



# **Understanding B2B e-business Solutions**

*An Executive's Guide to Business-To- Business e-business*

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## INTRODUCTION TO E-BUSINESS SOLUTIONS

With Y2K pressures behind them many companies are focusing their efforts on leveraging e-business technologies to achieve significant benefits and competitive advantage. This is propelling the e-business revolution into a new and exciting phase whose size promises to dwarf the incredible growth that we have seen in the past 3 years. While the initial phases of this revolution were fueled by the vision and innovation of companies that focused on business-to-consumer (B2C) e-business, the current phase will be defined and driven by the leadership and market success of companies engaged in business-to-business (B2B) e-business. The B2B segment consists of solutions that will focus on improving communication between enterprises, reducing the churn enterprises go through when trying to manage supply issues, reducing clerical activity, improving accuracy and reducing overhead spending in all links of the supply chain.

The B2B segment is expected to undergo a period of hyper growth, growing at a combined annual growth rate of 41% over the next five years. The Gartner Group estimates B2B revenue worldwide to be \$7.29 trillion dollars by 2004. The volume of investment in B2B companies by venture capitalists in the first quarter of 2000 is further validation of these very aggressive estimates.

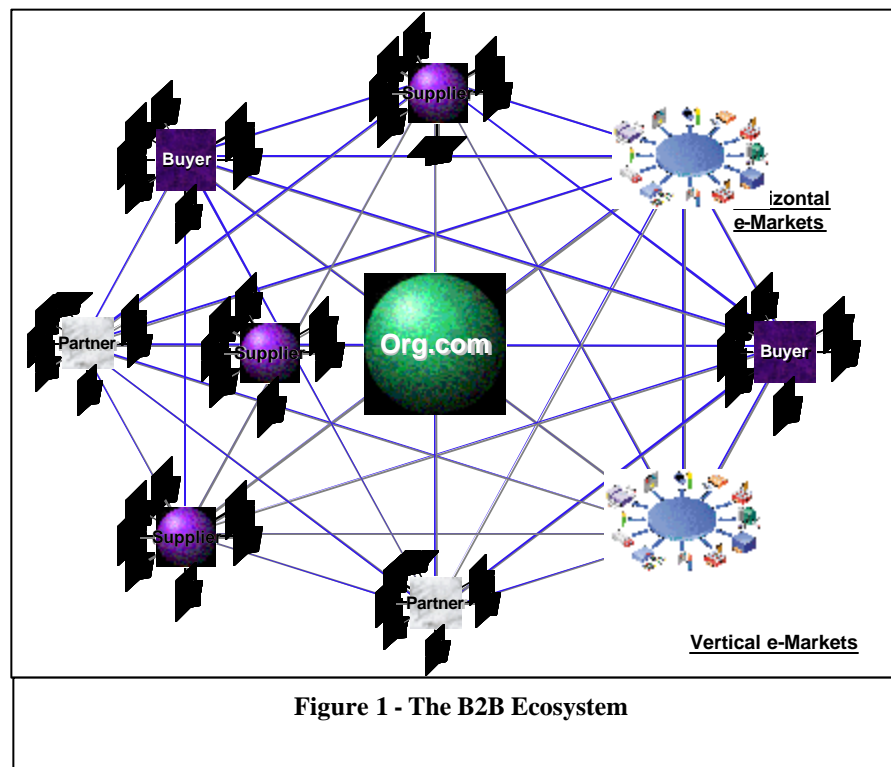
In a series of papers published in 1997 and 1998, we introduced e-business solutions and identified approaches for implementing e-business solutions. In this paper we will take an in-depth look into Business-to-Business (B2B) e-business solutions and explore the challenges and opportunities that face enterprises in this marketplace.

## THE B2B ECOSYSTEM

B2B solutions support the emerging set of customer priorities, which include greater speed to market, more flexibility and nimbleness, accelerated global expansion and more supplier and customer integration. They help customers and businesses redefine concepts such as value, competitiveness and the very nature of transactions. In short, these solutions are not just about technology - they use evolutionary technology and re-engineered business processes to develop revolutionary new applications that are not limited by time, space, organizational boundaries and territorial borders. They provide new ways of adding value by cutting bottom-line expenses, through a lower cost of ownership, higher efficiencies, reduced transaction costs and process improvements. They also help fuel top-line growth by helping companies move faster, embrace new markets, explore new distribution channels, and bring out the creativity in their enterprises.

As Internet technologies continue to mature and become engrained into our day to day lives, a new phenomenon is starting to emerge – applications, systems and even enterprises are no longer islands but rather a part of an overall ecosystem where, much like in nature, they exist through complex and ever-changing dynamic relationships with one another.

At the core of this B2B ecosystem are collections of highly efficient electronic marketplaces (e-markets) that allow enterprises to pool significant buying and spending power to streamline the process of buying and selling direct and indirect goods. E-markets are trading exchanges that facilitate and promote buying, selling, and business community among trading partners within certain industries. In these marketplaces, a market maker seeks to control the point of commerce by creating marketplace liquidity and providing a value-added trading alternative to buyers and sellers. There are two types of marketplaces - Vertical markets are those dealing with specialized goods and services used by a specific industry or segment. For example, a vertical marketplace for computer manufacturers may address Printed Circuit Boards, memory chips and other integrated circuit chips. Horizontal markets address expenditures that are applicable across a wide range of industries, such as office supplies, business services, or temporary employees. Product goods refer to parts and assemblies that are ultimately embodied in a firm's manufactured products.



Enterprises in this ecosystem are seamlessly connected to these marketplaces and to other enterprises through dedicated networks. In order to be effective in this ecosystem, enterprises should be willing to fundamentally disintegrate and reassemble their value chain. In his groundbreaking work in 1980, Michael Porter described, the value chain as the set of activities an organization performs to create and distribute its goods and services, including direct activities like procurement and production and indirect activities like human resources and

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Finance. Each of these activities adds some value to the product. Increasing the effectiveness of the value chain will increase the competitiveness of the organization. To re-invent the value chain, an organization must rethink core business processes, which include but are not limited to:

- ✂✂ Buying products and services required for its core business processes;
- ✂✂ Selling its finished products or services to its customers and partners;
- ✂✂ Sharing and communicating information across the various links on the value chain within the organization, at their customers and at their suppliers and vendors;
- ✂✂ Managing its supply chain by addressing the inherent inefficiencies in inter-department and inter-organizational interaction;
- ✂✂ Designing and launching new products; and
- ✂✂ Exploiting new and emerging channels into the marketplace.

### The B2B Solution Portfolio

Enterprises can become a part of the B2B ecosystem by implementing several different types of B2B solutions. These solutions can be categorized under 4 broad categories:

- ✂✂ Electronic Marketplaces,
- ✂✂ Buy Side Solutions,
- ✂✂ Extended Value Chain Solutions, and
- ✂✂ Sell Side Solutions.

These solutions have to be built on a common set of services that will help design, develop, implement and support scalable, flexible and dynamic solutions.

### e-Markets

The first few weeks of the new century have seen an explosion of new e-Markets. e-Markets are typically sponsored and driven by a market maker who brings suppliers and vendors by together by leveraging the ubiquitous nature of the web. In this environment, buyers benefit by being able to access product specific information and by taking advantage of lower prices from competing suppliers. Sellers get a new, efficient distribution channel to new markets, and the opportunity to compete with previously entrenched vendors. In short, e-markets facilitate product availability, increase price leverage, and improve service levels due to the competitive forces present in a consolidated, frictionless market.

e-markets, typically support multiple types of market models including auctions, reverse auctions and exchanges. They support dynamic pricing models that are based on trading partner agreements and different ways of completing the trade including the ability to support Request For Proposals (RFP) and Request For Quotations (RFQ).

An example of an e-Market is the Global Freight Exchange (gf-x.com), which is an online marketplace for Freight Forwarders and Airlines. This exchange provides a neutral one-stop shop where participants can trade and book cargo capacity

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online. This exchange provides reverse auction functions, that allow airlines to sell their unused cargo capacity to freight forwarders. In addition to the trading capabilities, this exchange provides options for integrating into and exchanging data with carrier capacity systems. Finally, this exchange also provides analysis and intelligence based on market data that can be used to improve the decision making process.

#### Buy Side Solutions

Many enterprises today are trying to build on their investments in supply chain automation and ERP solutions, streamlining the procurement of direct and non-direct products for use in maintenance, repair, and operations (MRO) by implementing procurement-centric exchanges. These exchanges leverage the substantial buying power of these large enterprises. These solutions allow the buyer to take a dominant position by commoditizing sellers' positions in the marketplace and thereby creating substantial barriers to entry for other market makers attempting to operate in the same industry segment. Large enterprises can leverage this model by channeling the cost savings of commodity procurement to improve their own bottom line. They can also create transaction income by passing the benefits of aggregated buying power to suppliers in the network.

A good example of a buy side solution is IBM's Internal e-Procurement system. This system has resulted in \$6.5 billion in savings in its first 2 years in operation. This 'best of breed' e-procurement solutions has allowed IBM to:

- cut its average time to process purchase orders
- reduce the contract cycle time from 12 months to 30 days
- reduce the average length of contracts from over 40 pages to 6 pages and
- significantly increase the use of EDI for transmission of purchase orders from 0% to 85%.

This solution received the Gold Medal for Professional Excellence given to the best solution by Purchasing Magazine in 1999.

#### Sell Side Solutions

Electronic Commerce applications integrate online catalogs with secure payment and delivery capabilities and make them available to customers through a virtual storefront on the Internet. These applications help an organization conduct business across the web by accepting and processing transactions across the Internet. These applications include:

- Setting up virtual storefronts on the Internet;

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- ✍✍ Implementing intelligent catalogs that help customers shop for products on the Internet;
  - ✍✍ Accepting and processing secure transactions; and
  - ✍✍ Establishing interfaces with back-end systems to process and fulfil these transactions.

These solutions provide several significant benefits to enterprises that implement them, most notably:

- ✍✍ Expanding the reach of products and services by exploring new distribution channels through dedicated partner focused e-Commerce sites, Vertical Marketplaces, Vendor and Dealer/Industry extranets and Trading partner networks.
- ✍✍ Retaining existing customers by providing them increased flexibility, choice and customization without increasing the cost of the product or sacrificing the level of service.
- ✍✍ Improving the level of service provided to the customer by providing transparent access to relevant information along the value chain. Companies can gain significant competitive advantage in this space by being proactive about customer service and providing anytime, anywhere access to this service.
- ✍✍ Reducing overall operating expenses by eliminating redundant processes and moving information closer to the people who need it. For example, allowing a vendor to place an order on a web site and automatically check the status of the order without having to access a call center
- ✍✍ Reducing the cost of sales by exploring more cost effective channels to promote and sell the products

Consider the example of Staples, one of the largest retailers in the office supplies business. In 1999, Staples implemented Staplelink.com, an online commerce site that was aimed to address the needs of its large business customers. This site provided a comprehensive online catalog of products and allowed individuals within organizations to order these supplies directly off the web. This buying process is also supported by the ability to setup multiple levels of approvals, routing and workflow. Finally, this site also provides the ability to dynamically price the purchases based on the contracts that have been established between the buyer organizations and Staples. This solution has provided Staples significant cost savings in addressing the needs of large buyers. It has also allowed them to easily participate in emerging e-Markets for indirect goods.

#### Extended Value Chain Solutions

In the 1990s enterprises invested heavily in ERP applications that were primarily targeted at improving the efficiency of the enterprises' supply chain process. Today's e-business technologies allow us to build on these solutions and extend

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the benefits of these solutions by increasing the transparency of core processes across the value chain of an organization.

These solutions include:

- ☞ Applications that enhance the supply chain and reduce cycle times by helping enterprises share information such as demand projections, production schedules, inventory levels, and quality assurance results with vendors and suppliers.
- ☞ Solutions that help reduce inventories, lower costs of production and facilitate just-in-time manufacturing by leveraging trusted relationships with a small set of vendors and suppliers.
- ☞ Solutions that support innovative business processes and allow enterprises to explore new markets and introduce radically new products and services.

These solutions provide several significant benefits to enterprises that implement them, most notably:

- ☞ Reducing manufacturing costs by improving the efficiency of their procurement and supply chain operations by establishing closer links with their suppliers and vendors.
- ☞ Reducing inventory carrying costs by increasing the liquidity of goods across the value chain and by accurately forecasting the demand for products and services.
- ☞ Strengthening ties with vendors and suppliers by increasing the transparency of key business processes such as product design, manufacturing, order processing, etc. between the organization, partners, vendors and other players on the value chain.

Consider the example of [SAAB Cars USA](#), who has implemented an extranet based Dealer Management System that allows SAAB dealers to use a browser based interface to connect into SAAB's core business systems to simplify day-to-day functions such as checking warranty claims, ordering parts, checking the status of orders and other dealer management functions. This system has allowed SAAB dealers to have immediate access to information that they need to provide the best level of service to their customers.

Another example is Goodyear Tire and Rubber, the largest maker of tires in the United States. For the US market, replacement tire sales are a vital part of Goodyear's sales mix and they occur through Goodyear's independent dealer network, as well as through wholesalers, large retailers and Goodyear's own company-owned outlets. In 1998, Goodyear implemented Xpert.com – a dealer extranet solution that was designed to improve the productivity and efficiency of its independent dealer network. This system has allowed Goodyear to establish its leadership position by addressing the changing service needs of dealers (speed,



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self service and integration) and providing better service to its dealers without increasing associated costs.

### Critical Success Factors

In order to achieve market leadership in the B2B ecosystem, an organization should:

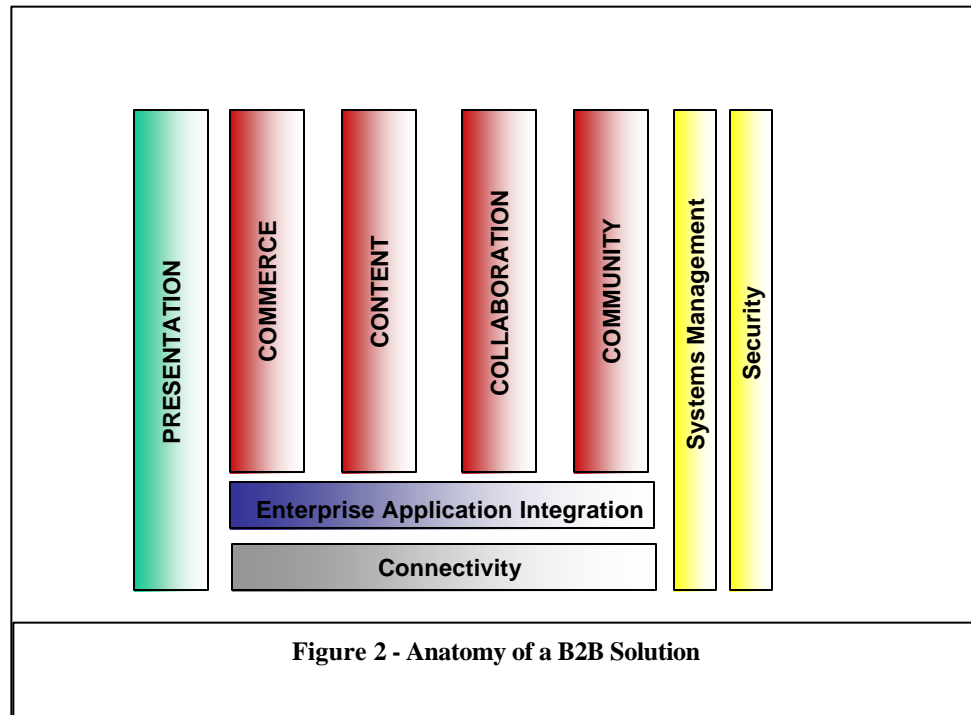
- ✎✎ Develop the network of buyers and sellers needed to establish the transactional liquidity for the solution. This will ensure that the B2B solution is viable and sustainable. In today's environment there are several solutions that fail because they have not been able to aggregate purchasing or selling power in order to take advantage of them.
- ✎✎ Attract and retain a large and sustainable set of users of the network. In order to do this enterprises should determine how to attract people to their sites and how to keep them there by improving the 'stickiness' of their solutions.
- ✎✎ Be able to rapidly sense and respond to changing market conditions. This is what Stephan Haecel, refers to as sense-and-respond organization. In his 1999 book, the Adaptive Enterprise, he defines a sense-and-respond organization as one that does not attempt to predict future demand for its offerings. Instead, it identifies changing customer needs and new business challenges as they happen, responds to them quickly and appropriately, before these new opportunities disappear or metamorphose into something else.
- ✎✎ Leverage its knowledge of the industry and position in the marketplace to provide value added services to its value chain partners. In the words of John Hagel, from his 1998 book Net Gain, these organization need to become infomediaries because consumers will not have the time, the patience, or the ability to work out the best deal with information buyers on their own (nor will vendors have time to haggle, customer by customer). In order for consumers to strike the best bargain with vendors, they'll need a trusted third party – a kind of personal agent, not a middle-man but an infomediary – to aggregate their information with that of other consumers and to use the combined market power to negotiate with vendors on their behalf.
- ✎✎ Build their applications on a reliable and scalable architecture that is based on standards. This architecture should be designed to leverage existing investments in applications and infrastructure. It should also be adaptable to changing business requirements and be able to incorporate new and emerging technologies.
- ✎✎ Have ready and easy access to Capital that will help bring these solutions to the marketplace quicker and address the increased integration requirements that are typical to this environment.

## THE ANATOMY OF A B2B SOLUTION

The previous section identified some of the critical success factors for the implementation of a successful B2B solution. In this section we will look at the basic components that need to be a part of any B2B solution. These are:

- Community,
- Collaboration,
- Commerce Lifecycle,
- Content,
- Presentation,
- Enterprise Application Integration,
- Security, and
- Systems Management.

These components should be based on a solid architecture that is based on Open standards and technologies. Let us now look at these components in more detail.



### Community

This component is at the core of most B2B solutions including e-Markets. It deals with how the community of users, participants, market makers and others, is built and supported using a set of core technologies. This component facilitates different types of interactions between the members of the community. It also enforces security rules on these interactions and makes sure that the privacy of the participants is maintained.

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At the core of the community and network that is essential to have a thriving and profitable B2B solution is a membership directory. This directory should support registration of new members, the ability to store the preferences of members as part of the membership profiles, the ability to locate services that could exist on the same machine, on the same Local Area Network or somewhere else on the network and the ability to grant and revoke privileges for access and use. With the Lightweight Directory Access Protocol (LDAP) promising fast and reliable access to global directories, the thought process in the past 18 months was towards the establishment of global directories to support e-business Solutions. However, the proliferation of competing directories from industry leaders such as Microsoft, Netscape, IBM and Novell has caused us to take a step back and analyze the feasibility of implementing localized directories that can be replicated as needed. This concept is also facilitated by the emerging popularity of DSML, an XML based standard for storing and retrieving web services being promoted by industry newcomers such as BowStreet and directory vendors such as IBM, Netscape, Microsoft and Novell.

### Collaboration

While the Community provides a way of organizing and managing participants in a workgroup, the Collaboration component provides the services and tools that allow the members to communicate, interact and collaborate with others in the community. This collaboration can occur in several forms including:

- ✍✍ Traditional electronic communication mechanisms such as email (IMAP, POP3 and SMTP), fax and pagers.
- ✍✍ Services that promote collaboration among workgroups and communities – these include support for Chat rooms, white boards, bulletin boards and instant messaging services.
- ✍✍ Program to program collaboration enabled through the use of techniques such as EDI and passing XML documents.
- ✍✍ Broadcast and multi-casting services, that allow us to send a message or a sequence of messages to multiple recipients. This includes support for broadcasting rich media such as audio and video, streaming media etc.

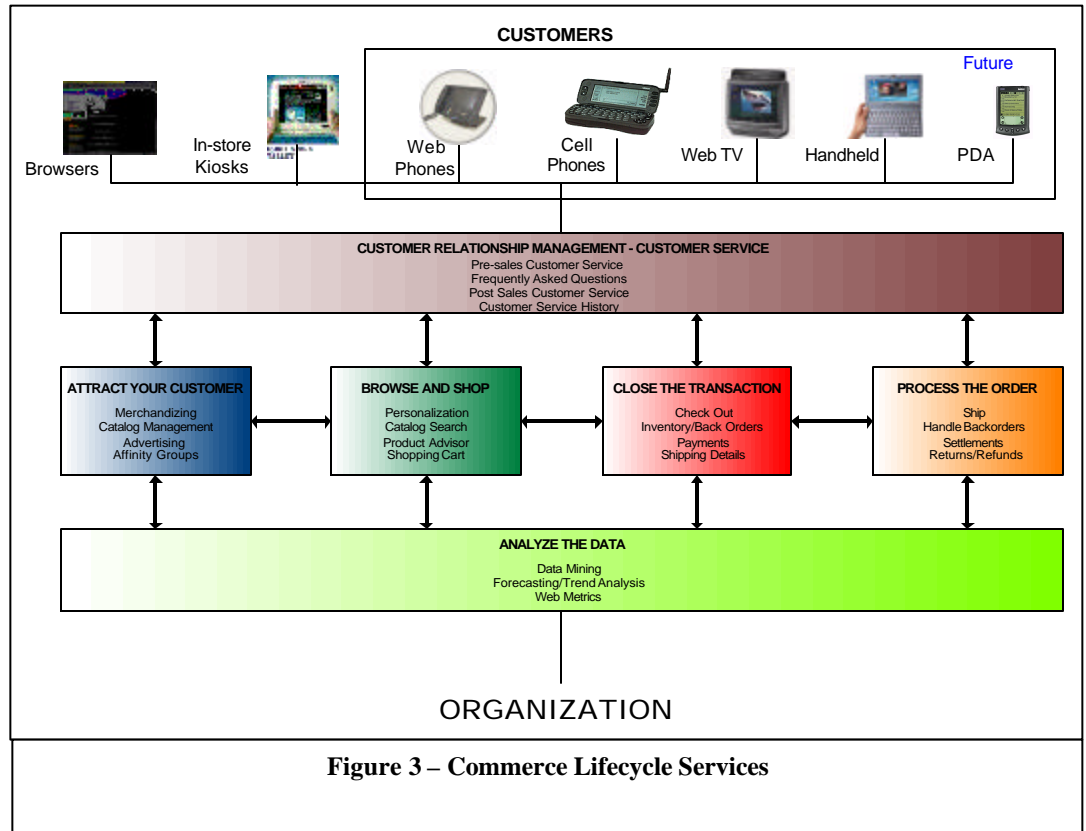
The collaboration services identified above are typically combined with a Workflow engine that provides the ability to set up and sequence atomic activities to support more complex processes that may involve multiple users from different workgroups, departments and organizations. There are several workflow engines that are available in the market today - one of the most commonly used products is Lotus Notes/Domino.

### Commerce Lifecycle Services

These services help provide specialized functions that are required to implement e-Commerce applications that provide significant competitive advantages. These services go beyond providing a simple web based catalog but extend into all of the areas of the commerce lifecycle. The major commerce services that need to be

provided include:

- ✍✍ Advertising and Merchandising functions
- ✍✍ A highly personalized user interface
- ✍✍ An online Catalog
- ✍✍ An Electronic Shopping Cart and checkout capabilities
- ✍✍ Multiple forms of electronic payment
- ✍✍ The ability to connect to and update disparate backend systems and
- ✍✍ The ability to capture and analyze trends on the online site.



Thanks to the explosive growth in B2C sites over the past year, this space is very well developed with several very well established and proven commerce server products. These include:

- ✍✍ IBM's WebSphere Commerce Server, which has been ranked at the top of the pack by Forrester research and has over 2000 installations around the world today;
- ✍✍ BroadVision One-to-One Enterprise, which provides an increased focus on personalization and the concept of one-to-one marketing;
- ✍✍ Blue Martini, which has very strong merchandising and catalog management capabilities;
- ✍✍ Evergreen's Ecentral, which is a standards based commerce server with the ability to work with several Java based application servers; and

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- ✍ Microsoft Site Server Commerce Edition, which uses the Component Object Model (COM) to implement commerce, functions on a Microsoft Platform.

## Content

In the end, the type of content that is available on it will determine the success of the B2B solution. The content provided by the site ranges from the static web pages that may be displayed on the solution's web site, to the data and information that is stored and accessed from backend systems and databases. In addition, to the core processes that are required to create and manage the content of a solution, this component will cover several additional value added services.

They include:

- ✍ Customization - a process for customizing the content based on special rules or contracts that are negotiated between partners,
- ✍ Personalization – presenting the content based on the individual preference of a user or groups of users,
- ✍ Content Refresh- a process for creating, updating, maintaining, publishing, and distributing content across departmental and organizational boundaries, and
- ✍ Web Intelligence – a set of services that allows the organization to analyze the usage patterns and transactional details and mine it to provide the insight required to create a sustainable competitive advantage.

## Customization

Customization of e-business solutions builds on the concept of personalization and extends it beyond the realm of a personalized user experience into a more sophisticated arena where one can customize the business agreements that exist between enterprises. These business agreements, sometimes also called Trading Partner Agreements, describe commitments, schedules, terms and conditions, design specifications and configuration, and many other details required for two entities to do business together. Today this is done by a combination of information systems and manual procedures, in order to provide the ability to rapidly evolve to the changing needs of the marketplace we have to look at solutions that provide these functions. There are several players emerging in this area who leverage the component based application development capabilities provided by the Enterprise Java Beans (EJB) model and the high availability solutions provided by Web Applications Servers that use the EJB model.

The key players in this area include Luna Server from Luna Information Systems, Versata Logic Server and the BowStreet Web Automation Factory.

## Personalization

Personalization encompasses the ability to gather and store information about individual customers, analyze the information, and then act on the knowledge by delivering the right information to each customer at the right time. It is a key

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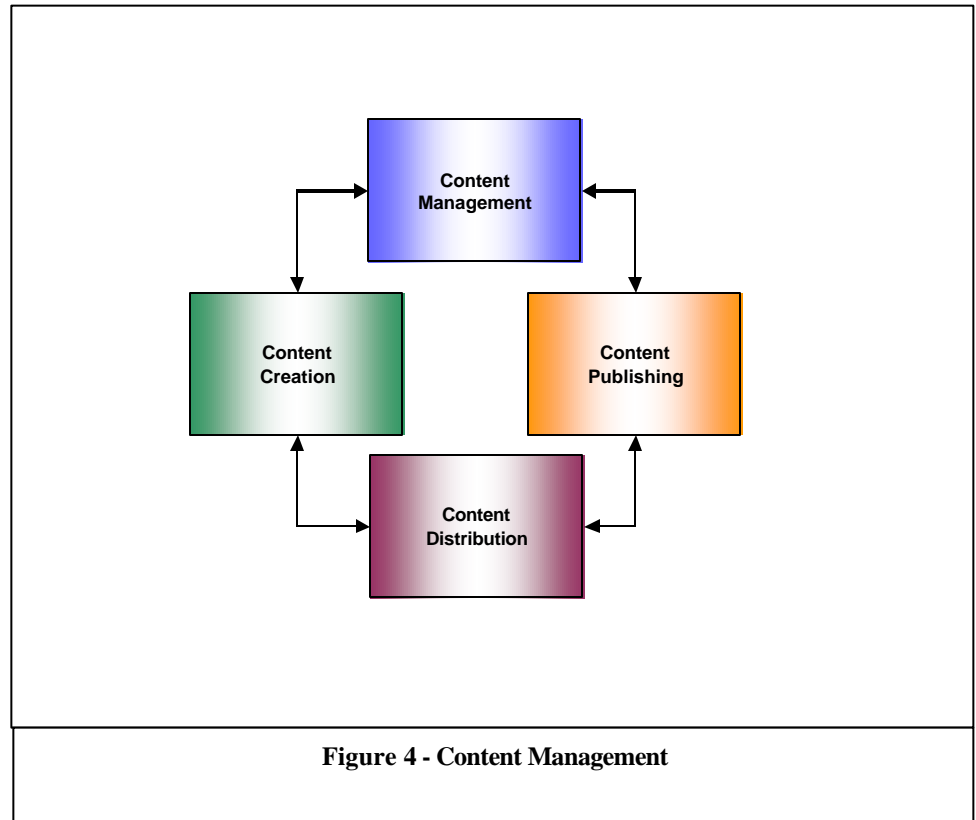
technology which is needed to differentiate web sites and provide value added services in the areas of customer relation management, advertising and merchandising, marketing campaign management, Web site content management, knowledge management, personalized portal and channel management. Although each specific application area may need special tailoring, especially in the areas of user interface and data collection, the basic set of core techniques for personalization are quite consistent.

There are several leading vendors of personalization solutions. Most providers of commerce servers tend to embed varying degrees of personalization capabilities into their products. Examples include the rules based personalization capabilities that are built into IBM's new WebSphere Commerce Server 4.0 and Broadvision's One-to-One. There are also several more sophisticated tools that provide advanced personalization techniques such as collaborative filtering (NetPerceptions, Likeminds), dynamic profiling (Match Logic) and serving dynamic content through templates (Microsoft Site Server, FutureTense, Vignette).

#### Content Refresh

Content Refresh refers to process that encompasses the creation, maintenance, distribution, protection and manipulation of that content. Content is the foundation of a web site. It is text, images and sounds visitors see or hear when they navigate to the site. It is information visitors may add themselves, including responses to an on-line poll or a book review. It is even meta-information about text, images and sounds that visitors may never see, such as keywords that make content easier to find, or instructions on how to display the content itself. In a B2B environment, the process of developing, managing and publishing content will span departmental and organizational boundaries.

The key players in this area include Vignette StoryServer, IBM's Content Manager and Interwoven's TeamSite.



#### Web Intelligence

These services extend traditional data warehousing and data mining techniques into the web space. They include sophisticated functions that can be used to capture, analyze, and predict how customers interact with the web solution. This includes products and services that help organizations analyze web logs and other usage to determine usage characteristics, buying patterns and other important information. This space includes value added services such as IBM's Surf Aid and Hyperion and reporting products such as Micro Strategy.

#### Enterprise Application Integration

Integration and Interoperability are critical for realizing the true potential of B2B solutions. Even though there has been an explosion of online exchanges and marketplaces, a study by AMR Research that looked at over 600 exchanges found that only 10 have the capability to integrate with the core systems of their members. This means that enterprises that participate in these exchanges are still fraught with the inefficiencies of manual, semi-automatic or redundant processes.

Most 'Brick and Mortar' enterprises have significant investments in legacy systems and Enterprise Resource Planning solutions. In order to realize the true

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benefits of the B2B revolution, it is important to integrate these solutions with ERP systems, legacy applications and databases that may exist within the organization. It is also important to make sure that the solution can work with other solutions and marketplaces within the B2B ecosystem.

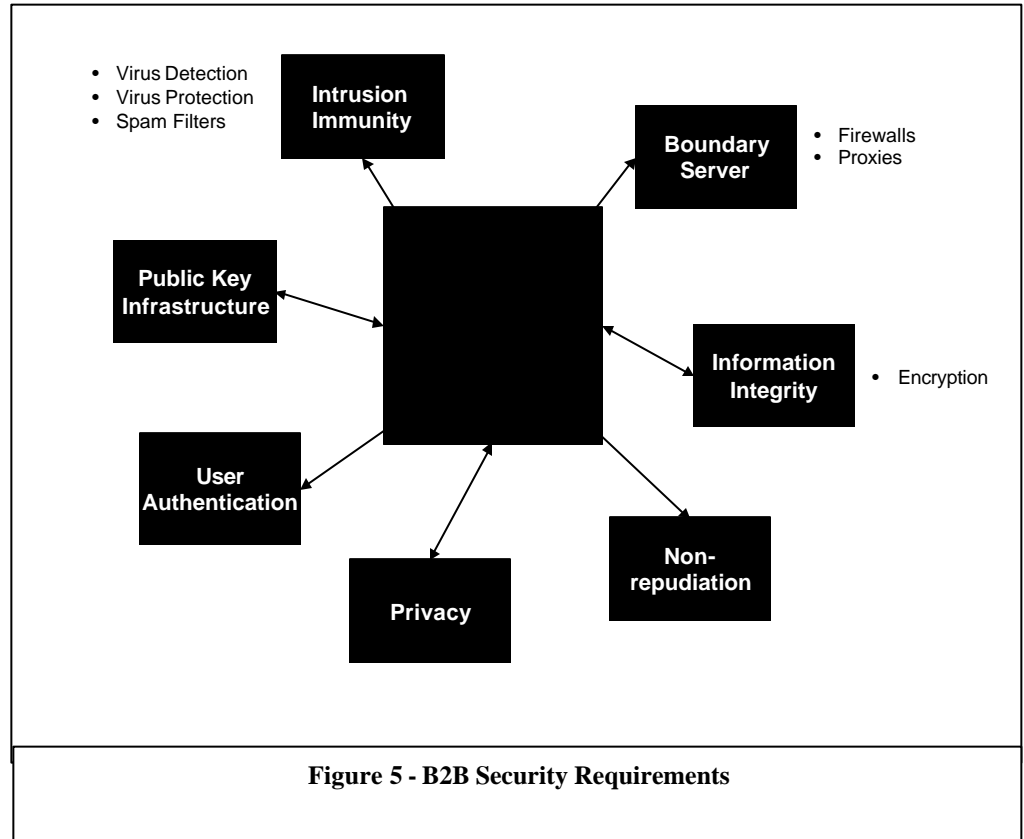
There are 2 primary challenges to make this happen, the first one is the most difficult one to solve, it is the process of establishing a common language and rules for implementing meaningful B2B communication. The second challenge is the Interoperability of the various competing technologies that support these solutions. Enterprise Application Integration vendors are working to address these problems and are looking to eXtensible Markup Language (XML) as the solution to both of these problems. XML's ease of use and its ability to represent structured data make it an ideal choice to solve these problems. There are several leading providers of EAI solutions; they include IBM's WebSphere B2B Integrator, WebMethods B2B, Mercator and Extricity.

### Security and Privacy

As the barriers between people, departments, enterprises and eventually countries come down, the need for multiple levels of security of information and privacy of individuals and organizations becomes increasingly apparent. This calls for a more comprehensive look at Security and Privacy policies. These policies should include:

- ✍✍ Intrusion Immunity, which includes detection and prevention mechanisms such as virus detection and protection.
- ✍✍ Boundary Servers such as proxies and firewalls that prevent unauthorized access.
- ✍✍ Information Integrity through the use of Encryption Technologies.
- ✍✍ The Non-repudiation services that are needed to make the electronic data and documents hold up in a court of law.
- ✍✍ Authentication services to authenticate users and sessions. This includes password protection, user profiles, digital certificates etc.





### Standards based Architecture

The primary objective of the e-business architecture is to provide a foundation for the development and implementation of large scale, high volume transaction processing applications. This architecture that support B2B solutions should have the following characteristics:

**Standards Based** - Be built using established industry products and standards including Java, XML, LDAP, IMAP etc.

**Scalability** - The architecture will scale to provide acceptable levels of performance for multiple users and at high transaction volumes. The architecture should support Vertical and Horizontal scalability across three (3) distinct domains - hardware, software and application.

**Flexibility** - The architecture is open and supports the incorporation of newer technologies and products, as they become available. The architecture also ensures that the features and services provided are accessible from different types of clients including Graphical User Interfaces, Web Browsers, Voice Response Units, Personal Digital Assistants and other clients.

**Reliability** - The architecture provides reliable and dependable support for its users. It should support ACID (Atomicity, Consistency, Integrity and

Durability) of transactions across multiple resource managers (legacy applications, ERP applications, departmental databases etc.).

**Availability** - The architecture supports operational capabilities that are consistent with the Service Level Agreements that are established for this application. If the supporting infrastructure goes down it should be able to recover and restart the applications within acceptable timeframes.

**Extensibility** - The architecture is easily extendable to support new business functions. It should also support easier upgrades of the underlying hardware and software.

**Manageability** - The architecture is supported by a set of commercially available tools that will simplify the systems management functions for the distributed components of the architecture. This includes starting and stopping services, automatic restarts, monitoring and error reporting, software distribution and performance tuning and

**Recoverability** - The architecture provides error detection and recovery functions for all of its services. It should also make sure that transactional and database integrity is preserved through the restart and recovery process.

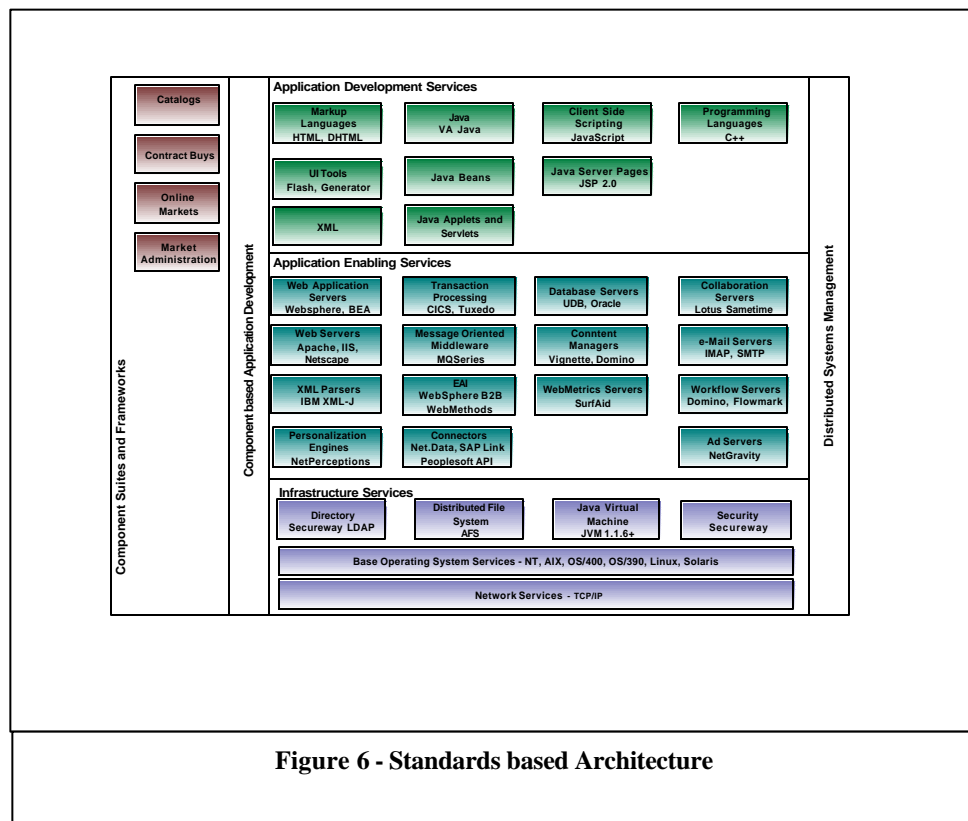


Figure 6 - Standards based Architecture

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## CONCLUSION

B2B solutions promise to radically change the global business landscape. While the technology and business models in this space continue to evolve and change on a regular basis, the fundamentals still remain the same:

- ✍️ These solutions should be built on a solid, viable and eventually profitable business model;
- ✍️ A strong network of partners whose combined buying/selling power can provide the liquidity required to support a strong and thriving marketplace; and
- ✍️ Built on a scalable and reliable architecture built on standards that promotes integration and interoperability.

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