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Broadcast_Mobile_Convergence

Mobile Services for Seamless Audio-Visual Content Consumption

Services Examples and Business Model Considerations

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Content:

Executive summary

The number of mobile services for audio-visual content consumption proliferates.

The services for audiovisual content consumption provided at mobile devices increasingly become similar to the services available on stationary devices as PCs and TV sets: mobile TV and mobile access to media centres and podcasts are some examples here. This serves as a basis for seamless services for audio-visual content consumption on mobile and stationary devices.

In most cases existing content is provided to mobile devices, eventually repurposed and adapted to the mobile consumption.

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.

In addition, seamless services give room to the service providers to use the delivery channel most effectively, for both service provisioning and cost consideration. This, however, provided that the devices are enabled to the used delivery technology. Examples here are podcast delivery via unicast, multicast und broadcast delivery and flexible assignment of channels to a broadcast TV bouquet depending on mass audience considerations.

Seamless service also means direct access from one service to another while users do not have to take care of the different delivery channels to be used for the services. Barker channels may serve as an example here.

Finally, the seamless usage of different devices in the home environment for the same service or the dynamic update of the list of available content depending on the available delivery channels while on the move shall be mentioned here.

Today, providers of the mobile services for seamless audio-visual content consumption come from various business areas: They are broadcasters, mobile operators, publishers, technology providers and vendors, service providers etc.

Correspondingly, there are different strategic approaches to the service provision.

- Part of the service providers aim at generating direct or indirect revenues by the service itself. As usual, the business model may be based on user payments or advertising. Both approaches seem to be proven for most of the services.
- For another part of the providers the service shall support their core business. In these cases the service is paid by marketing or PR costs or, as is the case with public broadcasters, by tax or a special fee.
- And a third part of service providers is transforming (part of) its core business into the digital world.

The opportunities for direct or indirect revenues highly depend on the service type. For most of the services the seamless extension from the stationary envi-

ronment to mobile devices does not change the nature of revenue generating. It is just another device for service usage. But from the user's point of view seamless mobile service access is understood as comfortable usage of the service itself. This may lead to a more extensive service usage and subsequently to higher revenues.

Seamless services in the home environment often can be realized by user-owned equipment without service provider involvement. However, in many cases standardisation of the device interactions is a prerequisite here to avoid fragmentation.

With audio-visual content delivery to mobile devices the transmission costs are a substantial part of the overall service costs. While the data traffic will increase exponentially about 16 times until 2013, the user-generated revenue for data traffic is expected about to double only in the same period[1].

This raises questions on how to cover the costs for the necessary mobile network infrastructure in the future. It is doubtful that advertising alone may fill this revenue gap. One solution may be new technologies with much better costs per bit ratio (LTE as a candidate); another solution might be the usage of broadcast networks for specific content and services delivery, especially to mass audience.

All together, there are a lot of services and content approaches, business opportunities and business models as well as substantial challenges for the media and telecommunications industries in order to generate and provide new commercial services for seamless audio-visual content consumption.

After an introductory chapter, this study describes the nature of seamless services in the mobile and home environment. The main section provides a lot of existing and future examples of mobile services for seamless audio-visual content consumption. The regulatory section explains some of the hurdles for the new services, especially copyrights. The study closes with business model considerations.

Use this study to extend your current business by mobile services for seamless audio-visual content consumption!

Create new services based on these opportunities and the underlying legal framework!

[1] Source: NSN/informa

1 Introduction

Convergence of fixed and mobile telecommunication and entertainment services is a megatrend today!

Delivery of audio-vial content to user's devices can be realized by unicast, multicast and broadcast networks.

Service operators are interested in providing the audio-visual content in a cost optimizing way by one or the other network type depending on content and service type and the number of users.

From the user's point of view convergence means using telecommunications and entertainment services in a seamless manner wherever and whenever.

This implies at least two aspects:

- In the mobile environment users want to use on their mobile devices the same services they know from their home environment. The user will not take care about what technology resp. network will be used for the service delivery.
- When changing the usage environment from mobile to home or vice versa, users want to seamlessly continue using the services on the appropriate devices[2].

Such type of seamless service provision is a challenge for the industry, as there are a lot of different services, networks and devices for the consumption of audio-visual content.

Today, in most markets fixed and mobile services are provided by different fixed network and mobile network operators. In the big telcos there is a trend to integrate the now separated fixed and mobile business units for a better provision of converged services[3].

But this may not be sufficient, as broadcast networks[4] shall become a substantial part of an economic service delivery in the case of mass audience, not only in a mobile but also in a home environment.

In a series of former studies, **bmco**forum described business models for mobile TV. They focused on the use of broadcast networks for the provision of TV services to mobile devices. These models are well understood today. Their main issue now is to be a real success on the market.

This study will consider business approaches for mobile services for audio-visual content consumption which may include unicast[5]/multicast[6] as well as broadcast

[2] Seamless here does not necessarily mean without time interruption, but may also mean continuing to use the service on the other device from the interruption point.

[3] Deutsche Telekom is joining T-Mobile and T-Home in a single business unit. Vodafone Germany integrated Arcor in its business unit.

[4] In a broadcast network the content can be received by any technology-ready user device without a specific network connection.

networks for the delivery of audio-visual content in the mobile and home environment. We use the term "audio-visual content" here to address that we will not limit ourselves to linear content provision as TV but have in mind all types of push and pull services to be used both, in mobile and home environments.

Convergence has a variety of dimensions:

- *Convergence at marketing level*

  The user is acquiring a product which is a bundle/package of individual services. The product may bundle different services on the same device (e.g. on the mobile) or the same service on different devices (mobile and PC, mobile and TV).

  However, in case of service consumption the user is faced with different interfaces for the individual services.

  Convergence at marketing level is the lowest level of convergence.

- *Convergence at device level*

  In the device different forms of convergence can be implemented:

  - Within a single service: The service delivery includes different networks; on the technical basis this is transparent for the user (tariff issues to be considered separately).
  - Between different services: A service allows flexible crossover to other services by directly accessing them (and going back). These services may use different networks.
  - Between devices: A device can be used to control another user device (e.g. the mobile device as TV or PVR controller) or switch service consumption to another device (e.g. continue watching mobile TV on a stationary TV set when arriving at home).

- *Convergence at network level*

  Several forms of convergence are possible here;

  - A service is provided via different networks; the user device will be able to select the appropriate delivery channel from an economic or reception parameter point of view (e.g. WLAN instead of mobile network when available).
  - The service provider chooses the most economic delivery channel (e.g. the broadcast network for mass audience delivery, unicast for video on demand)

- *Convergence at the service platform level*

  The same service is available on different (fixed and mobile) devices. Delivery may be realized by different networks. In any case, the service

[5] Unicast networks provide services based on a point-to-point connection.

[6] Multicast networks provide services to a group of users based on a point-to-multipoint connection. MBMS in mobile networks may serve as an example.

platform provides an adequate look and feel and format taking into account user settings.

- *Convergence at content level:*

  The same content is provided by different services, e.g. broadcast, on demand, podcast and/or RSS.

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.

As the provision of seamless unicast/multicast/broadcast-based mobile services is in an early stage, the study focuses on the description and analysis of already existing services followed by an evaluation of the services regarding viable business models.

The study also includes regulatory framework considerations of such type of seamless services, in specific copyright issues.

2 Seamless Services

2.1 Mobile environment

Mobile devices are enriched by more and more functionality. One of the recent developments includes access to audio-visual content. A series of generic services is available for the mobile consumption of audio-visual content: live TV/radio, video/audio on demand, video/audio to go (side-loaded content).

From a content formats point of view the services contain live TV and past episodes of TV formats, user generated content, music clips, e-books, and others.

Source Nokia:

While on the move, the content can be delivered to mobile devices by telecommunication networks as mobile networks or WiFi/WIMAX as well as by broadcast networks. In the home and other stationary environment (wireless) local networks or point-to-point connections (Bluetooth, cable) may be used for content delivery to mobile devices.

As the user is not interested in which delivery channel will be used to deliver the audio-visual content to his mobile device, the service provider may use the best one under availability, quality and economic aspects.

So, today mobile TV services are delivered either on a streaming basis by mobile networks or broadcast via broadcast networks. If available, broadcast networks may provide a better quality and are more economic for mass audience coverage.

Within the existing commercial mobile broadcast services the broadcast networks have mainly been used for broadcasting (existing) TV channels. Some of them have started to broadcast also interactive content and service elements.

Within mobile broadcast services the mobile network is mainly considered to provide the return channel for interactive services.

On the other hand, via the mobile network a lot of other audio-visual services can be accessed which are streaming or downloading the audio-visual content to the mobile devices. A part of them is provided by the mobile operators as live TV bouquets or music stores; the vast majority as catch-up TV, podcast and filecast services or access to YouTube, all available via mobile internet access.

The user can also side-load content from his PC or laptop to the mobile device for later consumption while on the move.

As mentioned before, broadcast networks are most effective for a mass delivery of content. But this does not mean that only TV channels can be broadcast.

Datacasting is an efficient methodology to broadcast audio and video content in a carousel service. With a service protection system a powerful distribution system can be built.

Many concepts for filecast-type service over the broadcast network were already discussed and partly implemented in the Berlin DVB-H trial in 2004.

Why not deliver to mobile devices podcast content requested by many users over the broadcast network? Podcast services in cases of simultaneous mass delivery at the same time can be realized effectively with mobile broadcast networks with a kind of carrousel broadcast channel.

Why should a channel be broadcast the whole day when it will be watched by a mass audience only a few hours? Maybe it is more efficient to stream it, for example in the off-peak time, and use the broadcast capacity more efficiently.

In the end, users expect seamless experience despite multiple delivery technologies, as there is broadcasting, datacasting, streaming or downloading.

2.2 Home environment

In the home environment the audio-visual content can be consumed with many devices types, not only the mobile device but also with connected TV sets, with TV-browsers, game consoles and personal computing devices.

The user is interested in seamlessly continuing the service consumption when switching from one device to the other, e.g. watching the same TV channel on the stationary TV set when entering the living room or seamlessly continuing to consume a demanded video or a podcast on the PC.

The user might be interested for economical reason to switch to another delivery channel when he or she changes from mobile to home environment. While switching from home to mobile environment, the change of the delivery channel might be even necessary, e.g. switching from WLAN delivery to mobile network delivery.

Sometimes, especially during live events the content acquired via unicast connections places a large burden on the mobile or fixed IP network. Flexible switching between unicast and broadcast delivery relieves the burden of operators to dimension their networks on mass audience peaks. This also requires flexibility in the ESG and the TV clients.

Another means to improve the user experience is by having content available from local storage in the home. This availability also impacts the Electronic Service Guide.

Potentially, a lot of services can make use of seamless delivery via the different network types, including stationary broadcast, mobile broadcast, IPTV and internet access.

Some of the seamless issues may be solved by the devices, e.g. transferring the information on the watched TV channel from one device to the other when changing it. Other issues need service provider based support.

The flexibility given with seamless service consumption has its price. More cooperation and standardisation are needed to bring together the communications and the entertainment industries. And the business models have to be adapted to these converged services.

3 Evaluation of service examples

In this chapter different categories of seamless services are described. Examples of existing commercial services are given for each category. Finally, the service category will be considered under business models aspects.

3.1 Barker channels

3.1.1 General service description

"A **barker channel** is a TV channel that is used almost entirely for promotion and advertising, usually marketing various features of the service carrying the channel. The name is analogous to a dog barking to attract attention.

There are several of these channels on digital cable systems and especially on direct broadcast satellite systems like DirecTV. On interactive TV systems, these also allow for ordering of pay-per-view TV programmes or other pay TV services. The TV Guide Channel can also be considered somewhat of a barker channel, though it now carries a lot of full-length programming.

Barker channels are normally free-to-view or occasionally free-to-air, even without a subscription."[7]

On the one hand, on mobile phones a barker channel can be used to promote and advertise broadcast service

- Other channels (Free-to-air and subscription based)
- Programme parts of a channel (pay-per-view)
- Bouquet subscriptions

On the other hand, on mobile phones a barker channel can also be used to promote specific services of the mobile operator and/or service providers.

This might be a broadcast TV "MNO Services" barker channel, which markets new MNO services and allows an easy and seamless forwarding to the service used by mobile internet or direct ordering of a service. If the service news of a single MNO does not fill out the broadcast TV channel, the offers of several MNOs could be bundled in such a channel.

Last but not least, a barker channel can be used as a general advertisement channel for products and services including web links and interactive services for selling-up, voting etc. Many other creative marketing ideas are possible here like providing info (about coverage area etc.).

[7] http://en.wikipedia.org/wiki/Barker_(television)

3.1.2 Examples of existing services

3.1.2.1 Mobile TV Preview (FLO TV Inc., USA)

The FLO TV service in the US includes a free preview channel that allows consumers to experience the FLO TV service quality and depth of programming before purchasing a subscription.

The preview channel highlights the paid channel bouquets offered by subscription through either Verizon Wireless or AT&T Mobile TV services. The preview channel broadcasts a rotation of programmes in 30 minute intervals (see figure below).

The FLO TV preview channel is free and can be received on all MediaFLO-enabled mobile devices, regardless of whether or not the user has a FLO TV subscription.

Source: Qualcomm

CHANNEL	SHOW TITLE	DESCRIPTION	AIR DATE	AIR TIME	CARRIER	SCHEDULE
	Mobile TV Preview	Comedy Central Preview Limited Time Only	5/13	3:00am	All	GO TO
	Mobile TV Preview	ESPN Preview Limited Time Only	5/13	3:30am	All	GO TO
	Mobile TV Preview	Comedy Central Preview Limited Time Only	5/13	4:00am	All	GO TO
	Mobile TV Preview	MSNBC Preview Limited Time Only	5/13	4:30am	All	GO TO
	Mobile TV Preview	ESPN Preview Limited Time Only	5/13	5:00am	All	GO TO

Source: Qualcomm

3.1.2.2 Electronic Service Guide

The Electronic Service Guide (ESG) which users are required to use to access Mobile TV services is a special barker channel that primarily contains information on programming of the channels. This may include audiovisual and interactive formats. At the same time the ESG can contain web links to the home pages of the channels or other links but also carry any advertising.

3.1.3 Service considerations

Barker channels may realize convergence at terminal level by providing easy switching opportunities to the barked services or content. This may include the usage of other delivery channels, if necessary, to access them.

Barker channels are usually clear-to air, so that they can be received on any device enabled for the corresponding technology.

The potential audience is equal to the number of the device owners.

Promoting bouquet subscriptions by barker channels will reduce the potential audience by the number of those who have already subscribed to that bouquet.

Normally, a barker channel is operated by the mobile broadcast service provider which uses part of the overall multiplex capacity to promote other channels or services.

The mobile broadcast service provider has to pass on the costs of the barker channel to those who profit from it by higher up-selling (Pay-TV provider or MNOs) or by higher channel audience (public and commercial broadcasters). This may be part of the overall agreement with them.

In the case of the Electronic Service Guide passing on the investment and operational costs are obvious. For a special barker channel similar agreements can be expected.

If the barker channel promotes specific services of several mobile operators, it might be necessary to separate them, displaying the specific promotions of a MNO to its customer devices only.

Promotion of third party services or products via the barker channel is comparable to the advertising in normal broadcast channels. The business model seems to be similar in this case.

A barker channel can share the capacity with a broadcaster. Promotion then will be done at specific times of day only, probably most suitable for it. The channel La3 Italy is an example here.

The question about barker channels is which up-selling rate can be generated, and how this can be compared to print or internet advertisement. Furthermore, it has to be evaluated whether the production, publication and transmission costs are more effective in comparison to other advertising forms.

3.2 Filecast services

3.2.1 General service description

While broadcast services are normally conceived of as providing TV or (visual) radio channels to a mass audience via a broadcast network, filecast services are characterized by other formats to be provided to a mass audience. In general, filecast services can be provided via unicast or broadcast networks.

There is a high variety of potential filecast services. Some of them may be

- Podcasts
- Best of YouTube
- Music charts
- Push VoD
- Push Games
- Electronic books
- Electronic newspaper

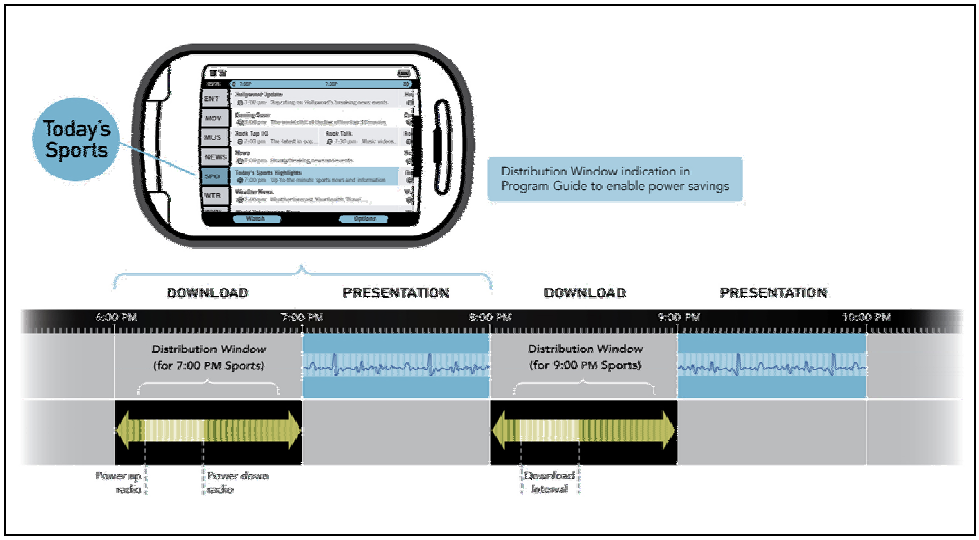
If implemented in the device or provided by the service, a subscriber can set its own profile and then the device is saving to the memory only those files which are applicable with the personal profile.

3.2.2 Examples of existing services

3.2.2.1 MediaFLO clipcasting

“Clipcasting media” is one of the features of the MediaFLO™ system. It enables the delivery of short-format content delivered in clips for playback where and when the viewer chooses.

The users are able to subscribe to a package of clipcast channels. The electronic service guide contains the clip descriptions and a distribution window.



Source: Qualcomm

A multi-presentation view of clipcasting media allows users to choose from a variety of clips offered on a single channel at any time during the day, irrespective of their location as the content will be downloaded and cached on the device. The presentation list can be a selection of video or data clips.

Source: Qualcomm

The MediaFLO clipcasting feature can be used by the service providers Verizon and AT& for economic mass audience delivery of files.

3.2.2.2 Podcasting services

A podcast[8] is a series of digital media files, usually either digital audio or video that is released periodically and made available for download by means of web syndication.[9]

With web syndication, website material is made available to multiple other sites. Most commonly, web syndication refers to making web RSS[10] feeds available from a site in order to provide other people with a summary of the website's recently added content (for example, the latest news or videos).

The syndication aspect of the delivery is what differentiates podcasts from other ways of accessing files, such as simple download or streaming: it means that special client software applications known as “podcatchers” (the RSS Reader) can automatically identify and retrieve new files in a series when they are made available, by accessing a centrally-maintained web feed that lists all files currently associated with that particular podcast.

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[8] The term is a portmanteau of the words "iPod" and "broadcast", the Apple iPod being the brand of portable media player for which early podcasting scripts were developed, allowing podcasts to be automatically transferred from a personal computer to a mobile device after they are downloaded.[9]

[9] http://en.wikipedia.org/wiki/Podcast

[10] RSS is most commonly translated as “Really Simple Syndication”

Video podcast is a special term used for the online delivery of video on demand video clips. In this case the RSS feed is used as a non-linear TV channel to which consumers can subscribe using a PC, TV, set-top box, media centre or mobile multimedia device. Web television series (see below) are often distributed as video podcasts.

From a web server, a video podcast can be distributed as a file or as a stream. Both methods have their advantages and disadvantages. Downloading complete video podcasts in advance gives the user the ability to play the video podcasts offline, for example, on a portable media player. A downloaded version can be watched many times with only one download, reducing bandwidth costs in this case. Streaming allows seeking (skipping portions of the file) without downloading the full video podcast, better statistics and lower bandwidth costs for the servers; however, users may have to face pauses in playback caused by slow transfer speeds.

Today, the number of video podcast services is increasing dramatically. Only a few examples can be described hereafter.

Many websites additionally provide podcast services of its content for a permanent reach of interested subscribers.

Normally, podcast services are provided by unicast networks as fixed lines or 3G mobile networks. In the case of a very high number of subscribers a podcast could be provided to the user devices by broadcasting it. However, special content rights issues may arise out of that (see section 4.1).

3.2.2.3 iTunes Store

iTunes is a free proprietary digital media player application for Mac and PC to play-out and maintain a personal media centre.[11]

From the Apple "iTunes Store" via Internet music, music videos, television shows, applications, iPod games, audio books, various podcasts, feature length films and movie rentals, and ringtones may be purchased and downloaded.

With an iPhone (which is also an iPod) users can download music and podcasts from the iTunes store. The connection is possible either via a WiFi or via a 3G network.

The iTunes Store in 15 categories offers more than 100,000 audio and video podcasts from independent creators. Everyone can provide his or her own podcasts to market them via the iTunes Store.

Besides this downloading on-the-move the traditional side-loading is possible. In this case the content is first downloaded from the iTunes Store to the iTunes client at the PC and then synchronized with the iPhone.
The content is partly premium and partly for free.

[11] http://en.wikipedia.org/wiki/iTunes

Source: Apple iTunes Store interface

The iTunes Store realizes two convergence aspects. On the one hand, convergence at content level as the same content is available via different services (download, side-load, podcast); on the other hand, convergence at device level as the service may be received via different networks (3G, WiFi and PC connection).

3.2.2.4 DailyMe TV (Germany)

DailyMe TV is a podcast service offering a choice of more than 600 channels with content provided by broadcasters ranging from German “ProSieben” to N24 to web TV shows such as the cult wine podcast "Bottleplot".

The user can select the more than 600 channels by 26 categories, by a lot of tags or by key words. The channel selection can be done either on the PC or using the mobile phone. The user can also add his or her own video clips or RSS feeds.

Source: www.dailyme.tv

The service is available at Symbian and Windows Mobile operating systems where it can be used via WLAN, Bluetooth and/or UMTS. The iPhone version recently is available for WLAN only.

Source: www.dailyme.tv

To use the service, the DailyMe TV Player has to be downloaded to the mobile phone.

The subscribed channels will be picked up automatically by the mobile phones.

The service is subscription-based and free of charge.

DailyMe TV realizes two convergence aspects. On the one hand, convergence at content level as the same content is available via different services (streaming, podcast, RSS); on the other hand, convergence at device level as the service may be received via different networks (3G, WLAN, Bluetooth and PC connection).

3.2.2.5 PC Welt TV (Germany)

PC-Welt is one of the oldest German computer magazines. It is published monthly by the International Data Group (IDG).

PC-WELT.tv is part of the portal of the magazine, several times a week presenting and evaluating in video clip format new hardware and software products. It also includes video workshops.

The video clips can also be downloaded automatically on a subscription basis or on-demand basis by the video podcast service which can be accessed via iTunes or other podcatchers.

The video podcast feed works also as a RSS news ticker. So the RSS subscribers will be informed on new clips which then can be streamed to the device by a flash player.

Source: www.pcwelt.de

Source: iTunes Store PC Welt podcast interface

The podcast and the RSS feed list the latest five video clips. Older clips are available for download from an archive.

Rounding up the service, a newsletter, informing on new PC –WELT.tv clips, can be subscribed.

The service is free-of-charge, at the moment available on PCs only.

The PC Welt TV service realizes convergence at content level: the same content is available via different services (streaming, download, podcast, RSS).

3.2.3 Future filecast services

3.2.3.1 E-books service

Amazon Kindle is a software and hardware platform to read electronic books (e-books). Three hardware devices, "Kindle", "Kindle 2," and "Kindle DX" support this platform, as does an iPhone application "Kindle for iPhone." The first device was released in the United States in November 2007 (http://en.wikipedia.org/wiki/Amazon_Kindle).

Source: www.amazon.com

The Kindle hardware devices download content over the Amazon service which is branded “Whisper-net” using Sprint’s cellular EVDO network, alternatively WiFi hot-spots. Kindle hardware devices can be used without a computer.

The Whispernet is accessible without any fee – the consumer only pays for the books. When the Kindle was initially launched, Amazon's Kindle Store had more than 88,000 digital titles available for download, with the number of titles steadily increasing, and currently numbering above 275,000.

The Kindle device featuring a 6-inch display was retailed for $399; Amazon subsequently lowered the price to $359.

Amazon does not sell the Kindle outside the United States, as Whispernet only works in the U.S.

The internal memory of the Amazon Kindle 1 can hold approximately 200 non-illustrated titles, and the memory is expandable with an SD memory card.

At the moment, no convergence has been implemented here, but broadcast networks may increase delivery economics in case of mass audience orders, e.g. of new top-seller books.[12]

3.2.3.2 E-newspaper service

Electronic newspapers have been under consideration for many years. The main issue is that devices having the real look and feel of newspaper are not available so far.

But the first newspapers as The New York Times already offer electronic versions through the Kindle device; The Times on the Kindle costs $14 a month, similar to the cost of other papers. The New York Times Website started as a replica of print, but it has now evolved.

Plastic Logic is developing a device with the dimensions 21,58 x 27,4 cm, 7 mm thick, weighing 170 Gramm (see figure below). It shall be available in 2010. In the beginning only side-loading from the PC will be available. But similar devices will become connected later on.

Source: www.plasticlogic.com

Broadcast networks can be used to deliver an e-newspaper to a subscribed mass audience, even several times a day, while mobile networks can be used for special e-newspapers with lower audience or on-demand provision of an e-newspaper. Interactive elements may become possible within the e-newspaper, when clicking to a headline, a photo or ad, additional information will be provided via the mobile network.

Furthermore, as a connected electronic device, e-newspapers can determine who is reading them, and even which articles are being read. Advertisers would be able to understand their audience and provide targeted advertising[13].
The economic value of e-newspapers can be characterized by the fact that 65 – 70% of the costs of a traditional newspaper are related to printing and delivering it.

E-newspapers may serve as an example of convergence at network level. The service provider may choose the most economic delivery channel, e.g. delivering to daily mass audience subscribers of newspapers or journals over night by

[12] An example here might be the Bertelsmann book club in Germany.
[13] Subject to privacy protection rules

broadcast network and providing streaming or download access for individual orders of a specific newspaper or journal.

3.2.4 Service considerations

The described filecast services differ regarding the usage environment and delivery channel:

- The MediaFLO filecast service is available on mobile phones. It uses a MediaFLO specific filecast player. The content is delivered (down-loaded) using the broadcast network.
- The iTunes podcast service is some kind of podcast shop. A lot of different podcasts can be accessed from here.
- The PC-WELT.tv services are internet-based and can be used with a browser (TV), podcatcher or RSS reader.
- The DailyMe TV service is available on mobile phones. It uses its own player. The content is downloaded via WAN, Bluetooth or UMTS.
- The e-book service is based on special devices to display the content in an appropriate manner to read books. In most of the cases it will be a download service, but broadcasting could be used in the future for providing new books to subscribers of a specific service.
- The e-newspaper service is also grounded on special devices to display the content in an appropriate manner to read newspapers. Such service tends to be a filecast service, although download can complement it for low audience or on-demand.

The number of podcasts is growing very fast (compare the variety of the iTunes video podcast offer). From the delivery point of view only those podcasts are relevant for broadcasting that reach mass audience.

The MNO may decide to use a broadcast network for the delivery of mass audience podcasts, if the costs for the broadcast network delivery are lower than for extending its unicast network to handle the mass traffic.

3.3 Service bundling

3.3.1 General service description

Users would like to have a seamless user experience with all services they are interested in. This includes that they can easily access all audio-visual content from a single entry point independently from the service and the network which is necessary to provide it.

Different levels of service bundling for unicast and broadcast mobile TV services are possible:

- Two products with price bundling, which is very weak bundling (convergence at marketing level)
- One product with different interfaces which does not yet provide a single entry point (convergence at marketing level)
- One product with single ESG (convergence at device level)

A single ESG can include all meta-information on the content of interest, classified in a user-specified manner. An example here is an ESG including all available TV channel both via broadcast and 3G streaming (see also 3.7.2.5). In an extended version the subscribed podcasts (e.g. catch-up TV or soap podcasts) could be part of the ESG as well.

3.3.2 Examples of existing services

3.3.2.1 Price bundling

Consumers are interested to get audio-visual content at least for a fixed price including the transmission. For broadcast delivery this is normally fulfilled by subscription or pre-paid access to some content. Unicast delivery might be provided by a flat fee data plan.

For example, in addition to the current “AT&T Mobile TV Basic” which currently is offered at 15 USD/month and offers unlimited access to the broadcast-based TV service, enabled by FLO TV Inc., the customer can optionally subscribe to an unlimited data plan for 15 USD/month (Source: AT&T.com)

Most of the European providers of mobile broadcast TV bundle the TV access with flat usage of voice, SMS and data (e.g. see 4.3.2.2).

AT&T also provides a more advanced quadruple play bundle: Customers can mix and match from cellular, fixed broadband, home TV services (via its U-Verse IPTV service), and fixed voice. The bundle gives AT&T subscribers one of the four for free when taking TV and a total of three of the four services.

This bundle is a clear sign of increased competition between MNO’s and cable TV operators. So one of the largest cable TV operators, Cox Communications, has announced plans for CDMA2000 and LTE networks of its own, and will use them to compete in wireless. It is widely believed that this will lead to an in-

creased price competition and that such developments will also be replicated in other parts of the world.

Price bundling realizes convergence at marketing level.

3.3.2.2 Bluewin TV mobile (Swisscom)

Swisscom provides mobile TV services under the brand “Bluewin TV mobile”:

- In standard quality via the Vodafone Live! portal and the UMTS/EDGE network (streaming),
- In (so called) HD quality via the mobile TV application and the DVB-H broadcast network.

The service offer differs in some channels, some of them available only via Vodafone Live!, other available only via the broadcast network.

There is a single Bluewin TV mobile package at one price including access to both standard and HD Quality. However the service is not seamless, as different applications shall be used. So it realizes convergence at marketing level.

Sender		HD-Qualität	Standard-Qualität
	SF 1	✓	✓
	SF zwei	✓	✓
	News & Meteo	✓	×
	Teleclub	✓	✓
	TC Sport Flash	✓	×
	SF info	✓	✓
	Pro 7	✓	✓
	RTL	✓	✓
	RTL 2	×	✓
	SAT.1	✓	✓
	VOX	✓	✓
	ARD	✓	✓
	ZDF	✓	✓
	ORF 1	×	✓
	VIVA	✓	✓
	MTV	✓	✓
	Eurosport	✓	✓
	n-tv	×	✓

Sender		HD-Qualität	Standard-Qualität
	TSR 1	✓	✓
	TSR 2	✓	✓
	News & Meteo	✓	×
	Teleclub	✓	✓
	TC Sport Flash	✓	×
	TF 1	✓	✓
	TV 5	×	✓
	France 2	✓	✓
	France 3	✓	✓
	France 5	×	✓
	M6	✓	✓
	TSI 1	✓	✓
	TSI 2	✓	✓
	Rai Uno	✓	✓
	Italia 1	×	✓
	Canale 5	✓	✓
	CNN	×	✓

Source: Swisscom

3.3.2.3 3 Austria Mobile TV

3 Austria offers its mobile TV services both broadcast over the DVB-H network and streamed over the mobile network. Some of the more than 50 channels are available only by streaming, and not with DVB-H, and vice versa.

Broadcast access is available via DVB-H enabled mobile phones by using the integrated TV player.

Streaming mobile TV is available on mobile phones, laptops or PCs.

Depending on the mobile phone type, the streaming service can be accessed either by using special mobile TV player (available for most of the mobile phones and laptops) or by the 3Planet internet access service.

Source: 3 Austria

Main features of the mobile TV player are:

- Easy zapping with channel preview (more comfortable than browser zapping) and advertising during channel switching,
- EPG programme guide,
- Channel specific chats with other viewers while watching a channel.

Mobile TV access on laptop or PC is possible using a 3Datamodem, 3Datacard or 3Datarouter, 3Phone as modem.

The 3Datamodem additional to the mobile broadband internet service allows mobile TV on the Laptop/PC via DVB-H.

Source: 3 Austria:

Source: 3 Austria

The Windows based TV application allows viewing of the DVB-H programs on the PC/laptop, it also lets the customer start the streaming based programs with a simple click.

Although the DVB-H player lacks a seamless handover between DVB-H and streaming, not possible due to missing APIs for the video transport on a Windows based platform, 3 aims to upgrade this in future versions of the software.

Convergence is at marketing level only; the interface is mainly predetermined by the device type.

3.3.3 Single ESG in Nokia devices

The Nokia Live TV application on the N96 smartphone supports a single ESG for channels broadcast over DVB-H broadcast network as well as channels streamed over the mobile network. The ESG is OMA BCAST compliant for both broadcast and streamed channels and broadcast over the DVB-H network.

The Nokia Live TV application with single ESG will be available also for Nokia 5800 and N97 devices, which receive the DVB-H signal over the accessories SU33W and Bluetooth connection.

The single ESG realizes convergence at device level.

3.3.4 Service considerations

Service bundling may ease the user's consumption of audio-visual content. As this is a user interface matter of a service it cannot be expected that users will pay for the bundling itself.

But there may be some advantages for the service provider:

- Service bundling may be considered as a mean to reduce churn, as it may be more inconvenient to change a complex service.
- The acquisition costs for offering bundles to existing subscribers may be lower than for winning subscribers for a new service.
- Bundles may generate higher revenues.
- Adding a small amount of service fee to an existing bill by bundling services maybe better accepted by subscribers.

3.4 Special made for mobile formats and channels

3.4.1 General service description

Existing broadcast channels are adapted to the specific watching behaviour in a fixed environment (mainly at home). The watching behaviour on the move is quite different: For most of the usage it can be characterized by lower watching session time (minutes instead of hours) and less attention. Furthermore, much content is not very suitable for the small screens of mobile devices.

Special made for mobile channels will focus on these specifics of mobile TV watching. They can be created by repurposing content from existing channels or by creating new channels, all adapted to the mobile watching environment.

Examples of repurposed content based mobile channels are

- Channels combining best content from a number of stationary channels,
- Loops, e.g. 24/7 loop of the top music videos,
- Mobile distribution prior to stationary distribution, e.g. of soaps,
- Broadcasting additional soap backstage content,
- Special formats of existing content to avoid long shots, e.g. being “closer to the ball”.

Examples of newly created mobile channels are

- Barker channels (section 3.1).
- A special sport channel using user-generated content.
- Visual radio channels

Together with the video and audio content of a TV channel, additional information can be sent via broadcast or mobile networks to be selected and displayed by the user on an occasional basis.

Moreover, active elements as initiating a call, sending SMS or MMS or connecting to a specified web site can be included in the audio-visual content.

By using communication functions of the mobile network, interactive services may generate additional turnover contributing to the overall mobile TV business case.

3.4.2 Examples of existing formats and services

3.4.2.1 La3 (3 Italy)

LA3 is an entertainment channel made up mainly with in-house produced content. It combines the experience of La3 live (a barker channel launched in 2006 which had more than 10.000 hours of live transmission in two years) and the content of La3 Sports (Serie A, MotoGp Wrestling, Poker and much more).

Source: 3 Italy

The channel daily schedule is built around ''Loft Live'', our main theme, the common thread of our daily programming.

Everyday from 7 to 21 one of our presenters, the so-called 3jay, is on air live to introduce the daily schedule, to launch programs, to interview guests etc.

Special slots of LoftLive are dedicated to various topics such as cinema, sport, travel, etc.

Original programming is dedicated to football, emerging performing artists, and TV series coupled with all the latest technology. Plus there's cinema, music, entertainment and much more sport to watch wherever you are.

The channel schedule is enriched with special acquired content in order to support our TV productions, such as feature and short films to complete our section on cinema, video clips and music concerts for our programs on music.

The thread that unites the mandate of the channel is modernity, a way to conceive TV that goes beyond tradition, with elements from the WEB, rather than other platforms, and with the full use of new technologies, to aggregate a new generation of users/viewers.

A relevant part of La 3 programming is the local information in real time, produced according to the new trend of ''citizen journalism'' with the full of use of H3G platforms for mobile broadband.

La3 is also filled with moments of relaxation and enjoyment, with funny programs and jokes.

La 3 is on air 16 hours a day, from of 07.00 to 23.00 7 days a week. Scheduling is structured enabling viewers, with different habits, to see the contents in different time slots. During the same day first runs and repeats are shown.

3.4.2.2 ARD Tagesschau and ZDF Heute in 100 seconds (News)

The German public broadcasters provide a special mobile format of their well-branded news “Tagesschau” (ARD) and “Heute” (ZDF) fitting into 100 seconds.

Source: http://www.tagesschau.de/multimedia/sendung/ts14284.html

The format is updated every hour and is available on the internet (www.tagesschau.de , www.zdf.de) as well as on mobile devices (m.zdf.de, wap.tagesschau.de).

It is also part of the mobile TV package of German mobile operators.

This is an example of service platform convergence. The service is provided in a device-adequate manner (shorter viewing time on mobile devices).

3.4.2.3 Redbull MOBILE (Austria)

On of the trends is that brands become TV channels. Red Bull is an example here.

Red Bull is a manufacturer of energy drinks. As such, its intensive brand building includes a web (www.redbull.at) as well as a mobile portal (see www.redbullmobile.at) with audio visual content focusing on adventure, sports, actions, etc.

Red Bull agreed with mobilcom Austria on two special Red Bull branded tariffs which include voice, data as well as streaming and partly broadcast mobile TV.

Redbull mobile is positioned with a strong profile driven by the red bull energy drink brand.

The mobile portal contains a community service, news and videos of the Red Bull events and heroes, action, sports and lifestyle content as well as other news, sports and weather info, ringing tones etc.

Furthermore, it includes a community service for user-generated content. An action camera can be bought as well.

Mobile TV is part of the portal. It started with DVB-H only, but is now available also via UMTS. The only phone supporting DVB-H is the ZTE RBM1. The service includes a branded Red Bull MOBILE TV player.

Red Bull TV is a special made for a mobile TV channel which is available via UMTS but also broadcast Austrian-wide via DVB-H. It features the Red Bull Sport & Event Magazine on air.

Altogether, the audio-visual content of Red Bull is marketed

- Within the internet,
- By its own mobile portal via the MVNO service and
- By its own mobile TV channel.

The main business idea behind the Redbull MOBILE is to strengthen the brand. The MVNO approach is a further vehicle but seems to be secondary under direct revenue aspects.

Source: www.redbullmobile.at

Redbull Mobile realizes convergence at several levels: Convergence at content level, as the same content is provided by different services (broadcast, streaming); convergence at service platform level, as the same service is available on different devices (PC, mobile) and delivered by different networks (DVB-H, 3G); the mobile TV service adapted to the mobile environment.

3.4.2.4 Visual radio

Visual radio is an audio (radio-based) broadcast or mobile network service complemented by visual content, normally in text, picture and/or low quality moving image formats. The service may include interactive elements as well.

Source: GMIT

In a lot of cases, visual radio services are offsets of streaming radio services provided via mobile networks and the internet.

Stations supporting visual radio include the UK's GWR Bristol, GWR Bath, Virgin Radio, The Voice in Helsinki, Mediacorp stations in Singapore, and Los 40 Principales in Spain.[14]

[14] Source: en.wikipedia.org/wiki/Visual_radio

Furthermore, in Germany, 90elf tested its football radio channel (www.90elf.de) as a visual radio channel via DVB-T and DVB-H and MotoFM its radio music channel (www.motorfm.de) as visual radio channel via DVB-H.

Visual radio services normally realize convergence at the service platform level, as the same service is available on different devices (PC, mobile) and delivered by different networks (DVB-H, 3G), the mobile TV service adapted to the mobile environment.

3.4.2.5 Interactive services

Source: GMIT

Audio-visual content consumption and communication can be combined on the mobile device to provide seamless interactive services. Seamless means here that the user can interact, not interrupting or even stopping, content consumption.

The content can be delivered by a broadcast or a mobile network; the interactivity communication is done via the mobile network.

In a special study[15] **bmco**forum described several use cases of interactive mobile broadcast services to illustrate potential service offerings. Some examples are:

- A jukebox
- Participation in a quiz show
- E-commerce in a music channel

Interactive service may realize convergence at the device level using different delivery networks.

3.4.2.6 Service considerations

Most of 3G mobile network operators provide streaming mobile TV services bouquets based on repurposed content of existing brand channels. The bouquets may be free or paid: For example, T-Mobile Germany provides mobile TV for 2 € per day or 7.50 € per month. Vodafone Germany provides 4 channels for free and more than 20 channels for 1.99 € per day or 9.99€ per month.

Additionally, broadcasters provide mobile adapted versions of their websites also including audio-visual content from their channels.

Finally, brands have started to become mobile TV channel providers.

First special made for mobile broadcast channels are available, but probably more will come up with a higher mobile broadcast TV audience.

[15] Interactive Mobile Broadcast Use Cases, **bmco**forum, September 2008, http://www.bmcoforum.org/index.php?id=179

3.5 Media centres

3.5.1 General service description

A media centre is a kind of library service where users can select the audiovisual content to be watched. The content can be streamed, broadcast or downloaded. Some providers also add media podcast services. If not streamed, copyright is an issue.

Catch-up TV services provided today by many broadcasters are a special type of media centre services.

3.5.2 Examples of existing services

3.5.2.1 Orange Video Services

Orange is offering convergent multimedia services. That includes downloads but also streaming content. In some countries (Austria) TV via DVB-H is also offered.

Orange UK offers a full set of multimedia content film database. One can select TV content, episodes, films and see trailers, clips, screenshots and music on the PC or mobile. A link with cinema tickets purchase is included. A typical music clip costs 99p.

A specific media player is included in the offer. This is for side-loading content to the mobile phone via the PC. The player can be downloaded on the PC and manages the mobile phone. The player is for free.

3.5.2.2 Vodafone Media Centre (Germany)

The Vodafone media centre (http:/videothek.vodafone.de) offers movies and TV series. The content can be viewed on a PC or a mobile phone. The rental fee is EUR 0.99 for TV series and EUR 1.99 for movies, plus connection costs. Advertising-financed formats can be viewed online by all customers at no extra charge.

The Vodafone video service enables customers to watch both mobile movies and TV series on their handsets. The advertising-financed content on the internet is aimed at Vodafone customers and at third party customers with appropriate internet access.

In the premium section, one can rent a movie for 24 hours at prices starting from EUR 1.99 and TV series from EUR 0.99 onwards. During these 24 hours, the subscriber can watch the video content any number of times on a PC or mobile phone.

Source: http://videothek.vodafone.de/TV

Many of the videos are also available for purchase. In this case, the entire video is downloaded to a PC or laptop and stored there.

The Vodafone Media centre realizes convergence at service level: The same service is available on PCs and mobile phones.

3.5.2.3 ZDF Mediathek (Germany)

The second German public broadcaster ZDF is providing a catch-up TV service, available both via stationary (www.zdf.de/ZDFmediathek) and mobile internet option (www.zdf.de/ZDFmediathek/mobile).

The service is web based and provides not only a big part of the broadcast programmes in full length on-demand but also live TV streams. In a few cases programmes are put online to the media centre before they are broadcast.

If you click on the button “Missed a programme?”, a list of the programmes of the past 7 days is available.

The archive is available by using the search function. The storage duration depends on the copyright situation.

Source: www.zdf.de/ZDFmediathek/mobile

Source: www.zdf.de/ZDFmediathek

The service is free-of-charge and available worldwide. Depending on the rights situation some content may be accessible only in Germany and Europe.

Some programmes are also available in third party podcast services as DailyMe TV.

The ZDF Mediathek realizes convergence at service platform level, providing it by different networks (fixed and mobile) in an adequate format. It also provides convergence at content level, providing partly the same content by streaming and podcasts.

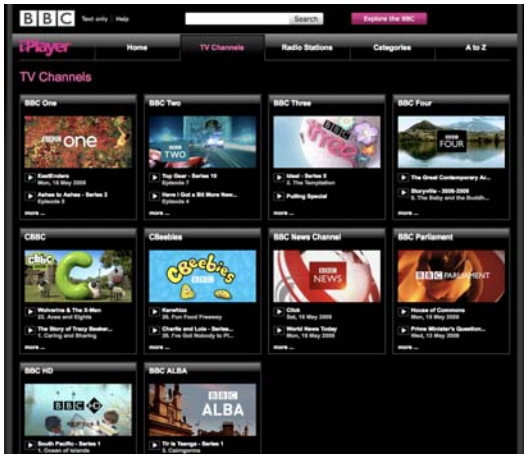
3.5.2.4 BBC iPlayer (UK)

BBC iPlayer offers replays of programmes broadcast on all BBC TV and radio channels in the past seven days. Programmes are available from all national BBC television channels as well as BBC Wales programmes. Due to licensing agreements, international and some privately-produced shows or movies are not available on iPlayer. The iPlayer also offers an electronic programme guide (EPG) with listings for both the previous seven and next seven days' programmes.

BBC TV productions are financed by the UK television licence fee as well as rights agreements with third parties. As a result, BBC iPlayer TV programmes are only officially accessible in the UK. However, most radio programmes can be accessed from outside the UK, with the exception of programmes, such as live sport, which are affected by rights issues.

Thus, for UK residents this means that only they can:

- View programmes from the past seven days and watch them on the iPlayer website (streaming),
- Download and stream HD programmes,
- Access BBC iPlayer on certain mobile phones,
- Download programmes to the computer, if it supports BBC iPlayer Desktop application.



Source: BBC

Source: BBC

The content is either streamed or downloaded to the user device (where supported). Streamed content can be accessed via Windows, Mac or Linux personal computers, or via the Nintendo Wii, Sony Playstation 3 and a variety of mobile phones from Nokia, Samsung Sony Ericsson and Apple (iPhone). The iPlayer application is also available for the Nokia N85 and N96 for content download to these devices.

One of the key features of the iPlayer download service is the use of peer-to-peer technology to enable the distribution of large video files (i.e. TV programmes) to scale effectively. Once downloaded, the content is only playable within the iPlayer itself or Windows Media Player 10 or 11. Digital rights management (DRM) software will prevent it from being directly copied to another medium (e.g. another computer or CD-ROM). Additionally, the DRM allows the BBC to decide on how long the programmes remain watchable. Programmes will be available for download for seven days following the broadcast. Once a programme is downloaded, a user will have thirty days to start watching it. Once a user starts to watch a programme, it will continue to be available for the next seven days. These limitations do not apply to viewers using the online streaming service.

The BBC iPlayer realizes convergence at content level, as the content can be streamed or downloaded. It also provides convergence at service level, as the service is available on different devices (PC, mobile phones).

3.5.3 Service considerations

Media centres normally provide on-demand access to a significant amount of audio-visual content. Some content be accessed by a browser (e.g. ZDF Media-

thek), others need a special application to be downloaded to the user's device (e.g. BBC iPlayer). In both cases special mobile versions may be available.

As the on-demand access is based on a point-to-point connection, the appropriate access is via communication networks as fixed line, WiFI and mobile internet access. There is no room for broadcast delivery in on-line accessing media centres.

But media centres may also provide podcast services which might use a broadcast network for delivery to a mass audience. Copyright issues may arise in this case (see section 4).

3.6 Flexible mobile broadcast channel bouquet

3.6.1 General service description

In mobile networks the Multimedia Broadcast Multicast Service (MBMS) is designed as the multicast extension to be used when several users access the same content at the same time. A seamless switch-over between unicast and multicast is part of the specification. However, the number of multicast channels in a cell is limited to a few only.

On the other hand, today mobile broadcast networks transmit a fixed channel bouquet regardless of the expected audience to be reached.

Finally, today some MNOs stream and broadcast the same channels due to coverage issues. In case there is no broadcast signal, the user is able to switch (hopefully seamless in the future) to the unicast/multicast streaming option.

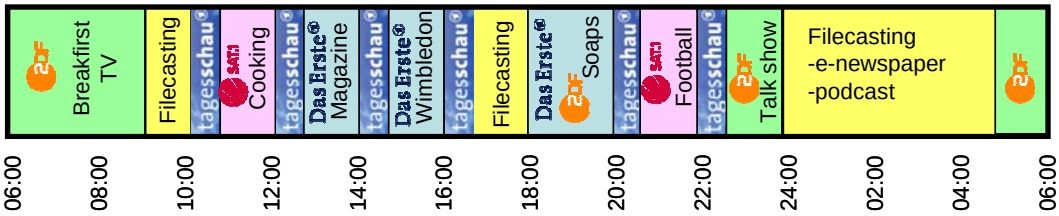
All these limitations are not optimal from an economic point of view of the network providers. A flexible and optimal concept would allow the used transmission option (unicast, multicast, broadcast) to be adapt within a day to the recent audience of a channel, using the broadcast channel for extreme high audience, the multicast for less audience and the unicast for individual access.

During daytime with low TV channel audience, the broadcast network could be used for not-time-critical filecast services, e.g. e-newspaper, to be broadcast in the early morning.

In other words: The broadcast network should not transmit a fixed bouquet of channels the whole day but instead broadcast the channels with the highest expected audience at any time of the day (see figure below).

If the users have a single ESG for all unicast, multicast and broadcast channels available, they are not aware of the delivery technology and the network.

The following figure exemplary showcases the possibility of flexible time allocation within a channel.



Source: **bmco**forum

The flexible mobile broadcast channel bouquet described here realizes convergence at device and network levels within a single service. The user shall not be aware of the delivery network used by the service provider for economic delivery.

3.6.2 Service examples

Currently, there are no service examples known to optimize the broadcast network use by adapting the bouquet to the channels with highest audience expectations.

The technology is partially available as show barker channels (see the MediaFLO preview channel, chapter 3.1.2) and “Best of” channels (mentioned in chapter 3.4.1). However, the reasons for channel switching are different: a preview in the barker channel case and copyright issues in the “Best of” case.

3.6.3 Service considerations

Today, with the fixed channel bouquet in mobile broadcast networks the relationship between the mobile broadcast service provider and the distributors (mainly MNOs/MVNOs) is a wholesale/resale relationship in most of the cases. The distributor pays for the mobile broadcast bouquet which is stable over time.

The flexible and seamless approach brings the mobile broadcast service provider in the position to decide on the content to be broadcast. This does not only influence the relationship between the mobile broadcast service provider and the distributors but also between them and the broadcasters.

Normally there is only one mobile broadcast network per country and one mobile broadcast service provider but several distributors; so they have to agree together about which content the highest audience is expected, and thus, to broadcast it.

In the shared network model the mobile broadcast service provider does not have its own customers. Normally the channels pay for being broadcast (like for example in South-Korea free-to-air model) or, as in the Austrian DVB-H service, the MNOs pay on a per customer basis for the broadcast, this way sharing the risk with the mobile broadcast service provider.

The seamless approach brings more flexibility to the content to be broadcast, both from a time and bandwidths point of view. Different distributors may use capacity based on a dynamic schedule. So, capacity management should be part of the business model.

In this case MNOs do not simply resale a permanent broadcast bouquet but handle the whole content split between unicast and broadcast delivery. As a result, the relationship to the broadcasters and mobile broadcast service provider will change.

3.7 Seamless services in the home environment

3.7.1 General service description

As briefly mentioned in chapter 2.2, seamless services in the home environment have a variety of facets, among them

- Controlling the audio-visual service consumption on home devices (TV set, PC) by mobile devices,
- Switching consumption of audio-visual services between a mobile device and one of the home devices and vice versa,
- Using broadcast delivery instead of streaming/downloading in case of mass audience consumption of the same audio-visual service at home devices.

The implementation of such type of services is still in an early phase. So, only exemplary services will be described hereafter.

3.7.2 Service examples

3.7.2.1 Mobile device as interactive device at home

One of the reasons why MHP has not become a success in most of the countries was the absence of telecommunications connectivity in living rooms for interactivity.

The mobile device can be used to at least partly realize the same interactivity approach: If a person watching TV on a stationary TV is interested in an interactive service of a channel, he or she may switch on (in parallel) the same channel on his or her mobile device with the integrated interactive service using the 3G/LTE network for interactivity.

This example demonstrates convergence at the service platform level, however, in a weak manner.

3.7.2.2 Mobile devices as a remote control unit at home

There are a lot of solutions available to use the mobile phone as a remote control of the TV, HiFi set, CD, VCR and DVD player at home.

In the US, Verizon has recently announced plans to release a program for mobile phones that will allow them to act like a WiFi based remote control or its FiOS TV service. DirecTV also allows its customers to program its DVR with selected handsets.

Source: /www.novii.tv

Special remote control applications are available for the different mobile operating systems, using the infrared connection to the equipment to be controlled.

Normally, codes for the different devices can be downloaded.

The example shown on the left is the NovviRemote Deluxe for Window Mobile.

Another example is the irRemote from Psiloc for the S60 operating system.

Due to the limited distance of infrared connectivity the solution cannot be used while on the move but only at home.

This is a device-based solution but not a service.

3.7.2.3 Mobile phones as smart home controller on the move

Many smart home pilots have experienced using web access to a smart home server to control home equipment among them heating, light, blinds as well as entertainment equipment.

Normally the smart home server provides a web base interface, which can be used to control the devices connected to the server.

Source: www.eyeonautomation.com

An example here is the EyeOn Automation Server providing two types of access while on the move:

- The web-based interface can be accessed with an internet connection through a secure URL.
- The mobile phone/PDA application provides remote access on the go.

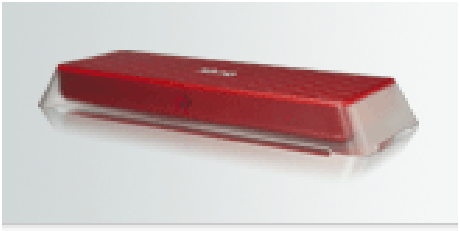
Both allow access of any system feature, including IR remote programming.

Smart home systems may also send reminders to the mobile device.

The smart home server is normally operated by the user and on his or her own responsibility. But there are attempts of platform providers and operators as well to provide smart home services.

3.7.2.4 SlingPlayer Mobile

The SlingBox is a device which can control up to 4 audio and video sources allowing to watch live television via the Internet on a computer or mobile phone.



Source: www.slingmedia.com

The Slingbox streams live video from whatever source it is connected to a PC/laptop running the SlingPlayer software or a mobile phone (Symbian, Windows Mobile) or iPhone running the corresponding SlingPlayer Mobile software.

The TV consumption is location agnostic. This may raise copyright concerns regarding the content consumption abroad.

The SlingBox is a device-based solution without involvement of service provider.

3.7.2.5 TV session transfer between devices

In this example the user will be able to suspend watching TV on one device (e.g. the home TV set) and resume watching on another device (e.g. the mobile phone when leaving home).

a) Direct session transfer

The status of watching (channel, access rights) is transferred directly between the devices by an infrared, Bluetooth or WLAN link.

In the special case of session transfer from the mobile device to the TV set, the mobile forced switch is like a remote control, where the 'sending' device really forces the transfer to the 'recipient' device.

This implementation realizes convergence at device level.

b) Park and pickup session transfer

In the park and pickup TV concept an arbitrary device (as the SlingBox) or service can park a TV service and another device can search for parked services and pick them up.

A joint PVR available for the different devices including the mobile phone may play the parking role. When suspending watching TV on the first device the time shifting function of the PVR will be activated. By accessing the PVR immediately or at a later point of time, the user can resume watching on the second device from the interruption point on. This can also be done using a different network (e.g. cable TV in the stationary case, 3G network for the mobile phone).

The device or service should be able to handle the device formats. This means that the PVR has to store a format that is good enough for the highest quality device type and to transform it into the appropriate device format for viewing. Furthermore, in case of encrypted channels the corresponding digital rights have to be available on all devices.

The park and pickup session transfer realizes convergence at service platform level, as described above. The service platform may be private (as in the SlingBox case) or provided by a service provider.

3.7.2.6 Access to additional TV channels in a WiFi environment

While on the move, the Electronic Service Guide (ESG) on the mobile phone will display the (broadcast and/or streaming) channels available on the move. When entering the WiFi enabled home or a WiFi hotspot area of the mobile operator, the ESG shall also contain the specific channels available via WiFi at home or in the hotspot (e.g. area specific channels).

The user, unaware of the delivery network used, can then select a channel from all the available delivery networks: broadcast, 3G and WiFi.

Such a service realizes convergence at terminal level. However, implementation should be supported by the service operator providing a single ESG for the different delivery channels.

3.7.3 Service considerations

Several described examples can be implemented by user specific devices (3.7.2.1, 3.7.2.4) or servers (3.7.2.2 and 3.7.2.3) without service provider involvement.

Among the described examples only the park and pickup session transfer between devices (3.7.2.4b) and the access to additional TV channels in a WiFi environment (3.7.2.5) are relevant for service provisioning. Although these services may be interesting for users, the added value and, thus, the additional revenue for service providers seems to be limited.

4 Regulatory framework of seamless services

4.1 Regulatory hurdles and issues

When unicast/multicast and broadcast mobile services converge for a single user experience, regulatory issues have to be considered.

Broadcast services are normally much more regulated than unicast/multicast services due to the high audience that can be reached and influenced by them. The question is which regulation applies for seamless services:

- What licenses and copyrights are necessary for seamless services?
- What advertising rules apply to seamless services?
- Is there a specific price regulation to follow?[16]
- Are push and pull services regulated in a different manner?
- Does a copyright for mobile delivery include both push (multicast, broadcast) and pull (download, streaming)?
- Is streaming of TV channels to a high number of users considered as broadcasting?[17]
- Does Electronic Programme Guide regulation apply to a combined EPG including broadcast and streamed channels?
- What national copyright remuneration rules apply to seamless services?

So far, the regulation is not fully prepared to answer these questions. So, before setting up seamless services, the applicable regulatory framework has to be considered in detail.

As this regulation may differ from country to country, specific national analysis may be necessary which is out of the scope of this study[18]. So only some exemplary aspects will be described in detail hereafter.

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[16] In Finland the law requires that the user knows how much to pay for the service, also in case of seamless services. So the user has to be informed if the price is changing due to switching from unicast to broadcast and vice versa.

[17] In Bavaria streaming is considered as broadcasting if a platform enables more than 500 users to access the same content at the same time. Up to 10.000 access licenses are granted without precedents, otherwise the same rules as for cable providers apply.

[18] For more details see: Interactive content and convergence: Implications for the information society, A Study for the European Commission, (DG Information Society and Media), Screen Digest Ltd, CMS Hasche Sigle, Goldmedia Gmbh, Rightscom Ltd, October 2006.

4.2 Copyrights

4.2.1 The copyright framework

The copyright framework for audiovisual services is mainly based on the following documents resp. organisations:

- Berne Convention for the Protection of Literary and Artistic Work[19]
- World Intellectual Property Organization Copyright Treaty, abbreviated with the WIPO Copyright Treaty[20]
- Copyright Directive 2001/29/EC of the European Parliament and of the Council on the harmonisation of certain aspects of copyright and related rights in the information society[21]
- National copyright laws.

Article 11bis (Broadcasting and Related Rights) of the Berne Convention declares to authors of literary and artistic works "the exclusive right of authorizing the broadcasting of their works or the communication thereof to the public by any other means of wireless diffusion of signs, sounds or images".

The WIPO Copyright Treaty is adding authors the exclusive right of authorizing any communication to the public of their works, by wire or wireless means, including making their works available to the public so that members of the public may access these works from a place and at a time individually chosen by them (right of communication to the public).

As a consequence the following rights have to be distinguished:

- Broadcasting rights
- On-demand rights (communication to the public).

The Berne Convention also determines that it is a matter for national legislation to determine the conditions under which the rights may be exercised. The conditions apply only in the countries where they have been prescribed.

"In most of the countries, different collecting societies are charged with the management of copyrights and related rights. Especially in relation to mass exploitation, the authors do not exercise their rights individually. Hence, authors or owners of neighbouring rights transfer to a collecting society rights to negotiate rates and terms of use and grant non-exclusive licences to users, to collect royalties, to monitor and enforce their rights and to distribute collected royalties.

In many situations, especially in the case of multimedia productions, the user has to clear the rights in relation to works which involve many different rights holders and many different rights. Hence, the user has to deal with several dif-

[19] http://www.wipo.int/treaties/en/ip/berne/trtdocs_wo001.html#P156_28886
[20] http://www.wipo.int/treaties/en/ip/wct/trtdocs_wo033.html
[21] http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2001:167:0010:0019:EN:PDF

ferent bodies and different licence practices in order to acquire the necessary rights.

Moreover, only some parts of the rights are issued by collecting societies, while others are still issued individually."[22]

4.2.2 Broadcasting rights

Broadcasting rights may be subdivided into "original programme rights" and "simultaneous and unaltered retransmission rights".

a) Original programme rights

For broadcast TV the broadcaster has to acquire the corresponding copyrights (original programme rights).

Mobile broadcast TV rights in principle do not differ from stationary broadcast rights. However, they may be contracted individually.

Original broadcasting rights are normally specified for

- A territory with a corresponding amount of the population
- Distribution channel(s)[23] as DVB-T, DVB-C, DVB-S, DVB-H, 3G TV, IPTV etc.
- Pay-TV or Free-to-air[24] (normally Pay-TV first, then FTA)
- etc.

The price for the copyrights may depend on all of them.

b) Simultaneous and unaltered retransmission rights (hereafter named "re-transmission rights")[25][26]

Retransmission rights can be used if someone does not own original programme rights of the content to be broadcast via a specific technology (like Mobile TV) or for a specific country (for example Italian RAI Uno in Finnish cable network) and the original programme rights are difficult to negotiate (for example, if so many parties to negotiate that it's impossible in practice).

The retransmission entity is different from the original broadcaster. E.g. it may be a

- Cable operator for retransmitting a channel with original programme rights in its cable network,

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[22] Interactive content and convergence: Implications for the information society, A Study for the European Commission, (DG Information Society and Media), Screen Digest Ltd, CMS Hasche Sigle, Goldmedia Gmbh, Rightscom Ltd, October 2006

[23] There is a distribution chain for movies: they will be first shown in movie theatres, then printed on DVD and only then broadcast.

[24] Usually, movies are first shown on Pay-TV and only later free-to-air.

[25] Retransmission is understood here as a copyright term only, not as a technical term; the retransmission entity can buy the technical service from another entity.

[26] Called "secondary transmissions" by USC in the US.

- Mobile operator for streaming a channel with original programme rights via the mobile network,
- Mobile broadcast service provider for retransmitting a channel with original programme rights in a DVB-H network,
- Broadcaster retransmitting a programme from another broadcaster that owns original programme rights

This entity can buy (easy one stop shopping) copyrights from a national collecting society (e.g. in Finland these international TV programme rights are in Kopiosto and music rights are in Teosto).

National collecting societies hand over the remuneration to each of those countries' copyright associations who pay, for example, the studios. So, studios normally get the copyright remuneration either from original programme rights owners or from collecting societies for retransmissions rights.

4.2.3 On-demand copyrights

On-demand copyrights are usually managed by the authors themselves. They also may be limited to specific areas.

4.2.4 Case: Broadcasting and on-demand copyrights in Germany

The German copyright law (Urheberrechtsgesetz – UrhG) differentiates:

- The *right of making available to the public*: This is the right to make a work available to the public so that members of the public may access them from a place and a time individually chosen by them (§19a UrhG)
- The *right of broadcasting*: This is the right to make a work accessible to the public by broadcasting, such as radio or television transmission, or by wire or by other similar technical devices (§20 UrhG)

In a decision of the higher regional court Stuttgart it is fixed that transmitting music as a stream in the internet is considered making music available to the public (§19 a UrhG). It is not considered broadcasting, when only the user decides on the time and the duration of the access and the demand and no permanent programme is sent out.

So, in the German law, making available to the public and broadcasting are different rights and should be agreed upon separately with the rights owners.

4.2.5 Case: Bundesliga football rights in Germany

The ownerships of the Bundesliga football original programme rights (broadcast are widespread:

The **live Pay-TV** rights for all games were licensed to the pay-TV broadcaster Premiere.

The public broadcaster ARD got a licence for **free-to-air summaries** of the games on Saturday after 6:30 PM and Sunday after 9:45 PM. The other public broadcaster ZDF may broadcast summaries on Saturday after 10 PM.

Deutsche Telekom got the license for **IPTV** and **mobile TV**. On this basis Deutsche Telekom provides a paid IPTV package and T-Mobile provides its also paid “Bundesliga Total” package.

Premiere is the license holder for **web TV**.

The on-demand rights are licensed on a network infrastructure basis.

4.2.6 Case: No content licenses for streaming of existing channels in Austria

Due to a decision of the High Court, in Austria streaming of existing TV channels by a mobile operator is considered the same as retransmission of this channel within a cable network. Therefore, no special original content licensing of mobile TV is necessary by the mobile operator.

However, meanwhile the Austrian Federal Organisation of Telecommunications and broadcasting companies have signed agreements with the collecting societies regarding license fees for mobile TV retransmission.

5 Business model considerations

The business models of the described services are quite different.

- The public broadcasters as BBC, ARD or ZDF finance their wide-spread online and mobile activities by the public fee based on the arguments that they should be present also in the new media. In July 2009 the European Commission has set new rules for their online presence.
- The online and mobile presence of brands like Red Bull and PCWelt support their core business and is not designed to generate (substantial) direct revenues.
- Service providers as H3G, Swisscom or 3 Austria may use barker channels and service bundling to support the core business of service provisioning and generate advertising revenues.
- MNOs provide audio-visual content (e.g. media centres) as part of their entertainment packages. They are usually partly for free, partly charged as extra services or bundles with other voice or data services.
- E-book services seek to up-sell books and should cover both the content and transmission costs. As the user is interested in a fixed pricing for a book including the transmission, it should be either part of the data plan or there should be a wholesale price for the delivery by the operators. [27] [28]
- E-newspaper services in the beginning might be for free supporting the print and online versions, but it would be hard to introduce paid services in a second step.
- Many specialized service providers (e.g. DailyMe TV) provide audio-visual content from a lot of sources, e.g. a collection of broadcast channels. The business model here is either paid by subscriptions or advertising based. Both models have to gather a mass audience to be successful. Content rights clearing is essential for such services, as shows the Zatoo case forced to stop access to some movies.
- The iTunes Store initially was designed for up-selling music for iPods. Now it is a general store for music, movies, television shows, music videos, podcasts, applications, and video games. On the one hand, it supports up-selling of devices and content/apps in its own sector (iPod, iPhone). On the other hand, it provides content outside its own sector

[27] In Germany, the kindle service has not been launched so far. Reports say that the German MNOs were asking for more for the wholesale service than Amazon was willing to give.

[28] A similar problem has been reported on the provision of content for the BBC iPlayer. So far BBC does not pay for the wholesale service of the MNOs, but the traffic has reached a considerable part of the overall data traffic of the mobile networks. So they raised the question of who is going to pay, as they have to extend their infrastructure.

for PCs and mobile phones. The content and applications are partly for free, partly paid.

In Q2/09 iTunes Store sales, iPod services, and Apple-branded and third-party iPod accessories generated revenue of over 1 Billion $ which is about 60% of iPod sales revenue in the same period.

- Special made for mobile channels are usually provided by existing content or service providers for convergence of content and service provision.
- The flexible mobile broadcast channel bouquet may help operators to economize network investments.
- Most of the described seamless service in the home environment can be realized based on user-owned devices. So only the device industry may generate revenues with corresponding device features.

To conclude, the business models of mobile services for seamless audio-visual content consumption do not differ from the models of the underlying services in most cases. But they may provide opportunities for a more extensive service usage and content consumption, contributing to the objectives of the service providers.

Furthermore, additional service revenues (bundling), upstream revenues (inter-activity), customer intimacy, cross fertilisation and cross marketing are aspects to be observed when implementing mobile service for seamless audio-visual content consumption.

On the bmcoforum work item "Generic business models"

Since 2006, the **bmco**forum work item "Generic business models" has published a series of studies on business model relates issues:

- Mobile Broadcast Business Models – A State of the Art Study, November 2006,
- The Status of National Licensing Frameworks for Mobile TV, March 2008,
- Best Practice Regulatory Frameworks for Mobile TV, June 2008,
- Mobile Broadcast Business Models - Generic Business Models and Country-specific Implementations, September 2008,
- Mobile Broadcast Business Models - With latest status and new countries addressed, Update February 2009.

Analyzing business model issues of seamless content and services consumption on mobile devices is in line with the extended **bmco**forum objective addressing the use of personal mobile devices in delivering relevant audiovisual content and services wherever, whenever by the best delivery channel.

Furthermore, the work item will continue to study the implementation of commercial business models for mobile broadcasting TV worldwide.

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Broadcast_Mobile_Convergence

Mobile Services for Seamless Audio-Visual Content Consumption

Services Examples and Business Model Considerations

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