VERITAS™ Volume Replicator Frequently Asked Questions

Answers to frequently asked questions are relevant for the latest shipping versions of VERITAS Volume Replicator. For details on previous versions please visit Volume Replicator: Documentation.

Latest Shipping Versions
- AIX: 4.0
- HP-UX: 4.1
- Solaris: 4.1
- Windows: 4.3
- Linux: 4.0

FREQUENTLY ASKED QUESTIONS

1. What is replication?
   Replication is a technology designed to maintain a duplicate data set on a completely independent storage system at a different geographical location. As a general rule, replication is defined as copying data over IP while mirroring is the copying of data across a Storage Area Network (SAN).

2. What is synchronous replication?
   Synchronous replication requires that all changes made within the primary site be recorded at the secondary site before the application returns the acknowledgment that the change has occurred. This guarantees that no data will be lost between the primary and the secondary locations. However, there will be an application performance impact since the application must wait for the network round trip before going on to the next transaction.

3. What is asynchronous replication?
   Asynchronous replication commits application writes at the primary site immediately without waiting for a commitment of writes at the secondary location. Meanwhile, writes to the secondary are made based on network availability.

4. What is VERITAS Volume Replicator?
   As an option to Storage Foundation, Volume Replicator software offers volume-level replication natively across IP networks. Volume Replicator provides a reliable, efficient and cost-effective solution for geographically replicating data sets between dissimilar storage devices.

   Volume Replicator makes efficient use of network resources and keeps WAN traffic to a minimum by replicating only the data blocks that actually change. The volume-based replication of Volume Replicator has the flexibility to replicate synchronously or asynchronously keeping both data loss and application impact to an absolute minimum while guaranteeing data integrity. It also gracefully handles temporary network outages and failures by tracking changes as they occur and includes robust error-handling capabilities — which is an absolute requirement for long-distance replication over wide area networks.
5. How does VERITAS Volume Replicator replicate data in synchronous mode?
A write request is submitted from the primary application and logged in the Storage Replicator Log (SRL). Then the data is sent over to the secondary site and committed to disk at the secondary location. At that time a commitment is sent back to the primary site and committed by the primary application. Synchronous replication provides the benefit of zero data loss but does impact the performance of the application.

6. How does VERITAS Volume Replicator replicate data in asynchronous mode?
The way that Volume Replicator performs asynchronous replication is the same way that synchronous replication is performed the only difference is when the data is committed to disk at the primary site. With Volume Replicator in asynchronous mode a write request is submitted from the primary application, logged in the Storage Replicator Log (SRL) and committed to disk immediately at the primary site. Then as soon as the network can afford to take it the data is sent over to the secondary site and committed to disk. Asynchronous replication does not slow down the application at all and it guarantees data integrity at the secondary site by ensuring the data arrives at the secondary site in the same order that it was written at the primary site. In the event of a disaster, potential data loss would be whatever information was written to the SRL at the primary, but had not yet been committed to the secondary site. This data loss can typically be measured in milliseconds.

7. What is an RVG?
An RVG, Replicated Volume Group, corresponds to a subset of volumes within a disk group that is replicated from or to. This is the object with which VVR performs its replication management.

8. What is the Storage Replicator Log or SRL?
The Storage Replicator Log, or SRL, is a volume within the Replicated Volume Group (RVG) where data is stored prior to being replicated to the remote hosts. The SRL ensures that all writes to any element of an RVG are written in the correct order, maintaining write order fidelity. In the asynchronous mode the SRL acts as a buffer, storing data that has already been written to the primary storage, but not yet committed to the secondary storage site.

9. What is a DCM?
DCM, Data Change Map, is an object that contains a bitmap which represents blocks that differ between the primary and secondary RVGs. This is how we provide fast fail-back functionality or the ability to fail over and failback between sites without requiring a full re-initialization of data.

10. What is an RLINK?
The RLINK is the communication link between the primary and the secondary RVG and provides the ability to natively replicate data over an IP network. An RLINK reads data from the primary SRL and sends it to the secondary SRL.

11. Does Volume Replicator come with some sort of bandwidth throttling so that asynchronous replication traffic over the T1 line can be managed?
No, Volume Replicator itself does not provide bandwidth throttling. Today we work with 3rd party vendors such as Peribit networks and NetCelerra to perform this functionality. In the future, Volume Replicator will provide bandwidth throttling in the core product.
12. Does Volume Replicator replicate compressed data? Encrypted data?
Volume Replicator can replicate compressed data (through hardware based compression). However, Volume Replicator itself does not compress the data itself. The same is true for encryption.

13. Does Volume Replicator guarantee data integrity of replicated data?
Yes, Volume Replicator guarantees data integrity of data, regardless if the customer is operating in synchronous or asynchronous mode. This is accomplished with the Storage Replicator Log (SRL) by tracking writes at the primary site and ensuring they arrive at the secondary site in that exact same order.

14. Can the Volume Replicator replicate open files and databases?
Yes. Because data is replicated to the secondary site as it is written to the primary site, files and databases are, by default, open.

15. Can the replicated data at the secondary site be accessed for data backup or reporting purposes?
Yes. This is accomplished by creating a space optimized snapshot using VERITAS FlashSnap (included with Storage Foundation Enterprise). The need for breaking off a full mirror copy of the data is eliminated through the use of pointers to the data. Extra storage is needed only for writes that occur after the snapshot is taken. This allows replication at the secondary to continue, while a point in time copy of the data on the secondary can be mounted and accessed for backup, reporting, or testing purposes. If desired, however, VVR can easily produce an actual mirror of the secondary site using FlashSnap. This mirror can be mounted and accessed at any time.

16. Since a replicated volume group can't have a Dirty Region Log, how does it avoid a complete resynchronization?
When a volume is in an RVG, the recovery is performed differently. We use the SRL to perform the recovery since the SRL is the final arbitrator in an RVG. Therefore, when a volume is in an RVG, even though it doesn't have a DRL, a full resynchronization is not required.

17. What methods can be used to synchronize the primary and secondary?
VVR offers the ability to initialize the secondary site in one of three ways: over the wire, mirroring as well as tape-based. Over the wire means all of the data at the primary site is sent over to the secondary location over the network and then replication can begin after the initial data set arrives. Mirroring is the creation of an exact copy of a volume on separate disks or disk groups at the primary site. Then the disks are sent over to the secondary location so replication can begin. This process eliminates the need to send all the data over the wire but can be fairly expensive in terms of shipping costs because the storage array must be sent from one location to another. A third approach that VERITAS offers is a tape based initialization. With a tape based initialization a typical tape backup is taken at the primary site and a checkpoint is inserted into the SRL. Then the tapes are sent to the secondary site and the data is loaded from tape. The systems are turned on and only the changes that occurred after the checkpoint are sent over the wire. This means the customer will be able to begin replication but save in bandwidth and shipping costs.

18. Does Volume Replicator require separate dedicated servers and/or infrastructure (including a dedicated network)?
Absolutely not. The only requirement is that there are two hosts with the same operating system with Volume Replicator licenses and any IP network between the two. The network connection does not have to be dedicated for the sole purpose of replication.
19. Does Volume Replicator support peer-to-peer replication (multiple master sources and targets replicating to each other, potentially the same sets of data)?
Volume Replicator does not support bi-directional replication on the same data set. In other words, no read/write everywhere capabilities for the same data set. While Volume Replicator does not allow for simultaneous access, it does facilitate the easy failback of databases and applications to the primary site by allowing roles of the primary and secondary to be swapped facilitating replication in either direction. However, with the click of a button, the roles of the primary and secondary can be switched facilitating data replication in either direction.

20. Can the administrator filter specific volumes to be replicated?
Yes, an administrator can designate based on volume what data needs to be replicated to the secondary site.

21. What is the copy block size between a primary and a secondary?
VVR replicates I/O and will replicate the size of the I/O that the application requests. So if the write request of size 32k is received by VVR, it sends that write as a single update of 32k. The secondary will not commit the I/O to disk unless it receives all of it.

22. Does Volume Replicator support replication of raw disk volumes?
Absolutely, as long as the raw disk volumes are under VERITAS Volume Manager control. Anything that Volume Manager supports Volume Replicator can replicate. This applies to Sybase, Oracle, or any other DBMS that can write to raw devices.

23. Does VERITAS File System have to be used in order to use VERITAS Volume Replicator?
No, but it is highly recommended. VERITAS File System provides the benefits of improved I/O performance, robustness, and Quality of Storage Service giving customers yet another tool to increase efficient use of resources.

24. Does VERITAS Volume Manager have to be running in order to use VERITAS Volume Replicator?
Yes. As an option to VERITAS Storage Foundation (Volume Manager), VERITAS Volume Replicator requires the virtual storage capabilities that VERITAS Storage Foundation provides.

25. Does Volume Replicator support cascading replication?
No. Usually cascading replication is used by hardware based replication technologies because they have a distance limitation between the primary and secondary. Volume Replicator does not have any distance limitations.

26. Does Volume Replicator support a writing application at the primary site telling a reading application at the secondary site when it is safe to read replicated data?
Yes. Normally, data replicated to a secondary site cannot be read while it is still being written to. Using Volume Replicator’s In Band Control (IBC) messages, however, a signal can be sent to secondary to create a snapshot of the data, using VERITAS FlashSnap technologies, which can then be accessed for multiple uses. An application at the primary can, for instance, freeze the file system, issue an IBC, and unfreeze the file system. This ensures that when the IBC arrives at the secondary, the state of the data at the secondary is consistent so that it can be recovered. When the IBC is received at the secondary, replication to the secondary is frozen. You could, at this point, break off a mirror at the secondary, unfreeze replication to the main volumes, and start the backup operation on the broken off volumes. After backup is complete, reintegrate the broken off volumes (using VM FastResync). With Oracle, the same principle applies, except that at the primary, before freezing the file system, you would want to additionally freeze Oracle momentarily.
27. What operating systems does Volume Replicator support?
   - Solaris 8, 9, 10
   - HP-UX 11i
   - AIX 5.1, 5.2, 5.3
   - Red Hat Linux 3.0
   There are no plans to support previous versions of the operating system.

28. Are there any feature differences between VVR for UNIX (Solaris, HP-UX, and AIX) and VVR for Windows?
   The only feature difference is that VVR on Windows does not have the ability to use space optimized snapshots. The reason for this is because VERITAS utilizes its file system for this functionality and there is not currently a file system available on Windows.

29. Can VVR replicate across different operating systems?
   At this time VVR can only replicate from Solaris to AIX or vice versa. We are investigating the possibility of replicate across other operating systems.

30. How much bandwidth do I need?
   VERITAS offers a free tool called VRAdvisor that helps in planning for bandwidth requirements. VRAdvisor is a free Java application that lets potential customers monitor their environment for a period of time (typically 1-2 weeks) to gauge the data change rate vs. bandwidth tradeoff expected using VVR. The VRAdvisor takes vxstat information as input and produces output that may be used to size the SRL and RLINK. The tool consists of a downloadable program and a configuration file. Requirements change based on the rate of change for the volume to be replicated. For detailed instructions on the installation of VRAdvisor please visit VERITAS Architect Network (VAN).

31. How do I size the SRL?
   Ideally, the VRAdvisor tool should be used to size the SRL. If synchronous replication is configured, the SRL will not grow. Therefore, SRL sizing is not important. But if asynchronous replication is used or if Volume Replicator is setup to automatically switch modes, sizing the SRL is very important. The SRL must be able to hold outstanding write requests until the secondary has received them. Sizing the SRL depends on application write activity. For example, if the application writes about 1GB per hour, the SRL must be at least 24GB to tolerate a 24-hour network outage.

32. How do I size the RLINK?
   Ideally, the VRAdvisor tool should be used to size the RLINK. To size the RLINK, you must know the application’s bandwidth. In a synchronous configuration, the RLINK’s bandwidth must match or be greater than the application’s peak bandwidth. In a synchronous setup, the RLINK’s size and performance directly affect application performance because application writes are not committed until the secondary has received and acknowledged them.

   In an asynchronous setup, the RLINK’s bandwidth must match or be greater than the application’s average bandwidth. The RLINK’s size and performance affect the SRL’s ability to drain. If the RLINK is too small, writes may build up in the SRL and eventually fill it.
33. Is consulting required for Volume Replicator?
Yes. Currently, consulting is required for the first installation of Volume Replicator at a customer site. Like any replication solution successful implementations require planning, detailed knowledge of network infrastructure, as well as a sense for the data update rate.

34. What network protocol does VVR use to replicate?
VVR for Solaris, AIX, HPUX, and Linux support TCP and UDP over IP.
VVR for Windows supports UDP over IP.

35. Will VVR work through a firewall?
Yes. Ideally, the customer would use an IP-based security. If the customer wants to do port-based security, they will have to pen up the well-known port (1710, by default) and then open the OS assigned ports, which are OS specific. Using Solaris, this involves opening all ports from 32k to 64k. As you can see, that's pretty wide open.

36. What hardware is Volume Replicator supported on?
Volume Replicator is supported on any hardware that Volume Manager is supported on.

37. What databases does Volume Replicator support?
Volume Replicator replicates any data that Volume Manager recognizes including all databases. Because replication occurs at the volume level, Volume Replicator is independent of application or file types. However, special configuration is required for replication of parallel applications such as Oracle RAC.

38. Will VVR work over a routed network (primary and secondary are in different subnets)?
Since the IP Protocol is a routable protocol, VVR will work fine with routers.

39. How is Volume Replicator licensed and priced?
Volume Replicator is priced on a per host basis and is tiered according to host (just like Volume Manager). Each server using Volume Replicator needs a license. In addition, the servers must already have Volume Manager installed. For example, if there are two sites each with two servers then the customer would need 4 licenses of Volume Replicator in addition to the licenses needed to install Volume Manager on the 4 systems.

40. What channels will Volume Replicator sell through?
Volume Replicator is available through the direct channel as well as certified enterprise channel partners.

41. Do we have any performance impact data for VVR?
Based on field studies, Volume Replicator only adds an additional 2-3% CPU cycles to the normal 3% CPU cycles consumed by Volume Manager for a total of 5% CPU cycles. The 5% CPU impact is equivalent to a `find` command in Solaris.

42. Do you have any examples of customer configurations with data size as well as network bandwidth?
Yes. With thousands of licenses of Volume Replicator sold, VERITAS has helped thousands of customers with a diverse environment of hardware, network, and system needs. While only a handful are presented in the form of customer references, detailed information about select customer implementations can be obtained directly through VERITAS contacts. Please contact: Tyler Carter - Product Marketing Manager, or Venkat Kolli - Product Manager
43. **What customer references do we have for Volume Replicator?**
   Visit the [Customer Reference](#) page for Volume Replicator for current customer success stories. We are always seeking customer references as a name drop, for a quote, case study or speaking engagements.

44. **How many licenses have we sold of VVR?**
   Thousands licenses of Volume Replicator have been sold to date.

45. **Who can sell Volume Replicator?**
   Currently, any direct sales person as well as enterprise partner can sell Volume Replicator.

46. **How can Sales Reps and System Engineers help Volume Replicator Sales?**
   Submit sales references to the Sales Reference Database. Remember, customer information can be inputted in the reference database even if the customer has not put the product into production. After the product is in production, the reference can be updated with the new information.

47. **Can VVR replicate between different versions of an operating system?**
   Yes as the long as the VERITAS Volume Manager and Volume Replicator versions are the same. For example, VVR can replicate from a Solaris 2.6 to a Solaris 8 device as long as the same version Volume Manager is installed.

48. **Are there any current analyst reports on VERITAS Replication technologies?**
   Yes. DH Brown recently released an analyst report highlighting the benefits of host-based replication. The report can be found at: [http://www.veritas.com/Vrt/offer?_requestid=124934&a_id=7719&](http://www.veritas.com/Vrt/offer?_requestid=124934&a_id=7719&)

49. **What management interface does VVR provide?**
   The UNIX versions of VVR (Solaris, HPUX, AIX, and Linux) have three options which include a web based interface and a command line interface in addition to the VEA GUI offered with Volume Manager. VVR for Windows has the Web GUI as well as the VEA GUI for the Windows platform.

50. **What is the difference between Volume Replicator and Storage Replicator?**
   Volume Replicator, which replicates at the volume level, is designed for mission-critical database environments where data loss can not be tolerated. Volume Replicator is completely integrated with VERITAS Cluster Server and the Global Cluster option to offer a complete Disaster Recovery Solution in heterogeneous environments. Volume Replicator is available on Solaris, AIX, HPUX, Linux, and Windows. Storage Replicator is for file-based backup consolidation and remote office data protection for the Windows platform.

51. **Is Volume Manager a prerequisite for Volume Replicator?**
   Yes. Volume Manager is the basis for Volume Replicator. The two can be ordered together as a package in VERITAS Storage Foundation.

52. **Is Volume Replicator cluster compatible? Cluster Aware? What clustering products can be used with VVR?**
   Volume Replicator is absolutely cluster compatible and cluster aware. In other words, Volume Replicator will seamlessly failover locally in the event of a local server outage (assuming appropriate VCS agents are in place). Volume Replicator is supported with VERITAS Cluster Server, HP ServiceGuard and Microsoft Cluster Server.
53. Can VVR replication be managed by VERITAS Cluster Server Global Cluster Option?
Yes. VERITAS Cluster Server and the Global Cluster option can manage the replication jobs being performed
by Volume Replicator.

54. When will VERITAS offer a replication technology on Netware?
There are not any current plans to have a replication technology on Netware.

55. What is the disaster recovery solution set? How should I position these products?
In order to recommend a disaster recovery solution to the customer the recovery point (or data loss)
requirements as well as the recovery time (downtime) requirements must be understood. VERITAS
recommends that all customers perform regular backup. As the customer recovery point objective moves to
minimal or no data loss then Volume Replicator is recommended as the replication technology. As the
customer decides that they want minimal downtime on their application then a high availability technology,
such as VERITAS Cluster Server, must be implemented. By implementing the Global Cluster option to
VERITAS Cluster Server the customer will receive the ultimate in a disaster recovery solution. VERITAS
Cluster Server and the Global Cluster option, while integrated with Storage Foundation and Volume
Replicator will provide a high available solution while monitoring replication jobs. In addition, if a disaster
occurs the Global Cluster option has the ability to completely migrate from a primary site to a secondary site
with a single click of the mouse. In addition, the Global Cluster option will redirect the DNS traffic to the
secondary site.

56. How do I receive training for Volume Replicator?
Visit the VERITAS Education Services (insert link) website for upcoming training.

57. Where do I go for more information?
Visit the Volume Replicator product page on Vnet, VERITAS Partner Network for responses to questions.

58. How does Volume Replicator stack up to competitors’ replication products on the market?
Unlike most competitors, Volume Replicator is truly a volume based replication product. This fact alone
provides a number of advantages over array based replication products such as EMC SRDF, Hitachi
TrueCopy and IBM PPRC. The list below is just a few of the advantages Volume Replicator offers customers.
For more detailed information on how Volume Replicator compares to competitors’ products visit Intellisource,
VERITAS’ site for competitive information.
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<th>Common Competitor Disadvantages</th>
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<td>Array based solutions require the same storage at both locations</td>
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<td>devices</td>
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<td>Scalability: Replication can occur between 32 locations</td>
<td>Hardware based solutions often limited by number of locations that can be replicated too</td>
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<td>No distance limitations</td>
<td>Array replication required dedicated fibre channel connection between locations. For</td>
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<td>distances beyond fibre channel IP converted devices are necessary. These devices can</td>
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<td>significantly add to the cost of implementing a disaster recovery solution over distance.</td>
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<td>No additional network hardware required</td>
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<td>Write-order fidelity</td>
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<td>Superior write performance</td>
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<td>Easily handles network outages</td>
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<td>Asynchronous or synchronous</td>
<td>Some offer only synchronous, others offer point in time copies (periodic replication) not</td>
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<td>true asynchronous replication</td>
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<td>Minimal storage</td>
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<td>Integrates with VERITAS products</td>
<td>Products lack ability to leverage application cluster products to ensure the</td>
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<td>application can get online with minimal downtime.</td>
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