

Game Audio

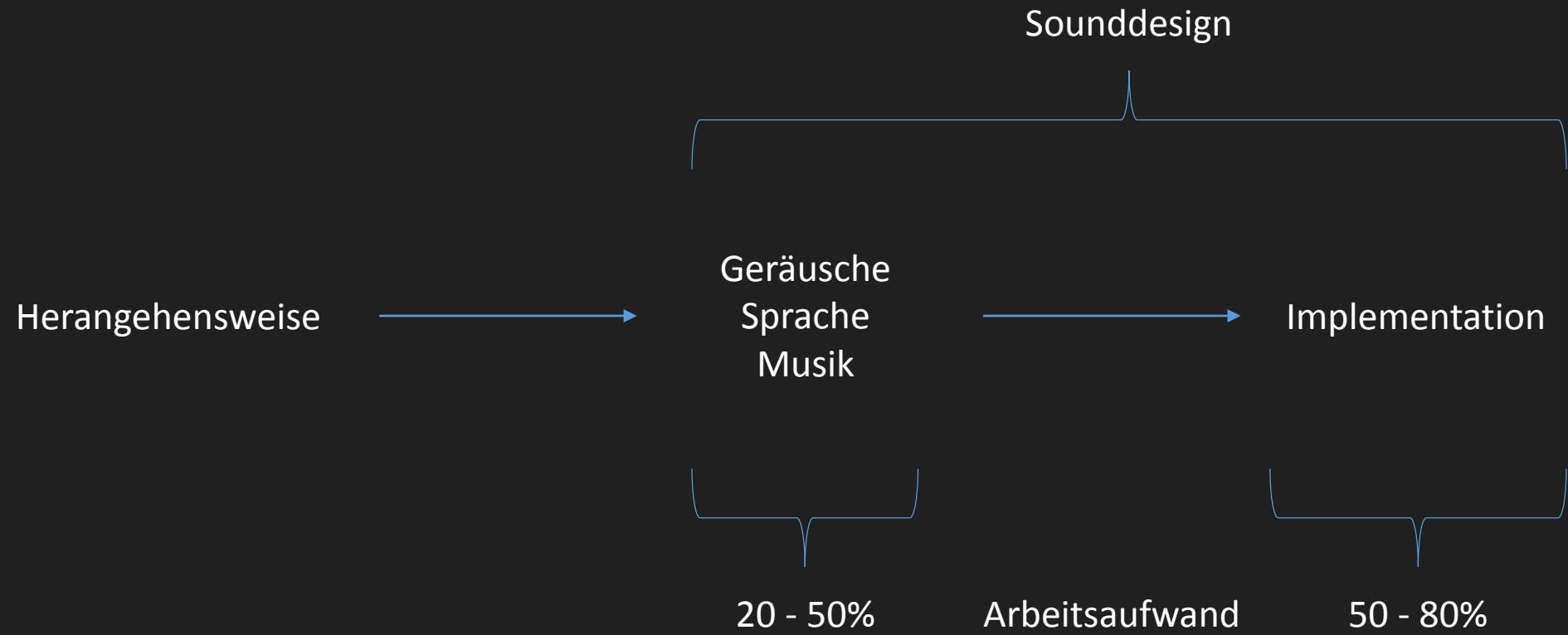
Vertonung von Computerspielen

Michael Dmoch

md079@hdm-stuttgart.de

Sounddesign

WS15/16





Sounddesign



Sprachaufnahmen



Musikproduktion

ENTWICKLERSTUDIO



Sounddesign



Sprachaufnahmen



Musikproduktion



Audio Director

ENTWICKLUNGSTUDIO



Sounddesign



Sprache



Musikproduktion



Audio Director

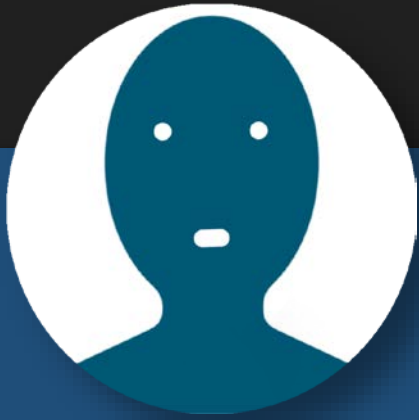


ENTWICKLERSTUDIO

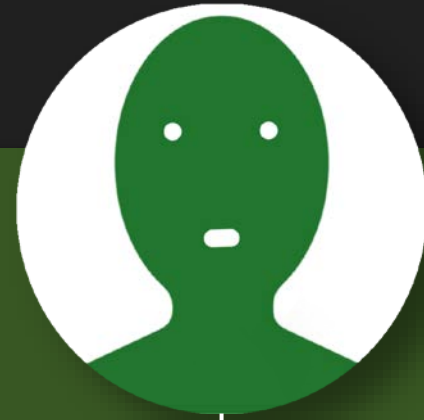
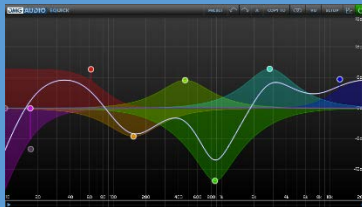
Technical Sounddesigner

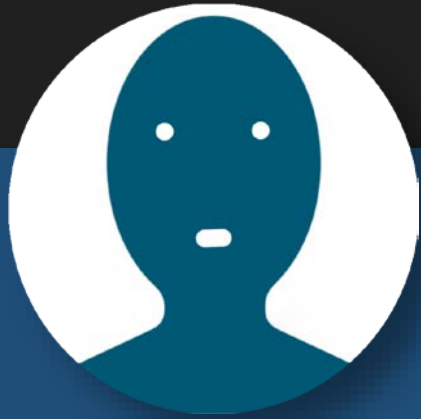


Workflow

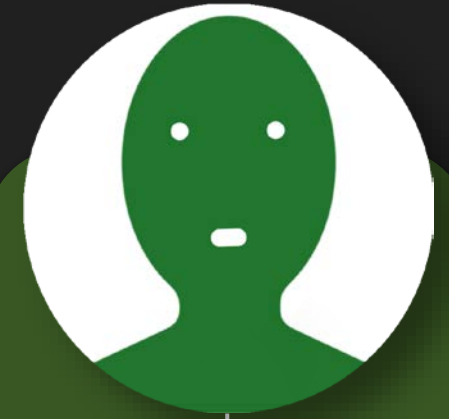


DAW



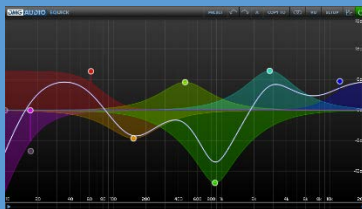
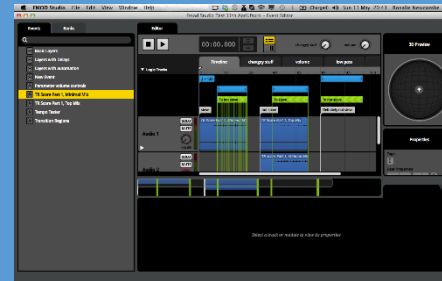


besserer Workflow

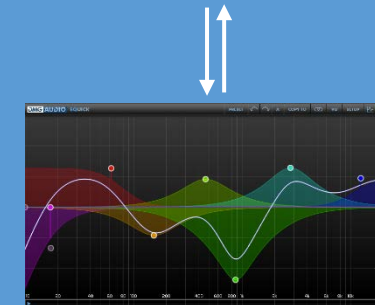


DAW

fmod



destruktive Effekte



dynamische Effekte
zur Laufzeit

Vorteile des Workflows mit Middleware

- Bedienkonzept
- Gestaltungsprozess -> Sound Designer
- Zuständigkeiten sind klar definiert
- Weniger Arbeit für das Dev-Team
- Weniger Abhängigkeit vom Dev-Team

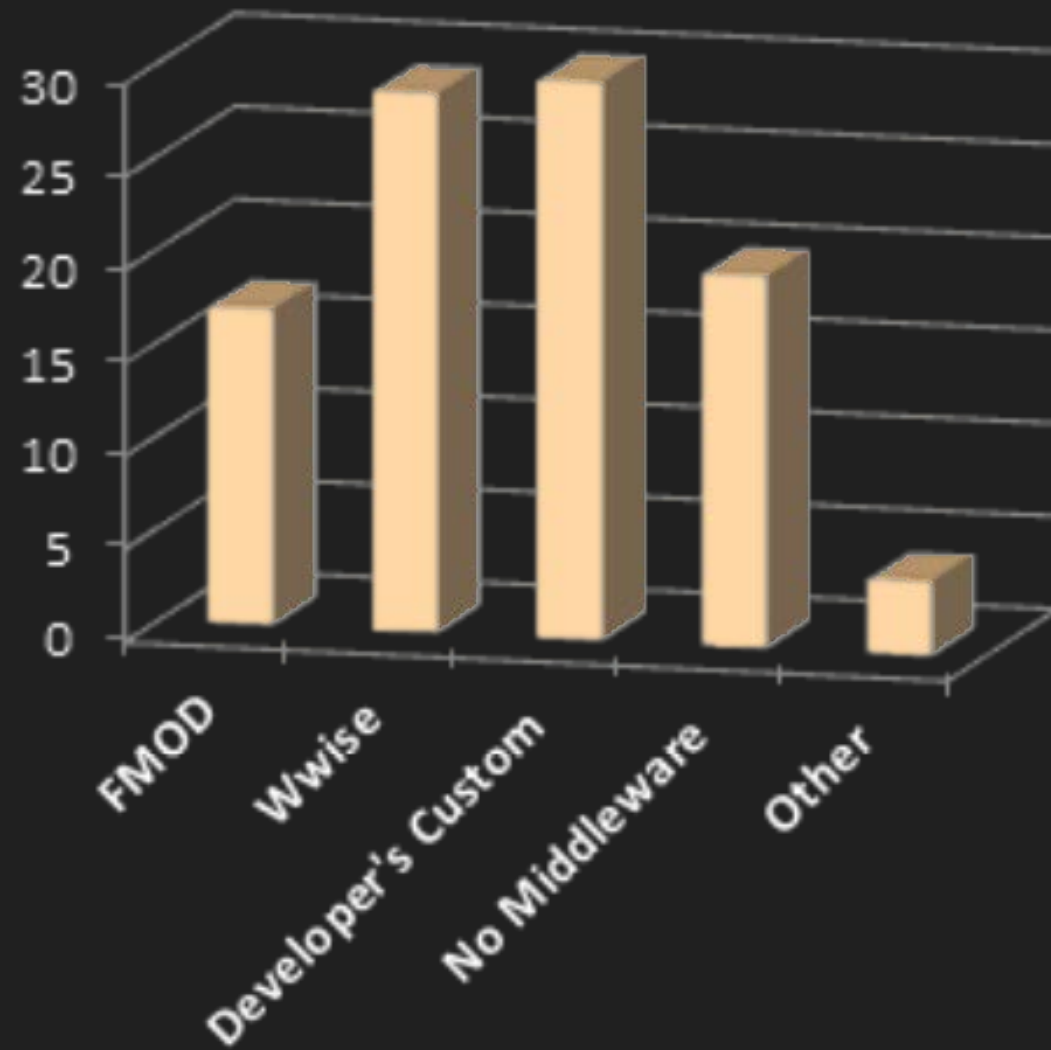
Game Engine

- Entwicklungsumgebung des Dev Teams
- Framework für Spielablauf und –grafik
- Beliebt:
 - Unity
 - Unreal
 - Cry Engine
 - Havoc (v.a. Xbox)
 - Phyre (v.a. Ps4)
- eigene Audio-Engine
 - (Unity: basiert auf Fmod)

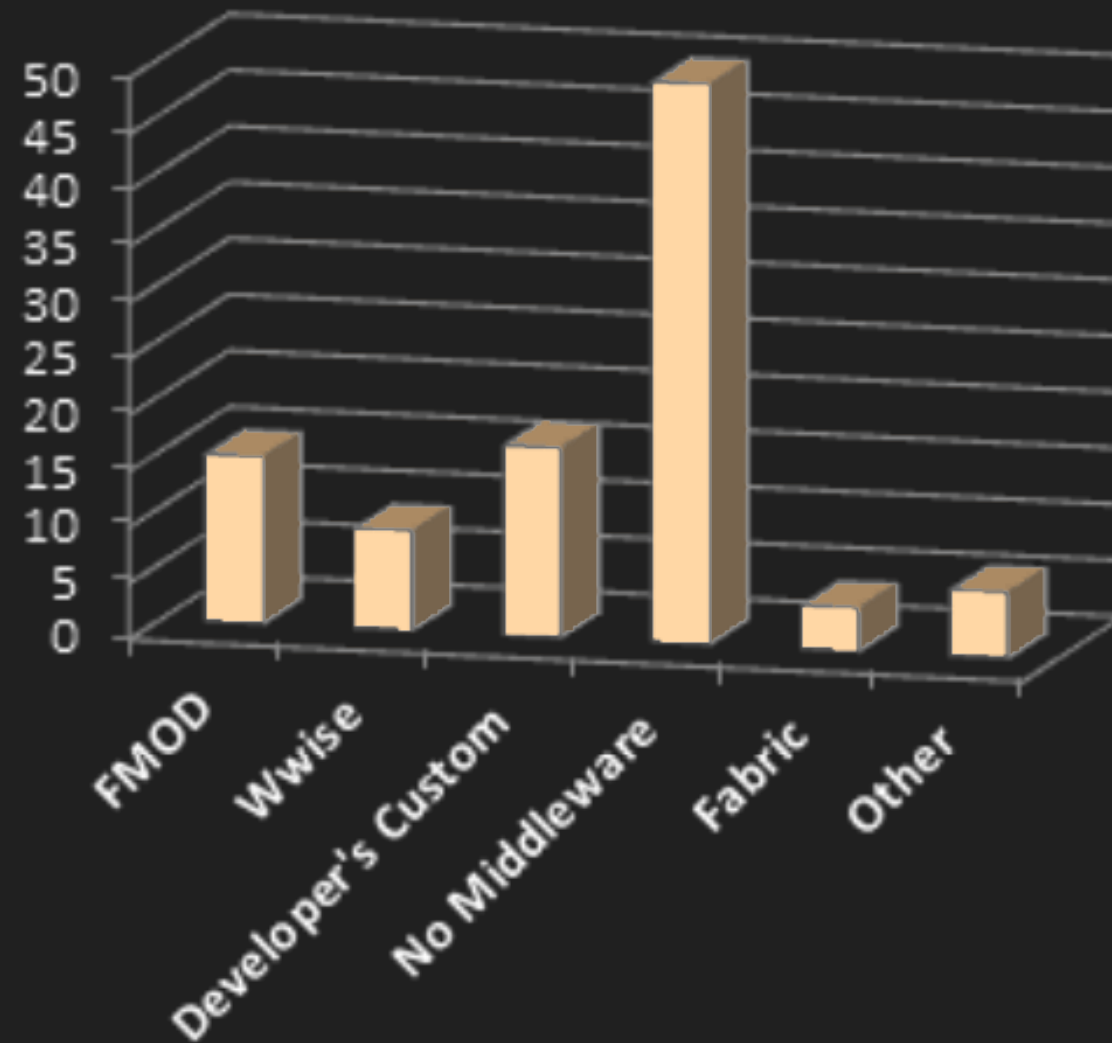
Audio Middleware

- Sound Engine (PlugIn) + Authoring Tool
- Beliebt:
 - Wwise
 - FMOD Studio
- Interessant:
 - Fabric
 - Elias
- Low Level:
 - FMOD API, Oculus Audio SDK, XAudio2, DirectMusic, ISACT, XACT, ...
- Proprietäre Audio Engines / Authoring Tools
- Mobile Devices & Browser?

Middleware in AAA Games



Middleware in Indie und Casual Games



FMOD Studio

- Cross-Plattform: Gleichzeitig für mehrere Plattformen entwickeln
 - Win, MacOS, Linux (SteamOS)
 - Alle von: Playstation, Xbox, Nintendo
 - iOS, Android
 - Google Native Client (Chrome)
- Formate
 - Verlustfrei: WAV, AIF, FLAC, ADPCM
 - Verlustbehaftet: MP3, OGG
 - 5.1 / 7.1 Surround
- Spielt Sounds:
 - Play from RAM
 - Stream from Harddisk
 - Stream via IP
- Bietet zur Laufzeit DSP-Effekte:
 - Halleffekte
 - Filter, Equalizer
 - Echo, Chorus, Phaser, ...
 - Kompressor, Limiter
 - Distortion
 - Doppler-Effekt
 - VST-Plugins zur Laufzeit

Sound Assets ansteuern



Play

Event 2D

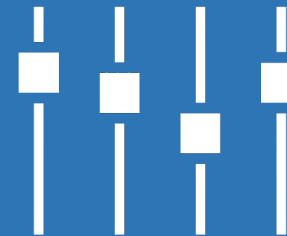
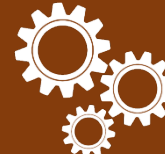
Event at Location

Event Attached

Event 1

fmod

Soundbank



Play Event 2D

- Hat nichts zu tun mit 2D/3D-Grafik
 - Meint: Dramaturgisch / nicht-diegetisch
 - Keine Auralisation
-
- Soundtrack
 - Erzähler
 - Interface-Sounds

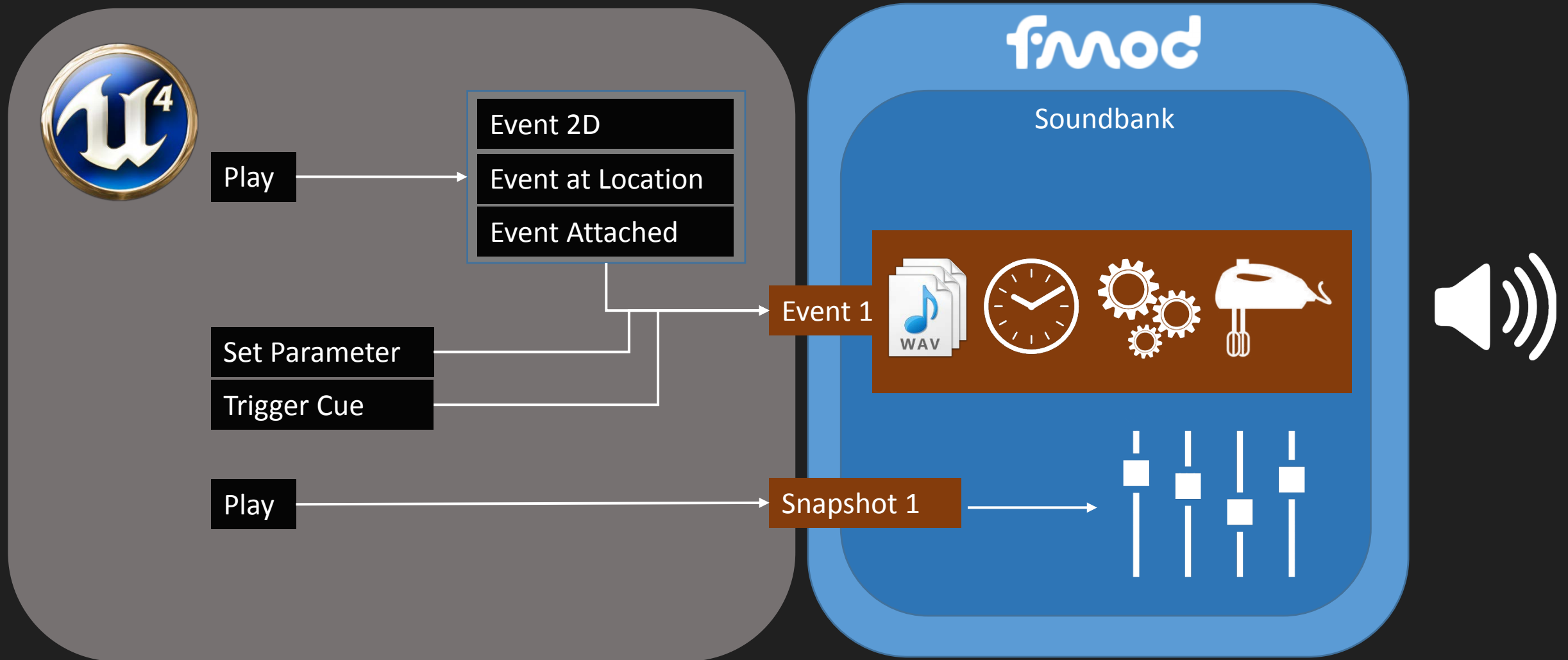
Play Event at Location

- Audio Source unbeweglich, gebunden an Ort
- Diegetisch
- Atmos

Play Event Attached

- Audio Source ist an Objekt gebunden
- Diegetisch
- Geräusche wie Schritte, Schüsse, ...
- Sprache der Charaktere
- Radio mit Musik?

Sound Assets ansteuern

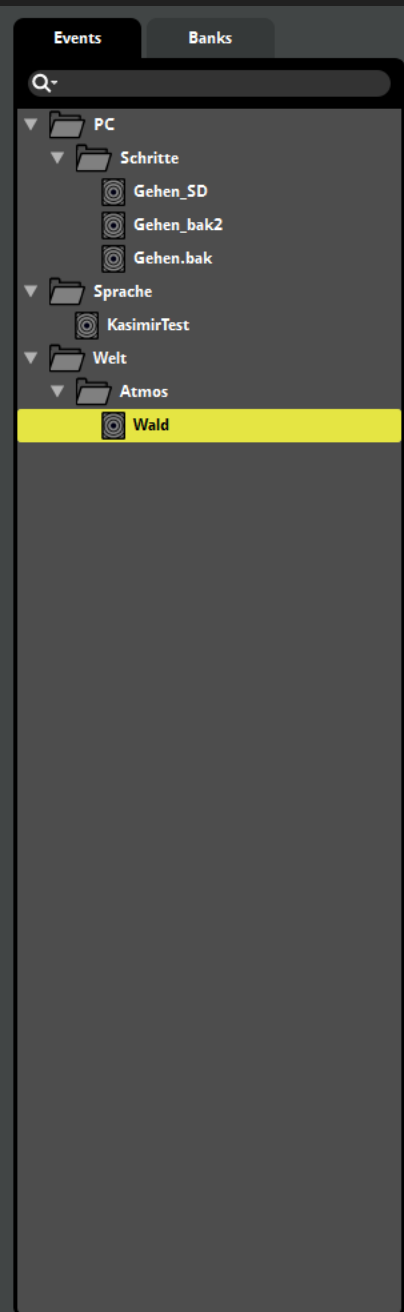


Das Authoring Tool

The interface is divided into several main sections:

- Events/Banks:** A sidebar on the left showing a hierarchical tree of audio assets. The 'Wald' bank is currently selected and highlighted in yellow.
- Timeline:** A central horizontal timeline with a time scale from 0:00:000 to 0:00:650. It features a playhead and various control buttons (stop, play, cue, solo, mute) for each track.
- Logic Tracks:** A section below the timeline showing the arrangement of audio events. The 'Wald Surround' track contains a long blue event labeled 'forest_surround2'. The 'Kanarienvogel' and 'Wolf' tracks contain shorter blue events labeled 'Kanarienv Scatt... catterer Sound!'. The 'Master' track is at the bottom, showing a 'MON' indicator and a 'Gain' control.
- 3D Preview:** A circular 3D visualization of the audio field, showing the spatial distribution of the sound sources.
- Properties:** A panel on the right side of the 3D preview, containing sections for 'Tags', 'User Properties', and 'Notes', each with an 'I' icon.
- Master/Event Macros:** A section at the bottom right, containing a 'Panner' control (a circular 3D panner) and an 'Out' control (a vertical slider).
- 3D Panner:** A large control panel at the bottom center, featuring a 'Distance Attenuation' graph, 'Envelopment' controls (Auto, User, Off), 'Sound Size' and 'Min Extent' knobs, 'LFE' and 'Reverb' sliders, and a 'Volume' knob.

Browser



Properties



Arranger

Wald

00:00.000

Cues A

Timeline

Logic Tracks

Wald Surround

SOLO

MUTE

0.0 dB

forest_surround2

Kanarienvogel

SOLO

MUTE

2.5 dB

Kanarienv Scatt... catterer Sound

Wolf

SOLO

MUTE

10 dB

Kanarienv Scatt... catterer Sound

Master

MON

0dB

„Sounds“ in FMOD

- Single Sound
- Multi Sound
- Event Sound
- Scatterer Sound
- Programmer Sound

Sound

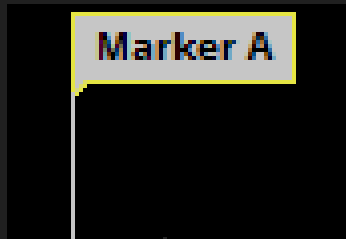
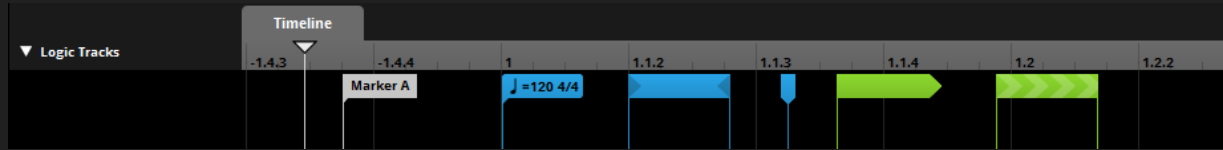
Multi Sound

↗ Nested Event

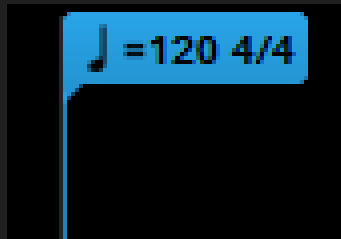
Scatterer Sound

Programmer Sound

Logic Track



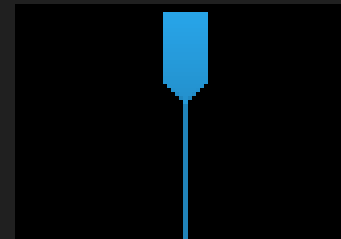
Marker



Tempo Marker



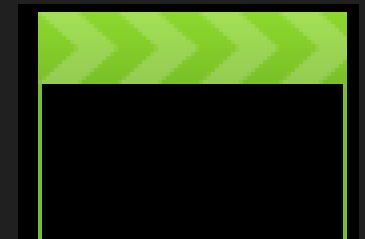
Loop Region



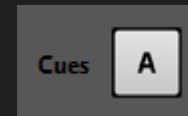
Sustain Point



Transition



Transition Region



Trigger Cue
(Trigger KeyOff)

„Sounds“ in FMOD

- Single Sound
- Multi Sound
- Event Sound
- Scatterer Sound
- Programmer Sound

Sound

Multi Sound

↗ Nested Event

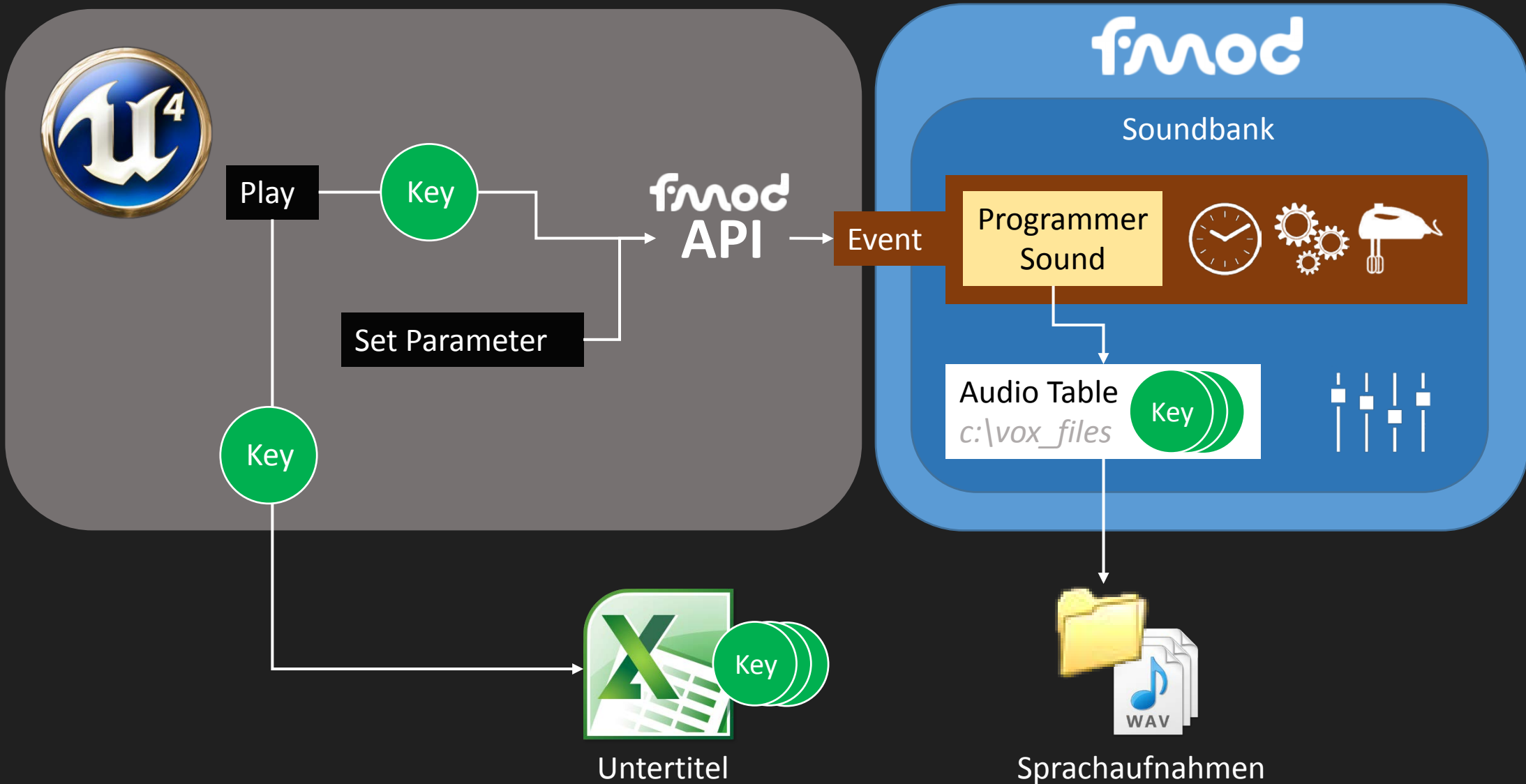
Scatterer Sound

Programmer Sound

Sprache

- Geschichte
 - Cinematics / Cutscenes / NIS / FMV
 - Quicktime Events
 - Scripts
- Dialog
 - PC und NPCs (Gegner, Fussgänger)
 - In-Game Reactions
- Sonstiges
 - Mission

Programmer Sounds





Pausen



Post-Roll:
0,7 Sek

Pausen



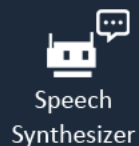
Post-Roll



Reference files

T:\Projects\Alto\AltoTestGen\VoiceFiles\Test 1

en_Dialogue0.wav
en_Dialogue1.wav
en_Dialogue10.wav
en_Dialogue100.wav
en_Dialogue101.wav
en_Dialogue102.wav
en_Dialogue103.wav
en_Dialogue104.wav
en_Dialogue105.wav
en_Dialogue106.wav
en_Dialogue107.wav
en_Dialogue108.wav
en_Dialogue109.wav
en_Dialogue11.wav
en_Dialogue110.wav
en_Dialogue111.wav
en_Dialogue112.wav
en_Dialogue113.wav
en_Dialogue114.wav
en_Dialogue115.wav
en_Dialogue116.wav
en_Dialogue117.wav
en_Dialogue118.wav
en_Dialogue119.wav
en_Dialogue12.wav
en_Dialogue120.wav
en_Dialogue121.wav
en_Dialogue122.wav
en_Dialogue123.wav
en_Dialogue124.wav
en_Dialogue125.wav
en_Dialogue126.wav
en_Dialogue127.wav
en_Dialogue128.wav
en_Dialogue129.wav
en_Dialogue13.wav
en_Dialogue130.wav
en_Dialogue131.wav
en_Dialogue132.wav
en_Dialogue133.wav
en_Dialogue134.wav
en_Dialogue135.wav
en_Dialogue136.wav
en_Dialogue137.wav
en_Dialogue138.wav
en_Dialogue139.wav
en_Dialogue14.wav
en_Dialogue140.wav

Speech
Synthesizer

English (British) - Reference

Dialogue lines

File path T:\Test\Audio\Alto Speech Synthesizer\FrenchGameDialogue.txt

- ☒ Passe-moi ton flingue!
- ☒ Artillerie en position!
- ☒ Capitaine, nous sommes à court de munitions!
- ☒ L'ennemi se rapproche dangereusement de nos positions!
- ☒ Exterminez-moi ces cafards!
- ☒ A mon signal, déclenchez la contre-attaque.
- ☒ Prenez-les vivants, nous avons besoin d'information!
- ☒ Feu à volonté!
- ☒ Ils ne doivent pas passer!
- ☒ Ma mitrailleuse s'est enraillée!
- ☒ Missile à 3 heures.
- ☒ Demande couverture aérienne! Maintenant!
- ☒ Larguez les bombes!
- ☒ Capitaine, les parachutistes sont prêts à sauter.
- ☒ A vos ordres, mon capitaine.

☒ Select All ☐ Clear

Voice

Voice French (France) -> Hortense (Female,Adult)

Rate 0 Volume 50

Format 16000 Hz, 16-bit, mono

Output

Folder T:\Test\Audio\Alto Speech Synthesizer

File name ☒ Use dialogue text☐ Use base name + index

Base name Voice

Generate

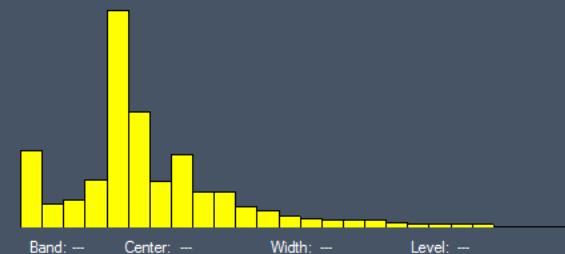
Close

Danish

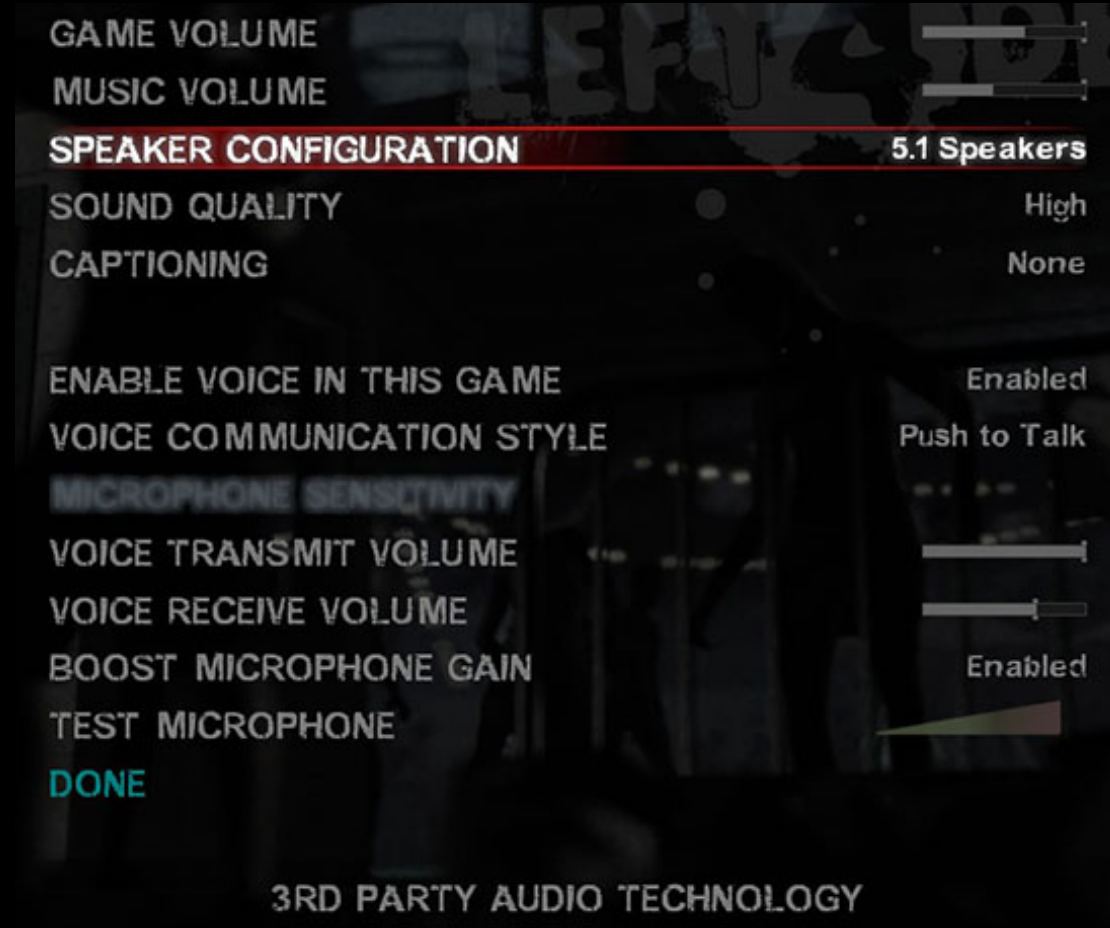
T:\Projects\Alto\AltoTestGen\VoiceFiles\Test 1\da_Dialogue109.wav

Sample Rate: 22050 Hz
Bit Depth: 16-bit
Channels: 1

File Size: 284.63 KB
Modified: 07/02/2015 13:20:05
Duration: 6.608 s

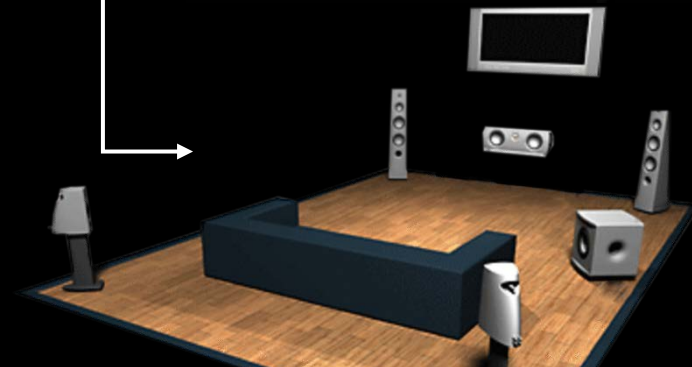
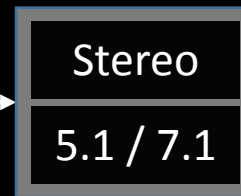
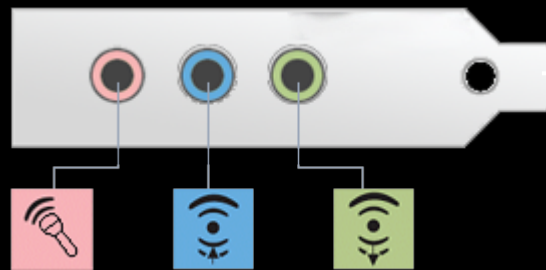


Ausgabeformat



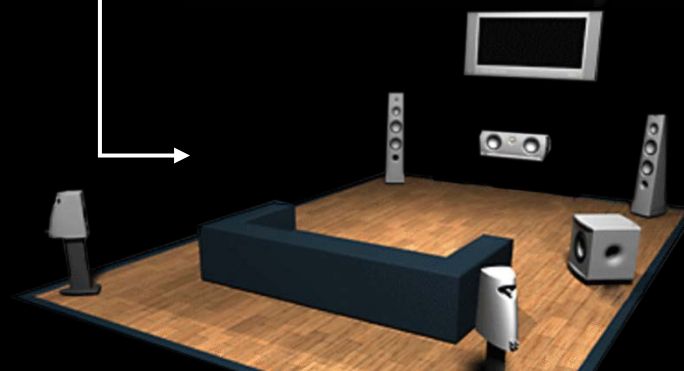
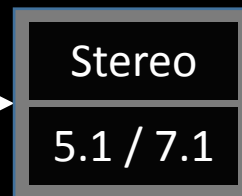
Surround

fmod



Surround

fmod

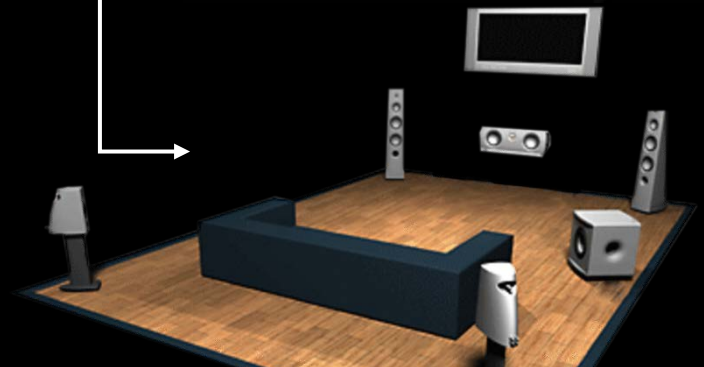


Head Related Transfer Function



Surround

fmod





Razer Surround



Dolby Headphone

3DCEPTION

fmod



Surround



3D-Plugins

- 3Dception
- Oculus Audio SDK
- AstoundSound
- Phonon
- RealSpace 3D
- Fraunhofer Cingo
- Iosono Proximity
- Rayav
- AMD True Audio
- ...

3D-Plugins

Plugin	3Dception	AstoundSound RTI	Oculus Audio SDK	Phonon 3D	RealSpace 3D
Version	1.0.0	1.1	0.9.2 (alpha)	1.0.2	0.9.9 (beta)
Company	Two Big Ears	GenAudio	Oculus	Impulsonic	VisiSonics
Azimuth (L / R / front / back)	✓	✓	✓	✓	✓
Elevation (up / down)	✓	✓	✓	✓	✓
Room modeling	✓	N/A	✓	N/A	✓
ERs (early reflections)	✓	N/A	not available with "fast" setting	N/A	✓
Spatialized ERs	✓	N/A	N/A	N/A	N/A
Reverb	N/A	✓	✓	N/A	✓
Additional distance cues	sound delay based on distance	enhanced reverb	N/A	N/A	N/A
Notes			using "fast" setting (not High Quality)	developer made aware of performance issues	beta version test; developer is aware and working on performance issues
AVG. AUDIO CPU LOAD					
Samsung Galaxy Note 4	35 - 40%	55 - 65%	20%	70 - 100%	100 - 105%
MacBook Pro (Early 2013)	7 - 8%	8%	6%	11 - 12%	65 - 75%

<http://goo.gl/xC2rFX>

Mehrere Hallräume



Trigger Volume



Mixer Snapshot

fmod

Occlusion / Obstruction

Performance

- CPU
- RAM
- Streaming-Bandbreite

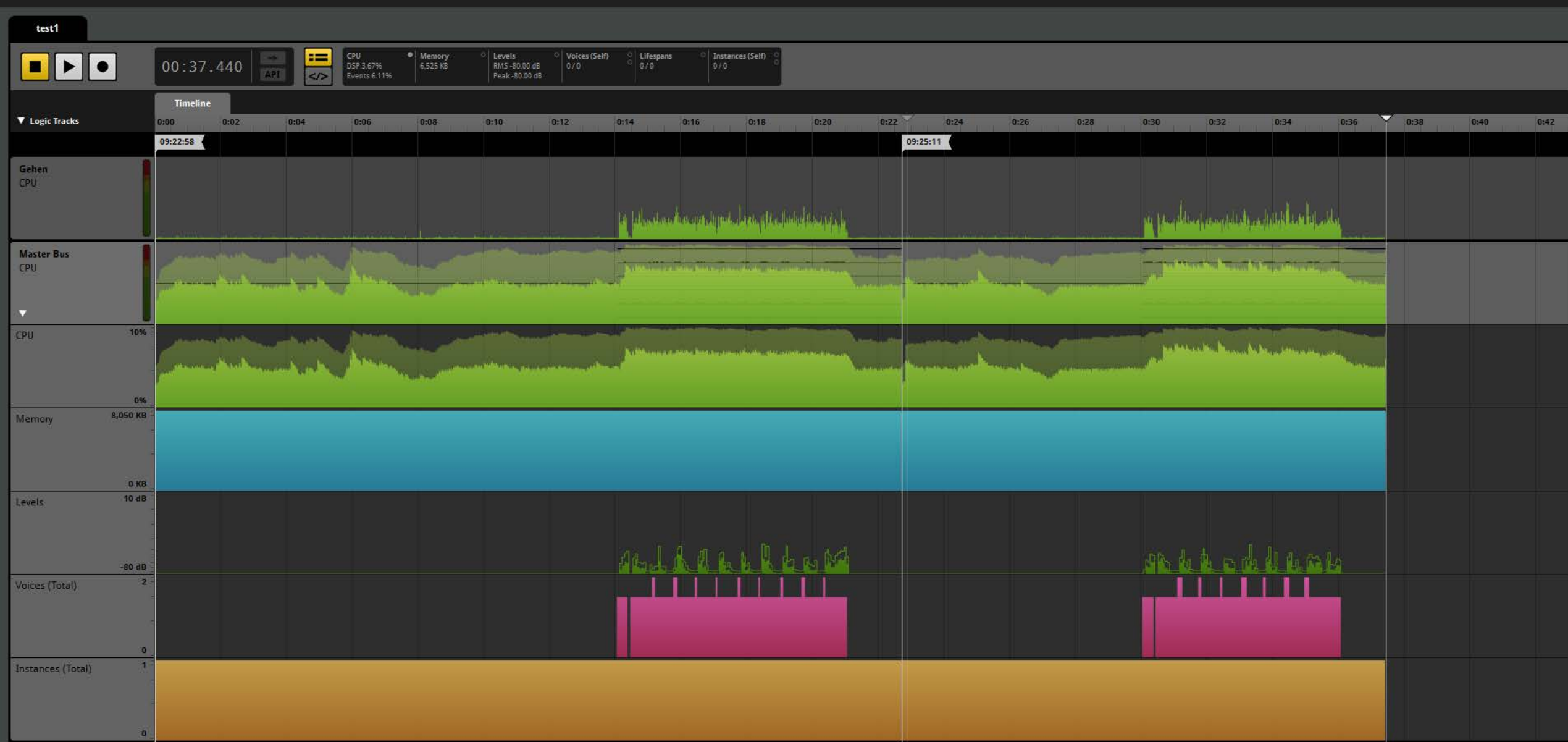
- Samples
- Effekten
- Spuren

Speicherformat der Samples



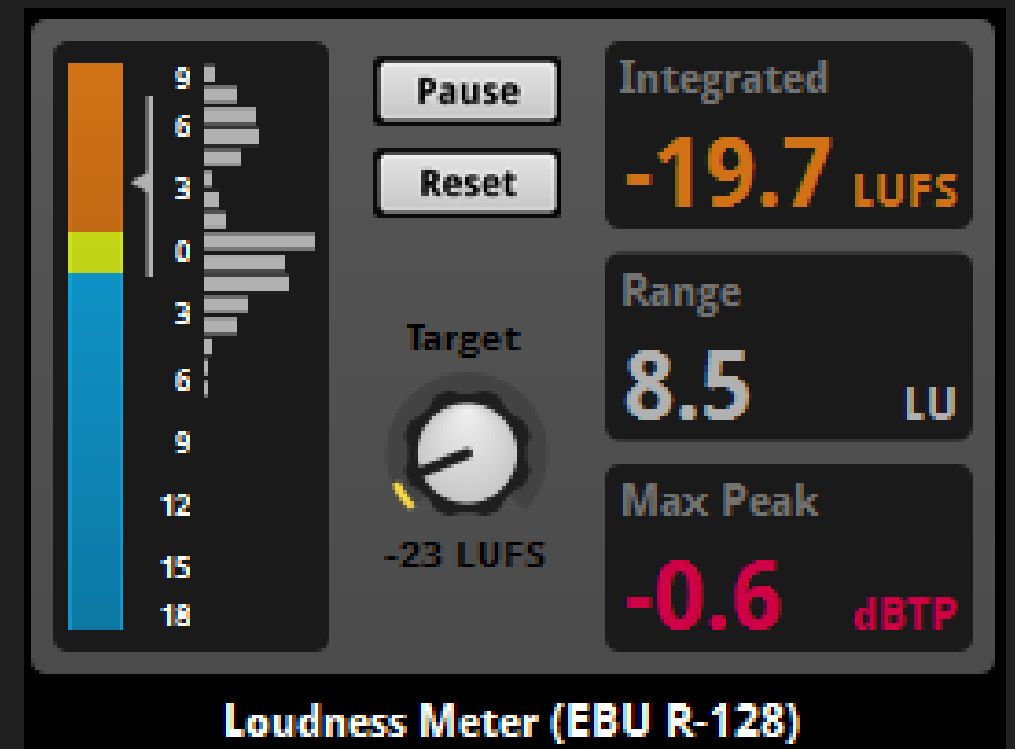
	CPU	RAM	
PCM			
ADPCM			
OGG			verlustbehaftet

Profiler

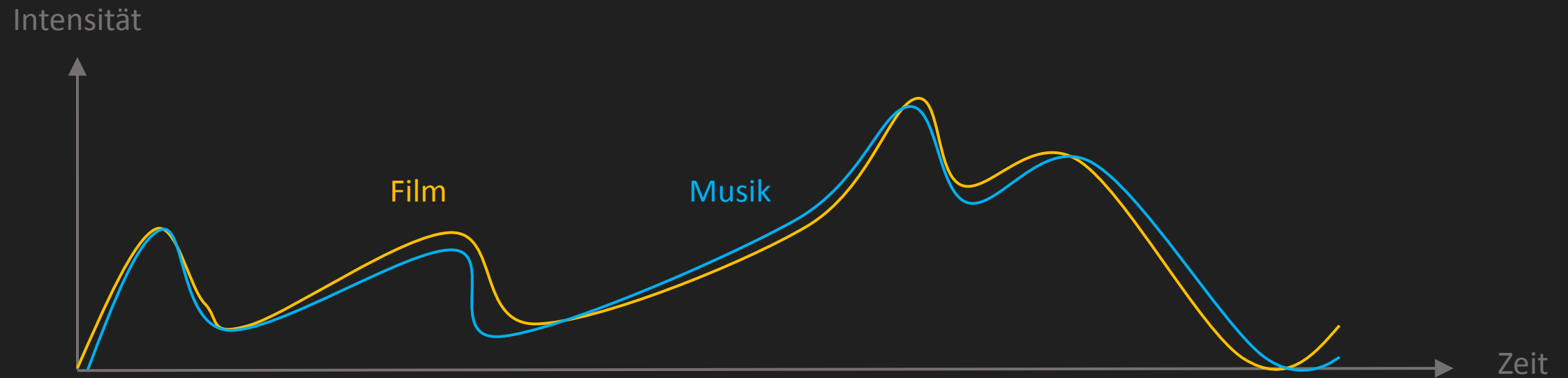


Metering

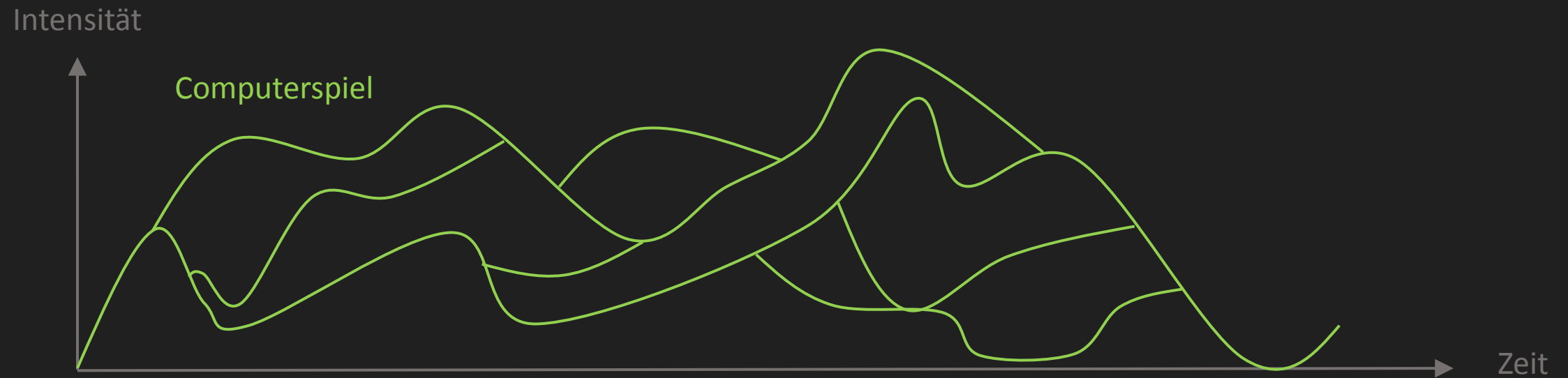
- Peak
- RMS
- LUFS nach EBU R128



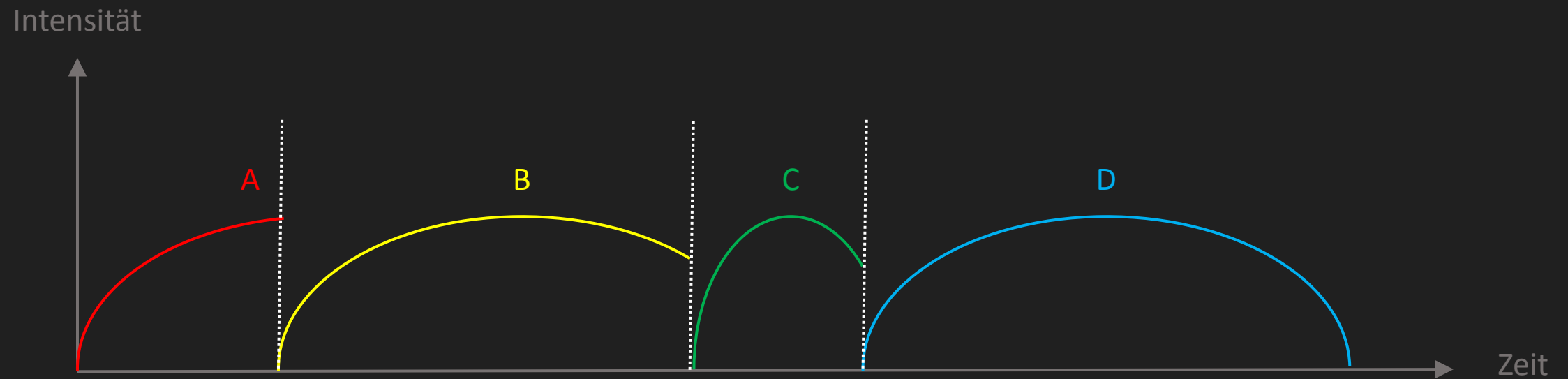
Lineare Medien



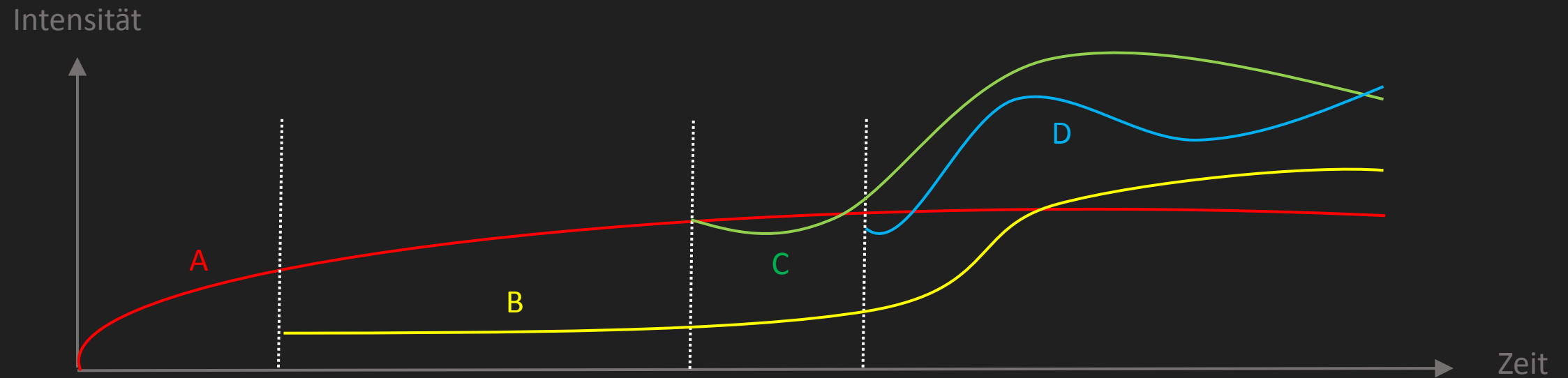
Nicht-Lineare Medien



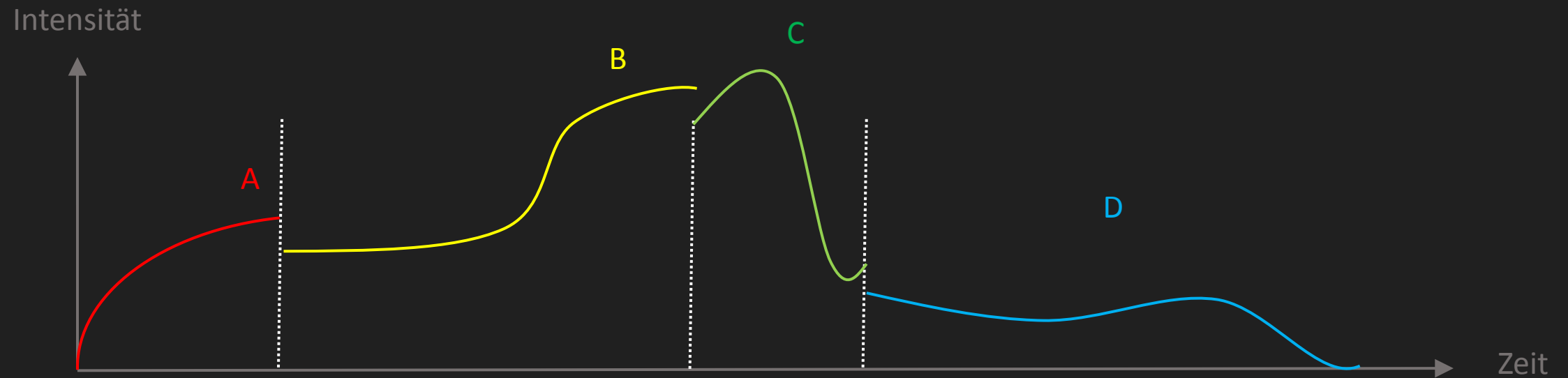
Playlist-Dramaturgie



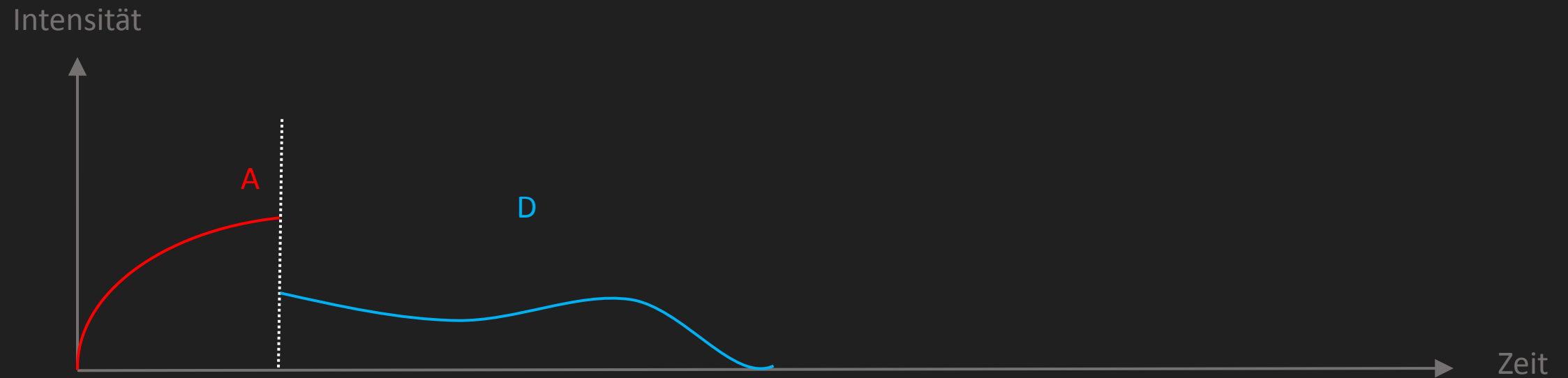
Adaptive Musik: Vertikal



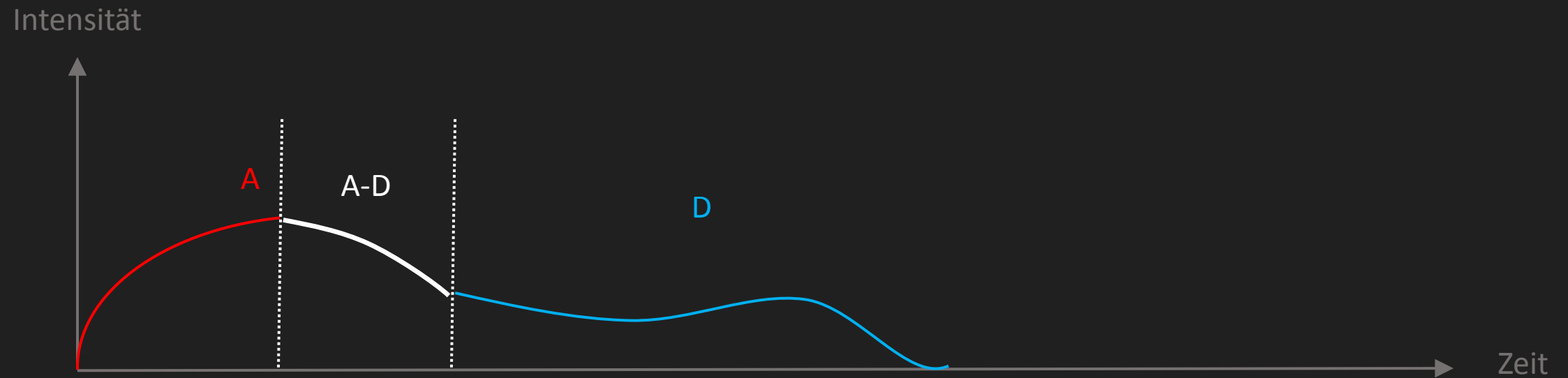
Adaptive Musik: Horizontal

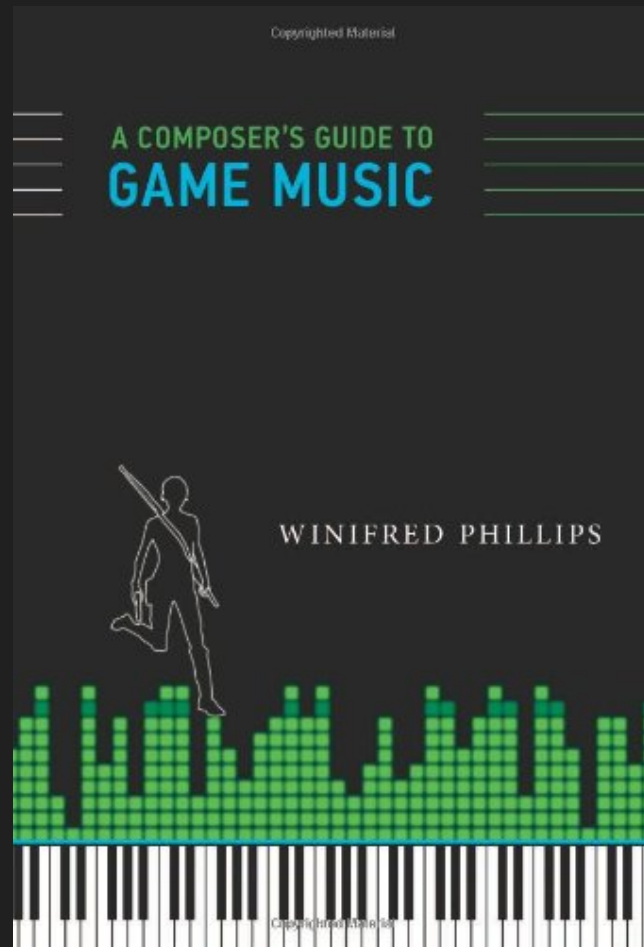


Adaptive Musik: Horizontal



Adaptive Musik: Horizontal





Winifred Phillips
„A Composer's Guide To Game Music“



Podcast (US-Eng)
“Beards, Cats and Indie Game Audio”



GAMASUTRA

The Art & Business of Making Games

www.gamasutra.com