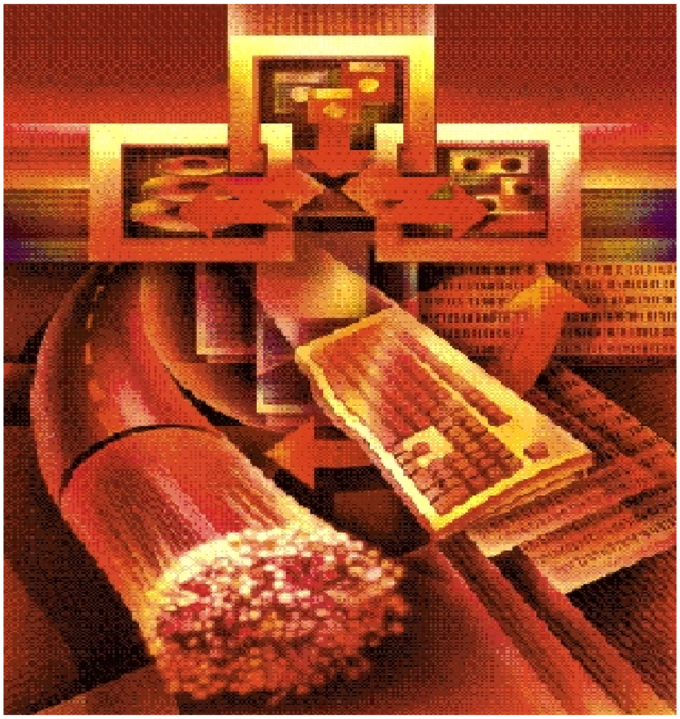
August 25, 1999

William G. Dering, Jr.
ASP Research Analyst
212-572-8086
wdering@unterberg.com

C.E. UNTERBERG, TOWBIN

Application Service Providers

Creating a Paradigm in Application Management & Delivery



Early-Stage, High-Growth Market. The overall ASP market is expected to reach $6.4 billion in 2001, up dramatically from under $100 million in 1998.

Emerging ASP market is a paradigm shift in the way applications are both managed and delivered to customers.

We believe the ASP market offers tremendous investment opportunities, as companies seek to reduce application deployment timeframes and their total cost of ownership.

TABLE OF CONTENTS

William G. Dering, Jr.
ASP Research Analyst
212-572-8086
wdering@unterberg.com

Majority of Diagrams were created or recreated by Kate Mazejka. Source of diagram on the cover page was Veritas Software.

EXECUTIVE SUMMARY: AN ASP OVERVIEW

As privatization, globalization, e-commerce and the basic need to grow profits revolutionize competitive landscapes, organizations are deploying strategic software applications to streamline business processes and gain a competitive edge in their end markets. Enterprise applications, such as ERP packages, supply-chain management suites, e-commerce systems, collaborative systems and sales force automation suites, are enabling companies to reduce costs, improve productivity and enhance customer service. Analytical applications, such as decision support systems and data warehouses, are also being utilized to analyze and convert data into value-added information, enabling companies to improve the flow and quality of their products to the marketplace, increase market share and boost earnings. Today, more and more companies are utilizing applications to perform a variety of critical business functions. Indeed, applications are growing in significance, as they increasingly become embedded in the business process itself. Even basic office productivity software, such as Word, Excel and PowerPoint, are now required by most people to perform daily business functions.

Today, more and more companies are utilizing applications to perform a variety of critical business functions

Originally, companies deployed proprietary applications that were built in-house and customized from scratch. These solutions were often costly and took a long time to deploy. Although many companies continue to run these proprietary applications, in recent years, firms have been migrating to packaged applications, which enable firms to leverage the specialized development efforts and industry best practices of independent software vendors. In turn, this enables the delivery of both applications at a lower cost and, in many instances, a higher quality product.

As packaged applications have become more prevalent, they have added more functionality to provide companies with a broader and richer set of options. Many applications are now addressing entire business processes, evolving beyond single business functions. Meanwhile, many applications are migrating from mainframe to distributed environments. All of this has made applications become inherently more complex, increasing deployment periods and escalating the challenges of maintaining high levels of application availability and performance. We cannot overstate this point. In addition, technology upgrade cycles continue to grow shorter, intensifying this evolution.

Given these trends, businesses are demanding more system management software, more IT personnel, and more planning and ongoing management to keep their mission critical applications operational—as a software application has emerged as only a portion of an overall solution. Businesses are also demanding shorter deployment timeframes in order to more quickly realize a return on their investment. However, the ongoing shortage of skilled IT professionals, and the subsequent challenge of hiring, motivating and retaining skilled engineers, has only increased the difficulty for companies, especially non-technical firms, to meet these requirements.

As a result of these requirements and problems, the cost of delivering a solution continues to explode, as many companies are finding it difficult to afford the up-front capital investments and total cost of ownership (e.g., costs of additional IT labor, software, servers, PCs, network hardware) of a solution that is hosted in-house. Even without these increasing management costs, many companies, especially smaller firms, struggle to afford these applications.

Yet, for many of these same companies, it has become essential for them to realize the benefits of these solutions in order to remain competitive and grow their bottom line—creating a significant obstacle for businesses, not just to flourish, but ultimately to survive. To overcome these hurdles, many companies will require a new approach: the Application Service Provider (ASP) model.

ASP Definition

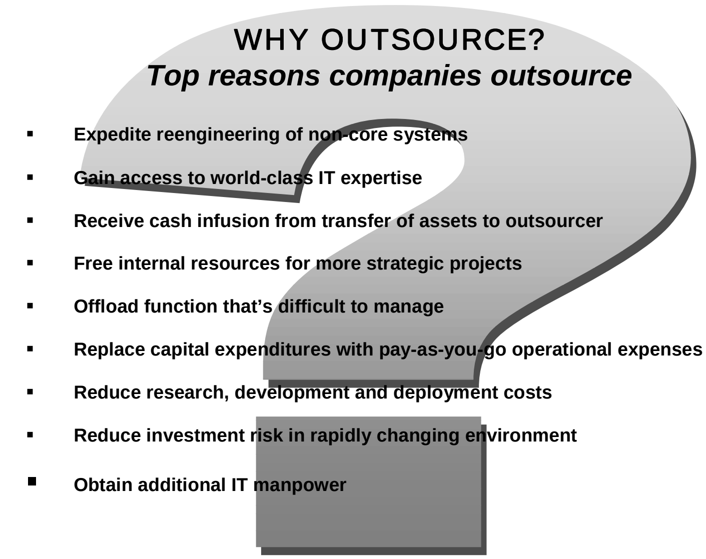
ASPs are service firms that deploy, host, manage and enhance software applications for customers at a centrally managed facility, guaranteeing application availability, performance and security. End-users access and use applications remotely using the Internet or leased lines, which has, in large part, only recently become feasible with improvements in bandwidth capacity and the build-out of the world-wide web.

ASPs combine software (e.g., applications, system management software, operating systems), hardware and networking technologies to provide a service-based application solution rather than an internally owned and managed solution

ASPs combine software (e.g., applications, system management software, operating systems), hardware and networking technologies to provide a service-based application solution rather than an internally owned and managed solution. ASPs usually rent the use of packaged applications to customers for a fixed-monthly per user fee, partnering with software vendors to provide a standardized application offering that involves minimal customization. This enables the ASP to significantly reduce application deployment timeframes—a critical and key value to customers. ASPs are also able to spread their infrastructure costs among an array of customers, enabling them to achieve economies of scale and significantly reduce their cost structure in the long run. In the end, we believe the demand for ASP services will be driven by the following key trends, which we discuss in more detail on page 15.

- **Financial Cost Savings** (i.e., lower mgmt. costs, reduced capital investments & improved purchasing power)
- **Increasing Importance & Complexity of Applications** and the need for technological expertise in deploying and managing mission critical applications
- **Scarcity of Skilled IT Professionals**
- **Need for Businesses to Focus on their Core Competencies**
- **Superior Infrastructure** provides improved business agility, scalability and more rapid deployment timeframes
- **Growth of e-commerce and Internet Applications**

DIAGRAM 1:



Source: The Outsourcing Institute

INDUSTRY BACKGROUND: THE ASP SECTOR IS PART OF A LARGER APPLICATION OUTSOURCING MARKET

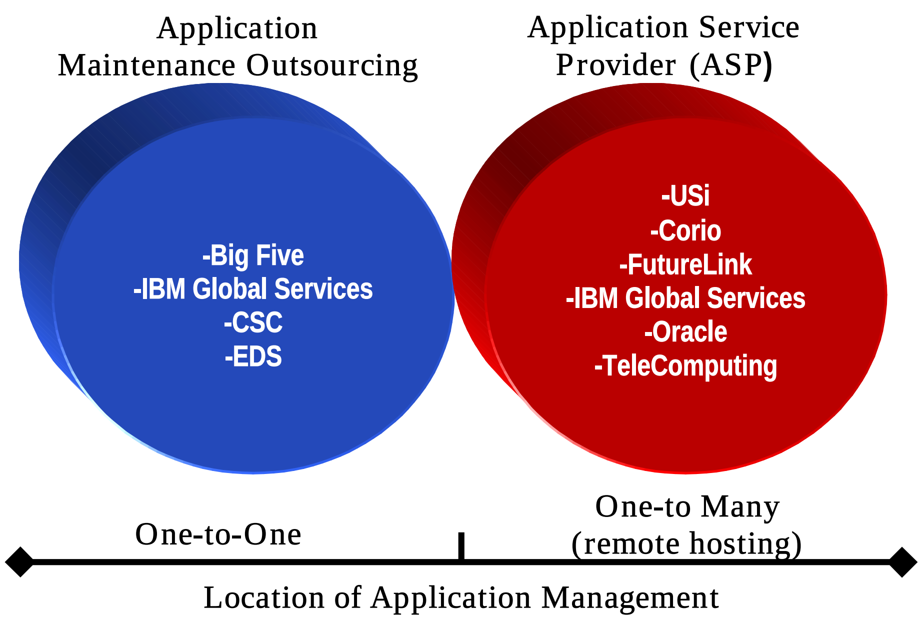
Business environments and models are undergoing a dynamic evolution, as information technology increasingly becomes critical to business success. Years ago, the demand for new business functions and capabilities was driving technology. Later, the opposite was true: information technology advances began pushing business development. Today, the two are intertwined, as information is at the heart of nearly every business function—becoming an essential tool for enhancing operational productivity and competitive positioning.

As the rapid pace of technological change and upgrade cycles increase, most business are increasingly unable to keep up--as this task requires a significant amount of expertise that falls outside most businesses’ core competencies. Coupled with the shortage of IT labor, this rapid pace of change is causing many businesses to re-evaluate what projects and where their limited amount of information technology resources and personnel should be spent—causing them to potentially outsource all or a portion of their IT tasks to an outside service firm. One of the most important such tasks is the management of mission critical applications, i.e., application outsourcing.

According to IDC, the AO market is expected to reach $16.2 billion in 2003, rising over 18% from $7.0 billion in 1998

Applications Outsourcing (AO) is one of the most exciting opportunities within the IT Service market, as it is the fastest growing major segment within the overall market. According to IDC, the AO market is expected to reach $16.2 billion in 2003, rising over 18% from $7.0 billion in 1998. Application Outsourcing involves the contractual service for deploying, managing and enhancing a packaged or proprietary software application. This service is handed off to an outside provider that guarantees application performance, availability and enhancement.

DIAGRAM 2:
APPLICATION OUTSOURCING MARKET SEGMENTATION



Source: C.E. Unterberg, Towbin & IDC

The AO market consists of two sub-segments, or types of AO models and providers, which we highlight below:

- **Traditional Application Maintenance Outsourcers.** This model is a one-to-one relationship in which the AO takes responsibility and over the management of an application(s) at the customer's site. This arrangement may involve the transfer of assets and some IT personnel associated with the application(s) to the AO. However, the customer owns the application. Historically, these applications may have been proprietary applications that the AO built. Traditional AOs include Anderson Consulting, PricewaterhouseCoopers, CSC, EDS and IBM Global Services. This portion of the market, which is growing at a much more modest pace than the ASP sector, is not the focus of our report.

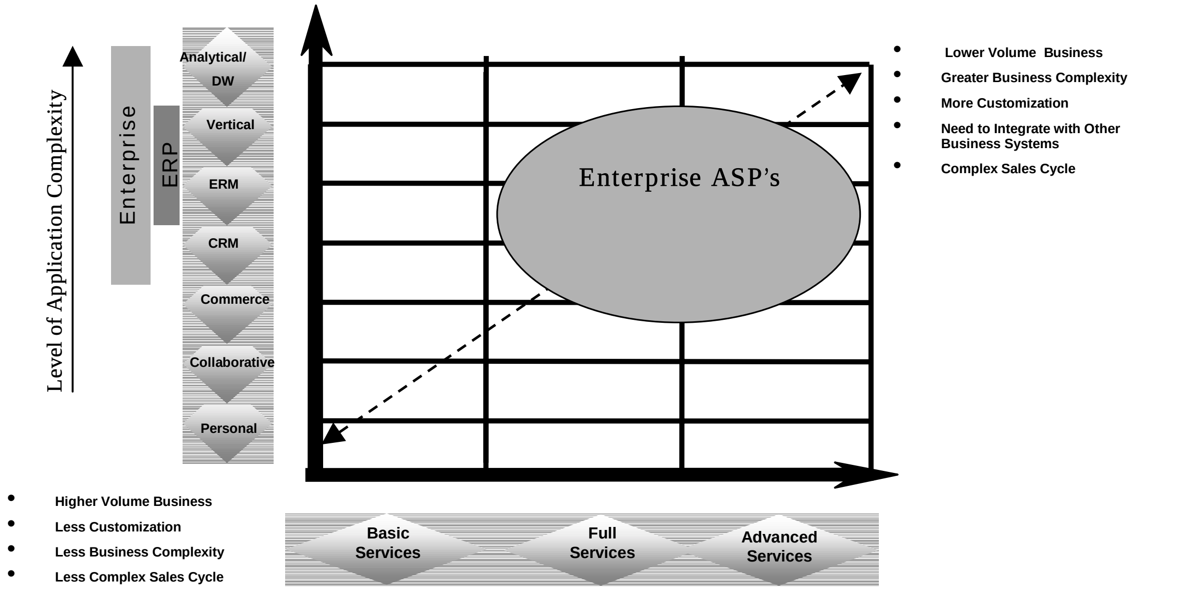
- **Application Service Providers (ASPs).** Comparatively, the ASP model is a one-to-many relationship in which the ASP manages multiple customers' applications from a central facility using the Internet to connect the application to an end-user. The ASP model normally involves packaged applications that are standardized and, thus, can be deployed quickly due to little or no customization of the original package.

In many respects, the ASP model evolves beyond the definition of outsourcing and into a utility model

In many respects, the ASP model evolves beyond the definition of outsourcing and into a utility model, as ASPs own an application and rent the use of it for a fixed-monthly per user fee or on a per transaction fee basis. For instance, with outsourcing, the responsibility for an application is handed over to an outsourcer with certain goals and guidelines--such as to drive costs down and improve performance; however, there may be restrictions on how this can be accomplished, such as the use of various hardware.

Comparatively, with a utility model, the customer requests a set of business functions but doesn't care how these functions are delivered--as it is completely at the ASP's discretion. The ASP will determine what combination of IT resources works the best—the ASP will even select which software vendor and package to use to best meet the needs of its customers. Although this may not be entirely true today, as many companies are buying a specific application (e.g., PeopleSoft, SAP R/3) rather than solely the ASP's service, we believe the ASP market will ultimately evolve in this direction.

DIAGRAM 3:
ASP MARKET LANDSCAPE



Source: IDC

SEGMENTING THE ASP INDUSTRY

The ASP industry can be evaluated using multiple market segmentations of where ASPs are playing. As the market continues to evolve and mature, it will be important for ASPs to understand the different segments of the ASP market and their varying characteristics.

In recent months, there has been growing momentum behind the ASP concept, coming from numerous vendor announcements and increasing customer adoption

In recent months, there has been growing momentum behind the ASP concept, coming from numerous vendor announcements and increasing customer adoption. Despite this growing momentum, the ASP market continues to be, in large part, a supplier driven market—although we expect that to change dramatically over the next year. As such, we begin by segmenting the market by the type of application that an ASP services. Clearly, this is a supplier segmentation and has some limitations. Still, we believe it provides some interesting insights of the market in this early adoption stage. In addition, we also segment the market by consumer type, and, in the next section, we segment the market by the different components of the ASP model.

THE ASP MARKET BY APPLICATION TYPE

As can be seen in Diagram 3, the ASP market can be segmented on a two-dimensional plane with two metrics: the level of complexity of an application offered and the depth of service being offered by the ASP. We evaluate these dimensions in more detail on the following page.

TABLE 1:
TYPES OF APPLICATIONS

Analytical Applications	▪ business intelligence solutions that include data warehouses, data mining applications and decision support systems. Vendor examples include Sagent, Business Objects, Cognos, Information Advantage and Actuate.
Vertical Applications	▪ software suites that are targeted at specific vertical markets. For instance, a class registration system would be specifically designed for the higher education space. Together, ERM and Vertical applications comprise the enterprise resource planning (ERP) space. Vendor examples include many of the same vendors in the ERM market, as well as I2 Technologies, Manugistics and SCT Corporation.
Enterprise Resource Management (ERM) Applications	▪ software suites that focus on functions that can be used, to a major extent, across multiple vertical industries. ERM applications are cross-industry ERP applications and include accounting, human resources and material management suites. Vendor examples include SAP, Peoplesoft, The Baan Company, J.D. Edwards, Oracle and Great Plains.
Customer Relationship Management (CRM) Software	▪ includes customer care & support software, marketing and sales force automation software. Vendor examples include Siebel Systems, Pivotal Software, Onyx and Vantive.
E-Commerce	▪ Internet and e-commerce applications can either be discrete or environmental, depending on whether they are integrated into back office applications. For instance, an e-commerce application is a discrete application if it simply an informational web-site.
Collaborative Applications	▪ email systems, knowledge management, groupware, imaging and document management, and conferencing applications. Examples include Lotus Notes and Microsoft Outlook, as well as Boston based X-Collaboration's Software, which is offering some interesting "Internet-enabled" collaborative software.
Personal Applications	▪ some office productivity products such as Word, Excel and PowerPoint, as well as consumer applications (e.g., games, home productivity). These are discrete applications.

Source C.E. Unterberg, Towbin & IDC

Level of Application Complexity

The complexity of an application will be, in part, closely linked to the category (e.g., discrete or environmental) and the type of application offered (e.g., ERP, e-commerce, Excel). Discrete business applications exist in isolation to address an individual business function. An environmental application, on the other hand, addresses an entire business process, which consists of multiple business functions that are tightly integrated together. As we move from the discrete side of the spectrum to the environmental side, applications become increasingly complex. Table 1 highlights the major types of applications an ASP might support.

We note that CRM, ERP and analytical applications are all enterprise applications. High-end e-commerce applications can be considered enterprise applications if they are environmental applications. ASPs that focus on providing enterprise application solutions are typically referred to as "enterprise ASPs."

Depth of ASP Services Provided

Based on given ASP strategies and customer needs, ASP vendors will offer various levels of service. However, we believe there will be a relatively high correlation between the depth of services provided and the type of application offered (e.g., email, CRM, ERP). Below we highlight the three major levels of services provided by ASPs:

- **Basic Services** are the lowest level of services provided. In this scenario, the ASP hosts the application on its own server and provides some basic application maintenance functions, such as various types of sophisticated backups and application reporting options. Basic services include monitoring networks, servers, application/data security and guaranteeing that the application is available, i.e., the application is up and running, and the customer has access to it. In some cases, an ASP may only manage and guarantee applications up to the database level, stopping short of taking responsibility for problems with the application's code. Customer support inquires would have a slower response time—as a customer would probably initially receive an inquiry representative who would then have to speak with additional ASP personnel to help solve the customer's problem.

- **Full Services**, in addition to basic services, would also provide SLAs about application performance and security (also availability, as it's included in basic services). ASPs may also provide a hardware ever-green agreement—guaranteeing that the ASP will always use the latest and greatest hardware technologies in its data centers. A customer requiring support would initially receive a technical support analyst that may even be dedicated to a specific account. In terms of performance, ASPs will provide customers with an option to purchase various guaranteed levels of availability and performance at various prices. For instance, if a customer wants a 99.9% application availability guarantee vs. a 95% guarantee, then the customer might have the option to purchase additional bandwidth capacity and around-the-clock support for a higher per user price.

- **Advanced Services,** in addition to full services, would include some application customization and extension services. Typically, customers purchasing advanced services would buy high levels of bandwidth and around-the-clock customer support. Support services would also include "how-to-use" an application, which enters the realm of training services.

THE MARKET BY END-CUSTOMER

The ASP industry can also be segmented into two markets based on the type of end-customer using an application. Below we outline these two segments:

According to Forrester Research, there are over 300,000 emerging enterprises in the United States with revenues between $40 - $500 million, and IT budgets of $5 million or less

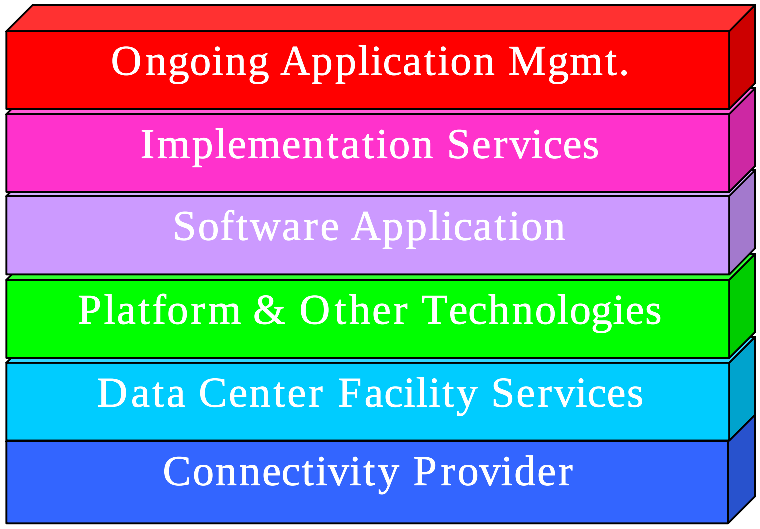
- **Business-to-Business.** This segment covers the entire application spectrum, consisting of enterprise applications and e-commerce applications, as well as collaborative and personal suites. We note that some of the less complex applications will overlap into the business-to-consumer market. The business-to-business space can be further segmented into three sub-segments based on the number of employees in a company: high-end (employees>1000), the middle market (employees between 100 & 1000) and the low end (small companies with <100 employees). These smaller-sized companies may represent one of the most lucrative opportunities for ASPs. According to Forrester Research, there are over 300,000 emerging enterprises in the United States with revenues between $40 - $500 million, and IT budgets of $5 million or less.

Interestingly, we expect many ASPs playing in this space to partner with Internet portal companies to facilitate access to their services

- **Business-to-consumer**. This segment consists of email and personal applications, as well as some specific vertical market applications. For instance, Intuit's WebTurboTax provides tax-return services over a web-browser to the consumer, or individual home market. Similar to small businesses (small<100 employees), the vast majority of customers in this market have no IT expertise, such as running software setup programs or checking available disk space. Currently, this segment of the market is less developed than the business-to-business section. Interestingly, we expect many ASPs playing in this space to partner with Internet portal companies to facilitate access to their services.

Multi-Dimensional Segmentation. We believe that using both of our segmentations together (e.g., a multi-dimensional segmentation) can be even more value-added in evaluating the ASP market. For instance, both FutureLink and USinternetworking are offering support for an ERP accounting module (an enterprise application). Based on our first segmentation, it would appear that USi and FutureLink are competing in the same space. However, using the sub-segmentation within the business-to-business ASP market segmentation, we realize that, although there is some minimal overlap, FutureLink is focusing on the low end of the market, while USi is focusing on the mid-and high ends of the market.

DIAGRAM 4:
COMPONENTS OF THE ASP MODEL



Source: C.E. Unterberg, Towbin

COMPONENTS OF THE ASP MODEL

To successfully deliver an ASP solution, there are several critical elements or "components" that an ASP will need to have in place. Below we review these key components:

Connectivity Provider

This component of the ASP model consists of companies providing the physical connection between a customer's desktop and an ASP's computing facilities. These are the telecommunications companies, such as Uunet, Sprint, AT&T, GTE, Qwest, and others, that provide a long-distance, data highway or "Internet backbone." This component could also include some local loop providers, such as ISPs and CLEKs. Most ASPs outsource this component of the ASP solution by partnering with multiple connectivity providers.

Network Infrastructure & Data Center Facilities

Network Infrastructure and data center companies provide computing facilities and a network connection to multiple connectivity providers. These providers utilize high capacity fiber optic cable and architect their networks to maximize throughput, typically providing ASPs with a room or "cage" to host their servers and applications, to build and configure an internal LAN, and provide a connection to plug a LAN into the larger network. Security measures, including firewalls, are also provided by data center companies to authenticate access to applications inside each "cage." Examples of infrastructure providers are Exodus Communications and Concentric Networks. In many other instances, ASPs, such as USinternetworking, are building their own network infrastructure and data centers rather than leasing space from third parties. As a result, this component of the ASP model is being both outsourced and performed internally by ASPs.

Software Application

The actual software application is the center component of the ASP model. Most ASPs offering enterprise application solutions are partnering with software vendors for this component of the model. However, some software vendors are internally bundling ASP services with their software applications in order to create a more attractive solution.

Platforms & Other Technologies

This component of the ASP model consists of hardware and operating system platforms that ASPs are using to deploy application solutions upon—whether it's UNIX, Windows NT and/or Citrix's thin-client technology. This component of the ASP model also includes databases and system management software. In all cases to date, ASPs are outsourcing this portion of the model and buying these technologies from third parties. This component is generally thought to be outside the core competency of an ASP.

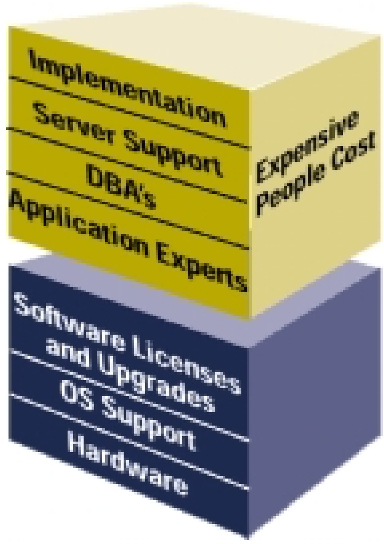
Systems Integration Services

Application integration involves strategic consulting and implementation services that are focused on helping firms utilize the best applications and technology, as well as then deploying these applications into day-to-day use. These services begin by: identifying, investigating and mapping out a company's business processes / requirements; selecting and validating an application to meet these business requirements; and figuring out how to implement those business processes and functions with a given application, including customizing and configuring an application to address specific preferences. Implementation services involve integrating an application with a given operating system, testing and fine tuning the application and operating system once it is running, and, if a legacy system exists, transferring all of the legacy data over to the new system. Implementation services also involve making a client operational, which may include some training services. Interestingly, most enterprise ASPs have developed rapid implementation methodologies and standardized application templates to reduce deployment timeframes.

Ongoing Management & Support

This component of the ASP model involves the ongoing management and support of an application and its interaction with the operating system, its database, the network and end-users. This portion of the model is a one-to-many process and where ASPs should focus on driving volume into their business, leveraging economies of scale and spreading ongoing management costs between customers. Ongoing support involves monitoring networks and applications with powerful system management tools, fielding incoming customer inquiries and working to solve customer problems. Specifically, some of these tasks might include nightly backups, restarting the O/S after it crashes, database tuning, load balancing, and monitoring data mirroring to remote locations for disaster recovery purposes.

DIAGRAM 5:
IMPLEMENTATION & ONGOING MANAGEMENT SUB-COMPONENTS



Source: Corio

The "True ASP"

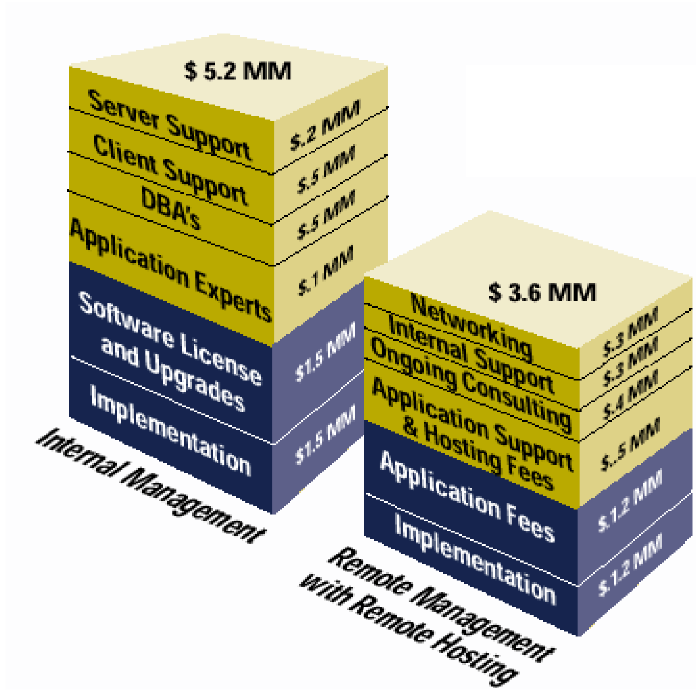
The term ASP has been used loosely to describe many companies providing a variety of different services

The term ASP has been used loosely to describe many companies providing a variety of different services—all linked by a common denominator: they each provide some element or sub-component of the ASP model. However, companies that we consider to be "True ASPs" focus upon the ongoing management and, at least, a portion of the systems integration components of the ASP model. Depending on their own business model or business heritage (which we discuss in a later section), these "True ASPs" may or may not outsource other components of the ASP model. Since most ASPs are focusing on the systems integration and ongoing management elements of the ASP model, we have segmented these components into several sub-layers in Diagram 5, which illustrates various elements in an IT infrastructure that an ASP must support.

Support for hardware, networking infrastructure, operating systems and certain basic desktop applications (Word, Excel, email) form the foundation layers of application support and can usually be performed by general IT professionals. Some of these tasks include nightly backups, restarting the O/S after it crashes, and monitoring data mirroring to remote locations for disaster recovery purposes. However, with complex ERP applications, dedicated experts are required for the management of several more advanced tasks, such as database tuning, report generation & customization, screen changes, business rule & configuration, integration, upgrades and adding modules.

For instance, SAP implementations require a professional experienced in SAP R/3, a BASIS expert (a proprietary middleware layer that links the SAP application with its relational database), and a DBA expert for the type of database (Oracle, Informix, Sybase) being implemented. It is in these more advanced functions that companies, especially mid-sized firms, struggle to afford and retain qualified people and the expertise to maintain complex applications. Thus, these two components of the ASP model are where an ASP can deliver the most compelling value proposition to the customer.

DIAGRAM 6:
FIVE-YEAR TCO ANALYSIS OF A TYPICAL MID-MARKET ERP SYSTEM



Source: Corio

KEY ASP MARKET TRENDS

Below we identify the following key trends and factors driving the growth of the ASP industry:

Financial Cost Savings. Utilizing economies of scale, the ASP model can provide customers with significant cost savings. In the traditional application delivery model, a customer must purchase a variety of items, such as network components, other hardware, operating systems, databases, an IT administrator and the application. The license fee can end up being only a portion of the total cost of ownership of an application. This traditional model is often slow, extremely expensive, and has high risks in terms of technological obsolescence. Specifically, we believe the ASP model provides a compelling alternative due to the following reasons:

- **Lower Management (Labor) Costs** – By consolidating the management of multiple customers' applications into a central facility, customers and application outsourcers can realize costs savings through economies of scale in labor management costs. For instance, consider ten customers that each deploy an ERP application at their headquarters, i.e., ten applications running on ten different servers at ten different locations. At a bare minimum, it would require at least ten different IT administrators at any given point in time (one IT person at each of the ten sites) to monitor these applications. However, if all of these applications were running at a single, centralized facility, it may only require five IT administrators to monitor these ten applications. By consolidating the management of these applications, cost savings with IT labor can be realized.

- **Reduced Capital Investment** – With the ASP model, companies can avoid the enormous up-front capital investment that comes with the traditional application delivery model, such as building a network and purchasing new hardware, operating systems and the actual application—all of which can cost hundreds of thousands of dollars. In addition, as upgrade cycles grow shorter, companies can avoid the costs of continually reinvesting large amounts of dollars into enhancing their IT infrastructure. Instead, companies can utilize this critical capital for more strategic business initiatives, such as acquisitions, product development or marketing, as these costs will be both reduced and spread out over time, rather than being incurred up-front.

- **Improved Purchasing Power** – Similar to the consolidation of management costs, ASPs can utilize economies of scale in purchasing a variety technological items through volume purchases. Such items may include servers, operating systems, network components, databases, system management software, an Internet connection and the actual packaged applications. Many ASPs will be able to negotiate subscription licensing and usage of these technological items. (We discuss subscription licensing in more detail on page 29.)

Overall, IT labor costs are the most expensive component of an application's total cost of ownership (TCO)

Overall, IT labor costs are the most expensive component of an application's total cost of ownership (TCO), as software licenses, hardware and infrastructure costs, even in the more expensive and traditional application delivery model, typically only account for 10-20% of the TCO. For instance, a good Oracle database administrator (DBA) needed for an ERP application can typically cost a company $150K per year. Diagram 6 highlights a five-year analysis of the TCO between the traditional delivery model and ASP model for an ERP application.

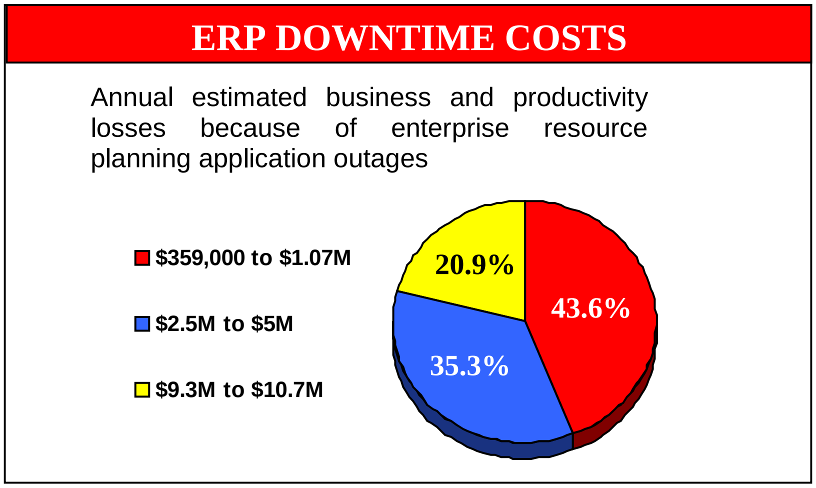
In the end, we believe the value-proposition of these financial costs savings is even more profound for medium and smaller-sized companies, as the cost of capital and opportunity costs of its capital are usually significantly higher than a larger company's cost of capital. As a result, we expect the mid-and low ends of the ASP market to be the sweet spots of the industry.

TABLE 2:
CUSTOMER COST SAVING EXAMPLES

Customer	ASP	Cost Savings
E-Trade	Critical Path	Relationship has saved E-Trade over $500K in personnel & operational costs over the past 10 months.
Netgiftregistry.com	USi	$2 mm payment to USi over next 5 yrs. is 30-40% less than what it would have cost to host in-house.
Lexington, NC School District	Learning-Station.com	According to the district's director, Larry Burwell, using Learningstation.com is saving us nearly $100K this year.
Westburne Supply Alberta	FutureLink	According to Westburne, FutureLink is saving them approximately 30% of what it would have cost to keep several applications in-house.

Source: C.E. Unterberg, Towbin; Newsweek; The Industry Standard and Network Computing

DIAGRAM 7:



Source: Merit Survey

Organizations and, ultimately, their productivity are increasingly becoming dependent on applications

Increasing Importance & Complexity of Applications. Companies are demanding the outside technological expertise to implement, deploy and manage strategic software applications, as this process continues to grow in both complexity and importance. Organizations and, ultimately, their productivity are increasingly becoming dependent on applications, as more and more end-users utilize these software applications to perform mission critical tasks. As a result, businesses are now demanding extremely high levels of application performance, availability and security on a 24x7x365 basis.

Yet as applications have added more functionality, which has provided customers with a broader and richer set of options, they have inherently become more complex to deploy and manage. Enterprise applications are evolving beyond those that address a single or discrete business function to address an entire business process, or multiple business functions that are tightly integrated together.

There are currently between 30 and 40 million telecommuters or home-based employees in the U.S.

At the same time, applications are migrating from mainframe to distributed platforms, creating islands of information processing and storage and, thus, more challenges with respect to application availability, performance and security. The prevalence and evolution of the Internet and remote access computing are further amplifying the challenges of distributed computing—as according to Forrester Research, there are currently between 30 and 40 million telecommuters or home-based employees in the U.S. In addition, the growing complexity of the overall IT computing environment (e.g., multiple types of operating systems, applications, databases, hardware platforms, communication protocols, etc.) has created even more difficulty in managing applications. Indeed, a broad and deep array of IT skills and expertise is required to effectively manage both the complexity of these applications and the overall IT environment.

As a result of these trends, companies are re-evaluating whether they have the IT resources, i.e., time, infrastructure and labor, to effectively accomplish this task, as significant application downtime can potentially cost many businesses thousands of dollars in lost revenues (see Table 7). Today's shortage of skilled IT professionals, which we discuss in more detail in the next section, coupled with the rapid pace of technological change, is driving an enormous amount of companies to answer this question: "NO."

According to the Information Technology Association of America, in 1998 there were over 340,000 (and growing) open IT positions in the U.S. alone

Scarcity of Skilled IT Professionals. Overall, there continues to be a general shortage of skilled IT professionals and, more specifically, skilled application engineers in the world today, escalating the difficulty for companies to hire, motivate and retain qualified people. According to the Information Technology Association of America, in 1998 there were over 340,000 (and growing) open IT positions in the U.S. alone. The fast pace at which technology and applications continues to change only exacerbates the challenge for IT professionals to keep their skills up-to-date—especially since this change is emerging from hundreds of different vendors. Meanwhile, there is currently a general trend for skilled IT people to prefer working for larger organizations that focus on technology. This has made the challenge of retaining skilled IT professionals particularly hard for medium and smaller-sized firms—adding to one of many obstacles that these firms must overcome.

For instance, consider a person dedicated to a career in information technology. This person does not want to spend the majority of his time performing mundane maintenance and IT plumbing duties (such as restarting the OS after it crashes, performing LAN maintenance or desktop support, etc.) that will not enable him to develop his skills for the broader market. Instead, this person would prefer working on interesting projects in a larger computing environment (i.e., a larger company) that is committed to industry standards and using leading edge technology. Ultimately, most medium and smaller-sized companies, especially non-technical firms, cannot offer a career path that is attractive or afford the required IT personnel—as they simply do not have enough interesting work to keep these IT experts busy. As such, there continues to be a migration of the limited amount of skilled IT professionals to larger companies. Interestingly, many of these larger companies are outsourcers that have been retaining these employees through outsourcing contracts, which is illustrated in Table 3.

TABLE 3:
EXAMPLES OF MIGRATION OF TALENT
TO LARGER COMPANIES

- Approximately one-third of the 15,000 people IBM Global Services hires every year comes from outsourcing deals.
- CSC has added over 13,000 IT employees through 47 outsourcing contracts since its General Dynamics contract win in 1991.

Source: IDC

Focus on Core Competencies. With trends such as privatization, globalization and e-commerce rapidly reshaping the competitive landscape in many industries, companies want to focus more intensely on their core competencies. By utilizing an ASP, operations personnel can focus on product research, development and marketing. Internal IT personnel, if an IT department even exists, can focus on more strategic initiatives, such as streamlining a supply-chain or next generation network planning, rather than being inundated by rudimentary projects, such as retaining employees or mundane maintenance and IT plumbing. For instance, we estimate that over 25% of a CIO's time is spent on simply hiring, motivating and retaining qualified IT employees. In short, the ASP model enables an IT administrator to focus on more high-impact projects that can enable his firm to differentiate itself from the competition.

Improved Business Agility, Scalability & More Rapid Deployment Timeframes. Utilizing economies of scale with capital investments and their superior intellectual IT capital, ASPs can develop, maintain and manage superior infrastructure for hosting and managing a client's applications. Generally, this infrastructure may consist of a highly reliable, dedicated, secure and a fully redundant global network, as well as servers and operating systems, databases, system management software, multiple types of applications for rent, rapid implementation methodologies and highly competent application engineers and IT professionals. In addition, an ASP's network is usually linked to the Internet via several major Internet backbone providers, enabling customers to bypass congested public exchange points. Table 4 highlights several benefits from an ASP's infrastructure that a smaller company might not be capable of building internally.

TABLE 4:

- Server Clustering
- Multi-path routing
- Daily tape backup
- Data mirroring to remote locations
- Continuous & uninterrupted power supply (UPS)
- Redundant network connections
- Tools to monitor and tune databases & applications to scale

Source: Corio

As businesses attempt to expand their business operations either through vertical market or geographic expansion, or merger/acquisition, firms require the agility to rapidly scale their technological infrastructure to support their business expansion. Specifically, we believe ASPs' infrastructure will enable greater scalability due to the following two reasons:

- **Cheaper Costs.** Again, ASPs enable customers to avoid large up-front capital investments that can often times be too costly for a smaller and medium-sized business. This in itself has limited many companies' ability to be competitive and expand rapidly. Indeed, the ASP model is the ultimate leveler of the playing field in this respect.

- **Shorter Deployment Periods.** By utilizing an already established, more easily scalable technological infrastructure and standardized software, ASPs enable an existing or new customer to get up-and-running in a relatively short time-frame, i.e., a matter of days or weeks. According to Meta Group, the average deployment period of an ERP application continues to be over twelve months. For many complex applications, this is an extremely important point, as shorter deployment periods reduce the amount of time until a customer begins realizing a return on its investment.

Ultimately, shorter deployment periods and enhanced market agility may be the most significant value-propositions of the ASP model

Ultimately, shorter deployment periods and enhanced market agility may be the most significant value-proposition of the ASP model. For instance, Fortune 100 firms can afford the total cost of ownership of an ERP application, have a reliable network, competent application engineers, etc. However, with so many projects and business-line executives demanding various functions, it can often take in excess of 15 months to deploy an application. There have been many instances in which applications never go live—and are later scrapped after hundreds of thousands of dollars and months of work. And by the time the application deployments that are successful go live, many of the required functions have changed, potentially making some uses of the packaged application outdated. Meanwhile, as the clock ticks, it is taking longer for firms to utilize these applications to reduce costs, boost productivity and enhance customer service—placing a customer at a competitive disadvantage.

According to Forrester Research, Internet commerce revenues will grow from approximately $10 billion in 1997 to $183 billion by 2001

Growth of E-commerce & Internet Applications. The Internet is revolutionizing the competitive landscape for almost every market. Whether simply a marketing and information tool, or an actual channel for conducting sales transactions, the Internet is redefining the very concept of how companies will conduct business in the next millennium. According to Forrester Research, Internet commerce revenues will grow from approximately $10 billion in 1997 to $183 billion by 2001. Meanwhile, IDC estimates that the number or worldwide web-users will reach 319 million in 2002, up dramatically from 68 million in 1997. As such, many companies will increasingly demand to build and maintain e-commerce sites, which will become absolutely essential for businesses--not just to flourish--but also to survive. Many firms will require the application expertise to avoid having their site “crash” and, again, will also struggle to afford the total cost of ownership of an e-commerce site.

Beyond this initial focus of business-to-consumer e-commerce, firms are realizing the potential benefits of business-to-business web-solutions. Firms are looking to connect their internal systems to external suppliers’ systems via an extranet, as well as their e-commerce systems with their traditional ERP systems—thus creating an integrated electronic supply-chain management and trading system. However, many web applications are being hosted by outsourcers, making the integration between these web applications and ERP applications that are hosted in-house difficult. Indeed, the growth of web applications has not only created a growing need for web application management expertise, but also the need to integrate a patchwork of applications, which are increasingly being located at distributed locations. Using an ASP, firms can be relieved of these problems, as ASP’s can more easily integrate these solutions by housing them at a single site or server farm.

MARKET ENABLERS

Over the past couple of years, there have been several key technological advances that have enabled the ASP model to become feasible. Although we do not consider these advancements market drivers, they are critical developments and "market enablers" that are worth noting below:

- **Advances in Networking Technology** have created additional bandwidth capacity, which has, in turn, enabled applications to be more feasibly used over the Internet since many performance bottlenecks have been eliminated. Specifically, this expansion in bandwidth capacity has, in large part, been occurring due to two major factors: the build-out of world networks (i.e., the Internet) and improvements in bandwidth capacity.

  The Telecommunications Act of 1996 deregulated local markets, breaking up local loop monopolies and allowing many new start-up telecom providers, such as CLECs, to enter these markets

  Increasing Size of Networks. Over the last couple of years, the raw size of the world's networks has grown tremendously, due, in large part, to several factors. First, new backbone carriers, such as Qwest and Level 3, have emerged in addition to the traditional carriers, such as AT&T, MCI/Worldcom and Sprint. These new carriers have been building additional long-distance fiber lines across a variety of geographies. Second, the Telecommunications Act of 1996 deregulated local markets, breaking up local loop monopolies and allowing many new start-up telecom providers, such as CLECs, to enter these markets. These new entrants, which includes both CLECs and new backbone providers, are building additional fiber lines and, thus, additional capacity, as well as also causing increased competition, creating more affordable prices. Third, many traditional local-loop providers have been upgrading their inefficient networks with more advanced fiber lines.

  Improvements in Bandwidth Capacity Technology. The adoption of wave-division multiplexing technology has enabled multiple light waves, which carry data streams, to be transmitted over a single fiber optic line, creating an extremely cost effective way to deliver additional fiber optic capacity. In the future, the bandwidth capacity is expected to only improve, as firms, such as Lucent and Nortel, continue to push the envelope with wave-division multiplexing technology. (For more details on advancements in bandwidth capacity, see CEUT's *Broadband Access Report: Solving the Bandwidth Bottleneck* dated January 1999.)

- **Internet Enabled, or Deliverable, Software.** Innovations in application architectures are creating a more efficient method for delivering applications on a remotely hosted basis. In recent years, client server computing has been enabling application processing to be shared between a desktop client and a network server. This has created both enormous improvements in productivity for end-users and enormous headaches for IT personnel to keep these applications up-and-running.

More recently, the development of thin-client technology is introducing the idea of pulling application computing back to the server from the desktop client, leaving only a small slice of the application on the desktop. The concept of thin-client computing has several major benefits--but perhaps the greatest contribution to the ASP model is its ability to minimize the amount of data moving between the server and the client. This is reducing network congestion and improving the consistency of application performance and availability over a wide area network.

- **Improvements in Distributed Systems Management Software** over recent years have enabled IT departments, and now ASPs, to more effectively manage their IT resources across a wide area network. Sophisticated software modules and agents, such as network performance management software, are being used in identifying network bottlenecks, performing capacity planning and load balancing duties, smoothing out minor disruptions and avoiding system failures. Today, various types of system management software, such as storage, performance, security, network, frameworks, etc., are enabling IT departments to tightly monitor their applications and guarantee 99%-plus levels of availability, performance and security across a distributed wide area network. (For more details about system management software, see CEUT's *Storage Management Software Report: Managing the Data Explosion* dated April 1999 and CEUT's *Network Management Software Report* dated June 1999.)

In the end, these continuing improvements in technology will be critical for the delivery of applications over public networks; as the U.S. Department of Commerce estimated that in 1998, the volume of data flowing over the Internet was doubling every 100 days.

ASP MARKET GROWTH RISKS

Below we highlight several major inhibitors that could potentially slow the development and growth of the ASP market:

- **Customer Education.** ASPs' biggest competition today is educating the customer about the potential benefits of the ASP model over both the traditional application outsourcing model and a customer's internal IT department. ASPs must be able to put to rest many customer misperceptions and fears about security and availability. If ASPs are unable to address these concerns and adequately education their potential customers about the ASP concept, then the market's growth could slow.

- **Poisoned Well Concept.** Since the ASP concept is a relatively new and unproven model, any major disasters by one ASP could significantly impact other ASPs. Customers could associate individual disasters with the entire industry and the ASP model rather than an individual company. For instance, if USinternetworking were to lose a customer's data and the problem was very specific to USi, we suspect other ASPs, such as FutureLink, might lose customer leads. These other public ASPs would also trade down significantly in sympathy.

- **Maturity of the World's Infrastructure.** Because applications are delivered on a remotely hosted basis, the ASP model is dependent upon using the Internet or leased lines. Although this is less of a concern in North America, in other less developed portions of the world, ASP developments might be delayed until adequate infrastructure is built.

ASP MARKET SIZING & OPPORTUNITY

In recent months, there has been a flurry of excitement and confusion around the early-stage, high-growth ASP industry. There have been a couple of notable efforts to quantify the size of the current market opportunity. Below we review the following market projections:

- **Enterprise ASP Market.** According to IDC, the enterprise ASP market is expected to reach $2.0 billion in 2003, rising over 91% per annum from approximately $150 million in 1999. (We note that IDC defines enterprise applications as ERP, CRM and high-end e-commerce applications). IDC's projections do not include any ASP solutions that support mid-or low-end e-commerce applications, as well as any collaborative or personal productivity applications. We roughly estimate that the ASP market for these other types of services are at least the size of the enterprise ASP market—however, no official projections have been published to date.

  As can be seen in Table 5, the vast majority of ASP solutions are expected to be delivered in North America in the coming years. As such, we expect every notable ASP in the world today to be building a North American presence. Interestingly, TeleComputing, a leading European ASP based in Norway, recently announced it was moving its headquarters to Florida to attack the U.S. market.

TABLE 5:
IDC's ENTERPRISE ASP MARKET PROJECTIONS

	1999	2003	CAGR
North America	$135.9	$1,415.0	80%
Western Europe	9.1	390.1	156%
Japan	2.5	110.4	157%
Asia/Pacific	1.8	34.2	108%
ROW	1.1	50.4	161%
Total	$150.4	$2,001.1	91%

Source: IDC. Numbers in millions. ROW stands for "Rest of World"

- **Forrester.** According to Forrester Research, the market for renting applications is expected to reach $6.4 billion in 2001, rising over 300% per annum from under $100 million in 1998. We note that Forrester's projections are becoming outdated since they were issued in early 1998. In addition, Forrester has not provided any detailed break-down of this sizing by application type.

- **Estimate of $21 Billion is Often Mis-Quoted.** According to Forrester Research, the overall application outsourcing market is aggressively expected to reach $21 billion in 2001. In recent months, this number has been frequently misquoted in numerous press articles. Again, this estimate represents the overall AO market, of which the ASP market accounts for a significantly smaller portion of the $21 billion.

- **Application Management Transfer Opportunity.** One of the most significant opportunities for ASPs is gaining business without the sale of a new software license. In this scenario, ASPs could gain contracts by transitioning customers' existing software licenses that are managed in-house and moving them to an ASP's facilities. We believe there is a particularly strong opportunity for ASPs to attack this strategy with less complex applications and smaller-sized businesses.

In summary, because it is an extremely early and high growth market, the ASP opportunity is difficult to precisely quantify. What-ever the exact sizing, the bottom line is that the ASP market is expected to evolve into a multi-billion dollar market over the next few years, rising at a hyper-growth rate from under a $100 million in 1998.

DEVELOPING AN ASP BUSINESS OPERATIONS MODEL

Overall, the ASP market represents a fundamental and dynamic shift in the way applications are both managed and delivered to end-users. It is a market that is early in its development and poised for rapid growth, providing an explosive opportunity that will ultimately have a profound impact on information technology. As such, there are a flurry of both new ASP entrants and already established players that are pursuing a variety of different strategies and niches. These ASPs are adopting a variety of approaches in supporting an array of different applications, as well as addressing which components of the ASP model to support internally vs. externally, such as whether to build their own data centers or lease data center space from a third party. In the end, the goal of these strategies can be reduced to a common denominator: how to create the most compelling value proposition to customers, and maximize both profitability and growth. Below we highlight a variety of issues that ASPs will need to address:

- Choosing which type(s) of Software to provide
- Choosing a Software Partner
- Structuring the License Agreement
- Level of Customization
- Level of Support Provided
- Building a Data Center vs. Leasing Space
- Developing a Sales Channel

It will be important for ASPs to strike a balance between driving volume into their business, spreading costs between multiple customers, and providing quality levels of service to each customer

In addressing these issues, ASPs must focus on achieving economies of scale in every element of their business model and infrastructure. It will be important for ASPs to strike a balance between driving volume into their business, spreading costs between multiple customers, and providing quality levels of service to each customer. More than likely, the ASP industry will be broad enough to support more than one successful business model and there will be a number of firms that are able to capitalize on the ASP opportunity—significantly growing revenue and earnings. However, how ASPs address these issues may ultimately determine both how profitable and how much of the ASP opportunity a provider can grasp relative to other providers. In the following pages, we discuss the key issues in developing a successful business model. We believe ASPs will need to carefully consider these issues to optimize the profitability and growth of their businesses.

Choosing a Software Partner

In forming a partnership with an application vendor, ASPs will need to consider an array of factors, beginning with the market share of an ISV (independent software vendor) and whether the vendor will be a market share leader of tomorrow. For instance, our research indicates that several ASPs were turned off from The Baan Company, which is one of the largest ERP vendors in the world, due, in large part, to the company's recent financial instability. In addition to these issues, on the following page we highlight several key criteria that ASPs may want to consider. We note that much of these observations are more relevant to "enterprise ASPs" than non-enterprise ASPs.

DIAGRAM 8:

Source: C.E. Unterberg, Towbin

- **Working with an ISV.** How ready a software partner is to support the ASP model will be a critical issue for enterprise ASPs, including structuring license agreements and working with the ASP to develop standardized templates. To maximize profitability and growth, it will be important for ASPs to minimize deployment periods and maximize their ability to scale. Thus, it will be important for ASPs to choose partners that will work closely with them to develop standardized templates and applications that will run more efficiently over the Internet. By working with the ISV in developing and engineering some unique application features and capabilities on specific hardware platforms, both ASPs and ISVs may be able to create a competitive advantage. To avoid working with an ISV whose resources are spread too thin, an ASP should be aware of how many other ASP relationships an ISV has. Interestingly, geography may be a factor for choosing a partner, as working with an ISV on the other side of the globe could prove difficult, given dramatic differences in time zones, cultures and traveling time. Again, we note that for non-enterprise ASPs, these factors are less significant.

ASPs should look to negotiate some exclusive points to a relationship, which could potentially provide an ASP with a competitive edge

- **Terms of the Agreement.** ASPs should look to negotiate some exclusive points to a relationship, which could potentially provide an ASP with a competitive edge. Negotiating a long-term agreement with an ISV may be important to minimize an ASP's risk of investing a tremendous amount of time and resources into a partnership--only to have the relationship cancelled several months later. For instance, Corio was able to negotiate a 10-year contract with PeopleSoft, while, comparatively, USinternetworking's original agreement with PeopleSoft can be cancelled after 90 days notice. (We note that USi has since re-negotiated its contract with PeopleSoft for a longer time period.) Secondly, ASPs should consider the size of the target market an ASP negotiates with an ISV to maximize the size of their available target market. For instance, USinternetworking negotiated a target market for its PeopleSoft solution of companies with revenues under $500 million, while Corio's target market for its PeopleSoft offering consists of companies with revenues under $250 million.

Exclusivity will be another key issue for ASPs to address with their application partners. Our research found that most ASPs negotiated the right to offer competing applications (e.g., offer both SAP and PSFT financials). If an ASP decides to offer multiple competing applications, it will be important to evaluate potential conflicts, which could ultimately lead to an ISV ending a partnership. Also, ASPs will need to weigh the benefits of a second solution vs. the resources required to build expertise with the second application.

How ASPs address this latter point will be critical in their ability to scale the delivery of their technology and maximize their financial margins

- **Architecture of Application.** The direction an ISV is heading with its architecture will be an important issue for ASPs to consider since architectural efficiency will have a major impact on the performance of an application over the Internet. Choosing an application that can be cost effectively delivered on a remotely managed basis will be a paramount concern, as ASPs address issues such as how many instances of an application can run on a single server and what are the security and performance implications of this scenario. How ASPs address this latter point will be critical in their ability to scale the delivery of their technology and maximize their financial margins.

- **Application Features / Functions.** It will be important for ASPs to select a partner whose applications have a rich set of functions and options that are tailored to an ASP's target market. If an ASP's target market and customer base is growing rapidly, ASPs should consider whether an application has the functions to support this growth--i.e., does the application provide a foundation set of functions and an array of additional capabilities that can be rolled out in a rapid timeframe if needed? ASPs will also want to consider choosing an application that is flexible enough to be expanded into additional vertical markets to minimize the learning curve when expanding into a new vertical.

ASPs can significantly reduce the amount of pirated software

- **Provide Value to the ISV.** To optimize the relationship with a partner, ASPs will also need to provide incremental value to the ISV. We believe there are several major ways an ASP can accomplish this proposition. First, an ASP must successfully create an additional avenue of revenue growth for the ISV and, in the process, potentially create greater stability to an ISV's revenue stream. We note that the second part of this assertion assumes a revenue sharing model, which we discuss in more detail in the next section. Second, by working with software vendors on some of the more complex applications, an ASP may be capable of not only creating a competitive advantage for itself, but also for the ISV. Third, since ASPs are the party that is actually in control of the application, ASPs can significantly reduce the amount of pirated software, as it is estimated that over 50% of all software is pirated, which we believe is particularly useful for ISV's offering non-enterprise applications. Fourth, ASPs can provide aggregated insights to software vendors about what product features are the least and most used, and where customers are having the most problems. Because ASPs can closely monitor the customer's interaction with a software solution, they can help the software vendor better understand how to improve its solution.

Structuring a License Agreement

In structuring a license agreement, ASPs will need to consider the advantages and disadvantages of several options that we discuss below:

Revenue Sharing Model

In this scenario, the application vendor will get paid as the ASP receives its monthly payment from an end-customer, breaking away from payment of a large up-front license fee to the ISV

In this scenario, the application vendor will get paid as the ASP receives its monthly payment from an end-customer, breaking away from payment of a large up-front license fee to the ISV. If the customer cancels the use of an application with the ASP, the ASP's obligation to pay the application vendor is also canceled. There are two major benefits to this type of agreement for an ASP. First, the ASP avoids having to make a large up-front capital investment to purchase a software license, which could be important for a younger, start-up ASP that does not yet have the cash flow to be a financing machine for end-customers. This first benefit could grow increasingly important as customers scale rapidly and license values reach into the hundreds of thousands of dollars. Second, by not purchasing a license outright, an ASP minimizes its risk (i.e., inventory risk) that a customer permanently stops using an application.

In negotiating favorable terms for a revenue sharing model, it will be important to ensure that the ISV understands the potential benefits of this model for them. First, the revenue sharing model creates a more stable and predictable revenue stream for the ISV compared to a big up-front license fee that creates a more lumpy and volatile revenue stream. Second, the revenue sharing model may enable ISVs to penetrate a portion of the market that they were unable to previously penetrate.

Finally, ASPs must keep in mind that many ISVs that are public companies may be resistant to this model because of public market pressures. For instance, if an ISV views the ASP model as simply another sales channel into the same target market, then it may conclude that an ASP will not generate any incremental revenues. Thus, during the transition period of moving more towards the ASP channel, an ISV's license growth rate might slow--significantly reducing an ISV's incentive to offer the revenue sharing model.

On the other hand, if an ISV views the ASP channel as an additional avenue for growth, then the ISV will be more willing to adopt the revenue sharing model since it will create incremental revenue that is more predictable. The majority of software vendors with whom we interviewed indicated that they, at least, partially view the ASP model as an additional sales channel.

Purchasing a License Up-front

ASPs that purchase a license up-front will then rent the use of the license to a customer on a monthly basis. In this scenario, it will be critical for ASPs to negotiate "modular" license contracts. Modular implies that the license can be broken up into sub-licenses and rented out to several different parties. For instance, an ASP can buy a license for 300 seats and break this license up between three customers for 100 seats each. In addition, if a customer cancels a given level of seats, it will be important for an ASP to negotiate the flexibility to re-license these seats to a new customer—which is called "fungibility."

. . . after three years, the ASP would then have a revenue-producing asset with no associated license costs

ASPs that purchase a license up-front will have to evaluate the cash flow analysis of buying the license up-front and using it over the expected life of the application, versus renting the application on a per month basis from the ISV. For instance, if an application has an expected life of four to five years, then it may be more economical for an ASP to purchase the license up-front, initially incurring a large capital expenditure that will be amortized over a given period of time (let us assume three years). After three years, the ASP would then have a revenue-producing asset with no associated license costs. In this scenario, it would be more costly for an ASP to rent an application from the ISV.

Our research indicated that ASPs that purchased a license up-front were able to negotiate significant volume discounts, enabling them to potentially expand their margins and offer more affordable pricing to customers

ASPs will have to determine whether there is enough demand in their pipeline to support the up-front purchase, the probability of potential customers being converted into cash, and the probability that a given application will still be in use after the amortization period ends. It will be important for ASPs adopting this license structure to negotiate access to all future releases and upgrades of a given application. Our research indicated that ASPs that purchased a license up-front were able to negotiate significant volume discounts, enabling them to potentially expand their margins and offer more affordable pricing to customers.

We note that depending upon the specific issues an ASP and an ISV are currently facing, it might also make sense for an ASP to adopt a licensing structure that is a hybrid between the revenue sharing model and the up-front purchase.

Other Technologies

It will be important for ASPs to consider similar issues as it did in structuring software application license agreements with hardware, operating system and other technology vendors. For instance, FutureLink recently announced that it was able to negotiate subscription licensing (i.e., revenue sharing model) with Microsoft for Microsoft SQL Server, Windows NT Server and Microsoft Exchange. At a recent industry conference, both Sun Microsystems and HP also indicated their willingness to offer subscription licensing to ASPs.

Developing a Solution

Once ASPs have selected application partners and structured license agreements with these partners, they will need to focus on developing a cost-effective and value-added product that is scalable and can be quickly rolled out to customers. In accomplishing this objective, ASPs will need to address a variety of issues that include customization, developing standardized templates, integration, customer support, and product pricing. Below we review these key issues:

Customization: To customize or not to customize?

ASPs must strike a balance between the level of customization offered and getting a customer up-and-running in a rapid timeframe

Keeping in mind that the ASP model is supposed to be a one-to-many model, ASPs must strike a balance between the level of customization offered and getting a customer up-and-running in a rapid timeframe. Although most ASPs will offer pre-packaged applications, customers will still require some level of basic customization. So where is the balance? How enterprise ASPs address this issue and price their customization services will be paramount in optimizing profitability.

Most ASPs we spoke with indicated that they only offer configuration services to customers. We define configuration as identifying business processes, mapping out those processes, figuring out how to implement those business processes with a given application and, if a legacy system exists, transferring all of the legacy data over to the new system. Configuration may specifically involve such tasks as changing the workflow of an application, the presentation of a screen and, perhaps, the data model. Configuration does not involve any heavy customization that involves re-writing code to develop specialized business functions. We believe that ASPs that offer heavy customization will have to overcome several extremely difficult hurdles:

- Heavy customization significantly lengthens the deployment period and, thus, lengthens the time until a customer begins realizing the benefits from the application.
- There have been many horror stories about heavy customization of complex packaged applications that were "years delayed and 100's of percent over budget."
- Heavy customization may be outside the core competency of an ASP and more inside the competency of the application vendor.
- Keeps the ASP in the one-to-one stage of the ASP model, limiting a provider's ability to sign up new customers.
- Heavy customization creates enormous difficulties in upgrading customers to new versions of an application.

The basic principle of the ASP model is to leverage economies of scale in providing application management services to customers and create a one-to-many relationship. Despite this goal, the integration and deployment stage of the ASP model will always be a one-to-one process—especially for complex applications. Thus, ASPs must determine the most efficient methods for limiting the time that they spend in this process. Indeed, how ASPs develop this ability will be critical for deploying a new customer quickly, moving on to new customers, leveraging economies of scale on the application management side and, ultimately, maximizing revenue growth and profit margins. Interestingly, FutureLink has altogether avoided this one-to-one configuration process by partnering with system integrators to provide this service.

Developing Standardized Templates

Developing standardized templates will be one of the most critical methods for accomplishing the goal of minimizing deployment periods

Developing standardized templates will be one of the most critical methods for accomplishing the goal of minimizing deployment periods. For instance, within a specific vertical market, typically 80-85% of the configuration performed is universal between companies. It is the remaining 15-20% that is specific and unique to each company. Therefore, by pre-configuring 80% of the options for an application into standardized templates, ASPs can significantly reduce deployment periods and costs. For instance, a controller might be able to choose if he wants his customer numbers to look like "$$$-###" or "###-$$$" or "$#$#$#." There can be hundreds of similar choices. ASPs that have the expertise and understanding of a specific market, and are able to work closely with their ISV partner, will be capable of developing standardized templates that enable them to scale quickly and in a cost-effective manner. For example, consider a customer that is building a new plant and needs a new application to support its operations at this plant. By utilizing pre-configured templates and not engaging in any heavy customization, an ASP would be capable of implementing an application by the time construction for the plant is finished, enabling the plant to become fully operational in a relatively shorter time period.

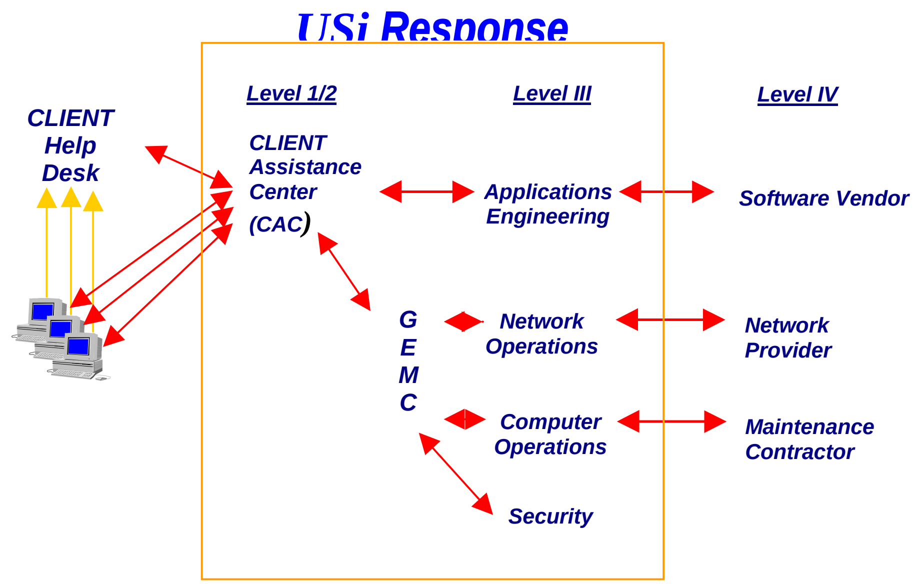
Our research indicated that most ASPs are charging a small, up-front fee for configuration services. We believe this is a preferable alternative to embedding the charge within a monthly rental fee for two reasons. First, customers typically perceive that they are receiving more value from the ASP by paying something up-front. Second, if a configuration fee is embedded in the monthly rental fee, then every time a customer needs additional configuration, the monthly fee will fluctuate. This can become confusing to customers, causing sales cycles to lengthen, eliminating a fixed and predictable cost for a customer and, potentially, creating a feeling that the customer is getting short-changed.

Integration

As ASPs build their offerings, it will be critical for them to plan for the integration between applications. Integration, by its very nature, is a custom job; thus, it is a process that pulls an ASP away from the one-to-many model. At the same time, the integration of applications to create entire business processes can create enormous value to a customer. Therefore, it will be important for ASPs to strike a balance between providing integration value and minimizing the one-to-one integration process.

Similar to the development of templates for single applications, ASPs should develop standardized templates for integrating applications to address a select few, but key, business processes. For instance, it might be possible to create over 25 business processes by fully integrating a Human Resource application with a Financials/Accounting application and a Distribution application. Of these 25 processes, a customer may only regularly require or need five processes. The remaining 20 processes will be seldom used, if at all, and the time it takes to complete this integration is quite extensive. Thus, by focusing on developing standardized templates for integrating a select few business process between applications, ASPs can minimize integration times and decrease deployment periods.

DIAGRAM 9:
CUSTOMER SUPPORT EXAMPLE:
USI'S CLIENT CARE STRUCTURE



Source: Usinternetworking

Client Care & Customer Support

Most ASPs today offer a multiple tiered support organization in which Level I typically involves fielding a call and identifying the problem. Level I may also include a dedicated web site for each customer that contains instructions on a variety of potential inquires, including a most-frequently asked questions section. Level II involves working with the customer to solve more simplistic questions and problems—such as "how to use" questions. Interestingly, Corio finds that the majority of its calls are "how to use" questions. Depending on the application and level of support an ASP is providing, Level I and II support personnel may be the same people.

Level III consists of application engineers, network and computer operations personnel, and security professionals that are experts and specialists in their respective areas. Once a problem is identified as being more technical in nature, Level I/II support will contact Level III personnel to help solve the problem. Incidentally, the majority of the time a problem is severe enough to reach Level III, the ASP is already aware of and working to solve the problem well before the customer calls.

In some instances, the problem could be so technical or complex in nature that Level III personnel might need to contact the original technology vendor. For instance, if there was a major problem with the code of an application, application engineers at the ASP would contact the software vendor for further assistance. Meanwhile, if a network goes down outside the control of the ASP, then the network operations personnel at the ASP would contact the network provider to solve the problem. Incidentally, the majority of ASPs are using multiple ISPs and telecommunications providers. Thus, if service from one provider goes down, an ASP can immediately switch over to a second provider.

The quality of customer support will ultimately be key to both gaining a competitive edge and success for an ASP

The quality of customer support will ultimately be key to both gaining a competitive edge and success for an ASP. Several ASPs are providing their customers with dedicated "800" numbers that connect customers directly to customer support teams. These support teams are available or are backed up by engineers on a 24x7x365 basis. ASPs should consider tightly compensating their support personnel based on a level of customer satisfaction and retention.

One of the major issues in supporting a client will be how to manage potential finger-pointing between different levels and components of support. For instance, networking engineers might initially refuse to help solve a problem because they believe it is an application problem, while application engineers might do the same because they believe it is a network issue. To solve this potential bottleneck, USinternetworking only writes a single "trouble ticket," which enables the various components of its support organization to easily track and work together to solve problems. In the end, providing a single point of contact will be critical for customer satisfaction and retention, as customers will not want to deal with multiple parties. As a result, it will be important for ASPs to be responsible to the customer for every component of the ASP model.

Clearly, there will be different levels of customer support, which will have varying prices, based on the various computing and business needs of a customer. As a result, some ASPs may vary in their degree of customer support guarantees based on varying customer target markets. Finally, it will also be important for ASPs to establish clear and solid service-level agreements with each customer and establish boundaries of responsibility.

Customer Pricing

Depending on the solution offered, ASPs will need to evaluate whether to use a subscription or a transaction-based pricing model. In the vast majority of cases today, ASPs are using a subscription-based model, which consists of customers paying a monthly per user rental fee to the ASP. With some unique types of applications, such as a consumer tax-return application, it may make sense for ASPs to charge customers, or consumers, on a per transaction basis. ASPs offering the subscription-based model should consider offering several per user prices, depending on the type of end-user. For instance, Corio prices its offering to customers based on three types of users: active users, casual users and web-users (infrequent users). Finally, some ASPs may offer traditional application pricing that consists of buying the license entirely up-front.

For configuration, most ASPs are charging a single up-front fee. However, in some instances, ASPs are embedding the configuration fee within the monthly fee. Interestingly, Applicast, a start-up ASP in California, charges a steady per company monthly fee for configuration services and a monthly per user charge. As a customer grows rapidly and adds more users, Applicast believes its pricing will remain competitive since the per user charge is a smaller incremental fee.

Developing a Sales Channel

In developing a direct sales channel, we believe it will be important for ASPs to address the following issues:

- **Direct Sales Force Education.** To effectively sell a solution, an ASP's direct sales force will need to develop competencies with each of the applications that it offers. Our research indicates that many ASPs are sending their direct sales force through training with the direct sales force of the application vendor. It will also be important for an ASP's sales force to recognize that the psychology of the ASP sale is quite different from the traditional sale of an application.

. . . . it will be important for ASPs to closely monitor whether an ISV is actually compensating its sales people equally

- **Eliminate Sales Conflict.** Of critical concern will be eliminating any potential sales channel conflict between the sales forces of an ISV and an ASP. It will be key to compensate an ISV's sales force the same for either a traditional or an ASP sale. Many application vendors will want to be responsible for compensating their sales force for the ASP sale. As such, it will be important for ASPs to closely monitor whether an ISV is actually compensating its sales people equally. Additionally, to minimize any potential conflicts, ISVs may restrict ASPs from "solely" pursuing a portion of their target market, such as allowing them to only target companies under $500 million in revenues.

  Another major issue will be the timing of sales persons' commissions from an ASP sale. Since the average life of a sales person with an ISV is about two years, most sales persons will prefer to receive their traditional up-front sales commission—rather than an annuity commission from the ASP sale. Although an ISV's sales force is an excellent sales channel philosophically, we believe sales channel conflicts might ultimately be difficult to overcome.

- **Educate & Leverage an ISV's Direct Sales Force.** ASPs should structure their ISV relationship in such a way that they can leverage the ISV's sales force. An ASP's sales force should work with an ISV's to exchange potential leads. As such, it will be important for ASPs to educate and motivate an ISV's direct sales force about the ASP model and how it can help them increase commissions.

Many ASPs are also developing a sales strategy with indirect channels. Below we highlight several of these indirect strategies:

Interestingly, Sun Microsystems has indicated that in 5-10 years, it believes its only customers will be ASPs

- **Hardware Partners.** ASPs should consider forming strategic reseller partnerships with key hardware vendors that want to bundle some value-added services with their commoditized hardware. In this instance, a hardware vendor would resell an ASP's services to a customer and then its hardware to the ASP to deploy the customer's new application. For instance, netASPx, a start-up and pure play ASP vendor in the Washington, DC area, has reached a strategic relationship with Sun Microsystems. Interestingly, Sun Microsystems has indicated that in five to ten years, it believes its only major customers will be ASPs.

- **Systems Integrators & Consultants (VARs).** ASPs should also consider partnering with firms that work on the integration or consulting portion of deploying an application, but do not have the infrastructure or resources for the ongoing management of the application. In the lower end of the market, this strategy might be particularly successful since many VARs "own" the relationship with their customers. Interestingly, this has been FutureLink's primary sales strategy.

- **Telcos & ISPs.** Telecommunications companies will present some excellent opportunities for ASPs to partner. These firms' whole motivation for living is to maximize the use of their bandwidth and many of them would be more than willing to resell some more value-added ASP services—since they would be a direct beneficiary if the ASP, in return, agreed to use the telco as its carrier. For instance, USinternetworking is partnering with US WEST to distribute its e-commerce solutions in a 14-state region.

- **Vertical Specific Business Advisors.** Depending on the types of applications being offered, it may make sense for an ASP to partner with a vertical specific business. For instance, Healtheon, which is a vertical ASP and software vendor that focuses on the healthcare industry, recently signed a five-year reseller agreement with TPA—the largest independent healthcare administrator in the U.S. As a result, many of these vertical specific business advisors will be extremely excited about reselling an ASP's solution, as it provides them with more value-added services to offer their customers.

- **Internet Portals.** Again, depending on the type of application being offered, ASPs should consider partnering with some Internet Portal companies that have a significant audience with an ASP's target market. For instance, Campus Pipeline, an Internet Portal firm that caters to the higher education market, could be an excellent target for ASPs wishing to sell email or office productivity (Word, Excel, PowerPoint) solutions to college students. Interestingly, Campus Pipeline has already become a front-end for accessing and using several of SCT Corporation's (SCTC) higher education applications. In addition, Critical Path (CPTH) has a relationship with E-Trade in which E-Trade uses CPTH to host email accounts for its customers.

- **Customers.** ASPs should be aware that their own customers could create some solid sales leads. For instance, a manufacturing company that is using an enterprise ASP might refer its distribution partner to the ASP, as it would want the distribution partner to use the ASP to build an integrated trading system, which would be created, hosted and managed by the ASP.

ASPs should search for ways to optimize relationships with both ISVs and indirect partners in order to reduce the amount of resources invested in their own sales organization

In summary, ASPs should search for ways to optimize relationships with both ISVs and indirect partners in order to reduce the amount of resources invested in their own sales organization. Specifically, we believe this is important in an emerging market where per customer acquisition costs are extremely high—as the ASP must not only convince a customer that its own solution is valuable, but must also educate the entire market about the value of the ASP concept. As the market matures, utilizing indirect channels will also help eliminate some of the capacity constraints of a direct sales force. As such, indirect channels enable ASPs to devote more resources to the ongoing management and enhancement of applications, as well as to other R&D initiatives, such as configuring standardized templates or developing a thinner computing platform.

Type of Application to Offer & ASP Strategy

The key to optimizing earnings growth for ASPs will be their ability to build a large customer base, scale rapidly, drive volume and economies of scale through their business, and cross-sell additional applications into their installed base

The key to optimizing earnings growth for ASPs will be their ability to build a large customer base, scale rapidly, drive volume and economies of scale through their business, while cross-selling additional applications into their installed base. Before ASPs choose a software partner, they first will need to select an application offering strategy. ASPs will need to select what type of application to offer and whether to focus on a horizontal or vertical strategy.

ASPs that are able to cross-sell additional applications will be able to gain incremental revenues at presumably lower costs and higher profit margins. Thus, the application heritage of an ASP, or the type of application an ASP first offers, will play an integral role in what type of strategy an ASP adopts. Below we review several strategies:

DIAGRAM 10:
ASP BUSINESS STRATEGIES

	Vertical	Horizontal
Upstream Approach	Corio AristaSoft Applicast	USinternetworking FutureLink
Downstream Approach		NetASPx Critical Path TeleComputing

Source: C.E. Unterberg, Towbin

- **Upstream Strategy.** With an upstream strategy, ASPs begin by offering applications that bring the most immediate and largest amount of strategic value to a customer, i.e., applications that customers desperately require, such as e-commerce or CRM. These are typically complex applications in which it is often difficult to build the adequate in-house management expertise. Interestingly, this is the same criteria that drives many systems integration and consulting practices, making these firms strong candidates to enter the ASP market with this type of strategy. Both Eggrock Partners and BrightStar Information Technology Group (BTSR) are examples of firms that are transitioning more towards the ASP model.

Beginning with complex applications provides an ASP with a greater defensible position against future competition

Beginning with complex applications provides an ASP with a greater defensible position against future competition. The skill set required to manage and deploy complex applications, such as ERP or CRM, is far greater than the skills needed for less complex applications, such as email. Therefore, from an expertise standpoint, it will be much easier for ASPs to move downstream vs. moving upstream in cross-selling additional applications.

Customer loyalty to an ASP will be directly related to the importance and strategic value of an application

Customer loyalty to an ASP will be directly related to the importance and strategic value of an application. ASPs that provide complex applications will become fundamentally entrenched with the customer because these complex applications facilitate the majority of the customer's business. For instance, if a customer ever requires an e-commerce solution, then the new solution will need to be integrated with its transaction system—which is work that will be done by the ASP. Thus, it will make sense to have the existing ASP host the new e-commerce solution. In addition, if an enterprise ASP was responsible for all of the implementation work—then it will be difficult and costly for a customer to switch ASPs after the originally application is installed.

By beginning with a more complex application, an ASP is viewed as a strategic partner to the customer due to two reasons. First, the ASP has probably spent time with almost every executive staff member of the customer. Second, the application holds more value to the customer. Again, the key here is to cross-sell additional applications into a customer base and the "upstream" approach strategically positions an ASP to accomplish this goal.

However, ASPs should also be aware that this approach is more risky, requires a greater level of expertise and is more difficult to accomplish from scratch. Sales cycles will be longer and the volume of customers with this approach will be smaller. Since the upstream approach begins with complex enterprise applications, which are extremely mission critical and require high levels of performance, availability and security on a 24x7x365 basis, this approach requires a greater investment in infrastructure and, thus, will have a higher cost structure than a downstream approach. As a result, ASPs pursuing an upstream approach must carefully balance the competitive pricing of their solutions with their cost structure in order optimize profitability over the long run.

- **Downstream Approach.** ASPs that adopt this approach will begin by hosting applications that are less complex in nature, such as collaborative applications, which will provide more value with productivity gains rather than in creating a competitive edge. ASPs that are adopting this strategy believe that the technical management of these applications will not provide customers with any strategic advantage. Thus, customers will be more inclined to outsource the management of less complex applications and will focus on "how to use" these applications more productively to create a competitive advantage. These ASPs also believe that it will be easier to gain customer acceptance of the ASP model and there will be lower risks of making a mistake. In the future, it could make excellent sense for a downstream ASP to merge with an upstream ASP.

One of the most attractive characteristics of this approach is the enormous size of the target market and potential volume of end-users--ranging from end-users in a large enterprise to end-users at many medium and small companies. Since most of these smaller-sized companies have little or no IT expertise, many of these customers will be inclined to outsource the management and implementation of these less complex applications. Furthermore, since less complex applications are less difficult to transfer ownership—a significant play for downstream ASPs may be to win new customers by having them imply transfer the management of their existing licenses from inside their companies to ASPs.

In addition to application heritage, an ASP's target vertical market will be a second element in determining an ASP's strategy and its ability to cross-sell. Below we review the benefits and difficulties of a vertical and horizontal strategy:

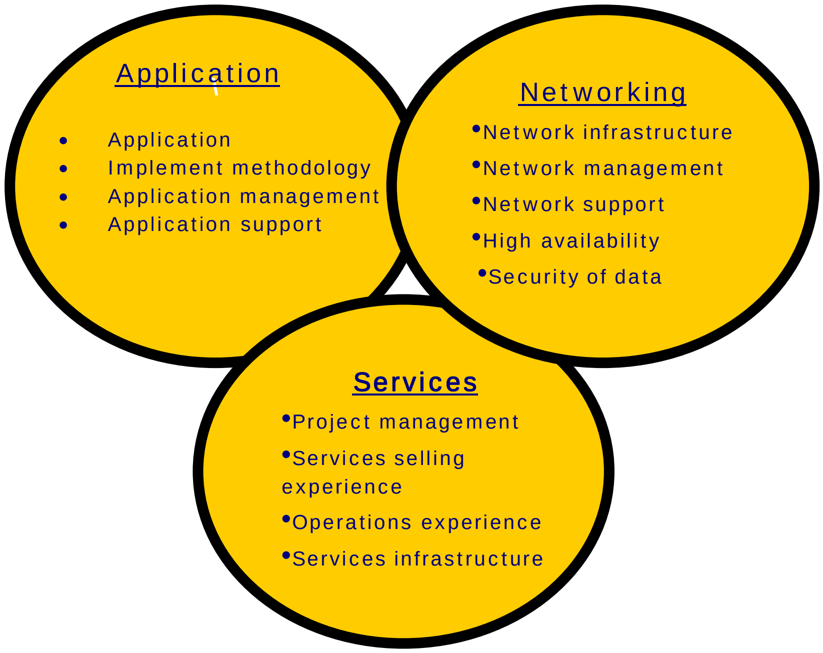
- **Horizontal Strategy.** ASPs adopting a horizontal strategy may sign up several software partners and focus on a variety of vertical markets. Horizontal ASPs will not limit their target market and will seek to sign up customers in a variety of vertical markets, building expertise in these vertical markets as they go along. Most likely, and especially with complex applications, horizontal ASPs will begin by only focusing on a select few applications and a specific customer size, such as companies with revenues under $250 million.

  Horizontal enterprise ASPs deploying and managing complex applications will find that they must develop multiple standardized templates, which could initially be challenging since it requires expertise in multiple vertical markets. (See Customization discussion on page 30 for more details on standardized templates.) For instance, an ASP that is initially attacking four or five vertical markets may find that the level of universal configuration between these four markets is only 50%. Thus, horizontal ASPs will may be challenged in minimizing deployment periods and finding the devoted resources to develop multiple templates for each vertical market.

  On the other hand, it will not be as difficult for horizontal ASPs that begin "downstream" to develop the in-depth expertise per application offered since these applications are less complex in nature. Thus, ASPs pursuing a horizontal focus may be well served to also begin downstream.

- **Vertical Strategy.** Vertical ASPs focus on providing a specific vertical market and target customers with a full-set of applications. For instance, AristaSoft and Corio are targeting emerging high-tech companies, while World Technology Services is focusing on the construction industry. Using their extensive expertise and understanding of a specific market, vertical ASPs will focus on developing highly standardized templates for both single applications and the integration of multiple complex applications. As a result of their focus, vertical ASPs may be capable of deploying a solution faster than a horizontal ASP and limiting its time in the "one-to-one" stage of the ASP model. However, vertical ASPs may potentially limit their market opportunity by having too narrow of a focus, especially vertical ASPs that only offer less complex applications. Vertical ASPs should carefully consider expanding into adjacent and closely related vertical markets to best leverage their pre-existing vertical expertise.

DIAGRAM 11:
ASP CORE COMPETENCIES



Source: IDC

ASP CORE COMPETENCIES

ASPs will need to build a hybrid of application, networking and services competencies

As we discussed in a previous section, there are several major components of the ASP model, including connectivity services, network infrastructure and data center facilities, the software application, platform and other technologies, systems integration and implementation services and, finally, ongoing application management and support. With so many components that require extensive expertise, the ASP model will certainly be difficult to manage end-to-end. As such, we have already seen many ASPs outsource several components of the ASP model to a third party. Still, in order to provide customers with the best service and, thus, remain competitive, ASPs will need to build a hybrid of application, networking and services competencies. In the following pages, we review these three key ASP competencies:

Services Competencies. On a services front, ASPs must develop systematic methodologies for efficiently managing and delivering an application project. Because technological computing environments have become extremely complex, there can be little room for confusion with implementations and upgrades of mission critical applications. ASPs must understand that application administrators can often find themselves overwhelmed as they attempt to balance and handle day-to-day operations, daily crisis and a mission critical implementation process. As a result, ASPs must devote dedicated resources to managing an implementation process and developing structured methodologies.

ASPs must specifically build strong project management skills that range from basic planning and scheduling to risk management, contingency planning, resource management and prioritizing high-level business objectives. Below we review several key project competencies:

- **Scheduling.** ASPs must build realistic project schedules and understand all of the various participants and parties being impacted by a project. With scheduling, it will be important to define a certain level of detail and milestones in order to assign project accountability, and track and ensure project progress.
- **Resource Analysis.** Implementations and upgrades are "human capital" intensive, leading to personnel resources being pulled in a variety of directions and tasks. As this occurs, many projects can inefficiently utilize human capital, as each project can be unique and unpredictable. ASPs will need to develop a methodology for effectively managing its resources.
- **Cost Analysis.** Overall costs for traditional application implementations have often run significantly over original budgets. ASPs should track and break down budgets into detailed levels in order to closely monitor and control any project components that begin to run over budget.
- **Overall Management Disciplines.** ASPs must develop application implementation processes that include periodic reviews with key personnel and construct a high level view of the overall implementation process, which includes highlighting trouble areas and unresolved issues.
- **Training Competencies.** ASPs will need to build skills to properly train customers how to use an application once it is implemented.

Finally, ASPs must understand how to deliver and manage a customer's solution from a service perspective, including understanding how to market and sell their solutions as a service.

Networking Competencies. ASPs will need to provide a data communications connection between a customer's desktop, or laptop, and the application running at the ASP's server farm. The first part of this service involves competencies in monitoring, troubleshooting and integrating wide-area networks. For instance, ASPs must be able to monitor and integrate the process of receiving data over a Sprint line and then redirecting the data through a Uunet or Verio connection. In terms of troubleshooting, an ASP must be able to build a Network Operations Center (NOC)—whether they are leasing data center space or building their own facilities--to effectively monitor the performance and availability of its network and identify network problems before a customer ever calls to report the problem. Finally, ASPs must understand how to manage relationships with multiple long-distance carriers and which network protocols, such as Frame Relay or ATM, make the most or any sense for each customer.

ASPs must also build competencies in managing and constructing internal or local area networks (LAN). For ASPs leasing data center space, this component of the network is what is built inside a "cage." ASPs will need to be capable of architecting and configuring a LAN to maximize both throughput and network capacity, as well as optimizing network scalability to support tens of thousands of users. For instance, ASPs might need to understand how to efficiently configure all of the switching algorithms. As with the WAN, ASPs will need to have competencies in monitoring and troubleshooting the LAN portion of their network.

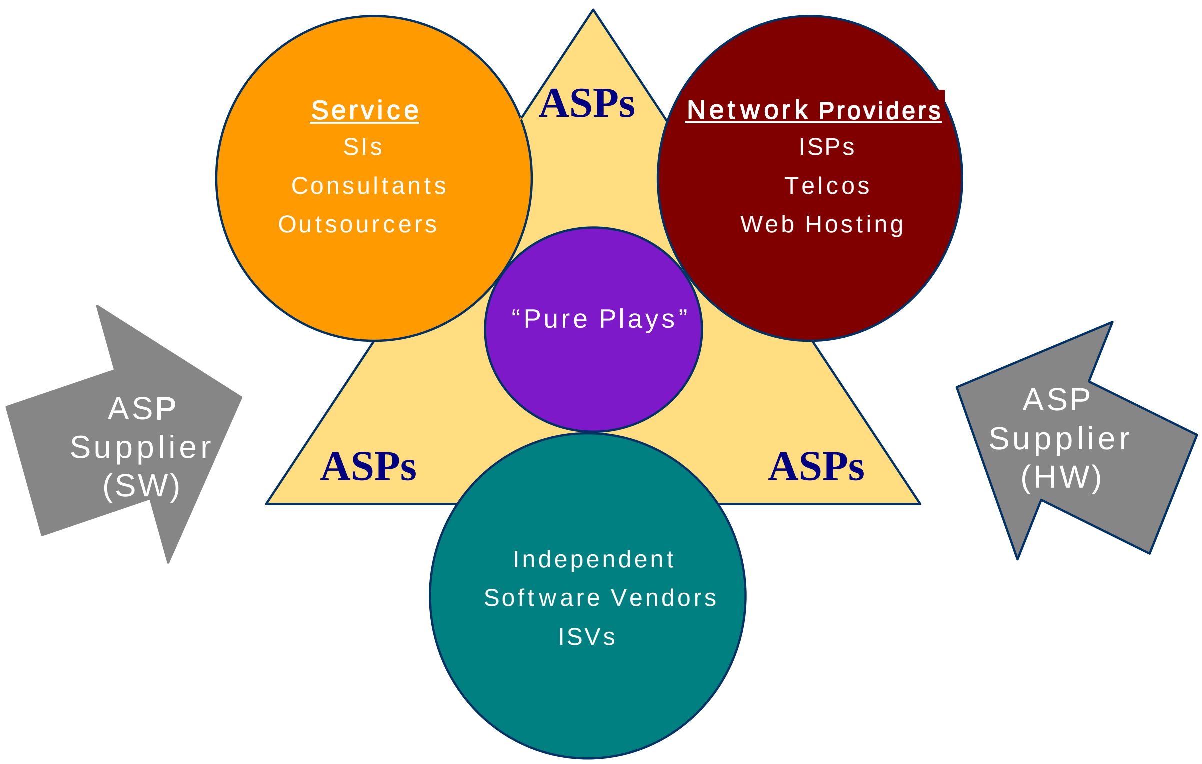
From a technical standpoint, ASPs will need to develop expertise with operating systems and how to integrate various applications to optimally run and interact with an operating system.

Application Competencies. From an application perspective, ASPs will need to first provide an application to a customer and have some expertise in how that application operates. Next, ASPs will require expertise with application deployment and systems integration services, which includes several competencies. First, a rapid implementation methodology that involves understanding how to analyze a business, identify its business processes, map out those processes and apply those business processes and functions with a given application. Second, ASPs will need to develop standardized templates to reduce the amount of configuration and customization work. Third, from a technical standpoint, ASPs will need to develop expertise with operating systems and how to integrate various applications to optimally run and interact with an operating system. Incidentally, part of this technical expertise may include integrating an application into a thin-client platform, such as Citrix. Fourth, an ASP will require competencies in ensuring that the client, or desktop, is ready to go live, which could simply involve installing a web-browser.

Finally, ASPs will require competencies in supporting the ongoing management of their application environments, including a keen understanding of how a given application interacts with an operating system. Several other ongoing application support functions include: integrating applications into mirroring and system management tools, tuning specific databases, 24x7 backup services and integrating databases with mirroring systems.

We also note that implementation and ongoing management competencies are not simply a one-two punch. Instead, they are a continual process, or lifecycle, that ASPs need to understand how to manage.

DIAGRAM 12:
CATEGORIES OF ASP PLAYERS



Source: IDC

ASP PLAYERS

Due to the broad set of competencies required to be an ASP, there are a diverse set of firms that may participate in the Application Service Provider market. Depending on an ASP's heritage, an ASP will be stronger in some competencies and weaker with others. As such, below we highlight the different types of potential ASP players:

- **Telcos and ISPs** provide their network and WAN infrastructure for the "connectivity" component of the ASP model. To date, most of these players are participating in the market by providing data communication services to ASPs.

- **Network Infrastructure Firms** are providing the data center facilities for applications to be managed. In many instances, these firms are web-hosting companies, such as Exodus and Concentric, that could potentially expand their services into the ASP arena. In other cases, Telcos and ISPs are providing data center facilities. For obvious reasons, these firms will be stronger with networking tasks and may struggle with application issues.

- **Application Vendors.** Since the ASP model is centered upon providing support services for a software application, vendors of applications may eventually become ASPs. The most visible example of this type of player is Oracle's Business Online initiative, which includes some hosting for Oracle applications. Another significant initiative is SAP's recent MySAP.com vision, in which the company is attempting to reposition itself as a service provider rather than a software company. Historically, software providers have owned their customers through their own direct sales force. However, with the new ASP model, application vendors are being reduced to only a component of an overall solution in which the ASP owns the customer. Thus, application vendors may move into the ASP market to retain control of their customer bases and provide greater value to their customers.

  In other cases, the ASP model may be highly attractive for specific types of software companies that are offering use of their application on a per transaction basis over the Internet. For instance, it might make perfect sense to offer a tax-return application to consumers over the Internet and for the ISV to host the application in-house.

In the end, an ASP solution is a service; thus, firms with a service background may be the best positioned to provide ASP solutions

- **Systems Integrators & Consultants.** In the end, an ASP solution is a service and, thus, firms with a service background may be the best positioned to provide ASP solutions, despite their lack of networking competencies. These service firms bring many of the implementation and project management experience to the ASP table. In some instances, consulting companies will initially be challenged by the concept of the ASP model, which is to minimize deployment periods and get as many customers in the ongoing management stage of the model as possible, which enables an ASP to spread costs between customers and maximize profitability. Specifically, many traditional consulting companies, such as the Big Five, have had a philosophy of creating an extended customer engagement. Thus, from a culture and risk standpoint, many of these firms may have trouble adjusting to the concept of a one-to-many model. Eventually, we suspect many of these consulting firms to adjust the natural evolution of rapid implementation projects. Interestingly, KPMG recently announced a joint venture with Qwest to begin an ASP business, which will be called Qwest Cyber.Solutions.

- **Pure-Play ASP.** Pure-play ASPs must begin from scratch and incorporate all of the competencies discussed on the previous pages. Although these types of ASPs are characterized as pure-plays, the founders of these companies more than likely have backgrounds, or a heritage, from one of the above types of firms. The potential advantage for a pure-play is that it may have multiple founders from multiple backgrounds. Currently, USinternetworking is the most notable pure-play in the market today. Interestingly, USi's CEO, Chris McCleary, was the former CEO of Digex.

COMPETITION

Our research indicates that the biggest competition for ASPs is coming from customers' internal IT department and a lack of customer information

To date, competition in the ASP market has been limited, as ASPs have been more appropriately focusing on how to create the most compelling business model and, ultimately, value proposition to a customer. Our research indicates that the biggest competition for ASPs is coming from customers' internal IT department and educating customers about the benefits of the ASP model vs. the traditional application maintenance outsourcing model.

Although we expect competition in the market to steadily increase over the next year, especially with the flurry of new ASP entrants, overall competition should remain relatively limited in this early-stage, high growth market. Still, looking out, we believe competition will begin to be based on the following factors:

In short, the ASP is either in the game or not in the game

- **Application reliability** is an ASP's ability to deliver quality levels of application availability, performance and security on a 24x7x365 basis. Specifically, application reliability consists of how well an ASP can monitor, troubleshoot and integrate its networks, servers and clients with an application. Many firms believe that application service reliability will be a key competitive differentiator between ASPs. For instance, an ASP that is able to more efficiently architect and integrate an application into a thin client computing environment may be capable of delivering improved application performance over another ASP. However, for the majority of system management duties aimed at providing application availability and performance—we believe an ASP either can or cannot deliver these services. In short, the ASP will be either in the game or not in the game.

- **Breadth of Solutions Offering.** One of the bigger selling points of the ASP model to customers is that ASPs are the single-point of contact for a customer. Assuming that a customer is happy with its first application, a customer may choose to deploy a second application with an ASP and prefer to have a single ASP deliver all of its remotely hosted applications. As a result, ASPs that fail to offer a complete set of applications may be placed at a competitive disadvantage to ASPs that can offer a broader set of applications to customers. Still, we note that there will be niche markets and vertical market applications where this principle will not always hold true.

- **Software package.** Some customers today may prefer an SAP package over a Peoplesoft package and, thus, choose an ASP that offers an SAP solution over a second ASP that only offers a Peoplesoft package.

Customers will have a preference towards an ASP that has an established track record, a large number of satisfied customers and has proven it can deliver these solutions in the past

- **Customer Satisfaction.** Simplistically, customer satisfaction and references will be a key competitive differentiator, which is the case with most service businesses. Unlike any product sales, customers are handing over their mission critical applications to an ASP; thus, in some respects, they are at the mercy of the ASP. Therefore, customers will have a preference towards an ASP that has an established track record, a large number of satisfied customers and has proven it can deliver these solutions in the past.

- **Brand-Name.** Ultimately, the culmination of customer satisfaction, application reliability and all of the other factors in building a leadership image (including effective sales and marketing) will create a competitive advantage for an ASP.

Beginning on page 50, we profile a number of established and emerging ASPs.

VALUATION

In valuing Application Service Providers, it will be important to utilize several important tools:

Because most public ASPs are early in their development and have yet to become profitable or EBITDA positive, comparing ASPs on an price-to-earnings or EBITDA multiple basis is not possible

- **Comparable Company Analysis Tables**. As is the case with almost every type of asset or stock, using the values of relatively similar publicly traded companies can provide standard proxies to calculate the value of the ASP in question. Because most public ASPs are early in their development and have yet to become profitable or EBITDA positive, comparing ASPs on an price-to-earnings or EBITDA multiple basis is not possible. Thus, we are limited to valuing ASPs using revenue multiples and revenue growth rates.

  ASP Revenue Multiples are Useful, but Limited Proxies. Revenue multiples are useful in valuing ASPs because they reflect a valuation metric that a group of investors are actually collectively paying or valuing an ASP. However, ASP's revenue multiples are limited in respect that they may not reflect which ASPs are more efficiently creating net income from their revenue and will generate better financial margins in the long run. As a result, when using an ASP revenue multiple, we believe it will be useful to keep a variety of factors discussed in our "Developing a Business Operations Model" section in mind (See page 26), which discusses a variety of business model choices and their potential impact on profitability.

  Internet Craze Could Offer Upside. The compelling value-proposition of the Internet is the rapid pace at which information can be exchanged between a vast amount of people. In short, the Internet provides a capability that enables companies to break through traditional economic and productivity barriers of limitation. Thus, companies utilizing "the Internet" can create and focus upon market opportunities that dynamically surpass historic opportunities. As such, many companies utilizing the Internet have been receiving high valuations based on this potential.

  Interestingly, because ASPs, in some instances, utilize the Internet to deliver applications to customers, ASPs could be viewed as "Internet companies." Although we would not agree with an ASP being broadly characterized as an "Internet Company" and receiving a high valuation based on this characterization, we believe the possibility offers valuation upside for investors.

  Comparable Groups

  As can be seen in our valuation table on page 49, we have created three groups of companies to better analyze potential multiples of ASPs. The first group of comparables consists of companies that offer ASP services as their major solutions offering or are in the process of moving more towards the ASP model from the traditional application outsourcing model.

In general, we believe it would be appropriate for ASPs to trade at higher multiples than Network Infrastructure Providers

The second group of companies consists of network infrastructure and data center facilities providers, which includes web-hosting companies such as Exodus and Concentric. In general, we believe it would be appropriate for ASPs to trade at higher multiples than Network Infrastructure Providers (assuming relatively equal growth rates), since ASPs are providing more value-added services and, thus, should generate higher financial margins in the future.

Finally, our third group of comparable companies consists of traditional application outsourcing companies. Interestingly, Cambridge Technology Partners and Sapient are both using rapid implementation methodologies that are similar to ASP's methodologies.

- **Discounted Cash Flow Analysis** is useful in determining the amount of potential cash an ASP can generate for its stockholders in the future and what the value of the company is today based on that future cash generation power. Unfortunately, DCF analysis is largely theoretical and is based on a stack of assumptions, such as the appropriate discount rate, terminal value and growth in working capital. As such, DCF analysis can be a useful valuation tool when used in conjuction with a comparable company analysis, such as the ASP scenario, or when no comparable analysis is possible, such as with Internet companies whose costs are growing more rapidly than its revenues.

CONCLUSION

It is not inconceivable to believe that in one day, the vast majority of application management and processing will be done through the ASP model

We believe the Application Service Provider market is a paradigm shift in the way applications are both managed and delivered to end-users. The emerging ASP market is an early-stage, high growth market that will ultimately have an extremely profound impact on the world of information technology. It is also a model that calls upon software to evolve into merely a part of a larger solution. Indeed, it is not inconceivable to believe that in one day, the vast majority of application management and processing will be done through the ASP model. As a result, we believe the ASP market offers tremendous investment opportunities, as customers seek to reduce application deployment timeframes, their total cost of ownership, leverage the application expertise of ASPs and focus on their core competencies.

Although we have seen a flurry of recent vendor announcements and there has been tremendous excitement about the ASP concept, the market has been, in large part, a supplier driven market. However, we expect this to change dramatically over the next year, as more customer success stories become mainstream. Interestingly, ASPs are building a variety of different business models to create a compelling value proposition to customers and, to be successful, will need to build a hybrid of networking, application and services competencies. More than likely, the ASP model will be broad enough to support several different business models and numerous successful ASPs. Thus, we believe there will be tremendous opportunities for both financial investors and emerging ASPs to profit.

Application Service Providers

C.E. Unterberg, Towbin

Summary of Selected ASPs & Comparable Valuation Companies
(Dollars in millions, except per share data)
(LTM = Latest Twelve Months)
(LQA = Latest Quarter Annualized)

	Ticker	Stock Price 8/25/99	52-Week Stock Price Low	52-Week Stock Price High	Market Value of Equity	Net Market Value	Net Mkt. Value/ Revenue: 1999	Net Mkt. Value/ Revenue: 2000	Revenue Growth LQA/ LFY	Revenue Growth 99/ 00	Total Debt/ Total Cap.
ASPs											
Brightstar Technology Group	BTSR	$3.31	$2.88	$11.00	$27.1	$23.0	0.2	0.1	79%	28%	0.7%
Critical Path	CPTH	36.31	31.13	150.25	1,385.5	1,131.7	87.1	23.1	792%	277%	2.6%
Futurelink Distribution Corp.	FLNK	7.88	1.19	9.50	228.9	228.5	20.8	3.4	186%	518%	42.3%
Interliant	INIT	12.63	10.50	23.31	533.0	467.3	11.7	5.1	768%	130%	0.0%
USinternetworking	USIX	18.88	17.75	60.00	714.8	661.6	22.1	6.0	550%	267%	15.6%
						Median	**20.8**	**5.1**	**550%**	**267%**	**2.6%**
Network Infrastructure Providers											
Concentric	CNCX	23.19	7.13	57.63	960.7	801.7	5.5	3.0	60%	83%	34.7%
Digex	DIGX	26.00	14.63	31.13	312.0	152.0	3.0	1.5	66%	100%	0.0%
Exodus	EXDS	86.81	3.88	82.88	7,146.4	7,391.5	34.4	16.3	222%	111%	92.3%
						Median	5.5	3.0	66%	100%	34.7%
Traditional Application Outsourcers											
Cambridge Technology Group	CATP	14.63	10.63	45.00	880.5	821.2	1.2	1.0	7%	25%	0.3%
Computer Sciences Corp.	CSC	63.44	46.25	74.88	10,149.2	10,537.4	1.4	1.2	8%	19%	NA
EDS	EDS	59.13	30.44	67.38	29,146.0	30,567.6	1.6	1.3	9%	21%	17.2%
Sapient	SAPE	71.00	24.25	82.88	1,965.4	1,882.2	7.0	4.7	60%	50%	0.8%
						Median	1.5	1.2	9%	23%	0.8%
					Page Median		**6.3**	**3.2**	**72%**	**91%**	**2.6%**

Net Market Value is defined as Mkt Value plus total debt minus cash & short-term investments
Earnings estimates from First Call Consensus & C.E. Unterberg, Towbin research reports.
NE = No Estimate, NA = Not Available, NM = Not Meaningful.

Company Profiles

Applicast

Applicast is a start-up ASP targeting aggressive growth companies with less than $200 million in revenue and whose growth rates consistently reach 50-100% per annum. Applicast's solution addresses the entire application lifecycle, which consists of implementation services, hosted operations, support and proactive upgrade services. Currently, Applicast is offering support for ERP and CRM applications through its partnerships with SAP and Siebel Systems. Using its templated, FastFit implementation methodology and in-depth understanding of applications, Applicast is capable of configuring and implementing an SAP or Siebel application in a matter of weeks. Customers include Flash Electronics and CoSine Communications. Currently, Applicast has approximately 50 employees and is using GTE Data Services as its network infrastructure partner.

AristaSoft

Founded in January 1999, AristaSoft is a vertical specific ASP targeting medium and small-sized companies in the high-tech industry, such as electronics manufacturing companies. AristaSoft's goal is to offer a full suite of applications to its target market and has begun with J.D. Edwards' OneWorld suite, providing integrated solutions that span the entire enterprise applications life cycle—which consists of implementation and user support, as well as system and network management. The company plans to implement a co-location application management strategy, utilizing the data center facilities of a third party, and connect to its customers via a private line. Interestingly, because many of AristaSoft's target market (electronic manufacturers) are already outsourcing their manufacturing to an EMS provider, they may be favorably inclined to outsource the management of their applications. AristaSoft received venture capital from CrossPoint Venture Partners and expects to officially launch its service live in the Fall of 1999.

Breakaway Solutions

Breakaway Solutions is an ASP offering a full range of e-business services and support for customer relationship management solutions. Breakaway formally entered the ASP space last February, when it merged with Applica and combined its systems integration and consulting skills with Applica's strong ongoing application management and support skills, creating a complete ASP solution. In the CRM space, Breakaway is currently partnering with Onyx and Clarify, as well as several other new software companies that are focusing on developing more "Internet-enabled" and thinner client applications, including Rubric, firstwave and Applix. Meanwhile, in the e-commerce space, Breakaway is partnering with Oracle, Broadvision and formulating partnerships with emerging vendors. Breakaway recently acquired WebYes, an application and web-hosting firm headquartered in Boston, Mass. Including this acquisition, Breakaway now has over 120 clients being supported from 10 different data centers. More recently, Breakaway filed an S-1 with the SEC for an IPO under the ticker symbol "BWAY."

BrightStar Information Technology Group (Ticker: BTSR)

BrightStar is a global provider of information technology services of enterprise-wide solutions to Fortune 1000 companies and other large organizations. BrightStar has four major services. First, BrightStar offers services for rapid implementations of complex ERP applications, such as SAP, Peoplesoft and J.D. Edwards. Second, BrightStar's web-applications services involves building e-commerce sites and supplier-interfacing web-systems for companies. Finally, BrightStar's last two services are ongoing application support and hosting. The company's hosting division is currently adopting part of the ASP model, managing applications from a central site and enabling users to access these applications via the Internet. Interestingly, BrightStar believes that software rental is an attractive licensing structure, but has not yet adopted such a model. BrightStar expects its ASP business to generate approximately $10 million in revenue in 1999, as compared to the company's total revenue projection of $140 million.

Corio

Corio is building a leadership position in the ASP market by focusing on rapidly growing companies in the high-tech industry. Corio is offering a full-set of application services centered around Peoplesoft's human resources, finance/accounting and manufacturing/logistics ERP suite. In fact, Corio has a "preferred partnership" agreement with Peoplesoft, which consists of a 10-year non-cancelable contract and Peoplesoft making an equity investment in Corio. By focusing on a specific vertical, Corio believes it can develop more standardized templates for both rapid application implementation and integration—enabling Corio to sign-up more customers in a rapid timeframe. Corio currently partners with Exodus and Concentric Network to lease both data center space, avoiding the large-up front capital investment of buying and maintaining that infrastructure. Instead, Corio is focusing its resources on the ongoing management of applications and working with Peoplesoft to develop both more standardized templates and software that runs more efficiently over the Internet, which could ultimately create a competitive advantage for Corio. Recently, Corio announced a relationship with Octane Software, a provider of customer care and support applications. Corio currently has approximately 10 customers, including Excite@Home and Clarent. We expect Corio to expand its offering into e-commerce and decision support in the coming months.

Critical Path (Ticker: CPTH)

Critical Path is the leading ASP for the advanced hosting of email services. According to IDC, the number of electronic mailboxes in the U.S. is expected to reach nearly one billion in 2002, up from only 150 million in 1998. Critical Path's strategy is to capitalize on this explosive growth by offering its customers comprehensive, advanced Internet messaging services, which includes ongoing management and support of these applications. Critical Path's email services are accessed and used over a web browser, and target a wide range of organizations, including ISPs, web hosting companies, web portals and corporations. Some of Critical Path's more notable customers include E*Trade, Network Solutions, Sprint and U.S. West Communications. These customers are, in turn, giving their customers access to email with Critical Path's help. Recently, Critical Path has been on the acquisition war path with several completed or proposed transactions, including Fabrik, dotOne and Amplitude. These acquisitions should enable Critical Path to build a broader set of outsourcing services. Critical Path is expected to generate ($0.67), ($0.01), and $0.50 in earnings in 1999, 2000 and 2001, respectively.

EDS (Ticker: EDS)

EDS formally entered the ASP industry last February when it announced an alliance with SAP to provide application outsourcing services for SAP's R/3 ERP application. EDS and SAP's alliance targets companies with revenues between $25 million and $200 million, (i.e., the middle market) and with 200 seats or less. SAP is responsible for selling and marketing the solution and EDS will provide the infrastructure and ongoing support on a per-user, per month rental basis. In some instances, EDS may transfer incoming customer calls, such as "how to use" questions, to an SAP help desk. Interestingly, SAP will be billing customers independently for the software license fee. This alliance is also mutually nonexclusive, as both parties are allowed to partner with other providers. Clearly, SAP's recent entry into the ASP industry is a major endorsement of the ASP model.

Eggrock Partners

Eggrock Partners is an information technology services firm that was founded by three former partners of Cambridge Technology Partners, focusing on companies with an emerging enterprise and revenues between $50-$500 million. As Eggrock has evolved from its founding, the company has grown to currently support four software needs: e-commerce, customer relationship management, business intelligence and financials. As Eggrock continued to service clients in these areas, the company recognized the value of delivering these solutions in the emerging ASP model. As such, Eggrock recently created its Ecoshare ASP offering and partnered with Digex for network infrastructure. Currently, Eggrock has approximately 30 clients, of which two are ASP customers. In the coming months, Eggrock will be focusing on acquiring new customers and converting several existing customers to its EcoShare offering. Eggrock generated roughly $5 million in revenue in 1998 and is on target to generate nearly $13 million in 1999.

FutureLink Distribution Corporation (Ticker: FLNK)

FutureLink is a traditional IT consulting and outsourcing services firm that is currently shifting its focus to delivering applications through the ASP model. FutureLink's goal is to become "the computer utility company" for small to mid-sized companies that do not have the technological infrastructure and expertise, or the financial capital, to manage applications internally. In fact, FutureLink was one of the founding members of the ASP Industry Consortium. Recently, FutureLink announced its intended acquisition of Microvisions, the leading U.S. integrator and reseller of Citrix Systems' thin-client enabling software—which is an ideal platform for the ASP model. Interestingly, FutureLink has decided not to provide application implementation, integration and deployment services. Instead, the company is focusing on the ongoing management and enhancement of applications—partnering with leading systems integrators and VARs to provide these services and sell FutureLink's solutions. FutureLink believes that this strategy enables it to support a number of customers across a variety of industries. Thus, FutureLink is better able to leverage economies of scale on the application management side and minimize its resources tied up in sales & marketing, lowering its per customer acquisition costs—which can typically be very high in a new market.

IBM Global Services – (A division of IBM; Ticker: IBM)

In 1997, IBM Global Services announced a network-delivered application offering for packaged applications. This offering involved implementation services, network infrastructure connection and management, systems hardware and software support, and the ongoing management and enhancement of the application. In 1998, IBM announced support for J.D. Edwards' OneWorld ERP application targeted at small and medium-sized businesses with 50 or more employees. More recently, IBM has announced a partnership with Great Plains to provide its Dynamics financial application and introduced applications from Saleslogix (front office software) and Ultimate Software (human resources software).

Interliant (Ticker: INIT)

Interliant is a leading provider of a wide-range of hosting and enhanced Internet services, including virtual (shared) hosting, dedicated hosting, co-located hosting, groupware hosting and application outsourcing (i.e., Interliant's AppsOnline Solutions). Interliant's AppsOnline or ASP offering provides support for solutions in the following areas: distributed learning, sales automation & customer relationship management, legal automation and e-commerce. Within these areas, Interliant is partnering with Lotus (Collaboration), Synergistics (CRM), TitleLink (Real Estate Automation), Auction Pool (E-commerce) and Firstuse.com (Legal Automation). Interliant originally was founded in 1997 and has since grown through the acquisition of 17 hosting and Internet related services businesses. To date, the company hosts over 10K customized Lotus Notes/ Domino based applications for over 1,300 customers, as well as provides web hosting solutions for over 47,000 customers. Interliant went public in early July, pricing seven million shares at $10 per share.

Interpath Communications

Interpath is an emerging ASP whose roots involve telecom, networking and consulting services. Based in South Carolina and originally focused on providing telecom services, the company has been focusing on the financial, health care, education and governments industries in the Mid-Atlantic and SouthEastern United States. The company currently provides solutions for messaging and e-commerce applications through partnerships with InterWorld and Amptiva. In May, Interpath became the first ASP to offer SAP R/3 on a direct licensing basis to customers. Previously, SAP had announced partnerships with EDS and Qwest—but sold the licensing separately from these ASPs' services. In addition, Interpath also is partnering with Sun Microsystems through its new ServiceProvider.com program that provides an operating platform for ASPs.

Javelinx

Javelinx is an emerging ASP targeting the financial services industry. The company's application partners include Broadvision, Information Advantage, ATIO and Galleon Distributed Technologies.

NaviSite

NaviSite is an emerging ASP that was originally part of the whole CMGI family, serving as an internal IS group for all of the small technology start-ups that CMGI was investing. Here, NaviSite was building networks and data centers to support all of these CMGI start-up companies' applications. However, over the past two years, NaviSite has been building a non-CMGI customer base, recognizing the attractiveness of leveraging its infrastructure to a broader audience. Initially, NaviSite was offering web-hosting services and was competing with companies such as Exodus, BBN and Digex. Although NaviSite continues to offer these basic hosting services to customers, NaviSite is focusing on providing more "enhanced" services, such as ongoing application management. Currently, this growing focus accounts for approximately 30-40% of NaviSite's overall business. Interestingly, NaviSite has elected to only provide support for the ongoing management of applications, partnering with leading system integrators to provide business process implementation services. Both Dell and Microsoft recently bought a 10% stake in NaviSite.

netASPx

netASPx is a recent ASP offering support for less complex applications, such as collaborative applications (e.g., email, messaging, imaging), to small and medium-sized businesses. The company's founders trace their roots to ServiceNet, an ASP offering Lotus Notes to Anderson Consulting. After ServiceNet decided not to widely attack the ASP market, ServiceNet's former CEO left the company. Although netASPx is a relatively new company, its founders have been pioneers in the ASP industry for the last several years. Little details are known about the company, but it is our understanding that they will be using Sun Microsystems as their platform partner and are building a couple of their own data centers. We look forward to seeing some upcoming partnership and solutions announcements in the coming months.

Oracle (Ticker: ORCL)

Oracle recently announced the success of its pilot program for its Oracle Business Online hosting services for enterprise business applications. Oracle's pilot program consists of its financial, manufacturing and human resource applications being implemented, hosted and maintained by Oracle and its partners. End-users are accessing applications remotely using a web-browser. Oracle's Business Online is partnering with Sun and HP for hardware infrastructure and technical support. In June, Oracle announced its partnership with Qwest Communications to be Oracle's first preferred applications hosting and network infrastructure provider. Interestingly, if all goes well, Oracle could potentially spin-off its ASP business in the future for an "Internet like" valuation.

Qwest Cyber.Solutions (QCS)

In June, Qwest Communications announced a joint venture with KPMG called Qwest Cyber.Solutions to provide end-to-end Internet-based application hosting, management and ASP services. Under the terms of the agreement, Qwest will own 51% of the venture with KPMG owning the remaining 49%, and both will contribute assets to the venture worth over $120 million. Specifically, Qwest will provide domestic and international access to Qwest's fiber-based Internet infrastructure and hardware vendor relationships, while KPMG will "leverage existing contracts with independent software vendors," including HP, SAP and other leading hardware and software vendors. Qwest Cyber.Solutions specifically plans on offering a broad-set of solutions, including ERP (e.g., SAP & Peoplesoft) and CRM (Siebel) applications. Within this powerful alliance, KPMG is contributing approximately 450 staff members along with over $400 million worth of existing contracts.

Retail Aspect

Retail Aspect is the leading ASP to the retail industry, providing emerging and mid-market companies the ability to leverage Island Pacific's ERP solution. Retail Aspect deploys its Rapid Solutions Methodology (RSM), and experienced retail and technology experts to significantly decrease implementation timeframes of its RetailASP solution, which, in addition to its implementation services, includes training, application support, data center operations and help desk support. In February 1999, Retail Aspect won its first customer—Friedman's Jewelers. Founded in October 1998, Retail Aspect to date has over 30 employees.

ServiceNet

ServiceNet is an ASP that has traditionally offered support for proprietary, customized applications. ServiceNet's first large contract was to host Anderson Consulting's Lotus Notes environment and Anderson Consulting holds a majority interest in ServiceNet, with GTE Internetworking also being a significant investor. Currently, ServiceNet is expected to generate over $80 million in revenues in 1999 and $5 million in earnings. Several months ago, Anderson Consulting decided to postpone ServiceNet's strategy to attack the broader ASP market, which included growing its customer base and offering support for a variety of packaged applications. As such, several of ServiceNet's top executives have since left the company. Never the less, ServiceNet could be an interesting company to keep on your radar screen, as it is already generating significant ASP revenues.

TeleComputing

Founded in Norway in 1997, TeleComputing is a leading ASP with an impressive 60 ASP customers in over 140 locations in Europe. TeleComputing utilizes Citrix's thin-client computing platform to deliver Microsoft Office applications (e.g., MSFT email & Office 97 and 2000), real-time financial and trading applications, and banking and transaction oriented applications. TeleComputing also provides support and services around a couple of sales force automation applications, including Goldmine and Onyx. Last Spring, TeleComputing signed a strategic partnership with Compaq to resell its solutions all over Norway. In addition to Compaq and Citrix, TeleComputing also has partnerships with Uunet and Marimba. TeleComputing recently established a U.S. office in Fort Lauderdale, FL that will serve as the company's new world-wide headquarters.

USinternetworking (Ticker: USIX)

USinternetworking is a leading ASP for enterprise applications, such as ERP, CRM, decision support and e-commerce solutions, and is the first pure-play ASP to go public. Currently, USinternetworking is partnering with Peoplesoft, Siebel Systems, Sagent, Microsoft and Broadvision to deliver its iMAP solutions (Internet Managed Application Provider) to mid-sized companies for a flat monthly per user fee. USi's iMAP solutions seamlessly integrate the implementation, customization, and ongoing operation and support of an Internet-enabled application and the specialized communications infrastructure on which the application is deployed. Unlike several other pure-play ASPs, USinternetworking has built both its own data centers and network infrastructure to provide more focused and improved application performance and customer service. USi's strategy is focused on signing up mid-market customers across a variety of different industries.

World Technology Services (WTS)

World Technology Services (WTS) is a leading provider of hosting services for J.D. Edwards applications to the construction industry. Originally, WTS began as the IT department for a construction company, Wright Schuchart Inc., and was later spun-off from its parent construction company after several acquisitions and divestitures, and WTS' independence was questioned. At this time, J.D. Edwards took a 50% investment in the company and suggested it expand its offering beyond its four original customers. WTS has over 20 employees, 13 ASP customers and generated approximately $2.5 million in revenues last year.

Glossary

Application Service Provider
An organization that hosts software applications on its own servers within its own facilities. Customers access the application via private lines or a public network.

(ATM) Asynchronous Transfer Mode
A network technology for both LANs and WANs that supports realtime voice and video as well as data. The topology uses switches that establish a logical circuit from end to end, which guarantees a quality of service (QoS) for that transmission. However, unlike telephone switches that dedicate circuits end to end, unused bandwidth in ATM's logical circuits can be appropriated whenever available.

Backbone
The through-portions of a transmission network, as opposed to spurs which branch off the through-portions.

Bandwidth
The relative range of analog frequencies or digital signals that can be passed through a transmission medium, such as glass fibers, without distortion. The greater the bandwidth, the greater the information carrying capacity. Bandwidth is measured in Hertz (analog) or Bits Per Second (digital).

Bit Error Rate
A measure of transmission quality stated as the expected probability of error per bit transmitted.

Broadband
A high-capacity communications apparatus.

Capacity
The highest possible transmission speed that can be carried on a channel; can be expressed as raw speed or net throughput.

CLEC (Competitive Local Exchange Carrier)
A company that competes with LECs in the local services market.

Configuration
The makeup of a system. To "configure" is to choose options in order to create a custom system.

Customer Relationship Management Software
See ERM Software.

Custom Software
Software that is specifically designed and programmed for an individual customer.

Datacenter
The department that houses computer systems and related equipment, including a data library. Data entry and systems programming may also come under its jurisdiction.

Data Warehouse	A database designed to support decision making in an organization. It is batch updated and can contain enormous amounts of data. When the database is organized for one department or function, it is often called a data mart rather than a data warehouse. It is structured to support a variety of analyses, including elaborate queries on large amounts of data that can require extensive searching.
Disaster Recovery	Backing up data, databases and applications to an off-site and different geographic location to guard against a catastrophic disaster (e.g., earthquake) that would destroy all primary data and backed up data at a company's facilities.
E-commerce	Doing business online, typically via the Web. It is also called e-business, e-tailing and I-commerce.
Enterprise Relationship Management (ERM)	An integrated information system that serves the "front office" departments within an organization, which are sales, marketing and customer service. Also known as CRM software ("C" = Customer). The leading CRM vendor is Siebel Systems.
Enterprise Resource Planning (ERP) Software	An integrated information software system that serves all departments within an enterprise. ERP implies the use of packaged software rather than proprietary software written by or for one customer. An ERP system can include applications for manufacturing, order entry, accounts receivable and payable, general ledger, purchasing, warehousing, transportation and human resources.
Frame Relay	A high-speed, data-packet switching service used to transmit data between computers. Frame Relay supports data units of variable lengths at access speeds ranging from 56 kilobits per second to 1.5 megabits per second. This service is well-suited for connecting local area networks, but is not presently well suited for voice and video applications due to the variable delays which can occur. Frame Relay was designed to operate at high speeds on modern fiber optic networks.
Full Duplex	Simultaneous two-way communication path.
Gbps	Gigabits per second, which is a measurement of speed for digital signal transmission expressed in billions of bits per second.
ISP (Internet Service Provider)	A company that provides business and consumers with access to the internet.
ISV	Independent software vendor implies an organization that specializes in software only and is not part of a computer systems or hardware manufacturer.
Interexchange Carrier	A company providing inter-LATA (or long distance services) between LATAs on an intrastate or interstate basis.
Local Area Network (LAN)	A local network of multiple interconnected computers and devices. The most common LAN topologies are ethernet, token rings and FDDI.

LEC (Local Exchange Carrier)	A company historically providing local telephone services.
Local Loop	A circuit that connects an end user to the LEC central office within a LATA.
Middleware	Software that functions as a conversion or translation layer between two or more incompatible environments, e.g., applications, databases or tools.
Multiplexing	An electronic or optical process that combines a large number of lower speed transmission lines into one high speed line by splitting the total available bandwidth into narrower bands (frequency division), or by allotting a common channel to several different transmitting devices, one at a time in sequence (time division).
Packaged Software Applications	An application program developed for sale to the general public. Packaged software is generally designed to appeal to a large audience of users, and although the programs may be tailored to a user's taste by setting various preferences, it is not as individualized as custom-designed and custom-programmed software.
Replication	In database management, the ability to keep distributed databases synchronized by routinely copying the entire database or subsets of the database to other servers in the network.
Scalability	The ability to adjust, expand and/or increase the capabilities or power of a technology without requiring changes to a customer's software.
System Management Software	Software that manages computer systems in an enterprise, which may include any and all of the following functions: software distribution, version control, backup & recovery, printer spooling, job scheduling, virus protection and performance and capacity planning. Depending on organizational philosophy, systems management may include network management or be a part of it.
UNIX	A multi-user, multitasking operating system that is widely used as the master control program in workstations and especially servers. Myriads of commercial applications run on UNIX servers, and most Web sites run under UNIX. There are many versions of UNIX and, except for the PC world where Windows dominates, almost every hardware vendor offers it either as its primary or secondary operating system. Sun has been singularly instrumental in commercializing UNIX with its Solaris OS (formerly SunOS). HP, SCO, IBM and Digital have also been major UNIX vendors and promoters.
Web hosting	Placing a customer's Web page or Web site on a commercial Web server. Many ISPs host a personal Web page at no additional cost above the monthly service fee, while multi-page, commercial Web sites are hosted at a very wide range of prices.

Wide Area Network (WAN)

Remote computer communications system. Utilized mostly among geographically distributed computing sites. WANs are slower than LANs, but have the capacity to serve as a communications "backbone."

C. E. UNTERBERG, TOWBIN

Swiss Bank Tower
10 East 50th Street
New York, New York 10022
(212) 572-8000 FAX (212) 888-8678

CEUT

Market Making -- August 1999

Trading Desk

Brian Finnerty, *Mgr. Director*
212-572-8059

Jeff Moskowitz, *Mgr. Director*
212-572-8080

James Alperin	**John Haun**	**Paul Lyle**	**Brett Moskowitz**	**Susan Riordan**
212-572-8126	212-572-8165	212-572-8058	212-572-8037	212-572-8074

Adaptive Broadband	**ADAP**
ADC Telecommunications	**ADCT**
AdForce, Inc.	**ADFC**
AES Corporation (China Warrants)	**AESCW**
AHL Services, Inc.	**AHLS**
Altris Software	**ALTS**
American Mobile Satellite Corp.	**SKYC**
ANTEC Corporation	**ANTC**
Applied Micro Circuits	**AMCC**
ASI Solutions Incorporated	**ASIS**
Aspect Telecommunications, Inc.	**ASPT**
Asymetrix Learning Systems, Inc.	**ASYM**
beyond.com	**BYND**
BMC Software	**BMCS**
Broadcom Corporation	**BRCM**
Caere Corporation	**CAER**
Castelle	**CSTLC**
Catapult Communications	**CATT**
C-Cube Microsystems Inc.	**CUBE**
CD Radio Inc.	**CDRD**
CDNow Inc.	**CDNW**
Coinmach Laundry Corporation	**WDRY**
Concentric Network Corporation	**CNCX**
Concord Communications	**CCRD**
Cyberian Outpost, Inc.	**COOL**
Cybershop	**CYSP**
Cybersource Corporation	**CYBS**
Diamond Multimedia System	**DIMD**
Digital Lightware Inc.	**DIGL**
DoubleClick, Inc.	**DCLK**
DSP Technology	**DSPT**
EarthWeb Inc.	**EWBX**
ECCS, Inc.	**ECCS**
Echostar Communications Corporation	**DISH**
Echostar Communications PFD	**DISHP**
EDGAR Online, Inc.	**EDGR**
EIS International, Inc.	**EISI**
Electronics for Imaging, Inc.	**EFII**
Euphonix, Inc.	**EUPH**
Evercel, Inc.	**EVRC**
Excalibur Technologies Corporation	**EXCA**
Exodus Communications	**EXDS**
Faroudja, Inc.	**FDJA**
Fatbrain.com	**FATB**
ForSoft Ltd.	**FORSF**
FutureLink Distributionj Corp.	**FLNK**
Genesis Microchip Inc.	**GNSS**
Gilat Satellite Networks	**GILTF**
Globalstar Telecommunications Ltd.	**GSTRF**
Globecomm Systems Inc.	**GCOM**
Harmonic Inc.	**HLIT**
Healthworld Corporation	**HWLD**
HI/FN Inc.	**HIFN**
ICTS International N.V.	**ICTSF**
In Focus Systems, Inc.	**INFS**
Infoseek	**SEEK**
Intel Corporation	**INTC**
Internet Gold	**IGLD**
Iridium World Communications	**IRIDQ**
JDS Uniphase Corporation	**JDSU**
JetForm Corporation	**FORM**
Judge Group, Inc.	**JUDG**
Kofax Image Products, Inc.	**KOFX**
Landmark Systems	**LDMK**
Marker International	**MRKR**
Media Metrix, Inc.	**MMXI**
Mercury Interactive Corporation	**MERQ**
Meridian Holdings, Inc.	**MDHG**
Metacreations Corporation	**MCRE**
Micromuse, Inc.	**MUSE**
Mitek Systems, Inc.	**MITK**
Modem Media . Poppe Tyson, Inc.	**MMPT**
Mobile Data Solutions, Inc.	**MDSI**
MTS Systems Corporation	**MTSC**
Musicmaker.com, Inc.	**HITS**
MySoftware Company	**MYSW**
Number Nine Visual Tech. Corp.	**NINE**
ObjectShare Inc.	**OBJS**
On Assignment, Inc.	**ASGN**
Open Text Corporation	**OTEX**
Optibase Ltd.	**OBAS**
ORBIT/FR, Inc.	**ORFR**
PairGain Technologies	**PAIR**
PanAmSat Corporation	**SPOT**
PathoGenesis Corporation	**PGNS**
Peerless Systems Corp.	**PRLS**
Pegasus Communications	**PGTV**
Pericom Semiconductor	**PSEM**
Pioneer Commercial Funding Corp.	**PCFC**
Point of Sale Limited	**POSI**
Polycom, Inc.	**PLCM**
PMC-Sierra, Inc.	**PMCS**
Professional Staff, Spon ADR	**PSTF**
Programmer's Paradise, Inc.	**PROG**
PROVANT, Inc.	**POVT**
Proxim, Inc.	**PROX**
Quad Systems Corporation	**QSYS**
Radcom LTD.	**RDCM**
Rambus, Inc.	**RMBS**
Ravenswood Winery	**RVWD**
RIT Technologies Ltd.	**RITT**
RMH Teleservices	**RMHT**
Sapiens International	**SPNS**
ScanVec Company	**SVECF**
Select Appointments Holdings	**SELA**
Siebel Systems, Inc.	**SEBL**
Sigma Designs, Inc.	**SIGM**
SOS Staffing Services, Inc.	**SOSS**
SPACEHAB, Incorporated	**SPAB**
Splash Technologies Holdings	**SPLH**
Stac, Inc.	**STAC**
Stamps.com Inc.	**STMP**
Stolt-Nielsen SA ADR	**STLBY**
Strategic Diagnostics, Inc.	**SDIX**
Systems & Computer Tech. Corp.	**SCTC**
Tech Data Corporation	**TECD**
Tellabs, Inc.	**TLAB**
TranSwitch Corporation	**TXCC**
Trikon Technologies, Inc.	**TRKN**
Tut Systems, Inc.	**TUTS**
United States Satellite Broadcast. Co.	**USSB**
Veritas Software Corp.	**VRTS**
ViaSat, Inc.	**VSAT**
Vignette Corp.	**VIGN**
Verity Corp.	**VRTY**
Vista Information Solutions, Inc.	**VINF**
Vitesse Semiconductor	**VTSS**
VocalTec Communications	**VOCL**
Westaff, Inc.	**WSTF**
WorldGate Communications	**WGAT**
WorldPort Communications	**WRDP**
Xionics Document Technologies, Inc.	**XION**
Zoran Corporation	**ZRAN**

Research Department

Alex Kotlyar
Managing Director, Software
212-572-8003 akotlyar@unterberg.com

Nancy Moyer
Managing Director, Business Services
212-572-8075 nmoyer@unterberg.com

William G. Dering, Jr.
Application Service Providers
212-572-8086 wdering@unterberg.com

Mark J. Hughes
New World Services
212-572-8089 mhughes@unterberg.com

William B.F. Kidd
Satellite Communications
212-572-8008 wkidd@unterberg.com

Karl Motey
Semiconductors
415-659-2242 kmotey@unterberg.com

Daniel Ries
eCommerce
212-572-8046 dries@unterberg.com

Tara Long
eMarketing
212-572-8044 tlong@unterberg.com

Paul Rodriguez
Software/Services
212-572-8077 prodriguez@unterberg.com

Ben Sim
eCommerce Enablers
212-572-8171 bsim@unterberg.com

Seth Spalding
Broadband Technologies
415-659-2245 sspalding@unterberg.com

Gregory Tapper
Internet Content & Services
212-572-8007 gtapper@unterberg.com

John Todd
Networking
415-659-2244 jtodd@unterberg.com