

# A Long, Short History of Realtime AI Agents

How to embrace LLMs for machine conversations in realtime media, both on the telephone and in a browser.

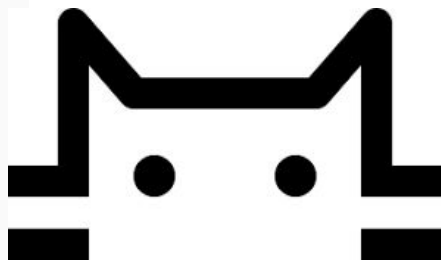


# Voice AI is cool

Open Source Voice AI is coolerer

There are many (partially) open source ways to build a voice AI

jambon3 



LiveKit

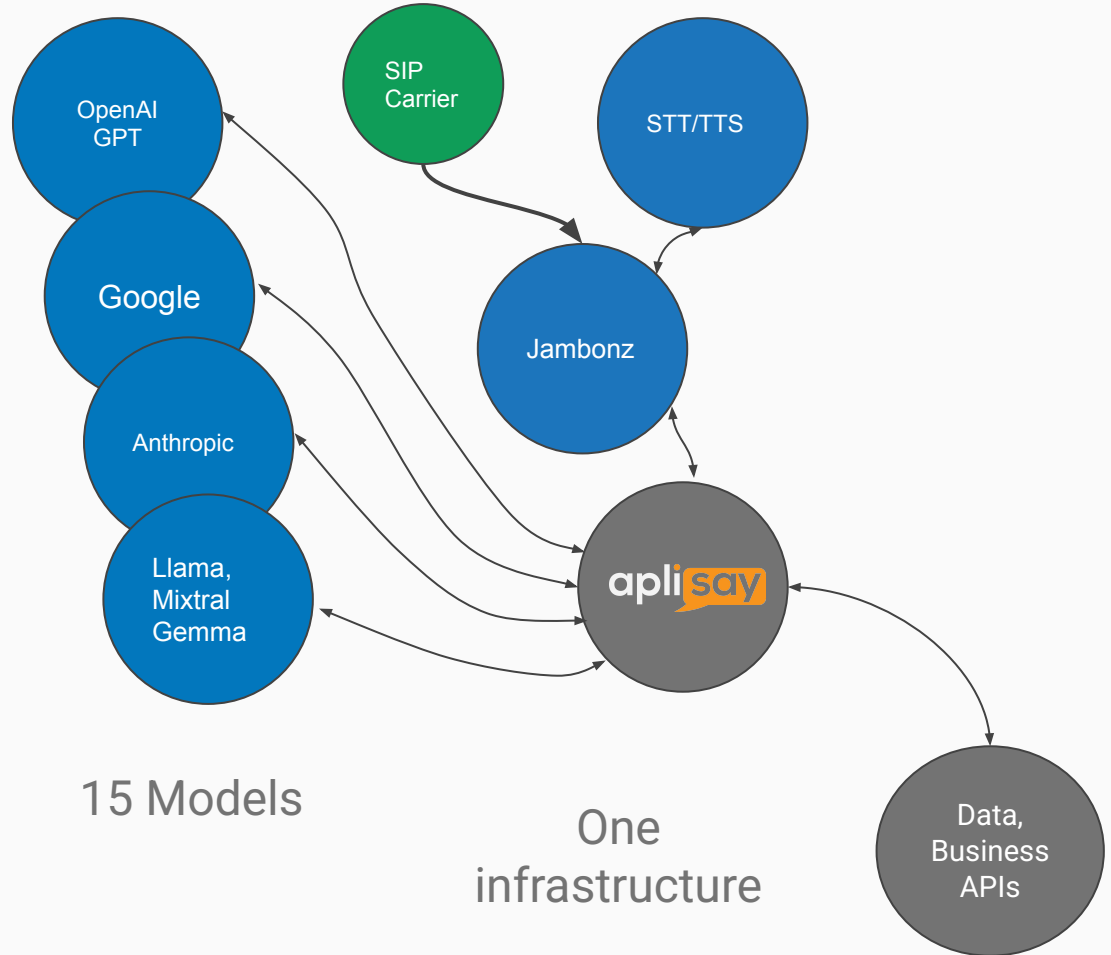


apli  say

# 2023: Building Something

Open source and leverage existing open source

Ready to be useful?





```
1 {
2   "name": "Robo EMF",
3   "description": "The agent deployed on 2102 at #EMF2024: queries APIs for village and schedule data to a
4   "prompt": {
5     "value": "You are a helpful agent, people will call and ask you questions about E M F Camp, find the
6     "changed": true,
7     "changedSinceCreate": true
8   },
9   "modelName": "openai:gpt-4o",
10  "language": "en-GB",
11  "voice": "google:en-GB-Neural2-F",
12  "functions": [
13    {
14      "implementation": "rest",
15      "name": "get_villages",
16      "description": "Search villages at emfcamp, returns all villages that contain any of the the text
17      "url": "https://emfcamp-apis-37viybmjq-nw.a.run.app/villages?search={search}",
18      "method": "get",
19      "parameters": [
20        {
21          "type": "string",
22          "name": "search",
23          "description": "A string of comma separated search terms. All results that match any search te
24        }
25      ]
26    },
27    {
28      "implementation": "rest",
29      "name": "get_schedule",
30      "description": "Get a schedule of talks and events at EMFCamp which mention a specific search stri
31      "method": "get",
32      "url": "https://emfcamp-apis-37viybmjq-nw.a.run.app/schedule?search={search}",
```

STT,  
LLM,  
TTS

Pipelines

jambon<sup>3</sup>



LiveKit



Then this happened...



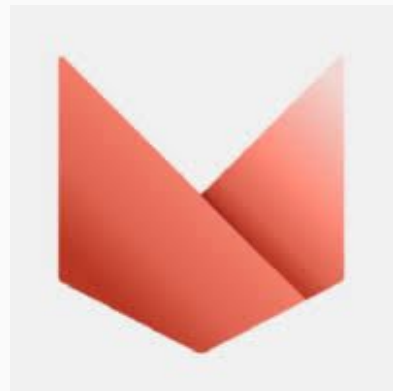
# Fixie.ai Ultravox

Lets hand over to Emily

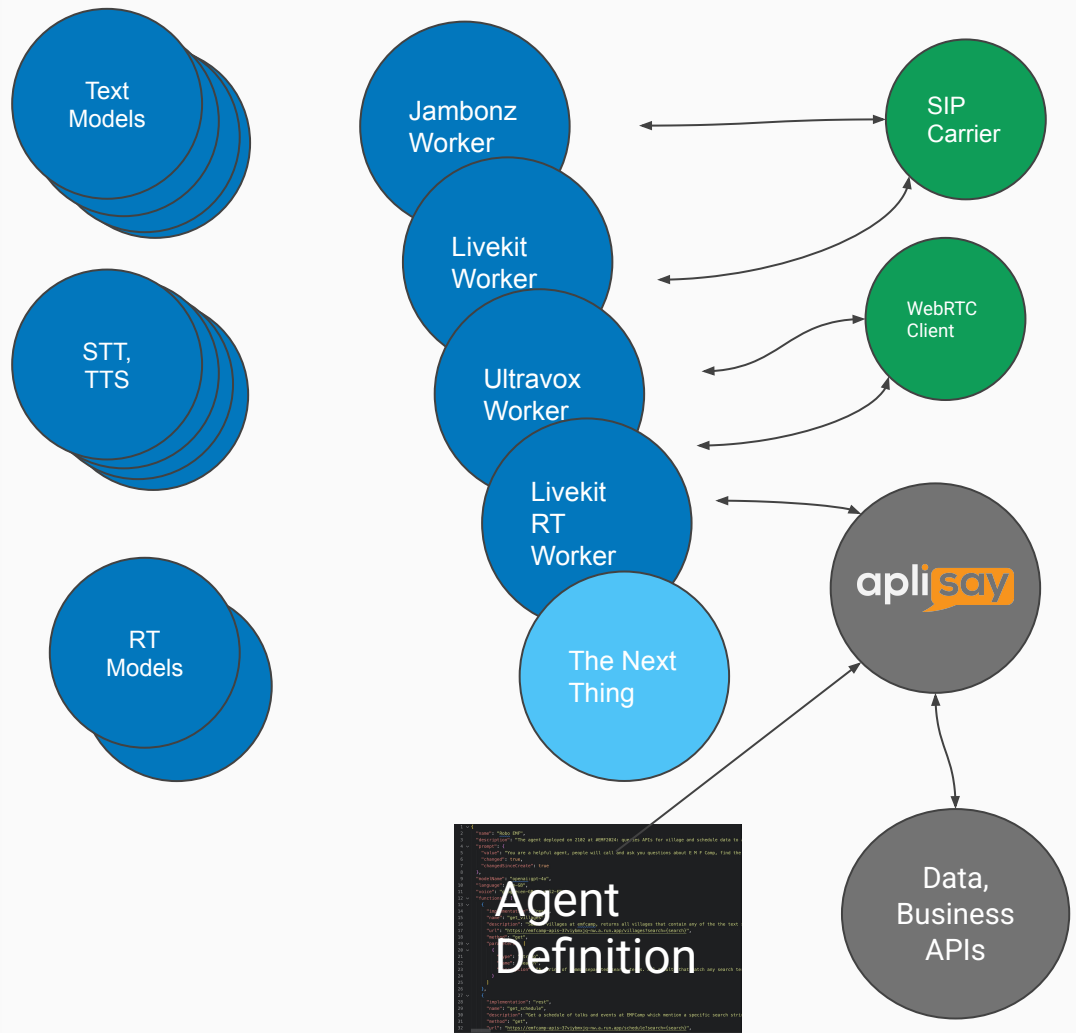
jambon3



LiveKit



# Adding Realtime Audio Models





Setting up a function call  
in the Aplsay playground.

<https://llm.aplisay.com/>

### Edit function ✕

**Function Name**  
  
Unique function name, no spaces, starts with a letter and contains only letters, numbers and underscores

**Function Description**  
  
Describes to the LLM what this function does; why it should be called. Mirror any language in prompt

Parameter Name	Type	Parameter Description	
<input type="text" value="latitude"/>	Number ↕	<input type="text" value="The latitude"/>	<input type="button" value="Delete"/>
<input type="text" value="longitude"/>	Number ↕	<input type="text" value="The logitude"/>	<input type="button" value="Delete"/>

**Implementation**  ↕    **method**  ↕    **API Key**

**URL**  
  
URL to GET, use "(parameter-name)" to expand input parameters

## Function calls in the JSON definition

```
10 "language": null,
11 "voice": "google:en-GB-News-I",
12 "functions": [
13   {
14     "implementation": "rest",
15     "name": "get_weather",
16     "description": "Get the weather at a given latitude and longitude",
17     "parameters": [
18       {
19         "type": "number",
20         "name": "latitude",
21         "description": "The latitude"
22       },
23       {
24         "type": "number",
25         "name": "longitude",
26         "description": "The logitude"
27       }
28     ],
29     "result": "The weather in {location} is warm and dry",
30     "method": "get",
31     "url": "https://api.open-meteo.com/v1/forecast?latitude={latitude}&longitude={longitude}&current=temperature_2m,apparent_temperature,precipitation,wind
32   },
33   {
34     "implementation": "rest",
35     "name": "get_lat_lon",
36     "description": "Gets a JSON structure that gives the LAT/LON for any city",
37     "parameters": [
38       {
39         "type": "string",
40         "name": "name",
41         "description": "A city name"
42       }
43     ],
44     "method": "get",
45     "url": "https://geocoding-api.open-meteo.com/v1/search?name={name}&count=1&language=en&format=json"
46   }
47 ],
48 "options": {
49   "temperature": 0.2
50 },
51 "keys": []
52 }
```

```
name": "Presentation",
description": "Follow a google presentation",
prompt": {
  "value": "You are an enthusiastic presenter called Emily, and you are going to be joining Rob in the middle of a presentation to read out the notes and content",
  "changed": true,
  "changedSinceCreate": true
},
  You, 19 hours ago • first pass
modelName": "ultravox:fixie-ai/ultravox-70B",
language": "en-US",
voice": "ultravox:Emily-English",
functions": [
  {
    "implementation": "client",
    "method": "get",
    "name": "get_current_slide",
    "description": "Gets notes and background fields for the current slide",
    "result": "{ \"notes\": \"hello, welcome to our presentation about aardvarks. Aardvarks are very interesting things as I am sure you will agree\", \"background\": \"\"}"
  },
  {
    "implementation": "client",
    "method": "get",
    "name": "get_next_slide",
    "description": "Gets notes and background material from the next slide",
    "result": "{ \"notes\": \"Anteaters are a little bit similar to aardvarks but they are not exactly the same\", \"background\": \"My co-presenter, Rob likes to eat ants\"}"
  }
],
options": {
  "temperature": 0.8,
  "tts": {
    "vendor": "ultravox",
    "voice": "Emily-English"
  }
},
keys": []
```

## Calling client side functions

```
const get_next_slide = useCallback(() => {  
  // eslint-disable-next-line react-hooks/exhaustive-deps  
  current_slide = Math.min((current_slide + 1), numSlides - 1);  
  setCurrentSlideIndex(current_slide);  
  console.log({ current_slide, numSlides }, 'next slide');  
  return JSON.stringify(slides[current_slide]);  
}, [currentSlideIndex, numSlides, slides, nextSlide]);
```

```
<AplisayWidget  
  url={url}  
  listenerId={listenerId}  
  roomKey={roomKey}  
  clientFunctions={{  
    get_current_slide,  
    get_next_slide  
  }}  
  debug={true}  
  showStatus={true}  
  open={open}  
  theme={{  
    palette: {  
      mode: "light",  
      primary: { main: "#4a90e2" },  
      background: { default: "transparent" },  
      text: { primary: "#1a1a1a" }  
    }  
  }}  
/>
```

# Questions?

## Links

<https://aplisay.com>

[@rob:matrix.org](https://twitter.com/robmatrix)

[rob@pickering.org](mailto:rob@pickering.org)



**Rob Pickering**

Internet and Real Time  
Communication Software Expert, O...



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