

Table of Contents

Preface	vii
1. Networking Objectives	1
Business Requirements	1
OSI Protocol Stack Model	5
Routing Versus Bridging	10
Top-Down Design Philosophy	12
2. Elements of Reliability	14
Defining Reliability	14
Redundancy	17
Failure Modes	44
3. Design Types	50
Basic Topologies	50
Reliability Mechanisms	61
VLANs	66
Toward Larger Topologies	70
Hierarchical Design	81
Implementing Reliability	113
Large-Scale LAN Topologies	115
4. Local Area Network Technologies	126
Selecting Appropriate LAN Technology	126
Ethernet and Fast Ethernet	130
Token Ring	141
Gigabit and 10 Gigabit Ethernet	146
ATM	149

FDDI	154
Wireless	155
Firewalls and Gateways	160
Structured Cabling	162
5. IP	169
IP-Addressing Basics	170
IP-Address Classes	173
ARP and ICMP	175
Network Address Translation	177
Multiple Subnet Broadcast	179
General IP Design Strategies	182
DNS and DHCP	191
6. IP Dynamic Routing	193
Static Routing	194
Types of Dynamic Routing Protocols	196
RIP	197
IGRP and EIGRP	206
OSPF	213
BGP	228
7. IPX	234
Dynamic Routing	236
General IPX Design Strategies	242
8. Elements of Efficiency	247
Using Equipment Features Effectively	248
Hop Counts	249
MTU Throughout the Network	250
Bottlenecks and Congestion	252
Filtering	253
Quality of Service and Traffic Shaping	254
9. Network Management	273
Network-Management Components	273
Designing a Manageable Network	275
SNMP	280
Management Problems	288

10. Special Topics	306
IP Multicast Networks	306
IPv6	319
Security	333
Appendix: Combining Probabilities	341
Glossary	344
Bibliography	364
Index	369

