

SOLUTION BRIEF: Riverbed and 3PAR

A Joint Solution by Riverbed and



Consolidation and disaster recovery are perhaps the most obvious and popular means of enhancing IT service levels while simultaneously lowering costs. Of course, the degree of success achievable – both at the application and the storage level – is often constrained by the functional limitations of the traditional or legacy IT infrastructure. Revolutionary technologies from Riverbed and 3PAR, pioneers in application acceleration and storage consolidation, are removing the final barriers to consolidation and, leading the way to new levels of service, simplicity, and cost-effectiveness.

Riverbed and 3PAR Combine to Deliver both IT Consolidation and Disaster Recovery – Simply, Cost-effectively, and Simultaneously

With Riverbed and 3PAR, customers can deploy or grow into a highly consolidated application and storage infrastructure while retaining the ability to provide disaster recovery capabilities for the entire environment, both simply and affordably.

Riverbed’s award-winning Steelhead appliances provide wide-area data services (WDS) for enterprises of all sizes, helping IT managers to achieve IT consolidation over distances without performance tradeoffs. 3PAR Utility Storage is a simple, efficient and scalable tiered-storage array for utility computing that allows organizations to meet the demands of virtualized, highly consolidated storage while simultaneously reducing total cost of data by 50%. Together, Riverbed and 3PAR offer a combined solution that leverages the industry-leading features delivered by both platforms to deliver game-changing benefits that include:

- Reduction of physical capacity requirements by 50% with 3PAR Thin Provisioning
- Centralized storage, replication and/or backup
- Accelerated replication to deliver improved Recovery Time Objectives (RTO)
- Frequent remote snapshots to deliver improved Recovery Point Objectives (RPO)
- Increased WAN capacity and/or deferral of WAN upgrades

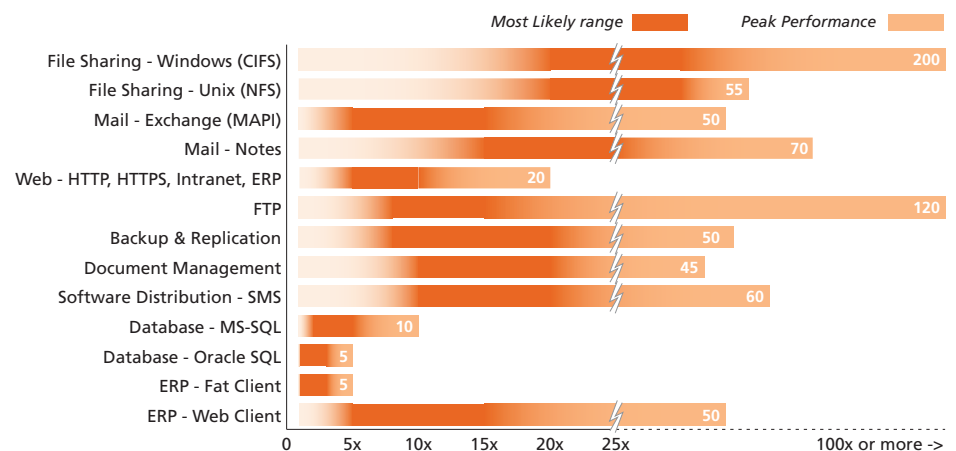
IT Consolidation with Riverbed and 3PAR

Consolidation is perhaps the most obvious and popular means of enhancing IT service levels while simultaneously lowering costs. Of course, the degree of consolidation achievable – both at the application and the storage level – is often constrained by the functional limitations of the traditional or legacy IT infrastructure. Revolutionary technologies from Riverbed and 3PAR, pioneers in application and storage consolidation, are removing the final barriers to consolidation and leading the way to new levels of service, simplicity, and cost-effectiveness.

Wide-area Data Services

Riverbed Steelhead appliances enable organizations to achieve dramatic cost by enabling any worker, in any office, to feel as though his application or data were local. This powerful level of acceleration then makes consolidation possible – redundant servers, redundant storage, remote tape backups and all of the associated management overhead can all be removed– without impacting the end user experience. The chart below illustrates the potential acceleration of typical enterprise applications across a WAN while using Riverbed Steelhead appliances.

Steelhead Appliances Accelerate a Broad Range of Applications



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A wide-area data services solution from Riverbed also enable customers to reduce their bandwidth utilization, typically by 60% to 95%. This enables enterprises to effectively absorb the increased WAN demands of consolidation with no additional investment in WAN infrastructure or bandwidth.

Utility Storage

Riverbed's enablement of greater IT consolidation is enhanced by the ability of 3PAR Utility Storage to absorb the increased capacity and data workloads that IT consolidation demands. The 3PAR InServ® Storage Server is a simple, efficient and massively scalable tiered-storage array that is ideal for open-systems storage consolidation, integrated data lifecycle management, and performance intensive applications. With 3PAR, users can

- Start and grow in small, affordable increments
- Scale massively and confidently within a single system
- Provision lifetime, application-tailored storage in 15 seconds
- Purchase capacity only for written data
- Optimize tiered storage automatically

As a result, 3PAR customers are able to improve storage infrastructure responsiveness by 10x while cutting their total cost of data by 50%.

High Performance Disaster Recovery

With traditional technologies the consolidation of disaster recovery environments is fraught with cost and complexity. Too often, disaster recovery implementations are plagued by numerous device- or application-specific replication technologies and protocols, expensive professional services and consulting engagements, and high storage, software, and bandwidth costs.

“We use 3PAR Remote Copy with native IP connectivity and Riverbed Steelhead WAN optimization appliances to deliver extremely simple and efficient disaster recovery (DR) capabilities. We are able to meet stringent DR requirements with virtually no administration while speeding data transfers significantly.”

— *Kevin Fiore, Vice President and Director of Engineering Services, Thomas Weisel Partners*

Given these weighty cost and support burdens, most users are forced to carefully select only a subset of their applications, users, and datasets to receive protection. However, with 3PAR and Riverbed, users are no longer forced into such compromising trade-offs.

The simplicity and efficiency of the combined 3PAR and Riverbed solution mean that even large and comprehensive application environments can be cost-effectively deployed and protected without compromise.

3PAR Remote Copy is a uniquely simple, efficient and flexible replication technology that allows customers to affordably protect and share data of any application. Implemented natively over IP and with a handful of simple,

intuitive commands, 3PAR Remote Copy can be set up, managed, and tested in a matter of minutes. Costly and prolonged professional services engagements that are common with other replication technologies are simply eliminated.

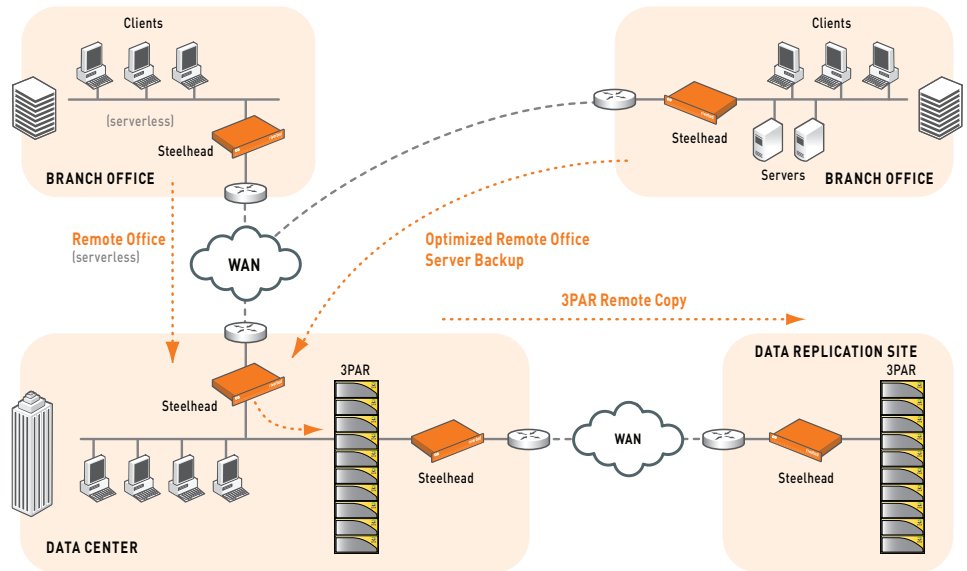
With Remote Copy, users may flexibly choose to use one or both modes of operation: Asynchronous Periodic and/or Synchronous, the latter of which also supports native Fibre Channel connectivity. Remote Copy allows users to mirror data between InServ Storage Servers of any model and configuration, eliminating the incompatibilities and complexities associated with attempting to mirror between traditional vendors' midrange and high-end array technologies. Source and target volumes may also be flexibly and differently configured to meet users' needs (e.g., different RAID levels and drives types).

3PAR Remote Copy efficiently uses existing disk capacity by utilizing high performance, reservationless snapshot technology to track changes when in Asynchronous Periodic mode. Since Remote Copy is Thin Provisioning-aware, target volumes provide the same dramatic cost savings and ease-of-use benefits associated with thin provisioned source volumes. Bandwidth is also efficiently utilized since (with Asynchronous Periodic mode) changed data within a volume or consistency group is transferred only once, no matter how many times it may have changed between synchronization intervals.

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Riverbed's Steelhead appliances have the ability to minimize WAN costs and dramatically accelerate the complete disaster recovery process. When deployed in conjunction with 3PAR Remote Copy, Riverbed Steelhead appliances significantly improve the efficiency of Remote Copy operations to deliver even greater combined benefits. For example, the Riverbed Optimization System (RiOS) simultaneously addresses bandwidth constraints by using fine grain data reduction as well as compression to perform Data Streamlining, typically reducing bandwidth utilization by 60 to 99%. Transport Streamlining and Application Streamlining can minimize protocol chattiness, eliminating 65 to 98% of packet round trips across the WAN.

Solution Testing Results

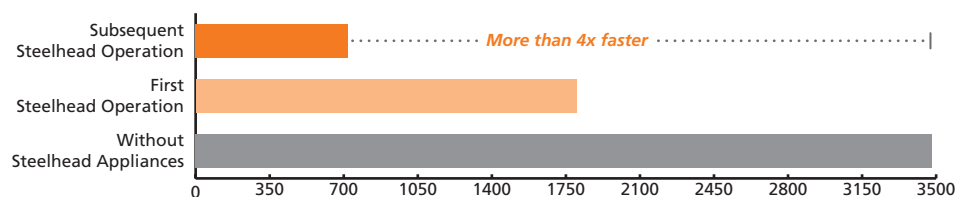


■ Riverbed optimizes both remote office backup and data center replication across the WAN. Disk-to-Disk backup software simplifies and automates remote office data protection for servers, but is often hampered by latency and bandwidth limitations. In addition, once the data is stored centrally on backup servers in the data center, it may be replicated to a separate disaster recovery site. Riverbed can facilitate the replication to the DR site through its advanced acceleration capabilities.

In the combined 3PAR/Riverbed deployment illustrated above, thinly provisioned volumes are used at both the source and target sites while Asynchronous Periodic Mode is used to transfer data between the two sites. Asynchronous Periodic Mode is ideal for long-distance data replication, as it leverages 3PAR reservationless snapshot technology to provide a consistent point-in-time copy of data at the remote site while only capturing and mirroring data that has changed since the last update to the remote site. For each scheduled Asynchronous Periodic snapshot, only the incremental change is replicated to the remote site, thereby enabling faster resynchronizations.

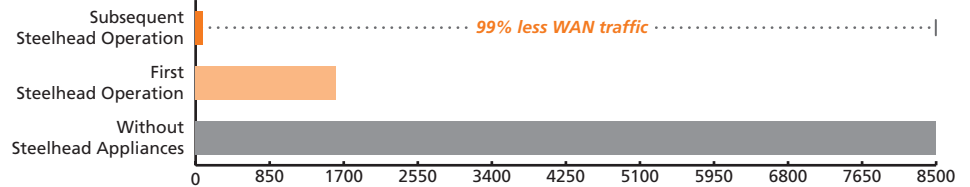
In the test results summarized below, 3PAR Virtual Volumes (VVs) were mirrored from one 3PAR InServ Storage Server to another InServ over variable distances using different modes of operation (Synchronous and Asynchronous Periodic). Testing was conducted with and without the Riverbed Steelhead appliances and the results are summarized below:

Time Improvement for Replicating 8500MB of Oracle data – Time to Complete (in seconds)

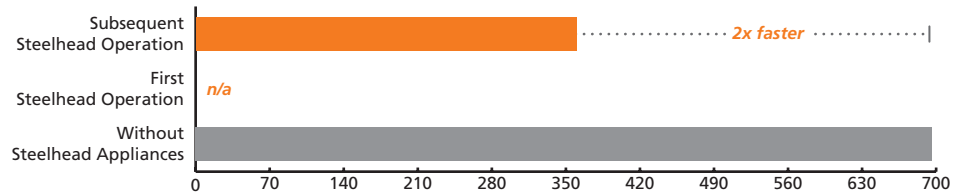


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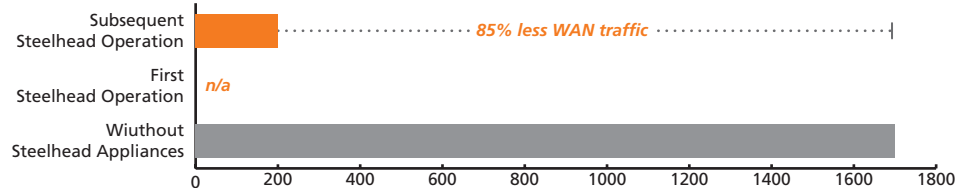
Bandwidth Improvement for Replicating 8500MB of Oracle data on a 20 Mbpsec, 100 msec RTT (in megabytes)



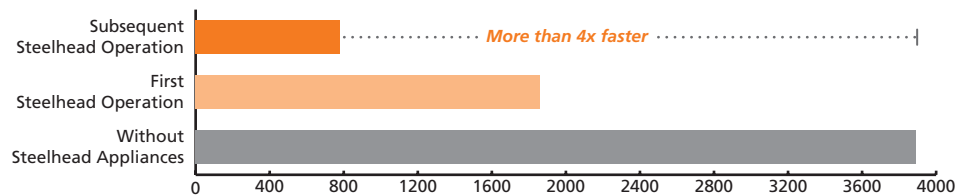
Time improvement to sync 1700 MB of Random Oracle rewrites – Time to Complete (in seconds)



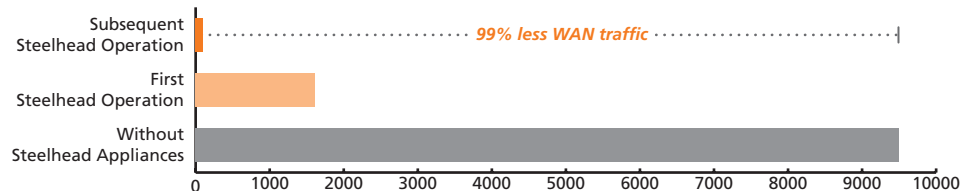
Bandwidth Reduction for Syncing 1700MB of Random Rewrites of Oracle Data on a 20Mbps, 100msec RTT (in megabytes)



Time Improvement for Replicating 9500MB of File System Data – Time to Complete (in seconds)



Bandwidth Improvement for Replicating 9500MB of File System Data over 20Mbps, 100msec RTT (in megabytes)



**These results are based on the testing scenario presented in this paper. Your results may vary based on the conditions of your own network and the specifics of your own use cases.*

These results illustrate how Riverbed’s Steelhead appliances minimize WAN costs and dramatically accelerate the complete disaster recovery process. This acceleration is achieved via the Data and Transport streamlining modules resulting in enhanced recovery time objectives (RTO). Additionally, Steelhead appliances enable lower utilization of bandwidth resulting in deferral of bandwidth upgrades, while allowing frequent snapshots resulting in better Recovery Point Objectives (RPO).

While 3PAR Remote Copy will only send disk write changes to the secondary site, it does not have the ability to recognize whether changed disk data has been “seen” or sent previously across the IP network. However, the Riverbed Steelhead appliance is capable of distinguishing previously transmitted data, whether it has been seen by Remote Copy or any other application. In addition, Steelhead appliances work at a fine-grained level of 100 bytes per data segment on average, meaning that they can isolate very small changes in data blocks.

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ACHIEVE MORE WITH LESS

Virtualization and consolidation technologies are essential strategies for reducing IT costs. 3PAR and Riverbed are virtualization and consolidation pioneers with revolutionary technologies that enable organizations to achieve more with less by reducing the amount of capacity, bandwidth, equipment, and resources required to deliver superior performance levels at greatly reduced cost. Together, Riverbed and 3PAR offer a combined solution that leverages the industry-leading benefits delivered by both platforms to deliver game-changing benefits that remove the final barriers to consolidation and lead the way to new levels of service, simplicity, and cost-effectiveness for IT organizations looking to cut costs without sacrificing performance or service levels.

As a result, when Steelhead appliances are used in conjunction with Remote Copy, the bandwidth required to complete routine Remote Copy operations can be massively reduced. For example, when a customer reorganizes their database, the existing data is rearranged across free disk space within the primary system. At the specified interval, the 3PAR Remote Copy service queues these writes of rearranged data for transmission to the remote InServ system. Since the Riverbed Steelhead appliance recognizes this data as previously transmitted, use of the Steelhead results in a dramatic reduction in bandwidth required to complete the Remote Copy operation. Even in scenarios where the underlying application is writing new data, there are many cases where that data is similar to past data and therefore use of the Steelhead appliance in conjunction with Remote Copy has the ability to reduce bandwidth requirements significantly. All the tests illustrated above were conducted with the encryption setting disabled on the Steelhead appliances. To validate encryption with 3PAR Remote Copy, non-instrumented tests conducted with encryption enabled demonstrated no significant effect on performance and no detrimental effects to Remote Copy operations.

About 3PAR

3PAR is the leading provider of Utility Storage, a simple, efficient and massively scalable tiered-storage array for utility computing that lets customers serve more with less. 3PAR Utility Storage can cut an organization's Total Cost of Data by 50%. Capacity and related costs can be cut by 75% while storage administration and associated expenses can be reduced by 90%. 3PAR Utility Storage is ideal for open systems storage consolidation, integrated data lifecycle management and performance-intensive applications.

3PAR is based in Fremont, California, and has offices in Bracknell, UK, Stuttgart, Germany, and Tokyo, Japan. The company's corporate headquarters are located at 4209 Technology Drive, Fremont, CA 94538. Phone: 510-413-5999, fax: 510-354-3070, email: salesinfo@3pardata.com, Web site: <http://www.3par.com>.

About Riverbed

Riverbed Technology is the performance leader in wide-area data services (WDS) solutions for companies worldwide. By enabling application performance over the wide area network (WAN) that is orders of magnitude faster than what users experience today, Riverbed is changing the way people work, and enabling a distributed workforce that can collaborate as if they were local. Additional information about Riverbed (Nasdaq: RVBD) is available at www.riverbed.com.

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