SD-WAN: Accelerating Agile Operations in Asia-Pacific

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Adrian Ho is responsible for Ovum's Asia-Pacific Enterprise practice and is based in Melbourne, Australia. Adrian's primary focus is on technologies and solutions delivered to multinationals, enterprises, government agencies, and SMEs across the region. This includes WAN services, enterprise mobility solutions, cloud and data centre services, collaboration and social enterprise, security, and other emerging technologies shaping the ICT industry. Adrian also leads the research agenda and customised advisory services for service providers, vendors, and enterprise technology buyers in the region. He works closely with these various communities to help them understand how these changing technologies can shape their business strategy and transform their ICT infrastructure to be more competitive in the dynamic Asia-Pacific region.

Introduction

There has been a rapid increase in interest and adoption of SD-WAN in Asia-Pacific over the past 18 months. As digital transformation accelerates in the region and more MNCs move toward a hybrid IT model, the need to ensure secure, highly agile, and flexible network access to branch offices across the region becomes more pivotal than ever. Strong, resilient networks are becoming core to MNCs' digital investment priorities as they race to build their presence in the region.

This paper will discuss and highlight the following:

• Asia-Pacific will be ground zero for global foreign investments.

• MNCs expanding deep into Asia need to select service providers that can deliver global consistency of services in emerging markets.

• Asia-Pacific is a geographically challenged and diverse region that poses serious issues for WAN, many of which Ovum believes can be resolved by SD-WAN adoption.

• The top drivers of SD-WAN adoption are cost optimisation, fast provisioning, robust redundancy, and application visibility and security.

• SD-WAN will allow the proliferation of branch offices in a cost-effective and manageable way.

• MNCs that build a strong SDN framework and objectives from the start with proper due diligence can successfully transform their networks.

• MNCs should learn the best practices from their peers and factor in the various issues and challenges that SD-WAN will bring.

Why Asia will be the epicentre of global growth

The Asia-Pacific region continues to benefit from increased investment. The International Monetary Fund (IMF) expects Asia's economic growth to remain strong (5.4% in 2018) as the region continues to be the leader of global growth. With Asia's rapidly growing population centres and an emerging, more affluent middle class, there are several opportunities for enterprises looking for international growth. Consumer-centric MNCs have led the charge. This includes Walmart's acquisition of Flipkart in India, and Amazon's and Starbucks' aggressive push into several countries.

According to Ovum's survey, 78% of modern businesses said their companies plan to expand into Southeast Asia (Singapore, Malaysia, Thailand, Indonesia), followed by 68% with plans to expand to major Indian cities. With a growing middle class, strong mobile penetration, and a younger population, the region has all the ingredients for high growth.

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Expansion across Asia-Pacific will bring two unique challenges for MNCs:

- **Global to local requires consistency**: While global MNCs see Asia's fast-growing, populous markets as important for growth and expansion, expanding to new markets requires the careful choosing of service providers with local partnerships and capabilities not only for business and commercial operations but also for IT and network infrastructure. The same is true for Asian startups and businesses with global aspirations that have expanded into new regions as their home market economies mature. Japanese retail giant, Fast Retailing (the parent company of Uniqlo), which is one of the largest retailers in the world, has been expanding outside of Japan over the last few years as growth stagnated in its home market. It and many global enterprises have networks connecting major urban markets in Asia and are looking to invest further or set up new sites outside the major cities in second and third-tier cities in China, India, and Australia. Chinese digital entities including Alibaba, JD.com, and Tencent have been the most aggressive, especially in Southeast Asia in their initial expansion but now also have global agendas.

- **Asia's diverse geography poses challenges to traditional ICT infrastructure**: MNCs are also keen to modernise their Asia-Pacific regional WANs with improved performance of business applications and cloud connectivity infrastructure, and by increasing the agility of the network to respond more quickly to the rapidly changing business conditions in the region. There are also many unique challenges for MNCs that are expanding into the Asia-Pacific region, including the diverse geographical topography and the contrasting maturity of ICT infrastructure between countries. Some western MNCs will be caught unprepared or will be surprised by the wide gap in the maturity of ICT infrastructure between mature markets such as Singapore, Hong Kong, and Japan, and less mature markets such as Indonesia, Vietnam, and the Philippines. Problems for MNCs include the use and management of multiple systems, such as internet and LTE, as well as the real-time allocation of resources and data compliance.

Global to local requires providers with good local knowledge to deliver consistency across geographies
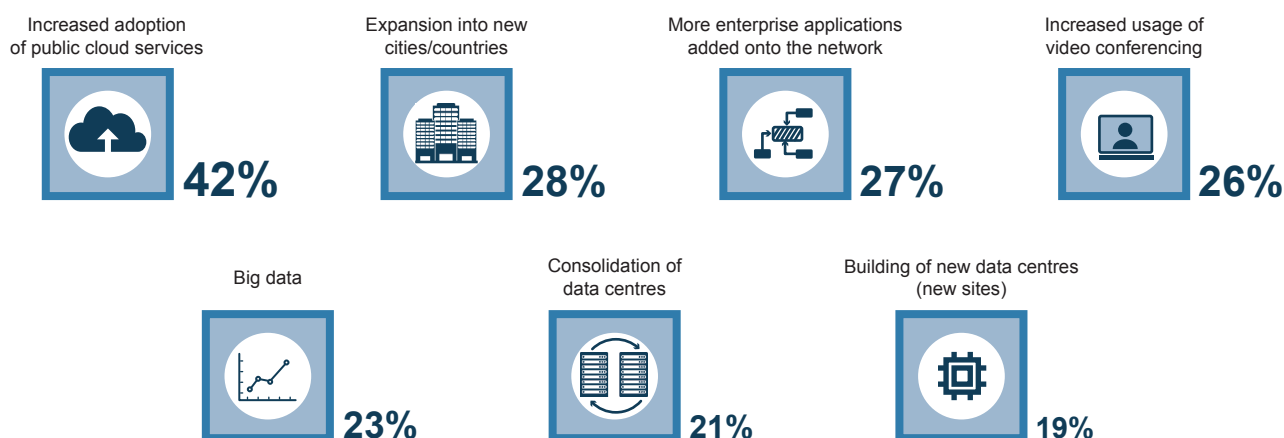
Rapid expansion in Asia involves opening new sites, setting up new datacentres, and expanding to new cities. This factor and the increased adoption of public cloud services (see Figure 1) are the top drivers of network services spending in the Asia-Pacific region. In regional MNC hubs such as Singapore and Hong Kong, big data initiatives have emerged as one of the top key drivers, with more than 30% of MNCs mentioning it as a factor for driving network spending. This could be attributed to both geographies being hubs for big data storage, processing, and analysing.

30%

of MNCs mentioning big data initiatives as a factor for driving network spending

Public cloud adoption remains the top factor driving network investments. Enterprises are demanding secure VPN access with optimal bandwidth to public cloud providers as critical workloads are being migrated to a public cloud environment. Cloud adoption and the other factors discussed above strongly indicate that service providers need to have strong local presence which allows them to provide a consistent level of support globally especially as MNCs push deeper into new markets. Local presence and experience are also essential to help MNCs navigate through the diverse network challenges brought about by topography and maturity of basic network infrastructure especially in less developed Asia. The providers' ability and experience to support all network requirements including cloud and big data needs, consistently are key differentiators for MNCs looking for extended domestic coverage. This is increasingly one of the key

criteria for service provider selection for many MNCs. It's also essential to have a good understanding of the local competitive and regulatory environment.

Figure 1: Primary drivers of network services spending in the next two years

Increased adoption of public cloud services	Expansion into new cities/countries	More enterprise applications added onto the network	Increased usage of video conferencing
42%	28%	27%	26%

Big data	Consolidation of data centres	Building of new data centres (new sites)
23%	21%	19%

Source: Ovum survey 1,800 multinational enterprises

Just over 50% of MNCs that indicated they are switching network service providers in the next 12 months highlighted that one of the main factors driving the change is that local support is unsatisfactory. This proportion rises to more than 70% for MNCs in Singapore. This underscores the importance of working with service providers that have a strong presence and partnerships across the region.

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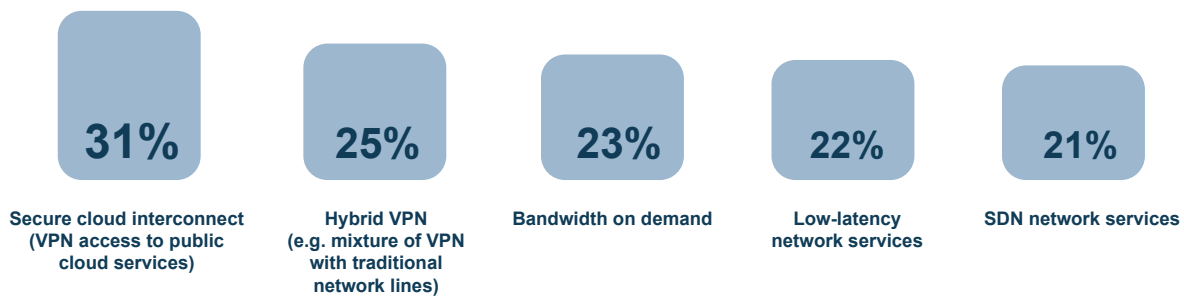## Modern enterprises need agility, flexibility, and a highly resilient network performance

The IT infrastructure of MNCs in Asia-Pacific are evolving rapidly, driven by a revolution in the way services are delivered and the way in which customers are consuming services. As a result, IT operations and customer engagement models have also evolved. High-capacity networks are therefore increasingly critical in Asia as businesses digitise their operations and processes and also provide content and applications to an ever-growing and demanding customer base.

The five key market dynamics to pay attention to

• **Content is king in a digital world**. Software, media and content companies also require huge bandwidth for software and content distribution over the internet to the very large and fast-growing consumer market in Asia-Pacific. The consumption of all media in Asia is fundamentally moving toward near real-time on any mobile device model.

• **Manufacturers are integrating their supply chains**. Asia-Pacific is a major manufacturing hub that has spread beyond China and into Vietnam, Cambodia, and Indonesia. Manufacturers have invested heavily in applications to closely integrate their supply chains to support just-in-time production and have also invested in networks to support these enterprise applications.

- **Retailers are using analytics on the edge to improve foot traffic**. Retailers that have been devastated by the rise of e-commerce are using analytics to drive better foot traffic into their stores by improving the customer experience and delivering personalised marketing. Networks are also supporting near real-time processing of data analytics for retailers. Close to 25% of retailers say that using analytics to better understand their customers is their number-one digital priority in Asia-Pacific.

- **Asian consumers are going cashless**. Mobile payment and banking is an area where even higher growth is predicted. Asia already leads the world on mobile payments, especially in mature markets such as China. The growth potential is significant in Southeast Asia where most consumers use a mobile device for banking and do not access traditional banks. China leads the world in mobile payments with more than $15 trillion in payments in 2017, far exceeding any other country by a very wide margin.

- **Low-latency networks are vital for the banking and finance sector**. These companies rely on high-capacity, low-latency Ethernet services between trading centres in Sydney, Singapore, Hong Kong, and Tokyo, as well as links to global financial centres in the UK and US to facilitate ultra-high-speed movement of data into and out of the region. Over 40% of financial services companies have indicated they will be increasing spending on low-latency networks in the next 12 to 24 months.

Figure 2: Important network services in the next 12 to 24 months

31%	**25%**	**23%**	**22%**	**21%**
Secure cloud interconnect (VPN access to public cloud services)	**Hybrid VPN (e.g. mixture of VPN with traditional network lines)**	**Bandwidth on demand**	**Low-latency network services**	**SDN network services**

Source: Ovum

Cloud is core to many digital efforts by MNCs in the region and MNCs are therefore demanding better network performance on cloud services, such as using private and secure VPN access to public cloud services, and using hybrid VPN networks that rely on MPLS at critical sites and internet access at branches and small sites (see Figure 2). This represents the top network service over the next 24 months.

However, there is a limit to network budgets and while they are being stretched to cope with more enterprise applications moving to the cloud, enterprise demand is growing for more network flexibility including bandwidth flexing, paying for bandwidth, and bursting bandwidth when it's needed and then scaling it back. MNCs are also moving toward a hybrid model.

The major growth area is software-defined networking (SDN), which is moving outside the data centre to the wide area network (SD-WAN). The appeal of SD-WAN is that it's an application-centric overlay network that is transport-agnostic and enables enterprises to set and adjust policies on application routing dynamically in case of congestion. In addition, the entire network can be managed and orchestrated centrally.

SD-WAN will become the enabler for agile operations in Asia-Pacific

SD-WANs are gaining traction in Asia-Pacific because of their appeal to enterprises looking for more flexible and cost-effective WANs that support a mix of transport (internet DSL, Ethernet, MPLS, or LTE), depending on the site requirements. Asian enterprises that have heavy branch density across the region, especially retailers, have led the charge toward SD-WAN adoption. In the Asia-Pacific region, Singapore and Hong Kong continue to lead the region in adoption with more than one-third of enterprises indicating that they have either piloted or have small SDN deployments within the branch. Of MNCs in both countries, 80% are expecting that approximately 30% of their networks will be SDN-managed and driven.

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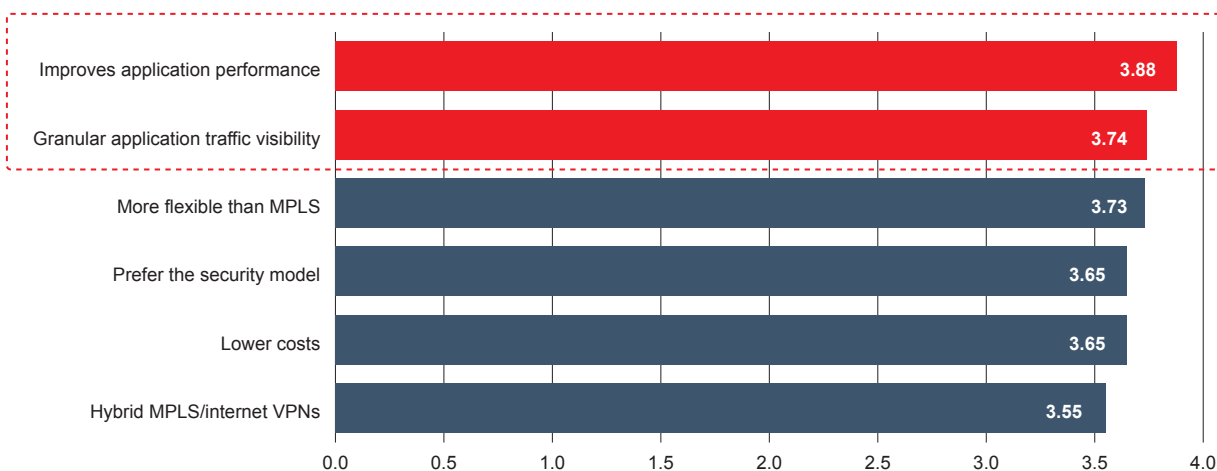
Ovum found that although enterprises are widely familiar with SD-WAN, large-scale migration is uncommon because many businesses are still experimenting with pilots or small targeted deployments.

Enterprises' biggest SD-WAN concerns are related to due diligence issues. As they prepare to increase their investment in these new technologies, businesses need to verify that the platforms are stable, secure, and reliable, and that the performance lives up to its claims.

SD-WAN adoption drivers

- Application performance and application traffic visibility take the top spots in enterprise perceptions of SD-WAN.

- Flexibility and agility was also ranked highly. This allows MNCs with dense branch office networks across the region to use a variety of network access and services beyond MPLS. This is particularly important for MNCs moving further into large countries such as Indonesia, China, and India where local support has been challenging in the past. MNCs that are looking for agility are also considering adopting network function virtualisation (NFV) technologies within the branch as an extension of their virtualisation initiatives.

- Ovum notes that cost savings has dropped as a priority over the years. Like SD-WAN security, however, it remains an important part of the solution because cost optimisation is important for many MNCs that want to hedge their bets as they expand aggressively across the Asia-Pacific region.

- In its discussions with enterprise customers, Ovum similarly found that IT managers are increasingly focusing on thinking about the network in terms of application management, because with greater digitalisation, initiatives are increasingly application-centric.
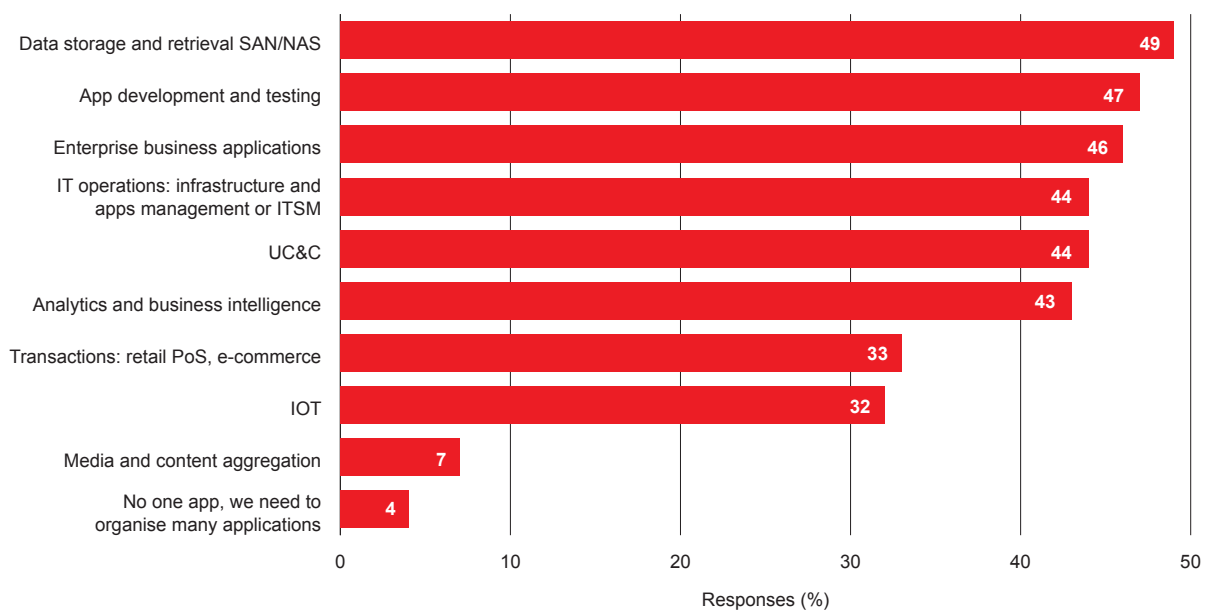
Figure 3: Perceived value of SD-WAN features

Source: Ovum

- In terms of which enterprise applications are driving SD-WAN deployments, it's across the board, with improving data storage and retrieval (storage area networks), network storage systems (NAS), and enterprise business applications in general.

- Another key highlight is that enterprises are giving IT operations, application management, and app development and testing visibility into network traffic where application performance is a top driver. This is also due to the adoption of DevOps within IT teams and the fact that applications are increasingly relying on public cloud infrastructure and highly reliable networks.

- In SD-WAN, the industry is focused on "hot" verticals, such as retail, retail banking, and professional/ business services, because of the number of branch offices and distributed sites. Ovum also found that media and communications and transport/logistics are hotspots for SD-WAN.

Figure 4: Catalysts for SD-WAN deployment

Source: Ovum

Customer expectations and considerations of SD-WANs

MNCs in Asia-Pacific are now past the tipping point of SD-WAN deployment, with many now understanding the major benefits of the technology. This has led MNCs to adopt hybrid WAN (a combination of MPLS and internet VPNs) as the future framework for their global WAN topography. There are several considerations to keep in mind.

Reduce network downtime and improved availability

- With SD-WAN, enterprises that have deployed hybrid networks have more robust redundancy. Managed SD-WAN services dynamically route traffic to the next best performing path in the event of an outage, minimising disruption and, in most cases, providing increased availability. With the increasing use of online channels and e-commerce, any downtime directly translates to a reduction in revenue.

- **Considerations**: Interoperability is a major challenge when SDN technologies are introduced because there will be legacy equipment. Open APIs are therefore critical. Also ensure that the SD-WAN solution has visibility and control features to configure rerouting, dynamic bandwidth, and a total view of the network.

Hybrid network is a cost-effective alternative to pure MPLS

- Enterprises have frequently cited cost savings as one of the most compelling reasons to adopt SD-WAN. SD-WAN simplifies the network by allowing enterprises to build hybrid networks and use multiple access technologies (often more cost-effective than MPLS) in geographically challenged and diverse regions such as Asia-Pacific. SD-WAN enables the management and orchestration of these hybrid network services. It also provides flexibility, which is especially important for businesses with seasonal business cycles.

- **Considerations**: SD-WAN was primarily designed for use on internal corporate networks, but a hybrid model offers integration with different WANs, using other access technologies such as the public internet. Enterprises need to factor in the possibility that network architecture could need some redesign and might require an external third party for assistance.

Intelligent path control and application-driven policy

- Enterprises rate the faster provision of applications and the intelligent path selection of SD-WAN as one of its top attributes so that when a network link is down, mission-critical enterprise applications can be rerouted. Today's digital workplaces require workers to be constantly connected to their enterprise applications, including cloud services such as MSFT365 and Salesforce.

- **Considerations**: Enterprises should consider getting a complete application network assessment to better understand their requirements for monitoring, managing, and analysing critical business applications. An assessment can provide insights to help determine a rerouting policy, load balancing, and application-based policies that will support the enterprise in ensuring that the network is aligned with application priorities.

Application visibility and optimisation

- Managed SD-WAN provides application awareness with deep packet inspection of traffic to identify and monitor each application's performance and bandwidth consumption. Enterprises gain visibility into the traffic running across the network, and can fine-tune the network for business-critical services and resolve network problems. Application-specific acceleration capabilities can be used to improve transaction response times while also reducing WAN bandwidth requirements. SD-WAN application visibility in near real-time supports:
  - Fine-grained policies on a per-application or per-user basis
  - Dynamic application-aware policies with performance-based routing
  - The quality of experience and performance of applications, particularly for the cloud applications that businesses are increasingly dependent on.
  - Application SLA enforcement where SLA management is based on application or service type based on latency, jitter, packet loss, and MOS score for voice.

- **Considerations**: Enterprises should select a solution that meets their requirements for both visibility and control of performance. Many solutions provide visibility with some configuration alternatives to create dynamic or rerouting policies without human intervention.

Security protection is paramount

- Cyberattacks are on the rise everywhere. SD-WAN uses a combination of encryption, segmentation, and security tools including branch-to-branch encryption. This can provide internet access as part of the hybrid network mix. The architecture can also be used in the case of a security breach and can be used to quickly reduce exposure. However, to ensure a holistic view of security, securing the edge is critical, which is possible with SD-WAN edge technology.

- **Considerations**: When applications are first deployed on SD-WAN, IT needs to align security best practices. The best way to do this is to ensure that application-coding standards and routines address the needs of both SD-WAN and non-SD-WAN networks.

SD-WAN is here to stay

As the centre of economic gravity pivots toward Asia-Pacific, the region will become ground zero for MNC investment, with many betting on future growth in the region. Network complexity and challenges will correspondingly increase with expansion, and the digital wave will continue to grow as enterprises invest in cloud, AI/ML, mobility, virtualisation, customer engagement tools, and other technologies. Network resilience will underpin these digital technologies and enterprises want services that are easy to use from partners that are easy to engage. The importance of getting the networks right for any digital enterprise should never be under estimated because falling short could include the failure to reap the full benefits of technology investments resulting in less than satisfactory improvements in business operations, productivity, and customer engagement. There are several best practices that enterprises should consider as they embark on their SD-WAN journey.

- Identify well-defined objectives and usage.
- Objectives and goals should be well-defined from inception.
- Assemble an internal steering committee and a cross-functional team.
- Start off with pilots or tests in less critical network areas. Very few organisations deploy SDN enterprise wide with a big-bang approach.
- Pick the right partner. Because this continues to be a relatively new technology, most organisations do not have the expertise to pull everything together.

Appendix

Methodology

This paper is based on insights from two Ovum surveys, the first a survey of 1,800 multinational decision-makers and enterprise end users across several geographies, and covering their network, cloud, mobility, and collaboration solution requirements. The research included the assessment of vertical needs and key personas in the enterprise buying process.

The second survey was conducted by Ovum with 423 enterprises regarding their companies' SDN and NFV strategies in October and November 2017.

SD-WAN flavours and definitions

As with any new market, there are multiple flavours of SD-WAN. SD-WAN is a single virtual network function (VNF) and can be delivered as part of vCPE or uCPE or on its own via a lightweight appliance and may or may not replace legacy CPEs. SD-WAN together with virtual CPE is already one of the leading use cases of NFV.

Providers are increasingly delivering capabilities including routing (SD-WAN), WAN optimisation, and security (firewall, intrusion detection and prevention systems, unified threat management) as VNFs. These VNFs are often delivered on an x86 server platform.

These software functions can be deployed in NFV service nodes within the provider's network (for example, in front of cloud service connections or internet gateways) or at enterprise locations, using x86-based appliances termed "virtual customer premises equipment" (vCPE).

Software-defined-WAN (SD-WAN) is an overlay of equipment/software that sits at the company's end locations. It automates control over underlying internet/wide area network services and provides a comprehensive, cloud-based management view of applications. Service providers offering these services call them managed SD-WAN. Vendors in the field include Cisco (Viptela), VMWare NSX (Velocloud), and Versa Networks.

Virtual customer premises equipment (vCPE) is the use of industry-standard x86 devices, rather than function-specific appliances, for enterprise network edge functions, including WAN edge routers, WAN optimisation controllers, and security functions such as firewalls.

Network function virtualisation (NFV) is an architecture that involves virtualising network functions and running them on standard equipment (x86 servers). Network functions such as switching, routing, firewalls, or WAN acceleration traditionally ship in a box as dedicated hardware appliances. NFV is a software-only license version of virtual network functions (VNFs) that can be loaded, spun up, and managed in a generic cloud environment such as OpenStack.

Universal customer premises equipment (uCPE) is a piece of hardware purpose-built to host a network/ cloud environment on the customer premises. uCPE can support multiple virtual network functions or VNFs, such as SD-WAN, WAN optimisation, firewalls, SIP trunking, and routing to a branch office via a single grey box.

ABOUT OVUM

Ovum is a leading global technology research and advisory firm. Through its 180 analysts worldwide it offers expert analysis and strategic insight across the IT, telecoms, and media industries. Founded in 1985, Ovum has one of the most experienced analyst teams in the industry and is a respected source of guidance for technology business leaders, CIOs, vendors, service providers, and regulators looking for comprehensive, accurate, and insightful market data, research, and consulting. With 23 offices across six continents, Ovum offers a truly global perspective on technology and media markets and provides thousands of clients with insight including workflow tools, forecasts, surveys, market assessments, technology audits, and opinion. In 2012, Ovum was jointly named Global Analyst Firm of the Year by the IIAR.

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