

# **The CIO's Guide to Optimizing Virtual Desktops**

How to Improve VDI Performance

## INTRODUCTION: WHY ARE CUSTOMERS CHOOSING DESKTOP VIRTUALIZATION?

As information technology continually evolves, there is a cycle of tendencies between central and distributed control. You could envision mainframe technology with terminal services at one end of the spectrum: high performing, resilient and singular in its standardized support of thin clients connecting across the network. Open systems might be somewhat opposite, with a range of servers, desktops, and laptops, giving great flexibility and a small enough footprint to serve local users anywhere, but somewhat at the expense of management simplicity and robustness. More recent trends toward consolidation, including server and storage virtualization, are often driven by operational and financial considerations to return to fewer servers with higher utilization, simplified disaster recovery operations, and common platforms. The next logical step in the cycle might be a return to true thin clients, embodied presently as a virtual desktop infrastructure (VDI). This continues the effort to reduce the dependence on heavy, distributed physical components, in favor of the light-weight portability of virtual desktop services in branch offices.

Desktop virtualization customers are seeking to reduce support and maintenance costs, simplify management, replace traditional PC hardware, and increase security and resilience. ESG reports that "With increasing numbers of corporate applications to support, nearly one-third (32%) of IT organizations surveyed spend more than 12 hours of IT staff time per client device per year performing routine management and maintenance tasks, with some organizations devoting more than 24 hours per device to annual ongoing management."<sup>1</sup>

### What are some types of desktop virtualization that Riverbed enhances?

Riverbed Technology solutions have been found to have significant benefits for a wide variety of desktop and application virtualization solutions from a number of independent software vendors (ISVs). These include, but are not limited to, Citrix ICA (as in XenDesktop), Microsoft Terminal Services, and VMware View. Although many such offerings are based on the RDP network protocol which includes some compression features, Riverbed® WAN optimization has been demonstrated and is used by many customers for incremental performance enhancements in delivery of these solutions to the end users.

#### *Citrix XenDesktop & XenApp*

- ICA

#### *VMware View*

- RDP
- PCoIP

#### *Microsoft Remote Desktop Services*

- RDP 7

### How does WAN optimization improve delivery of desktop virtualization solutions?

However, the benefits of desktop virtualization may be elusive if the end user productivity symptomatically suffers from the performance limitations of the new architecture, particularly the capability of the wide area network (WAN) to deliver the entire desktop platform, user profiles, applications, and data to clients. Limitations of bandwidth and network latency are doubly challenged by 1) the increased distance between users and servers and 2) the increased dependence on the remote virtualization technology servers. Yet for a desktop virtualization project to be successful, the delivery must perform satisfactorily to sometimes hyper-sensitive users. ESG research shows 41% of planned VDI adopters have concerns with "increased network bandwidth requirements" and 38% have worries about "poor performance (application response time)" holding them back.<sup>2</sup> Failure to tackle these infrastructural challenges with may delay the wider rollout of desktop virtualization solutions, or even abandonment of the entire initiative. Fortunately, WAN optimization addresses the root causes of performance problems, often making the difference between failure and success.

How does WAN optimization help? Often desktop virtualization products struggle to run in these constrained environments, but Riverbed is able to achieve much improved results. Extensive testing has shown that Riverbed WAN optimization reduces bandwidth utilization for desktop virtualization by 50% to 90%. In addition response time for activities like login can be improved 5X. These improvements are achieved with more efficient compression algorithms, memory-based deduplication of the data to be transferred, TCP tuning, QoS enabling prioritization of traffic and reduction of native traffic on the WAN. These advantages can often make the difference in realizing desktop virtualization project success.

- Lower costs by reducing WAN bandwidth requirements to support VDI
- Significantly improve end user response times
- Enable co-existence of desktop virtualizations and other WAN usage

This paper outlines a range of typical desktop virtualization goals and how WAN optimization improves each:

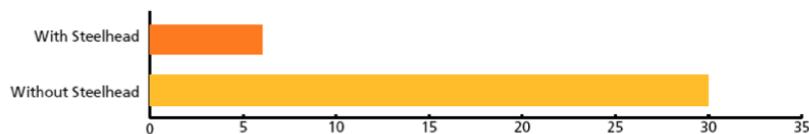
- Application response time and performance
- Reduced network operating expense requirements
- Data protection and disaster recovery
- Simplified OS and software deployments, upgrades, and patches
- Improved security and compliance
- Enable offline desktop operations

Ultimately, this paper will present the Riverbed Steelhead® family of products as a solution to the WAN performance problems that can constrain the number of users of desktop virtualization (limited by available bandwidth) and damage the responsiveness of their virtual desktops (limited by latency.) Customers endeavoring to deploy desktop virtualization solutions should evaluate the feasibility of the project and recognize where and how WAN optimization will help.

### Application responsive time and performance

One of the top concerns when considering VDI solutions is the impact it will have on the end users and their productivity. The desire is that employees will be able to seamlessly adjust to virtual desktops and enjoy applications that respond quickly, allowing them to do their jobs without delay. However if the WAN has too little bandwidth or too high latency to smoothly deliver virtual services, branch office users might suffer and even protest. Fortunately, Riverbed overcomes these network constraints through highly efficient compression, often cutting the bandwidth required by 30-50% or more. Riverbed can also offer QoS functionality to prioritize WAN traffic for the appropriate balance between desktop virtualization and other business applications.

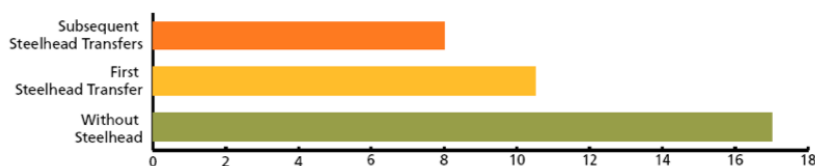
Test results with Citrix ICA for login over a fully utilized T1 at 100msec round trip latency using Steelhead appliances. (In seconds)



### Reduced network operating expense requirements

As noted, customers evaluating desktop virtualization solutions are rightly concerned about the increased bandwidth requirements of their WAN. Upgrading the WAN connections to many locations can be logistically difficult not to mention the ongoing monthly operating expense increases going counter to the desire to save money with VDI. This alone can often destroy the ROI of an otherwise sound desktop virtualization initiative. Network bandwidth constraints might also limit the number of virtual desktop clients that can be run at any one time. Riverbed can help customers make room for desktop virtualization without having to upgrade their networks through a combination of freeing up bandwidth through data reduction of TCP applications by 60-95% and directly reducing the load generated by VDI itself.

Test results with Citrix ICA for bandwidth required per session using Steelhead appliances. (In kpbs)



### Data protection and disaster recovery

Another goal of virtual desktops is improved data protection through consistent and reliable backups, and swifter recovery. Companies would like to more comprehensively cover their end user systems and data, and flexibly restore to generic hardware. Again, rolling out this capability across the enterprise may be limited by the WAN, especially if the network is shared between business applications, virtual desktop delivery, and data protection operations. Riverbed can solve this challenge, by recognizing redundant data such as common OS images and similar files in user profiles, and eliminating the requirement for this repetitive data to transfer across the WAN from the servers to remote data centers. In this case of across the WAN backup, the bandwidth utilization may be reduced by up to 99% in some cases, with customers reporting upwards of 50x faster VMware backups.

### Simplified OS, software deployments, upgrades, and patches

One of the most sought after benefits of VDI is the ability to quickly and consistently roll out new software across the enterprise, keeping systems up to date without undue management burden on the IT staff for desktop maintenance. If a few gold images can be created for desktop systems, and these can be automatically deployed to all end user hardware, this can be a reality. The most likely problem is if the WAN isn't able to keep up with the network load of copying tens, hundreds, even thousands of identical OS and application images at once. Riverbed Steelhead products can address this, giving LAN speed performance for some architectures, for example when there is a local ESX server in the branch but profiles are hosted in the datacenter, and also greatly optimize the download of centrally stored user profiles and non-thin client data at the same time.

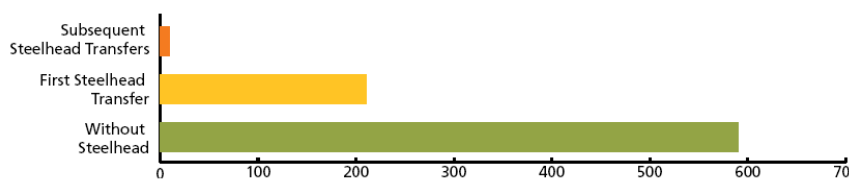
### Improved security and compliance

Desktop virtualization customers often are looking for a company-wide approach to improving their information security, protect their IP from both internal and external threats, and demonstrate compliance with both government regulations and industry standards. The previous discussion on software deployment definitely applies here, as well as the additional consideration of how the virtualization platform and network themselves are hardened and secured from tampering. Riverbed can enhance VMware's security features by efficiently encrypting data-in-flight with IPSEC on the network and data-at-rest with AES- 256 encryption of the Steelhead product's data store should someone try to attack there instead of the primary storage. Further, the Steelhead product support optimization of HTTPS, SSL and VPN traffic, and offers role based administration, all requirements for secure computing environments.

### Enable offline virtual desktop operations

One last concern of customers about desktop virtualization is mobility and offline functionality. If the thin client is utterly dependent on a live network connection to the virtual servers, this prevents end users from working offline or on the road. Further, the load required to migrate to offline modes might cause excessive delays. Riverbed can significantly improve the situation, letting users go offline at LAN speeds, while handling incremental synchronization seamlessly. Actions that would take minutes or hours unoptimized can be completed in seconds or minutes. Steelhead Mobile can further improve the offline experience anywhere through WAN optimization of applications and data transfer over any WAN or VPN connection, giving users performance as if they were in the office.

– Test results with VMware VDI of check out of a View desktop over T1 with 100msec round trip latency using Steelhead appliances. (In minutes)



## Conclusion

Desktop virtualization as an enterprise solution promises many benefits to customers: from simplified and standardized desktop support, to greater consistency and control, to better security and compliance. Support costs alone can make it well worthwhile to undertake such an architectural change. However, if customers want true desktop virtualization success, they would be well advised to evaluate WAN optimization solutions as a way to conquer many of the challenges and constraints of their network infrastructure. Riverbed offers many enhancements and efficiencies above and beyond the native approach, and often makes the difference in realizing the full benefits of desktop virtualization.

There are ways to overcome these performance difficulties for both thick and thin clients and to keep end users satisfied and productive. WAN optimization can be an essential tool in improving the response time and quality of both native and desktop virtualization solutions. Steelhead products and Steelhead Mobile software from Riverbed Technology enable significant improvements in application and desktop performance across the WAN, overcoming the challenge of more reliance on more data across the same old network. WAN optimization from Riverbed is also far more effective in addressing the root causes of the problem than alternatives such as pouring more and more money into upgrading network connections to many offices.

## About Riverbed

Riverbed delivers performance for the globally connected enterprise. With Riverbed, enterprises can successfully and intelligently implement strategic initiatives such as virtualization, consolidation, cloud computing, and disaster recovery without fear of compromising performance. By giving enterprises the platform they need to understand, optimize and consolidate their IT, Riverbed helps enterprises to build a fast, fluid and dynamic IT architecture that aligns with the business needs of the organization. Additional information about Riverbed (NASDAQ: RVBD) is available at [www.riverbed.com](http://www.riverbed.com).



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