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## Conference Analysis Newsletter

In-depth reports on leading IT conferences

# Emerging Technology Scene

Presented by Giga Information Group
**December 7-9, 1999**
Palm Desert, Calif.

**Reported by Larry Press**

One of the most critical — and most difficult — aspects of an IT executive's job is keeping up with the cutting edge of technology. Each year, Giga tries to help solve this problem with this conference, dedicated to emerging trends.

As always, **this year's conference presented and analyzed technology that's newly available or soon to be available in the marketplace**. The audience was made up of IT executives, and **the focus was on e-business** — on the Internet, extranet and intranet.

At the heart of the conference were four TechnoVista sessions: "Behind the Scenes of e-Business Applications," "Spinning the Enterprise Web: Infrastructures for E-Commerce," "Technologies Enabling the Connected Worker of Tomorrow" and "Customer-Centric e-Business Solutions." Each session lasted roughly three hours, and each followed the same format.

A Giga analyst began with an excellent overview of current practices, emerging technology and short-term trends. Next came short demonstrations of several new products. (Although Giga screened the companies giving the demonstrations, the quality of the products and presentations was uneven.) After each product presentation, the audience voted on three counts: the degree of innovation, business applicability and quality of the demonstration. (They used wireless terminals, so the votes could be tallied and displayed immediately.) Next came open discussion between the analyst leading the session, a challenging analyst (a gentle curmudgeon) from Giga, a panel of executives from user organizations, and questions from the audience. Finally, there was a vote for an overall winner.

## Giga

**Giga Information Group®**
**YOUR e-BUSINESS ADVISOR**

### Emerging Technology Scene

**Dates:** December 7-9, 1999
**Location:** Desert Springs Marriott Resort and Spa
   Palm Desert, Calif.
**Number Attending**: 285

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**Conference Analysis Newsletter**

Each TechnoVista session concluded with the analyst asking the audience some relevant survey questions. Some of the more interesting survey results are summarized at the end of each section, and all the questions and responses are shown at the end of this report.

There were a number of activities in addition to

the TechnoVista sessions: one-on-one sessions with Giga analysts, Analyst Outlooks (in which the analysts present overviews of new developments and trends in their practice areas), keynote talks by futurists, a description of Giga's Site ScoreCard service, executive exchanges and commercial exhibits.

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## ABOUT THE REPORTER

**Larry Press** is Professor of Computer Information Systems at California State University, Dominguez Hills, and is a contributing editor to both *Communications of the Association for Computing Machinery* and *OnTheInternet*, the publication of the Internet Society. Mr. Press studies the applications and implications of computer networks and the global diffusion of the Internet.

## TechnoVista 1: Behind the Scenes of e-Business Applications

Giga Analyst: Mike Gilpin

The session began with Mike Gilpin's overview of e-business application and integration platforms. He opened by reviewing some of the business forces driving e-business and, therefore, e-business platforms. **In the general economy, these include globalization, deregulation, and growth through merger and acquisition.** There are also opportunities in customer-facing applications, including retail e-commerce and gathering information about customers in order to better serve and market to them.

**On the production side, the Internet is being used to integrate supply chains and create virtual organizations.** For example, we see new business models in which retailers work with partners to handle order fulfillment, billing, customer service requests, and so on.

These and other factors are driving business to the Internet — and systems must be fast, reliable and scalable, because they are extending beyond the enterprise to customers and suppliers. **The days of downtime for maintenance or batch processing on weekends or late at night are past.** Increasingly, customers want service at all hours (whether it's self-help or assisted), and if the system is down when they come online, they cannot do business. The brand and even stock price of the company may be adversely affected.

These demands have led to two general platform categories: **application servers and integration servers.** The application server market is growing rapidly. Application servers evolved out of the need to supplement the capability of Web servers and hand-coded CGI applications. They provide common functions, which fall into four categories:

1. They provide **reliability** by doing load balancing, resource pooling, failover, caching and runtime resource management.

2. They are also able to help with the **reformatting of output for a diverse collection** of client sizes and capabilities.

3. Developer **productivity** is another function, with state management, authentication and other common runtime tasks and a variety of development tools provided as part of the environment.

4. The final function is **integration with legacy systems** on mainframes and other platforms.

While some application servers include system integration features, an independent integration server may be required as well. Gilpin asked the audience to imagine the merger of five companies, each with an IT department and a call center. An integration server capable of talking to a variety of databases, mainframes and enterprise resource planning (ERP) systems would be required. It is not even necessary for the companies to merge, they may just want to work together — for example, a retailer, a fulfillment service and a shipping firm. Gilpin thinks **the integration server market is less mature than the application server market**, and in the future he expects to see more integration functionality added to application servers.

Internet application integration, within and among enterprises, was a clear theme of Gilpin's talk. He foresees this leading to:

- **XML-based business communication** over secure, reliable, Internet connections

- **Greater leverage of Internet application architectures** using Java and Microsoft component technologies

- Advent of **applications built on standard e-business components** from mixed vendors

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- **Loosely-coupled, message-based (asyn-chronous) business transactions**

- Increased use of **application servers and close integration with Web servers**

Gilpin concluded by pointing out that he had addressed only the application/integration server component of integrated systems, and that new development tools and processes, improved operating systems, and directory and security services would also be needed and forthcoming. **He also predicted that developers will need new skills, and there will be much faster application development and maintenance cycles;** rapidly obsolete skills and Internet time are coming to enterprise IT. (Pass the aspirin.)

Gilpin's overview was followed by the following product presentations:

- NCompass Labs, www.ncompasslabs.com: A content management system in which presentation and business rules are separated and the test/publish cycle is managed

- **GemStone Systems**, www.gemstone.com: A forthcoming food market Web site that selects products based on recipes and meals chosen by the user

- **SilverStream Software**, www.silverstream.com: An application server and development tool with cleanly separated presentation, business logic and data access using Java 2, Enterprise Edition (www.sun.com)

- **Attachmate Corp.**, www.attachmate.com: An order-entry application, featuring real-time access to corporate data using a cell phone as a Web browser

- **Bluestone Software**, www.bluestone.com: Integration of voice and data over a cell phone and a Web-enabled database

- **Radiant Logic**, www.radiantlogic.com: A virtual directory server that maintains the locations of database records

- **Vitria Technology**, www.vitria.com: A Web application design and development tool with a high-level system flowcharting tool

- **Forte Software** (owned by Sun), www.forte.com: A Web application development tool designed for loosely coupled systems in which business logic is cleanly separated

When the audience voted, **Bluestone was the clear leader**, with the highest percent of votes in all three categories (most innovative, clearest business application, and best demonstration). Not surprisingly, Bluestone was also voted the best product overall from this session.

Bluestone won because it did an ambitious, entertaining demonstration and it worked without a hitch. (Several others failed). The demonstrators used a wireless scanner to read the barcode from an attendee's badge, looked up his name, e-mail address and cell phone number in the conference registration database, sent that to a server which generated a custom image with his name, printed it on a T-shirt, and sent him an e-mail and called him on his phone to say the shirt was ready.

**Attachmate came in second,** and it also featured wireless access to corporate data. The terminal in the demonstration was a cell phone; it expects the number of phones on the Net to quickly exceed the number of PCs. He suggested that it would not be long before someone walking by a coffee shop might get a call on their cell phone from someone who saw them go by and would like to share a cup. Evidently, this is already happening in Japan, with special purpose devices that talk directly with each other.

It is a common assumption these days that everyone will soon have personal digital assistants (PDAs) and cell phones that are connected to the Internet, but one wonders if the people making those predictions have truly considered the implications of the ergonomics and bandwidth of cell phone e-mail clients and Web browsers. The band-

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width problem may one day be resolved — Europe is beginning to roll out faster cellular technology — but the ergonomics are a tough nut to crack. (For more on ubiquitous, networked devices — including some misgivings — see my article "The Post-PC Era.")

Bluestone won the voting, but it was difficult to compare these products. While they were all oriented toward integrated Web applications, there was a mixture of development tools, runtime servers and pure application demonstrations. This was not an apples-to-apples vote. Furthermore, some of the demonstrations were very poor (in all the sessions). The commentators and audience had no idea what, if anything, some of the vendors were actually selling. They used their time to discuss generalities, but never got around to saying what they were selling and why it was useful.

The audience liked the live demonstrations of applications that had been developed before the conference. They were not partial to presentations that focused on development tools and the way they are used. SilverStream demonstrated its development tools by making a minor change to a prewritten application, and Forte also showed its development environment. Both were hammered in the voting, but a more technical audience may have liked them. It seems this audience did not want to see even one line of code. (The bottom line is that the votes may not be all that meaningful.)

## TechnoVista 2: Spinning the Enterprise Web: Infrastructures for E-Commerce

Giga Analyst: Richard Fichera

**E-commerce places unprecedented, stringent demands upon IT infrastructure.** Applications must be available 24 hours a day, every day, development is continuous and incremental, security is a nightmare, and capacity planning is made very difficult by rapid growth and very uneven usage patterns. The cost of an hour of downtime can be very high - resulting in lost revenue and precipitous decline in stock value. Web sites undergo constant revision and extension as logs are analyzed and business models change, and major revisions and architecture changes are frequent. The security system must properly authenticate internal users as well as those of suppliers and distribution and marketing partners.

At the same time, a visible Web site is subject to constant attack on the Internet. Average numbers of users and traffic volumes grow exponentially, and there are demand spikes due to marketing promotions, new listings on search engines, the time of the day and the day of the week. Variable external delays on the Internet exacerbate the impact of volatile traffic. The user is interested in end-to-end availability and performance, and usually does not distinguish between problems on a Web site and problems in the Internet. Finally, rapid e-commerce growth has resulted in ad hoc server sprawl. Fichera asked the audience whether they knew exactly how many servers there were in their companies and in their central server farms, and many did not.

**This is much more complex than the old IT environment** — with scheduled batch and downtime, an ordered queue of applications to implement, somewhat regular processing cycles, a mostly captive user audience of company employees, and so on. These challenges are precipitating the sorts of innovation that were highlighted in this TechnoVista session.

Fichera divides Web infrastructure into four general layers:

- Outside the organization is **the Internet**, with fluctuating quality of service (QOS). New infrastructure and protocols may one day make the Internet reliable and predictable (at a price), but for now, a Webmaster must assume, and try to compensate for, a volatile Internet.

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- The **Web services layer** would have been only a Web server and perhaps a simple firewall a few years ago, but today we also see load balancing servers, proxies and content management tools and servers.

- Below the Web services layer, we find **application and business logic**. The application and integration servers discussed in TechnoVista 1 are found at this layer. These applications also talk with legacy systems that lie outside this layered conceptual scheme.

- Finally, there is the **database layer**, where business data and Web content are stored.

**Each of these layers must be done well or the system will fail.** Transaction state maintenance, server clustering, failover, and so on, must all be handled properly. Ideally, the end user should only notice a slight delay when something goes wrong, and the integrity of all transactions should be maintained. Even if there are no highly visible disasters, there may be many slight outages — a few minutes downtime here and there or a short burst of aborted transactions.

Fichera discussed several technologies within these layers. He sees increased use of **caching** to improve performance. For example, the pages of a large, non-volatile catalog could be maintained in memory and distributed to several servers. He also foresees increased use of **replication** in order to increase performance and availability.

Fichera also sees **improved load balancing** and Internet Protocol management. **Automatic caching and background replication will increasingly move onto the Internet**, cutting on-site complexity. He also sees these functions becoming proactive, anticipating user action and demand for content, as well as reactive.

Content-aware routers that make decisions based upon port numbers, URLs, and even cookie content will replace the traditional IP-layer router. This will allow variable QOS depending upon

what the user is doing and how important the user is. (For an in-depth discussion of these issues, see our report on the 1999 Networld+Interop Conference). Improved management tools will enable the administrator to monitor and adjust the state of the system.

In response to a question as to whether one would ever have enough servers, it seems that for now the answer may be "no." Increasing numbers of users, inefficiency due to more general purpose software, and an increasing number of functions per user are all driving the need for server cycles up. Only hardware improvement mitigates in the opposite direction. Fichera also suggested that **one should be sure the basic Web and transaction processing applications are stable and working well before adding servers for data analysis and mining.**

Fichera envisions a **number of improvements** during the next three years. He looks forward to the **programming and architectural flexibility** provided by the tools reviewed in TechnoVista 1. **Storage area networks** (SANs) will also proliferate, improving reliability and performance and simplifying application architecture through a single logical file system and management point. (For coverage of SANs, see our report on the 1999 Network+Interop Conference). The QOS and routing protocols mentioned above will also be in place.

He envisions servers with over 1,000 CPUs. (Note that IBM research is committed to building a million-processor system for genetic research, www.nytimes.com/library/tech/99/12/biztech/articles/06blue.html). The communication demands imposed by many CPUs and shared memory, storage and I/O will require a transition from bus to switch architecture within these machines. Independent instances of the operating system using whatever hardware resources have been allocated to them will run in separate "domains," as they do on logically-partitioned mainframes today.

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(Sun and Unisys demonstrated such machines during this TechnoVista.) These machines will be used for server consolidation and load balancing, since resources can be dynamically shifted from one domain to another.

Fichera also expects **improvements in system management tools**, and interdomain resource shifting and assignment of QOS levels to users and applications will be done manually by operators or automatically under control of scripts and rules. (This sounds like a possible application for rule-based expert systems). All of this complexity will be hidden from the application developer.

Above all, undertakings of the next data center should reflect true business needs and profitability. For example, data mining might be more profitable to the organization than adding a new transaction-processing feature.

No discussion of Web infrastructure would be complete with a discussion of Windows vs. Unix. **Fichera concedes the desktop to Windows. On the server side, however, he sees Unix outperforming Windows and being more reliable,** especially under heavy loads. Windows 2000 does appear to be closing the gap, especially for smaller applications, though its reliability and scalability are still unknown and untested.

Looking toward the future, he sees **Unix continuing to dominate the high-end market** with NT picking up volume and doing best in less demanding applications. But Windows is clearly improving even for high loads.

He described three very large applications running on Windows servers. Merrill Lynch has a broker information management system running on 16 NT servers with DB2 databases. This system is in production, and handles 250 complex financial transactions per second. He also cited a massive transaction processing demonstration that Unisys built for Comdex. Finally, he described a massive Tandem demonstration in which a system with

128 CPUs, 256 GB memory and more than 3,000 disks handles 15,000 to 30,000 inserts and 400 to 1,000 customer queries per second while uploading 1 percent of the transactions for data mining. This activity is taking place in a 112 TB database with 101 billion rows. (That is about 17 rows per person on Earth!)

These high-performance examples might lead one to the conclusion that the conventional wisdom on the Windows-Unix war is incorrect. Perhaps Windows will win on the server and Unix on the desktop. There is only one vendor of Windows, and, as Fichera acknowledges, it is improving. Server-side applications are complex and demanding, and the broad developer base and relatively uniform platform offered by an improved Windows might make it an attractive alternative to Unix in the future, even for high-end applications.

On the client side, Microsoft's Office monopoly keeps Windows on top, but with so many desktops, unit cost is highly significant. The cost advantage of Linux is very attractive, and if Sun's Star Office, www.sun.com/staroffice/, or another suite can offer sufficient feature and file format compatibility with Microsoft Office, Linux might be acceptable. This scenario is somewhat more likely with Microsoft under the Department of Justice (DOJ) scrutiny. It will not be as likely to combat a competing office suite with undocumented OS and Back Office hooks and marketing bundles as it would have been in the past. The DOJ might even break Microsoft into OS, tool and application companies, in which case one would expect a release of Microsoft Office for Linux, which, along with a reborn Netscape (or AOL) Internet browser, might have a significant desktop cost advantage.

The product presentations in this session were:

- **WRQ**, www.wrq.com: Monitors application performance and provides availability and response time reports for management

- **ISOCOR**, www.isocor.com: Automatically updates Notes, NT and other directories based on a single entry in a metadirectory

- **FirstSense Software**, www.firstsense.com: End-to-end performance monitoring using a downloaded client that talks to its server

- **Unisys Corporation**, www.unisys.com: A dynamically reconfigurable, multidomain server running Windows NT on Intel processors (including Merced when it is available)

- **Sun Microsystems**, www.sun.com: A dynamically reconfigurable, multidomain server running Unix on Sun processors

- **Sybase**, www.sybase.com: Transaction processing using a handheld wireless terminal

- **NextPoint**, www.nextpoint.com: Monitors application performance and provides availability and response time reports for management

**Unisys was the overall winner, but ISOCOR was voted most innovative**, with the greatest application potential, and second on demonstration quality. This seeming inconsistency reflects the heterogeneity of the products shown in this TechnoVista.

Unisys presented an ambitious hardware product. Its ES7000 enterprise server weighs 1,200 pounds and is as big as a refrigerator. It holds up to 32 Intel processors, 64GB memory, 96 PCI slots for I/O and disk drives. The system should be very fast. Memory is interleaved with a total bandwidth of up to 20GB/second, and third-level caches are provided. Every two processors share a bus, and a crossbar switch connects the busses. Applications running in different domains communicate through shared memory. Extensive hardware redundancy and error checking and recovery are designed in for high reliability. It seems Unisys is betting that Windows NT will win out over Unix on the server.

An ES7000 can be configured as a single, 32-processor machine, or broken into as many as eight four-processor domains. Each domain functions as an independent machine, with its own memory, I/O, storage and operating system instance. As with a mainframe partitions, computing, memory, I/O and storage resources may be moved from one domain to another at will, either using an operator console or under control of predefined scripts. For example, a script might transfer CPUs and memory from a testing or data mining domain to transaction processing if that domain became heavily loaded. Sun presented a similar system, as did Compaq at last year's Emerging Technology Scene.

ISOCOR presented software instead of hardware. It has a metadirectory that is used to maintain all other directory entries automatically. For example, when a metadirectory record is created for a new employee, Lotus Notes and Windows NT Server accounts could be automatically created. When a metadirectory record is changed, the others would be as well, and when an employee left the organization, all accounts would be automatically deleted.

The functions of these products are totally different, making an apples-to-apples comparison impossible. The audience liked the power and sophistication of the Unisys server, and could clearly see its potential for reliable enterprise computing and the consolidation of large, complex server farms. ISOCOR's offering is less ambitious, but it also has a very clear, useful function.

## TechnoVista 3: Technologies Enabling the Connected Worker of Tomorrow

Giga Analyst: Rob Enderle

Enderle began by showing an IBM commercial depicting a man using a computer with a wireless network connection and a tiny display in front of his glasses to make stock trades and converse with someone while sitting in Red Square. This com-

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mercial illustrates the "connected worker" theme of the session, but also depicts a man who is not cognizant of his physical surroundings.

To establish context, Enderle summarized the evolution of the personal computer. He began with DOS machines of the 1980s. IT departments had long backlogs and offered poor service, so users brought PCs in to do their own jobs. (This was happening even earlier with CP/M machines and the Apple II with the VisiCalc Spreadsheet program, and is being repeated today as individuals within organizations set up their own Web sites without IT participation or control.)

In the 1990s, the personal computer got a color monitor, sound card, and Windows, but it still had the same basic bus and expansion card architecture. Enderle predicts the demise of this "hobbyist" architecture, because users do not want the ability to add expansion cards nearly as much as they want low cost and reliability. IT departments do not utilize the expandability, but we all pay for and suffer with it. He used the Compaq Ipaq, http://www.compaq.com/products/internetdevices/index.html, as an example of the Internet computer of tomorrow. It is a fairly standard machine, but it uses USB in place of serial and parallel ports and has no expansion slots. This configuration will be even more attractive with the availability of USB-2, and we can expect to see similar machines from other manufacturers.

Enderle digressed from his PC history by discussing IBM's "near death" experience under John Akers. He attributed IBM's difficulty to Akers being out of touch with reality, only talking to a small number of executives under him. He speculated that Bill Gates' temper might leave him vulnerable to the same sort of isolation — no one wants to bring him bad news.

Enderle reviewed the **factors that are driving change for the connected worker**. One factor is **dissatisfaction with the cost, complexity**

**and fragility of the bus-oriented hardware and operating systems described above**. Machines break when we install new hardware or software, and take time to upgrade. **Workers are also increasingly mobile** and likely to work at home. Reliability and remote diagnosis are important for the worker at home or on the road. Companies also want more flexibility. When a worker moves to a new office (temporarily or permanently) their working environment should stay with them. **Customer dissatisfaction with Microsoft** (it consistently leads Giga dissatisfaction polls) and Intel and product delays also lend pressure for change. The **Department of Justice** is also a change agent. These and other factors point toward thin clients (often with wireless connections) with files and services on the network.

Enderle surveyed the **technologies he expects to see in the near future**. He likes **micro-displays placed near the eye**, as in the IBM commercial he showed, and increased use of speech recognition for control. He pointed out that some people have difficulty using **speech for data input**, although lawyers and doctors are often skilled at dictation. Security will be a major issue for the connected worker, and **smart cards and biometric transducers** will be used for identification. As noted above, he expects a proliferation of network appliances that are well suited to work with application service providers. He expects to see **Linux** embedded in many Internet appliances, and is hopeful that Transmeta's new Crusoe processor, www.transmeta.com, will lead to improved function and competition in mobile devices.

The operating system will be hidden on the evolved desktop, so will not be so important. Industrial design will matter, as in any appliance. The machine will be simple and portable, staying with the user as he or she moves around the building or from one job to another. It will not happen overnight, but **Enderle expects today's**

**personal computer to be gone within five years.**

The following companies showed products after Enderle's presentation:

- **IBM Pervasive Computing**, www-3.ibm.com/pvc/: Windows CE and Palm portables dialing into a Windows remote-access server

- **Indus River Networks**, www.indusriver.com: VPN access for mobile workers, telecommuters, remote offices and trading partners

- **WRQ**, www.wrq.com: Seamless roaming between wireless LAN segments

- **Centura Software**, www.centurasoft.com: Extending enterprise information systems to wireless handheld devices

- **Sun Microsystems**, http://www.sun.com/products/sunray1/: A thin client, enterprise appliance for 100 mb/s switched LANs

- **Dragon Systems,** www.dragonsys.com: Batch recognition and indexing of terms found in Real Video files

- **Sybase**, www.sybase.com: Offline SAP transactions using a PDA

**Dragon Systems dominated the voting,** winning all three categories and being selected best overall. For some time, Dragon has offered batch voice recognition in its Naturally-Speaking Mobile product, which allows the user to record speech on tape for recognition at a later time. It is working on products that can do the same sort of batch recognition on data from multiple speakers. For this demonstration, it had preconverted several Real Video clips to speech, and then inverted the text file so the user could search for clips with certain words. They searched on the term Microsoft, and found a talk by Larry Ellison of Oracle. They could then display a timeline of the

clip, with instances of the word Microsoft highlighted. (You can see a similar technology demonstration from Compaq at www.compaq.com/speechbot/).

Dragon did not announce this as a product, but it plans to have a commercial version ready during the first quarter of 2000. That program will work with uncompressed call center data, not Real Video, which may enable some interesting customer relationship management applications. The demonstrators were not able to say when other speech formats would be supported or comment on recognition accuracy rates. One suspects they are considerably below those achieved when a recognition system is trained on the voice of a single user who speaks into an active microphone in an acoustically controlled environment.

As in the other demonstration sessions, the products were not directly comparable. Sun demonstrated its version of a thin client designed for switched Ethernet LANS (with cable modem and DSL versions on the way), and there were several wireless products. One of these was IBM, which did poorly. It was rated least innovative and last overall because it used a Palm Pilot with an IBM logo and was unsuccessful in making a connection to a standard Windows remote access server. Even its own Windows CE device failed to connect. IBM claimed its goal was a billion people interacting with a million businesses using a trillion devices. It will have to apply some of the innovative engineering it uses for million-processor systems and hard drives the size of a quarter if it hopes to win votes at the next Emerging Technology Scene.

## TechnoVista 4: Customer-Centric e-Business Solutions

Giga Analyst: Erin Kinikin

This session focused on using the Internet to establish and maintain customer relationships. It

was the least technical of the sessions, focusing primarily on business issues.

Kinikin began by placing customer relationship management (CRM) interaction in context.

Contact with and information about customers may either be direct or indirect, coming through partners and resellers. (In some cases, the indirect communication channel may be a bit noisy. For example, an auto dealer that represents several brands competes with the manufacturers for control of the customer relationship, and will be reluctant to share information.)

Whether the contact is direct or through channel partners, it is handled by "front-office" employees in the sales, marketing and service departments. They, or their systems, may use "back-office" ERP systems in servicing the customer. The back-office system extends to the supply chain, and the CRM system to the demand chain. **ERP systems are geared toward cost cutting and efficiency; whereas CRM systems are geared toward building the right products and giving the customers excellent service.**

Kinikin feels most organizations have better integrated, more complete ERP systems than **CRM systems, and concludes that CRM will be the strategic differentiator in the future.** (The next issue is how to differentiate an organization once everyone has both effective ERP and CRM systems in place — but that is a question for a future conference, as Internet CRM is just getting started.)

Kinikin outlined a three-phase online customer life cycle:

1.  **Attracting customers and marketing products**: This is where CRM began, with sites evaluated on the numbers of "eyeballs" they attracted. Functions here include Web advertising, displaying products, user profiling, and product configuration and other presales support.

2.  **Negotiating prices and accepting orders**: This is where Web revenue is generated, and the functions are user authentication, price negotiation, and ordering and paying, typically with a shopping cart and credit card.

3.  **Conducting post-sales activity**: The goal of this phase is customer retention. Amazon.com and other retailers now report repeat-order rates, as well as site visits, to stockholders. Functions here include user feedback, customer service, technical support and billing. Post-sales activity feeds back into marketing as one uses information about customers to inform them of related products and promotions. Kinikin cited the example of an Auto Club that doubled its follow-on sales in this manner. The Web is another channel.

Kinikin gave some site design tips by criticizing cdnow.com, a site she considered to be poorly designed. At the time of her visit, she found the site to be superficial, and lacking in information – better suited to a "one-night stand" than an ongoing customer relationship. It was input-intensive, requiring the user to spend too much time for what he or she received. (Digital "passport" proposals from companies like Novell or Microsoft might alleviate this problem if they become widely used). The product recommendations she received at cdnow.com were uneven and delivered without contextual information. Overall, she felt there was too much emphasis on getting a new order rather than supporting and informing the customer.

CRM should be integrated with e-commerce. **An e-commerce site will yield a wealth of useful information**, including fast feedback on the efficacy of specials and campaigns, and knowledge of what people looked at and did not buy, as well as what they did buy. All channels need to be integrated as well. A "click and mortar" enterprise must be consistent and comprehensive in dealing with customers from the store or the Web.

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The Web also means a customer will know your product line better when they contact you — whether by phone, e-mail or in person. It is also important that the information they receive is the same. Product and other information should be in an integrated database that is used by sales and customer service representatives and the Web site. The customer should get the same answer regardless of the contact person or the media used. Kinikin gave an example of an insurance company where a sales agent and the automated Web system recommended different coverage amounts for the same person. The contact people and the Web system should also use the same customer profile and history data. A carefully planned system architecture is a must, and the same business rules, scripts, customer data, and workflow procedures should be used by all.

Kinikin pointed out that the CRM system should discover which customers are most valuable and treat them accordingly. The cost per interaction is much greater with a direct sales call (at least $100) or even a phone call ($5 to $20) than with a chat session ($2 to $7), e-mail or, best of all, self-service. **The value of customers must be balanced against the cost of serving them.**

She suggested that CRM systems be evaluated on customer results. E-mail response times must be kept low. She cited a case in which 50,000 e-mail messages had been unassigned and never answered. The systems and people surrounding the CRM system must be in place if it is to be effective.

Each of the three goals of CRM — improved customer acquisition, increased retention and optimizing customer value — can be measured. Customer acquisition metrics include response rates, conversion rates, site metrics, abandon rates, purchase surveys and demographic analysis. Customer retention and revisit rates can also be mentioned, and you can administer customer satisfaction surveys using the Internet.

Having set the context, Kinikin invited the following vendors to show their products:

- **Exchange Applications**, www.exapps.com: A system for creating and delivering e-mail promotions and announcements, and handling responses and analyzing campaign effectiveness

- **Silknet Software,** www.silknet.com: Tools and a methodology for building interactive "advisors" for configuration or product selection

- **TriVida Corp**., www.trivida.com: Either development tools or a service (it was not clear from the presentation or a visit to its Web site) for customer data mining

- **FirePond,** www.firepond.com: An integrated marketing and CRM suite

- **Ten North Software**, www.tennorth.com: A generalized extranet solution for working with indirect sales partners

- **Vantive Corp.**, www.vantive.com: A forthcoming CRM package that will be well integrated with back-end ERP systems

- **Luna**, www.luna.com: A generalized portal for business-to-business extranets

This session also had a clear winner: **Silknet Software won every vote**, including best overall. Its demonstration showed an "interactive advisor" in action. It was a dialog with an agent called "Jill" that offered assistance in selection of a notebook computer. This was a live demonstration of a production system, and you can interact with Jill at www.cozone.com.

While the demonstration looked good, and the audience could see the potential, one gets a sense of the limitations by trying it out. This is not a complex, rule-driven expert system, but a fairly straightforward checklist and branching dialog with a picture of a young woman who appears to be speaking to the user in first person.

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A more important (though perhaps easily fixed) problem with Jill is that she gives bad advice. I asked for a high-end portable with demanding characteristics, and the program recommended a couple of old Pentium 2 models that were far from state-of-the-art. A cynic would conclude that Jill was limited to making recommendations for which cozone.com makes a large markup, but I will be charitable and assume that it is just that no person or system is responsible for keeping Jill's database current. Either way, Jill is a CRM disaster if a customer is knowledgeable, and it does a disservice if the customer is a beginner.

After seeing these demonstrations, one concludes that the CRM is in its early stages, and this was borne out in the audience surveys that followed each TechnoVista session.

## TechnoVista Audience Surveys

At a conference like this, the other attendees offer as much as the formal program itself does. Giga understands this well, and the audience surveys are a conference highlight. At the end of each TechnoVista, the analyst chairing the session posed several questions to the audience. Within a few minutes, the votes of a roomful of highly qualified IT executives and others were tabulated and fed back to the audience. The results of the poll are listed at the end of this report, so you can do your own data mining. The following are a few of our observations.

Some of the questions simply define who the audience is. For example, the majority of the audience is from IT departments, and 60 percent of them expect to invest more than $1 million in new e-business initiatives during 2000. Eight percent will spend more than $50 million, and over half are already doing e-commerce with revenue transactions on the Web.

They wish they didn't have to do business with Microsoft, and think Intel doesn't understands

their needs. The most popular anti-trust remedy against Microsoft is to have them open the Windows source code (that is also the least frightening action, and it would make little difference, especially if the tool and application divisions were not touched). Also, 26 percent would break Microsoft up somehow, and only 10 percent would leave them alone. On the positive side, IBM was the company most would choose if they had to work only with one vendor.

Regardless of their poor opinion of Microsoft as a vendor, Windows DNA/2000 got the most votes as the Internet e-business platform that best satisfies their requirements. However, the combined total of the Java-oriented vendors (76 percent) was much greater than Microsoft's (24 percent). It will be interesting to see how this question is answered next year, after we have experience with Windows 2000. More than half use a mix of Microsoft and other platforms, and 84 percent use Unix for enterprise critical applications. Over half have IBM mainframes, and 6 percent use them for Internet applications.

The poll results confirmed Kinikin's observation that CRM implementation is less mature than ERP. Many respondents are still in the planning stage, there is no clear winner among the classes of vendor, and planned budgets are not so high – the majority of investment will still be in other areas next year. On the other hand, the majority of new CRM investment will be directed toward the Web, and the motivation is customer orientation, not cost savings.

## Other Activities

While the TechnoVistas were the focus of the conference, there were a number of breakout activities as well. These were one-on-one sessions with Giga Analysts, Analyst Outlooks, keynote talks by futurists, a description of Giga's Site ScoreCard offering, executive exchanges, and commercial exhibits. These are held during break-

out sessions (so one cannot catch them all), but we offer some highlights.

## One-on-One with a Giga Analyst

Each attendee was encouraged to schedule a 30-minute consulting session for a specific organization or project. I put on the hat of one of my consulting clients, the U.S. distributor for an auto manufacturer, and scheduled a one-on-one with Mike Gilpin.

I summarized the situation for him, outlining its size, e-commerce activities to date, the platforms it was using and its staff capabilities. He asked what I would like to know, and we talked about its development and application server, hosting, and dealer-connectivity strategies. By the end of the session, I was convinced that it was acceptable for it to continue with Microsoft DNA and had several specific tools and servers to consider. He also made suggestions for dealer connectivity. All in all, it was a worthwhile session.

## Analyst Outlooks

Gilpin and Enderle gave talks that reviewed and extended their TechnoVista sessions somewhat. Gilpin added that we would be seeing a variety of client types, some geared to beginners and others to users of small, portable devices using the Wireless Application Protocol. He expects to see more calls from mechanized clients (for example, shopping agents) and feels XML will play a major role here.

Enderle added a prediction that in the second half of 2000, we would see some high-flying Web stocks crash, Linux consolidation, and large telephone companies entering the application services market. During 2001, he expects to see the appliances he discussed in his TechnoVista session outselling PCs, flat panel displays replacing CRTs, a proliferation of electronic books (this prediction may be based on the standardization effort being undertaken by the Open eBook Initiative and Microsoft's forthcoming Reader), and the full impact of the Department of Justice case against Microsoft.

A third Analyst's Outlook was presented by Giga's Daniel Rasmus, who has fun with gadgets. He spoke on "Untethering the Knowledge Worker," and predicted that we would be seeing portable devices for e-mail, voice and sound, video playback, Web browsing, secure e-commerce, FAX, paging, telephony, and more. He referred to Project Oxygen at MIT, and also cited a long list of problems that had to be overcome. His predictions for the next two to five years include wireless dial tone, cooperation between devices, pen input remaining dominant over voice, 1GB flash memory, cameras being common, and continued problems with battery life.

## Futurist Keynotes

There were two keynote speakers: **Dr. James Canton**, founder and CEO of the Institute for Global Futures (www.technofutures.com) and **Frank Ogden**, a.k.a. "Dr. Tomorrow" (www.drto-morrow.com/content.html).

As perhaps befits a futurist, Dr. Canton stayed at a very general, high level. The overall theme of his talk was that radical innovation is the only competitive advantage — adapt or decline. In keeping with the topic of this conference, he considers every business a customer-centric e-business. Buyers will demand lower cost, higher quality, and better and faster service. He asked the audience when they had last spent a day with a customer. He would have appreciated Kinikin's session on CRM, and sees customer relations as the way to differentiate yourself from the ubiquitous e-businesses in the future.

Dr. Canton sees four technologies as critical in the next century: computers, networks, biotechnology and nanotechnology. He sees the rate of improve-

ment in computers exceeding Moore's Law of the past 20 years and predicts rapid bandwidth increases. He pointed out that the biotechnology and nanotechnology fields will use these powerful computers and networks as tools.

Key IT futures include virtual reality, agents, lots of powerful services on networks, the importance of intellectual property (keeping employees will be difficult), virtual private markets, and a blending of physical and virtual reality and work and personal time. Companies will deal in a mix of bits, atoms and genes. He asked what business is AOL in – communications, Web content and hosting, banking services? This will lead to power shifts from the physical to the virtual, from sellers to buyers, from data to knowledge and from humans to machines.

While he focused his e-commerce advice on customers, he tipped his hat to the importance of supply-chain integration near the end of his talk. That is the key to moving quickly. Dr. Canton is breathless and upbeat, but he does see security and privacy concerns as possible roadblocks. He worries that consumers will rebel against too much intrusive use of clickstream and other data mining.

Dr. Tomorrow also believes in a radically changed techno future. The bulk of his talk was the demonstration of various gadgets that he feels foreshadow the future. While they may have seemed futuristic to some general audiences, a room full of IT professionals could hardly be impressed by such things as a digital camera, a digital tape recorder, a combination flashlight and radio (for natural disasters, I guess), or an electronic book. While much of what he showed was well known, his admonition to spend at least ten hours a week studying or learning was good advice. He concluded his talk with a surrealistic animated video inspired by Jules Verne's *Around the World in Eighty Days.*

## Giga's Site ScoreCard

Giga held a session on its Site ScoreCard service. For a fee, Giga analysts will do an in-depth evaluation of a Web site, using a checklist of more than 300 items grouped into five categories: usability, effectiveness of marketing and general content, purchase and fulfillment, service and support, and use of technology. It performs the same analysis on the sites of two competitors and two best-practice sites. After the site owner has time to revise based on feedback, Giga will revisit and give a final report. (For more on this service, visit www.web-sitescorecard.com.)

## Executive Exchanges

Executive exchanges are peer interaction sessions in which a Giga analyst moderates a meeting of attendees who share their experiences and answer each others' questions. This year's topics included Windows 2000 deployment plans, CRM/ERP integration, e-commerce site architecture, and portal and desktop plans and strategies. These sessions were quite valuable; participants learned that their problems are common, and they shared experiences and solutions.

## Commercial Exhibits

Forty three companies had exhibit booths. Most of them had made TechnoVista presentations, so, if one caught your fancy, you could follow up immediately. The exhibits were open during lunch and after the sessions ended.

## Summing Up

The major themes of the conference were captured in the TechnoVista sessions:

- **E-commerce is mission critical**, and the server-side problems are enormous.

- We can look forward to an **explosion of wireless portable devices**, used by knowledge workers and for transaction processing.

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- **Desktop PCs will give way to simpler units** with lower total cost of ownership and support.

- **Web CRM is not as far along as ERP**, but it will provide strategic differentiation and must be well integrated with ERP and other CRM media.

While the TechnoVista sessions were the focus of the conference, interaction with other attendees was a highlight — whether it took place formally during the audience surveys and the executive exchanges or informally over lunch or coffee.

I have attended two of the Emerging Technology

Scene conferences, and found the product presentations somewhat uneven this year. Giga might consider cutting the number of presentations down a bit and giving the speakers some guidelines for using their limited time effectively. I also preferred the Keynote format last year. Instead of two generalists, there was a single speaker with in-depth knowledge of the topic.

These reservations aside, the attendees I spoke with during the breaks were all pleased with the conference, as was I. It was an excellent opportunity for a harried IT executive or manager to get away from it all for a few days of perspective building.

## Audience Survey Results

### TechnoVista 1: Behind the Scenes of e-Business Applications

Which of the following vendors do you consider to be the most strategic vendor of software infrastructure for your e-business?

| | | |
|---|---|---|
| 1. BEA Systems | 12 | 9% |
| 2. IBM | 22 | 17% |
| 3. Microsoft | 40 | 31% |
| 4. Oracle | 13 | 10% |
| 5. Sun | 22 | 17% |
| 6. Sybase | 0 | 0% |
| 7. Other | 20 | 16% |
| | **129** | |

What is the size of the portion of your IT budget for 2000 for investing in new e-business initiatives? (Don't answer if you don't know at least within the ballpark of the right answer.)

| | | |
|---|---|---|
| 1. < $500,000 | 18 | 23% |
| 2. $500,000–$1M | 13 | 17% |
| 3. $1M–$5M | 22 | 28% |
| 4. $6M–$10M | 8 | 10% |
| 5. $11M–$25M | 6 | 8% |
| 6. $26M–$50M | 5 | 6% |
| 7. > $50 M | 6 | 8% |
| | **78** | |

At what rate is this e-business IT budget growing, comparing 2000 to 1999? (Don't answer if you don't know at least within the ballpark of the right answer.)

| | | |
|---|---|---|
| 1. < 10% | 8 | 12% |
| 2. 15 – 20% | 5 | 8% |
| 3. 25 – 30% | 11 | 17% |
| 4. 35 – 50% | 14 | 22% |
| 5. 55 – 70% | 4 | 6% |
| 6. 75 – 90% | 5 | 8% |
| 7. > 90% | 18 | 28% |
| | **65** | |

Which of the following best describes your e-business server software platform strategy?

| | | |
|---|---|---|
| 1. Primarily based on Microsoft operating systems and Microsoft Internet (DNA) software platform solutions. | 10 | 12% |
| 2. Based on a mix of Microsoft and non-Microsoft operating systems, with platform independent Internet software platform solutions such as Enterprise JavaBeans | 43 | 51% |
| 3. Primarily based on Unix operating systems, with platform independent Internet software platform solutions | 26 | 31% |
| 4. Primarily based on mainframe operating systems, with platform-independent Internet software platform solutions | 5 | 6% |
| | **84** | |

Of the following Internet e-business application software platforms, which best satisfies your requirements for an e-business application platform?

| | | |
|---|---|---|
| 1. Microsoft DNA/2000 | 21 | 24% |
| 2. IBM WebSphere family | 16 | 19% |
| 3. BEA Systems WebLogic family | 13 | 15% |
| 4. Sun/Netscape iPlanet Application Server | 14 | 16% |
| 5. Oracle Application Server / and/or 8i | 6 | 7% |
| 6. Other EJB application / environment | 10 | 12% |
| 7. Other non–EJB application environment (including proprietary platforms such as ERP) | 6 | 7% |
| | **86** | |

### TechnoVista 2: Spinning the Enterprise Web: Infrastructures for e-Commerce

Do you plan to implement W2K advanced server or data center server for enterprise critical applications other than MS Office and Exchange?

| | | |
|---|---|---|
| 1. Yes | 28 | 47% |
| 2. No | 32 | 53% |
| | **60** | |

How soon after release ?

1. Within first six months    5      10%
2. Seven to twelve months    15      29%
3. More than twelve months    31      61%
            **51**

Do you currently use an IBM mainframe?

1. Yes      39      57%
2. No      30      43%
       **69**

If yes to the last question, do you still expect to be using it in two years?

1. Yes      35      88%
2. No      5      13%
       **40**

Do you currently use Unix systems for enterprise critical applications?

1. Yes      56      84%
2. No      11      16%
       **67**

If yes, which vendor (choose the one used the most)?

1. Compaq    4      7%
2. HP    11      19%
3. IBM    10      17%
4. Linux    3      5%
5. SCO    2      3%
6. Sun    26      45%
7. Others    2      3%
       **58**

Over the next 24 months, do you expect your use of Unix for enterprise critical applications to:

1. Increase    40      63%
2. Stay about the same    18      28%
3. Decrease    6      9%
       **64**

Do you have a B2B or B2C commerce site with revenue transactions?

1. Yes      40      56%
2. No      31      44%
       **71**

Has it ever been unavailable for revenue generating transactions within the last (choose one):

1. Thirty days?      9      47%
2. Sixty days?      4      21%
3. Ninety days?      6      32%
       **19**

If you know the details, for how long?

1. Less than 10 minutes    6      25%
2. 10 minutes – 1 hour    5      21%
3. More than an hour    13      54%
       **24**

## TechnoVista 3: Technologies Enabling the Connected Worker of Tomorrow

If you had to pick one vendor that you would work with exclusively (assuming all could provide the same solution) which would it be:

1. AOL      2      2%
2. AT&T      3      3%
3. Compaq      3      3%
4. Dell      1      1%
5. HP      14      15%
6. IBM      33      36%
7. MCI/WorldCom/
Sprint      2      2%
8. Microsoft      11      12%
9. Oracle      4      4%
10. Sun      19      21%
       **92**

If you could stop doing business with any vendor, or not start, that vendor would be:

| | | |
|---|---|---|
| 1. AOL | 8 | 8% |
| 2. AT&T | 2 | 2% |
| 3. Compaq | 1 | 1% |
| 4. Dell | 5 | 5% |
| 5. HP | 0 | 0% |
| 6. IBM | 6 | 6% |
| 7. MCI/WorldCom/ Sprint | 7 | 7% |
| 8. Microsoft | 49 | 51% |
| 9. Oracle | 17 | 18% |
| 10. Sun | 2 | 2% |
| | **97** | |

The Microsoft settlement I would prefer is:

| | | |
|---|---|---|
| 1. Break up the company | 27 | 26% |
| 2. Fine them, but leave them alone otherwise | 15 | 15% |
| 3. Leave them alone | 10 | 10% |
| 4. Force them to "Open Source" Windows | 31 | 30% |
| 5. Put in place a regulatory body to make sure they behave | 8 | 8% |
| 6. Force them to auction off Windows | 2 | 2% |
| 7. Force them to hire some competent attorneys | 9 | 9% |
| | **102** | |

The Microsoft settlement that scares me the most is:

| | | |
|---|---|---|
| 1. Break up the company | 13 | 13% |
| 2. Fine them, but leave them alone otherwise | 7 | 7% |
| 3. Leave them alone | 36 | 36% |
| 4. Force them to "Open Source" Windows | 1 | 1% |
| 5. Put in place a regulatory body to make sure they behave | 25 | 25% |
| 6. Force them to auction off Windows | 10 | 10% |
| 7. Force them to hire some competent attorneys | 9 | 9% |
| | **101** | |

My ideal personal computer would be:

| | | |
|---|---|---|
| 1. No different than what I have today | 7 | 6% |
| 2. A series of specialized appliances that would be wherever I go | 12 | 11% |
| 3. A personal appliance that would always be with me | 22 | 20% |
| 4. A personal wearable appliance | 5 | 4% |
| 5. A modular device that would go from hand-held computer to desktop system with a consistent user interface | 43 | 38% |
| 6. A modular device that would go from laptop to desktop configuration easily | 7 | 6% |
| 7. One heck of a lot more reliable than what I have today | 14 | 13% |
| 8. Have no Intel Technology. | 0 | 0% |
| 9. Have no Microsoft software. | 0 | 0% |
| 10. Have no Microsoft or Intel Technology in it | 2 | 2% |
| | **112** | |

Which of the following is more true:

| | | |
|---|---|---|
| 1. Intel knows what I want and builds products I want to buy | 23 | 26% |
| 2. Intel has no clue what I want and I'm tired of waiting for them to figure it out | 65 | 74% |
| | **88** | |

Which is most true: I represent a:

| | | |
|---|---|---|
| 1. Hardware Vendor | 4 | 4% |
| 2. Software Vendor | 24 | 24% |
| 3. IT Department | 67 | 66% |
| 4. Publication | 6 | 6% |
| | **101** | |

### TechnoVista 4: Customer-Centric e-Business Solutions

The primary driver for CRM projects at my company is :

| | | |
|---|---|---|
| 1. Customer acquisition | 8 | 17% |
| 2. Customer retention | 15 | 32% |
| 3. Customer profitability | 7 | 15% |
| 4. Customer segmentation or value analysis | 11 | 23% |
| 5. Cost reduction | 0 | 0% |
| 6. Not defined | 6 | 13% |
| | **47** | |

Are your e-commerce and CRM strategies

| | | |
|---|---|---|
| 1. Completely separate? | 14 | 29% |
| 2. Loosely coordinated? | 17 | 35% |
| 3. Tightly coordinated? | 11 | 23% |
| 4. The same? | 6 | 13% |
| | **48** | |

My primary solution vendor for CRM will be

| | | |
|---|---|---|
| 1. ERP vendor (Oracle, SAP, Peoplesoft, Baan, JD Edwards) | 2 | 5% |
| 2. Traditional CRM vendor (Siebel, Clarify, Onyx, Pivotal) | 12 | 29% |
| 3. E-Commerce vendor (Broadvision, IBM, etc.) | 4 | 10% |
| 4. New e-CRM vendor (Silknet, Octane, Cisco, etc.) | 8 | 20% |
| 5. Combination | 15 | 37% |
| | **41** | |

The current status of my CRM initiatives is

| | | |
|---|---|---|
| 1. Evaluating for specific functions (sales, service, etc.) | 16 | 41% |
| 2. Initial department implementations | 6 | 15% |
| 3. Evaluating for enterprise CRM supplier | 13 | 33% |
| 4. Implementing enterprise CRM supplier | 0 | 0% |
| 5. Complete | 4 | 10% |
| | **39** | |

The biggest challenge for CRM implementations is

| | | |
|---|---|---|
| 1. Cultural and business change | 15 | 34% |
| 2. ERP integration | 2 | 5% |
| 3. Customer data consolidation & cleansing | 8 | 18% |
| 4. Gaining executive commitment | 3 | 7% |
| 5. Determining and aligning with business strategy | 13 | 30% |
| 6. Technical solution complexity | 3 | 7% |
| | **44** | |

What percentage of discretionary IT spending will be CRM-related in 2000?

| | | |
|---|---|---|
| 1. Less than 20% | 30 | 68% |
| 2. 20 – 40% | 12 | 27% |
| 3. 41 – 60% | 2 | 5% |
| 4. 61 – 80% | 0 | 0% |
| 5. Greater than 80% | 0 | 0% |
| | **44** | |

The amount of CRM spending devoted to Web initiatives will be

| | | |
|---|---|---|
| 1. Less than 20% | 4 | 9% |
| 2. 20 – 40% | 7 | 16% |
| 3. 41 – 60% | 7 | 16% |
| 4. 61 – 80% | 6 | 14% |
| 5. Greater than 80% | 19 | 44% |
| | **43** | |