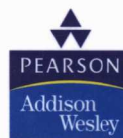


大学计算机教育国外著名教材系列 (影印版)



JAVA NETWORK PROGRAMMING AND DISTRIBUTED COMPUTING

Java网络程序设计 与分布式计算



David Reilly
Michael Reilly 著



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PREFACE

Welcome to *Java Network Programming and Distributed Computing*. The goal of this book is to introduce and explain the basic concepts of networking and discuss the practical aspects of Java network programming.

This book will help readers get up to speed with network programming and employ the techniques learned in software development. If you've had some networking experience in another language and want to apply your existing skills to Java, you'll find the book to be an accelerated guide and a comprehensive reference to the networking API. This book does not require you to be a networking guru, however, as Chapters 1–4 provide a gentle introduction to networking theory, Java, and the most basic elements of the Java networking API. In later chapters, the Java API is covered in greater detail, with a discussion supplementing the documentation that Sun Microsystems provides as a reference.

What You'll Learn

In this book, readers will learn how to write applications in Java that make use of network programming. The Java API provides many ways to communicate over the Internet, from sending packets and streams of data to employing higher-level application protocols such as HTTP and distributed computing mechanisms.

Along the way, you'll read about:

- How the Internet works, its architecture and the TCP/IP protocol stack
- The Java programming language, including a refresher course on topics such as exception handling
- Java's input/output system and how it works
- How to write clients and servers using the User Datagram Protocol (UDP) and the Transport Control Protocol (TCP)

- The advantages of multi-threaded applications, which allow network applications to perform multiple tasks concurrently
- How to implement network protocols, including examples of client/server implementations
- The HyperText Transfer Protocol (HTTP) and how to access the World Wide Web using Java
- How to write server-side Java applications for the WWW
- Distributed computing technologies including remote method invocation (RMI) and CORBA
- How to access e-mail using the extensive JavaMail API

What You'll Need

A reasonable familiarity with Java programming is required to get the most out of this book. You'll need to be able to compile and run Java applications and to understand basic concepts such as classes, objects, and the Java API. However, you don't need to be an expert with respect to the more advanced topics covered herein, such as I/O streams and multi-threading. All examples use a text interface, so there's no need to have GUI experience.

You'll also need to install the Java SDK, available for free from Sun Microsystems (<http://java.sun.com/j2se/>). Java programmers will no doubt already have access to the SDK, but readers should be aware that some examples in this text will require JDK 1.1, and the advanced sections on servlets, RMI and CORBA, and JavaMail will require Java 2.

A minimal amount of additional software is required, and most of the tools for Java programming are available for free and downloadable via the WWW. Chapter 2 includes an overview of Java development tools, but readers can also use their existing code editor. Readers will be advised when examples feature additional Sun Microsystems software.

Companion Web Site

As a companion to the material covered in this book, the book's Web site offers the source code in downloadable form (no need to wear out your fingers!), as well as a list of Frequently Asked Questions about Java Networking, links to networking resources, and additional information about the book. The site can be found at

<http://www.davidreilly.com/jnpbook/>.

Contacting the Authors

We welcome feedback from readers, be it comments on specific chapters or sections or an evaluation of the book as a whole. In particular, reader input about whether topics were clearly conveyed and sufficiently comprehensive would be appreciated. While we'd love to receive only praise, honest opinions are valued (as well as suggestions about coverage of new networking topics).

Feel free to contact us directly. While we can't guarantee an individual reply, we'll do our best to respond to your query. Please send questions and feedback via e-mail to: jnpbook@davidreilly.com.

David Reilly and Michael Reilly
September 2001

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CHAPTER 1

Networking Theory

This chapter provides an overview of the basic concepts of networking and discusses essential topics of networking theory. Readers experienced with networking may choose to skip over some of these preliminary sections, although a refresher course on basic networking concepts will be useful, as later chapters presume a knowledge of this theory on the part of the reader. A solid understanding of the relationship between the various protocols that make up the TCP/IP suite is required for network programming.

1.1 What Is a Network?

Put simply, a network is a collection of devices that share a common communication protocol and a common communication medium (such as network cables, dial-up connections, and wireless links). We use the term *devices* in this definition rather than *computers*, even though most people think of a network as being a collection of computers; certainly the basic concept of a network in most peoples' mind is of an assembly of network servers and desktop machines.

However, to say that networks are merely a collection of computers is to limit the range of hardware that can use them. For example, printers may be shared across a network, allowing more than one machine to gain access to their services. Other types of devices can also be connected to a network; these devices can provide access to information, or offer services that may be controlled remotely. Indeed, there is a growing movement toward connecting non-computing devices to networks. While the technology is still evolving, we're moving toward a network-centric as opposed to a computing-centric model. Services and devices can be distributed across a network rather than being bound to individual machines. In the same way, users can move from machine to machine, logging on as if they were sitting at their own familiar terminal.