

White Paper

8 good reasons for an SD-WAN



The advances in digitalization are demanding ever higher bandwidths, high-availability networks, maximum data security, and fast time-to-service requirements. And yet traditional network management approaches no longer measure up to these challenges. An SD-WAN, on the other hand, offers decisive advantages for companies with multiple locations.

A software-defined wide area network (SD-WAN) uses any type of Internet-based wide area network (WAN) to provide high-speed digital applications and multi-service networks. At the same time, an SD-WAN is an effective measure against the shortage of skilled workers, because it replaces traditional, static, manually configured network infrastructures with automated provisioning and site configuration. This eliminates the need to send qualified technicians to the different company locations.

When to decide for an SD-WAN?

The following provides a list of 8 good reasons for using SD-WAN technology. If the items on this list are what you miss about your network today, then it is probably a good time for your business to adopt SD-WAN.

1. You are still using expensive MPLS connections

Many companies and organizations have long relied on conventional WAN infrastructures based on Multi-Protocol Label Switching (MPLS) to network distributed locations with their headquarters. From today's perspective, however, these are technologically obsolete, static, inflexible, and are much too expensive compared, for example, to DSL connections. SD-WAN is a cost-effective alternative with maximum transport flexibility for implementing global, highly scalable corporate networks: Inexpensive and ubiquitously available Internet access (DSL, fiber optics, cellular) supplements or replaces existing, cost-intensive MPLS connections.

2. You want to operate less hardware

Have you ever thought about replacing your hardware with network resources provided in software? Especially for growing companies with distributed locations, the subject of NFV (network functions virtualization) is well worth considering. An SD-WAN uses generic virtual machines (VM) and "white-box gateways" to support the virtualization of your network resources. Known as vGateways, vFirewalls, and vWLCs, these virtual devices offer the full range of functions of their hardware-based counterparts, with two decisive advantages: First, they are created and commissioned with just a few clicks, for example using Microsoft Azure—which basically means instant deployment, anywhere. Second, they grow with the demands of the network: Instead of installing more powerful hardware as we used to, a virtual network component scales up at the click of a mouse, for example to support more bandwidth or additional VPN channels.

Important technologies for an SD-WAN – Policy Based Routing

It is essential to control which applications are allowed or blocked on company networks. This is easily done using the orchestrator of a modern SD-WAN: Policy Based Routing can redirect or block applications. Trusted applications should be prioritized with a local Internet breakout at the individual locations, so saving unnecessary load on the connection to the headquarters and thus improving the performance of the network overall.

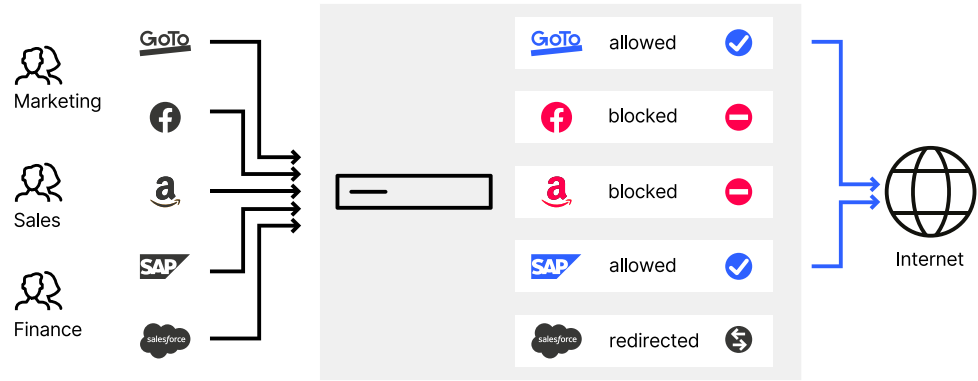


Figure 1:
Policy Based Routing

Application monitoring

These days it is vital to know which applications are operating on the network in order to use application management. A modern SD-WAN records around the clock which users are using which applications and to what extent (top users / top applications). Historical logging and graphic analysis provide the best overview for effective network decision-making.

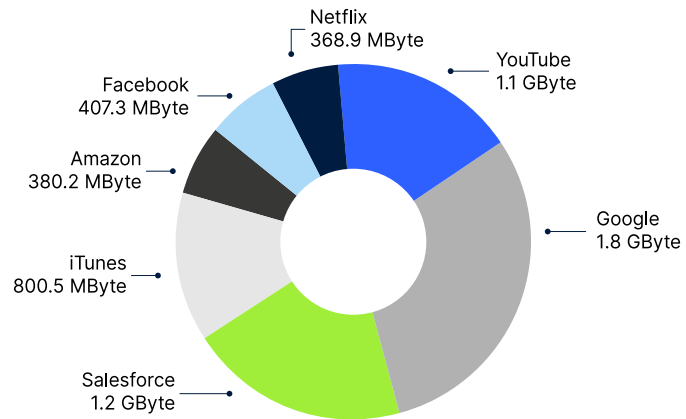


Figure 2:
Application monitoring

Active / active mode (load balancing)

Active / active mode, meaning the parallel operation or load balancing of multiple Internet connections at one location, increases the total available bandwidth and enables dynamic load balancing. This mode is versatile enough to operate with any kind of wireline connection in parallel—be it Ethernet, fiber-optic or DSL/cable with an external modem or even cellular.

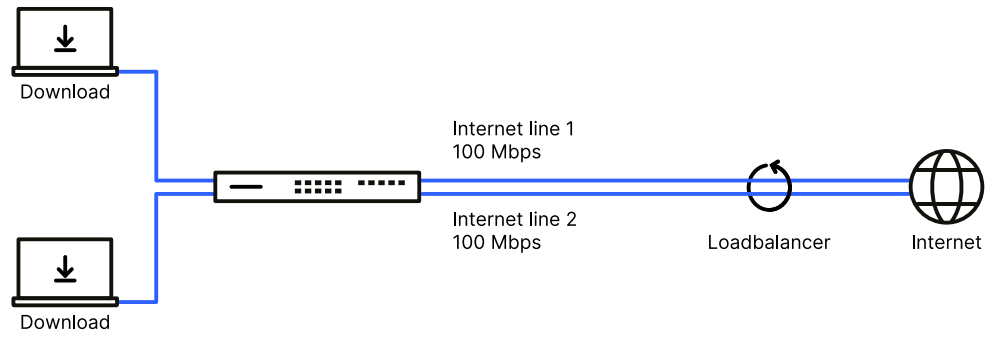


Figure 3:
Active / active-mode
(load balancing)

Dynamic Path Selection

Dynamic Path Selection in an SD-WAN directs business-critical applications over the best available line. This feature uses continuous path quality monitoring on all WAN connections with regard to load, packet loss, latency or jitter and, depending on the current connection quality, dynamically decides which line to use for certain applications. The Dynamic Path Selection algorithm selects the best quality line for sessions. If several lines meet the requirements, load balancing uses round-robin scheduling to spread the weight. Users in large SD-WAN infrastructures with multiple WAN connections in active / active mode benefit from maximum performance and reliability.

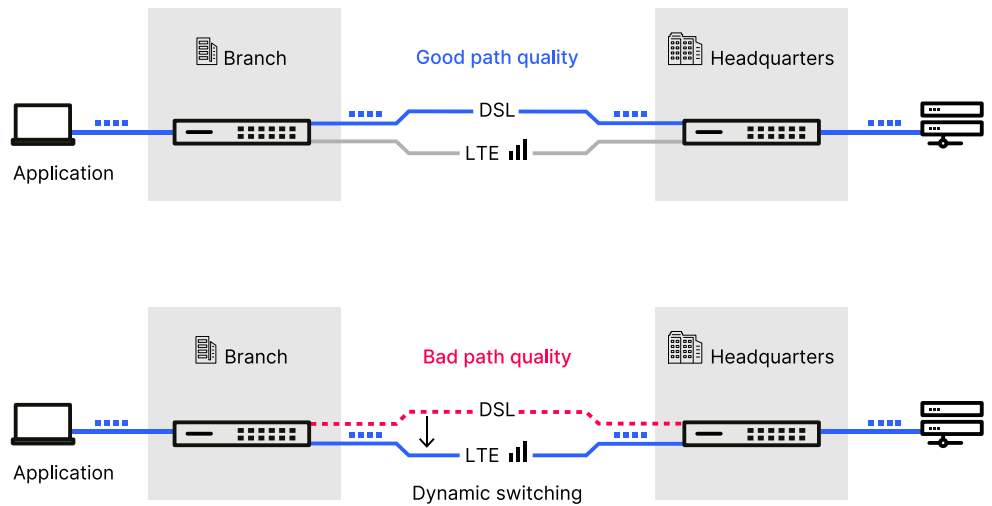


Figure 4:
Dynamic Path Selection

ARF – extending VLANs into the WAN

ARF stands for Advanced Routing and Forwarding. This technology operates on a central gateway and sets up separate communication channels for each different group of users, e.g. the accounts, development, and management departments. All communication channels or IP contexts are securely isolated from one another. This allows a certain number of users to access certain IP contexts according to their needs, while other segments remain inaccessible to them.

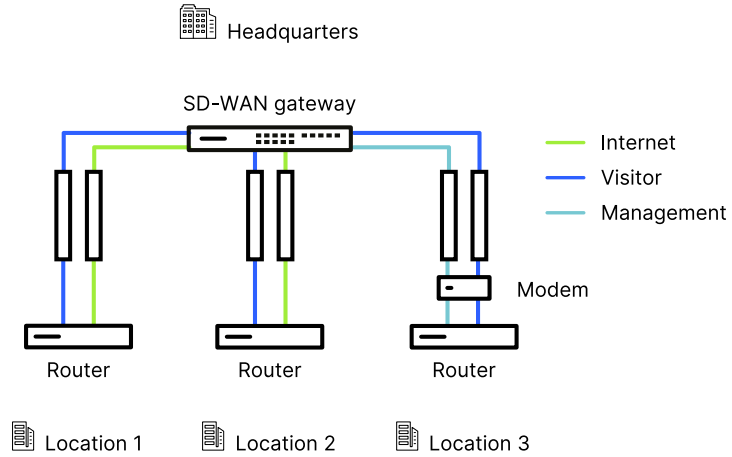


Figure 5:
Advanced Routing
and Forwarding (ARF)

High Scalability VPN (HSVPN)

In these times of increasing digitalization, a diversity of applications and steadily increasing volumes of data, HSVPN significantly improves the scalability and efficiency of an SD-WAN architecture: Where previously each application needed its own VPN tunnel, HSVPN now allows any number of networks to be collected into a single VPN tunnel and transported together to the remote site ("secure tunneling"). Despite this, networks remain securely and strictly separated from one another. The advantage: Considerably fewer VPN tunnels are required, and recovery times are much faster in a failover event.

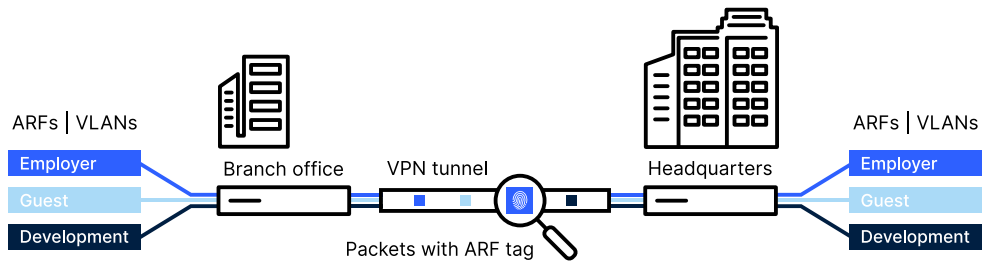


Figure 6:
High Scalability VPN (HSVPN)

Advanced Mesh VPN

With classic, star-shaped VPN site networks, in which all branches are only connected via the headquarters and not directly to each other, the internet line of the headquarters quickly becomes the bottleneck of the entire communication. With Advanced Mesh VPN, the branch offices communicate directly with each other, thus ensuring significantly less traffic at the headquarters and, as a result, higher performance. The VPN tunnels are set up dynamically as soon as data traffic is transported from one branch office to another. If there is no more communication, the VPN connection is also terminated dynamically.

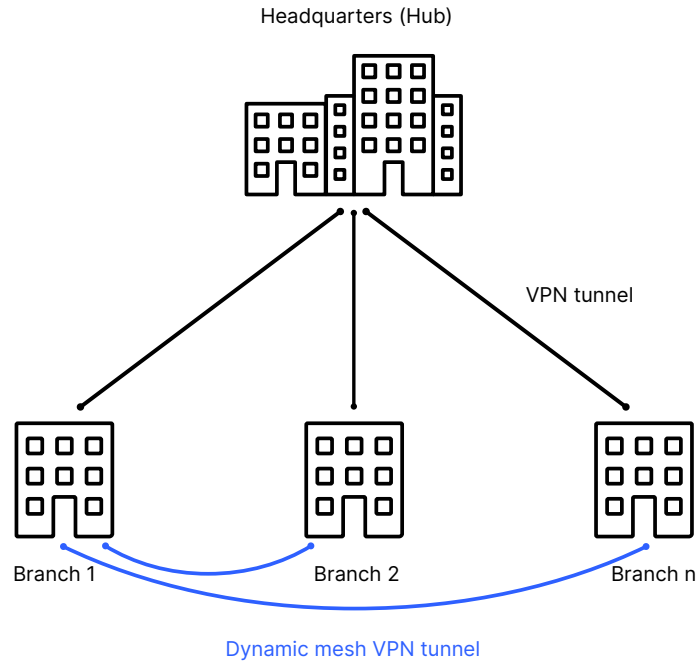


Figure 7:
Site networking via
Advanced Mesh VPN

Separated control and data planes

An essential feature for the security of a modern SD-WAN infrastructure is the strict separation of management and data connections (control plane and data plane, respectively): While the data connections (e.g. VPN tunnels) are set up between the VPN gateways, the individual network components are connected directly to an orchestrator via independent management connections. What this means is: User data remains invisible to the management system while the management and monitoring of network components works independently of the data connections and their status. What's more, the whole system functions completely automatically by means of a secure connection from the device to the management system and without any prior configuration of the devices (zero-touch provisioning). By moving the control plane—i.e. the network management—to a central cloud, you have the advantage of a permanent, cross-site, central, web-based administration interface for all devices, all sites, and all applications.

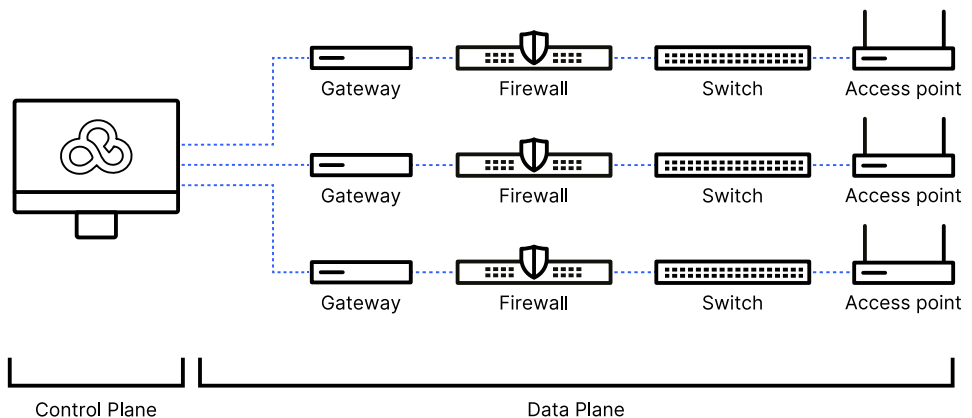


Figure 8:
Separated control
and data planes

3. You use many (cloud) applications

A number of features are available to optimize your WAN traffic. SD-WAN Policy Based Routing detects cloud-based applications such as Office 365 and routes them directly to the Internet (local break-out). Also, unwanted applications can be completely blocked from certain parts of the network by means of layer-7 application management. Not only is it possible to use several WAN connections simultaneously in active/active mode (load balancing), you can also optimize the performance of business-critical applications by dynamically routing them over the best quality connection (dynamic path selection).

4. You want to combine maximum security with maximum efficiency

An SD-WAN puts everything in place that you need to effectively protect your valuable business data traffic. Advanced Routing and Forwarding defines securely separated networks within your WAN by strictly isolating IP networks from one another. VLANs are securely and separately transmitted end-to-end over the entire WAN route—it is even possible to use overlapping IP network segments. Maximum security and efficiency is delivered by a specialized protocol named “LANCOM High Scalability VPN” (HSVPN). This provides state-of-the-art security through IPSec-VPN based on IKEv2, as well as highest availability thanks to a decentralized system architecture that has no central SD-WAN orchestrator as a single point of failure.

5. You don't have the trained personnel on site

SD-WAN completely removes the need to manually configure individual devices. When choosing your SD-WAN provider, you should check that the gateways on offer are all SD-WAN-capable and can be integrated into the central management system without major effort. Your work is made much easier if your SD-WAN provider enables you to roll out all of the gateway configurations via “zero-touch provisioning”. This means that devices receive their configuration completely automatically, and you can even control the different firmware versions on different device types at the click of a button. Devices with Ethernet interfaces and Internet connect directly to the SD-WAN orchestrator and are set up by auto-configuration. You don't even need an on-site specialist to commission the new hardware: New devices are simply connected to the network by cable and then to the Internet using the Setup Wizard—and that's it.

6. You want central control over all of your network components

A modern management instance in the cloud based on innovative software-defined technology lets you orchestrate more than just your WAN, because the latest SD-WAN solutions think one step further: The same interface lets you control your entire infrastructure, even at dispersed company locations, known as “SD-Branch”. An SD-Branch solution supplements SD-WAN with a highly integrated approach for the

orchestration of every part of the network (gateways & WAN, switches & LAN, access points & WLAN, firewalls & security) within branch infrastructures. All devices are orchestrated collectively and automatically—for more than 70% time savings in your daily business.

7. Your compliance requirements demand the use of a private cloud

Ask your provider whether they can meet your advanced security requirements by offering an alternative to a public cloud solution in the form of a private cloud solution, where the orchestrator is hosted in a data center of your choice. This is particularly interesting for large enterprise networks and service providers.

8. And it pays off for you!

Your business benefits from an SD-WAN in three ways: While you minimize costs, the available bandwidth increases at the same time. Furthermore, your network offers unprecedented flexibility that allows you to commission new company locations extremely quickly.

Reduce your network costs

A LANCOM SD-WAN dramatically reduces your WAN operating expenses (OPEX) because high-cost MPLS lines are either supplemented or replaced by inexpensive Internet access (DSL, fiber optic, cable, LTE, 5G). Furthermore, expensive field-service operations and the complex configuration of individual devices have been made obsolete by SD-WAN. New routers are easily commissioned using “zero-touch provisioning”, and entire locations are rolled out automatically. In many cases, little or even no investment in hardware (CAPEX) is required: With modern SD-WAN providers, you can simply continue to operate your existing routers and VPN gateways.

Make the most of the bandwidth available on site

For modern enterprises operating performance-hungry online applications and cloud services, a single DSL connection or MPLS line just does not provide enough bandwidth. In the short term, many locations simply will not be supplied with high-speed fiber optic connections. The solution is a hybrid WAN: With SD-WAN you have maximum transport flexibility by combining the several Internet connections available on location, e.g. DSL, fiber optics, cable, MPLS lines, etc. In this way you can increase the available bandwidth as required. Internet access via 4G or 5G further serves as a backup and ensures high availability. Intelligent and highly efficient load balancing (active / active mode) ensures that all of the Internet connections are operated to the maximum. This creates the best performance for your WAN applications.

Maximum flexibility when modifying and expanding your network infrastructure

While manual WAN configurations in static networks at distributed locations were formerly complex, time-consuming and error-prone, SD-WAN saves you more than just expense. It also lets you react in a highly flexible manner. SD-WAN reduces the effort of any new or reconfiguration to just a few clicks of the mouse. You can even roll out new applications, workplaces, and entire locations at any time and from anywhere in a highly automated manner. Any new location is immediately included into the central 24/7 monitoring. This even makes an entirely new experience of remote troubleshooting: In the future, you will be able to detect network errors and causes even before the users notice them, therefore reacting immediately, proactively, and on target. This assures delay-free operation at all locations.

Summary

Have we convinced you that SD-WAN raises the potential of your network to a completely new level, saves expense, and opens up completely new possibilities? If so, please contact the LANCOM International Inside Sales team.

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