Andrews Consulting Group

Product Evaluation Series

LANSA: Fast Track to E-Business Development Success

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Andrews Consulting Group Product Evaluation

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Introduction

IT departments are being challenged as never before to bring their organizations into the e-business model of computing. But Internet and e-business computing is unlike any previous computing model. Systems must be enhanced significantly to allow a whole new class of previously unknown customers to access critical resources. New communication processes must be implemented with new computing languages to keep the business competitive. At the same time, older applications, with older technologies, must be stretched to meet the ongoing demands of the corporate business plan. All of this must happen quickly—more quickly than the development cycle in traditional application development allows for—to take strategic advantage of the e-business computing model.

Where do you even start to assess the skills and tools that will be required to meet such challenges? How can your company succeed at e-business development when the learning/training cycle for many new development tools may actually exceed the life cycle of some new, key management-defined projects? What about cross-platform support? Does it make sense to invest in a server-specific e-business strategy when the price/performance of other platforms is changing so rapidly?

These are the quandaries that the rapid rise of e-business and modern Internet computing have imposed upon professional software developers: IT must embrace new technology and new development methodologies to develop more robust applications with shorter application life cycles while simultaneously maintaining critical legacy business applications with ever-shrinking personnel resources.

In response to these challenges, LANSA Inc. has developed a suite of application development tools that address many of the most urgent needs of professional AS/400 software developers. This paper examines this suite of tools and explores how this suite can successfully streamline AS/400[1] e-business development. *LANSA for the Web, Visual LANSA,* and *LANSA for the AS/400* are significant and important development tools that every AS/400 development organization should seriously consider. ◆

[1] While this paper is focused on AS/400 development, it is worth noting that many LANSA shops also leverage the LANSA tool suite for NT and Unix development.

Executive Overview

LANSA is a comprehensive suite of AS/400 and Microsoft Windows development tools that can streamline the implementation of the e-business computing model. LANSA uses the construct of a centralized source called the *Object Repository*—containing data definitions, database rules, and interface logic—to coordinate development across several key layers of e-business technology. *LANSA for the Web* leverages this design for the development of transactional e-business applications. *LANSA for the AS/400* uses the Object Repository for the development of back-end business process. *Visual LANSA* leverages the construct for Microsoft Windows and cross-platform functionality. This cohesive design strategy—which is further enhanced by other LANSA tools we will touch on in this paper—can substantially save manpower, time, and expense, far outstripping the capabilities of traditional models of application development. Andrews Consulting Group believes the use of LANSA's products can save organizations as much as 50 percent of the normal development cycle. Furthermore, applications developed with LANSA tools are substantially easier to maintain and enhance; so ongoing savings can be far greater.

By using templates, business objects, and a powerful fourth-generation language (4GL) called *Rapid Development and Maintenance Language* (RDML), LANSA is significantly easier for traditional AS/400 developers to learn than IBM's e-business development frameworks. Development timelines can be shortened while still meeting the requirements for maintaining an IBM-compliant deployment strategy.

LANSA's design strategy provides many e-business deployment options that make the system very resilient to changes in technology. Developers who use *LANSA for the Web* dynamically choose the mode and type of code generated for both front-end browser support—selecting from hypertext markup language (HTML), Extensible Markup Language (XML), Wireless Markup Language (WML), and Java—and back-end server support such as Common Gateway Interface (CGI) and Java servlets. The choice of deployment mode does not impact the design structure or design processes of developing the model of the application itself. A key consideration is that there are deployment options that produce a Web application fully compliant with IBM's WebSphere strategy, while other deployment options produce applications that run on platforms not yet supported by WebSphere.

However, LANSA is not for every e-business or Web application and should not be confused with simple Web-design tools or legacy-level Web-application enablers to build a basic Internet presence. Nor is LANSA designed for heavy graphical requirements, though it is well suited for integration with other graphical Web tools such as Microsoft FrontPage. For informational Web applications that don't support business transactions, LANSA is overkill. LANSA should be used for supporting and developing mission-critical transactional business applications as they are moved into the Internet realm.

The breadth and depth of design make the LANSA suite an exceptional set of tools for the professional business application developer, creating applications for a broad spectrum of platforms. *LANSA for the Web* and *LANSA for the AS/400* are particularly important when considering corporate e-business development on the AS/400, while *Visual LANSA* supports cross-platform and Windows deployment. ◆

LANSA Product Set and Methodology

Overview of LANSA's Product Set

LANSA is an extremely powerful application development environment for business developers. It's not a single product but a comprehensive and integrated set of software services designed to streamline the application development process. LANSA can let you develop brand new applications from the ground up, while simultaneously extending and strengthening existing applications within your software portfolio.

Though most of our discussion will be focused on *LANSA for the Web*, *LANSA for the AS/400*, and *LANSA for the Web Commerce Edition*, you should be aware of the breadth of the full LANSA suite of products. These include the following:

- *LANSA for the Web*. A Web development tool for designing scalable AS/400 business transactions.
- *LANSA for the Web Commerce Edition.* A set of common components for business-to-business (B2B) and business-to-consumer (B2C) applications.
- *LANSA for the AS/400.* A complete AS/400 development environment for building competitive business applications.
- *Visual LANSA*. An easy-to-learn, component-based visual development environment for cross-platform applications.
- *LANSA Open for Windows and Java*. A set of middleware tools that provides direct access to the data and processes for third-party Windows and Java development tools like Visual Basic or VisualAge for Java.
- *LANSA / Client*. A basic set of end-user graphical query, reporting, and charting tools.

We'll briefly examine how each of these products can productively enhance the application development environment. But first, let's look at how LANSA can integrate development across so many tools.

The LANSA Object Repository

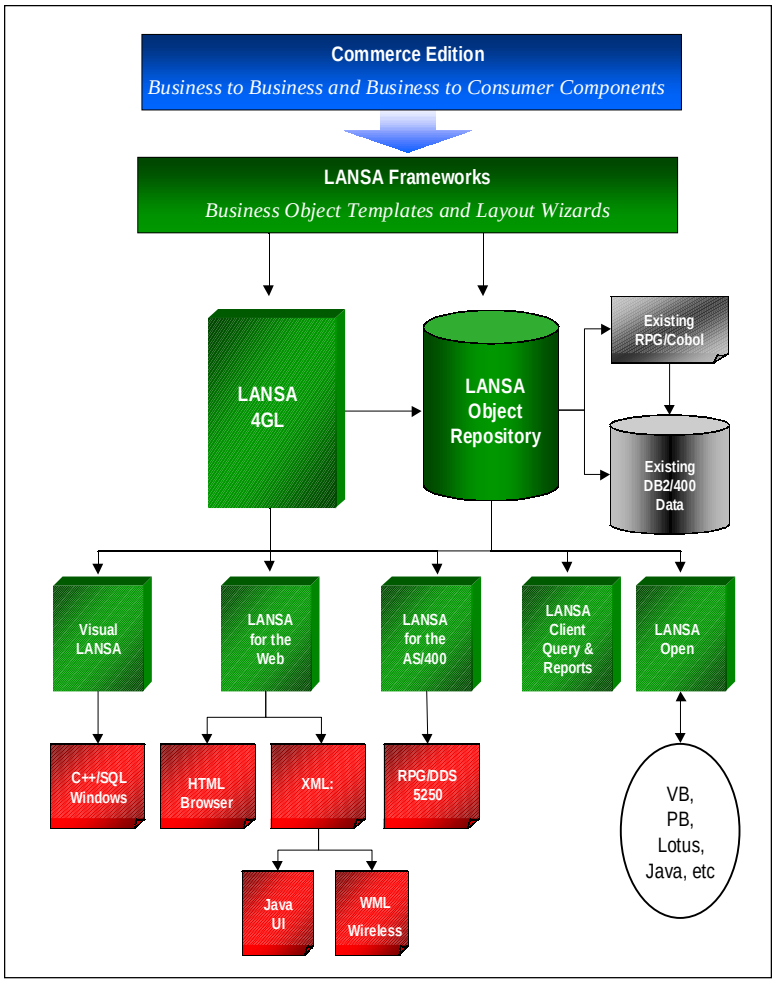
Three great challenges face application development:

- *Scalability.* As applications become increasingly complex, how do you maintain robustness, consistency, and functionality across hundreds or thousands of modules?
- *Transportability*. Applications today are often deployed across multiple server platforms. How can you coordinate, maintain, and transport deployed code if applications are written in different languages and spread to different server platforms?
- *Maintenance.* Business rules and computing technologies are changing faster than ever before. How can you rapidly adapt applications to meet changing needs without risk of breakage?

LANSA's answer to these challenges—and its greatest advantage—is the strategic, centralized architecture of its Object Repository.

As illustrated in Figure 1, the *Object Repository* is a software structure that holds the data definitions, data validation rules, help text, and error messages. As application development commences, the programmer interacts with the Object Repository through LANSA's fourth-generation language (4GL) called *Rapid Development and Maintenance Language* (RDML), completing templates, referencing business objects, and defining the application according to the repository's rules. Each completed application definition is stored within the Object Repository once—and only once. When the time arrives to finalize and test the logic of the application, the Object Repository

Figure 1: LANSA's Object Repository



generates the actual program code in the language required for the target platform (AS/400, Windows, Unix, etc.).

The Object Repository can fully define a new application from ground zero, or it can be populated with data definitions from previously created data, allowing the programmer to use LANSA products to enhance and strengthen previously built information systems. This might include data from J.D. Edwards & Company's ERP software, System Software Associates, Inc.'s BPCS, or any customer-designed database. LANSA has been optimized for DB2/400, but it also fully supports Oracle and Microsoft databases. Any database that supports ODBC calls can be accessed through the LANSA repository. In addition, the LANSA Object Repository can make program calls to existing RPG and COBOL business logic routines.

Some applications and transactions are fully defined within the repository, while others provide references to external processes or data. For example, if you were writing a retail sales application, you might want to fully define the process for putting items into your shopping cart. However, instead of fully defining the credit card processing and validation rules, you might want to purchase a payment server and just tell LANSA to pass the parameters and rules to the external system for processing. Application programming interfaces (APIs) from an off-the-shelf application, such as the J.D. Edwards financial suite, can also be called from transactions defined in the Object Repository.

LANSA's predefined templates interact with the Object Repository to let you quickly define the rules for standard operations such as adding, modifying, or deleting records. The templates are also simple to utilize. The language used to define the transactions for the Object Repository, Rapid Development and Maintenance Language (RDML), has the look and feel of the AS/400 CL language; so it is very easy for an AS/400 RPG or COBOL programmer to become comfortable with it. By centralizing the definitions and rules in the intermediate language of the Object Repository, an application can be regenerated in its entirety and—if necessary—distributed across the deployment platforms.

Now that we have outlined how LANSA integrates applications through the Object Repository, we will give you a closer look at the various LANSA products.

LANSA for the Web

LANSA for the Web is a development tool that allows you to easily create Web-based access to AS/400. The development process is template driven: you fill in the business details of what your Web application needs to do, and LANSA for the Web generates the actual code. This template-driven approach is highly efficient because the LANSA tool generates the actual application, allowing the deployment details to be decided later.

LANSA for the Web supports several options for the creation of front-end code—options that don't have to be selected until the application is generated. It can generate output in several formats:

- *HTML*. You can provide a pure graphical HTML front end, which can be successfully delivered to virtually any browser.[2]
- *Java Client*. You can use the Java Client for the front end, which offers more function and flexibility but requires a browser with a Java Virtual Machine (JVM) at the proper level of support. As in the first option, you can merge tailored objects with the generated ones to create the desired look and feel for the application.
- *XML*. You can generate XML for the front end. Typically, this code isn't delivered through a browser at all; it is passed to another application on a remote system for processing. This is useful for many business-to-business applications and supports automation in place of human interactions.[3]
- *WML*. WML is a specialized form of XML designed to support wireless devices such as mobile phones and palmtops. Many of these devices now include miniature screens and keyboards, allowing them to interface with remote applications.

There are options for generating the back-end code as well:

- *CGI*. The CGI script is particularly useful for older AS/400s that haven't implemented the Java Virtual Machine (JVM).
- *Java servlets*. Java servlets utilize the AS/400's Java Virtual Machine to respond to browser-to-AS/400 communications. Of course, the highest performance for Java servlets will be achieved on the newest models of the AS/400 that support OS/400 V4R5.

LANSA Layout Wizard

The *LANSA Layout Wizard* comes with LANSA for the Web. It's a tool that gives you more control over the standard HTML generated by LANSA for the Web. It provides you with instant graphical capability that can be tuned to the look and feel you want for your Web site. The Layout Wizard lets you choose from over 300,000 combinations of colors and graphics. You might still want to hire a professional Web designer for your home page, but in many cases the rest of the site can be completely generated by LANSA with an appropriate matching look and feel. This can save you time and money: instead of hiring a professional Web designer for the full site, in many cases you can simply hire the professional for cosmetic alterations.

How LANSA for the Web Enhances Programmer Productivity

LANSA for the Web delivers business transactions in a reliable and scalable form. The most complicated part of building Web applications is identifying users,

[2] The LANSA-generated HTML is functional and usable. However, the application may also need to be artistically appealing. Typically, a professional Web graphics designer will be hired to design competitive Web pages that convey the desired impressions for your application. By providing the Web designer with a list of data tags to be used for input and output data, it becomes a relatively simple matter to merge the generated HTML with the designed look and feel at the end of the development process. Often, it is desirable to provide a fresh look and feel for the application every couple of months so Web surfers don't become bored with a site. It would be very inefficient to completely recode the application this frequently; it is much more practical to redo the final HTML merge process each time the Web designer provides a new look and feel.

[3] When you store data definitions in the LANSA repository, you can define the XML tags that identify that data. This facilitates the generation of industry-specific or standard XML.

managing state (including handling timeouts, security, and commitment control), doing data conversions, and integrating the Web site with specific Web servers and existing AS/400 applications. Much of this is done automatically by LANSA for the Web so that the application developer doesn't have to be concerned with it.

LANSA for the Web's ability to generate both CGI and Java servlets, supporting deployment to other servers, is particularly useful. Organizations often want to position a Web server in front of a corporate firewall or outsource the management of the Web server to an Internet service provider (ISP) while leaving the mission-critical business processes and data on an AS/400, safely hidden behind the firewall. LANSA for the Web allows you to deploy the application to whatever combination of servers is most appropriate, without touching the source code.

This is how the inherent flexibility of LANSA for the Web enables you to maintain one centralized definition of the Web application in the Object Repository that can be implemented across an entire array of server platforms. There's no need to have one AS/400 version and a separate NT version, with a separate group of application developers maintaining each. Even customers who deploy applications on a single platform discover that maintenance is much more economical with LANSA because each business rule is defined once in the Object Repository.

LANSA for the Web Commerce Edition

LANSA for the Web Commerce Edition is a suite of business-to-business (B2B) and business-to-consumer (B2C) components that utilize LANSA for the Web tools. LANSA for the Web Commerce Edition generates application components into LANSA's Object Repository and fourth-generation language. This means that the B2B and B2C components generated by the Commerce Edition are then easily customizable using LANSA for the Web.

The components provide a core set of business rules and definitions that are relatively common across multiple Web sites. LANSA for the Web Commerce Edition lets you modify them through a set of simple questions and answers to fit your specific application needs. Customers can rapidly generate e-business applications that extend existing AS/400 RPG and COBOL applications. The components include customer relationship management, merchandising, and administration functions.

How do they work? Let's take an example. Virtually every commerce application written for the AS/400 needs a payment interface for collecting a credit card number, validating it, choosing a form of shipment, and handling the whole host of tasks that are involved in an e-commerce transaction. Instead of defining this in every LANSA project, a single object can be created that completes all the necessary steps. Additionally, the same question-and-answer process developed through LANSA for the Web Commerce Edition could fill in information about your existing data and programs. For instance, if you already have an order fulfillment program, you could link a prebuilt object template with the existing data and program parameters. By using LANSA for the Web Commerce Edition, it's not unusual to shorten the development process by as much as 85 percent.

LANSA for the AS/400

LANSA for the AS/400 provides a complete AS/400 development environment for building competitive AS/400 business applications. It interacts with the same Object Repository that is utilized in LANSA for the Web. In addition, it supplies programmable templates, a screen and report painter, and change management tools.

Organizations can achieve some impressive productivity benefits using LANSA for the AS/400. For instance, instead of replicating common logic throughout a series of separate programs, LANSA for the AS/400

centralizes the logic in the Object Repository and shares it among modules. This sharing makes development much faster than with RPG. The LANSA environment also delivers many of the benefits touted by object-oriented projects without forcing you to retrain RPG or COBOL programmers or hire trained object-oriented developers. Its design brings you the benefits of modular programming without the overhead.

LANSA for the AS/400 generates RPG code, which in turn compiles on the AS/400 to provide optimal performance. However, there is no need for developers to deal with the actual generated code. In fact, because the RPG is not used to define the LANSA rules—and AS/400 optimization is all done on the generated code itself—a LANSA-built application can be easily ported to other platforms if it ever becomes necessary or desirable. Once the LANSA Object Repository is moved to the new platform, all you need to do is regenerate the application, all without touching the source code.

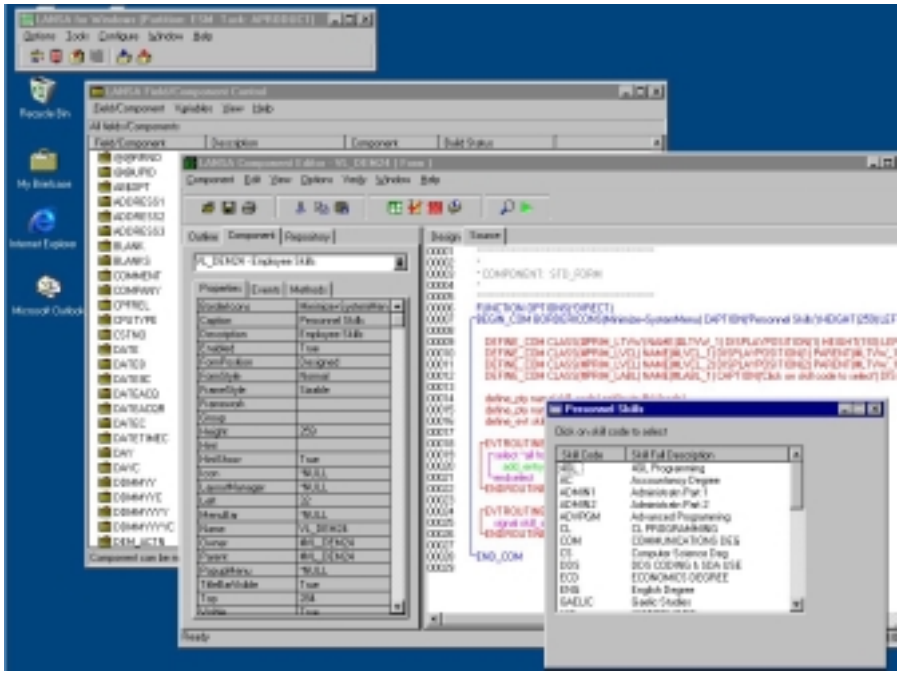
There are other productivity tools included in LANSA for AS/400. One of the most useful is the *Data Modeler*. The Data Modeler helps you rapidly define new databases with full referential integrity, as well as imports and adjusts the definitions of your existing databases. It can also generate any necessary data migration tools for release-to-release compatibility. Programmable templates are provided for many standard applications, making it easy to rapidly build a complete application set. Used in conjunction with LANSA for the Web, LANSA for the AS/400 lets you quickly deliver both the batch parts of your application suite and competitive interactive, Web-based components.

Visual LANSA

Visual LANSA is a component-based visual development environment that is very easy to learn. It is built on top of the same Object Repository as the other LANSA products, but it allows the developer to build a cross-platform C++ client front end with a very competitive look and feel.

Our experience has shown that developers can become productive graphical designers much more quickly using Visual LANSA than with other visual development products such as VisualAge C++ or VisualAge for Java. This is, again, because LANSA fully leverages the power of the central Object Repository in this tool. As is the case with the other LANSA products we've examined, a wide number of deployment options are available, options that don't impact the LANSA source code. Client software can be deployed on any server that supports C++, including both Linux and every Windows release from Windows 3.1 to Windows 2000. Visual LANSA can also generate back-end C++/SQL code for NT,

Figure 2: Visual LANSA on a developer's desktop



HP-UX, and RS/6000, providing an important advantage to ISVs and large AS/400 shops that support mixed operating environments.

The key enhancement provided by Visual LANSA is full support for the event-driven paradigm that is so essential to well behaved Windows applications. LANSA's RDML gives you a full set of event constructs. Additionally, it is easy to integrate LANSA applications with Microsoft applications such as Microsoft Word. Finally, the Visual LANSA development environment can even be used to build, test, and deploy green-screen AS/400 applications. This functionality lets developers enhance the productivity of terminal-based users by enabling some of the functionality of a well-designed Windows workstation without requiring the user to have a PC.

LANSA Open for Windows and Java

LANSA Open for Windows and Java is a set of middleware tools that provides direct access to data and processes in the Object Repository from almost any development environment. This includes Java, Visual Basic, PowerBuilder, Delphi, or Lotus Notes/Domino. The middleware is fast and efficient. It provides full application portability while leveraging business rules, such as database triggers and stored procedures, on the server. Using LANSA Open as your link between the business data on the AS/400 and new application environments, such as Domino, will let you rapidly create new applications without fear of compromising your business and database integrity.

LANSA/Client

LANSA/Client provides a base set of end-user graphical query, reporting, and charting tools. LANSA Open links the LANSA/Client into the server to utilize the definitions provided in the Object Repository. This technique gives your users a direct and powerful data analysis capability without creating the sort of security exposures other tools bring with them. Additionally, LANSA/Client lets you generate reports in HTML that can be published and integrated directly into your Web site. ◆

LANSA Key Advantages Help Your Development Methodology

All LANSA products support the full application development process. The combination of the RDML language and the Object Repository support rapid prototyping and simple, platform-independent program maintenance. An interactive 4GL debugger is provided, as well as tools to support impact analysis. Standards at both the database level (SQL) and the user interface level—via Common User Access (CUA)—are automatically adhered to. Because of the Object Repository, it is very rare to find duplicated rules or object definitions. A basic set of project management and change control tools is also provided. And last, but certainly not least, documentation is generated that matches the generated applications. For larger development projects where more sophisticated project or change management tools are warranted, you can choose from any of the popular management tool suites, including those from Mortice Kern Systems (MKS) Inc., Aldon Computer Group, SoftLanding Systems, Inc., and Industrial Strength Software, Inc., which all fully support LANSA objects.

LANSA Implementation Time Frames

The time it takes to implement a project using LANSA tools will, of course, vary depending on the developers level of experience and the complexity of the project. In general, an experienced LANSA developer can develop and deploy a new business application about twice as quickly with LANSA products compared to a similar effort with traditional green-screen-based RPG or COBOL tools. The LANSA-based application will have a side advantage of being Web enabled with no additional effort, while the RPG or COBOL application will require follow-on integration with a separate tool set that may double the development costs.

Training on the full LANSA product set and methodology can take up to six weeks. Additionally, a novice LANSA developer will need up to three months of practice—ideally with a mentor available—to become fully productive. Nevertheless, this is significantly shorter than the time that is required to train and prepare a developer in most other generic development environments. Second, many projects don't require the developer to use the full LANSA product suite. For instance, if the goal is to build Web-based applications to supplement an existing application portfolio, with the existing transactions, that same developer would only need two weeks of training and another two weeks of practice. Some of the Web sites we studied (listed in Appendix B) were actually developed and fully delivered in an elapsed time of less than two months.

Your real LANSA productivity gains are realized when you need to leverage new technology. For instance, customers who had already developed LANSA for the Web applications are now finding they can implement and support Web interfaces on palmtop devices with almost ***no*** new development at all. With the latest LANSA release, all they need to do is regenerate their applications with different options. ◆

Comparing and Contrasting E-Business Development Tools

One important consideration when using any application development suite is how the suite of tools will interact with the development strategies of the server vendor. Companies have to be particularly mindful of the server vendor in this era of e-business deployment when IBM has embarked on numerous strategic and sometimes conflicting initiatives. By looking at how LANSA products can interact with IBM's key strategies, developers can better determine the most logical and efficient use of all the resources that are currently available to them.

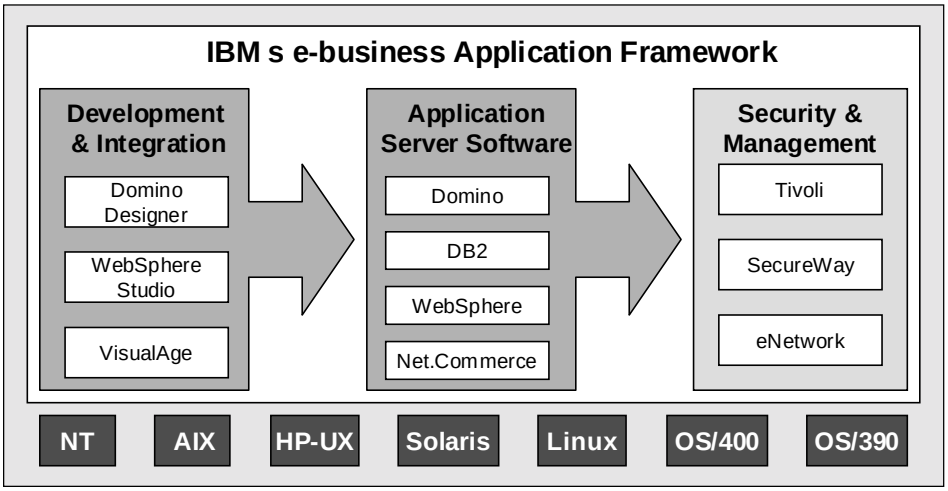
Overview of IBM's E-Business Strategy

IBM has constructed a family of e-business application frameworks for developing and deploying Web applications. The overall architecture is shown in Figure 3.

The main tools that IBM recommends for developing new applications are Domino Designer, WebSphere Studio, and VisualAge for Java. Sometimes, VisualAge Generator is recommended. IBM suggests that the server-side of the applications should be developed by either leveraging the Java business objects developed at the IBM SanFrancisco Project or by creating Enterprise JavaBeans (EJBs) that can be plugged into the IBM WebSphere suite. IBM also supports middleware products such as MQSeries that can be used to link legacy applications to WebSphere Host On-Demand and SecureWay Host Publisher.

For many AS/400 developers, IBM's comprehensive development strategy is fraught with challenges. Central among these challenges is the need to become proficient in Java. An RPG or COBOL programmer might typically require between six months and two years of retraining and experience to become a proficient object-oriented Java programmer. Even if a company is willing and able to pay for such training and experience, it may not have the luxury of waiting that long to implement its e-business strategy. Meanwhile, there are very few Java programmers available in the job market who have the critical server-side programming skills needed to develop viable e-business applications. Combine these basic Java skill requirements with the additional personnel skills needed to ensure Web security, and the scope of the e-business development dilemma becomes clear: IBM's development strategy—though robust—is a difficult and expensive path for most IT departments.

Figure 3: IBM's e-business architecture



Relationships Between LANSA and the IBM E-Business Strategy

Fortunately, you can quickly build applications that support IBM's e-Business Frameworks by using the LANSA product suite. For example, LANSA for the Web supports Java servlets plugged into either WebSphere or Microsoft IIS as one of the server generation options, and LANSA fully supports and exploits IBM's UDB DB2 for the AS/400 in its product line.

In fact, the use of LANSA actually complements IBM's development strategies while speeding the development process. Instead of pouring years of training into personnel just to move your organization within reach of IBM's strategies, you can start your e-business development sooner with LANSA while your staff gains the overall skills necessary to meet IBM's robust development goals. Or, relying upon LANSA's continued product evolution, you can continue to dovetail LANSA's highly efficient development tools into IBM's own evolving strategies. Whichever path you take, your organization ends up with more options and a greater likelihood that it will be able to meet the demanding requirements of e-business development.

How does this LANSA strategy compare to IBM's? Let's look at two parallel project plans that pinpoint the savings and speed-to-deployment that LANSA provides.

Parallel Project Plans: Comparing and Contrasting IBM's Tools with LANSA

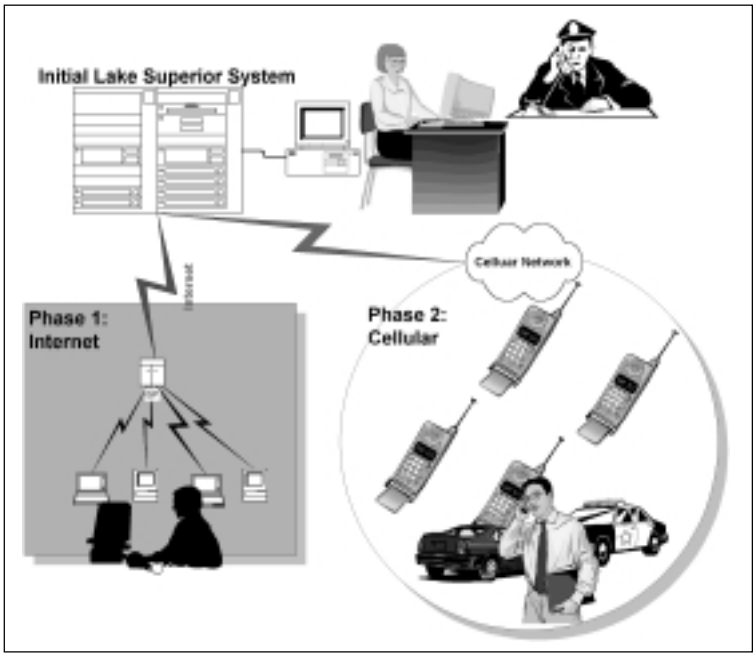
Let's consider a sample project plan. The government for the City of Lake Superior has a small AS/400 that they have been using to run their tax and utility application suite. They also have a payroll application for all of the city employees. Two RPG programmers currently maintain the entire application suite as well as support the AS/400 server itself.

Now let's imagine that the local police department issues about 30 parking tickets and speeding tickets per day. Today, they only have a green-screen application for entering data and tracking tickets, accessible solely by the city clerk.

However, the police chief wants a Web application built so that the guilty drivers can actually pay their fines online with their credit cards. He wants this application set up so that both he and his deputies can use Web browsers, both at the police station and at their homes, to enter new tickets and check on the fines that have been paid. Meanwhile, the city clerk needs to be able to enter any fines received in person or by mail. Drivers who feel they were ticketed unfairly can also choose to contest their fines online. When they do this, information is forwarded to both the police chief and the local judge.

But that's not all. As a second phase of the project, the police chief also needs to enable the mobile phones that he's providing to each of his deputies. He wants his deputies to be able to inquire through the phones to find out if a traffic offender has any unpaid fines or contested tickets when a new ticket is being written.

Figure 4: Phases of the City of Lake Superior proposal



The City of Lake Superior has budgeted enough money to hire one outside consultant to write Phase 1 of the project. In addition, the city has also budgeted money for the training of one of the RPG programmers so that he can do ongoing maintenance of Phase 1 and complete Phase 2 of the project.

The consultant has provided two proposals. Proposal A will use IBM's suggested e-Business Framework tools strategy. Proposal B will alternately use LANSA's tools strategy. Both proposals will have the same application functionality with a set of new HTML pages, some of which will be used for data entry and some for inquiry. Two levels of user identification will be supported in the new system. City employees will continue to use their previously assigned AS/400 user profiles and passwords. The first time that a driver enters the system, he will initially identify himself by providing his driver's license number and a ticket number; at that point he can create a personal user profile in the system with a personal ID and password. The next time he enters the system, his profile will be found in the system and will be tied to an AS/400 user profile named DRIVER that has access to just the public portions of the new application. In both Proposals A and B, the consultant proposes to put the entire Web application on a new model 170 AS/400e series for the city, using WebSphere and the AS/400 Payment Server product. However, in Proposal A, the consultant will use VisualAge Java, WebSphere Studio, and the AS/400 Toolbox for Java to build the application. In Proposal B, the consultant will use LANSA for the Web and LANSA for the AS/400.

Building Phase 1

In order to deliver Phase 1, there are a number of activities that must take place (regardless of the tool used), both before programming starts and after the application is delivered for testing.

The following general activities would be a core part of the estimate:

- Develop a project scope and work with the City of Lake Superior's representatives to clearly define the requirements and map out the required user interface. Also work with the city's IT group to outline integration points and roles and responsibilities on the project.
- Complete data modeling activities for the new file requirements.
- Create a mockup of the page layouts using a Web-design package.
- Gain sign-off and agreement from the City of Lake Superior to move forward with the scope, project plan, and site map/user interface.
- In both proposals, the consultant recommends that the RPG programmer, who will be taking over the maintenance and building of Phase 2, should take the recommended training and then work with the consultant throughout the project. The consultant will be kept on a retainer for Phase 2 to provide assistance as needed.
- Set up the hardware, the Internet access using TCP/IP, and the WebSphere server.
- Set up development and test environments (note that these configurations will be different, depending on which proposal is selected). In both proposals, the consultant recommends that the city purchase and maintain a separate PC for ongoing maintenance of this project. With Proposal A, the PC will be set up with both WebSphere Studio and the Enterprise Edition of VisualAge Java. With Proposal B, the PC will be set up with LANSA for the Web and the development components of LANSA for the AS/400.
- Conduct a security review to make sure the city's business assets on the AS/400 will be adequately protected. Select, configure, and install any recommended firewall hardware and software.
- Integrate with the existing application where reuse of core logic makes sense (e.g., calculation of fines, penalties, history checks, etc.). In both proposals, APIs will need to be created by the city's RPG programmers to integrate the existing application.
- Set up the AS/400 Payment Server for credit card processing as well as the communications and arrangements with the bank and clearing house.
- Complete system testing and user acceptance testing.
- Implement and roll out.

The following are specific activities under Proposal A:

- Integrate the new system with the existing application. Using the AS/400 Toolbox for Java, the consultant will create Java interfaces for each of the new RPG entry points so that they can be called from Java.
- Integrate the new system with the credit card processing software. The consultant will write Java servlets that interface with the AS/400 Payment Server and collect information from the Web pages.
- Deploy and test the new system.

The following specific activities will need to be performed under Proposal B:

- Set up the database and Object Repository. Load the existing database into LANSA Object Repository and set up any new database files required.
- Integrate the new system with the existing application. The consultant will enter definitions for the new RPG entry points into the LANSA Object Repository so that they can be accessed through LANSA.
- Integrate the new system with the credit card processing software. Credit card processing routines, including access to the AS/400 Payment Server, will be pulled from the new LANSA framework.

In order to prepare the City of Lake Superior programmer to both maintain the LANSA-delivered application from Phase 1 and to develop the Phase 2 requirements, training should be taken by the RPG developer.

Table 1 below shows the tools used in each proposal, as well as the required training.

Building Phase 2

The functionality for the Phase 2 requirements is very simple. This may already be one of the inquiry applications delivered in Phase 1 or an extension of two more inquiry pages, which could be done in a matter of days. The main complexity with Phase 2 is not the programming but the setting up of the infrastructure to support the new wireless interface. In addition, the user interface will need to be trimmed down for delivery in a wireless device because the wireless screen is much smaller and harder to type into.

The following general activities would be a core part of the estimate for Phase 2:

- Identify mobile phones that support WML (Wireless Markup Language) and that work throughout the City of Lake Superior region.
- Mock up and test page layouts for the phone displays to correspond to a subset of the Web pages used in Phase 2. A Web designer using FrontPage and graphics packages will suffice.
- Set up hardware for testing the new phones.

Under Proposal A, the RPG programmer will write a new set of Java programs to support the new mobile phone application. Under proposal B, the RPG programmer will configure LANSA for the Web to generate WML for the appropriate parts of the application.

Table 1: Tools and training for the proposals

	Proposal A: Using IBM's e-Business Frameworks Strategy	**Proposal B: Using LANSA's Strategy**
Development tools used	• WebSphere Studio • VisualAge Java • AS/400 Toolbox for Java	• LANSA for the AS/400 • LANSA for the Web
Training	• Thinking in Terms of Objects: An Introduction to Object Technology (2.5 days) • Object-Oriented Programming Using VisualAge for Java (4.5 days) • How to Use Java in the AS/400 Environment (4 days) • WebSphere on the AS/400 Workshop (4.5 days) • Advanced Java Programming (4.5 days)	• LANSA Fundamental Workshop (5 days) • LANSA for the Web Workshop (4 days)

Table 2: Schedule estimates for the proposals

		Proposal A: Using IBM's e-Business Frameworks Strategy		Proposal B: Using LANSA's Strategy	
Phase 0	Classroom training		20 Rdays		9 Rdays
	Study and exercises		100 Rdays		20 Rdays
	Training time		120 Rdays		29 Rdays
Phase 1	Prototype development	25 Cdays	12 Rdays	7 Cdays	3 Rdays
	Code development	60 Cdays	30 Rdays	45 Cdays	22 Rdays
	Testing	5 Cdays	10 Rdays	5 Cdays	10 Rdays
	Time for Phase 1	90 Cdays	52 Rdays	57 Cdays	35 Rdays
Phase 2	Prototype development	2 Cdays	5 Rdays	1 Cday	3 Rdays
	Code development	4 Cdays	10 Rdays	2 Cdays	5 Rdays
	Time for Phase 2	6 Cdays	15 Rdays	3 Cdays	8 Rdays
Totals	Total training time		120 Rdays		29 Rdays
	Total development time	96 Cdays	67 Rdays	60 Cdays	43 Rdays
	Total time	96 Cdays	187 Rdays	60 Cdays	72 Rdays

Note: These estimates are based upon Andrews Consulting Group experience with both the IBM development processes and with our experience with LANSA development processes. They are reinforced by the accumulated testimonials of companies who have chosen the LANSA tools strategy. Appendix A includes a checklist of considerations before investing in any application development toolset.

After spending two weeks scoping the proposals and laying out plans and schedules for both alternatives, the consultant came up with estimates for the two proposals. Each estimate includes Cdays (days spent by the consultant) and Rdays (days spent by the city's RPG developer).

LANSA Delivered Results Faster

Clearly, Proposal B—the LANSA proposal—provides a more time-sensitive and cost-effective alternative to Proposal A. This is because the LANSA developer can leverage the efficiencies of the LANSA Object Repository: while the code built with WebSphere Studio and VisualAge for Java might be slightly more compact than the code generated by LANSA, the actual number of statements the developer has to deal with is far less. This is especially true in the areas where the new application has to be integrated with the existing application. While the work involved in adding APIs to the existing RPG application is the same in both proposals, the amount of code written to access those APIs is substantially less with LANSA because the LANSA developer doesn't need to deal with parameter setup and conversion. Additional savings are gained because the LANSA developer starts with predefined services and business object templates. In fact, even if the City of Lake Superior had to add two months of training for the consultant himself, the LANSA-equipped proposal would be the more affordable alternative. The City of Lake Superior could realize a substantial savings in development man-hours and training while simultaneously adhering to IBM's strategic e-business strategies and delivering a highly cost-effective and functionally robust solution. Secondly, as Phase 2 of the police chief's proposal is implemented, the LANSA solution provides an extension to the technology of mobile phones without requiring new code to be created. Last, long-term benefits will be achieved because ongoing maintenance will be much easier. ◆

Final Thoughts

In the race to become Web enabled, those companies that have paid attention to the following criteria have tended to be the most successful:

- *Speed of e-business deployment*. In the case of the new digital economy, the early bird gets the worm. Those companies that have been the quickest to deploy their applications on the Web, in a manner that is both intuitive and user friendly, have benefited most significantly.

  The LANSA product set enables very rapid deployment, especially when the need arises to link an existing LANSA application into newer technologies such as a mobile phone. If the application had been developed with VisualAge for Java and WebSphere and other assorted development products, you would have to redevelop complete portions of the application to support new technologies. With LANSA, you can regenerate as soon as you receive an updated development environment.

- *Cost effectiveness of deployment*. While speed of deployment is important, companies do not and should not have to spend a great deal of resources Web-enabling their applications. For example, rewriting existing applications from scratch or trying to change back-end applications often results in errors, lost time, and great cost with little gain. Additionally, a requirement for developing and maintaining portions of the application on users' workstations can create huge management headaches. Companies are learning that host-based solutions are more manageable and economical than distributed solutions. Here again, the LANSA product set offers a substantial advantage, primarily because of the centralized Object Repository.

- *Attention to refitting applications for e-business*. Web-enabling business applications can often create confusion for customers who should not have to navigate through the same screens that company employees do. For example, order entry applications should be reengineered for Web deployment. They should be redesigned for simplicity and ease of use for the potential customer. LANSA for the Web excels at letting the Web designer focus on ease of use and competitive design with full access to existing transactions.

- *Manner of application delivery to the Web.* The method of delivering applications—whether via intranet, extranet, or the Internet—needs to be both fast and economical. Because LANSA for the Web lets you select your delivery method through a switch at application-generation time, it provides the ultimate level of flexibility. LANSA designers aren't allowed to build delivery dependencies into the rules repository; so, as new technologies develop, they can be leveraged very rapidly without any source changes.

- *Server security, reliability, and availability*. Whether providing extranet access for business and supply chain partners or allowing customers to conduct business over the Internet, it is essential that the server hosting the applications be available on a 24x7 basis and that transactions can be conducted securely and privately. Otherwise, customers will go elsewhere, and credibility with trading partners could be compromised. LANSA for the Web is directly linked into the Object Repository so that data integrity is never exposed and full security can be maintained. The combination of LANSA and the AS/400e platform provides a truly secure system.

- *Integration between the core business and Web applications*. The level of integration between Web applications and core business applications is often the barometer of successful Web projects. Without the right links, online customers can be promised parts that aren't in stock, suppliers can get the wrong orders, deliveries can accidentally be delayed, and duplicate work can inadvertently be generated. Even with the full LANSA product suite, most businesses don't have enough time or resource to redesign their entire application portfolio. The beauty of the LANSA tools is that you can create active links in the Object Repository to all of the legacy applications and data, thus ensuring that all of the right links are indeed in place to guarantee full business integrity. ◆

Appendix A: Checklist for Development Tool Shopping

Before you invest in a new application development tool, you should seriously examine the profile of the tool vendor and consider the following elements. While the consideration of these elements won't guarantee you are making a good investment, they will provide you with a good indication of the long-term viability of both the products and the vendors who are marketing them.

Vendor Prospectus

Look at the recent financial history of the tool vendor. Check the annual statement, and find out if the company is likely to be part of an acquisition, merger, or spin-off. Determine whether the tool is part of the company's main business or just a sideline. Also, check the overall reputation of the company. Some good clues can be found by looking at the company's Web site.

Vendor Tool Development Investments

Look at the recent history of the tool, including how often new releases are delivered. Check to see whether the company makes it easy for customers to request enhancements or discuss usage problems. When new releases of related products are delivered, how rapidly does the company step up to support them? (For example, if the tool generates Java, what levels of the Java specifications are supported? If the development environment runs on Windows, is Windows 2000 supported?) How important does release-to-release compatibility seem to the company? Does it provide good migration aids for new releases, and how rapidly does it force customers to upgrade clients and servers?

Tool Upgrade and Enhancement Strategies

Examine the vendor's announced future strategies for the development tool. Does the vendor have such a strategy? Especially ask about technologies that might be important to your company in the coming years. For example, if your company is supporting Web delivery, what are the vendors' plans for supporting palmtop devices, mobile phones, and other new wireless technologies? And if the AS/400 at some point in the future is no longer price/competitive, does the vendor of the tool have a strategy that will support alternate servers in a manner that will let you leverage your proposed investment in the tool?

Purchase Terms and Conditions

Obviously, it's important to get an estimate for how much the tool costs. However, also make certain you know about the cost of both development support and runtime support. Make certain you ask about the hardware and operating systems prerequisites to productively use the tool. (Not just the minimum requirements, but the *realistic* requirements.) Find out if the vendor supports a trial or prototyping period for the tool.

Ongoing Service Availability

Examine the terms and conditions associated with upgrading the tool. Find out how service is delivered for the product, and how problems are reported. Does the vendor guarantee a response time for reported problems?

Customer Satisfaction: Tool Track Record

Check to see if there is an active user's group for the tool. Are there Internet chat boards, message lists, or forums dedicated to the tool? Contact some of the users in these forums and talk with them about their experiences with the tool. Ask if there are user conferences sponsored by the vendor, and learn if prospective customers are invited to attend.

Ask the vendor to provide references for you to contact in companies that are similar to your company. Ask the vendor to focus on providing references in the same industry, with similar personnel skill levels or in development environments similar to yours. Note if these references represent a large and active user community. By identifying the size of the user support community up front, you'll be able to network with other professionals who are actively using the tool. Then, even should the vendor run into long-term support problems, the size of the user community will encourage other vendors to develop an appropriate migration path to their products.

Skills, Training, and Evaluation

Find out how much training is needed to effectively use the tool. Examine those training requirements and any associated training schedule in light of the skills within your current staff. Where is that training? In what forms is it made available? How often is it made available? Find out if your current staff has any prejudices or preferences associated with the proposed tool. Ask consultants and other IT professionals whom you trust to look at the tool. Get opinions based upon their real, hands-on experience. If your company is contemplating a complete migration of applications to a new tool or methodology, consider obtaining a professional evaluation from a qualified third party that knows both your development environment and the proposed development environment. ◆

Appendix B: LANSA Customer References

LANSA's Business-to-Business Success Stories

The following customers have used LANSA to successfully create business-to-business (B2B) sites:

A. Sturm & Sons
A. Sturm & Sons is a manufacturer of oatmeal, hot chocolate, and other dry goods products. It sells products through a series of brokers, and the new extranet site allows the brokers to view account status, AR information, order status, and well as place orders over the web. The Web site was integrated directly with their legacy RPG applications to provide real-time information and transactions.

Coastline Distribution
www.coastlinedistribution.com
Coastline Distribution has combined LANSA and Domino for this extranet application. Coastline is a wholesale distributor of air conditioning and heating equipment, supplies and accessories. Its site allows distributors to look up account status, product availability, and pricing information, as well as getting quotes and entering orders. Domino is used to manage the content of the site while LANSA handles the database transactions and integration with their legacy RPG applications. Coastline bought a new model 170 as the Web server for this application—and the site was built in about a month.

Crown Worldwide Moving and Storage
www.crownwms.com
Crown Worldwide Moving and Storage has deployed a B2B Shipment Tracking Extranet on AS/400 that allows any of it's customers—many of whom are Fortune 100 companies—to track online status, location, and planned delivery information for shipments. This application was built in a single month by IBM business partner IBS using LANSA for the Web.

Daihatsu Holland
http://www.daihatsu.nl/
Daihatsu Holland, a branch office of the well known Japanese car manufacturer, has an extranet application for their car dealers. Via this network it is possible to order spare parts and cars and to query price information, availability, delivery dates, an order's progress, account information, and much more. In a second stage the e-business application will be extended to include the processing of warranties.

Fortis Assurances
Fortis Assurances is France's leading life insurance company with 260,000 customers and 45 branch offices in France. Its head office is in Paris. Fortis employs 200 administrative staff, 450 sales staff, and has 50 agents. Fortis has used LANSA and AS/400 with an intranet to replace cumbersome paper-based communications between its branch offices.

Gasa Odense
GASA Odense, a leading fruit and vegetable sales cooperative in Denmark, sets the pace for the Danish market with 40 to 50 percent of all sales. In only a few weeks, GASA Odense used LANSA for the Web to build an AS/400 B2B solution that gives earlier and better information to growers and resellers. This enables better decision-making and higher revenues from the sales of produce. With this B2B site, Gasa Odense is not only improving customer service, it is also increasing revenue.

Global Crossing
This world-leading telecommunications company is using Infinium's e.ssential product—a LANSA and

AS/400 application from business partner Rippe & Kingston—to automate procurement processes. This browser-based application allows employees to submit requisitions, track the status, and keep the requestor posted all the way through the generation of the purchase order and fulfillment process from anywhere in the world. The system is integrated with Global Crossing's Infinium ERP application and saves the company money by replacing a manual process to eliminate steps in filing, requisition processing, and correspondence.

John Wiley & Sons
John Wiley & Sons is one of the world's top three publishers for scientific, technical, and medical publications. Wiley has extended its core applications with LANSA and IBM's WebSphere to provide Web-based order entry and inquiry directly to its customers. In a staged implementation, thousands of bookstores around the world will be able to access Wiley's regional AS/400s to place and trace orders and access electronically published contents. Wiley sees improved customer service and cost savings as its key business benefits of deploying their B2B application.

KTM Sportmotocycles
KTM Sportmotorcycle is a growing motorcycle company that specializes in dirt bikes. KTM implemented an AS/400 LANSA-based Internet Dealer Communication System (DCS) from IBM and LANSA partner Strategic Business Systems. The systems allows 260 plus dealers in the US to place orders for motorcycle parts and to search for part pricing and inventory information online. SBS has now used LANSA for the Web to replace a Windows-based system to allow KTM dealers to order parts directly over the Web. This application has allowed KTM to reduce the number of calls to their customer service department by over 30 percent. Meanwhile the dealers are happier because they can now look up and order parts after hours.

Trek Bicycles
The $350 million supplier of bikes and biking equipment has launched a dealer extranet called Dexter that allows 500 Trek dealers to order bikes and parts, check inventory and shipment status, and review invoices while providing many other customer service functions. The acceptance of Dexter by the dealers has been excellent. Trek is experiencing improved customer service and increased orders.

Westwood One
Westwood One provides over 150 news, sports, music, talk, and entertainment programs to the more than 7,500 radio and TV stations. It has used LANSA for the Web to create a B2B extranet that allows the stations to submit reports that identify which commercials were aired. The system replaces an expensive and cumbersome paper-based system. Westwood One is saving significant costs by deploying this LANSA and AS/400 B2B application.

LANSA's Business-to-Consumer Success Stories

The following are a few business-to-consumer Internet sites powered by LANSA:

AS/400 Magazine
www.the400resource.com
This original AS/400 Magazine Web site was developed by LANSA Inc. using a combination of LANSA for the Web, the leading AS/400 transactional Web development tool and Lotus Domino, the world's leading groupware software. The site runs exclusively on AS/400e. The site provides daily news updates, chat rooms, and allows one to order a magazine subscription over the net with a secure encrypted credit card transaction. A new site from CE Communications (www.the400resource.com) now provides AS/400 information and education, and features content produced by AS/400 Magazine.

Chown Hardware
www.chown.com
Chown Hardware is the largest family-owned distributor of quality door hardware and plumbing fixtures in

the USA. Chown used LANSA for the Web to develop an online product catalog.

Common
www.common.org
Common is the AS/400 North American User Group that meets on a semiannual basis. The organizers have created a Web site to not only better communicate with its members and promote user group activities, but one can also maintain/renew user group memberships, and register for the conferences online, again with a secure encrypted credit card transaction.

Fotbal
www.fotbal.com
Slavia Data, an IBM Business Partner and the LANSA distributor in the Czech Republic has used LANSA for the Web to rebuild an existing NT web site for the Czech soccer league Fotbal. Football fans can visit the new AS/400-based Web site for dynamically updated information on Czech and international football clubs and their players, scheduled local and international matches, results, commentary on recent matches, and a full game's history.

First Call Direct
www.firstcalldirect.ie
First Call Direct (FCD) offers general insurance products for a very competitive price directly to the public, using a LANSA-based Web site. It's never been easier to get a quotation or to renew your insurance. You will receive confirmation by e-mail and your policy documents will arrive by post within days. It's that simple. FCD started with offering motor insurance over the Web and will soon offer home and travel insurance over the Web with LANSA as well.

Mikasa
www.mikasa.com
Mikasa, the well-known provider of quality home products, offers a select group of their products, from candle holders and clocks to special gifts, on a new online shipping site. When you add something to your

order, a LANSA for the Web application will promptly and securely process it.

Papier en Ligne
www.papierenligne.com
Papier en Ligne sells office paper via the Web to customers in the Paris region. Papier en Ligne guarantees same day delivery for orders that are entered between 9:00 am and noon and 24-hour delivery for orders. Delivery is all 365 days a year and free of charge for orders above 300 francs. This LANSA-based business-to-consumer site offers a secure credit card payment facility. Business is booming for the four people who set up this Internet company.

National Music Publishers Association
www.songfile.com
The National Music Publishers Association has built a Web site allowing you to search a 2 million record database of songs, artists, and albums. Also, one can purchase CDs, sheet music, license lyrics and listen to songs over the Internet. Currently, the site gets over 100,000 hits a day and is powered by LANSA.

Riviera Hotel & Casino
www.theriviera.com
Using ResNet, an AS/400 e-business application, customers of Riviera Hotel & Casino can check hotel room availability, place reservations, charge it to a credit card, and receive a confirmation number in real-time over the Web. ◆

Appendix C: LANSA Company Profile

LANSA is a leading provider of development tools and services for IBM AS/400, e-business, and advanced graphical applications. Founded in 1987, LANSA has over 6,500 installations in 68 countries around the world. LANSA is a licensed AS/400 Application Development Partner, an IBM Partners In Development All-Star, and the winner of IBM's Powered by AS/400e award for excellence in AS/400 e-business. For more information, contact LANSA at 630-472-1234 or visit *www.lansa.com*.

LANSA is a subsidiary of ASPECT Computing, Pty Ltd, a company headquartered in Sydney, Australia that provides a wide range of services including information technology, professional services, project management, and customer education. ASPECT has grown steadily since it was founded in 1974 and is now the largest independent Australian-owned software and services organization with a worldwide staff of more than 1200 employees. The LANSA family of application development tools was initially developed to solve internal application development problems within ASPECT. A separate business named LANSA was created to focus on a worldwide mission for delivering competitive application development tools. With a research and development team of over 45 developers, they continue to deliver new releases on a timely basis. LANSA has a track record of being early adopters of new technologies such as Java, XML, and mobile phones. In most cases, they have found ways to leverage these new technologies in ways that completely shield their customers from the associated complexities. ASPECT has offices in Australia, Great Britain, Europe, and North America. For more information, visit *www.aspect.com.au*. ◆

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