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TWOFIFTY – remembering Beethoven
All the audio workflows at once, with Ardour

tmt 32
TONMEISTERTAGUNG 2023

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The project:

- planned concert series for the Beethoven year 2020
- original compositions by contemporary composers
- specially commissioned by Ensemble E-MEX (Essen/Germany)
- concert dramaturgy by choreographer and director Joachim Schloemer

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After completion of planning for all tour venues, the pandemic hit.

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The alternative:

- director and scenographer came up with a film concept and storyboard
- single location for all music takes: Kreuzeskirche Essen
- a few insert scenes filmed and recorded in other locations
- one day setup, 6 days of filming

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The works:

- voc / elec improvised performances (David Moss)
- organ solo (Mio Chareteau)
- performance with fixed-media video (Johannes Kreidler)
- perc / piano / fixed-media 4-channel electronics (Annesley Black)
- p / live video projection (Manos Tsangaris)
- six slide projectors performed live to click-track (Mio Chareteau)
- fl / vl / vc / acc / perc / p with fixed-media audiovisuals (Sara Glojnarić)

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The challenges (1):

- classical miking, but invisible and as mobile as a sound cart!
  (oh, and no budget for film-specific audio rental, no wireless)
- timecode to camera by wire (I know...)
- constant moving of recording desk due to different shot angles in the venue, no permanent “safe” space for gear
- visual concept and storyboard are volatile, not clear if the room sound will be “narrated”, so:
  reverb balance must accommodate “dry-looking” close-ups as well as wide establishing shots

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The challenges (2):

- scores must be realized correctly
- some musical editing will be required
- composers, musicians and tonmeister want the best played take
- director does not give a toss and chooses the visually best one (always the last one, by which time the musicians have been completely used up)
- director does not give a toss about complications of the score, and ignores composers' performing instructions

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The challenges (3):

- highly reverberant recording environment
- full crosstalk between all open mikes
- challenging edits!
- visuals and music *must* be in sync
- director works with cutters without consulting the tonmeister
- hand-synchronize musically satisfying composite take to unrelated picture
- sometimes: restore errors if false note is seen played (!)

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Source material:

- full multitrack takes recorded in Ardour (no load-in, nice!)
- fixed media provided by composers
- single shotgun or supercardioid plus soundfield on a boom, into a Zoom F8 (tricky take management due to fast-paced improvisations, tedious load-in)
- a set of 7 x 4 location impulse responses (sources x recording positions)

Target formats:

- 5.1 for cinema
- 2.0 for demoing and online distribution

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Major open source systems used:

- the Linux operating system
- Ardour DAW (ardour.org)
- JACK Audio Connection Kit (jackaudio.org)
- Xjadeo timecode video player (gareus.org)
- x42, zam, and swh plugins
- zita-njbridge (uncompressed multichannel network audio), and
- the jconvolver matrix convolution engine (kokkinizita.linuxaudio.org)
- 6 Raspberry Pi 4B with RaspiOS and custom overlay (github.com/nettings)


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Tasks performed with Ardour on location:

- timecode generation
- multitrack recording and monitoring

- playout of fixed media and clicks for performers (second Ardour instance)
- fixed media re-recording
- time display for performers
- take management / annotations
- nightly rushes to ascertain we have all we need

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Tasks performed with Ardour in post:

- track analyzing and cleanup
- music editing
- some Foley editing (and making)
- surround sound design / assembly
- AV synchronisation (manually, hard and painful, but no pitching artefacts)
- mixing 80+ tracks to 5.1 and stereo
- loudness metering and monitoring to two 5.1 rigs and a stereo system

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Some nice DIY hacks:

- use “single-pin” connections between plugins to run two automatable virtual microphones in each soundfield track to generate front and rear surrounds at the same time

- use the x42 matrix mixer to implement ITU-R BS.1770-4 channel weights, so the x42 R128 stereo meter can perform surround metering
- use JACK to send and receive audio from external 7x4 IR matrix convolver
- use pan-ganged surround auxes to drive the convolution reverb
- use JACK to pipe 5.1 output over LAN from studio to living-room consumer surround rig for easy “home listener” checks in realtime

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In fact,

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- no closed-source, proprietary applications (or media, including fonts) have been used in the preparation of this talk

  (that means you can steal everything you see here :o)

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well, except

- QLab for the video performance, because it kicks ass and it's paid off, and their support on is par with the open-source community

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