

# 2016 State-of-the-WAN Report

## *What's Driving the Interest in Software Defined WANs?*

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### Introduction

The wide area network (WAN) is a critically important topic for number of reasons. Those reasons include:

- The latency, jitter and packet loss that is associated with the WAN often cause the performance of applications to degrade;
- The WAN can be a major source of security vulnerabilities;
- Unlike most of the components of IT, the price/performance of WAN services doesn't obey Moore's Law;
- The outage of a WAN link often causes one or more sites to be offline;
- The lead time to either install a new WAN link or to increase the capacity of an existing WAN link can be quite lengthy.

A discussion of wide area networking is extremely timely because after a long period with little if any fundamental innovation, the WAN is now the focus of considerable innovation. As a result, for the first time in a decade, network organizations have an opportunity to make a significant upgrade to their WAN architecture and design.

The goal of this e-book is to provide insight into the current state of the WAN that is based on a survey of 110 network professionals that was completed in May 2016. Towards that end, this e-book examines topics such as:

- What factors are driving change in the WAN?
- How are WAN budgets changing?
- How satisfied are network organizations with their current WAN architecture?
- How are network organizations approaching the adoption of SD-WAN functionality?
- What would drive or inhibit an organization from implementing a Software-Defined WAN?
- What deployment options are network organizations considering?
- How receptive are network organizations to new vendors of WAN functionality?

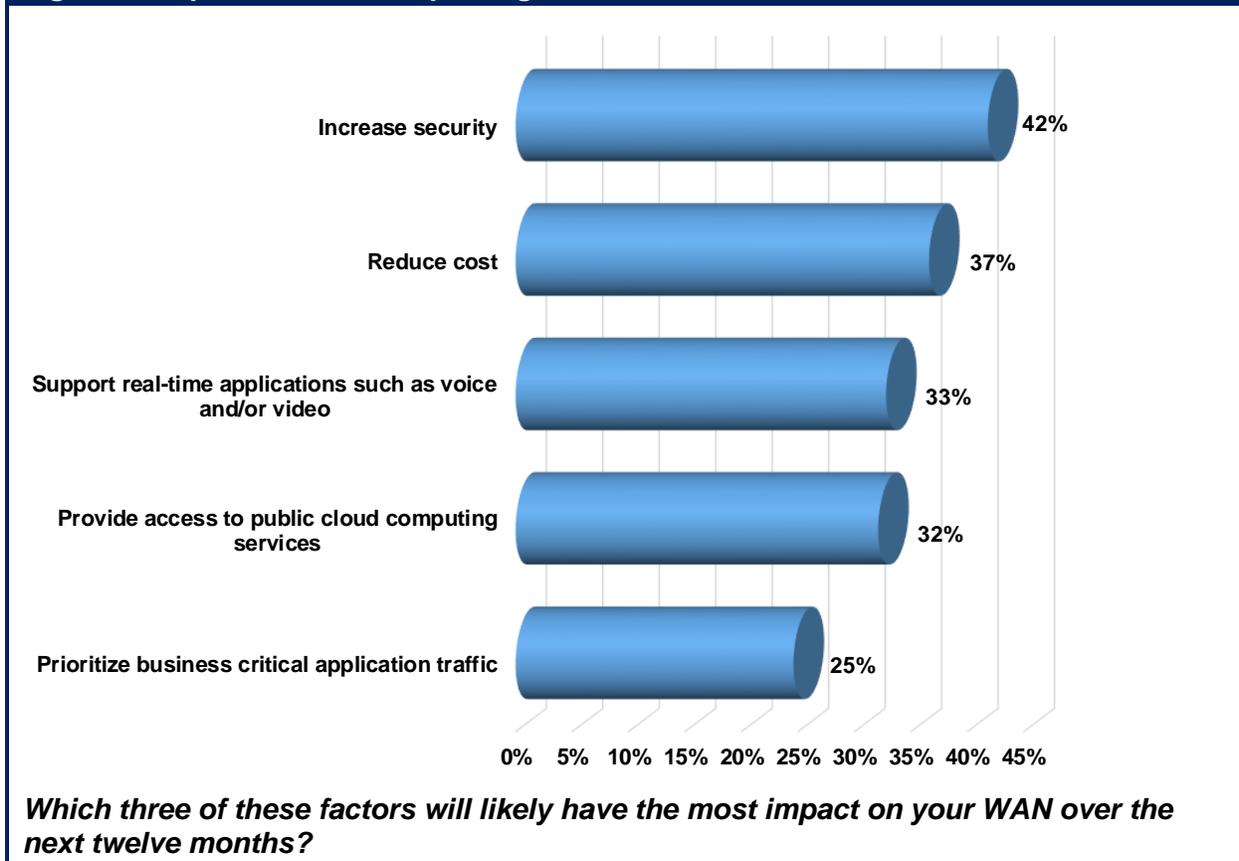
Where appropriate, the results of this year's research will be compared to last year's which are highlighted in [The 2015 State-of-the-WAN Report](#). While large shifts in a single year are somewhat uncommon, interesting insight into the state of the WAN can sometimes be gained from looking at modest shifts.

## What are the Factors Driving Change in the WAN?

It's not surprising that as shown in **Figure 1**, increasing security and supporting real-time applications such as voice and/or video are two of the top factors driving change in the WAN. They were the top two factors in last year's report.

Interesting observations that can be drawn from **Figure 1** include that reducing cost, which somewhat surprisingly was only the fifth most important factor driving change in last year's survey, is back in its traditional place of being one of the most important factor driving change in the WAN. In addition, in line with the increasing use of public cloud services, the importance of providing access to those services has grown in importance over the last year.

**Figure 1: Top Five Factors impacting WAN**

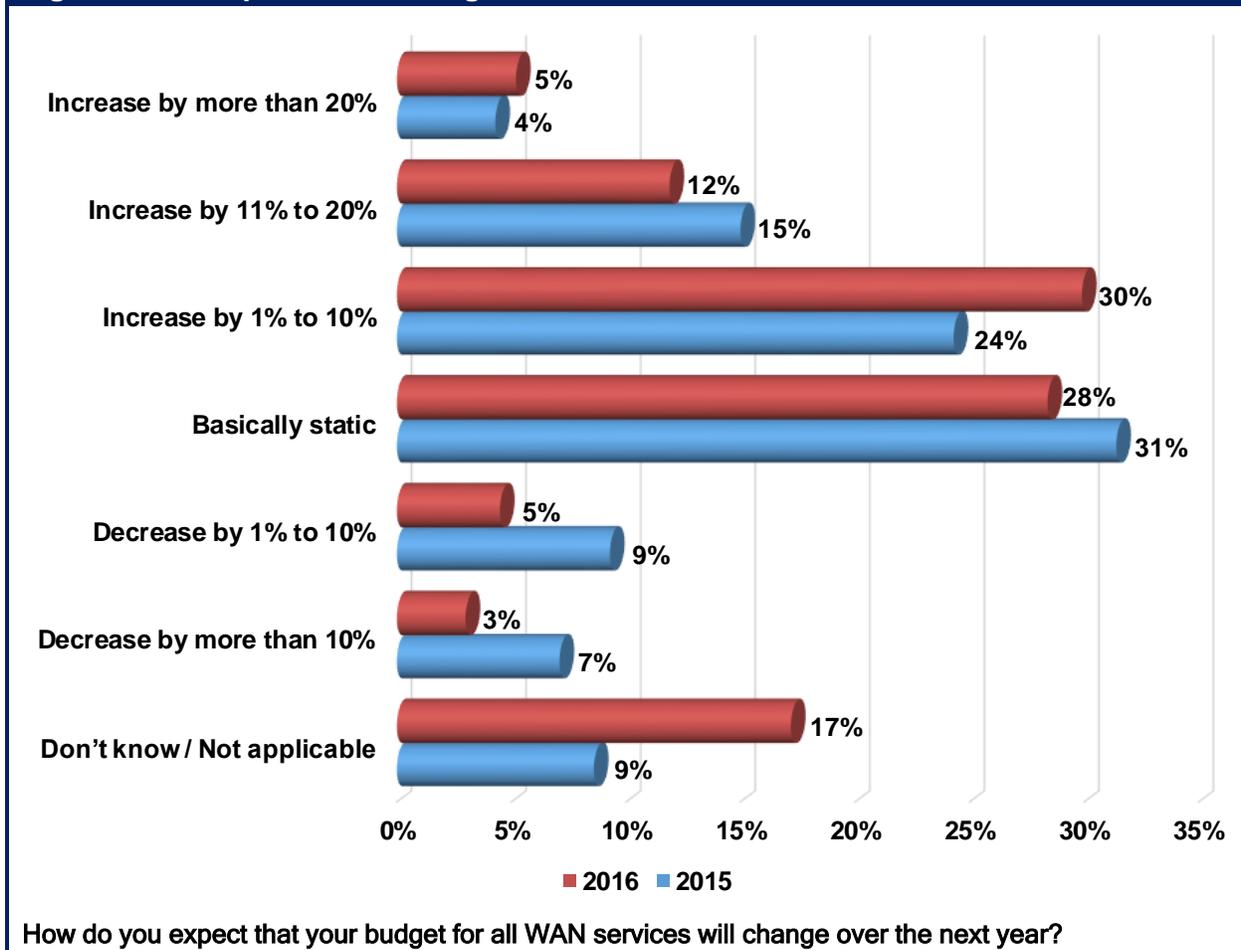


Supporting the Internet of Things (IoT) was not included in the 2015 Report. It was included in this year's report and 16 percent of the survey respondents indicated that it was one of the factors most likely to have an impact in their WAN. That placed it eighth out of the 15 factors that were included in the survey question. It will be interesting to see next year if the impact of supporting IoT follows the same trajectory as has the impact of providing access to public cloud services.

## How are WAN Budgets Changing?

WAN budgets are looking relatively healthy in 2016. When compared with 2015 levels, the biggest change is a reduction in the percentage of budgets that are decreasing.

Figure 2: Anticipated WAN Budget Increase



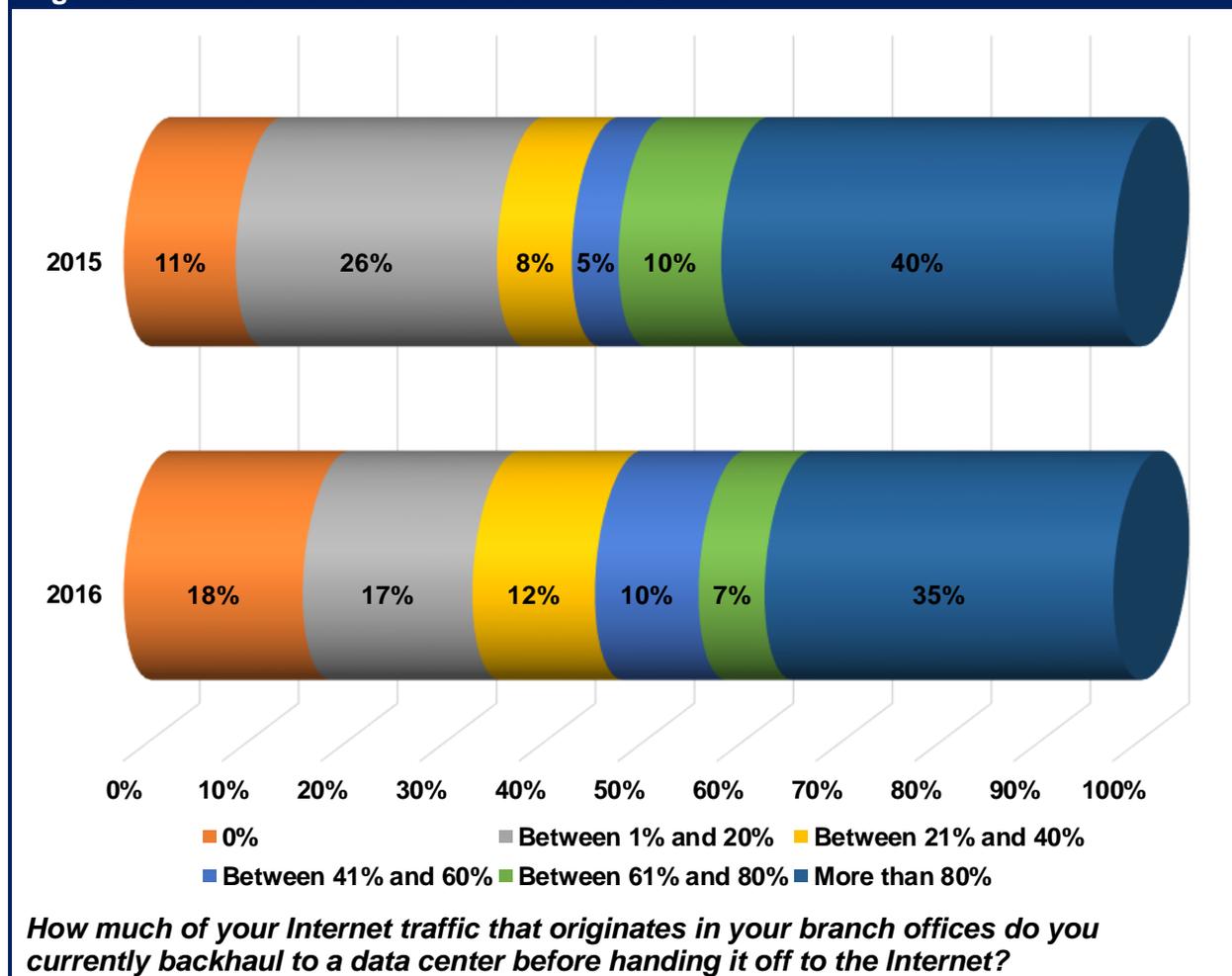
A couple of years ago the mantra for the IT organization in general and for the WAN organization in particular, was *do more with less*. The current WAN mantra still calls for organizations to do more with their WAN, but this time most organizations will have the same or a slightly larger budget.

## The Status of Internet Backhaul

One common approach to designing a branch office WAN is to have T1/E1-based access to a service provider's MPLS network at each branch office and to have one or more high speed links at each data center. In this design, it is common to have some or all of a company's Internet traffic be backhauled to a data center before being handed off to the Internet. One of the limitations of this design is that the Internet-bound traffic transits both the MPLS network and the Internet access link, adding both cost and delay.

The penalties associated with backhauling Internet traffic are usually acceptable if the amount of Internet traffic is relatively light. However, the Internet traffic generated by most companies is large and growing. One of the many factors driving the growth of Internet traffic is the previously mentioned increasing use of public cloud computing services. In the vast majority of instances, these services are accessed over the Internet.

Figure 3: Internet Traffic Backhauled to Data Center



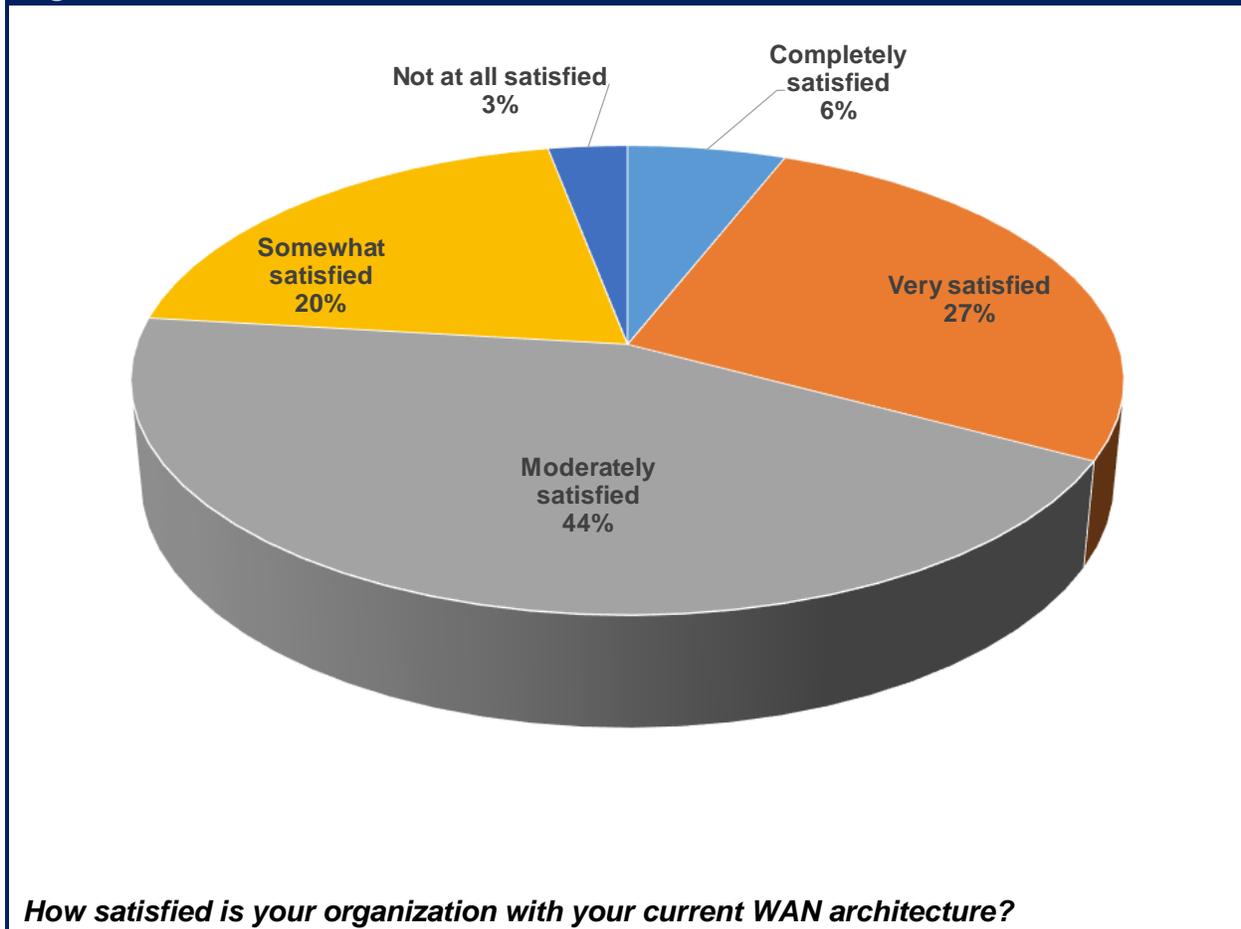
One observation that can be drawn from **Figure 3** is that over the last year that there has been a modest decrease in terms of how much Internet traffic is backhauled. Another observation is that there is a bimodal approach to how Internet traffic is handled. Thirty-five percent of organizations backhaul 20 percent or less of their Internet traffic while the same percentage of organizations backhauls more than 80 percent of their Internet traffic.

[The 2015 Guide to WAN Architecture and Design](#) discusses some options for how to handle the Internet traffic that is generated in branch offices.

## How Satisfied are Organizations with their Current WAN Architecture?

As shown in **Figure 4**, by a small margin, network organizations are more likely to be satisfied with their current WAN architecture than they are to be dis-satisfied. However, the fact that almost a quarter of network organizations are either not satisfied or only somewhat satisfied with their current WAN architecture indicates that a large portion of the WAN marketplace would likely be receptive to alternative WAN architectures.

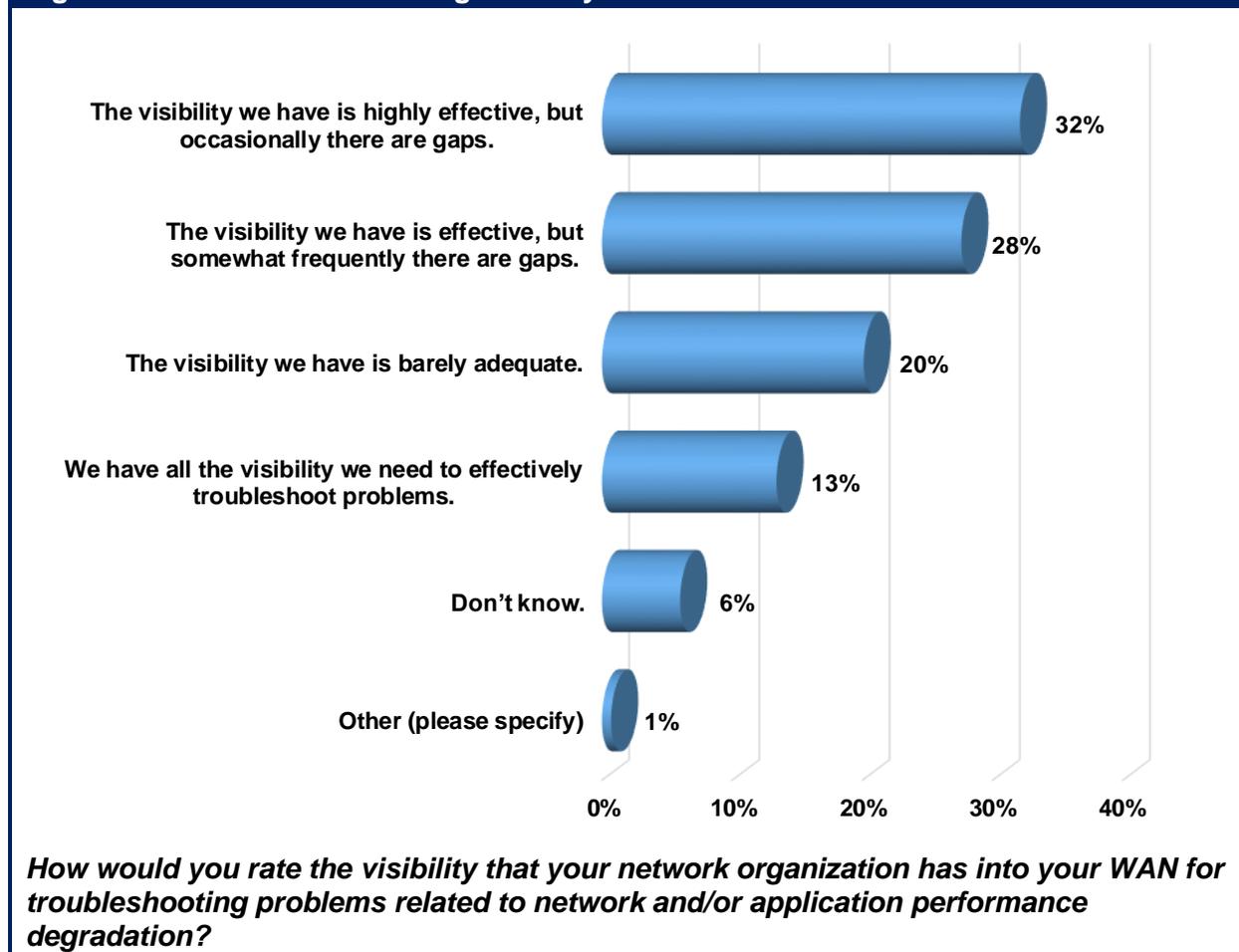
**Figure 4: Satisfaction with current WAN architecture**



## Do Network Organizations have the WAN Visibility They Need?

The marketplace is crowded with tools and services that are positioned as being able to provide network organizations with all of the visibility into their WAN that they need for troubleshooting problems related to network and/or application performance degradation. However, whether it is the deficiencies of those tools or the troubleshooting processes used by network organizations, less than one out of seven network organizations has all of the visibility that they need to effectively troubleshoot problems. In addition, roughly half of network organizations report having visibility into their WAN that either has frequent gaps or that is barely adequate.

Figure 5: WAN Troubleshooting Visibility



The current rather dismal state of WAN visibility combined with the growing interest into software defined branch office WANs creates an opportunity and a challenge for network organizations. The opportunity is that by implementing these WANs, network organizations might be able to increase their visibility into the WAN. The challenge is that network organizations need to ensure, as they explore software defined branch office WAN alternatives, that they evaluate the visibility provided by each of those alternatives.

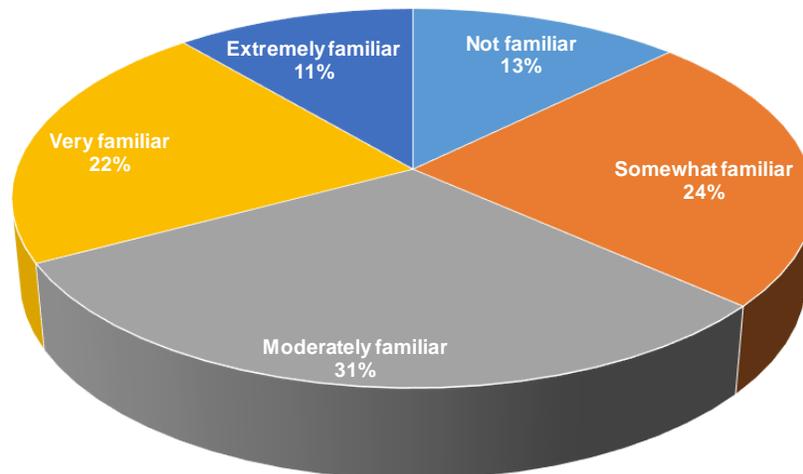
## What is a Software Defined WAN?

As is the case with any software defined network, a software defined WAN (SD-WAN) centralizes the control function into an SDN controller. The controller abstracts the user's private network services from the underlying IP network and it enables the operations of the user's private network services via centralized policy. The controller also enables the automation of management tasks such as configuration and provisioning and it sets up virtual overlays that are both transport and technology agnostic.

The 2015 Report indicated that only 15 percent of network professionals were either very or extremely familiar with SD-WANs. That report stated that "This lack of familiarity isn't surprising given that an SD-WAN is an emerging concept. It does, however, highlight the need for more education on this topic."

Over the last year there has been a lot written about SD-WANs. The breadth of that educational effort is reflected in this year's survey results in which a third of the respondents indicated that they were either very or extremely familiar with SD-WANs.

**Figure 6: Familiarity with SD-WAN**

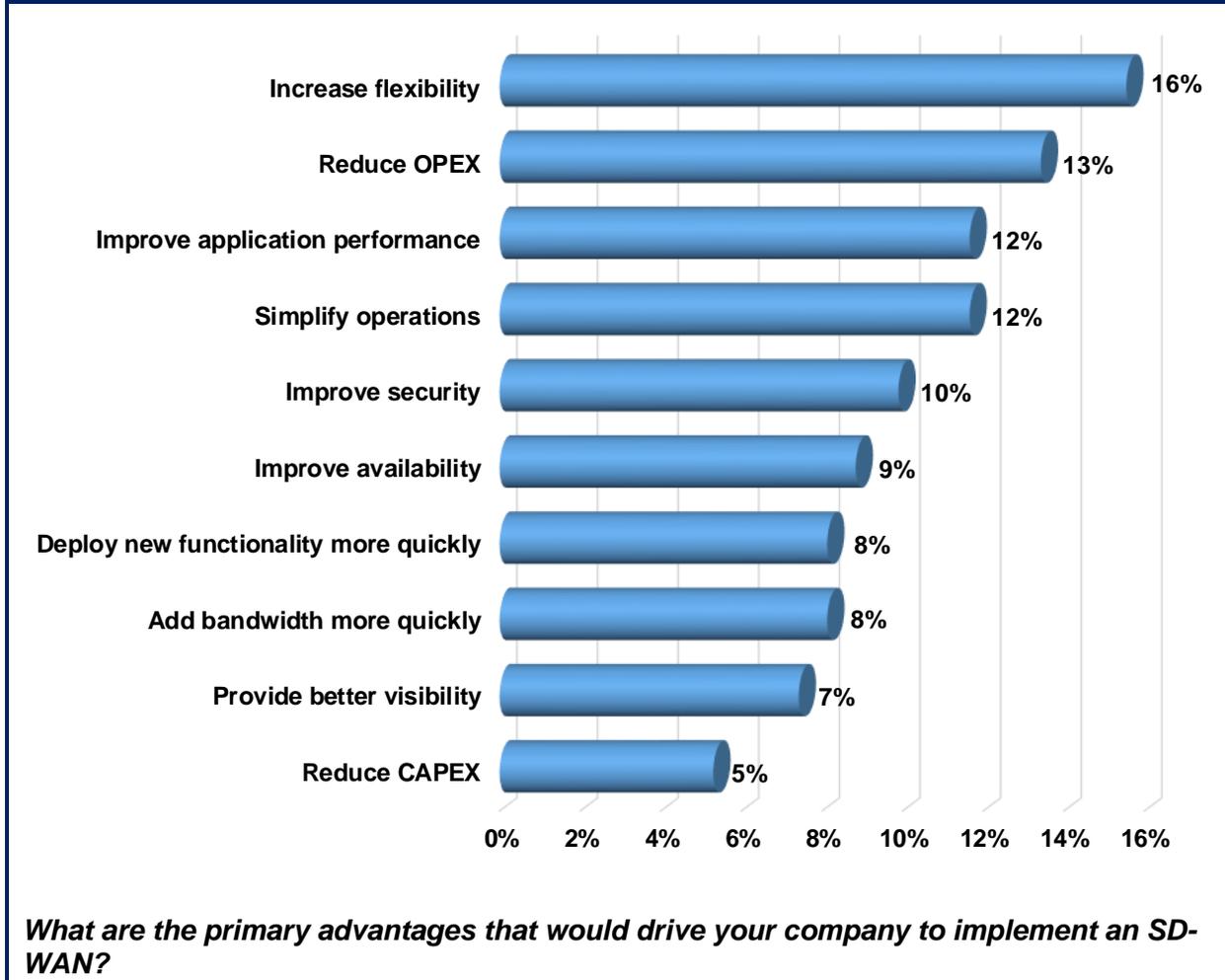


*How familiar are you with the concept of a Software Defined WAN (SD-WAN)?*

## What are the Drivers of SD-WAN Adoption?

The desires to increase flexibility and to reduce OPEX are the two primary drivers of SD-WAN adoption while reducing CAPEX and providing better visibility are the two least important drivers of SD-WAN adoption.

**Figure 7: Drivers for SD-WAN Implementation**



The 2015 Report expressed surprise that reducing OPEX was not one of the top drivers of SD-WAN deployment. **Figure 7** indicates it now is one of the top drivers. Most likely this change is due in large part to the educational effort that has occurred over the last year.

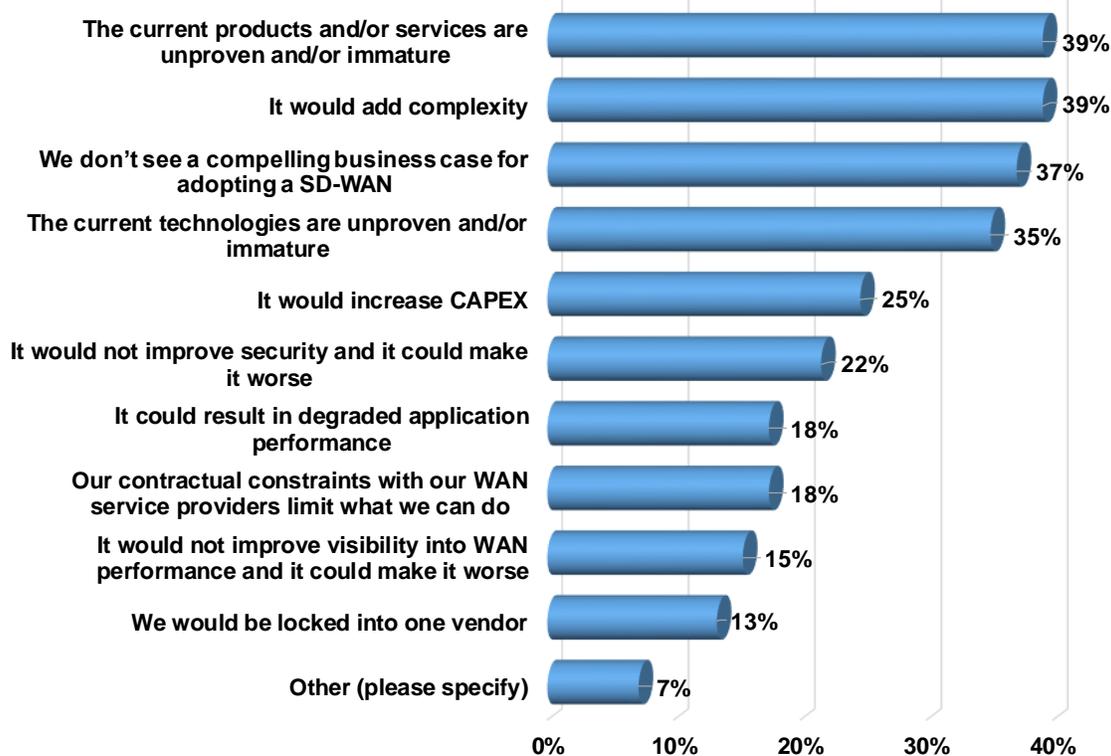
## What are the Inhibitors to SD-WAN Deployment?

In the 2015 Report, by a wide margin the top inhibitor to SD-WAN deployment was that the current **technologies** are unproven and/or immature. This was followed by:

- It would add complexity;
- The current **products and/or services** are unproven and/or immature;
- We don't see a strong reason to adopt an SD-WAN.

As shown in **Figure 8**, the four inhibitors listed above are the top four inhibitors again this year. There are, however, some interesting differences in this year's results vs. last year's. Whereas last year the unproven and/or immature status of the technologies was by a wide margin the primary inhibitor, this year it is less important and it is tied for importance with complexity, which is a much stronger inhibitor this year than it was last year. While it is not surprising that concern over the maturity of technologies lessens over time, it does not always follow that concerns about complexity increase over time. It was also somewhat surprising that the percentage of this year's survey respondents who indicated that they don't see a strong reason to adopt an SD-WAN is notably higher than the percentage last year.

**Figure 8: Inhibitors to implementing an SD-WAN**



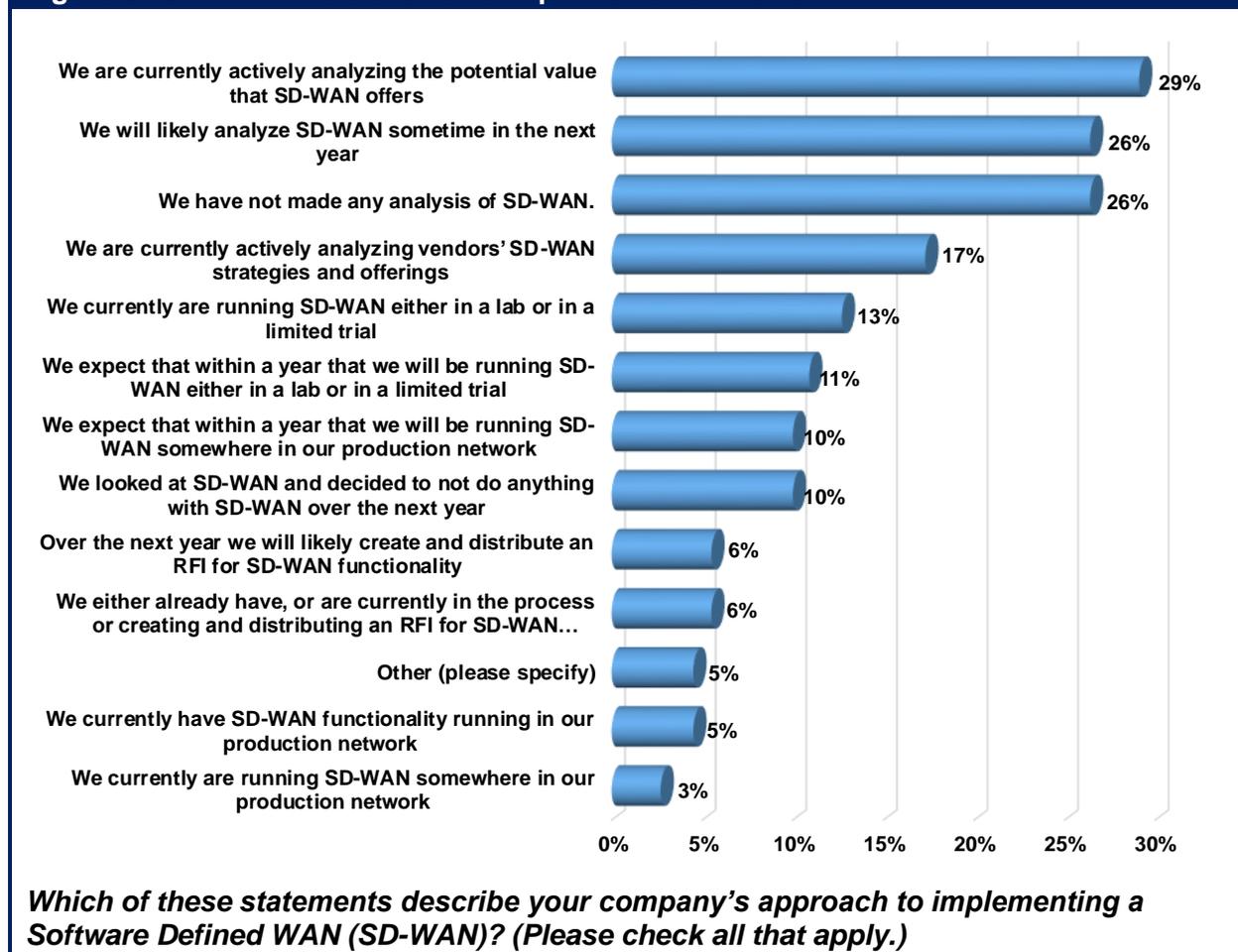
**What are the primary concerns that would inhibit your organization's implementing an SD-WAN?**

It is reasonable to assume that over the next year that the maturity and proven nature of the current products and solutions and of the enabling technologies will improve. If the current products and services are indeed complex to implement and manage, then vendors need to address that issue. If, however, that is a false perception, then that perception needs to be changed. Vendors also need to focus on helping network organizations understand the business case for adopting an SD-WAN.

## How are Network Organizations Approaching SD-WANs?

The data in **Figure 9** highlights two key characteristics of the SD-WAN market. The fact that only three percent of network organizations have already implemented an SD-WAN indicates that this is an emerging market. However, a number of other data points indicate that this market could experience a significant uptake in the near term. Those data points include the percentage of respondents who indicated that they either currently are, or will over the next year, analyze the potential value of an SD-WAN and the percentage of respondents who indicated that they are currently actively analyzing vendors' strategies and offerings.

**Figure 9: SD-WAN Evaluation and Implementation Plans**

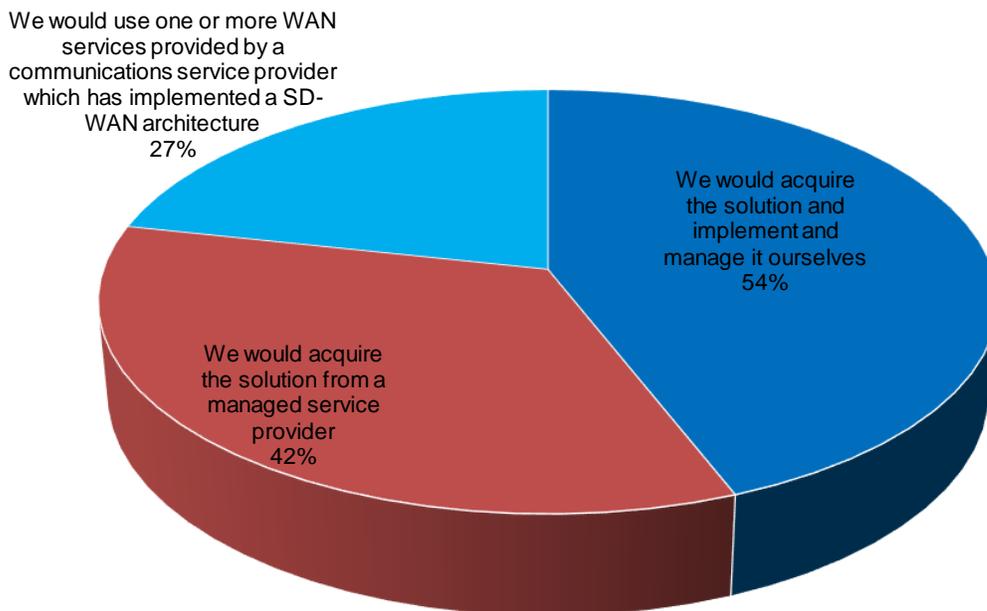


## What Deployment Option Will Organizations Choose?

The majority of the discussion of software-defined branch office WANs has focused on Do-It-Yourself (DIY) solutions that call for network organizations to acquire the solution from a vendor and then implement and manage the solution on their own. However, a number of vendors of SD-WAN solutions have relationships with service providers which enable those providers to leverage those solutions and offer an SD-WAN as a managed service.

The data in **Figure 10** indicates that the DIY approach to SD-WAN is the preferred approach, but not by a very large margin. That data also indicates that network organizations have a relatively strong interest in using one or more WAN services that are provided by a Communications Service Provider (CSP) which has implemented an SD-WAN architecture. Acquiring a WAN service from a CSP makes sense if the network organization is concerned about the complexity or maturity of the solution. The DIY approach makes sense if network organizations see a significant potential to reduce OPEX by cutting the amount of money that they spend on MPLS.

**Figure 10: WAN Implementation**



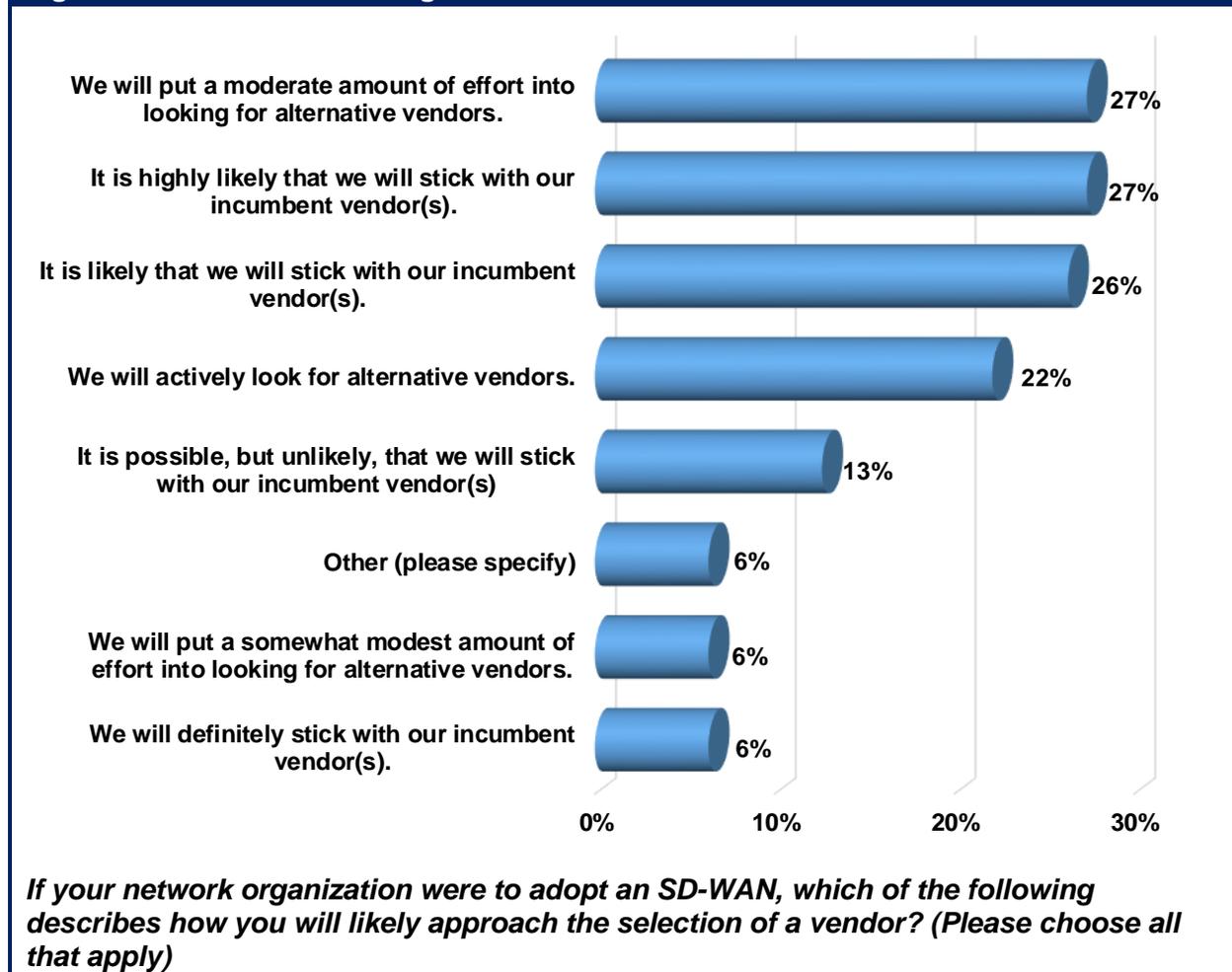
*If your organization were to adopt an SD-WAN which deployment option are you most likely to implement: (Please check all that apply.)*

## Will Network Organizations Stay with their Current Vendors?

SD-WANs represent a fundamental transformation in terms of how network organizations implement a WAN. As is the case with any fundamental transformation in the IT industry, some vendors will gain market share and some will lose it.

Similar to the situation with Internet backhaul, **Figure 11** shows that network organizations have a bimodal approach to choosing vendors. In response to a survey question that allowed multiple answers, 49 percent of the survey respondents indicated that their organization would either actively look for alternative vendors or would put a moderate amount of effort into looking for them. However, 53 percent of the survey respondents indicated that it was either likely or highly likely that their organization would stick with their incumbent vendor(s).

**Figure 11: Interest in Looking for New Vendors**



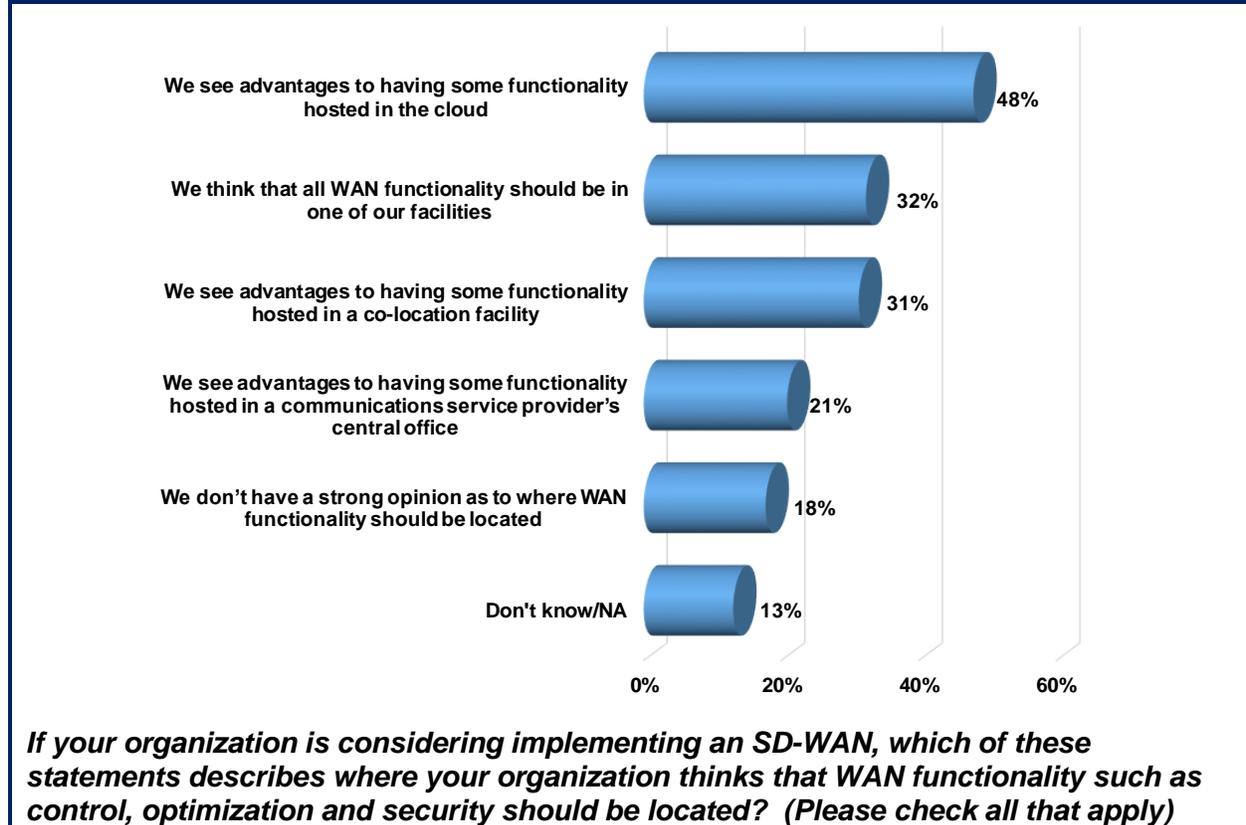
## Where Should WAN Functionality Be Hosted?

A distinction between an SD-WAN and a traditional branch office WAN is that within an SD-WAN there are more places to host functionality such as orchestration, control and security. Those locations include:

- At the customer’s branch offices;
- In a service provider’s central office;
- At the customer’s data centers;
- In a cloud site provided by the SD-WAN vendor;
- At a co-location facility;
- At a public cloud provider’s facility.

Figure 12 indicates that a sizeable percentage of the survey respondents either didn’t know where their organization believes that key WAN functionality should be hosted or they worked for an organization that didn’t yet have a strong opinion. That is consistent with the embryonic status of SD-WAN adoption. However, looking just at those organizations that have an opinion shows that many network organizations are receptive to a range of options relative to where WAN functionality is hosted. It also shows a strong interest in having some WAN functionality hosted in the cloud.

Figure 12: WAN Location



### Summary

In the preceding pages, we took an in-depth look at each of the survey questions. The findings show:

- The primary factors driving change in the WAN are to increase security, to reduce cost and to support real-time applications.
- WAN budgets are looking healthy for the second year in a row.
- The use of Internet backhaul continues to slowly diminish.
- Network organizations are moderately satisfied with their current network architecture.
- Very few organizations feel that they have all the visibility they need to troubleshoot WAN-related issues.
- Over the last year the familiarity that network organizations have with SD-WANs has increased significantly.
- Reducing OPEX has become one of the top drivers of SD-WAN adoption while reducing CAPEX is a non-factor for the vast majority of network organizations.
- The major inhibitors to SD-WAN implementation are the state of maturity of current products and services, a perception of added complexity and the lack of a compelling business case.
- While very few network organizations have already implemented an SD-WAN in production, the majority of organizations are currently exploring or planning to explore SD-WAN alternatives in the next year.
- By a slight margin, network organizations prefer a DIY approach to implementing an SD-WAN vs. acquiring one as a managed service.
- The question of sticking with incumbent vendors is up in the air as only a very small percentage of network organizations will definitely stick with their incumbent vendor(s).
- Network organizations are open to a range of options relative to where key WAN functionality is hosted and almost half of all network organizations are receptive to hosting at least some WAN functionality in the cloud.

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Jim Metzler has a broad background in the IT industry. This includes being a software engineer, an engineering manager for high-speed data services for a major network service provider, a product manager for network hardware, a network manager at two Fortune 500 companies, and the principal of a consulting organization. In addition, he has created software tools for designing customer networks for a major network service provider and directed and performed market research at a major industry analyst firm. Jim's current interests include cloud networking and application delivery.

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