

Internationalization of Data Visualization

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Executive Summary

Visual Mining™ is dedicated to the technologies used in the internationalization of data visualization software, on-line help, and documentation. Our aim is to provide you with useful tools that could help you streamline your performance dashboard localization processes.

Visual Mining started internationalization right from the beginning, when we determined the requirements for the NetCharts® software. We designed the flexibility into our software that's necessary to enable easy localization by understanding how the requirements differ among all the countries and languages (locales) that NetCharts needed to support.

By globally enabling NetCharts, the core binary executable supports data presentation in virtually any language that has Unicode characters defined.

The Internet is a global medium with the power to connect the world's disparate peoples, but only if the software products can adequately handle the languages, encodings, and local expectations that make up different cultures.

Overview

Internationalization is the process of designing and developing software or Web applications so that they can be easily adapted to various linguistic and cultural environments without additional programming or engineering. Central to internationalization is the separation of language and cultural data from the source code.

Cultural and Technical¹

When creating software for use around the world, there are many considerations and modifications to be made, for example:

- **Locales:** The program may need to be modified to recognize which country's local conventions should be used.
- **Time and Date Displays:** International time and dates are displayed differently around the world. In general, Americans indicate dates by 'month-day-year;' Europeans use 'day-month-year,' and Asian cultures use 'year-month-day.' The program needs to be designed to accommodate these variations.
- **Measurement Systems:** The program should be written to accommodate both imperial and metric systems.

¹ © 2006 SDL International, <http://www.sdl.com/services/services-sdl-language-services/services-sdl-internationalization.htm>

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- **Formatting Numbers and Currency:** Many languages use commas instead of decimals points and a period or a space instead of a comma to indicate the thousands place. Symbols for currency differ between countries as well. The software needs to be designed with these modifications in mind.

Sorting and Searching²

Sorting in English is not a problem because sorting mechanisms are written with the assumption that the alphabet and words within the sentence are divided by spaces. Text in Far Eastern languages is represented by symbols and characters. Because of this, sorting characters is more difficult than sorting words. There are also different sort sequences on a country-by-country basis. For example, European languages raise issues when accented characters are used.

Character Sets²

Asian languages do not exclusively use alphabetical systems; they also use pictorial representations of words called glyphs or ideographs. Problems can arise because many programs were written to support characters in a single byte, while Asian characters may require two or more bytes per character. For this reason, products that need to be translated into Japanese, Chinese, or Korean, need to be double-byte enabled or written in Unicode.

Benefits

Innovations in information and communications technologies have changed the way enterprise companies work, communicate, and transact business. Businesses are using operational tools to access global markets and forge closer relationships with their vendors and customers.

Today's international high-technology marketplace has created a need for global applications and Web-delivered data visualization. As more companies attempt to measure, manage, and analyze their vendor's and subsidiary's performance, the challenges of managing the technology and data are emerging.

The main benefits of globally enabled software are:

- In an internationalized program with the addition of localization data, the same executable can run worldwide
- Internationalized applications are easy to tailor to the customs and languages of end users around the world

² © 2006 SDL International, <http://www.sdl.com/services/services-sdl-language-services/services-sdl-internationalization.htm>

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Goals

The goals of NetCharts Internationalization are to:

- Develop and maintain applications like input methods for multiple languages, scripts, and cultures
- Improve applications and utilities to support and process multiple languages, scripts, and cultures
- Quality-assure that existing applications meet Internationalization standards
- Coordinate any techniques, conventions, guidelines and activities within NetCharts that provide better integration, interoperability, and ease of use worldwide

New Features/Technology

Internationalization features let you separate culturally dependent data from the application (internationalization) and adapt it to as many cultures as needed (localization) without changing the source code.

NetCharts gives developers the ability to adapt text, numbers, dates, and currency to any country's conventions.

Text messages are the most obvious form of data that varies with culture. However, other types of data may vary with region, culture, or language. The following list contains examples of culturally dependent data

- Messages
- Online help
- Colors
- Icons
- Time
- Currencies
- Phone numbers
- Postal addresses
- Keyboard usage
- National holidays
- Gender roles
- Labels on GUI components
- Sounds
- Graphics
- Dates
- Numbers
- Measurements
- Honorifics and personal titles
- Page layouts
- Collation and sorting
- Product or service names
- Geographic examples

Technical Considerations

Internationalization involves:³

- Ensuring that all localizable elements (such as text and graphics) are extracted from the source code and stored in external resources
- Ensuring that the design of the user interface (UI) is flexible and neutral
- Ensuring that the relevant character set is supported

³ © 2005 Usability Professionals' Association (UPA), <http://www.usabilitybok.org/design/p290>

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- Ensuring that regional standards are supported
- Using locale-sensitive utilities for formatting and collation
- Providing localized graphics or using scaleable vector graphic (SVG) formats to facilitate text replacement

Cultural Considerations⁴

A globally enabled software product needs to account for the technical rules for product internationalization and the cultural differences between the markets. When designing for different cultures (Aykin, 2004):

- Design with internationalization in mind (i.e., consider and select design characteristics that would be acceptable for most countries.)
- Perform usability evaluations with cultural differences in mind.
- Have local experts who will check the interface for cultural insensitivities or errors.
- Hire translators whose native language is the target language.

NetCharts manages the complexities that arise in developing, visualizing, analyzing, and maintaining internationalized charts, graphs, reports, and dashboards.

NetCharts introduces innovations that make the creation of world-ready data visualization easier. The list of features for globalization and localization for this new generation of dashboard requirements is, as follows:

- Ability to render charts, tabular data and page content using virtually any language, date/time convention, or currency presentation.
- Support for internationalized data inputs within the NetCharts Designer design tool.
- Ability to load data from multi-byte sources
- Support for Internationalized text to be used as conditional drill-down tags
- Internationalization support in the ASP/.NET and JSP toolkits.

Conclusion

Whether you are a developer seeking the software product to start internationalizing your performance dashboard projects or a project manager seeking the tool that will enable your team to work more efficiently and effectively, you will find what you are looking for in NetCharts.

NetCharts incorporates the standards that provide for global interoperability and provides the features required to work with multilingual data on the Web.

NetCharts provides the basic tools for creating performance dashboard applications that can work in the end-user's native language and writing system.

⁴ © 2005 Usability Professionals' Association (UPA), <http://www.usabilitybok.org/design/p290>

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NetCharts supports an environment where internationally enabled, fully localizable performance dashboard products can be released as smoothly and quickly as possible.

If you want your data visualization to really communicate with people, you need to speak their language, not only through the text, but also through local imagery, color, and objects.

Definitions

Internationalization is closely connected to globalization and localization:⁵

- Globalization is the process of putting in place business practices and processes necessary to take a product globally (e.g., technical, marketing, personnel.)
- Localization is the process of adapting a product to the requirements of a target locale (i.e., to the set of standards and rules specific to a language and geographical area.)

Internationalization is a design and technical part of globally enabled software. It reduces time and cost of getting a product to international markets and facilitates localization of the product in a specific market.

Globally Enabled Software⁶

Globally enabled software is software that supports a wide range of languages, human cultural conventions, fonts, encodings and other features that make it useful, not just in one country or region, but around the world. Additionally, the user interface for globally enabled products is separate from the core instruction code, allowing the software to be translated without requiring recompilation. Since globally enabled software doesn't make assumptions about language of the user interface, the translated programs are more robust, requiring less "fixing" or special enhancements to support individual languages.

Internationalization

Internationalization is the process of planning, designing, developing, and implementing software or Web applications so that they can be easily adapted to various local languages and cultural environments without requiring additional programming or engineering

Localization

Localization is the process of adapting internationalized software or Web applications for a specific region, culture, or language by adding locale-specific components and translating text.

⁵ © 2005 Usability Professionals' Association (UPA), <http://www.usabilitybok.org/design/p290>

⁶ © 1998–2006 by individual mozilla.org contributors, <http://www.mozilla.org/docs/refList/i18n/>

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Unicode⁷

Unicode provides a unique number for every character, no matter what the platform, no matter what the program, no matter what the language. The Unicode Standard has been adopted by such industry leaders as Apple, HP, IBM, JustSystem, Microsoft, Oracle, SAP, Sun, Sybase, Unisys and many others. Unicode is required by modern standards such as XML, Java, ECMAScript (JavaScript), LDAP, CORBA 3.0, WML, etc., and is the official way to implement ISO/IEC 10646. It is supported in many operating systems, all modern browsers, and many other products. The emergence of the Unicode Standard, and the availability of tools supporting it, are among the most significant recent global software technology trends.

About the Author

Larry Wolter, Vice President of Marketing, leads the product management, brand development, and strategic marketing teams for Visual Mining, Inc. He brings 25 years experience in building profitability through strategic marketing, partnerships, and customer service, and is responsible for expanding Visual Mining's corporate strategy and product roadmap plans.

A highly successful senior marketing executive, Mr. Wolter has effectively defined and implemented marketing, product management, and branding strategies for both private and public companies. Before accepting the position at Visual Mining, he had been the Vice President of Marketing and Customer Operations at Blue Ridge Networks. Mr. Wolter has also held positions from Director of Product Management to Vice President of Marketing with high-technology companies, such as Winstar Communications, Oblicore, worldweb.net, Network Access Solutions, and Cable & Wireless USA.

Mr. Wolter received a Masters of Science degree in Engineering Management from the University of Massachusetts, and a Bachelor of Science degree in Electrical Engineering from Purdue University.

About Visual Mining, Inc.

Visual Mining is the premier provider of on-demand graphical reporting, visual analytics, and performance dashboard solutions for Business Intelligence solutions. Visual Mining produced NetCharts® as the industry's first commercial Java-based charting engine. Sales Executive™, an on-demand business intelligence solution, represents industry best practices developed through a decade of experience in serving thousands of customers worldwide. Visual Mining products are deployed worldwide and have earned numerous industry awards. Information about the company's products and services is available at www.visualmining.com.

⁷ © 1991-2006 Unicode, Inc., <http://www.unicode.org/standard/WhatIsUnicode.html>