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WESTDEUTSCHER
RUNDFUNK



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**ITU-R Workshop:
“Topics on the Future of Audio in Broadcasting”**

**Session 1:
Immersive Audio and Object based Programme
Production**

The future of illustrated sound in programme making

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02 \ Procedure of production

03 \ Layers in radio drama and radio feature
story telling

04 \ Interactivity

05 \ Consequences and Questions for
Broadcasters



01

New developments in audio



WDR®

Check – shoot – goal

Radio Feature with binaural sound elements



New developments in audio formats

Beyond 5.1-Surround Sound

About 10 years ago, the German broadcasters started with 5.1 transmissions in radio and television

in radio we still have the problem, that 5.1-content can only be distributed via transmission channels like DVB-S/C, which still isn't accepted by the audience (perhaps a communication or marketing problem?) But there are limits for production ideas, because the loudspeaker setup situation at consumers home is rarely correct.

So we have to look for ways to raise the interest for High Quality Productions on the consumer side

Even for new TV-Formats like UHD we have to reach a more realistic experience for the audio part aswell.

Immersive audio is an often used term to describe the feeling of being inside the acoustic scene

New developments in audio formats

EBU – FAR (Future Audio Formats and Renderers) + Immersive Audio

New consumption practice – Hi level consumer standards

Listening habits - great spectrum: Movie sound, game sound, home cinema, surround sound, sound bar, stereo setup, mobile device, headphone, mini speaker

The consumption of Broadcast-Content with mobile devices like Smartphones and tablets is a further challenge. Increasing number of headphone users.

The special potential of consumption via Internet and mobile media has to be considered

Especially the features of interactivity and personalization in this media will bring new challenges to the creative people in production

New developments and ideas in audio

New technologies - new ideas – discover new things

- sound quality of “new” binaural synthesis can be excellent to optimize headphone reproduction.
- current advanced head tracking systems improve immersive impression for headphones.
- head tracking technology is expected on mobile devices in future
- rendering chips on mobile devices are available
- delivering 5.1 productions in a binaural-version as download file to reach consumers
- Wavefield systems with loudspeaker-setups for reproduction in auditorium
- Mobile Devices are normally used with headphones!

Current Points of interest

Topics of radio production

1. Experience with object based production
2. discussion is open with editors, authors and directors
3. Solutions for TV – Audio, Immersive Audio and scaled receiver situation
4. What kind of audio media do broadcasters need in future?
5. Is there one basic media format to broadcast, for mobile devices and all other kinds of receiver?
Experience is necessary!
6. pros and cons have to be discussed
7. Focus on mobile devices with binaural production for optimized headphone reproduction is possible right now. Exchanging of broadcasters experiences is important.
8. Editors are enthusiastic about binaural production examples
9. Successful programme

Location Recording



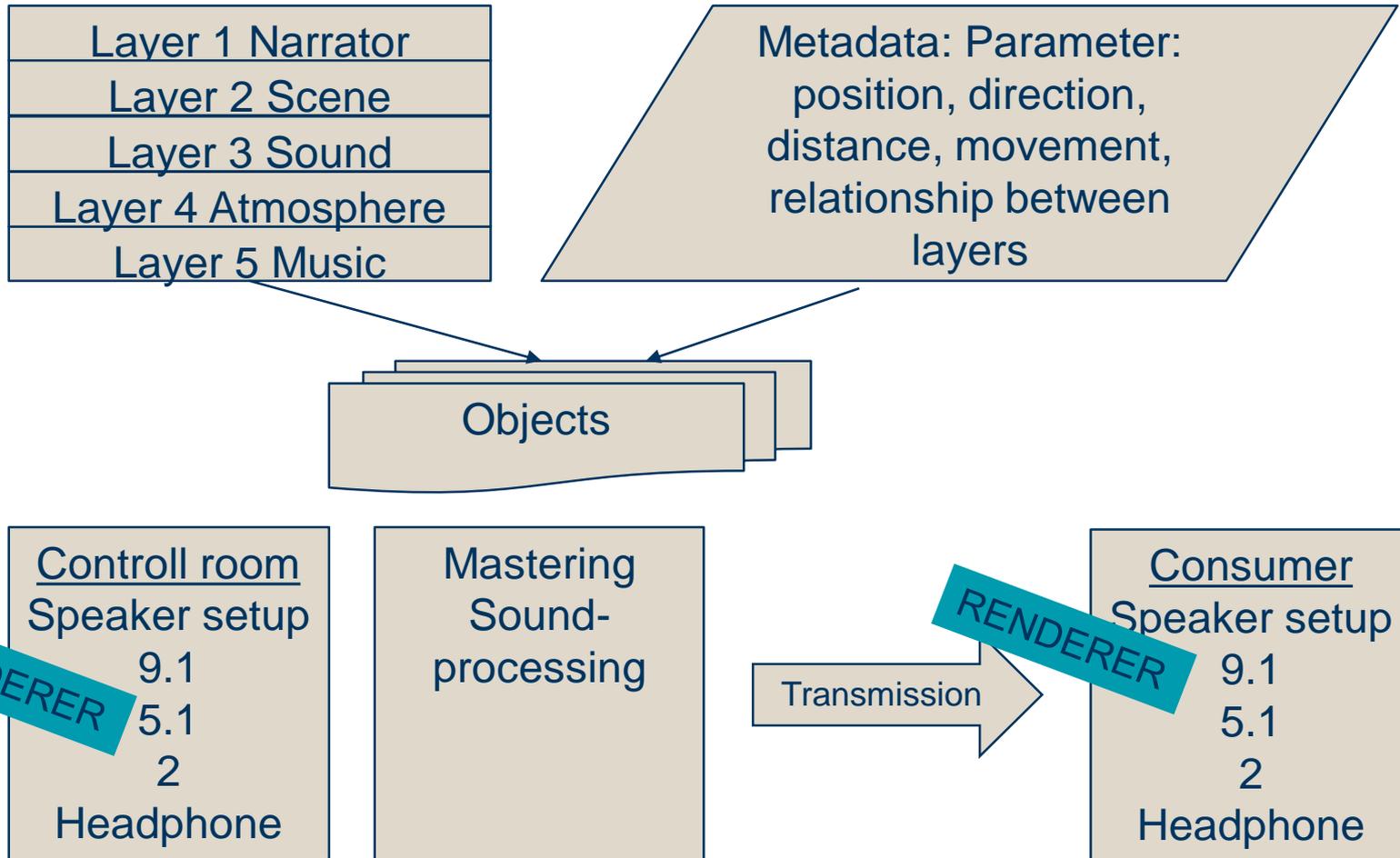
02

Procedure of production



Procedure of production

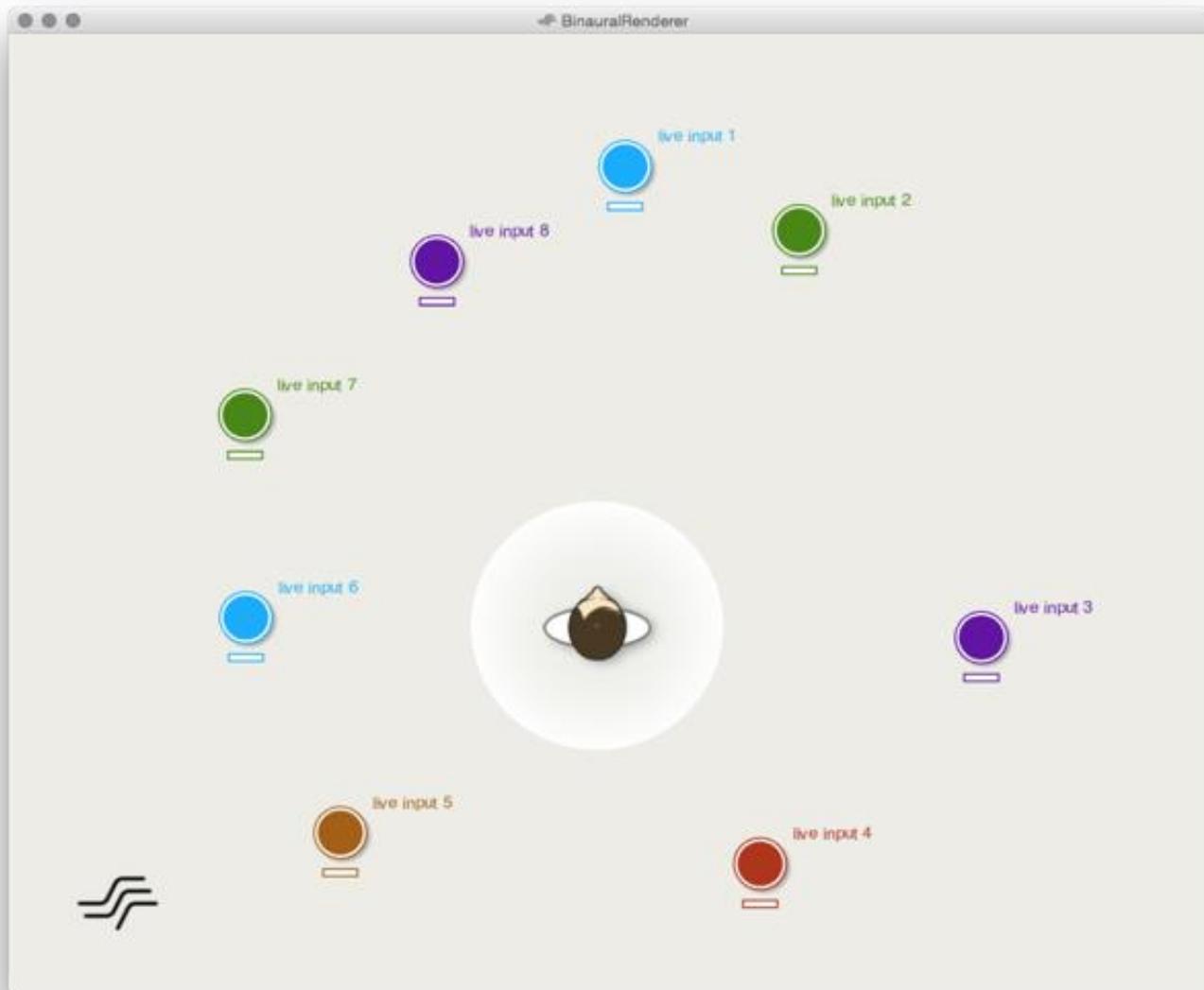
Production process chain ist not closed.



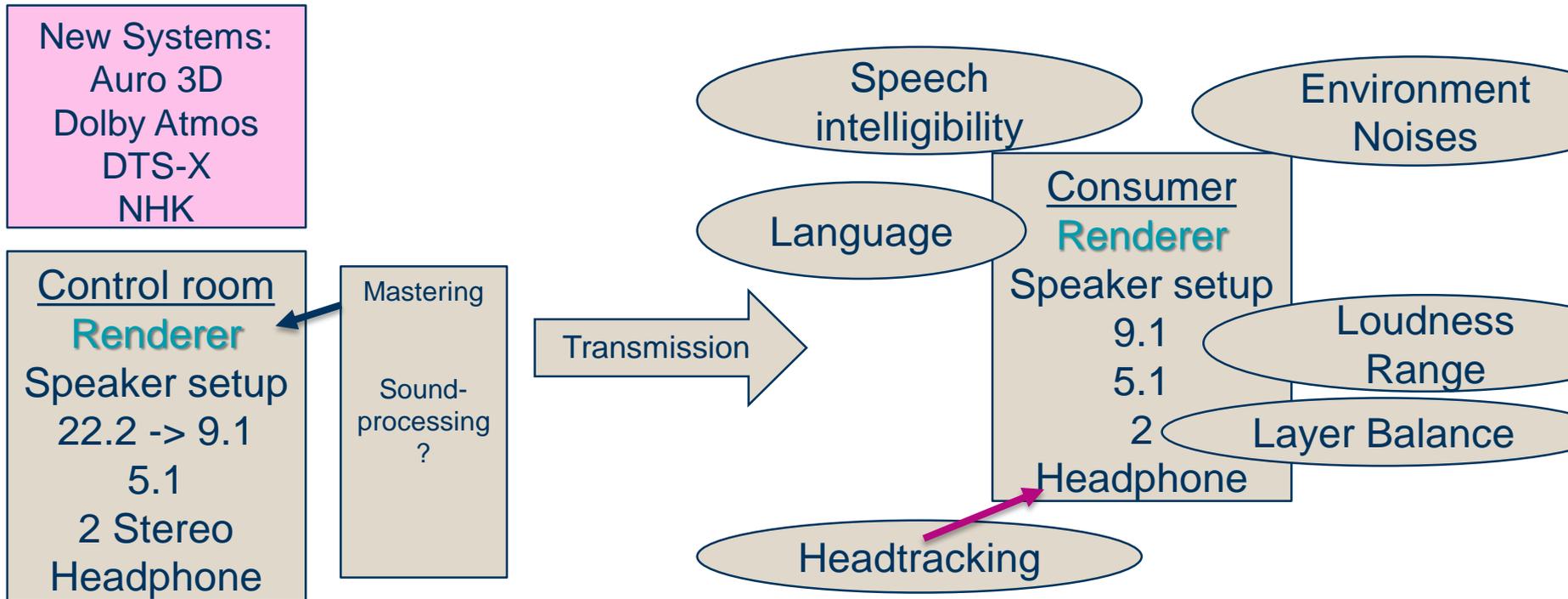
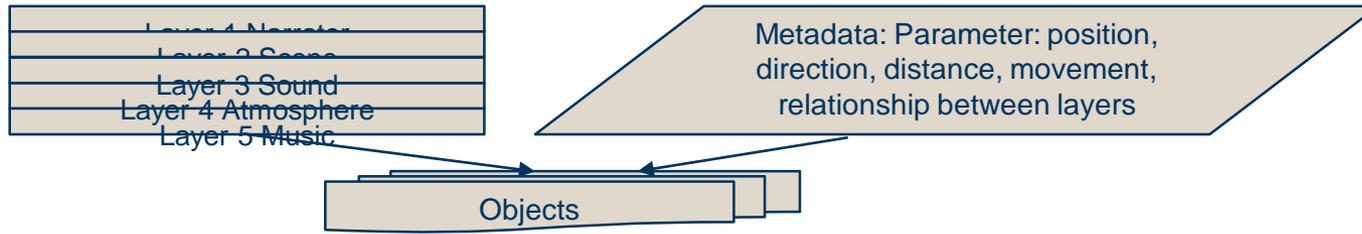
Renderer : Development – Experiments

- SoundScapeRenderer (open source project, hosted: University Rostock) used at WDR in partnership with Cologne University of Applied Sciences
- BBC Research & Development projects, renderer, 3D audio speaker systems, immersive audio over headphone, radio and tv projects ...
- RadioFrance nouvOson, streaming via internet with web access to online binaural renderer
- Institut für Rundfunktechnik, Munich, developing renderer
- Bayerischer Rundfunk, Munich, cooperation with IRT

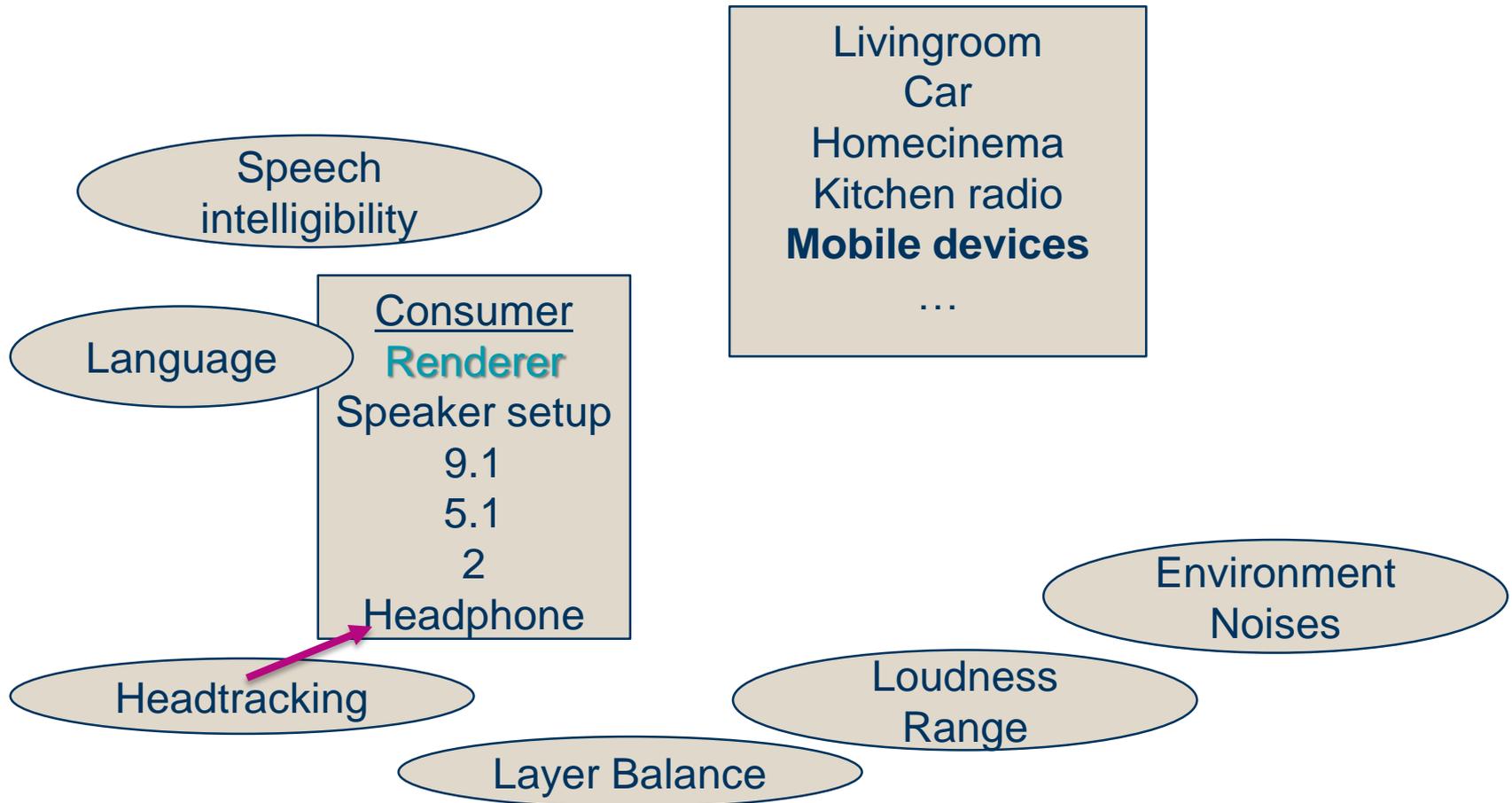
SoundScape Renderer (University Rostock)



Production process: control room to consumer

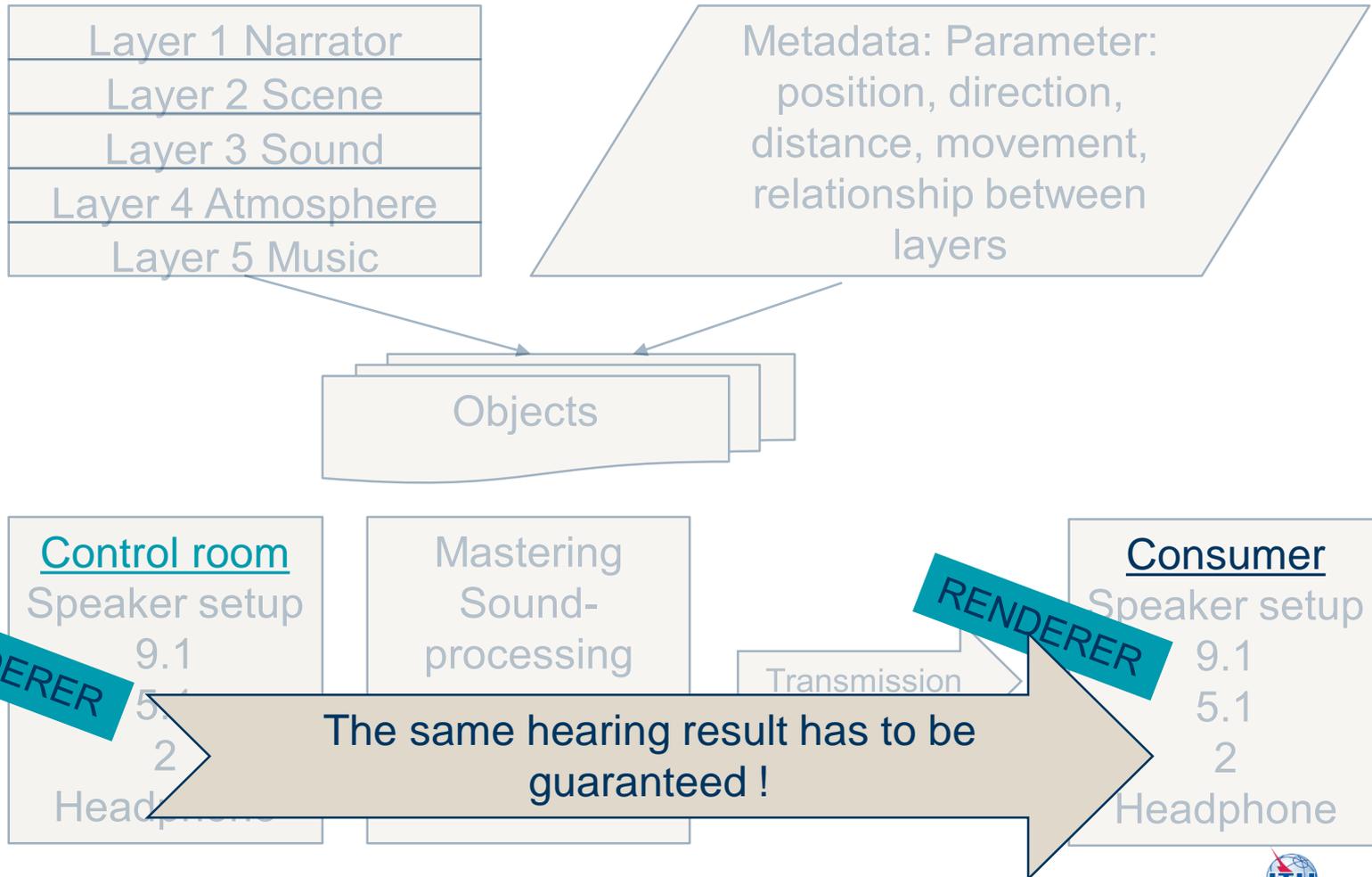


Every day use: wide range

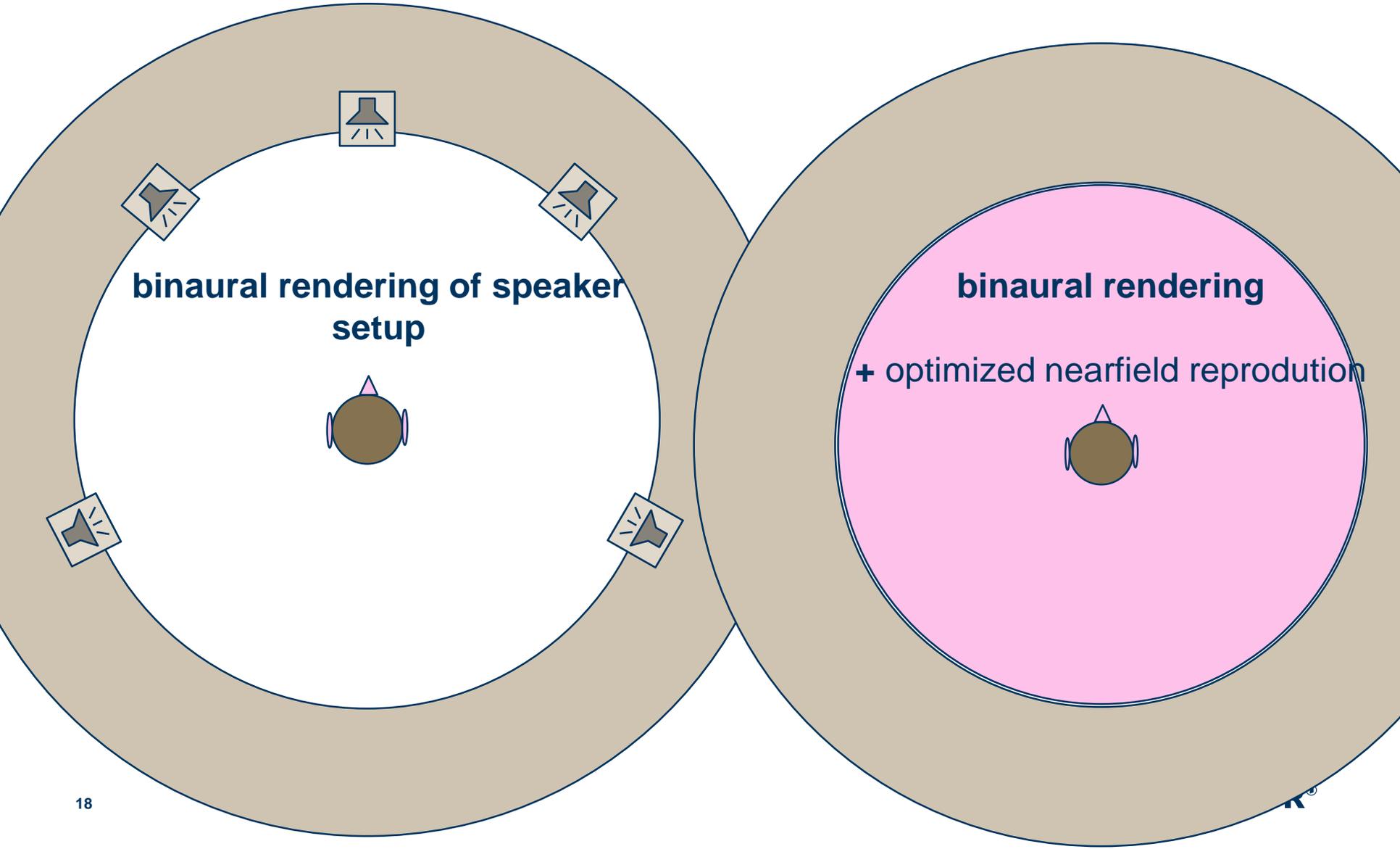


Scrutiny - Preview

Editorial Inspection or Acceptance



Renderer



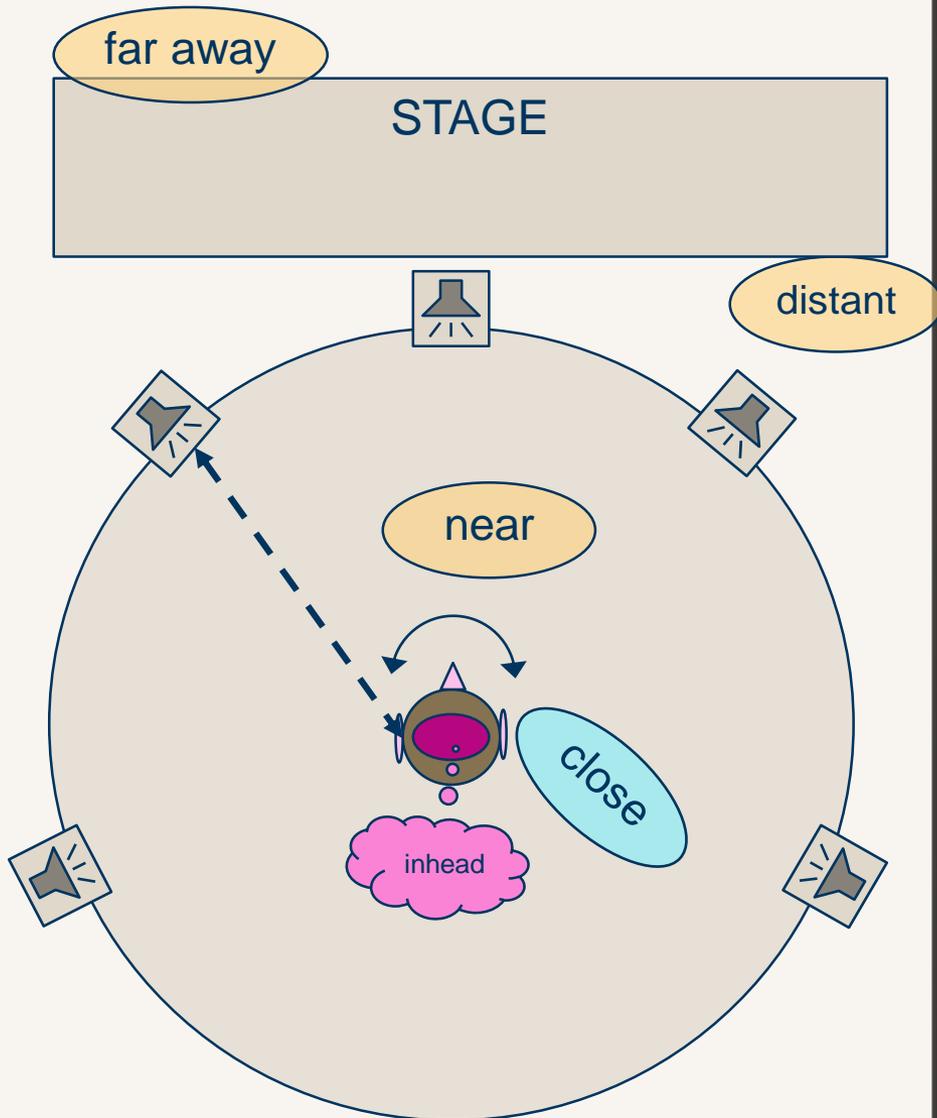
03

Layers in radio drama and radio
feature story telling



Layers in audio story telling

- distance not only for authenticity
- classic stereo as usual habit very important for music
- stage in front: for music or theater
- **Immersive audio** is an often used term to describe the feeling of being inside the acoustic scene, even more with height and depth. (Auro-3D, Dolby Atmos, DTS:X,)
- **Headphone reproduction** system has no space between ears and speaker! Binaural production for best results.



Binaural production in audio story telling (1)

Production Topics

- 360° horizontal panorama with height and depth
- wide range of distance, very close or far away
- mixing different kinds of recording or production is possible
- stage in front: for music or theater

Result

- virtual “reality”, to separate sound patterns or layers, (actors, scenes, narrator, background scene...)
- to separate sound patterns... similar to reality, very strong impression, transport of emotions ...**Immersive Audio**
- good for using traditional production tools and sound libraries, good to separate sound patterns...
- normal standard situation, additional improvement, if consumer inside of audience atmosphere ...**Immersive Audio**

Binaural production in audio story telling (2)

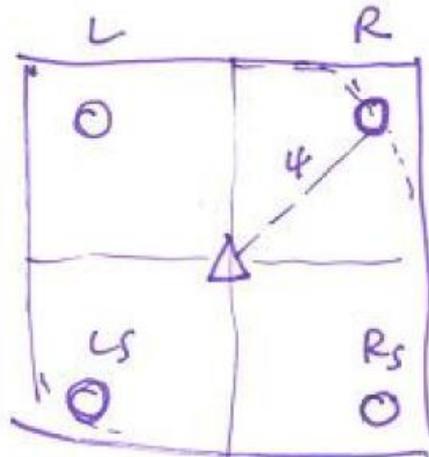
Production

- Headphone reproduction system has no space between ears and speaker! Direct binaural rendering for best results.
- small movements of sound elements or sound image

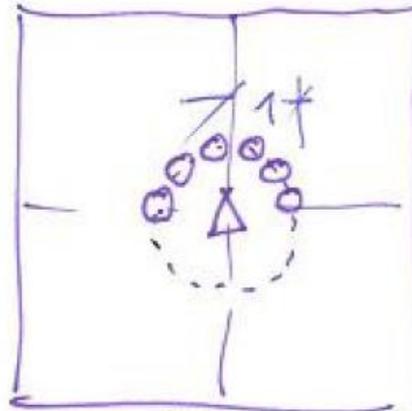
Result

- Experience in production department: much better result. Tone quality of renderer is important, especially for voices. Very sensitive topic.
- improving of “life-like” sound

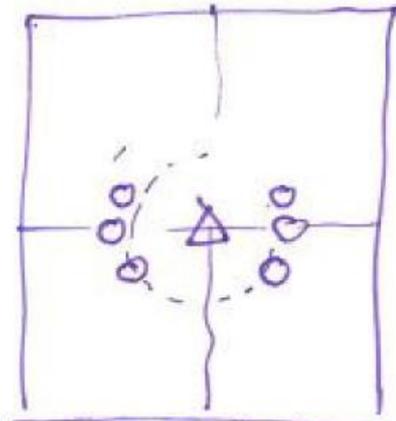
Realization: Definition: Kinds of Audio Objects



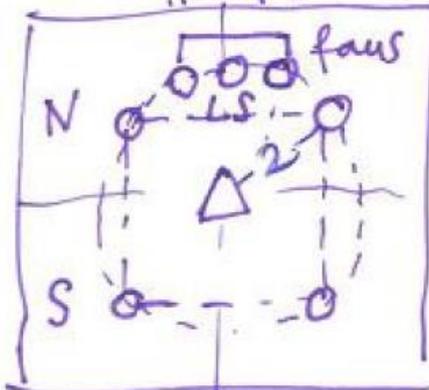
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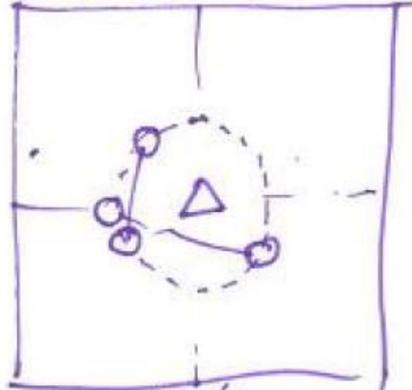
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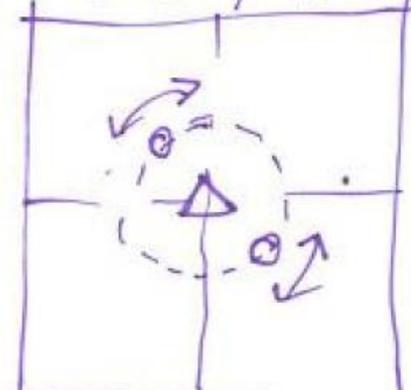
Musik/atmos fix



B Halle fix



Breaks/Delays.
mobile

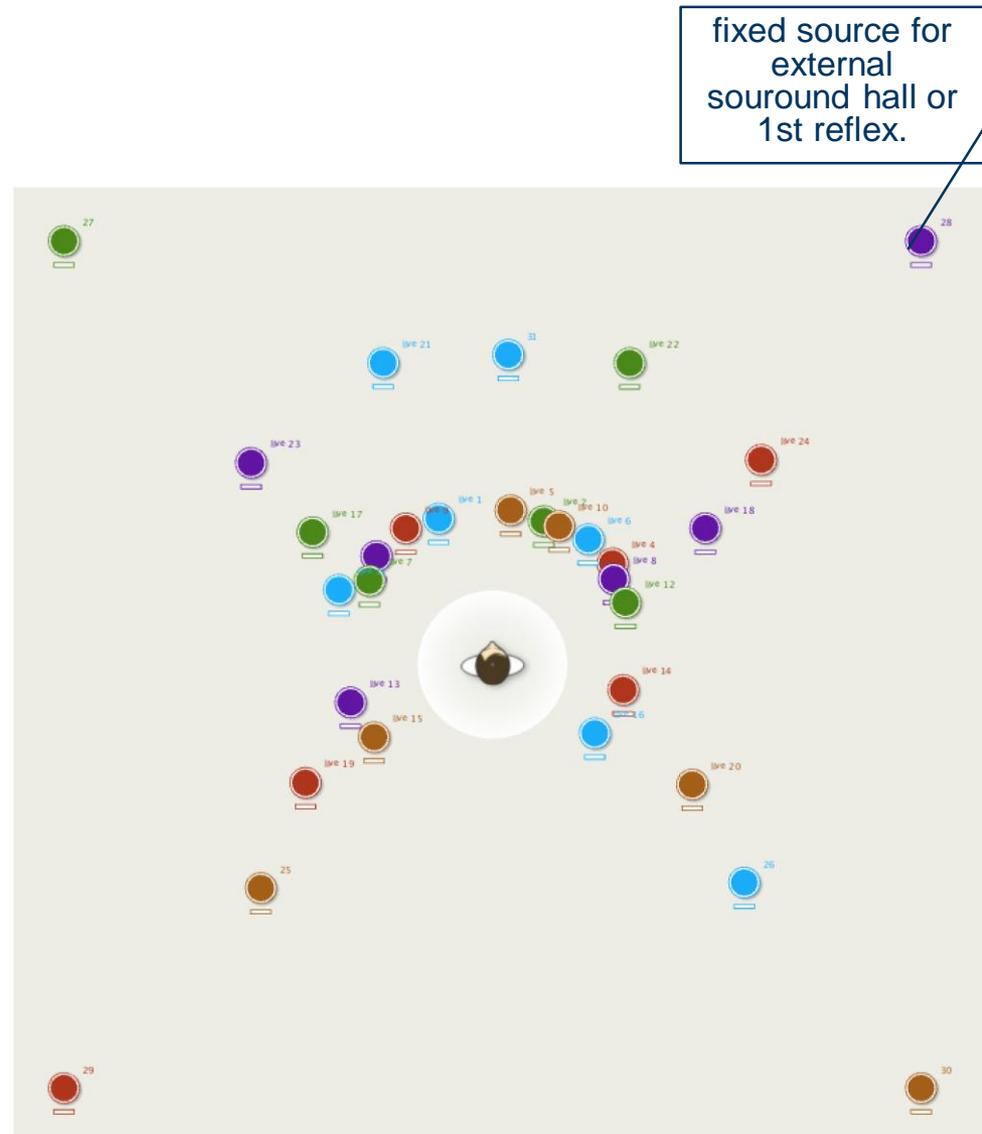


Cable guys mob.

Realization

Layers

- 30-40 objects
- fixed objects
- moving objects
- mixed with direct sound without rendering



04

Interactivity

Interactivity

Mobile devices - Internet

Interacting is normal for consumers. Screen control is standard.

- New for all programme makers.
- New for traditional broadcasters.

New possibilities:

- select chapters,
- select different streams
- select different perspectives
- select and follow a link on internet
- offer additional media content

...

Interactivity

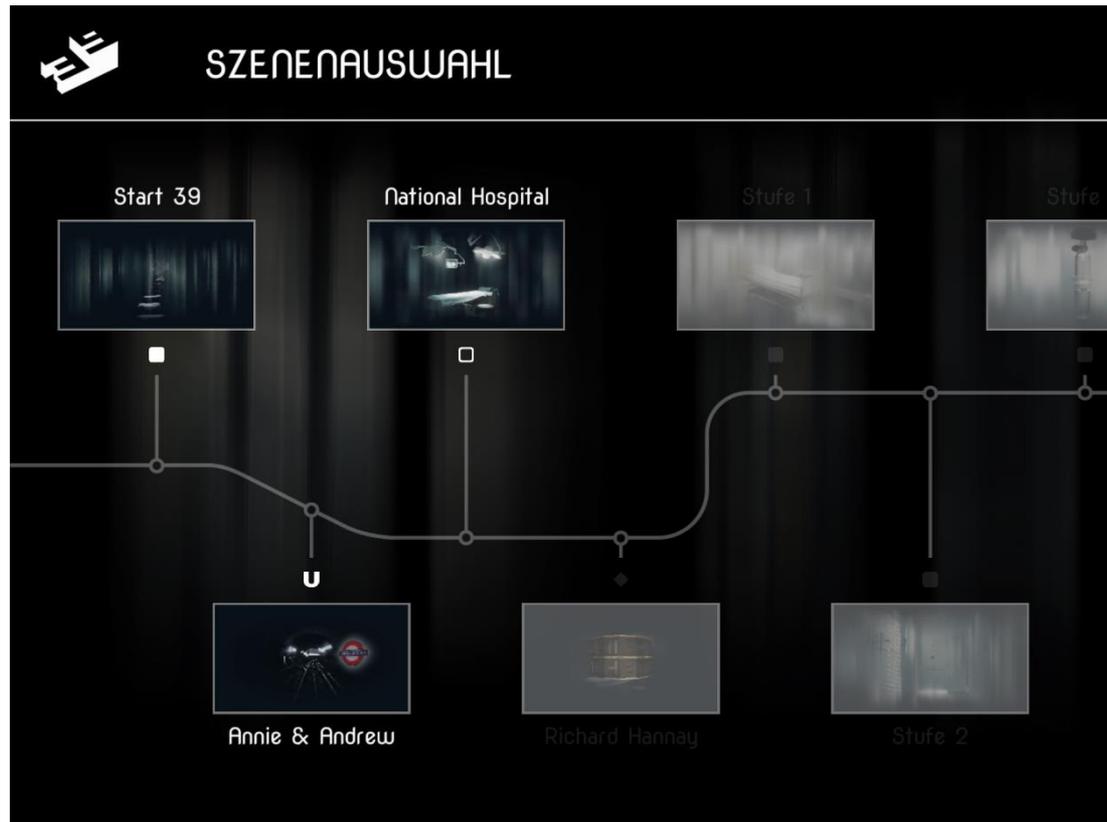
Mobile Devices – Internet – Audiogame „39“



Binaural radiodrama as „HörSpiel“ – App, an audio game

Interactivity

Mobile Devices – Internet – Audiogame



Some Topics

- game engine includes binaural renderer
- visualization
- linear story, how to integrate interactivity
- game vs. linear
- moving via screen control
- integration of dummy head recordings
- ...

05

Consequences and Questions for Broadcasters

Consequences and questions for Broadcasters

- Object based audio has a big potential to deliver an improved audio service to the customers of radio and TV broadcasters
- Ongoing experiences in radio drama and feature production group indicate a big profit in producing special binaural products
- Producing in classical production studio is possible but needs more time
Experience is necessary
- Easy usable production tools are required and have to be tested
- “Interaction” is a very complex theme: authoring, realization and developing needs extra capacity and structure, but promises big value.
- Object-based audio in production offers different optimized audio products during one editing-process, with separate mastering (5.1/stereo/binaural)
- How to “down mix” or render different versions even for traditional broadcasting?

Consequences and questions for Broadcasters

- Will it be possible to verify the different kind of mixes from the editors point of view in the broadcast houses?
- In case of broadcasting object based productions, how can we control the rendering process and how can we guarantee a good quality on multiple platforms and devices?
- Is installing a standard renderer a solution?
- Is it possible to describe a standard renderer in devices, so broadcasters can guarantee the transmission of optimal audio media?
- Experiences, exchange and discussion will follow
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Thank You!



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