

# Veritas™ Volume Replicator Release Notes

Solaris x64 Platform Edition

5.0



# Veritas Volume Replicator Release Notes

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Veritas Volume Replicator 5.0

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Symantec Corporation  
20330 Stevens Creek Blvd.  
Cupertino, CA 95014  
[www.symantec.com](http://www.symantec.com)

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## Licensing and registration

Veritas Volume Replicator is a licensed product. See the *Veritas Volume Replicator Installation Guide* for license installation instructions.

## 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.



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Appendix A Third-party Legal Notices

# Veritas Volume Replicator Release Notes

Veritas™ Volume Replicator by Symantec (VVR) is a licensed product and an add-on feature to Veritas Volume Manager (VxVM). This document provides release information for Veritas Volume Replicator on Solaris and contains information supplemental to the *Veritas Storage Foundation™ Release Notes*.

VVR contains VVR Veritas Enterprise Administrator (VVR VEA), Veritas Volume Replicator Web Console (VRW), and Veritas Cluster Server (VCS) Agents for Veritas Volume Replicator. VVR also provides Veritas Volume Replicator Advisor (VRAdvisor), which is a planning tool that helps you plan an optimum Veritas Volume Replicator configuration. This document provides information about the VVR VEA, VRW, VCS Agents for VVR, and VRAdvisor.

Review this entire document before installing VVR. For additional information about this release, see “[Required patches](#)” on page 9.

Veritas Volume Replicator 5.0 is supported on the Solaris 10 (64-bit) Operating System.

## New features

This release of Veritas Volume Replicator includes the following features:

### Replicating volume sets

VVR now supports replicating volume sets by including the volume set itself as a part of the RVG. When a volume set is included in an RVG, VVR also ensures that the replicated volume set configurations are consistent across the Primary and Secondary.

## Cross-platform data sharing

Veritas Volume Replicator (VVR) is now CDS compliant. VVR uses CDS format to support the following functionality:

- migrating data between heterogeneous systems (either on the Primary or the Secondary) where each system has direct access to the physical devices used to hold the data. Note that CDS does not support simultaneous use of data from more than one platform.

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**Caution:** Stop all the applications working on that disk group before migrating data between hosts. Failure to do so may result in data loss.

---

This release does not support replicating data between platforms.

## Bunker replication

Bunker replication enables VVR to achieve complete Recovery Point Objective (RPO) and limited Recovery Time Objective (RTO) without any major impact on the application's performance. Bunker replication uses a bunker site, which maintains a copy of only the Primary SRL without having to maintain additional copies of the data volumes. This feature combines the advantages of synchronous and asynchronous modes of replication.

## Enhanced cluster support

VVR supports 4-node cluster applications.

## VVR VEA features

You can use VVR VEA to replicate to a bunker, which can then be used for disaster recovery.

## Managing VVR using the Web GUI

The VVR Web GUI includes the following new features:

- links to volume views enable you to access detailed information about local volumes in the RDS.
- new look and feel provides consistency among Veritas Storage Foundation products.
- new role-based administration model enables you to control access to administrative tasks according to preassigned roles: Storage Administrator, Storage Operator, and Read Only.



- allows replication to a bunker site, which can then be used for disaster recovery.

## Centralized management of VVR

VVR can be centrally managed through the Storage Foundation Management Server. For more information, see the documentation for Storage Foundation Management Server.

## Veritas Volume Replicator Advisor

- Planning the SRL Size for Multiple RVG Configurations—VRAdvisor now supports SRL size planning for multiple RVGs that share the same network bandwidth within the same configuration. It uses the bandwidth throttling feature to control the maximum network bandwidth to be used by VVR for replication, thus enabling effective usage of the bandwidth by VVR and other applications. The results are displayed in a graphical and summary view.

For more information about the Veritas Volume Replicator Advisor, refer to the *Veritas Volume Replicator Advisor User's Guide* (`vvr_advisor_users.pdf`), which is available in the `dvd1/volume_replicator/tools/vradvisor/docs` directory.

## Required patches

Patch information is determined at the time of product release. For the latest information about Solaris patches, contact Sun Microsystems.

- Patches for VVR  
Veritas Volume Replicator does not require any specific patches. Refer to the *Veritas Storage Foundation Release Notes* for information about patches required for Veritas Storage Foundation.  
To support upgrading from VVR 4.1 to VVR 5.0 without disrupting replication, install the latest patches for VVR 4.1. The following patches are required to support this type of upgrade:  
124359-01 - VRTSvxvm  
124360-01 - VRTSvrpro  
Install these patches to all of the 4.1 nodes at the same time, before beginning the upgrade to 5.0.
- Patches for VCS Agents for VVR  
VCS Agents for Veritas Volume Replicator does not require any patches. Refer to the *Veritas Cluster Server Release Notes* for more information.

- Patches for VVR VEA and VRW  
VVR VEA and VRW depend on the Java Runtime Engine (JRE) 1.5. Make certain that your operating system has the necessary patches to run the JRE. For more information, visit your operating system vendor's Web site.

## Installation notes

The following information includes guidelines, tips, and other considerations for installing the product. For details on upgrading and installing VVR, refer to the *Veritas Volume Replicator Installation Guide*.

### Obtaining a license key

Before installing VVR, obtain a license key for Veritas Volume Replicator. Note that even if you have already obtained a Veritas Volume Manager license key, you must obtain a separate license key for VVR. For details, see the section about license information in the *Veritas Storage Foundation Installation Guide*.

### Compatibility considerations

#### VVR

This release of VVR is available for the Solaris 10 (64-bit) Operating System. Solaris 10 provides the Zone feature. VVR is supported in the global zone only. Note that although VVR cannot be executed in a non-global zone, VVR can support applications that run in non-global zones, provided the data resides on VxVM volumes in a global zone. For example, if an application is mounted on Veritas File System in a non-global zone and the file system uses VxVM volumes in a global zone, VVR can be used to replicate such an application's data.

VVR is not supported with the Internet Protocol (IP) version IPv6. All nodes in a VVR environment must use IPv4.

VVR supports replication between systems running VVR 5.0 and VVR 4.1 or later. That is, you can replicate between a Primary host using VVR 5.0 and a Secondary host using VVR 4.1 or vice versa. This enables you to upgrade VVR on your Primary and Secondary at different times.

This release of VVR does not support replicating data between platforms.

VVR enables you to replicate VxVM ISP volumes, provided that all the volumes in an RVG are ISP volumes.

## VCS Agents for VVR

Veritas Cluster Server (VCS) Agents for Veritas Volume Replicator have been tested to work with VVR running on the 64-bit versions of the Solaris 10 operating systems. These agents are for use with VCS 5.0.

## VVR VEA

VVR VEA is available for installation on the Solaris 10 operating systems. VVR VEA can only be installed on hosts on which VVR 5.0 is installed.

## VRW

VRW is available for installation on the Solaris 10 operating systems.

VRW can only be installed on hosts on which VVR 5.0 is installed. VRW also requires that Web Server for Storage Foundation Host Management is installed.

## Web browser requirements

Depending on the platform, one of the following Web browsers is required to run VRW:

**Table 1-1** Web browsers and their supported platforms

Operating System	Firefox 1.0.7 (or later)	Internet Explorer 5.5 (or later)	Mozilla 1.6 (or later)	Netscape Navigator 7.0 (or later)
AIX			✓	
HP-UX			✓	
Red Hat	✓		✓	✓
Solaris			✓	
SUSE	✓		✓	✓
Windows	✓	✓		✓

Your browser must support either JScript 5.5 (provided with Microsoft Internet Explorer 6 or later) or JavaScript 1.2 (provided with Netscape Navigator 7.x). Additionally, for Internet Explorer, Secure Sockets Layer (SSL) 3.0 ActiveX scripting must be enabled.

If you are using pop-up blockers (including Yahoo Toolbar or Google Toolbar), either disable them or configure them to accept pop-ups from the Web Server to which you will connect. Note that pop-up blocking is enabled by default in Netscape 7.2.

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**Note:** For Internet Explorer 6.0 on Windows 2003 (Server and Advanced Server), set the default Intranet zone security level to MEDIUM or lower.

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## VRAdvisor

Veritas Volume Replicator Advisor (VRAdvisor) requires Windows Installer 2.0 and later for the installation. VRAdvisor is supported on the following operating systems:

- Windows XP
- Windows 2000 Professional, Windows 2000 Server, Windows 2000 Advanced Server, Windows 2000 Datacenter Server
- Windows Server 2003: Standard Edition, Web Edition, Enterprise Edition, Datacenter Edition

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

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## Fixed issues

The following incidents were corrected for the 5.0 release.

### Installation issues

#### License package not completely removed from local zones

Some files from the Veritas licensing package (`VRTSvlic`) might not be removed from a local zone that was created after `VRTSvlic` was originally installed. This problem has been fixed.

### SRL issues

#### Limitations in the SRL resize feature

You can now resize the SRL while automatic synchronization or DCM replay is in progress. Also, the SRL resize operation now preserves checkpoint information. [310204]

## Veritas Volume Replicator vradmin fixed issues

The following table contains information about fixed issues for VVR vradmin in this release:

Incident	Description
306656	Synchronizing volumes and RVG—The output of the <code>vradmin syncrvg</code> and the <code>vradmin syncvol</code> commands displayed incorrect volume sizes for data volumes that are large in size.
497131	Under certain conditions, VVR would hang while executing the <code>vradmin resizesrl</code> command.
641439	A security issue was discovered that could have resulted in a Low or Medium Severity attack against the VVR Administration service port, TCP/8199. The attacker would have needed to gain access to the network or gotten the user to visit a malicious site from which the attacker could initiate the attack. An attack could crash the vradmind service, which would need to be restarted. Potentially, an attack could degrade system performance if the attack was sustained.
776831	Migration of the Primary could not be done after one node of Primary cluster panicked.

Incident	Description
786185	Replicating from the Bunker to a Secondary generated startrep notification continuously, causing the GUI to hang.
none	The <code>vradmin resizesrl</code> command now enables you to increase the size of the SRL on the Secondary while the application is active and replication is in progress. For instructions on resizing the SRL, see the <i>Veritas Volume Replicator Administrator's Guide</i> .
none	For a Replicated Data Set (RDS) with multiple Secondaries, the <code>vradmin migrate</code> command now automatically reconfigures the new RDS.

## Veritas Volume Replicator VEA fixed issues

The following table contains information about fixed issues in this release of VVR VEA:

Incident	Description
602261	In some situations, the Current Logging field showed the value SRL when it should have been DCM.
776622	The Creating a Primary wizard failed when the list of data volumes was too long.
784039	In a VVR setup using a bunker Secondary with the STORAGE protocol, if the bunker disk group had been deported and imported several times, VVR VEA displayed incorrect information about the RDS.

## Known issues

Before installing any product, read the following Veritas Technical Support TechNote for the latest information on updates, patches, and software issues regarding this release:

<http://support.veritas.com/docs/286955>

The following incidents were reported for this release.

## Installation issues

### VCS Agents for VVR (42381)

When you try to install VVR on a system that already has a version of VCS Agents for VVR, the `installvvr` script indicates that VVR is already installed on the system. This may be erroneous because the script does not check for the other VVR packages. In this case, some of the packages required by VVR that do not exist on the system may not get installed.

Workaround: Use the `pkgadd` command to manually add the VVR packages that are not installed.

### Permissions on the `/etc` directory change during product installation

Because of a Solaris bug in the `pkgadd` command, the permissions on the `/etc` directory may change during the installation of Symantec product packages. Check after an installation procedure to see if this occurred. Use the `chmod` command to reset the permissions.

### Software disc cannot be ejected during installation

During installation, if any of the products were configured and started, the software disc cannot be ejected. This may prevent installation from continuing in following circumstances:

- If the language pack disc needs be loaded so that the associated packages can be installed.
- A product was installed that did not require a system reboot to complete the installation.

This problem is not an issue if a product was installed or upgraded that required a system reboot to complete the installation.

#### To avoid this problem at install time

- 1 Specify the `-installonly` option to the `installer` script in addition to any other options.
- 2 Eject the software disc.
- 3 Run the `installer` script with the `-configure` option specified.

#### If a software disc cannot be ejected

- 1 Stop the event source daemon:  

```
# /usr/sbin/vxddladm stop eventsource
```
- 2 Kill the `vxcached`, `vxrelocd` and `vxnotify` processes by using the `kill -9` command with their process IDs as reported by the `ps` command.

- 3 Eject the software disc.
  - 4 Restart the VxVM daemon processes:

```
# /usr/sbin/vxddladm start eventsource
# /etc/vx/bin/vxcached
# /etc/vx/bin/vxrelocd
```
- [622442]

## Support and compatibility issues

### Replication through NAT firewall not supported (1007888)

This version of VVR does not support replication through a NAT firewall. This issue only applies to firewalls using Network Address Translation (NAT).

### Running VxFS commands (135938)

VxFS commands may execute very slowly and appear to be hung when the following conditions exist:

- The RLINK is in synchronous mode
- The network has a low bandwidth
- VxFS has a very large cache

If you encounter this problem, contact Customer Support.

### VxVM ISP Stripe-mirror Volumes Cannot be Associated to an RVG

You cannot associate VxVM ISP volumes of the type stripe-mirror to an RVG.  
[497136]

## The vradmin issues

### Multiple vradmin commands (304827)

If a number of `vradmin` commands are started at the same time in the background, some of the commands might fail.

### Incorrect configuration (304859)

The `vradmin printrvg` command does not display an error message to indicate an incorrect configuration when the `local_host` and `remote_host` attributes contain the names of the hosts that are not in the RDS.

### Invalid license (139302)

The `vradmin` commands that change the configuration may fail before completing if the VVR license has expired. Although an attempt is made to undo



the changes, it may not be possible to undo the changes because the license has expired.

### Synchronizing volumes and RVG—user cannot specify an offset (306135)

The `vradmin syncrvg` and the `vradmin syncvol` commands do not allow the user to specify an offset for the synchronization operation. They perform the operations on the entire data volume. If the operation is terminated, it must be restarted.

### Synchronizing volumes and RVG with large volumes

The `vradmin syncrvg` and the `vradmin syncvol` commands do not work correctly for volumes larger than 1TB. When either of these two commands is used to synchronize large volumes, the command still runs, but it reports wrong total size of the volumes being synchronized and it actually synchronizes only a portion of the volume having size larger than 1TB.

**Workaround:** Instead of using the `vradmin syncrvg` command to synchronize the RVG, use the Automatic Synchronization feature when starting replication. To do this, use the `vradmin startrep -a` command. Or, reduce the size of the volume to below 1TB before running the `vradmin syncrvg` command.

For the `vradmin syncvol` command, the only workaround is to reduce the size of the volume to below 1TB. [840217]

### Verifying data (306479)

The `vradmin verifydata` command may hang if certain events occur, for example, if the network disconnects, or a large number of writes on the Primary cause the RLINK to go in to DCM mode after the command is issued and before it completes.

**Workaround:** Kill the `vradmin verifydata` command using the SIGTERM signal. Press **^C** on the command line, and then perform the following steps on Secondary host:

- 1 Issue the command:  

```
# vxibc -g dg_name status rvg_name
```

The output displays one or more application IDs.
- 2 Choose the application ID that begins with `VD` and use this `app-id` in the following steps.
- 3 Issue the command:  

```
# vxibc -g dg_name stoprecv app-id rvg_name
```
- 4 Issue the command:  

```
# vxibc -g dg_name unregister app-id rvg_name
```

The output of the command `vxibc -g dg_name status rvg_name` should no longer display the `app-id`.

### Resizing the SRL

The `vradmin resizesrl` command enables you to increase the size of the SRL while the application is active and replication is in progress. The `vradmin resizesrl` command does not allow you to decrease the size of the SRL. For instructions on resizing the SRL, see the *Veritas Volume Replicator Administrator's Guide*.

### Separator display in the vradmin output (306642)

The separator in the output of `vradmin -l printrvg` is not localized; it always displays as a comma (,).

### Adding a 5.0 Secondary to an RDS with a 4.1 Primary (423878)

If the RDS has a 4.1 Primary and a 5.0 Secondary, you cannot use the `vradmin addsec` command to add an additional 5.0 Secondary to the RDS. First, upgrade the Primary to 5.0, and then add the Secondary.

## RVG and RLINK issues

### RVG name size (304979)

If the total number of characters in the name of the RVG name and the name of the remote host exceeds 26 characters, the default RLINK names created by the `vradmin addsec` command are truncated. This may result in a conflict with other RLINK names and cause an error.

To avoid this error, use the `prlink` and `srlink` attributes with the `vradmin addsec` command.

### RLINK name (151336)

The `vxmake rlink` command fails if the host name is longer than 31 characters.

### Output from the vxrlink stats command (583456)

In some cases, you may see garbled output in the Blocks Sent column of the `vxrlink stats` command. This problem is due to VVR accessing freed memory, and can be safely ignored.

## DCM issues

### Converting DCM volumes to layered volumes (147490)

Converting a volume with a DCM to a layered layout completes successfully but incorrectly prints the following error messages:

```
vxvm:vxplex: ERROR: Failed to obtain locks:  
temp-P05: no such object in the configuration  
temp-P06: no such object in the configuration
```

```
vxvm:vxassist: ERROR: Could not attach log plex(es) to volume  
<volume-name>
```

### **Error when logging writes to DCM (146293)**

When writes are being logged to the DCM, the output of the `vxrlink status` command is as follows:

```
VxVM VVR vxrlink: INFO:V-5-1-12887 DCM is in use on rlink  
<rlinkname>. DCM contains <number> Kbytes (nn%) of the Data  
Volume(s).
```

The message is confusing because the number could be larger than the physical size of the DCM object. The number of kilobytes indicated is the amount of data that requires resynchronization.

### **DCM is removed during relayout (156244)**

If you perform a relayout that adds a column to a striped volume that has a DCM, the DCM is removed. There is no message indicating this has happened. The DCM can be replaced using the command:

```
# vxassist addlog vol logtype=dcm
```

## SRL issues

### **SRL overflow (152276)**

If the SRL overflows on the Primary, any IBC message that exists on the Primary SRL is dropped and therefore not delivered to the Secondary.

### **Secondary SRL failure during IBC could cause pending writes to be lost (541265)**

When an IBC suspends writes to the Secondary data volumes, the writes are stored in the Secondary SRL. These pending writes in the SRL could potentially be lost if all the mirrors of the SRL fail.

## Takeover issues

### **Fast-failback synchronization after an SRL failure on the original Primary may cause data corruption on the new Secondary (284372)**

After a takeover if fast-failback synchronization is performed and the new Secondary, which was the original Primary, has recovered from an SRL failure, the synchronization may not synchronize the updates that were lost because of SRL failure. This results in data corruption on the new Secondary. To recover, synchronize the Secondary completely.

### **Secondary hangs while taking over as failback Primary after receiving in-flight updates from a bunker (598288)**

If the bunker SRL write latency is comparable with the Primary SRL write latency, it is possible for the bunker to be ahead of the Primary in terms of the data logged. Such data termed as "in-flight writes" is logged on the Secondary when the Secondary is synchronized using the bunker after a Primary crash.

If such a Secondary which has logged in-flight data writes is promoted to failback Primary, the logged writes are flushed to its data volumes. However, because of uninitialized log end pointers, this can sometimes result in VxVM hanging on this Secondary node.

## VRW issues

### **Limitation in the search feature in the Japanese version of the VRW online help**

In the Japanese version of the VRW online help, the search feature does not always result in a successful match. Although corresponding terms may exist in the online help, the search results may indicate that the term could not be found. The search results vary, depending on the character set being used in the search.

### **After migration, the Secondaries tab does not show information about the Secondary (575992)**

In some cases, after you migrate the Primary role to the Secondary, the Secondaries tab does not show the information about the Secondary RVG. The RVG, SRL and Data Volume information may be blank.

Workaround: To display the information, navigate to the Summary tab and then select the Secondaries tab again.

### **Associate Volume wizard shows associated volume sets (612927)**

The Associate Volume wizard may show volume sets that are already associated to an RVG. A volume set cannot be associated to multiple RVGs.

## VVR VEA issues

### **Overview views display incorrect layout and mirror information for certain volume layouts (600485)**

For volumes with the layouts concatenated mirrored or mirrored concatenated, the overview views of the Primary and Secondary RVGs show the layout incorrectly as concatenated. The number of mirrors may also be incorrect.

**In Japanese locale, Create RDS wizard checkboxes do not appear correctly (616618)**

In Japanese locale, the Important Prerequisites page of the Create RDS wizard does not display correctly. The checkbox next to each question is not displayed because the dialog is truncated.

Workaround: Use mnemonic keys to answer the question.

- For the 1st question use Alt+p.
- For the 2nd question use Alt+d.
- For the 3rd question use Alt+s.

**Issue with VVR VEA in the Japanese locale**

In the Japanese locale, the Add Bunker wizard page has truncated text. When you add a bunker using VVR VEA, the description text for the Bunker DG and Protocol fields is truncated. The incomplete text should read as follows:

**Bunker DG:** If protocol is Storage the Bunker DG is expected to have been imported on the Primary host.

**Protocol:** Protocol should be set to Storage when Bunker storage is directly accessible from the Primary host.

[616709]

## Software limitations

### Support for local zones

VVR is supported in the global zone only. Note that although VVR cannot be executed in a non-global zone, VVR can support applications that run in non-global zones, provided the data resides on VxVM volumes in a global zone. For example, if an application is mounted on Veritas File System in a non-global zone and the file system uses VxVM volumes in a global zone, VVR can be used to replicate such an application's data.

VVR and VxVM commands must be executed in the global zone. If you are replicating an application running in a non-global zone, the global zone administrator requires application context to perform tasks such as snapshots and IBCs.

## Solaris 10 zone feature limitation

### Limitation in tasks requiring application context

VVR and VxVM commands must be executed in the global zone. If you are replicating an application running in a non-global zone, the global zone administrator requires application context to perform tasks such as snapshots and IBCs.

## Unsupported Internet protocol versions

VVR does not support IPv6. All nodes in a VVR environment must use IPv4.

## RAID-5 volume

VVR does not support Volume Manager RAID-5 volumes as part of RVGs. Hardware RAID-5 is supported.

## Disk Group Split and Join

VVR does not support Disk Group Split and Join. This means that you cannot use Disk Group Split and Join on data volumes in an RVG. However, you can take snapshots of data volumes and use DGSJ on the snapshots.

## Importing a disk group with VVR objects

If a private disk group containing VVR objects is imported on two nodes, as well as the problems documented for VxVM objects, the SRL is corrupted and a full resynchronization of the Secondary is required.

## Volumes in boot disk group

It is not recommended to have replicated volumes in the boot disk group (`bootdg`).

## Selecting records using search expressions

The `vxprint -e pattern` command: Selecting RVG and RLINK records using search expressions is not supported.

## Adding a Secondary

When adding a Secondary to the RDS, the `vradmin addsec` command cannot be entered from the host being added. If the RDS contains the Primary only, the command must be entered on the Primary.

## VRW limitations

### Increasing font size

Increasing the font size may cause problems in viewing and navigating the wizards.

### IBC messaging support

This release of VRW does not support In-Band Control (IBC) messaging.

## VCS Agents for VVR limitations

### Onlining and offlining the RVG resources

Currently a problem with Veritas Volume Manager affects the RVG resources. When many RVGs are defined, the number of requests to the Volume Manager to `online` or `offline` can overload the `vxconfigd` process of VxVM, preventing some RVGs from going online or offline.

Workaround: The RVG resources have been set to allow only a single instance of an RVG resource to be brought online or offline. This slows down the onlining and offlining of service groups containing RVGs.

### Limitations in the RVGSnapshot agent

Fire drill setup (`fdsetup`) supports applications using one disk group only. The RVGSnapshot agent does not support volume sets.

## Documentation

Product guides are available on the documentation disc in PDF and HTML formats. We recommend copying pertinent information, such as installation guides and release notes, from the disc to your system directory `/opt/VRTS/docs` for reference.

**Table 1-2** Veritas Volume Replicator and Veritas Volume Manager documentation sets

Title	File Name
<i>Veritas Volume Replicator Release Notes</i> (this document)	<code>vvr_notes.pdf</code>
<i>Veritas Volume Replicator Installation Guide</i>	<code>vvr_install.pdf</code>
<i>Veritas Volume Replicator Administrator's Guide</i>	<code>vvr_admin.pdf</code>

**Table 1-2** Veritas Volume Replicator and Veritas Volume Manager documentation sets

<b>Title</b>	<b>File Name</b>
<i>Veritas Volume Replicator Planning and Tuning Guide</i>	vvr_planning.pdf
<i>Veritas Volume Replicator Advisor User's Guide</i>	vvr_advisor_users.pdf
<i>Veritas Volume Replicator Web Console Administrator's Guide</i>	vvr_web_admin.pdf
<i>Veritas Cluster Server Agents for Veritas Volume Replicator Configuration Guide</i>	vvr_agents_config.pdf
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<i>Veritas Storage Foundation Release Notes</i>	sf_notes.pdf
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#### JavaTip87: Automate the Hourglass Cursor

Kyle Davis

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