Framing the IT Services Industry

"Extended Enterprise Applications"

Spotlight Report

Opportunities for
Project-Based Service Providers

Cherry Tree & Co.
Customized investment banking for IT services firms

Presidents, CEOs and CFOs of IT services firms look to Cherry Tree & Co. as their leading provider of in-depth industry information and customized investment banking services. Cherry Tree & Co.'s Web site at www.cherrytreeco.com *puts this timely insight at your fingertips, allowing you to make the most strategic and well-informed business decisions for your company. Cherry Tree exclusively focuses on offering customized service to emerging private IT services firms. Should you wish to discuss growth options or the sale of your business under confidential terms, please call us at 612-893-9012 or e-mail us at info@cherrytreeco.com*

Contents

"Extended Enterprise Applications"
Spotlight Report

ERP + CRM + SCM + EAI = Extended "*e*"Enterprise

This Spotlight Report is Cherry Tree & Co.'s first quarterly research report for 2000 and our first in-depth examination of the "Extended Enterprise." This Spotlight Report is part of a regular series of research reports that are prepared and published by Cherry Tree & Co. Please see our web site at **www.cherrytreeco.com** for additional research published in 1999 regarding Application Service Providers (ASPs), Professional Consulting, Project-Based Service Providers, and IT Staff Augmentation.

We have broadened our coverage for this report to include emerging segments of the extended enterprise software and software integration industries that are creating opportunities for IT services firms. We strongly believe that as new, web-enabled technologies arise to connect traditional enterprise software packages with suppliers, distributors, and customers, a new and more complex set of skills will be demanded of IT services firms to facilitate this evolution.

This report will define the concept of the extended enterprise and explain its relevance to IT services firms. We will then highlight two of the hottest segments in the extended enterprise space — *Customer Relationship Management* and *Supply Chain Management* — to demonstrate how the functionality of corporate IT systems is being extended beyond the "enterprise." We will then review how *Enterprise Application Integration* tools are being utilized in extended enterprise environments to enable the connectivity of multiple applications both within and between businesses.

### *Relevance for Privately Held Firms*

Although we will review the evolution of the underlying technology, the main thrust of this report will center on the enormous opportunities that have been created for External Service Providers (ESPs) by the increased demand for extended enterprise applications. We believe that with proper planning and execution, privately held IT services companies can be well-positioned to take advantage of this new wave of opportunity. Consistent with our previous research, we will conclude this report with potential strategies that private IT services firms can use to exploit these new opportunities. Included in this section will be strategic business development considerations including:

- Partnership opportunities with CRM, SCM, and EAI software vendors;
- How to leverage vertical industry expertise;
- How to leverage an existing ERP implementation practice; and
- Utilizing EAI expertise to open other web application development opportunities

Stock Market Performance

As a component of our quarterly research, Cherry Tree & Co. provides a brief review of the previous twelve months' market performance for all the different IT Services sectors that we follow.[1]

IT Services Composite Stock Price Index
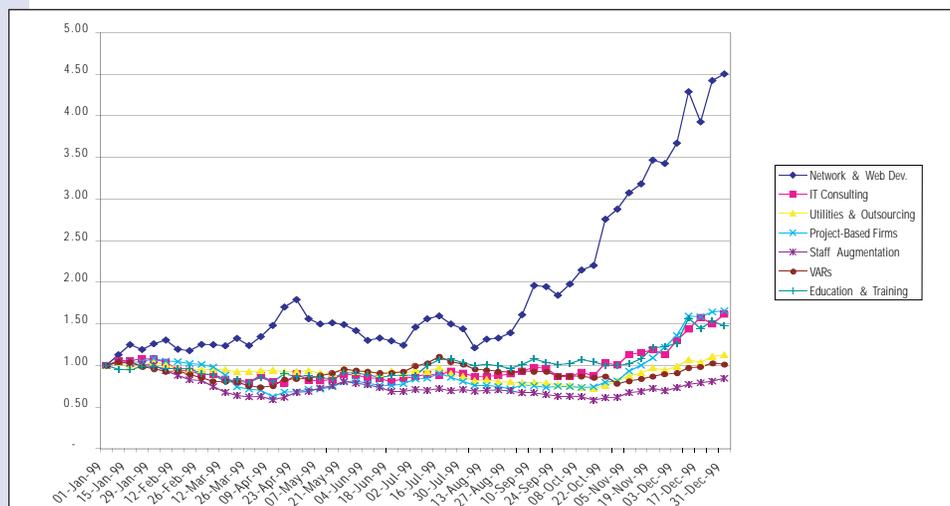
1 A listing of the Cherry Tree & Co. IT Services Universe and Sector Definitions are provided in the appendices to this report.

www.cherrytreeco.com

1

Cherry Tree & Co.

The Network & Web Development companies have been separated from the other Project-Based companies to illustrate Wall Street's ongoing enthusiasm for "all things Internet" as these firms continue to trade at multiples far in excess of their IT Services counterparts. The rest of the IT Services sector has staged a comeback in the last several months, which we fully expect to continue into the foreseeable future. While the Web Development firms continue to dominate the stock market, the IT Consulting companies, Project-Based Service Providers, and Education & Training firms have also performed particularly well.

The Extended Enterprise

Before we jump into our analysis we should first define what we mean by an "extended enterprise." An extended enterprise is a business whose information systems operate within a distributed application architecture. This architecture is arguably the most critical component of the new e-business environment. IDC projections indicate that business-to-business e-commerce revenue is expected to increase from $80 billion in 1999 to over $1 trillion in 2003. Given this explosive growth potential, Cherry Tree & Co. believes that the market for the extended enterprise applications that enable this e-business environment will expand dramatically.

At the core of the extended enterprise sits the core ERP backbone or other core accounting, manufacturing, and HR applications. These applications reside *within* the enterprise and can be described as being primarily *inward* facing applications that track the *internal* flow of information. An enterprise starts to become "extended" when its information systems face *outward* by enabling connectivity with customers, suppliers, and distributors. Examples of extended enterprise applications include **Customer Relationship Management (CRM)** and **Supply Chain Management (SCM)** software that will be described in detail below. A company completes its evolution and becomes a truly extended enterprise when this connectivity with its business partners becomes fully integrated into its ERP backbone. Notably, this final step in the evolution is the missing link for most companies since this integration task has been very elusive even for the most highly respected systems integrators.

Figure 1.
"The Extended Enterprise"
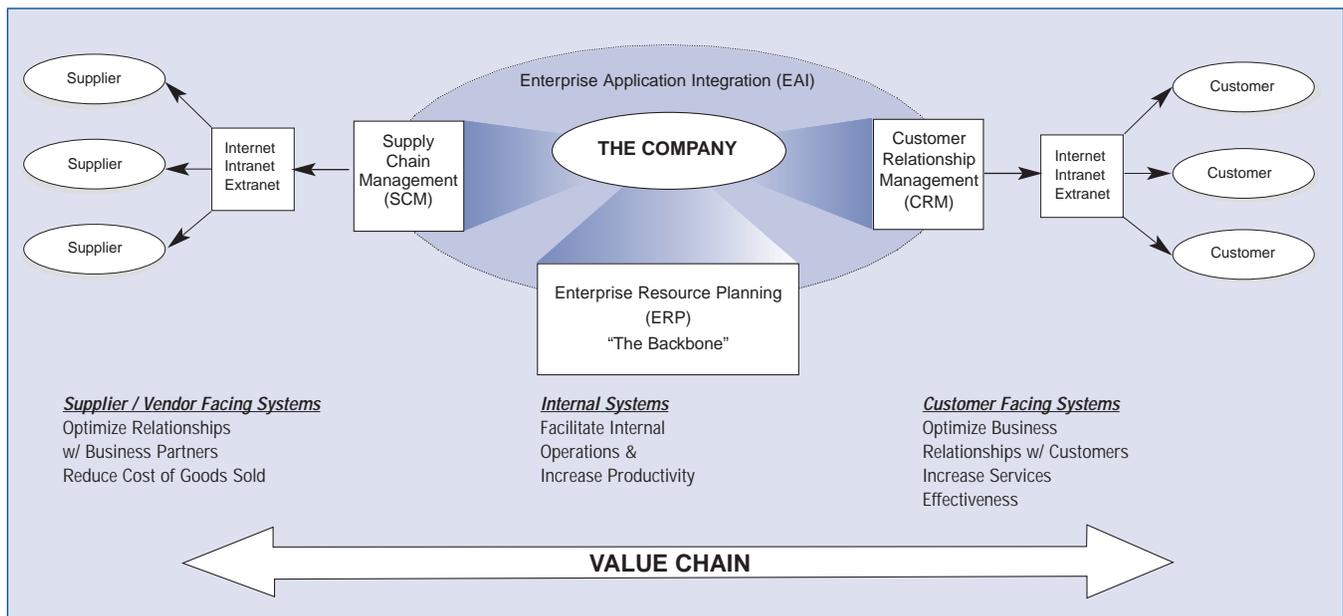
Source: Cherry Tree & Co. Research

As we have illustrated in **Figure 1**, traditional ERP packages are now being viewed **not** as a comprehensive solution but as the backbone to which customer- and supplier-facing applications may be linked as a means of extending the functionality of enterprise software. Once accomplished, the complete connectivity between the sales and supply chain arms of the business will manifest itself in a fully-integrated "Value Chain" - indicative of the value that each component of the business adds during the delivery of products and services to the client. While the traditional large ERP software providers recognize this trend and are rushing to add this capability to their product offerings, a new group of packaged software providers have emerged as early leaders in these segments.

Extended Enterprise Applications Overview

Extended Enterprise Applications and Tools:
Three "Hot Zones"

We are well aware of the fact that the extended enterprise software market encompasses a number of categories of applications designed to connect with and extend an enterprise's ERP backbone. To restrict our discussion of this market to only three segments may appear to be something of an oversimplification. Nonetheless, we have chosen to confine our focus to two high-growth, high-profile areas — **Customer Relationship Management** and **Supply Chain Management** — and one emerging area — **Enterprise Application Integration** — as it is our belief that these three segments are highly relevant to the owners of IT services firms. These segments can be described as follows:

## 1. Customer Relationship Management

Overview

Customer Relationship Management (CRM) applications are front-end tools designed to facilitate the capture, consolidation, analysis, and enterprise-wide dissemination of data from existing and potential customers. This process occurs throughout the marketing, sales, and service stages, with the objective of better understanding one's customers and anticipating their interest in an enterprise's products and/or services. A CRM software deployment has two primary goals:

1. *Enable the company to more effectively identify, contact, and acquire new customers.* Certain CRM applications automate the process of generating customer and market profiles, tracking marketing campaigns across a variety of media, and managing the quote/proposal process through negotiation to close. By accelerating and refining the process by which prospective clients are identified, these applications allow companies to focus limited marketing resources on the most promising target markets and thus maximize top-line growth.

2. *Leverage existing customer relationships.* The two primary means of accomplishing this task are identifying cross-selling opportunities and increasing retention through improved post-sale service. By tracking and analyzing sales patterns, CRM applications are able to generate suggestions for the cross-selling of higher value-added services to existing customers based upon past purchasing behavior. Other applications document all post-close service- and support-related interactions with customers, enabling the enterprise to provide improved technical assistance and anticipate demand for customer service. Given the fact that the cost of acquiring a new customer is many times that of retaining an existing one, these retention-focused applications are becoming increasingly critical.

To accomplish these objectives, a fully integrated CRM system obtains data from any number of customer touchpoints (e.g. phone contact with a salesperson, interaction with the enterprise's Web site, responses to mail or e-mail marketing materials, etc.) and consolidates the information into a central data reservoir. Once collected, stored, and organized, this information can be analyzed and accessed in a number of ways by various users within the enterprise — as shown in **Figure 2.**

Figure 2.
CRM Process Diagram
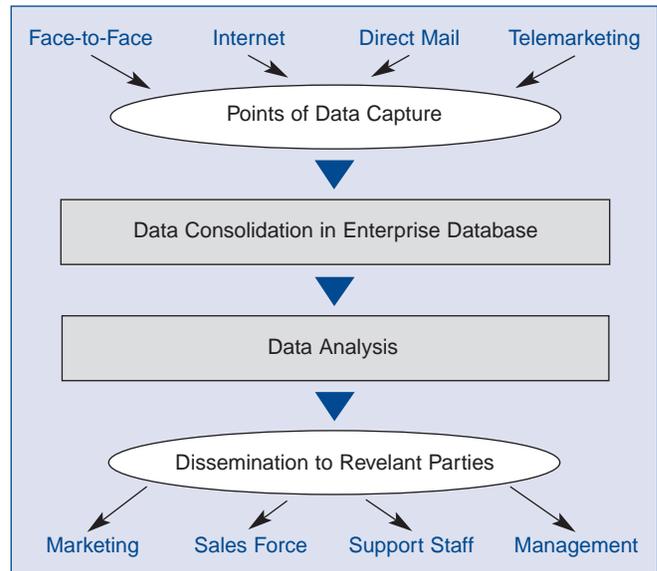
Source: Cherry Tree & Co. Research

Cherry Tree & Co.

The central value proposition of a comprehensive CRM system is the ability to seamlessly integrate customer information from across the enterprise into a user-friendly, real-time format, and transform the entire enterprise into a single integrated sales network. This model requires sufficient cohesion such that at every instance of contact with a customer or prospect, enterprise personnel have access to a comprehensive overview of the marketing/sales/service relationship. Such an overview would include but would not be limited to the customer/prospect's initial contact with the enterprise, their current status within the sales cycle, account status, post-sale interactions with customer service and support personnel, and suggestions for additional sales opportunities based upon previous purchases and inquiries.

Segmenting the CRM Landscape

Cherry Tree & Co. has identified three major segments within the broader CRM market: Marketing Automation, Sales Force Automation, and Customer Service & Support. Although several major vendors in the CRM space attempt to offer comprehensive customer relationship software suites (e.g. *Siebel* and *Vantive*), most major players tend to specialize in one of these sub-sectors (a detailed segmentation of CRM vendors may be found in Appendix 3).

• **Marketing Automation** applications optimize an enterprise's marketing process, with the objective of allocating resources to target markets with the highest potential value. These applications, which evolved from earlier data mining and database marketing systems, assist in the planning and execution of marketing campaigns by managing customer and market profiles, identifying target markets with high revenue and profitability potential, generating leads, selecting appropriate contact media (i.e. mail, phone, print ads) and tracking initial customer contact efforts across these channels.

• **Sales Force Automation** software manages and optimizes an enterprise's sales cycle, increasing its productivity by accelerating the contracting process and improving revenue velocity. These applications manage and track the presentation and negotiation process, generate product/service proposals and preliminary quotes, and create final sales packages based on automated price and product configuration. They also link the enterprise's sales force (field and internal) with the corporate office and enterprise database, and facilitate improved communications between the sales force and management.

• **Customer Service & Support** applications developed apart from other CRM packages as automated help desk and call center systems but are in the midst of a convergence with other customer-centric software packages. These systems were originally custom-designed to reduce headcount in an enterprise's customer service/technical support department by automating such functions as order tracking and account status checks. Today these applications offer advanced customer service centers integrated with other front-office applications and are capable of receiving and tracking customer requests and feedback from a variety of communication channels. The primary objective of these capabilities is to document all post-close interactions with the enterprise's client base in order to maximize customer satisfaction and retention while minimizing customer service staff.

CRM Software Market Forecast

As shown in **Figure 3**, the CRM packaged software market is expected to continue expanding dramatically. The US market alone is expected to grow at a compounded annual growth rate of nearly 50 percent through the next five years, from $2.3 billion in 1998 to almost $17 billion by 2003.

Figure 3.
US CRM Software Market Forecast
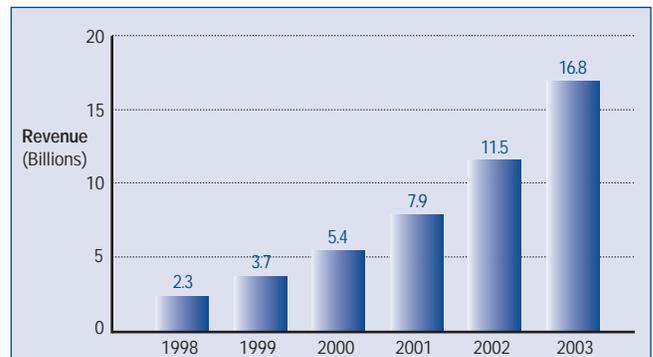
Source: AMR Research

Implications for External Service Providers

The exploding demand for web-enabled CRM applications is creating a myriad of opportunities for services companies to add value. Quite simply, demand for CRM-related services far outstrips available talent, and in-house IT departments are generally incapable of providing the intellectual capital needed to implement such complex applications. This disparity between corporate needs and available resources will continue to drive tremendous demand for CRM-oriented implementation and integration services.

As shown in **Figure 4**, CRM-related services represent a growing opportunity. Gartner Group estimates that through 2004, 80 percent of enterprise-level CRM initiatives will be outsourced to External Service Providers, and IDC forecasts that the global CRM services market (including consulting, systems integration, outsourcing, and training) will reach nearly $90 billion by 2003.

Figure 4.
CRM Services Forecast
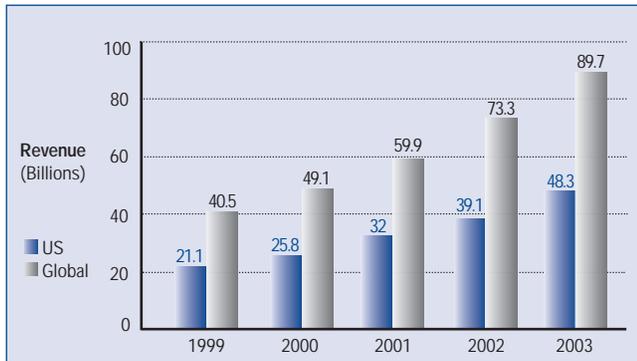
Source: IDC and Cherry Tree & Co. Research

The high-end of the CRM services market is currently dominated by the usual systems integration giants — *Andersen Consulting, Deloitte & Touche, PricewaterhouseCoopers,* and the like. However, Cherry Tree & Co. is of the opinion that more agile, focused firms have the opportunity to compete effectively with the generalists to be the service providers of choice by taking advantage of several trends detailed below.

• **Enterprises Face a Complex CRM Environment.** Given the extreme complexity behind the development and implementation of CRM applications, it will be difficult for any single software vendor to offer a comprehensive solution that provides complete functionality across all segments of the customer relationship spectrum. There are simply too many variables to take into account across industries, business processes, and functional requirements for any one vendor to emerge with the definitive CRM package.

While certain firms that are more conservative in their adoption of new technologies may be content with the basic functionality provided by generic application suites, we believe many enterprises will turn to "best-of-breed" applications from specialized vendors. Gartner Group research confirms this trend and indicates that over the next four to five years, a variety of factors, including industry-specific requirements, business process and functionality require-ments, and various financial and cultural influences will drive procurement of multiple CRM components from different vendors.

Seamlessly linking all of these components is an extremely complicated process that will drive demand for customized integration work performed by services providers with demonstrated domain expertise in CRM applications. A small- to mid-size firm with a solid track record of providing specialized CRM services in accordance with deep functionality requirements will often present a much more compelling value proposition to a prospective client than a larger systems integration generalist. While it is probably unrealistic to expect private ESPs to win Fortune 500 engagements over the largest consultancies on a

regular basis, the opportunity exists for these firms to establish a defensible niche with mid-market companies and begin to make inroads towards the larger corporate clients.

• **There is a Growing Need for Vertical Market Expertise.** The complexity of the technological environment created by the use of best-of-breed solutions as discussed above will be compounded by an enterprise's need for industry-specific expertise. As the CRM software market develops and matures, vendors will be forced by widely varying user requirements across industries to offer applications tailored to specific vertical markets. It is highly unlikely, for example, that a discount retailer could effectively use the same Sales Force Automation application as a high-end financial services firm tracking investment, credit, and insurance information; the relevant customer data points and purchase behavior patterns are simply too divergent for any one application to track and analyze.

As CRM software vendors tailor their products to meet industry-specific requirements, this trend will fuel demand for ESPs to develop similarly tailored service offerings. Competitive differentiation through vertical focus has always been a sound strategy for firms seeking to add value, and it becomes even more compelling given the significant customer relationship challenges we see in certain markets.

Demand for CRM applications is especially pronounced in those industries that have undergone major shifts in their competitive environment, as deregulation, consolidation, and the rise of Internet commerce have dramatically intensified competition. For example, in the financial services industry, the elimination of regulatory barriers between commercial banking, insurance, and securities, along with increasing industry consolidation and the rise of new sales and delivery channels (e.g. online banking and stock trading), has significantly intensified competition for customers among full-service financial institutions. The rise of the comprehensive "financial supermarket" has created a need for these firms to transition from a product-centered business model to a customer-centric, integrated financial services delivery system facilitated by CRM technology.

For private IT services firms, the development of core competencies based on these and other vertical markets should prove to be an effective means by which to add value and create competitive advantage through strategic differentiation.

Cherry Tree & Co.

2. Supply Chain Management

Overview

Supply Chain Management (SCM) packages are back-end applications designed to link suppliers, manufacturers, distributors, and resellers in a cohesive production and distribution network and thus allow an enterprise to track and streamline the flow of materials and data through the process of manufacturing and distribution to customers. SCM applications represent a significant evolution from previous enterprise planning systems, such as MRP, in terms of their ability to integrate an enterprise's business partners into the production process. By enabling greater data sharing between these supply chain partners, SCM applications improve production efficiency and flexibility. The three primary goals of an SCM system are:

1. *Decrease inventory costs by matching production to demand.* SCM forecasting applications utilize extremely complex planning algorithms to predict demand based upon information stored in the company database. These applications also incorporate any changes in supply chain data into the forecast much faster than previous modes of calculation, allowing companies to more accurately predict demand patterns and schedule production accordingly.

2. *Reduce overall production costs by streamlining the flow of goods through the production process and by improving information flow between an enterprise, its suppliers, and its distributors.* Logistics-oriented systems such as transportation management, warehouse management, and factory scheduling applications all contribute to reduced production costs. By ensuring real-time connectivity between the various parties in a supply chain, these applications decrease idle time, reduce the need to store inventory, and prevent bottlenecks in the production process.

3. *Improve customer satisfaction by offering increased speed and adaptability*. SCM applications allow enterprises to reduce lead times, increase quality, and offer greater customization, enhancing the customer relationship and improving retention.

The SCM process begins with forecasting and data mining applications analyzing information consolidated in the enterprise's database. Planning algorithms are used to generate a demand forecast upon which to base subsequent procurement orders and production schedules. **Figure 5** illustrates this process.

Figure 5.
Simplified Supply Chain
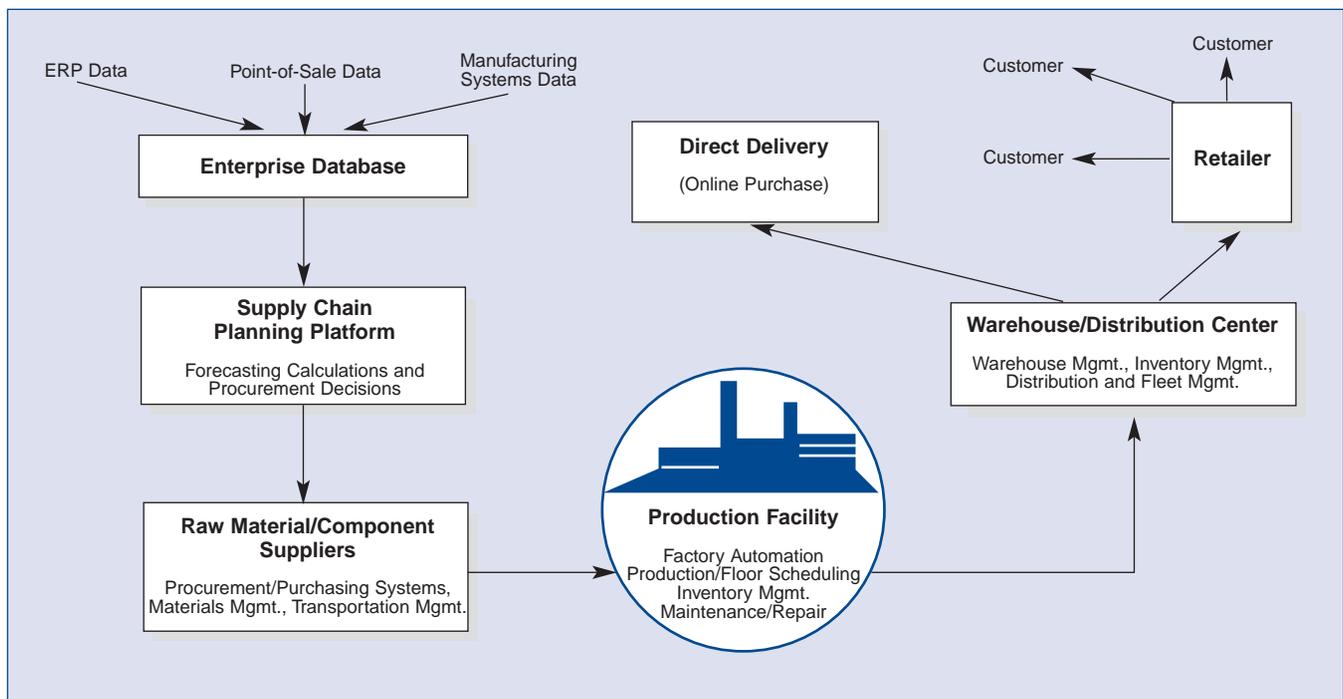
Source: Cherry Tree & Co. Research

Cherry Tree & Co.

Supply Chain Management represents the convergence of all facets of the manufacturing and sales process: anticipated demand, production and storage capacity, capital resources, time constraints, and profitability objectives. The value proposition of a SCM application is the capacity to integrate suppliers, manufacturers, and distributors into a dynamic Internet-, intranet-, or extranet-enabled system that takes all of these factors into account.

Through the increased collaboration between supply chain partners permitted by such a system, an enterprise in effect extends its operational boundaries. Suppliers are better able to anticipate the enterprise's need for materials, the enterprise is better able to schedule production processes and manage inventory levels, transportation companies are better able to coordinate material delivery and product distribution, and customers are better able to place and track orders.

Segmenting the SCM Landscape

We have segmented the Supply Chain Management market into two sectors: Supply Chain Planning (SCP) and Supply Chain Execution (SCE). Although SCM market leader *i2 Technologies* is expanding beyond its core SCP business into SCE and even some customer-facing offerings, most SCM firms have remained specialists in one sector or the other (a full segmentation of SCM vendors may be found in Appendix 3).

• **Supply Chain Planning** applications are tools used to access and analyze information stored in the company database in order to forecast product demand and plan manufacturing accordingly. Sophisticated computing platforms run data through extremely complex planning algorithms and optimization routines in a comparatively short time frame to produce anticipated demand figures and corresponding procurement and scheduling requirements, the calculation of which used to take days. These systems may be applied to both operational decisions (such as shop-floor scheduling) and long-term strategies (such as factory construction and quarterly forecasting).

• **Supply Chain Execution** applications use the information generated by SCP tools to guide the physical production, storage, and movement of raw materials, assembly components, and completed products. These applications are able to interface with SCP and order management systems to determine production capacity, including cost or time constraints, and calculate a production plan which satisfies all requirements and can adapt quickly to any change in variables.

Both Supply Chain Planning and Supply Chain Execution applications can be further segmented along functional lines. While the scope of this report does not permit an in-depth exploration of these subdivisions, **Figure 6** illustrates the major points of functionality involved.

Figure 6.
Supply Chain Functionality by Segment
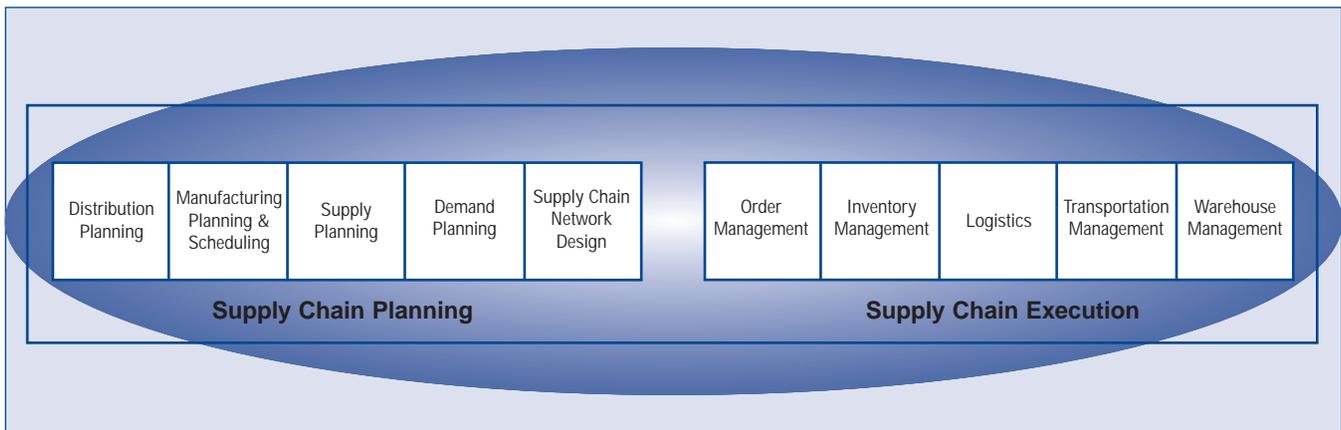
Source: Cherry Tree & Co. Research

Cherry Tree & Co.

SCM Software Market Forecast

As is the case in the CRM market, demand for Supply Chain Management applications is expected to continue its rapid growth. The US market is expected to expand at a compound annual growth rate of almost 50 percent and reach an estimated total value in excess of $18 billion by 2003.

**Figure 7.**
US SCM Software Market Forecast
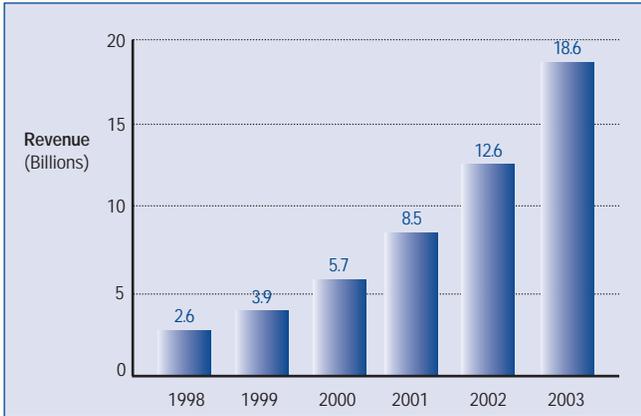
Source: AMR and Cherry Tree & Co. Research

Implications for External Services Providers

The market for supply chain solutions, much like the CRM market, is a case of too much demand chasing too little talent. In addition to the enormous challenges associated with integrating web-based back-end applications with legacy mainframe and client/server systems, SCM adopters face the daunting task of linking their systems with those of their supply chain partners. Internal IT divisions rarely have either the staff or the technical knowledge to deal with this level of complexity. **Figure 8** illustrates the exploding demand for SCM services provided by ESPs.

Figure 8.
SCM Services Forecast
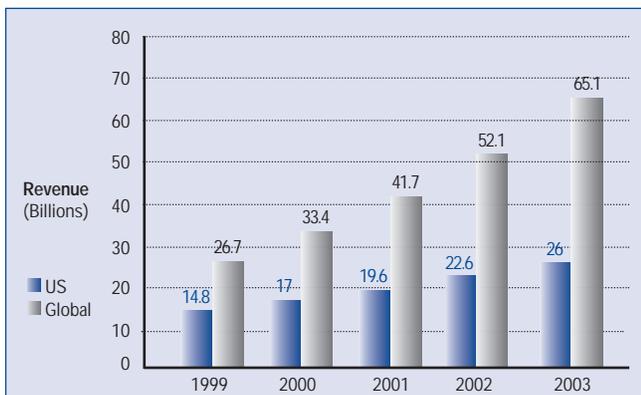
Source: IDC and Cherry Tree & Co. Research

As is the case in the CRM market, Cherry Tree & Co. believes that private ESPs are well-positioned to compete for supply chain engagements, particularly in the middle market. Several factors are creating dramatic opportunities for services firms that are willing and able to develop significant SCM competencies.

- **Enterprises Face a Challenge in Integrating IT Systems with Supply Chain Partners.** Linking a Supply Chain Management system to an enterprise's legacy ERP applications and other internal systems is only the first step in a painstaking and complex process. The bulk of the implementation work occurs beyond the boundaries of the enterprise and involves the integration of the SCM application with the systems of an enterprise's supply chain partners: raw materials and component suppliers, distributors, and shippers. Full integration involves linking incompatible and heretofore non-communicative software, hardware, and infrastructure systems. This connectivity increases collaboration in the forecasting, purchasing, production, and inventory management processes, and in synchronizing delivery and distribution schedules.

The difficulties associated with this task can be exacerbated depending on the financial condition, level of technical sophistication, and overall mindset of the supply chain partner. Partners constrained by financial, technological and cultural considerations can complicate integration immensely. Increasingly, SCM adopters will require the services of specialized integration partners who have the technical knowledge and experience to effectively surmount these and other obstacles.

- **Reconciling the Disparity Between Customer Functionality Demands and Vendor Offerings.** As adoption of SCM systems accelerates, customers are increasingly demanding both Supply Chain Planning and Supply Chain Execution functionality in their back-end systems. These demands have led to a disconnect between the solutions desired by the marketplace and the solutions that vendors are actually capable of providing; although certain SCP vendors are beginning to branch into SCE applications, the supply chain market is far from fielding a unified SCM suite encompassing both planning and execution.

In addition, there is a lack of complete functionality even within the SCE segment, as the major vendors have yet to offer a fully functional execution suite spanning inventory, warehouse, and transportation management. In order to bridge the gap between functionality desired and functionality available, enterprises often purchase from multiple supply chain software vendors, which requires work performed by ESPs to ensure compatibility and full integration. With the introduction of the first comprehensive SCM suite several years out, we expect demand for integration services to remain strong for the near- to medium-term.

Cherry Tree & Co.

www.cherrytreeco.com

• **Vertical Market Expertise and Familiarity with Business Processes are Increasingly Critical.** The supply chain functionality required by a given enterprise varies widely across vertical markets. Discrete manufacturing demands different production optimization techniques than process manufacturing, and inventories of consumer goods cannot be managed in the same manner as inventories of industrial components. As the SCM market matures, it will mirror the CRM market in that applications will become increasingly specialized along vertical industry lines, fueling demand for vertically focused service providers.

Since SCM solutions have implications for both cost-containment and revenue enhancement, demand is strongest in those industries in which increasing competition has resulted in a need to enhance growth and margins through improved inventory and production methods. As an example, the wholesale/retail distribution sector, which has been comparatively slow in implementing supply chain solutions, is being forced to transition to a more agile production model as Internet vendors with fully integrated supply chains chip away at traditional retailers' top- and bottom-line growth. As a result, distributors will increasingly require SCM implementation to improve logistics, enhance supply chain collaboration, and thus bolster their margins and regain market share.

Cherry Tree & Co. believes that a growing number of SCM-related consulting and integration engagements will be awarded based on vertical market experience and that private services firms that move quickly to establish themselves within a set of vertical markets will have a distinct advantage over their competitors.

3. Enterprise Application Integration

Overview

Despite the value that extended enterprise applications such as CRM and SCM bring to the table, their full potential can never be realized without the technological "glue" that integrates them into the core of the enterprise. Most legacy or client/server-based enterprise applications, whether packaged or customized, were not designed to inter-operate with external applications or browser-based, end-user clients.

Consider that the vast majority of web applications augment rather than replace existing transaction management systems. This integration challenge often results in disconnected applications throughout an enterprise that are referred to in a number of different ways including "stovepipes," "islands of automation," and "vertical application silos." These islands of automation, in their native state, are oblivious to what exists outside of their domain. In order to solve this problem, a diverse set of tools and technologies have evolved out of the general category of middleware that are loosely grouped together under the rubric of Enterprise Application Integration — or EAI.

Differentiating EAI from Traditional Middleware Solutions

It is critical to understand that EAI and traditional middleware solutions are not one in the same. Whereas traditional middleware facilitates the integration of individual applications and discrete transactions between them, EAI enables an enterprise to manage relationships among multiple applications and the surrounding network of transactions that constitute a business process. To better illustrate the difference between EAI and integration utilizing traditional middleware it is helpful to think through a couple of different integration examples. In **Figure 9**, we have selected a CRM / Sales Force Automation example to highlight the two different types of integration challenges that can arise during the utilization of the same web-based application.

Cherry Tree & Co.

Figure 9.
Sales Force Automation Integration Challenges

	Scenario #1	Scenario #2
End-User Request	Sales Person Checks Status of Order	Sales Person Requests an Order Configuration
Integration Requirements	"Front-to-Back Office" "Tightly Integrated" "Straight Through Processing"	"Multiple Applications"
What is Automated?	A Discrete Task or Transaction	The Ordering of Transactions or Discrete Tasks in the Form of a Business Process
Technology Utilized	**Traditional Middleware**	**EAI/Businessware**

Source: Cherry Tree & Co. Research

Although our example is a bit of an oversimplification, the central point made in Figure 9 is that different integration challenges arise depending on how the sales force automation application is utilized. In **Scenario #1,** the sales person uses his/her browser to check the status of a customer order. This end-user request drives a tightly integrated front-to-back office communication that can be thought of as a discrete task. The computer processing required to answer this question can be thought of as an extended transaction. This type of "straight-through" processing between two programs requires the use of traditional middleware products. The advent of the Internet as a platform does not eliminate this type of integration challenge — in fact, it increases the volume of end-user requests that drive the need for this type of integration. While this type of integration is absolutely crucial for the utilization of Web-based applications, **this type of integration is not EAI.** Although we are not including this type of integration within our definition of EAI, we do not want the reader to lose sight of the fact that there is also a tremendous demand for consultants who can effectuate tightly-coupled / point-to-point integration between front-end Web-based applications and back-end legacy systems.

In **Scenario #2,** the salesperson requests that an order be configured for a customer. Order configuration, once broken down into all of its component parts, can be thought of as 5 or 10 or 20 different discrete transactions that, when grouped together, constitute a business process. Depending on the situation, the processing of all of the different discrete tasks that constitute a business process - such as order configuration - will require communication between several applications. A new brand of middleware, often referred to as businessware, has recently been introduced that enables business process automation by integrating numerous applications. **It is essential to keep in mind that it is the chaining together of discrete transactions, in the form of a business process, from one application to the next that constitutes EAI.**

Before we move forward, we do not intend to suggest that it is impossible to accomplish EAI through the utilization of traditional middleware products. As we have discussed below, the amount of custom coding required to effectuate EAI with traditional middleware far surpasses that required through the utilization of businessware.

Perhaps the hottest new area within EAI is what IDC refers to as businessware - we have adopted their terminology for purposes of this analysis. To illustrate the anticipated value that businessware products bring to the table, consider the following growth statistics published by IDC:

Figure 10.
Middleware & Businessware Growth Projections

Middleware & Businessware Revenues: 1998-2003

■ 2003   ■ 1998

Legacyware	750 / 200
Data Access Middleware	1200 / 800
Message-Oriented Middleware	800 / 400
Transaction Server Middleware	3100 / 800
Object Middleware	800 / 175
Businessware	5400 / 220
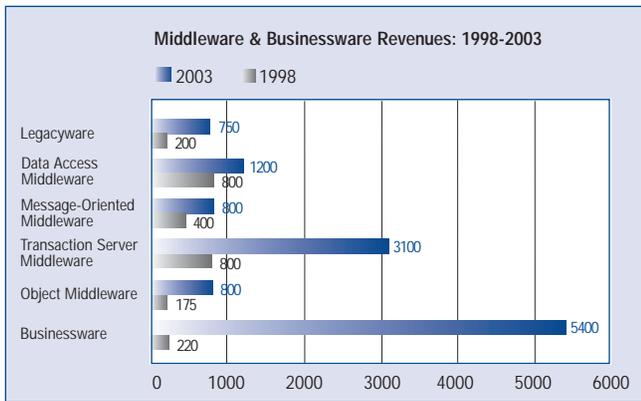
Source: IDC

Although favorable growth has been projected for several of the middleware product segments, we cannot give each of these equal time within the framework of this report. Instead, we will focus primarily on businessware as we believe it will become the most integral component of the new EAI paradigm.

In essence, EAI can be thought of as a hierarchy of functionality that is predominantly controlled by the new businessware products as shown in **Figure 11** below:

Figure 11.
EAI Hierarchy

Business Process Layer

Business Rules Layer
Intelligent-routing —Event Driven Processing

Data Transformation Layer
XML-enabled

Businessware

Transportation Layer

Message-Oriented Middleware
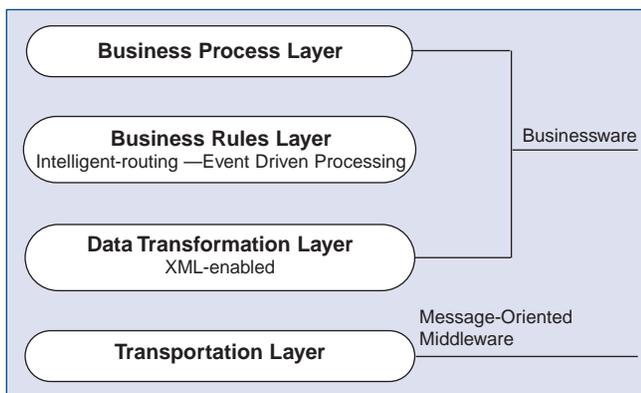
Source: Cherry Tree & Co. Research

Our illustration of the EAI hierarchy starts with the business process layer on top. At its highest level, EAI is being facilitated through the use of businessware. The business process layer enables configuration of communications between disparate applications in a manner that automates, or replicates, a business process.

The business rules layer is also controlled by many of the businessware products. The rules layer dictates the rules that are utilized to perform the tasks in the bottom two layers — data transformation and message transportation. The rules layer is associated with the event driven processing component of businessware that we will describe more fully below.

The data transformation layer interprets and transforms the large number of different types of data into a usable format that can be communicated between applications. When XML is mentioned in the context of EAI, it is typically in reference to this process. Most businessware and traditional middleware products are now embedding XML functionality into their product offerings. Finally, the transportation layer, consisting primarily of message-oriented middleware, handles routing of messages and guarantees delivery of messages between applications. Within our EAI hierarchy, the transportation layer is the only layer that arguably falls outside of the domain of businessware and into the realm of message-oriented-middleware.

The dramatic growth projected for businessware is predicated on the fact that these products offer three unique value propositions that can be summed up as follows:

1. Application integration within an independent system infrastructure;
2. Event driven processing; and
3. Business process automation.

1. Application Integration Within Independent System Infrastructure

As mentioned above, the integration challenge centers on uniting the many different "islands of automation" that exist within an enterprise. Businessware vendors have taken the position that the only real solution to this problem is to facilitate integration without introducing conditions that lead to new islands of automation — which is often the case when individual Application Program Interfaces (API's) are authored for point-to-point integration of two programs.

Cherry Tree & Co.

In this vein, businessware contemplates an independent system infrastructure designed specifically for the integration task. By "unbundling" or "decoupling" the integration task a new "thin" computing layer is created. In the context of an Internet-enabled "n-tier" architecture, an enterprise's distributed application architecture can be illustrated as follows:

Figure 12.
Distributed Application Architecture

Thin Client/ Applications Sitting on Desktop	Business Logic/ Supported by Transaction Server Middleware	Database Logic	Application Integration (EAI)
1st Tier	**2nd Tier**	**3rd Tier**	**nth Tier**
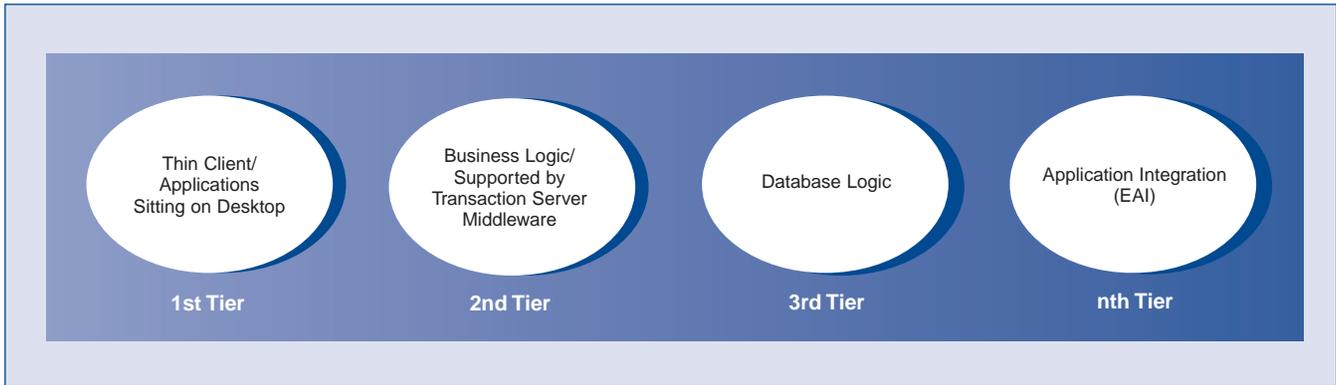
Source: Cherry Tree & Co. Research

In this vision of a distributed application architecture, the role of application integration receives its own tier or layer of computing power. This has several advantages, not the least of which is the realization of integration without interfering with the stovepipe application's ability to operate unchanged in its native environment. In addition, separate processing power can be directed at the integration tier as needed. Finally, by centralizing the application integration infrastructure in a generalized businessware solution, the cost to develop and maintain integration scenarios is greatly reduced.

2. Event Driven Processing

In the vocabulary of businessware, a "business event" is a piece of information generated by an application (such as an order entry by a customer) that must be shared with other applications (such as a requisition system with a supplier). Middleware has facilitated the transportation of this information on a point-to-point basis for a long time with the assistance of considerable custom coding. Today, businessware allows business analysts, not custom developers, to configure applications so that the "business events," once published into the separate integration infrastructure, become available to all of the other applications within the enterprise that have a need to be aware of the "business event" — hence the phrase event driven processing. The fundamental concept of integration has not changed dramatically with the advent of businessware — only the ease with which it can be executed between multiple applications without the need for point-to-point integration. The relative ease with which inter-application processing can be configured, without an army of custom coders, is a significant value-added for companies seeking connectivity between a host of web-applications and core systems.

3. Business Process Automation

Businessware automates business processes by again taking advantage of the separate tier of computing for the integration infrastructure. Simply put, rather than having business processes hard coded into applications, the business processes are configured by business analysts into the businessware itself. In other words, the business process, like the integration itself, is "decoupled" from the native application. The advantage to this approach is that new processes can be configured into the integration infrastructure on the fly without having to re-code any of the distributed applications.

Cherry Tree & Co.

Other Integration Products

Although we don't have space within the framework of this report to fully describe all of the different tools that could possibly be pulled into an integration project, we want to reiterate the fact that there will continue to be tremendous demand for integration of web-based applications without the use of businessware products. As depicted in **Figure 9,** different uses of applications present different integration challenges — many of which cannot be solved with businessware. Businessware should not be thought of as the "silver bullet" that solves any and all integration problems.

Many other tools besides businessware will continue to be very useful in different integration scenarios. For example, we should mention the importance of application servers, transaction servers, XML, and other message brokering technologies. Without getting tangled in too much technical detail, application and transaction server vendors, such as *BEA Systems* and *SilverStream Software,* support the middle tier of the distributed application architecture where the business logic resides and therefore are an essential component of most Internet centered integration solutions.

Also, XML is making headlines as the glue that facilitates the data formatting and conversion necessary to connect Web-pages to world class databases. We believe that XML will likely become part of the answer within the data transformation layer of most integration solutions — both within the context of EAI and traditional point-to-point integration. Finally, despite the advent of businessware, there will undoubtedly be situations where point-to-point integration using traditional message-oriented middleware is the preferred approach. This brand of integration, although not as flexible as that accomplished with businessware, may be favored in certain situations where tighter integration is important.

Implications for External Service Providers

At first glance, it appears that the advent of EAI represents a threat to ESPs and to the traditional revenue streams associated with systems integration work. If EAI in fact delivers on its promise to greatly simplify the integration of multiple enterprise applications, systems integrators may experience a decrease in demand for custom coding that has heretofore accompanied point-to-point systems integration assignments.

Despite this potential threat, we believe that in the end there will be two very substantial integration opportunities for IT services firms:

(1) EAI — the chaining together of discrete transactions, in the form of a business process, from one application to the next; and

(2) Tightly-coupled integration of web-based applications to back office systems utilizing more traditional middleware products and methodologies.

Our conversations with the pure-play Web Development companies lead us to believe that there is a severe shortage of firms that truly have the ability to deliver on both types of integration.

We should also note that there is considerable upside for the utilization of businessware tools by IT services firms. Although new businessware tools lend themselves to more rapid deployment than was previously possible, the task of selecting the appropriate EAI tools and then configuring business processes within the integration infrastructure is still beyond the abilities of the vast majority of internal IT departments. Indeed, Cherry Tree & Co. is of the opinion that the ultimate result of EAI will be increased demand for integration-related services, for the reasons outlined below:

• By demonstrating how the new EAI technologies make it possible to truly leverage all of the applications within a distributed application architecture, ESPs with command of EAI technologies will be better able to sell their clients on new extended enterprise initiatives. As businessware allows services firms to better demonstrate ROI associated with new web-application initiatives, these services firms will enhance their credibility and their footprint within a given market.

• Developing EAI-related competencies represents a means by which services firms will be able to differentiate themselves from their competitors. Businessware will provide agile, first-to-market ESPs with a competitive advantage as an emerging core practice area upon which to build vertical and/or domain expertise in integrating best-of-breed extended enterprise applications. Integrators who can leverage business process expertise and embed that expertise within standard methodologies surrounding the use of the new businessware products will gain a tremendous competitive advantage as vertical industry expertise becomes an increasingly important point of differentiation.

• Given that client companies demand differing degrees of intra- and inter-enterprise integration, businessware enables ESPs to tailor their offerings to the level required by a given customer. This ability represents a significant enhancement to an ESP's value proposition and provides them with the opportunity to establish leadership in different integration scenarios. For example, *e-commerce integration* involves establishing connectivity between an enterprise's front-end, web-based sales engine and its back-office systems. Integration work is primarily intra-enter-

prise and does not involve linking with external suppliers or distributors. In contrast, inter-enterprise integration is externally-focused and requires that an enterprise's systems be connected with those of its business partners. The central point is that different integration challenges require different EAI tools and different levels of business process expertise. The complexity of these integration tasks, even without the custom coding, will require IT consultant involvement.

• Finally, integration projects that fall outside of the scope of the EAI contemplated by businessware will continue to be extremely important. Very few companies have truly mastered the art of effectuating tightly coupled communication between web-based applications and legacy transaction systems. Integrators who have strong skills in this area will continue to be highly valued in the marketplace.

We believe that as standardized integration technologies, such as businessware, mature and proliferate, systems integrators focusing on enterprise application integration will evolve from custom-coders to application component assemblers and configuration experts. IT services firms will likely remain at the hub of the process, but the business analyst with business process knowledge will ultimately supplant the expert custom-coder as an IT service company's most valued asset in EAI projects.

At the same time, we believe that demand for point-to-point integration will remain strong despite the advent of businessware. The custom-coders will remain as valued contributors on point-to-point integration assignments. Standardized middleware products will continue to evolve to simplify these integration tasks as well, but the complexity of selecting and utilizing the correct middleware tools will bolster the value of those companies that have mastered this complex practice.

Significant News & Events

A review of the past four quarters' news and events for software and services firms within the extended enterprise application market reveals that the pace of partnering and merger and acquisition activity is accelerating. Newcomers to this market are attempting to acquire or develop new customer- and supplier-centric competencies, while companies with an established presence are leveraging and refining existing skill sets. Appendix 4 contains a comprehensive listing of major transactions announced during this period; this section will highlight several major trends that are most relevant to owners of private services firms.

Major ERP Vendor Migration to the Extended Enterprise Space

Faced with a slowdown in demand for full-scale enterprise systems as a result of the Year 2000 lockdown and a maturing Fortune 1000 market, the major ERP vendors are attempting to stimulate sales by developing competencies in extended enterprise applications through acquisitions, strategic partnerships, and in-house development. *Oracle* and *J.D. Edwards* have been the most aggressive vendors in this regard, adding capabilities in both SCM and CRM over the past several quarters. Focusing on customer management, Oracle has launched a front-office suite offering functionality in all three CRM segments as well as integration with the company's ERP applications. The company has also launched a Supply Chain Planning application targeted at the manufacturing industry, and has entered into partnerships with EAI vendors *TSI* and *TIBCO*.

J.D. Edwards has focused on adding supply chain capabilities to its ERP suite, agreeing to acquire major SCP vendor *Numetrix* for $80 million and entering into a partnership with *IBM* and *SynQuest* to develop supply chain solutions for the industrial manufacturing industry.

SAP has moved into the extended enterprise application space, partnering with supply chain software vendor *Aspect Development* and launching a web-based sales configuration engine. SAP also acquired a 9.7 percent stake in *Catalyst International* and announced that the two companies have entered into a strategic alliance to develop Supply Chain Execution solutions for mySAP.com.

PeopleSoft has also begun to move aggressively in recent quarters, agreeing to acquire CRM vendor *Vantive* for $433 million (2.4 times trailing revenues) and partnering with Supply Chain Execution vendors *Optum* and *McHugh.*

As companies have accelerated efforts to introduce new product and service offerings into the enterprise application space, the majority have selected acquisition or partnering strategies rather than internal development as the preferred means of obtaining the necessary intellectual capital and technological infrastructure. One of the major trends that has emerged has been major EAI software vendors partnering with other market leaders or acquiring smaller software vendors to extend their footprint in this market. EAI vendor *New Era of Networks (NEON)* has been at the forefront of this trend, acquiring five integration software vendors and entering into an alliance with *BEA Systems,* a provider of integration and networking software. *SilverStream Software* announced that it will acquire two private firms, *GemLogic* and *ObjectEra*. GemLogic's primary product offering is an XML-based integration suite, while ObjectEra is a provider of distributed computing solutions using Java-based object request broker technology.

SCM and CRM vendors have also been active in expanding their product offerings via acquisitions and strategic alliances. *i2 Technologies* announced a partnership with SCE vendor *Aspect Development* and acquired CRM vendor *SMART Technologies*. *SalesLogix* acquired marketing automation software vendor *Enact*, while *Clarify* acquired *Newtonian Software*, an interactive selling and sales configuration software firm.

Demand for vertical industry expertise has been a key driver of acquisition activity among software vendors. Demonstrating this trend, two of the enterprise software firms acquired by *NEON, VIE Systems* and *SLI International,* had vertically-focused business models — VIE specializes in the transportation, financial services, and retail industries, while SLI focuses on retail, manufacturing, and consumer goods. In addition, *TSI Software International*, an EAI vendor, announced its acquisition of *Braid Group Ltd*., a UK-based provider of EAI software to banking and securities firms.

Another major trend visible in this sector is the acquisition of small, niche service providers by larger ESPs as a means of migrating into the extended enterprise market. *CIBER* recently announced its acquisition of *Waterstone Consulting*, a Chicago-based management consulting firm with strong competencies in SCM and CRM solutions. The transaction was valued at $31 million, 2.1 times Waterstone's revenues of $15 million. *Metamor Worldwide* acquired *PrimeSource Technologies*, $10 million services firm specializing in ERP and SCM implementation, and *Interliant* acquired *Sales Technology*, a CRM and groupware implementation firm, to augment its CRM practice.

As is the case among software firms, services providers with demonstrated industry-specific competencies have been the preferred acquisition targets. Web developer *iXL Enterprises* recently announced an agreement to acquire *Tessera Enterprise Systems*, a provider of web-based CRM integration and consulting services to the financial services, telecommunications, and direct marketing industries. The transaction was valued at approximately $120 million, over five times annualized revenues. Application outsourcing company *Syntel* acquired *Metier, Inc.*, a privately held ESP specializing in the implementation of ERP and CRM applications for clients operating in the healthcare, financial services, and manufacturing markets.

We have highlighted several major transactions in the CRM and SCM spaces in **Figure 13** below. Notably, we are not aware of any IT services acquisition activity related to or motivated by EAI expertise. As this practice area develops, however, we fully expect that private firms with EAI capabilities will be highly valued as acquisition prospects. For example, Cherry Tree & Co. has surveyed many of the public web development companies who have repeatedly indicated that the skill sets they most require center around the ability to integrate web-based applications with legacy ERP systems.

Figure 13.
Selected IT Services M&A Transactions

Buyer	Seller	Functionality	Approximate Value	Revenue	P/Revenue
iXL	Tessera Enterprise Systems	CRM Integration and Consulting Services	120	11.5	5
CIBER	Waterstone	Management Consulting, CRM and SCM Services	31	15	2.1
CSC	ECS	Oracle, CRM, SCM, and Data Warehousing Services	N/D	18.5	n/a
Syntel	Metier	Oracle, CRM, and E-commerce Services	N/D	25	n/a
Metamor	PrimeSource	ERP and SCM Implementation Services	N/D	10	n/a
Interliant	Sales Technology	CRM and Groupware Implementation Services (UK)	N/D	1	n/a

Source: Cherry Tree & Co. Research

Opportunities for Privately Held Firms

We believe the trends we have described above will continue to drive corporations to adopt the type of distributed applications architectures that we have dubbed as the extended enterprise. Although CRM and SCM are the two hottest extended enterprise application products at the moment, the evolution of EAI technologies will foster the growth of many other distributed application products - both packaged and custom designed. Whether the realization of the extended enterprise as we have depicted it becomes a reality for most companies over the next 2-4 years or over the next 5-10 years is yet to be seen. This time frame will no doubt hinge in part on the capability of the technologies we have described to deliver on the hype that is currently surrounding them.

Irrespective of the time frame, the direction is clear and so many IT services firms should consider positioning themselves to take advantage of this trend. We have identified several different strategies that can be used and have summed them up as follows:

1. **Partnering with CRM and SCM Vendors:** One suggestion is for firms to establish partnerships with vendors in the SCM and CRM markets, as listed in the appendices to this report. As we have described in our previous research, a good partnership with the right vendor can accelerate an emerging practice with in your organization, and certification as a major vendor's preferred partner may carry significant weight in winning new engagements.

2. **Partnering with EAI Vendors:** Because this market is still in its infancy, private IT services firms that act quickly to develop EAI expertise will gain a significant "first mover" advantage over their competitors. We have compiled a very extensive listing of the public and private companies that have offerings in the traditional middleware and businessware categories and have included them in the appendices to this report. IT services firms seeking to differentiate themselves from their competitors should consider investigating partnership opportunities with these vendors.

   For example, we recently spoke with Paul Auvil, Chief Financial Officer of businessware vendor *Vitria Technology*. Mr. Auvil indicated that Vitria's management is very open to the idea of partnering with private IT services firms, as they recognize the fact that many middle market and Internet-based "dot.com" clients prefer to work with niche-oriented services companies. Mr. Auvil indicated that Vitria is predominantly interested in selling product and that it will look towards its implementation partners for services. Although we haven't interviewed executives at all of the businessware vendors, we believe that the majority of these firms will focus predominantly on the technology sell — leaving the services opportunities to the ESPs.

3. **Leveraging Vertical Industry and Business Process Expertise:** Another practical way to take advantage of these trends is to find ways to leverage vertical industry expertise with existing clients into a new practice area with a CRM, SCM, or EAI focus. All of these practice areas require business process expertise that comes from industry specialization. Leveraging business process expertise may be a better approach than seeking partnerships with vendors, especially in the SCM and CRM areas, since most projects require the use of multiple vendors. In fact, knowing which vendors to use can be a major component of value that the IT consultant brings to the table.

   The need for business process expertise is also extremely important for EAI projects. Consultants who can embed business process into the application integration infrastructure will develop reusable methodologies that can be transferred from client to client within the same vertical. Once developed, this capability will present a formidable competitive advantage.

   For those firms that only have marginal business process knowledge, perhaps a relationship with a business process oriented management consulting firm will facilitate the transition. As we described last summer in our *Professional Consulting Spotlight Report,* traditional management consulting and IT consulting are merging in a number of areas — nowhere is this more clear than in the context of CRM and SCM solutions.

4. **Leveraging An Existing ERP Implementation Practice:** Firms with established ERP implementation practices should consider seeking out opportunities to use their brand recognition as enterprise software experts to build extended enterprise-oriented service offerings. In many cases, this strategy would not require a major realignment of vendor partnerships, as the Big Five ERP vendors are all migrating to the extended enterprise space and are thus providing implementation partners with the opportunity to adjust their offerings accordingly.

   Several ERP implementation companies that we have spoken with have indicated that they have already been performing limited amounts of CRM and SCM based on the current offerings in those areas made available by the Big Five ERP firms. Recognizing those skill sets and then repackaging them as distinct practice areas will allow certain firms to draw attention to a set of consulting skills that might otherwise be buried within a stagnant ERP practice.

5. **Leveraging Existing Middleware Expertise:** For those services firms with legacy and client/server integration capabilities using traditional middleware, migration to EAI represents a natural progression. Such a transition would most likely involve less custom coding but the process of embedding business processes into the EAI infrastructure will be a significant value-added that project-based firms will bring to the table. Execution of this strategy will require some re-tooling in general Internet and EAI technologies. We believe that traditional systems integrators who can manage this transition while maintaining recognition with their clients as integration experts will position themselves for success.

We also don't want to overlook the demand for point-to-point integration required for direct legacy-to-net connectivity. Firms with strong middleware capability should consider marketing themselves as the experts in the field of back-end plumbing required for e-commerce sites. While we have drawn a distinction between this type of integration and EAI, there currently is a tremendous demand for both skill sets as the pure-play Web developers such as *Razorfish*, *Viant*, and *Scient* are discovering that they can fall short in their integration efforts.

6. **Utilizing EAI to Open Other Web Development Opportunities:** As we have discussed, the business case for a new web application is greatly enhanced if the new application can be integrated into an overall distributed application architecture. ESPs that already have a thriving Internet consulting practice will further advance their ability to win large projects once they can demonstrate their ability to use EAI to increase the ROI for new custom applications.

7. **Partnering with an EAI Specialist:** Custom web application developers who have been inclined to avoid application integration issues may find that partnering with an EAI-focused services firm presents a significant opportunity to add value. As extended enterprise applications become pervasive, web developers will be under increasing pressure to demonstrate that they are able to integrate their offerings with an enterprise's existing systems. A partnership with an EAI specialist therefore represents a compelling addition to a web developer's value proposition.

Cherry Tree & Co.

Cherry Tree Research — IT Services Universe by Subsectors

IT Consulting

Company	Ticker
CACI International	CACI
Diamond Tech. Partners	DTPI
META Group	METG
Superior Consultant Holdings	SUPC
American Management Systems	AMSY
The A Consulting Team	TACX
First Consulting Group	FCGI

Project-Based Service Providers

Company	Ticker
(1) App. & Systems Development	
Complete Business Solutions	CBSI
Affiliated Computer Services	ACS
Mastech. Corp	MAST
Tier Technologies	TIER
Whittman-Hart	WHIT
PSW Technologies	PSWT
Cambridge Technology Partners	CATP
Cognizant Tech. Solutions Corp.	CTSH
Intelligroup	ITIG
Metamor Worldwide	MMWW
Tenfold	TENF

(2) Implementation/Integration	
AnswerThink	ANSR
BrightStar	BTSR
Computer Task Group	TSK
Renaissance Worldwide	REGI
Technisource	TSRC
Technology Solutions Corp.	TSCC
Aztec Technology Partners Inc.	AZTC

(3) Network & Web Development	
Sapient	SAPE
USWeb/CKS	USWB
Rare Medium	RRRR
Proxicom	PXCM
Razorfish	RAZF
AppNet	APNT
Scient	SCNT
iXL Enterprises	IIXL
Viant, Inc.*	VIAN

Value Added Resellers

Company	Ticker
Microage	MICA
Acxicom Corp.	ACXM
Alphanet Solutions	ALPH
Viasoft, Inc.	VIAS
Compucom Systems	CMPC
Comdisco, Inc.	CDO
Black Box Corp.	BBOX
Merisel, Inc.	MSEL
Inacom	ICO

Outsourcing

Company	Ticker
(1) Application Outsourcing	
IMRglobal	IMRS
Syntel	SYNT
Critical Path	CPTH
FutureLink	FTRL
Interliant	INIT
USinternetworking	USIX

(2) Information Utilities / Business Process Outsourcing	
Automatic Data Processing	AUD
BISYS Group	BSYS
Ceridian	CEN
Equifax	EFX
First Data	FDC
Fiserv	FISV
Sungard Data Systems	SDS

(3) Platform IT Outsourcing	
Computer Sciences	CSC
Electronic Data Systems	EDS
Perot Systems	PER
Sykes Enterprises	SYKE

Staff Augmentation

Company	Ticker
(1) Pure IT Staffing	
Analysts International	ANLY
Cotelligent	CGZ
Hall Kinion	HAKI
Metro Information Services	MISI
PRT Group	PRTG
Alternative Resources	ALRC

(2) Transitioning Firms	
Ciber, Inc.	CBR
Computer Horizons	CHRZ
Keane	KEA

(3) General Staffing	
Modis Professional Services	MPS
Romac International	ROMC
StaffMark	STAF
CDI Corp.	CDI
Comforce	CFS
Personnel Group America	PGA
Volt Information Sciences	VOL
RCM Technologies	RCMT

Education & Training

Company	Ticker
ARIS	ARSC
CBT Group	SMTF
Wave Technology International	WAVT
Computer Learning Centers	CLCX
Learning Tree International	LTRE

*Indicates companies tracked by Cherry Tree but not yet included in stock indices due to insufficient trading history.

Cherry Tree & Co.

IT Services — Structural Perspective

While it is extremely difficult to place IT Services companies in specific subsectors, Cherry Tree & Co. has developed the following set of working definitions and categorizations for purposes of analyzing key trends and developments in the industry. We recognize that readers often have their own mental categorizations that may be slightly different than what we are suggesting. Although pure-play examples are hard to find, we have found the following structural perspective to be very useful in depicting critical developments within the IT Services industry:

♦ *Professional Consulting:* Firms that focus on corporate level business and strategic engagements; further divided into three sub-sectors:

- *IT Consulting.* Firms that predominately focus on high level consulting projects that are directed at strategic information technology engagements. Project scope often entails company-wide evaluation of client business needs and essential processes, existing platforms, available technologies, and solutions design. The effort to structure an IT initiative as an integral component of a strategic or business process design oriented endeavor is what separates these companies from their Project-Based service provider counterparts.

- *Strategic Management Consulting.* Firms that provide advice centering upon a client's overall corporate objectives and competitive position. Strategy should be thought of as the creation of a unique and valuable position for an enterprise that affords it a sustainable competitive advantage. Project scope involves such topics as market trend analysis, business and customer mix, marketing efforts, and capital structure.

- *Business Process Consulting.* Firms that provide consulting expertise relative to the maximization of the operational effectiveness of a corporation at either the functional or business unit level. Operational effectiveness includes practices and processes that allow a company to better utilize its resources to generate the highest level of output at a minimized cost.

♦ *Project-Based Service Providers:* Client projects within this sector have comparatively well defined tangible deliverables and scope. Contract designs range from a billable hours approach to fixed-price engagements for components and even entire projects. Companies typically focus around some type of vertical industry expertise, either in specific technologies or industry applications.

- *Application and Systems Development.* Companies that specialize in custom software development aimed at serving the specific needs of their clients, typically in proprietary systems settings. Deliverables can include targeted modules or components, upgrades to existing systems, as well as original application development.

- *Implementation/Integration.* Firms that specialize in the deployment of complex enterprise wide (ERP) software packages. As part of this implementation, these companies integrate the new software by ensuring that diverse hardware, network, and software components work together. Companies may also specialize primarily in integration technologies, interface development, database management, and other enabling technologies that allow disparate systems to share information.

- *Network and Web Development.* Firms that develop client/server and web-enabled technologies that link business units together via LAN and WAN facilities and various Internet-based client solutions. Projects may also entail vendor and supplier coordination, customer communications and overflow management, billing, and receivables, as well as various e-commerce initiatives.

♦ *Outsourcing:* Companies providing process automation services and facilities management and operations for clients desiring a variety of technical outsourcing solutions; divided into three subsectors:

- *Platform IT Outsourcing*. Firms offering a range of data center services, including hardware facilities management, onsite and offsite support services, server-vaults and data security, and disaster recovery capabilities. These relationships typically involve the transfer of IT facilities, staff, or hardware.

Cherry Tree & Co.

- *Utilities or Business Process Outsourcing*. Firms focus on economic and efficient outsourcing solutions for complex but repetitive daily business processes. These processes could be as sophisticated as finance and accounting or be more repetitive processes, such as disbursements and payroll. The provider assumes all responsibilities associated with the entire business process or function.

- *Application Outsourcing.* Firms that manage and maintain software applications, with the provider assuming the responsibilities associated with the application. There are two subdivisions of the AO sector: *Application Service Provider* (ASP) remotely hosts and delivers a packaged application to the client from an off-site location. *Application Maintenance Outsourcing* providers manage a proprietary or package application from either the client's or the provider's site.

♦ <u>*Staff Augmentation:*</u> Companies that specialize in providing qualified IT professional staff on a temporary or long-term contract basis to clients in need of specific skill sets and project support for internal systems development projects.

- *Pure IT Staff Augmentation*. Firms that derive the vast majority of their revenues from their core IT staffing business. Company strategies are often defined by geographic concentrations, vertical expertise, or technology focus.

- *Transitioning Firms.* Companies that have traditionally been viewed as being in the IT staffing business but have recently attempted to redirect their growth towards higher value added and higher margin project-based services. Various combinations of merger and acquisition, divestiture, and internal growth facilitate this migration.

- *General Staffing with IT.* Firms that provide professionals with a wide array of skills including finance, accounting, etc., which also have an IT staffing division with significant revenues. Several companies in this category are rapidly building IT services divisions, through both internal growth and by acquisition, which may eventually reposition their business mix.

♦ <u>*Education and Training:*</u> Companies that provide training and help desk consulting for firms that have adopted custom designed or packaged software products. Engagements can include onsite or training center programs following new installations or for skills development and certain technical applications.

♦ <u>*Value Added Resellers:*</u> Solutions-oriented vendors providing integrated hardware and software systems, often including consulting, design, and implementation services. These companies have historically operated under specialty hardware and software distributor arrangements, though trends are towards broader vendor representation and increased consulting services.

CRM Software Vendors / Marketing Automation

Public Firms

Company	Ticker	Price as of 12/30/1999	Mkt. Cap.	TTM Revenue	TTM Net Income	P/E	P/Rev.	Web Address
Broadbase	BBSW	$105.13	1808.57	7.30	(20.84)	N/A	247.60	www.broadbase.com
E.piphany	EPNY	$211.38	5705.43	11.87	(19.67)	N/A	480.70	www.epiphany.com
Exchange Applications	EXAP	$52.13	606.89	37.53	0.90	473.86	16.20	www.exapps.com
Siebel Systems*	SEBL	$85.75	15984.14	616.94	97.07	161.79	25.90	www.siebel.com
Vantive Corp.*	VNTV	$18.13	489.38	183.71	(7.94)	N/A	2.70	www.vantive.com

Group Average:	317.83 154.62
Group Median:	317.83 25.90

Private Firms

Company	Web Address
DataSage	www.datasage.com
Knowledge Discovery One	www.kd1.com
MarketFirst Software	www.marketfirst.com
MarketSwitch Corp.	www.marketswitch.com
ON!contact	www.oncontact.com
Prime Response	www.primeresponse.com
Rubric	www.rubricsoft.com

Indicates vendors whose software suites offer functionality across all three CRM segments.

CRM Software Vendors / Sales Force Automation

Public Firms

Company	Ticker	Price as of 12/30/1999	Mkt. Cap.	TTM Revenue	TTM Net Income	P/E	P/Rev.	Web Address
Calico Commerce	CLIC	$51.88	596.20	27.08	(19.89)	N/A	22.01	www.calicocommerce.com
FirstWave Technologies	FSTW	$3.50	19.86	12.13	(2.65)	N/A	1.60	www.firstwave.net
Onyx Software	ONXS	$38.50	665.43	51.36	(2.47)	N/A	13.00	www.onyx.com
Pivotal Corp.	PVTL	$43.06	862.12	29.43	(2.63)	N/A	29.30	www.pivotal.com
SalesLogix Corp.	SLGX	$41.38	768.50	30.03	(6.62)	N/A	25.60	www.saleslogix.com
Siebel Systems*	SEBL	$85.75	15984.14	616.94	97.07	161.80	25.90	www.siebel.com
Vantive Corp.*	VNTV	$18.13	489.38	183.71	(7.94)	N/A	2.70	www.vantive.com

Group Average:	161.80	17.16
Group Median:	161.80	22.01

Private Firms

	Web Address
2order.com	www.2order.com
Actionware	www.actionware.com
Moss Software	www.mosssoftware.com
Saratoga Systems	www.saratogasystems.com
Trilogy	www.trilogy.com

Indicates vendors whose software suites offer functionality across all three CRM segments.

Cherry Tree & Co.

CRM Software Vendors / Customer Service & Support

Public Firms

Company	Ticker	Price as of 12/30/1999	Mkt. Cap.	TTM Revenue	TTM Net Income	P/E	P/Rev.	Web Address
Astea International	ATEA	$4.28	59.64	32.44	5.90	10.11	1.84	www.astea.com
Clarify	CLFY	$123.00	2875.49	200.41	15.52	178.30	14.35	www.clarify.com
eGain Communications	EGAN	$36.69	974.40	2.41	(22.84)	N/A	404.32	www.egain.com
Kana Communications	KANA	$202.00	5510.36	7.99	(22.22)	N/A	689.66	www.kana.com
Pegasystems	PEGA	$11.50	331.18	68.67	(13.79)	N/A	4.82	www.pegasystems.com
Remedy	RMDY	$44.63	1384.27	206.39	23.58	53.80	6.71	www.remedy.com
Siebel Systems*	SEBL	$85.75	15984.14	616.94	97.07	161.80	25.91	www.siebel.com
Silknet Software	SILK	$165.50	2573.03	17.68	(10.46)	N/A	145.53	www.silknet.com
Vantive Corp.*	VNTV	$18.13	489.38	183.71	(7.94)	N/A	2.66	www.vantive.com
					Group Average:	101.00	143.98	
					Group Median:	107.80	14.35	

Private Firms

AIT (USA) Inc.	www.ait-us.com
Octane Software	www.octaneinc.com
Brightware	www.brightware.com

Indicates vendors whose software suites offer functionality across all three CRM segments.

SCM Software Vendors / Supply Chain Planning

Public Firms

Company	Ticker	Price as of 12/30/1999	Mkt. Cap.	TTM Revenue	TTM Net Income	P/E	P/Rev.	Web Address
i2 Technologies	ITWO	$199.44	15202.56	508.56	16.84	867.12	29.90	www.i2.com
Logility	LGTY	$21.00	280.85	32.09	2.45	116.67	8.80	www.logility.com
Manugistics Group	MANU	$31.00	847.85	149.24	(79.05)	N/A	5.70	www.manugistics.com
					Group Average:	491.90	14.80	
					Group Median:	491.90	8.80	

Private Firms

Paragon Management	www.paragonms.com
SynQuest	www.synquest.com
The Lyte Group	www.lytegroup.com
LogicTools, Inc.	www.logictool.com
Distinction Software	www.distinction.com
Prescient Systems	www.prescientsystems.com

SCM Software Vendors / Supply Chain Execution

Public Firms

Company	Ticker	Price as of 12/30/1999	Mkt. Cap.	TTM Revenue	TTM Net Income	P/E	P/Rev.	Web Address
Agile Software	AGIL	$210.00	4157.79	22.58	(14.47)	N/A	184.10	www.agilesoft.com
Aspect Development	ASDV	$67.39	1924.75	86.99	9.26	224.64	22.10	www.aspectdv.com
Catalyst International	CLYS	$12.50	87.81	40.93	(2.42)	N/A	2.10	www.catalystwms.com
Descartes Systems Group	DSGX	$20.75	759.12	46.24	(22.86)	N/A	16.40	www.descartes.com
Industri-Matematik	IMIC	$5.56	175.81	75.10	(34.72)	N/A	2.30	www.im.se
Manhattan Associates	MANH	$7.06	169.81	78.06	1.96	88.29	2.20	www.manhattanassociates.com
QAD, Inc.	QADI	$8.28	250.28	233.74	(23.28)	N/A	1.10	www.qad.com
Robocom Systems Intl.	RIMS	$2.00	$6.94	6.78	(2.09)	N/A	1.00	www.robocom.com

Group Average:	156.47	28.91
Group Median:	156.47	2.25

Private Firms

Company	Web Address
EXE Technologies	www.exe.com
Global Technology Services	www.globaltechltd.com
HK Systems	www.hksystems.com
Marcam Solutions	www.marcam.com
McHugh Software	www.mchugh.com
Optum	www.optum.com
Vastera	www.vastera.com
Technology Advantage	www.tadv.com

Cherry Tree & Co.

EAI Software Vendors

Public Firms

Company	Ticker	Price as of 12/30/1999	Mkt. Cap.	TTM Revenue	TTM Net Income	P/E	P/Rev.	Web Address
Active Software	ASWX	$92.00	2,213.61	18.95	(10.73)	N/A	116.80	www.activesw.com
BEA Systems*	BEAS	$70.50	11,056.37	397.27	(9.95)	N/A	27.80	www.beasys.com
IBM*	IBM	$108.75	198,208.19	88,497.00	7,969.00	24.91	2.20	www.ibm.com
Intellicorp Inc.	INAI	$3.19	52.24	23.56	(5.10)	N/A	2.20	www.intellicorp.com
New Era of Networks*	NEON	$46.88	1,534.22	114.93	(36.45)	N/A	13.30	www.neonsoft.com
SAGA Systems	AGS	$19.94	606.77	231.16	23.83	25.24	2.60	www.sagasoftware.com
TIBCO Inc.*	TIBX	$153.75	9,280.50	96.44	(19.48)	N/A	96.20	www.tibco.com
TSI Software	TSFW	$54.75	1,389.23	82.48	(5.04)	N/A	16.80	www.tsisoft.com
Vitria Technology	VITR	$237.00	7,073.04	23.21	(13.03)	N/A	309.00	www.vitria.com

Group Average:	25.08	63.19
Group Median:	25.08	13.30

Private Firms

Company	Web Address
Alier Inc.	www.alier.com
Crossworlds Software	www.crossworlds.com
Cycle Software	www.livedata.com
Extricity Software	www.extricity.com
Mint Technologies	www.mintech.com
Muscato Corp.*	www.muscato.com
Oberon	www.oberon.com
OpenConnect Systems	www.openconnect.com
Software Technologies Corp.*	www.stc.com
ViewLocity	www.viewlocity.com
Visual Edge Software*	www.vedge.com

* Indicates vendors whose software offerings encompass functionality across multiple EAI/Middleware segments.

Middleware Vendors / Legacyware

Public Firms

Company	Ticker	Price as of 12/30/1999	Mkt. Cap.	TTM Revenue	TTM Net Income	P/E	P/Rev.	Web Address
Ardent Software*	ARDT	$38.25	725.14	154.75	5.87	103.38	4.70	www.ardentsoftware.com
Carleton Corp.	CARL	$2.34	7.85	5.67	(9.33)	N/A	1.40	www.carleton.com
Computer Assoc. Int'l	CA	$70.38	37,933.88	5,817.00	716.00	52.91	6.50	www.cai.com
Computer Network Technology	CMNT	$24.63	577.60	151.73	8.92	63.14	3.80	www.cnt.com
IBM*	IBM	$108.75	198,208.19	88,497.00	7,969.00	24.91	2.20	www.ibm.com
New Era of Networks*	NEON	$46.88	1,534.22	114.93	(36.45)	N/A	13.30	www.neonsoft.com
Primix Solutions*	PMIX	$8.13	119.31	9.56	(5.67)	N/A	12.50	www.primix.com
Sterling Software*	SSW	$31.44	2,543.96	807.00	(10.76)	N/A	3.20	www.sterling.com
Unisys Corp.*	UIS	$31.88	9,878.22	7,633.50	504.90	19.20	1.30	www.unisys.com

	P/E	P/Rev.
Group Average:	52.71	5.43
Group Median:	52.91	3.80

Private Firms

Company	Web Address
Blue Lobster Software	www.bluelobster.com
CEL Corp.	www.celcorp.com
Clearview Software Int'l	www.clearview-software.com
Clientsoft Inc.	www.clientsoft.com
Connextions.net	www.connextions.com
InfoSpinner Inc.	www.infospinner.com
Macro 4	www.macro4.com
Metaserver Inc.	www.mserver.com
Mitem Corp.	www.mitem.com
MODCOMP Inc.	www.modcomp.com
Muscato Corp.*	www.muscato.com
Seagull Software	www.seagullsw.com
Software Technologies Corp.*	www.stc.com
StarQuest Software	www.starquest.com
Translink Software	www.translink.com

Indicates vendors whose software offerings encompass functionality across multiple EAI/Middleware segments.

Middleware Vendors / Data Access Middleware

Public Firms

Company	Ticker	Price as of 12/30/1999	Mkt. Cap.	TTM Revenue	TTM Net Income	P/E	P/Rev.	Web Address
Apple Computer	AAPL	$100.31	16,130.23	6,134.00	601.00	23.88	2.60	www.apple.com
Ardent Software*	ARDT	$38.25	725.14	154.75	5.87	103.38	4.70	www.ardentsoftware.com
BEA Systems*	BEAS	$70.50	11,056.37	397.27	(9.95)	N/A	27.80	www.beasys.com
Bull SA*	Paris Exchange	N/A	N/A	N/A	N/A	N/A	N/A	www.bull.com
Centura Software	CNTR	$5.00	176.99	50.61	(2.32)	N/A	3.50	www.centurasoft.com
Compaq Computer Corp.*	CPQ	$27.44	46,452.53	38,906.00	995.00	45.73	1.20	www.compaq.com
Hewlett-Packard Co.*	HWP	$115.25	117,425.46	42,370.00	3,491.00	37.66	2.80	www.hp.com
IBM*	IBM	$108.75	198,208.19	88,497.00	7,969.00	24.91	2.20	www.ibm.com
Inprise*	INPR	$11.81	682.34	277.47	64.01	9.84	2.50	www.inprise.com
International Software Group	SISG	$15.63	131.69	N/A	N/A	N/A	N/A	www.isgsoft.com
MERANT plc	MRNT	$30.75	916.00	371.50	11.70	78.29	2.47	www.merant.com
Neon Systems Inc.	NESY	$36.13	319.71	24.18	3.77	50.88	13.20	www.neonsys.com
Persistence Software*	PRSW	$24.13	459.53	13.24	(8.09)	N/A	34.70	www.persistence.com
Santa Cruz Operation Inc.	SCOC	$28.88	991.74	223.62	16.86	58.93	4.40	www.sco.com
ShowCase Corp.	SHWC	$5.88	60.44	38.81	(1.04)	N/A	1.60	www.showcasecorp.com
Sterling Software*	SSW	$31.44	2,543.96	807.00	(10.76)	N/A	3.20	www.sterling.com
Sun Microsystems*	SUNW	$78.44	122,529.39	12,357.08	1,188.57	101.87	9.90	www.sun.com
Sybase Inc.	SYBS	$17.00	1,390.00	867.08	21.64	65.38	1.60	www.sybase.com
Symantec Corp.	SYMC	$57.44	3,310.61	662.62	89.48	36.12	5.00	www.symantec.com
Unisys*	UIS	$31.88	9,878.22	7,633.50	504.90	19.20	1.30	www.unisys.com

	P/E	P/Rev.
Group Average:	50.47	6.93
Group Median:	45.73	3.00

Private Firms

Company	Web Address
Attachmate Corp.	www.attachmate.com
Cornerstone Software*	www.corsoft.com
Cross Access Corp.	www.crossaccess.com
Dharma Systems	www.dharma.com
Easysoft Ltd.	www.easysoft.com
Enterworks Inc.	www.enterworks.com
Information Builders Inc.	www.ibi.com
Liant Software Corp.	www.liant.com
M.B. Foster Associates	www.mbfoster.com
NobleNet Inc.*	www.noblenet.com
Ontos	www.ontos.com
OpenLink	www.openlink.co.uk
OpenPath Software	www.openpath.com
Promia*	www.promia.com
Secant Technologies*	www.secant.com
Simba Technologies	www.simbatech.com
Solutions IQ	www.solutionsiq.com
The Object People	www.objectpeople.on.ca
Viaserv Inc.	www.viaserv.com

Indicates vendors whose software offerings encompass functionality across multiple EAI/Middleware segments.

Middleware Vendors / Message-Oriented Middleware

Public Firms

Company	Ticker	Price as of 12/30/1999	Mkt. Cap.	TTM Revenue	TTM Net Income	P/E	P/Rev.	Web Address
BEA Systems*	BEAS	$70.50	11,056.37	397.27	(9.95)	N/A	27.80	www.beasys.com
Compaq Computer Corp.*	CPQ	$27.44	46,452.53	38,906.00	995.00	45.73	1.20	www.compaq.com
IBM*	IBM	$108.75	198,208.19	88,497.00	7,969.00	24.91	2.20	www.ibm.com
Level 8 Systems*	LVEL	$34.56	311.07	41.10	(28.22)	N/A	7.60	www.level8.com
New Era of Networks*	NEON	$46.88	1,534.22	114.93	(36.45)	N/A	13.30	www.neonsoft.com
Software AG	Frankfurt Exchange	N/A	N/A	N/A	N/A	N/A	N/A	www.softwareag.com
TIBCO Inc.*	TIBX	$153.75	9,280.50	96.44	(19.48)	N/A	96.20	www.tibco.com
Unisys Corp.*	UIS	$31.88	9,878.22	7,633.50	504.90	19.20	1.30	www.unisys.com
					Group Average:	29.95	21.37	
					Group Median:	24.91	7.60	

Private Firms

Company	Web Address
Allen Systems Group	www.asg.com
Candle Corp.	www.candle.com
Cornerstone Software*	www.corsoft.com
PeerLogic	www.peerlogic.com
Precise Software Solutions	www.precisesoft.com
Talarian Corp.	www.talarian.com
Tempest Software	www.tempest.com

* Indicates vendors whose software offerings encompass functionality across multiple EAI/Middleware segments.

Middleware Vendors / Transaction Server Middleware

Public Firms

Company	Ticker	Price as of 12/30/1999	Mkt. Cap.	TTM Revenue	TTM Net Income	P/E	P/Rev.	Web Address
BEA Systems*	BEAS	$70.50	11,056.37	397.27	(9.95)	N/A	27.80	www.beasys.com
Bull SA*	Paris Exchange	N/A	N/A	N/A	N/A	N/A	N/A	www.bull.com
Compaq Computer Corp.*	CPQ	$27.44	46,452.53	38,906.00	995.00	45.73	1.20	www.compaq.com
Hewlett-Packard Co.*	HWP	$115.25	117,425.46	42,370.00	3,491.00	37.66	2.80	www.hp.com
Iona*	IONA	$54.88	1,081.64	97.37	6.50	161.40	11.10	www.iona.com
Persistence Software*	PRSW	$24.13	459.53	13.24	(8.09)	N/A	34.70	www.persistence.com
SilverStream Software	SSSW	$116.50	1,978.05	17.07	(17.82)	N/A	115.90	www.silverstream.com
Unisys*	UIS	$31.88	9,878.22	7,633.50	504.90	19.20	1.30	www.unisys.com
					Group Average:	66.00	27.83	
					Group Median:	41.70	11.10	

Private Firms

Company	Web Address
Brokat Infosystems	w3.brokat.com
Chili !Soft	www.chilisoft.com
Constellar Corp.	www.constellar.com
GemStone Systems Inc.	www.gemstone.com
ObjectSwitch	www.objectswitch.com
Secant Technologies*	www.secant.com

* Indicates vendors whose software offerings encompass functionality across multiple EAI/Middleware segments.

Middleware Vendors / Object Middleware

Public Firms

Company	Ticker	Price as of 12/30/1999	Mkt. Cap.	TTM Revenue	TTM Net Income	P/E	P/Rev.	Web Address
Ardent Software*	ARDT	$38.25	725.14	154.75	5.87	103.38	4.70	www.ardentsoftware.com
BEA Systems*	BEAS	$70.50	11,056.37	397.27	(9.95)	N/A	27.80	www.beasys.com
Compaq Computer Corp.*	CPQ	$27.44	46,452.53	38,906.00	995.00	45.73	1.20	www.compaq.com
Hewlett-Packard Co.*	HWP	$115.25	117,425.46	42,370.00	3,491.00	37.66	2.80	www.hp.com
IBM*	IBM	$108.75	198,208.19	88,497.00	7,969.00	24.91	2.20	www.ibm.com
Inprise*	INPR	$11.81	682.34	277.47	64.01	9.84	2.50	www.inprise.com
Iona*	IONA	$54.88	1,081.64	97.37	6.50	161.40	11.10	www.iona.com
Level 8 Systems*	LVEL	$34.56	311.07	41.10	(28.22)	N/A	7.60	www.level8.com
Primix Solutions*	PMIX	$8.13	119.31	9.56	(5.67)	N/A	12.50	www.primix.com
Rational Software	RATL	$48.25	4,213.82	479.77	73.06	56.76	8.80	www.rational.com
Sun Microsystems*	SUNW	$78.44	122,529.39	12,357.08	1,188.57	101.87	9.90	www.sun.com
TIBCO Inc.*	TIBX	$153.75	9,280.50	96.44	(19.48)	N/A	96.20	www.tibco.com

Group Average:	67.69	15.61
Group Median:	51.25	8.20

Private Firms

Company	Web Address
Black & White Software	www.blackwhite.com
Expersoft	www.expersoft.com
I-Kinetics Inc.	www.i-kinetics.com
NobleNet Inc.*	www.noblenet.com
Objective Interface Systems	www.ois.com
Promia*	www.promia.com
Visual Edge Software Ltd.*	www.vedge.com

Indicates vendors whose software offerings encompass functionality across multiple EAI/Middleware segments.

Merger & Acquisition Review

1st Quarter, 1999

♦ **JD Edwards (JDEC)** announced the acquisition of **The Premisys Corporation**, a sales engineering automation software vendor. Privately held and based in Chicago, IL, Premisys was JD Edwards' first acquisition since 1997.

♦ **AnswerThink (ANSR)** acquired CRM vendor **Quintus Corporation's (QNTS)** Call Center Enterprises consulting organization. The group's 13 consultants were merged into AnswerThink's Customer Solutions practice, where they will continue to provide services related to Quintus' customer interaction software suite.

♦ **Industri-Matematik (IMIC)** announced its acquisition of **Astea International's (ATEA)** Abalon CRM software operations for $9.5 million. The Abalon operations, including 80 consultants and staff members, were integrated into Industri-Matematik's Advanced Supply Chain Execution Suite.

♦ **TSI International Software Ltd. (TSFW)** acquired **Braid Group Ltd**., a provider of EAI solutions to the financial services industry. Braid is privately held and based in London, England.

♦ **New Era of Networks (NEON)** acquired **D&M Ltd.**, an IT services firm headquartered in Hong Kong. D&M specializes in designing, implementing, and managing enterprise applications, network infrastructures, and databases.

2nd Quarter, 1999

♦ **JD Edwards (JDEC)** announced the acquisition of **Numetrix**, a privately held Supply Chain Planning software vendor headquartered in Toronto, Canada. The transaction was valued at approximately $80 million.

♦ **i2 Technologies (ITWO)** announced an agreement to acquire **SMART Technologies**, a developer of Internet-based CRM software. SMART offers applications that facilitate e-commerce, customer care, and Internet billing. The all-stock transaction was valued at approximately $68 million, 9.4 times SMART's 1998 revenues of $7.2 million.

♦ **SalesLogix (SLGX)** announced an agreement to acquire **Enact, Inc.**, a provider of sales configuration software. Enact's software manages marketing resources and product catalogs, and generates sales proposals and orders.

♦ **SAGA Software (AGS)** announced a definitive agreement to acquire **Blue Lobster Software, Inc.** for $12 million in cash. Blue Lobster, based in San Jose, CA, develops application integration software.

♦ **NEON (NEON)** announced two acquisitions this quarter. In early April the company acquired **VIE Systems, Inc.**, a privately held provider of EAI software serving the travel, transportation, financial services, and retail markets. Later in April NEON announced the signing of an agreement to acquire **SLI International AG**, an implementation firm providing SAP implementation services. Headquartered in Zurich, Switzerland, SLI specializes in the following vertical markets: retail, electronics, manufacturing, chemicals, pharmaceuticals, and consumer goods. The $22 million transaction was composed of both cash and stock.

3rd Quarter, 1999

♦ **Syntel (SYNT)** completed two acquisitions this quarter. In August the company announced the acquisition of **IMG, Inc.**, a consulting firm that provides services in areas such as e-business and web application development. Privately held, IMG reported 1998 revenues of $2 million. In September Syntel acquired **Metier, Inc.**, a privately held firm based in Los Angeles, CA. Metier specializes in the design and implementation of e-commerce, CRM, and data warehousing solutions for middle market clients in the healthcare, manufacturing, and financial services industries, and reported trailing revenues of $25 million

♦ **Interliant (INIT)** acquired U.K.-based **Sales Technology Ltd.** in September. Sales Technology Ltd. specializes CRM implementation services and is an Onyx Software reseller and integration partner.

♦ **Exchange Applications (EXAP)** acquired **GBI**, a Seattle, WA-based marketing software vendor. GBI provides Web, email, and other customer interaction processing capabilities, primarily to "dot.com" firms. The all-stock transaction was valued at $24 million; GBI was privately held and employed 28 consultants and staff members.

♦ **Clarify, Inc. (CLFY)** announced its acquisition of **Newtonian Software**, a privately held developer of interactive selling/sales configuration software. The two companies had been marketing partners since 1998. Clarify acquired Newtonian for a combination of cash and stock valued at $16.5 million.

♦ **Remedy Corp. (RMDY)** acquired **Fortress Technologies, Inc.**, an IT services firm providing asset management consulting. Fortress is privately held and headquartered in Hinsdale, IL.

♦ **NEON (NEON)** announced two agreements this quarter. The first transaction to be announced was the agreement to acquire **Convoy Corporation,** a provider of application integration software for PeopleSoft ERP applications. Convoy is privately held and generated revenues of $10.4 million for their fiscal year ended March 31, 1999. NEON also agreed to acquire **MicroScript, Inc**., a vendor of application integration software for Windows NT based in the U.K. Privately held, MicroScript had 1998 revenues of approximately $8 million and has 62 employees.

♦ **Metamor Worldwide (MMWW)** acquired the assets of **PrimeSource Technologies LLC**, a Scottsdale, AZ services firm specializing in ERP and SCM implementation services. PrimeSource has projected 1999 revenues of approximately $10 million and employs 60 consultants.

♦ **TSI International Software (TSFW)** announced its intention to acquire **Novera Software, Inc**., a provider of web application integration software to the business-to-consumer market. Novera is privately held and headquartered in Burlington, MA.

4th Quarter, 1999

♦ **PeopleSoft (PSFT)** announced a definitive agreement to acquire **The Vantive Corporation (VNTV)**. One of the leading vendors in the CRM space, Vantive provides an integrated customer management software suite. The all-stock transaction is valued at approximately $433 million, 2.4 times Vantive's trailing twelve-month revenues of $183.7 million. The acquisition is expected to close during the first quarter of 2000.

♦ **Nortel Networks (NT)** announced a definitive merger agreement with **Clarify, Inc. (CLFY)**. Another top CRM vendor, Clarify's product offerings web-enable and automate customer service and support functions. Clarify has agreed to be acquired for approximately $2.1 billion, 10.5 times the company's trailing twelve-month revenues of $200.4 million.

♦ **CIBER (CBR)** announced the acquisition of **Waterstone Consulting, Inc.**, for $31 million. Waterstone, a management consulting firm with CRM and SCM expertise, is based in Chicago, IL and employs 130 consultants and staff members. The purchase price is 2.1 times Waterstone's revenues of $15 million.

♦ **iXL Enterprises (IIXL)** announced a definitive agreement to acquire **Tessera Enterprise Systems**, a provider of CRM consulting and integration services to firms in the financial services, telecommunications, and direct marketing industries. Tessera agreed to be acquired for $120 million, 5.2 times annualized revenues.

♦ **TIBCO Software (TIBX)** acquired **InConcert, Inc.**, a subsidiary of **Xerox Corporation** and a provider of infrastructure software for telecommunications firms.

♦ **Calico Commerce (CLIC)** entered into a definitive agreement to acquire **ConnectInc.com (CNKT)**, a provider of technology and services designed to connect purchasing and selling companies via the Internet. The stock transaction is valued at approximately $90 million, 14.3 times trailing revenues.

♦ **E.piphany, Inc. (EPNY)** announced a definitive agreement to acquire **RightPoint,** a provider of real-time online marketing and personalization solutions. RightPoint is privately held and headquartered in San Meteo, CA.

♦ **Onyx Software (ONXS)** acquired **Market Solutions, Ltd.**, a U.K.-based firm specializing in the development and implementation of CRM systems. The transaction consisted of $6 million in cash and stock, in addition to an $8 million earnout.

♦ **Siebel Systems, Inc. (SEBL)** agreed to acquire **OnTarget, Inc.**, a provider of consulting and training services to sales and marketing organizations, and companies operating in the telecommunications and technology industries. The two firms have been partners since 1996. The stock transaction is valued at approximately $259 million, 6.5 times OnTarget's estimated 1999 revenues.

♦ **Computer Sciences Corporation (CSC)** acquired **ECS Integrated Technology Solutions LLC**, a provider of Oracle implementation and support services. ECS focuses on e-business, CRM, SCM, and data warehousing applications and reported trailing revenues of $18.5 million.

♦ **Quintus Corp. (QNTS)** acquired **Acuity Corp.**, a provider of web-based customer interaction software with a focus on customer service and support. Acuity is based in Austin, TX.

♦ **SilverStream Software (SSSW)** announced that it will acquire two private firms, **GemLogic** and **ObjectEra**. GemLogic's product offering consists of an XML-based integration suite, and ObjectEra is a provider of distributed computing solutions using Java-based object request broker technology. The two firms were acquired for a total of $29 million in cash.

♦ **Braun Consulting (BRNC)** announced the acquisition of **Emerging Technologies Consultants, Inc.**, a privately held services company specializing in CRM-related consulting. ETCI employs 40 consultants and was acquired for approximately $27 million in cash and stock.

♦ **Broadbase Software Inc. (BBSW)** entered into a definitive agreement to acquire **Rubric, Inc.**, a provider of web-based Marketing Automation software to Fortune 500 and dot.com clients. Rubric is privately held and headquartered in San Mateo, CA.

This page intentionally left blank.

Cherry Tree & Co.

About Cherry Tree & Co.

Customized investment banking for IT services firms

Cherry Tree & Co. specializes in mergers & acquisitions, private placements and advisory services with an exclusive industry focus on Information Technology (IT) services.

Cherry Tree's commitment to research and emphasis on working with emerging private companies proves optimal for IT services business owners interested in selling or acquiring a business or raising capital. As a result of our customized approach and dedication to the IT services industry, our clients receive the most comprehensive and personalized investment banking service available.

Our robust foundation and experience in the IT services industry ignite our clients' ability to make effective strategic and financial decisions. With over 60 years of experience in investing as principals and developing IT businesses, Cherry Tree has the essential resources and networks to execute timely and successful transactions. Our continuous efforts to exceed client expectations and provide the highest level of personal service in the industry have paid off with tremendous bottom-line results for our clients.

"If we had to choose investment bankers all over again, we would definitely choose Cherry Tree & Co."

David Teckman, President
Disc Systems

For further information, please contact us directly:

Dave A. Henderson, *Managing Partner* 612-832-3346
Kevin R. Green, *Managing Partner* 612-832-3358
Gordon F. Stofer, *Managing Partner* 612-832-3350

Scott B. Tudor, *Principal/Research Chairman* 612-832-3344
Peter J. Erickson, *Principal* 612-832-3355
Brian M. Klemenhagen, *Associate* 612-832-3359

Jill S. Paider, *Marketing Associate* 612-832-3352
Robert J. Rogers, *Research Analyst* 612-832-3356
James Radtke, *Analyst* 612-832-3345
Steven A. Laboe, *Database Administrator* 612-832-3349

Cherry Tree & Co.
Voice: 612-893-9012
Fax: 612-893-9036
e-mail: info@cherrytreeco.com

Please visit our Resource Bank at
www.cherrytreeco.com
to view:

- **IT Services Industry Spotlight Reports:**
  - *Extended Enterprise Applications*
  - *Application Service Providers (ASP)*
  - *Professional Consulting*
  - *Project-Based IT Services Firms*
  - *IT Staff Augmentation*
  - *IT Services*
  - *Beyond 2000*
- **Mergers & Acquisition Analyses for the IT Services Industry**
- **Case Studies of Business Owners who Have Recently Sold their IT Services Firms**
- **Industry News & Events**

Cherry Tree & Co.
Customized investment banking for IT services firms

Centennial Lakes Office Park
7601 France Avenue South, Suite 150, Edina, Minnesota 55435
Voice: 612-893-9012   Fax: 612-893-9036   info@cherrytreeco.com