INTRODUCTION

The past 20 years have seen many changes in IT. For example, the shift from physical appliances to virtual, manual management to automated, and centralized applications to distributed applications across multiple clouds and SaaS. Additionally, the scale of devices that connect to the network is continuing to increase exponentially as IoT devices become more prevalent.

Where virtualization and centralization brought increased agility to the world of server and storage infrastructure, Software Defined Networking (SDN) is helping transform traditional networking technologies. SDN is reducing cost and complexity while addressing risk and compliance concerns through secure and resilient network infrastructure technologies.

Using SDN technologies we can provision and manage the network centrally rather than performing per device configurations which is time-consuming and prone to human error. SDN also increases the network availability which leads to better user experience.

Software Defined WAN (SD-WAN), utilizes the principles listed above and creates a virtual overlay on top of the underlying transport allowing the organizations to be transport agnostic. Private circuits such as MPLS with provider SLAs may be used in conjunction with more economical broadband circuits which can be deployed quickly for new branch locations.

TRENDS AND CHALLENGES FOR THE WAN

The network must evolve to accommodate the applications and users who depend on it. As the applications move to multiple clouds (IaaS, SaaS, Private, Public) and the users begin to work from branches with Direct Internet Access (DIA), this added demand puts strain on the corporate WAN that is expected to provide the same level of service as the LAN. The IT team must balance user experience with costs for private circuits and devices, resiliency, visibility, control and security of the WAN.

Interestingly, a SD-WAN deployment is one of the few IT projects where a positive ROI can be realized if the plan includes replacing expensive private circuits with more economical broadband circuits.
SD-WAN CRITERIA

When choosing a SD-WAN solution, what are some points that should be considered?
We are going to begin with the assumption that each option will provide the basic features such as:

- **Continuous Link Monitoring:** the SD-WAN will monitor all links.
- **Dynamic Path Selection:** The SD-WAN will monitor all links and dynamically adjust traffic flow based on the quality of the link (brownouts – jitter, latency, delay, packet loss etc.).
- **Data Path Encryption:** The SD-WAN will encrypt the data traffic with AES 256.

Let’s consider some other aspects:

- **Compliance:** Does your organization have any compliance concerns and is the SD-WAN solution able to address those concerns? Is the cloud hosted management/controller suite compliant? If not, then do they offer an equivalent on-premise deployment option? Is your organization ready to deploy and manage that solution with the understanding that it should be deployed in a resilient fashion across multiple datacenters? Is your team prepared to patch and update the SD-WAN virtual machines regularly?
- **Security:** Security Services (natively or with partners) that comply with your security posture such as network segmentation, so you may classify and separate traffic from Guests, Corporate traffic and PCI, HIPPA or SOX compliant traffic. Do you require additional security services such as a Layer 7 firewall, Intrusion Prevention, URL filtering, DNS and Anti-Malware protection?
- **Flexibility:** Service-chaining or APIs to work with 3rd party devices that are being used in your network.
- **Agility:** Zero Touch Provisioning to quickly deploy new edge devices - virtual or physical.
- **Migration:** How easy would it be to migrate to SD-WAN? Can any of your existing devices be utilized as-is or with an upgrade of licensing and memory?
- **Application visibility and classification:** Can it classify the applications that are critical for your organizations and deploy policy accordingly? The devil is in the details and the due diligence here will go a long way in ensuring that the correct solution is chosen. As part of the WAN upgrade process, please identify the critical apps for your organization so that detailed design discussions can be based on your environment.
- **WAN optimization:** Increasing bandwidth does not resolve any issues being caused by the latency from long distances. Does the solution offer just TCP window optimization, or does it go beyond with advanced features such as caching? Does your organization currently use Wan optimization?
- **Cloud Access and Optimization:** As applications move to the cloud, SD-WAN can provide secure and reliable access to those applications whether they are IaaS (AWS, Azure etc.) or SaaS such as Office365 and Salesforce. Prepare a list of your critical SaaS applications and determine which SDWAN vendor natively recognizes them at the application level.
• **Routing Protocols:** Which routing protocol is being used in your LAN environment and is it supported by the SD-WAN vendor? Would it add complexity to add another routing protocol and then having to perform mutual redistribution on redundant devices across the network?

• **Forward Error Correction (FEC):** FEC adds a packet loss recovery packet in the stream. The number of these packets are variable and may be dynamic based on circuit conditions. Some vendors duplicate packets for select applications on the redundant link while others use FEC.

• **Packet Duplication:** Duplicate packets are sent on the redundant circuits and the remote SD-WAN device re-arranges the packets stream with the first received packet. This is only done for select applications such as voice.

• **Cost:** As mentioned earlier, a SD-WAN deployment may have a positive ROI. When comparing costs, ask for the total TCO of each solution including hardware, software, licensing and ongoing support.

**CONCLUSION**

Choosing between the various SD-WAN vendors can be a difficult task as it is a fragmented and highly competitive marketplace. Understanding your organization’s needs and mission critical apps and how they will be impacted by SD-WAN is crucial. There are many features but only a select few may be applicable for your organization and understanding your needs is essential for those discovery discussions.

Red River offers a SD-WAN assessment to begin your journey. Our assessment ensures that SD-WAN is addressing your organization’s unique needs. The assessment starts with a comprehensive review of your current state - applications, locations, circuits, network infrastructure, compliance and security posture. We then discuss your organization’s plan for the next 3-5 years. We cover your requirements such as cloud access, business agility, operational excellence and security, and begin weighing those key performance indicators (KPIs) against what the market has to offer. Our deliverable is a comprehensive report that clearly outlines all of the data points to help you make an informed decision based on technology and cost.