Magic Quadrant for Data Center Networking

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As enterprises scale digital business initiatives, they must balance refreshing equipment and expanding capacity, while improving agility and maintaining uptime in their data center networks. I&O leaders can use this research to identify which vendors best fit their requirements.

Strategic Planning Assumptions

The percentage of manual data center networking operational activities will fall below 50% by 2021, down from 80% today.

The predominant data center networking server access port speed will shift from 10 Gbps today to 25 Gbps during 1Q20.

Through 2023, 90% of current applications will still be in use.

Market Definition/Description

The data center networking vendors covered in this research provide hardware and/or software solutions to deliver connectivity primarily within enterprise data centers. This includes data center core/spine switches, access switches (top of rack [ToR], leaf), virtual switching, Ethernet fabrics, network operating systems (NOSs) and network overlays, and the requisite management, automation and orchestration of those components.

Historically, the data center network was just a fast and scalable LAN to connect all data center equipment, mainly servers. Today, while high-speed Ethernet ports (10/25/50/100 GbE) are still important, the market extends far beyond just the "speeds and feeds" affiliated with switches and switch ports. Increased enterprise adoption of cloud computing models and support for digital business initiatives demand improved data center network agility. Specifically, enterprises need better automation, orchestration and integration with the rest of the data center infrastructure (storage, compute, cloud management, container management and infrastructure automation).

This research evaluates data center networking solutions for enterprises that procure and manage their own data center networking infrastructure, for installation within their premises or in colocation facilities. We also evaluate the ability to extend data center networking functionality onto public cloud providers' service offerings, in order to better manage hybrid cloud networks. That said, we are not evaluating the internal physical networking infrastructures within public cloud providers' networks.

The data center LAN market is now clearly differentiated from campus LANs, which include wired and wireless access infrastructure, covered in "Magic Quadrant for the Wired and Wireless LAN Access Infrastructure." Refer to the Market Overview section for the extended market definition.
Figure 1. Magic Quadrant for Data Center Networking

Source: Gartner (July 2018)

Vendor Strengths and Cautions

Arista Networks

Arista Networks is a publicly traded company based in Santa Clara, California, with nearly 5,000 data center networking customers. Arista is a pure-play networking company focused on data center networking. Arista's Universal Cloud Network (UCN) includes Extensible Operating System (EOS) software, CloudVision management software and the 7000 series of switches/routers. Arista focuses on serving cloud providers, the financial services sector and large enterprises. Arista has a solid installed base in North America and Western Europe, with less coverage in the rest of the world, and is partnering with Hewlett Packard Enterprise (HPE) to broaden its enterprise channel. In 2017, Arista grew
port shipments at market rates, and introduced highly scalable routing as a feature on its high-end spine switches. All enterprises should shortlist Arista, particularly large organizations that need flexible and programmable solutions, provided there is appropriate local sales and channel coverage.

Strengths

- Arista is experienced and well-regarded by customers in large-scale environments that require programmable infrastructure that are integrated with a wide range of third-party software orchestration, including VMware, Puppet and Ansible.

- We believe that Arista's vision and product roadmap to deliver increasing levels of automation and uniform policy across multicloud environments align with emerging customer requirements.

- Arista's broad portfolio of switches/routers and software allows the vendor to address a variety of use cases within and between data centers, and to the internet.

Cautions

- Geographically, Arista's coverage is still limited, when compared to its larger rivals. Outside of North America and Europe, we observe Arista focusing on specific verticals and very large accounts, so customers should verify appropriate local resources.

- Arista lacks expertise in the midmarket, as it focuses primarily on customers with large data center networks, including large enterprise and technology companies.

- Arista focuses on incremental, nondisruptive innovation, which does not always address the needs of organizations that want to fundamentally transform the way they operate their data center networks.

Big Switch Networks

Big Switch Networks is a privately held company based in Santa Clara, California, with over 100 data center networking customers. Big Switch is a pure-play networking vendor offering both data center networking and network packet brokers, and its flagship data center networking product is Big Cloud Fabric (BCF) software. BCF is an Ethernet fabric that includes a controller that provides centralized control and management and an NOS. Big Switch does not offer hardware switches directly, but its BCF fabric software is certified to run on multiple hardware switches, including Dell, HPE and multiple white-boxes. We estimate the vendor grew revenue above market rates in 2017. Most of Big Switch's customers are in North America, but it also has dozens of deployments in the Asia/Pacific region. Include Big Switch on shortlists in North America and Asia, when an open and automated fabric is desired.

Strengths

- Big Switch is agnostic with respect to switching hardware, and is co-certified to run on multiple hardware switching platforms, including Dell EMC, HPE and others. The Dell and HPE offerings allow customers to receive integrated hardware, software and support from a single supplier.

- The vendor provides turnkey integration and visibility for OpenStack, containers and hyperconverged systems from Dell and Nutanix, which simplifies management and improves automation.
Big Switch's vision and roadmap for an automated and open switching fabric and strong integration with third-party platforms matches Gartner's view of emerging customer needs.

Cautions

- Big Switch has a smaller installed base and limited channels compared to other vendors in this research, particularly in Latin America and Africa.

- The vendor lacks capabilities that some enterprises require, including integration with Hyper-V, limited multicast, no FCoE and no chassis-based switch.

- The vendor does not currently offer the capability to manage multiple BCF instances, which can create management challenges at scale or across multiple physical locations. We anticipate the vendor releasing this capability in 4Q18.

Cisco

Cisco is a large publicly traded company based in San Jose, California, with over 100,000 data center networking customers. Cisco offers a broad array of infrastructure hardware and software, and its flagship data center networking offering is Cisco ACI, which includes Nexus 9000 hardware switches and the APIC controller. The vendor provides switches, NOS, and the requisite control, management and automation capability. Cisco is relevant in nearly all verticals and geographies. Over the past year, it has maintained its leadership with over 30% port share, but grew below market rates. Cisco should be shortlisted for all data center networking opportunities globally.

Strengths

- The vendor's vision and product roadmap to deliver increasing levels of automation and uniform policy across multicloud environments align with emerging customer needs.

- The vendor has the broadest portfolio of hardware switches, including a variety of form factors, interfaces and performance characteristics.

- Cisco has very large global channels and a large and loyal installed base, and maintains very strong visibility in the market. This means there is a large pool of networking personnel and channels familiar with Cisco products, which can aid with implementation and operation.

Cautions

- Based on client feedback and Gartner's analysis, migrating from legacy infrastructure to Cisco ACI infrastructure is complex for a combination of financial, technical and cultural reasons. This has led to limited ACI adoption in the market, and also limited usage of the full ACI feature for customers that have adopted it.

- Cisco's data center networking solutions are higher in price than most vendors evaluated in this research, based on deals Gartner reviews and our market share research.

- Cisco's broad portfolio of data center switches and associated management platforms overlaps in multiple areas, and integration across platforms is limited in many instances. This can make it difficult for customers to select and deploy the optimal solution.
Cumulus Networks

Cumulus Networks is a privately held company based in Mountain View, California, with over 500 enterprise data center networking customers. Cumulus is a pure-play networking company and its flagship data center networking product is Cumulus Linux, a Linux-based NOS. The vendor’s primary offerings in this market include its NOS, hardware switches branded as Cumulus Express and NetQ software, which provide network troubleshooting and change validation. Cumulus caters to forward-leaning organizations that prefer a high degree of automation, with a sizable installed base in North America, Europe, Asia and Australia. In 2017, Cumulus launched its first branded hardware switch, making it more relevant to enterprise customers. Cumulus grew its enterprise customer count by more than 200 over the past year, which is above market rates. Organizations should shortlist Cumulus when looking to manage their data center switches with Linux-based automation tools.

Strengths

- Cumulus is well-experienced in and aligned with environments where customers manage their networking equipment via DevOps principals using Linux-based tools such as Ansible, Chef and Puppet.

- Cumulus allows its NOS to run on a variety of hardware partners, including Dell, HPE, Mellanox Technologies and others. This provides customers with hardware choices while preserving their ability to source support from a single supplier.

- Cumulus continues to pioneer a vision based on open components, disaggregation of switching hardware/software and automation, which aligns with emerging customer requirements.

Cautions

- Cumulus lacks several capabilities compared with several competitors in this research. For example, it doesn’t offer turnkey fabric software to manage multiple switches as a single construct; doesn’t support multiple OSPF instances per switch, or multicast across MC-LAG; and lacks a GUI for network visibility.

- Cumulus’ own branded hardware portfolio is currently limited in terms of form factors, and was late to market with support for 25G interfaces.

- Cumulus is one of the smaller vendors in this research, and lacks the channel and geographic reach of several larger competitors, which could impact its ability to grow its mainstream enterprise business.

Dell EMC

Dell EMC is a large privately held company headquartered in Hopkinton, Massachusetts, providing a broad range of IT products and services to enterprises and service providers, although networking represents a small portion of its overall business (less than 10% of overall revenue). Dell EMC maintains a global installed base of customers. It continues to be a leading proponent of open networking and brite-box switching, supporting NOSs from Big Switch Networks, Cumulus Networks, Pluribus Networks and others, in addition to its own NOS. The vendor provides a range of leaf, spine and blade switches, and grew above market rates for port shipments in 2017. Dell EMC’s software portfolio enables it to provide customized, fit-for-purpose solutions for a broad set of use cases. All organizations should...
shortlist Dell EMC, particularly those interested in open networking, provided there is appropriate networking skills in the region.

Strengths

- Dell EMC was an early proponent of, and remains committed to, open networking, which has driven and altered the market, and transformed the way many customers (and competitors) think about data center networking.

- The vendor’s vision and roadmap to support open and disaggregated platforms with the ability to receive support from a single supplier align with emerging customer requirements, particularly around fit-for-purpose software.

- Dell EMC’s pricing is aggressive, based on client deals that Gartner observes.

Cautions

- Dell EMC lacks visibility as a networking player in the market, and Gartner rarely observes it on customer shortlists, which may hinder its ability to grow in the market.

- Dell EMC lacks a high-density modular chassis, which limits its ability to compete for certain customers that prefer chassis.

- Customers have reported a lack of robust documentation, including best practices, user guides and tutorials.

Extreme Networks

Extreme Networks is a publicly held networking vendor based in San Jose, California, with more than 7,000 data center networking customers (a Gartner estimate). The vendor’s flagship solution data center networking solution is based on the acquisition of Brocade’s IP Networking business, which includes the SLX and VDX platforms, and StackStorm, an event-driven automation tool. The vendor also simultaneously supports legacy Enterasys, Extreme and Avaya data center networking products. Extreme provides a full portfolio of switches, NOS, fabric software, and the requisite management and orchestration software to coincide. Extreme had approximately 1% port share in 2017, but the November 2017 acquisition of Brocade’s data center networking business roughly doubled its size. Organizations should shortlist Extreme for data center networking opportunities in the Americas and Europe.

Strengths

- Extreme is aggressively growing its portfolio and installed base via acquisitions, which indicates a long-term corporate commitment to this market.

- The vendor offers a solid portfolio of switches and fabric options that meets the needs of most enterprises.

- Extreme has a very good reputation for customer support, based on Gartner client inquiries, customer reference surveys and peer insights; 100% of its support function is insourced.

Cautions
Extreme is supporting and integrating multiple disparate data center networking portfolios, which requires substantial internal resources, and we believe this will divert attention away from delivering innovative features and maintaining strong customer support.

We believe that legacy Extreme and legacy Avaya data center networking customers will be pushed toward the strategic Brocade-based platform at refresh and/or within the next three to four years. We believe this migration will be challenging for customers.

Extreme lacks support for Ansible, Puppet and Chef, which is of increasing importance to Gartner clients in automating data center networks.

HPE

Hewlett Packard Enterprise (HPE) is a publicly traded company based in Palo Alto, California, with more than 10,000 data center networking customers. The vendor has multiple HPE-branded offerings in the market, including FlexFabric switches and software, obtained via its joint venture with New H3C Group (in which HPE maintains a minority ownership at 49%) and brite-box Altoline switches, based on Acton Technology hardware. In addition, HPE resells Arista's networking switches and leads with Arista switches in many opportunities. Also, HPE resells both Nokia Nuage Network’s and VMware NSX overlay products. As a result, HPE operates as both a system integrator/reseller and traditional data center networking vendor in this market. In this research, we primarily evaluate HPE-branded offerings. HPE is relevant on a global basis and in nearly all verticals, although it grew below market rates for port shipments in 2017. Customers considering FlexFabric should ensure that HPE will remain committed to the offering for the next five years. Customers that value open networking/brite-box options should shortlist HPE Altoline.

Note: On 15 May 2018, HPE announced the intent to acquire data center networking vendor Plexxi prior to 31 July 2018. However, this is not included in our analysis as it was not finalized prior to publication.

Strengths

- HPE has a broad portfolio of products that, in total, can address all use cases and has global reach, with a strong presence in enterprise data centers.

- HPE’s FlexFabric portfolio is well-aligned with customers that need support for high-performance storage networking via NVMe over RoCE/Ethernet fabric.

- HPE’s strategy to apply intent-based capabilities across compute, storage and networking is compelling for companies committed to a complete HPE-sourced data center.

Cautions

- HPE has limited control of the majority of its data center networking technology, in contrast to other vendors in this research. Thus, it may be challenged to deliver key data center network functions that customers desire.

- HPE’s complex portfolio leads to confusion in the sales channel and may lead to difficulty in providing consistent high-quality support to customers on a global basis.
We believe that potential conflicts between HPE and New H3C Group for global opportunities may sour the relationship, leading to divergent product priorities that could lead to misalignment with customer needs.

Huawei

Huawei is a privately held company headquartered in Shenzen, China, with over 2,500 data center networking customers. The majority of Huawei data center customers are located in the Asia/Pacific region, and the vendor is also expanding its enterprise installed-base quickly in Europe. Huawei offers a broad array of infrastructure hardware and software, and its flagship data center networking offering is the CloudFabric Intent-Driven Network, which includes physical switches, NOS, Agile Controller and the FabricInsight analytics engine. Huawei continues to expand market awareness and, in 2017, grew above market rates. Enterprises, especially those outside of North America, should shortlist Huawei for data center networking solutions.

Strengths

- Huawei offers a broad portfolio that supports flexible architectural options, many based on open standards. This enables Huawei to support a wide variety of use cases, from small single-vendor networks to large, complex multivendor/open-source software deployments.

- Huawei has significant financial resources, enabling it to invest in product development to align with customer requirements, and expand its footprint outside of the Asia/Pacific region.

- Huawei is developing capabilities in its fabric to support low-latency, zero packet loss for artificial intelligence and RoCEv2 workloads within the next year, which we anticipate will be increasingly important for the enterprise over the next 18 months.

Cautions

- Despite solid adoption of Huawei’s switching hardware, we have observed limited implementation and adoption of the vendor’s Agile Controller.

- Huawei has not demonstrated the capability to drive and shape the broader market and customers’ data center networking expectations.

- Huawei has a small presence in North America, as Gartner estimates that less than 2% of its installed base is headquartered there. Similarly, geopolitical concerns are a gating factor to adoption in the U.S.

Juniper Networks

Juniper Networks is publicly traded company based in Sunnyvale, California, with over 3,000 data center customers. Juniper is a long-established networking and security vendor. Its flagship data center networking solution consists of QFX switches running Junos software, which can be offered with its Contrail Enterprise Multicloud orchestration software. The vendor provides a full portfolio of hardware switches, NOS and network overlay for enterprise needs. Juniper is relevant in all geographies and verticals, although we observe it most often in larger-scale environments. The vendor had 5% port share in 2017, but port shipments grew below market rates. Juniper should be shortlisted for all enterprise data center networking opportunities, especially in larger enterprises.
**Strengths**

- The vendor has a deep portfolio of hardware and software solutions that can address nearly all enterprise requirements, and often leads with automated, open- and standards-based approaches.

- Juniper's vision and product roadmap to deliver an intent-based data center network with self-healing capabilities, based on open standards, align with emerging customer requirements.

- The vendor has a strong history of providing high-performance solutions for large-scale environments, including service providers and large enterprises.

**Cautions**

- The vendor makes the majority of its overall revenue with service providers and large enterprise clients. Thus, midmarket clients should assess its market coverage and the capabilities of its local channels.

- Juniper provides certified product integration with VMware NSX, but also competes with NSX via the Contrail orchestration product. The two companies pursue their sales strategies (partnering versus competing) on an account-by-account basis, which can confuse clients.

- The vendor provides multiple fabric architectures, which has confused some customers and can lead to suboptimal architectural selection.

**Lenovo**

Lenovo is a publicly traded company based in Morrisville, North Carolina and Hong Kong. The vendor has a broad data center infrastructure portfolio, and focuses on the server access and aggregation portion of the data center network. Lenovo maintains a global installed base, but we only observe its data center networking products being used by customers that are also running Lenovo servers. The vendor provides ToR switches and embedded switches for data center server systems. Lenovo partners with Juniper Networks, which increases customer choice and/or rounds out its networking portfolio to allow Lenovo to sell a complete data center networking solution. In 2017, Lenovo grew below market rates for port shipments and began shipping its newer Cloud NOS as the default on all switches. Lenovo should be shortlisted for networking by organizations deploying Lenovo servers.

**Strengths**

- The vendor provides integrated blade switches for its server platforms, including Flex System with equivalent ToR switches, to deliver a consistent networking experience for customers deploying both blade and rack services.

- Lenovo provides access switches that support Fibre Channel and Ethernet in the same physical form factor.

- The vendor now supports ONIE on some of its switches; we believe this is an indication of future support for disaggregation and open networking, which increases customer choice.

**Cautions**
Lenovo has very limited experience as an end-to-end data center networking vendor in large-scale environments (100+ switches).

Lenovo has limited visibility and awareness as a network vendor. We do not see Lenovo in opportunities where it is not the server vendor, which could hinder its ability to compete in the market.

The vendor lacks several capabilities in its portfolio, including a chassis-based switch and native support for Puppet/Chef.

Mellanox Technologies

Mellanox Technologies is a publicly traded company headquartered in Sunnyvale, California, and Yokneam, Israel, with approximately 1,000 data center networking customers, the majority of which consume Mellanox products for high-performance storage use cases. Mellanox provides InfiniBand and Ethernet switches, and software and network interface cards, and its flagship data center network offering is branded Ethernet Storage Fabric (ESF). Mellanox has a sizable installed base in North America, Europe, Asia and Australia. Mellanox also has a brite-box offering supporting software from Cumulus Networks, and Metaswitch on its switches. In 2017, Mellanox grew above market rates. The vendor should be shortlisted for high-performance/low-latency use cases.

Strengths

- Mellanox has proven expertise and a solid portfolio of low-latency Ethernet switches that are well-suited for demanding workloads, including NVMe/roCE, high-frequency trading, high-performance computing, VXLAN routing and machine learning.

- The vendor has form factors that are optimized for hyperconverged integrated system (HCIS) and storage applications, and has integrated with hyperconverged infrastructure (HCI) vendors including Nutanix and HPE.

- Mellanox's brite-box offering, which includes integration with Cumulus Networks and other NOSSs, provides customers with a choice of software to match their needs, while preserving a single-vendor support experience.

Cautions

- We rarely observe customers shortlist or deploy Mellanox outside of its low-latency-focused usage scenarios, which may limit the vendor's ability to support and grow mainstream enterprise customers.

- Mellanox lacks a chassis-based switch, which some enterprises prefer and/or is required for very large-scale deployments.

- Mellanox lacks important mainstream enterprise certifications for VMware NSX and vRA, which can complicate deployment in mainstream use cases, although we anticipate the vendor will achieve NSX certification in 4Q18.

New H3C Group

New H3C Group, a joint venture of Tsinghua Holdings (51%) and HPE (49%), is based in Beijing and Hangzhou, China, with over 500 data center networking customers, mostly in China. New H3C offers a
broad portfolio of enterprise IT solutions, including networking, firewalls, servers, storage, hyperconverged systems and IT management products. New H3C is also the exclusive provider of HPE-branded servers, storage and technology services in the Chinese market. New H3C’s flagship product is Application Driven Data Center and comprises the Virtual Cloud Fabric/FlexFabric family of switches, NOSs and associated network management software. HPE is the exclusive provider of New H3C networking products outside of greater China (sold under the HPE FlexFabric brand). New H3C grew above market rates and was the No. 3 overall data center networking vendor in 2017, when measured by port shipments. Over the past year, the vendor released its VCF Controller product, which provides automated switching fabric management software. Organizations in China should shortlist this vendor for data center networking.

Strengths

■ New H3C grew above market rates in 2017, and is very aggressive in pricing its solutions.

■ New H3C has a broad portfolio of data center networking switches and software, and can also provide x86 compute, storage and firewall capabilities, which is appealing to organizations looking for a full-stack single-vendor solution.

■ New H3C has proven experience in large-scale network environments, including hyperscale cloud providers Alibaba and Tencent, as well as in large financial institutions in China.

Cautions

■ Enterprises with global requirements that do in-region purchasing will likely have to deal with multiple suppliers, because New H3C is limited to selling data center networking solutions in greater China.

■ Due to the HPE arrangement and low visibility outside of China, New H3C has a limited ability to grow and support enterprise customers outside of the China region.

■ The vendor provides automation via two separate software platforms that are not unified and provide different user interfaces, which raises operational expenses and complexity in managing the environment.

Pluribus Networks

Pluribus Networks is a privately held company based in San Jose, California, with over 100 paying enterprise data center networking customers. It is a pure-play networking vendor and its flagship data center networking offering is Adaptive Cloud Fabric and its Netvisor NOS. In addition, Pluribus offers its own branded hardware switches. Most Pluribus customers are located in North America and Europe. In the past year, the vendor expanded its customer base above market rates, partnered with Dell and achieved certification for Nutanix HCl. Pluribus should be shortlisted in North America and Europe for customers that desire a switching fabric with embedded analytics and telemetry that can run on multiple hardware platforms.

Strengths

■ The vendor provides a solid data center networking switching fabric with embedded visibility, analytics and telemetry. Also, the solution natively supports geographically distributed fabrics.
Pluribus provides ample choice for enterprises around hardware: They can run a Pluribus-branded switch, Dell and D-Link switches, and certified white boxes.

The vendor has increased its relevancy in the enterprise market over the past year, eclipsing 100 paying enterprise customers, in part due to the relationship with Dell.

Cautions

- Pluribus has limited channel and brand visibility, and the smallest installed base of any vendor profiled in this research. This may limit its long-term sustainability in the market versus larger, better-known competitors.

- The vendor does not currently offer a chassis-based solution, which is preferred by some enterprise customers, particularly in larger, denser deployments.

- The vendor lacks several specific capabilities that many competitors have, including official NSX certification and FCoE, and its GUI is less intuitive.

VMware

VMware is a publicly traded company based in Palo Alto, California, and has over 4,500 data center networking customers for its flagship NSX product. It is a large infrastructure software vendor. NSX is VMware’s network virtualization platform, a software-only network overlay consisting of a controller with virtual switches running in each hypervisor. VMware does not provide network switching hardware, but can run over any appropriately provisioned IP network. We observe VMware in all verticals and geographies, although most existing NSX implementations are in larger enterprises and service providers. Over the past year, VMware has grown the NSX installed base by more than 1,000 customers, which is above market rates for customer adoption. Further, the vendor is increasingly embedding NSX in its other offerings. NSX should be shortlisted by large organizations looking to improve agility and automation, and/or add microsegmentation, within their data center.

Strengths

- VMware’s vision and roadmap to support a software-centric, automated, multicloud data center with embedded security network aligns with emerging customer requirements.

- NSX provides microsegmentation capabilities via embedding firewalls into virtual switches, and we estimate that half of the NSX installed based is using this capability.

- NSX is a software solution that can be deployed gradually, with no hardware dependencies.

Cautions

- NSX is expensive and Gartner clients report that its high price is difficult to justify internally.

- VMware currently offers two platforms, NSX-T and NSX-V, which have different capabilities and management platforms. Gartner believes NSX-T is the strategic platform, and customers running NSX-V will have to migrate within the next two years, which may lead to the need for operational resources and downtime.
NSX installation and deployment is complicated, and Gartner clients report there is a backlog for VMware-branded professional services to deploy NSX.

Vendors Added and Dropped

We review and adjust our inclusion criteria for Magic Quadrants as markets change. As a result of these adjustments, the mix of vendors in any Magic Quadrant may change over time. A vendor’s appearance in a Magic Quadrant one year and not the next does not necessarily indicate that we have changed our opinion of that vendor. It may be a reflection of a change in the market and, therefore, changed evaluation criteria, or of a change of focus by that vendor.

Added

Mellanox Technologies and Pluribus Networks were added because they met inclusion criteria.

Dropped

NEC was dropped because it no longer meets inclusion criteria.

Inclusion and Exclusion Criteria

To qualify for inclusion in the Magic Quadrant, vendors need to:

- Provide hardware and/or software addressing the emerging enterprise data center networking requirements outlined in the Market Definition/Description and Extended Market Definition sections.

- Produce and release enterprise data center networking products for general availability as of 16 January 2018. All components must be publicly available, shipping and included on the vendors' published price list as of this date. Products shipping after this date will only have an influence on the Completeness of Vision axis.

- Provide commercial support and maintenance for their enterprise data center networking products. This includes (but is not limited to) hardware/software support, access to software upgrades, and troubleshooting and technical assistance.

- Show relevance to Gartner's enterprise clients on a global basis by meeting both of the following criteria:
  - Demonstrate at least 100 current enterprise data center networking customers (with active support contracts).
  - Demonstrate at least 10 current enterprise data center networking customers that are based in three separate continents (with active support contracts).

- Show relevance to Gartner's enterprise clients by meeting at least one of the following:
  - More than $55 million of product revenue in the enterprise data center networking market over the last four quarters
  - More than $27.5 million of product revenue in the enterprise data center networking market over the last four quarters and growth at more than 30% from the prior four quarters
More than 1,000 current enterprise customers (with active support contracts)

**Evaluation Criteria**

**Ability to Execute**

**Product or Service:** Core goods and services that compete in and/or serve the defined market. This includes current product and service capabilities, quality, feature sets, skills, etc. This can be offered natively or through OEM agreements/partnerships as defined in the market definition section and detailed in the subcriteria.

This evaluates vendors by looking at their overall data center networking portfolios, including the ability to deliver and manage all hardware and software aspects of data center networking. It includes Ethernet fabrics, core/spine switches, ToR/leaf switches, virtual switches, blade switches, NOS, controllers, and the relevant automation, management and orchestration of those components. Particular attention will be paid to the programmability of products including automation and integration within broader data center workflows and orchestration. We consider product and architectural migration strategies, and the ability to address virtualization, latency and scalability issues for both north-south and east-west traffic. More emphasis is placed on capabilities that would apply in highly automated and open environments, including disaggregation, because many of those areas cross the boundaries of the IT architecture, making proprietary protocols a limiting factor. We focus on the vendors’ flagship enterprise products and/or what products they lead with for enterprise accounts.

**Overall Viability:** An assessment of the overall organization’s financial health, and the financial and practical success of the business unit. Viability also includes an assessment of the likelihood that the individual business unit will continue to invest in and offer the product, and advance the state of the art within the organization’s portfolio of data center switching products. Geopolitical issues will also impact overall viability for some vendors in this market.

**Sales Execution/Pricing:** The organization’s capabilities in all presales activities and the structure that supports them. This includes deal management, pricing and negotiation, presales support, and the overall effectiveness of the sales channel.

This evaluates presales and go-to-market activities of both the vendor and its channels, and includes analysis of how the vendor interacts with its current and potential customers. The second aspect of this criterion includes our evaluation of the cost-effectiveness of the solutions for purchase and support, and the ability to recognize and position the most appropriate solution in specific sales situations.

**Market Responsiveness and Track Record:** Ability to respond, change direction, be flexible and achieve competitive success as opportunities develop, competitors act, customer needs evolve and market dynamics change. This includes how well the vendor’s offering matches buyers’ requirements at the time of purchase. We assess the vendor’s track record in delivering new capabilities when the market needs them. This criterion also considers the vendor’s history of responsiveness to changing market demands.

**Marketing Execution:** The clarity, quality, creativity and efficacy of programs designed to deliver the organization’s message in order to influence the market, promote the brand, increase awareness of products and establish a positive identification in the minds of customers. This mind share can be
driven by a combination of publicity, promotional, thought leadership, social media, referrals and sales activities.

This focuses on how the vendor is perceived in the market, and how well its marketing programs are recognized. For data center network infrastructure, the evaluation focuses on how well the vendor is able to influence and shape perception in the market through marketing activities. An additional indicator for this criterion is how often Gartner clients consider a vendor as a possible supplier in a shortlist evaluation.

**Customer Experience:** Products and services and/or programs that enable customers to achieve anticipated results with the products evaluated. Specifically, this includes quality supplier/buyer interactions technical support or account support. This may also include ancillary tools, customer support programs, availability of user groups, service-level agreements, etc.

Looks at all aspects of the customer interaction, with a heavier weighting on postsales service and support activities. This includes customers' experience with the vendors' data center networking products and services used in their production data center environments. This includes initial provisioning, as well as day-to-day operation and management of data center networks. This includes hardware and software quality, and how existing customers describe their experience with the vendors' products.

**Operations:** This criterion is not rated.

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<tr>
<th>Evaluation Criteria</th>
<th>Weighting</th>
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<tbody>
<tr>
<td>Product or Service</td>
<td>High</td>
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<tr>
<td>Overall Viability</td>
<td>Medium</td>
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<tr>
<td>Sales Execution/Pricing</td>
<td>High</td>
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<tr>
<td>Market Responsiveness/Record</td>
<td>Medium</td>
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<td>Marketing Execution</td>
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<td>Customer Experience</td>
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<tr>
<td>Operations</td>
<td>Not Rated</td>
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Source: Gartner (July 2018)

**Completeness of Vision**

**Market Understanding:** Ability to understand customer needs and translate them into products and services. Vendors should show a clear vision of their market — and be able to listen, understand customer demands, and shape or enhance market changes with their added vision.
This assesses the vendor's ability to look into the future and drive new ideas into product roadmaps and offerings. It includes the vendor's understanding of the core data center network buyers as described in the market definition. In this market, we look at the vendor's ability to address increased network agility and automation, hybrid cloud networking, changing application architectures, openness, choice, and investment protection.

**Marketing Strategy:** Clear, differentiated messaging consistently communicated internally, externalized through social media, advertising, customer programs and positioning statements.

This evaluates the ability of the vendor to influence the market through its messaging and marketing campaigns. Further, it includes the extent to which the vendor articulates a differentiated message and communicates it consistently. We look for consistent communication throughout the organization and through its website, advertising, customer programs and positioning statements, as well as in its statements of direction and product roadmaps.

**Sales Strategy:** A sound strategy for selling that uses the appropriate networks including direct and indirect sales, marketing, service, and communication. This includes partners that extend the scope and depth of market reach, expertise, technologies, services and their customer base.

This evaluates the vendor's use of direct and indirect sales to extend the scope and depth of its market reach. It includes development of effective go-to-market strategies, alliances and partnerships. In addition, it includes how the vendor exploits new business models that are emerging due to market and technology transitions.

**Offering (Product) Strategy:** An approach to product development and delivery that emphasizes market differentiation, functionality, methodology and features as they map to current and future requirements.

This evaluates how the vendor plans and invests in R&D to continue to innovate in the key market transitions identified in the Market Definition/Description and Extended Market Definition sections. It includes roadmaps around improving agility/automation, open networking, disaggregation, multicloud/hybrid cloud and other emerging technological approaches.

**Business Model:** The design, logic and execution of the organization's business proposition to achieve continued success.

This assesses the soundness and logic of a technology provider's underlying business proposition.

**Vertical/Industry Strategy:** This criterion is not rated.

**Innovation:** Direct, related, complementary and synergistic layouts of resources, expertise or capital for investment, consolidation, defensive or pre-emptive purposes.

This measures the vendor's ability to address emerging data center networking requirements, and/or increasing value to enterprise customers. We look at how the vendor invests in new technologies to move its business and the market forward, with a focus on technologies that are differentiated, unique and offer high value to the enterprise buyer. Specific examples include intent-driven networking, hybrid cloud/multicloud networking, increasing operational agility and automation, and even nonproduct innovations such as consumption-based pricing. A key attribute in the data center market is for the vendor to innovate in technology areas that best meet emerging enterprise market requirements, including increasing levels of automation. Innovation is not a checkbox of current and proposed product
features. In fact, innovation is not limited to products, and can cover multiple aspects of the vendor's strategy.

**Geographic Strategy:** This criterion is not rated.

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Source: Gartner (July 2018)

**Quadrant Descriptions**

**Leaders**

A Leader has demonstrated a sustained ability to address changing requirements for enterprise data centers, including a complete product portfolio. A Leader also has high visibility in the market, and the ability to drive, shape and transform the market, and maintain strong relationships with its channels and customers.

**Challengers**

A Challenger has demonstrated sustained execution in the marketplace, and has clear, long-term viability and visibility in the market and a solid product portfolio. However, a Challenger has not shown the ability to drive, shape and transform the market.

**Visionaries**

A Visionary has innovated in some key areas of data center networking, such as automation, open networking, operational efficiency and cost reductions. Visionaries often help to transform the market via driving new ideas for solving enterprise challenges.

**Niche Players**
A Niche Player has a complete or near-complete product offering, but has limitations such as geographic reach or vertical market focus. A Niche Player has a viable product offering, but has not shown the ability to transform the market or maintain sustained execution.

**Context**

**Market Forecast**

Data center switching revenue and ports have enjoyed steady expansion and are forecast to do so for the next several years. However, the on-premises market has seen less growth as workloads shift to off-premises sites, particularly IaaS/PaaS cloud providers. Along these lines, port shipment growth in 2017 included:

- 32% overall growth, including both ODM and OEM vendors
- 123% growth via ODM vendors, which we assess as primarily shipping to large networking operators including cloud providers
- 24% growth via OEM vendors

The transition from 10 Gbps switch interfaces for server access and 40 Gbps uplinks to 25 Gbps/100 Gbps interfaces is being driven by multiple factors, including near price parity and increased server processing and I/O capacity. We anticipate that, during 1Q20, the number of 25 Gbps-capable interfaces shipped will pass 10 Gbps.

**Popular and Emerging Topics**

These include:

- **Automation and agility**: The current state is that many data center networking changes are manual, CLI-driven (more than 70% for many enterprises). Thus, Gartner clients mention a desire to improve automation and agility in nearly all our data center networking conversations. In some instances, this is driving investment in data center networking beyond hardware refresh/expansion, with clients often looking at VMware NSX and Ansible in these scenarios (see “Building Data Center Networks in the Digital Business Era”).

- **Containers and microservices**: Adoption of containers and microservices are growing substantially, albeit it from a low base in enterprise data centers. While we don't yet get substantial client interest in container networking, we do see vendors increasingly investing in integrations to simplify management and orchestration in containerized environments. Most of the vendors in this research have or plan to have plugins for leading container orchestration systems. This is a point of product differentiation today, but is not driving the market in a substantial way.

- **HCIS**: Hyperconverged integrated systems typically use the same network for user access, compute cluster data networking and cluster storage networking, including replication, sharding, RAID and failure recovery. As a result, traffic patterns are often unpredictable and can be very heavy. Most users have responded by overprovisioning the network, but this is increasingly a challenge as more demanding workloads move to HCIS. As a result, we are seeing HCIS vendors offer greater network orchestration/optimization integrated in their offerings. This is a point of differentiation among solutions in the market today.
Multicloud is an emerging capability of data center products that includes the ability to provide visibility, troubleshooting, configuration and management for workloads that exist in a public cloud provider's infrastructure. VMware, Cisco and Juniper Networks have been publicly vocal about their commitment to solve these emerging challenges, and, while enterprise interest is increasing, real-world adoption of these solutions remains very low.

Visibility and analytics: As the core hardware and operating systems become increasingly commoditized in this market, vendors are moving to differentiate their products in different ways, including visibility and analytics. We are seeing vendors starting to provide dramatically improved visibility and analytics, including support for streaming telemetry or In-band Network Telemetry (INT). These capabilities provide much more granular insight for enterprises to manage, troubleshoot and operate data center networks versus today's approaches. While there is substantial value for enterprises, there is a general lack of education and budget, and real-world adoption of these capabilities remains low today. Further, there is an unclear financial model from vendors delivering this capability. We anticipate INT will become a key feature of data center networking, but not result in a dramatic shift to data center network buying habits over the next 12 months.

Programmable chips: Historically, vendor network chips have innovated at the pace of hardware (18 months), but this is no longer fast enough to keep up with demand, particularly in large-scale environments. As a result, buyers requiring access to the latest features increasingly find that their recent purchases are obsolete before budgets allow replacement. Moving forward, a new generation of chips from companies such as Barefoot Networks, Broadcom and Cavium hope to address this via delivering feature-programmable packet processors. This enables switch manufacturers to enhance already-shipped products via firmware updates and also allows them to deliver optimized solutions for particular use cases. We anticipate this will result in a new class of hardware-programmable switches, which will be increasingly relevant to enterprises by 2020.

Intent-Based Networking (IBNS): Intent-based networking is a new way to build and operate networks that improve network availability and agility, compared to traditional approaches. IBNS provides life cycle management for network infrastructure, including design, implementation, operation and assurance. Enterprises are increasingly interested in intent, but adoption in production is very limited. We see vendors making product investments and marketing announcements, and we anticipate intent will heavily influence market direction moving forward.

NVMe: NVMe PCIe is a super-low-latency, high-performance storage technology that promises the lowest end-to-end latency from application to storage. Solid-state arrays benefit from the low latency of the media to deliver the best storage performance possible, and NVMe promises dramatic improvements over existing SCSI/Fibre Channel technology. As NVMe-oF is adopted for solid-state arrays over the coming three years, we expect Ethernet/RoCE v2 to be the default networking technology due to its low latency. Consequently, a number of vendors are offering Ethernet fabrics that are optimized for RoCE.

Missed Opportunities in the Market

There are several innovations that Gartner believes can and should have been delivered to this market that simply haven't been. This is part of Gartner's position that established vendors have not delivered appropriate levels of network operations innovation in the market around network operations (see "Look Beyond Network Vendors for Network Innovation"). Some examples include:
Cloud-managed networks are very popular for WLAN and SDWAN, and extend to wired switching as well. We do not see cloud-managed networking being delivered in the data center, although many clients would benefit from it, particularly in the midmarket.

In midmarket and smaller environments, the concept of “the two-switch data center” provides ample compute capacity, and performance for up to several hundred VMs. Unfortunately, we rarely see vendors leading with this architecture — instead leading with more expensive and more complicated solutions.

Ethernet fabrics provide a simplified way to manage multiple switches as a single construct, and we believe could be delivered as a mobile application to further simplify network operations, but this has not materialized in the market.

Market Overview

Gartner’s view of the market is focused on transformational technologies or approaches delivering on the future needs of end users. It is not exclusively focused on the market as it is today.

Market Drivers

The data center networking market is primarily driven by three factors:

- Refresh of existing data center networking equipment that is at its technological or support limits (see “Know When It’s Time to Replace Enterprise Network Equipment”)
- The expansion of capacity (i.e., physical buildouts) within existing locations
- The desire to increase agility and automation to an existing data center

Vendor Landscape Changes

Just a few years ago, almost every vendor in this research was a fierce head-to-head competitor. This is no longer the case, as there is a substantial degree of co-opetition, with vendors both partnering and competing. There are numerous instances of this, with specific examples including:

- Dell EMC is the majority owner of VMware, owning 80%-plus of VMware stock.
- HPE maintains a 49% ownership in New H3C group, resells Arista and VMware data center networking products, and also supports running Big Switch Networks, Cumulus Networks and other vendors’ NOSs on its Altoline switches.
- Dell supports Cumulus Networks, Big Switch Networks, Pluribus Networks and other vendors’ software running on its switches.
- Mellanox Technologies supports the Cumulus Networks NOS (and others) running on its switches.
- Cumulus Networks has its own hardware, but also has integrated its software to run on HPE, Mellanox Technologies and Dell switches.
- VMware NSX runs on top of all vendors’ hardware, and it has performed specific hardware/overlay integration with most vendors in this research, including Arista Networks and Juniper Networks.
Lenovo partners with Juniper Networks to fill out its data center networking portfolio, including the use of Contrail as an overlay solution.

**Market Recommendations**

I&O leaders responsible for building and operating data center networks should:

- **Invest heavily in automation**, including both time and resources, to create a "relentless automation" or "automation by default" mindset (see "Market Guide for Network Automation").

- **Change your networking teams’ culture** to one that manages risks appropriately rather than one that avoids them at all costs (see "Bring Web-Scale Networking Concepts to Your Data Center").

- **Build a rightsized physical infrastructure** by using a leaf/spine design with fixed-form factor switches and 25G/100G capable interfaces (see "Building Data Center Networks in the Digital Business Era").

- **Optimize data center networking availability** by embedding analytics to increase visibility, and by applying anti-fragile design and operational principles (see "NetOps 2.0: Embrace Network Automation and Analytics to Stay Relevant in the Digital Business Era").

**Extended Market Definition**

**Typical Business Outcomes** — The primary business outcome is local connectivity within enterprise data centers, between servers, data center appliances (like firewalls and application delivery controllers), IP storage, and those network edge platforms that provide connectivity to the rest of the enterprise network or other data centers. This local connectivity is needed to support applications and services running in the data center.

**Market** — Data center networking provides network functions that support connectivity within enterprise data centers. Connectivity can be provided by physical switches, which comprise hardware and software and which may be acquired in bundled or unbundled form. However, with the emergence of network virtualization and new architectural models like software-defined networking, software overlays became an additional option in the market and are considered in this Magic Quadrant. Further information on the data center switching market can be found in Gartner’s Enterprise Network Equipment Market Share research.

**Typical Buyers** — Within the enterprise, CIOs, CTOs, VPs of I&O, directors of networking and network managers are typically the buyers of data center networking infrastructure. Personnel responsible for cloud infrastructure and data center automation are increasingly influencing personnel who are making buying decisions as well.

**How Buyers Shape Their Buying Decision** — Data center networking equipment is business-critical and has a long life cycle, so buyers are strongly influenced by historical vendor relationships, experiences with the quality of their support and technical familiarity with previously installed products. In terms of feature/functionality, buyers typically focus on several factors, including performance, form-factor, deployment options, supplier availability and ease of management. They also focus on integration with higher-level infrastructure orchestration platforms, automation tools, programmability through an API, visibility/analytics, customer experience, brand visibility and overall solution architecture. In particular, automation, ease of management and the ability to support hybrid cloud use cases are increasingly...
important. Price, for both equipment and support, is also a factor, although not the main driver for most enterprise buyers.

**Deliverables** — The most common deliverable is in the form of a switch (physical or virtual) or switching fabric, and the requisite management and control affiliated with the switches. The switches provide physical and logical data network connectivity for IT infrastructure residing in the data center (like servers, IP storage systems, security platforms and other network appliances). The most common network technology deployed in data centers is Ethernet, in all speed variants from 1 to 100 gigabits, with copper or fiber cables. Virtual network overlays are a more recent addition and provide logical connectivity over the physical network, leveraging virtual switches and creating virtual tunnels with protocols like VXLAN. Typical network functions include the ability to create virtual network segments and manage logical connectivity at Layer 2 (VLANs and VXLANs) and Layer 3 (IP routing). Some solutions are referred to as Ethernet fabrics and can be managed as a single logical entity through a GUI or API, rather than at the individual switch level, providing low-touch provisioning on its devices.

**How Providers Package, Market and Deliver** — Buyers typically source their data center network: (1) directly from network equipment suppliers, or (2) via a reseller or system integrator. The data center network is normally purchased (capex) and maintained for a number of years under a support contract. In the last two years, we have seen a trend toward disaggregation of hardware and software in pricing. Alternative software options can often be selected for the same hardware platform, and some vendors propose perpetual software licenses and price software support separately from hardware support. These changes in pricing scheme show that value is shifting from hardware to software/services and impacting vendor’s revenue composition. Data center networking solutions can also be procured from some vendors via leasing, pay-as-you-grow or other consumption-based pricing models.

Data center networking solutions are characterized by the following elements:

- **Physical interfaces**: Physical interfaces to plug-in devices are a very common component of products in this market. 10G is now the most common interface speed we see in enterprise data center proposals. However, we are also rapidly seeing the introduction of new Ethernet connectivity options at higher speeds (25 GbE, 50 GbE and 100 GbE). Interface performance is rarely an issue for new implementations, and speeds and feeds are less relevant as buying criteria for the majority of enterprise clients, when compared to automation and ease of operations (see "40G Is Dead — Embrace 100G in Your Data Center!").

- **Physical topology and switches**: The spine-and-leaf (folded Clos) topology is the most common physical network design, proposed by most vendors. It has replaced the historical three-tier design (access, aggregation, core). The reduction in physical switching tiers is better-suited to support the massive east-west traffic flows created by new application architectures (see "Building Data Center Networks in the Digital Business Era" and "Simplify Your Data Center Network to Improve Performance and Decrease Costs"). Vendors deliver a variety of physical form factors for their switches, including fixed-form factor and modular or chassis-based switches. In addition, this includes software-based switches such as virtual switches that reside inside of physical virtualized servers.

- **Switching/infrastructure management**: Ethernet fabric provides management for a collection of switches as a single construct, and programmable fabrics include an API. Fabrics are commonly adopted as logical control planes for spine-and-leaf designs, replacing legacy protocols like Spanning Tree Protocol (STP) and enabling better utilization of all the available paths.Fabrics automate several
tasks affiliated with managing a data center switching infrastructure, including autodiscovery of switches, autoconfiguration of switches, etc. (see "Innovation Insight for Ethernet Switching Fabric").

- **Automation and orchestration:** Automation and orchestration are increasingly important to buyers in this market, because enterprises want to improve speed to deliver data center network infrastructure to business, including on-demand capability. This includes support and integration with popular automation tools (such as Ansible, Chef and Puppet), integration with broader platforms like VMware vRA, inclusion of published/open APIs, as well as support for scripting tools like Python (see "Building Data Center Networks in the Digital Business Era").

- **Network overlays:** Network overlays create a logical topology abstracted from the underlying physical topology. We see overlay tunneling protocols like VXLAN used with virtual switches to provide Layer 2 connectivity on top of scalable Layer 3 spine-and-leaf designs, enabling support of multiple tenants and more granular network partitioning (microsegmentation), to increase security within the data center. Overlay products also typically provide an API to enable programmability and integration with orchestration platforms.

- **Public cloud extension/hybrid cloud:** An emerging capability of data center products is the ability to provide visibility, troubleshooting, configuration and management for workloads that exist in a public cloud provider's infrastructure. In this case, vendors are not providing the underlying physical infrastructure within the cloud provider network, but provide capability to manage that infrastructure in a consistent manner with on-premises/colocated workloads.

**Evidence**

Gartner analysts conducted more than 500 Gartner client inquiries on the topic of data center networking between February 2017 and February 2018.

Revenue and port share for data center networking is derived from "Market Share: Enterprise Network Equipment by Market Segment, Worldwide, 4Q17 and 2017."

All vendors in this research responded to a brief 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 ($n = 85$).

Analysts reviewed Gartner Peer Insights data for this market.

**Evaluation Criteria Definitions**

**Ability to Execute**

**Product/Service:** Core goods and services offered by the vendor for the defined market. This includes current product/service capabilities, quality, feature sets, skills and so on, whether offered natively or through OEM agreements/partnerships as defined in the market definition and detailed in the subcriteria.

**Overall Viability:** Viability includes an assessment of the overall organization's financial health, the financial and practical success of the business unit, and the likelihood that the individual business unit
will continue investing in the product, will continue offering the product and will advance the state of the art within the organization's portfolio of products.

**Sales Execution/Pricing:** The vendor's capabilities in all presales activities and the structure that supports them. This includes deal management, pricing and negotiation, presales support, and the overall effectiveness of the sales channel.

**Market Responsiveness/Record:** Ability to respond, change direction, be flexible and achieve competitive success as opportunities develop, competitors act, customer needs evolve and market dynamics change. This criterion also considers the vendor's history of responsiveness.

**Marketing Execution:** The clarity, quality, creativity and efficacy of programs designed to deliver the organization's message to influence the market, promote the brand and business, increase awareness of the products, and establish a positive identification with the product/brand and organization in the minds of buyers. This "mind share" can be driven by a combination of publicity, promotional initiatives, thought leadership, word of mouth and sales activities.

**Customer Experience:** Relationships, products and services/programs that enable clients to be successful with the products evaluated. Specifically, this includes the ways customers receive technical support or account support. This can also include ancillary tools, customer support programs (and the quality thereof), availability of user groups, service-level agreements and so on.

**Operations:** The ability of the organization to meet its goals and commitments. Factors include the quality of the organizational structure, including skills, experiences, programs, systems and other vehicles that enable the organization to operate effectively and efficiently on an ongoing basis.

**Completeness of Vision**

**Market Understanding:** Ability of the vendor to understand buyers' wants and needs and to translate those into products and services. Vendors that show the highest degree of vision listen to and understand buyers' wants and needs, and can shape or enhance those with their added vision.

**Marketing Strategy:** A clear, differentiated set of messages consistently communicated throughout the organization and externalized through the website, advertising, customer programs and positioning statements.

**Sales Strategy:** The strategy for selling products that uses the appropriate network of direct and indirect sales, marketing, service, and communication affiliates that extend the scope and depth of market reach, skills, expertise, technologies, services and the customer base.

**Offering (Product) Strategy:** The vendor's approach to product development and delivery that emphasizes differentiation, functionality, methodology and feature sets as they map to current and future requirements.

**Business Model:** The soundness and logic of the vendor's underlying business proposition.

**Vertical/Industry Strategy:** The vendor's strategy to direct resources, skills and offerings to meet the specific needs of individual market segments, including vertical markets.

**Innovation:** Direct, related, complementary and synergistic layouts of resources, expertise or capital for investment, consolidation, defensive or pre-emptive purposes.
Geographic Strategy: The vendor's strategy to direct resources, skills and offerings to meet the specific needs of geographies outside the "home" or native geography, either directly or through partners, channels and subsidiaries as appropriate for that geography and market.

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