

Solution Brief

**Optimizing Data
Replication:
How Juniper Networks
Accelerates Symantec
Veritas Volume
Replicator**

Increasing the reliability and availability of data to employees throughout the distributed enterprise is critical to effective global operations. Just as vital to business operations is the ability to easily recover critical data and applications, so that a company can quickly resume conducting business following a disaster. Effective and efficient data replication is fundamental to ensuring that data and applications are protected and highly available.

As the need for tight integration among enterprise sites across the globe increases, the need for efficient use of corporate WAN links also increases. Data replication over IP is critical to site integration, but it significantly increases WAN traffic. IT finds itself struggling between the demands of two competing goals: to make data more accessible on the one hand and to manage spiraling WAN costs on the other. Recurring monthly fees for WAN services routinely comprise 28 to 40 percent of IT budgets according to Nemertes Research.

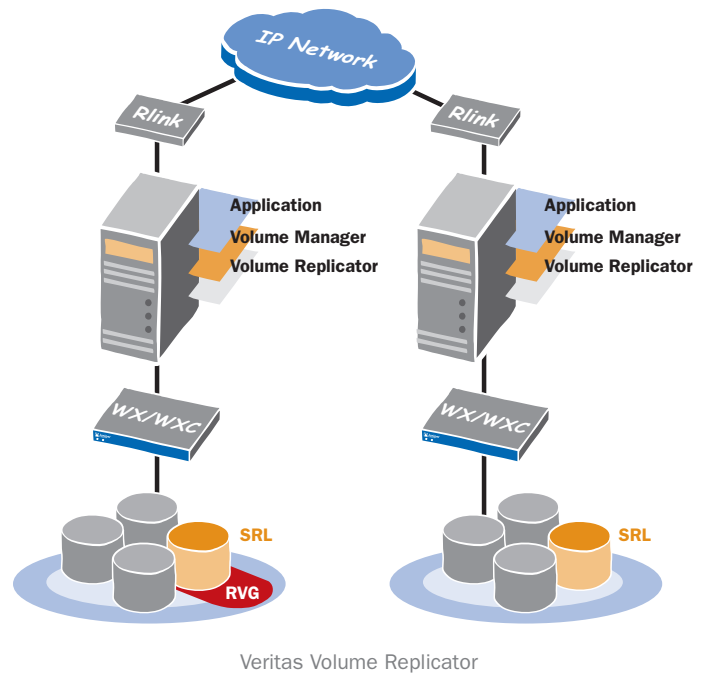
To relieve the contention between data replication needs and traffic demands on the WAN, many businesses have turned to a combination of effective replication software and WAN optimization platforms. Together, these solutions can meet business productivity needs and improve WAN performance.

The Key to Speeding Up Data Replication

The appeal of Symantec's software-only approach to data replication has proven attractive to many customers. The company offers a broad array of tools for data protection, high availability of data, storage and server automation, and performance enhancements for many ERM applications.

One of Symantec's key software products is its Veritas Volume Replicator (VVR). VVR enables businesses to use IP networks to replicate data between sites for disaster recovery, planned maintenance, or site migration. It replicates data between dissimilar storage hardware platforms on all major operating systems.

Veritas Volume Replicator supports synchronous as well as asynchronous data replication. It also helps ensure reliability of the replicated data through its write order fidelity, which guarantees that data arrives at the replicated site in the same order in which it was written at the primary site. This feature is especially key in asynchronous mode, when data is written to the second site after the first site is already done with an operation.



Today's Requirements for Efficient Replication

WAN optimization provides for speedy replications and improved application response times. The most effective approach demands that several business and technical requirements are met, including:

Increase WAN performance of data replication

Compression is a significant contributor to optimizing performance over WAN links. Being able to reduce repetitive data patterns delivers much faster replication times, critical for completing backups or restoring data more quickly.

Ensure bandwidth availability for critical enterprise applications

There's no point in optimizing WAN links if they are immediately clogged with non-essential communications. With Quality of Service (QoS), IT can prioritize application traffic and allocate the WAN bandwidth so that key applications perform consistently without being impacted by sudden bursty replication and backup traffic. This is particularly important for time-sensitive applications like voice over IP (VoIP). IT can define a limit, for instance, on the amount of bandwidth allocated to data replication so that process never diminishes the performance of other critical applications.

“We chose Juniper Networks and (Symantec’s) Veritas because the joint solution was very cost effective – VVR does not require additional hardware to operate, and the WX application acceleration platforms enabled us to avoid a very expensive network upgrade.”

Eugene Rivera
 Technical Support Manager
 Banco Santander

Accelerate applications

Optimizing TCP/IP flows and higher-layer protocols allows for more frequent replications with optimal application performance across wide-area links. Using more reliable and efficient transport techniques can significantly reduce the amount of bandwidth consumed and the time it takes to complete data replication when WAN latency is impacting performance.

Monitor WAN performance

Real-time WAN monitoring and reporting is essential, so IT can gain instant visibility into network performance. Reports of top talkers and the ability to capture packets can assist in understanding the root cause of problems and addressing them in a timely manner.

Easy deployment

With today’s focus on operational efficiency, it’s a given that WAN optimization platforms must be easy to configure and deploy. Remote-office locations often lack on-site IT support, so deploying WAN optimization cannot require changes to existing applications, networks, routers, or WAN interfaces. WAN optimization devices must also work transparently with IPsec VPNs and MPLS.

Flexible, reliable deployment

WAN optimization devices should also offer multiple deployment options. Some sites, for example, have a link between LAN backbone equipment and the WAN router, while other locations use a collapsed backbone, with one device supporting both the backbone connections and the WAN interfaces. WAN optimization platforms must be able to operate in either scenario. They also need to support a range of data replication models.

Juniper Networks Instantly Optimizes Veritas Volume Replicator

Juniper Networks offers a complete family of application acceleration platforms designed to improve application response times within central sites, to branch offices, and for remote users. Two members of that family – the WX™ and the WXC™ application acceleration platforms – focus on WAN optimization to instantly accelerate applications and optimize WAN transmissions, enabling IT to deploy Veritas Volume Replicator over the existing WAN infrastructure. The WX and WXC platforms are based on the WX Framework™, which integrates a comprehensive and interdependent set of technologies to accelerate application performance over wide-area links, delivering the ideal solution for improving and streamlining data replication.

The WX Framework defines specific attributes that a WAN optimization and application acceleration platform must have to overcome the bandwidth, latency, congestion and manageability issues that impede application performance over the WAN. Each element of the WX Framework addresses a specific challenge that prevents applications from running efficiently over the WAN, organized into four categories: compression and caching; acceleration; application control; and visibility.

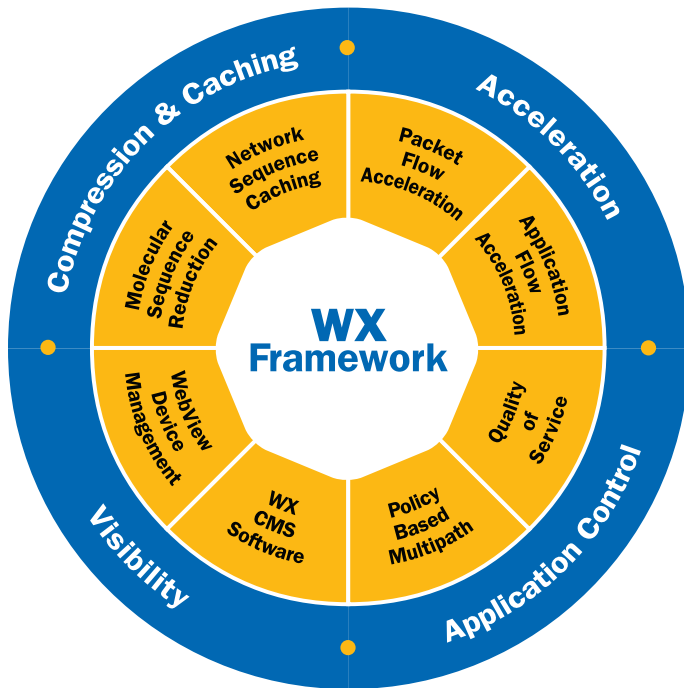
The compression and caching component of the WX Framework includes Molecular Sequence Reduction™ (MSR™) compression, which frees up WAN capacity by eliminating repeated data patterns, and Network Sequence Caching, which uses hard disks to store and recognize large repeated patterns, even if they were sent days or weeks earlier.

The acceleration component includes Packet Flow Acceleration™ (PFA™) techniques, which combat the effects of latency on the TCP protocol, and Application Flow Acceleration™ (AppFlow™) technology, which provides protocol-specific acceleration for applications such as Exchange, Microsoft file services, and web.

The application control segment includes Policy-Based Multipath™ (Multipath™) optimization technology, which allows IT to direct application flows to a specific WAN link when multiple links are available; and Quality of Service (QoS) and bandwidth-management tools for prioritizing critical application traffic and ensuring bandwidth availability.

Finally, the visibility components of the WX Framework include WebView device management for configuring and managing individual WX and WXC platforms, and WX Central Management System™ (CMS™) software for gaining visibility into and centralized control over platforms distributed throughout an organization.

Each of these technologies work together seamlessly and transparently to meet the challenges associated with data replication over the WAN.



The WX Framework integrates key technologies that work together and influence each other, providing IT with distributed stateful intelligence about their WAN links and applications.

Instantly increase WAN capacity to accelerate data replication

With the MSR and sequence caching technologies, IT can instantly increase existing network link capacity up to 10 times by reducing the amount of traffic traversing the WAN link. MSR compression identifies variable-sized, repeating patterns in the data stream across multiple packets, applications, or sessions and replaces those patterns with a label, reducing the traffic flow. The labels and their associated data patterns are stored in memory in dictionaries in the WX and WXC devices on both ends of the WAN link.

Sequence caching is similar to MSR compression in its use of labels, but with sequence caching, the stored pattern sequences reside on hard disks available only on the WXC platforms, increasing the size of the patterns stored as well as the time between repeated patterns. The combination of both MSR and sequence caching technologies provides optimum data reduction, and because up to 90 percent of network traffic is repetitive, eliminating this data redundancy generates significant efficiencies in WAN transmissions.

By pairing the WX and WXC platforms with Veritas Volume Replicator, IT can dramatically reduce repetition within the replicated data, requiring far less bandwidth to complete the data replication. As a result, IT can achieve higher levels of data integrity at secondary sites without costly investments in additional WAN bandwidth.

Ensure bandwidth availability for critical enterprise applications

The WX Framework's bandwidth-management tools, including QoS and bandwidth allocation, enable IT to prioritize applications across the WAN and allocate bandwidth among applications. With these tools, IT can readily define minimum and/or maximum throughput levels for the data-replication processes as well as the other business applications. When Veritas Volume Replicator traffic crosses a WAN link with other high-priority applications such as VoIP, these tools ensure that the more sensitive and "bursty" phone traffic is not impacted by replication traffic.

Accelerate applications

The WX and WXC platforms dramatically improve application response times by optimizing TCP/IP flows as well as higher-layer protocols for specific applications. The innovative PFA techniques minimize the impact of WAN latency, enabling TCP/IP traffic to flow faster and optimizing frequent replications. PFA operates transparently to applications and network equipment, simplifying its implementation.

One PFA feature, called Active Flow Pipelining™, uses a Juniper-developed transport protocol in lieu of TCP on high-latency links to utilize more of the WAN link and accelerate application response times by eliminating the need to wait for acknowledgements on TCP. The PFA technique enhance Veritas Volume Replicator's data replication and enable IT to maximize utilization across the WAN.

The AppFlow technology accelerates applications that are constrained by their own protocol behavior, specifically Microsoft Exchange, Microsoft file services, and web-based applications. For Exchange and CIFS, the AppFlow technique pipelines the hundreds or even thousands of round-trip times (RTTs) required to complete a single transmission, sending as many in parallel as needed to fill the available WAN capacity so that messages and files are downloaded at LAN speeds.

For web traffic, the AppFlow technique enables WX and WXC devices to learn and cache objects associated with URLs. The WX and WXC platforms confirm the freshness of each object or pre-fetch them when new or updated versions are available, in advance of the client's request, allowing browsers to display web pages much faster.

Working with Veritas Volume Replicator, the AppFlow technology optimizes WAN performance by accelerating file transfers, delivering more LAN-like performance without consuming an inordinate amount of bandwidth.

Monitor WAN performance

Powerful real-time WAN monitoring and reporting capabilities available with the WX and WXC platforms provide IT with packet capture, top talker, and other WAN and application statistics critical for maximizing wide-area resources. An intuitive GUI provides IT managers with instant visibility into network performance, and an export feature enables, for instance, NetFlow statistics to be exported to a NetFlow collector, enabling IT to use any NetFlow platform, such as those from Concord or Micromuse, to perform traffic analysis.

This powerful partnership delivers real-time data availability and protection solutions that ensure business continuity in case of a site failure.

Easy to deploy

The WX and WXC platforms are easy to install and configure. Installation of hub devices is typically a 10-minute process, and IT can automate deployment in branch offices that have no local IT staff. IT simply defines a configuration in the WX CMS

software for the remote locations and, upon booting up, the remote devices will automatically request a temporary address, look up the central WX CMS server, download the configuration, and begin operation.

In addition to supporting this automated deployment, the WX and WXC platforms also operate transparently to existing applications, networks, routers, and WAN interfaces. The platforms also work transparently with IPsec VPNs, MPLS, and firewalls.

Flexible, reliable deployment

The WX and WXC devices are rack-mountable network appliances that interface to the network as two-port LAN switches, sitting inline between a LAN backbone switch and a WAN router or off-path attached to a WAN router serving as a collapsed backbone. They support 10/100/1000 Ethernet interfaces and are installed behind external firewalls and encryption devices, processing corporate data before it's sent to WAN transmission devices.

The platforms are also highly reliable and integrate seamlessly with high-availability environments and load-balanced networks. In the event of a traffic overload, they pass through the excess traffic. In the event of a failure, they automatically switch to pass-through mode, allowing all traffic to just flow through the device and across the WAN.

Customer Success Story:

Banco Santander Central Hispano International

Business Benefits:

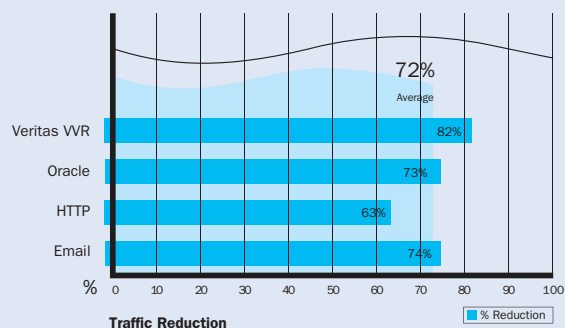
- 100% increase in replication speed and data reliability
- Reduced IT staff time dedicated to maintaining replication by 95%
- Saved \$60,000 in bandwidth costs in first year by avoiding network upgrade
- Saved \$50,000 to \$75,000 in hardware costs by using VVR's open architecture
- Peace of mind that critical data is available in real time and service would be uninterrupted even with site failure

The Miami headquarters of Banco Santander Central Hispano, Spain's leading financial institution, is the business center for the company's private-banking operations in the United States, Bahamas, Geneva, and London.

The Miami site is located in the heart of Gulf Coast hurricane country, so the bank needed a real-time data availability and protection solution that could ensure business continuity in case of site failure. In addition, regulatory requirements for

data availability required Banco Santander Central Hispano to protect more than 40 GB of business-critical data traveling across its WAN.

To protect its business-critical data, Banco Santander Central Hispano chose both Veritas Volume Replicator and Juniper Networks WX application acceleration platforms to replicate the data across the WAN to a backup facility. The WX platforms accelerate the performance of the Symantec Veritas software; the combined Veritas and Juniper Networks solution delivers fast, cost-effective, and uninterrupted failover and reliable data protection.



Easily Measure and Predict Results

Both Symantec and Juniper Networks provide free tools to help IT evaluate the requirements for and results of deploying their respective data replication and WAN optimization solutions.

Forecast Veritas Volume Replicator bandwidth requirements

The Veritas Volume Replicator Advisor (VRAdvisor) helps IT understand the optimal bandwidth needed for replicating data between sites. VRAdvisor collects information on the rate of data writes over a period of time and then calculates the needed bandwidth, taking into account the current WAN bandwidth and different outage durations.

VRAdvisor then uses that analysis to recommend the optimal bandwidth, and it helps IT configure a Storage Replicator Log (SRL) within Veritas Volume Replicator. VRAdvisor, now available as a free download, provides the following key features:

- Performs both data collection and analysis
- Helps plan the SRL size after analyzing the sample data
- Provides the analyzed output in a graphical and text format
- Allows “what if” analysis, which helps IT plan accurately and understand worst-case scenarios.

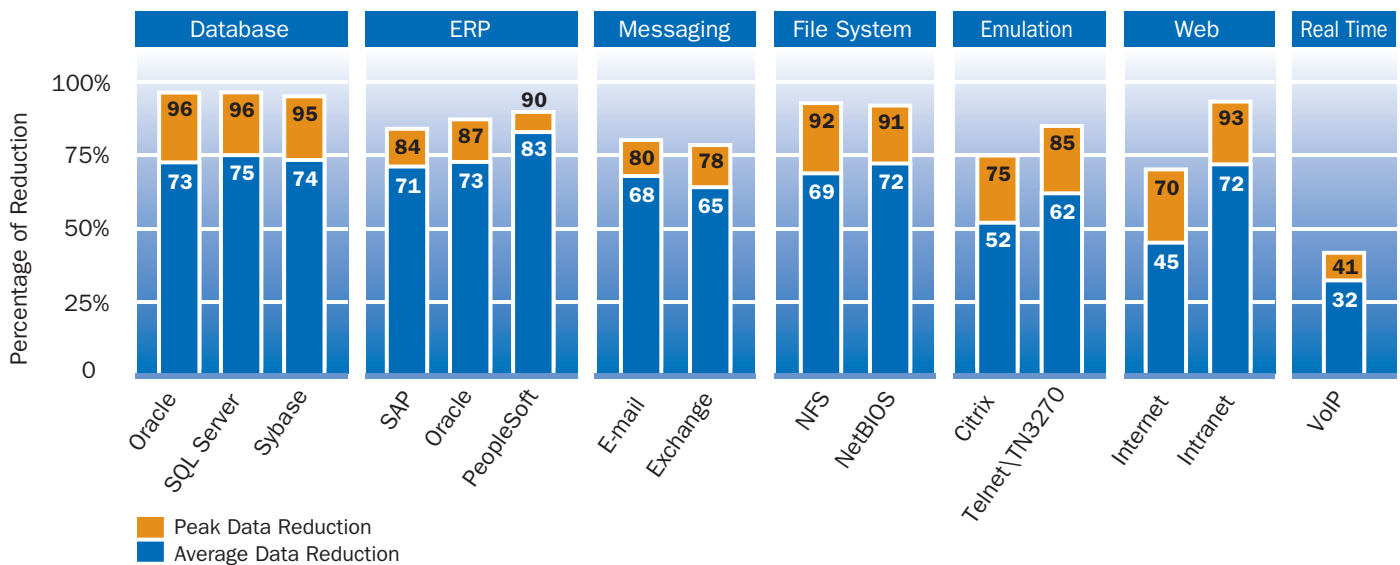
Evaluating WAN performance improvement

To truly measure the actual reduction rates on a given network, enterprises should use the Profile Mode on the WX or WXC platforms. The Profile Mode enables organizations to transparently and non-intrusively install a WX or WXC platform at a single location in their network on a mirrored switch port. The device receives a copy of all the traffic destined for the WAN link and can therefore precisely measure the reduction results that it would deliver if it were deployed inline. This profiling capability can provide a quick and accurate ROI analysis of the value a WX or WXC platform would bring to any environment.

Together, VRAdvisor and the WX or WXC Profile Mode provide IT with critical deployment information. The reports from these tools estimate the capacity required for Veritas Volume Replicator and show how much additional capacity the Juniper Networks solution will provide. With this data, IT can effectively plan for the Symantec Veritas deployment.

“Juniper Networks WX application acceleration platforms and Veritas Volume Replicator deliver fast and cost-effective protection of our business critical data, ensuring day-to-day business continuity in the face of system failure.”

Eugene Rivera
 Technical Support Manager
 Banco Santander



The table above summarizes the reduction results for commonly deployed enterprise applications. A reduction rate of 75% corresponds to a capacity increase of 4x.

Juniper Networks results for Symantec Veritas Volume Replicator and other applications

WANs are responsible for transporting a wide variety of IP-based data, voice, and video traffic. All applications – including storage, back-up, e-mail, and ERP – must efficiently leverage precious WAN bandwidth. The actual performance improvement a given organization will gain from a joint Symantec-Juniper solution will vary depending on the type and mix of applications and data as well as the latency and loss characteristics of the WAN links.

Symantec and Juniper Networks: A Powerful Partnership

Symantec provides businesses with compelling software-only solutions for data replication. With Juniper Networks WX and WXC platforms deployed in conjunction with Veritas Volume Replicator, enterprises can replicate their data more frequently and within shorter periods of time – all while leveraging their existing WAN capacity. Faster data replication, improved data integrity, and optimized WAN throughput – Symantec and Juniper deliver it all.

Juniper Technology	Symantec Veritas Volume Replicator Deployment Benefit
Molecular Sequence Reduction and Network Sequence Caching	Eliminate repetition, including redundant large file transfers, to increase WAN capacity and improve performance, allowing the existing WAN to support more replication traffic
Packet Flow Acceleration and Application Flow Acceleration	Accelerate TCP traffic and other applications, overcoming latency to decrease replication and backup time windows
Bandwidth Management	Allocate bandwidth and prioritize traffic to support enterprise business applications as well as backup, replication, and disaster-recovery traffic
Policy-Based Multipath	Enable branch offices to use both public Internet and private WAN services to more cost effectively back up and replicate application data, with IT specifying which applications should follow which path
Visibility	Provide detailed visibility into WAN performance, including backup and replication traffic – measure replication impact and improvements as well as verify SLA compliance



CORPORATE HEADQUARTERS
AND SALES HEADQUARTERS
FOR NORTH AND SOUTH AMERICA

Juniper Networks, Inc.
1194 North Mathilda Avenue
Sunnyvale, CA 94089 USA
Phone: 888-JUNIPER (888-586-4737)
or 408-745-2000
Fax: 408-745-2100

www.juniper.net

EAST COAST OFFICE

Juniper Networks, Inc.
10 Technology Park Drive
Westford, MA 01886-3146 USA
Phone: 978-589-5800
Fax: 978-589-0800

ASIA PACIFIC REGIONAL
SALES HEADQUARTERS

Juniper Networks (Hong Kong) Ltd.
Suite 2507-11, 25/F
ICBC Tower
Citibank Plaza, 3 Garden Road
Central, Hong Kong
Phone: 852-2332-3636
Fax: 852-2574-7803

EUROPE, MIDDLE EAST, AFRICA
REGIONAL SALES HEADQUARTERS

Juniper Networks (UK) Limited
Building 1
Aviator Park
Station Road
Aldershot
Surrey, KT15 2PG, U.K.
Phone: 44-(0)-1372-385500
Fax: 44-(0)-1372-385501