

WHITE PAPER

Server Architectures in the Retail Industry: Shopping for the Right Fit

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IDC INSIGHTS OPINION

In recent years, the retail industry has been faced with numerous challenges to its IT infrastructure. Industry consolidation, cost pressures, and increased use of in-store technologies are all driving IT decision makers to better align server architectures with changing business practices. Based on customer interviews with retail business managers, IDC Retail Insights has identified a number of criteria that are helping IT stakeholders select a strategy and a solution that best fit their individual needs.

IN THIS WHITE PAPER

This white paper provides a detailed view of the considerations for selecting a server architecture to support retail operations, both at the store level and at the headquarters level. It examines business requirements of retail operations, based on case study interviews at five retail enterprises with annual revenues ranging from \$100 million to over \$1 billion. It looks at the varied requirements of large retail chains, with many store sites, and smaller retail operations. Based on these customer interviews, this paper examines the needs of retail businesses today, and the IT requirements for the computer systems that can support those businesses in a flexible and reliable way.

SITUATION OVERVIEW

The Return of Profitable Growth

A survey of CEOs conducted by IBM Business Consulting Services (BCS) in 2004 showed that these senior executives were turning their attention once again to revenue growth to strengthen financial performance over the next several years. Cost reduction and asset utilization were also high on the priority list — translating into an overarching 2005 objective of profitable growth. The retail industry is no exception; profitable growth is at the top of the retail CEO's agenda.

There are different paths to profitable growth for the retail organization. If one takes each element, revenue growth and profitability, a general framework for retail strategy emerges (see Figure 1). Growth is generally achieved either by opening new stores or by expanding sales channels such as Web sites or catalogs. Profitability strategies tend to shift between operational efficiencies (having the lowest possible operating costs) and creating a differentiated niche (that justifies premium pricing).

FIGURE 1

Retail Strategy Grid

Revenue growth	New store openings	Example: Home Depot opens a new store every 48 hours while investing in improved store operations.	Example: Target opens new stores while maintaining its "cheap chic" differentiation.
	Channel expansion	Example: Sears acquires Lands' End for catalog and Web, expands Sears Web site to include service scheduling and store inventory.	Example: Nordstrom expands its catalog and Web presence while maintaining high levels of service and a premium product assortment.
		Operational efficiency	Differentiated niche

Profitability

Source: IDC Insights, 2005

It should be noted that these strategies are rarely binary — many retailers pursue growth from both new stores and channels, and retail companies that have a differentiated offering don't ignore the pursuit of cost economies. There is, however, a tendency to emphasize one approach over the other, and the intent is to frame retail business strategy on that basis. Four strategies emerge based on the two considerations:

- ☒ **New store openings with operational efficiency:** Expand outlets while consistently applying established operational practices
- ☒ **New store openings with differentiated products/service:** Expand stores while delivering on the unique value proposition and shopping experience
- ☒ **New channels with operational efficiency:** Expand channel activity but keep product offerings and customer information consistent
- ☒ **New channels with differentiated products/service:** Get a larger share of the customer's wallet by offering several ways to interact with the organization

These business strategies must be applied in the context of some high-level trends within the retail industry, including:

- ☒ The retail industry is dominated by extremely large players created by rapid growth (Wal-Mart, Target, Costco) or acquisitions (Sears and Kmart, Federated and May). These large players represent formidable competitors and exert substantial influence.

- ☒ Product and operating costs are accelerating, but it is increasingly difficult to pass these increases on to customers. Sourcing of products from low-cost regions, such as China, has increased in an effort to mitigate the effects, although this process has created considerable supply chain challenges.
- ☒ Product offerings and promotions have become more targeted, requiring sophisticated market basket and consumer analysis.
- ☒ New technology is being introduced at the store level to enhance the shopping experience without adding labor costs. Examples include self-service checkout, cart buddies, and kiosks.

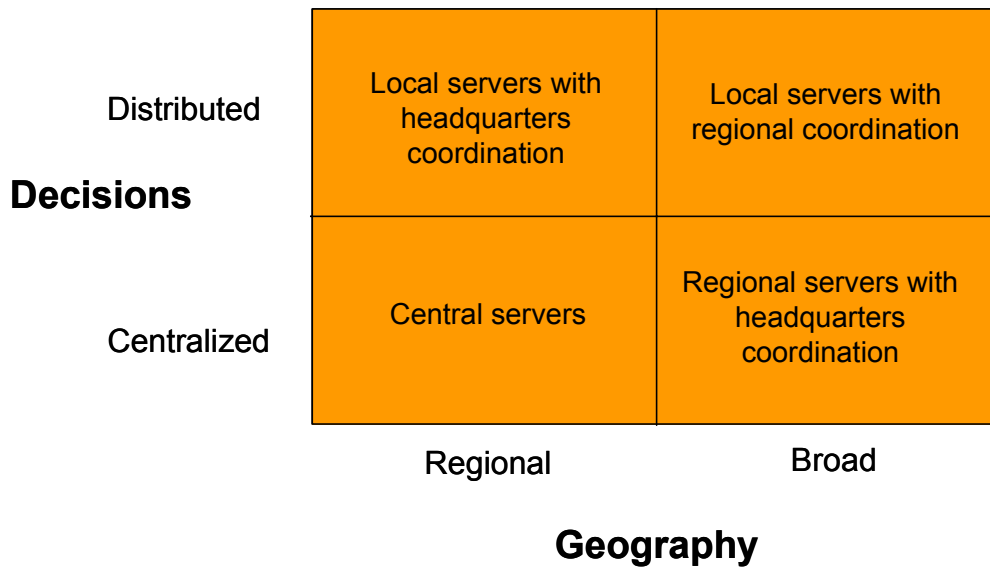
Aligning Server Deployment with Business Strategy

Sam Walton was fond of the saying, "Retail is detail." This phrase meant that, regardless of the strategy, success will depend on how well the organization executes on all of the repetitive tasks at headquarters, the distribution centers, and, most important, the stores. All of this execution comes down to assuring that the right product is available at the right place, at the right time, and for the right customer.

A server selection and deployment approach for retail should support the execution of the business strategy. One can look at this correlation based on how decisions are made and the geographic distribution of locations (see Figure 2).

FIGURE 2

Server Deployment Framework



Source: IDC Insights, 2005

The range of decisions includes everything from personnel scheduling to creating product assortments to promotions. We spoke to companies that gave varying levels of decision latitude to the local store manager, but the degree of decision making allowed directly correlated to the level of capability needed from the servers deployed to the stores. The more empowered the local outlets are, the more information is needed.

For companies expanding channels to include Web and catalog activity, there is more centralization of decision making as customer information, cross-selling, and product recommendations are brought together to deliver a consistent customer experience. We spoke to one retailer that is highly regarded for the personalized service its stores provide. As it expands its call center and Web self-service capabilities, this retailer is applying the customer information it has collected to assure a similar experience in these channels. Achieving this goal requires centralizing data and integrating it with order management and fulfillment applications.

As geographies expand, retailers begin to apply a tiered approach to server deployment, which usually takes the form of regional servers coordinating field activity while being connected back to the home office. Regional servers are typically located at distribution centers, and information flow is consistent with the physical movement of products through the distribution system. Some retailers have had separate approaches to store operations and distribution networks, but most are working to consolidate those server deployments to save costs and provide more consistent information management.

Several factors must be considered when selecting a server platform to support a deployment strategy. All of the factors should be considered prior to making a decision, but the weighting of any of them individually may change based on the deployment objectives. The factors include:

- ☒ **Support costs:** This factor consists largely of the number of full-time employees needed per server to support the platform. It would be more heavily weighted in situations involving a high number of new store openings with wide geographic coverage — even more so where operational efficiency is the key to profitability.
- ☒ **Acquisition costs:** These are the costs to purchase new servers. One should always consider the need to support failover and total available capacity in the calculations. Acquisition costs should be heavily weighted in situations where there is rapid geographic expansion or where channel expansion dictates a server consolidation project.
- ☒ **Reliability:** These servers can be the lifeblood of the retailer's operation, with downtime translating to lost sales. Those strategies that include channel expansion and differentiation would give significant weight to this factor.
- ☒ **Flexibility:** Many retail markets are seasonal and subject to spikes in activity. The ability to scale up capacity temporarily can be of considerable benefit in this situation, particularly for channel expansion and when the profitability strategy includes differentiation.

- ☒ **Transition costs:** Most retailers are locked into a server platform by the application software that they run. Although they may not wish to change applications immediately, an open architecture would allow them to migrate to a new solution (not limited to just what runs on that operating system or processor type), if desired. This ability isn't a high priority in the context of any of the business strategies, but it should be considered in the selection process.

Value Proposition for Server Acquisition

It is common for IT managers of retail operations to have inherited the servers, storage, and software selected by their predecessors. To ensure that systems are up to date, and supporting business in an efficient and productive way, IT managers must evaluate whether new servers should be acquired, through either purchase or lease.

The acquisition of new servers begins with a business analysis that includes the following factors:

- ☒ Benefits and challenges associated with each category of servers, and the computing environments that surround them (e.g., centralized datacenters, distributed operations with servers in each retail store)
- ☒ Building a framework and/or a decision tree for deciding on a strategy to acquire IT hardware and software (This decision tree is supported by a matrix analysis showing attributes of each IT approach, based on business type, size, and location pattern of stores. A business case model is built for each scenario that is selected.)

This business analysis is followed by an IT study of the types of servers that will best support the retail operation; it includes the following steps:

- ☒ Evaluation of server architectures and costs associated with acquisition and ongoing operations for each
- ☒ A period of testing and benchmarking for the server hardware and software
- ☒ Development and/or modification of applications and selection of ISV software to run on the servers
- ☒ Deployment of systems, and maintenance of systems, throughout the product life cycle

In general, newly acquired retail systems should include:

- ☒ Support for ISV packaged software for the retail industry — or for custom software developed in-house to support a specific retail business
- ☒ Support for in-store systems for point-of-sale (POS) and employee management (e.g., payroll, time and attendance, HR); store POS systems must be able to report periodically to central-site servers, usually over a high-speed network

- ☒ Servers with the ability to support new applications, over time, to enable products and services being developed by the retail business (This includes the use of technologies new to retail, such as digital merchandising and wireless shopper tools, which present unique challenges in terms of the amount of data captured and processed.)
- ☒ Support for virtualization and workload consolidation — because combining workloads that have been running on a high number of very small servers is not as efficient as consolidating workloads to run on a smaller number of systems (Simplified management of systems often results in reduced total cost of ownership [TCO] over a period of several years.)

IBM Server Solutions

IBM server solutions support a range of computing capabilities and price points. IBM competes with other server vendors to provide server platforms for use in the retail marketplace. Any of these systems may be housed within one or more tiers of a multitier datacenter (tier 1 for Web serving, tier 2 for application serving and collaborative software [e.g., email], and tier 3 for database serving and support of OLTP, enterprise applications, and business intelligence [BI] workloads).

Following is a summary of IBM's line of eServer platforms, along with a brief description of each platform:

- ☒ **iSeries server platforms:** iSeries platforms are RISC-based systems that support a high degree of in-the-box integrated virtualization and system management. These systems are designed to deter security problems and to support high levels of uptime, which makes them well suited to retail operations that must provide high levels of security and availability in support of POS business transactions and 24 x 7 business operations. The iSeries server has a built-in database and integrated storage — and support for x86 servers (whether housed within the iSeries cabinet or housed externally) running Windows. The iSeries systems support a variety of operating systems, including the built-in IBM i5 operating system (formerly known as IBM OS/400), Linux, and Microsoft Windows. IBM AIX 5L Unix can also be run on the iSeries server, as can Java-enabled applications, supporting workload consolidation onto the iSeries system.
- ☒ **xSeries x86 server platforms:** IBM's xSeries servers support Windows and Linux applications and Novell NetWare workloads. As with the iSeries servers, they also support Java, Microsoft's .NET, and the Internet's networking protocols — all of which enhance support of online catalogs and Web site promotions. xSeries servers are often coinstalled with other types of platforms, and they are frequently grouped together in industry-standard racks or clustered for high-availability and scale-out deployments.

- ☒ **pSeries RISC-based platforms:** The pSeries systems run IBM AIX 5L, which supports a range of ISV applications available for the retail market. Because the pSeries server shares many of the hardware components of the iSeries server, it can be considered a companion system to the iSeries, and it can be managed by the same IT staffers within a company's datacenter. Both the pSeries system and the iSeries system are 64-bit platforms that can add capacity, as needed, to support growing applications and databases. The pSeries servers, like the iSeries and xSeries servers, support Java and Internet networking protocols, providing a very long reach into the world of Internet-enabled applications and Web services.

- ☒ **zSeries mainframe platforms:** IBM's zSeries systems are the successors to the IBM System/390 mainframe systems. Introduced in 2000 with a 64-bit architecture, the zSeries servers support the older IBM OS/390, IBM MVS, IBM VM, and IBM DOS/VSE operating environments and associated applications from earlier generations of mainframes. The zSeries servers are scalable compute resources with extremely high levels of reliability, availability, and serviceability (RAS) as well as manageability that can be carved into partitions that run specific applications or workloads. Like all other IBM eServer platforms, the zSeries systems support Linux and Java and Internet networking protocols. However, the zSeries server excels at supporting dozens, hundreds, or even thousands of Linux virtual instances, running with Linux logical partitions (LPARs) on the zSeries system. This ability allows large teams of software developers to write or to test new Linux application code on the zSeries servers; it also provides support for a wide variety of Internet-enabled workloads on the zSeries system that are written on top of the Linux software stack.

CASE STUDIES

The following case studies represent a range of business challenges, and the server architecture solutions that were applied to meet those challenges. All sites had one or more IBM iSeries systems installed, along with a range of other IBM systems and some non-IBM server systems.

Case Study 1: Direct Sales Division of Upscale Department Store

The direct sales division (DSD) of an upscale department store chain (catalog and online) is becoming an increasingly important part of that company's growth strategy. With stores in the United States and Europe, total revenue for the retailer exceeds \$6 billion, and DSD has grown to approximately 20% of that total. The IT infrastructure supporting DSD is situated on a WAN, with servers primarily in one location. The focus of this case study is the server architecture supporting the warehouse management, order fulfillment, and customer service operations.

The DSD was interested in upgrading its iSeries servers but was faced with a discontinued upgrade path for its existing models. This situation left the retailer with a wide range of options, including switching to an alternative architecture. At the heart of the selection were reliability and performance, both of which support this retailer's

corporate imperative of exceptional customer service. It is estimated that one hour of downtime costs the DSD hundreds of thousands of dollars in lost sales. Another important criterion was supportability, which helps to keep operating costs low.

The decision for IT investment was managed centrally at the corporate level through a capital expenditure committee, as well as through IT and strategic sourcing groups. The groups considered compatibility with existing systems, knowledge levels of the IT staff, acquisition costs, and operational costs as inputs to their decision. The teams acknowledged that acquisition costs were higher for the iSeries system than they were for some other options, but operational costs would be lower in the long run. Ultimately, the eServer iSeries 825 was selected.

The IT manager involved in the decision process admits that he would have made the same decision even if the acquisition costs had been higher and the company's IT staff experience had been lower. The company purchased the boxes from an IBM VAR that also helped manage the implementation, which was on time and on budget. The actual cutover to the new servers took less than one full business day. The VAR was also helpful in validating certain decisions, such as how to build in room for growth.

The iSeries server replacement has yielded some significant performance benefits, including an order-processing throughput increase of more than 5x; batch processes have increased 4x. Even in light of these performance improvements, the IT manager identifies maintenance costs as the number 1 benefit of the new system. On the maintenance topic he offers, "It just runs." The numbers support this claim: The servers have experienced an outage lasting a total of two hours in five years.

One benefit that was realized didn't factor into the retailer's selection criteria. The retailer has the common problem of a highly seasonal sales pattern. During the peak period, the company was able to activate additional processing power and then scale it back when the activity subsided. This on-demand capability was discussed during the decision process, but the company didn't fully appreciate the value until it was able to absorb the increased volume without sacrificing customer service.

Case Study 2: Audio and Video Entertainment Retailer

Recentralizing IT systems is a new theme in retail store operations looking to streamline in-store IT and to manage a smaller number of servers in a headquarters datacenter. This approach is enabled by the advent of high-speed networks that allow POS systems and thin client desktops to be linked with central-site IT systems located hundreds, or even thousands, of miles away. Today, some stores are leveraging high-speed networks and more powerful servers to replace aging store systems that were installed five or more years ago.

One such business is a Canadian-based retailer that sells entertainment and music products, including CDs and DVDs, aimed at the youth market (ages 18–25) in more than 100 locations throughout the country. In this chain, local stores, many of them 3,500 sq ft or more in size, had been using a frame relay network. This aging network technology has since been replaced by a 1.5Mbps multiprotocol label switching

(MPLS) network, which delivers Internet-browser interfaces to thin client displays that show inventory data to store managers and customers alike. The new systems and network are expected to support new business functionality in the coming months and years, such as increasing the in-store information provided by kiosks and support for wireless devices that track inventory and access product information.

With the high-speed network and new back-office servers in place, the older IBM AS/400 store systems are being retired over a period of several months. "It was strictly servers that were being depreciated over five years," said the IT manager. "We knew that we would be moving off them. And because we were not putting 100 more out there, IT managed to keep costs flat [when compared with the late 1980s]. We haven't added anybody, we haven't let go anybody, and no one has quit."

This retail chain chose new IBM iSeries systems to consolidate all of the back-office workloads (e.g., database, time/attendance, financial applications, and business intelligence) onto a small number of servers managed by a relatively small IT staff of 20 people. These staffers manage the entire network, including four iSeries servers and a central-site installation of about 50 small x86 servers. The company has deployed approximately five x86 servers as Web serving and proxy servers — one x86 server as the primary email server, another as a backup email server, and the rest to support IT infrastructure (e.g., file/print and network support). In all, the IT budget comes to just 1.25% of total revenue, with annual revenue running at several hundred million dollars (Canadian) annually. Overall IT costs have been contained, growing less than 0.5% a year.

IT managers at this chain identify the chief benefits of iSeries technology as reliability, which maintains service levels for mission-critical business applications; manageable costs associated with a small central-site IT staff; and the low number of full-time equivalents (FTEs) associated with the iSeries IT systems used as datacenter servers at headquarters. More IT staffers work with the x86 servers and the network, the IT director said, than work with the iSeries servers.

Case Study 3: Auto Parts Retailer

A respected retailer of tires and related automotive services operates hundreds of stores in the United States and earns more than \$1 billion in annual revenue. The company is recognized for its exceptional customer service and regularly receives third-party awards in this area. One of the ways the company enables its high level of customer care is by empowering each retail outlet to make decisions that benefit customers. Store managers have considerable latitude in determining the product assortment offered, pricing, and promotions. Not surprisingly, this company also maintains a store-centric server architecture.

The company has been running both x86 and iSeries applications in iSeries boxes that are located at the stores. A number of factors have combined to cause the company to change its approach to centralizing its x86 servers at headquarters while keeping the iSeries applications running locally at the stores:

- The usage level of the x86 applications (primarily office productivity applications) is low, less than 5% of the total activity for store personnel.

- ☒ Wide area network bandwidth costs have dropped since the initial deployment, making centralization of the Intel servers reasonable from a cost perspective. Also, the performance of the retailer's thin client technology, Citrix, improved.

Leaving the iSeries servers in the stores continues to enable the store autonomy critical to this firm's success, while centralizing other applications lowers overall operating costs.

The new model is currently being piloted in key retail locations, and it will require one month to convert the remaining stores. Each new iSeries server is provisioned at headquarters and then sent to the store; in all, total provisioning, shipping, and setup time is three days. The company cites training and education as the biggest components of the conversion, with technical activities requiring relatively little effort.

The lead for the customer technology services (CTS) organization recommends that those considering a change in server strategy become well educated on the business needs of their sales environment. A good fit for the business may cost more up front, but it should be counterbalanced by a favorable TCO, including support costs. Otherwise, the importance of delivering good quality of service (QoS) at reasonable costs, over time, would not be widely seen. For this organization, IT support staff is "where the real costs come in." A staff of four is able to support nearly 400 remotely located iSeries servers as well as 60+ servers at corporate.

Case Study 4: Apparel and Footwear Retailer

This North American apparel and footwear retailer is quality focused and prioritizes the construction and materials in its clothing. A quality product is critical to the retailer's image because the bulk of products in the store are private label. The company has long prided itself as being ahead of the curve on technology — the director of IT Infrastructure states, "We have always used technology early. We had connected tills back when the rest of retail was using standalone."

The company's servers, as well as all other major business components, are managed centrally at headquarters. All stores have a dedicated connection to the corporate site, either through 56K frame relay or private DSL. All devices in the retail outlets run on the Linux operating system, and they have POS applications, terminal emulation for legacy applications, and Web browsing capability. In the event that the connection to headquarters is lost, the stores can continue to conduct all transaction types, except for debit card processing, which requires real-time connectivity.

The application architecture is set up on three tiers: The first tier comprises the POS terminals, which connect to a second tier of xSeries Intel servers that support transaction processing. This second tier is then connected to a third tier of iSeries servers where the databases, planning, and financial applications reside.

The primary rationale for the centralized architecture is controlling the net operating cost of each store. The cost savings have enabled the company to invest in newer technology in the stores, which "has paid for itself many times over" claims the director of IT infrastructure. Another advantage of the current setup is simplicity. The company states that its "keep it simple" guiding principle was followed with ease throughout the Linux-iSeries pairing.

Case Study 5: Home Supplies Retailer

Reliability is the leading characteristic for many retail IT departments considering acquisition of a new server system. Store operations must stay online, or sales will be lost at the checkout counter and inventory will go untracked. High availability for applications and data is, therefore, top of mind — and may even justify a price premium paid for the systems that provide it, over the long term.

For retail operations, reducing downtime is a key consideration during the evaluation process for new servers. "The reliability — high availability (HA) — the iSeries — was a factor in its selection," said the IT director of a \$50 million West Coast home supplies retail chain. "It definitely was a factor. It was certainly the right fit for this operation ... I sleep well at night."

The retail chain manages more than 20 West Coast stores, many are 4,000 sq ft or more in size. Historically, each store had a small AS/400 server, but the chain started recentralizing three years ago — and installed larger iSeries systems at headquarters two years ago. The older in-store systems, acquired at low prices as used equipment, are now being retired, their functionality replaced by the new iSeries systems at the central site. At the center of the company's network is an iSeries Model 810, which supports the IBM DB2 relational database. An iSeries Model 620 runs the company's ERP software, as customized by an East Coast VAR.

The iSeries servers had such good uptime characteristics, said the retailer's IT director, that the unplanned outage last year was caused by someone tripping over a system cord rather than by any hardware or software error. Centralized backup routines have replaced in-store tape backups, over time, ensuring business continuity (i.e., in case of a local power outage) for any one of the stores. Localized backup routines slowed data processing — and the process was changed. "The stores were running out of processing time at the end of the day," the IT director said of then older store systems. "We were reliant on store personnel to change out [the backup] tapes."

The presence of the updated network has affected the quality of the data services that can be delivered by the IT organization, allowing the company to start identifying new services for customers. "It has impacted the services we now offer the stores," said the retail chain's IT director. Network links are also being updated: An aging frame relay network is being upgraded to a high-speed (384Kbps) network that hosts VoIP functionality. One consequence of this upgrade is that older client desktops, supporting IBM 5250 terminal functionality associated with the AS/400s, will also be replaced — this time with multifunction terminals affording access to multiple data services hosted on the central-site systems.

The high-speed network, combined with high levels of system reliability, will allow this kind of networked systems solution to support each local store at the "end" of the network link. Importantly, the same combination of updated network and server technology will support organic growth within the retail chain as new stores are added — each tapping into the central-site server resources.

IBM CHALLENGES/OPPORTUNITIES

IBM competes with other server vendors in the retail marketplace. This segment of the market focuses on solutions and places a premium on system reliability and uptime because downtime results in lost sales revenue and reduces profitability.

Customers prize the high availability for applications supported by the iSeries system because it supports their ongoing business operations and because it can be managed by a small number of IT staffers. In cases where the iSeries system is used as a platform for workload consolidation, it has the potential to optimize performance for Linux and Windows applications that have been running on a variety of other hardware platforms. But the iSeries system is one component of large retail operations that also include a variety of other systems — both from IBM and from other vendors — that must also be managed and maintained in a complex, heterogeneous networked environment. Also, many retail sites are not familiar with the iSeries server's capabilities and its solution-oriented usage model, and they do not consider it when evaluating new server systems.

Meeting the Challenges

IBM's partnerships with retail ISVs, and with a wide range of retail customers worldwide, give it a strong position as a provider of retail systems. The industry knowledge of its business consultants, both from the former PricewaterhouseCoopers, now part of IBM, and from specialists within IBM Global Services (IGS), gives customers deep experience that can be tapped in addressing the full spectrum of business challenges associated with retail operations. Importantly, IBM's global reach, and its ability to deliver products and services directly, supports large companies that have retail operations in many countries. But its partnerships with regional ISVs and VARs ensure that local support is available worldwide as well, allowing IBM to support smaller companies and regional retail chains. Thus, IBM's channel partners are a key element of its go-to-market solutions strategy for the retail market space.

CONCLUSION

Server deployment approaches in the retail industry will support the execution needs of delivering a profitable growth strategy for retail businesses, large and small. The selected approach will reflect how decisions are made (local versus centralized) and the breadth of geographic coverage required. Although common criteria for server deployment within retail operations continue to emerge, the weight that is given to each factor will vary, based on the business objectives and operating parameters of each customer's organization.

The IBM iSeries server provides a strong foundation for retail businesses, according to a series of customer interviews that IDC conducted in the retail market segment. The iSeries system is a server platform that should be considered for server solutions to support retail operations, given its hardware and software characteristics and the availability of ISV solutions for retail workloads. However, as in any acquisition process, each retail customer site will need to apply its own criteria, and IT experience base, to the various phases of server evaluation, testing, selection, deployment, and maintenance.

ESSENTIAL GUIDANCE

- ☒ Understand how the company's business strategy is executed and how decisions are made. Assign a specific weight to each of the criteria discussed in this white paper. Be aware of the whole ownership life cycle; don't give inordinate weight to acquisition costs.
- ☒ Create multiple scenarios for supporting the business need that include different vendors and deployment options. Score each decision factor in the context of those scenarios and select the highest-ranking scenario. Validate your rankings with independent third parties and server customer references and be absolutely sure the scenario can be implemented in the required time frame.
- ☒ Server vendors are likely to have channel partners that have retail industry expertise; take advantage of that competency. Although they are far from unbiased, they generally deliver high levels of service and can suggest possible alternatives that would be worth considering.

METHODOLOGY

This basis for this white paper was formal case study interviews with senior IT leadership at five retailers in North America. These individuals represent a spectrum of retail business profiles, ranging from small chains with strong reliance on in-store systems to superstores with hundreds of stores and central-site IT operations. All of the companies interviewed have IBM iSeries server solutions, but all of them have other types of IBM servers and non-IBM servers installed as well.

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