CHARACTERISTICS OF ELECTRONIC DATA STORAGE DEVICES

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Abstract: Electronic data storage devices serve to store, transmit, and process information. The article examines their main characteristics: storage capacity, speed, reliability, portability, and adaptability. It also analyzes types such as flash memory, hard drives, optical disks, and cloud storage, and their role in modern technologies. The article emphasizes effective use and advantages.

Keywords: electronic data storage devices, storage capacity, speed, reliability, portability, adaptability, flash memory, hard drives, optical disks, cloud storage.

Identifying the characteristics of electronic data storage devices is crucial for ensuring their proper classification in criminal proceedings, as well as their acquisition, verification, and evaluation in accordance with legally established procedures. These features encompass the technical, functional, and legal properties of electronic data carriers, distinguishing them from traditional evidence. Below are the main characteristics of electronic data storage devices, their significance in criminal procedure, and aspects of their practical application.

The first characteristic is that electronic data storage devices are designed for long-term storage of digital information. According to Article 2041 of the Criminal Procedure Code, "electronic information refers to data created, processed, and stored using electronic devices and information systems, as well as information technologies"[1]. Additionally, the concept most closely related to electronic information is computer information. According to the interpretation provided in Article 2782 of the Criminal Code, the legislator defines computer information as "information presented in a form suitable for processing by an electronic computer, information stored on an electronic computer, computer system, or computer network"[2].

According to paragraph "b" of Article 1 of the Agreement on Cooperation in Combating Crimes in the Field of Computer Information among the Member States of the Commonwealth of Independent States (June 1, 2001), computer information is defined as "information stored in computer memory, on machine or other media in a form accessible to a computer or transmitted through communication channels."

O.G. Grigoriev defines computer information as follows: "information about persons, objects, facts, events, phenomena, and processes (including those stored in its functional devices), created or received by humans using a computer, processed by other methods, and programs (sets of instructions) designed to ensure the operation of the computer and its devices, as well as to process the specified data" [3].

D.V. Vershok, emphasizing that computer information is a type of radio-electronic information, defines it as "sounds, signs, signals, other images about individuals, objects, facts, events, phenomena, and processes produced using tele-, radio-, and other radio-electronic devices (sources), transmitted and received through radio-electronic technical means,

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technologies, networks, or systems, through which legally significant radio-electronic-information social contacts or relationships arise between participants in the field of radio-electronic information"[4].

Also noteworthy is V.B. Vekhov's definition of "computer information." He asserts that computer information is information (messages, data) in electronic-digital form, recorded on a material medium using electromagnetic interaction or transmitted through communication channels via electromagnetic signals[5].

Analyzing the above concepts, the main shortcoming of all definitions from a criminal procedural point of view is that they reveal the concept of "computer information" in a broad sense, in a general theoretical approach, but do not cover such important aspects as its status as evidence in criminal proceedings, the procedure for obtaining, formalizing, verifying, and evaluating it, and its procedural form.

In turn, Yu.V. Gavrilin listed the following features inherent in computer information[6]:

1. The ability to quickly process data. Data processing refers to a set of operations such as collection, accumulation, input, output, reception, transmission, recording, storage, registration, destruction, and modification[7]. For the evaluation and comparison of computer performance, the term "flops" is used - this is the unit used to measure computer performance[8]. It shows how many operations this computing system performs per second. In the mid-1990s, the computing speed of computers was 109 flops, while the computing speed of modern computers is approximately 1018 operations per second.

2. The ability to easily delete data. There are software methods for erasing data without the possibility of its subsequent restoration, in which data is erased and rewritten once or more times.

In addition, there are the following physical methods of destroying computer data:

- by mechanical destruction of electronic data carriers;

- by heating the magnetization point (usually 800-1000 degrees Celsius);

- through chemical liquids;

- by ionizing radiation;

- de-magnetization or magnetization of the working layer of the electronic data carrier[9].

3. The ability to modify (create, modify, copy) data using computer technology. Data modification means making changes to it (or its parameters). The Law establishes the following methods of legislative modification of programs (databases), which are:

- correcting obvious errors;

- making changes for the operation of programs and databases on the user's technical means;

-partial modification of the program to interact with other programs. Data copying is the transfer of initial data to a separate carrier without changes[10].

4. Features of data transmission through communication channels. In this case, data of practically any volume can be transmitted over any distance. The development of mobile communication networks has increased technical capabilities for data transmission. For example, the 2G mobile radio communication standard, created in 1992, allowed data transmission at a speed of 220 kbit per second. The next 3G mobile radio communication standard, used since 2000, is capable of transmitting data at a speed of 7.2 Mbit per second. The communication standard for 4G mobile phones has the ability to transmit data at a speed

of 1000 Mbit per second (in practice, the data transfer speed rarely exceeds 100 Mbit/s). The currently widely used 5G format is 10 Gbit/s[11].

5. The ability to use the electronic data of several users simultaneously. For example, in the university's electronic library system, students, teachers, and researchers have the opportunity to simultaneously read, download, and use one electronic textbook or scientific article.

The second feature is the identity between the original and the copy of the data on electronic media. The content of information on electronic media does not depend on the type of material medium used. For example, when data is transferred from a flash drive to a hard drive, the files (original and copy) are identical in terms of content. The identity of the copy and the original The original information and the copy obtained from it have the same value. M.A. Mitrofanova drew attention to this property of electronic data carriers in her research[12]. An electronic document medium can always be transferred to another medium without changing its content. Ya.A. Karev notes in this regard: "when concluding transactions by exchanging documents through communication channels, the replacement of the electronic document carrier occurs at least twice - at the moment of transfer of the document by the drafter to the information system and at the moment of its receipt by the other party"[13].

The third characteristic is the carrier's ability to store large amounts of data despite its small size. Carrier capacity is measured in Megabytes (Mbyte, 1024 Kbytes) and depends mainly on data recording technology based on the following physical principles:

-magnetization of the domains on the surface of magnetic disks;

- the presence of pits on the surface of the optical disk that emit the laser beam;

- transmission of pulses from one computer to another via connecting cables;

- Placement of electric charges in electronic "traps" in the semiconductor structure, etc.

Flexible magnetic disks (diskettes), which have fallen out of use today, but were most widely used in the mid-90s - early 2000s, had only 1.44 MB of information capacity.

On CD and DVD laser discs, the optical principle of data reading is applied. CD disks have an information capacity of 700 MB, and DVD disks have an information capacity of 4.7 GB. The currently popular Flash memory capacity ranges from 4 MB to several Tb[14].

It should be especially noted that today there are data storage devices consisting of a powerful network of servers, which users can use from anywhere in the world and at any time.

Specific features of such servers:

- the absence of limitations on the volume of data storage;

- the possibility of simultaneous use by two or more persons;

- a high level of data security;

- the possibility of data synchronization;

- availability of various devices;

-requires a constant internet connection;

- the ability to back up and restore data.

This technology is one of the most promising areas for storing and using data in the modern digital world.

The fourth characteristic is the presence of a close connection between the data carrier and the data stored in it. Digital data can be stored only on data carriers (diskettes, magnetic tapes, laser disks, semiconductor circuits, etc.), on the computer itself (RAM), in their system

(RAM of peripheral devices), and in their network (buffer memory of communication devices) [15][16]. At the same time, since information is by its nature immaterial, its content does not depend on the type of material medium used.

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