

Hibernate 实战

(第2版·英文版)

JAVA
PERSISTENCE
WITH
HIBERNATE

Christian Bauer Gavin King 著

- Hibernate之父亲自执笔
- 无可替代的Hibernate权威参考
- 涵盖Hibernate 3.2



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图灵程序设计丛书

Java系列



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内 容 提 要

本书全面讲述了 Hibernate 和 Java Persistence，并对两者进行了详细的对比分析。书中通过一个应用将数百个例子融合起来，不仅深入剖析了 Hibernate 3.2 和 Java Persistence 丰富的编程模型，还深刻阐述了数据库设计、对象 / 关系映射（ORM）和优化等方面的基本原则、策略和最佳实践。书中处处闪烁着作者超凡的真知灼见，将大大升华读者对 ORM 乃至企业级应用开发的理解。

本书适合广大的开发人员，从 ORM 的初学者到经验丰富的开发人员。

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Praise for the First Edition

“2005 Best Java Book!”

—*Java Developer's Journal*

Hibernate In Action has to be considered the definitive tome on Hibernate. As the authors are intimately involved with the project, the insight on Hibernate that they provide can't be easily duplicated.

—*JavaRanch.com*

“Not only gets you up to speed with Hibernate and its features...It also introduces you to the right way of developing and tuning an industrial-quality Hibernate application. ...albeit very technical, it reads astonishingly easy...unfortunately very rare nowadays...[an] excellent piece of work...”

—*JavaLobby.com*

“The first and only full tutorial, reference, and authoritative guide, and one of the most anticipated books of the year for Hibernate users.”

—*Dr. Dobb's Journal*

“...the book was beyond my expectations...this book is the ultimate solution.”

—*Javalobby.org*, (second review, fall 2005)

“...from none others than the lead developer and the lead documenter, this book is a great introduction and reference documentation to using Hibernate. It is organized in such a way that the concepts are explained in progressive order from very simple to more complex, and the authors take good care of explaining every detail with good examples. ...The book not only gets you up to speed with Hibernate and its features (which the documentation does quite well). It also introduces you to the right way of developing and tuning an industrial-quality Hibernate application.”

—*Slashdot.org*

“Strongly recommended, because a contemporary and state-of-the-art topic is very well explained, and especially, because the voices come literally from the horses' mouths.”

—*C Vu, the Journal of the ACCU*

"The ultimate guide to the Hibernate open source project. It provides in-depth information on architecture of Hibernate, configuring Hibernate and development using Hibernate...It also explains essential concepts like, object/relational mapping (ORM), persistence, caching, queries and describes how they are taken care with respect to Hibernate...written by the creators of Hibernate and they have made best effort to introduce and leverage Hibernate. I recommend this book to everyone who is interested in getting familiar with Hibernate."

—*JavaReference.com*

"Well worth the cost...While the on-line documentation is good, (Mr. Bauer, one of the authors is in charge of the on-line documentation) the book is better. It begins with a description of what you are trying to do (often left out in computer books) and leads you on in a consistent manner through the entire Hibernate system. Excellent Book!"

—*Books-on-Line*

"A compact (408 pages), focused, no nonsense read and an essential resource for anyone venturing into the ORM landscape. The first three chapters of this book alone are indispensable for developers that want to quickly build an application leveraging Hibernate, but more importantly really want to understand Hibernate concepts, framework, methodology and the reasons that shaped the framework design. The remaining chapters continue the comprehensive overview of Hibernate that include how to map to and persist objects, inheritance, transactions, concurrency, caching, retrieving objects efficiently using HQL, configuring Hibernate for managed and unmanaged environments, and the Hibernate Toolset that can be leveraged for several different development scenarios."

—*Columbia Java Users Group*

"The authors show their knowledge of relational databases and the paradigm of mapping this world with the object-oriented world of Java. This is why the book is so good at explaining Hibernate in the context of solving or providing a solution to the very complex problem of object/relational mapping."

—*Denver JUG*

foreword to the revised edition

When *Hibernate in Action* was published two years ago, it was immediately recognized not only as the definitive book on Hibernate, but also as the definitive work on object/relational mapping.

In the intervening time, the persistence landscape has changed with the release of the Java Persistence API, the new standard for object/relational mapping for Java EE and Java SE which was developed under the Java Community Process as part of the Enterprise JavaBeans 3.0 Specification.

In developing the Java Persistence API, the EJB 3.0 Expert Group benefitted heavily from the experience of the O/R mapping frameworks already in use in the Java community. As one of the leaders among these, Hibernate has had a very significant influence on the technical direction of Java Persistence. This was due not only to the participation of Gavin King and other members of the Hibernate team in the EJB 3.0 standardization effort, but was also due in large part to the direct and pragmatic approach that Hibernate has taken towards O/R mapping and to the simplicity, clarity, and power of its APIs—and their resulting appeal to the Java community.

In addition to their contributions to Java Persistence, the Hibernate developers also have taken major steps forward for Hibernate with the Hibernate 3 release described in this book. Among these are support for operations over large datasets; additional and more sophisticated mapping options, especially for handling legacy databases; data filters; strategies for managing conversations; and

integration with Seam, the new framework for web application development with JSF and EJB 3.0.

Java Persistence with Hibernate is therefore considerably more than simply a second edition to *Hibernate in Action*. It provides a comprehensive overview of all the capabilities of the Java Persistence API in addition to those of Hibernate 3, as well as a detailed comparative analysis of the two. It describes how Hibernate has been used to implement the Java Persistence standard, and how to leverage the Hibernate extensions to Java Persistence.

More important, throughout the presentation of Hibernate and Java Persistence, Christian Bauer and Gavin King illustrate and explain the fundamental principles and decisions that need to be taken into account in both the design and use of an object/relational mapping framework. The insights they provide into the underlying issues of ORM give the reader a deep understanding into the effective application of ORM as an enterprise technology.

Java Persistence with Hibernate thus reaches out to a wide range of developers—from newcomers to object/relational mapping to experienced developers—seeking to learn more about cutting-edge technological innovations in the Java community that have occurred and are continuing to emerge as a result of this work.

LINDA DEMICHIEL
Specification Lead
Enterprise JavaBeans 3.0 and Java Persistence
Sun Microsystems

foreword to the first edition

Relational databases are indisputably at the core of the modern enterprise.

While modern programming languages, including Java™, provide an intuitive, object-oriented view of application-level business entities, the enterprise data underlying these entities is heavily relational in nature. Further, the main strength of the relational model—over earlier navigational models as well as over later OODB models—is that by design it is intrinsically agnostic to the programmatic manipulation and application-level view of the data that it serves up.

Many attempts have been made to bridge relational and object-oriented technologies, or to replace one with the other, but the gap between the two is one of the hard facts of enterprise computing today. It is this challenge—to provide a bridge between relational data and Java™ objects—that Hibernate takes on through its object/relational mapping (ORM) approach. Hibernate meets this challenge in a very pragmatic, direct, and realistic way.

As Christian Bauer and Gavin King demonstrate in this book, the effective use of ORM technology in all but the simplest of enterprise environments requires understanding and configuring how the mediation between relational data and objects is performed. This demands that the developer be aware and knowledgeable both of the application and its data requirements, and of the SQL query language, relational storage structures, and the potential for optimization that relational technology offers.

Not only does Hibernate provide a full-function solution that meets these requirements head on, it is also a flexible and configurable architecture. Hibernate's developers designed it with modularity, pluggability, extensibility, and user customization in mind. As a result, in the few years since its initial release, Hibernate has rapidly become one of the leading ORM technologies for enterprise developers—and deservedly so.

This book provides a comprehensive overview of Hibernate. It covers how to use its type mapping capabilities and facilities for modeling associations and inheritance; how to retrieve objects efficiently using the Hibernate query language; how to configure Hibernate for use in both managed and unmanaged environments; and how to use its tools. In addition, throughout the book the authors provide insight into the underlying issues of ORM and into the design choices behind Hibernate. These insights give the reader a deep understanding of the effective use of ORM as an enterprise technology.

Hibernate in Action is the definitive guide to using Hibernate and to object/relational mapping in enterprise computing today.

LINDA DEMICHIEL
Lead Architect, Enterprise JavaBeans
Sun Microsystems

preface to the revised edition

The predecessor of this book, *Hibernate in Action*, started with a quote from Anthony Berglas: “Just because it is possible to push twigs along the ground with one’s nose does not necessarily mean that that is the best way to collect firewood.” Since then, the Hibernate project and the strategies and concepts software developers rely on to manage information have evolved. However, the fundamental issues are still the same—every company we work with every day still uses SQL databases, and Java is entrenched in the industry as the first choice for enterprise application development.

The tabular representation of data in a relational system is still fundamentally different than the networks of objects used in object-oriented Java applications. We still see the object/relational impedance mismatch, and we frequently see that the importance and cost of this mismatch is underestimated.

On the other hand, we now have a range of tools and solutions available to deal with this problem. We’re done collecting firewood, and the pocket lighter has been replaced with a flame thrower.

Hibernate is now available in its third major release; Hibernate 3.2 is the version we describe in this book. Compared to older Hibernate versions, this new major release has twice as many features—and this book is almost double the size of *Hibernate in Action*. Most of these features are ones that you, the developers working with Hibernate every day, have asked for. We’ve sometimes said that Hibernate is a 90 percent solution for all the problems a Java application devel-

oper has to deal with when creating a database application. With the latest Hibernate version, this number is more likely 99 percent.

As Hibernate matured and its user base and community kept growing, the Java standards for data management and database application development were found lacking by many developers. We even told you not to use EJB 2.x entity beans in *Hibernate in Action*.

Enter EJB 3.0 and the new Java Persistence standard. This new industry standard is a major step forward for the Java developer community. It defines a lightweight and simplified programming model and powerful object/relational persistence. Many of the key concepts of the new standard were modeled after Hibernate and other successful object/relational persistence solutions. The latest Hibernate version implements the Java Persistence standard.

So, in addition to the new all-in-one Hibernate for every purpose, you can now use Hibernate like any Java Persistence provider, with or without other EJB 3.0 components and Java EE 5.0 services. This deep integration of Hibernate with such a rich programming model enables you to design and implement application functionality that was difficult to create by hand before.

We wrote this book to give you a complete and accurate guide to both Hibernate and Java Persistence (and also all relevant EJB 3.0 concepts). We hope that you'll enjoy learning Hibernate and that you'll keep this reference bible on your desk for your daily work.

preface to the first edition

Just because it is possible to push twigs along the ground with one's nose does not necessarily mean that that is the best way to collect firewood.

—Anthony Berglas

Today, many software developers work with Enterprise Information Systems (EIS). This kind of application creates, manages, and stores structured information and shares this information between many users in multiple physical locations.

The storage of EIS data involves massive usage of SQL-based database management systems. Every company we've met during our careers uses at least one SQL database; most are completely dependent on relational database technology at the core of their business.

In the past five years, broad adoption of the Java programming language has brought about the ascendancy of the object-oriented paradigm for software development. Developers are now sold on the benefits of object orientation. However, the vast majority of businesses are also tied to long-term investments in expensive relational database systems. Not only are particular vendor products entrenched, but existing legacy data must be made available to (and via) the shiny new object-oriented web applications.

However, the tabular representation of data in a relational system is fundamentally different than the networks of objects used in object-oriented Java applications. This difference has led to the so-called *object/relational paradigm* mismatch.

Traditionally, the importance and cost of this mismatch have been underestimated, and tools for solving the mismatch have been insufficient. Meanwhile, Java developers blame relational technology for the mismatch; data professionals blame object technology.

Object/relational mapping (ORM) is the name given to automated solutions to the mismatch problem. For developers weary of tedious data access code, the good news is that ORM has come of age. Applications built with ORM middleware can be expected to be cheaper, more performant, less vendor-specific, and more able to cope with changes to the internal object or underlying SQL schema. The astonishing thing is that these benefits are now available to Java developers for free.

Gavin King began developing Hibernate in late 2001 when he found that the popular persistence solution at the time—CMP Entity Beans—didn't scale to non-trivial applications with complex data models. Hibernate began life as an independent, noncommercial open source project.

The Hibernate team (including the authors) has learned ORM the hard way—that is, by listening to user requests and implementing what was needed to satisfy those requests. The result, Hibernate, is a practical solution, emphasizing developer productivity and technical leadership. Hibernate has been used by tens of thousands of users and in many thousands of production applications.

When the demands on their time became overwhelming, the Hibernate team concluded that the future success of the project (and Gavin's continued sanity) demanded professional developers dedicated full-time to Hibernate. Hibernate joined jboss.org in late 2003 and now has a commercial aspect; you can purchase commercial support and training from JBoss Inc. But commercial training shouldn't be the only way to learn about Hibernate.

It's obvious that many, perhaps even most, Java projects benefit from the use of an ORM solution like Hibernate—although this wasn't obvious a couple of years ago! As ORM technology becomes increasingly mainstream, product documentation such as Hibernate's free user manual is no longer sufficient. We realized that the Hibernate community and new Hibernate users needed a full-length book, not only to learn about developing software with Hibernate, but also to understand and appreciate the object/relational mismatch and the motivations behind Hibernate's design.

The book you're holding was an enormous effort that occupied most of our spare time for more than a year. It was also the source of many heated disputes and learning experiences. We hope this book is an excellent guide to Hibernate (or, "the Hibernate bible," as one of our reviewers put it) and also the first comprehensive documentation of the object/relational mismatch and ORM in general. We hope you find it helpful and enjoy working with Hibernate.

acknowledgments

This book grew from a small second edition of *Hibernate in Action* into a volume of considerable size. We couldn't have created it without the help of many people.

Emmanuel Bernard did an excellent job as the technical reviewer of this book; thank you for the many hours you spent editing our broken code examples. We'd also like to thank our other reviewers: Patrick Dennis, Jon Skeet, Awais Bajwa, Dan Dobrin, Deiveehan Nallazhagappan, Ryan Daigle, Stuart Caborn, Patrick Peak, TVS Murthy, Bill Fly, David Walend, Dave Dribin, Anjan Bacchu, Gary Udstrand, and Srinivas Nallapati. Special thanks to Linda DeMichiel for agreeing to write the foreword to our book, as she did to the first edition.

Marjan Bace again assembled a great production team at Manning: Sydney Jones edited our crude manuscript and turned it into a real book. Tiffany Taylor, Elizabeth Martin, and Andy Carroll found all our typos and made the book readable. Dottie Marsico was responsible for typesetting and gave this book its great look. Mary Piergies coordinated and organized the production process. We'd like to thank you all for working with us.