



International Journal of Innovative Research in Computer and Communication Engineering

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)





BCFS – A Blockchain Based Cloud File Sharing System

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ABSTRACT: "Decentralized Cloud: Secure File Sharing with Blockchain" introduces an innovative approach to cloud storage, prioritizing security, transparency, and decentralization. By leveraging blockchain and IPFS technology, users can store, share, and access files seamlessly without relying on centralized servers. This system not only enhances data security through encryption and immutability but also fosters a trustless environment where individuals and businesses can collaborate with confidence. Unlike traditional cloud storage, which is controlled by third-party providers, this decentralized model ensures user autonomy, prevents unauthorized modifications, and eliminates single points of failure. It's a paradigm shift in digital file management, enabling a secure, efficient, and globally accessible storage ecosystem.

KEYWORDS: Decentralized Cloud Storage; Blockchain File Sharing; Secure Data Storage; Peer-to-Peer File Sharing; Immutable Data Storage; Encrypted Cloud System; Trustless File Sharing; IPFS Storage Network; Smart Contract-Based Storage; Distributed Ledger for Cloud.

I. INTRODUCTION

The advancement of digital technology has revolutionized the way data is stored, shared, and secured in recent years. The emergence of blockchain-based cloud file-sharing systems represents a significant shift from traditional centralized storage models to decentralized, secure, and transparent alternatives. These platforms provide users with a trustless environment where data is encrypted, distributed across multiple nodes, and accessed through a secure consensus mechanism. This study explores the concept of blockchain-based cloud file sharing within the framework of decentralized storage systems, analyzing how they enhance data security, privacy, and accessibility. By conducting a comprehensive review of existing research on blockchain-powered storage solutions, this paper aims to highlight their effectiveness in mitigating data breaches, preventing unauthorized modifications, and ensuring seamless access to files. Through this research, we aim to deepen our understanding of how decentralized cloud storage functions, its role in modern digital infrastructure, and its potential implications for the future of secure data management.

II. RELATED WORK

Decentralized cloud storage platforms leverage blockchain technology to enhance **security, transparency, and efficiency** in file sharing. Unlike traditional cloud storage services controlled by centralized entities, blockchain-based systems **distribute data across multiple nodes**, reducing reliance on a single point of failure and mitigating risks such as data breaches or service downtime. Platforms like **IPFS (InterPlanetary File System)**, that utilize **peer-to-peer (P2P) networking and cryptographic hashing** to store and retrieve files securely. These systems ensure **data integrity and authenticity** through immutable records and consensus mechanisms, preventing unauthorized access, data loss, or tampering.

Additionally, **smart contracts** in blockchain storage solutions enable **automated access controls, permissions, and payment settlements**, eliminating the need for intermediaries. By integrating **encryption protocols such as AES (Advanced Encryption Standard) and RSA (Rivest-Shamir-Adleman)**, these platforms ensure privacy while maintaining high availability. Some systems also incorporate **token-based incentives**, rewarding storage providers with cryptocurrency for offering unused disk space. The decentralized nature of blockchain-based cloud storage fosters **cost-effective, resilient, and scalable** data-sharing solutions, making them ideal for industries such as **finance, healthcare, and legal sectors**, where secure and verifiable file management is critical.



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III. OVERVIEW

Blockchain Cloud Share is a decentralized file-sharing system designed to provide secure, efficient, and transparent cloud storage solutions. Leveraging blockchain technology and smart contracts, the platform ensures data integrity, privacy, and seamless collaboration for users looking to store, share, and access files globally. With its decentralized architecture and cryptographic security, Blockchain Cloud Share redefines traditional cloud storage by eliminating centralized control and offering enhanced user autonomy and security.

At its core, Blockchain Cloud Share functions as a distributed network where users can upload files with confidence, knowing that their data is encrypted, immutable, and resistant to unauthorized access. By utilizing blockchain's decentralized ledger, the platform ensures transparency and security, preventing data breaches and unauthorized modifications. Users maintain full control over their digital assets, leveraging cryptographic keys for access management and file-sharing permissions.

One of the standout features of Blockchain Cloud Share is its smart contract-driven access control, which enables users to set precise sharing permissions and automate file access based on predefined conditions. Whether sharing documents with colleagues, collaborating on projects with distributed teams, or securely storing personal files, the platform provides a seamless and trust environment for data exchange. The system also supports real-time file synchronization and versioning, ensuring that users always have access to the latest updates without the risk of data loss.

In addition to secure storage and sharing, Blockchain Cloud Share integrates a reward-based incentive mechanism that compensates users for contributing storage space to the network. By participating as storage providers, users can earn tokens that can be redeemed for premium services or exchanged within the ecosystem. This decentralized approach not only enhances network efficiency but also fosters a community-driven model where users actively support the system's sustainability.

Moreover, Blockchain Cloud Share leverages advanced cryptographic techniques and zero-knowledge proofs to enhance privacy while ensuring data accessibility. Users can enjoy a balance between confidentiality and usability, benefiting from a system that prioritizes both security and convenience. With its user-friendly interface and blockchain-powered backend, Blockchain Cloud Share is poised to revolutionize the way individuals and businesses manage and share digital assets in an increasingly connected world.

Key Features:

- **Decentralized Storage:** Utilizes blockchain technology to distribute files across a secure, trusted network, eliminating reliance on centralized servers. This ensures that no single entity has control over stored data, reducing risks of censorship or failure.
- **End-to-End Encryption:** Ensures secure file transfers and storage using cryptographic encryption, protecting data from unauthorized access. Data is encrypted both in transit and at rest, preventing interception by third parties. Only users with the appropriate decryption keys can access the stored files.
- **Smart Contract Access Control:** Enables users to define file-sharing permissions via blockchain-based smart contracts, ensuring transparency and automation. Users can set granular access levels, allowing only specific individuals or groups to retrieve files.
- **Immutable File Integrity:** Blockchain's ledger ensures files remain tamper-proof and verifiable, preventing unauthorized modifications. Each file is hashed and recorded on-chain, allowing users to verify authenticity at any time. Any unauthorized attempt to alter files is immediately detected and rejected.
- **Incentivized Storage:** Users can earn tokens by contributing storage space, fostering a decentralized and community-driven network. This rewards system encourages more users to participate, increasing available storage capacity.
- **Cross-Platform Accessibility:** Designed for seamless use across desktop and mobile devices, ensuring secure access from anywhere. Users can upload, retrieve, and share files with ease, regardless of device type.



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IV. ARCHITECTURE

MERN Stack:

- Frontend Development (React.js, JavaScript, HTML, CSS): React.js enables the development of a dynamic and user-friendly interface for uploading, managing, and sharing files. JavaScript ensures seamless interactivity, while HTML and CSS provide structure and styling for a visually appealing user experience.
- Client-Side Validation: JavaScript is used for form validation when users upload files, ensuring correct metadata input, preventing malicious file types, and providing a smooth user experience.
- Event Handling: React's component-based structure facilitates efficient event handling for features like file uploads, downloads, sharing, and permission management.

Backend (Node.js, Express.js):

- API Development: Node.js and Express.js power the backend, handling user requests, authentication, file metadata management, and transaction logging.
- Blockchain Integration: Smart contracts deployed on a blockchain network (e.g., Ethereum, Polygon, or Binance Smart Chain) govern file access control, ensuring decentralized and transparent file-sharing policies.
- User Authentication: A decentralized identity mechanism (DID) or traditional JWT-based authentication is implemented to validate user access securely.

IPFS & Pinata.cloud Storage:

- Decentralized File Storage: Pinata.cloud, built on IPFS, enables secure and distributed storage, ensuring files are tamper-proof and accessible without centralized servers.
- File Hashing: Every uploaded file is assigned a unique cryptographic hash that is stored on the blockchain, ensuring data integrity and verifiability.
- Access Control: Smart contracts manage file-sharing permissions, allowing users to specify who can access or modify files via blockchain-based access control lists (ACLs).

Database (MongoDB):

- Metadata Storage: MongoDB stores non-sensitive file metadata, user preferences, and system logs, ensuring efficient query performance.
- User and Transaction Records: Keeps track of file transactions, upload histories, and permission changes without storing actual file contents

Hosting & Deployment:

- Frontend Hosting: Deployed using Firebase Hosting, Vercel, or Netlify for seamless and secure access.
- Backend & API Deployment: Hosted on cloud platforms like AWS, DigitalOcean, or Heroku for scalability and reliability.
- Smart Contract Deployment: Deployed on blockchain networks like Ethereum, Binance Smart Chain, or Polygon, ensuring decentralized governance and transparency.

This architecture ensures a secure, scalable, and decentralized file-sharing system, leveraging blockchain and IPFS for enhanced security and privacy.

V. WORKING AND SYSTEM IMAGES

The system operates through the following steps:

1. **User Authentication:** Users first visit the homepage, where they can log in or sign up. After successful authentication, they are redirected to their profile page, which displays personal information such as username and email.
2. **Dashboard Access:** The user is provided with a dashboard containing options like "Manage Files," "Shared Files," and a logout button.
3. **File Upload & Storage:** When a user clicks on "Manage Files," they can select a file for upload. The file is encrypted for security and then stored on a decentralized cloud storage system, such as IPFS (InterPlanetary File System). A unique file hash is generated and stored on the blockchain to ensure immutability.



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4. **File Sharing:** After uploading, users can share files by selecting recipients. Instead of sending the file directly, the system shares the file hash stored on the blockchain. Only authorized users with the correct decryption key can access the file.
5. **Accessing Shared Files:** The "Shared Files" section allows users to view and download files shared by others. Each file's integrity is verified using blockchain-stored hashes to ensure it has not been altered.
6. **Security & Transparency:** Blockchain provides a tamper-proof ledger, ensuring that all transactions (uploads, shares, and downloads) are recorded. Smart contracts automate file access control, restricting unauthorized users from accessing shared data.
7. **Logout & Session Management:** Users can securely log out, ensuring that unauthorized access to their account is prevented.


BCFS
Home Login Signup

BCFS

EASILY UPLOAD, SHARE AND MANAGE FILES

FROM NOW

GET STARTED




About us

BCFS is a blockchain-based file sharing system is a decentralized method of storing and sharing files using a distributed network. It ensures data security and integrity through cryptographic techniques, preventing unauthorized access or tampering. Each transaction or file access is recorded on the blockchain, providing transparency and traceability.

EXPLORE NEW FEATURES

- Profile
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- My Logs
- Logout

Profile



Aadiitya

adityamaurya9471@gmail.com

USER

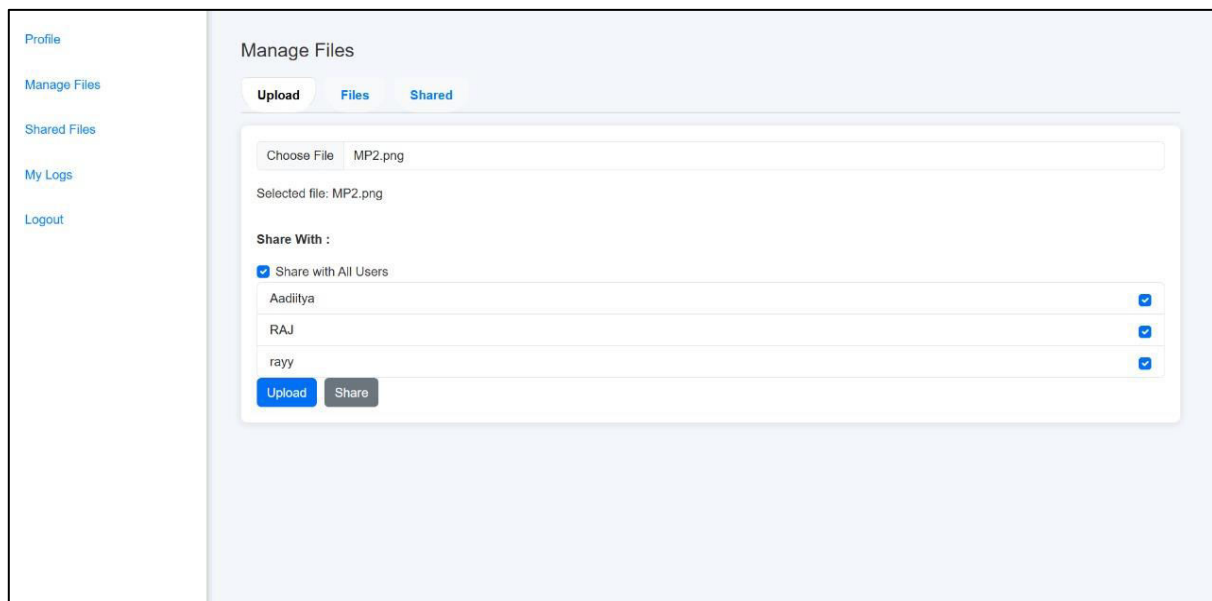
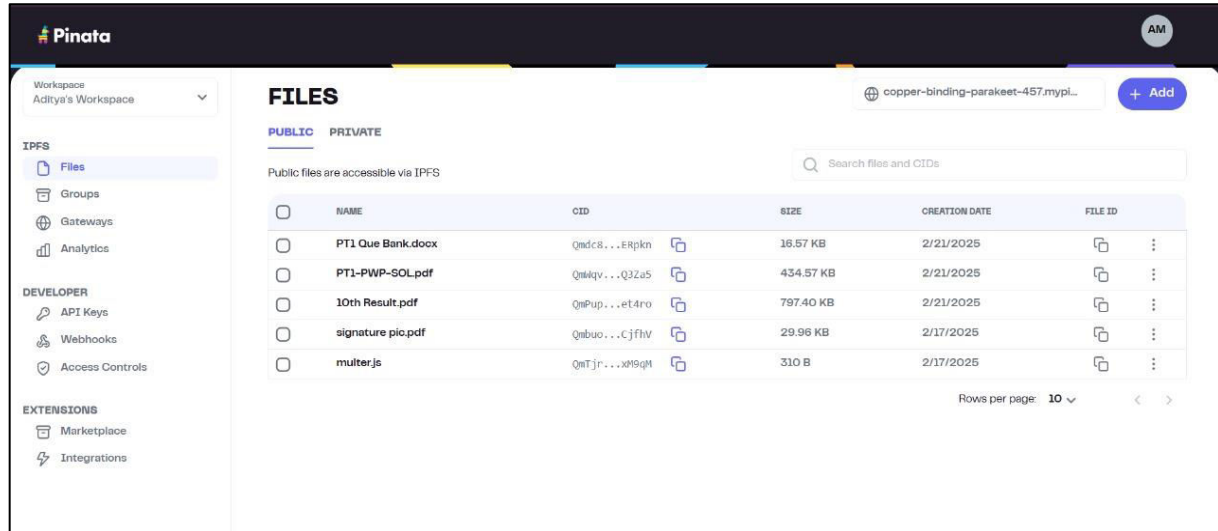
Personal Information

Email	adityamaurya9471@gmail.com
Role	USER



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VI. BENEFITS

Implementing a blockchain-based cloud file-sharing system offers numerous benefits. Firstly, it enhances security and data integrity by leveraging blockchain’s decentralized and tamper-proof nature, ensuring files remain protected from unauthorized modifications. Secondly, it fosters trust and transparency by recording all file transactions on an immutable ledger, allowing users to verify data authenticity. Additionally, it eliminates reliance on centralized servers, reducing the risk of data breaches and server downtimes while providing users with greater control over their files. Moreover, it enables efficient and automated access control through smart contracts, allowing users to define precise file-sharing permissions without intermediaries. Lastly, it promotes decentralized storage and incentivization, where users can contribute storage space and earn rewards, fostering a more sustainable and community-driven ecosystem. Overall, a blockchain-based cloud file-sharing system enhances security, transparency, and efficiency while empowering users with greater autonomy over their digital assets



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VII. CONCLUSION AND FUTURE WORK

In Summary, our examination of blockchain-based cloud file sharing systems highlights their transformative potential in securing and decentralizing data exchange. Through detailed analysis, we have demonstrated how these systems enhance data security, user autonomy, and trust in digital transactions. Our findings emphasize the significance of decentralization in mitigating data breaches and fostering a transparent, community-driven storage ecosystem. Looking ahead, future research in this domain could explore various enhancements. Firstly, assessing the effectiveness of different cryptographic techniques and consensus mechanisms to optimize security, efficiency, and scalability. Additionally, investigating the integration of emerging technologies like zero-knowledge proofs or homomorphic encryption to further enhance privacy-preserving data sharing. Furthermore, conducting longitudinal studies to evaluate the long-term impact of decentralized storage adoption on enterprise and individual users would provide valuable insights. Lastly, exploring the economic and sustainability aspects of incentivized storage models could drive innovations that balance decentralization with energy efficiency. Advancements in these areas will further refine blockchain-based cloud file-sharing systems, ensuring they remain robust, secure, and user-friendly.

REFERENCES

1. <https://www.researchgate.net/publication/318131748> **An Overview of Blockchain Technology Architecture Consensus and Future Trends**
2. <https://www.kaleido.io/blockchain-platform/document-exchange>
3. <https://www.mdpi.com/1424-8220/22/14/5100>
4. <https://jdrro.sjoi.info/articles/10.4038/jdrro.v1i2.22>
5. <https://cointelegraph.com/explained/decentralized-file-sharing-explained>
6. <https://www.jetir.org/papers/JETIR2305491.pdf>



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