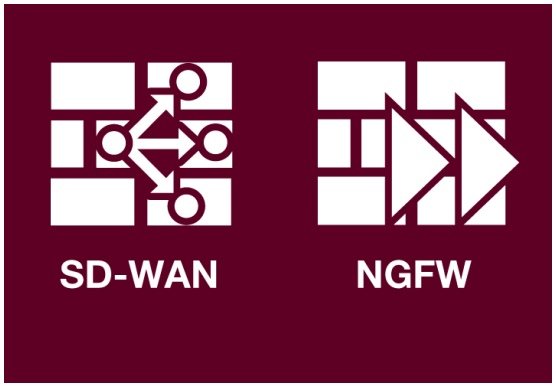
Secure SD-WAN: WAN transformation with Security-Driven Networking Approach

While digital innovation and rapid cloud adoption are changing the face of today's business, they also create significant challenges for organizations. Poor user experience as a result of increased traffic demands is one example. Another is increased operating expenses because of exclusive reliance on expensive multiprotocol label switching. Over the years, wide-area network (WAN) technologies have evolved to solve these issues by transforming the WAN Edge to include WAN optimization, routing, security, and software-defined WAN (SD-WAN).

SD-WAN has become the de facto solution for many network engineering and operations leaders seeking to replace traditional WAN and provide better performance and reliability. But not all SD-WAN solutions are complete and many pose significant challenges including:

- Poor security posture exposes the organization to greater risk of a security breach.
- Multiple point products and supplemental devices are required to cover security gaps and critical network functions, increasing capital expenses and infrastructure complexity



Alternatively, an SD-WAN solution that consolidates intelligent networking features and advanced security capabilities into one device offers organizations a better option for more effective and secure implementation. FortiGate Secure SD-WAN offers exactly this sort of solution.

FortiGate Secure SD-WAN, powered with a purpose-built SD-WAN ASIC, simplifies the process of transforming legacy router infrastructures to provide enhanced application performance, a better user experience, and improved security. Once WAN policies are set based on application criticality, performance requirements, security policies, and WAN paths, the FortiGate Secure SD-WAN solution takes over.

Gartner explores four popular SD-WAN use cases based on critical capabilities for WAN Edge Infrastructure. Fortinet received the highest score for the "Security-Sensitive WAN" use case. In addition, Fortinet scored in the top third for all remaining WAN Edge use cases in the November 2019 Gartner analyst research report, "Critical Capabilities for WAN Edge Infrastructure."

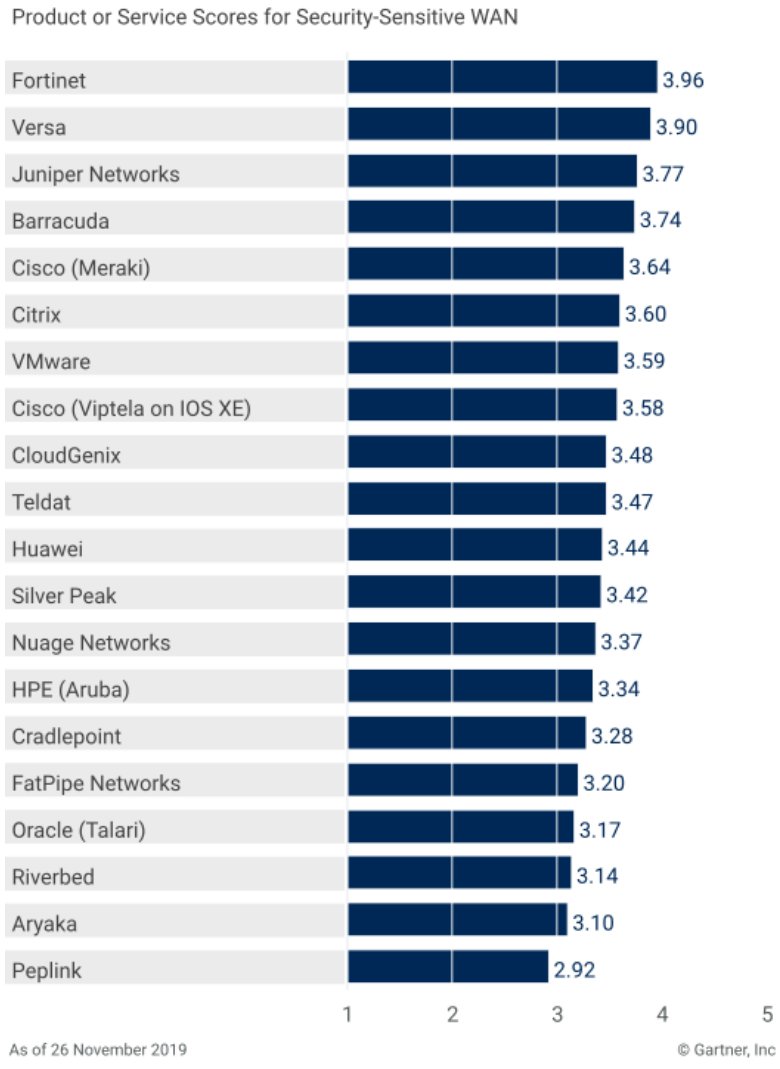
In the report, Gartner states, "Gartner recommends that users consider the set of critical capabilities as some of the most important criteria for WAN Edge solution acquisition decisions."

Fortinet believes these results further highlight its focus on Secure SD-WAN innovation.

Gartner includes recommendations on how to select the best SD-WAN solution based on use cases and features. For network and security leaders who want to see how FortiGate SD-WAN can scale to meet current and future WAN demands, request a demo of FortiGate Secure SD-WAN or refer to the Secure SD-WAN portal.

Source: Fortinet

FIGURE 4 Vendors' Product Scores for the Security-Sensitive WAN Use Case



Source: Gartner (November 2019)

Research from Gartner

Critical Capabilities for WAN Edge Infrastructure

Infrastructure and operations leaders responsible for networking are evaluating WAN edge solutions to address expanding business requirements in order to connect to on-premises and cloud-based workloads. They should use this research to identify vendors that best fit their specific use cases.

Key Findings

- The global wide-area network (WAN) edge market is crowded, as Gartner estimates that there are more than 70 vendors providing viable technology solutions driven primarily by software-defined WAN (SD-WAN).
- While SD-WAN is the dominant functionality, security and application performance/visibility features are increasingly being integrated into vendor solutions. Consequently, vendor alignment varies based on the specific use case.
- Ease of use and agility are cornerstones of most SD-WAN solutions, making network setup and ongoing management easier, more scalable, less time-consuming, and more effective in hybrid WAN and hybrid IT environments.
- Increasingly, vendors are offering different types of deployment models (on-premises and cloud-hosted) and form factors to focus on different buyers and use cases.

Recommendations

To build and sustain scalable and reliable cloud and edge infrastructure, I&O leaders should:

- Update network infrastructure by leveraging current WAN edge solutions with a focus on SD-WAN functionality.
- Focus on differentiating SD-WAN solutions by comparing their native application performance and security capabilities.
- Maximize agility, performance and reliability while controlling costs by using SD-WAN solutions to leverage multiple circuits (such as MPLS, internet and LTE) and simplifying operations.
- Maximize flexibility by determining the best deployment model with either all functions deployed at the branch or some at the branch and some in the cloud.

Strategic Planning Assumptions

By 2024, to increase agility and enhance support for cloud applications, 60% of enterprises will have implemented SD-WAN, compared with less than 20% in 2019.

By 2023, to deliver cost-effective scalable bandwidth, 30% of enterprise locations will only have internet WAN connectivity, compared with less than 10% in 2019.

Through 2021, over 80% of SD-WAN solutions will continue to be delivered on dedicated hardware versus uCPE due to performance, price and simplicity.

What You Need to Know

As organizations digitally transform, the WAN edge market has been evolving with the primary goal to address the shift from traditional hub-and-spoke WAN architectures (from branch office to on-premises data center) to connect with more distributed cloud services and internet-based resources as well as other corporate locations. Infrastructure and operations (I&O) leaders responsible for networking can use the critical capabilities assessed in this report to narrow down their search for appropriate solutions that more closely meet their specific requirements.

In this Critical Capabilities for WAN edge infrastructure, we analyze four popular use cases:

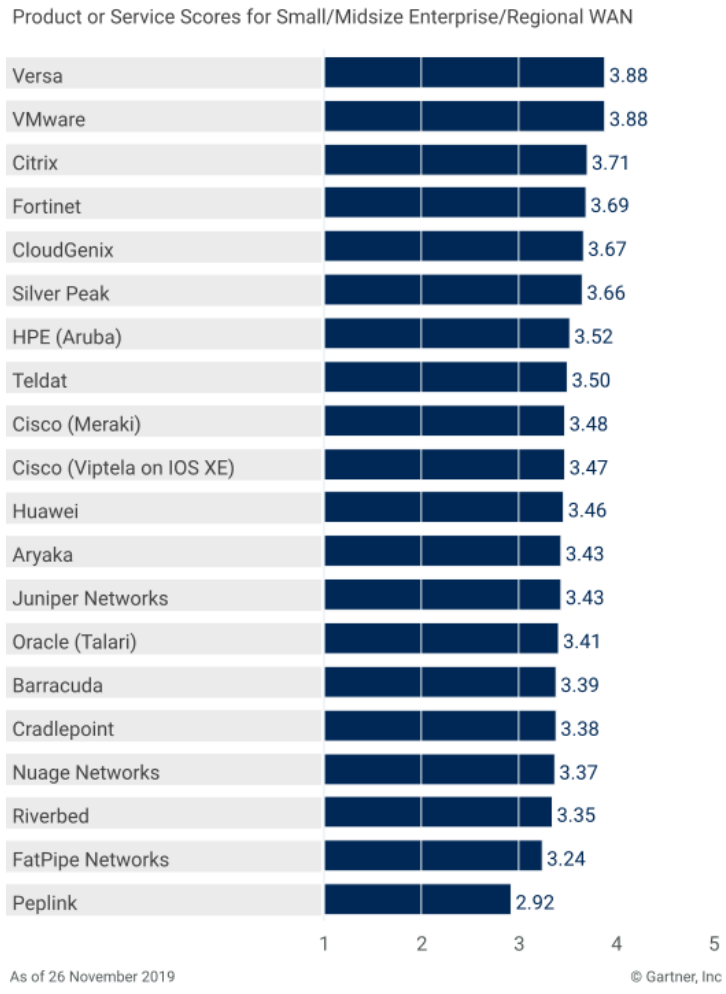
- A regional WAN that is typical in many midsize enterprises (MSEs) or larger enterprises with a smaller number of WAN locations (fewer than 50 sites).
- A global WAN requirement for larger multinational organizations with 200 to more than 1,000 sites, and that spans at least two continents with increasing resources moving to the cloud.

- A large-scale retail WAN typified by small footprint locations (such as gas stations, convenience stores and similar environments) that scales from hundreds to thousands of near-identical locations, either domestically or across multiple countries and regions.
- A security-sensitive WAN typical in some mid- to large-scale organizations from 25 sites and higher that are focused on securing branch offices as the main priority where network and security procurements are increasingly converging.

Analysis

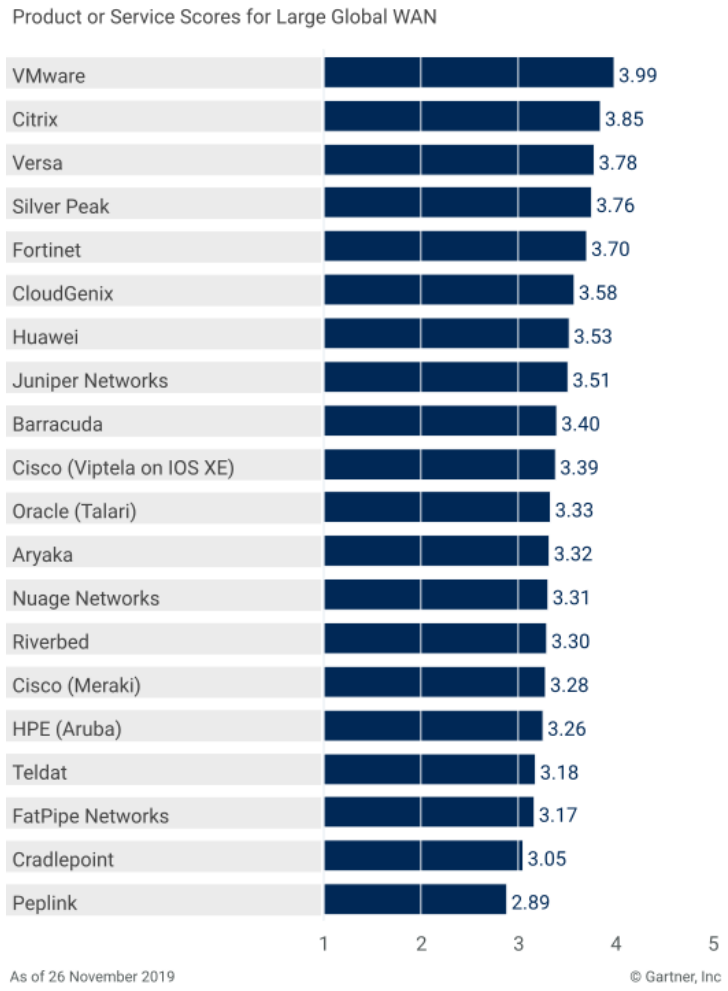
Critical Capabilities Use-Case Graphics

FIGURE 1 Vendors' Product Scores for the Small/Midsize Enterprise/Regional WAN Use Case



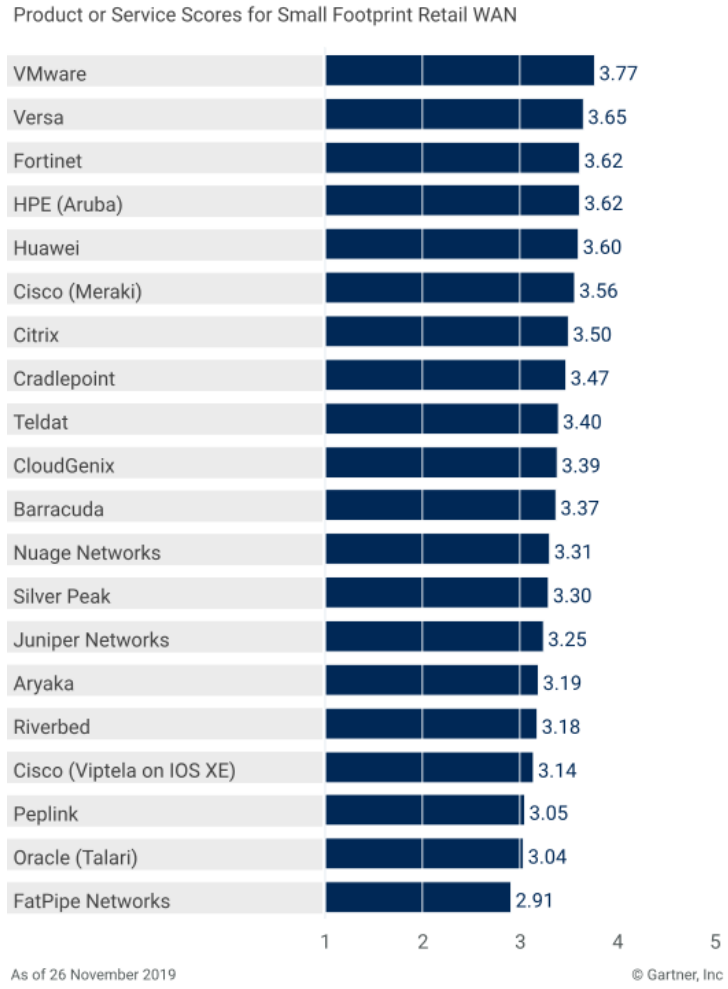
Source: Gartner (November 2019)

FIGURE 2 Vendors' Product Scores for the Large Global W AN Use Case



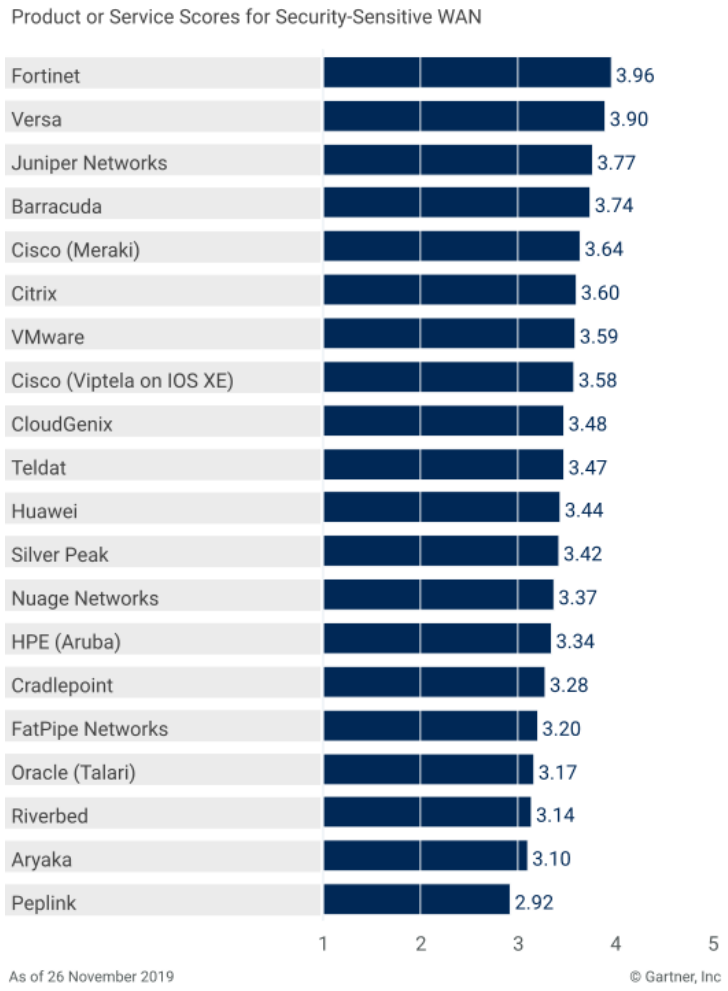
Source: Gartner (November 2019)

FIGURE 3 Vendors' Product Scores for the Small Footprint Retail WAN Use Case



Source: Gartner (November 2019)

FIGURE 4 Vendors' Product Scores for the Security-Sensitive WAN Use Case



Source: Gartner (November 2019)

Vendors

Aryaka

Aryaka is a privately held company headquartered in San Mateo, California. Gartner estimates that Aryaka has more than 800 WAN edge customers deployed globally. Aryaka has a fully managed service (SmartCONNECT) for global WAN connectivity in a network as a service (NaaS) model. SmartCONNECT combines the Aryaka Network Access Point (ANAP) CPE with the Aryaka Global Core backbone, which the edge devices connect. The service includes SD-WAN, WAN optimization and visibility, as well as options for remote access, integrated perimeter security from third-party vendors, and the procurement and management of internet access. The Aryaka backbone allows controlled routing of traffic not only to applications in enterprise data centers, but also to cloud-hosted applications via both direct cloud gateways and internet gateways. The solution has limited native advanced security capabilities and is sold as a managed service, so it is not suitable for do-it-yourself (DIY) customers.

Aryaka ranks in the middle third for the small/midsize enterprise/regional WAN and large global WAN use cases and in the bottom third for the small retail footprint and security-sensitive WAN use cases. Aryaka should be considered by organizations with a global, geographically distributed footprint wanting a fully managed service experience.

Barracuda

Barracuda is a privately held company based out of Campbell, California. Gartner estimates that Barracuda has over 20,000 WAN edge customers. Barracuda positions its CloudGen Firewall as its primary WAN edge product. While the CloudGen Firewall has a built-in graphical user interface, it does not yet have cloud-based management capabilities. In keeping with the product's firewall roots, there is also a deep range of advanced security features including IPS and IDS, in addition to a next-generation firewall. The solution also includes support for latency-sensitive traffic, such as voice, via packet duplication and other application performance capabilities. Despite Barracuda's historic focus on the MSE market, CloudGen Firewall has many features found in products geared toward larger enterprises. Still, the solution lacks granular path selection capabilities in support of performance-based routing.

Barracuda ranks in the top third in the security-sensitive WAN use case, in the middle third in the large global WAN and small retail footprint WAN use cases, and in the bottom third for the small/midsize enterprise/regional WAN use case. Barracuda is suitable for security-conscious enterprises located in the Americas and Western Europe looking for a combined security and networking solution.

Cisco (Meraki)

Cisco is a publicly traded company based in San Jose, California. Gartner estimates that Cisco has more than 100,000 WAN edge customers with approximately 13,000 on its cloud managed Meraki MX platform, principally deployed as remote office firewalls. The Meraki cloud management platform also integrates Meraki wireless access points, wired switching platforms and phones. Meraki solutions are largely positioned to midsize organizations or for remote offices of larger enterprises. Consumption models are streamlined and the cloud-based management lessens the operational burden of deploying and managing remote offices. The Cisco SD-WAN powered by the Meraki solution is based on Meraki's MX security appliances with SD-WAN capabilities added to the platform over the past three years. Currently, the platform has limited application recognition, application analytics and performance capabilities compared to the competition.

Cisco's Meraki WAN edge solution ranks in the top third in the small footprint retail WAN and security-sensitive WAN use cases and in the middle third for the small/midsize enterprise/regional WAN as well as the large global WAN use cases. The Meraki solution should be considered by lean IT organizations looking for a simple, cloud-managed WAN edge solution, especially for those looking for a fully manageable remote branch combining networking and security.

Cisco (Viptela on IOS XE)

Cisco is a publicly traded company based in San Jose, California. Gartner estimates that Cisco has more than 100,000 WAN edge customers (primarily Integrated Services Routers [ISR] customers), including more than 800 of its Cisco SD-WAN powered by Viptela offering, but only about 100 of these are delivered on the ISR platform. Its flagship WAN edge networking offering is Cisco SD-WAN powered by Viptela software running on ISR 1000 and 4000 series with IOS XE managed by vManage. It also sells Viptela on the Aggregation Services Routers (ASR) 1000

series, Enterprise Network Compute System (ENCS) 5000 series, the vEdge platform (Viptela solution offered before the Cisco acquisition) and virtual form factors in major cloud platforms such as AWS, Azure and Google Cloud. The Cisco offering supports complex architectures and sophisticated routing with application performance functionality and recent advanced security capabilities. However, there continues to be performance and stability issues of the IOS-XE Viptela product delivered on the ISR platform, as reported by many clients, MNS providers and channel partners. Given this, enterprises may be offered Viptela on the vEdge and ENCS platforms as alternatives, which results in market confusion regarding which product to choose based on feature disparity and product stability/performance.

For the purpose of this research, Gartner primarily analyzed Viptela on the IOS XE code. Gartner didn't evaluate the vEdge product, as that is not the Viptela product Gartner clients see Cisco leading with in the market. Having said that, Cisco's Viptela-based SD-WAN solution ranks in the middle third for the security-sensitive WAN, the small/midsize enterprise/regional WAN and large global WAN use cases. Further, the vendor ranks in the bottom third in the small footprint retail WAN use case. Cisco Viptela should be considered for all enterprise SD-WAN use cases, but organizations should be mindful of scaling and stability issues with the product delivered on the ISR platform (with the IOS XE code) especially for larger deployments.

Citrix

Citrix is a publicly traded company based in Fort Lauderdale, Florida. Gartner estimates that Citrix has more than 1,200 WAN edge customers deployed globally. Citrix's flagship WAN edge products are its Citrix SD-WAN appliances (physical, virtual and cloud), which are managed via the Citrix SD-WAN Center. Citrix has a comprehensive SD-WAN solution with application performance capabilities, including WAN optimization and some voice optimization. In addition, the vendor has some native advanced security capabilities (such as an application layer firewall) but lacks full advanced security capabilities when compared with other vendors in this research. The Citrix SD-WAN product scales from small sites to large headquarters and has deployments in both small and large networks over 1,000 sites. The vendor also recently announced a cloud gateway solution to offer cloud onramp capabilities for easier access to cloud workloads.

Citrix ranks in the top third for the small/midsize enterprise/regional WAN, large global WAN and security-sensitive WAN use cases. Further, the vendor ranks in the middle third in the small footprint retail WAN use case. Citrix SD-WAN should be considered for all organizations (especially existing Citrix software customers) of any size across any vertical that are looking to upgrade their WAN architecture to SD-WAN.

CloudGenix

CloudGenix is a privately held company based in San Jose, California. Gartner estimates that CloudGenix has more than 800 WAN edge customers. CloudGenix is focused primarily on SD-WAN, with its flagship offering including Instant-On Network (ION) devices that are available in both hardware and software form factors and also exist in the AWS and Azure marketplaces. The vendor's management portal is cloud-delivered with intuitive workflow and detailed analytics. CloudGenix supports a wide range of routing and network topologies, but no WAN optimization or native advanced security. The solution offers comprehensive path selection capabilities based on various performance criteria. Further, the vendor offers comprehensive network health and application performance data.

CloudGenix ranks in the top third in the small/midsize enterprise/regional WAN and large global WAN use cases and in the middle third in the small footprint retail WAN and security-sensitive WAN use cases. CloudGenix should be considered by organizations across all sizes and verticals, primarily in North America, for all use cases.

Cradlepoint

Cradlepoint is a privately held company headquartered in Boise, Idaho. Gartner estimates that Cradlepoint has over 5,000 WAN edge customers. Cradlepoint positions both its NetCloud Service for Branch, which includes its Advanced Edge Routers (AERs), and its Cloud Virtual Router (CVR) as its primary WAN edge product suites. Cradlepoint has been focused on enabling connectivity to small branch and retail locations with a specific emphasis on 4G/LTE connectivity. Additionally, Cradlepoint's NetCloud Perimeter offers over-the-top capabilities to provide an overlay fabric when utilizing the public internet as part of the WAN. However, the NetCloud suite does not provide application performance (WAN optimization or real-time traffic remediation technologies such as FEC or packet duplication).

Because Cradlepoint has historically focused on LTE/4G integration into its products, it continues to excel in this area but offers less capabilities in supporting wired connections.

Cradlepoint ranks in the middle third in the small footprint retail WAN use case and in the bottom third for the small/midsize enterprise/regional WAN, large global WAN and security-sensitive WAN use cases. Cradlepoint should be considered by distributed organizations, particularly in retail and hospitality industries, with a strong reliance on 4G/LTE integration, and by those that have relatively basic application traffic requirements.

FatPipe Networks

FatPipe Networks is a privately held company based in Salt Lake City, Utah. Gartner estimates that FatPipe has more than 1,600 WAN edge customers, primarily midmarket and in North America. FatPipe offers a broad array of WAN products, including secure routers, link aggregators/load balancers and WAN optimization appliances. Its flagship WAN edge offering is the FatPipe SD-WAN offering, which includes the company's MPVPN CPE (physical and virtual) and its Symphony orchestrator. FatPipe has strong path selection, link-bonding capabilities, some native advanced security capabilities (such as IPS, A/V and content filtering), and a history of supporting hybrid network architectures. It typically has sold its solutions in the midmarket with very little presence in the large enterprise space and limited experience with more complex networks. Additionally, its products don't support integrated Wi-Fi for smaller footprint locations.

FatPipe ranks in the bottom third for all use cases. FatPipe should be considered primarily by midmarket organizations located in North America with a focus on strong application performance needs.

Fortinet

Fortinet is a public company headquartered in Sunnyvale, California. Gartner estimates that Fortinet has over 21,000 WAN edge customers primarily using it as UTM/NGFW for the midmarket. Fortinet addresses the WAN edge market with a focus on security, and it positions its FortiGate firewall as its flagship WAN edge product. Fortinet has expanded the capabilities of its next-generation firewall and advanced security features with SD-WAN features and functionality. FortiGate is available in traditional appliance, as well as an NFV for on-premises deployments and is also available as a virtual appliance in AWS, VMware Cloud, Azure, Google Cloud, Oracle and Alibaba marketplaces. FortiGate WAN edge is managed via either FortiManager or FortiGate Cloud platforms. FortiGate also supports application performance techniques for both real-time and non-real-time traffic, which positions the product to support a wide range of use cases. The vendor has been slow to develop cloud-based security solutions as well as hosted cloud gateways.

Fortinet ranks in the top third for all use cases. Companies of all sizes and verticals in any geographic region should consider Fortinet, especially in network infrastructures requiring a strong security focus.

HPE (Aruba)

Aruba operates as a subsidiary of Hewlett Packard Enterprise (HPE), which is a publicly traded company based in San Jose, California. Aruba is a long-established networking Wi-Fi and LAN switching vendor, and Gartner estimates that it has more than 250 WAN edge customers. Its flagship WAN edge solution includes branch gateways, physical and virtual (for AWS and Azure) headend gateways, and the Aruba Central Cloud Platform. Aruba is repositioning itself from predominantly a leading LAN and WLAN vendor to also a WAN vendor by developing its integrated orchestration solution, including switching, WLAN, WAN and security as a combined SD-Branch solution. On the WAN side, the vendor offers scalable orchestration but lacks WAN optimization for non-real-time traffic as well as real-time optimization for VoIP, such as FEC and packet duplication. It also lacks some native advanced security capabilities, such as antivirus, data leak prevention (DLP) and IPS.

Aruba ranks in the top third for the small footprint retail WAN use case, middle third in the small/midsize enterprise/regional WAN and security-sensitive WAN use cases, and bottom third in the large global WAN use case. Aruba should be considered for all use cases globally, especially in the small footprint retail use case and when combining LAN/WLAN with SD-WAN orchestration is increasingly important.

Huawei

Huawei is a privately held company headquartered in Shenzhen, China. Gartner estimates that Huawei has over 50,000 WAN edge customers. Huawei

offers a broad suite of network infrastructure hardware, and its flagship products in the WAN edge market are its CloudWAN and NetEngine AR series of routers. Huawei's WAN edge suite of products supports all traditional WAN topologies in addition to cloud and multicloud integration. The NetEngine AR router is available as both an on-premises appliance and a VNF form factor. Cloud management capabilities are supplied via the Huawei Cloud Service, cooperative clouds and private clouds. However, potential adopters should be aware that it is less intuitive and more technically challenging than most other SD-WAN management interfaces. Both CloudWAN and NetEngine support application performance capabilities such as WAN optimization and real-time traffic optimization via FEC, Adaptive-FEC and packet duplication. The platform also includes comprehensive traffic analytics in addition to per application reporting.

Huawei ranks in the top third for the small footprint retail WAN use case and in the middle third for the small/midsize enterprise/regional WAN, large global WAN and security-sensitive WAN use cases. Continuing geopolitical challenges affecting Huawei make adopting the technology problematic in North America and, to a lesser extent, Western Europe, but organizations outside of those geographies should consider Huawei in all use cases.

Juniper Networks

Juniper Networks is a publicly traded company based in Sunnyvale, California. Gartner estimates that it has more than 23,000 WAN edge customers, which are primarily security-focused WAN deployments based on the SRX security/routing platform. Juniper's flagship WAN edge solution is its Contrail SD-WAN, composed of its SRX Series Services Gateways (physical, virtual and cloud) and Contrail Service Orchestration. Juniper's primary route to market is through managed service providers and long-standing network service provider relationships, often leveraging its NFX secure uCPE appliances. Juniper has strong support for routing, SD-WAN and native advanced security capabilities. However, the vendor lacks features such as WAN optimization, has limited real-time optimization, has a suboptimal small footprint form factor (for example, lacking integrated Wi-Fi), and has limited experience delivering SD-WAN solutions directly to the enterprise market.

Juniper ranks in the top third for the security-sensitive WAN use case and in the middle third for the small/midsize enterprise/regional WAN, large global WAN and small footprint retail WAN use cases. Juniper should be considered by organizations for all use cases globally, especially when sourced as managed service solutions and where strong security requirements exist.

Nuage Networks

Nuage Networks is based in Mountain View, California and is a division of publicly traded Nokia Networks, based in Espoo, Finland. Gartner estimates that Nuage has approximately 1,400 WAN edge enterprise customers and 70 service provider partners for its SD-WAN solution. Nuage and its SP partners have production deployment beyond 1,000 sites. Nuage Virtualized Network Services (VNS) include its Virtualized Services Directory (VSD), the Virtualized Services Controller (VSC) and the Network Services Gateway (NSG) CPE (physical, virtual and cloud). The vendor has developed a highly scalable WAN edge SD-WAN solution with solid routing capabilities. It leverages well-established relations with network service providers around the globe to deploy SD-WAN as a service, though it has only limited experience dealing directly to support DIY enterprise accounts. The solution does not include any WAN optimization functionality to support non-real-time traffic.

Nuage ranks in the middle third for the large global WAN, small footprint retail WAN and security-sensitive WAN use cases and bottom third for the small/midsize enterprise/regional WAN use cases. Nuage can be considered by all types of global organizations that require their SD-WAN solution to be delivered and managed through service provider channels.

Oracle (Talari)

Oracle is a publicly traded company headquartered in Redwood City, California. Gartner estimates that Oracle has over 500 WAN edge customers. In 2018, Oracle acquired Talari Networks; therefore, the original Talari Failsafe SD-WAN has been rebranded as Oracle SD-WAN, Oracle's flagship product in the WAN edge market. Oracle SD-WAN supports limited WAN optimization, but it also supports real-time packet loss mitigation functionality. Adopters will find the on-premises (or self-hosted in public cloud environments) management tools more than adequate to manage the platform. However, there is no Oracle-hosted cloud-based management platform available at

this time. Oracle's Aware platform offers deep traffic and application performance analytics. Additionally, while the vendor has an integrated firewall, Oracle has limited native advanced security capabilities such as NGFW. Oracle also offers comprehensive performance-based path selection functionality, but it has limited options for small footprint locations with no integrated Wi-Fi or LTE.

Oracle ranks in the middle third for the small/midsize enterprise/regional WAN and large global WAN use cases. Further, the vendor ranks in the bottom third for the small footprint retail WAN and security-sensitive WAN use cases. Oracle should be considered primarily by midsize/regional WAN as well as some large global WAN use cases with a strong emphasis on mission-critical application performance and survivability.

Peplink

Peplink is a public company listed on the Hong Kong Stock Exchange as Plover Bay Technologies. Peplink is headquartered in Hong Kong, and Gartner estimates that it has over 8,500 WAN edge customers. Peplink addresses the WAN edge market with both its MAX and Balance router platforms, which provide wired and wireless SD-WAN, respectively, with the main focus on wireless. Both platforms are managed via Incontrol 2, Peplink's cloud management platform, and are available in appliance and NFV for on-premises deployments. However, since virtual images are not available on any of the cloud marketplaces, customers requiring integration with AWS and Azure must manually procure and upload a virtual image. Additionally, Peplink's SpeedFusion technology, which is present in both MAX and Balance products, delivers application performance via link bonding. While the vendor offers unique capabilities in support of wireless networks, it also offers limited security capabilities as well as limited application analytics and WAN optimization functionality.

Peplink ranks in the bottom third for all use cases. Peplink should be considered for regional enterprise and retail WAN deployments, especially in use cases where 4G/LTE connectivity is a primary requirement.

Riverbed

Riverbed is a privately held company based in San Francisco, California. Historically recognized as a leader for its WAN optimization platform, Gartner estimates that Riverbed has over 30,000 WAN edge customers with over 3,000 using its SteelConnect and SteelHead SD SD-WAN products. The Riverbed SD-WAN platform is available in both appliance and virtualized form factors and is managed via SteelConnect Manager, which can be deployed on-premises or in the cloud. Riverbed does not offer vendor-hosted cloud gateways. However, it does offer one-click deployment of cloud-based appliances on AWS and Microsoft Azure and is semiautomated for Google Cloud, IBM Cloud and Oracle Cloud. Although Riverbed's SD-WAN solution offers excellent WAN optimization capabilities, it lacks real-time optimization (such as FEC and packet duplication) and offers limited advanced security capabilities. Also, it should be noted that the future of the SD-WAN portion of the SteelHead SD product is planned to be outsourced to Versa as part of an OEM relationship.

Riverbed ranks in the middle third for the large global WAN use case and the bottom third in the small/midsize enterprise/regional WAN, small footprint retail WAN and security-sensitive WAN use cases. Riverbed SD-WAN is suitable for midsize and large companies globally, especially where WAN optimization is a primary driver.

Silver Peak

Silver Peak is a privately held company headquartered in Santa Clara, California. Gartner estimates that Silver Peak has approximately 3,000 customers with over 1,500 on its flagship WAN edge platform. Silver Peak integrates its long-standing WAN optimization functionality into its flagship Unity EdgeConnect SD-WAN offering, which includes Unity EdgeConnect edge devices, Unity Orchestrator and optional Unity Boost. Silver Peak also offers real-time optimization capabilities (such as FEC and packet duplication) as well as solid path selection, application recognition and application visibility capabilities. While Silver Peak lacks cloud gateways, it does offer a Cloud Intelligence solution that finds the lowest latency path to hundreds of SaaS applications. Additionally, although the vendor has limited native advanced security capabilities, it offers integration with a variety of cloud-based security offerings and on device VNFs.

Silver Peak ranks in the top third in the small/midsize enterprise/regional WAN and large global WAN use cases. Further, the vendor ranks in the middle third for the small footprint retail WAN and the security-sensitive WAN use cases. Companies

of any size and vertical located in North America, Western Europe and Asia/Pacific should consider Silver Peak for SD-WAN, especially where ensuring application performance is a key requirement.

Teldat

Teldat is a privately held communications company based in Madrid, Spain and Nuremberg, Germany. Gartner estimates that Teldat has more than 1,000 WAN edge customers. Teldat offers a broad range of voice and data products, including LAN, WAN, wireless LAN (WLAN) and voice. Its flagship WAN edge offering is the Teldat M8 Smart, an SD-WAN gateway and the Cloud Network Manager (CNM) controller. Teldat has routing support as well as basic firewall, IDS, A/V and cloud content filtering functionality. Additionally, the vendor offers no WAN optimization and no real-time optimization capabilities. The GUI is basic and somewhat technical in nature and offers limited visibility and reporting, but it provides good alarming capabilities. Additionally, the vendor primarily operates in Europe, with increasing capabilities in South America.

Teldat ranks in the middle third for the small/midsize enterprise/regional WAN, small footprint retail WAN and security-sensitive WAN use cases, and in the bottom third for the large global WAN use case. The solution is suitable for midsize and retail use cases looking for a service-provider-delivered solution without complex WAN topologies.

Versa

Versa is a privately held company based in San Jose, California. Gartner estimates that Versa has more than 1,000 WAN edge customers. Versa focuses on branch/WAN functions, including routing, security and SD-WAN. Its flagship WAN edge offering is Versa FlexVNF software, and it has the requisite management and orchestration. FlexVNF can be delivered as a branded appliance in AWS, Microsoft Azure, Google Cloud, Alibaba and Tencent, and as a software appliance delivered on white-box hardware. It supports comprehensive SD-WAN capabilities, scalable routing as well as a broad range of advanced security functions, including NGFW, IPS, A/V and SWG. While Versa supports FEC and packet duplication for real-time traffic, there are no native WAN optimization features for non-real-time traffic, instead relying on third-party solutions deployed on its uCPE platform. The GUI is intuitive and application-oriented, with solid support for predefined templates.

Versa ranks in the top third for all use cases. Versa should be considered by enterprises of all sizes and verticals for SD-WAN solutions, especially where advanced security, flexible deployment options and managed services are desired.

VMware

VMware is a publicly traded company based in Palo Alto, California. Gartner estimates that VMware has over 5,500 WAN edge customers deployed globally, from smaller MSEs to the largest enterprise WANs. VMware's flagship offering is VMware SD-WAN by VeloCloud, which includes edge appliances, orchestration and cloud-resident gateways, some of which are hosted by carriers and some by the vendor. The solution includes comprehensive SD-WAN that, when combined with its cloud-resident gateways, offers enterprises a platform for cloud migration and adoption. However, the vendor lacks traditional WAN optimization functionality and has limited native advanced security solutions where it primarily relies on service chaining with partners. VMware offers three subscription levels to align with different use cases and price points primarily based on network scale and cloud connectivity.

VMware ranks in the top third for the small/midsize enterprise/regional WAN, large global WAN and small footprint retail WAN use cases. The vendor also ranks in the middle third for the security-sensitive WAN use case. VMware should be considered by enterprises of all sizes, verticals and geographies for SD-WAN solutions.

Context

WAN edge products are increasingly being relied upon to deliver the required features for a modern WAN. The WAN edge market is a combination of existing capabilities, such as routing, WAN optimization and edge security, but it is primarily driven now by early mainstream SD-WAN products.

WAN edge solutions can be combined with cloud-resident functionality for overarching policy and operational control, as well as cloud gateways and security. The result is a simpler, more streamlined remote office footprint (especially for lean IT organizations) that enables organizations to better deal with more dynamic and distributed traffic flows resulting from greater use of cloud and internet resources.

Product/Service Class Definition

WAN edge solutions cover a broad spectrum

of deployment and procurement options. The branch office footprint can be delivered as a fully integrated appliance from a single vendor, an open VNF-ready hardware and software solution with software from multiple vendors, or as virtualized software on a dedicated third-party hardware device. In some cases, solutions are deployed as hardware or software in all enterprise locations, with possible deployments in cloud service provider locations (often available in the cloud marketplace). Meanwhile, other solutions also offer cloud resident gateways, which are deployed in selective locations to enhance the delivery of internet/cloud-destined traffic. A variety of capabilities run between these cloud PoPs — from basic VPN tunneling and route determination to more complete WAN optimization, security and cloud optimization features. Business models also cover a range of options, including traditional capex-heavy, opex-capex hybrid models and full opex-based subscription service offerings. Both DIY and managed options can be delivered in each model.

Critical Capabilities Definition

SD-WAN Features

SD-WAN features include application-based policy configuration, automated application recognition, path selection between multiple links and the ability to support various routing protocols/ architectures.

SD-WAN represents a simplified way of deploying and managing the WAN edge. SD-WAN provides a replacement for WAN routers with an ability to terminate multiple diverse carrier transport options. This includes autorecognition of applications, dynamic path selection across diverse WAN connections with application performance awareness and various cloud-enabled functions. Key components include performance, scalability, routing support and the portfolio architecture.

Security

Security includes all aspects related to ensuring secure networking and, in particular, across the WAN. It can be delivered directly from the network edge equipment, in the cloud or a service chained with partners.

Security has been a stand-alone functionality as part of the overarching WAN edge infrastructure. This includes firewalls, segmentation, VPN and various next-generation firewall/UTM capabilities. This additional capability consists of IDS/IPS, application layer firewall, antivirus/malware, content filtering, DLP, sandboxing and more. It is increasingly being integrated in broader WAN edge solutions either at the network edge or in the cloud.

Application Performance

Application performance is driven by broad WAN optimization features, but also includes SaaS optimization, QoS techniques and optimization for real-time traffic to improve the quality of experience (QoE) across the WAN.

While a mature stand-alone technology, WAN optimization includes TCP protocol optimizations, HTTP and SSL optimizations, in-line compression and deduplication, and caching and latency mitigation. SaaS optimization involves methods to optimize various network metrics (such as packet loss, latency and jitter) for applications hosted in the cloud. QoS includes techniques from prioritization to end-to-end enforcement of CoS. Real-time voice optimization includes techniques such as FEC and packet duplication.

Operational Features

New WAN edge solutions should enable significantly simplified operational environments compared to traditional branch office routing solutions. Additionally, they should offer a GUI for business policy configuration management and offer application analytics/visibility.

Integrated WAN edge solutions should dramatically simplify the complexity associated with the management, configuration and orchestration of WANs. Gartner's basic requirements include:

- The level of expertise required to configure the branch is akin to what is required to set up basic home wireless network with consumer-grade equipment.
- Network-wide configuration must be supported for all required configurations via a central controller that can automatically push/pull out all individual device configuration data. The central controller acts as a repository for all configuration data, as well as all device, application visibility and network reporting.
- Configuration parameters are application-centric and/or business-centric and can be created/ applied/changed by personnel that are not well versed in networking technologies.

- The solution must support zero-touch provisioning for new branches, which entails on-site branch personnel having to make physical (i.e., cabling) changes only and administrators not having to make configuration changes to bring new branches online.

Deployment Flexibility

New WAN edge solutions need to deliver a variety of form factors (both virtual and physical), WAN interfaces and deployment options. Hardware, software, cloud options and service chaining are important for many architectures.

The fundamental purpose is to enable connectivity between enterprise users, applications and services that reside in distributed locations, including headquarters, branches, corporate data centers, colocation/hosting facilities and cloud providers. This means that WAN edge infrastructure must be able to support a diverse set of deployment options, including hardware appliances, software (VNF) or as a cloud-based service. Virtual form factors must be available on several hypervisors as well as enable connectivity to hybrid cloud services. All form factors must scale from low throughput scenarios to very high throughput, as well as small networks to very large networks. It must be possible to create redundant solutions for high availability in an integrated turnkey manner. Appliances should offer multiple choices for WAN connectivity, such as Ethernet, E1/T1 and 4G/LTE.

Small Platform Flexibility

Solutions have the ability to scale downward to meet a specific use case that meets the necessary form factor, features, functionality and financial requirements.

Scalability

Demonstrating the ability to deploy at scale up to hundreds and even over 1,000 customer locations with SD-WAN solutions. This also includes the amount of network complexity that needs to be supported in terms of architecture and protocols.

Use Cases

Small/Midsize Enterprise/Regional WAN

A small, most likely regional, WAN that fits MSEs and similar environments with fewer than 50 sites that ensures reliable WAN connectivity.

Many midsize and other enterprises need to interconnect fewer than 50 sites within a small geographical area, such as a country or a number of countries within a specific geographic region. Most offices support less than 50 people. They often continue to use MPLS for core connectivity but also use internet-only access for small branch offices or for direct internet access and MPLS with internet in an active/active configuration for sites with a growing reliance on internet connectivity. These enterprises rely on a variety of business applications, with an increasing reliance on SaaS applications and a smaller branch footprint. A growing percentage show interest in migrating to internet-only services as their primary WAN transport. They need visibility and application control but not the full suite of application performance, as well as some level of security. Additionally, ease of use and automation are major drivers.

Large Global WAN

Requirements include the ability to scale to hundreds or thousands of sites, across multiple geographic regions. The minimum site count for this use case is 200 sites.

Remote offices will have different uses, scale and feature requirements. Overall, enterprises in this use case are comfortable with cloud applications and moving new capabilities off-premises.

Many global enterprises with large WANs span more than 200 sites across several countries in several regions. In this use case, since there is increasing use of cloud there is a strong need to deliver reliable and premium performance for those apps. Additionally, with geographically dispersed sites, the need for some level of WAN optimization to improve performance is desired. These enterprises need flexible and robust security as well as ways to optimize access to various types of XaaS. The solution needs to be simple, yet robust enough to overcome the effects of latency and packet loss due to the unpredictability of the internet. Architecturally, most sites will have an MPLS circuit and some type of internet access circuit and some less critical sites may only have redundant active/active internet circuits.

Many solutions will require some type of overlay or intelligent routing to avoid congestion, latency and packet loss in order to provide a higher-quality experience than what the internet can offer natively.

Small Footprint Retail WAN

This environment requires security and simple branch solutions, and to replicate environments across a large number of sites. We assume the minimum number of sites is 200.

This use case is representative of small site/mass deployment needs that are common in such retail markets as convenience stores, quick service restaurants, gas stations, specialty retail and independent insurance agents. WAN connectivity is typically required for a very large number of small footprint sites (often ranging from hundreds to thousands of locations) with a very common set of solution needs.

Typical support is for a small and very specific group of applications, such as point of sale, inventory, loyalty programs and guest internet access. There's a strong expense focus for this use case — that is, minimum capital and WAN expenditures — with a heavy reliance on internet where possible, often using xDSL, Ethernet, cable, 4G or VSAT for either primary or backup connections, with rapid failover between connections. Support required for both active/backup and active/active WAN connections depends on specific site locations. This use case often requires advanced handling of LTE connections to ensure service continuity as well as support for integrated Wi-Fi in a single platform.

Security-Sensitive WAN

In this use case, the number of locations can vary. The main focus of the enterprise is to provide a comprehensive security solution combined with the networking solution.

Enterprises in this use case are looking for some type of UTM or next-generation firewall solution with SD-WAN. This can be delivered as cloud service or from an SD-WAN appliance, with native security or with the ability to host a third-party security solution on the branch device. For example, several cloud-based security services offer sandboxing functionality and/or outbound firewall rules. Additionally, a secure web gateway (SWG) is required as part of the solution. Preferably, the solution incorporates SD-WAN and UTM/next-generation firewall in the same solution or service chained without the need for a separate appliance/solution. A standard stateless firewall is not sufficient. Security teams are typically extremely involved in this use case, along with network teams, to ensure the security parameters are met globally regardless of the technology used.

Example verticals of this use case are financial services, some retail, some healthcare, some regulated industries and some government.

Vendors Added or Dropped

Added

HPE (Aruba) was added due to a new product offering that meets the inclusion criteria.

Dropped

Cato Networks, Forcepoint and Cybera were dropped because they failed to meet inclusion criteria based on our assessments and data provided by the vendors.

Inclusion Criteria

The inclusion criteria represent the specific attributes that analysts believe are necessary for inclusion in this research. The main criteria are the same as the Magic Quadrant. To qualify for inclusion, vendors must:

- Provide hardware and/or software addressing the emerging enterprise WAN edge requirements outlined in the Market Definition and Market Description sections of the "Magic Quadrant for WAN Edge Infrastructure." Alternatively, the vendor could address this need by delivering a managed service that uses in-house-developed hardware/software to deliver the service.
- Produce and release enterprise WAN edge networking products for general availability as of 1 June 2019. All components must be publicly available, shipping and included on the vendors' published price list as of this date. Products shipping after this date, and any publicly available marketing information may only have an influence on the Completeness of Vision axis.
- Provide commercial support and maintenance for their enterprise WAN edge products (24/7) to support deployments on multiple continents. This includes (but is not limited to) hardware/software support, access to software upgrades, and troubleshooting and technical assistance.
- Demonstrate scalability by servicing at least three customers with active support contracts that have at least 100 sites each.
- Show relevance to Gartner's enterprise clients on a global basis with at least one of the two following criteria:
    - At least 25 customers with active support contracts and 10 sites each headquartered in two or more geographic regions (North America, South America, EMEA or APAC). This means 25 customers in one region and another 25 in a different region.

- At least 10 customers with active support contracts and 10 sites each headquartered in three or more geographic regions (North America, South America, EMEA or APAC). This means 10 customers each in three different regions for a total of more than 30 customers.

- Meet at least one of the following four criteria:
  - Total WAN edge infrastructure revenue of at least $20 million in the 12 months ending in December 2018
  - Total WAN edge infrastructure revenue of $13 million in the 12 months ending in December 2018, with at least a 100% growth rate over the previous 12 months
  - At least 20,000 WAN edge infrastructure sites deployed and under active support contracts
  - At least 300 WAN edge infrastructure customers under active support contracts with 10 or more sites deployed each

Basic Product Capabilities

Vendors must have generally available products as of 1 June 2019 that support all of the following capabilities. These capabilities must be supported natively on branch CPE:

- The ability to function as/replace the branch office router/CPE (including BGP, OSPF, support hub and spoke, mesh, and partial mesh topologies for a minimum of a 100-site network), with traffic shaping and/or QoS
- Centralized management for devices (with GUI), including application visibility, reporting and configuration changes, as well as software upgrades
- Zero-touch configuration for branch devices
- VPN (Advanced Encryption Standard [AES] 256-bit encryption) and NGN firewall, or firewall with the ability to redirect to a secure web gateway
- Dynamic traffic steering based on business or application policy (not limited to only DiffServ Code Point [DSCP]/ports or IPs/circuits or 5tuple) that responds to network conditions (changes in packet loss/latency/jitter)
- At least 100 well-known application profiles included (autodiscovered)
- Application visibility identifying specific traffic that traverses the WAN
- At least two of the following WAN interfaces: Ethernet, xDSL, Tx/Ex, fiber and 4G/LTE
- Software (ability to operate as a VNF at the branch or in the network and to be hosted in at least one cloud provider, such as AWS) and hardware form factor

Table 1. Weighting for Critical Capabilities in Use Cases

Critical Capabilities	Small/Midsize Enterprise/ Regional WAN	Large Global WAN	Small Footprint Retail WAN	Security-Sensitive WAN
SD-WAN Features	30%	25%	15%	15%
Security	10%	10%	10%	45%
Application Performance	5%	15%	5%	5%
Operational Features	30%	20%	15%	10%
Deployment Flexibility	5%	10%	5%	10%
Small Platform Flexibility	20%	5%	40%	5%
Scalability	0%	15%	10%	10%
Total	**100**%	**100**%	**100**%	**100**%
As of November 2019				

Source: Gartner (November 2019)

This methodology requires analysts to identify the critical capabilities for a class of products/services. Each capability is then weighted in terms of its relative importance for specific product/service use cases.

Critical Capabilities Rating

Each of the products/services has been evaluated on the critical capabilities on a scale of 1 to 5; a score of 1 = Poor (most or all defined requirements are not achieved), while 5 = Outstanding (significantly exceeds requirements).

Table 2. Product/Service Rating on Critical Capabilities

Critical Capabilities	Aryaka	Barracuda	Cisco (Meraki)	Cisco (Viptela on IOS XE)	Citrix	CloudGenix	Cradlepoint	FatPipe Networks	Fortinet	HPE (Aruba)	Huawei	Juniper Networks	Nuage Networks	Oracle (Talari)	Peplink	Riverbed	Silver Peak	Teldat	Versa	VMware
SD-WAN Features	3.2	3.0	3.1	3.4	3.9	3.6	3.4	3.3	3.3	3.1	3.3	3.5	3.1	3.2	2.9	2.8	3.7	3.2	4.0	4.0
Security	2.9	4.2	4.0	3.9	3.2	3.2	3.4	3.3	4.3	3.3	3.2	4.0	3.3	3.0	2.8	3.0	3.0	3.7	3.9	2.9
Application Performance	4.2	3.1	1.4	3.5	3.5	1.7	1.2	3.5	3.0	1.9	3.2	1.7	1.9	3.1	1.9	3.7	4.1	1.5	2.1	3.4
Operational Features	3.9	3.6	3.9	3.8	4.2	4.8	3.4	3.5	4.2	4.0	3.5	4.0	4.0	4.4	2.9	4.2	4.4	4.0	4.4	4.4
Deployment Flexibility	3.5	3.9	3.4	4.1	4.1	3.7	3.1	3.8	4.0	3.3	3.9	3.9	3.8	3.5	3.2	3.3	4.1	3.9	4.5	4.3
Small Platform Flexibility	3.1	3.2	3.7	2.7	2.9	2.8	3.9	2.5	3.3	4.0	3.7	2.5	3.1	2.5	3.2	3.0	2.6	3.5	3.2	3.4
Scalability	2.1	3.3	3.9	2.1	4.2	4.2	3.3	1.9	3.9	3.6	4.2	4.4	3.9	2.7	3.6	2.8	3.3	2.8	3.9	4.7
As of November 2019																				

Source: Gartner (November 2019)

Table 3 shows the product/service scores for each use case. The scores, which are generated by multiplying the use case weightings by the product/service ratings, summarize how well the critical capabilities are met for each use case.

Table 3. Product Score in Use Cases

Use Cases	Aryaka	Barracuda	Cisco (Meraki)	Cisco (Viptela on IOS XE)	Citrix	CloudGenix	Cradlepoint	FatPipe Networks	Fortinet	HPE (Aruba)	Huawei	Juniper Networks	Nuage Networks	Oracle (Talari)	Peplink	Riverbed	Silver Peak	Teldat	Versa	VMware
Small/ Midsize Enterprise/ Regional WAN	3.43	3.39	3.48	3.47	3.71	3.67	3.38	3.24	3.69	3.52	3.46	3.43	3.37	3.41	2.92	3.35	3.66	3.50	3.88	3.88
Large Global WAN	3.32	3.40	3.28	3.39	3.85	3.58	3.05	3.17	3.70	3.26	3.53	3.51	3.31	3.33	2.89	3.30	3.76	3.18	3.78	3.99
Small Footprint Retail WAN	3.19	3.37	3.56	3.14	3.50	3.39	3.47	2.91	3.62	3.62	3.60	3.25	3.31	3.04	3.05	3.18	3.30	3.40	3.65	3.77
Security-Sensitive WAN	3.10	3.74	3.64	3.58	3.60	3.48	3.28	3.20	3.96	3.34	3.44	3.77	3.37	3.17	2.92	3.14	3.42	3.47	3.90	3.59
As of November 2019																				

Source: Gartner (November 2019)

To determine an overall score for each product/service in the use cases, multiply the ratings in Table 2 by the weightings shown in Table 1.

Acronym Key and Glossary Terms

BGP	Border Gateway Protocol
CPE	Customer premises equipment
FEC	Forward error correction
GUI	Graphical user interface
IPS	Intrusion prevention system
LAN	Local-area network
LTE	Long Term Evolution
MPLS	Multiprotocol Label Switching
NGFW	Next-generation firewall
OSPF	Open Shortest Path First
POP	Point of presence
TCP	Transmission Control Protocol
uCPE	Universal customer premises equipment
vCPE	Virtualized customer premises equipment
VNF	Virtual network function
VPN	Virtual private network
VSAT	Very small aperture terminal
WAN	Wide-area network
WLAN	Wireless local-area network
WOC	WAN optimization controller

Evidence

Gartner analysts conducted more than 3,000 Gartner client inquiries on the topic of wide-area networking between 1 July 2018 and 30 June 2019.

Gartner analysts conducted more than 700 client inquiries on the topic of SD-WAN between 1 July 2018 and 30 June 2019.

Market size forecast sources are from "Forecast: Enterprise Network Equipment by Market Segment, Worldwide, 2016-2023, 1Q19 Update."

All vendors in this research responded to an extensive questionnaire regarding their current/future data center networking solutions.

We surveyed reference customers provided by vendors in this research. All vendors in this research provided reference customers, although not all reference customers completed the survey (n = 125).

Analysts reviewed Gartner Peer Insights data for this market.

Critical Capabilities Methodology

This methodology requires analysts to identify the critical capabilities for a class of products or services. Each capability is then weighted in terms of its relative importance for specific product or service use cases. Next, products/services are rated in terms of how well they achieve each of the critical capabilities. A score that summarizes how well they meet the critical capabilities for each use case is then calculated for each product/service.

"Critical capabilities" are attributes that differentiate products/services in a class in terms of their quality and performance. Gartner recommends that users consider the set of critical capabilities as some of the most important criteria for acquisition decisions.

In defining the product/service category for evaluation, the analyst first identifies the leading uses for the products/services in this market. What needs are end-users looking to fulfill, when considering products/services in this market? Use cases should match common client deployment scenarios. These distinct client scenarios define the Use Cases.

The analyst then identifies the critical capabilities. These capabilities are generalized groups of features commonly required by this class of products/services. Each capability is assigned a level of importance in fulfilling that particular need; some sets of features are more important than others, depending on the use case being evaluated.

Each vendor's product or service is evaluated in terms of how well it delivers each capability, on a five-point scale. These ratings are displayed side-by-side for all vendors, allowing easy comparisons between the different sets of features.

Ratings and summary scores range from 1.0 to 5.0:

1 = Poor or Absent: most or all defined requirements for a capability are not achieved

2 = Fair: some requirements are not achieved

3 = Good: meets requirements

4 = Excellent: meets or exceeds some requirements

5 = Outstanding: significantly exceeds requirements

To determine an overall score for each product in the use cases, the product ratings are multiplied by the weightings to come up with the product score in use cases.

The critical capabilities Gartner has selected do not represent all capabilities for any product; therefore, may not represent those most important for a specific use situation or business objective. Clients should use a critical capabilities analysis as one of several sources of input about a product before making a product/service decision.

Source: Gartner Research, G00381077, Jonathan Forest, Mark Fabbi, Mike Toussaint, 26 November 2019

About Fortinet

Fortinet (NASDAQ: FTNT) secures the largest enterprise, service provider, and government organizations around the world. Fortinet empowers its customers with intelligent, seamless protection across the expanding attack surface and the power to take on ever-increasing performance requirements of the borderless network - today and into the future. Only the Fortinet Security Fabric architecture can deliver security without compromise to address the most critical security challenges, whether in networked, application, cloud or mobile environments. Fortinet ranks #1 in the most security appliances shipped worldwide and more than 375,000 customers trust Fortinet to protect their businesses.
Learn more at http://www.fortinet.com, the Fortinet Blog, or FortiGuard Labs.

Share your thoughts with us and others about the report on social media. Use the hashtags #SDWAN, #Fortinet or connect with us online at Fortinet Twitter, Fortinet LinkedIn, Fortinet Facebook.

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