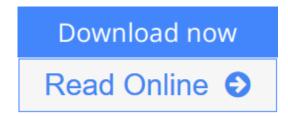# Building Web Applications with UML (2nd Edition)

By Jim Conallen

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This edition has been revised and updated to reflect the latest techniques and issues surrounding the development of software and systems for the web in 2002. Included is enhanced coverage of the latest security concerns regarding web applications.

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Editorial Review

Amazon.com Review
The Universal Modeling Language (UML) is a flexible and comprehensive way to design and diagram any software development project. *Building Web Applications with UML* covers the Web Application Extension (WAE) for UML and includes enough background information about Web applications to ease traditional software analysts and designers into the world of the Web.

Author Jim Conallen divides the text into two logical parts: the first is dedicated to explaining the various Web application architectures out there, the second to the process of modeling such systems with UML. The first chapter concisely explains the basics of the standard elements of the Web such as HTML, HTTP, forms, frames, and session management. Subsequent chapters provide an excellent overview to server-side and client-side functionality, delving into key technologies such as Active Server Pages (ASP), Java applets, and XML.

The remainder of the book is devoted to defining the requirements, architecture, and design elements of Web applications using UML. The reader will learn about Use Cases, apply analysis, and represent Web applications with the distinctive graphical elements of UML. A sample ASP application is used to illustrate the concepts. This material may be a level of abstraction above the working coder but is excellent for project managers and system architects. *--Stephen W. Plain*

Topics covered: Browser/Server interactions, Web page design elements, session management, dynamic client and server languages, Web security, model design, use cases, requirement specifications, analysis, sequence diagrams, and class diagrams.

From the Inside Flap

Late in 1996, I downloaded the preview edition of Microsoft's Active Server Pages. It was my first taste of what could be done on the Web. Even then I could see the potential for sophisticated Web applications. I began to investigate alternative architectures: CGI (Common Gateway Interface) and Allaire's Cold Fusion. Even before then, I had started tinkering with the Java beta and later bought Symantec's CafE to experiment with this new language.

At that time, I was an independent consultant working for AT&T in New Jersey. The project had nothing to do with the Web, so my only opportunity to experiment with this technology was during the evenings and whatever spare time I could find. In the end, it was all worth it. I learned a lot and was prepared for the coming onslaught and frenzy of Web application development.

My first opportunity to build a real Web application came at the request of a friend whose father owned a live cut rose wholesale and retail company, Hortico Nurseries Inc. Hortico was interested opening up a retail sales front on the newly emerging Internet. Together with a mutual friend, Jeff Wilkinson, we built our first production e-commerce site. The site was simple. It allowed customers to browse and to search a database of more than 1,400 varieties of roses and even to place orders. At first, the site didn't generate as many orders as we had hoped, but it did expose Hortico to a new market and certainly helped it's sales grow in other ways. To the best of our knowledge, Hortico was the first Web site to make a comprehensive catalog of rose varieties and pictures available to the Internet community. Jeff has pretty much taken over the management of the site, and I help when I can. He has gone on to win awards for Web site design for some of his other

projects, and I moved on to other contracts.

My first professional contract dealing with Web applications was with a small start-up company in the healthcare business. This experience got me even more involved with the subtleties of building Active Server pages (ASP) applications, especially with the issues of managing server-side resources and transaction management in a Web application environment. I learned a lot about the use of client-side scripting, applets, and ActiveX controls. I also learned a valuable lesson about testing applications: Client machines with different operating systems can behave differently with the exact same HTML, Java, and browser code. All of these experiences have driven me even more to a belief that Web applications need to be modeled and built just like any other complex software system. In the years that followed, I continued to experiment with the latest Web technologies and consulted with other companies with Web-related issues.

All throughout my Web application experiences, I tried to practice my object-oriented skills in the area of Web application development. I had little problem applying use case analysis, and it wasn't until I started creating analysis and design models that I realized that things were going to get difficult. When creating a Web application, my conceptual focus was always on the Web page. My idea of a model kept revolving around the concept of a site map. I knew that the navigation paths throughout the system were incredibly important to the understanding of the application and that any model of the system would have to include them.

My earliest attempts at modeling Web applications started with Rumbaugh's OMT (Object Modeling Technique); later, when UML version 0.8 was publicly released, I began to apply it. I knew that for any modeling technique to be useful, it needed to both capture the relevant semantics of Web-specific elements, such as Web pages and hyperlinks and their relations to the back-end elements of the systemo middle tier objects and databases. At the time, I found both OMT and UML inadequate to express the things I thought were important in a Web application.

Being a somewhat successful object practitioner and engineer, I jumped to the conclusion that a whole new development methodology and notation were needed. After all, if the existing methods and notation didn't have what I needed, the obvious solution was to invent new ones. This, of course, is a trap that many of us in the software industry fall into. In my free time, I started to draft new graphical and semantic ways to represent Web application architectures. Proud of my work, I began showing it to two of my colleagues: Joe Befumo and Gerald Ruldolph, both experienced object practitioners. Their immediate reaction was: Why? I tried to explain the issues involved with Web application development and the need for visually expressing their designs. Yet everyone I spoke with continued to think that developing a new method and notation was a little overkill.

I started to rethink what I was doing. I wasn't so stuck up to think that I was still right and everyone else wrong. I had more homework to do. I reexamined my original needs: to express Web application designs at the appropriate level of abstraction and detail, and most important, as a part of the rest of the system's design. Since UML was taking the industry by storm, I realized that anything I did would have to work with UML.

So I went back to the UML. By now, it was in version 0.91, and a new concept was included: stereotypes. At first, I was clueless to what a stereotype was. The UML specification is not the easiest reading, after all. It was long and difficult, but I knew that any success in the area of modeling Web applications had to come from this direction. Eventually, I started to understand what was meant by stereotyping and the other extension mechanisms: tagged values and constraints. I was finally starting to see light at the end of the tunnel.

I now had a mechanism with which I could introduce new semantics into the UML grammar without

disturbing the existing semantics. I always knew that the key was to provide a consistent and coherent way to model Web-specific elements at the right level of abstraction with the models of the rest of the system. The UML extension mechanism provided me with the framework to do so.

The next step was to start defining the extension by creating stereotypes, tagged values, and constraints. For me, the ability to use custom icons in diagrams with stereotyped elements went a long way to ease my concern for intuitive diagrams; also, Rational Rose, my visual modeling tool of choice,1 had just introduced a way to use one's own stereotypes in Rose models. I quickly created a set of icons for Web page abstractions. I tried to make them consistent, mostly rectangular with the stereotype indication in the upper-left corner. I used filled-in dog ears to represent pages and unfilled dog ears2 to denote components. Icons without any dog ears typically represented contained classes, which cannot be requested directly by a Web browser. The icon for Web page components is pretty much a copy of the icon used by the three amigosoGrady Booch, James Rumbaugh, and Ivar Jacobsonoin their book, The Unified Modeling Language User Guide (Addison Wesley Longman, 1999).

Looking back, I remember spending less than a day to draw up the icons. I didn't spend much time on it then, since I always believed that eventually someone with a little more experience would design some meaningful ones. In the almost two years since then, they have remained essentially the same. I am surprised that I have received absolutely no comments on the style of the icons from the hundred or more people who have been using them. I think that for this version of the extension, the style of icons is gonna stick.

As the extension evolved and a lot of the details and inconsistencies were getting corrected, I always kept an eye out for code-generation possibilities. In my mind, the modeling technique could be validated if it were possible, in theory only, to unambiguously generate and reverse engineer code. Since most of my experience was with Microsoft Active Server Pages, I began creating Rational Rose scripts to forward engineer ASP code. I've tailored the scripts to create Java Server Pages code also; from a code structure point of view the two are very similar.

From that point, things proceeded at a tremendous rate. I published a white paper on the Internet and presented the topic at the 1998 Rational User's Conference in Orlando, Florida. Grady Booch took an interest in the work and encouraged me. Addison Wesley Longman asked whether I was interested in expanding the topic into a book. If I had only known how difficult was going to be to write, I'm not sure that I would have agreed. I followed the original white paper with a stream of other articles for both online and print publications and started to get a regular stream of e-mail comments on the extension.

By the time this book hits the streets, I will have introduced the topic at five professional conferences and written at least a dozen articles and white papers on the topic. Ideally, this book will continue to propel the recognition that Web application development is a serious topic and one from which we can learn and adopt the successful practices of the past.

Jim Conallen
August 19991. All of the sample models used in this effort were developed with Rational Rose. I had worked with the Rose tools for many years prior to this and have recently given up independent consulting to join the Rational team. (My praise of the Rose tool, however, would have been made even if I were not a current Rational employee.)
2. A dog ear is the slang term for a bent or folded corner of paper.
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From the Back Cover

This is a new edition of the widely acclaimed *Building Web Applications with UML*. Based on the author's extensive experience as a Web developer, it incorporates helpful reader feedback, identifies and addresses modeling problems unique to page-based Web applications, and offers practical advice and straightforward solutions.

This thoroughly revised *Second Edition* reflects the latest techniques and issues surrounding the development of software and systems for the Web. You will find:

- Updated, expanded examples and diagrams
  - Enhanced coverage of the latest Web application security concerns
  - Detailed coverage of proven object technology concepts as applied to the development of Web applications

Robust, scalable, and feature-rich Web applications are attainable. Using the industry-standard Unified Modeling Language (UML) to create designs allows Web application developers to easily integrate them with other systems modeled in UML.

Written for project managers, architects, analysts, designers, and implementers, **Building Web Applications with UML, Second Edition** , demystifies the challenging aspects of modeling with the Web Application Extension (WAE) for the Unified Modeling Language. Because UML has been widely accepted as the standard language for modeling software systems, it is without question the best option for modeling Web application designs. The WAE extends the UML notation with semantics and constructs that empower you to model Web-specific architectural elements using the Rational Unified Process or an alternative methodology. Furthermore, using UML allows the modeling of Web applications as a part of the complete system and the integration of the business logic that must be reflected in each application.

With this book as your guide, you will be able to gain a clear understanding of how to address the unique problems of modeling the design of page-based Web applications, and more important, how to take your model directly into working code.

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Users Review

From reader reviews:

Howard Foster:

What do you think of book? It is just for students as they are still students or it for all people in the world, exactly what the best subject for that? Just you can be answered for that concern above. Every person has several personality and hobby for each and every other. Don't to be obligated someone or something that they don't need do that. You must know how great along with important the book Building Web Applications with UML (2nd Edition). All type of book can you see on many sources. You can look for the internet methods or other social media.

Andrew Joy:

A lot of people always spent their own free time to vacation or perhaps go to the outside with them family members or their friend. Do you realize? Many a lot of people spent many people free time just watching TV, or playing video games all day long. If you would like try to find a new activity that's look different you can read the book. It is really fun for yourself. If you enjoy the book that you simply read you can spent the entire day to reading a e-book. The book Building Web Applications with UML (2nd Edition) it is rather good to read. There are a lot of folks that recommended this book. They were enjoying reading this book. When you did not have enough space to bring this book you can buy the actual e-book. You can m0ore quickly to read this book from the smart phone. The price is not very costly but this book possesses high quality.

Lucia Stevenson:

People live in this new day time of lifestyle always attempt to and must have the time or they will get lot of stress from both lifestyle and work. So , once we ask do people have free time, we will say absolutely yes. People is human not a robot. Then we ask again, what kind of activity are you experiencing when the spare time coming to a person of course your answer can unlimited right. Then do you ever try this one, reading ebooks. It can be your alternative throughout spending your spare time, typically the book you have read is usually Building Web Applications with UML (2nd Edition).

Armando Morris:

The book untitled Building Web Applications with UML (2nd Edition) contain a lot of information on it. The writer explains the woman idea with easy technique. The language is very clear to see all the people, so do not really worry, you can easy to read the item. The book was written by famous author. The author will take you in the new period of literary works. You can easily read this book because you can read more your smart phone, or program, so you can read the book with anywhere and anytime. In a situation you wish to purchase the e-book, you can open their official web-site and also order it. Have a nice examine.

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