Professional Biography for Joseph W. Yoder

Joseph W. Yoder has a BS with honors and high-distinction in Computer Science and Mathematics from The University of Iowa, a MS in Computer Science from The University of Illinois, and worked towards finalizing his dissertation for a PhD in Computer Science at The University of Illinois at Urbana/Champaign in the area of Adaptable Architectures.

Joseph evolved from the Software Architecture and Patterns group at the University of Illinois. He has worked on various projects during his career that has incorporated many technologies. These range from stand-alone to client-server applications, web applications, web services, cloud computing, service oriented architecture, multi-tiered, various databases, object-oriented, frameworks, human-computer interaction, collaborative environments, and domain-specific visual-languages. In addition these projects have spanned many domains, including Medical Information Systems, Ordering, Import, Invoicing, Print, Shipping, Warehouse Management, Manufacturing, Medical Examination, Statistical Analysis, Scenario Planning, Client-Server Relational Database System for keeping track of shared specifications in a multi-user environment, Telecommunications Billing System, and Business & Medical Decision Making.

Joseph Yoder is a founder and principal of The Refactory, Inc., a company focused on providing training, mentoring and consulting for software architecture, design, implementation, consulting, and of most facets of software development. Joe specializes in architecture, analysis, and design in the following areas: C#/.NET; Java; Smalltalk; Patterns; Agile Methods; Testing; Adaptable Systems; Refactoring; Reuse; and Frameworks. Additionally, Joe is an accomplished author, having written a few dozen published papers. Joe has presented many talk/keynotes, tutorials, workshops, and published papers at global conferences.

Joe has been a member of the Hillside Group (a non-profit organization dedicated to increasing the quality of life of everyone who uses, builds, and encounters software systems) since 2000 and has been a board member since 2002. Joe served as Vice President of the Hillside Board from 2005 until 2010. In October of 2010 Joe was elected President of the board. Joe has attended all of Pattern Languages of Programming Conferences (PLoP) since they began in 1994, organizing several over those years. He has also helped organize and chair other PLoPs, such as SugarLoaf PLoP held in Brasil, ChiliPLoP held annually in Arizona, and AsianPLoP.

Joe has presented tutorials, talks, and papers at conferences such as OOPSLA, ECOOP, SATURN, CBSoft, SBES, Agile Portugal, Encontro Ágil in Brazil, AOSD, JAOO, QCon, SPLASH, and PLoP(s). He has organized tracks at QCon, panels and workshops at OOPSLA and ECOOP, and helped organized a web 2.0 workshop at the TOOLS conference in Europe. His design pattern, adaptive object model, and architecture related papers have been published in various conference proceedings and industry journals.

Before starting his own business, Joe was involved with writing Medical Software through Small Business Innovation Research Grants sponsored by the National Institute of Health, National Library of Medicine and HCFA. He did this as a project manager, research analyst, and software developer for University Park Pathology Associates and LifeSpan Research Institute. This included processing data provided from the CDC and integrating results into software applications (see projects section).

Joseph Yoder has extensive experience with a variety of object-oriented languages, including CLOS, Smalltalk, C++, C# .NET, and Java. He is a recognized expert on patterns, specifically those dealing with object-oriented programming and design. He has designed and taught advance courses on Patterns in Smalltalk Java and C# and has published in this area as well.

Summary of Experiences

Joseph W. Yoder has assisted many companies with the development of software applications, specifically object-oriented and web-based systems. Joe worked with the Illinois Department of Public Health (IDPH) providing consulting services including architecture, analysis, design, and software development (Newborn Screening, Immunizations, Refugee Registration, Dairy Automation System). This work included the design and implementation of a library of reusable components (Enterprise Class Library).

 Joe also assisted Caterpillar with The PPRD (Pre-Production Reliability Development) project, which is a web-based application that resides on the Caterpillar intranet. The PPRD is part of a suit of tools known as QRWB. QRWB is a reusable framework that is used to build three-tiered client server applications on the web. The PPRD application is responsible for acquiring data about the performance of equipment in the field, reporting this data, and presenting an analysis of it. It is a three-tiered architecture that uses a Java Applet for the client, Java Servlets as the middle tier, and Oracle for the backend tier. The project uses Java as the development language. Java Servlets are being used on the server side to support the Java Applet clients. The development environment is IBM's VisualAge for Java. The server environment is built using IBM's WebSphere server, with Oracle 8 on the backend. Joe's work included reviewing the architecture, mentoring on the evolution of the QRWB framework, and the design and implementation of some of the PPRD application.

 Joseph Yoder assisted the Illinois Department of Insurance with migrating a Smalltalk framework used for four different applications. This has included fixing and extending the framework along with documenting how to build applications with the reusable framework, and building a new application with the framework.

More recently, Joseph has assisted with the redesign of a web-based C# .NET framework for ordering, import, invoicing, print, shipping and warehouse management systems. The new architecture introduces new technologies, including adding the core of an adaptive object-model to the architecture to allow the system to adapt to changing business requirements without programming. Core Technologies and Practices included: C#/.NET, SQL Server, WebServices, Soap, WCF, .NET Remoting, VisualStudio, NUnit, EDI , XML, SVN, Agile, Use Cases, UML, SOA, Web Applications and Windows Form Applications.

Additionally, Joe has mentored many industry developers, providing internal training on all aspects of the object-oriented development process. Recently he has taught Java, C#, Agile Development, Test Driven Development (TDD), Enterprise-Level Services and .NET Web Services, Software Configuration Management and Version Control, Smalltalk, Design Patterns, Refactory, Building Dynamic Systems, Frameworks, Object-Oriented Analysis and Design and has mentored the developers on the many of their applications.

Consulting and Training Highlights
- Caterpillar - Architecture, Design, Training, Mentoring, and Framework Development
- Motorola - On-Site Design Pattern Training and Mentoring
- Cisco - On-Site Design Patterns Training
- US Navy and Innovative Professional Solutions, Inc. - Refactoring, Analysis, Design, and Development
- US Navy Air Warfare System – Design Pattern Training
- Reliance Communications - Application Development and Agile Consulting
- Communications Security Establishment - Adaptive Object Model Consulting and Mentoring
- Donovan Data Systems - Object Oriented Design and Patterns Training and Mentoring
- MedImpact Healthcare Systems, Inc. - Refactoring Training
- Utah Education Network - Design Patterns Training
- Illinois Department of Insurance – Refactoring, Design, Development and Mentoring
- Illinois Department of Public Health - Training, Design, Mentoring, and Review; including development of various Medical Systems
- Iron Mountain Fulfillment Services - Architecture, Analysis, Design Training and Mentoring. including development of various Manufacturing and Financial Systems

Training, Consulting, and Mentoring Overview

Joe takes an active role in creating and developing interactive and informative training and mentoring formats for programming, design, and best practice lessons in the following areas.

- Agile Design and Estimating
- Introduction to Agile Projects and Agile Development
- Agile Best Practices - Beginners, Intermediate, and Advanced Courses
- Introduction to Testing and Testing Best Practices
- Test Driven Development Beginners, Intermediate, and Advanced Courses
- Software Configuration Management and Version Control
- Developing and Testing Enterprise-Level Services and .NET Web Services
- Java/C#/.NET Development - Beginners, Intermediate, and Advanced Courses
- Object Oriented Design - Beginners, Intermediate, and Advanced Courses
- Advanced Object-Oriented Development for Java/C#/.NET Programmers
- Design Patterns Beginners, Intermediate, and Advanced Courses
- Beginners and Intermediate Refactoring and Testing Courses
- Advanced Refactoring and Continuous Integration Testing
- Building Dynamic Systems (Adapting to Changing Business Requirements)

Joseph Yoder has expertise in the following areas:

- Adaptive Object-Models – Adaptive Object Models (www.adaptiveobjectmodel.com) makes it easier for systems to adapt to new rules, policies, and features without programming. Joe has done pioneering research in this area and has published these results at various Object Oriented and Software Engineering conferences. These publications can be found at the abovementioned website.

- Patterns – Joseph Yoder also offers unparalleled expertise in design patterns. Patterns distill recurring architectural, structural, and functional motifs employed by experienced designers when they construct their systems. Patterns have been proven to greatly facilitate the development process and give analysts, designers, and developers a common design vocabulary.

- Lightweight Methodologies – Joe has been working with objects for around fifteen years, and this experience has exposed him to the lightweight, nimble, agile style of development that emerged from this community. He is primarily a proponent of a modern, lightweight, incremental, evolutionary object-oriented development process based on proven practices that have been cultivated in object-oriented development circles for nearly thirty years. Contemporary manifestations of some of these practices include James Highsmith's Adaptive Development, Alistair Cockburn's Crystal development, the SCRUM model, and Martin Fowler's "New Method". Perhaps the best known of these methods is Beck's eXtreme Programming (XP) methodology. Joe's approach utilizes a number of the practices that Beck advocates, such as collaboration, testing, feedback, and adaptation. This development process has especially proven very useful for object-oriented design and web-based applications. Agile coupled with Test Driven Development (TDD) provides the means with which to create lightweight and adaptable systems.

- Web-Based Experience – Joe has been involved with the web since Mosaic emerged from NCSA. He has built a variety of object-oriented web-based applications, employing a wide range of different technologies. He also has extensive academic and commercial website design and implementation experience.

- Framework evolution – Joe has been involved with some of the groundbreaking work in the area of framework and object evolution. He has applied these insights he has cultivated from frameworks for a variety of domains. The results of his work can be found at:
  http://joeyoder.com/research/frameworks

- Reuse – Reuse is often touted as one of the benefits of object-oriented technology. However, merely using object-oriented languages and tools will not make one's system reusable. It takes a gift for abstraction, patience, commitment, and experience to glean reusable classes, components and frameworks from the applications that spawn them. Joe has experience on how to make reuse work. Joe has built a number of successful object-oriented frameworks, and reused these frameworks to build new applications.

- Enterprise Library – Joe was involved in the architectural design and implementation of IDPH's Enterprise Library. This consisted of a set of reusable frameworks and components for building Enterprise applications. He also assisted Caterpillar with similar work.

- Security and Persistence – Joe has some particular expertise in this area, and have incorporated our insights into a number of systems, including systems for IDPH and Caterpillar. Joe's work in this area has been published and validated as proven techniques in Industry.

- Leadership and Entrepreneurial Experience – Joe has been involved in forming and successfully operating many different business models. This allowed him to lead groups of employees into specified business goals. His leadership has been made possible by his understanding of business principles and the ever changing landscape of technology.

Summary of Related Projects

The following is a list of related projects that Joe has been involved with. The projects presented are related medical, web-based, and object-oriented applications.

Medical Systems

- **AbdoExam** - An Interactive Graphical and Textual Abdominal Examination Record System developed as a prototype to research ways to assist the physician during their examination. The design and implementation used object-oriented and hypertext techniques.

- **MEDIGATE** - The MEDIGATE System (Medical Examination Direct Iconic and Graphic Augmented Text Entry System) is a computer enhanced interactive graphic and textual record of the findings from physical examination designed to provide ease of user input and to support organization and processing of the data characterizing these findings. The design of this system employees an object-oriented approach through the direct manipulation of graphical objects integrated with hypertext and semantic networking technologies to build a system that is more natural to the user. The results of this system were written up as Joe's Masters Thesis.

- **MEDISTAT** - MEDISTAT is designed to record and help interpret laboratory results, more specifically pathology results. The application incorporates graphical pattern matching along with some primitive diagnostic capabilities. Object-oriented design and implementation and hypertext techniques are used throughout to provide for easy ways to build the diagnostic application to the needs of individual users.

- **Ragged Edge Health Risk Appraisal** - This video game for junior-high or high school health education classes was mentioned by the Wall Street Journal on June 21, 1989. It is a real-time non-prescriptive health education video game, which demonstrates (but does not preach) the effects of health behavior choices on undesirable outcomes such as mortality, disfigurement, or even the loss of a driver's license.

- **Aids Health Risk Appraisal** - The AIDS/HIV Health Risk Appraisal is a confidential interactive risk communication computer program designed to answer: "What is the probability that I have ever been exposed to HIV, and do I need a blood test?" and "What is the probability that I have been exposed to HIV in the last year, and how do I reduce that probability in the next year?"

- **Blood Bank Analysis Tool** - The Blood Bank Analysis System is a computer-based decision support tool for blood banks and the blood banking industry to assist in estimation of the medical,

economic, legal and policy consequences of current vs. alternative screening test sequences for human immunodeficiency virus (HIV) and for hepatitis markers in donated blood. This system was designed and implementation using object-oriented techniques and languages and was deployed on Windows.

- **Newborn Screening** - This is a project by the Illinois Department of Public Health to provide a computerized system to help support the screening of newborns. There are a few genetic diseases that if observed in the very early years of the life of a baby, they can be treated and the individual can live a normal life. This is an object-oriented system that is being developed in VisualAge Smalltalk. Work is being done for developing Enterprise objects that can be used as the building blocks for quite a few other projects.

- **Refugee System** - This is a project by the Illinois Department of Public Health to provide a computerized system to help support the screening of refugees as they enter the country. There are different medical observations and follow-ups that need to be done when a new refugee enters the state and this system supports the collection of those observations along with the necessary follow-up. This is an object-oriented system that was developed in VisualAge Smalltalk using en enterprise framework. This system interfaces with a DB2 database for persisting the collected values.

- **Food Drug and Dairy System** - This is a project by the Illinois Department of Public Health, which is replacing and enhancing their mainframe systems for inspecting and following up with food, drug and dairy farms and manufacturers. This is an object-oriented system that was originally being developed in VisualAge Smalltalk using an en enterprise framework. This system interfaces with a DB2 database for persisting the collected values and for reporting.

Other Various Systems *(in addition to some of the above mentioned medical systems)*

- **Wheel Loader Information System** - We have developed a large scale X-window program that accesses a relational database system for keeping track of the specifications of equipment for Caterpillar. A metadata environment was created for generating the UIMX, Oracle, and C code that was then compiled based upon the descriptive metadata. This allowed for major changes to the code. A new table could be added to the specification database without writing and debugging tons of code since all you had to do was update the metadata describing the mapping into the real database and re-generate the application. The primary limitation was that it could not be done at run-time and compile time was starting to become very lengthy. During the technology transfer phase, Smalltalk was chosen as the language to allow for a more dynamic generation of the GUIs and the mappings to the database.

- **Scenario Planning Tool** - Scenario Planning is being studied as a potential tool to assist decision-makers be prepared for upcoming events. A scenario is a story of what might happen; possible elements are world trade, oil/commodity prices, political/economic stability, and productivity. This project was developed using ParcPlace VisualWorks and GemStone.

- **Financial Modeling Framework** – This is a fairly large financial modeling project for Caterpillar. The main result (from the point of view of Object-Oriented Solutions) is a framework for financial modeling. It lets you quickly build applications that examine financial data stored in a relational database and produces profit and loss statements, balance sheets, detailed analysis of departments, sales regions, and business lines, with the ability to drill down until you hit individual transactions. Metadata is used extensively for storing your business rules in a database.

- **Innoverse** - Innoverse is a black-box framework for telecommunications billing developed by ClearSystems. Innoverse makes it possible to quickly produce billing systems for all kinds of telecom service including cellular, PCS, local number portability, conventional local and long distance, and Immarsat satellite services. It is developed under ParcPlace Smalltalk and is integrated with Versant. It was developed using the ENVY environment. Metadata was used extensively for storing the rules in such a manner that a new application could be built with much less effort than normally.

- **Packaging Tool** - The Packaging Tool is a VisualWorks Smalltalk class library that provides structures for constructing and configuring software packages as basic components of applications. When building an image for either a run-time application or a development environment, patches, extra utilities, commercial add-ons, and modules for the application need to be filed in. These code segments often make use of classes and methods not in the base VisualWorks image. To ensure that all the code is filed in the right order, dependencies between the code pieces need to be established. This can be accomplished by grouping the code segments into packages and setting up dependencies between the packages. Building a customized image then just requires specifying which packages are desired. The Packaging Tool provides a simple interface for specifying which packages are needed with any dependencies (on other packages) they may have.

- **Warehouse Application Development** – Refactory team members were involved in a broad range of activities for Iron Mountain Fulfillment Services (IMFS), including a complete rewrite of their core backend systems and ancillary services. We were involved at the architectural level as well as design, development, and testing and implementation support. This work included the architectural design and development of Enterprise business frameworks specifically using Microsoft's .NET Frameworks and related technologies.

  This C# .NET project involved the incorporation of Adaptive Object-Model technology. Additional work included conversion of existing warehouse applications into Microsoft Windows .NET C# applications running on SQL Server. The Refactory team learned complex business domains and implemented new solutions into those domains, including: implement complex business rules for our ordering, import, invoicing, print, shipping and warehouse management systems. Core Technologies and Practices are: C#/.NET, SQL Server, WebServices, Soap, WCF, .NET Remoting, VisualStudio, NUnit, EDI , XML, SVN, Agile, Use Cases, UML, SOA, Web Applications and Windows Form Applications.

Web-Based Systems

- **Caterpillar University Relations (CUR)** - CUR is a web-application that provides a web interface to all information pertaining to Caterpillar university relations. It provides Caterpillar employees information about the areas of research available at university partners and the relationship between Caterpillar and its partners. CUR provides Caterpillar employees with the most up to date information by providing access to live data queried from a Microsoft Access database.

- **Task Management** - Task Management automates task scheduling and assignment, thus making it so that projects can become more organized. It is a tool that has allows for the task to be dynamically created and organized, prioritized, and followed up upon. There is an administrative module that includes basic security.

- **Tutorial Builder** - Tutorial Builder is a generic web-application builder that provides for a web-based graphical means for making a web-based tutorial without writing any HTML pages or CGI code. It is a tool that has allows for the end-users to create a hierarchical listing of web-pages that can be a tutorial, product information, or just about anything. There is an administrative module that includes basic security.

- **Java Image Scroller** - Java Image Scroller is a JAVA program that allows for images to be scrolled on the screen and have a URL associated with them. The images and URL's are read from a file thus making it so that the desired behavior can be customized to suite the end-user of the application.

- **Database Management Tool** - The Database Management Tool serves as a bridge between a legacy flat files database and an Oracle database. The DBMT can be used to move any flat files database into an Oracle database. Only existing flat files are currently served by the DBMT, but future releases will allow for a flat files database to be created as well. The DBMT provides a simple, graphical interface which allows people who have no experience with SQL, Oracle, or UNIX to perform database tasks such as loading and deleting data

- **Java Graph** - This dynamic tool allows the user to plot a set of data points on a two-dimensional Cartesian Coordinate System. The four different types of plot fitting offered are: Linear, Quadratic, Polynomial of exact degree 3 (P3), Power Law which are added functions which have proved this instrument to be invaluable.

- **PLoP Registration System** - This system is a Java web-application that uses a secure server for taking credit card registrations for the Pattern Language of Programming (PLoP) conferences. This system is used for conferences World Wide and was developed using the Security and Persistence patterns published by Joseph Yoder and used in both IDPH and Caterpillar systems.

- **Scaleable eCommerce Solutions** - The commerce solutions provide the client an expansive solution for meeting the needs of their clients. The systems can be scaled according to client needs. All online sites include order processing, secure credit card handling within high level PCI compliance guidelines, shipping calculations, and tax processing.