Using Embedded System Information to Document Complex Business Applications

CGI's Documentation Infrastructure Enables Self-Documenting Capabilities within Its Enterprise Originations® Solution
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Introduction

Producing accurate and relevant information about business applications continues to grow increasingly more difficult and costly as software companies expand features and complexity at an ever-accelerating rate.

In the traditional documentation process, technical writers work with application teams to create and maintain system documentation. Types of documentation may range from end-user documents to technical manuals to configuration guides to training materials. As the business application changes, either in function or in configuration, writers must manually update the documentation.

This inherently manual process is fraught with laborious and error-prone tasks that result in the production of inaccurate and immediately outdated documents. As this condition has persisted, it has become an accepted state. Users have grown accustomed to documentation that is inaccurate and difficult to use in their day-to-day use of the software. Documentation has become a liability, an afterthought that is often written to complete an item on a checklist rather than as an asset to accompany the business application it is intended to represent. Without proper documentation, even great solutions fall short of their potential.

A variety of factors are to blame for this condition, including the complexity of modern business applications and the frequency with which they change. Applications contain more features, more functions and more configuration points than ever before; and they evolve and morph at an ever-increasing pace. Understanding the complexity of and staying ahead of the changes in modern applications while maintaining necessary profit margins is a nearly impossible task.

Compounding the enormity of the task of staying on top of an ever-changing application is the fact that the accepted tools for maintaining documentation are not designed with agility in mind. Popular word processing packages mix content with presentation, resulting in writers needing to become design experts to avoid producing documents that are unusable. Even if the writer is not ultimately responsible for the formatting of the content, the writer must still deal with the formatting imposed by the chosen package.

In an informal poll of CGI staff, writers report that they spend an estimated 50-70 percent of their time formatting documents. Less than half of their time is spent actually creating content.

To combat these challenges, CGI developed the CGI Documentation Infrastructure as part of its Enterprise Originations® (EO) application. EO is a comprehensive solution for new account originations that supports the full spectrum of consumer and business products, regardless of the distribution channel.

CGI’s Documentation Infrastructure provides EO with the ability to systematically create and maintain system information and to generate end-user content directly from information contained within the system. The primary goals and benefits of the CGI Documentation Infrastructure are to:

- Automatically generate content from information embedded within the system
- Support multiple publishing formats
- Allow the writing team to focus on content development instead of format
- Provide a standard, corporate-approved style to all documents
- Increase accuracy
The Answer Is in the Metadata

As systems become more and more complex, designers of those systems, including EO, rely more and more on metadata to implement various aspects of the systems. Metadata helps to increase flexibility within the system and to ensure interoperability with other systems.

Within EO, specific application characteristics controlled by metadata are the data model, the user-interface, messaging and a host of other items that enable a more rapid development model.

A clear definition of metadata at first blush appears to be simple: Data about data. A more expansive definition might be: Data about data that can be understood both by people and by machines. Each of these definitions is a bit esoteric and is open to the passionate debates that often go into defining such seemingly simple concepts.

For the purposes of this discussion, metadata is defined as, “Information contained within an application that describes its behavior, function and/or configuration in a manner that is understandable by people and systems.”

In addition, with the emergence of metadata as a method for describing a system, a standard notation or markup has emerged to implement metadata: XML. XML is a general purpose markup language that is suited for a variety of purposes; one of the biggest advantages of XML is how quickly and easily it can be transformed from one form to another.

With most metadata being represented as XML, transforming that metadata into another form is just as easy as transforming any standard XML stream from one form to another. Given an XML standard that adequately describes end-user documentation, converting metadata into an end-user document would be as simple as writing a simple transformation from the metadata into that end-user form. Fortunately a number of such standards do exist. One such mature and well-established standard is DocBook.

DocBook is an easy-to-understand, mature and widely used XML specification (maintained by the OASIS Group) that defines the components of a document. According to DocBook: The Definitive Guide by Norman Walsh and Leonard Muellner, “DocBook provides a system for writing structured documents using [XML]. It is particularly well-suited to books and papers about computer hardware and software, though it is by no means limited to them.”

Combining application metadata with an XML-based document standard provides a powerful opportunity to automate parts of the traditional documentation process and to produce assets that would not be practical or possible with traditional documentation methodologies.
The CGI Documentation Infrastructure

To harness the power of this concept within Enterprise Originations, CGI leverages its Documentation Infrastructure to provide a systematic process for the creation and maintenance of content and to automate many of the steps in the typical documentation process, including the ability to generate end-user content directly from the system. The infrastructure also automates the usage of common, approved styles for the publication process. The CGI Documentation Infrastructure relies on two basic ideas:

- The use of an open, non-proprietary standard for creating and maintaining content
- The ability to generate content directly from the systems being documented

An Open Approach

The basic foundation of the Documentation Infrastructure is the use of an open, non-proprietary format for creating and storing documentation content, DocBook. As mentioned above, DocBook is an open standard that describes the content of a document. Just as important as being an open standard, DocBook specifically and intentionally separates content from presentation. This separation provides a number of benefits.

The first is that writers can focus on creating content instead of formatting documents. This benefit alone prompts a significant gain in writer productivity and accuracy as writers focus more time on creating new content or improving the quality of existing content.

In a traditional model, a writer would need to manually edit and apply style changes to each document. Since the content is not locked into a specific presentation format, DocBook also provides greater opportunity for publishing into multiple channels. Generic style sheets exist to publish DocBook documents directly to HTML and to PDF; and the CGI Documentation Infrastructure extends the delivered style sheets to provide the proper branding of documents and to provide a richer user experience than is provided by the generic style sheets. The presentation of each media is easily configurable by modifying the style sheets and can be applied to all documents automatically.

The Infrastructure in Action

For the 2.0 release of EO, the documentation team used CGI's Documentation Infrastructure to produce more than 5,000 pages of new documentation and four sets of web-based training. Of those 5,000 pages, more than 3,000 were generated directly from the system using metadata and required no manual editing. The remaining 2,000 were manually created using the DocBook standard.

The infrastructure thus allowed the documentation team to create more documentation at a higher quality than would have been possible using traditional methods. In addition, several documents were produced that would not have been feasible using traditional documentation methods.
One such document was a 600 page guide that described in detail every data element in the system and was cross-linked to all related data elements. This document was generated completely from metadata that already existed in the system and was produced with every build of the system, ensuring that the document was always in sync with the system.

Not only was this particular document generated with every build of the system during development, but every document was regenerated and republished with every build. This capability ensured that all documentation was always in sync with the current state of the system.

Because the infrastructure has the ability to generate documentation in real-time based on the current state of the system, it provides a powerful framework to allow clients to generate and publish custom documentation that is specific to their environment and configuration.

A Hidden Weapon

CGI’s Documentation Infrastructure is a particularly potent tool for EO because of the CGI Web Framework (WFX) on which EO is built. WFX is a J2EE-based web development framework in which technical and functional application architects and developers describe an application in terms of metadata, providing for a higher-level application development environment. Applications constructed using WFX are largely defined and implemented using metadata.

As mentioned above, EO takes full advantage of the WFX metadata capabilities to control the data model, the user-interface, messaging and other items that enable a more rapid development model.

In addition to EO, upcoming releases of two new CGI solutions, Enterprise Collections (EC) and Enterprise Gateway (EG), are constructed using the WFX and, as such, are particularly rich in metadata content. To continue to leverage this metadata, CGI is expanding its Documentation Infrastructure for use by these new systems. By leveraging the metadata in these systems through the Documentation Infrastructure, CGI is able to provide end-user quality documentation that delivers detailed insights into how the systems function and how they are constructed across the entire solution set.

In a traditional model, providing this level of detail with the accuracy that comes from generating the content directly from the system would be a labor-intensive, costly and error-prone process. In many cases, it would not be possible.

Building a Better Mousetrap

Constructing a solution to take advantage of application metadata requires the ability to mix content generated from metadata with content produced by writers. Within EO, many of the documents contained a mixture of system-generated and writer-produced content.
As seen in Figure 1 - CGI Documentation Infrastructure, the infrastructure begins with the creation of content whether by a writer or by a systematic generation of content. Writers edit content directly in the DocBook format, while generated content is produced by transforming application metadata into the DocBook format using XSL style sheets. These style sheets describe how to convert the application metadata into the DocBook format. Specific sets of documentation for which the infrastructure provides automatic content generation include:

- User interface guides
- Web services catalogs
- Configuration guides
- Data models
- Data dictionaries
- Workflow guides and diagrams

**Figure 1 - CGI Documentation Infrastructure**
An XSL processor combines the XSL and the metadata to produce content that conforms to the DocBook specification. Within EO, the style sheets are designed intelligently to construct the content with proper contextual information that makes them appear as if a person manually created the document.

Once in the DocBook format, numerous publishing options exist. CGI's Documentation Infrastructure extends generic XSL style sheets for publishing to HTML and to PDF. Again, these style sheets describe how to transform a DocBook document into either an HTML document or a PDF document. Extensions to the style sheets include appropriate branding, style changes to conform to corporate style guidelines, and additional changes to provide an enhanced user experience. An example of this can be seen in Figure 2 - Sample EO HTML Document, which illustrates a two-paned view of the HTML documentation with an expandable and collapsible table of contents.

**Figure 2 - Sample EO HTML Document**

Although this process may seem complex, it is actually quite simple from the writer's standpoint. The only task for which the writer is responsible is creating content. Once the content is created, the remainder of the process is fully automated. The writer does not need to worry about any aspect of formatting the document.

Of course, upfront time must be invested into constructing the infrastructure and appropriately extending the style sheets; but once the initial work is complete, the only maintenance required is to makes changes to the style sheets to accommodate changes in branding or style guidelines. These types of changes, however, are a much smaller effort than would be needed in a traditional model if branding or style guidelines were to change.
Because all documents are published from a central set of style sheets, all documents can be updated automatically with new branding and style guidelines simply by republishing the documents. In a traditional model, each and every document would require a manual effort to apply the changes.

This capability is particularly useful in a client environment. As mentioned above, the infrastructure is a framework that allows clients to generate and publish custom documentation. By extending and tweaking the style sheets employed by the infrastructure, clients are able to produce documents that conform to their corporate styles and that contain their own corporate branding. The infrastructure even can be used to generate content for inclusion in existing content management systems.

Setting a Standard for Agile System Documentation

CGI's Documentation Infrastructure uses a number of standards and utilities that are not particularly new. In fact, most are quite mature. The compelling case for this infrastructure is that it leverages these tools in a new way. The infrastructure reuses existing information already contained within EO to produce end-user documentation, while also providing a more efficient environment for writers to work.

The current infrastructure is only part of the story. The rest of the story is the potential that this type of solution provides to generate the maximum return on the time spent in creating application metadata. If other systems, which are already largely metadata driven, were designed with the goal of leveraging that information in new and expansive ways, a growing number of possibilities would emerge for how to use that information.

In addition, the content manually produced by writers also can be leveraged in new ways within the organization and even across other organizations, including CGI's clients. Since it is maintained in DocBook, an open XML standard, businesses can easily transform that content for other uses.

Business applications are changing at an ever-increasing pace with ever more features and functions. Providing insight into how these applications are configured, how they are changing, and how they function is a never-ending challenge. Conventional methods for tracking and documenting these applications are no longer sufficient.

The information contained in modern applications in the form of metadata provides a tremendous view of the characteristics that define the systems. Enterprise Originations is an example of this type of application; and by leveraging the metadata contained in EO (and soon in EC and EG) via its Documentation Infrastructure, CGI is able to build better, more robust system documentation and, more importantly, to identify opportunities for CGI and its clients to use the metadata in ways previously unimagined.
About CGI

CGI is in the business of satisfying clients. For 30 years, CGI has operated upon the principles of sharing in clients’ challenges and delivering quality services to solve them. A leading IT and business process services provider, CGI has approximately 25,000 professionals operating in 100+ worldwide offices.

In the credit management field, CGI works with clients to synchronize all customer contact points across an organization, a strategy that serves as a company’s key competitive differentiator. Combining credit expertise; consulting, systems integration and outsourcing services; and market-leading solutions such as Enterprise Originations, CGI provides the latest strategy and tools that help clients deliver faster, more targeted services with greater consistency.

For more information, send an e-mail to credit.solutions@cgi.com or call 703-227-4502.