



WHITE PAPER

SD-WAN and Out-of-Band: A Smart Solution

Modern networks need to be optimized and flexible enough to handle the need for ever-increasing bandwidth. At the same time, network costs have to be manageable. It's no wonder that so many network managers are turning to Software Defined Wide Area Networks (SD-WAN). This paper takes a look at the advantages and the growing pains of SD-WAN and offers advice on creating a reliable SD-WAN with Out-of-Band (OOB) management.

WHAT IS SD-WAN?

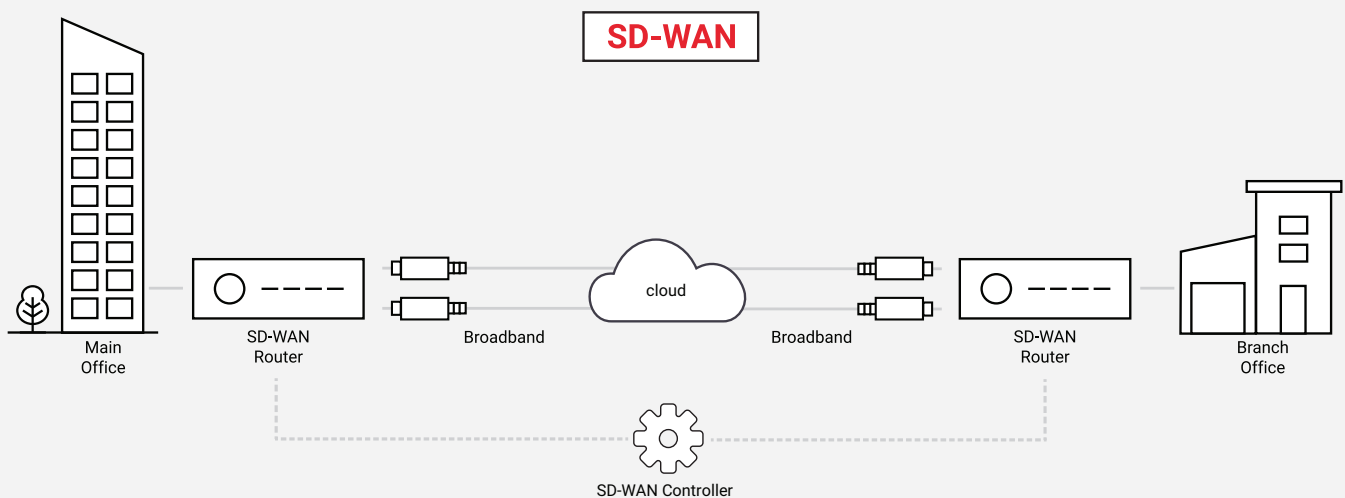
SD-WANs can be deployed as a software-based solution or as a software and hardware combination with branch sites hosting WAN devices. SD-WAN vendors who offer software plus hardware solutions replace traditional branch routers with appliances that automatically figure out the most efficient network paths and shift traffic to optimize bandwidth. These devices are centrally managed, with routing that can be updated in real-time in response to changing network requirements.

The technology that comprises SD-WANs has been around for a long time. What is new is an SD-WAN's ability to dynamically share network bandwidth across connections.

An SD-WAN can manage multiple types of connections, from LTE to broadband to multiprotocol label switching (MPLS) links. This means that traffic can be routed over the most cost-effective services, such as broadband. Services that require high quality, such as video or voice, or high security, with sensitive information, can still be routed over remaining MPLS lines, although many enterprises are freeing themselves of MPLS entirely. Because of this flexibility, SD-WANs can dramatically lessen the cost and minimize the complexity of traditional WANs. SD-WAN adoption is growing explosively. According to IDC, the SD-WAN market was \$220M in 2015, and is projected to be a \$8B market by 2021.¹

CHARACTERISTICS OF SD-WAN

- Supports multiple connection types, for example LTE, Broadband Internet, and MPLS.
- Efficient and dynamic load sharing of traffic across multiple WAN connections that can be based on business and/or application policies.
- Simple management and configuration. Expertise needed to configure a branch should be as easy to set up as a home Wi-Fi.
- Supports secure VPNs and allows the integration of other network services, like firewalls, web gateways, and WAN optimization controllers..



1. "IDC Forecasts SD-WAN Market to Reach \$8 Billion in 2021 As Enterprise Branch Network Requirements Accelerate," International Data Corporation (IDC), retrieved 16 July 2018 from <https://www.idc.com/getdoc.jsp?containerId=prUS42925117>

WHAT ARE MPLS CIRCUITS?

Traditional branch networking used Multi-Protocol Label Switching (MPLS) circuits. MPLS circuits are dedicated private links between headquarters and branch offices. Because those dedicated circuits do not use the public Internet, MPLS are “enterprise-grade” secure. But they’re also expensive.

An MPLS circuit can cost up to \$600/Mbps/month which means a single branch could easily incur \$10k or \$20k/month on connectivity alone. Now consider that a typical Cable business plan offers a 75Mbps commodity Internet connection for \$180/month. This amounts to \$2.4/Mbps/month, a significant cost savings. For many years, a commodity Internet connection with VPN has been an alternative to MPLS circuits (at 99% price discount), but enterprises have hesitated to change because of manageability and security concerns.

WAN BEFORE SD-WAN

In the past, enterprises had to have complicated infrastructure at each branch office, including routers, firewalls, WAN path controllers, WAN optimizers, potentially expensive MPLS circuits, and more. Maintaining an MPLS-based WAN is expensive. In most cases it’s also outmoded since a majority of traffic is already headed for a public Internet gateway.

The business shift to SD-WANs is coming about quickly because they not only dramatically lower costs, they help businesses become more agile by enhancing business productivity.

Traditional WANs weren’t architected for a dynamic, internet-based environment. Having to backhaul traffic from the branch to headquarters to the internet and back again is inefficient, costly, and prone to disruption. These days, users find that their business apps run faster on their home network or on their mobile devices than on a traditional WAN.

SD-WANs are typically two and a half times less expensive than a traditional WAN. An enterprise with 100-branch offices with MPLS circuits could cost \$600,000 over 3 years in a traditional WAN setup, but only \$225,000 using an SD-WAN. SD-WAN architecture recognizes that branch offices now just need a subset of what they used to and SD-WAN vendors commonly offer the most important features bundled together.

BENEFITS OF SD-WAN

- Increased flexibility of network configuration, with reduced complexity.
- Quick deployment of new network locations using zero touch provisioning.
- Seamless management of distributed team members with Virtual Local Area Networks across multiple locations.
- Reduced cost by leveraging commodity hardware and eliminating expensive private network circuits.
- Secure connection of standard broadband via a dynamic VPN tunnel.
- Traffic balanced across multiple technologies (broadband, 4G LTE) without the need for expensive dedicated MPLS circuits.

SD-WAN AND CLOUD-BASED PROVISIONING

Not only does SD-WAN offer a huge savings in cost, it also can provide time and resource savings with Cloud-Based Provisioning. Cloud-Based Provisioning makes the initial provisioning and configuration of network equipment simple.

Here's how it works:

1. The user buys networking equipment, which is shipped directly to the branch deployment locations.
2. Instead of configuring the devices on site, a user at any location can go to a website offered by the SD-WAN vendor and can configure the equipment virtually.
3. When the equipment is powered on, it automatically looks for an Internet connection and connects to the cloud service. It then gets the correct configuration based on its serial number.

While Cloud-Based Provisioning makes the provisioning and configuration of an SD-WAN router straightforward, it is also limited by being in-band management. If the Internet link goes down, you are out of luck. But there is a solution.

WHAT YOUR SD-WAN IS MISSING

In traditional branch networking, often branch routers go for years without needing any intervention like

configuration changes or firmware updates. But SD-WAN routers are more sophisticated and run a larger software stack. Firmware updates are common which means that there are many more opportunities for things to go wrong. And while Cloud-Based Provisioning makes provisioning and configuration of an SD-WAN router easier, ultimately it is still In-Band management, with all access to your network dependent on the same router. Without Out-of-Band (OOB) management, network events become serious disruptions.

BENEFITS OF SMART OOB

Out-of-band management minimizes the need for truck rolls and mean time to recover (MTTR) from a disruption. And this dependability is available for a cost that is a small fraction of the savings when enterprises move from traditional to SD-WAN.

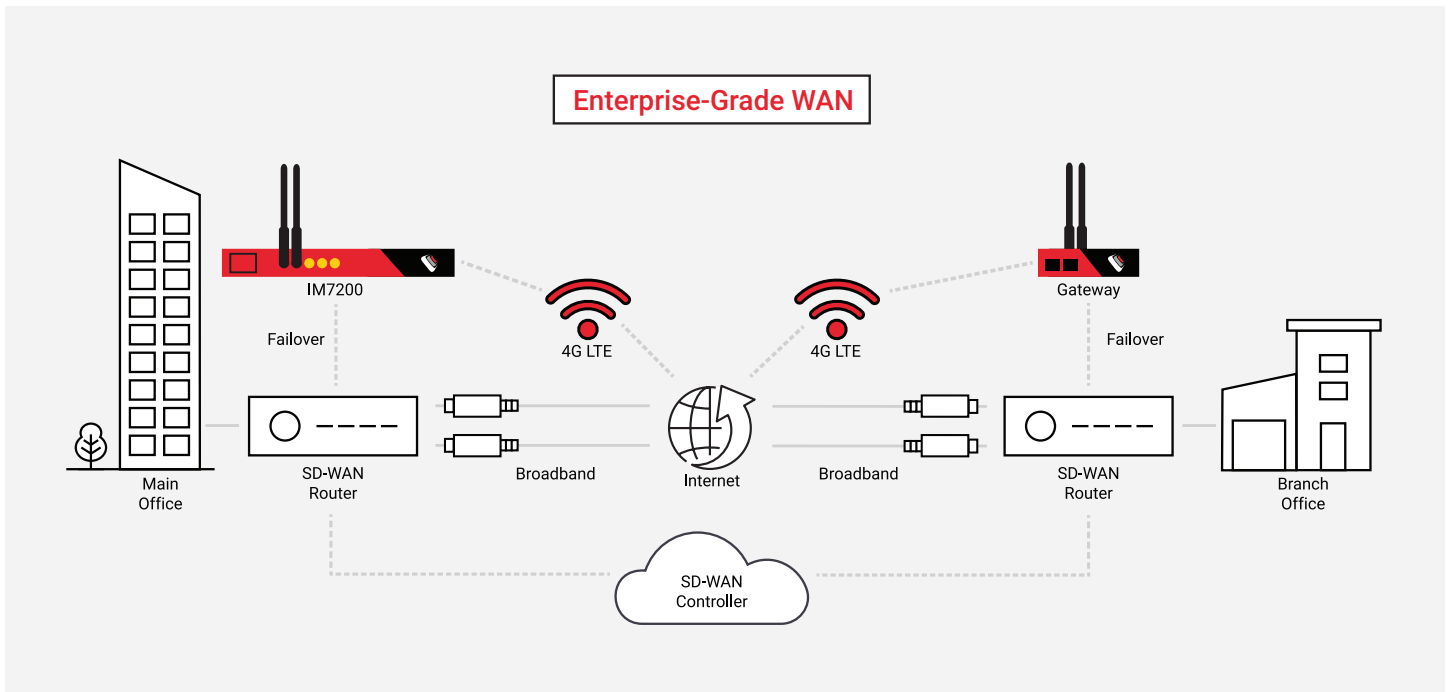
The increased demand for always-on connectivity and resilience in the face of SD-WAN network failure events means that more is needed from out-of-band management. Rapid identification and remediation of connectivity issues between dispersed Internet-connected

WHAT IS OUT-OF-BAND MANAGEMENT?

An enterprise network typically deals with three components: production and user data, management of this data, and control of the network itself. When the enterprise uses the same network interfaces to handle all three, it's known as In-Band management. The problem with In-Band management is that when the single network goes down, there's no path to access switches and routers to diagnose and fix problems.

Out-of-Band (OOB) management means that the enterprise has a secondary network with management access to the devices in your production network. This secondary network has its own switches and routers so interruptions on the primary network do not affect the OOB network. OOB management lets administrators securely and remotely manage devices when the primary network is unavailable.





devices and remote infrastructure is critical. Additional benefits of an Opengear *Smart Out-of-Band (Smart OOB™)* solution are that it:

- Ensures your infrastructure is accessible from anywhere, which is crucial during system or network outages
- Proactively detect faults before they become failures by monitoring everything including the physical environment
- Offers much faster recovery from network and IT failures with Failover to Cellular
- Minimizes disruption and downtime, providing the highest levels of business continuity

Smart OOB lets SD-WAN enterprises remotely and securely monitor, access, and manage virtually any device on the network from anywhere, even when the network is down. The powerful combination of remote access and monitoring capabilities include auto-response and remediation, plus OOB over cell/dial and Failover to Cellular™ backup. All features are easily managed from a centralized console. Smart OOB dashboards provide secure remote interaction

with key data such as statuses on power levels, network availability, server performance, temperature conditions, cage door positions, and more from any web interface anywhere.

SD-WAN + SMART OOB = ENTERPRISE-GRADE WAN

It's clear why your enterprise-grade WAN should shift to an SD-WAN with a *Smart OOB* solution. Because of the huge cost savings you get from reducing the number of MPLS circuits, the ROI of an SD-WAN is quick, consisting of thousands of dollars per month per location. This is a great opportunity to budget for the adoption of OOB. A branch *Smart OOB* solution costs about \$1200 to deploy and \$10/month to operate. A single truck roll costs \$2000. How much does a day of disruption cost you?