<p style="text-align:center">**CHAPTER 6: ICT SYSTEM SUPPORT**</p>

6.1 Introduction

This unit describes the competencies required to perform ICT infrastructure support. It involves identification and documentation of ICT infrastructure, evaluation of the state of performance and possible causes of failure, diagnosing and fixing of the problems, testing of performance and user training.

6.2 Performance Standard

o   Performed audit on existing ICT Components and Infrastructure
o   Identified and used appropriate Tools for ICT infrastructural support
o   Performed troubleshooting on the ICT infrastructure and components
o   Identified and applied Safety and precautions measures as per the internal ICT policy

6.3 Learning Outcome

6.3.1 List of the Learning Outcomes

These are the key learning outcomes, which make up workplace function:
o   Identify and document ICT infrastructure
o   Evaluate the state of performance and possible causes of failures
o   Diagnose and fix problems
o   Test component performance
o   Perform User training

6.3.2 Learning Outcome 1: Identify and Document ICT infrastructure

6.3.2.1 Learning Activities
The following are the performance criteria:
o   Perform audit on existing ICT Components and Infrastructure as per the manufacturers manual
o   Perform ICT Components and Infrastructure documentation as per the manufacturers manual
o   Classification of ICT infrastructural components is done as per the manufacturers manual
o   Specifications of ICT infrastructure is established based on manufacturer's manual
o   Tools for ICT infrastructural support are identified as per the audit report
o   Safety and precautions measures are identified as per the internal ICT policy
o   Maintain the ICT Infrastructure and components asset register to date

Trainees to demonstrate knowledge in relation to:
o   Definition of ICT infrastructure
o   Components of ICT infrastructure
o   ICT infrastructure specifications

o Types of ICT infrastructure: Computer hardware platforms, Operating system platforms, Enterprise and other software applications, Data management and storage, Networking and Telecommunications platforms, Internet platforms, End users
o Safety precautions of ICT Infrastructure
o Documentation of Infrastructure assets and their operational and service status

6.3.2.2 Information Sheet

The ICT Infrastructure that is currently used in the business constitutes all the information and communications technology and other systems infrastructure reasonably necessary to carry on the business, including having sufficient capacity and maintenance and support requirements to satisfy the requirements of the business with regard to information and communications technology, data processing and communications.

Typically, a **standard ICT infrastructure consists of the following components:**
o **Hardware:** Servers, computers, data centers, switches, hubs and routers, and other equipment
o **Software:** Enterprise resource planning (ERP), customer relationship management (CRM), productivity applications and more
o **Network:** Network enablement, internet connectivity, firewall and security
o **Meatware:** Human users, such as network administrators (NA), developers, designers and end users with access to any IT appliance or service are also part of an IT infrastructure, specifically with the advent of user-centric IT service development.

A **computer platform** is a system that consists of a hardware device and an operating system that an application, program or process runs upon. An example of a computer platform is a desktop computer with Microsoft Windows installed on it. A desktop is a hardware device and Windows is an operating system.

In the same way generally an **operating system** acts as an interface between hardware and the user in IT, a **platform** is any hardware or software used to host an application or service.

An application platform, for example, consists of hardware, an operating system and coordinating programs that use the instruction set for a particular processor or microprocessor.

Enterprise software, also known as enterprise application software (EAS), is computer software used to satisfy the needs of an organization rather than individual users. Such organizations include businesses, schools, interest-based user groups, clubs, charities, and governments.

Data management is a critical component of any business strategy as companies of all sizes and types struggle with data growth, **data storage** costs, data protection (through replication,

snapshots or backups) and long-term data storage capacity to meet growing business demands.

Telecommunications/telephone services companies that offer voice and data connectivity, wide area networking, and Internet access typically provide telecommunications platforms.

Internet is a big network, which is formed by connecting multiple small networks. It is a platform for all the users that are connected to it. Internet acts as platform in different fields. Such as: Internet as a collaboration platform, Internet as a news and event platform.

An end user is the person that a software program or hardware device is designed for. The term is based on the idea that the "end goal" of a software or hardware product is to be useful to the consumer. The end user can be contrasted with the developers or programmers of the product. End users are also in a separate group from the installers or administrators of the product.

Negative impacts of ICT tools:
o   Eye irritation and eye fatigue, lower back pain, wrist pain, cold and flu
o   Mobile phone and our health: It is believed that mobile phones can affect the health of people who use them. Research from Finland suggests that mobile phone radiation causes changes in the brain and even low-level emissions from headsets are still damaging.
o   Some of the long-term health effects are: Headaches and tiredness, Creates joint pain, Mobile phone battery explosion.

It is important to educate users regarding the negative impacts of using computers for long duration and the harmful effects of sedentary lifestyle. A lot of time users forget to appropriately use ICT tools. These can be easily addressed through ergonomics (workplace furniture and set up) and lifestyle changes.

Source: http://ergonomictrends.com
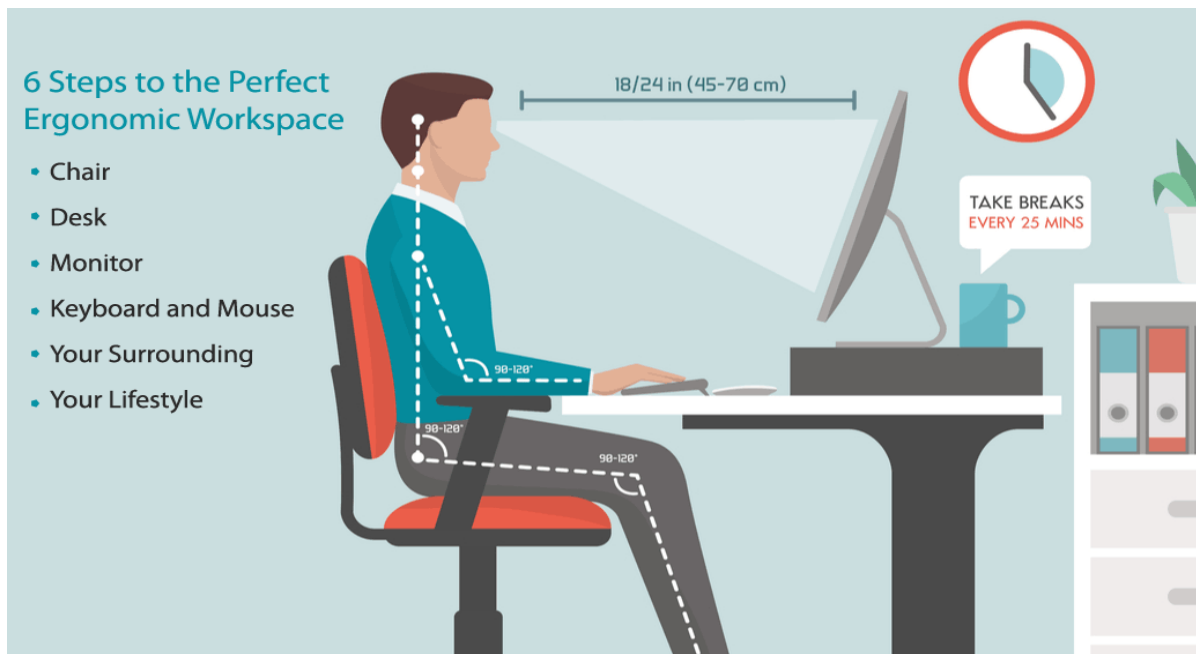
Figure 65: Sitting ergonomic

Infrastructure asset management is the integrated, multidisciplinary set of strategies in sustaining public infrastructure assets such as water treatment facilities, sewer lines, roads, utility grids, bridges, and railways. Generally, the process focuses on the later stages of a facility's life cycle specifically maintenance, rehabilitation, and replacement. Asset management specifically uses software tools to organize and implement these strategies with the fundamental goal to preserve and extend the service life of long-term infrastructure assets, which are vital underlying components in maintaining the quality of life in society and efficiency in the economy.

6.3.2.3 Self-Assessment
i.   What is ICT Infrastructure?
ii.   Differentiate between operating system and platform.
iii.   Who are end-users?
iv.   What is Internet platform?
v.   What is enterprise software?
vi.   **Case situation:** You are School Network Administrator currently your network device support 50 students, by next year, the total number of student will be 200. What type of network infrastructure will you suggest? Prepare a budget plan for full network solution and seamless ICT education for all students.
vii.   Prepare an awareness-training program for proper use of ICT devices for your institution or company.
viii.   How do you sit ergonomically on your computer desk?
        A. Bending your back
        B. Your head closer enough to your screen
        C. Your legs on the desk

D. Sitting ergonomically

ix. _____ is a big network, which is formed by connecting multiple small networks.

    A. Internet

    B. Computer

    C. Telephone

x. _____ acts as an interface between hardware and the user.

    A. Operating system

    B. Platform

    C. Network

    D. Computer

6.3.2.4 Tools, Equipment, Supplies and Materials

Public Address System, Radio, Mobile Phone, Computer, paper, pen, presentation

6.3.2.5 References

- https://www.advance-africa.com/health-and-safety-using-ict-tools.html
- https://searchservervirtualization.techtarget.com/definition/platform
- https://www.lawinsider.com/dictionary/ict-infrastructure
- ICT Infrastructure Management authored Office of Government Commerce published by

6.3.3 Learning Outcome 2: Evaluate the state of performance and possible causes of failures

6.3.3.1 Learning Activities

The following are the performance criteria:

- o Perform troubleshooting of failed components as per as per the manufacturers manual
- o Determine Possible causes of failure as per the manufacturers manual
- o Carry out repair or replacement of failed components according to Manufacturer manual
- o Test the repaired or replaced component
- o Adopt component failure Prevention measures as per the manufacturers manual
- o Generate report as per the manufacturers manual

Trainees to demonstrate knowledge in relation to:

- o Define troubleshooting
- o Possible causes of failure: Unstable power, Malfunctioning, Mechanical faults
- o Environmental factors: Natural disasters, Dust, Ventilation
- o User factors: Malicious damage, Accidents, Lack of maintenance

6.3.3.2 Information Sheet

Troubleshooting is a systematic approach to problem solving that is often used to find and correct issues with complex machines, electronics, computers and software systems.

There are many different things that could cause a problem with your computer. No matter what's causing the issue, troubleshooting will always be a process of trial and error—in some cases, you may need to use several different approaches before you can find a solution; other problems may be easy to fix. We recommend starting by using the following tips.

o **Write down your steps:** Once you start troubleshooting, you may want to write down each step you take. This way, you'll be able to remember exactly what you've done and can avoid repeating the same mistakes. If you end up asking other people for help, it will be much easier if they know exactly what you've tried already.
o **Take notes about error messages:** If your computer gives you an error message, be sure to write down as much information as possible. You may be able to use this information later to find out if other people are having the same error.
o **Always check the cables:** If you're having trouble with a specific piece of computer hardware, such as your monitor or keyboard, an easy first step is to check all related cables to make sure they're properly connected.
o **Restart the computer:** When all else fails, restarting the computer is a good thing to try. This can solve a lot of basic issues you may experience with your computer.

Read: Quick tips for troubleshooting:
https://edu.gcfglobal.org/en/computerbasics/basic-troubleshooting-techniques/1/

Tips for addressing client troubleshoot

Step 1: What exactly *is* the problem?
Getting to the bottom of a computer issue can be tricky, so it's crucial to ask the right questions first if you want to discover the root problem quickly.

• If you're talking to someone or emailing with them, listen or read carefully and take notes (mental or otherwise). When they're done, proceed with questions that either have a yes/no answer or can be answered quantifiably (e.g., "How many times did this happen?"). This approach can move things along and cut down on ambiguous responses.
• What should you ask? The key is to find out the **"who, what, and when"** of the problem. Does the issue affect just one person or many people? Did it occur right after a significant event on the computer or the network? There are specific questions you can ask to drill down beneath general statements like "I can't send email." Are they using a PC or mobile device? Is the PC power on? Are they able to open their e-mail client? Can they send or receive email, or both?
• Once you've got a grasp on the issue, try repeating your understanding of the problem so that you're both on the same page as to what's wrong. It's a good idea to use some of the same language they used and avoid using complex tech terminology. Ideally, this will help remove potential confusion related to the issue.

Now that you have a basic understanding of what the issue is all about, you can look into technical details that could point you toward to a solution.

Step 2: Gather more details, eliminate variables

In many instances, what was reported as a general issue (e.g., the Internet is down) is actually something very particular, such as a specific website being offline. Best way to find out? Ask those pertinent questions and then dig up more info from various sources such as:

- **Error messages:** If the user reports one or you're present to check for one, they can point you in the right direction as to why a failure occurred. For example, Windows blue screens of death provide a relevant error code that'll give you a good sense of what caused a failure.
- **Events logs:** Do they exist, and if so, what exactly do they say? In addition to error messages, logs often provide a timestamp so you can answer the question of when exactly events happened. Checking the Windows event viewer can be a first step in pointing you towards any relevant logs.
- Can the user provide screenshots, video, or other supporting information that can help assist in the troubleshooting process?
- **Diagnostics results:** Have you run system utilities to get even more information? For example: ping can help you remotely check if a server or website in question is reachable. Additionally, the Windows memory diagnostic can check for faulty memory, the resource monitor or performance monitor can check for unusually high CPU or memory usage, and a disk check can examine your hard drives for errors.
- **Monitoring:** Do you have any 3rd party tools that can offer more clues or predict issues before they occur? A network monitoring solution like company provides preemptive alerts and warnings about servers at risk of going down. And a network inventory application can provide vital statistics on dozens or hundreds of systems such as disk space, available memory, OS installed, and software running on the devices in question.

Step 3: Reproduce the problem, develop hypothesis of root cause

Now that you've gathered basic background info, it's time to get hands-on with the problem.

- Reproducing an issue simply means verifying you can recreate the same error the user reported. You can do this at the physical site of the problem, or through a remote desktop/ remote control application. Neither of those options available? You might be able to approximate the same conditions on a similar computer.
- Once you encounter the same error(s), you can more easily develop theories as to the root cause based on what you observe, then start taking steps to fix the issue. Sometimes you'll find it is pretty quick. Other times, it'll take longer and you may have to dig into knowledge bases, comb through data, or Google the problem for others who have faced the same issue.
- At this phase, a deep understanding of how computers work will prove… useful. For example, in computer networking, if you understand 7 layer OSI model for networks (a problem can exist in any one of them), you have a framework for systematically working your way through the potential causes of a networking problem. For a connectivity issue, an Ethernet cable could be damaged or unplugged (Layer 1 issue), network requests might not be going through (Layer 3), or an application might not be properly coded (Layer 6).

Step 4: Attempt a fix based on findings

The evidence you've already gathered should have narrowed down possible root causes and positioned you to fix the issue. You can try tweaking changing settings related to the problem, swapping out faulty parts, repairing corrupted files, updating drivers and software, etc. until you solve the problem (or at least get closer).

While every issue is like a unique, a significant number of issues can be resolved through common troubleshooting steps like rebooting the problematic machine, checking for DNS and DHCP issues, checking the device manager for driver issues, cleaning up a machine, or checking firewall or proxy settings, etc.

For issues that are tougher, if your own experimentation and Google searches don't result in a satisfactory result, browsing discussions online IT forums can be extremely helpful for fixing PC issues.

Problem Solved? Prepare for future issues. No matter what the underlying tech problems are (networks issues, driver conflicts, disk problems, etc.), the process outlined above works well for gathering info, identifying possible causes of the issue, and getting to a solution no matter what issue you're dealing with. But you'll still have to make judgment calls depending on each unique case.

With this sort of system in place, and knowledge learned working through previous computer problems, you'll be able to knock out computer problems more efficiently as you gain more experience. And to be proactive in avoiding future crises, perhaps you can document issues so they can be referred to by anyone who encounters similar challenges down the line.

Unstable power sources are a common challenge for devices in remote and extreme environments. This can severely affect solid-state drive (SSD) operation. Instability during start-up and shutdown can cause system crashes and restarting issues.

Malfunctioning is a failure to operate or function in the normal or correct manner.

Machine fault diagnosis is a field of mechanical engineering concerned with finding faults arising in machines. A particularly well-developed part of it applies specifically to rotating machinery, one of the most common types encountered.

A **natural disaster** is a major adverse event resulting from natural processes of the Earth; examples are floods, hurricanes, tornadoes, volcanic eruptions, earthquakes, tsunamis, and other geologic processes.

Dust in a computer can cause a variety of heat-related issues. Dust that collects on

components, such as memory modules, insulates them, preventing the air from the computer's fans from drawing the heat away.

Ventilation is the intentional introduction of outdoor air into a space and is mainly used to control indoor air quality by diluting and displacing indoor pollutants; it can also be used for purposes of thermal comfort or dehumidification.

Malicious damage the crime of intentionally causing damage to property.

An accident, also known as an unintentional act, is an undesirable, incidental, and an unplanned event that could have been prevented had circumstances leading up to the accident been recognized, and acted upon, prior to its occurrence.

Lack of Maintenance Processes is maintenance operations are the backbone of every heavy industry company. Almost every major industrial disaster can be tracked back to a root cause of a clear lack of maintenance protocol or adherence to maintenance practices.

6.3.3.3 Self-Assessment
i.   Define malicious damage.
ii.   What is natural disaster?
iii. What is troubleshooting?
iv.   How does dust affect your computer performance?
v.   **Case situation:** You are IT technician, a user save file on desktop after some minutes file become shortcuts how will you resolve the problem?.
vi.   Identify the steps to solve problems for a client over a call. What are the options you have to sort the problem without travelling to your client location? Tips! Use online tools to have a deeper look.
vii. A technician arrives and asks a customer, "Can you describe the problem?" The customer replies, "All email messages that I send have the wrong date. I have restarted the computer several times, but this does not seem to help." What could be the problem?
      A. The CMOS battery has failed
      B. The hard drive is beginning to fail
      C. The MBR is corrupted
      D. The CPU voltage is set too low
viii. Several times during the last few days, a user has experienced the Blue Screen of Death when plugging an external hard drive into a laptop via USB. What is a possible solution for this problem?
      A. Upgrade the operating system.
      B. Research the boot error beep code to identify the source of the error.
      C. Research the STOP error and the name of the module that produced the error.
      D. Reinstall the operating system
ix.   A PC is not able to connect to a wired network. Pinging the loopback address is successful, but the gateway cannot be reached. On the network switch all the interface

lights are on, except for the interface connected to the PC. The LED on the network card is off. What is the most likely cause of this problem?

x.   A computer repeatedly locks without any error message. Which two conditions may be the cause of the problem? (Choose two.)
  A. The index service is not running.
  B. The computer has a virus.
  C. An update has corrupted the operating system.
  D. The UAC has been turned off.
  E. The user has breached the user security policy.
  F. The CPU needs to be upgraded

6.3.3.4 Tools, Equipment, Supplies and Materials
Computer, Software

6.3.3.5 References
- https://whatis.techtarget.com/definition/troubleshooting
- https://www.haploos.com/home/industry-issues/maintenance/
- ICT Infrastructure Management authored Office of Government Commerce
- Failure-Tolerant Computer Design authored by William H. Pierce published Academic Press, 2014

6.3.4 Learning Outcome 3: Diagnose and fix problems

6.3.4.1 Learning Activities
The following are the performance criteria:
o Tools and equipment for diagnosing and fixing the problem are identified
o Troubleshooting activities are carried out to establish causes of problems
o Problems identified are fixed as per the manufacturer guidelines
o Generate a report as per the manufacturers manual

Trainees to demonstrate knowledge in relation to:
o Define diagnostic terms
o Identify diagnostic and repair tools and their functions
o Tools to diagnose and fix the problems
o Hardware related problems
o Software related problems
o Internet/network related problems
o User related problems
o Role of ICT Policies in organizations

6.3.4.2 Information Sheet

Diagnostic terms means identification of a condition, disease, disorder, or problem by systematic analysis of the background or history, examination of the signs or symptoms, evaluation of the research or test results, and investigation of the assumed or probable causes. Effective prognosis is not possible without effective diagnosis.

Tools are available to help you diagnose and solve hardware-related problems.

Power-on self-test (POST), progress codes (checkpoints), error codes, and isolation procedures: The POST checks out the hardware at system initialization. IPL diagnostic functions test some system components and interconnections. The POST generates eight-digit checkpoints to mark the progress of powering up the blade server.

Light path diagnostics: Use the light path diagnostic LEDs on the system board to identify failing hardware. If the system error LED on the system LED panel on the front or rear of the BladeCenter unit is lit, one or more error LEDs on the BladeCenter unit components also might be lit.

Troubleshooting tables: Use the troubleshooting tables to find solutions to problems that have identifiable symptoms.

Dump data collection: In some circumstances an error might require a dump to show more data. The Integrated Virtualization Manager (IVM) or Hardware Management Console (HMC) sets up a dump area. Specific IVM or HMC information is included as part of the information that can optionally be sent to IBM® support for analysis.

Stand-alone diagnostics: The AIX-based stand-alone diagnostics CD is in the ship package and is also available from the IBM Web site. Boot the diagnostics from a CD drive or from an AIX network installation manager (NIM) server if the blade server cannot boot to an operating system, no matter which operating system is installed.

Functions provided by the stand-alone diagnostics include:
o   Analysis of errors reported by platform, such as microprocessor and memory errors
o   Testing of resources, such as I/O adapters and devices
o   Service aids, such as firmware update, format disk, and Raid Manager

Hardware troubleshooting is the process of reviewing, diagnosing and identifying operational or technical problems within a hardware device or equipment. It aims to resolve physical and/or logical problems and issues within a computing hardware. Hardware or technical support technician does hardware troubleshooting.

Internet connection problems can be frustrating. Ensure you check the physical connections before getting too involved with troubleshooting. Someone could have accidentally kicked

the router or modem's power cable or pulled an Ethernet cable out of a socket, causing the problem.

As the ICT department tries to meet the needs of the workforce, it also needs to develop policies to ensure the acceptable uses of ICTs within the organization. Developing an ICT policy for an organization is as important as having any other policy within the organization.

Read: https://www.liberianobserver.com/columns/technology/develop-an-ict-policy-within-your-organization-a-repeat/

6.3.4.3 Self-Assessment
i.   Identify different kinds of diagnostic tools available.
ii.   What is hardware troubleshooting?
iii. What is troubleshooting?
iv.   How to fix Internet problem?
v.   **Case situation:** In a network that contains two servers and twenty workstations, where is the best place to install an anti-virus program?
vi.   Prepare an ICT policy for a firm of 20 employees.
vii. A laptop that is running Windows 10 displays "Missing NTLDR" after the POST. What are the two most probable reasons for this problem? (Choose two.)
      A. There is a conflict with a newly installed device.
      B. The index service is not indexing the correct locations.
      C. Boot.ini is missing or damaged.
      D. The boot order is not set correctly in the BIOS.
      E. BOOTMGR has been corrupted
viii. _____ can help with troubleshooting because it can help you eliminate the simplest possible causes of a computer problem.
      A. The KISS (Keep it simple and straightforward) principle
      B. An owner's manual
      C. A call to tech support
      D. A call to a help desk
ix.   John sets up a new Window 10 Professional PC for his client in an insecure, networked environment. What's the first step for making the data safe?
      A. Make sure the user shuts the machine off every night.
      B. Require the user to log in with a password
      C. Require the user to log in with a password composed of alphanumeric characters
      D. Nothing, anybody with a external disk can access the data on the PC
x.   Which utility is useful in identifying a program that is hogging the processor?
      A. Task Manager
      B. Device Manager
      C. System Monitor
      D. System Information

6.3.4.4 Tools, Equipment, Supplies and Materials

Protocol analyzer, Toner probe, Punch down tool, Cable tester, SolarWinds Security Event Manager

6.3.4.5 References

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- https://www.ibm.com/support/knowledgecenter/en/HW235/ps701_r_diagnostics_tools.html
- https://www.howtogeek.com/126265/how-to-troubleshoot-internet-connection-problems/
- https://www.ibm.com/support/knowledgecenter/en/SS63NW_9.1.0/com.ibm.tivoli.tem.doc_9.1/SUA_9.1/com.ibm.license.mgmt.doc/probdet/r_ui_problems.html
- Troubleshooting and Maintaining Your PC All-in-One For Dummies authored by Dan Gookin published by For Dummies; 2nd edition

6.3.5 Learning Outcome 4: Test component performance

6.3.5.1 Learning Activities

The following are the performance criteria:
- o   System is powered on and performance analysis is carried out
- o   Recommendation from performance analysis is done.
- o   Test performance report is generated as per the manufacturers manual

Trainees to demonstrate knowledge in relation to:
- o   Test Hardware performance, Test Software performance, Test Internet/network performance
- o   Performance analysis, recommendation from performance analysis, performance test report

6.3.5.2 Information Sheet

Test Hardware performance: check your every hardware performance and quality assurance

In software quality assurance, performance testing is in general a testing practice performed to determine how a system performs in terms of responsiveness and stability under a particular workload.

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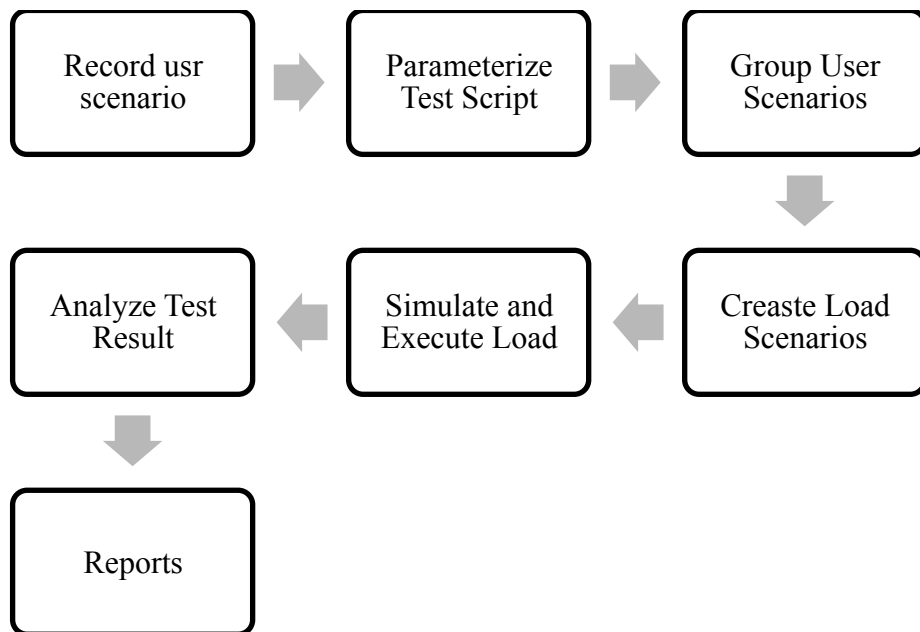
Figure 66: Performance Testing Process

Test Internet/network performance
The **NDT (Network Diagnostic Tool)** is a bandwidth test that will test your upload and download connection speeds as well as provide additional diagnostics about your network.

Performance analysis is a measure of the success or failure of a project using various parameters. It helps in developing a positive culture of project management that yields excellent results. A good program performance typically needs: proper management of stakeholders.

Performance analysis of system is based on collaborative filtering and demographics.

Below are some tools, which technicians use to troubleshoot a windows PC. These tools are useful in diagnosing a PC to find out the exact issue.

Process Explorer: Process Explorer is a small utility available for free. It can help to find out the files and directory opened by a program. If you need information that - what file or folder is using a process then this tool is very helpful. It is useful to track the DLL version problems or handle leaks.

Windows Sysinternals Suite: Sysinternals suite is collection of diagnostic and troubleshooting utilities provided by Microsoft for free. So it includes all the utilities, which can help to troubleshoot a PC. Process explorer and other useful tools like Autoruns, PsTools, desktops etc. are bundled with this.
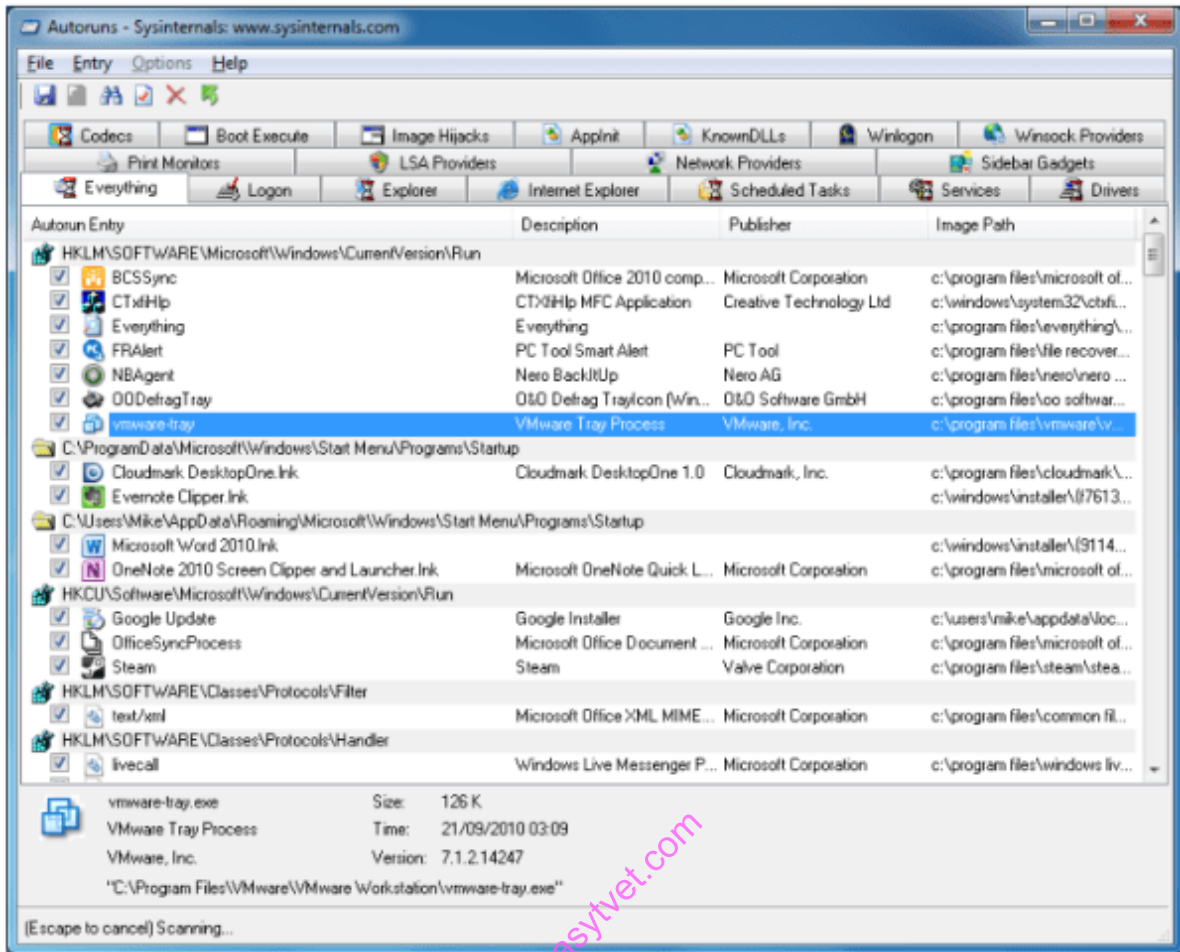
Source: www.downloadcrew.com
**Figure 67: Windows Systeminternals suite**

HWiNFO: Popular and award winning hwinfo is a free software utility for hardware monitoring and reporting with detailed analysis. It can generate reports and log files in XML, CSV and HTML Formats. It alerts about the system health by real time monitoring. Customized tables and graphs option.

Speccy is a hardware information tool by Piriform. It gives detailed information about motherboard, graphics card, CPU, RAM etc. It is a free utility. There are some more advanced features are available in its Pro version.

Hddscan It is a disk drive diagnostic tool. HDDScan is available free to download. It can check storage devices including USB drive for bad sectors.

File database can help to find out the suspicious files, system resources detailed graphs, WMI browser and more.

System Explorer: It is also a free software tool to get the detailed system information. It is an award winning software, which can explore the internal system and processes running in the computer such as - get details about tasks, processes services, drivers and opened files.

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Source: http://www.rohitab.com
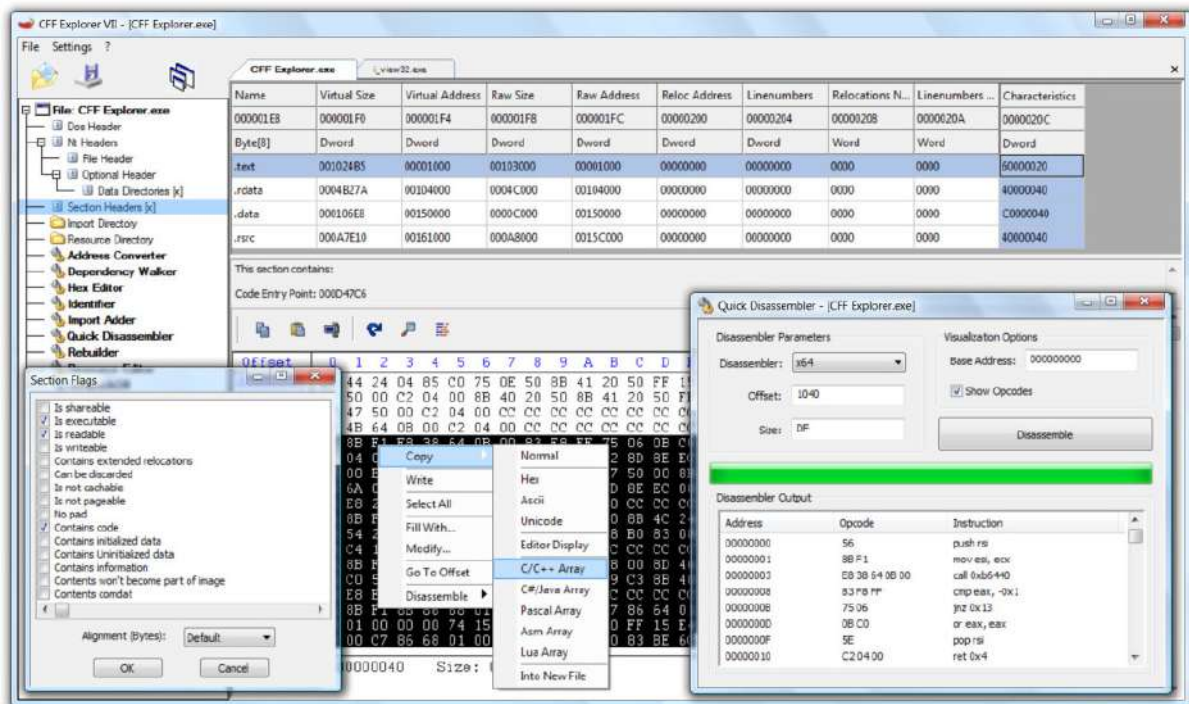
Figure 68: System explorer

6.3.5.3 Self-Assessment

i.   How to perform software test?

ii.   Explain performance analysis?

iii.   Which of the following is NOT a static testing technique?

    A. Error guessing

    B. Walkthrough

    C. Data flow analysis

    D. Inspections

vi.   Identify tech support tools for system diagnosis. Prepare a list and mention their benefits.

v.   _____ is a disk drive diagnostic tool.

    A. Hddscan

    B. Flash disk

    C. CD-ROM

vi.   _____ is a small utility available for free. It can help to find out the files and directory opened by a program.

    A. Mozilla firefox

    B. Process Explorer

    C. Internet

vii.   What is NDT?

    A. Network Diagram Tools

    B. Network Diagnostic Tool

    C. Network Data test

6.3.5.4 Tools, Equipment, Supplies and Materials

Ranorex, TestComplete, Tosca Testsuite, TestingWhiz, Windows Sysinternals Suite, System Explorer.

6.3.5.5 References

- https://www.techsupportall.com/10-best-computer-diagnostic-tools-technicians/
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6.3.6 Learning Outcome 5: Perform user training

6.3.6.1 Learning Activities

The following are the performance criteria:

- o User training needs are identified
- o User skill set is determined based on the user training needs report
- o User training is conducted based on the user training needs report

Trainees to demonstrate knowledge in relation to:

- o Meaning of user training
- o Importance of user training
- o Implement end user training plan

6.3.6.2 Information Sheet

User Training is a term business executives hear quite often when they are in the process of implementing a new software system, however, more often than not, many choose to opt out of receiving this training for their staff. **Training of the end users** is one of the most important steps for a successful system implementation.

The creation of a training plan is one element within the training process of a software organisation. The model has four components:

- o (E) entry criteria : Management support, Training policy and objectives, Resources, Organizational context
- o (T) tasks: Conducting training needs analysis, Create training plan, Design curriculum, Create training products, Pilot and deliver training, Evaluate training
- o (V) validation tasks or criteria: Training plan approved, course development and delivery processes followed, Quality standards me, Training results analyzed and reported
- o (X) exit criteria: Needed training delivered, Training objective met

Importance of **Training and Support After Software is implemented.** When adopting or creating new software, training helps users adapt to changes in their be it roles, new team members, or vendors, while support helps end-users address issues they experience.

6.3.6.3 Self-Assessment

i.   Why is user training important?

ii.   What are the approaches for training end-users?

iii.   What is importance of support after software installation? What are the kinds of support provided by some of the key software companies?

iv.   **Case situation:** Prepare a software-training plan for an organization for using basics of Microsoft Excel for documenting research data.

v.   _____ end-user training is more effective and memorable if you tailor it to your own organization's use of the software, rather than generic lessons.

    A. Creating a training program

    B. Setting training

    C. All are true

vi.   Determine set skill is training program scalable a scalable training program is flexible enough to accommodate both small numbers of users

    A. True

    B. False

vii.   Now-a-days there is a number of online application for bodaboda drivers. The bodaboda drivers are new users of technology for transportation logistics. Mobile application companies are training the bodaboda drivers on using the app effectively. Is it an example of user-training?

    A. Yes

    B. No

    C. I don't know

6.3.6.4 Tools, Equipment, Supplies and Materials

Test training materials for accuracy, Test training database, training & support material

6.3.6.5 References

- https://www.princeton.edu/~pshrsys/Implementation%20Plan/Strategies/EndUserTraining.html
- http://www.namtek.ca/the-importance-of-user-training-during-software-implementation/
- End-User Training (Technological Innovation And Human Resources) authored by Urs E. Gattiker published by D Gattiker