WAN optimization made easy

Executive summary

Mobile computing, branch offices, software-as-a-service (SaaS), and other applications are stressing the security and performance of WANs. To squeeze the most benefit from these costly connections, companies must choose WAN optimization products not only on a cost basis, but also on their potential security, manageability, and flexibility benefits. Most importantly, implementing WAN optimization should not require a major overhaul to a company’s existing network, nor should it require extensive retraining of IT personnel. Successful WAN optimization should be easy to implement, yet provide a solid infrastructure for continued growth. This paper discusses WAN optimization challenges and proposes cost-effective and secure solutions.

Introduction

WANs are now an essential part of most companies’ computing infrastructures. WANs connect remote offices to central offices, allowing a major physical presence in multiple locations without sacrificing corporate computing power. WANs directly connect smaller branch offices with headquarters, enabling them to perform big-office tasks with more cost-effective staff. The next-generation WANs enable mobile workers to become highly productive in the field by tapping into the main corporate office.

While the benefits of WANs are indisputable and essential for most corporations, the cost and complexity of optimizing new or existing WANs may seem too complicated and expensive to consider. As a result, many WANs perform at substandard speed, with a dramatic loss in productivity. If leased lines are used, these un-optimized WANs are costing businesses more money than necessary.

The need for WAN optimization

As companies spread workforces across the country and the world, fast and secure remote access to centralized corporate facilities is the key to increased productivity and profit. These regional, branch, and mobile workforces require increasingly sophisticated applications and services to perform productively. Some or all of this remote access should travel over public networks. As computing continues to expand beyond the comfortable confines of the corporate firewall, a number of security, performance, and productivity issues should be addressed if corporations are to achieve a secure and demonstrable return on their WAN investments. These WAN connections, due to the increasing complexity and bandwidth demands of software applications, will become more and more crowded over time. The trend is toward more traffic and more

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— Matthias Machowinski, 
directing analyst, 
Infonetics Research
congestion. It is estimated that 31-percent of business communications costs are consumed by WANs.¹

Performance and productivity
Of constant concern to corporate WAN administrators looking to contain costs is the issue of network and application performance. Without performance enhancements, the latency and traffic inherent in WAN connections can drag remote connections to a crawl in some instances. When remote applications are response-dependent, optimized WAN connections from end-to-end are crucial to prevent applications from timing out, corrupting data, or frustrating workers at remote sites. New applications such as videos, virtualized server applications, and SaaS require more bandwidth than traditional text-based data files and database records. As a result, just a few years after deployment, WAN connections may already be showing signs of severe bandwidth constraints.

First and foremost, WANs need to be optimized for performance to maintain remote-access users’ productivity and help applications function smoothly. Businesses need to squeeze all the bandwidth they can from expensive leased lines.

Security
As the number of workers outside the main facility increases, so does the number of applications that need access to sensitive data. Therefore, WAN optimization schemes should address not only issues of performance, but also data security from end-to-end. Companies that rely on segments of the public network for some or all of their WAN connectivity should be especially concerned about exposing data to risk. Regulatory and legal concerns may mandate that these WANs are impervious to outside attacks, theft, or intrusion. Regardless, WAN optimization without increased security is not a prudent business or IT infrastructure decision. While cost and complexity may make many companies reluctant to approach WAN security, ignoring security issues is a long-term risk corporations cannot afford.

Introducing additional security measures, however, often frustrates or even eliminates gains in optimizing performance. Companies need to choose products carefully to ensure that security enhancements do not degrade performance. Ideally, WAN acceleration should also accommodate greater data security, not only between WAN routers, but also from end-to-end.

Flexibility
One of the chief obstacles in implementing WAN optimization is incorporating performance acceleration and application enhancement for systems that are already deployed in the field. Even completely new WAN segments should be integrated into the existing central office’s infrastructure, hopefully at little cost and with minor

reconfiguration. Ideally, businesses should view WAN optimization as a feature enhancement to their existing computing architecture – not as a major IT overhaul.

In addition, businesses may attempt to deploy WAN optimization in stages, testing the effectiveness of the technology on selected network segments and software applications before a large-scale rollout. On the other hand, some businesses may have only a targeted use for WAN optimization, confined to one remote office or to one mobile application. In these cases, all-or-nothing optimization may not be an appropriate fit.

Management
Regardless of the scale of the WAN acceleration project, IT administrators should be able to manage and monitor the performance and security of the connection. If more WAN applications and segments are added to the infrastructure, the management capacity of the optimization product should scale as well. Ideally, managers should be able to easily configure and deploy new connections and applications. Similarly, with the rise in server and storage virtualization, managing acceleration should be an integral part of realizing the best performance on these platforms. Reducing the complexity of WAN optimization management in these environments will involve secure access management functions from a number of locations.

Optimization pitfalls
With a myriad of WAN optimization products on the market, businesses should be aware of potential pitfalls in implementing any given solution. Whether hardware or software, WAN optimization products should be easy to install and maintain, provide consistent performance and manageability, and secure data from end to end.

Cost and complexity
Hardware solutions are the most costly. Typical WAN acceleration devices should be configured and tuned properly when dropped into an existing LAN or WAN to ensure the best performance. With most of these products, this project is not a simple one. Quality of service (QoS) and traffic priorities on both WAN endpoints and internal LANs have to be reconfigured in many cases. Most of the major WAN acceleration switch providers recommend anywhere from one to five days of administrator training to get the most out of the equipment. Some switch vendors offer acceleration blade add-ons to their hardware, but businesses need to have that vendor’s product installed to use them. Further configuration and retuning may be necessary as applications are added to the WAN traffic mix. In addition, hardware-only solutions do not provide end-to-end application acceleration. Mobile applications realize little or no performance or security improvements as a result. Similarly, traffic along the local segment may gain little in performance unless further LAN tuning occurs. Optimization stops at WAN acceleration hardware. In short, many WAN acceleration products require major reconfigurations of both the WAN and resident LAN routings. Some may require moves and changes to existing switches and routers.

Software-only solutions may solve some mobile application requirements, but do little for security. Software solutions, too, may require extensive testing and configuration to be
effective. Additionally, software-only solutions may need large amounts of server and client resources, making them impractical or too costly for enterprise-wide deployments. Some may only address a limited platform – such as Windows – or only laptop computers, leaving smartphones and PDAs un-optimized.

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As a result, some businesses are forced to "mix and match" WAN acceleration products, as some cover mobile devices, while others cover edge-to-edge performance. Management of these multiple solutions is difficult and introduces potential instabilities into the infrastructure. Lastly, many WAN optimization products duplicate services already in place in existing network switches and routers, compounding problems with WAN configuration and maintenance. Beyond the issue of complexity, companies may pay for these features when they already exist within the network.

Limited or erratic performance increases
Many products require static configurations that are set to the properties of the WAN connection at the time of installation. If the WAN connection is stable, this may be acceptable. However, most WANs experience peaks in traffic and fluctuating conditions over a period of time. Tuning them for a range of connection conditions requires thoughtful reconsideration of a number of properties, including TCP window size, compression type, transport flow, QoS, and many other options. If the WAN connection sees wildly fluctuating traffic conditions, performance may not be increased at all on average, unless these conditions are specifically addressed by proper configuration. Remote laptop computers may have to install heavy client software to realize any improvement in performance. If SSL or IPSEC security options are not configured properly, performance decreases significantly. In addition, each application, SaaS, or end device may require individual attention for peak performance. A worst-case scenario of extreme congestion or a denial-of-service attack on the network will also severely degrade most optimization devices.

Potential security gaps
WAN optimization products may include additional security features, but most need to be carefully configured as previously mentioned. In addition, these extra security measures do not protect data at rest on the network’s server edge. Once the data has made its trip


through WAN acceleration, it is unpacked and delivered to the network without security. The same situation applies to data delivered, regardless of whether it is transmitted over public or private WAN networks. Mobile applications are especially vulnerable.

WAN optimization made easy

Circadence® offers the Circadence MVO™ 1200 WAN Optimization suite that requires far less configuration than existing solutions on the market. Because Circadence MVO does not depend on specific network devices to achieve acceleration and security, it requires virtually no configuration. The Circadence MVO product line is available as a software-only client-server solution, as a hardware-based appliance, and as an embedded add-on to virtualization applications. Regardless of the Circadence MVO optimization solution, the product dynamically adjusts to changing conditions on the WAN to provide peak performance, with no complex settings or parameters to set. The Circadence MVO 1200 WAN Optimization suite also offers solutions for smartphone and PDA users connecting to the WAN. All products work together. Customers can choose the solution that fits their WAN optimization requirements, with no reconfiguration of existing LAN or WAN equipment necessary.

Intuitive set-up

Circadence has worked closely with its customers to produce an easy-to-install solution. Circadence MVO installations require no prior training, and most companies require less than 10 minutes to set up a Circadence MVO Appliance. Server software consumes only 1 MB of space, while the 200 KB Windows client software for desktop and laptop computers installs in minutes with no configuration necessary. Client users are completely unaware of the software, and no intervention is required on their part.

Performance

Circadence MVO acceleration technology improves WAN performance by at least 50-percent, depending on the application and connection type. In independent testing by a major U.S. cellular carrier, some remote applications experienced an increase in performance ranging from 100- to 1,000-percent over a CDMA cellular network.

Circadence MVO performance is achieved through Circadence’s patented optimization protocol that tunnels through network congestion. Because Circadence MVO solutions do not depend on the native network devices for provisioning, Circadence’s protocol achieves superior speeds regardless of switch equipment brand or type. An independent testing lab compared Circadence’s protocol to TCP protocols in a highly congested Internet environment to 27 disparate geographic locations.

Figure 1
Circadence’s protocol performed better than TCP to each geographical location. Analysts recorded increased performance using Circadence’s protocol that ranged from 51- to 555-percent.

Security
Circadence MVO acceleration algorithms also provide default data security from end-to-end with no configuration needed. Because Circadence MVO solutions maintain protection directly to the client, data at rest on the edge server is not an issue. Circadence MVO security, in fact, has withstood the scrutiny of customers such as the U.S. government and U.S. Department of Defense (DoD).

Ease of management
All Circadence MVO products are managed through an intuitive web interface. Regardless of which Circadence MVO product is installed, the management console provides a unified view of all connected software and hardware agents. Administrators can access the Circadence MVO management console from any location.

Resilient Circadence MVO connection
Circadence MVO solutions provide the additional benefit of a resilient connection. In extremely congested or intermittent WAN carrier conditions, Circadence MVO solutions keep endpoints connected. In particular, mobile applications require this resiliency to avoid timeouts and data retransmissions. Resilient connections maintain user productivity and minimize the risk of missing or corrupted data.

Circadence MVO 1200 WAN Optimization suite solutions
Circadence components can be mixed and matched to provide a complete WAN optimization infrastructure without reconfiguring existing networks. Because all components are modular, the system can adapt as business needs grow. Circadence MVO is available in the following products:

- **Circadence MVO Software suite** – This software package supports Windows and Linux, and is portable to almost any POSIX-compliant operating system.
- **Circadence MVO Appliance** – This hardware solution not only centralizes Circadence MVO connections, but also ensures survivability during denial-of-service attacks. The Circadence MVO Appliance is DoD-certified for classified installations.
- **Virtual Circadence MVO** – This solution provides support for Oracle VM, VMware, Microsoft Virtual Server, Xen, and other virtualization solutions, and can serve as a virtual gateway.

Conclusion
WAN optimization customers need solutions that fit their existing networks but can accommodate future expansion. WAN optimization should not require days of training, nor should it cause reconfiguration of existing networks. Customers should choose the type and extent of WAN optimization needed rather than be bound by vendors’ requirements. Secure, reliable WAN acceleration should cover the entire WAN – from handheld devices, to servers, to individual desktops if necessary. Finally, WAN optimization should dynamically handle any WAN condition without the need for complex configuration. The Circadence MVO 1200 WAN Optimization suite offers affordable, flexible solutions for businesses that need to maximize their WAN investments.

About Circadence
Since 1993, Circadence has leveraged the power of advanced technologies to pioneer smarter, faster, and more cost-effective solutions for improving IT performance. What started with an innovative platform for making massively multiplayer online games run faster has quickly grown into the most capable suite of optimization solutions available. Based in Boulder, Colorado, Circadence continues to expand today’s possibilities with tomorrow’s technologies – addressing new, growing concerns with dynamic, high-performance solutions. Only Circadence offers the most capable IT innovation solutions available – proven to outperform some of the world’s most demanding challenges. For more information on Circadence, visit [www.circadence.com](http://www.circadence.com).

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