EBU **TECHNICAL**

HBB television
Hybrid Broadcast Broadband TV – EBU Requirements

Joint EBU/ETSI Workshop, 9 September 2009

Franc Kozamernik

European Broadcasting Union

EBU·UER

Disclaimer 1

In this presentation we draw a distinguish between HBB television and HbbTV

HBB television or simply HBB: generic usage

"HBB is a content distribution platform for signalling, transport and presentation of enhanced and interactive television services and related applications designed for using both a broadcast and internet networks and is running on hybrid terminals that include both a broadcast and internet connection."

HbbTV: a specific instance of HBB television

HbbTV is being developed and promoted by an industry-led consortium including IRT, APS, ANT, Philips, OpenTV and French HD Forum. In August 2009, version 0.8 of HbbTV specification was released.

Disclaimer 2

In this presentation we only address the most important high-level issues and we do not plan to enter the technical details and solutions.

Example: We will not discuss whether the presentation engine should be browser based or JavaScript based or indeed a combination of the two.

The word “Hybrid”

Compare hybrid TV with a hybrid combustion/electric car (i.e. Toyota Prius)

“Hybrid” is also used in “hybrid networks” (main tx + gap fillers, CDN + P2P)

Hybrid user terminals **(or hybrid CE devices) refer to a combination of a conventional DVB tuner *and* broadband connectivity (wired or wireless) with an associated internet browser, in the same television or STB device.**

- Hybrid user terminals are being used by today’s internet TV services like Net TV, VieraCast, Internet@TV, etc.

Hybrid services **combine a mainstream broadcast (TV or radio) channel *and* some broadcast-related or broadcast-independent services delivered over the broadband network.**

- Examples: on-demand and catch up TV, enhanced teletext, local news, weather reports, stock exchange, etc. These applications may be signaled via broadcast and/or broadband channels.

Hybrid content **refers to a programme item that consists of components received from the broadcast channel *and* broadband (internet) in order to constitute an editorially consistent whole.**

- The broadband components may be co-timed or not with the mainstream broadcast programme.

EBU's role

In the technical area the EBU provides impartial advice to the broadcast industry about the merits of different broadcast developments and adopts the relevant Recommendations

Facilitate the understanding of different broadcast technologies and perform the necessary research and development

Collaborate with other constituencies, industry groupings and research projects

Drive harmonisation of the various broadcast technologies meeting the following principles:

- **Required by the market and are useful for end users at a given time**
- **Simple, user-friendly and cost - efficient**
- **Horizontal market rather than vendor specific or proprietary**
- **TV centric**
- **Avoids re-inventing the wheel and technology duplication**
- **Support a variety of services and business models**
- **Tries to integrate the specific legacy environments (backwards compatibility)**
- **Evolutionary and future proof**

EBU's reset button is HBB television – Why?

Take the best of each delivery:

- Broadcast is good for massive live events and high quality professional content (HDTV, 3D)
- Internet is good for on-demand, catch up TV, personalised services, individual search for content, audience tracking, social networking, consumer relationship and monetising of content

Two reasons for moving to hybrid:

- Business model: Internet delivery is based on GB delivered – content provider is a victim of his success
- Technical: Internet alone is not able to deliver HDTV to 300 million people in the same time (as is required for Eurovision Song Contest) – it requires broadcast support.

Hybrid does not mean that the YouTube style videos of skateboarding dogs will prevail. On the contrary, professional content which is intrinsic to traditional broadcasting should now be extended to online services

What the EBU has done on HBB

EBU Members have elected HBB as one of the essential strategic objectives for EBU members in the near term.

A two-track approach:

Strategic/political/business matters: EBU "HBB Task Force"

- **EBU Recommendation R127 "Television in a Hybrid Broadcast Broadband environment"**
- **Efforts to harmonize different HBB television approaches**

The EBU Project Group D/WMT (Web Media Technologies)

- **Technical contributions to HbbTV specification**
- **Draft EBU Requirements on HBB television**
- **Technical demonstrations of different HBB systems and in-depth analyses**

EBU Commercial Requirements on HBB television

1. **General requirements**
2. **System-related requirements**
3. **Content-related requirements**
4. **Services-related requirements**
5. **Delivery-related requirements**
6. **CE devices-related requirements**
7. **End user-related requirements**

SWOT analysis:

- **Strengths**
- **Weaknesses**
- **Opportunities**
- **Threats**

EBU Requirements on HBB – General

1. **Broadcasters want to re-establish a direct relationship with the end user and want to use the internet to provide catch-up services (like iPlayer) and other services directly to them.**
2. **HBB should enable the provision of enhanced features where broadcast and broadband services and content are suitably combined.**
3. **Minimum core functionalities/capabilities as well as higher level extensions shall be defined as mandatory and/or optional ones.**
4. **European broadcasters and CE manufacturers should agree on an implementation roadmap indicating which functionalities/features should be implemented**
5. **HBB shall be rolled out on the horizontal market for CE devices.**
6. **The HBB system shall be agreed at pan-European level as an open (non-proprietary) standard adopted by ETSI.**
7. **HBB shall permit rolling out any business models including free-to-air (FTA), pay-TV, pay-per-view (PPV), premium content offer, special events, etc. for both linear and non-linear content.**
8. **IPR and patent issues shall be resolved prior to rolling out the HBB services**

EBU Requirements on HBB – System related

1. **Technical solutions shall be as simple as possible, so that HBB time-to-market could be as short as possible (one year maximum).**
2. **HBB technical specification shall be a subset of the existing broadcast-related international standards/specifications, such as Open IPTV Forum, DVB, UPnP, DLNA, W3C, IETF, etc.**
3. **The HBB system shall support, wherever possible, conventional audio/video codecs and containers that are already part of existing broadcast specifications.**
4. **The HBB system architecture shall be layered logically in distinct functional blocks (modules), in order to allow for some flexibility in design and avoid interdependence of layers**
5. **HBB shall be able to support – at some stage - some advanced features such as adaptive HTTP streaming, enhanced video graphics and multiple media components.**
6. **Similarly to today's connected iDTV sets, HBB should enable standalone internet (no broadcast channel) services.**

EBU Requirements on HBB – Content related

1. **Broadcasters should be committed to develop innovative interactive HBB contents in order to attract the existing and new audiences to use the new HBB services.**
2. **The TV stations must have an exclusive control on the content and services that are super-imposed (totally or partially) on or around their broadcast services according to the principles of editorial integrity.**
3. **Interactive content produced by broadcasters shall be signalled within the broadcast audio-visual stream, where practicable.**
4. **As broadcasters are responsible for the coherence of TV experience and they must be the only parties entitled to enrich their programmes.**
5. **HBB should permit the users to upload and publish their content (UGC).**
6. **Broadcasters shall remain responsible for ensuring that the content-related regulatory constraints in force are respected and that the rights of the copyright owners are respected.**
7. **The broadcasters and content providers should be able to adjust their production facilities, technical equipments and workflows for creating the interactive HBB content and services.**

EBU Requirements on HBB – Services related

1. **The broadcast brands and logos embedded in the content to identify content owner shall remain visible to the end user.**
2. **Broadcasters' services delivered via the broadband channel, shall be available via a broadcast service portal.**
3. **If required, Internet TV services would match the coverage area of, say, a terrestrial broadcast, offering local news, local weather reports, local traffic reports and local sport results.**
4. **HBB should allow for personalised, targeted-group and localised services.**
5. **In those countries where middleware systems are in operational usage on broadcast channels, the introduction of HBB shall not cause the discontinuation of these services.**
6. **HBB shall be able to offer an alternative to some broadcast API technologies, principally in countries where no interactive broadcast legacy is available.**
7. **Audience research and tracking of audience behaviour possible.**

EBU Requirements on HBB – Delivery related

1. **Broadband HBB services shall meet the requirements for mass audiences (typically measured in millions of concurrent viewers) that are usually encountered in the broadcast world.**
2. **The HBB system (particularly its broadband portion) should cope with flash crowds which may occur in the beginning of live events when several thousands of users send requests to the server.**
3. **Synchronisation between various service components shall be required. Severe sync problems may arise if some service components travel via broadcast chain and some other components via broadband chain.**
4. **Distribution costs should be closely monitored and should be kept low.**
5. **Home network connectivity both wired and wireless should be enabled.**
6. **In future, connectivity to IMS will be required.**

EBU Requirements on HBB – CE devices related

1. **The same CE device shall be used for any HBB TV compatible services. National variations should be acknowledged but minimised if possible.**
2. **Given economy of scale and mass market production, we expect that incremental cost for the HBB internet-enabled end user devices should be minimal.**
3. **All HBB television services shall be available with the help of a remote control and displayable on a large flat screen.**
4. **Depending on national broadcast requirements, broadband HBB applications provided by broadcasters should be accessible via a dedicated or re-configurable button on remote control.**
5. **HBB browsers shall support the functionalities required for implementing a range of possible "red button" applications and services proposed by broadcasters.**
6. **HBB device shall be expandable and upgradable, in order to be future-proof and could embrace new features and content formats in the future.**

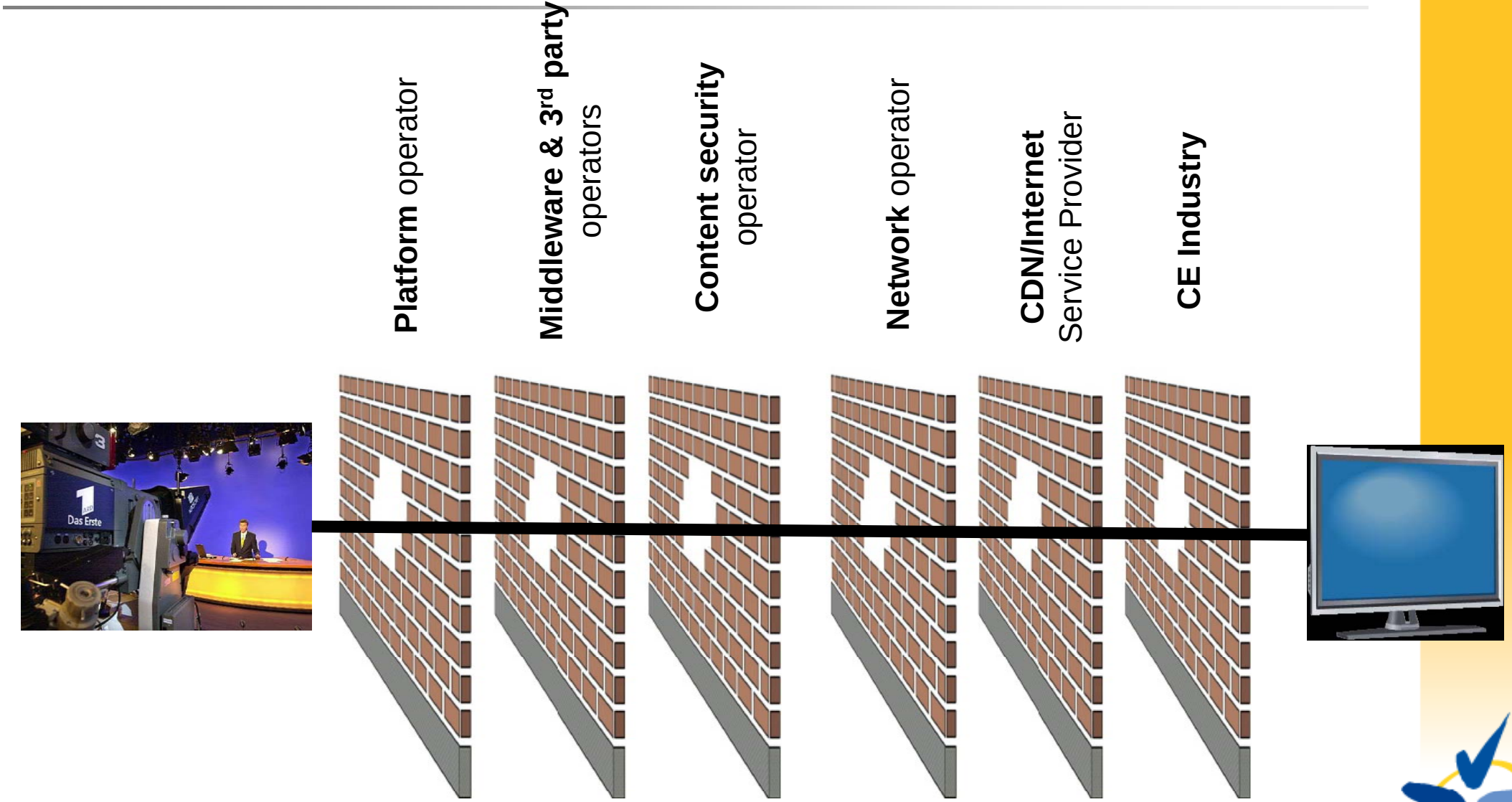
EBU Requirements on HBB – end user related

1. **The use of broadcast and broadband channels should be transparent to the user – the user does not mind how the content reaches him.**
2. **HBB shall allow the users to use the system functions in a user-friendly, intuitive manner .**
3. **HBB shall allow the users to find, organize, schedule and record TV shows, including single episodes and series taking into account broadcast and broadband content.**
4. **Users should be able to enter any web URLs using a remote control, and render their content on TV. Such webs may be related or unrelated to the broadcast and manufacturer portals.**
5. **Saving visited URL/portals (e.g., bookmarks, favourites) shall be possible for the users.**
6. **When content is recorded for private copying or time shifting purposes, links to information shall also be recorded or relevant web pages shall be stored alongside content.**

Services delivered by HBB television via the **Internet**

Related to broadcast channel – non time sensitive	• Catch up TV (channel content – deferred) • Archive TV
Related to broadcast channel content – time sensitive	• Related textual information (captions, subtitles) • Related video clips (Picture-in-Picture) • Related signing (for hearing impaired) • Related audio description (for visual impaired)
Unrelated to broadcast channel but provided by broadcaster	• Teletext (analogue or digital)
Unrelated to broadcast channel	• Arbitrary URL (e.g. Hulu, YouTube)

Gatekeepers



Some specific non-technical issues related to HBB

- The Audio-Visual Media Directive status
- Telecom Package status
- Net neutrality
- Privacy and user data protection
- Content security (DRM)
- Geolocation
- Linear versus On-demand
- Advertising rules
- Must-carry rules
- Content originator rules
- Competition and business models

HbbTV - a specific HBB television solution

HbbTV is an industry led initiative.

It represents one solution but it is not the only one. Its specification is now almost completed and will shortly be submitted to the ETSI standardisation process.

The EBU members have been able to comment on the draft specification and a large majority of our comments have been taken into account

We look forward to a smooth standardisation process and quick adoption of the HbbTV standard.

HbbTV largely satisfies the service and system EBU's requirements

We appreciate that HbbTV has adopted a simple, pragmatic evolutionary (step-by-step) approach and does not seek over-complex solutions from the very beginning.

However, the question is whether HbbTV will enjoy sufficient support from all players and all regions.

Common HBB solution for Europe

Currently, several Internet TV and HBB television systems are being considered

Several standardisation bodies are involved:

- Open IPTV Forum
- ETSI MCD
- W3C
- IETF
- CEA
- HBBTV industry partnership and
- DVB - MHP

Many legacy approaches concerning content security, middleware, APIs and metadata are available.

HbbTV consortium and Project Canvas are currently engaging in "tentative" dialog about combining their respective efforts. HbbTV is intending to submit comments to the BBC Trust.

The EBU welcomes the opportunity to embrace the Canvas requirements to create a truly pan-European specification for hybrid broadcast/broadband TV.

Is HBB an intermediate step or an ultimate solution ?

HBB television represents a quick and simple route for broadcasters to offer value-added non-linear (on-demand) services to their viewers in order to enhance their fidelity and trust.

All components of HBB are readily available, stable and well defined.

HBB television is backwards compatible with conventional broadcasts.

Broadcast component of HBB television provide for QoS and high bandwidth

Internet component is complementary to broadcast and will primarily provide the interactive, on-demand services and possibly signalling.

Stand-alone internet will expand in the direction of long tail and niche services.

The stand-alone internet future is uncertain – large scale internet delivery can be destabilized due to varying business models, lack of legal and regulatory arrangements, malware, and infrastructure deficiencies.

HBB television is likely to become a mainstream TV service and is here to stay for long.

SWOT Analysis - Strengths

- **Backwards compatibility with the existing terrestrial, satellite, cable and IPTV broadcasting (e.g. existing end user devices will not be disenfranchised)**
- **Evolutionary extension of traditional linear broadcast (adding minimal complexity) to embrace non-linear (on-demand) content delivery**
- **Reusing the exisiting broadcast infrastructure (i.e. no new investments in the delivery infrastructure is required)**
- **A range of new interactive applications and services possible (e.g. enhanced teletext, picture in picture, additional content shown on the same display, etc)**
- **New business models (in addition to free-to-air): pay TV, pay-per-view, premium content, archive download)**
- **Possibility to re-use some of the processes and workflows already adopted for the web publishing – integrated production possibilities**
- **Scalability – compared to pure internet TV, much larger numbers of concurrent users could be achieved**
- **Some interactive services could be available by using legacy middleware.**

SWOT Analysis - Weaknesses

Relatively low quality of some new broadband services (at least initially):

- **limited background (web applications mainly developed for PC and not for TV set)**
- **limited fonts and graphics**

New expertise and new workflows will be required by broadcasters (hybrid BC/BB services are neither pure web nor pure TV but a combination of the two)

SSignificant investment in promotion to the end-users in order to raise awareness will be required

Broadcasters have limited impact in mandating broadcasters' "own" standards

Limited premium contents (production investments required)

Costs/investments related to the implementation aspects

Initially scarce diffusion of the horizontal HBBTV devices (only a "niche market") inadequate to the economic sustainability of the initiative

Ownership of the end user will be split between broadcaster and CE manufacturer

SWOT Analysis – Opportunities (1)

Extension of broadcast market, new audiences could be attracted

Horizontal solution for consumers (i.e. a single end device could serve all service providers)

Horizontal solution for content production (the same production facilities, metadata schemas, codecs and formats could be reused for all service providers)

Bringing typical IPTV strengths to TV set

- **High-quality broadcast content offer for massive audiences**
- **Embracing digital production and flexibility in aggregating contents in new formats including HDTV and 3D**
- **True user interactivity**
- **Users' profiling and personalization**
- **Brand and EPG control**
- **Targeted advertising**
- **Building user communities**

New revenue models, especially for on-demand services

SWOT Analysis – Opportunities (2)

- **Value-added and creative content development opportunities**
- **Delivery of niche content (long tail) for minorities, specialist audiences and people with disabilities**
- **Personalised and interactive tutoring, teaching, coaching**
- **Specific governmental and medical services**
- **Potential for seamless (user-transparent) software upgrading of end devices**
- **Potential for UGC (user generated content, citizen journalism)**
- **Later: integration with home networks and mobile services (IMS, NGN, etc)**

SWOT Analysis – Threats (1)

- **Mature service penetration of commercial vendor-specific Internet TV solutions (such as Philips, Samsung, Panasonic, Sony, Sharp, etc) at the moment when HBB services are being introduced**
- **Lack of a clear roadmap for rolling out the Hybrid BC/BB services in different countries**
- **Digital divide: limited broadband coverage (i.e. no broadband connectivity available country-wide)**
- **Lack of agreement among the actors in the value chain as to who "owns" the end-user**
- **Complex operation, user unfriendly CE devices (e.g. too many buttons on the Remote Control, non-intuitive solutions)**
- **Too costly CE devices on the consumer market**
- **Spreading of solutions that allow the users to access the Internet, in an unrestrained way**
- **Potential lack of technical standards and lack of benchmark trials**

SWOT Analysis – Threats (2)

- **Competition from (one the one hand) managed IPTV and (on the other hand) open web TV solutions (multimedia content via PC)**
- **Unresolved IPR issues (particularly “submarine” patents)**
- **Malware and viruses entering via broadband channel**
- **Various gateways that may block, filter, hamper or throttle content on its way from the playout to the end user**
- **Unclear business models (i.e. how are actors sharing profits)**
- **Lack of content protection agreements**
- **Flash crowd and scalability problem (in case of major live events).**