Speed Brief #9

MAKE YOUR WAN WORK LIKE A LAN

A GUIDE TO FAST APPLICATION DELIVERY AT THE BRANCH

Citrix WANScaler™

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A GUIDE TO FAST APPLICATION DELIVERY AT THE BRANCH

The trend toward globalization is propelling the branch office front and center of the enterprise. Meanwhile, concurrent moves toward consolidation are centralizing IT operations back at corporate headquarters. Increasing the distance between the application user and the application causes poor application performance and reduces worker productivity at the branch – where business needs it most.

This brief takes a close look at these emerging trends and how they impact the network, application delivery and, ultimately, the end user experience at the branch office. You'll find out how to make your WAN work like a LAN through a simple, cost-effective solution that will meet these challenges now and into the future.

Make Your WAN Work Like a LAN

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Introduction

ENTERPRISE GLOBALIZATION MEETS IT CONSOLIDATION

Welcome to *Make Your WAN Work Like a LAN: A Guide to Fast Application Delivery at the Branch*. Delivering important applications quickly to business frontlines is mission critical in today's increasingly distributed enterprise. If branch office application performance over the wide area network (WAN) is not living up to expectation, and you want LAN-like speeds from your WAN, then read on.

The Changing World of the Enterprise

Two distinct trends are transforming the way organizations do business. Globalization is opening up new opportunities with greater geographic reach. Meanwhile, IT consolidation is bringing the focus back to corporate or datacenters. With business transactions far afield and IT at headquarters, the network is feeling the tension. Unprecedented demands on enterprise WANs are compromising application performance, file and data access, user productivity and the business bottom line.

Going Global

Moving key business functions, and your workforce, out of headquarters and into the field alongside your customers and suppliers makes good business sense. To

maintain a regional foothold, a global organization must establish a strong local presence. Also, trends toward business process outsourcing and worker mobility are further driving globalization.

The Move Toward IT Consolidation

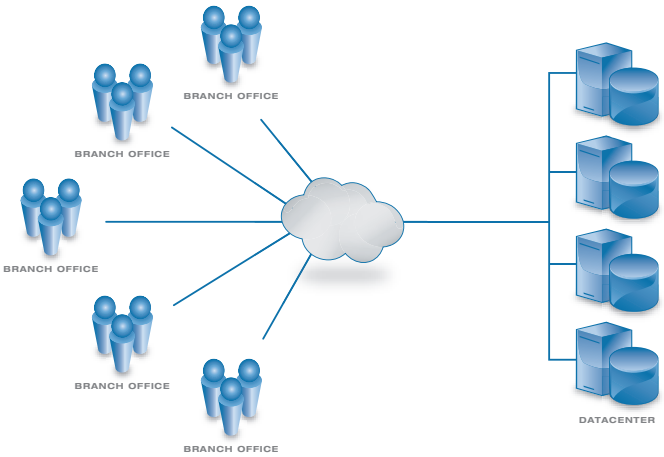
Pressure to cut costs, assure accuracy and security as well meet regulatory compliance (e.g. Sarbanes-Oxley Act) is pushing the move toward application and data storage and server consolidation – with data easier to control at the datacenter. Centralized data, along with application single hosting, enables business processes at one datacenter to serve the entire organization.

The Rise of the Branch Office

The branch office has emerged as the key customer touch point and critical to business success. Now making up over 50 percent of the workforce, branch office personnel need access to the same applications – customer relationship management (CRM), enterprise resource planning (ERP) and office productivity tools – as

at headquarters. Only, these key applications now reside at the datacenters.

The New World of the Enterprise



Today's enterprise conducts most of its business at the branch office while corporate data and IT services are back at headquarters.

Feeling the Pain

THE BRANCH IS WHERE IT HURTS

These growing trends are compelling business to rely more and more on the network to fill in the gap between the datacenter and the branch office. Yet, today's networks aren't equipped to handle these new demands.

Increased Demand on the WAN

The WAN is now facing a huge increase in network traffic that once traveled short distances over a large-capacity LAN now traversing states, countries and even continents over a less-capacity WAN. With streaming video, remote backups, voice over IP (VoIP), etc. jamming network pipes, the WAN can slow to a crawl. And it does.

Branch Office Breakdown

When the WAN falters, critical business application data doesn't reach its destination on time, if at all. Branch workers experience slow response times – with email, ERP and CRM, for example – while slow file access curtails productivity and collaboration. And IT managers face slow backup and restore, undermining data integrity and security. Yet, IT must ensure the same high performance and reliability they once delivered over the LAN, while also cutting costs and increasing security through consolidation.

Latency Takes Its Toll

TRAVEL THE DISTANCE

Latency is the key culprit in slow branch office application delivery. No matter how fast the WAN circuit – or its implementation (VPN, MPLS, Frame Relay, etc.) – WAN throughput decreases as WAN distance increases. Sheer distance, alone, contributes to latency; however, other factors are also to blame.

TCP Limitations

TCP/IP is notoriously inefficient in coping with high-latency connections, where TCP windows don't adjust rapidly. When a packet drops, for example, data recovery mode reduces the window in half and resends missing packets and/or the entire TCP window.

Chatty Protocols

Chatty protocols – such as CIFS (Windows drag and drop) and MAPI (email) – require several communication exchanges in order to open a connection and transfer data. It may take tens or hundreds of round trips to complete a single transaction.

Packet Loss

Dropped packets can impact network performance. When a packet becomes lost or corrupt in transit, the system discards

the bad packet and requests a resend of data, causing all other packets in transit to backtrack to the beginning of the sequence.

Network Congestion

Competition for the same share bandwidth leads to WAN congestion and delayed or dropped traffic, slowed throughput and many packet retransmissions. With IT consolidation, data used or changed in each branch office must now traverse the WAN on its way back and forth to the datacenter.

The Trouble with Chatty Protocols

With chatty protocols, the end user has to wait for a large number of small application messages traveling over great distances to complete before proceeding – dramatically impacting application performance.

BREAK WITH TRADITION

In response to these challenges, IT managers often turn to traditional approaches, especially when looking for a quick fix to performance issues. However, what might have worked in the "old" enterprise won't necessarily stand up in the new. Let's take a look at some of these traditional approaches.

Setting Thresholds for WAN Utilization

A common technique is to adjust WAN bandwidth in response to network utilization, adding resources when utilization exceeds a threshold – often in the range of 70 to 80 percent. Setting thresholds assumes that performance problems are caused by heavy latency-sensitive network traffic, which isn't the case with email and bulk file transfers.

Adding More Bandwidth

Adding bandwidth, an expensive proposition, is one solution to threshold crossing, but it doesn't necessarily resolve all performance issues. And it will increase ongoing IT costs. More importantly, it doesn't get at the root cause or address other factors such as chatty protocols, data speed on the wire, number of round trips for a single transaction or the impact of various intermediate WAN devices. It's not enough just to add

more resources, you also need to minimize latency effects and match resource allocation to business needs.

Reaching for Point Products

There are many individual products on the market that address specific network issues – accelerators, compression tools, routers, etc. The temptation is to piece them together to come up with a workable solution. However, unless these products are built to work together, they probably won't integrate with each other or with other network tools and technology, only adding more complexity to the mix.

The Solution: Fast Application Delivery at the Branch

ACHIEVING LAN-LIKE PERFORMANCE OVER THE WAN

The best way to meet the demands of the new enterprise environments is through a comprehensive *branch office application delivery infrastructure* that delivers the tools and technology needed to ensure top performance and data integrity without adding complexity and cost. You need a solution that makes the most of what you already have, and more. One that will deliver the high level of performance you demand now and for whatever comes next.

Best-in-Class Optimization Technologies Deliver High Performance

The right solution gets applications and data quickly and efficiently to the branch using innovative tools and technology that work to mitigate the effects of latency, optimize chatty protocols and cut down the number of packets needed to transfer data. The following technologies will ensure that applications are delivered to the branch at LAN-like speed over the WAN:

- **Adaptive TCP Flow Control Mechanisms** to optimize bandwidth utilization by automatically detecting and adjusting network usage.

- **Multi-level Compression** to reduce congestion and make the most of existing bandwidth by shrinking data size before transmission over the WAN.

- **Protocol-specific Accelerators** to reduce chattiness and resulting WAN delays by reducing round trips and, therefore, effective latency for CIFS, NFS, HTTP, and FTP protocols.

The Benefits of Fast Branch Office Application Delivery

- Deliver LAN-like performance at the branch
- Capitalize on cost savings with IT resource consolidation
- Protect data centrally
- Accelerate all TCP-based enterprise applications
- Provide application fluency for faster data transfers
- Extend collaborative workflows and improve productivity
- Improve application throughput in heavily congested environments

Less is More

Complexity does not equal sophistication. These high performance tools can be easily deployed using an unobtrusive appliance-based approach. A simple appliance – at the data center and the branch – can greatly impact performance without comparable impact on your network. Everything stays intact; only your important applications and data get to their destinations safely and on time.

- **Network Transparency**

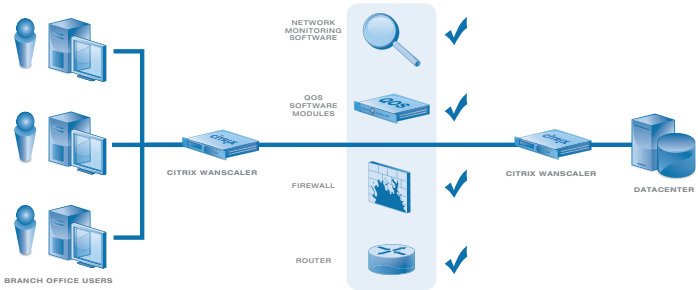
  The right solution should install transparently into your existing network infrastructure, allowing your network to function as it did before – only better. No changes needed to firewalls or routers, monitoring probes or applications and no impact on security or quality of service (QoS). Installation is seamless with little to no configuration and setup, and the network dynamically self-tunes for optimal performance based on real-time conditions.

- **Low Maintenance**

  As branch office IT will be limited, the solution should be easy to deploy and maintain. You should be able to

continue using your existing set of applications and management tools. Even with a great number of appliances, there shouldn't be any need for extensive product-specific training or professional IT expertise for day-to-day maintenance or troubleshooting.

Branch Office Application Delivery Infrastructure



An effective branch office application delivery infrastructure will ensure top performance at the branch without adding complexity and cost.

The Application Delivery Triumvirate

THE THREE POWER TOOLS OF FAST BRANCH PERFORMANCE

At the heart of the ideal branch office application delivery system are three advanced technologies working in concert to intelligently adapt to changing network conditions to fully utilize existing bandwidth over any distance, reduce round trip times and speed up file access.

Adaptive TCP Flow Control

Make the Most of Your Link

To optimize bandwidth utilization, Adaptive TCP Flow Control automatically detects and adjusts network consumption based on real-time network conditions. Adaptive TCP Flow Control allows senders to transmit only as much data as the network can accommodate to eliminate overflows and ensure that all senders fully utilize available bandwidth.

Multi-level Compression

Go for Maximum Throughput

To reduce the amount of data traversing the WAN, compression shrinks data size before transmission, alleviating congestion on the shared link and improving overall application performance without WAN upgrade

costs. Applying different types of compression to deal with different applications and situations makes the most of existing bandwidth.

Protocol-specific Acceleration

Optimize with Application-fluent Precision

To reduce net latency, protocol-specific accelerators increase the numbers of packets that can be transmitted without receiving acknowledgement. This mitigates the impact of chatty protocols by cutting back on redundant application messages. Accelerators that are optimized explicitly for CIFS, NFS and HTTP will ensure these protocols run at optimal performance. Combined with compression, protocol-specific acceleration moves files and content *faster*.

Protocol-specific Acceleration

Protocol-specific acceleration localizes traffic flow to reduce chattiness and the effects of latency.

The Importance of Network Transparency

SEAMLESS NETWORK INTEGRATION

Your branch office application delivery infrastructure should be built on a transparent network (*and* application) architecture, preserving the key characteristics of traffic flow on the WAN – like IP addresses, port numbers and protocols (TCP or UDP). Other solutions may claim application transparency, but not *network transparency*, which has broader implications for the WAN, performance and IT management.

What Transparency Means to the Network

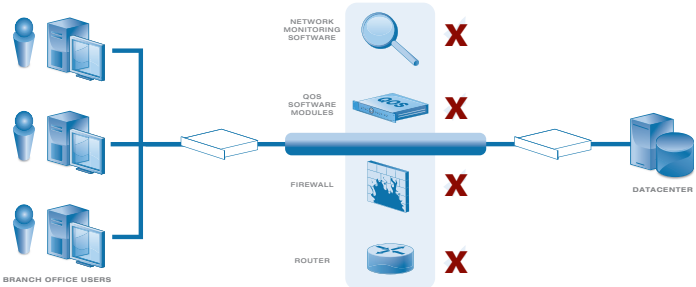
With transparency, your network essentially behaves as it did without the new system, but even better. Only network-transparent devices interoperate with other networking products – firewalls, monitoring, QoS devices – without reconfiguration or the need to create proprietary TCP or UDP tunnels or replace network addresses and other identification fields. No need to rework QoS or traffic tagging, change network security policies or redirect end user applications – making the system easy to maintain and support.

The Trouble with Tunnels

Experienced administrators know it's better to administer the network *without* having to build or maintain tunnels. Tunnels have significant limitations. They typically require additional set

up and configuration, often requiring non-standard ports to be opened in firewalls to allow optimized traffic to pass, for example. When network routes change, for example, tunnels can lead to unpredictable behavior or even complete loss of connectivity.

Tunnels Interfere with Critical Network Services



Unlike Citrix WANScaler™, solutions that tunnel interfere with network services like QoS, security, and monitoring. Tunneling solutions increases deployment complexity, introduces risks to the network, and requires costly reconfiguration of the network so critical network services are once again available. The complexity and risks associated with tunneling solutions necessitate more ongoing IT management and thus higher overall total cost of ownership compared to Citrix WANScaler.

The Benefits of Network Transparency

- Installs fast; easy to get up and running
- Integrates quickly with no configuration of network, firewalls, security policies, routers or clients
- Works with all network devices, applications and WAN technologies
- Won't break downstream and interfere with QoS or firewalls
- Enables visibility for monitoring above Layer 4
- Dramatically reduces ongoing maintenance and management

Branch Office Application Delivery Checklist

FOR GREAT PERFORMANCE, HAPPY END USERS, IMPRESSIVE BOTTOM LINE

Fast branch office application delivery enables IT to keep up with the changing world of the enterprise. But not just any system will do. The right approach will make your WAN work like a LAN and elevate productivity at the branch where it's needed most. Use the following checklist as a quick reference to guide you to the right tools and technology. Then, enjoy great application availability and performance at the branch, on the road or wherever you do business.

- √ **Best-in-class WAN Optimization Technologies** – with adaptive TCP flow control mechanisms, multi-level compression and protocol-specific accelerators
- √ **Fully Transparent Network Architecture** – for seamless integration into your existing network with no need to reconfigure or create intrusive tunnels
- √ **Quick Plug N' Play Install** – to get up and running in no time
- √ **Simple Appliance-based Solution** – to bring high performance to the branch with minimum cost and maintenance

About Citrix

Citrix Systems, Inc. (Nasdaq:CTXS) is the global leader and the most trusted name in application delivery infrastructure. More than 180,000 organizations worldwide rely on Citrix to deliver any application to users anywhere with the best performance, highest security and lowest cost. Citrix customers include 100% of the Fortune 100 companies and 98% of the Fortune Global 500, as well as hundreds of thousands of small businesses and prosumers. Citrix has approximately 6,200 channel and alliance partners in more than 100 countries. Annual revenue in 2006 was $1.1 billion.

CITRIX WORLDWIDE

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