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Sharp Microelectronics of the Americas

Creating and Managing the Demand for Semiconductor Components in the American Marketplace

By Geoffrey E. Bock
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Executive Summary

Located near Portland, Oregon, Sharp Microelectronics of the Americas (SMA) creates and manages the demand for discrete electronic components produced by Sharp Corporation's factories in the Far East. Like other electronic component suppliers in the computer hardware industry, it is facing stiff competition from multiple sources. It has relied on the legacy business systems of its parent corporation, Sharp Electronics Corporation in Mahwah, New Jersey, to manage supply-chain information—such as order status, availability, and delivery schedule—with customers and suppliers.

SMA has now embarked on a major e-business initiative to transform both its internal operations and its customer-facing business processes. It is focusing on the underlying customer experience—the flow of information between the factories that produce electronic components and the sales and distribution processes that enable employees to promise shipments and ensure delivery. SMA is rapidly deploying a suite of e-business solutions designed to ensure that sales and marketing professionals have access to the right information at the right time, in support of the engineers and procurement specialists that comprise the division's end-customer base.

SMA is creating a comprehensive suite of applications linked through a Web portal. This portal combines information from multiple sources, organized around business roles and tasks. The lynchpin for its technical architecture is an enterprise application integration (EAI) solution for business process management. SMA relies on the capabilities of an IBM Business Partner—Extricity/Peregrine—and the technical capabilities of its business-to-business integration (B2Bi) solution to exchange critical content among disparate business applications.

SMA is deploying mission-critical business applications, based on a flexible and adaptable e-business architecture. For instance, SMA can now consolidate data from its distribution channels and utilize the resulting information in a variety of business processes on a weekly basis, rather than on a monthly or quarterly one. As a result, financial reconciliation and error correction are more automated and take less time. In addition, product managers can create and manage product information online and communicate with their customers through a dynamic product catalog that displays changes when published.

SMA is beginning to forge electronic connections with some of its direct customers and to integrate customers' order management activities into its own Internet-based e-business infrastructure. SMA is also working with various Sharp corporate sales and marketing groups from around the world (especially Japan) to launch a global supply-chain initiative. This initiative creates direct electronic links with manufacturing operations in the Far East to provide world-wide supply-chain visibility. The B2Bi solution serves as the lynchpin for interconnecting disparate business systems, thus improving supply-chain operations.

Business Context: The Challenges of a Global Corporation

Beyond Consumer Electronics

Sharp is a global brand in consumer electronics. With corporate operations in Osaka, and many of its engineering facilities located in other cities in Japan, the company produces and markets such varied items as microwaves, copiers, air conditioners, televisions, vacuum cleaners, tape decks, DVD players, and video recorders. It manufactures these goods primarily in factories throughout the Far East and then distributes them through a series of wholly-owned subsidiaries located in various geographies around the world. Headquartered in Mahwah, New Jersey, Sharp Electronics Corporation in America is one such subsidiary, charged with marketing, selling, and distributing Sharp products throughout the Western Hemisphere.

Sharp is a vertically integrated corporation. It develops and manufacturers many of the specialized electronic components—such as LCD screens, memory chips, and optoelectronics—that it incorporates into its consumer goods. Sharp also sells in-house designed and manufactured electronic components to other computer and electronics manufacturers. In so doing, the Japanese-based global corporation looks to its regional subsidiaries in Singapore, Europe, and the Americas to manage sales, marketing, and distribution activities to growing microelectronics markets around the world.

Microelectronics Sales and Marketing

Organized as a division of Sharp Electronics, and based outside Portland, Oregon, Sharp Microelectronics of the Americas (SMA) creates and manages the demand for discrete electronic components produced by the corporation's factories in the Far East. It markets and sells custom components designed for specific technical markets, including flat panel displays, flash memory microcontrollers, and system-on-chip devices.

SMA takes orders for Sharp-produced electronic components, tracks shipments from Far-Eastern factories, manages the sale of in-country inventories, and distributes goods to various business customers throughout the United States, Canada, and Central and South America. It is a distribution business operating in an international environment.

Like other electronic component suppliers in the industry, SMA maintains the following three-tiered distribution strategy:

- SMA sells directly to a limited number of major hardware OEM accounts, such as Hewlett-Packard, Cisco Systems, IBM, Lucent Technologies, Motorola, and Dell Computer.

- SMA reaches the broad hardware OEM market by selling through five large distributors: Avnet, All American Semiconductor, Arrow Electronics, Future Electronics, and Reptron Electronics. These firms manage supply chains with vendor-managed inventory, distributor-managed inventory, and customer-managed inventory.

- Finally SMA maintains relationships with over 20 third-party sales organizations (which it calls "rep firms"). Working in combination with local sales and technical support personnel from individual rep firms, SMA reaches customers in specific markets that are looking for local support and assistance in developing electronic designs.

SUMMARY: IBM-RELATED SOLUTIONS AND TECHNOLOGIES

SOLUTION: Major e-business initiative that transforms both internal operations and customer-facing business processes. Initiative integrates internal business operations and begins to link to large customers through B2B process integration.

SOFTWARE: Extricity/Peregrine B2Bi, which IBM now markets as part of WebSphere Business Integrator; Lotus Quickplace; EDI; Screen scraping.

BUSINESS BENEFITS: Enterprise application integration strategy speeds up the flow of information for improved decision making and change management. Rapid deployment of mission-critical business applications on a flexible and adaptable e-business architecture. Substantially improved internal operations, such as financial reconciliation and error correction, which are more automated and take less time. Beginning to improve external operations by forging electronic links with supply-chain partners.

SMA maintains separate marketing operations aligned with such product groups as LCD, memory, optoelectronics, and RF electronics to meet the needs of each of these three channels. In 2001, the division employs roughly 200 people. Illustration 1 summarizes the business landscape for SMA.

Proactive Selling

Creating demand requires ongoing investments in sales and marketing operations. SMA must continually develop new sales opportunities for Sharp-manufactured components, ideally without adding large numbers of sales people and substantially increasing costs. Its sales personnel seek to be more than passive order-takers. They need to work proactively with the design engineers within hardware design organizations who can incorporate the specifications for Sharp components into product designs, and thus generate requirements for large and continuing orders.

SMA also needs to balance availability and inventories by adjusting its prices to match anticipated order flows and factory capacity. SMA staff members need to access a wide range of readily up-to-date operational and market-oriented information about customers' activities.

The Value Proposition: Deploying Strategic Information Resources

As the parent corporation for business operations in North America, Sharp Electronics manages all of its information technology (IT) resources through centrally-controlled enterprise systems. Initially, the company had an internally-implemented IBM S/390 Parallel Enterprise Server. More recently, it has rolled out an SAP R/3 environment, running on IBM AS/400 hardware. Operational information is updated periodically (usually daily or weekly) and then distributed through predefined reports to the operating business units within various divisions. As a separate division within the North American subsidiary, SMA has had to rely on the IT resources of its parent corporation.

Thus, orders and status information for electronic components are compiled and disseminated on a fixed schedule. When customer service agents receive tele-

The Business Landscape for Sharp Microelectronics

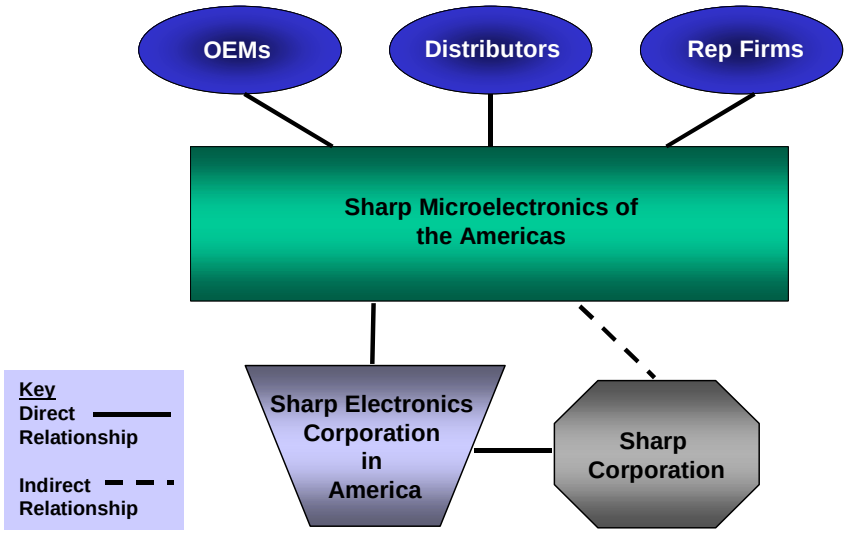

Illustration 1. Sharp Microelectronics of the Americas is a division of Sharp Electronics Corporation in America, the subsidiary established by the Sharp Corporation in Japan to manage sales, marketing, and distribution of Sharp-produced products in North and South America. SMA, in turn, has three customer segments: major hardware OEMs, large distributors, and third-party sales organizations or "rep firms."

phone calls from customers or field sales personnel, they have to log onto the enterprise systems or reference printed reports (created the previous day) for order status and product availability. This is a time-consuming and labor-intensive process which can yield inaccurate or out-of-date information.

As a result, marketers and sales personnel within SMA need better and faster access to information in order to meet customer expectations and locate order-status and product-availability information rapidly. When customers have access to the right information at the right time, they can make timely, informed decisions. Providing accurate, near-real-time product- and order-status information enables SMA to compete effectively in the changing electronics component marketplace.

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The e-business Initiative

Creating a Strategy: Decentralizing Information Resources for Competitive Advantage

Early in 1999, senior managers at SMA realized that, with the advent of the Internet and the Web, they had an opportunity to improve the flow of information across the division's entire supply chain. After attending different seminars and tracking industry trends in the trade press, these executives began to focus on the business benefits of seamless electronic connections and the capabilities of decentralized information resources.

The senior staff concluded that an Internet-enabled infrastructure could enable SMA to develop its own customer-facing IT environment, one particularly attuned to the requirements of competing (effectively) in the electronic components marketplace. Spurred on by leadership from its executive ranks, the division was prepared to invest time and resources to improve its sales, marketing, and distribution operations substantially. All that was missing was the overall strategic plan and the technical leadership to implement the vision of the senior managers.

Don LaVallee began to work with SMA in August 1999—initially as an outside consultant—to develop a strategy for the division's customer-facing activities. By October, he had developed a functional (enterprise-wide) business plan, together with the high-level technology architecture and a corresponding organizational-level implementation plan.

Senior management at SMA approved these plans, as did executives within Sharp Electronics in New Jersey and Sharp Corporation in Osaka. LaVallee formally joined SMA in November 1999 as Director of Strategic Business Operations and Information Technology, with responsibilities to manage the implementation and deployment of the customer-facing business strategy. He is now leading a multi-functional e-business design team, composed of both technologists and business integration specialists, to implement a comprehensive solution.

An Action Plan: Focusing on the Selling Experience

Since SMA's core business depended upon distributing products through multiple channels and business entities, LaVallee and his e-business design team decided to focus on the sales process. In particular, they singled out the underlying customer experience—the flow of information between the factories that produce electronic components and the sales activities that promise delivery. They broke this large and complex task into several components. First, they decided to focus on the collaboration and support of the sales and marketing processes, as well as links to the outbound supply chain. Once these efforts were well underway, the design team planned to focus on the upstream supply chain linking distribution activities with manufacturing.

The design team believed that if the sales and marketing people could be more productive, SMA would be able to meet its core operating objectives: creating expedited business processes while remaining profitable in the dynamic marketplace of electronic components.

GOALS. The e-business design team identified the following three basic goals for SMA's e-business initiative:

- Sales representatives should add new value to the division by spending more time selling and getting to know their customers better.

- The owners of information should have control over how it is used.

- The division should simplify specific business processes and accelerate the flow of relevant information among staff members and their customers.

Decision-making needed to be pushed down through the management chain so that employees could get rapid decisions from management, and management could still maintain control and ensure that sales reps were accountable.

OPERATIONAL OBJECTIVES. The e-business initiative would accomplish the following three operational objectives:

- **Distribute High-Speed, Meaningful Information.** In creating a customer-facing distributed infrastructure, SMA would use computer software and network connectivity to generate meaningful, high-speed, and efficient exchanges of information among people. Electronic workflow would drive this function.

- **Foster Rapid Analysis and Change.** The focus on e-business would provide visibility into things never before seen within SMA's distribution environment and would require rapid analysis and implementation of changes to its business operations. In turn, this would require investments in improved reporting and analysis of online information activities.

- **Increase Employee Involvement.** As a result, Sharp employees would be more involved in analyzing and managing their business processes, rather than just being cogs in the wheels of these processes. This would require significant training of people in the use of analytical tools and methods.

SMA expects to recoup its investment rapidly and validate its decision to make these significant changes in its technology and business infrastructure by dramatically improving its sales and marketing business processes.

AN ENTERPRISE INFRASTRUCTURE. Prior to the e-business initiative, SMA did not have any IT resources of its own. LaVallee thus proposed to implement a comprehensive solution that would address all of the key business requirements, while creating an adaptable IT environment designed to address the requirements of electronic component distribution. The proposed solution used best-of-breed tools from various vendors that supported out-of-the-box functionality. Also included in this strategy was an enterprise integration component to interconnect information flows among various third-party applications.

The entire budget for the first year was $1.8 million—roughly $800,000 for hardware and software and $1 million for technical personnel (programming), deployment, and organizational redesign. The development and integration project was slated to run for twelve months, commencing in April 2000. From November 1999 to April 2000, the e-business team prototyped various solutions, reviewed technology options, and validated the overall design of integrating multiple applications into a comprehensive business system architecture. The first in a series of production rollout began in April 2001.

Recouping Investments in Sales and Marketing Processes

SMA expects to recoup its investment rapidly and validate its decision to make these significant changes in its technology and business infrastructure by dramatically improving its sales and marketing business processes. These processes include the abilities to capture and distribute sales leads and generate sales forecasts from Web-based product catalogs, manage the quote and order process electronically, view product availability accurately, track new sales leads, load forecasted orders into a global supply-chain tracking system, and track the flow of products through an international supply chain.

This solution incorporates the following industrial-strength capabilities:

- Ad hoc collaboration among sales personnel and customers
- Effective content management designed to remove Webmaster bottlenecks
- Customer-focused product selection, together with customer-specific pricing and quoting
- Customer relationship management to track customer orders, status, queries, and leads
- Sales management to track sales activities and lead generation
- Order processing and status information management to track the flow of goods through the supply-chain pipeline
- Supply-chain logistics that link to the shipments from Far-Eastern factories
- Customized integration with the back-office ERP system
- Data warehousing and data reporting capabilities

All of these features and functions will be seamlessly integrated into a comprehensive enterprise infrastructure.

Organizing the Effort

Within SMA, different business functions require varied information resources. For instance, staff members managing the supply chain require access to inventory data as well as demand-planning and allocation-planning applications. Sales personnel need to track sales forecasts (which extract data from supply-chain applications and manufacturing resource planning forecasts) together with marketing data and sales data.

LaVallee and the e-business design team identified the information resources required to support the specific business processes. The e-business team planned to deliver a comprehensive suite of enterprise-wide functional capabilities by managing the information access, presentation, and communications activities for individual operational tasks. The e-business team set out to transform key business interactions—both in terms of how customers would do business with SMA and how employees could communicate and share information with one another. The team sought to focus on both customer-facing and employee-facing activities.

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CUSTOMER-FACING ACTIVITIES. The e-business team wanted to empower SMA customers to take control of their own business information when doing business with the division. For simple but essential activities, customers would have the ability to update their own directory listings, ship-to addresses, account information, and so forth. Moreover, they would be able to search through online catalogs of microelectronic components and find both tailored pricing and availability, based on their market segment and company contacts. This required a variety of technology and business process modifications related to the underlying security infrastructure.

Thus, SMA would know with whom it was interacting electronically and be able to communicate directly with its varied customer segments, providing them with up-to-date information about the components available for purchase and delivery. The increased velocity of customer-oriented product content would increase sales (and maintain profit margins) by linking back-office order-management and supply-chain planning tasks to front-office sales, marketing, and product-distribution activities. Customers would quickly be able to order samples, receive customized quotes, order and check on the status of their transactions, and arrange financing online.

EMPLOYEE-FACING INTERACTIONS. Managing demand and distribution in an international environment requires a complete set of mission-critical enterprise applications. The e-business team expected to launch a

series of applications (linked through a single Web portal) that highlight specific sales, customer-support, marketing, supply-chain planning, and business-operation functions, such as the following:

- The sales organization would have an integrated view of all customers, pricing, and order information. Sales personnel would develop pricing models by product and customer, generate quote requests and secure approvals, check order status and product availability, and process returns.

- The sales organization would also be able to manage and track their own operational activities. Managers and account teams could create and track forecasts, as well as view sales plans, compensation plans, and commissions.

- Supply-chain planners would have ready access to product and program information updates. SMA would maintain near-real-time electronic feeds of product status and availability, quotes, orders, and manufacturing schedules. It would communicate with both upstream and downstream supply-chain partners (such as component-manufacturing factories in the Far East) using EDI, FTP, e-mail, fax, RosettaNet business transaction exchanges, or Web-based browser access—as would be most appropriate for the underlying systems environment.

The lynchpin is an enterprise application integration (EAI) strategy for business process management.

The e-business team anticipated being able to tie together various e-business activities through integrated information flows, based on an enterprise-wide architecture. The team would create a comprehensive Web portal, which would combine information from multiple sources, organized around business roles and tasks. The environment supported extensive workflow capabilities so that people would get the information they needed with two to three clicks.

When fully deployed, the e-business environment would reduce the amount of time and effort required for SMA personnel to find information, make decisions, and respond to individual opportunities. Key to this effort was controlling and managing access to mission-critical information repositories, brought together using robust enterprise application integration capabilities.

Results: Delivering an Adaptable Enterprise-Wide Solution

A Phased Implementation

LaVallee and the e-business team have organized, and are now delivering, a phased implementation of their integrated, enterprise-wide solution. They are using a rapid application design (RAD) methodology which accomplishes the following:

- It quickly specifies the overall business functionality.

- It creates mockups, identifies product requirements, and selects software vendors.

- It develops working prototypes and solution benchmarks that integrate functions across multiple applications.

- It manages the evolution from pilot implementations to full production rollouts with modifications to the base system as required to maintain high levels of functionality and optimized performance.

The end result is still a work in progress. SMA is an organization in the midst of considerable organizational and industry-wide change. Project timelines and business requirements are modified monthly. Employees need to adapt to doing business electronically and learn how to utilize the interactive Web-based environment while also maintaining day-to-day business operations for their current customers. (See Illustration 2 for the e-business timeline.)

Accomplishments to Date

LaVallee and the e-business design team have selected vendors willing to work with them on delivering out-of-the-box and customized functionality that fits the business operations model and technology architecture. They are combining these applications with targeted custom-development efforts. They are integrating appli-

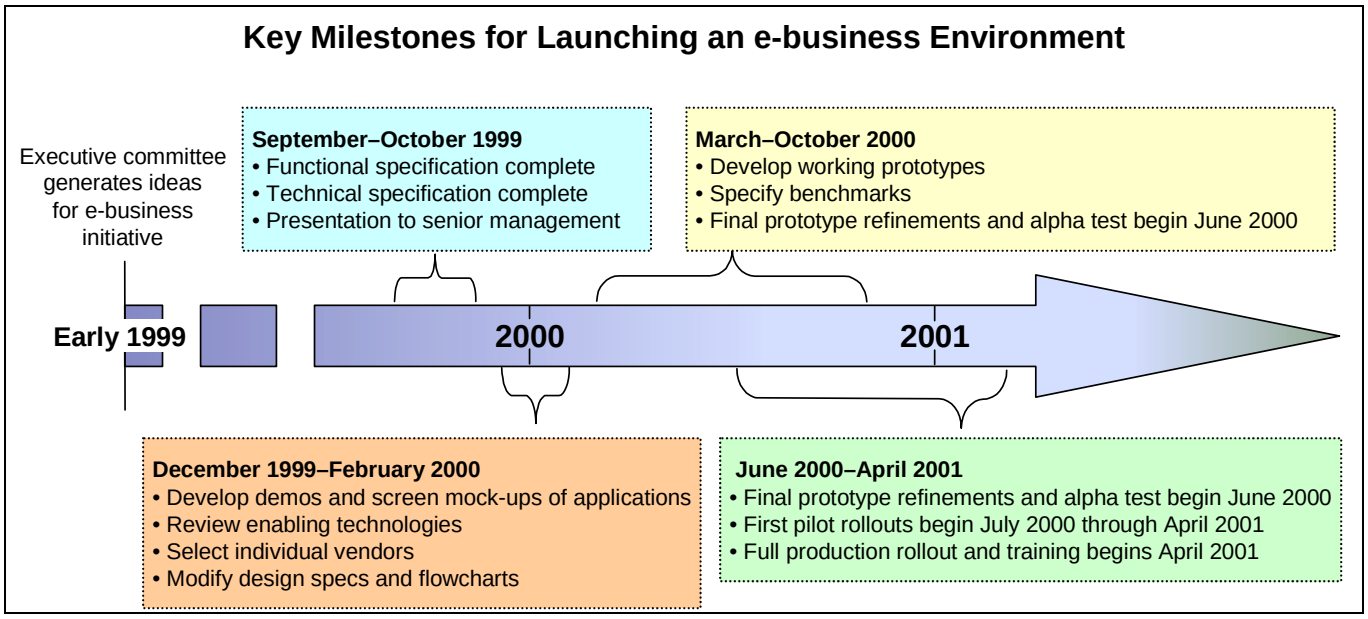

Illustration 2. The e-business environment at SMA has progressed through these stages.

cations and services through a transaction manager and workflow layer in a modular and component fashion. They can readily adapt individual components to a wide variety of changing requirements.

The lynchpin is an enterprise application integration (EAI) strategy for business process management. The e-business team relies on the capabilities of an IBM Business Partner—Extricity/Peregrine—and the technical capabilities of its business-to-business integration (B2Bi) solution to exchange critical content among disparate business applications. IBM now markets the B2Bi solution as part of WebSphere Business Integrator. (We describe the infrastructure in more detail in the sidebar, "Evolving the Technical Infrastructure.")

The team is focusing on initiatives in two strategic areas: supporting sales and distribution processes and creating direct company-to-company connections with key suppliers and large customers.

SUPPORTING SALES AND DISTRIBUTION PROCESSES. The e-business design team has focused on launching an environment to support key sales and distribution processes. This includes the following:

- Integrating point-of-sales (POS) data from distributors directly into the Sharp Microelectronics environment.
- Creating a Web-based quotation system that supports electronic workflows.
- Exchanging production-level order and product data with the IBM enterprise systems located at Sharp Electronics Corporation in America's headquarters. These systems will communicate directly to the factories in the Far East.
- Creating a database-driven component attribute environment on a separate Web site for all SMA component parts where none had existed before.
- Developing customized systems for tracking quotes, sales commissions, and dynamic product pricing capabilities.
- Communicating electronically with key business partners, using the methods that are most appropriate for each individual partner's business systems.

CREATING DIRECT COMPANY-TO-COMPANY CONNECTIONS. The e-business team is developing and deploying an adaptable environment that integrates components from multiple data sources. As a result, the team has been able to demonstrate its ability to link electronically with key business partners using Roset-

taNet partner interface processes (PIPs), EDI, e-mail messaging, or ordinary file transfers.[1] The team has also developed customized direct electronic connections to (and enabled SMA to reinforce a business partnership with) selected wafer manufacturing facilities. SMA is now creating direct electronic links to its build-to-order collaborative supply-chain processes, which will be part of its newly announced North American design center for Sharp-produced microcontroller and system-on-chip products.

This means that SMA now has the necessary technical infrastructure in place for rapidly integrating various operational business processes with those of its key customers and suppliers. Suppliers and customers are beginning to integrate their own electronic business processes with those of SMA. For instance, an OEM is able to request price and availability information electronically for specific Sharp components, receive an automatic reply almost immediately, and then place an electronic order as part of a seamless business process.

As an end result, SMA will be able to create seamless electronic linkages with strategic business partners, based on the strength of individual business agreements. SMA, its suppliers, and its major OEM customers will all benefit from direct company-to-company integration by reducing operational costs and streamlining day-to-day commercial activities.

The Benefits of Business Process Management

LaVallee and his e-business team are banking on a component-based approach to deploy an adaptable infrastructure. They combine a flexible search environment with access to relevant information resources via the Internet. The team needs to synchronize the flow of data among four different repositories continually, organized around sales, marketing, inventory availability, and replenishment information. (See "Evolving the Technical Infrastructure" for a more detailed discussion.)

The EAI strategy is beginning to pay off. "The Extricity/Peregrine B2Bi solution provides the access to various databases," LaVallee observes. "It provides the electronic workflow and the business transaction flow that's generated through the customer-facing applications on the front-end," he continues. As a result, the B2Bi solution leads to the deployment of a flexible environment designed to address a wide range of business problems.

The immediate benefits of business-process management include the following:

- SMA can now consolidate data from its distribution channels and utilize the resulting information in a variety of business processes on a weekly basis, rather than on a monthly or quarterly one.
- A sales engineer with no detailed technical training can access a product data catalog, create a cross-reference table for SMA products, and save this information to a favorites list. Product marketing managers, engineers and procurement managers can then exchange relevant product information in near real-time, on a push or pull basis.
- The e-business environment provides the framework for collecting and distributing sales leads. Business managers can manage these opportunities by simply filling in small amounts of information to move the lead through a sales process, interconnecting people in many geographies and business functions.
- SMA can Web-enable, customize, and deploy its entire order-management system—tracking parts, product information, and availability—by communicating with the corporate enterprise systems that manage the order and replenishment processes with direct customers, distributors, and Sharp factories in the Far East.

[1] RosettaNet is a consortium of more than 400 companies in the information technology, electronic components, and semiconductor manufacturing industries, dedicated to the collaborative development and rapid deployment of Internet-based standards for business-to-business integration. RosettaNet partner interface processes (PIPs) choreograph the exchange of electronic messages between two or more trading partners across the Internet. In effect, individual PIPs define the specific business processes related to order management, collaborative forecasting, or other operational activities.

Evolving the Technical Infrastructure

LaVallee and the e-business team have created an enterprise architecture for integrating business processes. The underlying architecture is based on event-driven transactions, business process rules, and database persistence. It combines customer-facing content with remote access to back-office operational data to create a series of task-specific business portals. This architecture is based on a common message bus to integrate both machine-to-machine interfaces and browser-based end-user access to information seamlessly. (See Illustration 3 for a block-level diagram.)

The e-business environment at SMA relies on a series of databases and electronic data feeds. Some data are stored locally while others are stored remotely on servers around the world, all interconnected by a global corporate intranet. The e-business team has created local databases derived from many of these world-wide data sources to synchronize and organize information about customers, products, and business processes. Some data are accessed from remote sources using a variety of messaging techniques

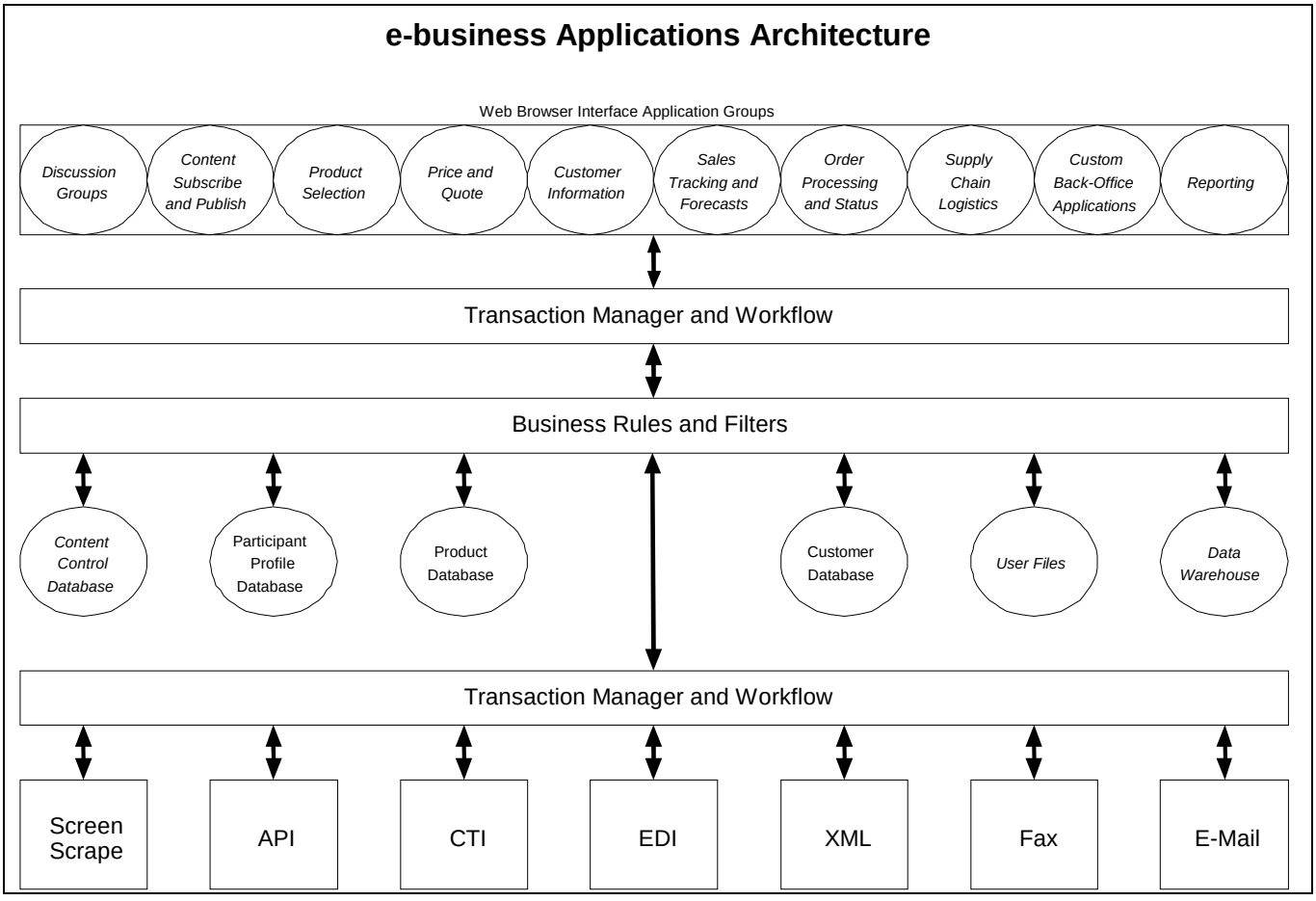

Illustration 3. SMA has implemented a multi-tiered e-business application architecture. This architecture integrates content from multiple internal databases as well as a variety of external data sources, using the transaction manager and workflow capabilities of Extricity/Peregrine's B2Bi solution. As a result, SMA now has a flexible and scalable environment to which it can readily add new data sources and in which it can tailor the distribution of information to different groups within the division, using business rules and filters. People are linked through the Web (at the top of this illustration), while automatic e-business processes occur through machine-level, B2B interfaces (detailed at the bottom of this illustration).

and protocols (EDI, XML, e-mail, or 3270 screen scraping). Specific technical choices depend upon the communications capabilities at remote internal or customer sites.

Whether they are registered customers, business partners, or employees, end users have a consistent user experience while accessing disparate distributed enterprise applications. These people are using a Web portal application built on Java. All of the information individual people need to do their jobs and interact with electronic systems will be accessible through sets of Web page views, accessed by a single log-on. End users can transparently interact with multiple databases and enterprise systems.

Extricity/Peregrine's B2Bi EAI suite provides the underlying glue for the task-based workflow integration. The B2Bi solution includes a self-contained process manager, various adapters for linking to internal applications, and multiple channels for communicating with external applications. It extracts the communications characteristics of a particular channel from the underlying business process to foster seamless integration among multiple enterprise repositories. In particular, as a middleware layer, B2Bi blends access to flat-file repositories (using FTP), message-queued repositories (such as IBM DB2 databases), and transaction interfaces running IBM MQSeries.

As a result, LaVallee and the e-business team will be able to incorporate logistics and product data stored on the company's IBM enterprise systems. They will use Extricity/Peregrine B2Bi, EDI, and screen scraping for linking external systems into the SMA customer-facing environment. Using the B2Bi solution, business-oriented staff members create adapters to access the remote data sources and thus integrate disparate enterprise applications into the B2B infrastructure.

Employees at SMA are continually analyzing and developing initiatives to improve their business processes. Now they can spend more time focusing on integrating their customers' business processes and improving particular strategic-market opportunities because they have easier and more reliable access and visibility to critical business information.

Collaborative Selling through an Extranet

In addition to the B2Bi solution, the e-business team is deploying a collaborative sales environment based on Lotus Domino and its QuickPlace application. This application bridges the gap between mainstream enterprise applications and dynamic electronic-commerce environments that connect people with customized information on a need-to-know basis. Says Bruce Elgort, Manager of Information Technology and a key technical architect on the design team, "Using the flexibility of Lotus Domino and its QuickPlace application, together with our B2Bi capabilities from Extricity/Peregrine, we can quickly integrate ad hoc collaboration with formally-defined business processes."

Sales people can now create and manage their own extranets with their key customers. They can share calendars, design documents, and product content on a self-contained Web site. QuickPlace provides the core content-editing capabilities as well as the permissions, access-control lists, and role definitions to manage how individual people access the site.

Thus, an SMA sales engineer can use QuickPlace to participate in a collaborative design process with product marketing managers and the technical team members working inside a customer account. Individual designers can post product requirements and design milestones. The sales engineer can collect the appropriate content from many online internal resources, create customized reports, post them on the QuickPlace Web site, and participate (sometimes remotely) in ongoing technical design activities.

The sales engineer can seamlessly access the wide range of information resources organized within SMA and then channel the appropriate content to his/her customer's staff members—saving considerable time and effort in the process. All of this collaborative content is stored in electronic format. As a result, business users can easily maintain visibility to all needed and modified content without the assistance of technical Webmasters.

Future Directions: Enhancing the Velocity of Information Flows

Creating Direct Links with Manufacturing Operations in the Far East

The Achilles heal of SMA's e-business initiative revolves around customer forecasting, logistics, and demand-chain planning. Since all of Sharp's manufacturing capabilities are located in the Far East, streamlined electronic connections are essential.

Currently, critical operational information related to manufacturing plans, inventory in transit, replenishment, and shipping schedules flows through the consumer-goods-oriented enterprise systems maintained by Sharp Electronics. Thus, while SMA has considerably enhanced its customer-facing interactions, it still relies on periodic updates and batch processes for its product information, which come from many different systems and sites within the global Sharp Corporation. Not surprisingly, the validity of the entire e-business initiative is only as robust as its weakest link.

LaVallee is now beginning to work directly with Sharp in Japan and with other company sales offices on an initiative to improve world-wide supply-chain management operations. This is being driven by Sharp headquarters in Japan with a view toward improving global supply-chain management operations. In the future, LaVallee expects to implement near-real-time electronic links with operational supply-chain management systems around the world. Key to this effort is SMA's EAI solution—using robust electronic transaction-management capabilities to query private enterprise processes remotely from a network-enabled B2Bi process manager.

Illustration 4 summarizes the state of e-business evolution at SMA.

Synchronizing Product Content

SMA also expects to exchange product-content information automatically with its key customers and design centers around the world, using existing EDI capabilities as well as emerging XML-based standards like RosettaNet. Thus, hardware design engineers within customer organizations will be able to search through internally-maintained product catalogs to identify the most up-to-date electronic components that can be incorporated into their designs.

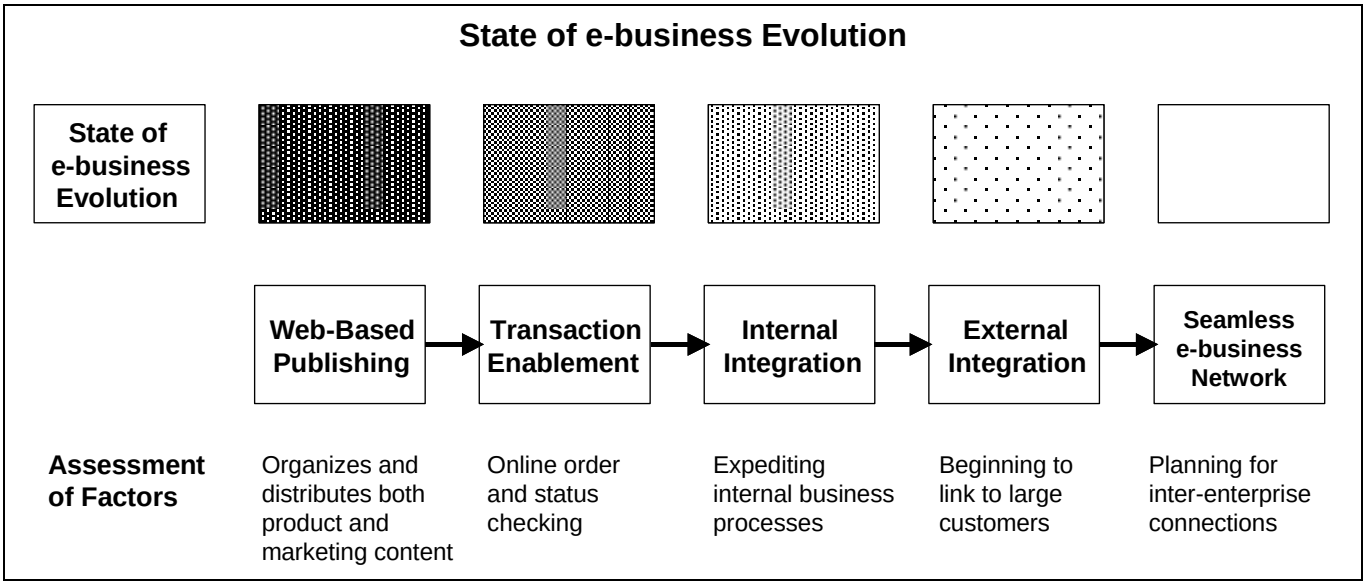

Illustration 4. The e-business environment at SMA substantially enables transactions and integrates a variety of internal business processes. The design team has a number of business-to-business integration initiatives underway to forge direct electronic connections with key business partners. However, external integration efforts are only beginning.

SMA will have the procedures and capabilities in place to synchronize its product data repository automatically within its customers' product-catalog databases. Using industry-standard publish/subscribe techniques in combination with dynamic content display based on validated user logins, SMA will syndicate its product content, following a predefined data schema. Customer organizations will import this syndicated content into their own internally-maintained electronic product catalog.

Accelerating Information Flows within an International Supply Chain

In summary, as the e-business initiatives at SMA gather momentum, LaVallee expects to approach the limits of electronic connections and people. "The limiting factor for B2B commerce will not be the flow of information but the physical transportation of products and people's abilities to deal with the large amounts of information available [in time to take advantage of business opportunities]. You cannot move product through the supply chain any faster than a ship, plane, or truck can carry them. People can only process information and make decisions so fast. At present, however, people and communication processes are still the limiting factor in supply-chain management," he observed. "We want to reduce the amount of time for information to flow between all the systems and people, so that they can quickly make decisions that will affect the physical movement of product and ultimately take the limitations of the physical movement into consideration when optimizing supply-chain flows."

In so doing, SMA is in the process of creating additional customer demand for Sharp-produced electronic components. It is focusing on accelerating the flow of product and logistics information through an international supply chain—linking sales, marketing, and demand-creation activities in the Americas with manufacturing and logistics capabilities in the Far East. The e-business design team is thus making it easier and more profitable for customers to do business with SMA.

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