For more information about this title, click here.

CONTENTS

Acknowledgments xiii
Introduction xv

❖ 1 **Introduction to High Availability, Clustering, and Load-Balancing Technologies** 1

Introduction to High Availability 2
High Availability 3
Pros and Cons to Clustering and Load Balancing 5
Hot Spare 6
A Need for Redundancy 7
Manageability 7
Reliability 7
Scalability 7
Clustering with NT 4.0 9
Windows 2000 Clustering and Load Balancing 10
Windows 2000 Clustering Services 10
Network Load Balancing 14
Server 2003 Clustering and Load Balancing 17
Windows Server 2003 Enterprise Servers 17
Windows Server 2003 17
Application Center 2000 18
Component Load Balancing 20
Highly Available Databases with SQL Server 2000 21
Designing a Highly Available Solution 22
Creating a Project Plan 23
Pilots and Prototypes 23
Designing a Clustered Solution 24
Designing a Load-Balanced Third-Party Solution 33

Copyright 2003 by The McGraw-Hill Companies, Inc. Click Here for Terms of Use.

N-Tier Designs 34
Three-Tier Designs 35
Security and Remote Access Design 36
Handling the Costs 38
Budget 38
ROI and TCO Fundamentals 39
Creating Your Design Plan and Implementation Team 40
Creating the Project Plan 40
The Team (Human Resources) 41
Management's Approval and Getting Started 41

❖ 2 **Designing a Clustered Solution with Windows 2000 Advanced Server . 43**

Designing a Clustered Solution with Windows 2000 Advanced Server 44
Where to Begin 44
The Design Phase 45
Plan Your Hardware Roll Out 45
Microsoft's Hardware Compatibility List 46
The Servers and Presales Support 46
Power Supplies 47
Power and Uninterruptible Power Supply (UPS) 47
Server Mounting and Racking 48
Environmental Considerations 48
Locked Cases and Physical Security 49
Central Processing Unit (CPU) 49
Memory Requirements (Physical and Virtual) 49
NIC's Cabling and Switch Connections 50
Small Computer System Interface (SCSI) 52
Advanced SCSI Configuration 54
Configuring the Shared SCSI Bus 54
SCSI Cables: Lengths, Termination, and Troubleshooting . . 55
Fibre Channel 56
Quorum Devices and Shared Storage 56
Adding Devices to the Shared SCSI Bus 59
RAID Considerations 60
Cluster Server Drive Considerations 61
Final Hardware Design Considerations 61
Plan your Software Rollout 61
Preinstallation Configurations 62
Installation and Configuration 62
Precluster System Customization and Configuration 67
Disk Drive Configuration 67
Page File Configuration 73
Configuring Network Properties 73
Heartbeat Connection and Client Access 75

IP Addressing and NIC Card Configurations 76
Advanced Configuration and Troubleshooting for Network Connections 80
NETBIOS and WINS 84
User Accounts and Security 86
Cluster Service Account Advanced Configuration 88
Domain Connection 90
Clustering Service Preinstallation Checklist 93
Clustering Services Installation 94
Joining a Cluster 99
Postinstallation Troubleshooting 100
Using Cluster.exe Command-Line Administration 100
The Test of Failover and Last Tips 101
Designing a NLB Solution with Windows 2000 Advanced Server 102
Where to Begin 103
The Design Phase 104
Hardware Load Balancers and Software Load Balancers . . 105
Topology Maps 105
Initial NLB Planning and Readiness Assessment 105
NLB Software Rollout 108
Installation and Configuration 110
Configuring Cluster Parameter 110
Configuring Host Parameters 113
Configuring the Port Rules Tab 115
Windows 2000 Advanced Server NLB Installation and Advanced Settings 119
NLB Cluster Performance Is Slow 119
Exam Fundamentals 121
Conclusion 122

❖ **3 Designing a Clustered Solution with Windows Server 2003 . . . . . 123**

Windows Server 2003 Rolling Upgrade 124
Planning a Rolling Upgrade with Management 124
Planning a Rolling Upgrade 127
Rolling Upgrade Going Live 134
Windows Server 2003 Rolling Upgrade 136
Designing a Clustered Solution with Windows Server 2003 137
Where to Begin 137
The Design Phase 138
Other Infrastructure Design Concerns 140
Clustering Services Install Preinstallation Checklist 141
Configuring Network Properties 142
Domain Connection and Client Access 144
Installation and Configuration of Windows Server 2003 Cluster Services 146

Configuring and Troubleshooting the Cluster Service 159
New Command Line Tools 175
Windows Server 2003 Cluster Tips 175
Designing a NLB Solution with Windows Server 2003 177
Where to Begin 177
The Design Phase 181
Initial NLB Planning and Readiness Assessment 182
Windows Server 2003 NLB Software Rollout 184
Cluster Parameters 185
Host Parameters 189
Port Rules 191
Adding/Editing Port Rules 193
Managing Network Load Balancing 196
Using the Network Load Balancing Manager 196
Using the NLB Command 198
Conclusion 201

❖ 4 **Designing a Clustered and Load-Balanced Solution with Application Center 2000 . . . . . 203**

Predesign Planning 204
The Purpose of Application Center 2000 204
Application Center 2000 Feature Set and Requirements . . . 206
Preparation and Installation 213
Planning the Deployment of Application Center 2000 in n-tier Environments 214
Basic Configuration of Application Center 2000 218
Creating a New Cluster 218
The Cluster Controller 224
Adding a New Member to an Application Center 2000 Cluster 226
Postdesign Tips and Troubleshooting 227
Memory Check 227
Changing Node Names 228
The Network Load Balancing Hot Fix Package 228
Uninstalling Application Center 2000 Doesn't Remove a Member from the Cluster 228
Conclusion 229

❖ 5 **Designing a Clustered Solution with Windows SQL Server 2000 Enterprise Edition 231**

Predesign Planning 232
SQL Server Component Planning 232
SQL Server Cluster Model 235
Planning for Failover-Based Pricing 237
SQL Server 2000 Minimum Requirements 237
Planning Tips for SQL Server 2000 Failover Cluster Servers 239

Placement of SQL Server in the N-Tier Architecture 239
Virtual Server 240
Preinstallation Checklist 241
Installing and Configuring MSDTC 242
Installation and Configuration of SQL Server in a Clustered Solution 244
Advanced Troubleshooting 254
Running Services 254
Event Viewer Errors 255
Other Error Messages 255
IP Addressing Problems 257
Changing Service Accounts on a SQL Virtual Server 260
Changing a Clustered SQL Server Network Name 261
Moving Resources 261
Network Failure 262
Log Files 263
Conclusion 263

❖ 6 **Designing a Highly Available Solution with Windows Services 265**
Highly Available Windows Services 266
Highly Available DHCP Services 266
Highly Available WINS 278
Conclusion 287

❖ 7 **Building Advanced Highly Available Load-Balanced Configurations . . 289**
Predesign Planning 290
NLB Advanced Design and Troubleshooting 290
More NLB Best Practices 300
NLB Security Design 302
Building a Highly Available Server 2003 NLB Solution 304
Building a Load-Balanced Cluster with Server 2003 304
Conclusion 313

❖ 8 **High Availability, Baselining, Performance Monitoring, and Disaster Recovery Planning 315**
Planning for High Availability 316
Planning Your Downtime 316
Building the Highly Available Solutions' Plan 317
Disaster Recovery Planning 321
Building the Disaster Recovery Plan 321
System Monitoring and Baselining 325
Why Monitor and Baseline? 326
Using Performance Monitor on Your Servers 327
Configuring the Performance Console 329
Advanced Performance Monitoring Techniques 338
Conclusion 350

❖ **A Project Plan Sample** **351**
High-Availability Project Planning 352
Build the Project 352

❖ **B Advanced Troubleshooting: Event IDs** **357**
Event ID 1000 358
Event ID 1002 358
Event ID 1006 358
Event ID 1007 359
Event ID 1009 359
Event ID 1010 359
Event ID 1011 359
Event ID 1015 360
Event ID 1016 360
Event ID 1019 360
Event ID 1021 360
Event ID 1022 361
Event ID 1023 361
Event ID 1024 361
Event ID 1034 362
Event ID 1035 362
Event ID 1040 362
Event ID 1042 363
Event ID 1043 363
Event ID 1044 363
Event ID 1045 363
Event ID 1056 364
Event ID 1061 364
Event ID 1062 364
Event ID 1063 364
Event ID 1068 365
Event ID 1069 365
Event ID 1070 365
Event ID 1071 365
Event ID 1104 366
Event ID 1105 366
Event ID 1107 366
Event ID 5719 366
Event ID 7000 367
Event ID 7013 367

❖ **Index** **369**