

Internationalization and Localization:

Partners in Successful Globalization

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Localization and Internationalization: Definitions

Even in this era of global commerce, instant information exchange, and falling economic boundaries, the business of “globalization” is rife with confusing terms and concepts, especially for client companies wading into the area for the first time.

At Lingoport, we find that, in general, technology firms with global ambitions well understand what localization is and how it relates to software globalization. But they often have limited understanding of the related field of internationalization, and how it relates to the job at hand.

That’s of course a generalization. Many firms are well versed in both terms, and in the case of the largest global technology brands, support internal staffs devoted to internationalization. Their needs are of course dramatically different than firms that, by virtue of their size, industry focus, or experience, simply aren’t familiar with the intricacies and interdependencies of I10n and i18n.

So let’s start by closely defining the individual terms and their interrelationships. We draw heavily on the work of the W3C for these definitions.¹ Visual emphasis is added.

Localization (“I10n”)

Localization refers to the **adaptation of a product**, application or document content to meet the language, cultural and other requirements of a **specific target market** (a “locale”).

Often thought of only as a synonym for translation of the user interface and documentation, localization is often a substantially more complex issue. It can entail customization related to:

- Numeric, date and time formats
- Use of currency
- Keyboard usage
- Collation and sorting
- Symbols, icons and colors
- Text and graphics containing references to objects, actions or ideas which, in a given culture, may be subject to misinterpretation or viewed as insensitive.
- Varying legal requirements
- and many more things.

Localization may even necessitate a comprehensive rethinking of logic, visual design, or presentation if the way of doing business (e.g., accounting) or the accepted paradigm for learning (e.g., focus on individual vs. group) in a given locale differs substantially from

¹ Source: Richard Ishida, W3C, Susan K. Miller, Boeing; “What do the terms ‘internationalization’ and ‘localization’ mean, and how are they related?” World Wide Web Consortium (www.w3c.org), 2005

the originating culture. (Note: In the I10n abbreviation, the 10 refers to the 10 letters between the I and the n).

Internationalization (“i18n”)

Internationalization is the design and development of a product, application or document content that **enables easy localization** for target audiences that vary in culture, region, or language.

Internationalization typically entails:

- Designing and developing in a way that removes barriers to localization or international deployment. This includes such things as enabling the use of Unicode, or ensuring the proper handling of legacy character encodings where appropriate, taking care over the concatenation of strings, avoiding dependence in code of user-interface string values, etc.
- Providing support for features that may not be used until localization occurs. For example, adding markup in your DTD to support bidirectional text, or for identifying language. Or adding to CSS support for vertical text or other non-Latin typographic features.
- Enabling code to support local, regional, language, or culturally related preferences. Typically this involves incorporating predefined localization data and features derived from existing libraries or user preferences. Examples include date and time formats, local calendars, number formats and numeral systems, sorting and presentation of lists, handling of personal names and forms of address, etc.
- Separating localizable elements from source code or content, such that localized alternatives can be loaded or selected based on the user’s international preferences as needed.

Notice that these items do not necessarily include the localization of the content, application, or product into another language; they are **design and development practices which allow such a migration to take place easily in the future but which may have significant utility even if no localization ever takes place.**

(Note: in the i18n abbreviation, the 18 refers to the 18 letters between the i and the n)

Getting Specific: The Real Work of i18n

So, in short, internationalization prepares your applications for more efficient, timely localization, which in turn prepares your application for a locale.

But still, what’s really entailed in an i18n project?

Adam Asnes, founder and CEO of Lingoport, a specialist in i18n services to leading technology and technology-dependent firms, broke down the major issues in a recent issue of *Client Side News*²:

² Adam Asnes, "Winning Revenue by Globalizing Right," Client Side News (Feature), October 2006

Internationalization is the design and development of a product, application or document content that **enables easy localization**

I meet many localization sales people and executive staff that actually don't understand internationalization at all. It's simply a problem that they have never dealt with. Perhaps there's more than a touch of "eyes glazing over in boredom" when they see technical articles about the subject; but you really don't have to make major technical leaps to understand the issues.

Simply put, internationalization is all of the planning and execution that needs to be included in the development of software that lets the software support languages and locale formatting (like numerical formats, dates, times, currencies, postal addresses and more). Applications not only have to be capable of displaying any language, they have to correctly allow the input, storage, processing and retrieval of that multilingual/multi-locale data.

It mostly breaks down to engineering for a few categories of issues, which include:

- **Character Encoding** – Every character you see on the screen corresponds to a set of zeros and ones that get "interpreted" into what you read on the screen. How an application supports character encoding determines whether it will actually work in Chinese, Japanese, French, German, etc. This is where terms like Unicode or ISO-Latin apply. The right character encoding strategy isn't always obvious and will depend on a balance of marketing requirements, technical requirements and development budget, especially if the code already exists rather than starting from scratch.
- **String, Images and Resource Management** – Every message presented and ultimately translated in an application is referred to in software terms as a string. An important and time consuming part of internationalization involves finding all the user-facing messages (but can also include things like interface sizing), extracting them from the source code, and placing them in some kind of repository files (or database) appropriate to the software architecture. That way you can work on translating the words without breaking the source code. With the right engineering those words can be replaced with any language that the application is supporting. Additionally, string management includes issues like sorting, string concatenation and the like. You'll also want to identify and manage any images that are embedded in the code (just like strings) so that they may be localized as necessary.
- **Locale-limiting Functions** – Each programming language has its own set of functions or methods that do things like limit the way a date is interpreted, or how many bytes a character can contain. There are hundreds of these sneaky little things in C/C++ and there are dependencies based on your character encoding choice (e.g. Unicode UTF-8). Other programming languages such as Java and C# have less of these issues, but still have their own possible pitfalls. These functions need to be found and replaced with others that support the locale requirements that will be needed.

With the right engineering those words can be replaced with any language that the application is supporting.

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- **Locale-limiting Programming Patterns** – Programmers may do many of the right things in terms of extracting strings, using functions that support “wide” characters and the like, but it’s still easy to get in trouble. Think of programming patterns as logic created for a specific application, which doesn’t work once you include issues around multiple locales. Programmatic sorting logic is a good example; a typical developer would sort by alphabetical order rather than by character brush stroke. Programming patterns can be a big nasty area to re-engineer, and it takes experienced examination and planning to manage.
- **Locale Operators** – Simply determine how the software will detect what locale it needs to support and how it will behave under the circumstances. For instance, does the user manually choose the locale, or does the application check the operating system setting?
- **Third Party Product Limitations** – Most software makes use of other application components. These can include databases, reporting mechanisms (i.e. Crystal Reports), email generators and more. Often these components have their own internationalization support issues, which can create their own challenges to the software developer.

Client Requirements: Who Needs What, When?

No two globalization challenges are the same, but obvious similarities in client requirements are worth examining. In general, a few familiar business events and issues lead to an often frenzied, time-critical push for combined I10n and i18n efforts.

According to Lingoport’s Asnes³, these include:

1. Somebody sold something — there has been some new marketing partnership or a new powerful customer opportunity that requires multi-locale support. A classic example is that the company gains a business contract that will necessitate supporting Japanese or another language. In some cases we’ve seen new license deals for entire countries, such as in health care or education. It’s a big hurry up to meet the customer demands.
2. Localization is realized as a competitive necessity. Perhaps the company has already invested in global sales efforts and finds growth is limited given a poor competitive position without internationalization.
3. A global company has just purchased another company or intellectual property and wants to make the new product useful for its worldwide sales efforts and product line.

³ Adam Asnes, “Change Your Encoding, Change Your Company,” Multilingual Magazine Internationalization Getting Started Guide (supplement), April/May 2007

- The CEO is mandating a new global initiative. This is an important new step for the company's evolution. You can't go to a management conference these days without hearing about globalizing revenue opportunities and for good reason.

The difficult decisions revolve around the very different resources required for internationalization, a specialty that's seldom supported in-house.

How best to approach the problem becomes the pressing issue. The answer rests in the resources and experience available within the firm. Assuming that I10n tasks are farmed out – a nearly universal approach, since even the largest firms can't justify in-house translation teams – the difficult decisions revolve around the very different resources required for internationalization, a specialty that's seldom supported in-house.

Specifically, engineering and top management must analyze a) if there are idle engineering resource available to tackle i18n code remediation tasks, and b) if there are, whether those resources have the requisite experience to do the job in a timely, effective manner. Generally, though not always, the answer is no.

That's when technology firms turn to i18n service providers like Lingoport for assistance, or in many cases, full outsourcing. At Lingoport, we have a well-defined process for assessing client need and customizing a solution around that need.

The following diagram models the steps that we follow to assess, design, and carry out i18n project work for typical clients:



Figure 1: Lingoport's proven process provides a fully customized approach to each i18n project. Built around your staff's i18n experience and availability, Lingoport can help accelerate your firm's global initiatives.

Note that only after two initial assessment steps is the client confronted with the key decision – whether to identify and deploy scarce internal resources, farm out the job to outsiders, or a combination of both. As we've said, there's no simple answer, just as no two i18n – and for that matter, I10n – projects are the same.

By the Numbers: The Financial Case for i18n

Many costs/benefit analyses of software globalization have profiled the value of taking products and services global. Our examination won't repeat those findings, which are uniformly positive.

Rather, we take as our starting point that organizations fully understand the value of globalization, and are already committed to taking their wares global as rapidly as possible. Stated another way, it's never the case that firms consider l10n and i18n in the context of *whether* to globalize – they're focused on *when to go global*, and *at what cost*.

i18n: It's a Matter of Time (to Market)

While there's no viable alternative to localizing products for overseas markets, internationalization requirements are often misunderstood and underestimated. How should a globally inclined firm evaluate the merits of combining i18n with their l10n plans?

Put simply, how do you know if i18n is worth your time and money?

The following analysis looks at on the impact of **accelerating time to global markets** available through a *combination* of localization and internationalization, compared to a series of “one off” localizations efforts to achieve a similar result.

In brief, the promise of i18n is that it simplifies, shortens the duration, and reduces the risk of every localization project. Note that while i18n clearly holds promise to lower l10n project cost, the far greater impact lies in **i18n's potential for increasing top and bottom line results** by enabling businesses to **achieve their international goals sooner, with higher quality and lower support costs**. In this light, i18n becomes a strategic component of every globalization effort.

How Long Can International Opportunities Wait?

This analysis' key variable is the time delay an l10n project would have in the absence of an accompanying i18n effort. This obviously varies by client, by application, by platform, by target market, and many other variables.

In general, of course, legacy code that wasn't thoroughly architected for international markets causes difficulties in every facet of l10n – in identifying, segregating, translating and ensuring the quality of locale-specific strings, methods, and other components of software applications. And it's nearly impossible to estimate such delays before beginning l10n work – making go-to-market planning problematic.

Over our experience, a conservative estimate forecasts a **3 to 6-month delay**, on average – notably, for the first and every *subsequent* l10n project for the application considered.

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Adding It Up

Let's consider a generic example. Assume a product (either technology or technology-dependent) projected to generate \$10M in first year revenue from a single new international market (i.e., as the result of a specific I10n effort). What would be the "cost" of a 3-month delay in releasing that product to its target market?

We'll further assume a general cost profile consistent with firms Lingoport has served in recent years. And we'll assume that the product experiences only modest growth over a five-year timeframe.

The P&L below displays the result, both with and without i18n factored in:

Yr 1 revenue	10000
Ship delay (mo)	3
Annual Rev growth	5%

w/o i18n

Revenue		7,500	10,375	10,894	11,438	12,010	52,218
COGS	30%	2,250	3,113	3,268	3,432	3,603	
GM		5,250	7,263	7,626	8,007	8,407	
Op Exp	50%	3,750	5,188	5,447	5,719	6,005	
EBITDA		1,500	2,075	2,179	2,288	2,402	10,444

w/i18n

		Yr1	Yr2	Yr3	Yr4	Yr5	Total
Revenue		10,000	10,500	11,025	11,576	12,155	55,256
COGS	30%	3,000	3,150	3,308	3,473	3,647	
GM		7,000	7,350	7,718	8,103	8,509	
Op Exp	50%	5,000	5,250	5,513	5,788	6,078	
EBITDA		2,000	2,100	2,205	2,315	2,431	11,051

Impacts

Revenue	3,039
EBITDA	608
	5.8%

As shown, the firm stands to benefit substantially through reducing time to market alone – by nearly **6% increases in both revenue and EBITDA**, most of that impact occurring in year 1 of the analysis, with smaller advantage in each subsequent year. If higher sales growth expectations or the expected cost savings from the I10n effort to produce these results were included, the impact would be even greater.

And most importantly, for this same product, the same financial improvement would accrue to **each subsequent I10n project** targeting other overseas markets. That could multiply the benefit by as much as 10 times, given the diverse international markets the average firm might address over time.

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Case Studies: Integrating i18n and I10n for Global Success

It's clear that localization and internationalization complement each other in important ways. i18n makes every I10n job simpler, quicker,

and more repeatable, while I10n requirements make i18n necessary, even strategically important.

But with a dizzying array of project requirements, internal resources, outsourced service providers, and urgent management expectations compounding the complexity of global initiatives, it's fair to ask: can these integrated projects come together, on time and in budget?

In Lingoport's experience, the answer is yes. The company has a long track record of working with leading I10n firms and internal staffs to coordinate efforts— in myriad different ways, from simple project support to full outsourced project management.

Two case studies that profile sample relationships and successful client outcomes follow:

IronPlanet: Taking an Online Vertical Market Leader's Code Global

IronPlanet, the world's leading online auction company for used heavy equipment, faced a familiar problem. The time had come to add multilingual support to their innovative website, but the in-house development team was already fully committed delivering other enhancements necessary to support the rapidly growing business (named one of the Inc. 5000 fastest growing private companies in America in 2007).



Jeff Barca-Hall, IronPlanet's CTO, and a veteran of leading enterprise software firms, recognized the benefit of bringing in outside expertise to adapt the large body of code running the IronPlanet website and address the company's requirements for immediate (or sooner) localization in the overseas markets where IronPlanet usage was most prevalent.

Enter Lingoport. Three localization firms IronPlanet considered all recommended Lingoport for structural code remediation. Working in concert with IronPlanet's chosen I10n firm, Translations.com, Lingoport's Services team, using the company's proprietary Globalyzer technology, analyzed and adapted IronPlanet's code, line-by-line, to ensure the quality of the current and future localization work the company undertook.

"The work Lingoport did for IronPlanet was first-rate," said Barca-Hall. "Their focus, expertise, and attention to detail were crucial to the project's success. By operating as an extension of our team, Lingoport enabled us to fully internationalize our code base in a much shorter timeframe than we could have accomplished on our own."

Sycle.net: Accelerating International Business Results through Partnership

In six short years, Sycle built a dynamic, growing business supplying the most advanced



online patient management and marketing application to over 3,500 hearing care practitioners in the US and Canada. But when the world came calling, a daunting task lay ahead.

A prospective partner approached Sycle to take their business to overseas markets. Like many growth businesses, however, Sycle didn't have the depth of experience – or easily available resources – to take on the software reengineering required for the task.

Sean Shofstall, Sycle's CTO, understood the challenge: the company's code base, developed for domestic markets, was full of common impediments to easy, repeatable localization. And the confusing array of localization options wasn't easy to sort through, as well.

Lingoport's endorsement of a localization partner helped get the ball rolling, and under Sycle's management, both the i18n and localization projects were completed in timely, cost-effective fashion.

"It's easy to get bogged down in localization projects if you're new to the space," said Shofstall. "Unless you're lucky enough to have in-house software internationalization resources – and we aren't – it pays to bring in the experts. Lingoport's work helped make our path to international markets smoother than we'd ever hoped."

For More Information

A vital resource for developers of global web applications is the Internationalization Core Working Group, part of the W3C Internationalization Activity.

Learn more at <http://www.w3.org/International/core/>.

You'll find in-depth technical information about best practices for information architects, software developers, and other technology professionals with ongoing internationalization requirements.

About Lingoport

Founded in 2001, Lingoport, Inc, helps global businesses adapt and leverage their software for world market readiness. Lingoport's Globalyzer helps companies systematically adapt their software code and development practices to be more efficient for worldwide customers who demand that software works the way they expect it to. The company also provides internationalization services including internationalization analysis, implementation, testing and training.



In addition to its offices in Boulder, Colorado, Lingoport maintains development offices in Laramie, Wyoming. For more information, call +1-303-444-8020 or visit <http://www.lingoport.com>.

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