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THE MAIN TRENDS IN THE DEVELOPMENT OF TECHNOLOGIES OF INFORMATION EXCHANGE

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In this paper the analysis of peculiarities of development trend of computer technology is given. It was shown how to provide virtually unlimited bandwidth of routing protocols that can be used in wireless networks. Continuously growing number of professionals working from a PC which is becoming their main working tool. The characteristic feature of the new generation computers connected to the introduction of artificial intelligence and natural language communication are considered.

Keywords: information technology, wireless network, protocol, characteristics, efficiency, computing.

Introduction. The emergence and development of electronic computing in the twentieth century has had and continues to have a huge impact on the global society. The importance of information technology based on computerization is global. Their impact affects government structures and civil society institutions, economic and social spheres, science and education, culture and lifestyle of people [1, 2].

In our time the life of every individual and society as a whole is closely connected with the computer. Computer technology is included in all areas of our lives. The computer has become commonplace not only in production but also in classrooms the classroom and everyday life.

Continuously growing number of professionals working from a PC which is becoming their main working tool.

Neither economic nor scientific achievements are now impossible without communication and without special trained staff.

Throughout the history of computer technology discusses the problem of specialization of computer technology and computer systems in production: an alternative or addition to the development direction of universal computer systems. Will the "universal" computing system "specialized", if it would be included, for example, a specialized processor? However, any specific universal computing system is limited by its purpose and consequently acquires the properties of specialization (at least at the level applied FOR) [3, 4].

In addition, the successful implementation of a number of modern projects connected with the development and production of modern military systems, allows to speak about a serious breakthrough in the traditional approaches to creating technical and business policies of creating computer systems. The basis of this breakthrough is that for the realization of military projects are widely used ready hardware and software technologies of open type. This so-called

COTS technology (Commercial Off-The-Shelf "ready for use"). Standardization is a joint effort of a large number of competing companies.

Computer science and its practical results have become the most important engine of scientific and technological progress and development of human society. Its technical basis are means of processing and transmitting information. The speed of their development is very high, in the history of mankind this growing process there is no analogue. Even if we consider the rapid growth of industry, scientific and other areas. It can be argued that computing history is unique primarily because of the fantastic pace of development of hardware and software. Recently there has been strong growth in the merging of computer, communication and household appliances in a single set. Will create new system hosted on one diagram and includes besides the CPU and its surroundings, and software.

The main tendency of development of computing machinery is currently the further expansion of applications of computers and, as a consequence, the transition from individual machines to their systems – computer systems and complexes of various configurations with a wide range of functionality and characteristics.

The most promising, created on the basis of personal computers, geographically distributed multicomputer systems – computer networks – focusing not so much on computational information processing, but rather on communication and information services: electronic mail, teleconferencing systems and information and reference systems [5-7].

Experts believe that in the first quarter of the XXI century in civilized countries will change the basic information environment. Specific volumes of information received by society on traditional information channels (radio, television, print) will be disastrously low in comparison with the amount of information obtained through computer networks.

Forecasts further growth of mass production and the proliferation of personal computers, embedded microprocessor, the creation of global and regional networks of information exchange. An example here is the development of the Internet [8, 9].

Today the users of the global network Internet became available in almost any storage of knowledge that the network is not confidential information.

Internet e-mail allows you to receive mail from anywhere in the world (where there are the terminals of the network) after 5 sec, not in a week or a month, as is the case when using regular mail.

In the design and creation of computers actually substantial and sustained priority in recent years have powerful computers – supercomputers and miniature and subminiature PC. Being, as already indicated, the search works on creating computer 6th generation, based on a distributed neural architecture of

Neurocomputers. In particular, the Neurocomputers can use existing specialized network MP – multiplexer.

The widespread use of broadband multi-channel radio, fiber optic, and within line of sight and infrared channels of information exchange between computers would provide practically unlimited bandwidth (transfer up to hundreds of million bytes per second).

Wide introduction of multimedia, primarily audio and video media input and output information, will allow you to communicate with the computer in natural language. Multimedia should not be construed narrowly, only as a multimedia PC. You can talk about home (domestic) media, including the PC and a whole bunch of consumer devices that put the flow of information to consumers and actively collecting information [10-12] from him.

That already contributed to:

1. The current technology of media server, able to collect and store huge amounts of information and produce it in real time on multiple incoming requests simultaneously;
2. System ultra-fast broadband information highways, linking together all of the consumer system.

Named expected technology and characteristics of computer devices in conjunction with their overall miniaturization can do all sorts of computing tools and systems ubiquitous, usual, ordinary, naturally saturating our daily lives.

Experts predict in the coming years the possibility of creating a computer model of the real world, such a virtual (apparent, imaginary) system in which we can actively live and manipulate virtual objects. The simplest type of such apparent peace now exists in complex computer games. But in the future you can talk about games, but about virtual reality in our daily lives, when we are in the room, for example, will be surrounded by hundreds of active computing devices, automatically switch on and shut off as needed, actively tracking our location, constantly supplying us with the necessary situational information, actively perceiving our information and control many household appliances and devices.

The information revolution will touch every aspect of life; there will be a system that creates a virtual reality:

1. Computer system – when working on computers with "user-friendly" subscribers via video-link to see a virtual partner, to actively communicate with him in a natural voice level with audio and videoethernet, tips, hints. "The computer alone", so affect the psyche of active users of computers will disappear.
2. Computer aided learning – in the presence of reverse video will be the subscriber to communicate with a personal virtual teacher that takes into account the psychology, readiness, receptivity of the student.

3. Trading in any goods will not be accompanied by a magnetic code printed on a commercial label, and the active computer sign remotely communicating with a potential buyer and report all the information he needed – what, where, when, how, how many and how much.

Technical support needed to create such virtual systems:

1. Cheap, easy, portable computers with multimedia facilities;
2. Software for ubiquitous applications.
3. Miniature two-way radio devices (transceivers) for communication of computers with each other and with the network.
4. Distributed broadband communication channels and networks.

Many of the preconditions for establishing these components, and their simplest prototypes already exist.

But there are problems. The most important of them is the enforcement of intellectual property and confidentiality, to personal life of each one of us has not become public.

The characteristic feature of fifth generation computers has to be the introduction of artificial intelligence and natural language communication. It is assumed that computing machines of the fifth generation will be just manageable. The user will be able to submit.

It is expected that the XXI century will be the century of greatest use of achievements of computer science in the economy, politics, science, education, medicine, everyday life, military Affairs.

The main tendency of development of computing machinery is currently the further expansion of the introduction of computers and, as a consequence, the transition from individual machines to their systems - computer systems and complexes of various configurations with a wide range of functionality and features.

Development trends of Informatics

In the field of scientific methodology is reconsidering the role of information and information processes in the development of nature and society. Information approach becomes a fundamental method of scientific cognition.

For theoretical computer science most promising research of the General properties of information, the study of the principles of information interaction in nature and society, the basic laws of realization of information processes.

New opportunities for Informatization of the economy, urban management, transport systems, material and human resources [13-16].

A significant expansion of the functionality of getting information technology on the processing and use of images, speech information, full text documents, results of scientific measurements and mass monitoring (especially in connection with the development of digital libraries and electronic full-text archives).

The search continues for effective methods of formalized representation of knowledge, including vague and poorly formalizable, as well as methods of their use in the automated solution of complex problems in various spheres of social practice.

Insufficient is the use of achievements of computer science in the study of human medicine, the development of culture. This is due to financial constraints and a backlog in the training of specialists in relevant fields, good knowledge of means and methods of Informatics.

Computer science as modern science, directly related to information technology and technological progress, cannot remain at the current level of development, it is changing and developing. Programming languages, as an important part of computer science, also have certain tendencies and prospects of improvement and development.

The progress of computer technology has determined that new variety of sign systems for recording algorithms – programming languages. The meaning of the appearance of such language include a set of computing formulas for more information, transforms this set into the algorithm.

A programming language serves two related purposes: it gives the programmer the device to specify the actions that must be performed, and forms a concept used by the programmer, thinking about what to do. The first goal perfectly meets the language that is so "close to the machine" that all major aspects of the machine easy to operate sufficiently obvious to the programmer. The second goal perfectly meets the language that is so "close to the task at hand" to the concept of its solution could be expressed directly and briefly.

Trends in the development of programming languages due to the following reasons:

1. The need to address more complex and diverse tasks. Early computers had limited capabilities, therefore, programs were simple. In the evolution of computing from it has required increasingly complex and diverse challenges. Therefore, the programming language should allow to write programs to solve these new challenges. This contributed to the emergence and development of languages of various new technologies. For example, it is very popular technology of object-oriented programming.
2. The program became more and more volume. The intention was to improve the efficiency of the process of creating programs. Therefore, there is a trend in the development of programming languages for writing fast programs. It is also worth noting the emergence of multiple systems of visual programming, to some extent, facilitate the work of the programmer.
3. Wish that worked on different platforms, has led to the development of independence from the computer system programming languages. The

system programming languages are operating systems, compilers and other system programs that are developing in the direction of independence from the computer. So, for example, most operating systems are written in C and not in assembler. For example, the operating system Unix almost entirely written in C.

4. Large projects involve joint efforts of many programmers. Opportunities in light of team work is well-proven technology of object-oriented programming. Therefore, most modern programming languages support OOP.

Thus, programming languages are evolving in the direction of increasing abstraction from the real machine instructions. And the most obvious advantage here is the increase in the rate of development of the program.

Also a priority is the development of Informatics intelligent systems. Intelligent system (is, eng. intelligent system) is a technical or software system capable of solving tasks that are traditionally considered creative, belonging to a specific subject area, knowledge of which is stored in the memory of the system. The structure of the intelligent system consists of three main sections — knowledge base, solver and intelligent interface.

Intellect - intensive production of intellectual product.

The principles of creating intellect:

1. The source of knowledge and tasks (or queries) should be as close as possible to texts direct users who are experts in their field (or fields) of knowledge. The text must consist of terms of the user collected in the lexicon of this field of knowledge.
2. Each user request is accepted as true, except in cases of formal or fundamental errors or contradictions existing knowledge, which deny the truth of knowledge or phrases of the query.
3. Internal code (representation in memory intellect) resulting from the translation of the source text into the internal representation, should include only necessary in a coherent, independent and full of knowledge. Moreover, the mapping process should take place without loss of knowledge or loss is known to the user.
4. The variety of representations of knowledge and data must meet the needs of the user, the rules in NL grammars, SEG and language of Leibniz.
5. Intellect to produce a solution results only in accordance with the knowledge, communicated to her via BZ or requests, and requirements that are generated as a result of discussion of the shortcomings of PP.
6. Must be reliable resolve queries: the compiler and debugger knowledge needs to detect errors, to correct them or find ways to correct them, to seek additional knowledge.

7. Each intellect should be as intelligent (each step is associated with the logical inference rules of the IL), to consider the accumulated knowledge in computer science through interface and dialogue with the user, and should be evaluated by a measure of intelligence.

The user only knows the possibilities of intellect that execution of the request requires no special language for solving a class of problems, intellect determines the class of tasks, and the user only response can be judged to what class should include this request.

It should be noted that in the Toolkit provides a dialog for entering parameters the exact characteristics of each class of problems. For example, the user feels that he has formulated the theorem, and in dialogue with the instruments pointed phrase, which would be launched as a result. As a result of her run in intellect derived truth conditions of the theorem, therefore, decided the task class, and the answer suggested that the problem was solved class B. In the framework of classical or intuitionistic logics the solution of such problems is hampered by the build of the individual algorithms and software for the solution of all problems without regard to poorly formalizable parts of the original statement of the problem. Currently implemented heuristic programming (using ES) solves some of the problems of poorly formalized programming tasks, but it is based on the commands of a special form - the products, does not solve all these problems and it has no means of debugging knowledge. The main reason that hinders the solution of problems in the framework of classical logic lies in the use of the deductive method that is not implemented effectively on modern VMS. To build intellect was a need for a new, so-called computer logic, it does not use the deduction explicitly and implicitly use generally does not give rise to deep trees exhaustive search of logical inference.

Classification of intellect allow you to determine where the funds intellect among FE and AI, which is characterized mainly by the possibility of bringing a direct user of the VM for SVT, by specifying the style of the application VM by means of widespread software WINDOWS. Classification of intellect defines the direction for use (subject and problem domain) VM for solving problems izobreteniya, design, development and maintenance of objects of different nature. Classification space forms a rather comprehensive set of solved with the help of intellect problems. One may assume that this volume exceeds the volume of solved problems in PP. IP-based intellect has the property of attraction to computer science a large number of users, don't have any knowledge in programming. IE expands the range of users and applications VM.

When classifying intellect we select seven independent axes of classification coordinates. Each coordinate is a feature of the use of one and the same intellect:

1. knowledge base
2. the language of professional prose,
3. request form,
4. kind of knowledge,
5. logical calculus,
6. the true logical calculus,
7. the structure of intellect and tools.

It is important to pay attention to the fact that the point in space of such coordinates defines the implementation of intellect for this particular use.

Conclusion

Based on the above material, it is possible to assume, what would represent a computing system of the future. First, the components of this system will differ small dimensions and remarkable performance. Secondly, the computer system will be characterized by wide introduction of multimedia, primarily audio and video media input and output information that will allow you to communicate with the computer in natural language.

Will be available Neurocomputers. With certainty it is known that already now there are systems of information processing built on combining optical and neural computers, - the so-called neurono-optical computers. In order to create a powerful information processing system, had to develop a hybrid system, i.e. having properties of both optical and neural computers. It can be assumed that the merger will give the world's most powerful hybrid computing system. This system from conventional to distinguish the big performance (through parallelism) and the possibility of effective processing and control of sensory information. But this is only speculation, no actual evidence is currently not supported. However, the technology to create computing systems are not in place, and in the near future on the market perhaps the emergence of new computing systems.

Also, it is not necessary to the progress of Informatics, as a science, including the software industry. Development Informatics leads the trend of development of programming languages. Appear and develop intelligent systems.

ЛИТЕРАТУРА

1. Фомина Ю.А., Преображенский Ю.П. Принципы индексации информации в поисковых системах / Вестник Воронежского института высоких технологий. 2010. № 7. С. 98-100.
2. Мишин Я.А. О системах автоматизированного проектирования в беспроводных сетях / Вестник Воронежского института высоких технологий. 2013. № 10. С. 153-156.

3. Ермолова В.В., Преображенский Ю.П. Архитектура системы обмена сообщений в немаршрутизируемой сети / Вестник Воронежского института высоких технологий. 2010. № 7. С. 79-81.
4. Милошенко О.В. Методы оценки характеристик распространения радиоволн в системах подвижной радиосвязи / Вестник Воронежского института высоких технологий. 2012. № 9. С. 60-62.
5. Завьялов Д.В. О применении информационных технологий / Современные наукоемкие технологии. 2013. № 8-1. С. 71-72.
6. Дешина А.Е., Чопоров О.Н., Разинкин К.А. Информационные риски в мультисерверных системах: выбор параметров системы защиты / Информация и безопасность. 2013. Т. 16. № 3. С. 365-370.
7. Душкин А.В., Чопоров О.Н. Декомпозиционная модель угроз безопасности информационно-телекоммуникационным системам / Информация и безопасность. 2007. Т. 10. № 1. С. 141-146.
8. Баранов А.В. Проблемы функционирования mesh-сетей / Вестник Воронежского института высоких технологий. 2012. № 9. С. 49-50.
9. Головинов С.О., Хромых А.А. Проблемы управления системами мобильной связи / Вестник Воронежского института высоких технологий. 2012. № 9. С. 13-14.
10. Дешина А.Е., Ушкин И.А., Чопоров О.Н. Интегральная оценка общего риска при синтезе ИТКС на основе параметров риска ее компонентов / Информация и безопасность. 2013. Т. 16. № 4. С. 510-513.
11. Попов Е.А., Корнеева Н.Н., Чопоров О.Н., Заряев А.В. Риск-анализ информационно-телекоммуникационных систем при аддитивном характере параметра нергулярности / Информация и безопасность. 2013. Т. 16. № 4. С. 482-485.
12. Иванов М.С., Преображенский Ю.П. Разработка алгоритма отсечения деревьев / Вестник Воронежского института высоких технологий. 2008. № 3. С. 031-032.
13. Зазулин А.В., Преображенский Ю.П. Особенности построения семантических моделей предметной области / Вестник Воронежского института высоких технологий. 2008. № 3. С. 026-028.
14. Землянухина Н.С. О применении информационных технологий в менеджменте / Успехи современного естествознания. 2012. № 6. С. 106-107.
15. Ряжских А.М., Преображенский Ю.П. Построение стохастических моделей оптимизации бизнес-процессов / Вестник Воронежского института высоких технологий. 2008. № 3. С. 079-081.
16. Филипова В.Н., Тарасова Д.С., Олейник Д.Ю. Проблемы управления в туризме / Вестник Воронежского института высоких технологий. 2013. № 10. С. 119-123

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ОСНОВНЫЕ ТЕНДЕНЦИИ РАЗВИТИЯ ТЕХНОЛОГИЙ ИНФОРМАЦИОННОГО ОБМЕНА

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В данной работе дан анализ особенностей тенденцией развития вычислительной техники. Показаны возможности обеспечения практически неограниченной пропускной способности протоколов маршрутизации, которые могут быть использованы в беспроводных сетях. Непрерывный рост персональной техники обуславливает ее повседневное применение. Характерной чертой компьютеров нового поколения связано с внедрением искусственного интеллекта и естественных языков общения.

Ключевые слова: информационные технологии, беспроводные сети, протокол, характеристика, эффективность, вычислительная техника