

# ADVANCED VoIP VOICE CHAT SYSTEM

## DOCUMENTATION

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Patch Notes:

[What's new in v1.00 update? \(2022/03/01\)](#)

- 1.0: Main Release
- Supports 4.25-5.0EA2 and not 5.0 Preview1+ which uses *MetaSounds* instead of *cues* for audio/sound.

## Description

Advanced Audio/Voice Signal Spectrum/Band Routing for Multiplayer Video Games Blueprint System in Unreal Engine with multiple devices for communication. Audio jammer with area boxes is also present.

This is a project and not a plugin

- **\*\*No Sound middleware depended e.g., FMOD, Wwise\*\***
- **\*\*100% Blueprints NO C++ required\*\***
- **\*\*Works for host & client model\*\***

## Features

Supports up to 4 players but can be extended to your needs whatever you like by adding similar code.

(Most horror Multiplayer Games have 4 survivors with 1 player as the killer (5 total) or NPC instead of actual PvP or PvE settings)

- 1) Simple VOIP Voice Chat (team/global/positional-proximity)
  - 2) Walkie Talkie VoIP Voice Chat
  - 3) Cellphone VoIP Voice Chat
- Proximity/Positional Distance Voice Chat
  - Global Voice Chat (2 Methods)
  - Team Voice Chat
  - Mute-Player/s
  - Walkie-Talkie SingleBand (mono-Frequency) + Proximity/Positional Attenuation Distance Near Player
  - Walkie-Talkie MultiBand (multi-Frequencies) + Proximity/Positional Attenuation Distance Near Player
  - Routing Voice to Speakers assets inside 3D environment aka "the singer effect" hearing live signal feedback (VOIP Audio/sound Real-time conversion to 3D Location Based sound)
  - SinglePlayer Voice Routing to Speaker Assets without the need for Multiplayer Session initiated (same as above bullet but without the session)

- Cellphone Call circuit (A player can call any other player and talk privately with proximity Audio Distance from Phone and players Position Voice)
- No engine modifications, ready to use.

### **Cellphone 2 Categories**

Circuit Information on the player (Data in the memory of the Player)

Circuit Information on the phone (Data in the SIM card of the phone)

Walkie-Talkie States:

- OFF (no receive no broadcast)
- ON (receive but no broadcast)
- ON (receive and broadcast)

### **Cellphone States:**

- OFF
- ON
- ON + Receive Call to answer (Circuit-Setup) + Busy Circuit if on call already
- ON Make Call to a certain Player (Circuit-Setup) + Busy Circuit if on call already

### **Frequencies:**

- A player can pick a Frequency FM and only in that Frequency can talk to other players with synched same Hz

### **Additional mechanics:**

- Multiplayer LAN Session Client-Server
- Pickup/Drop Actor System
- Locomotion States
- NPC A.I Detection by Hearing for testing
- Niagara Visualizer Audio Spectrum/Band-freq Analysis/Response Waveform kinetics
- Basic Graphics Quality Settings

- Team Selection Screen
- Walkie-Talkie Screen Emission on different states
- Player Name-Tags with proper repNotify for late join-games
- Works on Late join-games as well without interruption to new or old players
- Cellphone + Walkie-Talkie SoundFX + Calling/Dial RingTones + Areas Boxes (no event Tick! but Live update between switching while talking) with Signal Audio Attenuation Low Bar quality/static Noise and Signal Corruption (ideal for Horror Multiplayer Games e.g., Attach it on areas or Enemys when nearby your Audio will get low quality while talking with others or even complete noise static corruption From Both Receiver/s and Sender/s Perspective while other players remain untouched to signal degradation - yes evil presence interrupts comms :) )
- Volume/Mic Input/Output Sensitivity Adjust
- 2D/3D Sound
- Compatible with any UE4 Online Subsystem using UE4 standard network API (RPC, replicated variables/RepNotifies)
- Cross-Platform

## Usage

You should migrate the project if you want to use it in your one or test it in the current.

The project uses custom modes.

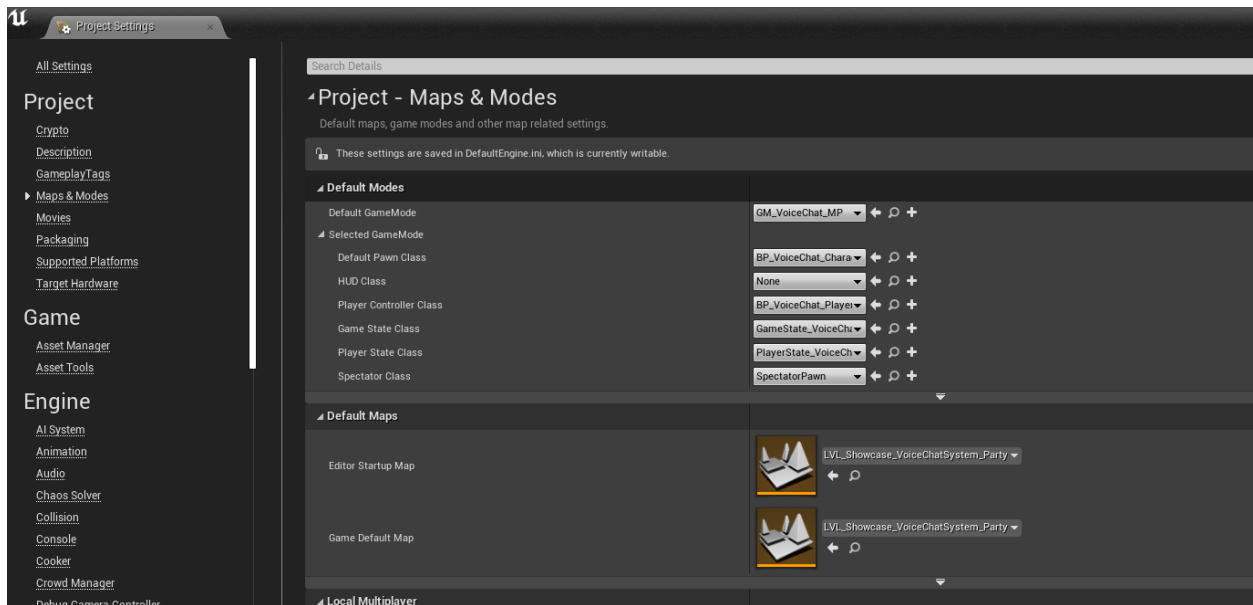


Figure 1 Custom Modes in Project Settings

## Project Config File

In order for real time audio to work these project config files has been modified:

1. Go to your UE4 project folder, see *Config/DefaultEngine.ini*
2. Lines Added:
  - a. **[Voice]**
  - b. **bEnabled=true**
3. Lines Added:
  - a. **[OnlineSubsystem]**
  - b. **DefaultPlatformService=null**
  - c. **bHasVoiceEnabled=true**
4. Go to your UE4 project folder, see *Config/DefaultGame.ini*
5. Lines Added:
  - a. **[/Script/Engine.GameSession]**
  - b. **bRequiresPushToTalk=true**

If you use Steam for your game, use **DefaultPlatformService=Steam** instead **DefaultPlatformService=Null**

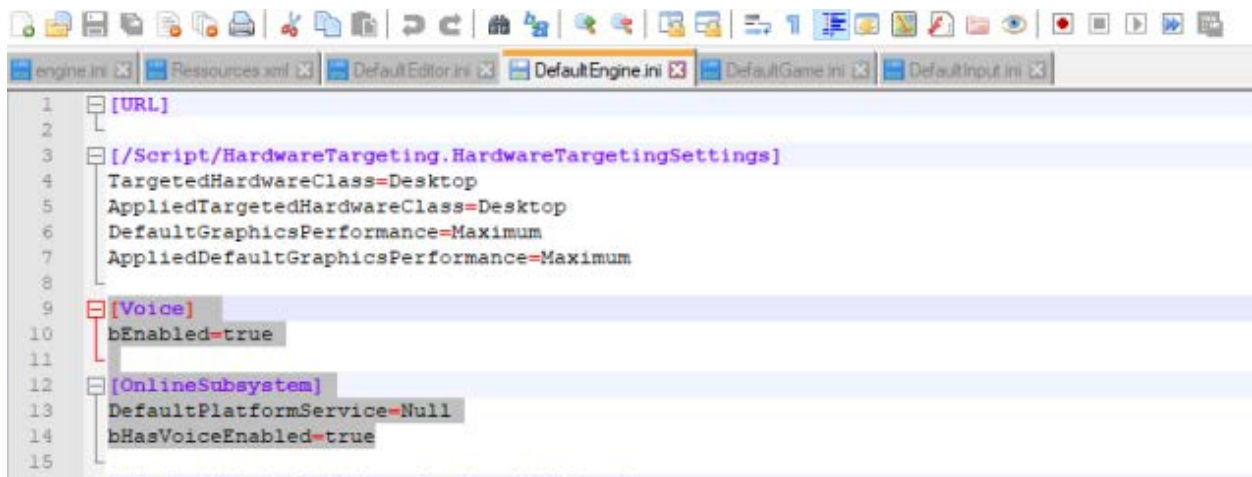


Figure 2 Example Layout of config edit files

## Example Build Project

Google Drive Link:

## Optimization

Boost Volume

In **Audio Project Settings** set a Sound Class for **VoIPSoundClass**

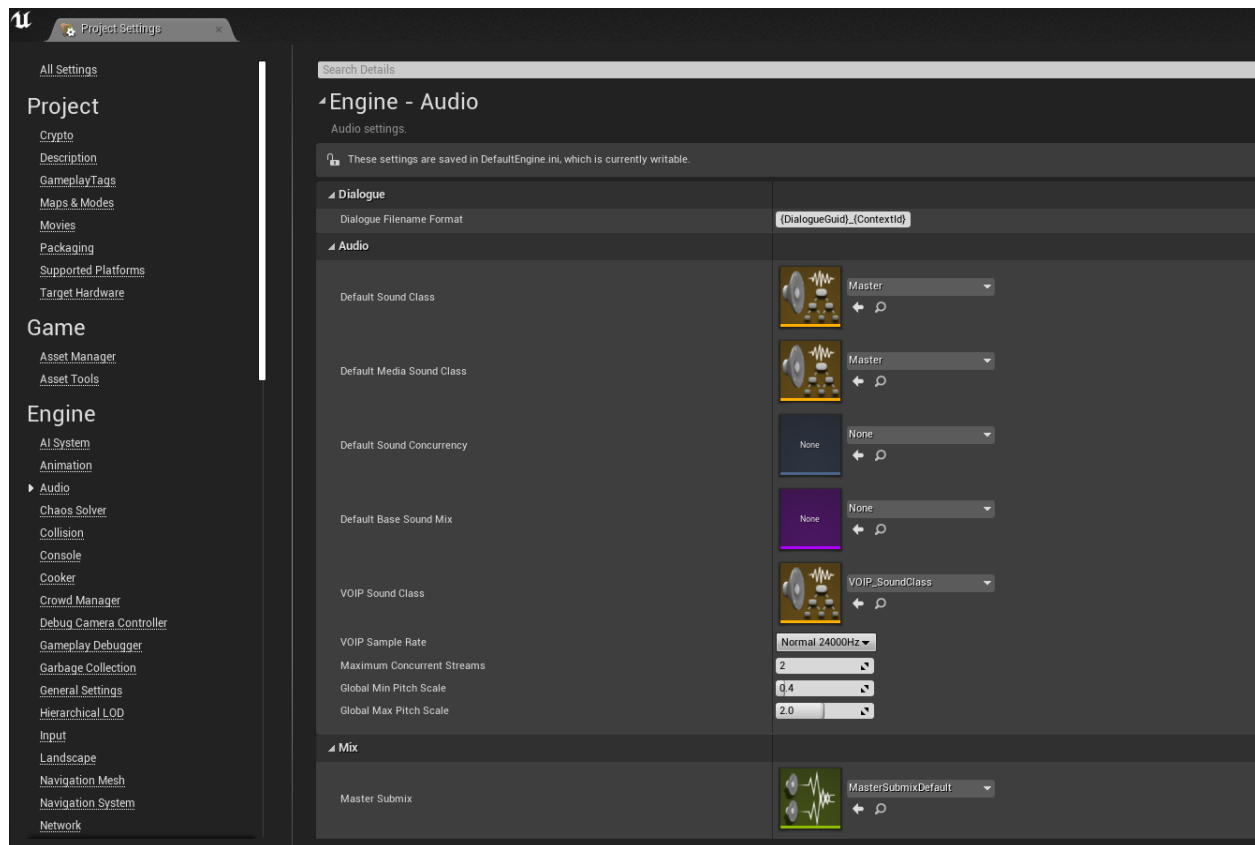


Figure 3 Boost Volume via Sound Class which already included in the project

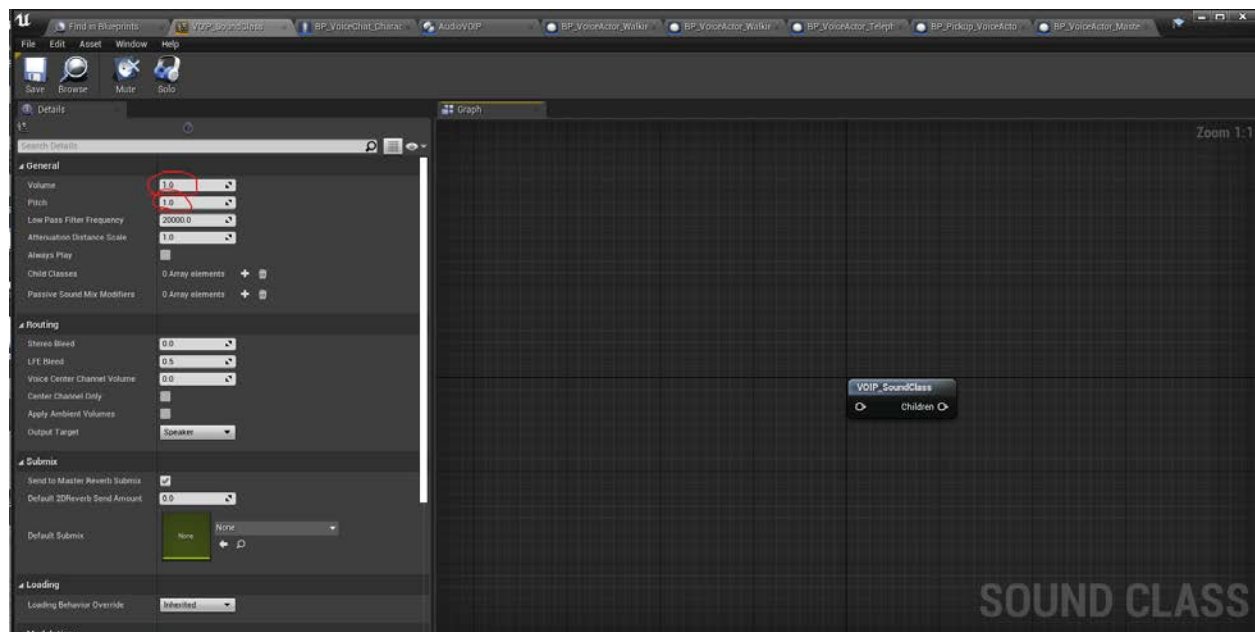


Figure 4 Boost Volume through Sound Class

You could also boost volume through Audio Components inside actors for a specific boost.

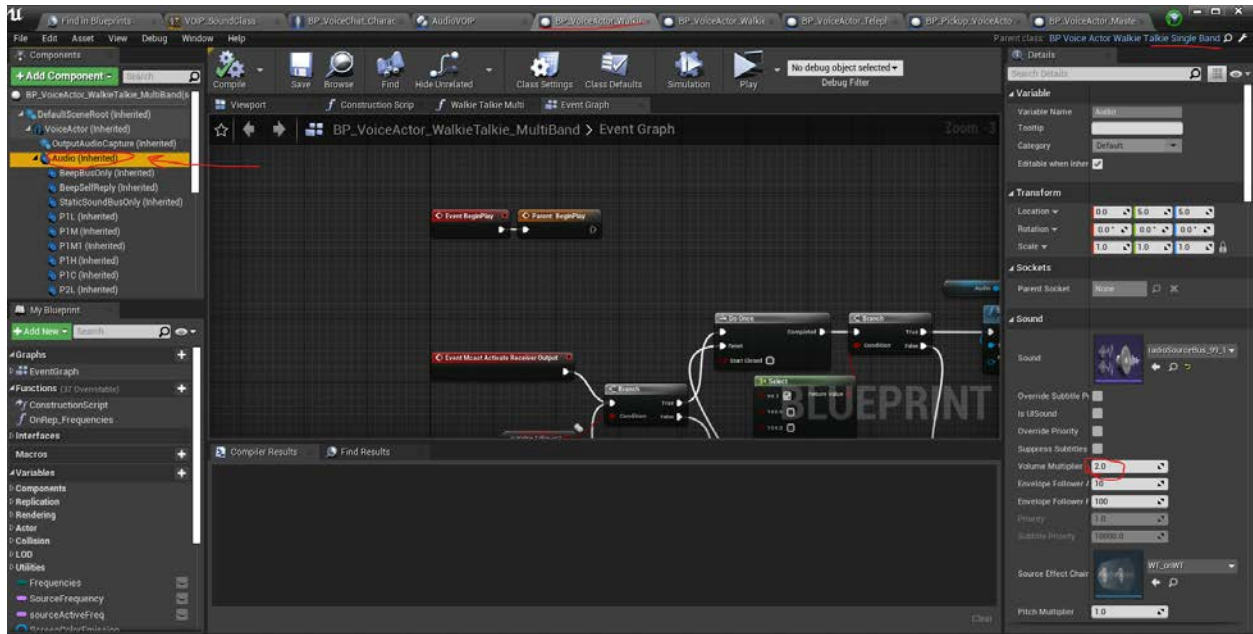


Figure 5 Boost Specific Volume only and not overall

## Change Audio Settings

In **Audio Project Settings** you can adjust **VoIP** values, if your VoIP is stuttering, increasing the buffering delay might help but make VoIP less responsive. You can increase the VoIP quality by increasing **VoIP Sample Rate**. If you get a warning message about too many streaming, you should increase **Maximum Concurrent Streams**.

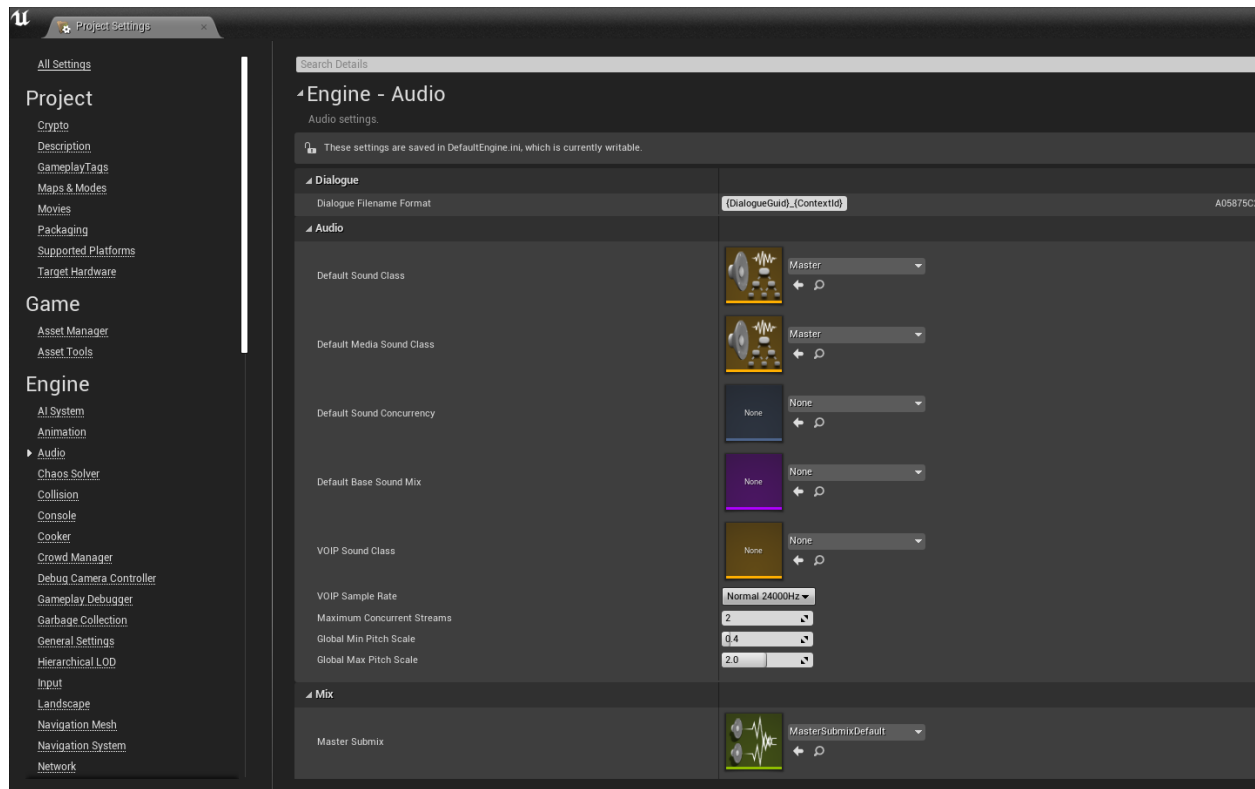


Figure 6 Project Audio Settings

## Boost The Network (Advanced)

By default, and to avoid saturating the network, Unreal Engine allows a bandwidth of 32 kb/s to be shared between all connections to the server. This limit is sufficient for gameplay information but is a bit limited to allow Voice Chat of sufficient quality. Fortunately, these values can be configured (Values found empirically, it will be necessary to look in more detail at the engine code to understand exactly who does what!)

It is highly recommended to setup your project to fit your network bandwidth needs, otherwise you can expect stutter, packet drops. An example of project settings configuration I use:

In **DefaultGame.ini**

**[/Script/Engine.GameNetworkManager]**

**TotalNetBandwidth=4000000**

**MaxDynamicBandwidth=100000**

**MinDynamicBandwidth=40000**



In **DefaultEngine.ini**

**[/Script/Engine.Player]**

**ConfiguredInternetSpeed=500000**

**ConfiguredLanSpeed=500000**

**[/Script/OnlineSubsystemUtils.IpNetDriver]**

**MaxClientRate=100000**

**MaxInternetClientRate=100000**

**MaxInternetClientRate** is the cap set by the server while **ConfiguredInternetSpeed** is the limit the client set on itself. The lowest value is the one that is being used.