IBM

Reaching the worldwide customer.

Globalization capabilities of IBM WebSphere Commerce

Contents

Introduction

With the enormous and rapidly growing popularity of the Internet, traditional business constraints, such as distance, have disappeared. Companies and individuals can now do business with each other from almost any part of the world. With the help of the Internet, separate marketplaces are now being transformed into a single global marketplace. And to take advantage of a global marketplace, companies need to create e-commerce Web sites, which presents new challenges. Meeting the challenges includes:

Working with global information. Data from many languages must be stored and manipulated without loss of meaning. E-commerce Web sites also need to be able to store, retrieve and display data for different countries simultaneously.

Anticipating cultural norms. Beyond simple translation and data representation, it is important to provide information in the correct format to customers. Aspects of expectation or normal use, such as page layout, design or color, contribute to the overall user experience. By not presenting data in familiar or appropriate format to a particular user, companies risk offending customers and losing sales. For example, U.S. customers expect English text, U.S. dollars and pounds, while German customers expect German text, German marks and kilos.

Applying logic to worldwide business issues. Many other worldwide business issues need to be addressed, including the use of various currencies, taxation rates or shipping regulations. Often, certain products can be sold only in certain geographical locations, while the same products shipped to customers in Germany and the United States may or may not be eligible for discounts or subject to different taxes and shipping charges.

Establishing and maintaining a cost-effective operation. Simple answers, such as deploying an e-commerce Web site for every region, may avoid some problems – for example, data representation – but these solutions are difficult to implement and maintain economically. A viable solution for the long term must have the required functions and also be maintainable in a cost-effective manner. For example, a Hong Kong enterprise using a Chinese operating system needs to be able to work with other Asian languages, such as Japanese or Korean, on the same system using the same interface.

This white paper describes how IBM WebSphere® Commerce, Version 5.4 helps meet these challenges and enables businesses to extend their reach in a cost-effective way.

The ShopIBM experience

When the ShopIBM e-commerce Web site was first developed, it was expected that companies from around the world would visit the site. To handle buyers on a global scale, ShopIBM had to anticipate the needs of multiple cultures and become globalized. This meant that data being displayed to shoppers would have to meet customer expectations in content, language and formatting. Throughout the development of the ShopIBM site, many challenges arose in storing data in different languages. No single set of integrated formatting functions was available to ensure correct cultural formatting. Other difficulties included lack of tooling to manage data in different languages and problems with data organization within the database. Although these problems were eventually overcome, simplifying the process of creating e-commerce for a global marketplace would help companies avoid the same difficulties. WebSphere Commerce needed to provide globalization capabilities out of the box, proving that global e-commerce could be accomplished easily.

Globalization features in WebSphere Commerce

Recognizing the challenges of a global marketplace, one of the main goals for developers of WebSphere Commerce was to give sellers the ability to create e-commerce Web sites so that each of their customers could interact in their preferred languages and cultural formats.

WebSphere Commerce provides companies with the ability to globalize their e-commerce Web sites easily, through its globalization-capable features, including data, cultural norms, business logic and maintenance. Figure 1 shows features, functions and benefits of globalization.

WebSphere Commerce globalization capabilities		
	Function provided	Benefits
Maintenance	• Database population and management tools • Content management tools • Seller-level tools • JSP templates and store models	• Easy maintenance of multilingual database data, static HTML or store information • Reduced JSP template maintenance • Rapid site development for new languages
Business logic	• Taxation wizard • Shipping wizard • Fulfillment centers • Campaigns and discounts	• Realistic taxation and shipping charges based on customer jurisdiction • Accurate modeling of real-life fulfillment systems • Multilingual marketing initiatives
Cultural norms	• Multiculturally enabled commands, beans and rules templates • Inherited functions provided by Java components for data formatting • Currency formatting functions • Language and currency selected independently • Single JSP design model	• Automatic multilingual data manipulation and retrieval • Automatic data formatting • Dual currency display and customized currency formatting • Easy language and cultural customizations for page look and feel
Data	• Unicode database (UTF-8) • Language and cultural data separation within database design • Automatic code page conversion for multilingual data entry, storage and retrieval	• Ability to store and manage data in different languages in a single database (Korean, German, Chinese) • Database design for easy storage of multicultural data • Accurate management of multilingual data to ensure no corruption

(At right of table, vertical scale: **Most difficult** at top, **Least difficult** at bottom)

Figure 1. Globalization functions and benefits of WebSphere Commerce

Data

Businesses need to store, retrieve and display data in different languages simultaneously on their e-commerce Web sites. An immediate advantage provided by WebSphere Commerce at the most basic stage of globalization capabilities is that data is stored in Unicode. This allows the database to properly handle data regardless of language. Also, language and culturally sensitive data are fully separated from the culturally nonsensitive data within the database design. This globalization-capable database design allows sellers to easily enter and manage cultural data apart from noncultural data. It also reduces the amount of duplicate product data to be stored in the database because two product entries can be compacted into one product entry with two descriptions, offering space savings and allowing smoother data management.

Cultural norms

WebSphere Commerce also provides a suite of functions to allow companies to customize their e-commerce Web sites to accommodate cultural differences. The server-side code is fully enabled for multiple cultures so that data is always retrieved in the correct context. By combining these features and by leveraging the inherent functionality of Java™ technology, sellers can help ensure that data is presented in the anticipated cultural format. This means that dates, numbers, prices or measurements can be displayed in the format expected, helping customers feel confident to conduct business in a familiar environment.

Custom currency formatting allows an enterprise to display multiple currencies simultaneously or to help them customize formatting on a per-currency, per-store, per-language basis—all data driven, providing true flexibility. The recommended JavaServer Pages (JSP) model also provides tremendous advantages to customization and maintenance. The culturally neutral master JSP template model requires sellers to maintain only a single set of JSP components that is enabled for all languages. By using dynamic includes, a seller can customize the look and feel of a page based on a customer's preferences. Compared to a JSP-per-language model, this gives an enterprise enormous savings in terms of site maintenance and customization.

Business logic

Because IBM knows there are different requirements when doing business globally, WebSphere Commerce is accompanied by a supporting set of business logic features. Tools include taxation and shipping calculation wizards that allow a seller to define rules that calculate the proper taxes and shipping charges based on a customer's physical location. Companies have the ability to create fulfillment centers for more accurate modeling of their real-life global fulfillment systems. Using an accompanying suite of marketing rules that can be defined by sellers, they can promote their products on a global basis.

Additional benefits include sharable seller catalogs that help sellers to rapidly set up store catalogs for new storefronts and a payment management application that helps them to identify which payment methods they want to accept at specific locations. WebSphere Commerce provides companies with many of the tools needed to set up an easily deployable global online business.

Maintenance

In the past, data restrictions prevented the combination of data in certain languages from being stored on a single machine. Now these limitations for site or data hosting have been removed. A classic example is the problem of storing Japanese data in the same machine as Chinese data. The limitation existed because the characters from these two languages were in two different formats. With the use of Unicode, this restriction goes away, giving sellers the freedom to group and host information together. In addition, WebSphere Commerce provides a complete set of database management-, content management- and seller-level aids to properly manage data. These tools are fully enabled for multiple cultures, which means this is a central set of tools companies anywhere in the world can use — a big advantage — because it eliminates the need to procure separate tools for different geographies and makes communication within a company more efficient.

Globalized store design

When selling products to a global community, a company needs to ensure its e-commerce Web site is properly designed to address areas that are multiculturally sensitive — no trivial task. See Figure 2 to view a store page with areas that can be affected. Globalization requirements can affect every aspect of the page. To be properly equipped to sell to global customers, companies must approach e-commerce Web site design with special planning and powerful tools to help them generate and manage the information properly.
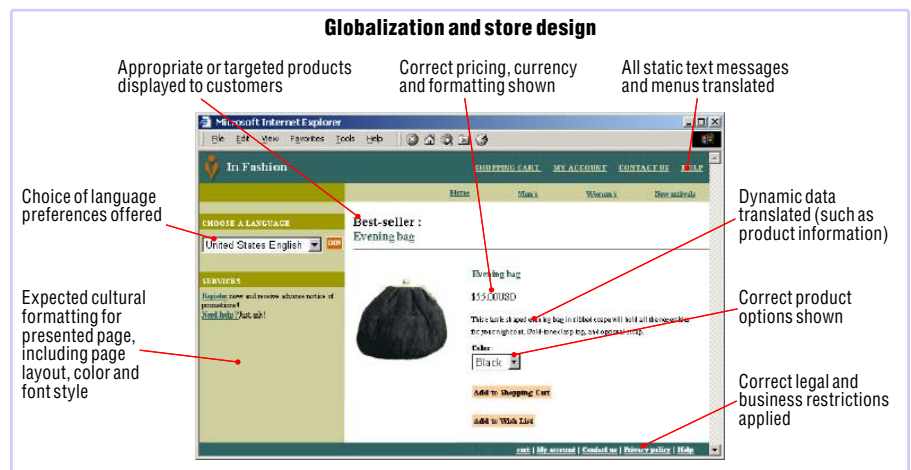

Figure 2. Sample store page illustrating areas of multicultural sensitivity

Solution architecture

WebSphere Commerce is designed to have globalization capabilities embedded in the product architecture. The task of enabling globalization capabilities is much larger and wider in scope than translation. Globalization permeates all components within the product because every level within e-commerce Web site architecture is affected. At a detailed level, globalization sensitivity – beneath translation or formatting – touches deeper levels of user experience. See Figure 3, which illustrates different levels of enabling e-commerce Web sites for globalization.

WebSphere Commerce application model

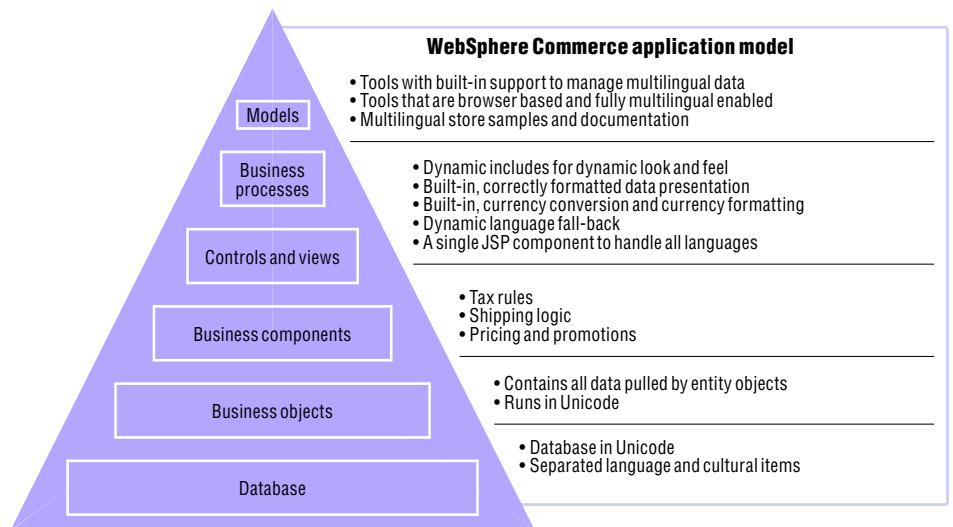| Layer	Features
Models	• Tools with built-in support to manage multilingual data • Tools that are browser based and fully multilingual enabled • Multilingual store samples and documentation
Business processes	• Dynamic includes for dynamic look and feel • Built-in, correctly formatted data presentation • Built-in, currency conversion and currency formatting • Dynamic language fall-back • A single JSP component to handle all languages
Controls and views	
Business components	• Tax rules • Shipping logic • Pricing and promotions
Business objects	• Contains all data pulled by entity objects • Runs in Unicode
Database	• Database in Unicode • Separated language and cultural items

Figure 3. WebSphere Commerce application model

Database and data

Knowing about data is key to understanding globalization. Some data is invariant, or language independent, but large amounts of other data change from one language to another.

Data can be classified into three types: administrative, seller and customer data.

- *Administrative data includes information that is used for control or configuration purposes at the site level. Examples are user group information, database configurations and application server settings.*

- *Seller data is seller, or store-level, information and includes either seller preferences or store settings. Examples are promotional names, campaign initiatives or a list of store-supported currencies.*
- *Customer data is information that is displayed directly to a customer, such as product descriptions or catalog descriptions. This data must be translated into each of the different languages supported by the e-commerce Web site.*

Thus a basic requirement for globalization is a single system where multilingual data can be stored and manipulated properly. Other aspects of basic globalized data support are related to the ability to track a user's language or currency preferences. WebSphere Commerce provides the flexibility to independently determine use of language and currency.

In addition to multilingual data, separating language from geography also presents challenges. Relating data to a customer's physical location must be clearly separated because certain geographical locations share languages. For example, in Canada, there are two national languages, English and French. A common, but more subtle, separation exists within a single language, where customers may prefer different types of usage or spelling, depending on profession, age group or cultural background. This reality of dialects or variations even within a single language calls for more than just the ability to store data. It requires specific structure and organization of data so that different descriptions can be entered for each language or dialect without requiring data duplication to occur within the database. WebSphere Commerce meets these requirements.

When dealing with data in different languages, the most obvious question is storage. The real problem is that every language is stored in its own native format. For example, the English language is represented by the characters a-z, or A-Z, along with the standard punctuation characters. These characters are presented in a format called a code page. Other languages, such as Japanese, have individual alphabets, and are therefore stored in different code pages. The challenge is to ensure that data belonging to different code pages can be stored in a common code page.

Using a universal code page in the database to store data from different code pages in a common code page and the Unicode code page UTF-8 to help ensure multiplatform compatibility, WebSphere Commerce can store and manipulate characters from every language. The database model is language friendly; that is, the database tables that contain language-specific information are separated. This provides businesses with the ability to enter multiple descriptions in multiple languages easily. If the seller wants to sell in a different language, no database schema changes are necessary. All that is required is the addition of the new translation to the separated database tables for the new language.

Business objects

At a higher level of complexity, the challenge becomes how to format an e-commerce Web site to fit different cultures. It is important that information, such as numeric data, dates and time, measurements or currencies and prices, be presented in the format anticipated to avoid confusion and misinterpretation by customers in their daily business. For example, in U.S. English, a number is displayed as 50,000.00 but, in French, the same number is displayed as 50.000,00. Also, customers in different parts of the world can be confused by various date presentation formats they do not use, such as day-month-year, month-day-year or year-month-day.

Sellers need to have a uniform interface to retrieve data and receive the information in correct cultural format. Business objects pull separated data together in a coherent way. In WebSphere Commerce, business objects exist primarily as Enterprise JavaBeans (EJB) technology. The business objects retrieve data in the correct context, manipulate retrieved data and combine the data for display in a form that is logical and meaningful to the customer.

From a globalized perspective, built-in logic causes business objects to perform retrieval of multilingual data based on the current customer context. For example, if a company is operating in German, business objects retrieve data in German. If no German data is found, business objects use a fall-back language as defined by the seller and attempt to retrieve data in the next-best language. Another big advantage for sellers where translations are not available in certain languages or translations may not be complete. WebSphere Commerce provides powerful out-of-the-box functionality for the company in terms of globalized data presentation and display.

Business components

Another stage in globalization is to understand the business rules or business logic that is unique to different cultures. The business logic of a culture directly affects the way an e-commerce Web site functions because such rules govern how business takes place. Taxation rates or shipping charges that apply to customers on a global scale are a good example. A product shipped to a customer in Toronto, Canada, incurs different taxes and shipping costs than a product shipped to a customer in Tokyo, Japan. These rules can also differ based on where a shipment originated. Often, business restrictions prevent certain types of products from entering a country, and controls must be set in place to restrict customers from attempting to buy products that are not shipped to their geographical regions. In designing an e-commerce Web site, it's important to know what currencies and payment methods customers will use to complete their transactions. The price of an item can change depending on where and how it is purchased — discounts available to one type of customer may not apply to others, and promotions are often specific to a targeted geography. Globalization capabilities bring layers of complexity that affect the way business is done.

Business components, or rules, help to define e-commerce Web site behavior. Business components give companies the ability to influence what customers buy simply by setting rules and guidelines. In WebSphere Commerce, business components establish rules to influence behavior from a marketing perspective and a store-operations perspective. Marketing business components include promotions, discounts and campaign rules. Store-operation business components include tax rules, shipping regulations and payment method configurations.

Business components that influence a customer's shopping experience need to change based on the characteristics of that customer. Customer geography and demographics are incorporated with the operating logic of the business components. Examples are taxation and shipping wizards that give sellers the ability to set charges based on a customer's location. Sellers can also define customer segments that manage which customer receives which discount based on personal demographics, such as age, income and interests. With WebSphere Commerce, sellers have true flexibility to customize shopping experience on a per-customer basis.

Controls, views and business processes

Basic cultural preferences can determine how customers react to an overall e-commerce Web site look and feel. For example, when a customer begins a check-out process on an e-commerce Web site, the sequencing of pages can change depending on that customer's physical location or demographics. Certain steps in the business process may need to be performed when a customer lives in a particular location, while the same steps may be optional or not even displayed for customers in other locations. For example, buyers from one location might be required to register or those from another location might have to accept terms in a legal agreement prior to making a purchase.

The look and feel of an e-commerce Web site also changes in similar, though more subtle, ways. An example is the U.S. address entry form, where customers must enter the county they live in, while in Canada, where there are no counties, the address form does not include that field. Another address subtlety is that the U.S. uses a five-character numeric zip code, and Canada uses a six-character alphanumeric postal code. Color, font type or general page layout of an e-commerce Web site can help or hinder customers from different cultures. Certain colors are offensive to people in some cultures, while not in others. Page format that is comfortable to a customer who reads English, may be difficult to follow or distracting to readers of Hebrew text. Enabling an e-commerce Web site for multiple cultures goes beyond the lower levels of the architecture.

WebSphere Commerce offers the amalgamation of embedded, lower-level logic in the controls, views and business processes layer of the architecture. At this high level, real-world processes that have actual meaning appear. While business processes mainly involve seller or buyer tasks, controls and views involve the variability of the display within an e-commerce Web site. WebSphere Commerce deals with these variations through its implementation of JSP templates, include files and site workflows. JSP templates form the backbone of controls and views. The JSP template model is designed with the intent that JSP components should be language independent. Depending on the customer's preferences, the templates join with the language and culturally specific include files, such as page headers, footers, messages and diagrams.

Therefore, these templates become language or culturally specific only at runtime. The culturally correct views are joined together through site workflows, which are defined by the commands and tasks provided out of the box, to form business processes. Examples include the user registration process, the catalog navigation process or order processing. Each business process defined within WebSphere Commerce is fully enabled for multiple cultures.

Models

Finally, at the site level, a combination of the various controls, views and business processes forms an entire e-commerce Web site. Throughout the examination of the application model, globalization capabilities can be seen to affect every level of the architecture in a profound way. Consequently, questions arise about how multicultural e-commerce Web sites will look when finished, how they will work and how they will be maintained. WebSphere Commerce includes several sample stores to help illustrate the concepts and functions implemented throughout the application model and demonstrate the viability of globalization capabilities. The samples are simple stores that can be used for education and as launchpad e-commerce Web sites for sellers to modify, creating their own stores.

A full suite of tools is provided to aid a seller in managing an operational store, including wizards to examine and modify product, customer and order information. WebSphere Commerce also includes a complete set of tools to help the seller define business component rules, such as tax rates, shipping charges or marketing initiatives. The benefit of WebSphere Commerce accelerator tools is that they are completely browser-based and thus fully enabled for multiple languages. Using the tools provided, sellers have full flexibility to manage multilingual data through a single interface.

Solution model summary

With WebSphere Commerce, globalization capabilities are easier because most of the work has been automated and embedded with the logic of the product. Depending on the preferred language of the customer, static and dynamic text is retrieved in the correct language from either property files or from the database, respectively. Data, such as dates, times, measurements or currencies, is formatted automatically and correctly, based on customer preferences, at retrieval time, as shown in Figure 4.
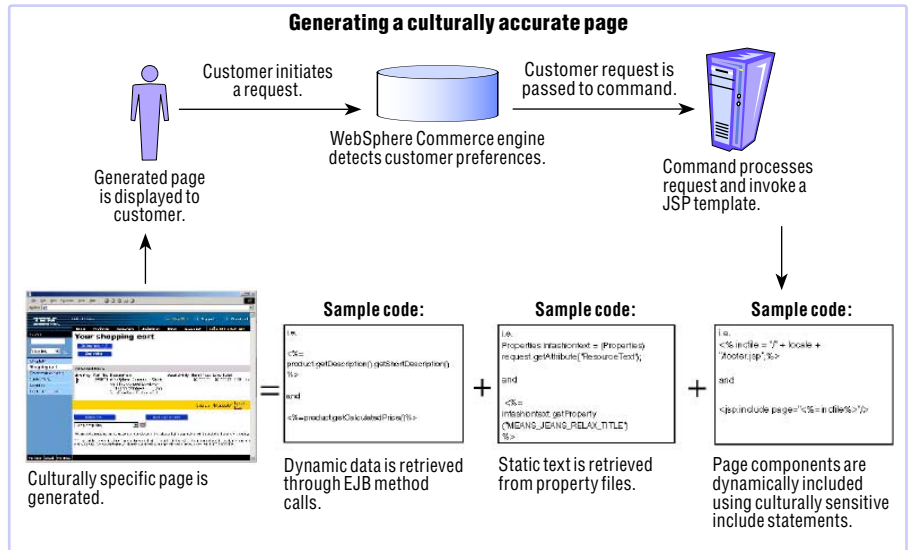
Generating a culturally accurate page

Customer initiates a request.

WebSphere Commerce engine detects customer preferences.

Customer request is passed to command.

Command processes request and invoke a JSP template.

Generated page is displayed to customer.

Culturally specific page is generated.

Sample code:

Dynamic data is retrieved through EJB method calls.

Sample code:

Static text is retrieved from property files.

Sample code:

Page components are dynamically included using culturally sensitive include statements.

Figure 4. WebSphere Commerce solution model

When a customer visits an e-commerce Web site, culturally neutral JSP templates automatically include the appropriate page components, along with retrieved text and data, to render a culturally specific view at runtime. The result is that many of the changes – multicultural look-and-feel and page content changes – necessary from one customer view to the next become transparent to the merchant. It all happens automatically with a single code base and a single set of JSP templates.

Summary

A vast number of issues must be addressed when enabling an e-commerce Web site for a global customer base. It is not a simple matter of translation or format. Instead, it is the ability to properly interact with customers and to engage in business activities with people according to their cultural expectations. WebSphere Commerce, with extensive built-in globalization capability, meets sellers' needs to effectively reach customers worldwide. The base database architecture and storage model has been fully enabled so that multicultural data can exist in one central repository. An interface, or business objects layer, has been created to allow sellers complete flexibility to retrieve and format cultural and linguistic data.

Rules logic, accompanied by a tool set fully enabled for multiple cultures, is included to allow sellers to model real-life business logic in their e-commerce Web site. In the past, the task to globalize an e-commerce Web site was difficult and time-consuming. With WebSphere Commerce, the effort is almost transparent.

For more information

To learn more about WebSphere Commerce and its accompanying products, contact your IBM sales representative, or visit **ibm.com**/websphere/ecommerce.

business software