



# BUILDING AND DEPLOYING ENTERPRISE APPLICATIONS FAST

**LESSONS LEARNED**  
BUILDING AND  
DEPLOYING DISTRIBUTED,  
COMPONENT-BASED  
ENTERPRISE APPLICATIONS



SPECIAL ADVERTISING SUPPLEMENT

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O B J E C T D E S I G N

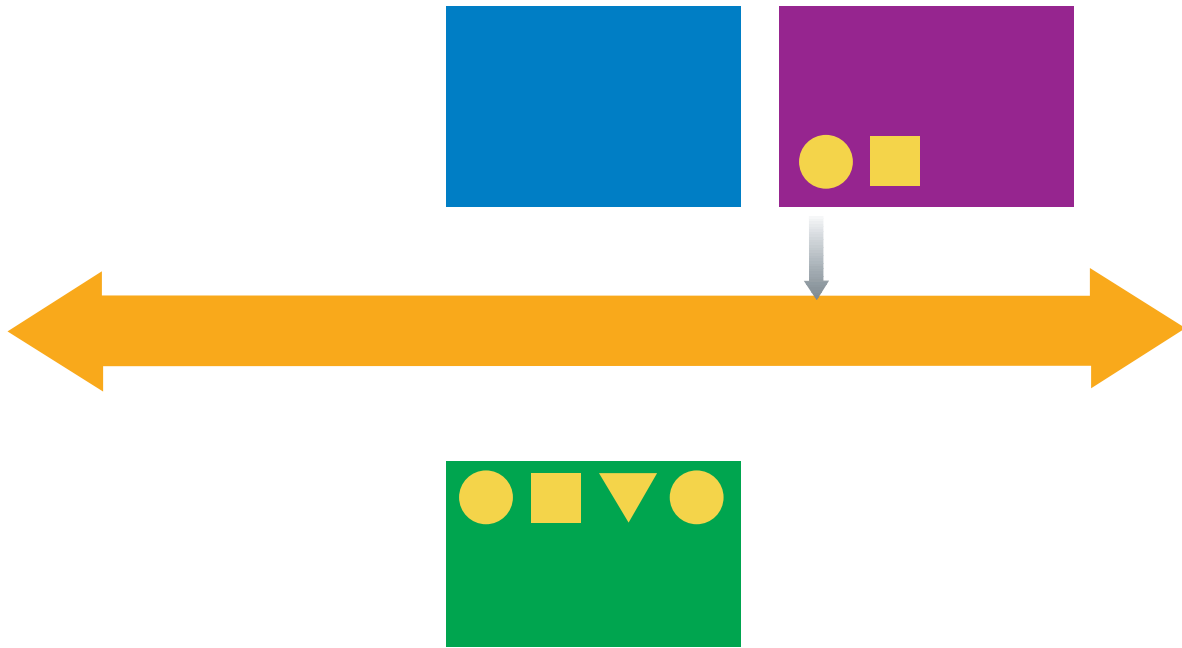
## **ART ONE:**

STRATEGIC APPLICATION  
DEVELOPMENT FOR THE INTERNET AGE

### **Gaining Strategic Advantage**

Despite all the talk about packaged commercial applications, despite the availability of off-the-shelf ERP, supply chain, customer

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turned to packaged applications.

But packaged applications don't provide a complete answer. Packaged applications, too, can be very costly and slow to implement and, no matter how well designed and engineered, will bring the organization only to parity with the level of its industry. With all or most competitors in an industry running the same or similar packaged applications, no one gains a competitive advantage at that level. To capture what is unique about the organization and leverage that uniqueness for competitive advantage, organizations must, at the least,

build some custom applications.

This supplement looks at the strategic implications of building and deploying custom strategic applications quickly as a critical competency of organizations that intend to thrive in the emerging Internet-driven business environment.

- Part One identifies where organizations are today and where they must go. It examines the global business environment and how it affects an organization's business processes and supporting applications. It explores the value of applications as

a corporate asset to be leveraged going forward. It also identifies the obstacles that have prevented organizations from fully capitalizing on their applications. Finally, it introduces a strategy for overcoming those obstacles based on standard, reusable distributed components and key enabling technologies.

- Part Two examines the open, standards-based enabling technologies that are allowing companies to regain control of their strategic application development and describes how those technologies address key strategic issues: productivity, time to market, investment protection, staffing and training, and cost reduction.

Profiled throughout this supplement are companies that have worked with enabling technologies. Their experiences represent best practices that organizations can model as they develop and deploy custom applications to achieve competitive advantage.

## Today's Corporate Computing Environment

Today's corporate computing environment, especially among large organizations, contributes to the difficulties of building and deploying applications, both packaged solutions and custom-built applications. Gone are the days of single, centraliz

LESSONS  
LEARNED



of software code, usually invisible to most people in the organization, capture the business process knowledge and expertise of the organization. They process transactions, drive production, manage workflow, facilitate collaboration, expedite decision making, speed customer service and support all aspects of the organization.

Management journals and business

## CASE STUDY

### GEMSTONE



## Campus Pipeline Building an Online University Portal

**C**AMPUS PIPELINE IN SALT LAKE CITY supplies Internet portal applications for students and faculty in a university setting. The application integrates existing campus software with a browser interface customized for each individual. Campus Pipeline software enables colleges and universities to serve as exclusive providers of personalized electronic communication for their entire on- and off-campus populations.

The objective of Campus Pipeline is to help colleges and universities unite their entire campus community by publishing student and professor information, class schedules, workgroups, discussion groups, class syllabi, e-mail, on-campus event listings and club activities in an electronic and easily accessible format. The result is an online university portal, where all these facets of university life are tied into a single location.

To deliver on this vision, Campus Pipeline teamed with Systems and Computer Technology Corp. (SCT) and GemStone Systems Inc. to supply applications and application server infrastructure. Campus Pipeline chose to use GemStone/J, a secure, scalable Java application server with built-in support for Enterprise JavaBeans, Corba and Web integration. GemStone/J architecture supports hundreds of distributed Java Virtual Machines (JVMs) to run all the services and a

Corba infrastructure that provides support for distributed communications. GemStone/J's Object Transaction Monitor (OTM) supports XA-compliant, scalable and load-balanced distributed transaction services so that users can carry out tasks on the system that may touch several data sources. A large persistence mechanism in GemStone/J is used to store Java objects that represent business entities such as users, their e-mail and preferences.

For all members of the university community to have access to the system, GemStone/J provides a Web server integration strategy and Java servlet engine that can support a user community of 70,000 or more. The Campus Pipeline portal application also integrates with SCT's Banner2000 enterprise application, which also runs on the GemStone/J platform and includes a business process design tool that teams business processes, best practices, people and information.

The result? "By leveraging GemStone's application server technology, Campus Pipeline is more efficient in providing personalized content, tracking user preferences and integrating with core university systems, thereby significantly reducing the time to market for our solution," says William Borghetti, co-CEO, Technology, Campus Pipeline. ✎

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CASE STUDY

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## TPN Register—Leveraging Best-of-Breed Reusable Components for Fast Development

TPN REGISTER, IN ROCKVILLE, MD.,

**AREN BOUCHER** specializes in component/object technology and middleware technology (transaction processing monitors, enterprise messaging technology and object request brokers).



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CASE STUDY

**First Union Bank—Adopting a Common  
Component Framework for Flexibility and Speed**

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the purposes of application development. A component usually offers ways for developers to modify or configure its behavior. If necessary, a component can be further extended or modified by the developer, producing a new component.

Components perform the work of the application by communicating among each other to complete a function, such as processing an order. For example, a developer can assemble a customer management component, transaction component, database access component and other components to create a new application with minimal writing of new code. In this way, CBD speeds development and reduces costs through increased developer productivity. It also delivers consistent, high-quality applications through the use of proven, tested components.

CBD results in flexible applications.

## When something in the **business environment** requires that the **application be changed**, only the affected components need be modified or replaced.

When something in the business environment requires that the application be changed, only the affected components need be modified or replaced. "You glue together components to meet today's need. When the business changes tomorrow, you just rearrange the components," notes Watson.

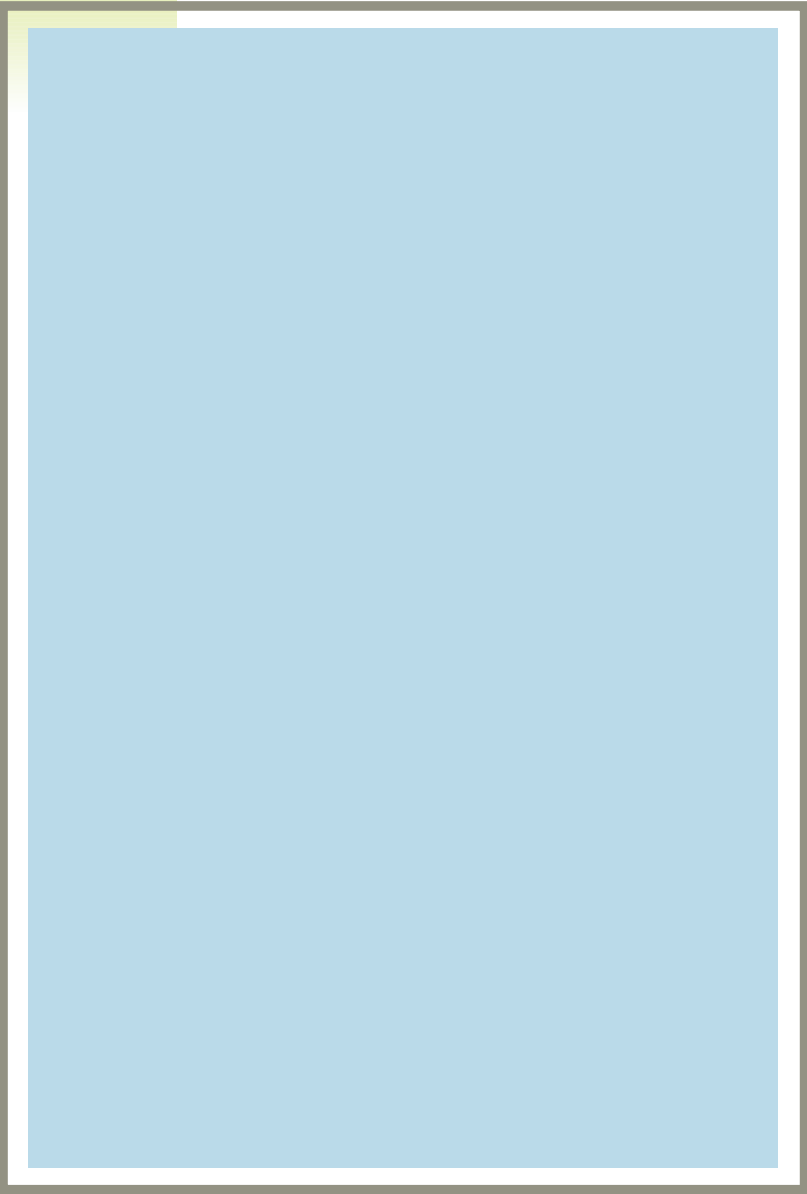
And components are reusable. Organizations can collect libraries of proven useful components for use in subsequent applications. For example, a security management component can be reused in every application that requires

security, eliminating the time it would take developers to build a security function each time and ensuring a consistent approach to security across all the organization's applications. The library of reusable components itself can become a valuable corporate asset.

### **CBD Enabling Technologies**

CBD requires the support of several key enabling technologies to deliver its strategic payoff: speeding development and lowering costs. The foremost requirement is an open standard that provides a

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consistent way for components to communicate with each other and for developers and applications to access and trigger component functionality.

In addition, CBD benefits from middleware and frameworks that provide the routine, low-level technical services required by almost any application. In the past, corporate application development groups have burned untold resources and time creating and re-creating this underlying complicated plumbing or infrastructure for every application.

With the advent of component/object models such as OMG's Corba component standard as well as Enterprise Java Beans (EJB), a complementary Java technology, application developers have the open, standards-based communications, middleware and framework to effectively pursue CBD. "Corba is a mechanism to tie together all the pieces and make CBD easily accessible to any programmer," explains Watson.

Using enabling technologies such as Corba, programmers and business analysts will ultimately, be able to work at higher levels of abstraction to create business programs by assembling business components. When the business changes, they will be able to quickly reconfigure and reassemble the application to respond to the change. Underneath it all, Watson continues, Corba will transparently tie together all the low-level technology pieces—the back-end databases, the application logic and the front-user pieces.

Unified modeling language (UML) is another enabling technology for CBD. UML has emerged as a public standard for visually creating models of component-based applications. UML enables developers to define the components of an application at yet an even higher level of abstraction, which makes application development that much easier. At the end of the process, software tools can automatically generate large parts of the application, explains Richard Soley, OMG CEO. When the application needs subsequent modifications or

enhancements, these can be made in the model and quickly regenerated.

### Web-Enabling Technologies

CBD and its enabling technologies alone won't solve today's application development challenges. The Web has emerged as a major factor. The Web can be viewed as the ultimate network, connecting businesses, individuals, applications and information on a vast scale.

In many ways, the Web simplifies application deployment and eliminates many of the problems that plagued application deployment in the past. By standardizing on the browser client, a front-end presentation language (HTML) and a communications protocol (HTTP), the Web allows a single user interface to access millions of applications, which he observes has tremendous strategic business implications.

The Web makes it possible for customers, prospects and suppliers to access an organization's information and applications. This opens up a host of possibilities for growing the business and streamlining business processes.

Key Web-enabling technologies include Java, EJB, application servers, and XML-XMI.

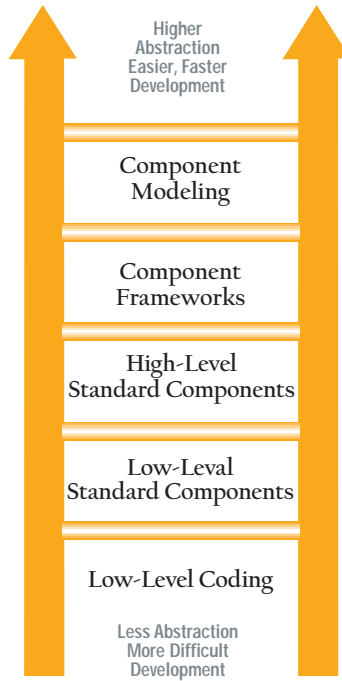
- Java is a component/object-oriented, platform-independent programming language that works particularly well with the Internet and is often used to create either Corba or EJB components.
- The EJB standard, closely aligned with Corba, enables component-based development of distributed applications and deployment via the Web.
- Application servers represent a new form of middleware, which uses Corba and EJB technology to connect Web clients to appropriate applications and services, wherever they may reside.
- XML-XMI extends the capabilities of HTML beyond static display, enabling application developers to effectively use the Web client as a universal, interactive application front end. XMI (Extensible Metadata Interchange) extends XML (Extensible Markup Language) for use with component repositories and object-oriented application development tools.

Organizations can combine CBD and CBD-enabling technologies with the Web and Web-enabling technologies to address many of the application development and deployment problems that have hindered organizations in the past while producing dramatic results in the following key areas:

• **Interoperability among Heterogeneous Systems**

Incompatible systems can frustrate organizations at every turn. However, by treating existing systems as components unto themselves and using Corba, organizations can achieve widespread interoperability. The trick, suggests Soley, is to define standard, easily maintained interfaces, specifically Corba interfaces,

## Ladder of Application Development Abstraction



Source: CIO Communications

FIGURE 2

and let automated tools underneath handle the detailed mappings, translations, and transformations required.

Similarly, Corba can be used as the foundation for a wide range of enterprise application integration (EAI) efforts. A number of EAI vendors incorporate Corba into their own tools. The use

of Corba ensures a more open solution, eliminating the need to build or buy proprietary EAI tools that may be difficult to maintain over the long run. Gartner Group predicts that object/component technology, which underlies EAI, will provide the foundation for 98 percent of new applications by 2001.

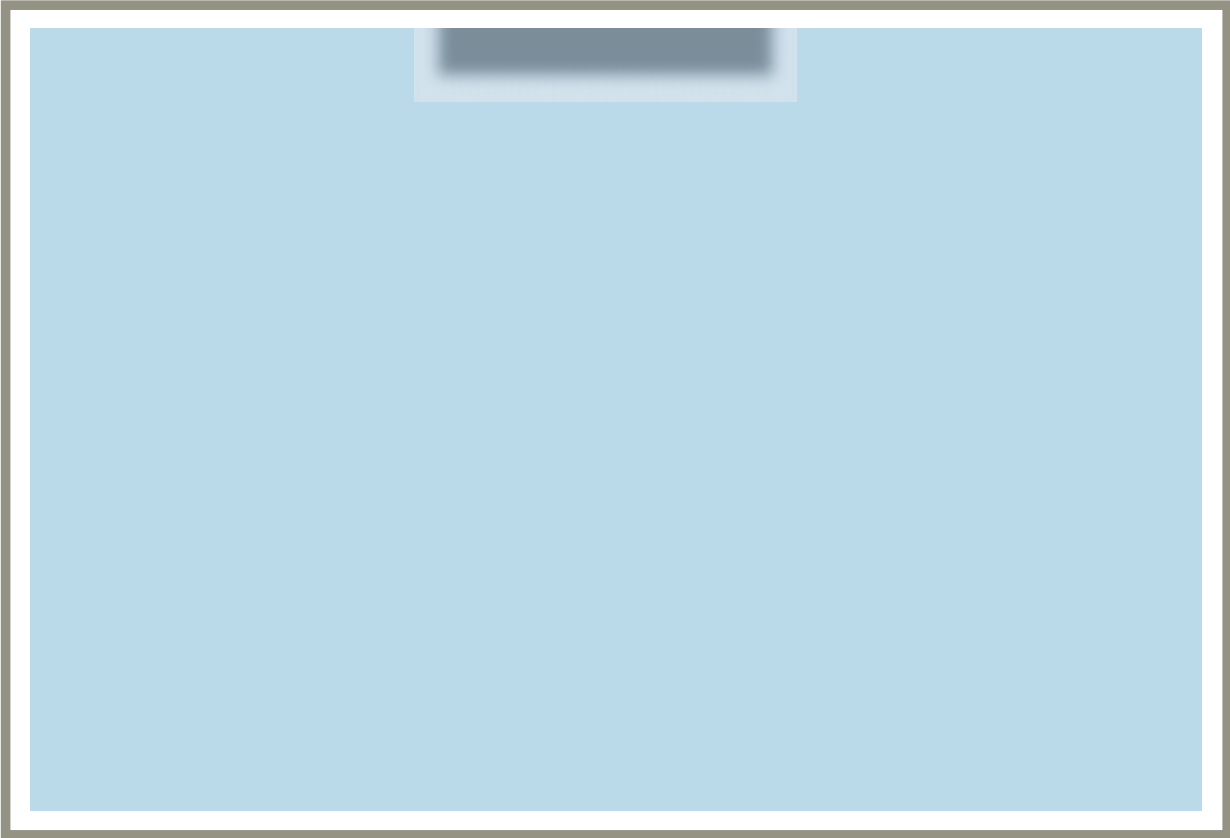
• **Extending the Enterprise via the Web**

Successful organizations today extend beyond their own four walls to embrace suppliers, partners and customers. The Internet plays a critical role, allowing suppliers, partners and customers to access not only information but applications. Suppliers can follow inventory levels to ensure sufficient supplies just in time. Partners can coordinate workflow via the Web. Customers can perform many service functions, from address changes to order-status updates, on a self-service basis, resulting in greater customer convenience and lower cost.

Just as components facilitate integration within the organization, so too can Corba and EJB components can speed the development and deployment of Web applications and interoperability among the systems of customers, partners, suppliers and the organization. Again, Corba's ability to provide a consistent, standards-based platform- and language-neutral interface to diverse applications and systems while automating the underlying communications ensures that organizations can quickly project their reach over the Internet.

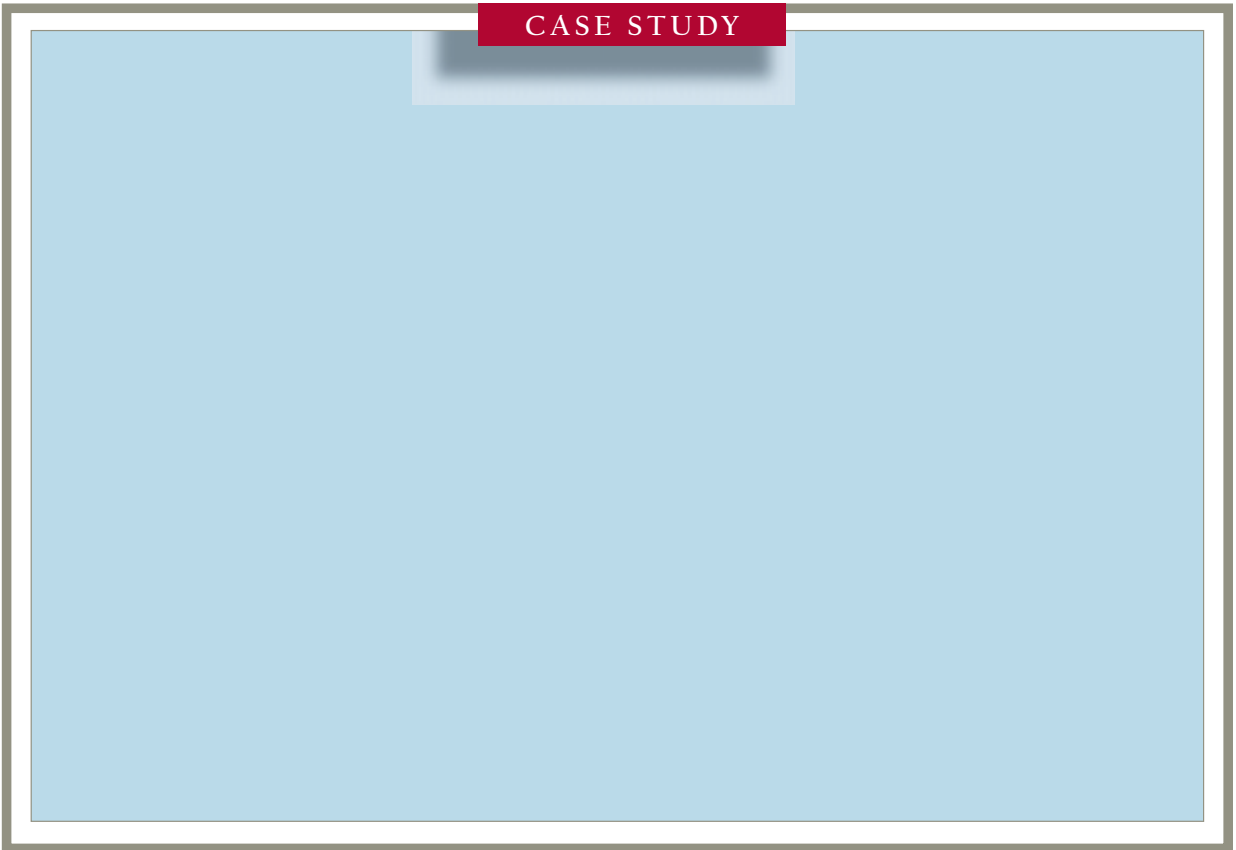
**Organizations can combine CBD and CBD-enabling technologies with the Web and Web-enabling technologies to address many application development and deployment problems.**







CASE STUDY



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