

Troubleshooting NetWare for the 286

at Ivie and Cheryl D. Snapp

Troubleshooting NetWare for the 286

ring expert tips and techniques for main-
g a healthy, productive NetWare 2.2 LAN





First published in 1990 in North America by M&T Publishing, Inc., 501 Galveston Drive, Redwood City, CA 94063-4728, U.S.A., and co-published for sale outside North America by Prentice Hall International (UK) Limited, 66 Wood Lane End, Hemel Hempstead, Hertfordshire, HP2 4RG, England, a division of Simon & Schuster International Group.

© 1991 by Cheryl Snapp, Scott Ivie, and M&T Books



All rights reserved. No part of this book may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying, recording, or by any information storage and retrieval system, without prior written permission from the Publisher. For permission within North America contact M&T Publishing, Inc., 501 Galveston Drive, Redwood City, CA 94063-4728, U.S.A.

This edition may be sold only in those countries to which it is consigned by Prentice Hall International (UK) Limited. It is not to be re-exported, and is not for sale in North America.

The Author and Publisher make no warranty of any kind, expressed or implied, with regard to these programs or the documentation contained in this book. The Author and Publisher shall not be liable in any event for incidental or consequential damages in connection with, or arising out of, the furnishing, performance, or use of these programs.

All brand names, trademarks, and registered trademarks are the property of their respective holders.

British Library Cataloging-in-Publication Data and Library of Congress Cataloging-in-Publication Data are available from Prentice Hall International, (UK), Ltd

Snapp, Cheryl T., 1958-

Ivie, Scott, 1965-

Troubleshooting NetWare for the 286/Cheryl Snapp and Scott Ivie
p. cm.

ISBN 0-13-952294-9

94 93 92 91

4 3 2 1

Trademarks:

dBASE III Plus is a registered trademark of Ashton-Tate.

Turnstyle is a registered trademark of Connect Computers.

Intel and **LANShell** are registered trademarks of Intel Co.

All other products, names, and services are trademarks or registered trademarks of their respective companies.

Cover design: Lauren Smith Designs
Project Editor: Tova F. Fliegel
Editor: Barbara Hume

Dedication

From Scott

To my wife, Chris, who patiently stayed home during this project and will never forget the words, "It's getting there."

To my father and mother, the late Kenneth M. and LaRae Ivie.

To the many co-workers I've had throughout the years, who've helped me gain the knowledge I have today.

From Cheryl

I dedicate this project to the important men in my life:
my husband Doug, and sons Nathan, Richard, and Craig.

Acknowledgments

We'd like to thank the following people for making this project possible:

- Network authors and experts Mike Day, Ken Neff, and Ed Liebing
- The world's greatest Value-Added Editor: Barbara Hume (She's the best!)
- NetWare expert Doug Snapp, who, in addition to providing technical assistance, managed to keep things lively during the night by sending phony error messages over the LAN. (Very clever.)
- Eric Stral, partner in consulting firm E K & C (formerly the general manager of LAN Group International), for sharing his experience in testing the ways NetWare v2.2 really works.

Foreword

For small businesses and workgroups, it's difficult to decide how and when to establish a personal computer network. Until now, the primary choices have been small, inexpensive peer-to-peer networks or stripped-down, less-expensive versions of popular server-based networks such as the Entry-Level System (ELS) versions of NetWare 286.

Novell's introduction of NetWare v2.2 presents a great opportunity for small businesses and departments to gain the advantages of a server-based network (security, reliability, and the ability to share information, applications, and peripheral resources) at a much lower cost than Novell's high-end iAPX6-based network operating system, NetWare v3.11.

We've designed the Supervisor's Guide for NetWare v2.2 to serve two purposes: to acquaint businesses and workgroups who haven't previously used a network with the capabilities of NetWare v2.2, and to assist network administrators who've already purchased NetWare v2.2 in making their installation and management experience as productive as possible.

We realize that many NetWare v2.2 administrators are already familiar with previous versions of NetWare. However, given the nature of the small business and workgroup market NetWare v2.2 addresses, many of those who must install and maintain NetWare v2.2 are unfamiliar with advanced network features such as system fault tolerance or multiprotocol support. Or they may be installing and maintaining a network for the very first time.

We've tried to compile a book that will be useful from both the novice and the expert points of view.

Scenarios

To help you understand the installation of a full network—no matter what your level of expertise, we'll use two different scenarios throughout the rest of the book.

You may want to refer back to these introductory pages for descriptions of the network components and configurations.

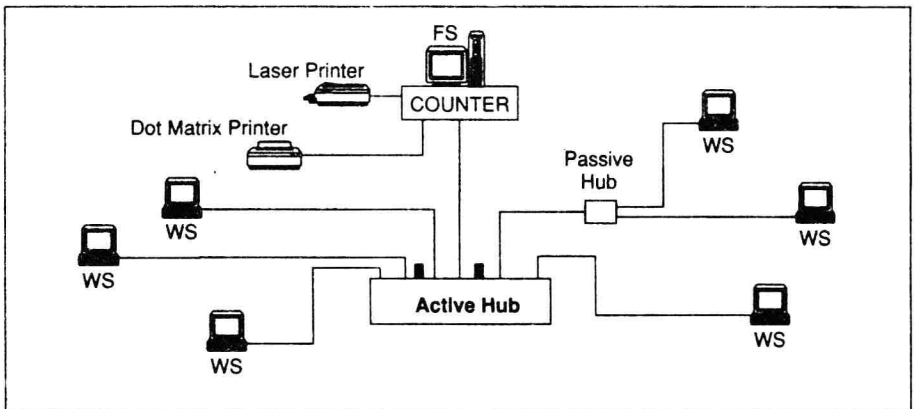
Scenario 1: Advanced Accounting, Inc.

The first scenario involves a small six-user accounting business (known from now on as “Advanced Accounting, Inc.”) that will be upgrading its nondedicated file server (named COUNTERS).



The company uses applications that include a small FoxPro/LAN v2.0 database, Lotus 1-2-3 v2.2, and WordPerfect 5.1. We’ll go through the directory structure for each application to verify that they are all working correctly.

This installation is also running Arcnet.



Scenario 1: This is the physical layout of Advanced Accounting’s six-user network.

Scenario 2: Highland Insurance, Inc.



The second scenario entails a two-server, 165-user new installation for an insurance company that we'll call Highland Insurance, Inc.

Both servers being installed are using NetWare v2.2. The first file server, called ANIMAL, runs a critical client database that must be up at all times. Because this database is critical, we'll duplex the disk channels to prevent a possible failure on one of the channels. The second server, called JUNGLE, will have applications and users' personal areas installed.

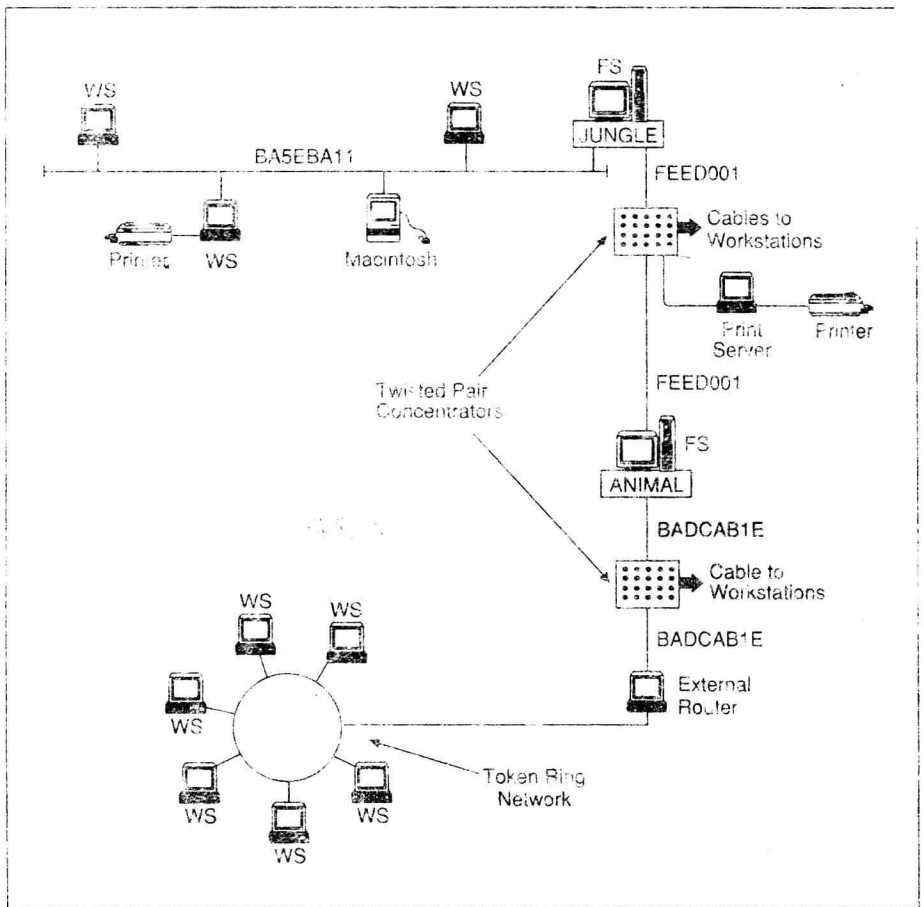
The applications installed on server JUNGLE include a Data Access DataFlex 3.0 database; two word processors, WordPerfect 5.1 and Microsoft Word for Windows/OS2/Macintosh; two spreadsheets, Lotus 1-2-3 v2.2 and Excel for Windows/OS2/Macintosh; and Windows 3.0.

The company has a variety of workstations. Some are Apple Macintoshes, others are running OS/2, and others are using DOS and/or Windows 3.0.

The firm will be installing printers throughout the whole network using a dedicated print server.

The network is running on a twisted-pair cabling scheme (10-Base-T). The company will also be adding a NetWare router to allow them to attach a small Token-Ring network.

To help manage the network, the administrator will assign workgroup managers, account managers, print server managers and console operators.



Scenario 2: This illustration shows the physical layout of the Highland Insurance two-server, 165-user network.

Contents

WHY THIS BOOK IS FOR YOU.....	1
INTRODUCTION	3
New Features in NetWare v2.2	4
Ease of Installation	5
ZTEST	5
Automated Initial User Setup (NWSETUP)	6
Workstation Generation (WSGEN)	6
Dedicated Protected-Mode Router	6
NetWare Core Printing Services	7
Choice of Dedicated or Nondedicated Server Mode	8
WSUPDATE for DOS Workstations	8
Resource Accounting	8
Security/Workgroup Management	9
ROUTESEN	11
SFT Level II Offered to All Users	11
NetWare for Macintosh (Phase II): Macintosh Administration	11
Multiprotocol Drivers (ODI)	12
Enhanced FCONSOLE, FILER, LOGIN, and MAP	12
Overview of NetWare v2.2	13
The Network Computing Environment	13
The NetWare v2.2 Operating System	17
Connection Services	18
Fault-Tolerance Services	19
Fault Tolerance Considerations	24
Security Services	24

File System Services	25
File Service Processes	31
NetWare Print Services	31
Management Services	33
Accounting Services	33
Application Services	34
Multiple Protocol Support	36
Media-Level Protocols	37
Media Access Protocols	38
Networking Hardware and Protocols	39
NetWare's Transport and Service Protocols	40
Internetwork Packet Exchange	40
Sequenced Packet Exchange	41
NetBIOS	41
NetWare Core Protocol	41
OS/2 Environment Protocols	42
Macintosh Environment Protocols	42
Open Data-Link Interface	44
File System Support	44
Workstation Environments	45
The DOS Workstation	45
The Windows Workstation	48
The OS/2 Workstation	49
The Macintosh Workstation	51
The ODI Workstation	53

PART ONE: INSTALLING NETWARE V2.2

CHAPTER 1: TOPOLOGIES AND CABLING	57
Topologies	57
Bus Topology	57
Ring Topology	58

Star Topology	58
Cabling Types	59
Arcnet Cabling Concepts	61
Arcnet Components	63
Rules for Low-Impedance Arcnet Networks	64
Troubleshooting Arcnet.....	65
Ethernet Cabling Concepts.....	66
Thin Ethernet Concepts	67
Thick Ethernet Concepts	69
Common Troubleshooting Tips for Ethernet Cabling.....	71
Token-Ring Concepts	73
Components Associated with Token-Ring Networks	73
Common Troubleshooting Tips for Token-Ring	75
Cable Troubleshooting Tips and Tools ..	75
Always follow the cabling requirements.....	75
Always test connections or cables before installation.....	75
Establish a user-friendly cabling system	76
Establish a fault-resistant cabling scheme.....	76
Follow local laws for cable installations	77
Know about useful troubleshooting tools.....	77
Network and Node Addresses	77
Common Installation Mistakes Associated with Addressing.....	80

CHAPTER 2: INSTALLING THE NETWARE V2.2

FILE SERVER	81
Using the NetWare Documentation	81
Dedicated versus Nondedicated File Server	82
Core Printing Services versus the NetWare v2.2 Print Server	83
Print Services—An Installation Concern	84
File Server Installation for a New Network	85
Preparatory Steps—The Hardware Components	85
Preparatory Steps—The Operating System Plan	86

The Volume Configuration Sheet	86
File Server Installation	88
The Installation Alternatives	89
The Installation Process	92
Configuring the LAN Drivers	94
Configuring the Hard Disk Driver(s)	95
Linking and Configuring	96
The Track Zero Test (ZTEST)	96
The File Server Definition	97
Logical Size	99
Disk Mirroring	99
Final steps	99
Installation Troubleshooting Recommendations	100
Basic Troubleshooting Guidelines	100
Troubleshooting Your File Server Installation	100
File Server Installation on an Existing Network	103
Node Address for a Nondedicated DOS Process	104
Common Network Addressing Mistakes	104
 CHAPTER 3: UPGRADING TO NETWARE V2.2	105
Upgrading an Existing NetWare 2.x File Server to NetWare v2.2	105
Planning	107
Execution of the Plan	107
Operating System Generation	108
 CHAPTER 4: INSTALLING AN EXTERNAL ROUTER	111
External Router Installation	111
Planning the Installation	111
Decide Which Mode to Use	112
Check for NetWare hardware compatibility	113
Write Down Information Concerning the Router	113
Performing the Installation	114

Hardware Installation	114
Software Installation	114
Software Installation Steps	114
Starting, Maintaining, and Troubleshooting Your Router	116
Starting the Dedicated Router	116
Starting the Nondedicated Router	116
Router Console Commands	117
Troubleshooting Your Router	119

CHAPTER 5: INSTALLING VAPS..... 121

Installing the NetWare for Macintosh VAP	123
Planning the Network Configuration	123
Installing NetWare for Macintosh on a File Server	123
Maintenance Tasks—Reconfiguring NetWare for Macintosh on a File Server	125
Upgrading NetWare for Macintosh from v2.15 to v2.2	125
Installing NetWare for Macintosh on an External Router	126
Loading VAPs on the Router	127

CHAPTER 6: INSTALLING NETWARE V2.2

WORKSTATIONS.....	129
Installing the Network Interface Card	129
Steps for Installing the LAN Adapter	130
DOS Workstation Software Installation	131
Steps in Installing DOS Workstation Software	131
Using SHELL.CFG to Optimize Your Workstation Parameters	133
Logging In Using a DOS Machine	133
Troubleshooting a DOS Workstation	134
Using Microsoft Windows on the Network	136
Implementing ODI	137
Preparation Before Installation	137
Creating an ODI Boot Diskette	137

Logging in to the Network with ODI Drivers	140
Troubleshooting DOS Workstations with ODI Drivers	141
Troubleshooting ODI Problems on DOS Workstations	141
Diskless Workstations	143
Preparations for Installing a Diskless Workstation	143
Creating One Boot Image File for All Workstations	144
Creating Multiple Boot Image Files for Diskless Workstations	145
Logging In to the Network	148
Common Installation Problems Specific to Diskless Workstations:	149
OS/2 Workstation Network Software Installation	149
Steps for Installing the Requester on the Workstation	149
Modifying the CONFIG.SYS File	150
Installing the NetWare Utilities for OS/2	152
Logging In to the File Server on an OS/2 Workstation	154
Troubleshooting Your OS/2 Workstation	154
Installing the Macintosh Network Software	155
Logging In to the Network	156
Common Problems When Installing Macintosh on the Network	158

PART TWO: SETTING UP DIRECTORIES, APPLICATIONS, AND USERS

CHAPTER 7: INCORPORATING A SECURITY SCHEME.....	163
NetWare v2.2 Security Concepts	163
The NetWare Bindery	163
Login and Password Restrictions	164
User and Directory Security	166
Setting Up NetWare Security	170
Using SYSCON to Set Up NetWare Security	170
Using FILER to set up NetWare Security	173
Using the FLAG Utility to Set File Attributes	174
Using the FLAGDIR Utility to Set Directory Attributes	176

Using GRANT to Establish Trustee Rights	177
Using the REVOKE Utility to Remove Trustee Assignments	178
Using the REMOVE Utility to Delete Group Rights	179
Utilities Used for Finding Security Problems	179
Using the RIGHTS Utility to Display User Rights	179
FLAG	180
FLAGDIR	180
TLIST	180
WHOAMI	181
SECURITY	182
BINDFIX	182
BINDREST	183
Other Methods of Locating Security Holes	184
Protecting the Network from Viruses	184
 CHAPTER 8: SETTING UP DIRECTORIES	191
NetWare Directory Structure	191
NetWare System Directories and Files	192
Creating Directories on the File Server	193
Setting Up Your DOS Directories	193
Application Directories	194
Data Directories	195
Home Directories	196
Creating Directories on the Server	196
 CHAPTER 9: INSTALLING APPLICATIONS	201
Preventive Maintenance—Establishing a Separate Directory for Applications	201
Installing the Applications	202
Tips for Installing NetWare-Aware Applications	202
Test New Applications Rigorously	202
Bring Up New Applications One at a Time	203

If the Application Includes Instructions for Installing on a Network	203
Printing from Applications Designed for Network Printing	204
If the Application Doesn't Include Instructions for Installing on a Network	205
Specific Troubleshooting for Applications That Aren't Sufficiently	
Network-Aware	206
Common Application Problems	206
Tips for Troubleshooting General Application Problems	211
Installing Windows on the Network	217
Setting Up Windows User Files	218
Logging in to the Network	219

CHAPTER 10: SETTING UP USERS AND GROUPS.....221

NetWare User and Group Concepts	221
User Accounts	221
User Login Scripts	222
Using Groups to Simplify Administration	223
Distributing Network Management	223
User Account Managers	224
Workgroup Managers	225
Creating Users and Groups	226
Using the SYSCON Utility to Create Groups	227
Using the MAKEUSER Utility to Create Users	229
Using the USERDEF Utility to Create Users	232
Using the NWSETUP Utility to Create Users	235
Creating User Groups	237
Creating Groups	238
Assigning Trustee Rights to the Groups	238
Adding Users to a Group	238
Assigning User Account Managers and Workgroup Managers	239
Creating User Account Managers	239
Creating Workgroup Managers	239
Tips for Creating Users and Groups	240