Stages of information technology development

The 1st stage (until the middle of the 19th century) - "manual", "paper" information technology: feathers, ink, books, etc.

The 2nd stage (end of the 19th - beginning of the 20th century) - "mechanical" informational technology: mechanical typewriter, arithmetic meters, etc.

The 3rd stage (40s - 60s of the 20th century) - "electric" information technology: large computers and software, electric typewriters, etc.

4th stage (early 70s - mid 80s) - "electronic" information technology: large computers, as well as ACS and IPS (information and search systems) on their basis.

5th stage (from the mid-80s) - modern (new) computer information technology: PCs, software for them. Hybrid informative technologies.

Classification of information technologies

- network information technologies:

- computer technologies for working with text information;

- computer technologies of accumulation and analysis of structured information;

- intelligent information technologies;

- information visualization technologies;

- computer technologies for working with graphic information;

- information protection technologies.

Informatization software is divided into universal, instrumental, special

Classification of software:

- with open source (free software);

- with closed code.

Information system is a combination of technical and organizational provision, as well as personnel, designed to provide timely target group of users with relevant information.

An information system is a resource consisting of computers, telecommunication and other equipment, which is controlled by software provision can carry out computing processes in information technologies.

Information technology is an organized set of resources, processes, materials and products intended for information processing.

Information systems and technologies are a significant asset for achieving ecological stability

Information systems themselves represent a source of pollution environment. Therefore, green information systems are those that correspond to ecological ones principles of the concept of sustainable development.

Green energy is energy obtained from renewable sources sources without damage or with minimal damage to the environment Green technology is a technology that is understood as a set methods, processes and materials used in any field of activity for creation of new tangible or intangible products, and based on principles of sustainable development, obtaining and using green energy.

Sustainable development — general concept regarding the need to establish a balance between pleasure modern needs of humanity and protecting the interests of future generations, including them the need for a safe and healthy environment.

Green computing is a type of computing that energy-efficient computing. This is a collection of scientific knowledge, methods, types activities related to increasing energy efficiency, safety and environmental friendliness computer technologies.

Green computing is the theory and practice of environmentally oriented people information computer technologies (ICT. IST), these are energy-saving, energy-efficient computing technologies.

The following concepts and terms are also often used:

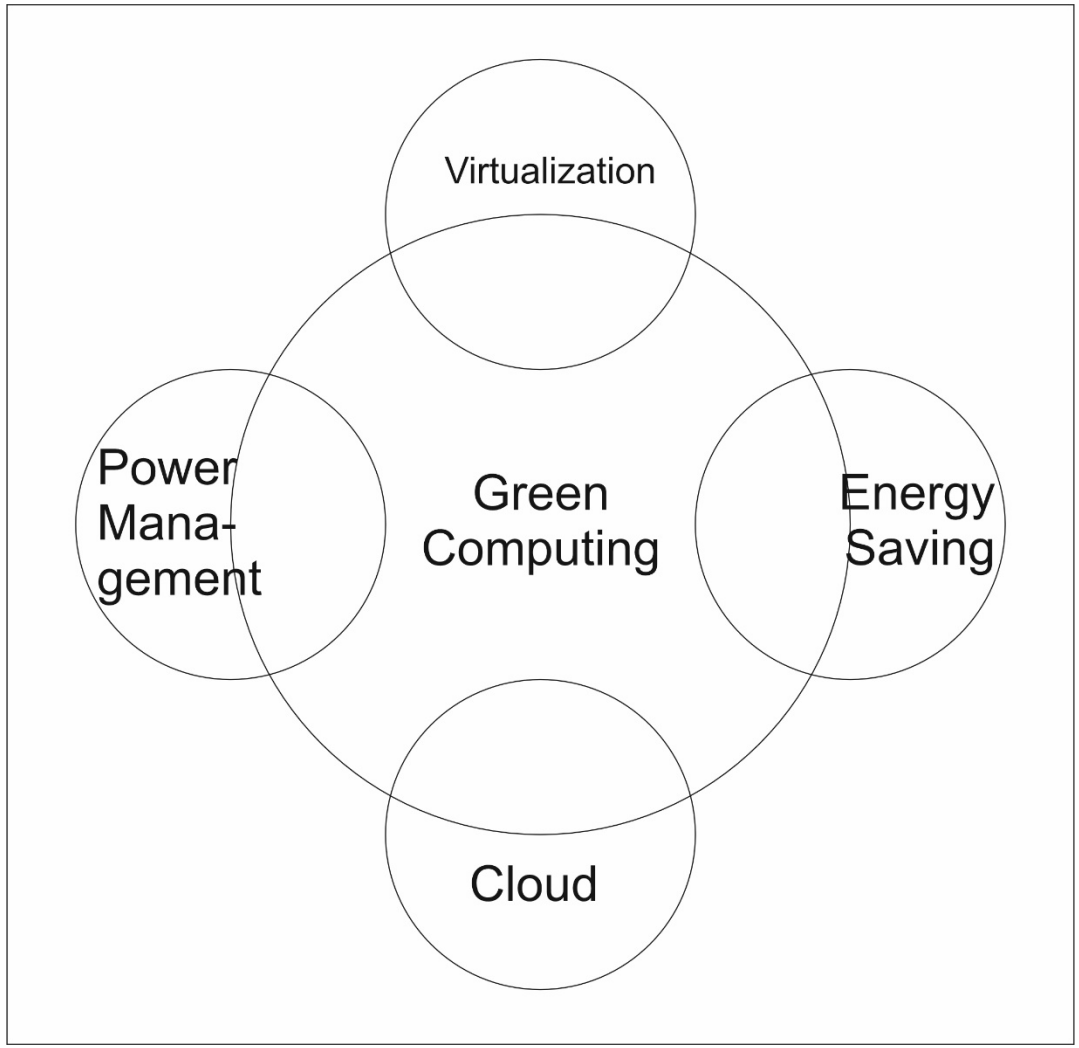
- energy-oriented computer systems (Epeg2u-A\uage Soshriieg Zuzietz),

- energy-efficient (in terms of energy consumption) computer systems based on energy-saving approaches,

- energy efficient computer systems

Green computing is the field of information technology (IT) that studies design, production, use and disposal of computing equipment and computer subsystems (monitors, printers, devices data storage, processing and transmission).

Fundamental methods of environmentally friendly computing.



The main goals of Green Computing

1. Reducing the use of hazardous materials and IT products

2. Increasing the life cycle of IT products

3. Increased efficiency of energy consumption.

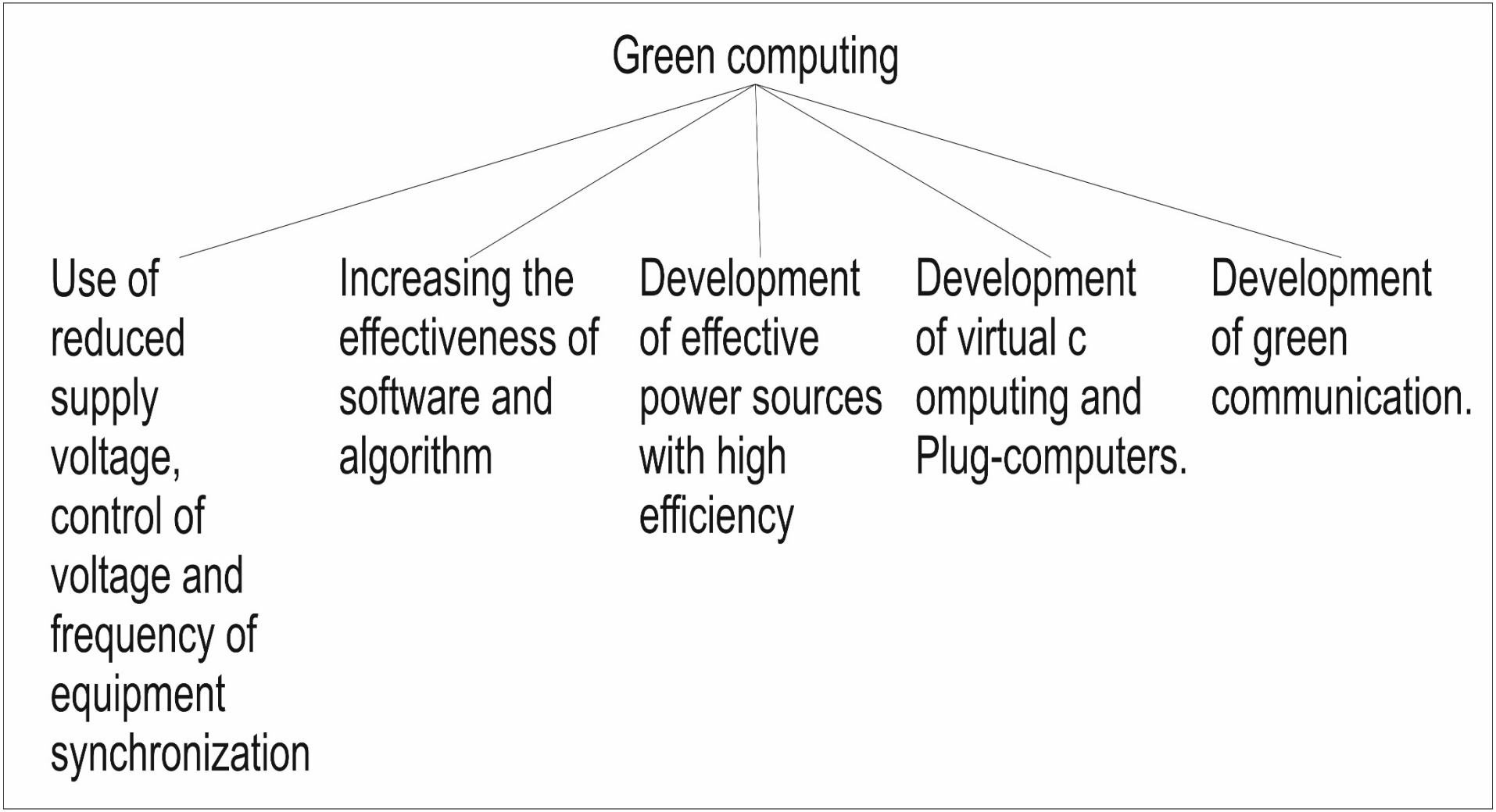
4. Effective disposal.

5. Maximum efficiency of IT products during the life cycle.

Green communications are a component of green computing.

Green information technology is a set of processes, methods and means of searching, collecting, storing, processing, providing, distributing information, etc methods of their implementation aimed at increasing energy efficiency and safety and environmental friendliness of the very technologies and systems in which they are used, as well as on spread of relevant values in society.

The main directions of green computing.



Green hardware means that minimizes energy consumption and risks of dangerous failures when using safety-critical systems. Accordingly, we can talk about green chips, microprocessors, modules, etc.

Green software tools are software tools that minimize information and energy resources of the system, and are also based on code that is optimized by energy metrics.

Green IT systems (infrastructures) are IT systems (infrastructures) that implement green information technologies, i.e. built with use green hardware and/or software.

The concept of and is widely used systems and infrastructures based on:

- green cloud technologies,

- green grid technologies,

- green web services,

- green data storage and processing centers or data centers,

- green LMI - human-machine interface

A green data center is a repository for storage, management and distribution data in which mechanical, electrical and computer systems are designed for ensuring maximum energy efficiency and minimum impact on environment.

Green cloud computing is defined as technologies (engineering) that can provide potential environmental benefits and savings energy resources when providing services using the Internet or other technologies distributed computing.

Green security is a generalizing term and represents combination of hardware and software and services that enable the user to minimize the impact of using a computer or computer room systems on the environment and the cost of their application and service.

Green provision is sometimes seen as a special kind software to reduce energy consumption and/or impact on environment.

IT landscaping - a set of tools and processes, aimed at improving the characteristics of energy consumption, environmental friendliness, etc security of IT systems and objects controlled by them.

Green IT reengineering - modernization of existing IT systems of various nature in the interest of reducing energy consumption.

Energy consumption of IT systems is determined by the energy consumed, and energy efficiency is a complex indicator.

Energy saving has a wider meaning and indicates not only quantitativeмthe value of energy savings when using green IT, but also on a set of measures, aimed at reducing its consumption.

Green metrics - energy consumption indicators, energy efficiency and energy saving for the IT system, its components and processes, which are related to the development and application, indicating:

- the share of processes aimed at reducing the used resources;

- the relative impact of each of these processes and project actions on resources, energy consumption and energy efficiency;

- degree of improvement of resource characteristics of products.

Green IT culture is the values and norms of behavior connected and aimed at preservation and increase of environmental components, resources, energy ensuring security through improvement, development and implementation green information technologies and systems, as well as methods of professional and social activities of IT specialists on the formation, development, and dissemination of these values and norms.

Green IT business is a business aimed at the development and implementation of green information technologies and technologies that confirm the values of green culture, implements such a business organization that minimizes the use of energy, others resources when creating products and services.

Green IT policy is a set of goals and measures that regulate the achievement of rational results in the field of green IT, specific indicators on energy efficiency and resource conservation.

A green office is an IT company's premises in which a set of measures has been implemented savings of all kinds of resources.

Values of green IT.

Information technologies and IT systems create new values through savings human time, providing assistance in making better decisions, improving quality products and services. Green IT allows you to create social and economic values.

At the same time, it is necessary to implement the principles of "three balances":

- the principle of balance by life cycle stages of green IT systems;

- the principle of balance of green characteristics and other technical characteristics of IT-systems;

- the principle of balance of applied methods and measures aimed at the development and implementation of green IT systems.

Longevity technologies are of particular interest the direction of creation of ecologically oriented computer equipment, this is a continuation service life of the equipment.

It is believed that restoration and modernization are more ecologically effective existing equipment, than the production of new.

Numerous organizations have been created that fight for energy efficiency, the goal which is a reduction in the emission of "greenhouse" gases. In particular, there is an international organization IFG, which develops IFG Standarts.

To minimize energy consumption, the following areas are considered:

- reduction of supply voltage,

- clock frequency reduction,

- development of new circuit technologies,

- analysis of energy-efficient software and various algorithms.

1. Advances in virtual computing technologies.

2. It is recommended to use where there is no need for "powerful" calculations, so-called barebones (Barebone) is a computer assembled on the basis "frame" system and intended for self-assembly by the user. These computers are more energy efficient and cheaper.

Barebone-systems

Plug-computer

Ecological principles for achieving sustainable development When creating and using green information systems and technologies, it is worth be guided by the principles of sustainable development:

1) environmental efficiency.

2) environmental justice,

3) environmental performance.

According to environmental efficiency, it is necessary use less methods and means that harm nature and are ineffective use resources.

According to ecological justice, it is necessary to be equal distribute resources between the current and future generations. Because we have equal rights to natural resources.

Environmental performance - must be completely stopped negative impact on the environment.

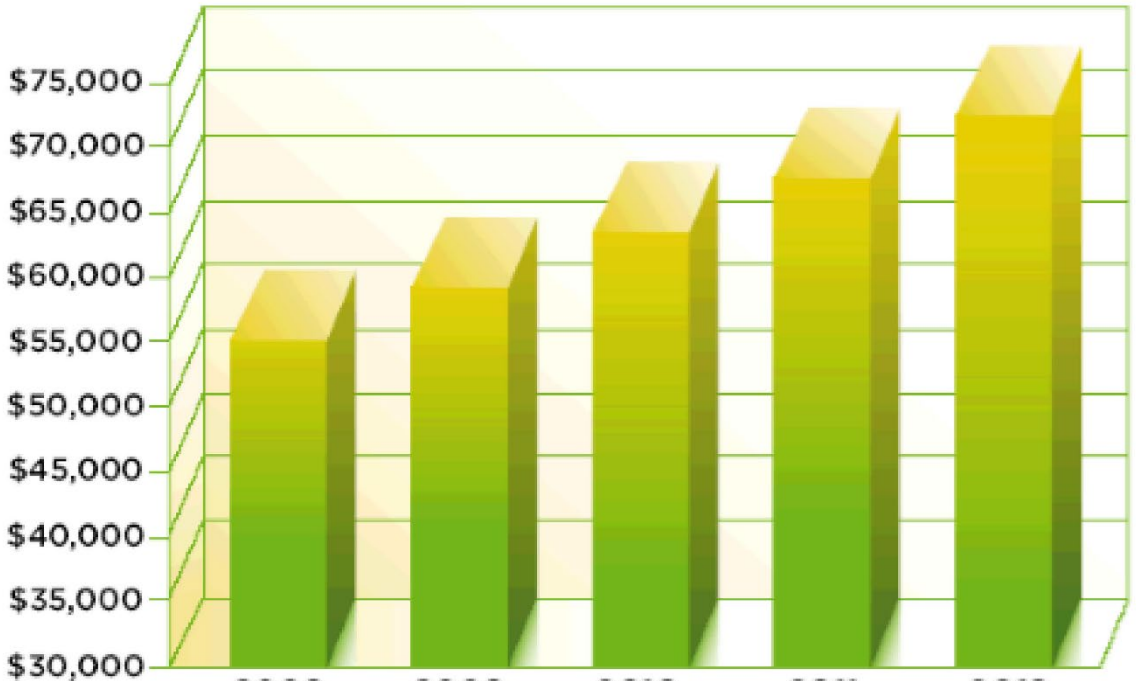
Thus, let's draw conclusions about the methods of saving energy consumption

- use of energy management tools

- organization of conferences (seminars) in a virtual environment,

- use energy-efficient servers components,

- implement virtualization (several OSes run on one server, which allows more efficient use of resources).



	2008	2009	2010	2011	2012
Cost/kWh	$0.062	$0.066	$0.071	$0.076	$0.081
Cost	$55,341	$59,215	$63,360	$67,795	$72,541

The figure shows the increase in the cost of energy supply per 1,000 pcs. of desktop PCs from 2008 to 2012.