

Software as a Service for the Supply Chain

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An Introduction to Software as a Service (SaaS)

Industry analysts, software vendors, technology press and the investment community are all talking about Software as a Service, or SaaS. But what is SaaS? And how is it different from traditional software approaches? The concept behind SaaS is very simple. Instead of purchasing a perpetual software license, SaaS users subscribe to an application for an ongoing monthly recurring service fee. The SaaS vendor hosts the application in its own data center, providing all of the maintenance, upgrades and support activities. This, of course, differs from the traditional software model in which a corporation customizes, manages and operates the software themselves.

TRADITIONAL SOFTWARE

- Perpetual license paid upfront
- Corporate IT customizes, installs and maintains
- Hosted in corporate IT data center
- Accessed over corporate wide area network
- Buyer must demonstrate ROI through successful implementation

SOFTWARE AS A SERVICE

- Monthly subscription fee
- Vendor installs and maintains
- Hosted in vendor data center
- Accessed over Internet
- Vendor must demonstrate ROI to retain business

There are a variety of different SaaS business models. Vendors will sometimes disagree on what constitutes a true SaaS model versus a hosted software application. However, the following characteristics generally apply to all SaaS models:

- **Accessed via the Web**—End users access the application over the Internet using a standard web browser. The web-based approach is used instead of the traditional, PC-based client accessing resources over a corporate WAN.
- **Vendor Support**—Rather than being managed by the corporate IT department, the application is hosted and operated by the software developer themselves.
- **Subscription Pricing**—Instead of paying upfront perpetual license fees, the customer pays a recurring monthly fee for use of the functionality.
- **Low Customization**—Very little customization of the software is performed. Applications are highly standardized across customers, often hosted in a “multi-tenant” architecture model.
- **Managed Upgrades**—Functionality enhancements are completely controlled by the vendor. Frequent upgrade cycles occur with new features being introduced multiple times per year.

Software as a Service Defined

Software as a service (SaaS) is a software application delivery model where a software vendor develops a web-native software application and hosts and operates (either independently or through a third-party) the application for use by its customers over the Internet. Customers do not pay for owning the software itself but rather for using it.

The term SaaS has become the industry preferred term, generally replacing the earlier terms Application Service Provider (ASP), On-Demand and “Utility computing.” **Source: Wikipedia**

The SaaS model represents a radical change to the software industry as it encompasses several major paradigm shifts. Pricing and upgrade models are an obvious

area of change with SaaS. But the implications are much more far-reaching, impacting nearly every aspect of a software company's business from financial reporting to organizational structure. Perhaps the two biggest changes are:

- **Shift to service-based mentality**—The SaaS model requires a paradigm shift away from a product-centric approach and toward a service model. In the new model SaaS vendors are accountable not just for developing the application, but the entire suite of services to support the software in production. Beyond just the application code, the vendor must provide the entire customer experience including implementation, testing, training, troubleshooting, maintenance, hosting, upgrades and security.
- **Success based revenue model**—In the SaaS model a vendor's success is critically linked to the customer's success. The buyer makes no upfront investment in software, hardware or implementation resources. The vendor is only paid if the client is satisfied with the software and therefore continues their subscription. Unlike traditional software models, unsatisfied users of SaaS can easily unsubscribe and switch to a competing provider.

The Evolution of SaaS

The idea of a centrally hosted software application is not a new concept. In fact, the first business applications were accounting and payroll systems that were centrally hosted in a time-shared mainframe environment. Today, business process outsourcing providers and IT outsourcing firms who operate business applications on a customer's behalf offer a model similar to SaaS. During the dot com era of the late 1990s, many companies experimented with SaaS type models which were referred to as "Application Service Providers" or ASPs. Only a few of the ASPs survived the recessionary period that followed the Internet bubble. However, the failure of the ASP concept may have been less a matter of value than it was an issue of timing. In many respects the ASP model may have been a concept ahead of its time.

A number of market forces are converging that promise to reinvigorate the SaaS concept.

The market drivers are operational, financial and technological in nature:

- **Operations**—There is a growing level of frustration among corporate IT departments with traditional software models. Corporations struggle to achieve the ROI promised by software vendors. Hidden costs associated with implementation and support typically erode expected cost savings. Unforeseen delays in deployment due to complexity or customization often delay payback periods. Corporations pay high annual maintenance fees in return for upgrades that require monumental efforts to deploy and offer little new, useful functionality. Mergers and acquisitions in the software community compound issues even further by increasing the costs associated with version upgrades and reducing the predictability of product roadmaps.

THE PARADIGM SHIFT OF SAAS

- Shift to service-based mentality
- Success based revenue model

IT MODELS WITH SIMILAR CHARACTERISTICS TO SAAS

- Mainframe Timesharing
- Application Service Providers
- Business Process Outsourcing
- Web Hosting of e-Commerce Applications

- **Financial**—The capital markets are beginning to influence the software delivery model as well. The investor community is showing a preference for companies that offer lower types of risk and higher levels of predictability. The monthly recurring revenue model SaaS delivers provides highly predictable cash flows, excellent visibility in future performance and lower levels of operational risk. SaaS vendors have been rewarded in both the private and public markets with higher valuations than many of the traditional software players. Investor pressures will drive both venture capital based upstarts and established public companies to consider the SaaS model.
- **Technology**—Performance, security and reliability were often cited as deterrents to the early ASP models. However, since the start of the decade, the perceived barriers to hosted applications have been removed. Network bandwidth prices have decreased significantly. Broadband access both through landline and wireless networks is becoming almost ubiquitous in developed countries. Additionally, the use of the Internet as a network for secure business transactions has become more commonplace. As a result, security, performance and reliability are no longer roadblocks for SaaS deployments.

Customer Benefits of Adopting a SaaS Strategy

The SaaS model can offer numerous benefits over traditional licensed software approaches. Four key benefits are outlined below.

- **Pricing Flexibility**—With SaaS, applications are traditionally utilized on a subscription basis for a monthly recurring fee. Customers do not need to invest in upfront license commitments or the supporting hardware infrastructure. Subscriptions typically range in term from twelve to sixty months. Pricing is based upon actual usage as measured by transaction volume or end user activity. The subscription payment model offers flexibility over traditional enterprise-wide perpetual licenses.
 - First, if the client is unsatisfied with the value delivered by the application, they can simply unsubscribe. The client may be subject to early termination fees if they elect to opt out prior to the end of a contractual period. However, even if there is a termination fee charged, the overall cash outlay is typically significantly less than a corporation would pay for server hardware and perpetual license fees.
 - Second, buyers only pay for what is used. Often, IT organizations will overestimate the actual software utilization by the end user community. For example, an IT organization may forecast an active end user community for a particular application to grow to 10,000 employees within a year. However, customization and implementation delays may result in only 500 employees actually using the software a year later. With SaaS, corporate buyers only pay for the active users of the system—not the forecasted user community.

BENEFITS OF SAAS

- Ease of switching vendors
- Usage-based pricing
- Known Total Cost of Ownership (TCO)
- Better customer experience
- Faster implementations
- Painless upgrades

- **Known Total Cost of Ownership**—SaaS vendors typically will bundle all of the necessary hardware, software and support services such as implementation, training, help desk, troubleshooting, upgrades, security and business continuity into a single fee. As a result, the total cost of to operate the application is fixed. More importantly, the overall total cost of ownership is known in advance. One of the historical complaints about licensed software models has been the unknown cost to deploy and operate. Often software implementations result in hidden costs that were not forecasted prior to the license purchase. Root causes for hidden fees include failed deployments, vendor product delays and poor user adoption. Studies suggest that the cost to implement, maintain and operate a software application is typically four times the cost of the initial license purchase. The SaaS model offers unparalleled protection against cost variability for software applications.

SaaS offers a known TCO that eliminate the variable cost components of software.

TABLE 1: DETERMINING THE TCO OF SOFTWARE

Fixed Costs	Variable Costs
License Fees	Customization Costs
Maintenance Fees	Upgrade Costs
Training Fees	Support Costs
Server and Desktop Hardware	Performance, Reliability or Security Issues

- **Customer Experience**—SaaS offers significantly more power and control for the corporate buyer than traditional software license models. SaaS vendors are only paid based upon actual usage by end users. Implementations that are delayed due to functionality testing or acceptance by the end user community have a significant cost to the vendor. As a result, SaaS vendors need to work harder to demonstrate their value proposition and retain their customers. The result is an enhanced customer experience. Many early adopters of SaaS services state that the quality of technical support is higher than traditional software vendors. Additionally, SaaS vendors are generally viewed as highly responsive to enhancement requests or defects in the user application.
- **Time to Market**—A SaaS model can often reduce the time to value for an application. There are a few factors that accelerate deployment in the SaaS model.
 - **Fewer Internal Delays**—The SaaS vendor takes responsibility for the provisioning of hardware, software and network infrastructure at the data center. Additionally, SaaS applications typically have limited customization of features and the user interface. As a result, there are no delays resulting from the need for internal IT organizations to perform development, enhancement or deployment of the application. No large budget approvals are required either. With the pay-as-you go model of SaaS, gaining executive approval for application projects is easier and faster than ever.
 - **Vendor Motivation**—SaaS vendors typically collect revenues based upon actual usage of the application. If an end user community is not using the software then they will not have to pay for it. As a result, the software vendor is highly motivated to work fast in order to have the software implemented and the end users trained so that the application can be used by the customer.

“Buyers are beginning to recognize that SaaS vendors often provide higher levels of customer-centricity...”

— SHOULD YOU MAKE YOUR SOFTWARE MORE “SAASY”
AMR RESEARCH, MAY 2007

“SaaS vendors need to ensure happy customers given the lower switching costs and the fact that customers must renew regularly.”

— SHOULD YOU MAKE YOUR SOFTWARE MORE “SAASY”
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- **Upgrades**—SaaS vendors manage the upgrade process. Upgrades are deployed centrally to the hosted applications. Upgrades do not have to compete for resources with other IT projects. There are no client applications on end user desktops to be touched. There is no evaluation of the ROI from the upgrade effort. SaaS vendors typically deliver two to four major upgrades per year and several minor updates that the user receives automatically. Users of SaaS based applications can always be certain that they are using the latest version of the software provided by the vendor.

SaaS Target Applications and User Groups

Despite its advantages, not all vendors or corporate buyers will adopt a SaaS model. Certain application types and customer profiles will embrace SaaS more than others.

Business Segments

To date, SaaS has enjoyed success in only a few niche application segments:

- **CRM**—Early pioneers of the SaaS model focused on areas such as Sales Force Automation (SFA) and Customer Relationship Management (CRM). Major CRM vendors such as Siebel failed to deliver on their value proposition through the traditional licensed software approach. As a result, innovators such as Salesforce.com and RightNow were able to expand successfully by capturing market share from frustrated customers.
- **Financial Applications**—Back office applications such as time and expense reporting and payroll administration have enjoyed success with SaaS as well. Such applications are viewed as natural candidates for outsourcing as they offer little opportunity for competitive advantage even when executed flawlessly.
- **ERP**—The complexity of ERP systems offers an opportunity for SaaS vendors who can simplify the implementation, maintenance and upgrade processes. Niche vendors such as Netsuite have enjoyed success with SaaS-based ERP. Oracle, SAP and Microsoft have each announced SaaS strategies for their ERP applications as well.

SaaS for the Supply Chain

Applications such as sales force automation, payroll processing and expense reporting have enjoyed most of the success and publicity in the early years of SaaS. But there is a growing level of interest in utilizing SaaS for a broader range of business applications. Supply chain is an area in which vendors are investing in SaaS models. In fact, there are a number of factors which may drive supply chain applications to become the leading category of SaaS in the near future.

Supply chain applications are unique in that they are used by a community of business partners rather than one individual enterprise. Buyers, suppliers, logistics providers and even financial institutions all need to access and update data in supply chain systems. All of the participants

SAAS APPLICATION AREAS:

- Customer Relationship Management
- Sales Force Automation
- Time and Expense Reporting
- Payroll Processing
- ERP

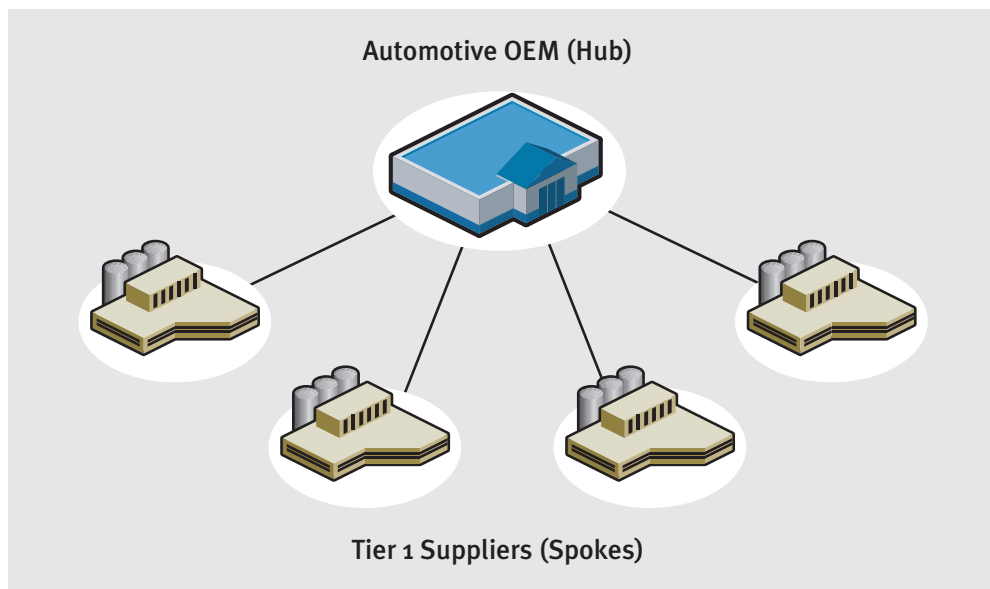
derive some level of value from the use of the application, although the value may be weighted differently among the various trading partners. The multi-company nature of supply chain applications introduces a number of challenges not easily solved by traditional software models. Consider the following questions:

Licensing Fees

A supply chain application may be used by hundreds or thousands of trading partners. Who among the community of supply chain partners pays for the software application? Or are the licensing fees somehow divided?

One easy answer might be that the channel master, or buyer hub as they are referred to, funds the software application. Historically, such an approach was logical as the hubs were the primary beneficiary of the information housed in supply chain applications. However, there is a changing dynamic in the funding of technology in supply chains. It is becoming more common for the hub to pay very little for B2B technology. Instead, the suppliers, or spokes as they are sometimes referred to, are expected to fund all B2B expenses as a cost of doing business.

FIGURE 1: HUB AND SPOKE EXAMPLE



Suppliers often question the logic of such an approach as they will undoubtedly pass the cost of the B2B program back to the customer in the cost of goods sold. Furthermore, suppliers complain that they are being unfairly burdened with funding a technology that primarily benefits their customer.

However, as supply chains become more demand driven, there is more of a balance between the benefits provided to the supplier and the buyer. Consider the case of the retail industry. Retailers and consumer products suppliers are collaborating more than ever to jointly create new products

“In instances where external constituents need to be involved with an application, SaaS may be the only cost effective means of connecting multiple business partners together.”

— SHOULD YOU MAKE YOUR SOFTWARE MORE “SAASY”
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Who pays the software licensing fees for an application used by hundreds or thousands of different companies?

Historically, the hub or channel master has funded shared supply chain applications.

and to promote existing SKUs. To collaborate, retailers are sharing whole databases of information with suppliers about consumer buying patterns. Data shared includes point-of-sale transactions that detail purchases by store and SKU as well as loyalty card data, which provides consumer demographics and buying preferences. Additionally, market basket data is being shared to provide insights into the mix of products a shopper selected. The market data can be used by consumer products manufacturers to develop new products or enhance existing SKUs.

FIGURE 2: COLLABORATION IN THE RETAIL INDUSTRY



SaaS provides a model for equitably distributing licensing costs among a community of trading partners.

In such a scenario, the primary benefits are to the supplier, which in this case is the consumer products manufacturer. However, the retailer will enjoy some benefit from enhanced products in their stores and fewer out-of-stocks on their shelves.

SaaS provides an excellent model for equitably distributing licensing costs amongst a community of trading partners. A hub may choose to initiate a particular supply chain program that leverages a SaaS based application. The hub may elect to fund fifty percent of the overall technology budget with the remainder to be divided among the trading partner community. The SaaS vendor can register each trading partner, monitor end user activity and then invoice based upon usage. As a neutral third party, the SaaS vendor facilitates the distribution of costs within the trading partner community in a manner that avoids unpleasant negotiations between buyer and supplier.

Support

The distribution of support costs is a similar challenge for multi-enterprise applications. To support a supply chain application, some group must be tasked with the design, development, testing, training, deployment, administration, maintenance, upgrades and security of the application.

A supply chain application may be used by a variety of companies—some of which are large enterprises, others of which might be small suppliers in emerging markets. A wide range of technology expertise, IT resources and IT budget will exist amongst the trading partner community.

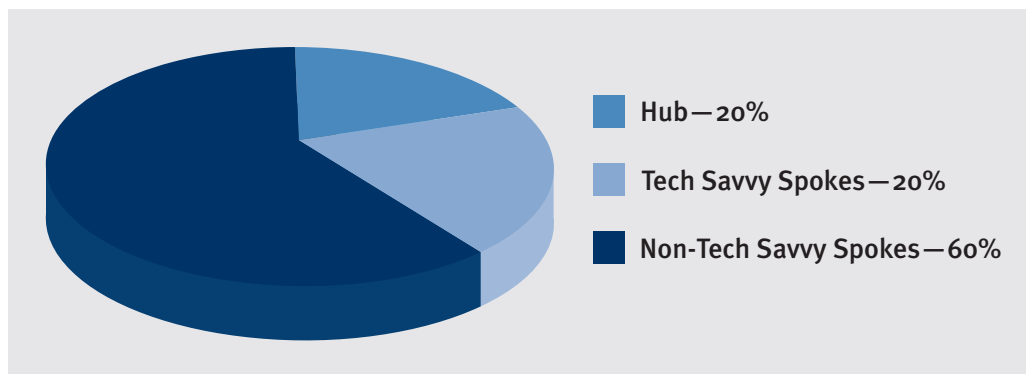
Who should provide the ongoing maintenance and support for a supply chain application? All trading partners in the community benefit from support services, but some may derive more value than others. Again, one might argue that the channel master or hub should be responsible for the support of the supply chain application. However, the investment required by the hub to support an entire trading partner community can be considerable. The costs to implement, operate and upgrade a software application are often four times the investment in the license itself. Furthermore, much of the support effort required may be to resolve errors caused by the smaller, less experienced trading partners. Is it fair to expect the hub to bear the full expense when less technically savvy trading partners generate a disproportionate amount of support costs? An alternative model would be to distribute support costs across the overall trading partner community. However, if such a model were adopted, how would technical support costs be tracked and billed across the community? Are trouble tickets aggregated on a monthly basis and then forwarded to a billing system which invoices all trading partners for usage? Alternatively, the costs could be reconciled through credits and deductions taken by the buyer against supplier invoices.

SaaS provides an elegant model for distributing costs among the trading partner community. Each trading partner enrolls in the subscription service, paying a percentage of the overall cost. Smaller businesses that require more assistance can subscribe to a higher level of customer support. Trading partners that rarely access the support function will pay a lower fee than high-volume power users. The use of a neutral third party, the SaaS vendor, facilitates the distribution of costs within the trading partner community in a manner that avoids unpleasant negotiations between buyer and supplier.

Who pays the support fees for an application used by hundreds or thousands of users?

SaaS provides an elegant model for distributing support costs amongst a community of trading partners.

FIGURE 3: EXAMPLE COST DISTRIBUTION FOR SUPPORT OF SUPPLY CHAIN APPLICATION WITH SAAS



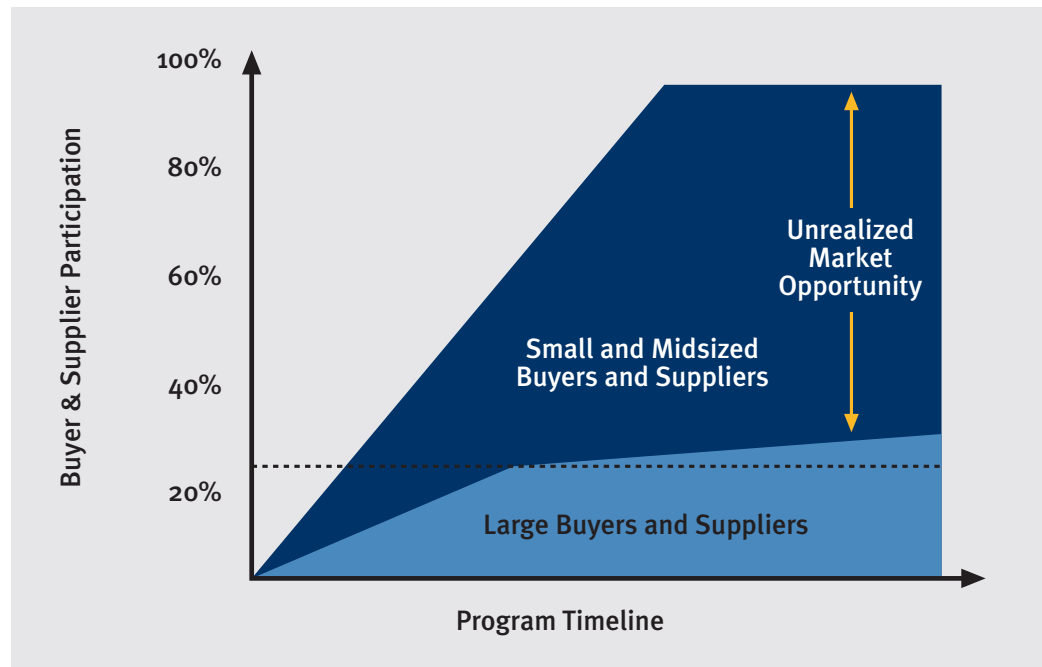
The challenges with supply chain applications are not limited to cost distribution. Convincing the community of trading partners to use the supply chain application can be a significant undertaking as well.

Participation

Anyone who has ever deployed a software application appreciates the complexities of getting the end user community to use the functionality. The challenge of end user adoption is complex within an individual enterprise even when there are executive mandates supporting the deployment. The multi-enterprise nature of supply chain applications compounds end user adoption challenges by orders of magnitude. Enrolling a community of hundreds or thousands of businesses on the same application can take years to complete. The key challenge is how to encourage all members of the supply chain community to use the same application. Some channel masters have such purchasing power that they can influence the trading partner community to adopt a new application without much resistance. However, the majority of channel masters have less influence over their trading partners. In such scenarios community adoption will not be quick or easy. Suppliers will often avoid or delay participation in supply chain programs, particularly if there is a cost associated with implementation. The challenges extend well beyond cost considerations. Adoption of supply chain applications often requires trading partners to change their business processes.

Encouraging trading partners to use a supply chain application is one of the biggest deployment challenges.

FIGURE 4: TYPICAL SUPPLY CHAIN RAMP



SaaS can often yield end user participation rates that are much higher than comparable licensed software applications. As discussed earlier in the document, SaaS vendors only receive revenues from trading partners who are utilizing the application. As a result, the vendors have a financial

incentive to ramp the trading partner community on the supply chain application as quickly as possible. Additionally, SaaS offers two functional advantages over traditional software in the area of trading partner participation.

The Network Effect

As industries continue to consolidate through mergers and acquisitions there becomes a greater degree of sharing of common vendors among large buyers. Within a niche industry it is common for many large buyers to share common direct materials suppliers. The grocery sector offers a good example. Large retailers such as Metro, Tesco, Carrefour, LianHua and Woolworths all source from a common set of global brands such as Kraft, Nestle, Unilever, Henkel, P&G and Coca-Cola. Vendor overlap is not limited to large suppliers. Within niche product categories such as locally grown organic vegetables or offshore-sourced patio furniture, retailers often leverage a common community of suppliers. Supplier overlap occurs more frequently with providers of indirect materials and services. For example, many of the world's largest automotive, electronics, aerospace, furniture and apparel manufacturers will source their logistics services from a small community of the top fifty providers worldwide. Similarly, Global 2000 manufacturers are likely to share common banking institutions and insurance carriers.

SaaS offers a competitive advantage over traditional software in the area of trading partner overlap. In the traditional software model, each buying organization must establish a separate connection to each individual trading partner in their value chain. The result is a spaghetti-like maze of connections between buyers and suppliers. The process of trading partner onboarding often takes years due to the need to connect each community member one-by-one.

When a buyer subscribes to a supply chain application using the SaaS model, they gain immediate access to the existing community of trading partners already using the service. As more buyers and more suppliers join the community significant economies of scale are generated. Onboarding times can be significantly reduced using the SaaS model. When a new supply chain community decides to subscribe to the application only a subset of the trading partners will need to be ramped. The new suppliers, who are not already using the application with another buyer, are the only ones that must be enrolled.

Specialized Community Onboarding Services

For the new suppliers that must be registered and enrolled SaaS vendors offer specialized services referred to as trading partner enablement or community management. SaaS vendors will employ a team of inside sales and support staff that specializes in the communication, education, implementation and support of trading partner communities. First, these teams will work with channel masters to identify the complete list of corporations in the supply chain. Then each trading partner will be contacted to explain the process for rolling out a new application, the financial benefits to the community and the steps required to participate. A readiness assessment of each trading partner will be performed to determine their level of technical

With SaaS, trading partner ramping time and effort is decreased. Buyers and suppliers gain immediate access to a community of trading partners.

SaaS vendors often provide specialized community onboarding services to accelerate trading partner adoption of supply chain applications.

Traditional software vendors rarely have the capability or the financial incentive to ramp trading partners onto a supply chain application.

competence. Small businesses with lower budgets, resources and experience will receive higher levels of support than large businesses with more extensive resources.

By developing specialized teams that utilize best practices while focusing on trading partner onboarding, SaaS vendors can achieve economies of scale that other organizations cannot achieve. Trading partner onboarding services are among the most appealing features of SaaS supply chain applications. Few traditional enterprise software vendors offer trading partner enrollment services. Community enablement is a specialized skill that is not typically found in the professional services teams of the software vendors. Furthermore, the vendor has little financial incentive to undertake the complex challenge of trading partner enablement. In the traditional software model, vendors collect upfront license revenues and ongoing maintenance fees independent of the actual utilization levels for the supply chain application. As a result, community enablement becomes the customer's problem. Very few IT organizations have personnel who wish to contact trading partners to sell them on the value of using a supply chain application. Most IT personnel are not interested in such sales and marketing functions.

Example of SaaS Supply Chain Applications

Real world examples will help to illustrate the benefits that SaaS can offer supply chain applications. Three emerging and increasingly popular SaaS applications are transportation management, vendor managed inventory and trade finance.

Example 1—Transportation Management

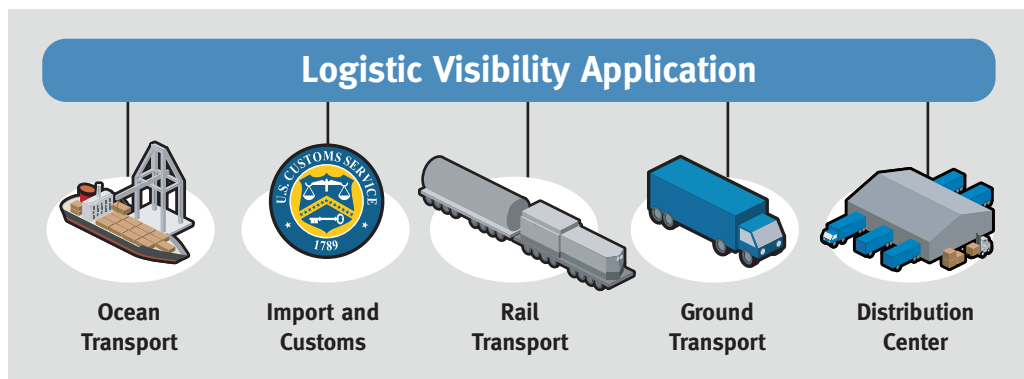
Transportation management applications are used by buyers and suppliers to manage all the activities associated with inbound and outbound freight. Features of a transportation management application might include load planning, carrier selection, freight tendering, shipment scheduling, container tracking and bill payment. Trading partners involved in transportation include not only the supplier and buyer, but insurers, consolidators, TLs, LTLs, 3PLs, 4PLs, postponement specialists, customs brokers and freight forwarders.

Transportation management applications such as international logistics visibility are strong candidates for the SaaS model.

One of the most challenging aspects of transportation management is tracking of international shipments. Containers often traverse multiple modes of transportation including ocean, air, rail and ground while en route to their final destination. Almost all transportation providers offer the ability to perform container tracking as part of their service offering. Most freight carriers offer an online website with access to tendering, scheduling, tracking and payment functions. However, most large companies use not just one, but some times as many as one hundred different freight providers. Logging into each carrier's website to gather shipment status data is time consuming and inefficient. A centralized portal that offers a single view of all shipment locations would be preferred. Larger carriers will offer the ability to integrate their shipment tracking applications directly with customer's transportation applications using EDI or XML. The customer can then view all shipment status information in a centralized interface. The

direct integration to large carriers eliminates the need to log in to multiple websites, but it creates another challenge with B2B integration. Each customer must establish a connection to each of their transportation vendors. The enablement process is lengthy, time consuming and expensive. In many cases mapping of data to and from the carrier's format (e.g. EDI) into the customer's application format (e.g. SAP) must occur. The result is a complex maze of connections that adds unnecessary complexity for all parties.

FIGURE 5: INTERNATIONAL LOGISTICS TRACKING



In the case of transportation management, the SaaS model offers a compelling “network effect” to all participants. Once a carrier connects to the hosted transportation management application they can exchange data with all the buyers and suppliers on the system. As the community of carriers, buyers and suppliers continues to grow, the value for all participants begins to multiply. Rather than connecting to each of the hundreds or thousands of transportation vendors utilized throughout the world, corporate buyers can connect to the SaaS vendor once. As new relationships between carriers and customers are formed, technical integration efforts are minimized. SaaS vendors can offer a single portal through which customers can manage relationships with all of their transportation providers worldwide. Such applications offer a comparative view of carrier performance and one search engine to track all in-transit shipments.

Example 2—Vendor Managed Inventory

Vendor managed inventory (VMI) is becoming a more popular model to improve supply chain efficiencies in the manufacturing and retail sectors. The VMI model requires the supplier to assume responsibility for the replenishment and ownership of the inventory up to the point of sale or consumption. Often minimum and maximum inventory guidelines are established, which suppliers must closely monitor to prevent stock outs. It is cost-prohibitive to have an on-site inventory manager in each customer location using VMI. As a result, software applications are used to monitor consumption and notify suppliers of replenishment needs on an hourly or daily basis. VMI applications typically provide rich graphical interfaces that allow end users to track inventory on-hand, in-transit, on-order and out-of-stock at an individual part or SKU level. Additionally, the application can model and predict out-of-stock situations based upon forecasted consumption and replenishment plans.

Vendor Managed Inventory applications are strong candidates for SaaS models due to their shared use among buyers and suppliers in a manufacturing community.

For such an application, how should support and licensing costs be distributed among the community? Value is derived by both the customer and the supplier. The benefits to the customer are reduced out-of-stocks and lower inventory costs. The benefits to the supplier are increased sales and supply chain flexibility. Both parties incur significant costs to operate the VMI application as well. Heavy integration is required with the customer's manufacturing or store operations systems as well as the supplier's order management and transportation applications. Ensuring trading partner enrollment is less of a challenge as suppliers must elect to participate in VMI programs. However, agreeing to common business practices governed through a shared application can be problematic.

SaaS provides an elegant solution for VMI applications. Licensing and support fees can be equitably distributed among the supplier and customer. Remote hosting enables secure, reliable, high performance accessibility from a variety of retail stores, manufacturing plants and distribution centers. The third party SaaS vendor acts in a neutral capacity to provide governance for product enhancements and upgrade requests.

Example 3—Supply Chain Finance

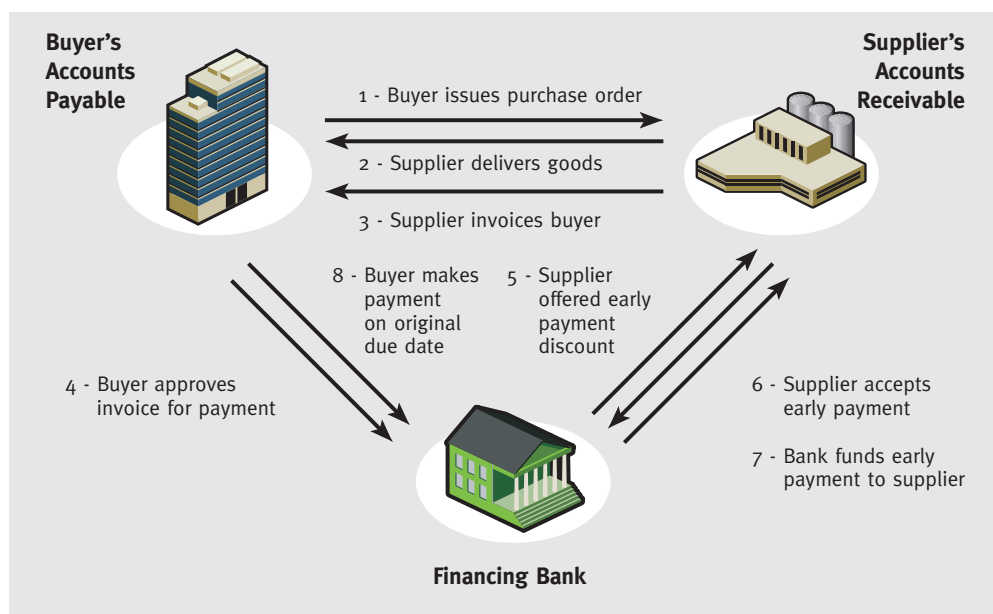
A new breed of application is being introduced to help identify financing opportunities in the supply chain. Increasingly, buyers and suppliers are seeking more flexible payment terms to improve their working capital. To illustrate the concept example, consider the case of a small supplier in China who manufactures goods for export to the United States or Europe. Typically, these suppliers must purchase raw materials and pay their workforce months in advance of receiving payment from the buyer. Buyers of goods are often interested in retaining their cash as long as possible. Consequently, buyers will negotiate payment terms of forty-five or sixty days after receipt of the goods. Extended cash-to-cash cycles put significant financial pressure on small suppliers. In many scenarios, the small suppliers are forced to borrow money at credit card level interest rates to finance their manufacturing activities. The cash constraints of suppliers ultimately raise the costs and risks in the supply chain.

Large buyers are introducing new supply chain finance services to improve working capital in the supply chain. The new services enable suppliers to leverage financial institutions to achieve greater flexibility in payment terms. The process works as follows. Financial institutions monitor supply chain transactions to identify scenarios with longer payment terms. The financial institution will then approach the supplier with the option to receive an early payment in exchange for a nominal fee. If accepted, the financial institution will pay the supplier immediately. The supplier can use the cash to pay for raw materials or fund their employee payroll. The buyer will pay the invoice at its maturity date. However, instead of paying the supplier, the buyer will remit funds to the financial institution. Trade finance applications offer a win-win proposition to trading partners. Suppliers benefit from increased liquidity, better cash flow forecasting and lower financing costs. Buyers achieve lower cost of goods sold, reduced risk of supplier insolvency and un-impacted payment processes. The most valuable supply chain finance applications will be those that offer access to a community of banks with financing

Supply chain finance applications are a strong candidate for a SaaS model due to their shared use among a community of buyers, suppliers and lenders.

services. Using multiple banks helps to ensure that liquidity will be available to a wide range of suppliers with different credit ratings located in different countries around the world.

FIGURE 6: SUPPLY CHAIN FINANCE APPLICATION



The multi-enterprise nature of supply chain finance applications introduces a number of challenges not easily solved with the traditional software model. For example, who owns and operates the trade finance application? One might argue that the primary beneficiary of the services should be the owner and operator. The small suppliers in the value chain enjoy the most value with accelerated cash flows. However, small suppliers are typically not well equipped to host and operate an application. Buying organizations will benefit from supply chain finance, but only indirectly through lower risk and costs. As a result, buyers are not the ideal choice for hosting the application. Banks benefit from service fees associated with the financing. Banks would be a good choice to operate the application. But in a community with multiple financial institutions, which bank should assume responsibility? Suppose each bank manages its own trade finance platform. Each supplier would then have to connect with multiple banks to access the services. The result would be a complex maze of connections that adds significant cost to all parties involved.

SaaS offers an elegant model for trade finance applications. Instead of an individual bank hosting and operating the application, the SaaS vendor performs the management. SaaS can enable a many-to-many exchange of information between the various banks, suppliers and buyers in the value chain. A network effect is created as more suppliers and financial institutions join the marketplace. As more suppliers register, banks have access to more potential customers. As more banks subscribe to the service, suppliers enjoy more competitive financing rates and broader selection of products. Additionally, the SaaS vendor can perform the enablement of trading partners in the supply chain community.

What can the Software Industry Learn from the Supply Chain?

As individual corporations become more specialized and outsourcing of business functions increases, processes that were once internal are now becoming external supply chain functions.

The preceding discussion has focused on how the supply chain can benefit from SaaS. However, SaaS can benefit from the supply chain as well. The growth of SaaS may be accelerated due to changing dynamics in the value chain. The need for multi-enterprise applications to manage supply chain functions is increasing as companies become more specialized and outsource more business functions. In the early days of manufacturing, vertically integrated companies would produce all of the raw materials and component parts required to build their products. However, the past one hundred years have seen radical transformations in value chains. Corporations today are highly specialized, depending upon a network of partnerships to help them design, manufacture, transport and service their products. As more supply chain functions are outsourced to business partners, activities such as design, manufacturing and service, which have historically been considered internal, are now becoming external supply chain functions. As a result, applications such as product lifecycle management, manufacturing visibility and service parts management are shifting from single enterprise applications to multi-enterprise systems. As each of these applications becomes external, business partners will confront the financial and operational challenges of traditional software models. SaaS provides an elegant solution to the multi-enterprise challenges.

Many supply chain and manufacturing sectors are turning to services versus new product sales for growth.

There are other relationships between the supply chain and the software sector. Both are product sectors that are entering more mature phases of their lifecycle, albeit at different speeds. A comparison between the manufacturing and the software sector offers some interesting insights into the potential future of the industry.

Rolls-Royce “Power by the Hour” program customers pay a fixed warranty and operational fee for the hours engines are running. The Rolls-Royce concept is analogous to SaaS in many respects.

When most people think of the supply chain they think of the manufacturing and transportation of products. However, service is becoming an important function in the supply chain, especially when it comes to revenue growth. Consider the automotive industry. Leading OEMs such as Toyota, Ford and Peugeot-Citroen are best known for producing cars, trucks and motorcycles. However, one of the fastest growing and most profitable areas of the automotive industry is the service sector. Automotive retailers and OEMs make considerably greater margins on financing services, aftermarket parts and extended warranties than they do on new vehicle sales. Similar trends exist in other manufacturing sectors such as aerospace. Manufacturers such as Boeing, Airbus and Embraer are best known for their innovative airplane designs. However, the sale of a commercial jetliner is just the beginning of the service opportunities for an aerospace manufacturer. Substantial business can be generated from the after-sales maintenance, repair and overhaul (MRO) and upgrade activities throughout the life of the plane. Rolls-Royce offers an interesting example with their jet engine products. Rolls has bundled its product and ongoing support for engines into a model called “Power by the Hour.” Customers pay a fixed warranty and operational fee for the hours that the engines are running. The Rolls-Royce concept is analogous to SaaS in many respects. Similar trends are emerging in the manufacturing sectors for telecommunications equipment, server computing, industrial

machinery and high end medical devices. Deloitte Research recently completed a study titled “The Service Revolution in Global Manufacturing Industries.” The report found that manufacturing sector leaders generate over fifty percent of revenues from service and parts management, which is a significant accomplishment for product-centric companies.

TABLE 2: REVENUE IMPACT OF SERVICE AND PARTS BUSINESS BY GLOBAL INDUSTRY (SHARE OF SERVICE AND PARTS BUSINESS IN OVERALL SALES)

Industry Sector	Average	Top 90th Percentile
Aerospace and defense	47%	50+%
Automotive and commercial vehicles	37%	50+%
Diversified manufacturing and industrial products	20%	50+%
High technology and telecommunications equipment	19%	50+%
Life sciences and medical devices	21%	50+%

Source: Deloitte Research—Service Revolution in Global Manufacturing Industries

There are a number of factors driving the growth of services in the supply chain sector. The developed markets of North America, Western Europe and Japan are experiencing relatively slow growth rates of two to five percent. For established product lines in these mature markets, manufacturers are challenged to demonstrate significant growth rates. Many larger manufacturers have begun to focus on fast growing regions of the world such as China, India, Brazil and Russia. These emerging markets boast double digit growth rates. However, their overall spend is only a small percentage of the developed markets. In order to meet shareholder expectations, manufacturers need to find new sources of revenue in the established markets. Services to the installed base are a natural focus area for growth.

What does this discussion on the manufacturing sector have to do with the software industry? The software industry, which has been historically product-centric, may evolve in a manner similar to the manufacturing sector. In fact, one could argue that the emergence of SaaS might be one of the initial steps in such a transformation. Data exists to support such a hypothesis. Companies today spend more money to maintain their existing software applications than they do on purchasing new licenses. Figure 7 developed by TripleTree suggests that fifty percent of total revenues from the software industry are already derived from maintenance, support and professional services.

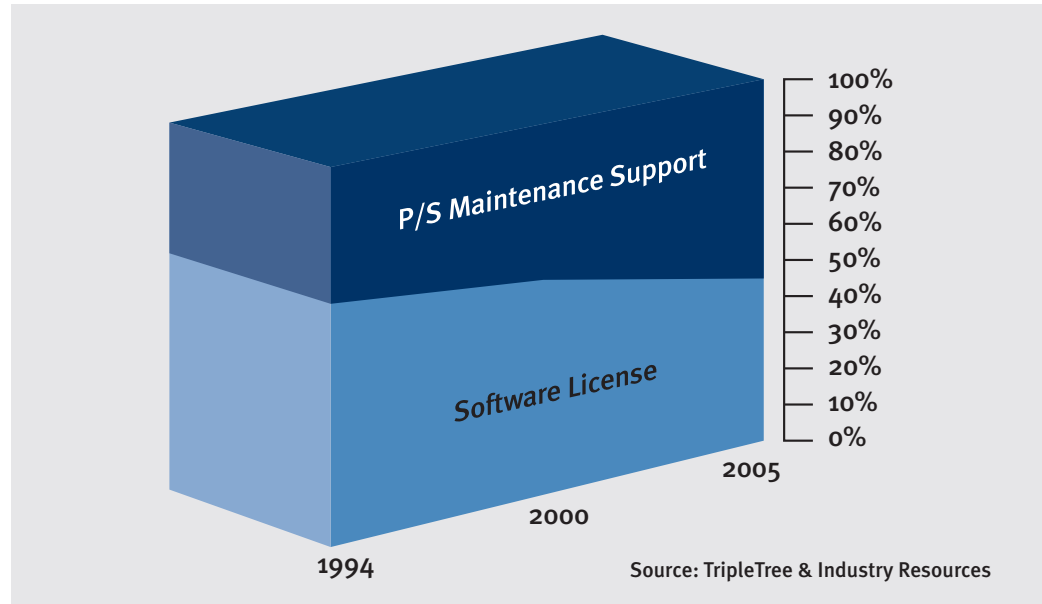
The software industry has enjoyed dramatic growth rates since the advent of the personal computer in the early 1980s. However, the above average growth rates will not continue indefinitely. As software industry growth rates decline, vendors will need to find new sources of growth. There is no question that services will be one of the areas of focus.

Manufacturing leaders generate over fifty percent of revenues from service and parts management.

— THE SERVICE REVOLUTION
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Software is product-centric much like the manufacturing industry. As the software market matures will it become services dominated?

FIGURE 7: GROWTH OF SERVICES IN THE SOFTWARE INDUSTRY



Fifty percent of revenue in today's software market is generated from maintenance, support and professional services.

Source: TripleTree and Industry Resources

Another interesting parallel between manufacturing and software is the concept of captive service revenue. Captive refers to the fees generated from services provided to a vendor's own installed base. The Deloitte study found that while manufacturers are enjoying higher service revenues, many are failing to capture a high percentage of their own captive market. For example, many car owners have their vehicle serviced at an aftermarket location other than the dealership. Overall, manufacturers only service forty percent of their captive market on average.

Manufacturers only capture forty percent of their captive service revenue potential.

TABLE 3: CAPTIVE SERVICE REVENUES IN MANUFACTURING

Industry Sector	Average
Aerospace and defense	20%
Diversified manufacturing and industrial products	50%
High technology and telecommunications equipment	40%
Life sciences and medical devices	90%

Source: Deloitte Research—Service Revolution in Global Manufacturing Industries

The concept of captive service revenue is an interesting one to explore for the software market. Most software vendors have a virtual monopoly on the annual maintenance packages that include technical support and access to upgrades. Training is another area in which vendors enjoy a dominant share of the captive market. By contrast, software vendors traditionally have not been able to capture high percentages of professional and managed services for their captive market. Activities such as customization, integration testing, deployment, hosting and security are typically performed by a third party systems integrator. As software growth rates naturally decline with the market maturity, the competitive dynamic for captive service revenues may change. With less revenue from new product sales, software vendors may focus their attention

Software vendors dominate service functions such as maintenance and training, but lack strength in other functions such as customization and hosting.

on gaining a greater share of non-maintenance services. SaaS vendors, by definition, capture one hundred percent of the captive service revenues for their products. If the market dynamic for captive service changes, SaaS vendors will be well positioned to capitalize on the trend. The majority of traditional software vendors lack the deep services organizations to provide many of the after-sale functions. IBM, with its strong Global Services and Business Consulting division, is perhaps the only significant exception.

It is too early to predict whether the software industry will follow in the footsteps of other product-centric, manufacturing sectors. However, the growing popularity of SaaS certainly suggests a trend in that direction.

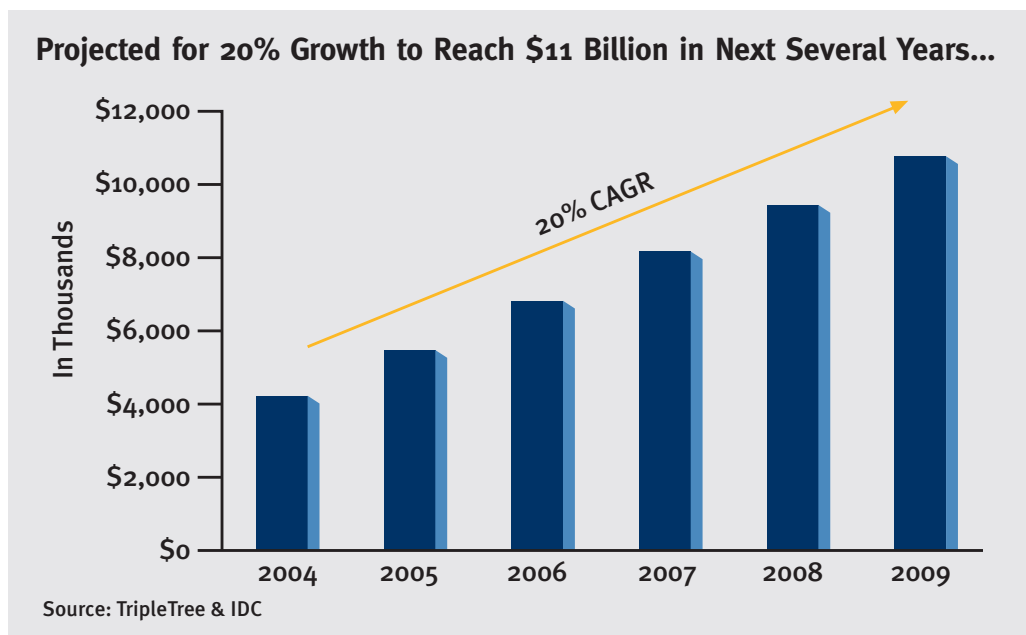
The Future of SaaS

The SaaS model offers numerous advantages over traditional enterprise software approaches. The success of SaaS pioneers in the CRM, ERP and SFA sectors suggests a promising future for the model. New application segments such as Supply Chain are beginning to embrace the SaaS model as well. However, despite the competitive advantages and market potential, not all vendors or corporations will adopt such a model. In the near future, most companies and vendors will continue to use traditional packaged software applications. Some will use a combination of both models. Thus, it is unlikely that we will witness the demise of traditional licensed software packages in the near future. However, it does seem clear that the SaaS model will play an increasingly important role in the software industry for years to come. In fact, analysts are predicting that by 2009 as much as ten percent of all enterprise software applications could be delivered via the SaaS model.

SaaS vendors capture one hundred percent of captive service revenues.

IDC estimates that only two percent of the \$95 billion software market in 2005 was revenue generated from SaaS.

FIGURE 8: FUTURE GROWTH FOR SAAS



Triple Tree estimates that as much as ten percent of all enterprise software applications could be delivered via SaaS in 2009.

No formal market projections have been developed for Supply Chain SaaS applications. However, the benefits SaaS can offer to solve traditional supply chain software problems suggest that significant adoption will occur in the near future.

Additional perspectives on Software as a Service can be found on GXS thought leadership portal, Insights, at www.gxs.com/insights. Featured on Insights is a video-taped session of a panel on SaaS. The panel consists of thought leaders from GXS and AMR Research who debate the role of SaaS in the supply chain and offer their opinions on the evolution of the software industry.

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