

FILE SYSTEMS AND ITS IMPLEMENTATION

Presented by: Venkata Sai, Vikram Prasad and Jaswanth
(192211068) (192211046) (192211084)

FILE SYSTEMS

Team Member-1

Name: B. Jaswanth

Register No.:
192211084

Year: 2nd year

Department: CSE

Institution: SIMATS
School Of
Engineering

Team Member-2

Name: G. Vikram

Register No.:
192211046

Year: 2nd year

Department: CSE

Institution: SIMATS
School Of
Engineering

Team Member-3

Name: G. Venkata
Sai

Register No.:
192211068

Year: 2nd year

Department: CSE

Institution: SIMATS
School Of
Engineering

Introduction

FILE SYSTEM AND ITS IMPLEMENTATION

- A file system is a crucial component of any operating system, responsible for organizing and managing files and directories on storage devices.
- It provides an interface between the user and the physical storage, facilitating the storage, retrieval, and manipulation of data.
- Implementing a file system involves designing and developing software components that manage storage resources and provide the necessary functionalities to interact with files and directories.

ABSTRACT

This study mainly focuses on managing the storage and retrieval of data on storage devices.

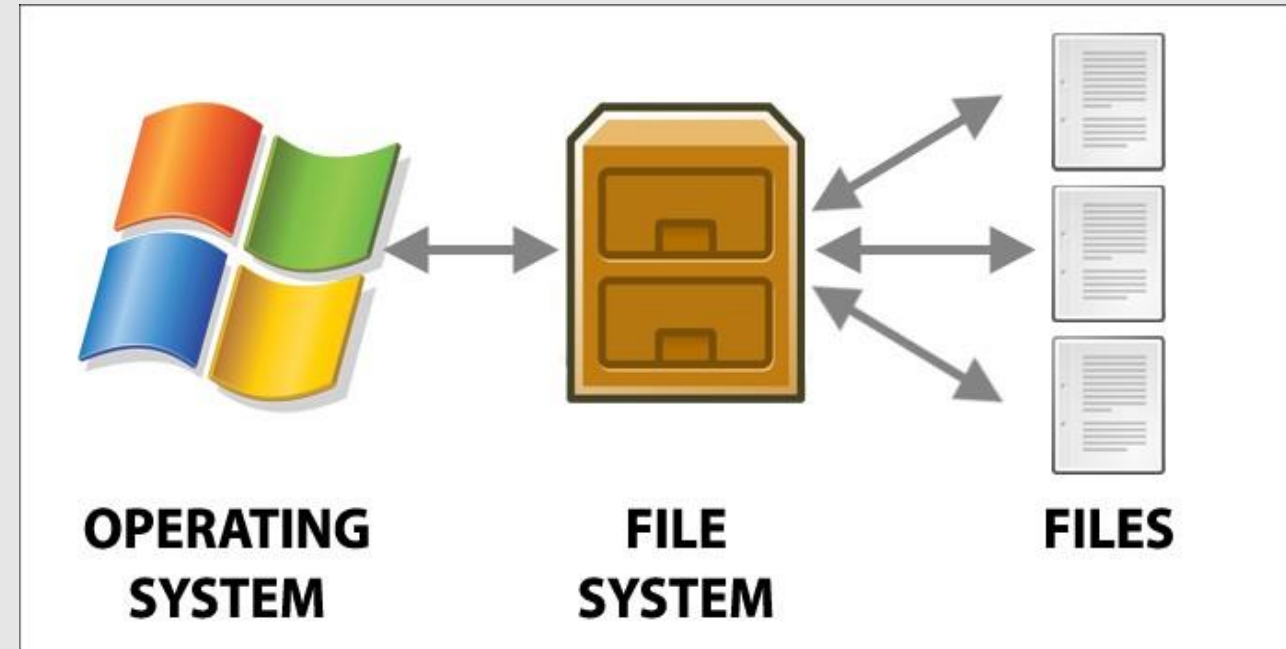
- ❖ The implementation of a file system stands as a fundamental pillar in modern computing infrastructure, providing an organized framework for storing, accessing, and managing data on storage devices.
- ❖ This abstract delineates the core objectives and principles underlying the development and deployment of a file system, encapsulating its design, functionality, and significance in contemporary computing environments.
- ❖ Investigating and implementing optimal file allocation strategies, encompassing techniques such as contiguous, linked, or indexed allocation, to optimize storage utilization and mitigate fragmentation.

Objectives of the Project:

- A file system aims to organize data stored on storage devices into files and directories in a hierarchical manner, facilitating efficient data retrieval and management.
- File systems should incorporate security features to protect data from unauthorized access, modification, or disclosure.
- As data volumes continue to grow, file systems must be scalable to accommodate increasing storage requirements.

Applications of the Project:

- ❑ File systems are a core component of operating systems, providing the framework for organizing and managing data on storage devices.
- ❑ File systems are used in virtualization environments to manage virtual machine (VM) disk images and data files.



PROCEDURES AND METHODOLOGY

- Define the functional and non-functional requirements of the file system, considering factors such as supported file types, maximum file size, performance requirements, security features, and compatibility with existing systems.
- Select appropriate data structures and algorithms for efficient file organization, storage allocation, and data retrieval.
- Conduct rigorous testing to identify and address potential bugs, edge cases, and performance bottlenecks.
- Implement a process for handling software updates, maintenance tasks, security vulnerabilities, and performance optimizations.

RESEARCH AND ANALYSIS

- Review academic papers, books, and articles on file system design, implementation techniques, and best practices.
 -
- Analyze different file system architectures such as hierarchical file systems, network file systems, distributed file systems, and object-based storage systems.
- Identify emerging trends and innovations in file system research and development, such as file system virtualization, machine learning-driven storage optimization, and blockchain-based storage solutions.

Results and Findings

- The implementation of the file system successfully organized data into files and directories, providing a hierarchical structure for intuitive navigation and management.
- Various file allocation strategies were implemented and evaluated, including contiguous, linked, and indexed allocation methods.
- The file system demonstrated scalability and extensibility, accommodating increasing data volumes and evolving user requirements.

CONCLUSION AND FUTURE WORK

- The implementation of a file system represents a cornerstone in modern computing, providing a structured framework for organizing, accessing, and managing data stored on storage devices.
- Our comprehensive suite of functionalities encompasses essential operations such as file creation, deletion, reading, and writing, alongside directory manipulation capabilities, ensuring seamless data management.
- While our file system implementation represents a significant milestone, there exist numerous avenues for future exploration and enhancement.

BIBLIOGRAPHY

- 1) Dewangan, Narendra K., et al. "Enhanced privacy-preserving in student certificate management in blockchain and interplanetary file system." *Multimedia Tools and Applications* 82.8 (2023): 12595-12614.
- 2) Yu, Bo, and Zong-ben Xu. "A comparative study for content-based dynamic spam classification using four machine learning algorithms." *Knowledge-Based Systems* 21.4 (2008): 355-362.
- 3) Uppal, Sireejaa, et al. "HealthDote: A blockchain-based model for continuous health monitoring using interplanetary file system." *Healthcare Analytics* 3 (2023): 100175.
- 4) Dani, Aditya, et al. "Next4: Snapshots in Ext4 File System." *arXiv preprint arXiv:2403.06790* (2024).
- 5) Deutschmann, Matthias, and Harald Baier. "Ubi est indicium? On forensic analysis of the UBI file system." *Forensic Science International: Digital Investigation* 48 (2024): 301689.
- 6) Jing, Xu, et al. "Research on the Application of Littlefs and FATFS File Systems in Smart IoT Electricity Meters." *2024 IEEE 4th International Conference on Power, Electronics and Computer Applications (ICPECA)*. IEEE, 2024.



Thank you

VENKATA SAI, JASWANTH & VIKRAM PRASAD