WHITE PAPER ON
GLOBAL VIDEO COPYRIGHT CHAIN

gvcc1.0
https://gvcc.vip

CONTENTS

preface

At present, the Internet is in a revolution, centralized proprietary server is being replaced by decentralized open service; trusted participation is being replaced by verifiable computing; fragile location addressing is being replaced by flexible content addressing; inefficient integrated service is being replaced by point-to-point computing; bitcoin, Ethereum and other blockchain networks have proved to be decentralizedTo improve the effectiveness of accounting books.These public ledgers handle complex smart contract applications and deal with tens of billions of dollars worth of encrypted assets.

Based on the transparency, openness and complete decentralization of blockchain technology, it ensures that the nodes in the blockchain system have the basic characteristics of distribution, openness and peer-to-peer, and the nodes are linked with each other in a flat topology. This network structure ensures that the data generated in any block will be broadcast to other peer nodes synchronously and decentralized for verification, and the verification results will be verifiedResults are stored synchronously on all nodes.As a result, a new content management model is formed, in which all participating nodes produce and transfer data content equally and transparently, and are supervised and protected by all nodes at the same time.Therefore, the "anti loss" and "anti tampering" of video copyright content on the blockchain are realized, because if you intend to tamper with a certain data or infringe a certain video   copyright resource, you need to obtain the "consent" of all nodes in the whole network, and tamper one by one.Undoubtedly, the cost of infringement is immeasurable, and it is bound to exceed the possible benefits of piracy.The distributed consensus feature of

blockchain technology has released the supervision right of content management in video copyright protection, which undoubtedly establishes an automatic early warning mechanism for copyright protection, and also makes video infringement act retreat and break through.

The biggest significance of the application of blockchain technology for copyright protection is that through the technical layer and network structure layer, the main scope of copyright protection is expanded: from the administrative supervision department in the traditional copyright protection to everyone's participation and supervision.With the support of blockchain technology, copyright protection will also realize the transformation from offline "centralization" to online "equal rights", and achieve the orderly cooperation and strengthened supervision and management online and offline, so as to promote the transformation and development of video copyright protection in the era of blockchain.

In technology, the latest point-to-point IPFs (interplanetary file system) interstellar file system and hypermedia distribution protocol are adopted.This is the first application of IPFs technology in the field of video copyright. It will set off a wave of decentralized application in the field of video copyright. It will contribute to the permanent preservation and inheritance of human classic video works. It is of great significance in the contemporary era and will have a profound impact on the whole field of video and video.

1.research and development background

At present, there are about 20000 Historical Heritage related films that want to be permanently stored and passed on, and listed as human cultural heritage by the United Nations.As a great wealth of mankind,

human cultural heritage is the history solidified by the precipitation of time. With this carrier, we can go through the barriers of time and space, restore the scene at that time, and touch the vicissitudes of time and the reality of history.

Cultural heritage is a vivid embodiment of world cultural diversity. Due to its own vulnerability and the strong impact of modern civilization, cultural heritage is facing an unprecedented crisis.Some cultural heritages that rely on oral instruction are disappearing. Many cultural heritages are on the verge of extinction. The loss of a large amount of information causes huge losses. The indiscriminate abuse and excessive piracy of file information cause a mixed market, and the real copyright owners are unable to protect their rights.Due to the different standards of copyright institutions in different regions, copyright information cannot be shared, and many backward countries have low visibility on the weight of file information version, and there is no global unified copyright standard, so it is difficult to query the copyright ownership.

Since the first film was released in 1895, the controversy about the legal issues of film works has not stopped.At present, the development of science and technology makes the creation of cultural works out of the traditional mode of "one pen, one author".More popular cultural works need to rely on huge industrial power, integrate various intellectual innovation achievements, and spend a lot of investment to be produced.Since the birth of the video works, the copyright legal issues related to the industry have been widely concerned because of their complexity. According to their own legal traditions and theories, various countries have developed different copyright systems. The world copyright convention has also made arduous efforts to unify the legal

systems in this field.German copyright law is still silent on the proposition of "who is the author of the film", leaving the right of discretion to the case court.Britain is still vacillating on the issue of direct protection or indirect protection of films. Its written copyright law and case law have derived two different ways of protection.Most of the copyright systems in the traditional civil law countries have developed into the copyright law system (or "copyright law" system), while the British, American and French countries have generally developed into the copyright law system.There are differences between the two copyright systems in legislative purpose and starting point, resulting in many system problems.

The globalization of video industry is obvious to all. With the global flow of video works and the increasing global cooperation, the copyright of different video industries will undoubtedly bring obstacles to international exchanges.All industrial profits are based on the perfect industrial copyright system and the supporting profit distribution system. The copyright system and the corresponding profit distribution system are very important for the survival and development of a country's film industry.At present, the revitalization of the video industry needs not only financial and material support, but also the innovation and development of relevant systems and systems. The improvement of the copyright system of the video industry is an important part of the system construction.

In order to inherit, permanent storage must be carried out, but the traditional storage methods have some problems, such as loss, tampering, upload error and so on. With the passage of time, the traditional culture will gradually disappear.

Based on the direction of human intellectual property protection of the United Nations, we have developed a global video copyright chain (gvc) of the next generation blockchain browser IPFs.

The global video copyright chain is a video access protocol running on the IPFs file system. By entering the corresponding address in the IPFs blockchain browser, the video resources corresponding to the blockchain can be accessed, and it is compatible with P2P (peer-to-peer) network data.The goal is to supplement or even replace the hypertext media transfer protocol (HTTP) used in the past 20 years, hoping to build a faster, safer and freer Internet era.

2.research and development purpose

The copyright protection and permanent storage of human video works.

3.brief introduction

3.1   what is the global video copyright chain?

Global video copyright chain (gvc) is a non-profit organization: United Nations Federation of artists. For the storage of 20000 films of human art and cultural heritage, it launched a gvcc protocol name in 2019, which uses IPFs technology as the underlying architecture and is completely open source on GitHub.

Global video copyright chain is a global, peer-to-peer (P2P) distributed version file system, which is dedicated to creating a persistent and distributed network transmission protocol for storing and sharing files.The goal is to supplement (or even replace) the hypertext transfer protocol (HTTP), which currently dominates the Internet, and connect all computing devices with the same file system.

Global video copyright chain is a multi centralized solution. Content

addressing is not through domain name and IP, but through a unique hash key to find data.Global video copyright chain is a distributed file storage system. File data is not stored in a centralized server, but stored in all qualified computers on the network.This is a bit like P2P seed download. For example, if you download a small movie, the download resources come from the computers of many users who are also downloading the movie on the network, rather than from the central server of a movie website.

In order to improve the storage efficiency, the global video copyright chain will choose the fastest path to store data. The data is initially stored in its own hard disk. When a user downloads it, a new copy will be generated, and the data will be copied to the user nearby.

Whether it's storage or retrieval, the fastest path is adopted to improve efficiency.Reading is not as fast as storage. When the number of readers is large, the corresponding copy will be generated. The person who chooses to read the file can read from the nearest node, and can read from multiple nodes at the same time, and can obtain from multiple nodes at the same time, so the efficiency will be improved.

The global video   copyright chain is a distributed network for storing and sharing files.What is the user has the final say?For example, if an enterprise uses the global video copyright chain network to store data, it may establish multiple data centers and save a copy of the data to be saved in multiple data centers (which can be realized through configuration or application interface).As long as the resources are uploaded, the global video copyright chain will store the corresponding data.

Probably because for most users, there is already a good enough

system: http.By far, HTTP is the most successful distributed file system.With the use of browser, HTTP has great influence in technology and society.It has become the most practical and effective method of Internet file transfer.However, it does not make good use of dozens of excellent distributed file technologies invented in the last 15 years.On the one hand.Due to the limitation of backward compatibility and the need for a large amount of investment in the current model, it is almost impossible to continue to develop and improve the web infrastructure.But on the other hand, since the appearance of HTTP, some network protocols have appeared and been widely used.At present, HTTP has been used for a long time because it is relatively stable and cheap to transmit some small files, even for some organizations with congested networks.At present, in the era of big data, the speed and security of the network is an urgent problem for us to improve.Due to the impact of key features and bandwidth, we have abandoned HTTP as a different file distribution protocol.

At present, some industries have got rid of HTTP, because mobile small files are relatively cheap, even for small organizations with large traffic.With new challenges, a new era of data is being developed.

3.2 principle of global video　copyright chain

The principle of using content-based address instead of domain name based address, that is, the user is not looking for an address, but the content stored in a certain place. It does not need to verify the identity of the sender, but only needs to verify the hash of the content. In this way, the web page can be faster, more secure, more stable and smoother.

There are six layers of agreements in the global video　copyright

chain

（1）Identity: mainly responsible for the generation of peer identity information ecdsa-secp256k1

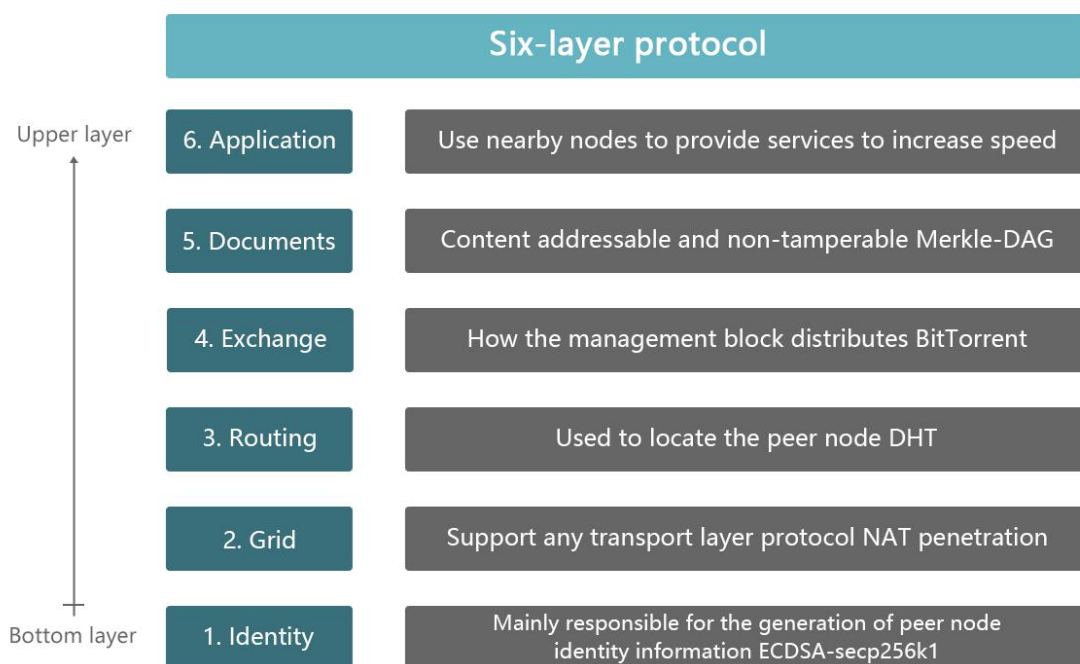（2）Network: support any transport layer protocol NAT penetration

（3）Routing: used to locate the DHT of peer node

（4） Exchange: how to distribute BitTorrent in management blocks

（5）File: content addressable and non tamperable Merkle DAG

（6） Application: use the nearest node to provide services to improve   the

speed

**4.characteristic**

4.1 Semantic Web: Cut the data into pieces, and then create an association in the middle. Once the pieces are connected, the computer and people can explore the data. Through a piece, we can find some other related data. The connection piece follows the unified standard,

which is the "metadata" that gives the computer the meaning to understand.

4.2 micro storage:A file will be divided into several pieces, and each piece will be saved in multiple nodes.
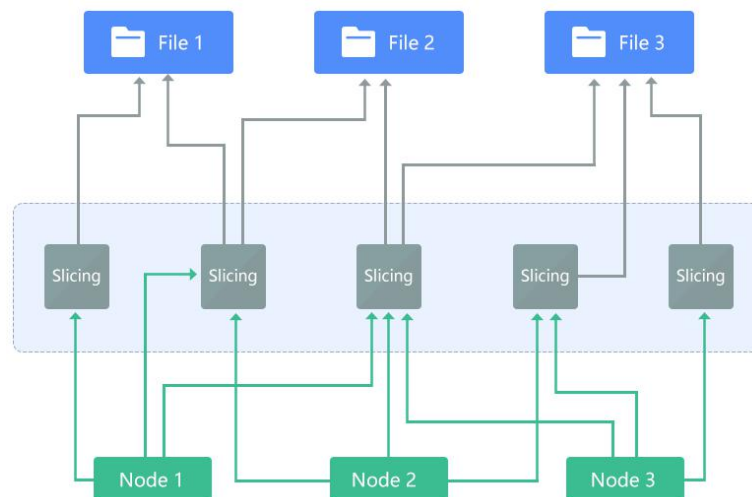
4.3 strong distribution:A single node uses DHT (distributed hash table) to query the nearest node that owns a partition (this partition can be owned by more than one person).From the nearest node in accordance with the distance of sorting, get their own desired pieces.

4.4 comprehensive characteristics: At present, resource retrieval mainly involves resource database, block database and block analysis service.Firstly, the block analysis service receives data through the blockchain network and saves it to the block library, then extracts the resource index and saves it to the resource library.Resource retrieval only needs to search in the local resource database, because the published resources on the network will eventually be updated to the resource database.

The current technology adopts the most advanced slicing technology. For example, if a movie a is uploaded, it will be sliced into a 24K file for strong distribution. A single node queries the nearest node with a certain slice through DHT (distributed hash table) (this slice can be owned by more than one person).From the nearest node in accordance with the distance of sorting, get their own desired pieces.At this time, all the nodes on the network will get the corresponding announcement. The second person who uploads a movie, the system will automatically detect whether there will be fragments. All the same fragments will achieve the effect of instant upload, and there will not be many a movie effects on the whole network.

5.copyright protection

Copyright protection of global video   copyright chain.

Decentralized storage network (DSN): we provide an abstraction of a network of independent service providers providing storage and retrieval services.Then we put forward the token of global video copyright chain: GVC (token) as incentive, auditable and verifiable DSN construction.

Copyright protection: the research and development of global video copyright chain aims to protect human cultural heritage, because video can be distributed, copied and pirated after downloading.So we can protect the copyright of the resources uploaded by the publisher through the chain storage. If we find that the infringement can be complained, we can study it from four aspects: release, download, reward and copyright complaint.

Because every software on the chain is encrypted storage, put an end to the drawbacks of the previous centralized system, previously

downloaded movies, videos can be copied and forwarded.The films downloaded by GVC can't be copied. The films composed of encrypted hash value and random code can only be viewed by paying, which ensures the copyright of the films and eliminates the problem of piracy.

5.1 release

Publishers will publish the original video on the global video copyright chain, the video will be distributed in different bandwidth and hard disk, and the global video   copyright chain will encrypt all the video with hash value to form random code for chain storage.

5.2 download

All the movies downloaded by using the global video   copyright chain technology are encrypted with hash value and then scrambled. The movie is downloaded to the local hard disk and cannot be watched. The encrypted scrambled code can only be watched through the mechanism on the "GVC" video   chain, and can be watched with the circulation currency (GVC).

5.3 reward

The global video   copyright chain requires the copyright owner to give 20% to 80% reward to the public who provide bandwidth and hard disk after releasing the film.That is to say, for each GVC output to the copyright owner, the copyright owner must provide 20% to 80% of the reward to the public who contribute bandwidth and hard disk.The higher

the proportion of giving, the more times the copyright Party's resources will be displayed and the more money they will provide.

5.4 copyright appeal

If the publisher publishes forbidden videos about violence, pornography, terror, reactionaries, etc., but the information received by the people who provide bandwidth and hard disk is encrypted hash value and garbled code, so the content of the video cannot be identified. While the people who download and publish the video get the video information, the supervision department can query the video publisher through the online chain and pursue the responsibility.

When someone pirates a publisher's video, the publisher can appeal to the regulatory authorities. After the appeal, the POS votes and decides that every person holding GVC can mortgage it with GVC. This is a completely decentralized content supervision and a fair vote.

If the video sent to the chain is found to have the same video, it can appeal on the chain, and the defendant's information can be sent to the plaintiff for offline processing.

6. token Generation mechanism

The total number of GVCs(tokens) is 1 billion. When the project was created, the mining area will start the project with 1 million GVCs and distribute them to the first batch of miners.

6.1 mining

Through the construction of community nodes and the pledge of

GVC mining, all GVC are generated.

6.2 resources uploaded by the copyright party

When the copyright owner stores resources, it needs to mortgage GVC. The specific rules are as follows: according to the total number of copyright uploads of the whole network on that day, 0.01 GVC will be added for every ten times (default price: 0.01gvc). When the whole network uploads 1000 times on that day, 1gvc will be added for the mortgage price, 2gvc will be added for 2000 times, and so on.

6.3 watching

Suppose that the price of a movie is one GVC (token), and the person watching the movie needs to pay one GVC copyright fee.

7. Trading rules:

When a miner needs to transfer his GVC, he will charge a handling charge of two thousandths (for example, if he transfers 1000 GVCs, he will charge an additional two GVCs as the handling charge), and 50% of the handling charge will be distributed to the developer community and 50% to the POS mining holders.

8. Punishment system:

8.1 double signing in verifier

In the verification phase, if the double signer is used, it will be punished, and the system will reduce 5% of the total pledge quantity of the verification node and the client as a penalty.After the double signature occurs, the atom of the delegation in the node will be redeemed automatically and cannot be re entrusted, which means that during the redemption period (21 days), the consignor will not get any income and the verifier will be permanently blocked.

8.2 verification of node disconnection

If the cumulative number of signatures of the non participating blocks exceeds 50 hours, 1% of the GVC will be confiscated and the mining machine will be imprisoned for 24 hours (no income will be obtained during the period of imprisonment). If it needs to be restored, it needs to apply separately after expiration.

8.3 remarks

(1) double signing refers to two blocks or two signatures at the same height.

Verifier: nodes participating in block rights

The number of votes of verifier: the sum of the number of verifier's mortgage and the number of consignor's mortgage

Client: the account number that mortgages its own amount of primary currency to the verifier to obtain the reward.

9. Application

The global video copyright chain focuses on the protection and permanent storage of video copyright.The global video   copyright chain has broken through such technological innovations as routing penetration, storage fragmentation, data deletion and rollback.

10. Description of global video copyright chain agreement

10.1 introduction of global video copyright chain agreement

The global video copyright chain is software used to replicate applications securely and consistently on many computers.The so-called security means that even if up to 1 / 3 of the machines fail in any way, the global video   copyright chain can still work normally.What we mean is that every non fault machine sees the same transaction log and calculates the same state. Secure and consistent replication is a basic

problem in distributed systems.It plays an important role in the fault tolerance of many applications, from currency to election, infrastructure process and so on.

The ability of the global video copyright chain to tolerate machine failure in any way (including becoming malicious) is known as Byzantine fault tolerance (BFT).The theory of BFT has a history of decades, but software implementation has not become popular until recently, which is mainly due to the success of "blockchain technology" such as bitcoin and Ethereum.Blockchain technology is only a reform of BFT in a more modern environment, focusing on point-to-point network and password authentication.The name comes from the way of batch processing transactions by blocks, in which each block contains the encrypted hash of the previous block to form a chain.In fact, the blockchain data structure actually optimizes the BFT design.

The global video copyright chain consists of two main technical components: the blockchain consensus engine and the general application program interface, which can ensure that the same transactions are recorded on each computer in the same order.

The global video copyright chain appears in the tradition of bitcoin, Ethereum and other cryptocurrencies. Its goal is to provide a more effective and secure consensus algorithm for proving the workload of bitcoin.In the early days, a simple currency was built into the global video copyright chain. In order to participate in the consensus, users must "bind" the monetary unit to the deposit. If they misbehave, they can withdraw the deposit - this is the proof of stack algorithm.

10.2 overview of consensus

The global video copyright chain uses an easy to understand, mainly

asynchronous BFT consensus protocol.The protocol follows a simple state machine.As follows:
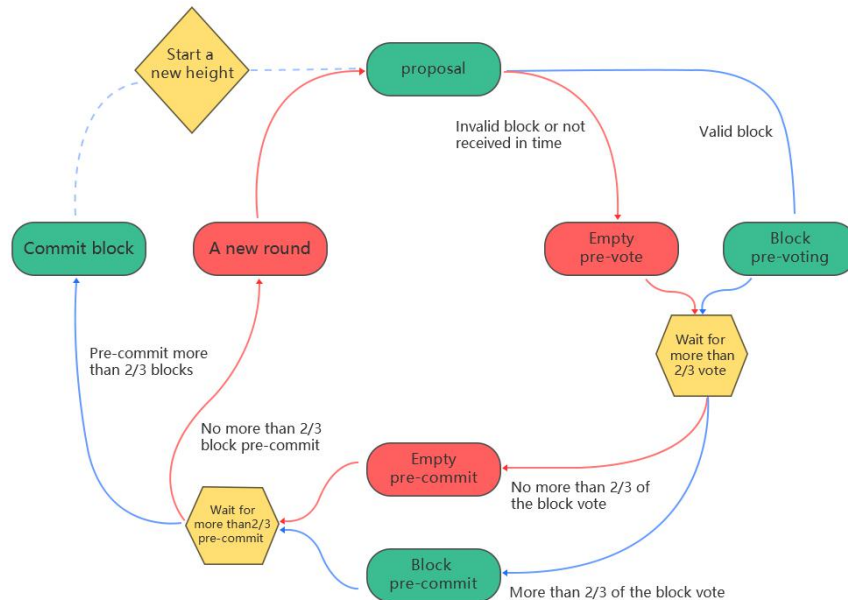
Participants in the agreement are called verifiers; they take turns proposing and voting on trading blocks.The blocks are placed in chains with one block at each height.A block may not be committed, in which case the protocol will move to the next round and the new verifier will propose a block for that height.Successful submission of a block requires two stages of voting; we call them pre vote and pre commit.When more than 2 / 3 of the verifiers in the same round submit the same block in advance, a block will be submitted.

There is a picture of a couple doing Polka because the verifier is doing something similar to polka.When more than two-thirds of the verifiers pre vote on the same block, we call it polka.In the same round, each presentment must be defended by polka.

The verifier may fail to submit the block for a variety of reasons; the current proposer may be offline, or the network speed may be slow.The global video copyright chain allows them to determine that the

verification process should be skipped.The verifier needs to wait a short period of time to receive the complete proposal block from the proposer before voting to decide whether to proceed to the next round of voting.This dependence on timeout makes the global video copyright chain a weak synchronous protocol rather than an asynchronous protocol.However, the rest of the protocols are asynchronous, and the verifier can make progress only after hearing more than two-thirds of the verifier set.A simplified element of the global video copyright chain is that it uses the same mechanism as skipping the next round to submit blocks.

Assuming that less than one-third of the verifiers are Byzantine, the global video copyright chain guarantees that security will never be violated, that is, verifiers will never submit conflicting blocks at the same height.To this end, it introduces some locking rules, which adjust the path that can be followed in the flowchart.Once the verifier submits a block in advance, it locks it on the block.then, It must pre vote for locked blocks; If there is a polka dot in a later round, it can only unlock and pre submit a new block.

10.3 copyright

The global video copyright chain agreement provides resource retrieval and integration for the copyright owner. When the copyright owner is first listed on the chain, it will register its own copyright owner number (default 6 digits, automatic expansion if insufficient) and introduction information on the chain as the identity of the copyright owner.

10.4 data synchronization

When the user starts the node, all blocks will be synchronized, and

the resources and copyright information published on the chain will be retrieved.

These data will be written to the local database for the client to retrieve.

It includes the name and size of the copyright resource, the copyright owner, the number and introduction of the copyright owner.

10.5 resource retrieval

When the user enters the copyright address in the client browser address bar, such as（dmfs://123456.dm).

The system will automatically match the corresponding copyright data in the local database and generate the copyright homepage to display.

Of course, you can also directly enter keywords to search on the chain, and support three kinds of result filtering: 1. Copyright introduction, 2. Resource keywords, 3. Movie Title keywords

10.6 resource download

When publishing resources, the copyright owner can set the reward ratio (20-80%), for example, when the reward ratio is 50% and the price is 100gvc, someone will buy the resources and download them successfully

The copyright owner will be rewarded with 50gvc, and other bandwidth providers will share another 50gvc according to their contribution proportion.

The same copyright resource needs to be purchased when it is downloaded for the first time, and there is no need to pay again for subsequent downloads

The downloaded resources are automatically seeded for other users

to download. When other users purchase and download through your bandwidth, they will pay you a part of the cost. The higher the bandwidth they contribute, the higher the proportion of the cost they get.The maximum percentage of commission will not exceed the upper limit.