White Paper

VOX®

SD - WAN

DELIVERED THROUGH MULTIPLE CLOUDS IN A DIGITAL-CENTRIC ENVIRONMENT

Did you know?
SD-WAN doesn't require choosing one network infrastructure over another

Contents

VOX®

MARKET OVERVIEW:
THE GROWTH OF SD-WAN AND ITS IMPORTANCE TO THE SOUTH AFRICAN MARKET

The global market size for SD-WAN (software-defined networking in a wide area network) topped $1.4 billion last year, and is expected to reach $43 billion by 2030 at a compound annual growth rate of 38.6%. Even in South Africa, more companies are embracing SD-WAN as its benefits are becoming apparent given the significant financial pressures resulting from the lockdown in 2020.

SD-WAN is considered one of the most disruptive network technologies available today. This can partly be attributed to the rapid migration from legacy solutions to more modern, Cloud-based ones as companies embrace digital transformation.

In a developing economy like South Africa with many industries still reliant on traditional (and ageing) infrastructure, SD-WAN presents a significant opportunity to reinvent the fundamental network building blocks on which their organisations are built.

Simply put, SD-WAN is a virtual network architecture that enables companies to leverage any combination of transport services; including MPLS, 5G, LTE-A, fibre, wireless and the like to securely connect users to applications. So, unlike traditional WAN services that connect users at the office to applications hosted on servers in a Data centre, SD-WAN meets the requirements of software-as-a-service (SaaS) applications delivered through multiple clouds in a digital-centric environment. Adopting SD-WAN also does not mean having to choose one network infrastructure over the other. Instead, it facilitates a hybrid environment to ensure existing network investments have not been wasted. By gradually enabling a business to move towards software-based systems, it can mitigate traditional executives' concerns about having to outlay more money in new technology at a time where budgets are closely scrutinised.

The COVID-19 pandemic has irrevocably changed how businesses across industry sectors regardless of size must operate to remain relevant. As it is a software-driven approach, SD-WAN can lower operational costs and improve resource optimisation across multiple sites – a key component at a time when distributed working has become normalised. Furthermore, it introduces a level of resilience which local organisations require to securely create an enabling structure for employees working from home. SD-WAN solutions cut out expensive routing and reduce hardware costs while providing the business with the flexibility of accessing multi-cloud services.

For instance, take the enhanced security awareness resulting from the new normal. As companies are expanding the number of entry points into the back-end, they are also increasing their exposure for potential attacks. Security forms an integral part of SD-WAN as it delivers an integrated layer of protection. Of course, not all SD-WAN solutions are created equal. The basic firewall and virtual private network (VPN) functions provided by most of these are not enough. The digitally-led business environment requires the organisation to look at an SD-WAN offering that incorporates a range of security features such as sandboxing capabilities, encryption, intrusion prevention, next-generation firewalling, as well as anti-virus.

UNDERSTANDING SD-WAN TECHNOLOGY AND HOW IT IS CHANGING WAN MANAGEMENT

Of course, SD-WAN is not a recent invention. The technology has been around since 2013, with corporate interest for it steadily gaining momentum as more companies embrace cloud computing and digital transformation initiatives. As mentioned, an SD-WAN connects users to any application wherever it resides. It intelligently determines which path best meets the ideal performance needs for a specific application and then routes the traffic through the optimum WAN path.

Some of its Competitive Features Include the Following:

- **Application awareness**
  SD-WAN solutions can intelligently identify applications on the very first packet of Data traffic. Network teams gain the visibility they need about which applications are used most widely across the business, so they can make smarter, more well-informed decisions on network policies.

- **Dynamic Path Selection**
  SD-WAN solutions enable dynamic path selection for traffic to flow through: an MPLS connection, a broadband connection, and 5G/LTE. This ability to intelligently identify the best path for application-specific features, results in significantly improved functionality and network performance.

- **Zero-touch deployment**
  Because SD-WAN is based on the same methodology as software-defined networking (SDN), it delivers centralised management and orchestration. SD-WAN enables faster deployments with zero-touch provisioning capabilities while doing it at scale.

- **Centralised Orchestration**
  Companies can also benefit from centralised deployment and automated features to respond faster to business requirements. A centralised orchestrator, such as Fortinet Secure SD-WAN Orchestrator, can provide an intuitive workflow for business policies to strategise distribution of applications, and other traffic across and between branch offices.

According to Aberdeen, to ensure the network performs optimally, SD-WAN must deliver next level operational capabilities that deliver functionality including:
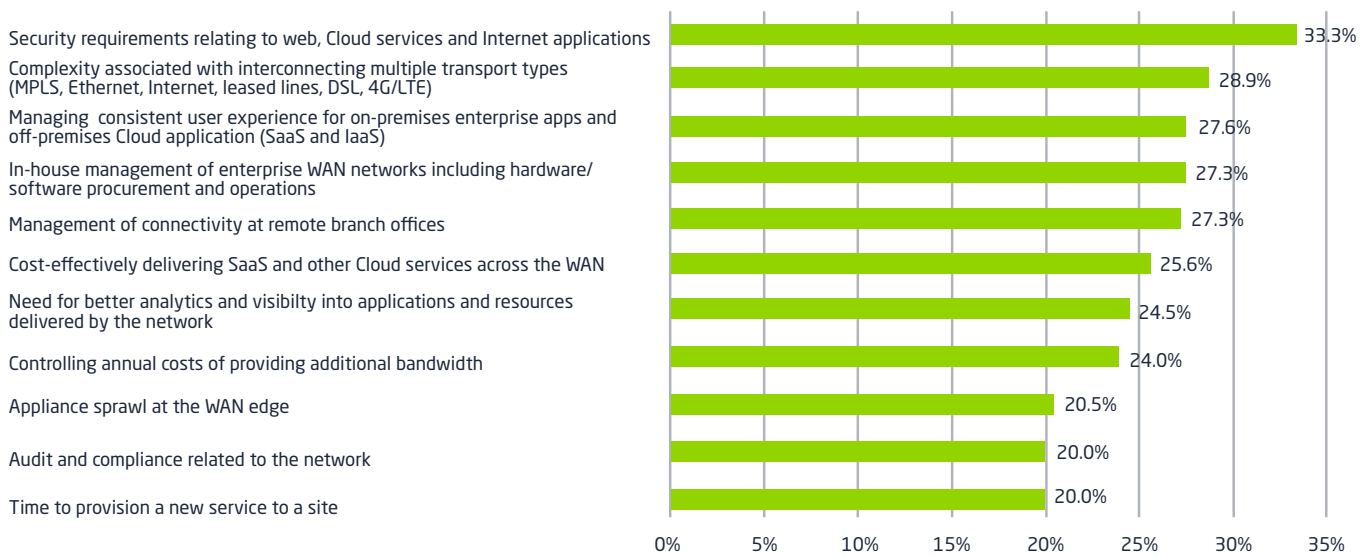
- Monitor the configuration state of all devices in the network.
- Provide built-in, best-practice architectures for initial provisioning.
- Limit direct manual access through a verifiable audited interface.
- Comprehend the network impact of any change.
- Apply changes with minimal impact.
- Apply changes that understand architectural dependencies.
- Work out any hidden dependencies automatically when possible.
- Verify that changes have been successfully applied or reverted when needed.

Fundamentally, SD-WAN represents the new landscape of networking that is required to future-proof business infrastructure. Remote working has exacerbated the growth of network traffic across a multi-device (and multi-cloud) system. Companies require centralised management and built-in automation to simplify the increased complexity of evolving workflows.

IDC research has highlighted the most significant WAN challenges organisations admit to facing in the connected business environment.

Cloud Security and Rising WAN Complexity Are the Top of WAN challenges Today

Q. Select the three most important WAN challenges (from the following) that best relate to your company:

Challenge	Percentage
Security requirements relating to web, Cloud services and Internet applications	33.3%
Complexity associated with interconnecting multiple transport types (MPLS, Ethernet, Internet, leased lines, DSL, 4G/LTE)	28.9%
Managing consistent user experience for on-premises enterprise apps and off-premises Cloud application (SaaS and IaaS)	27.6%
In-house management of enterprise WAN networks including hardware/ software procurement and operations	27.3%
Management of connectivity at remote branch offices	27.3%
Cost-effectively delivering SaaS and other Cloud services across the WAN	25.6%
Need for better analytics and visibilty into applications and resources delivered by the network	24.5%
Controlling annual costs of providing additional bandwidth	24.0%
Appliance sprawl at the WAN edge	20.5%
Audit and compliance related to the network	20.0%
Time to provision a new service to a site	20.0%

Source: IDC Technology Spotlight

The research house believes that as Cloud usage is a key driver of WAN technology choice, and given the security, interconnectivity and user experience concerns, SD-WAN can effectively bridge the divide between traditional and modern technology approaches.

Because of the far-reaching impact of SD-WAN on network security, application workloads and other infrastructure components, the paradigm has shifted when it comes to WAN management. It would not be untoward to say that SD-WAN does for networking what virtualisation has done for computing. And with the Cloud now a given for most organisations, those who have been undecided about SD-WAN are likely to start transitioning into this more agile environment.

Vox

TRENDS INFLUENCING SD-WAN

As SD-WAN starts gaining more traction in South Africa, people will come to the realisation it is not only something large corporates can benefit from, but smaller businesses as well. Yes, the higher end of the market that leverages innovations like artificial intelligence, automation, automatic orchestration around application service level agreements and the like will garner the most compelling interest in the short-term.

However, it is in the SME space where SD-WAN stands to benefit this country the most, as smaller companies provide the agility to readily adapt to this new way of managing infrastructure and applications. For instance, an SD-WAN solution can do a better job of maximising throughput according to what certain applications or processes need. When combined with a firewall, an SD-WAN system is simultaneously a robust traffic management system and a flexible, reliable security solution.

Smaller businesses need to control their computing expenses where possible, and SD-WAN can make this easier with its compatibility with commodity x86 hardware. With commodity computing, an administrator can take advantage of several low-cost computers running in a series within a parallel computing structure. And because SD-WAN is compatible with x86 hardware, a smaller business can enhance its network without significantly increasing their budget.

Further enabling this is the increasing availability and affordability of high-speed Fibre in the country. No longer limited to organisations with large connectivity budgets, Fibre becomes an enabler for change across all industries and company sizes.

And when combining world-class, international SD-WAN solutions with local expertise on the challenges the SME market face through partners like Vox, companies can realise the true potential of this new approach.

Events of 2020 have illustrated the need to embrace SD-WAN, especially given the pressure of becoming a digital enterprise. South African businesses have been forced to rethink how they are approaching their network architecture. Some of this entails reprioritising spend to optimise the performance on their networks and better cater for remote working and multi-Cloud environments.

In fact, SD-WAN provides the means to enable multi-Cloud connections and delivering collaboration features irrespective of where employees are working from. Tying this together is the renewed focus on security to include more than just Anti-virus and Firewall options. The digitalisation of work requires security to be integrated into all organisational processes. SD-WAN does this at the core of the network to ensure the foundation is in place to safeguard devices and data against potential compromises.

According to Gartner, there are several key trends impacting on the global adoption of SD-WAN on an enterprise level:

- **By 2023, to deliver flexible, cost-effective scalable bandwidth, 30% of enterprise locations will have only Internet WAN connectivity, compared with approximately 15% in 2020.**
- **By 2024, more than 60% of SD-WAN customers will have implemented a secure access service edge (SASE) architecture, compared with about 35% in 2020.**
- **By 2024, to enhance agility and support for cloud applications, 60% of enterprises will have implemented SD-WAN, compared with about 30% in 2020.**
- **By 2024, 20% of SD-WAN centralised configuration and troubleshooting will be touchless via an artificial intelligence (AI) assistant, compared with none in 2020.**

Beyond this, SD-WAN adoption is vital in facilitating hybrid-Cloud deployments and avoiding vendor lock-ins. It easily allows Data centres to be extended into public, private, and hybrid clouds while also delivering opportunity for multi-cloud solutions. SD-WAN technology overcomes the challenges typically associated to these hybrid environments:

- **Security between sites.**
- **WAN orchestration.**
- **Consistent and compatible networking services between sites and vendors.**
- **Awareness of mission-critical traffic to prioritise and guarantee bandwidth.**
- **Geographical remoteness.**

The digitalisation of work requires security to be integrated into all organisational processes.

Source: Fortinet

For its part, Fortinet has been named a Leader in the Gartner 2020 Magic Quadrant for WAN Edge Infrastructure. By combining the industry's best performance with advanced remediation techniques, such as dynamic traffic steering, forward error correction, and packet duplication, Fortinet Secure SD-WAN can automatically repair complex WAN issues that can undermine network performance. Combined with Fortinet's artificial intelligence and machine learning-powered application learning, customers can establish advanced visibility and control at every edge to improve performance, expand business agility, and achieve higher levels of productivity to deliver and maintain a better application experience and drive growth and revenue further and faster.

This means Fortinet's ability to adapt to evolving market conditions is well-proven enabling companies, especially those in the SME sector, to readily meet any existing and future networking needs.

THE BUSINESS CASE FOR SD-WAN

Visibility and control are also important considerations for SaaS adoption across an extended branch workforce.

Network connectivity using traditional WAN management solutions was expensive and only affordable for enterprise customers like banks, retail chains, and the like. But transforming into a software-driven environment, instead of a hardware-driven one, means companies can reduce the network and connectivity costs for mission-critical services.

We have included two use cases for transforming branches with Fortinet secure SD-WAN solutions.

Use case 1: Digital transformation of enterprise branches

Distributed enterprises with multiple offices are looking for effective adoption of critical SaaS applications, for example Microsoft Office 365 and other multi-cloud services for improved operational efficiency and cost savings across their extended workforce.

Because of the limits of MPLS connectivity and traffic backhauling, most traditional WAN infrastructures cannot effectively handle the added network strain that cloud-based services introduce. Problems include low bandwidth, limited visibility and control, poor user experience, and increased latency. SD-WAN's ability to perform intelligent load sharing of traffic across multiple broadband connections for greater network efficiency, dynamic operation, and cost savings can alleviate these problems. SD-WAN delivers all the productivity benefits of cloud-based applications to enterprise branches, but only if its connections are secure.

As part of the Fortinet Security Fabric, a FortiGate NGFW with Secure SD-WAN provides advanced security features for protecting direct Internet access. This includes comprehensive threat prevention, such as web filtering, anti-malware, and intrusion prevention (IPS). It also encompasses threat detection, such as SSL-encrypted traffic inspection, and sandboxing via FortiSandbox integration.

Visibility and control are also important considerations for SaaS adoption across an extended branch workforce. Individual employees can easily install cloud-based applications without the involvement or approval of IT management. This form of Shadow IT can directly introduce malicious threats to branch networks, create gaps in security, and even violate compliance with privacy laws and industry regulations if left unchecked. Secure SD-WAN supports full application visibility and control through several key features:

Broad application awareness.

Fortinet Secure SD-WAN uses 'first-packet identification' to intelligently identify applications on the very first packet of data traffic. The solution references an application control database of over 3 000 applications—and this number continues to grow as both the threat landscape and digital network evolve. New applications—including encrypted and cloud application traffic—can be identified and classified via an optional FortiGuard Security Subscription Service. FortiGate NGFWs can receive ongoing threat intelligence updates from FortiGuard Labs researchers for more efficient application routing as well as real-time threat protection.

Compliance tracking and reporting.

Secure SD-WAN-enabled tracking and reporting helps ensure adherence to privacy laws, security standards, and industry regulations while reducing collateral risks of fines and legal costs in the event of a breach. These features track real-time threat activity, facilitate risk assessment, detect potential issues, and mitigate problems. They also monitor firewall policies and help automate compliance audits. The Fortinet Security Rating Service provides best practices for compliance standards such as the Payment Card Industry Data Security Standard (PCI DSS), the Health Insurance Portability and Accountability Act (HIPAA), and other regulations. As part of the service, organisations receive their own security posture score and are then able to compare that to the scores of their peers.

Use case 2: Simplify with 'SD-branch'

Many enterprise branches may want to simultaneously replace both their WAN and LAN devices in favour of a solution with deeper integration and simplified branch operations management. Using separate WAN and LAN infrastructures not only increases branch complexity (more devices to deploy and update with multiple management consoles). It also reduces visibility and control of operations while increasing the opportunities for security gaps that hackers can exploit.

A software-defined branch (SD-Branch) model eliminates these challenges by unifying WAN and LAN operations within a single solution. As an extension of the Fortinet Security Fabric, a FortiGate NGFW featuring Secure SD-WAN integrates with FortiAP and FortiSwitch solutions using a special FortiLink protocol. This enables customers to manage local endpoints (such as Internet of Things devices) connected to LAN and automatically quarantine devices showing indicators of compromise. Fortinet-enabled SD-Branch deployments provide deep WAN/LAN integration, simplicity, security, and the lowest total cost of ownership in the industry.

Vox
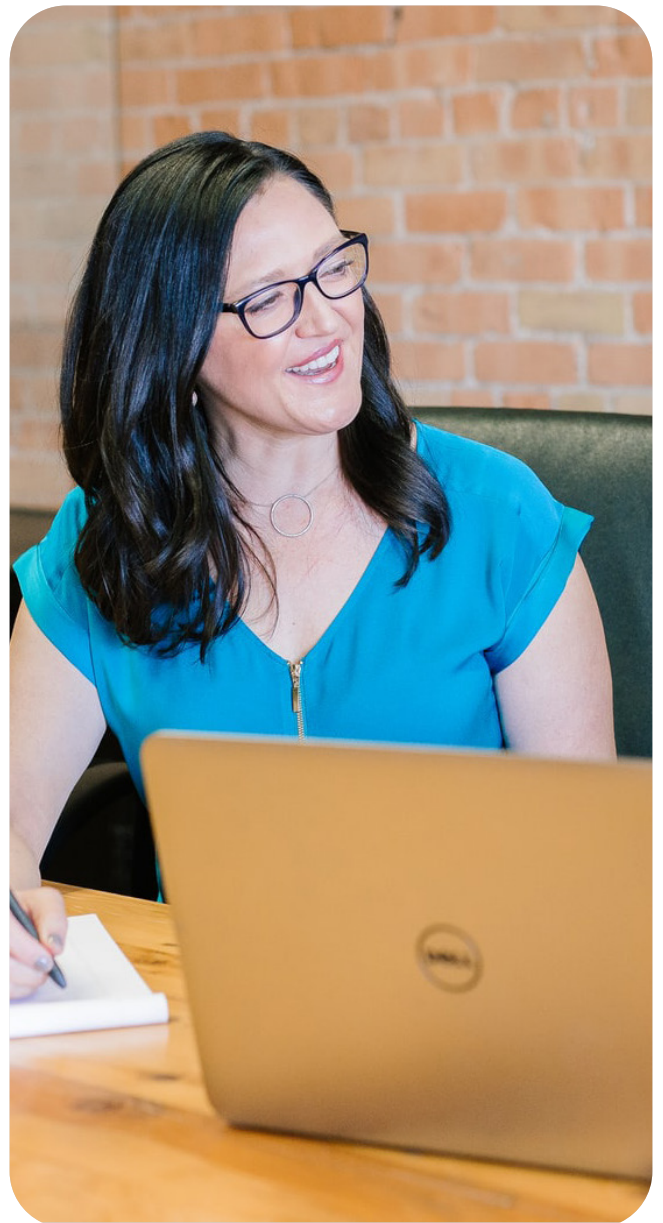
Single-pane-of-glass management.

Fortinet provides a single-pane-of-glass view that combines both network and security for centralised SD-WAN management, configuration, and monitoring tools. Fortinet has been recognised as a leader in both the enterprise firewall and unified threat management (UTM) markets and has a long history of understanding the needs of enterprises from both a security and networking perspective. Fortinet Secure SD-WAN consolidates several point products at the branch — including routing, WAN optimisation, SD-WAN, and security elements — into a single device.

New branches can be connected and secured with little expertise and no additional overhead.

Zero-touch deployment.

Deploying SD-WAN should also be as easy as turning on a feature — and this is exactly what Fortinet Secure SD-WAN zero-touch deployment offers. New branches can be connected and secured with little expertise and no additional overhead. Fortinet simplifies infrastructure and delivers SD-Branch operations with consolidated WAN/LAN functions and advanced security features.

THE BUSINESS CASE FOR SD-WAN

Even prior to COVID-19, SD-WAN was one of the fastest-growing segments in the network infrastructure market. The inability of traditional WANs to support modern business, SaaS, and hybrid cloud usage, and the need to simplify network management regardless of connection type meant that companies around the world started making the transition.

The pandemic has further cemented the importance of SD-WAN technology.

The virus has become the catalyst for digital transformation to take place at an unprecedented scale. Companies can ill afford to ignore the potential that a software-driven approach can provide. With remote working becoming part of standard operating procedure, companies must now transform their WANs to deal with the increase in cloud traffic while delivering comparable network performance across all sites.

> What SD-WAN does is arbitrate between these bits and pieces and find the best way to get you where you need to go.

Ease of management, security, and integrated visibility become crucial in the new normal. Furthermore, SD-WAN delivers the business continuity capabilities essential to mitigate the business risk of potential future lockdown scenarios or other disasters entirely. It comes down to delivering a consistent user experience with virtualised services as the barometer.

Cloud traffic will only increase as companies move more of their traditional on-premise solutions into always-on environments. When combined with more touch points into the back-end, the complexity of WAN infrastructure will increase by orders of magnitude. This is where SD-WAN will fulfil a vital role to automate much of a traditionally people-driven approach.

According to Scott Raynovich, chief technology analyst at Futuriom, the inherent qualities of SD-WAN will see its popularity sustain: *"We've gone through several generations of networking, starting with client server and followed by the explosion of the Internet,"* he points out. *"The next stage was the data centre and then cloud, with each stage leaving remnants of the previous generation. What SD-WAN does is arbitrate between these bits and pieces and find the best way to get you where you need to go."*

COVID-19, he believes, will end up simply emphasising the value of SD-WAN as the glue that pulls everything together, a sort of a built-in VPN overlay, essential at branch sites and for the many people now working at home. *"There are so many different applications and use cases for SD-WAN,"* he points out.

In the same article, Shin Umeda, analyst at Dell'Oro Group, agrees that there has definitely been a major impact from COVID-19 on the market.

"If you look at it from the point of view of the access router market, the big branch office devices that form wide area networks, that has traditionally been dominated by a single vendor – Cisco. Now what we are seeing is SD-WAN and a more software-centric approach with many new vendors. Enterprises are really focusing in on the benefits of using a centralised software centric model - gaining more control of their network and really attacking the way the traffic patterns have changed. SD-WAN is not something that just emerged out of thin air, but it's an alternative to technologies that existed in the past."

THE VOX SD-WAN OFFERING

Following extensive analysis of the South African market, Vox has developed two unique solutions catering for different segments. Its flagship offering, SD-WAN Secure, delivers advanced WAN capabilities along with Next-Generation Security for medium and large companies. Additionally, Vox has developed SD-WAN Lite for the small business market that requires a streamlined offering.

Vox SD-WAN Secure – Designed for big business

Vox has used the Forti Secure product as the foundation of the flagship SD-WAN Secure solution. It targets mission-critical operations as well as large and enterprise-level businesses.

SD-WAN Secure delivers intelligent networking and security capabilities in a unified solution for companies who need WAN resiliency, with security in mind. It supports Multi-branch VPN overlays, dynamic policy-based decisions for application path selection across multiple independent WAN connections, consolidated management, and advanced protection against threats. SD-WAN Secure can reduce operational cost and complexity and improve efficiency without compromising on security.

SD-WAN Secure is characterised by:

- Native Next-Generation Security.
- Multi branch VPN overlays.
- Highest Quality of Experience for voice and data traffic.
- A reduction of the cost of connectivity and operating expenditure.
- WAN resiliency and intelligent application steering.
- Real time monitoring, analytics, and reporting

SD-WAN Secure delivers the following features:

Feautures	Benefits
Next-Generation Security	Effective Security across entire network
Flexibile Bandwidth Allocation	Greater Business agility and responsiveness
Efficient WAN Path Controller	Higher SLA for Business Applications
Simplify the deployment and management	Scalable Single Pane of Glass, that include Zero Touch provisioning and effective monitoring
Agile approach to connectivity solutions	Increased bandwidth at a lower cost
Dynamic Connection Establishment	WAN Selection and diversity

HOW IT WORKS
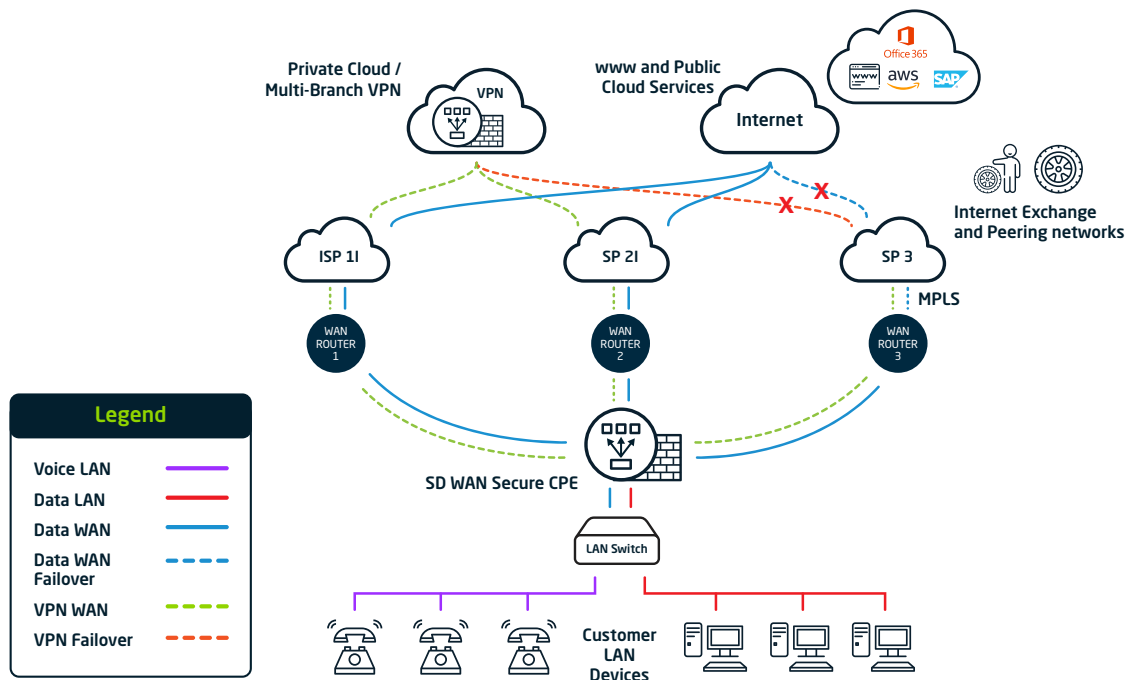
Vox SD-WAN Lite – An SME value proposition

Vox has developed Vox SD-WAN Lite, an entry-level SD-WAN solution. It is built from the ground up to cater to the unique needs of the South African small business. When compared to the above technology trends and requirements for enterprise-level SD-WAN solutions, the SD-WAN Lite product provides a more niche value proposition.

The focus is on delivering high resiliency in Internet connectivity while providing excellent voice quality, reliability, and an in-depth view of network performance via an online Web portal. The SD-WAN Lite solution is designed for small business and SOHO customers who cannot afford expensive enterprise-level SD-WAN solutions and dedicated connectivity solutions:

- **It reduces the cost of expensive dedicated connectivity solutions.**
- **It will improve the quality of connectivity to support voice services specifically in under-services connectivity areas.**
- **It improves the uptime ratio of connectivity by means of automatic failover.**
- **It is quick and easy to install.**
- **It is a quality control system.**
- **It brings to the user information about the quality of their connectivity and self-control to make adjustments.**

Along with affordable pricing, Vox SD-WAN Lite delivers monitoring and alerting services to alert businesses when their Internet links become unavailable. The product caters for connectivity that includes fibre, wireless, 5G, LTE, satellite, and xDSL ensuring the SME is covered regardless of how it accesses the Internet.

Any of the following examples illustrate the customer who would benefit most from an SD-WAN Lite solution:

- A customer in an under-serviced area with limited quality connectivity. Typically, fibre is not available. In this instance, the customer will benefit from load balancing traffic over multiple links.
- A customer who uses a mission critical service such as VoIP or e-commerce systems. They would require failover or load balancing between connectivity options to improve service uptime.
- A customer who requires information on the performance of their connectivity links, such as latency, speed, and uptime.
- A customer who wants to leverage their existing security solutions and integrate those with the advantages that an SD-WAN delivers.

Vox SD-WAN Lite delivers the following features

- **WAN Link Failover.** Automatic failover from one link to another.
- **Traffic Load Balancing.** Manages traffic load balancing while delivering automatic fail-over.
- **Voice quality optimisation.** Ensures voice quality is maintained over lossy Internet access links.
- **Zero-touch provisioning.** The SD-WAN CPE devices are plugged in and automatically configured based on desired failover policies.
- **Monitoring.** This cloud-based monitoring platform allows users to view their access links' performance in real time.
- **Alerting.** The user can get notifications via email of link downtime and when a failover event occurs.
- **Full Control.** Allows users to adjust their load balancing and failover strategies at will.

Image below demonstrates how the Vox SD-WAN Lite solution works:
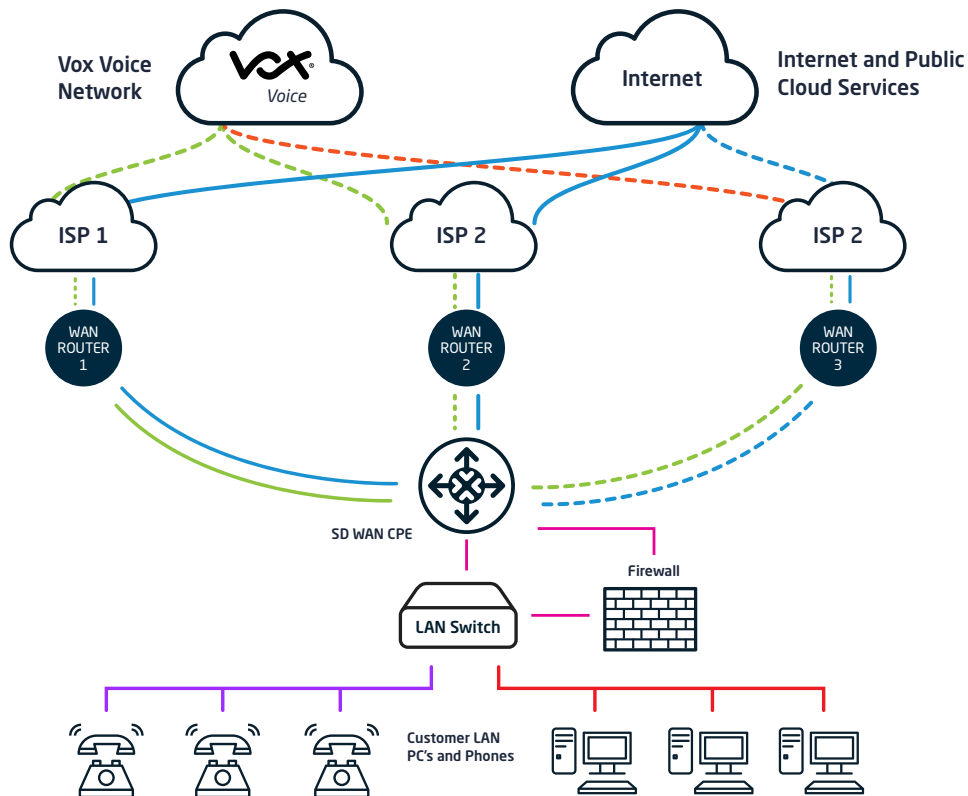
Vox SD-WAN Lite supports up to three direct Internet connections that can be any combination of the technologies referred to above. Internet bound traffic can use multiple links concurrently or be configured to failover in order of priority as chosen by the customer. This can be combined to offer, for example, two links in active/active load balancing mode and a 3rd passive link specifically for failover, should the other links go down.

Voice traffic uses only one WAN connection at a time, and preference must be given by the customer as to which links should be used for voice, and the priority assigned for failover. Voice optimisation is achieved using an advanced algorithm, which sends redundant voice packets in the main flow to ensure that real-time voice packets arrive in time and in the correct order.

> Vox SD-WAN Lite supports up to three direct Internet connections that can be any combination of the technologies referred to above.

CONCLUSION

It delivers a combination of WAN capabilities with firewall-driven security effectiveness.

The traditional WAN is no longer an effective solution for today's distributed business. Companies are overcoming significant security and network issues by moving to SD-WAN. There are many different SD-WANs on the market today, and IT departments must carefully review their options.

Vox SD-WAN Secure, using the foundation of FortiGate SD-WAN, integrates enhanced SD-WAN features with proven security capabilities, delivering next-generation protection and networking capabilities that improve network efficiency without compromising security. It delivers a combination of WAN capabilities with firewall-driven security effectiveness. Essentially, a large business gets two solutions for the price of one.

Vox SD-WAN Lite is a more customisable offering that is streamlined to deliver the features a small business would require. This makes it not only affordable, but also provides an environment where the company can more easily scale according to how it is growing and adapting to market forces.

About Vox

Innovation and insight combine in Vox, a market leading end-to-end integrated ICT and telecommunications company. We have an enviable track record of meeting the needs of thousands of consumers, SMEs, large corporates, and public sector organisations. Thanks to our dedicated staff of more than 1 500 people – and our several hundred business partners countrywide - we set the benchmark for service delivery by connecting people through best of breed technology.

From data to voice, as well as Cloud, business collaboration and conferencing tools, Vox offers intelligent solutions that connect South Africans to the world, supporting entrepreneurs, customers and commerce, whilst practicing values of integrity, choice and service excellence in all of its dealings.

Visit us at **vox.co.za**