

This brochure has been developed as part of the **Consumer Education Programme** of the **Communications Commission of Kenya**. It was compiled as a result of a review of material from various sources and presents the current perception of the information available on Internet service options, with particular reference to Kenya.

## What is the Internet?

The Internet is a worldwide, publicly accessible series of interconnected computer networks, which enables users to access resources and information within the network. Essentially, the Internet is a loose confederation of autonomous databases and networks, which was originally developed for academic use, but which now offers a global infrastructure of millions of sites, which are universally accessible.

## Web hosting

The web hosting service enables individuals and organizations to offer their own websites, all of which are accessible via the World Wide Web. Various hosting services are offered, the most basic offering webpage and small-scale file hosting whereby files are uploaded via File Transfer Protocol (FTP) or by means of a web interface. Such files are usually delivered to the web 'as is' or with little processing. Many Internet service providers (ISPs) offer to upload data as a free service to their subscribers, others charge a fee. In general, web hosting companies quote a monthly bandwidth limit for a website of, for example, 5 Gigabytes per month. When the total amount of data downloaded from the website in any month exceeds this limit, the web hosting company may deny further public access to the site.

## Dial-up Internet services

The dial-up Internet service allows access to the Internet via a conventional telephone line and a modem, and is useful to those who travel and require an easily available cost-effective service for small-scale data transmission. Once the Internet is engaged, the phone line is no longer available to make or receive calls. The dial-up connection speed for a standard 56K modem can theoretically transfer 56 Kilobits of data per second. To put this in perspective - the average web page (with images) is around 50 Kilobytes, so the transfer of such a page would take around 7 seconds. Since some Internet Service Providers charge by the minute for a connection – this can have a financial impact.

### Advantages of dial-up connection

Dial-up connections can be economical and are widely available; they use a standard modem, thus hardware costs are minimal.

### Disadvantages of dial-up connection

Dial-up connections are very slow. When connected to the Internet the same phone line cannot be used for phone calls.

## Cable Internet service

Some cable television companies provide an Internet connection service, which utilizes their cables to deliver a fast, continuous connection (connection speeds range from 500 Kbps to more than 1 Mbps). The speed of download in relation to cable Internet connections is, however, often faster than the speed of data transmission. Such services are normally offered for a monthly subscription fee (plus an initial fee for the cable modem), and may be cheaper if the consumer is already a client of the cable company in question.

### Advantages of cable connections

Cable Internet connection offers high-speed download of large files (music or large attachments). Cable connections transfer data digitally, eliminating any digital/analogue conversion overhead. Cable connections are permanently connected – so there is no wait to make a connection.

### Disadvantages of cable connections

Cable connections are not available in every neighbourhood. Because cable connections are permanently connected, firewalls and other security devices are required to protect the computer.

## Integrated Services Digital Network (ISDN)

The ISDN digital access service is delivered via existing telephone lines and offers the possibility of initializing end-to-end digital connection, which can support a variety of services such as:

### Web browsing

ISDN enables the user to surf the Internet at speeds up to four times faster than those attainable when using an analogue modem.

### Faxing at high speed

ISDN enables a user to exchange (on plain paper) a high quality document with another fax machine in less than 10 seconds.

### Interconnecting a local area network (LAN)

ISDN can be used to interconnect LANs located at different places thus creating a fast wide area network.

### Desktop video-conferencing

An ISDN line can enable the use of a desktop video conferencing system.

## Asymmetric Digital Subscriber Line (ADSL) services

The ADSL service uses a conventional telephone line and a modem and works by splitting the phone line into two separate channels: one for data (e.g. Internet access) and the other for voice (phone calls), thus allowing simultaneous data and phone use. ADSL offers:

### Remote LAN access/High speed internet access.

By means of ADSL, remote LAN access/internet access services have been made available in Kenya in the following bandwidth ranges.

- 32/128 kbps
- 64/256 kbps
- 128/1MB
- 512/2MB

**Note:** two values are offered for each configuration - the first figure gives the upload speed and the second figure gives the maximum download speed.

Access to E-Commerce – by provision of the bandwidth necessary to allow instant transactions.

Security surveillance – via the provision of cost-effective solutions for the monitoring of remote locations, which can be streamed via the Internet on closed circuit television (CCTV).

## Wireless Internet services

There are a number of wireless Internet services, such as;

iBurst: a mobile broadband wireless access system, which offers high performance, high speed, secure, mobile wireless access for business, home and office applications. iBurst offers: up to 1 Mbps data connectivity; wide area wireless access; continuous connectivity and enhanced security.

## Worldwide inter-operability for Microwave Access (WiMAX)

WiMAX is a third generation protocol for wireless communications that makes more efficient use of bandwidth and better avoidance of interference.

## Wireless Fidelity (Wi-Fi)

Wi-Fi is a wireless data network, which allows Wi-Fi enabled devices (such as PCs or mobile phones) to connect to the Internet when they are in the vicinity of the wireless data network. Offering low-cost implementation and high access, Wi-Fi areas are sometimes termed 'hot spots'.

## General Packet Radio Service GPRS

General Packet Radio Service (GPRS) is a packet-based wireless communication service, which provides continuous Internet connection for mobile phone users. GPRS allows 2G (2nd Generation) mobile phones to connect to the Internet for such purposes as the collection of emails or for the access of WAP pages. The cost of the service is based on the amount of data that is downloaded.

## High-Speed Downlink Packet Access (HSDPA)

HSDPA is a new mobile telephone data transmission protocol, which is technically known as 3.5G. Essentially, it offers download speeds on a mobile phone, which are equivalent to those offered on an ADSL (Asymmetric Digital Subscriber Line), thus removing any limitations deriving from a slow connection. In theory, HSDPA can achieve data transmission speeds of 8-10 Mbps (Megabits per second).

## Enhanced Data-rates for GSM Evolution (EDGE)

EDGE is a faster version of the standard GSM wireless service, which is based on GSM standards while using TDMA technology.

## Wireless technology for mobile phones

The two most common types of wireless phone technology currently in use in Kenya are: GSM (Global System for Mobile Communication) and CDMA (Code Division Multiple Access).

## GSM technology

GSM is a second-generation wireless telecommunications standard for mobile cellular services.

## CDMA technology

CDMA digital wireless technology employs a special coding scheme (whereby each transmitter is assigned a specific code), which allows multiple users to share common access to the network.

## Third Generation (3G) technology

3G technology is the newest and most innovative form of communication technology and offers high data transfer rates, wide bandwidth and increased capacity, all of which are required to support: Internet access, multimedia applications, global roaming and access to such things as: sports news, weather updates, horoscopes, competitions, films, video messages, and online gaming.

## VSAT services

The services that can be made available through VSAT (Very Small Aperture Terminal) include:

- Electronic mail.
- WAN/LAN networking.
- Broadband Internet/Intranet access.
- Automatic teller machine interconnection.
- Electronic point of sale terminal interconnection.

- Credit card verification.
- Multimedia service delivery.
- Distance learning and training.

## How to measure the speed of an Internet or data connection

The type of connection you use has a direct effect on the speed with which you will be able to use the Internet. The capacity of an Internet connection is referred to as its bandwidth, and is measured in bits of data per second (a Bit being an on or off, 1 or 0 signal). A thousand Bits equal one Kilobit (Kb); a million Bits equals one Megabit (Mb); a thousand million Bits equal one Gigabit (Gb). Data files are measured in Bytes and KiloBytes (KB) with one Byte consisting of eight Bits. It therefore follows that:

A 1MB file is 8,000,000 Bits and will take 200 seconds (3 minutes 20 seconds) to transfer over a perfect 40kb/s (40,000 Bits per second) connection.

## Internet terms

**Bandwidth:** a measure of the information carrying capacity (rate/speed) of a communication line that is often used as a synonym for data transfer rate - the amount of data that can be carried from one point to another in a given time period (usually a second). This kind of bandwidth is usually expressed in Bits (of data) per second (bps).

**Broadband:** a data rate greater than the ISDN basic rate, this is the generic term for high-speed digital Internet connections, such as wire line, DSL or cable modems and wireless 3G technologies. Broadband service is 'always on' so dial-up is not required. Broadband is capable of supporting a variety of voice and data applications, such as voice telephony, internet access, pay TV and multimedia services. Broadband connections can be divided into two major categories: shared and dedicated. Shared Internet connections include DSL and cable broadband connections. Dedicated connections relate to leased lines such as E1, T1. **Dedicated bandwidth:** means that the bandwidth for which you subscribed is committed to your exclusive use 24/7 and regardless of total network utilization at any given time. **Shared bandwidth:** means that the bandwidth to which you have subscribed is used collectively between yourself and other users of the same service plan. While the ISP

will endeavour to achieve the minimum set speed on your service level agreement, this may only be possible when other users are few or are inactive. **Modem (MODulator – DEModulator):** a device used to connect a computer to a telephone line to enable the transmission of data through the line. **Download:** Retrieval of data from another computer via a communications link. **Upload:** Sending of data to another computer via a communications link.

MB (Megabyte): a measure of data that is equal to 1,048,576 Bytes, or roughly one million Bytes. As a guide:

- It is possible to view approximately 20 Internet pages for each MB of download.
- An average four-minute MP3 (music file) is approximately 4 MB.
- A five-minute movie trailer may be as much as 30 MB.

## Need to know more?

For further information on the above topic or any other aspect of health and safety with regard to communicational equipment, please contact:

**Disclaimer:** while every attempt has been made to ensure that the information included in this document is accurate, it is intended ONLY as a guideline towards the safe operation of communications equipment and should not be regarded as (or used in lieu of) legal advice. The Communications Commission of Kenya will not, therefore, accept any liability for the consequences of any actions taken, or decisions made upon the information offered. **Acknowledgements:** This brochure was developed as part of the Consumer Education Outreach Programme of the Communications Commission of Kenya, working in partnership with Teknobyte (Kenya).

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# Internet service options



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