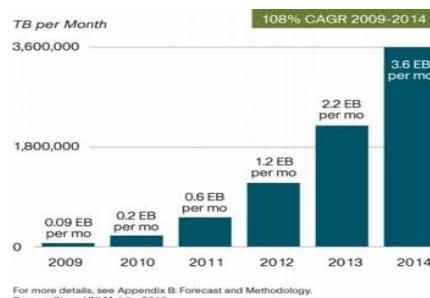


bmcoforum White Paper

Seamless unicast and broadcast services to meet increasing mobile TV and video consumption

Mobile TV and video consumption – a mass market phenomenon

Mobile TV and video subscribers are growing rapidly. Forecasts for Europe indicate an increase of the mobile TV and video penetration from 4-5% in 2009 up to 10 – 30% in 2015 [1] [2].



At the same time bandwidth demand due to data/video is increasing. Globally, mobile data traffic will double every year through 2014, increasing 39 times between 2009 and 2014 [3].

The biggest driver for the traffic increase will come from video traffic. While video traffic averaged roughly 39% of all mobile traffic in 2008, it will account for roughly 66% of all mobile data traffic in 2014 [3].

In 2008, the most advanced mobile TV markets Japan and Korea counted about 60 Mio connected and unconnected users, with a strong focus on mobile broadcast TV. Also in 2008, China reported 4.6 Mio CMMB subscribers and no 3G mobile TV subscribers; in the US broadcast mobile TV, still in its infancy, boasted 0,6 Mio subscribers and the number of consumers of mobile video reached more than 15 Mio with an annual growth of 70% [4]. At the same time, whole Europe counted only 15 Mio subscribers, with about 1 Mio DVB-H users, and 14 Mio subscribers using 3G streaming TV [1].

While the mean mobile TV streaming usage is 5 to 10 min per day, mobile broadcast usage is reported to be about 30 min per day [5].

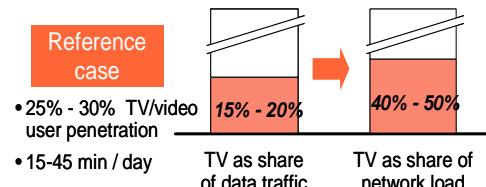
Mobile TV and video consumption will be both mass audience consumption of live TV and other video as breaking news and top videos as well as consumption of long-tail TV channels and on-demand streaming or download of video, like YouTube.

Mobile TV and video traffic cause a considerable part of the future investments of MNOs

To face the data traffic growth, mobile operators will have to invest in mobile network capacity, particularly in most dense areas. The installed capacity per site in the densest areas will grow from around 1 Mbps/cell to 50 Mbps/cell [5].

Different technological options exist to increase cellular capacity (HSPA upgrades, unused carrier, new spectrum acquisition, LTE). So, a significant decrease of cost/Mbps can be expected, especially with LTE. Nevertheless, investments into mobile networks will be needed to meet the increasing data and video traffic demands.

Estimations for European MNOs would result in a 5 to 10 times annual investment increase for network evolution within the next 8 years, compared to the current spending level [5].



Relationship between TV related data traffic and network load

TV/video uptake significantly contributes to these investments due to the high concentration of usages during a few hours of the day (peak hours) and the higher concentration of TV usage than other mobile data applications (live TV events, football matches etc.).

As MNOs dimension their network capacity on traffic peaks, the network load of video and TV represent the driving dimensioning parameters.

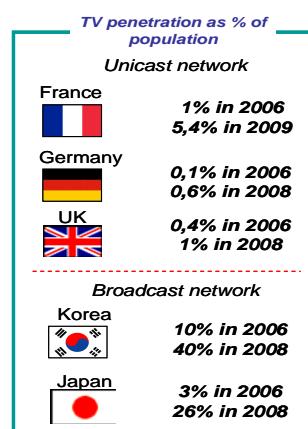
Mobile broadcast networks are better suited for mass delivery than mobile networks

Limitation of mobile data usage or throughput rate after a certain amount of GB/month may lead to customer frustration. An alternative strategy is off-loading parts of the traffic to other networks with lower costs.

Unicast networks as LTE and WiFi (available in hotspots and homes) can carry part of the traffic, especially long-tail TV channels and on-demand streaming or download video. The high advantage of mobile broadcast networks is their unlimited number of users that can be served in the coverage area without any saturation risk. However, dedicated mobile broadcast networks also require investments; this will be considered below.

Mobile broadcast networks protect the scarce unicast spectrum resource.

While an MNO usually owns 15 MHz bandwidth, under certain realistic assumptions broadcasting 16 TV channels will require 3 MHz per MNO in case of 10 min live TV usage per day and 7-8 MHz per MNO in case of 30 min live TV per day or about 30 MHz for 4 MNOs in a country. At the same time, a broadcast network requires 8-10 MHz to serve the whole TV market [5].



Mobile broadcast networks simultaneously serve an unlimited number of users with high quality.

Depending on the throughput rate a 3G mobile network can service 5 to 20 mobile TV and video users per cell. The broadcast network can simultaneously serve an unlimited number of users in the cell.

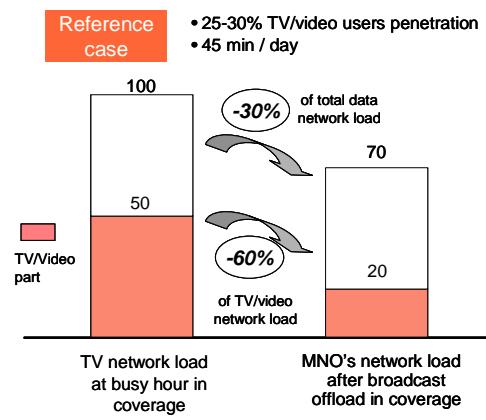
Estimations for a hypothetical European MNO with 10% cell capacity per site used for mobile TV show that a 3G network can serve 0.4% and a LTE network can simultaneously serve 2% of the customers, while the broadcast network can serve an unlimited number of users within the covered area [5]. This has to be compared with the actual mobile TV market penetration as shown in the graphic on the left [4] [6].

Cooperation between mobile broadcast and unicast networks results in optimization of overall network investments

As a result of technology improvements and productivity gains, the costs for unicast mobile data coverage will grow moderately only compared to the huge increase in traffic volume carried on the network. Conversely, the cost to carry a user's TV traffic over the unicast network will decrease by a factor 5 [5].

But in any case, the broadcast network usage costs are and will remain significantly lower than the unicast network costs and this by a factor greater than 10 [5].

Although the monthly unicast network costs per user for mobile TV will decrease considerably until 2015, still the monthly costs per user of the mobile broadcast network are one dimension lower. And they become even cheaper with higher service penetration.



Depending on TV usage, a broadcast network could offload -30% of unicast network load.

The possible offload reduction strongly depends on the broadcast percentage of population covered in a broadcast network and the broadcast handset and equipment penetration rate.

Calculations show that at a given coverage the use of broadcast network could reduce unicast network load by 30% of total data network load and 60% of TV/video load in case of a large audience, e.g. during sports events [5].

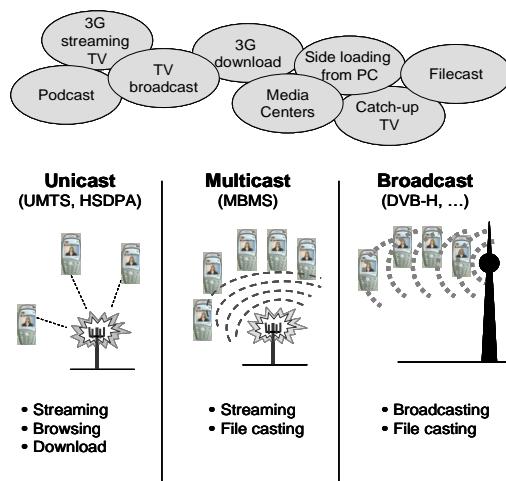
Seamless services may use the best of all delivery networks

Seamless services means that the user does not have to worry about any service delivery issue but may instead focus on content and service consumption only. So, if a service is available via different delivery networks, the user device should be able to select the appropriate delivery channel based on costs or reception quality criteria.

At the same time, seamless services give room to the service providers to use the delivery channel most effectively, for both service provisioning and cost consideration, for example the broadcast network for mass audience delivery, unicast for long-tail and individual video content. In any case the service platform provides a comprehensive description of the services line up, with an adequate look and feel and format taking in account user settings.

As shown below, altogether there are many service types for audio-visual content consumption to be delivered to mobile devices. Depending on their audience and their nature each of them may be most efficiently delivered by the unicast, multicast and broadcast networks. This also includes wireless local delivery.

Mobile broadcast is also capable to deliver mass audience non-linear content



Mobile broadcast networks are best suited to carry mass audience services. These are linear top TV channels and premium offerings. But mobile broadcast is more than broadcast of linear TV: Large audience podcast services including news podcasts, electronic books and newspapers and top music videos may be broadcast as well, using the datacast features of the mobile broadcast networks.

On the other hand, medium and long tail linear TV services as well as individual video-on-demand and download services maybe better delivered via the unicast network.

Ways to achieve successful seamless services

Cooperation is necessary between the content providers, mobile operators and the mobile broadcast network and service provider allowing both risk and profit sharing.

This challenge can be met by standards based solutions that enable service providers to embrace the cost and performance advantages of hybrid unicast and broadcast access networks with smart service indication and switching facilities.

The mobile operators would benefit from the potential of mobile broadcast technologies in answering the future demand for audio-visual mass content delivery to mobile devices; the content providers from the opportunity of the emerging market of mobile usage for their content.

The **bmcoforum** plans to develop a set of guidelines on how hybrid unicast/broadcast deployments can be realized. It aims at securing a wide availability of broadcast enabled handsets avoiding market fragmentation, e.g. ensuring the unicast/broadcast electronic service guides are synchronised and can be managed within a unified TV player and a unique user interface. Other aspects are an accurate seamless handover between networks and as a result, minimal specifications for the head end platforms.

References:

- [1] Informa & Telecom 2009;
- [2] Idate 2008;
- [3] Cisco Visual Networking Index 2009;
- [4] screendigest 2009;
- [5] TDF 2009 (internal study);
- [6] Company websites

About the bmcoforum:

The “Broadcast Mobile Convergence Forum” (**bmcoforum**) is an international non-profit organisation designed to shape open markets for media delivery. **bmcoforum** addresses the use of personal mobile devices in delivering relevant audiovisual content and services wherever, whenever by the best delivery channel. For that reason **bmcoforum** brings together players from all parts of the media delivery value chain.

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