



# Certified Digital Citizen

## VS-1247

### V-Skills Certifications

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## 1. DIGITAL CITIZEN BASICS

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We discuss what exactly does being a digital citizen is and the need to become one.

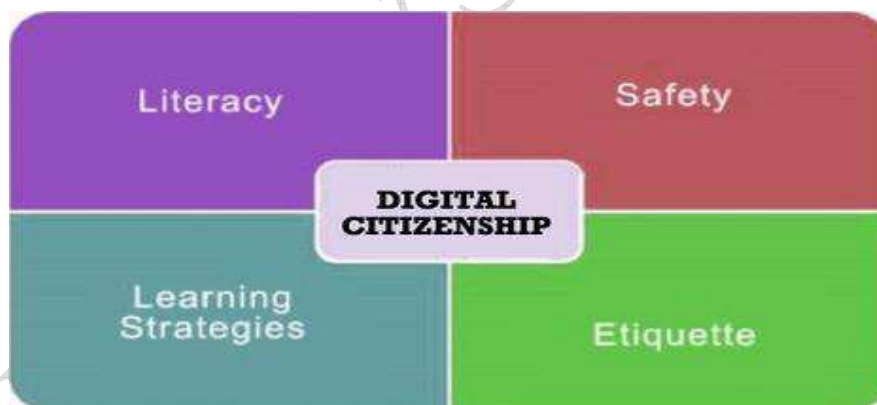
### 1.1. Definition

A digital citizen refers to a person utilizing information technology (IT) in order to engage in society, politics, and government participation.

Digital citizens are "those who use the Internet regularly and effectively". In qualifying as a digital citizen, a person generally must have extensive skills and knowledge in using the Internet through computers, mobile phones, and web-ready devices. People characterizing themselves as digital citizens often use IT extensively, creating blogs, using social networks, and participating in web journalism sites.

A digital citizen

- ✓ is a confident and capable user of ICT
- ✓ uses technologies to participate in educational, cultural, and economic activities
- ✓ uses and develops critical thinking skills in cyberspace
- ✓ is literate in the language, symbols, and texts of digital technologies
- ✓ uses ICT to relate to others in positive, meaningful ways
- ✓ demonstrates honesty and integrity and ethical behaviour in their use of ICT
- ✓ respects the concepts of privacy and freedom of speech in a digital world



### 1.2. Need

Addressing the 21st century skill of digital citizenship is important; to help learn, communicate and collaborate safely and responsibly. Being a best digital citizen includes having email etiquette, reporting and preventing cyber bullying, learning how to protect private information, etc.

According to the latest Norton Online Family Report

- ✓ 62 percent of children worldwide have had a negative experience online
- ✓ 4 in 10 children have been involved in serious situations, i.e. cyberbullying or receiving inappropriate photos from strangers.

- ✓ 74 percent of kids active on social networks say they've found themselves in unpleasant situations.
- ✓ 3 out of every 4 middle and high school kids own a cellphone, yet a quarter of adolescents say parents know little or nothing about what they're doing.
- ✓ 20 percent of kids won't tell parents about negative online experiences for fear of getting into trouble.

Based on recent surveys, parents, kids and teachers largely agree that the Internet and technology should be better integrated into modern schools, college curriculums and university classrooms as well.

We must take measures to keep pace with suddenly confusingly fast – advancement. We owe it to ourselves to better prepare kids to greet the many positives and challenges the connected life brings.

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## 2. DIGITAL ACCESS

Digital Access focuses on basics of information technology, computer networking and mobile technology so as to acquaint the technical terms in use.

### 2.1. IT Basics

Computer is an electronic device, which is used for computing and processing the data. The word computer is derived from compute; meaning to calculate, thus it is a machine, which can perform arithmetical operations at a higher speed.

Characteristics of computing devices, responsible for their wide spread usage, are

- ✓ Speed - Computer can perform tasks in seconds and speed is measured in nanoseconds.
- ✓ Consistency - Computer can work without getting tired and with same speed and accuracy.
- ✓ Versatility - A computer can perform multiple and varied jobs by multitasking.
- ✓ Remembrance power - Retain each and every information for a long period in storage.
- ✓ Malfunction - Just like any machine, it is subject to occasional breakdown or malfunction.
- ✓ Wrong output - It cannot correct wrong instructions so; wrong input results in wrong output.

Hardware refers to physical components which can be touched like monitor, keyboard, mouse, chips, wires etc. where as software points to instructions, programs for specific task but it cannot be touched.

Representation of data involves various technical terms as

- ✓ Data - It is meaningless and is raw fact as number, character etc. like count of items sold.
- ✓ Information - It is meaningful and processed data like which product sells most.
- ✓ Binary Number System - It uses two symbols to represent data, i.e. 0 and 1 and its base is 2 just like decimal system which uses 10 digits 0 to 9 and has base as 10.
- ✓ Memory Size - Collection of data is grouped in memory and expressed as units like Bit, Byte, KB, MB similar to units for weight like mg, gm, kg

Unit	Equals
1 Bit	0 or 1
1 Nibble	4 bits
1 Byte	8 bits

Unit	Equals
1 KB	1024 bytes
1 MB	1024 KB
1 GB	1024 MB

Computing devices store data in binary form. They use a mapping to map human readable characters in languages like English, Hindi, etc to binary form, also called as character encoding. ASCII (American Standard Code for Information Interchange) can represent 256 different characters by using 8 bits or 1 byte per character. Unicode handles text expressed in most of the world's writing systems by using 4 bytes in UTF-32.

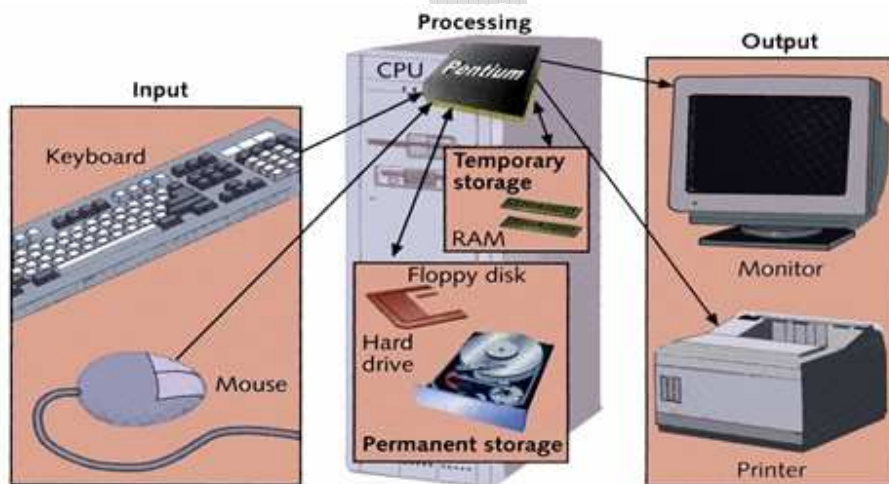
The basic operations in a computing device are

- ✓ Input - The process of entering the data and instruction to computer.
- ✓ Process - It refers to processing in CPU on the data, as per the given instructions.
- ✓ Output - The process of output of the data from the computer system to user.

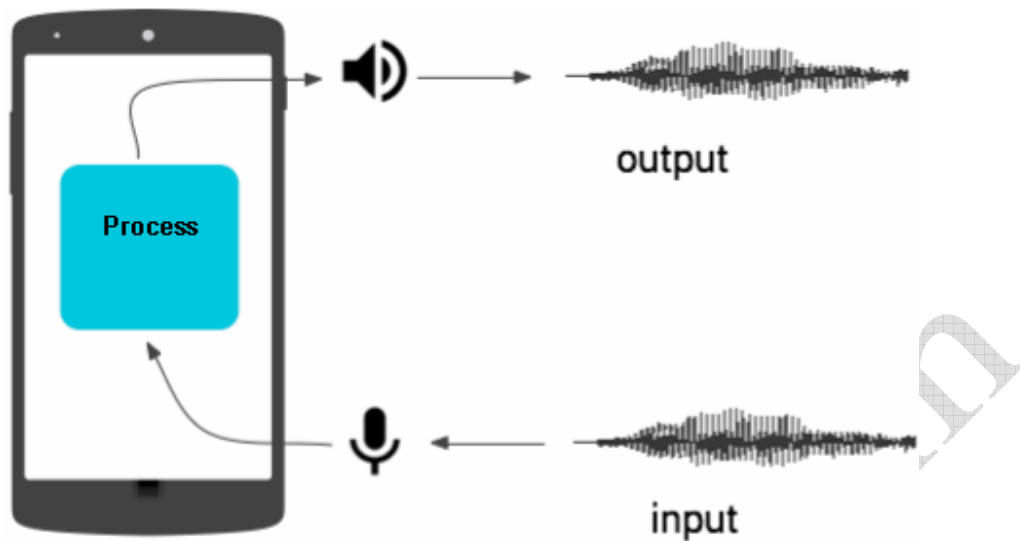


Basic operations are carried by devices in computing devices and which are

- ✓ Input Unit - Component which accepts input from the user like keyboard, mouse etc.
- ✓ Output Unit - Data output and feedback is given by this component like printer, monitor etc.
- ✓ Storage Unit - It stores data as per need like hard disk, optical disk, pen drive, etc.
- ✓ Central Processing Unit - It is responsible for all calculations and also maintains order by controlling flow of information.



Computer activity consists of input, processing, storage, and output



## Devices

A peripheral is a "device that is used to put information into or get information out of the computer." There are two different types of peripherals: input devices, which interact with or send data to the computing device (mouse, keyboards, etc.), and output devices, which provide output to the user from the computer (monitors, printers, etc.). Some peripherals, such as touchscreens, can be used both as input and output devices. Devices used for input, output, storage or processing, are as

**Input Devices** - It consists of touch screen, mouse, keyboard, etc.

- ✓ **Keyboard** - It is like a typewriter keyboard with 101 keys arranged in 5 groups as
  - ✓ Alphanumeric - A-Z, 0-9 plus some more characters.
  - ✓ Modifier - Shift, Ctrl (control key), Alt (alternate key).
  - ✓ Function - The function keys (F1, F2....F12) to give the special commands.
  - ✓ Cursor movement - Arrow keys to the position of cursor on the screen.
  - ✓ Special purpose- Used for specific function like esc, print screen, scroll lock & pause.
- ✓ **Mouse** - A pointing device used to position the pointer, to create graphics, for click and drag-and-drop. Ball or optical mouse is connected by PS/2 port or USB port to computer.
- ✓ **Scanners** - It converts printed image to electronic by shining light and sensing the intensity of the reflection. It is of various types like
  - ✓ Bar code reader - It is used for reading bar codes on products.
  - ✓ Optical Character Recognition (OCR) - It translate image to text by OCR software.
  - ✓ Optical Mark Reader (OMR) - It recognize marks by pencil or pen and used in answer sheets.
  - ✓ Magnetic Ink Character Recognition (MICR) - It is used in banks to process cheques.
- ✓ Touch Screens, Voice Recognition Devices are also some other input devices.

**Output Devices** - They consist of screen or monitor, printers, etc.

- ✓ **Monitor** - It is similar to television giving a soft copy output. Earlier monochrome or Colour CRT monitors were used but now LED & LCD are used. It divides the display area into rows and columns called resolution like 640 x 480, HD, etc. Each intersection of row and column is called a pixel (Picture Element).
- ✓ **Printers** - It produces hard copy output on paper and is classified as impact & non-impact.
  - ✓ **Impact Printers** - They print on paper by impacting the paper like dot matrix printer.
    - ✓ *Dot matrix printer*- It prints dots onto page, by impacting print head onto paper and is available in 80 and 132 columns.
  - ✓ **Non- Impact Printers**- They print on paper by not impacting the paper like laser or inkjet printer.
    - ✓ *Ink jet Printer* It uses nozzles which spray jets of ink onto the paper from ink cartridge.
    - ✓ *Laser Printer* It is expensive with faster output speed and high print quality. They directly scan laser beam on the roller which fuses ink to the paper.
- ✓ **Plotters** - It plots big size drawings on to the sheets for engineering drawings, maps, etc.

**Storage Devices** - It is sub-divided into primary and secondary memory.

**Primary Storage Devices** - It is internal storage device and is used during calculation or start up. It consists of cache, ROM & RAM.

- ✓ **RAM (Random Access Memory)** - It is read/write volatile memory storing temporary data.
- ✓ **ROM (Read Only Memory)** - It stores data permanently which can only be read so it is non-volatile. It stores programs for booting the computer or mobile, like BIOS (Basic Input & Output System).
- ✓ **Cache** - It is high speed memory, used for speeding up the data supply to CPU.

**Secondary Storage Devices** - It is usually external storage and consists of tape, disk & flash.

- ✓ **Disk Drives** - It is circular in shape having track and sectors. The disk surface is divided in concentric circles called tracks which are further subdivided into sectors. Greater the number of tracks so, more is the storage capacity of the disk.
  - ✓ *Hard Disk Drive* - It has huge storage capacity. It is non-volatile memory. It has disk platters placed on a spindle, with read/write head having 250-1024 GB capacity.
  - ✓ *Optical Disk* - High power laser beam burns disk surface to write data and low power laser beam is used to read. It has speed rating or data transfer speed where 1X refers to 150 Kbps. CD-ROM and DVD are examples with 700 MB and 4.3 GB capacity. Blue ray is upcoming technology with 50 GB data storage capacity.
- ✓ **Flash Memory** - It uses semiconductor memory and is used in USB drives, memory cards, etc. Data can be read or written to it and device can be detached to transfer or move data.

**Central Processing Unit (C.P.U)** - It executes given commands and consists of

**Control Unit** - It supervises and controls information flow by a clock signal as per which the processing is done. Clock signal is given in MHz/GHz (Mega Hertz/ Giga Hertz).

**Arithmetic Logic Unit** - It performs arithmetic and logical operations on data from memory.

## Software

Software is instructions, programs to execute and it is classified as



**System Software** - It has direct interface with hardware Windows XP, Linux and consist of Operating System Software - It controls the hardware and running of the application software like Linux, Windows XP/2003, MS-DOS. It does resource (CPU, memory) and task management with command interpretation (by a user interface graphical or character).

Device Drivers - It controls a device attached to computer like printers, displays, etc. and usually has DLL or EXE file name in Windows.

**Application Software** -It needs system software and it fulfill a specific user's requirement like

Word Processing Software - It create and edit letters, reports, etc. like MS-Word

Spreadsheet Software - It store and process data in columns and rows like MS-Excel.

Presentation Graphics Software - It is used to create slides for presentations like MS-PowerPoint.

### Other Software Terms

Utility software - It helps to optimize and maintain computer like disk cleanup, backup, etc.

Custom Made Software - It is made as per user's requirement by software programmers.

Packaged Software - It is readymade software, which we purchase like a commodity.

Translators - It accepts statements in one language or source and produces equivalent statements in another language, usually in machine language. It includes assembler, compiler and interpreter.

### Disk Organization Terms

- ✓ **Boot Record** - It is in the first sector of disk drive, from where the operating system is loaded into the memory when the computer is started.
- ✓ **Disk partitioning** - Process of creating primary and extended partitions on disk drive.
- ✓ **File System** - It is a way to organize data on storage device (hard disk) and like NTFS, FAT, etc
- ✓ **File Allocation Table (FAT)** - It is a file system used by MS-DOS and MS-WINDOWS.

### Personal Computer Hardware

A computer system has many hardware devices. The input and output devices are linked to the system unit or the chassis or cabinet as shown in figure 1. A cabinet or chassis is the box or outer shell that houses the circuit boards and other electronics as shown in figure 2.

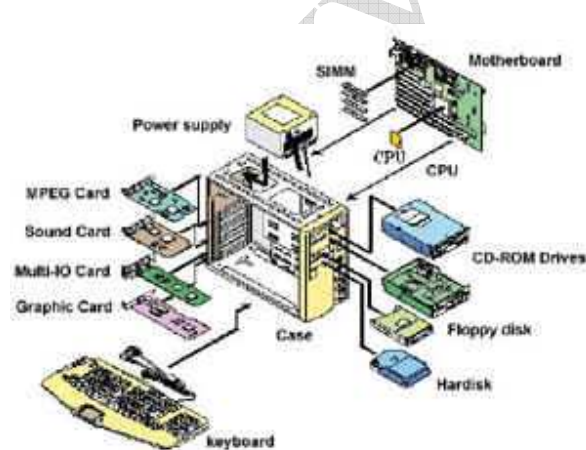


Figure 1



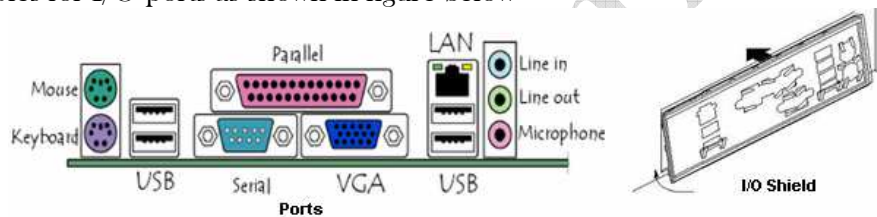
Figure 2



Various components in a chassis are

- ✓ Motherboard - Circuit board which acts as a backbone to which all other components are attached
- ✓ CPU or Processor - The part which does calculations and is usually from AMD or Intel
- ✓ Heat Sink - It is attached on top of CPU for providing air cooling to CPU.
- ✓ Power supply - They are usually supplied with the chassis in the market. The power rating of the power supply (also called as SMPS) is dependent on the form factor of the chassis.
- ✓ RAM modules - It acts as buffer between CPU and secondary memory with GBs of capacity.
- ✓ Optical drive - It is either CD-ROM or DVD drive to read or write CDs or DVDs.
- ✓ Hard Disk - It stores data in partitions and operating system is in it with capacity in GB.
- ✓ Buttons - Buttons on chassis for power and reset to turn on or off or reset a computer.
- ✓ LED and Miscellaneous Cables - LED indicate power and hard disk activity status. LED are present in the front of the chassis. Miscellaneous cables connect LED to the motherboard.

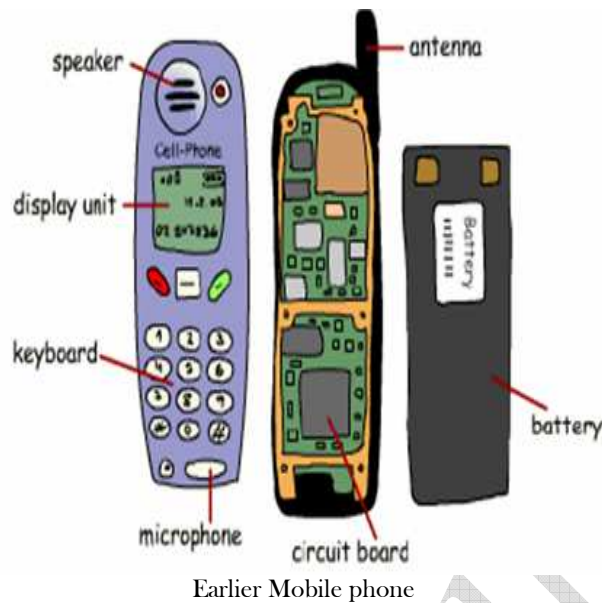
**Ports** - Ports are physical connectors and with their software conduct signals in and out of PC. Ports are usually built into the motherboard and include parallel (for printer), USB, LAN (or RJ45), VGA and PS/2 (for mouse or keyboard). I/O shield, is a metal plate installed in the chassis to provide holes for I/O ports as shown in figure below



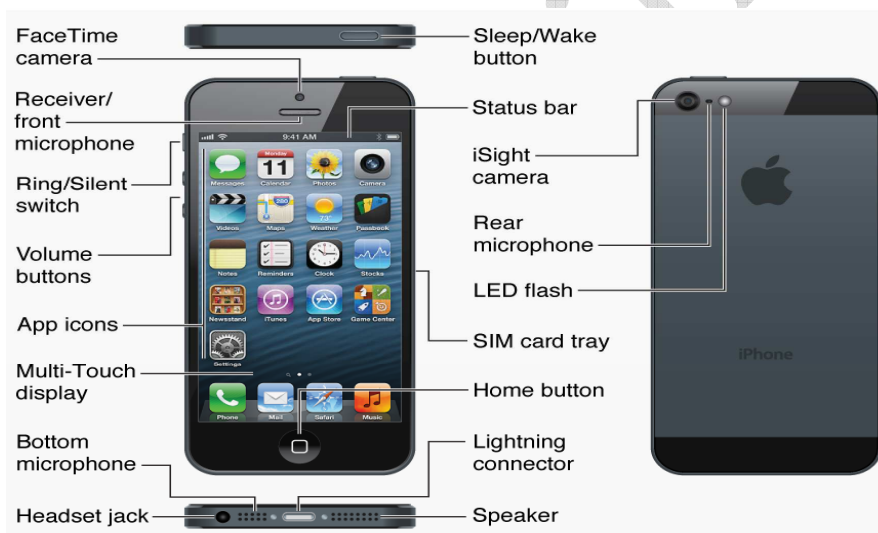
## Mobile Phone

The nine important and basic parts of a cell phone are

- ✓ Circuit board
- ✓ LCD screen
- ✓ Battery
- ✓ Keypad
- ✓ Microphone
- ✓ Speaker
- ✓ The Plastic Case
- ✓ Other Accessories (earphones, data cable etc)



Earlier Mobile phone



## 2.2. Networking Basics

Networking of computers mean interconnection of two or more computers or computer peripherals, which are joined by some type of communication media.

### *Advantages Of networking*

- ✓ Sharing of data - Computers if networked, can share data amongst themselves.
- ✓ Sharing of peripherals - Computers can also share expensive peripherals like printers, scanners, etc.
- ✓ High communication speed- Sometimes inter office mail takes long time for receipts, but in case of a computer, the communication speed is very high and data reaches the destination quickly.
- ✓ Lower cost - Data transmission being fast and accurate is cheaper than a fax.

## Network Types

There are different types of networks and are classified as per the geographical area they cover, as

- ✓ LAN (Local Area Network) - This type of network can transmit data within a local or small area, usually one kilometer across like within an office, within a floor of a building, amongst various floors of a building, etc. As they cover smaller distances hence wired media - cables is used as an interconnecting medium between computers.
- ✓ WAN (Wide Area Network) - This type of network can transmit data over large geographical areas. It interconnects long distances. It can also interconnect various LAN in different locations, as a single network, spanning large distances. For example Internet is a WAN.
- ✓ Internet - It is an example of WAN (Wide Area Network). It is a very huge network and is also known as worldwide network of networks. It has a backbone network operating at high speed. Internet works on TCP/IP (Transmission Control Protocol / Internet Protocol). A protocol is a set of rules and regulations, about how data should be transmitted over a network. Internet provides various services like E-mail, WWW, FTP, etc. Internet can be accessed by an ISP (Internet Service Provider) like BSNL, MTNL, Satyam, Airtel, etc. in India.
- ✓ Intranet - It is WAN which uses Internet for transmission of data. It interconnects various offices of a company, which are at distant places. Different offices are interconnected and they interact, as if they are on a LAN.
- ✓ VPN (Virtual Private Network) - VPN uses a technique known as tunneling to transfer data securely on the Internet to a remote access server on network. Using a VPN helps save money by using the Internet instead of making long-distance phone calls to connect securely with private network.

## Network Media

Networking media can be wired or wireless and are explained as

- ✓ Wired Media - It uses wires for data transmission and usually Cat 5 UTP (unshielded twisted pair) cable is used and it transmits at 10/100/1000 Mbps. Fiber optic cable is used for transmitting large data amounts usually 1Gbps and uses light through fiber optic cable with specialized equipments.
- ✓ Wireless Media - It uses radio waves to exchange data wirelessly. It is a "wireless local area network (WLAN) product that is based on the 802.11 standards which are commonly called as Wi-fi.

## Network Devices

There are different types of network devices for different connectivity and are

- ✓ Switch: It is like hub, but it takes the signal and sends it to the correct PC linked to it and not to all PCs connected to it as in hub. So, each port has full bandwidth. They have a matrix of wiring instead of a main circuit and logic to pass signal to correct port.
- ✓ Router: It connects two or more networks and routes data from one location to another, by IP address and IP network numbers. Routers are logical with their own OS, for Cisco device it is IOS (Internetwork Operating System).
- ✓ Wireless Access Point (WAP): They connect wireless networking connectors on PCs. They transmit data using WiFi standards of 802.11a/b/g/n on 2.4GHz or 5GHz frequencies.

- ✓ LAN card : It is the connector in which the networking cable is attached on the client computer. It has usually RJ 45 connector for Cat 5/6 UTP cable. In case of wireless connector, it is embedded in computer.

### Internet Connectivity Options

Connection to Internet can be done by dial-up, DSL, decide as per download speeds.

- ✓ Dial-Up - It was used extensively earlier. It used a modem which dials to ISP computer when connection is to be made. It used land line telephone or public switched telephone network (PSTN). It was slow and maximum speed of 56 Kbps.
- ✓ DSL - Digital subscriber line (DSL) has digital data transmissions over phone lines but at high speeds. DSL modem or router connects to the phone line and to the PC's network adapter to share internet. It has speeds of 384 Kbps and upwards. Phone and data transmission takes place simultaneously.
- ✓ Cellular - It is more popular with widespread use of smart phones and uses 2G, 3G or 4G technology to connect to internet. Cellular service provider charge for amount of data used.
- ✓ 802.11 Wireless - It is wireless options for LAN. The 802.11x series of protocols tells the speeds, frequencies, and methods to transmit data over radio waves in small geographic areas using unlicensed spectrums. There are four different 802.11 derivatives 802.11a, 802.11b, 802.11g, and 802.11n. It needs wireless access point (AP) and wireless network adapters which should be compatible.

### Wi-Fi

Wi-Fi stands for Wireless Fidelity. Wi-Fi is based on the IEEE 802.11 family of standards and is primarily a local area networking (LAN) technology designed to provide in-building broadband coverage. Different individual standards are designated by a letter following the 802.11, such as in 802.11g or 802.11n. In general all of the 802.11 standards operate on either a 2.4GHz or 5GHz radio frequency, though some can work on both bands.

SSID (Service Set Identifier) or network name, is the door to connecting to a Wi-Fi network, and is often the only piece of information you will need to get connected. Like any Radio Frequency based technology, Wi-Fi uses radio waves of different band-widths to transmit data. Channels define the range of wave-lengths that a transmitter uses. For example several of the Wi-Fi standards use the 2.4GHz frequency, which ranges from 2.4000-2.4835GHz. This frequency range is divided into 13 channels which includes substantial overlap. To make matters more confusing only certain channels are usable from a legal standpoint in different countries. The United States for example uses channels 1-11. Various types of Wi-Fi standards are

- ✓ 802.11a and 802.11b are some of the oldest the Wi-Fi standards and operate on the 5GHz and 2.4GHz frequencies respectively. It could be said that 802.11b was the standard that popularized Wi-Fi, and many legacy devices still utilize this standard today. The main difference, are speed and range. 802.11a enables speeds of up to 54Mbit/s but the shorter wavelength isn't as effective at penetrating walls and other obstructions making it less feasible for home networks. 802.11b is limited to 11Mbit/s of throughput, but the 2.4GHz frequency handles signal degradation better.

- ✓ 802.11g combined the benefits of its predecessors, offering 54Mbit/s using a 2.4GHz radio. It is backward compatible with 802.11b devices, though using an 802.11b device on an 802.11g network will reduce the data rate for all clients to 11Mbit/s.
- ✓ 802.11n is the current Wi-Fi standard, and supports the use of both 2.4GHz and 5GHz bands. This ability to use both sets of frequencies is known as MIMO (Multiple-Input Multiple-Output). The benefits are data rates up to 600Mbit/s, and some additional security features. 802.11n offers backward compatibility, though for performance reasons these features are optional, and are not always enabled.

**Wireless Devices** - Wireless network have usually only two types of devices - Access Points and Clients, both come in a variety of form factors.

- ✓ Access Point is generally physically connected to a wired network and some examples of access point type devices are Wireless Routers or Wireless Range Extenders. Configuration of wireless settings like security, and SSID is managed on it.
  - ✓ A Wireless Router indicates that the device includes additional functionality to allow various devices to talk to each other and share an internet connection.
  - ✓ Range Extenders extend range of wireless network without requiring additional networking cable.
- ✓ Wi-Fi Client devices are any device connecting to the wireless network offered up by an Access Point and could be laptop or desktop computers, tablets, cellular phones, printers, or even home theater equipment. A Wi-Fi client will have some means of connecting to a specific SSID or list of SSID's, and the ability to configure security settings like an encryption key or passphrase. Clients can also create an ad-hoc or peer-to-peer network, to connect two clients to each other.

**Guidelines** - Essential suggestions for secured, efficient and effective usage of Wi-Fi are

- ✓ For best coverage from access point is to centrally locate it in the area signal is needed.
- ✓ There should be minimal or no physical obstructions in the line of sight of access points. They should be placed at a height to achieve the same.
- ✓ Interference can also be caused by other wireless devices like Bluetooth, cordless phones, or wireless peripherals like a mouse or keyboard. Hence, try to minimize them or choose different channel to mitigate interference caused by other wireless devices.
- ✓ Don't Overshare Access Point - For best results, don't share any single wireless access point with more than 20 users. The more users sharing an access point, the slower the wireless network can become.
- ✓ Security is vital to wireless networking. Some security methods to consider for your network include:
  - ✓ Data encryption, so only authorized users can access information over your wireless network
  - ✓ User authentication, which identifies computers trying to access the network
  - ✓ Secure access for visitors and guests
  - ✓ Control systems, which protect the laptops and other devices that use the network.

**Security** - There are many reasons for which Wi-Fi networks need to be secured, from protecting personal information to not getting sued because of what an unauthorized user was doing with your network. Standards and techniques for implementing security in Wi-Fi are

- ✓ Wired Equivalent Privacy (WEP) was once the standard for Wi-Fi security, but is not considered secure. Several tools exist that will analyze encrypted Wi-Fi traffic and provide the security key with little technical knowledge required.
- ✓ Wi-Fi Protected Access (WPA) is a more secure solution than WEP, and is supported on most modern Wi-Fi devices. WPA also has vulnerabilities, but may be your best option if you're using an older Access Point.
- ✓ WPA2 is the current standard for Wi-Fi security, and is required for new devices seeking Wi-Fi certification. WPA2 supports backwards compatibility with WPA clients, so there shouldn't be any client compatibility reasons to revert to WPA.

An additional security step that is commonly used is a hidden SSID. This isn't a full security measure, but can help prevent unauthorized users from seeing your network. Also, change the username and password used to log in to Access Point itself, to prevent unauthorized modification of the configuration of wireless network.

### 2.3. Mobile Tech

The mobile phone (also called a wireless phone or cellular phone) is a portable electronic device used for mobile voice or data communication over a network of specialized base stations known as cell sites. An electronic, handheld device primarily used for wireless communication via radio waves or satellite transmission.

The name comes from the cell-like structure of these networks. There is some confusion about cell phones being a different thing to smart phones, but technically, every mobile phone, is a cell phone. The term Smart phone has come to mean a cell phone which offers more advanced features than just calls, SMS messages and basic organizer software.

A wireless phone is a cross between a traditional telephone and a radio device. A wireless phone receives and transmits radio signals via radio towers. These towers connect to a central system that links to the standard telephone system.

The first commercially available cell phone was developed by Motorola between 1973 and 1983, and went on sale in the U.S. early in 1984. This huge 28 ounce (790 gram) cell phone, called the DynaTAC 8000x, cost \$3995.00 and needed to be charged after just thirty minutes of use.

#### **Cellular Networks**

A cellular network, is made up of cellular masts or towers distributed across an area in a grid-like pattern. Each mast covers usually around ten square miles, called a Cell. Several masts can be located on the same tower.

Mobile phones work by converting voice, text, multi-media messages or data calls into radio waves or radio frequencies (RF). Mobile phone base stations transmit and receive these calls and connect callers to other phones and other networks.

When you make a call on a cell phone, the signal travels through the air to the nearest mast or tower, and is then relayed to a switching network and finally on to the handset of the person you are calling via the mast closest to them. If you are making a call whilst traveling, in a moving vehicle



for example, you may quickly move from the range of one cell tower to the range of another. No two adjoining cells use the same frequency, so as to avoid interference, but the transition between cellular mast areas will normally be seamless.



Wireless phone service is essentially line-of-sight transmission. If there's something between your phone and the nearest cellular antenna or tower, your call may not go through. Buildings, hills, heavy foliage and severe weather can create dead spots and block your calls.

### Cell-phone Codes

All cell phones have special codes associated with them. These codes are used to identify the phone, the phone's owner and the service provider.

- ✓ Electronic Serial Number (ESN): a unique 32-bit number programmed into the phone when it is manufactured
- ✓ Mobile Identification Number (MIN): a 10-digit number derived from your phone's number

Mobile technologies evolved with more speed offering, in different generations, as

- ✓ First generation: Analog mobile phones are considered 1G or first generation. It uses duplex voice channels, which is where 2 frequencies are used per call, allowing both people to talk at the same time.
- ✓ Second generation: These are digital mobile phones. Digital mobile phones convert analog signals to digital signals (a series of 0 and 1) and compresses it when transmitting a signal. These signals are then converted back with reasonable quality. Due to the possibility of now compressing digital signals, up to 3 times as much information can be transmitted in a given bandwidth. It has speed of 10kb/sec.
- ✓ Third generation: 3G phones are considered to be true multimedia phones. Like a small laptop, they have broadband capabilities (up to 3mb/s depending on the ISP) such as video conferencing and video streaming. 3G phones can handle both web and phone based multimedia and software. Data speeds are from 2Mbps to 14Mbps; and for moving devices about 1Mbps. But usually a minimum of 384Kbps is offered. Now laptops with in-built 3G are also coming.
- ✓ Fourth generation: 4G is the newest standard and is being implemented across the world. It offers speed in the range of 100Mbps to 1Gbps.

- ✓ 5G (5th generation mobile networks or 5th generation wireless systems) is the under development standard. Data rates of several tens of megabits per second are to be supported for tens of thousands of users. 1 gigabit per second to be offered simultaneously to tens of workers on the same office floor.

## Operating System

Mobile operating systems combine features of a personal computer operating system with other features useful for mobile or handheld use; usually including, and most of the following considered essential in modern mobile systems; a touchscreen, cellular, Bluetooth, Wi-Fi, GPS mobile navigation, camera, video camera, speech recognition, voice recorder, music player, near field communication and infrared blaster.

### Current software

- ✓ Android - Android (based on the Linux Kernel) is from Google Inc. It has the largest installed base worldwide on smartphones. Android's releases prior to 2.0 (1.0, 1.5, 1.6) were used exclusively on mobile phones. Android 2.x releases were mostly used for mobile phones but also some tablets. Android 3.0 was a tablet-oriented release and does not officially run on mobile phones. The current Android version is 5.0.
- ✓ iOS - iOS (previously known as iPhone OS) is from Apple Inc. It has the second largest installed base worldwide on smartphones, but the largest profits, due to aggressive price competition between Android-based manufacturers. It is closed source and proprietary and built on open source Darwin core OS. The Apple iPhone, iPod Touch, iPad and second-generation Apple TV all use iOS, which is derived from OS X. The current iOS version is 9.
- ✓ Windows Phone - Windows Phone (Soon to be Windows 10 Mobile) is from Microsoft. It is closed source and proprietary. It has third largest installed base on smartphones behind Android and iOS.
- ✓ BlackBerry - BlackBerry 10 (based on the QNX OS) is from BlackBerry. As a smart phone OS, it is closed source and proprietary. It is used mostly by corporate employees as it has a secured platform for messaging. Once one of the dominant platforms in the world, its global market share has been reduced to 0.4% by the end of 2014. The current BlackBerry version is 10.

## Application Store

Since 2008 customizable OSs allow the user to download applications ("apps") like games, GPS, Utilities, and other tools by digital distribution platform, called as application store. Any user can also create their own Apps and publish them. They are typically operated by the owner of the mobile operating system, such as the Apple App Store, Google Play, Windows Phone Store, and BlackBerry App World. Some apps are free, while others must be bought. Usually, they are downloaded from the platform to a target device

For apps with a price, generally a percentage, 20-30%, goes to the distribution provider (such as iTunes), and the rest goes to the producer of the app.

## Certifications

### Accounting, Banking and Finance

- Certified AML-KYC Compliance Officer
- Certified Business Accountant
- Certified Commercial Banker
- Certified Foreign Exchange Professional
- Certified GAAP Accounting Standards Professional
- Certified Financial Risk Management Professional
- Certified Merger and Acquisition Analyst
- Certified Tally 9.0 Professional
- Certified Treasury Market Professional
- Certified Wealth Manager

### Big Data

- Certified Hadoop and Mapreduce Professional

### Cloud Computing

- Certified Cloud Computing Professional

### Design

- Certified Interior Designer

### Digital Media

- Certified Social Media Marketing Professional
- Certified Inbound Marketing Professional
- Certified Digital Marketing Master

### Foreign Trade

- Certified Export Import (Foreign Trade) Professional

### Health, Nutrition and Well Being

- Certified Fitness Instructor

### Hospitality

- Certified Restaurant Team Member (Hospitality)

### Human Resources

- Certified HR Compensation Manager
- Certified HR Staffing Manager
- Certified Human Resources Manager
- Certified Performance Appraisal Manager

### Office Skills

- Certified Data Entry Operator
- Certified Office Administrator

### Project Management

- Certified Project Management Professional

### Real Estate

- Certified Real Estate Consultant

### Marketing

- Certified Marketing Manager

### Quality

- Certified Six Sigma Green Belt Professional
- Certified Six Sigma Black Belt Professional
- Certified TQM Professional

### Logistics & Supply Chain Management

- Certified International Logistics Professional
- Certified Logistics & SCM Professional
- Certified Purchase Manager
- Certified Supply Chain Management Professional

### Legal

- Certified IPR & Legal Manager
- Certified Labour Law Analyst
- Certified Business Law Analyst
- Certified Corporate Law Analyst

### Information Technology

- Certified ASP.NET Programmer
- Certified Basic Network Support Professional
- Certified Business Intelligence Professional
- Certified Core Java Developer
- Certified E-commerce Professional
- Certified IT Support Professional
- Certified PHP Professional
- Certified Selenium Professional
- Certified SEO Professional
- Certified Software Quality Assurance Professional

### Mobile Application Development

- Certified Android Apps Developer
- Certified iPhone Apps Developer

### Security

- Certified Ethical Hacking and Security Professional
- Certified Network Security Professional

### Management

- Certified Corporate Governance Professional
- Certified Corporate Social Responsibility Professional

### Life Skills

- Certified Business Communication Specialist
- Certified Public Relations Officer

### Media

- Certified Advertising Manager
- Certified Advertising Sales Professional

### Sales, BPO

- Certified Sales Manager
- Certified Telesales Executive

**& many more job related certifications**

Contact us at :

**Vskills**

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[www.vskills.com](http://www.vskills.com)