



Beginners User Guide

The Basics of Information Technology



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This guide is one of a series of "How To" Guides" produced by Enterprise Ireland to meet the needs of Irish companies, particularly our client base, the majority of whom are small to medium enterprises (SMEs) in manufacturing or internationally traded services.

They are designed for non-IT professionals charged with developing and/or implementing eBusiness/IT strategy in their companies. Hopefully they may also be of use to IT professionals.

These guides are only one of a range of eBusiness resources provided by Enterprise Ireland. Most of the other resources, can be accessed through our eBusiness webpages

www.openup.ie

Here you can access more guides and cases about eBusiness and related topics, details of solution providers, access to our free eBusiness e-zine and discussion forum, eBusiness events guide and links to interesting reports etc.

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Beginners How To Guide – The Basics of Information Technology

This Guide has been written for absolute beginners, to define Information Technology and related terms and to put a context on the use and importance of ICT (Information and Communications Technology) in business.

Information Technology involves the processing of information by a computer. Usually this means the use of hardware, software, services, and the supporting infrastructure to manage and deliver information.

IT has changed our daily personal lives radically over recent years - the use of mobile phones to make calls and send text messages, the use of websites to book cheap flights and the use of ATM machines for banking are all an integral part of our society today.

Clearly the business environment has been hugely impacted by these developments and practically every company has had to adapt IT in some form in order to compete effectively.

eBusiness can be defined as the application of IT to business processes; i.e. the process of doing business with trading partners electronically. This includes, for example, processing business transactions electronically, integrating business processes electronically and transferring payments electronically and delivering services electronically.

Hardware

Hardware can be defined as IT-related machinery and equipment - if you can fall over it, it's hardware! This would include physical machines such as personal computers (PC's), storage devices (such as CD's) and cables etc. In order to operate however, a computer uses software - hardware and software are interdependent. Hardware is the physical unit which stores and transmits information, software is the logic and language that dictates how this is done (see Software below). Until the late 1970's, most word processors were dedicated machines e.g. typewriters. Now computers have replaced almost all dedicated word processors. However in order to be able to work with text, a PC, which is hardware, requires a set of instructions, which is software that provides word processing functions on the PC.. Popular word processing software packages are Microsoft Word and WordPerfect.

The amount of work that a computer can do is dependent on the size of its memory and the speed that it can operate at.

When you see an advertisement for computers, RAM is often mentioned. This means Random Access Memory and defines the computer's capacity for work. Memory is like an electronic checkerboard, with each square holding one byte of data or instruction. When personal computers first came on the market in the late 1970s, 64 kilobytes (64 KB) of RAM was the upper limit. Today, 64 megabytes (64 MB) of RAM is entry level (the starting point) for a desktop computer i.e. a thousand times as much.

The speed at which a computer operates is dictated by the Processor in the Central Processing Unit (CPU), which is the processing part of the computer. The CPU, clock and main memory make up a basic computer. A complete computer system needs other elements such as the control units, input devices (e.g. keyboard), output devices (e.g. screen), storage devices and an operating system (the master control program that runs the computer). Any hardware device connected to a computer, such as a monitor, keyboard, printer, disk, tape, graphics tablet, scanner, joy stick, mouse etc is known as a peripheral device.

The Operating System (O/S) is the first program (set of instructions) to come to life when the computer is switched on. Its main part, the "kernel," is kept in the memory at all times. The operating system is the link between the hardware and the application programs that run in the computer. The applications "talk to" the operating system for all user activity and file management operations.

Operating Systems that you have probably heard of include the various versions of Windows (95, 98, NT, XP etc), the Unix versions (Solaris, Linux, etc.), the Macintosh OS, the AS/400's and of course there are many more. Anyone remember DOS - with its tiny text on a dark screen? DOS is still used as an Operating System for some applications. There are other special-purpose operating systems.

Storage devices are the temporary or permanent holding place for digital information. It refers to disks and tapes, for example where information is stored - think of it as having extra physical space in a warehouse. Memory is not a storage device - it is a temporary workspace that the computer uses to execute tasks, such as processing information.

Hardware requirements depend on the size of the databases that will be created and the number of users or applications that will be served at the same time. How much? How fast?

One clear trend in hardware development is the move towards portability. Portable PC's such as laptops and notepads (different suppliers label portable PC's in different ways) are becoming more popular. The advantages of portable PC's are many - business people can work from home, the airport or at any workstation in the office without the need for a fixed location. This can improve productivity and even reduce office overheads as the need for fixed workstations diminishes. Portable PC's also facilitate Internet access from remote locations giving access to information regardless of where the user is situated (as long as an Internet connection can be established in that location) it also makes it easier for the employee and can reduce overheads

However portable PCs are more expensive - in some cases significantly so - than Desktops. Also where there is no power source, the user is dependent on the life of the battery, which can be limited, typically for 1.5 to 2 hours and possibly less depending on the age of your machine, the model etc..

Another growing trend in hardware is the development of various other small portable devices which have much of the power of a computer, are connected by radio links to the Internet but are generally smaller and are used by service engineers, sales people, truck drivers etc. These are called Personal Digital Assistants (PDAs). iPAC and PalmPilot are well known brands in this marketplace - the line between these devices and mobile phones is slowly blurring over time.

Software

Software can be defined as the set of instructions for the computer - it dictates what is to be done. Software runs on (i.e. operates on) hardware. A list of instructions that undertakes a particular requirement or task is known as a "program." The two major categories of software are "system software" and "application software." System software is made up of control programmes for the computer itself, such as the operating system and database management system (DBMS). Application software is any programme that processes data for the user (e.g. inventory, payroll, spreadsheets, word processors, etc.).

Often people confuse software with data however it is not data - it tells the hardware how to deal with the data - in simple terms software is "run" (i.e. a set of instructions is initiated) and data is then processed. The data itself often comes in the form of databases - which are files that are originated and managed by a database management system (DBMS). DBMSs can manage data in many different formats such as text, sound, images and video Database and file structures are determined by the software being used.

Required Equipment and Connections for setting up a basic PC workstation

You need to, at least, budget for the cost of an entry (beginner) level PC with some basic software such as Microsoft Works, a printer and a scanner.

Your Internet connection via a high-speed line (in this example, DSL) would involve the cost of a modem plus the ISP's costs. This type of standard starter pack should suffice in most startup situations and the facilities can always be "ramped up" should demand increase.

Networks

A network is a group or a number of people or things linked or connected together, either physically or by association. A Local Area Network (LAN) is common in business and it serves users within a confined geographical area.

Networking an office involves each individual piece of hardware and software - for example your PC's, printers, fax machine, scanner and phone connection- to be networked together to pass and share information. Although networking is traditionally done by physical cabling some LANs run on radio links without the need for cabling, in much the same way as cordless phones have removed the need to be dragging a long telephone line behind you - you can talk and move around at the same time.

Here's how a basic network could work; if there are 4 people in your office and you are the only person that has a printer, each time one of your colleagues wants to print a document they have to email it over to you or get up from their desk, walk over to you and hand you a disk to print from. Why not share that printer with your colleagues by networking the 4 computers together. Now they can print directly to your printer through the network without disturbing you or wasting time walking across the office to give you the disk to print. However there is a flaw in the above scenario in that the PC, to which the printer is attached, controls the printer. This means that the PC must be constantly switched on for the printer to work. Alternatively, you can have a printer connected directly to the network by means of a Network Interface Card [NIC] in exactly the same way as a PC is linked to the network. In this way, the printer is independent of all the PCs on the network. Other hardware and devices that can be shared include your fax machine, scanner and telephone connection. Equally, software applications such as your accounts package e.g. TAS Books /SAGE / Exchequer, can be accessed across the network. Some applications such as ACT, a customer contact management package, work best when used in a network environment.

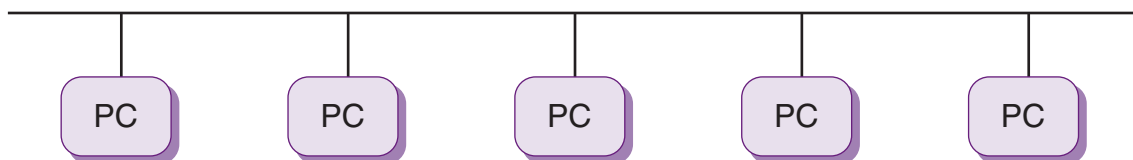
A hub can act as the central contact point, connecting to the network interface cards of each device [PC or printer] on the network and distributing the information across the network.

In terms of internet access, to send and receive external email and surf the Internet you need a router, which acts as the buffer between your network and the outside world.

Bus Topography

However rather than having all the computers or 'workstations' and other hardware connecting to the hub, you could connect them all by one cable in a ring or loop where the first computer connects to the next and so forth until the last computer connects back to the first. This is described as a BUS type network, which uses a common pathway between all devices

In a BUS type network all the computers are connected by one cable where any computer connected can send a signal down the cable to all the other machines.



The basic components are as follows;

Network Interface Cards

Most PC's now have Network Interface Card's included therefore they do not have to be bought for the network. If your PC is not new, you may need to purchase a Network Interface Card [NIC].

Hub

Costs can vary depending on the size and demands of your network.

Router

Prices start at €380 to €500 and can rise rapidly to over €25,000 for a robust enterprise wide solution. Cisco is the market leader in hubs and routers.

Cable

The amount of cable required will depend on the number of PCs and other hardware being connected and the distance between each point. Remember the maximum distance between a PC and the hub is 50m.

Example 1: To network a small office with 4 PCs and no external access, assuming NIC cards are already included in your PCs, your expense will be the cost of the cable and hub.

Example 2: To network the same office with 4 PC's and external access, only one machine needs to be connected to the internet others share from this connection - this is fairly easy to do with DSL as you can connect straight to the router which enables all other machines connected to the same router to share the connection. Your expense will be the cost of the cable, router, and the telecommunication cost for DSL.

Wide Area Network (WAN)

What if you have a sub office? Why not include them in your network by building a wide area network? A WAN requires additional hardware to facilitate the secure transmission of company information.

For example, the general manager of your regional office may need access over a telecommunication line to the head office for central information such as client data, project and stock status as well as requiring the ability to send and receive emails internally. Equally, people at the head office will use this WAN to see and communicate with the regional office.

For security, a firewall is required to filter data as it passes over the public network to prevent unsolicited access.

Remote Access

Perhaps you want to work from home once a week but still want to access files on a PC in the office. This can be achieved efficiently and cost effectively. One of the PC's in the office needs a phone line linking into it. You dial through your home phone line directly into that PC and the two modems establish a connection. Once connected you have full access to all the other PC's and hardware in the office network.

Virtual Private Network

Perhaps your sales team is geographically dispersed and need regular access to the company network to process orders and check stock status.

A Virtual Private Network (VPN) may utilise your existing network and public networks such as the Internet. For example a sales representative based in the UK can Telework from their hotel by dialing in over the Internet to the office network in Ireland, and work away as if the user was in the company office. With the remote connection established, the user has access to everything that is normally available when sitting at the desk.

To set up a VPN, additional software, hardware and security is required. However, the savings in the long term could far outweigh the initial costs that are incurred. For example, a UK based employee accesses the VPN by making a local call to an ISP and through that Internet connection he can access the company office network and other relevant company information. Because the UK employee is using a VPN over the Internet, the cost of the connection is a local call to the ISP instead of an international call to the head office. Multiply this scenario and the savings soon become apparent.

The Internet

The Internet is a computer network made up of thousands of networks worldwide. No one knows exactly how many computers are connected to the Internet. It is certain, however, that these number in the millions.

No one is in charge of the Internet. There are organisations which develop technical aspects of this network and set standards for creating applications on it, but no governing body is in control. The Internet backbone, through which Internet traffic flows, is owned by private companies.

All computers on the Internet communicate with one another using a standard or protocol called the Transmission Control Protocol/Internet Protocol suite, abbreviated to TCP/IP. Computers on the Internet use a client/server architecture. This means that the remote machine (server) provides files and services to the user's local (client) machine.

Often the terms internet and web are used synonymously. In casual conversation such as "I was on the Internet" or "I was on the Web," there is no difference. However in practice these are two entirely different items. In the same way that a car travels on a road, a web page travels over the internet, which is the physical network. An Internet user has access to a wide variety of services: electronic mail, file transfer, vast information resources, interest group membership, interactive groups, multimedia displays, real-time (live) broadcasting, shopping opportunities, breaking news, and much more.

The World Wide Web is basically a particular way of transporting text, images (graphics) and other multimedia content e.g. video and sound clips, over the Internet. Web servers (computers or software) on the Internet are set to respond to particular requests by sending documents to the requester, usually done in HTML. HTML stand for Hyper Text Mark up Language and it is a standard language made for typesetting. It is mainly used for creating documents on the World Wide Web. Included in the language are provisions for including pictures and links to other pages. The requester must use a browser (software programme) to receive this data.

Email

Email stands for electronic mail. Email is the most commonly used application on the Internet. Email allows you to send text messages across a network, either an internal network or an external one like the Internet. To send an email you must know the email address of the person you want to send the mail to e.g. john@somewhere.com. An email address is comprised of a user name, in this case john, and the name of the server that the mail has been sent to, in this case somewhere.com.. The power of e-mail can be seen from the fact that traditional paper-based mailing list procedures are now being superseded by mail-shots at targeted audiences, which can be transmitted instantly at little cost via electronic mail.

Emailing [external] people requires a computer with Internet access. Specialist software packages facilitate the delivery and receipt of email. There are two ways to receive email; one is via specialist programmes and the other is via a web service e.g. Eircom or yahoo! Web-based email is typically free. However if you use a software package such as Outlook Express or Eudora, they are far richer in features than web service email facilities. This software will be configured (set up) to use your chosen Internet Service Provider's (ISP) service and will dial in to this service to receive and send your emails. One of the advantages of using an email package on your PC is that you can control various limits, for example with free e-mail you typically do not get a very large mailbox and your mailbox can fill up - if you do not routinely check your mail subsequent emails and attachments will be turned away. With your own email software, you will typically have much higher size limits and more control over managing the process. Most business people use computer-based software such as Microsoft Outlook, or Lotus Notes.

Email has many benefits including speed, the fact that you can send "attachments" (e.g. documents) with your email and the fact that the physical location of the sender or recipient is immaterial to the activity.

Websites

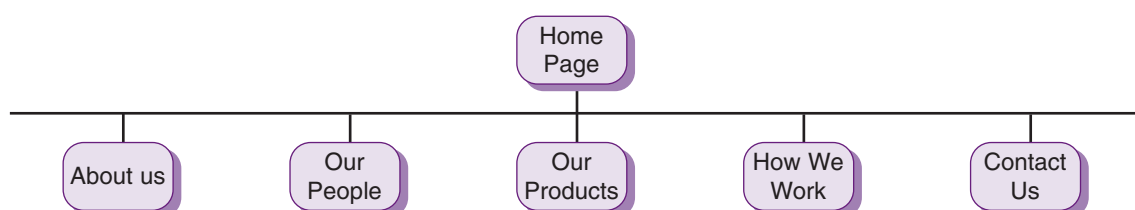
A website is a location on the Web owned and controlled by a single person or organisation. It is a set of HTML pages linked to each other. Initially company websites simply reflected their corporate brochures and although this is still the case for some business sites, others are using websites to transact business, allow customers access to their account information, allow suppliers access to company systems, allow purchasers to check quotes across a variety of suppliers and many more applications.

To have a website available to the Internet 24 hours a day 365 days a year your web server needs to be connected to the Internet permanently. This permanent connection used to be costly however costs have reduced significantly in recent years. However this does raise other issues such as security and reliability. Typically an Irish company will use an internet service provider (ISP) or hosting company who will store the company website on hi-spec web servers (machines) and make the website available twenty four hours a day, seven days a week.

Hosting costs start at around €300 per annum and increase with the size and complexity of your website.

A typical basic brochure website could have 6 pages where the home page links to 5 other pages containing information on the company, key personnel, products/services as well as a feedback form. In order to make sales on the site, the products page could lead to a shopping cart system where visitors can purchase products online in a secure environment with their credit card. The transaction may then be verified by one of the banks verification systems.

Examples of web sites include <http://www.kennys.ie> and <http://www.tesco.ie>



Browsers

A browser is a program that allows your computer to access and display web pages. It interprets the electronic information from the Internet and allows you control what pages you view.

Many different browsers are available, but the most popular of them are Microsoft Internet Explorer and Netscape Navigator. It's important to make sure that you always have the most recent edition, as new features are added all the time. Updates are free and will help you enjoy the latest developments which web designers are using on sites e.g. dynamic images.

Search Engines and Directories:

Search engines are tools which enable people to search the Internet's pages for specific information or websites. Simply type one or more words into the search box and click on the search button. A list of matching web pages will be displayed. So click on one to visit it.

When it comes to search engines, Google is among the most popular, accessing information on such wide-ranging subjects as careers, shopping, auctions, film and movie reviews, free email, etc.

Directories perform a similar task to search engines in that they hunt for information on web sites, but they differ in one important respect. Directories are hierarchical lists of information which need a level of refinement not required with search engines. Among the most popular directories is Yahoo!

Some companies have found it cost effective to pay specialist vendors to ensure that the company web site always features very well when a potential customer does a search on the Internet. However, before paying another vendor to improve the visibility on the web, an astute company with knowledge of how search engines work on the web could do many things to improve web visibility. This all comes under the umbrella of 'Search Engine Optimisation' and is an area that is now receiving a lot of coverage in books on e-Business and on the Internet.

See Enterprise Ireland's How to guide to promoting your business...

How will IT affect your Business?

IT can give your company a significant competitive advantage; the other side of this coin is that if you fail to embrace technology in your business, your competitors will get ahead. Moreover an eBusiness approach consolidates a company's position in the market, opening up new business opportunities and improving profit margins.

Competitiveness:

- eBusiness offers a reliable, cost effective and involuntary means of doing business. Routine tasks can be automated and customers, if they wish, can avail of a 24-hour service.
- More players will enter the market as technology enables firms to penetrate overseas, this represents both an opportunity and a threat.
- New technologies can change the face of your business; look at the Irish airline industry and consider how the internet has changed the entire business model in this market.

Security:

- Information Technology can give companies a competitive advantage. However, this can mean that customers, suppliers, contractors, and business partners are routinely allowed access to critical business data and to the systems that process and store the information. Consequently, companies must have a security program.
- The three fundamentals of a security program are
 - **Confidentiality** - only authorized parties can read the details of the transaction
 - **Integrity** - unauthorized modifications of the transaction will be detected
 - **Availability** - systems are reliable and recoverable
- There are many areas that a company may address as part of a security program and these include:
 - Regular Backups and Recovery;
 - Anti Virus Protection;

- Disaster Recovery;
- Audit Logs and Monitoring of unusual activity
- Authorised User Access utilizing password control.

Cost Benefits

- Lower transaction expenses are a reality and labour costs associated with administration can be slashed.
- Supply costs can be reduced. The extensive availability of Internet-based information means that companies have a wider choice of suppliers and by extension, there is more competitive pricing.
- Publication and distribution fees fall. Publishing a brochure online enables a vast number of people to access it, while also allowing the company to update the information on an ongoing basis.
- The role of the Middleman becomes less important as companies can sell direct to the customer.

Marketing

- Websites help to build brand awareness offering new avenues of promotion.
- Customer loyalty deepens because web based purchasing affords customers the opportunity to communicate with the company.
- Conversely, a web site also allows the firm to offer better service to consumers.
- For a closer look at the Marketing Mix, visit our Advanced How to Guide "Marketing Your Online Presence".

Business Issues

Managerial commitment is also a factor in the success or otherwise of the application of IT to your business. If the eBusiness initiative is seen as a marginal concern then it will never achieve its true potential.

Good management is crucial to the ongoing creation of value and efficiency. If the company is looking toward the global marketplace, important considerations which could affect the success of the initiative are localisation, the legislative framework within which business operates and logistics.

It is imperative to state that processes within a company may need to change considerably if the company is about to embark on a new [e-business] sales channel. Web Customers need and expect different levels of service. Companies must understand that the purchase of new technology is of little value unless the company is willing to go through a program of process re-engineering and change management.

Regardless of whether you want to work on a local, national or international level, you need to get to grips with the way in which IT affects your business; now and in the future.

Useful sites

Useful Reference Sites

- www.openup.ie
A comprehensive resource site for companies going on-line for the first time.
- www.basis.ie
This website has been developed in order to provide business with a single access point to all Government information and services
- www.entemp.ie
The website of the Dept. of Enterprise, Trade & Employment
- www.internet.com
A very comprehensive site that covers all aspects of the Internet from technology to marketing to eBusiness.
- www.domainregistry.ie
Secure the name of your Irish website here.

Search Engines

Search engines are sites that look for information for you on the web.

- www.yahoo.com
- www.google.com
- www.altavista.com
- www.metacrawler.com
- www.searchenginewatch.com

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