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BROADCAST

WHITE PAPER

Hybrid system and new business model

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The explosion of data traffic over telecom networks is changing both business rules and network deployment methods for network operators and methods for network deployment. Indeed, new user habits on the internet are driving growth and generating lots of traffic contention, while mobile networks in many countries are facing fierce competition and a decrease in ARPU (Average Revenue Per User) in developed countries. Loss of revenues forces mobile operators to find new economic rationale for the service they want to distribute to their customer and drives the evolution of new network architecture.

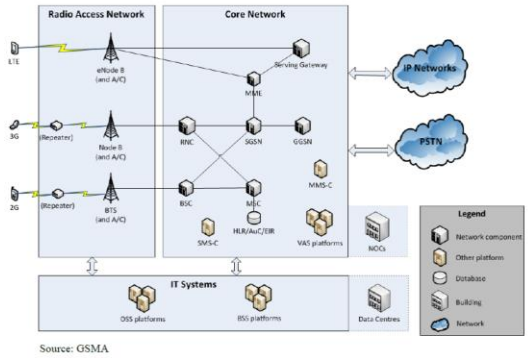


Fig. GSMA, contributing energy for wireless networks

Economical barrier

Network operators will face two major barriers. One is economic barrier where 80% of the traffic growth is related to video streaming; this requires a lot of infrastructure investment but does not generate more revenues for the mobile operators. Specialist forecasters and network planning experts state that today, at least three times as much equipment is needed to guarantee the same QoS (Quality of Service) with best available technology (4G) as was needed with previous technologies (3G).

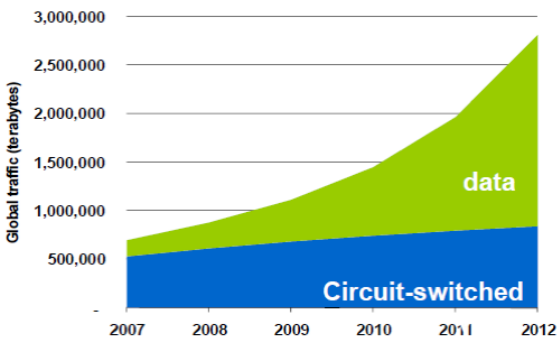


Fig. Data vs circuit switched over the last few years, source Qualcomm

The graph below was published in 2012 by T-com. All the traffic related to the core telecom service (Voice Dominated) was clearly correlated with the traffic for which each user was invoiced. This meant good profitability for the network because investment in technology was paid by the user using the service.

Fig. Traffic volume vs time, T-telecom

Now, the traffic has moved to blind data (internet data embedding services) — traffic for which the network operator is not in position to use a service-based invoicing method. This has led to a decoupling between revenues and traffic and a loss of profitability. This trend is accelerating because the revenues in many countries are mature and actually decreasing due to competitive price cutting.

Business Statistics in France have shown a drop by 30% of the ARPU (Average Revenue Per user) over the last two years after a fourth player entered the market. In the next three to five years, this model will drive network operators to a large structural debt. As a consequence, investment in new technologies like 5G will not be sustainable if this model is not reviewed and improved. Applying pure financial analytics to this situation, if the new model does not take into account both cultural differences (and the different ways that countries raise finance) and new usage patterns, this will have a strongly negative political impact on providing means for developing cultural programs.

The energy barrier

The second barrier is the energy barrier where the energy spent for viewing HD video is multiplied by ten, mainly due to the deployment of data centers sized for point to point traffic.

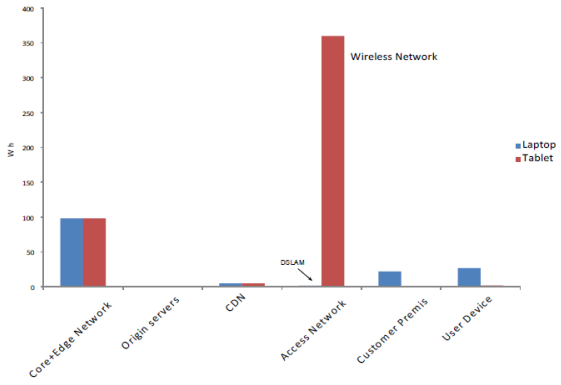
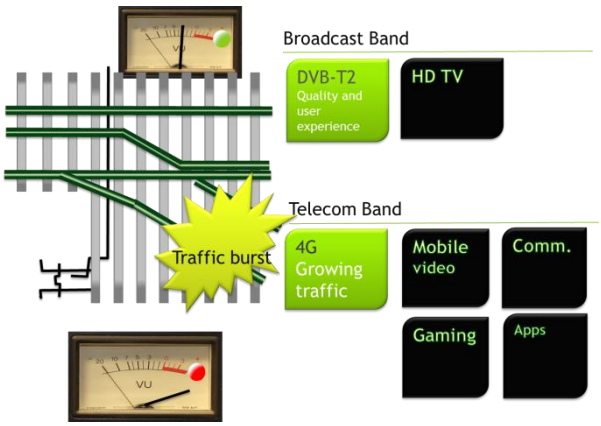


Fig. Comparing Viewing One hour of hd on a tablet. (University of Surrey @2013)

The current situation is that viewing one hour of HD programs consumes ten times more energy than the same service delivered by “broadcast” method. The main contribution of this consumption is driven by large (oversized?) data centers required for managing of data traffic on the internet.

Data centers, if they want to address customer needs, will increasingly use a more decentralized model, and probably use locations closer to the main consuming locations — dense urban areas.
Economies of scale for powering these centers can be achieved, and one can foresee about 20% improvement of energy efficiency on a global scale. On the RAN (Radio Access network) network, the same 20% could be achieved by adopting optimization techniques. (Celtic project operaNET). But this will not be enough to address the demand-led exponential explosion of data traffic. As a consequence, with the current model and available technologies, this will lead to an ‘energy barrier’ where the traffic growth is finite not because of technology limitations — fiber is capable of meeting traffic demand — but because of energy costs. This model will not meet European commission 2020 objectives for reduction of GHG emissions and carbon footprint.



Taxing content platforms?

One solution to address economic barrier is to impose a tax on big internet players like Google, YouTube, and Facebook, who are responsible for generating most of the data traffic growth. But this is a complicated and risky approach that is not compliant with government policy in many countries. Even if this path were to be pursued at a political level, it would not solve the issues of net neutrality, cultural content protection and the energy barrier.

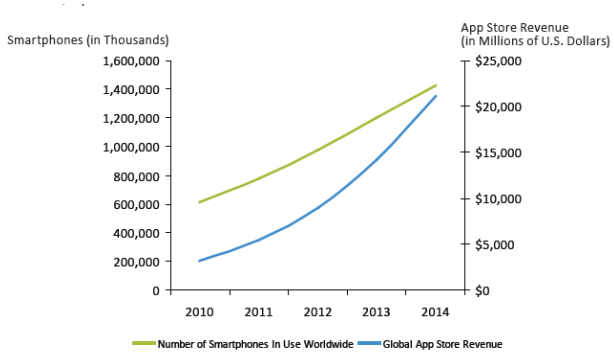
Hybrid broadcasting service

In order to find an answer to both the economic barrier and the energy barrier, it is important to start form the working model based on service.
What are the services required today over the mobile networks and the correlation with existing infrastructure?

	Traffic over Telecom networks	Profit	"Broadcast Like"
Voice	30%	+++	---
Video	45%	---	+++
Mobile Apps	20%	++	++
Gaming	5%	+++	---

"Broadcast Like" means the ability of the service of being pushed to the network in a one-to-many fashion.

Profit means the revenues (that consumers are ready to pay an extra subscription) for telecom operators.



From this table, the most demanding application is a pure cost for the network. Mobile App and Video services data are a good candidate to be partly offloaded over broadcast infrastructure or other means of media delivery because they can be consumed in a delayed manner.

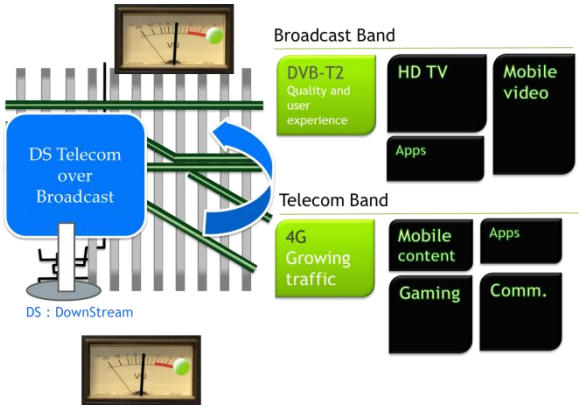
Let's look what we have available in our basket to address a telecom offload scenario:

eMbms technologies

This technology provides the telecom network with a means of sending data in a one-to-many fashion over the telecom networks. It requires existing infrastructure to be updated and will consume data bandwidth on the same frequency bands, with the possibility of being dedicated to higher profitability services. There have been many attempts to develop technologies in 3GPP that tackle these issues but it requires investment to deploy these technologies and often a new infrastructure.

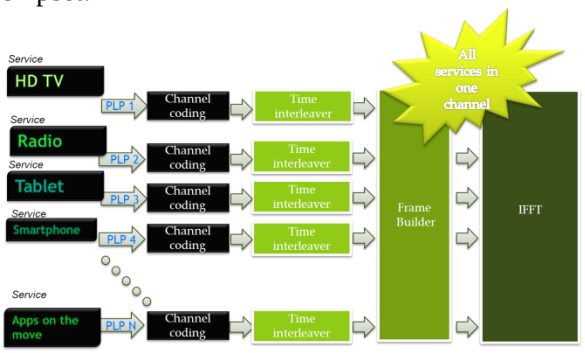
Development of hybrid service with DVB-T2 technology using PLP (Physical Layer Pipes)

The other solution is to use other technology platforms to offload telecom data traffic onto existing broadcast networks operating traditional broadcast services. In the past, mobile technology required huge infrastructure investment but now Thomson Broadcast has proved, in the Engines project (Celtic Award, March 2014), that with DVB-T2 technology it can be done in a way that makes good business sense either for telecom operators or broadcast operators.



How it works

As video compression improves efficiency, it is now possible to bundle core TV services and Data pipes to offer core TV content and off-load telecom content in the same frequency resource. In 2011, Thomson Broadcast demonstrated a system running DVB-T2 with up to 64 differentiated services, each having a different quality of service where 32 of them were dedicated to off-load telecom content. The data streams were complimentary or independent from the core broadcast services representing current TV content carried by broadcast infrastructure. These streams could carry telecom video traffic. The signal is received by a legacy terrestrial chipset used in millions of STBs (set top boxes). These chipsets will be more and more integrated in mobile phones and tablets as the DVB-T2 network spreads. An example is the recent DTV deployment in Thailand where iMobile provides IQ 6.8 DTV model natively embedding the DVB-T2 chipset.

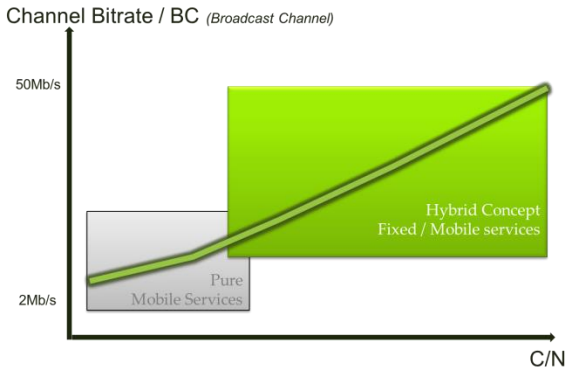


MPLP : Multiple Physical Layer Pipe

Thomson Broadcast Leading Edge PLP technology concept for hybrid service transmission

Positive impact on public policy, energy efficiency of the network and new level of business

The broadcast operator in a developed country mostly organizes the different legacy TV programs around the multiplex being transmitted in a channel. The hybridization of service allowing the offload of telecom content on existing infrastructure (frequencies and equipment) would allow horizontal market opportunities for piping telecom data over broadcast infrastructure. Our studies have shown than with the evolution of video compression, it would be possible to generate up to 15Mb/s for offloading data content — meaning that less infrastructure investment is required from telecom companies.



TV content producers for broadcast networks (TV channels) are producing high quality program content, encoded to a high quality. They are also investing in equipment for HD 1080p and Ultra HD 4K TV services in the future. Traditionally, the counterpart of a free exploitation of frequency bands is the obligation placed on the channel owner to help finance the content production: this is part in many countries of the public policy of protecting cultural differences. Introducing hybrid services in a channel would make it possible to invoice broadcaster operators on the data traffic while protecting the finance of the local content producer.

Fig. Thomson Broadcast Transmitter, modulators, receiver with Leading Edge PLP technology for hybrid service transmission