HACKATHON CLUB

FUELING INNOVATION WITH EVERY LINE OF CODE.

SR UNIVERSITY

Topic : Recovery of Deleted Data and Associated Metadata from XFS and Btrfs Filesystems .

Domain : Cyber Security

Team ID : T-185

Team members:

S.Shree priya(2303A51465)
B.Anushka(2303A510E6)
B.Mary Anivika(2303A510C9)
B. Spurthi(2303A51802)

Objective

- Develop an efficient data recovery system tailored for **XFS** and **Btrfs** file systems.
- Implement specialized **algorithms** to recover deleted files and their **metadata**.
- Support a wide range of **file types**, including documents, images, archives, scripts, and databases.
- Ensure accurate retrieval of **timestamps (creation, access, modification, deletion)** and other critical metadata.
- Provide a **user-friendly interface** (GUI/CLI) for seamless data navigation and reporting.

Problem Statement

Issue: Recovering deleted data & metadata from XFS & Btrfs is challenging.

Challenges:

🛠Complex Structures – Advanced journaling & copy-on-write hinder recovery.

📉Metadata Loss – Hard to retrieve timestamps & file history.

🔄Data Fragmentation – Deleted files are scattered, making recovery difficult.

🚫Limited Tools – Few forensic tools support XFS/Btrfs recovery.

Pain Points:

❌ Incomplete file recovery (data + metadata).

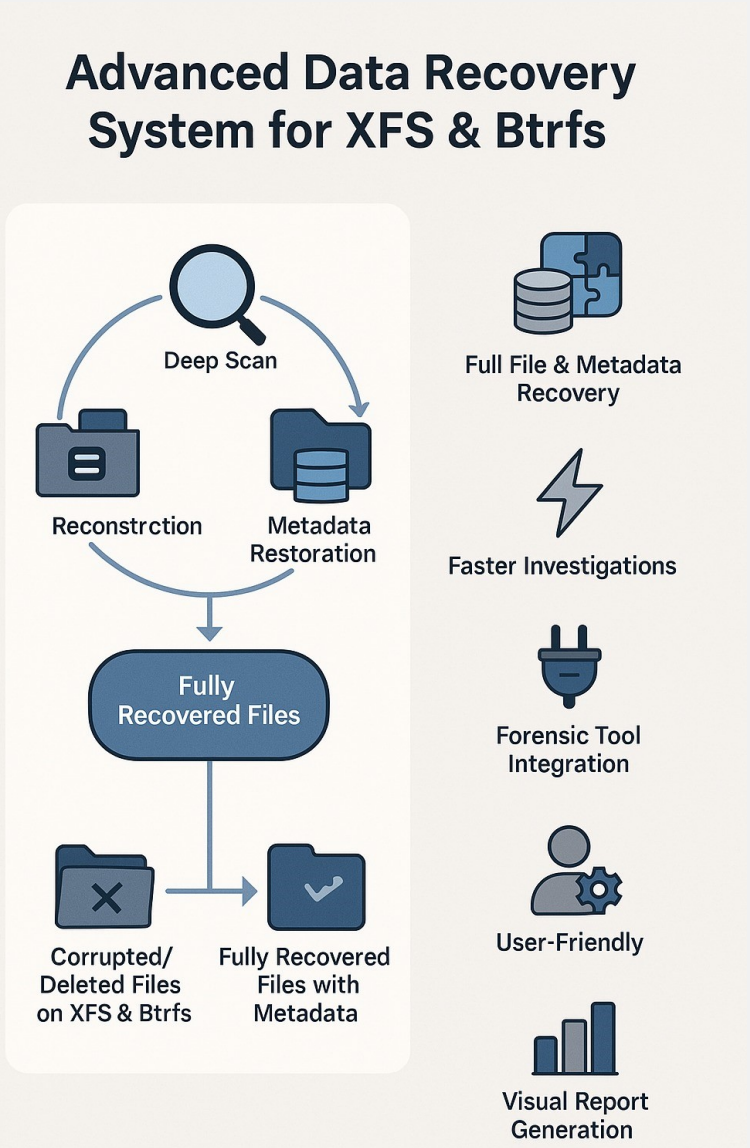
❌ Standard methods fail for modern file systems.

❌ Investigations slow down due to inefficient recovery techniques.

Existing system

Features	Existing System	Proposed System
File System Support	Limited support for XFS/Btrfs	Specialized for XFS & Btrfs
Metadata Recovery	Often incomplete/lost	Recovers full metadata (timestamps, permissions)
Data Fragmentation	Hard to reconstruct	Efficient recovery of fragmented files
Speed & Efficiency	Manual & time-consuming	Automated, reducing investigation time
Forensic Tool Integration	Lacks modern forensic tools	Seamlessly integrates with forensic tools
User Effort	High manual intervention	Minimal manual effort required

Proposed system



Data Recovery Workflow

1 **Data Input & Identification**

System detects deleted data in Xfs/Btrfs

2 **Metadata Extraction**

Extract timestamps & file attributes

3 **Data Recovery Process**

Use forensic techniques to reconstruct data

4 **Verification & Integrity Check**

Validate recovered files

5 **Report Generation & Export**

Generate a recovery summary

System Architecture

Tech Stack

- Languages used (Java)
- Data base used for data management
- Database security for protection
- Cloud service used for hosting
- API's used for system integration
- Diagram analysis of final Output

Key points to cover

1. Show the system's technical structure.
2. Use a layered or block diagram.
3. Label different components and their interactions.
4. Keep the explanation brief and precise.
5. Maintain a clean and organized layout.

Conclusion & Future Scope

Key takeaways:

- Improves forensic data & metadata recovery for XFS & Btrfs.
- Enhances accuracy, security, and efficiency in investigations.

Future Scope:

- AI-based predictive recovery.
- Support for more file systems (ZFS, APFS).
- Real-time monitoring for proactive forensics.
- A step toward advanced forensic data recovery