



Content Technology Works

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# Building an Enterprise-Class System for Globalization: Autodesk's Worldwide Initiative

*A Major Software Company Puts Radically Improved Processes  
and Workflow in the Hands of its Users*

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**Autodesk®**

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## Executive Summary

Autodesk, Inc., one of the world's leading 2D and 3D design software companies, creates tens of thousands of pages of product documentation and help for its users every year. Because Autodesk operates internationally with users in more than 106 countries, its software and the associated content needs to be localized into as many as 18 languages. Such localization has proven to be a time-consuming, highly manual, and costly process, yet it grows in importance each year as the company and its global user base continue to grow.

The documentation and localization teams at Autodesk have long been interested in the adoption of a new system that would improve on the management of the authoring and localization functions. In 2003, the company formed a cross-functional team to evaluate potential systems, and recommend a new system and processes and tools for implementing the system.

The result of this cross-functional project was the adoption of Idiom WorldServer, together with Adobe FrameMaker for structured authoring in XML. Following an initial pilot of the system, Autodesk has since migrated more than eight million source words of content into the system, resulting in localized content totaling more than 74 million words. Impressively, users have highly automated workflows and powerful tools for automatically creating outputs such as PDF, Compiled Help (CHM), and HTML.

The implementation of the system has not been without challenges. The initial spike in users—coupled with a lack of a common data model and shared tools—left the implementation team with a very challenging and at times unsustainable environment. However, the team made some very wise midcourse corrections, implementing a standard model and standard tools, and now has hundreds of productive users on the system.

As Autodesk looks back on its initial phases of work with the new system, it can point to significant success of the system, including large volumes of work being produced with much greater automation and consistency. The company also can point to cost savings, though the details of arriving at a specific metric for cost savings remain illusive, as discussed below. Finally, Autodesk is now managing an enormous base of source content in a centralized system and using a common data model. They are very well positioned for future initiatives such as finding ways to reuse the content in support of broad product development efforts.

This case study profiles one organization. While Autodesk's approach may not be universal, its success in solving critical problems is indisputable. It is not possible to generalize the Autodesk approach into a universal formula, but there is much here that will be useful to other organizations with similar corporate goals.

## In Their Own Words: The Autodesk Perspective

### Recognizing the Opportunity

*What were the symptoms in the market that brought this need to your attention?*

“Globalization is incredibly important to Autodesk. We operate in over a hundred countries around the world and about sixty percent of our revenue comes from outside the United States—and forty percent of that revenue is from fully localized products. So, we could not be as successful as we are today if we weren’t a very global company.” *Minette Norman, Senior Software Systems Manager, Worldwide Localization*

“Autodesk recognizes the importance of high-quality documentation, and we have a documentation base of over eight million words that we translate into up to 18 languages. We had a tremendous opportunity to standardize and improve upon how this localization is done.” *Mirko Plitt, Program Manager, Worldwide Localization*

*How did you identify what specific content technologies were appropriate for Autodesk?*

“Autodesk’s interest in better content management and localization technology goes back several years. The localization and authoring teams collaborated on a project where authoring, content management, and globalization management technologies were considered and evaluated.” *Minette Norman, Senior Software Systems Manager, Worldwide Localization*

“We were interested in a system that would allow us to streamline the documentation and localization lifecycle through the use of a unified yet modular process built upon mature industry standards.” *Mirko Plitt, Program Manager, Worldwide Localization*

### The Vision

*What did you want to be able to do by using content and globalization technologies for Autodesk?*

“The old processes had a number of manual and time-consuming steps, making schedules even more challenging and potentially error prone. We wanted the new system to bring much more automation to the steps, and improve on the existing workflow and processes.” *Mirko Plitt, Program Manager, Worldwide Localization*

### Product Selection

*Which vendor(s) did you select and what were the overriding considerations?*

“Autodesk chose Idiom because it had an integrated solution for the authoring side of documentation as well as the globalization and localization side. And we really wanted to buy one piece of software that could be used for both of those functions. We didn’t find anything else that met those needs.” *Minette Norman, Senior Software Systems Manager, Worldwide Localization*

### Measuring Success

*What do the users think of the system?*

“In spite of all the challenges we faced and lessons learned the hard way, we’ve been incredibly successful in getting millions of words into and out of this relatively new system. The Localization team members think the system is remarkable, enabling them to produce more localized documentation in a shorter time frame than ever before. The authors using the system find it more restrictive than they’d like, but that is more because of the need to follow new

standards than the system itself.” *Minette Norman, Senior Software Systems Manager, Worldwide Localization*

### **Autodesk Company Background**

Software giant Autodesk, Inc., founded in 1982, totaled \$1.6B revenue in its most recent fiscal year. Autodesk products, which include its flagship AutoCAD, Autodesk Inventor, Revit, 3ds Max and Maya software applications and a broad portfolio of 2D and 3D design software tools, are used by 100% of the Fortune 100 companies. With more than seven million users and over 2,800 third-party developers, Autodesk’s software is a major presence in industries such as manufacturing, building and construction, and media and entertainment.

Autodesk is a global company, with more than 5,000 employees worldwide, operations in 106 countries, and over 60 percent of its revenue derived outside the United States. As a result, document localization is critical. A document base of over 8.3 million source words is localized into as many as 18 different languages, resulting in over 74 million localized words.

Major company milestones:

- 1982—Autodesk is founded and releases first version of AutoCAD
- 1985—Autodesk goes public
- 1994—Autodesk ships 1,000,000<sup>th</sup> copy of AutoCAD
- 1997—Autodesk acquires SoftDesk, the first of more than a dozen companies it will acquire in the next several years
- 1999—Autodesk launches Autodesk Inventor for 3D modeling
- 2005—Autodesk exceeds \$1B in revenue

## **The Problem: Simultaneous Delivery in Multiple Languages**

As a global software provider, Autodesk recognizes that the value of its products is intrinsically linked to its information sources. Software products have little value without supporting information that is accurate, timely, and readily available. When software users cannot find, understand, or apply product documentation, they simply do not use or worse yet, evangelize the product—regardless of its potential value to the organization. Certainly, software usability has improved tremendously over the past decades. Still, users consistently expect accessible product support from multiple sources, including printed documentation, online help, and training materials.

The Autodesk commitment to product documentation as an integral part of the company's product line is historic. Regarded as a strategic and essential company asset, product documentation is a significant component of the company's customer-centric information supply chain. With over 60 percent of revenue derived from outside the United States, Autodesk's vision for content globalization is paramount to continued market leadership.

The existence of a Worldwide Localization (WWL) department speaks volumes about the company's commitment to globalization as a business practice. However, organizational structure was just one piece of Autodesk's strategy to achieve simultaneous delivery of products and documentation in multiple languages.

With support from an executive steering committee, a multi-departmental extended team, and a core project management team, WWL approached the tactical challenges within the vision from a decidedly lifecycle perspective. The "end goal" required Autodesk to unify and align content creation, localization, management, and publishing processes in order to:

- Integrate and streamline authoring and translation processes
- Automate manual and redundant tasks such as file transfer and publishing
- Enable collaboration within review and approval processes, providing flexibility for last-minute changes and resource sharing
- Increase localized content volume
- Improve product quality through enhanced consistency

A strong focus on enabling efficient and cost-effective workflow would play a large part in overcoming these challenges, allowing the organization to eliminate lifecycle content processes that were inconsistent, incomplete, sometimes incompatible, often manual, and only partially documented. Without this focal point, providing the organization with the speed and coordination required for simultaneous, multilingual delivery was clearly impossible. WWL was also well aware that scaling inefficient processes equates to increasing cost rather than reducing it. Hence, cost reduction was an overriding deliverable for each project goal.

## **The Need: Design New Processes and Workflow for Improved Localization**

Although Autodesk boasts a centralized WWL department, the company also includes highly independent divisions with product-driven organizations. As part of product development departments, content creation groups were intrinsically linked to software engineering counterparts, and they did not often collaborate with groups in separate divisions. Hence, authoring teams were using a variety of content creation programs including:

- HTML editors such as Dreamweaver and HomeSite
- FrameMaker (structured and unstructured)

- RoboHELP
- WebWorks

More significantly in terms of process cost and redundancy, the groups used various approaches and methods to manage ad-hoc and inconsistent workflow. For example, each group:

- Ingested HTML source separately into multiple content creation tools
- Invoked various Perl scripts or WebWorks to enable single-sourcing
- Maintained individual translation memories per project or component and language
- Maintained individual conversion processes to transfer content to translation management systems
- Manually transferred files between various process contributors at inconsistent intervals resulting in illogical work sequences
- Performed independent weekly compilations of documentation products such as online help

Although charged with meeting the localization requirements of all divisions, WWL was far downstream in this scenario. Multiple, divergent processes virtually guaranteed the failure of the initiative to provide simultaneous product delivery.

### **Criteria for Success: Higher Throughput, Fewer Manual Steps, More Automation**

With millions of words being managed in the system, Autodesk is experiencing better throughput and a greater degree of automation. They are already shipping more languages simultaneously in many of their product releases. Minette Norman reports, “With Idiom WorldServer, we have seen more throughput—more languages and more content—and we are able to do this in shorter time frames. There are far fewer manual steps and much more automation.”

Key to the automation is the ability to use the workflow engine in WorldServer. A Graphical User Interface enables users to establish workflows that combine a variety of user steps (shown in purple in Figure 1), such as translate and review, with automated steps (shown in blue), such as automatic notification or having the system take a certain action when an error is encountered.

Another example is the management of segment assets. When text is ready to be translated, WorldServer performs a function to segment the XML into individual sentences prior to being compared to the translation memory database. This is an automatic step in WorldServer, while the earlier process had the Autodesk teams handling the files manually and running scripts to process the files.

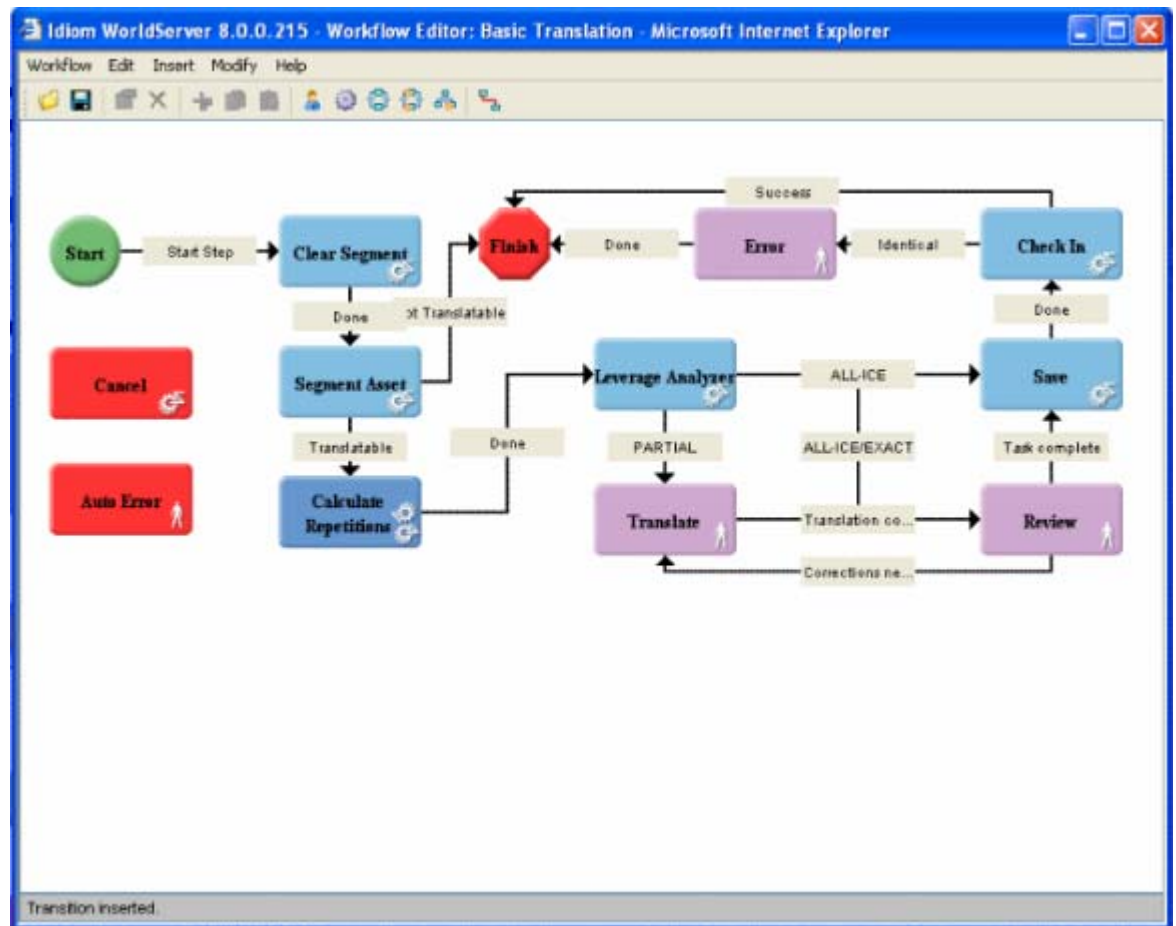


Figure 1. *Idiom WorldServer Workflow.* The illustration above shows a typical WorldServer workflow, and not one of Autodesk’s workflows, which are lengthier and more complex. The light purple boxes are steps performed by users, such as Translate and Review, while the blue steps are automated ones such as Segment Assets, where the XML content is segmented into individual sentences prior to being compared to the relevant translation memory.

### The Need: Greater Visibility into Localization Efforts

Localization is a complex process, even with the best technology. Translating a large document into 18 languages involves the efforts of the original author, the translators, and typically a localization manager or project leader who oversees the work. Ideally, a system will give the localization manager, documentation manager, and all other stakeholders good visibility into the status of the work.

As noted elsewhere, prior to the automation, Autodesk was challenged to have this kind of visibility into the work, and was often hampered by complex, human-intensive processes that created awkward break points in the processes. A goal for the new system was to have greater visibility into the processes. Ideally this visibility would help reveal improvements resulting from the automation—and point to additional process changes and enhancements that could be undertaken using the new system.

To begin with, the additional visibility comes from having an automated workflow with a graphical user interface and a useful reporting capability. The GUI allows the Autodesk users to see the status of work at any time, and to answer basic questions such as where files are in the translation process, what files are due in or late, and who is currently working on or responsible



for a file. The project history has also proven very useful for Autodesk; if there are problems with a file, the Autodesk users know who worked on the file and can then follow up appropriately. While in some ways basic, these features have led to important efficiencies for Autodesk, especially on the localization side of the work.

### **Criteria for Success: Improved Efficiency for Localization**

Autodesk can point to a number of efficiencies from its use of Idiom WorldServer. As noted above, many of these efficiencies come from the use of a central repository and centralized workflow system that give users continuous visibility into project status.

Another set of efficiencies comes from the capabilities of the WorldServer system itself. Autodesk gains efficiency from production tools such as the one that segments the XML assets into individual sentences for the translation memory (a step they used to perform by running a script). A system such as WorldServer has a number of features like this that automate common tasks and provide a large group of users (as at Autodesk) with significant efficiencies.

### **The Need: Improved Quality and Consistency**

Improved quality was not an explicit goal of the new system. In fact, Autodesk had a record of excellent documentation quality. So while quality was not necessarily a goal, what has been achieved is great consistency. The consistency results from the single data model, unified output formats, and the highly automated tools that are used to create the various outputs and to create the materials that are delivered to translators. Authors can better track what they are doing. They can do a better job of keeping things up to date, and they have a higher confidence that they have the right information, the right content, and are not using the wrong versions of files.

But the automated publishing has created some tradeoffs. Technical publications managers, if asked, would likely cite less flexibility and creativity available to the authors because of the standardized content structures (DTDs) and outputs. While these tradeoffs might be notable from the authoring side, the standardized data structures and outputs are much better for localization needs.

### **Criteria for Success: Up to Date, Consistent Information**

The criteria for success spring more from the growing confidence users have in the system and in the highly automated internal processes. Users now have push-button tools for creating outputs such as HTML and Help. The users also have a secure system from which they are checking out the content. In the past, they faced a higher risk of having the wrong content localized or missing content. The new centralized system and the improvement in processes yield important quality changes for the Autodesk users.

Another important outcome with the new system is the consistency in look and feel for the various outputs, including the core documents and the Help systems. Because Autodesk now has in place a common data model and common style sheets and processing scripts, the content products are uniform. In the past, every division's content products (and even different products within a division) looked radically different. Now, with the consistent content tagging and stylesheets, the content products have a consistent look and feel, providing Autodesk's customers with a much more uniform experience of the products.

## Solution Components

### Introducing the Autodesk System

Autodesk is using Idiom WorldServer, together with Adobe FrameMaker for authoring. The FrameMaker authoring is done using FrameMaker's structured mode, so the authored files are stored in XML. Because the content is stored in XML, WorldServer is able to use XML-based technologies for publishing the various outputs. The PDFs are created using XSL-FO (Extensible Stylesheet Language—Formatting Objects) using the RenderX XEP Engine. The compiled and uncompiled HTML Help outputs are created with XSLT (XSL Transformations).

All together, the various outputs are created under the control of WorldServer and processed with a small cluster of servers. The servers ensure that the users have sufficient processing power to produce the various outputs quickly.

### The Role of Idiom WorldServer

Idiom WorldServer is the hub of all of the work and processes described herein. It manages the authoring of the content, and provides automated workflows to link the authors to the localization vendors and translators, and vice versa. WorldServer manages all details of the localization, from the terminology management, control of the translation memory, and scoping and management of the projects. WorldServer then integrates with the publishing tools described above to create the various documentation and Help outputs that ship with the products.

### Best Practices and Organizational Changes

Autodesk's focus has not been on organizational changes. The system deployed by Autodesk serves several independent groups and divisions, so the group responsible for the system has instead focused on enabling rapid adoption and converting the content and users from the existing processes to the new system. As a result, the organization focus has been on successful adoption and best practices.

Three years into using the system, Autodesk now has impressive automated workflow and automated generation of content into different formats. However, the first year of using the system was marked by some challenges.

- Major bottlenecks generating output; the production server could not handle Autodesk's output generation throughput requirements
- Three widely divergent data models (this meant content sharing was impossible without data migration)
- Innumerable XSLs, each developed by separate divisions
- Even more scripts, each developed by separate divisions
- Additional divisions to bring into the system
- Major challenges supporting users because processes and implementations weren't standardized

In short, while they were producing significant amounts of work out of the new system, the complexities of adoption had created an unsustainable situation. As a result, the implementation team made a number of changes in the second year of the project. These included hiring a Data Model Architect to consolidate DTDs and having the implementation group take central control over the DTDs, FrameMaker Element Definition Documents (EDDs), XSLs, and supporting scripts. The implementation team then reworked the DTDs to minimize specializations for divisions and developed a single set of XSLs and scripts used by all divisions.

Finally, because the system supports hundreds of users, the Autodesk implementation team identified a need to provide them with greater throughput for running the various publishing processes. Autodesk designed a remote “build machine architecture” to run publishing processes on a separate suite of servers from the WorldServer system. The resulting processing power gives the large group of Autodesk users high-performance tools for publishing their required outputs.

Along with the implementation of a change control process, these improvements enabled the team to bring additional content from the first three divisions into the system and bring content from two new groups into the system.

## Results

### Higher Throughput and More Simultaneous Shipping

- “Following an initial pilot of the system, we converted three groups to the new system in the first year, and they delivered their English and localized documentation using WorldServer. This was more than we anticipated putting through the system in the first year.” *Minette Norman, Senior Software Systems Manager, Worldwide Localization*

Clearly, the Autodesk story has a successful outcome. One of the world’s leading design software companies has taken millions of words, ported the content into a new system, and has hundreds of users producing final, localized content with highly automated tools. Costs have improved, though specific measurement of the improvement has been hard to quantify. Some recent analysis within Autodesk shows markedly improved throughput and greatly improved turnaround times with the new system. And quality has improved, giving internal users a higher level of assurance over the content they are working with and producing. The unified data model and output formats have also ensured consistency across the company’s documentation sets.

Our interviews with Autodesk and our review of internal documents and presentations revealed a number of interesting additional issues and observations.

- Autodesk is seeing costs go down on projects that have been in the new system for more than one release.
- While Autodesk was somewhat apprehensive of how their localization vendors would accept the change and business impact, they have found that the vendors cooperated very well
- Autodesk recommends standardizing on a common data model for the whole company at the beginning of the process, and not doing it later, when the content would need to be converted a second time.

### Assessing Financial Impact

There is no doubt that Autodesk is realizing business benefit as a result of the efficiencies that it introduced to its globalization processes. Proof points are explored extensively in this case study: more languages, more content, shorter timeframes, high levels of internal user satisfaction.

Cost savings are obviously an important measure of success for Autodesk. Today it is possible to estimate translation costs for individual projects and as an aggregated corporate expense. Autodesk believes that it will be able to do an even better job in the future with enhanced reporting tools and integration with other systems supporting Autodesk product development.

Beyond cost savings, however, the overall financial impact of its investment will always be less quantifiable. Autodesk correctly recognizes that comparing its previous environment with the

new automated workflow is largely a hypothetical exercise. Two factors make it very difficult to do a reliable, meaningful analysis:

- Autodesk would have to calculate how much it would be spending today to achieve current results under its old processes—much effort for what is likely to produce a relatively crude guess.
- The nature of translation projects makes it difficult to establish baseline costs that can be established and tracked. Metrics for comparing costs are highly fluid. For example, size and complexity of products that need to be localized, translation vendor pricing, number of target languages, and evolving delivery format requirements rarely stabilize over time.

While noting the importance of understanding financial return, then, Autodesk knows that reasonable estimates can be achieved, but precise results are virtually impossible. In presentations on its globalization initiatives, Mirko Plitt is conscientious about cautioning other adopters to set the right expectations when promising ROI analysis as part of making a business case to management. Know what can be measured and tracked reliably over time, and be sure to constrain promises of financial analysis within those parameters.

## A Supplier's Voice: Idiom Technologies

As a globalization software solutions provider, Idiom Technologies is intimately aware of the challenges facing large companies that earn the better share of their revenue in offshore markets. In addition to Autodesk, Idiom serves a full roster of global companies that implement lifecycle content processes across widely-dispersed divisions and vendors.

Like Autodesk, Idiom customers view the delivery of timely, relevant and language-specific content as strategic asset that grows in value with the continuous expansion of their global reach. And when delays between the availability of content in the original language and required translations do occur; the revenue losses can stretch into the tens of millions of dollars.

Though essential, maintaining the high asset value of global content management is undeniably complex. Some of the most challenging requirements relate to:

- Creating unified, repeatable processes to link internal and external contributors in a variety of roles with varying degrees of autonomy
- Optimizing the productivity benefits of familiar business processes, technologies and tools—such as enterprise content management systems, authoring tools and translation products
- Providing controlled access to content stored in disparate systems, file formats and translation memories
- Gaining the control and process visibility provided by centralization without sacrificing local autonomy
- Synchronizing global content delivery cycles

With Idiom, global companies overcome these challenges with an approach that optimizes familiar resources, processes and preferences—while providing the efficiency and collaboration needed for simultaneous, multilingual delivery. That is why the Autodesk experience with Idiom is so effective.

Designed on the premise that transparent integration is essential for productivity optimization, WorldServer is the engine that enables Autodesk to reinforce the strengths of its single-source publishing and content localization capabilities. And it is able to do so with greater speed, consistency and cost-effectiveness, thanks to the centralized process automation and translation reuse functions of WorldServer.

Tailoring globalization solutions to address the unique technology environment requirements of global companies of all sizes is an Idiom hallmark. Companies with a variety of content globalization needs and resource commitments would benefit from leveraging WorldServer to achieve the kinds of gains realized by Autodesk.

### About Idiom Technologies

Idiom Technologies optimizes the globalization supply chain by aligning global enterprises, language service providers and translators. Award-winning WorldServer software expands market reach and accelerates multilingual communication with a proven platform for automating translation and localization. Idiom enables organizations including Adobe, Autodesk, Continental Airlines, eBay, Mattel and Travelocity to cost-effectively globalize and deliver content for global websites and applications, software and print. Idiom also partners with systems integrators, consulting and technology firms to help customers achieve measurable results and leverage enterprise infrastructure for maximum business benefit. Headquartered in Waltham, Massachusetts, Idiom operates offices throughout North America and Europe.

Contact [www.idiominc.com](http://www.idiominc.com) or +1 781-464-6000.

## Conclusions: The Gilbane Report Perspective

At Gilbane, we continue to see some of the most interesting and high-impact content management initiatives come out of the nexus of structured content creation in XML, single source publishing, and content globalization. Including this publication, three of our last four case studies have dealt with globalization challenges at major companies—Sun Microsystems, Siemens Medical Solutions, and, with this paper, Autodesk, Inc.

This focus on content globalization is not mere happenstance. Unless you have been stranded on a desert island for the past ten years, you know that we live in an increasingly global economy. Major companies are eager to reach global markets, and the Internet has put global buyers in a comfortable driver's seat where they can literally shop the world without leaving the comfort of their home or office.

Simultaneous with this surge in global marketing, large companies have mastered the details of single-source publishing. With complex products come large documents and the need to produce variant formats such as PDF for online or print distribution, Help, and HTML for Web sites and CD-ROM distribution. When a large company like Autodesk looked at its impressive capacity for single-source publishing—and its equally impressive capacity for localizing its content into many languages—what they found lacking was a unified system to ensure that all of this activity was happening efficiently, cost-effectively, and with an eye toward standardization and uniform quality.

Autodesk has clearly found such a system in Idiom's WorldServer. Indeed, in the last year alone, Autodesk has produced more than 74 million localized words from the system—74 million and counting, as they like to say, because the documentation volume increases each year. The system now manages the work of several hundred documentation and localization professionals. And while the implementation was not without its challenges, each challenge has since been met with a very well thought-out and executed response from Autodesk. Lacking a standard data model, they created one. Lacking standard tools and scripts, they created them. Autodesk had the benefit of an experienced and dedicated implementation team, and—significantly—when the team identified a need for additional resources and effort, management backed them on this.

We are also compelled to point out that Autodesk's experience illustrates a valuable and sometimes overlooked lesson in making a business case. The payoff for investment in technology, people, and process should be measured in terms of strategic business goals rather than solely in monetary terms. Cost savings are important, yes, but maintaining competitive advantage as a major software provider in global markets is among the significant benefits that Autodesk is poised to realize as a result of its relationship with Idiom.

Companies with a requirement for content globalization would be well served by digesting and reflecting on the experience of Autodesk and how it made an ambitious, multi-division, and cross-functional technology adoption project work so well.

## About Content Technology Works

Content Technology Works (CTW) is an industry initiative, administered by The Gilbane Group, to develop and share content technology best practices and success stories. The premise is that when given enough proven recipes for success, enterprise consumers will be able to adapt and replicate that success for themselves—increasing productivity and confidence.

Success stories are written by The Gilbane Group, with final editorial control resting entirely in the hands of the adopter. The result is that:

- Vendors do not control content.
- Success stories are as opinionated and as jargon free as the adopter prefers.
- Analysis is included from **The Gilbane Group** and invited contributors.
- The stories are not just about technology, but also focus on what matters to the adopter in terms of business requirements and other objectives.

CTW case studies provide organizations with best practices in content technologies and strategies for securing funding, measuring actual value, and driving adoption. Please visit [www.gilbane.com](http://www.gilbane.com) to view our library of case studies and for more information on the program.

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