A Frost & Sullivan Executive Brief

Fast-Track Your Digital Transformation Journey with Managed SD-WAN

Sponsored by AT&T

Powering clients to a future shaped by growth

FROST & SULLIVAN

INTRODUCTION

Software-defined WAN is revolutionizing the business WAN space with its ability to bring virtualization to the edge. In the recent Frost & Sullivan WAN survey, 15% of business IT decision-makers stated they have deployed SD-WAN, and 18% of them stated they plan to deploy SD-WAN in the next 12-24 months. Global SD-WAN market revenues for 2018 exceeded $580 million and are forecast to grow at a CAGR of 50% to reach $4.5 billion in 2023. The managed SD-WAN market opportunity, which includes the SD-WAN overlay and underlying transport networks, is even larger, with market revenues forecast to exceed $6.5 billion in 2023.

Cost savings, network agility, application-aware routing, optimized cloud connectivity, and enhanced application and performance visibility are driving adoption of SD-WAN among businesses. The benefits of SD-WAN to branch internetworking are undeniable. The ability to dynamically route traffic on the most optimized transport path (public and private), based on pre-defined policies and performance of the WAN connections, is dramatically different from the previous static hybrid WAN deployments.

As SD-WAN solutions become integral parts of enterprise WAN architectures, there are several complexities involved in deploying, operating, and managing a global WAN while keeping up with key technology trends such as hybrid cloud services, network and application security, hosted IP voice and unified communications. Working with a managed services provider partner can help your organization eliminate those complexities and seamlessly embrace and integrate SD-WAN with other enterprise solutions.

WHY SD-WAN AND WHAT IT MEANS TO YOUR ORGANIZATION

An SD-WAN architecture uses SDN principles to separate the data plane from the control plane and management plane in the WAN. It abstracts the underlying transport networks (MPLS, internet, Ethernet, wireless) and shifts control intelligence from customer premises equipment (CPE) or edge devices into a centralized, software-based controller. A graphical user interface (GUI)-based management platform enables network administrators to define application-specific business policies, which the controller translates into routing policies enforced in the edge devices.

Key business benefits of an SD-WAN deployment include:

- Reduced network costs as you no longer need to rely only on static, higher-cost, private links and instead can use a combination of private and public links.
- Increased agility as network policies can be centrally defined by a software and applied to edge devices.
- Rapid deployment of branch sites as the edge device comes with zero-touch orchestration that can be set up in minutes, and the branch can be operational using wireless links.
- Application-aware routing feature of SD-WAN enables your network administrators to optimize cloud connectivity as the edge device recognizes traffic that can be sent directly to the cloud over internet links, versus that which is intra-network and can go over public or private links.

IMPACT OF SD-WAN ON ENTERPRISE DIGITAL TRANSFORMATION TRENDS

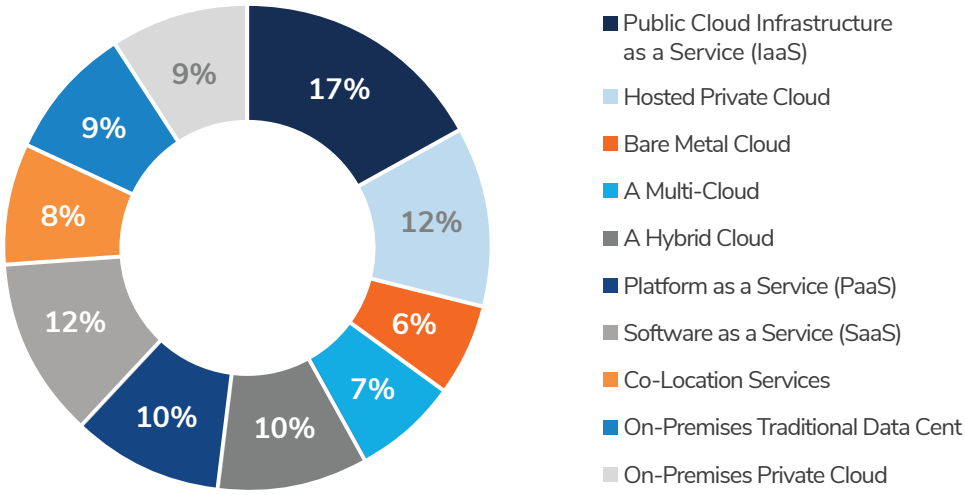
Several technology trends are enabling enterprise digital transformation initiatives. SD-WAN plays an integral role in supporting those technology trends.

Enterprise Hybrid Cloud Networking

Cloud computing has irreversibly altered the enterprise IT landscape in the past decade with nearly 60% of businesses currently using public cloud or IaaS. According to a recent Frost & Sullivan Cloud User Survey of IT decision-makers, 80% of respondents agreed with the statement, “A cloud strategy is critical for us to remain competitive in our industry,” and 75% of respondents agreed with the statement, “Cloud is integral to our digital transformation initiatives.”

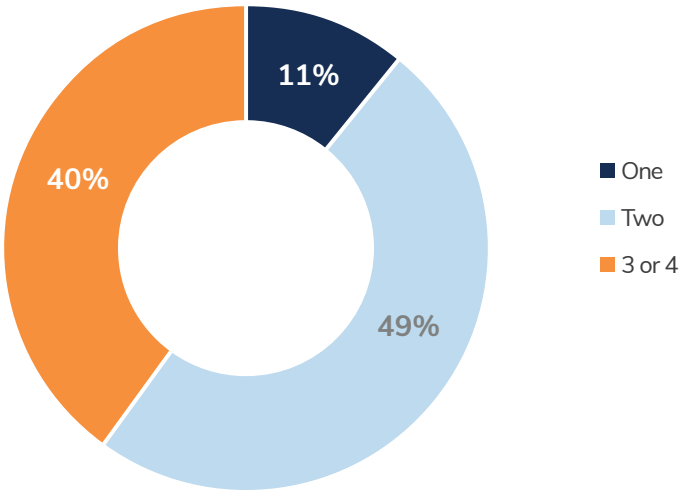
> **“Cloud computing has irreversibly altered the enterprise IT landscape in the past decade with nearly 60% of businesses currently using public cloud or IaaS.**

Deployment Models Businesses Currently Use



As per the same survey, businesses use an average of 4.8 deployment models for their workloads, including premises-based servers, managed services, and cloud. The use of multiple environments reflects businesses' decision to implement a flexible, hybrid, multi-cloud strategy. To meet enterprise needs for agility, cost-effectiveness, and application performance, the networks connecting the hybrid IT environment should keep pace with the IT infrastructure; SD-WAN enables enterprises to do just that. For example, while private MPLS or Ethernet links could be the right choice to connect to an ERP application in a hosted private cloud, for reasons of security and compliance, internet links could suffice for accessing a less-critical SaaS application. Businesses also use, on average, two public cloud providers.

Number of Cloud IaaS Providers Businesses Currently Use



Our Cloud survey indicates that over 40% of the enterprises currently use SaaS-based applications. Disaster recovery as a service (80%), desktop or workspace as a service (77%) and data center as a service (76%) are the top three SaaS applications that businesses use today. SD-WAN offers a reliable and secure connectivity option for businesses doing direct internet breakout to SaaS-based Office 365 or RingCentral applications. The SD-WAN functionality enables businesses to flexibly use and seamlessly integrate multiple transport networks (MPLS, internet, Ethernet, DIA, 4G/LTE, satellite). The pre-defined business policies determine which cloud applications are routed directly to the internet, versus backhauled to a hub site.

Global Branch Sites Deployment and Management

Global branch sites connectivity and management are time-consuming and complex for large distributed enterprises. Most large enterprises have a hybrid WAN in place today, wherein they may use MPLS to connect critical locations and IPsec VPNs to connect less-critical branch sites. However, the current hybrid WAN architecture they have in place is likely static in nature. Any change in network configuration involves truck rolls and requires network engineers to make the changes—which is time-consuming and expensive.

SD-WAN CPE dramatically reduces the time required to add new branch sites, as the CPE can be configured without oversight by on-site network personnel. Zero-touch provisioning enables the device, once plugged into the network, to automatically connect to the controller and self-configure. New branch locations can deploy SD-WAN equipment and start with readily available wireless LTE service while waiting for a network service provider to provision wired services (internet or MPLS).

Enhanced Network and Application Security

Virtual solutions built on virtual machines located at the customer premises or in the cloud make it easier to deploy additional security measures in near-real-time. SD-WAN solutions come integrated with deep security features for enterprises to deploy while doing internet breakout to cloud-based applications. Network administrators can define policies for traffic going over the internet to be routed to a secure gateway before reaching the user.

Alternatively, you can choose to deploy a universal CPE (uCPE) that supports several virtual network functions (SD-WAN, firewall, WAN optimization, etc.) on a single appliance. This allows your network managers to deploy modular security solutions by spinning up virtual machines to combine security solutions from multiple vendors. For example, deploy a virtual firewall from Cisco and then add a set of additional features from Juniper.

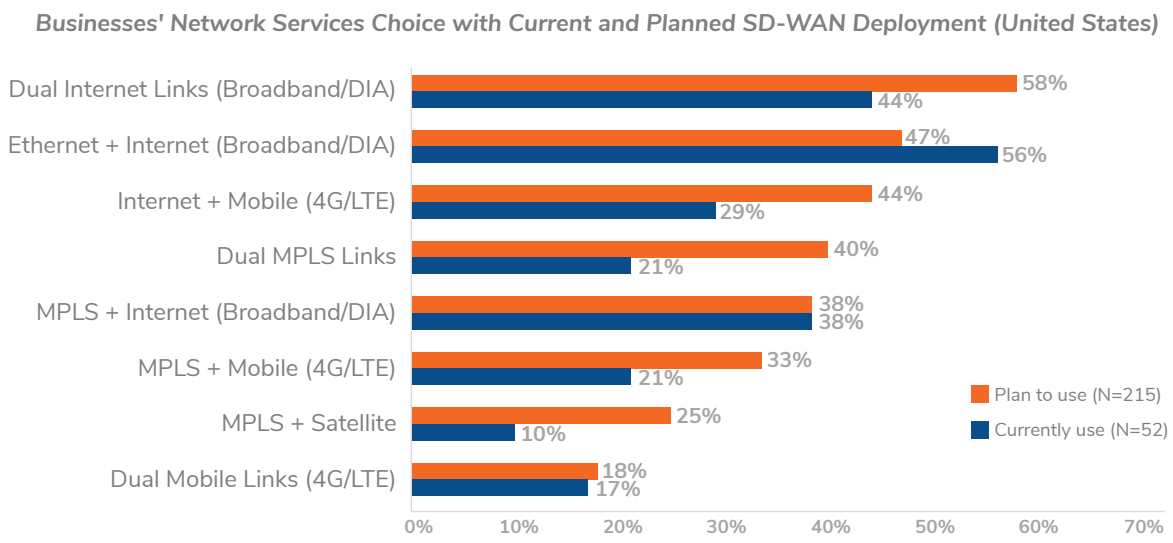
THE VALUE OF A MANAGED SERVICES PROVIDER IN A BUSINESS'S SD-WAN JOURNEY

As described in the previous section, the role of SD-WAN in a digital transformation journey is critical. As your organization undertakes this journey, working with a managed services provider can be invaluable due to the following factors.

Hybrid WAN is the Mantra When it Comes to SD-WAN

Hybrid network services are the underlying foundation of an SD-WAN solution. Despite all the talk about SD-WAN eliminating the need for MPLS network or private WAN services in general, businesses continue to value private network services. While IT decision-makers indicate a preference for dual internet links, our survey (see Figure 1) results indicate continued demand for MPLS and Ethernet. As your organization chooses to deploy a combination of WAN links at distributed global sites, procuring, deploying and managing those links can be extremely time-consuming for the network staff. A managed SD-WAN service provider partner can help aggregate access links (either their own or from a partner) and combine them with SD-WAN hardware and software solutions to offer an end-to-end managed SD-WAN solution.

Figure 1: Network Services Choice with SD-WAN



Source: Frost & Sullivan SD-WAN Survey

> **Hybrid network services are the underlying foundation of an SD-WAN solution. Despite all the talk about SD-WAN eliminating the need for MPLS network or private WAN services in general, businesses continue to value private network services.**

Global SD-WAN Deployments Can be Complex without a Managed Service Provider Partner

SD-WAN solutions offer superior benefits over traditional hardware-centric, static WAN deployments. The SD-WAN appliance is simple and easy to deploy and can self-configure without the need for network personnel to deploy and configure it. However, after the initial phase of SD-WAN deployments, in our discussions with businesses and service providers, it has become clear that many businesses struggle with SD-WAN solutions at their branch sites. Commonly stated challenges include trouble with LAN discovery and lack of knowledge by the staff at the branch site to even connect the appliance and carry through the basic steps. Therefore, most businesses deploying SD-WAN prefer working with a managed service provider that can deploy and manage the SD-WAN solution at all of the sites and ensure a consistent performance. Furthermore, the SD-WAN solution is only efficient if integrated well with the underlying network infrastructure, and as explained earlier, WAN management is a complex process. If your organization chooses to manage the WAN infrastructure in-house, you must have expert network managers on staff across locations to run and operate a global WAN. Alternatively, managed service providers that have the expertise and technology to integrate disparate operations and management systems across various access providers, and the ability to present a unified view for enterprise network teams, can take on this responsibility for your organization.

SDN, NFV and SD-WAN Technologies are Converging, Adding to WAN Complexity

SDN and NFV technologies have made significant inroads into enterprise WAN architectures in the last five years. SDN-based bandwidth on-demand capability is widely available today from many leading network service providers. NFV-based virtual network services that enable businesses to deploy key network functions (for example, virtual router or virtual firewall) in software format are slowly gaining traction. As your organization evaluates SD-WAN technology, it is recommended that you also look at virtual network services to transform the WAN more holistically. For example, it is more meaningful to deploy SD-WAN and virtual security together so that network administrators can deploy security on the go for direct internet breakout to cloud-based applications. The convergence of SDN, NFV and SD-WAN technologies enables businesses to do exactly that. Therefore, working with a managed service provider that can support a plethora of services and features ensures a future-proof approach to embracing these new technologies.

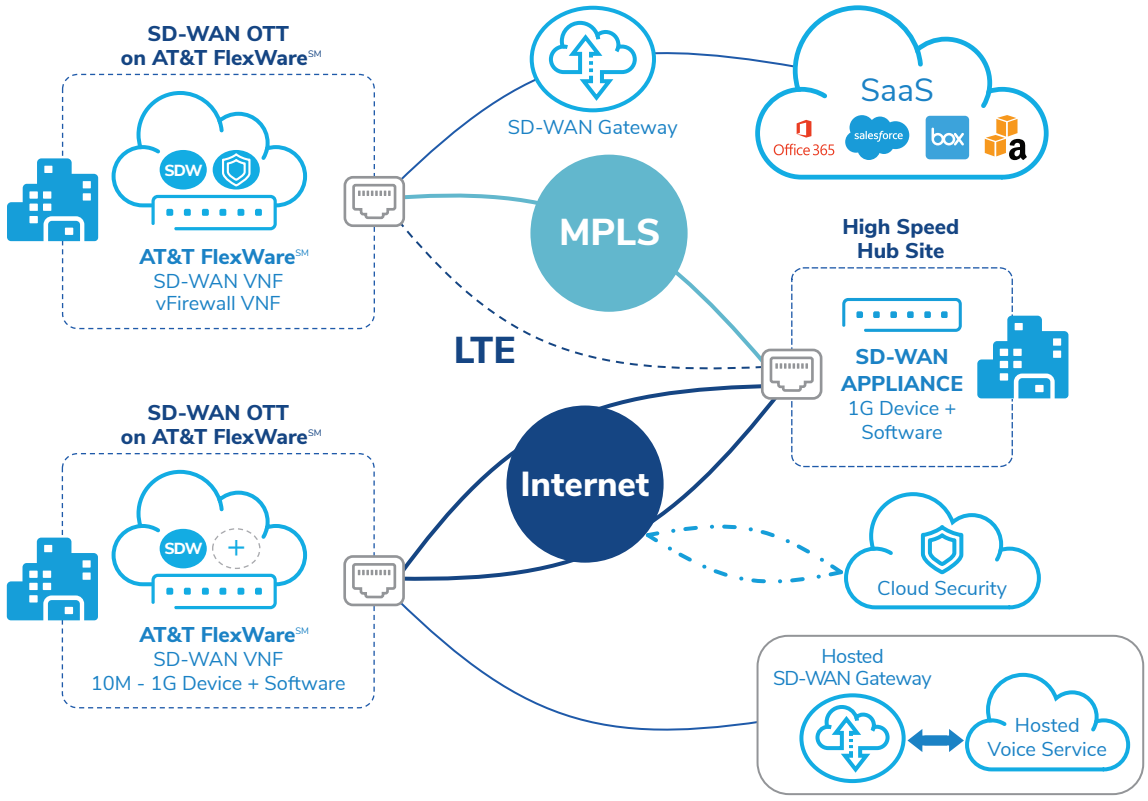
INTEGRATED AND HOLISTIC APPROACH TO SD-WAN FROM AT&T

AT&T offers a broad range of solutions for businesses at different stages of the SD-WAN adoption journey.

Over-the-top SD-WAN Solution

The over-the-top (OTT) managed SD-WAN service is delivered over an SD-WAN Appliance or on the AT&T FlexWareSM Device, a universal CPE that can run multiple virtual network functions (VNFs) to create an overlay network over any public or private network. Customers can use a wide variety of AT&T's services—MPLS, Dedicated Internet Access (DIA), Broadband and wireless—or bring their own networks to connect locations. The service is available globally in fully managed or co-managed options. The fully managed solution provides installation, day-2 support, project management and an integrated service experience from AT&T. The co-managed option gives customers the flexibility to manage business policies. Figure 2 shows one of AT&T's OTT Managed SD-WAN Solution Architectures.

Figure 2: AT&T's Over-the-top Managed SD-WAN Solution Architecture



Source: AT&T

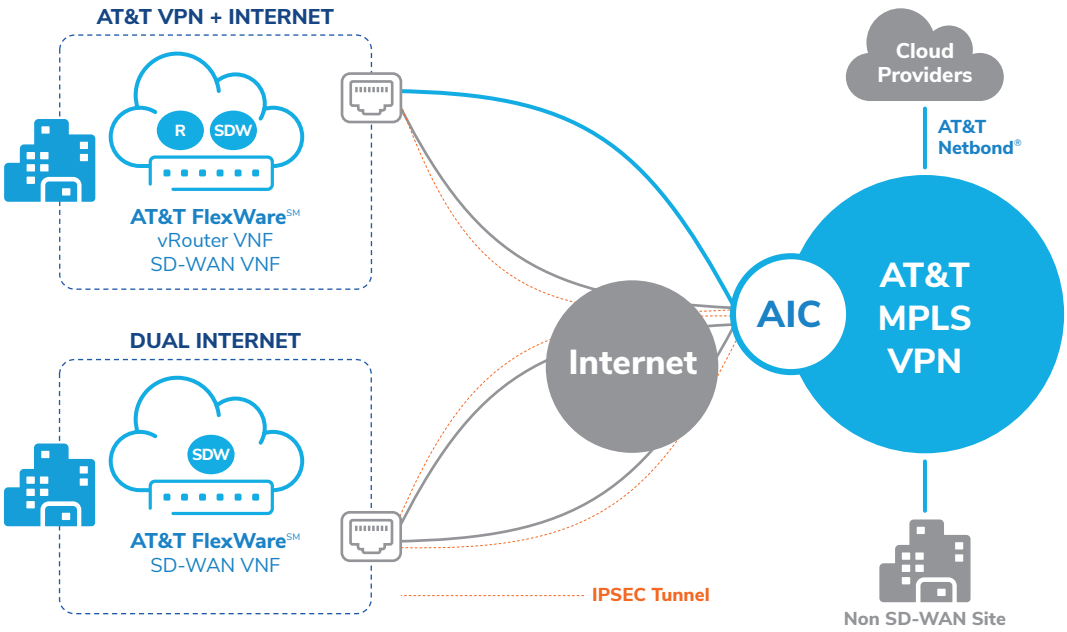
The OTT managed SD-WAN service is available through AT&T's global direct and indirect channels, in 150+ countries and territories. The service is available in a subscription model where the customer pays a single monthly recurring charge (MRC) for the managed SD-WAN service and applicable bandwidth fees. The MRC includes access to an expert technician, concierge, day-2 support services, global project management, and an integrated service experience from AT&T.

Network-based Solution

The network-based solution utilizes the AT&T FlexWare Device to deliver multiple VNFs. Key highlights of the network-based SD-WAN solution include:

- Customer edges can either do a direct internet offload or connect to the AT&T Integrated Cloud for traffic to be routed on the AT&T virtual private network, which offers Class of Service, unlike in an overlay network.
- The network-based service uses SD-WAN gateways distributed across AT&T's MPLS network in AT&T Integrated Cloud nodes and a cloud-based orchestrator to route traffic. This offers inherent resiliency in that each SD-WAN site is assigned to primary and backup SD-WAN gateways and orchestrators. If the primary SD-WAN gateway fails, the traffic is automatically rerouted to the backup SD-WAN gateway. Similarly, if the primary orchestrator fails, the customer can simply log on to the backup orchestrator.
- Additionally, the SDN-enabled AIC nodes allow for the gateway bandwidth to be automatically adjusted if site bandwidth changes. This is a co-managed service, with AT&T responsible for the installation of the AT&T FlexWare Device and SD-WAN VNF, monitoring of those network elements, and trouble resolution. The customer would be responsible for the SD-WAN policy administration via the SD-WAN portal. AT&T provides training on the SD-WAN and policy management. Figure 3 shows AT&T's network-based SD-WAN solution architecture.

Figure 3: AT&T Network-based SD-WAN Architecture



Source: AT&T

With AT&T's network-based SD-WAN option, customers can easily mix and match SD-WAN and non-SD-WAN sites. The ability to mix and match site types allows customers to gradually introduce SD-WAN into their networks. The AT&T network-based option is available globally in 200+ countries and territories.[1]

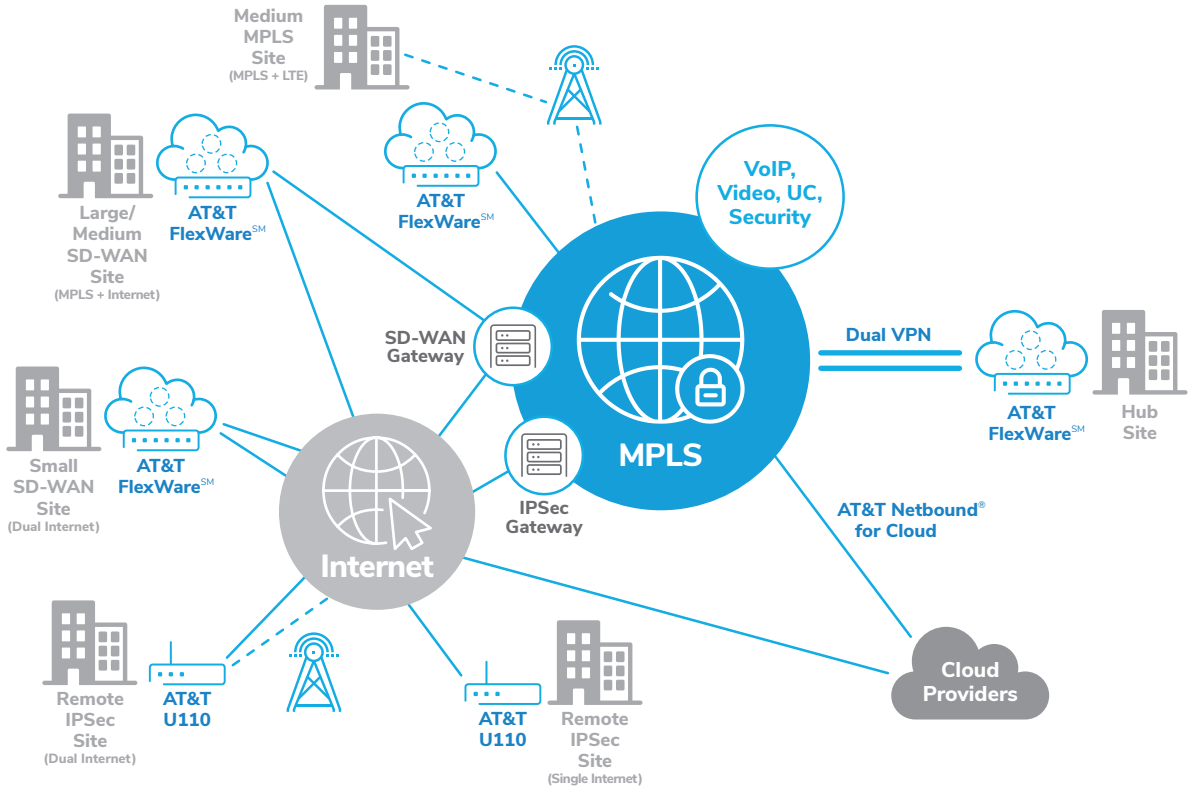
1. Subject to conditions

AT&T's network-based approach to SD-WAN builds upon the investments the company has made in SDN and NFV technologies. The company's SDN-based network on-demand offering gives customers the ability to procure dynamic bandwidth across AT&T Switched Ethernet and AT&T Dedicated Internet services. The ability to run SD-WAN functionality as a VNF on the AT&T FlexWare Device eliminates the need for a separate CPE and allows businesses to seamlessly integrate SD-WAN functionality into their WAN architectures.

AT&T's Hybrid Networking and SD-WAN

As detailed above, most businesses have some form of hybrid networks (any combination of MPLS, Ethernet, and IPsec VPNs) in place already. To facilitate a phased approach to SD-WAN, AT&T encourages its MPLS and IPsec customers to use hybrid networking alongside SD-WAN, instead of a rip-and-replace approach. Existing AT&T VPN and AT&T Network-Based IP VPN Remote (AT&T NIRA) service customers can continue to keep MPLS and IPsec sites and add SD-WAN at select sites, thus simplifying the evolution to SD-WAN. Figure 4 shows AT&T's hybrid networking and SD-WAN solution architecture.

Figure 4: AT&T's Hybrid Networking and SD-WAN Approach



Source: AT&T

AT&T offers management and visibility into all services via the Business Center online portal. For customer sites using AT&T VPN and SD-WAN, the AT&T FlexWare Device is available for customers that are ready to make the move to a virtual edge. The hybrid approach, with prices ranging from low-priced IPsec sites, medium-priced SD-WAN sites, and higher-priced MPLS sites, offers customers the choice to deploy services that best suit their price points and application requirements.

CONCLUSION

As your organization goes through the digital transformation journey, the WAN will be more critical than ever to embrace key technology trends. SD-WAN technology brings the much-needed agility and flexibility to the traditional static WAN to keep up with the increasingly hybrid cloud-centric era. As detailed in this paper, global multi-site SD-WAN deployments can be time-consuming and complex for the internal network and IT team to manage. Working with a managed SD-WAN provider can help your organization seamlessly embrace SD-WAN.

To learn more about AT&T SD-WAN, please visit www.att.com/sdwan.

Roopa Honnachari
Industry Director – Business Communication Services & Cloud Computing
Frost & Sullivan
rshree@frost.com

NEXT STEPS

- **Schedule a meeting with our global team** to experience our thought leadership and to integrate your ideas, opportunities and challenges into the discussion.

- Interested in learning more about the topics covered in this white paper? Call us at 877.GoFrost and reference the paper you're interested in. We'll have an analyst get in touch with you.

- Visit our **Digital Transformation** web page.

- Attend one of our **Growth Innovation & Leadership (GIL)** events to unearth hidden growth opportunities.

Silicon Valley
3211 Scott Blvd
Santa Clara, CA 95054
Tel 650.475.4500
Fax 650.475.1571

San Antonio
7550 West Interstate 10
Suite 400
San Antonio, TX 78229
Tel 210.348.1000
Fax 210.348.1003

London
Floor 3 - Building 5,
Chiswick Business Park
566 Chiswick High Road
London W4 5YF
Tel +44 (0)20 8996 8500
Fax +44 (0)20 8994 1389

myfrost@frost.com 877.GoFrost http://www.frost.com

FROST & SULLIVAN

Frost & Sullivan, the Growth Partnership Company, works in collaboration with clients to leverage visionary innovation that addresses the global challenges and related growth opportunities that will make or break today's market participants. For more than 50 years, we have been developing growth strategies for the Global 1000, emerging businesses, the public sector and the investment community. Is your organization prepared for the next profound wave of industry convergence, disruptive technologies, increasing competitive intensity, Mega Trends, breakthrough best practices, changing customer dynamics and emerging economies?

For information regarding permission, write:
Frost & Sullivan
331 E. Evelyn Ave., Suite 100
Mountain View, CA 94041