Entertainment Retailer Expects Store Data Analysis to Increase Sales by $1.8 Million

Overview

Country or Region: United States
Industry: Retail

Customer Profile
Headquartered in Los Angeles, California, Virgin Entertainment Group, North America, has operated as an entertainment retailer for more than 12 years.

Business Situation
Virgin wanted to analyze its daily operation's data more quickly, in greater depth, and with less effort, so that the company could respond to rapidly changing customer demands.

Solution
Virgin, with partners Xavor and Analysis Team, used Microsoft® integrated server software and the Microsoft .NET Framework to build a business intelligence solution.

Benefits
- Expected savings of US $575,000 over two years
- Expected $1.8 million increase in overall revenue
- Increased store traffic from improved campaign analysis
- Lower cost of sale due to improved vendor monitoring

> "With Windows Server System and .NET, we built a comprehensive solution to a pressing business problem. Now, we can influence our results instead of just reviewing them."
>
> Robert Fort, Director of IT, Virgin Entertainment Group, North America

Virgin Entertainment Group operates Virgin Megastores, one of the largest entertainment media retail specialty chains in the United States. Virgin wanted to increase the effectiveness of its store managers and product buyers by giving them flexible tools to analyze inventory, sales, and store-traffic data. Initially the company considered mainframe-based software, but eventually tasked Analysis Team and Xavor to build a business intelligence solution based on Microsoft® Windows Server System™ software, SharePoint Server, BizTalk Server and Microsoft .NET Framework. The solution collects data from the company's inventory, traffic, and point-of-sale systems for real-time data analysis. Over the next two years, the system will cost U.S.$575,000 less than comparable solutions; Virgin expects to raise store traffic and efficiency, increasing revenue by $1.8 million per year, initially, with greater returns to come.

Situation

These days, the entertainment media retail business is a rough place to be. On one side, digital downloads and online retailers are taking an ever-growing share of music and video sales. On the other side, large department stores and consumer electronic variety stores have depressed retail prices by selling CDs and DVDs at deep discounts. The low prices lure customers into the store, where they also purchase higher-margin items such as televisions and computers. Virgin Entertainment Group, North America, is stuck in the middle.

The North American division of Virgin Entertainment Group is a subsidiary of the Virgin Group. Headed by the dynamic entrepreneur Richard Branson, Virgin has created more than 200 companies worldwide, most notably in the travel, mobile communications, and entertainment verticals. Virgin operates one of the largest entertainment media retail specialty chains in the United States: Virgin Megastores. Each of the 20 Megastores sells a broad range of audio and video titles—everything from the latest releases by internationally famous acts to obscure artists working in esoteric genres. Each Megastore stocks an average of 255,000 products, including CDs, DVDs, books, video games, fashion items, electronics, and accessories. Across the chain, Virgin maintains a 400,000-product catalog and records about 7.5 million sales transactions.

Managing that much active inventory in the face of constantly changing entertainment trends is an enormous challenge. Virgin runs its enterprise resource planning (ERP) system, on JDA Portfolio software on an AS/400. The system was comprehensive and reliable, but it provided few tools for reviewing the data once it was collected.

For Virgin, as with any retailer, timely information about inventory movement can make the difference between a profit and a loss. The product buyers at corporate headquarters rely on sales and inventory information when negotiating deals with the company's vendors—the record companies and movie distributors. At the retail stores, managers need to know what's selling and what's not so that they can organize their floor displays and be sure that the mix of products that they receive from the buyers makes sense for their stores. To give buyers and managers the information they need, the product and finance groups at Virgin generate more than 105 reports each month that track the company's operations, including inventory, sales, and gross margins—all subdivided by store and product category.

But although the reports are crucial to efficiently operating the business, they were tremendously time-consuming to produce. The company installed JDA Retail IDEAS to help build its key reports but quickly discovered that using the JDA tools effectively required programming skills, which put the tools far beyond the reach of a typical end user. Despite the best attempts of the Virgin IT department to provide and modify queries, the staff responsible for analyzing sales data and providing reports—the product buyers—largely abandoned the system. "We knew that we needed better business intelligence, and Retail IDEAS was an attempt to solve that problem," says Robert Fort, Director of IT for Virgin Entertainment Group, North America, who oversaw the retirement of the Retail IDEAS solution. "It was just too difficult for most people to use. They were frustrated, they couldn't get their hands on their data, and every time they needed something new, they had to go through IT."

Instead, Virgin staff continued to assemble necessary reports largely by hand, running broad queries to download sets of data from

the JDA system and then manipulating the data in Microsoft® Excel worksheets. "Pulling the data together took hours," says Fort. The reports—the majority of which were intended for store managers—were posted on a companywide intranet site. Despite the extensive effort required to create them, the reports were woefully inadequate: They provided only the most basic information and were out of date almost as soon as they were created.

Store managers were frustrated with the lack of flexibility and timeliness of the analyses. For instance, it was impossible for a store manager to run a report that would list all out-of-stock items. The only way to know whether a product was out of stock was to compare the number of units at the store with how many had been sold. This required active intervention by the manager or a store employee, in addition to constant canvassing of store inventory. Inevitably, some out-of-stock or low inventory conditions would remain undiscovered for days. That delay could cause a store to miss the ordering deadline for the product and remain out of stock during a high-sales period, like a weekend. Also, although store managers generally knew what genres of music—for example, rock, jazz, or heavy metal—were selling particularly well at their stores, it was nearly impossible for them to find data to prove it. This, in turn, made it difficult for the store managers to persuade the product buyers at corporate headquarters to adjust the product mix at a specific store.

Meanwhile, the lack of timely data and deep analysis put the product buyers at a distinct disadvantage. "To a certain extent, we were at the mercy of our vendors," says Fort. "We couldn't analyze our inventories and sales patterns to find our strengths and then use those as negotiating tools. Meanwhile, our vendors had scorecards, and they could tell us what discounts they'd given us, and how much product they'd shipped to our stores. At

times, they had better reports on our sales statistics than we did. It was embarrassing."
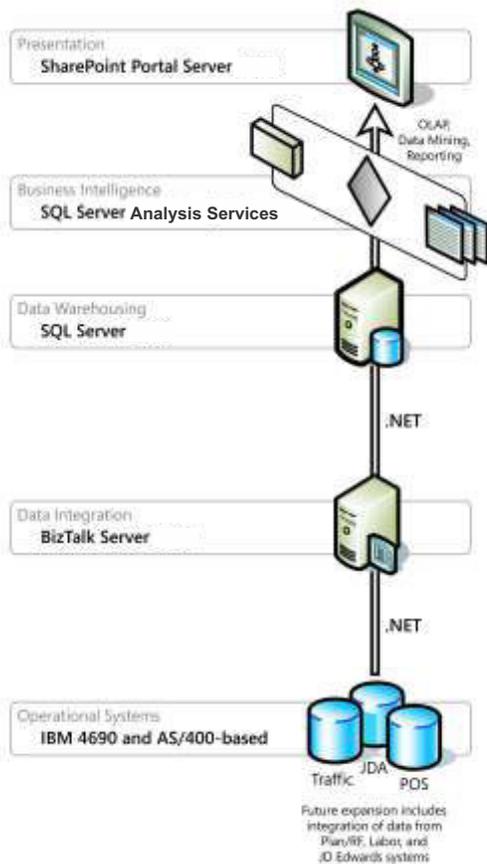
Beyond shortcomings in data reporting, Virgin also lacked the ability to exploit real-time data streams. For instance, the point-of-sale (POS) systems at the retail stores posted data to local servers continuously. However, it took in some cases 7 to 10 days for the purchases to be grouped, categorized, filtered, and made available through the company's reports. Also, although each store had sensors on every doorway that reported foot traffic in and out of the store every 15 minutes, the data took days to gather and analyze. And even though Virgin mounts several promotional events every month at its stores, the company couldn't evaluate the effectiveness of those promotions until days or weeks later. "We had a classic problem," says Fort. "We had lots and lots of transactional information, but none of it was easy to report on or analyze."

Solution

Virgin wanted a data analysis tool that anyone in the organization could use. "We imagined the store managers as a barometer," says Fort. "They're very busy people, and they don't have a lot of time to be trained in deep data analysis. We were looking for something that anyone could use to get answers quickly, and then get back out on the sales floor and make a difference."

With the trouble clearly defined, Virgin began researching solutions. Keeping in mind that the success of whatever system it chose depended on the success of the staff using it, the company assembled a group of users from several departments to evaluate the options. Virgin also hired Analysis Team, a business intelligence consulting firm, to give a seminar on business intelligence (BI), so that the group would understand what to look for in a data analysis tool. The group—led by

Figure 1. The Crescendo solution is built from Windows Server System software, including Windows Server. The .NET Framework provides integration at key points.

Presentation
SharePoint Portal Server

OLAP Data Mining, Reporting

Business Intelligence
SQL Server Analysis Services

Data Warehousing
SQL Server

.NET

Data Integration
BizTalk Server

.NET

Operational Systems
IBM 4690 and AS/400-based

Traffic   JDA   POS

Future expansion includes integration of data from Plan/IF, Labor, and JD Edwards systems

Fort—then examined software from Hyperion, Cognos, Applix, and Microsoft, and considered more extensively customizing the Retail IDEAS software that it already had. The evaluation process began with a preliminary round of demonstrations by representatives from each software vendor. The evaluation group chose two finalists—Hyperion and Microsoft—because those vendors' solutions were easy to use and could handle the company's large inventory.

For Virgin, building a solution on Microsoft Windows Server System™ integrated server software made better financial and structural sense. "I was glad to see Microsoft in the final round," says Fort. "We wanted to find the right solution, but based on my own research, I knew that Windows Server System would be significantly less expensive to develop and maintain." Because Virgin already used Microsoft software extensively, Fort also felt that a Windows Server System–based solution would be easier to integrate into the company's existing infrastructure.

However, the decision still revolved around the end users' ability to access data quickly and easily. Fort brought back Analysis Team to build two sample analysis systems, one based on Hyperion Essbase, and one based on Microsoft SQL Server™ Analysis Services, the integrated online analytical processing (OLAP) and data-mining component of SQL Server. Virgin worked with Analysis Team to build identical multidimensional data cubes using two months of historical sales data and an inventory database of 180,000 products. The group at Virgin then compared the prototype systems, working through typical scenarios and

focusing primarily on ease of use. "Our testers universally found the data easier to access through the Microsoft solution," says Fort.

With the user test results in, Virgin chose to build its solution on Windows Server System software. "We chose products from Windows Server System because its comprehensive and integrated software meets our business needs at several levels," says Fort. "It provides highly capable and highly accessible business intelligence software; it saved us thousands of dollars in hardware, development, and maintenance; and it meshed smoothly with the systems that we already had in place."

Virgin chose two partners to build the complete solution: Xavor and Analysis Team. The project—called Crescendo, because Virgin expects it to have exponential business impact—consists of three primary logical layers: data integration, data warehousing, and BI (see Figure 1). In the first layer, Xavor used Microsoft BizTalk® Server to extract data from existing data sources, including the central JDA system, the POS servers, and the traffic sensors. That data is sent to the data warehouse, which was built by Analysis Team using Microsoft SQL Server Finally, at the BI layer, Analysis Team used SQL Server Analysis Services to link the data tables and build analysis tools and reports for the various groups at Virgin. The reports, delivered through Microsoft Office Excel worksheets, are posted on portals hosted by Microsoft Office SharePoint® Server. BizTalk Server, SQL Server, and SharePoint Server are all part of Microsoft Windows Server System.

The various components are integrated with custom code written in the Microsoft .NET Framework, an integral component of the Microsoft Windows® operating system that

provides a programming model and runtime for Web services, Web applications, and smart client applications. "Windows Server System and the .NET Framework were ideal for this project," says Ammara Masood, Senior Vice President at Xavor. "The flexibility that they provided and the turnaround time that we achieved were tremendous—no competitive product could have done that."

To help monitor each step of the project, from development through deployment and production support, the group relied on an error-reporting service built on the .NET Framework to identify, capture, and report errors. All components of the solution run on the Windows Server System—on servers located either at Virgin corporate headquarters in Los Angeles, California, or at a colocation center in Atlanta, Georgia.

Despite the size and complexity of the project, the development group was relatively small. "Using software from Windows Server System allowed us to accomplish this project with a surprisingly few number of people in a surprisingly short period of time," says Fort. Three Xavor employees worked on the data integration layer, while only two developers were required for the data warehousing and BI layers: one from Analysis Team and one from Virgin.

"The integration of the Windows Server System software allowed us to keep the development group small and focused," says Arshad Masood, Solution Architect for Xavor. Alan Flaesgarten, Senior Manager, Applications and Development for Virgin, agrees. "The integration was seamless," says Flaesgarten, "We were able to get up and running very quickly."

The first step in building the Crescendo system was to extract information from the

customer traffic and POS systems. Each store has a controller that pulls data from the individual traffic sensors every 15 minutes and from POS terminals in real-time. The controller appends the fresh data to two continuously growing flat files; one fixed-length and the other written in a proprietary IBM format. Xavor set up a series of servers running BizTalk Server on Windows Server, at a colocation center in Atlanta. The store controllers make the POS and traffic data available on a File Transfer Protocol (FTP) server. "We couldn't have done either the traffic polling or the business polling as simply without BizTalk Server," says Ammara Masood. "The 15-minute frequency is not common, but BizTalk Server could handle it without modifications."

However, Xavor did need to write some custom code to integrate the traffic and POS servers with BizTalk Server. First, Xavor wrote an FTP adapter so that the servers running BizTalk Server can connect to the POS store controllers. Second, Xavor wrote two custom pipelines to parse the complex, proprietary POS and traffic data formats. In both cases, Xavor used the Microsoft Visual Studio.NET® development system and the Microsoft Visual C#®.NET development tool to provide the necessary integration.

The store controllers append new data to a constantly growing file, so Xavor used the Orchestration and Mapper features of BizTalk Server to pick out the new transactions and transform the data to match the format of the data warehouse.

Xavor and Analysis Team worked together on pulling the necessary data from Virgin's JDA system into the new data warehouse. The development group found that it was dealing with two basic classes of data.

The first type, which the group dubbed metadata, describes the products that Virgin
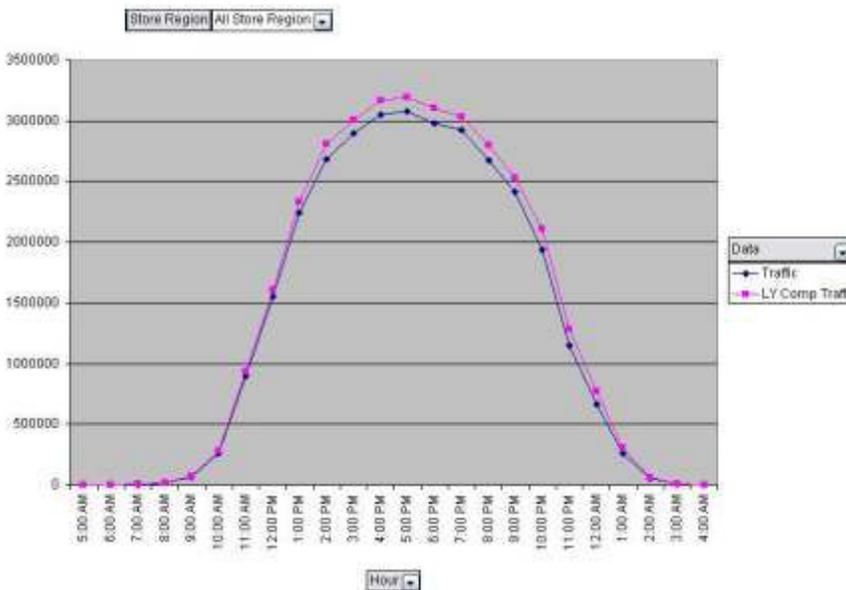
keeps in inventory and includes such fields as album name, artist, and year of release. The group worked with the Virgin IT staff to have JDA present the metadata to BizTalk Server nightly as a batch over an FTP drop. BizTalk Server then parses the data and passes it on to the data warehouse.

Pulling the second class of data from JDA into the new data warehouse was more complicated, however. This second class of data includes the regular price of a product, its cost to Virgin, and any promotions—called "events"—of which the product was a part. This data varies by store, by product, and by day. It must be loaded into the data warehouse before each day's sales begin because it provides essential context for analyzing daily gross sales margins.

The time sensitivity of the second class of data introduced an extra set of challenges. "The warehouse matches up the sales data as it comes in with the contextual data from JDA," says Steve Humphrey, Senior Consultant for Analysis Team. "But we had to plan for the possibility of a system outage or

a network failure." Xavor and Analysis Team used Visual C# .NET to write a data access abstraction layer to manage the time state of the data in the SQL Server warehouse. "If the contextual data isn't available for some reason, BizTalk Server notifies the data warehouse," says Humphrey. "When the missing information becomes available, the warehouse collects it and then resynchronizes the records created during the gap." In the meantime, reports based purely on the sales and traffic data will still be up-to-date.

Once the data is in the warehouse, it's analyzed in OLAP cubes created by Analysis Team using Microsoft SQL Server Analysis Services. "Analysis Services can incorporate very large dimensions, it's directly integrated with the database itself, and it makes it easy to create and prototype business cubes," says Humphrey. "That all combines to give us a huge advantage—we have to do less programming to set the system up, and less programming to maintain it."

Finally, the analyzed data is presented graphically in a series of Excel worksheets (see Figure 2). For instance, the traffic report for a given store displays the traffic in 15-minute increments for the current day. The same worksheet also contains a 13-week rolling average and graphs comparing traffic at that store at the same time of day, one week, one month, and one year ago. Another worksheet adds analysis derived from the POS sales data. The new system also replaces the reports previously generated by the product group, including store and product rankings, sales volume, and gross margins.

Virgin is rolling out the Crescendo project gradually, starting with the reports that staff members use most frequently. Over a 12-month period, the company expects to present 20 to 30 BI report templates covering ever more complex statistics like real-time

Figure 2. Sales and traffic data from Virgin Megastores is collected by BizTalk Server, analyzed by SQL Server, and presented through worksheets hosted on SharePoint Server.

conversion rate—that is, the number of customer transactions compared with total shopper traffic—units per transaction, and dollars spent per transaction. Virgin plans to produce more refined analysis over time, including benchmark reports for individual products and vendors; the development group expects to use SQL Server Reporting Services to develop much of this advanced analysis. Virgin will also work to integrate more data sources, including information about the company's labor force (such as hours worked and the number of employees per store), and market data from industry reports like SoundScan. "Microsoft Windows Server System not only will meet our needs now, but also will be able to meet our needs as we grow our data warehouse and expand our business intelligence capabilities," says Fort.

Benefits

For Virgin Entertainment Group, the new business intelligence solution has been like turning on a light in a dark room. The company has dramatically reduced the effort necessary to collect and analyze its key operational data, and expects to recapture thousands of hours of staff time each year. At the same time, the company has improved the quality and timeliness of that data—Virgin staff can now make sound decisions informed by statistics captured and analyzed that day, or even that hour. "After a presentation to our executives, one of them asked, 'We're on the verge of having all this information at our fingertips, aren't we?' " says Fort. "I was able to tell him, 'Yes. That's exactly right.' "

Virgin estimates that it will be able to relatively quickly increase its revenue by at least U.S.$1.8 million per year by using the information to bring more customers into its stores, convince those customers to purchase products instead of just browsing, and make more profit off each sale. "With Windows Server System and the .NET Framework, we built a comprehensive solution to a pressing business problem," says Fort. "Now, we can influence our results instead of just reviewing them."

Integrated Solution Cuts Costs, Lays Foundation for Future Growth

By building a solution using Windows Server System software, integrated with the Framework, Virgin streamlined and improved its data collection and analysis processes, controlled project and maintenance costs (see Figure 3), and built a core system that will support future data integration requirements across the company.

Virgin was able to relieve the product and finance groups of the burden of creating reports manually. With the Microsoft .NET—connected, Windows Server System–based solution in place, Virgin expects to save 330 hours per month in staff time—just short of two full-time employees. "We can finally let these highly paid professionals do what they're good at instead of churning out reports," says Fort.

The integration between the Windows Server System products also helped Virgin to quickly build a highly capable system at a significantly lower cost than that of the other options it evaluated. In fact, Virgin estimates that it will save roughly $75,000 in hardware costs and more than $500,000 in hardware and software maintenance costs over the next two years. "The Windows Server System–based solution was significantly cheaper than the other options," says Fort. "And, due to the integration between the

Figure 3. By using Windows Server System software, Virgin was able to streamline its data reporting while controlling both implementation and ongoing maintenance costs.

Virgin Recaptures Staff Time, Controls IT Costs	
Category	**Savings**
Time saved creating reports	330 hours per month
Hardware costs saved over alternative solutions	$75,000
Maintenance costs saved over alternative solutions	$500,000 over two years

Data Integration and Business Intelligence Provides Financial Benefits for Virgin	
Category	Estimated Impact
Conversion Rate	$1,800,000 additional revenue
Gross Margins	$450,000 additional gross margin
Inventory Turn	$1,500,000 additional revenue
Traffic	150,000 additional customers

All numbers represent average increase across all stores per year. Inventory turn is the number of times that inventory is completely refreshed. For example, a product that sells out every month would turn 12 times per year.

Figure 4. By acting on the intelligence drawn from its new data analysis solution, Virgin Entertainment Group expects to see growth in several key business metrics.

Windows Server System products, our development team has been smaller, our development time has been faster, and our code base is substantially smaller than it would have been with another solution."

Virgin expects the benefits of its system to continue to unfold over time. "Windows Server System provides us with a strong foundation to build on," says Flaesgarten, "The components are robust and easy to configure and change as our business needs change."

"Looking ahead, we're confident in our decision to go with Microsoft," says Fort. "BizTalk Server will make it easy to pull in other data sources. And with SQL Server, we can expand our data warehouse and increase the amount of business intelligence that we're providing. Windows Server System is a critical part of our future plans."

Traffic Data Expected to Increase Conversion Rate, Campaign Effectiveness

Success in the retail industry starts with understanding what gets customers to come in the door and what causes them to spend money after they're inside. Virgin expects to see some of the most immediate results from acting on near-real-time reports on store traffic and sales to increase the number of people who buy something after they've entered the store.

Prior to deploying its Windows Server System–based solution, Virgin found it difficult to track the relationship between traffic and sales. Now that both traffic and sales are reported in 15-minute increments, a store manager can gauge the factors affecting a store's effectiveness, from how the displays are configured to the number of staff available. Rick Smith, Store Manager for the Virgin Megastore in Anaheim, California, has already identified a drop in the conversion rate at roughly 7:00 P.M. on weekdays and is experimenting to see whether it can be fixed. He hasn't solved the problem yet but is happy to have the opportunity. "I'm not sure whether it's something that I can control, but the system gave me a specific area of my business to analyze. It's a starting point," says Smith.

With the new data provided by its Windows Server System-based solution, Virgin expects to increase its overall conversion rate by 2.5 percent, which is expected to contribute $1.8 million in additional revenue. "Our new system can catch lost opportunities for sales that even our best managers couldn't have seen," says Fort.

Virgin also expects that its Windows Server System–based solution will increase the effectiveness of marketing campaigns and eventually increase the chain's total traffic counts. When running marketing campaigns, Virgin will now be able to track the success or failure of a campaign on a daily basis—a tremendous improvement over its previous tracking capability. "Our customers know about our campaigns, and they tend to show up on the day that the campaign starts," says Fort. "Our marketing staff can look at traffic patterns on the very first days of the campaign and adjust if the traffic isn't what they anticipated. With Windows Server System, we can be more effective with our marketing dollars."

Increased Visibility Expected to Increase Sales and Profits

Because the Windows Server System–based solution will help the company understand what products are selling, where they're selling, and how quickly they're being purchased, Virgin expects to increase both its total unit sales and the profit that it makes on each product.

Managing store inventory is a huge challenge for any retail business. By analyzing the reports that are now available for each store and each product department, Virgin can quickly spot trends and exploit or correct them. "I can't tell you how excited I am about this stuff," says Smith. "For instance, I can see what CDs customers are purchasing in addition to a new release, and set up a display to take advantage of that."

The new system will also give stores more up-to-date information about inventory status, helping them avoid or minimize out-of-stock situations. "We sold 300 CDs at an in-store event with a popular artist," says Smith. "But I found out late the next day that we had sold out of the new release of a similar artist, and that delay cost the store revenue. Now, I'll be able to see that as it's happening and order sooner." Over the coming year, Virgin expects to reduce the number of times that its stores are out of stock by 10 percent and to increase the average number of times that it completely refreshes its inventory. Overall, Virgin expects the better inventory management enabled by its Windows Server System–based solution to yield $1.5 million in increased sales.

Higher sales volumes don't necessarily translate to increased profit, however. Virgin also expects to increase its overall gross margin—the difference between what the company pays for a product and what it's able to sell it for. The company conservatively estimates bringing in an additional $450,000 each year. With the new reports, store managers can review the profitability of individual departments and subdepartments on a day-to-day basis, and they can compare the results with historical data. Beyond discovering what products are selling quickly, the managers can identify the departments of a store where a high-margin new release is likely to do well. The managers can then work with the product group to add products to popular sections and deemphasize less profitable areas, tailoring the inventory to the particular store's clientele. "Windows Server System gives us the ability to look at the profitability of each store by department over days, weeks, and months," says Fort. "It will be a powerful tool for improving our business."

Better Data Has Improved Vendor Relationships, Performance

Along with looking closely at its own inventory and sales trends, Virgin can now focus on the performance of its suppliers and back up its negotiations with hard data. Instead of merely trusting vendors to ship product in the quantities promised, the company can track the daily receipt of orders at its stores and put the facts in front of the suppliers. "Now, when a vendor sends us only 70 percent of a shipment, we can document that and insist on compensation," says Fort. "We may end up with a larger discount on our next order, but it improves our relationships with our suppliers, because they know that we're paying attention."

In addition, Virgin now has better leverage when negotiating for product allocations on popular, heavily promoted titles that are practically guaranteed to sell, even at the high-margin price applied to new releases. "Sometimes, it's like being in court," says Fort. "You have to convince the supplier that you'll sell your inventory quickly at a premium price. With our new system, we have the data to back up our claims."

Virgin is using its new Windows Server System–based solution to drive a broader organizational change; so far, the response at every level has been overwhelmingly positive. "The new system integrates thousands of pieces of data in real time," says Fort. "Store managers love it, executives love it—everyone loves it. In fact, one of our store managers is so enthusiastic that he grabbed a giant 42-inch plasma screen and he's displaying the analysis charts—updated every 15 minutes—in his office. When the store personnel come back and see the numbers changing, they get excited and go back out on the floor and engage the customers and drive sales."

Microsoft Windows Server System

Microsoft Windows Server System integrated server infrastructure software is designed to support end-to-end solutions built on the Windows Server operating system. Windows Server System creates an infrastructure based on integrated innovation, Microsoft's holistic approach to building products and solutions that are intrinsically designed to work together and interact seamlessly with other data and applications across your IT environment. This helps you reduce the costs of ongoing operations, deliver a more secure and reliable IT infrastructure, and drive valuable new capabilities for the future growth of your business.