERITAS\Volume Replicator Advisor`, click **Next**. The **Ready to Install the Program** page appears. Then, go to step 7.
   - To choose another location for installing `VRAdvisor`, click **Change**. The **Change Current Destination Folder** page appears.

     In the **Folder name** field, enter the complete path to the directory where you want the `VRAdvisor` package to be installed. You can also use the browse button to navigate to the required directory. Click **OK.**

   On the **Destination Folder** page, click **Next**. The **Ready to Install the Program** page appears.

7. Click **Install** to proceed with the installation.

   The **Installing VERITAS Volume Replicator Advisor** page appears. This page displays a progress bar to indicate that the installation is in progress.

   After the installation completes, a message indicates that the installation was successful.

8. Click **Finish**. A message prompts you to restart the system for the changes to take effect.

9. Click **Yes** to reboot the system now. Click **No** to reboot it later.

Notes

Windows 2000 includes counters that monitor the activity of physical disks (including removable media drives) and logical volumes. The `diskStats` utility used by `VRAdvisor` for collecting sample data on Windows uses these counters. The operating system enables a driver called `diskperf.sys` to activate the disk monitoring counters. By default, the operating system activates only the Physical Disk performance counters. To activate the Logical Disk counters, `VRAdvisor` installer uses command `diskperf -YV` and prompts you to reboot the system because the counters are enabled only after restarting the computer.

On Windows 2003, a reboot is not required to enable disk performance counters. Therefore, the VRAdvisor installer does not ask you to reboot the Windows 2003 system.

Uninstalling VRAdvisor on Windows

1. To uninstall VRAdvisor, select **Settings > Control Panel** from the Windows **Start** menu.

2. Select **Add or Remove Programs**.

3. Select **VERITAS Volume Replicator Advisor** from the list of programs.

4. Click **Remove**. Windows prompts you to confirm that you want to remove VERITAS Volume Replicator Advisor.

5. Click **Yes**. The **VERITAS Volume Replicator Advisor** dialog box appears.

   The progress bar on the **VERITAS Volume Replicator Advisor** dialog box indicates that the removal is in progress.

   After the uninstallation procedure completes, the **Add or Remove Programs** dialog indicates that the VERITAS Volume Replicator Advisor program has been removed successfully.

Collecting the Sample of Data 3

This chapter explains how to collect data write samples that can be used with the VRAdvisor wizard. VRAdvisor uses the sample of data for analysis. We recommend that you collect the samples of data using the volumes that are to be part of the VVR configuration you are planning to set up. To collect a representative sample of data, we recommend that you collect the sample of data over a period of 7 to 14 days. Make sure that the collection period includes times of peak usage for your application, so that the collected data reflects your actual requirements.

Note The data must be collected for a minimum of seven days.

VRAdvisor calculates an optimum size of the Storage Replicator Log (SRL) and the network for your VVR configuration using a sample of the write statistics. For VRAdvisor to use the sample of data for analysis, the data must be in one of the required input formats.

Depending on the operating system on which you are collecting data, you can either collect the sample of data using VRAdvisor or another tool. VRAdvisor collects the sample of data in a required format. If the data is collected using other tools, you may need to use the scripts provided with VRAdvisor to convert the data to a required format. For details, refer to the section for your platform.

- "Collecting the Sample of Data on Solaris" on page 10
- "Collecting the Sample of Data on HP-UX" on page 15
- "Collecting the Sample of Data on Linux" on page 17
- "Collecting the Sample of Data on AIX" on page 20
- "Collecting the Sample of Data on Windows" on page 24

Prerequisite

✔ If you use VERITAS Volume Manager (VxVM) volumes, make sure that you import the disk group containing the required volumes onto your system.

Collecting the Sample of Data on Solaris

VRAdvisor can be used to collect and analyze a sample of data. You can collect data using the VRAdvisor wizard or the `vxstat` or `iostat` commands. To use VRAdvisor to collect data, you must install VRAdvisor on your system. If you do not plan to install VRAdvisor on your system, and VxVM is installed, you can use the `vxstat` command to collect data. If you do not have VRAdvisor or VxVM installed, you can use the `iostat` command to collect data.

Before collecting data, be sure the locale for your system is set to one of the supported locales. For details, see "Supported Locales."

On Solaris, collect the sample of data using one of the following methods:

- Collecting Data Using the VRAdvisor Wizard
- Collecting Data Using the vxstat Command
- Collecting Data Using the iostat Command

You can also collect the sample of data using the command line interface provided by VRAdvisor. For more information, see "Command-Line Interface" on page 45.

Supported Locales

VRAdvisor requires the data to be collected in a supported locale. Before using any of the methods for collecting data, set the locale to a supported locale. For Solaris, VRAdvisor supports the following locales:

English:

C

en_US.UTF-8

ios_8859_1

Japanese:

ja

ja_JP.PCK

ja_JP.UTF-8

ja_JP.eucJP

Any of the methods of data collection include a date stamp with each sample of data. When you use VRAdvisor to analyze the sample data file, VRAdvisor uses the date stamp to determine the data collection interval. To enable VRAdvisor to automatically determine the data collection interval, the date must be displayed in one of the following formats.

Date formats for English locales:

Fri Oct 1 14:37:13 2004

Fri Oct 1 14:37:13 PDT 2004

Friday October 1 17:37:13 PDT 2004

Date formats for Japanese locales:

2004年09月24日 16時21分23秒
2004年09月24日 (金) 16時20分59秒

If VRAdvisor cannot determine the data collection interval, it prompts you to specify the data interval.

Collecting Data Using the VRAdvisor Wizard

▼ To collect data using the VRAdvisor wizard

1. Set the locale to a supported locale. For example:

   ```
   # export LC_ALL=C
   ```

2. Change directory as follows:

   ```
   # cd /opt/VRTSvradv/bin
   ```

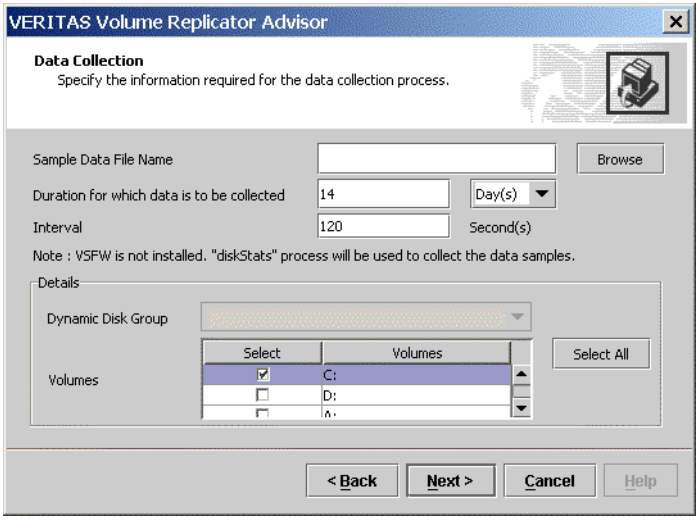
3. Launch the VRAdvisor wizard on Solaris, using the following command:

   ```
   # ./vradvgui
   ```

   The **Welcome** page appears.

4. Select **Data Collection**. Click **Next**.

The **Data Collection** page appears.



5. Complete the **Data Collection** page as follows:

Sample Data File Name	Enter the name of the file where the data write samples will be collected. Make sure the name is not being used by another application. If a file already exists with that filename, or if the path is incorrect, a message is displayed.
Duration for which the data is to be collected	Enter the duration in days or hours. The default value is 14 days. The maximum duration is 30 days.
Interval	Enter a value, in seconds, to indicate the frequency at which you want the data to be collected. The default value is 120 seconds.
Details	If you have VxVM installed, enter the appropriate disk group in **Dynamic Disk Group**. Select the required volumes individually, or click **Select All** to select all of the available volumes in the selected disk group. If you do not have VxVM installed, the Details field is not available.

6. Click **Next**. The **Confirmation** page appears.

7. To start the data collection process immediately, click **Yes**. To go back and make any changes, click **No**.

8. The **Data Collection Summary** page indicates that the data collection has started. It also displays a summary of the specifications you entered for the data collection.

9. Click **Finish**. VRAdvisor continues to collect data for the specified duration, although the wizard window closes.

After the data collection completes, the file specified by **Sample Data File Name** contains the sample of data in a format that can be used for analysis by VRAdvisor. To proceed, see "Analyzing the Sample of Data" on page 29.

Collecting Data Using the vxstat Command

If you do not want to install VRAdvisor and VxVM is installed on your system, use the `vxstat` command to collect data.

▼ To collect data using vxstat

1. Set the locale to a supported locale. For example:

```
# export LC_ALL=C
```

2. To collect the data in the format required for analysis, use the following command with exactly the parameters shown:

```
# vxstat -g dgname -i interval -c count volumes > filename
```

where:

`interval` is the data collection interval in seconds.

`count` is the number of samples to collect.

`volumes` is a list of volume names separated by spaces.

For example, use the following command to collect a sample of data every 120 seconds and to collect 5040 samples. The volumes are the data volumes `hr_dv01` and `hr_dv02` in the disk group `hrdg`. The results are collected in the file `vra_in`.

```
# vxstat -g hrdg -i 120 -c 5040 hr_dv01 hr_dv02 > vra_in
```

After the data collection completes, the file *`filename`* (for example, `vra_in`) contains the sample of data in the `vxstat` format, which can be used for analysis by VRAdvisor. To proceed, see "Analyzing the Sample of Data" on page 29.

Collecting Data Using the iostat Command

▼ To collect data using iostat

1. Set the locale to a supported locale. For example:

   ```
   # export LC_ALL=C
   ```

2. To collect the data in the format required for analysis, use the following command with exactly the parameters shown:

   ```
   # iostat -x -n -Td interval count > filename
   ```

   where:

   interval is the data collection interval in seconds.

   count is the number of samples to collect.

   For example, use the following command to collect a sample of data every 120 seconds and to collect 5040 samples. The results are collected in the file `vra_in`.

   ```
   # iostat -x -n -Td 120 5040 > vra_in
   ```

After the data collection completes, the file *filename* (for example, `vra_in`) contains the sample of data in the `iostat` format, which can be used for analysis by VRAdvisor. To proceed, see "Analyzing the Sample of Data" on page 29.

Collecting the Sample of Data on HP-UX

There is no native version of VRAdvisor available on the HP-UX platform. If VxVM is installed on your system, use `vxstat` to collect data for analysis. If VxVM is not installed, collect data using the `sar` command and use the script provided with VRAdvisor to convert the output of the `sar` command into the VRAdvisor format. Use the Windows client to analyze the data that was collected in the `vxstat` or `csv` files.

On HP-UX, collect the sample of data using one of the following methods:

- Collecting Data Using the vxstat Command
- Collecting Data Using the sar Command

Collecting Data Using the vxstat Command

If VxVM is installed on your system, use the `vxstat` command to collect data.

▼ To collect data using vxstat

1. Set the locale to C:

   ```
   # export LC_ALL=C
   ```

2. To collect the data in the format required for analysis, use the following command with exactly the parameters shown:

   ```
   # vxstat -g dgname -i interval -c count volumes > filename
   ```

   where:

   `interval` is the data collection interval in seconds.

   `count` is the number of samples to collect.

   `volumes` is a list of volume names separated by spaces.

   For example, use the following command to collect a sample of data every 120 seconds and to collect 5040 samples. The volumes are the data volumes `hr_dv01` and `hr_dv02` in the disk group `hrdg`. The results are collected in the file `vra_in`.

   ```
   # vxstat -g hrdg -i 120 -c 5040 hr_dv01 hr_dv02 > vra_in
   ```

After the data collection completes, the file *`filename`* (for example, `vra_in`) contains the sample of data in the `vxstat` format, which can be used for analysis by VRAdvisor. To proceed, see "Analyzing the Sample of Data" on page 29.

Collecting Data Using the sar Command

If VxVM is not installed on your system, collect data using the `sar` command and use the script provided with VRAdvisor to convert the output of the `sar` command into the VRAdvisor format.

▼ To collect data using `sar`

1. Set the locale to C:

   ```
   # export LC_ALL=C
   ```

2. To collect the data in the format required by the conversion script, use the following command with exactly the parameters shown:

   ```
   # sar -bd interval count > filename
   ```

   where:

   `interval` is the data collection interval in seconds.

   `count` is the number of samples to collect.

   For example, use the following command to collect a sample of data every 120 seconds and to collect 5040 samples. The results are collected in the file `sar_out.hp`.

   ```
   # sar -bd 120 5040 > sar_out.hp
   ```

The sample of data that you have collected now needs to be converted to a format that can be analyzed with VRAdvisor. Proceed with the following section to run the appropriate conversion script.

Converting the Data to the Required Format

After the data has been collected with the `sar` command, run the conversion script located in the following directory on the VERITAS software disc containing VRAdvisor:

`volume_replicator/tools/vradvisor/scripts/sar2csv_hp.pl`

▼ To convert sar data for HP-UX

1. Ensure that perl is installed on the system on which the script is to be run.

Note The script can be run on any system that has perl installed. It does not need to be the same system on which the `sar` command was run.

2. To run the script, use the following command:

   ```
   #perl sar2csv_hp.pl sar_out.hp > vra_in.hp
   ```

The resulting file, `vra_in.hp`, contains the sample of data in the `VRAdv CSV` format, which can be used for analysis by VRAdvisor. To proceed, see "Analyzing the Sample of Data" on page 29.

Collecting the Sample of Data on Linux

There is no native version of VRAdvisor available on the Linux platform. If VxVM is installed on your system, use the `vxstat` command to collect data for analysis. If VxVM is not installed, you can collect data using the `sar` command and use the script provided with VRAdvisor to convert the output of the `sar` command into the VRAdvisor format. Use the Windows client to analyze the data that was collected in the `vxstat` or `csv` files.

On Linux, collect the sample of data using one of the following methods:

- Collecting Data Using the vxstat Command
- Collecting Data Using the sar Command

Collecting Data Using the vxstat Command

If VxVM is installed on your system, use the `vxstat` command to collect data.

▼ To collect data using vxstat

1. Set the locale to C:

   ```
   # export LC_ALL=C
   ```

2. To collect the data in the format required for analysis, use the following command with exactly the parameters shown:

   ```
   # vxstat -g dgname -i interval -c count volumes > filename
   ```

   where:

   interval is the data collection interval in seconds.

   count is the number of samples to collect.

   volumes is a list of volume names separated by spaces.

   For example, use the following command to collect a sample of data every 120 seconds and to collect 5040 samples. The volumes are the data volumes `hr_dv01` and `hr_dv02` in the disk group `hrdg`. The results are collected in the file `vra_in`.

   ```
   # vxstat -g hrdg -i 120 -c 5040 hr_dv01 hr_dv02 > vra_in
   ```


After the data collection completes, the file *filename* (for example, vra_in) contains the sample of data in the vxstat format, which can be used for analysis by VRAdvisor. To proceed, see "Analyzing the Sample of Data" on page 29.

Collecting Data Using the sar Command

If VxVM is not installed on your system, collect data using the sar command and use the script provided with VRAdvisor to convert the output of the sar command into the VRAdvisor format.

▼ **To collect data using sar**

1. Set the locale to C:

   ```
   # export LC_ALL=C
   ```

2. To collect the data in the format required by the conversion script, use the following command with exactly the parameters shown:

   ```
   # sar -bd interval count > filename
   ```

   where:

   interval is the data collection interval in seconds.

   count is the number of samples to collect.

   For example, use the following command to collect the buffer and device activity every 120 seconds and to collect 5040 samples. The results are collected in the file sar_out.linux.

   ```
   # sar -bd 120 5040 > sar_out.linux
   ```

The sample of data that you have collected now needs to be converted to a format which can be analyzed with VRAdvisor. Proceed with the following section to run the appropriate conversion script.

Converting the Data to the Required Format

After the data has been collected with the sar command, run the conversion script located in the following directory on the VERITAS software disc containing VRAdvisor:

volume_replicator/tools/vradvisor/scripts/sar2csv_linux.pl

▼ To convert the sar data for Linux

1. Ensure that perl is installed on the system on which the script is to be run.

Note The script can be run on any system that has perl installed. It does not need to be the same system on which the `sar` command was run.

2. To run the script, use the following command:

```
# perl sar2csv_linux.pl sar_out.linux > vra_in.linux
```

The resulting file, `vra_in.linux`, contains the sample of data in the `VRAdv CSV` format, which can be used for analysis by VRAdvisor. To proceed, see "Analyzing the Sample of Data" on page 29.

If the `sar2csv_linux.pl` script cannot determine the time stamp from the specified input files, then the command may fail with the following message:

```
Cannot determine timestamp information from sar_out.linux. Please
provide data collection interval in seconds
```

In this case, use the following command to run the script:

```
# perl sar2csv_linux.pl <sar_data_file> <interval_in_seconds> > \
    <csv_data_file_name>
```

For example, use the following command for an time interval of 5 seconds:

```
# perl sar2csv_linux.pl sar_out.linux 5 > vra_in.linux
```


Collecting the Sample of Data on AIX

VRAdvisor handles input from several tools for AIX. The tools are listed in order of preference. For example, if you have VERITAS Volume Manager, you should use `vxstat` to collect data for analysis with VRAdvisor.

On AIX, collect the sample of data using one of the following methods:

- Collecting Data Using the vxstat Command
- Collecting Data Using the lvmstat Command
- Collecting Data Using the iostat Command

Collecting Data Using the vxstat Command

If VxVM is installed on your system, use the `vxstat` command to collect data for analysis.

▼ To collect data using `vxstat`

1. Set the locale to C:

   ```
   # export LC_ALL=C
   ```

2. To collect the data in the format required for analysis, use the following command with exactly the parameters shown:

   ```
   # vxstat -g dgname -i interval -c count volumes > filename
   ```

   where:

   `interval` is the data collection interval in seconds.

   `count` is the number of samples to collect.

   `volumes` is a list of volume names separated by spaces.

   For example, use the following command to collect a sample of data every 120 seconds and to collect 5040 samples. The volumes are the data volumes `hr_dv01` and `hr_dv02` in the disk group `hrdg`. The results are collected in the file `vra_in`.

   ```
   # vxstat -g hrdg -i 120 -c 5040 hr_dv01 hr_dv02 > vra_in
   ```

After the data collection completes, the file *`filename`* (for example, `vra_in`) contains the sample of data in the `vxstat` format, which can be used for analysis by VRAdvisor. To proceed, see "Analyzing the Sample of Data" on page 29.

Collecting Data Using the lvmstat Command

If VxVM is not installed on your system, you can collect data using the `lvmstat` command and use the script provided with VRAdvisor to convert the output of the `lvmstat` command into the VRAdvisor format.

▼ To collect data using lvmstat

1. Set the locale to C:

   ```
   # export LC_ALL=C
   ```

2. Enable stat collection on the volume group using the command:

   ```
   # lvmstat -v volgrpname -e
   ```

3. Include a start date at the beginning of the file, because `lvmstat` does not print the date.

   ```
   # date > lvmstat_out.aix
   ```

4. To collect the data in the format required by the conversion script, use the following command with exactly the parameters shown:

   ```
   # lvmstat -v volgrpname 120 5040 >> lvmstat_out.aix
   ```

   This command tells `lvmstat` to collect the statistics for all logical volumes in the volume group *volgrpname* every 120 seconds and to collect 5040 samples. This is seven days' worth of sampling.

The sample of data that you have collected now needs to be converted to a format which can be analyzed with VRAdvisor. Proceed with the following section to run the appropriate conversion script.

Converting the Data to the Required Format

After the data has been collected with the `lvmstat` command, run the conversion script located in the following directory on the VERITAS software disc containing VRAdvisor:

`volume_replicator/tools/vradvisor/scripts/lvmstat2csv_aix.pl`

▼ To convert the lvmstat data for AIX

1. Ensure that perl is installed on the system on which the script is to be run.

Note The script can be run on any system that has perl installed. It does not need to be the same system on which the `sar` command was run.

2. To run the script, use the following command:

```
# perl lvmstat2csv_aix.pl lvmstat_out.aix interval > vra_in.aix
```

where *interval* is the data collection interval (in seconds) that was used in the `lvmstat` command to collect the data.

The resulting file, `vra_in.aix`, contains the sample of data in the `VRAdv CSV` format, which can be used for analysis by VRAdvisor. To proceed, see "Analyzing the Sample of Data" on page 29.

Collecting Data Using the iostat Command

If VxVM is not installed on your system, you can collect data using the `iostat` command and use the script provided with VRAdvisor for AIX to convert the output of the `iostat` command into the VRAdvisor format.

Note When VRAdvisor calculates the SRL size, it includes the SRL header overhead, which is calculated based on the number of IO operations to volumes. If the sample data is collected using the `iostat` utility, VRAdvisor uses the number of transfers per second (tps) to calculate the SRL header overhead. Because a transfer can combine multiple logical requests, the number of transfers is smaller than the number of actual logical requests. Consequently, VRAdvisor gives a significantly smaller SRL size than expected. Add 30 percent to the suggested SRL size to get an appropriate SRL size.

▼ To collect data using `iostat`

1. Set the locale to C:

```
# export LC_ALL=C
```

2. To collect the data in the format required by the conversion script, use the following command with exactly the parameters shown:

```
# iostat -T -d interval count > filename
```

where:

interval is the data collection interval in seconds.

count is the number of samples to collect.

For example, use the following command to collect the buffer and device activity every 120 seconds and to collect 5040 samples. The results are collected in the file `vra_in`.

```
# iostat -T -d 120 5040 > iostat.out.aix
```

Note The `-T` option may be omitted if it is not supported in the `iostat` command. You must then specify the data collection interval when running the conversion script to convert from the `iostat` format to the VRAdvisor format.

To improve performance, disable the collection of disk input/output statistics on a continuous basis. This causes the first disk report of `iostat` output to display the message `"Disk history since boot not available."` instead of disk statistics. The subsequent interval reports generated by the `iostat` command contain disk statistics collected during the report interval.

Note If collection of disk input/output statistics is enabled on the system, the first block of statistics displayed by the `iostat` command will contain cumulative statistics since the system was last booted, and this block needs to be deleted from the file `iostat.out.aix` before the script is invoked on it.

Converting the Data to the Required Format

After the data has been collected with the `iostat` command, run the conversion script located in the following directory on the VERITAS software disc containing VRAdvisor:

`volume_replicator/tools/vradvisor/scripts/iostat2csv_aix.pl`

▼ To convert the iostat data on AIX

1. Ensure that perl is installed on the system on which the script is to be run.

Note The script can be run on any system that has perl installed. It is not necessary to run the script on the same system on which the `iostat` command was run.

2. Run the conversion script. If the `-T` option was specified in the `iostat` command when collecting the data, use the following command:

```
# perl iostat2csv_aix.pl iostat.out.aix > vra_in.aix
```

If the `-T` option was not specified in the `iostat` command when collecting the data, then the interval time in seconds must be specified when running the conversion script, as shown below:

```
# perl iostat2csv_aix.pl iostat.out.aix 120 > vra_in.aix
```

The resulting file, `vra_in.aix`, contains the sample of data in the `VRAdv CSV` format, which can be used for analysis by VRAdvisor. To proceed, see "Analyzing the Sample of Data" on page 29.

Collecting the Sample of Data on Windows

VRAdvisor can be used to collect and analyze a sample of data. You can collect data using the VRAdvisor wizard or the `diskStats` command. To use VRAdvisor to collect data, you must install VRAdvisor on your system. If you do not plan to install VRAdvisor on your system, use the `diskStats` command to collect data.

On Windows, collect the sample of data using one of the following methods:

- Collecting the Sample of Data Using the VRAdvisor Wizard
- Collecting Data Using the diskStats Command

Prerequisite

✔ If you are using VSFW volumes, then ensure that you import the disk group containing the required volumes onto your system.

Collecting the Sample of Data Using the VRAdvisor Wizard

▼ **To collect data using the VRAdvisor wizard**

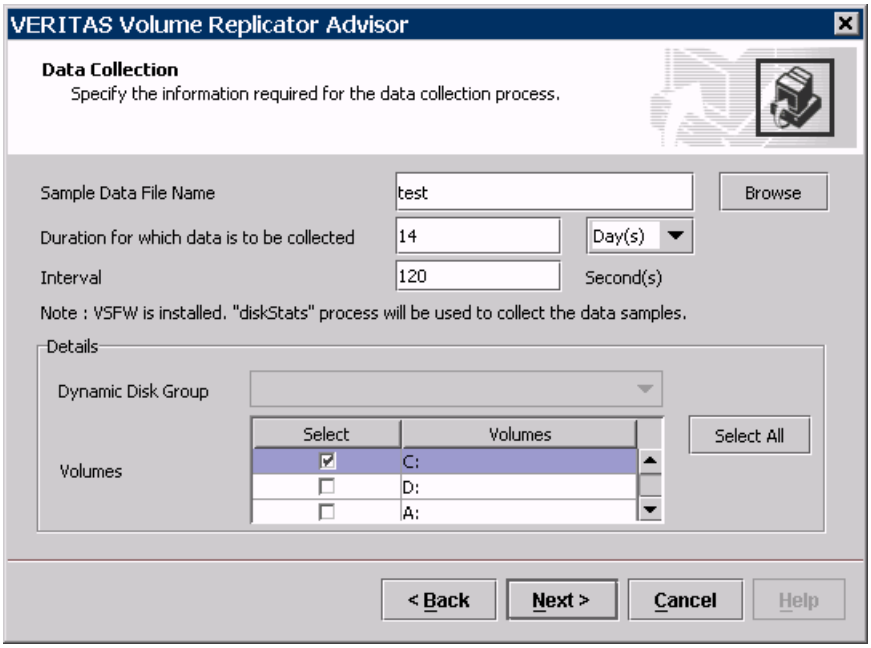
1. To launch the VRAdvisor wizard on Windows, select **Start > Programs > VERITAS > Volume Replicator Advisor > VRAdvisor Wizard**.

   The **Welcome** page appears.

2. Select **Data Collection**. Click **Next**.

   The **Data Collection** page appears.

Note On Windows, only the `diskStats` command will be used to collect data.



3. Complete the **Data Collection** page as follows:

Sample Data File Name	Enter the name of the file where the data write samples will be collected. Make sure the name is not being used by another application. If a file already exists with that filename, or if the path is incorrect, a message is displayed.
Duration for which the data is to be collected	Enter the duration in days or hours. The default value is 14 days. The maximum duration is 30 days.
Interval	Enter a value, in seconds, to indicate the frequency at which you want the data to be collected. The default value is 120 seconds.

Details	Select the required volumes individually, or click **Select All** to select all of the available volumes in the selected disk group. Only volumes with drive letters are displayed. On Windows, the Dynamic Disk Group field is not available.

4. Click **Next**. The **Confirmation** page appears.

5. To start the data collection process immediately, click **Yes**. To go back and make any changes, click **No**.

6. The **Data Collection Summary** page indicates that the data collection has started. It also displays a summary of the specifications you entered for the data collection.

7. Click **Finish**. VRAdvisor continues to collect data for the specified duration, although the wizard window closes.

After the data collection completes, the file specified by **Sample Data File Name** contains the sample of data in a format that can be used for analysis by VRAdvisor. To proceed, see "Analyzing the Sample of Data" on page 29.

Collecting Data Using the diskStats Command

On Windows, use the `diskStats` command to collect the data required for analysis. This command can be used to collect data whether or not the VERITAS Storage Foundation is installed on the system. The `diskStats` utility is installed in the following location:

```
\VERITAS\Volume Replicator Advisor\bin\diskStats.exe
```

▼ To collect data using the diskStats command

1. Navigate to the specified path:

   ```
   \VERITAS\Volume Replicator Advisor\bin\
   ```

2. At the prompt, enter the following command with exactly the parameters shown:

Note The `diskStats` command can accept only drive letters of the volumes as inputs. Volume names or mount points are not supported. Volumes created by any application are supported.

```
diskStats  [-i interval [-c count]] \
  <drive 1> [[drive 2][drive 3]... ]
```

The command will display the output on the console.

To save the output to a file, you can redirect the output to a named file using the command:

```
diskStats  [-i interval [-c count]] \
     <drive 1> [[drive 2][drive 3]... ] > <filename>
```

After the data collection completes, the file *`filename`* contains the sample of data in the `diskStats` format, which can be used for analysis by VRAdvisor. To proceed, see "Analyzing the Sample of Data" on page 29.

Analyzing the Sample of Data 4

You can use VRAdvisor to analyze the sample of data that you have collected. VRAdvisor analyzes the sample of data according to parameters that you specify such as available network bandwidth and network outage. In addition, VRAdvisor enables you to perform a What-If analysis by varying the values of the parameters. The output of the analysis gives the network bandwidth required to replicate in synchronous mode, and the SRL size required for a given bandwidth and for the given outages to replicate in asynchronous mode. The results of the analysis help you to set up an optimum configuration for VVR.

VRAdvisor enables you to analyze data collected on any of the supported platforms described in "Collecting the Sample of Data" on page 9. However, to analyze the data, you must install and use VRAdvisor on either a Solaris or a Windows system.

Prerequisite

- ✔ The sample of data must be available in a format required by VRAdvisor as discussed in "Collecting the Sample of Data" on page 9.

Analyzing the Collected Data

▼ To analyze the collected data using VRAdvisor

1. Launch the VRAdvisor wizard.

   On Solaris:

   a. Change directory as follows:

      ```
      # cd /opt/VRTSvradv/bin
      ```

   b. Launch the VRAdvisor wizard, using the following command:

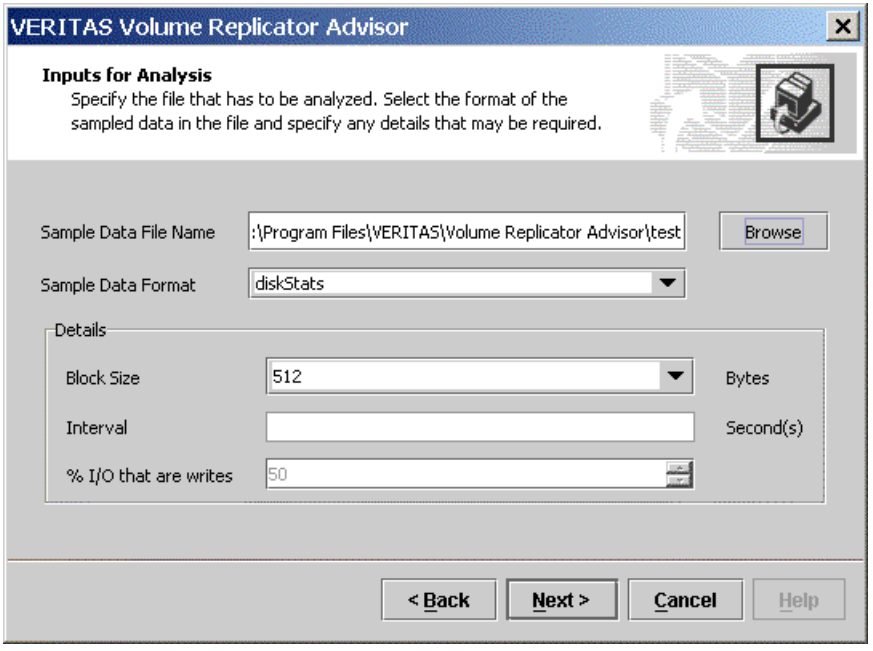
      ```
      # ./vradvgui
      ```

   On Windows:

   Choose **Start** > **Programs** > **VERITAS** > **Volume Replicator Advisor** > **VRAdvisor Wizard**

2. In the **Welcome** page, select **Analysis**, and then click **Next**.

3. Complete the **Inputs for Analysis** page as follows:



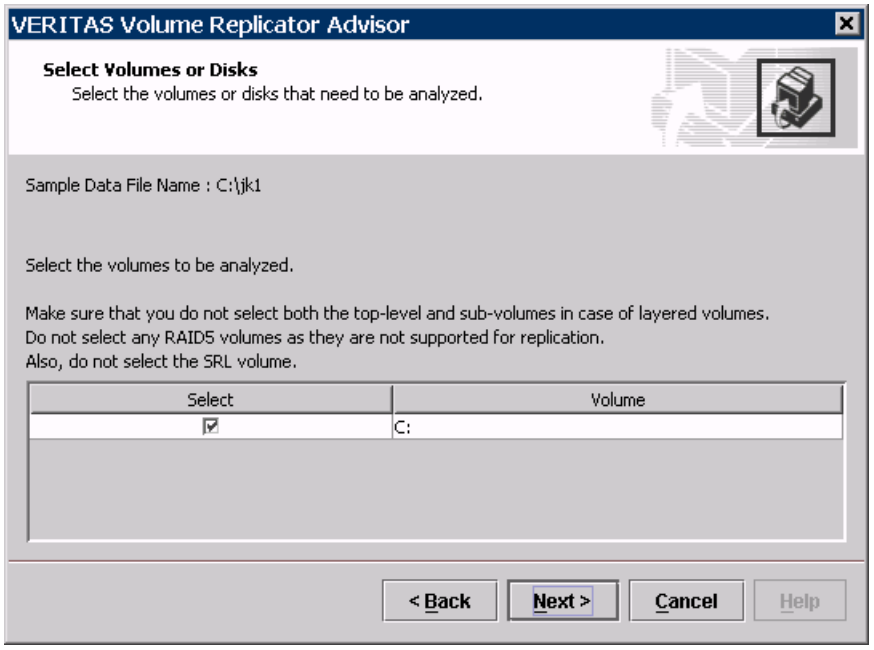
Sample Data File Name	Enter the name of the file containing the sample of data to be analyzed.
Sample Data Format	Select the format of the sample data file. ◆ `vxstat` ◆ `iostat (Solaris)` ◆ `diskStats` ◆ `VRAdv CSV format`
Details	Enter additional information in the following fields as required for the sample data format that you specified.
Block size	If the field is available, enter the block size. If the field is not available, it is not required for the format that you specified for the sample data file.
Interval	If the field is available, enter the interval at which the data was collected. If the field is not available, it is not required for the format that you specified for the sample data file. VRAdvisor determines the interval from the data collected in the file.

4. Click **Next**.

If the sample data has been collected for less than seven days, a warning message displays. We recommend that you provide at least seven days' worth of data. If you want to continue, click **OK**.

Note VRAdvisor prompts you to enter the interval if it is unable to determine the interval from the file; for example, if the file does not use the expected date format for the locale. Enter the data interval and click **Next** to continue.

5. Complete the **Select Volumes or Disks** page as follows:



Click the check boxes in the **Select** column for the volumes or disks that you want to analyze. You should select the volumes that you intend to use for your RVG setup. By default, all the volumes are selected.

Note

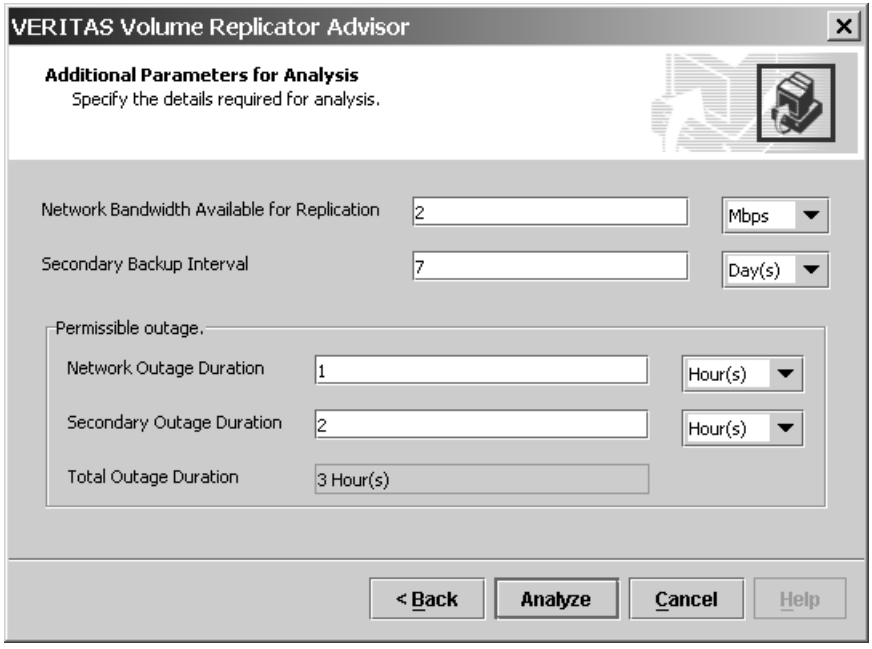
When selecting volumes make sure you do not select:

- RAID-5 volumes because these are not supported.
- Sub-level volumes (if the volumes are layered volumes). Select only the top-level volumes.
- The volume that you intend to use as the SRL.

---

6. Click **Back** if you want to make changes. Otherwise, click **Next**.

7. Complete the **Additional Parameters for Analysis** page as follows:



This page allows you to specify additional parameters for analyzing the sample data. For example, the availability of network bandwidth directly impacts the writes to the Secondary.

Network Bandwidth Available for Replication	Enter the network bandwidth that will be available for replication. Select the unit for the network bandwidth from the drop-down list. The default is 2 Mbps. Before specifying the network bandwidth you must also consider the loss of available bandwidth because of the TCP-IP/UDP headers, because VRAdvisor does not handle this.
Secondary Backup Interval	Enter the interval at which the Secondary will be backed up, in days or hours. The default value is seven days.

Outage Duration	
Network Outage Duration	Enter the duration of the network outage in days, hours, or minutes. The default is one hour.
Secondary Outage Duration	Enter the maximum duration of Secondary outage in days, hours, or minutes. This value indicates the maximum time the Secondary may be unavailable for replication. The outage could be because of various reasons, such as, the Secondary had to undergo regular maintenance or the Secondary has failed. The default is two hours.
Total Outage Duration	Displays a total of the network and Secondary outage durations.

8. Click **Back** if you want to make changes. Otherwise, click **Analyze** to proceed. VRAdvisor displays the results of the analysis for the sample data file.

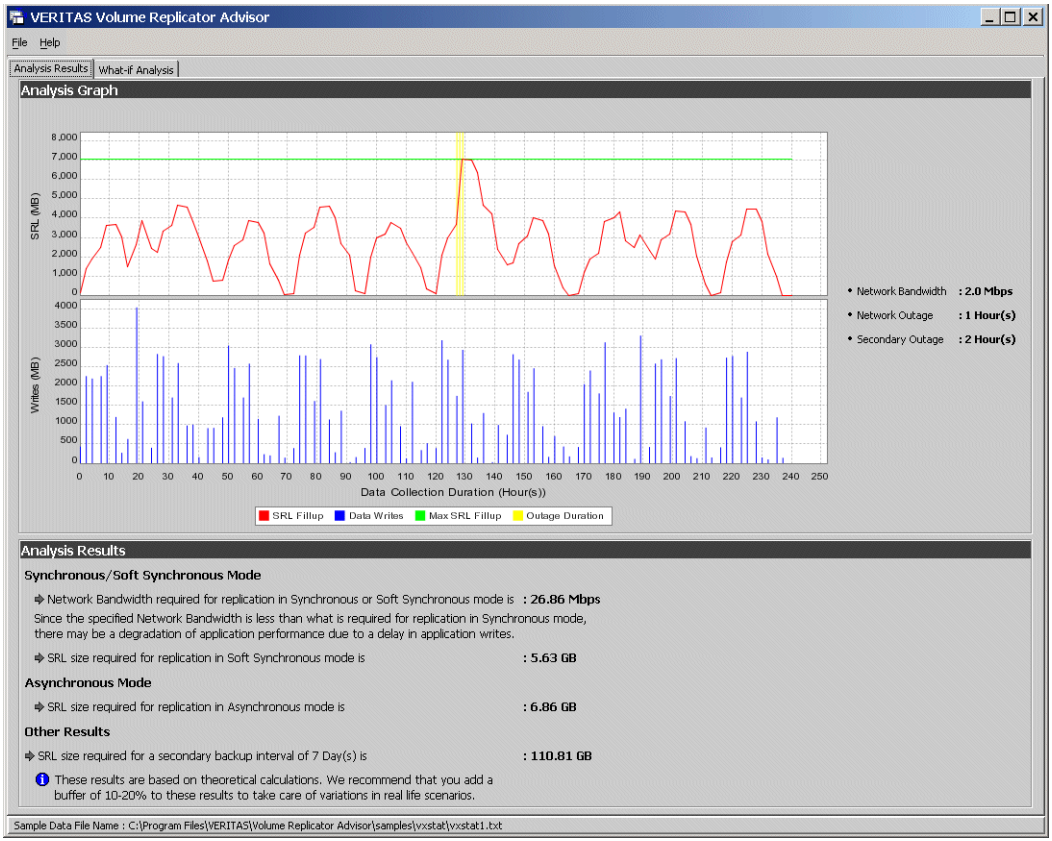
Understanding the Results of the Analysis

After the analysis completes, VRAdvisor displays the results of the analysis and also enables you to recalculate the results after changing some parameters. The results are described in the following sections:

- Viewing the Analysis Results
- Recalculating the Analysis Results

Viewing the Analysis Results

After the analysis completes, the Analysis Results page displays by default.



The Analysis Results page displays information in the following sections:

Analysis Graph

The Analysis Graph section shows the following information:

- The top graph shows the SRL fillup in megabytes (MB) over the data collection duration for the y-axis. The x-axis shows the data write duration values. The peak SRL fillup size is shown against a max outage window, displayed in yellow, which indicates the worst case scenario.

Note If the SRL fillup value in the graph is steadily increasing, with the maximum at the last data write duration, it indicates that you do not have sufficient network bandwidth for the amount of data writes in the sample of data.

- The bar graph shows the values of the Application Writes in bytes for the y-axis. The x-axis shows the data write duration values.
- To the right of the graphs, the page displays the values you specified for network bandwidth and the outage parameters.

Analysis Results

The Analysis Results section shows the network bandwidth and the SRL size that are required based on the analysis of the data, as described below:

Synchronous / Synchronous Override Mode

For Synchronous replication, the SRL size is not displayed because the SRL is not required to be very large as the writes are first committed on the Secondary before being acknowledged at the Primary.

- Network bandwidth required for synchronous replication.

  If the required bandwidth is more than the bandwidth that you specified, then VRAdvisor displays a message to indicate that the performance of the application writing to the disk writes will be affected.

- The SRL size for Synchronous Override replication is displayed.

Asynchronous Mode

This section displays the SRL size required for asynchronous replication.

Other Results

This section displays the SRL size required for a specified Secondary backup interval.

Note We recommend that you add a 10-20 percent buffer to the values calculated by VRAdvisor when setting up your VVR configuration. VRAdvisor analyzes the data based on the specified values, which could be affected by factors that VRAdvisor does not consider, such as TCP/IP headers overhead, network congestion, or peak time bandwidth unavailability.

Saving the Analyzed File

VRAdvisor enables you to save the file that is being analyzed into the VRAdv CSV format. If you want to use the file for analysis in the future, save the file into the VRAdv CSV format for faster processing.

▼ To save the file

- Select **File** > **Save** to save the file in the same directory location as the original file. The name is the same as the original filename except the file extension is changed to `.vra`.

or

- Select **File** > **Save As** to save the file with a name and location that you choose. The file extension `.vra` is automatically used.

The `.vra` file contains the information from the original sample of data in a comma-separated values (CSV) format. The results of the analysis, including the parameters that were used in the calculations, are found in the Results file. For details, see "Recording and Viewing the Results" on page 43.

Recalculating the Analysis Results

You can recalculate the Analysis Results in the following ways:

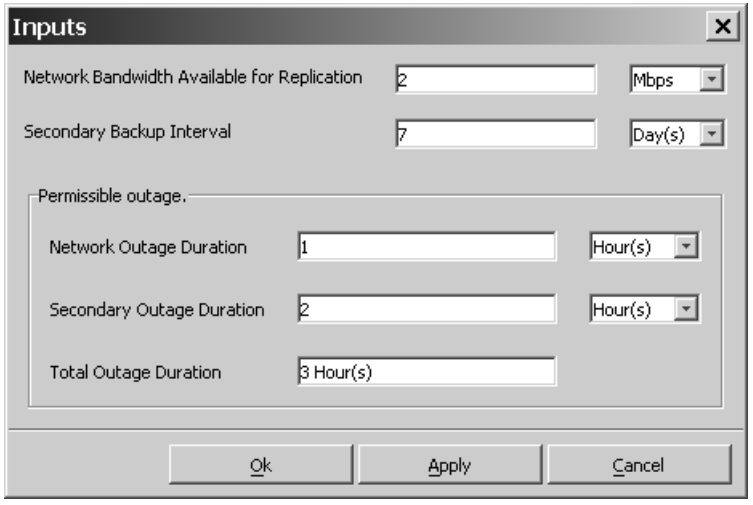
- Applying Different Parameters to the Existing Sample of Data
- Performing What-if Analysis

Applying Different Parameters to the Existing Sample of Data

You can recalculate the analysis results by changing the values you specified for the network bandwidth and the outage durations.

▼ To recalculate the analysis results

1. To change the values you specified, select **File** > **Change Inputs**.
2. On the **Inputs** page, specify new values for any of the fields.



3. Click **Ok**.

   VRAdvisor performs the analysis of the data using the changed values and displays the results.

Performing What-if Analysis

After checking the analysis results, you can use the What-if Analysis page to do additional calculations, to plan for future requirements or alternative scenarios.

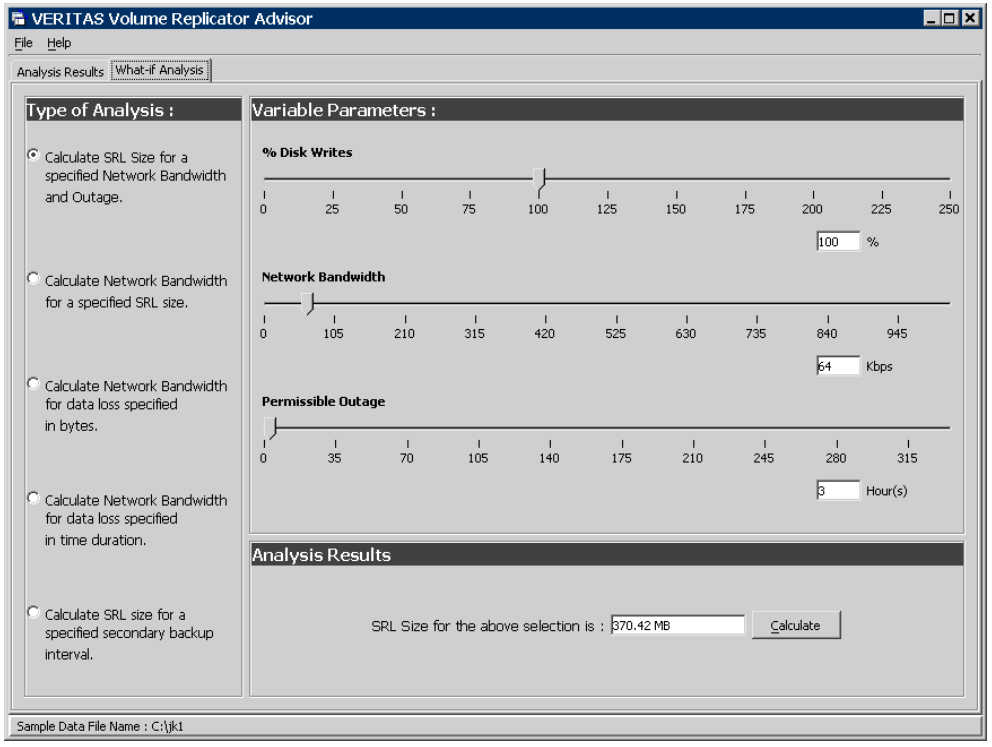
You can vary the parameters and recalculate the results according to different criteria. For example, you can vary the network bandwidth parameter to see what effect it would have on the SRL size. Or, you can specify a potential SRL size and see how much network bandwidth would be required for that SRL size.

Note Before specifying the network bandwidth, you must also consider the loss of available bandwidth due to the TCP-IP/UDP headers, because VRAdvisor cannot manage this.

What-if Analysis also enables you to vary the percentage of disk writes as compared to the sample of data that was analyzed. For example, if you anticipate that your future needs will involve twenty percent more disk writes, set the percentage of disk writes to 120% and recalculate.

▼ To recalculate results using the What-If Analysis

1. Select the **What-If Analysis** tab.



2. Select the appropriate option on the left side of the What-If Analysis page to recalculate results, as follows:

   - **Calculate SRL Size for a specified Network Bandwidth and Outage**.

     Use this option to calculate the SRL size for a specified network bandwidth and outage duration.

     Available parameters for this option are % Disk Writes, Network Bandwidth, and Permissible Outage.

   - **Calculate the Network Bandwidth for a specified SRL size**.

     Use this option to calculate the network bandwidth for varying SRL sizes.

     Available parameters for this option are % Disk Writes and SRL Size.

- **Calculate the Network Bandwidth for data loss specified in bytes**.

  Use this option to calculate the network bandwidth that would be required to minimize the amount of data loss at the Primary host.

  Available parameters for this option are % Disk Writes and Data loss in bytes.

- **Calculate Network Bandwidth for data loss specified in time duration.**

  Use this option to calculate the network bandwidth that would be required to minimize the amount of data loss at the Primary host.

  Available parameters for this option are % Disk Writes and Data loss in time.

- **Calculate SRL size for a specified secondary backup interval.**

  Secondary backup interval is the duration of the backup interval specified in days, hours, or minutes. Use this option to calculate the optimum SRL size by varying the Secondary backup interval.

  Available parameters for this option are % Disk Writes and Secondary Backup Interval.

The right side of the page displays the parameters you can specify for each option, and the corresponding slider bars.

3. Use the slider bar to specify the value for each parameter. Each slider has a default range of values, which can be customized using the **Preferences** option that is available from the **File** menu. For more information, see "Changing the Value Ranges on the Slider Bar" on page 42.

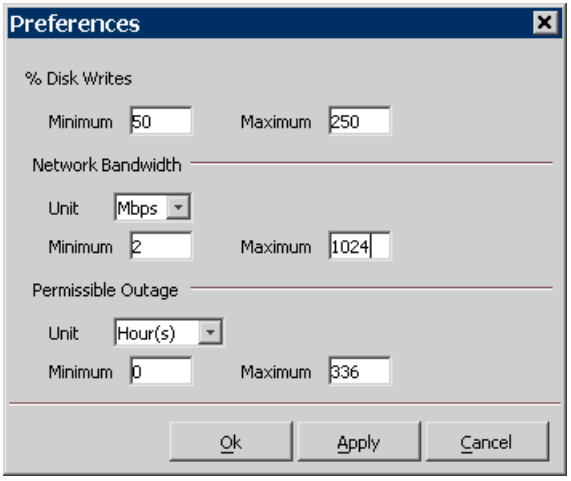
4. Click **Calculate** at the lower region of the page.

Changing the Value Ranges on the Slider Bar

Follow the steps given below to change the value ranges for the slider bars.

1. Make sure the option for which you want to change the value ranges is selected in the left side of the **What-if Analysis** page.

2. Use the **File > Preferences** option to display the **Preferences** page.



Note The **Preferences** dialog box displays parameters corresponding to the calculate option that you selected.

3. Change the values on the **Preferences** page as required:
   - Select the Unit for each option from the drop-down box.
   - Specify the appropriate values in the **Maximum** and **Minimum** fields. These values are used to indicate the range of values available on the slider bar.

4. Click **Ok**.

Recording and Viewing the Results

VRAdvisor records any values that you had specified in the analysis phase and the results of the What-if Analysis to a file, which uses the following naming convention:

`VRAdvResults_`*`Datestamp_and_Timestamp`*`.txt`

For Windows, the file is located in the `VERITAS/Volume Replicator Advisor/results` subdirectory. For Solaris, the file is located in the `/opt/VRTSvradv/results` subdirectory.

Every time you start the Analysis wizard, this file is automatically created and can be referenced later.

Command-Line Interface 5

You can use the VRAdvisor Command-Line Interface (CLI) to perform most of the functions that can be performed using the Graphical User Interface.

The VRAdvisor Command-Line Interface is supported only on Solaris. The data collection option, `vradv -c`, can be used only to collect a sample of data on Solaris. The analysis option, `vradv -a`, can be run only on a Solaris system, but can analyze data collected on any platform, if the sample of data is in the appropriate format. See "Collecting the Sample of Data" on page 9 for information about collecting data on your platform.

Note On Windows, the command-line interface for VRAdvisor is currently not supported.

Collecting Data Using the VRAdv Command

Command

```
vradv -c
```

Syntax

```
vradv -c [-p process_type][-g diskgroup] [-v vol1 vol2...voln]
[-t duration[h/d]] [-f filename] [-i data_collection_interval] [-h]
```

Note When you run the command with all the parameters as shown above and press Return, the data collection process starts. If you specify the `-c` option only, the command prompts you for inputs. If you run the command without specifying any options or with the `-h` option, only the help is displayed.

Description

The `vradv -c` command enables you to collect the sample of data for one or more volumes in a dynamic disk group over a specified time duration. If you do not specify any options and only specify the command with the mode, the command prompts you to provide the parameters required to proceed with data collection.

Command Options

To collect data using the command line, run the `vradv` command with the required options from the command prompt. The following table lists the command options and their descriptions.

Option	Description
-c	Specifies the data collection mode.
-p *process_type*	Specifies the process type for data collection. The available options are: `vxstat` and `iostat`.
-g *diskgroup*	Specifies the dynamic disk group name for which the data write statistics have to be collected. This option is available when process type is `vxstat` and the volumes are VxVM volumes.
-v *volumes*	Specifies the list of volumes under the selected dynamic disk group for which the data write statistics have to be collected. This option is used only when the process type is `vxstat`.
-t *duration*	Specifies the time duration over which the data has to be collected. The time specified can be in hours (h) or days (d). For example, to specify 5 days, use the option `–t 5d`. The default unit is `d` (days) and the default number of days is 14 days.
-f *filename*	Specifies the file name in which you want to save the data.
-i *interval*	Specifies the data collection time interval in seconds. For example, –i 300 specifies that the data be collected at regular intervals of 300 seconds. The default value is 120 seconds.
-h	Displays the help.

Example 1

The command in this example collects data writes for the volumes `dgvol1` and `dgvol2` of dynamic disk group `mydg`. The duration for data collection is seven days over an interval of 300 seconds. The data is collected in the file named `data_collect.txt`.

```
vradv -c -p vxstat -g mydg -v dgvol1 dgvol2 -t 7d -f data_collect.txt
-i 300
```

where the data collection parameters have the following values:

Parameter	Actual Values
-p *process_name*	vxstat
-g *diskgroup*	mydg
-v *volumes*	dgvol1, dgvol2
-t *duration*	7 days
-f *filename*	data_collect.txt You can also specify the complete path for the filename in case you need to access it from a specific directory.
-i *data_collection_interval*	300 seconds

Example 2

This example illustrates the case when you do not specify any parameters for the `vradv -c` command. In this case, the command prompts you for the required parameters.

1. Enter the following commands at the command prompt:

```
# cd /opt/VRTSvradv/bin
# ./vradv -c
```

   The command prompts you to enter the required information.

2. Specify the required information at the prompts and press Return to continue.

```
Enter information for Data Collection:
Process Type [vxstat/iostat]: vxstat

Group Name: ExchDg

Volumes: Exch, Regrep

Duration [(h/d) default 14 days]: 5d

Data Collection Interval [value in seconds [120]]: 15

File Name: data_sample
```

   A summary of the specified parameters is displayed; then VRAdvisor proceeds with the data collection.

```
Data Collection information:
- Process Name: vxstat
- File Name: data_sample
- Duration: 432000 seconds.
- Data Collection interval: 15 seconds.
Data Collection Started...
```

Analyzing Data Using the VRAdv Command

Command

```
vradv -a
```

Syntax

```
vradv –a -n network_bandwidth –o network_outage_duration[h/d]
–d secondary_downtime [h/d] –b secondary_backup_interval
-f filename -v vol1 vol2…voln [-h]
```

Description

The `vradv -a` command enables you to analyze the data write statistics information that you have collected for a specific time duration. You can specify the various options available with the command to analyze the data according to the specific requirements.

Command Options

To analyze the collected data using the command line, run the `vradv` command with the required options from the command prompt. The following table lists the command options and their descriptions.

Option	Description
-a	Specifies the analysis mode.
-n *network_bandwidth*	Specifies the network bandwidth available for replication. You can specify the unit after the network bandwidth using the following symbols: k - to represent kilobits per second (Kbps). m - to represent megabits per second (Mbps). g - to represent gigabits per second (Gbps). For example, `–n 1g` The default unit is Mbps (m).

Option	Description
-o *network_outage_duration*	Specifies the network outage duration. You can specify the unit following the duration using the following symbols: h – represents hours d – represents days For example, `-o 1d` indicates network outage duration of 1 day. The default unit is days (d).

-d *Secondary_downtime*	Specifies the Secondary downtime duration. You can specify the unit following the duration using the following symbols:
	`h - represents hours`
	`d - represents days`
	For example, `-d 2d` indicates Secondary downtime duration of 2 days.
	The default unit is days (d).

-b *Secondary_backup_interval*	Specifies the Secondary backup interval in number of days and is an optional value. For example, -b 5 indicates that the Secondary will be backed up after every 5 days.
-f *filename*	Specifies the name of the file that contains the data write statistics. This can be in different formats such as csv, vxstat, or iostat.
-v *volumes or disks*	Specifies the list of volumes or disks for which the data needs to be analyzed. In case –v option is not specified then all the volumes or disks for which data write statistics is collected will be analyzed.
-h	Displays the help

If you run the command without specifying any options or with the `-h` option only, the help is displayed. If you specify the command with the `-a` option only, the command prompts you for the remaining inputs.

After specifying the command options, VRAdvisor prompts you to specify the file format. Depending on the file format, you are required to provide additional inputs. The following table lists the additional inputs that are required for each file format.

File format	Additional input
cvs	None
vxstat	Block Size
iostat	Percentage of writes (will need to specify either or both depending on the platform)

Example 1

The following example uses the collected data from the file `.datafile.txt` (`vxstat` format with block size 512KB) for the specified volumes `vol1` and `vol2`, and displays the calculated SRL size for synchronous override mode, asynchronous replication mode, and for the specified Secondary backup window. It also calculates the network bandwidth required for synchronous mode. These results are calculated based on the input of network bandwidth of one Gbps, network outage of one day, Secondary downtime of two days, and Secondary backup window of seven days.

1. To analyze the collected data, use the following command:

   # **`vradv -a -n 1g -o 1d -d 2d -b 7 -v vol1, vol2 -f datafile.txt`**

   where the data analysis parameters have the following values:

Parameter	Actual Values
-a mode	analysis
-n network bandwidth	1 Gbps
-o network outage	1 day
-d duration	2 days
-b secondary backup interval	7 days
-v volume or disks	vol1, vol 2

Parameter	Actual Values
-f filename	datafile.txt

2. At the prompt, select the file format. For this example, the format is `vxstat`.

3. VRAdvisor prompts you for the following values:

```
Block size (512 KB) : 512
```

The data analysis starts. The output is displayed as follows :

```
SRL size for synchronous override mode: 500 MB
SRL size for asynchronous mode: 2 GB
Network bandwidth required for synchronous replication: 2mbps
SRL Size for 7 -day secondary backup interval: 16 GB
```

Example 2

This example shows the use of the `vradv -a` command when no parameters are specified. VRAdvisor prompts you for the required information.

1. Enter the following commands at the command prompt:

```
# cd /opt/VRTSvradv/bin
# ./vradv -a
```

2. Specify the required information at the prompts and press Return to continue.

```
Enter information for Data Analysis:
Network Bandwidth [(k/m/g) default unit Mbps]: 2M

Network Outage Duration [(h/d) default unit days]: 5h

Secondary Downtime Duration [(h/d) default unit days]: 2h

File Name: # /opt/VRTSvradv/samples/vxstat/vxstat1.txt

Volumes: test_vol

Do you want to calculate SRL Size for specified Secondary backup
interval? [y/n]: n
```

```
File Format:
1. csv
2. vxstat
3. iostat  (Solaris)
Select the file format: 2

Block Size [value in bytes] : 512
```

VRAdvisor begins the data analysis and displays the following message:

```
Data analysis is in progress...
```

- After the data analysis is complete the results are displayed in the following format:

```
SRL size required for replication in Synchronous override mode is :
62.71 MB

SRL size required for replication in Asynchronous mode is :
75.04 MB

Network Bandwidth required for replication in Synchronous mode :
240.4 KBPS
Since the specified Network Bandwidth is less than what is required
for replication in Synchronous mode,there may be a degradation of
application performance due to a delay in application writes.
```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