Section 2

ANALYSIS OF FILE SYSTEMS AND TECHNOLOGICAL SOLUTIONS FOR LOCAL DATA STORAGE

Alona Chepelevych
National Aerospace University «Kharkiv Aviation Institute»
Scientific adviser: Artem Perepelitsyn

Relevance. During the construction of modern systems that use large arrays of data, there is a need to index this data between different drives and servers [1]. The process of transfer itself between them represents the work with small files or the chunks. Using this approach can increase the efficiency of the drive itself and the file system and also simplify the downloading process when working with such a cloud storage system [2].

In order to implement support for local storage with file partitioning into blocks, it is necessary to search for technical solutions that most file systems will support and to consider the target file systems themselves.

The purpose of this study is to analyse file systems and technological solutions for local data storage. To achieve this goal, it is necessary to solve the problem of analysing the most universal of the common file systems, analysing technological solutions for working with a large number of large files and proposing the practical implementation of the research results.

Principal provisions. In order to make access easier and faster, certain blocks can be placed on different physical drives. This can solve the problem of the size of such a file if its size is hundreds of gigabytes. At the same time, checksums of individual chunks within a file make it easier to identify and localise a value mismatch than for the entire file. Also, an individual chunk can be more easily double-checked, read, or written during transmission.

For most practical applications and non-critical areas of application tasks, this form of file storage can significantly reduce the time required to work with files. They can also be placed in most data storage systems as part of archives [1]. Information about the whole file is stored in the form of metadata. This makes the process of working with such files and indexing them discrete and speeds up access to them on storage devices. It also simplifies the task for the drive buffer itself when accessing a part of a file as part of a file system or files as part of archives.

In order to utilise more elements, it is necessary to search for file systems themselves [3].

A preliminary review of file systems shows that the following file systems are prioritised for maximum support by most existing operating systems: exFAT, FAT32 and UDF.

Conclusions. The analysis shows that using separate blocks simplifies the work with large files. The analysis of file systems for removable drives for file storage shows that the following priority set is advisable for maximum support among existing operating systems: exFAT, FAT32 and UDF.

List of references

1. Analysis of Archive Formats applicability for practical use: Comparison of Compression [Text] / A. Perepelitsyn, A. Litvinov, & A. Chepelevych // Proceedings 2024 14th International Conference on Dependable Systems, Services and Technologies, DESSERT 2024, – 2024. – 6 p., accepted.
2. Optimized private cloud storage for heterogeneous files in an university scenario [Text] / B. Prabavathy, P. Ramya, & C. Babu // Proceedings of 2013 IEEE International Conference on Recent Trends in Information Technology ICRTIT 2013, 2013, pp. 323-328, DOI: 10.1109/ICRTIT.2013.6844224.
3. Forensics filesystem with cluster-level identifiers for efficient data recovery [Text] / M. Alhussein, A. Srinivasan, & D. Wijesekera // 2012 International Conference for Internet Technology and Secured Transactions, 2012, pp. 411-415.

Information about the authors

Alona Chepelevych, student at the Computer Systems, Networks and Cybersecurity Department, National Aerospace University «Kharkiv Aviation Institute», a.i.chepelevych@student.csn.khai.edu

Artem Perepelitsyn, Associate professor at the Computer Systems, Networks and Cybersecurity Department, National Aerospace University «Kharkiv Aviation Institute», PhD, a.perepelitsyn@csn.khai.edu