

# Chapter 14: The IT Professional



IT Essentials v7.0



# Chapter 14 - Sections & Objectives

- 14.1 Communication Skills and the IT Professional
  - Explain why good communication skills are a critical part of IT work.
    - Explain the relationship between good communication skills, troubleshooting, and professional behavior.
    - Use communication skills and professional behavior while working with a customer.
    - Explain why professional behavior at work is important.
    - Perform good customer communications while on a call.
- 14.2 Operational Procedures
  - Explain how to manage change and unplanned disruptions in a business environment.
    - Compare and contrast different types of IT and business documentation.
    - Describe how change is managed in an IT environment.
    - Explain measures taken by IT organizations to reduce the impact of unplanned outages or data loss.



## Chapter 14 - Sections & Objectives

- 14.3 Ethical and Legal Issues in the IT Industry
  - Explain appropriate behavior when faced with the legal and ethical issues that arise in the IT industry.
    - Describe ethical and legal issues in the IT industry.
    - Describe procedures for dealing with inappropriate content.
  
- 14.4 Call Center Technicians
  - Explain the call center environment and technician responsibilities.
    - Describe the responsibilities of different types of call center technicians.
    - Describe the basic commands and operation of scripts in different environments.



# 14.1 COMMUNICATION SKILLS AND THE IT PROFESSIONAL



# Relationship Between Communication Skills and Troubleshooting

- Troubleshooting is as much about communicating with the customer as it is about knowing how to fix a computer.
- To troubleshoot a computer, you need to learn the details of the problem from the customer. Most people who need a computer problem fixed are probably feeling some stress.
- If you establish a good rapport with the customer, the customer might relax a bit. A relaxed customer is more likely to be able to provide the information that you need to determine the source of the problem and then fix it.





# Relationship Between Communication Skills and Professional Behavior

- If you are talking with a customer in person, that customer can see your body language.
- If you are talking with a customer over the phone, that customer can hear your tone and inflection.
- Customers can also sense whether you are smiling when you are speaking with them on the phone.
- Many call center technicians use a mirror at their desk to monitor their facial expressions.





# Communication and Troubleshooting

- A knowledgeable technician who uses good communication skills will always be in demand in the jobs market.
  - As technical knowledge increases, so does ability to quickly determine a problem and find a solution.
- A technician should establish a good rapport with the customer since a relaxed customer is better able to explain the details of the problem.
- The technician has access to several communication and research tools. Any of these resources can be used to help gather information for the troubleshooting process.



# Know, Relate, and Understand

Rule	Definition	Example
<b>Know</b>	Call your customer by his or her name. Ask if there is any name that they prefer you use.	For example, if the customer tells you her name is Mrs. Johnson, ask if that is what she prefers to be called by you. She may say yes, or she may give you her first name. In any case, only use the preferred name with your customer.
<b>Relate</b>	Create a one-to-one connection between you and your customer.	For example, find something you may have in common (without giving too much information). If you hear a dog barking in the background of the call and you have a dog, then briefly ask about their dog. If you have had to call customer support for your own computer, mention that you understand how frustrating this can be and that you will do everything you can to help them. Do not lose control of the call.
<b>Understand</b>	Determine your customer's level of knowledge about the computer to help you best communicate with them.	For example, a customer who is very new to computers will not be likely to know all of the jargon that you use every day, so you should use the most common words you can think of to describe aspects of their computer. A more experienced customer probably knows some of the same jargon that you use.



## Active Listening

- Allow the customer to tell the whole story. During the time that the customer is explaining the problem, occasionally interject some small word or phrase, such as “I understand,” or “Yes.”
- Do not interrupt the customer to ask a question or make a statement. Listen carefully when your customers speak and let them finish their thoughts.
- An open-ended question usually involves information about what the customer was doing, what they were trying to do, and why they are frustrated.
- After listening to the customer explain the whole problem, summarize what the customer has said.
- Follow-up questions should be targeted, closed-ended questions based on the information that you have already gathered. Closed-ended questions should focus on obtaining specific information. The customer should be able to answer a closed-ended question with a simple “yes” or “no” or with a factual response, such as “Windows 10.”



# Communication Skills, Troubleshooting and the IT Professional

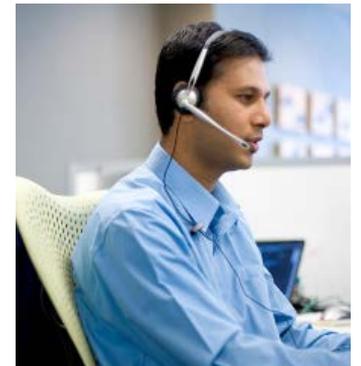
- Establish good communication skills
  - Present yourself professionally.
  - Keep your own emotions in check.
  - Listen to your customer to learn the details of the problem.
  - Learn the name of the customer and create a connection with the customer.
  - Speak directly with the customer.
  - Gather information from the customer.
  - Ask questions that assess the knowledge level of the customer.
- Good Customer Service
  - A technician follows up with a customer after services are completed.
  - A technician notifies a customer as soon as possible that there may be a delay.





# Working with a Customer

- **Determine customer problem**
  - Listen actively to customer problem
  - Do not interrupt
  - Understand the problem, ask to clarify as necessary
- **Display professional behavior**
  - Treat customer with respect and prompt attention
  - Know the proper procedure to put a customer on hold or transfer a call
  - Explain how you can assist the customer
- **Stay focus**
  - Keep the communications focus on the customer issue
  - Understand how to deal with different customer types
- **Proper netiquette**
  - Practice good netiquette when communicating online with the customer





# Types of Difficult Customers

- Recognize traits to manage a call accordingly:
  - A **talkative** customer discusses everything except the problem and uses the call to socialize.
  - A **rude** customer complains during the call, makes negative comments, may be abusive and uncooperative, and may be easily aggravated.
  - An **angry** customer talks loudly, tries to speak when the technician is talking, is usually frustrated and upset that they have to call somebody to fix the problem.
  - A **knowledgeable** customer wants to speak with a technician that is equally experienced in computers and usually tries to control the call.
  - An **inexperienced** customer has difficulty describing the problem and may not be able to follow directions correctly.



# Handling the Different Types of Customers

- A technician needs to be able to recognize which traits their customer exhibits. Recognizing these traits will help them to manage the call accordingly.
- **A talkative customer** discusses everything except the problem and uses the call to socialize.
  - Allow them to talk for one minute.
  - Gather as much information about the problem as possible.
  - Politely refocus the customer. This is the exception to the rule of never interrupting a customer.
  - Ask as many closed-ended questions as you need to once you have regained control of the call.
  - Avoid conversation that is not related to the problem.



# Handling the Different Types of Customers

- A technician needs to be able to recognize which traits their customer exhibits. Recognizing these traits will help them to manage the call accordingly.
- A **rude customer** complains during the call, makes negative comments, may be abusive and uncooperative, and may be easily aggravated.
  - Listen very carefully, as you do not want to ask them to repeat any information.
  - Follow a step-by-step approach.
  - Try to contact the customer's favorite technician to see if they can take the call.
  - Apologize for the wait time and the inconvenience, even if there has been no wait time.
  - Reiterate that you want to solve the problem as quickly as possible.



# Handling the Different Types of Customers

- An **angry customer** talks loudly, tries to talk when the technician is talking, is usually frustrated and upset that they have to call somebody to fix the problem.
  - Let the customer tell their problem without interruption, even if they are angry.
  - Sympathize with the customer's problem.
  - Apologize for wait time or inconvenience.
  - Avoid putting this customer on hold or transferring them.
  - Avoid talking at length about the cause of the problem.
  - Focus on solving the problem.
  - Listen to the complaint and then apologize for any inconvenience.



# Handling the Different Types of Customers

- A **knowledgeable customer** wants to speak with a technician that is equally experienced in computers and usually tries to control the call.
  - If you are a level-one technician, try to set up a conference call with a level-two technician.
  - Tell the customer the overall approach to what you are trying to verify.
  - Avoid using a step-by-step process.
  - Avoid asking the customer to check the obvious.



# Handling the Different Types of Customers

- An **inexperienced customer** has difficulty describing the problem and may not be able to follow directions correctly.
  - Use a simple step-by-step process of instructions.
  - Speak in plain terms.
  - Avoid using industry jargon.
  - Avoid sounding condescending or belittling.



# Using Professional Behavior with the Customer

- When dealing with customers, it is sometimes easier to explain what you should not do. The following list describes things that you should not do when talking with a customer:
  - Do not minimize a customer's problems.
  - Do not use jargon, abbreviations, acronyms, and slang.
  - Do not use a negative attitude or tone of voice.
  - Do not argue with customers or become defensive.
  - Do not say culturally insensitive remarks.
  - Do not disclose any experiences with customers on social media.
  - Do not be judgmental or insulting or call the customer names.
  - Avoid distractions and do not interrupt when talking with customers.
  - Do not take personal calls when talking with customers.
  - Do not talk to co-workers about unrelated subjects when talking with the customer.
  - Avoid unnecessary holds and abrupt holds.
  - Do not transfer a call without explaining the purpose of the transfer and getting customer consent.
  - Do not use negative remarks about other technicians to the customer.



# Keeping the Customer Call Focused

- **Use proper language** – Be clear and avoid technical language that the customer might not understand.
- **Listen and question** – Listen carefully to the customer and let them speak. Use open and closed ended questions to learn details about the customer's problem.
- **Give feedback** – Let the customer know that you understand the problem and develop a friendly and positive conversational manner.





# Tips for Putting a Customer On Hold

## How to Put a Customer On Hold

### Do

- Let the customer finish explaining the problem.
- Say that you must put the customer on hold and explain why.
- Ask the customer for permission to put the call on hold.
- When the customer agrees, thank the customer and explain that you expect to be back in just a few minutes.
- Explain what you will be doing during that time.
- If, after placing the call on hold, it takes longer to return to the customer than expected, quickly get back on the call to explain the situation to the customer.
- Always thank the customer for their patience as you work to fix their problem.

### Do Not

- Interrupt the customer.
- Put a customer on hold without an explanation.
- Put a customer on hold without the customer's consent.
- Assume that your time is more valuable than the customer's time.



# Tips for Transferring a Call

## How to Transfer a Call

### Do

- Let the customer finish explaining the problem.
- Say that you must transfer the call and why.
- Tell the customer the name and number of the person they will be speaking with.
- Ask the customer for permission to transfer the call.
- When the customer agrees. thank the customer and begin the transfer.
- Tell the new technician who will be receiving the transfer your name, the ticket number, and the customer's name.

### Do Not

- Interrupt the customer.
- Transfer the call without an explanation.
- Transfer the call without the customer's consent.
- Assume that your time is more valuable than the customer's time.



# Proper Netiquette

- Be pleasant and polite.
- Open with an appropriate greeting.
- Check grammar and spelling.
- Remember you are dealing with people.
- Follow the standards of behavior that you follow in the rest of your life.
- Know where you are in cyberspace.
- Respect other's time and bandwidth.
- Be ethical.
- Share expert knowledge.
- Respect the privacy of others.
- Forgive other's mistakes.
- Use mixed case lettering. All uppercase lettering is considered SHOUTING.
- Never send chain letters through email.
- Do not send or reply to flames.
- If you would not say it to their face, then do not send or post.

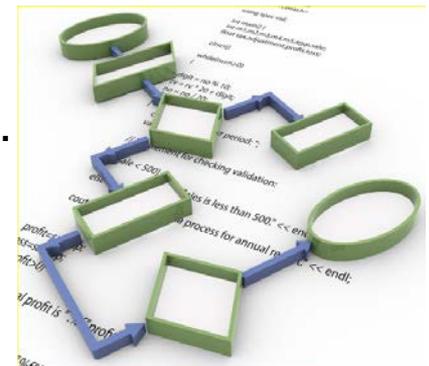


# 14.2 OPERATIONAL PROCEDURES



# Documentation Overview

- Purposes for documentation include:
  - Providing descriptions for how products, software, and hardware function using diagrams, descriptions, manual pages and knowledgebase articles.
  - Standardizing procedures and practices so that they can be repeated accurately in the future.
  - Establishing rules and restrictions on the use of the organization's assets including acceptable use policies for internet, network, and computer usage.
  - Reducing confusion and mistakes saving time and resources.
  - Complying with governmental or industry regulations.
  - Training new employees or customers.





# IT Department Documentation

## Policy Documents

- Acceptable use policies that describe how technology is to be used within the organization.
- Security policies that outline all aspects of information security, including password policies and security incident response methods.
- Regulatory compliance policies which describe all federal, state, local and industry regulations that apply to the organization.
- Disaster recovery policies and procedures that provide detailed plans for what must be done to restore services in the event of an outage.
- Concerned with specifying what data must be collected and how long it must be retained.

## Operation and Planning Documents

- IT strategy and planning documents outline the near- and long-term goals of the department.
- Proposals for future projects and project approvals.
- Meeting presentations and minutes.
- Budgets and purchasing records.
- Inventory management, including hardware and software inventories, licenses, and management methods, such as the use of asset tags and barcodes.
- The assessment change management process component is concerned with the cost and resources necessary for implementation.



# IT Department Documentation

## Project Documents

- User requests for changes, updates or new services.
- Software design and functional requirements, including flow diagrams and source code.
- Logical and physical network topology diagrams, equipment specifications, and device configurations.
- Change management forms.
- User testing and acceptance forms.

## User Documentation

- Features, functions, and operation of software, hardware, and services provided by the IT department.
- End-user manuals for hardware and software.
- Help desk ticket database with ticket resolutions.
- Searchable knowledgebase articles and FAQs.



# Regulatory Compliance Requirements

- Federal, state, local, and industry regulations can have documentation requirements over and above what is normally documented in the company's records. Regulatory and compliance policies often specify what data must be collected and how long it must be retained. A few of the regulations may have implications on internal company processes and procedures. Some regulations require keeping extensive records regarding how the data is accessed and used.
- Failure to comply with laws and regulations can have severe consequences, including fines, termination of employment, and even incarceration of offenders.



# Change Control Process

CHANGE CONTROL WORKSHEET			
NAME OF PROJECT		DATE CREATED	
PROJECT MANAGER		DATE APPROVED	
TECHNICIAN		DATE STARTED	
STAKEHOLDERS		DATE COMPLETED AND ACCEPTED	
PROJECT DESCRIPTION			
PROPOSED CHANGE	<i>A detailed description of the proposed change.</i>		
PURPOSE OF CHANGE	<i>A detailed overview of the reasons this change is necessary.</i>		
SCOPE OF CHANGE	<i>Descriptions of all of departments and/or services that will be impacted by this change.</i>		
INTENDED OUTCOME	<i>Overview of benefits resulting from change.</i>		
ESTIMATED TIME FRAME	<i>Timeframes for preparation, notification, implementation, testing and approval.</i>		
RISK ANALYSIS	<i>Detailed analysis of potential risks involved with this change.</i>		
BACK-OUT OR RECOVERY	<i>Detailed steps needed to return system to operational status if the change fails.</i>		
PROJECT IMPLEMENTATION PLAN			
PLAN FOR CHANGE	<i>Steps necessary to prepare for change.</i>		
PLANNED IMPLEMENTATION STEPS	<i>Steps to perform change.</i>		
ACTUAL STEPS PERFORMED	<i>Detail of the actual implementation of the change. If any unplanned steps are necessary to complete the change, or if there are steps that cannot be completed for any reason, note them here.</i>		
DOCUMENTATION AND FOLLOW-UP	<i>Provide a list of current documentation that needs to be updated as a result of this change.</i>		



# Preventing Downtime and Data Loss

Backup Storage Method	Advantages	Disadvantages
Cloud Backups	<ul style="list-style-type: none"><li>• Reliability - cloud providers use the latest technology and can offer other related services. such as compression and encryption.</li><li>• Scalability - cloud backups scale easily, so a business doesn't need to worry that it doesn't have the storage capacity or media if their data files increase in size.</li><li>• Accessibility - cloud backup files are available anywhere the Internet is accessible.</li></ul>	<ul style="list-style-type: none"><li>• Time - backing up data and restoring files are dependent on the speed and reliability of the Internet connectivity. In the event of a regional natural disaster, network congestion may cause intermittent connectivity.</li><li>• Discontinuation of service or increase in pricing.</li></ul>
Local Backups	<ul style="list-style-type: none"><li>• Local control of where data files reside and who has access to them.</li><li>• Accessibility - in the event of a disaster that impacts network connectivity, locally stored backup media may be more accessible.</li><li>• Speed of file restores - locally attached media restore times are usually faster than over the Internet.</li></ul>	<ul style="list-style-type: none"><li>• Scalability - keeping local backups often requires manual intervention and handling of the media. The media itself has storage limitations that may cause issues as data file sizes increase.</li><li>• Off-site storage requirements, fire protection, and environmental controls.</li></ul>



# Disaster Recovery Overview

- A disaster recovery plan is a comprehensive document that describes how to restore operation quickly and keep critical IT functions running during or after a disaster occurs. The disaster recovery plan can include information such as offsite locations where services can be moved, information on replacing network devices and servers, and backup connectivity options.
- Some services may even need to be available during the disaster in order to provide information to IT personnel and updates to others in the organization. Services that might need to be available during or immediately after a disaster include:
  - Web services and internet connectivity.
  - Data stores and backup files.
  - Directory and authentication services.
  - Database and application servers.
  - Telephone, email and other communication services.



# Elements of a Disaster Recovery Plan

- There are five major phases of creating and implementing a disaster recovery plan:
  - Phase 1 - Network Design Recovery Strategy
  - Phase 2 - Inventory and Documentation
  - Phase 3 - Verification
  - Phase 4 - Approval and Implementation
  - Phase 5 - Review



# 14.3 ETHICAL AND LEGAL CONSIDERATIONS



# Ethical and Legal Considerations in IT

- Respect your customers, as well as their property. Computers and monitors are property, but property also includes any information or data that might be accessible, for example:
  - Emails
  - Phone lists and contact lists
  - Records or data on the computer
  - Hard copies of files, information, or data left on a desk





# Personal Identifiable Information (PII)

- Examples of **Personal Identifiable Information (PII)** include, but are not limited to:
  - Names such as full name, maiden name, mother's maiden name, or alias.
  - Personal identification numbers, such as social security number (SSN), passport number, driver's license number, taxpayer identification number, financial account or credit card number, address information, such as street address or email address.
  - Personal characteristics, including photographic images (especially of the face or other identifying characteristics), fingerprints, handwriting, or other biometric data (e.g., retina scan, voice signature, facial geometry).



# Payment Card Industry (PCI)

- **Payment Card Industry (PCI)** information is considered personal information that needs to be protected.
- The PCI Security Standards Council was formed in 2005 by the 5 major credit card companies in an effort to protect account numbers, expiration dates, magnetic strip and chip data for transactions around the globe.
- For more information on PCI, visit [www.pcisecuritystandards.org](http://www.pcisecuritystandards.org).





# Protected Health Information (PHI)

- **Protected Health Information (PHI)** is another form of PII that needs to be secured and protected.
- PHI includes patient names, addresses, dates of visits, telephone and fax numbers, and email addresses.
- With the move from paper copy records to electronic records, **Electronic Protected Health Information (ePHI)** is also regulated.
- Penalties for breaches of PHI and ePHI are very severe and regulated by the **Health Insurance Portability and Accountability Act (HIPAA)**.



# Legal Considerations in IT

- The laws in different countries and legal jurisdictions vary, but generally, actions such as the following are considered to be illegal:
  - To make any changes to system software or hardware configurations without customer permission.
  - To access a customer's or co-worker's accounts, private files, or email messages without permission.
  - To install, copy, or share digital content (including software, music, text, images, and video) in violation of copyright and software agreements or the applicable law. Copyright and trademark laws vary between states, countries, and regions.
    - Violations should be reported through the proper channels.



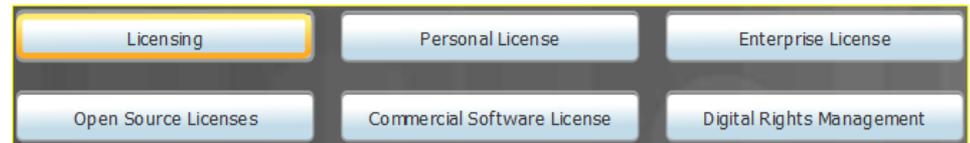
# Legal Considerations in IT

- The laws in different countries and legal jurisdictions vary, but generally, actions such as the following are considered to be illegal:
  - To use a customer's company IT resources for commercial purposes.
  - To make a customer's IT resources available to unauthorized users.
  - To knowingly use a customer's company resources for illegal activities. Criminal or illegal use typically includes obscenity, child pornography, threats, harassment, copyright infringement, Internet piracy, university trademark infringement, defamation, theft, identity theft, and unauthorized access.
  - To share sensitive customer information. You are required to maintain the confidentiality of this data.



# Licensing

- It is illegal to use licensed software without the appropriate license.
- An example of a **personal software license** is an **End User License Agreement (EULA)**.
  - A user is allowed to install the software on only one computer.
- An **enterprise license** is a software license held by a company for its employees to use.
- **Open source licensing** – a copyright license for software that allows developers to modify and share the source code that runs the software.
- If you use software to make money, you must pay for a commercial license.
- **Digital rights management (DRM)** – software that is designed to prevent illegal access to digital content and devices.





# Computer Forensics

- Data from computer systems, networks, wireless communications, and storage devices may need to be collected and analyzed in the course of a criminal investigation.
- The collection and analysis of data for this purpose is called **computer forensics**.
- The process of computer forensics encompasses both IT and specific laws to ensure that any data collected can be authenticated through the **chain of custody** is admissible as evidence in court.
- A properly and carefully documented chain of custody can prevent evidence tampering.





# Data Collected in Computer Forensics

- Two basic types of data are collected when conducting computer forensics procedures:
  - Persistent data** - Persistent data is stored on a local drive, such as an internal or external hard drive, or an optical drive. When the computer is turned off, this data is preserved.
  - Volatile data** - RAM, cache, and registries contain volatile data. Data in transit between a storage medium and a CPU is also volatile data. If you are reporting illegal activity or are part of an incident response team, it is important to know how to capture this data, because it disappears as soon as the computer is turned off.





# Cyber Law

- **Cyber law** – a term to describe the collection of international, regional, country, and state laws that affect computer security professionals.
- IT professionals must be aware of cyber law so that they understand their responsibility and their liability as it relates to cybercrimes.
- Cyber laws explain the circumstances under which data (evidence) can be collected from computers, data storage devices, networks, and wireless communications. They can also specify the manner in which this data can be collected.



# First Response

- First response is the term used to describe the official procedures employed by those people who are qualified to collect evidence.
- Routine administrative tasks can affect the forensic process.
- You may be the person who discovers illegal computer or network activity. Do not turn off the computer. Volatile data about the current state of the computer can include programs that are running, network connections that are open, and users who are logged in to the network or to the computer. This data helps to determine a logical timeline of the security incident. It may also help to identify those responsible for the illegal activity.
- Be familiar with your company's policy regarding cybercrimes. Know who to call, what to do and, just as importantly, know what not to do.



# Documentation

- If you discover illegal activity on a computer or network on which you are working, at a minimum, document the following:
  - Initial reason for accessing the computer or network
  - Time and date
  - Peripherals that are connected to the computer
  - All network connections
  - Physical area where the computer is located
  - Illegal material that you have found
  - Illegal activity that you have witnessed (or you suspect has occurred)
  - Which procedures you have executed on the computer or network





# Chain of Custody

- To prove the chain of custody, first responders have documentation procedures in place that track the collected evidence. These procedures also prevent evidence tampering so that the integrity of the evidence can be ensured.
- Incorporate computer forensics procedures into your approach to computer and network security to ensure the integrity of the data. These procedures help you capture necessary data in the event of a network breach. Ensuring the viability and integrity of the captured data helps you prosecute the intruder.





# 14.4 CALL CENTER TECHNICIANS



# Call Center Best Practices

- Call Center – a place that exists within a company and provides computer support to both employees and customers of the company.
- A call center environment is organized and professional.
- Customers call in to receive computer-related help.
- The workflow of a call center starts with calls from customers displayed on a callboard.
- If the level one technician cannot solve the problem, it is escalated to a level two technician.
- Contact the customer if the technician is going to be late for a follow-up appointment.
- Get Customer Authorization before making any changes to software installed on the computer.





# Call Center Best Practices

- Prioritize your activities by following the business policy.
- Technicians should be sure to treat all customers equally.
- Answer calls in the order they arrive.
- Compose yourself between customer calls.
- Adjust your workstation to help you do your job.
- Keep a customer's information and property private.
- Observe SLAs
  - The technician must supply the level of support that is outlined in the customer's **Service Level Agreement (SLA)**.
  - SLA defines an agreement between the interested parties.
  - When dealing with customers, you need to observe the content of the SLA.
  - Management determines the exceptions to the SLA.





# Call Centers

- Computers in call centers have support software that technicians use to manage many of their job functions:
  - Log and Track Incidents
  - Record Contact Information
  - Research Product Information
  - Run Diagnostic Utilities
  - Research a Knowledge Base
  - Collect Customer Feedback
- Follow business policies:
  - Handling customer calls
  - Call center activities
  - Ensuring customer satisfaction

Name	Definition	Priority
Down	The company cannot operate any of its computer equipment.	1 (Most Urgent)
Hardware	One (or more) of the company's computers is not functioning correctly.	2 (Urgent)
Software	One (or more) of the company's computers is experiencing software or operating system errors.	2 (Urgent)
Network	One (or more) of the company's computers cannot access the network.	2 (Urgent)
Enhancement	There has been a request from the company for additional computer functionality.	3 (Important)



# Level One Technician Responsibilities

- A level one technician gathers information when a customer calls for help
- Information Checklist
  - Contact information
  - What is the manufacturer and model of computer?
  - What OS is the computer using?
  - Is the computer plugged in to the wall or running on battery power?
  - Is the computer on a network? If so, is it a wired or wireless connection?
  - Was any specific application being used when the problem occurred?
  - Have any new drivers or updates been installed recently? If so, what are they?
  - Concise description of the problem
  - Priority of problem
  - Entering all this information into a ticketing system



# Level Two Technician Responsibilities

- Level-two technicians may be known as product specialists or technical-support personnel.
- The level-two technician is usually more knowledgeable than the level-one technician or has been working for the company for a longer period of time.
- When a problem cannot be resolved within ten minutes, the level-one technician prepares an escalated work order.
- When a level-two technician receives the escalated work order with the description of the problem, they then call the customer back to ask additional questions and resolve the problem.

<b>Work Order</b>		Company Name: Cisco Systems, Inc.			
		Contact: Office Manager			
		Company Address: 170 West Tasman Drive, San Jose, CA 95134			
		Company Phone: 408-526-4000			
<b>Generating a New Ticket</b>					
Category	HW	Closure Code		Status	Open
Type	Laptop	Escalated?	Y	Pending	
Item	Laptop	Business Impacting:	Yes No	Pending Until Date	
Summary	Won't Boot				
Case ID	Cisco001	Connection Type	Wireless network connection		
Priority	Medium	Environment	Mobile		
User Platform	Windows 7				
<b>Problem Description</b>					
User complains that the laptop won't boot up. No software was added recently. No operating system changes have been made. No peripherals have been added.					
<b>Problem Solution</b>					
The level one technician was unable to resolve the problem within 10 minutes. The work order is being escalated to a level two technician.					



## Level Two Technician Responsibilities

- When to escalate a problem to a more experienced technician:
  - Problems that require opening the computer case.
  - Problems that require installing applications, operating systems, or drivers.
  - Problems that will take a long time to walk a customer through, such as Configuration Memory Operating System (CMOS) changes.
  - “Down” calls – The entire network is down, and a more experienced tech may be able to resolve the issue faster.
  - Level-two technicians can also use remote diagnostic software to connect to the customer's computer to update drivers and software, access the operating system, check the BIOS, and gather other diagnostic information to solve the problem.



# Programming Languages

- A **compiler** is a computer program that translates computer code written in one programming language (the source language) into another language (the target language) like assembly language, object code, or machine code to create an executable program.
- **Compiled** Languages
  - Visual Basic
  - C
  - C++
  - C#
  - Java



# Programming Languages

- An **interpreter** built-in to the program takes the human-readable code and turns it into something else before making it something the machine can read.
- The code is not compiled first but it does require the originating program to be installed on any machine that needs to run it.
- **Interpreted Languages**
  - Python
  - JavaScript
  - VBScript
  - Perl
  - Batch
  - Shell



# Scripts

- A script file is a simple text file written in scripting languages to automate processes and tasks on various operating systems.
- The script file can save the technician a lot of time, especially when the same tasks need to be performed on many different computers.
- A script file might be used to automate the process of performing a backup of a customer's data or run a list of standard diagnostics on a broken computer.



# Script Examples

```
@echo off
echo My first batch script!!
echo My hostname is: %computername%
pause
```

- This Windows batch script do the following:
  1. Turn off automatic echoing output at the terminal.
  2. Echo the sentence. "My first batch script!!" to the terminal.
  3. Echo 'My hostname is:' followed by the variable %computername% to the terminal.
  4. Pause the script with a prompt of "Press any key to continue..."

```
#!/bin/bash
echo My first batch script!!
echo My hostname is: $(hostname)
sleep 2
```

- This Linux shell script do the following:
  1. Identify the shell that the script will be using.
  2. Echo the sentence, "My first batch script!!" to the terminal.
  3. Echo "My hostname is:" followed by the variable \$(hostname) to the terminal.
  4. Pause the script for two seconds.



# Script Languages

You should also be able to identify several types of script files because a script file may be causing a problem at startup or during a specific event.

Scripting Language	Extensions	Description
Windows Batch File	<b>.bat</b>	Windows command-line interpreted language
PowerShell	<b>.ps1</b>	Windows task-based command-line shell and scripting language
Linux Shell Script	<b>.sh</b>	Linux shell interpreted language
VBScript	<b>.vbs</b>	Windows visual basic script
JavaScript	<b>.js</b>	Client-side scripting language that runs in the browser
Python	<b>.py</b>	An Interpreted, object-oriented, high-level language



# Script Syntax

Scripting Language	Comment Syntax
Windows Batch File	REM <i>comment</i>
PowerShell	# <i>comment</i> or <# <i>comment</i> #>
Linux Shell Script	# <i>comment</i>
VBScript	' <i>comment</i>
JavaScript	// <i>comment</i>
Python	# <i>comment</i>



# Basic Windows Script Commands

COMMAND	OUTPUT
<code>dir</code>	View the contents of the current directory
<code>cd</code>	Change directories
<code>mkdir</code>	Make a directory
<code>cls</code>	Clear the screen
<code>date</code>	Display / set the date
<code>copy</code>	Copy a file or files



# Basic Linux Script Commands

COMMAND	OUTPUT
<code>ls</code>	View the contents of the current directory
<code>cd</code>	Change directories
<code>mkdir</code>	Make a directory
<code>clear</code>	Clear the screen
<code>date</code>	Display / set the date
<code>cp</code>	Copy a file or files



# Variables/Environmental Variables

## ■ Variables

- Variables are designated places to store information within a computer.
- A primary function of computers is to manipulate variables.
- Some variables are environmental, which means that they are used by the operating system to keep track of important details such as: username, home directory, and language.
- Some useful Windows environmental variables are **%SystemDrive%** (the system folder is) and **%WinDir%** (the Windows folder).

## ■ Environmental Variables

- The figure is of a shell script depicting environmental variables.
- The Linux variables **pwd**, **language**, and **shell** were preset when the user logged into this terminal.
- To view a list of all environmental variables use the **env** command.



# Variables/Environmental Variables

- Variable Type
  - Some scripting languages require that variables are defined as being integers (numbers), characters, strings or something else.
  - In code, a string usually contains multiple characters but can also use numbers and spaces
  - When defining a string, quotes are used to denote the beginning and end of the string, for example, “Scott sold 3 computers yesterday.”

DATA TYPE	DESCRIPTION	EXAMPLE
int	Integer Numbers	-1,0 1.2,3
float	Numbers with Decimals	1234.5678
char	A Single Character	S
string	Multiple Characters	He77o!
bool	True or False	True



# Conditional Statements

- Conditional Statements
  - Conditional statements are needed for scripts to make decisions.
  - These statements usually come in the form of an if-else or a case statement.
  - In order for these statements to make a decision, a comparison must be made using operators.
  - The syntax of these commands will vary, depending on the Operator language.



# If-Then Conditional Statements

```
User@Linux:~$ cat ./script3.sh
#!/bin/bash
TIME=$(date | cut -f 4 -d ' ' | cut -f 1 -d ':')
declare NOON=12
if [ $TIME -ge $NOON ]
  then echo "Afternoon"
  else echo "Morning"
fi
User@Linux:~$ ./script3.sh
Morning
```

- This figure is of a shell script determining if it is morning or afternoon.
- In this script, the date command is cut until only the hour remains, and the result is placed in a variable.
- The if statement compares the variables \$TIME and \$NOON using the -ge operator to determine if the output is going to say “afternoon” or “morning”.



# Relational Operators

- When making a mathematical comparison, use relational operators.
- Other types of operators include arithmetic (+, -, \*, /, %), logical (and, or, not), assignment (+=, -=, \*=), and bitwise (&, |, ^).

OPERATOR	BATCH	POWERSHELL	BASH	PYTHON
Equal	==	-eq	-eq	==
Not Equal	!=	-ne	-ne	!=
Less Than		-lt	-lt	<
Greater Than	>	-gt	-gt	>
Less Than or Equal To	<=	-le	-le	<=
Greater Than or Equal To	>=	-ge	-ge	>=



# Loops

- In order to repeat commands or tasks a loop can be used.
- The three main types of loops found in scripts are:
  - **For loop**
  - **While loop**
  - **Do-While loop**



# For Loops

- The For loop repeats a section of code a specified number of times.

```
User@Linux:~$ cat ./script5.sh
#!/bin/bash
for COUNT in `seq 1 5`; do
  let "NUMBER1 = $RANDOM % 256"
  let "NUMBER2 = $(echo "obase=2; $NUMBER1" | bc)"
  echo $NUMBER1 = $NUMBER2
done
User@Linux:~$ ./script5.sh
160 = 10100000
71 = 1000111
43 = 101011
187 = 10111011
7 = 111
```

- This shell script outputs five binary numbers.
- The For loop in this script repeats a sequence exactly five times.
- The variable NUMBER1 is randomly generated to be between 0 and 255.
- The variable NUMBER2 is the binary conversion of NUMBER1.
- The spacing between the commands “for” and “done” are optional in some languages, but they help the programmer to understand what code is contained in the loop.



# While Loops

- The While loop checks a variable to verify that it is true (or false) before repeating a section of code. This is known as a pre-test loop.

```
User@Linux:~$ cat ./script6.sh
#!/bin/bash
NUMBER=1
while [ $NUMBER -le 8 ]; do
    let "NUMBER=$RANDOM % 10+1"
    echo -n "$NUMBER "
done
    echo "> 8 .. loop broken."
User@Linux:~$ ./script6.sh
5 7 9 > 8 .. loop broken.
```

- This shell script runs until a randomly chosen number is greater than 8.
- In this script, the loop keeps running until a random number is chosen which is greater than eight.
- Notice how the variable NUMBER was set to 1 before the loop started. This is to prevent the test in the next line [ \$NUMBER -le 8 ] from failing.



## Do While Loops

- Finally, the Do-While loop repeats a section of code, then checks a variable to verify that it is true (or false). This is known as a post-test loop.
- Unlike most compiled languages, several scripting languages lack a Do-While loop.

```
User@Linux:~$ cat ./script7.sh
#!/bin/bash
while true ; do
    let "NUMBER=$RANDOM % 10+1"
    echo -n "$NUMBER "
    if [ $NUMBER -gt 8 ]; then break; fi
done
echo "> 8 .. loop broken."
User@Linux:~$ ./script7.sh
3 7 4 1 5 7 6 7 1 7 9 > 8 .. loop broken.
```

- This shell script determines if a vowel or consonant is used.
- This emulates the post-test function using an If statement within the loop followed by a Break statement



# 14.5 CHAPTER SUMMARY



## Chapter 14: The IT Professional

- Explain why good communication skills are a critical part of IT work.
- Explain how to manage change and unplanned disruptions in a business environment.
- Explain appropriate behavior when faced with the legal and ethical issues that arise in the IT industry.
- Explain the call center environment and technician responsibilities.

