31 Days Before Your CompTIA A+ Certification Exam

A Day-by-Day Review Guide for the CompTIA 220-901 and 220-902 Certification Exams

Laura Schuster
Dave Holzinger
31 Days Before Your CompTIA A+ Certification Exam

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Dedication

Laura Schuster: This book is dedicated to my husband Craig, who has always supported my efforts and tolerated my crazy personality.

Dave Holzinger: I would like to dedicate this book to my wife Jacqueline, without whom I would not be in this field. She pushes me to succeed and always has my back.
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Dave Holzinger: I would like to thank Allan Johnson for recommending me to Pearson and his help and support along the way. My co-author Laura Schuster has done such an amazing job on this, her first book. She has been fantastic to work with. Also, thanks to Mary Beth Ray, Ellie Bru, and Chris Crayton. They have been helpful, supportive, knowledgeable, and professional. This book is a much better book because of all their hard work.
Contents at a Glance

Introduction xviii
Day 31: BIOS/UEFI Settings 1
Day 30: Motherboard Components 9
Day 29: PC Component Installation, Part 1 19
Day 28: PC Component Installation, Part 2 29
Day 27: Peripheral Devices and Connectors 41
Day 26: Printer Installation 55
Day 25: Printer Technologies and Maintenance 65
Day 24: Network Cabling 77
Day 23: IP Addressing 83
Day 22: Ports and Protocols 93
Day 21: SOHO Router Installation 101
Day 20: Network Devices and Internet Connections 107
Day 19: Laptop Components and Features 121
Day 18: Mobile Device Components and Features 129
Day 17: Hardware Troubleshooting, Part 1 135
Day 16: Network Troubleshooting and Tools 143
Day 15: Hardware Troubleshooting, Part 2 155
Day 14: Windows Installation 171
Day 13: Windows Tools 189
Day 12: Windows Networking and Maintenance 209
Day 11: Mac and Linux Operating Systems 227
Day 10: Client-side Virtualization and Cloud Concepts 235
Day 9: Network Services 241
Day 8: Mobile Operating Systems Management 245
Day 7: Security Threat Prevention 255
Day 6: User Access, Device Security, and Data Disposal 263
Day 5: SOHO Security Implementation 271
Day 4: PC Operating System and Security Troubleshooting 277
Day 3: Mobile OS and Security Troubleshooting  291
Day 2: Safety and Environmental Procedures  299
Day 1: Professionalism and Troubleshooting Methodology  307
Exam Day  313
Post-Exam Information  315
Index  319
Contents

Introduction xviii

Day 31: BIOS/UEFI Settings 1
CompTIA A+ 220-901 Exam Topics 1
Key Topics 1
Purpose of the BIOS 1
Booting with BIOS 3
Accessing the Physical BIOS 3
The POST 4
Complementary Metal-oxide Semiconductor 4
UEFI 5
Booting with UEFI 6
Firmware Upgrades 7
Boot Security Measures 7
Study Resources 8

Day 30: Motherboard Components 9
CompTIA A+ 220-901 Exam Topics 9
Key Topics 9
Motherboards 9
CPU Sockets 11
Chipsets 12
Clock Rates 13
RAM Slots 14
Expansion Slots 16
Power Connectors 17
Study Resources 18

Day 29: PC Component Installation, Part 1 19
CompTIA A+ 220-901 Exam Topics 19
Key Topics 19
Motherboard Preparation and Installation 19
Install Expansion Cards 24
Install Storage Devices 25
Study Resources 28
Day 28: PC Component Installation, Part 2

CompTIA A+ 220-901 Exam Topics
Key Topics
PC Connection Interfaces
Install Power Supply
Custom PC Configurations
Study Resources

Day 27: Peripheral Devices and Connectors

CompTIA A+ 220-901 Exam Topics
Key Topics
Types of Display Devices
Video Settings
Analog Versus Digital Displays
Privacy/Antiglare Filters
Using Multiple Displays
Display Connector Types
Device Cables and Connectors
Installing and Configuring Common Peripheral Devices
Study Resources

Day 26: Printer Installation

CompTIA A+ 220-901 Exam Topics
Key Topics
Selecting a Printer
Installing Printers
Installing Multifunction Printers for SOHO
Printer Drivers
Configuring the Printer
Local Connections
Network Printer Installation
Wireless Printing
Cloud Printing/Remote Printing
Apple Printing
Secure Printing
Study Resources
<table>
<thead>
<tr>
<th>Day 25: Printer Technologies and Maintenance</th>
<th>65</th>
</tr>
</thead>
<tbody>
<tr>
<td>CompTIA A+ 220-901 Exam Topics</td>
<td>65</td>
</tr>
<tr>
<td>Key Topics</td>
<td>65</td>
</tr>
<tr>
<td>Printer Types and Features</td>
<td>65</td>
</tr>
<tr>
<td>Printer Connections</td>
<td>73</td>
</tr>
<tr>
<td>Printer Maintenance and Optimization</td>
<td>74</td>
</tr>
<tr>
<td>Study Resources</td>
<td>76</td>
</tr>
</tbody>
</table>

| Day 24: Network Cabling                   | 77 |
| CompTIA A+ 220-901 Exam Topics            | 77 |
| Key Topics                                | 77 |
| Fiber                                     | 77 |
| Twisted Pair                              | 78 |
| Coaxial                                   | 81 |
| Study Resources                           | 82 |

| Day 23: IP Addressing                     | 83 |
| CompTIA A+ 220-901 Exam Topics            | 83 |
| Key Topics                                | 83 |
| IP Version 4                              | 83 |
| Client-side DHCP                          | 88 |
| Client-side DNS                           | 88 |
| Classless Inter-domain Routing            | 88 |
| IP Version 6                              | 89 |
| Study Resources                           | 91 |

| Day 22: Ports and Protocols               | 93 |
| CompTIA A+ 220-901 Exam Topics            | 93 |
| Key Topics                                | 93 |
| Common Ports                              | 93 |
| Common Protocols                          | 96 |
| Study Resources                           | 100 |

| Day 21: SOHO Router Installation          | 101 |
| CompTIA A+ 220-901 Exam Topics            | 101 |
| Key Topics                                | 101 |
| Wireless Standards                        | 101 |
SOHO Router Configuration  101
Study Resources  105

Day 20: Network Devices and Internet Connections  107
CompTIA A+ 220-901 Exam Topics  107
Key Topics  107
Connecting to an ISP  107
Wireless Connections  111
Network Types  113
Networking Devices  115
Study Resources  119

Day 19: Laptop Components and Features  121
CompTIA A+ 220-901 Exam Topics  121
Key Topics  121
Laptop Expansion Options  121
Laptop Hardware Replacement  122
Laptop Displays  125
Laptop Features  126
Laptop Accessories  126
Study Resources  127

Day 18: Mobile Device Components and Features  129
CompTIA A+ 220-901 Exam Topics  129
Key Topics  129
Tablets and Smartphones  129
Specialty Mobile Devices  130
Wearable Devices  130
Mobile Device Connection Types  131
Mobile Device Accessories  133
Study Resources  134

Day 17: Hardware Troubleshooting, Part 1  135
CompTIA A+ 220-901 Exam Topics  135
Key Topics  135
Troubleshooting Motherboards  135
Troubleshooting RAM  136
<table>
<thead>
<tr>
<th>Day 12: Windows Networking and Maintenance</th>
<th>209</th>
</tr>
</thead>
<tbody>
<tr>
<td>CompTIA A+ 220-902 Exam Topics</td>
<td>209</td>
</tr>
<tr>
<td>Key Topics</td>
<td>209</td>
</tr>
<tr>
<td>Domains Versus Homegroups Versus Workgroups</td>
<td>209</td>
</tr>
<tr>
<td>Establishing Network Connections</td>
<td>216</td>
</tr>
<tr>
<td>Preventive Maintenance Procedures</td>
<td>220</td>
</tr>
<tr>
<td>Study Resources</td>
<td>225</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Day 11: Mac and Linux Operating Systems</th>
<th>227</th>
</tr>
</thead>
<tbody>
<tr>
<td>CompTIA A+ 220-901 Exam Topics</td>
<td>227</td>
</tr>
<tr>
<td>Key Topics</td>
<td>227</td>
</tr>
<tr>
<td>Features of Mac and Linux</td>
<td>227</td>
</tr>
<tr>
<td>Mac and Linux Tools</td>
<td>229</td>
</tr>
<tr>
<td>The Terminal</td>
<td>230</td>
</tr>
<tr>
<td>Mac and Linux Best Practices</td>
<td>232</td>
</tr>
<tr>
<td>Study Resources</td>
<td>233</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Day 10: Client-side Virtualization and Cloud Concepts</th>
<th>235</th>
</tr>
</thead>
<tbody>
<tr>
<td>CompTIA A+ 220-902 Exam Topics</td>
<td>235</td>
</tr>
<tr>
<td>Key Topics</td>
<td>235</td>
</tr>
<tr>
<td>Virtual Machines and Their Requirements</td>
<td>235</td>
</tr>
<tr>
<td>Cloud Concepts and Services</td>
<td>237</td>
</tr>
<tr>
<td>Study Resources</td>
<td>239</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Day 9: Network Services</th>
<th>241</th>
</tr>
</thead>
<tbody>
<tr>
<td>CompTIA A+ 220-902 Exam Topics</td>
<td>241</td>
</tr>
<tr>
<td>Key Topics</td>
<td>241</td>
</tr>
<tr>
<td>Server Roles</td>
<td>241</td>
</tr>
<tr>
<td>Internet Appliances</td>
<td>242</td>
</tr>
<tr>
<td>Study Resources</td>
<td>243</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Day 8: Mobile Operating Systems Management</th>
<th>245</th>
</tr>
</thead>
<tbody>
<tr>
<td>CompTIA A+ 220-902 Exam Topics</td>
<td>245</td>
</tr>
<tr>
<td>Key Topics</td>
<td>245</td>
</tr>
</tbody>
</table>
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.

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Introduction

31 Days Before Your CompTIA A+ Certification Exam is a powerful tool to use as a link between all the preparation work you have done so far and taking the CompTIA A+ exams. It will take you through each objective and make certain that you have learned all the material. Every day for the next 31 days, you will cover from one to three objectives. This strategy will help you focus on a topic and not be overwhelmed with the amount of tested material.

However, you might be reading this book at the beginning of your studies. If this is the case, then this book will provide you with an excellent overview of the material you will be studying. Working with this book and some of the additional resources provided here will prepare you to pass the exams. In either case, when you are well prepared for the exam, your stress level is greatly reduced, which makes for a better exam experience.

This book counts down starting from Day 31 until you reach Day 1. The first 17 days (Day 31 through Day 15) are dedicated to the 220-901 exam. The last 14 days are dedicated to the 220-902 exam. After the first 17 days, you might want to take the 220-901 and then complete the second half of the book. This strategy can help you break up the amount of knowledge and study necessary for both exams.

Study Resources

Pearson provides an abundance of books and video resources to serve you well as you learn and study for the exams. At the end of each day, we list where in the following resources you can go to find more information if you feel uncertain. You might already own many of these resources. If not, you can find them at www.pearsonitcertification.com.

Primary Resources

One of the primary resources that we used for this book is the CompTIA A+ 220-901 and 220-902 Exam Cram (ISBN 9780789756312) by David L. Prowse. It provides comprehensive coverage of the exam material with excellent support resources, such as practice exams, real-world scenarios, and cram quizzes.

CompTIA A+ 220-901 and 220-902 Cert Guide, Fourth Edition (ISBN 9780789756527) by Mark Edward Soper is another excellent resource. This book has a great deal of content and provides key topics along the way to help facilitate your understanding. It also provides memory tables at the end that provide an easy way to memorize content.

Cisco Networking Academy offers an introductory course called IT Essentials that covers computer hardware and software, as well as operating systems, networking concepts, mobile devices, IT security, and troubleshooting. All CompTIA A+ exam objectives from both exams are covered. The IT Essentials version 6 books that support this course are published by Cisco Press/Pearson and are referenced as a primary resource within this study guide for those of you who might have taken that course: IT Essentials v6 Companion Guide (ISBN 9781587133558) and IT Essentials v6 Lab Manual (ISBN 9781587133541).

Finally, the Complete CompTIA A+ Guide to IT Hardware and Software, Seventh Edition (ISBN 9780789756459) by Cheryl A. Schmidt is an academic approach to the material that includes exercises, activities, labs, and review questions.
Supplemental Resources

In addition to those primary resources, there is a set of videos that we would recommend. They are the *CompTIA A+ 220-901 Complete Video Course* (ISBN 9780789756466) and the *CompTIA A+ 220-902 Complete Video Course* (ISBN 9780789757302) by David L. Prowse (also available together as a set as *CompTIA A+ 220-901 and 220-902 Complete Video Course Library*; ISBN 9780134510286). With more than 19 hours of video training, the two video courses provide a demonstration of the material being covered, including hands-on demonstrations, audio instructions, animations, whiteboard training, and configurations. The Complete Video Course also includes numerous hands-on networking, OS, and UI demos; real-world troubleshooting methods; and security concepts with hands-on solutions.

So, which resources should you buy? That question is largely up to how deep your pockets are or how much you like books. If you are on a budget, then choose one of the primary study resources and one of the supplemental resources, such as the Cert Guide and the *CompTIA A+ 901 and 902 Complete Video Course* library. Whatever you choose, you will be in good hands. Any or all of these authors will serve you well.

Goals and Methods

The main goal of this book is to provide you with a clear and succinct review of the A+ 220-901 and 220-902 objectives. Each day’s exam topics are grouped into a common conceptual framework and use the following format:

- A title for the day that concisely states the overall topic
- A list of the CompTIA A+ objectives being covered
- A Key Topics section to introduce the review material and quickly orient you to the day’s focus
- An extensive review section consisting of short paragraphs, lists, tables, examples, and graphics
- Activities that match the material being covered throughout the chapter
- A Study Resources section to provide you a quick reference for locating more in-depth treatment of the day’s topics
- A Check Your Understanding quiz covering the content

The book counts down starting with Day 31 and continues through exam day to provide post-test information. Please note that the first 17 days (Day 31 through Day 15) are dedicated to the 220-901 exam. The last 14 days are dedicated to the 220-902 exam. After the first 17 days, you might want to take the 220-901 exam and then complete the second half of the book. This strategy can help you break up the amount of knowledge and study necessary for both exams. If you do, read “Exam Day” before each exam. You will also find a calendar and checklist inside the book that you can tear out and use during your exam preparation.

Use the calendar to enter each actual date beside the countdown day and the exact day, time, and location of each of your CompTIA A+ exams. The calendar provides a visual for the time you can dedicate to each exam topic.

The checklist highlights important tasks and deadlines leading up to your exam. Use it to help map out your studies.
Who Should Read This Book?

The audience for this book is anyone finishing his or her preparation for taking the CompTIA A+ 220-901 and 220-902 exams. A secondary audience is anyone needing a refresher review of the CompTIA A+ exam topics—possibly before attempting to recertify. Another possible audience is those who are just getting started studying for the exam and want an overview of what they will encounter and what they need to know.

Getting to Know the CompTIA A+ 220-901 and 220-902 Exams

The A+ certification is held by more than 1 million IT professionals worldwide. It is the beginning of a path in the IT industry. It validates understanding of common hardware and software technologies used in business and is a powerful credential that will help get you a job in the IT field.

The CompTIA A+ 220-901 exam covers PC hardware and peripherals, mobile device hardware, and network connectivity issues. The CompTIA A+ 220-902 exam covers installing and configuring operating systems, including Windows, iOS, Android, Apple OS X, and Linux. It also addresses security, cloud computing, and operational procedures.

The exam has a maximum of 90 multiple-choice (single- and multiple-response), drag-and-drop, and performance-based questions. You will have 90 minutes to complete them. For the 220-901 exam, a passing score is 675 out of a possible 900 points. A passing score for the 220-902 exam is 700 out of a possible 900 points.

If you’ve never taken a certification exam before with Pearson VUE, a video titled What to Expect in a Pearson VUE Test Center nicely summarizes the experience (it is 2 minutes and 45 seconds long). You can search for it on YouTube.

When you get to the testing center and check in, the proctor will verify your identity, give you some general instructions, and then take you into a quiet room containing testing stations with computers. When you’re at the PC, you have a few things to do before the timer starts on your exam. For instance, you can take the tutorial to get accustomed to the PC and the testing engine. Even if you are familiar with how the test engine works, taking the tutorial can help settle your nerves and get focused. Anyone who has user-level skills in getting around a PC should have no problems with the testing environment.

What Topics Are Covered on the A+ Exams

Table I-1 summarizes the four domains of the A+ 220-901 exam.

| Table I-1 A+ 220-901 Exam Domains and Weightings |
|-----------------|------------------|
| Domain          | % of Examination |
| 1.0 Hardware    | 34%              |
| 2.0 Networking  | 21%              |
| 3.0 Mobile Devices | 17%          |
| 4.0 Hardware and Network Troubleshooting | 28% |
| Total           | 100%             |
Table I-2 summarizes the five domains of the A+ 220-902 exam.

Table I-2  A+ 220-902 Exam Domains and Weightings

<table>
<thead>
<tr>
<th>Domain</th>
<th>% of Examination</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0 Windows Operating System</td>
<td>29%</td>
</tr>
<tr>
<td>2.0 Other Operating Systems &amp; Technologies</td>
<td>12%</td>
</tr>
<tr>
<td>3.0 Security</td>
<td>22%</td>
</tr>
<tr>
<td>4.0 Software Troubleshooting</td>
<td>24%</td>
</tr>
<tr>
<td>5.0 Operational Procedures</td>
<td>13%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
</tr>
</tbody>
</table>

Registering for the A+ 220-901 and 220-902 Exams

If you are starting 31 Days Before Your CompTIA A+ Certification Exam today, register for the first exam right now. There is no better motivator than a scheduled test date staring you in the face. Don’t worry about unforeseen circumstances—you can cancel your exam registration for a full refund up to 24 hours before taking the exam. So if you’re ready, you should gather the following information and register right now!

- Legal name
- Social Security or passport number
- Company name
- Valid email address
- Method of payment

You can schedule your exam at any time by visiting http://www.pearsonvue.com/comptia/. We recommend you schedule it now for 31 days from today, or if you want to take the first exam when you are done with the 901 material, schedule the first exam for 17 days from today. The process and available test times will vary based on the local testing center you choose.

Digital Study Guide

Pearson offers this book in an online digital format that includes enhancements such as activities and Check Your Understanding questions—plus full-length exams for each test.

31 Days Before Your CompTIA A+ Certification Exam Digital Study Guide is available for a discount for anyone who purchases this book. There are details about redeeming this offer in the back of the book.

- Read the complete text of the book on any web browser that supports HTML5—including mobile.
- Reinforce key concepts with more than 50 dynamic and interactive hands-on exercises, and see the results with the click of a button.
Test your understanding of the material at the end of each day with more than 350 fully interactive online quiz questions, PLUS a full-length final quiz for each exam of 90 questions each that mimic the type you will see in the CompTIA A+ certification exam.

Throughout this book there are references to the Digital Study Guide enhancements that look like this:

**Activity: Identify Ports on a Computer**
Refer to the Digital Study Guide to complete this activity.

**Check Your Understanding**
Refer to the Digital Study Guide to take a 10 question quiz covering the content of this day.

When you are at these points in the Digital Study Guide, you can start the enhancement. You can take the Practice Exams at the end of Day 1 at any time.
Printer Installation

CompTIA A+ 220-901 Exam Topics

- Objective 1.12: Install and configure common peripheral devices.
- Objective 1.13: Install SOHO multifunction device/printers and configure appropriate settings.

Key Topics

Today we will be focusing on installing printers in both a local and networked setting. This includes configuring appropriate settings as well as touching on topics such as wireless, cloud, and remote printing. We also will cover installing small office/home office (SOHO) multifunction devices and printers.

Selecting a Printer

Consulting users to determine their needs is the first step to take when selecting a printer. Ensure that the printer meets the needs of the users in terms of speed, amount of printing needed, consumables, and options. For a networked printer, make sure it has the correct network adapter installed. Look for the letter $N$ in the name of the model number. It usually indicates a printer with a built-in network adapter. For a local printer, make certain that the printer drivers are compatible with the operating systems (OSes) being used.

Installing Printers

Instructions for installing a printer vary based on the connection being used and the options included. It is important to read the instructions that come with the printer and follow them exactly.

When installing a printer directly to the computer, the only connections to deal with are one for power and the connection to the PC. The connection to the PC can be through a serial, parallel, FireWire, SCSI, or USB port. Devices that connect through a USB connection are considered hot-swappable and may require the driver to be installed before attaching the printer. The most commonly used connection when going directly from the computer to a printer is USB.

Connect the printer to the correct port on the computer, and then plug the power cable into a wall outlet. For most printers, it is best to also use a surge protector. Do not use an uninterruptible power source (UPS) for a laser printer due to the high voltage the printer requires.
Installing Multifunction Printers for SOHO

Multifunction printers usually are used in SOHO environments. They typically connect using a USB port or wirelessly. It is best to update the device driver before connecting the printer to avoid outdated driver issues.

When installing a multifunction device, the driver often comes with additional programs that support faxing, copying, and scanning capabilities. You might need to remove or configure them depending on which portions of the device you intend to use and which programs make sense.

Faxing

The faxing part of the printer will need to connect to a phone line. Features can include any of the following:

- Answering machine
- Color printout
- Receive and send capabilities
- Sent/Received forwarding to email capability
- TCP/IP methods for network and Internet faxing

Copying

Copying requires that the printer have an automatic document feeder. If copying will be a heavily used function, consider a separate copy machine. The copying part of the printer can include some or all of the following capabilities:

- Finishing, such as duplex, stapling, hole punching, and folding
- Booklet pagination
- Scaling and resolution
- Page numbering

Scanning

Multifunction printers usually provide only basic scanning capabilities. The scanning part of the printer includes the following features:

- Retrieval from storage
- Automatic document feeder
- Duplexing
- Multiple formats, including PDF, TIFF, JPEG, and so on
- Security
**Printer Drivers**

Most printers are plug-and-play (PnP) devices, so when connecting, the OS will install what it needs automatically. If not, insert the disc that came with the device and install the driver and utilities. You also can go to the website of the manufacturer to get the latest drivers.

If the correct driver is not installed, the printout will appear as strange characters or garbage print. To determine the correct driver, note the printer manufacturer and the model of the device. It also is important that the driver match the OS version and the edition (32-bit versus 64-bit).

Drivers control many of the printer functions, such as how to handle specific media types, paper size, quality, the correct tray, how many copies, and so on. Some of the functions are controlled by the software using the printer as well as the driver. Page setup can be one of those functions. It can change from portrait to landscape, normal-size page layout versus reduced size or enlarged size, borderless versus borders, fitting to the size of the page, and scaling.

**Configuring the Printer**

Depending on the printer, configuration options can be found on the device itself, included with the driver, or accessed through a web browser on a networked device. When working with the print driver, right-click the printer and select the Properties option. Selections can include managing print jobs, configuring the print spooler, managing permissions, as well as other options more specific to the device itself.

The first printer installed will become the default printer. This can be changed later when more printers are added. Many applications automatically select the default printer.

**Configuration Settings**

Typical configuration settings include some or all of the following:

- **Duplexing**—Requires a duplexing unit to be installed; prints on both sides of a paper.
- **Collate**—Putting pages in order and then in sequence (for example, Print Job 1 – 123, Print Job 2 – 123, Print Job 3 – 123).
- **Orientation**—Based on viewing a page vertically (called portrait) versus horizontally (called landscape).
- **Drawers/Trays**—Some units can have additional paper trays installed.
- **Finishing**—One or two sided (duplex) stapling, collating, banner printing, and spooling settings.
- **Quality**—Used to change how much ink is dispersed depending on the importance of the document. It’s measured in dots per inch (DPI); 600 DPI or higher is considered letter quality.
- **Printer Priority**—Can be set from 1 to 99; it is possible to install two software printers that print to the same physical printer. This is one scenario in which priority might be useful; two or more physical printers could be combined to create a printer pool where print priority might be an issue.
- **Printing Preferences**—Includes page setup, finishing, paper source, and quality.
Print Spooling

Print spooling is the process of sending the print job to a file one page at a time until the job is finished. This can help alleviate low memory problems on the printer. It also enables the user to continue working while the print job is run in a background process.

Several options are available when working with the print spoolers. The first option is to start the print job immediately. This setting provides one page at a time to be sent to the spooler. The second option is to start printing after the last page is spooled. The entire document is sent to the hard drive and then sent to the printer. Another option is to print directly to the printer and bypass the print spooler altogether. Be sure to have a lot of memory in the printer before choosing this option.

In Windows, the print spooler is controlled by a service. It is the service’s responsibility to print requests and send them to the printer. If the print server fails, the service can be stopped, started, or restarted using the following methods:

- **Computer Management**—Open the Computer Management window and expand Services and Applications; then select Services and scroll until you find the Print Spooler. Right-click the service and select Start, Stop, or Restart.
- **Task Manager**—Open Task Manager (right-click the taskbar and select it or press Ctrl+Shift+Esc). Then go to the Services tab and scroll until you find the Print Spooler.
- **At the command prompt**—Type in `net start spooler` or `net stop spooler`.

Calibration

Monitors or computer displays create color images using pixels that contain three colors: red, green, and blue. Printers use cyan, magenta, yellow, and black (CMYK). Trying to get the two to match requires a process called calibration. Color and ink jet printers usually provide some type of calibration utility used to calibrate the printer to match the monitor. It can also be performed on the device itself. Calibrating actually aligns the cartridge nozzles to the paper and each other. Without it, the print quality degrades over time. Look for fuzzy lines or colored areas that don’t look right.

Testing the Printer

After installing the printer driver, print a test page in Windows to determine whether the installation was successful. The Print Test Page box is usually found on the General tab of the Printer Properties windows. You can find this by going into Devices and Printers in Windows 7 and in 8, by right-clicking the printer, and selecting Printer properties. Some printers offer an option on the print device itself to not only print a test page, but also print the configuration information.

Local Connections

If connecting to a port directly on the computer, the port will be one of the following:

- **USB**—Requires a USB cable; printers use the Type B port and the computer a Type A
- **IEEE 1394**—Requires a FireWire cable.
- **Serial**—9- or 24-pin male/female serial cable.
Network Printer Installation

Network printers can reduce the cost of doing business by allowing multiple users to access a single device. Usually the printer will have a built-in Ethernet connection. Any locally connected printer can be turned into a networked printer by sharing it, or by creating a new TCP/IP port to connect. Wireless and Ethernet are the most commonly used network connections for printers. Each should have a specific logical IP address.

When installing a network printer, the Add Printer Wizard scans for available printers on the network. When the printer is selected, Windows automatically searches for drivers. If the printer is not found, Windows provides a method of browsing using the printer name or IP address in order to configure the printer manually.

Print Servers

A print server is responsible for controlling multiple printers, including the queues, spooling, sharing, pooling, and permissions. A Windows client can be configured as a print server, especially if it is sharing multiple devices. A print server also can be a device called an external print server that plugs into the network, and it can be a service on a server, dedicated to managing all network printing.

Figure 26-1 shows how a typical print server might be set up.
Configuring a Network Printer in Windows

A Microsoft Windows shared printer is also known as a print server. A shared printer is similar to sharing a folder on a Windows machine. Be aware that Windows does not consider a printer as an actual device, but as a program that can provide services for more than one physical printer. It also considers both the drivers and the spooler as part of the printer.

Browsing and connecting to a printer on both workgroups and domains can be accomplished using the printer’s IP address or its name as a URL or by using its universal naming convention (UNC). A UNC name is assigned to a printer to provide users a method to access it. The UNC name is used in Windows OSes to identify both the computer and printer. It is important to know the syntax of the name:

Example: `\Win7\AdminInkJet`

- `\Win7` refers to the name of the computer controlling the printer.
- `\AdminInkJet` refers to the name of the printer.

Sharing a printer using Microsoft’s OSes is done through the Devices and Printers applet. Support for other versions of OSes that use this printer can be provided by using the Additional Drivers button on the Sharing tab. This enables users to automatically download the correct driver when connecting. When an update to the driver is available, it only needs to be installed on the print server.

Authentication/Authorization

Network printers usually come with little or no default security. Most printers will allow full access unless specific steps are taken to control it—both physically and through the network. Setting rights for printer authorization and authentication occurs within the domain or workgroup level, not the printer level.

The Devices and Printers applet and Print Management console comprise the methods for managing printers in Microsoft OSes for both local and network printers. Either can be used to set printing authorization and permissions.

Share permissions can be used to secure locally shared printers. Share permissions affect only the printer being shared. Permission can be assigned to each person who uses the printer or to a group of users.

Windows provides four types of printer permissions:

- **Print**—Each user can print, cancel, pause, or restart documents.
- **Manage documents**—Manage all jobs for a printer waiting in the queue.
- **Manage printers**—Rename, delete, share, and choose preferences for the printer; choose printer permissions for other users and manage all jobs for the printers (administrator group manage printers by default).
- **Special permissions**—Used only by administrators to change the printer owner.
**Printer Pooling**

A *printer pool* uses two or more identical physical printers with a single logical printer showing on your computer. Printer pools have the following characteristics:

- All printers in the pool are identical.
- All printers must share the same print driver.
- Printer ports can be mixed.
- All printers are in one location, which makes it impossible to predict which will print.

The advantage of printer pooling is that one broken printer or one print error will not affect the print jobs coming in behind it. It will be redirected to another printer. It also allows more printers to share the print load, which is especially important for large print jobs that can tie up a printer.

Figure 26-2 shows how to set printer pooling under the Ports section of a printer.

**Figure 26-2 Enable Printer Pooling**

![Enable Printer Pooling](image)

**Network Connections**

A shared printer can use PC ports. A network printer connection includes the most common network ports as well as the following:

- **Network connection**—RJ-45 connector with unshielded twisted pair (UTP) is the most common.
- **Wireless**—Connect using Wi-Fi - 802.11 (a, b, g, n, ac) standards or Bluetooth.
- **Others**—Includes Apple AirPrint, Epson iPrint, and HP ePrint.
Wireless Printing

The 802.11 standard is the most common wireless standard and usually requires connecting to a wireless access point or a wireless network interface card (NIC). Bluetooth requires a phone, laptop, or tablet with Bluetooth installed. A less standard option includes infrared, which has the shortest range.

Wireless networks usually have two ways of communicating with clients. The first is an *ad hoc* network in which computers communicate directly with each other through wireless NICs. A computer that comes within range of the network can automatically connect with the correct authentication. This method is very inexpensive and fast (twice as fast as infrastructure mode).

*Infrastructure mode* includes the use of an access point, which usually connects to a wired network. That means all clients must share the connection to the wired network if any of the devices reside there. To have roaming computers to which you can connect in an infrastructure mode setup, multiple access points need to be configured. Because an access point also can be a router with a firewall, Internet access with some security is likely.

Cloud Printing/Remote Printing

Cloud computing provides Internet access to remote printers. The most common cloud printing available is Google’s Cloud Print services. It supports multiple operating systems, and a printer that can use the Google Cloud Print Connector.

Cloud-ready printers connect directly to the Internet and do not require a computer or server for configuration. Once connected, print jobs can be sent from any remote device with the proper authentication. To set up a printer on Google, select `chrome://devices` on a new tab. For Android devices, go to System and select Printing > Cloud Print; then add the printer.

Apple Printing

Apple uses a program called Bonjour to discover devices such as printers as well as other computers, allowing for zero-configuration on a network. A Bonjour name can have upper- and lowercase letters, numbers, and hyphens. All names have the .local name extension automatically appended to the Bonjour name.

AirPrint is Apple’s way to wirelessly connect and print documents from a Mac, an iPhone, an iPad, or an iPod without installing any additional software. It also provides connectivity through USB or an Ethernet port.

Secure Printing

When copiers, printers, or multifunction machines are repaired or disposed of, one of the considerations must be the possibility that data still resides on the machine. This is especially true of machines that provide any type of storage before printing. Check the manufacturer for information on whether the storage is used for processing or storage.
Another aspect of security in printing is requiring authentication for users to access the device. Some printers provide authentication services that can be accessed through the printer itself; others use network applications that integrate with the printing services. Additionally, some software packages track printing usage based on the authentication of the user.

Activity 26-1: Match the Printing Process to Description
Refer to the Digital Study Guide to complete this activity.

Activity 26-2: Match the Printing Configuration Settings to Its Description
Refer to the Digital Study Guide to complete this activity.

Study Resources
For today’s exam topics, refer to the following resources for more study.

<table>
<thead>
<tr>
<th>Resource</th>
<th>Location</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary Resources</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exam Cram</td>
<td>13/14</td>
<td>Peripherals/Custom Computing, Printers</td>
</tr>
<tr>
<td>Cert Guide</td>
<td>9/10</td>
<td>Installing and Configuring Output Devices, Printers and Multifunction Devices</td>
</tr>
<tr>
<td>IT Essentials (Cisco Networking Academy course)</td>
<td>11.2/11.3</td>
<td>Installing and Updating a Printer, Sharing Printers</td>
</tr>
<tr>
<td>Schmidt/Complete Guide</td>
<td>1, 10, 14</td>
<td>Intro to the World of IT, Printers, Wireless Printers</td>
</tr>
<tr>
<td>Supplemental Resources</td>
<td></td>
<td></td>
</tr>
<tr>
<td>220-901 Complete Video Course</td>
<td>11/12</td>
<td>Peripherals, Printers</td>
</tr>
</tbody>
</table>

Check Your Understanding
Refer to the Digital Study Guide to take a quiz covering the content of this day.
Symbols
32-bit operating systems, 174
64-bit operating systems, 174
802.11 Wi-Fi, 111

A
accelerometers, 247
acceptable use policy (AUP), 261
access control lists. See ACLs
access point placement, 275
accessing
BIOS, configuring, 3
command lines, 189-190
computers, 263
files/folders, 264
physical access, 257-259
servers, 241-242
UEFI, 6
accessories for mobile devices, 133
accounts, types of, 263
ACLs (access control lists), 259
Action Center, 204
actions, documenting, 310
addresses
IP, configuring, 217
IPv4
gateways, 87
guidelines, 86-87
IPv6, 89
private, 85
special, 85
traffic, 89
Unicast, 90
MAC, filtering, 272
administrative shares, 212
administrator account, 263
AFP (Apple Filing Protocol), 95, 98
airplane mode, 250
analog displays, 45-46
analyzers, Wi-Fi, 146
Android, 247-248
Android application packages.
See APKs
antenna placement, 275
APKs (Android application packages), 247
Apple. See also Mac
BIOS/UEFI, 1
Configurator, 227
printing, 62-63
appliances, Internet, 242
apps
development, 247
mobile OS
security, 294-296
tools, 293-294
troubleshooting, 291-293
scanners, 296
troubleshooting, 162
architecture (32-bit/64-bit), 21
aspect ratios, configuring, 44
attacks, 256
audio. See also sound
audio/video (A/V) editing
workstations, 37
connections, 32
ports, 51-52
AUP (acceptable use policy), 261
authentication, network printers, 60
authorization, network printers, 60
A/V (audio/video) editing
workstations, 37

B
backups, networks, 222-225
bad power, 299. See also electricity
bandwidth, 107
basic disks, 198
basic input/output system. See BIOS
batteries
CMOS, 4
troubleshooting, 160-161
BCD (boot configuration data)
files, 285
beep codes, 4, 137
best practices
- Linux, 232-233
- Mac, 232-233
- network maintenance, 221
- security, workstations, 266-267
biometrics, 258
BIOS (basic input/output system), 1
- accessing, 3
- booting, 3
- configuring, 2-3
- device support, 1
- POST, 4
- purpose of, 1
- upgrading, 7-8
BitLocker, 266
blackouts, 300
blue screen of death (BSOD), 135, 279
Bluetooth, 33, 157, 251, 292
boot configuration data (BCD) files, 285
booting
- BIOS, configuring, 3
- errors, 279-285
- Linux errors, 286
- security, 7-8
- UEFI, 6
bootmgr (Windows Boot Manager), 280
bootrec, 285
botnets, 257
bots, 257
bridges, 116
brightness, 45, 293
brownouts, 300
BSOD (blue screen of death), 135, 279
buffered RAM, 15
bus speeds, 13

cable Internet, connecting, 109
cables
- coaxial, 81-82
- display devices, 50-52
- fiber, 77
- placement, 302
testers, 145
- tools, 144-146
- twisted-pair (TP), 78-80
caches, CPUs, 20
CAD (computer-aided design), 37
CAL (client-access license), 304
calibration, 247-248
- printers, 58
CAM (computer-aided manufacturing), 37
capacitor dangers, 301
cards
- communications, 25
- expansion, installing, 24-25
- media, 24
- networks, configuring, 220
- ports, adding, 25
- POST, 4
career options, 315-316
CCFL (cold cathode fluorescent lamp), 42
cell tower analyzers, 296
cellular wireless connections, 112
certificates, reviewing, 315
certification
- exam failure options, 316-317
- options, 315-316
channels, 103
chipsets, 12-13
CHKDSK tool, 139
CIDR (Classless Inter-Domain Routing), 88-89
CIFS (Common Internet File System), 95, 98
Classless Inter-Domain Routing. See CIDR
cleaning printers, 167. See also maintenance
client-access license (CAL), 304
client-side DHCP, 88
client-side DNS, 88
clock rates, 13
- bus speeds, 13
- CPU speeds, 14
cloud computing, 237-238
cloud printers, 62
CMOS (complementary metal-oxide semiconductor), 4-5
coaxial cables, 81-82
cold cathode fluorescent lamp. See CCFL
command lines
accessing, 189-190
tools, 146-153, 286-287
troubleshooting, 190
commands
ifconfig, 150
ipconfig, 148
Linux, 231
NET, 152
netdom, 153
netstat, 151-152
nslookup, 153
ping, 146-147
privileges, 191
service, 278
sudo, 230
traceroute, 150
tracert, 150
Common Internet File System. See CIFS
communications cards, 25
communications connectors, 33
communications skills, 307-308
compatibility
components, motherboards, 10-11
errors, 278
complementary metal-oxide semiconductor. See CMOS
components
handling/storing, 303
motherboards, 10-13
power connectors, 17
computer-aided design. See CAD
computer-aided manufacturing. See CAM
Computer Management, 191
computers
clock rates, 13
bus speeds, 13
CPU speeds, 14
cloud, 237-238
connection interfaces, 29
physical connections, 29-33
wireless connections, 33-35
customizing, 37-39
destruction methods, 268-269
laptops. See laptops
power supplies, installing, 35-37
configuration settings (Windows), 175-176
configuring
BIOS, 1
accessing, 3
booting, 3
device support, 1
options, 2-3
POST, 4
domains, 211-212
HomeGroups, 210
multiple displays, 46
network printers, 60
networks, 218
cards, 220
connecting, 216
firewalls, 218
proxy servers, 218
remote assistance, 217-218
TCP/IP, 216-217
peripheral devices, 52-54
security, 263-265
best practice, 266-267
data destruction/disposal methods, 268-269
mobile devices, 267-268
share resources, 212-215
SOHO routers, 101-105
video, 43
aspect ratios/resolution, 44
brightness/lumens, 45
refresh rates, 44
wireless
encryption, 273-274
firewalls, 273
networks, 274-275
workgroups, 211
connecting
c coaxial cables, 81
displays, 47-49
fiber-optic cables, 77
ISPs, 107
cable Internet, 109
dial-up, 107
DSL, 108
fiber to the x, 110-111
ISDNs, 108
mobile devices, 131-132, 249-251
network printers, 61
networks, 216
bridges, 116
cards, 220
devices, 115
firewalls, 117, 218
modems, 117
patch panels, 118
PoE, 118
proxy servers, 218
remote assistance, 217-218
repeaters/extenders, 118
routers, 115
TCP/IP, 216-217
VoIP, 119
WAPs, 116
peripheral devices, 52-54
ports, 93-95
power supplies, 35-36
printers, 58, 73
proxy servers, 218
remote, troubleshooting, 157-159
twisted-pair (TP) cables, 80
wireless connections, 111
802.11 Wi-Fi, 111
cellular, 112
Internet over satellite, 112-113
line-of-sight wireless, 112
connection interfaces, 29
physical connections, 29-33
wireless connections, 33-35
connectors, display devices, 50-52
content filtering, 272
Control Panel (Windows). See also tools
converters, media, 52
cooling CPUs, 21-22
copying, 56. See also printers
cores, CPUs, 19
CPUs (central processing units)
installing, 22
motherboards
cooling, 21-22
installing, 19-21
sockets, 11
types, 11-12
speeds, 14
troubleshooting, 137, 161
crimping tools, 145
customer service skills, 308
customizing PCs, 37-39

D

data destruction, 268-269
data loss prevention (DLP), 259
data synchronization, mobile devices, 252-253
dates, CMOS, 4-5
DDR DIMM memory, 14
DDR2 DIMM memory, 15
DDR3 DIMM memory, 15
default subnet masks, 84-85
demilitarized zones. See DMZs
development, apps, 247
Device Manager, 192, 281
devices, 205
display, 41
LCD, 41-42
OLED, 43
plasma, 42
projectors, 42
mobile. See mobile devices
networks, 115
bridges, 116
firewalls, 117
hubs, 115
modems, 117
patch panels, 118
PoE, 118
repeaters/extenders, 118
routers, 115
switches, 115
VoIP, 119
WAPs, 116
support (BIOS), 1
DHCP (Dynamic Host Configuration Protocol), 96, 242
client-side, 88
ports, 94
dial-up ISPs, connecting, 107
difficult customers, dealing with, 308.
See also customer service skills
digital displays, 45-46
digital rights management (DRM), 304
digital security, 259-261
digital subscriber line. See DSL
digitizers, 125
disable execute bits, 21
disabling
ports, 275
SSIDs, 271
WPS, 272

disassembly processes, 162-163
Disk Management, 197-198
Diskpart, 139
display devices, 41
accessories, 126-127
analog/digital, 45-46
brightness, 41
cables/connectors, 50-52
connecting, 47-49
features, 126
laptops, 125
LCD, 41-42
multiple, 46
OLED, 43
plasma, 42
privacy filters, 46
projectors, 42
troubleshooting, 140, 156-157
video
aspect ratios/resolution, 44
brightness/lumens, 45
configuring, 43
refresh rates, 44
Display utility, 201
disposal methods, 268-269
DLP (data loss prevention), 259
DMZs (demilitarized zones), 104
DNS (Domain Name System), 96
client-side, 88
ports, 94
servers, 242
documentation
motherboards, 10
MSDS, 303
Domain Name System. See DNS
domains, 209-212
dot-matrix printers, 65-66
double-sided RAM, 15
drivers
printers, 57
testing, 58

drives
formatting, 184-185
mapping, 214
partitioning, 182-183
troubleshooting, 159
DRM (digital rights management), 304
DSL (digital subscriber line),
connecting, 108
dual-channel RAM, 15
dual rail power supplies, 36
dual voltage options, 37
DVI connectors, 49
dynamic disks, 198
Dynamic Host Configuration Protocol.
See DHCP

E
Easy Transfer program, 177
ECC (error checking and
correction), 136
ECC (error correction code), 15
EEPROM (electrically erasable
programmable read-only memory), 5
electricity, safety procedures, 299-301
electronic paper (e-paper), 130
electrostatic discharge. See ESD
elevated privileges, 265
e-mail, mobile devices, 249-251
emergency notification features, 248
encryption, 273-274, 293
end user license agreements
(EULAs), 304
environmental procedures, 303
equipment, grounding, 301
e-readers, 130
error checking and correction. See ECC
error correction code (ECC), 15
errors
booting, 279-285
codes, HTTP, 94
compatibility, 278
Linux, booting, 286
system log, 277
eSATA ports, 50
ESD (electrostatic discharge), 122, 135,
162, 301
EULAs (end user license
agreements), 304
Event Viewer, 277

exams
exam day preparation, 313
materials needed for exam, 313
score reports, 313

post-exam information
certification options, 315-316
reviewing certificates, 315
what to do if you fail, 316-317

expansion cards, installing, 24-25
expansion options, laptops, 121-122
expansion slots, 16
extended partitions, 182
extenders, 118
external customers, communications skills, 308

F

factory recovery, 285
failure to boot, 279
fans
assembling, 21
CPU cooling, 21-22
power connectors, 17
faxing, 56. See also printers
fiber-optic cable, 77
fiber to the x, connecting, 110-111
field replaceable units. See FRUs
file corruption, 279
file server roles, 241
file systems, 184-185
Linux, 185
Mac, 186
troubleshooting, 282

File Transfer Protocol. See FTP
files
accessing, 264
paths, 174-175

filtering
content, 272
MAC addresses, 272
privacy, 46

findings, documenting, 310
fires, electrical fire safety, 301

firewalls, 117
configuring, 218
security, 259
Windows Firewall, 203
wireless, configuring, 273

FireWire (IEEE 1394), 30, 51

firmware
mobile devices, 252
upgrading, 7-8
flash drives, 26
folders. See also files
accessing, 264
options applet, 201
form factors, motherboards, 9-10
formatting hard drives, 184-185. See also configuring
forwarding, ports, 103
fox and hound, 145
frame rates, 44
front/top panel connectors, 17
FRUs (field replaceable units), 155
FTP (File Transfer Protocol) ports, 93
functionality, verifying, 310

G
gaming PCs, 38
gateway addresses, IPv4, 87
geotracking, 248
Global Positioning System. See GPS
GOUs (graphics processing units), 21
government regulations, compliance, 303
GPS (Global Positioning System), 130, 157, 293
GPT (GUID partition table), 182
GPUs (graphics processing units), 21
GRand Unified Bootloader (GRUB), 280
graphic workstations, 37
graphical user interfaces. See GUIs
graphics processing units. See GPUs
grounding equipment, 301
GRUB (GRand Unified Bootloader), 280
guest account, 263
GUIs (graphical user interfaces), 227, 248
GUID partition table (GPT), 182
guidelines, IPv4 addresses, 86-87
gyroscopes, 247

hard drives, troubleshooting, 139, 159
hard resets, 294
hardware
BIOS, 1
accessing, 3
booting, 3
configuring, 2-3
device support, 1
POST, 4
CMOS, 4-5
CPUs, troubleshooting, 137
displays, troubleshooting, 140
hard drives, troubleshooting, 139
laptops
accessories, 126-127
displays, 125
features, 126
replacing, 122-125
motherboards, troubleshooting, 135-136
power, troubleshooting, 138
projectors, troubleshooting, 140
RAID, troubleshooting, 139-140
RAM, troubleshooting, 136-137
requirements (Windows), 177
troubleshooting, 161, 281
video, troubleshooting, 140
VMs, 237
HDMI (High-Definition Multimedia Interface), 122
heat sinks, 21
help, command-line, 190
hidden shares, 212
High-Definition Multimedia Interface. See HDMI
home server PCs, 38
home theater PCs, 38
HomeGroups, 205, 209-210
hostnames, resolving, 97
hot items, 302
hotspots, 249
HTTP (Hypertext Transfer Protocol)
error codes, 94
ports, 94
HTTPS (HTTP Secure), 95
hubs, 115
hyperthreading, 19
hypervisors, 236
IaaS (Infrastructure as a Service), 238
ID badges, 258
identification, mobile devices, 252
IDS (intrusion detection system), 242
IEEE 1394, 51
ifconfig, 150
IMAP ports, 94
impact printers, 65-66, 75, 168
implementing
SOHO, wireless security, 271-275
solutions, 310
improper shutdown, 280
incidents, responses, 304-305
Infrared (IR) technology, 35
inkjet printers, 70, 75, 167
In-Plane Switching. See IPS
input/output devices, configuring, 52-54
installing
expansion cards, 24
adding ports, 25
communications cards, 25
media cards, 24
motherboards, 19, 23-24
CPUs, 22
CPU characteristics, 19-21
CPU cooling, 21-22
RAM, 23
power supplies, 35-37
printers, 55
cloud, 62
configuring, 57-58
connecting, 58
drivers, 57
multifunction for SOHO, 56
networks, 59-61
remote, 62
selecting, 55
testing, 58
troubleshooting, 166
wireless, 62
SOHO routers
configuring, 101-105
wireless standards, 101
storage devices, 25
hotswappable drives, 27
magnetic hard disk drives, 25
optical drives, 26-27
RAID, 27
SSDs, 26
tape drives, 27
Windows, 175, 186-187
comparing 64-bit/32-bit operating systems, 174
configuration settings, 175-176
file paths/structures, 174-175
file systems, 184-185
formatting, 184-185
hardware requirements, 177
installation options, 176
partitioning drives, 182-183
upgrade installations, 177
Windows 7 installations, 179-180
Windows 8/8.1 features, 173-174
Windows 8/8.1 installations, 180-181
Windows Vista installations, 178

Institute of Electrical and Electronics Engineers (IEEE), 30
Integrated Services Digital Networks. See ISDNs
interfaces
connection, 29
physical connections, 29-33
wireless connections, 33-35
GUIs. See GUIs
UEFI, 1, 5-6
internal customers, communications skills, 308
Internet appliances, 242
Internet Options, 200
Internet over satellite wireless connections, 112-113
Internet Protocol. See IP
Internet service providers. See ISPs
intrusion detection system. See IDS
intrusion prevention system. See IPS
iOS, 247-248
IP (Internet Protocol)
addresses, configuring, 217
CIDR, 88-89
client-side DHCP, 88
client-side DNS, 88
ipconfig, 148
IPS (In-Plane Switching), 125
IPS (intrusion prevention system), 242
IPv4 (Internet version 4), 83-84
default subnet masks, 84-85
gateway addresses, 87
guidelines for addresses, 86-87
private addresses, 85
special addresses, 85
IPv6 (Internet version 6), 89
traffic, 89
Unicast addresses, 90
IR (Infrared) technology, 35
ISDNs (Integrated Services Digital Networks), 108
ISPs (Internet service providers)
connecting, 107
cable Internet, 109
dial-up, 107
DSL, 108
fiber to the x, 110-111
ISDNs, 108

J
jailbreaking, 247, 295
jewelry, 302
joining workgroups, 211

K
kernel panic, 280
key fobs, 258
keyboards, troubleshooting, 159
Keychain, 229
LANs (local area networks), 113
land grid array (LGA), 11
laptops
   accessories, 126-127
   applications, troubleshooting, 162
disassembly processes, troubleshooting, 162-163
displays, 125, 156-157
expansion options, 121-122
features, 126
hard drives, 159
hardware
   replacement, 122-125
troubleshooting, 161
keyboards/touchpads, troubleshooting, 159
networks, troubleshooting, 157-159
power, troubleshooting, 160-161
troubleshooting, 155
laser printers, 67-70, 75, 166
LCDs (liquid crystal displays), 41-42, 125. See also display devices
LDAP (Lightweight Directory Access Protocol), 97
LED backlighting, 42
LGA (land grid array), 11
licensing, 304-305
lifting, 302
Lightning connectors, 131
LILO (Linux Loader), 280
line-of-sight wireless connections, 112
Linux
   booting, troubleshooting, 280, 286
   commands, 231
   features, 227-229
   file systems, 185
   service command, 278
tools, 229-230
   best practices, 232-233
   Terminal, 230
troubleshooting booting errors, 286
Linux Loader (LILO), 280
liquid-based cooling solutions, 22
liquid crystal displays. See LCDs
listening skills, 308
Local Security Policy tool, 193-194
Local Users and Groups tool, 193
location services, 248, 293
logical drives, 182
loopback plugs, 146
lumens, configuring, 45
Mac
   best practices, 232-233
   features, 227-229
   file systems, 186
   Terminal, 230
tools, 229-230
   updating, 233
MAC (media access control)
   addresses, 272
Magic Mouse, 228
magnetic hard disk drives, 25
Mail servers, 242
maintenance
   networks, 220-225
   printers, 74-76, 166-168
malware, troubleshooting, 288-289
MAN (municipal area network), 114
man-in-the-middle attacks, 256
manual troubleshooting, 285
mapping
drives, 214
printers, 215
master boot records. See MBRs
Material Data Safety Sheet (MSDS), 303
Measured Services, 238
media cards, 24
media converters, 52
memory
   laptops, 122
   RAM
      installing, 23
      slots, 14-15
troubleshooting, 136-137
troubleshooting, 161
metal-oxide varistors. See MOVs
Microsoft OneDrive, 296
migration, 177
MiniPCI, 16
Mission Control (OS X), 228
mobile broadband, 112. See also wireless connections
mobile devices
accessories, 133
applications, troubleshooting, 162
connecting, 131–132
disassembly processes, troubleshooting, 162–163
displays, troubleshooting, 156–157
hardware, troubleshooting, 161
keyboards/touchpads, troubleshooting, 159
networks, troubleshooting, 157–159
operating systems, 245
connecting, 249–251
data synchronization, 252–253
types of, 247–248
updating, 252
power, troubleshooting, 160–161
security, 267–268
smartphones, 129
specialty, 130
tables, 129
troubleshooting, 155
wearable, 130–131
mobile OSs (operating systems)
security, 294–296
tools, 293–294
troubleshooting, 291–293
mobile payment services, 248
modems, 117
motherboards, 9
chipsets, 12–13
clock rates, 13
bus speeds, 13
CPU speeds, 14
components, 10–11
documentation, 10
expansion slots, 16
form factors/sizes, 9–10
installing, 19, 23–24
CPUs, 19–22
RAM, 23
power connectors, 17
RAM slots, 14–15
selecting, 10
troubleshooting, 135–136
MOVs (metal-oxide varistors), 300
msconfig (System Configuration Tool), 194–195, 225, 283
MSDS (Material Data Safety Sheet), 303
multifunction printers, installing, 56
multimedia connectors, 32, 47
multimeters, 146
multimode fiber cables, 77
multiple displays, configuring, 46. See also display devices
municipal area network. See MAN
N
NAT (Network Address Translation), 103
Nbtstat, 152
Near Field Communication. See NFC
NET command, 152
NetBIOS, ports, 95
NetBT, ports, 95
netdom command, 153
netstat, 151–152
Network Address Translation. See NAT
Network and Sharing Center, 206
networks, 113–114
cables
coaxial, 81–82
fiber, 77
tools, 144–146
twisted-pair (TP), 78–80
cards, connecting, 220
client computers, 38
command-line tools, 146–153
common symptoms, troubleshooting, 143–144
connecting, 216–218
devices, 115
bridges, 116
firewalls, 117
hubs, 115
modems, 117
patch panels, 118
PoE, 118
repeaters/extenders, 118
routers, 115
switches, 115
VoIP, 119
WAPs, 116
PCs (personal computers)

domains, configuring, 211-212
firewalls, connecting, 218
HomeGroups, configuring, 210
Internet appliances, 242
maintenance, 220-225
printers
  connecting, 61
  installing, 59-61
proxy servers, connecting, 218
remote assistance, connecting, 217-218
servers, 241-242
share resources, configuring, 212-215
TCP/IP, connecting, 216-217
troubleshooting, 157-159
wireless, configuring, 274-275
workgroups, configuring, 211
New Technology File System.  
See NTFS
NFC (near field communication), 35, 249
non-impact printers, 67-72
non-Parity RAM, 15
nonresponsive touchscreens, 157.  See also troubleshooting
non-WCC RAM, 15
nslookup command, 153
NTFS (New Technology File System)  
permissions, 264

O

OLED (organic light-emitting diode)  
displays, 43, 125.  See also display devices
on-demand cloud computing, 238
operating systems.  See also Windows
  64-bit/32-bit, comparing, 174
BIOS, 1
  accessing, 3
  booting, 3
  configuring, 2-3
  device support, 1
  POST, 4
cannot be found error, 280
command-line repair tools, 286-287
Linux, 227-229
Mac, 227-229
malware, troubleshooting, 288-289
mobile devices, 245
  connecting, 249-251
  data synchronization, 252-253
types of, 247-248
  updating, 252
security
  best practices, 266-267
  configuring, 263-265
troubleshooting, 287-288
troubleshooting, 277-285
UEFI, 5-6
optical drives, 26-27
optimizing printers, 74-76, 168
options.  See also configuring
BIOS, configuring, 2-3
certification, 315-317
dual voltage, 37
installation (Windows), 176
laptop expansion, 121-122
organic light-emitting diode.  
See OLED
OS X, 227.  See also Mac; operating systems
outcomes, documenting, 310
overclocking, 14

P

PaaS (Platform as a Service), 238
PAN (personal area network), 114
panels, patches, 118
parental controls, 272
parity RAM, 15
partitions
  factory recovery partition, 285
  hard drives, 139
passwords, 265
patch panels, 118
paths, files, 174-175
PCs (personal computers).  See also computers; laptops
booting errors, 286
connection interfaces, 29
  physical connections, 29-33
  wireless connections, 33-35
customizing, 37-39
operating systems
  booting errors, 279-285
  command-line repair tools, 286-287
  malware, 288-289
  security issues, 287-288
  troubleshooting, 277-278
  power supplies, installing, 35-37
  troubleshooting, 281-282
PCI (Peripheral Component Interconnect), 16
PCIE (PCI Express), 16, 31
PCI-X, 16
PE (preinstallation environment), 285
performance, slow system, 278
Peripheral Component Interconnect (PCI), 16
peripheral devices, configuring, 52-54
permissions, 264
personal area network. See PAN
personal safety procedures, 302
personally identifiable information (PII), 304
PGAs (pin grid arrays), 11
phishing attacks, 256
physical access, security, 257-259
physical connections, 29-33
physical security, wireless, 275
PII (personally identifiable information), 304
pin grid arrays (PGAs), 11
ping, 146-147
plasma displays, 42
Platform as a Service (PaaS), 238
PoE (Power over Ethernet), 118
pooling printers, 61
POP3 (Post Office Protocol 3)
  ports, 94
  ports, 93-95, 143. See also connecting
  adding, 25
  audio, 51-52
  disabling, 275
cSATA/SAT, 50
forwarding, 103
PS/2, 51
trigging, 103
USB, 50
POST (power on self-test), 4, 136
power
  connectors, motherboards, 17
  supplies, 35-37
  troubleshooting, 138, 160-161
  user accounts, 263
Power over Ethernet. See PoE
Power Saver option, 203
preinstallation environment (Windows PE), 285
prevention methods (attacks), 257-261
printers, 205
  cloud, 62
  configuring, 57-58
  connecting, 58, 73
  drivers, 57
  installing, 55
  maintenance, 74-76, 166-168
  mapping, 215
  multifunction for SOHO, installing, 56
  networks
    connecting, 61
    installing, 59-61
  optimizing, 168
  pooling, 61
  remote, 62
  selecting, 55
  sharing, 215
  testing, 58
  troubleshooting, 163-166
  types of, 65
    impact, 63-66
    non-impact, 67-72
  wireless, 62
printing
  Apple, 62
  security, 62-63
  servers, 241
  spooling, 58
privacy filters, 46
private addresses, IPv4, 85
privileges, 191, 265
probable causes, establishing, 309
problems. See also errors;
  troubleshooting
    identifying, 309
    resolving, 310
procedures
environmental, 303
safety, 299
component handling and storage, 303
electricity, 299-301
incident response, 304-305
licensing, 304-305
personal, 302

professionalism
communications skills, 307-308
troubleshooting skills, 309
determining causes, 310
documenting findings, 310
establishing probable causes, 309
identifying problems, 309
resolving problems, 310
verifying functionality, 310

Program Compatibility
Troubleshooter, 278

projectors
displays, 42
troubleshooting, 140

protocols, 96
AFP, 98
CIFS, 98
DHCP, 88, 96, 242
DNS, 96
IP. See IP
IPv4, 83-84
default subnet masks, 84-85
gateway addresses, 87
guidelines for addresses, 86-87
private addresses, 85
special addresses, 85
LDAP, 97
SMB, 98
SNMP, 98
SSH, 98
TCP, 98-100
TCP/IP, 216-217
TKIP, 274
UDP, 98-100

proxy servers, configuring, 218, 242
PS/2 ports, 51
punchdown tools, 145

Q
QoS (quality of service), 104

R
radio frequency. See RF
radio power levels, 275
RAID (redundant array of independent [or inexpensive] disks), 27, 139-140
RAM (random access memory), 292
booting, troubleshooting, 279
installing, 23
laptops, 122
slots, 14
troubleshooting, 136-137, 161
types of, 14-15
ransomware, 255
Rapid Elasticity, 238
RDP (Remote Desktop Protocol), ports, 95
reassembly processes, 162-163
records, resource, 97
Recovery Console, 283
redundant array of independent (or inexpensive) disks. See RAID
refresh rates, 44
Region tool, 186
regulations, compliance, 303
remote assistance, configuring, 217-218
remote connections, troubleshooting, 157-159
remote printers, 62
removing malware, 289
Repair Disk option, 285
repeaters, 118
replacing laptop hardware, 122-125
reports, score, 313
requirements, VMs, 235-237
resolution, 44, 157
resolving hostnames, 97
Resource Pooling, 238
resource records, 97
restoring networks, 222-225
reviewing certificates, 315
RF (radio frequency)
communication, 34
RFID badges, 258
RJ-11 connectors, 33
RJ-45 connectors, 33
rooting (iOS), 247
rootkits, 255
routers, 115

S
SaaS (Software as a Service), 238
Safe Mode, 285
safety procedures, 299
component handling and storage, 303
electricity, 299-301
incident response, 304-305
licensing, 304-305
personal, 302
sags, 300
SATA (Serial AT Attachment), 25, 31, 50
scanning, 56. See also printers
score reports, 313
screen orientation, 247-248
SDKs (software development kits), 247
security
booting, 7-8
data destruction/disposal methods, 268-269
digital, 259-261
firewalls, 218, 259
mobile devices, 267-268, 293-296
operating systems
best practices, 266-267
configuring, 263-265
PCs, troubleshooting, 287-288
physical access, 257-259
physical wireless, 273
printing (Apple), 62-63
threats/vulnerabilities, 255-261
VMs, 237
wireless, SOHO, 271-275
selecting
motherboards, 10
printers, 55
Serial AT Attachment. See SATA
servers
print, 59
proxy, configuring, 218
roles, 241-242
service command, 278
Service Set Identifier. See SSID
services
cloud computing, 237-238
failure to start, troubleshooting, 278
networks
Internet appliances, 242
servers, 241-242
share permissions, 264
share resources, configuring, 212-215
sharing printers, 215
shoulder surfing, 256
simple volumes, 183
single-channel RAM, 15
single-mode fiber cables, 77
single-sided RAM, 15
single sign-on (SSO), 265
sizes
motherboards, 9-10
of power supplies, 36
skills
communications, 307-308
customer service, 308
listening, 308
troubleshooting, 309
determining causes, 310
documenting findings, 310
establishing probable causes, 309
identifying problems, 309
resolving problems, 310
verifying functionality, 310
slots
expansion, 16
RAM, 14-15
slow system performance, 278
SLP (service location protocol), ports, 95
small office/home office. See SOHO
small outline dual in-line memory modules (SODIMMs), 122
smart cards, 258
smartphones, 129
SMB (Server Message Block), 95, 98
SMTP (Simple Mail Transfer Protocol), 94
SNMP (Simple Network Management Protocol), 98
social engineering, 256
sockets
CPUs, 11
types, 11-12
SODIMMs (small outline dual in-line memory modules), 122
Software as a Service (SaaS), 238
software development kits. See SDKs
SOHO (small office/home office), 271
multifunction printers, installing, 56
routers
    configuring, 101-105
    wireless standards, 101
wireless security, 271-275
solid state drives. See SSDs
solutions, implementing, 310
sound
troubleshooting, 162
utility, 205
spear phishing, 256
special addresses, IPv4, 85
specialty mobile devices, 130
spikes, 300
spontaneous shutdown/restarts, 280
spoolers, troubleshooting printers, 165
spyware, 255
SSDs (solid state drives), 26
SSH (Secure Shell), 93, 98
SSID (Service Set Identifier), 271
SSO (single sign-on), 265
standard use account, 263
standards
twisted-pair (TP), 80
wireless, 101
storage devices
hotswappable drives, 27
installing, 25
magnetic hard disk drives, 25
optical drives, 26-27
RAID, 27
SSDs, 26
tape drives, 27
stripers, 145
subnet masks, 84-85
sudo command, 230
surges, 300
switch ports (RJ-45), 271
switches, 115
System Configuration Tool
    (msconfig), 225
system log errors, 277
system repair disc, 285
system utilities (Windows), 199-200. See also tools
System window, 202

T
tables, 129
tailgating, 256
tape drives, 27
Task Manager, 195-197
TCP (Transmission Control Protocol)
    versus UDP, 98-100
TCP/IP (Transmission Control Protocol/Internet Protocol),
    configuring, 216-217
Telecommunications Industry Association/Electronic Industries Alliance (TIA/EIA), 80
Telnet, ports, 93
Temporal Key Integrity Protocol.
    See TKIP
Terminal, 227, 230
testing, troubleshooting theories, 310
tethering, 249
thermal paste, 22
thermal printers, 71, 76, 168
threats (security), 255-261
Thunderbolt, 31
time, CMOS, 4-5
Time Machine, 229
TKIP (Temporal Key Integrity Protocol), 274
tokens, 258
toner probes, 145
tools
cabling, 144-146
command line, 146-153
command-line repair, 286-287
Device Manager, 281
Event Viewer, 277
Linux, 229-230
Mac, 229-230
mobile devices, 293-294
printers, 165
Program Compatibility
Troubleshooter, 278
Recovery Console, 283
Region, 186
System Configuration Tool (msconfig), 225, 283
Terminal, 230
Windows, 189
    accessing command lines, 189-190
    basic/dynamic disks, 198
    command privileges, 191
    Computer Management, 191
    Control Panel, 200-206
    Device Manager, 192
    Disk Management, 197-198
    Local Security Policy, 193-194
    Local Users and Groups, 193
    msconfig, 194-195
    system, 199-200
    Task Manager, 195-197
    troubleshooting command lines, 190
top-level domains, 97
touchpads, troubleshooting, 159
TPM (Trusted Platform Module), 266
traceroute, 150
tracert, 150
traffic, IPv6, 89
triggering, ports, 103
triple-channel RAM, 15
Trojan horses, 255
troubleshooting
    Bluetooth, 157
    command lines, 190
    CPUs, 137, 161
    displays, 140
    file systems, 282
    GPS, 157
    hard drives, 139
    hardware, 281
    laptops, 155
        applications, 162
        disassembly processes, 162-163
        displays, 156-157
        hard drives, 159
        hardware, 161
        keyboards/touchpads, 159
    networks, 157-159
    power, 160-161
    Linux booting errors, 286
    manual, 285
    mobile devices, 155
        applications, 162
        disassembly processes, 162-163
        displays, 156-157
        hard drives, 159
        hardware, 161
        keyboards/touchpads, 159
        networks, 157-159
        power, 160-161
    mobile OS, 291-293
        security, 294-296
        tools, 293-294
    motherboards, 135-136
    networks
        cabling tools, 144-146
        command-line tools, 146-153
        common symptoms, 143-144
    operating systems, 277-278
        booting error, 279-285
        command-line repair tools, 286-287
        malware, 288-289
        security, 287-288
    power, 138
    printers, 74-76, 163-166
    projectors, 140
    RAID, 139-140
    RAM, 136-137, 161
    skills, 309
        determining causes, 310
        documenting findings, 310
        establishing probable causes, 309
        identifying problems, 309
        resolving problems, 310
        verifying functionality, 310
    sounds, 162
    video, 140
    Wi-Fi, 158-159
troubleshooting utility, 205
Trusted Platform Module. See TPM
twisted-pair (TP), 78-80
types
    of accounts, 264
    of cables
        coaxial, 81-82
        fiber, 77
        twisted-pair (TP), 78-80
    of chipsets, 13
of cloud models, 238
of CPU sockets, 11-12
of hypervisors, 237
of ISPs
cable Internet, 109
dial-up, 107
DSL, 108
fiber to the x, 110-111
ISDNs, 108
of mobile devices, 130-131, 247-248
accessories, 133
connections, 131-132
of networks, 113-119
of permissions, 264
of ports, 93-95
of printers, 65
impact, 65-66
non-impact, 67-72
of RAM, 14-15
of resource records, 97
RAID, 27

User Account applet, 201
user manuals, motherboards, 10
utilities. See tools
UTM (unified threat management), 242

V
verifying functionality, 310
video
aspect ratios/resolution, 44
brightness/lumens, 45
configuring, 43
refresh rates, 44
troubleshooting, 140
virtual assistants, 248
virtual machine managers. See VMMs
virtual machines. See VMs
virtual printers, 72
virtual private networks. See VPNs
virtualization, 20, 37
viruses, 255
VMs (virtual machines), requirements,
235-237
VMMs (virtual machine managers), 20, 236
VoIP (Voice over Internet Protocol), 119
voltage options, 37
volumes, 182
VPNs (virtual private networks), 250,
260, 295
vulnerabilities (security), 255-261

W
WANs (wide area networks), 113
WAPs (wireless access points), 116
wattage, 36. See also power supplies
wearable mobile devices, 130-131
Web server roles, 241
Wi-Fi, 111, 292
analyzers, 146, 296
calling, 248
troubleshooting, 158-159
Wi-Fi Protected Setup. See WPS
Windows
installing, 175, 186-187
collection settings, 175-176
file systems, 184-185
formatting, 184-185
hardware requirements, 177
installation options, 176
partitioning drives, 182-183
upgrade installations, 177
Windows 7 installations, 179-180
Windows 8/8.1 installations, 180-181
Windows Vista installations, 178
Windows Vista/Windows 7 features, 171-173
network printers, configuring, 60
Recovery Environment, 285
tools, 189
accessing command lines, 189-190
basic/dynamic disks, 198
collection privileges, 191
Computer Management, 191
Control Panel, 200-206
Device Manager, 192
Disk Management, 197-198
Local Security Policy, 193-194
Local Users and Groups, 193
msconfig, 194-195
system, 199-200
Task Manager, 195-197
troubleshooting command lines, 190
Windows 7
features, 171-173
installing, 179-180
Windows 8/8.1
advanced startup procedures, 284
features, 173-174
installing, 180-181
Windows Boot Manager
(bootmgr), 280
Windows Firewall, 203
Windows mobile device operating
system, 247-248
Windows preinstallation environment
(Windows PE), 285
Windows Recovery Environment. See
WinRE
Windows Vista
features, 171-173
installing, 178
WinRE (Windows Recovery
Environment), 284
wired mobile devices, 131
wireless access points. See WAPs
wireless connections, 33-35, 111
802.11 Wi-Fi, 111
cellular, 112
Internet over satellite, 112-113
line-of-sight wireless, 112
Wireless LANs. See WLANs
wireless mobile devices, 132
wireless printers, 62
wireless security, SOHO, 271-275
wireless standards, 101
WLANs (Wireless LANs), 111, 114
workgroups, 209-211
workstations, security, 266-267
worms, 255
WPS (Wi-Fi Protected Setup), 272
Z
zero-day attacks, 256
ZIF (zero insertion force), 11
zombies, 257