

# Video Streaming using BlockChain Technology

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**Abstract** - Blockchain-based video streaming systems aim to build decentralized peer-to-peer networks with versatile monetization mechanisms for video streaming services. They scale back operation value, have bigger fault tolerance, fewer trust necessities between storage suppliers and data homeowners and are less prone to attacks. With the event of blockchain technology, decentralized storage mode has entered the general public read. Video transcoding has been widely applied in video streaming trade to convert videos into multiple formats for heterogeneous users. We justify however the traditional framework of media delivery can be reworked by IPFS based mostly delivery network supported by HLS streaming for every kind of distribution model (live or on-demand).

**Key Words:** Blockchain, Decentralized, IPFS, HLS, Transcoding.

## 1. INTRODUCTION

With the high demands for online streaming services, video streaming platforms have become popular over the past decade. However, these traditional online streaming platforms have several disadvantages such as High cost, piracy and low privacy for consumers.

These issues can be addressed with the help of emerging technologies like IPFS Block-chain supported by HLS. We propose a distributed system that improves network efficiency, provides untampered content with built-in security and no duplicate content.

### 1.1 Blockchain.

A blockchain is a growing list of records, known as blocks, that are joined mistreatment cryptography. Each block contains a crypt logical hash of the previous block, a timestamp, and dealing information.

### 1.2 Blockchain Applications

Cryptocurrency like Bitcoin has been the mainstay to many of the other applications of blockchain. It is mainly used in financial applications. But it has many different applications other than cryptocurrencies and financial ledgers. These applications include Social inclusions, Private data storage, Reputation management, Education, Banking and Finance payroll and settlement. It has applications in public services like Taxation, Healthcare,

voting, insurance. Here we will focus on Blockchain Application- 'Data Storage' using Blockchain.

### 1.3 Blockchain for content sharing

When the user wants to share his video content, the RTMP protocol is used to store the video on the open video network that are the nodes in the IPFS network. The video content undergoes the following process.

1. **Transcode:** Collect the Video and transcode the video.
2. **Encrypt:** Encrypt the transcoded video.
3. **Generate Block:** Collect this encrypted data and organize it into blocks.
4. **Storage:** Store this data in the distributed node network using IPFS.
5. **Delivery:** End Users can access the video through the video streaming platform.

The video content is delivered to the end-user using HLS. The HLS is used to pull the contents present on the Distributed Network and provide to end-user by using a video streaming platform.

### 1.4 Existing system and its drawbacks

In a traditional system, RTMP deploys video content over the Internet (Media Server). RTMP splits the video stream into fragments. The Standard fragment size for the audio is 64bytes and for the video 128bytes.

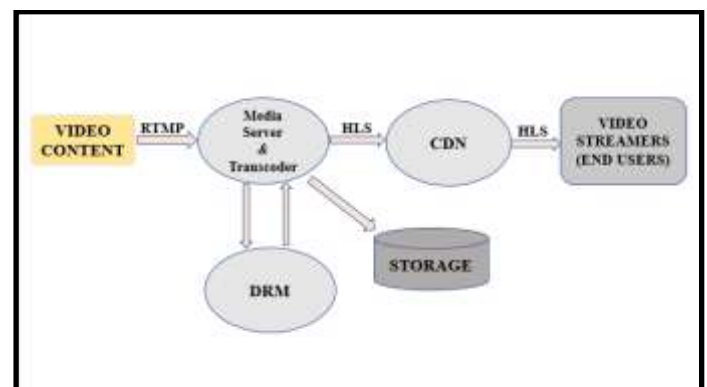


Fig -1: Traditional Video Streaming

DRM is present on the media server which protects the data from copyright while uploading the video. CDN is a distribution network that provides the requested web content to the end-user with the help of HLS. In the existing system, platform controls search results and storage and streaming uses centralized servers. It also has the censorship control of the content and control on demonetization.

## 2. PROPOSED SYSTEM.

The IPFS can solve all the above problems in the existing system. When the video content is shared, it is stored on IPFS. IPFS is the InterPlanetary File System.

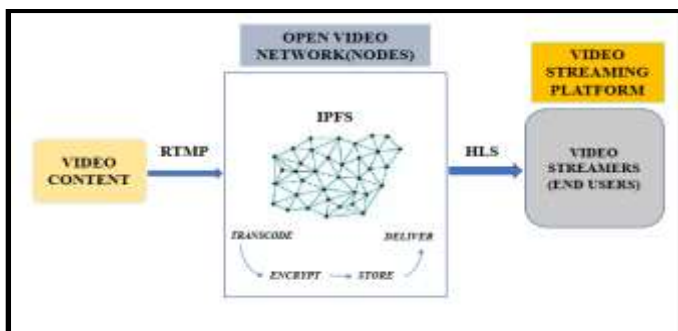


Fig -2: Proposed System

IPFS works on content-based addressing instead of the location-based addressing. When the content is uploaded, a unique hash is generated for it. The file is checked if it has tampered. The file is untampered if the hash of the content matches with the requested content. This provides built-in security for the uploaded content. Also because of hash, no duplicate content is allowed that helps to improve the network efficiency.

### 2.1 Video storage on the Proposed system.

When a user shares the video, it is stored on the node in the network inside the IPFS object. The video content is transcoded and is segmented. Generally, the size of an IPFS object is 256 KB. The video content is larger and is split over IPFS objects connected with each other by an empty IPFS object. An empty data object contains only links and has no data.

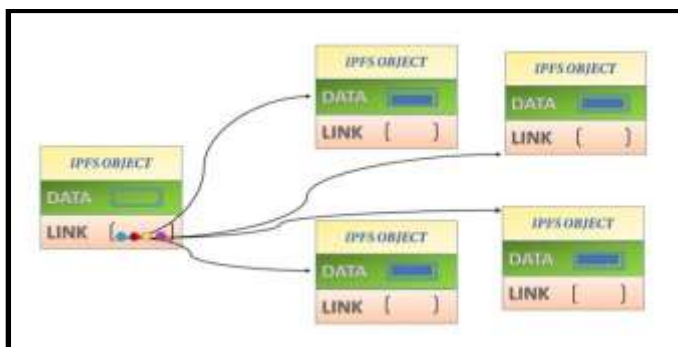


Fig -3: Video Storage on IPFS objects.

## 2.2 Algorithm Used

### 2.2.1 Hashing Algorithm

Hashing is a technique to modify security throughout the method of message transmission once the message is meant for a specific recipient solely. A formula generates the hash, that helps to guard the protection of the transmission against meddling.

In the case of SHA-256, despite how huge or tiny your input is, the output can continuously have a set 256-bits length. This becomes important after your area unit managing a large quantity of knowledge and transactions. So essentially, rather than remembering the large input file that may well be immense, you'll simply keep in mind the hash and keep track.

### 2.2.2 Codec Algorithm

Codec is a 'coder-decoder' algorithm used for compression of audio or video. H.264 has mostly used the codec. H.264 provides interoperability between the different platforms.

H.264. It consists of four stages.

Divide the video frame into pixel blocks for the processing.

Remove the redundancy in content by using prediction, transform, quantization and entropy coding techniques.

Removal of Temporal dependencies by motion estimation and compensation.

### 2.2.3 Consensus Algorithm

The consensus is a common agreement that ensures that previously present blocks in blockchain agree with newly added block. Also, the trust between new blocks and existing blocks in the distributed network.

The consensus algorithm maintains the integrity of the data in the system, also prevents attacks like Denial of service (DoS) and spam.

Consensus algorithms are classified into two types-

1. Voting Based Consensus.
2. Proof Based Consensus.

## 3. CONCLUSION

In this paper, we proposed a novel blockchain-based framework for the video streaming system. Firstly, the video content delivers to the media server through RTMP protocol. Then by using different protocols such as IPFS, Codec, HLS the video is transcoded, encrypted, decrypted and deliver to the end-user. In this way, our proposed system has the potential to overcome issues such as piracy with the help of budding technology Blockchain. As data is

stored in decentralized formats it increases the security and reduces tampering of original data.

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