Cass Information Systems, Inc.

Implementing SD-WAN

The Complete Guide to Enterprise SD-WAN Deployment

A Quick Overview

What is SD-WAN?

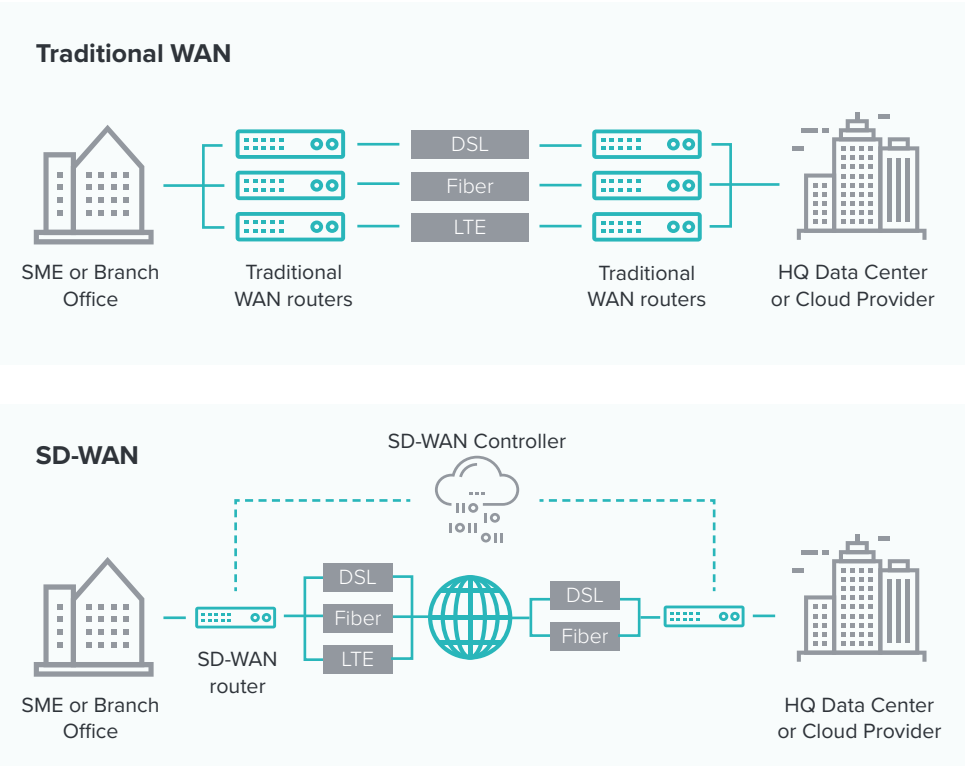
Software-defined wide-area networking (SD-WAN) is an approach to designing and deploying an enterprise network that determines the most effective way to deliver WAN services to remote locations.

SD-WAN simplifies the management and operation of a network by abstracting physical hardware to a virtual overlay. This affords greater network automation, monitoring, and management and enables administrators to remotely program edge appliances via a central controller. With this central control enterprise provisioning times are greatly reduced, as the need to manually configure traditional routers at branch locations is eliminated.

SD-WAN is frequently considered a cost-saving solution because of its ability to reduce or eliminate reliance on expensive leased lines. In truth, however, the benefits of an SD-WAN implementation extend far beyond reduced costs and include: accelerated service delivery, increased performance, improved availability, and enhanced security.

It comes as no surprise then that SD-WAN is a technology rapidly gaining ground in the networking marketplace. Rising to prominence, especially within the retail, manufacturing and healthcare industries, it has the potential to not only offer significant cost-savings but also improve overall network connectivity and control.

Traditional WAN vs SD-WAN



Why Choose SD-WAN?

Enterprise networks are regarded as the final frontier of the traditional IT marketplace. Rapid transformation has brought flexibility, cost-savings, and efficiency throughout the IT industry, but the underlying networks remain largely unchanged.

In this era of fast-paced technological change and disruption however, the number of users, applications, and mobile devices is expanding exponentially. Enterprise networks are struggling to meet the demands placed upon their outdated systems.

Traditionally enterprises have purchased and operated private networks – such as MPLS – with service level assurances to ensure mission-critical application availability. But private networks are expensive, and high-cost line rentals can quickly drain IT budgets and prevent enterprises supporting more modern real-time applications, such as video conferencing, VoIP (Voice over Internet Protocol), and some e-commerce transactions.

While modern-day broadband connections continue to offer increasing amounts of bandwidth at a low cost, these internet connections generally fail to provide the manageability, performance, and reliability assurances that businesses want. They are often utilised as a backup, fail-safe connection, but are rarely deployed as a primary connection.

SD-WAN is an attractive solution because it leverages the benefits of standard broadband with the advantages of private lines. Combining the ubiquity, high bandwidth, and low cost of the internet, with the quality, reliability, and security of leased lines offers enterprises clear cost-savings, while improving overall connectivity between multiple branch locations and sites.

The Future of SD-WAN?

SD-WAN is a technology set to disrupt the enterprise networking marketplace. In the next three years, **Gartner estimates spending on SD-WAN products will rise from $129 million to $1.3 billion** as the technology continues to offer a simplified, cost-effective, and flexible alternative to traditional WAN solutions.

While SD-WAN technology is reaching market velocity, and deployments are coming along quickly, the technological shift from hardware-centric architecture to software-defined environment is still, technically, in its infancy.

Eventually, SD-WAN will have a far-reaching impact on the connected world because it represents a technology that is at the conjunction of three rapidly expanding areas: the wide-area network (WAN) market, the cloud computing arena, and software-defined everything (SDX) industry.

While it is by no means a perfect solution, it's looking increasingly likely that SD-WAN will be the face of enterprise networking for years to come. It boasts many advantages over more traditional networking solutions, improving the performance of applications both on-premises and in the cloud.

Benefits

SD-WAN provides numerous advantages to traditional enterprise networks and represents a simplified, cost-effective, and flexible alternative to traditional WAN solutions. It is emerging as a networking approach that can deliver multiple performance benefits as well as driving cost-savings.

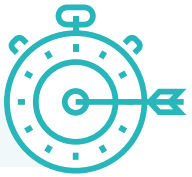
Here we focus on the 5 key benefits of SD-WAN for enterprise environments.

1. Service Delivery

An SD-WAN solution enables enterprises to use less expensive and more quickly deployed broadband circuits as opposed to purchasing additional lines when scaling-up resources.

This means that a new office or branch can be provisioned almost instantly when utilizing an internet broadband or LTE solution due to the configuration, orchestration, and rapid provisioning of an SD-WAN solution.

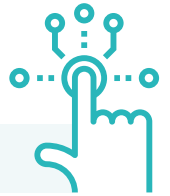
2. Performance



An SD-WAN solution has the ability to recognise latency-sensitive and mission-critical workloads, and, through the aggregation of available connections, can ensure that high-quality data transfer is maintained during busy periods.

SD-WAN also supports dynamic path selection, which ensures congestion points are spotted quickly and results in optimized load balancing and congestion management, minimising the number of dropped packets.

3. Availability



SD-WAN allows for the rapid deployment of WAN services (bandwidth and firewall) without the need for IT personnel. Configurations allow for the availability of zero-touch provisioning which reduces manual configuration of devices.

Scaling an SD-WAN solution is easy. Bandwidth can be easily added or reduced as business requirements evolve, providing organizations with the agility they need to stay ahead of competitors.

Benefits

4. Security

SD-WAN security is granular. The statistical analysis of IP traffic, ports, and source and destination traffic allows the technology to become very sophisticated at only allowing the right traffic through.

SD-WAN also has built-in encryption capabilities, ensuring that only authorized users can access and view assets. It also segments the network, ensuring that unauthorized users are unable to access high-value data.

5. Cost-Savings

SD-WAN reduces reliance on expensive leased lines by leveraging all available network connections to their full capacity, reducing the amount of traffic carried along them to include only mission-critical data.

Administrators have the ability to dynamically route traffic over both private and public links, sending lower priority data over low-cost public internet connections, while reserving more expensive lines for mission-critical traffic.

SD-WAN is frequently compared to more traditional enterprise network connections; this section explores the differences between SD-WAN and similar network offerings.

MPLS	VPN	P2P
• High security • High cost • High speed • Very slow provisioning • High reliability	• High security • Low cost • Variable speed • Slow provisioning • High flexibility • High complexity	• High security • Very high cost • High speed • Low latency • Limited versatility • No scalability

MPLS

MPLS is a data transport mechanism designed to increase speed and reduce memory overheads in a large network. It directs data from one network node to the next based on short path labels – rather than long network addresses – increasing the speed of connectivity.

MPLS is one of the more expensive forms of connectivity and this monetary impact can often affect the ability of an enterprise to support real-time data transfer in a cost-effective manner.

While private-based networking such as MPLS is still in demand – particularly in enterprises that require a high-level of reliability, predictability, and security – an SD-WAN environment is considered superior for deploying affordable connectivity to edge environments. SD-WAN can leverage an MPLS line to create a hybrid environment, eliminating the need for MPLS lines to extend all the way to the edges, generating cost savings.

VPN

A Virtual Private Network (VPN) is used to connect an enterprise environment to the cloud using a secure, encrypted, private connection over the internet, and is created utilising public infrastructure, removing the need for expensive leased lines.

VPNs require a highly-detailed understanding of network security issues to be truly secure, meaning installation and configuration time can be extensive, and, due to the fact they use public infrastructure, connectivity issues and downtime is sometimes unavoidable.

A VPN is similar to an SD-WAN solution insofar as both provide connectivity between two remote locations, but whereas SD-WAN uses dynamic-path selection to hide the complexity of building redundant tunnels, monitoring the quality of the tunnels, and failing-over, VPNs are significantly more complex to set-up.

P2P

Point-to-Point (P2P) is a networking technology used to establish a direct connection between two end-points – most frequently an enterprise environment and the nearest cloud service provider.

P2P solutions provide the most efficient connection possible, delivering high-speed, low-latency connectivity while avoiding the potential instability of connecting over the internet.

While P2P can be considered a suitable solution for organisations with single enterprise environments, it can be impractical, and will not scale when more than one connection is required. By contrast, SD-WAN can be provisioned almost instantly in any number of different enterprise environments, no matter their geographical location.

1. Business Case

For enterprises looking to adopt SD-WAN to complement their current network connectivity, or, for organizations looking to update their outdated hardware, the first step in implementing an SD-WAN solution starts with the business case.

A business case has three key functions:

- It captures the reasoning for initiating the project.
- It is presented to decision-makers to help justify the decision for initiation.
- It operates as a plan that can be referenced further into the project lifecycle.

As a rule, the business case must be presented to key stakeholders in a carefully constructed document and articulate a clear path to an attractive return on investment (ROI).

For an SD-WAN implementation, the first step in building a practical business case is to conduct a continuous, systematic full-service audit. Without knowing the billing records, contracts, tariffs and inventories of each enterprise location, it's not possible to quantify the cost-savings that can be achieved as a direct result of SD-WAN adoption and calculate an accurate ROI.

Communicating with your TEM provider throughout this process is crucial. For a business case to be functional it must be integrated with comprehensive inventory records and a complete expense management solution.

Best-in-class TEM environments should include the full procure-to-pay lifecycle, ensuring your inventory at any given time is accurate and reflective of all recent MACDs. And your TEM provider should be providing inventory management services to ensure your enterprise has all the relevant information to discern whether an SD-WAN implementation is viable.

2. Providers

Once the business case has been completed, communicated to key stakeholders, and the project signed-off, the next stage in the SD-WAN implementation process is to gain insight into the marketplace and find the right provider.

A plethora of start-ups and established industry players have now crowded onto the SD-WAN scene, all offering variations on the same theme: technology that uses SDN principles to dynamically aggregate multiple WAN links, improving performance and decreasing reliance on costly MPLS connections.

The first step to discerning which of these providers can provide the right solution must come from identifying your needs, referencing the business case, and determining how ROI will be impacted.

Again, your TEM provider can be a vital support network. Their vast experience of the telecoms market allows them to offer invaluable benchmarking expertise – providing information and advice on things like viable rates and assisting with negotiating waivers – and creating customized reports tailored to your specific needs.

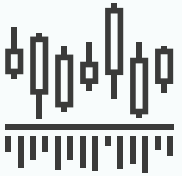
Industry-leading TEM providers can also help with sourcing – putting together requirements and going out to bid – and should have the expertise and know-how to take as active or passive role as required to get the best deal.

With a deep understanding of the networking marketplace, visibility into vendors, and knowledge of what they are really willing to give, your TEM provider is perfectly placed to help you benchmark and source a new contract, while ensuring that you get both the best rate and terms.

How your TEM provider can help:

Marketplace Insight

Vendor Visability



Benchmarking & Sourcing

3. Implement

Once you have settled on your chosen provider the real implementation phase begins. No matter the purpose of your SD-WAN implementation – whether integration, hybrid, or rip-and-replace – there are considerations to streamline the process.

While the business case has demonstrated that the potential ROI for SD-WAN can be high, pitfalls exist that can reduce the ability of your enterprise to fully leverage the benefits of switching.

Software-defining an enterprise network has many advantages: the aggregation of physical hardware to a network overlay provides greater control to network administrators, the addition of a central controller allows for the replacement of existing edge infrastructure to shrink the branch stack, and enhanced network virtualization improves monitoring and managing capabilities.

However, there are also downsides. While administrators have greater control, network maintenance complexity is increased. Shrinking the branch stack ultimately reduces complexity, but it ties you to one service provider and eliminates the leverage and security gained from spread commitment. And, finally, while monitoring and management capabilities are improved, the extra responsibilities can often require additional staff, diminishing cost-savings.

To ensure that you are fully prepared to deal with the potential pitfalls associated with an SD-WAN implementation and achieve the ROI outlined in the business case, offloading existing workloads to your TEM provider and gaining expert advice and guidance is essential.

Long-standing TEM providers have extensive experience and a broad understanding of how enterprise networks operate. Not only can they provide a detailed overview of some of the more commonly encountered obstacles likely to be faced, but by transferring as much of the day-to-day inventory and expense management tasks to them as possible – ordering new circuits, disconnecting unused services, and validating bills etc. – you can also maximise adoption benefits.

With a proven TEM provider picking up the more everyday tasks, your enterprise workforce can focus its efforts on the SD-WAN implementation. Existing personnel can get better acquainted with the new network to mitigate issues further down the road, and the obligation to pay for additional staff is eliminated.

4. Legacy

Once the implementation phase ends, enterprises will begin to experience some of the benefits of their new networking solution. However, continued management of the adoption process is essential.

The technological shift from hardware-centric architecture to software-defined environment produces infrastructure that is no longer viable in an SD-WAN network. This 'legacy' architecture now adds no value to the overall environment but will continue to cost money and drain resources unless removed.

One of the key benefits of a business case is that it can be referenced later in the project lifecycle. Remember, in order to quantify the cost-savings that could be achieved as a direct result of SD-WAN adoption, a thorough audit was conducted that contained billing records, contracts, tariffs and inventories of each enterprise location.

Cross-referencing this audit with the new SD-WAN environment and identifying what remains will provide a comprehensive list of networking offerings that are no longer required as a result of the SD-WAN transition.

To maximise the benefits of an SD-WAN solution, the legacy architecture will need to be disconnected. This will not only add additional cost-savings to your enterprise but also reduce the overall complexity of the network environment, further increasing performance.

Leveraging your best-in-class TEM provider to file and validate the disconnects of unneeded services can save you significant time and headaches, while ensuring that the ROI outlined in the business case is achieved.

5. Validation

The final step of an SD-WAN implementation is to validate whether the adoption process was a success and if your enterprise is benefitting from the attractive ROI that was presented in the business case.

It can often prove challenging to confirm whether or not your enterprise is extracting the maximum amount of value from your implementation. To calculate if the cost-savings match the business case, and make sure the new solution meets the contract rates and billing set out by the provider, communicating with your TEM provider can provide some much-needed clarity.

TEM providers are experts at providing a fully transparent billing data that includes an accurate list of charges. They can help to identify anomalies on invoices and review contract-compliance, ensuring all discounts and rates, as described in the contract terms, are honoured.

With knowledge of the providers' procedures and access to dispute channels, your TEM provider can help your enterprise resolve all billing errors, credits, refunds, cost reduction opportunities, and credit and recovery issues quickly and effectively, and ensure that you extract the maximum benefits from your SD-WAN implementation.

Conclusion

In this era of digital transformation, for an enterprise to thrive, their networks must provide seamless access to digital services.

In recent years, the number of users, applications, and mobile devices has grown rapidly and hardware-bound legacy networks are now struggling to meet the demands placed upon them.

As enterprises face more pressure to be responsive and agile, it's increasingly obvious that parts of the network, like the WAN, aren't keeping up with those demands.

To survive, enterprises need to adapt, evolve, and grow and a new form of networking technology is needed. This is the promise of SD-WAN.

SD-WAN is a networking technology that can deliver multiple performance benefits as well as drive cost savings, and one that is set to disrupt the enterprise networking marketplace. SD-WAN can transform an enterprise network from slow and fractured to agile and optimized, all while supporting a whole host of other networking technologies.

Implementation provides significant advantages for business, but to leverage these benefits support and guidance from your TEM provider is essential. If you don't currently have a TEM provider, or your TEM provider cannot provide this level of service, why not get in contact with Cass today.

As a provider of Expense Management services for over 60 years, Cass has the reliability, experience and insight within the telecoms environment to help your organization effectively plan, negotiate, and implement a cost-effective SD-WAN solution that continues to add value throughout its lifecycle.

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