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Digital Asset Management

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Abstract: Blockchain aficionados immediately saw its potential for numerous applications after it was initially developed for the virtual currency Bitcoin. Blockchain technology is being considered as a way to share private health information, follow products as they move through the supply chain, and even decentralise the energy market since it enables the distribution of digital information while preventing its copying.

Blockchain is especially helpful for digital asset management because of its advantages, including security, a thorough audit trail, and error-proof transaction tracking. SmartContracts are a new idea offered by Blockchain 2.0 that eliminates the middlemen generally present in contractual transactions (such as attorneys and notaries), establishes rules and sanctions, and verifies and enforces the agreements made. With the use of this technology, content creators can share ownership of an asset, receive payments that are fairly distributed, and easily transfer their rights when an item is sold or transferred.

Index Terms—Digital Asset Management, Automation, Smart Contracts

I. INTRODUCTION

The act of organising, storing, and retrieving digital assets, including photos, videos, audio files, documents, and other multimedia content, is known as digital asset management (DAM). Organizations of all sizes and in all sectors utilise DAM solutions to effectively and efficiently manage their digital assets. A DAM system's main objective is to give all digital assets a central location that is easily searchable and accessible to authorized users.

Features like metadata tagging, version control, rights management, workflow automation, and analytics are frequently included in DAM systems. The brand identification, marketing strategies, and other digital endeavors of a company all depend on its digital assets. DAM systems give businesses the ability to manage their digital assets in a systematic and efficient manner, making them readily available to those who need them.

Organisations can gain from DAM systems in a number of ways, such as higher production, lower costs, improved efficiency, and improved teamwork.Organisationss can save time and money by centralising their digital assets, ensuring that they are used efficiently by all teams and departments.

The value of DAM systems in the current digital era cannot be emphasized. Effective digital asset management is becoming important as businesses produce more digital assets. DAM systems are a crucial tool for businesses trying to improve their overall digital strategy, cut expenses, and streamline their digital workflows.A unified and organised system for managing digital assets, including as pictures, videos, audio files, documents, and other multimedia information, is what Digital Asset Management (DAM) is designed to do. Organisation may efficiently and effectively store, organise , and retrieve digital assets with the use of DAM systems.

Digital assets can be stored using conventional methods like:

Physical drives, such as either internal or external hard drive (HDD) or solid-state disks (SSD), can be used to store digital assets. These drives offer storage space for storing files and can be linked to a computer a server.
Local Servers: Local servers are specialised computers built to store and handle data, and they can be used to store digital assets. Other devices on the local network can access these servers, which can be set up to offer storage space for digital content.

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II. TRADITIONAL APPROACHES TO MANAGE

DIGITAL ASSET

A work-attached storage (NAS): A network is connected to NAS devices, which serve as specialised file servers. They offer central storage for digital content and allow simultaneous access from various users or devices. In homes or small offices, NAS devices are frequently used.

Tape Drives: In the past, digital assets were frequently stored on tape drives for long-term use. Magnetic recordings, which offer huge storage capabilities, are used to write and read data. However, drives for tapes are less popular today since they are slower than other forms of storage

Optical Media: Digital assets have been stored on optical media, including CDs, DVDs, and Blu-ray discs. Using optical drives, these discs can be loaded with data and accessed. In contrast to other storage solutions, they have a smaller storage capacity.

Cloud Storage: Although it is not regarded as a conventional strategy, cloud storage is gaining popularity. It entails putting digital assets on distant servers under the control of a company that provides cloud services. With a connection to the web, users are able to access their assets form any location. Scalability, redundancy, and simple file sharing are all features of cloud storage.

III. ADVANCEMENTS IN DIGITAL ASSET

MANAGEMENT

The field of the management of digital assets (DAM) has undergone a number of developments to keep up with the changing demands of both organisations and consumers. Some notable developments include:

Cloud-Based DAM: DAM systems in the cloud have become increasingly popular. Scalability, adaptability, and availability from any location with an internet connection are all features they offer. Cloud DAM systems make it simple for team members to collaborate, share, and manage versions of digital materials.

AI and Machine Learning: DAM has been transformed by artificial intelligence, or AI, and machine learning (ML) technologies. They enable search, content recognition, metadata extraction, and automatic tagging. Images, videos, and audio files may all be analyse by AI- powered algorithms, which makes it simpler to locate and arrange materials according to their content.

Connection with Creativity Tools: DAM solutions now smoothly interact with design software and other creative tools like Adobe Creative Cloud. By enabling users to access, edit, and save digital materials straight from their favourite creative programs, this interface streamlines the creative workflow.

Metadata Management: DAM technologies have enhanced capabilities for managing metadata. Strong metadata formats, unique metadata fields, and the capacity to import or sync metadata from outside sources are all provided. Effective digital asset searching, filtering, and sorting are made possible by advanced metadata management.

Version Control and item History: Version control tools in DAM solutions now let users manage many iterations of the same item. It makes it possible to log changes, evaluate different iterations, and go back to earlier versions. Asset history functionality offers a thorough audit trail, recording user actions and asset updates.

Rights Management and Licensing: DAM platforms now offer rights management and licensing features. They give consumers the ability to control the licensing agreements, expiration dates, and usage rights related to digital content. This facilitates licensing procedures and ensures adherence to copyright rules.

Mobile Accessibility: With the use of mobile devices growing, DAM systems increasingly provide responsive web interfaces or mobile apps for managing digital assets on tablets and smartphones. Asset management and cooperation may be done on the go thanks to mobile accessibility.

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Analytics and Insights: Advanced DAM solutions offer analytical and reporting tools to help users understand how assets are used and how users behave. These analytics aid businesses in understanding asset popularity, enhancing content strategy, and deciding how to distribute and manage assets.

Blockchain and Digital Rights Management: The use of blockchain technology to improve digital asset management is now being investigated, particularly in the areas of provenance, copyright protection, and safe transactions. Solutions built on the blockchain can offer transparent rights management, smart contracts for authorisation, and unchangeable records of asset ownership.The company, accessibility, collaboration, and general effectiveness of handling digital assets across numerous industries are all improved by these DAM improvements.

IV. TYPES OF DIGITAL ASSET MANAGEMENT

APPROACHES

Several strategies for managing digital assets effectively are provided by blockchain technology. Here are some noteworthy strategies:

Asset Tokenisation: Using a blockchain, real-world assets can be tokenised and represented as digital tokens on the network. This strategy enables fractional ownership, more liquidity, and simple asset transfers. Tokenising assets like real estate, works of art, or commodities enables anyone to purchase, trade, and sell digital shares of those things.

Smart Contracts: Smart contracts act as self-executing contracts with established rules and circumstances, and blockchain systems like Ethereum support them. Smart contracts manage the distribution and administration of digital assets according to established norms. When a digital piece of art is sold, for instance, royalties from the sale can be automatically given to the artist.

Transparent and unalterable ownership of assets and transaction history are both provided by the technology of blockchain. This function is especially helpful for confirming the provenance and authenticity of digital assets, such as works of art, antiquities, or intellectual property. Increased trust, lessened fraud, and easier tracking of the ownership of assets through time are all benefits.

Decentralised Storage: Conventional digital assets are frequently kept on centralised systems, which are prone to data loss or hacking. Decentralised and distributed storage is offered by blockchain-based systems for storage, such as the IPFS system (InterPlanetary File System) or Storage. Redundancy, security, as well as accessibility are ensured by splitting files into smaller pieces, encrypting them, and storing them across an internet of nodes.

Blockchain can simplify royalty handling for digital goods like music, films, or publications, for example. Smart contracts have the ability to track and pay royalties to copyright holders and content creators automatically based on preset criteria and licenses. Real-time royalty payments are made possible by this strategy, which also ensures transparency and cuts down on middlemen.

Rights and Intellectual Property Protection: Blockchain can be used to create a time-stamped, tamper-proof record of who owns what copyrights and intellectual property. Creators can prevent plagiarism and unauthorised use by establishing digital asset information or hashes on the blockchain and proving the validity of their work at a certain time.

Transparency and auditable supply chain management for digital goods is made possible by blockchain. Throughout an asset's existence, it ensures its verifiability and traceability. For example, blockchain can trace theprovenance, ownership, and movement of digital media files, preventing their illicit dissemination and piracy.

Decentralised Marketplaces: Blockchain makes it possible to build decentralised markets where peers can directly trade and exchange digital assets. These marketplaces do deal with the need for middlemen, cut costs, and give transactions between individuals a secure setting. Blockchain-based marketplaces for digital art, domain names, or virtual products are a few examples.

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V. BENEFITS AND CHALLENGES OF STORING

DIGITAL ASSET

Benefits of Digital Asset Storage

Accessibility: Users may easily and rapidly access digital assets from a variety of devices, places, and platforms as well making them very convenient.

Scalability: Because digital storage is scalable almost infinitely, businesses and people can store enormous amounts of data without facing any physical limitations.

Cost effectiveness: Digital asset storage reduces the requirement for real estate for storage and the accompanying expenses. Generally speaking, it is less costly to maintain than physical storage infrastructure.

Protection and Durability: Digital assets that are properly saved have the potential to last for a very long time without degrading or losing their quality.

Searching and Organisation: By offering search and organisation features, digital asset management systems make it simpler to find and classify files according to metadata, tags, or content.

Collaborative Workflows: By storing digital materials in shared repository or in the cloud, team members may collaborate easily. Version control, user input, and real- time updates are all made possible.

Disaster Recovery and Backup: Digital assets can be periodically copied and backed up, ensuring data redundancy and facilitating speedy recovery in the event of hardware breakdowns or emergencies.

Issues with Storing Digital Assets

Data security is a major worry when storing digital assets since it opens the door to issues like illicit access, breaches of information, or hacking attempts. To safeguard sensitive assets, robust safety protocols and encryption are required.

Data Loss and Corruption: Due to hardware malfunctions, software bugs, or human errors, digital assets are subject to data loss or corruption. To reduce these risks, regular backups and data integrity checks are essential.

Storage expenses: even though digital storage is typically inexpensive, keeping huge amounts of data over an extended period of time can still incur expensive costs, especially for powerful storage solutions.

Technological Obsolescence: Due to the quick development of new technologies, some media or storage formats may become obsolete.

Compliance and Legal Considerations: Storing digital assets may necessitate adhering to particular legal and compliance standards, such as data privacy laws or standards relevant to a given sector of the economy. Compliance monitoring can be difficult and time- consuming.

Long-Term Preservation: Providing for the continued availability and accessibility of digital assets over protracted periods, including data migration to novel storage formats or platforms, can be a challenging endeavour that necessitates proactive planning and administration.

Data Transfer Speed: Depending on network speeds and capacity restrictions, uploading or moving massive digital assets over networking can take a long time.

To maintain the integrity, accessibility, and lifespan of priceless digital assets while balancing the advantages and drawbacks of digital asset storage, it is important to carefully examine security precautions, data management techniques, and future- proofing solutions.

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VI. METHODOLOGY

.A distributed business network may be used to model, design, test, and deploy business applications using the IBM Blockchain Platform, which is configured by the Blockchain Operator in step one.

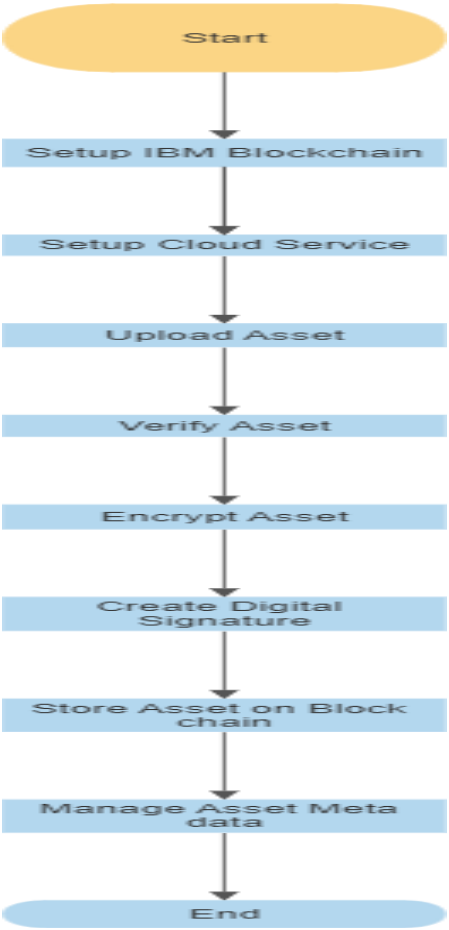
The IBM Blockchain Platform service establishes a Hyper-ledger Fabric network on an IBM Cloud Kubernetes Service, and the Blockchain Operator deploys and instantiates the smart contract on the network.-Developers may adapt and set up various blockchain network components to meet their unique business needs thanks to Hyper-ledger Fabric's modular and adaptable design. It encourages building privately accessible, permission blockchain networks that businesses may use.

The Node. j s application server utilises the Fabric SDK to communicate with the network that has been built on the IBM Blockchain Platform, an instance of IBM Cloud Object Storage, and the Mail trap Server (a phoney SMTP testing server), and it generates APIs for a web client. A cross-platform, open-source runtime environment for JavaScript called Node.js enables programmers to create server-side JavaScript applications. Node.js is based on Google's V8 JavaScript engine and offers an event-driven, non- blocking I/O architecture that makes it lightweight and effective for developing scalable, real-time applications.

The network communication between the Vue.js client and the server is handled by the Node.js application API.-Open-source JavaScript frameworks Vue.js and Node.js each have specific uses, but they are not interchangeable. For the purpose of creating user interfaces and online applications, Vue.js is a front-end

JavaScript framework. Making it simpler to create sophisticated user interfaces with less code, it offers a straightforward and beautiful syntax for creating reusable components, reactive data binding, and tools for managing state. Both independent usage and integration with current web apps are possible with vue.js.

To interact with the application for digital asset management, the user uses the Vue.js web interface.



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VII. BEST PRACTICES AND GUIDELINES

AfterSeveral recommendations and best practices should be taken into account while using blockchain technology. Key suggestions are as follows:

Clearly Define Use Case: Clearly outline the issue or use case that blockchain will attempt to solve. Identify the best solution by taking into account the needs for decentralisation, transparency, and trust Pick the Best Blockchain Platform: Based on your use case, pick the best blockchain platform. Think about elements like scalability, security, consensus mechanisms, development tools, and community support. Popular blockchain systems with various features and use cases include Corda, Hyperledger Fabric, and Ethereum.

Immutability- and security-conscious design Utilise blockchain's security and immutability properties. Make sure that once a smart contract is implemented, crucial data or the logic behind it cannot be changed. Secure private keys, accessrestrictions, and sensitive data by putting in place strong security measures.

Make Sensible Use of Smart Contracts: Carefully plan and create smart contracts. Conduct in-depth code reviews and security audits to find vulnerabilities or possible problems. To guarantee that the logic in smart contracts is accurate and effective, use the right testing procedures.

Take Privacy Demands into Account: Consider your use case's privacy needs. Identify the best blockchain type for your needs: private, public, or consortium. Use privacy-enhancing methods, such as selective disclosure, zero-knowledge proofs, or encryption, for private or consortium blockchains.

Evaluation of scalability and performance factors for your blockchain application is step six. When necessary, consider layer-2 scaling alternatives (such as side chains, state channels, or off-chain processing) as well as blockchain technology' potential constraints in terms of transaction throughput and latency.

Regulatory and Legal Compliance: Know the relevant rules and laws and abide by them. While implementing blockchain technology, some sectors may have particular requirements that must be taken into account, such as financial regulations (AML/KYC) or data protection laws (GDPR).

User Experience Considerations: When creating blockchain apps, put the user's needs first. Provide end users with intuitive, recognisable, and simple-to-use interfaces that abstract away the blockchain technology's intricacies.

Continuous testing and auditing: Adopt solid testing procedures to find errors, weaknesses, or inefficiencies in your blockchain application. Keep your blockchain solution's integrity and security up to date by doing frequent security audits.

Work together and get knowledge from the community: Participate in forums, conferences, and other gatherings to interact with people in the blockchain community and gain knowledge from their experiences. To keep informed about the most recent developments and industry best practices in the blockchain world, collaborate with experts and developers.

To guarantee the effective adoption of blockchain-based solutions, keep in mind that blockchain technology is always changing. It is crucial to remain up to speed with the most recent studies, security issues, and best practices.

VIII. FUTURE DIRECTIONS

With continuing technological breakthroughs, user demands, and market trends, the digital asset management (DAM) environment is always changing. The following are some possible future improvements for DAM:

Artificial Intelligence (AI) and Machine Learning (ML): AI and ML may greatly improve DAM's capabilities by automating processes like picture identification, tagging, and metadata management. AI-powered search engines may provide more precise search results, enhancing efficiency and discoverability

Decentralisation and blockchain technology: Blockchain technology may improve the security, openness, andimmutability of digital assets. Blockchain-based decentralised storage and distribution systems may provide digital assets a more secure and censorship-resistant foundation.

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Cloud Computing and Storage: The DAM industry will continue to be impacted by the expansion of cloud computing and storage options. It is simpler to manage and distribute digital assets across teams and platforms because to cloud-based DAM systems' increased flexibility, scalability, and accessibility.

Virtual and Augmented Reality (VR/AR): VR/AR technologies are already employed in several sectors to improve user engagement and experiences. Future developments in VR/AR might have an influence on the DAM sector by introducing immersive and interactive methods to manage, exhibit, and store digital content.

Internet of Things (IoT): As IoT devices proliferate, they have the potential to have a big influence on the DAM market by facilitating the collecting and administration of enormous volumes of data. IoT device integration with DAM platforms may provide a more thorough picture of digital assets, facilitating better judgment and insights.

Social Media connection: As social media grows in importance as a medium for content distribution, future DAM systems may provide seamless connection with social media platforms, making it possible to create, curate, and distribute content across social media channels quickly and effectively.

Personalised and contextualisation: DAM upgrades in the future may make it possible to provide personalised interactions based on user preferences and context. In order to present consumers with relevant and tailored information, machine learning algorithms may make suggestions based on user behaviour and interests.

Voice-Activated Search: As voice-controlled assistants proliferate, future DAM systems may provide voice-activated search features, making it easier and more hands-free for users to locate digital assets.

These are but a few prospective improvements to DAM.

IX. CONCLUSION

In conclusion, the area has benefited greatly from and advanced significantly as a result of the use of blockchain technology in digital asset management (DAM). With blockchain, managing digital assets is now more secure, immutable, transparent, and trustworthy. As a result, data integrity is guaranteed and the possibility of single points of failure is decreased. It also allows decentralised and distributed storage. Processes for managing assets, such royalties and licensing, are automated and made more effective by smart contracts. Copyright protection, provenance tracing, and safe transactions are all made possible by the usage of blockchain in DAM. Scalability, privacy issues, and regulatory compliance are still problems, among others. Taking on these issues will be essential for broader acceptance and reaching the full capacity of blockchain-based DAM solutions as blockchain technology develops and matures. In general, blockchain has shown promise as a technology for transforming the handling of digital assets by delivering a more secure, open, and effective environment for both enterprises and people.

REFERENCES

[1].Rahul Rao Vokerla, Bharanidharan Shanmugam, Et.al “An Overview of Blockchain Applications and Attacks”, International Conference on Vision Towards Emerging Trends in Communication and Networking, IEEE 2019.

[2].Liang Liu, Budong Xu, “Research on Information Security Technology Based on Blockchain”, IEEE International Conference on Cloud Computing and Big Data Analysis
,5386-4301, 2018.

[3].Mahdi H. Miraz, Maaruf Ali, “Applications of Blockchain Technology beyond Cryptocurrency”, Annals of Emerging Technologies in Computing (AETiC) Vol. 2, No. 1, 2018.

[4].Thomas kitsantas, Athanasios Vazakidis, Et.al. “A Review of Blockchain Technology and Its Applications in the Business Environment”, Research Gate ,2019.

[5].P. C. Kahn and E. Y. Zhang, "An examination of digital asset management systems in the cultural heritage sector," Journal of the Association for Information Science and Technology, vol. 70, no. 11, pp. 1177-1194, Nov. 2019. doi: 10.1002/asi.24153.

[6].Apichart Boonpheng, Dr. Waranon Kongsong, Et.al, “Blockchain technology and cryptocurrency share database for contract management in construction engineering”, International Journal of Advanced Research in Engineering and Technology (IJARET), Volume 12, Issue 1,1073-1084, 2020.

[7].Chao Lin, Debiao He, Et.al, “PPChain: A Privacy-Preserving Permissioned Blockchain Architecture for Cryptocurrency and Other Regulated Applications”, IEEE, 2020.

[8].Yang Hu, Yang (Greg) Hou, Les Oxley, Shaen Corbet “Does NFT patent- development influence Bitcoin risk?”, ScienceDirect, 1042- 4431,2020.

