

# Media and Entertainment: Case studies

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# About China Mobile - Migu

## 关于中国移动咪咕公司

### □ China Mobile: 5G and multimedia innovation

### □ 中国移动5G和多媒体创新

- One of the largest mobile telecom by \*market capitalization and by subscribers (902 million, June 2018). \*The Financial Times. June 2018
- Plans to offer a full 5G service by the end of 2019. Thanks to 'Slicing Packet Network' (SPN) technology in 5G, the operator can section off certain parts of network for certain applications. For example, one network slice could carry video traffic at a stadium, while another is reserved for safety officials.

### □ Migu: The digital content company from China Mobile, operating business in video, music and other multimedia fields.

- One of the largest full-scene brand immersion platforms in China, the largest digital content aggregation platform in China.
- 咪咕是中国移动数字内容运营公司。中国最大最全最强的全场景品牌沉浸平台，是国内最大的正版数字内容聚合平台。
- During the 2018 World Cup, 4.3 billion person-time watched the World Cup through Migu. 200 million person-time watched the final game through Migu's platform.
- 世界杯期间，43 亿人次通过咪咕视频观看本届世界杯赛事。决赛当天 2亿+人次观赛。
- Effective Monthly Active Users: Migu Video: 120+ million, Migu Cinema: 14.56 million, Migu Broadcast: 9.52 million Migu Music: 64.43 million, Migu Reading: 7.4 million, Migu Games: 11.39 million
- 有效月活用户数: 咪咕视频:1.20 亿+, 咪咕影院:1456 万 咪咕直播:952 万 咪咕音乐:6443 万 咪咕阅读:7040 万 咪咕游戏:1139 万

# Experience sharing in Video broadcasting area

## 我们在视频领域经验分享

- Video broadcasting over web via Weibo and Wechat
- 微博微信Web视频
- HTML5 application for broadcasting of FIFA World Cup 2018
- 世界杯直播中的H5应用

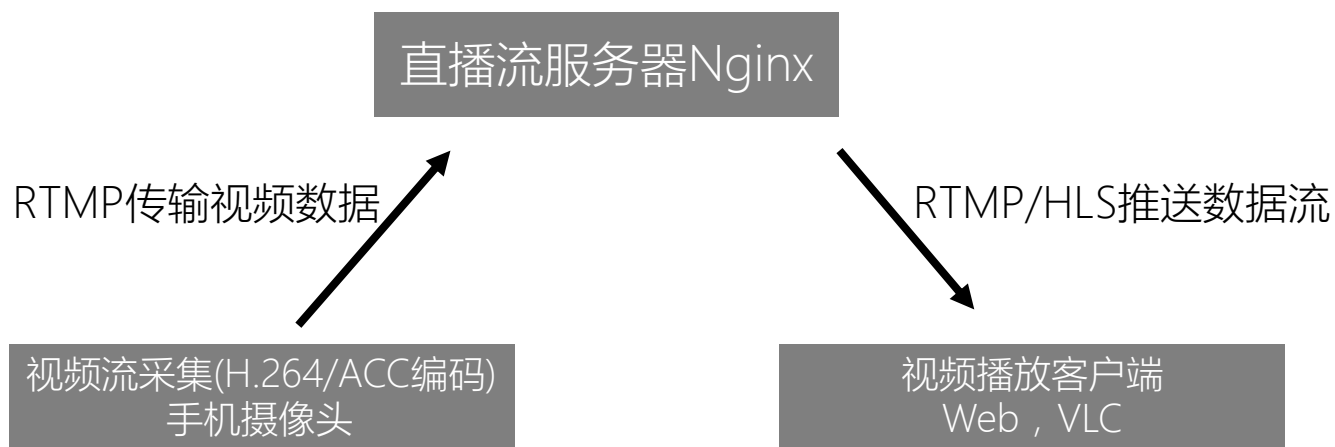
H5 plays a non-replaceable role in mobile live broadcasting

H5在移动直播端也承载着不可替代的作用

- Fast spreading and easy deployment
- 传播快，易发布的优势。最为关键的是H5 同样可以播放直播视频，且具有视频节目更新部署灵活的特点。
- H5 supports video playback and broadcasting. The content exposure is convenient right after the settings of video capturing and streaming
- 服务端做好视频采集端、视频流推流服务之后，便可以直接在H5页面配置 video 标签播放直播视频。

# Experience sharing in Video broadcasting area

## 我们在视频领域经验分享



世界杯直播整体流程

HTML5 Application in broadcasting of Worldcup 2018  
世界杯直播中的H5应用

Technical difficulties and troubleshooting:  
实现过程中遇到问题与解决方案：

- HLS codec is limited to H264+AAC
- H5 HLS 限制必须是H264+AAC编码
- Sliced video packet is the key to frozen video playback: Distribute ts file over CDN and cache via DNS.
- H5 HLS 播放卡顿: server 端可以做好分片策略, 将 ts 文件放在 CDN 上, 前端可尽量做到 DNS 缓存等。
- RTMP protocol improves smooth interactive.
- H5 直播为了达到更好的实时互动, 也可以采用 RTMP协议, 通过video.js实现播放。

# Experience sharing in Video broadcasting area

## 我们在视频领域经验分享

```
rtmp {
  server {
    #监听的端口
    listen 1935;
    # RTMP 直播流配置
    application rtmplive {
      live on;
      #为 rtmp 引擎设置最大连接数。默认为 off
      max_connections 1024;
    }
    # HLS 直播流配置
    application hls{
      live on;
      hls on;
      hls_path /usr/local/var/www/hls;
      hls_fragment 1s;
    }
  }
}
```

### HTML5 Application in broadcasting of Worldcup 2018

#### 世界杯直播中的H5应用

Non-replaceable advantages with H5's video technologies.  
H5 直播视频却有一些不可替代的优势:

Fast spreading, easy deployment as well as quick sharing over social network.  
传播性好，利于分享等操作。

Dynamically publishing media content: In real-time iterative product development.

No need for APP installation.

可以动态发布，有利于实时迭代产品需求并迅速上线。  
不用安装 App，直接打开浏览器即可。

# Experience sharing in Video broadcasting area

## 我们在视频领域经验分享

### HTML5 Application in broadcasting of Worldcup 2018 世界杯直播中的H5应用

Some video portals rely on flash technology, leading to high CPU occupation rate.  
一些视频直播网站PC端的点播、直播使用flash技术（flv、rtmp），存在用户端cpu占用率过高、风险较大等弊端。

### HTTP Live Streaming in Worldcup 2018 broadcasting 我们在世界杯直播中使用H5播放技术HLS

- The stream is segmented into HTTP-based files for downloading.
- 整个流分成数个基于HTTP的小文件来下载，每次只下载一些。
- 当媒体流正在播放时，Web客户端选择从不同备用源中以不同的速率下载同样的资源，允许流媒体会话适应不同的数据速率。
- Web client can retrieve data with different data sources → Self-adaptive for data bandwidth.
- 在开始一个流媒体会话时，客户端会下载一个包含元数据的extended M3U (m3u8)playlist文件用于寻找可用的媒体流前端代码。
- 通过相关手段（需要允许跨域访问媒体资源文件）解码视频资源格式（m3u8、ts、mp4）转化成fragment mp4，吐给浏览器形成播放行为。

# Experience sharing in Video broadcasting area

## 我们在视频领域经验分享



### HTML5 Application in broadcasting of Worldcup 2018 世界杯直播中的H5应用

The ways for users interaction in web broadcasting:

Web直播中的咪咕用户交互分为：

- Gift 礼物 (Difficulties ★)
  - DOM and CSS3 to implement gifting logics and animation.
  - 在H5端利用 DOM 和CSS3实现送礼物逻辑和一些特殊的礼物动画。
- Comments 评论 (Difficulties ★)
- Bullet Curtain 弹幕 (Difficulties ★★ ★)
  - Websocket for rendering and transmission.
  - 弹幕实时性，利用 websocket 来实时发送和接收新的弹幕并渲染出来。
  - Long-polling or timer for incompatible browser.
  - 对于不支持 websocket 的浏览器来说，降级为长轮询或者前端定时器发送请求来获取实时弹幕。
  - 弹幕渲染时的动画和碰撞检测(即弹幕不重叠)

#### 积分榜

排名	球队	胜	平	负	积分
13	大连一方	6	5	10	23
16	贵州恒丰	3	3	15	12

# Our plan in Media and Entertainment (Scenarios)

我们在媒体娱乐方向的工作（场景和用例）

Media & Entertainment related case studies

USE CASE 1: Bullet Curtain

USE CASE 2: HD Definition Switch

USE CASE 3: Cue Events

USE CASE 4: VR(360°) View



# USE CASE 1: Bullet Curtain - Definition

## 用例1:弹幕 - 定义

Bullet subtitle/bullet screen/danmaku subtitles/barrage refers to the comment subtitles that pop up on the screen when the user watches the video on the network.



# USE CASE 1: Bullet Curtain - Scenarios

## 用例1:弹幕 - 场景

**See reviews of group users:** Users can see comments from a group of users, with similar interests in a same video.

同组类型人的兴趣爱好

**Real-time interaction:** users can interact and comment with other users.

**Engagement:** Viewing the comments as part of the video viewing experience or entertainment.

深深的参与感

**Generation Y:** Favor multitasking - texting and watching video.

新一代年轻用户：喜欢一边看视频一边刷微信。

**Social Presence:** \*Studies show that online-based interactions can facilitate social presence.

刷社会存在感

\* Dunlap "Tweeting the Night Away: Using Twitter to Enhance Social Presence" Journal of Information Systems, 2009

\* McLissac "The Relationship of Social Presence and Interaction in Online Classes" The American Journal of Distance Education, 2002

# USE CASE 1: Bullet Curtain – Situations

## 用例1:弹幕 – 当前方式和困难

The JSON information of the comments is grabbed from the remote server, then drawn and overlapped on the video through DOM and Canvas.

从远程服务器抓取评论的JSON信息，然后通过DOM以及Canvas绘制并层叠在视频上。

It is necessary to calculate the position of the screen, consider the synchronization between the screen and the video, the speed and animation of the screen, and avoid collision of different titles of the screen. If there are characters in the video, it is necessary to avoid collision between bullet curtain and characters.

需要计算弹幕的位置，考虑弹幕与视频的同步，弹幕的速度与动画，以及不同字号的弹幕文字要避免碰撞。如果视频画面存在人物，需要避免弹幕和人物碰撞（AI相关）

In view of the fact that the demand for bullet curtain is more common in Asia, standardization can unify the data structure of bullet curtain, reduce the difficulty of development, improve user experience, and expand advanced functions in the future.

# USE CASE 1: Bullet Curtain – Suggestions

## 用例1:弹幕 – 建议

- Develop standard formats for bullet curtain, such as text, color, style, duration and time offset.
- Add new file formats (vdt, Video Danmaku Track). The data format of VDT can refer to the above instructions.
- Introduced through the track tag under Video, Video automatically draws the bullet curtain according to the content of vdt.

制定弹幕的标准格式，比如弹幕包含text（文本），color（颜色），style（样式），duration（显示时长）

以及timeoffset（时间偏移量，用于在指定时间显示文本）

增加新的文件格式（vdt, Video Danmaku Track），vdt的数据格式可以参考上面的说明，通过Video下的track标签引入，Video根据vdt的内容进行自动绘制弹幕。

```
<video width="320" height="240" controls>
  <source src="forrest_gump.mp4" type="video/mp4">
  <track src="danmaku.vdt" multiple kind="subtitles">
</video>
```

# USE CASE 2: HD Definition Switch - Scenarios

## 用例2: 视频清晰度切换 - 场景

- ❑ HD definition - Auto-switch: In order to comprehensively consider the traffic and viewing experience of users when watching video, developers will set video definition strategy according to the equipment and network environment used by users, then to realize automatic switch HD definition scenario.
- ❑ HD definition - Manual switch: when users have higher requirements for viewing video quality and definition, users can choose picture with better quality through mobile network or Wi-Fi according to their current network environment.

```
<body>
  <div id="mse"></div>
  <script src="//cdn.jsdelivr.net/npm/xgplayer@1.1.4-beta.3/browser/index.js" charset="utf-8">
</script>
  <script src="//cdn.jsdelivr.net/npm/xgplayer-hls.js/browser/index.js" charset="utf-8"></script>
  <script type="text/javascript">
    new window.HlsJsPlayer({
      id: 'mse',
      url: 'http://10.8.123.179:8080/live/liveStream.m3u8',
      autoplay: true,
      playsinline: true,
      height: window.innerHeight,
      width: window.innerWidth
    });
  </script>
</body>
```

# USE CASE 2: HD Definition Switch – Situations

## 用例2:视频清晰度切换- 当前方式和困难

**Difficulties:** Developers need to detect network conditions by themselves to play the best videos. It is hard to ensure smooth switch of pictures and sounds in MP4 video, and the user experience needs to be optimized.

Media Playback Quality of WICG can be used to detect network quality.

### Expectation:

Mp4 video manual switching is difficult to ensure smooth switch of pictures and sounds, and the user experience is poor. At the same time, developers need to judge network conditions to play the best video. With standardization, the browser's video player can automatically detect the current network status and load the optimal video resources, while ensuring a good user experience when switching video.

mp4视频手动切换时难以保证画面、声音不停顿的平滑切换，用户体验较差；同时开发者需要自行检测网络状况来播放最佳视频。

标准化后，浏览器的视频播放器可以自动检测当前网络状况并加载最优视频资源，同时在视频清晰度切换时可以保证良好的用户体验。

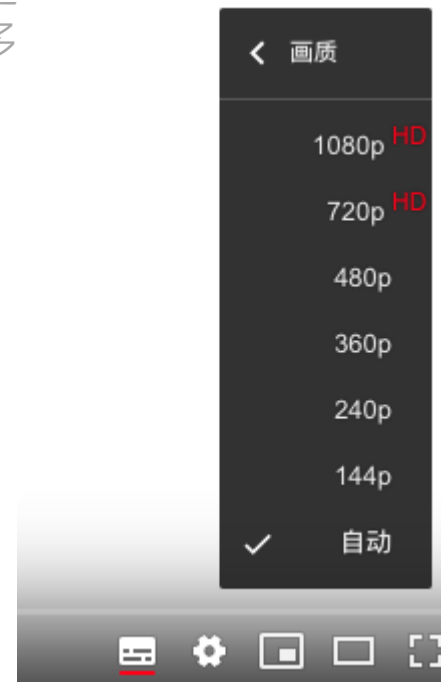
# USE CASE 2: HD Definition Switch – Suggestions

## 用例2:视频清晰度切换- 建议

- ❑ Browser built-in implementation, users need to configure some video sources with different resolution. The browser automatically selects the best video source according to the network speed for playback. At the same time, seamless switch can be guaranteed when each video source is switched.

浏览器内置实现，用户只需要简单配置好多个不同清晰度的视频源即可。浏览器自动根据网速选择最佳视频源进行播放。同时，在各个视频源进行切换时，可以保证无缝切换。一个假想的加载多频源的例子（也许有更好的写法）

```
<video width="320" height="240" controls>
  <source type="video/mp4">
    <quality src='1080.mp4'>1080P</quality>
    <quality src='720.mp4'>720P</quality>
    <quality src='480.mp4'>480P</quality>
  </source>
</video>
```





# USE CASE 3: Cue Events - Scenarios

## 用例3: 视频打点 - 场景



- Label the highlights
- Adding operational copy to tags
- Quick understanding of interested content



# USE CASE 3: Cue Events – Situation & Suggestion

## 用例3: 视频打点 – 当前现状和建议

Background configuration of the dot information, developers from the remote server to grab the video dot customization information (including text information and time offset), and then through the DOM to draw and overlay on the top of the video or other areas of the page.

After standardization, it can provide a more concise, general and robust API interface to manage the dotting information. It can process not only text information, but also binary dotting information (such as metadata including picture information in video).

Suggestion:

To improve Media Timed Events Standard and Providing Standard Universal Cue Events Interface

# USE CASE 4: VR 360° – Scenarios

## 用例4: VR(360°)全景视频 – 场景

- ❑ When sports events are broadcast live or on demand, you can drag and drop videos and watch them freely from all angles.
- ❑ When watching the event, you can close the camera and watch the details of the event.
- ❑ When a specific person appears in the video, the screen automatically displays the corresponding person profile information.



# USE CASE 4: VR 360° – Situation & Suggestions

## 用例4: VR(360°) - 当前方式和建议

**Current implementation:** Parse each frame in the panoramic video, then create Canvas and play it through WebGL rendering on Canvas.

The current browser video player cannot play 360 panoramic video directly.

### Expectation:

With further standardization, browser video player can directly support playing 360 panoramic videos, with better performance, more friendly to developers and more convenient.



# To make contribution to W3C community

## 我们在本社区投入计划

- Promote W3C technology and standards in China Mobile Group.
- 在中国移动集团，推广W3C技术和标准。
- To assist **W3C China** in organizing media entertainment tech. **seminars in China**
- 协助W3C中国，在中国举办媒体娱乐技术研讨会