Comment

Software Goes On Demand

Reason for Report: Industry Update

Industry

Highlights:

- **We believe that 2004 will be the year the software industry will hit a critical inflection point and move closer to being consumed as an On Demand service.**

- **We define On Demand as the new software business model that enables organizations to reduce cost, optimize time, and minimize risk through term based licensing and outsourced delivery solutions.**

- **As a result, we expect more customers to opt for term or subscription based licensing versus the traditional perpetual model and move toward outsourced solutions.**

- **Very simply put, software in an On Demand world will change the way customers buy, vendors sell, and investors invest.**

- **We are launching the Merrill Lynch On-Demand Index or MLODI. MLODI is designed to help investors to better track, measure, and understand the transformation of the software industry to an On Demand model.**

- **Within the index, we will track the amount of software sold by subscription versus perpetual license along with the percentage that is deployed via outsourcing or internally managed.**

RC#30204114

Software via On Demand Takes Off in 2004

We believe that 2004 will be the year the software industry will hit a critical inflection point and move closer to being consumed as an On Demand service. While much has been written about software as a service or a utility (we like IBM's description of On Demand computing) we believe the transformation is just beginning. In this Comment we outline the trends, drivers, and effects of this transformation on the software industry. Very simply put, Software in an On Demand world will change the way customers buy, vendors sell, and investors invest. We do not believe this change can be viewed simply as a return to time-sharing during the mainframe era or some re-hashed dot-com hype story around application service providers (ASPs). We think the change is more far-reaching and customer adoption is moving at a rapid pace that will catch many vendors, customers, and investors by surprise.

We define On Demand as the new software business model that enables organizations to reduce cost, optimize time, and minimize risk. When we look at the transformation of the industry to the On Demand model, we think about the issues intersecting at the avenues of cost, time, and risk. Cost is obviously related to the upfront licensing fee, but also, and more importantly, the associated fees with implementation, management, maintenance, and upgrades. From a time perspective, the real focal point concerns flexibility. Does software inhibit or enable an organization to meet its business requirements? Finally, we believe organizations look at their IT resources as scarce with the explicit goals of minimizing risk, maximizing return, and delivering value. In many ways, the IT organization can be viewed as a service provider to the business and the On Demand business model as a tool used for realizing those goals.

We first examine this trend from the customer's viewpoint. We believe the pragmatic driver concerns the absolute size and growth of the IT budget. Overall IT budgets are not likely to grow at the same rate as they did in the 1990's. However, the pressure on IT to facilitate business performance is increasing. Customers are finding that the dynamics surrounding cost, time, and risk are altering their approach to consuming and utilizing software. This will likely manifest itself into different modes of purchasing and implementing technology and ultimately, software vendor share gains or losses.

From a licensing perspective, there has been much push-back from customers over hefty upfront charges or paying maintenance for unimplemented technology. Given the economic downturn as well as a more cautious buyer, the trend has been toward a pay-as-you-go practice. We believe customers want choice when they are procuring enterprise software and subscription based offerings provide that value. The technology implications of this trend are also important because in many instances customers have purchased too much capacity and have

significant amount of under utilized hardware or software. As a result, the concept of On Demand computing promises to let customers utilize exactly what they need - when they need it.
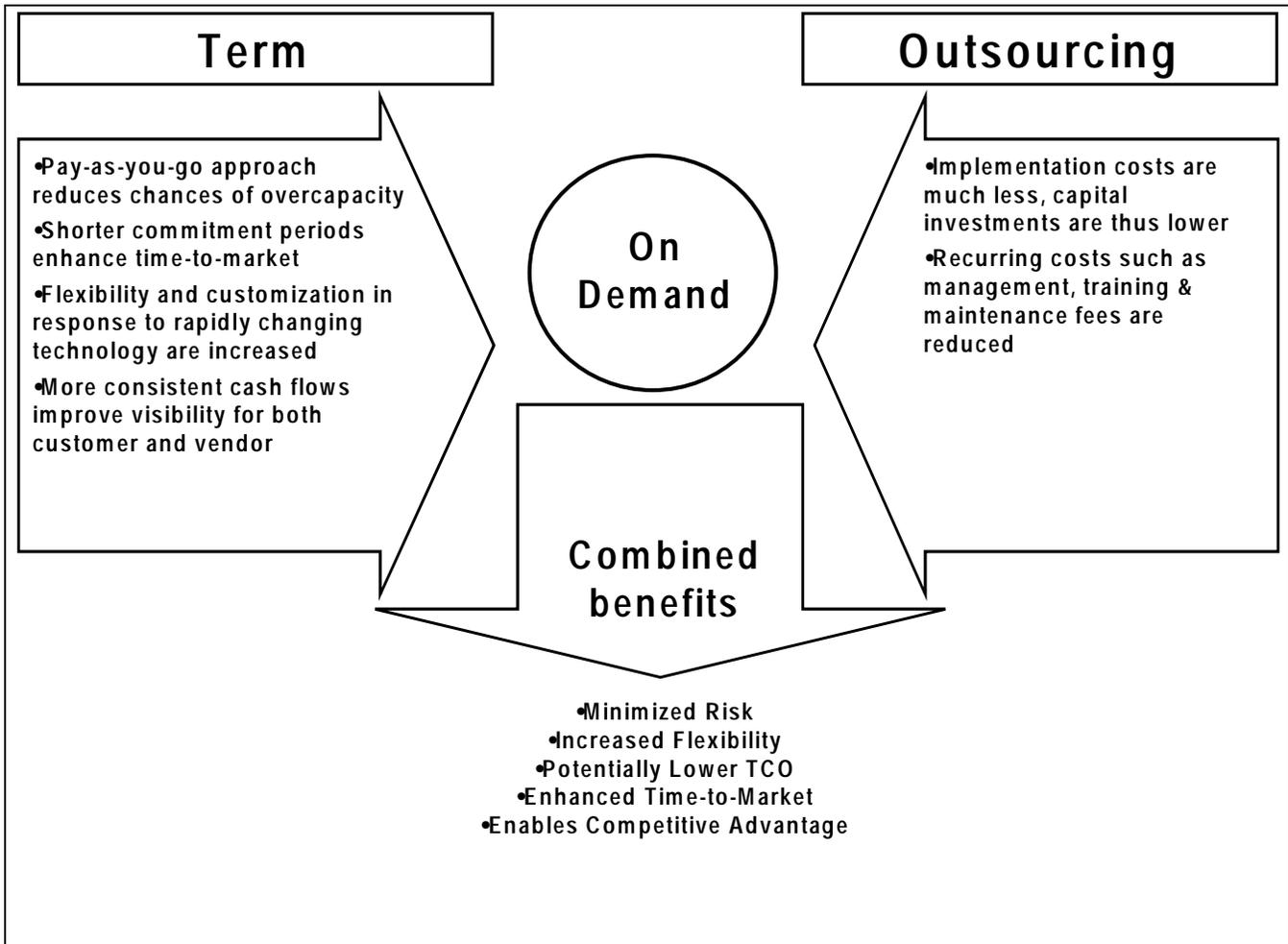
For the software vendors, this change will have a material impact on their business models and delivery practices. The days of reaping a huge windfall from a large upfront licensing fee seem to be over. While we do not think that large deals will disappear completely, we are confident that the lessons learned from the 90's will at the very least bring a more rational and pragmatic approach to buying software. In the past, customers often over-bought in order to get a larger discount from software vendors. Unfortunately, many customers never grew into their software purchase, and ended up with large maintenance bills for software they were never going to use. From a delivery perspective, On Demand computing will force vendors to rethink the costs that are thrust upon their customers. Vendors are now realizing that a customer that is burdened by significant implementation, maintenance, administration, and upgrade costs is not always eager to keep coming back again and again.

For the investor, the changes to the software business model have deep consequences. If just the licensing model changes and vendors sign more contracts on a subscription basis versus the traditional perpetual approach, the financials will look entirely different. From an implementation perspective, the On Demand model may require more upfront infrastructure investment or new distribution partners that alter the typical operating expense structure. As a result, normal valuation metrics such as price-to-earnings and price-to-sales may not be appropriate. We imagine that metrics such as enterprise value-to-cash flow and operating expenses-to-total bookings may prove to be better methods of evaluating the underlying operations of these businesses.

Finally, we are launching the Merrill Lynch On-Demand Index or MLODI. MLODI was designed to help investors to better track, measure, and understand the transformation of the software industry to an On Demand model. Within the index, we will track the amount of software sold by subscription versus perpetual license along with the percentage that is deployed via outsourcing or internally managed. In addition, we are revamping our entire approach to valuation by utilizing more cash flow and booking centric methods along with our traditional metrics. We will examine this from a macro perspective as well as by specific market sub-segments to better ascertain changes that may propel or inhibit individual company's prospects. MLODI will be rolled out following the March reporting season and will subsequently be updated on a quarterly basis.

Chart 1: The On Demand Model

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│      Term       │                    │    Outsourcing      │
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•**Pay-as-you-go approach reduces chances of overcapacity**

•**Shorter commitment periods enhance time-to-market**

•**Flexibility and customization in response to rapidly changing technology are increased**

•**More consistent cash flows improve visibility for both customer and vendor**

On Demand

•**Implementation costs are much less, capital investments are thus lower**

•**Recurring costs such as management, training & maintenance fees are reduced**

Combined benefits

•**Minimized Risk**
•**Increased Flexibility**
•**Potentially Lower TCO**
•**Enhanced Time-to-Market**
•**Enables Competitive Advantage**

Source: Gartner Group and Merrill Lynch

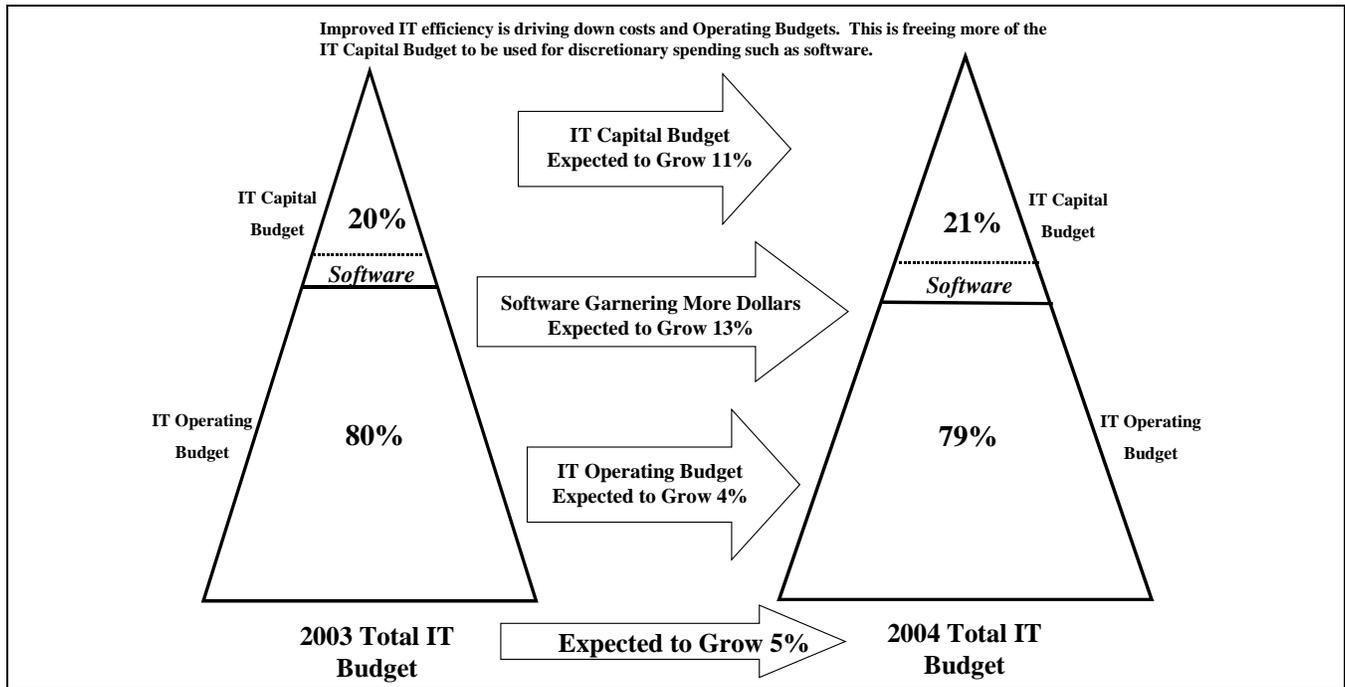## Budgetary Considerations on Software Purchasing

Before we dive headlong into the On Demand software debate we think it is important to understand the IT spending and economic backdrop. These macroeconomic factors will have a material impact on the rate of the industry transformation.

While we are confident that we will soon begin to see an IT turnaround, this does not mean companies are going to revert to purchasing patterns of the late 1990's. From 1990 to 2000, Gartner estimates that IT spending as a whole grew at a 9% CAGR. Conversely, from 2000 to 2002, IT spending declined 5%. Despite better conditions, it is our opinion that companies will continue to focus on IT efficiency, and will emphasize driving operating costs and waste lower. This means that we should continue to expect a continued move toward server consolidation, outsourcing, offshoring, and increased utilization.

We believe that the IT spending environment will show considerable improvement in 2004. The Gartner Group

expects overall IT budgets to show growth in the low single digit range. However, capital expenditures could grow in the high single digit range compared to operating budget growth of flat or even modest declines. In Merrill Lynch's January IT survey, published by Steve Milunovich, the average IT budget growth was 2.4%, with capital expenditures up 6%, and the operating budget up 1%. We assume for most companies that the operating budget consumes approximately 70%-80% of the budget with the remaining 20%-30% going to capital expenditures. Given that companies are focused on lowering their overall IT costs yet still feel the need to reinvest in the business, we expect a period of robust capital spending to ensue. As corporate profitability and cash flow increase there should be more room for spending on capital goods including software. Given corporations' somewhat cautious view on the economic recovery and the reluctance to add labor costs, we believe that productivity investments will continue throughout the next few years. This should have a positive impact on new license or subscription revenue for many software firms, as these products have typically been viewed as somewhat

Chart 2: IT Budget Growth in 2004

Improved IT efficiency is driving down costs and Operating Budgets. This is freeing more of the IT Capital Budget to be used for discretionary spending such as software.

IT Capital Budget — **20%**

Software

IT Capital Budget Expected to Grow 11%

Software Garnering More Dollars Expected to Grow 13%

IT Operating Budget — **80%**

IT Operating Budget Expected to Grow 4%

2003 Total IT Budget

Expected to Grow 5%

IT Capital Budget — **21%**

Software

IT Operating Budget — **79%**

2004 Total IT Budget

Source: Gartner Group and Merrill Lynch

discretionary for the business. We believe that software can be one of the biggest beneficiaries of the recovery as its usage can enable significant workforce productivity, lower operating costs, and technology-enabled revenue synergies. While all these trends bode well for the industry, it is important to remember the lessons of the last economic boom and bust and the impact that it will have on the variables of cost, time, and risk for software purchases. We believe, this simple fact will cause continued customer interest in the On Demand model.

Chart 3: More Dollars to Software - Mathematical Illustration ($ 000s)

	2003		2004		
Revenue (assuming flat)	$1,000		$1,000		
	% of Revenue	Absolute $$	% of Revenue	Absolute $$	Y/Y Increase
Total IT Budget	4.0%	$40.4	4.3%	$42.6	5%
	% of IT Budget				
IT Capital Budget	**20%**	**$8.1**	**21%**	**$9.0**	**11%**
IT Operating Budget	80%	$32.3	79%	$33.7	4%
	% of Capital Budget	Absolute $$	% of Capital Budget	Absolute $$	
Hardware	35%	$2.8	36%	$3.2	14%
Software	**21%**	**$1.7**	**22%**	**$1.9**	**13%**
Networking/ Telecom	15%	$1.2	15%	$1.3	11%
Internal Staff	14%	$1.1	13%	$1.2	4%
External Service Providers	11%	$0.9	11%	$1.0	11%
Other	4%	$0.3	4%	$0.4	9%

Source: Gartner Group and Merrill Lynch

Understanding the Pain of Consuming Enterprise Software

Implementing enterprise software has always been a less than glamorous process for most customers. In many cases, customers might opt to substitute "less than glamorous," with words like "painful" and even "excruciating," given the costs and complexities associated systems. We believe important factors in the problem are both derived from, and are exacerbated by, the traditional perpetual license model and customer managed deployment and maintenance costs. We identify key pain points as well as inherent structural conflicts within the software consumption cycle. We breakdown the three vectors of software-related pain as: Cost, Time and Risk.

■ Cost: Difficult to Predict and Tougher to Swallow

Assessing total cost of software ownership is a thorny task even for experienced IT buyers. Beyond the price of licenses and ongoing support, there are the added costs associated with implementation, hardware, management, user training and maintenance. The rule of thumb we often use is that for every dollar spent on software license, customers should expect to spend another 6-8 times that on services. Implementation costs (services and customization) can be particularly difficult to forecast for complex installations and the deployment of new versions or types of software. Management costs can often spiral if there are flaws or performance issues. The additional cost

of software to manage deployments (i.e., testing, and monitoring software) also may not be fully understood until software is in production. Inability to accurately forecast costs has often resulted in excess purchasing ahead of anticipated need, resulting in significant overcapacity (and resultant inflation of ongoing maintenance costs).

■ Time: Maybe Tomorrow, Maybe Not…

Time is also a contributor to the pain. In particular, implementations that extend longer than anticipated impart additional costs and can disrupt critical business plans. In particular, during the mid to late 1990's there were many notable examples of over-budget and elongated ERP implementations. As CRM began to grow, the number of cancelled or failed sales automation projects also became commonplace in the news. In fact, we estimate that successful projects, defined as those completed on time and within budget, comprised less than a third of all projects undertaken. Organizations are under pressure today to be more responsive to the needs of the business. In order to meet those objectives, the delivery of IT cannot take years and years. This means flexibility and adaptability are crucial elements of a successful IT organization. Part of the reason we like On Demand business models is that the implementation and maintenance of enterprises capture this need so effectively.

■ Risk: Failure is Not an Option

The risk of failure increases with the complexity and

extensiveness of implementation. Improperly managed deployments as well as undiscovered flaws can expose the business to risk of system crashes and security exploits. Patching and upgrades also introduce risk of unanticipated infrastructure conflicts. In general, as IT systems become more integrated and are brought online the risk of unplanned downtime and interruption becomes even greater.

Pain across the Consumption Cycle

We identify how pain occurs during several phases of the software consumption cycle under a perpetual license model - purchasing, implementation, maintenance and evaluation. We believe the perpetual software license business model gives rise to inherent conflicts between vendor and customer.

■ Purchase

The perpetual license purchasing process generates the most up-front pain for customers. During the purchase process, vendors and customers negotiate the exchange of benefits. Vendors naturally prefer to sell as much software as possible. The customer's motivation in purchasing software is to solve a business problem and achieve competitive advantage, process efficiencies or productivity gains – at the lowest practical cost. Vendors employ various pricing strategies (total seat count, concurrent pricing, CPU based pricing, tiered discount structures, etc.) that may disguise the true cost of ownership and result in over-buying.

Vendors that rely on perpetual license sales often rely on a product-driven strategy that involves creating the product first then selling it – rather than developing solutions that respond purely to customer need. In some cases this promotes a "rush to market" approach in which vendors sell products that don't deliver as promised – a/k/a "vaporware." Flawed or half-baked software generates cascading costs and delays throughout implementation and management as customers work to customize the solutions to better suit their needs.

■ Implementation

The implementation process can be the source of much unanticipated pain. One result of a product–driven strategy is that bugs, flaws and required customization add time, cost and aggravation to deployments. Typically, the customer wants a solution uniquely tailored to the business in the minimum amount of time at minimal cost. Vendors want replicable product offerings to achieve economies of scale so there is more incentive to leave most customization to the customer. Services also carry lower margins than software; hence vendors do not always build out their internal resources to ensure effective implementation across the customer base and will commonly offload service to third parties.

■ Management and Maintenance

Once a software solution is in production, management and maintenance processes can generate additional difficulties. Performance and scalability issues often drive need for additional hardware, software, tools, services and even licenses. Patching can be problematic because of unforeseen "ripple" effects in the infrastructure. Businesses can overpay for maintenance costs if they do not pay close attention to usage at renewal, particularly after corporate downsizing. Vendors commonly drive product upgrades by phasing out support of older versions, forcing additional spending on hardware and infrastructure.

■ Evaluation and Upgrade

Customers facing a decision whether to upgrade or switch face many of the same challenges involved in initial purchase, but decisions are colored by context. Switching costs must be evaluated in terms of not just new licenses, hardware and implementation but also training. "Sunk" investments in time and training often block newer and better solutions that would win in greenfield competition. When an upgrade path is chosen, the pain of implementation and customization begins anew.

Business Cycle Influences Customer Priorities

Finally, it is important to understand how the business cycle influences and impacts customer priorities around the issues of cost, time, and risk. In the go-go period of the 1990's, customers were not concerned much about the cost of software. The primary issue for many companies was competitive advantage, and time to value became the important currency. Risk was still important especially as systems and applications went online but even then, the concern of being "dot-com'd" or being a second mover was paramount. As the economy cooled, the priorities flipped dramatically from being time-conscious to cost-obsessive. The last two years have brought a tremendous focus on cost rationalization and re-centralized IT decision making. No longer are companies concerned that line-of-business managers have impediments or obstacles in procuring IT. Today, those impediments are viewed as sound governance practices to limit rogue spending and ensure compliance with corporate standards. Interestingly, the issue of risk still appears to be holding its position as companies are more sensitive to the inherent interdependency of systems and are striving to ensure maximum uptime and minimal project errors.

In our view, the fluctuations of cost and time will no doubt swing back and forth somewhat with the business cycles and the temperature of corporate priorities. However, what is intriguing to us is that with the notion of On Demand software models, we may now have a lever that lets organizations have the best of both worlds. Below, we dive into the background and rationale for the model.

Background and Rationale for Software Vendors

■ Background

As we consider the evolution of the software toward the On Demand model, we need to keep in mind that in a way, we've been here before. Although it might not have been called as such, software in antediluvian days was available in a limited fashion. The limitations – mostly how much of it you could use and for how long – was largely a function of how computing used to be done, in a centrally managed, time limited, expensive, and (by today's standards) low performance manner. The limitations stemmed from having to rely on expensive hardware, with low bandwidth, and extremely limited interactivity.

The computing "revolution" of the 1980s changed much of that by making available a profusion of widely available and relatively inexpensive computing: personal computers. Though central computing, and mainframe- or, later, server-based, applications never completely went away of course. Instead, we ended with a world of co-existing software applications and computing architectures.

We mention this much abbreviated history only to point out that as software moves to the On Demand model it will not be the same as it was three decades ago. Years ago, computing (logic and memory) was expensive and today it is a commodity. Back then, commercially available applications were limited or non-existent while today we are overflowing with lines of code. In the past, software was often bundled or offered by the hardware manufacturer itself (and the hardware was often leased, so there was the progenitor of the time-based model) while today the industry has broken the model of vertical integration. We think that the business and technology rationales for the adoption today are different.

■ Business Rationale

The business rationale for the new model includes pricing, maintenance/upgrade, and technology adoption. Below we discuss each topic.

For software vendors the pricing, i.e., net present values, of a contract can vary depending on its duration and the fulfilled or unfulfilled obligation the vendor has to deliver. In many cases, term licenses are sold at discount to the perpetual contracts with the implicit assumption that the customer will renew at equal rates and/or expand their capacity usages.

For vendors, being able to manage maintenance and/or upgrade spending (maintenance is often implicit in the cost of a subscription); we should note that how a vendor apportions the product and maintenance parts of a contract depends on whether maintenance is separately cancelable or not. For customers, smoothing out the cash flow over the life of a contract is also a motivation for adopting a time-based model of access to technology.

But beyond these cash flow and pricing considerations, we think a principal motivation has to do with the rate of change in technology. In other words, a basic premise of ours is that when the software technology is expected to change relatively quickly then it simply makes more sense to rent the access to the applications than to purchase it. This makes sense especially when the technology changes quickly or the need for capacity changes, and the contract calls for the ability to re-mix the value of different applications (this usually applies where there are complex, multi-product contracts).

Therefore, when we talk about software as a service it can in fact refer to the means of access, for instance, as a kind of utility with some means of measuring its capacity and use, and/or in contractual terms with respect to its defined terms and conditions, or both. The balance or relevance of business and technology rationale will be a function of the maturity of the technology, the cash flow requirements of the customer, and the developer's ability to meet revenue recognition requirements.

The Implications on Delivery and Implementation

The development of the On Demand software model will also change the economics and practices around delivery and implementation. We need to remember that in a typical software project, a company would only spend about 20%-25% of the total project budget on up-front software licenses, while the majority of the remaining budget would be spent on IT services work for the implementation and customization of the software. On the back of the broad adoption of standard application software throughout the 1990s, the IT services market for System Integration has been growing significantly and is now according to IDC an $85 billion market globally. This represents about 25% of the total IT services market and is significantly larger than the global software market.

We believe that the value proposition offered via the On Demand model could lower the overall costs of deployment by 5x-10x compared to traditional implementation models. There appears to be room for saving money not only in the upfront license and maintenance fees but perhaps more importantly in the hidden cost areas such as customization and implementation, hardware, labor, training, and upgrades. This also does not include some of the soft-benefits such as getting access to technology enhancements in a much more rapid manner. Remember, when an On Demand solution provider adds a feature or fixes a bug there is nothing to do on the customer side. The customer simply logs onto the web site and gets immediate access to the improved technology. This is where the network effect of the On Demand model can get very appealing as the community of users grow and begin to innovate.

■ **The Influence of Cost, Time, Risk**

The traditional symbiotic relationship between software and IT services companies often meant poor value for customers. The perpetual license model with customer managed implementation is a concept that has gone wrong in the eyes of many customers. The bad deal for customers already started in the software selection process. The 'ideal' world of a software purchase involved initially a consulting project with an external IT services provider (a $24 billion market according to IDC) in which the suitable software solution would be determined. However, the suggestions were not always impartial as they were often driven by the consultant's ability to implement certain packages and by the consultant's relationships with the specific software vendors.

We have already talked about the problems arising when purchasing large number of seats in up-front license deals. After the software is purchased, IT Services companies would take over again and would implement the software package. Given this process, it is easy to see that in the past, there was no real control mechanism for cost, time or risk. The majority of the IT services work was done on a per-consultant per-hour basis allowing no control of project costs, deadlines often overran and in case of failure, responsibility was shoved between consultant, software vendor and system integrator. In the recent downturn, the power balance shifted more towards the customer and we see now more fixed-price or even value contracts but so far we have not seen dramatic changes to the traditional model.

We believe the role of a consultant will have to change with On Demand software delivery. To determine the changes we need to differentiate the use cases individually. However, one factor is true for all scenarios, in the future the customer relationship will be much closer and long-term focused as the dependency increases significantly in the new IT services world.

■ **Functionality Trade-Off's**

In all of this we need to be aware that the 'New World', especially software hosting, only works if business processes are getting significantly more standardized than they are today. We believe that only fully standardized software can be hosted successfully. The interesting question then arises, "is this really desirable for all companies?" since better processes can offer significant competitive advantages (see Dell). One of the important and positive roles of IT Services companies is to help customers to achieve exactly that. Therefore, we believe there will be always room for IT services vendors and non-hosted software solutions to help companies attempting to differentiate themselves through better business processes. However, the number of IT services providers and the available budget dollars will be significantly lower than they are today and their deliverables could look entirely different.

Model Variations

Next, we examine the variations to the traditional perpetual license with customer managed software model. We believe that the industry will gradually move to the pure On Demand model. However, we would not be surprised to see companies move in an incremental manner, as they become more comfortable with the new approaches. Accordingly, we break the approaches down into three categories. First, we look at the perpetual license model but with the technology delivered via outsourcing. Second, we examine a subscription model but with the software still managed by the customer. Finally, we look at the On Demand model where the software is purchased as a subscription and the technology is delivered via an outsourced offering.

■ **Perpetual License with Outsourcing**

We believe in this case, the amount of necessary system integration work is significantly reduced. However, vendors could earn additional revenue by providing the hosting service. Hosted software needs to be far more standardized as the hosting nature only allows limited client specific customization. IT services companies that are able to change their business model and can offer scalable hosting facilities will be able to increase revenue significantly. Nevertheless, as many customers have global needs and as many IT services companies still only have regional presence, we would also expect further consolidation among vendors. Customers benefit significantly, not only because of reduced IT services work, but because it enables a global software purchasing approach that can significantly reduce the number of seats necessary and increases the level of discounts achievable.

■ **Software Subscription with Customer Managed**

We believe, in the world of software as a subscription, all else held constant, the implications for IT services vendors are limited. One could argue that the lower initial payment for software leaves a larger amount to spend for IT services. However, we are not convinced that this will really happen. This model does have some benefits for the customer, as the vendor will be forced to earn the business given that the license will be for a set term or duration and renewal is not a guarantee. We expect this type of approach to play better in cases where the end customer has more mature IT capabilities or the software requires some deeper integration or customization of legacy systems.

■ **On Demand Model**

We think of a pure On Demand delivery model as a deployment where there is a single instance of the software being delivered to multiple customers in a shared tenancy approach. This means there is minimal customization for the end user and enhancements and feature upgrades are

disseminated almost daily to the customer base. We believe the system integration and customization work is reduced significantly. This has significant benefits in terms of achieving rapid time to deployment, hidden labor and training costs, and costly upgrades and bug fixes. While this model may not permeate every category of software it will likely hit areas that are more commodity-like in nature where the benefits of customization are not as obvious.

An IT services company could establish additional sources of revenue. In the case of a true on demand model, IT services vendors buy software in 'bulk' and need to position themselves more as transaction houses, which we can currently observe in the US financial services industry. As companies outsource their mission critical data operations, vendor viability will be key. Hence, we believe only a few service providers will have the balance sheet to compete successfully, accelerating the current consolidation process significantly.

Surveying the Software Landscape

As we look at the move toward On Demand, there are clearly some areas within software that are better suited for this model. Additionally, we expect that the transformation will likely be a process, rather than a sharp conversion. We suspect that we will see varying degrees of progress. Specifically, there are some cases in which the licensing model makes the transition first, such as with Microsoft's volume licensing program. Or in other cases, the rate of the technology change is so extreme, that to continue to upgrade is much too daunting a task, which makes the outsourced/hosted model more appealing. In this section, we explore the major categories of software and offer a view on the sub-segments as well as specific comments on individual companies.

■ Application Software

Enterprise Resource Planning (ERP)

The ERP market has moved toward a period of relative maturity. While most large enterprises have already purchased ERP solutions from such vendors as SAP, Oracle, PeopleSoft, or Lawson, there are several ERP companies that have been hugely successful with the On Demand model. We are finding that when a business application supports processes that are viewed as utility-like, or lacking much means for competitive differentiation, then it is ripe for an On Demand model.

For traditional human resources services, including payroll, and benefits, Paychex, Ceridian, NetSuite and ADP have been very successful in selling their managed HR offerings to thousands of customers. With respect to the larger ERP vendors, executives at Oracle are huge proponents of the software as a service model, and offer its eBusiness Suite on a hosted basis. Although it still represents less than 3% of the company's total revenue, Oracle is taking many steps to move down stream into the

SMB market, which is likely a better candidate for a hosted Oracle ERP solution. We definitely expect to see Oracle's On Demand business increase as a percentage of the business over the next couple of years. PeopleSoft and SAP have also recently been touting their On Demand goods, as they too are striving to move into the SMB market with more economical solutions.

Customer Relationship Management (CRM)

CRM has perhaps been one of the first of the enterprise applications segments to have true success with the hosted model. Salesforce.com, for example was somewhat of a pioneer in the On Demand world, and has successfully hosted CRM solutions for more than 8,400 customers. Although Siebel Systems, the industry leader in CRM, generates most of its business on a perpetual license basis, the On Demand model has resonated with many enterprises. Seeing the success Salesforce.com has had with its On Demand model, Siebel has teamed up with IBM to provide its own CRM solution hosted by IBM. The significant benefit that Siebel offers its customers is a growth path into its full-featured enterprise solution. In this particular case, the move to the hosted model for Siebel was largely driven by customer demand, rather than a business model shift. Launched just four months ago, it is still too early to assess the financial impact the On Demand product will have on Siebel's earnings results. We suspect that it will cause a bit of a drag on earnings, at least in the first year, particularly as the company is providing the first 3-months of service to its customers for no charge.

Supply Chain Management (SCM)

Although there are some exceptions, SCM solutions are a bit difficult to offer using the On Demand model. While Oracle, PeopleSoft and SAP do provide such solutions on a hosted basis; to date this has not been an area of huge demand. We believe that there could be some growth in this market around hosted collaboration solutions between customers and suppliers as there are benefits of aggregated data. However, we think in the near-term this market may stay more aligned with the traditional models.

Knowledge Worker Applications

In the knowledge worker application category we focus on three of the larger players - Microsoft, Autodesk, and Adobe - as examples of the trend. Microsoft has been the most aggressive in moving the licensing portion of their business to a ratable model in order to encourage more frequent upgrades and a smoothing of revenues given the elongation of the PC cycle. As a result, Microsoft Office was typically included in many of the Software Assurance deals as a result of the licensing program change. We believe that this model has some challenges given that customers may not require all the latest functionality in Office. This means the company must continue to focus on adding more value in the product through its rights management, XML, and even business solutions modules in order to drive frequent upgrades and renewals.

Merrill Lynch

Autodesk has been working to increase its base of recurring revenues. Autodesk uses the classic product upgrade cycle model. It was only in the past two to three years, after being able to move to a more rapid release cycle (plus price inducements), that the company was able to start growing its base of recurring revenues through what are in effect maintenance contracts.

Adobe Systems on the other hand, while having had significant success in establishing market leadership in multiple design application markets, and now with its Acrobat business, has not yet made the commitment to build more of recurring or subscriptions-based model. We suspect that part of the impediment thus far is that on a per-customer basis the number of users is often, though not always, relatively small.

MCAD/Product lifecycle Management (PLM)

The companies in this segment of the Technical software market – such as Parametric Technology and Dassault Systems – have relied upon the fairly classic model of new seat deployment plus maintenance (with maintenance being the recurring part). There has been little movement here toward subscription or software as a service, although Dassault's "right to use" model is perhaps a variant of the rental model (and one that has successfully evolved, having half of their revenues from a recurring source).

On the whole however, we have seen little movement towards evolving technology access and revenue recognition models along the lines discussed above. Our general observation or explanation for that is that the technology does not change, nor is it as multifaceted, as in EDA. Where there might be an opportunity is software as a service for project management, as a king of repository meeting a collaborative requirement, e.g., a hosted service. Autodesk has had some success here in the architectural and construction markets with its Buzzsaw service but it has been on the whole a limited phenomenon thus far. It appears that for the time being the conventional license and maintenance model will prevail here. Having said that, we do see examples of companies with relatively mature product lines and customer bases trying to proffer new licensing models with flexible access rights, namely MSC Software with its "token license model."

Business Analytics

There are several Business Analytic vendors with subscription-based or hosted business models. The most prominent is SAS Institute, which has built its $1.2 billion + business over the past 28 years on a predominantly term based subscription model. The focus of sales efforts on renewals has aligned the company's product development to customer needs. SAS typically develops product enhancements based on customer feedback – and spends an industry-high 28-30% of sales on R&D (roughly double the software industry average). Other Analytic vendors with similar term licensing models include SPSS and Spotfire.

Hosted Analytics provide an attractive solution to customers who either prefer to outsource the processes involved with running a data warehouse or lack in-house expertise to translate data analysis into actionable recommendations. Fair Isaac's Marketsmart and TRIAD solutions help financial services firms prospect new customers and manage their portfolio of existing customer relationships. Web Analytics offerings from vendors such as KeyLime, WebSideStory and SAS are offered on a hosted basis. There is also interest among large customers in outsourcing all aspects of a data warehouse. In particular, SAS Institute has seen a recent upsurge in enterprise deals involving a combination of both term licenses and hosting.

■ Infrastructure Software

Operating Systems

With the operating system market dominated by Microsoft a survey of this segment is an examination of their business practices along with the burgeoning momentum around Linux. Microsoft has pushed its customer base in the direction of term based licensing with the Licensing 6.0 program. On a delivery basis, the OS is normally bundled and shipped with hardware and deployed on premise. As Linux has gone mainstream the delivery practice has been similar with OEM's like IBM, HP, and Dell pre-bundling a version from Red Hat or Novell's SUSE. The interesting component of the Linux open source model though is the absence of an upfront licensing fee and just a subscription support contract. This is typically a one-year maintenance contract for technology support, upgrades, and maintenance. As a result, the Linux total cost of ownership argument is gaining strength as customers are moving significant workloads over from both proprietary UNIX and Microsoft. One only has to look at Red Hat's Linux subscription growth as a barometer of the success.

Database

On the database front Oracle, IBM, and Microsoft still primarily sell perpetual licenses for their products, however, there are some slowly changing dynamics. Oracle will manage database deployments for its customers via its outsourcing business unit. This is typically done in conjunction with an E-Business suite deal however there are few database consolidation deals occurring. For IBM they will manage a DB2 instance as part of a broader outsourcing agreement. Microsoft is not necessarily in the business of managing an outsourced deployment but they will license the technology on a term basis as part of a Software Assurance agreement. We think customers are beginning to consider both term licensing and outsourcing for their database deployments but the tipping point is still years away. The transition to term licensing might happen sooner than later as the technology becomes mature and customers take advantage of the grid-based features.

Application Server Platforms

The major application server vendors, BEA and IBM, typically sell their products on a perpetual basis and customers tend to manage the operations themselves. For the most part, hosted offerings are only done on a larger outsourcing basis given that the development of applications on the platform are typically done by internal IT or a 3rd party systems integrator. Over time, we would expect both firms to offer some greater flexibility in licensing as customers seek to add capacity. Open source offerings also could push the licensing approach in the direction of term-based pricing.

Enterprise Application Integration

The EAI category is perhaps one of the trickiest segments to move to the On Demand model given the inherent challenges of legacy technology. Some of the segments such as EDI are likely candidates to move quickly given the growing maturation of web services and XML technologies. We think the gradual adoption of service-oriented architecture could change this dynamic in the next three to five years as more organizations build and deploy systems that have the needed XML hooks to allow network based integration approaches. There will most likely always be a market for traditional EAI tools but new solutions from providers such as Grand Central are quite interesting. If Grand Central's hosted, service-oriented integration network takes off it could change the face of the integration market. From a licensing perspective, most of the deals done today are on a perpetual basis. A few years back, webMethods was selling on a term basis, however, customers ended up driving more toward a perpetual model given the project nature of the deployments.

Systems Management

The systems management category is undergoing an interesting transformation on both fronts. From a licensing perspective, term based pricing has been a typical practice with mainframe based systems as customers are comfortable with buying capacity for their particular machines. These deployments are often also managed by IBM or another 3rd party systems integrator. We would expect the mainframe segment to continue to be a leader in terms of On Demand business models.

In the distributed market, the practices are evolving quickly. Most of the solutions sold in the 1990's were large frameworks that typically had a very low success rate in terms of project completion. As a result, there was backlash against paying large upfront license fees for technology that was rarely implemented as advertised. This is why vendors like Computer Associates, BMC, and even Tivoli (IBM) have all in one way or another adopted more flexible licensing programs. CA has recast its business model to term based licensing from the upfront perpetual model for a myriad of reasons. BMC is also beginning to be a bit more flexible and is offering both perpetual and term licenses.

The other aspect of this market that has changed in the last few years is the popular usage of hosted application performance management (APM) solutions. Given the data overload of traditional systems management solutions many customers found that using agent-less APM to monitor end-user service levels was a more cost-effective and value-added means of ensuring uptime and satisfaction. Mercury Interactive used this model very successfully to break into the APM business. Part of their success also included the flexibility of term-based licensing so the obstacles to customers' adoption were miniscule. We would expect this market to continue to evolve from both a licensing and hosting perspective to a pure On Demand model.

Security

Security software vendors have long sought to enhance revenue visibility through the subscriptions, and there is a clear trend toward greater emphasis on subscriptions across the sector. For Anti-Virus vendors (including Network Associates and Symantec) subscriptions represent a much higher proportion of revenues than other categories of software – typically approaching 50% or more of the initial software purchase price per year. Deferred revenues (which currently represent near 50% of next-12 month estimated sales for both vendors) provide demonstrable revenue visibility to the company and to investors. Web Content Filtering and Intrusion Detection/Protection vendors similarly rely to a great extent on selling subscriptions for content updates. Vendors such as WebSense and SurfControl enjoy revenue visibility similar to the Anti-Virus vendors.

Symantec recently announced it would allocate an increasing proportion of its non-AV Enterprise Security products to subscriptions. Check Point and NetScreen have introduced additional subscription-based services to provide "signature" updates to there Application Intelligence and Deep Inspection capabilities, respectively. Network Associates plans to offer pending enhancements to its e-Policy Orchestrator product on a subscription-only basis.

Hosted solutions also enjoy strong appeal in the security software market. Email filtering in particular lends itself to a hosted model. Vendors such as Postini and Frontbridge have seen strong growth by providing email "cleansing" and Spam quarantine on a hosted basis, enabling organizations to avoid the productivity losses and drain on bandwidth and server resources related to the ever-increasing rate of unsolicited e-mail. PKI (Public Key Infrastructure) in particular lends itself to a hosted approach given the complexity involved with implementation. As a result, VeriSign's hosted PKI approach has held up much better than pure PKI software vendors such as Baltimore and Entrust. In the Anti-Virus segment, Network Associates is the only vendor to offer hosted McAfee ASAP services, which have targeted the consumer and small enterprise market for several years.

Overcapitalization of the Managed Security Services market ahead of demand resulted in a number of early failures from 2000-2002. However, the market is showing increased stability. While the Managed Security Services market has seen sluggish adoption in the Small and Medium Business segment due to relatively unattractive price points, traction is building steadily. Leading MSS vendors such as Symantec, ISS and VeriSign have recently reported steady growth (albeit off relatively small numbers) and improving margins.

Storage

Both Veritas and Legato use term licenses of 2-3 years whereby a customer pays initial license fee plus 18% or 23% per year for maintenance. Some investors are concerned that the recent slow product license growth for Veritas (+6.5% sequentially in CQ4) is because the company is feeding its installed base but not expanding its customer base much. However, the other argument is that much of the slower growth was due to a difficult comparison with a strong CQ3.

On hosted versus managing themselves, most customers today prefer managing storage themselves. There was a lot of noise related to outsourced storage a few years ago (with the advent of SSPs, or storage service providers), but the SSP phase came and went. For example, StorageNetworks, a pioneer in SSPs, recently returned funds to shareholders after abandoning the SSP market to become a software company. At this time, it appears that most customers today are more comfortable managing their mission-critical data in-house.

Valuation Methods for the On Demand Business

As companies transition to the On Demand business model, Wall Street must also adapt its valuation methods. Today the common approach is to use standard metrics such as price-to-earnings or price-to-sales multiples as the best way to compare valuations for software companies. As the On Demand model grows, investors will need to apply increased scrutiny on the balance sheet and cash flow statement in addition to the income statement. In simplistic terms, this change in the model typically results in earnings and revenues that are understated in the near-term, as bookings shift from the income statement onto the balance sheet. Over time, the income statement reflects the growth from prior years' bookings, as the deferred subscription revenue is transferred to the income statement. Therefore, it is bookings growth, (changes in deferred revenue + reported revenue) and cash flow growth that should become the primary methods to determine the strength of the business.

From an investor's viewpoint, this can be viewed as both good and bad depending on the timeframe. In the near-term following a transition, the bad news is that these companies will tend to look expensive relative to others, using traditional valuation metrics, as both earnings and

revenues will appear depressed. Over the longer term, the On Demand model allows for significantly better revenue visibility and consistency, and it can reduce the pressure on vendors to push for deals in the last moments of the quarter in order to make their numbers.

With an On Demand model, revenue is booked upon signing the contract but is recognized ratably, which creates a great deal of visibility into a company's revenue stream on a forward basis. This means that the company only moves deferred revenue off of the balance sheet and onto the income statement one period at a time. For example, a two-year term license will be recorded as revenue ratably over 8 quarters. As a result, the income statement visibility drastically improves under this model versus perpetual licensing. Accordingly, we can now look onto the deferred revenue line on the balance sheet as an indicator of future revenue to be recognized in coming quarters. However, we are not naïve to the fact that investors will also need to look more toward balance sheet metrics, specifically the increase in deferred revenue, as a near-term indicator of growth. Cash flow in addition becomes the much more representative indicator of actual profitability versus reported net income. One area that investors must remain vigilant is the issue of renewals. For vendors, the longer-term viability of the model is predicated on strong annualized contract value renewal rates. This is important or otherwise the model just serves to mask a slowdown in bookings. To be fair though we still have this issue in the perpetual world today as investors don't really know how much license is being sold on a per CPU basis. We are not overly obsessed or concerned with this dynamic of the term model because of the over-selling of forward capacity in the perpetual model. However, in order to remain balanced, we acknowledge this concern and will try to carefully monitor and track this to the extent it is disclosed.

Given the model change, we believe companies' performance should be viewed in the context of total bookings (revenues + net change in deferred revenues). In other words, while revenues are an important gauge of performance we believe bookings are equally relevant as a metric to judge underlying performance, as this is a measure of future cash flows. Accordingly, we have developed a set of valuation metrics that takes into account changing business models. We will look at EV/OCF, OCF/E, and lastly as a productivity metric, we look to our OER, or operating expense ratio, which gives us a bookings-adjusted operating margin. That's not to say that we think investors should ignore more traditional valuation metrics such as price to sales (P/S), and price to earnings (P/E) multiples, or even DCF models. However ,we believe that some of the following metrics might be more useful for measuring the performance of companies with an On-Demand revenue model.

■ **EV / OCF**

First we apply an Enterprise value to operating cash flow (EV/OCF) multiple. We assume EV to equal the market capitalization plus any long-term debt, minus cash, while we calculate operating cash flow as net income, plus change in deferred revenue, and change in working capital. This allows us to more appropriately value the business, especially during a business model transition in which revenue growth appears to be understated, as do corresponding earnings growth rates. You can use this metric, and compare it to the company's EV / Op E that we calculate as the company's taxed operating earnings. This helps to illustrate the understatement of the earnings on the income statement.

■ **OCF / E**

Similarly, utilizing an operating cash flow to net income, or earnings multiple further illustrates the magnitude of the understatement of revenue and earnings on the income statement. As mentioned earlier, we believe that operating cash flow provides a more complete view of a company's operating performance.

■ **Op Ex / Total Bookings**

As companies can successfully move customers to a subscription model, we would expect to see improvement in both gross margin, as well as revenue growth, which will lead to improvements in the company's operating margin over the longer term. From a productivity perspective, we use Operating Expense to Total Bookings (where bookings equals revenue plus net change in deferred revenue) to measure the productivity of the model. Again, because revenue typically just moves from the balance sheet, we believe you need to look at the total bookings number in the quarter to measure the true salesforce performance.

Below we take a look at three very different examples of vendor transitions to On Demand models. First, we look at Microsoft and the move it made when it introduced its new 6.0-licensing program in 2002. Next, we examine how Mercury Interactive used the model to enter a new market and transform an existing segment. Finally, we discuss the changes in the Electronic Design Automation (EDA) space.

■ **Microsoft's Move to Licensing 6.0**

In August of 2002, Microsoft made the decision to move to a new volume licensing strategy, which is more subscription-based in nature than the previous model. As a result of Microsoft's licensing policy change, the company experienced a surge in term-bookings at the time of the policy change, thus growing the unearned (or deferred) revenue balance significantly on the balance sheet. As a result, investors began to look to the deferred revenue balance as a measuring stick for the company's true performance in the quarter.

So, what was Microsoft's rationale for making the switch to the subscription-based, business model? During a period of contracting IT spending, PC lifecycles have stretched to 3-5 years. To encourage more frequent repurchasing of software, the company moved to an On Demand model. Microsoft's licensing program provides an incentive for customers to upgrade frequently, and does not favor those that put off migrations beyond three years. While perpetual licenses are still available, they cost about 15% more. Presently, we estimate that about 25-30% of the company's business is derived from annuity licensing. At the end of the company's fiscal second quarter, management indicated that of the $7.85 billion in unearned revenue on the balance sheet, $2.56 billion is expected to be recognized in Q3. Therefore, assuming our FQ3 revenue estimate of $8.6 billion, On-Demand revenue should be about 30%. The company also indicated that the way to look at On-Demand revenue on a go forward basis is as follows: Client is about 25% volume licensing, Server is 40% volume licensing, and Information Worker is also 40% volume licensing.

As mentioned above, following the deadline for customers to switch to the new licensing policy, Microsoft recorded a huge increase in unearned revenue, which was followed by a corresponding increase in the stock price. Over the next several quarters, there was an increased scrutiny on the company's balance sheet, specifically as it pertained to the company's unearned revenue balance. This balance has been declining for the last several quarters, as deferred revenue has been transferred to the income statement, and bookings for term licenses have not been growing as fast, which has created some investor concern. As a matter of fact, even the company has had a difficult time in trying to predict the change in unearned revenue balance, as lately the company has seen a shift back to perpetual licenses. This is because many customers who typically would have purchased perpetual licenses opted to try the subscription based arrangement but then reversed course, opting not to renew but rather, buy the licenses instead as many could not upgrade within the subscription period due to cost or time constraints. From an investor's standpoint, it has been the performance of the unearned revenue balance that has been a catalyst for stock price movement. Accordingly, we believe that it has been the under-performance of bookings that have kept the shares in a tight trading range for the last several quarters. This is a great example of the renewal rate challenges and serves as an indicator of how important that factor plays when determining valuation.

■ **Mercury Interactive (MERQ, C-1-9, $48.27)**

Another company that has made a major shift in its licensing policy is Mercury Interactive. In 2000, the company began its shift to an On-Demand model. Whereas Microsoft's shift was to increase repurchasing, Mercury's model shift was due to its new APM product offering that focused on end-user, agent-less, service monitoring. A key competitive advantage of its offering was both the flexible term licensing and its hosted delivery option.

Following the success the company had in using this delivery method for the APM business, it also began to offer its testing products on both a term, and a perpetual license basis. In the first year, subscription revenue represented just 3% of the company's total business. In just three years, in 2003, subscription revenue was nearly 20% of the company's total revenue. More importantly subscription bookings as a percentage of total product bookings has surged to over 51% as of the December 2003 quarter.

Furthermore, the company has increased its deferred revenue balance in every quarter since the introduction of its On Demand licensing, implying significant bookings growth. But, as mentioned earlier, as the move to the On-Demand model has given the company improved revenue visibility into future quarters, most savvy investors are looking to the balance sheet and statement of cash flows for performance indicators for this company.

We believe that Mercury Interactive is one of the most misunderstood stocks, with respect to its comparative valuation. Some investors still believe that it is an expensive stock on a P/E basis and cling to the old metrics of valuation. We encourage investors to look closer at the balance sheet and cash flow statement as better indications of value. For example in the last quarter, the company posted a $57 million increase in deferred revenue, with $40 million of the increase coming from deferred subscription revenue. The Q4 period was both a record bookings and cash flow ($67 million) generation quarter. Accordingly, we believe that traditional valuation metrics do not appropriately capture the performance of the company. On a P/E basis, Mercury trades at a premium to its peer group, however, we believe that the added revenue visibility afforded by the On Demand model, as well as the growing level of operating cash flow, should not be discounted. On a cash flow basis, the stock trades at a much more reasonable level when compared to its peer group.

We will use as an example, Mercury's valuation compared with a company just beginning its transition to the On Demand model, Siebel Systems. Using traditional valuation metrics, Mercury trades at 44x our 2004 EPS estimate of $1.06, versus Siebel's 40x multiple. On a price to sales basis, Mercury trades at 7x our 2004 estimate, versus 5x for Siebel. Looking at our proposed new bookings adjusted valuation metrics, Mercury trades at a discount to Siebel. Specifically, looking at EV / OCF, Mercury trades at 22x, versus 27x for Siebel due to Mercury's significant cash generation afforded by its On Demand model. Additionally, we look at the bookings adjusted OER (operating expense ratio), where Mercury has a 29% margin, significantly above Siebel's 18% projected for 2004. As Siebel gets further along with its On Demand model, and has an increasing percentage of its business coming from its subscription business, we would expect to see its OER tick up. For now, taking bookings into consideration, it looks to us like Mercury is much cheaper than conventional PE wisdom might imply.

Our $55 price objective reflects a 40-45x P/E on our 2005 EPS estimate of $1.30, which is in line with the peer group average. Risks include a deterioration of the IT spending environment, the ability to maintain pricing power, and acquisition integration.

■ **Electronic Design Automation**

We saw a prime example of the new model adoption starting in 1999-2000 as the two largest EDA companies, Cadence Design Systems and Synopsys, moved their models to a largely ratable mix of business through the use of subscriptions (in lieu of what had been largely perpetual and term licenses). We wouldn't be surprised if other software companies outside of EDA have looked at this experience for guidance on what it means to revenues and valuations.

In the spring of 1999, Cadence adopted a new targeted license model with an estimated percentage of subscriptions licenses (about 30-40%, which was subsequently raised to about a three-fourths mix in a revision to the model in late 2002). Synopsys changed their model in late 2002, and leapfrogged Cadence in that change in the sense that they went to a predominantly subscriptions license mix right away (they discontinued the former term licenses in the mix, keeping only perpetuals as the alternative license type). In late 2003, in a revision to their model, they reintroduced term licenses. At the moment, the two companies have roughly similar ratable license expectations.

Now, strictly speaking, these model changes are not about software as a service per se, as though EDA at least has become a kind of utility and the access to, or location of, the software has moved from a customer owned and managed infrastructure. It has been to date more about the technology delivery obligations of a vendor and therefore how the software transactions are to be recognized as revenue. Nevertheless, we think that over the last three or four years of this model's evolution – in the midst of the not so small matter of an EDA "recession" – that the longer term outcome has been to improve valuations in the sense that the shares seem to have moved to a higher range of price/revenue multiples.

In the months leading up to the first Synopsys model revision, which was formally announced in August 2000, the shares declined as the market discounted the likely reduction in revenue forecasts as a result of the prospective model change (earnings estimates then and since are more variable than revenues since costs are not variable with respect to license type). In 2001, for instance, Synopsys reported a 13% decline in revenues notwithstanding what we've calculated was better than a one-fifth increase in product bookings. The shares traded as low as low as 2.5x revenues. However more recently, we have seen a recovery in the valuation to as high as 4x revenues given the market's perception of a general end market or industry recovery and the understanding that the large majority of estimated revenues is already in backlog.

The Launch of the Merrill Lynch On Demand Index (MLODI)

The goal of the Merrill Lynch On Demand Index is to create an objective measure for investors to better value and invest in software companies as they make the transition to an on demand world. MLODI is intended to provide investors with a quarterly tool that tracks both the amount of revenue generated and solutions deployed via the On Demand model. This will allow us to capture how quickly the industry is progressing in its transformation. The index will break down the software sector by sub-segments for applications, infrastructure, and management. We will also define some of the niche markets to help give investors an idea if this competitive change is accelerating in particular segments so they can better understand company specific issues.

The second component of MLODI will concern our valuation analysis. We are revamping our entire approach by utilizing cash flow and booking methods in conjunction with our traditional metrics. We believe this is important for investors so they can better make relative valuation comparisons between companies that have different models. The first results of MLODI will be published in early spring and updated after each calendar-reporting season.

Chart 4: Merrill Lynch On Demand Index (MLODI)
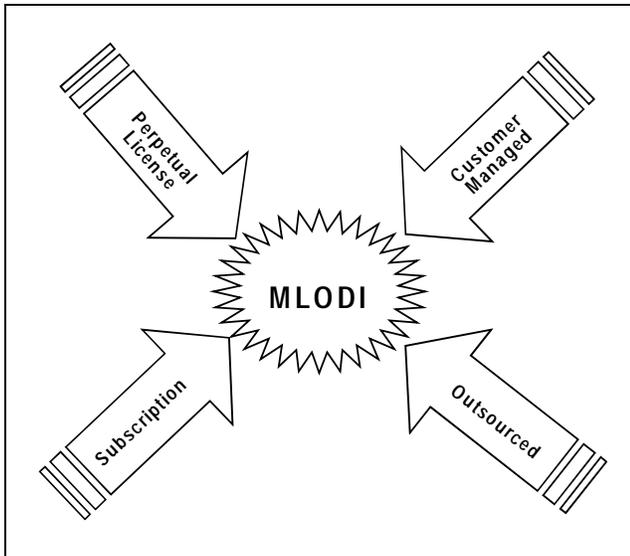
Source: Merrill Lynch

Analyst Certification

I, Jason Maynard, hereby certify that the views expressed in this research report accurately reflect my personal views about the subject securities and issuers. I also certify that no part of my compensation was, is, or will be, directly or indirectly, related to the specific recommendations or view expressed in this research report.

Important Disclosures

MERQ Price Chart
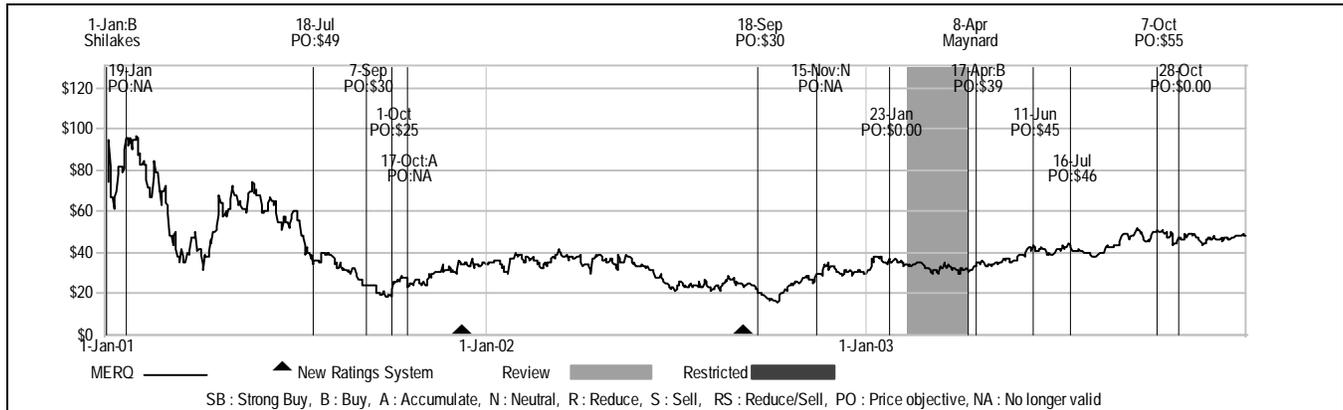
Prior to 8 Dec. 2001, the Investment Opinion System included: Buy, Accumulate, Neutral, Reduce and Sell. From 8 Dec. 2001 to 6 Sep. 2002, the Investment Opinion System included: Strong Buy, Buy, Neutral, and Reduce/Sell. On 8 Dec. 2001 Buy ratings became Strong Buy, Accumulate became Buy, and Reduce and Sell became Reduce/Sell. On 6 Sep. 2002, Strong Buy and Buy ratings became Buy, and Reduce/Sell became Sell. Any exceptions to these rating revisions are reflected in the chart. All price objectives for Neutral and Sell rated securities established before 6 Sep. 2002 were eliminated as of that date. The current Investment Opinion System is contained at the end of the report. Dark Grey shading indicates security is restricted with the opinion suspended. Light Grey shading indicates security is under review with the opinion withdrawn.

Investment Rating Distribution: Technology Group (as of 31 December 2003)

Coverage Universe	Count	Percent	Inv. Banking Relationships*	Count	Percent
Buy	102	45.13%	Buy	23	22.55%
Neutral	109	48.23%	Neutral	14	12.84%
Sell	15	6.64%	Sell	2	13.33%

Investment Rating Distribution: Global Group (as of 31 December 2003)

Coverage Universe	Count	Percent	Inv. Banking Relationships*	Count	Percent
Buy	1050	42.53%	Buy	352	33.52%
Neutral	1236	50.06%	Neutral	309	25.00%
Sell	183	7.41%	Sell	31	16.94%

* Companies in respect of which MLPF&S or an affiliate has received compensation for investment banking services within the past 12 months.

OPINION KEY: Opinions include a Volatility Risk Rating, an Investment Rating and an Income Rating. VOLATILITY RISK RATINGS, indicators of potential price fluctuation, are: A - Low, B - Medium, and C - High. INVESTMENT RATINGS, indicators of expected total return (price appreciation plus yield) within the 12-month period from the date of the initial rating, are: 1 - Buy (10% or more for Low and Medium Volatility Risk Securities - 20% or more for High Volatility Risk securities); 2 - Neutral (0-10% for Low and Medium Volatility Risk securities - 0-20% for High Volatility Risk securities); 3 - Sell (negative return); and 6 - No Rating. INCOME RATINGS, indicators of potential cash dividends, are: 7 - same/higher (dividend considered to be secure); 8 - same/lower (dividend not considered to be secure); and 9 - pays no cash dividend.

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