This deliverable is a report of the HRADIO Hackaton taking place from 26th to 27th Nov. 2019 at IRT in Munich. It provides a brief summary of activities and results, the event itself being the real “deliverable”. Learnings from the Hackathon are included in the HRADIO exploitation activities (see D6.4)
## Basic Information

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## Disclaimer

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EXECUTIVE SUMMARY

The project invited interested parties for a 1 ½ day event at IRT in Munich. Goal of the “Hackathon” was to show and educate the participants about the HRADIO developments, their possibilities and features as well as how to make use of them in their own projects.

20 participants registered for the Hackathon, coming from public broadcasters like Deutschlandradio or Hessischer Rundfunk, organisations such as the EBU or companies like Audi AG.

All in all, the HRADIO Hackathon was a very good opportunity to get to know the technologies and concepts of the HRADIO project and to discuss in detail with radio specialists. The discussions with the broadcaster members of the participants were fruitful in the sense that the project members had the opportunity to introduce and present the entire range of HRADIO sample and pilot applications without time pressure and tailored to the specific needs and situation of the counterpart. It became clear that the acceptance of the HRADIO use cases directly depends on the quality of the metadata and data services. For example, a song-based access to the TimeShift Buffer only makes sense if the correct metadata is also part of the broadcast signal.

The opportunity to use the applications “Hands On” over a longer period of time (not just briefly at a trade show or online demo) also allowed for objective discussions on controversial use cases such as song skipping. The discussion with participants from the developer community (Audi, BR, EBU) in turn provided valuable technical feedback on DAB over IP, OMRI and its Android implementation as well as on the JavaScript libraries.

The fact that the HRADIO libraries were previously distributed under OpenSource licenses enabled the participants to get involved with the details in advance and thus specific discussions became possible. After this long exchange, the work on new ideas could begin. In particular, “Share your Radio” was realized and demonstrated. The idea “Live Radio Transcript” lives on in IRT as a possible prototype for the implementation of radio for hearing impaired people.

One problem was the short time frame of the event. Considering the time for introductions and general discussions the interesting work could not be finished in the end. However, the feedback from the participants was very positive.
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# ABBREVIATIONS

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<tr>
<th>Acronym</th>
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<tr>
<td>DAB</td>
<td>Digital Audio Broadcasting</td>
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<td>DNS</td>
<td>Domain Name Server</td>
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<td>DRM</td>
<td>Digital Radio Mondiale</td>
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<td>EBU</td>
<td>European Broadcasting Union</td>
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<td>EPG</td>
<td>Electronic Programme Guide</td>
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<td>FM</td>
<td>Frequency modulation</td>
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<td>HTTP</td>
<td>Hyper Text Transfer Protocol</td>
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<td>IP</td>
<td>Internet Protocol</td>
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<td>RBB</td>
<td>Rundfunk Berlin-Brandenburg</td>
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<td>RDS</td>
<td>Radio Data System</td>
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<td>SSF</td>
<td>Second Screen Framework</td>
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<td>SI</td>
<td>Service Information</td>
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<td>SPI</td>
<td>Service and Programme Information</td>
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<td>TCP</td>
<td>Transmission Control Protocol</td>
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<td>VRT</td>
<td>Vlaamse Radio en Televisieomroeporganisatie</td>
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<td>VUB</td>
<td>Vrije Universiteit Brussel</td>
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1. INTRODUCTION

“A hackathon (a word created from “hack” and “marathon”) is a collaborative software and hardware development event. Alternative names are “Hack Day”, “Hackfest” and “codefest”. The goal of a hackathon is to produce useful, creative or entertaining software products together or, more generally, to find solutions to given problems within the duration of this event. Participants in software hackathons usually come from different areas of the software or hardware industry and often work on their projects in cross-functional teams. Hackathons always have a specific topic or are technology-related.” For 1 ½ day the HRADIO project invited interested parties to participate in such an event at the premises of IRT in Munich. At the same time at IRT also the WorldDAB interoperability workshop was held. This opened up the opportunity to present HRADIO project achievements to the participants. Classical hackathons usually go on for 2-3 days (usually a full weekend). The goal is the end-to-end development of an idea until it becomes a working prototype. Since the HRADIO Hackathon was only scheduled for 1 1/2 days, it was not possible to wait until the time for the full realization of ideas. Therefore, the focus was not only on the implementation of prototypes but also on the presentation and teaching of the different HRADIO technologies.

1 https://de.wikipedia.org/wiki/Hackathon
2. AGENDA AND PARTICIPANTS

“INNOVATE, BUILD and SHOW” was the motto of the HRADIO Hackathon. The ideas and invitation have been collected amongst the HRADIO project partners as well as this the EBU (member of the IAB) which has experience in the organisation of such events. EBU every year in February holds the EBU radio week including the EBU RadioHack.
HRADIO aims to leverage the potential of hybrid technology for radio. To make this happen, the project enables cost-effective and user engaging live broadcasting to be integrated with online features on mobile applications, portals, connected radios, as well as in the car. This allows broadcasters to deliver time and location independent linear radio services seamlessly linked to personalised on-demand content.

The HRADIO project in cooperation with the EBU invites developers and radio creatives to a 1½ day Hackathon to innovate and develop novel radio experiences based on the HRADIO technical solutions and the OpenDigitalRadio platform.

**Schedule:**

**26th November 2019**

09:00 Arrivals and Welcome
10:00 Presentation of HRADIO technologies, workshop infrastructure and solutions
10:30 Attendees introduction and idea pitch
11:00 Brainstorming, team setup, ideas presentation
   -- Work phase begins --

**27th November 2019**

10:00 Welcome attendees to the interoperability event WorldDAB
12:00 Presentation Hackathon projects during the interoper event
   -- End of the event around 14:00 --

The Hackathon will be free of charge including a complementary catering, though an registration is required. The number of participants is limited.

Please send an e-mail until 19th of November 2019 at: event@irt.de

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**Date & location**

Start: Tue, 26th Nov, 9:00
End: Wed, 27th Nov, 14:00
Institut für Rundfunktechnik
Floriansmühlstraße 60
80939 - Munich - GERMANY
Room: A116
www.irt.de/en/irt/directions/

**Get Together**

On the 25th of November we welcome every attendee to a little Get Together in the evening. Please let us know if you are interested in participating in your registration for the Hackathon.

**Program & organisation**

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**Figure 1: Image1: HRADIO Hackathon invitation**

For participants traveling to Munich on 25th November, IRT organised a “GetTogether” in order to get to know each other and to exchange first ideas.
On the first day, the focus was on educating participants about the ideas, the core concepts and technologies of the HRADIO developments.

After that, the goal was to brainstorm ideas, which could fit into the tight timeframe and can be developed with the help of the HRADIO project partners present in the meeting.

Finally attending were 18 representatives from:

- Audi AG
- Hessischer Rundfunk
- M-net
- Bremedia
- Bayerischer Rundfunk
- EBU
Deutschlandradio

and HRADIO partners from

- IRT
- LMU
- imec
- Konsole
3. IDEAS

1.1. LIVE RADIO TRANSCRIPT

The EBU participat proposed to make use of a HARDIO DAB-over-IP stream which could be decoded to PCM by a small Node.js server component by using the HRADIO JavaScript libraries.

The PCM samples then could be fed into a Google Speech-to-Text engine and the results could be sent out together with the original DAB-over-IP radio stream to a Player.

Challenging issue for this idea is the compensation of the time delay, which is introduced by the computation of the text stream via Google Text-to-Speech. Also challenging is the portation of the HRADIO JavaScript client libraries into a server based Node.js component. During the workshop a 1st prototype server could be implemented, however due to incompatibilities with the HRADIO JavaScript libraries and Node.js the idea, while technically feasible, could not be realized in the time frame.
SHARE YOUR RADIO

This workshop idea is based on the fact, that nearly all applications, which involve in some extent content (e.g. photos, video, chats, e-mail), allow the sharing of this content items over social networks and other communication channels. Therefore the idea seems obvious to use this concept and its mechanics also for sharing the listening in a radio application. Person A, let’s call him Bob, listens to an interesting song or an interesting contribution on the radio. He wants to share this moment with his girlfriend (Alice). Now it is not enough to simply transfer the station on which the song or article is playing encoded in a URL. Since Bob does not know when Alice will receive the message, the time aspect of the message must also be encoded. One of the core concepts in HRADIO is the realisation of time-shift radio. During the Hackathon, the technology was utilized to implement a “share” button into the HRADIO platform app, which opens the well-known “share” dialog. So if Bob decides to share, he can click and hold a radio item for a second in the UI of the radio app, the usual share dialog will come up and offer him his personal social media and messaging options to use and choosing Alice’s contact to share and send. Alice gets notified and when pressing the link, a choice can be made to open it either in a browser or in the radio app when installed.
This idea and its implementation have been demonstrated at the WorldDAB-TC meeting on 28 November.

1.3. ADDITIONAL IDEAS AND PROJECTS

Additionally the following ideas and projects were discussed and work has been started, although it could not be finished during the workshop:
**Audi AG**: For inhouse testing at Audi, an Android application exists which utilizes DAB library similar to the HRADIO OMRI implementation. Task was to take the existing sources submit them to the version control repositories and port the DAB part to the new and more powerful (DAB-over IP, Timeshift ...) OMRI library.

During the workshop the existing sources have been submitted to the code repositories and the app could be integrated into the HRADIO build system and. Due to time constraints the port to OMRI could not be finished.

**BR**: The participants from Bayerischer Rundfunk attended the workshop with the goal to learn as much as possible about the HRADIO DAB-over-IP and time shift implementations. Goal during the workshop was to use timeshifted DAB-over IP in the newly developed ARD Audiothek Website.
4. ASSESSMENT OF RESULTS

All in all, the HRADIO Hackathon was a very good opportunity to get to know the technologies and concepts of the HRADIO project and to discuss in detail with radio specialists. The discussions with the broadcaster members of the participants were fruitful in the sense that the project members had the opportunity to introduce and present the entire range of HRADIO sample and pilot applications without time pressure and tailored to the specific needs and situation of the counterpart. It became clear that the acceptance of the HRADIO use cases directly depends on the quality of the metadata and data services. For example, a song-based access to the TimeShift Buffer only makes sense if the correct metadata is also part of the broadcast signal.

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