

The amazing world of the internet – challenges of the internet age

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Abstract: *This presentation is aimed at briefly underlining the most important developments in informatics, following the introduction of the new informational techniques and technologies.*

Our presentation began by enumerating the programming languages used over time, by presenting the computers industry and computers generations. We have focused on numerous technical aspects, such as hardware structure; however the basis was represented by the way how information and computer networks are organized. At said point, an analysis was made of the Intranet and Internet, with a particular focus on the evolution of the Internet and its advantages and disadvantages. The Internet has represented and continues to represent a great challenge for its users, whereas as beneficial its advantages might be, the more dangerous it can become its use by some users in less controlled environments.

Introduction

Most scientists, i.e. linguists, philosophers, logicians, informatics and cybernetics specialists, admit that the main function of the language is communication and thus the transmission of information, while other knowledge is also transmitted along with such. Natural language has been the starting point for the literary, historic, poetic, philosophic, logic, scientific languages, up to the

formalized and conventional languages and computer programming languages.

Scientists currently accept that information is a primary concept that can be transmitted by a minimum of energy; nonetheless the quantity of information does not depend on the value of such minimum value. Nowadays information theory is considered to be a self standing area, although its history is still short.

In 1838 the French scientist A.M. Ampère introduced the term of cybernetics,

while in 1868 the principle of a feedback device was introduced by Maxwell, who then in 1871 made a connection between the notion of information and the energetic notion of entropy.

1. Programming Languages

From a semiotic standpoint, most specialists assert that some programming languages are more similar to the logic languages, while others are rather similar to the natural ones.

From a chronological view, the code machine was the first programming language ever to be used. Starting from the semantic description of algorithm, a program comprises a finite array of instructions written in the form of binary characters sequences. It implies significant effort from programmers, and it is currently used only for programming microprocessors for simple automate machines. Nowadays, most of the phases necessary in order to programming in machine code have been transferred to the computer, by creating a series of types of programming languages. Said languages are recognized by the computer, which has a series of programs installed to such end that are named compilers and transform such into machine code. During the last forty years, an impressive number of programming languages have been created, among which we mention:

- ALGOL - an algorithmic language, in which a series of instructions are input for forming correct constructions, definitions of the senses to be allocated to such constructions and definitions regarding potential uses. This is a widely used language in universities;

- FORTRAN – an universal language, one of the most used languages in the 70s. Facilities for creating cycles exist in this language.

- COBOL – a language used for data manipulation, accountancy operations;

- BASIC – a language used by the wide mass of users who are not programming specialists. It is first of all used by engineers for simple programs, when they use certain engineering formulae;

- APL – the first language used by scientific researchers;

- PROLOG – a language used for expert programs in various areas – medicine (for diagnosis and treatment recommendations), geology, technologic processes etc;

- C++ - an object focused languages, that allows for data from the reality to be stored, for programming tools and modeling of situations in the real world;

- JAVA – a modern objects focused language used for Web pages, well protected against viruses.

2. Computers Industry, Computers Generations

The most important scientific and technologic development was faced by the computers industry, both in the hardware (intrinsic computer construction) and in the software area (programs and operation systems installed on computers). Thus, from 1946, when the first electronic computer ENIAC appeared and until the present moment development boosted and analysts were able to distinguish between categories by time and development level.

I. The First Computers Generation

This generation includes the period between the creation of the first electronic

computer and up to 1955. Computers of that generation were equipped with electronic tubes, electromagnetic relays, while internal and external memories used magnetic tubes. That is why the calculation speed was of approximately 10,000 operations a second, the working capacity was low, with low (approximately 2 ko) internal and external memories.

II. The Second Computers Generation

The second generation benefited of semi conducting commuting circuits (transistors, diode, Zener diode etc.), of ferrite based internal memories and electromagnetic external memories.

This generation covers the period between 1956 and 1963. The working speed reached 100,000 – 200,000 operations a second, and the internal memory capacity reached 32 ko.

The first operation systems occurred (own programs of the computing system that control the data input and output activity, the alternative running of programs, programs for standard services such as sorting and categorizing, standard computing programs for mathematic functions such as square root, exponents) and high level programming languages by which the bases of programming engineering were created:

- FORTRAN (FORmula TRANslator) focused on technical-scientific computation, in 1956;

- COBOL (Common Business Oriented Language), focused on economic computation which manipulate high data volumes, in 1960;

- ALGOL (ALGORithmic Language), introduced in 1958, focused on technical-scientific computation, and later one generating PASCAL programming language.

III. The Third Computers Generation

The computers of this generation appeared between 1964 and 1975 and were built with integrated circuits, with an integrated circuit capsule comprising a series of active circuits (transistors, diodes) and passive circuits (resistors and condensers), they had internal memories made out of semi conductors, thus much more rapid than the magnetic based external memories. Microcomputers with microprocessors of 8 bites addressing appeared, which allowed for direct access for the user to computation technique and the wide use of information.

This computers generation benefited of developed programming languages. New programming languages appeared:

- PL1 (Programming Language no.1), created by IBM;

- LISP (LISt Processing language), created in 1960 and focused on lists based processing. It was the first non-procedural language on which artificial intelligence and expert systems are based.

- PASCAL, created in 1971, a structural language (each processing is deemed as a block, and blocks can be closed, encapsulated in one another). This language created in Switzerland faced wide development once the microcomputers occurred.

- C was created in 1971 by Bell-Telephone company, in order to allow for the Unix operation system to be achieved. It is a high performance language, with the concepts of high level structural languages allowing it further access to hardware.

- BASIC (Beginners All-purpose Symbolic Instruction Code), was created in 1975 and is an interactive language that can be used on microcomputers and even calculators. It was created in the USA and allows

people to use it who are not informatics specialists.

During this computers' generation operating systems grew significantly. In 1965, IBM introduced two operating systems DOS (Disk Operating System) – focused on personal computers and OS (Operating System) – focused on strong, multi-program time partition computers.

IV. The Fourth Computers Generation

Computers became a production mean during this period, which began in 1973 and ended in 1990, representing the boost of PCs (Personal Computer).

In Romania this period began in 1990.

The computers of this generation used medium scale integrated circuits – MSI, large scale integrated circuits – LSI and very large scale integrated circuits – VLSI.

The internal memory was also built with integrated circuits, while external memories were made by also using magnetic disks, however with much larger memory capacities.

The computers of this generation had a computing speed of 10 MIPS, the capacity of the internal memory of 16 Mo, and their low mass allowed for such to be installed on desks, while prices allowed for PCs to also be used by private individuals.

Computer networks were widely used and thus interactive working with other intelligent terminals.

Operating systems evolved greatly, and companies which specialized in producing them were Microsoft and Digital Research. The first microcomputers generation used the CP/M operating system made by Digital Research, while the second generation was dominated by MS-DOS and then Windows systems developed by Microsoft.

Mass application packages appeared for text processing, data base management, image and sound processing, computer assisted design etc.

Non-procedural languages began to develop: LISP created in USA and PROLOG created in France.

By using such programs, computers manage to reason.

V. The Fifth Computers Generation

The computers of the fifth generation, produced by Japanese were defined as complex knowledge processing systems. They are planned to be used in areas such as:

- Intelligent computer assisted research/design systems;
- Intelligent computer assisted training systems;
- Intelligent office automation systems;
- Intelligent robots.

Obviously, computers in the fifth generation to which scientists are currently working will gradually replace the ones in the previous generations.

3. Computer Hardware Structure

The hardware component of a computer is formed of the physical equipment in which the automatic information processing is made and of the equipments allowing for the user to communicate with the computer. It is formed of the following sub-assemblies:

a. Internal memory, where programs and the data used on a particular moment are stored;

b. External memory, the computer hard-disk where all programs and data that might be necessary to the computer for processing purposes are stored. Hard-disk is formed of a set of disks on which data and

programs can be installed. It is mounted inside the computer and has a storing capacity that nowadays can exceed 9 Go. Computers generally have only one hard-disk, which is used for the permanent storing of programs, including the operating system, and data.

Equipments allowing for the user to communicate with the computer are formed of:

- Input peripherals.
- Output peripherals.
- Input/output peripherals.

4. Information Organization

4.1. Data and Information

To become information, data regarding the object of activity must be processed in accordance with the information requirements, i.e. data collection and processing and then distributing them to policy makers.

So:

- Data are about primary events collected for information or for solving problems or situations;
- Information are messages obtained through data processing, calculations, sorting, classifying.

Data subject to computer processing are introduced in the form of numbers and alphanumeric (letters, digits and other special characters).

Today IT is defined as the science that processes data electronically.

In computer development, one can distinguish four stages:

Stage I 1940 - 1960, when informatics is a novelty and enters the U.S. major military staffs, universities and research institutes.

Stage II 1960 - 1970 when informatics was introduced within enterprises and

particularly trade and oil companies.

Stage III 1970 - 1990, informatics was based mainly on the creation and use of medium capacity computers. Informatics entered in all areas of daily life, especially in military and economic activity, scientific research and education.

Stage IV 1990 - 2000 and further is when computers gained momentum reaching into all areas of economic and social activity, including people's homes. At the same time intelligent computers occurred and they are developing their own organizational and environment recognition programs including voice and writing recognition of the users they are in contact with.

4.2. File types

The file is a collection of information, homogeneous in terms of the nature of information and their processing requirements, a collection can be stored on an information support.

The file identifier consists of two elements: the name and extension.

For the MS-DOS operating system, the file has a maximum 8-digit alphanumeric characters and a string of 3 characters extension, file type is used to determine its affiliation in a class file. Separation period is used to separate the base file name from the extension.

Windows 95 supports long file names, which can have up to 255 characters and thus allow a better definition of the content file, and the first characters are used by default making it uniquely defined in the tree.

4.3. MS-DOS Directories

Directory is a catalogue, a table, a directory of the disk. Information about files that are recorded on the disc so that any file can be found on disk are stored in it.

The root directory is created whenever you format a disk or a floppy disk. In the Root Directory the following are stored: the name of each file with its extension, the space occupied on the disk in bytes, date and time it was created or modified.

Tree is a directory tree structure created by the boot disk starting from the root directory.

Building directory tree is subject to the following rules:

- A directory has only one home directory, called the parent directory (parent directory) located immediately on the superior level. A directory that has a parent directory is also called subdirectory. This allows a directory tree and several subdirectories.
- A directory can have multiple directories child directories. These directories are in direct subordination and they are found on the next inferior level.

4.4. Folders

Folders are used in Windows 95 and 98 respectively to define a container that can store files, applications and even other folders. If the directory is a mechanism through which physical files are organised on the disk, the folder represents a logical organization mechanism at the level of the interface of different entities, including files the operating system is working with.

5. Operating Systems

Operating system is software (programs and data) that provides an interface between the hardware and other software and is composed of a collection of programs that manage computer resources and controls its whole activity.

The operating system provides mainly

the following functions:

- Management of the physical resources of the computer and its peripheral devices;
- Management of input/output;
- Management data (files) onto the external memory;
- Internal memory load control, activity functioning and seizing for user programs;
- Notification of special events that occur during execution and handling these events (error messages and solving recommendations);
- Providing the user interface, its access to control the program, examining the system state.
- Components of the operating system:
 - kernel;
 - shell.

Processor sharing is made through a core operating system component called the process scheduler. The process scheduler solves the requests of the active programs loaded into internal memory through a system of priorities, sharing time, etc.

The operating system interface provides communication between the user and computer. Via keyboard or mouse, user send commands or responses to requests via the computer and monitor, computer send users messages or questions.

Interfaces can be made using:

- Command languages;
- Menu systems;
- Graphics using symbols (icons).

6. Computer networks

6.1. Structure of computer networks

Two or more computers can share data between them in two ways:

- Off line - data sharing is accomplished through floppy disks;

- On line - data sharing is accomplished through an electric cable or communication lines.

A network is formed when a group of computers are connected to each other by various means, so that they may communicate with each other.

A. Intranet: If the network is composed of PCs that are in the same place it is called local area network (LAN). These are computers which are usually in the same department, department of work or place of business. A local area network of a company is called intranet, to distinguish the Internet. Intranet access is generally limited to employees of a firm. The available Intranet information belongs to the company, and thus from the legal and organizational point of view enters under secrecy incidence.

If computers are spread over a much wide area, the network is called wide area network (WAN). These networks may consist of computers located in different cities or countries.

B. The Internet: is a worldwide conglomeration of computer networks. The Internet is not owned or managed by a company and it represents a network of computer networks that can communicate with each other.

Most networks consist of one server and the clients connected to the network.

A computer network offers a wide range of advantages, among which we mention:

- Communication through email;
- Centralized data can be accessed by the computers from the network;
- Resources can be shared between computers (i.e. modems, printers, etc.);

- The possibility to make safety backups on the server.

- The term Internet, or - internet, has several closely related meanings depending on the context:

- The proper noun Internet (in upper case) refers to the World Wide Web, the single global network of computers interconnected through communication protocols (rules) Transmission Control Protocol and Internet Protocol, shortly called TCP / IP. The precursor of the Internet is dating from 1965, when the Defence Advanced Research Projects Agency (DARPA) (Advanced Research Projects Agency Defence - Ministry of Defence, Department of Defence or the U.S. DoD) created the first network of interconnected computers called ARPAnet. Today's super-network is the result of the extension of the ARPANET.

- The common noun internet (written with lowercase) represents in most cases the same network, but seen as a medium of mass communication, with information and services offered to users via this medium.

Technically, the term can also refer to a network that interconnects two or more independent networks that are far away from each other. Examples of large networks, for which the use of this name is justified, are SIPRNet and FidoNet.

The word "Internet" is derived from the artificial and partial annexation of two English words: interconnected and network.

The starting point for the development of the Internet has been the rivalry between two great powers of the twentieth century: the United States and the Soviet Union. In 1957, the USSR (Union of Soviet Socialist Republics) launches into space the Earth's

first artificial satellite called Sputnik. This triggered a particular concern in the United States of America, and President Eisenhower established a special agency subordinated to Pentagon: Advanced Research Projects Agency (www.darpa.mil). This agency of the Ministry of Defence (Department of Defence, abbreviated DOD) is led by scientists, has reduced bureaucracy, and its mission is the following: "To maintain technological superiority of the U.S. military and prevent technological surprise from harming our national security by funding the newest and most revolutionary scientific discoveries and by investing practically unlimited funds for connecting the scientific research and its technological military substantiation." In 1959 John McCarthy, professor at Stanford University, whose name will be associated with artificial intelligence, found the solution to connect multiple terminals to a single central computer: time-sharing. This is a method of working in which several applications (software) require competitive access to a resource (physical or logical), whereby to each application is allocated a time to use the requested resource. When the first computers appeared within large universities, there was also the problem of their interconnection. Researcher Lawrence Roberts supports an interconnection solution by packet switching in the model called "client-server". Thus in order to transmit information, it is shredded into small parts called packets. As in classic mail, each packet contains information regarding the recipient, so it can be properly directed on the network. Full information is reassembled at the destination. Although this method encounters resistance from experts, in 1969 "ARPANET" network starts operating between four nodes: University of

California, Los Angeles (UCLA), University of California, Santa Barbara (UCSB), The University of Utah and The Stanford Research Institute's Augmentation Research Center. All these have been codified into a protocol that regulates data transmission. In its final form, it was TCP / IP (Transmission Control Protocol / Internet Protocol), developed by Vint Cerf and Robert Kahn in 1970 and is now the Internet. TCP / IP makes possible for different models of computers, i.e. the ones that are compatible with IBM and Mac's, using different operating systems such as UNIX, Windows, MacOS, etc. to "get along" one with another. In this way, the Internet was to become truly independent of the used hardware platform. As the U.S. program of Ministry of Defence, the ARPANET has grown amazingly fast, more and more computers connecting to this network. In 1979 ARPA decided to separate the network into two, one for commercial and academic world, and one for military. The two networks could still communicate, basically building an inter-network (internet) originally called DARPA Internet and subsequently established as the Internet. Many academic and military researchers have concentrated efforts to develop network communication programs. Thus in 1980 a series of communication programs (based on well defined protocols), which are used today, were already completed. In 1983, TCP / IP Protocol become the only official Internet protocol and thus, more computers worldwide were connected to the ARPANET. The increased number of computers connected to the Internet has become exponential, so in 1990 Internet included 3,000 networks and 300,000 computers. In 1992 the 100000 computer was already connected. Then the size of the Internet has

doubled about every year.

The rapid development of Internet was due to the fact that the access to the reference material of the mandatory protocols was and still is free. 1969 S. Crocker initiated a series of "research notes" called RFC (Request for Comments), numbered chronologically and being in time free to access on-line (on the internet). The great change began in 1989 when Tim Berners Lee at the European Center for Nuclear Physics in Geneva (CERN) founded the first prototype development of the World Wide Web (WWW or Web). Another major change occurred when, in 1993, the National Center for Supercomputing Applications (NCSA) in the USA has provided the browser named "Mosaic", which was based on a graphical interface (Windows). The enormous growth of the web began almost at once: in June 1993 were recorded 130 web servers, and in 1994 were already more than 11,500 servers.

6.2. Using the electronic mail

Email is a modern form of communication that combines the speed of a phone call with the recording and sending a letter. Sending the letter only takes a few seconds, and the recipient can respond to it when he wishes to and also it is not necessary to contact the direct recipient for sending the letter.

Another advantage of the email is the low subscription price.

The downside is that email does not ensure the inviolability of correspondence.

An email address has two parts, first part is the user's name or any name chosen by the user followed by the @ sign and the second part is represented by the email account name, often followed by the symbol of the country in which the server is. Usually the account name is the same as the server name the host computer is subscribed to.

7. Social issues related to Internet and its dangers

The prevalence of the Internet in the world is huge: in June 30, 2009 about 1.67 billion inhabitants of the Earth had access to the Internet.

Simple and cheap Internet access has also a negative consequence, i.e. no one can guarantee the correctness of users. Thus there is already a wide range of malware, created by evil persons, that are beginning with (invisible) spying to a user's activity and ends with theft of bank account of people who do not know how to defend themselves.

Some world states prohibit, censor or restrict their population's access to the Internet in various fields: politics, religion, pornography, etc., for example North Korea, China etc.

There are lots of web hosting service providers on the internet that can host websites and online projects. The largest international companies in 2008 were: GoDaddy, 1 & 1 Internet AG, ThePlanet and net@access. In Romania there are also many companies offering web hosting. There is also an active community, Gazduire.info, composed mainly of representatives of these companies, community that aimed at promoting these services locally.

Informatics specialists are warning those who use wireless Internet about the dangers they are exposing to by using free WLAN networks and Internet cafes. The number of mobile computers is continuously increasing. Especially netbook markets have much to gain from this development: the very attractive prices and the possibility of accessing the Internet anytime the user wants to represent good reasons to attract

a younger market segment like the tourists who want to have the opportunity to use a mobile device connected to the www especially during holidays. Security experts (see www.marketwatch.ro) draw attention on the risks those who use free connections expose to, especially free WLAN networks from airports, holiday establishments or Internet cafes. Often, upon returning from vacation it turns out that these low-cost connections used during vacations are traps of the cyber criminals who increasingly target these "holiday" connections.

The netbooks with insufficient protection are not the only source of danger. WLAN and free internet cafes use can also transform your holiday into a failure. Criminals often create fake free wireless networks. Then, all the traffic data is received by hackers. Checking your bank accounts or booking a hotel for accommodation with credit card can constitute major problems for their victims when they return from travel.

Especially young people are extremely interested in netbooks. Despite the very low purchase price, these devices offer everything you need to surf the Internet. A problem that many of them have is the antivirus protection, because they do not provide quality security solutions, leading users to be almost unprotected from attacks.

Holiday tips from security experts:

1. *Do not use online banking services or make purchases online from an Internet cafe, a public terminal or using a free WLAN.*
2. *After using the services of internet cafes or public terminals, delete the browsed files, browser history and stored cookies.*
3. *Do not forget to hit "log off" when you logged on a website as registered user. Otherwise, the next user will be able to access your account.*

4. *To send holiday cards it would be better to make a particular email account before the trip, for example on yahoo.com.*

5. *Many Internet applications such as browsers or email clients are generically called "Portable Apps" and can be launched without a laborious installation directly from a USB stick. A contact point for this type of "portable" applications is www.portableapps.com.*

6. *As an alternative to WLAN: use a UMTS card, which, even if it is expensive, involves less risk for users.*

Children's safety and concerns while using the Internet depends on each parent separately. If parents will require children not to do certain things on the internet, it is possible that those prohibited actions to become more attractive. It is therefore important that the education process to be bilateral developed together with children. It is best that parents have an open conversation with children; to make them reach the correct conclusions regarding the internet surfing. The available safety rules for children who use a safe internet must provide an online experience in a positive manner. It should be noted that the Internet is a living organism. With each innovation, we expose ourselves and our children to a new risk.

Conclusion

Nowadays technology has recorded astonishing development rates.

The development of technology refers to knowledge management, new business models and organizational structures, dynamic and cooperative business processes on the network, optimised labour and cooperative work environments, virtual and digital production, modeling, simulation and presentation instruments.

Objectives to be achieved in this area is to create a mobile communications platform for data transmission and access to business information services, developing integrated software tools for financial and economic activities, development of high performance computational techniques for real-time systems, multi-agent systems for quality management processes in a virtual organization, structure, design and development of industrial and other areas / complex activities within economy in modern, advanced, virtual and extended design, creating embedded systems for business development and work environments in cooperation, development of methods and techniques in monitoring processes and technological facilities, development of methods and techniques of dynamic clustering and selection to develop

a virtual enterprise, systems to assist the decision within the transfer of information, achieving an integrated information network of protection and control for the technological processes, managing information safely in special institutions, creating an informational integrated system of modelling and simulation of electricity consumption within the residential area, developing an integrated resource management in multimodal transport of goods, handling uncertain information and developing an electronic auction service for small and medium enterprises, achieving integration of the resources of agro tourism services, developing a food quality detection system using innovative techniques, models and algorithms for design guidance and creation technology for the industrial products within machine building industry.

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