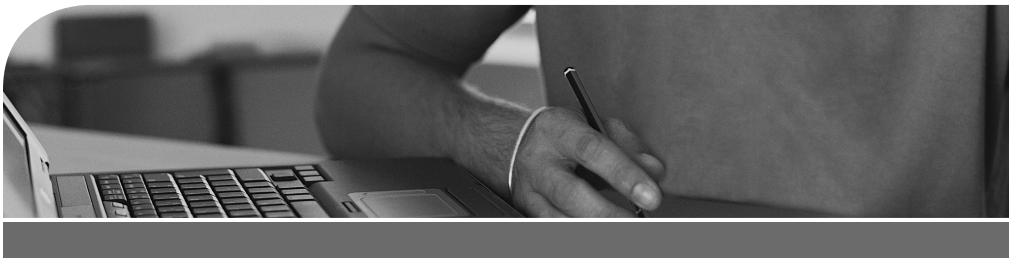

31 Days Before Your CompTIA A+ Certification Exam

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

Laura Schuster
Dave Holzinger

PEARSON IT CERTIFICATION • 800 East 96th Street • Indianapolis, Indiana 46240 USA

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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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.

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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

Domain	% of Examination
1.0 Windows Operating System	29%
2.0 Other Operating Systems & Technologies	12%
3.0 Security	22%
4.0 Software Troubleshooting	24%
5.0 Operational Procedures	13%
Total	100%

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.

Day 26

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.

- **Infrared (IR)**—Must be within 5 meters (16 feet).
- **Wireless**—802.11 requires a wireless access point.
- **Bluetooth**—Uses Class 2 cable; can be up to 10 meters (33 feet).

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.

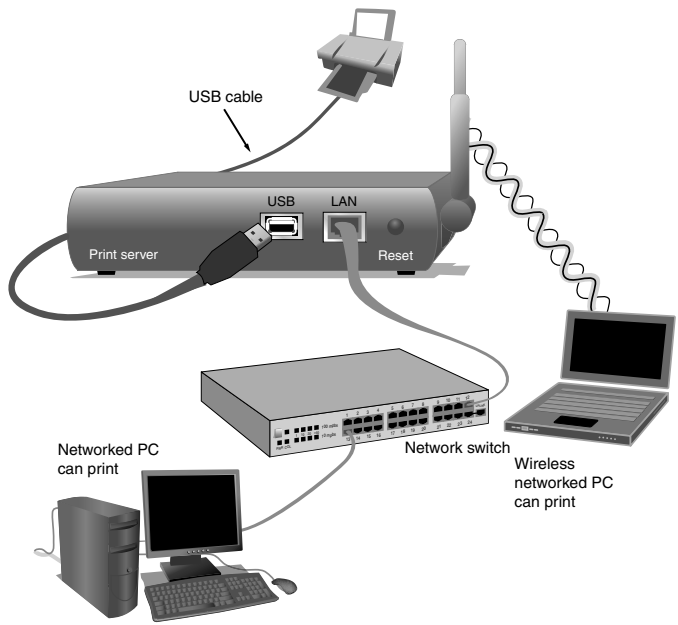
When installing a network printer, the Add Printer Wizard scans for available printers on the network. When the printer is selected, Windows automatically searches for drivers. If the printer is not found, Windows provides a method of browsing using the printer name or IP address in order to configure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

Figure 26-1 Print Server Setup



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.

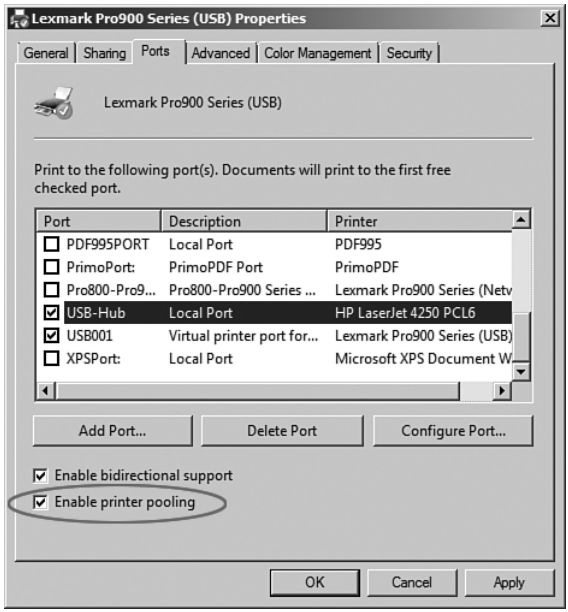
Printer Pooling

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



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 HPePrint.

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.

Resource	Location	Topic
Primary Resources		
Exam Cram	13/14	Peripherals/Custom Computing, Printers
Cert Guide	9/10	Installing and Configuring Output Devices, Printers and Multifunction Devices
IT Essentials (Cisco Networking Academy course)	11.2/11.3	Installing and Updating a Printer, Sharing Printers
Schmidt/Complete Guide	1, 10, 14	Intro to the World of IT, Printers, Wireless Printers
Supplemental Resources		
220-901 Complete Video Course	11/12	Peripherals, Printers
220-902 Complete Video Course		

Check Your Understanding

Refer to the Digital Study Guide to take a quiz covering the content of this day.

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