



# The Sound of Horror

## Resident Evil 7: Biohazard

Akiyuki Morimoto (Capcom)  
Kenji Kojima (Capcom)  
Ken Usami (Capcom)



# Akiyuki Morimoto

Composer

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# Kenji Kojima

Sound Programmer

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# Ken Usami

Sound Designer

[ken-usami@capcom.com](mailto:ken-usami@capcom.com)





# Overview

- **What is RE7?**
  - Game Features
  - Sound Summary
- **Sound Design and Pipeline**
  - Sound Effects
  - System/Workflow
  - Music
  - Working with level designers
- **Q&A**





# Resident Evil 7:

- **Photo-real visuals**
- **First person view**
- **Back to its horror roots**







# Audio Production

## Audio Director:

Wataru Hachisako

## Sound Designers:

Yuji Higashiyama

Ken Usami

Yoshito Kato

Mitsutoshi Kodama

Gaku Komura

## Voice Editor:

Sayaka Yaegashi

## Composers:

Akiyuki Morimoto

Miwako Chinone

Satoshi Hori

## Sound Programmers:

Kenji Kojima

Yusuke Kinoshita

## Mixing Engineer

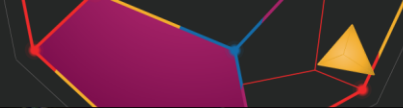
Kazuya Takimoto

## Audio Producer

Motoi Kishimoto



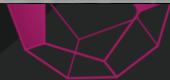




# Sound Summary

## The Sound of Horror

- Enhance the creepy mood
- Blend of realistic, dramatic, and horror
- Pacing, silence
- Traumatic, Paracusia, Immersive
- Dynamic/Interactive







# Sound Summary

## Automated system

### ➤ Auto-trigger

- ✓ Movements, footsteps, props etc.

### ➤ Utilize other resources

(Effect collision, mesh)

- ✓ Ambience, reverb, occlusion







Features of  
**RE ENGINE**  
and **Our Sound System**





# What is RE ENGINE



- In-house game engine
- Designed for RESIDENT EVIL 7





# Our Sound system

- The aim was...
  - Sound tasks roughly done automatically
  - But leave time and choice to do manual polish as well





# Wwise® RE ENGINE Integration



Powered by  
**Wwise®**

- Game programmers need only to...
  - implement triggers
  - open public parameters and/or states in game







# Other features of the sound system

Changing sound by materials

Automated trigger by motion

Checking space

Animation Sequence

Monitoring tools

Trigger by marker

Basic features

Clip / Timeline

Generator

FSM Actions

Rigid body

Ragdoll

Zone



**RE ENGINE  
SOUND SYSTEM**





# Sound Effects





# Let's watch!



- **"Real sound"**

- Resonance, Texture, Details, Fidelity





# Foley

- Foley stages
  - Capcom Foley Stage
  - TOHO Studio
    - Foley artist: Masaya Kitada
- Mic setting
  - 3 mics in different position





# Foley

- 700 Props
- Ambience
- Character, weapon
- In-game demo

Data size:

**24bit 96k 130GB+**





# Let's watch!





# Equipment/Gear

- Microphones
  - AKG C214 C414
  - Shure SM58
  - Sennheiser MKH416
  - Schoeps CMC641C
- Plug-ins
  - Magnetic II
  - RX4
- Harmonizer
  - H8000 H3000







# Ambience

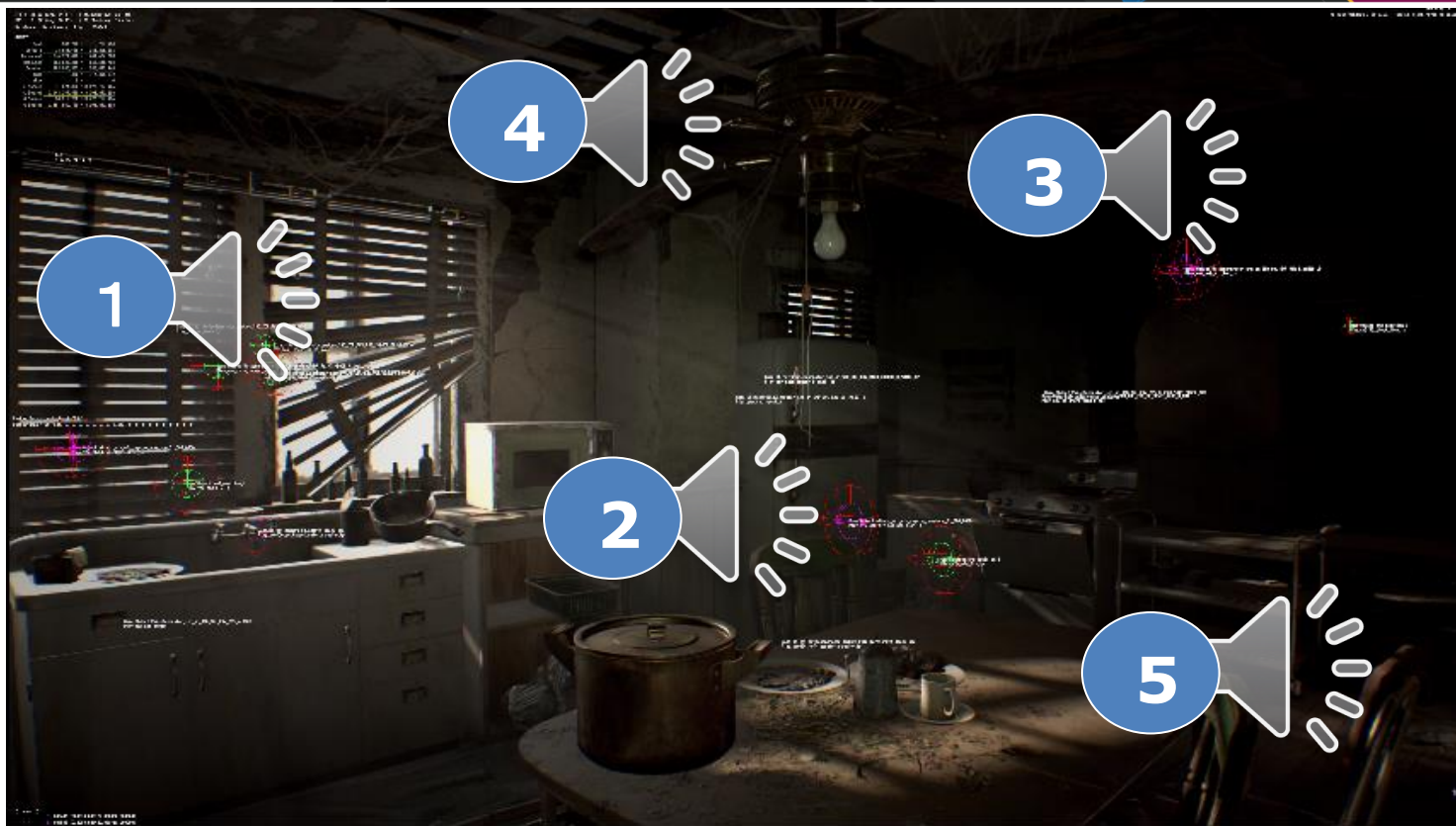
## 3 Elements

**Base ambience**

**3D Positional**

**3D Spooky**





# GDC

GAME DEVELOPERS CONFERENCE®

| FEB 27-MAR 3, 2017

| EXPO: MAR 1-3, 2017

#GDC17



UBM



# Reverb, Occlusion

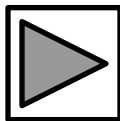
- Detect parameters from **Mesh** and **Effect collision**
  - Shape of area
  - Space where player or sound source are played
    - Switch reverb sets (aux send) to each source dynamically
  - Materials
    - Occlusion, Footsteps, hit sounds etc.

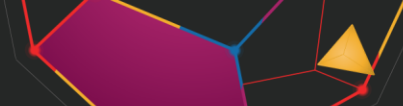




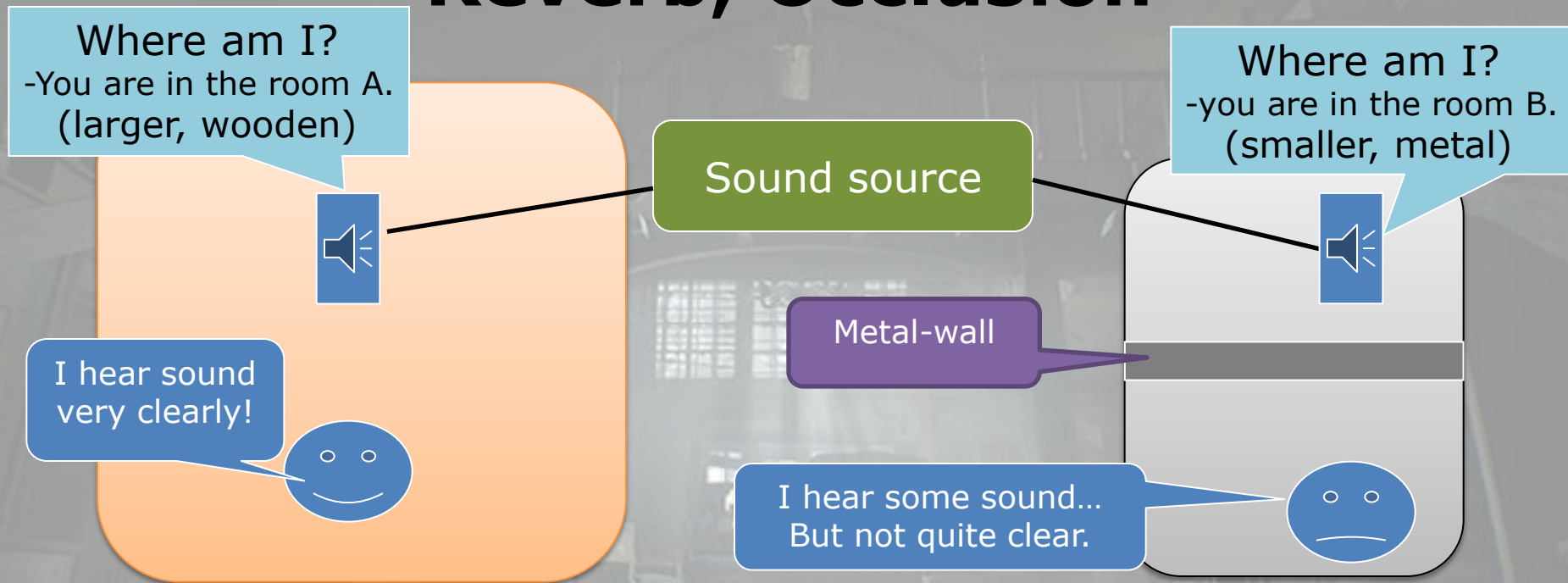


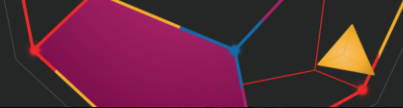
# Let's watch!





# Reverb, Occlusion





# Benefits

- **Cost down to roughly 1/3**
- **Optimization**





# System / Workflow





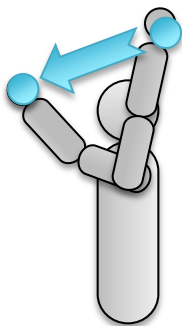
# Automated Sound Trigger



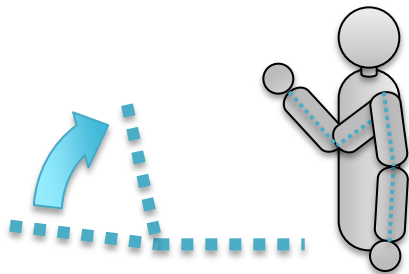


# Automated sound trigger by animation

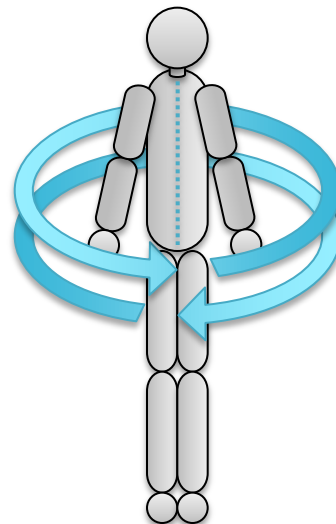
Velocity



Angular Velocity



Twist Angular Velocity







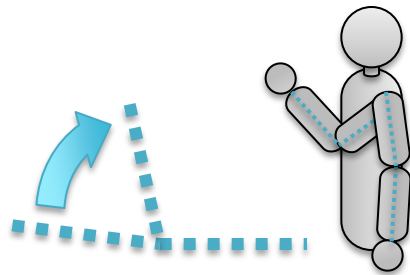
# Let's watch!





# How to use automated sound trigger

## Runtime Calculation



## Pre-Calculation

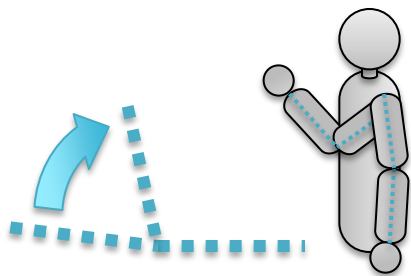
Track	Frame															
Footstep																
Rustling Arm																
Rustling Body																
Whoosh																





# Benefits

## Runtime Calculation



- Be able to get triggered correctly in complex blend
- No need to keep changing when animation updates





# Benefits

- Keys can be added/deleted easily
- Timing adjustable



## Pre-Calculation

Track	Frame															
Footstep																
Rustling Arm																
Rustling Body																
Whoosh																





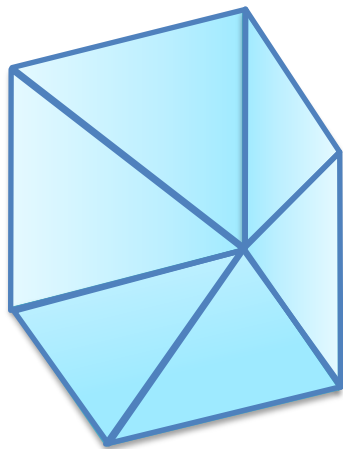
# Effective Use of Meshes



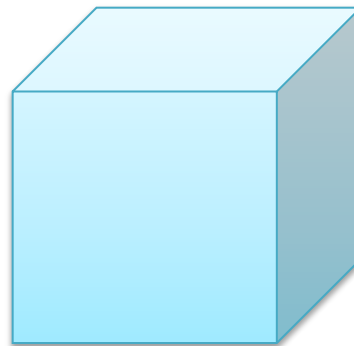


# RESIDENT EVIL 6

Mesh



Primitive Shape

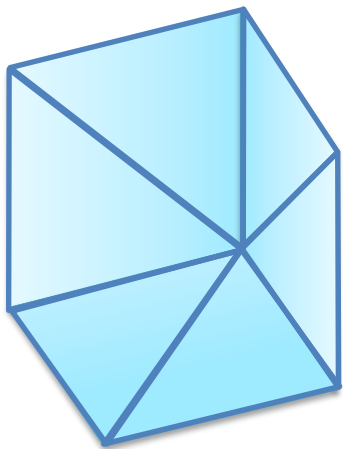






# RESIDENT EVIL 6

Mesh



- To change sounds by materials, e.g. footstep, hit sounds and more

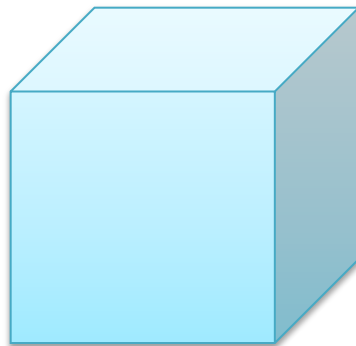




# RESIDENT EVIL 6

- To change reverb and Ambience by each room
- For obstruction and occlusion

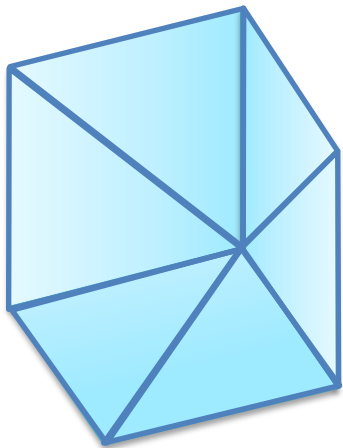
Primitive Shape





# RESIDENT EVIL 7

Mesh



- To change...
  - sounds by materials
  - reverb and environmental sounds by room
  - obstruction and occlusion

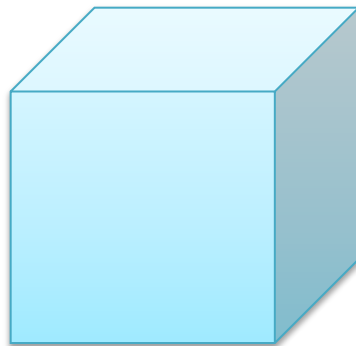




# RESIDENT EVIL 7

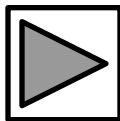
- To override the effect of mesh
- The aim is to reduce the effort of artists

Primitive Shape





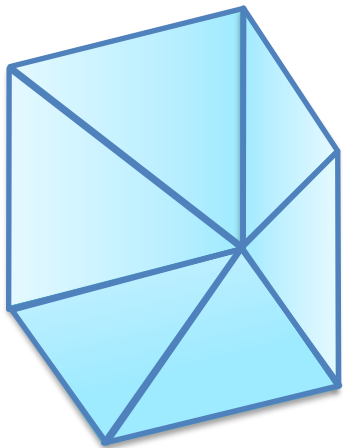
# Let's watch!





# RESIDENT EVIL 7

Mesh



- Is everything ok?
  - No
  - Use of many meshes require high CPU costs

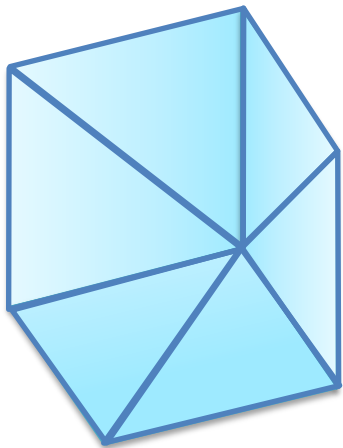






# RESIDENT EVIL 7

Mesh

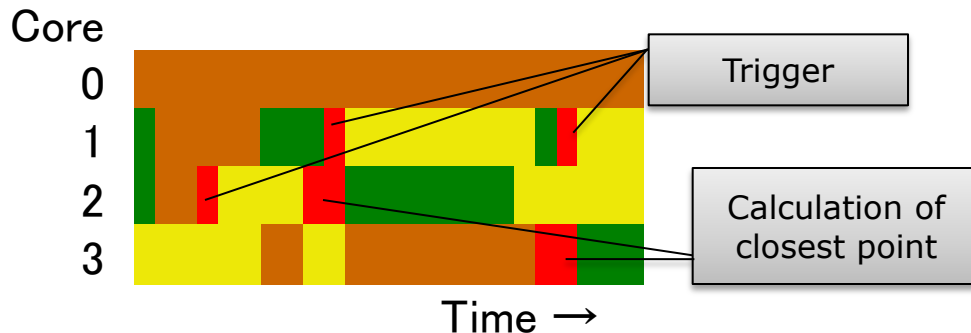


- Can it be solved?
  - Yes
  - Thinning out update
  - Updating asynchronously





# Update process without blocking



**Fig.** Sound behavior update process in cluster 0.

A part of behavior update.





# Update process without blocking

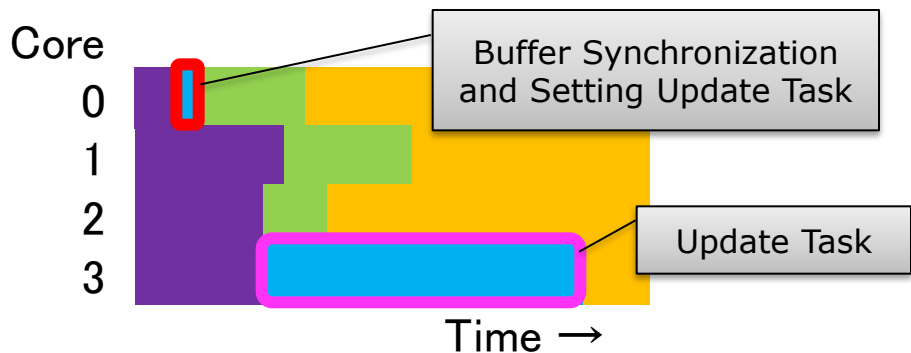
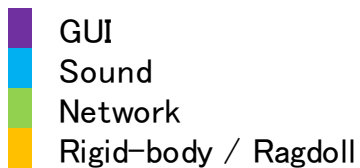


Fig. Sound Module Update Process in Cluster 0.

A part of module update.





# Music



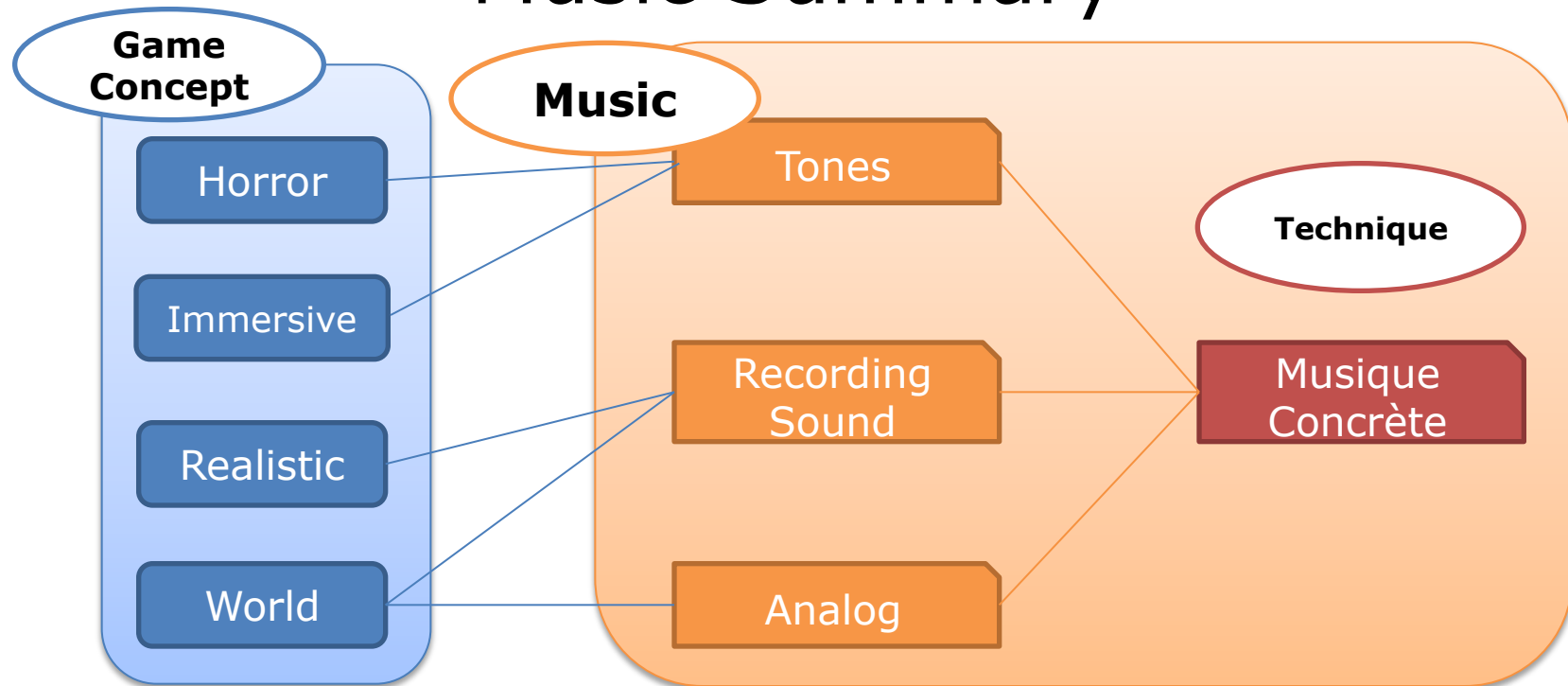


# Let's watch!





# Music Summary







# Music Summary

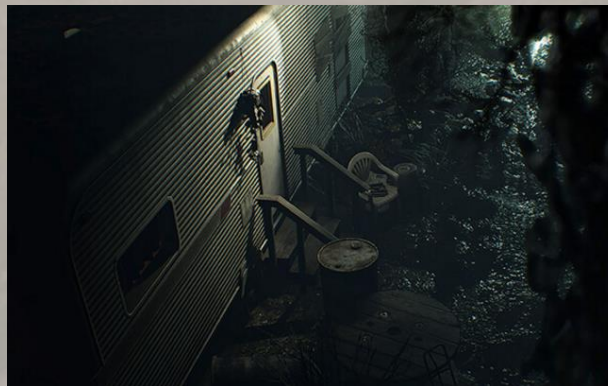
- **Tone** > Basic musical elements
- Tone-based composition = **Musique Concrète**
- Micro tones, spector music, sound texture





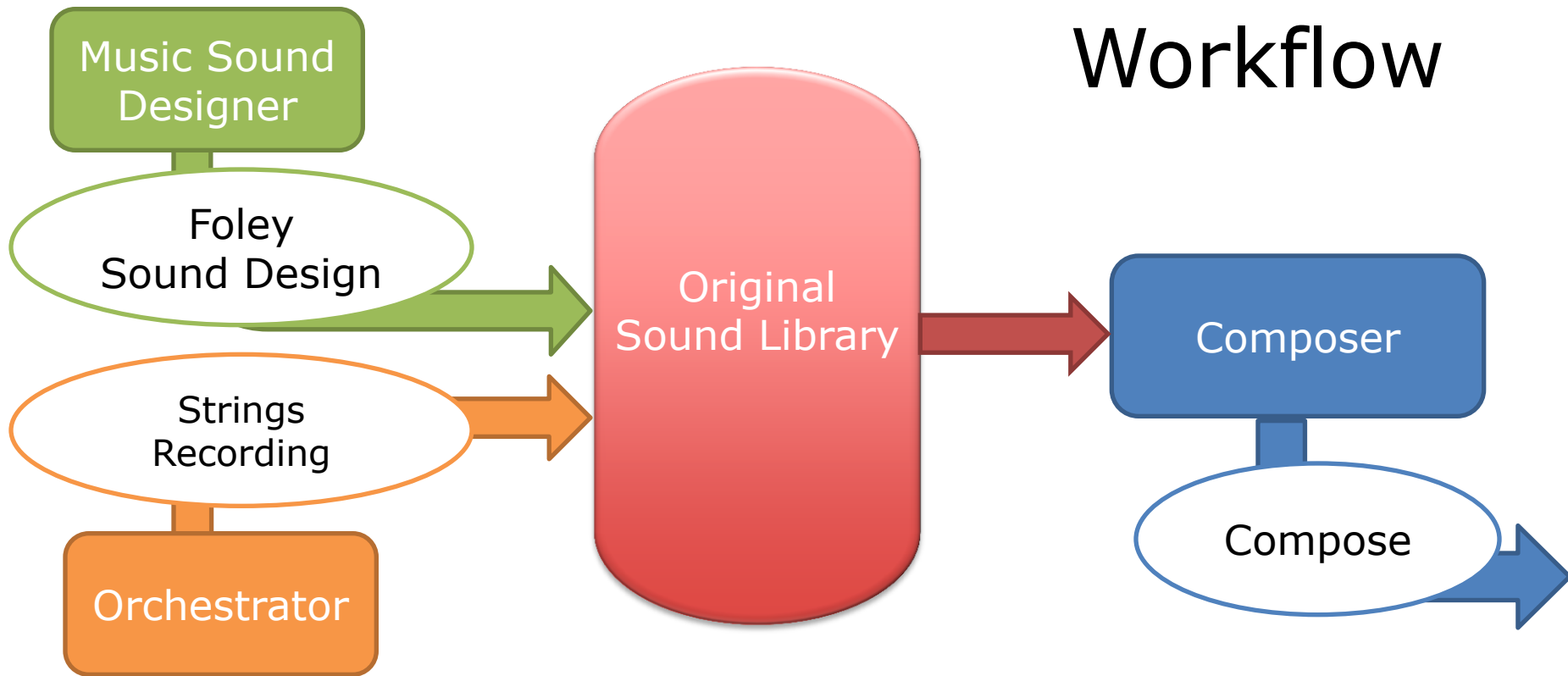
# Music Summary

- *Summer in Louisiana*
  - *High-temperature and humidity*
- *Cassette tape and VHS*
  - *Noise texture*
  - *Analog sound*
- *Old mansion*
  - *Ruined, dead, silent*
- *Mold*
  - *Decayed*





# Workflow





# Original Sound Library for Music

- Recording source = “**Sound Palette**”

- 10000 tracks
  - ✓ *Strings FXs*
  - ✓ *Voice FXs*
  - ✓ *Foley FXs*
  - ✓ *Pre-designed sound FXs*





# Strings FX Recording

- *THE BRIDGE RECORDING*
- *Orchestrated by*
  - Chad Seiter
  - Chris Velasco
- *Recorded and Mixed by*
  - Daniel Kresco
- *Edited by*
  - bitMaster Studio (CAPCOM)
- *Cinema Scoring, Los Angeles*
  - Vln. 1<sup>st</sup> 6
  - Vln. 2<sup>nd</sup> 6
  - Vla. 6
  - Vlc. 4
  - DB. 3

- **1/4 Tone Clusters**
- Tremolos & Trills
- Bending Clusters
- Col Legno
- **Super Low Clusters**
- Shot Sounds
- Percussive Sounds
- ...and More







# Voice FX Recording

- *The Village*

- *La Hacienda Creative*

- Actor 1
- Actress 2

- Whisper
- **Death Scream**
- Breath
- Laugh
- Beast Roar
- **Throat Sound**
- Wild Growl
- ...and More





# Foley FX Recording

- *La Hacienda Creative*

- *Produced by*

- *Brian D'Oliveira*

- *Lead Sound Designer*

- *Maximilien Simard-Poirier*

- *Sound Designer*

- *Pierre-Luc Sénécal*

- *Sound Editor*

- *Adamantia Klonaris*

- Prepared Piano

- Hurdy Gurdy

- Dilruba

- **Insect Noise**

- Sanukite (Bell-like)

- Sand Paper

- Sledgehammer Sound

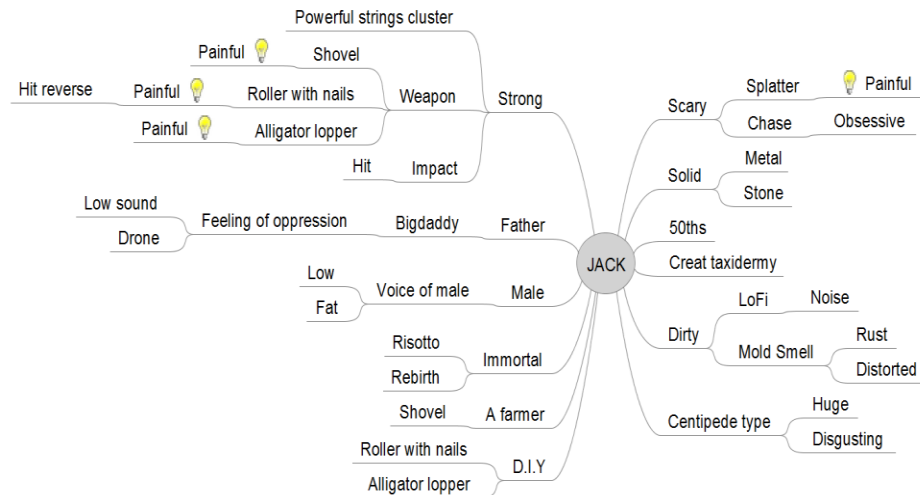
- ...and More





# Sound texture for characters

- *La Hacienda Creative*
- Unique sound for each character
  - Foley FX sounds







# Resident Evil Music Module

## *REMM Staff:*

- *Designed and produced*  
✓ *Koyo Sonae*
- *Scripter*  
✓ *Casey Edwards*
- *UI designer*  
✓ *Scott Kane*

## Features:

### • KONTAKT Instrument

- Editing
- Lemur
- Process effects
- Playback-speed adjustable
- Flexible patching
- 3 octave layer





# Let's watch!





# Other plug-ins

## Soundtoys

- ✓Crystallizer
- ✓Echo Boy
- ✓Decapitator
- ✓Panman

## Nomad Factory

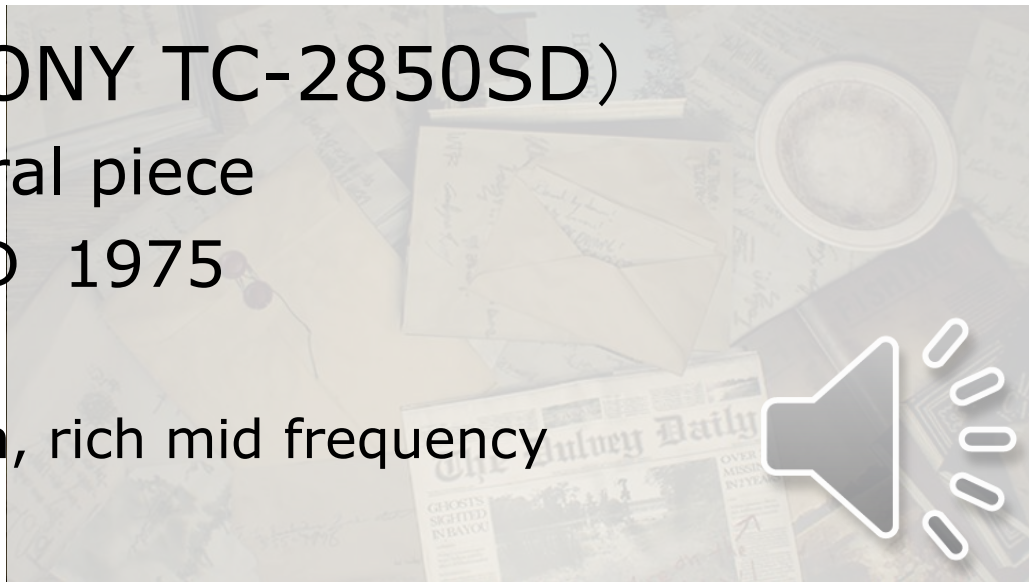
- ✓MAGNETIC II





# Tape sound

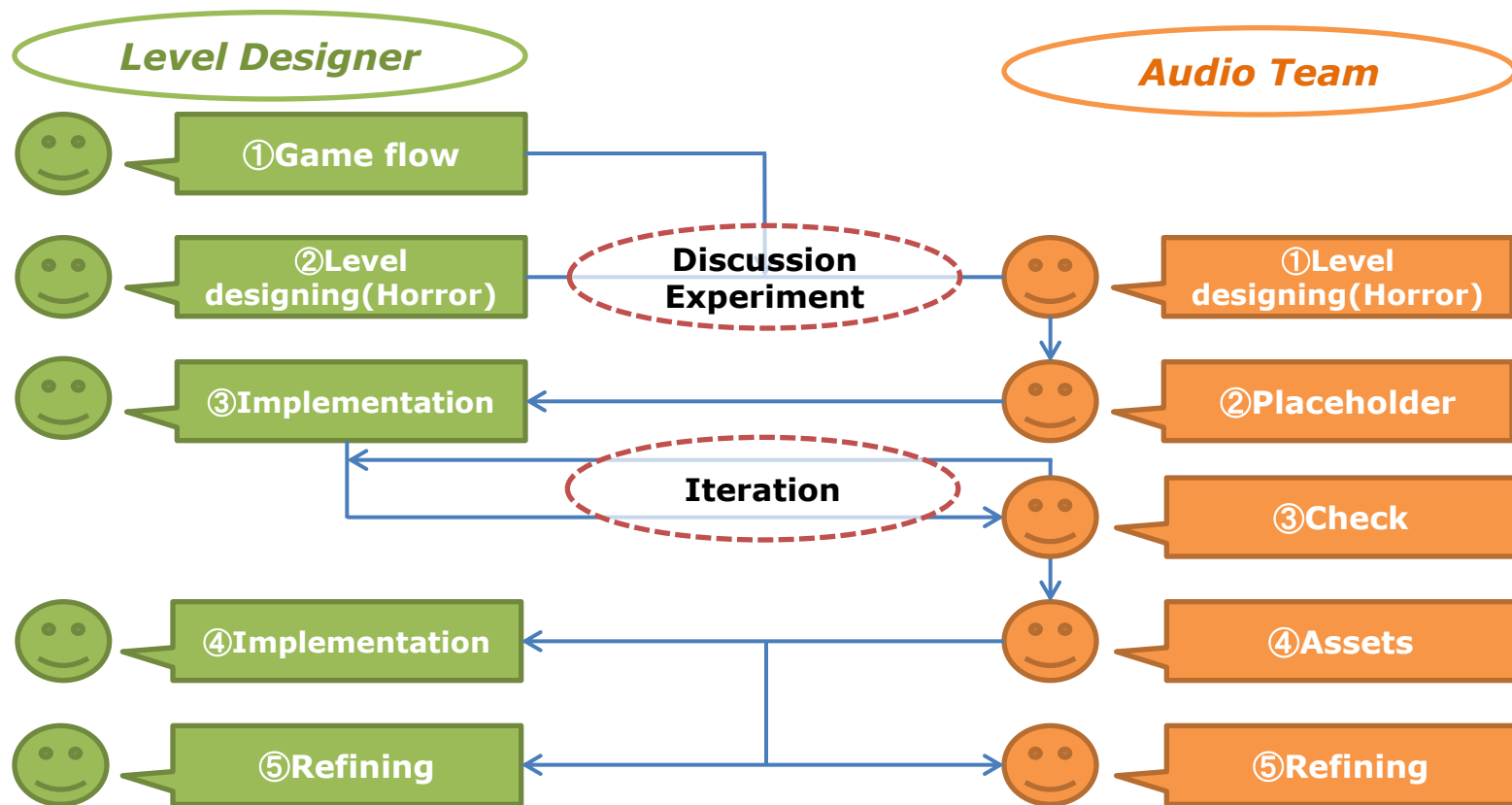
- Tape recorder (SONY TC-2850SD)
  - **Re-amped** several piece
  - SONY TC-2850SD 1975
  - Tape heads
    - **Analog warmth**, rich mid frequency





# Working with level designers









# Thank you!

# Arigato Gozaimashita





# Q & A

