

A series of thin, black, overlapping lines forming various geometric shapes like triangles and polygons, creating a complex, abstract pattern in the upper left quadrant of the slide.

# CONF42




## HARMONIZING CODE AND MELODY

Music Agent in *action*, making electronical music in a matter of speaking!



# WHO AM I ?

- Jan Van Wassenhove 
- Lead Architect @ **Sopra Steria BeLux BL Design & Develop**
- 17+ years of working experience (private/public sector)
- Creator of the **SCRUM** Programming language



@mITy.John

Blog [mityjohn.com](https://mityjohn.com)



sopra  steria







# MUSIC AGENT

## Homegrown project

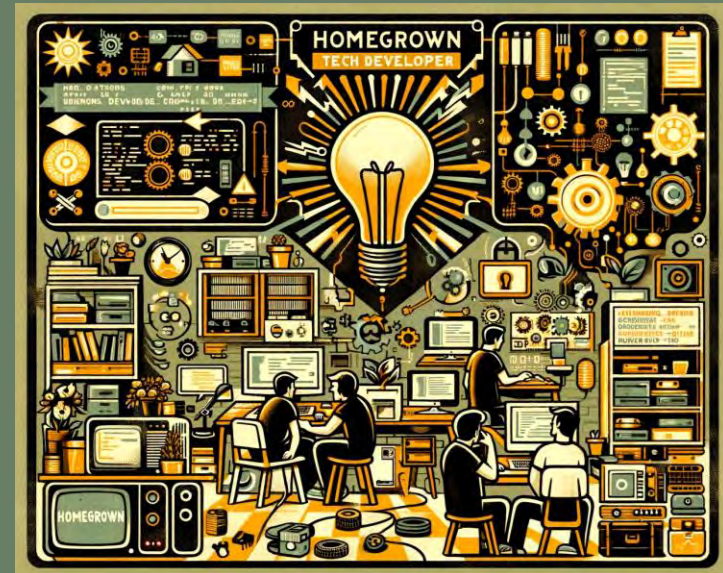
- Main coding in **Python**
- Open Source, available on GitHub

## Based on LLM & Image Model generation usage

- Using the **OpenAI or Anthropic** API's, **Langchain** for integration

## Is capable of publishing a complete new song as end result

- **Sonic Pi Song Code** (with recording)
- Integrate Audio Samples
- Album Cover
- Booklet (documentation)



# THE PROCESS OF SONG CREATION

## Songwriting

- Initial melody and lyrics creation

## Arrangements

- Structuring the song with instruments.

## Recording

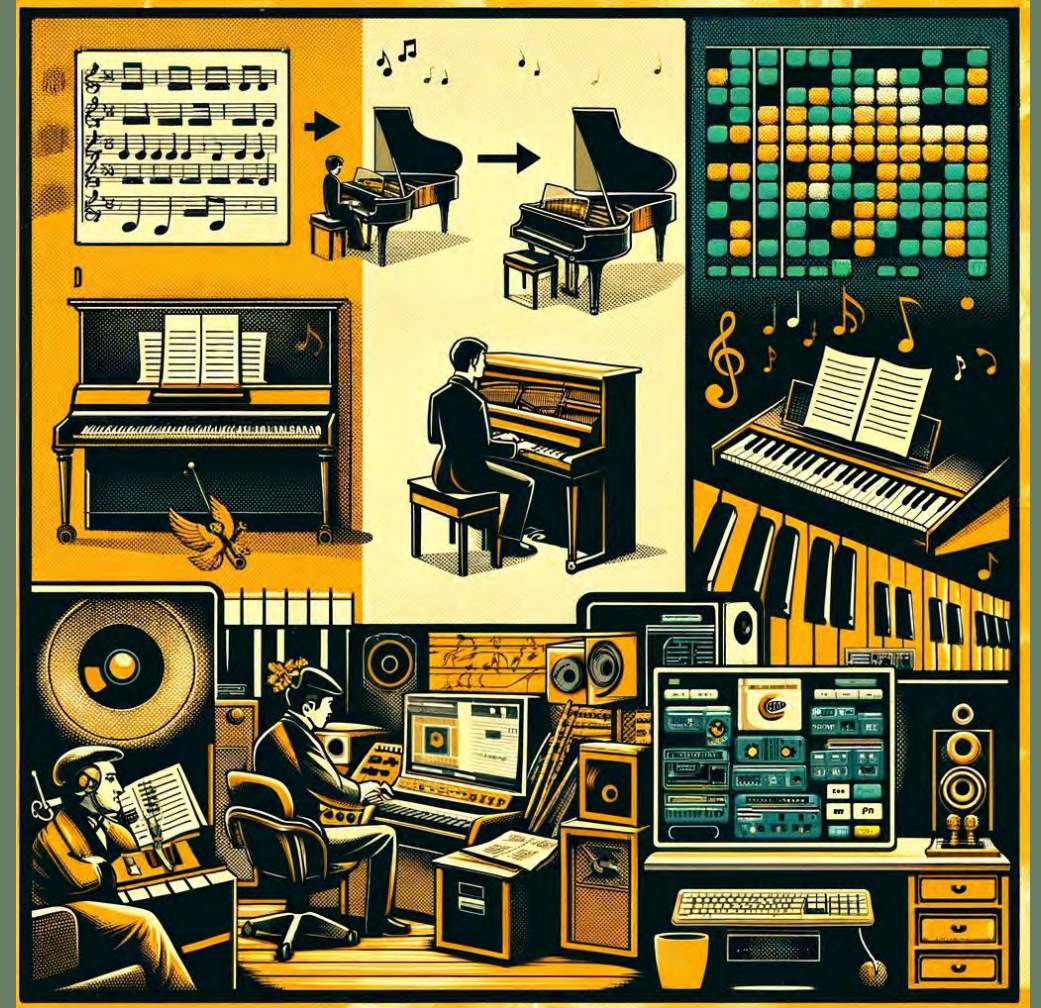
- Capturing the performance.

## Mixing and Mastering

- Final audio adjustments.

## Publishing

- Generating the final product, including album cover and technical details.





BUT HOW DO WE DO THAT WITH MUSIC AGENT?





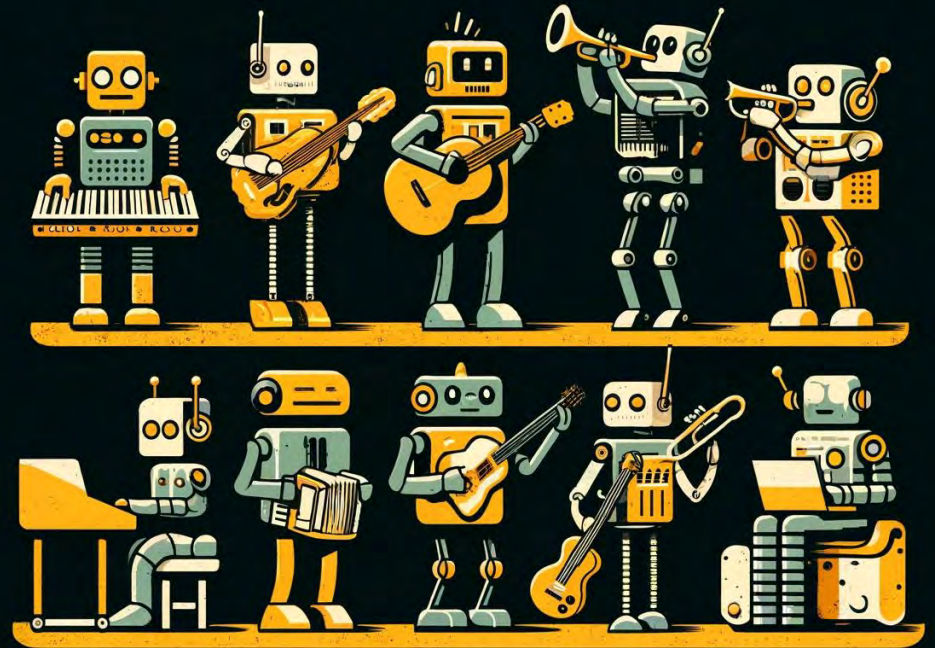
# MULTI-AGENT SYSTEMS (MAS)

## MAS

- Multiple Autonomous Agents
  - Each having **individual focus & mission**
- Interact with each other to achieve a common goal.

## Music Agent Context

- Different song component tasks (e.g., **melody**, **harmony**, **rhythm**, **sampling**, ... ) as agents
- Collaborating to create a cohesive composition



# OVERCOMING CHALLENGES



- **Technical Hurdles**

- Managing Sonic Pi's limitations
- Handling LLM usage
  - *Setting the context*
  - *Promoting the right answers*
  - *Token limitations*

- **Chaining** the agents

- Setting the conversation context

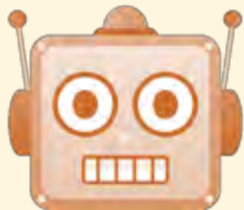
- **Model** choice

- *GPT-4o, GPT-4o-mini, claude-3.5-sonnet, ...*
- *Cost, speed, effectiveness, goal (coding, image, recording, ... )*





# MUSIC AGENT FLOW



Design Phase



Creation Phase



Mastering Phase

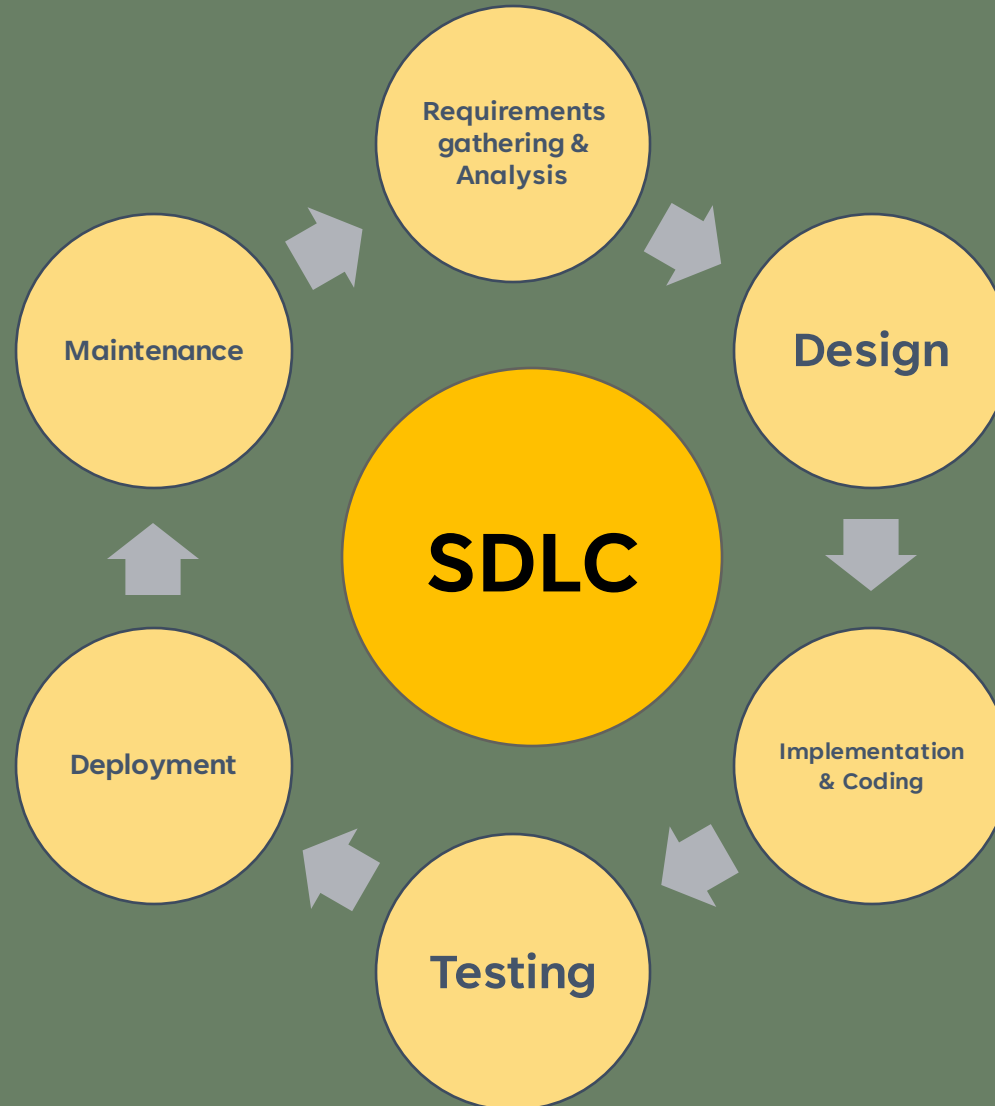


Publishing Phase





# ON A SIDENOTE, THE SOFTWARE DEVELOPMENT LIFECYCLE



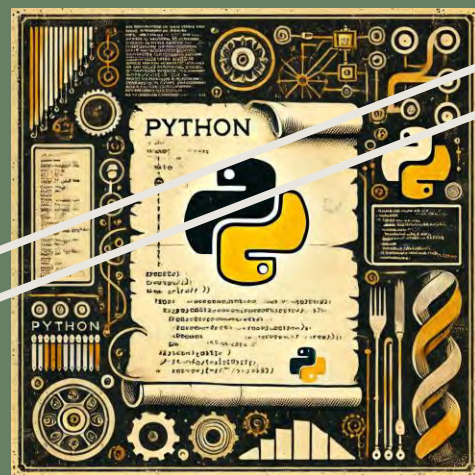


CLI



# ARCHITECTURE OVERVIEW

GUI



Configuration





# MUSIC AGENT IN PRACTICE – BASE SETUP

## ArtistConfig.json

```
...
"assistants": [
  "artist_style": " Retro & vintage using yellow, dark green, orange,
  black, white color palette.",
  {
    "Artist": [
      "You are an musical artist making electronical music with Soni PI."
    ]
  },
  {
    "Composer": [
      "You come up with an idea for a song. This idea is a theme, a
      melody and a rhythm."
    ]
  },
  ...
]
```



## MusicCreationPhaseConfig.json

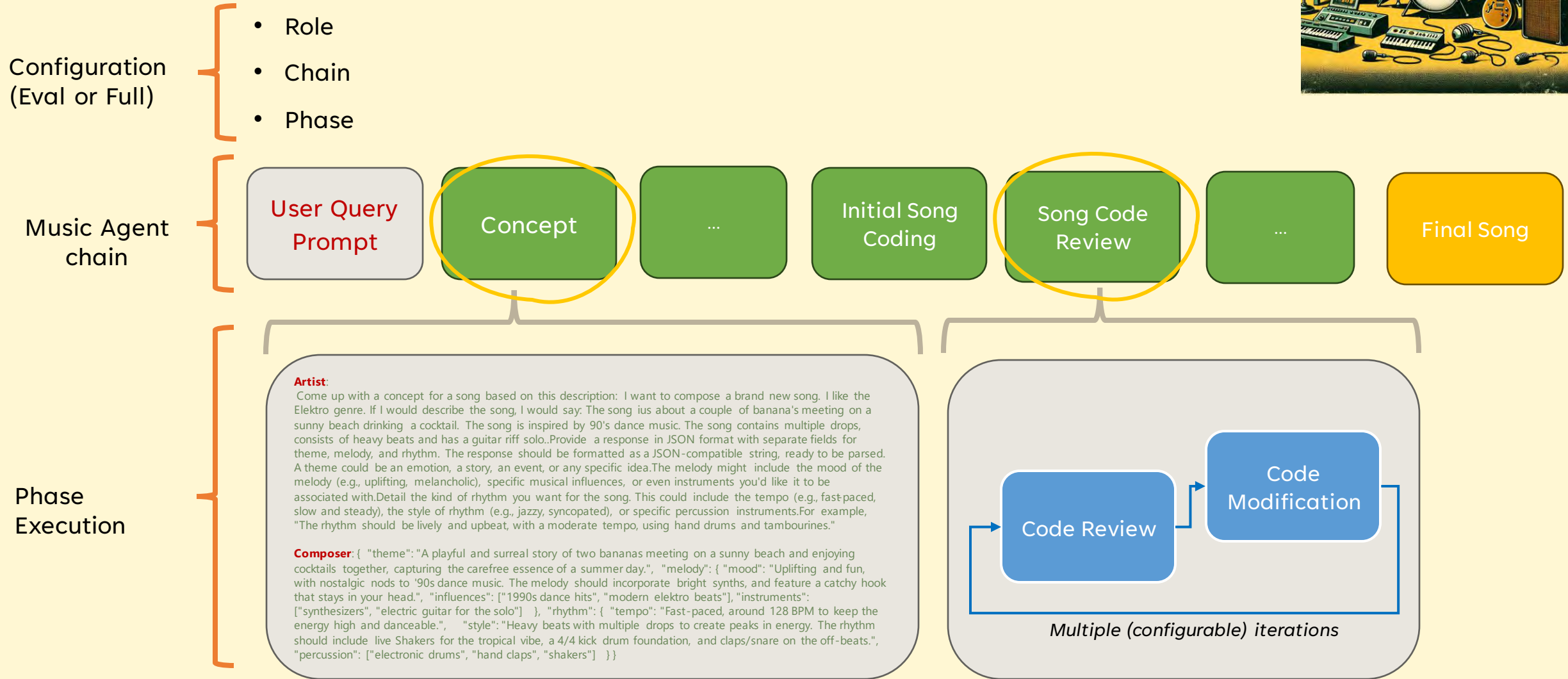
```
"Songwriting": {
  "type": "chat",
  "assistant_role_name": "Songwriter",
  "user_role_name": "Composer",
  "phase_prompt": [
    "Write me lyrics for the song with following ideas: ",
    "Theme of the song: {theme}. ",
    "Melody: {melody}. ",
    "Rhythm: {rhythm}. ",
    "Lyrics should not be single words, but wel elaborated, taking the
    structure of the song into account.", "Provide a response in JSON
    format with separate fields for lyrics and structure. The response should
    be formatted as a JSON-compatible string, ready to be parsed. ", "The
    structure of the song, can be defined like e.g. Intro - Verse - Chorus -
    Verse - Chorus - Solo - Bridge - Chorus - Outro.", "For defining the
    structure, the choice is free and should take into account the melody &
    rhythm."
  ],
  "input": {
    "theme": "theme",
    "melody": "melody",
    "rhythm": "rhythm"
  },
  "outcome": {
    "lyrics": "lyrics",
    "structure": "structure"
  }
}
```

## MusicCreationChainConfig.json

```
...
{
  "phase": "Arrangements",
  "phaseType": "SimplePhase"
},
{
  "phase": "Initial Song Coding",
  "phaseType": "SimplePhase"
},
{
  "phase": "Song Code Review",
  "phaseType": "ComposedPhase",
  "cycleNum": 5,
  "Composition": [
    {
      "phase": "Code Review",
      "phaseType": "SimplePhase"
    },
    {
      "phase": "Code Modification",
      "phaseType": "SimplePhase"
    }
  ]
},
...
```



# MUSIC AGENT IN PRACTICE- BASIC FLOW





# MUSIC AGENT IN PRACTICE – EXTENDED



Configuration

- Role
- Chain
- Phase

Music Agent chain

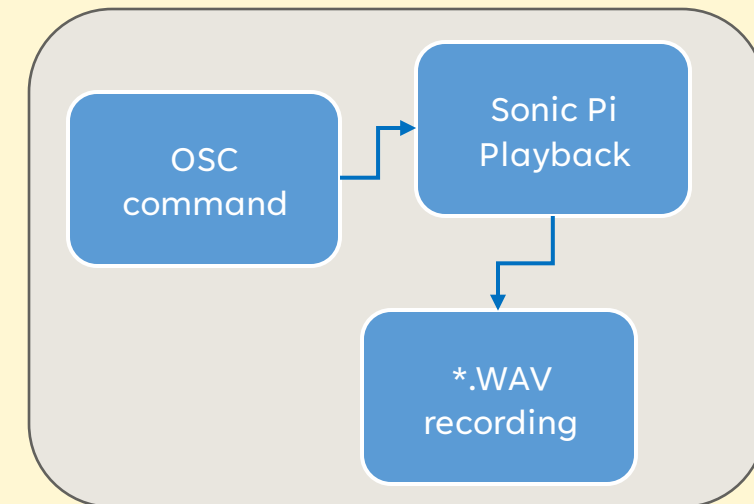
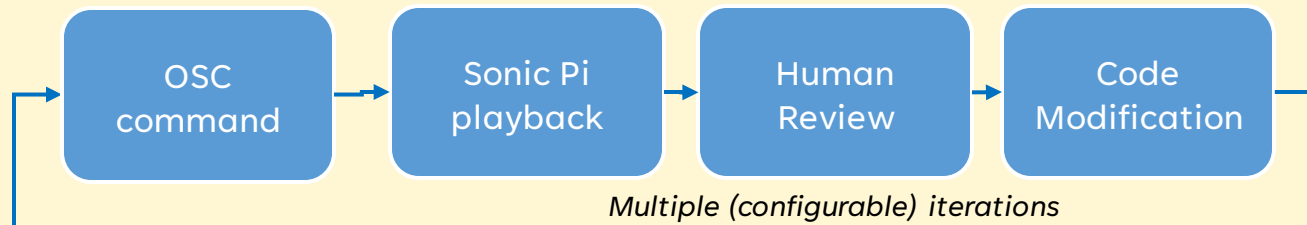


## Artist

Please provide us your remarks on the song:

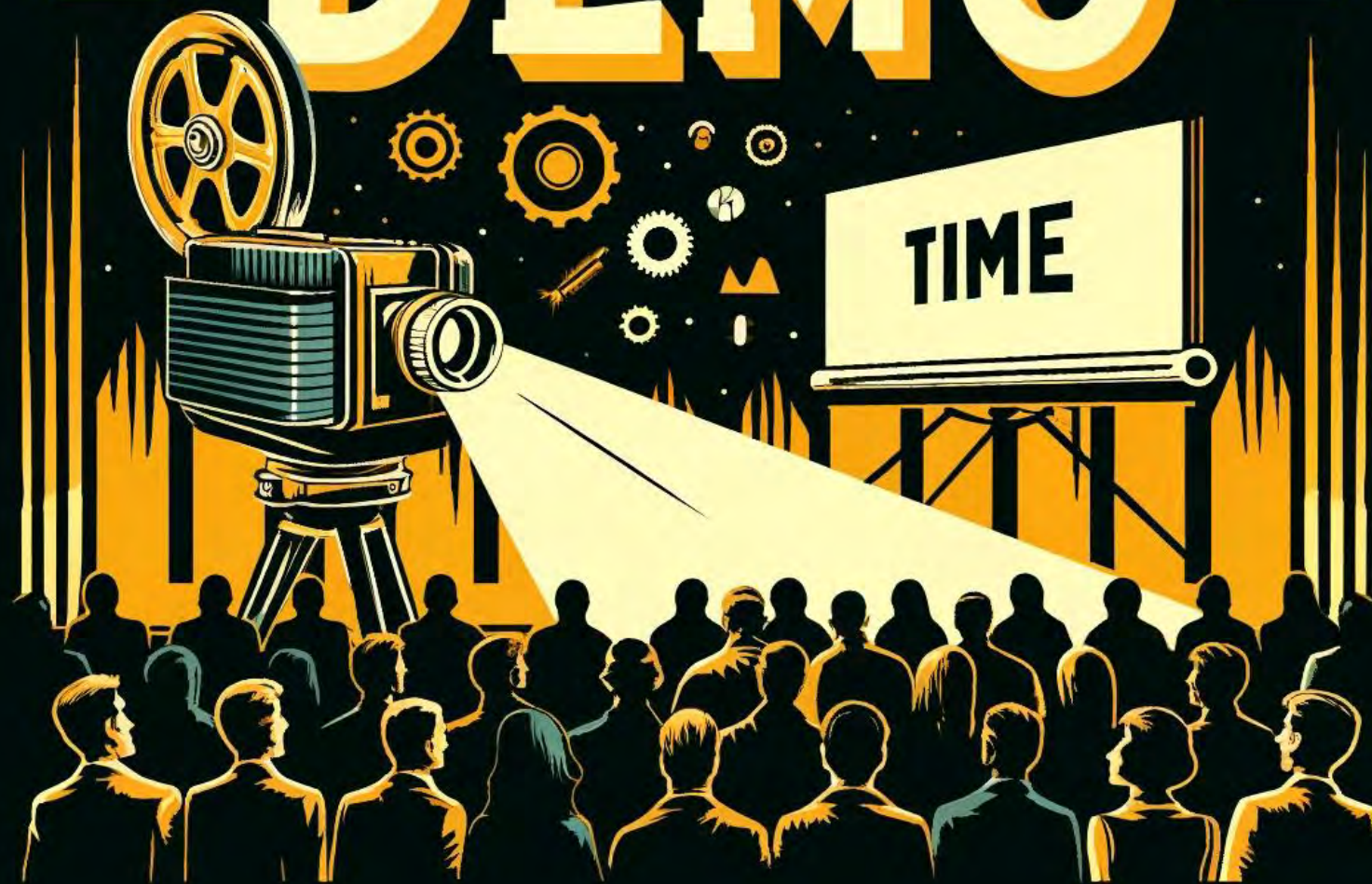
## User Input:

*I'm missing a an extra instrument, add a bridge after the second chorus*





# DEMO



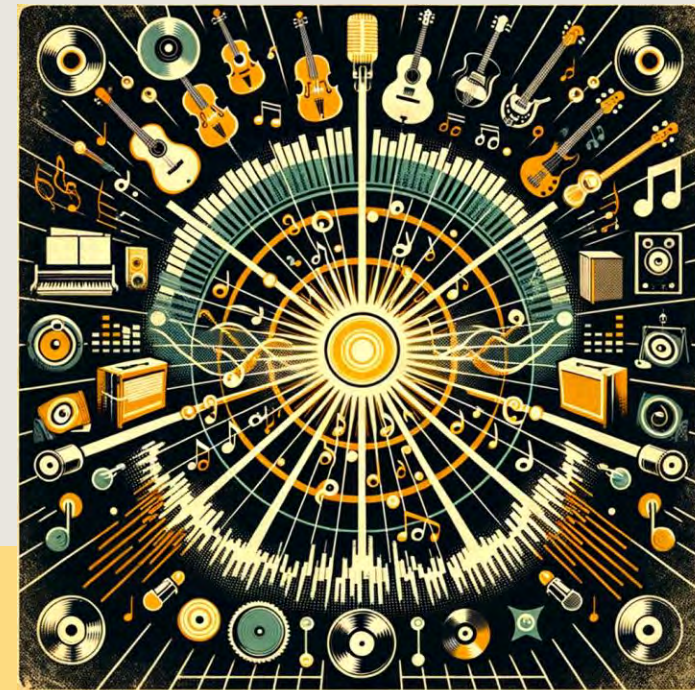




IT'S A BLOOD AND GUTS BUSINESS,  
HERE AT MY DESK, THAT REQUIRES  
SOMETHING OF ME TO INITIATE  
THE NEW AND FRESH IDEA.  
**IT REQUIRES MY HUMANNESS.**

*Nick Cave*





Code Repo

The Development Repository

<https://github.com/janvanwassenhove/MusicAgent>

Blog

<https://mityjohn.com/>

RESOURCES







# LET'S CONNECT

Jan Van Wassenhove



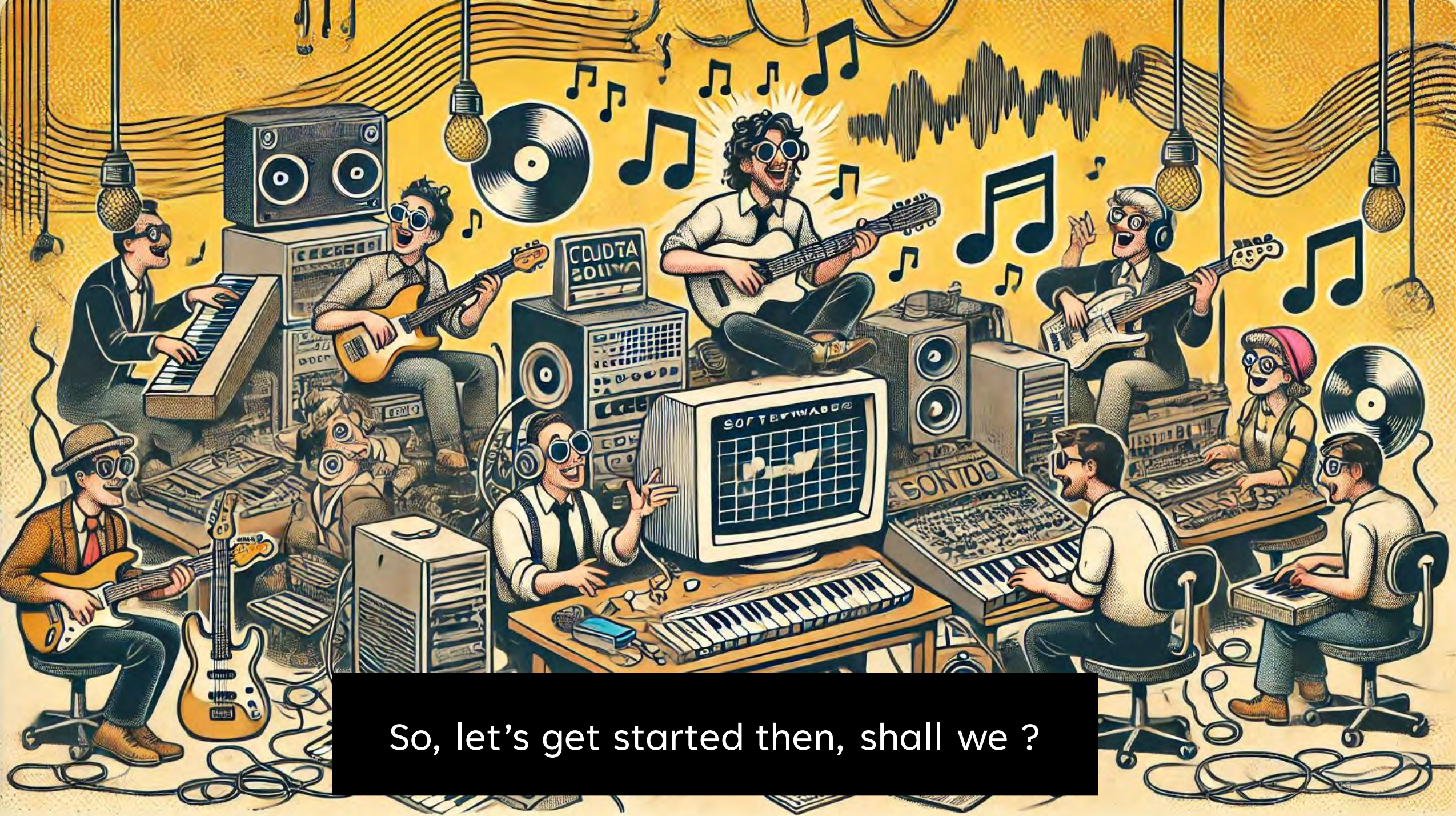
Questions?  
Just Ping Me!



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So, let's get started then, shall we ?