

THE EXPERT'S VOICE® IN JAVA

Beginning EJB 3

Java EE 7 Edition

*GET STARTED WITH ENTERPRISE
JAVABEANS FOR YOUR ENTERPRISE
APPLICATIONS*

Jonathan Wetherbee, Chirag Rathod, Raghu Kodali, and Peter Zadrozny

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To my sons -- Jacob, Patrick, and Nicholas -- for your love, support and inspiration throughout this endeavor.

– *Jon Wetherbee*

To Shaylee and Ashwini.

– *Chirag Rathod*

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About the Authors



Jon Wetherbee is a consulting engineer and tech

lead for EJB development tools on Oracle's JDeveloper IDE. He has over 20 years of experience in development at Oracle, working on a variety of O/R mapping tools and overseeing Oracle's core EJB toolset since EJB 1.1. Most recently, Jon has been responsible for the design and development of EJB and JPA data binding solutions for ADF, Oracle's application development framework.

Prior to joining the JDeveloper project, Jon was a product manager for Oracle's CASE (computer-aided software engineering) tools and worked on early object-relational frameworks. He received a patent in 1999 for his work on integrating relational databases in an object-oriented environment. Jon is coauthor of the first edition of this book, *Beginning EJB 3 Application Development: From Novice to Professional*, and has published articles online in Java Developer's Journal and Oracle Technical Network. He enjoys speaking, and has given talks at conferences and developer groups, including Oracle's iDevelop (Bangalore, Taipei), The Server Side Java Symposium (Barcelona), and various Java user groups. Jon holds a Bachelor of Science degree in cognitive science from Brown University.



Chirag Rathod is a principal engineer

responsible for developing and supporting design time features for EJB and CDI in Oracle's JDeveloper IDE. He has over 14 years of experience in developing development tools. Prior to joining the JDeveloper IDE team, he helped develop Oracle's flagship products like Oracle SQL*Plus, Oracle Forms, and Oracle Designer. Chirag received a Bachelor of Engineering degree in computer science from The Faculty of Technology and Engineering, Maharaja Sayajirao University.



Raghu Kodali is vice president of Product

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Peter Zadrozny is a veteran of the software

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About the Technical Reviewer



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website at <http://armel-ndjobo.developpez.com> .

Preface

Dear Reader,

When we conceived the original edition of this book in 2006, the lightweight EJB 3 API was still in its early stages, yet it was clear to us that the EJB specification designers had at last achieved the right blend of power and usability. Coming from the EJB 2.x world, it was like a breath of fresh air, and reminded us of how it felt to discover Java technology after years of programming C and C++. The EJB component, redefined as an ordinary Java class whose metadata could be declared through Java annotations, and enhanced by the introduction of generics, container injection, and interceptors, became the basis for a much more nimble development model: one that gained elegance through simplicity. Enter the new Java Persistence API (JPA), where entities, too, were recast as lightweight Java classes and O/R mapping metadata could be specified through spec-defined annotations, and we suddenly had a comprehensive enterprise component model comprising the latest technologies, all rolled into a worldwide standard. So you can see what got our buzz going. Fast forward to now, and the release of the EJB 3.2 and JPA 2.1 specs. Spanning over a thousand pages combined, these specifications have matured to address a number of new areas and improve upon their ease of use. Once again we saw an opportunity to translate this latest material into an approachable format that reads well and makes liberal use of examples that you can build, execute, and further explore on your own machine. In this second edition, accompanying the release of Java EE 7, we introduce the EJB 3.2 and JPA 2.1 APIs along with key features in the CDI and JAX-RS specifications through a series of digestible chapters, allowing you to become comfortable with these technologies one topic at a time. Within each chapter we provide executable source code examples that demonstrate how each feature works, and how the pieces fit together. So you don't have to swallow the whole enchilada in one humongous gulp. In the spirit of our Apress Wines Online application, which we use for numerous examples throughout the book, we want you to truly savor and appreciate the richness of the Java EE 7 component ecosystem.

For each technology we provide straightforward examples, but we also strive to explain when and where to use its features and what their strengths and weakness are, and offer insights into best usage practices. Following these topical explorations, we explain how to integrate EJB and related components into a comprehensive Java EE 7 application, and then turn the spotlight on transaction management, performance analysis, deployment, testing in an Embeddable EJB Container, and how to build solid EJB clients.

Our job is to transform you from EJB novice to expert, and we want you to enjoy the ride!

Jonathan Wetherbee, Chirag Rathod, Raghu Kodali, and Peter Zadrozny

Who should read this book?

This book is targeted at enterprise software developers who are experienced with Java; have built single tier or multitier applications using earlier versions of EJB; related

technologies such as Spring, or custom service frameworks; and are ready to take on the challenges and rewards of building enterprise applications using standards-based technology.

As authors of an introductory-level text, we have two main goals:

- Our first goal is to get you comfortable working with the many essential elements of EJB and several closely related technologies so that you can design, build, deploy, execute, and test comprehensive enterprise applications in a Java EE environment. We expect you to be able to come away with a sense of ease with the nuts and bolts required to build and assemble an application based on EJB components.
- Our second goal is to provide you with a broad perspective on the service and persistence tiers of Java EE as a whole and, in particular, on the full range of features offered by EJB. We intend for you to leave this book holding a breadth-first foundation that will serve as a launchpad from which to explore specific areas of the EJB and related specifications in greater depth.

To this end, this book strives to provide an approachable on-ramp to EJB that gets you comfortable with building services and applications that exercise the full breadth of EJB. We deliberately avoid diving deep into many areas of the spec, so that you can get familiar with the overall environment without getting distracted by the minutia of fine-grained options. We feel that this breadth-first foundation—based on a solid understanding of the broad range of features offered by EJB—will put you in the best position to then explore in greater depth, using the specification and other advanced texts as your reference guides, specific areas of the EJB API that are required for your own software development projects.

Acknowledgments

This book is borne of the efforts and insights of people who provided both technical input and pure inspiration throughout its life. In particular, I would like to thank my colleague and principal coauthor of this second edition, Chirag Rathod, for his insight, spirit, and dedication at all stages of the endeavor. Late nights and early mornings are made lighter when a close collaborator is also such a good friend! Raghu Srinivasan and John Bracken were invaluable in design meetings and discussions of EJB and JPA best practices. Chris Carter supported me on my quest, even when it took my attentions away from JDeveloper; he knew that the insights gained from researching and writing this book would surely pay back dividends to the team. And an enjoyable hour and a half with Marina Vatkina discussing the latest state and future directions of EJB 3.2 was both enlightening and timely.

With the technical help from all of the above, writing a book on this topic I hold dear would have been a mere marathon, if it weren't for all of the diversions of everyday life! But for these welcome distractions, I would like to single out a few individuals among many. Adam Beyda and Lauren Webster have given me a lifetime of insight and perspective on what really matters. And Bob Lieb's deep guidance and navigation through the psychological waters of writing a book was essential. Rhonda Jeffrey, Andy Cortwright, Dave Clark, and Marianna Klebanov: thank you for being good sounding boards and wonderful friends during this past year.

My parents, Andrea and Peter Wetherbee, thank you for your love and encouragement and the constant reminder that you are my biggest fans.

In the end, my primary motivation for punching this thing through came from the desire to, once again, spend more time with my children and close friends. That time is now!

Jon Wetherbee

When Jon Wetherbee asked me if I would be interested in doing a "non-work" related project with him, I had no idea about what I would be getting into. I would like to thank Jon for giving me this wonderful opportunity of coauthoring this second edition. For me he is more than a lead author—he is a friend and guide who led me through the path that resulted in this book.

I would like to thank Srinivasan T. Raman and Chris Carter who not only supported me during this endeavor but also encouraged me. I would have burnt a lot more midnight oil writing this book if Oracle would not have given me time and resources. For this I am grateful to Oracle Corporation.

My parents, Chandrabala and Jayantilal Rathod, thank you for your love. Last but not least I would like to thank my wife Ashwini and daughter Shaylee for making me feel like an "author" who was authoring the next "bestseller."

Chirag Rathod

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