

The Effort Of DouyuTv Streaming System: An Individual Research Report

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Abstract

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As time goes by, Internet becomes an important part in daily life. Internet provides real-time transactions and easy access for almost every business form due to its high information transportation ability. The traditional acting could take advantage of Internet, audiences could watch acting in home by just one click, and the associated businesses like advertisements could also easily delivered to browser and other device. DouyuTV, a famous live stream sharing and broadcast provider in china invested by Sequoia Capital, owns 270000 daily IP visits. This amount of audience makes DouyuTv becomes the top one broadcast and living streaming provider in China. DouyuTV costs millions dollars in data management and distribute system development, its predecessor is a living stream department of barrage streaming provider, Acfun.

Douyu TV contains several categories (channels): Gaming, Entertainment, Sport, Science and Education. Gaming is for players to share and broadcast their gaming skills. Entertainment is for anchors especially beautiful female anchors to show their faces, bodies, songs and dances. Sport is for rebroadcasting sport events. Science and Education is currently under developing which may be used for online teaching.

This article would analyze why Douyu TV success and its development effort in distributed computing system including CDN distribute system and video solutions, which are also known as cloud computing.

Introduction

Technology has highly improved human's life quality during its development. Besides information technology, nowadays people cannot leave the high technologies.

Live-streaming combines high-fidelity computer graphics and video with low-fidelity text-based communication channels to create a unique social medium. Live streaming previously was at the fringes of social media, with a small population producing and consuming content. Around 2009, live streams of people playing games began growing in popularity. Four years later, the video game live streaming scene has exploded. DouyuTV, or just Douyu, a website supporting video game and talkshow streaming, has over 34 million unique monthly viewers and thousands of streamers.

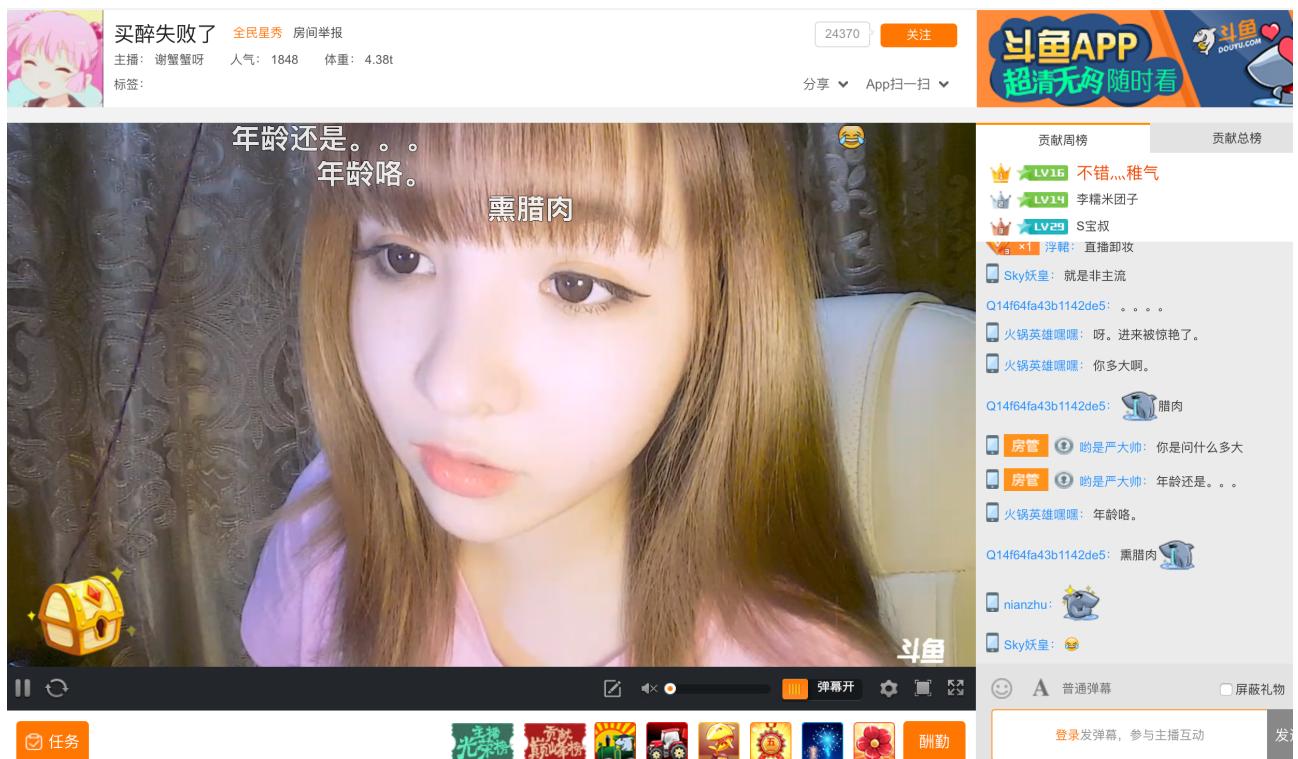


Figure 1. Douyu streams enable streamers to broadcast high-fidelity video of gameplay and real-life. Participants simultaneously communicate through streamed media and an associated chat channel

Live streaming, in its current form, enables public broadcast of live audio and video streams alongside a shared chat channel (Figure 1). Viewers of the stream can communicate with the streamer also other viewers through the chat. Participation in streams is simple. All that required to chat is a free Douyu account.

We found that people engage in live streaming for two reasons: they are drawn to the unique content of a particular stream, and they like being interacted with and participating in that stream's community. Many DouyuTv streams are what we consider to be participatory communities, characterized by openness as well as the means for and encouragement of members to engage in shared activities. Sociability in streams takes the form of humorous banter and light-hearted conversation, alongside play. Core community members engage in key activities: building community by engaging other participants, promoting participation, and moderating chat.

As the popularity of live streaming has increased in recent years, many streams have become very large, some regularly in excess of 5,000 live participants. However, as streams scale up, information overload renders chat unreadable, and moderation becomes overwhelming. Some large streams continue to grow. However, participants become frustrated with the difficulty of interacting in these streams. We found that for this reason, many choose to participate in smaller streams, which they experience as affording more meaningful interaction.

Due to Chinese characteristic, Douyu has many paid service, as well as member level. This are another reason why lots of steamers and audiences got into Douyu. In general, a streamer with 5000+ audience could earn 1-2.5 thousands dollars per month. This include the hourly payment by douyu and virtual gifts. Douyu develop a new form of business logic in streaming.

Business Model

As part of software development, the business model is an important component of a successful system. DouyuTv has a simple but valuable business model, which is modeled by other competitors across the Asia.

At audience side, audience is encouraged to register to become a member. Membership is free to register but who can have higher video quality. Also, member has two virtual currency, one is called fishball, another is shark's fin. The fishball could be collected by watching advertisement or complete website's daily mission, which ask members to download third party games. The shark's fin can be only collected from buying using real money. Also, members can level up by gifting streamers. High level member can send longer message and has a striking prefix like "LV45". To reach the top level, a member need to spend 1 hundred thousand of dollars. As figure 2 shows, there is an rank recorder in every streamers room, the rank is calculated by the gift amount gifted by members. It is obvious that he can get more chances to interact with streamer when he at the front of rank recorder. Also, streamer could assign anyone he/she want to become admin of room. The admin of room can ban other audience to post message. This design attracts lots of rich people to spend their money, also this is the main incoming of Douyu.

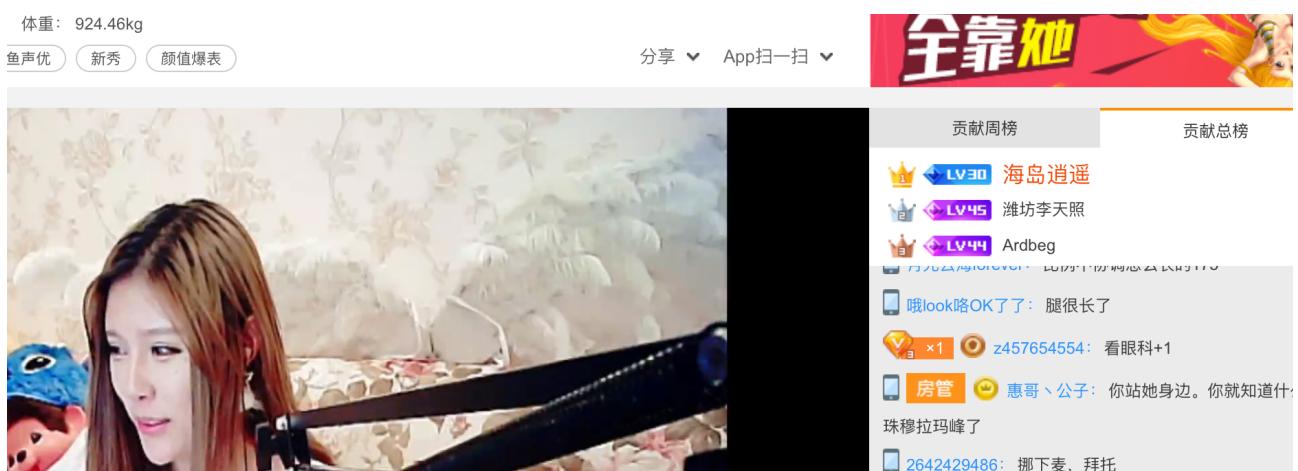
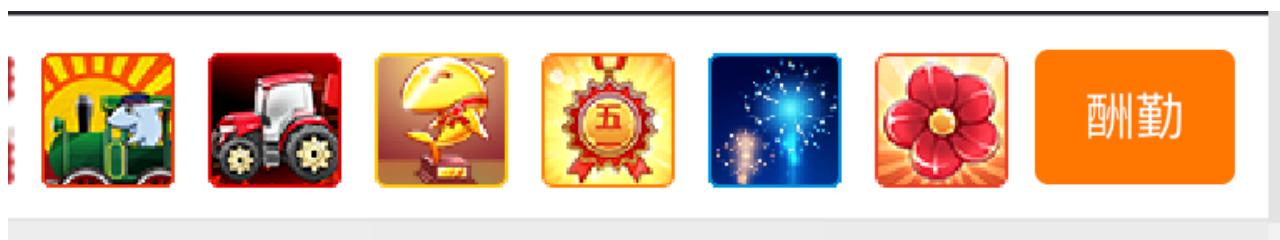


Figure 2. Rank recorder.

At streamers side, streamers broadcast their shows including game plays and acting. They get paid by Douyu. Streamers income are including two parts. One is hourly payment, this is only valid for whom sign a contract with Douyu, which prevent them to stream on other sites or media. Another one is deducted from the shark's fin paid gift. Usually, douyu would take down 50% of the value of a gift, and pay 50% to streamer.

The virtual currency, one shark's fin is equal to 1 ¥ RMB. Gifts can buy using shark's fin, also it has an ranking and different effect.



Gift Name	Shark fin required	Real money amount	special effect
rocket	500	80\$	broad cast to all rooms in site, including sender's user name and streamer's user name. and free fish ball box gift to all audiences required 3 minute wait time
aircraft	100	17\$	broad cast to current room
golden ball	20	3\$	none
I love you	1	0.16\$	none

As table shows, these gift system design make douyuTv to exist to siphon off cash. People want to spend money to satisfy their vanity or make a chance to pick up the beautiful streamers. Money is everything to them.

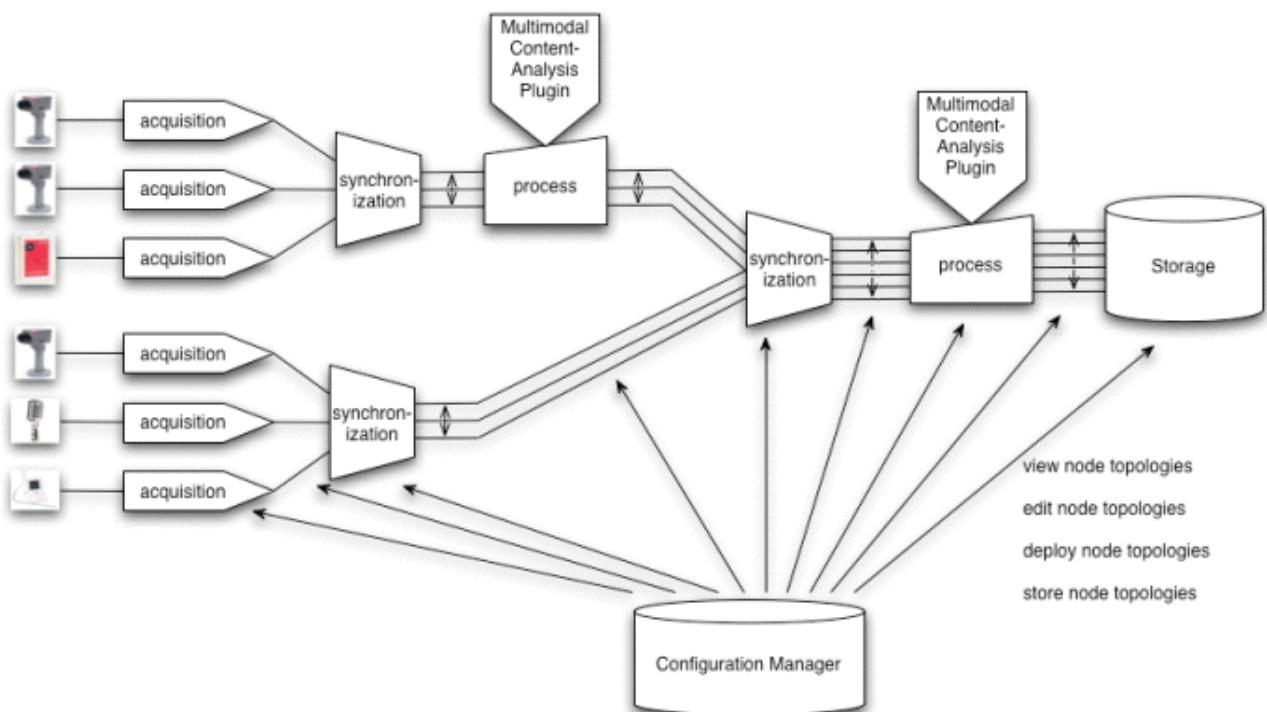
Technical Effort

Besides a successful business model, Douyu also has an advanced software system.

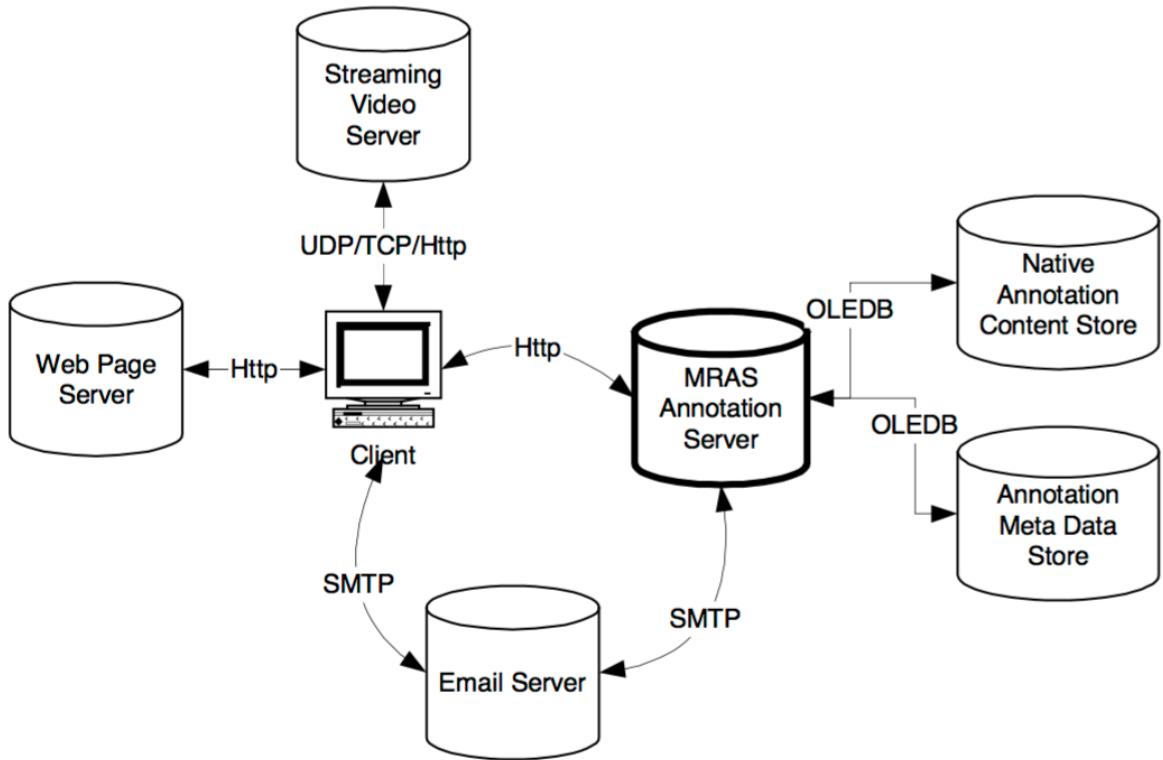
As a milestone online streaming broadcast provider, douyuTV's user interface was highly friendly and directly. This makes the users getting satisfied in the beginning. The technology behind this interface is a php plus database combination however it based on distributed systems. As indicated above the high internet traffic website need distributed systems to deliver content from different servers to ensure every user could get response in time.(Beal).

The first distributed system they used is CDN(content deliver network), this technology is commonly used in worldwide websites which could store the static html files to CDN servers and deliver to user who ask for.(wiki) In other words, this system separates users to based on different locations. For instance, if you are in LA, then you would be assigned a LA server, the content is the same like original sever. After this, user would reach the second distributed system, which is developed by their own.

This is a basic distributed system that received upload streaming and broadcasting these streaming to the user who asked for. (baidu)



That distributed system also has a center transaction control unit to decide the resource distribution ratio for servers.(baidu). The web pages and video streaming are connected like below:



When a user accesses a web page containing streaming video, the web browser contacts the web server to get the HTML page and the video-server to get the video content. If there are annotations associated with the video in the web page, the user can contact the Annotation Server to retrieve them. Figure shows the interaction of these networked components. The Annotation Server manages the Annotation Meta Data Store and the Native Annotation Content Store, and communicates with clients via HTTP. Meta data about target content is keyed on the target content's URL. Since the display of annotations is composed with target media at runtime on the client, location and user access rights for target content are not restricted.

Conclusion

DouyuTv is successful because their strongly technologies used in back to proved a best user experience through the internet plus a successful business logics of system design.

Since its launch, Douyu has focused on video games and the gaming community. It's easy to see however, how the site could transfer that "social video" approach to other communities and interests like beauties show. Indeed, the site has begun to push into a new sector: talkshow. In 2012, the site added a "全民星秀" category for beautiful girls and has started to live-stream concerts on the site.

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