Mobile video: The new frontier

To help mobile operators conquer the mobile video market and monetize the service, Huawei Business and Network Consultancy services offer the knowledge and experience on what it takes to build a full end-to-end video ecosystem.

Dr. Jose L Gil
Huawei Mobile Broadband Consultant

Mobile video ecosystem components

A profitable mobile video business requires an understanding of the complex end-to-end video ecosystem, from content producers to content providers. Mobile operators must establish key deals with content producers and content providers as a prerequisite, followed by a good selection of video transport technologies, such as unicast and broadcast (eMBMS) systems. But deployment of eMBMS, without a proper business case, will not drive mobile video by itself. Huawei Business and Network Consultancy services offer mobile operators the knowledge and experience to build a full end-to-end video ecosystem, from business development to network implementation.

The race for the conquest of mobile video started long ago, but very few in the

mobile communications industry have an understanding of the intricacies involved in developing a successful proposition. There is no doubt that the experience accumulated over the past years will shape the future mobile video business, but mobile operators already looking beyond traditional video streaming traffic will have a higher likelihood of setting the basis for success.

Video has become a major part of mobile network traffic – 50% on average. However, is this video traffic being monetized? In general, the answer is no. Whether video traffic is 5%, 50% or 90% of a monthly data allowance, the mobile operator gets the same revenue from the user.

E2E ecosystem for mobile video

Three domains can be distinguished in the end-to-end mobile video ecosystem: content provider, network provider, and service provider.

Content provider domain

The content provider domain is owned by the producers of the media content. The producers of films, national news or documentaries are examples of content producers.

Network provider domain

The network provider domain corresponds to the last-mile telco that provides the media content to the end user. These networks can be any type, but in this article we consider mobile.

Service provider domain

The service provider domain is also known as the distribution or aggregation domain, because it is the point at which multiple media channels are aggregated and distributed to the edge/last-mile networks responsible for delivering the media content to the end user. The service provider domain usually includes three functions: broadcast, head-end and data center.

Broadcast domain: Once the media content is produced, the next step is to broadcast it over a national or regional territory. Satellite systems are commonly used to broadcast the media content over a large geographical area. Cable TV operators typically receive the content via satellite. Other systems, such as terrestrial radio frequency systems or fiber systems, are also used. Even a mixture of all these systems can be found in many cases. The broadcast domain can distribute the content to last-mile networks or directly to the end user. Nowadays it is also pertinent to mention the importance of the Internet to make media content available to the end user directly from the media producer.

Head-end domain: The head-end function is necessary to convert the media content into IP-based streams. Powerful hardware units transcode the media content into different IP-based formats.

Data center domain: The data center (DC) domain is an important component of the end-to-end mobile video system that contains, among other elements, the security systems, which ensure that only authorized paying subscribers access the broadcast content. Security solutions are divided broadly into two categories – conditional access systems (CA) and digital rights management systems (DRM). The CA system ensures that only authorized subscribers access the media content. The DRM system ensures that the content owner's business model and rights are implemented. Encryption and security keys are typical functions implemented as part of

the security solution. Other functions found in the DC are related to network management and billing.

In today's mobile networks, video content is delivered to the end user through unicast transport. Unicast means that the network establishes a one-to-one dedicated connection to the end user. If the same video content is downloaded by another user at the same time, the network establishes another separate dedicated connection to the second user. From a transport efficiency standpoint, the new solution multicast/broadcast (eMBMS) is being trialed by certain major mobile network operators. This solution is a one-to-many network connection where the same video content is transmitted just once and received by multiple users, therefore saving scarce network resources. While the multicast/broadcast is still not widely deployed, it is gaining momentum. Unicast and multicast/broadcast transport mechanisms do not compete, but complement each other, and will always co-exist on a mobile network. This is because of the differing natures of different video applications. Video applications such as video on demand (VOD) imply a unicast transport method, because the user downloads video content at any time.

From an architectural perspective, the introduction of eMBMS does not require major new network elements on top of existing LTE. Only three new entities are required:

Broadcast Multicast Service Center (BM-SC): authenticates and authorizes the content provider and forwards video content to the eMBMS gateway inside the mobile core network. Manages the broadcast/multicast sessions.

eMBMS GW: forwards the video content and session control information to the eNodeB.

Multi-cell Entity (MCE): manages eNodeB radio resources and schedules eMBMS transmission.

An eNodeB only requires a software upgrade to support eMBMS. However, one important requirement for eMBMS is that the entire LTE network (eNodeB's + EPC) must be synchronized in time and phase. This requirement is already satisfied in TDD networks, as TDD operation requires eNodeB synchronization. However, FDD networks are typically unsynchronized, and the introduction of eMBMS requires the deployment of a synchronization solution for the entire network. The most typical synchronization solution is GPS-based, but other alternatives exist such as IEEE-1588 or Ethernet Synch. One additional requirement is the enablement of IP multicast within the core and radio network. This can typically be achieved by a software upgrade, or activation of the IP multicast protocol within routers, and some possible additional IP planning.

The basic network architecture for eMBMS can be complemented with a connection to an IPTV system and/or a CDN network.

A vision for mobile video

In today's mobile networks, up to 50% of total data traffic (and even more in some networks) is video. For a mobile operator to monetize mobile video content, it would be necessary to define tariff plans where video is charged separately, currently a big challenge due to tariff competitiveness among operators and other issues such as net neutrality.

The increasing volume of traffic generated by mobile video pushes the mobile operator to increase network CAPEX and OPEX. But will this result in more revenue? It might increase revenue

Business use cases and content deals are the most important factors that drive mobile video monetization. Such business cases must drive the next step – network implementation. However, it is the type of video content to be delivered that determines the network video solution, and not the other way around.

indirectly by creating more expensive flat tariffs with larger data quotas. This is probably the most straightforward and established method for mobile operators to monetize mobile video. However, it is indirect, and offers little control. To establish a direct cause-effect relationship, mobile operators should establish solid relationships with video content producers and providers to offer premium content and targeted video applications to end users. Such video content must be attractive and valuable to mobile users, suited to smaller screen sizes, and different from what fixed operators or terrestrial broadcasters can offer.

Premium or differentiated mobile video content is the way to monetize mobile video. Huawei's Business and Network Consultancy (BNC) team houses experts from different backgrounds in video/OTT, capable of helping mobile operators establish key deals with content producers and content providers. Mobile operators must pay close attention to establishing these deals because they are the route to revenue. However, these deals might be costly and therefore risky. To reduce this risk, mobile operators must create new in-house teams with video expertise, as illustrated in the previous end-to-end video ecosystem section, or rely on external consultancies such as Huawei BNC. Some possible use cases where mobile video can offer singular value and open successful revenue streams are:

Football stadiums: goal replays, souvenir advertising, and food offers.

Tennis matches: replays key shots (it is difficult to see all shots from all court angles).

Formula One: The whole circuit cannot be watched from a single seat but, with the help of an in-situ eMBMS mobile network, the race can be viewed from a subscriber's mobile device.

Smart cities: display restaurants, information points, banks, traffic levels, etc.

Other events: broadcast live interviews, event information, paid ads, live advertising, and live remote auctions.

Business use cases and content deals are the most important factors that drive mobile video monetization. Such business cases must drive the next step – network implementation. However, it is the type of video content to be delivered that determines the network video solution, and not the other way around. Delivering video content in a Formula 1 circuit to enable all spectators to watch the race requires a broadcast system (eMBMS) installed in the F1 circuit. The delivery of interviews or marketing information at the Mobile World Congress requires a mobile broadcast system (eMBMS). VOD requires a unicast solution.

Mobile operators already trialing or deploying eMBMS systems without a solid business case with established video content deals run the risk of not getting a return on their investment. There are some in the industry who believe that a lot of the current video traffic transported over unicast connections can be transferred to broadcast systems, such as eMBMS, for a more efficient and cost-effective transport method. However, the majority of the current video traffic is VOD, which is unicast, and therefore not suitable for a broadcast system. To send unicast traffic efficiently over a broadcast network, it would be necessary that a large number of users concentrated in the same geographical area decided to view the same content at the same precise time, which is highly unlikely for VOD applications. Huawei Network Consultancy services have already been working for some time on technical solutions to help operators design, deploy and manage video network solutions such as eMBMS.