Data Center Transformation for Dummies

Learn to:

• Dramatically improve users’ application performance
• Consolidate infrastructure without sacrificing top performance
• Put data where you want it with control where you need it
• Deliver performance dashboards for your business
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Introduction

Only a decade ago, consumers were happy if they could look up such basic information as a store’s hours online. Today, users take the online presence of even the smallest businesses for granted, and they want to access information fast — often, from a mobile device.

The shift to empowered and savvy IT consumption is also occurring in the corporate environment. Many workers feel that they have better technology at home than they do at work, and nearly half are solving work problems with personal technology.

Consumerization trends, such as Bring Your Own Device (BYOD), mobility, and cloud computing, pose new challenges to IT departments worldwide. How does IT give users the better, faster, easier experience they want without sacrificing the need for availability, scalability, and security? Meeting these challenges starts with understanding how apps and data are delivered from the data center (enterprise-owned or in the cloud) and then developing an improvement plan involving technologies such as performance acceleration and performance management.

About This Book
This book describes effective yet economical steps you can take to improve user experience with applications delivered from your data center. If you’re wondering
how to make your users more productive, create more
cost-effective data centers, and do both things without
replacing your existing infrastructure, this book is for
you.

This book is organized with multiple audiences in mind.
Whether you’re part of your IT department’s networking,
server, storage, or application team, you find relevant
projects here that help you deliver better business
results.

Icons Used in This Book
Throughout the book, special icons call attention to
important information.

This icon points out information that may well
be worth committing to memory.

This icon marks especially technical material
that you don’t have to read (but I hope you
will).

This icon points out helpful suggestions and
nuggets of useful information.

Warnings offer practical advice to help you
avoid making potentially costly mistakes.

Beyond the Book
For more information about and resources on data
center transformation, visit www.riverbed.com.
Chapter 1

The Elements of Data Center Transformation

In This Chapter
▶ Getting the right IT roles involved
▶ Focusing on five key projects
▶ Putting the right technology in place

Change is never risk-free, especially in the IT world. The secret of success is using technologies that provide a smooth transition to a higher-performance, more cost-effective infrastructure without a major redesign.

Making such a transition requires coordinating the IT trifecta: people, processes, and technology. That means getting all the people involved on board, establishing key projects that can achieve the desired goals, and figuring out which technology solutions to use.

This chapter is for you if
✓ You’re a CIO or VP of infrastructure who’s looking at new ways to improve your IT performance without breaking the bank
You’re a network, storage, or application manager who wants to improve collaboration with other parts of your IT organization

**People: Getting the Right IT Teams to Work Together**

In the IT-centric world of only a few years ago, each domain (such as storage, networking, applications, and server) was managed by a team of professionals who were dedicated solely to that particular part of infrastructure. Each team operated in its own silo. Any change was very slow, and the idea of asking users what they wanted rarely crossed anybody’s mind.

Today, IT is no longer just a cost center, but also a driver of innovation for a business. In this user-centric era, all pieces of the IT puzzle must work together perfectly.

A successful data center transformation should make collaboration easier and should help each team achieve its goals. That means focusing these five roles on

- **Network:** Reducing bandwidth cost, automating performance monitoring, and improving app response times
- **Storage:** Securing data, ensuring that data is always accessible, and decreasing storage and backup costs
- **Server:** Virtualizing and consolidating resources, making those resources elastic, and providing global load balancing across data centers
✓ **Application development:** Accelerating the release of new apps, decreasing the cost of app production, and improving communication with operations teams

✓ **Application operations:** Increasing the availability and visibility of application performance, ensuring application scalability, and reducing troubleshooting time

**Processes: Tackling Five Key Projects**

Organizations that make successful large-scale improvements in their data centers focus on the following five projects:

✓ **Making applications faster:** Providing great performance for all users everywhere

✓ **Converging branch infrastructure:** Improving local performance without adding local complexity

✓ **Protecting branch data:** Enabling users to access data anywhere without that data leaving the data center

✓ **Consolidating data centers:** Giving users the same experience or better with fewer data centers

✓ **Managing performance:** Monitoring, troubleshooting, and accelerating application performance

I cover all these projects in detail in Chapters 2–6.
Technology: Choosing the Right Tools

The key enablers of data center transformation fall into two categories: performance acceleration and performance management. A comprehensive application performance acceleration solution makes both users and IT more productive. Users can accomplish more in a shorter time when applications are available at great speeds at any time and on any device. Also, IT can spend less time troubleshooting and more time driving innovation for business if it has efficient performance management tools.

For details on specific tools that can help with data center transformation, see Chapters 2–6.
Are you responsible for application performance? Would you like to reduce user complaints about slow applications? If you answered “Yes” to both questions, this chapter is for you.

Seeing the Need for Application Speed

Your business needs applications of all kinds — collaboration, e-commerce, business suites, and so on — that are rapidly available to both internal and external users. Applications let businesses eliminate manual, paper-based processes; reduce employee travel; and lower other costs of doing business.

As applications become more complex, performance bottlenecks may occur at several points, such as the servers running the application, the network delivering...
the application, or the application rendering the content. To improve user experience, you can do one or more of the following things:

- Accelerate delivery of applications to remote users, who often experience slow uploads and downloads, page loads, and other functions
- Prioritize applications based on business need and service level agreements
- Scale applications to ensure that applications continue to deliver high performance as user and business needs grow
- Monitor applications, servers, and network infrastructure to detect performance problems and pinpoint their causes, ultimately accelerating problem resolution

I discuss all these strategies in this chapter.

Using WAN Optimization to Accelerate and Prioritize Apps

Delivering slow applications to your remote employees can put your business at a distinct competitive disadvantage and decrease user satisfaction. Those users depend on the network for their applications, as do all employees who access applications in the cloud. Speeding network traffic all the way out to users, wherever they may be, is clearly a priority, but multiple factors can slow your mission-critical applications.

Challenges

It’s challenging to provide users on the fringes of a network the same performance that they’d receive at
headquarters. Communications speeds over the network are limited by available bandwidth, latency, and packet loss.

Packet loss and network congestion are network characteristics that severely affect the speed of applications and data transfer.

WAN optimization uses several techniques in a single controller, so you can holistically overcome performance impediments. Five techniques within a WAN optimization solution are

- **Data streamlining**: Eliminates redundant data transfers and, as a result, reduces WAN bandwidth use by up to 95 percent
- **Transport streamlining**: Eliminates transport protocol inefficiencies and reduces the number of TCP packets required to transfer data by up to 98 percent
- **Application streamlining**: Provides additional optimizations for application protocols
  Also, by reducing application protocol chattiness by up to 98 percent and minimizing application overhead, application streamlining increases throughput.
- **Quality of service (QoS)**: Allows IT to identify and prioritize business-critical applications to ensure optimal user experience for real-time and interactive applications
  QoS also helps restrict non-business-critical applications that consume significant network traffic.
- **Path selection**: Like QoS, allows IT to send prioritized traffic across the most appropriate network connection
IT can deliver applications on the network link that provides the best performance, cost, and reliability characteristics.

## Improving Scalability and Speed with App Delivery Technology

Sometimes, applications are slow for reasons beyond network problems. Your applications may be slow or failing because they’re overwhelmed by the volume of users or the amount of content on a web application page.

It’s difficult to predict how many users are going to access an application at the same time and make sure

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### Candidate apps for WAN optimization

Applications that users access over a WAN and/or the cloud are candidates for WAN optimization, including the following:

- Collaboration and unified communications applications, including document sharing, voice, and video applications
- Business-suite applications, such as enterprise resource management and customer relationship management applications
- Application and desktop virtualization, such as virtual desktop infrastructure (VDI), terminal services, and application streaming software
- Software as a Service (SaaS) applications used by employees
that they all get a fast application experience. Application availability and speed are limited by the number of server connections, server processing resources, bandwidth, and latency.

You may need an application delivery controller (ADC). ADCs are advanced load-balancers, designed to make applications run faster, more reliably, and more securely by offloading some of the work that web servers would otherwise have to perform. This strategy boosts the throughput of the web-server tier in an application. In addition to load balancing application workloads across various environments, ADCs optimize user services by inspecting, transforming, prioritizing, and routing application traffic.

Finding Tools That Monitor and Troubleshoot Applications

As applications have become more critical, they've also become more complex. Infrastructure changes, application code updates, and mobile user devices and networks constantly introduce new variables to application execution and delivery. In the face of ongoing change, you need a continuous, end-to-end view of application and infrastructure performance.

Figuring out why an application is performing slowly or not responding at all can be like finding a needle in a haystack. Resolving performance issues quickly becomes extra-complicated with cloud IT services, service-oriented architectures (SOA), virtualization, and mobility.

A complex application infrastructure requires a performance management solution that looks across the
application delivery chain. Whether you’re rolling out new applications, consolidating or virtualizing data centers, or migrating to the cloud, managing application performance requires a holistic view that takes into account user experience, transaction tracing, component monitoring, and infrastructure and network performance management.
Chapter 3
Converging Branch Infrastructure

In This Chapter
▶ Centralizing branch resources
▶ Virtualizing and consolidating branch services
▶ Monitoring branch IT operations

As branch-office employees take more responsibility for sales and customer relationships, maintaining productivity and reducing business disruption become more critical. Any interruption of service negatively affects productivity in the branch, which negatively affects the business as a whole.

For IT, branch offices have traditionally been hard to manage and costly to maintain. Centralizing servers, storage, and even desktops from branch locations into central data centers reduces the complexity of branch IT infrastructure and allows a business to take advantage of data center cost efficiencies. IT must ensure,
however, that it can converge the branch operations to a small infrastructure footprint without compromising user performance and still provide efficient management with maximum availability of services.

If you’re responsible for storage and data backup, or if you want to consolidate and manage data and applications in the data center while making them accessible at branch offices at local speeds, you’ve come to the right place. This chapter is for you.

**Employing WAN Optimization**

Many organizations choose to centralize branch office applications and data to reduce costs and complexity. Providing LAN-like performance and efficiency for remote users is critical to the success of branch convergence, yet most applications aren’t designed to operate over a network. Also, bandwidth limitations and protocol inefficiencies are exacerbated by distance and latency.

Many organizations have turned to WAN optimization to address bandwidth and latency concerns. WAN optimization products combine data reduction, transport protocol optimization, and application protocol optimization, providing WAN application acceleration and bandwidth reduction to centralized applications that users in branch offices can access. This technique eliminates the need to upgrade network bandwidth and is one of the most significant benefits of deploying WAN optimization appliances.
Going One Step Further with Storage Delivery

WAN optimization is necessary but not always sufficient. You can fully centralize all your branch resources in your data center without also tackling the need for LAN-like performance for storage resources by using an emerging technology called storage delivery.

Storage delivery works similarly to WAN optimization. It uses a series of streamlining techniques to optimize the delivery of data across networks, thereby overcoming the distance, latency, and packet-loss characteristics that can plague networks. The result is that your branch users can access file servers, application servers, and databases now located thousands of miles away in your data center.

WAN optimization also allows users to take advantage of storage-intensive technologies such as virtual desktop infrastructure (VDI). Traditionally, VDI hasn’t worked well on WANs, but storage delivery eliminates the performance issues that lead to poor user experience.

I discuss the specifics of storage delivery (and show how it also increases data security) in Chapter 4.

Virtualizing Branch Services

Consolidation and virtualization are rapidly changing the way that organizations manage their branch-office
IT infrastructures, providing greater flexibility, improving service delivery, and reducing costs. Many of these benefits can be extended to local branch services such as print, dynamic naming service (DNS), and dynamic host configuration protocol (DHCP).

When you virtualize branch services on a single, converged appliance, you lighten the IT footprint by providing a simplified, consolidated architecture that streamlines operations, simplifies management, and enables agile service delivery. You can also save money. One organization saved $10,000 to $15,000 in equipment costs in its new offices by running local branch services on a converged appliance.

**Monitoring Branch Operations**

Many IT administrators rely on user complaints to detect performance issues. But advanced integrated management tools allow you to monitor and troubleshoot any issues that arise before they become problems. By automatically mapping IT environments networkwide, these tools speed consolidation efforts and give the organization a current, accurate view of infrastructure inventory.

These capabilities are provided by network performance management (NPM) and application performance management (APM) tools, which I cover in Chapter 6.
Develop a plan for resiliency

Consolidating branches delivers compelling savings, but IT leaders need to carefully consider the resiliency of WAN architecture to ensure uptime and continuity for critical business applications and functions. WAN optimization technology can help. One global leader in business technology deployed WAN optimization technology and reduced its backup windows from 24 to 6 hours, decreased bandwidth use by 90 percent, and ensured data was kept securely in the data center.
In This Chapter

▶ Centralizing storage in the data center
▶ Protecting data without sacrificing performance
▶ Seeing how storage delivery technology works

When it comes to data, IT has two goals: to make it accessible and responsive so users can use it productively and to keep it safe. In the past, achieving both goals simultaneously in branch offices has been difficult. Data is safe when it’s stored at the data center, where skilled IT professionals back it up and guard it behind a robust perimeter. When data is left anywhere outside the data center, however, it’s vulnerable and exposed to risks.

If you’re responsible for branch infrastructure or applications, or if you seek to consolidate and manage all your data in the data center while making it accessible at branch offices at local speeds, keep reading. This chapter is for you.
Centralizing All Your Data

The same storage delivery technology that I discuss in Chapter 3 can be applied to data security so that you no longer have to compromise data safety for accessibility. Data centralization also eliminates the hassle and cost of performing local backups in the branches.

The latest innovation in storage delivery allows you to consolidate and manage all your data in the data center while making it accessible to branch offices at local speeds. In this approach, storage is decoupled from its server but actually works as though it were local. A user in Paris, for example, can access a virtual server in that city, which in turn accesses data in Chicago, but the user’s experience is local.

Taking a New Approach to Storage Delivery

Low-level storage protocols like SCSI are designed to work over short distances (with low latency and high bandwidth) via reliable media. SCSI over TCP/IP is deployed only inside a data center, where distances are limited, connectivity issues are absent, and bandwidth is ample. Now, however, the SCSI protocol can work over long distances with limited bandwidth over unreliable media. This new approach to storage delivery requires the installation of two components:
Data-center component: The first element is installed in your data center and connects to the storage system of your preferred vendor, using industry-standard low-level storage protocols. Then it “projects” the storage to the branch.

The data-center component also inspects mounted file systems and proactively streams data to the branch locations via block-level prediction algorithms (key software that predicts and fetches blocks needed at branch offices). This capability allows virtual servers and data from centralized storage to be available wherever and whenever they’re needed.

Branch component: The second component resides in the branch office itself. This branch (sometimes referred to as edge) component communicates with its data center counterpart and presents the remote data to the branch for use by local servers and applications.

In addition, the branch component caches working data to deliver LAN-like performance to branch users and applications. It also extends thin provisioning to the remote site, because not all data is required to work in the branch. Finally, the branch component supports fast cold writes, which essentially means that applications get fast local access and data is streamed back to the data center.
Can storage delivery help you?

These questions may determine whether storage delivery can help protect your organization’s data:

✓ **Does your organization still host servers and/or storage in branches?** By consolidating data in the data center, a storage delivery system improves data safety and allows you to simplify your remote operations.

✓ **How is data protected in branch offices?** Outside the data center, your data is vulnerable to multiple risks. A storage delivery system keeps data in a secure data center and encrypts that data both while it’s in use at the branches and while it’s in transit to and from the data center.

✓ **Does your organization perform remote backups?** By centralizing your data, a storage delivery system eliminates the hassle and cost associated with branch backup, saving you 50 percent on average.

✓ **How quickly can your branches recover from disaster?** With the storage delivery approach, you can reconnect to the data center and boot branch servers back into service to resume operations in minutes.

✓ **How quickly can you provision an entire branch?** With new ways of delivering storage, you can provision centrally, connect, and start branch services in new locations within minutes.
Don’t be confused by similar-sounding approaches. Proper storage delivery solutions must operate at block level to remain application- and data-agnostic. Object-level caching solutions aren’t the same as the storage delivery approach I describe here. These solutions fail to achieve the data performance and integrity of block-level storage delivery solutions.
Multiple data centers have become the norm as organizations expand their operations. For IT departments, this trend has led to more costs and bigger infrastructure management headaches. To compete in a highly competitive global market, businesses must find a way to reduce the number of data centers without negatively affecting user experience.

Reducing the number of data centers in an enterprise can produce significant reductions in cost and complexity. At the same time, without the need to operate redundant data centers, IT becomes more efficient and can scale resources to deliver services to branches and users effectively.
This chapter is for you if

✓ You’re responsible for data center infrastructure and operations.
✓ You’re in charge of storage and data backup.
✓ You want to operate fewer data centers, achieve consistent high performance across a distributed organization, and streamline administration and data center protection.

Recognizing the Key Aspects of Data Center Consolidation

The right approach to consolidating data centers enables IT departments to reduce cost and streamline administration tasks with no effect on application performance.

A successful data center consolidation project has four key aspects: acceleration, scaling, discovery, and redirection. I discuss acceleration and scaling in Chapter 2 as part of improving application performance. In the following section, I elaborate on the two other requirements: discovery and redirection.

Using Performance Management Tools to Discover Consolidation Requirements

Proper planning and discovery ensure minimal impact from a consolidation project. Dependency mapping, for
example, should be part of preparing for a consolidation project, because even one change may affect every user on the network. Application and network monitoring tools provide visibility into virtualized environments and traffic performance. This visibility enables IT organizations to map global IT environments and reduce the risk of data center migrations and network outages by highlighting application dependencies.

You can accomplish this dependency mapping with the right performance management tools. These tools greatly improve IT productivity and efficiency, as well as ensure better application performance. IT organizations can use these tools to identify and diagnose performance problems faster, thereby reducing recovery time. I talk about these tools in more depth in Chapter 6.

Look for performance management tools that provide visibility and actionable insight into network and application performance. These tools should offer a combination of user-experience monitoring, application-transaction tracing, and network and IT infrastructure performance management.

Redirecting Traffic with ADCs and WAN Optimization

As you consolidate to fewer data centers, you have to be smart about where you send traffic. Do you send a user to the closest data center for her application? What if that data center is offline or at capacity already? You need technology that can help you answer these questions and automatically redirect traffic as necessary.
WAN optimization and ADC technologies not only accelerate performance for critical applications, but also ensure efficient load balancing of users across data centers based on performance, availability, and cost considerations to deliver the best user experience.

Selecting the right path with WAN optimization

The right WAN optimization technology provides LAN-like access to data and applications across a WAN — any time, anywhere throughout the enterprise — for mobile workers, branch offices, and data centers. It also facilitates management of complex hybrid networks by using path selection, described in Chapter 2.

A hybrid network is one that consists of multiple network link types, such as multi-protocol label switching (MPLS), IP virtual private networks (VPN), and commodity Internet connections. Path selection allows you to prioritize which traffic traverses which network link. You can send traffic out on a specific link based on performance, cost, security, or availability criteria.

Traditionally, companies backhauled Internet traffic across a private network, sent the data off to the Internet, and then routed it back across the private network to the end user. These secure links are often quite expensive, so the economics of this approach are poor. Also, the user experience is terrible. Because so much Internet traffic now consists of mission-critical applications, this double trip of Internet traffic just clogs the central network. A direct-to-net link would be faster and more cost-effective.
Redirecting traffic across hybrid networks is essential in highly consolidated environments. Without this redirection you risk providing a poor user experiencing and incurring higher network costs.

**Redirecting users with ADC technology**

Consolidating data centers with ADC technology in place means that users don’t feel the effects of migrating data centers or moving applications. The ADC technology offers a single point of control for all users and can redirect those users locally or globally.

*Local redirection* points a user to the best resource within the data center. This technique may mean sending a user to a server or virtual machine that’s used less than the others or that has specific computing capabilities.

*Global redirection* points a user to a different data center — one that has more capacity, higher performance infrastructure, or greater resilience.

Look for ADCs that offer advanced features such as web content optimization and application firewall capability. Software ADCs give you more flexibility and scalability with off-the-shelf hardware. Also look for industry-standard application programming interfaces (APIs) like REST so that you can program your ADC, as well as integrate it with technologies such as performance management tools.
Is a virtual ADC right for you?

If your answer to any of the following questions is “yes,” your organization may benefit from a software-based virtual ADC:

✔ Are you virtualizing the applications that you’re load-balancing?

✔ Do you need to scale ADC capacity up and down quickly?

✔ Are you running an application or part of an application in the cloud (such as Microsoft Windows Azure, Joyent, or Rackspace)?

✔ Are you trying to shorten application version release cycles?
Managing performance is an everyday concern for people who are charged with maintaining application and data center infrastructure, but it’s even more critical for an IT department that’s involved in a large-scale data center transformation effort. Such an IT department requires sophisticated monitoring tools. The consolidation of multiple data centers provides even more opportunity for performance problems to arise, and any kind of structural change requires IT to pay extra attention to user experience, trace transactions, and monitor network performance. Powerful, easy-to-use performance management tools are the keys to maintaining quality of service.
You’ll likely want to read this chapter if you’re
✓ Responsible for application support
✓ Struggling to identify, troubleshoot, and resolve application performance issues
✓ Responsible for successfully migrating applications during data center consolidation or relocations

Meeting Performance Management Challenges

To take advantage of all that modern performance management tools have to offer, IT operations and application teams need to overcome two critical challenges: relocating IT resources and diagnosing problems in complex networks.

Relocating IT resources

The first challenge is relocating applications, whether relocation is due to branch consolidation, data center consolidation, or the use of public cloud services. IT organizations then need the flexibility to relocate other IT resources, such as server and storage infrastructure. Traditional tools perform manual discovery and mapping, but that process is slow and error-prone. Agent- and scan-based discovery and mapping tools are expensive, resource-intensive, and potentially limited in scope.
Diagnosing problems in complex networks

Virtualization is blurring the traditional lines of server, storage, and network infrastructures. Users expect applications to be fast and available, but redundant networks, interdependent application tiers, and virtualized servers and networks make diagnosing an application performance issue extremely complex.

Legacy tools provide only a fragmented view of operations. Also, IT operations are overloaded with vast amounts of performance data but can’t derive any actionable information from it. As a result, problem identification, diagnosis, and resolution can take days or weeks.

Choosing Performance Management Tools

Performance management tools can help your organization quickly identify, troubleshoot, and resolve performance issues, as well as plan and optimize infrastructure deployments.

Your organization may already have dozens (if not hundreds) of performance management point tools. Some of these tools are specific to network, server, or storage; others provide only monitoring, dependency mapping, or analysis capabilities. To manage performance effectively across a modern enterprise, however, you need a performance management suite.
Focus on a suite that enables you to do four things: monitor, trace, troubleshoot, and customize. I discuss all four tasks in the following sections.

**Monitoring end-to-end**

Problems can occur anywhere, from a device to the data center. To diagnose performance issues accurately, you need to be able to monitor all aspects of the environment.

Monitoring starts with users, because their experience is the ultimate criterion by which a system is judged. If performance starts to degrade for users, it’s better for you to know before users even notice that things have started to slow down.

You can increase user productivity by 7 percent by proactively fixing user problems.

End-to-end user visibility requires the ability to monitor what’s happening on an actual device, as well as fine-grained packet and flow level monitoring to monitor user response times.

In addition, you need comprehensive infrastructure monitoring tools, which focus on the network. Comprehensive infrastructure monitoring tools not only go deep on network monitoring, but also provide insight into the rest of the data center infrastructure.

Make sure that your monitoring tools are application-aware, capable of analyzing specific protocols and traffic types and then reporting in terms of the actual applications involved.
**Tracing application transactions**

Application transaction tracing helps you track, monitor, and troubleshoot the performance of all components of multiple-tier applications and the transactions that link them. Following transactions complements your monitoring efforts, giving you a true, 360-degree view of performance in your environment.

In addition, you can use these tools to get accurate application-dependency maps — fantastic tools to use before you begin any migration activities in your data center transformation efforts.

**Troubleshooting performance issues**

You can decrease outages by 67 percent by troubleshooting application performance issues. But to ensure that you can uncover all types of performance issues, you need detailed analytics.

Good troubleshooting tools offer the following features:

- Offline, multiple-tier analysis of a single transaction
- Transaction delay breakdown
- Application capacity planning
- What-if scenario modeling

To get broad coverage, you need troubleshooting tools that integrate with a wide variety of monitoring tools. A tool that incorporates flow, packet, user, and transaction trace data provides the best troubleshooting analytics.
You also want tools that offer “try this” recommendations and transaction modeling to provide proactive or even predictive troubleshooting.

**Creating customized dashboards**

The final task in a good performance management strategy is creating customized dashboards, because visualizing application and user performance is critical to IT and to business executives.

From an IT perspective, a well-crafted dashboard ensures that you can make quick decisions on the overall health of your IT environment. As part of your data center transformation, you want to track applications, locations, users, and infrastructure types to make sure that things are progressing smoothly. A comprehensive performance management suite provides this level of tracking and allows you to transition quickly from viewing data to taking action.

From a business perspective, dashboards ensure that large projects (such as data center transformation) are occurring on time and on budget. An executive dashboard may be simpler than an IT dashboard, highlighting the health of specific applications broken down by relevant lines of business. The dashboard also may present relevant data about any chargeback models you’ve implemented.
Integrating Performance Management Tools

To take better advantage of your performance management suite, integrate it with the rest of your data center transformation investments. WAN optimization and application delivery controllers (ADCs), for example, can serve as data-capture devices that feed into your performance management environment. These controllers can reduce the cost of deploying dedicated flow and packet-capture devices.

You can go one step further by creating performance automation loops. Your WAN optimization controller, for example, is capable of shaping and prioritizing traffic. If you integrate performance management with WAN optimization, you can trigger automatic actions based on performance problems as they arise. Similarly, you can measure the user experience of a particular web application and then automatically trigger a content-optimization or load-balancing action on your ADC.
Chapter 7

Ten Ways To Justify Your Data Center Transformation

In This Chapter
▶ Delaying costly upgrades
▶ Eliminating unnecessary infrastructure
▶ Saving IT personnel time and energy

Transforming your data center is the key to meeting changing business requirements and rising user expectations. If your organization is like most, though, you need to justify your IT projects.

The good news is that data center transformation efforts provide compelling benefits. This chapter outlines ten areas in which performance acceleration and performance management technologies can benefit virtually any organization.

Improving User Productivity
Arguably, IT’s most important mission is to keep employees productive and happy. Most employees,
however, spend minutes or even hours accessing slow applications and data. Performance acceleration technologies such as WAN optimization, application delivery, and storage delivery remove this obstacle. Keeping users productive not only provides direct, immediate savings, but also saves money over the long term by bolstering employee satisfaction and retention.

### Delaying Bandwidth Upgrades

In addition to accelerating applications, WAN optimization typically reduces bandwidth consumption by 60–95 percent. That savings can enable you to delay a bandwidth upgrade project, which can cost thousands of dollars per site — or tens of thousands of dollars for international sites in remote and emerging nations.

### Eliminating Recreational Traffic

Chances are that video traffic from websites such as YouTube or Netflix consumes up to 50 percent of your corporate bandwidth. Some of this traffic may be business-critical, but most of it is likely to be recreational traffic. Quality of service (QoS) can prioritize business-critical applications and restrict network use to sites that drive business value, which can also reduce bandwidth needs and allow you to postpone upgrades (see the preceding section).

### Reducing Server Infrastructure

Application delivery controllers (ADCs) improve the uptime of an application and reduce the number of web servers needed for an application by making servers more efficient. As a result, you can further consolidate
and virtualize your server infrastructure, as well as eliminate unnecessary costs.

**Centralizing Branch Infrastructure**

Combine WAN optimization and storage delivery to centralize servers, applications, and data from your remote sites, all without affecting user experience. Centralizing your branch infrastructure eliminates the need to run dedicated servers and storage at remote sites and can cut IT costs at each location by 30–50 percent.

**Making Branch Backups Unnecessary**

Storage delivery technologies eliminate storage at your branch locations, which has many ancillary benefits. You no longer have to run expensive, dedicated branch backup solutions, which often require software, backup media such as tape, and local personnel. You can multiply these cost savings by the number of sites where you use storage delivery.

**Using Cheaper Network Links**

Building hybrid networks (as described in Chapter 5) can dramatically change the economics of your network. Consider using cheaper Internet links and virtual private networks (VPNs) to get as much as five times the bandwidth for one fourth the cost of traditional WAN choices.
Leveraging Cloud Storage

Back up all your data center storage can be costly. Even if you’ve moved to technologies such as virtual tape libraries, you still need to maintain in-house infrastructure to store backup and archive data. Cloud storage of data, however, costs only a few pennies per gigabyte per month. Many companies are eliminating expensive backup and archive infrastructure. Instead, they’re saving up to 80 percent by using storage delivery technologies that leverage public cloud storage.

Improving IT Staff Productivity

Performance management solutions that provide an end-to-end view of users, applications, and infrastructure can improve IT efficiency by enabling faster problem identification, quicker mean time to resolution, and fewer on-site visits to resolve performance issues.

Consolidating Monitoring Tools

A comprehensive performance management suite reduces the need for separate monitoring tools to track user experience; trace application transactions; and monitor components, servers, the network, and other infrastructure. Many organizations can eliminate a dozen or more separate products by using a performance management suite.
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