Mobile Content Delivery: Challenges and Opportunities

Chunshan Xiong
sam.xiongchunshan@huawei.com
Main Content

- Opportunities of Mobile Video
- Challenges of Mobile Video
- Thoughts on Mobile Content Delivery
Mobile Traffic and Mobile Video

Mobile Video Services make people’s life more luxury;
Mobile Video Services consume up a great number of bandwidth and transport resources, and vendors can sell more network devices to network operators or service providers;
Operators stick its users through the video services, but operators try to free out more transmission bandwidth of the video in the Busy Time at the same time not degrading QoE with video optimization technologies;


Cisco Forecasts 24.3 Exabytes per Month of Mobile Data Traffic by 2019

Source: CISCO

Mobile Video Will Generate More Than 69 Percent of Mobile Data Traffic by 2019

Source: CISCO
NFV-based Mobile Video Optimization

Open Caching NFV Software Optimizes the Network for Video

Cloud Computing/SDN/NFV are reshaping the IT/CT industry: more and more companies now announce cloud-based platforms and mobile video acceleration solutions based on NFV.

Source: http://qwilt.com/solutions/mobile/
Based on mobile cloudlet (micro cloud) technology, more and more applications will be introduced into the mobile network, which realizes the NaaS. Because the mobile cloudlet closes to users, a lot of special acceleration can be deployed;
4K Creates New Industry Opportunities

4K video will soon create & establish new opportunities for the (mobile) video industry and eco-systems;

Source: Cisco

Global 4K Video Traffic

Increasing Video Definition: By 2019, More Than 30 Percent of Connected Flat-Panel TV Sets Will Be 4K

Source: Cisco

4K = 4096 x 2160
UHD = 3840 x 2160
Source: Wikipeida

Beamr Video to field breakthrough video optimization technology that can cut 4K HEVC bitrates by 50%
April 4, 2014 by itersnews 0 Comments

Source: Itersnews

News

Source: lightreading

One rack per 4K stream – expensive and cumbersome
4X definition, 2X frame rate
14 265
Wireless AR requires big BW and Near-Zero Delay of UL Mobile Video

AR implementation approach diversity determines the BW and delay of UL Video transmission, but all requires the shorter delay of transmission and processing.

Note: Currently, the VR’s relationship with the cellular network is still not very clear.
At present the Browser-based HTML5/WebRTC real-time video services still have some QoE problems, the QoE guarantee of Interactive video/whiteboard faces more challenges.
Mobile Video is one of the three key 5G (IMT-2020) Requirements

3D/4K/UHD video will be the most important traffic contributor to the 5G cellular network. At the same time ensuring the 5G video QoE also creates new industry opportunities;
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Widely using of HTTPS/HTTP2 makes the middle-box based mobile video almost impossible.

HTTP2

- Header Compression
- Server Push
- Multiplexing
- Stream Prioritization
- TLS Encryption
- Flow Control

OTT encryption of the service data flow makes the network become dumb pipe; the cellular network operators position and the influence in the video/content industry chain is declining further;
OTT E2E DASH/SRTP/(D)TLS Technologies Transparently Pass Through Cellular Network

The E2E interaction between UE APP with the OTT Server (such as bandwidth detection, encryption, flow control) automatically adapt the video Codec/Rate along with network bandwidth changes and transparently pass through all transport network functions.

Source: records.sigmm.ndlab.net
Cellular Network Capacity Open API Lacks Support from OTTs

PCRF-based QoS capability openness mainly aims at operator’s Walled Garden Services, TDF/DPI does not work well facing the E2E encryption. The SCEF-based network capability openness to OTT still remains to be seen.
ICN/CCN/NDN Video Transport Solutions are far from Large-Scale Deployment

From IP-centered to Content-centered hourglass model

The new Clean-Slate ICN/CCN/NDN network architecture proposed during the research procedure for the Future Internet still have so many challenges to be resolved;

Source: www.cse.wustl.edu
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Thoughts on Mobile Content Delivery

- Along with mobile user and IOT machine are generating huge volume of Video, AR/VR/3D/4K/UHD with 5G/MEC/NFV/SDN/Distributed GW creates new mobile video industry and business opportunities;
- Video QoE will be one of the most important KPIs for cellular operators;
- A good mobile content delivery solution needs to solve and cover from Up to Down, E2E and system-level thinking and cooperation:
  - Up to Down: Application (i.e. Web, Video), transport (HTTP1/2, TLS, TCP), Cellular Network
  - E2E: User preference, UA capability, Radio link & Cellular network Capability, Routing path, Web Server, Content;
  - An overlay solution over cellular network generally faces a lot of challenges: Mobility, Bearer Binding, Charging;
  - MCD-based solution normally is very hard to be standardized.
- The current industry environment is unfavorable to mobile network operators and MCD solution providers, they need to develop friend business environment:
  - Net Neutrality
  - User Content Privacy ← American government’s large scale clandestine surveillance program
  - OTT/CP’s Content Property
    - HTTPS
Thank you

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