

Proactive WAN Application Optimization – A Reality Check



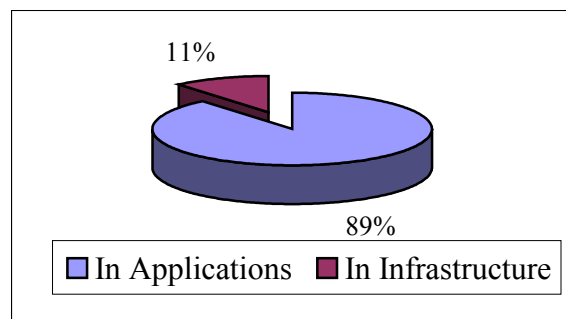
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1.0 Introduction

IT organizations have always been under pressure to demonstrate the business value that they provide. During the dot com era, many companies had the belief that Information Technology (IT) provided immeasurable value since it would allow them to quickly and easily enable fundamental business transformations. It is now well understood that enabling fundamental business transformation is actually quite difficult. It is also well understood that IT organizations that wish to enable business transformation need to start by focusing on facilitating the performance of their company's key applications.

In the post dot com era, there is increased pressure on IT organizations to demonstrate business value. To understand the value that business and functional managers get from IT, Ashton, Metzler & Associates recently surveyed roughly 200 IT professionals. These IT professionals were asked to identify where their company's business and functional managers saw value from the IT function. Was it in the infrastructure? Or was it in the applications?

Their answers to that question are summarized in Figure 1.



Source: Ashton, Metzler & Associates

Relative Value of IT
Figure 1

Figure 1 demonstrates that a company's business and functional managers primarily see the value of IT as coming from the applications that they use on a daily basis. That view was reinforced by one of the IT professionals that were interviewed as part of the creation of this white paper (see section 2.0 – Research Methodology). The interviewee is the COO of an Electronic Records Management Company. He stated that, "The days in which an IT organization can show business value merely by implementing and managing the infrastructure are over. Today, IT organizations absolutely must ensure the effective performance of applications."

One of the principal ways that IT organizations look to enable the optimum performance of the company's key business applications is through deploying WAN application optimization products that provide functionality such as TCP acceleration, Wide Area File Services, and QoS. When companies first deployed these products they were

typically seeking to solve a well-defined problem on a small subset of their overall network. Also, as is typical when companies deploy first generation products, performance was one of the key criteria that companies used at that time to select a product.

However, as will be demonstrated in this white paper, now that the WAN application optimization marketplace is maturing, some fundamental shifts are underway relative to how these products are deployed and selected. In particular, one of the key marketplace shifts that are occurring is that companies are becoming more proactive in their deployment of these techniques. In addition, while the performance of these products is still a key selection criterion, the ease of deploying and managing these products has also become a key selection criterion.

2.0 Research Methodology

In October 2005, a survey was distributed to the subscribers of Webtorials. The goal of this survey was to gather quantifiable insight into the use of network management in general, and the use of WAN application optimization techniques in particular. There were two hundred and thirty four responses to the survey. Throughout this white paper, the IT professionals who responded to this survey will be referred to as The Survey Respondents.

In addition to the survey, interviews were conducted with several IT professionals. The purpose of these interviews was to gather detailed insight into the usage of WAN application optimization products.

As is often the case, company policy precludes the interviewees from being quoted by name in this white paper. Table 1 contains a brief description of the job description of each of the interviewees as well as the phrase that will be used throughout this white paper to refer to each interviewee.

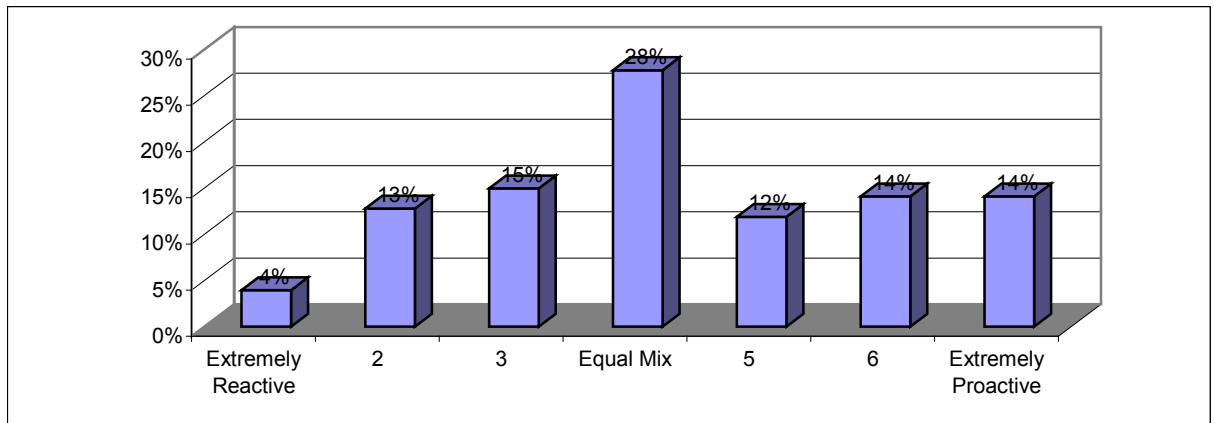
Brief Job Description	Phrase to Reference the Interviewee
Chief architect at a major motion picture company	The Motion Picture Architect
COO at an Electronics Records Management Company	The COO
Chief Information Management Officer for a branch of the DOD	The DOD Officer
IT architect at a multinational, diverse technology company	The Technology Architect
Architect at a Hospitality Company	The Hospitality Architect

**Listing of the Interviewees
Table 1**

3.0 Network Management

The survey respondents were asked to indicate their company's approach to overall network management in terms of how proactive or reactive the approach was. The survey defined a 'reactive' approach as focusing on fixing a problem after it occurs, while a 'proactive' approach was defined as focusing on implementing tools and processes to identify and eliminate problems before they occur.

The responses to this question are contained in Figure 2. As depicted in that figure, there is a tendency for IT organizations to be more proactive than reactive relative to network management. However that tendency is relatively slight and in general companies are roughly as likely to have a reactive approach to overall network management as to have a proactive approach.

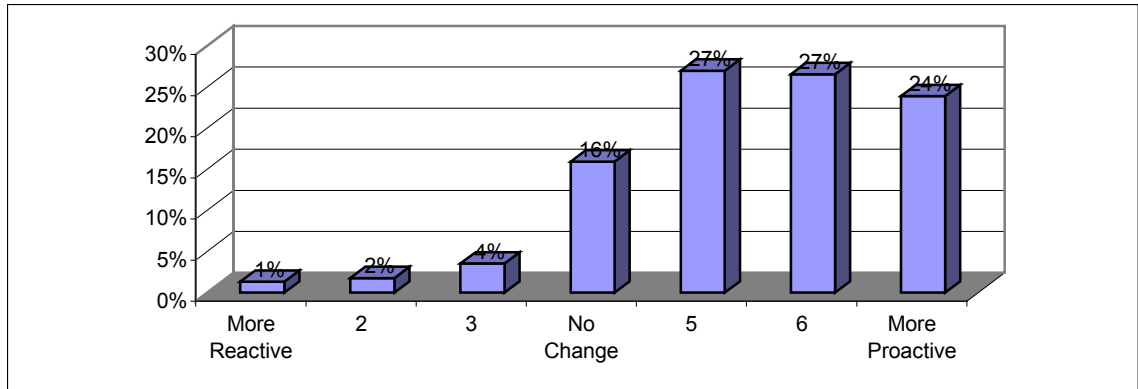


Source: Kubernan ¹

Approach to Network Management
Figure 2

The survey respondents were asked to indicate what changes they expected to their company's approach to WAN management over the next year or two. The responses to this question are contained in Figure 3.

¹ Kubernan is an analyst and consulting joint venture of Steve Taylor and Jim Metzler



Source: Kubernan

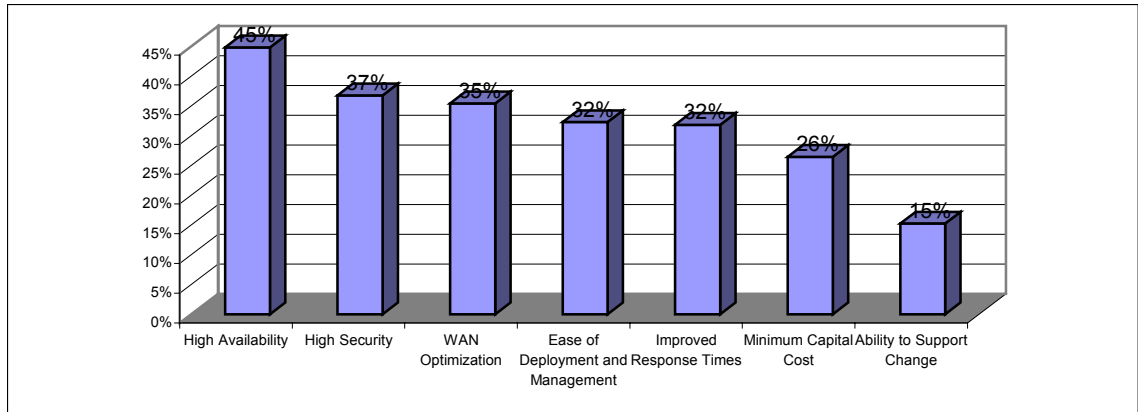
Anticipated Change in WAN Management Approach
Figure 3

The data in Figure 3 clearly reflects optimism on the part of The Survey Respondents relative to their organization becoming more proactive with managing their company's WAN. There were many reasons for this optimism. For example, The Motion Picture Architect stated that he thought that as devices became more intelligent, it would be easier for his company to implement more proactive WAN management.

The Technology Architect commented that his company has recently hired a new CIO. One of the key initiatives that the new CIO is driving is a reduction in the number of data centers that the company is going to support on a worldwide basis. The Technology Architect believes that in order for the company to successfully reduce the number of data centers, they will have to become more proactive at WAN management.

The Hospitality Architect pointed out that her company's approach to WAN equipment selection is changing from an emphasis on deploying a hot box to emphasis on manageability. She stated that on a going-forward basis her company "will not deploy it (a piece of WAN equipment) if we can not manage it."

The Survey Respondents were asked to indicate the two goals that are typically the most important to their IT organization during the design phase of a large project. So that all of the respondents had the same frame of reference, they were given two examples of what was meant by a large project. Those examples were consolidating servers into a centralized data center and installing the WAN infrastructure for new branch offices. The responses to this question are shown in Figure 4.



Source: Kubernan

**Primary Design Phase Goals
Figure 4**

As shown in Figure 4, the goals fall into a number of distinct categories. Those Categories are:

Most Important Goal

- High availability

Very Important Goals

- High levels of security
- WAN optimization for improved throughput and utilization
- Ease of deployment and ongoing management
- Improved response times for delay-sensitive applications

Important Goal

- Minimize the capital costs for devices such as switches, routers and servers

Somewhat Important Goal

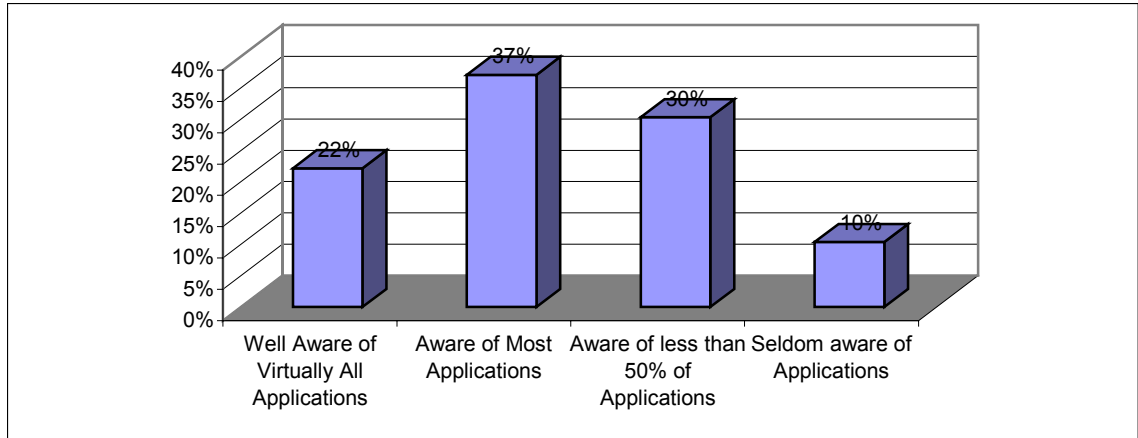
- Ability to support change

The DOD Officer noted that during the design phase his organization places a lot of importance on the ease of implementation, including ensuring that any new device that might be deployed is compatible with the other devices that are already on the network. His organization also places a lot of importance on ease of management, including the vendor’s responsiveness to situations in which there is a problem with the device.

Another interviewee that found ease of deployment and ongoing management to be important was the COO. He stated that, “On a scale of 1 to 10, ease of deployment and

ongoing management is about a 15.” He went on to explain that his company’s clients tend to be very large and very demanding. The COO regards the ease of implementation and ongoing management of IT functionality as being key to satisfying the needs of these customers.

One of the issues that have historically hindered application optimization is that network organizations are often unaware of applications before they get deployed. When asked about how knowledgeable their network organization is of application deployment, The Survey Respondents answered as shown in Figure 5.



Source: Kubernan

Knowledge of Application Deployment
Figure 5

As shown in Figure 5, the majority (59%) of network organizations are aware of most or all of their company’s applications before they get deployed. The fact that more than half of network organizations are aware of the majority of their company’s applications before they are deployed demonstrates that there is better communications between the network and the applications organizations than was the norm a year or two ago. This fact also indicates that IT organizations recognize the business value associated with a company’s key applications and hence are becoming more proactive relative to application management.

However, while the majority of network organizations are aware of most or all of their company’s applications before they get deployed, 41% of network organizations are not. These companies will continue to struggle optimizing application performance when they typically do not have even rudimentary knowledge of the company’s applications.

The COO commented that the network and applications organizations at his company are “very tight”. He pointed out that that tight relationship is a relatively new phenomenon and came about after a long period in which there was insufficient communications between the two organizations.

The Hospitality Architect stated that within her company there is not a tight relationship between the network and the applications organizations, She said that, “The network organization tends to be made aware of critical applications just before they get deployed.”

4.0 WAN Application Optimization

The Survey Respondents were asked how important WAN application optimization was to their organization relative to other network infrastructure priorities. Fifty two percent of The Survey Respondents indicated WAN application optimization was of more than average importance.

The Survey Respondents were then asked to indicate which optimization techniques their company’s IT organization had already deployed, and whether or not those techniques had been deployed broadly. The survey question defined *broad deployment* as meaning that the techniques had been deployed to more than half of the sites where it would be appropriate.

The responses to that question are shown in Table 2. Some of the conclusions that can be drawn from the data in Table 2 include:

- **QoS and Reporting are Hot:** The optimization techniques that have the broadest deployment, as well as the least number of companies with no plans to deploy, are QoS and Visibility & Reporting
- **TCP Acceleration is Hot:** The optimization technique with the largest percentage of companies that have not yet deployed it, but which plan to deploy it, is TCP acceleration
- **WAFS is Not:** The optimization technique with the narrowest deployment as well as the highest number of companies with no plans to deploy is Wide Area File Services

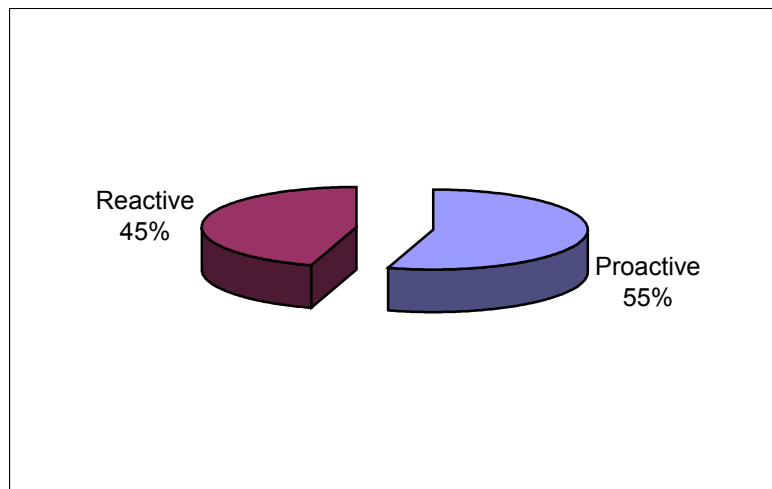
	No plans to deploy	Have not deployed, but plan to deploy	Deployed in test mode	Limited production deployment	Broadly deployed
Compression	27%	22%	9%	25%	17%
File Caching	31%	19%	11%	19%	20%
HTTP acceleration	37%	20%	8%	18%	17%
TCP acceleration	37%	24%	13%	17%	9%
Wide Area File Services	51%	23%	9%	11%	5%
QoS	11%	20%	12%	27%	30%

Visibility & reporting	23%	18%	11%	20%	28%
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Source: Kubernan

**Deployment of Optimization Techniques
Table 2**

In an attempt to determine if WAN application optimization techniques are being deployed in a proactive or reactive manner, we asked The Survey Respondents to characterize their company’s most recent deployment of these techniques. The survey question defined proactive as meaning that the deployment was planned well in advance as part of an overall strategy, and defined reactive as meaning that the deployment was in response to user complaints or rapid escalation in link utilization.

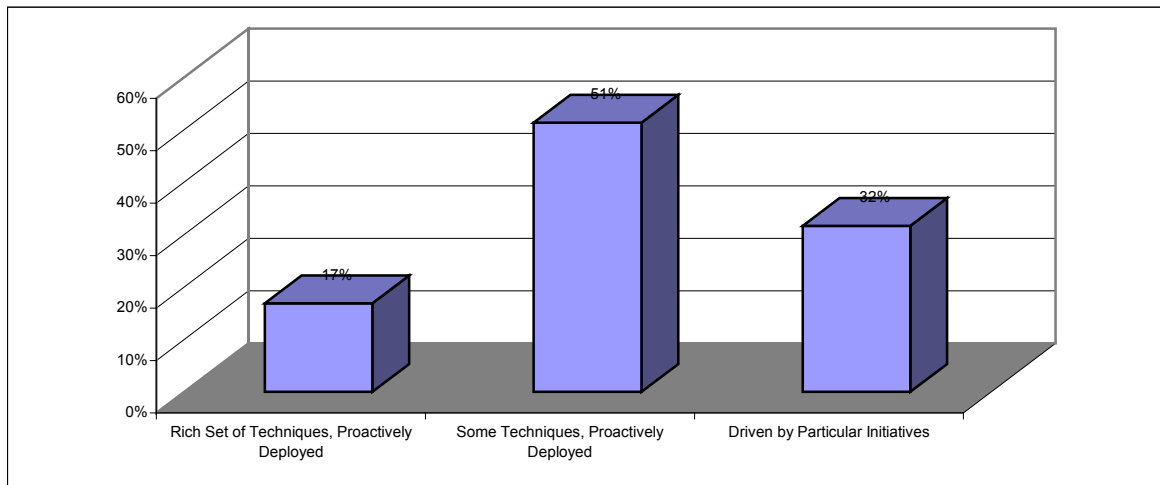


Source: Kubernan

**Characterization of Most Recent Deployment
Figure 6**

Figure 6 indicates that the majority of the recent deployments of WAN application optimization techniques were done in a proactive manner.

To put the data in Figure 6 in a broader context, we asked The Survey Respondents to describe their company’s overall approach to deploying WAN application optimization techniques. Their responses are contained in Figure 7. As the data in Figure 7 demonstrates, the vast majority of companies are taking a proactive approach to deploying WAN application optimization techniques.



Source: Kubernan

**Approach to WAN Application Optimization
Figure 7**

The COO stated that his company’s initial deployment of WAN application optimization techniques was to solve a particular problem. He also stated that his company is “absolutely becoming more proactive moving forward with deploying these techniques.”

In a similar fashion, The Motion Picture Architect commented that his organization has been looking at these technologies for a number of years, but has only deployed products to solve some specific problems, such as moving extremely large files over long distances. He noted that his organization is now looking to deploy products proactively to solve a broader range of issues relative to application performance. According to The Motion Picture Architect “Even a well written application does not run well over long distances. In order to run well, the application needs to be very thin and it is very difficult to write a full featured application that is very thin.”

5. The Need for Simplicity

According to The Survey Respondents, the implementation and ongoing management of WAN application optimization products each contribute approximately as much to the Total Cost of Ownership (TCO) as does the initial product cost. Because of that, lowering the TCO is one of several reasons why many of The Survey Respondents were looking for products that were simpler to implement and manage.

The hospitality architect stated that, “The ability for a WAN application optimization product to be transparent to applications from a traffic analysis perspective is extremely important to us. We want to be able to use our existing tools to see things like source and destination IP address as well as source and destination port”. She went on to say that if

you deploy a product that takes away this visibility that you have the burden of finding another way to get this visibility back.

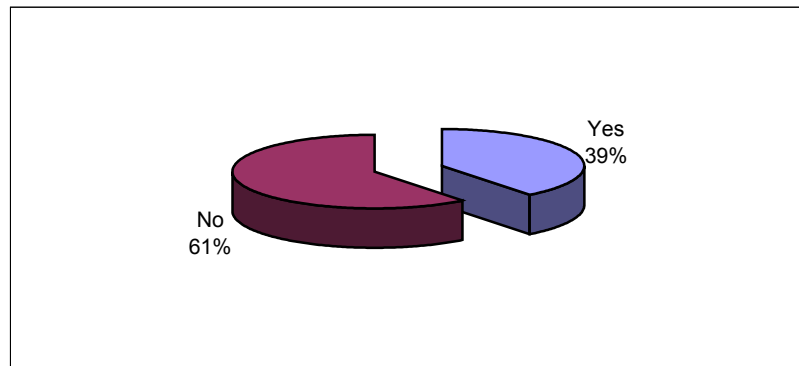
The Motion Picture Architect described his need for simplicity when he stated that relative to WAN application optimization products what he wants is “something that you just plug in and it works.” He added, “The whole idea of an appliance is to make the average IT guy more productive. It is not there to tie up an expert.”

The COO and the Technology Architect concurred. The COO said that, “If I can just plug it in and it works, that is invaluable.” The Technology Architect added that, “Deploying WAN application optimization products makes the operations group nervous, and so they resist deploying these products. They are nervous because the new product may cause problems and because the new product may make it difficult to troubleshoot a problem.”

With the goal of simplicity in mind, The Survey Respondents were asked to indicate how complex WAN application optimization products were to implement. So that all of the respondents had the same frame of reference, we defined ‘average complexity’ to mean that the WAN application optimization product was as complex to implement as a LAN switch. Forty nine percent of The Survey Respondents indicated that WAN application optimization products were more complex to deploy than a LAN switch.

The Motion Picture Architect noted that his company had deployed some SSL accelerators that were extremely difficult to deploy. He stated that, “even the vendor did not know how to make them work.” The Motion Picture Architect also pointed out that WAFS solutions are “really complex”. He stated that when you deploy a WAFS solution, you “trust the congruency of your company’s data to a black box.” He added, “If the WAFS solution goes south, you may have to touch all of your desktops again.”

In order to better understand the complexity associated with implementing WAN application optimization products, we asked The Survey Respondents whether or not their company as ever implemented a WAN application optimization product and experienced a surprising side effect – such as having to reconfigure a firewall. Their responses are contained in Figure 8.



Source: Kubernan

**Experienced a Surprising Side Effect
Figure 8**

Given the high percentage of companies that have experienced a surprising side effect, the survey drilled down further on this topic. In particular, The Survey Respondents were asked to indicate which tasks took longer than expected the last time their company implemented a WAN application optimization product.

Table 3 contains the primary tasks that are associated with implementing a WAN application optimization product along with the percentage of The Survey Respondents that indicated that performing that task took more time than anticipated the last time their company implemented a WAN application optimization product.

Implementation Tasks	Took More Time Than Expected
Install the appliance	30%
Configure the box to communicate with other devices in the network	45%
Implement policy changes on WAN routers	42%
Test the appliance	38%
Determine the available bandwidth and the percentage to be used by the appliance	46%
Set up service classes	49%
Implement workarounds to make the appliance work with QoS functionality or MPLS	48%
Either turn on or turn off certain optimization features	30%
Add routing rules to direct traffic flow through the appliance	40%
Check for impact on devices such as firewalls, Intrusion Detection Systems, and Intrusion Prevention Systems	47%

Source: Kubernan

**Implementing a WAN Application Optimization Product
Table 3**

Seventy one percent of The Survey Respondents whose company had experienced a surprising side effect indicated that the impact of that side effect was at least moderate, and one company out of eight indicated that the impact of the side effect was very significant.

The DOD Officer noted that testing and configuration typically consume half of the time it takes to implement a WAN application optimization product. However, he added, “If things go wrong, you can spend a lot of time fixing the problem.” The DOD Officer also commented that a recent deployment of WAN application optimization products did not go well and the IT organization had to implement static IP addresses in order to get the devices to work properly.

The Motion Picture Architect agreed that initial testing often consumes a large amount of time. He noted that his organization always tests WAN application optimization products in a lab prior to deploying them. However, he pointed out that a laboratory environment is not the same as a production network and so, even if the product performs well in the lab, it still needs to be tested in the production network.

The Motion Picture Architect also pointed out that the challenge facing all WAN application optimization products is that they need to be really well thought out. He stated that when you deploy them and say, “Just optimize these three applications”, then “They’d better be able to do just that.” He had this concern because there was a failure in his network a few weeks ago due to a surprising side effect of implementing a WAN application optimization product. What happened was that they turned on acceleration for a particular application and it was not supposed to touch any other applications. Not only did it touch several other applications, it caused them to fail.

Keeping the goal of simplicity in mind, The Survey Respondents were also asked to indicate how complex WAN application optimization products were to manage. This question had the same frame of reference as the question about implementation in that we again defined ‘average complexity’ to mean that the WAN application optimization product was as complex to manage as a LAN switch. Fifty three percent of The Survey Respondents indicated that WAN application optimization products were more complex to manage than a LAN switch.

The Technology Architect commented that, “Any time you drop a box in the middle of a network, there is a chance that it will cause a problem.” He added that, “Vendors seem to be making a real attempt to make their boxes be easy to install. However, they do not seem to be motivated to make them easy to manage or troubleshoot.” He added that, “These products are easy to manage as long as they work. If they do not work, troubleshooting is very difficult.”

The Motion Picture Architect agreed and stated that if things go well, a junior member of the IT organization can install and manage a WAN application optimization product. However, he also noted that if things do not go well, that a junior IT professional cannot fix the problem, as it requires a high degree of expertise, potentially in multiple disciplines. The Motion Picture Architect further added that if a WAN application optimization product is performing badly that it is hard to convince upper management that it is “just teething pains” and that it makes sense to make further deployment of these products.

6. Summary and Conclusions

As shown in this white paper, in order for IT organizations to demonstrate that they add business value, they must focus on ensuring the optimum performance of the company’s key applications. One of the principal ways that IT organizations can ensure the best

performance of applications is by implementing WAN application optimization techniques.

WAN application optimization techniques are not new – companies have been deploying them for several years. The deployment of these techniques has historically been very narrow, reactive, and focused on the hottest box. An example of such a deployment is a company that deployed compression on just one or two WAN links in response to user complaints. That company has typically chosen the hottest box (i.e., the product that had the highest compression ratio) and the fact that this product was difficult to install and manage was not a major consideration.

However, given both the increasing scale of deployments as well as the importance that companies place on applications, there are some fundamental shifts underway in terms of how WAN application optimization techniques are selected and deployed. For example, the majority of companies are now deploying WAN application optimization products as part of a broad, well thought out strategy, and not just in response to user complaints and poor performance on one or two WAN links.

Another fundamental shift is being driven by the complexity of many of these products, the side effects that often result during implementation, as well as the high cost associated with implementing and managing these products. In particular, many IT organizations are now placing much greater emphasis on choosing a product that can be implemented in a transparent fashion and efficiently managed on a broad scale.

The bottom line is that IT organizations will continue to deploy WAN application optimization products in response to tactical issues. However, IT organizations looking to show business value will increasingly deploy WAN application optimization products in a systematic and proactive fashion. By doing this, these companies will reap the benefits of better application performance, more efficient WAN utilization, and lower TCO.