

# Magic Quadrant for Data Center Networking

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Data center networking continues to evolve, with increasing choices for open and disaggregated network solutions, while other vendors aim for more closed, proprietary systems. Enterprises should evaluate different vendor approaches and architectures, with a particular focus on software capabilities.

## Market Definition/Description

Data center (DC) networking solutions covered in this research provide logical and/or physical network connectivity within enterprise data centers. Organizations' data center networking requirements have continued to evolve rapidly after a period of architectural stability that lasted more than 15 years. While speed, density and scale increased, the underlying architecture continued to rely on an oversubscribed three-tier hierarchical approach. Over the past two years, organizations have increasingly adopted a two-tier fat-tree architecture that delivers high cross-sectional bandwidth for east-west traffic while increasing flexibility and reducing cost.

The new style of web-scale IT that is run in hyperscale organizations such as Google, Facebook and Amazon has changed the paradigm for delivery of IT services, and it is having a trickle-down effect on operational and buying practices within the enterprise. Early adopters and mainstream enterprise organizations are now attempting to improve their ability to deliver increased agility, improved management and/or reduced cost for their constituents.

The influence and lessons from hyperscale deployments will have continued repercussions in the enterprise data center networking market. Thus, the market is being transformed with new architectures, technologies and vendors that specifically target solutions to:

- Improve and simplify network operations activities to align more closely with business goals and broader data center agility
- Address the changing size and density within the data center
- Account for shifts in application traffic patterns
- Provide solutions that are open and standards-based, to increase interoperability, foster innovation and reduce vendor lock-in

## What's Changed?

During the past 12 months, we have seen the market stabilize and many enterprises focus on executing the first steps of a data center transformation. Rather than focusing on high levels of innovation and all-encompassing change, 2015 saw more pragmatic deployments of automated fabric and basic software-defined networking (SDN) solutions.

From a vendor perspective, more attention was placed over the past year on extending feature capabilities rather than game-changing architectural announcements. We are also seeing smaller vendors, such as Big Switch Networks and Cumulus Networks, gaining visibility as an increasing number of enterprises look toward open-networking solutions as viable alternatives.

No major vendor acquisitions took place during 2015. However, the recently completed sale of 51% of Hewlett Packard Enterprise's (HPE's) H3C subsidiary in China to Tsinghua Holdings' Unisplendour will have significant implications to HPE's strategies in the DC networking market.

The enterprise data center networking market was also relatively stable from a financial perspective in 2015, with annual revenue growth of 5.1%. 1G ports declined by more than 13% as the market for server-attached connections shifted to 10G, which had an 18.5% increase. However, the average cost of a 10G port dropped by more than 18% to less than \$215, excluding optics, resulting in a 2.2% decline in revenue for 10G ports in 2015. Revenue for 40G connections was up by 93% during 2015.

End-user discussions have primarily been about:

- Determining the right network for your cloud (see "Target Networking for Successful Cloud Deployments").
- Gaining more agility (see "How to Improve Data Center Network Agility Without Getting Fired").
- Evaluating the leading offerings from major suppliers — Cisco Application Centric Infrastructure (ACI) versus VMware NSX (see "Comparing Cisco ACI and VMware NSX: Programmable Fabrics or SDN Overlays?"). This discussion has spread to many mainstream enterprise organizations.
- Aligning the DC network with bimodal IT initiatives (see "Network Planners Need to Prepare for the Impacts of Bimodal IT").
- Adopting Ethernet fabrics as a replacement for traditional three-tier architectures and often as a precursor to integrating the network into a broader orchestration system (see "Simplify Your Data Center Network to Improve Performance and Decrease Costs").
- The increasing use of fixed form factor (FFF) switches for data center spine/core deployments (see "Rightsizing the Data Center Network — The Move Toward Fixed Form Factor Core").

Other emerging trends include:

- New pricing models including subscription service pricing, burst capacity pricing, and the split of hardware and software acquisition and support prices

- Continued disaggregation of the network stack to include brite-box solutions and the announcement of open source network switch OS. We estimate that there are 650 deployments of brite-box deployments as of year-end (YE) 2015 (see "The Future of Data Center Network Switches Looks 'Brite'"). This represents a growing, but still very small proportion of the enterprise market.
- New switch platforms enabling cost-effective 25G server access and 100G inter-switch connections.
- An increasing use of Internet Protocol (IP)-based storage networking, which drives more traffic to the DC network.
- Connectivity for containers and microservice architectures will become a key requirement as the use of containers migrates over the next two years from the current use in development environments to production deployments of Mode 2 applications.

### Differentiation Shifting Toward Software

A move toward differentiation in the software stack continues, as vendors leverage merchant-based silicon within their switching portfolios. In addition, vendors are strongly focusing on adding value to their fabric, SDN, automation and brite-box strategies through the use of value-added software components, often running externally to network devices. These capabilities can be delivered in external controllers, by external software that configures or orchestrates the fabric or controller, and by integration of third-party services into a more integrated network solution. Thus, differentiation between vendor solutions continues to shift toward software (management, provisioning, automation and orchestration), with hardware capabilities (bandwidth, capacity and scalability) becoming more standardized. Most Gartner client interactions regarding data center networking now include virtualization, management and orchestration, versus the "speeds, feeds and protocols" mentality that was dominant for many years.

### SDN Garners Mainstream Interest, but Limited Deployments

While many of the vendors included in this Magic Quadrant made notable progress toward fulfilling their SDN strategies, much of the enterprise interest focused on network overlays and more pragmatic fabric solutions. From the user perspective, 2015 became the year of initial SDN deployments, though the number in production is still relatively small (we estimate approximately 1,700 SDN customers as of YE 2015, with roughly 25% in production environments). SDN-related inquiry volume continued at a high rate, with SDN coming up in approximately 70% of DC networking inquiries, largely due to clients looking for more automation. While SDN is one possible solution, many discussions evolve to programmable fabrics and SDN overlays, rather than a more comprehensive overhaul of the DC network.

Clients often cite the following drivers when exploring SDN and related technologies:

- Faster and automated provisioning of workloads
- Improved security

- Improved management
- Reduced expenditures on networking hardware/software
- Reduced operational expenditures to operate networks
- Reduced vendor lock-in
- Concern over making long-term investments that do not include SDN capabilities

Concerns about complexity and difficult integration are cited as reasons not to deploy SDN and programmable fabric solutions. For SDN deployments to increase, we believe the technology must be more seamlessly integrated into larger orchestration systems, and implementation configurations simplified. It will take continued investments to improve these areas, given the often far-reaching impact of SDN. Enterprise organizations also struggle with a lack of internal resources than can deal with the cross-silo impacts of these new technologies.

### SDN Overlays

Several vendors included in this Magic Quadrant provide overlay network capabilities, which typically integrate the provisioning of network and compute resources for a more agile infrastructure. While this is an important development, it is also important to consider how various overlay solutions are implemented, as the overlay is still fully dependent on a physical underlay network, and issues of network control and visibility are critical to ensure the reliability of overlay solutions.

### White-Box, Disaggregated Switching and Open Networking

Interest and adoption of white-box switching has increased significantly within hyperscale data centers over the past several quarters. White-box switching now accounts for 7.5% of data center ports shipped. Shipments increased by nearly 30% during 2015 in an overall market with 6% port shipment growth. Inspired by hyperscale deployments, we are now seeing interest in white-box switching from an increasing number of Type A organizations (see Note 1).

This has resulted in a new style of switching, which Gartner refers to as branded white-box switching (or "brite box," for short). Brite-box switching disaggregates network-switching hardware from software, but addresses several of the shortcomings of "pure" white-box switching, such as acquisition, integration and support. The ecosystem for this style of switching continues to expand, with vendors expanding their brite-box options and the announcement of an open-source network switch OS, such as the HPE-led OpenSwitch project and Microsoft's contribution of SONiC to the Open Compute Project (OCP; see "HP-Led Open-Source Switch OS to Push Innovation in Data Center Networks").

### Integrated Systems

While most SDN-based solutions offer greater disaggregation and choice, we simultaneously see a counter trend among one segment of the market that is characterized by purchases of integrated systems. Converged infrastructure has gained popularity to simplify operations and improve

provisioning times. Integrated systems are forecast to grow at 18.7% per year through 2019. The networking components of an integrated system are largely prescribed, which results in the transfer of the physical access layer network buying decision from what was solely a networking decision to a server/storage/network decision. While strong growth is expected, vendor alliances are changing as acquisitions influence existing partner relationships. For example, the pending acquisition by Dell of EMC will influence both their own offerings and that of EMC-controlled VCE.

### What Is Required in New Data Center Networks?

We have described an environment that has undergone substantial change and that offers the opportunity to deliver networking capabilities in very different, more agile and cost-effective ways.

Many of the vendors in this research provide "good enough" solutions to solve today's data center networking requirements. However, ample differentiation between vendors exists, including price, architecture, and how vendors are addressing emerging and future requirements. Moving forward, modern data center network solutions must address:

- The need for simplified and improved network agility
- Changing data center network size and density
- Changing application architectures
- Innovation and choice
- Migration and investment protection
- Overlay/underlay management integration

### Simplified Networks With Improved Agility

Data center networks must address an increased business appetite for faster, service-based delivery of IT. This is driven by real-time business requirements and the availability of viable options outside of traditional corporate IT. This has exposed suboptimal network operation paradigms (including static and manual provisioning and configuration activities), which increase time-to-delivery services, lower network availability, increase operational expenditures and make it increasingly difficult to scale the environment.

### Changing Size and Density

The size and density of data centers are changing, with several macro-level trends driving both the expansion and contraction of data centers:

- Server and data center consolidation require IT organizations to centralize compute resources and reduce the number of physical data centers, resulting in fewer, but larger, corporate data centers.

- Increasing compute density using multicore, multisolet servers — combined with virtualization and storage convergence, and increasing use of hyperconverged integrated systems — is reducing the physical footprint required for the enterprise data center. Workloads that used to take multiple racks of servers are now delivered within a portion of a single rack.
- The migration of applications toward external cloud services also reduces the space requirements within the corporate data center.
- New workloads, due to analytics based on increasing data provided through the Internet of Things, could increase compute footprints for some organizations.

### Changing Application Architectures

Typical enterprise applications have become more distributed, increasingly independent from specific servers and more elastic in their deployment. Applications such as big data have more stringent bandwidth, latency and interface buffer requirements than traditional applications. In addition, there is an increasing trend to containerize microservices architectures. The resulting and increasing requirement to efficiently deal with east-west traffic has resulted in several recent innovations, including:

- Higher-performance, low-latency top-of-rack (ToR) switches
- The adoption of one- or two-tier (leaf/spine) physical Ethernet fabric architectures
- The increasing use of FFF core switches
- More intelligence and traffic-forwarding within the server access layer (through the use of virtual chassis or chassis clustering solutions)
- Connectivity for containers

These approaches improve server-to-server performance and enable the data center network to provide a homogeneous set of capabilities for all connected compute resources.

### Long-Term Innovation and Choice

Disaggregation, network automation and orchestration, and open networking offer opportunities for transformational change within the networking marketplace. The decoupling of hardware and software represents the potential for a fundamental improvement in how networks are designed, procured, managed and evolved. The potential for long-term innovation that could emerge with an open SDN-based marketplace is clearly disruptive to what has traditionally been a hardware-centric model.

### Migration and Investment Protection

While new technology and business model innovation are critical, vendors also need to be concerned with providing investment protection for existing investments and migration plans from currently deployed architectures to the new ones. New software-driven architectures should not render existing hardware platforms obsolete.

# Magic Quadrant

Figure 1. Magic Quadrant for Data Center Networking



Source: Gartner (May 2016)

## Vendor Strengths and Cautions

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### Arista Networks

Arista Networks continues to be one of the fastest-growing vendors in this research, with product revenue growth of 40.6% in 2015. As of YE 2015, Arista has approximately 3,700 customers and is No. 3 in ranking for DC networking with 8.5% revenue share, gathering continued interest from Gartner clients. Arista is focused exclusively on data center switching and is expanding the portfolio to cover data center interconnection, a critical component for clients building cloud-based infrastructures. Arista provides a programmable solution based on their Extensible Operating System (EOS) software, which can be integrated in nearly all data center management and orchestration architectures. In 2015, it introduced CloudVision, a single network control point that facilitates integration with third-party SDN solutions to achieve networkwide automation and orchestration. Arista delivers sophisticated monitoring capabilities, providing networkwide telemetry and analytics through real-time streaming of the network state.

Arista is expanding to address the broader mainstream enterprise and increasing geographic reach, and also leveraging partnerships with VMware NSX and Hewlett Packard Enterprise.

Organizations should consider Arista for all data center network solutions, particularly if they are implementing highly automated cloud computing environments or need detailed monitoring capabilities. They should, however, verify local account and engineering expertise and coverage.

### Strengths

- Arista provides tight integration with a wide range of software orchestration and SDN solutions, and gives its customers flexibility through the programmability of its EOS platform, based on standard Linux.
- Arista provides a single control point (CloudVision), centralized network state (NetDB), network telemetry and application visibility capabilities, along with extensible APIs and software development kit (SDK).
- Arista offers a portfolio of products with different form factors, including some large fixed configuration switches, enabling the implementation of rightsized and often cost-effective solutions for every environment.
- Arista provides high-performance and very scalable solutions, with deep buffers, large address tables and low latency to deal with the complexities of modern DC applications and to scale to cloud size.

### Cautions

- Geographic coverage is still limited outside of North America and Western Europe when compared with more established vendors, and Arista is still ramping up its support practices and channel programs to better serve the mainstream market.



- Arista does not provide interfaces for converged storage networks where FC (or FCoE) is a requirement.
- Arista was a price/performance leader when compared to more traditional solutions, but increasing adoption of merchant silicon-based switches, combined with similar spine-and-leaf architecture, has enabled competitors to close the gap.
- An ongoing legal dispute with Cisco represents an increased level of perceived risk for some potential customers. Organizations should have their legal departments assess the risk associated with this issue (see Note 2).

## Avaya

Avaya continues to gain traction with its Fabric Connect solution, which significantly simplifies network configuration within the data center. Avaya has now deployed more than 500 Fabric Connect solutions — a 60% year-over-year increase. Despite growing Fabric Connect customers, Avaya's overall DC networking business declined by nearly 15% in 2015 — a trend that Avaya cannot continue if it is to have long-term viability in this market. Avaya's Fabric Connect solution offers not only a robust data center fabric, but also provides extensions to the campus and branch network. For those with requirements to extend automation using SDN, Avaya offers SDN Fx, an OpenDaylight (ODL)-based controller, and Fabric Orchestrator to integrate with OpenStack. Consider Avaya (after confirming local support capabilities) when configuration simplification and network automation are priorities.

## Strengths

- Avaya can deliver a well-proven, mature, end-to-end fabric that reaches from the data center to campus and branch locations.
- The solution provides strong automation of data center network functions.
- Avaya offers a highly scalable multicast solution that is simple to provision and manage, where only the edge nodes need to be provisioned.
- Avaya is leveraging the continued trends toward merchant silicon by delivering its software preloaded on validated original design manufacturer (ODM) hardware. While predominantly aimed at cloud and service provider customers, this presents an opportunity for Avaya to increase its presence in the market, and represents a more streamlined and supported way of taking advantage of ODM pricing.

## Cautions

- As the smallest vendor analyzed in this research, Avaya suffers from a lack of both market visibility and technical resources and partners that are familiar with their solutions. Enterprises need to ensure local partners and Avaya have resources with appropriate deployment experience.

- Avaya's networking portfolio has received relatively little leverage and investment compared to Avaya's core unified communications business.
- Long-term viability in the DC networking market is questionable due to Avaya's continued revenue decline.
- Avaya currently lacks certification with VMware and has limited capabilities with Puppet and Chef for organizations that are looking for application integration for network provisioning.

## Brocade

Brocade is a longtime data center networking player with a solid portfolio that includes VDX switches, MLXe Core Routers and SDN applications with an associated controller. As of YE 2015, Brocade has approximately 4,000 customers running its flagship data center networking product, the VCS switching fabric. Its nearly 20% DC networking revenue growth during 2015 allowed Brocade to increase market share to 2.6%. Brocade has consistently focused on providing an automated network switching fabric, resulting in increased market traction for their fabric solution. Over the past year, Brocade released several products, including a new fabric offering called IP Fabric, which is based on a Level 3 scale-out architecture and aimed primarily at larger-scale environments. Further, Brocade has continued to make investments and innovate in the areas of automation, workflow orchestration and SDN capability within its portfolio. Enterprises looking for automated switching solutions should consider Brocade.

## Strengths

- Gartner clients tell us that Brocade's VCS fabric is simpler to operate versus competitors' solutions, due to the high degree of automation and zero-touch provisioning capabilities.
- Brocade's current products and roadmap include investment protection across architectures. For example, the same switching hardware and software support both the VCS and IP Fabric offerings, which helps reduce expenditures if requirements change.
- Brocade has a strong installed base and understanding of specialized requirements in several verticals, including federal, university, service provider and healthcare.
- Brocade offers flexible business models, including subscription-based billing and pay-as-you-grow options.

## Cautions

- Brocade has limited channels compared to leading competitors, which means that many buyers that could potentially benefit from Brocade's offering do not consider this vendor.
- Despite a solid portfolio of products, Brocade is not a top-five player in the market based on port shipments, switching revenue or unaided Gartner client mentions.
- Compared with other leading vendors, Brocade has a limited installed base in the midmarket (which Gartner defines as organizations with 100 to 999 employees), and midmarket Gartner clients seldom mention Brocade's solutions.

- Versus leading competitors, Brocade will be later to market with 25/50G capability, which is desirable in larger-scale data centers or when making investments with long-term investment protection in mind.

## Cisco

Cisco leads the data center networking market by a wide margin, whether measured by port shipments or revenue, and continues to be the most oft-mentioned vendor by Gartner clients. However, consistent with recent trends, it continued to lose share in 2015, with revenue share declining from 62.1% to 60.7% and shipment market share declining from 45.9% to 44.2%.

Cisco has a broad, but potentially confusing data center networking portfolio, complicated by many management options that include the Application Policy Infrastructure Controller (APIC), the recently introduced Nexus Fabric Manager (NFM), the Virtual Topology System (VTS), the Open SDN Controller (based on the OpenDaylight controller), Cisco Prime and the Data Center Network Manager (DCNM). Compatibility and upgradability across families are challenging, and the choice of software can dictate underlying hardware. Cisco has continued to release new hardware and software products into the market, including new Nexus 9200 and NFM, and it leads an open-source container networking initiative called Project Contiv. Cisco should be considered for all data center opportunities globally.

## Strengths

- Cisco has a large and loyal installed base of customers that are comfortable configuring Cisco products, which can simplify deployments and limit training costs.
- Cisco has product portfolio and sales channels to cover all verticals and geographies.
- We are seeing increasing interest from Gartner clients in Cisco Nexus 9000 switches, which is driving increased adoption of these products.
- Early adopters of ACI software have noted that software and hardware quality are good, although most customers are using it primarily for automation and centralized management, versus advanced service orchestration and policy management.
- In addition to networking, Cisco provides compute, storage networking, security and unified communications (UC) solutions. This appeals to customers looking to limit the number of vendors they purchase from.

## Cautions

- Cisco has a history of creating products that rely on closed and/or proprietary features, leading to vendor lock-in. This extends to the Cisco ACI solution, which dictates both hardware and software components.

- Customers have noted that migrating from legacy networking infrastructures to ACI is difficult because of the requirement to understand dependencies between applications and the manual configuration that is required to define application profiles.
- Based on client proposals, Cisco's overall data center networking hardware and software solutions are generally more expensive than other vendors'.
- Cisco and its channel have repeatedly informed customers that upgrading Nexus 9000-series switches from non-ACI to ACI mode is very difficult.
- Cisco's customers complain to Gartner about a lack of investment protection. Specific examples include Nexus 9300 FFF spine switches that cannot be converted from non-ACI to ACI mode, and lack of full ACI support for Nexus 7000 switches and UCS.

## Dell

Dell continues to strongly push its "open" strategy, with noticeable growth in sales that include partner software solutions from Big Switch Networks, Cumulus Networks, IP Infusion, Midokura and Pluribus Networks. As of YE 2015, Dell has more than 400 customers (up from approximately 100 last year) running their open networking solution and its "future-ready enterprise" strategy offers flexibility and investment protection for Dell customers. Recent announcements of Dell's OS10 Linux-based switch OS further enhance the benefits of a disaggregated network architecture. The move toward open networking resulted in Dell's unit shipments increasing by 5.6% during 2015, despite a revenue drop of 9% — an indication of the customer interest and economic drivers behind open-networking solutions. With the pending acquisition of EMC, we expect Dell to become a stronger force with enterprise customers, with the opportunity to deliver more complete and varied converged solutions to the market. Consider Dell for all data center networking opportunities, especially when an open, flexible solution is desired.

## Strengths

- Dell offers a growing portfolio of switches that supports their open strategy of disaggregating hardware from available network software alternatives.
- Dell provides the largest selection of open software options in the market, combined with global support for its partner software providers.
- In addition to networking, Dell provides PC, compute and storage infrastructure, which appeals to customers that prefer to purchase their infrastructure from a single vendor.
- Dell has integrated its networking components into integrated systems offerings. We expect the pending EMC acquisition will allow Dell to deliver a broader range of integrated and hyperconverged systems in the future.

## Cautions

- Transition to a private company and the pending acquisition of EMC are disruptive, and while they represent long-term opportunities, short-term integration issues and market confusion are limiting Dell's sales. In 2015, Dell's DC networking revenue fell by 9% in a market that grew 5%.

- Dell's networking awareness in specific vertical markets can be variable, with weaknesses in financial services industry and public-sector accounts.
- Dell sales are predominantly driven through a direct sales model, so its channels can be less mature when compared with other vendors. When working with Dell channel partners, check references and make sure they have several implementations of similar scale before committing.
- The breadth of available software options has created confusion about the best option for different use cases.

## Extreme Networks

After the assimilation of Enterasys Networks, Extreme Networks has realigned resources and reduced costs, and is now pivoting toward selling solutions to specific market segments. Extreme has transformed the engineering organization to support a software-driven strategy and is now focusing 90% of resources on software. Extreme has over 22,000 customers, but less than 10% of them are for data center solutions, resulting in less than 2% market share in revenue, with revenue declining by 15% in 2015. Extreme is, however, one of the smaller vendors, with a comprehensive LAN portfolio covering both wired and wireless, as well as campus and data center. Extreme has rationalized the portfolio, introduced new products and can offer an SDN controller based on a hardened version of OpenDaylight. It joined the VMware NSX partner program, and together they are working on integration of the respective solutions. Extreme is evolving the portfolio to support new market trends, focusing on open standards and FFF platforms. Extreme should be considered by enterprises in North America, South America and Europe looking for a pure-play networking provider that can fulfill all LAN requirements.

### Strengths

- Extreme provides very strong customer service through a 100% insourced service and support team.
- Extreme has a deep and broad portfolio of data center networking equipment with more than 15 years' history of providing high-performance and reliable data center network solutions.
- Extreme can aggressively price its data center networking solutions in competitive scenarios.
- Extreme has an open and standards-based approach to address emerging data center networking requirements, including widespread support for VXLAN, OpenFlow, an SDN OpenDaylight-based controller and multiple APIs, including OpenConfig.

### Cautions

- Extreme is one of the smaller vendors in this research and is growing below market rates. Thus, organizations should ensure there is appropriate local sales and support coverage.
- Extreme has been late with NSX integration, although they are now actively working on it.

- Extreme had a strong focus on chassis platforms, which we are still seeing in client proposals, rather than newer FFF solutions, which are often better suited for its customer base.
- Extreme's current offerings lack capabilities that many larger and advanced "forward lean" organizations desire, such as support for Puppet and Chef.

### Hewlett Packard Enterprise

Hewlett Packard Enterprise (HPE) enters 2016 with a new corporate name (after the split from HP in November 2015) and the completed sale of 51% of its H3C subsidiary in China (as of 1 May 2016) to form the New H3C. Clients are reporting that HPE is messaging a "business as usual" approach that emphasizes their No. 2 revenue position in data center networking. However, we believe the changes point to significant challenges ahead, as HPE will be reliant on H3C for the primary Comware code base and platforms for its DC network portfolio. HPE's flagship data center switching OS is developed via a joint venture (JV) with H3C, in which H3C has the majority 51% stake. While we see significant investments in the Altoline portfolio (a partnership with Accton) and the launch of the OpenSwitch open-source switch OS initiative, HPE does not yet have an alternative that is fully developed in-house.

Despite a strong HPE networking portfolio, we continue to observe HPE channels offering server solutions bundled with competitive networking products, such as Arista Networks, Cisco and Mellanox Technologies.

We believe the creation of a minority-owned New H3C raises questions concerning the future product offerings of HPE's DC network portfolio, with the potential for increasing confusion between Comware- and OpenSwitch-based solutions. Consider HPE for data center networking opportunities (outside of China), after reviewing proposals for long-term investment and support of proposed solutions.

### Strengths

- HPE exits 2015 as the No. 2 vendor in terms of data center network revenue.
- HPE retains a strong DC networking portfolio with a variety of internally developed, jointly developed (with the New H3C) and partner alternatives that can meet the needs of nearly any enterprise.
- HPE remains committed to expanding its open networking strategy beyond support for Cumulus Networks and Pica8, and have made significant investments into SDN, disaggregated networking and open-source initiatives.
- HPE has global delivery and support capabilities, fully able to support complex data center requirements with a full line of networking, compute and storage solutions.

### Cautions

- Based on our research, HPE has less control of its flagship platforms and code base than other vendors in this analysis.

- HPE offers a varied set of options for data center networks including homegrown, JV-based and partner solutions, which may confuse some buyers. Proposals can vary based on the source and focus of the requirements (network-led or server-led, for example), including a lack of integration of HPE's Virtual Connect blade switch into the HPE Networking hardware and software architectures.
- HPE and its channels sometimes undersell HP maintenance offerings, which can lead to support challenges for some customers.
- DC networking sales of HPE and New H3C will be measured separately due to the majority sale of H3C, which will result in an expected drop in market share ranking during 2016.

## Huawei

Huawei gained significant traction in 2015 as it became the fastest-growing vendor in this analysis, with year-over-year revenue growth of more than 70%. In 2015, Huawei enhanced its Cloud Fabric architecture, CloudEngine switching platforms and SDN controller offerings, which leverage open standards. Huawei's goal focuses on open SDN innovation in the market. Huawei is driving toward more flexible procurement models that will allow customers to pay as they go, as requirements change. While Huawei has global scale and reach, the vendor's data center products are primarily delivered in China, the Asia/Pacific region and other emerging markets, with growing investments in Western Europe. Huawei should be considered in Asia and developing markets, especially when there is a need for a high degree of scalability and port density.

## Strengths

- Huawei has a broad data center switch portfolio based on its CloudEngine portfolio, including scalable chassis architectures and FFF leaf-and-spine switches to support Ethernet fabric architectures.
- Huawei has a broad set of open SDN options to deliver software overlays, a full SDN infrastructure and hybrid solutions, all based on standards to allow third-party integration and enhancements to its architecture.
- Huawei offers a complete converged infrastructure data center offering with network, compute and storage.
- Huawei has deep financial resources and has demonstrated a willingness to invest in regional markets to increase its corporate presence.

## Cautions

- Despite global scale, Huawei has limited channels outside of China and parts of Asia, forcing it to rely on internal resources to support customer deployments. Huawei has small but growing capabilities in Western Europe and limited capabilities in North America.
- Huawei has limited partnerships with support for Puppet, but is behind other vendors in supporting DevOps tools such as Chef and Ansible.

- Gartner clients have observed that Huawei needs to improve sales processes and documentation outside of China.
- Huawei has relatively poor marketing and messaging, which further limits company visibility and differentiation. This means that it is not considered for all potential opportunities in its target markets and geographies.

## Juniper Networks

Juniper Networks has an extensive set of data center networking capabilities and is a top-four vendor when measured via port shipments or revenue. Juniper's DC networking business grew slightly above market rates in 2015, to close the year with 4.8% revenue share. Juniper has accelerated the delivery of new products in 2015, leading with the introduction of a high-density 100Gb platform (QFX10000). It is also introducing support for the hardware/software disaggregation model with the introduction of a brite-box switch (OCX1100) with its Junos software, the introduction of the QFX5200 and the independent availability of Junos software. Juniper has a strong technical reputation and solid installed base with service providers and large enterprises. Juniper has reinvested in its enterprise business to regain awareness for its data center solutions, although it lags behind Cisco, Arista Networks and HPE in our inquiries. Juniper is a VMware partner that provides complete VXLAN Tunnel EndPoint (VTEP) integration and seamless management of its switches as NSX underlay. In addition, Juniper offers Contrail, an SDN software made available in both a supported version and through an open-source model, which has helped position Juniper as an option for service providers and large enterprises looking to integrate with OpenStack environments.

All organizations should consider Juniper in their shortlists for data center networking, in particular large environments that want to have multiple suppliers.

## Strengths

- Juniper has a broad portfolio of data center solutions based on common building blocks that can be used to create different fabric solutions. It has a strong track record in supporting demanding, midsize to large-scale data center environments.
- Juniper has an open and well-thought-out roadmap that can address emerging data center networking requirements.
- In competitive deals that Gartner reviews, Juniper aggressively prices its solutions.
- Juniper offers an open and interoperable architecture, including open APIs, brite-box switches, disaggregated Junos software and an open-source SDN overlay (Contrail) that is one of the more prominent solutions for OpenStack deployments.

## Cautions

- Juniper has lost some traction with Gartner enterprise clients, as witnessed from a decrease in inquiries and contract reviews.



- Gartner clients have indicated confusion over Juniper's multiple data center switching and fabric options.
- Juniper needs to increase its presence with midsize enterprise accounts.
- Juniper does not offer an integrated systems solution of its own; instead, it works with a variety of partners that can integrate Juniper technology with compute and storage solutions.

## Lenovo

Lenovo focuses primarily on the server access layer, with ToR switches and embedded modules for Lenovo's blade and flex server systems. While Lenovo remained a top-10 vendor when measured by port shipments or revenue, Lenovo's sales and revenue for DC networking products declined by more than 40% in 2015. With a lack of core networking solutions and limited vision on how to fill this gap organically, Lenovo both competes and partners in this market, and maintains alliances with Cisco, Arista Networks and Brocade, and it recently announced a comprehensive partnership with Juniper Networks. Organizations with Lenovo servers should consider this vendor, predominantly for server access, or combined with partners for a larger DC networking solution.

### Strengths

- Lenovo is focused exclusively on server access and has a solid understanding of requirements for that usage scenario.
- Lenovo's switches can provide both Fibre Channel and Ethernet interfaces in the same ToR access switch hardware.
- Lenovo does not restrict organizations to exclusively using Lenovo networking gear in their server systems. It offers support for modules from competitors, including Cisco, Brocade and Mellanox Technologies.
- Lenovo's Flex System Interconnect supports up to 20 network devices that can be managed as a single entity, while supporting Ethernet, FCoE and Fibre Channel interfaces.

### Cautions

- Gartner clients do not deploy Lenovo as an end-to-end DC network solution. Instead, they are deployed only as an access layer solution for Lenovo server environments.
- Lenovo currently lacks several interface capabilities that are desired in the access layer, including 10GBase-T and newer 25/50G interfaces.
- Lenovo lacks several key features that are of increasing importance at the server access layer, including support for Linux automation tools (such as Puppet, Chef and Ansible).
- Lenovo has been slow in executing against their vision, with few new product launches or new software solutions delivered over the past year.

## NEC

NEC is a new entrant in the Magic Quadrant, based on its increasing revenue and growing deployments of SDN solutions. NEC was one of the first established vendors to invest heavily in emerging SDN technologies, and this has now paid dividends with its growing presence in SDN solutions for both carrier and enterprise networks. NEC has over 200 production SDN deployments, including some of the largest production networks that scale to hundreds of supported switches. While NEC has a range of hardware switches, its increasing focus is on the software layers of the DC networking stack, where they will continue to deliver their SDN controller and SDN applications that focus on microsegmentation, network virtualization, service chaining, automation and policy-based flow control. NEC has regional support centers to support a global customer base.

### Strengths

- NEC was one of the earliest networking players to see the potential benefits of SDN and has invested a large portion of its R&D on developing SDN software.
- NEC has a large installed base of production SDN deployments (greater than 200) in both enterprise and service provider environments, including some of the largest production deployments of SDN in the market.
- NEC has strong service capabilities to help potential customers deploy newer SDN solutions.
- NEC has delivered a wide range of SDN-based networks across many use cases and geographies.

### Cautions

- NEC has a limited portfolio of older hardware platforms suitable for data center deployments, making NEC increasingly dependent on other networking players to provide the physical network in an NEC-controlled SDN solution.
- NEC has not released capabilities to directly support the DevOps community with tools such as Puppet, Chef and Ansible.
- While NEC has global reach, their regional units act independently, which can create confusion and inconsistency on global delivery and product offerings. It has limited its presence largely to Japan and North America.
- NEC has spent relatively little on marketing its capabilities, and therefore is often not considered on shortlists for enterprise opportunities.

## New H3C Group

This is the first year that H3C is being evaluated as an independent vendor; it was previously a wholly owned subsidiary of HP. In September 2015, HP announced the sale of a majority stake in H3C to Tsinghua Holdings, with the deal completed on 1 May 2016 with the launch of the New H3C Group. Thus, New H3C will now operate as an independent data center networking vendor based in China, with over 5,000 employees. In addition, New H3C will sell HPE's server and storage products

in China, allowing H3C to offer a complete integrated system. Prior to the majority sale, H3C was responsible for the majority of R&D for HP Networking's data center networking portfolio. In China, New H3C conducts direct and indirect sales via a channel of 3,000 partners, with traction in large enterprises and service and cloud providers. Further, HPE and New H3C will retain a close relationship, and outside of China, HPE repackages the New H3C switching portfolio as its primary data center networking product offering. New H3C should be considered for all data center networking opportunities in China.

Note: Due to the timing of the announcements, we have a limited number of client interactions regarding New H3C as an independent networking vendor, and Gartner has not tracked H3C revenue independently of HP/HPE.

## Strengths

- New H3C has a full portfolio of data center networking switches to meet the needs of nearly all enterprise environments.
- New H3C has emerged as one of the largest networking providers in China. The majority ownership by Tsinghua Holdings will allow it to better compete for government and state-owned enterprise and telecom business within China.
- New H3C has a very solid understanding of local buying requirements in China and a large sales channel within the region.
- New H3C also provides servers, storage, integrated systems, routers, firewalls and wireless LAN (WLAN), which helps clients that are looking to limit their number of suppliers.

## Cautions

- New H3C has had a successful 13-year track record in the network business, operating in both a JV model and as a wholly owned subsidiary. However, there may be startup challenges as an independent company. New H3C will need to execute on its portfolio sold in China as well as joint development efforts with HPE.
- New H3C is reliant on HPE as its primary route to market outside of China. Organizations purchasing H3C via the HPE relationship should be aware that such partnership agreements can be transient.
- New H3C had placed a disproportionate effort on developing a chassis-based switching solution rather than leading a transition to FFF.
- Some clients are confused about the relationship between HPE and H3C, including which entity owns the intellectual property, where the R&D is performed and the future strategy of the two providers.

## VMware

VMware NSX is a network virtualization platform that leverages virtual switches running in each hypervisor to create an SDN overlay. Given its incumbent position in the server virtualization market, VMware wields a high degree of influence in the data center, and Gartner has seen increased interest from clients in discussing NSX and comparing it to other physical network solutions. Over the past year, VMware has improved manageability and operations, delivering better correlation between the overlay and the underlay. VMware promotes specific usage scenarios, such as intra-data-center security (microsegmentation), self-service provisioning and support of multiple data centers for business continuity.

VMware has invested to increase its networking capabilities and its focus in its sales organization and channel; however, efforts to partner with hardware vendors on individual accounts has been problematic for VMware. NSX is the leader of the sales and production deployments of SDN platforms in the market. VMware is the only vendor in this research that does not provide hardware, thus organizations must design, operate and manage the physical data center network infrastructure separately. This puts VMware in a unique position, as it partners with most of the vendors in this market (except Cisco) to provide support for nonvirtualized endpoints (through VTEP implementation in Ethernet switches) and integrated management. However, it is also a competitor for influence and software elements within the data center, taking value away from the physical network infrastructure. VMware should be considered by organizations that have a highly virtualized VMware implementation, and that are looking to increase networking agility or security as part of broader infrastructure orchestration initiatives.

### Strengths

- VMware's virtual switching solutions are widely deployed across VMware's installed base, with a deep feature set and a proven track record for reliability.
- NSX does not require large upfront capital investments or mandate hardware changes; it can be piloted and introduced incrementally.
- VMware NSX is hardware-agnostic and can run on top of any appropriately provisioned IP-based Ethernet network, although better integration is achieved with switches from technology partners.
- NSX microsegmentation is an innovative mechanism to provide intra-data-center security (east/west) in a cost-effective and scalable manner, compared to traditional appliance-based approaches.

### Cautions

- The value of NSX is dramatically diminished in environments that are not highly virtualized, since integration of bare-metal resources requires gateways or switches supporting VTEP integration from technology partners.
- The future of NSX for Multi-Hypervisor is uncertain, given increasing investments in features for NSX for vSphere (NSX-v).

- With the 6.2 release, VMware provides improved visibility into the network. However, it is important to select the right third-party tools to appropriately consume the data. Overall management can be improved through the adoption of network solutions from NSX technology partners or management tools from third parties (such as Arkin).
- Based on client inquiries, we have observed that NSX licensing is often expensive.

## Vendors Added and Dropped

We review and adjust our inclusion criteria for Magic Quadrants and MarketScopes as markets change. As a result of these adjustments, the mix of vendors in any Magic Quadrant or MarketScope may change over time. A vendor's appearance in a Magic Quadrant or MarketScope 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.

The data center networking market is extremely dynamic and innovative, as vendors attempt to bring new ideas and solutions to the enterprise market. We track a number of vendors that do not yet meet our inclusion criteria, because we believe they have the potential to impact this marketplace over time, and to provide advice to our clients that ask about smaller, innovative vendors. Vendors being actively tracked in this market include ALE Enterprise (formerly Alcatel-Lucent Enterprise), Nokia's Nuage Networks, Allied Telesis, Big Switch Networks, Cumulus Networks, D-Link, Mellanox Technologies, Microsoft, Midokura, Netgear, Oracle, Pica8, Pluribus Networks, Plexxi, Quanta Computer and PLUMgrid.

### Added

- NEC was added, as it now meets our inclusion criteria for revenue and enterprise customers.
- New H3C Group was added due to the recently completed sale of 51% of Hewlett Packard Enterprise's H3C subsidiary in China.

### Dropped

- No vendors were dropped in the 2016 analysis.

## Inclusion and Exclusion Criteria

To qualify for inclusion, vendors need to:

- Provide hardware and/or software addressing the emerging enterprise Data Center networking requirements outlined in the Market Definition/Description and Market Overview sections.
- Produce and release enterprise data center networking products for general availability as of 4 January 2016. All components must be publicly available, shipping and included on the

vendors' published price list. Products shipping after this date will only have an influence on the Completeness of Vision axis.

- Demonstrate relevance to Gartner clients (via a minimum of \$50 million of annual product revenue) in the enterprise data center networking market, and/or 20% share within specific market geographies (such as Europe, North America and Latin America). Revenue includes all data center networking hardware and software, but excludes services revenue.
- Demonstrate at least 500 enterprise customers that use its data center networking products in production environments as of 4 January 2016.
- Demonstrate production enterprise data center customers with at least five reference customers supporting data center networks of more than 500 physical servers.

## Evaluation Criteria

### Ability to Execute

The following provides some insight into the criteria Gartner uses when evaluating a vendor's Ability to Execute. At a high level, our analysis of Ability to Execute attempts to capture how well a vendor is performing across the primary functional units of the business — product, sales/channels, marketing, service/support and financial:

- **Product/Service:** Evaluates vendors by looking at their overall portfolios, including the ability to deliver and manage all hardware and software aspects of data center networking. This includes Ethernet fabric architectures, core/spine switches, ToR/leaf switches, virtual switches, blade switches, SDN controllers, SDN applications, and the relevant management, orchestration and control of the architecture. 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 open environments, including disaggregation and SDN, because many of those areas cross the boundaries of the IT architecture, making proprietary protocols a challenge.
- **Overall Viability (Business Unit, Financial, Strategy, Organization):** 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 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:** Evaluates presales and go-to-market activities of both the vendor and its channels, and includes an analysis of how the vendor interacts with its potential customers. The second aspect of this criterion includes our evaluation of the cost-effectiveness of the solutions for capital purchase and long-term maintenance, and the ability to recognize and position the most appropriate solution in specific sales situations.

- **Market Responsiveness and Track Record:** Assesses the 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 provider's history of responsiveness.
- **Market Execution:** 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 the market around key messages and attributes related to operational agility, changing size and density requirements, and new application architectures. An additional indicator for this criterion is how often Gartner clients consider a vendor as a possible supplier in a shortlist evaluation. The change in momentum in this indicator is particularly important.
- **Customer Experience:** Looks at all aspects of the customer interaction, with a heavier weighting on post sales service and support activities.
- **Operations:** This criterion was not ranked.

Table 1. Ability to Execute Evaluation Criteria

Evaluation Criteria	Weighting
Product or Service	High
Overall Viability	Medium
Sales Execution/Pricing	High
Market Responsiveness/Record	Medium
Marketing Execution	Medium
Customer Experience	High
Operations	No Rating

Source: Gartner (May 2016)

## Completeness of Vision

Evaluations for Completeness of Vision attempt to determine how well the vendor understands and is preparing for future market conditions, as well as how it is shaping the future market:

- **Market Understanding:** Assesses the vendor's ability to look into the future and drive new ideas into product roadmaps and offerings. In this market, leadership in driving the data center network to address increased network agility, size/density, changing application architectures, openness, choice and investment protection are good examples of what we are looking for. This includes the vendor's strategies around open networking, automation and programmability, disaggregation, SDN, and other emerging architectural approaches.

- **Marketing Strategy:** Evaluates the ability of the vendor to influence the market through its messaging and marketing campaigns. Vendors that incorporate and drive the three key data center network market transitions demonstrate an ability to use their marketing strategies to their advantage.
- **Sales Strategy:** Evaluates how the vendor exploits new business models that are emerging due to market and technology transitions.
- **Offering (Product) Strategy:** Evaluates how the vendor invests in R&D to continue to innovate in the key market transitions identified in the Market Definition and What Is Required in New Data Center Networks? sections. This includes roadmaps around open networking, disaggregation, SDN and other emerging architectural approaches.
- **Business Model:** The soundness and logic of a technology provider's underlying business proposition.
- **Innovation:** Measures the vendor's ability to drive innovation to satisfy emerging data center networking requirements, and how the vendor invests in new transformational technologies to move its business and the market forward. A key attribute in the data center market is for the vendor to innovate in technology areas that best meet emerging market requirements.
- **Vertical/Industry Strategy and Geographic Strategy:** These criteria were not ranked.

Table 2. Completeness of Vision Evaluation Criteria

Evaluation Criteria	Weighting
Market Understanding	High
Marketing Strategy	Medium
Sales Strategy	Low
Offering (Product) Strategy	Medium
Business Model	Medium
Vertical/Industry Strategy	No Rating
Innovation	High
Geographic Strategy	No Rating

Source: Gartner (May 2016)



## Quadrant Descriptions

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### Leaders

A Leader has demonstrated a sustained ability to meet the changing needs for mainstream data center architectures. A Leader also has the ability to shape the market and maintain strong relationships with its channels and customers, while offering solutions for the data center infrastructure market.

### Challengers

A Challenger has demonstrated sustained execution in the marketplace, and has clear, long-term viability in the market, but has not shown the ability to shape and transform the market.

### Visionaries

A Visionary has demonstrated an ability to increase the features in its offering to provide a unique and differentiated approach to the market. A Visionary has innovated in one or more of the key areas of data center infrastructure, such as management (including virtualization), security (including policy enforcement), SDN and operational efficiency, as well as cost reductions.

### Niche Players

A Niche Player has a complete or near-complete product offering, but does not have strong go-to-market capabilities (such as for channels) or has geographical limitations. A Niche Player has a viable product offering and, in some cases, will be an appropriate choice, depending on the usage scenario.

## Context

This Magic Quadrant focuses on data center networking solutions to solve the emerging requirements for a scalable, high-performance and simply managed network that places the network into a more cohesive data center architecture. The data center networking market, as described in this research, is still emerging as architectures and vendor differentiation continue to be developed.

Because the market is rapidly changing and requirements are evolving, organizations should ensure that they understand the shifts in application architectures and how they impact the network. Data center organizations should carefully evaluate alternate approaches and vendor solutions to arrive at the most appropriate future architecture.

## Market Overview

This Magic Quadrant includes vendors that provide networking hardware and/or software solutions within enterprise data centers, in support of an organization's applications and services.

This Magic Quadrant focuses on the current and emerging requirements and technologies in the enterprise data center networking market today. Technologies include data center core/spine networking solutions, server access switches (ToR/leaf), virtual switching, SDN solutions — including SDN overlays — and emerging trends toward leveraging open-source and disaggregated networking technologies in the data center.

As enterprises started to look more specifically at their business requirements, Gartner noticed a segmentation of the network infrastructure market and a shift in the buying practices — from making a homogeneous decision for all LAN switching requirements to one where requirements were disaggregated into three largely independent decisions (LAN access, campus core and data center networking). The campus edge, which includes wired and wireless access infrastructure, is now covered in "Magic Quadrant for the Wired and Wireless LAN Access Infrastructure."

## Gartner Recommended Reading

*Some documents may not be available as part of your current Gartner subscription.*

"How Gartner Evaluates Vendors and Markets in Magic Quadrants and MarketScopes"

"Software-Defined Networks: A Taxonomy"

"Four Recommendations Before Purchasing Cisco ACI or VMware NSX"

"Innovation Insight for Ethernet Switching Fabric"

"How to Make a Path to SDN Success"

"The Future of Data Center Network Switches Looks 'Brite'"

"Web-Scale IT Is Closer Than You Might Think"

### Note 1 Types A, B and C Companies

Gartner defines Type A, B and C companies as:

- Type A companies are more aggressive and willing to take risks to achieve competitive goals and distance from their competition. They are generally more technologically sophisticated than the other types.
- Type B companies tend to be fast followers once the risks are mitigated and proof points have been established.

- Type C companies tend to be risk-averse and less achievement-oriented, and they are willing to delay usage until after a considerable part of the market has adopted a technology.

### Note 2 Cisco Arista Litigation

On 5 December 2014, Cisco filed a complaint against Arista Networks in the California Northern District Court. Details of the filing can be found at "[Cisco Systems, Inc. v. Arista Networks, Inc.](#)"

During 2015, the case was also filed with the United States International Trade Commission. Preliminary rulings on part of this filing were made during early 2016. Details can be found at the U.S. International Trade Commission's [website](#).

## 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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