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Why the Cloud is the Network

By: Lee Doyle, Principal Analyst at Doyle Research

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Executive Summary

Mission critical enterprise applications are moving to the cloud, driving the need for wide area network (WAN) agility, flexibility, and rapid scalability. Leading IT trends such as Software as a Service (SaaS), Cloud storage, Enterprise mobility, and globalization increase the importance of network assets. However, the advantages of public and private data centers are diminished if the network is slow, inflexible, and unpredictable. Erratic network performance with high latency, jitter and packet loss can significantly impact user adoption, satisfaction, and productivity.

End users are increasingly distributed from remote branch offices and need to access corporate applications and data 24/7/365 from multiple devices. The Internet provides a global access for cloud applications, but is limited by poor reliability, unpredictable performance, and weak security. The solution is to put network intelligence in the cloud to control traffic flows, orchestrate centrally and leverage multiple links (e.g. hybrid WAN) for reliability.

The increased deployment of cloud applications, storage, hosted voice, video, and mobile applications has challenged IT and business managers to provide high quality WAN services to the branch. Deploying and managing the WAN has become more challenging and costly as traffic flows decentralize. The solution for many organizations is to place network intelligence in the cloud to monitor, steer, and secure traffic flows. SD-WAN offers compelling advantages for distributed organizations with critical branch operations, including the benefits of business agility, improved application performance, and lower cost of bandwidth.

Trends in Cloud Adoption

The adoption of cloud computing, cloud storage, and SaaS has rapidly changed the way users access applications and data. As the functionality, security, and performance of SaaS applications has improved, the usage of popular SaaS applications like Salesforce.com, Google Docs, and Microsoft Office 365 has skyrocketed. Every day millions of workers access cloud services such as Amazon Web Services and Microsoft

Azure, cloud-based storage (e.g. Box and Drop Box), unified communications services (e.g. Ring Central, Vonage Business, Skype for Business) and conferencing applications like Go-to-Meeting and WebEx.

Industry analysts expect the use of cloud-based computing and applications to grow strongly over the next five years. Research conclusions include:

- IDC predicts that worldwide spending on public IT cloud services will grow from $56.6 billion in 2014 to more than $127 billion in 2018.
- According to Okta Research, most organizations currently use between 11-16 off-the-shelf cloud applications.
- IDC predicts that more than 80 percent of new applications will be deployed via the cloud and that cloud platforms will gradually displace the client/server approach as the dominant model for application delivery.

The reality is that the majority of the workforce (approximately 70%) is located far from corporate headquarters either at branch offices or at remote/home offices. All IT organizations need to provide branch users with fast, reliable, secure access as they increase their use of cloud-based applications.

The Cloud is an Ideal Platform for the WAN

The growth in globalized business operations, increasingly dynamic remote offices, and adoption of cloud-hosted apps and data have created new challenges for IT managers tasked with providing secure, reliable access to cloud-based applications. End-user experience and satisfaction are directly related to a network's responsiveness, so IT departments must concern themselves with latency, packet loss, and jitter if they are going to ensure consistent performance for critical cloud-based applications. With the distribution of branch offices (everywhere) and the distribution of cloud-based applications (everywhere), IT organizations must adopt new strategies for delivering WAN connectivity.

Due to rigid architectures, complexity, and cost concerns the traditional model of connecting branch office users to a centralized data center via T1s, Frame Relay, or

MPLS cannot scale to meet these needs. Employees (and customers) need to connect to cloud-based applications directly via high speed Internet access. The new WAN requires solutions that leverage the benefits of the Internet (speed, ubiquity) with a fabric to connect distributed users to distributed applications. Network intelligence based in the cloud can remediate network (Internet) challenges to reduce jitter, packet loss, and improve redundancy. By providing diversity in network access and re-routing traffic when necessary, an intelligent network can improve reliability.

Security is a critical concern due to the distributed nature of cloud applications and remote users who can no longer be controlled by IT. As the security perimeters break down, security and policies need to be embedded within the network. A new WAN provides enhanced security by monitoring and applying policies across network traffic, applications and users.

The solution for organizations with a distributed work force is to deploy software defined wide area network (SD-WAN) solutions – see Figure 1. SD-WAN solutions consist of centrally managed WAN edge (physical or virtual) devices deployed in branch (or remote) offices. SD-WAN provides the following capabilities:

- Leverages the abundant availability of ordinary broadband links like Cable and DSL to augment the existing MPLS to connect efficiently to the Cloud resources
- Simplifies business operations for all remote employees to access cloud resources without hair-pinning through the corporate datacenter
- Centralize and orchestrate the branch office WAN network via a cloud console and eliminate the need for truck rolls to implement branch network changes
- Deploy secure connectivity to all branch offices and simplify the setup of site-to-site VPNs
- Deliver link quality remediation over private and public transport
- Enable bi-directional quality of service across public transport (such as Internet) directly to and from cloud applications, compute, storage and Internet applications
- Leverage cloud hosted services for scalable, redundant connectivity to both enterprise and cloud datacenters without network reconfiguration

SD-WAN technology delivers the network intelligence required to connect an increasing remote work force with cloud-based applications and data.

Figure 1: Cloud Enabled WAN
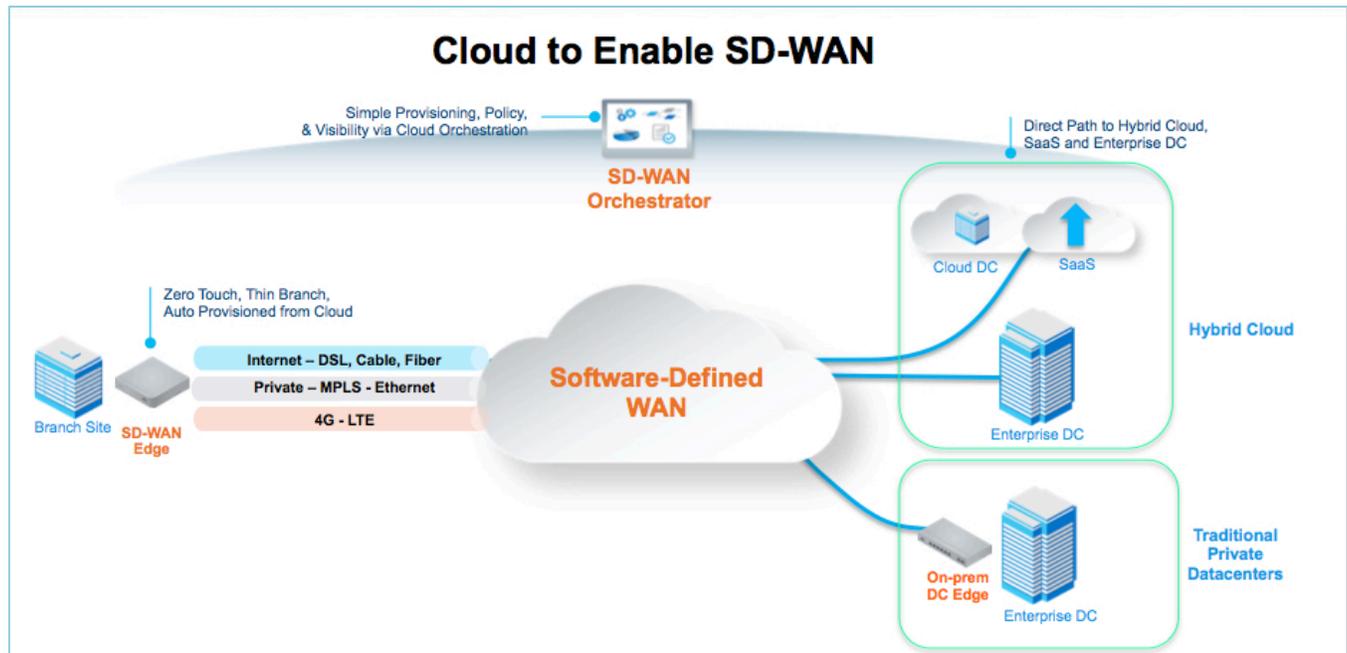
SD-WAN Use Cases

Cloud-based WAN solutions are installed in a number of use cases across different verticals including:

- Hybrid WAN: Organizations migrate to SD-WAN by adding Internet circuits to their existing MPLS networks to improve available network bandwidth and to provide faster access to cloud resources for remote branch users. This architecture also improves reliability and reduces bandwidth costs.
- Unified Communications: IT organizations faced with inconsistent UC or video experience are leveraging the benefits of hosted voice and video with the SD-WAN traffic steering and packet conditioning capabilities

- Temporary Office Access: Organizations, such as retail and construction, are constantly provisioning remote office access to pop-up retail stores and new construction sites. SD-WAN's ability to quickly and easily provision secure WAN connectivity via Internet links is ideal for rapid Internet access.

VeloCloud SD-WAN Solution

Founded in 2012, VeloCloud is a cloud networking provider based in Mountain View, CA. VeloCloud has helped a number of existing customers across multiple vertical industries with their WAN challenges. Its architecture consists of the following:

- Edges and Virtual Edges installed in branches and datacenters
- Gateways offered as a service by VeloCloud and its provider partners at top transit POPs and cloud datacenters around the world. Gateways provide SD-WAN functionality for both on-premise and cloud-based sites.
- Cloud Orchestrator provides centralized configuration, real-time monitoring and control plane automation
- The solution is delivered as both a service subscription and more traditional purchase model

VeloCloud's solution provides a broad SD-WAN feature set including automation application recognition and categorization for traffic prioritization, dynamic WAN circuit and path selection and remediation, and ease of deployment, management, and change.   See Figure 2 for an overview of VeloCloud's SD-WAN architecture.

VeloCloud partners include:

- Security partnerships with Zscaler and Websense
- IT partnership with HP's Open NFV alliance and Intel NetBuilders
- Cloud infrastructure partnerships with Equinix and IIX

Figure 2: VeloCloud Architecture
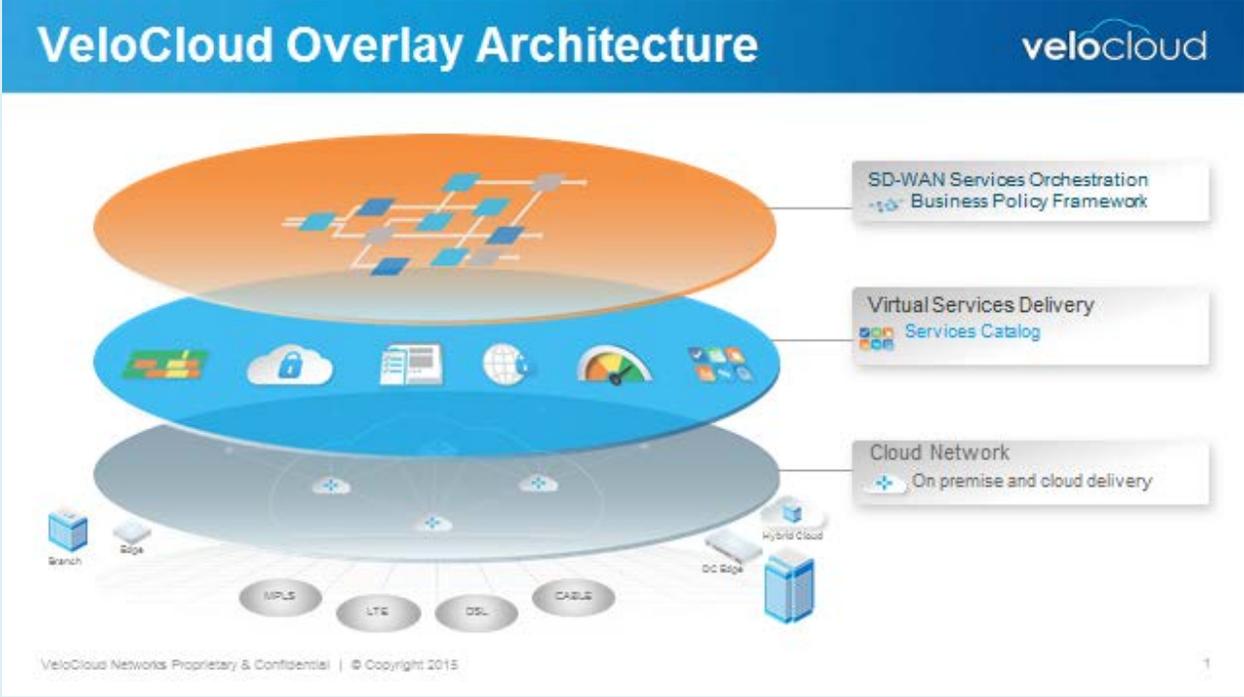
Conclusions and Recommendations for Customers

The increased popularity of cloud-based platforms, including compute, storage, UC, conferencing, and other popular applications is changing WAN requirements. The new WAN must be able to connect any user to any application reliability, securely, and with near real time response (low latency). Network intelligence based in the cloud enables IT organizations to quickly, easily, and securely adapt their network to the new cloud-oriented traffic flows. It provides the ability to leverage the advantages of Internet connectivity (high speed, low cost, wide availability) while minimizing the disadvantages (unpredictable reliability, poor latency, and limited security).

SD-WAN provides new features that better handle changing network traffic patterns resulting from cloud computing and provides a dramatically simplified way of deploying and managing remote branch office connectivity in a cost-effective manner. SD-WAN eliminates the backhaul penalties of traditional MPLS networks and leverages the Internet to provide secure, high performance connections from the branch to cloud. With SD-WAN, remote users will see significant improvements in their experience when using the Cloud/SaaS-based applications.

SD WAN technology is currently in use of a number of interesting use cases, including:

- Hybrid WAN (MPLS and Internet)
- Internet-only WAN
- Unified communication/video quality over the top of Internet
- Temporary, secure WAN access

SD-WAN will help IT organizations transition from MPLS only networks to hybrid WAN while leveraging Internet economics. Organizations with a distributed workforce which access cloud-based applications should consider the adoption of SD-WAN solutions.

Meet the Author

Lee Doyle is Principal Analyst at Doyle Research, providing client focused targeted analysis on the Evolution of Intelligent Networks. He has over 25 years' experience analyzing the IT, network, and telecom markets. Lee has written extensively on such topics as SDN, NFV, enterprise adoption of networking technologies, and IT-Telecom convergence. Before founding Doyle Research, Lee was Group VP for Network, Telecom, and Security research at IDC. Lee contributes to such industry periodicals as Network World, Light Reading, and Tech Target. Lee holds a B.A. in Economics from Williams College.