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Cert Guide

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MCSA

70-697 and 70-698

Configuring Windows Devices

Installing and Configuring
Windows 10

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MCSA 70-697 and 70-698 Cert Guide

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MCSA 70-697 and 70-698 Cert Guide

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Contents at a Glance

Introduction	xxvi
CHAPTER 1	Introducing Windows 10 3
CHAPTER 2	Implementing Windows 75
CHAPTER 3	Post-Installation Configuration 137
CHAPTER 4	Managing Windows in an Enterprise 193
CHAPTER 5	Installing and Managing Software 225
CHAPTER 6	Windows 10 Networking 253
CHAPTER 7	Windows 10 Security 311
CHAPTER 8	Windows 10 Data Security 389
CHAPTER 9	Managing User Data 443
CHAPTER 10	Windows Hyper-V 511
CHAPTER 11	Configuring and Securing Mobile Devices 553
CHAPTER 12	Managing Mobile Devices 591
CHAPTER 13	Microsoft Intune 615
CHAPTER 14	Configuring File and Folder Access 653
CHAPTER 15	Configuring Remote Access 703
CHAPTER 16	Configuring and Maintaining Network Security 757
CHAPTER 17	Managing Mobile Apps 793
CHAPTER 18	Managing Desktop Applications 819
CHAPTER 19	Monitoring and Managing Windows 873
CHAPTER 20	Configuring System Recovery Options 935
CHAPTER 21	Configuring File Recovery 971
CHAPTER 22	Final Preparation 1007
APPENDIX A	Answers to the “Do I Know This Already?” Quizzes 1015
	Glossary of Key Terms 1057
	Index 1080

Elements Available On the Book's Website

APPENDIX B	Memory Tables
APPENDIX C	Memory Tables Answer Key
APPENDIX D	Study Planner
	Glossary of Key Terms

Table of Contents

Introduction	xxvi
Chapter 1 Introducing Windows 10	3
“Do I Know This Already?” Quiz	4
Foundation Topics	8
A Brief History of Windows	8
Windows 10	9
Windows 10 Editions	10
Features Tour of Windows 10	13
Improvements Provided in Versions 1507 and 1511	13
Improvements Provided in Version 1607	15
A Quick Tour of Windows 10	17
Cortana and the Windows 10 Search	20
The Get Started App	21
Configuring the Windows 10 Taskbar	23
<i>Toolbars</i>	24
Windows 10 Apps	24
Libraries	24
Windows Settings	25
<i>System</i>	26
<i>Devices</i>	28
<i>Network & Internet</i>	30
<i>Personalization</i>	31
<i>Accounts</i>	34
<i>Time and Language</i>	37
<i>Ease of Access</i>	38
<i>Privacy</i>	39
<i>Update and Security</i>	41
Control Panel	43
<i>System and Security</i>	44
<i>Network and Internet</i>	45
<i>Hardware and Sound</i>	47
<i>Programs</i>	48
<i>User Accounts</i>	49
<i>Appearance and Personalization</i>	50
<i>Clock, Language, and Region</i>	51
<i>Ease of Access</i>	51
The Computer Management Snap-in	51
Configuring Windows Updates	53
Configuring Windows Update Settings	54
Using a WSUS Server with Windows 10	58

Configuring Windows Update Policies	58
Managing Update History and Rolling Back Updates	64
Updating Windows Store Applications	65
Configure Updates in the Enterprise	67
Implement Insider Preview	68
Current Branch (CB)	69
Current Branch for Business (CBB)	70
Long Term Servicing Branch (LTSB) Scenarios	71
Exam Preparation Tasks	71
Review All the Key Topics	71
Definitions of Key Terms	72
Chapter 2 Implementing Windows	75
“Do I Know This Already?” Quiz	75
Foundation Topics	82
Preparing for Installation Requirements	82
Evaluating Hardware Readiness and Compatibility	82
<i>Windows 10 Hardware Requirements (Including Screen Resolution)</i>	82
<i>Hardware Compatibility</i>	83
<i>Using 32-Bit or 64-Bit Windows</i>	84
<i>Software Compatibility</i>	86
Determining Appropriate Editions According to Device Type	88
<i>Mobile Devices</i>	88
<i>Other Devices</i>	88
Determining Requirements for Windows Features	89
Performing a Clean Installation	90
Performing an Attended Installation	90
Performing an Unattended Installation of Windows 10	97
<i>Understanding Answer Files</i>	97
<i>Understanding Configuration Passes</i>	98
<i>Creating an Answer File</i>	98
<i>Using the Answer Files to Perform an Unattended Installation</i>	105
Dual-Booting Windows 10	105
<i>Boot Management Programs Used by Windows 10</i>	106
<i>Setting Up a Dual-Boot System</i>	106
Refreshing Windows 10	107
Troubleshooting Failed Installations	108
<i>Stop Errors or Blue Screen of Death (BSOD)</i>	108
<i>Stopped Installation</i>	110
Upgrading to Windows 10	110
Choosing Between an Upgrade and a Clean Installation	112
Preparing a Computer to Meet Upgrade Requirements	112
Upgrading the Computer to Windows 10	113
Upgrading from One Edition of Windows 10 to Another	115

Using Alternate Installation Media	117
Installing to a Virtual Hard Disk (VHD)	117
<i>Understanding VHDs</i>	117
<i>Types of Virtual Hard Disks</i>	118
<i>Tools Used with Virtual Hard Disks</i>	119
<i>Using Disk Management</i>	120
<i>Installing Windows 10 to a VHD</i>	122
Installing Additional Windows Features	124
Configuring Windows for Additional Regional and Language Support	127
Configuring Native Boot Scenarios	129
Best Practices for Using Native-Boot VHDs	130
Booting VHDs	131
Exam Preparation Tasks	133
Review All the Key Topics	133
Complete the Tables and Lists from Memory	134
Definitions of Key Terms	134
Chapter 3 Post-Installation Configuration	137
“Do I Know This Already?” Quiz	138
Foundation Topics	143
Configuring and Customizing the User Interface, According to Device Type	143
Configuring the Start Menu and Taskbar	143
<i>Group Policies for Start Menu and Taskbar</i>	148
Configuring the Desktop	150
Configuring Notification Settings	151
Configuring Windows 10 Options	152
Configuring Accessibility Options	153
Cortana and the Windows 10 Search	154
<i>Cortana Group Policy Settings</i>	156
Configuring Microsoft Edge and Internet Explorer	156
<i>Microsoft Edge</i>	157
<i>Internet Explorer</i>	158
<i>Compatibility View</i>	159
<i>SmartScreen Filter</i>	160
<i>Internet Explorer Group Policies</i>	161
<i>Internet Explorer Compared to Edge</i>	163
Configuring Hyper-V	164
Configuring Power Settings	165
Configuring Devices and Device Drivers	165
Device Setup	166
Devices and Printers	167
Updating Drivers	169

Using Device Manager	169
<i>Using Device Manager to Uninstall Drivers</i>	173
<i>Using Device Manager to Disable Drivers</i>	173
Maintaining Device Drivers	173
<i>Managing and Troubleshooting Drivers and Driver Signing</i>	173
<i>Driver Signing Requirements in Windows 10</i>	174
<i>Checking Drivers for Digital Signatures</i>	175
<i>Driver Installation Permissions in Windows 10</i>	176
Managing Driver Packages	177
Resolving Driver Issues	178
<i>Using Device Manager to Resolve Driver Conflicts</i>	178
<i>Using Windows 10 Rollback to Resolve a Problem Driver</i>	182
Configuring Driver Settings	183
<i>Driver Verifier</i>	184
<i>Advanced Driver Settings</i>	185
Using Deployment Image Servicing and Management (DISM) to Add Driver Packages	187
Exam Preparation Tasks	190
Review All the Key Topics	190
Complete the Tables and Lists from Memory	191
Definitions of Key Terms	191
Chapter 4 Managing Windows in an Enterprise	193
“Do I Know This Already?” Quiz	193
Foundation Topics	196
Active Directory	196
The Building Blocks of Active Directory	196
Joining a Domain	198
Remote Server Administration Tools	201
<i>Installing RSAT on Client Workstations</i>	201
<i>Active Directory Users and Computers</i>	203
Group Policies	206
<i>Creating and Applying GPOs</i>	207
UAC	211
Windows in an Enterprise Environment	211
The Windows Imaging and Configuration Designer (ICD)	212
Activation of Windows Computers in the Enterprise	216
<i>Implement Volume Activation Using a KMS</i>	217
<i>Implement Active Directory-Based Activation</i>	219
<i>Query and Configure Activation States</i>	220
Exam Preparation Tasks	222
Review All the Key Topics	222
Complete the Tables and Lists from Memory	222
Definitions of Key Terms	222

Chapter 5 Installing and Managing Software 225

- “Do I Know This Already?” Quiz 225
- Foundation Topics 228
- Microsoft Account 228
 - Sign In Using a Microsoft Account 228
 - Domain Accounts* 231
 - Managing the Use of Microsoft Accounts 231
 - Integrating Microsoft Accounts Including Personalization Settings 232
- Windows Store and Cloud Apps 233
 - Introduction to Windows Store Apps 234
 - Installing and Managing Software by Using Microsoft Office 365 and Windows Store Apps 235
 - Configuring and Managing Office 365* 235
 - Managing Software Using Office 365* 237
 - Updating Windows Store Apps 238
 - Controlling Windows Store Access* 239
 - Sideloaded Apps 240
 - Sideloaded into Online and Offline Images* 243
 - Sideloaded Apps Using Microsoft Intune* 244
 - Deep Link Apps by Using Microsoft Intune* 248
- Exam Preparation Tasks 249
- Review All the Key Topics 249
- Complete the Tables and Lists from Memory 250
- Definitions of Key Terms 250

Chapter 6 Windows 10 Networking 253

- “Do I Know This Already?” Quiz 253
- Foundation Topics 258
- Configuring TCP/IP Settings 258
 - Configuring and Supporting TCP/IP Version 4 Settings 261
 - Static IPv4 Addressing* 262
 - Classless Interdomain Routing* 264
 - Private IPv4 Networks* 265
 - Configuring and Supporting TCP/IP Version 6 Settings 265
 - IPv6 Address Syntax* 265
 - IPv6 Prefixes* 266
 - Types of IPv6 Addresses* 266
 - Compatibility Between IPv4 and IPv6 Addresses* 268
- Configuring IP Settings 269
 - Configuring Name Resolution 270
 - Configuring TCP/IPv6 Name Resolution* 273
 - Disabling IPv6 274
 - Connecting to a Wired Network 275

<i>The Network and Sharing Center</i>	276
<i>Using the Network and Sharing Center to Set Up a TCP/IPv4 Connection</i>	277
<i>Implementing APIPA</i>	280
<i>Connecting to a TCP/IP Version 6 Network</i>	281
<i>Configuring Network Locations</i>	283
<i>Setting Up New Network Connections</i>	284
<i>Connecting to Existing Networks</i>	285
<i>Setting Up Network Sharing and Discovery</i>	286
<i>Using Internet Connection Sharing to Share Your Internet Connection</i>	288
Configuring Network Settings	292
Connecting to Wireless Networks	292
<i>Wireless Networking Protocols</i>	293
<i>Setting Up a Wireless Network Connection</i>	294
<i>Managing Wireless Network Connections</i>	297
Managing Preferred Wireless Networks	299
<i>Wireless Network Profiles</i>	300
Configuring Network Adapters	303
Troubleshooting Network Issues	305
Exam Preparation Tasks	307
Review All the Key Topics	307
Complete the Tables and Lists from Memory	309
Definitions of Key Terms	309
Chapter 7 Windows 10 Security 311	
“Do I Know This Already?” Quiz	311
Foundation Topics	319
Configuring Authentication and Authorization	319
Authentication	319
<i>Microsoft Passport</i>	320
<i>Picture Password and Biometrics</i>	323
<i>Configuring Local Accounts</i>	325
<i>Configuring Microsoft Accounts</i>	330
<i>Configuring Windows Hello</i>	332
Authorization	336
<i>Workgroups</i>	336
<i>Domain Account Settings</i>	337
<i>HomeGroup</i>	338
<i>Joining a HomeGroup</i>	340
<i>Modifying HomeGroup Settings</i>	341
<i>Configuring Device Registration</i>	344
<i>Configuring Device Guard</i>	348
<i>Configuring Credential Guard</i>	354
<i>Configuring Device Health Attestation</i>	355

<i>Configuring UAC Behavior</i>	356
<i>Features of User Account Control</i>	357
<i>Application Prompts</i>	360
<i>Running Programs with Elevated Privileges</i>	361
<i>Configuring User Account Control</i>	362
<i>User Account Control Policies</i>	363
Supporting Authentication and Authorization	366
Windows 10 Lock Screen and Logon Prompts	366
Picture Password	368
Managing Credentials	369
<i>Adding, Editing, and Removing Credentials in Credential Manager</i>	369
<i>Windows Credentials Backup and Restore</i>	371
<i>Web Credentials</i>	372
Managing Multifactor Authentication	372
<i>Requesting Certificates</i>	374
Configuring Computer and User Authentication	375
<i>Secure Channel</i>	375
<i>Account Policies</i>	376
Configuring NTFS Permissions	378
NTFS File and Folder Permissions	378
<i>Applying NTFS Permissions</i>	379
<i>Specifying Advanced Permissions</i>	381
<i>NTFS Permissions Inheritance</i>	384
<i>Taking Ownership of Files and Folders</i>	385
Exam Preparation Tasks	386
Review All the Key Topics	386
Complete the Tables and Lists from Memory	387
Definitions of Key Terms	387
Chapter 8 Windows 10 Data Security	389
“Do I Know This Already?” Quiz	389
Foundation Topics	393
Support Data Security	393
Issues Related to Shared Folder and NTFS Permissions	394
<i>Viewing a User’s Effective Permissions</i>	394
<i>Copying and Moving Files and Folders</i>	395
<i>Copying Files and Folders with NTFS Permissions</i>	396
<i>Moving Files and Folders with NTFS Permissions</i>	396
<i>Using the Mouse to Copy or Move Objects from One Location to Another</i>	397
Dynamic Access Control	398
Access to Removable Media	400
Encrypting File System	402
Encrypting File System Basics	403
Preparing a Disk for EFS	405

Encrypting Files	406
Backing Up EFS Keys	407
Decrypting Files	408
EFS Recovery Agents	409
Configuring Local Security Policy	410
Configuring Local Policies	412
<i>Audit Policies</i>	412
<i>Security Options</i>	415
Security for Mobile Devices	416
Configuring BitLocker and BitLocker To Go	417
<i>BitLocker Drive Encryption</i>	417
<i>BitLocker To Go</i>	424
<i>BitLocker Policies</i>	426
<i>Operating System Drives</i>	426
<i>Fixed Data Drive Policies</i>	428
<i>Use of Data Recovery Agents</i>	430
<i>Microsoft BitLocker Administration and Monitoring (MBAM)</i>	433
Configuring Startup Key Storage	434
<i>Preparing a Computer Without a TPM to Use BitLocker</i>	434
<i>Syskey Startup Keys</i>	438
Exam Preparation Tasks	439
Review All the Key Topics	439
Complete Tables and Lists from Memory	440
Definitions of Key Terms	440
Chapter 9 Managing User Data	443
“Do I Know This Already?” Quiz	443
Foundation Topics	450
Configuring Data Storage	450
Configuring Storage Using Disk Management and Windows PowerShell	451
Basic and Dynamic Disks	452
<i>Working with Basic Disks</i>	454
<i>Converting Basic Disks to Dynamic</i>	459
<i>Working with Dynamic Disks</i>	460
RAID Volumes	461
<i>Creating a RAID-0 Volume</i>	462
<i>Creating a Spanned Volume</i>	464
<i>Creating a Mirrored Volume</i>	465
<i>Creating a RAID-5 Volume</i>	465
<i>Using DiskPart to Create Striped, Mirrored, and RAID-5 Volumes</i>	466
<i>Managing and Troubleshooting RAID Volumes</i>	467
Creating and Configuring VHDS	467

Removable Devices	468
Storage Spaces	469
<i>Creating a Storage Space</i>	469
Troubleshooting Storage and Device Issues	472
Managing File System Fragmentation	474
<i>Optimizing Drives</i>	474
<i>The Defrag.exe Command-Line Tool</i>	477
<i>Error Checking</i>	477
Supporting Data Storage	478
DFS Client Configuration Including Caching Settings	478
Managing Storage Spaces	480
<i>Configuring Fault Tolerance of Storage Spaces</i>	482
<i>Managing Storage Spaces with PowerShell</i>	483
Configuring OneDrive	484
<i>OneDrive App</i>	484
<i>OneDrive Desktop</i>	485
<i>OneDrive Settings</i>	486
User Data Migration and Configuration	488
Migrating User Profiles	488
<i>User State Migration Tool</i>	488
Configuring Folder Location	494
<i>Benefits of Folder Redirection</i>	495
<i>Redirecting Library Folders</i>	495
Implementing Domain-Based Folder Redirection	498
Configuring Local, Roaming, and Mandatory Profiles	501
Implementing Roaming Profiles	504
Establishing Mandatory Profiles	506
User Profiles and Operating System Versions	507
Exam Preparation Tasks	508
Review All the Key Topics	508
Definitions of Key Terms	509
Chapter 10 Windows Hyper-V	511
“Do I Know This Already?” Quiz	512
Foundation Topics	515
Introduction to Virtualization	515
Creating and Configuring VHDs	516
<i>Using DiskPart to Create a VHD</i>	517
Mounting VHDs	519
Creating and Configuring Virtual Machines	521
Enabling Client Hyper-V in Windows 10	521
Creating a Hyper-V Virtual Machine	523
<i>Using the Hyper-V Manager</i>	524

	<i>Creating Virtual Machines</i>	525
	<i>Configuring Virtual Machines</i>	529
	Deploying Virtual Machines	535
	<i>Integration Services</i>	536
	<i>Converting a Physical Machine</i>	538
	Creating and Managing Virtual Machine Checkpoints	539
	Using Virtual Machine Checkpoints	539
	Creating and Configuring Virtual Switches	543
	Using an External Virtual Switch	545
	Using Internal Virtual Switches	546
	Using Private Virtual Switches	547
	Connecting Virtual Machines	547
	Exam Preparation Tasks	549
	Review All the Key Topics	549
	Complete the Tables and Lists from Memory	549
	Definitions of Key Terms	550
Chapter 11	Configuring and Securing Mobile Devices	553
	“Do I Know This Already?” Quiz	553
	Foundation Topics	557
	Configuring Offline Files and Sync Center	557
	Client Computer Configuration	558
	Sync Center	560
	Server Configuration	562
	Offline File Policies	564
	Using the Always Offline Mode	565
	Configuring Transparent Caching of Offline Files	567
	Configuring Power Policies	568
	Configuring Power Options	569
	<i>Power Plans</i>	570
	<i>Additional Power Plan Options</i>	571
	<i>Advanced Power Settings</i>	573
	Battery Meter	575
	Power Management and Group Policy	579
	Configuring Windows To Go	581
	Preparing USB Drives for Windows To Go	582
	<i>Provisioning a Windows To Go Workspace</i>	582
	Using Windows To Go on a Host Computer	584
	Configuring Wi-Fi Direct	586
	Exam Preparation Tasks	588
	Review All the Key Topics	588
	Complete Tables and Lists from Memory	588
	Definitions of Key Terms	589

Chapter 12 Managing Mobile Devices 591

- “Do I Know This Already?” Quiz 591
- Foundation Topics 594
- Mobile Device Policies 594
 - Security Policies 594
 - Configuring Account Policies 596
 - Password Policies* 596
 - Account Lockout* 598
 - Unlocking an Account* 599
 - Configuring Local Policies 600
 - Audit Policies* 600
 - Security Options* 602
 - Configuring Remote Wipe 604
- Managing Data Synchronization 605
 - Work Folders 606
- Managing Broadband Connectivity 609
 - Metered Networks* 610
 - Broadband Tethering* 610
- Exam Preparation Tasks 613
- Review All the Key Topics 613
- Complete the Tables and Lists from Memory 613
- Definitions of Key Terms 613

Chapter 13 Microsoft Intune 615

- “Do I Know This Already?” Quiz 616
- Foundation Topics 619
- Microsoft Intune Administration 619
 - User Accounts, Device Enrollment, and Device Management 619
 - User Accounts* 620
 - Enrolling Devices* 625
 - Viewing and Managing Devices* 630
 - The Microsoft Intune Connector Site System Role 634
 - Manage User and Computer Groups 636
 - Manage Remote Computers 638
- Microsoft Intune Monitoring 639
 - Configure Monitoring and Alerts 639
 - Managing Policies 642
- Deploying Software Updates 645
 - Third-Party Updates 648
 - Reports and In-console Monitoring 649
- Exam Preparation Tasks 650
- Review All the Key Topics 650
- Complete the Tables and Lists from Memory 651
- Definitions of Key Terms 651

Chapter 14 Configuring File and Folder Access 653

“Do I Know This Already?” Quiz 654

Foundation Topics 658

Configuring Data Encryption Using Encrypting File System (EFS) 658

Encrypting File System Basics 659

Preparing a Disk for EFS 660

Encrypting Files 661

Backing Up EFS Keys 663

Decrypting Files 664

EFS Recovery Agents 664

Configuring Disk Quotas 666

Some Guidelines for Using Quotas 668

Configuring Object Access Auditing 669

Enabling Object Access Auditing 670

Specifying Objects to Be Audited 671

Configuring Shared Resources 674

Using the Network and Sharing Center to Configure File Sharing 674

Sharing Files, Folders, and Printers 676

Configuring Shared Folder Permissions 678

Use of the Public Folder for Sharing Files 682

Mapping a Drive 682

Command-Line Administration of Shared Folders 683

Media Streaming 684

Configuring File Libraries 685

HomeGroup 687

Creating a Homegroup 687

Joining a Homegroup 689

OneDrive 692

Troubleshooting Data Access and Usage 693

Effective Permissions 693

Practical Guidelines on Sharing and Securing Folders 694

Configuring Shared Printers 695

Configuring Location Aware Printing 698

Exam Preparation Tasks 700

Review All the Key Topics 700

Complete the Tables and Lists from Memory 701

Definitions of Key Terms 701

Chapter 15 Configuring Remote Access 703

“Do I Know This Already?” Quiz 703

Foundation Topics 707

Configuring Remote Authentication 707

Remote Authentication Planning 708

Remote Access Authentication Protocols 709

NTLM and Kerberos Authentication	711
Remote Authentication Group Policies	712
Configuring Remote Desktop Settings	713
Establishing a Remote Desktop Connection with Another Computer	714
Configuring the Server Side of Remote Desktop	717
Selecting a Nondefault Port	718
Configuring VPN Authentication and Settings	719
Understanding Remote Access	720
Establishing VPN Connections and Authentication	721
VPN Connection Security	725
Enabling VPN Reconnect	726
App-Triggered VPN, Traffic Filters, and Lockdown VPN	727
<i>App-Triggered VPN</i>	728
<i>Traffic Filters</i>	730
<i>LockDown VPN</i>	731
Configuring DirectAccess	732
<i>Remote Desktop Services (RDS)</i>	732
<i>DirectAccess</i>	732
Configuring Remote Management	735
Choosing the Right Tools	735
Windows Remote Management (WinRM)	737
Using Windows Remote Shell	739
Using Windows PowerShell and MMCs for Remote Management	739
<i>PowerShell and PowerShell ISE</i>	740
<i>PowerShell Remoting</i>	743
<i>Using MMC Snap-ins for Remote Management</i>	745
Remote Assistance	747
Configuring and Using Easy Connect	753
Exam Preparation Tasks	753
Review All the Key Topics	753
Complete the Tables and Lists from Memory	754
Definitions of Key Terms	754
Chapter 16 Configuring and Maintaining Network Security	757
“Do I Know This Already?” Quiz	757
Foundation Topics	761
Configuring Windows Firewall	761
Basic Windows Firewall Configuration	762
Configuring Windows Firewall with Advanced Security	768
<i>Configuring Multiple Firewall Profiles</i>	770
<i>Configuring New Firewall Rules</i>	772
Configuring IPsec Security Rules	776
Configuring New Connection Security Rules (IPsec)	777
Modifying Rule Properties	778

	Configuring Notifications	780
	Group Policy and Windows Firewall	781
	Configuring Authenticated Exceptions	783
	Configuring Network Discovery	784
	Managing Wireless Security	787
	Exam Preparation Tasks	789
	Review All the Key Topics	789
	Complete the Tables and Lists from Memory	790
	Definitions of Key Terms	790
Chapter 17	Managing Mobile Apps	793
	“Do I Know This Already?” Quiz	793
	Foundation Topics	796
	Remote Desktop Services and RemoteApp	796
	Configuring RemoteApp	796
	Configuring Group Policy Objects (GPOs) for Signed Packages	801
	Configuring Remote Desktop Web Access for Azure RemoteApp Distribution	805
	Subscribing to Azure RemoteApp and Desktop Connection Feeds	807
	Microsoft Azure RemoteApp	810
	Configuring RemoteApp and Desktop Connection Settings	811
	<i>Azure RemoteApp Collections</i>	811
	<i>Publishing RemoteApp Applications</i>	812
	Support for iOS and Android	813
	Exam Preparation Tasks	816
	Review All the Key Topics	816
	Definitions of Key Terms	817
Chapter 18	Managing Desktop Applications	819
	“Do I Know This Already?” Quiz	820
	Foundation Topics	824
	Implementing Apps	824
	Startup Options and Windows Features	824
	Windows Store for Business	826
	<i>Signup and User Configuration</i>	827
	<i>Working with Store for Business Apps</i>	831
	<i>Client Configuration</i>	833
	Windows Assessment and Deployment Kit (ADK)	836
	Desktop Application Compatibility	837
	Application Compatibility Toolkit (ACT) and Compatibility Database	838
	<i>Using the Application Compatibility Toolkit (ACT)</i>	838
	Using Windows Installer	842
	<i>Understanding MSI Features and Support</i>	846
	Implementing Shims	847

Configuring File Associations and Default Program Settings	849
<i>Modifying Default Program Settings</i>	849
<i>Associating File Extensions with Specific Programs</i>	851
Configuring Application Compatibility Mode	853
Desktop Application Coexistence	856
Managing App-V Applications	857
<i>Overview of App-V</i>	857
<i>The App-V Management Console</i>	858
<i>App-V Command-Line Utilities</i>	860
User Experience Virtualization	861
Getting Started with UE-V	862
Custom Settings Location Templates	864
Using Microsoft Intune for Desktop Apps	866
Exam Preparation Tasks	870
Review All the Key Topics	870
Complete the Tables and Lists from Memory	871
Definitions of Key Terms	871
Chapter 19 Monitoring and Managing Windows	873
“Do I Know This Already?” Quiz	873
Foundation Topics	877
Monitoring Windows 10	877
Event Viewer	877
<i>Viewing Logs in Event Viewer</i>	878
<i>Customizing Event Viewer</i>	880
<i>Creating Tasks from Events</i>	881
<i>Using Event Log Subscriptions</i>	882
Monitoring Computer Performance	886
<i>Task Manager</i>	886
<i>Resource Monitor</i>	890
<i>Performance Monitor</i>	893
<i>Data Collector Sets</i>	897
<i>Optimizing and Troubleshooting Memory Performance</i>	902
<i>Optimizing and Troubleshooting Processor Utilization</i>	904
<i>Optimizing and Troubleshooting Disk Performance</i>	905
Monitoring System Resources	907
Monitoring and Managing Printers	908
Reliability Monitor	911
Configuring Advanced Management Tools	914
Microsoft Management Console (MMC)	914
<i>MMC Options for Delegation</i>	914
Windows Services	916
System Configuration Utility	918

	<i>General Tab</i>	918
	<i>Boot Tab</i>	919
	<i>Services Tab</i>	919
	<i>Startup Tab</i>	920
	<i>Tools Tab</i>	920
	Configuring Indexing Options	921
	Task Scheduler	924
	<i>Scheduling a Task with Task Scheduler</i>	926
	Windows PowerShell	928
	Exam Preparation Tasks	931
	Review all the Key Topics	931
	Complete the Tables and Lists from Memory	932
	Definitions of Key Terms	932
Chapter 20	Configuring System Recovery Options	935
	“Do I Know This Already?” Quiz	935
	Foundation Topics	939
	Configuring a USB Recovery Drive	939
	Performing Recovery Operations Using Windows Recovery	942
	System Restore and Restore Points	945
	Configuring System Restore	945
	Performing a Refresh or Recycle	948
	<i>Refreshing Your Computer</i>	949
	<i>Resetting Your Computer to Original Installation Condition</i>	952
	<i>Advanced Startup Options</i>	954
	<i>Performing a System Image Recovery</i>	957
	Configuring Restore Points	960
	Resolving Hardware and Device Issues	962
	Using Device Manager to Resolve Driver Conflicts	962
	<i>Use of Security and Maintenance to View Device-Related Problems</i>	965
	<i>Use of System Information to View Device-Related Problems</i>	966
	Rolling Back Drivers	967
	Exam Preparation Tasks	969
	Review All the Key Topics	969
	Definitions of Key Terms	969
Chapter 21	Configuring File Recovery	971
	“Do I Know This Already?” Quiz	971
	Foundation Topics	975
	Restoring Previous Versions of Files and Folders	975
	How to Restore Damaged or Deleted Files	975
	Using Windows Backup to Protect Your Data	976
	<i>Configuring Windows Backup for the First Time</i>	976
	<i>Managing and Troubleshooting Your Backups</i>	981
	<i>Scheduling Your Backups</i>	984

Recovering Files with Backup and Restore (Windows 7)	985
Using Wbadmin to Recover Data	988
Configuring File History	989
Setting Up File History	990
Adding Additional Folders to File History	996
Restoring Files Using File History	997
Creating a System Image	999
Recovering Files from OneDrive	1001
OneDrive and the Recycle Bin	1001
OneDrive Version History	1002
Exam Preparation Tasks	1004
Review All the Key Topics	1004
Definitions of Key Terms	1004
Chapter 22 Final Preparation	1007
Tools for Final Preparation	1007
Pearson Test Prep Practice Test Software and Questions on the Website	1007
<i>Accessing the Pearson Test Prep Software Online</i>	<i>1008</i>
<i>Accessing the Pearson Test Prep Software Offline</i>	<i>1008</i>
Customizing Your Exams	1009
Updating Your Exams	1010
<i>Premium Edition</i>	<i>1011</i>
Memory Tables	1011
Chapter-Ending Review Tools	1011
Suggested Plan for Final Review/Study	1012
Summary	1012
Appendix A Answers to the “Do I Know This Already?” Quizzes	1015
Glossary of Key Terms	1057
Index	1080
 Elements Available On the Book’s Website	
APPENDIX B	Memory Tables
APPENDIX C	Memory Tables Answer Key
APPENDIX D	Study Planner
	Glossary of Key Terms

About the Authors

Don Poulton (A+, Network+, Security+, MCSA, MCSE) is an independent consultant who has been involved with computers since the days of 80-column punch cards. After a career of more than 20 years in environmental science, Don switched careers and trained as a Windows NT 4.0 MCSE. He has been involved in consulting with a couple of small training providers as a technical writer, during which time he wrote training and exam prep materials for Windows NT 4.0, Windows 2000, and Windows XP. Don has written or contributed to several titles, including *Security+ Lab Manual* (Que, 2004); *MCSA/MCSE 70-299 Exam Cram 2: Implementing and Administering Security in a Windows 2003 Network* (Exam Cram 2) (Que, 2004); *MCSE 70-294 Exam Prep: Planning, Implementing, and Maintaining a Microsoft Windows Server 2003 Active Directory Infrastructure* (Que, 2006); *MCTS 70-620 Exam Prep: Microsoft Windows Vista, Configuring* (Que, 2008); *MCTS 70-680 Cert Guide: Microsoft Windows 7, Configuring* (Que, 2011); *MCTS 70-640 Cert Guide: Windows Server 2008 Active Directory, Configuring* (Que, 2011); *MCTS 70-642 Cert Guide: Windows Server 2008 Network Infrastructure, Configuring* (Que, 2012); and *MCSA 70-687 Cert Guide Configuring Microsoft Windows 8.1* (Que, 2015).

In addition, he has worked on programming projects, both in his days as an environmental scientist and more recently with Visual Basic to update an older statistical package used for multivariate analysis of sediment contaminants.

When not working on computers, Don is an avid amateur photographer who has had his photos displayed in international competitions and published in magazines such as *Michigan Natural Resources Magazine* and *National Geographic Traveler*. Don also enjoys traveling and keeping fit.

Don lives in Burlington, Ontario, with his wife, Terry.

Harry Holt started his technology career in the early 1980s while working in trust accounting, where he discovered the advantages of Lotus 1-2-3 over paper spreadsheets, and how much better D:Base was at tracking transactions than a cabinet full of 3×5 index cards. That prompted a career change, and Harry took advantage of the burgeoning IT program at Virginia Commonwealth University's prestigious School of Business to hone his knowledge.

Harry gained experience over the years in most technical roles in the industry—from computer operator, programmer, and LAN administrator, to network engineer, DBA, and project manager, among others. He has used his skills to improve efficiencies in a range of organizations, including Fortune 500 companies, financial institutions, government agencies, and even small partnerships and sole proprietorships.

Exploring aspects of the computer industry and evolution of technology both professionally, as a hobby, and as a volunteer for various nonprofit organizations, Harry gained a working knowledge of many types of systems from large IBM z/OS mainframes, VAX systems, and UNIX platforms, to Windows, Macintosh, and Linux systems. He can program in a variety of development languages and platforms and enjoys collaborating in open source projects.

Harry has a bachelor's degree in IT and PMP certification and is currently working as a cyber applications manager in Richmond, Virginia. He lives with his wife, Donna, and enjoys going for meals prepared by his son and Master Chef, Alex, at fine dining restaurants in Richmond, Virginia.

Randy Bellet: After establishing himself as a retailer in Richmond, Virginia, curiosity about the fledgling small computer industry brought Randy Bellet into the IT field in 1981. Beginning with the TRS-DOS operating system on a Radio Shack Model III and “sneaker-net,” he automated his own and other businesses, initially programming spreadsheets using one of the original versions of VisiCalc. Hardware consisted of 32 K of RAM, monochrome monitors, and no hard drives. Data was stored on floppy disks that really flopped. After the PC-XT and its clones arrived, he followed the market and extended his skills into the networking of PCs and XENIX servers and wrote applications for the retail and pager industries.

As PCs became commonplace and their connectivity a necessity, Randy configured Windows client/server networks for small- and medium-sized businesses, and wrote n-tier applications on various Windows platforms ranging from Windows 3.1 through Windows Server 2008 for the medical, insurance, food, and leisure industries. As organizations expanded and scaled their uses of PCs, extracting data from mainframes for use in Windows applications became a specialty.

Since 1999, Mr. Bellet has been on the faculty of ECPI University, delivering and developing curriculum in Network Security and Software Development and writing ancillary instructor materials. Certifications include CompTIA Network +, MCSE, MCSA, and MCDBA. He holds a bachelor's degree in economics and marketing from New York University and a master's degree in IT from Virginia Tech.

Dedication

This book is dedicated to my newest grandson, Ryan, who arrived in this world just as this project was getting underway. Like his older brother, Blake, he holds a world of international love in his future with his Chinese/Canadian heritage.

—Don Poulton

This book is dedicated to my family. I love you.

—Harry Holt

Dedicated to my wife, Evelyn, and daughters Rachel and Sarah, all of whom supported my career choices at every turn.

—Randy Bellet

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—Don Poulton

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—Harry Holt

Thanks to everyone at Pearson, including Michelle Newcomb, Chris Cleveland, and Vanessa Evans. And to Vince Averello and Tonya Simpson. Thanks especially to Don Poulton, who has set the standards, and to Harry Holt, whose tireless efforts and research into the always-changing technology made this something special.

—Randy Bellet

About the Technical Reviewer

Vince Averello has been a professional geek for more than 30 years. During those often funny, sometimes frightening, but always interesting years, he's worked for more than 10 organizations, lending his expertise to a variety of projects. Every one of them has been a learning experience, so now he knows a little bit about a lot of things ranging from the Internet to garment trucking. Vince lives in lovely midtown Bayonne, New Jersey, with his loving wife, daughter, and two cats with delusions of grandeur.

We Want to Hear from You!

As the reader of this book, you are our most important critic and commentator. We value your opinion and want to know what we're doing right, what we could do better, what areas you'd like to see us publish in, and any other words of wisdom you're willing to pass our way.

We welcome your comments. You can email or write to let us know what you did or didn't like about this book—as well as what we can do to make our books better.

Please note that we cannot help you with technical problems related to the topic of this book.

When you write, please be sure to include this book's title and author as well as your name and email address. We will carefully review your comments and share them with the author and editors who worked on the book.

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*Be sure to check the box that you would like to hear from us to receive exclusive discounts on future editions of this product.

Introduction

MCSA 70-698: Installing and Configuring Windows 10 is designed to prepare you to implement and administer Windows 10 computers in environments ranging from a few computers to enterprise-level deployments. It is structured around the objectives and topics published by Microsoft for Exam 70-698. With this book, you get a direct and hands-on approach to installing, configuring, and supporting deployments of Windows 10 computers. This is the first of two exams required to complete your MCSA certification in Windows 10. The exam is designed to measure your skill and ability to implement, administer, and troubleshoot computers running all editions of Windows 10. Microsoft not only tests you on your knowledge of the desktop operating system, but also has purposefully developed questions on the exam to force you to problem solve in the same way that you would when presented with real-life problems.

MCSA 70-697: Configuring Windows Devices is designed to build upon the foundations laid by the 70-698 exam, including the management and supporting of devices on the network, configuration of devices, applications, and security features, as well as the recovery of computers from various types of failures. It is structured around the objectives and topics published by Microsoft for Exam 70-697. This exam is the second of two exams required to complete your MCSA certification in Windows 10.

Both exams rely heavily on use-case scenarios and real-world situations. These questions test your knowledge of the proper way to deploy, configure, and troubleshoot Windows 10 when faced with challenges that are common when operating Windows computer networks in the real world. Not only will this book help to prepare you for the certification exams, it will ensure you have a fundamental understanding of the way in which you can leverage these powerful tools regardless of the size or complexity of your organization.

This book covers all the topics listed in Microsoft's exam objectives, and each chapter includes key topics and preparation tasks to assist you in mastering this information. It covers all the objectives that Microsoft has established for exams 70-697 and 70-698. It doesn't offer end-to-end coverage of the Windows 10 operating system; rather, it helps you develop the specific core competencies that you need to master as a desktop support specialist. You should be able to pass the exam by learning the material in this book, without taking a class.

About the 70-697, Configuring Windows Devices and 70-698, Installing and Configuring Windows 10 Exams

The 70-697, Configuring Windows Devices and 70-698, Installing and Configuring Windows 10 exams compose the two exams required to complete your MCSA certification in Windows 10. They have been designed for individuals who already have experience administering Windows 10 client computers in an enterprise environment and want to transition their responsibilities to the next career level. These exams test the candidate's understanding of the functionality and technical support of enterprise-level networks of Windows 10 computers

together with Windows Server computers, with a particular focus on best-practices solutions to real-world challenges. They assume a high degree of familiarity with the functionality of Windows computer networks and support components.

These exams are computer-based tests that have 50 to 60 questions and a 120-minute time limit. All exam information is managed by Microsoft and is always subject to change, so candidates should monitor the Microsoft certification sites for any exam updates at <https://www.microsoft.com/en-us/learning/exam-70-697.aspx> and <https://www.microsoft.com/en-us/learning/exam-70-698.aspx>.

You can take these exams at Pearson VUE testing centers. You can register with VUE at www.vue.com/microsoft.

70-697 Exam Topics

Table I-1 lists the topics of the 70-697 exam and indicates the chapter in the book where they are covered.

Table I-1 70-697 Exam Topics

Exam Topic	Chapter
Manage identity (10–15%)	
Support Windows Store and cloud apps: Install and manage software by using Microsoft Office 365 and Windows Store apps, sideload apps by using Microsoft Intune, sideload apps into online and offline images, deeplink apps by using Microsoft Intune, integrate Microsoft account including personalization settings.	Chapter 5
Support authentication and authorization: Identifying and resolving issues related to the following: Multi-factor authentication including certificates, Microsoft Passport, virtual smart cards, picture passwords, and biometrics; workgroup vs. domain, Homegroup, computer and user authentication including secure channel, account policies, credential caching, and Credential Manager; local account vs. Microsoft account; Workplace Join; Configuring Windows Hello.	Chapter 7
Plan desktop and device deployment (10–15%)	
Migrate and configure user data: Migrate user profiles; configure folder location; configure profiles including profile version, local, roaming, and mandatory.	Chapter 9
Configure Hyper-V: Create and configure virtual machines including integration services, create and manage checkpoints, create and configure virtual switches, create and configure virtual disks, move a virtual machine's storage.	Chapter 10
Configure mobility options: Configure offline file policies, configure power policies, configure Windows To Go, configure sync options, configure Wi-Fi direct, files, powercfg, Sync Center.	Chapter 10
Configure security for mobile devices: Configure BitLocker, configure startup key storage.	Chapter 8

Exam Topic	Chapter
<i>Plan and implement a Microsoft Intune device management solution (10–15%)</i>	
Support mobile devices: Support mobile device policies including security policies, remote access, and remote wipe; support mobile access and data synchronization including Work Folders and Sync Center; support broadband connectivity including broadband tethering and metered networks; support Mobile Device Management by using Microsoft Intune, including Windows Phone, iOS, and Android.	Chapter 12
Deploy software updates by using Microsoft Intune: Use reports and In-Console Monitoring to identify required updates, approve or decline updates, configure automatic approval settings, configure deadlines for update installations, deploy third-party updates.	Chapter 13
Manage devices with Microsoft Intune: Provision user accounts, enroll devices, view and manage all managed devices, configure the Microsoft Intune subscriptions, configure the Microsoft Intune connector site system role, manage user and computer groups, configure monitoring and alerts, manage policies, manage remote computers	Chapter 13
<i>Configure networking (10–15%)</i>	
Configure IP settings: Configure name resolution, connect to a network, configure network locations.	Chapter 6
Configure networking settings: Connect to a wireless network, manage preferred wireless networks, configure network adapters, configure location-aware printing.	Chapter 6
Configure and maintain network security: Configure Windows Firewall, configure Windows Firewall with Advanced Security, configure connection security rules (IPsec), configure authenticated exceptions, configure network discovery.	Chapter 16
<i>Configure storage (10–15%)</i>	
Support data storage: Identifying and resolving issues related to the following: DFS client including caching settings, storage spaces including capacity and fault tolerance, OneDrive.	Chapter 9
Support data security: Identifying and resolving issues related to the following: Permissions including share, NTFS, and Dynamic Access Control (DAC); Encrypting File System (EFS) including Data Recovery Agent; access to removable media; BitLocker and BitLocker To Go including Data Recovery Agent and Microsoft BitLocker Administration and Monitoring (MBAM).	Chapter 8

Exam Topic	Chapter
<i>Manage data access and protection (10–15%)</i>	
Configure shared resources: Configure shared folder permissions, configure HomeGroup settings, configure libraries, configure shared printers, configure OneDrive.	Chapter 14
Configure file and folder access: Encrypt files and folders by using EFS, configure NTFS permissions, configure disk quotas, configure file access auditing, configure authentication and authorization.	Chapter 14
<i>Manage remote access (10–15%)</i>	
Configure remote connections: Configure remote authentication, configure Remote Desktop settings, configure VPN connections and authentication, enable VPN reconnect, configure broadband tethering.	Chapter 15
Configure mobility options: Configure offline file policies, configure power policies, configure Windows To Go, configure sync options, configure Wi-Fi direct.	Chapter 11
<i>Manage apps (10–15%)</i>	
Deploy and manage Azure RemoteApp: Configure RemoteApp and Desktop Connections settings, configure Group Policy Objects (GPOs) for signed packages, subscribe to the Azure RemoteApp and Desktop Connections feeds, export and import Azure RemoteApp configurations, support iOS and Android, configure remote desktop web access for Azure RemoteApp distribution.	Chapter 17
Support desktop apps: The following support considerations including: Desktop app compatibility using Application Compatibility Toolkit (ACT) including shims and compatibility database; desktop application co-existence using Hyper-V, Azure RemoteApp, and App-V; installation and configuration of User Experience Virtualization (UE-V); deploy desktop apps by using Microsoft Intune.	Chapter 18
<i>Manage updates and recovery (10–15%)</i>	
Configure system recovery: Configure a recovery drive, configure System Restore, perform a refresh or recycle, perform a driver rollback, configure restore points.	Chapter 20
Configure file recovery: Restore previous versions of files and folders, configure File History, recover files from OneDrive.	Chapter 21
Configure and manage updates: Configure update settings, configure Windows Update policies, manage update history, roll back updates, update Windows Store apps.	Chapter 1

70-698 Exam Topics

Table I-2 lists the topics of the 70-698 exam and indicates the chapter in the book where they are covered.

Table I-2 70-698 Exam Topics

Exam Topic	Chapter
<i>Implement Windows (30–35%)</i>	
Prepare for installation requirements: Determine hardware requirements and compatibility; choose between an upgrade and a clean installation; determine appropriate editions according to device type; determine requirements for particular features, such as Hyper-V, Cortana, Miracast, Virtual Smart Cards, and Secure Boot; determine and create appropriate installation media.	Chapter 2
Install Windows: Perform clean installations, upgrade using Windows Update, upgrade using installation media, configure native boot scenarios, migrate from previous versions of Windows, install to virtual hard disk (VHD), boot from VHD, install on bootable USB, install additional Windows features, configure Windows for additional regional and language support.	Chapter 2
Configure devices and device drivers: Install, update, disable, and roll back drivers; resolve driver issues; configure driver settings, including signed and unsigned drivers; manage driver packages; download and import driver packages; use the Deployment Image Servicing and Management (DISM) tool to add packages	Chapter 3
Perform post-installation configuration: Configure and customize Start menu, desktop, taskbar, and notification settings, according to device type; configure accessibility options; configure Cortana; configure Microsoft Edge; configure Internet Explorer; configure Hyper-V; configure power settings.	Chapter 3
Implement Windows in an enterprise environment: Provision with the Windows Imaging and Configuration Designer (ICD) tool; implement Active Directory–based activation; implement volume activation using a Key Management Service (KMS); query and configure activation states using the command line; configure Active Directory, including Group Policies; configure and optimize user account control (UAC).	Chapter 4
<i>Configure and support core services (30–35%)</i>	
Configure networking: Configure and support IPv4 and IPv6 network settings; configure name resolution; connect to a network; configure network locations; configure Windows Firewall; configure Windows Firewall with Advanced Security; configure network discovery; configure Wi-Fi settings; configure Wi-Fi Direct; troubleshoot network issues; configure VPN, such as app-triggered VPN, traffic filters, and lockdown VPN; configure IPsec; configure Direct Access.	Chapter 6
Configure storage: Configure disks, volumes, and file system options using Disk Management and Windows PowerShell; create and configure VHDs; configure removable devices; create and configure storage spaces; troubleshoot storage and removable devices issues.	Chapter 9

Exam Topic	Chapter
Configure data access and usage: Configure file and printer sharing and HomeGroup connections; configure folder shares, public folders, and OneDrive; configure file system permissions; configure OneDrive usage; troubleshoot data access and usage.	Chapter 14
Implement apps: Configure desktop apps, configure startup options, configure Windows features, configure Windows Store, implement Windows Store apps, implement Windows Store for Business, provision packages, create packages, use deployment tools, use the Windows Assessment and Deployment Kit (ADK).	Chapter 18
Configure remote management: Choose the appropriate remote management tools; configure remote management settings; modify settings remotely by using the Microsoft Management Console (MMC) or Windows PowerShell; configure Remote Assistance, including Easy Connect; configure Remote Desktop; configure remote PowerShell.	Chapter 15
<i>Manage and maintain Windows (30–35%)</i>	
Configure updates: Configure Windows Update options; implement Insider Preview, Current Branch (CB), Current Branch for Business (CBB), and Long Term Servicing Branch (LTSB) scenarios; manage update history; roll back updates; update Windows Store apps.	Chapter 1
Monitor Windows: Configure and analyze Event Viewer logs, configure event subscriptions, monitor performance using Task Manager, monitor performance using Resource Monitor, monitor performance using Performance Monitor and Data Collector Sets, monitor system resources, monitor and manage printers, configure indexing options, manage client security by using Windows Defender, evaluate system stability using Reliability Monitor, troubleshoot performance issues.	Chapter 19
Configure system and data recovery: Configure a recovery drive, configure a system restore, perform a refresh or recycle, perform a driver rollback, configure restore points, resolve hardware and device issues, interpret data from Device Manager, restore previous versions of files and folders, configure File History, recover files from OneDrive, use Windows Backup and Restore, perform a backup and restore with WBAAdmin, perform recovery operations using Windows Recovery.	Chapter 20
Configure authorization and authentication: Configure Microsoft Passport, configure picture passwords and biometrics, configure workgroups, configure domain settings, configure HomeGroup settings, configure Credential Manager, configure local accounts, configure Microsoft accounts, configure Device Registration, configure Windows Hello, configure Device Guard, configure Credential Guard, configure Device Health Attestation, configure UAC behavior.	Chapter 7
Configure advanced management tools: Configure services, configure Device Manager, configure and use the MMC, configure Task Scheduler, configure automation of management tasks using Windows PowerShell.	Chapter 19

About the *MCSA 70-697 and 70-698 Cert Guide*

This book maps to the topic areas of the 70-697 and 70-698 exams and uses a number of features to help you understand the topics and prepare for the exams.

Objectives and Methods

This book uses several key methodologies to help you discover the exam topics on which you need more review, to help you fully understand and remember those details, and to help you prove to yourself that you have retained your knowledge of those topics. So, this book does not try to help you pass the exams only by memorization, but by truly learning and understanding the topics. This book is designed to help you pass the 70-697 and 70-698 exams by using the following methods:

- Helping you discover which exam topics you have not mastered
- Providing explanations and information to fill in your knowledge gaps
- Supplying exercises that enhance your ability to recall and deduce the answers to test questions
- Providing practice exercises on the topics and the testing process via test questions on the companion website

Book Features

To help you customize your study time using this book, the core chapters have several features that help you make the best use of your time:

- **“Do I Know This Already?” quiz:** Each chapter begins with a quiz that helps you determine how much time you need to spend studying that chapter.
- **Foundation Topics:** These are the core sections of each chapter. They explain the concepts for the topics in that chapter.
- **Exam Preparation Tasks:** After the “Foundation Topics” section of each chapter, the “Exam Preparation Tasks” section lists a series of study activities that you should do at the end of the chapter. Each chapter includes the activities that make the most sense for studying the topics in that chapter:
 - **Review All the Key Topics:** The Key Topic icon appears next to the most important items in the “Foundation Topics” section of the chapter. The Review All the Key Topics activity lists the key topics from the chapter, along with their page numbers. Although the contents of the entire chapter could be on the exam, you should definitely know the information listed in each key topic, so you should review these.
 - **Complete the Tables and Lists from Memory:** To help you memorize some lists of facts, many of the more important lists and tables from the chapter are included in a document on the companion website. This document lists only partial information, allowing you to complete the table or list.

- **Define Key Terms:** Although the exam may be unlikely to ask a question such as “Define this term,” the Microsoft MCSA exams do require that you learn and know a lot of Windows computer administration terminology. This section lists the most important terms from the chapter, asking you to write a short definition and compare your answer to the glossary at the end of the book.
- **Web-based practice exam:** The companion website includes the Pearson Test Prep practice test software that allows you to take practice exam questions. Use these to prepare with a sample exam and to pinpoint topics where you need more study.

How This Book Is Organized

This book contains 21 core chapters—Chapters 1 through 21. Chapter 22 includes some preparation tips and suggestions for how to approach the exam. Each core chapter covers a subset of the topics on the 70-697 and 70-698 exams. The chapters cover the following topics:

- **Chapter 1, “Introducing Windows 10,”** covers the basics of Windows 10, a history of the Windows operating system, new features introduced with Windows 10, and provides a brief tour of Windows 10. It also covers how to work with application updates and Windows Update.
- **Chapter 2, “Implementing Windows,”** covers installation of Windows 10, upgrades to Windows 10 from older versions of Windows, how to install or upgrade Windows using various media and techniques, and installing Windows features. This chapter also covers using virtual hard disks (VHDs) to install and run Windows 10 and maintaining Windows 10 images.
- **Chapter 3, “Post-Installation Configuration,”** covers configuring and customizing the Windows user interface for the many device types that Windows 10 supports, configuring Windows options, and configuring devices and device drivers.
- **Chapter 4, “Managing Windows in an Enterprise,”** covers Active Directory and the many tools and systems available for managing and deploying large numbers of Windows servers and workstations in an organization.
- **Chapter 5, “Installing and Managing Software,”** covers the use of a Microsoft Account for logging in and keeping user information in sync, the Windows Store, and how to work with Universal Windows Platform apps.
- **Chapter 6, “Windows 10 Networking,”** covers the basics of TCP/IP networking, and the network capabilities available in Windows operating systems. It also covers various Windows network settings for VPN, Bluetooth, wireless, and other networking features.
- **Chapter 7, “Windows 10 Security,”** covers basic Windows security features for authentication and authorization. It also covers NTFS permissions and access control lists (ACLs), credential storage and management, and User Account Control (UAC) features and configuration.

- **Chapter 8, “Windows 10 Data Security,”** covers Windows features available for securing data at rest, including NTFS security, BitLocker and BitLocker To Go, Data Access Control (DAC), and Encrypting File System (EFS). This chapter also covers Windows policies that can be used to enforce good data security standards.
- **Chapter 9, “Managing User Data,”** covers data storage technologies available in Windows, working with disks and volumes, Storage Spaces, Distributed File System (DFS), and OneDrive cloud storage. It also covers managing user profile data and migrating user data from one system to another.
- **Chapter 10, “Windows Hyper-V,”** covers some virtualization concepts and configuring and working with virtualization in Windows, including virtual hard disks (VHDs), native boot, Microsoft client Hyper-V, creating and configuring Hyper-V virtual machines, checkpoints, and Hyper-V virtual switches.
- **Chapter 11, “Configuring and Securing Mobile Devices,”** covers technologies useful for Windows mobile devices, including offline files and Sync Center, power policies, Windows To Go, and Wi-Fi Direct.
- **Chapter 12, “Managing Mobile Devices,”** covers tools for managing mobile devices, which includes mobile device policies, data synchronization, and Work Folders, and technologies for managing broadband connectivity.
- **Chapter 13, “Microsoft Intune,”** covers Intune, Microsoft’s cloud-based mobile device management (MDM) solution for organizations. It includes coverage for Intune administration, monitoring, and deployment of software updates for managed devices.
- **Chapter 14, “Configuring File and Folder Access,”** covers data encryption using Encrypting File System (EFS), disk quotas for limiting user storage, file access auditing, and configuration of shared resources such as file and printer sharing.
- **Chapter 15, “Configuring Remote Access,”** covers remote authentication technologies, Remote Desktop settings, VPN authentication and configuration, and configuration and use of remote management technologies.
- **Chapter 16, “Configuring and Maintaining Network Security,”** covers the configuration of Windows Firewall, IPsec security, and network discovery in Windows 10.
- **Chapter 17, “Managing Mobile Apps,”** covers the server-based services Remote Desktop Services (RDS), RemoteApp, and the use of Azure RemoteApp.
- **Chapter 18, “Managing Desktop Applications,”** covers the Windows Store for Business, desktop application compatibility for older applications, Windows Installer, App-V, and User Experience Virtualization (UE-V). This chapter also covers the use of Microsoft Intune for managing desktop applications for Intune-managed client computers.
- **Chapter 19, “Monitoring and Managing Windows,”** covers tools available for Windows 10 to monitor the use and performance of Windows 10 clients and the configuration of advanced management tools, including Microsoft Management Console (MMC), the Services applet, Task Scheduler, and Windows PowerShell management cmdlets.

- **Chapter 20, “Configuring System Recovery Options,”** covers how to create and use a USB recovery drive, and using System Restore and restore points. It also covers how to use Device Manager to resolve driver problems and conflicts, and the use of Driver Rollback capabilities.
- **Chapter 21, “Configuring File Recovery,”** covers using File History and Windows Backup and Restore to restore previous versions of files and folders, how to configure File History, and how to recover files from OneDrive.
- **Chapter 22, “Final Preparation,”** identifies tools for final exam preparation and helps you develop an effective study plan. It contains tips on how to best use the web-based material to study.
- **Appendix A, “Answers to the ‘Do I Know This Already?’ Quizzes,”** includes the answers to all the questions from Chapters 1 through 21.
- **Glossary:** Provides the list of key terms and their definitions as listed at the end of Chapters 1 through 21.
- **Appendix B, “Memory Tables,”** (a website-only appendix) contains the key tables and lists from each chapter, with some of the contents removed. You can print this appendix and, as a memory exercise, complete the tables and lists. The goal is to help you memorize facts that can be useful on the exams. This appendix is available in PDF format on the book’s website; it is not in the printed book.
- **Appendix C, “Memory Tables Answer Key,”** (a website-only appendix) contains the answer key for the memory tables in Appendix B. This appendix is available in PDF format on the book’s website; it is not in the printed book.
- **Appendix D, “Study Planner,”** is a spreadsheet, available from the book’s website, with major study milestones, where you can track your progress through your study.

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1. Go to <http://www.PearsonTestPrep.com>.
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3. Go to your account page and select the **Registered Products** tab.
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5. Click the **Install Pearson Test Prep Desktop Version** link under the Practice Exams section of the page to download the software.
6. After the software finishes downloading, unzip all the files on your computer.
7. Double-click the application file to start the installation, and follow the onscreen instructions to complete the registration.
8. After the installation is complete, launch the application and select the **Activate Exam** button on the My Products tab.
9. Click the **Activate a Product** button in the Activate Product Wizard.
10. Enter the unique access code found on the card in the sleeve in the back of your book, and click the **Activate** button.
11. Click **Next** and then the **Finish** button to download the exam data to your application.
12. You can now start using the practice exams by selecting the product and clicking the **Open Exam** button to open the exam settings screen.

Note that the offline and online versions will sync together, so saved exams and grade results recorded on one version will be available to you on the other as well.

Customizing Your Exams

When you are in the exam settings screen, you can choose to take exams in one of three modes:

- Study Mode
- Practice Exam Mode
- Flash Card Mode

Study Mode enables you to fully customize your exams and review answers as you are taking the exam. This is typically the mode you would use first to assess your knowledge and identify information gaps. Practice Exam Mode locks certain customization options, because it is presenting a realistic exam experience. Use this mode when you are preparing to test your exam readiness. Flash Card Mode strips out the answers and presents you with only the question stem. This mode is great for late-stage preparation when you really want to challenge yourself to provide answers without the benefit of seeing multiple-choice options. This mode will not provide the detailed score reports that the other two modes will, so it should not be used if you are trying to identify knowledge gaps.

In addition to these three modes, you will be able to select the source of your questions. You can choose to take exams that cover all the chapters, or you can narrow your selection to a single chapter or the chapters that make up specific parts in the book. All chapters are selected by default. If you want to narrow your focus to individual chapters, deselect all the chapters and then select only those on which you want to focus in the Objectives area.

You can also select the exam banks on which to focus. Each exam bank comes complete with a full exam of questions that cover topics in every chapter. You can have the test engine serve up exams from all four banks or just from one individual bank by selecting the desired banks in the exam bank area.

You can make several other customizations to your exam from the exam settings screen, such as the time of the exam, the number of questions served up, whether to randomize questions and answers, whether to show the number of correct answers for multiple-answer questions, or whether to serve up only specific types of questions. You can also create custom test banks by selecting only questions that you have marked or questions on which you have added notes.

Updating Your Exams

If you are using the online version of the Pearson Test Prep software, you should always have access to the latest version of the software as well as the exam data. If you are using the Windows desktop version, every time you launch the software, it checks to see if there are any updates to your exam data and automatically downloads any changes that were made since the last time you used the software. This requires you to be connected to the Internet at the time you launch the software.

Sometimes, due to many factors, the exam data may not fully download when you activate your exam. If you find that figures or exhibits are missing, you may need to manually update your exams.

To update a particular exam you have already activated and downloaded, select the **Tools** tab and select the **Update Products** button. Again, this is an issue only with the desktop Windows application.

If you want to check for updates to the Pearson Test Prep exam engine software, Windows desktop version, select the **Tools** tab and select the **Update Application** button. This ensures that you are running the latest version of the software engine.



This chapter covers the following subjects:

- **Configuring Offline Files and Sync Center:** The Offline Files feature enables users to work with files stored on a network share when they are disconnected from that share. You can specify how files are synchronized with the copies on the offline computer and how to deal with synchronization conflicts.
- **Configuring Power Policies:** Microsoft provides several options for configuring power management on Windows 10 computers. This section introduces you to these options as well as configuring Group Policy for power management settings.
- **Configuring Windows To Go:** Microsoft provides the capability to install a completely functional version of Windows 10 together with applications and settings on a supported USB drive. You can use this drive to boot a computer with supported hardware into the USB copy of Windows 10, bypassing the operating system installed on the computer you're using.
- **Configuring Wi-Fi Direct:** Wi-Fi Direct is a new technology that enables users on portable computers to create ad hoc wireless connections with devices such as smartphones and TVs and share data with these devices without the need for an access point.

This chapter covers the following objectives for the 70-697 exam:



Configure mobility options: Configure offline file policies, configure power policies, configure Windows To Go, configure sync options, configure Wi-Fi settings, configure Wi-Fi Direct, files, powercfg, Sync Center.

Configuring and Securing Mobile Devices

Mobile computing has entered the mainstream of everyday business activity, with portable devices of all kinds, including laptops, tablets, and smartphones presenting an unprecedented level of computing power. You can do almost as much on a notebook or laptop computer or tablet as on a desktop, with the added convenience of portability to any workplace, client, hotel, or home situation as the demand requires. People are buying ultra-portable Surface devices and other hybrid computers that not only act as tablets but can be a fully functional replacement for laptops, with the capability to switch between those roles seamlessly.

Along with the convenience of portability comes the risk of exposing valuable data to unauthorized access as a result of loss or theft of the computer. Microsoft has enhanced the BitLocker full drive encryption feature and added the new BitLocker To Go portable drive encryption feature.

Windows 10 includes many useful mobile computing features, such as the capability to obtain a geographic location based on data collected by a GPS sensor, storage of startup keys, and the capability to remotely wipe information stored on a lost or stolen computer. Microsoft has continued and enhanced features introduced with older Windows versions, including the Windows Mobility Center, offline file access, improved power management, and presentation settings. This chapter introduces you to these portable computer features.

“Do I Know This Already?” Quiz

The “Do I Know This Already?” quiz allows you to assess whether you should read this entire chapter or simply jump to the “Exam Preparation Tasks” section for review. If you are in doubt, read the entire chapter. Table 11-1 outlines the major headings in this chapter and the corresponding “Do I Know This Already?” quiz questions. You can find the answers in Appendix A, “Answers to the ‘Do I Know This Already?’ Quizzes.”

Table 11-1 “Do I Know This Already?” Foundation Topics Section-to-Question Mapping

Foundation Topics Section	Questions Covered in This Section
Configuring Offline Files and Sync Center	1–5
Configuring Power Policies	6–9
Configuring Windows To Go	10–11
Configuring Wi-Fi Direct	12

CAUTION The goal of self-assessment is to gauge your mastery of the topics in this chapter. If you do not know the answer to a question or are only partially sure of the answer, you should mark that question as wrong for purposes of the self-assessment. Giving yourself credit for an answer you correctly guess skews your self-assessment results and might provide you with a false sense of security.

1. You have configured the Offline Files option on your Windows 10 computer and want to ensure that all available files on a network share are automatically cached to your computer. Which option should you enable?
 - a. Open Sync Center
 - b. Disk Usage
 - c. Sync Selected Offline Files
 - d. Always Available Offline
2. You are configuring server options for offline files and want to ensure that users can always run cached files locally, so that performance as experienced by the users is always optimized. Which settings should you configure? (Each answer represents part of the solution. Choose two.)
 - a. Only the files and programs that users specify will be available offline.
 - b. No files or programs from the shared folder are available offline.
 - c. All files and programs that users open from the shared folder are automatically available offline.
 - d. Optimize for performance.

3. You want to enable client computers to temporarily cache all files obtained across a slow WAN link. What Group Policy setting should you enable?
 - a. Configure Background Sync
 - b. Enable Transparent Caching
 - c. Administratively Assigned Offline Files
 - d. Configure Slow-Link Mode
4. Which offline file policy determines whether offline files are synchronized in the background when extra charges on cell phone or broadband networks could be incurred?
 - a. Enable Transparent Caching
 - b. Configure Slow-Link Mode
 - c. Enable File Synchronization on Costed Networks
 - d. Remove Work Offline Command
5. Which offline file policy controls caching of offline files across slow links so you can specify a network latency value above which network files are temporarily cached?
 - a. Enable Transparent Caching
 - b. Configure Slow-Link Mode
 - c. Enable File Synchronization on Costed Networks
 - d. Remove Work Offline Command
6. Windows 10 uses which mode, which automatically saves your work and configuration information in RAM and turns off the computer's monitor, hard disk, and other system components?
 - a. Sleep
 - b. Standby
 - c. Hibernate
 - d. Suspended
7. Which Windows 10 power plan turns off the display after 2 minutes and sleeps after 10 minutes when on battery power?
 - a. Balanced
 - b. Power Saver
 - c. High performance
 - d. Energy Star Qualified

8. You want to reduce the processor power being used so that you can watch a movie on your laptop computer while on a long flight without running out of battery power. What setting should you configure? (Choose two; each is a complete solution to this problem.)
 - a. Balanced power plan
 - b. Power Saver power plan
 - c. Processor power management advanced setting
 - d. Sleep advanced setting
 - e. Multimedia advanced setting
9. Which of the following tasks can you configure directly from the battery meter on a Windows 10 portable computer? (Choose all that apply.)
 - a. Choose a power plan.
 - b. Use presentation mode.
 - c. Adjust screen brightness.
 - d. Specify hard disk settings.
 - e. Open the Power Settings page.
10. Which of the following best describes Windows To Go?
 - a. A portable computer on which Windows 10 is installed and booted with user credentials obtained from a USB device.
 - b. A copy of Windows 10 located on a network drive that you access from any computer using a USB device that contains user credentials and a path to the network drive.
 - c. A copy of Windows Mobile imaged onto a USB device that enables a user to boot any computer with compatible hardware into the operating system on the USB device.
 - d. A copy of Windows 10 imaged onto a USB device that enables a user to boot any computer with compatible hardware into the operating system on the USB device.
11. Windows To Go works on which editions of Windows 10?
 - a. Windows 10 Pro and Enterprise
 - b. Windows 10 Enterprise and Education
 - c. All except Windows Mobile
 - d. Windows To Go can run any edition

12. You are planning to implement Wi-Fi Direct on your wireless network. Which of the following are advantages that you will gain from the Wi-Fi implementation? (Choose all that apply.)
- a. Computers will be able to connect seamlessly with any wireless devices without the need for additional hardware.
 - b. You can create an ad hoc connection among five computers running any version of Windows 10.
 - c. Computers can connect concurrently to the Internet and to devices such as smartphones.
 - d. You can stream media between devices over a high bandwidth connection.
 - e. Windows 10 UWP apps can communicate over Wi-Fi Direct without the need for additional setup and configuration.
 - f. Devices requiring IP address assignment can automatically receive an IP address from a DHCP server or from a built-in DHCP allocator in Windows 10.

Foundation Topics

Configuring Offline Files and Sync Center



The Offline Files feature in Windows 10 enables a user to access and work with files and folders stored on a network share when the user is disconnected from that share. For example, such a situation could occur when the user is working from a laptop, tablet, or smartphone on the road or at home. This feature ensures that users are always working with the most recent version of their files.

When you enable Offline Files, the feature makes anything you have cached from the network available to you. It also preserves the normal view of network drives, and so on, as well as shared folder and NTFS permissions. When you reconnect to the network, the feature automatically synchronizes any changes with the versions on the network. Also, changes made to your files while online are saved to both the network share and your local cache. Windows 10 includes the Always Offline feature, which keeps the computer operating in Offline mode even when the server is available. This mode can enhance the performance of the computer because it always retrieves data from the local hard disk rather than going across the network to the server (which can limit performance if the network or server happens to be slow).

Offline files are stored on the local computer in a special area of the hard drive called a *cache*. More specifically, this is located at %systemroot%\CSC, where CSC stands for client-side caching. By default, this cache takes up 10 percent of the disk volume space.

You need to configure both the client computer and the server to use the Offline Files feature. Keep in mind that, in this sense, the “server” refers to any computer that holds a shared folder available to users of other computers. This may be a computer running Windows 7 Professional, Enterprise, or Ultimate, Windows 8.1 Pro or higher, or Windows 10 Pro or higher, as well as a server running Windows Server 2008 R2, Windows Server 2012/R2, or Windows Server 2016. It could even be a computer running an older version of Windows, although these versions are no longer supported.

NOTE For more information on new features of Offline Files in Windows 10 and Windows Server 2016, refer to “Folder Redirection, Offline Files, and Roaming User Profiles Overview” at [https://technet.microsoft.com/en-us/library/hh848267\(v=ws.11\).aspx](https://technet.microsoft.com/en-us/library/hh848267(v=ws.11).aspx).

Client Computer Configuration

By default, the Offline Files feature is not enabled on the client computer. The following procedure shows you how to enable offline files and configure the available client options:



- Step 1.** Click **Start**, then scroll the program list that appears and select **Windows System**, and choose **Control Panel**.
- Step 2.** In the Control Panel search box, type **sync**, and then click the **Sync Center** link.
- Step 3.** From the Sync Center applet, click the **Manage Offline Files** link.
- Step 4.** The Offline Files dialog box appears. By default, Offline Files are disabled, and the dialog informs you that Offline Files is currently disabled. You will see an Enable Offline Files command button. Click this button to enable Offline Files. You may be asked to restart your computer. If so, after restarting, you will be able to access the available options shown in Figure 11-1.

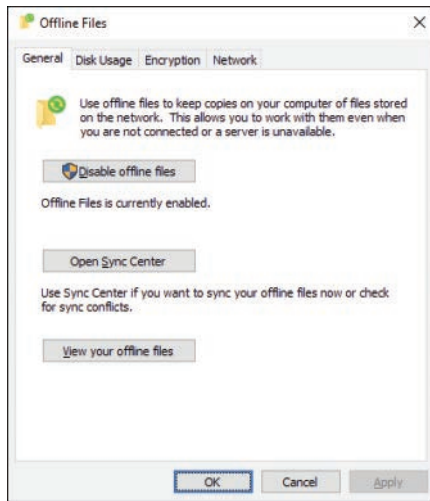


Figure 11-1 Configuring Offline Files at the Client Computer from the Offline Files Dialog Box

- Step 5.** From the General tab, select the following options as required:
- **Disable Offline Files:** Select this command button if you do not want to use Offline Files. You must restart your computer to disable Offline Files. If Offline Files is disabled, this command button enables you to enable Offline Files.
 - **Open Sync Center:** Opens the Sync Center.
 - **View Your Offline Files:** Opens a File Explorer window displaying the contents of the Offline Files folder.
- Step 6.** Select the **Disk Usage** tab to configure the amount of disk space currently used for storing offline files. Click **Change Limits** to modify this setting. Click **Delete Temporary Files** to delete locally stored files.
- Step 7.** Select the **Encryption** tab, and then click **Encrypt** to encrypt offline files. This feature uses the Encrypting File System (EFS) to encrypt offline files, keeping them secure from unauthorized users. By default, offline files are not encrypted.
- Step 8.** Select the **Network** tab to check for slow network connections. You can specify the number of minutes (5 by default) at which Windows 8.1 checks for a slow connection.
- Step 9.** When finished, click **OK** or **Apply**.

Sync Center

When you have enabled your computer for Offline Files, copies of files and folders you access across the network are stored automatically in your cache area according to the server configuration parameters in effect. These parameters are discussed in the next section.

You can also automatically cache all available files from a network share to which you have connected. Right-click the shared folder icon and choose **Always Available Offline**, as shown in Figure 11-2. This automatically caches all available files without your having to open them first. You can also synchronize your cached files manually when you are connected to the network share. To do so, right-click the shared folder icon and choose **Sync > Sync Selected Offline Files**.

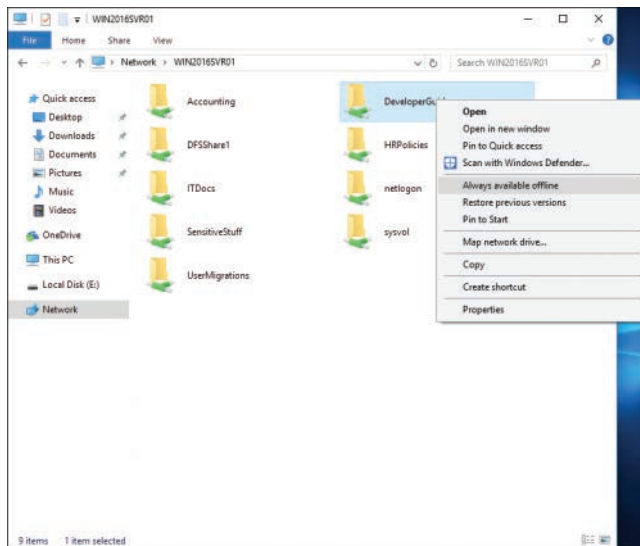


Figure 11-2 Caching Files from a Network Share

The Sync Center was first included in Windows Vista; it enables you to manage cached offline files and folders after you have configured them as described in the previous sections. The Sync Center enables you to perform the following actions:

- **View sync partnerships:** View the devices and places you are syncing with.
- **View sync conflicts:** If different users have performed conflicting edits on a file (such as a Word document), the Sync Center informs you and enables you to save multiple copies of the edited file for later analysis.
- **View sync results:** You can check the status of sync with any of your offline files or partnerships.

- **Set up new sync partnerships:** Sync Center establishes sync partnerships for all shared folders that you have cached locally. You can configure these partnerships to specify how and when the folders are synced.
- **Manage offline files:** Displays the Offline Files dialog box, shown previously in Figure 11-1.

Use the following procedure to view sync partnerships and synchronize files:

- Step 1.** Use one of the following methods to open the Sync Center:
- From the Search bar or Cortana text box, type **sync center** and click **Sync Center** in the list.
 - From the Offline Files dialog box previously shown in Figure 11-1, click **Open Sync Center**.
- Step 2.** In the task list on the left side of the Sync Center, click **View Sync Partnerships** to display configured partnerships.
- Step 3.** To set up a new sync partnership, click **Set Up New Sync Partnerships**.
- Step 4.** To synchronize a specific network share, right-click its partnership and then click **Sync Offline Files**.

Sync Center also enables you to schedule synchronization activities to take place at any of the following actions:

- At a specified time and synchronization interval
- When you log on to your computer
- When your computer has been idle for a specified number of minutes (15 minutes by default)
- When you lock or unlock Windows

Use the following steps to create a schedule:

- Step 1.** In Sync Center, select **View Sync Partnerships**, double-click the **Offline Files** folder, and then select the required synchronization partnership. From the menu, select **Schedule**.
- Step 2.** In the Offline Files Sync Schedule dialog box that appears, select the items to be synched on this schedule and then click **Next**.
- Step 3.** To specify a time for the sync to begin, select **At a Scheduled Time**. To initiate synchronization when an event occurs, select **When an Event Occurs** and then select the desired action or actions. Available events include When I Log On to My Computer, My Computer Is Idle for a Specified Number of Minutes, I Lock Windows, and I Unlock Windows.

- Step 4.** If you select **At a Scheduled Time**, Sync Center automatically provides the current date and time as a start time and a one-day repeat interval (see Figure 11-3). Accept these or specify a different date, time, and interval as required, and then click **Next**.

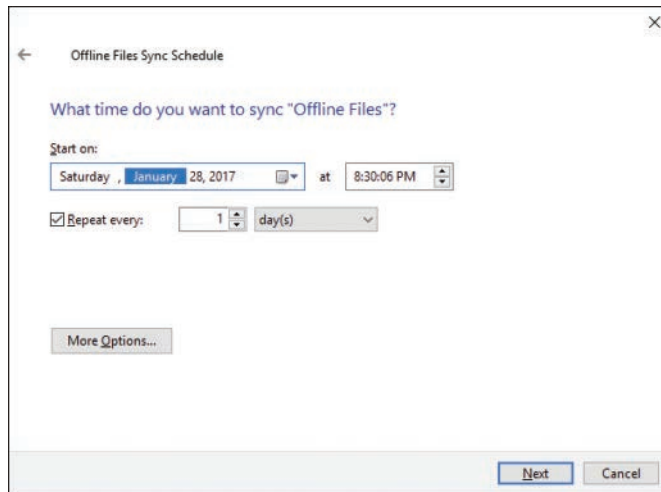


Figure 11-3 Specifying the Date, Time, and Synchronization Interval for Your Sync Schedule

- Step 5.** Specify a descriptive name for the scheduled synchronization and then click **Save Schedule**.

After you have created a synchronization schedule, the Offline Files Sync Schedule dialog box provides additional options for viewing or editing an existing sync schedule or deleting the schedule.

If different users modify a synchronized file while working on different computers, a synchronization conflict occurs. Sync Center informs you when conflicts have occurred. To view information about sync conflicts, click **View Sync Conflicts** in the Tasks pane. Sync Center informs you about the file or files that are in conflict.

To resolve a conflict, select it and click **Resolve**. Sync Center enables you to keep either or both versions by using an altered filename, thereby allowing you to compare them and resolve differences at a later time.

Server Configuration

To enable the caching of files stored on a shared folder, you need to configure the shared folder on the server and specify the type of caching available. The following procedure shows you how to perform these tasks on a Windows 10 computer.

- Step 1.** Right-click the shared folder and choose **Properties**.
- Step 2.** On the Sharing tab of the folder's Properties dialog box, click **Advanced Sharing**. If you receive a UAC prompt, click **Yes**.
- Step 3.** On the Advanced Sharing dialog box, click **Caching** to open the Offline Settings dialog box shown in Figure 11-4.

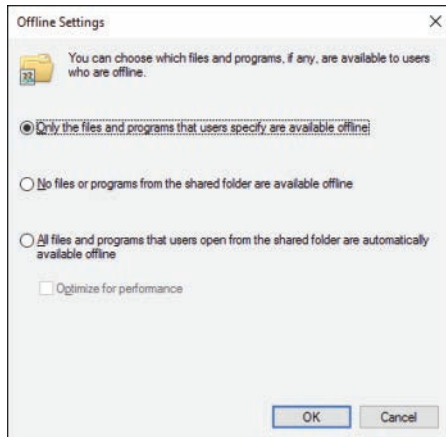


Figure 11-4 Offline Settings Dialog Box Providing Several Options for Enabling Offline Caching in Windows 10

- Step 4.** Select from the following options and then click **OK**:
- **Only the Files and Programs That Users Specify Are Available Offline:** Requires that a user connecting to the share specifically indicate the files to be made available for caching. This is the default setting.
 - **No Files or Programs from the Shared Folder Are Available Offline:** Effectively disables the Offline Files feature.
 - **All Files and Programs That Users Open from the Shared Folder Are Automatically Available Offline:** Makes every file in the share available for caching by a remote user. When a user opens a file from the share, the file is downloaded to the client's cache and replaces any older versions of the file.
 - **Optimize for Performance:** Enables expanded caching of shared programs so that users can run them locally, thereby improving performance. Available only if you have selected the All Files and Programs That Users Open from the Shared Folder Are Automatically Available Offline option.

Step 5. Click **OK** to close the Advanced Sharing dialog box and then click **Close** to close the Properties dialog box for the shared folder.

Offline File Policies

Group Policy makes available a series of policy settings. In Local Group Policy Editor or Group Policy Management Editor, navigate to Computer Configuration\Administrative Templates\Network\Offline Files to display the policy settings shown in Figure 11-5. Note that some of the policy settings available here are applicable to computers running older Windows versions only and are provided for backward-compatibility purposes. Table 11-2 describes the more important policy settings relevant to Windows 10 and Windows Server 2016 computers that you should be aware of.

Key Topic

Table 11-2 Offline File Policies

Policy	Description
Specify Administratively Assigned Offline Files	Specifies network files and folders that are always available offline. Type the Universal Naming Convention (UNC) path to the required files.
Configure Background Sync	Enables you to control synchronization of files across slow links. You can configure sync interval and variance parameters, as well as blackout periods when sync should not occur.
Limit Disk Space Used by Offline Files	When enabled, limits the amount of disk space in MB used to store offline files.
Allow or Disallow Use of the Offline Files Feature	Determines whether users can enable Offline Files. When enabled, Offline Files is enabled and users cannot disable it; when disabled, Offline Files is disabled and users cannot enable it.
Encrypt the Offline Files Cache	When enabled, all files in the Offline Files cache are encrypted.
Enable File Screens	Enables you to block file types according to extension from being created in folders that are available offline. Specify the extensions to be excluded, separated by semicolons—for example, *.jpg; *.mp3.
Enable Transparent Caching	Controls caching of offline files across slow links. You can specify a network latency value above which network files are temporarily cached. More about this policy in the next section.
Configure Slow-Link Mode	Controls background synchronization across slow links and determines how network file requests are handled across slow links.

Policy	Description
Enable File Synchronization on Costed Networks	Determines whether offline files are synchronized in the background when extra charges on cell phone or broadband networks could be incurred.
Remove Work Offline Command	Prevents users from manually changing whether Offline Files is in online mode or offline mode, by removing the Work Offline command from File Explorer.

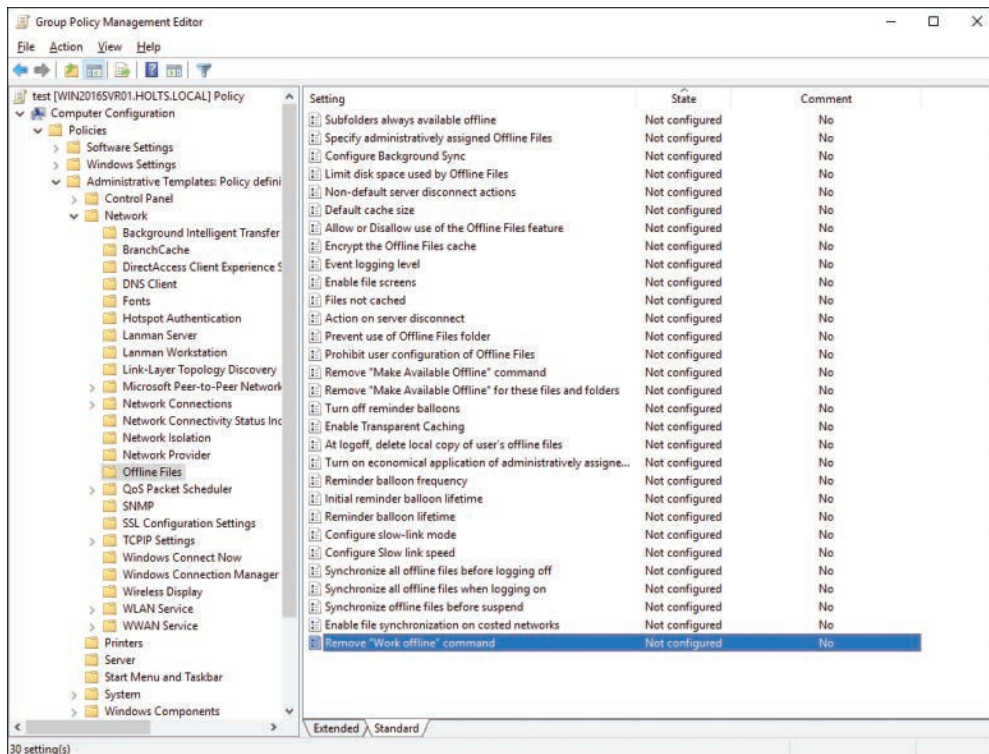


Figure 11-5 Configuring a Large Number of Policy Settings Related to the Use of Offline Files

Using the Always Offline Mode

The Always Offline mode enables faster access to cached files and redirected folders in an Active Directory Domain Services (AD DS) environment. Enabling this mode reduces bandwidth usage because users are always working offline, even when connected to the network.

Use the following steps to enable the Always Offline mode:

- Step 1.** At a server running Windows Server 2016 (or Windows Server 2012), or a computer running the Remote Server Administration Tools, access the Group Policy Management Editor and open a Group Policy Object (GPO) focused on the desired domain, site, or organizational unit (OU).
- Step 2.** Navigate to the Computer Configuration\Policies\Administrative Templates\Network\Offline Files node.
- Step 3.** Right-click the **Configure Slow-Link Mode** policy and choose **Edit** to display the Configure Slow-Link Mode dialog box shown in Figure 11-6.

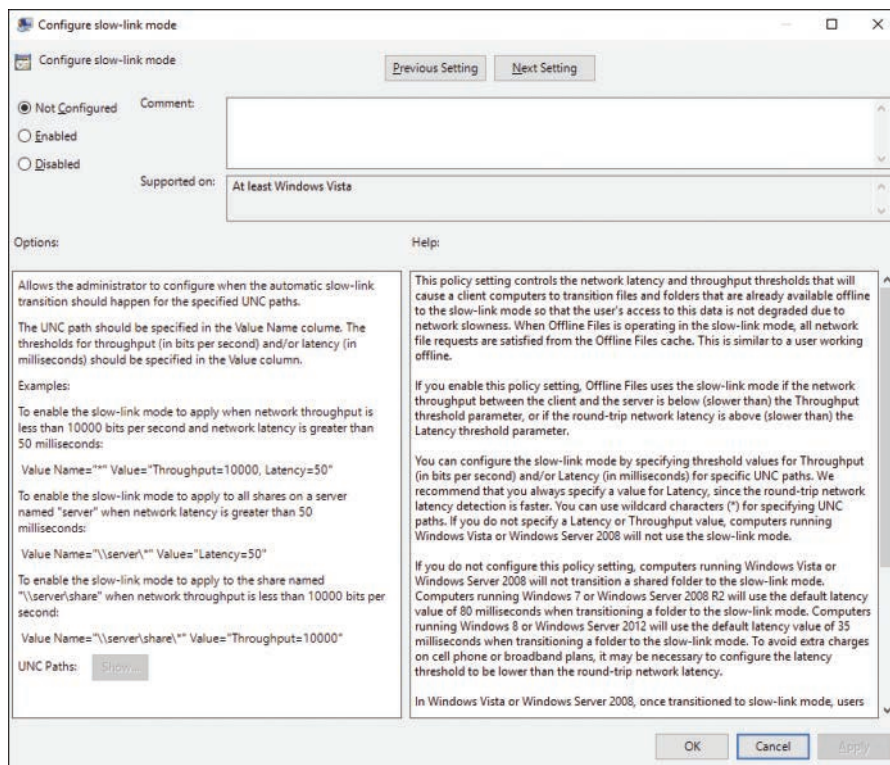


Figure 11-6 Configuring Slow-Link Mode

- Step 4.** Select **Enabled**.
- Step 5.** Scroll the Options section of this dialog box to click **Show** at the bottom of this section.

- Step 6.** From the Show Contents dialog box, specify the file share for which the Always Offline mode should be enabled, as shown for \\win2016svr01\HRPolicies in Figure 11-7.

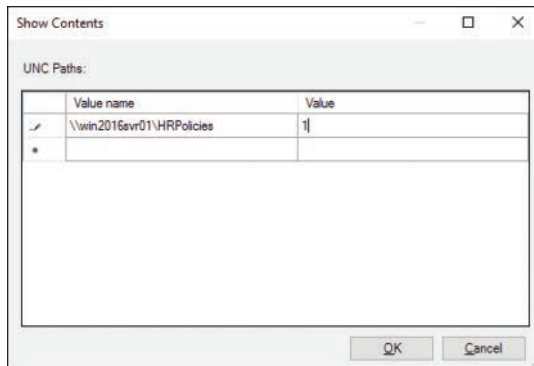


Figure 11-7 Specifying a Shared Folder That Should Always Be Available Offline

- Step 7.** In the Value column, specify a latency value in milliseconds (as shown for 1 millisecond in Figure 11-7) and then click **OK**.
- Step 8.** Click **OK** to close the Configure Slow-Link Mode dialog box.

NOTE For more information on the Always Offline mode, refer to “Enable the Always Offline Mode to Provide Faster Access to Files” at [https://technet.microsoft.com/en-us/library/hh968298\(v=ws.11\).aspx](https://technet.microsoft.com/en-us/library/hh968298(v=ws.11).aspx).

Configuring Transparent Caching of Offline Files

Introduced with Windows 7 and available in Windows 10 is the concept of *transparent file caching*, which enables client computers to temporarily cache files obtained across a slow WAN link more aggressively, thereby reducing the number of times the client might have to retrieve the file across the slow link. Use of transparent caching also serves to reduce bandwidth consumption across the WAN link. Prior to Windows 7, client computers always retrieved such a file across the slow link.

The first time a user accesses a file across the WAN, Windows retrieves it from the remote computer; this file is then cached to the local computer. Subsequently, the local computer checks with the remote server to ensure that the file has not changed and then accesses it from the local cache if its copy is up-to-date. Note that this type of file caching is temporary; clients cannot access these files when they go offline.

You can configure the Enable Transparent Caching policy shown in Figure 11-8 so that clients can perform transparent caching. Enable this policy and set the network

latency value, which is the number of milliseconds beyond which the client will temporarily cache files obtained across the WAN.

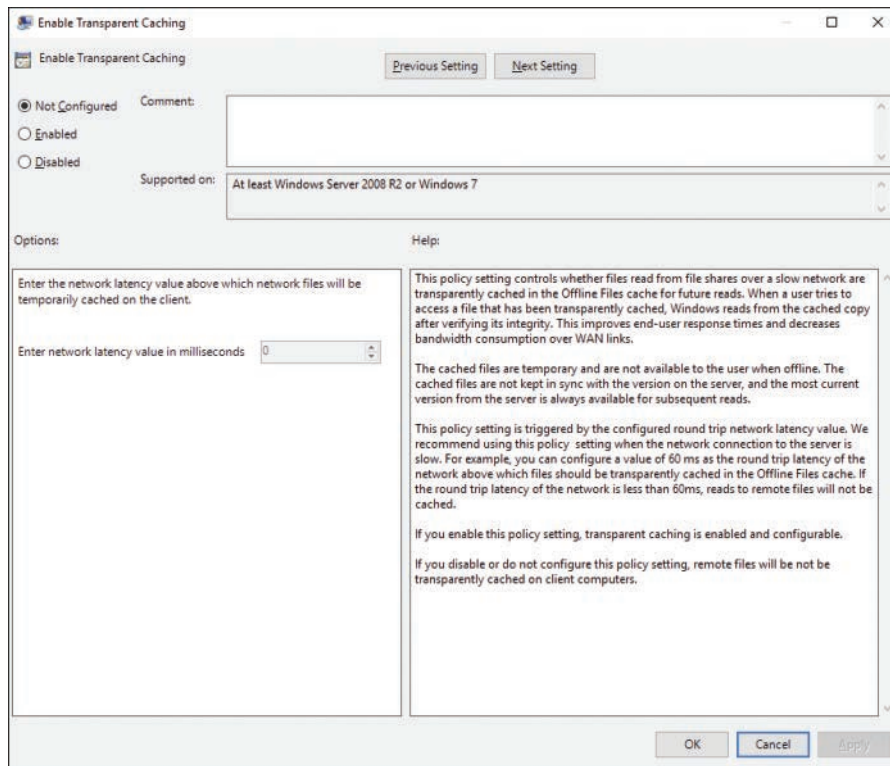


Figure 11-8 Enabling the Enable Transparent Caching Policy Setting So That Clients Can Temporarily Cache Files Obtained Across a Slow WAN Link

Configuring Power Policies



The Hardware and Sound category of Control Panel contains two applets of particular interest to mobile users. Open the Control Panel and select **Hardware and Sound** to display these options, which include the Power Options applet that enables you to configure power use for specific conditions, including connecting your computer to an AC outlet or running it on battery power.

Configuring Power Options

The chief issue with system performance for mobile users is that of managing power consumption on mobile computers when running on battery power. Microsoft provides the Control Panel Power Options applet for configuring several power management options that enable you to configure energy-saving schemes appropriate to your hardware.

NOTE Although designed with mobile users in mind, the power options discussed in this section are available to all users of Windows 10. Users of desktop computers can utilize these options to decrease electricity consumption in these days of ever-increasing electric utility bills.

Windows 10 uses Sleep mode, which replaces the Standby mode used in Windows versions prior to Vista, and offers the following advantages compared to shutting down your computer:

- Windows automatically saves your work and configuration information in RAM and turns off the computer's monitor, hard disk, and other system components. Should your battery run low, Windows saves your work to the hard disk and turns off your mobile computer.
- Entering the sleep state is rapid: it takes only a few seconds.
- When you wake your computer, Windows restores your work session rapidly. You don't need to wait for your computer to boot and restore your desktop after logging on.

You can access the Power Options applet from the Hardware and Sound section or the System and Security section of Control Panel. You can also access this applet by accessing the Search bar or Cortana and typing **power options**. This opens the dialog box shown in Figure 11-9, from which you can configure the options described in the following section.

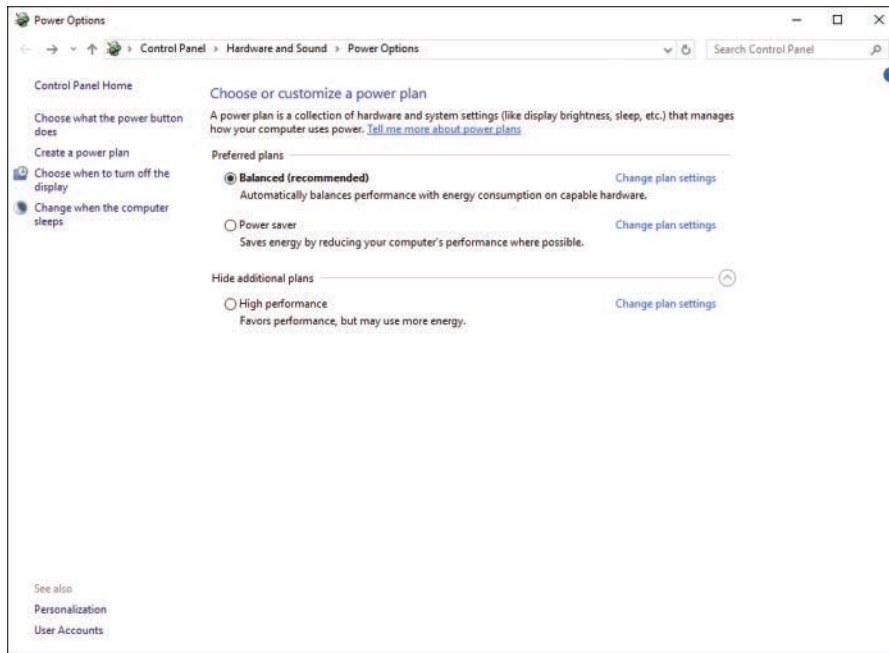


Figure 11-9 Power Options Applet Providing Several Options for Configuring Power Management

Power Plans

Microsoft has supplied three preconfigured power plans that help to strike a balance between usability and power conservation:

- The High-Performance power plan optimizes the computer for performance at the expense of battery life and is suitable for individuals who run graphics-intensive or multimedia applications frequently.
- The Power Saver plan optimizes battery life by slowing the processor down and is suitable for those who use the computer primarily for purposes such as email, Web browsing, and word processing.
- The Balanced plan strikes a balance between these extremes.

You can edit one of these power schemes or create a new one if the preconfigured power schemes do not fulfill your needs. Table 11-3 compares the three preconfigured power plans.

**Table 11-3** Windows 10 Power Plans

Power Plan	When on Battery Power	When Plugged into AC Outlet
Balanced	Turns off display after 5 minutes Sleeps after 10 minutes	Turns off display after 10 minutes Sleeps after 20 minutes
Power Saver	Turns off display after 2 minutes Sleeps after 10 minutes	Turns off display after 5 minutes Sleeps after 15 minutes
High Performance	Turns off display after 10 minutes Does not sleep	Turns off display after 15 minutes Does not sleep

NOTE Some computers might label the Balanced power plan as Energy Star Qualified.

CAUTION Do not use Sleep mode when on a commercial airplane. Airline regulations forbid the use of electronic devices during takeoff and landing. Because a computer can wake to perform a scheduled task or other action, you should turn off your computer completely at these times.

Additional Power Plan Options

Windows 10 enables you to perform additional power management actions that you can use to tailor your computer's power scheme to your needs. When you first access these pages, settings will be read-only. Click the **Change Settings That Are Currently Unavailable** link, and respond to any UAC prompts displayed, to change the options.

Selecting the Change Plan Settings link next to any of the top three options on the task list in the Power Options applet previously shown in Figure 11-9 brings up the System Settings screen for that power plan, shown in Figure 11-10. This enables you to perform the following actions:

- **Turn Off the Display:** You can choose how much idle time to allow before turning off the computer's display.

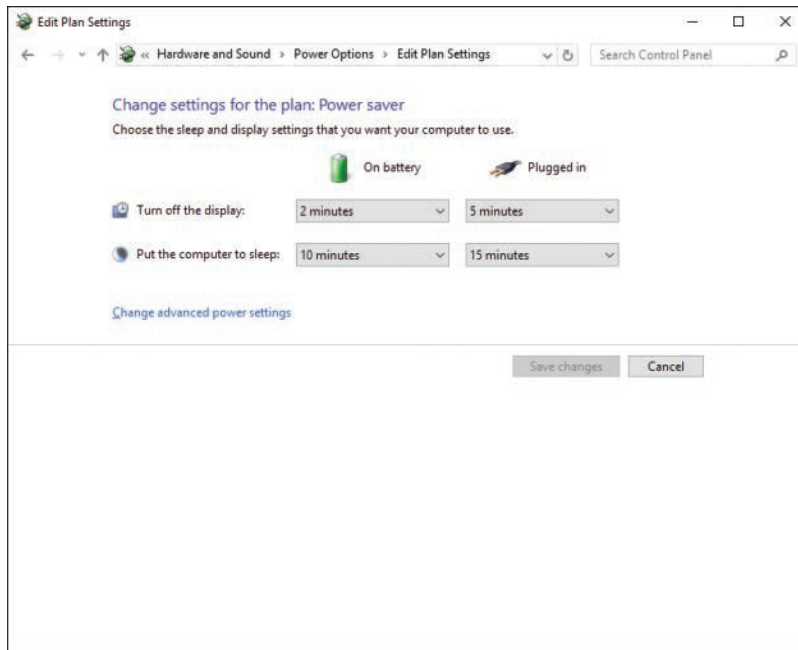


Figure 11-10 Define Power Buttons and Turn On Password Protection Dialog Box Enabling You to Define Power Lid Actions, Configure Password Protection, and Enable Several Shutdown Settings

- **Put the Computer to Sleep:** Decide how long you want the computer to remain idle before going into Sleep mode.
- **Change Advanced Power Settings:** Clicking this link displays all the discrete power options for devices and subsystems shown in Figure 11-11. The Advanced power settings are discussed next.

Key Topic

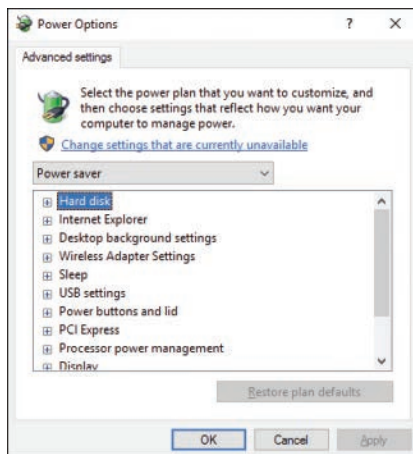


Figure 11-11 Advanced Settings of Power Options Allowing You to Set Discrete Options for Your Power Plan

Advanced settings allow you to modify any of the existing power plans or create your own custom power plan.

Advanced Power Settings

Click **Change Advanced Power Settings** to bring up the dialog box shown in Figure 11-11 for the following additional options, each of which you can define separately for operation on battery power or when plugged in:

- **Hard Disk:** You can specify the number of minutes of inactivity after which the hard disk is turned off.
- **Internet Explorer:** You can configure the JavaScript Timer frequency for either maximum performance (the default when plugged in) or maximum power savings (the default when operating on battery power).
- **Desktop Background Settings:** You can choose whether to make the background slide show available, or to pause it.
- **Wireless Adapter Settings:** You can specify a maximum performance, or low, medium, or maximum power saving for the adapter. The more power saving you specify, the poorer the signal throughput might become.
- **Sleep:** You can specify the number of minutes after which your computer enters Sleep mode. You can also enable wake timers, enabling the PC to be brought out of sleep at a specific time, usually for running backups or other scheduled tasks. You enable all wake timers or Important Wake Timers Only, which includes things like reboots after a Windows update that requires one.
- **USB Settings:** You can enable USB Selective Suspend Setting, which enables Windows to turn off the USB root hub when not in use.
- **Power Buttons and Lid:** You can define the action that occurs when you close the lid or press the Power or Sleep buttons. You can also define the action (sleep, shut down, or turn off the display) that occurs when you select the Power Off button from the Start menu.
- **PCI Express:** You can define the level of power savings for *link state power management*, which controls the power management state for devices connected to the PCI Express bus if present in the computer.
- **Processor Power Management:** You can control the minimum and maximum power status of the processor, also known as throttling the processor. Reducing the processor power levels saves battery power at the expense of lengthening the time required to respond to keyboard and mouse actions. Also available is the System Cooling Policy, which covers the amount of power the fan requires. Active state increases the fan speed before slowing the processor, whereas setting the state to Passive slows the processor before increasing the fan speed.

- **Display:** You can control the display brightness and the length of time before it is turned off. You can also enable *adaptive display*, which increases the waiting time before turning off the display if you wake the computer frequently.
- **Multimedia Settings:** You can control whether the computer enters Sleep mode when sharing multimedia with other users. When you set this option to Prevent Idling to Sleep, the computer will not go to sleep if media is being shared with other computers or devices. You can also define what to do when playing video. The options are to Optimize Video Quality, Optimize Power Savings, or to use a Balanced setting.
- **Battery:** You can specify actions to take place when the battery power reaches a low or critical level, as well as the battery level at which these events occur. By default, low battery level is at 10 percent and produces a notification but takes no action. The critical level is at 5 percent; it notifies you and puts the computer into hibernation when running on battery power.

TIP Configure power plans to turn off components after a period of inactivity. If you set up a power plan to turn off components separately after an interval of non-use, the computer progressively moves toward Sleep mode. This should happen if a user is away from his laptop for 20 or 30 minutes. At the same time, a user doing presentations should not have her computer go into Sleep mode. Remember that the user can enable presentation settings so that this and other actions do not occur.

You can customize a power plan to suit your needs if required. Use these steps to create a custom power plan:

- Step 1.** From the left pane of the Power Options window previously shown in Figure 11-9, click **Create a Power Plan**.
- Step 2.** On the Create a Power Plan dialog box that appears, select the default plan (Balanced, Power Saver, or High Performance) that is closest to your desired plan.
- Step 3.** Provide a descriptive name for the plan and then click **Next**.

- Step 4.** On the Change settings window, select the time interval after which the display is turned off and put to sleep, select the display brightness, and then click **Create**.
- Step 5.** You are returned to the main Power Options window. If you want to configure additional settings for the plan you just created, click **Change Advanced Power Settings** to display the dialog box previously shown in Figure 11-11.

Battery Meter

Windows 10 uses the battery meter to help you keep track of remaining battery life. This is represented by a battery icon in the Notification area, which also contains a Plug icon when the mobile device is plugged into AC power. Hover your mouse over this icon to view the percentage of battery power left. To view the battery meter in full, as shown in Figure 11-12, click the Battery icon.

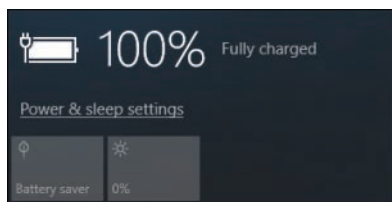


Figure 11-12 Battery Meter Informing You of the Current Battery Charge Level

From the battery meter, you can also change these settings:

- **Battery Saver:** Turns on Battery Saver mode (can be activated when on battery power).
- **Adjust Screen Brightness:** Lowers the screen brightness to save power.
- **Power and Sleep Settings:** Opens the Battery Settings page shown in Figure 11-13. This page changes the settings for the current power plan settings from the applet shown previously in Figure 11-10. You can click the **Additional Power Settings** link to display the Power Options applet from Figure 11-9.

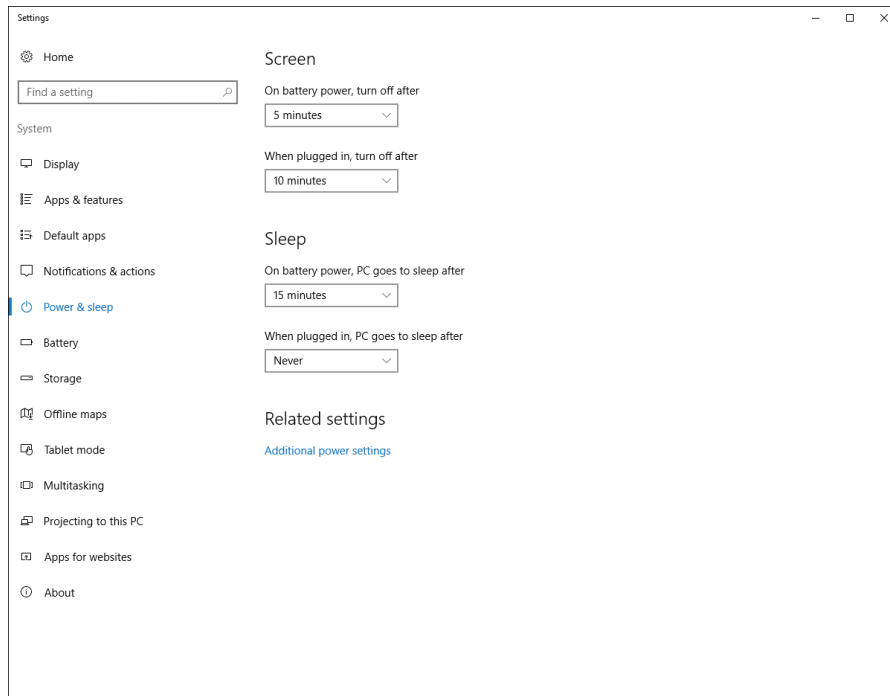


Figure 11-13 Battery Settings Page Enabling You to Modify the Default Screen and Sleep Settings.

Battery Saver is a new feature in Windows 10 designed to improve how long Windows can run on battery power. When Battery Saver is turned on, several background processes are suspended, such as noncritical Windows updates, Mail, and Offline Folder synching. Certain apps are stopped from running in the background (this is configurable; see the following list), some notifications are turned off, and by default the screen is dimmed.

You can adjust some of the behavior for Battery Saver in Settings by accessing the Action Center, selecting **All Settings**, clicking on **System**, and then selecting the **Battery** menu. This brings up the Battery Settings page shown in Figure 11-14. At the top of the page, the Overview displays the current charging status of your battery. The list that follows describes the available options from this page.

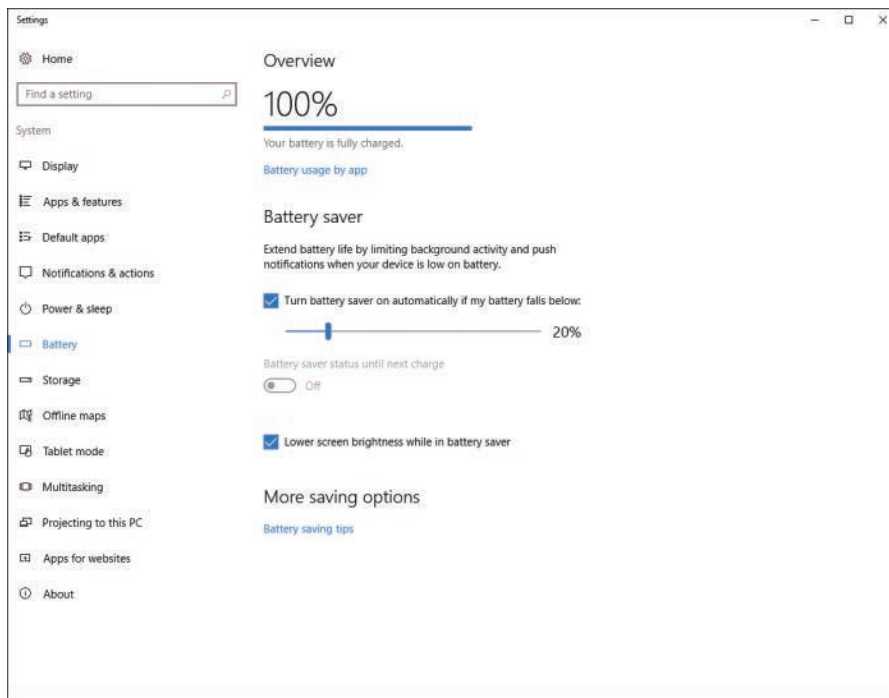


Figure 11-14 Battery Settings Page Allowing You to Adjust the Behavior of Battery Saver

- **Battery Usage by App:** Clicking this link displays a list of apps on your computer that have been consuming battery power and the percentage of battery power used by each. This can help you identify which apps are using the most power. You can select an app and click the **Details** button to get more information. For apps designed for Windows 10, you can limit the app's background activity, as shown in Figure 11-15.

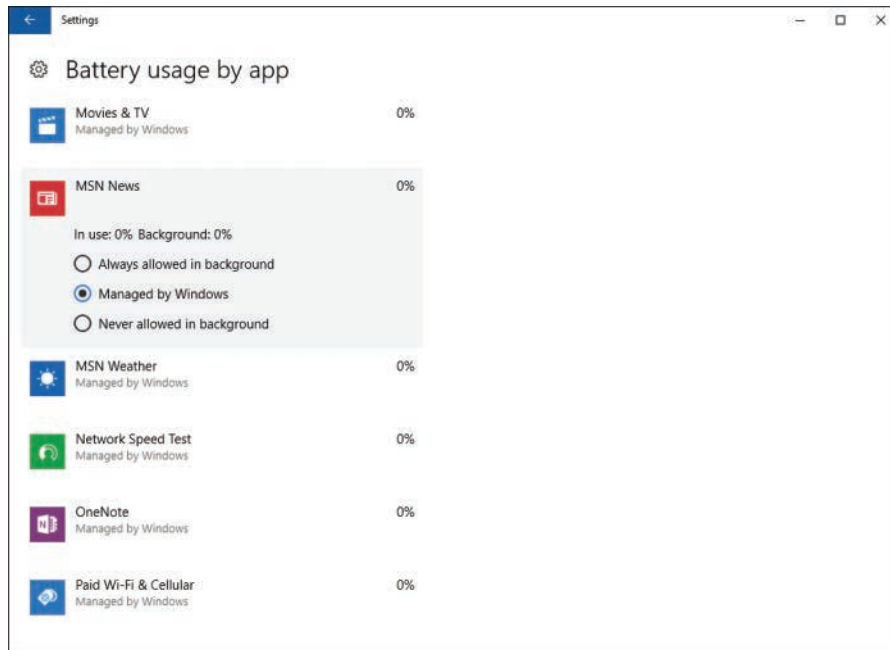


Figure 11-15 Customizing How Battery Saver Controls the Background Behavior of Each Windows App

- **Always Allowed in Background:** The app will always run in the background even when Battery Saver is turned on.
- **Managed by Windows:** The app will stop running in the background when Battery Saver mode is on, and will be temporarily turned off if there is a high battery drain and the app has not been used recently.
- **Never Allowed in Background:** The app will stop running in the background when Battery Saver is activated.
- **Battery Saver:** With the check box selected, Battery Saver will automatically turn on when the battery drains to a specific level; 20% is the default. You can use the slider to adjust the battery level at which you want Battery Saver to be activated.
- **Battery Saver Status Until Next Charge:** This toggle turns on Battery Saver until the next time you plug in your device.

- **Lowering the Screen Brightness While in Battery Saver:** Lowering the screen brightness will significantly save battery power, but if you do not want the screen dimmed while Battery Saver is on, you can uncheck this box.
- **Battery Saving Tips:** Opens the default browser to display the Microsoft Support page for tips on saving battery charge.

When the power drops below 10 percent, you receive a warning message informing you to either plug in your computer or shut it down and change the battery; the battery meter and icon display a red X icon. Some computers can sound an audible notification. You should plug your computer into a power outlet when this message appears.

NOTE For more details on Battery Saver and how it works, see “Battery Saver” at <https://msdn.microsoft.com/en-us/windows/hardware/commercialize/design/component-guidelines/battery-saver>.

Power Management and Group Policy

Windows 10 includes the capability for configuring power management settings in Group Policy. When you configure policies for power management, a nonadministrative user cannot modify the power settings.

Use the following procedure to use Group Policy to configure power management settings:

- Step 1.** Open Group Policy Management Console (GPMC) either through the **Start** menu or by searching for **gpedit.msc**. You can edit a GPO for the domain or use the GPMC on the local computer.
- Step 2.** Navigate to the Computer Configuration\Administrative Templates\System\Power Management node. You receive the policy settings shown in Figure 11-16.

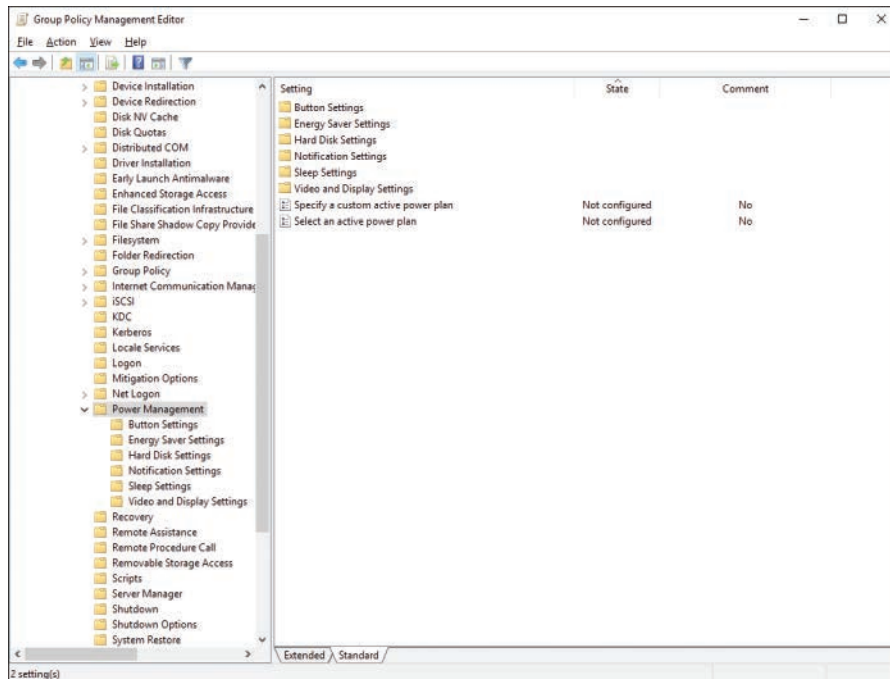


Figure 11-16 Group Policy Enabling You to Configure a Large Range of Power Management Settings

Step 3. Configure the following groups of settings as required:

- **Button Settings:** Enables you to define the actions that occur when the Power button, Sleep button, or Start menu power button is pressed or the lid closed. You can define these separately for battery and AC power conditions.
- **Hard Disk Settings:** Enables you to specify when the hard disk will be turned off when the computer is plugged in and when the computer is running on battery.
- **Notification Settings:** Enables you to define the battery levels at which low and critical alarm notifications take place and the actions that will occur.
- **Sleep Settings:** Includes settings for controlling when and how the computer enters Sleep mode and when and how it reawakens.
- **Video and Display Settings:** Enables you to specify how long the computer must be inactive before the display is turned off and whether the time interval is adjusted according to the user's keyboard and mouse usage.

- **Energy Saver Settings:** Enables you to select either an active power plan or specify a custom power plan to be active on all computers controlled by the Group Policy Object.

Step 4. When finished, close the GPMC.

Configuring Windows To Go



Windows To Go enables you to create a workspace on a USB device that you can boot on any computer that meets the Windows 7 or later hardware certification requirements. Using Windows To Go, technicians can prepare standardized corporate Windows 10 images from which users can access their desktop on any machine in alternative work locations, such as home, hotel, or client computer location. All necessary files, applications, and the Windows 10 operating system are hosted on a portable USB drive, such as a thumb drive or portable hard drive.

Windows To Go can also be useful for staff or consultants that use their own non-domain-joined computers or laptops, tablets, or similar devices. You can provide them with a Windows To Go workspace to use in your environment. In this way you can enforce organizational network and domain policies without needing to provision a separate physical computer.

When you first insert a Windows To Go drive to a given host computer, Windows To Go detects all hardware on the computer and installs any required drivers. On subsequent boots of Windows To Go on the same computer, Windows To Go identifies the host computer and automatically enables all required drivers.

Windows To Go operates in much the same manner as any other Windows 10 installations, with the following exceptions:



- **Internal disks are offline:** Internal hard disks on the host computer are offline by default when the computer is booted into a Windows To Go workspace. This is to ensure that data security on the host computer is not compromised in any way.
- **Trusted Platform Module (TPM) is not used:** If BitLocker Drive Encryption is used, a preboot password is used for security rather than the TPM, because the TPM is linked to a specific computer and Windows To Go drives can move among different computers. You learned about BitLocker in Chapter 8, “Windows 10 Data Security.”
- **Hibernation is disabled by default:** This is to ensure complete portability of Windows To Go workspaces between computers. However, you can reenable hibernation using Group Policy.

- **Windows Recovery Environment isn't available:** If you need to recover your Windows To Go workspace, simply re-image it with a new Windows image.
- **Refreshing or resetting:** Refreshing or resetting Windows is not supported for a Windows To Go workspace.
- **Windows Store is disabled by default:** This is because apps licensed from Windows Store are linked to specific hardware. It is possible to enable the store if Windows To Go workspaces won't be roaming among multiple host machines.

Preparing USB Drives for Windows To Go

Windows To Go requires specific types of USB drives. Most commodity flash drives cannot support Windows To Go; however, Microsoft has provided a Windows 10 certification program for hardware manufacturers that want to support the Windows To Go workspace functionality. These devices have been specially optimized for Windows To Go and meet several specific requirements for running a full version of Windows 10.

Drives certified for Windows To Go have certain specific characteristics:

Key Topic

- The drive must be a USB 3.0 drive and have read/write performance specifications that will support the demands of the Windows 10 operating system, including the thousands of random access I/O operations per second required.
- The drive is tuned to ensure it will boot and run on any computer that has been certified for use with Windows 7 and later.
- The drive has been manufactured to quality standards that ensure endurance under the typical demand for Windows To Go. This includes a manufacturer warranty for operation and reliability under normal use with a Windows To Go workspace.

NOTE You can find information about the USB drives Microsoft has certified for use with Windows To Go at <https://technet.microsoft.com/en-us/itpro/windows/plan/windows-to-go-overview#wtg-hardware>.

Provisioning a Windows To Go Workspace

To create the Windows To Go workspace, you will need an installation image file for your environment (a .WIM file) or a Windows 10 Enterprise or Education installation image file (.ISO) in DVD format. Typically, the .WIM file will be stored

on a network share that you can access from your Windows 10 Enterprise or Education computer. The .ISO file with the Windows 10 installation needs to be downloaded to your local computer. You learned about creating and managing Windows images in Chapter 2, “Implementing Windows.”

If you are using an .ISO file for the Windows 10 installation image, copy the .ISO file to your computer’s Downloads folder, and then open the **Downloads** folder, right-click the Windows 10 installation image .ISO file, and then select **Mount**. Windows will mount the ISO file as a new drive letter and open the drive in Explorer.

You are then ready to create a Windows To Go workspace:

Key Topic

- Step 1.** Open Control Panel by right-clicking the **Start** button and selecting **Control Panel**, or by any other method.
- Step 2.** In the Control Panel Search box, type **windows to go** and then click the **Windows To Go** Control Panel link to open the Windows To Go provisioning tool, as shown in Figure 11-17.

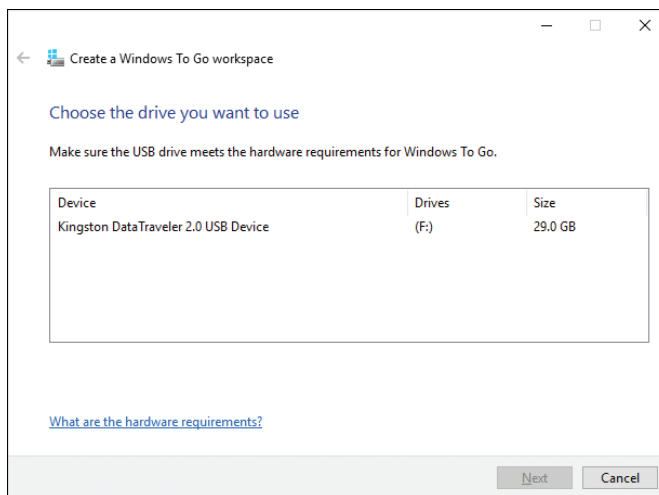


Figure 11-17 Windows To Go Provisioning Tool Will Search the Computer for Compatible USB Drives to Install the Windows To Go Workspace

- Step 3.** Select your USB drive from the list. If your drive is not compatible with Windows To Go, Windows will not allow you to install Windows To Go on it. Also, if the drive is a slower device, Windows may present a warning. After selecting the USB device to use, click **Next** to proceed.
- Step 4.** Windows searches for installation images to use. If the image file you want is not listed, click the **Search Options** button and select the folder where your .WIM file is located. If you mounted an .ISO image, select

the drive where the image was mounted. When you have found the image you want to use, select it from the list and click **Next**.

- Step 5.** Windows To Go provides an option to encrypt the workspace using BitLocker. Encrypting your portable drive is recommended because they are small and can be easily lost. Encrypting the drive will ensure that no one will be able to load your workspace or open your files if the drive is lost or stolen.

To encrypt the drive with BitLocker, select the check box Use BitLocker with My Windows To Go Workspace, type your password into the boxes supplied, and click **Next**.

If you do not want to use BitLocker, click the **Skip** button.

- Step 6.** The last dialog box is displayed, describing the drive that will be used to create the Windows To Go workspace. When you are ready, click **Create**.
- Step 7.** The provisioning tool will take some time to create your Windows To Go workspace on your USB drive.
- Step 8.** After the workspace is installed, Windows asks you to Choose a Boot Option. This will change the computer's firmware to automatically boot from any plugged-in USB device. If you will be using this computer to boot Windows To Go, select Yes to allow Windows to change this setting. You can then either select **Save and Restart** to boot Windows To Go or select **Save and Close** if you want to continue working.

CAUTION When Windows creates the Windows To Go workspace on your USB drive, it completely reformats and deletes all contents on the drive. Be sure that you select the correct drive and that any files on the drive are removed or backed up.

NOTE For more information on using Windows To Go, refer to “Windows To Go: Feature Overview” at <https://technet.microsoft.com/en-us/itpro/windows/plan/windows-to-go-overview> and “Deploy Windows To Go in Your Organization” at <https://technet.microsoft.com/en-us/itpro/windows/deploy/deploy-windows-to-go>.

Using Windows To Go on a Host Computer

The Windows To Go USB drive will work on any desktop computer or laptop or tablet that is certified to run Windows 7 or later. It might be necessary to access

the computer's BIOS or firmware settings to enable the computer to boot from a removable device.

For instance, on many Dell computers you can press the F12 button when the computer first posts to access the boot menu, and then select the boot drive or device. This technique provides a one-time option for booting the computer from an alternative device. If you will be using the computer frequently, it will be more convenient to change the BIOS settings so that the computer will attempt to boot from a USB device whenever one is available. Typically, the BIOS will allow you to set a boot order, so the computer checks each device in turn until it finds a bootable partition. If the first hard disk is set as the first boot device, it will never find the USB device to run the Windows To Go workspace.

The first time you load the Windows To Go workspace by booting a computer from the USB drive, Windows will take some time finding and loading device drivers and display *Getting Devices Ready* as it loads. If you used the Windows installation .ISO to create the workspace, Windows then walks you through a few setup tasks, just like it would for a new computer.

- Step 1.** Windows displays a dialog box displaying the EULA ID. You must check the **I Accept the License Terms** check box and click **Next** to proceed.
- Step 2.** The next screen asks you to pick a color and a PC name to personalize your Windows To Go workspace. You must enter a name in the box provided. Click **Next** to continue.
- Step 3.** At this point, Windows displays the Settings dialog, where you have an opportunity to customize a number of settings, such as for security, location, updates, and more. This is the same Settings customization screen displayed during the Attended Installation in the first section of this chapter. You may want to adjust some of these settings for your Windows To Go workspace, which you can do by selecting the **Customize** option. If not, select **Use Express Settings** to proceed.
- Step 4.** Windows To Go then asks you to Sign In to Your PC. You have the same options as you normally do for a Windows 10 workstation, using a Microsoft account or a Local account.
- Step 5.** After a few minutes, your new Windows To Go workspace is ready to use.

Like all Windows operating systems starting with Windows XP, Your Windows To Go workspace requires activation, so it needs to be connected to a corporate network that supports volume activation. This can be implemented using either Key Management Service or Active Directory–based volume activation. KMS activation is good for 180 days, so mobile workers using Windows To Go can stay offline for

an extended period of time. They will need to renew the activation within the 180-day period (by connecting to the corporate network), or the workspace activation will lose validity.

You can carry your Windows To Go USB drive from computer to computer and boot to a familiar environment everywhere you go. This is very convenient for workers who travel from place to place, where equipment is already available, and it can save costs over supplying each mobile worker with a separate laptop or tablet computer.

Configuring Wi-Fi Direct



Wi-Fi Direct is a new industry standard connectivity technology in Windows 10 that enables data and content sharing between devices and PCs on a peer-to-peer network without the need for separate Wi-Fi access points. It supplants the older ad hoc mode of wireless networking between two portable computers. In Windows 10, for example, you can sync data between a smartphone and a portable computer while sitting at the airport waiting for your flight to be called. Wi-Fi Direct supports the latest security technologies, including Wi-Fi Protected Access 2 (WPA2) security, which is enabled by default, minimizing the risk of data being intercepted by unauthorized users or devices. No infrastructure devices such as wireless routers are needed for the connection.

The following are several properties of Wi-Fi Direct in Windows 10:

- Wi-Fi Direct is integrated into the Wi-Fi stack and is enabled by default. You can connect to any device that supports Wi-Fi Direct.
- Wi-Fi Direct builds on existing Wi-Fi hardware. You can enable Wi-Fi Direct without the need for added hardware components, such as chipsets or antennas. Microsoft has worked with hardware manufacturers to ensure compatibility and support.
- Wi-Fi Direct permits concurrent connection to the Internet and to devices such as smartphones. The chipset can be used for multiple simultaneous connections.
- Wi-Fi Direct is optimized for power savings. It is turned on by demand and turns off when not in use.
- It is simple to set up devices for direct streaming of media between devices over a high-bandwidth connection—for example, sharing of high-definition video between computers and TVs, including video as you download it from the Internet.
- Windows UWP apps can communicate over Wi-Fi Direct without the need for additional setup. The apps can talk to each other by leveraging proximity application programming interface (API).

Windows automatically detects and installs devices after Wi-Fi Direct pairing occurs; consequently, installation and configuration of Wi-Fi Direct devices is simple, as the following procedure shows:

- Step 1.** From the Control Panel Devices and Printers applet, select **Add a Device**.
- Step 2.** Select the Wi-Fi Direct device from the list, and then click **Next**.
- Step 3.** If the device comes with a PIN, enter the PIN when requested.
- Step 4.** Windows installs any required drivers, and the device is ready for use.

Windows UWP apps can communicate between devices using Wi-Fi Direct. Proximity sensors on newer PCs and devices can detect each other when the devices are placed near to each other, and the computers can communicate with each other and share information when both computers are running the same app; users need only open the app on each computer with a simple tap on touch-sensitive screens or a click of the mouse. Developers can create additional apps that automatically connect with each other when in close proximity; such a connection is managed by Windows, and the developer does not need to manage Wi-Fi Direct semantics.

Wi-Fi Direct works in Windows by means of a simple three-step sequence:

- 1. Finding the device:** This happens automatically when you click Add a Device as already explained. Extended attributes included with devices (known as the container ID) help identify the device.
- 2. Pairing with the device:** In other words, Windows is creating a relationship to the device. This takes place after the user has selected the device. Extended attributes help to provide an improved experience during the pairing process and enable the user to remain in control. These attributes include a container ID, which represents the physical device, and a vertical device ID, which represents logical devices within the physical device.
- 3. Connecting to the device:** The device remains connected only when actually in use. When the user resumes use of the device, an on-demand reconnection is initiated by Windows. This provides advantages, such as optimizing battery life on the device. Further, Wi-Fi Direct enables multiple devices to connect to Windows concurrently; however, only two computers can participate in a single Wi-Fi Direct session. Devices requiring IP address assignment can automatically receive an IP address from a DHCP server. A built-in lightweight DHCP allocator in Windows 10 can assign IP addresses in the range 192.168.173.0/24 to devices needing them.

NOTE Wi-Fi Direct is an industry standard supported by many vendors as well as Microsoft. For more information about Wi-Fi Direct, start with the Wi-Fi alliance documentation at <https://www.wi-fi.org/discover-wi-fi/wi-fi-direct>.

Exam Preparation Tasks

Review All the Key Topics

Review the most important topics in the chapter, noted with the Key Topics icon in the outer margin of the page. Table 11-4 lists a reference of these key topics and the page numbers on which each is found.



Table 11-4 Key Topics for Chapter 11

Key Topic Element	Description	Page Number
Step List	Enabling offline files and configuring the available client options	558
Table 11-2	Offline File Policies	564
Table 11-3	Windows 10 Power Plans	571
Figure 11-11	The Advanced settings of Power Options allows you to set discrete options for your power plan	572
Figure 11-16	Group Policy enables you to configure a large range of power management settings	580
List	Exceptions to Windows To Go operation	581
List	Characteristics of drives certified for Windows To Go	582
Step List	Creating a Windows To Go workspace	583

Complete Tables and Lists from Memory

Print a copy of Appendix B, “Memory Tables” (found on the book’s website), or at least the section for this chapter, and complete the tables and lists from memory. Appendix C, “Memory Tables Answer Key,” also on the website, includes completed tables and lists to check your work.

Definitions of Key Terms

Define the following key terms from this chapter and check your answers in the glossary.

battery meter, cache, hibernation, offline files, power plans, remote wipe, Sleep mode, Sync Center, synchronization conflicts, synchronizing files, Wi-Fi Direct, Wi-Fi triangulation, Windows To Go

Index

Numbers

6-to-4 addresses, 269
32-bit Windows OS, 84-85
64-bit Windows OS, 84-85, 88
802.1x, 296
802.11a wireless networking protocol, 293
802.11ac wireless networking protocol, 294
802.11b wireless networking protocol, 293
802.11g wireless networking protocol, 294
802.11n wireless networking protocol, 294

A

About, System utility (Windows Settings utility), 28

access

Access Center, 51
accessibility options, configuring, 153-154
closed captioning, 38, 154
conditional access policies (Intune), 643
data, DAC, 398-399
Ease of Access category (Control Panel), 51
Ease of Access utility (Windows Settings utility), 38-39
EFS encrypted file access lists, 662
high contrast option, 154
keyboards, 39, 154
magnifier option, 154
mouse, 39, 154
Narrator option, 38, 154
networks, isolating, 762
object access auditing, 669
 enabling, 670-671
 specifying objects to be audited, 671-674
OneDrive, 484
remote access
 Remote Assistance, 747-753
 remote authentication, 708-713

Remote Desktop, 708, 713-718, 732, 736
 remote management, 708, 735-753
 VPN, 708, 719-735

resource access policies (Intune), 643
Windows Store, 239

Access Control Assistance Operators group (local), 327

accounts

Accounts utility (Windows Settings utility), 35-36

domain accounts, 231

Microsoft accounts and, 337

Secure Channel and, 376

family accounts, Accounts utility (Windows Settings utility), 36

local accounts

configuring, 325-330

CTRL+ALT+DEL security policies, 330

secure sign-in, 330

lockout policies

mobile devices, 598-599

unlocking accounts, 599

Microsoft accounts

advantages of, 228

blocking, 232, 332

configuring, 330-332

creating, 229

customizing, 232

domain accounts, 231, 337

managing, 332

passwords, 229

personalizing, 232

sign-ins, 230, 331

syncing with other devices, 232

mobile device policies

account lockout policies, 598-599

password policies, 596-598

- Passport accounts
 - configuring*, 321
 - passwords*, 322
 - PIN*, 322
- policies, 376-378
 - lockout policies*, 598-599
 - mobile device policies*, 596-599
- Privacy utility (Windows Settings utility), 40
- school accounts, Accounts utility (Windows Settings utility), 36
- synchronizing account settings, Accounts utility (Windows Settings utility), 37
- user accounts
 - secure sign-ins*, 366
 - UAC*, 356-366
 - User Accounts category (Control Panel)*, 49
- work accounts, Accounts utility (Windows Settings utility), 36
- ACL (Access Control Lists) and NTFS, 378**
- Acrobat Reader Touch, 236-237**
- ACT (Application Compatibility Toolkit), 87.**
 - See also Upgrade Analytics*
 - Compatibility Administrator, 838-840
 - configuring, 838
 - fixes, 840
 - installing, 838
- Action Center**
 - devices, troubleshooting, 181, 965-966
 - power settings, configuring, 165
 - Security and Maintenance page, troubleshooting devices, 965
 - sleep mode, configuring, 165
- Action log (Setupact.log), troubleshooting**
 - Windows 10 installations, 108
- Active Directory. *See* AD**
- active partitions, defined, 473**
- AD (Active Directory)**
 - ADUC, 203-206
 - Azure AD
 - device registration*, 345-347
 - Intune and*, 619, 636-637
 - Windows 10 clean installations*, 96
 - DAC, 398
 - DC, defined, 197
 - domains
 - creating OU*, 205-206
 - defined*, 196
 - joining*, 198-200
 - enterprise environments, activating in via KMS, 219
 - forests, defined, 196
 - global catalogs, defined, 197
 - Group Policies, creating GPO, 206-210
 - mandatory user profiles, 504
 - operations masters, defined, 197
 - OU
 - creating*, 204-206
 - defined*, 197
 - roaming user profiles, 504
 - RSAT
 - ADUC*, 203-206
 - installing on client workstations*, 201
 - sites, defined, 197
 - structure of, 197
 - trees, defined, 196
 - UAC, 211
 - user profiles, 504
- AD DS (Active Directory Domain Services)**
 - client activation, 217
 - domains, joining, 198-200
 - SSO profiles, 293
- adaptive displays, 574**
- Add a Device Wizard, 167**
- Add Driver Wizard, print driver installations, 910**
- Add Recovery Agent Wizard, 409, 665**
- adding/removing credentials, 369**
- ADK (Assessment and Deployment Kit), 836-837**
 - ICD, 212-214
 - UE-V Template Generator, 864
- administration**
 - administrative tools, 45
 - remote administration with PowerShell, 929-930
 - shared files/folders, 683-684
 - Windows Store for Business, permissions, 828-831

administration with Intune

- APN, 626-627
- connector site system role, 634-636
- device enrollments, 625, 629-630, 643
 - managing*, 632-633, 643
 - retiring*, 632
 - viewing*, 631-632
 - wiping*, 632
- managing
 - computer groups*, 636-637
 - device enrollments*, 632-633, 643
 - remote computers*, 638
 - user groups*, 636-637
- MDM/SCCM hybrid solution, 634-636
- TeamViewer, 639
- user accounts, 620-621, 624
- Administrators group (local)**, 327
- Adobe Flash and Internet Explorer**, 158
- ADUC (Active Directory Users and Computers)**, 203-206
- Advanced Security snap-in**. *See* Windows Firewall with Advanced Security
- AES (Advanced Encryption Standard)**, 788
- Airplane mode**, Network utility (Windows Settings utility), 31
- alerts**
 - Data Collector Sets, 900
 - Event Viewer logs, 878
 - Intune alerts, 907-908
 - configuring*, 640
 - email notifications*, 641-642
 - types of*, 639
 - Performance Counter alerts, 900
 - Performance Monitor, 894
 - Task Scheduler, 925
- all-user wireless network profiles**, 300
- Always Offline mode (Offline Files)**, 565-567
- Android**
 - RemoteApp support, 813-816
 - smartphones, broadband tethering, 611
- answer files**
 - configuring, 104
 - creating, 97-98, 101
 - editing, 105
 - SIM
 - configuring answer files*, 104
 - creating answer files*, 97-98, 101

unattended Windows 10 clean installations,
97-98, 101, 104-105

antimalware protection, 956**anycast IPv6 addresses**, 266, 268**API (Application Programming Interface)**

shims, 847-848
Windows Installer, 847

APIPA (Automatic Private Internet Protocol Addressing), IPv4/IPv6 addressing, 280-281**APN (Apple Push Notifications)**, managing with Intune, 626-627**App-V (Application Virtualization)**, 16

coexisting desktop apps, 857
command-line utilities, 860-861
management console, 858-860
overview of, 857-858

Appearance and Personalization category (Control Panel), 50-51**Application Compatibility mode**, 853-856**application prompts (UAC)**, 360-361**AppLocker**, 13**approving update deployments with Intune**, 647**apps**, 24

Accounts utility (Windows Settings utility), 35
Acrobat Reader Touch, installing, 236-237

ACT. *See also* Upgrade Analytics

Compatibility Administrator, 838-840
configuring, 838
fixes, 840
installing, 838

ADK, 836-837, 864

app-triggered VPN, 728-730

App-V, 16

coexisting desktop apps, 857
command-line utilities, 860-861
management console, 858-860
overview of, 857-858

Application Compatibility mode, 853-856

assigning, 832

background apps, Privacy utility (Windows Settings utility), 41

Company Portal app, 626

deep link apps and Intune, 248

default apps, 27

- default programs
 - associating file extensions with specific programs*, 851-853
 - modifying*, 849-850
- desktop app compatibility
 - ACT*, 838-840
 - App-V*, 857-861
 - Application Compatibility mode*, 853-856
 - coexisting apps*, 856-857
 - default programs*, 849-853
 - Intune and*, 866-869
 - shims*, 847-848
 - UE-V*, 861
 - Windows Installer*, 842-847
- Get Started app, 21-22
- installing, Office 365 and, 236-237
- Intune and, 866-869
- licensing models, 831
- LOB apps, 234, 240, 248, 829
- managing, Office 365 and, 237-238
- Maps app, 28
- mobile apps, 793, 796-798, 801-816
- Office 365 and, 236-237
- offline licensing, 831
- OneDrive app, 484-485
- online licensing, 831
- power/battery management, 577
- provisioned apps, 243-244
- publishing apps, 812
- RemoteApp, 793, 796-798, 801-816, 856-857
- shims, 847-848
- sideloading apps, 234, 240-242
 - Intune and*, 244, 248
 - online/offline images*, 243-244
- startup, activating apps for, 825
- System utility (Windows Settings utility), 27-28
- UE-V
 - components of*, 861-862
 - custom settings location templates*, 864-866
 - GPO*, 863
 - permissions*, 862
 - requirements for*, 862
 - Template Generator*, 864
- UWP apps, 234
 - Remote Desktop*, 716
 - updating*, 238
- Windows Installer, 842
 - API*, 847
 - deploying apps*, 843
 - installing apps*, 844
 - msi files*, 847
 - Msiexec.exe*, 844-847
 - removing apps*, 844
 - transform files*, 847
 - troubleshooting*, 844, 846
- Windows Store apps, 234
 - network isolation*, 762
 - PowerShell and*, 67
 - updating*, 65-67, 238
- Windows Store for Business, 819
 - acquiring apps*, 831
 - administration*, 828-831
 - app fees*, 831
 - assigning*, 832
 - client configuration*, 833
 - Device Guard and*, 829
 - free apps*, 831
 - inventory*, 832
 - licensing models*, 831
 - LOB apps*, 829
 - permissions*, 828-831
 - private store setting*, 835
 - requirements for*, 826
 - signup*, 827
 - user configuration*, 827
- ARP (Address Resolution Protocol), defined, 259**
- Assessment and Deployment Kits, installing, 99-101**
- assessments, ADK, 836-837, 864**
- assigning**
 - apps, 832
 - drive letters
 - to partitions*, 454
 - to RAID-0 (striped) volumes*, 464
- attended Windows 10 clean installations, 90-93, 96**
- auditing**
 - mobile device policies, 600-602
 - object access, 669
 - enabling*, 670-671
 - specifying objects to be audited*, 671-674

- policies, 412-414, 600-602
- security, 14
- Auditpol.exe command-line tool, object**
 - access auditing, 674
- auditSystem configuration pass, 98**
- auditUser configuration pass, 98**
- authenticated exceptions, Windows Firewall**
 - with Advanced Security, 783-784
- authentication**
 - 802.1x, 296
 - accounts
 - configuring local accounts, 325-330*
 - configuring Microsoft accounts, 330-332*
 - policies, 376-378*
 - biometrics, 323-325
 - Certificate Manager, 372-374
 - certificates, remote authentication, 710
 - CHAP, remote authentication, 709
 - Credential Manager, 369, 371
 - defined, 319
 - EAP-TLS, 293
 - EAP-TTLS, remote authentication, 710
 - exemption rules (IPsec), 778
 - Kerberos authentication, 711-712
 - local groups, 327-328
 - lock screen, 366-368
 - logon prompts, 366-368
 - MS-CHAPv2, 293, 709, 787
 - multifactor authentication, 372-374
 - NTLM authentication, 711-712
 - PAP, remote authentication, 710
 - Passport, 13
 - advantages of, 320*
 - configuring accounts, 321*
 - passwords, 322*
 - PIN, 322*
 - registering, 321*
 - passwords, 323-325, 368
 - PEAP, 293, 710, 787
 - picture passwords, 323-325, 368
 - remote authentication
 - Group Policies, 712-713*
 - Kerberos authentication, 711-712*
 - NTLM authentication, 711-712*
 - planning, 708*
 - protocols, 709-710*
 - Secure Channel, 375
 - SSL, 375
 - TLS, 375
 - Web Credentials, 372
 - WEP, 293, 296
 - Windows Hello, 332-335
 - WPA, 293
 - WPA2, 293, 296
- authorization**
 - Credential Guard, 354
 - Credential Manager, 369-371
 - defined, 319
 - Device Guard, 348-351, 354
 - device registration, 344, 347
 - DHA, 355
 - domain accounts and Microsoft accounts, 337
 - HomeGroups, 338
 - joining, 340-341*
 - modifying settings, 341-343*
 - lock screen, 366-368
 - logon prompts, 366-368
 - picture passwords, 368
 - UAC
 - application prompts, 360-361*
 - configuring, 356-357, 362*
 - features of, 357-360*
 - group policies, 363-366*
 - running programs with elevated privileges, 361*
 - Web Credentials, 372
 - workgroups, joining, 336
- automatic restart on system failure, 956**
- Automatic Start/Stop Actions, VM**
 - configuration, 533
- automating tasks with PowerShell, 929**
- AutoPlaying**
 - Devices utility (Windows Settings utility), 30
 - media, 47
- Azure AD**
 - device registration, 345-347
 - Intune and, 619, 636-637
 - Windows 10 clean installations, 96
- Azure RemoteApp**
 - Android support, 813-816
 - cloud collections, 812

- desktop connections
 - configuring*, 811
 - feed subscriptions*, 807-809
- distributing with RD Web Access, 805-806
- iOS support, 813-816
- publishing apps, 812

B

background apps, Privacy utility (Windows Settings utility), 41

backgrounds (desktop)

- Personalization utility (Windows Settings utility), 32

- power/battery management, 573

Backup and Restore Wizard, 981

Backup Operators group (local), 328

backups, 42, 45

- Backup and Restore, 985-987
- configuring for the first time, 976, 980

- credentials, 371

- device backups and OneDrive, 487

- disk space management, 981

- EFS keys, 407-410, 663

- File History, 989

- adding folders to*, 996

- configuring*, 990, 993-995

- restoring files*, 997-999

- system images*, 999-1000

- incremental backups, 981

- managing

- backups*, 981-983

- disk space*, 981

- scheduling, 984-985

- shadow files/folders, 975, 1001

- troubleshooting, 984

- Windows Backup

- Backup and Restore Wizard*, 981

- configuring for the first time*, 976, 980

- managing backups*, 981-983

- managing disk space*, 981

- scheduling backups*, 984-985

- Set Up Backup Wizard*, 976

- troubleshooting backups*, 984

Balanced power plan, 570-571

bandwidth, VM connections, 548

Bare Metal Recovery (Push-Button Resets), 949

baseline performance, 897

basic disks

- dynamic disks

- advantages to basic disks*, 452

- converting basic disks to*, 459-460

- MBR, converting to GPT, 453

- partitions

- creating*, 454

- deleting*, 458

- extending*, 455

- shrinking*, 456

- viewing properties of*, 456

- volumes

- deleting*, 458

- extending*, 455

- shrinking*, 456

battery/power management, 45, 48

- advanced settings, 573-574

- apps, 577

- battery meter, 575

- Battery Saver, 575-579

- Group Policies, 579-581

- hibernation mode, 574, 581

- power plans, 570-571

- Sleep mode, 569-575

- System utility (Windows Settings utility), 28

BCDboot command-line tool and VHD, 119

BCDedit command-line tool and VHD, 119, 131-133

Bing SafeSearch and Cortana, 156

biometrics, 323-325, 335

BIOS (Basic Input/Output System)

- troubleshooting, 472-473

- VM configuration, 531

- Windows 10 requirements, 84

BitLocker

- BitLocker Encryption, 13

- DRA, 430, 433

- enabling, 419-423

- encryption, 45

- fixed data drive policies, 428-429

- Group Policies, 427-428

- managing, 423

- MBAM, 433-434

- operating system drives and, 426-428

- policies, 426
 - TPM, 417-419, 434-436
- BitLocker To Go, 417, 424-426**
- blocking**
 - Microsoft accounts, 232, 332
 - Windows Store access, 239
- Bluetooth, Devices utility (Windows Settings utility), 29**
- boot logging, 956**
- bootup**
 - Bcdedit.exe, 106
 - boot management programs, 106
 - Bootcfg.exe, 106
 - dual-booting, Windows 10
 - clean installations, 105-106*
 - VHD, 124*
 - Fast Startup, 824-825
 - native-boot VHD
 - best practices, 130-131*
 - boot scenarios, 129-130*
 - Secure Boot, 90, 426
 - troubleshooting, 472-473
 - VHD
 - dual-booting, 124*
 - native-boot VHD, 129-133*
 - Winload.exe, 106
 - Winresume.exe, 106
- brightness (displays), adjusting, 575, 579**
- broadband connections**
 - hotspots, 610-612
 - mobile devices, 609
 - broadband tethering, 610-612*
 - hotspots, 610-612*
 - metered networks, 610*
- BSOD (Blue Screen of Death), troubleshooting, 108-109**
- business**
 - Windows Hello for Business, 16
 - Windows Store for Business, 14
 - Windows Update for Business, 15

C

- CA (Certificate Authority), 375, 660, 663**
- caching files**
 - network shares, 560-561
 - Offline Files, 558
 - shared folders, 562-563
 - transparent file caching, 567
- Calendar, Privacy utility (Windows Settings utility), 40**
- call history, Privacy utility (Windows Settings utility), 40**
- cameras, Privacy utility (Windows Settings utility), 40**
- CB (Current Branch), 69**
- CBB (Current Branch for Business), 70**
- Certificate Export Wizard, EFS key backups, 408, 663**
- certificates**
 - APN certificates, managing with Intune, 626-627
 - CA, 375
 - Certificate Manager, 372-374
 - EFS certificates, 659-660, 663
 - MMC snap-in, 372
 - PKI, 374-375
 - remote authentication, 710
 - requesting, 374
- Change Permissions permission (NTFS), 384**
- CHAP (Challenge Handshake Authentication Protocol), remote authentication, 709**
- checkpoints (VM), 523, 532, 539**
 - creating, 541
 - reverting VM state, 542
- child VHD (Virtual Hard Disks), 118, 130**
- Chkdsk.exe command-line utility, 461**
- CIDR (Classless Inter-Domain Routing), 264**
- cipher command-line utility**
 - EFS file decryption, 664
 - EFS file encryption, 661
- classifying documents with DAC, 399**
- clean installations, Windows 10**
 - attended installations, 90-93, 96
 - dual-booting installations, 105-106
 - refreshing Windows 10, 107
 - troubleshooting installations, 108-110
 - unattended installations, 97-98, 101, 104-105
 - upgrades versus clean installations, 112
- Cleanmgr.exe (Disk Cleanup) command-line utility, 461**
- Client Hyper-V, 511**

- coexisting desktop apps, 856
- DEP, 521
- enabling, 521
- requirements for, 521
- SLAT, 521
- troubleshooting, 522
- VHDX format, 516
- virtual switches
 - connecting VM, 547*
 - creating, 543*
 - external virtual switches, 543-545*
 - internal virtual switches, 543, 546*
 - private virtual switches, 543, 547*
- VM
 - configuring, 529-535*
 - creating, 523, 526, 529*
 - deploying, 535-538*
- Windows 10 hardware requirements, 89
- Clock, Language, and Region category (Control Panel), 51**
- closed captioning, 38, 154**
- cloud collections (Azure RemoteApp), 812**
- cloud services, 344, 355-356**
- cloud storage and OneDrive**
 - accessing, 484
 - configuring, 486
 - copying files, 485
 - device backups, 487
 - moving files, 485
 - OneDrive app, 484-485
 - OneDrive desktop, 485
 - settings, 486
 - syncing settings, 487
- clusters, defined, 474**
- cmd.exe. *See* PowerShell**
- code integrity policies and Device Guard, 348**
- coexisting desktop apps, 856-857**
- collecting events (Event Viewer), 883**
- collector-initiated subscriptions (Event Viewer), 883**
- colon-hexadecimal addressing, 265**
- colors (displays), Personalization utility (Windows Settings utility), 32**
- COM ports, VM configuration, 532**
- Company Portal app, 626**
- compatibility**
 - Compatibility Administrator (ACT), 838-840
 - Compatibility view (Internet Explorer),
 - configuring, 159-160
 - Windows 10 installations
 - hardware, 83-84*
 - software, 86-87*
- compliance policies (Intune), 645**
- computer groups, managing with Intune, 636-637**
- Computer Management snap-in, 51-52, 676**
- conditional access policies (Intune), 643**
- configuration passes, 98**
- configuration policies (Intune), 643-644**
- configure state, activating in enterprise environments via KMS, 220**
- configuring**
 - accessibility options, 153-154
 - ACT, 838
 - alerts, Intune alerts, 640
 - answer files, 104
 - Cortana, 154-156
 - default programs, 49
 - desktop, 150
 - device drivers, 183
 - advanced settings, 185-187*
 - Driver Verifier, 184-185*
 - devices, 166, 170-172
 - disk quotas, 668
 - Edge, 156-158
 - Event Viewer log subscriptions, 884-885
 - File History, 990, 993-995
 - Hyper-V, 164-165
 - indexing options, 921-924
 - Internet Explorer, 156-158
 - Compatibility view, 159-160*
 - Group Policies, 161-162*
 - SmartScreen Filter, 160-161*
 - Intune alerts, 640
 - IPsec, 776
 - connection security rules, 777-778*
 - Windows Firewall with Advanced Security, 778-784*
 - libraries, 685
 - local accounts, 325-330

- Local Security Policy
 - audit policies, 412-414*
 - Security Options, 415-416*
- Microsoft accounts, 330-332
- network adapters, 303-304
- notification settings, 151
- Office 365, 235
- Offline Files, client computer configuration, 558-559
- OneDrive app, 486
- Passport accounts, 321
- PnP devices, 166
- power settings, 165
- Remote Desktop, Server Side configurations, 717-718
- RemoteApp, 796-798, 801
 - Android support, 813-816*
 - Azure RemoteApp, 805-816*
 - cloud collections, 812*
 - desktop connection feed subscriptions, 807-809*
 - desktop connections, 811*
 - GPO for signed packages, 801-804*
 - hybrid collections, 812*
 - iOS support, 813-816*
 - publishing apps, 812*
 - RD Web Access for Azure RemoteApp distribution, 805-806*
- roaming user profiles, 505-506
- shared file/folder permissions, 678-681
- sleep mode, 165
- Start menu, 143-148
- startup key storage
 - BitLocker on computers without TPM, 434-436*
 - Syskey startup keys, 438-439*
- Storage Spaces, 471
- System Restore, 945-947
- Taskbar, 23, 143-148
- UAC, 356-357, 362
- user interface
 - desktop, 150*
 - notification settings, 151*
 - Start menu, 143-148*
 - Taskbar, 143-148*
- user profiles
 - paths, 503-504*
 - roaming user profiles, 505-506*
- USMT, 490-491
- VHD, 467
- VM, 529-535
- Windows 10, 127-129
- Windows Backup, 976, 980
- Windows Firewall, basic configuration, 762-767
- Windows Firewall with Advanced Security, 768
 - authenticated exceptions, 783-784*
 - Group Policies, 781-782*
 - notifications, 780*
 - profiles, 770-772*
 - rules, 769, 772-780*
- Windows Hello, 332-335
- Windows Update, 54-63
- connected devices, Devices utility (Windows Settings utility), 29**
- connection security rules (Windows Firewall with Advanced Security), 770, 777**
- contacts, Privacy utility (Windows Settings utility), 40**
- contrast (displays), High Contrast settings, 32, 38, 154**
- Control Panel, 43**
 - Appearance and Personalization category, 50-51
 - Clock, Language, and Region category, 51
 - Ease of Access category, 51
 - Hardware and Sound category, 47-48
 - Network and Internet category, 45-46
 - Programs category, 48-49
 - System and Security category, 44-45
 - User Accounts category, 49
- converting**
 - basic disks to dynamic disks, 459-460
 - MBR disks to GPT, 453
 - physical machines to VM, 538
- copying**
 - files/folders
 - NTFS permissions and, 396*
 - OneDrive, 485*
 - objects with mouse, 397
- corporate device enrollment policies (Intune), 643**
- Cortana**
 - configuring, 154-156

- Edge and, 15
- Group Policies, 156
- history settings, 156
- privacy settings, 156
- searching with, 20
- Windows 10 hardware requirements, 89
- Covert.exe utility, formatting disks for EFS, 660**
- CPU tab (Resource Monitor), 892**
- Create Basic Task Wizard, 881, 927**
- Create Files permission (NTFS), 383**
- Create Folders permission (NTFS), 383**
- Create New Data Collector Set Wizard, 899-902**
- Credential Guard, 354**
- credentials**
 - adding/removing, 369
 - backing up, 371
 - Credential Guard, 13, 16
 - Credential Manager, 49, 369-371
 - editing, 369
 - Web Credentials, 372
- Cryptographic Operators group (local), 328**
- cryptography**
 - private key cryptography, EFS, 403
 - public key cryptography, 375, 403
- CTRL+ALT+DEL security policies**
 - local accounts, 330
 - local groups, 366-368
- customizing**
 - desktop, 150
 - Event Viewer, 880
 - Microsoft accounts, 232
 - MMC consoles, 915
 - notification settings, 151
 - practice exams, 1009-1010
 - Start menu, 143-148
 - Taskbar, 143-148
 - user interface
 - desktop, 150*
 - notification settings, 151*
 - Start menu, 143-148*
 - Taskbar, 143-148*

D

- DaaS (Desktop-as-a-Service), 796**
- DAC (Dynamic Access Control), 398-399**
- damaged files, restoring, 975**
- Dashboard (Intune), 623**
- data (stale), RAID-5 volumes, 467**
- Data Collector Sets, 897**
 - creating, 899-902
 - viewing, 902
- data encryption**
 - EFS, 658
 - access lists, 662*
 - certificates, 659-660, 663*
 - decrypting files, 664*
 - EFS key backups, 663*
 - encrypting files, 661-663*
 - formatting hard disks, 660-661*
 - private key cryptography, 659*
 - public key cryptography, 659*
 - recovery agents, 664*
 - unique encryption keys, 659*
 - unique encryption keys, 659
- data migration**
 - folder redirection, 494
 - benefits of, 495*
 - domain-based folder redirection, 498-501*
 - Library folders, 495-496*
 - user profiles, 488
 - USMT, 488-489
 - collecting files from source computer, 491-492*
 - loading collected files on destination computer, 492*
 - offline mode, 493-494*
 - server configuration, 490-491*
 - technician computers, 490*
- data partitions, formatting, 405**
- data recovery, 42, 949**
- data restoration, backups, 42, 45**
- data security**
 - DAC, 398-399
 - EFS, 402
 - backing up EFS keys, 407-410*
 - decrypting files, 408*
 - encrypting files, 406*
 - formatting partitions, 405*

- managing*, 403
 - overview of*, 403
 - preparing disks for*, 405
 - private key cryptography*, 403
 - process of*, 403
 - public key cryptography*, 403
 - recovery agents*, 409-410
- Local Security Policy, 410-411
 - audit policies*, 412-414
 - configuring*, 412-416
 - Security Options*, 415-416
- removable media, 400
- shared folders and NTFS permissions
 - copying files/folders*, 396
 - moving files/folders*, 396-397
 - viewing user permissions*, 394
- WPD, 401
- data storage, 450**
 - basic disks
 - converting to dynamic disks*, 459-460
 - creating partitions*, 454
 - deleting partitions/volumes*, 458
 - dynamic disks versus*, 452
 - extending partitions/volumes*, 455
 - GPT*, 453
 - MBR*, 453
 - shrinking partitions/volumes*, 456
 - viewing partition properties*, 456
 - defragmenting disks
 - Defrag.exe command-line utility*, 477
 - Error Checking dialog box*, 477
 - Optimize Drives utility*, 474-476
- DFS, 478
 - Cache Duration*, 480
 - Namespaces*, 479
 - Replication*, 479
- disk management tools, 461
- dynamic disks
 - basic disks versus*, 452
 - converting basic disks to*, 459-460
 - Disk Management snap-in*, 461
 - dynamic volumes*, 460-461
 - primary partitions*, 452
 - simple volumes*, 460-461
- OneDrive
 - accessing*, 484
 - configuring*, 486
 - copying files*, 485
 - device backups*, 487
 - moving files*, 485
 - OneDrive app*, 484-485
 - OneDrive desktop*, 485
 - settings*, 486
 - syncing settings*, 487
- RAID volumes, 461
 - managing*, 467
 - RAID-0 (striped) volumes*, 460-466
 - RAID-1 (mirrored) volumes*, 460-462, 465-467
 - RAID-5 volumes*, 460-462, 465-467
 - troubleshooting*, 467
- removable storage, 468
- simple volumes, 460
- spanned volumes, 460, 464
- storage pools, 469
 - creating*, 470, 481
 - fault tolerances*, 482
 - renaming*, 481
- Storage Spaces
 - configuring*, 471
 - creating*, 469, 481
 - fault tolerances*, 482
 - managing with PowerShell*, 483
 - resiliency options*, 471
- troubleshooting, 472-473
- VHD, 467
- data synchronization**
 - mobile devices, 605-609
 - Work Folders, 606-609
- data usage, Network utility (Windows Settings utility), 31**
- DC (Domain Controllers), defined, 197**
- Debugging mode, 956**
- deep link apps and Intune, 248**
- default gateways, defined, 261**
- default programs**
 - configuring*, 49
 - file extensions, associating with specific programs*, 851-853
 - modifying*, 849-850
- defragmenting disks**
 - Defrag.exe command-line utility*, 461, 477
 - Error Checking dialog box*, 477
 - Optimize Drives utility*, 474-476

Delete permission (NTFS), 384

Delete Subfolders and Files permission (NTFS), 384

deleted files, restoring, 975

deleting

logical drives, 458

partitions/volumes, 458

DEP (Data Execution Prevention) and Client Hyper-V, 521

deploying

ADK, 836-837, 864

apps with Windows Installer, 843

Assessment and Deployment Kits, installing, 99-101

DirectAccess, 733-735

DISM

adding driver packages, 187-190

parameters, 188-189

Intune policies, 644

updates with Intune, 645

approving updates, 647

in-console monitoring/reporting, 649-650

third-party updates, 648-649

VHD, 520

VM, 535

converting physical machines to VM, 538

Integration Services, 536

WDS, 119, 131

deployment rings, planning, 67-68

desktops

apps

ACT, 838-840

App-V, 857-861

Application Compatibility mode, 853-856

coexisting apps, 856-857

default programs, 849-853

Intune and, 866-869

shims, 847-848

UE-V, 861

Windows Installer, 842-847

backgrounds, power/battery management, 573

configuring, 150

DaaS, 796

Remote Desktop, 708, 713

establishing connections, 714-716

Licensing Diagnoser tools, 798

RD Gateway, 732

RDP, 714, 796

RDS, 732, 796-798, 801-804

remote management, 736

selecting nondefault ports, 718

Server Side configurations, 717-718

Task view, 150

VDI, 797, 810

Windows 10 desktop, touring, 17-19

device drivers

configuring, 183

advanced settings, 185-187

Driver Verifier, 184-185

defined, 137, 165

digital signatures, 175-176

disabling via Device Manager, 173

driver packages, 177, 187-190

driver stores, 174

installing

modifying installation behavior, 169

permissions, 176

PnPUtil command-line utility, 178

managing, 173

rolling back, 967-969

signature enforcement, 956

signing, 173-175, 956

troubleshooting, 173, 178-183, 962-963

UASP, support for, 166

uninstalling via Device Manager, 173

updating, 169

USB 3.0, support for, 166

Windows 10 requirements, 84

Windows To Go, support for, 166

Device Guard, 348-351, 354, 829

Device Health Attestation, 14

Device Manager, 166

accessing, 169-170

configuring devices, 170, 172

device drivers

disabling, 173

rolling back, 967

troubleshooting, 178, 180, 962-963

uninstalling, 173

troubleshooting devices, 170

views of, 963

devices

Add a Device Wizard, 167

backups, OneDrive and, 487

- compliance policies (Intune), 643
- configuring, 166, 170-172
- connections, Devices utility (Windows Settings utility), 29
- corporate device enrollment policies (Intune), 643
- Device Guard, 16
- Device Manager, 47, 52
- enrolling with Intune, 625, 629-630
 - managing enrolled devices, 632-633, 643*
 - retiring enrolled devices, 632*
 - viewing enrolled devices, 631-632*
 - wiping enrolled devices, 632*
- lockdown, 14
- lost/stolen devices, removing from Intune, 632
- PnP devices, configuring, 166
- printers and, 167-168
- properties, 172
- registering, 344, 347
- syncing, Microsoft accounts, 232
- troubleshooting, 170
 - Action Center and, 181, 965*
 - System Information utility and, 181, 966*
- unenrollment, 14
- Devices utility (Windows Settings utility), 28-30**
- DFS (Dynamic File Systems), 478**
 - Cache Duration, 480
 - Namespaces, 479
 - Replication, 479
- DHA (Device Health Attestation), 355**
- DHCP (Dynamic Host Configuration Protocol)**
 - DHCP Allocators, 288
 - name resolution, IPv6 addressing, 274
 - network connections
 - IPv4 addressing, 278-280*
 - IPv6 addressing, 282-283*
- diagnostics, Privacy utility (Windows Settings utility), 41**
- dial-up Internet connections, Network utility (Windows Settings utility), 30**
- differencing VHD (Virtual Hard Disks), 118, 130**
- digital signatures, device drivers, 175-176**
- DirectAccess and VPN**
 - benefits of, 733
 - deploying, 733-734
 - Group Policies, 735
 - RDS, 732
- disabling**
 - device drivers via Device Manager, 173
 - IPv6 addressing, 274
 - Offline Files, 559
 - OneDrive from startup, 826
- Disk Cleanup (Cleanmgr.exe) command-line utility, 461**
- Disk Defragmenter (Defrag.exe) command-line utility, 461, 477**
- Disk Management snap-in, 52**
 - basic disks
 - converting to dynamic disks, 459-460*
 - creating partitions, 454*
 - deleting partitions/volumes, 458*
 - extending partitions/volumes, 455*
 - shrinking partitions/volumes, 456*
 - viewing partition properties, 456*
 - dynamic disks, extending volumes, 461
 - functions of, 452
 - GPT, converting MBR to, 453
 - hard disks, formatting for EFS, 660
 - MBR, converting to GPT, 453
 - RAID volumes, troubleshooting, 467
 - removable storage, 468
 - storage pools, 469-470
 - troubleshooting data storage, 473
 - VHD, 119-120
 - creating, 121, 516*
 - mounting, 121, 519-520*
- disk quotas, 666-668**
- disk space/usage, Offline Files, 559**
- Disk tab (Resource Monitor), 892**
- diskette drives, VM configuration, 532**
- DiskPart.exe command-line utility**
 - disk management, 461
 - GPT, converting MBR to, 453
 - MBR, converting to GPT, 453
 - RAID volumes, creating, 466
 - VHD, 119, 122
 - creating, 517-519*
 - mounting, 520*
- disks**
 - clusters, defined, 474

- defragmenting
 - Defrag.exe (Disk Defragmenter)*
 - command-line utility, 461, 477
 - Error Checking dialog box*, 477
 - Optimize Drives utility*, 474-476
- DISM (Deployment Image Servicing and Management) command-line tool**
- driver packages, adding, 187-190
- parameters, 188-189
- VHD and, 119, 125-127
- displays, 48**
 - adaptive displays, 574
 - Appearance and Personalization category (Control Panel), 50
 - backgrounds, Personalization utility (Windows Settings utility), 32
 - brightness, adjusting, 575, 579
 - colors, Personalization utility (Windows Settings utility), 32
 - High Contrast settings, 32, 38, 154
 - magnifying, 38
 - power/battery management, 574
 - System utility (Windows Settings utility), 27
 - themes, Personalization utility (Windows Settings utility), 32
 - Windows 10 requirements, 82
- Distributed COM Users group (local), 328**
- DNS (Domain Name Service)**
 - DNS Proxy, 289
 - name resolution
 - IPv4 addressing*, 270-273
 - IPv6 addressing*, 274
 - server addresses, defined, 261
- DNT (Do Not Track) exceptions, Internet Explorer, 158**
- documents**
 - classifying with DAC, 399
 - Documents library, 24
- domain accounts**
 - Microsoft accounts and, 337
 - Secure Channel and, 376
- domain profiles (Windows Firewall with Advanced Security), 770**
- domains**
 - defined, 196
 - domain accounts, 231
 - folder redirection, 498-501
 - joining, 198-200
 - OU, creating, 205-206
- double-colon blocks, IPv6 addressing, 266**
- DRA (Data Recovery Agents) and BitLocker, 430, 433**
- dragging objects with mouse, 397**
- drive letters, assigning**
 - to partitions, 454
 - to RAID-0 (striped) volumes, 464
- Driver Verifier, device driver configuration, 184-185**
- drivers. *See* device drivers**
- dual-booting Windows 10**
 - clean installations, 105-106
 - VHD and, 124
- dual-homed VPN connections, 721**
- duplex, 304**
- DVD drives**
 - ISO files and, 532, 536
 - VM configuration, 532
- dynamic disks**
 - basic disks
 - advantages of dynamic disks*, 452
 - converting to dynamic disks*, 459-460
 - dynamic volumes, 460-461
 - primary partitions, 452
 - simple volumes, 460-461
- dynamic memory, VM configuration, 533**
- dynamic VHD (Virtual Hard Disks), 118, 130**
- dynamic volumes, 460-461**
- Dynamic WEP. *See* 802.1x**

E

- EAP-TLS (Extensible Authentication Protocol-Transport Layer Security), 293**
- EAP-TTLS (Extensible Authentication Protocol Tunneled Transport Layer Security), 710**
- early-launch antimalware protection, 956**
- Ease of Access category (Control Panel), 51**
- Ease of Access utility (Windows Settings utility), 38-39**
- Easy Connect and Remote Assistance, 752-753**

Edge

- compatibility, 15
- configuring, 156-158
- Cortana and, 15
- Edge Hub, 157
- Favorites button, 157
- Internet Explorer versus, 163-164
- OneNote, 158
- Reading mode, 157
- Reading View, 15
- security, 15
- Web Note, 15
- Web Notes, 158

editing

- answer files, 105
- credentials, 369

EFS (Encrypting File System), 402, 658

- access lists, 662
- backing up EFS keys, 407-410
- certificates, 659-660, 663
- decrypting files, 408, 664
- EFS key backups, 663
- encrypting files, 406, 661-663
- formatting
 - partitions*, 405
 - hard disks*, 660-661
- managing, 403
- overview of, 403
- preparing disks for, 405
- private key cryptography, 403, 659
- process of, 403
- public key cryptography, 403, 659
- recovery agents, 409-410, 664
- unique encryption keys, 659

elevated privileges, running programs with, 361**elevation prompts. *See* UAC****email**

- Accounts utility (Windows Settings utility), 35
- notifications, Intune alerts as, 641-642
- Privacy utility (Windows Settings utility), 41

encryption

- AES, 788
- BitLocker
 - DRA*, 430, 433
 - enabling*, 419-423
 - fixed data drive policies*, 428-429

- Group Policies*, 427-428
- managing*, 423
- MBAM*, 433-434
- operating system drives and*, 426-428
- policies*, 426
- TPM*, 417-419, 434-436

- BitLocker Encryption, 13, 45

- BitLocker To Go, 417, 424-426

- EFS, 402, 658

- access lists*, 662
- backing up EFS keys*, 407-410
- certificates*, 659-660, 663
- decrypting files*, 408, 664
- EFS key backups*, 663
- encrypting files*, 406, 661-663
- formatting hard disks*, 660-661
- formatting partitions*, 405
- managing*, 403
- overview of*, 403
- preparing disks for*, 405
- private key cryptography*, 403, 659
- process of*, 403
- public key cryptography*, 403, 659
- recovery agents*, 409-410, 664
- unique encryption keys*, 659

- Offline Files, 559

- TKIP, 788

- unique encryption keys, 659

- WEP, 787-788

end-of-chapter review tools, exam preparation, 1011**enrolling devices with Intune, 625, 629-630**

- managing enrolled devices, 632-633, 643
- retiring enrolled devices, 632
- viewing enrolled devices, 631-632
- wiping enrolled devices, 632

enterprise data protection. *See* WIP**enterprise environments**

- ICD and, 212-214
- Windows 10 activation in
 - KMS*, 216-220
 - MAK*, 216
 - SLMGR*, 220-221

Enterprise updates

- CB, 69
- CBB, 70
- deployment rings, planning, 67-68

- Insider Preview, 68-69
- LTSB scenarios, 71
- Error Checking dialog box, defragmenting disks, 477**
- Error log (Setuperr.log), troubleshooting Windows 10 installations, 108**
- Ethernet, Network utility (Windows Settings utility), 30**
- Event Log Readers group (local), 328**
- event logs and File History, 995**
- Event Viewer, 52, 746**
 - customizing, 880
 - events
 - associating tasks with, 881*
 - collecting events, 883*
 - forwarding events, 883*
 - logs
 - subscriptions, 882-885*
 - viewing, 878-880*
 - opening, 877
 - tasks, 881
 - UAC prompts, 878
- exam preparation**
 - customizing exams, 1009-1010
 - end-of-chapter review tools, 1011
 - memory tables, 1011
 - Pearson Test Prep practice test software, 1007-1009
 - Premium Edition, 1011
 - study plans, 1012
 - updating exams, 1010
- exceptions (authenticated), Windows Firewall with Advanced Security, 783-784**
- exporting VM, 523**
- Extend Volume Wizard, 455, 461**
- extending**
 - partitions/volumes, 455
 - volumes, 461
- external virtual switches, 543-545**

F

- family accounts, Accounts utility (Windows Settings utility), 36**
- Fast Startup, 824-825**
- fault tolerances, 482**
- Favorites button (Edge), 157**
- feature updates, 61**
- feedback, Privacy utility (Windows Settings utility), 41**
- fees for apps, 831**
- Fibre Channel adapters, VM configuration, 531**
- File Explorer, 51**
 - disk quotas, 666-668
 - mapping network drives, 682-683
 - object access auditing, 671-672
 - sharing files/folders, 677
- files/folders**
 - adding folders to libraries, 25
 - caching files
 - shared folders, 562-563*
 - transparent file caching, 567*
 - copying
 - copying files/folders
 - NTFS permissions and, 396*
 - OneDrive, 485*
 - damaged files, restoring, 975
 - default programs
 - associating file extensions with specific programs, 851-853*
 - modifying, 849-850*
 - deleted files, restoring, 975
 - DFS, 478
 - Cache Duration, 480*
 - Namespaces, 479*
 - Replication, 479*
 - disk quotas, 666-668
 - EFS, 402, 658
 - access lists, 662*
 - backing up EFS keys, 407-410*
 - certificates, 659-660, 663*
 - decrypting files/folders, 408, 664*
 - EFS key backups, 663*
 - encrypting files/folders, 406, 661-663*
 - formatting hard disks, 660-661*
 - formatting partitions, 405*
 - managing, 403*
 - overview of, 403*
 - preparing disks for, 405*
 - private key cryptography, 403, 659*
 - process of, 403*
 - public key cryptography, 403, 659*

- recovery agents*, 409-410, 664
 - unique encryption keys*, 659
- File Explorer, 51
 - disk quotas*, 666-668
 - mapping network drives*, 682-683
 - object access auditing*, 671-672
 - sharing files/folders*, 677
- File History, 45, 989
 - adding folders to*, 996
 - configuring*, 990, 993-995
 - restoring files*, 997-999
 - system images*, 999-1000
- folder redirection, 494
 - benefits of*, 495
 - domain-based folder redirection*, 498-501
 - Library folders*, 495-496
- HomeGroups
 - creating*, 687
 - joining*, 689-692
- ISO files
 - DVD drives and*, 536
 - VM configuration*, 532
 - VM deployments*, 536
- libraries, configuring, 685
- Library folders, redirecting, 495-496
- moving files/folders
 - NTFS permissions and*, 396-397
 - OneDrive*, 485
- NTFS file/folder permissions, 378
 - applying*, 379-380
 - copying files/folders with*, 396
 - inheritance*, 384-385
 - moving files/folders with*, 396-397
 - shared folders and*, 394-397
 - specifying advanced permissions*, 381-384
 - taking ownership of*, 385
 - viewing user permissions*, 394
- object access auditing, 669
 - enabling*, 670-671
 - specifying objects to be audited*, 671-674
- Offline Files, 557
 - Always Offline mode*, 565-567
 - caching files from network shares*, 560-561
 - caching files in shared folders*, 562-563
 - client computer configuration*, 558-559
 - determining disk space/usage*, 559
 - disabling*, 559
 - encryption*, 559
 - optimizing for performance*, 563
 - policies*, 564-565
 - server configuration*, 562-563
 - slow network connections*, 559
 - storage*, 558
 - Sync Center and*, 558-561
 - transparent file caching*, 567
 - viewing files*, 559
- OneDrive, 692
 - accessing*, 484
 - configuring*, 486
 - copying files*, 485
 - device backups*, 487
 - moving files*, 485
 - OneDrive app*, 484-485
 - OneDrive desktop*, 485
 - settings*, 486
 - syncing settings*, 487
- paging files, 902-904
- recovery
 - Backup and Restore*, 985-987
 - damaged files*, 975
 - deleted files*, 975
 - File History*, 989-990, 993-1000
 - OneDrive*, 1001-1003
 - shadow files/folders*, 975, 1001
 - Wbadmin command*, 988-989
 - Windows Backup*, 976, 980-985
- security, 676
- shadow files/folders, 975, 1001
- shared files/folders, 52
 - caching files*, 562-563
 - command-line administration*, 683-684
 - configuring shared permissions*, 678-681
 - HomeGroups*, 687-692
 - libraries*, 685
 - mapping drives*, 682-683
 - OneDrive*, 692
 - Public folder and*, 682
 - public folder sharing*, 674-675
 - security*, 676
 - sharing lists*, 677
 - standard folder sharing*, 674
 - troubleshooting data access/usage*, 693-695
- transparent file caching, 567

- troubleshooting data access/usage
 - guidelines, 694-695*
 - permissions, 693-694*
- USMT
 - collecting files from source computer, 491-492*
 - loading collected files on destination computer, 492*
- viewing, 51
- Work Folders, 45, 606-609
- filter keys (keyboards), 39**
- filtering traffic, VPN and, 730-731**
- firewalls**
 - ICF. *See* Windows Firewall
 - Windows Firewall, 44, 761
 - basic configuration, 762-767*
 - IPsec transport mode, 762*
 - PowerShell and, 762*
 - Windows Store app network isolation, 762*
 - Windows Firewall with Advanced Security, 768
 - authenticated exceptions, 783-784*
 - configuring, 769-784*
 - Group Policies, 781-782*
 - notifications, 780*
 - profiles, 770-772*
 - rules, 769, 772-780*
- FireWire, device configuration, 167**
- firmware**
 - UEFI firmware, 85, 955
 - VM configuration, 531
- fixed data drive policies, BitLocker and, 428-429**
- fixed VHD (Virtual Hard Disks), 118, 130**
- fixes (ACT), 840**
- Flash (Adobe) and Internet Explorer, 158**
- Flash Card mode (practice exams), 1009**
- folders**
 - adding to libraries, 25
 - disk quotas, 666-668
 - EFS, 402, 658
 - access lists, 662*
 - backing up EFS keys, 407-410*
 - certificates, 659-660, 663*
 - decrypting files/folders, 408, 664*
 - EFS key backups, 663*
 - encrypting files/folders, 406, 661-663*
 - formatting hard disks, 660-661*
 - formatting partitions, 405*
 - managing, 403*
 - overview of, 403*
 - preparing disks for, 405*
 - private key cryptography, 403, 659*
 - process of, 403*
 - public key cryptography, 403, 659*
 - recovery agents, 409-410, 664*
 - unique encryption keys, 659*
- File History, 989
 - adding folders to, 996*
 - configuring, 990, 993-995*
 - restoring files, 997-999*
 - system images, 999-1000*
- HomeGroups, 687
 - creating, 687*
 - joining, 689-692*
- libraries, configuring, 685
- Library folders, redirecting, 495-496
- object access auditing, 669
 - enabling, 670-671*
 - specifying objects to be audited, 671-674*
- OneDrive, 692
- recovering
 - Backup and Restore, 985-987*
 - damaged files, 975*
 - deleted files, 975*
 - File History, 989-990, 993-1000*
 - OneDrive, 1001-1003*
 - shadow folders, 975, 1001*
 - Wbadmin command, 988-989*
 - Windows Backup, 976, 980-985*
- redirecting, 494
 - benefits of, 495*
 - domain-based folder redirection, 498-501*
 - Library folders, 495-496*
- security, 676
- shadow folders, 975, 1001
- shared folders, 52
 - caching files, 562-563*
 - command-line administration, 683-684*
 - configuring shared permissions, 678-681*
 - HomeGroups, 687-692*
 - libraries, 685*
 - mapping drives, 682-683*
 - NTFS permissions and, 394-397*
 - OneDrive, 692*

- Public folder and*, 682
- public folder sharing*, 674-675
- security*, 676
- sharing lists*, 677
- standard folder sharing*, 674
- troubleshooting data access/usage*, 693-695
- troubleshooting data access/usage
 - guidelines*, 694-695
 - permissions*, 693-694
- viewing, 51
- Work Folders, 45, 606-609
- fonts, managing**, 51
- forests, defined**, 196
- formatting**
 - data partitions, EFS, 405
 - hard disks, 660-661
 - partitions, 405, 454
 - RAID-0 (striped) volumes, 464
- forwarding events (Event Viewer)**, 883
- fragmented disks, defragmenting**
 - Defrag.exe command-line utility, 461, 477
 - Error Checking dialog box, 477
 - Optimize Drives utility, 474-476
- FSRM (File Server Resource Manager), DAC and document classification**, 399
- Fsutil.exe command-line utility, disk management**, 461
- Full Control permission (NTFS)**, 379, 383
- full-duplex**, 304

G

- gateways (default), defined**, 261
- generalize configuration pass**, 98
- gesture replay and picture passwords**, 324
- Get Started app**, 21-22
- global catalogs, defined**, 197
- global permissions, Windows Store for Business**, 829-831
- global unicast IPv6 addresses**, 267
- Go Back to Previous Build**, 955
- golden computers, Device Guard and**, 350
- GPMC (Group Policy Management Console), creating GPO**, 207-210
- GPO (Group Policy Objects)**
 - creating, 207-210
 - remote management and, 737
 - signed packages, 801-804
 - UE-V, 863
 - Windows Installer, deploying apps, 843
- GPT (GUID Partition Tables), converting MBR disks to**, 453
- graphics processors, Windows 10 requirements**, 82
- group memberships, auditing**, 14
- Group Policies. See also Local Security Policy**
 - AD and, 206-210
 - BitLocker and, 427-428
 - Cortana and, 156
 - data security
 - removable media*, 401
 - WPD*, 401
 - DirectAccess, 735
 - EFS recovery agents, 409, 665
 - GPO, creating, 207-210
 - Internet Explorer, 158, 161-162
 - Intune and, 643
 - power/battery management, 579-581
 - remote authentication, 712-713
 - removable media and data security, 401
 - Start menu, 148-150
 - Taskbar, 148-150
 - UAC policies, 363-366
 - Windows Firewall with Advanced Security, 781-782
 - Windows Hello for Business, 335
 - Windows Store, 240-242
 - Windows Update and, 58-63
 - WPD and data security, 401
- groups**
 - HomeGroups, 338
 - joining*, 340-341
 - modifying settings*, 341-343
 - local groups, 52, 327-328, 366-368
 - workgroups, joining, 336
- Guests group (local)**, 328

H

half-duplex, 304

hard disks

basic disks

converting to dynamic disks, 459-460

creating partitions, 454

deleting partitions/volumes, 458

dynamic disks versus, 452

extending partitions/volumes, 455

GPT, 453

MBR, 453

shrinking partitions/volumes, 456

viewing partition properties, 456

cached, Offline Files, 558

clusters, defined, 474

defragmenting

Defrag.exe (Disk Defragmenter)

command-line utility, 461, 477

Error Checking dialog box, 477

Optimize Drives utility, 474-476

disk space management, backups and, 981

dynamic disks

basic disks versus, 452

converting basic disks to, 459-460

dynamic volumes, 460-461

primary partitions, 452

simple volumes, 460-461

EFS formatting, 660-661

GPT, converting MBR disks to, 453

MBR, converting to GPT, 453

NTFS, EFS formatting, 660-661

optimizing, 905-907

performance monitoring, 905-907

power/battery management, 573

troubleshooting, 472-473, 905-907

VHD, 467, 515

BCDboot command-line tool and, 119

BCDedit command-line tool and, 119, 131-133

booting, 131-133

capabilities of, 117

child VHD, 118, 130

creating, 121, 131, 516-519

deploying, 520

differencing VHD, 118, 130

Disk Management snap-in and, 119-121

DiskPart command-line tool and, 119, 122

DISM command-line tool and, 119, 125-127

dynamic VHD, 118, 130

fixed VHD, 118, 130

initializing, 121

mounting, 519-520

native-boot VHD, 129-131

partitioning, 518

Sysprep utility and, 119, 131

VHDX format, 121, 516

WDS and, 119, 131

Windows 10 installations, 117, 122-124, 129-131

Windows PE and, 119

VM configuration, 532

Windows 10 requirements, 82

hardware, Windows 10 installations

compatibility, 83-84

requirements, 82-85, 89

Hardware and Sound category (Control Panel), 47-48

health attestation, 14

Hello (Windows), Windows 10 hardware requirements, 89

Hey Cortana feature, 155

hibernation mode (power/battery management), 574, 581

High Contrast settings (displays), 32, 38, 154

High-Performance power plan, 570-571

History view, Cortana and, 156

HomeGroups, 46, 338

creating, 687

File History and, 995

joining, 340-341, 689-692

modifying settings, 341-343

hotspots, 31, 610

hybrid collections (Azure RemoteApp), 812

Hyper-V

Client Hyper-V, 511

coexisting desktop apps, 856

configuring VM, 529-535

creating VM, 523, 526, 529

DEP, 521

deploying VM, 535-538

enabling, 521

requirements for, 521

- SLAT*, 521
- troubleshooting*, 522
- virtual switches*, 543-547
- configuring, 164-165
- Hyper-V Manager, 524-525
 - configuring VM*, 529-535
 - creating VM*, 526, 529
 - deploying VM*, 535-538
- RemoteApp configuration, 797
- troubleshooting, 522
- VHD, 515
- VHDX format, 516
- virtual switches
 - connecting VM*, 547
 - creating*, 543
 - external virtual switches*, 543-545
 - internal virtual switches*, 543, 546
 - private virtual switches*, 543, 547
- VM
 - configuring*, 529-535
 - creating*, 523, 526, 529
 - deploying*, 535-538

hypervisors, 511, 541

I/O (Input/Output) ports, device configuration, 172

ICD (Imaging and Configuration Designer), 13-15, 212-214

ICF (Internet Connection Firewall). *See* Windows Firewall

ICMP (Internet Control Message Protocol), defined, 259

ICS (Internet Connection Sharing), 288-290

IDE controllers, VM configuration, 531

IIS Web Server, RemoteApp configuration, 798

IKEv2 (Internet Key Exchange version 2)

- IPsec transport mode and Windows Firewall, 762
- VPN and, 720

images (system), File History and, 999-1000

inbound rules (Windows Firewall with Advanced Security), 769

incremental backups, 981

indexing options, configuring, 921-924

infrared connections, 46-48

inking. *See* Windows Ink

Insider Preview, 68-69

installing

- Acrobat Reader Touch, 236-237
- ACT, 838
- apps
 - Office 365 and*, 236-237
 - Windows Installer and*, 844
- Assessment and Deployment Kits, 99-101
- device drivers
 - modifying installation behavior*, 169
 - permissions*, 176
 - PnPUtl command-line utility*, 178
- Office 365, 235
- print drivers, 910
- RSAT, client workstations, 201
- software, Office 365 and, 236-237
- Windows 10
 - 32-bit Windows OS*, 84-85
 - 64-bit Windows OS*, 84-85, 88
 - additional features*, 124, 127
 - attended clean installations*, 90-93, 96
 - clean installations*, 90-93, 96-98, 101, 104-112
 - dual-booting clean installations*, 105-106
 - hardware compatibility*, 83-84
 - hardware requirements*, 82-85, 89
 - mobile devices*, 88
 - native-boot VHD*, 129-131
 - new feature requirements*, 89
 - refreshing Windows 10*, 107
 - software compatibility*, 86-87
 - specialized devices*, 89
 - stopped installations*, 110
 - Telnet client*, 125-127
 - troubleshooting installations*, 108-110
 - unattended clean installations*, 97-98, 101, 104-105
 - upgrades versus clean installations*, 112
 - to VHD*, 117, 122-124, 129-131
- Windows Installer, 842
 - deploying apps*, 843
 - installing apps*, 844
 - msi files*, 847

removing apps, 844

troubleshooting, 844-846

instructive video, watching with Get Started app, 23

Integration Services, VM

configuring, 532

deploying, 536

internal virtual switches, 543, 546

Internet

access, Windows 10 requirements, 83

ICS, 288-290

Network and Internet category (Control Panel), 45-46

Network utility (Windows Setting utility), 30

Internet Explorer

Compatibility view, configuring, 159-160

configuring, 156-158

Compatibility view, 159-160

Group Policies, 161-162

SmartScreen Filter, 160-161

developer features, 158

device compatibility, 158

Edge versus, 163-164

Flash (Adobe) and, 158

Group Policies, 158, 161-162

phone capability, 158

power/battery management, 573

SmartScreen Filter

configuring, 160-161

phishing attacks, 160

Intune, 615

administration console

APN, 626-627

connector site system role, 634-636

device enrollments, 625, 629-633, 643

enabling TeamViewer, 639

managing computer groups, 636-637

managing device enrollments, 632-633, 643

managing remote computers, 638

managing user groups, 636-637

MDM/SCCM hybrid solution, 634-636

retiring device enrollments, 632

user accounts, 620-621, 624

viewing device enrollments, 631-632

wiping device enrollments, 632

alerts, 907-908

configuring, 640

email notifications, 641-642

types of, 639

Azure AD and, 619, 636-637

Company Portal app, 626

Dashboard, 623

deep link apps, 248

desktop apps, 866-869

Group Policies and, 643

MDM, 625

MDM/SCCM hybrid solution, 634-636

monitoring with

alert types, 639

configuring alerts, 640

email notifications, 641-642

in-console monitoring, 649-650

policies, 642-645

Office 365 and, 619

device enrollments, 625, 629-633, 643

managing user accounts, 620-621, 624

policies, 642-645

Remote Assistance and, 639

reports, 649-650

SCCM, MDM/SCCM hybrid solution, 634-636

sideloading apps, 244, 248

software updates, deploying, 645

approving updates, 647

in-console monitoring/reporting, 649-650

third-party updates, 648-649

TeamViewer, enabling, 639

VPN traffic filters, 731

Windows Store for Business, private store setting, 835

I/O (Input/Output) ports, device configuration, 172

iOS, RemoteApp support, 813-816

IP (Internet Protocol), defined, 259

IPsec (Internet Protocol Security), 776

connection security rules, 777-778

transport mode, IKEv2 for transport mode and Windows Firewall, 762

Windows Firewall with Advanced Security

authenticated exceptions, 783-784

Group Policies, 781-782

modifying rule properties, 778-780

notifications, 780

IPv4 (Internet Protocol version 4)

- 6-to-4 addresses, 269
- APIPA, 280-281
- CIDR, 264
- classes, 262
- components of, 261
- default gateways, defined, 261
- DNS server addresses, defined, 261
- IP addresses, defined, 261
- IPv4-mapped addresses, 268
- IPv6 address compatibility, 268-269
- loopback testing, 263
- name resolution, 269-273
- network connections, 270, 275-280
- network locations, 270
 - existing network connections*, 285
 - network sharing/discovery*, 286
 - new connections*, 284-285
 - sharing Internet connections*, 288-290
- private IPv4 networks, 265
- static IP addressing, 262-264
- subnet masks
 - CIDR*, 264
 - defined*, 261
 - static IP addressing*, 263-264
- Teredo addresses, 269
- WINS addresses, defined, 261

IPv6 (Internet Protocol version 6)

- 6-to-4 addresses, 269
- address syntax, 265
- anycast IPv6 addresses, 266-268
- APIPA, 280-281
- benefits of, 259-260
- disabling, 274
- double-colon blocks, 266
- IPv4 address compatibility, 268-269
- multicast IPv6 addresses, 266-268
- name resolution, 269, 273-274
- network connections, 270, 275-276, 281-282
- network locations, 270
 - existing network connections*, 285
 - network sharing/discovery*, 286
 - new connections*, 284-285
 - sharing Internet connections*, 288-290
- prefixes, 266
- Teredo addresses, 269
- unicast IPv6 addresses, 266-268

IRQ (Interrupt Requests), device configuration, 172**ISO files**

- DVD drives and, 536
- VM configuration, 532
- VM deployments, 536

isolating networks, 762**isolation rules (IPsec), 778**

J - K

joining

- domains, 198-200
- HomeGroups, 340-341
- workgroups, 336

Jumbo Frames, 304**Jumbo Packets, 304****Kerberos authentication, 711-712****keyboards**

- accessibility options, 154
- filter keys, 39
- on-screen keyboards, 39
- sticky keys, 39
- toggle keys, 39

KMS (Key Management Server), Windows 10 activation in enterprise environments, 216

- AD-based activation, 219
- configure state activation, 220
- query state activation, 220
- volume activation, 217-219

L

L2TP (Layer 2 Tunneling Protocol) and VPN, 720**languages**

- Clock, Language, and Region category (Control Panel), 51
- Cortana and, 155
- Time and Language utility (Windows Settings utility), 37
- Windows 10 support, configuring, 127-129

legacy network adapters, VM configuration, 531

libraries

- adding folders to, 25
- configuring, 685
- creating, 25
- Documents library, 24
- Music library, 24
- Pictures library, 24
- sharing, 25
- Task Scheduler Library, 926
- Videos library, 24

Library folders, redirecting, 495-496**licensing models, apps, 831****link-local unicast IPv6 addresses, 267****link state power management, 573****List Folder Contents permission (NTFS), 379****List Folder permission (NTFS), 383****LLMNR (Link-Local Multicast Name Resolution), 260****LOB (Line of Business) apps, 234, 240, 248, 829****local accounts**

- configuring, 325-330
- CTRL+ALT+DEL security policies, 330
- secure sign-in, 330

local groups, 52, 327-328, 366-368**Local Security Policy, 410-411. *See also* Group Policies**

- audit policies, 412-414, 600-602
- configuring, 412-416
- mobile devices
 - account policies, 596*
 - audit policies, 600-602*
 - security policies, 594-596*

Security Options, 415-416, 602**local user profiles, 52, 501-504****Location-Aware Printing, 698-699****locations, Privacy utility (Windows Settings utility), 40****Lock screen**

- authentication, 366-368
- authorization, 366-368
- Cortana and, 155
- Personalization utility (Windows Settings utility), 32, 36

LockDown VPN, 731**locking down devices, 14****lockout policies (account)**

- mobile devices, 598-599
- unlocking accounts, 599

logical drives, deleting, 458**LogicalDisk, 905-906****logins, Accounts utility (Windows Settings utility), 36****logon prompts, 366-368****logs (event)**

- Event Viewer
 - subscriptions, 882-885*
 - viewing, 878-880*
- File History and, 995

loopback testing and IPv4, 263**lost/stolen devices, removing from Intune, 632****low-resolution video, 955****LTSB (Long Term Servicing Branch), 71, 89**

M

magnifying displays, 38, 154**maintenance, Security and Maintenance page (Action Center), 965****MAK (Multiple Activation Key), Windows 10 activation in enterprise environments, 216****malware, early-launch antimalware protection, 956****managing**

- APN with Intune, 626-627
- apps, Office 365 and, 237-238
- backups
 - disk space and, 981*
 - Windows Backup, 981-983*
- BitLocker, 423
- certificates, 372-374
- computer groups with Intune, 636-637
- Computer Management snap-in, 51-52
- credentials, 369-371
- device drivers, 173
- devices, 47
- Disk Management snap-in, 52
- disk space, backups and, 981
- EFS, 403
- enrolled devices in Intune, 632-633, 643
- fonts, 51

- indexing options, 921-924
- Microsoft accounts, 332
- multifactor authentication, 372-374
- printers, 47, 908-911
- RAID volumes, 467
- remote management, 708, 735
 - GPO*, 737
 - Intune and*, 638
 - MMC*, 736, 745-746
 - PowerShell ISE*, 740-743
 - PowerShell Remoting*, 736, 743-745
 - Remote Assistance*, 747-753
 - Remote Desktop*, 736
 - Remote Management Users group (local)*, 328
 - selecting tools*, 736-737
 - WinRM*, 736-739
 - WinRS*, 736, 739
- servers, MMC, 914-915
- services
 - System Configuration Utility*, 918-920
 - Windows Services*, 916-917
- software, Office 365 and, 237-238
- Storage Spaces with PowerShell, 483
- tasks with Task Scheduler, 924-927
- user accounts with Intune, 620-621, 624
- user groups with Intune, 636-637
- Windows Update
 - update histories*, 64-65
 - Windows Store apps*, 65-67
- wireless networks
 - network connections*, 297-298
 - preferred networks*, 299-300
- mandatory user profiles, 506-507**
 - AD and, 504
 - defined, 501-502
- Map Network Drive Wizard, 682**
- mapping network drives, 682-683**
- Maps app, 28**
- MBAM (Microsoft BitLocker Administration and Monitoring), 433-434**
- MBR (Master Boot Records), converting to GPT, 453**
- MDM (Mobile Device Management), 13-14**
 - Intune as, 625
 - MDM/SCCM hybrid solution, 634-636
- media**
 - AutoPlaying, 47
 - streaming, 675, 684
- memory**
 - dynamic memory, VM configuration, 533
 - NUMA, VM configuration, 535
 - optimizing, 902-904
 - paging files, 902-904
 - performance monitoring, 902-904
 - RAM
 - VM configuration*, 533
 - Windows 10 requirements*, 82
 - tables, exam preparation, 1011
 - troubleshooting, 472, 902-904
 - VM configuration, 531-535
- Memory tab (Resource Monitor), 892**
- messaging, Privacy utility (Windows Settings utility), 41**
- metered connections, 298**
- metered networks, mobile device broadband connections, 610**
- microphones**
 - Cortana and, 155
 - Privacy utility (Windows Settings utility), 40
- Microsoft accounts**
 - advantages of, 228
 - blocking, 232, 332
 - configuring, 330-332
 - creating, 229
 - customizing, 232
 - domain accounts, 231, 337
 - managing, 332
 - passwords, 229
 - personalizing, 232
 - sign-ins, 230, 331
 - syncing with other devices, 232
- Microsoft Edge. *See* Edge**
- Microsoft Intune. *See* Intune**
- Microsoft Passport. *See* Passport**
- migrating data, 488**
 - folder redirection, 494
 - benefits of*, 495
 - domain-based folder redirection*, 498-501
 - Library folders*, 495-496
 - user profiles, 488

- USMT, 488-489
 - collecting files from source computer*, 491-492
 - loading collected files on destination computer*, 492
 - offline mode*, 493-494
 - server configuration*, 490-491
 - technician computers*, 490
- Miracast, Windows 10 hardware requirements**, 89
- mirrored (RAID-1) volumes**, 460-462, 465-467
- MMC (Microsoft Management Console)**, 372
 - console options, 915
 - customizing consoles, 915
 - delegation options, 914
 - remote management, 736, 745-746
 - server management, 914-915
 - Task Scheduler
 - actions*, 926
 - components of*, 924
 - creating tasks*, 927
 - scheduling tasks*, 926
 - Task Scheduler Library*, 926
- mobile apps and RemoteApp**, 793
 - Android support, 813-816
 - Azure RemoteApp, 805-816
 - cloud collections, 812
 - configuring, 796-798, 801, 811
 - desktop connection feed subscriptions, 807-809
 - GPO for signed packages, 801-804
 - hybrid collections, 812
 - iOS support, 813-816
 - publishing apps, 812
 - RD Web Access, 805-806
- mobile devices**
 - account policies
 - account lockout policies*, 598-599
 - password policies*, 596-598
 - audit policies, 600-602
 - broadband connections, 609
 - broadband tethering*, 610-612
 - hotspots*, 610-612
 - metered networks*, 610
 - data synchronization, 605-609
 - Local Policies
 - audit policies*, 600-602
 - Security Options*, 602
 - MDM, 13-14
 - Offline Files, 557
 - Always Offline mode*, 565-567
 - caching files from network shares*, 560-561
 - caching files in shared folders*, 562-563
 - client computer configuration*, 558-559
 - determining disk space/usage*, 559
 - disabling*, 559
 - encryption*, 559
 - optimizing for performance*, 563
 - policies*, 564-565
 - slow network connections*, 559
 - storage*, 558
 - Sync Center and*, 558-561
 - transparent file caching*, 567
 - viewing files*, 559
 - password policies, 596-598
 - power/battery management
 - advanced settings*, 573-574
 - apps*, 577
 - battery meter*, 575
 - Battery Saver*, 575-579
 - Group Policies*, 579-581
 - hibernation mode*, 574, 581
 - power plans*, 570-571
 - Sleep mode*, 569-575
 - Remote Wipe, 604-605
 - security, 416
 - BitLocker*, 417-423, 426-430, 433-436
 - BitLocker To Go*, 417, 424-426
 - Local Security Policy*, 594-596
 - Security Options (Local Policies)*, 602
 - startup key storage*, 434-439
 - Sleep mode, 569-575
 - Sync Center
 - features of*, 560
 - Offline Files and*, 558-561
 - scheduling synchronizations*, 561
 - unlocking accounts, 599
 - Wi-Fi Direct, 586-588
 - Windows 10 installations, 88
 - Windows To Go, 581
 - creating workspaces*, 582-584
 - USB drives and*, 582
 - using on host computers*, 584-585

- Work Folders, 606-609
- mobile hotspots, Network utility (Windows Settings utility), 31**
- mobility, Windows Mobility Center, 48**
- Modify permission (NTFS), 379**
- modifying default programs, 849-850**
- monitoring**
 - Event Viewer
 - associating tasks with events, 881*
 - collecting events, 883*
 - creating tasks, 881*
 - customizing, 880*
 - forwarding events, 883*
 - log subscriptions, 882-885*
 - opening, 877*
 - UAC prompts, 878*
 - viewing logs, 878-880*
 - Intune
 - alert types, 639*
 - configuring, 640*
 - email notifications, 641-642*
 - in-console monitoring, 649-650*
 - policies, 642-645*
 - performance
 - Data Collector Sets, 897-902*
 - hard disks, 905-907*
 - memory, 902-904*
 - performance baselines, 897*
 - Performance Monitor, 893-902*
 - printers, 908, 911*
 - processors, 904-905*
 - Reliability Monitor, 911-913*
 - Resource Monitor, 890-893*
 - system resources, 907-908*
 - Task Manager, 886-890*
 - Windows Firewall with Advanced Security, 770
- mounting VHD, 519-520**
- mouse, 39**
 - accessibility options, 154
 - copying objects with, 397
 - Devices utility (Windows Settings utility), 29
 - moving objects with, 397
- moving**
 - files/folders
 - NTFS permissions and, 396-397*
 - OneDrive, 485*

- objects with mouse, 397
- MS-CHAPv2 (Microsoft Challenge Handshake Authentication Protocol version 2), 293, 709, 787**
- msconfig**
 - Event Viewer, 878
 - Resource Monitor, 890
 - System Configuration Utility, 918-920
- msi files, Windows Installer, 847**
- Msixexec.exe, Windows Installer, 844-847**
- multicast IPv6 addresses, 266-268**
- multifactor authentication, managing, 372-374**
- multimedia**
 - power/battery management, 574
 - Windows 10 requirements, 83
- multitasking, System utility (Windows Settings utility), 28**
- music**
 - Music library, 24
 - streaming music, 675, 684
- My Device History and Cortana, 156**

N

- name resolution, 261**
 - IPv4 addressing, 269-273
 - IPv6 addressing, 269-274
 - LLMNR, 260
- narrator option (accessibility options), 38, 154**
- NAT (Network Address Translation), 289**
- native-boot VHD**
 - best practices, 130-131
 - boot scenarios, 129-130
- navigation, Appearance and Personalization category (Control Panel), 50**
- net share command, shared files/folders, 683-684**
- netsh command, wireless network profiles, 301-302**
- network adapters**
 - configuring, 303-304
 - Network Adapter Troubleshooting Wizard, 307
- Network and Sharing Center, 46, 276**
 - IPv4 networks, 277-280

- existing network connections*, 285
 - network sharing/discovery*, 286
 - new connections*, 284-285
 - sharing Internet connections*, 288-290
- IPv6 networks, 281-282
 - existing network connections*, 285
 - network sharing/discovery*, 286
 - new connections*, 284-285
 - sharing Internet connections*, 288-290
- Network Configuration Operators group (local)**, 328
- Network tab (Resource Monitor)**, 893
- networks**
 - access, isolating, 762
 - adapters
 - configuring*, 303-304
 - Network Adapter Troubleshooting Wizard*, 307
 - ARP, defined, 259
 - connections
 - IPv4 connections*, 270, 275-280
 - IPv6 connections*, 270, 275-276, 281-282
 - Offline Files*, 559
 - troubleshooting*, 559
 - ICMP, defined, 259
 - IP, defined, 259
 - IPv4
 - 6-to-4 addresses*, 269
 - APIPA*, 280-281
 - CIDR*, 264
 - classes*, 262
 - components of*, 261
 - default gateways*, 261
 - DNS server addresses*, 261
 - IP addresses*, 261
 - IPv4-mapped addresses*, 268
 - IPv6 address compatibility*, 268-269
 - loopback testing*, 263
 - name resolution*, 269-273
 - network connections*, 270, 275-280
 - network locations*, 270, 284-290
 - private IPv4 networks*, 265
 - static IP addressing*, 262-264
 - subnet masks*, 261-264
 - Teredo addresses*, 269
 - WINS addresses*, 261
 - IPv6
 - 6-to-4 addresses*, 269
 - address syntax*, 265
 - APIPA*, 280-281
 - benefits of*, 259-260
 - disabling*, 274
 - double-colon blocks*, 266
 - IPv4 address compatibility*, 268-269
 - name resolution*, 269, 273-274
 - network connections*, 270, 275-276, 281-282
 - network locations*, 270, 284-290
 - prefixes*, 266
 - Teredo addresses*, 269
 - unicast IPv6 addresses*, 266-268
 - isolating, 762
 - legacy network adapters, VM configuration, 531
 - mapping drives, 682-683
 - metered networks, mobile device broadband connections, 610
 - network adapters
 - configuring*, 303-304
 - VM configuration*, 531-532
 - Network and Internet category (Control Panel), 45-46
 - Network Discovery, 784
 - network profile sharing options*, 786
 - wireless security*, 787-789
 - Network utility (Windows Settings utility), 30
 - Next Generation TCP/IP stacks, 260
 - TCP, defined, 259
 - TCP/IP, Next Generation TCP/IP stacks, 260
 - troubleshooting network issues, 305-307
 - UDP, defined, 259
 - VPN, 16, 708, 719
 - app-triggered VPN*, 728-730
 - connection plug-ins*, 727-728
 - connection security*, 725
 - DirectAccess and*, 732-735
 - dual-homed connections*, 721
 - establishing connections*, 721-725
 - LockDown VPN*, 731
 - Network utility (Windows Settings utility)*, 30
 - protocols*, 720
 - traffic filters*, 730-731
 - VPN Reconnect*, 726
 - wireless networks, 292

- connecting to*, 294-296
- managing connections*, 297-298
- managing preferred networks*, 299-300
- metered connections*, 298
- profiles*, 300-302
- protocols*, 293-294
- security*, 293, 296
- SSO profiles*, 293

New Connection Security Rule Wizard, 777

New Mirrored Volume Wizard, 465

New RAID-5 Volume Wizard, 465

New Simple Volume Wizard, 454

New Striped Volume Wizard, 462

New Virtual Machine Wizard, 531

Next Generation TCP/IP stacks, 260

NIC (Network Interface Cards) and virtual switches, 543-545

notes

OneNote, 158

Web Notes, 158

notifications

APN, managing with Intune, 626-627

configuring, 151

Cortana and, 155

email notifications, Intune alerts as, 641-642

Privacy utility (Windows Settings utility), 40

Quick Actions, 152

System utility (Windows Settings utility), 27

Windows Firewall with Advanced Security, 780

NTFS (New Technology File System)

ACL, 378

DAC versus, 398

file/folder permissions, 378

- applying*, 379-380

- copying files/folders with*, 396

- inheritance*, 384-385

- moving files/folders with*, 396-397

- shared folders and*, 394-397

- specifying advanced permissions*, 381-384

- taking ownership of*, 385

- viewing user permissions*, 394

hard disks, formatting for EFS, 660-661

NTLM (NT LAN Manager) authentication, 711-712

NUMA (Non-Uniform Memory

Architecture), VM configuration, 535

O

object access auditing, 669

- enabling, 670-671

- specifying objects to be audited, 671-674

OCSP (Online Certificate Status Protocol), 373

Office 365

apps

- installing*, 236-237

- managing*, 237-238

configuring, 235

installing, 235

- apps*, 236-237

- software*, 236-237

Intune and, 619

- enrolling devices*, 625, 629-633, 643

- managing user accounts*, 620-621, 624

managing

- apps*, 237-238

- software*, 237-238

software

- installing*, 236-237

- managing*, 237-238

updating software, 235

Offline Files, 557

Always Offline mode, 565-567

caching files

- from network shares*, 560-561

- in shared folders*, 562-563

- transparent file caching*, 567

client computer configuration, 558-559

determining disk space/usage, 559

disabling, 559

encryption, 559

optimizing for performance, 563

policies, 564-565

server configuration, 562-563

slow network connections, 559

storage, 558

Sync Center and, 558-561

viewing files, 559

offline licensing, apps, 831

offline maps, System utility (Windows Settings utility), 28

offlineServicing configuration pass, 98

on-screen keyboards, 39

OneDrive, 692

- accessing, 484
- configuring, 486
- copying files, 485
- device backups, 487
- file recovery
 - Recycle Bin, 1001-1002*
 - version histories, 1002-1003*
- moving files, 485
- OneDrive app, 484-485
- OneDrive desktop, 485
- Recycle Bin, file recovery, 1001-1002
- settings, 486-487
- startup, disabling OneDrive from, 826
- syncing settings, 487
- version histories, file recovery, 1002-1003

OneNote, 158

online licensing, apps, 831

oobeSystem configuration pass, 98

operating system drives, BitLocker and, 426-428

operating systems

- troubleshooting, 472
- user profile versions, 507-508

operations masters, defined, 197

Optimize Drives utility, 474-476

optimizing

- hard disks, 905-907
- memory, 902-904
- processors, 904-905

OU (Organizational Units)

- creating, 204-206
- defined, 197

outbound rules (Windows Firewall with Advanced Security), 769

P

paging files, 902-904

PAP (Password Authentication Protocol), remote authentication, 710

partitions

- active partitions, defined, 473
- assigning drive letters to, 454

deleting, 458

EFS, 405

extending, 455

formatting, 405, 454

GPT, converting MBR disks to, 453

MBR, converting to GPT, 453

primary partitions, dynamic disks, 452

shrinking, 456

VHD, 518

viewing properties of, 456

Passport, 13

- advantages of, 320
- configuring accounts, 321
- passwords, 322
- PIN, 322
- registering, 321

passwords

- account policies, 376-378
- Accounts utility (Windows Settings utility), 36
- gesture passwords. *See* picture passwords
- Microsoft accounts, 229
- mobile devices, 596-598
- PAP, remote authentication, 710
- Passport accounts, 322
- picture passwords, 36, 323-325, 368

PCI Express, power/battery management, 573

PEAP (Protected Extensible Authentication Protocol), 293, 710, 787

Pearson Test Prep practice test software, 1007-1009

pen and Windows Ink, Devices utility (Windows Settings utility), 29

per-user wireless network profiles, 300

performance

monitoring

Data Collector Sets, 897-902

hard disks, 905-907

memory, 902-904

performance baselines, 897

Performance Monitor, 893-902

Performance Monitor Users group (local), 328

printers, 908, 911

processors, 904-905

Reliability Monitor, 911-913

Resource Monitor, 890-893

- system resources*, 907-908
 - Task Manager*, 886-890
- Offline Files, optimizing for performance, 563
- Performance Counter alerts, 900
- Performance Log Users group (local), 328
- Performance Logs and Alerts. *See* Data Collector Sets
- power/battery management
 - advanced settings*, 573-574
 - apps*, 577
 - battery meter*, 575
 - Battery Saver*, 575-579
 - Group Policies*, 579-581
 - hibernation mode*, 574, 581
 - power plans*, 570-571
 - Sleep mode*, 569-575
- permissions**
 - device drivers, installation permissions, 176
 - global permissions, Windows Store for Business, 829-831
 - NTFS file/folder permissions, 378
 - applying*, 379-380
 - copying files/folders with*, 396
 - DAC versus*, 398
 - inheritance*, 384-385
 - moving files/folders with*, 396-397
 - shared folders and*, 394-397
 - specifying advanced permissions*, 381-384
 - taking ownership of*, 385
 - viewing user permissions*, 394
 - printers, 909
 - shared files/folders
 - configuring permissions*, 678-681
 - troubleshooting permissions*, 693-695
 - shared printers, 696-698
 - UE-V, 862
 - user permissions, viewing, 394
 - Windows Store for Business, 828-831
- personalization**
 - Appearance and Personalization category (Control Panel), 50-51
 - Microsoft accounts, 232
 - Personalization utility (Windows Settings utility), 32-34
- phishing attacks, SmartScreen Filter**, 160
- phone capability, Internet Explorer**, 158
- PhysicalDisk**, 906
- physical machines, converting to VM**, 538
- picture passwords**, 36, 323-325, 368
- Pictures library**, 24
- PIN (Personal Identification Numbers)**
 - Accounts utility (Windows Settings utility), 36
 - BitLocker TPM, 419
 - Passport accounts, 322
 - Windows Hello, 334
 - Windows Hello for Business, 335
- pinning programs to taskbar**, 23
- PKCS #12 (Personal Information Exchange #12)**, 805
- PKI (Public Key Infrastructure)**, 374-375
- playing media**, 47
- PnP (Plug and Play)**
 - auditing activity, 14
 - configuring devices, 166
- PnPUtl command-line utility, device driver installations**, 178
- policies**
 - account policies, 376-378, 598-599
 - code integrity policies and Device Guard, 348
 - CTRL+ALT+DEL security policies
 - local accounts*, 330
 - local groups*, 366-368
 - fixed data drive policies, BitLocker and, 428-429
 - Group Policies. *See also* Local Security Policy
 - AD and*, 206-210
 - BitLocker and*, 427-428
 - Cortana and*, 156
 - data security*, 401
 - DirectAccess*, 735
 - EFS recovery agents*, 409, 665
 - GPO, creating*, 207-210
 - Internet Explorer*, 158, 161-162
 - Intune and*, 643
 - power/battery management*, 579-581
 - remote authentication*, 712-713
 - removable media and data security*, 401
 - Start menu*, 148-150
 - Taskbar*, 148-150
 - UAC policies*, 363-366
 - Windows Firewall with Advanced Security*, 781-782
 - Windows Hello for Business*, 335
 - Windows Store*, 240-242

Windows Update and, 58-63

WPD and data security, 401

Intune policies, 642

compliance policies, 645

conditional access policies, 643

configuration policies, 643-644

corporate device enrollment policies, 643

resource access policies, 643

Local Security Policy, 410-411. *See also* Group Policies

account policies, 596

audit policies, 412-414, 600-602

configuring, 412-416

mobile devices, 594-596, 600-602

Security Options, 415-416, 602

security policies, 594-596

lockout policies (account)

mobile devices, 598-599

unlocking accounts, 599

Offline File policies, 564-565

roaming user profiles

AD and, 504

configuring, 505-506

defined, 501-502

ports

COM ports, VM configuration, 532

I/O ports, device configuration, 172

Remote Desktop, selecting nondefault ports, 718

power/battery management, 45, 48

advanced settings, 573-574

apps, 577

battery meter, 575

Battery Saver, 575-579

configuring, 165

Group Policies, 579-581

hibernation mode, 574, 581

Power button, 573-575

power plans, 570-571

Sleep mode, 569-575

System utility (Windows Settings utility), 28

Power Users group (local), 328

PowerShell, 928

APP-V command-line utilities, 860-861

PowerShell ISE, 740-743

PowerShell Remoting, 736, 743-745

printer management, 911

remote administration, 929-930

remote management

PowerShell ISE, 740-743

PowerShell Remoting, 736, 743-745

restore points, 962

Storage Spaces, managing, 483

tasks, automating, 929

VHD, creating, 131

Windows Firewall and, 762

Windows Store apps and, 67

PPP (Point-to-Point) VPN protocol, 720

PPTP (Point-to-Point Tunneling Protocol), VPN and, 720

practice exams

customizing, 1009-1010

end-of-chapter review tools, 1011

Flash Card mode, 1009

memory tables, 1011

Pearson Test Prep practice test software, 1007-1009

Practice Exam mode, 1009

Study mode, 1009

study plans, 1012

updating, 1010

prefixes, IPv6 addressing, 266

Premium Edition of book, exam preparation, 1011

preparing for exams

customizing exams, 1009-1010

end-of-chapter review tools, 1011

memory tables, 1011

Pearson Test Prep practice test software, 1007-1009

Premium Edition, 1011

study plans, 1012

updating exams, 1010

previous builds, going back to, 955

primary partitions, dynamic disks, 452

printers

devices and, 167-168

Devices utility (Windows Settings utility), 29

Location-Aware Printing, 698-699

managing, 47, 908-911

performance monitoring, 908, 911

permissions, 909

PowerShell and printer management, 911

print drivers, installing, 910

- Print Management console, 908
- print servers, 909
- sharing, 675, 695
 - Location-Aware Printing*, 698-699
 - permissions*, 696-698
- privacy**
 - Cortana and, 156
 - Privacy utility (Windows Settings utility), 39
- private IPv4 networks**, 265
- private key cryptography**, 403, 659
- private profiles (Windows Firewall with Advanced Security)**, 770
- private store setting (Windows Store for Business)**, 835
- private virtual switches**, 543, 547
- privileges (elevated), running programs with**, 361
- processors**
 - graphics processors, Windows 10 requirements, 82
 - optimizing, 904-905
 - performance monitoring, 904-905
 - power/battery management, 573
 - troubleshooting, 904-905
 - VM configuration, 531, 534-535
 - Windows 10 requirements, 82
- profiles (Windows Firewall with Advanced Security)**, 770-772
- Programs category (Control Panel)**, 48-49
- Projecting to This PC, System utility (Windows Settings utility)**, 28
- provisioned apps**, 243-244
- proxy servers, Network utility (Windows Settings utility)**, 31
- public folder sharing**, 674-675, 682
- public key cryptography**, 375, 403, 659
- public profiles (Windows Firewall with Advanced Security)**, 770
- publishing apps with RemoteApp**, 812
- Push-Button Resets**
 - Bare Metal Recovery, 949
 - Refresh Your PC option, 949-952
 - Reset Your PC option, 949, 952

Q - R

- quality updates, 61
- query state, enterprise environments, activating in via KMS, 220
- Quick Actions (notifications)**, 152
- radios, Privacy utility (Windows Settings utility)**, 41
- RAID volumes**
 - managing, 467
 - RAID-0 (striped) volumes, 460-466
 - RAID-1 (mirrored) volumes, 460-462, 465-467
 - RAID-5 volumes, 460-462, 465-467
 - troubleshooting, 467
- RAM (Random Access Memory)**
 - VM configuration, 533
 - Windows 10 requirements, 82
- RD Connection Broker, RemoteApp configuration**, 800
- RD Gateways**, 732, 800
- RD Licensing, RemoteApp configuration**, 801
- RD Session Host, RemoteApp configuration**, 801
- RD Virtualization Host, RemoteApp configuration**, 801
- RD Web Access, RemoteApp configuration**, 800, 805-806
- RDP (Remote Desktop Protocol)**, 714, 796
- RDS (Remote Desktop Services), RemoteApp configuration**, 796-798, 801-804
- Read & Execute permission (NTFS)**, 379
- Read Attributes permission (NTFS)**, 383
- Read Extended Attributes permission (NTFS)**, 383
- Read permission (NTFS)**, 379
- Read Permissions permission (NTFS)**, 384
- Reading mode (Edge)**, 157
- Reading View (Edge)**, 15
- reconnecting VPN connections**, 726
- recovering data**, 42
- recovering files/folders**
 - Backup and Restore, 985-987
 - damaged files, 975

- deleted files, 975
- File History, 989
 - adding folders to*, 996
 - configuring*, 990, 993-995
 - restoring files*, 997-999
 - system images*, 999-1000
- OneDrive
 - Recycle Bin*, 1001-1002
 - version histories*, 1002-1003
- shadow files/folders, 975, 1001
- Wbadmin command, 988-989
- Windows Backup
 - configuring for the first time*, 976, 980
 - managing backups*, 981-983
 - scheduling backups*, 984-985
 - troubleshooting backups*, 984
- recovery**
 - Bare Metal Recovery, 949
 - Push-Button Resets
 - Bare Metal Recovery*, 949
 - Refresh Your PC option*, 949-952
 - Reset Your PC option*, 949, 952
 - System Image Recovery, 955-959, 968
 - System Restore, 955
 - configuring*, 945-947
 - restore points*, 947, 960-962
 - USB recovery drives
 - creating*, 939, 942
 - Startup Repair and*, 943-944
- recovery agents**
 - DRA and BitLocker, 430, 433
 - EFS, 409-410
- Recovery Drive Wizard, 940**
- Recycle Bin (OneDrive), File recovery, 1001-1002**
- redirecting folders, 494**
 - benefits of, 495
 - domain-based folder redirection, 498-501
 - Library folders, 495-496
- redundancy errors, RAID-5 volumes, 467**
- refreshing**
 - Refresh Your PC option (Push-Button Resets), 949, 951-952
 - Windows 10 clean installations, 107
- regions**
 - Clock, Language, and Region category (Control Panel), 51
 - Windows 10 regional support, configuring, 127-129
- registering**
 - devices, 344, 347
 - Passport, 321
- Reliability Monitor, 911-913**
- remote access**
 - Remote Assistance, 747-753
 - remote authentication
 - Group Policies*, 712-713
 - Kerberos authentication*, 711-712
 - NTLM authentication*, 711-712
 - planning*, 708
 - protocols*, 709-710
 - Remote Desktop, 708, 713
 - establishing connections*, 714-716
 - Licensing Diagnoser tools*, 798
 - RD Connection Broker*, 800
 - RD Gateways*, 732, 800
 - RD Licensing*, 801
 - RD Session Host*, 801
 - RD Virtualization Host*, 801
 - RD Web Access*, 800, 805-806
 - RDP*, 714, 796
 - RDS*, 732, 796-798, 801-804
 - Remote Desktop Users group (local)*, 328
 - remote management*, 736
 - RemoteApp configuration*, 796-806
 - selecting nondefault ports*, 718
 - Server Side configurations*, 717-718
 - remote management, 708, 735
 - GPO*, 737
 - Intune and*, 638
 - MMC*, 736, 745-746
 - PowerShell ISE*, 740-743
 - PowerShell Remoting*, 736, 743-745
 - Remote Assistance*, 747-753
 - Remote Desktop*, 736
 - Remote Management Users group (local)*, 328
 - selecting tools*, 736-737
 - WinRM*, 736-739
 - WinRS*, 736, 739
 - VPN, 708, 719-720
 - app-triggered VPN*, 728-730
 - connection plug-ins*, 727-728
 - connection security*, 725
 - DirectAccess and*, 732-735

- dual-homed connections*, 721
 - establishing connections*, 721-725
 - LockDown VPN*, 731
 - protocols*, 720
 - traffic filters*, 730-731
 - VPN Reconnect*, 726
- remote administration with PowerShell**, 929-930
- Remote Assistance, activating in Intune**, 639
- remote authentication, PEAP**, 710
- remote computers, managing with Intune**, 638
- Remote Desktop**
 - establishing connections, 714-716
 - Licensing Diagnoser tools, RemoteApp configuration, 798
 - RD Connection Broker, RemoteApp configuration, 800
 - RD Gateways, 732, 800
 - RD Licensing, RemoteApp configuration, 801
 - RD Session Host, RemoteApp configuration, 801
 - RD Virtualization Host, RemoteApp configuration, 801
 - RD Web Access, RemoteApp configuration, 800, 805-806
 - RDP, 714, 796
 - RDS, 732, 796-798, 801-804
 - RemoteApp configuration, 796-806
 - Remote Desktop Users group (local), 328
 - remote management, 736
 - selecting nondefault ports, 718
 - Server Side configurations, 717-718
- Remote Management Users group (local)**, 328
- Remote Wipe, mobile devices**, 604-605
- RemoteApp, 793**
 - Android support, 813-816
 - Azure RemoteApp
 - Android support*, 813-816
 - cloud collections*, 812
 - desktop connection feed subscriptions*, 807-809
 - desktop connections*, 811
 - distributing with RD Web Access*, 805-806
 - hybrid collections*, 812
 - iOS support*, 813-816
 - publishing apps*, 812
 - cloud collections*, 812
 - coexisting desktop apps*, 856-857
 - configuring*, 796-806
 - desktop connections*
 - configuring*, 811
 - feed subscriptions*, 807-809
 - GPO for signed packages, 801-804
 - hybrid collections, 812
 - iOS support, 813-816
 - publishing apps, 812
 - RD Web Access and Azure RemoteApp distribution, 805-806
- RemoteFX 3D video adapters, VM configuration**, 531
- removable media**
 - data security, 400
 - WPD, 401
- removable storage**, 468
- removing**
 - apps, Windows Installer and, 844
 - credentials, 369
- renaming storage pools**, 481
- Replicator group (local)**, 328
- reports (Intune)**, 649-650
- requesting certificates**, 374
- requirements**
 - hardware requirements, Windows 10 installations, 82-85, 89
 - upgrade requirements, Windows 10, 112
- resetting**
 - Push-Button Resets
 - Bare Metal Recovery*, 949
 - Refresh Your PC option*, 949-952
 - Reset Your PC option*, 949, 952
 - Reset Your PC option (Push-Button Resets), 949, 952
- resolution (screen), Windows 10 requirements**, 82
- resource access policies (Intune)**, 643
- Resource Monitor**
 - CPU tab, 892
 - Disk tab, 892
 - Memory tab, 892
 - Network tab, 893
 - performance monitoring, 890-893

- resources (system), performance monitoring, 907-908
- restarting automatic restart on system failure, 956
- restore points (System Restore), 947, 960-962
- restoring
 - Backup and Restore, 985-987
 - damaged/deleted files, 975
 - data from backups, 42, 45
 - files, File History and, 997-999
- resynching RAID-1 (mirrored) volumes, 467
- retiring enrolled devices from Intune, 632
- review tools (end-of-chapter), exam preparation, 1011
- roaming user profiles
 - AD and, 504
 - configuring, 505-506
 - defined, 501-502
- rolling back device drivers, 182-183, 967-969
- routing, CIDR, 264
- RSAT (Remote Server Administration Tools)
 - ADUC, 203-206
 - installing on client workstations, 201

S

- SaaS (Software as a Service)
 - Intune as, 615
 - Office 365 as, 235
- SACL (System Access Control Lists), object access auditing, 673
- Safe mode, 956
- scanners, Devices utility (Windows Settings utility), 29
- SCCM (System Center Configuration Manager), Intune and, 634-636
- Schannel. *See* Secure Channel
- scheduling
 - backups with Windows Backup, 984-985
 - synchronizations with Sync Center, 561
 - tasks, 51, 926
- school accounts, Accounts utility (Windows Settings utility), 36
- screen resolution, Windows 10 requirements, 82
- SCSI controllers, VM configuration, 531-532

- searches
 - Bing SafeSearch, 156
 - Cortana searches, 20, 154-156
- Secure Boot, 90, 426
- Secure Channel, 375
- secure sign-ins, 330, 366
- security
 - accounts
 - account policies*, 376-378
 - configuring local accounts*, 325, 327-330
 - configuring Microsoft accounts*, 330-332
 - lockout policies*, 598-599
 - apps, 762
 - auditing, 14
 - authentication
 - account policies*, 376-378
 - biometrics*, 323-325
 - Certificate Manager*, 372-374
 - Credential Manager*, 369-371
 - defined*, 319
 - local accounts*, 325-330
 - local groups*, 327-328
 - lock screen*, 366-368
 - logon prompts*, 366-368
 - Microsoft accounts*, 330-332
 - multifactor authentication*, 372-374
 - Passport*, 320-321
 - picture passwords*, 323-325, 368
 - Secure Channel*, 375
 - SSL*, 375
 - TLS*, 375
 - Web Credentials*, 372
 - Windows Hello*, 332-335
 - authorization
 - Credential Guard*, 354
 - Credential Manager*, 369-371
 - defined*, 319
 - Device Guard*, 348-351, 354
 - device registration*, 344, 347
 - DHA*, 355
 - domain accounts*, 337
 - HomeGroups*, 338-343
 - lock screen*, 366-368
 - logon prompts*, 366-368
 - picture passwords*, 368
 - UAC*, 356-366
 - Web Credentials*, 372
 - workgroups*, 336

- biometrics, 323-325
- BitLocker
 - DRA*, 430, 433
 - enabling*, 419-423
 - fixed data drive policies*, 428-429
 - Group Policies*, 427-428
 - managing*, 423
 - MBAM*, 433-434
 - operating system drives and*, 426-428
 - policies*, 426
 - TPM*, 417-419, 434-436
- BitLocker To Go, 417, 424-426
- CTRL+ALT+DEL security policies
 - local accounts*, 330
 - local groups*, 366-368
- data security
 - DAC*, 398-399
 - EFS*, 402-410
 - Local Security Policy*, 410-416
 - removable media*, 400
 - shared folders and NTFS permissions*, 394-397
 - WPD*, 401
- EAP-TTLS, remote authentication, 710
- Edge, 15
- EFS, 402
 - backing up EFS keys*, 407-410
 - decrypting files*, 408
 - encrypting files*, 406
 - formatting partitions*, 405
 - managing*, 403
 - overview of*, 403
 - preparing disks for*, 405
 - private key cryptography*, 403
 - process of*, 403
 - public key cryptography*, 403
 - recovery agents*, 409-410
- files/folders, 676
- firewalls
 - Windows Firewall*, 761-767
 - Windows Firewall with Advanced Security*, 768-784
- gesture passwords. *See* picture passwords
- ICF. *See* Windows Firewall
- IPsec, 776
 - configuring Windows Firewall with Advanced Security notifications*, 780
 - connection security rules*, 777-778
 - modifying Windows Firewall with Advanced Security rule properties*, 778-780
 - Windows Firewall with Advanced Security Group Policies*, 781-784
- local groups, 327-328
- Local Security Policy, 410-411
 - audit policies*, 412-414
 - configuring*, 412-416
 - Security Options*, 415-416
- mobile devices, 416
 - BitLocker*, 417-423, 426-430, 433-436
 - BitLocker To Go*, 417, 424-426
 - Local Security Policy*, 594-596
 - Security Options (Local Policies)*, 602
 - startup key storage*, 434-439
- Network Discovery, 784
 - network profile sharing options*, 786
 - wireless security*, 787-789
- networks
 - isolating*, 762
 - profile sharing*, 786
- NTFS file/folder permissions, 378
 - applying*, 379-380
 - copying files/folders with*, 396
 - DAC versus*, 398
 - inheritance*, 384-385
 - moving files/folders with*, 396-397
 - shared folders and*, 394-397
 - specifying advanced permissions*, 381-384
 - taking ownership of*, 385
 - viewing user permissions*, 394
- passwords
 - account policies*, 376-378
 - Accounts utility (Windows Settings utility)*, 36
 - gesture passwords*. *See* picture passwords
 - Microsoft accounts*, 229
 - mobile devices*, 596-598
 - Passport*, 322
 - picture passwords*, 36, 323-325, 368
- PEAP, remote authentication, 710
- picture passwords, 36, 323-325, 368
- PIN
 - Accounts utility (Windows Settings utility)*, 36
 - Windows Hello*, 334
 - Windows Hello for Business*, 335

- Secure Channel, 375
- secure sign-ins, 330, 366
- Security and Maintenance page (Action Center), troubleshooting devices, 965
- SmartScreen Filter, 389
- SSL authentication, 375
- startup key storage, configuring
 - BitLocker on computers without TPM*, 434-436
 - Syskey startup keys*, 438-439
- System and Security category (Control Panel), 44-45
- TLS authentication, 375
- Update and Security utility (Windows Settings utility), 41-43
- VPN connections, 725
- VSM, 349
- Windows Defender, 16, 42
- Windows Firewall, 761
 - basic configuration*, 762-767
 - IKEv2 for IPsec transport mode*, 762
 - PowerShell and*, 762
 - Windows Store app network isolation*, 762
- Windows Firewall with Advanced Security, 768
 - authenticated exceptions*, 783-784
 - configuring*, 769-784
 - Group Policies*, 781-782
 - notifications*, 780
 - profiles*, 770-772
 - rules*, 769, 772-780
- Windows Hello, configuring, 332-335
- WIP, 16
- wireless networks, 293, 296
- wireless security, 787-789
- server-to-server rules (IPsec), 778**
- servers**
 - managing with MMC, 914-915
 - print servers, 909
 - proxy servers, Network utility (Windows Settings utility), 31
- service management, 52**
 - with System Configuration Utility, 918-920
 - with Windows Services, 916-917
- Set Up Backup Wizard, 976**
- settings (Windows), 25**
 - Devices utility, 28-30
 - Network utility, 30
 - System utility, 26-28
- Setupact.log (Action log), troubleshooting Windows 10 installations, 108**
- Setuperr.log (Error log), troubleshooting Windows 10 installations, 108**
- shadow files/folders, 975, 1001**
- shared folders, 52**
 - caching files, 562-563
 - NTFS permissions and
 - copying files/folders*, 396
 - moving files/folders*, 396-397
 - viewing user permissions*, 394
- shared resources**
 - files/folders
 - command-line administration*, 683-684
 - configuring shared permissions*, 678-681
 - HomeGroups*, 687-692
 - libraries*, 685
 - mapping drives*, 682-683
 - OneDrive*, 692
 - Public folder and*, 682
 - public folder sharing*, 674-675
 - security*, 676
 - sharing lists*, 677
 - standard folder sharing*, 674
 - troubleshooting data access/usage*, 693-695
 - libraries, 25
 - media streaming, 675, 684
 - printers, 675, 695
 - Location-Aware Printing*, 698-699
 - permissions*, 696-698
- shims, 847-848**
- shrinking partitions/volumes, 456**
- sideloading apps, 234, 240-242**
 - Intune and, 244, 248
 - online/offline images, 243-244
- sign-ins**
 - Accounts utility (Windows Settings utility), 36
 - Microsoft accounts, 230, 331
 - secure sign-ins, 330, 366
 - Windows Hello, 334
- signatures (digital), device drivers, 175-176**
- signed packages, GPO for, 801-804**

signing device drivers, 173-175

SIM (System Image Manager), answer files

configuring, 104

creating, 97-98, 101

simple volumes, 460-461

site-local unicast IPv6 addresses, 267-268

sites, defined, 197

SLAT (Second Level Address Translation), Client Hyper-V and, 521

Sleep mode, 569-575

configuring, 165

System utility (Windows Settings utility), 28

SLMGR (Software License Manager) command-line tool, Windows 10 activation in enterprise environments, 220-221

slow network connections

Offline Files and, 559

troubleshooting, 559

smart cards

remote authentication, 710

Windows 10 hardware requirements, 90

Smart Paging, VM configuration, 532

SmartScreen Filter, 389

configuring, 160-161

phishing attacks, 160

software

compatibility, Windows 10 installations, 86-87

installing, Office 365 and, 236-237

managing, Office 365 and, 237-238

Pearson Test Prep practice test software, accessing, 1008-1009

SaaS, Office 365 as, 235

updating

deploying updates with Intune, 645-650

Office 365 and, 235

sound, Hardware and Sound category (Control Panel), 47-48

source-initiated subscriptions (Event Viewer), 883

spanned volumes, 460, 464

specialize configuration pass, 98

specialized devices, Windows 10 installations, 89

speech recognition

Cortana and, 155

Privacy utility (Windows Settings utility), 40

SSID (Service Set Identifiers), 292, 295, 300

SSL (Secure Sockets Layer), authentication, 375

SSO (Single Sign On) profiles, 293

SSTP (Secure Socket Tunneling Protocol), VPN and, 720

stale data, RAID-5 volumes, 467

standard folder sharing, 674

Standby mode. *See* Sleep mode

Start menu, 18-19

configuring, 143-148

Group Policies, 148-150

Personalization utility (Windows Settings utility), 32

Tablet mode, 147

Taskbar, 147

startup

apps

activating at startup, 825

viewing apps, 825

Fast Startup, 824-825

OneDrive, disabling from startup, 826

startup key storage, configuring

BitLocker on computers without TPM, 434-436

Syskey startup keys, 438-439

Startup Repair, 942

advanced startup options, 954-957

USB recovery drives and, 943-944

static IP addressing, 262-264

Status, Network utility (Windows Settings utility), 30

sticky keys (keyboards), 39

stolen/lost devices, removing from Intune, 632

Stop errors, troubleshooting, 108-109

stopped Windows 10 installations, troubleshooting, 110

storage

cloud storage, OneDrive, 484-487

data storage, 450

basic disks, 452-460

defragmenting disks, 474-477

DFS, 478-480

disk management tools, 461

dynamic disks, 452, 459-461

- OneDrive*, 484-487
- RAID volumes*, 460-467
- removable storage*, 468
- simple volumes*, 460
- spanned volumes*, 460, 464
- storage pools*, 469-470, 481-482
- Storage Spaces*, 469-471, 481-483
- troubleshooting*, 472-473
- VHD*, 467
- Offline Files, 558
- removable storage, 468
- startup key storage, configuring
 - BitLocker on computers without TPM*, 434-436
 - Syskey startup keys*, 438-439
- storage pools, 469
 - creating*, 470-481
 - fault tolerances*, 482
 - renaming*, 481
- Storage Spaces, 45
 - configuring*, 471
 - creating*, 469, 481
 - fault tolerances*, 482
 - managing with PowerShell*, 483
 - resiliency options*, 471
- System utility (Windows Settings utility), 28
- streaming media**, 675, 684
- striped (RAID-0) volumes**, 460-466
- Study mode (practice exams)**, 1009
- study plans, exam preparation**, 1012
- subnet masks**
 - CIDR, 264
 - defined, 261
 - static IP addressing, 263-264
- subscriptions, Event Viewer logs**, 882-885
- supernetting, defined**, 264
- switches (virtual)**
 - connecting VM, 547
 - creating, 543
 - external virtual switches, 543-545
 - internal virtual switches, 543, 546
 - private virtual switches, 543, 547
 - VLAN ID, 544, 548
- Sync Center**
 - features of, 560
 - Offline Files and, 558-561
 - scheduling synchronizations, 561
- synchronizing**
 - account settings, Accounts utility (Windows Settings utility), 37
 - conflicts in synchronization, 562
 - data
 - mobile devices*, 605-609
 - Work Folders*, 606-609
 - Microsoft accounts with other devices, 232
 - OneDrive settings, 487
 - scheduling synchronizations, 561
- Syskey startup keys**, 438-439
- Sysprep utility, VHD and**, 119, 131
- System and Security category (Control Panel)**, 44-45
- System Configuration Utility**
 - Boot tab, 919
 - General tab, 918
 - service management, 918-920
 - Services tab, 919
 - Startup tab, 920
 - Tools tab, 920
- system failure, automatic restart on**, 956
- system images**
 - File History and, 999-1000
 - System Image Recovery, 955-959, 968
- System Information utility, troubleshooting devices**, 181, 966
- System Managed Accounts Group (local)**, 328
- system recovery**
 - Push-Button Resets
 - Bare Metal Recovery*, 949
 - Refresh Your PC option*, 949-952
 - Reset Your PC option*, 949, 952
 - System Image Recovery, 955-959, 968
 - System Restore, 955
 - configuring*, 945-947
 - restore points*, 947, 960-962
 - USB recovery drives
 - creating*, 939, 942
 - Startup Repair and*, 943-944
- system resources, performance monitoring**, 907-908
- System Restore, 955**
 - configuring, 945-947
 - device drivers, rolling back, 968
 - restore points, 947, 960-962
- System utility (Windows Settings utility)**, 26-28

T

Tablet mode

- Start menu, 147
- System utility (Windows Settings utility), 28
- Taskbar, 147

Take Ownership permission (NTFS), 384-385

Task Manager

- performance monitoring, 886-890
- startup apps, 825

Task Scheduler, 51

Task view (desktop), 150

Taskbar

- Appearance and Personalization category (Control Panel), 50
- configuring, 23, 143-148
- Cortana and, 155
- Group Policies, 148-150
- Personalization utility (Windows Settings utility), 32, 34
- pinning programs to, 23

tasks

- automating with PowerShell, 929
- Event Viewer, 881
- Task Scheduler
 - actions*, 926
 - components of*, 924
 - creating tasks*, 927
 - scheduling tasks*, 926
 - Task Scheduler Library*, 926

TCP (Transmission Control Protocol), defined, 259

TCP/IP (Transmission Control Protocol/Internet Protocol)

- ARP, defined, 259
- ICMP, defined, 259
- IP, defined, 259
- IPv4
 - 6-to-4 addresses*, 269
 - APIPA*, 280-281
 - CIDR*, 264
 - classes*, 262
 - components of*, 261
 - default gateways*, 261
 - DNS server addresses*, 261

IP addresses, 261

IPv4-mapped addresses, 268

IPv6 address compatibility, 268-269

loopback testing, 263

name resolution, 269-273

network connections, 270, 275-280

network locations, 270, 284-290

private IPv4 networks, 265

static IP addressing, 262-264

subnet masks, 261-264

Teredo addresses, 269

WINS addresses, 261

IPv6

6-to-4 addresses, 269

address syntax, 265

anycast IPv6 addresses, 266-268

APIPA, 280-281

benefits of, 259-260

disabling, 274

double-colon blocks, 266

IPv4 address compatibility, 268-269

multicast IPv6 addresses, 266-268

name resolution, 269, 273-274

network connections, 270, 275-276, 281-282

network locations, 270, 284-290

prefixes, 266

Teredo addresses, 269

unicast IPv6 addresses, 266-268

Next Generation TCP/IP stacks, 260

TCP, defined, 259

UDP, defined, 259

TeamViewer, enabling in Intune, 639

technician computers, 490

telephone capability, Internet Explorer, 158

Telnet client, Windows 10 installations, 125-127

templates, UE-V

- custom setting location templates, 864-866
- Template Generator, 864

temporary user profiles, defined, 502

Teredo addresses, 269

test preparation

- customizing exams, 1009-1010
- end-of-chapter review tools, 1011
- memory tables, 1011
- Pearson Test Prep practice test software, 1007-1009

- Premium Edition, 1011
- study plans, 1012
- updating exams, 1010
- tethering (broadband), mobile device broadband connections, 610-612**
- themes (displays), Personalization utility (Windows Settings utility), 32**
- thin provisioning, Storage Spaces, 469**
- tickets, Kerberos authentication, 711-713**
- Time and Language utility (Windows Settings utility), 37**
- TKIP (Temporal Key Integrity Protocol), 788**
- TLS (Transport Layer Security), authentication, 375**
- toggle keys (keyboards), 39**
- toolbars, 24**
- touchpads, Devices utility (Windows Settings utility), 29**
- TPM (Trusted Platform Module), 14, 417-419, 434-436**
- tracking (websites), Internet Explorer, 158**
- traffic filters and VPN, 730-731**
- transform files, Windows Installer, 847**
- transparent file caching, 567**
- Traverse Folder permission (NTFS), 383**
- trees, defined, 196**
- troubleshooting**
 - backups with Windows Backup, 984
 - BIOS, 472-473
 - bootups, 472-473
 - BSOD, 108-109
 - clean Windows 10 installations, 108-110
 - Client Hyper-V, 522
 - data storage, 472-473
 - device drivers, 173, 178-183, 962-963
 - devices, 170
 - Action Center and, 181, 965*
 - System Information utility and, 181, 966*
 - hard disks, 472-473, 905-907
 - Hyper-V, 522
 - memory, 472, 902-904
 - Network Adapter Troubleshooting Wizard, 307
 - network connections, 559

- network issues, 305-307
- operating systems, 472
- processors, 904-905
- RAID volumes, 467
- shared files/folders
 - data access/usage, 693-695*
 - guidelines, 694-695*
 - permissions, 693-694*
- slow network connections, 559
- Startup Repair and, 942-943, 954-957
- Stop errors, 108-109
- stopped Windows 10 installations, 110
- volumes, 473
- Windows 10 installations
 - clean installations, 108-110*
 - stopped installations, 110*
- Windows Installer, 844-846
- Windows RE troubleshooting features, 955-957

tunnel rules (IPsec), 778

tunneling protocols, VPN and, 720-721

typing

- Devices utility (Windows Settings utility), 29
- fonts, managing, 51
- Privacy utility (Windows Settings utility), 40

U

UAC (User Account Control), 14, 211

- application prompts, 360-361
- configuring, 356-357, 362
- elevated privileges, running programs with, 361
- Event Viewer and, 878
- features of, 357-360
- group policies, 363-366

UASP (USB Attached SCSI Protocol), device drivers and, 166

UDP (User Datagram Protocol), defined, 259

UE-V (User Experience Virtualization), 16

- components of, 861-862
- custom settings location templates, 864-866
- GPO, 863
- permissions, 862
- requirements for, 862
- Template Generator, 864

UEFI (Unified Extensible Firmware Interface)

- firmware, 85, 955
- Windows 10 hardware
 - installing*, 84-85
 - requirements*, 84-85
- unattended Windows 10 clean installations**
 - answer files, 97-98, 101, 104-105
 - configuration passes, 98
- unenrolling devices**, 14
- unicast IPv6 addresses**, 266-268
- uninstalling device drivers via Device Manager**, 173
- unique encryption keys**, 659
- unique local IPv6 unicast addresses**, 267
- unlocking accounts, mobile devices**, 599
- updating**
 - deploying updates with Intune, 645
 - approving updates*, 647
 - in-console monitoring/reporting*, 649-650
 - third-party updates*, 648-649
 - device drivers, 169
 - Enterprise updates
 - CB*, 69
 - CBB*, 70
 - deployment rings*, 67-68
 - Insider Preview*, 68-69
 - LTSC scenarios*, 71
 - feature updates, 61
 - Go Back to Previous Build, 955
 - practice exams, 1010
 - quality updates, 61
 - software, Office 365 and, 235
 - Update and Security utility (Windows Settings utility), 41-43
 - UWP apps, 238
 - Windows Store apps, 65-67, 238
 - Windows Update, 15, 42, 53
 - configuring*, 54-58
 - configuring Group Policies*, 58-63
 - managing update histories*, 64-65
 - Windows Store apps*, 65-67
 - WSUS*, 58
 - Windows Update for Business, 15
- Upgrade Analytics**, 842. *See also* ACT

upgrading

- to Windows 10, 110-111
 - clean installations versus upgrades*, 112
 - from one edition of Windows 10 to another*, 115-116
 - from previous editions*, 113-115
 - upgrade requirements*, 112
- Windows Upgrade Analytics, 15
- USB (Universal Serial Buses)**
 - device configuration, 167
 - Devices utility (Windows Settings utility), 30
 - power/battery management, 573
- USB 3.0, device drivers and**, 166
- USB drives, Windows To Go and**, 582
- USB recovery drives**
 - creating, 939, 942
 - Startup Repair and, 943-944
- user accounts**
 - family accounts, Accounts utility (Windows Settings utility), 36
 - local users/groups, 52
 - managing with Intune, 620-621, 624
 - Privacy utility (Windows Settings utility), 40
 - school accounts, Accounts utility (Windows Settings utility), 36
 - secure sign-ins, 366
 - synchronizing account settings, Accounts utility (Windows Settings utility), 37
 - UAC
 - application prompts*, 360-361
 - configuring*, 356-357, 362
 - features of*, 357-360
 - group policies*, 363-366
 - running programs with elevated privileges*, 361
 - User Accounts category (Control Panel), 49
 - work accounts, Accounts utility (Windows Settings utility), 36
- user data**
 - migration
 - folder redirection*, 494-501
 - user profiles*, 488
 - USMT*, 488-494
 - storage, 450
 - basic disks*, 452-460
 - defragmenting disks*, 474-477
 - DFS*, 478-480
 - disk management tools*, 461

- dynamic disks*, 452, 459-461
- OneDrive*, 484-487
- RAID volumes*, 460-467
- removable storage*, 468
- simple volumes*, 460
- spanned volumes*, 460, 464
- storage pool*, 469-470, 481
- storage pools*, 481-482
- Storage Spaces*, 469-471, 481-483
- troubleshooting*, 472-473
- VHD*, 467

user groups, managing with Intune, 636-637

user interface, customizing

- desktop, 150
- notification settings, 151
- Start menu, 143-148
- Taskbar, 143-148

user profiles

- local user profiles, 501-504
- mandatory user profiles, 506-507
 - AD and*, 504
 - defined*, 501-502
- migrating, 488
- operating system versions, 507-508
- profile paths, configuring, 503-504
- roaming user profiles
 - AD and*, 504
 - configuring*, 505-506
 - defined*, 501-502
- temporary user profiles, defined, 502

users

- apps, assigning, 832
- permissions, viewing, 394
- UE-V
 - components of*, 861-862
 - custom settings location templates*, 864-866
 - GPO*, 863
 - permissions*, 862
 - requirements for*, 862
 - Template Generator*, 864
- Windows Store for Business
 - assigning apps*, 832
 - client configuration*, 833
 - permissions*, 828-831
 - signup/configuration*, 827
- Windows Store for Business signup/
 - configuration, 827

Users group (local), 328

USMT (User State Migration Tool), 488-489

- collecting files from source computer, 491-492
- loading collected files on destination
 - computer, 492
- offline mode, 493-494
- server configuration, 490-491
- technician computers, 490

UWP (Universal Windows Platform) apps, 234

- Remote Desktop, 716
- updating, 238

V

VDI (Virtual Desktop Infrastructure), 797, 810

VHD (Virtual Hard Disks), 467, 515

- BCDboot command-line tool and, 119
- BCDedit command-line tool and, 119, 131-133
- booting, 131-133
- capabilities of, 117
- child VHD, 118, 130
- creating, 121, 131, 516-519
- deploying, 520
- differencing VHD, 118, 130
- Disk Management snap-in and, 119-121
- DiskPart command-line tool and, 119, 122
- DISM command-line tool and, 119, 125-127
- dynamic VHD, 118, 130
- fixed VHD, 118, 130
- initializing, 121
- mounting, 519-520
- native-boot VHD
 - best practices*, 130-131
 - boot scenarios*, 129-130
- partitioning, 518
- Sysprep utility and, 119, 131
- VHDX format, 121, 516
- WDS and, 119, 131
- Windows 10 installations, 117, 122-124
 - native-boot VHD best practices*, 130-131
 - native-boot VHD scenarios*, 129-130
- Windows PE and, 119

video

- conferencing, Windows 10 requirements, 83

- instructive video, watching with Get Started app, 23
 - low-resolution video, 955
 - streaming video, 675, 684
 - video adapters, VM configuration, 531
 - Videos library, 24
- viewing**
 - apps, 825
 - Data Collector Sets, 902
 - enrolled devices in Intune, 631-632
 - Event Viewer logs, 878-880
 - files/folders, 51
 - Offline Files, 559
 - partition properties, 456
 - startup apps, 825
 - user permissions, 394
- virtual smart cards, Windows 10 hardware requirements, 90**
- virtual switches**
 - connecting VM, 547
 - creating, 543
 - external virtual switches, 543-545
 - internal virtual switches, 543, 546
 - private virtual switches, 543, 547
 - VLAN ID, 544, 548
- virtualization**
 - App-V, 16
 - coexisting desktop apps*, 857
 - command-line utilities*, 860-861
 - management console*, 858-860
 - overview of*, 857-858
 - Client Hyper-V, 511
 - coexisting desktop apps*, 856
 - configuring VM*, 529-535
 - creating VM*, 523, 526, 529
 - DEP, 521
 - deploying VM*, 535-538
 - enabling*, 521
 - requirements for*, 521
 - SLAT, 521
 - troubleshooting*, 522
 - virtual switches*, 543-547
 - Hyper-V
 - Client Hyper-V*, 511, 521-523, 526, 529-538, 543-547
 - configuring*, 164-165
 - configuring VM*, 529-535
 - creating VM*, 523, 526, 529
 - deploying VM*, 535-538
 - Hyper-V Manager*, 524-526, 529-538
 - troubleshooting*, 522
 - virtual switches*, 543-547
 - hypervisors, 511
 - RD Virtualization Host, RemoteApp
 - configuration, 801
 - UE-V, 16
 - components of*, 861-862
 - custom settings location templates*, 864-866
 - GPO, 863
 - permissions*, 862
 - requirements for*, 862
 - Template Generator*, 864
 - VDI, 797, 810
 - VHD, 515
 - creating*, 516-519
 - deploying*, 520
 - mounting*, 519-520
 - partitioning*, 518
 - VHDX format*, 516
 - virtual switches
 - connecting VM*, 547
 - creating*, 543
 - external virtual switches*, 543-545
 - internal virtual switches*, 543, 546
 - private virtual switches*, 543, 547
 - VLAN ID, 544, 548
- VM
 - checkpoints*, 523, 532, 539-542
 - configuring*, 529-535
 - connecting*, 547
 - converting physical machines to VM*, 538
 - creating*, 523, 526, 529
 - deploying*, 535-538
 - dynamic memory*, 533
 - exporting*, 523
 - New Virtual Machine Wizard*, 531
 - NUMA, 535
 - processors and VM configuration*, 534-535
 - reverting VM state*, 542
- VPN, 708, 719
 - app-triggered VPN*, 728-730
 - connection plug-ins*, 727-728
 - connection security*, 725
 - DirectAccess and*, 732-735

- dual-homed connections*, 721
- establishing connections*, 721-725
- LockDown VPN*, 731
- protocols*, 720
- traffic filters*, 730-731
- VPN Reconnect*, 726

Virtualization Based Protection of Code Integrity. *See* **Device Guard**

VLAN ID, virtual switches, 544, 548

VM (Virtual Machines)

- checkpoints, 523, 532, 539
 - creating*, 541
 - reverting VM state*, 542
- configuring, 529-535
- connecting, 547
- converting physical machines to VM, 538
- creating, 523, 526, 529
- deploying, 535
 - converting physical machines to VM*, 538
 - Integration Services*, 536
- dynamic memory, 533
- exporting, 523
- New Virtual Machine Wizard, 531
- NUMA, 535
- processors and VM configuration, 534-535
- reverting VM state, 542

volumes

- deleting, 458
- drive letter assignments to RAID-0 (striped) volumes, 464
- dynamic volumes, 460-461
- enterprise environments, activating in via
 - KMS, 217-219
- extending, 455, 461
- mirrored (RAID-1) volumes, 460-462, 465-467
- RAID volumes
 - managing*, 467
 - RAID-0 (striped) volumes*, 460-466
 - RAID-1 (mirrored) volumes*, 460-467
 - RAID-5 volumes*, 460-467
 - troubleshooting*, 467
- shrinking, 456
- simple volumes, 460-461
- spanned volumes, 460, 464
- striped (RAID-0) volumes, 460-466
- troubleshooting, 473

VPN (Virtual Private Networks), 16, 708, 719

- app-triggered VPN, 728-730
- connections
 - dual-homed connections*, 721
 - establishing*, 721, 722-725
 - plug-ins*, 727-728
 - security*, 725
 - VPN Reconnect*, 726
- DirectAccess and
 - benefits of*, 733
 - deploying*, 733-734
 - Group Policies*, 735
 - RDS*, 732
- dual-homed connections, 721
- LockDown VPN, 731
- Network utility (Windows Settings utility), 30
- protocols, 720
- traffic filters, 730-731

VSM (Virtual Secure Mode), 349

VSS (Volume Shadow Storage), 975, 1001

W - X - Y - Z

Wbadmin command and file recovery, 988-989

WDS (Windows Deployment Services)

- deploying VHD, 520
- VHD and, 119, 131

Web Credentials, 372

Web Notes, 15, 158

websites

- DNT exceptions, Internet Explorer, 158
- tracking, 158

WEP (Wired Equivalent Privacy), 293, 296, 787-788

Wi-Fi

- Network utility (Windows Settings utility), 30
- Wi-Fi Direct, 586-588

Windows

- history of, 8-10
- updates, 15

Windows 10

- 32-bit Windows OS, 84-85
- 64-bit Windows OS, 84-85, 88
- 1507 version, features of, 13-17
- 1511 version, features of, 13-17

- 1607 version, features of, 15-17
- 1703 version, features of, 17
- accessibility options, configuring, 153-154
- accounts, configuring
 - local accounts*, 325-330
 - Microsoft accounts*, 330-332
- apps, 24
- authentication
 - account policies*, 376-378
 - biometrics*, 323-325
 - Certificate Manager*, 372-374
 - Credential Manager*, 369-371
 - defined*, 319
 - local accounts*, 325-330
 - local groups*, 327-328
 - lock screen*, 366-368
 - logon prompts*, 366-368
 - Microsoft accounts*, 330-332
 - multifactor authentication*, 372-374
 - Passport*, 320-321
 - picture passwords*, 323-325, 368
 - Secure Channel*, 375
 - SSL*, 375
 - TLS*, 375
 - Web Credentials*, 372
 - Windows Hello*, 332-335
- authorization
 - Credential Guard*, 354
 - Credential Manager*, 369-371
 - defined*, 319
 - Device Guard*, 348-351, 354
 - device registration*, 344, 347
 - DHA*, 355
 - domain accounts*, 337
 - HomeGroups*, 338-343
 - lock screen*, 366-368
 - logon prompts*, 366-368
 - picture passwords*, 368
 - UAC*, 356-366
 - Web Credentials*, 372
 - workgroups*, 336
- boot management programs, 106
- clean installations
 - attended installations*, 90-93, 96
 - dual-booting installations*, 105-106
 - refreshing Windows 10*, 107
 - troubleshooting*, 108-110
 - unattended installations*, 97-98, 101, 104-105
 - upgrades versus clean installations*, 112
- Computer Management snap-in, 51-52
- configuring
 - language support*, 127-129
 - regional support*, 127-129
- Control Panel, 43
 - Appearance and Personalization category*, 50-51
 - Clock, Language, and Region category*, 51
 - Ease of Access category*, 51
 - Hardware and Sound category*, 47-48
 - Network and Internet category*, 45-46
 - Programs category*, 48-49
 - System and Security category*, 44-45
 - User Accounts category*, 49
- Cortana
 - configuring*, 154-156
 - searching with*, 20
- data migration
 - folder redirection*, 494-501
 - user profiles*, 488
 - USMT*, 488-494
- data storage, 450
 - basic disks*, 452-460
 - defragmenting disks*, 474-477
 - DFS*, 478-480
 - disk management tools*, 461
 - dynamic disks*, 452, 459-461
 - OneDrive*, 484-487
 - RAID volumes*, 460-467
 - removable storage*, 468
 - simple volumes*, 460
 - spanned volumes*, 460, 464
 - storage pools*, 469-470, 481-482
 - Storage Spaces*, 469-471, 481-483
 - troubleshooting*, 472-473
 - VHD*, 467
- desktop, touring, 17-19
- development of, 8-10
- Edge, configuring, 156-158
- editions of, 10-12
- enterprise environments, activating Windows
 - 10 in
 - KMS*, 216-220
 - MAK*, 216
 - SLMGR*, 220-221

- Get Started app, 21-22
- hardware
 - compatibility*, 83-84
 - requirements*, 82-85, 89
- history of, 8-10
- Hyper-V, configuring, 164-165
- improvements to
 - 1507 version*, 13-17
 - 1511 version*, 13-17
 - 1607 version*, 15-17
 - 1703 version*, 17
- installing
 - 32-bit Windows OS*, 84-85
 - 64-bit Windows OS*, 84-85, 88
 - additional features*, 124, 127
 - attended clean installations*, 90-93, 96
 - clean installations*, 90-93, 96-98, 101, 104-112
 - dual-booting clean installations*, 105-106
 - hardware compatibility*, 83-84
 - hardware requirements*, 82-85, 89
 - mobile devices*, 88
 - new feature requirements*, 89
 - refreshing Windows 10*, 107
 - software compatibility*, 86-87
 - specialized devices*, 89
 - stopped installations*, 110
 - Telnet client*, 125-127
 - troubleshooting installations*, 108-110
 - unattended clean installations*, 97-98, 101, 104-105
 - upgrades versus clean installations*, 112
 - to VHD*, 117, 122-124, 129-131
- Internet Explorer, configuring, 156-158
 - Compatibility view*, 159-160
 - Group Policies*, 161-162
 - SmartScreen Filter*, 160-161
- libraries
 - adding folders to*, 25
 - creating*, 25
 - Documents library*, 24
 - Music library*, 24
 - Pictures library*, 24
 - sharing*, 25
 - Videos library*, 24
- local groups, 327-328
- new feature requirements, 89
- power settings, configuring, 165
- Rollback feature, troubleshooting device
 - drivers, 182-183
- searches with Cortana, 20
- security
 - authentication*, 319-335, 366-378
 - authorization*, 319, 336-372
 - BitLocker*, 417-436
 - BitLocker To Go*, 417, 424-426
 - DAC*, 398-399
 - data security*. See *individual data security entry*
 - EFS*, 402-410
 - Local Security Policy*, 410-416
 - mobile devices*, 416-426, 434-436
 - NTFS file/folder permissions*, 378-385, 394-398
 - removable media*, 400
 - shared folders and NTFS permissions*, 394-397
 - SmartScreen filter*, 389
 - startup key storage*, 434-439
 - WPD*, 401
- sleep mode, configuring, 165
- Smart menu, 18-19
- software compatibility, 86-87
- Start menu, Personalization utility (Windows Settings utility), 32
- Tablet mode, 147
- taskbar
 - configuring*, 23
 - Personalization utility (Windows Settings utility)*, 32-34
- toolbars, 24
- upgrading to, 110-111
 - clean installations versus upgrades*, 112
 - from one edition of Windows 10 to another*, 115-116
 - from previous editions*, 113-115
 - upgrade requirements*, 112
- user interface, customizing
 - desktop*, 150
 - notification settings*, 151
 - Start menu*, 143-148
 - Taskbar*, 143-148
- user profiles
 - configuring profile paths*, 503-504
 - local user profiles*, 501-504
 - mandatory user profiles*, 501-507

operating system versions, 507-508

roaming user profiles, 501-506

temporary user profiles, 502

Windows Hello

configuring, 332-335

PIN, 334

sign-ins, 334

Windows Hello for Business, 334-335

Windows Settings utility, 25

Devices utility, 28-30

Network utility, 30

System utility, 26-28

Windows Assessment and Deployment Kit, 87

Windows Backup, 976

Backup and Restore Wizard, 981

configuring for the first time, 976, 980

managing

backups, 981-983

disk space, 981

scheduling backups, 984-985

Set Up Backup Wizard, 976

troubleshooting backups, 984

Windows Defender, 16, 42

Windows Firewall, 44, 761

basic configuration, 762-767

IKEv2 for IPsec transport mode, 762

PowerShell and, 762

Windows Store app network isolation, 762

Windows Firewall with Advanced Security, 768

configuring

authenticated exceptions, 783-784

Group Policies, 781-782

notifications, 780

profiles, 770-772

rules, 769, 772-777

modifying rule properties, 778-780

Windows Hardware Certification Program, 84, 90

Windows Hello

Accounts utility (Windows Settings utility), 36

configuring, 332-335

PIN, 334

sign-ins, 334

Windows 10 hardware requirements, 89

Windows Hello for Business, 16, 334-335

Windows Ink

Devices utility (Windows Settings utility), 29

Privacy utility (Windows Settings utility), 40

Windows Insider Program, 43

Windows Installer, 842

API, 847

apps

deploying, 843

installing, 844

removing, 844

msi files, 847

Msiexec.exe, 844-847

transform files, 847

troubleshooting, 844-846

Windows LTSB (Long Term Servicing Branch), 89

Windows Mobility Center, 48

Windows PE (Preinstallation Environment)

configuration pass, 98

VHD and, 119

Windows RE, troubleshooting features, 943, 955-957

Windows Services, 916-917

Windows Settings utility, 25

Devices utility, 28-30

Network utility, 30

System utility, 26-28

Windows SIM. *See* SIM

Windows Store

accessing, 239

apps, 234

network isolation, 762

PowerShell and, 67

updating, 65-67, 238

Group Policies, 240-242

Windows Store for Business, 14, 819

administration

permissions, 828-831

apps

acquiring apps, 831

assigning, 832

fees, 831

free apps, 831

licensing models, 831

- client configuration, 833
- Device Guard and, 829
- inventory, viewing, 832
- LOB apps, 829
- permissions, 828-831
- private store setting, 835
- requirements for, 826
- signup, 827
- user configuration, 827
- Windows To Go, 581**
 - device drivers and, 166
 - host computers, using on, 584-585
 - USB drives and, 582
 - workspaces, creating, 582-584
- Windows Update, 42, 53**
 - configuring, 54-58
 - device drivers, updating, 169
 - Group Policies, configuring, 58-63
 - managing update histories, 64-65
 - updating Windows Store apps, 65-67
 - WSUS, 58
- Windows Update for Business, 15**
- Windows Upgrade Analytics, 15**
- Windows XP mode, 524**
- WinRM (Windows Remote Management), 736-739**
- WinRS (Windows Remote Shell), 736, 739**
- WINS (Windows Internet Name Service)**
 - addresses, defined, 261
- WIP (Windows Information Protection), 16**
- wiping**
 - enrolled devices from Intune, 632
 - Remote Wipe, mobile devices, 604-605
- wireless adapters, power/battery management, 573**
- wireless networks, 292**
 - connecting to, 294-296
 - managing
 - network connections, 297-298*
 - preferred networks, 299-300*
 - metered connections, 298
 - profiles, 300-302
 - protocols, 293-294
 - security, 293, 296
 - SSO profiles, 293
- wireless security, 787-789**
- wizards**
 - Add a Device Wizard, 167
 - Add Driver Wizard, print driver installations, 910
 - Add Recovery Agent Wizard, 409, 665
 - Backup and Restore Wizard, 981
 - Certificate Export Key Wizard, EFS key backups, 408
 - Certificate Export Wizard, EFS key backups, 663
 - Create Basic Task Wizard, 881, 927
 - Create New Data Collector Set Wizard, 899-902
 - Extend Volume Wizard, 455, 461
 - Map Network Drive Wizard, 682
 - Network Adapter Troubleshooting Wizard, 307
 - New Connection Security Rule Wizard, 777
 - New Mirrored Volume Wizard, 465
 - New RAID-5 Volume Wizard, 465
 - New Simple Volume Wizard, 454
 - New Striped Volume Wizard, 462
 - New Virtual Machine Wizard, 531
 - Recovery Drive Wizard, 940
 - Set Up Backup Wizard, 976
- WMI Control, 52**
- work accounts, Accounts utility (Windows Settings utility), 36**
- Work Folders, 45, 606-609**
- workgroups, joining, 336**
- WPA (Wi-Fi Protected Access), 293, 788**
- WPA2 (Wi-Fi Protected Access version 2), 293, 787-788**
 - WPA2-Enterprise, 296
 - WPA2-Personal, 296
- WPD (Windows Portable Devices), 401**
- Write Attributes permission (NTFS), 383**
- Write permission (NTFS), 379**
- WSUS (Windows Server Update Services), 58**