UNLEASH THE BENEFITS OF SD-WAN FOR AN AGILE ENTERPRISE

34% of IT decision makers indicate plans to invest in a new SD-WAN solution within the next two years.[1]

In prior papers, we have used the analogy that keeping up with IT innovation today is like attempting to drink from a fire hydrant. It is difficult to come up with new clever ways to make the obvious point that technology is moving so fast. As trite as it sounds, the prodigious rate of speed that technical innovation is accelerating at is breath taking. In the past couple of years, we have discussed so many exciting technologies such as software-defined systems and Hyperconverged Infrastructure (HCI) along with the new strategies that unify the management of traditional IT and the cloud—Hybrid IT. All of these technologies have centered on transforming the data center into a flexible ecosphere to bring unbridled agility to the enterprise. While a strong focus on the data center is critical in achieving the digital transformation companies are ever striving for today, the ignored elephant in the room continues to be the WAN. The fact is that you can completely transform your data center, but unless the WAN is optimized for the digitally elastic paradigm upon us, the users dispersed across your field offices will not realize the full potential of the great investment that your organization is undertaking to transform the data center network. This is a pity, because the users in the field office are on the front lines. They are the ones witnessing the demand fluctuations and disruptions that are affecting your business in real time, making them critical to your organization.

This is why we are so excited to summarize the power and potential of SD-WAN. While software defining the data center is paramount, you cannot forget the WAN. In many ways, it is the final frontier. It is the last bastion of legacy architecture and hardware that is holding enterprises back from realizing full utilization of their digital transformation. In 2017, Gartner estimated that SD-WAN garnered less than five percent market share, but predicts that 25% of organizations

will manage their WAN through software within two years. By 2020, Gartner estimates that the SD-WAN market will be a $1.3 billion dollar industry.[2] In this white paper; we will discuss what SD-WAN is about and why its integration into your enterprise is so important.

FLEXIBILITY IS THE KEY TODAY FOR BUSINESS

In order to compete in today's fast paced disruptive global environment, organizational structure must evolve to unlock the potential within the enterprise in which predictable efficiency must give way to rapid adaptability.[3] In order to transform your organization, you must transform your IT architecture. This makes IT a competitive advantage for any organization today. According to the Harvard Business Review, 72% of business leaders believe competitors will use data and insights to disrupt their sectors within the next three years. At the same time, 92% of executives recognize they need to exploit data to compete.[4] In essence; your IT infrastructure must be adaptable enough to react and take advantage of newly exploited data, including your WAN.

Decisions keep the business moving forward, and forward is always a good thing.[5] Yet, it seems that as soon as you make a decision today, new data comes in that changes the direction of that decision. In other words, nothing is etched in stone anymore, except maybe the legacy network architecture that connects your field offices within your hub and spoke network made up of fixed circuits and proprietary hardware. As so many organizations have discovered in software defining the data center, software provides a fluidness and responsiveness that hardware cannot come close to matching. With SD-WAN, the advantages of SDN are no longer limited to the data center.

YOUR WAN NEEDS YOUR ATTENTION TOO

According to 2015 Research Study, it took four months to roll out new network services when factoring in purchasing, deployment and provisioning the necessary hardware.[6] Since then IT leaders have taken great strides to compress this time window. The server virtualization technology that radically streamlined the server deployment process and delivered full capacity resource utilization gave us the roadmap. Since then enterprises have software defined the networking and storage components of the data center as well. By software defining all members of the data center component trilogy, IT was then able to compact them into a single HCI appliance package. This introduced expandability and simplicity. More importantly, it gave network admins the ability to manage the data center through a single pane of glass in a hybrid IT environment in which services were hosted both on-premises and in the cloud.

Up until recently however, the WAN has been ignored, as the existing architecture has changed little for several decades. Services delivered to branch offices still predominantly rely on the deployment of physical appliances that must be installed by a skilled network engineer who must be dispatched from the main office as most field offices lack any sort of high-level IT personnel. The scheduling of these on-site visits add considerable time and costs. While the

reenactment of this scenario would seem archaic within the modern data center, it too often represents reality throughout the WAN. Add to this the rigidness of Multilayer Packet Switching (MPLS) and it is quickly understandable that it's only a matter of time until the technologies of virtualization, HCI and the cloud made their way into WAN architecture.

There was a time when WAN traffic was pretty much limited to Internet, email and voice traffic. Thanks to the proliferation of cloud and mobile computing, branch offices fully utilize cloud resources, SaaS applications, mobile computing and multimedia services. These new and differentiating traffic patterns create greater complexity than the legacy hub and spoke WAN model was designed to accommodate. Enterprises today need a WAN that is adaptive and software controlled with an emphasis on QoS. Simply oversubscribing and paying for anticipated peak capacity is longer acceptable. Furthermore, while your branch offices are the closest presence you have to your customers, branch locations are characterized by having slow cumbersome network performance compared to corporate. Because an enterprise is only as agile as it's least nimble component, that final frontier called the WAN must be addressed.

LEGACY NETWORK ARCHITECTURE CANNOT SUPPORT A CLOUD-FIRST ENTERPRISE

So many enterprises strive to be "cloud first." Yet their WAN holds them back from achieving this objective. Think about it. When a user at a remote field office in Omaha, Nebraska wants to access Office 365 or Salesforce.com, they open a browser on their computer. In doing so, they create a chain reaction which involves a connection sent from the on-premises MDF across multiple states in order to be backhauled to the enterprise data center in Boston, which then forwards it to the Internet from there. Network responses then flow back through the same stack and travel from the data center to the remote user. Known as the "Trombone Effect," this situation occurs in a network architecture that forces a distributed organization to use a single secure exit point to the Internet.[7] This can result in the saturation of WAN links. An example of this is illustrated below.
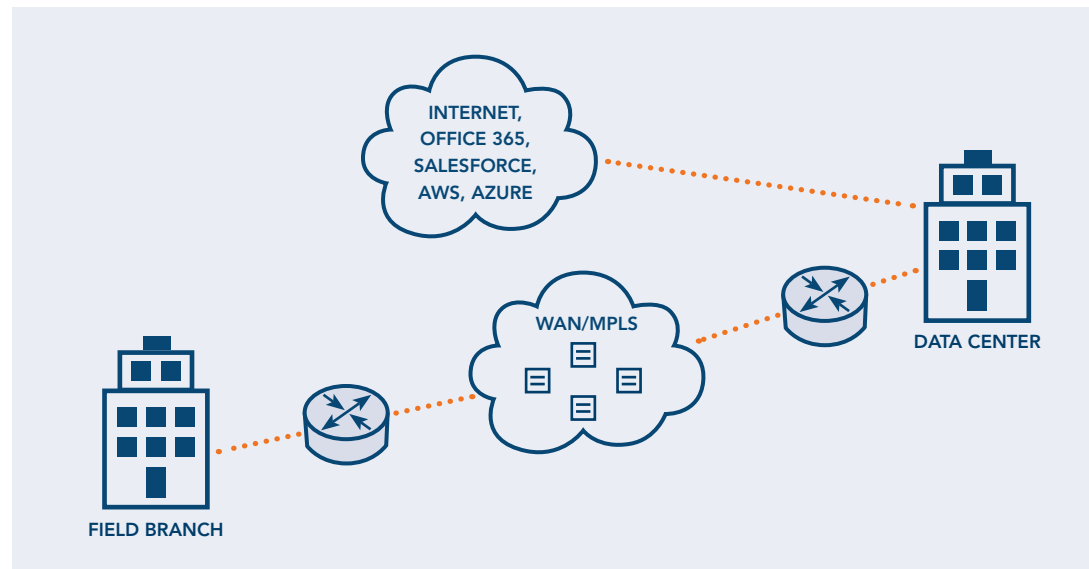
While this seemingly illogical process made sense decades ago, backhauling only slows performance for branch offices and users who require direct access to their cloud services and applications. In order to serve a cloud-first strategy, organizations must turn to a new architecture that provides secure local/regional breakouts to the cloud that allows traffic to flow directly to the Internet from the closest available link. It is for this reason alone that geographically distributed enterprises are quickly adapting to SD-WAN based architectures such as pictured below.
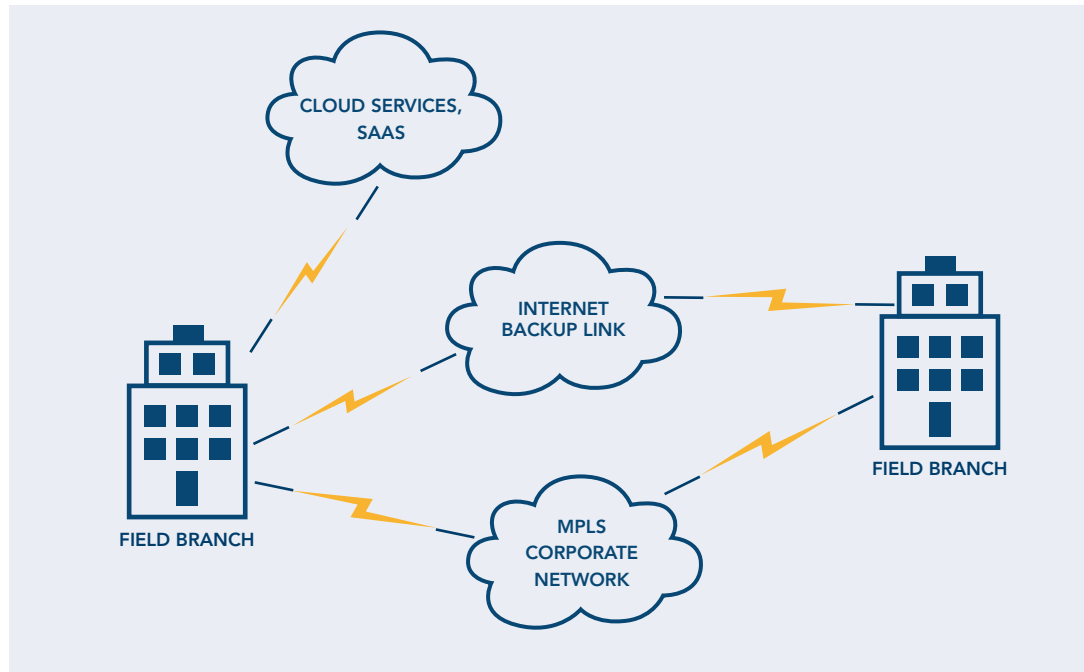
WHAT IS SD-WAN?

Designing and provisioning networks in a cloud-based world would be easy if everyone in your organization worked from the same location. Unfortunately, reality is far more complicated. SDN integrates policy-based automation in order to steer and prioritize application traffic so that critical traffic always presides, and application performance is guaranteed for users. SD-WAN is based on the same principle of SDN in that the control plane and data planes are abstracted from one another. This allows the WAN, including all branch edges to be centrally managed without the need for an onsite network or security admin at the branch offices. Traffic flows are routed according to established policies that analyze route availability and congestion in real time. Internet and SaaS traffic are allowed to exit at their earliest convenience while HR and finance-based traffic traverse encrypted through VPN tunnels to corporate. Meanwhile branch-to-branch video conferences and telephone traffic use overlay networking in order to achieve quality of service guarantees.

One of the motivations of backhauling network traffic across the WAN was the inability to secure network traffic from each WAN location. With SD-WAN, the functions of security and networking are fused into a single package. Routing web and cloud traffic directly out of your branches rather than pinning these traffic flows through the HQ data center is both a cost saver and a management change agent, but only if you have the security to protect it. This is why security is such an important part of SD-WAN. This cohesion means that data protection and traffic optimization are managed within the same interface. This single pane of glass approach is central to Fortinet's aggressive approach into the SD-WAN market. Their SD-WAN solution centers on the practice of consolidating products and functionality into a single device, all uniformly managed by a single admin. Separate WAN routers, WAN optimization appliances and security devices are no longer necessary, thus reducing management complexity. Like many SD-WAN solutions, it continually verifies and monitors the heal status of all links that connect the site to the WAN. Because it is application aware, it offers automatic WAN path control for your user traffic.

Technically, SD-WAN is not reinventing technology. It simply incorporates the modern value driven technologies that you are already implementing within your data center and dispersing them throughout your WAN. It may not recreate the wheel, but SD-WAN does ensure that all of your users, regardless of location, enjoy the same level of performance and security that your corporate users already benefit from.

THE BENEFITS OF SD-WAN

When it comes down to it, you pay for bandwidth you do not use, just like server hardware. Maximizing your bandwidth translates into maximizing your investment costs, which increases your ROI. By segregating your traffic patterns, traffic flows are more evenly dispersed throughout your WAN, bottlenecks are negated and application delivery is improved. Through virtualization, SD-WAN solutions can aggregate WAN circuits of any type, from any provider, providing the flexibility to enforce load balancing and true redundancy. Through a central interface pane, a single admin can control the entire WAN and thus control the shape and bandwidth at each location centrally through a GUI. With SD-WAN, cheap bandwidth and quality uptime fall into the same equation.[8]

Cisco is one of the leading SD-WAN solution providers in the industry today. This only makes sense as they have been offering WAN solutions from their early beginnings. In the same manner in which they set about to define the routing standard, Cisco has set out to meet the challenges of the modern WAN today, devising their SD-WAN architecture and functionality to conquer them. According to Cisco, the following enterprise challenges are alleviated by SD-WAN.

Enterprise Challenges	SD-WAN Benefits
50% of traffic is cloud related, yet the network is not cloud aware	Optimized for public cloud and SaaS
SaaS performs poorly	4x Improvement in SaaS response times
Complex workflows for public cloud providers (AWS, Azure)	Seamless connectivity to public cloud
SLA for the application experience is unpredictable	Predictable application SLA
70% of app outages are tied to networking problems	No app outages due to networking

VMware is another leader in the SD-WAN market today as they apply their proven data center virtualization technologies to the WAN. Enterprises need WANs that are both reliable and scalable. MPLS is reliable but not very scalable. Internet bandwidth is readily available and less costly, but not as reliable. VMware set out to simplify the process of adding bandwidth links, aggregating them into a seamless congruent pipe system, routing appropriate application traffic through policy assigned avenues. Like other leading SD-WAN solutions, their NSX SD-WAN solution provides the following benefits:

- Virtualizes the network

- Enables a secure overlay

- Simplifies services delivery

- Provides interoperability

- Leverages cost effective hardware

- Supports automation with business policy framework

- Monitors usage and performance

- Supports interoperable and open networking

A discussion on SD-WAN would not be complete without mentioning Aruba's SD-Branch. SD-Branch serves as a Branch Gateway that operates as a central policy enforcement point that consolidates broad functionality into a single branch appliance. Aruba leveraged their knowledge and portfolio of security, analytical solutions, and wireless networking and set out to design a new product from the ground up. SD-Branch is not a retrofit product, but a solution specifically designed to meet the needs of today's branch-based networks and supports broadband, MPLS, and LTE WAN connections. SD-Branch allows for central policy enforcement at all points of the enterprise, allowing admins to manage application traffic and security for

multiple locations. Aruba's solution provides granular visibility of all of your branches through a single pane of glass, allowing a single admin to customize access and bandwidth policies accordingly. No branch gateway solution would be complete without an emphasis on security, and SD-Branch provides application and user aware firewall capability as well as web content filtering. Public IP reputation and dynamic segmentation capabilities helps ensure that your branch users and assets are protected just as effectively as your corporate data center. SD-Branch is the complete solution that so many distributed enterprises need today.

CONCLUSION

The rate in which enterprises are expanding into the network edge clearly shows that it is no longer just about the core. While IoT is a major component of the intelligent edge, branch networking for the cloud and enterprise branch IT are just as important because they are the outposts that have the finger and the pulse of your customer base. SD-WAN is about ensuring that your users, resources and services on the furthest edges of your enterprise have access to bandwidth that is as reliable, scalable and secure as users that reside at HQ. To attain the agile enterprise that organizational leaders are chasing, all facets of the enterprise must be equally nimble. SD-WAN incorporates SDN, network function virtualization and overlay networks to optimize your WAN traffic automatically, all while ensuring that your data is protected from end-to-end. When it comes to the modern digital enterprise, there are no frontiers that can be ignored.

Sources
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