

Magic Quadrant for Midrange and High-End Modular Disk Arrays

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Midrange and high-end modular disk array storage systems offer the innovation and scalability required to cost-effectively meet demanding online storage requirements.

WHAT YOU NEED TO KNOW

This Magic Quadrant represents vendors that sell into the end-user market branded midrange and high-end modular disk array storage systems that support block access protocols. Bolstered by continued technology innovation, enhanced scalability, expanded deployment of server virtualization infrastructures and renewed product refresh projects, the midrange and high-end modular disk array market grew a vibrant 9.7% between July 2009 and June 2010.

The midrange and high-end modular disk array market is a fragmented market. Users have many alternative vendors from which to choose. While Gartner's quantitative research shows that the eight largest vendors represent 81% of midrange and high-end modular disk array market revenue, our end-user surveys and client inquiries indicate that IT personnel responsible for the storage infrastructure are increasingly willing to consider alternative vendors with midrange and high-end modular disk array products that might produce a better total cost of ownership (TCO) outcome, or more precisely meet service-level agreements (SLAs) associated with applications requiring extreme bandwidth performance or high-density disk storage. Nevertheless, Gartner does not expect a material change in market share between these two vendor segments during the next 12 months.

Thin provisioning, reservationless snap copies, automated quality of service (QoS) and data deduplication become attributes that play an important role in vendor selection as users address the need to improve operational efficiencies within their storage infrastructure technologies, such as unified storage architectures. In addition to the above features, midrange and high-end modular disk array systems incorporating intelligent power management capabilities and high-density storage provide economical solutions that address the growing power and space dilemmas faced by many organizations.

The emergence of scale-out and dual-controller midrange and high-end modular disk arrays based on industry standard platforms gained positive market traction in the past 12 months. This developing trend is likely to shift expenditures from hardware to software over the coming months and years.

MAGIC QUADRANT

This Magic Quadrant (see Figure 1) represents the current and probable relative strengths of vendors in the midrange and high-end modular disk array market at a moment in time by using a combination of product and nonproduct criteria. It is not a direct measure of product attractiveness, vendor market share, vendor viability or a vendor's support capabilities.

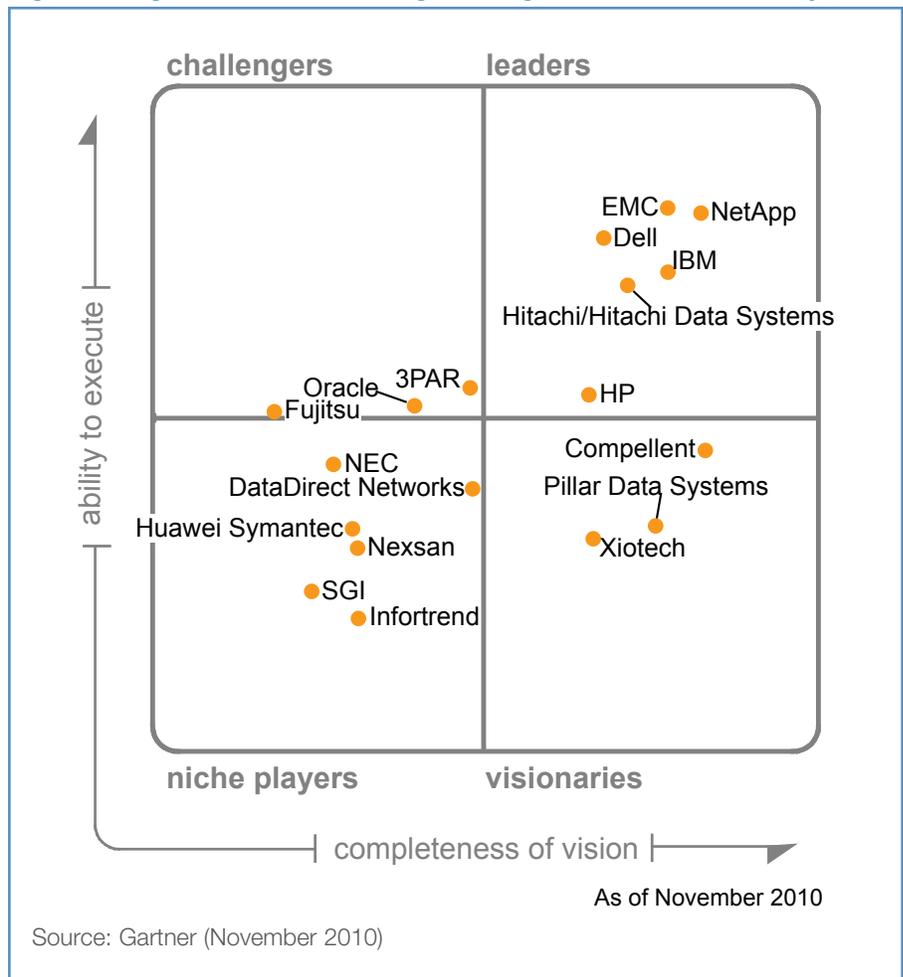
A vendor's position in a Magic Quadrant is affected not just by the vendor's own actions, but by the actions of its competitors. This is the conceptual equivalent of marking on a curve or operating in a marketplace that is constantly evolving. Since the market's ability to absorb new technology, services and messages is limited, Magic Quadrants include both forward- and backward-looking evaluation criteria. This makes it impossible for even major product announcements to instantly and dramatically alter a vendor's position in the Magic Quadrant, because without demonstrable success in the marketplace, which takes time, it is nothing more than an announcement.

The use of backward- and forward-looking criteria in positioning vendors in a Magic Quadrant also favors vendors moving from the Visionaries to the Challengers quadrant and from the Challengers to the Leaders quadrant when things are going well. It also favors vendors moving from the Niche Players to the Visionaries quadrant when expanding their product offerings. And when things are going poorly, it favors vendors in the Leaders quadrant falling back into the Challengers and even into the Niche Players quadrant.

While the move from the Visionaries to the Challengers quadrant implies a decrease in a vendor's completeness of vision, which is counterintuitive, it is really highlighting that a vendor has reached a level of maturity, acceptance and viability that qualifies it to be classified as a challenger to vendors listed in the Leaders quadrant. In other words, it is a step forward.

It is reasonable to use a Magic Quadrant to ease concerns about a company's long-term viability or evaluate a vendor's ability to implement its product development, marketing and service/support capabilities and sales strategies. *However, using it to justify vendor or product selection is not an appropriate use of a Magic Quadrant.*

Figure 1. Magic Quadrant for Midrange and High-End Modular Disk Arrays, 2010



Nonetheless, Magic Quadrants are good for highlighting key vendors in a market and helping IT personnel select a shortlist of vendors to evaluate. It is fine to buy from vendors that are not in the Leaders quadrant, particularly if your business needs require a specific feature set better provided by vendors in one of the other quadrants. This is particularly applicable to vendors that are growing their revenues and have demonstrated long-term viability. In fact, depending on the situation, Gartner will recommend including one or more of the storage vendors that fall outside the Leaders quadrant to be included on an end user's evaluation shortlist to gain access to innovative features or to address a particular storage infrastructure requirement.

Moreover, Gartner readers should not compare the placement of vendors from previous midrange disk array Magic Quadrants with this update. The market is changing, and vendors continue to evolve their product offerings.

The criteria used to evaluate a vendor and position it on the Magic Quadrant are identified and weighted in the Evaluation Criteria section. Gartner's assessments take into account the vendor's current product offering and overall strategies, as well as its publicly available future initiatives and product road maps. We also factor in how well vendors are driving market change or at least adapting to changing market requirements.

Market Overview

Users without a need for mainframe connectivity can choose from a variety of vendors' midrange and high-end modular disk array offerings. Many midrange and high-end modular disk array vendors support multiple block access protocols, including Fibre Channel (FC) and Internet Small Computer System Interface (iSCSI) on the same platform. A few are also offering Fibre Channel over Ethernet (FCoE). Some vendors also offer integrated Common Internet File System (CIFS) and Network File System (NFS) file access protocol options.

Market Definition/Description

Gartner defines midrange and high-end modular disk array products as external controller-based redundant array of independent disks (RAID) storage systems that support general-purpose storage requirements and meet the following criteria:

- Use a dual-controller or n-node cluster architecture
- Support Unix, Linux, Windows and NetWare server operating environments
- Offer no mainframe support
- Have an average selling price of more than \$24,999
- Support block access protocol
- Ship configured with disk drives

Inclusion and Exclusion Criteria

To be included in this Magic Quadrant, a vendor must meet the following criteria:

- The vendor must have midrange and high-end modular disk array storage systems commercially available and have active references that are using them in production scenarios.
- The vendor must generate at least \$25 million in annual midrange and high-end modular disk array hardware revenue.

- The vendor must actively market its branded midrange and high-end modular disk array products in at least two major regions (for example, North America and EMEA, or Japan and Asia/Pacific).
- The vendor must sell its branded midrange and high-end modular disk array products to user organizations via its direct sales force or through a reseller partnership sales channel.

Vendors offering midrange and high-end modular disk arrays that meet Gartner's requirements for this Magic Quadrant are listed in alphabetical order (see Note 1):

- 3PAR – InServ Storage Servers
- Compellent – Storage Center
- DataDirect Networks – S2A9900, S2A9700, S2A6620 and Storage Fusion Architecture (SFA) 10000
- Dell – Dell/EMC CX4 Series, Dell/EMC NS Series and Dell/EqualLogic PS Series
- EMC – CLARiiON CX4 Series and Celerra NS Series
- Fujitsu – ETERNUS DX400 (formerly branded as ETERNUS4000)
- Hitachi/Hitachi Data Systems – Adaptable Modular Storage (AMS) 2000 Series
- HP StorageWorks – Enterprise Virtual Array (EVA) Series and HP/LeftHand P4000 SAN Solutions
- Huawei Symantec – OceanSpace S5000 and S6000
- IBM – System Storage DS5000 Series, DS4000 Series, N Series and XIV Storage Systems
- Infortrend – Enterprise Scalable Virtualized Architecture (ESVA) Storage Array
- NEC – D3 and D8 Series
- NetApp – FAS Series
- Nexsan – DATAbeast, iSeries, SATAbeast, SATAbeast Xi
- Oracle – Oracle Sun Storage 6000 Array Family and Oracle Sun ZFS Storage Appliance
- Pillar Data Systems – Axiom

- SGI – InfiniteStorage IS4100, IS4600, IS5000, IS6120 and IS15000
- Xitech – Emprise 5000, 7000 and 9000

Added

Huawei Symantec was added.

Dropped

BlueArc was dropped because it does not attempt to proactively market its iSCSI capability, and its block access storage revenue remains insignificant.

Evaluation Criteria

Ability to Execute

The Ability to Execute axis highlights the change in vendor positioning directly attributable to vendor actions. While important, the product attribute is just one of the seven attributes evaluated by Gartner to determine a vendor's placement with respect to execution on the y-axis of the Magic Quadrant. The criteria weights used for this analysis are unchanged from the 2009 version of this Magic Quadrant.

Table 1. Ability to Execute Evaluation Criteria

Evaluation Criteria	Weighting
Product/Service	high
Overall Viability (Business Unit, Financial, Strategy, Organization)	high
Sales Execution/Pricing	high
Market Responsiveness and Track Record	high
Marketing Execution	high
Customer Experience	high
Operations	standard
Source: Gartner (November 2010)	

Completeness of Vision

Completeness of vision focuses on potential. A vendor with average vision will anticipate and respond to change by accurately perceiving market trends and exploiting technology. However, a vendor with superior vision can anticipate, direct and initiate market trends. While important, the product attribute is just one of the eight attributes evaluated by Gartner to determine a vendor's placement with respect to vision on the x-axis of the Magic Quadrant. The weightings for these criteria are unchanged from Gartner's 2009 Magic Quadrant.

Table 2. Completeness of Vision Evaluation Criteria

Evaluation Criteria	Weighting
Market Understanding	standard
Marketing Strategy	high
Sales Strategy	high
Offering (Product) Strategy	high
Business Model	high
Vertical/Industry Strategy	standard
Innovation	high
Geographic Strategy	standard
Source: Gartner (November 2010)	

Leaders

Vendors in the Leaders quadrant have the highest scores for their ability to execute and completeness of vision. A midrange and high-end modular disk array storage vendor in the Leaders quadrant has the market share, credibility, and marketing and sales capabilities needed to drive the acceptance of new technologies. These vendors demonstrate a clear understanding of market needs; they are innovators and thought leaders; and they have well-articulated plans that customers and prospects can use when designing their storage infrastructures and strategies. In addition, they have a presence in the five major geographical regions, consistent financial performance and broad platform support.

Challengers

A vendor in the Challengers quadrant participates in the broad general-purpose midrange and high-end modular disk array market and executes well enough to be a serious threat to vendors in the Leaders quadrant. They have strong products, as well as sufficient credible market position and resources to sustain continued growth. However, they lack adequate depth in the visionary attributes to qualify for the Leaders quadrant. Financial viability is not an issue for vendors positioned in the Challengers quadrant.

Visionaries

A vendor in the Visionaries quadrant delivers innovative products that address operationally or financially important end-user problems at a broad scale but has not demonstrated the ability to capture market share or sustainable profitability. Visionary vendors are frequently privately held companies and acquisition targets for larger, established companies. The likelihood of acquisition often reduces the risks associated with installing their systems. On the other hand, one company in the Visionaries quadrant – Compellent – is a public company.

Niche Players

Vendors in the Niche Players quadrant are often narrowly focused on specific market or vertical segments, such as data warehousing, high-performance computing (HPC), low-cost disk-based data retention and other areas that are generally underpenetrated by the larger midrange and high-end modular disk array vendors. This quadrant may also include vendors that are still ramping up their overall midrange and high-end modular disk array go-to-market efforts and have yet to develop the vision or the execution to break out of the Niche Players quadrant.

Vendor Strengths and Cautions

3PAR

We note that HP's acquisition of 3PAR was completed on 27 September 2010. However, since 3PAR was an independent company during the evaluation period covered by this Magic Quadrant, Gartner has elected to show 3PAR as an independent company in this Magic Quadrant. 3PAR is positioned in the Challengers quadrant for several reasons, including the scalability of the InServ Storage System enabling it to effectively span the midrange and high-end disk array markets, its successful track record of replacing monolithic frame-based disk arrays, its influence on the development directions of other vendors and the fact that it fetched a \$2.35 billion buyout price from HP.

Strengths

- The 3PAR InServ Storage Server has high product appeal; it is feature-rich and “green,” spans much of the modular and monolithic storage area network (SAN) storage markets, is simple to manage, and delivers solid reliability, availability and performance.
- 3PAR effectively markets new functional enhancements that solve existing user problems and complement and integrate well with existing functionality. Recent examples include its solid-state drive (SSD) and policy-based storage tiering implementations, its “get thin stay thin” marketing program, and its three-site remote copy support, which enables it to compete in environments demanding the shortest possible recovery time objectives (RTOs).
- A competent management team initially targeted what is now described as the IT-as-a-service market, kept the company investing in engineering and sales to the degree that it was able to negotiate multiple rounds of venture capital funding as it grew revenue and built a loyal customer base, took the company public, and commanded a high premium from HP before being acquired.

Cautions

- A lack of critical mass in the marketplace manifests itself in a small installed base, limited sales channel bandwidth and a lack of perceived corporate viability.

- 3PAR has relied on partners to provide network-attached storage (NAS) connectivity (e.g., CIFS and NFS) and professional services.
- Revenue growth is slow in a market that is populated by competitors that are rapidly closing the functional gap that 3PAR has enjoyed since going to market.

Compellent

Strengths

- Compellent continues its success with midsize enterprises and has grown its customer base to over 2,100 with more than 3,000 Storage Center systems installed.
- Customers appreciate Compellent's innovative, automated storage tiering at a granular level within its system (below the logical unit number [LUN] level, with support for different RAID levels and different drives), easy remote replication, thin provisioning and unlimited snapshots. In 2010, Compellent started shipping Live Volume, which allows nondisruptive cross-SAN data migration, and a zNAS gateway, whose technology came through an OEM deal from Nexenta's open-source ZFS-based NAS software. The company also introduced its Enterprise Manager to automate multisite storage management and 10Gb iSCSI host connection.
- Compellent's 100% channel business model results in no channel conflicts and strong channel training, support and loyalty. Much of its success is also driven by its strong support for virtual infrastructures such as VMware, Microsoft Hyper-V and Citrix.

Cautions

- Compellent's 100% channel sales model limits Compellent's relationships with large-customer accounts, which frequently enjoy direct sales relationships with their vendors.
- Compellent has spotty performance in its profitability in recent quarters, and the annual revenue growth rate for its product revenue slowed to 15.5% during the period of July 2009 through June 2010.
- Compellent's unified storage strategy is delivered by its zNAS gateways leveraging open-source ZFS-based NAS software from a third party. Gartner cautions about the uncertain nature of future developments of the open-source ZFS code, as Oracle intends to focus on monetizing ZFS.

DataDirect Networks

Strengths

- DataDirect Networks (DDN) has enjoyed fast revenue growth in the past year, expanding its presence in environments that require high bandwidth to handle a large amount of unstructured data, such as media/entertainment, HPC, life sciences and surveillance.
- Designed as a storage back end for scalable file systems, backup services and data analytics, DDN's storage systems stand out with their high density, their competitive cost performance and a storage system design that has no read/write penalty for RAID 6 and zero-impact drive rebuilds. In 2010, DDN finished its transition to the Storage Fusion Architecture (SFA), which uses multithreading to offer high transactional rates as well as large bandwidth.
- DDN added HP as an OEM partner and is also resold as the back end of IBM SONAS.

Cautions

- DDN's storage systems are typically not used for transactional applications, and therefore they lack some general-purpose storage features, such as snapshots, remote replication and thin provisioning, and also lack relevance in the virtual server environment.
- Some customers expressed their need for more-granular performance monitoring and analytical tools.
- Being a private company, DataDirect Networks lacks open financial transparency.

Dell

Strengths

- Dell extended its leadership in terms of iSCSI SAN vendor revenue to 50% of the total iSCSI SAN market in the first half of 2010. Hardware revenue from its EqualLogic PS iSCSI SAN product line surpassed the Dell/EMC CX hardware revenue in the second quarter of 2010. Dell's Intelligent Data Management strategy and solutions complement its EqualLogic PS Series and Dell/EMC CX4 Series.
- The success of the EqualLogic PS Series is attributed to its competitive-value all-inclusive software pricing for items such as remote replication; automation features such as automated load balancing between nodes; ease of use; channel adoption; and good integration with key infrastructure and application technology providers, such as VMware and Microsoft. In 2010, Dell added 10 Gbps Ethernet support to the EqualLogic PS Series and substantially increased the total number of supported high-performance disk drives with the introduction of the PS6500.

- Dell has expanded its storage-related portfolio in 2010 through partnerships with CommVault, EMC and Symantec for unified storage and deduplication backup/recovery solutions, providing a more robust ecosystem around the midrange modular storage arrays. Dell's technology acquisitions (Exanet, Ocarina Networks and Scalent) and its bidding for 3PAR signal to the industry that it's more serious about owning data management intellectual property to lay a foundation for future storage solutions.

Cautions

- According to Gartner research, the co-branded Dell/EMC CX Series suffered a 21% annual revenue decline for the four quarters ending 30 June 2010, after the 25% decline in the prior period. The failed bid to acquire 3PAR may add additional shadow on the existing relationship with EMC.
- The EqualLogic PS Series continues to lack Fibre Channel and NAS host connections that some customers desire to have.
- Although the EqualLogic PS series supports up to 16 nodes in a cluster (or 16 members in one group), the vast majority of customers configure fewer than six nodes within a cluster. As with all large deployments, customers should plan for firmware upgrades during periods of low input/output (I/O) activity, provide an adequate amount of time to apply the updates to each node sequentially, and follow best-practice guidelines to ensure the network has adequate bandwidth.

EMC

Strengths

- EMC is the market share leader in the midrange and high-end modular disk array market. It uses customer events, such as EMC World and VMworld, to help users maximize the value of their EMC investments and shape the competitive landscape by effectively delivering corporate messages that blend market trends with EMC development activities. Indirect channels, which account for more than 50% of CX4 and Celerra revenues in all geographic regions, are well-managed, market coverage is broad, customer satisfaction is good, and pricing is generally competitive.
- EMC keeps its CX4 systems competitive through a combination of ongoing functional enhancements, tight integration with other EMC products such as Celerra and RecoverPoint, and the rapid adoption of new hardware technologies, such as SSDs, 2.5-inch disks, compression, automated storage tiering, and partnerships with infrastructure and software vendors that create a user-friendly ecosystem.
- The introduction of Unisphere, a new management tool for EMC CLARiiON and Celerra, promises to make EMC's midrange and high-end modular storage offerings more attractive by providing a more-integrated management experience, better ergonomics, and an extensible architecture that includes provisioning, monitoring and replication management.

Cautions

- According to Gartner research, the CLARiiON and block access Celerra Series suffered a combined market share loss of 3.1 percentage points from 3Q09 through 2Q10. This market share decline reflects a 13.8% decline in stand-alone CLARiiON revenue and a 107% increase in block access Celerra revenue, while the overall midrange and high-end modular disk array market grew 9.7% in the same time period.
- Product considerations include the lack of an active/active controller design that automatically load-balances between controllers, SnapView and MirrorView overhead and functional limitations, and concerns about the impact of microcode updates on system performance/throughput and robustness, which have limited the sale of large CX4-960s.
- Large competitors through internal development efforts or acquisitions are now effectively contesting EMC claims of performance and functional leadership and demonstrating a willingness to compete on price, which is particularly important in these difficult economic times.

Fujitsu

Strengths

- The ETERNUS DX400 Series is well-suited to meet the performance, capacity, availability, operational usability and energy efficiency requirements associated with midrange and high-end modular disk storage systems. In April 2010, Fujitsu published the input/output operations per second (IOPS) throughput SPC-1 test results, in which the ETERNUS DX440 model achieved a performance of 97,498 SPC-1 IOPS under 100% load and a price-to-performance ratio of \$5.51/SPC-1 IOPS.
- Fujitsu has a proven global service and support delivery capability that is able to satisfy the demanding requirements of local organizations, as well as organizations with a multinational presence. Through its Centers of Excellence and system integration partners, Fujitsu provides customized support services on demand that enable customers to optimize ETERNUS DX400 Series performance and utilization.
- To attract new ETERNUS DX400 Series customers, Fujitsu is offering a wide range of product acquisition programs, including try-and-buy, flexible financing options through Fujitsu Financial Services, and specially priced server/storage/service bundles. In addition, working with select independent software vendor (ISV) partners, Fujitsu is offering preconfigured solutions to provide turnkey systems for specific applications including e-mail archiving and compliance.

Cautions

- Outside of Japan, Fujitsu has a limited ETERNUS DX400 installed base. Accordingly, Fujitsu's global reputation as a trusted provider of midrange and high-end modular disk storage systems is not broadly known by the end-user community.
- Fujitsu's ETERNUS DX400 midrange disk array storage success is closely tied to its server initiatives, and it is unlikely that you find ETERNUS DX400 systems deployed in a heterogeneous server infrastructure that is not predominately composed of Fujitsu servers. Accordingly, users with heterogeneous server infrastructures that wish to deploy the ETERNUS DX400 must ensure that the ETERNUS DX400 is formally qualified with nonbranded Fujitsu servers and that Fujitsu is able to provide knowledgeable service and support.
- The ETERNUS DX400 Series lacks support for in-line data reduction, secure multitenancy, automated sub-LUN data tiering, 10 Gbps Ethernet iSCSI, FCoE as well as tight snap copy management integration with leading ISV solutions, such as Oracle, SAP, Microsoft SQL and VMware. These limitations may represent a selection impediment in some competitive-bid situations.

Hitachi/Hitachi Data Systems

Strengths

- Hitachi/Hitachi Data Systems gained 1.1 percentage points of market share, giving it an 8.1% market share for the time period 3Q09 through 2Q10. The company increased its midrange and high-end modular disk array storage revenue by 27%, or almost three times faster than the market grew during this time period. High product attractiveness, an increased focus on growing modular revenue and a greater willingness to compete on price are the primary pillars of this growth.
- AMS 2000 Series highlights include availability features that also contribute to performance and ease of use, green storage features that include thin provisioning and power management, comprehensive replication options, and cost-effective packaging and serial attached SCSI (SAS) disk support. The AMS symmetric active/active controller design does automatic load balancing between controllers and eliminates the need for path failover software to maintain data accessibility during a nondisruptive microcode update. It also eliminates the performance penalties that can occur when a controller that owns a LUN does not have a host port assigned to the primary data path from the server that owns the LUN.
- Hitachi/Hitachi Data Systems is expanding its modular storage portfolio to include competitive NAS storage offerings and network-based replication solutions. It is also expanding its use of indirect channels to continue growing market share.

Cautions

- While Hitachi/Hitachi Data Systems has made progress in growing its marketing and direct and indirect sales channels, it is still underinvested in these areas. The underinvestment manifests itself in the frequency of the company's no-bidding competitive opportunities, client comments about the professionalism of its bid responses, its inability to gain market mind share for the functionality it is delivering, and the tight correlation between its investments in marketing, sales and indirect channels and its market share growth.
- Hitachi/Hitachi Data Systems needs to improve its competitive position in the relatively fast-growing NAS and unified storage markets, its time to market in supporting new releases, and tight integration with MS Exchange, SQL Server, SharePoint, Oracle and SAP.
- Hitachi/Hitachi Data Systems' reluctance to make major investments in new market opportunities, such as NAS, data deduplication and professional services, puts the company at strategic risk as competitors acquire the technologies needed to put together turnkey application-level solutions.

HP

Strengths

- Provided iSCSI satisfies the host interface requirement, the StorageWorks P4000 G2 SAN Series (formerly LeftHand Networks) represents a scale-out storage solution that is suitable for most midrange storage infrastructure environments. Featuring 10Gb Ethernet iSCSI, nondisruptive linear capacity and performance scalability, virtualized back-end disk storage pools, thin provisioning, reservationless snapshots, Network RAID, and asynchronous and synchronous replication copy functionality, the P4000 G2 SAN Series value is accentuated by its all-inclusive pricing model, including three years of hardware/software support.
- HP has done a credible job of integrating the P4000 G2 SAN and EVA Series into its converged infrastructure go-to-market strategy. The EVA4400 is the recommended storage solution for the HP BladeSystem Matrix program, which converges compute, network and storage resources to simplify management tasks and lower costs. Launched in June 2010, HP's P4800 BladeSystem SAN server, storage and networking solution is prepackaged into a single converged infrastructure targeted at client virtualization use cases.
- The June 2010 release of the EVA Cluster represents an effort by HP to enhance the product attractiveness (performance, scalability and function) of its traditional EVA disk array storage system. Supporting thin provisioning and LUN migration between disk arrays, the basic EVA Cluster aggregates two EVA6400 or two EVA8400 disk array storage systems into a single system image that can scale to 624 disk drives. Data is striped across all disk drives in the cluster to boost performance while management and data services come from the SAN Virtualization Services Platform software.

Cautions

- The EVA lacks sufficient scalability as well as native functionality, including thin provisioning, automated sub-LUN data tiering and in-line data deduplication. The deficiency thwarts its competitiveness in the midrange and high-end modular disk array market. These and other EVA shortcomings are further highlighted by HP's \$2.35 billion 3PAR acquisition.
- Gartner estimates that the EVA lost 2.1 points of share in the midrange and high-end modular disk array market in the 12-month period beginning September 2009 and ending in August 2010. This share loss was due in part to overlap with the HP P4000 product family (formerly LeftHand Networks) and in part due to competitive displacement.
- Noting that the 3PAR InServ Storage Server models essentially overlap the EVA 6400 and 8400 models and the Enterprise Virtual Array Cluster, current users and prospective buyers of these systems should obtain additional discounts as well as contractual guarantees regarding future support effectiveness and functional enhancements.

Huawei Symantec

Strengths

- As a joint venture between China's top telecom solution provider Huawei and U.S.-based Symantec, Huawei Symantec became the fourth-largest external controller-based (ECB) disk storage system vendor in China in 2009. Huawei Symantec grew its midrange modular disk array revenue by triple digits from a relatively small base in the period of July 2009 to June 2010 compared with the same period in the prior year. Propelled by its increasing presence in Russia, the Middle East, Africa, Asia/Pacific and Latin America, Huawei Symantec's international revenue grew to 50% of its total ECB disk storage revenue in the first half of 2010.
- Huawei Symantec's Oceanspace S5000 and S6000 are traditional dual-controller RAID arrays, which can scale capacity to 480 disk drives (including SSDs manufactured by Huawei Symantec in China) and offer snapshots, cloning and asynchronous and synchronous remote replication. Huawei Symantec's midrange modular ECB disk storage growth is driven by its aggressive pricing, good product reliability and performance, and its strong presence in the telecom industry. In 2010, it introduced the disk spin-down feature, as well as 8 Gbps FC and 10 Gbps iSCSI host connection support. The company has also developed a clear cloud strategy to help telecom carriers transform to public cloud providers.
- Chinese customers rave about Huawei Symantec's widespread, well-educated local service and support capabilities in China.

Cautions

- Huawei Symantec depends significantly on Symantec for technology development and lacks innovative differentiation. The current S5000 and S6000 products don't support thin provisioning, deduplication and automated tiering at the subvolume level, for example.
- None of the customers interviewed by Gartner use advanced features available with the products, such as snapshot, cloning and replication, signaling that many customers are using Oceanspace midrange disk arrays for second- or lower-tier storage, supporting applications that are less business-critical.
- Huawei Symantec has weak global brand awareness and zero to extremely limited presence in North America, Japan and Western Europe. The company still needs to develop a strong global sales and support ecosystem to enable its global expansion.

IBM

Strengths

- IBM has demonstrated its ability to effectively manage a complex midrange and high-end modular disk storage portfolio, growing revenue by over 29% during the period from July 2009 through June 2010. IBM increased its midrange and high-end modular disk array market share by 2.4 percentage points in this time period while expanding XIV revenue by 146%, increasing block access N series revenue by 11%, and transitioning from the DS4000 to the DS5000 Series without suffering a decline in revenue. IBM has developed marketing programs that generate demand and segment the market to limit fratricide between its multiple modular series, and it made effective use of its professional services, outsourcing capabilities, financial strengths and skills, and vertical-market expertise.
- IBM's market presence and its ability to manage OEM relationships, acquire needed technologies and drive indirect channel revenues remain strategic assets that provide IBM with multiple methods of entering new markets after they become large enough to affect current or future IBM revenues.
- The XIV continued to gain market mind share as an alternative to larger dual-controller and smaller monolithic frame-based storage arrays using its combination of availability, performance, functionality, ease of use and software-inclusive pricing to separate itself from traditional dual-controller arrays and monolithic frame-based architectures. IBM has also succeeded in keeping the XIV fresh via periodic enhancements, such as 2TB hard disk drive support, file space reclamation and better asynchronous remote replication. In a move that bodes well for the future, IBM has given its newly launched Storewize V7000 a graphical user interface with the same look and feel as the XIV and interoperability with the SAN Volume Controller (SVC).

Cautions

- With IBM's 8 October 2010 announcement of the Storewize V7000, IBM will have to revisit the subject of rationalizing its modular storage system portfolio. IBM now has three modular disk storage systems delivering block-level services with significant overlap – four if the N series is included. While Tivoli Productivity Center (TPC) and FlashCopy Manager (FCM) provide a common look and feel at a high level, they lack replication interoperability, and differences in detailed element management remain. Managing this rationalization without losing account control will require a skilled sales force and an expensive high-touch sales model in a price-sensitive market.
- IBM has still not increased the maximum number of nodes in an XIV, leading to speculation about its scalability, and without parity RAID, using it for data mining and archiving applications can be expensive. The DS5000 Series is missing thin provisioning; and the introduction of SONAS potentially limits the target market for the N series.
- To regain its image as a leader in the storage market, IBM must bring new technologies to market faster than its competitors; support new releases of software more quickly, especially server virtualization software; and increase its ability to offer turnkey solutions.

Infotrend

Strengths

- Designed for midrange enterprises, the Infotrend Enterprise Scalable Virtualized Architecture (ESVA) storage system features a broad set of data services, including storage pooling, thin provisioning, automatic data migration, distributed load balancing, snapshot and volume copy, and synchronous and asynchronous replication. Enabled by 8 Gbps Fibre Channel, 10 Gbps Ethernet for iSCSI, the latest SAS and Serial Advanced Technology Attachment (SATA) hard disk drive technology, SSDs, and storage pooling, the Infotrend ESVA storage systems can scale performance and capacity to support up to 2.7 petabytes. In April 2010, 12 EVSA F60 systems consolidated into a storage pool delivered 180,488.53 SPC-1 IOPS with an average response time of 8.38 milliseconds at a 100% workload level.
- Infotrend has an established successful track record for developing and selling RAID controller technology to system integrators and value-added resellers. Listed on the Taiwan stock exchange, Infotrend reported net revenue of \$72.1 million with net income totaling \$24.4 million in 2009.
- Headquartered in Taipei, Taiwan, Infotrend has corporate offices in the United States, United Kingdom, Germany, China and Japan, enabling Infotrend to provide sales and 24/365 support services on a global basis.

Cautions

- Even though the Infortrend ESVA storage systems are certified with VMware and Microsoft, Infortrend has yet to integrate its snap copy management data services software with VMware or SAP application software. This may make deployment in advanced VMware virtualized server infrastructures more difficult.
- Because of its relative newness in the market, potential ESVA users should conduct rigorous user reference checks and proof of concept (POC) testing to validate the maturity of ESVA data service software, as well as performance suitability and hardware reliability.
- Infortrend's marketing programs tend to focus on ESVA's technical features rather than on integration with leading ISV solutions, such as VMware, Microsoft Hyper-V, Microsoft SQL, Microsoft Exchange and Oracle, possibly hindering competitiveness in a solutions-oriented market.

NetApp

Strengths

- Gartner estimates that NetApp grew its SAN storage system revenue by 67% in the 12-month period from July 2009 through June 2010, and the company publicly announced over 30,000 production SAN customers and more than 150,000 unified storage systems shipped worldwide.
- NetApp's strong revenue growth in the past few quarters was driven by the company's increased penetration into data center environments, as well as small and midsize businesses through channel partners. Customers continue to appreciate NetApp's key value propositions, such as unified NAS and SAN storage systems that use the same robust data protection software suites, deduplication, and Flash Cache for performance boost and granular, space-efficient cloning for storage efficiency.
- In addition to continued focus with key technology partners such as VMware, Microsoft and Cisco, NetApp has developed programs to forge healthy relationships with cloud service providers in 2010. The company acquired Bycast in 2010 to develop future technologies for globally distributed storage or storage clouds.

Cautions

- NetApp's technology innovation pace has slowed down in recent years. While its key technology features and ease of use remain competitive, its competitors are slowly but steadily catching up.
- The scale-out cluster mode in its latest operating system Data ONTAP 8.0 has very limited adoptions because of its lack of sufficient support of existing software, especially for block

access protocols and because of the lack of automation in terms of back-end storage load balancing. The release of ONTAP 8.1 is delayed until 2011.

- NetApp continues to lack products and solutions for the long-term archive applications, where cost and ease of upgrade are top concerns.

Nexsan

Strengths

- Nexsan is an independent provider of energy and space-efficient high-density midrange modular disk storage systems. From a cost/capacity and cost/energy consumption perspective, Nexsan's SASBeast, SATABeast and SATABeastxi are well-suited for deployment as primary storage for large unstructured data repositories, as long-term bulk active-archive storage and as a storage component in data protection applications, such as D2D data backup/recovery.
- Representing Nexsan's top-of-the-line midrange modular disk array storage system, the DATABeast is appropriate for mission-critical online transaction processing (OLTP) applications typically found in midsize businesses and organizations. High points include multiprotocol Fibre Channel, iSCSI, NFS and CIFS host support, virtualized pools of storage, nondisruptive microcode updates, thin provisioning, reservationless snapshots, asynchronous and synchronous replication, support for 65,536 LUNs and scale-out capacity scalability.
- Led by seasoned and storage-savvy executives and with more than 24,800 systems installed across 65 countries, Nexsan has an established track record for providing midrange modular disk array storage systems primarily to midmarket businesses and organizations. Signaling its intention to become a publicly traded company, Nexsan filed a Form S1/A with the SEC in April 2010. Beyond technology investments, key strategies include dedication to a direct value-added reseller go-to-market model and an all-in-one hardware/software pricing policy.

Cautions

- The Nexsan DATABeast is not broadly deployed. Users should validate performance and data services software maturity by requiring POC testing and checking with customers that have installed DATABeast platforms in comparable applications.
- Nexsan's midrange modular disk array storage systems lack tight integration with some leading ISV offerings, including Oracle, SAP, Microsoft SQL Server, VMware vSphere and vStorage, and Citrix. This restrains product attractiveness when compared with competitive midrange modular disk arrays that are tightly integrated with these applications.

- Nexsan is a small privately held company with modest resources. Prospective users should consider the business risks regarding Nexsan's wherewithal to make the necessary R&D and service, support and marketing investments required to maintain a competitive position in the midrange modular disk array storage system market.

NEC

Strengths

- The NEC D-Series is a competitive modular disk storage solution that meets customer expectations with respect to scalability, performance/throughput and functionality. Highlights include scaling from one to four nodes, space-efficient writable snapshots, thin provisioning, 1 Gbps iSCSI host connectivity and iSCSI boot from SAN, virtual storage partitioning, dynamic pools, and availability features that enable the D-Series to tolerate cache failures and avoid many disk-related repair activities by repairing and recovering from potential drive failures.
- NEC is competing aggressively on price and offering customer satisfaction guarantees to gain a presence outside of Japan. NEC is focusing resources on its indirect channels, targeting selected vertical markets – such as healthcare, education and government, where price is important – and bundling its servers and storage into turnkey solutions.
- NEC is a very large \$41 billion technology company with deep roots in communications, servers, storage and semiconductors. Within the disk storage market, NEC has built a reputation for building reliable and innovative storage systems.

Cautions

- NEC is reorganizing and resizing its North American marketing, sales and support organizations to increase synergies between its various lines of business and bring costs in line with revenue. The impacts of these changes on revenue growth, sales activities and support capabilities are not yet fully visible or understood.
- Changes in NEC's North American marketing and sales strategies may limit the ability of NEC and its channels to effectively sell the value-add features of the D-Series, thereby restricting the size of the D-Series target market.
- ISV support remains limited; its lack of Citrix support limits its target market and creates potential deployment risks, and while D-Series customer satisfaction is good, its service and support capabilities are still maturing.

Oracle

Strengths

- The Oracle Sun ZFS Storage Appliance unified storage system (successor of the 7000 series) is Oracle's latest storage platform targeted at the midrange modular disk array market. Highlights include in-line deduplication and compression, thin provisioning hybrid storage pools that integrate and automate use of multitiered DRAM/flash/disk storage devices, and broad data service support, all for one integrated price. The extensibility of the ZFS Storage Appliance unified storage system is enhanced by its ability to support multiple host interface protocols, including iSCSI, Fibre Channel and InfiniBand, as well as NFS and CIFS.
- Developed specifically to further enhance the value of the Oracle Sun ZFS Storage Appliance, the embedded DTrace Analytics is a highly granular and robust management tool that users report as being very helpful in isolating and resolving problems, as well as analyzing the capacity and performance of the system down to the user level and impact on the network.
- The Oracle Sun Storage 6000 Array Family is a solid, conventionally featured dual-controller midrange modular disk array with first-rate OLTP performance. Fortified with complimentary software, such as Storage Archive Manager (SAM) for hierarchical storage management in education, government and healthcare, and Oracle E-Business in the retail sector, the Oracle Sun Storage 6000 Array Family is currently the main staple of Oracle's midrange modular disk array product offering.

Cautions

- Lacking support for thin provisioning, automated data tiering, unlimited writable snapshots, iSCSI and intelligent power management functionality places the Oracle Sun Storage 6000 Array Family at a competitive disadvantage relative to midrange and high-end modular disk array systems that have incorporated these features. Observing that the Oracle Sun ZFS Storage Appliance, which has a much-more-advanced set of data service capabilities, overlaps the Oracle Sun Storage 6000 Array Family in capacity and performance may place into jeopardy Oracle's long-range commitment to the Oracle Sun Storage 6000 Array Family.
- Since Oracle is reticent to provide long-range storage product road maps, end users may find it difficult to develop long-range strategies that count on Oracle's commitment to its current midrange and high-end modular disk storage systems. Prospective users of the Oracle Sun ZFS Storage Appliance are encouraged to execute POC testing to validate performance when the infrastructure requires a Fibre Channel or iSCSI host interface.

- Even though Oracle has made investments to certify Oracle Sun ZFS Storage Appliance and Oracle Sun Storage 6000 Array Family compatibility with leading ISV software offerings, its unequivocal R&D and support focus on Oracle application integration raises concern about deploying these systems in an environment that requires shared storage to support VMware, Hyper-V, Microsoft SQL, Microsoft Exchange, Microsoft SharePoint or SAP infrastructures.

Pillar Data Systems

Strengths

- Pillar Data Systems delivers a scalable storage architecture that addresses a fundamental challenge faced by the common two-controller architecture: how to scale performance while keeping high-capacity utilization. Pillar's Axiom systems support up to 128 RAID controllers and maintain a constant 6-to-1 disk-to-RAID-controller ratio, delivering predictable performance and high disk utilization with an 80% utilization guarantee.
- Its unified SAN/NAS systems offer large aggregate cache and shared disk pool with highly automated and flexible QoS profiles by application and their associated data migration across different tiers or RAID types within the system. In 2010, Pillar introduced native replication and AxiomONE Pre-emptive Copy to address the common issue with long disk rebuild time with RAID 5 or RAID 6.
- Customers also like Pillar's pricing practice (not capacity based) and Axiom's ease of management and provisioning of storage. In 2010, Pillar has increased its indirect sales to over 65% and its international sales to 40% of its total revenue.

Cautions

- User concerns sometimes centered on Pillar's small installed base for peer communications. The fact that Pillar is a private company with little financial transparency can be an issue as well for customers looking for long-term business relationships.
- Pillar will have a more severe uphill battle against the major incumbents within data centers for Tier 1 storage, as its top competitors are steadily closing technology gaps. Despite architectural scalability for its controllers, most customers deploy Pillar storage at modest scale.
- Pillar needs to add more technology partners to broaden its product appeal and offer more turnkey solutions.

SGI

Strengths

- The SGI InfiniteStorage IS4100, IS4600 and IS5000 are midrange modular disk arrays that emphasize balanced performance and capacity scalability. These underlying characteristics make these systems suitable storage solutions for data-intensive applications with mixed and demanding I/O workloads where emphasis is placed on price performance over expanded data service functionality. The Select Product versions on the IS4100 and IS4600 are applications ready for deployment in Oracle database, VMware and Microsoft enterprise software, including SQL Server, Exchange and SharePoint environments.
- Purpose-built to support data-intensive applications in energy, digital content and satellite communications/surveillance, the IS15000 has the bandwidth power to achieve up to 6GB per second bidirectional read/write performance and support 2K and 4K data streams without dropping frames in rich media applications. Supporting up to 2GB per second of throughput, up to 30,000 IOPS and up to 60 hard disk drives in a 4U enclosure, the S6120 is a storage system developed for environments that require optimum density per rack unit. Both products support the SATAAssure and Partial Rebuild features which improve drive reliability and availability, reducing the risks associated with large deployments of SATA disk drives.
- The internally developed CXFS and DMF optional host software enhance the product attractiveness of the SGI IS4100, IS4600, IS5000, IS6120 and IS15000 midrange modular disk array systems. CXFS allows multiple users to share one version of content at Fibre Channel or InfiniBand speeds. DMF virtualizes storage devices and automates the migration and archive of digital content throughout a virtual tiered storage pool based upon business policies.

Cautions

- SGI sources the IS4100, IS4600 and IS5000 from LSI, and the IS6250 and IS15000 from DataDirect Networks. Accordingly, SGI is not in complete control of its destiny from a technology perspective and must rely on these suppliers' continued and timely enhancements in order to maintain a competitive position in the midrange and high-end modular disk array market.
- The IS4100, IS4600, IS5000, IS6250 and IS15000 storage systems lack important controller-based features, such as thin provisioning, automated sub-LUN data tiering, secure multitenancy and unlimited snapshots. These shortcomings, along with limited LUN support, are likely to arrest their competitiveness against midrange and high-end modular disk storage systems processing these advanced capabilities.

- SGI's ability to provide professional, comprehensive and responsive presale and postsale service and support for its midrange and high-end modular disk array storage systems is not broadly known. Users are cautioned to take appropriate steps, including rigorous reference checks to confirm that SGI can meet expected requirements.

Xiotech

Strengths

- The Intelligent Storage Element (ISE) is a self-contained dual-controller virtualized storage array that is sold as the Emprise 5000. Its reliability, self-repair capabilities, performance, efficient capacity utilization, high-density packaging and five-year warranty have led to a number of Xiotech customers virtualizing multiple Emprise 5000 storage arrays behind IBM SVC, DataCore SANmelody and SANsymphony, and FalconStor NSS virtualization appliances. Xiotech's "Run Better" marketing campaign highlights the value of ISE as an appropriate storage platform for Microsoft Exchange, VMware and hosted virtual desktop (HVD).
- The new 9000 Series announced July 2010 is a new architecture storage array that can scale from one to six node pairs and is designed to take advantage of ISE technology. Compared with the Emprise 7000 Series, it offers more scalability and functionality and a new RESTful Cortex API, which preserves Xiotech's reputation for delivering easy-to-deploy, easy-to-manage solutions. Among the more important functional enhancements are thin provisioning and policy-driven autotiering.
- Xiotech's limited presence outside of the United States and its agreement with GlassHouse Technologies to scale out service and support capabilities create significant upside opportunities. GlassHouse Technologies is a well-known independent IT infrastructure consulting and services consulting organization with an excellent reputation for its technical skills.

Cautions

- Xiotech is a privately held company that needs to grow its revenues. It has a new management team in place and patient investors, but it needs to gain market share before competitors can provide reliability comparable to ISE.
- Effectively selling Emprise 9000 Series functionality will require a high-touch sales model that will demand a mix of superb resource management by Xiotech's management team and additional investments in marketing and sales.
- While ISE delivers high performance, Xiotech is still lacking an SSD option, which is important in certain use cases, such as handling boot, log-in and virus checking storms.

Acronym Key and Glossary Terms

AMS	Adaptable Modular Storage
CIFS	Common Internet File System
EMEA	Europe, the Middle East and Africa
ESVA	Enterprise Scalable Virtualized Architecture
EVA	Enterprise Virtual Array
FC	Fibre Channel
HPC	high-performance computing
iSCSI	Internet Small Computer System Interface
ISE	Intelligent Storage Element
ISV	independent software vendor
LUN	logical unit number
MSA	Modular Smart Array
NAS	network-attached storage
NFS	Network File System
QoS	quality of service
RAID	redundant array of independent disks
SAN	storage area network
SAS	serial attached SCSI
SATA	Serial Advanced Technology Attachment
SFA	Storage Fusion Architecture
SLA	service-level agreement
SSD	solid-state drive
TCO	total cost of ownership
USP	Universal Storage Platform
VAR	value-added reseller

Note 1

LSI is not included in the Magic Quadrant because it does not have a direct sales channel or brand equity in the midrange disk array market. However, its OEM relationships with IBM, SGI and Sun explain the commonality of features and functions of these companies' midrange offerings and highlight the importance of nonproduct criteria when positioning vendors in the Magic Quadrant.

Vendors Added or 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 appearing 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. This may be a reflection of a change in the market and, therefore, changed evaluation criteria, or a change of focus by a vendor.

Evaluation Criteria Definitions

Ability to Execute

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

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 of the individual business unit to continue investing in the product, to continue offering the product and to 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 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 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 in order 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, 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, etc.

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 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 product 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 set 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 verticals.

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.