SD-WAN:

The next wave in WAN refresh

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The last decade has witnessed a considerable change in the server, applications and end-point device landscape. Transformation in Wide Area Networks (WANs), however, has not kept pace. But the widespread migration of networks and datacenters to Cloud, the growth in end-user wireless devices and bandwidth hungry applications are forcing CTOs to re-examine how they architect, provision and manage their enterprise networks. Traditional MPLS (Multiprotocol Label Switching) used to manage network traffic has become expensive and can't really scale. Fortunately, a solution in the form of Software Defined WANs (SD-WANs) is on the rise, and about 25% enterprises will use SD-WANs to manage their networks in the next 2 years. Today, only 5% do so. With 55% of IT budgets sucked up by WANs, it is natural that CTOs will want to examine how SD-WANs can solve their problems. Gartner assumes that by 2020, more than 50% of WAN edge infrastructure refresh initiatives would be based on SD WAN versus traditional routers (up from less than 2% today).

Currently, enterprises have a complex and expensive infrastructure at branch offices (sites) consisting of terminals/devices, routers, switches, bridges, controllers, firewalls, etc. The individual sites are hauled back to a regional HQ; the regional HQs may be connected between themselves or to a central HQ – which then provides users and applications with Internet/Cloud access. The fact that offices, employees, partners and customers don't directly connect between themselves presents a handicap to real-time applications and collaboration. No enterprise can afford that. To overcome this, smart CTOs have begun to replace or supplement their traditional WANs with secondary links to low-cost business-grade Internet and are leveraging faster provisioning through 3G/4G/LTE.

A shift that is inevitable

This shift in strategy takes care of four things: it reduces anxiety of WAN latency and provides users with a great experience; it makes better use of WAN pipes; it brings down costs; and it eliminates the powerful stranglehold of pricing structures that telecom providers have over enterprises. The layer of software over traditional WANs ensures all modes of connectivity are managed for better ROI.

With intelligent software and an integrated approach, SD-WANs also make it possible to apply analytics and automation along with new pay-as-you-go models (for a comparison between traditional WANs and SD-WANs, see table "Why SD-WANs are trending"). This makes SD-WANs ready to take on the emerging challenges in enterprise connectivity and takes them from the realm of a technology discussion to the reality of implementation.

Why SD-WANs are trending	
Traditional WANs	**SD-WANs**
• Poor utilization of expensive infrastructure • Cumbersome device configuration and management approach; several tools required for provisioning, monitoring, security, troubleshooting and policy enforcement • Packet centric approach • Hardware centric approach • Fixed costs of dedicated infrastructure	• Improved infrastructure utilization through application aware policies and analytics • Integrated, automated and centralized provisioning, policy management, security, diagnostics and troubleshooting – adding to enterprise agility • Application aware traffic forwarding • Flexibility to move away from single hardware vendor approach • Incorporates flexible pay-as-you-go models

SD-WAN adoption

While SD-WAN adoption is inevitable, it is essential for an enterprise to go through a set of well-defined phases with a technology/system integration partner:

- **Consult:** Perform WAN bandwidth TCO, gap analysis in the present network, prepare a business case for SD-WAN migration and a project plan for start-to-end visibility

- **Design:** Run a POC, finalize the architecture most suitable for the corporate, detailed design and measures required to make the current infrastructure ready for SD-WAN adoption

- **Migrate:** Phase-wise migration from traditional WAN to SD-WAN, ensure smooth transition by both the networks running concurrently till 100% integration and testing is achieved and train the operations team to run the new network.

Enterprises must also examine the best-fit cost models that SD-WAN implementations offer (see box "Comparison between commercial SD-WAN models" below).

Comparison between commercial SD-WAN models	
CAPEX model	**OPEX model**
- Instead of dual MPLS at datacenter or headquarters and MPLS at branch office, the suggested approach is to have 1 x MPLS and 1 x Internet (direct cost savings of 50% on MPLS costs) - Cost of hardware - Cost of software (licensing) - Cost of provisioning, configuration, operations and management (as SD-WAN claims to consolidate these functions, expect cost savings here) - Single or dual business grade internet links at branch that do away with MPLS at branches and offer local internet breakouts add to the over all cost savings	- Bandwidth costs at datacenter and brand remain the same as CAPEX model - Monthly or quarterly hardware, software and management costs covered by the vendor in an as-a-Service model - Marginal people for resource to manage policies - Based on the chosen SD-WAN technology, other cost savings areas to be considered include router replacement solutions, firewall replacement solutions, vendor-specific appliances replaced by commodity x86 servers (vendors offer their SD-WAN component in the virtual format) and savings on power, cooling and real-estate space for physical appliances

Businesses of the future will depend on SD-WAN

The underlying reality of today's business is that infrastructure, networks and capacity must scale and shape dynamically, based on real-time needs. The widely used conference call that forms the bedrock of modern day-to-day enterprise operations, presents us with a classic example. When a team spread across geographies needs to conduct a conference in real-time, it sets up an online call-bridge allowing team members to conduct a discussion using their phone, mobile devices or a desktop. The enterprise and the team doesn't labor over the transport being used; they are not bothered with IT and infrastructure complexities. Their concern is centered around how quickly and effectively the business intent is fulfilled. Before the conference begins, the network does not exist. It is created just in time for the conference and is automatically dismantled as soon as the conference is over. The process is simple and it puts the network back in control of the enterprise.

In an era where CTOs cannot imagine a future without Infrastructure as-a-Service (IaaS), Software as-a-Service (SaaS) and mobile work forces, the need to adopt SD-WANs is even more urgent. Enterprises need quick, fast and flexible access to a variety of high-bandwidth services that are within their control. This is where SD-WANs score with cost savings, simplicity, better user experience and scalability.

About the author

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Swarup drives standardization in delivery, hyper automation and incubation of delivery teams to handle projects in emerging and niche technologies. He comes with IT management experience of 20+ years and has worked on many traditional WAN transformation projects in the pre-SD-WAN era and currently actively engaged in SD WAN transformations and adoptions at large enterprises. He can be contacted at, sowmya.swarup@wipro.com

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