



Media Acceleration Live Broadcast



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CDNetworks Media Acceleration Live Broadcast is an independently developed product that provides services of internet live streaming acceleration. It is based on CDN 2.0 delivery platform and it utilizes proprietary technologies including GLBS (Global Load Balance System) and private streaming media transfer protocol. It delivers fast, stable and secure end-to-end live streaming acceleration service, and terminal users will enjoy a low-latency and buffer-free video streaming experience.

CDNetworks Media Acceleration Live Broadcast is one of star products in CDNetworks, having supported the content delivery of countless large-scale online live streaming events, such as government convention, live gaming, pan-entertainment live streaming, etc. The multiple technologies including stream connector controlling, dynamic code rate adaption in real-time streaming media, broadcast delay in live have gained multiple technological patents.

Product & Current Status of Industry & Challenges

Since 2016, live broadcast has been on a rise globally. According to Cisco Report, Live video will grow 15-fold from 2016 to 2021. Facebook, Youtube, Twitch are also joining the online for live streaming, among which live gaming is springing up.

However, live streaming is facing a bright future as well as some emerging challenges.

Low Smoothness Affecting Viewing Experience

Smooth viewing is the paramount requirement for users, and the failure to meet the requirement will entail user churn. However, there are geographic divergence in network infrastructure construction in China, making it hard to fully satisfy the split-second Internet surfing demands nationally. The occasional video stuttering has severely impacted user viewing experience.

High Latency Affecting Interaction Experience

“Realtimeness” is a significant feature for live streaming, whose users are expected to obtain live streaming frame and get involved in the scene at the very first time. Interactive live streaming, in particular, is more sensitive to latency as fast response time matters in the interaction between broadcaster and viewer. However, the latency could occur from content production to video playback including data coding, transmission, decoding and player buffer filling, and it will impact the interaction experience.

Lack of Control over Push-Stream Content

The specialty of interactive live streaming lies in that all the video contents are user-generated and delivered to broadcast in real time. Live streaming platforms need to ensure the promptness of video broadcast and optimal interaction experience, but they have difficulty in assuring the legitimacy of pushing content from broadcasters. Once the illegal proliferates, the negative impact on platform is unpredictable.

Cost Increasing in Response to Sudden Spike

It is well known that one of live streaming features is sudden spike, which means the access surges in a specific period (such as promotion period) and the access is relatively stable in other period. For the former, insufficient



bandwidth reservation may fail to meet the need in the specific period; and the latter will cause the resource waste of video content provider.

Product Introduction

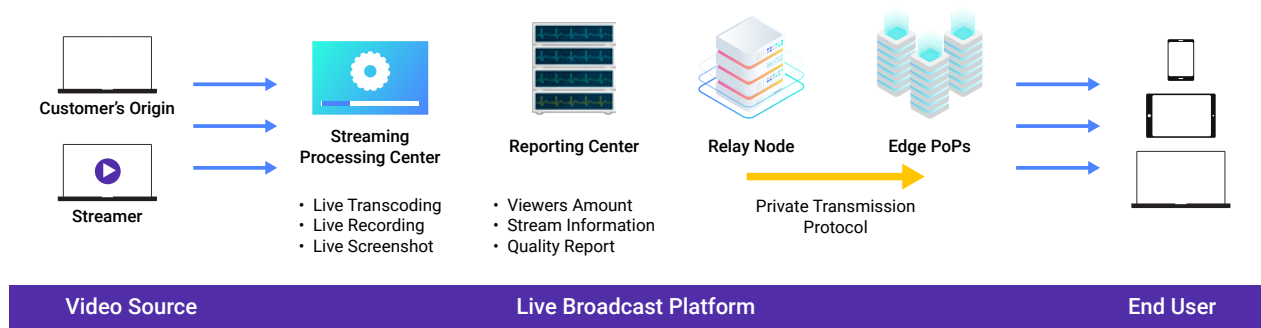
Product Brief

CDNetworks Media Acceleration Live Broadcast product is based on CDN 2.0 delivery platform, and utilizes proprietary technologies of GLBS and private streaming media transfer protocol, striving to provide one-step solutions of video ingestion, processing, delivering and decoding. It renders fast, stable and secure live streaming acceleration service, and provides users an excellent experience of low-latency, buffer-free viewing.

Product Positioning and Application Scope

MALB product strives to shield customers from headaches of video stuttering, high latency, severe bursts, and it promotes user loyalty to customer websites and advances customer brand equity by upgrading video live streaming playback quality and rendering terminal users a fast, smooth and stable viewing experience. The product is applied in: live streaming websites of all kinds, including beauty broadcaster live streaming, game live streaming, news video website, online educational website, etc.

Product Technology Architecture



Product Topology

The product is constituted by CDNetworks media center, NGB system, live broadcast processing center, and edge node, and adopts private transmission protocol in transmission. The modular performs its best function and provides customers fast and stable live broadcast services.

- CDNetworks media center deals with streaming input variants of customers, and for now has supported RTMP/HTTP FLV for pushing stream and RTMP/HTTP FLV/HTTP TS/HLS/HDS for pulling stream.
- NGB (New Global Balancer) is responsible for redirecting user requests to the optimum nodes;
- Live broadcast processing center is to process live streaming, including trans bitrate, resolution conversion, audio/video coding format conversion, HLS segmenting, etc.;



- The globally distributed CDN edge nodes will respond to end user requests in real time;

Product Features

Smooth Video Playing, Needless to Wait

NGB

New-generation global scheduling system will make a comprehensive judge based on the node loading and network quality acquired in real time, and redirect the user requests to the optimum node based on end user IP, thus the latency is reduced, fluency is upgraded and a smooth real time live broadcasting experience is delivered to end users.

Private Streaming Media Transmission protocol

CDNetworks focuses on live broadcast features, and develops transmission protocol independently, with which transmission speeds of live streaming and data delivery to end users are accelerated and the live broadcast quality is promoted with the reduction of latency and stuttering. These advantages are even outstanding for small operator service and in trans-national transmission (buffering time is shortened by 165% compared with normal trans-national transmission).

WNHD (Beta)

Weak Network High Definition, WNHD in abbreviation, is to address the issues of bad quality of the push stream from mobile terminal end in the unstable and weak network environment, cross-region, cross-ISP and overseas live broadcast scenarios.

WNHD is a two-ended acceleration protocol based on UDP implementation to realize the reliable and orderly transmission. It works similarly to TCP in terms of behavior characteristics while taking into consideration of mobile network (802.11 and 3G/4G) feature and making optimization targeting the feature. WNHD adopts the TCP-like mechanism to establish virtual connection, achieves reliable transmission and addresses issues of packet loss and disorderly transmission. It performs well under the weak network environment where great latency and random packet loss occur.

No Fascinating Content Will be Missed

Live Recording

The feature realizes recording live-stream contents and converting them into VOD file, convenient for customers in their VOD application and VOD file fetching. In addition, CDNetworks provides a suite solution for live streaming, live recording and VOD.

Live Broadcast Time Shifting

Supports live time shifting within 7 days, and users will watch the latest video streaming content by dragging progress bar and no amazing moment will be missed.



Live Broadcast Time Shifting – Amazing Content Sharing

Users can click the share button of player and share the content in form of small video, endowing live broadcast with more social features.

Richer Scalability

Live Stream Transcoding

With this feature, single high-definition live streaming input will output multiple streams, increasing live content's adaptability to various network environment. It will match end users to various origins according to network environment and ensures smooth viewing for users who are in poor network.

Multi-Terminal Supporting

CDNetworks live broadcast acceleration product supports the input of streaming in one protocol and exports live streaming in multiple protocols to meet various live streaming demands for terminal. The input streaming CDNetworks supports are: RTMP/HTTP FLV/HTTP TS, and the output streaming after conversion are: RTMP/HTTP FLV/HTTP TS/HLS/HDS. CDNetworks also supports the pure distribution of HLS/HDS protocol.

Streaming Status Feedback

CDNetworks streaming status feedback mechanism will update the information of broadcaster stream pushing and stream disconnection in the customer-designated platform, where customers will be well notified whether broadcaster has pushed stream and whether stream pushing has ended. It helps customers to upload the streaming to the website, meeting end users' viewing demands.

API in Variants

CDNetworks live broadcast acceleration product offers interfaces to check online viewer number, frame loss ratio and uplink speed measurement, assisting customers in real time monitoring on live stream contents.

Easy Control on Contents

Prompt Stream Forbidding

When an illegal content is detected in the broadcaster pushing stream, CDNetworks will provide the corresponding API, which customer can invoke to cut off the live broadcast in time, thus the entailed damage on customer economic benefits and brand identity can be avoided in time.

Broadcast Delay

It provides convenience for the live stream video providers to vet on live streaming information and the streaming will be stayed in CDNetworks nodes for a while before sending to the public.

Easy Control on Cost

Multiple Anti-Hotlinking

CDNetworks MALB product supports multiple anti-hotlinking to decrease the illegal requests for customers, to reduce the bandwidth wastes costed by these requests and the bandwidth costs resulting from hotlinking. The



anti-hotlinking supports are: referer anti-hotlinking, IP black and white listing, UA anti-hotlinking, timestamp anti-hotlinking, back-to-origin authentication, swf anti-hotlinking, and etc.

Audio/Video Unicast

The server can eliminate the visual or acoustic output when users only need either sound or image, thus bandwidth cost will be reduced for customers.

H.265

CDNetworks live broadcast H.265 scheme will save 50% of bandwidth when transferring the image in the equal resolution; its transcoding center of high availability and high concurrency will ensure the stable quality of service; full-link closed loop realizes P2P integration of stream pushing, transcoding and playback; lightweight SDK can be inserted on demand and configured adeptly for business needs.

Resolution Rebuild (Beta)

The use of resolution rebuild feature requires SDK embedding. Input video frame to SDK and SDK will output a high-resolution video frame with the input frame information and the pre-loaded deep learning model after the player implements decoding. For now, SDK of IOS, Android and PC end are available, and there are basic and advanced versions. It will increase the resolution without increasing the CDN bandwidth.

Product Value

Industry Leading in Node Coverage

CDNetworks owns 1500+ Global PoPs and 500+ Oversea PoPs covering multiple countries and regions.

Rich CDN Acceleration Experience

Boasting of ten-odd years' well practice in CDN acceleration, CDNetworks has accumulated industrial experience to service customers from various fields. The Operation & Maintenance team and customer service team can well apprehend customers' need in the very first time and respond with a scheme promptly, helping customers to well adapt to the constant changes and diverse demands in internet tides.

Rich Product Features and Stable Performance

CDNetworks MALB product takes initiative in feature development, targeting various industries and various customer scenarios. At the same time, it absorbs the successful experience of the industry and brings customers rich feature experience. The product has full-featured monitor system to conduct real time monitor on device load, network climate and live broadcast business development, and intelligently detects and thus addresses the problem.



Cheaper Operating Cost

CDNetworks will schedule resources on demand to ingest millions of concurrent requests and support T-level bandwidth surge, working as a robust backing for customers. The customers will be spared from huge server investment for origin construction, large amount of redundant bandwidth investment for burst, huge labor and money investment for operation and maintenance. And the integration with P2P service and anti-hotlinking feature will greatly reduce customer bandwidth costs, saving them money and expertise.

Flexible Customization Demands Fulfillment

With the mature development of live broadcast, the differentiation is the core value for customer to survive and outperform competitors. The feature will satisfy various demands from customers and develop along with the business expansion with customer.

About CDNetworks

CDNetworks is a global content delivery network (CDN) with a fully integrated cloud solution, offering unparalleled speed, security and reliability for the almost instant delivery of web content. Optimized for any device, browser and network, we ensure all users have a fast and safe web experience - whether you're serving B2B or B2C customers, mobile employees or remote offices.

CDNetworks accelerates and secures websites and web applications over our strategically built network of global PoPs in both established and emerging markets. We specialize in those parts of the world where keeping a website accessible is most difficult: Mainland China, Russia, South East Asia and the Middle East.

No matter where you are and which device is being used, our in-country experts can advise you on licensing requirements and regulations to deliver the best web experience to your users.

Since 2000, we have been providing our customers with exceptional customer services and support, thanks to our team of dedicated tech engineers located across the globe. Businesses with an international web presence trust CDNetworks to protect their websites, web applications and cloud services.

CDNetworks has offices located in the UK, France, Germany, US, South Korea, China, Japan, and Singapore.