

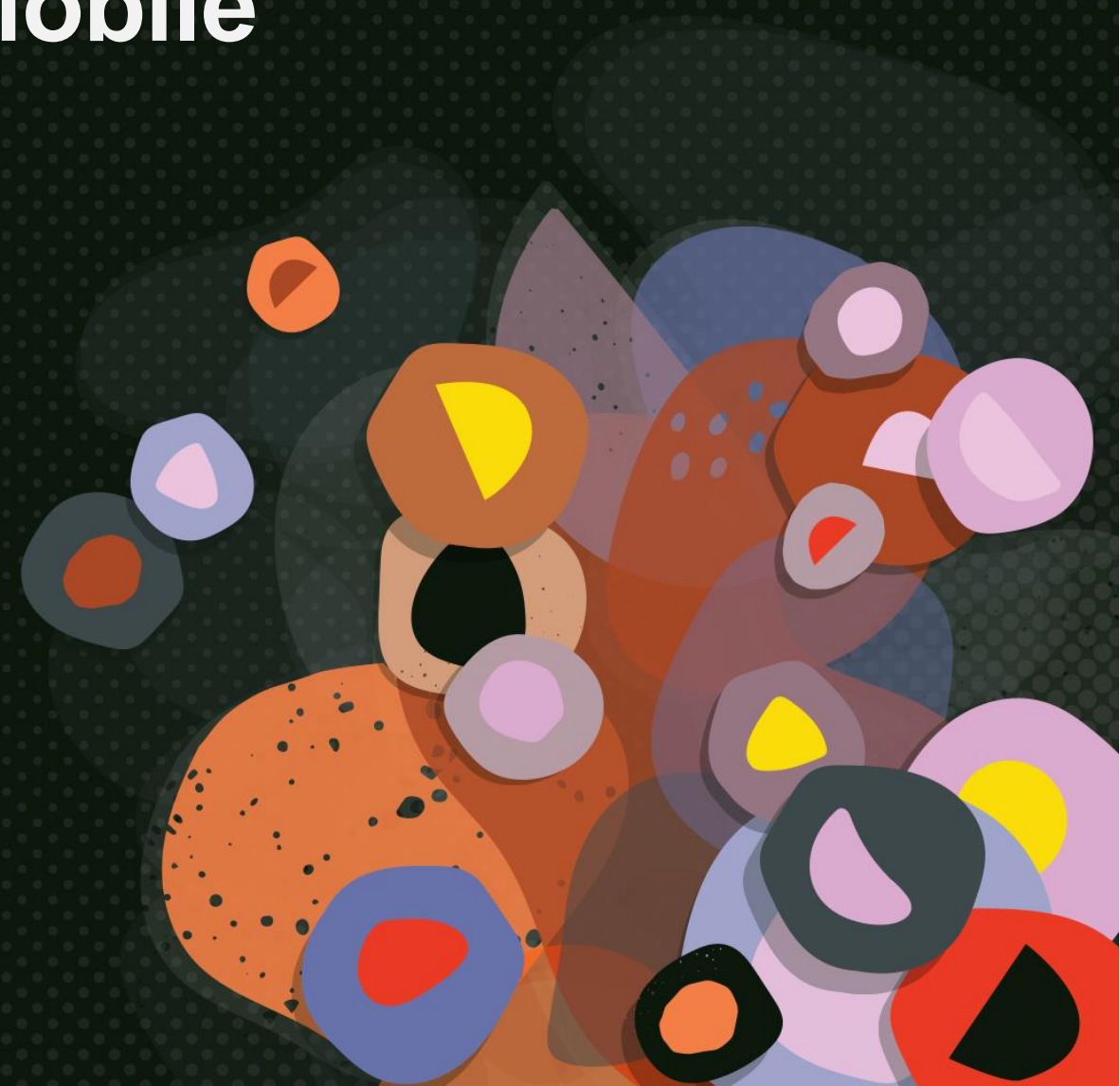


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San Francisco, CA

# Recording Art and Engineering Practice: Social Network with Musical Instruments in "Revelation Mobile"

Mingming FU & Zechen Xu  
Audio Designer & Project Manager  
NetEase

#GDC22







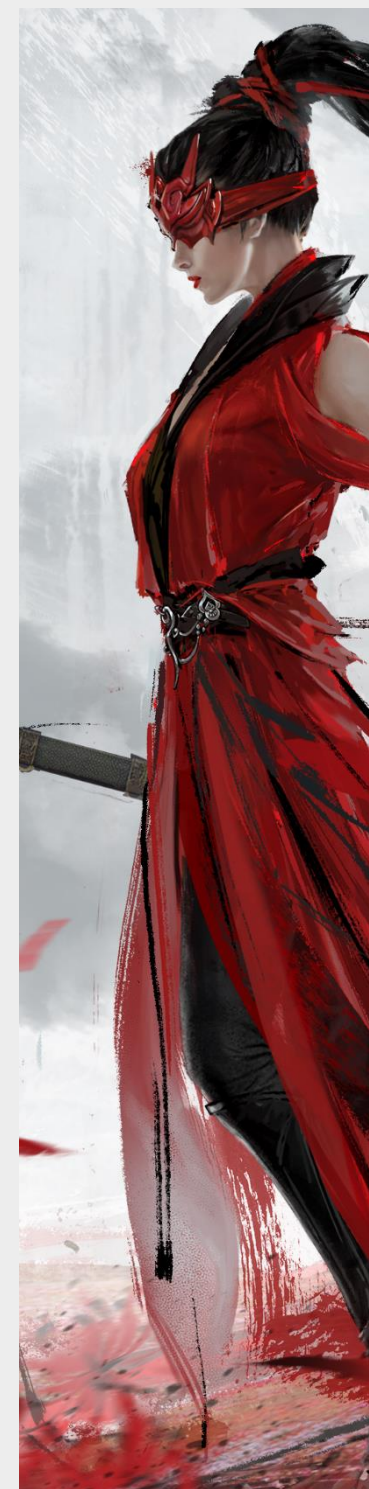
THUNDER FIRE  
STUDIO

# Mingming FU

Game Audio Designer

# Zeichen Xu

Data Product Manager & Project Manager



# Overview

## Part I

- Musical gameplay in a MMO game? Why?
- Play as a musician!
- From "one-man band" to "50-man band"
- The spread of musical gameplay

## Part II

- A mobile game built-in DAW
- Built-in 19 types of Virtual instruments
- Performance optimization & Workflow of introducing a new instrument

## Takeaway

# **01 Musical gameplay in a MMO game? Why?**



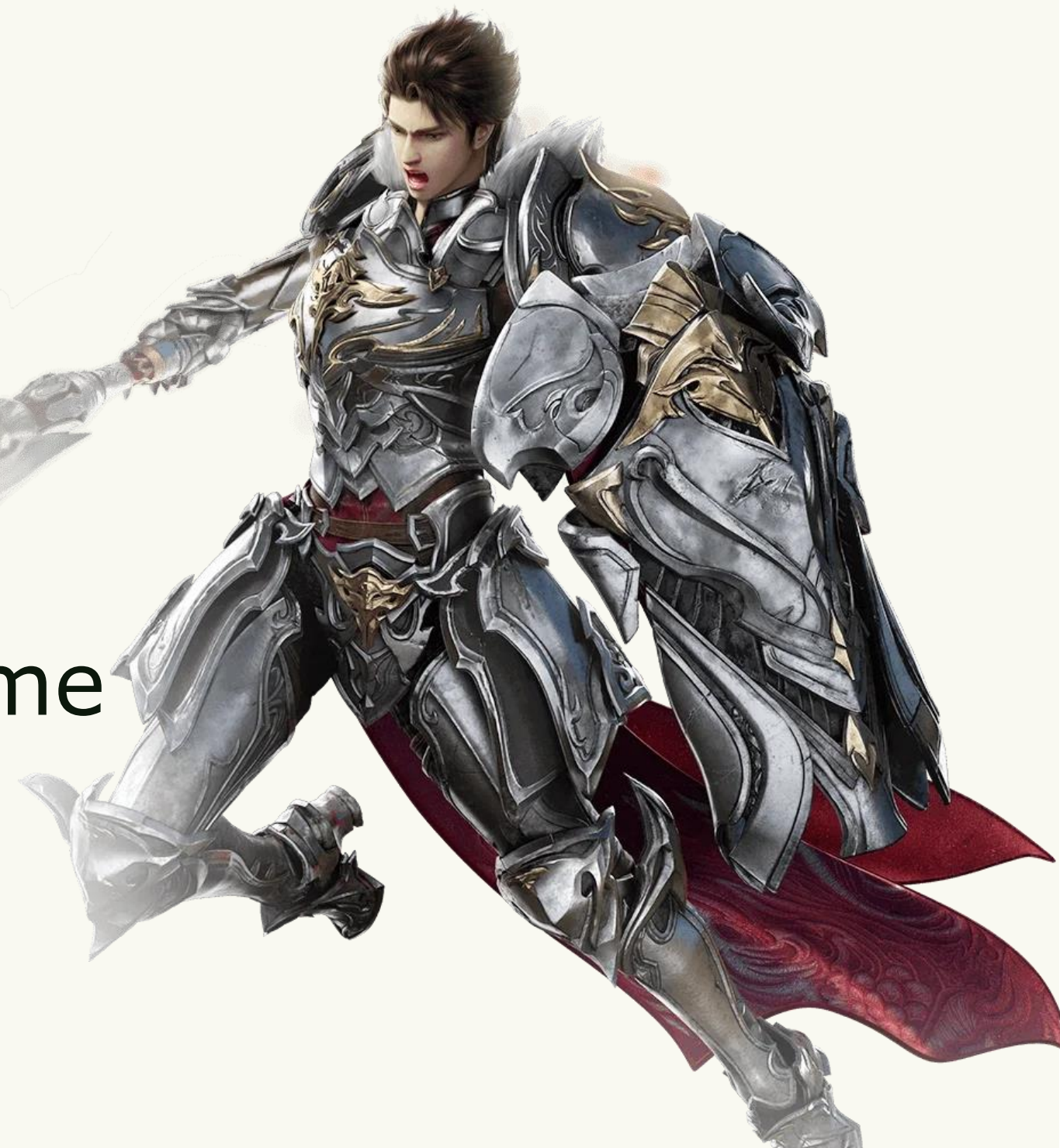
# 1 Birth of Musical gameplay





## Feature:

- 01 Participate in most of the play
- 02 Cultivate combat attributes
- 03 Take up most of the player's time



# Traditional Combat Roles VS **Leisure Participation**



## Feature:

- 01 Not core gameplay
- 02 Enrich non-battle experience
- 03 Meet needs of certain players



# Musical gameplay makes the game world more real

**Keywords** from Million Players Questionnaire survey (Multiple choice) :

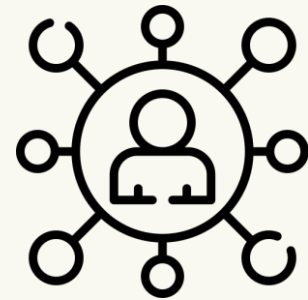
**At ease**

26%



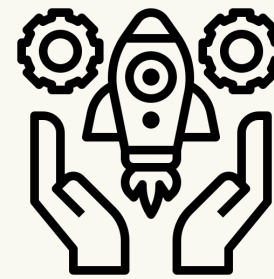
**Sociality**

20%



**Creation**

11%



**Simulated reality**

7%



We **do** need some casual gameplay with higher degrees of freedom

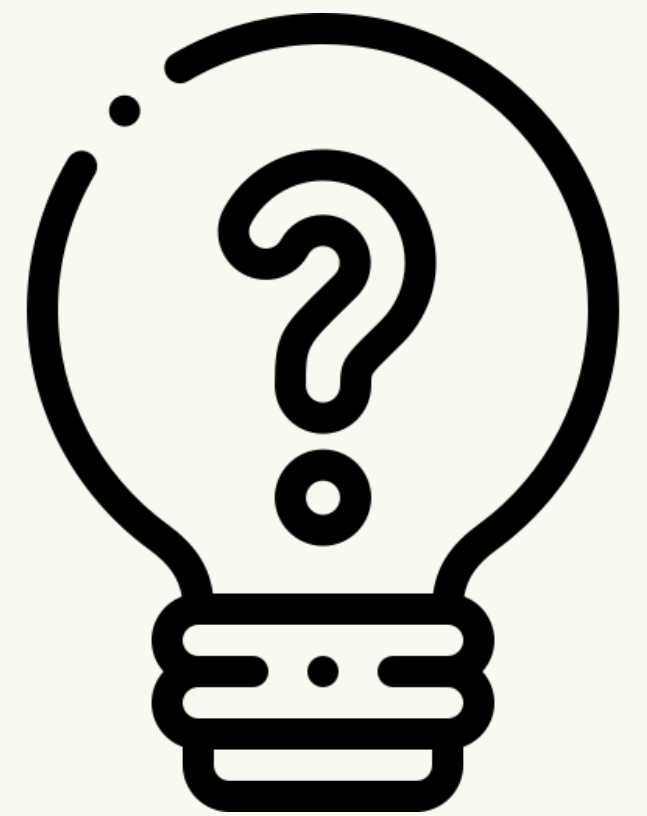


**1**

# Musical gameplay makes the game world more real

## What do we need?

- 01** Brand-new game experience
- 02** Improve social participation
- 03** More creativity freedom
- 04** Cover more leisure players



**1**

# **Musical gameplay makes the game world more real**

## **What do we need?**

## **Musical gameplay**

**01** Brand-new game experience

Music play

**02** Improve social participation

Band form

**03** More creativity freedom

Composition

**04** Cover more leisure players

Wide scope



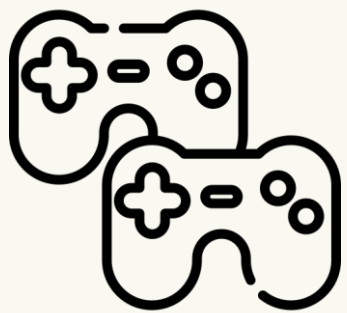
1

**Musical gameplay makes the game world more real**

**Music: Highly overlapping user structure**



**Streaming Music Users > 810 million**



**Mobile Games Players > 720 million**

1

# A successful gameplay?



**> 3 million**

**Music composed**



**> 20 million**

**Number of times played**



**> 100 Years**

**Total performance time**



1

**A successful gameplay?**

**Reason to retain our players:**

**29%**

**A social occupation with high  
degree of **creativity freedom****

# A successful gameplay?

## Reason to retain our players:



**43%** In-game friends

**28%** Enjoyable gaming experience

**26%** In-game goal pursuit



**38%** In-game friends

**31%** In-game goal pursuit

**26%** Enjoyable gaming experience



# **02 Play as a YueShi ( Musician ) !**

## 2 Who is YueShi?



YueShi

- Music professional
- Create & perform music

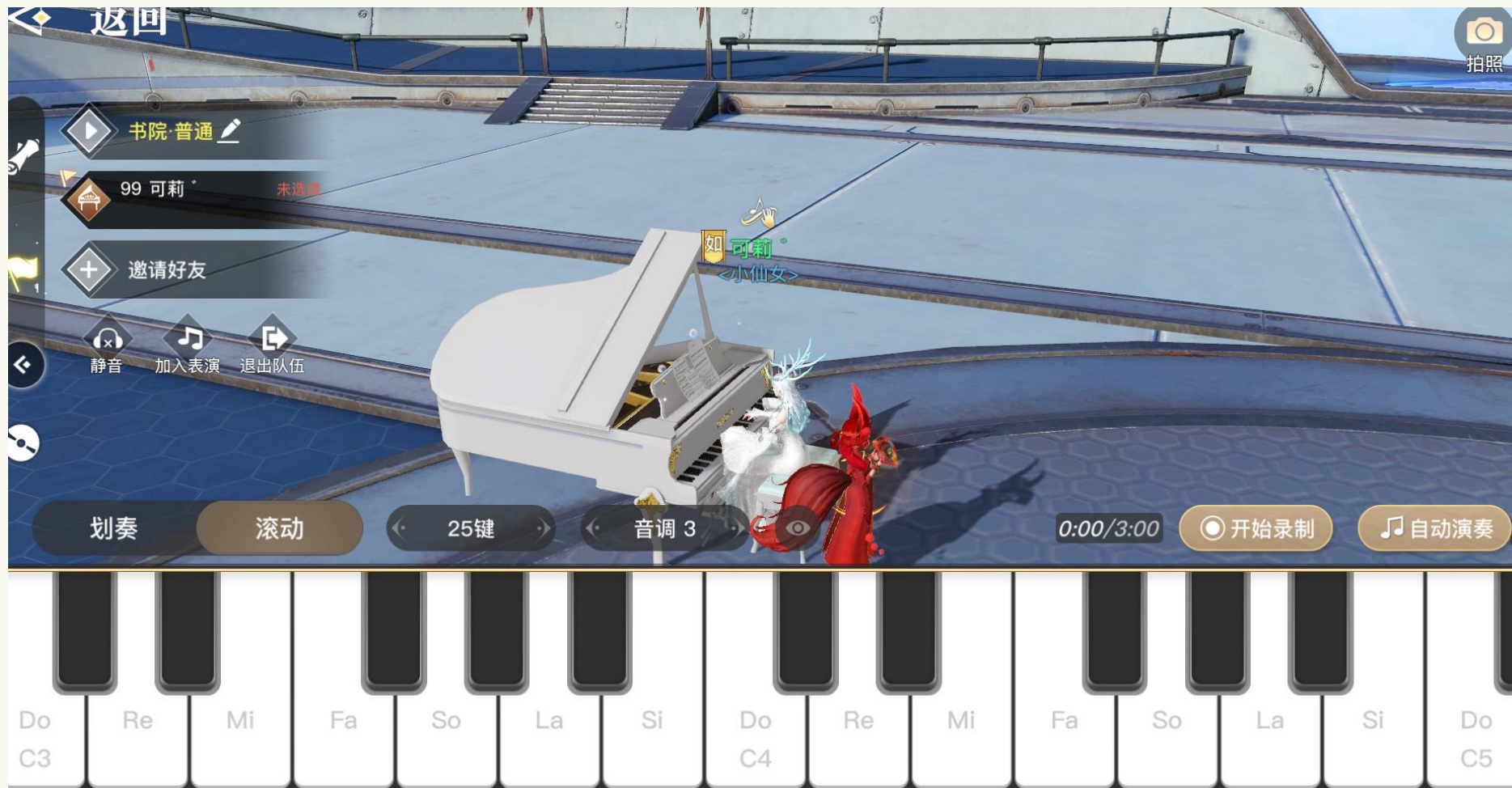
Ancient Chinese names for **musicians**, first appeared in 1000 BC



2

# Play as a YueShi ( Musician ) !

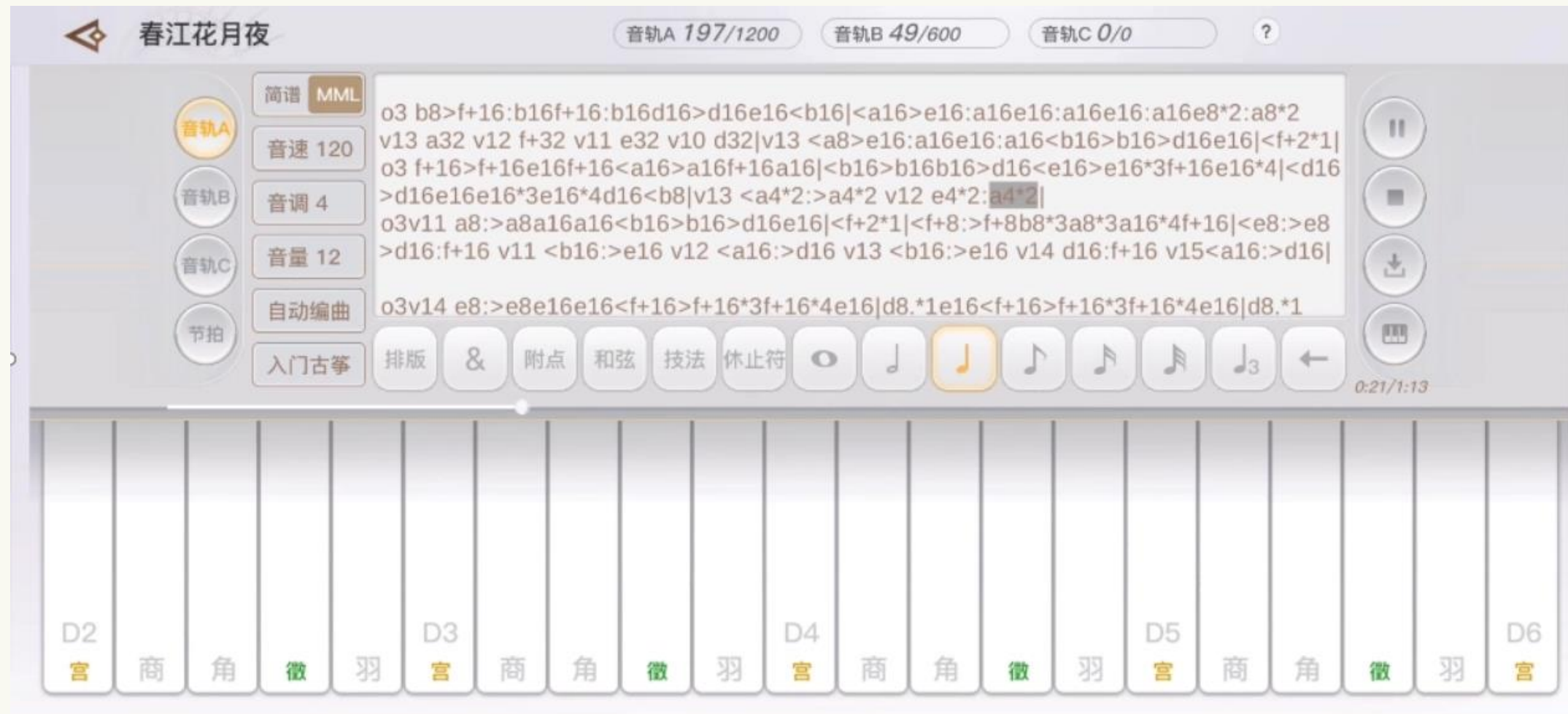
## Improvisation



**Players can choose their own musical instruments and play music on 88 key(Maxmum) piano-roll editor.**

## 2 Play as a YueShi ( Musician ) !

# Composition & Edit music score



**Players can edit music scores at the interface or import external music scores into the game.**



## 2 Play as a YueShi ( Musician ) !

### Upper limit:

19 instruments, 29 techniques, compose at will.

### Lower limit:

players with 0 music instrument background can be involved by broadcasting automatically.

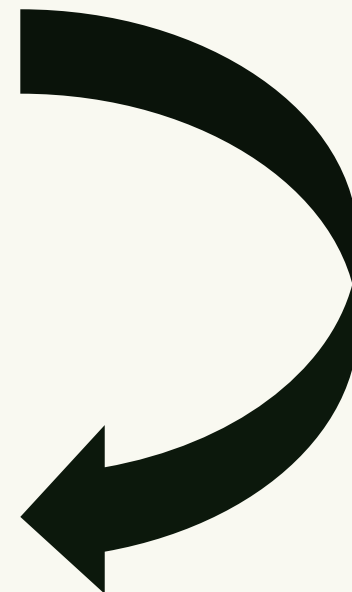
**High degree of freedom**



# **03 From "one-man band" to "50-man band"**

## Music as a method of relieving social anxiety:

Rewarding a Music player



Conversion ratio: **48%**

Applying to add a friend



## Strong tie

- Strong **homogeneity** in social network
- Strong emotional connection
- Shared hobby to become friend

## Weak tie

- Strong **heterogeneity** in social network
- Loose relationship
- Emotionally low maintenance

## Strong tie

- Union and group
- In-game marriage
- **Music gameplay**

## Weak tie

- Temporary team
- Matching
- Trade



# 3 Let's Make a Band

## Instrumental ensemble





### 3 Social relationship and band

**Band based  
social contact:**

Increased numbers of times of playing together



**Relationship  
strength**

**Strong tie:** increase social  
stability and retention

3

## Band gameplay increases retention

**Players involved in band gameplay**

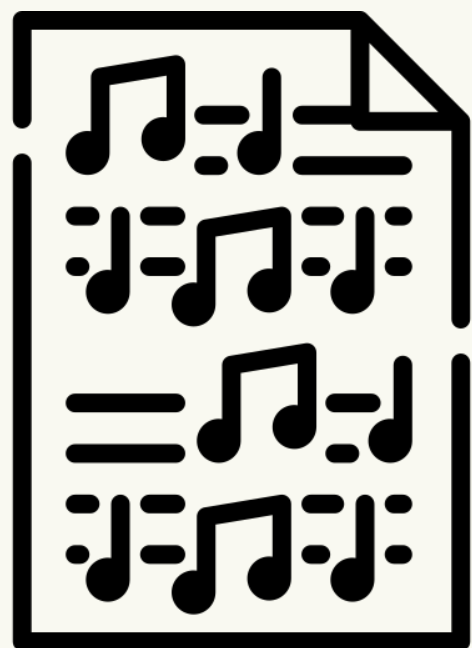
**VS**

**Regular Players**

**Retention 30 days: + 28.5%**

# **04 The spread of musical gameplay**





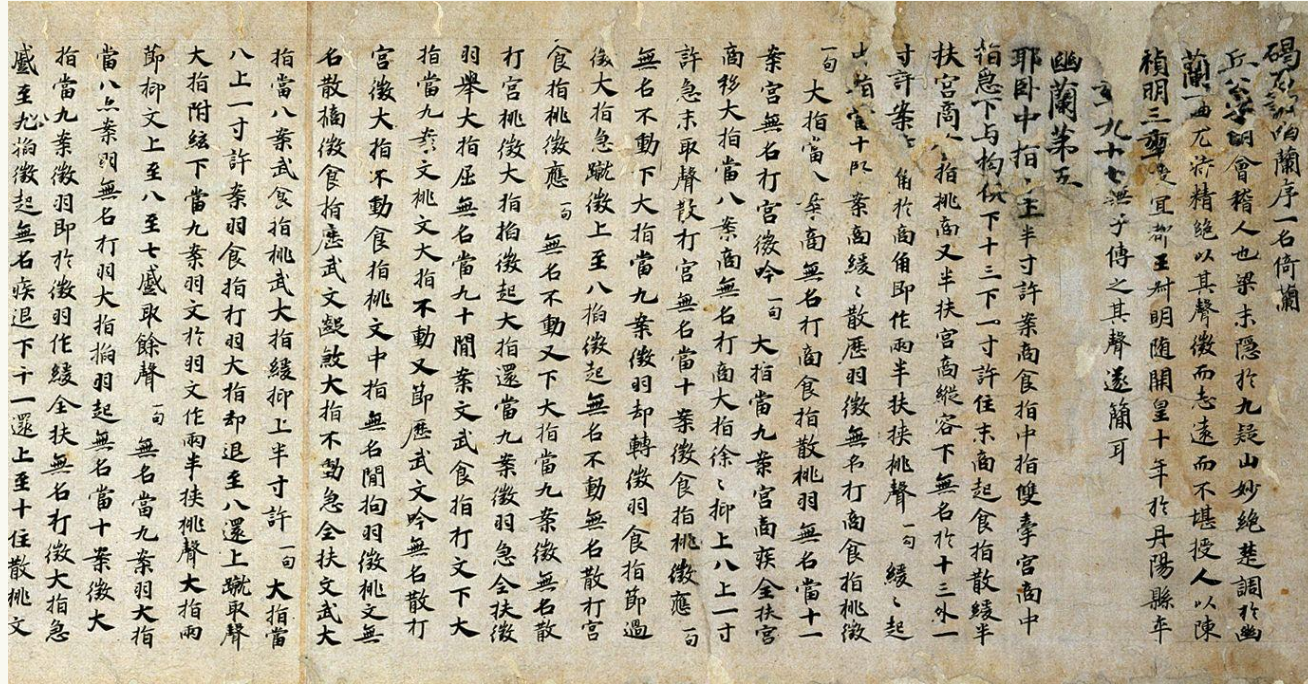
## Perform replication

High-difficulty, low-coverage, low-efficiency

## Medium reproduction

Low-difficulty, high-coverage, high-efficiency

Techniques in storage and broadcasting make it possible to **spread music** more quickly and efficiently.



## *Jieshi Diao Youlan*

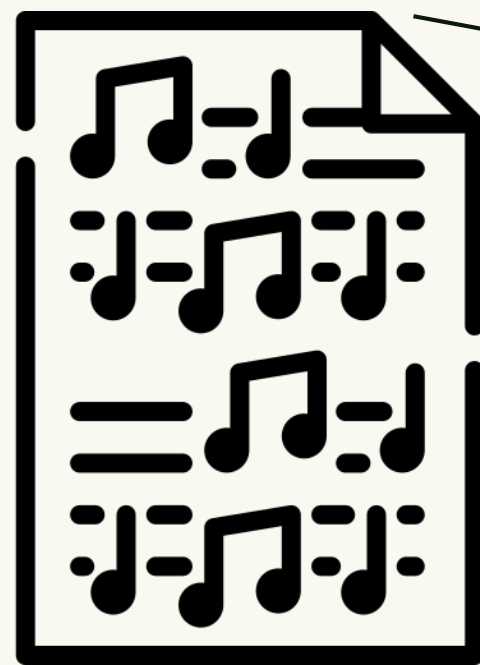
The earliest surviving Guqin score in China

## Play music according to ancient music score



To further spread music score, **MML** is chosen as language of music score

## Import a score:



**Out Game**



**In Game**

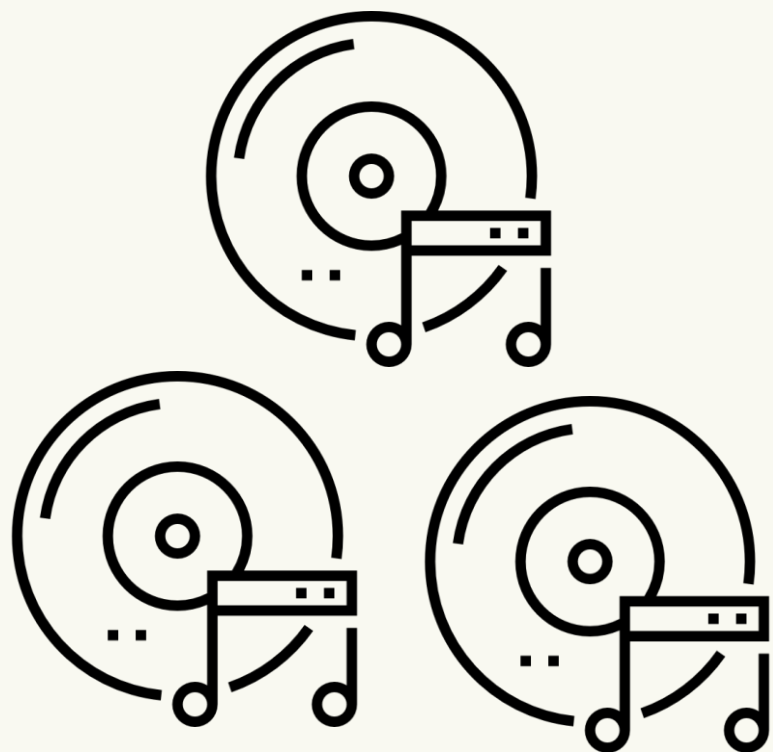




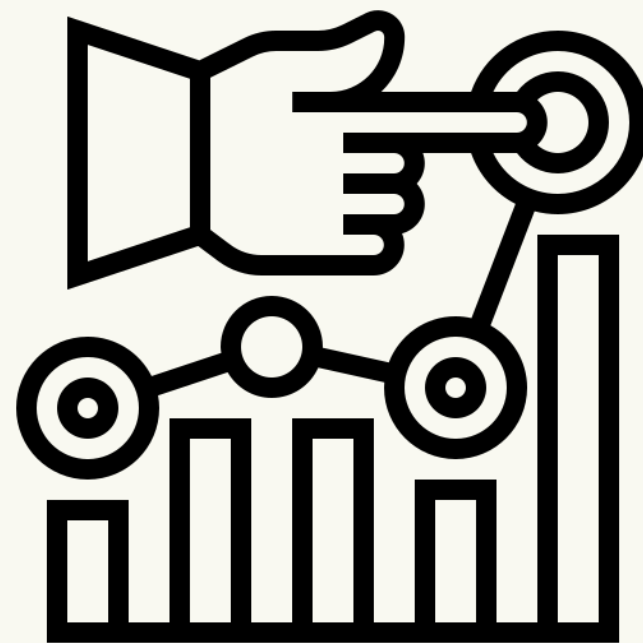
**Turnover: 3 million+**

**Music score market**

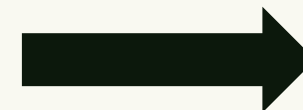
# Self regulation of music score trading market



**Music score of  
various qualities**



**Market  
Regulation**



**Music score of  
better quality**

# **05 A mobile game built-in DAW**

(Digital Audio Workstation)



# 5 What Revelation Mobile wants?

## Music Game

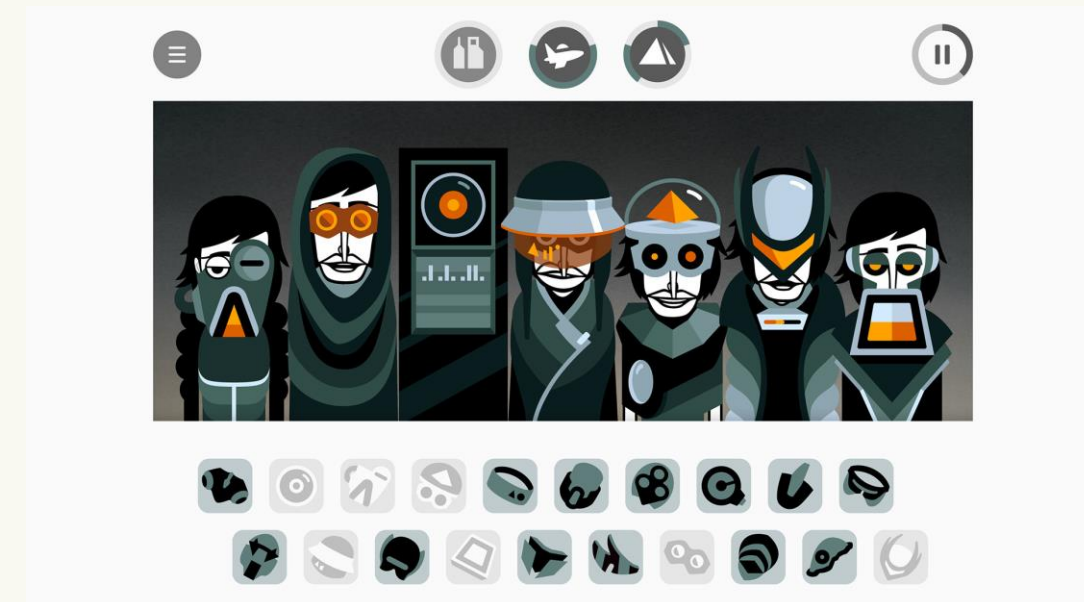
### 01 Rhythm-matching



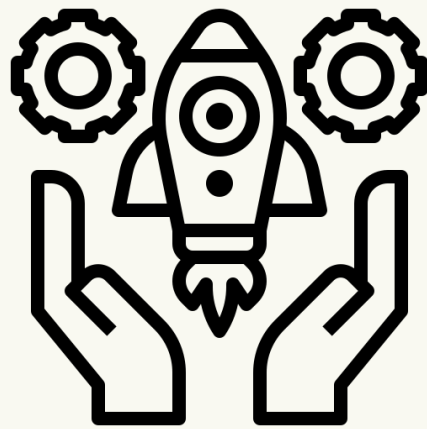
### 02 Music-making



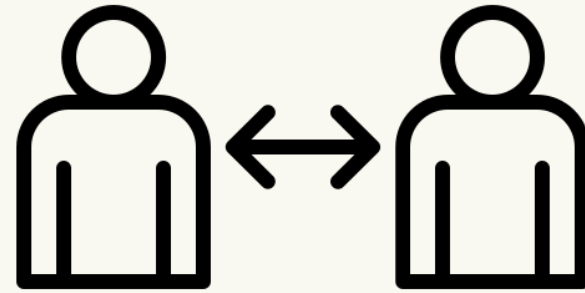
### 03 Music-mixing



## Music-making games



**Freedom  
&  
playability**



**UGC  
&  
Spread**



**Social  
Attributes**

# What Revelation Mobile wants?

**To provide the ability to create their own music:**

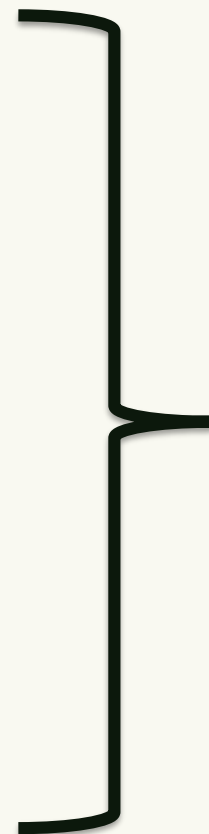
**01** Multi tracks play back

**02** Melody

**03** Rhythm

**04** Tempo

**05** Mixing



**DAW**  
**Digital Audio Workstation**



春江花月夜

音轨A 197/1200 音轨B 49/600 音轨C 0/0

简谱 MML t45v13

音速 120 音调 4 音量 12 自动编曲 入门古筝

凌波馆内，美酒在侧，只差故友一位。

o3 b8>f+16:b16f+16<a16>a16f+16a16|<b16>b16b16>d16<e16>e16\*3f+16e16\*4|<d16>d16e16e16\*3e16\*4d16<b8|v13 <a4\*2:>a4\*2 v12 e4\*2:a4\*2|  
o3v11 a8:>a8a16a16<b16>b16>d16e16|<f+2\*1|<f+8:>f+8b8\*3a8\*3a16\*4f+16|<e8:>e8  
>d16:f+16 v11 <b16:>e16 v12 <a16:>d16 v13 <b16:>e16 v14 d16:f+16 v15<a16:>d16|

排版 & 附点 和弦 技法 休止符

D2 宫 商 角 徵 羽 D3 宫 商 角 徵 羽 D4 宫 商 角 徵 羽 D5 宫 商 角 徵 羽 D6 宫



# Revelation game built-in DAW

The screenshot displays the built-in DAW interface for the game 'Revelation'. The title '春江花月夜' (Chun Jiang Hua Yue Ye) is at the top left. The interface includes a 'Tempo' section with '音速 120' and '音调 4'. A 'Music Macro Language' (MML) editor shows three lines of code: `o3v11 a8:>a8a16a16<b16>b16>d16e16|<f+2*1|<f+8:>f+8b8*3a8*3a16*4f+16|<e8:>e8>d16:f+16 v11 <b16:>e16 v12 <a16:>d16 v13 <b16:>e16 v14 d16:f+16 v15<a16:>d16|`, `o3v14 e8:>e8e16e16<f+16>f+16*3f+16*4e16|d8.*1e16<f+16>f+16*3f+16*4e16|d8.*1f+16<e8:>e8f+8*3|<e16 v13 b16:>e16 v12 <b16:>e16 v11 <b16:>e16 v10 e8*2 <e8|`, and `o3v14 e8:>e8e16e16<f+16>f+16*3f+16*4e16|<d16>d16d16f+16<e16>e16*3f+16e16*4|<d16>d16d16f+16<e16>e16*3f+16e16*4|o2 b8>b16b16d16>d16*3d16*4<b16|`. The interface also features a 'Mixing' section with '音轨A', '音轨B', and '音轨C' buttons, and a 'Rhythm' section with various note and rest icons. At the bottom is a 'Piano roll to edit melody' with keys labeled D2, D3, D4, D5, D6 and their corresponding Chinese names: 宫, 商, 角, 徵, 羽. Annotations with arrows point to the 'Multi tracks play back' section, the 'Mixing' section, the 'Rhythm' section, and the 'Piano roll to edit melody'.

春江花月夜

Tempo

音轨A 197/1200 音轨B 49/600 音轨C 0/0

Music Macro Language

Multi tracks play back

Mixing

Rhythm

Piano roll to edit melody

## Revelation game built-in DAW

What is **MML** ( Music Macro Language ) & why?

- **Cost-effective**
- **Easy to spread**

Functions achieved through this built-in DAW:

- **Real time performance**
- **Compose**
- **Band**

# Functions achieved through this built-in DAW





# **06 Built-in 19 types of Virtual instruments**

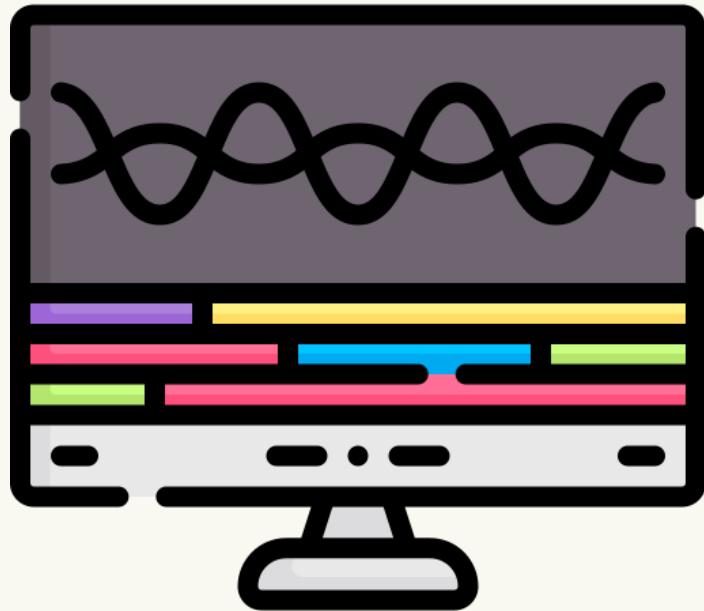


6

# 19 Virtual Instruments: Design

## Design

## Virtual instruments



**Synthesized instruments**



**Sampled instruments**

**01****Types****02****Multisampling?****03****Articulations****04****Velocity & dynamics**

## Recording



**Multisamplin?**

**Nope!**

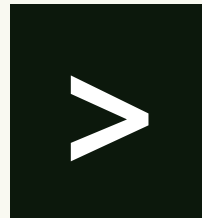
**Why?**

# 6 19 Virtual Instruments: Design

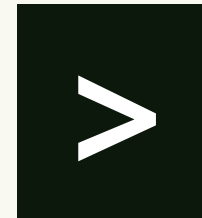
**Aims** Improve instruments quality & Reduce package size

**Importance:**

**Types**



**Articulations**



**Multisampling  
&  
Dynamics**



**Articulations**

**How?**



## Articulations

### 01 Using Samples

Harmonic / Vibrato / Palm Mute ect.....

### 02 Methods based on FMOD functions and programming

Pitch bend / Legato / Stacato ect .....



**Velocity  
&  
Dynamics**

**How?**

## Velocity & Dynamics

### 01 Dynamic layers

Instruments with a few notes like a drum set

### 02 Volume

Instruments with wider sound range

## Recording



## Equipment

- Gibson Les Paul Standard '60s with Marshall JCM 800
- Fender AMERICAN PROFESSIONAL II PRECISION BASS with ampeg SVT-7PRO+SVT-810AV
- Martin guitar standard series HD – 28
- Cordoba Classical Guitar C9
- DW Performance drum set
- Christina Master Violin EU6000C
- Christina cello C07
- Marimba
- Chinese Drums
- Chinese Huqiu Erhu
- Chinese Qudi (Chinese bamboo flute)
- Chinese Dunhuang Guzheng
- Chinese Pipa
- Chinese Suona
- Chinese Xiao

Neumann U87 & Schoeps-CMC-MK4  
Neve 1073 & Neve 5211





# Chinese Chiba





## Chinese Suona





## Chinese Erhu





# Chinese Suona



## Processing

**Audio format:**  
**Mono 44.1kHz wav**

**True peak:**  
**-3db**

**Loudness:**  
**-16lufs**

## Build virtual instrument in FMOD

**01 Events**

**02 Mixing**

**03 Banks**

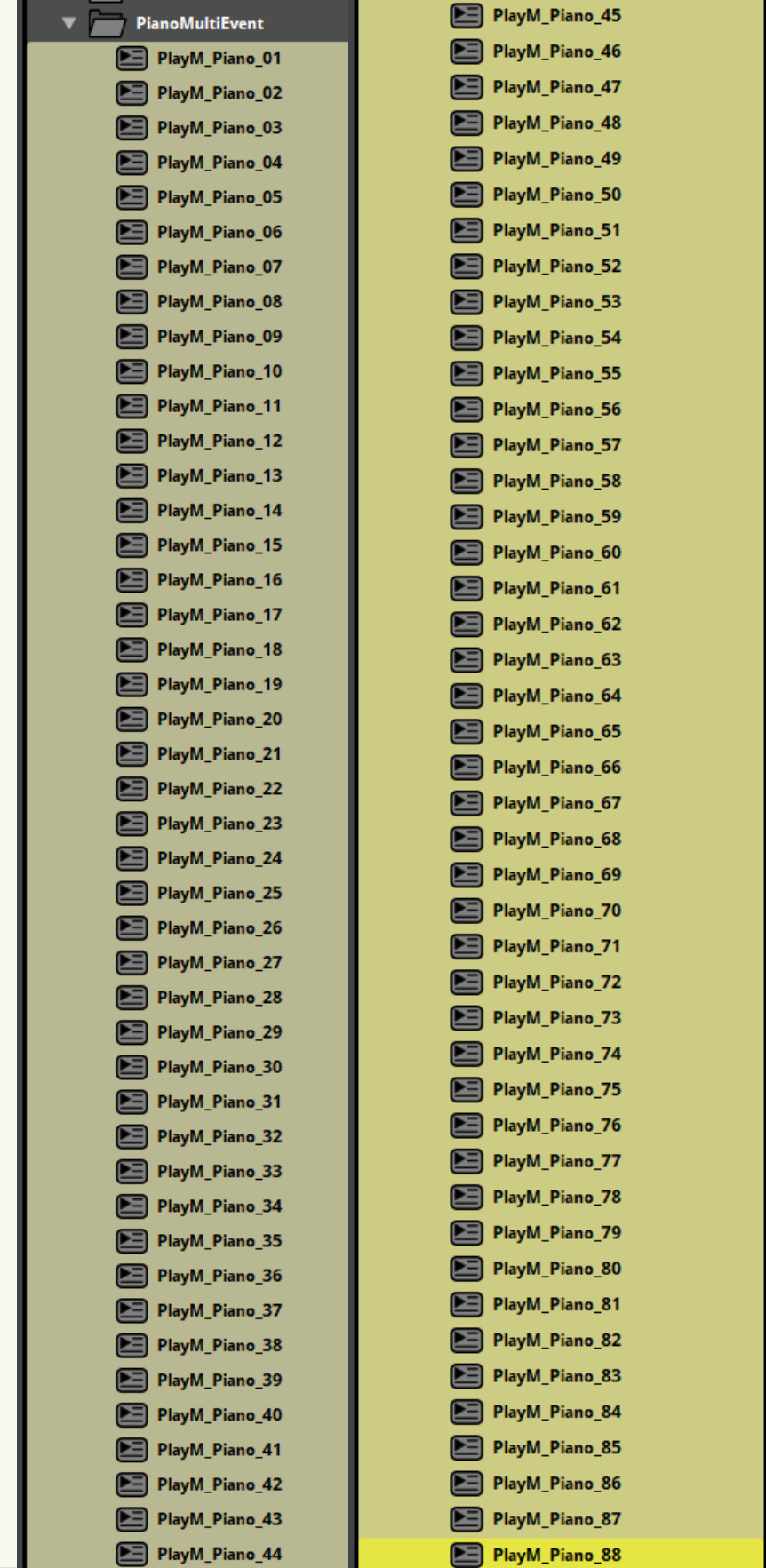
## Events

**Every music note was mapped to its corresponding 3D events in FMOD.**

### Take the piano as an example

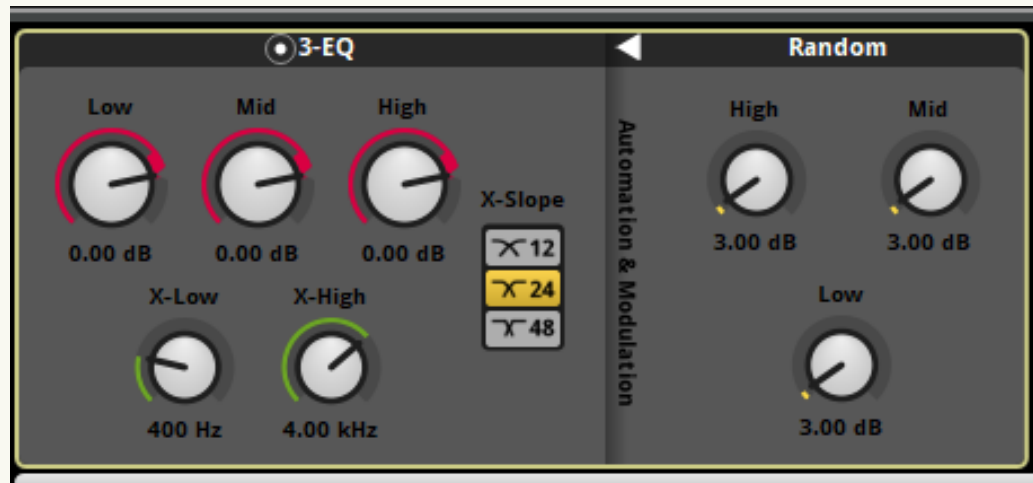
Note: C0 - FMOD event: PlayM\_Piano\_01

Note: C8 - FMOD event: PlayM\_Piano\_88

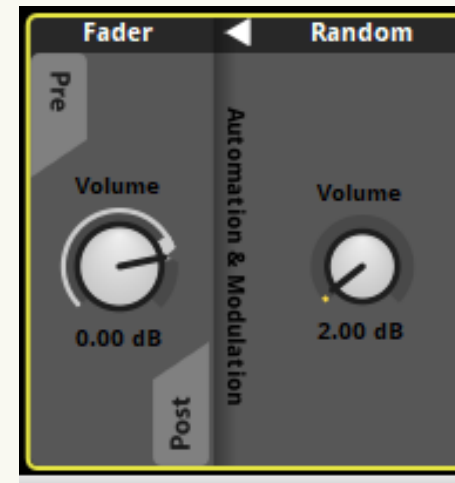




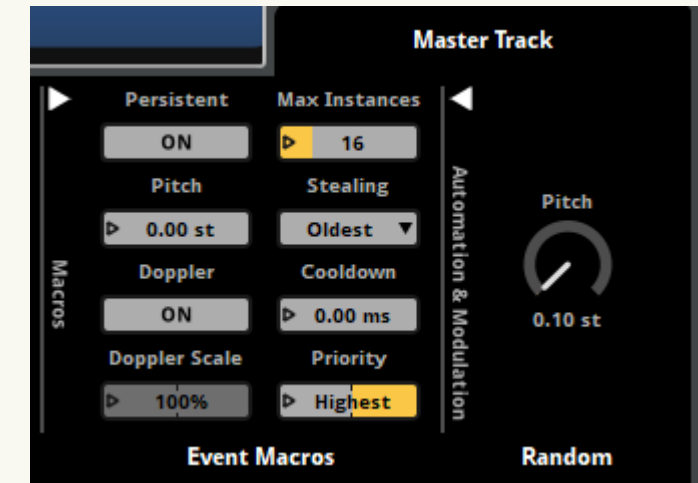
## “Multisampling” by FMOD:



EQ random modulation

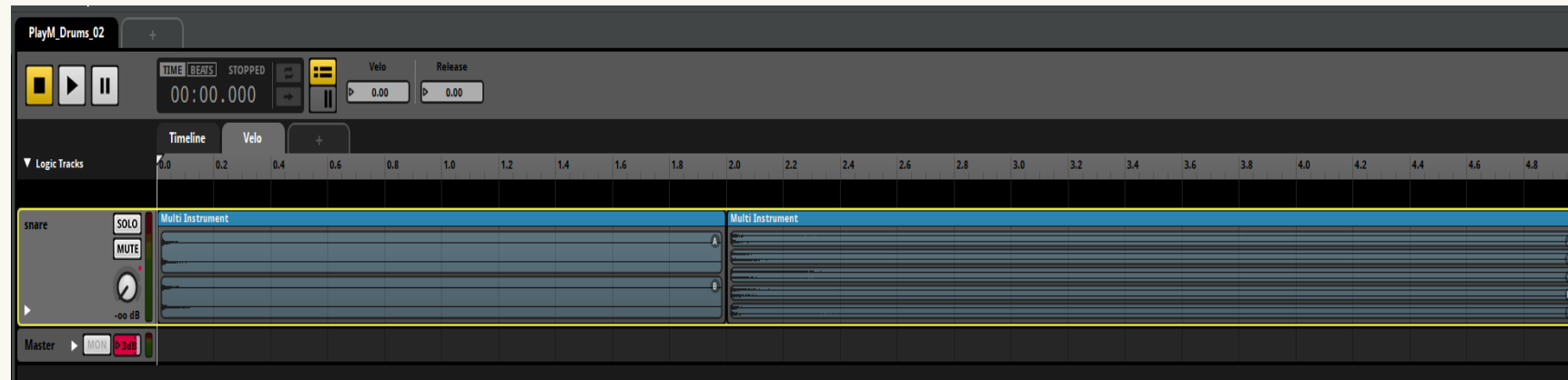


Volume random modulation

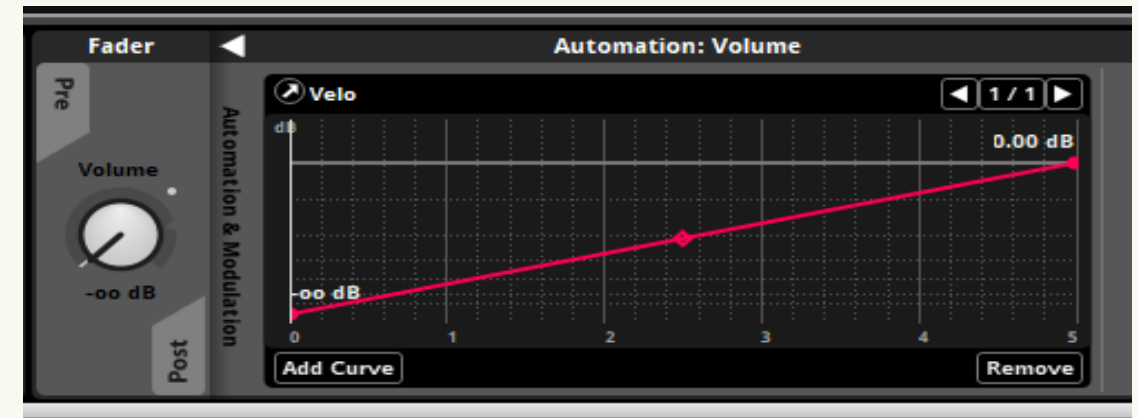


Pitch random modulation

## Velocity & dynamics:



Dynamic layers

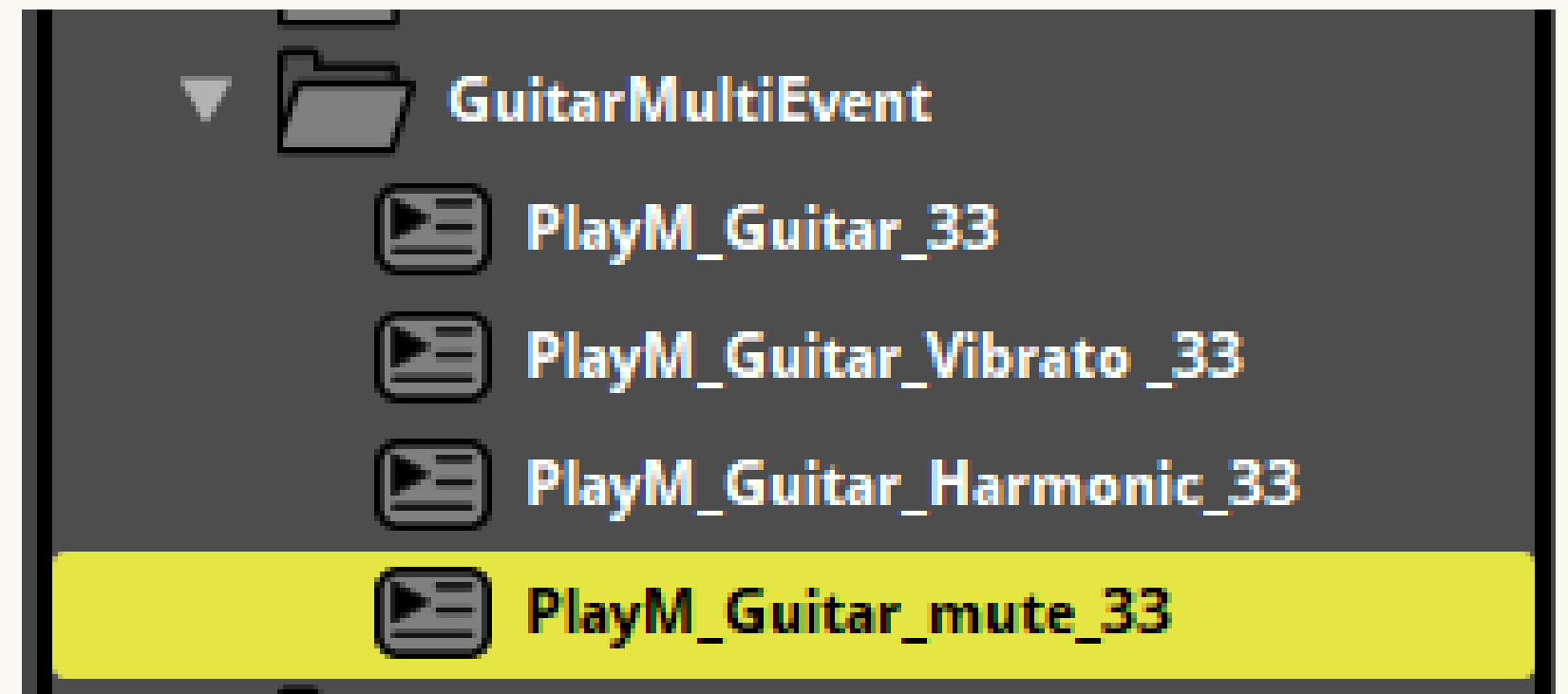


Volume automation

## Articulations:

### 01 Using Samples

### 02 Methods based on FMOD functions and programming



Mapped to corresponding new events

## Articulations:

**01 Using Samples**

**02 Methods based on FMOD  
functions and programming**



### **Pitch blend**

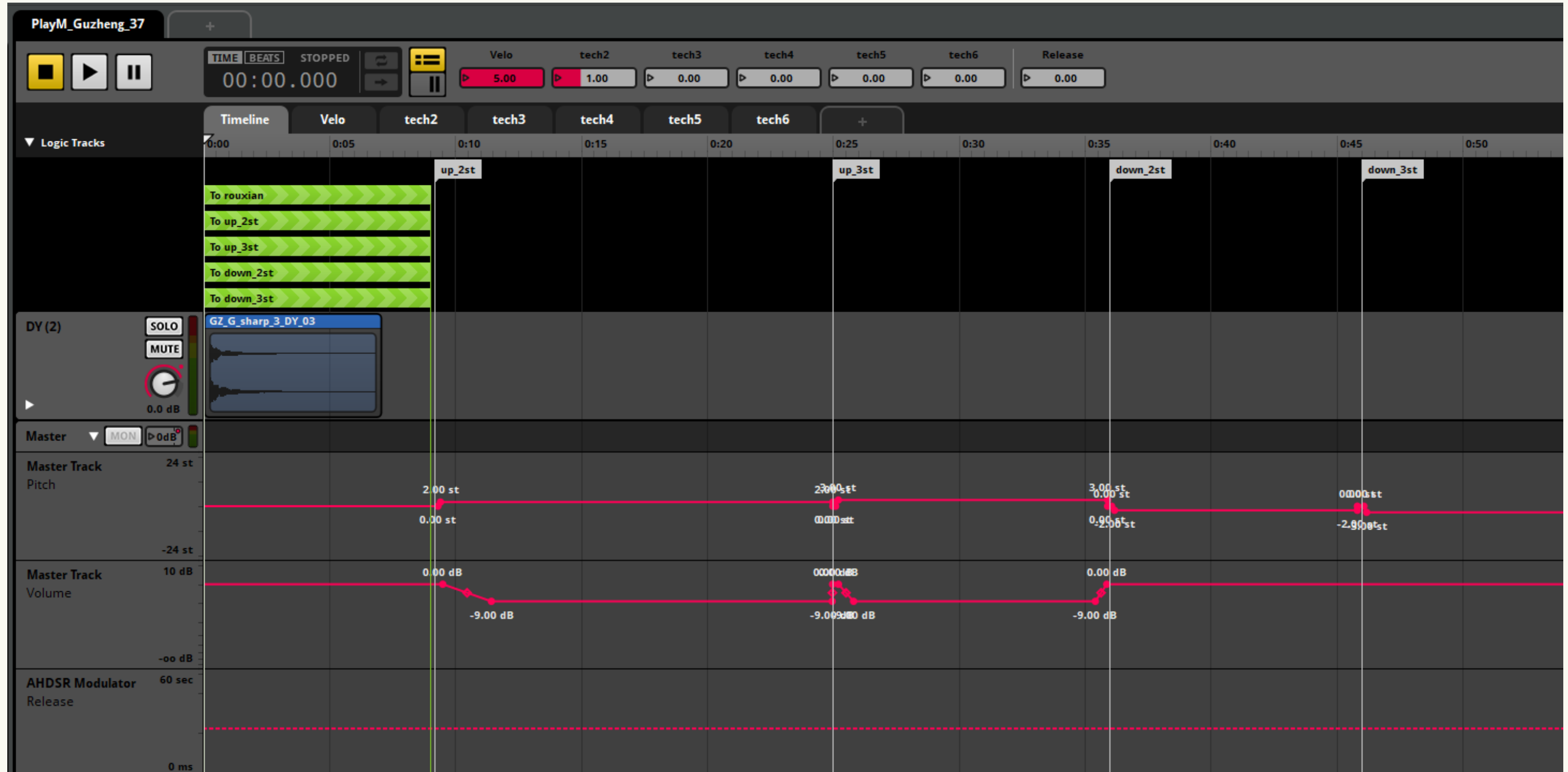
By pitch and volume automation in FMOD

### **Legato / Stacato**

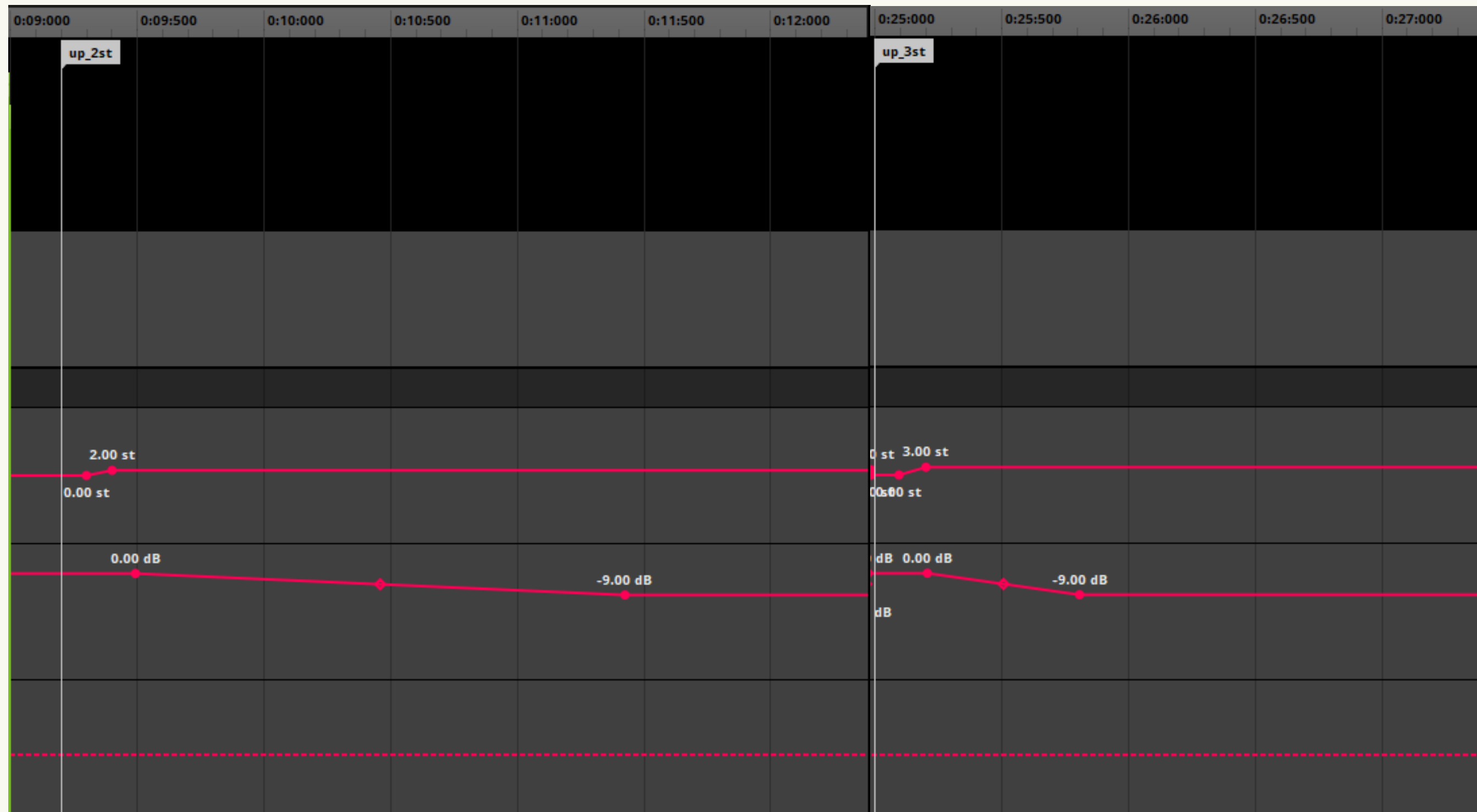
By attack and release automation in FMOD



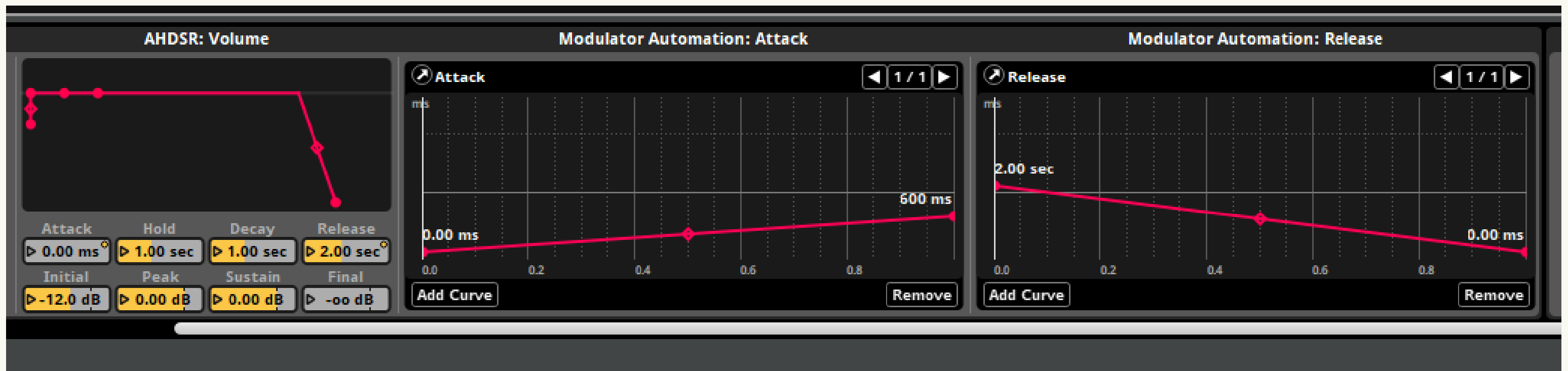
# 19 Virtual Instruments: Pitch blend in FMOD



# 19 Virtual Instruments: Pitch blend in FMOD



# 19 Virtual Instruments: Legato/Stacato in FMOD

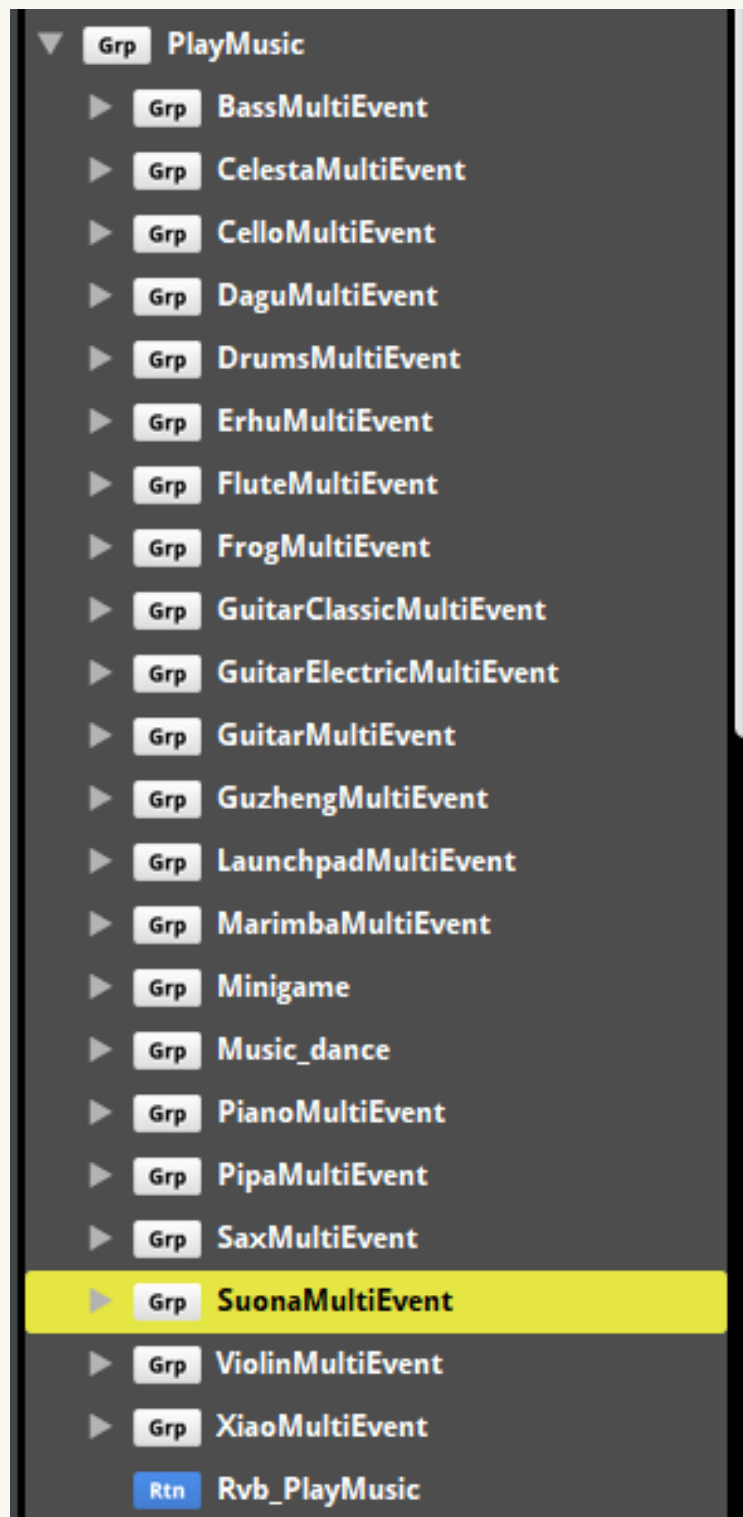


## Mixing

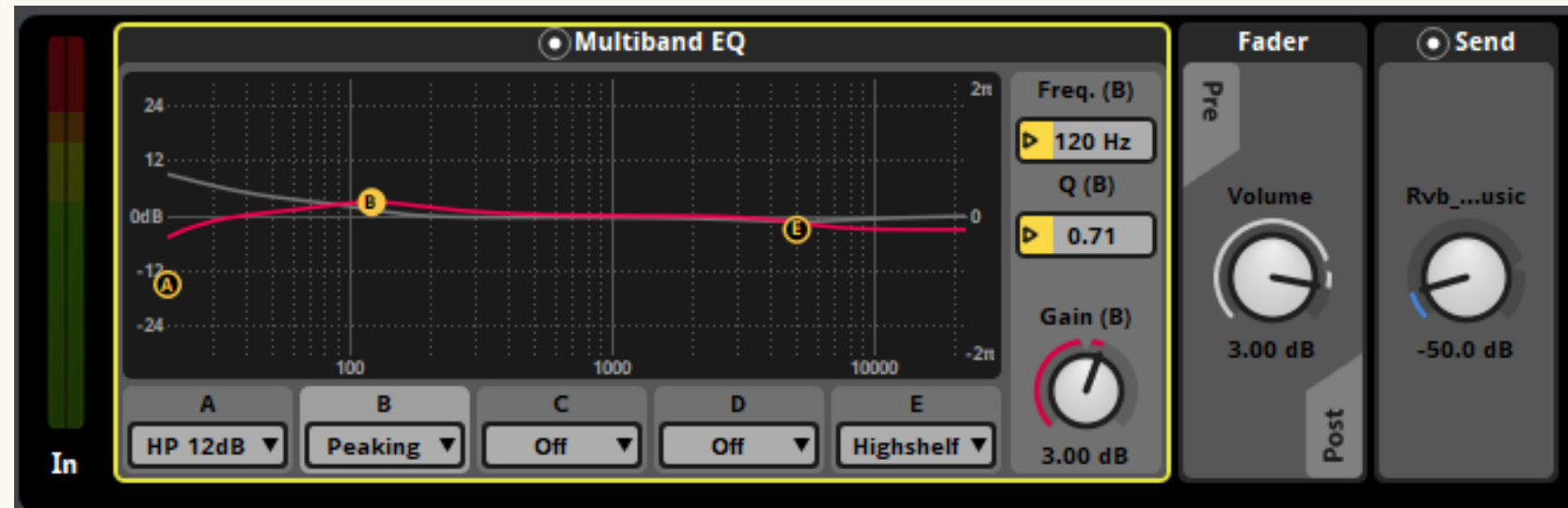
**01 Each type of instruments has its own mixing group**

**02 Pre-made reverb and EQ**

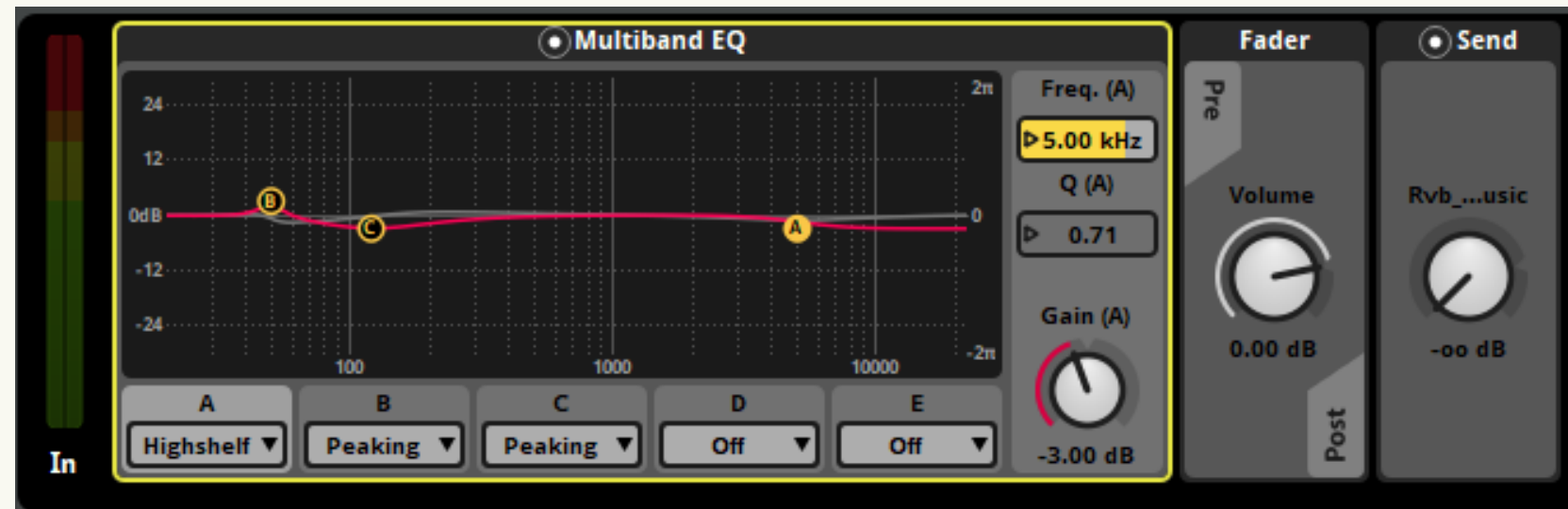




## Bass guitar pre-made EQ and reverb

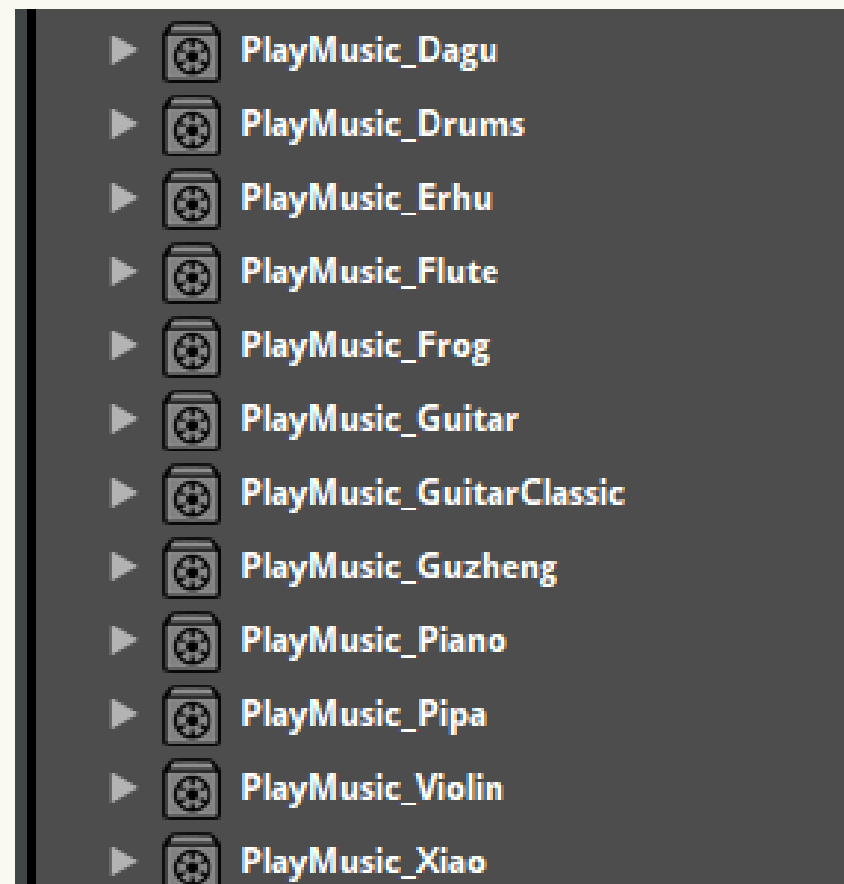


## Kick drum pre-made EQ and reverb

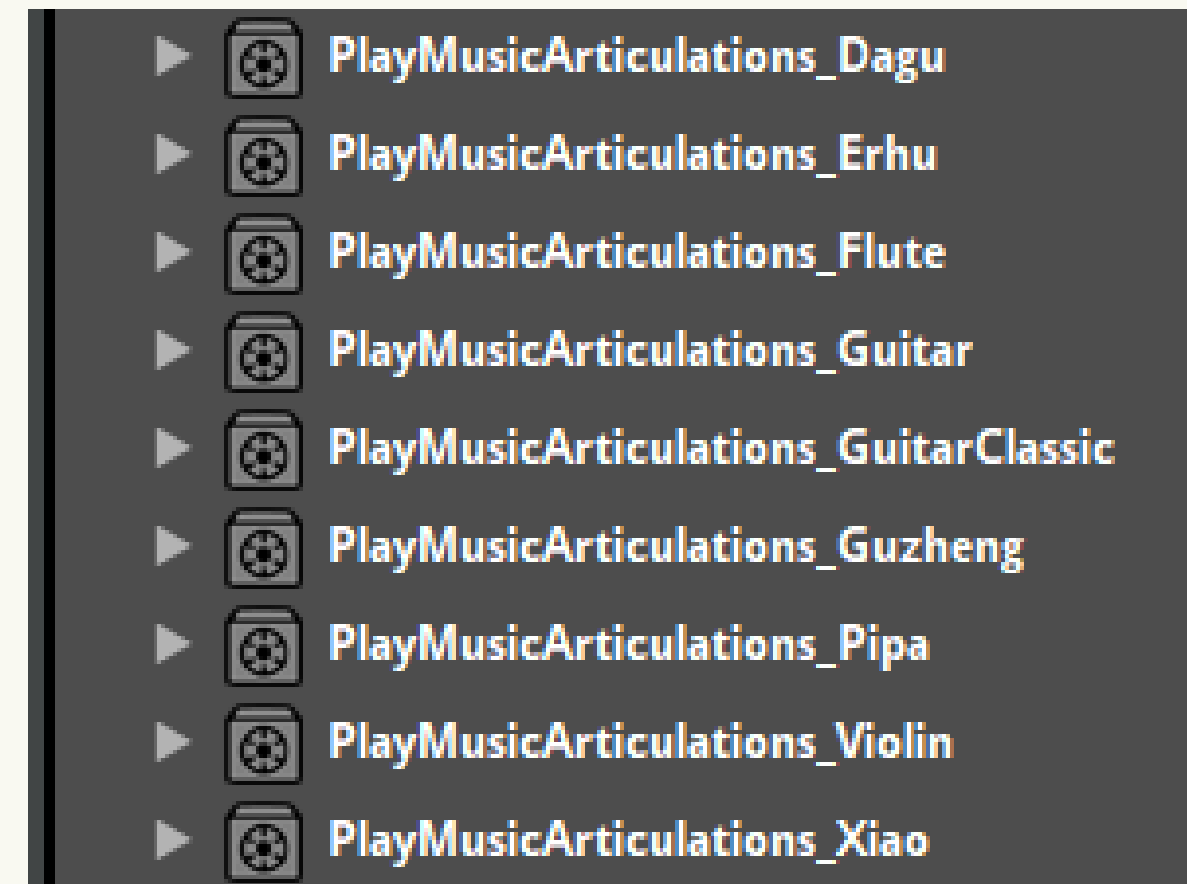


## BANKS:

01: Each instrument has its own bank



02 Each Sampled articulation has its own bank



# **07 Performance optimization & Workflow of introducing a new instrument**

**Latency**

**Band play**



## Workflow

**01 Choose a instrument**

**02 Determine sound range and Articulations by sampling**

**03 Recording**

**04 Processing**

**05 Build virtual instrument in FMOD**

**06 Test & In game mixing** ← **Release**

# Takeaway

# Takeaway

- 01** Why you could consider adding Music-making gameplay to your game?
- 02** How to achieve a high degree of freedom in Music-making gameplay.
- 03** How to build a digital audio workstation in a mobile game.
- 04** Tips on how to balance game effect and device performance.

# Thanks!