consoleconnect
by **PCCW** Global

THE ESSENTIAL HYBRID NETWORKING GUIDE

How SD WAN, dedicated cloud connections, MPLS and the public internet complement each other as essential components of the hybrid enterprise WAN

INTRODUCTION

Anyone who works with technology will know that confusion is commonplace. There is always something bigger and better coming to market and transformative trends are always just over the horizon. In some cases, the hype is justified and a sweeping technology trend will revolutionise the way we do business. In others, the technology is grossly mis-marketed or simply ahead of (or behind) the times, and its impact is much less dramatic.

The cloud is a good example of the former, mixed with elements of the latter. While cheap and easily accessible storage and compute changed the way we stored and manipulated data, the advent of public cloud didn't exactly ring the death knell for private clouds and the corporate data centre as some might have promised.

Many enterprises today have a range of assets residing in a mixture of both public and private clouds. As a result, there is a need to connect not just site-to-site and site-to-cloud but also cloud-to-cloud. This is a situation that is likely to persist for the foreseeable future and is having an impact on the network, where a similar transformation is taking place in terms of connectivity types.

MPLS has been the de facto WAN technology standard since the turn of the century, providing organisations with a robust way of connecting their branch offices together and to more important sites like the corporate headquarters where the data centre would reside.

Optimal routing means MPLS can achieve very low latencies, and the fact that it is a private network bolsters the security (although this also means some organisations neglect to encrypt their traffic, raising an interesting benefit of SD WAN, discussed later). MPLS can also guarantee sufficient bandwidth and managed variation in latency (AKA "Jitter") to ensure applications performance.

## "Rumours of my death are largely exaggerated"

- MPLS

However, when it comes to new deployments, MPLS is a slow contender, with installations often taking several months to complete. It can also be prohibitively costly to deploy in remote, rural or low traffic locations as it's an expensive form of transport. This means that when it comes to capacity, many networks are under provisioned from the start, or reconfigured on the fly, making for an intensely manual management process. The operations team tends to buy exactly what they need in terms of capacity over a multi-year term, without any form of buffer for future traffic demand. They will then use hierarchical application and service rules to ensure critical traffic is prioritised.

But it's the widespread adoption of public cloud-based applications and services that introduced a new and most challenging dynamic into the mix - the need for branch offices to connect directly to assets in the cloud.

Although MPLS is the workhorse of the WAN, it struggles to adequately support the highly accessible nature of the public cloud because it needs a pre-configured termination point and an end-to-end bandwidth management of the connection. This is easily done in the corporate data centre and sufficed when heavy applications were all backhauled through a managed network to central site, but as the public cloud is owned and operated by other organisations, deploying appliances is not an option, neither is managing the bandwidth on other organizations' networks. Furthermore, the Trombone Effect also comes into play here. There is little point in adopting SaaS applications to help your business' agility if you end up hauling the traffic to and from your private data centre through the internet. The variable latency and possible congestion may well wipe out any benefits.

INTERCONNECTION DEPLOYMENTS

2021 projection (Equinix)[1]
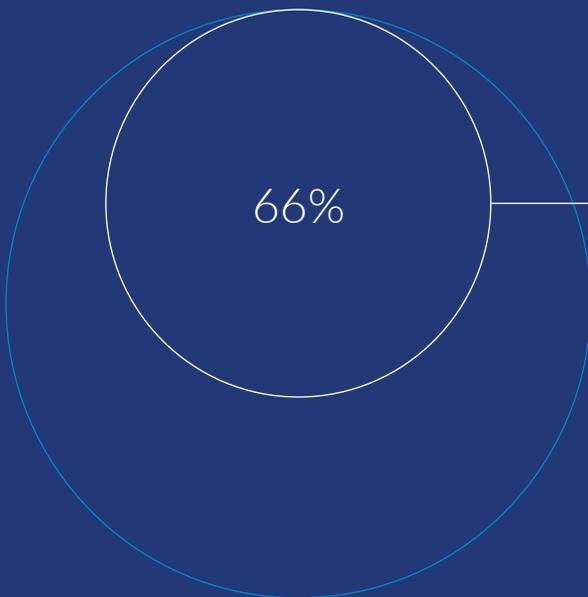
66%

of total interconnection bandwidth in 2021 will be enterprises interconnecting to network providers to solve latency.
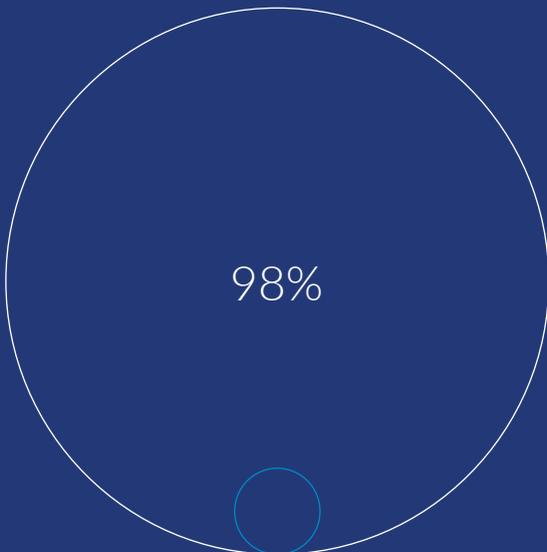
98%

of growth in interconnection bandwidth will be enterprises interconnecting to cloud and IT service providers to solve complexity.

SD WAN MEANS A RISE IN INTERNET CONNECTIVITY

It's this increasing appetite for internet-based application access and its budget friendly cost that are making public internet connections a popular choice not just for less critical sites but also for main sites too. This latter point being driven by confusion over the promises of SD WAN.

Demand for connectivity is growing year on year, with no sign of slowing down. For sites located in key business areas, there is a good amount of competition among infrastructure suppliers and affordable high bandwidth services. While for those sites located outside of key business centres, there is much less competition and significant cost associated with upgrading connectivity. It's also likely to be the case that no matter how far your network needs to extend, your budget almost certainly will not.

Over the last several years, SD WAN has gone from a much anticipated technology promise to a commercially viable service that is being widely adopted. SD WAN boosts business agility by enabling organisations to expand their branch sites more quickly, and manage their WAN more flexibly and in real-time. The potential to unlock significant cost savings is also touted by many providers as a key benefit, given that public internet links are an order of magnitude cheaper than MPLS. However, a word of warning is that it's never a good idea to implement a technology purely as a cost-saving measure.

The promise of SD WAN is that it complements the existing high-quality but high-cost MPLS connection with a high bandwidth, lower cost public internet service. By binding together different connections, whether they are public internet, dedicated link, or even 3G/4G mobile, it's possible to cost effectively increase the capacity of the WAN. One of the key benefits is that non-critical traffic can be sent over the internet in an encrypted tunnel, freeing up capacity on the more resilient (and expensive) MPLS connection for mission critical traffic.

> ## "There's a huge popular perception out there that SD-WAN has killed MPLS,"
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> - Nemertes analyst John Burke

"There's a huge popular perception out there that SD-WAN has killed MPLS," according to Nemertes analyst John Burke[2] in late 2018. "Our research consistently shows this to be untrue."

It's possible that some locations, specifically those where managed bandwidth is not required or can not be commercially justified, could even get rid of the MPLS access and use SD WAN over public internet alone, which has led to much confusion and perhaps a misunderstanding of where SD WAN fits in the connectivity portfolio. Such locations can still enjoy the security and application awareness of SD-WAN, but the connectivity will be unmanaged and subject to the erratic behaviour of public internet.

The analyst says that a large majority of organisations with MPLS plan to keep it even after they deploy SD WAN. "Almost all of them have no goal of eliminating it. Most do plan on changing their relationship to MPLS, though. They may be capping spending on it. Or they may be going from a strategy of putting MPLS everywhere to only putting it in larger or more critical sites," he says.

An interesting side effect is that some network managers say that SD WAN actually makes their WAN more secure despite the addition of internet into the mix, because the traffic is encrypted and they don't typically encrypt traffic on their existing MPLS WAN.

A special study from International Data Corporation (IDC)[3] in late 2017 found that "bandwidth optimisation", "consistent application security", "integration with existing WANs", and "improved automation and self-provisioning" were the top four motivators identified by respondents considering SD WAN adoption (36 per cent, 31 per cent, 28 per cent and 28 per cent, respectively).
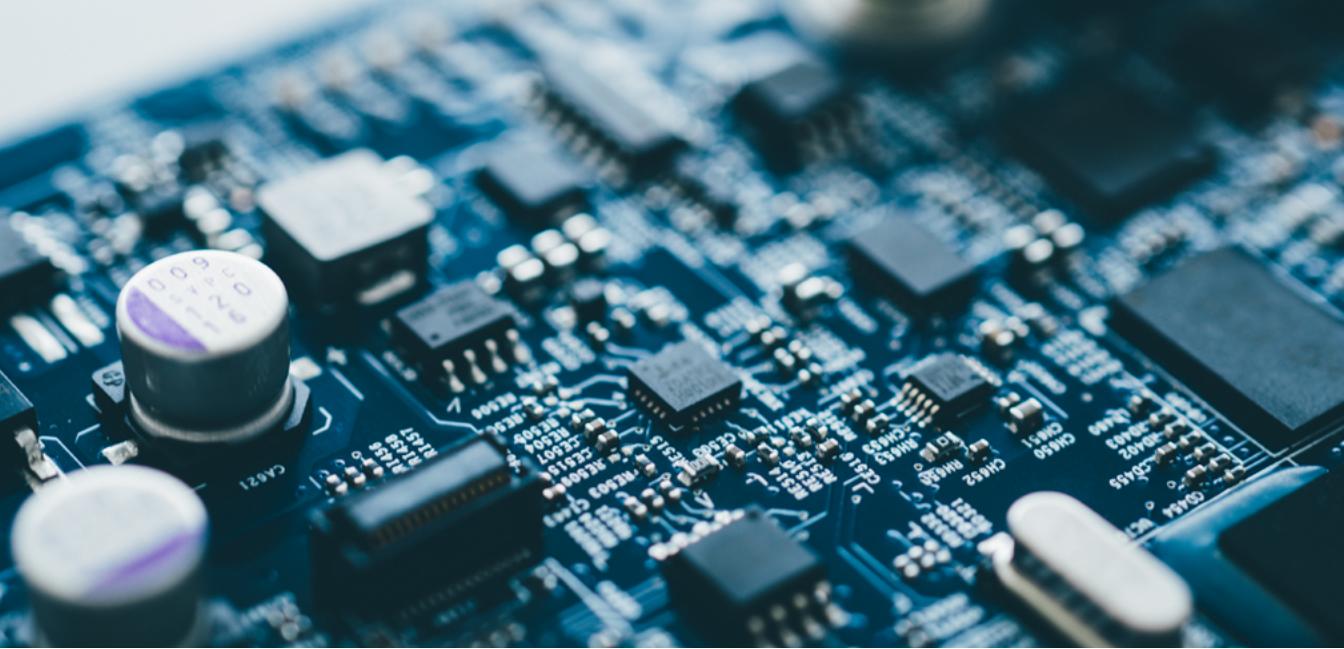
"In parallel with the proliferation of cloud-based applications and services, the enterprise WAN is being rapidly re-architected to cost-effectively deliver new, secure capabilities," said Rohit Mehra, vice president, Network Infrastructure at IDC, in the study.

What SD WAN enables is a true hybrid WAN. With more and more enterprise applications moving into the internet, businesses are adding more commodity internet into the traditional WAN mix to better balance network performance with price but the result is increased overheads in terms of network management, configuration and orchestration. The SD - Software Defined - part of the technology is where benefits are to be exploited in terms of network orchestration.

In the past, for each functional component the customer required, there may well have been a separate CPE appliance: a router from vendor A, a firewall from vendor B and a load balancer from vendor C, for example. Of course, these were all proprietary devices that didn't talk to each other. SD WAN capitalises on the technological gains made by NFV. That is to say a general purpose x86 server at the customer site is capable of running all network component functionality as a software application - a routing application, a firewall and a load balancer all running on this same server. This saves on hardware maintenance costs, but more importantly unlocks the benefits of much deeper automation and integration, giving network managers the opportunity for portal-based changing of firewall rules, modifying load balancing rules, or changing settings in real time.

"In parallel with the proliferation of cloud-based applications and services, the enterprise WAN is being rapidly re-architected to cost-effectively deliver new, secure capabilities"

- Rohit Mehra, vice president, Network Infrastructure at IDC

MAKING THE JUMP TO THE CLOUD

Now that SD WAN is becoming commonplace for many enterprises to connect their branch offices, there are still some challenges to overcome when figuring out how to connect the SD WAN to a cloud service provider. Virtual WAN support is becoming more available from cloud service providers such as Microsoft Azure and AWS, helping organisations get access to the cloud provider's network. But dedicated connections are still essential.

While enterprises have been pondering the reconfiguration of digital assets in terms of location and access requirements, another shift has taken place in terms of network topology. With the adoption of a hybrid infrastructure - that is to say a mixture of assets residing in public clouds and private data centres - becoming the norm, there is an increasing need for these cloud sites to connect to each other.

Often, organisations will want to get connected to specific SaaS applications or x-as-a-service, whether that be infrastructure, platform, or software-as-a-service. Take video conferencing providers for example - they're very sensitive to latency, jitter and congestion and enterprises want to have as good an experience with these technologies as possible. So when they realise that they can orchestrate connectivity from site-to-site and site-to-cloud, they then want to orchestrate connectivity directly to these SaaS providers.

This is where dedicated connectivity comes into its own. Network managers will need to connect enterprise data centers, headquarters to regional centers and branch offices and get private access to public clouds and other available IaaS providers. There may also be requirements to privately connect to apps and services such as video conferencing, unified communications and service desks.

Again, the prevalence of SDN, in offerings such as Console Connect, means that dedicated connectivity is available on demand, delivering automated interconnection provisioning and routing, removing the complexity of configuration so network professionals can focus on their core business instead of managing the network.

THE GROWING IMPORTANCE OF CLOUD-TO-CLOUD CONNECT

While the growing maturity and accessibility of SD WAN may suggest it can (eventually) solve all of a network or operation manager's challenges, there is a use case it is not a good fit for.

Data centre interconnect (DCI), the need to connect one cloud or data centre to another, is at the heart of new global business models. Cloud adoption and digital content delivery and services are driving demand among service providers, but DCI is becoming more crucial for other industries as well. According to the Equinix Global Interconnection Index[4] , global interconnect bandwidth is forecast to grow to over 8,200Tbps by 2021 - a five fold increase, with double digit growth across most industries, from 2017.

According to Ciena[5] , this phenomenon is driven by the appearance of purpose-built, compact, modular systems offering massive scalability to enable global deployments while reducing operational expenses related to data center space, power, and cooling. These systems offer modularity and pay-as-you-grow scalability for lower traffic scenarios, so enterprises can cost-effectively scale connectivity for cloud services and applications.

Telecommunications, manufacturing, and banking are all expected to be large contributors to total interconnect bandwidth by 2021. Smaller traffic areas, such as wholesale, retail, and healthcare, are also expected to grow at double-digit rates leading to the need for higher capacity services over time, according to Ciena.

Traditional networks are increasingly taxed by video traffic, e-sports, rich media and streaming music, increasing demand for DCI connectivity, while the rapid growth of IoT will only exacerbate the bandwidth challenges.

Due to the nature of the traffic moving between data centres (or public clouds), a dedicated, low latency, high bandwidth connection is necessary. Data Centre Interconnect is the fabric that connects and protects traffic across and between multiple data centres. Meanwhile, data centre federation helps content owners manage a distributed topology and serve their applications and content closer to consumers and delivery networks, ensuring consumers and enterprises have highly available, secure access to content, data and services.

BEST OF BREED FOR A HYBRID APPROACH

To meet the demands of digital transformation WANs will follow suit with the rest of the network world and undoubtedly become software defined, allowing the enterprise to utilise both public and private connections with application traffic determining which path is used. The aim being that cheaper internet connections can be used to supplement the existing MPLS network while at the same time freeing up valuable capacity for critical applications.

This will give businesses increased agility, thanks to increased automation and portal-based consumption, while making higher bandwidths affordable not just in key business areas, but also at more remote sites. But MPLS still has a critical role here - there is plenty of indication that while organisations prefer to forward traffic from secure enterprise web applications over the internet, big data applications, storage replication traffic, and enterprise resource planning (ERP) applications are still favoured for the reliable MPLS network.
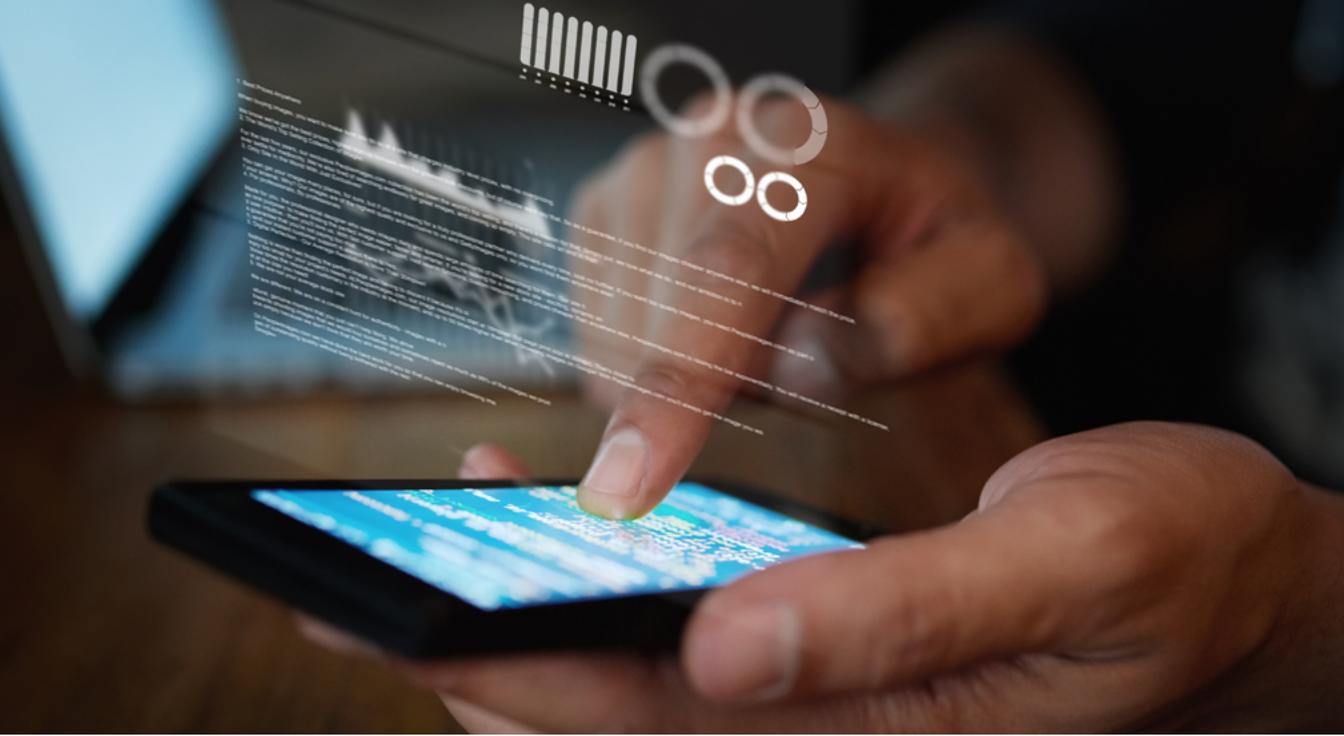
Then of course, for secure, high performance connectivity to the cloud and for connecting multiple private and public data centres together, dedicated connections are a key part of the arsenal. Ultimately, these best-of-breed components are all essential for different reasons. Putting them together can really simplify and complete the global enterprise network, improving performance and efficiency for the business.

As decisions on network procurement become more business driven and less technology driven, infrastructure and IT managers are looking more at how they can plug into their global WAN from anywhere and have application traffic delivered over the most appropriate transport. While still some ways off, the endgame is to move beyond multiple complementary technologies and have all networks merge together into a single service - the connection, revolutionising the way we do business once again.

CONSOLE CONNECT POWERED BY PCCW GLOBAL

Connecting the world from your desktop

PCCW Global is uniquely positioned to shape the future of hybrid networks and give its customers and partners a dynamic foundation for long-term innovation. Built on one of the world's largest MPLS networks, the Console Connect Software-Defined Interconnection® platform is rapidly evolving into a one-touch portal for seamless global connectivity, empowering its customers and partners with tailor-made connections to the world's leading software platforms, data centres and telecommunications networks.

Console Connect's exceptional cloud connectivity is complemented by PCCW Global's SD-WAN service, which optimises traffic across any kind of network connection: IP-MPLS, Broadband, Ethernet and 4G LTE, and delivers data in-country with a host of regional partner networks.

Through Console Connect, PCCW Global is striving toward a best-case scenario for global connectivity, where enterprise essentials of security, privacy, uptime and performance combine with flexible bandwidth-on-demand to give anyone at their desktop access to the digital world, simply, easily and affordably.

ENDNOTES

1 https://www.equinix.com/global-interconnection-index-gxi-report/

2 https://nemertes.com/home-field-advantage-sd-wan-and-mpls/

3 https://www.businesswire.com/news/home/20170928006218/en/IDC-Survey-Finds-Bandwidth-Optimization-Consistent-App

4 https://www.equinix.com/global-interconnection-index-gxi-report/

5 https://www.ciena.com/insights/articles/5-Ways-DCI-Growth-is-Driving-New-Innovations-in-Transport-Networking.html

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CONNECTING NETWORKS, CLOUDS AND BUSINESSES

Console Connect is a Software-Defined Interconnection® platform that makes connecting to cloud-based, business-critical applications simple, predictable and secure. Backed by PCCW Global, one of the world's leading telecommunications groups with a tier 1 global IP network spanning 150 countries, Console Connect helps creating direct and private connections in just a few clicks. The intuitive platform includes all the tools needed to dial bandwidth up or down on-demand and view utilization and connection performance; no more lengthy contracts and long set up times.

Easy as a click! Try it for free here

Have other questions we didn't cover?

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