Tap into New Revenue Streams

Software-Defined WAN running on Intel® technology enables Communications Service Providers to extend network coverage, introduce new value-added services to compete with through-the-network providers, and differentiate MPLS services.

Executive Summary

Enterprises are increasingly looking to Software-Defined WAN (SD-WAN) to simplify branch office networking. SD-WAN gives enterprises greater control by allowing them to intelligently route Internet and low priority traffic over consumer-grade broadband rather than Multiprotocol Label Switching (MPLS) and other managed networks. Enterprises can also dynamically change their bandwidth requirements to avoid overprovisioning, and thus overpaying. By doing so, they can lower the total cost of ownership (TCO) of their WAN and maintain their same level of service without sacrificing quality.

For the Communication Service Providers (CSPs), however, SD-WAN poses both a threat and an opportunity. As increasing numbers of enterprises deploy SD-WAN, the CSP’s traditional MPLS revenues will decline without an offset in the traffic on lower cost interfaces or transports, or unless they can offer alternative, value-added, revenue-generating services. One way they can do this, is through offering enterprises SD-WAN services.

When combined with virtualized Customer Premises Equipment (vCPE), CSPs can use SD-WAN to provision virtual overlays onto existing physical networks to offer wholesale broadband into places where they do not currently have their own network presence. They can also offer value-added services like integrated firewall, without having to procure and deploy costly on-site hardware. Enterprises benefit from more cost-effective WAN and services provision managed by a single point rather than multiple contacts, while CSPs can offset declining MPLS revenues, and possibly offer services into markets where they do not have physical assets.

This solution brief describes how to solve business challenges and enable digital transformation through investment in innovative technologies.

If you are responsible for...

- **Business strategy:** You will better understand how SD-WAN will enable you to successfully meet your business outcomes.
- **Technology decisions:** You will learn how a SD-WAN works to deliver IT and business value.

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**Business Challenge: Maintaining Revenue**

The WAN landscape is in flux. As enterprises discover the benefits of hybrid network architectures, running over CSP and consumer-grade broadband networks, SD-WAN is entering a period of rapid growth, while more traditional hardware-based WAN solutions are losing popularity. IDC forecasts worldwide spend on SD-WAN will reach USD 6 billion by 2020.

SD-WAN enables an enterprise to make dynamic and near real-time changes to network in the WAN and the policies affecting its communications traffic between interconnected sites over very long distances. The enterprise can do this through a third-party network, or possibly multiple CSP networks. This has the potential to open market segments otherwise prohibited to the CSP.

Inside the industry there a wide variety of opinions as to what exactly defines an SD-WAN solution, and while there is some effort to create a single accepted view, there are generally four essential characteristics to a SD-WAN solution. These are:

- Supports multiple types of WAN interfaces simultaneously, even if within the same physical layer
- Provides dynamic hands-off route selection and modification of traffic over these interfaces
- Provides the enterprise with a simple programmatic interface for the control and management of policy
- Supports multiple VPNs, firewalls, and other CPE-like features

In addition, some SD-WAN solutions may support WAN optimization and encryption, although this is not considered fundamental.

For enterprises, SD-WAN brings many benefits, allowing them to meet some of their key networking challenges head on, and on their own terms:

- It enables them to route the increasing number of hybrid cloud services and applications over non-MPLS connections and monitor the Quality of Service (QoS) and latency, reverting to MPLS if the performance of the broadband interface degrades, all in real time. This policy-based forwarding allows the enterprise to prioritize mission-critical applications over employees streaming cat videos, for example
- Management through software allows enterprises to quickly and easily scale or set up connectivity to increasing numbers of branch offices and remote users
- Enterprises can intelligently route traffic from bandwidth-intensive, business-critical applications, dynamically changing the rate limit of the WAN connection as needed, within the bounds of their link capacity. This allows them to use the bandwidth they need, when they need it, and then turn it off, avoiding overprovisioning and overpaying

While SD-WAN is good news for enterprises – they have greater control over their network traffic and can lower costs by reducing the overall traffic that is transported over carrier networks – it threatens to take away traditional MPLS revenue from the CSP.

To compound matters, WAN technology itself doesn’t have a lot of revenue potential from a product delivery perspective. It is essentially a pipe. The CSPs’ challenge is to find value-added services that they can monetize simply by delivering connectivity to enterprises. Ironically, the answer may lie in SD-WAN.

**Offer Cost-Effective, Value-Added Services from a One-Stop Shop**

CSPs can regain portions of lost MPLS revenue in various ways depending on the market segment in which they operate. One way is by using SD-WAN technology to provision virtual overlays onto existing physical networks so they can provide wholesale broadband into regions where they do not currently have their own network presence.

A virtual edge or ‘fog computing’ is enabled when SD-WAN is combined with vCPE. This approach allows a CSP to offer wholesale IP services where it does not otherwise have MPLS reach, provided it can establish an interworking agreement, and in some cases, reach across national borders with its service offering. This last point is regulatory and not technical.

There are some cases where the MPLS service is priced based on a national regulatory requirement and not driven by competitive or business factors. In these cases, CSPs may have greater control over their MPLS revenues, while the enterprise can still assume greater control of its WAN usage.

SD-WAN also allows the CSP to offer enhanced services in chained functions as the demands of customers change or expand, through organic growth or merger and acquisition, without having to procure and deploy costly on-site hardware.

For example, consider one national governmental agency with over 5,000 sites and over 17 separate service providers. In this case the agency has 17 different entities that manage or control its cloud-based firewalls. Here a CSP could offer one service that enables the customer to take control of its network and bypass the cumbersome task of coordinating with 17 external providers, simplifying firewall management. Other potential use cases include security or software release patching. These use cases can represent significant opportunity for the SD-WAN-enabled CSP.

**Solution Value: Lower Costs and Greater Agility**

SD-WAN technology delivers business-class and simple cloud-enabled WAN connection through open and software-based technology running on high volume industry-standard hardware. This more DevOps-oriented approach allows the CSP to reduce the TCO of WAN provision, while passing cost benefits onto the customer.

The lower half of figure 1 shows CAPEX savings from transitioning CPE to a modest PC-class appliance and replacing the expensive specialized hardware in the data
center with economical, high-volume servers. Moreover, industry-standard appliance and server platforms are open, fully programmable, and typically much easier to manage and support than proprietary hardware, resulting in substantial OPEX savings.

When combined with vCPE, SD-WAN allows CSPs to offer an integrated and complete platform that enables rapid deployment of multiple solutions, as well as automated service delivery provided that the CSP integrates a programmable network on their side of the interface and opens portals to the enterprise to enable this. CSPs can roll out new software-based managed services without having to integrate with proprietary appliances, reducing the time to get customers up and running to hours rather than weeks or months.

SD-WAN provides CSPs with the ability to tap into new revenue streams by monetizing customers not physically connected to their network and by moving into new market segments, like small- to medium-sized enterprises (SMEs), through wholesale broadband, rather than MPLS offerings. In some regions where competition from Cloud Service Providers is less fierce, CSPs with a cloud-service capability can also offer cloud-based Network Function Virtualization (NFV)-enabled services.

**Solution Architecture: SD-WAN and vCPE based on Intel® Technology**

Several companies are providing Intel-based SD-WAN solutions to CSPs. These include Nuage Networks, Huawei, Riverbed, CloudGenix, Aryaka Networks, Pertino, Versa Networks, Viptela, Velocloud, Talari and Silverpeak.

A variety of server processors from the Intel® Atom™ and Intel® Xeon® Processor D families, provide these partners with a range of performance capabilities for hardware platforms supporting small to large branches, headquarters, data centers, and the cloud. See figure 2.

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**Virtualization of the Enterprise**

*Customer Premise Equipment (vE_CPE)*

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**Figure 1. True SD-WAN compared to legacy hardware-based WAN**

<table>
<thead>
<tr>
<th>Today's hardware based WAN</th>
<th>The future with SD-WAN</th>
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<tbody>
<tr>
<td>Expensive, complex applicanes</td>
<td>Modest PC-class appliance</td>
</tr>
<tr>
<td>Expensive private lines, not aligned with Internet</td>
<td>Alignment with Internet, MPLS, broadband, etc.</td>
</tr>
<tr>
<td>Data center with lots of expensive hardware</td>
<td>Industry-standard, high-volume servers</td>
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**Figure 2. Policy-based forwarding supported by SD-WAN and vCPE running on Intel® technology**
Intel® Ethernet Controllers X710 extend Intel® Virtualization Technology beyond the server to the network with hardware optimizations and offloads for the rapid provisioning of networks. They deliver a theoretical maximum of 80 Gb/s bi-directional throughput (40 Gb/s in; 40 Gb/s out), intelligent offloading to enable high-performance with Intel Xeon processor-based servers, and excellent small packet performance for network appliances and NFV.

These Intel-based hardware platforms enable CSPs to avoid vendor lock in, giving them the ability to choose from a range of vendors and empowering them to define and purchase standard appliances based on their needs and specifications. CSPs also benefit from Intel’s reputation for high performance virtualization and pioneering NFV technologies, and can see regular performance increases made possible through Moore’s Law.

**Conclusion**

SD-WAN presents both a threat and an opportunity to CSPs. Those who choose to focus purely on their MPLS revenues risk losing customers to another CSP or even an SD-WAN vendor. The CSPs who will remain competitive are those who choose to integrate SD-WAN into their existing MPLS network. These CSPs will be able to offset declining MPLS revenues with new revenue streams enabled by SD-WAN, as well as diversify into new customer market segments. They will be able to respond much more quickly to customer demand for new services, improving customer stickiness, as well as the overall customer experience. Additionally, a software-centric approach increases efficiency helping the CSP to lower the TCO of WAN provision and stay in tune with the latest technologies and trends to respond to future shifts in the ever-changing WAN landscape.

Find the solution that’s right for your organization. Contact your Intel representative or visit intel.com/communication

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**Learn More**

This solution brief is part of an entire solution kit of content that is full of key insights and learnings:


- **Solution Brief:** Software-Defined WAN Increases Agility and Lowers Hardware Costs for CommsSPs: [https://builders.intel.com/docs/networkbuilders/software-defined_WAN_increases_agility_and_lowers_hardware_costs_for_CommSPs.pdf](https://builders.intel.com/docs/networkbuilders/software-defined_WAN_increases_agility_and_lowers_hardware_costs_for_CommSPs.pdf)

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