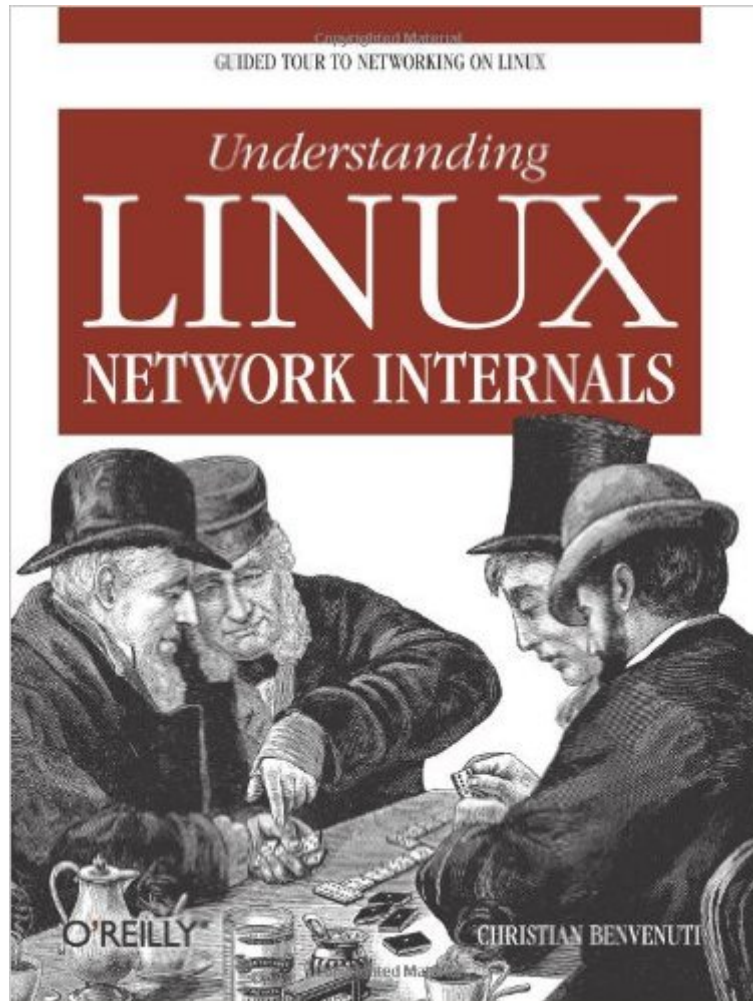


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# Understanding Linux Network Internals



## Synopsis

If you've ever wondered how Linux carries out the complicated tasks assigned to it by the IP protocols -- or if you just want to learn about modern networking through real-life examples -- Understanding Linux Network Internals is for you. Like the popular O'Reilly book, Understanding the Linux Kernel, this book clearly explains the underlying concepts and teaches you how to follow the actual C code that implements it. Although some background in the TCP/IP protocols is helpful, you can learn a great deal from this text about the protocols themselves and their uses. And if you already have a base knowledge of C, you can use the book's code walkthroughs to figure out exactly what this sophisticated part of the Linux kernel is doing. Part of the difficulty in understanding networks -- and implementing them -- is that the tasks are broken up and performed at many different times by different pieces of code. One of the strengths of this book is to integrate the pieces and reveal the relationships between far-flung functions and data structures. Understanding Linux Network Internals is both a big-picture discussion and a no-nonsense guide to the details of Linux networking. Topics include:

- Key problems with networking
- Network interface card (NIC) device drivers
- System initialization
- Layer 2 (link-layer) tasks and implementation
- Layer 3 (IPv4) tasks and implementation
- Neighbor infrastructure and protocols (ARP)
- Bridging
- Routing
- ICMP

Author Christian Benvenuti, an operating system designer specializing in networking, explains much more than how Linux code works. He shows the purposes of major networking features and the trade-offs involved in choosing one solution over another. A large number of flowcharts and other diagrams enhance the book's understandability.

## Book Information

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## Customer Reviews

I have read a number of books on the TCP/IP protocols and their implementations; both the original Berkeley (BSD) Unix TCP/IP stack and the Linux TCP/IP stack. I must say that this is the best of all of them. This book makes the subject very approachable for the newcomer to network protocol software but the explanations are detailed enough to satisfy an old dog like me. Benvenuti's writing style is clear and very readable. He liberally provides diagrams to illustrate the concepts he is discussing. My only fault with the book is that the transport layer protocols (UDP and TCP) are not covered. Benvenuti provides a list of important areas of the networking software that are not covered in the book but gives other references for most of these. I hope that he is working on a volume 2 to cover these areas. I would sum up by saying that if you want to learn about the Linux networking software or network protocol software in general, start with this book. This book will give you the background to understand other, less well written books that cover the remaining networking software topics.

If you already have knowledge about how computer networks work in general & want to know how those networking concepts are actually designed & implemented in an operating system, this book is a must. This Book is a smooth read & goes step by step. First it tells you how a NIC registers itself with the kernel. Then it describes an high-level introduction of how device drivers drive the device. Then it describes the interface between the kernel and the device drivers. It also discusses bridging & routing concepts. If you want to delve into the linux networking code of the kernel or if you are actually looking to modify a part of the networking code, this book is a must read. This book doesn't cover the transport layer though. You have to refer to other sources to knit all the pieces of the puzzle together.

If you are looking for a professional reference on how to develop an IP stack, develop fast path solutions for next generation networking products or just want to learn more about the implementation of the Linux TCP/IP stack then this book is for you. If you also want to learn a bit more about networking in general then this book definitely is for you. However if you're new to the subject then this book might be a bit heavy and if you're looking for user space (BSD sockets) termination and higher level application development then this book is not for you. It covers the subject very well and goes through all the different layers of the IP stack, highly recommended,

surprisingly easy to read and interesting. If a new edition comes out I'll buy it on the spot. Not that I'm missing anything but I'm sure things have happened in the last 5 years.

Extreme, and I do mean extreme, detail on the networking stack in Linux. He shows you source code, details each and every field of structures, and discusses in great detail every component involved in networking. Some of it gets tedious, but if you really want to understand what's going on (I did), this book will explain it.

This is a must read for anyone trying to decipher the code in the Linux networking stack or trying to write a Linux device driver for a network adapter. Packet flow into and out of the Linux kernel is explained in detail. Functions from the Linux source are explained in detail. Packet reception and transmission by network adapters is explained in detail. There are also excellent detailed diagrams that accompany the text. When you combine the text and diagrams with the actual Linux source, you will have everything you need to accomplish your goals. I used this book to write and modify device drivers for real and virtual network adapters, including the bridge and bond drivers. I used this book to write user mode code to queue and filter packets for dedicated network devices. This book has everything you need to write networking code for Linux.

As far as I know, there is not another book like this. It complements very well the Kernel book written by Bovet & Cesati, and goes beyond giving to the reader a complete scenario about the Linux Network Internals. Extremely rich in technical details, this book certainly will provide you an unique overview about the subject.

It seems like the only book that deals with the internals of network kernel. I delved into the network source code for the first time, it helped a lot to grasp its mechanism.

I can't imagine anyone reading this book like a novel. but in its 1000 odd pages is just about everything you might want to know and quite a bit you don't. Another big fat O'reilly book that continues their tradition of being detailed, well written and comprehensive. Now that Windows and to a lesser extent Apple appear to be making it harder and harder to do plain old fashioned networking and server functions, we are all going to have to go with Linux, whether we like it or not. That's fine by me. I like Linux, and this book tells it all. Highly recommended, but heavy going. 1000 pages and not a wasted word. This one's a keeper.

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