Performance for Virtualized and Cloud Environments

A Riverbed and VMware Joint Partner Brief
How two market leaders liberate businesses from common IT constraints

Companies all over the world are turning to wide area network (WAN) optimization and virtualization to accelerate business operations and improve productivity while cutting costs. VMware® is the global leader in virtualization solutions, while Riverbed Technology is the leading WAN optimization vendor. The two companies have partnered to deliver solutions that liberate businesses from common IT constraints by increasing application performance, enabling consolidation, and providing enterprise-wide network and application performance management – all while eliminating the need to increase bandwidth, storage, or servers.

Thousands of widely distributed businesses use Riverbed® performance solutions to make their IT infrastructure faster, less expensive, and more responsive. Meanwhile, with more than 300,000 customers and 25,000 partners, VMware helps organizations of all sizes lower costs, preserve freedom of choice, and leverage IT resources while saving energy. Combining VMware's virtualization solutions with award-winning WAN optimization and performance management products from Riverbed allows organizations to cut the costs of operating IT infrastructure while gaining better visibility into how applications are performing.

IT consolidation with VMware and Riverbed

Organizations are increasingly looking to consolidate their file/application server infrastructure from remote offices to reduce costs, simplify management, and meet compliance demands. In addition, they are looking to increase server utilization and lower their total cost of ownership. Riverbed solutions help organizations unlock the true potential of virtualization by enabling the consolidation of IT resources from branch offices to central sites or data centers without negatively impacting the end-user experience. Organizations can reduce the capital costs of acquiring new servers and the operational costs of deploying them in remote locations while gaining the ability to manage them from a central site. Together, VMware and Riverbed allow enterprises to effectively consolidate servers and implement green IT initiatives.

Each workload that previously required a dedicated physical server can be placed in a VMware virtual machine (VM), making it simple to consolidate multiple workloads onto fewer physical servers. Riverbed Steelhead® WAN optimization appliances enable enterprises to accelerate the performance over the WAN so that the virtualized workloads do not negatively impact the end-user experience. Steelhead products optimize both application and transport protocol chattiness, and offer unprecedented bandwidth optimization. These optimizations work in harmony with each other to provide the highest levels of performance improvement. With this kind of “LAN-like” performance, site consolidation projects can proceed without impacting performance for remote users accessing information over the WAN.

The shift to the consolidated, virtualized IT environment dramatically increases the reliance of application performance on the network, thus increasing the importance of a virtualization-aware performance management solution. By intelligently monitoring WAN, LAN and virtual network performance, Riverbed Cascade® products enable IT organizations to troubleshoot problems 67 percent faster to keep business-critical applications running at peak performance.

VMware infrastructure combined with Riverbed Steelhead appliances and Cascade products allow organizations to consolidate application and file servers to central sites, resulting in the elimination of redundant remote IT infrastructure without sacrificing end-user performance or the operations team’s ability to monitor and troubleshoot performance.

"If we had it to do over again, we'd install WAN optimizers before starting consolidation. We ended up having to play 'catch up,' and doing it fast...Our users are much happier now. No one notices or cares anymore that we've consolidated our datacenters. It's completely a non-issue now."

— Mike Williams, CIO, Defense Contract Management Agency
Accelerate disaster recovery for VMware deployments

Traditional disaster recovery (DR) plans require that recovery target hardware must exactly duplicate production hardware, effectively doubling hardware requirements for protected applications. In contrast, VMware virtual machines are hardware-independent so any physical server can serve as a recovery target for any VMs. VMware vSphere Replication provides a cost-effective and simple-to-manage solution for replicating VMs and associated data between remote locations. However, replicating data over a WAN introduces performance challenges. Limited bandwidth, high latency, and packet loss can prevent replication objectives or service level agreements (SLAs) from being met.

Steelhead appliances minimize WAN costs and accelerate the complete DR process for VMware deployments. They give organizations the ability to accelerate DR irrespective of where the data resides or what application is used. The data could reside inside a VM or in the VMware image files on an external storage device. The Riverbed® Optimization System (RiOS®) simultaneously addresses bandwidth constraints by using fine-grained data reduction as well as compression for data streamlining, typically reducing bandwidth utilization by 60 to 95 percent. Transport streamlining and application streamlining can minimize protocol chattiness, eliminating 65 to 98 percent of packet round trips across the WAN. RiOS also has the ability to find data commonality across multiple VMware images and application data results in dramatically accelerated replication.

vSphere Replication and Steelhead appliance network topology

Accelerate VMware View over the WAN

Desktop virtualization is one of the most sought after topics in the IT industry. Today, organizations are facing the challenge of satisfying both end users and IT organizations. End users require flexible and reliable access to their desktops, data, and applications, while IT organizations need to meet end-user demands while keeping budgets under control and company assets secure. Faced with these challenges, an increasing number of organizations are turning to desktop virtualization to deliver greater flexibility and reliability to end users while increasing the efficiency and security of managing desktop environments. However, the promises of desktop virtualization are not always easy to realize in complex, real-world deployments.

As with most distributed computing models, desktop virtualization faces a performance challenge when organizations attempt to use it to support a globally distributed workforce. Many of the protocols used for desktop virtualization were not originally designed for the WAN and typically run into two fundamental challenges:

- **Bandwidth constraints** - Limit the amount of data transferred or the number of users who can access virtualized desktops
- **Latency** - Prevents applications from having acceptable performance
VMware View® offers a purpose-built virtual desktop that provides positive end-user experience and simplified desktop management. It centrally maintains desktops, applications, and data to reduce costs and improve security. At the same time, it increases application availability and flexibility for end users. Steelhead appliances provide leading WAN and application acceleration technologies that improve end-user experience over the WAN for VMware View.

VMware View can be run in two modes:

- **Microsoft Remote Desktop Protocol (RDP):** a flexible method of delivery of desktop data, which can be configured to enable full WAN optimization including data deduplication, compression, encryption, and network tuning.
- **PC-Over-IP (PCoIP):** Running over UDP, it compresses, encrypts, and encodes desktop data. PCoIP splices USB Redirection data and sends it over a TCP session, which benefits from Riverbed WAN optimization. Riverbed Quality of Service (QoS) also provides prioritization and control for better delivery.

By using Riverbed Steelhead appliances with VMware View, native and virtualized clients are simultaneously accelerated in a consolidated and secure environment. This allows the IT organization to:

- Accelerate all data access (native and virtual) without additional branch server infrastructure
- Make more bandwidth available for virtual client traffic by reducing the impact of native clients
- Enable more users to access data without the need for costly bandwidth upgrades
- Optimize bandwidth for virtual client traffic by 30 percent or greater
- Deliver up to 94 percent reduction in WAN bandwidth and up to 50 percent latency improvement for USB file copy operations between Virtual Desktop and Client PC
- Accelerate access to data for remote users with Steelhead® Mobile software.

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**Optimized workload mobility to hybrid clouds over long distances**

Cloud computing has changed the paradigm of computing within and beyond the boundaries of the data center, forcing information technology infrastructure to evolve in lock step. The use of hybrid cloud environments (a mix of private and public clouds) is optimal for enterprises that strive to utilize the right mix of cloud environments for maximum choice, efficiency, and scale. With the adoption of hybrid cloud, the need to move workloads between the clouds in a secure and efficient manner is becoming more imperative. The VMware vCloud Connector (vCC) works in conjunction with VMware vCloud Director™ (vCD) to allow IT managers to move workloads between VMware vSphere™ and VMware vCD clouds efficiently. The movement of data across WANs comes with its own challenges that need to be addressed in order to successfully move workloads between clouds. Steelhead WAN optimization appliances are designed to work within and across cloud environments, enhancing the VMware solution to make movement of data and workloads over long distances feasible.
Deliver virtualized branch services with Steelhead appliances

The Riverbed® Virtual Services Platform (VSP) provides customers with the capability to run up to five additional services and applications virtually on VMware in a protected partition on the Steelhead appliance. This revolutionary approach allows customers to deploy local services in all their branch offices without the need to deploy and maintain full-blown servers to run the applications. This minimizes the hardware needed at the branch office, enabling companies to consolidate IT operations even further, reducing costs, and simplifying administration, all while still delivering high quality local services. Enterprises can combine VSP with the WAN optimization features of Steelhead appliances to achieve an efficient "branch office box" solution, plus the ability to run other services such as Microsoft Windows Server, video, security, or network management solutions. Steelhead appliances are the only WAN optimization devices to run industry-leading technology from VMware in a virtualization platform; taking advantage of the skills companies already have. Virtual servers run in a protected zone and do not impact the resources needed for peak Steelhead appliance operations. The VSP also enables customers to run up to five different VMs at once, eliminating additional servers from the branch office. By deploying joint solutions from Riverbed and VMware, organizations can benefit from the reduced IT complexity and agile service delivery of virtualization while allowing users to benefit from the efficiencies of application acceleration and WAN optimization.
Monitor and troubleshoot virtual machine performance

Enterprises are rapidly adopting virtualization for dynamic service delivery and service management agility, but as they continue down the path toward full server virtualization, they are quickly realizing that a shift in traffic occurred which inhibits network operations teams from monitoring and troubleshooting performance issues within the virtualized server environment. Traffic that once freely moved from one application server to another in a fully physical environment is now largely localized; applications running within a VM communicate with other applications on the same physical host. The activity between VMs hosted within a physical machine is considerable and goes undetected from a monitoring standpoint. Without proper monitoring and troubleshooting in place, virtualized server environments are compromised by lack of control and security.

Cascade® Shark Virtual Edition is packet capture and analysis software that runs on VMware vSphere environments. It taps into the virtual switch to monitor the performance of all inter-VM traffic. Cascade Shark Virtual Edition is unique in that it can continuously capture, index, and store full packet data on the local server or on a storage area network (SAN) for real-time or back-in-time analysis with Cascade® Pilot software while simultaneously sending summarized data to the Cascade® Profiler console for consolidated analysis and reporting across both the physical network and virtualized environment.

With Cascade Shark Virtual Edition, IT operations teams can restore visibility into their vSphere environments to keep applications running at peak performance by enabling:

- Continuous monitoring of all interactions between virtualized applications within the same physical host
- Accurate end-user experience metrics and response time measurements
- Deep, retrospective analysis of server interactions using stored packet data
- Baselining of virtual environment traffic analysis to identify abnormal changes in performance
- Security threat monitoring
- End-to-end understanding of application performance across both the physical network and virtual environment

Performance management for VXLAN Software-Defined Networks (SDNs)

Riverbed is also partnering with VMware to make the promise of software-defined networking (SDN) and software defined data centers (SDDC) a reality. SDN enables quick and dynamic configuration of virtual or overlay networks, which subsequently permits the creation of a virtual data center (VDC) – an isolated collection of all the necessary compute, storage, networking, and security resources – in a matter of minutes.

SDN decouples the physical network elements from the virtualization layer while ensuring that the physical network responds to the demands of the virtual network. This allows any VDCs to function in isolation from one another yet utilize the same physical infrastructure.

VMware® Virtual eXtensible Local Area Network (VXLAN) overlay technology is at the heart of enabling the complete virtualization of networking and SDN. VXLAN overlay networks encapsulate all traffic in UDP tunnels across the physical network, presenting significant operational challenges by creating a huge blind spot in the operations team’s ability to understand and troubleshoot performance issues.
To overcome this challenge, the two companies have jointly developed the new VXLAN-aware IPFIX format, which provides performance information about virtual overlay network traffic and its associated UDP-encapsulated traffic. This new VXLAN functionality extends Cascade’s performance management capabilities from monitoring the virtual switch/VDS within vSphere to fully encompassing virtual data centers and their associated overlay networks, enabling IT organizations to confidently embrace SDN by empowering network operations teams to:

- Control and understand virtual overlay network performance
- Monitor and troubleshoot virtual data centers and the physical network
- Provide VDC owners isolated views into their virtual data center performance and SLAs

Provision and scale high-performing applications faster in the cloud

Application development is evolving faster than ever in the cloud. Daily updates on functionality, hourly changes in scale, and a constant pressure of user demand creates a near constant rate of change that challenges application owners. In addition, as applications move to the cloud and become more dynamic, performance solutions must keep pace with how they are changing. Although cloud computing provides application owners with instant access to infrastructure, building out applications still requires administrators to individually install and configure application components on each VM to plug into the application architecture. In today’s cloud era, organizations need a better approach to accelerate application deployment across cloud environments.

Riverbed is partnering with VMware to integrate our Stingray Traffic Manager application delivery controller (ADC), with VMware vFabric™ Application Director hybrid cloud application provisioning solution. The joint solution combines Stingray Traffic Manager application acceleration power with vFabric Application Director’s automation capability, allowing customers to now provision and scale multi-tier applications faster and smarter in a hybrid cloud environment, enabling a higher level of application portability across cloud services and repeatable deployments of selected applications with standard deployment settings.

The integration between Riverbed and VMWare for out-of-the-box application blueprints will enable customers to deliver applications faster and with ease, significantly accelerating their time to market and reducing costs. Riverbed and VMware are partnering with leading application middleware vendors and system integrators such as Zend, a provider of software and services for developing, deploying and managing business-critical PHP applications in the cloud. This partnership will yield a blueprint for Magento E-Commerce store on a clustered high availability Zend server fronted by Riverbed. Customers who want high performing PHP applications in the cloud will now be able to use new blueprints that can save them significant time and resources.

These expanded integrations for ready-to-use, real world multi-tier enterprise application blueprints by Riverbed and VMware accelerate software web-based applications into the cloud for large enterprise customers who are heavily investing in application modernization efforts.
vFabric Application Director provides an easy-to-use drag-and-drop canvas for users to register cloud providers, select virtual machine templates and then customize application topologies using a convenient catalog of software and scripts.

Through this collaboration with VMware, Stingray Traffic Manager software is now available as a service for vFabric Application Director on VMware Marketplace. It can be deployed directly within vFabric Application Director, which offers a new approach to deploying applications in the cloud, allowing customers to gain a greater level of agility and control.

Summary of benefits
Together, Riverbed and VMware enable the enterprise to:

- Consolidate file and application server infrastructure
- Deliver “LAN-like” performance of centralized applications
- Migrate applications efficiently from private to public cloud providers
- Accelerate VM replication performance for improved disaster protection
- Reduce costs by consolidating branch office services onto a virtualized platform
- Deploy virtual desktop solutions and accelerate all native and virtual data access over the WAN
- Dramatically accelerate VMware replication and disaster recovery
- Monitor and troubleshoot network and application performance in virtualized and software-defined networks
- Provision and scale multi-tier applications faster and smarter in a hybrid cloud environment

More information at www.riverbed.com/vmware