

2004

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# WAN Equipment

## State of the Market Report

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Produced By:

**Webtorials**

# 2004 WAN Equipment State of the Market Report

## Introduction

In May 2004, the worldwide Webtorials community was surveyed concerning their satisfaction with existing wide area networking (WAN) equipment and their plans for implementing new equipment. The sampled community was sufficiently large to ensure that the results were consistent among these respondents, who consisted primarily of networking professionals with decision making, recommending, and influencing responsibilities.

Survey respondents also represented a wide cross-section of both company sizes and network sizes. Moreover, the base was truly multinational, with almost half of the responses coming from companies based outside the US. Detailed demographic information is included as an appendix.

In the following pages, the summary results of this study are presented along with commentary interpreting the results. Where appropriate, results are also contrasted with other Webtorials State-of-the-Market Reports. Additionally, this inaugural WAN Equipment State-of-the-Market Report provides a baseline for comparison for future reports.

This report is made available in part due to the generous support of Packeteer.

## WAN Services Overview

Even though the primary focus of this report is equipment rather than services, WAN equipment is by definition used in conjunction with a network service of some form. Thus, it is important to determine what services the respondents are currently using in order to provide a context for the responses concerning equipment.

Respondents were asked to indicate which of the services their company currently uses for WAN communications among their various sites. The choices were "Frame relay," "ATM," "MPLS-based Private IP VPN (including IP-enabled frame relay)," "Internet-based (IP-Sec) VPN," and "Dedicated transmission service (Private line)" both "at T1/E1 speeds or less" and "at T3/E3 speeds or above, including SONET." Since some

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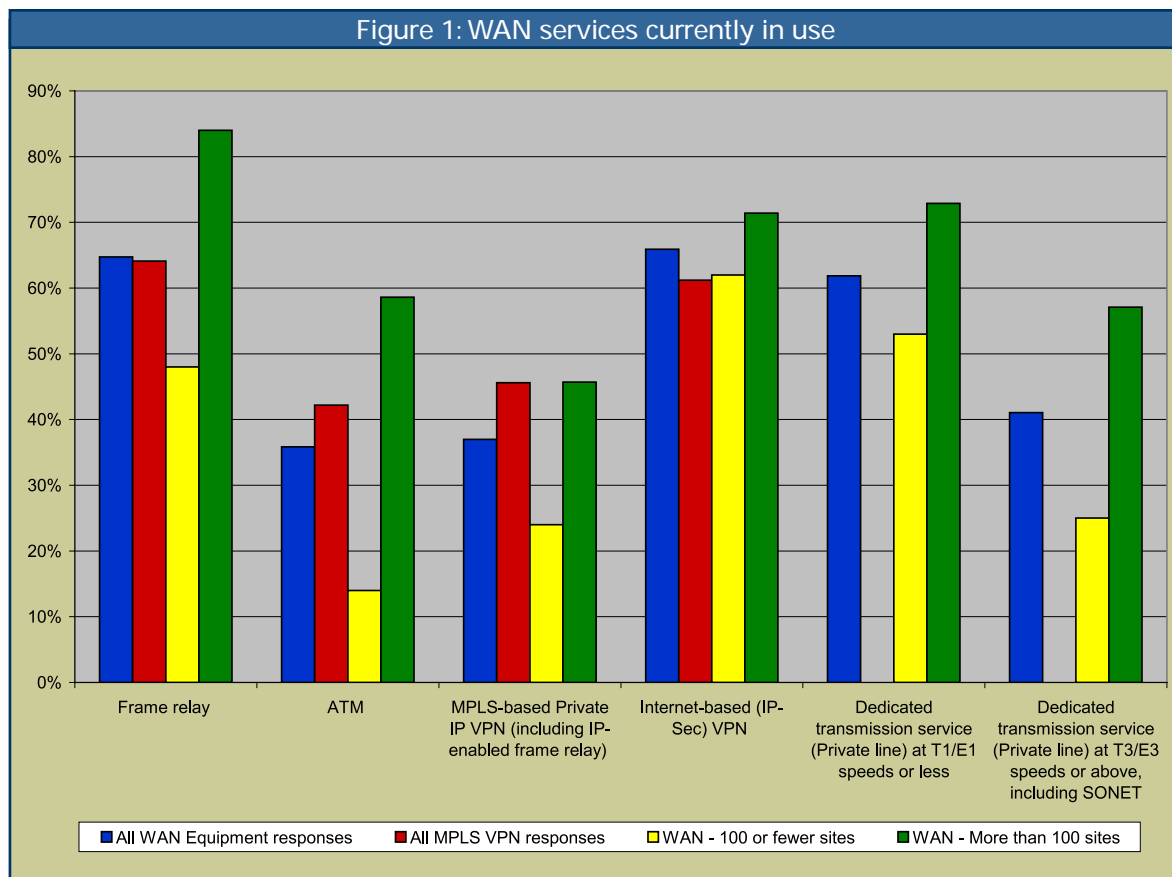
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of the services described here can be layered, such as Internet over frame relay over T1, the question was also clarified in that it referred to the respondent's view of the service delivered, not the service provider's core network infrastructure. For instance, if a respondent used frame relay service, but one happened to know that the service provider used ATM to transport the traffic, this was designated as a frame relay service and not an ATM service.

As shown in **Figure 1**, roughly two-thirds of the respondents use Frame relay, and about the same percentage use Internet-based (IP-Sec) IP VPNs. Almost as many, 62% of the respondents, also use dedicated transmission services in the T1/E1 or less speed range. The other options were much less frequently used. Dedicated transmission services in the T3/E3 and above speed range are in use by 41%, followed by MPLS-based VPNs with 37%, and ATM with 36%.

Figure 1 shows relatively close correlation between these usage levels and the levels found in the 2004 MPLS-based IP VPN Survey. It is not surprising that in the MPLS survey, MPLS usage is a bit higher, since the survey would naturally attract MPLS users. Additionally, the dedicated services were not included in the MPLS survey.

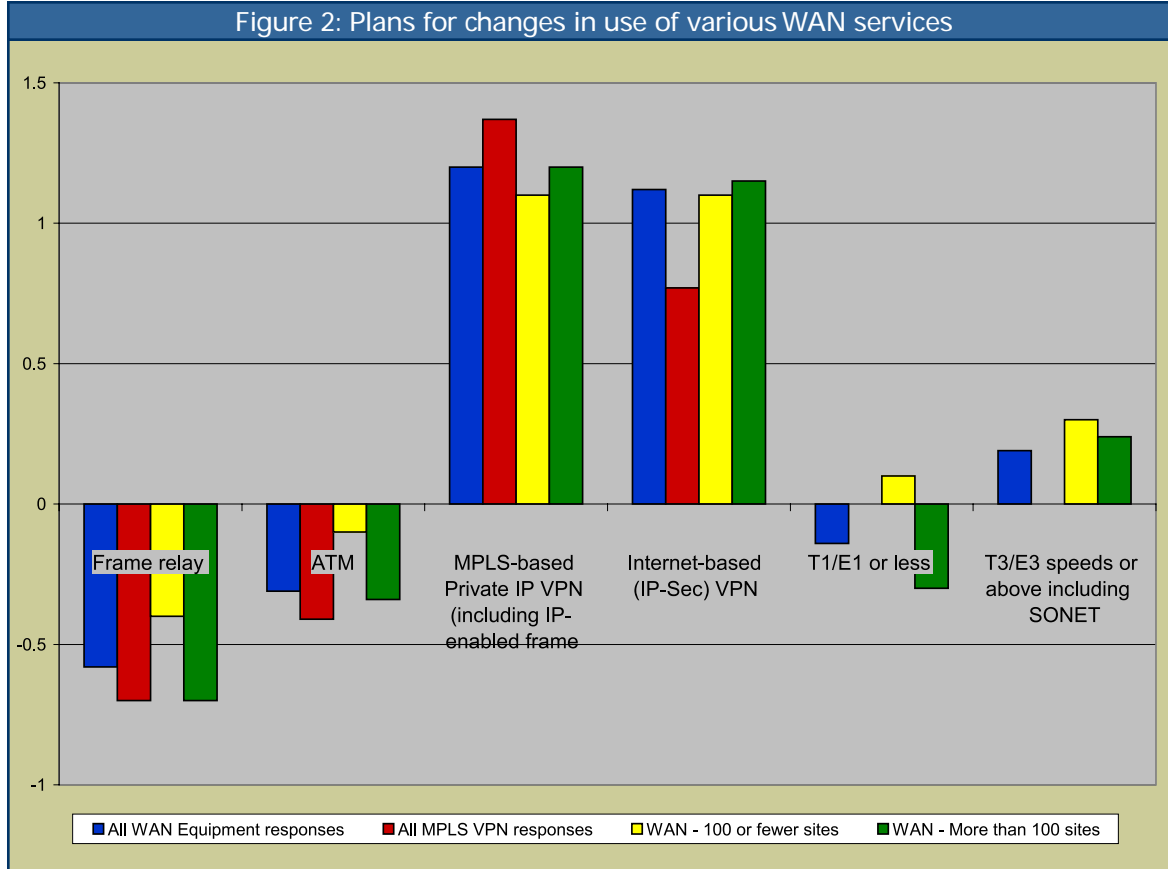
The comparison of larger networks to smaller networks revealed some not-too-surprising differences. Overall, 40% of the survey respondents had more than 100 net-



work sites, and 50% had fewer than 100. (The remaining 10% represented service providers, etc.) There was a higher percentage of all service types in the larger networks. It is of interest that the frame relay service penetration was significantly less among the smaller nets than among the larger nets. In fact, there was less usage of frame relay than of Internet-based VPNs (which dominated this category) and lower-speed dedicated transmission services in the smaller networks.

With this information as a baseline, the respondents were then asked to indicate their plans to increase or decrease their dependence on and usage of each service category over the next year. In **Figure 2**, these responses have been translated into a numerical average, where positive values indicate an increase, zero indicates little or no change, and negative values indicate a decrease. Larger positive or negative values represent more significant increases or decreases. In more detail, a value of plus or minus 1 indicates the response "Increase/Decrease use

Figure 2: Plans for changes in use of various WAN services



somewhat," and a value of plus or minus 2 indicates the response "Significantly increase/decrease use."

Clearly, the services with the most significant increase in usage are VPN services, and there is relatively little difference across the sub-demographics. The differences between the respondents to the MPLS study and the respondents to this study are once again explained by this survey's likely target audience.

According to the survey, frame relay and ATM are the services most likely to see decreases in usage, and the drop-off among the larger users should be greater. The market impact of this decrease may be compounded by the fact that these users also constitute a larger percentage of the current users. That is, the group using these services the most is likely to decrease usage most significantly.

The anticipated changes in usage of dedicated transmission services (T1/E1 and T3/E3) are not drastic, so these services seem to have reached a plateau.

With regard to the magnitude of changes in future usage, users anticipate a more significant increase in their use of VPN services than they anticipate in their increase or decrease of their usage of other services. This indicates that networks will continue to be a heterogeneous blend of various service types. That is, the increase of usage in VPNs is additive rather than a total replacement.

erogeneous blend of various service types. That is, the increase of usage in VPNs is additive rather than a total replacement.

## Current and Planned Equipment Types

Survey respondents were asked to identify what types of equipment they use in their networks and whether this equipment is provided as part of a managed service agreement. As shown in **Figure 3**, routers are – not surprisingly – used almost universally. At least 80% of the respondents also use stateful inspection firewalls, WAN network monitoring equipment, basic and integrated CSU/DSUs, network intrusion detection/prevention systems, and IP-Sec VPN appliance functions.<sup>1</sup>

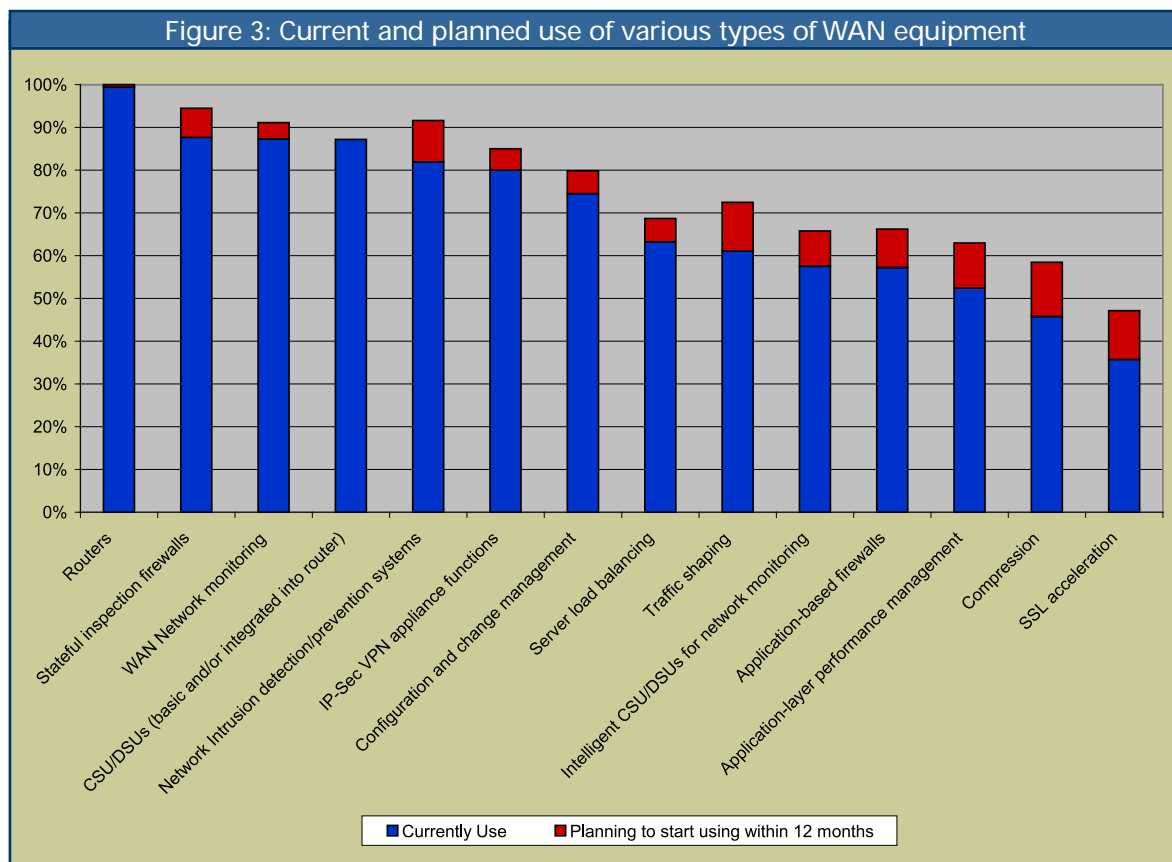
<sup>1</sup> Note that long distance savings are realized when the company has multiple sites. Carriers have also taken advantage of IP to reduce long distance costs, contributing to the price reductions in long distance over the last several years

The only devices in use by fewer than 50% of the respondents are compression devices and SSL acceleration appliances. The relatively low usage of SSL acceleration devices is not surprising, considering the fact that these devices are so new to the market. Indeed, this level of market penetration is a bit higher than one might expect.

On the other hand, the usage of compression is surprisingly low, especially considering that the capabilities have been in existence in some form for several years. One explanation for the lack of use of compression is that network bandwidth has been inexpensive enough that compressing data was hardly worth the trouble. In fact, among respondents based in the US, where bandwidth tends to be especially inexpensive, only 40% of the respondents indicated that they use compression, compared with 46% worldwide.

The other aspect of Figure 3 that is especially of interest is the indication of planned addition of capabilities. In this case, compression is the capability that should see the most additional use; 13% of the respondents intend to begin using it. This is consistent with a trend that we will find throughout this report: many companies are currently spending more energy optimizing their current networks than developing new capabilities.

The trend toward optimizing current networks is also indicated by the plans of 11% of respondents to add traf-



fic shaping, which brings the projected total (in 12 months) to about three-fourths of the respondents. The hottest "new" application is SSL acceleration, which should also be newly implemented by 11% of the respondents.

Other capabilities that should see significant growth are application-layer performance management (10%), network intrusion detection/prevention systems (10%), and application-based firewalls (9%). The changes in these areas help confirm yet another recurring theme: application performance management and security concerns are top priorities for corporate networks.

The area that is particularly disappointing in both current and planned use is intelligent CSU/DSUs for network monitoring and management. Currently, 58% of the respondents indicated that they use these devices, and only 8% indicated that they plan to start using them. These devices can pay for themselves easily in a very short time, so their lack of market penetration remains puzzling. The inclusion of these functions in routers with integrated CSU/DSUs

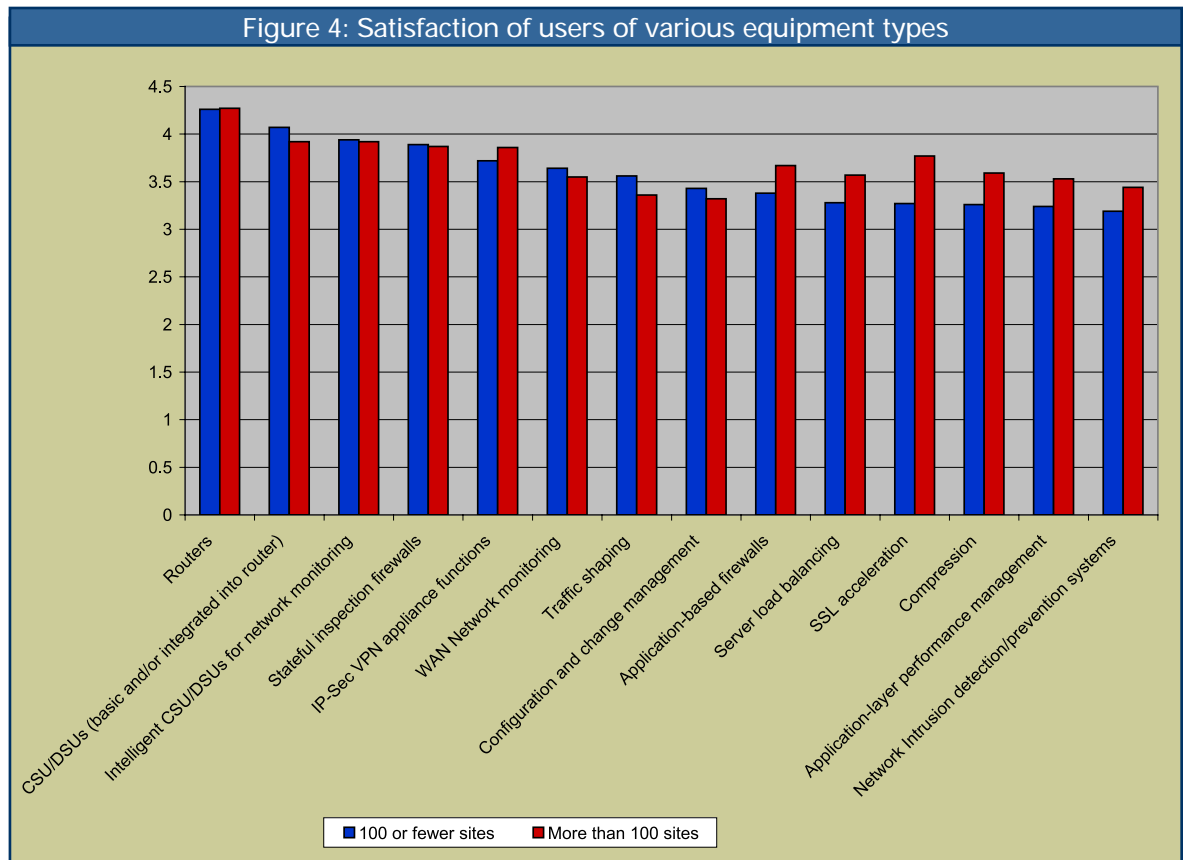
may also help expand use in this category.

In the above analysis of use of equipment, a distinction was not made between equipment owned by the customer, equipment supplied as a part of a managed service, and equipment that was a mix of owned and managed service equipment. The survey results indicate that managed services have not yet made a significant impact on the equipment market. For all equipment types in use,

71% of respondents indicated that their company owned all equipment, 16% indicated a mix of company and managed service products, and only 13% indicated that all equipment was supplied as part of a managed service. In fact, CSU/DSUs – both basic and intelligent – were the only category in which greater than 10% of the respondents indicated that the equipment was supplied as part of a managed service. For respondents indicating use of a mix of customer-owned and managed services, basic CSU/DSUs (used by 19% of this group), routers (used by 19%), and WAN network monitoring (used by 15%) were the services most frequently in use.

## Satisfaction and Dependence on Various Equipment Types

For the same categories as above, respondents were asked how satisfied they were with each type of equipment. More specifically, the respondents were asked to



indicate their current level of satisfaction using a scale from 1 – indicating "Not satisfied" – to 5 – indicating "Highly satisfied."

As shown in **Figure 4**, most respondents were generally satisfied with the performance of their networking equipment. This seems to be the case for both larger (greater than 100 sites) and smaller (100 sites or fewer) networks.

As a rule, users are more satisfied with more traditional equipment. The functions of routers, CSU/DSUs, and stateful inspection firewalls are well established and well known. Consequently, they seem to perform well for most users.

Although the differences between satisfaction levels for various types of equipment is not enormous, newer equipment is generally less likely to meet the expectations of its users. Also, differences between larger and smaller networks are more pronounced in these newer areas, which include application-based firewalls, server load balancing, SSL acceleration, compression, application-layer perform-

ance management, and network intrusion detection/prevention systems. In these cases, users with more than 100 sites tended to be more pleased than users with fewer than 100 sites. However, the reason for this discrepancy is not immediately obvious. It may reflect the general trend that telecommunications products tend to be somewhat complex in their early development, and, consequently, new technologies are more readily deployed by organizations with larger support staffs.

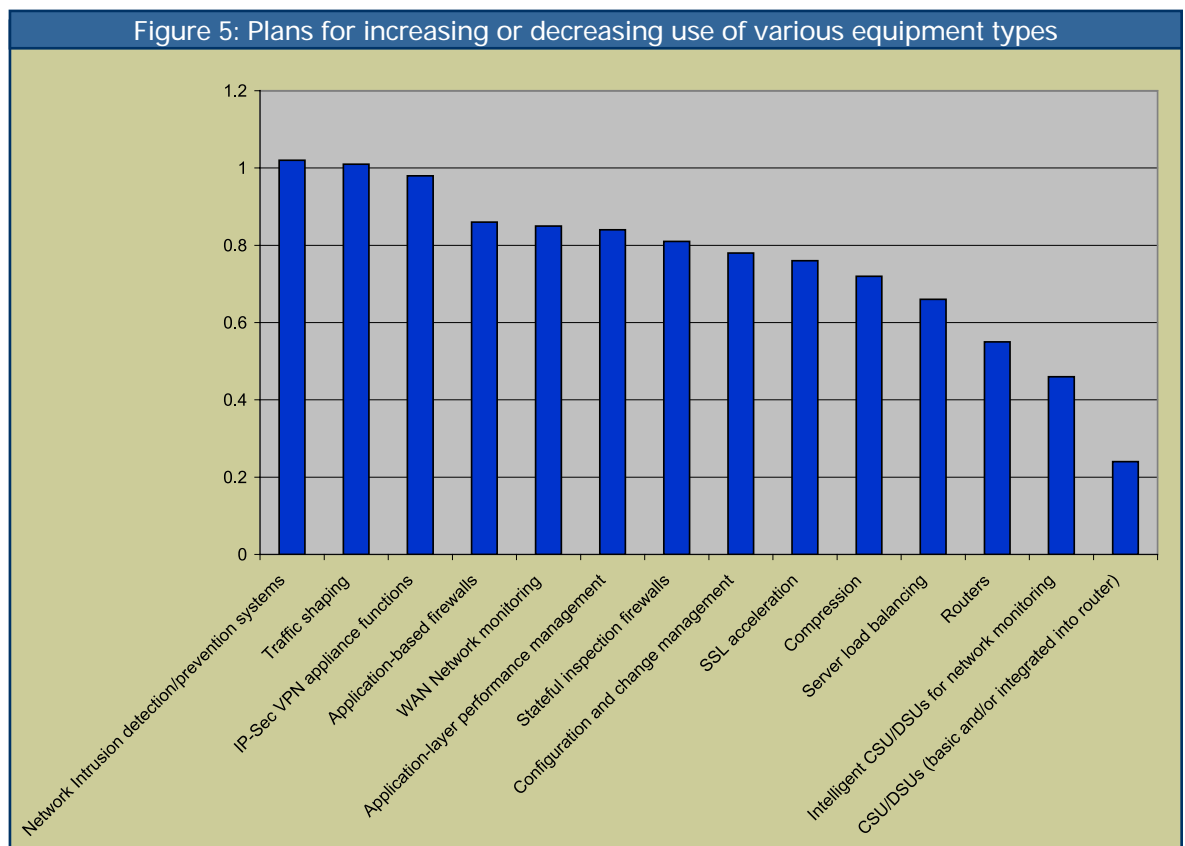
In a question analogous to the above discussion of planned use of services, respondents were asked to indicate their plans to increase or decrease their dependence on and use of various types of equipment over the next year. In **Figure 5**, these responses have again been translated into a numerical average, where positive values indicate an increase, zero indicates little or no change, and negative values indicate a decrease. Larger positive or negative values indicate larger increases or decreases. As before, a value of plus or minus 1 indicates a response of "Increase/Decrease use somewhat," and a value of plus or minus 2 indicates the response "Significantly increase/decrease use."

In this case, no areas showed a decrease in dependence, although the equipment that is already most widely deployed – routers and CSU/DSUs – showed the least increase in use.

Three categories – network intrusion detection/prevention systems, IP-Sec VPN appliances, and traffic shaping appliances – tied for the

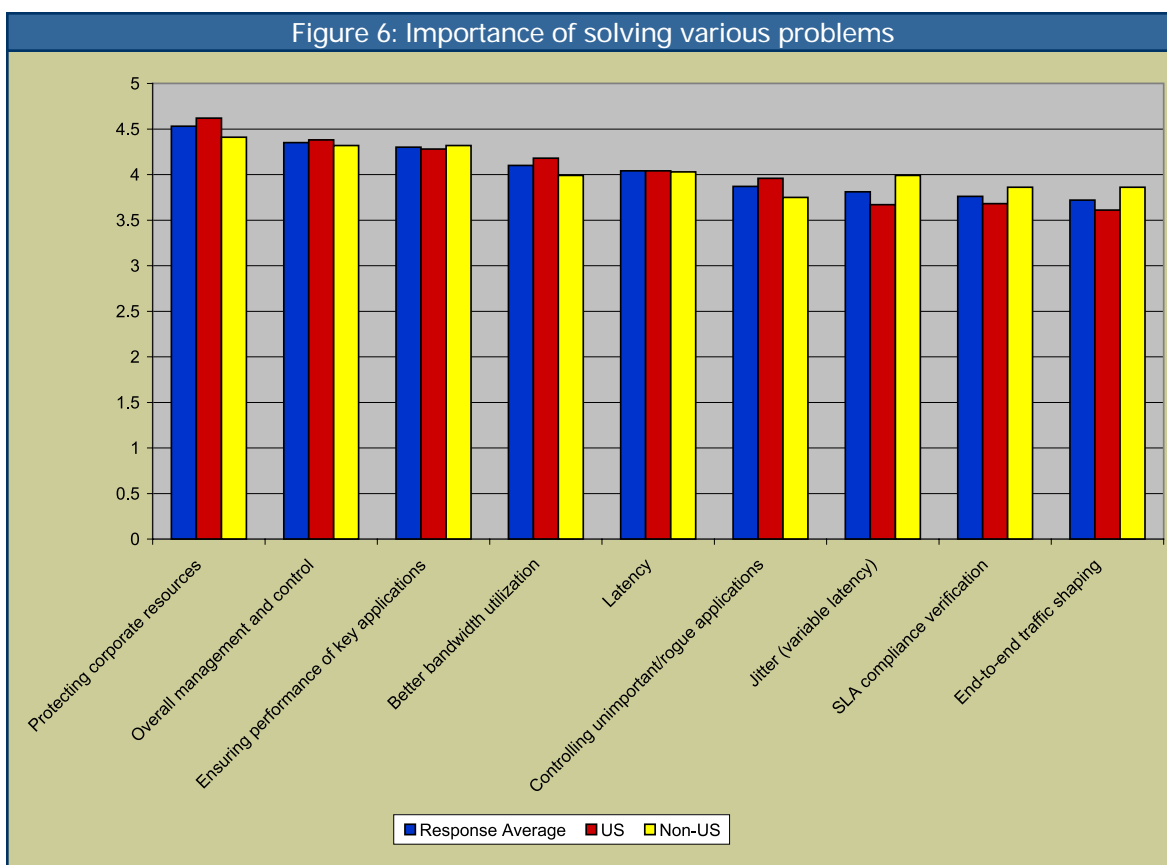
most expected increase in use. The increase in the use of network intrusion detection/prevention is certainly expected, especially with the increased dependence discussed above on Internet-based VPNs. The dependence on the Internet also helps to explain the need for VPN appliances. Traffic shaping, of course, continues as a top priority regardless of a company's network infrastructure. Once again, the industry trend towards optimization of current networks is reinforced.

One of the few surprises in Figure 5 is that compression falls so relatively low in the stack, especially considering the strong showing that the technology made in the "Plans to implement" category. Of course, this could be explained to some extent by the fact that – even though a significant number of respondents indicated that they planned to begin using compression – compression was second only to SSL acceleration in the number respondents who indicated they "Don't know/Don't use" the technologies (42% of the respondents chose this option).



## Critical Problem Areas

The respondents were queried as to which areas gave them particular problems. They were asked to rank the importance of solving each of a number of problems using their WAN networking equipment, using a scale from 1 ("Not at all important") to 5 ("Critical"). Their responses are summarized in **Figure 6**.



Overall, management-oriented problems out-ranked more technology-specific problems. "Protecting corporate resources," "Overall management and control," "Ensuring performance of key applications," and "Better bandwidth utilization" were judged to be the top concerns by the respondents as a whole. Interestingly, all of these but "application performance" were also considered to be of slightly greater import by respondents headquartered in the US than by Non-US respondents. The Non-US respondents, on the other hand, tended to be more concerned about jitter and latency than did their US-based

counterparts. Some of the difference can probably be attributed to the Non-US respondents having more global networks where jitter and latency would be more likely to be an issue.

Perhaps the most interesting result in Figure 6, though, is the relatively low importance of Service Level Agreement (SLA) compliance verification. In spite of the prevail-

ing attitude that SLAs are extremely important, having a capability to measure this compliance seems to be less-than-critical. This is particularly disturbing, since an SLA is only as good as its ability to be measured. If performance cannot be measured, then there is no remediation available in the event of non-conformance. The only mitigating factor here may be that the question explicitly asked about solving problems using the WAN equipment.

Consequently, the respondents may be using service-provider based reports to ensure SLA compliance – a tactic that is suboptimal at best.

In a related question, the respondents were asked again to use a scale of 1 ("Not effective") to 5 ("Extremely effective") to indicate how effective they themselves have been in dealing with a number of issues in their WANs. As shown in **Figure 7**, the area in which they feel they have been most effective is "Containing/Blocking potentially malicious traffic." However, even as the top item, this received only an average ranking of 3.7, where 3.0 would



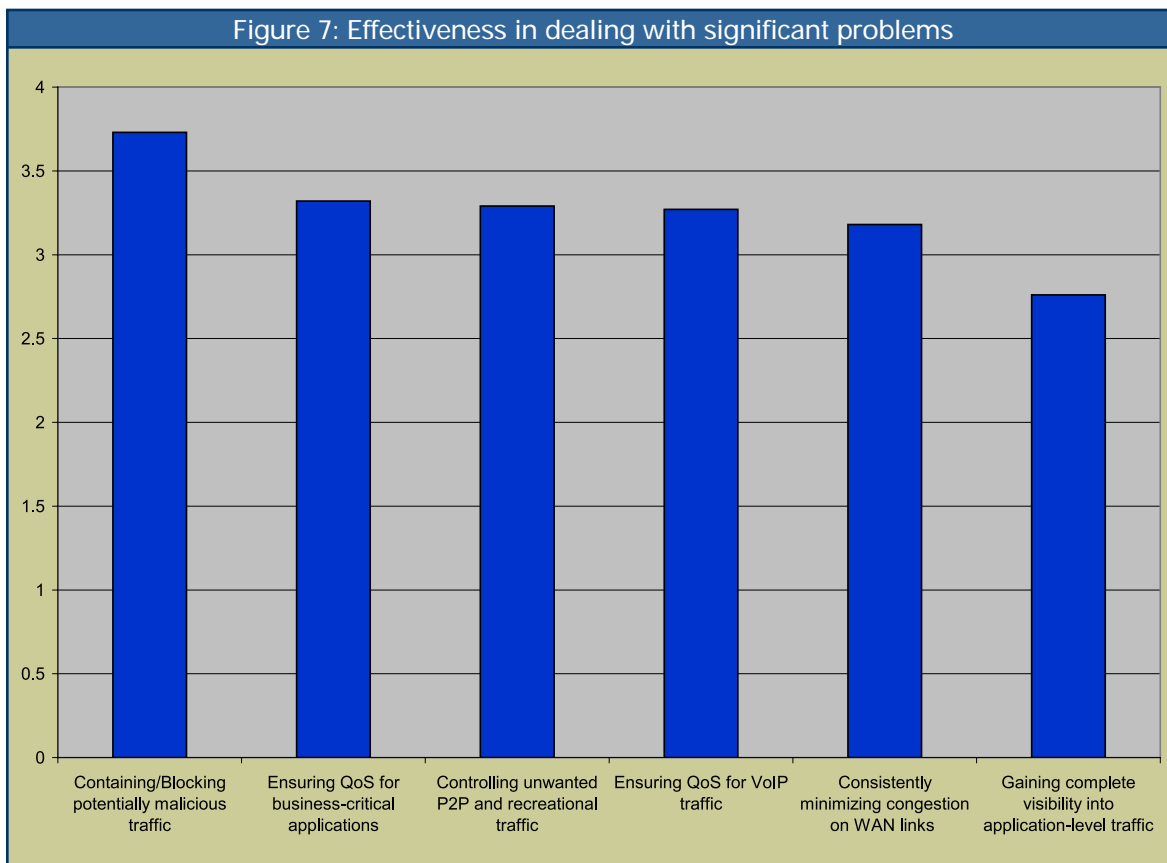
be the middle choice between "Extremely effective" and "Not effective." The next four issues, "Ensuring QoS for business-critical applications," "Controlling unwanted P2P and recreational traffic," "Ensuring QoS for VoIP traffic," and "Consistently minimizing congestion on WAN links," received essentially equal scores that were just barely positive. "Gaining complete visibility into application-level traffic" is the area in which the respondents thought they did least well; this area did not even reach the mid-point.

**Figure 8** summarizes the responses to the question in which the respondents were asked to use the familiar scale of 1 ("Not at all significant") to 5 ("Extremely significant") to rank a number of factors in their choice of new WAN networking equipment.

While there are few surprises in the top factors affecting purchasing decisions, the fact that "Adherence to standards" is the top overall consideration is a bit puzzling. This result is somewhat puzzling because adherence to stan-

dards is key to users' decision-making, but many of the areas that are addressed by WAN equipment – compression, traffic shaping, etc. – fail to fit within areas for which standards bodies currently exist to develop standards. Further and unfortunately, the current economic conditions are not favorable for the formation and support of user-oriented organizations to drive the standardization process. Thus, until users' companies are willing and

Figure 7: Effectiveness in dealing with significant problems



The primary lesson learned from this line of questioning is that there are a number of challenges that have yet to be effectively addressed. Most of the respondents have networks that "work," but they fall far short of being optimized.

## Factors in Choice of Wan Equipment

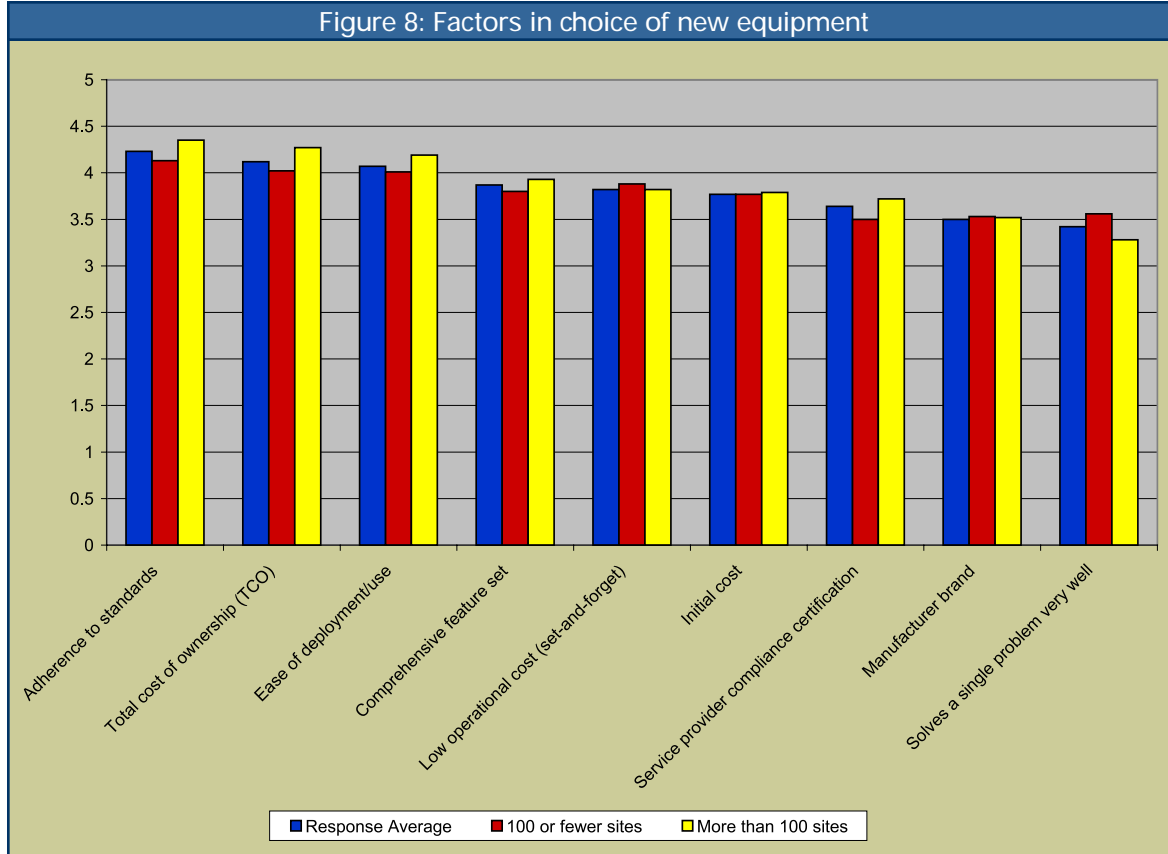
Since there are a number of identified problems in the WAN, the next step is to look at how choices are being made for choosing equipment to address these problems.

able to support the standardization process, this most important goal may be quite difficult to realize.

Fortunately, the next most important factors, "Total cost of ownership" and "Ease of deployment/use" are much more readily assessed. It is also notable that these top factors were even more important for users with large networks than for those with small and mid-sized networks.

In examining the remaining issues, some interesting contrasts are noticeable. Even though multifunction appli-

Figure 8: Factors in choice of new equipment



The users were next asked to identify those key factors that are accelerating their decision to upgrade their current WAN networking equipment. In order to provide differentiation, they were asked to check no more than three of the items listed as "major factors."

As shown in **Figure 9**, "Support for new services" was the primary factor, chosen by 58% of the overall respondents. This further emphasizes the point that networking services and equip-

ances were not explicitly addressed, they certainly seemed to be desired. Having a "Comprehensive feature set" was the fourth-most important in users' purchasing decisions, while point solutions ("Solves a single problem very well") came in last both overall and among users with larger networks. Another remarkable contrast is the high ranking of "Total cost of ownership" compared with the relatively low ranking of "Initial cost." Clearly the respondents plan financially for the long-term cost of equipment and its operation instead of buying an inexpensive product that is not easily maintained.

The most surprising result – and one that will be distressing for companies that sell strongly on brand and reputation – is that "Manufacturer brand" scored extremely low as a decision factor. Clearly, respondents are open to innovative solutions regardless of the equipment's supplier. Similarly, they seem to view compliance testing by a service provider as relatively meaningless; they prefer products that, when applicable, comply with standards.

ment are inextricably linked. As discussed at the beginning of this report, a major move to IP-based services is currently occurring, and it seems that many companies need to upgrade and/or replace their equipment to support these services. This factor is closely coupled with the third-ranking factor – "Need to support higher speeds" – cited by almost half (46%) of the respondents.

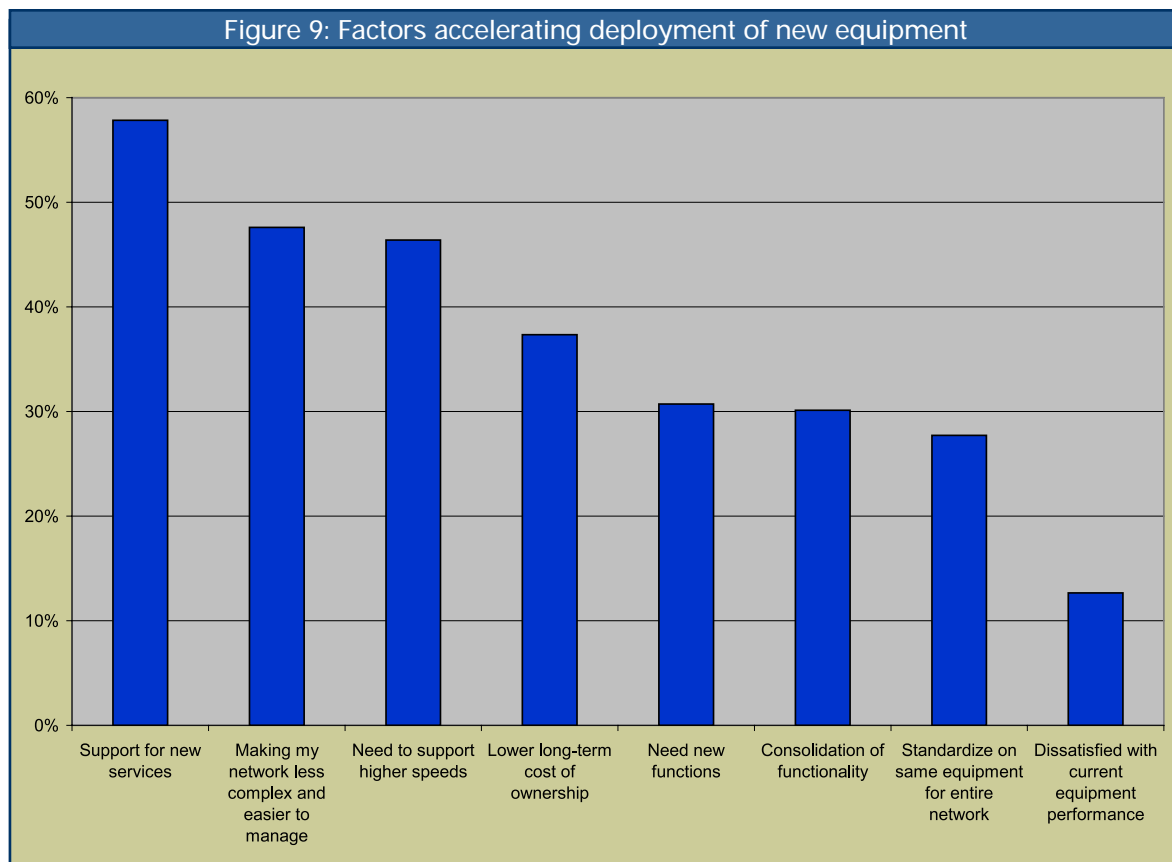
The second-ranking factor, chosen by 48% of respondents, was a nuts-and-bolts concern: "Making my network less complex and easier to manage." Once again, we find the recurring theme that today's networks are performing rather well, but users feel a strong need to fine-tune and simplify operational aspects. This desire is further confirmed by the last-place ranking of "Dissatisfied with current equipment performance;" only 13% of the respondents cited it as a major factor influencing their decisions to upgrade.

Finally, respondents were asked to identify major negative factors inhibiting or delaying their decision to upgrade their current WAN networking equipment. As with the positive factors, they were asked to check no more than three items, and their responses are displayed in **Figure 10**.

It comes as no surprise that "Lack of budget" was the primary factor inhibiting upgrades, cited by 41% of the respondents. "Complex integration" came in second (36%), and this response is consistent with respondents' strong desire to "Make networks less complex and easier to manage." Nevertheless, it is a difficult issue to address, since respondents also indicated that a "Comprehensive feature set" is highly desirable. Whenever more functions are added to a product, complexity is necessarily added.

"High equipment prices" ranked third, further substantiating general economic conditions as a major inhibitor. Interestingly, the WAN market seems to be more sensitive than other markets to the price of the equipment itself. In other recent studies, the lack of capital equipment budget has been cited as an issue even when the price of the equipment is deemed to be quite reasonable.

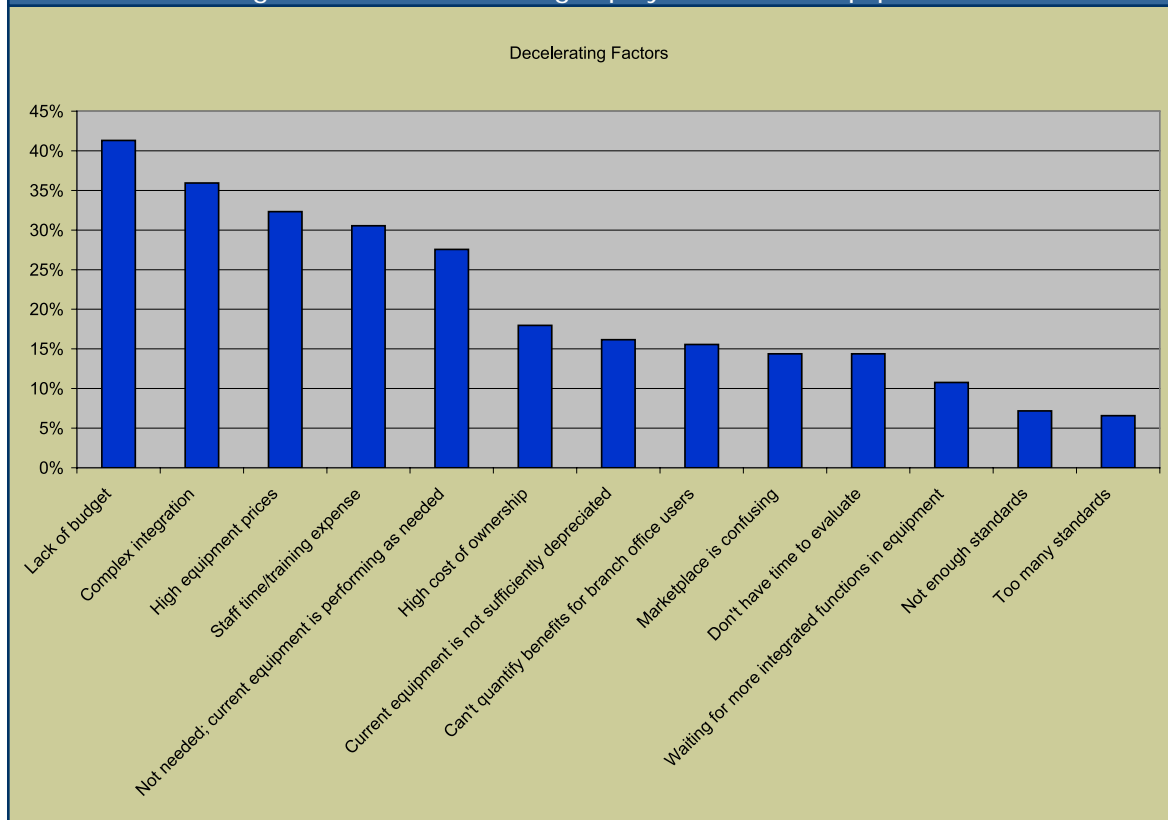
Further confirmation that networks are basically functional and that current focus is on optimizing those nets is shown in the fifth-place rank of "Not needed; current equipment is performing as needed" as an inhibitor to



equipment deployment. However, this fact has two possible meanings. On the one hand, over a quarter of the respondents (28%) saw adequate current performance as an inhibitor; on the other hand, the majority of respondents did not see this as an inhibitor. Therefore, there is room for improvement in existing networks if and when the budget is available.

As always, it's interesting to see what items were not viewed as inhibitors. In this case, standards were once again notably inconsequential. Since "Not enough standards" and "Too many standards" tied for lowest rank among the inhibiting factors at 7% each, we can infer that the level of standards is not of critical importance. Rather, users are more interested in conformance with existing standards (as discussed above). This view is consistent with the findings in our recent research concerning MPLS-based VPNs where "Waiting for an MPLS User-to-Network Interface (UNI)" came in last as an inhibitor for adoption of these services.

Figure 10: Factors inhibiting deployment of new equipment



If you're not actively shopping, your competitors are going to gain a strategic advantage when their networks run more efficiently than yours.

Also, remember to shop from a variety of sources. If there was a surprise in this survey's research, it was that "manufacturer brand" loyalty is quite weak. This factor is encouraging for the overall development of enhanced capabilities since market leaders will

## Conclusions

This survey, while revealing few surprises, nonetheless substantiated several trends among users. For the most part, users are more interested in optimizing current networks than in deploying radical new capabilities. Additionally, most users are pleased with the way that most of their wide area networking equipment is performing.

Performance management and security remain top concerns for most networks, and, while networks are generally performing well, there is a need both to fine-tune the networks and to simplify operational issues.

The primary advice, then, to the planners and managers of these networks is to continue to look for innovative devices to improve network performance. A wide variety of these devices are available, and if you're actively shopping, you're in good company.

be – or at least should be – given incentive to continue developing leading-edge capabilities.

## About the Author



**Steven Taylor** is president of Distributed Networking Associates and publisher of the Webtorials networking-education Web site, which conducted the survey for this report. An independent consultant, author, and teacher since 1984, Mr. Taylor is one of the industry's most published

authors and lecturers on high-bandwidth networking topics. His articles appear in *Business Communications Review* and *Network World*, and he co-authors the "Convergence" and "Wide-Area Networking" newsletters distributed by *Network World Fusion*.

# 2004 WAN State of the Market Report

**Demographics:** The respondents to the survey represented approximately 175 networking professionals from around the world. This number is quite sufficient to ensure that the overall results would not vary significantly by having more respondents. In fact, the number of respondents far exceeds the number necessary for consistent results among the surveyed population.

Figures A-1 through A-6 summarize the demographic results.

