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# WAN Optimization FOR DUMMIES®

Blue Coat Special 2nd Edition

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*Visibility, acceleration,  
and security —  
now that's powerful!*



Nancy Conner

## A message from the CEO

The pressure is on: More distributed branch offices and users; more reliance on the Web and WAN; more advanced applications to run the business and ensure competitiveness; remote users demanding LAN-like speeds; slow or unpredictable response times; recreational surfing consuming bandwidth needed for business apps; and escalating Malware and malicious content.



*WAN Optimization For Dummies* will help you to identify and address today's most difficult networking challenges. But first, a little background: As early as 1998, Blue Coat had a vision for where business was heading. A world becoming increasingly global and collaborative. More dynamic and dispersed than ever before. Blue Coat developed an infrastructure designed to support and enhance the ever-changing WAN environment. The resulting Blue Coat Application Delivery Network infrastructure combines three core technologies — Application Performance Monitoring, WAN Optimization, and Secure Web Gateway.

In the WAN world, you need visibility, acceleration, and security working together. Only this powerful combination provides the comprehensive application and user control required to contain costs, enhance business productivity, and respond quickly to changing business requirements.

You'll learn more in Chapters 1-3 of this booklet. In Chapter 4, we offer ten thought provoking questions to pose to WAN optimization vendors you may be considering. How they respond should ultimately determine who you choose.

I hope this information puts you on the fast track to a fully optimized WAN. If you have any questions we stand ready to help.

Sincerely,  
Brian NeSmith  
CEO, Blue Coat Systems



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# ***WAN Optimization***

FOR

# **DUMMIES®**

BLUE COAT SPECIAL 2ND EDITION

**by Nancy Conner**



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# Introduction

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**W**elcome to *WAN Optimization For Dummies*, Blue Coat Special 2nd Edition. In many enterprises, solving application delivery over wide-area networks (WANs) has taken center stage. Organizations are becoming more geographically distributed, while centralized data centers and outsourcing of critical applications onto the Internet can cause applications to perform slowly (or not at all) in branch offices. Many factors — latency, bandwidth, web-based applications, malware, and network misuse — can add up to productivity problems at remote sites. This book answers the question, “How can we get the WAN to perform like a LAN?”

## *About This Book*

*WAN Optimization For Dummies*, Blue Coat Special 2nd Edition, explains how your organization can sustain a competitive advantage by implementing an Application Delivery Network to optimize and secure the flow of information to any user, on any network, anywhere.

Most WANs see so much traffic these days that it’s not just a matter of speeding things up. You also need comprehensive application and user control before you can contain costs, enhance business productivity, and respond quickly to changing business requirements. This book outlines the challenges of WAN optimization, giving you the must-know info for delivering applications to all your users, wherever they are located.

The content of this book was provided by and published especially for Blue Coat Systems.

## About Blue Coat

Blue Coat Systems is the technology leader in application delivery networking. Blue Coat offers an Application Delivery Network infrastructure that provides the visibility, acceleration, and security required to optimize and secure the flow of information to any user, on any network, anywhere. This provides the comprehensive application and user control required to contain costs, enhance productivity, and respond quickly to changing business requirements, fueling a long-term competitive advantage for the distributed enterprise.

More than 15,000 of the most demanding organizations, including 81 percent of the Fortune Global 500, trust Blue Coat with their mission-critical applications. For more information, visit [www.bluecoat.com](http://www.bluecoat.com).

## Foolish Assumptions

WAN optimization is a fast-growing field that can add several fat volumes to your bookshelf. For this short overview, we made a few assumptions about you, the reader:

- ✔ **You're no dummy.** If you weren't smart, you wouldn't be interested in speeding up your WAN.
- ✔ **You're an IT decision maker.** You've heard at least a little about WAN optimization, and you're super-interested in what it can offer your organization.
- ✔ **You're an IT person with a vast knowledge of technology.** Perhaps you're a network engineer with responsibility for administering your organization's WAN. Or maybe you just want your applications to run faster. In any case, this book doesn't talk down to you by spelling out stuff you already know.
- ✔ **You speak tech.** Although we define terms and spell out acronyms, we assume that you're familiar with computer lingo.



## Icons Used in This Book

Throughout this book, icons highlight different types of information:



When we present something that can save you time and effort, we toss in this icon to highlight it.



This icon offers a little extra information of a technical nature.



This icon highlights important information you'll want to keep in mind.



This icon warns you of pitfalls to avoid.



## Chapter 1

# The WANderful World of Wide-Area Networks

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### *In This Chapter*

- ▶ Defining WAN optimization
  - ▶ Reaping the business benefits of optimizing your WAN
  - ▶ Using ADNs to solve network challenges
- 

**T**he rapid proliferation of branch offices, outsourcing, telecommuting, and an ever-more-mobile workforce means that your end-users may be anywhere in the world. Applications are becoming more diverse, centralized, or even outsourced. You need WAN traffic to move at the speed of business.

## *What's WAN Optimization?*

*WAN optimization* speeds up performance and gives you control over what's on your distributed network. Poor performance of critical applications causes user productivity to plummet and hurts your market competitiveness — bad news for the bottom line.



WAN optimization is about maximizing the performance of business applications over your distributed network — having the visibility to classify and prioritize applications, the ability to accelerate what is important to your organization, and the layered defenses to protect users and information.

The business benefits of optimizing your WAN are many:

- ✓ **Increased productivity:** When users get their applications and data quickly, they work more efficiently.
- ✓ **Decreased cost:** Prioritization of applications and traffic reduces WAN usage, decreases bandwidth consumption, and saves cash.
- ✓ **Regulatory compliance:** Store critical data safely at the data center.

## *WAN Traffic: The Need to Classify and Prioritize*

You know what kind of traffic you want flowing on the WAN: e-mail, file transfers, and other business-critical applications. But your network probably has a lot more on it than the good stuff. Personal Web surfing and big downloads — whether unauthorized or legit — translate into poor network performance.

Heavy Web traffic and tons of file downloads can elbow aside critical applications. You need the ability to optimize and secure the flow of information to any user, wherever they are. (See Chapter 3 for more on this topic.)

## *Solving the Challenges of Application Delivery*

Today's WANs offer a special set of challenges. To keep your business up to speed, you need to understand these challenges:

- ✓ **Centralization and response time.** As users and branch offices have spread out, IT resources have become more centralized. The distance between a central data center and a branch office often means that applications underperform. It takes time for the packets to travel. This

*network latency* can combine with too little bandwidth and inefficient Web applications to create sluggish applications and seemingly endless file transfers.

- ✓ **Remote users.** No matter where they're working, what device they're using, or how they're connected to the WAN, employees need secure access to information and applications — with the speed and performance of a desktop workstation. Outsourced staff and remote business partners also need to provide secure access limited to only the resources they need.
- ✓ **Chatty protocols.** When a protocol sends data in small, sequential steps over the network, that protocol is called *chatty*. To avoid the loss of data packets, these protocols chop up the data into lots of little packets.
- ✓ **Latency.** Increasing the bandwidth won't solve latency and chattiness problems. Often, the problem isn't bandwidth but latency. Applications designed for a LAN don't know how to cope with network latency. You want a solution that decreases the effects of latency and gives you flexible bandwidth control.

## *What's Your Problem?*

You can't identify a solution before you understand the problem. And you can't optimize WAN performance until you know what applications are running on the network and how much bandwidth they're using. For that, you need total visibility.

Visibility lets you identify and monitor all the applications using your network so that you can deal effectively with the issues slowing down performance.

## *ADN to the Rescue*

To give users access to critical applications and information, you need to keep traffic moving quickly. At the same time, you want to keep out malware and recreational applications and downloads that sap your employees' productivity.

*Application Delivery Networks* (ADNs) are on the front lines of WAN optimization. An ADN gives you a whole new layer of application and user control that allows you to contain costs, enhance productivity, and respond quickly to changing business requirements.

Wherever your users are and in whatever city or time zone, they need fast and seamless access to business-critical applications — no matter where the applications and data centers reside. As Chapter 3 explains, these applications may be internal, external, or real-time — each with their own management needs.

Finally, you need to keep the bad stuff — viruses, malware, and time-wasting, unauthorized Web content — outside your network, where it belongs. For real network optimization, you need to be able to filter URL and Web content and get granular in your policy management. (Chapter 2 tells you more about security on your WAN.)

## Chapter 2

# What You Get Is What You See: Network Visibility

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### *In This Chapter*

- ▶ Gaining visibility into network traffic
  - ▶ Monitoring bandwidth — and its costs
  - ▶ Keeping an eye on security
- 

**A**bout 70 percent of organizations don't know what's in their network traffic, and most network tools don't offer clear visibility. Probes and routers associate port numbers with general classes of application and are a good start. But to *really* optimize your network, you need to see applications, servers, locations, and users, which will allow you to start managing the bandwidth that your business applications require.

When you have visibility into your WAN traffic, you can accelerate the critical applications, limit unproductive user activity, and protect your network from malicious traffic.

## *What's Really on Your Network?*

Real visibility requires sophisticated technology because the applications you're trying to see can be pretty sophisticated. For example, port 80 is the primary port for HTTP traffic from the Web, and port 443 is for secure HTTPS communication. These ports are used by all kinds of applications: SAP order taking, credit-card processing, Oracle CRM, various other software-as-a-service (SaaS) apps, and so on.

## What's eating your bandwidth?

In many organizations, recreational and other nonessential traffic can consume up to 50 percent of the total bandwidth on the WAN. YouTube, Hulu, and iTunes use the same well-known ports as business applications. How do you distinguish business-related traffic from goofing-around traffic?

To make things more complex, some P2P traffic actively tries to hide itself from detection. An application might use *port hopping*, jumping from one port to another to avoid detection, or grab more bandwidth. Other evasion methods, such as encryption and tunneling, obscure packets' contents.

You can't manage what you can't see. And if you can't see it, you don't know what to accelerate, what to mitigate, and what to keep off your WAN altogether.

ADNs let you see and manage what's on the network so that you can allocate more bandwidth to the applications your business runs on:

- ✓ Automatically discover and classify applications.
- ✓ Find out which applications use the most bandwidth.
- ✓ Monitor response times so that you can isolate performance problems
- ✓ Pinpoint which users and Web sites get the most visits and bandwidth.



Knowing what's on your network gives you insight into bandwidth use, response times, network efficiency, and more.

## Application performance

You want business-critical apps to be as fast and responsive as they would be on a LAN, right there in the same office. And that's what your users expect.

Get a user's perspective on the network:

- ✓ Does application performance meet users' expectations?
- ✓ How are key applications performing? How is voice quality?

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- ✓ Which users are the biggest bandwidth hogs — and what applications are eating that bandwidth?
- ✓ Are all locations using their bandwidth efficiently?

Only this level of visibility lets you analyze bandwidth usage, track response times (on the network and on your server), find out what's causing delays, set benchmarks for service levels, monitor conditions, and address issues early.

## Putting It Together: Visibility and Monitoring

Visibility and monitoring work best together. If you can't see something, you can't monitor it. And if you don't watch your network traffic, it doesn't much matter whether you can see what's there. Combined, though, these two capabilities give you real insight into what's happening on your WAN, enabling you to

- ✓ Prioritize business applications.
- ✓ Reclaim bandwidth from recreational applications.
- ✓ Keep an eye on each and every location on the WAN.
- ✓ Define performance levels and alarm on degradations.

## A Word about Security

It's not enough for remote and roaming users to access internal applications from wherever they happen to be; internal users are doing real business on the Internet from inside the LAN, too, which makes the Internet part of both your *inbound* WAN and your *outbound* WAN. Whether roaming users, Internet-connected branches, or use of SaaS technologies — or all three — it connects business access and applications to the Internet. You gain all the benefit of connection from anywhere, but with the risk of the No. 1 security threat: web-borne malware.

Outside applications usually use SSL-encryption to send sensitive data over the Internet, and the provider — not you —

holds the application certificate. So how can you influence the security and performance of your critical applications?

Because SSL-encrypted sessions represent an important part of your company's application traffic, your acceleration solution must be able to see and then accelerate mission-critical SSL traffic. Of course, you can't just open up everyone's private stuff, so you need a way to find the business application hiding in the user data. Make sure that your solution allows these two goals and can accelerate SaaS traffic using the acceleration approaches covered in Chapter 3.

The WAN optimization solution you choose should be able to meet these security goals:

- ✔ Keep out malware.
- ✔ Control applications and content that come in from the Web.
- ✔ Allow visibility and control over SSL.
- ✔ Prevent data leakage.
- ✔ Ensure that you comply with government regulations.

## Chapter 3

# Speeding Up Your Applications

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### *In This Chapter*

- ▶ Identifying key types of enterprise applications
  - ▶ Prioritizing your needs
  - ▶ Getting important applications moving
  - ▶ Seeing how one company optimized its WAN
- 

At any given moment, your network may be delivering SaaS applications, training videos, Web conferencing, plain old e-mail, and other essential traffic — times hundreds or thousands of users at umpteen locations. Availability and performance of these apps keep your business productive. This chapter is all about accelerating business-critical traffic on the WAN.



For a real-life example, see the case study at [www.wanop4dummies.com/woodsbagot](http://www.wanop4dummies.com/woodsbagot).

## *Enterprise Application Types*

Different kinds of applications require different management issues and acceleration strategies. Here are some applications that typically make up WAN traffic:

- ✔ **Files (e-mail and backup):** When file access and e-mail lags, so does your business. Make sure that users can receive and respond to e-mail messages or access files in a timely manner — and that means right away. Similarly, data backups must happen smoothly and speedily.

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- ✔ **Web and SSL:** More and more applications — from ERP and CRM to e-mail, Sharepoint. Intranet applications, and new SOA apps — use HTTP and HTTPS transports. Web and SSL require application-level insight that ‘knows’ objects and that can safely manage certificates.
- ✔ **Rich media:** Powerful applications that incorporate voice, video, animation, and other media pack a punch in terms of productivity, but they also munch a lot of bandwidth.
- ✔ **External applications:** SaaS applications need to perform as well as traditional software. At the same time, you need to watch out for external recreational apps.
- ✔ **Real-time applications:** When the home office is having a video conference with several branch offices, the conference should be clear and smooth and *really* in real time. Often, though, other network traffic may shove aside the conference, resulting in frustrating, less-than-optimal performance.

## Setting Priorities

Every organization is different, and a one-size-fits-all approach to WAN optimization won't work. Ask yourself these key questions:

- ✔ Which applications are critical to our mission?
- ✔ What are our performance requirements?
- ✔ What traffic do we want to block or slow down?
- ✔ Will we have the same applications and priorities at this time next year?

When you understand your organization's applications and performance needs and can see in detail what's happening on your network, you can put the technology to work that will optimize your network.

## Speeding Up Critical Applications

Nobody likes to wait, least of all your users. Use the following strategies to keep apps and data moving.

### *Object caching*

An *object* is a collection of data that you can request by name, such as an image on a web page. In a network, requests to retrieve an object, such as a document, a video, or an image on a Web page, are a lot like trudging all the way to the library to look up a word in a dictionary. The request travels to the server, which returns the object — so far, so good. But if you need to retrieve the object again, you've got to repeat the whole routine. A hundred different users requesting the new training video at the same time puts a lot of traffic on the WAN.

*Object caching* puts a copy of the object on your bookshelf, so to speak. When a copy of the object is in the cache, the user who requested that object gets it from the cache, not from the server that stores the original — saving time and bandwidth. This cached copy is available to all the users in the network. With object caching, the only traffic that crosses the WAN is permissions checks (when required) and verification checks. The verification check makes sure that the object in the cache is current, so you never have to worry that you're reading a stale document from three or four edits ago.

Plus, an object cache does something no other optimization technique can do: It accelerates those enigmatic external SaaS and other Internet applications. Object caching works even if you don't control the entire network end to end (and, of course, the Internet is out of your control).

## Byte caching

If object caching works with entire objects, *byte caching* works at a lower level, looking at patterns of 1s and 0s. Instead of streams of raw data traveling over the network, the data gets compressed, cached, and represented by a small token, which can whiz around the network much faster.



You may see byte caching referred to as *dictionary compression*, *network sequence caching*, or *transparent data reduction*. It's all the same approach to WAN acceleration.

Two advantages make byte caching a great WAN acceleration solution:

- ✔ **It's general to all protocols.** Because it's not protocol-specific, byte caching works on all TCP (transmission control protocol) traffic, including CIFS (common Internet file system), so that all connections benefit.
- ✔ **It works both ways.** Byte caching is bidirectional. It uses the same tokens whether it's retrieving data from the local server or saving or posting data to the local server.



Windows applications use CIFS to access remote files, printers, and so on.

## Protocol optimization

Chapter 1 describes chatty protocols. Protocol optimization makes these protocols work better and faster on your network. How? By understanding how specific protocols function, an ADN infrastructure can anticipate user requests so that data gets retrieved before clients request it. With a bit of cleverness, you can fix protocols to work the best way possible for whatever network you're using.

For example, protocol optimization can make serial communications parallel. Instead of sending data one bit at a time, you can send several data signals at once.



Popular protocols that can benefit from optimization include CIFS, MAPI (messaging application programming interface), HTTP, TCP, and HTTPS.

## Compression

*Compression* is just what it sounds like: making a file more compact for easier storage or transfer — the smaller the data, the less bandwidth it needs, and the faster the transfer.

Compression uses an algorithm to take extraneous or predictable information out of the data before it's sent. When the data arrives at the other end, the same algorithm uncompresses the data, making it as good (and as big) as new.



Combine compression with byte caching and object caching to get your data really zipping along.

## Bandwidth management

With bandwidth management, you set policy rules for allocating bandwidth, taking into account application, protocol, time of day, source server, destination, and user data, such as name and role.

Then, you apply these bandwidth policies:

- ✓ **Minimum & Maximum:** Guarantee or limit the amount of bandwidth for different applications.
- ✓ **Priority:** Lets you move certain traffic to the front of the line, giving it bandwidth before other, lower priority classes.
- ✓ **Per Flow, Application level:** Protects a specific session or call.

Bandwidth management offers a flexible, comprehensive way to control network traffic flow, making sure that users, groups, and applications get appropriate network resources.





## Chapter 4

# Ten Questions to Ask a WAN Optimization Vendor

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### *In This Chapter*

- ▶ Choosing the right WAN optimization solution for your business
- ▶ Asking the right questions to maximize performance and security

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**W**AN optimization technology is a fast-growing field. How do you select the solution for your organization? Armed with the following checklist of questions, you can put any vendor through its paces and get the solution you need.

**How well can you speed up my applications?** You want a vendor to tailor its solution to your specific problems. For example, increasing bandwidth isn't much help if latency is slowing down your applications.

**Can you accelerate external apps, even if they're encrypted?** SSL-encrypted traffic from outside sources (such as SaaS) creates a blind spot where you can't see what's coming in to your organization. Proxy technology terminates connections in both directions and makes invisible traffic visible. Ask your vendor whether its solution uses proxies.

**Can you restrict applications you don't want on the WAN?** Even if you stop the bad stuff at the door, you probably still have a lot of junk in your WAN. Inappropriate Web surfing, YouTube, peer-to-peer (P2P) file sharing, personal VoIP calls — it all snowballs fast and can mess up the performance of critical applications. Worse, if you don't put some limits around these productivity drains, you're just encouraging users to waste time and bandwidth.

**Can you tell so-so applications from business-critical ones?**

Just as you wouldn't hire a person who couldn't tell a social networking site from an outsourced CRM solution, you wouldn't entrust your WAN with a clueless optimization solution. The solution you choose should be able to prioritize your network beyond just ports and know what applications and content help bring home the bacon.

**Can you treat users differently?** Not all users or user groups have equal claim on the network. Your WAN optimization solution should enforce the policy you set, prioritizing users, applications, and so on. Do consultants get the same privileges as the CEO? Make sure that your optimization solution recognizes their special status.

**How about video?** Internal corporate streaming video eats tons of bandwidth and can quickly clog up the WAN. Whether your business is creating more videos (live broadcasts, video conferencing, or on-demand training) or your users are accessing more video on the Web, make sure that your WAN optimization solution streamlines corporate video but doesn't let YouTube video crowd out everything else.

**How do you handle mobile users?** WAN optimization is one thing for networks you own, but what about users connecting in over the Internet? What can the vendor do to accelerate access to internal applications for remote users, while protecting them from Internet threats?

**Does this solution fit my future vision?** Considering opening up your branch offices direct to the Internet to cut down on backhaul costs? Moving to MPLS for VoIP? Planning a major outsourcing initiative? Check with your peers in other departments to see what they're up to so that you can make sure that you're all on the same page. Optimize the network right the first time for everyone in IT.

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It's a hyper-competitive world out there. How do you contain costs and retain predictable access to applications your organization counts on? WAN optimization is the place to start. By knowing what's running on your network, you can accelerate the important applications and secure against malicious intent. This little book provides the starting point to fuel a sustainable competitive advantage in a rapidly changing business environment.

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