IP and its effects on cross-media workflows

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On the one hand, the members of a team built by experts of all media categories must be enabled to work on productions purely conceptually without focusing on any medium in special – example given: a sound engineer who has so far produced radio broadcasts must now know how to prepare the audio content for the Internet or television, which codec algorithms to use, which protocols and which detailed configurations. For the future, this can mean that a radio program is not only recorded for audio playout, but is also filmed, so that listeners can hear and watch a radio program via the station's website or its Facebook page.

On the other hand, solutions must be found to meet the varying requirements for editorial preparation, sound quality, transmission path, coding algorithm, transmission protocols, transmission security, redundancy concept or even bandwidth economy.

Having this in mind, radio stations have a clear advantage, since they record and film their entire program but only broadcast directly via IP stream. In this case, a good editorial concept is needed to make the videos for the filmed radio show as entertaining and interactive as possible. Furthermore, it is important to consider which equipment should be used for the streaming itself, the distribution of the livestreams and the archiving.

For the final switch-over to pure IP transmission of broadcast stations mainly using Satellite or FM for program distribution, due to grown infrastructure, definitely several steps are needed to be able to live cross-mediality regarding editorial conception and production.

In a first step, the media production platforms TV, radio and online can merge in conceptual contribution planning and a central content management system. The aim is to enable joint conceptual work via an integrated newsroom or news desk and to offer an archive for central access to the produced content. For these purpose, program fields that produce on the same topics but prepare them differently for each medium are suitable. This can be for example the current news, live broadcasts of sports events, concerts or events. Also, pre-produced content that can be accessed at any time, such as regional topics or contributions to knowledge and education.

In a second step these broadcasters have to face a real challenge. A fully integrated media platform (for example as a virtual server) must be implemented for the individual production fields, which guarantees an absolute interoperability of TV, radio, online and content archives. Thus, not only a central archive would be available, but the entire program would be prepared automatically for TV, radio as well as Internet and at the same time for the different transmission paths (terrestrial, satellite and IP).

What does this mean for production in practical terms?

The audio and video signal should first be produced for the medium with the highest quality demands. Signal Editing for Media with lower quality requirements must be done by using conversion programs. For this purpose, a streaming server can be used which, for example, receives an uncompressed audio signal (such as PCM), converts it for other media, regarding codec algorithms as well as transmission protocols, and outputs it to these.

In the beginning, it can be sufficient when the produced content is available within a short timeframe. However, in order to also implement cross-mediality for live production, seamless conversion should be the goal. In addition, the system should offer a number of variable parameters, e.g. for the configuration of user groups, for the scheduled distribution of content or for setting up SIP telephone directories, in order to ensure a fast connection establishment between the studios.

Once again it becomes clear that the change to IP is simply necessary to support the economic concept (time and cost optimization) of cross-mediality.

Cross-mediality in place and some comments

For several years some broadcasters and science institutions are working intensively on the topic of cross-mediality. This very clearly points out that the issue is not an eccentric or absurd idea, but the future for public and private

broadcasters.

At the German national broadcasters BR, MDR, SWR and WDR the change is already taking place step by step. For the media production platforms TV, radio and online, a news desk will be set up for conceptual program planning and a central content management system. The editors of the various programs can thus jointly discuss which issues are the most important and should take place in all distribution channels. In the case of extraordinary live events, the news desk decides which reporter will go on site and which editorial staff will coordinate him. At the same time, it is planned whether a radio or television report should be produced as well and which material is relevant for online editing.

The German national broadcaster BR organizes its editorial offices and broadcasting studios in a way that radio, television and online can work more intertwined. Radio, television and online no longer work separately; rather, all topics are planned, researched and then offered on the various playout channels right from the start, regardless of time and location. For this approach completely new buildings and workspaces are being built on the grounds of BR in Munich Freimann. The following program fields already work in cooperation with each other on a cross-media basis: sports, culture, entertainment and homeland region, knowledge and education, current affairs, as well as politics and economy. BR is also upgrading its technology: the news program "Rundschau" recently started using a real-time graphics system and camera robots, which move to their position semi-automatically.

A BR spokesman explains: "Without exaggeration, we can say that the BR is currently in the biggest reform process in history, both in terms of program composition and structurally: We are in the process of positioning ourselves completely cross-media in order to become more innovative, especially in the digital world. In the association of German national broadcasters ARD the BR is a

pioneer in the field of cross-mediality. The Bayerischer Rundfunk (national Bavarian Broadcasting station, short: BR) wants to reach all people regardless of the medium they use for the consume information, entertainment or music because the future acceptance of public broadcasters depends on this. All broadcast fee payers will be enabled to receive their information through all technical distribution channels available. Whether via our on-demand media library, via the BR24 app or on TV or radio, we must be present everywhere. We can only achieve this by fully switch over to cross-medial production."

Another pioneer is Radio Sputnik, the young program of MDR also part of association of German public broadcasters ARD. Not only the respective radio show is produced here, but in parallel a video of the show. Thus, the young target group of Radio Sputnik is able to watch their radio show on mobile devices via Internet as a video and to interact via Facebook. Mr. Jan Schmieg (managing editor of Radio Sputnik) comments as follows: "Our moderators find it easy to switch between Radio and Facebook LIVE, as we have not only been making radio for many years, but are also present on many social networks with video content. With our Morningshow moderators Kathrin and Raimund the radio show therefore continues seamlessly after the stream. Our moderators are motivated to integrate the listener into the livestream and ask questions or participate in discussions. Comments are answered on screen and feedback is taken. Our moderators appreciate the direct

contact to the audience. Technically, this means that we use three smartphones and a tablet for the livestream, from which we stream directly to Facebook via an app. By using this app we are able to cut between the individual camera settings and to show and hide graphics or animations. The sound is picked up directly from the studio microphones to avoid a loss of sound quality in the live stream.

Where are we headed to?

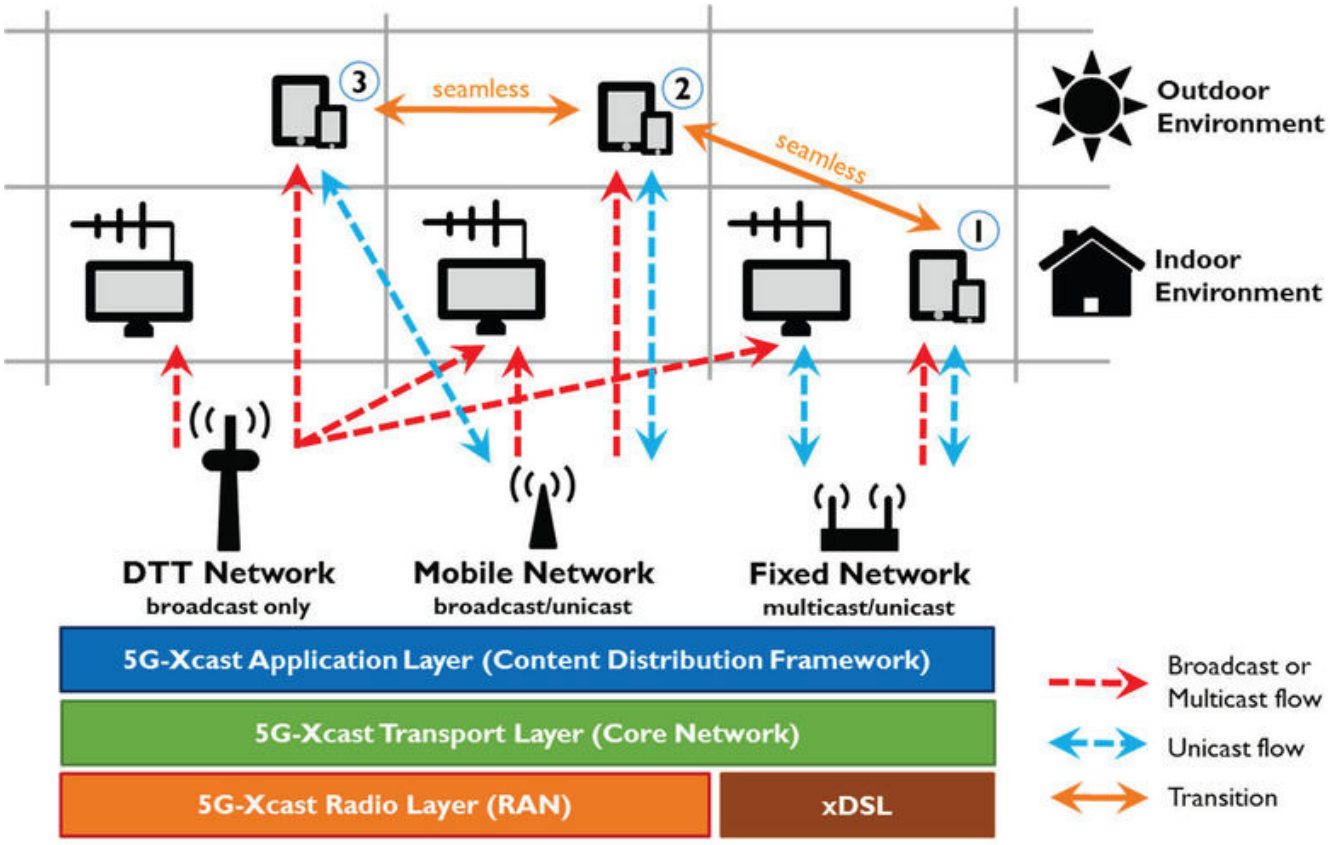

Photo: IRT Institut für Rundfunktechnik

Broadcasters themselves are demanding technologies that ensure interoperability of TV, radio, online and content archives and support the intensive cross-media roll-out. In addition, the Institute of Broadcasting Technology is involved in at least 3 Europe-wide projects that clearly support the IP transmission path:

- A major goal of the research project 5G-Xcast (Broadcast and Multicast Communication Enabler for 5G) is to establish a universal and multidirectional IP network for efficient large-scale media distribution. The project relies on dynamic switching between unicast, multicast and broadcast - and thus also enables spectrum-efficient distribution of program content to a very large number of simultaneous users when only one stream is broadcast. This would enable end users to receive live and linear content in the best possible quality from their 5G-capable devices without straining their data contingent. Currently the broadcast mode in 4G/5G is being tested in a test network with a coverage of 400 km² in the Munich area.

- As part of the ORPHEUS-Project a completely IP-based system solution for object-based audio shall be realized, which covers the whole chain from production to distribution to utilization. In the first project phase, a radio program was already implemented, with enhanced interactive functionalities such as immersive sound, controllability of foreground and background noise, language selection and use of detailed program metadata.
- The European initiative HbbTV combines the distribution of news, information and entertainment services for consumers via radio and broadband networks using IP-capable set-top boxes and televisions. More than 90% of the Smart TVs currently sold in Germany already have installed HbbTV. Appropriate applications allow the fast growing number of media contents for the end customer to be used directly on TV without any additional device. The technology used is based on market standards and Internet technologies from Open IPTV Forum (OIPF), Consumer Electronic Association (CEA), Digital Video Broadcasting (DVB) and World Wide Web Consortium (W3C). HbbTV also counteracts the fragmentation caused by the multitude of other IP-based service platforms. The first Smart TVs with the 2nd generation of HbbTV already appeared at the end of 2017. This will make new applications possible in the future, such as the coupling of a mobile terminal device or AR glasses. New features allow IP and broadcast to be interlinked even more closely, for example to be able to watch a program outside your own four walls or to take individual preferences into account (i.e. audio track in a different language, etc.).

Considering the opportunities for broadcasters, Internet providers and end users offered by the projects mentioned above, it is emphasized that we will move away from the traditional transmission paths and in the direction of "broadcast via IP". The big but: However, due to the slow expansion of broadband, the new technologies will take longer in the "dead spot areas" already mentioned and users there will not yet benefit from the changeover.