

***ISG** Provider Lens™

Network - Software Defined Solutions and Services

UK 2019

Quadrant
Report



A research report
comparing provider
strengths, challenges
and competitive
differentiators

Customized report courtesy of:



June 2019

About this Report

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The research and analysis presented in this report includes research from the ISG Provider Lens™ program, ongoing ISG Research programs, interviews with ISG advisors, briefings with services providers and analysis of publicly available market information from multiple sources. The data collected for this report represents information that was current as of June, 2019. ISG recognizes that many mergers and acquisitions have taken place since that time but those changes are not reflected in this report.

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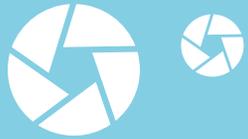
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EXECUTIVE SUMMARY

Network maturity had become analogous to the maturity of computer storage around five to seven years ago and is expected to move in the same direction, i.e. towards virtualisation.

The associated virtual network functions are key to unlock the meaningful automation and orchestration for the network requirements as it can completely do away with racking and stacking of devices as well as changing physical devices if required, thus optimising agility.

SDN/NFV can be considered a disruptive formula to deliver the agility, flexibility and programmability to align with the needs of the increasingly critical applications. Enterprises, however, are sometimes hesitant about the complexity and market hype around SDN, which necessitates a philosophical bend of mind to understand the different stages and generations of SDN technologies available today. As a result, they are seeking an agile and step-by-step approach to reach the “concept of zero”, i.e. moving from traditional to automated, automated to adaptive, and finally from adaptive to autonomous. This will require intent-based networking, which is a foundational layer for making the network autonomous, but there is a dearth of suppliers in this segment.

Furthermore, there is a greater scale of SDN adoption from a data centre perspective than SD-WAN which is counter intuitive. The concept of SDN from a data centre perspective is not business-case driven, but more of a mobility and agility-driven use case. The subsequent challenges are architectural complexity, vendor restrictions, troublesome migration, application mobility and portability constraints, multi-tenant requirements and lack of analytics-based actionable insights.

ISG has singled out a few prominent trends that are visible across the market landscape and have described them below:

Investment protection

Vendor lock-ins are still plaguing the vendor environment from an SDN perspective, and the industry has been exploring solutions that are vendor agnostic. This will make it possible to leverage the existing investments that the customer has made in the past and subsequently improve the overall cost effectiveness.

Dynamic application hosting scenarios

The application hosting landscape is rapidly changing, and multi-cloud network collaboration is necessary to cater to the requirement of richer network collaboration between hybrid and multi-cloud environments. SDN solutions are being crafted to provide a network that offers a centralised controller to support a unified visibility into the entire network infrastructure. For example, while migrating from a private cloud legacy environment to a public cloud, there could be some workload that is hosted on both these environments. This requires real-time network discovery along with a topologic view of applications with the underlying physical and virtual cloud base infrastructure. Furthermore, there would be a requirement to push unified network and security policies across multi-cloud environment. Service providers and system integrators are unanimously directing their efforts to address these complex requirements with SDN infrastructure.

Advanced integration

There are considerable levels of advanced integration for north and south bound as well as east and west-bound network traffic developments. In order to address this challenge of growing complexity, enterprises have started looking beyond discrete platforms to further boost their business efficiency with investments in hyper-convergence infrastructure. The network and overall architecture are demanding a single platform that can offer technology management for the entire stack, irrespective of it being compute, storage or network.

Policy structuring for changing enterprise environment: Telecom service providers (TSPs) are trying to align their business strategies with the changing user preferences for a mobile network over Wi-Fi. They are also trying to leverage the opportunities from policies, such as BYOD, that are required for the hybrid mix of people in an enterprise. While some of the applications that stakeholders want to use on mobile are offloaded on Wi-Fi at low or no cost, there should be a level of filtering for separating personal or social usage from business usage. Enterprises are very strict about the devices that are allowed on the private slice and most of the policies are driven in that direction. While the use of SIM cards in the private slice is restricted to a certain number, there is a requirement of service management (policy through SIM card). This necessitates the deployment of a thorough policy engine and policy switching and many TSPs are working on this.

5G developments driving SDx technology adoption: With the developments on the 5G front, TSPs have become more flexible to changes and have reportedly been approaching service providers and system integrators for deployments. The deployments often start

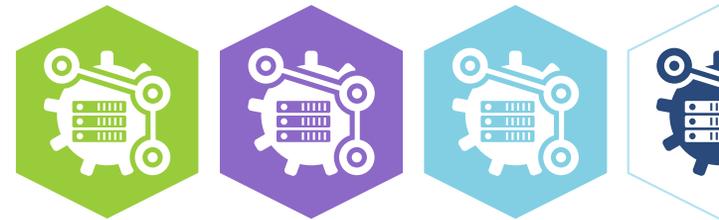
with a current 4G followed by LTE, thus preparing the ground for 5G. LTE has been leading 5G enablement, and the associated physical provisioning has been taking place simultaneously. Depending on the number of sites and end users, it can take weeks or months. On the other hand, there is a requirement for enterprises to have the changes implemented instantly.

Enterprises are trying to reduce the cost by adding on to the internet pile and prioritising the applications as per the bandwidth required. Physical infrastructure should be provisioned if there is a requirement of raw bandwidth. SDN resolves the bottleneck by allowing the applications to re-route the required bandwidth in order to balance the priority of the functions to be executed by the different applications.

These aspects, together with cloud networks, have been driving significant changes to networks and their operations over the past 30 years. Some telecommunication service providers, such as AT&T, have announced plans to make at least 75 percent of their networks SDN-compliant and functional by 2022. Others have introduced SD-WAN implementations to reap benefits in a shorter term.

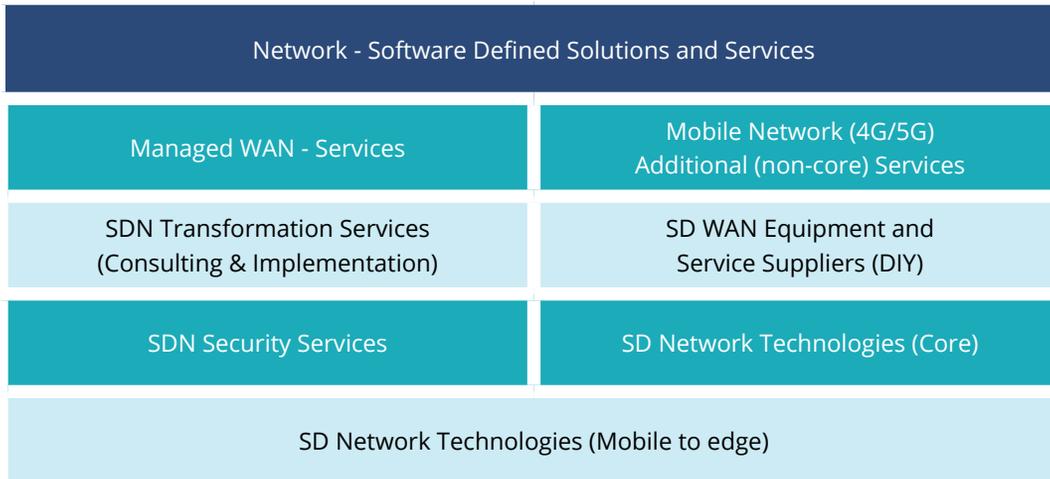
Many service providers that are reviewed in this study are involved in pilot projects and are often converting them into production-level deployments. Some have already completed such activities or have many demonstrated instances of doing so on behalf of their clients. This progression, coupled with the relative newness of SDN as a whole, leads ISG to expect that many of the companies that are currently categorised as either Product Challengers or Market Challengers in this study will be able to improve their positioning over the course of the year to enter leadership positions in their respective segments.

It must be noted that significant volatility exists in the constellation of market providers, partly due to the multitude of mergers and acquisitions that occurred during the last 18 months. This is set to continue and may even increase during the remainder of 2019 as software-defined networking becomes mainstream.



Introduction

Simplified illustration



Source: ISG 2019

Definition

The ISG Provider Lens™ study examines the different kinds of global network offerings related to SDN, SD-WAN and associated security, core-branch and mobility service offerings related to those segments in the UK. It also assesses the more traditional managed WAN market offerings. For users, both markets are extremely important. This study accounts for changing market requirements and provides a consistent market overview of the segments. It also offers concrete decision-making support to help user organisations to evaluate and assess the offerings and performance of service providers.

The areas described in the following sections are associated with SDN and more traditional managed WAN provisioning.

Definition (cont.)

Scope of the Report

Managed WAN Services

Managed WAN services cover the features and functionality that carriers offer in their WAN and at the customer point of demarcation. They are a collection of value-added services (VAS) that offer monitoring, reporting, security and outsourced customer-premises equipment (CPE) functions. Many enterprises see managed WAN services as a means to outsource IT functions and purchase them along with consulting and professional services to assess, design and implement their enterprise networks. At the basic level, the managed WAN services offered by carriers provide monitoring and alerts for critical problems such as network outages. Higher tiers of service can add configuration management, proactive troubleshooting and trouble resolution, service-level agreement (SLA) management, more sophisticated and granular monitoring and reporting, on-the ground CPE installation and hardware support to ensure that the CPE software is up to date and configured correctly, and the overall lifecycle management. This section should cover all the major suppliers of managed WAN services for enterprises. It covers all the major suppliers of managed WAN services for enterprises.

Mobile Network (4G/5G) Additional (non-core) Services

Fifth generation (5G) mobile networks and wireless systems are the next telecommunication standards after the current long-term-evolution (LTE) or 4G technology, operating in the millimeter wave bands (28, 38, and 60 GHz). It is aimed at a higher capacity than the current 4G, which would allow for an increased density of mobile broadband users and support more device-to-device, reliable and massive machine communications. It is also aimed at lowering latency and battery consumption compared to 4G equipment and is targeted at the internet of things (IoT). This segment covers specific mobility-targeted services or solutions, applications, management systems and methods, end-device control and management and related services. These services are either offered by service providers or suppliers as discrete solutions or as modules that will integrate with or rely on SDN or SD-WAN.

This section should cover all the suppliers of these additional services that make use of software-defined systems via LTE/4G or 5G delivery. **It does not cover the core licensed mobile telephony/data services themselves.**

Definition (cont.)

SDN Transformation Services (Consulting & Implementation)

SDN and SD-WAN provides the benefits of SDN technology to traditional hardware-based networking and is considered complementary to NFV. It is an overlay architecture with a networking foundation that is much easier to manage than legacy WANs. It essentially moves the control layer to the cloud and in the process, centralises and simplifies network management. This overlay design abstracts software from hardware, enabling network virtualisation and making the network more elastic. SD-WAN architecture reduces recurring network costs, offers network-wide control and visibility, and simplifies the technology with zero-touch deployment and centralised management. The key aspect of the SD-WAN architecture is its

ability to communicate with all network endpoints without the need for external mechanisms or additional protocols. Suppliers have been increasingly active as advisors/consultants as well as implementation enactors of managed services provision and to supply complete solutions to enterprises. Consulting companies, large vendors and managed network services providers have all been actively involved in offering SD-WAN as managed service packages in this space (independently or as part of partnership/consortium deals).

This quadrant should cover all the advisory/consulting, hardware and software, management/reporting tools, applications and services associated with delivering SD-WAN to enterprises, starting from consulting to managed services delivery.

Definition (cont.)

SD-WAN Equipment and Service Suppliers (DIY)

SD-WAN provides the benefits of SDN technology to traditional hardware-based networking. It has an overlay architecture with a networking foundation that is much easier to manage than legacy WANs. It essentially moves the control layer to the cloud and then centralises and simplifies network management. This overlay design abstracts software from hardware, enabling network virtualisation and making it more elastic. SD-WAN architecture reduces recurring network costs, offers network-wide control and visibility, and simplifies the technology with zero-touch deployment and centralised management. The key aspect of the SD-WAN architecture is its ability to communicate with all network endpoints without the need for external mechanisms or additional protocols. Suppliers have been active in selling directly SD-WAN solutions to enterprises for their “DIY” (enterprise owned and non-managed) implementations. They are also partnering more with licensed telco/ service providers to offer delivery packages in this space.

This section should cover all hardware and software, management/reporting tools, applications and services associated with delivering SD-WAN for enterprise-owned operations.

SDN Security Services

An SD-WAN is a logical overlay network that encompasses any WAN transport — public, private, even LTE/4G or 5G, and is independent of any single carrier or service provider. The overlay occurs between any two SD-WAN nodes, called edges, that can be deployed at the branches and/or data centres. A cloud-delivered variation extends the overlay to any cloud point-of-presence (PoP) or data centre. A key value in security services for the network is that SD-WAN unifies secure connectivity over all transports while supporting transport independence. There is no need to use/provide a different security mechanism for different transport types or to depend on the transport provider for their secure network. The network overlay can support a wide range of security capabilities and can enhance its inherent security capabilities by adding advanced security systems in the form of discrete overlays, services or applications. It can be managed both automatically and centrally as well as at local levels.

This section should cover all suppliers of software and/or hardware associated with additional and discrete security services based on SDN or SD-WAN systems.

Definition (cont.)

Network Technologies Suppliers (Core)

SDN technology is a networking approach that eliminates the complex and static nature of legacy distributed network architectures by using a standards-based software abstraction layer between the network control plane and underlying data forwarding plane in both physical and virtual devices. It is related to NFV but is fundamentally different in terms of end results and ability, although both approaches are mutually supportive. A network virtualisation program eliminates the conventional shortcomings and provisioning tasks related to legacy network segmentation technologies, such as switched VLANs, routed subnets, and firewall access lists (ACLs). An SDN-based network virtualisation application supports arbitrary assignment of IP/MAC addressing schemes, automates network configuration tasks and enforces the expected network segmentation. Data plane abstraction provides a standards-based approach to dynamically provide the network fabric from a centralised (or distributed) software-based controller or multiple controllers.

SDN technologies enable improvements in network agility and automation, while substantially reducing the cost of network operations compared to traditional network deployments. The implementation of an industry-standard data plane abstraction protocol (such as OpenFlow) allows the use of any type and brand of data plane devices as all the underlying network hardware is addressable through a common abstraction protocol. It allows the dynamic and automatic provisioning of virtual network segments and virtual routing services on both physical and virtual networking devices. Security policies can be automatically provisioned via a cloud orchestration platform, such as OpenStack, or through workloads assigned according to attributes, such as MAC, subnet, VLAN and IP protocol, in an automated manner.

The companies covered in this segment of this study will be vendors of SDN and NFV equipment and core services that are purchased either directly by enterprises or by service providers for specific enterprise projects.

Definition (cont.)

Network Technologies Suppliers (Mobile to Edge)

SDN technologies enable improvements in network agility and automation, while substantially reducing the cost of network operations when compared to traditional network deployments. The implementation of an industry-standard data plane abstraction protocol, such as OpenFlow, allows the use of any type and brand of data plane devices as all the underlying network hardware is addressable through a common abstraction protocol. It also allows for the dynamic and automatic provisioning of virtual network segments and virtual routing services on both physical and virtual networking devices. Additionally, all edge components can be managed in the same manner as core and SD-WAN components. With software-defined access out to branch/edge, including all CPE (referenced as virtual CPE or vCPE in SDN terms) and associated Wi-Fi networks, access points (APs), software-defined mobile networks (SDMN), SD-LAN (includes both wireless [SD-WLAN] or mobile [SD-WMLAN], the management protocol can be further improved.

This segment assesses all the main vendors and service providers (such as telcos) in the SD-LAN space, including vCPE, SDMN and SD-LAN specific vendors.

In this independent study, following the format of our internationally successful Provider Lens™ series, ISG sets out to deliver a comprehensive but defensible research program based on an extensive evaluation of criteria that cover all major telcos and service providers of relevance in the UK.

Provider Classifications

The ISG Provider Lens™ quadrants were created using an evaluation matrix containing four segments, where the providers are positioned accordingly.

Leader

The “leaders” among the vendors/providers have a highly attractive product and service offering and a very strong market and competitive position; they fulfill all requirements for successful market cultivation. They can be regarded as opinion leaders, providing strategic impulses to the market. They also ensure innovative strength and stability.

Product Challenger

The “product challengers” offer a product and service portfolio that provides an above-average coverage of corporate requirements, but are not able to provide the same resources and strengths as the leaders regarding the individual market cultivation categories. Often, this is due to the respective vendor’s size or their weak footprint within the respective target segment.

Market Challenger

“Market challengers” are also very competitive, but there is still significant portfolio potential and they clearly lag behind the “leaders.” Often, the market challengers are established vendors that are somewhat slow to address new trends, due to their size and company structure, and have therefore still some potential to optimize their portfolio and increase their attractiveness.

Contender

“Contenders” are still lacking mature products and services or sufficient depth and breadth of their offering, while also showing some strengths and improvement potentials in their market cultivation efforts. These vendors are often generalists or niche players.

Provider Classifications (cont.)

Each ISG Provider Lens™ quadrant may include a service provider(s) who ISG believes has a strong potential to move into the leader's quadrant.

Rising Star

Rising stars are mostly product challengers with high future potential. When receiving the “rising stars” award, such companies have a promising portfolio, including the required roadmap and an adequate focus on key market trends and customer requirements. Also, the “rising stars” has an excellent management and understanding of the local market. This award is only given to vendors or service providers that have made extreme progress towards their goals within the last 12 months and are on a good way to reach the leader quadrant within the next 12-24 months, due to their above-average impact and innovative strength.

Not In

This service provider or vendor was not included in this quadrant as ISG could not obtain enough information to position them. This omission does not imply that the service provider or vendor does not provide this service.

Network - Software Defined Solutions and Services - Quadrant Provider Listing 1 of 5

	Managed WAN Services	SDN Transformation Services (Consulting & Implementation)	SD-WAN Equipment and Services (DIY)	Mobile Network (4G/5G) Additional (non-core) Services	SDN Security Services	SD Network Technologies (Core)	SD Network Technologies (Mobile to Edge)
Aerohive	● Not in	● Not in	● Not in	● Not in	● Not in	● Product Challenger	● Not in
Apcela	● Contender	● Contender	● Product Challenger	● Product Challenger	● Product Challenger	● Product Challenger	● Product Challenger
Arista	● Not in	● Not in	● Not in	● Not in	● Market Challenger	● Product Challenger	● Not in
Aryaka	● Not in	● Not in	● Market Challenger	● Not in	● Market Challenger	● Market Challenger	● Not in
AT&T	● Product Challenger	● Not in	● Not in	● Not in	● Not in	● Not in	● Not in
BT	● Leader	● Leader	● Product Challenger	● Leader	● Leader	● Product Challenger	● Leader
Cato	● Not in	● Not in	● Product Challenger	● Not in	● Not in	● Product Challenger	● Product Challenger
CenturyLink	● Product Challenger	● Product Challenger	● Product Challenger	● Product Challenger	● Not in	● Not in	● Product Challenger
Cisco	● Not in	● Not in	● Leader	● Not in	● Product Challenger	● Leader	● Leader
Claranet	● Product Challenger	● Not in	● Not in	● Not in	● Not in	● Not in	● Not in
Colt	● Product Challenger	● Not in	● Not in	● Not in	● Not in	● Not in	● Not in
Computacenter	● Product Challenger	● Market Challenger	● Market Challenger	● Not in	● Product Challenger	● Product Challenger	● Not in
Dell EMC	● Not in	● Not in	● Leader	● Not in	● Not in	● Product Challenger	● Not in

Network - Software Defined Solutions and Services - Quadrant Provider Listing 2 of 5

	Managed WAN Services	SDN Transformation Services (Consulting & Implementation)	SD-WAN Equipment and Services (DIY)	Mobile Network (4G/5G) Additional (non-core) Services	SDN Security Services	SD Network Technologies (Core)	SD Network Technologies (Mobile to Edge)
D-Link	● Not in	● Not in	● Not in	● Not in	● Not in	● Not in	● Contender
EE	● Not in	● Not in	● Not in	● Market Challenger	● Not in	● Not in	● Not in
Ensign	● Market Challenger	● Not in	● Not in	● Not in	● Not in	● Not in	● Not in
Ericsson	● Not in	● Product Challenger	● Product Challenger	● Not in	● Not in	● Product Challenger	● Product Challenger
Extreme Networks	● Not in	● Not in	● Not in	● Not in	● Product Challenger	● Product Challenger	● Product Challenger
Fortinet	● Not in	● Not in	● Not in	● Not in	● Product Challenger	● Not in	● Not in
GTT	● Product Challenger	● Not in	● Not in	● Not in	● Product Challenger	● Not in	● Not in
Harman	● Product Challenger	● Product Challenger	● Product Challenger	● Product Challenger	● Rising Star	● Product Challenger	● Product Challenger
HCL	● Leader	● Leader	● Not in	● Not in	● Leader	● Leader	● Product Challenger
HPE	● Not in	● Contender	● Contender	● Not in	● Not in	● Contender	● Product Challenger
Huawei	● Not in	● Not in	● Contender	● Not in	● Not in	● Contender	● Not in
IBM	● Leader	● Leader	● Leader	● Leader	● Leader	● Leader	● Leader
Infosys	● Rising Star	● Leader	● Rising Star	● Product Challenger	● Leader	● Leader	● Product Challenger

Network - Software Defined Solutions and Services - Quadrant Provider Listing 3 of 5

	Managed WAN Services	SDN Transformation Services (Consulting & Implementation)	SD-WAN Equipment and Services (DIY)	Mobile Network (4G/5G) Additional (non-core) Services	SDN Security Services	SD Network Technologies (Core)	SD Network Technologies (Mobile to Edge)
Juniper	● Not in	● Not in	● Not in	● Not in	● Not in	● Market Challenger	● Not in
Logicalis	● Product Challenger	● Contender	● Not in	● Not in	● Not in	● Not in	● Not in
Netgear	● Not in	● Not in	● Not in	● Not in	● Not in	● Not in	● Market Challenger
NTT	● Product Challenger	● Not in	● Product Challenger	● Product Challenger	● Not in	● Not in	● Product Challenger
Nuage Networks (Nokia)	● Not in	● Product Challenger	● Product Challenger	● Not in	● Not in	● Not in	● Not in
Orange Business Services	● Leader	● Leader	● Leader	● Leader	● Leader	● Leader	● Leader
Prodapt	● Product Challenger	● Product Challenger	● Product Challenger	● Contender	● Product Challenger	● Product Challenger	● Product Challenger
Riverbed	● Not in	● Not in	● Product Challenger	● Not in	● Not in	● Not in	● Not in
Riedel Networks	● Contender	● Not in	● Not in	● Not in	● Not in	● Not in	● Not in
Silver Peak	● Not in	● Not in	● Product Challenger	● Not in	● Not in	● Not in	● Not in
Sprint	● Product Challenger	● Not in	● Product Challenger	● Not in	● Product Challenger	● Not in	● Not in
Symantec	● Not in	● Not in	● Not in	● Not in	● Product Challenger	● Not in	● Not in
Talari	● Not in	● Not in	● Product Challenger	● Not in	● Not in	● Not in	● Not in

Network - Software Defined Solutions and Services - Quadrant Provider Listing 4 of 5

	Managed WAN Services	SDN Transformation Services (Consulting & Implementation)	SD-WAN Equipment and Services (DIY)	Mobile Network (4G/5G) Additional (non-core) Services	SDN Security Services	SD Network Technologies (Core)	SD Network Technologies (Mobile to Edge)
TCS	● Leader	● Rising Star	● Rising Star	● Product Challenger	● Leader	● Not in	● Not in
Tech Mahindra	● Leader	● Product Challenger	● Product Challenger	● Product Challenger	● Product Challenger	● Not in	● Product Challenger
Telefónica (O2)	● Market Challenger	● Not in	● Not in	● Market Challenger	● Not in	● Not in	● Not in
TP-Link	● Not in	● Not in	● Not in	● Not in	● Not in	● Not in	● Contender
T-Systems	● Leader	● Leader	● Product Challenger	● Leader	● Leader	● Leader	● Leader
Unisys	● Not in	● Market Challenger	● Not in	● Not in	● Not in	● Not in	● Not in
Virgin	● Product Challenger	● Not in	● Not in	● Market Challenger	● Not in	● Not in	● Not in
VMware	● Not in	● Not in	● Leader	● Not in	● Product Challenger	● Not in	● Not in
Vodafone	● Leader	● Leader	● Not in	● Leader	● Leader	● Leader	● Leader
Wipro	● Leader	● Leader	● Product Challenger	● Rising Star	● Leader	● Rising Star	● Rising Star
Zayo Group	● Not in	● Not in	● Not in	● Not in	● Contender	● Not in	● Not in
Zeetta Networks	● Not in	● Not in	● Not in	● Not in	● Contender	● Not in	● Not in



Network - Software Defined Solutions and Services Quadrants

MANAGED WAN SERVICES

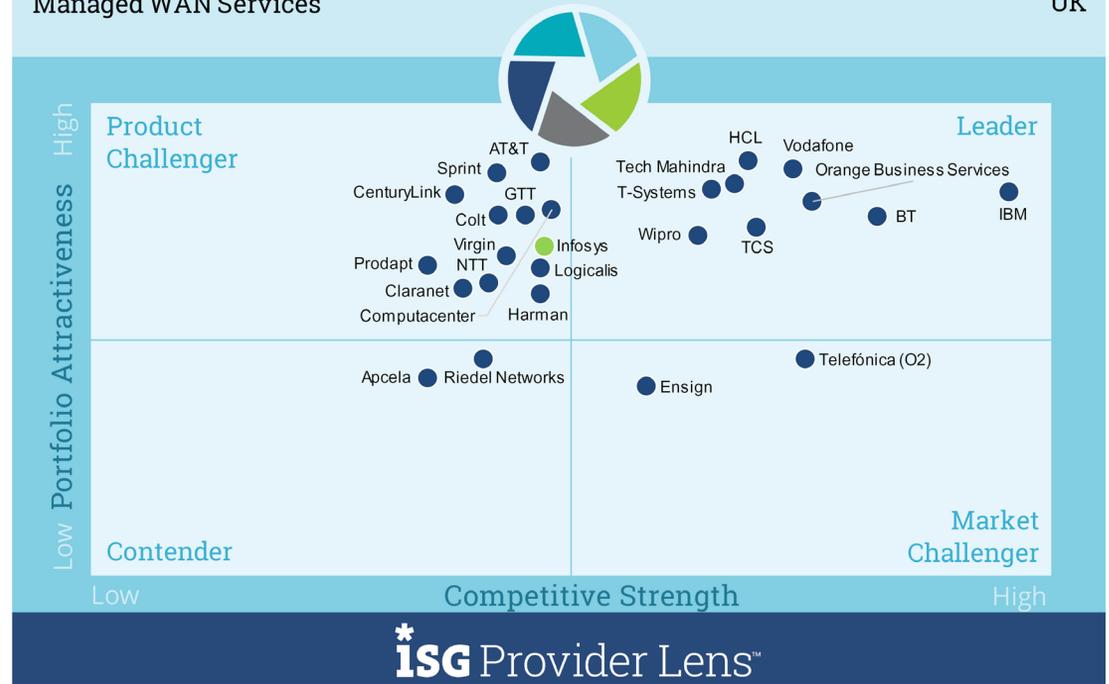
Definition

Managed WAN services are increasingly described as traditional in light of the SD-WAN offensive globally. A managed WAN covers the features and functionality that carriers offer in their network and at the customer point of demarcation. They are a collection of value-added services that include monitoring and reporting, security and outsourced customer-premises equipment (CPE) functions. Many enterprises choose managed WAN services to outsource IT functions and purchase them along with consulting and professional services to assess, design and implement their enterprise networks.

At the basic level, managed WAN services offer monitoring and alerts during critical problems such as network outages. They also include configuration management, proactive troubleshooting and trouble resolution, service-level agreement (SLA) management, on-the-ground equipment installation, hardware support and the overall lifecycle management.

Network - Software Defined Solutions and Services Managed WAN Services

2019
UK



Source: ISG Research 2019

MANAGED WAN SERVICES

Definition (cont.)

Managed WAN services cover the scope of services and functionalities of various network solutions, including core solutions such as the MPLS protocol for IP-VPN services and multiple access technology. They allow end customers to access resources for network operation centres (NOCs), disaster recovery, active fault clearance and customer portals.

Traditional managed WAN services, often based on MPLS, have come under pressure due to the growing prominence and prospects of SD-WAN which would continue over the next two years. MPLS is the most widely used WAN technology in companies with distributed locations and is being developed continuously. Today, it is possible to prioritise types of applications depending on their respective jitter, packet loss and deceleration to allow a performance boost in individual applications based on customer requirements or policies. While MPLS VPNs provide certain advantages in connecting locations, they are an

expensive medium when it comes to connecting mobile devices, especially with the growth of traffic that is not business critical. Mobile usage is also exploding due to the internet of things (IoT), the growing mobile workforce and the addition of decentralised locations within enterprises. Furthermore, enterprises are demanding networks to provide more flexibility and business-oriented SLA metrics such as performance per application and quality of experience. Such demands are causing a strain and affecting the smooth functioning of traditional WAN services and managed services. These newer flexibility and metric requirements call for a more flexible infrastructure compared to what MPLS networks provide, making SDN increasingly relevant.

ISG does not expect MPLS networks to be replaced by alternate software-driven networks any time soon. Instead, these networks would be increasingly complemented by SD-WAN technologies during 2019–2021.

MANAGED WAN SERVICES

Eligibility Criteria

- Product/service portfolio coverage, completeness and scope
- Ability to deliver and manage all hardware and software aspects
- Management capability for the orchestration and control of the overall architecture
- Stability and roadmap planning
- Reference customer/site volume in deployment
- Competitiveness of offerings and commercial terms

Observations

- **IBM** has a vast portfolio of its own network, service and security solutions. It is also expanding its robust partner ecosystem of major UK players in the managed network, SDN, multi-cloud network and multi-network integration space.
- **Tech Mahindra**, with its legacy connection with BT, has historically held a commanding position in the UK. It is globally known for its managed WAN and SD-WAN offerings at competitive price points with advanced service delivery. The firm has leveraged its experience from many SD-WAN transition programs worldwide to build a strong portfolio of off-the-shelf framework offerings.
- **Orange Business Services** covers a large spectrum of managed network services across the UK and globally. Its MPLS, SD-WAN and internet services can be integrated or combined with managed security, WAN optimisation, application visibility services along with an option of deployment via appliance or on virtual network functions (VNFs).
- **BT** is the incumbent regional player in the UK and has a high-quality global backbone, coupled with a commitment to continue delivering legacy managed WAN services. It is gradually expanding into SDN and SD-WAN services as well as managed services for its domestic and international client base.

MANAGED WAN SERVICES

Observations (cont.)

- **T-Systems** provides high quality service in the UK, throughout Europe and beyond. It covers more than 180,000 sites through over 2,500 networks, delivering a four-fold redundancy at a platform level. T-Systems has a diverse portfolio of bundled and standalone offerings for specific industry verticals and enterprise-wide packages.
- **Wipro** managed network services cover both off-the-shelf solutions and customised client-specific solutions in the UK and globally. These range from design, development, deployment and maintenance of the managed network.
- **Vodafone** uses its home market advantage to acquire and retain its client base in the UK. It is progressively moving a significant part of its portfolio towards SD-oriented services through in-house services and partnerships.
- **TCS** is one of the prominent providers of managed services in the UK. It has a spectrum of offerings for enterprises of different sizes and several industries.
- **HCL** has adopted a highly productised approach for serving clients in the managed WAN domain. It has crafted a consultative strategy with a significant level of customisation for clients moving to the SD architecture.
- **Infosys** (Rising Star) offers legacy WAN solutions as well as fully managed SD-WAN services that provide visibility, control, security and a significant reduction in WAN operational cost.

WIPRO

Overview

Wipro is an Indian multinational information technology, consulting and business process services provider. It has around 171,425 employees and generates \$8.4 billion in revenue.

Strengths

End-to-end consulting-led approach to SDx migration: Wipro typically approaches customers with a vendor-neutral consulting approach in order to give them visibility on how TSPs are bringing their SD-WAN into the market. Once they realise the value of SDN, how it can align with, and add value to the existing business model, Wipro delivers a POC or a pilot and gradually helps them migrate to the SD environment and operate SD-WAN. The firm augments the flexibility of SD-WAN with innovative and highly customisable as-a-service models, which enables enterprises to pick services offered under a managed service wrap around.

NetOps 2.0 to support SD-oriented applications: NetOps is Wipro's framework for network automation and can be considered as a DevOps model. With new generation applications, associated new-age solutions such as SD-WAN are unable to fit in the old models, necessitating an intense level of programmability. Wipro has designed the NetOps 2.0 to bring in the required level of programmability by using the application program interface (API) and enhancing multiple SDx systems through standard APIs

Strong partnership ecosystem: Wipro has maintained a robust partner ecosystem across the SD-WAN value chain not only with large telecoms or technology developers and product suppliers but also with SMEs (such as CloudGenix, Big Switch and NetBrain). This versatile collaboration bionetwork is a tactical move towards strengthening Wipro's go-to-market strategy with competence in niche areas such as greater levels of network automation through NetBrain. The firm maintains a deep partnership with telcos that provide WAN connectivity, enabling it to offer an end-to-end solution to enterprise customers from a network perspective.

Caution

Wipro is yet to zero in on a concrete integration solution between Wipro WANTAGE and WANFreedom.



2019 ISG Provider Lens™ Leader

Wipro has a significant and reliable managed services portfolio for traditional WAN and SD-WAN in the UK along with a vast enterprise client base.

MOBILE NETWORK (4G/5G) ADDITIONAL (NON-CORE) SERVICES

Definition

5G mobile networks or wireless systems are the next telecommunications standards after the current long-term evolution (LTE) or fourth generation (4G) wireless system technology, operating in the millimeter wave bands (28, 38, and 60 GHz). It is aimed at providing higher capacity than current LTE/4G, thereby allowing a higher density of mobile broadband users, more reliability and support for device-to-device and massive machine communications. It is also aimed at lowering latency and battery consumption compared to LTE/4G equipment and is targeted at mass internet of things (IoT) implementations.

However, this next-generation standard is being challenged by the increase in both speed and functionality of LTE/4G networks and equipment and their current rather than future availability. 5G coverage is planned to reach almost 73 percent of the European population by the end of 2025, although these plans are currently far from concrete. Capex spending is not expected to be a priority for most carriers before 2020–2021. Many pilots and proof of concept (POC) projects for specific use cases are planned for 2019–2021, resulting in most enterprises considering 5G for only long-term strategic planning.

Network - Software Defined Solutions and Services
Mobile Network (4G/5G) Additional (non-core) Services

2019
UK



Source: ISG Research 2019

MOBILE NETWORK (4G/5G) ADDITIONAL (NON-CORE) SERVICES

Definition (cont.)

The combination of improved network coverage, connected device proliferation (including IoT-type devices), higher speed demands and capabilities, enhanced service quality and reliability plus attractive package price points for users continues to drive the growth of mobile products and services. Mobility is also becoming increasingly important for enterprises.

ISG research has showed that around 85 percent of all employed adults in the US and EMEA use their mobile services and devices for both business and personal purposes. However, recent multi-operator surveys in those regions have indicated that only 41 percent of mobile users were aware that they require enterprise-specific security and policy applications or enterprise software. This statistic is increasing rapidly due to the increase in enterprise-specific use cases and innovations based on new technologies and services. According to the GSMA, mobile data traffic is expected to grow at a CAGR of 42 percent to 15.5–16 exabytes per month during 2016–2022, partly attributed to these trends.

Operators are still investing heavily in LTE/4G and are actively rolling out LTE/4G to populations globally. In many circumstances, LTE/4G applications and bandwidth are already beginning to deliver results similar to those that are expected from 5G. This has raised concerns among companies and analysts on when (or whether) the enterprise adoption of 5G will become a reality.

This segment covers specific mobility-targeted services or solutions, applications, management systems and methods, end-device control and management and related services. These services are either provided by service providers or suppliers as discrete solutions or as modules that will be integrated with or rely on SDN or SD-WAN. **This section does not cover the core licensed mobile telephony/data services themselves.**

MOBILE NETWORK (4G/5G) ADDITIONAL (NON-CORE) SERVICES

Eligibility Criteria

- Product/service portfolio coverage and scope
- Ability to deliver as a value-added service in a 4G/5G environment using software-defined methods
- Understanding of the overall market area and innovations/contributions to that area
- Scope of partnerships and offerings integration into a coherent solution delivery to customer
- Stability and roadmap planning
- Reference customer/solutions in POC/post pilot/commercial deployment
- Competitiveness of offering and types of commercial terms

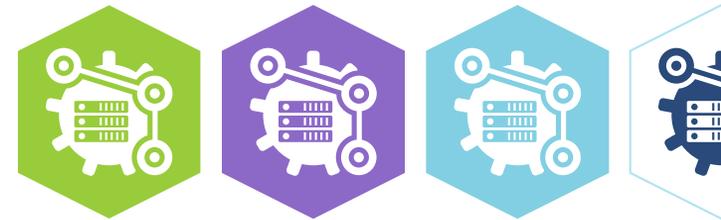
Observations

- **IBM** supports several VAS customisations for different industries and clients. It has a stable customer base of enterprises in the UK and across the globe.
- **BT** presents a global and high-quality network along with an extensive portfolio of solutions across verticals as well as enterprise-grade mobile business applications and several value-added solutions. It also has a strong partner program that allows a deeper level of customisation.
- **Orange Business Services** has a wide spectrum of enterprise-oriented value-added mobile applications in its portfolio. These are developed both in-house and through partnerships. They are offered with an Orange wrap around for enterprises of various grades.
- **T-Systems** delivers extensive enterprise mobility management (EMM) which revolves around the functionality expected within a mobile device management (MDM) delivery. It also offers applications and services in the VAS category, including expense management, BYOD/COPE/COBO management, multi-level security add-ons and unified endpoint management (UEM), etc.
- **Vodafone** presents a plethora of mobile and VAS mobile products and services to enterprises. Some of these include Vodafone One Net, Vodafone unified communications, business managed services, machine-to-machine. Vodafone Global Enterprise (VGE) manages the relationships with more than 550 multinational corporate customers and streamlines the facilitating fixed, mobile and data services for MNCs.

MOBILE NETWORK (4G/5G) ADDITIONAL (NON-CORE) SERVICES

Observations (cont.)

- **Wipro** (Rising Star) has a research-driven strategy of meeting enterprise requirements with 5G and has been investing significantly in the same. It has dedicated offerings aligned with enterprise operations on a function-by-function basis which enables a more customised approach.



RISING STAR: WIPRO

Overview

SD-WAN has been a major focus of Wipro's network practice. The firm started working on SD-WAN solutions as a part of its Network Practice around two and a half years ago and has already implemented several executions in this space.

Strengths

Research-oriented road mapping for niche areas: 5G edge is the key area of interest for Wipro. The company is expected to continue investing in exploring opportunities with disruptive technologies such as the 80.11AX Wi-Fi, which is changing the LAN edge landscape and the associated connectivity. The research initiatives will help Wipro to readily leverage the benefits of 5G connectivity on the enterprise and consumer fronts. The technologies can ideally complement each other and converge into innovative solutions such as an advanced branch-in-a-box, edge connectivity for a branch, campus or large office network for customers.

Maximising 5G potential for end user: With 5G setting in, services are expected to be offloaded to the edge. Also, the widespread adoption of Wi-Fi AX routers will enable the deployment of a faster intranet or LAN. Most of these services can be made available to other locations through a shared model. In order to leverage this high level of connectivity, Wipro has directed its efforts towards developing a distributed computing architecture for transferring computing power over the network from the branch on the user side. The futuristic research initiatives are expected to help Wipro gain a first-mover advantage over competitors.

Pioneering market strategy to enhance agility for business applications: Wipro's strategy for software-defined and niche areas, particularly SD-WAN, SD-ACCESS, cloud connect and 5G infrastructure, is directed towards helping enterprise clients to enhance flexibility for business applications. Wipro leverages the SDN principle, creates the necessary policies, and brings in the flexibility of choosing the right underlay from the appropriate TSP. Its flagship offering, WANFreedom, brings flexibility and agility to the business application by creating a WAN overlay that is transport agnostic.

Caution

Some of the research areas are far too futuristic and can be translated to revenue in the short term. Wipro should consider forming R&D-oriented partnerships with universities and startups to drive these projects.



2019 ISG Provider Lens™ Rising Star

A next-generation outlook future protects Wipro against the probable odds of the upcoming technology nuances.

SDN TRANSFORMATION SERVICES (CONSULTING & IMPLEMENTATION)

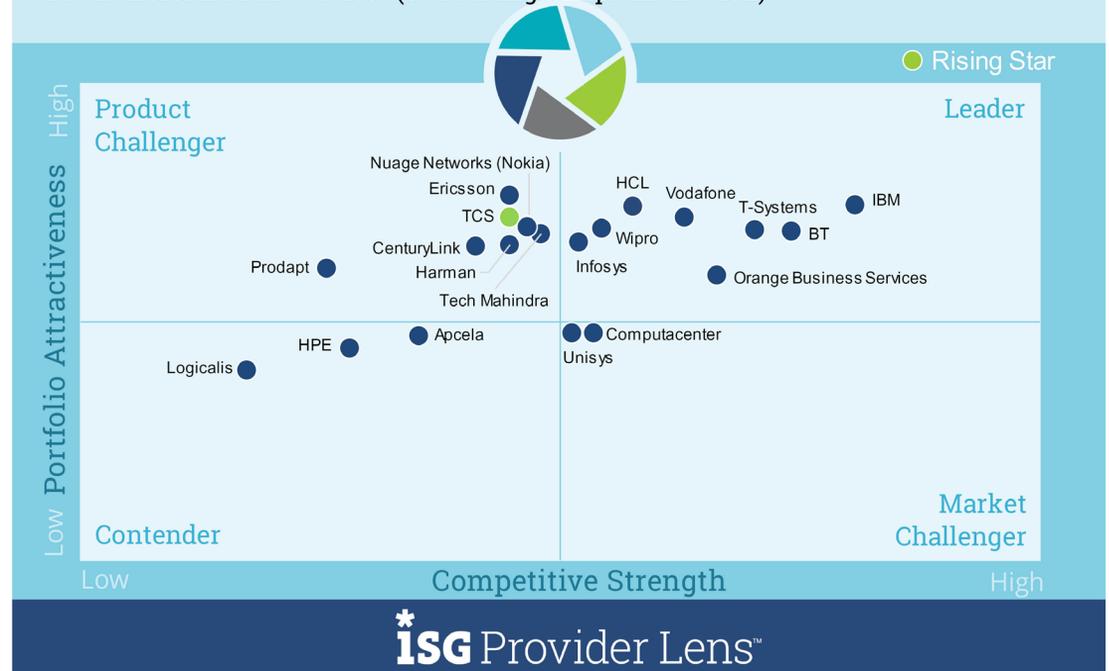
Definition

Traditionally, modifications or new installations of IT devices in a data centre and its external WAN networks involved making changes to each network component, which could take days or longer. This traditional, rigid architecture is being challenged by today's business requirements for more agility, flexibility, automation and security enhancements. Private, public and hybrid cloud computing, explosive mobile application usage in the workplace, internet of things (IoT), Industry 4.0, big data and infrastructure as a service (or XaaS) require a flexible network environment that can adapt to changes quickly and with minimum human intervention.

SDN and NFV are making strides towards responding to some of these issues using network abstraction. SDN and NFV differ in how they separate functions and abstract resources. SDN abstracts physical networking resources (switches, routers, etc.) and moves the decision-making process to a virtual network control plane that would determine where to send traffic, while the hardware continues to direct and handle it. It uses an open source protocol, such as OpenFlow, to enhance/enable this. NFV is aimed at virtualising all physical network resources beneath a hypervisor that allows the network to grow

Network - Software Defined Solutions and Services
SDN Transformation Services (Consulting & Implementation)

2019
UK



Source: ISG Research 2019

SDN TRANSFORMATION SERVICES (CONSULTING & IMPLEMENTATION)

Definition (cont.)

without adding more devices. NFV has higher vendor-dependant element reliance and doesn't benefit from an overriding protocol supported by multiple vendors in a consortium. While both SDN and NFV make the networking architectures more flexible and dynamic, they perform different roles in defining those architectures and the infrastructure they support.

The SDN architecture separates the control plane from the data plane and introduces several layers that are managed by software-defined policies and rule-based controls and management. The network elements are configured, administrated and controlled centrally by a separate software-based SDN controller or multiple SDN controllers. The data transport path and routing, including the quality of service level, bandwidth assignment, provisioning and modification of switches and hubs and their rules, are performed automatically. Overall security is maintained from the edge to the data centre. Based on the centralised network infrastructure management and the open architecture provided by SDN product vendors, it is also possible to use

SDN-enabled third-party switches, including white box switches at low price points (also used in hyperscale data centres). These switches help reduce costs and vendor lock-in risks. Applications and new network services can be provided rapidly on a management platform, which are all converged into a single-pane-of-glass type dashboard. This platform often combines a view of all network tasks and incidents plus all the applications and programs that are running. The controller provides a complete overview of applications, network components and data throughput rates; problems are detected and resolved quickly.

SD-WAN provides the benefits of SDN technology to traditionally hardware-based networking. It is an overlay architecture with a networking foundation that is much easier to manage than legacy WANs. It essentially moves the control layer to the cloud and, in the process, centralises and simplifies network management. This overlay design abstracts software from hardware, enabling network virtualisation and making the network more elastic. The SD-WAN architecture reduces recurring network costs, offers network-wide control and visibility, and simplifies the technology with zero-touch deployment and centralised management. The key aspect of this architecture is its ability to communicate with all network endpoints without the need for external mechanisms or additional protocols.

SDN TRANSFORMATION SERVICES (CONSULTING & IMPLEMENTATION)

Definition (cont.)

Advisory and consulting companies have been highly active in assisting enterprises in the transition from traditional networking to NFV/SDN and SD-WAN. They are also increasingly engaged in project management, implementation assistance, or as the “front end” of partnering with vendors or consortiums related to implementation. Managed SD-WAN suppliers have been increasingly active as both managed network services providers (MNS) and as suppliers of complete and partial solutions to other traditional MNS companies. MNS providers have been aggressively marketing complete SD-WAN solutions as managed services packages to enterprises as replacements or alternatives to traditional managed WAN solutions.

SD-WAN is expected to see a high uptake by enterprises that are seeking a managed service alternative to their WANs, with aggressive growth in both pan-European and Asia Pacific regions during 2019–21.

Eligibility Criteria

- Product/service portfolio coverage, completeness and scope
- Ability to deliver in consulting and implementational areas
- Understanding of overall market and contributions to it
- Scope of partnerships and offerings; management capability for the needed orchestration within a customer project
- Stability and roadmap planning of the provider
- Reference customer/solutions in post pilot/commercial deployment
- Competitiveness of offering and types of commercial terms

SDN TRANSFORMATION SERVICES (CONSULTING & IMPLEMENTATION)

Observations

- **BT** has been strengthening its enterprise transformation portfolio by steadily building up its consulting practice as a standalone service wing. With a spread-out partnership ecosystem comprising all major OEMs, BT is suitably placed in the UK for delivering enterprise-grade, SDN-oriented transformative services.
- **Vodafone** has a robust SDN transformation services portfolio of in-house and partner offerings that are gaining traction across the UK and Europe.
- **IBM** has been active in the enterprise digital transformation in the telecom domain for quite some time. Its managed service offerings are led by its IBM Global Technology Services, with additional support from the telecom, media and entertainment industry divisions. IBM delivers provider-agnostic solutions for the client enterprises in the UK and globally.
- **Orange Business Services** has been progressing steadily towards consultative, solution-driven enterprise transformation engage-

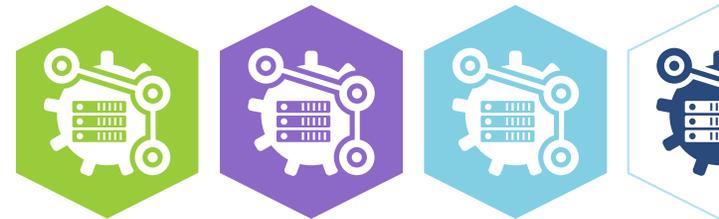
ments to ensure client requirements are met. Its SDx-oriented offerings are applicable to enterprise networking and include Flexible SD-WAN with full multi-network compatibility with Flexible SD-WAN ensured through virtual SD-WAN gateways globally.

- **T-Systems** SDx portfolio has considerable coverage and depth in scope. It includes integrated SD-WAN, (managed end-to-end SD-WAN), managed overlay, (SD-WAN selection dependent upon technology), IntraSelect SD-WAN (Cisco/Viptela solutions), and managed services (based on Riverbed, Silver Peak or Citrix). The company offers both custom and bundled solutions for specific industry verticals along with enterprise-wide packages within the SDN area. It covers end-to-end enterprise deployments with enhanced security (covered by its Magenta Security portfolio).
- **Wipro** offers reliable SD network services as a part of its Connected Future practice. Its offering covers services on data centre networks, WAN, SD-WAN and SDN/NFV which utilise Swift SDN and WANFreedom solutions. Wipro uses a consulting-led delivery model to offer both-off-the shelf solutions and customised client-specific solutions, supported by an array of toolsets, products and processes.
- **Infosys'** diverse transformation services are a combination of in-house offerings and partner portfolio that are reinforced by a competitive consulting practice.

SDN TRANSFORMATION SERVICES (CONSULTING & IMPLEMENTATION)

Observations (cont.)

- **HCL** offers exclusive, platformised transformation services to enterprises which the company is strengthening with respect to advances in disruptive technologies across security, managed services, SD-WAN and several aspects of virtualisation.
- **TCS** (Rising Star) has a deep-rooted consulting practice which drives its overall enterprise transformation exercise for clients. The company has a stable relationship with most of the leading OEMs and has an expansive client base across the UK.



WIPRO

Overview

Wipro's network practice considers SDN as one of its key focus areas. It has developed an SD-oriented solution for private and public clouds, extending it to hybrid cloud as well. The firm has around 3,600 network professionals to assist in the delivery of its solutions and services across the globe, mostly offshore.

Strengths

Framework-driven roadmap delivery: Wipro Insightix™ is a versatile network assessment framework that steers the consulting capabilities in a transformation project. The enterprise network is discretely analysed with respect to several parameters (such as availability, resiliency, scalability, utilisation, configuration monitoring, management, security and compliance, network currency and business alignment) as a part of Insightix™, and the output is fed into a maturity model, namely SOOS (standardised, organised, optimised and smart). The process exposes the voids in the network and points out scopes of improvement, thus delivering a credible roadmap.

MNS 2.0 to attract new clients: Wipro has refurbished its managed network services (MNS) to MNS 2.0 with an impressive holistic makeover. The inclusion of operation and reporting dashboard process tools and the usage of Wipro HOLMES™ can be cited as an example. Wipro runs its analytics engine on the tools as a part of the standard service management. The differentiations are expected to take Wipro to new heights and attract more technically mindful clients.

Intense automation-driven workflow: Wipro has significantly reduced the L0 and L1 range of tasks and engages L2 and L3 engineers only in case of extreme criticalities. The automation culture has been intrinsically infused in the processes that adopt automation not only from a technical perspective but also from the process and correlation point of view. The services are delivered with high flexibility, ranging from onsite delivery to dedicated model at the customer site, as well with a hybrid model.

Caution

Wipro's initiatives and process makeovers are mostly directed towards expanding its client base. This can take a toll on legacy customers that have been availing its services for a long time.



2019 ISG Provider Lens™ Leader

Wipro brings the right mix of automation, AI and strategic consulting capabilities, which can be useful for a client looking for network optimisation and not necessarily transformation.

SD-WAN EQUIPMENT AND SERVICE SUPPLIERS (DIY)

Definition

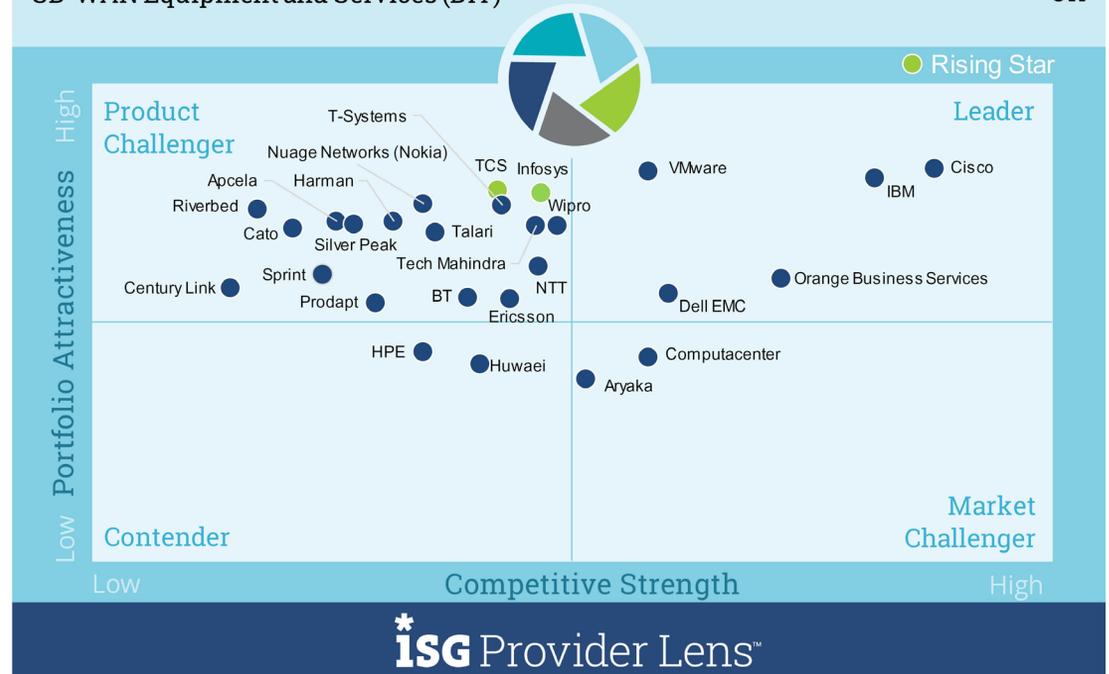
This segment examines those providers of equipment and services (ranging from partial WAN supply to entire end-to-end SD-WAN offerings) directly for the enterprises' own (or third-party) operations rather than those delivering SD-WAN solutions as a managed service.

SD-WAN provides the benefits of SDN technology to traditional hardware-based networking. It is an overlay architecture for a networking foundation that is much easier to manage than legacy WANs. It essentially moves the control layer to the cloud and, in the process, centralises and simplifies network management. This overlay design abstracts software from hardware, enabling network virtualisation and making it more elastic.

The SD-WAN architecture helps to reduce recurring network costs, offers network-wide control and visibility, and simplifies the technology with zero-touch deployment and centralised management. The key aspect of the architecture is its ability to communicate with all network endpoints without the need for external mechanisms or additional protocols.

Network - Software Defined Solutions and Services SD-WAN Equipment and Services (DIY)

2019
UK



Source: ISG Research 2019

SD-WAN EQUIPMENT AND SERVICE SUPPLIERS (DIY)

Definition (cont.)

During the last 10 years, most companies have been using multi-protocol label switching (MPLS) technology to transport data packets from A to B — an expensive but reliable transmission option for business-critical applications. Partly due to the proliferation of non-business critical traffic over WANs (such as social media, non-enterprise application use, informal messaging and video stream communications between colleagues), many enterprises require fast and flexible WAN connections to cloud providers and their own global offices with high bandwidth but lower criticality guarantees and price points.

SD-WAN is a virtual WAN that allows enterprises to bundle multiple WAN technologies and connections, such as MPLS, broadband internet, LTE and ethernet, and provide them as overall bandwidth. SD-WAN determines the path for transmitting data packets and the medium to be used. If a connection has too much load, another path is taken automatically. The virtual connections consist of multiple paths that are used in parallel. If one path fails, transmission is continued by simply taking another path. Available products ensure 256-bit tunneled encryption. A policy-based controller is used to influence paths and

connections. For example, a controller may transmit critical applications via MPLS only and other applications only via internet broadband connections or other technologies to ensure high-performance transmission of data, voice and video files. The controller or a management console is used to define rules that are applied automatically, for example, to speed up the data transfer of critical application or to route non-business-critical traffic to lower-cost transport methods. Based on the multiple paths of the virtual WAN environment, data transfers are accelerated, and bandwidths and costs can be reduced.

Cost reductions related to SD-WAN introduction can be highly significant. End users also have the option to give up parts of their high cost, rigid MPLS connections. They are not bound to use one carrier anymore but can order an optimal connection individually via a colocation hub provider in the short term. Although SD-WAN is still in its infancy, there is a growing interest in the technology as well as in associated NFV.

SD-WAN EQUIPMENT AND SERVICE SUPPLIERS (DIY)

Eligibility Criteria

- Product/service portfolio coverage, completeness and scope
- Ability to deliver equipment and service to customer, inclusive of prerequisite training
- Understanding of overall market area and contributions to that area
- Scope of partnerships and offerings, management capability for the needed orchestration within a customer project
- Openness of offering to avoid vendor lock-in
- Completeness of customer support and assistance post delivery
- Stability and roadmap planning of the provider
- Reference customer/solutions in post pilot/commercial deployment
- Competitiveness of offering and types of commercial terms

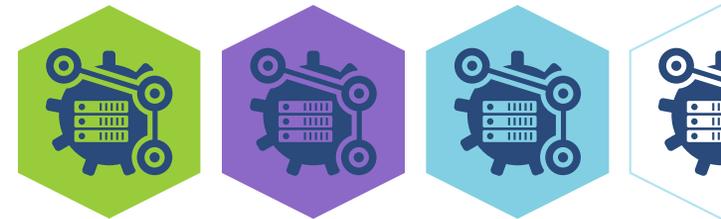
Observations

- **Cisco** has a vast client base for its product portfolio that spans Intelligent WAN (IWAN), Meraki SD-WAN and Cisco SD-WAN (Viptela) along with associated products and services. This is amalgamated with the portfolio of SD-WAN hardware (ASR/ISR 1000, ISR 4000, routers, vEdge routers, etc.) and management systems such as vManage. This again has been topped up with cloud enablement such as Cisco Cloud in order to increase the virtualisation aspect.
- **Dell EMC** designs, develops, and supports a range of information infrastructure and virtual infrastructure products and services. Though traditionally known for its expertise and excellence on server and data centre equipment and services, the company is rapidly evolving in the networking and SDN space, along with a new choice of edge and CPE equipment.
- **IBM** solutions can full enterprise SD-WAN, partial or branch SD-WAN (Intelligent edge) and hybrid private/public cloud enabled. The firm leverages its deep-rooted consulting practice to its portfolio of SD-WAN migration services which are delivered as part of the overall engagement.
- **Orange Business Services** has its signature Flexible SD-WAN solution which can be combined with managed security, WAN optimisation and application visibility services. It offers multi-sourcing integration (MSI) as a service with features such as multi-vendor and multi-network type integration and management.

SD-WAN EQUIPMENT AND SERVICE SUPPLIERS (DIY)

Observations (cont.)

- **VMware** SD-WAN by VeloCloud is VMware's flagship SD-WAN offering that is delivered in cloud, hybrid cloud and on-premise versions. The capability was gathered through the acquisition of VeloCloud in December 2017. VMware also has a credible portfolio containing SD-WAN Gateway, SD-WAN Edge and SD-WAN Orchestrator.
- **Infosys** (Rising Star) offers a robust, asset-oriented services offering portfolio, support by a strong engineering expertise and a widespread partner ecosystem. The firm offers these services in a ready-to-consume model, which makes it appropriate for customers in the evolving environment of SDN.
- **TCS** (Rising Star) drives its device engineering portfolio with its expertise in engineering services, directed at enterprise clients across several verticals. The company has established a Cognitive Business Operations (CBO) unit for improving organisation efficiency by seamlessly deriving and leveraging insights from both the business process and technology operation.



SDN SECURITY SERVICES

Definition (cont.)

Secure connectivity

SD-WAN provides end-to-end encryption across any network type, including the internet with full and secure authentication. It has strong scalable key exchange capabilities with automatic management. It also enables secure communication among branches and data centres, as well as communication to the cloud via gateways. All devices and components are fully authenticated in the network and all traffic across that network is encrypted.

Segmentation and micro segmentation

Many enterprises require segmentation to isolate different types of traffic for regulatory reasons or to give different business groups like finance, marketing and HR their own network segments. Enterprises typically address these needs by using either virtual LANs (VLANs) or virtual routing and forwarding (VRF). SD-WAN allows segmentation in a much more secure manner compared to MPLS (which doesn't encrypt the traffic) as it automatically encrypts all traffic.

Secure services insertion

An SD-WAN will have built-in foundational security capabilities (such as a Layer 7 firewall) in the edge devices. However, it may not be a best-of-breed security solution for all enterprise requirements. Additional security services can be inserted at various locations (for e.g. at the branch, in the cloud, and on-premise at the data centre or within headquarters) to provide enhanced security capabilities to meet enterprise needs. SD-WAN service insertion brings functions, such as virus scanning and data loss prevention, close to the appropriate traffic as much as possible. SD-WAN can perform deep application recognition, allowing granular control over routing of specific traffic to flow through specific and targeted security services.

Secure deployment

SD-WAN allows the enterprise to ship an edge device to a branch or for the branch to be acquired from a local supplier based on a provider list. The box can be installed in a plug-and-play manner by local non-IT/technical/engineer staff. The headquarter network staff centrally creates a configuration, typically using a group profile, that can be pulled down by the box following the authentication of a unique activation key or be pushed to the box from a cloud redirector after the box pings. A branch can be onboarded to the enterprise system or add resources within hours.

SDN SECURITY SERVICES

Definition (cont.)

There is no risk of losing shipped equipment or compromising the overall security of the enterprise system as it does not contain network security keys or encryption tokens.

Visibility and compliance

A major attribute of SD-WAN that extends to the cloud is its ability to recognise thousands of different applications. This can be combined with analytics, monitoring and metrics that an orchestrator and controller can collect from each of the edge and gateway devices. The operation allows the enterprise to perform critical activities such as detecting anomalies in application usage, screening for unsanctioned applications and dropping the packets of unwanted applications. The

enterprise can also apply policies around specific applications such as routing them through a specific additional security service if required. Traffic steering and segmentation in this manner can also assist in meeting regulatory or internal compliance requirements.

Additional overlay security and infringement tracking services

With the emergence of SD security, multi-layer security can be more easily integrated into an SD-WAN solution via software, which isn't possible with a standalone appliance-based approach. The benefits for providers and enterprise IT teams alike are a much simpler insertion of security into the branch to protect internet access, far more timely service deployment and upgrades, and greatly reduced chances of one standalone network or security component breaking another.

SDN SECURITY SERVICES

Eligibility Criteria

- Product/service portfolio coverage/focus, completeness and scope
- Understanding of overall security and SDN/SD-WAN and additional focus areas
- Scope of partnerships and offerings, management capability for the needed orchestration to deliver integrated product
- Completeness and pro-activeness of customer support and advisory post delivery
- Third-party accreditation of solution/test results and confidence delivery
- Stability and roadmap planning of the provider
- Reference customer/solutions in post pilot/commercial deployment
- Competitiveness of offering and types of commercial terms

Observations

- **IBM** has structured its roadmaps by applying a layer of security across the entire network portfolio and all offerings associated with SD-WAN. As a part of the SDx architecture, security will be highly programmable and scalable, translating to highly secured environments.
- **HCL** has a perfect combination of security services for different cross sections of clients as per the size and value of the engagement.
- **Orange Business Services** covers a large range of network security services which include managed security options based on both cloud security and SD-WAN security. The Secure by Orange SD-WAN service and SD-WAN appliance are expected to be integrated with advanced security in the second half of 2019.
- **Infosys** considers security as a key transformation element that can be comprised of VPN-integrated security, internet breakout and browsing proxy services, IT connectivity to business partners, firewall services of the data centre, internet infrastructure or global load balancing.
- **T-Systems** is growing its SD-WAN security offerings business as a standalone solution for its outsourcing project customers. It also offers vertical-oriented offerings for the automotive industry.

SDN SECURITY SERVICES

Observations (cont.)

- **TCS'** network security offering is a part of its overall security offerings and is focused on services such as firewall management, policy management, intrusion detection systems (IDS)/intrusion prevention systems (IPS) as well as equipment-level security.
- **Vodafone** considers security as an essential part of its connectivity portfolio across fixed and mobile service lines. The services include network-embedded fixed and virtual security solutions. They are deployed on-premise or in the network along with end-to-end managed, secured connectivity for mobile devices.
- **Wipro** has significant capabilities that are focused on policy based end-to-end security. It offers two-dimensional security coverage through Security by SDN and Security for SDN.
- **BT** offers SD-WAN security offerings with SD-WAN security controls for mission-critical, business-critical and other business sites.
- **Harman** (Rising Star) performs an intense level of inspection around the security element while delivering SDN solutions and services. It engages the best security component while deploying SD-WAN solutions depending on client requirements.

WIPRO

Overview

Wipro has a multi-pronged approach towards security that is offered as a standalone service as well as an integrated part of a larger transformation deal. The company maintains an extensive partnership ecosystem that includes niche players with a focus on security and other aspects, thus reinforcing its go-to-market strategy.

Strengths

Holistic security wrap for all network components: Wipro has strong expertise in policy-based, end-to-end security and offers a two-fold security coverage for SDN clients, namely Security by SDN and Security for SDN. These include third-party solutions as well as native feature sets. Enterprise clients are thus assured of a comprehensive, vendor-agnostic security wrap around all network components.

Partnership ecosystem to sharpen security credibility: Security is a fundamental part of every software-defined solution that is delivered either by Wipro or through partners. Wipro has an extensive partnership ecosystem that helps strengthen its security offerings. The strategic partnerships with Cumulus, Big Switch, Zscaler and others augment its cloud security capabilities that are integrated in the SD-WAN strategy.

Designated Wipro secure network access offering for improved LAN security: Wipro has been driving developments in the secured network access offering that can be considered as an internet-based networking concept. It can convert a distributed model of LAN or wireless controller network into a fabric model instead of a distributed fabric. The approach brings a higher level of security into the access part of the network along with making the network fabric based and more aligned with the business intent. Furthermore, the solution integrates significant analytics on the LAN. Based on the applications and user behaviour, the network becomes policy-based so that business policies can be deployed faster into the network.

Caution

Wipro does not sell SDN security offerings as isolated items like firewalls and intrusion prevention systems (IPS) separately. Security is offered as a part of the bundle along with SDN solutions such as SD-WAN. As the technology matures, Wipro may consider offering security as a standalone solution to enterprise networks.



2019 ISG Provider Lens™ Leader

Wipro's vast portfolio of network security offerings is continuously evolving with the progress in disruptive innovations and partnerships.

SD NETWORK TECHNOLOGIES (CORE)

Definition (cont.)

SDN technologies enable improvements in network agility and automation, while substantially reducing the cost of network operations compared to traditional network deployments. An industry-standard data plane abstraction protocol (such as OpenFlow) allows the use of any type and brand of data plane devices as all the underlying network hardware is addressable through a common abstraction protocol.

Such a protocol allows for the dynamic and automatic provisioning of virtual network segments and virtual routing services on both physical and virtual networking devices. Security policies can be automatically provisioned via a cloud orchestration platform, such as OpenStack, or through workloads assigned according to attributes like MAC, subnet, VLAN and IP protocol in an automated manner.

The utilisation of an SDN protocol additionally facilitates the use of bare metal switches from any mix of vendors, allowing full freedom within the supplier selection and the provisioning phases of a network. SDN controllers also allow API interaction (north and southbound), enabling the use of a wide range of off-the-shelf and custom-built network applications. This was previously unavailable in traditional networks.

The OpenFlow protocol is managed by the Open Networking Foundation (ONF) — a non-profit user-governed consortium that includes some of the world's largest users such as Google, Facebook, Yahoo!, Deutsche Telekom, Verizon and Goldman Sachs. Given the explicitly user-driven governance model of the foundation, it is not subject to conventional vendor influence which is common with other vendor-sponsored industry standards bodies.

The main companies covered in this segment are vendors of SDN and NFV equipment and core services that are purchased either directly by enterprises or service providers for specific enterprise projects.

SD NETWORK TECHNOLOGIES (CORE)

Eligibility Criteria

- Product portfolio coverage, focus areas, completeness of broader solutions
- Ability to deliver equipment and service to customer, inclusive of prerequisite training
- Understanding of overall market area, technology environment and evolutions and contributions to that area
- Scope of partnerships and offerings, management capability for the needed orchestration within a customer project
- Openness of offering to avoid vendor lock-in
- Completeness of customer support and assistance post delivery
- Stability and roadmap planning of the provider
- Reference customer/solutions in post pilot/commercial deployment
- Competitiveness of offering and types of commercial terms

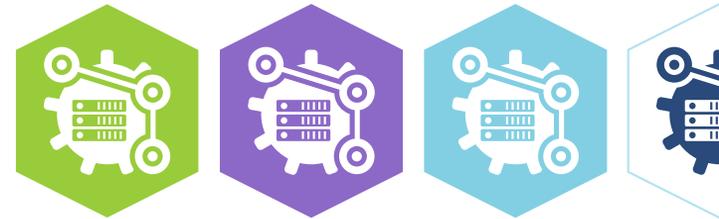
Observations

- With a wide spectrum of proprietary frameworks, platforms and tools, **HCL** has developed a robust portfolio of offerings for clients across core network technologies to supporting them on their SD journey.
- **T-Systems** has been actively leveraging its telco experience and expertise from its Deutsche Telekom parentage in order to bring out the best practices in its core networks offering.
- **Infosys** has transfused the research-driven developments from its centres of excellence to its core technology services, enabling clients to gain a competitive edge in the overall market.
- **Cisco** offers a range of infrastructure hardware and software, including switches, routers, network optimisation support (NOS), SD-WAN, IWAN, WAN hardware and software and related control as well as management and automation capability for core SD networks.
- **IBM** has a considerable focus on network engineering, integration and innovation services within the Global Technology Services (GTS) division. It has developed a strong portfolio of its own core technology along with an extensive partner ecosystem of leading market participants in the SDN space.
- **Orange Business Services** has been active in the developments of core SDN technologies, strategically linking them to pave the way for 5G deployments.

SD NETWORK TECHNOLOGIES (CORE)

Observations (cont.)

- **Vodafone's** core network technologies are expected to undergo a significant boost as the company is sharpening its focus on autonomous networks.
- **Wipro's** (Rising Star) core network offerings project a vendor-agnostic approach, flexible delivery and engagement model, multi-domain angle featuring multi-vendor technologies complemented by strong global delivery capabilities, proprietary IP, in-house expertise and cognitive automation.



RISING STAR: WIPRO

Overview

Wipro is an internationally renowned company with a workforce strength of 171,500 employees in 57 countries. It caters to 1,115 global clients from 14 global delivery locations. Its managed network services portfolio is part of the Cloud and Infrastructure Services (CIS) division, the fastest-growing business unit in Wipro, cutting across and supporting all industry verticals and business units. SD-WAN has been a major focus of Wipro's network practice. Known as WANFreedom, the solution is directed towards bringing flexibility and agility to the business application by creating a transport agnostic WAN overlay.

Strengths

Function outsourcing vendor to transformation partner: Wipro characterises its core network offerings with USPs such as a vendor-agnostic approach and a flexible delivery and engagement model. It also offers a multi-domain angle on multi-vendor technologies topped with efficient global delivery capabilities, proprietary IP, in-house expertise and cognitive automation enablers. Its all-inclusive operational model revolves around each aspect of client network support such as design, build, operate, engineering and consulting. The firm delivers a holistic solution that goes beyond functions outsourcing towards more of a transformation partnership with the client.

Integrated automation driven by “manual by exception” approach: Wipro adopts a “manual by exception” convention for its network services and associated SD services where the application program interface (API) is the foundation for network automation and DevOps. In order to drive this level of intrinsic automation across most of the functions and processes, Wipro continuously conducts co-innovation exercises with customers in services such as gain share labs and labs-on-hire. Wipro has been on the edge with disruptive developments such as cognitive computing and AI, human machine interface, smart machines, machine vision and blockchain.

Caution

While Wipro showcases a range of tools and services across the entire managed networking value chain, an additional layer of segregation as per verticals or application areas and use case models may be required for onboarding new clients.



2019 ISG Provider Lens™ Rising Star

Wipro offers consultative, end-to-end solutions and services that are highly customisable and driven by innovation.

SD NETWORK TECHNOLOGIES (MOBILE TO EDGE)

Definition

SDN technologies enable improvements in network agility and automation, while substantially reducing the cost of network operations compared to traditional network deployments. Deploying an industry-standard data plane abstraction protocol (such as OpenFlow) allows the use of any type and brand of data plane devices as all the underlying network hardware is addressable through a common abstraction protocol. Such a protocol allows for a dynamic and automatic provisioning of virtual network segments and virtual routing services on both physical and virtual networking devices. With SD access in branch/edge, including all customer-premises equipment (CPE, referenced as virtual CPE or vCPE in SDN terms) and associated WiFi networks, access points (APs), software-defined mobile network (SDMN), software-defined local area network (SD-LAN), which includes both wireless (SD-WLAN) or mobile (SD-WMLAN), the management protocol can be further improved.

Network - Software Defined Solutions and Services
SD Network Technologies (Mobile to Edge)

2019
UK



Source: ISG Research 2019

SD NETWORK TECHNOLOGIES (MOBILE TO EDGE)

Definition (cont.)

VCPE

The traditional CPE deployment model, which requires multiple specialised devices at customer premises with each involving complex installation and possibly pre-installation of enterprise-specific codes or software, is extinct. vCPE is replacing multiple hardware appliances with a generic CPE that is vendor independent and based purely on performance points, utilising SDN and/or SD-LAN and delivery capabilities rather than branding. This enables enterprises to provide services on-demand with the required flexibility to rapidly scale up/down services at high reliability and quality levels without the need for trained technical or support staff.

SDMN

SDMN is relatively new and stems from the complexity of network management in 5G mobile networks and beyond, driven by the growing mobile traffic demand, heterogeneous wireless environments, and diverse service requirements. This environment has invoked a need to introduce new radio network architecture by taking advantage of software-oriented design, the separation of the data and control planes, and network virtualisation to manage complexity and offer flexibility in 5G networks. SDN in mobile networks is fundamentally different from SDN for the internet. Mobile networks deal with the wireless access problem in complex radio environments, while the internet mainly addresses the packet-forwarding problem. Specific requirements in mobile networks shape the development of SDMN. As the proposed micro networks and enterprise-specific networks within 5G move towards reality and piloting, SDMNs (as part of the enterprise managed portfolio) are gaining prominence.

SD NETWORK TECHNOLOGIES (MOBILE TO EDGE)

Definition (cont.)

SD-LAN

SD-LAN is an emerging solution built on the principles of SDN. However, there are key differences in topology, network security, application visibility and control, management and quality of service compared to a wider reaching SDN or SD-WAN system. SD-LAN is similar in concept to cloud managed LAN systems. It decouples control management and data planes to enable a policy-driven architecture for wired and wireless LANs. SD-LANs are characterised by their use of a cloud management system and wireless connectivity without the presence of a physical controller. They may be found both in more traditional network environments with cloud management services, or as part of overreaching SDN/SD-WAN deployments and strategies.

SD-LAN builds an application and policy-driven wired and wireless access architecture to facilitate self-organising and centrally managed networks that are simpler to operate, integrate and scale. It can prioritise and change the behaviour of the network based on application requirements and policies of what can be accessed by users, clients and IoT. Typically, it has self-optimising, self-healing and self-organising wireless access points and access switches and is cloud managed. It has fully open APIs that allow tight integration of network and applications infrastructures that are not vendor dependant.

This segment will look at all main vendors and service providers (such as telcos) in the SD-LAN space, including vCPE, SDMN and SD-LAN specific vendors.

SD NETWORK TECHNOLOGIES (MOBILE TO EDGE)

Eligibility Criteria

- Product portfolio coverage, focus areas, completeness of broader solutions
- Ability to deliver equipment and service to customer, inclusive of prerequisite training
- Understanding of overall market area, technology environment and evolutions and contributions to that area
- Scope of partnerships and offerings, management capability for the needed orchestration within a customer project
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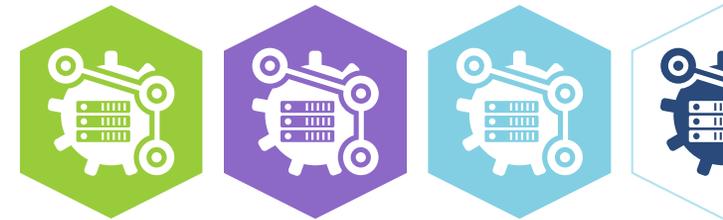
Observations

- **Cisco** has tiered and highly scalable offerings for the SME segment (Meraki) and large corporates (SD-WAN based on Viptela). It leverages intelligent edge features around control and capabilities.
- **IBM** had been driving considerable developments on SD-LAN, intelligent edge and u/vCPE devices and virtualised devices at the edge over the last few years. It offers a strong portfolio on the same.
- **T-Systems'** vigorous solution-based SD-LAN architecture has become popular among numerous next-generation mobile-to-edge network customers due to the flexibility of hybridisation.
- **BT** in collaboration with Cisco offers BT Connect Edge, an innovative mobile-to-edge solution (vCPE service) and network automation solution for NFV.
- **Vodafone** is well positioned to address the requirements of many enterprise customers by leveraging the product capabilities of market-leading vendors such as Cisco and Juniper in its virtual CPE portfolio.
- **Orange Business Services** covers a large range of network services, including SD-WAN, Flexible SD-WAN and uCPE services, which are provided either on appliance or on virtual network functions (VNFs).

SD NETWORK TECHNOLOGIES (MOBILE TO EDGE)

Observations (cont.)

- **Wipro** (Rising Star) network access solution is based largely on Cisco DNA (digital networking architecture) and is considered as an SD approach towards transforming wired or wireless LAN.



RISING STAR: WIPRO

Overview

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Strengths

Product-driven access network transformation to engrain digitisation: The access part of the SD-WAN, i.e. the user access network represented as LAN or the campus LAN network, is an important part of the Connected Future Network Practice. Wipro aligns this segment with the overall SDx strategy by bringing in digital transformation levers and reinforcing them with solutions like Secure Network Access which is a software-defined access solution. The firm also offers a branch-in-a-box solution called Net Box which enhances the modularity of the edge network for the client.

Centralised LAN control to bring mutability in edge operations: Wipro offers its secure network access based largely on the Cisco DNA solution (digital networking architecture) which is a software-defined approach for transforming wired or wireless LAN. The approach revolves around influencing fluidity, transparency and versatility in a centralised manner from the legacy network operations. The controller model enabled-LAN promises significant potential through its intent-based networking attributes and distributed architecture, bringing more security into the access part.

Caution

Wipro can consider sharpening its vertical-focused offering portfolio in order to meet the market demand for additional industry-specific solutions and expertise.



2019 ISG Provider Lens™ Rising Star

Wipro has been relentless in research activities across every sphere of network innovation. It is constantly exploring ways to translate the research findings into network features under the Wipro fabric.



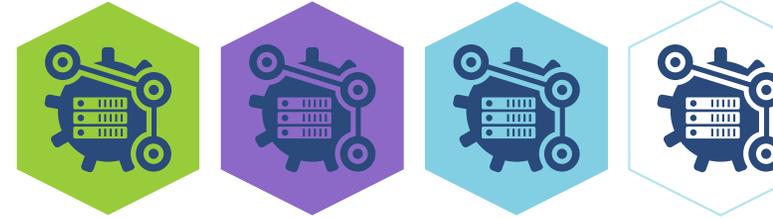
Methodology

METHODOLOGY

The ISG Provider Lens™ 2019 - "Network - Software Defined Solutions and Services" research study analyses the relevant software vendors and service providers in the UK market, based on a multi-phased research and analysis process, and positions these providers based on the ISG Research methodology.

The study was divided into the following steps:

1. Definition of Network - Software Defined Solutions and Services
2. Use of questionnaire-based surveys of service providers/vendor across all trend topics
3. Interactive discussions with service providers/vendors on capabilities & use cases
4. Leverage ISG's internal databases & advisor knowledge & experience (wherever applicable)
5. Detailed analysis & evaluation of services & service documentation based on the facts & figures received from providers & other sources.
6. Use of the following key evaluation criteria:
 - Strategy & vision
 - Innovation
 - Brand awareness and presence in the market
 - Sales and partner landscape
 - Breadth and depth of portfolio of services offered
 - Technology advancements



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Avimanyu Basu is a Lead Analyst specializing in cross-vertical research focusing on disruptive innovations and convergence technologies aligned with digital transformation of enterprises. Avimanyu authored studies focusing on digital disruptions and its influence on engineering service providers along with several blogs. With almost 8 years of experience in market research and consulting, Avimanyu has provided strategic recommendations to both public and private sector clients across Europe, Middle East and Asia Pacific. Prior to ISG, Avimanyu has worked with Frost & Sullivan, Infiniti Research and Zinnov in a number of assignments involving competitive benchmarking, market sizing, market penetration and segmentation.



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Jan Erik Aase is a director and principal analyst for ISG. He has more than 35 years of collective experience as an enterprise client, a services provider, an ISG advisor and analyst. Jan Erik has overall accountability for the ISG Provider Lens™ reports, including both the buyer-centric archetype reports and the worldwide quadrant reports focused on provider strengths and portfolio attractiveness. He sets the research agenda and ensures the quality and consistency of the Provider Lens™ team.

ISG Provider Lens™ | Quadrant Report June 2019

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