

Extreme Savings: Cutting Costs with Wide-Area Data Services

CUTTING COSTS WITH WIDE AREA DATA SERVICES

Introduction

Organizations of all sizes strive to be more productive and run low cost operations. Particularly in difficult economic times, many organizations will evaluate various cost-cutting initiatives in order to weather the storm. However, enterprises need to be careful to pursue cost cutting measures that won't negatively impact day-to-day operations or constrain long term growth. Employees need to do their jobs more efficiently than before, so it is vital to keep IT infrastructure up-to-date. Ideally, organizations should not make deep cuts in investments that may jeopardize future growth, such as product improvements or hiring of key personnel.

Much has been written about wide area data services (WDS) and its ability to improve productivity and collaboration across the enterprise. However, WDS investments can often be justified solely on the basis of cost savings. These cost savings can be achieved without negatively impacting operations – in fact, in most instances WDS helps organizations run better while cutting costs. Riverbed has over 3500 customers, ranging from small businesses to Fortune 500 companies, who are using our WDS solutions to reduce costs while improving productivity. Many Riverbed customers have seen a return on investment in just a few months because of the significant hard cost savings in areas such as bandwidth reduction and IT consolidation.

This paper explores how enterprises can use Riverbed solutions to cut hard costs and make the most of their existing infrastructure, without negatively impacting their operations.

What is Wide Area Data Services?

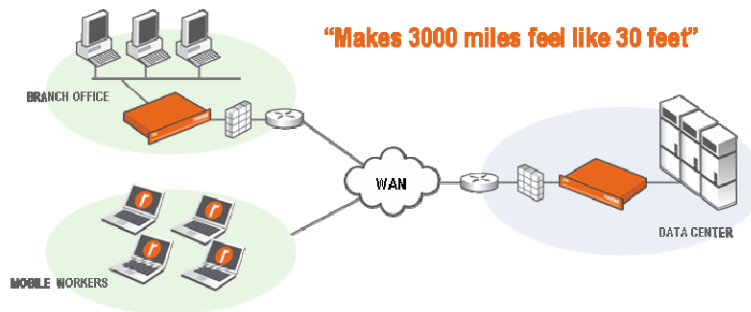
Riverbed is the pioneer and market and technology leader in WDS - the first comprehensive solution to a host of problems that plague enterprise applications operating across the wide area network (WAN) including:

- Poor application performance in distributed environments
- Insufficient, expensive or congested network bandwidth into remote offices
- Difficulties in successful IT consolidation
- Challenges with slow remote data backup and replication
- Increasing demands of the mobile workforce

Using WDS solutions from Riverbed, enterprises can improve application performance across the network typically by five to 50 times and in some cases up to 100 times, and can simultaneously reduce WAN bandwidth utilization by 65 to 95%. These dramatic results allow businesses to take advantage of their networks, infrastructure, and applications in ways they had never imagined possible.

WDS solutions accelerate applications by taking an integrated approach to application performance across the WAN. While some approaches solely focus on network optimization, or just concentrate on acceleration for a specific application, WDS improves the performance of all applications running over TCP and also has application-specific modules that address chatty application protocols. This combination enables WDS solutions to accelerate the applications that enterprises care about most, and provides the ability to easily add more functionality over time.

WDS products are architected to scale all the way from the largest data centers with clustered appliances down to software on a single user's laptop (or desktop). For organizations looking to optimize branch office operations, Riverbed offers a full line of Steelhead Appliances that can be easily integrated into a customer's network. There are thirteen models of Steelhead Appliances to choose from, based on the bandwidth to the site in question, the amount of data being used, and the number of desired TCP connections (roughly proportional to the number of users). For enterprises that want to improve productivity for their mobile workers, Riverbed also offers Steelhead Mobile software, which can be installed on a user's laptop to optimize that mobile user's communications with the data center. In effect, Steelhead Mobile software turns a user's laptop into a Steelhead Appliance, so that mobile users can enjoy the same performance benefits as workers in a Steelhead-enabled branch office.



- **Accelerate applications** to branch offices and mobile workers
- **Cut bandwidth use** by 60 – 95%
- **Grow your business** strategically by eliminating the constraints of distance

Figure 1: Overview of Riverbed's Solutions

How WDS Helps Companies Cut Costs

Because WDS significantly enhances the performance of applications over WANs, enterprises can realize considerable cost savings in addition to productivity improvements. IDC found that the average payback period for a Riverbed implementation is 7.3 months.¹

Riverbed WDS solutions can cut costs by helping organizations do the following:

- **Reduce bandwidth costs.** Using Riverbed to improve network performance, many organizations can defer WAN bandwidth upgrades. WDS projects can often be justified solely on bandwidth savings.
- **Consolidate infrastructure into the data center.** With WDS, enterprises can remove much of the IT infrastructure (such as file and email servers, SMS servers, SharePoint servers, tape auto-loaders, and so forth) that sit in branch offices—without impacting performance.
- **Simplify branch office infrastructure.** Riverbed offers the RiOS™ Services Platform (RSP), which enables customers to run best-of-breed services on the Steelhead appliance (such as print, IP address management, and other services). This allows customers to consolidate their IT even further, making a true “serverless” branch office a reality.
- **Optimize disaster recovery.** By improving the performance of a disaster recovery site, WDS can help organizations save money and backup their data in a more frequent and reliable manner.

This paper examines each of these areas in more depth. Specifically, the paper focuses on the hard cost savings that can be achieved with WDS. Productivity improvements, while a very important consideration for a WDS investment, have been well covered in other materials, and are therefore not the focus of this paper.

Reduce Bandwidth Costs

By deploying Riverbed WDS solutions, many enterprises have avoided purchasing additional bandwidth. Steelhead appliances on WAN links will typically reduce WAN traffic by 65% to 95%. That means an office served by a T1 (1.5 Mbps) could deliver bandwidth equivalent to between three and 30 Mbps just by adding Steelhead appliances to the WAN link, without any additional investment in infrastructure. Bandwidth savings can be significant, and many companies have justified a payback period of just a few months on bandwidth savings alone.

For example, GeoEngineers, an architectural and design firm, realized bandwidth savings of about \$400K per year by deploying Riverbed Steelhead appliances, in addition to significant benefits in terms of employee productivity and collaboration. According to Courtenay Bernier, IT manager at GeoEngineers, “the ROI was obvious

GeoEngineers, Inc., an environmental consulting firm, had difficulty transferring files between offices. A typical 720 MB file could take over two hours to transfer from one office to the other. After deploying Riverbed's Steelhead appliances in 15 offices, this transfer time was reduced to ten minutes.

On average, GeoEngineers has seen a 3.4x to 4x increase in WAN capacity with no additional investment in physical capacity. Steelhead appliances enabled the company to get a virtual 155 Mbps connection on a connection into the data center that is only 3 Mbps.

As a result, GeoEngineers has been able to save about \$400K per year in bandwidth costs, and their investment in Steelhead appliances was paid back in a matter of months.

¹ IDC Whitepaper, “Adding Business Value with Wide-area Data Services,” August 2007

to executive management, and payback was just a matter of months.” LG Electronics, another Riverbed customer, deployed Steelhead appliances globally and saves \$6M in annual bandwidth costs, generating a payback period of just five months. Kang-Seok Chung in the IT Infrastructure Group at LG commented: “I wish all IT projects could produce such impressive, tangible results.”

In addition, the Riverbed Steelhead Mobile product offers further benefits to enterprises in terms of bandwidth reduction. The workforce is becoming more mobile – IDC forecasts that nearly 75% of the workforce in the US will be mobile by 2011, up from 68% in 2006, and that there will be 1 billion mobile workers worldwide.² Steelhead Mobile optimizes the connections for these mobile workers, reducing the amount of bandwidth they consume. Piper Jaffray recently tested the Steelhead Mobile solution with stellar results: “The performance improvements we achieved with the Steelhead Mobile software client were nothing less than incredible. We experienced the largest improvements on Microsoft Word and Excel files, with performance increases in excess of 30x for both file types.” In these tests, Piper Jaffray was able to reduce by 50% the bandwidth required to support mobile users: “This translates into immediate WAN cost savings.”³

In addition to bandwidth savings, Steelhead Mobile can help companies achieve even more dramatic savings by reducing real estate and facilities costs. According to one estimate, “virtual” workers cost 60% less than those based at headquarters.⁴ One barrier for many organizations in making the workforce more mobile is the difficulty that mobile workers face in accessing key applications over the WAN. Steelhead Mobile removes this roadblock.

The key to these dramatic improvements in bandwidth utilization is Riverbed data streamlining, which removes repetitive traffic from the WAN. The data streamlining algorithms store all WAN traffic, in a proprietary form, on disks inside Steelhead products on both sides of the WAN link. Thereafter, the Steelhead product intercepts any TCP traffic going across the network, to see if any of that data has been across the network before. If any of it has been sent by any application, then only the new data is sent, along with references to the existing data.

Enable Remote Site Consolidation

Riverbed WDS solutions also enable consolidation of IT resources and equipment in branch offices and complement server virtualization initiatives in the data center. Initially, many enterprises placed servers at remote sites to deliver consistent application performance to remote users working with local data sets. Microsoft Exchange servers, for example, have commonly been deployed at remote sites with only 20-30 users.

However, provisioning of servers at remote sites is expensive and the resources are often underutilized. Exchange servers, for example, are typically resourced for a capacity of several thousand users, so deploying a dedicated server for a few dozen people is very costly. This same issue exists for file servers, and web servers. Worse, all those servers have to be managed, backed up, repaired, and patched.

By contrast, centralizing servers at a data center delivers clear cost benefits, including:

- Fewer servers to buy, patch, and upgrade
- Less software to buy, maintain, and upgrade
- Lower electricity bills
- Elimination of off-site media storage and management, for organizations that consolidate tape backup
- Improved IT staff productivity, including less travel to remote sites for scheduled (or unscheduled) maintenance and repair

The benefits of centralizing servers are clear – so why hasn’t every organization done it? WAN application performance is the main stumbling block. Application performance in remote locations would suffer greatly for many organizations if servers were consolidated in the data center. Typical WAN bandwidth at the edge of a network is only 1% or less of the typical LAN bandwidth, while latency is often 100 times longer – so while network capacity is 100 times narrower, latency is 100 times higher.⁵

Riverbed WDS solutions remove this performance problem and enable organizations to centralize their IT resources. With Riverbed WDS solutions, organizations no longer need servers at remote sites to provide acceptable performance to their users.

² “IDC Predicts the Number of Worldwide Mobile Workers to Reach 1 Billion by 2011,” Press Release, www.idc.com, 1/15/08

³ “Steelhead Mobile – Faster Than A Speeding Bullet,” Piper Jaffray, 2/28/08

⁴ “The Easiest Commute of All,” by Michelle Conlin, [Business Week](http://www.businessweek.com), 12/12/05

⁵ “Wide Area Data Services: Optimizing the Branch,” The Taneja Group, May 2005.

For example, the U.S. Defense Contract Management Agency (DCMA), a federal agency with 10,000 employees that manages contracts valued at more than \$1.1 trillion, deployed Riverbed Steelhead appliances to enable the consolidation of its data centers from 17 to two. Lockheed Martin chose Riverbed to enable its global consolidation efforts, enabling 130,000 users to be supported by a few data centers. An individual at Rohm and Haas, another Riverbed customer, summed up the clear value proposition of their server consolidation effort: "With WDS for a remote site in North America, the Active Directory replications, the Notes replications, file backups, they all are fast enough that we don't have to put a file server on location, which is saving us more money than the WDS solution costs, so it reduces the payback period to virtually nil."

WDS also complements server consolidation initiatives that leverage virtualization technology. Server virtualization allows IT to maximize resource utilization while containing server sprawl to minimize the physical footprint of hardware in data centers. This is a clear win in terms of reducing costs; however, when WANs are involved, applications that worked well on LANs work poorly, or not at all. Using Riverbed, enterprises can implement virtualization to consolidate many physical servers in branches down to just a few in a data center, with no performance hit for end-users. Riverbed also enables more flexibility when backing up or moving virtual machines from one location to another by dramatically reducing the time it takes to complete those tasks. Many customers have consolidated servers and sites using Riverbed and VMware together without their end-users ever knowing applications and data have been moved hundreds or thousands of miles away.

Enable Branch Office Simplification

In addition to consolidating remote office equipment into the data center, enterprises can further simplify IT in their branch offices with the RSP, which enables "virtualized edge services." As discussed above, Steelhead appliances enable organizations to pull servers from the branch offices and instead rely on resources at the data center. While this can eliminate much of the equipment in a branch office (such as Microsoft Exchange Servers, file servers, and web servers), branch offices often still need servers for basic services such as printing and IP address management.

The RSP brings the concept of a true "serverless" branch office one step closer, allowing enterprises to further consolidate IT equipment at the branch and reduce costs. With the RSP, customers can deploy best-of-breed software from other vendors on Steelhead appliances in a self-contained partition, so that they can deliver branch office services without separate servers. This means that organizations can run multiple branch services on a single Steelhead, simplifying administration and streamlining infrastructure. The RSP runs in a protected zone and does not impact the resource allocations dedicated to maintain peak Steelhead appliance operations.

The U.S. Defense Contract Management Agency (DCMA) deployed Riverbed's Steelhead WDS appliances at 47 sites to enable consolidation of IT resources and to reduce the cost and management overhead of distributed computing.

When the DCMA consolidated its data centers from 17 to two, upgrades in WAN bandwidth were not sufficient – response times were low and users were unhappy. The bandwidth upgrades did not address the issues of chatty protocols and network latency.

Within one day, the Steelhead appliances enabled LAN-like performance for users, reverting to pre-consolidation performance levels. According to Mike Williams, the CIO: "Our users are much happier now. Users don't notice nor do they care anymore that we've consolidated our data centers."

Fewer servers required to provide services at branch locations can lead to significant savings, particularly for larger

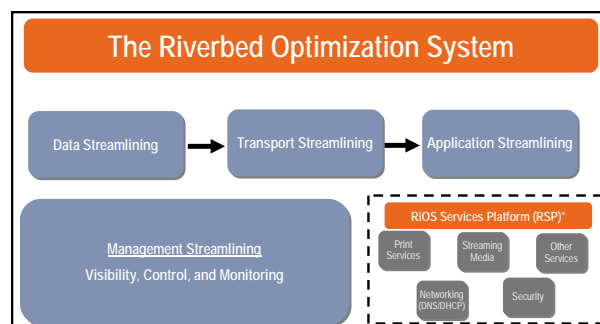


Figure 2: The RiOS Optimization System (RSP) allows customers to run best of breed services on a Steelhead Appliance, in a protected zone. This allows customers to reduce further the number of servers in branch offices.

organizations. For example, the list price of a server to supply IP address management in a branch office is about \$3200 for 75 – 200 users. In addition, technology purchase costs can be as little as 20% of the total cost of ownership, according to industry analysts.⁶ So, the TCO of this server could be up to \$16,000. When added up over many branch offices, these figures are significant: according to IDC, the average mid-size enterprise (100 – 999 employees) has 8.7 branches, and the average large business (over 1000 employees) has 65.2 branches.⁷ This means that the total cost to deploy and support servers across branches just for IP address management can range from about \$140 K for a mid-size company to over \$1 M for a larger company.

⁶ "Network Services in the Branch Office: The 'True' Cost of Acquisition," White Paper from InfoBlox, July 2007

⁷ "Addressing Operational Inefficiencies in Branch Offices," White Paper from IDC, May 2006

Instead, via the RSP, organizations can now deploy this functionality on a Steelhead appliance already sitting in a branch, and generate considerable savings. According to Justin Marthaler at Strand Associates (a Riverbed customer), the RSP "will save us \$10,000 to \$15,000 in equipment costs for new offices, and that doesn't include the continued cost of maintaining additional servers."

Optimize Disaster Recovery

Disaster recovery (DR) is an area of growing importance for most organizations. The majority of companies now have some type of DR site: according to a recent survey by Forrester and the Disaster Recovery Journal, 57% of companies have dedicated IT infrastructure for disaster recovery purposes.⁸

Enterprises can use Riverbed WDS solutions to optimize their DR investments in several ways. First, WDS can reduce the cost of DR operations. Because WDS effectively adds bandwidth capacity to the network, enterprises can spend less on bandwidth going to the DR site. In addition, with vastly improved data transfer speeds, many organizations can eliminate tape back up in remote offices and instead back up their data over the WAN.

For example, one of the world's largest banks with more than 200,000 employees used Riverbed WDS solutions to eliminate tape backup completely in 2500 branch offices. The network architect at the bank observed: "With Steelhead appliances, our WAN connections see the equivalent of a 146x capacity increase, which enables us to eliminate tape backup in branch offices." A streamlined DR infrastructure can also drive significant productivity improvements in the IT department, as the IT staff no longer needs to manage tapes that are distributed throughout branch offices.

WDS also enables more frequent and reliable backup and replication. For many organizations, it takes hours to complete a full backup and replication cycle. Not only does this consume network resources, but it also exposes an organization to significant risk. If there is a failure in the data center before a full backup is completed, an enterprise can lose a significant amount of data, which could lead to lost revenue and problems complying with regulations.

For example, LITTLE Diversified Architectural Consulting, an architectural consulting firm with 300 employees, is using Riverbed WDS solutions to improve its backup process. Chris France, the CIO at LITTLE observed: "A single day's worth of lost data can cost us \$200,000. So, as you can imagine, data backup is critical for us." With Riverbed Steelhead appliances, LITTLE was able to reduce its backup windows from four hours to just five minutes. Using Riverbed WDS enabled a more secure and reliable remote backup process that removed the risk of losing vital client data.

Riverbed WDS can also optimize disaster recovery by enabling dual-use DR. Investments in DR are still relatively small for most organizations. According to the Forrester/Disaster Recovery Journal survey, 45% of respondents spend less than \$500K per year on disaster recovery. This is true particularly for smaller organizations, which are less likely to invest significantly in disaster recovery.⁹ The net result is that the DR site for most organizations is vastly underpowered, and therefore not used on a regular basis.

With the Riverbed WDS solutions, the performance of a DR site can be improved significantly by increasing the WAN capacity to the site. With this improved performance, organizations can use the DR site for other purposes, such as sharing a data center's workload in peak hours, and turn a previously idle asset into a productive use of resources. Particularly for larger organizations that have made significant investments, dual use DR is a way to leverage an existing asset and offset costs. For smaller organizations that are reluctant to invest heavily in DR, dual use DR is a way to improve disaster preparedness in a cost-effective manner.

Finally, in the event of a disaster, WDS would considerably improve the performance of a DR site. The Riverbed solutions reduce bandwidth consumption by 65% to 95% and accelerate application performance from five to 50x, even up to 100x in some cases. For many companies, slowdowns of even a few minutes can have a substantial impact on revenues. With WDS at the DR site, organizations can ensure sufficient performance when they need it most.

LITTLE Diversified Architectural Consultants needed to enable more reliable and faster data backup. Their goal was to create a secure and centralized solution for remote backup, to remove the risk of losing vital data associated with client projects.

By deploying Steelhead appliances, LITTLE's architects and designers have accelerated access to the freshest data, regardless of their locations. This makes team collaboration easier, and the billable hours due to lost data have been reduced dramatically.

Backup windows were reduced from four hours to five minutes, and WAN bandwidth capacity was increased more than 3x. As a result, LITTLE saw an ROI in just six months.

⁸ "The State of DR Preparedness," by Forrester and the Disaster Recovery Journal, 2007. http://www.drj.com/index.php?option=com_content&task=view&id=794&Itemid=159&ed=10

⁹ *ibid*

Conclusion

Riverbed WDS solutions are a smart investment for any organization, even in tough economic times, because they drive significant cost savings that often pay for the investment in a matter of months. In addition, customers achieve dramatic productivity improvements, enabling them to work in ways that were not previously possible. Files that used to take hours to access now take seconds, and workers around the globe can collaborate as if they were in the same office. With more than 3500 customers across every industry, Riverbed is the clear leader in the WDS marketplace, helping customers cut costs today and prepare for growth in the future.

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