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TCP/IP详解

卷2：实现

英文版

TCP/IP Illustrated Volume 2: The Implementation

[美] Gary R. Wright 著
W. Richard Stevens



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内 容 提 要

本书是TCP/IP领域的经典之作! 书中完整而详细地介绍了TCP/IP协议是如何实现的。本书介绍了一个实际的TCP/IP实现, 并给出了这一实现的完整源代码, 帮助读者全面掌握TCP/IP的实现。本书内容详尽且具权威性, 几乎每章都提供精选的习题, 并在附录中提供了部分习题的答案。

本书适合任何希望了解TCP/IP协议如何实现的读者阅读, 更是TCP/IP领域研究人员和开发人员的权威参考书。

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前 言

概述

本书介绍并给出了TCP/IP的常见参考实现的源代码，即由加州大学伯克利分校计算机系统研究组（CSRG）研发的实现。历史上该实现是随4.x BSD（Berkeley Software Distribution）系统一起发布的。最早的发布版本出现于1982年，随后经过了多次大改、多次微调，并实现了映射到其他Unix及非Unix系统的众多端口。这个实现不可小觑，它是世界范围内无数系统中日常运行的TCP/IP实现的基础。该实现还提供了路由器功能，使我们可以展示出TCP/IP的主机实现与路由器的区别。

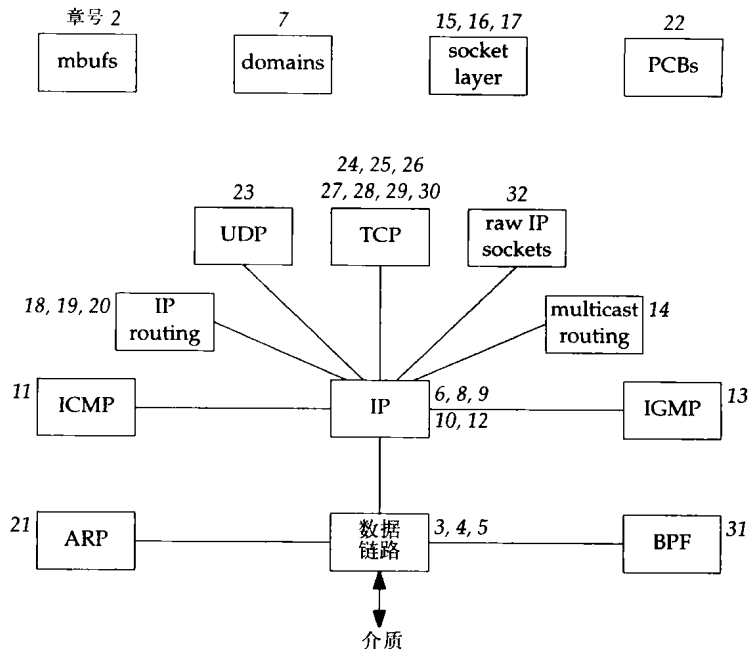
本书将描述该实现并给出TCP/IP核心实现的全部源代码，大约有15 000行C代码。书中介绍的Berkeley代码的版本是4.4BSD-Lite发布版本。这个代码于1994年4月公布，它在1988年的4.3BSD Tahoe发布版本、1990年的4.3BSD Reno发布版本以及1993年的4.4BSD发布版本基础上增加了大量的网络增强技术（附录B讲述了如何获取这些源代码）。4.4BSD发布版本提供了最新的TCP/IP特性，例如对多播（multicast）和长肥管道（long fat pipe）的支持（用于高带宽、长延迟的通道）。图1-1（第4页）提供了各版本的Berkeley网络代码的更多细节。

本书面向所有希望了解TCP/IP协议实现原理的读者：编写网络应用的程序员、利用TCP/IP维护计算机系统与网络的系统管理员以及希望了解实际操作系统中大型代码的集成

原理的程序员。

本书的结构

下面的图给出了本书涉及的各种协议和子系统，方框上的斜体数字指明了相应内容在哪一章讨论。



我们采用一种自底向上的方式来介绍TCP/IP协议族，首先是数据链路层，然后是网络层（IP、ICMP、IGMP、IP路由、多播路由）以及随后的套接字层，最后是传输层（UDP、TCP和原始IP）。

致读者

本书的读者应该对TCP/IP协议的工作原理有基本的了解。对TCP/IP协议不是很熟悉的读者应首先参考本套书的第1卷[Stevens, 1994]，该书对TCP/IP协议族有比较透彻的描述。本书将之前的第1卷称为卷1（Volume 1）。本书同时还需要读者对操作系统原理有初步的了解。

我们采用数据结构方法来描述协议的实现。每章不仅给出源代码，还用图片和文字描述源代码使用或者维护的数据结构。我们还展示了如何把这些数据结构集成到TCP/IP与内核所用的数据结构中。全书使用了大量的图表——超过250个。

这种数据结构方法使得读者可以用多种方式使用本书。那些对所有的实现细节都感兴趣的读者可以结合源代码，把本书从头一直读到最后。其他读者则可以通过理解数据

结构和阅读文字内容来理解协议的工作原理，而不一定非要参考源代码。

估计会有许多读者只是对本书中特定的章节感兴趣，并希望直接阅读这些章。全书贯穿了许多交叉引用，并提供了完整的索引，因此读者可以独立阅读各章的内容。索引后面还按照字母表顺序给出了书中所有函数和宏的交叉引用，以及相关详细信息的起始页码。每章的末尾都布置了一些习题，附录A给出了大部分习题的答案，这样做是为了本书更适合作为自学参考书。

源代码版权

本书中除了图1-2和图8-27之外的所有源代码都来自4.4BSD-Lite发布版。这个软件是公用程序，可以通过很多方式获得（详见附录B）。

书中的所有源代码版权说明如下：

```
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```

致谢

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作者制作了本书的最终电子版。描述工业级强度的软件系统就需要使用工业级强度的文本处理系统。本书的一位作者选择使用James Clark的Groff包，另一位作者只能勉强同意。

欢迎读者以电子邮件的方式反馈意见、提出建议或订正错误。两位作者都很乐意指出对方残存的错误。

Gary R. Wright

于康涅狄格州米德尔敦市

W. Richard Stevens

于亚利桑那州图森市

1994年11月

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