ISG Provider Lens™

Network - Software Defined Solutions and Services

Nordics 2019

Quadrant Report

A research report comparing provider strengths, challenges and competitive differentiators

Customized report courtesy of:

wipro

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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ISG Provider Lens™

ISG Provider Lens™

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EXECUTIVE SUMMARY

Scandinavia presents a promising market for advanced network technologies. The multi-network WAN services originated from Europe and the region has the longest history of any software-defined WAN model that has influenced this market.

Numerous verticals such as retail, financial services, manufacturing and utilities with dispersed points of presence (PoPs) are considering SD-WAN as a means of augmenting more cost-effective bandwidths into their existing network mix. These industries are pushing for the digitalization of underlay and overlay networks across their enterprise branches and headquarters. Also, enterprises are exploring options for maximizing automation capabilities, including self-healing features.

Enterprises are exploring ways of migrating to cloud or multi-cloud environments and accessing them from anywhere due to the benefits involved such as ease of consumption and quickness to market. This has been a challenge for network technologies for decades. They are also are considering the financial impact affecting the business by adding on to the internet pile in order to have applications prioritize the bandwidth they need to run. Physical infrastructure should be provisioned when there is a requirement of raw bandwidth. SDN enables the applications to re-route the required bandwidth in order to balance the priority of the functions to be executed by different applications.

Telecom service providers (TSP), original equipment manufacturers (OEMs) and system integrators are hurrying to leverage the opportunities associated with modernizing enterprise networks to bring down cost, optimize maintenance and maximize efficiency. The number of entrants in this space is exponentially increasing as SDN brings significant opportunities for enterprises through self-managed bandwidth, bug fixing and prioritizing of enterprise application. Instead of rejecting their legacy infrastructure altogether and shifting to a new, software-based infrastructure, enterprises are trying to evolve their legacy, MPLS or legacy hardware networks towards an SDN environment, which will also enable them to achieve optimum control over their network.

Existing managed LAN and WAN services, multiprotocol label switching (MPLS) and related technologies still form the backbone of telcos and other communication services providers' enterprise customer installed bases and account for most of the revenues they generate worldwide. However, this has been rapidly changing. The software-defined network (SDN) which is closely related to network function virtualization (NFV) and software-defined WAN (SD-WAN) technologies and services are evolving and rapidly increasing their market presence. A similar trend is observed with several other related network services such as performance assurance (management), managed networks and devices (MND) and 4G and 5G mobility (4G/5G) with associated additional (non-core) mobile servicers based upon those faster mobile data stream standards, along with their triggers and influences. The primary drivers and promises underlying this process of rapid change for the enterprises are.

Development of autonomous, self-healing networks: Autonomous networks have been one of the key priorities of most of the active players in the software-defined anything (SDx) ecosystem. Stakeholders are working towards delivering a network that will enable the managed service provider to continuously learn about the customer requirements

and preferences and accordingly respond in real time to address the issues they are experiencing on the network. Furthermore, the robust integrated automation attributes support auto-scaling and auto-healing. Certain steps are also taken for the virtual network function (VNF) to revitalize any affected part in a device.

Intent-based automation attributes: From an automation and orchestration perspective, the market for intent-based networking lays the foundation for making networks autonomous. Intent-based automation involves an intelligent system that has full clarity of the state of the existing network state. It can take inputs on the desired state of the network and accordingly provide suggestions with the least number of steps. Once the desired or intent state is specified, the number of steps to get there is calculated.

Networking devices integrated with predictive analytics engine: Enterprise networks are gradually being integrated with a predictive analytics engine that provides real-time insights to help network engineers to identify the problems before they affect the network operations and cause bottlenecks to the underlying applications. While a traditional system generates alerts based on threshold ratings, the analytics engine takes data from the devices and feeds it into the predictive insights model to look for patterns and search for anomalies. This predictive insight can be applied to a large range of network function indicators to find outliers and raise alerts.

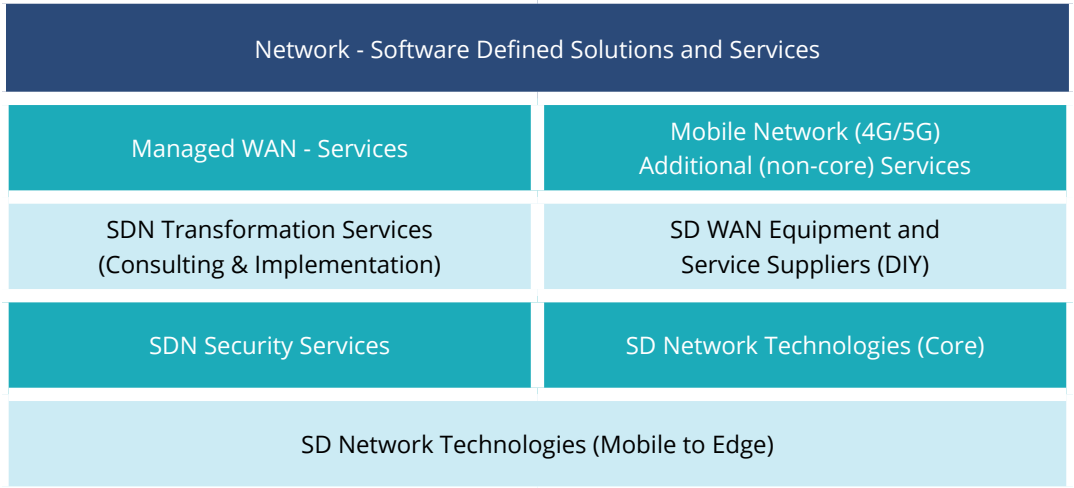
Telcos requiring cloud expertise and experience: Telcos do a network refresh once in every five years, resulting in enterprises getting a network refresh every 18 months. With the SD architecture gaining pace, many TSPs have been shifting from a hardware to a software-based architecture for the last three years, resulting in the need to create silos for neutralized environments. TSPs are seeking in-house or external partners that can provide consulting and proof of concept (POC) capabilities to move clients from a pre-utilization common unified cloud infrastructure.

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 concluded such activities or have demonstrated such instances 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 categorized 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 SDN 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 Nordics. 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 organizations 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 and 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 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.

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 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 provide 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, centralizes and simplifies network management. This overlay design abstracts software from hardware, enabling network virtualization 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 centralized 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 for supplying complete solutions to enterprises. Consulting companies, large vendors and managed network services providers have 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.

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 centralizes and simplifies network management. This overlay design abstracts software from hardware, enabling network virtualization 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 centralized 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 increasingly partnering 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.

Definition (cont.)

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 centers. A cloud- delivered variation extends the overlay to any cloud point-of-presence (PoP) or data center. 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.

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 fundamentally different from NFV in terms of end results and ability, although both approaches are mutually supportive. A network virtualization 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 virtualization application supports the arbitrary assignment of IP/MAC that addresses schemes, automates network configuration tasks and enforces the expected network segmentation. Data plane abstraction provides a standard-based approach to dynamically provide the network fabric from a centralized (or distributed) software-based controller or multiple controllers.

Definition (cont.)

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 main 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.

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 may be managed in the same manner as core and SD-WAN components. With software-defined access out to branch/edge, including all customer premises equipment (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 Nordics.

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 3

	Managed WAN Services	Mobile Network (4G/5G) Additional (non-core) Services	SDN Transformation Services (Consulting & Implementation	SD-WAN Equipment and Services (DIY)	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	Market Challenger
Arista	Not in	Not in	Not in	Not in	Not in	Product Challenger	Not in
Axians	Not in	Not in	Market Challenger	Market Challenger	Not in	Not in	Not in
BT	Not in	Not in	Product Challenger	Not in	Not in	Not in	Product Challenger
CenturyLink	Product Challenger	Not in	Product Challenger	Product Challenger	Not in	Not in	Product Challenger
Cisco	Not in	Not in	Not in	Leader	Product Challenger	Leader	Leader
Colt	Product Challenger	Not in	Not in	Not in	Not in	Not in	Not in
Dell EMC	Not in	Not in	Not in	Leader	Not in	Product Challenger	Not in
D-Link	Not in	Not in	Not in	Not in	Not in	Not in	Contender
Enea	Not in	Not in	Not in	Not in	Not in	Contender	Contender
Ericsson	Not in	Not in	Product Challenger	Leader	Not in	Product Challenger	Product Challenger
Extreme Networks	Not in	Not in	Not in	Not in	Not in	Product Challenger	Not in
Fortinet	Not in	Not in	Not in	Not in	Product Challenger	Not in	Not in

Network - Software Defined Solutions and Services - Quadrant Provider Listing 2 of 3

	Managed WAN Services	Mobile Network (4G/5G) Additional (non-core) Services	SDN Transformation Services (Consulting & Implementation	SD-WAN Equipment and Services (DIY)	SDN Security Services	SD Network Technologies (Core)	SD Network Technologies (Mobile to Edge)
GTT	Product Challenger	Not in	Not in	Not in	Product Challenger	Not in	Not in
HCL	Leader	Not in	Leader	Not in	Leader	Leader	Product Challenger
HPE	Not in	Not in	Contender	Product Challenger	Not in	Not in	Not in
Huwaei	Not in	Not in	Not in	Contender	Not in	Not in	Not in
IBM	Leader	Leader	Leader	Leader	Leader	Leader	Leader
Infosys	Rising Star	Rising Star	Leader	Product Challenger	Leader	Leader	Rising Star
Juniper	Not in	Not in	Not in	Not in	Not in	Market Challenger	Not in
Nuage Networks (Nokia)	Not in	Not in	Product Challenger	Product Challenger	Product Challenger	Not in	Not in
Orange Business Services	Leader	Leader	Leader	Leader	Leader	Leader	Leader
PCCW	Contender	Contender	Not in	Not in	Not in	Not in	Not in
Prodapt	Product Challenger	Contender	Product Challenger	Product Challenger	Product Challenger	Product Challenger	Product Challenger
Riverbed	Not in	Not in	Not in	Product Challenger	Not in	Not in	Not in
Sprint	Product Challenger	Not in	Not in	Product Challenger	Product Challenger	Not in	Not in

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

	Managed WAN Services	Mobile Network (4G/5G) Additional (non-core) Services	SDN Transformation Services (Consulting & Implementation	SD-WAN Equipment and Services (DIY)	SDN Security Services	SD Network Technologies (Core)	SD Network Technologies (Mobile to Edge)
Symantec	Not in	Not in	Not in	Not in	Product Challenger	Not in	Not in
TCS	Leader	Product Challenger	Leader	Rising Star	Leader	Not in	Not in
Tech Mahindra	Product Challenger	Product Challenger	Product Challenger	Product Challenger	Rising Star	Not in	Product Challenger
Tele2	Market Challenger	Market Challenger	Product Challenger	Contender	Contender	Not in	Market Challenger
Telenor	Leader	Leader	Leader	Market Challenger	Market Challenger	Market Challenger	Not in
Telia	Market Challenger	Market Challenger	Product Challenger	Contender	Market Challenger	Not in	Not in
Three	Not in	Product Challenger	Not in	Not in	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	Rising Star	Product Challenger	Leader	Rising Star	Leader
VMware	Not in	Not in	Not in	Not in	Product Challenger	Not in	Not in
Wipro	Leader	Product Challenger	Leader	Product Challenger	Leader	Leader	Leader

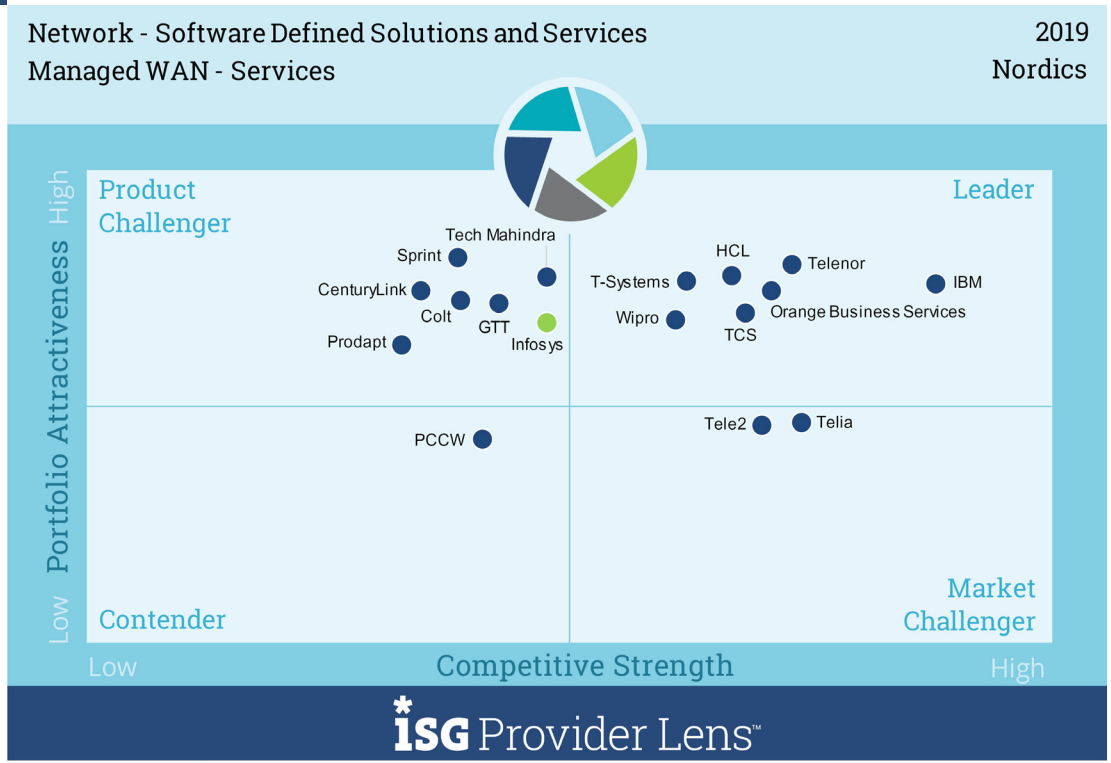
Network - Software Defined Solutions and Services Quadrants

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 (VAS) that include monitoring and reporting, security and outsourced customer-premise 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.



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. WAN services allow end users to access resources for network operation centers (NOCs), disaster recovery, active fault clearance and customer portals.

Traditional managed WAN services, often based on MPLS, have come under increased 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 prioritize types of applications depending on their respective jitter, packet loss and deceleration to allow a performance boost in individual applications as per 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 decentralized locations within enterprises. In addition, 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 require 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

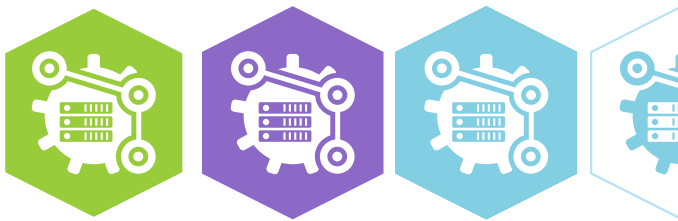
Observations

- **Wipro** offers a wide range of partner products and in-house solutions that enable enterprise connectivity. The company is enhancing its R&D capabilities to offer several innovation solutions such as self-healing networks.
- **T-Systems** offers a strong service delivery and deployment capabilities, complemented with a robust consulting practice.
- **HCL** has a strong managed WAN portfolio and a significant presence across the Nordics. The company is working towards the development of autonomous network capabilities.
- **TCS** offers network services as a part of its Cognitive Business Operations (CBO) pillar. It has a strong managed WAN and a comprehensive as-a-service portfolio to support a wide range of enterprise requirements.

MANAGED WAN SERVICES

Observations (cont.)

- **Orange Business Services** has a strong as-a-service model that is customizable and includes a layer of add-on services to support various enterprise needs. Its offerings are reinforced with a consulting-led practice to enable optimum managed WAN efficiency in an enterprise network.
- **Telenor** is one of the leading telecom service providers in Nordics with strong deployment capabilities across the region. The company offers customizable WAN solutions that can help achieve higher internet speeds.
- **IBM** has a wide range of in-house and partner products that deliver vendor-agnostic solutions to enterprises. IBM is progressing towards network innovation with intent-based automation.
- **Infosys** (Rising Star) presents an "internet first" vision with its extensive managed WAN service. It leverages its consulting expertise to customize the ideal solution for the enterprise client.



WIPRO

Overview

Wipro is an Indian multinational information technology, consulting and business process services provider. employing It has around 171,425 employees and generating generates around $8.4 billion in revenue. The delivery practice is consultative, covering both off-the-shelf solutions and customized client-specific solutions. Some of these include Wipro digital's Designit, ITIL integrated service platforms, Wipro SmartView for governance, Cloud Trust Security framework, Wipro HOLMES™ RPA/AI methods and toolsets and Wipro WANTAGE. The firm also offers partner solutions and products from Riverbed and Cisco.

Strengths

Intense R&D initiatives to speed up SDN maturity: Wipro has well-equipped network labs and Centers of Excellence (COE) with credible R&D capabilities and significant investments in research. Some of its recent activities include testing the cloud SDN, creating new solutions and exploring commercial nuances of migrating the network to the cloud. The COEs are integrated with multiple public clouds like Azure and AWS to support considerable levels of software testing on their network along with testing around SD-WAN and SD-access.

Designated managed WAN offering: Wipro has a dedicated managed WAN offering called Wipro WANTAGE which is gradually dovetailing software-defined WAN. The company has retained the conventional features of the solution for customers that want to continue with WAN optimization services. The service is offered as a pay as you grow model with wide-ranging lifecycle services that enable one-day realization of cost savings with zero upfront investment for customers. It also incorporates primary/secondary data centers, HQ/branch offices and mobile workers.

Proprietary consulting IP to portray the enterprise transformation landscape: Insightix™ can be represented as Wipro's IP framework for consulting to help customers realize the existing status of the network, the potential roadmap to next-generation networks and accordingly provide directions for digitizing the network. Wipro engages the factory model in which the Wipro team packages certain service catalogs for a predefined blueprint. The offering is highly customizable and can be tailored to any special requirement as per the environment.

Caution

Wipro has a plethora of tools and processes for clients in managed networking. However, to attract new and prospective, vertical-focused clients, the firm could adopt a use case-oriented approach.

2019 ISG Provider Lens™ Leader

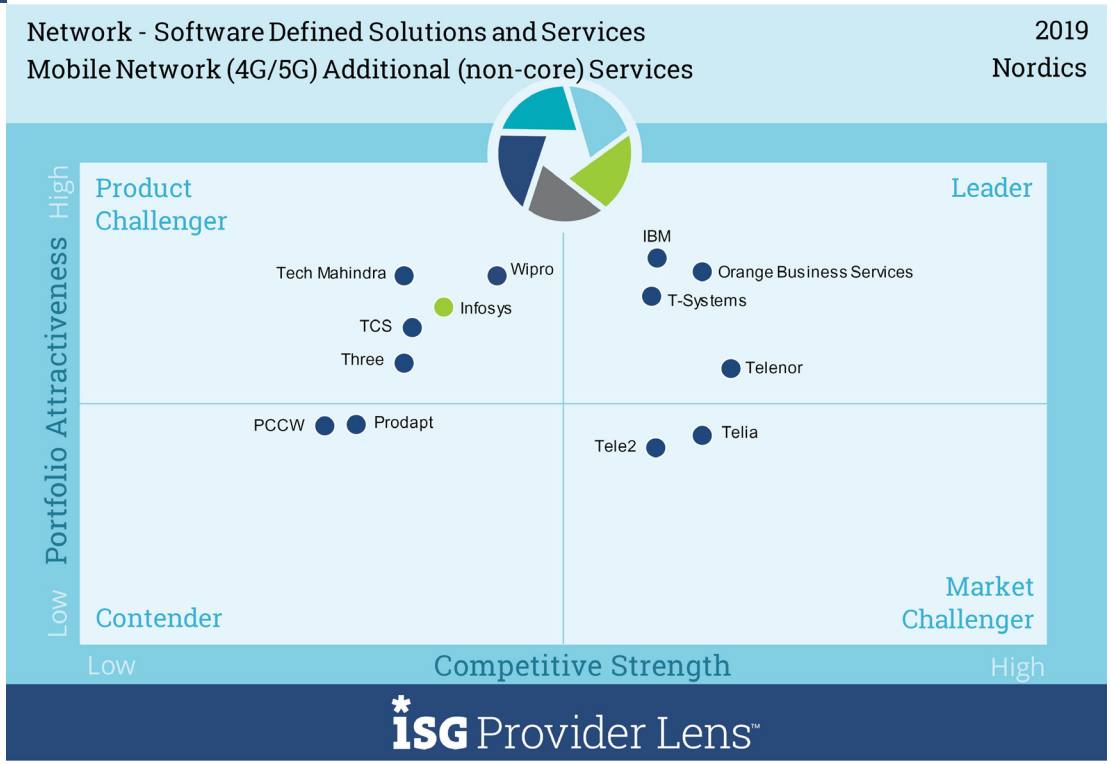
Wipro produces highly innovative and credible solutions backed by expertise, toolsets, methods and processes, including highly regarded AI and robotic process automation (RPA)-driven solutions.

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



Source: ISG Research 2019

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

Definition (cont.)

(POC) projects for specific use cases are planned for 2019–2021, resulting in most enterprises considering 5G for only long-term strategic planning.

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 U.S. 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

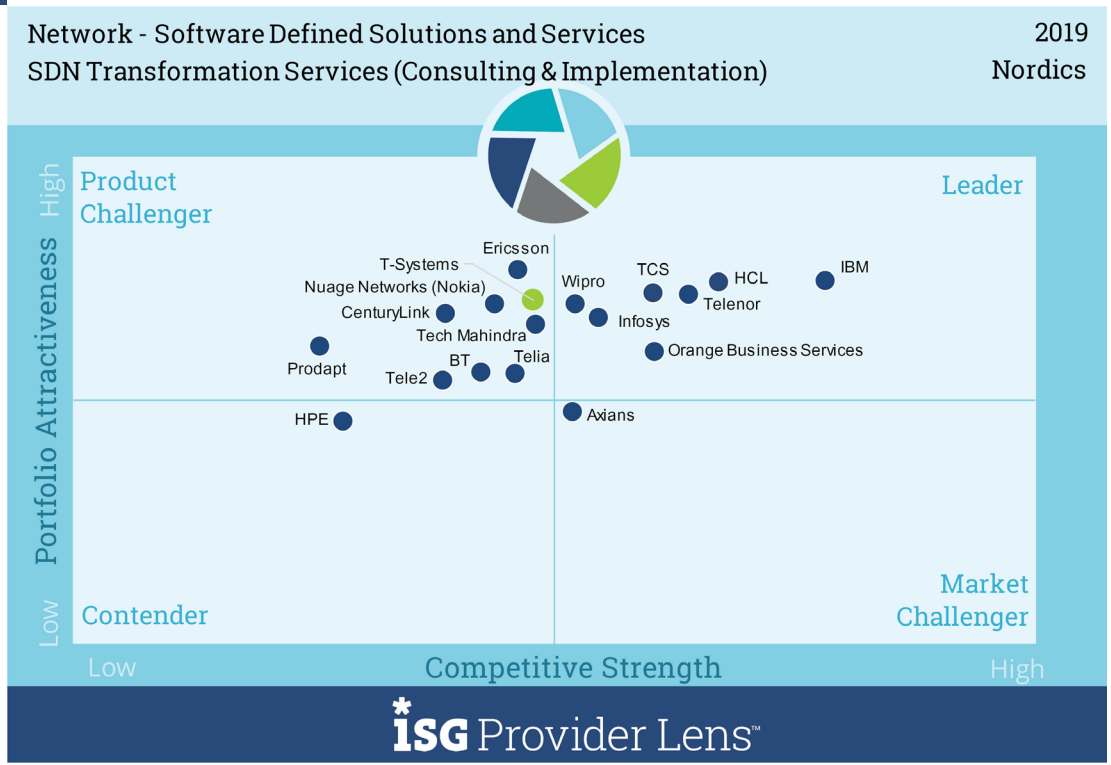
- **Orange Business Services** offers customizable value-added services (VAS) with a competitive consulting-led practice.
- **Telenor** offers a wide range of VAS, including cloud-based mobile solutions and mobile-based collaboration tools.
- Being a leading IT services and end-to-end enterprise technology solutions company, **T-Systems** has a strong existing client base for its 4G and 5G services. These are aimed at policy control for enterprise internet connectivity.
- **IBM** has comprehensive VAS deployments with strong service capabilities that are availed by several telcos.
- **Infosys** (Rising Star) works closely with many TSPs and enables them to provide extensive VAS across the globe. It offers an array of mobile business solutions that give enterprises access to some of the industry's most innovative products and services, with the added benefit of working with one source and one bill. It also has its own consulting resources and works with more than 40 professional service companies globally.

SDN TRANSFORMATION SERVICES (CONSULTING & IMPLEMENTATION)

Definition

Traditionally, modifications or new installations of IT devices in a data center and its external WAN networks involved making changes to each network component, which could take days or longer. This traditional, rigid architecture is been 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 virtualizing all



Source: ISG Research 2019

SDN TRANSFORMATION SERVICES (CONSULTING & IMPLEMENTATION)

Definition (cont.)

physical network resources beneath a hypervisor that allows the network to grow 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 center. Based on the centralized 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 centers). 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, centralizes and simplifies network management. This overlay design abstracts software from hardware, enabling network virtualization 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 centralized 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

- **HCL** has adopted a consultative approach in assisting enterprise clients across their digital journey and providing guidance on the required process reengineering and change management for the network transformation.
- **Telenor** is focused on developing and delivering a 5G-ready network transformation by enhancing its infrastructure capabilities.
- **Orange Business Services** has been strengthening its consulting/advisory wing and making acquisitions to sharpen its end-to-end transformation capabilities.
- **IBM** offers a range of pricing strategies and consumption-based business model to aid enterprises across various stages of network transformation.
- **Wipro** has a strong digital and network engineering capability which is leveraged to deliver a smooth enterprise network transformation service.
- **TCS** brings in the value proposition through agile business-centric goals to enable various functions across a network transformation project.
- **Infosys** has a strong partnership ecosystem with telecom service providers and equipment vendors, providing an all-inclusive approach for enterprises for their network reformation.
- **T-Systems** (Rising Star) has been progressing significantly with its disruptive cloud strategy that is directed towards network transformation projects, reflecting an improved go-to-market and reduced cost.

WIPRO

Overview

Wipro's network practice considers SDN as once 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 these solutions and services across the globe, mostly offshore.

Strengths

Holistic portfolio covering entire value chain: Wipro's end-to-end implementation services offering cover the entire service line, from planning, designing, procurement, implementation to testing and management. These SDN capabilities are leveraged to create pilot programs and eventually, production deployment of SDN solutions in private/hybrid clouds along with LAN and WAN networks. The intense exercise on the existing enterprise network helps customers to identify the shortcomings and choose the appropriate solution and service for the reformation as per their environment and business needs.

Enabling network fluidity with SWIFT SDN: The network practice under CIS is an integral part of Wipro's "connected future" offering, which delivers swift SDN transformations. Under the "SWIFT SDN" wrap-around, abstractions of lower level functions are engaged to programmatically control and manage network services in order to bring more flexibility on the enterprise network. Wipro considers SDN as a critical enabler and a key component of software-defined infrastructure (SDI) for influencing agility and cost optimization.

Caution

Wipro has an extensive client base for legacy services, which may not be significantly technologically progressive in adapting to SDN strategies. The firm should strategize a structured workshop-led, consultative approach to help clients become future ready.

2019 ISG Provider Lens™ Leader

Wipro's OEM-agnostic approach, flexible delivery and versatile engagement model, and skilled workforce combined with a global footprint and a plethora of IP and tools help the firm deliver reliable and holistic solutions to customers.

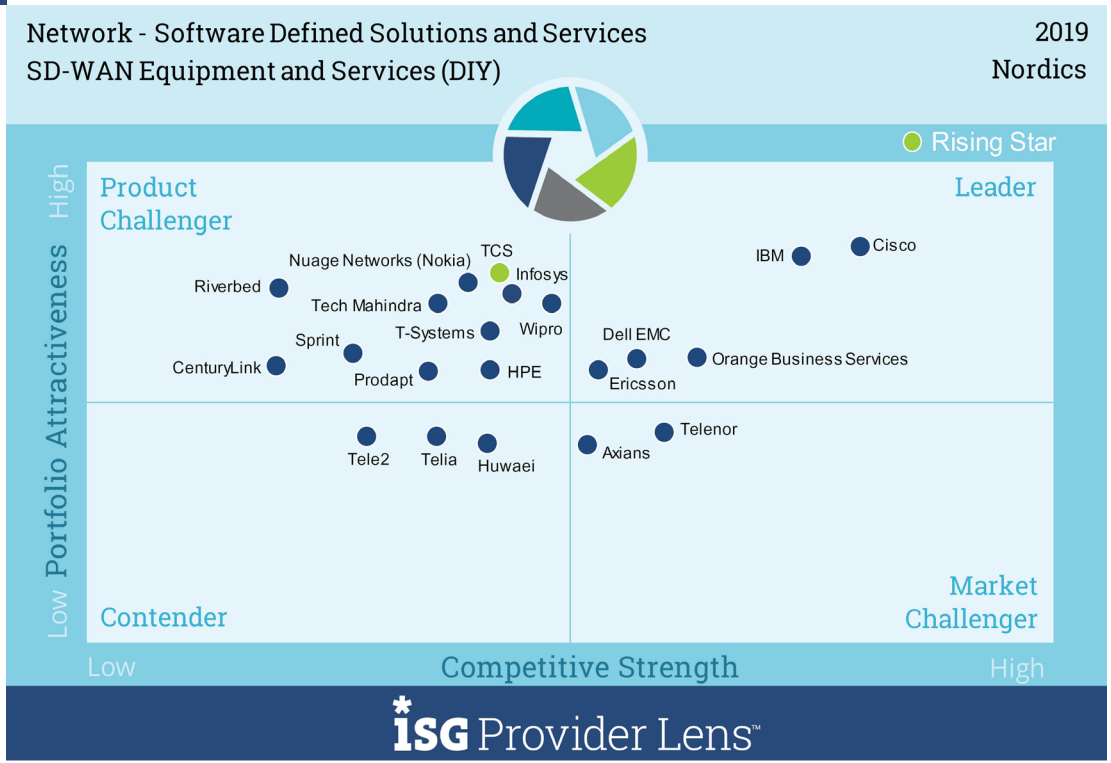
SD-WAN EQUIPMENT AND SERVICE SUPPLIERS (DIY)

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, centralizes and simplifies network management. This overlay design abstracts software from hardware, enabling network virtualization 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 centralized 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.



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

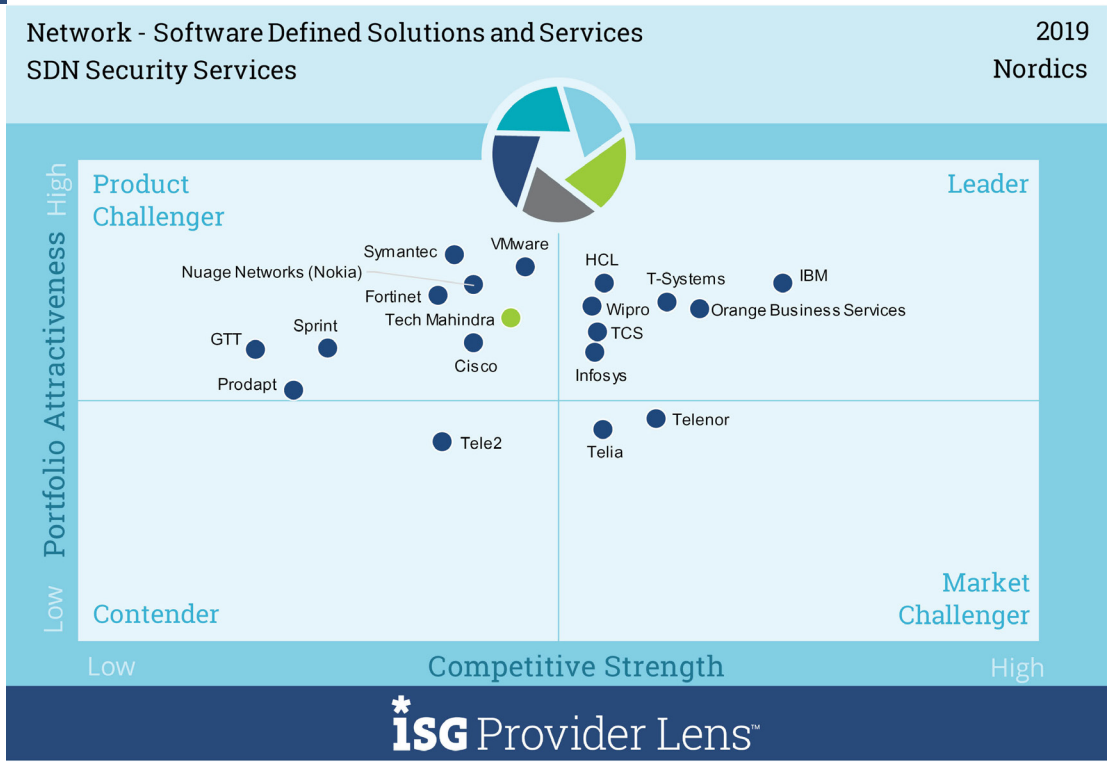
- **Cisco** has an industry-leading SD-WAN equipment and services portfolio. Together with its partners, it delivers a wide range of solutions and services to enterprise clients.
- **IBM** has steady partnerships with leading telecom service providers in the Nordics and is progressing towards network automation.
- **Orange Business Services** has strong, long-term and steady relationships with equipment vendors and telcos. This, coupled with its strong consulting and execution capabilities, enables the firm to deliver end-to-end solution to enterprises.
- **Dell EMC** offers a plethora of SDx equipment and do it yourself (DIY) solutions and services. It has a significant footprint globally and across Nordics.
- **Ericsson** is moving towards enhancing its deployment capabilities around SD-WAN. It is also heavily engaged in developments to enable faster 5G deployments.
- **TCS** (Rising Star) has structured a strategy for becoming a digital transformation partner for customers across the SDN business and has planned its strategy around customer centricity.

SDN SECURITY SERVICES

Definition

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 or data centers. A cloud- delivered variation extends the overlay to any cloud point-of-presence (PoP) or data center. 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 or 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 variety of security capabilities and can be enhanced in its inherent security capabilities by the addition of advanced security systems that are added as discrete overlays, services or applications and can be managed automatically and at central as well as local levels.

Generally, the top requirements that should be mandatory within every SD-WAN security regime are:



Source: ISG Research 2019

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 centers, 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 center 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. 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.

SDN SECURITY SERVICES

Definition (cont.)

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

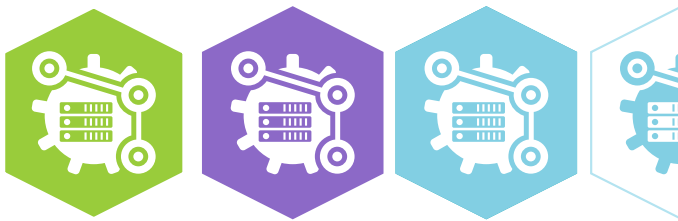
Observations

- **HCL** has adopted a consulting-led approach to mitigate network security risks. The company is also working on self-healing technology to enable auto-debugging and enhance security for enterprises.
- **T-Systems** offers standalone as well as bundled security offerings that are comprised of several security solutions, including web application firewalls, and automation-enabled vertical-focused security solutions.
- **Orange Business Services** offers robust SDN security solutions to different cross sections of clients across the entire network. It also offers cloud security.
- **IBM** enables security at each layer in a network. This is reinforced with continuous upgrades originating from a robust R&D engine, making security a key focus area within its network service offerings.
- **Wipro** maintains a strong partnership ecosystem with security vendors and offers various products and services with in-house or partner capabilities.

SDN SECURITY SERVICES

Observations (cont.)

- **TCS** offers top-notch network security solution with partners as a part of its "security first" enterprise strategy.
- **Infosys** has adopted a "cloud first" strategy to assist enterprises in mitigating security threats in an SDN ecosystem.
- **Tech Mahindra** (Rising Star) has combined its security operations center (SOC) offering with strategic partners to provide more robust, holistic security services to clients.



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 is focused on end-to-end security and delivers two-fold security for SDN clients, i.e. Security by SDN and Security for SDN, which includes third-party solutions as well as its native feature sets. Enterprises are thus assured of an all-inclusive, vendor-agnostic security layers over all network components.

Extended security through partnership: Security is an integral part of every software-defined solution offered by Wipro, delivered either as a standalone solution or through partners. The firm has an extensive partnership ecosystem that helps in strengthening its security offerings. The tactical partnerships, for instance, with Cumulus, Big Switch and Zscaler, enhance its cloud security capabilities with the SD-WAN strategy.

Dedicated secure network access offering for enhanced 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 and make 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 behavior, the network becomes policy-based so that business policies can be deployed faster into the network.

Caution

Being a niche technology area, SDN security offerings are not sold as isolated items like firewalls separately. Security is offered as a part of the bundle along with the SDN solutions such as SD-WAN. As the technology matures, Wipro may consider offering security as a standalone solution to enterprise networks.

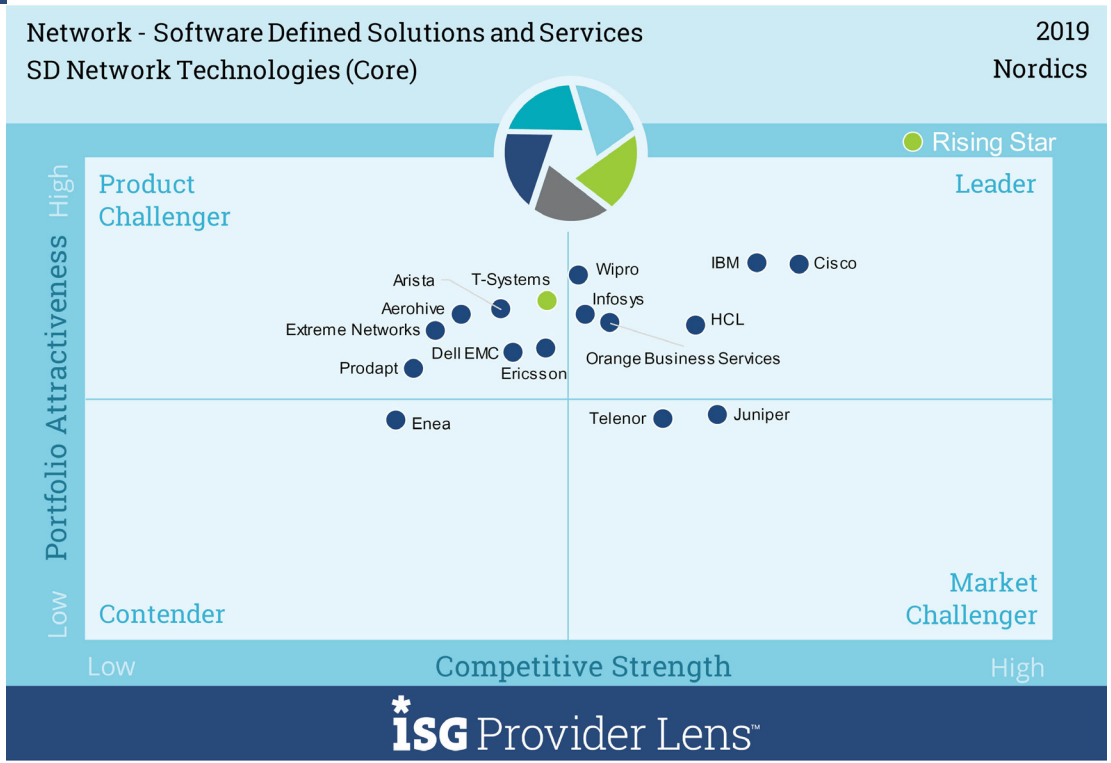
2019 ISG Provider Lens™ Leader

Wipro has a vast portfolio of network security offerings, which are continuously evolving with the progress in disruptive innovations and partnerships.

SD NETWORK TECHNOLOGIES (CORE)

Definition

SDN technology is a networking approach that eliminates the complex and static nature of legacy distributed network architectures by utilizing a standards-based software abstraction between the network control plane and underlying data forwarding plane in both physical and virtual devices. It is fundamentally different from NFV in terms of end results and ability, although both approaches are mutually supportive. A network virtualization 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 virtualization application supports arbitrary assignment of IP/MAC addressing schemes, automates network configuration tasks and enforces expected network segmentation. Data plane abstraction provides a standards-based approach to dynamically provide the network fabric from a centralized (or distributed) software-based controller or multiple controllers.



Source: ISG Research 2019

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 utilization 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

- **Infosys** offers vendor-agnostic SDN offerings through in-house developments and partnerships. It also provides consulting and deployment capabilities to help enterprises become 5G ready.
- **Wipro's** core network technology capabilities, coupled with R&D-driven strategies, enable the firm to showcase innovative solutions and services.
- **IBM** offers efficient core technology and services that are developed in-house or procured from partner vendors to deliver software-defined branch networks.
- **Cisco** has a customized portfolio of core network offerings that address a wide range of small to large enterprise requirements.
- **Orange Business Services** offers a wide portfolio of network core technology offerings through partnerships to deliver cost-efficient SDN solutions.
- **HCL** has been directing efforts towards building industry-leading, differentiated tools for optimized network automation and management.
- **T-Systems** (Rising Star) has a significant focus on the overall topic of fixed mobile convergence, i.e. mobile enterprise services, as most enterprises have considerable workloads on mobile broadband.

WIPRO

Overview

Wipro is continuing to focus on software-defined and niche areas especially on SD-WAN, SD-ACCESS, cloud connect as and 5G infrastructure. To help client enterprises enhance the flexibility of business applications, Wipro leverages the SDN principle, creates policies and attains the flexibility in choosing the right underlay from the appropriate TSP. SD-WAN has been a major focus of the Wipro networks practice. The WANFreedom solution brings flexibility and agility to the business application by creating a WAN overlay that is transport agnostic.

Strengths

Data center and cloud-oriented offering for improved network transparency: Wipro presents a well-defined and designated software-defined core offering where its SDN solutions are deployed primarily on data centers. The migration to cloud is also a part of this practice, and Wipro addresses the cloud-oriented SDN requirements with cloud SDN that extends to private, public and hybrid clouds. This gives the customers clear visibility over their network irrespective of the location of their major workloads.

Embedded automation driven by "manual by exception" convention: Wipro adopts a "manual by exception" convention for its network services and associated SD services wherein 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, which in turn sharpens its enterprise network intelligence capabilities.

Caution

Wipro can consider developing vertical-oriented use cases for onboarding new clients. It has a credible engineering competence and a range of tools and services across the entire managed networking value chain. It can introduce an additional layer of segregation as per verticals to exhibit industry-wise offerings.

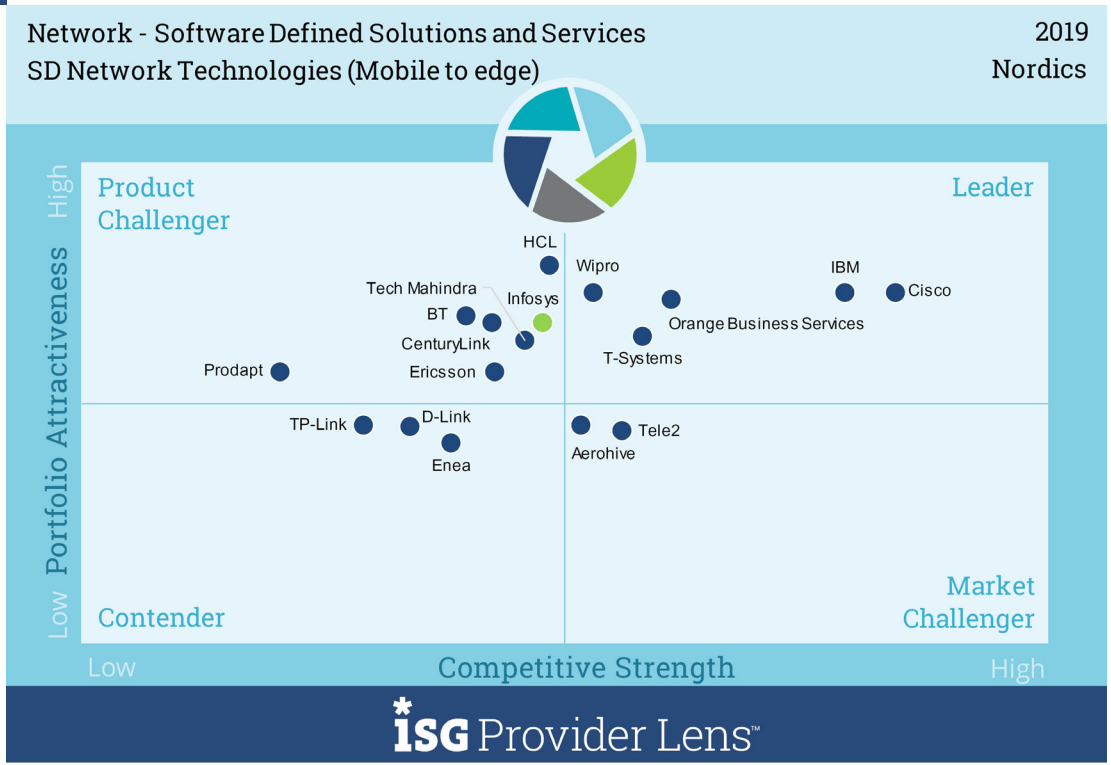
2019 ISG Provider Lens™ Leader

Wipro excels in delivering advisory-led, end-to-end solutions and services that are highly customizable 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.



Source: ISG Research 2019

SD NETWORK TECHNOLOGIES (MOBILE TO EDGE)

Definition(cont.)

vCPE

The traditional CPE deployment model, which requires multiple specialized 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, utilizing 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 virtualization 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-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 characterized 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 NETWORK TECHNOLOGIES (MOBILE TO EDGE)

Definition(cont.)

SD-LAN builds an application and policy-driven wired and wireless access architecture to facilitate self-organizing and centrally managed networks that are simpler to operate, integrate and scale. It can prioritize and change the behavior of the network based on application requirements and policies of what can be accessed by users, clients and IoT. Typically, it has self-optimizing, self-healing and self-organizing 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.

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

SD NETWORK TECHNOLOGIES (MOBILE TO EDGE)

Observations

- **IBM** enables a wide range of mobile to edge solutions including SD-LAN, virtualized edge, universal customer-premises equipment (uCPE) devices, from in-house and partner businesses.
- **Cisco** is one of the leading network hardware suppliers globally and has strong partnerships with leading network service and solution providers.
- **Wipro** offers value proposition through a range of pricing models, including gain share and value-based models, to support enterprise strategy.
- **Orange Business Services** offer VNFs, uCPE and virtualized enterprise devices to drive cloud connectivity and effective monitoring of enterprise edge.
- **T-Systems** offer strong consulting services to enable seamless end-to-end deployment of SD-LAN and edge computing among other services.
- **Infosys** (Rising Star) has extensive technology and networks engineering capabilities, with long-term involvements with TSPs together with enterprises in the migration and transformation spaces.

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. The WANFreedom solution is directed towards bringing flexibility and agility to the business application by creating a transport-agnostic WAN overlay.

Strengths

Forward-looking business strategy: Wipro has a unique go-to-market strategy that evolves from traditional time and material (T&M) and fixed price model pricing options towards a fixed capacity model or a gain share model or a value-based pricing and outcome-based pricing model. The progressive business model is aligned with Wipro's philosophy of continuous learning across its innovation journey.

Wi-Fi 6 innovations to accelerate enterprise 5G adoption: The 802.11AX Wi-Fi is one of the key focus areas of Wipro in the LAN segment on the edge side along with enterprise grade and private 5G connectivity. The firm has planned to make these disruptive technologies complement each other and provide a holistic edge solution (in the form of branch-in-a-box) to the client with the convergence of these innovations.

Wi-Fi 6 to instrument innovative edge services: Wipro has been working towards maneuvering the Wi-Fi 6 routers to bring the intranet, LAN and 5G to deliver several innovative services to the edge as well as make those services available to the other locations through a shared model. A distributed computing architecture can be cited as an example — if the compute is available on the branch at the user side, the computing power will be shared over the network. Wipro would also be able to use it on a shared model or rent it out to somebody else.

Caution

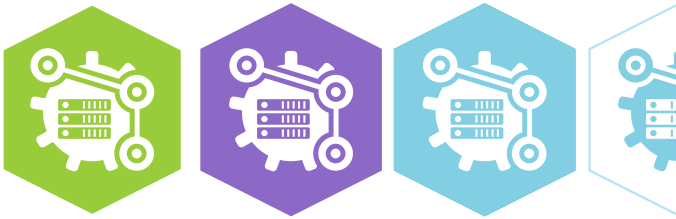
Wipro can consider strengthening its vertical-oriented offering portfolio to meet the market demand for explicit solutions in certain industries.

2019 ISG Provider Lens™ Leader

Wipro is directing its business models along continuous innovations and development of new solutions and use cases. These can support enterprise clients across their digital transformation roadmap at a lower cost, provide a better user experience and improve SLAs.

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 Nordics 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 market
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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