

# The e-Business Platform:

## A Future-Ready Foundation

By Russ Frahmman

The day business embraced doing business on the Internet, e-business began changing the way businesses work, driving new styles of interaction. The proliferation of Internet usage, for example, means businesses must be prepared to complete transactions:

- With and without human interaction
- With diverse devices
- With diverse audiences.

e-Commerce and e-business implementations of online purchasing, continuous call centers, and enterprise and market portals raise consumer and business expectations. Today's boundaries dissolve and reform as businesses extend and integrate their business processes with suppliers, customers, and employees.

This has led businesses to leverage new enabling technologies that achieve true integration and interoperability, and increase efficiency and competitive advantage. For example, Juniper Networks — an Internet-enabled, 100 percent virtual manufacturer — contracts out all its manufacturing and realizes revenues per employee of \$726,000. This high level of competitiveness enabled Juniper to capture 35 percent of the high-end Internet router market in only three years.

Dell is another example. By selling over the Internet, Dell can offer tens of thousands of configurations to its customers — a statistic that translates into more than \$40 million in sales per day through its Website. Dell's cost of capital is negative; customers pay Dell when they order their computers and only

then does Dell order the parts to produce the products.

"We substitute information for inventory," Michael Dell has said, "and ship only when we have demand from real end consumers."

It adds up to higher productivity for Dell's business and a significant competitive advantage.

Customers, business partners, and employees want more convenience, control, and personalized services as well as easy self-service.

Despite these benefits, few companies are fully e-business-enabled even though U.S. businesses have made unprecedented IT investments in the last decade — 30 percent of new capital investment according to some estimates. The difficulty of system integration is why few companies have yet turned this e-business revolution to their advantage.

### e-Business Presents an IT Challenge

To understand why integration presents such a formidable barrier to e-business, consider a challenge every company faces: Customer Relationship Management (CRM). Large companies often address CRM at the Line-of-Business (LOB) level. Every enterprise — and every LOB within each enterprise — is unique. Each has a unique set of circumstances and different customers, types of customers, products, selling styles, and application systems. Yet, today, the standard approach is to implement a packaged CRM system.

But the CRM application usually

solves only part of the business problem, leaving much of the problem — all those unique elements — unresolved no matter how much hard work the IT staff puts in. So companies often implement a second application to solve the remaining problems — or only another part of it. They keep going, buying more packaged applications to take care of more pieces of the problem. To join this patchwork of fixes together, businesses incur the further expense of building costly point-to-point integration pipelines.

This example reveals why large enterprises currently have anywhere from a few thousand to tens of thousands of applications. These are typically single-function legacy applications built to address core business functions, performing the jobs they were programmed to do while ignoring the applications around them. Their architectures aren't based on a distributed computing model and there are no standards vendors can use for developing complementary applications. But these applications are now expected to open their data and business processes across the enterprise and supply chain.

Previously, applications and systems were integrated with custom middleware and proprietary adapters. Connectivity with other applications was achieved using various types of middleware and many custom-developed implementations. This works when you're integrating only a few applications to support business processes. Today, those applications can typically number in the hundreds. Linking proprietary applications two-by-

two with proprietary adapters is time-consuming and expensive; adapters can cost \$50,000 to \$100,000 each. Linking one application to 100 others requires 100 adapters. Linking 100 to 100 requires 10,000 adapters. Clearly, this “spaghetti-ware” is laborious to change, impossible to uniformly update, and poses extreme obstacles in terms of integration with other e-business applications.

This model simply can’t meet the need for accelerated time-to-market and agility.

### Seeking a New Integration Solution

Today’s e-business initiatives are driving integration of disparate platforms, legacy applications, and data sources to the top of the priority list. These hundreds of applications must be integrated, each at a different level of functionality: data, application functionality, or user interface. They must also be adapted for unpredictable transaction loads and messaging, and other middleware technologies necessary to accommodate suppliers and occasionally connected devices. They must be enhanced to support “smart” content — information that’s adapted and manipulated for specific purposes, personalized access and delivery, and intelligence. Flexibility, scalability, performance, and reliability are all key success factors for a truly net-enabled business.

A new kind of infrastructure is necessary. Technologies such as object middleware, Common Object Request Broker Architecture (CORBA), and Distributed Component Object Model (DCOM) add support for distributed computing and a standards focus. However, they’re not a complete solution because their focus is “peer-to-peer” — they lack centralized management functionality.

For the agility to capture market share, a business needs an e-business platform that simplifies integration and eliminates the spaghetti-ware. An enterprise needs to integrate its legacy systems, enabling these systems to move data throughout the organization in ways that give its customers, employees, and trading partners personalized access to the information. In addition, an enterprise needs an environment that permits rapid, inexpensive development and use of custom applications. The emerging solution for this need is a systems architecture called the e-business platform. This new category of software helps companies manage and

simplify the complexities of e-business by letting distributed applications become Web services that are events in a seamless flow of business activity.

### Three-Tier e-Business Architecture

Increasingly, e-business applications will become components that can be deployed on platforms conforming to a standard architecture: the e-business platform. Having a standard architecture enables the coordination to support complete business processes reliably and securely while assuring high availability and performance. It’s component-based for faster time-to-market, increased productivity, and real-time changes that reflect changing policies and processes. Industry standards supply the basis for interoperability within and between enterprises. The architecture is distributed for Internet-based global deployment and synchronized updates. Finally, the e-business architecture is “built to integrate” to transform monolithic applications into free-flowing Web services.

“Global 2000 organizations are embracing a platform-based approach that defines a common stack of products and technologies that all enterprise applications can leverage,” said Craig Roth, senior program director at Meta Group, a leading research and consulting firm. “The e-business stack continues to

add layers as new technologies emerge, such as application server, portal framework, Web services, and integration. The e-business platform vendors will continue to subsume functionality as common features are recognized.”

This architecture models the business processes it supports. To access applications and databases over the Web, an enterprise requires a portal system that personalizes and recognizes different groups of users, and provides access to the information they need. The portal framework personalizes access, manages interactions, provides commerce capability, and allows additional portals to be developed quickly. Underlying the portal framework is the application and services framework, a horizontal layer of administrative functionality that provides uniform security, scalability, and content management. It eliminates the requirement that each application replicate those functions separately (see Figure 1).

### Application Servers Form the Core

Application servers are the foundation of this multi-tier architectural approach. Traditionally, application servers provide infrastructure, management capabilities, and tools. But today, users increasingly want comprehensive, complete solutions from a single vendor. Because application server vendors have responded with

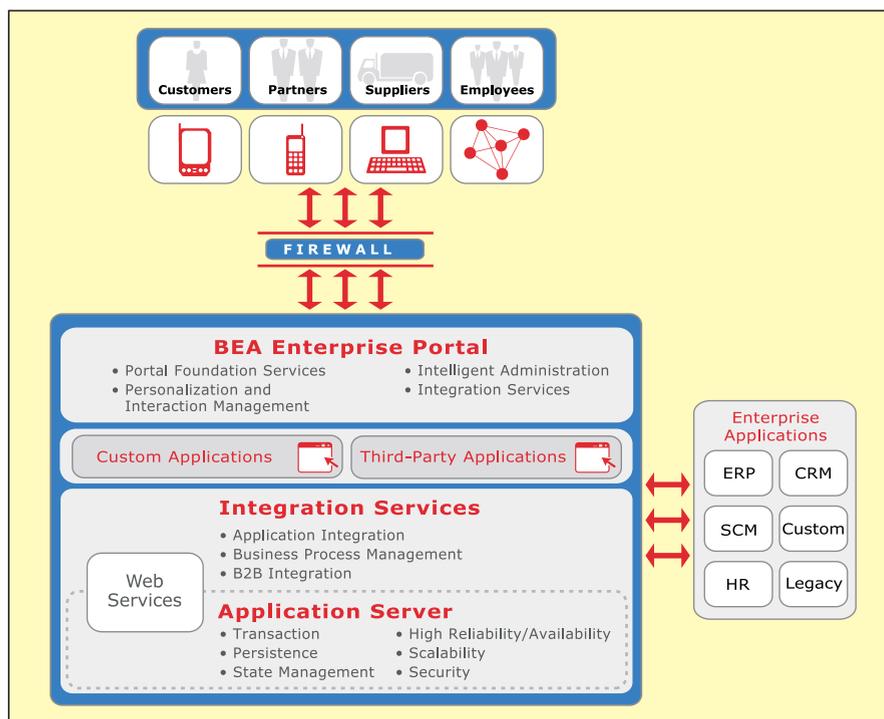


Figure 1

enhanced servers to address this need, their offerings are evolving into comprehensive e-business platforms.

Providing the building blocks of the architecture, the application server supplies the tools to build new applications and an infrastructure that offers scalability, extensibility, and reliability. Evolving reinforcement of standards such as Java 2 Enterprise Edition (J2EE) provides a base of knowledge and components that can be leveraged to build new applications.

Many functions can reside in the application server. First is business logic execution that includes software applications and business rules. Next, this level manages data and information access and integration. Application integration also resides here as well as critical features that aren't addressed by standards such as support for distributed, component-based solutions. The application maintains security; all applications access the central repository and use a common security model. Transaction processing capabilities, scalability, reliability, run-time load balancing, the developer interface, and data persistence are also essential parts of the application server. In addition, the application server manages distribution and replication of functionality for load balancing, fail-over handling, and the addition of incremental resources when required.

### Penetrating Application Barriers

Despite their growing focus on e-business, organizations still rely on existing IT infrastructures for integration. Thus, even as new applications are developed using a Component-Based Development (CBD), migrating existing functionality to CBD is still a long-term goal. To avoid disruptions to business activities, hiring developers expert in enabling technologies such as Java and eXtensible Markup Language (XML), and other such expenses, most companies begin by integrating and using new software with existing applications and data sources.

The more of these systems a company has, the higher grows the cost of integrating them. So, businesses require an architectural layer that integrates applications, enables the design of process flows across applications, and enables B2B communication across firewalls. The first key to achieving this is to place all this functionality in the integration layer. The second critical element is

standards that facilitate integration.

In the new model, integration behind the firewall is a critical part of the infrastructure, breaking down the walls between these monolithic and stand-alone applications. This also includes business-to-business integration (B2Bi) that enables applications from one company to directly work with the applications of a business partner across the Internet or a Virtual Private Network (VPN).

The integration layer supplies a mechanism for combining elements of disparate applications and enabling them to interoperate. Just as Web technologies are widely used on intranets, XML, Web services, and J2EE adapters can be expected to become common on corporate networks. While most of today's new applications are built to plug into the Web, companies need to assure that both Commercial Off-the-Shelf (COTS) applications and internally developed applications are "integration ready" out-of-the-box and can plug into this integration architecture. That's why the emerging family of Web services standards is essential. These standards — Simple Object Access Protocol (SOAP), Web Services Description Language

(WSDL), Universal Description, Discovery, and Integration (UDDI), e-business XML (ebXML) — enable businesses to mix and match integration solutions as they've been able to do with Web technologies.

A non-proprietary integration layer is built on:

- Emerging standards that replace proprietary technology
- Enabling technologies such as XML, Java Messaging Service (JMS), and CORBA
- Application servers and servers focused on integration such as XML servers
- Metadata and business rule repositories
- Adapters for connecting to application processes
- Data integration software.

Using these technologies, the integration layer enables the integration of:

- Applications that extract and transform data among sources
- Business-process applications that route messages among systems based on rules

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Today, the industry is rapidly coalescing around the Java/J2EE platform and the .NET alternative from Microsoft. Both platforms have a compelling shared vision of Web services, a vision that's already being proved by direct interoperability testing between the two. The additional value that Java offers is that Web services bindings can be generated transparently for existing J2EE applications and that the J2EE Connector Architecture (JCA) is commercially viable today. Indeed, systems such as PeopleSoft, Siebel, SAP, and many others are working to deliver standard JCA adapters for their enterprise suites. In addition, leading systems integrators, such as Accenture, CSC, EDS, and KPMG, are developing standards-based integration practices around this new framework. With the leading Java systems vendors promoting the use of J2EE as a basis for integration, J2EE-based integration gains critical mass.

### Services Layer Tailors Interaction With the User

Four key constituencies need access to the company's data: customers, suppliers, employees, and trading partners. The services layer manages the connections between the user interface and content sources while providing access points to applications deployed on the platform. Example functions include personalization, collaboration, categorization, search, portal gadgets, syndication, and Web applications.

The services layer, which often can be encapsulated in portal software, provides the ability to search and interact with resources the platform supports. Where the integration layer manages the logic governing the processes and connections across applications and platform components, the services layer manages the behavior and relationships of user-to-application connections. This layer requires support for various media, enabling access through multiple devices and application forms.

In contrast with first-generation portals, portals built on e-business platforms can easily add, integrate, exchange, or remove applications. Just as standard approaches to interfaces and components were critical to the growth of consumer

electronics, they're vital for enterprise portals. Today, both vendors and users have primarily rallied around either Microsoft-centric applications or those compliant with J2EE. Standards such as J2EE and SOAP will prove critical for communication between applications deployed across the e-business platform.

"Integrating portal services into application servers enables greater flexibility and customization than you get with a stand-alone product," said Meta Group's Roth. "Organizations are interested in having their e-business applications, such as portals, run on top of application servers to leverage existing investments in clustering, data access, connection pooling, integration, fail-over, and administration."

### Reduced Costs, Increased Effectiveness

The e-business platform opens up organizational knowledge resources that help businesses work more effectively. It preserves the usefulness of business applications because all software components speak the same language, using the same standards. It enables e-business from anywhere, at any time, to take advantage of different markets and environments, increasing access and enhancing productivity.

John Brady, vice president of emerging systems architecture, Alltel Information Systems, said his organization saw development productivity increased by 450 percent in the first year due primarily to a nearly 90 percent reduction in code. The improvement became possible when Alltel moved from C++ to Java. The company found it was easy to configure and deploy Enterprise Java Beans (EJBs) within the application server.

IT costs drop as productivity increases. The infrastructure offers a model for integrating, instead of replacing, legacy systems with new applications to protect existing investments. Business processes can be automated and streamlined to reduce operational costs. Every customer interaction can be personalized. Further, the e-business platform reduces the cost of change in products, services, and business models.

The e-business platform enables more effective business in other ways, too. With this infrastructure in place, businesses can open up new ways to interact with partners and customers. Being able to quickly bring innovative,

specialized applications to market can create and reinforce competitive position. Centralized and consistent use of this information magnifies control of security and customer privacy. Because it complies with industry standards, the e-business platform helps drive standards evolution, further promoting the efficiency of a common standards use for end-user applications.

### Summary

The viable Internet-era business can no longer be hard-coded. Making the swift changes necessary to business evolution simply cannot be done by changing code. The e-business platform transforms this rigid, monolithic application model.

e-Business platforms now play the central role in the evolution of distributed systems that span corporate networks, the Internet, and extranets. They're the key to integrating the wide range of packaged applications, custom software, and legacy systems.

"Some banks we work with ... perform 300 to 400 transactions per second," said Alltel's Brady. "As we add more personalization ... and expand our use of wireless and voice-based technologies, we expect a tenfold increase in transaction volumes. The new architecture had to meet today's demand levels and scale far beyond them."

The new approach is based on the n-tier architecture model with user-facing portals offering optimal flexibility for integration and adding new components and business partners. Standards will help prevent vendor "lock-in." The results are increased productivity, improved visibility of key business metrics, faster product and service roll-out, and free data flow within and among enterprises. It all adds up to an ability to leverage a company's business applications to deliver the kinds of services that customers want. 

### About the Author

*Russ Frahmman is director of product management with BEA Systems, a leading application infrastructure company, with more than 11,800 customers around the world. He is responsible for the direction of BEA WebLogic Integration, partner integration solutions, and B2B and application integration. e-Mail: russ.frahmann@bea.com; Website: www.bea.com.*