



THE BUSINESS VALUE OF ADAPTIVE NETWORKING TO ENTERPRISE WANs

F R O S T  S U L L I V A N

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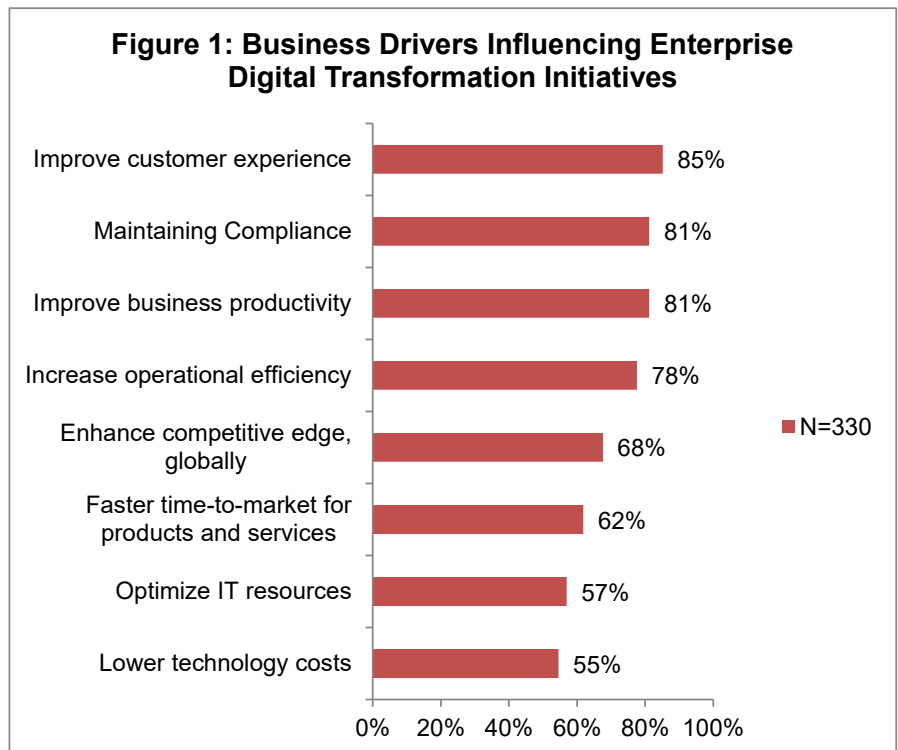
INTRODUCTION

In a recent Frost & Sullivan enterprise WAN survey (see Figure 1), 85% of the business decision makers surveyed stated “improving customer experience” as the top-rated driver for digital transformation initiatives; followed by “maintaining compliance,” and “improving business productivity.”

The focus on customer experience is noteworthy as RoI (return on investment) for technology spending is increasingly measured by the true value it adds to the business. As a business decision maker at your organization, you are probably familiar with key technology components of the enterprise digital transformation journey, such as hybrid cloud services, application security, big data and analytics, unified communications, mobility and Internet of Things (IoT), as well as the networking piece.

Enterprise wide area network (WAN) is the common fabric that ties together all of the above technology components, and is instrumental for the seamless interworking of various enterprise solutions. However, the traditional WAN architecture, with its mix of network protocols and proprietary hardware, is inflexible, expensive to deploy and manage, and hinders enterprise digital transformation by being complex and time-consuming.

Thanks to the emergence of software-defined networking (SDN), network function virtualization (NFV) and software-defined WAN (SD-WAN) technologies, the traditional static WAN is now programmable. A software-enabled WAN provides an intuitive layer of control that breaks away from the expense and complexity of the traditional WAN, and delivers an agile and flexible platform that quickly adapts to the fast-changing enterprise needs of an application age. In this whitepaper, we present a detailed analysis of adaptive networking, and the business value it brings to enterprises.



ADAPTIVE NETWORKING—A SMARTER, AGILE, AND RESPONSIVE NETWORK PLATFORM¹

In the recent Frost & Sullivan enterprise WAN survey, 61% of IT decision-makers identified the ability to make changes quickly to WAN as a top-rated criterion in their WAN selection process. Adaptive Networking, as defined in this paper, is the ability for enterprises to procure bandwidth (across hybrid WAN services) and related network functions in an on-demand manner, and centrally define, configure and manage network policy administration. The term adaptive, in this context, transforms the traditional network from a noun to a verb, as the components of adaptive networking are agile and flexible. Businesses who take advantage of adaptive networking realize the following operational benefits.

Superior Business Agility for the Successful Operation of the Digital Business

Next-generation digital technologies provide organizations with the configurable framework to adapt business processes rapidly in response to their changing business environment. Considering that the WAN is an enabler for all other enterprise solutions, adaptive networking is integral to your company's digital transformation initiatives, as it brings intelligence and automation to the otherwise static network.

- **Improved business productivity through greater network agility**

In the Frost & Sullivan enterprise WAN survey, 81% of IT decision-makers indicated “improving business productivity” as a key driver for their digital transformation initiatives. Business productivity depends on business agility; which, in turn, is dependent on how quickly the related IT and network components can scale based on application requirements. Adaptive networking delivers that capability by detecting the bandwidth requirements of various enterprise applications, and dynamically scaling network resources to support those applications.

- **Improved operations with centralized network control**

In the same Frost & Sullivan enterprise WAN survey, 59% of IT decision-makers stated faster provisioning of WAN services is highly critical for adapting to business changes. Adaptive networking offers enhanced network performance monitoring and access control features for businesses to streamline network operations. The software-defined architecture makes it easy for the IT managers to gain in-depth visibility into application performance, and make changes in real-time. In adaptive networking, the controller has knowledge of all the edge devices and routing policies, allowing network administrators to create network segments specific to user applications. For example, the segments could be by line of business across distributed sites, to limit access to critical applications; separate guest Wi-Fi access (e.g., always choose least expensive Internet links) from that of employees accessing business applications; and route traffic from non-enterprise-provided mobile devices to a scrubbing site that secures the information before allowing access.

- **Superior threat protection for business through additional security features**

In the 2018 Frost & Sullivan SD-WAN survey, 76% of IT decision-makers stated “ability to apply granular security policies” as a compelling reason to deploy SD-WAN. The ability to deploy additional security

¹ Adaptive Networking, as described in this paper, is not to be confused with the term Adaptive Network™ used by Ciena. Ciena Adaptive Network solutions are platforms and infrastructure elements that service providers use to build the networks. Adaptive networking, in this whitepaper, is an umbrella term encompassing several technology solutions that deliver flexible and agile networking to enterprises.

measures is a critical feature of adaptive networking, considering that it is a top priority for enterprises. Virtual solutions built on virtual machines, located at the customer premise or in the cloud, make it easier to deploy additional security measures, in near real-time, as functionality is in the virtual machines. Enterprise IT departments can choose to deploy modular security solutions by spinning up virtual machines (VMs) to combine security solutions from multiple vendors.

In the Frost & Sullivan enterprise WAN survey, network and application security ranks second (cited as important or very important by 77% of IT decision-makers) among top five tech priorities for organizations. Enterprises require deeper insight and expertise at capturing and eliminating threats before they impact the business. The global presence of adaptive networking is inherently suited for the task of providing more secure connectivity using automated threat intelligence built into the underlying network infrastructure.

Accelerate Branch Sites, Cloud, and Remote User Connectivity to Enterprise Applications

Global branch site connectivity and management is time-consuming and complex for large distributed enterprises. Businesses place a high value on being nimble, enabling them to anticipate or quickly respond to market conditions. The current hybrid, but static WAN architecture involves truck rolls, and requires network engineers to make any configuration changes—which is time-consuming and expensive. With adaptive networking, as business needs change, services can often be added and disconnected more quickly than in the hardware-intensive approach.

- **Quickly expand your business presence with simplified site set-up & management**

Adaptive networking enables quick deployment of network services and related network functions at branch sites. The traditional static WAN depends on dedicated hardware appliances for each network function, which could take multiple days or even weeks to deploy and operationalize. With adaptive networking, enterprise IT managers can deploy key network functions such as routing, WAN optimization, and security as virtual network functions (VNFs) on a single virtual CPE. The virtualized CPE reduces the amount of equipment in the enterprise WAN; which means less hardware costs, less moving parts, less things that could go wrong, and less maintenance for the IT team, due to reduced overall operational scale.

The virtual CPE can also support connectivity to multiple network services (MPLS, Ethernet, Wireless, Satellite, etc.) using the SD-WAN functionality. The virtual CPE is a plug-and-play device that installs without requiring any oversight by on-site network personnel. This means that new branch locations can be deployed with very little effort, and use readily available wireless LTE service, while waiting for a network service provider to provision wired services—e.g., Internet or MPLS. In the 2018 Frost & Sullivan SD-WAN survey, nearly 60% of the enterprise IT decision-makers indicated “ability to deploy branch sites faster” as a compelling reason to deploy SD-WAN. Adaptive networking ensures that new branch additions are not delayed.

- **Cost effectively manage and expand data center capacity**

While there are several scenarios where on-demand bandwidth scalability can be of value—sporting events; scheduled data transfers (at certain times of a day or certain days in a week/month) between

branch locations; scheduled company events (town hall meeting via video conferencing)—the biggest need for on-demand bandwidth is driven by cloud applications.

According to a recent Frost & Sullivan Cloud User Survey of IT decision-makers, businesses use an average of 4.5 deployment models for their workloads, including premises-based servers, managed services and cloud. They also use an average of 2.2 public cloud providers. The use of multiple cloud data center environments reflects the digital business's need for a flexible, high-performance, always available application platform. Hybrid cloud services is also the top-rated technology trend (cited by 80% of decision-makers as important or very important) in Frost & Sullivan's enterprise WAN survey.

The SD-WAN functionality of adaptive networking enables businesses to flexibly use and seamlessly integrate multiple transport networks (MPLS, Internet, Ethernet, DIA, 4G/LTE). Furthermore, the bandwidth on-demand functionality available with adaptive networking enables enterprises to establish on-demand connections to leading cloud platforms, in real-time.

- **High performance business connections to support mobility, big data, and IoT trends**

According to recent Frost & Sullivan forecasts of the global connected devices market, the number of connected devices is projected to grow from 19 Billion in 2018 to nearly 60 Billion by 2024. Mobile users are using their own smartphones and tablets to access corporate resources. Furthermore, Big Data and IoT applications, distributed across cloud and on-prem data centers, are putting immense pressure on WAN bandwidth, which MPLS alone cannot fulfill in a cost-effective manner. The traditional WAN architecture—with traffic passing back and forth from remote sites into central data centers, and back via MPLS—does not work well for distributed deployments. In contrast, adaptive networking enables remote offices or nodes to connect directly to the Internet via high-speed broadband, while ensuring that the links adhere to QoS and compliance requirements defined by the controller corporate policies.

Improved Network Resiliency and Centralized Network Management

Adaptive networking technologies completely redefine the way enterprise WANs are architected, by shifting the discussion from a static, inflexible, expensive, hardware-centric approach to one that is dynamic, agile, cost-effective and software-centric.

- **Superior network resiliency for the always-on digital business**

According to the 2018 Frost & Sullivan SD-WAN survey, the top-rated benefits compelling IT decision makers (78% of the respondents) to deploy SD-WAN is “ensuring network resiliency and business continuity,” and “achieve superior WAN performance.” The underlying software-defined architecture of adaptive networking helps avoid network failures by leveraging the intelligence built into the network for real-time performance monitoring. The edge devices constantly perform real-time monitoring of traffic paths to ensure that problems related to availability (sufficient bandwidth) and reliability (latency, jitter, and packet loss) are detected before they affect the users; moving traffic to a different path when necessary.

For example, a branch site can decide to use a high capacity Internet link as a primary circuit, and a low speed MPLS circuit as backup. If the primary link does not deliver the requisite QoS, mission-critical

applications can be dynamically re-routed to run on the MPLS link. Additionally, the virtualized nature of various network functions means that if a function fails, the network administrators can isolate and rebuild the function, as everything is in software. In the traditional network approach, if a device failed, the service provider would have to replace the hardware for each function.

- **Transition to a fully managed network**

In the recent Frost & Sullivan enterprise WAN survey, 78% of the IT decision-makers indicated “improve operational efficiency,” and 55% indicated “reduce technology costs” as key business drivers for their digital transformation initiatives. With adaptive networking, the resilient nature of virtual network services dramatically improves operational efficiency; it enables network administrators to cut down the time spent on deploying and managing hardware boxes, and instead focus on strategic initiatives of the company. Additionally, any maintenance updates to virtual functions can be done remotely, as opposed to sending a technician to reload updates on the device in the traditional, hardware-centric approach. Network and IT teams can now spend time doing real IT and networking versus administrative or supply chain functions that keep them from having the time to be innovative in their role. While the software-based approach of adaptive networking greatly simplifies WAN deployment and management, businesses can also expect reduced TCO as they can use OPEX dollars to procure VNFs on-demand, in an as-a-service model, and pay for them in a monthly, recurring charge model.

CONCLUSION

The move to a virtualized, software-centric WAN brings immense operational and cost efficiencies by consolidating multiple functions on a single device, and allowing network administrators to centrally manage and orchestrate the WAN. However, the process of embracing adaptive networking is not going to be an overnight transition, considering the current architectures. Leading service providers’ investments in SDN and NFV platforms to automate and virtualize their core networks are coming to fruition with the launch of commercial enterprise-centric adaptive networking services. CenturyLink is a leading service provider that can support your organization in making the shift to a software-centric architecture. For more information, please visit: <https://www.centurylink.com/business/networking.html>.

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