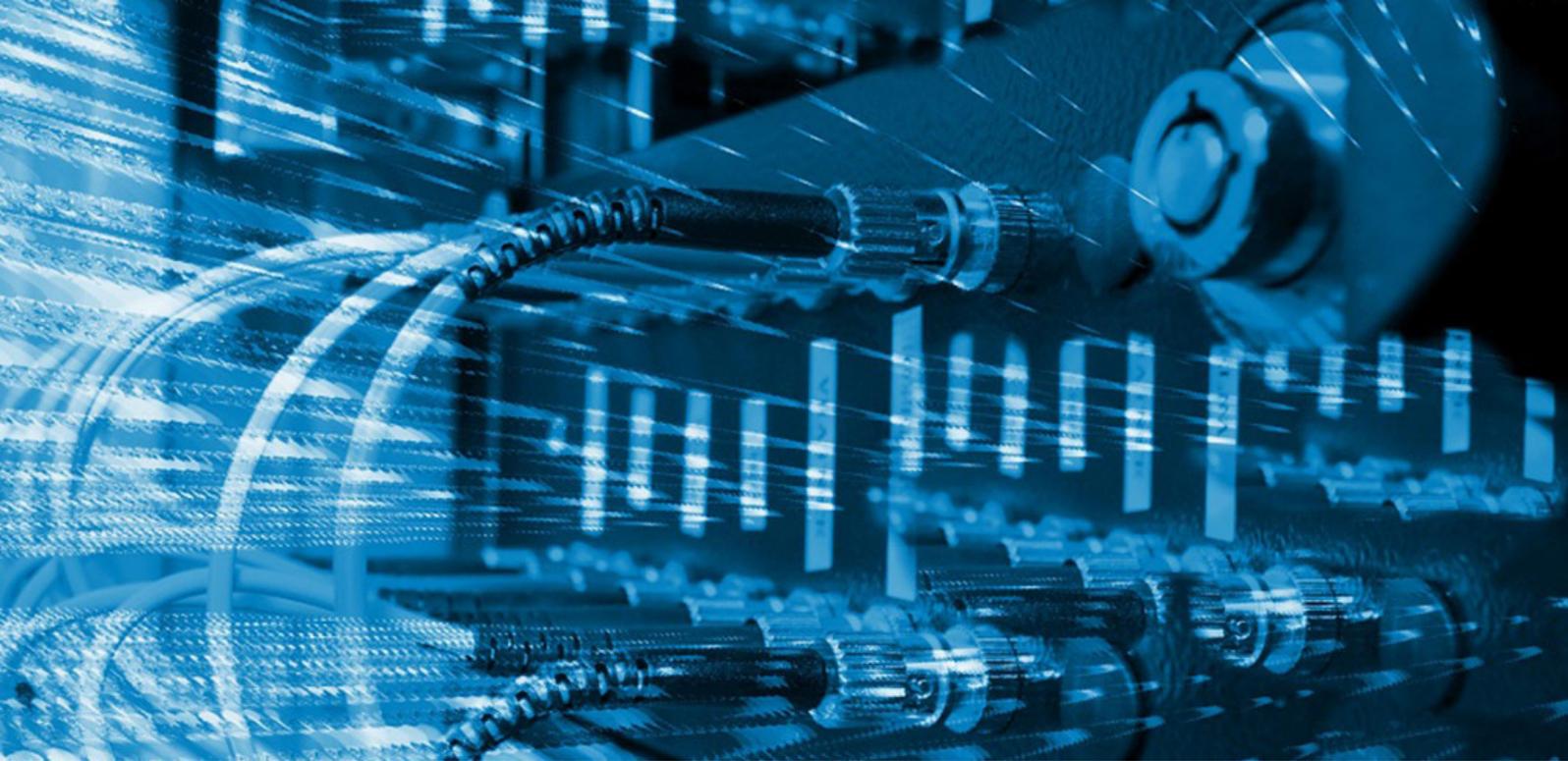




SD-WAN

Bringing Scale, Agility and Robustness
to Enterprise Networks



WAN technology, has evolved significantly over the last decade, with new products, new technology and new business models. However, of late, the dynamics of business have changed so fast that trusted networking applications, technologies and approaches are under significant pressure to adapt and evolve.

Today's enterprises have a completely different architecture as compared to businesses a decade ago. There is a much greater propensity towards automation and digitization, with a view to improve speed and performance. The availability of a wide range of technology options, both within the enterprise as well

as on the cloud, allows enterprises to optimize almost every part of the business, including supply chain, HR, marketing, finance, procurement, training, customer support, payments, risk management, etc. The digitization of business models (e.g. e-commerce, online banking, supply chain analytics, big data) etc. has brought in new levels of agility, and traditional businesses are under pressure to stay in tune with the changing market.

This is where geographically distributed businesses need to develop stronger network capabilities, which incorporate the following characteristics:

Seamless

As enterprise networks grow and evolve, they need to have an extremely well-coordinated and standardized set of policies and processes. This allows seamless operations across the network, irrespective of environment and stakeholders.

Scalable

Businesses today need to scale at an unprecedented rate. This makes existing network architectures difficult to manage. The network of the future must allow easy and rapid scalability to handle business growth, addition of new locations, introduction of new products / services and largescale business fluctuations.

Simple

As businesses become more complex, managing the enterprise WAN needs to be kept simple and straightforward. This requires centralization of governance and control, while allowing distributed offices to manage their point needs through simple, easy-to-use interfaces.

Agile

With companies moving quickly towards hybrid cloud and multicloud environments, networks need to seamlessly connect applications and devices across a diverse set of infrastructure, platforms and operating environments. Enterprise WANs must have the agility to incorporate current IT needs as well as emerging technology constructs in an evolving multicloud environment.



To meet these business needs, traditional architectures, components and deployment models for Wide Area Networks (WAN) are undergoing a transformative shift. With Software Defined Networking (SDN) concepts at its core, Software Defined WAN, or SD-WAN, is emerging as a much more robust, scalable and cost-effective way to deploy and manage a WAN across geographically distributed branches or enterprises.

Challenges with Traditional MPLS Based Networks

MPLS (Multiprotocol Label Switching) is quickly becoming legacy in terms of both available devices, deployment methods and capabilities. While the technology has been in use for a long time, and is generally considered robust and secure, the new business dynamics make it difficult for traditional MPLS-only networks to support all business needs. The key challenges with traditional MPLS based networks are:

Scalability

Since MPLS is used on private infrastructure and not on the internet, it is difficult to scale or modify network operations without making significant investments in infrastructure. As data load increases, MPLS networks may experience QoS issues and SLAs may be difficult to manage.

Security

While MPLS is run on private networks, it does not require any encryption or IPSec. However, business users today need to rely on the internet for a wide variety of transactional information, e.g. e-commerce sites, email servers, etc. The challenge for businesses is to maintain security and consistency of data that runs across encrypted and non-encrypted networks.

Control

While MPLS based networks can route traffic according to labels, the challenge arises when there are a large number of data types and scenarios. Traditional networks need to be manually configured to handle different data types. Also, the network parameters and policies cannot be centrally managed to accommodate new data types and needs.

Carrier Dependency

Since MPLS based WAN runs on a private network, there is a large dependency on a single carrier. This becomes a challenge when a new office is to be opened, or infrastructure needs to be scaled in an existing office. Because of the dependency on a carrier, there may be significant delays during set up and implementation.

Cost

To manage variability and fluctuating loads, companies often need to invest in more network infrastructure than they actually require. As the number of locations increases, the connections across the WAN start becoming more complex and it becomes very expensive to manage an MPLS-based WAN. Often, connecting to a wide network of partners through MPLS infrastructure becomes extremely expensive for the organization, to deploy and manage.

Geographical Constraints

As organizations expand into new geographies, IT teams find it more and more difficult to deploy and manage WAN infrastructure. Given the multiple risks around manageability of private networks and human resource challenges often experienced in remote locations, traditional MPLS deployments start becoming more challenging and time consuming with every new remote office.

SD-WAN: Leveraging Internet & Cloud Technologies



SD-WAN can potentially address most of the key challenges faced by traditional MPLS-based networks, since it uses the internet and cloud infrastructure to communicate with various branches of the enterprise. Since many companies today already use cloud-based applications (SaaS based tools and software) or infrastructure (AWS, Netmagic, MS Azure), using SD-WAN becomes much easier today as compared to a few years back.

Gartner mentions that to be defined as an SD-WAN, a network must have the following characteristic:

- > Support for different types of connections such as MPLS, frame relay and high speed LTE wireless communication
- > Dynamically select the most optimal path to ensure that loads are managed effectively
- > Easy configurability and manageability through simple user interfaces
- > Support for VPNs and other services such as WAN optimization controllers, firewalls and web gateways

Key Advantages of Using SD-WAN are:

Network Automation

A key feature of SD-WAN is automated network deployment and management, which provides significant advantages in terms of load optimization, performance and latency management. SD-WANs have the ability to measure key metrics such as availability, packet loss and traffic, which allows the system to auto-optimize the network (maximize performance, minimize latency). They generally offer strong capabilities around application aware routing, business analytics and traffic shaping.

Centralized Governance

SD-WANs allow all network resources to be controlled, provisioned / de-provisioned, scaled, ramped-down and configured centrally. With the availability of central data repositories and analytics, SD-WAN makes it now possible to drive powerful analytics that can further enhance network performance. Also, a key improvement in SD-WAN, as compared to traditional private networks, is the ability to add a layer of intelligence to traffic management. Users can centrally pre-configure policies to define pathways based on different parameters such as location, port, QoS needs, application types, data types, etc. SD-WANs have the ability to dynamically select the optimal path, for load sharing and resiliency purposes.

Unlimited Bandwidth

Since SD-WAN is internet based, it has the ability to aggregate a wide variety of cloud resources (including connecting to private and public clouds) to provide very high bandwidth. Enterprises can dynamically add or eliminate WAN connections, and scale up bandwidth, without the need to manual support at the branch or remote location.

Typically, companies choose to retain extremely sensitive and mission critical traffic on MPLS based networks, while using SD-WAN for internet based, high volume, traffic, e.g. email exchange servers, websites, SaaS applications. Organizations on an SD-WAN also have the ability to dynamically add network resources to its MPLS and public infrastructure, to manage sudden spikes in traffic.

Carrier Flexibility

SD-WAN solutions allow organizations to connect with and leverage multiple carriers. This allows them to create a carrier-independent network and drive SLAs more effectively. Organizations can choose different carriers for different locations, depending on their specific performance needs.

Hybrid Options

Almost every organization in its journey to SD-WAN will continue to use traditional MPLS and internet based networks. This is where SD-WAN provides the flexibility to integrate easily with the company's current network, irrespective of the network architecture. In most cases SD-WANs can be deployed or overlaid with minimal changes to the current MPLS network, to create an optimized combination of public and private network infrastructure. SD-WAN has the ability to support multiple connection types, such as MPLS, Internet leased lines, broadband, LTE wireless communications, VPNs, and third party NFV services.

Complete Encryption

Since SD-WANs use the internet, it allows for complete encryption of all WAN traffic. In a hybrid network situation, this makes the network much more secure a compared to traditional MPLS based WANs. SD-WANs typically offer advanced security parameters such as 256 bit AES encryption.

Cost Benefits

Typical internet based infrastructure (running on commodity hardware) is significantly cheaper than private infrastructure on which MPLS typically runs. This makes SD-WAN extremely cost-effective for organizations facing rapid growth that need to scale their network at an accelerated pace. Since there is minimal need for human intervention in deploying new devices, scaling to new locations is extremely quick and cost effective, as compared to traditional MPLS deployments. According to Gartner, provision network changes at a branch is 50% to 80% faster in an SD-WAN as compared to traditional WANs.

Key Focus Areas for SD-WAN Management



While the benefits of SD-WAN are clear and well understood by IT decision makers, there are still certain concerns regarding implementing and managing a different kind of WAN. This is partly because the traditional MPLS based WAN has proven to be robust and effective over a long period of time. Secondly, the market for SD-WAN is still evolving, with a number of leading players still coming out with new products devices and services. Some of the key focus areas for SD-WAN implementation are:

WAN Blueprinting

Organizations with legacy IT environments and distributed networks generally have a side range to tools, software components and network connectors across its landscape. This makes the typical WAN extremely complex, and difficult to define a clear, singular WAN strategy for the whole organization. SD-WAN implementation necessarily involves creating an organizational blueprint of all business needs, policies, network components, devices and applications. This allows IT teams to define the right policies across all branches, organizational processes and stakeholders.

Integration

SD-WAN appliances must be effectively integrated with WAN optimization appliances, routers, security devices and other network components. IT teams need to be very aware of data types, formats, application compatibility, security and network features while carrying out any integration initiatives.

Policy Management

Business teams must define a clear, well-articulated set of policies that meet all stakeholder needs across the network, while ensuring the highest levels of data governance and security. As business needs change, policies will need to be constantly updated and managed to ensure optimal levels of performance, security and availability.

Architecture

Today's hybrid IT environments demand a high degree of flexibility with respect to network management. SD-WANs are generally better suited to manage hybrid and multi-cloud ecosystems. When deploying SD-WAN, the architecture needs to factor a wide variety of on-premise, hosted and cloud resources.

Skills

IT teams need to build new skills and capabilities to manage the new SD-WAN based environment. Key skills that need to be developed include performance analytics, network optimization, device configuration, policy management, provisioning / de-provisioning, etc.

Conclusion

While there are a number of approaches to SD-WAN implementation, organizations need to create a customized, tailored plan for their own SD-WAN implementation journey. CIOs need to have a clear SD-WAN strategy with a few key aspects in mind:

Taking a Use-Case Centric Approach

It is necessary to take a step-wise approach instead of adopting an all-out or end-to-end approach. This allows teams to identify the high-priority and low-risk use cases for SD-WAN implementations.

- › Typically, organizations need to start by deploying a hybrid network in which the SD-WAN can be deployed for certain workloads, in parallel with the existing MPLS setup. This helps companies optimize network traffic depending on criticality, availability, privacy needs, etc.
- › As companies start to grow in confidence with regard to their initial SD-WAN deployments, they would gradually start extending the SD-WAN services to many other use cases across the organization.

Getting a Clear View of Network Maturity

CIOs need to constantly have an aggregated view of network performance and maturity. This allows them to define and modify policies as per changing business needs and prioritize implementation based on workload types.

Involving a Managed Service Partner

To manage key challenges, IT teams to collaborate and build consultative engagements with their Managed Service Providers (MSPs).

Eventually, while MPLS driven architectures will continue to stay, organizations will need to work on hybrid strategies that involve a mix of MPLS, SD-WAN and NFC technology. At Netmagic we offer a proven mix of products and managed services to help organizations navigate the transition to SD-WAN.

Business Environment is Changing Rapidly

Industry consolidation through mergers and acquisitions are creating new, complex challenges for network managers. Rapid site expansions have necessitated the need for quick turn around to connect remote sites and set up new sites.

Companies and Consumers Are Embracing The Cloud

Modern organizations and discerning millennial user base is creating a new set of demands on corporate computing environments of digital traffic.

Companies Need More Agile Networks

A new, more agile networking environment is necessary, which can adapt to new demands of varied and performance-sensitive application portfolio.

Consulting Is Key

SD-WAN is not a 'plug and play' proposition, and enterprises need to invest in consulting-led education staff so that they can take advantage of this new technology.

SD-WAN uptake to grow from less than 1% of enterprises to 30% of enterprises by the end of 2019

Gartner, "Market Guide for Software-Defined WAN"

SD-WAN: Key Capabilities

- > Optimized bandwidth and increased availability
- > No compromise on data loss or security issues
- > Seamlessly integrate with MPLS, broadband, mobile networks (4G or LTE)
- > Seamless public and private cloud connect
- > No dependency on individual telecom service providers
- > No geographical coverage issues



NTT COMMUNICATIONS - NETMAGIC ONE STOP SOLUTION FOR SD-WAN

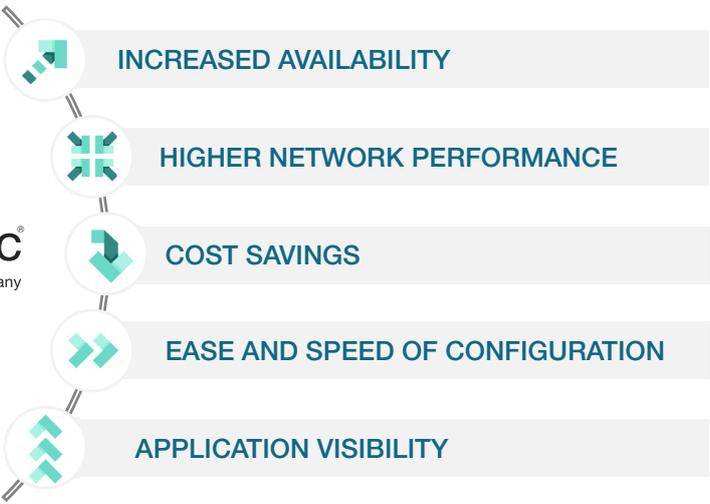
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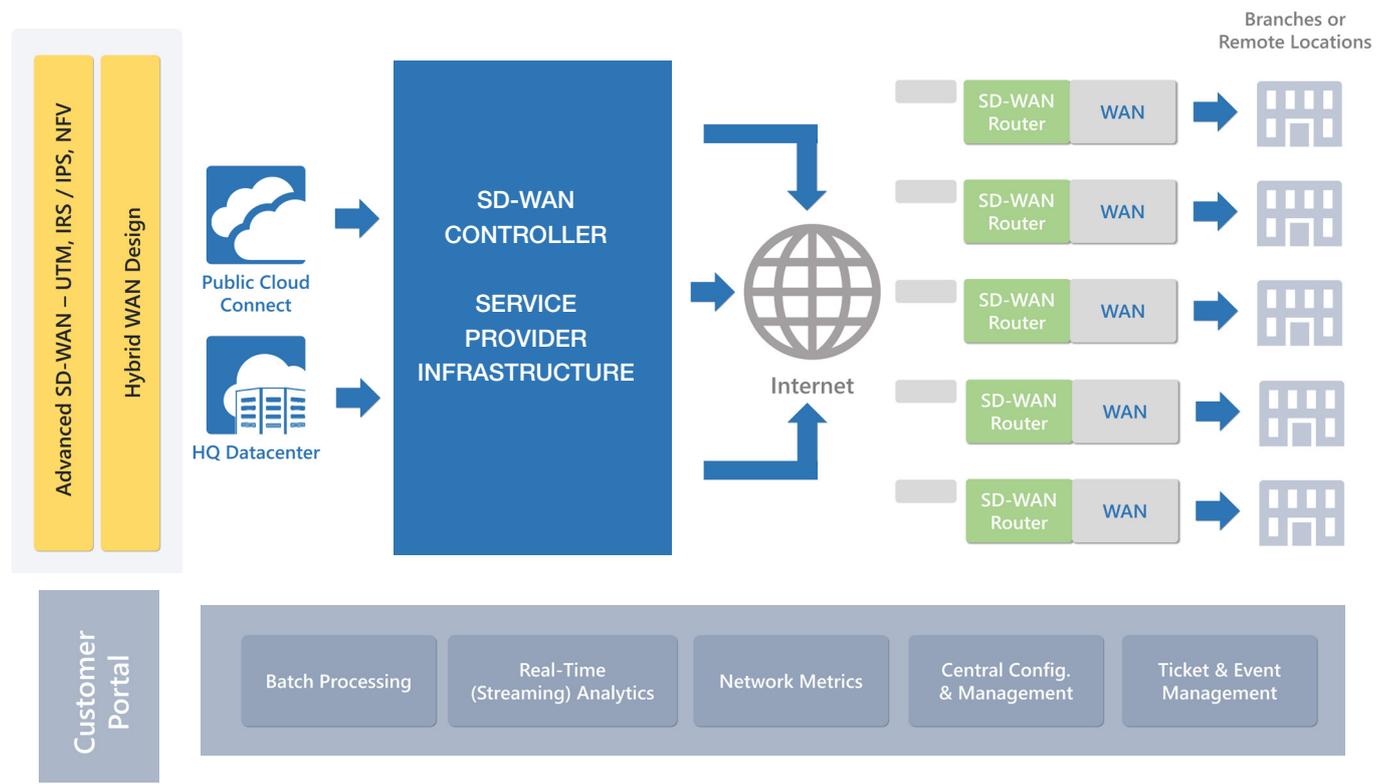


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Netmagic SD-WAN Services

Netmagic SD-WAN solutions are powered by the global reach and expertise of NTT Communications. Together with NTT Communications, we bring global best practices and world-class quality of service to leading organizations across industries.

Network Connectivity	Powered by NTT Communications, Netmagic offers a comprehensive suite of network access types and connectivity in over 190 countries.
Network Consultation	Netmagic SD-WAN consultants can help you identify your network challenges and design optimal solutions for your WAN needs.
Hybrid WAN Design	Netmagic offers hybrid WAN options that include a combination of different connectivity types, based on specific organization needs. We determine the best topology based on your business requirements, create optimal routing policies and allow for load balancing of default traffic, to ensure that all available WAN capacity is fully utilized and not wasted.
Application Aware Routing	Netmagic's SD-WAN management platform provides tight monitoring of application and network performance, across the WAN. The platform uses load-balancing mechanism to dynamically assign the most optimal network-path to all applications.
Customer Portal	The Netmagic Customer Portal provides a single interface for all information around your SD-WAN implementation. It includes: <ul style="list-style-type: none"> > Both batch processing and real-time streaming analytics > Communication between sites > Network metrics, including throughput / delay / jitter / packet loss > Central configuration and management of policies in real time > Ticket and event management
Deployment Options	Netmagic has both on-premise and cloud based deployment options for its SD-WAN solution. Deployment options include: <ul style="list-style-type: none"> > Netmagic's proprietary hardware installed within branch-office > SD-WAN as virtual network function installed within branch-office virtualized CPE > Cloud based SD-WAN service delivered from Netmagic's global network infrastructure
Site Design Options	Depending on your site requirements for service availability and bandwidth, Netmagic is able to design a solution that incorporates multiple hybrid connectivity options such as Ethernet, Direct Internet Access and broadband DSL. This allows for better use of your connectivity and optimizes the available bandwidth.
Application Routing Policies	Depending on your site requirements for service availability and bandwidth, Netmagic is able to design a solution that incorporates multiple hybrid connectivity options such as Ethernet, Direct Internet Access and broadband DSL. This allows for better use of your connectivity and optimizes the available bandwidth.



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About Netmagic

Netmagic, a wholly-owned subsidiary of NTT Communications, is India's leading Managed Hosting and Multi-Cloud Hybrid IT solution provider with 9 carrier-neutral, state-of-the-art data centers and serving more than 2000 enterprises globally. Headquartered in Mumbai, Netmagic also delivers Remote Infrastructure Management (RIM) services to various Enterprise customers globally including NTT Communication's customers across Americas, Europe and Asia-Pacific region. The Company was the first in India to launch services - Cloud Computing, Managed Security, Disaster Recovery-as-a-Service (DRaaS) and Software-Defined Storage. NTT Communications and Netmagic have been ranked 3rd and 5th respectively in Asia among the top global data center operators by Cloudscene in their Q1 & Q2 Leaderboard reports. This effectively makes Netmagic #1 data center service provider in India. Netmagic has been recognized with 3 awards at the CIO Choice Award 2018 and Frost & Sullivan India Digital Transformation Awards 2017.

To learn more, visit us at: www.netmagicsolutions.com.